

THE STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD CONSTRUCTION DETAILS

DESIGN VALUES ARE PRESENTED IN THIS DOCUMENT IN BOTH METRIC AND U.S. CUSTOMARY UNITS AND WERE DEVELOPED INDEPENDENTLY WITHIN EACH SYSTEM. THE RELATIONSHIP BETWEEN THE METRIC AND U.S. CUSTOMARY VALUES IS NEITHER AN EXACT (SOFT) CONVERSION NOR A COMPLETELY RATIONALIZED (HARD) CONVERSION. THE METRIC VALUES ARE THOSE THAT WOULD HAVE BEEN USED HAD THIS DOCUMENT BEEN PRESENTED EXCLUSIVELY IN METRIC UNITS; THE U.S. CUSTOMARY VALUES ARE THOSE THAT WOULD HAVE BEEN USED IF THIS DOCUMENT HAD BEEN PRESENTED EXCLUSIVELY IN U.S. CUSTOMARY UNITS. THEREFORE, THE USER IS ADVISED TO WORK COMPLETELY IN ONE SYSTEM AND NOT ATTEMPT TO CONVERT DIRECTLY BETWEEN THE TWO.

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)
(2013) - 1		GUARDRAIL END TREATMENT, TYPE 1
(2013) - 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)
(2013) - 1		GUARDRAIL OVER CULVERTS, TYPE 1-31
(2013) - 2		GUARDRAIL OVER CULVERTS, TYPE 2-31
(2013) - 3		GUARDRAIL OVER CULVERTS, TYPE 3-31
B-4 (2012)	–	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
(2012) - 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)
(2013) - 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
(2012) - 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)
(2012) - 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)
(2013) - 1 GUARDRAIL OVER CULVERTS, TYPE 1-27
(2013) - 2 GUARDRAIL OVER CULVERTS, TYPE 2-27
(2013) - 3 GUARDRAIL OVER CULVERTS, TYPE 3-27
B-17 (2010) – GUARDRAIL END TREATMENT (TYPE 4-27)
B-18 (2010) – CURVED GUARDRAIL SECTION
B-19 (2012) – 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 – P.C.C. CURB AND INTEGRAL P.C.C. CURB & GUTTER
(2013) - 1 P.C.C. CURB, TYPICAL CURB SECTION, AND TYPICAL TAPER SECTION AT NOSE OF MEDIANS
(2012) - 2 INTEGRAL P.C.C. CURB & GUTTER
C-2 – CURB RAMPS
(2013) - 1 TYPE 1
(2013) - 2 TYPE 2, 3, AND 4
(2013) - 3 TYPE 5
C-3 (2012) – ENTRANCES
C-4 (2012) – CURB OPENING DETAILS
C-5 (2011) – CURB OPENING WITH SIDEWALK DETAIL

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-R (2012) – DRAINAGE INLET REFERENCE SHEET
D-4 (2009) – INLET BOX DETAILS
D-5 – DRAINAGE INLET DETAILS
(2010) - 1 DRAINAGE INLET ASSEMBLY
(2010) - 2 DRAINAGE INLET FRAME AND GRATES
(2012) - 3 DRAINAGE INLET TOP UNITS
(2010) - 4 DRAINAGE INLET COVER SLAB DETAILS
(2010) - 5 DOUBLE INLET COVER SLAB DETAILS
(2012) - 6 34" x 24" DRAINAGE INLET AND COVER SLAB DETAILS
(2010) - 7 34" x 18" 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 – MAHOLE 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 (2011) – 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 – RESERVED
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 (2012) – 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 (2011) – RIGHT-OF-WAY MONUMENTATION
M-3 (2013) – SHARED-USE PATH & SIDEWALK DETAILS
M-4 (2011) – BIKE RACK LAYOUT DETAILS
M-5 (2004) – WOOD RAIL FENCE
M-6 (2011) – PATTERNED HOT-MIX OR CONCRETE & BRICK PAVER DETAILS
M-7 (2006) – CHAIN LINK FENCE DETAILS
M-8 (2007) – P.C.C. PARKING BUMPER
M-9 – BUS STOP PAD DETAILS
(2013) - 1 BUS STOP PAD DETAILS, TYPES 1, 2, & 3
(2013) - 2 BUS STOP PAD WITH SHELTER DETAILS, TYPES 1 & 2

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 (2012) – BUTT JOINTS
P-4 (2013) – PERMANENT CROSS-ROAD PATCH OVER PIPE TRENCH DETAIL

SECTION VIII - TRAFFIC

SHEET NO.	NAME
T-1	– CONDUIT JUNCTION WELLS
(2013) - 1	TYPE 1
(2013) - 2	TYPE 4
(2013) - 3	TYPE 5
T-2 (2011)	– JUNCTION WELL, GROUNDING & BONDING FOR STEEL FRAMES & LIDS
T-3	– CONDUIT JUNCTION WELLS
(2013) - 1	TYPE 11
(2012) - 2	TYPE 14
(2012) - 3	TYPE 15
T-4	– CABINET BASES
(2013) - 1	TYPES M & F
(2013) - 2	TYPE "P & R"
T-5	– POLE BASES
(2013) - 1	ROUND BASE & ROUND BASE WITH SQUARE FOUNDATION HEADER
(2013) - 2	TYPICAL SECTION AND INSTALLATION (BASES 1, 2, 2A, 2B, 3, 3A, AND 3B)
(2013) - 3	TYPICAL SECTION (BASES 6) AND POLE BASE DATA CHART
(2013) - 4	TYPICAL SECTION (BASE 4A AND 4B) AND ANCHOR DETAIL
T-6 (2011)	– SPECIAL POLE BASE
T-7 (2005)	– SIGN FOUNDATION
T-8	– LOOP DETECTOR LEAD-IN WIRE INSTALLATION
(2013) - 1	JUNCTION WELL BEHIND CURB OR CURB AND GUTTER WITH GRASS STRIP
(2013) - 2	JUNCTION WELL BEHIND CURB OR CURB & GUTTER WITH SIDEWALK AND JUNCTION WELL DIRECTLY BEHIND CURB OR CURB & GUTTER
(2013) - 3	JUNCTION WELL IN CONCRETE ISLAND
(2013) - 4	JUNCTION WELL WITHOUT CURB OR CURB & GUTTER WITH SIDEWALK AND GRASS STRIPS AND JUNCTION WELL DIRECTLY ADJACENT TO PAVED SURFACE
T-9	– LOOP DETECTOR INSTALLATION
(2013) - 1	LOOP DETECTOR SAWCUT TYPICAL, HOT MIX SURFACE TYPICAL SECTION, AND SPLICE KIT
(2013) - 2	TYPICAL INTERSECTION LAYOUT
(2013) - 3	PEDESTRIAN CROSSING TYPICAL LAYOUT
T-10	– **DETAIL REMOVED IN 2012 REVISION**
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 (2013)	– CONDUIT JUNCTION WELL, TYPE 7
T-14	– EMERGENCY PREEMPTION RECIEVER
(2006) - 1	UPRIGHT MOUNT
(2005) - 2	INVERTED MOUNT
T-15 (2013)	– BREAKAWAY SIGN POST AND PIN ASSEMBLY DETAILS
T-16 (2010)	– WOOD BARRICADE DETAILS
T-17 (2013)	– ELECTRICAL SERVICE PEDESTAL - LIGHTING, SIGNAL & 'ITMS' COMPONENT INSTALLATIONS

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

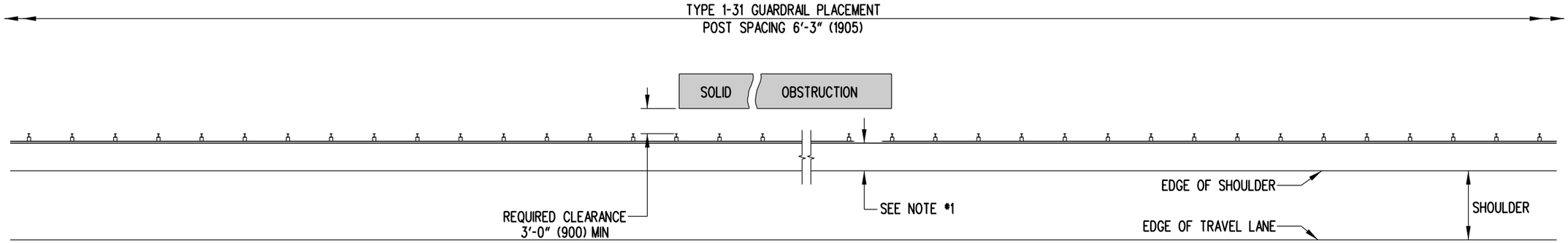
STANDARD NO. B-L (2010) | SHT. 1 OF 1

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

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

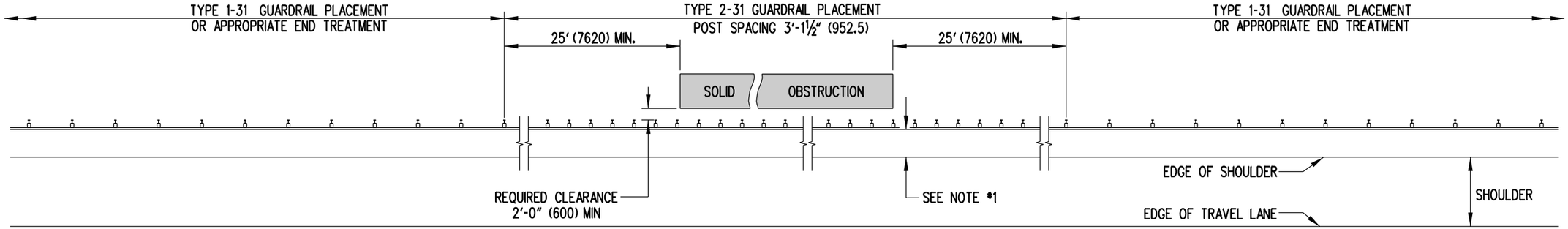
12/6/2010

SCALE : N.T.S.



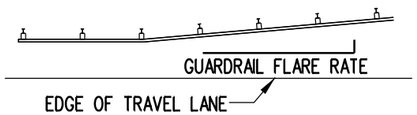
TYPE 1-31 GUARDRAIL

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

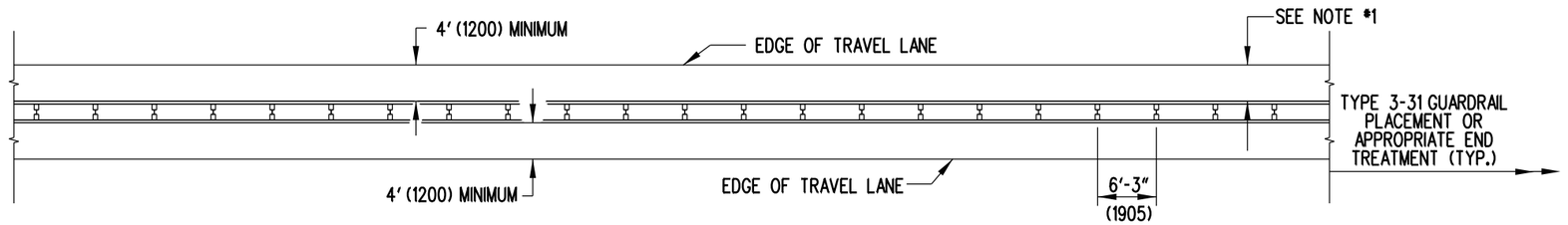


TYPE 2-31 GUARDRAIL

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

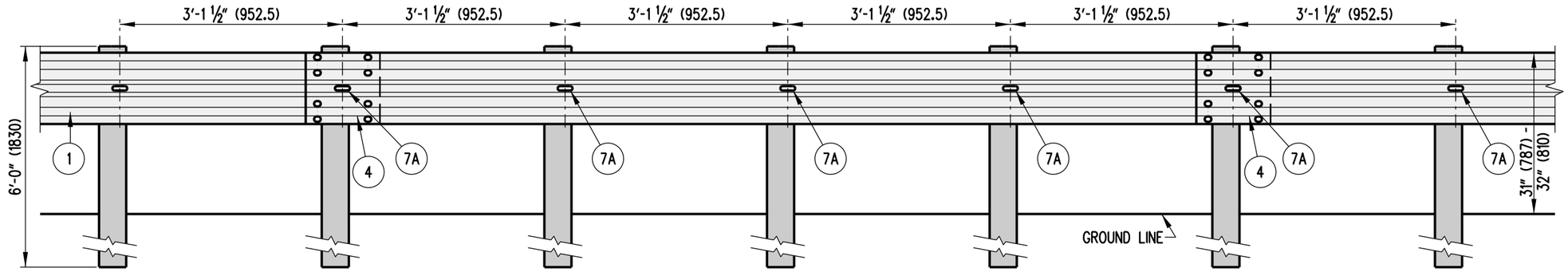
STANDARD NO. B-1 (2010) | **SHT. 1 OF 3**

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

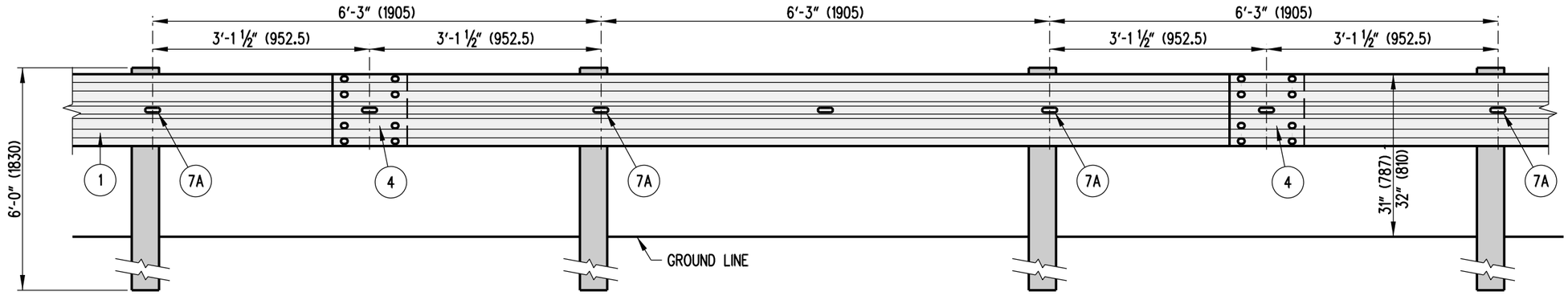
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

12/6/2010

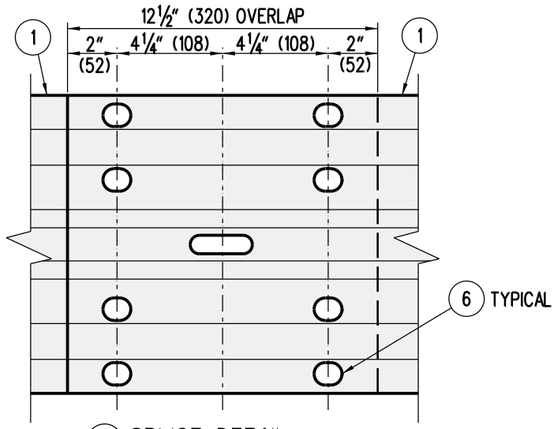
SCALE : N.T.S.



TYPE 2-31



TYPE 1-31 OR 3-31



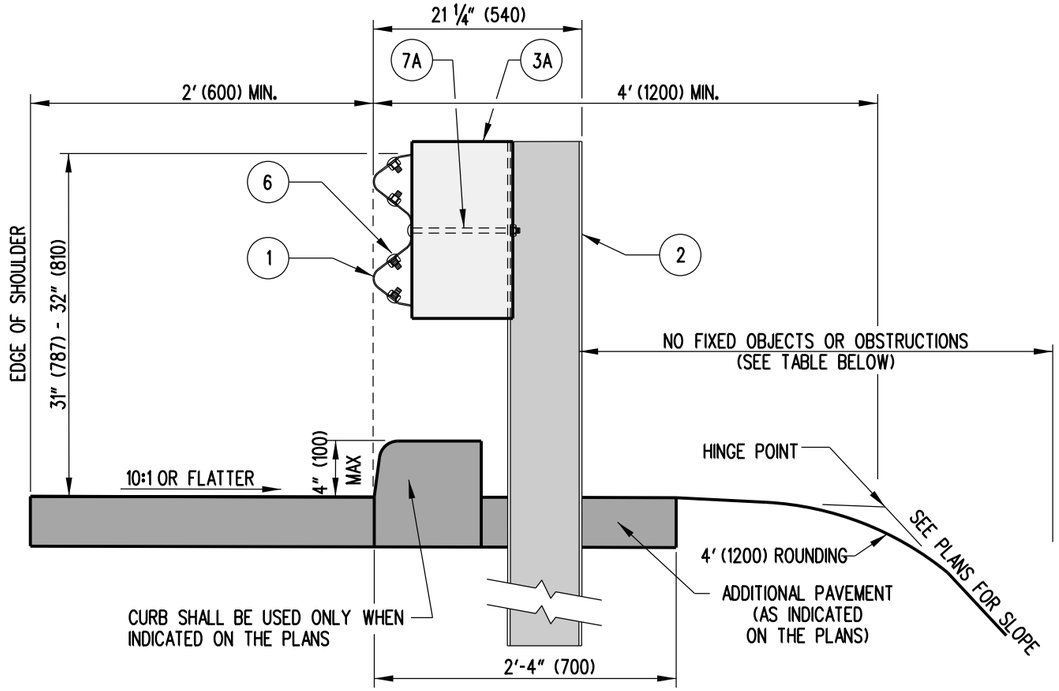
4 SPLICE DETAIL

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

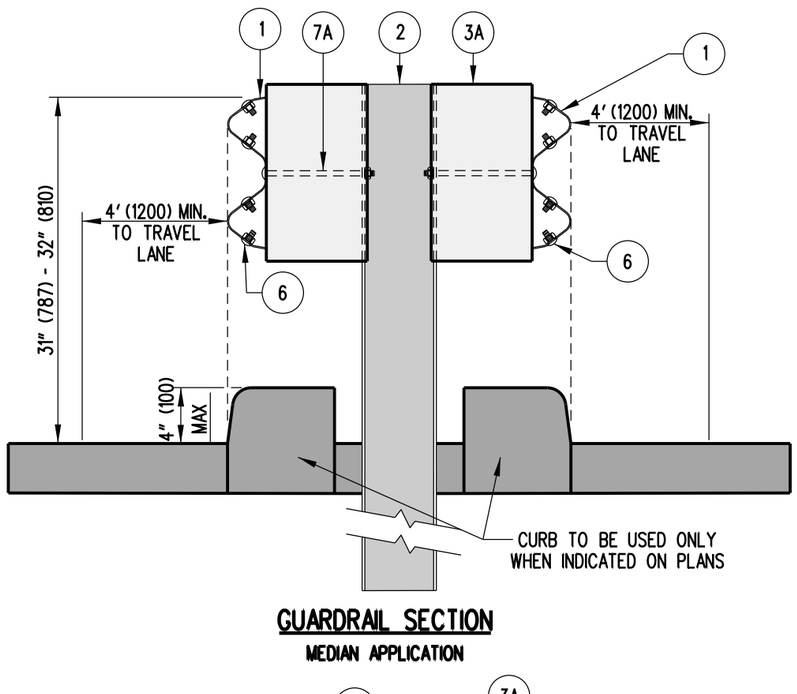
SCALE : N.T.S.



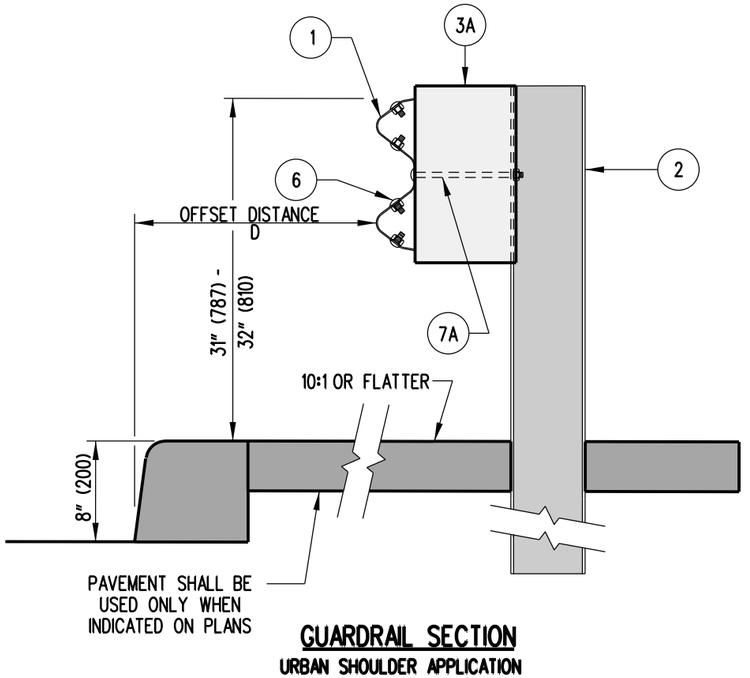
GUARDRAIL SECTION
RURAL SHOULDER APPLICATIOON

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

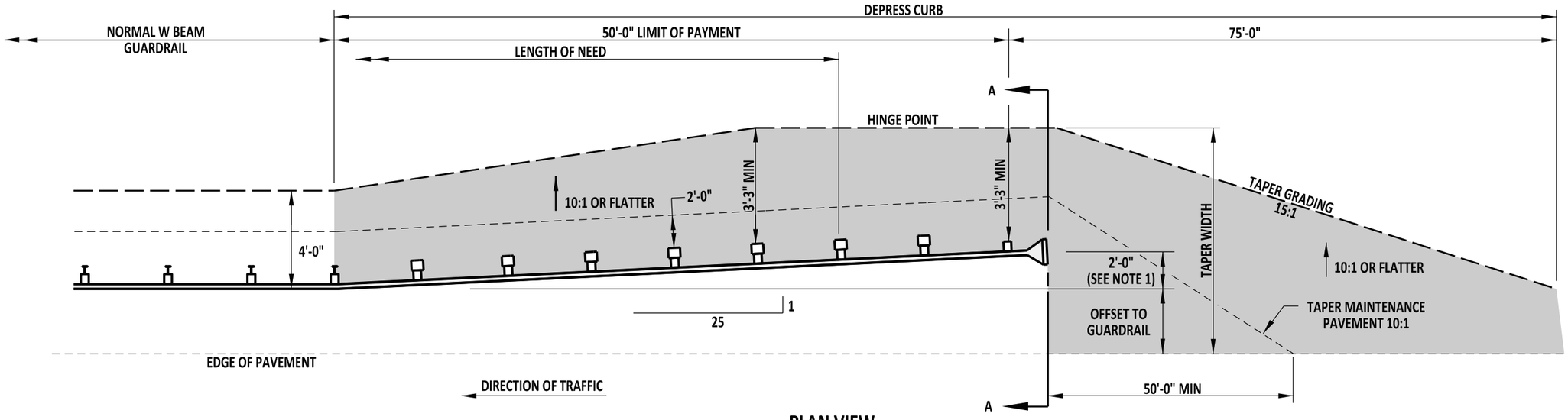


GUARDRAIL SECTION
URBAN SHOULDER APPLICATION

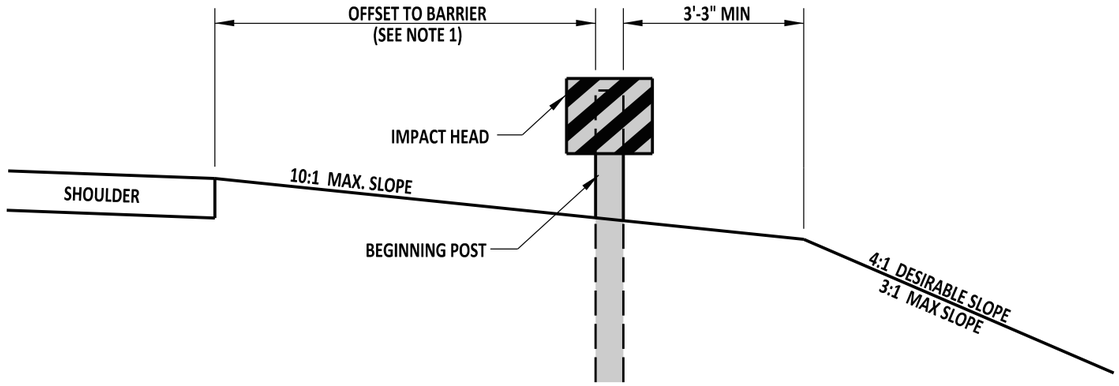
DELAWARE DEPARTMENT OF TRANSPORTATION	TYPES 1-31, 2-31, AND 3-31 GUARDRAIL APPLICATIONS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-1 (2010)	SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/6/2010

SCALE : NTS



PLAN VIEW



= NO OBSTRUCTIONS IN SHADED AREA

SECTION A-A

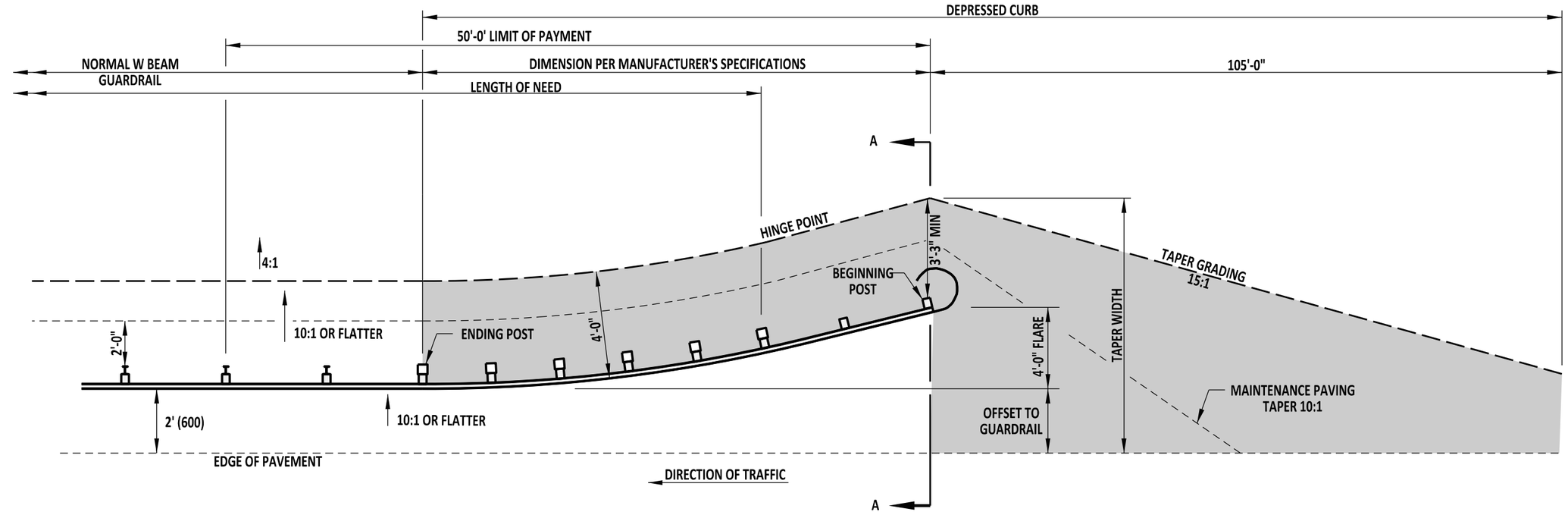
NOTES:

1). FLARE THE END TREATMENT AT 25:1 BEGINNING 50'-0" 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" 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) 02/14/2014 (DATE)
	STANDARD NO. B-2 (2013)	SHT. 1 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

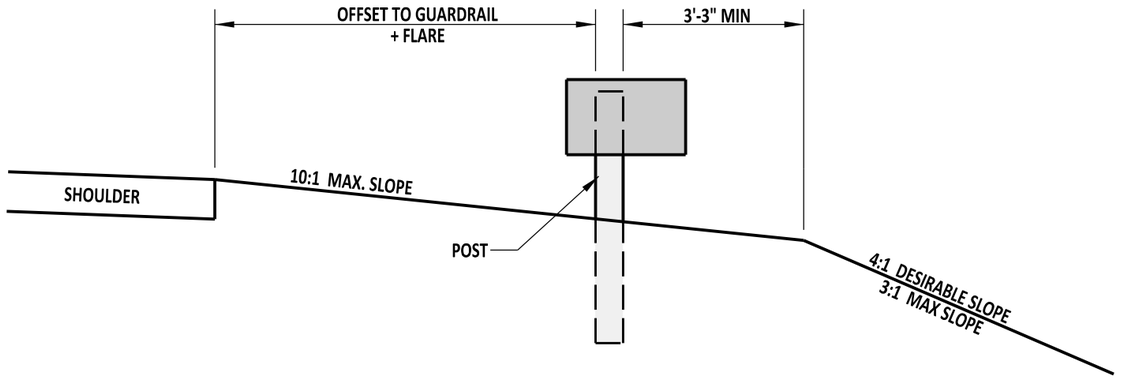
1/9/2014

SCALE : NTS



PLAN VIEW

= NO OBSTRUCTIONS IN SHADED AREA



SECTION A-A

NOTES:

1). FLARE SHALL BE 4'-0" 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.

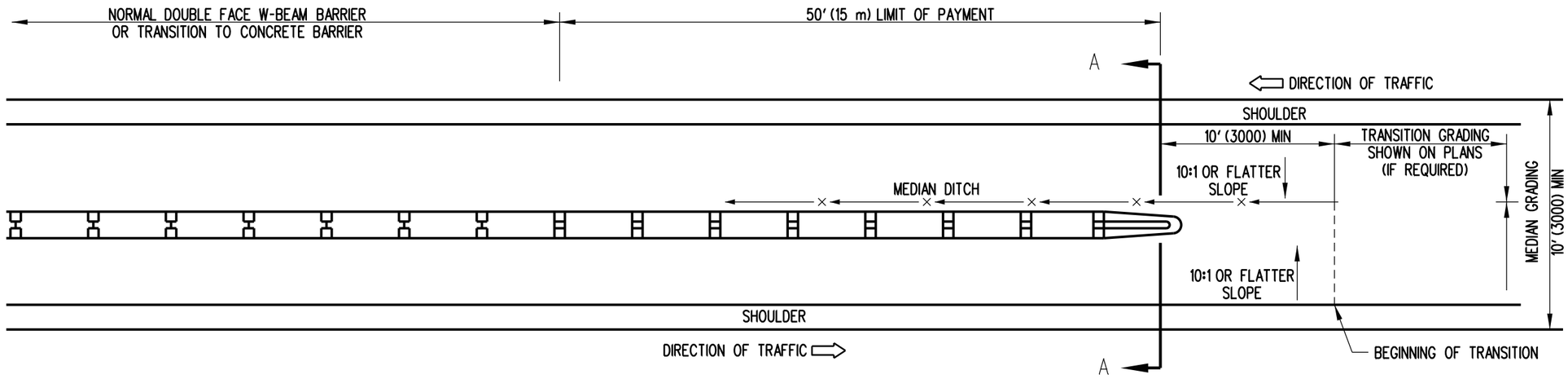
3). THE GUARDRAIL END TREATMENT ATTENUATOR SHALL BE INSTALLED AS PER THE MANUFACTURER'S AND THE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.

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

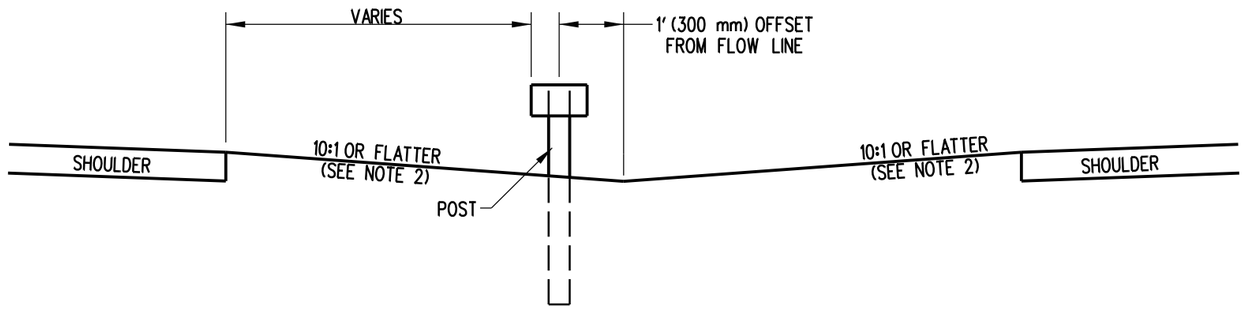
DELAWARE DEPARTMENT OF TRANSPORTATION	GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. B-2 (2013)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : N.T.S.



PLAN VIEW



SECTION A-A

GRADING FOR END TREATMENT ATTENUATOR, TYPE 3

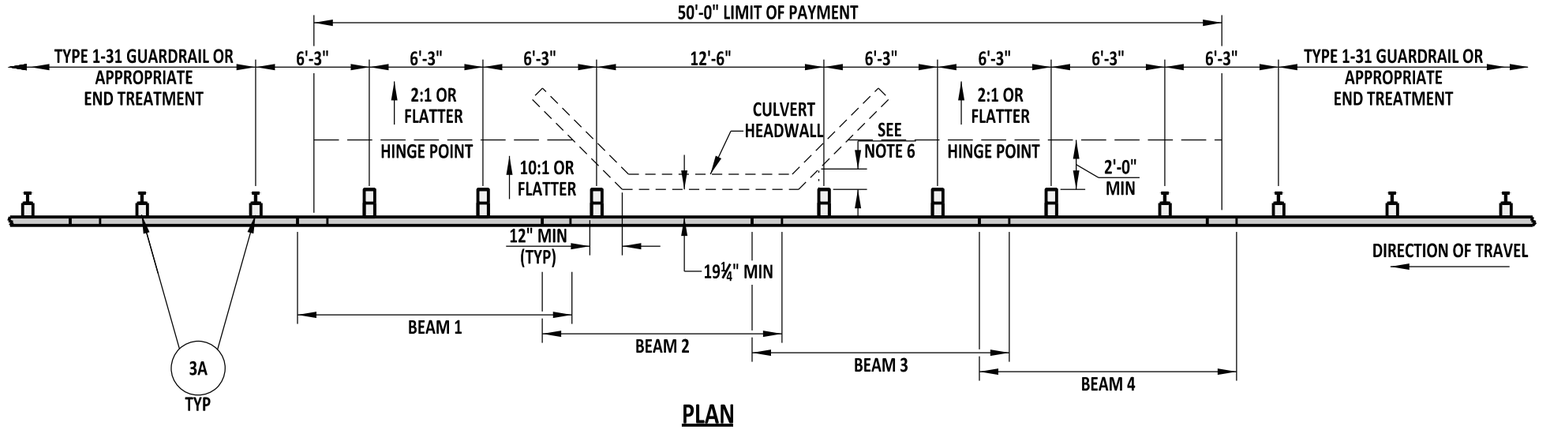
NOTES:

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.

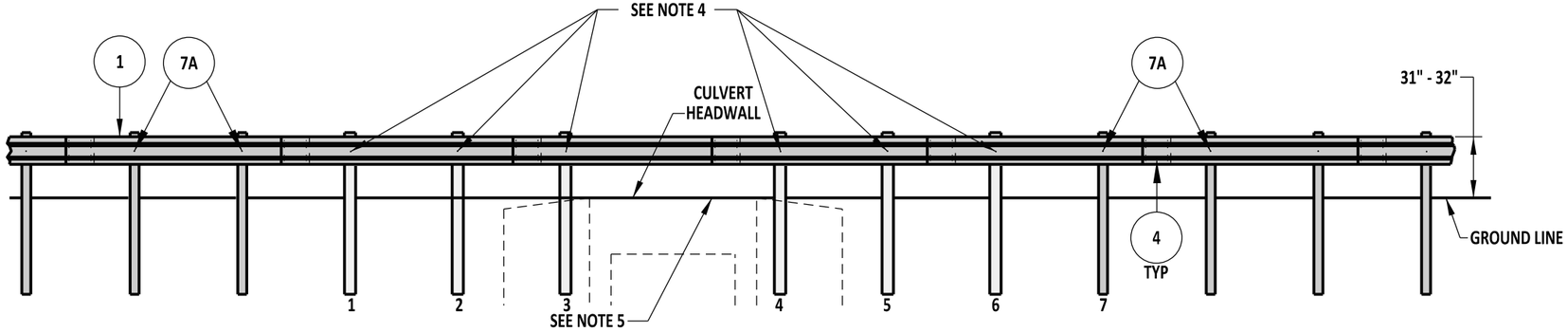
DELAWARE DEPARTMENT OF TRANSPORTATION	GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-2 (2010) SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/03/2010

SCALE : NTS



PLAN



ELEVATION

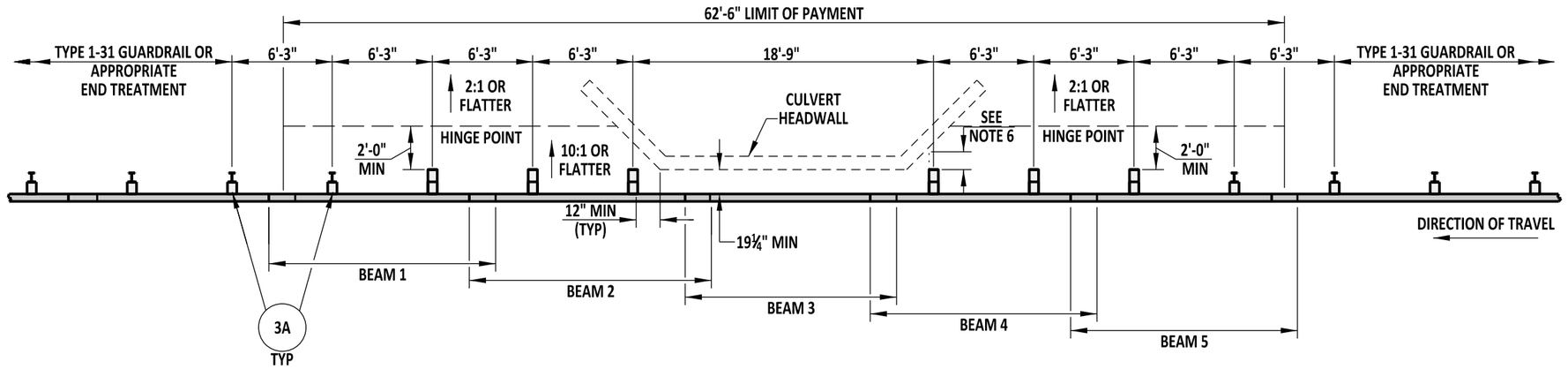
NOTES:

1). ALL W-BEAMS ARE 13'-6½" IN LENGTH.
2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3). POSTS 1 THROUGH 6 ARE TO BE TYPE 31 LONG, WOOD BREAKAWAY POSTS. POST 7 IS TO BE A W6x9 STEEL POST.
4). THE RAIL SHALL BE ATTACHED AT POSTS 1 THROUGH 6 WITH A ⅝" x 22" GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.
5). CULVERT HEADWALL SHALL NOT EXTEND MORE THAN 2" ABOVE GRADE.
6). THERE SHALL BE A MINIMUM OF 8" FROM THE BACK OF POST TO THE CULVERT WINGWALLS.

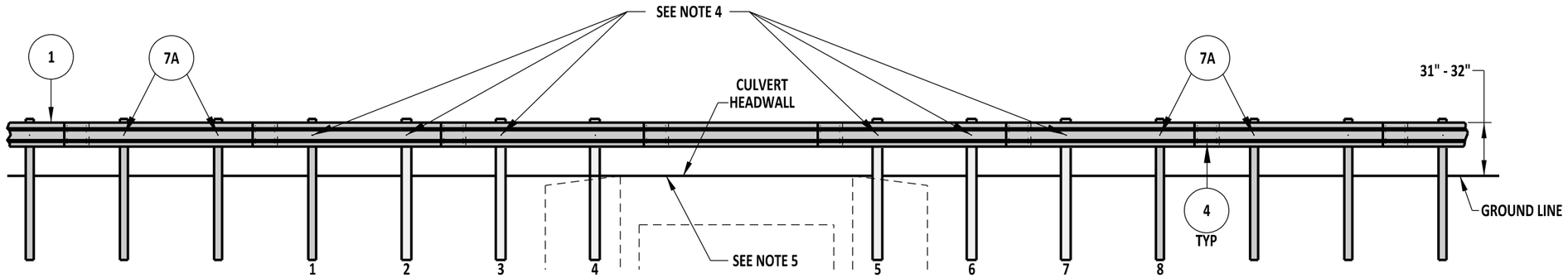
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 1-31		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. B-3 (2013)	SHT. 1 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



PLAN



ELEVATION

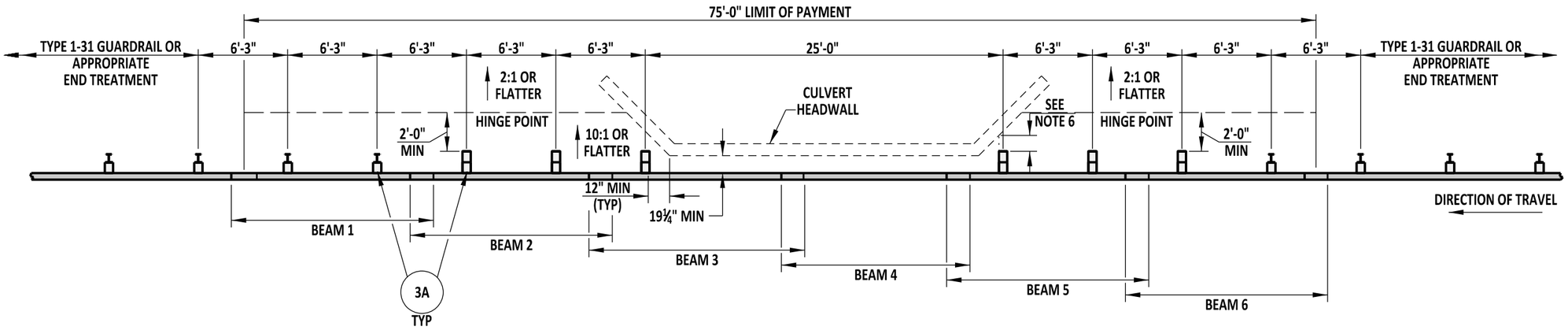
NOTES:

1). ALL W-BEAMS ARE 13'-6½" IN LENGTH.
2). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3). POSTS 1 & 8 ARE TO BE W6x9 STEEL POSTS. POSTS 2 THROUGH 6 ARE TO BE TYPE 31 LONG, WOOD BREAKAWAY POSTS.
4). THE RAIL SHALL BE ATTACHED AT POSTS 2 THROUGH 7 WITH A ⅝" x 22" GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.
5). CULVERT HEADWALL SHALL NOT EXTEND MORE THAN 2" ABOVE GRADE.
6). THERE SHALL BE A MINIMUM OF 8" FROM THE BACK OF POST TO THE CULVERT WINGWALL.

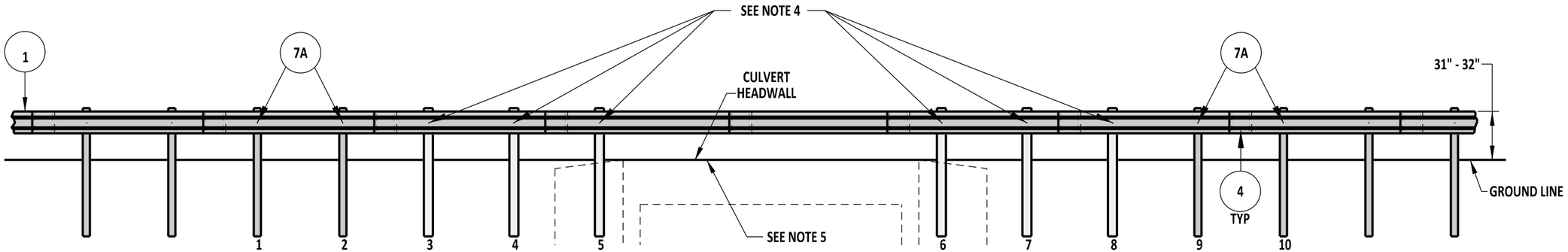
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 2-31		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. B-3 (2013)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



PLAN



ELEVATION

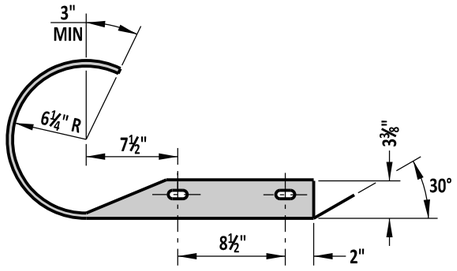
NOTES:

1). ALL W-BEAMS ARE 13'-6½" 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 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" x 22" GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.
5). CULVERT HEADWALL SHALL NOT EXTEND MORE THAN 2" ABOVE GRADE.
6). THERE SHALL BE A MINIMUM OF 8" FROM THE BACK OF POST TO THE CULVERT WINGWALLS.

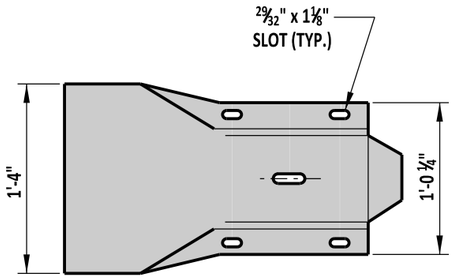
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 3-31		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. B-3 (2013)	SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

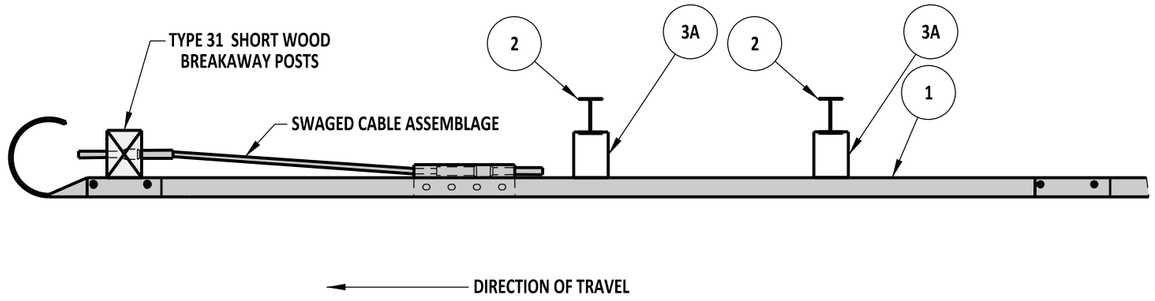
SCALE : NTS



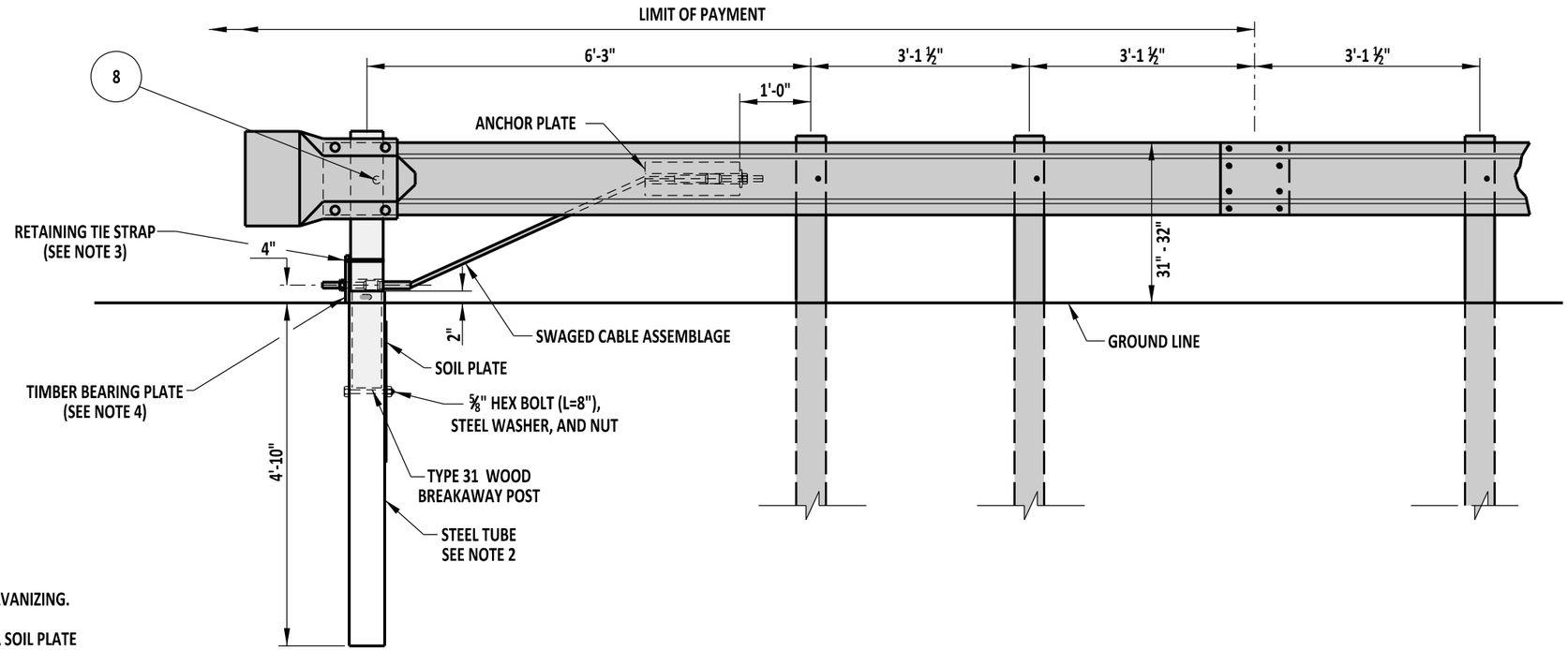
END SECTION PLAN



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'-0" STEEL TUBE WITHOUT A SOIL PLATE OR A 5'-0" STEEL TUBE WITH A SOIL PLATE.
3). PLACE A ½" WIDE PLASTIC RETAINING TIE STRAP AROUND THE SHORT TIMBER BREAKAWAY POST AND TIMBER BEARING PLATE TO ENSURE THE PROPER ORIENTATION OF THE TIMBER BEARING PLATE.
4). REFER TO DETAIL B-13, SHEET 8 OF 10 FOR PROPER TIMBER BEARING PLATE ORIENTATION.

DELAWARE
DEPARTMENT OF TRANSPORTATION

END ANCHORAGE, TYPE 31

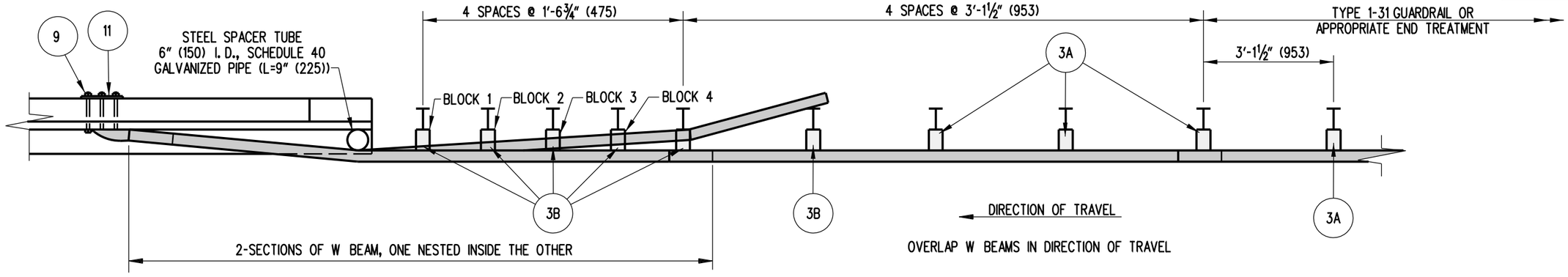
STANDARD NO. B-4 (2012) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)

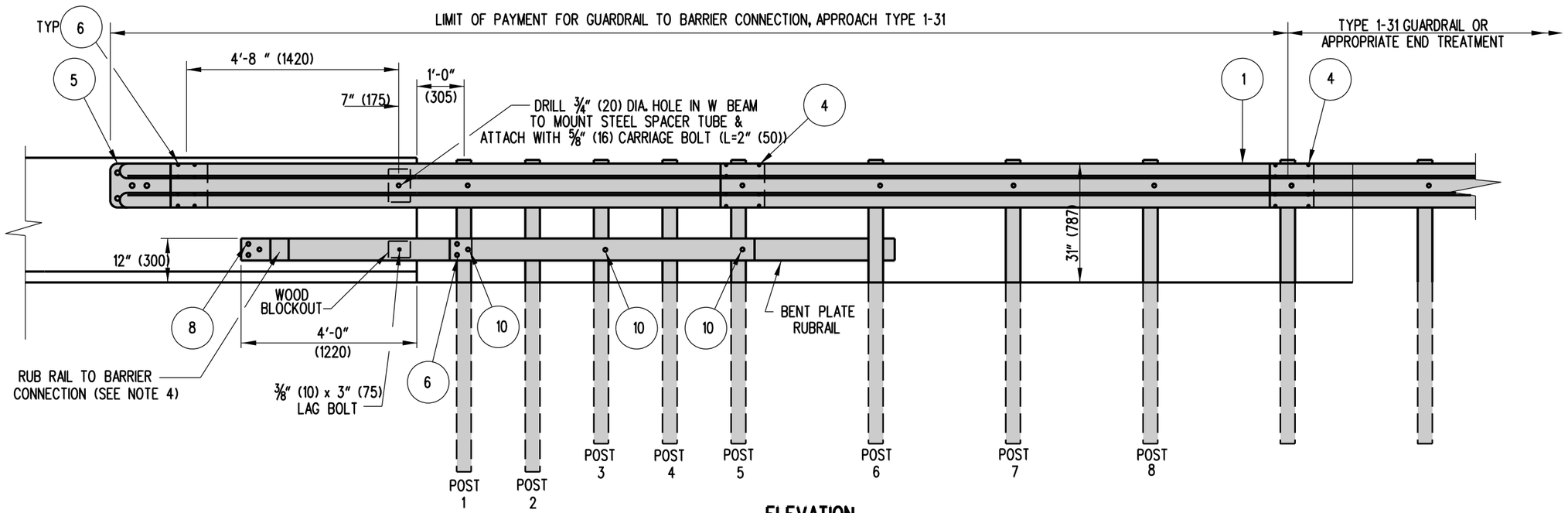
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

SCALE : N.T.S.



PLAN



ELEVATION

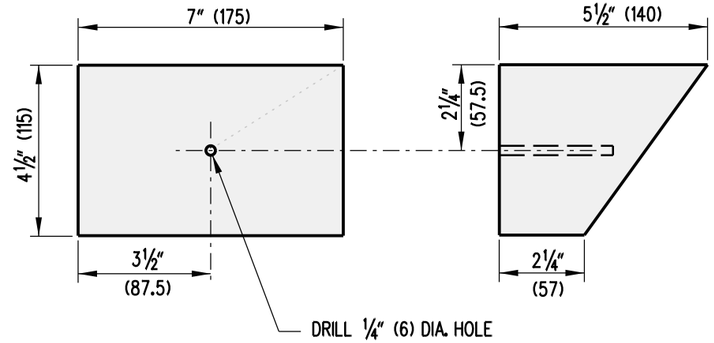
NOTES:

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)

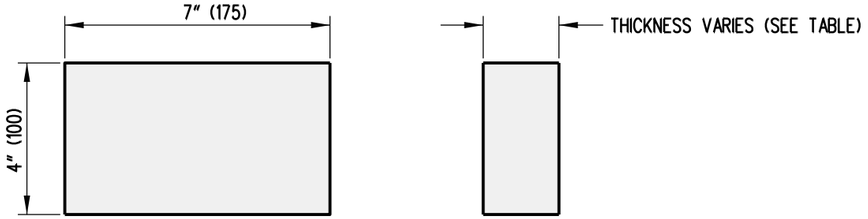
12/06/2010

SCALE : N.T.S.



ELEVATION RIGHT SIDE

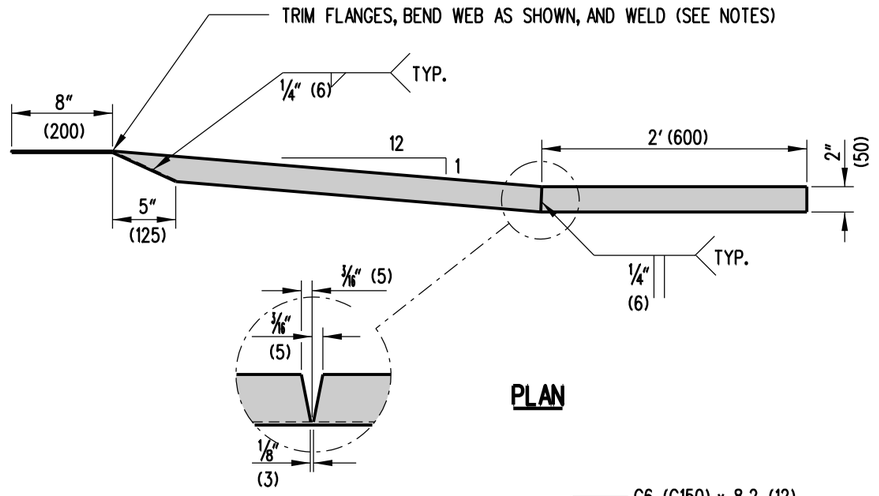
OFFSET BLOCK DETAIL



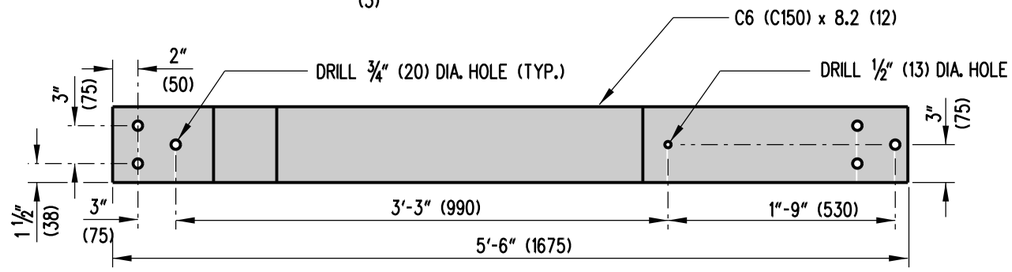
ELEVATION RIGHT SIDE

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

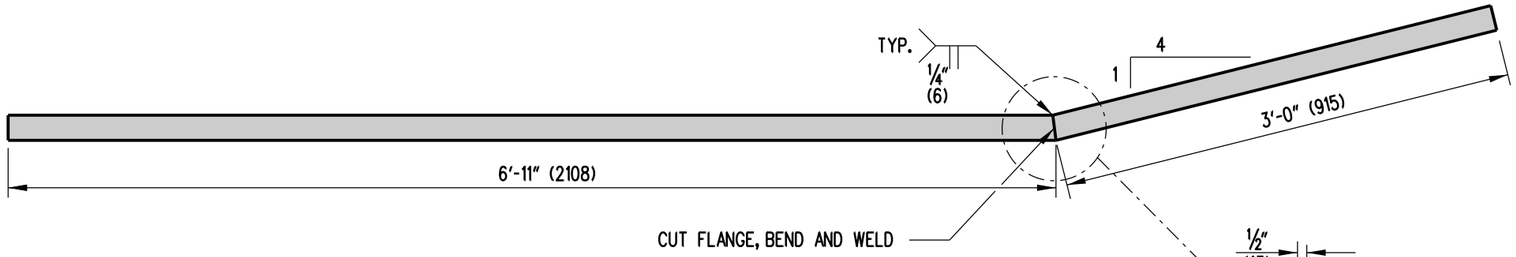
STANDARD NO. B-5 (2010) SHT. 2 OF 6

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

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

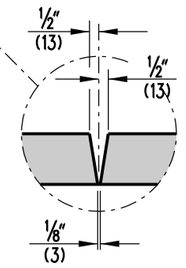
12/06/2010

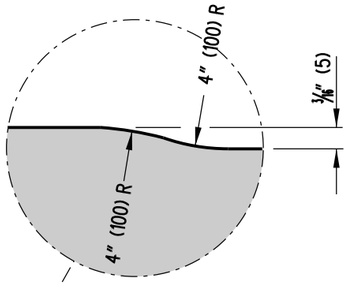
SCALE : N.T.S.

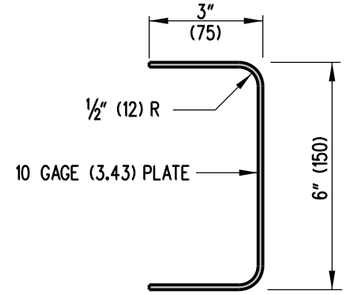


PLAN

SCALE: 1"=1'-0"

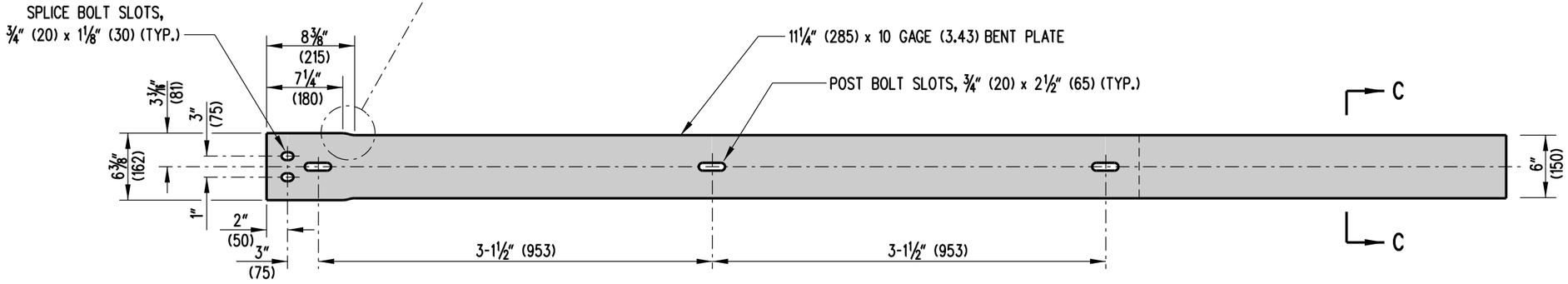






SECTION C-C

SCALE: 3" = 1'-0"



ELEVATION

SCALE: 1"=1'-0"

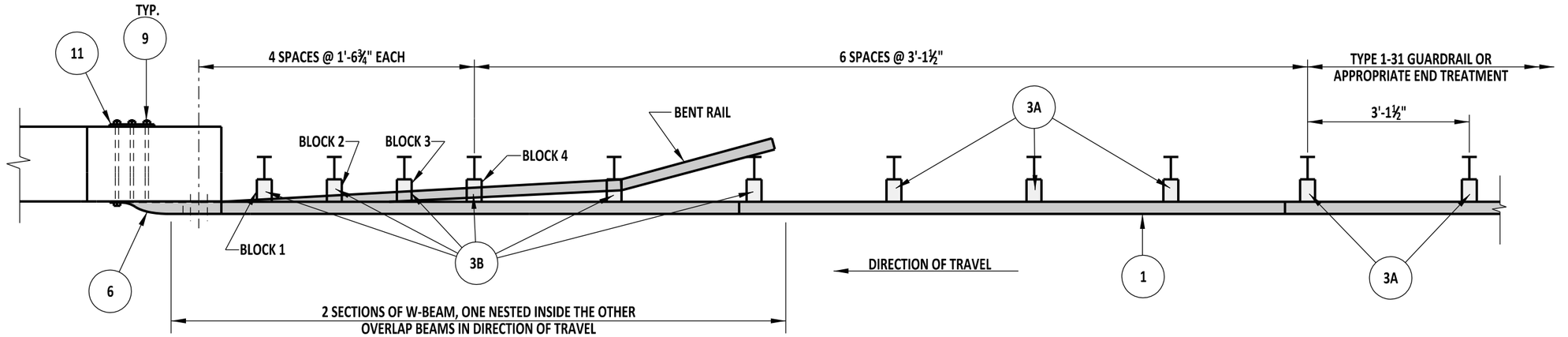
NOTE:

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

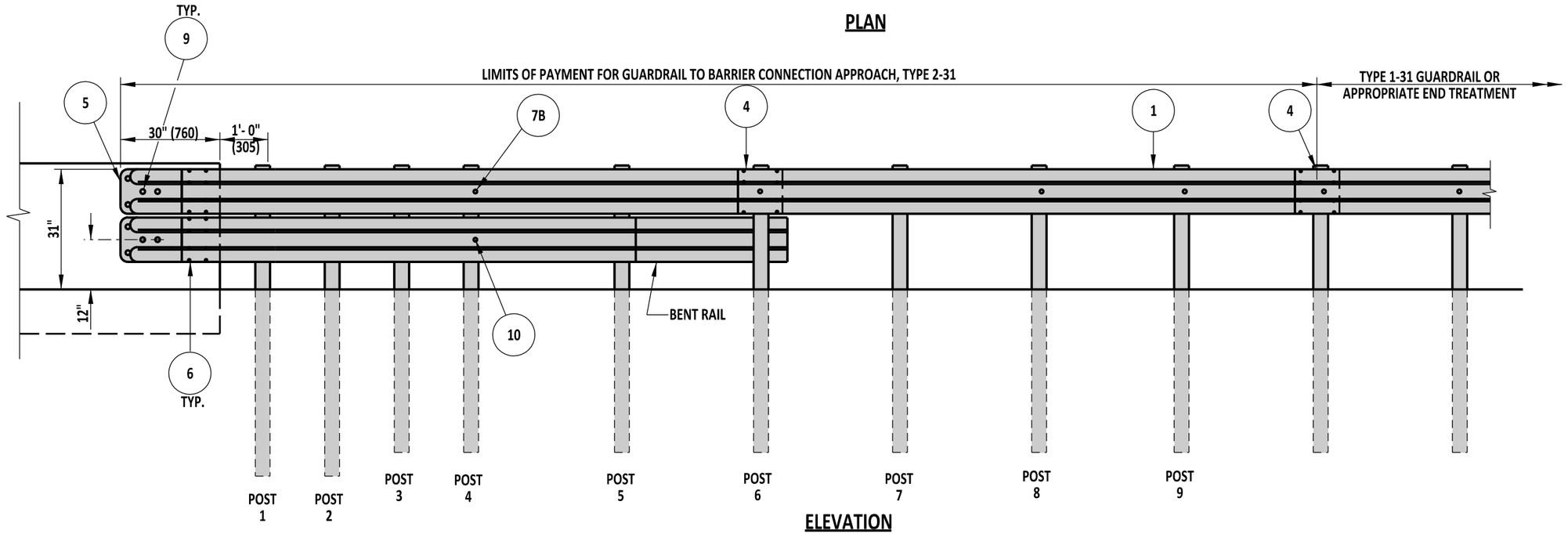
DELAWARE DEPARTMENT OF TRANSPORTATION	**GUARDRAIL TO BARRIER CONNECTION, BENT PLATE RUB RAIL**	**APPROVED** SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-5 (2010) **SHT. 3 OF 6**	**RECOMMENDED** SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/03/2010

SCALE : NTS



PLAN



ELEVATION

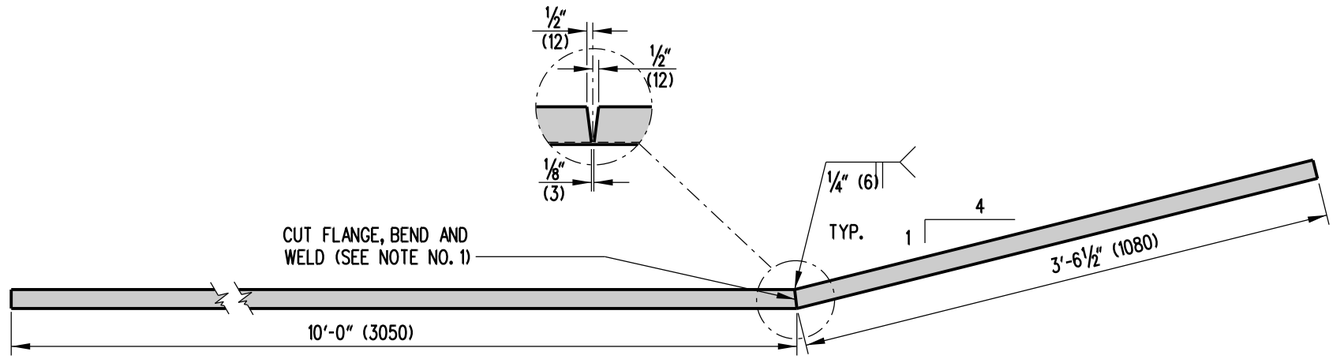
NOTES :

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, 7'-6" LONG. ALL OTHER POSTS IN TRANSITION ARE W6x9, 6'-0" 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" x 8" x 14" OFFSET BLOCK IS USED AT POSTS 1 THROUGH 6 AND A 6" x 12" x 14" 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) — 01/07/2013 (DATE)
	STANDARD NO. B-5 (2012)	SHT. 4 OF 6	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER) — 12/20/2012 (DATE)

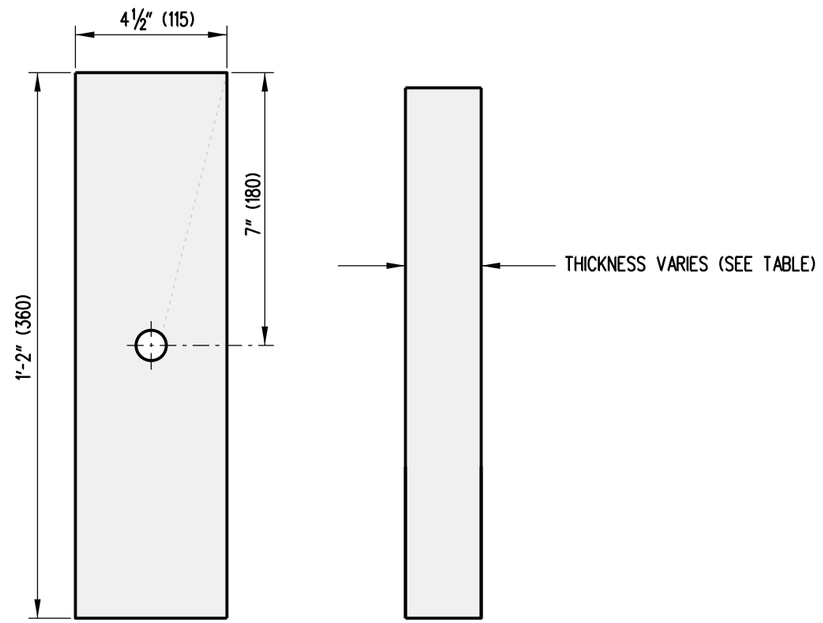
12/4/2012

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

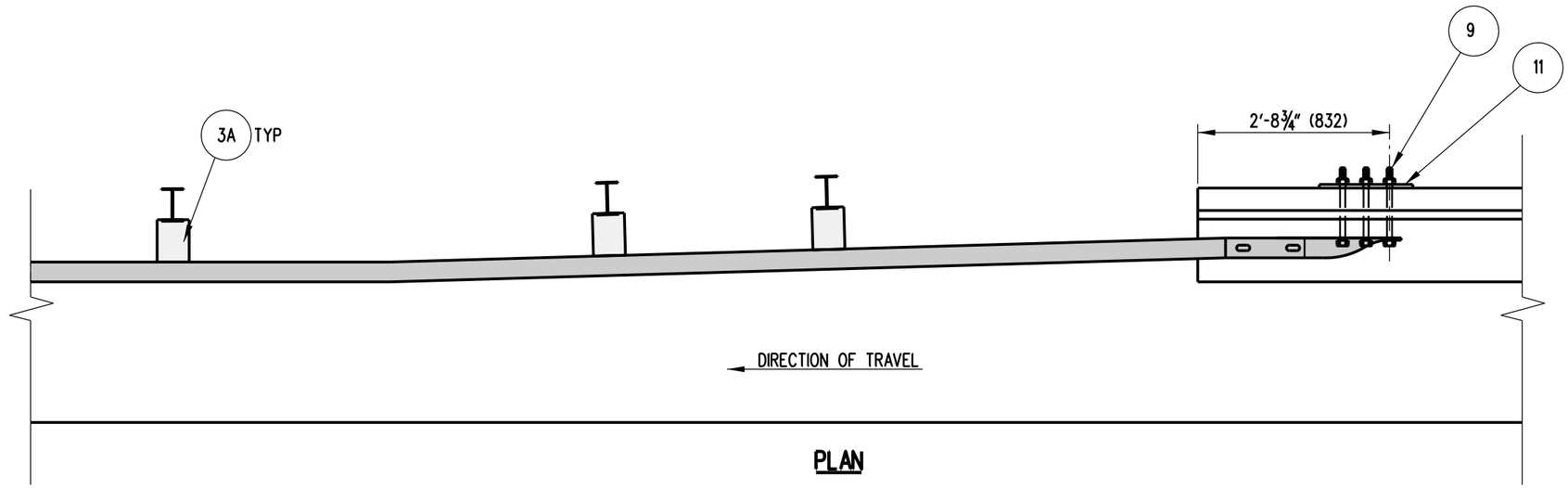
STANDARD NO. B-5 (2010) | SHT. 5 OF 6

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

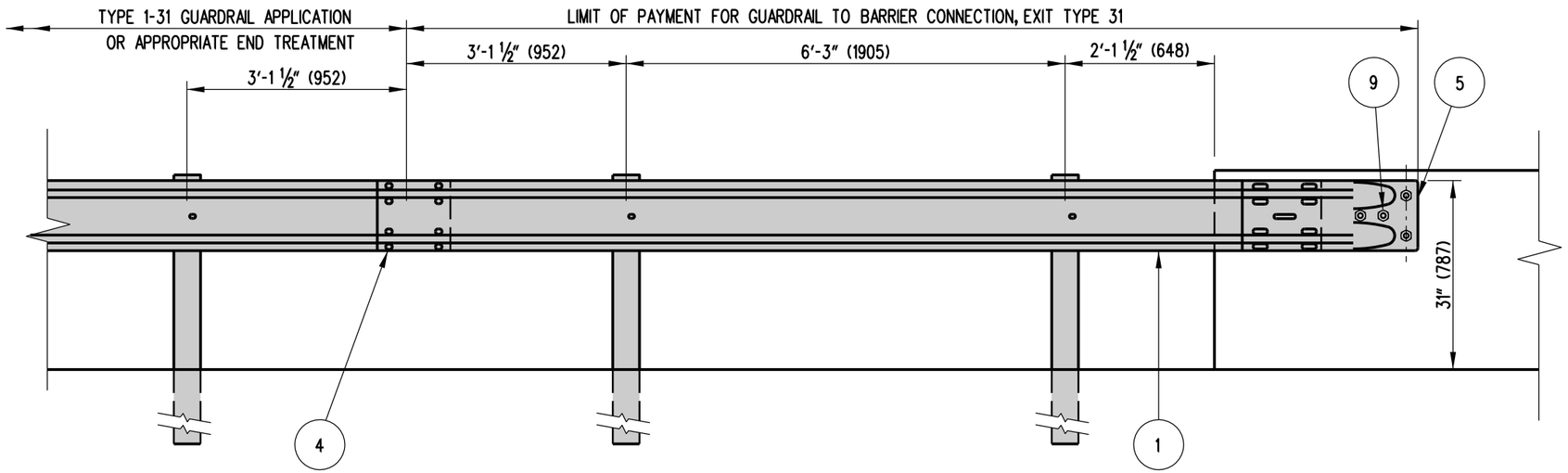
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/15/2010

SCALE : N.T.S.



PLAN



ELEVATION

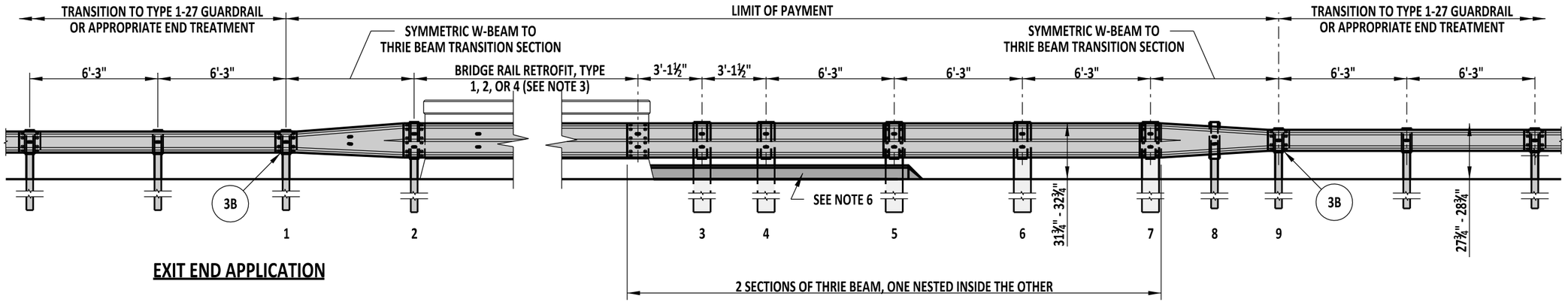
NOTES:

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

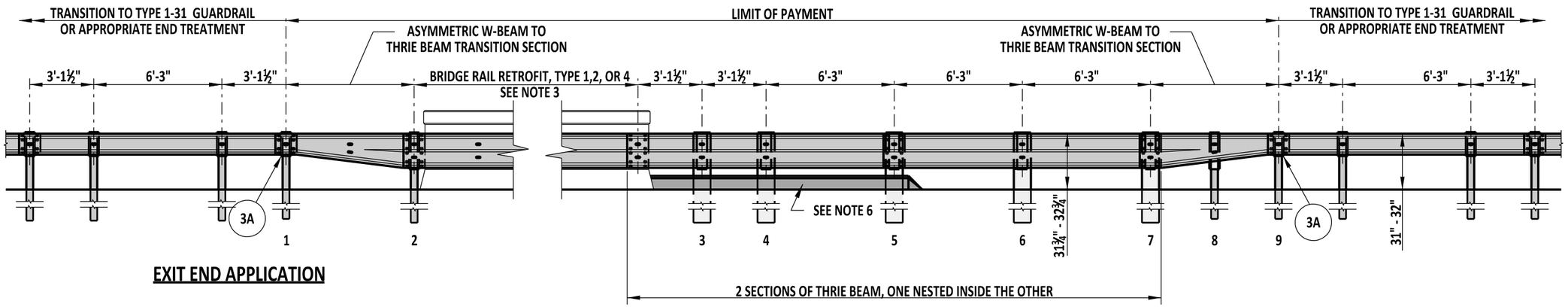
SCALE : NTS



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, 6'-0" LONG, STEEL POSTS AND POSTS 3 THRU 7 ARE 10" x 10" x 6'-6" 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 AND 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.

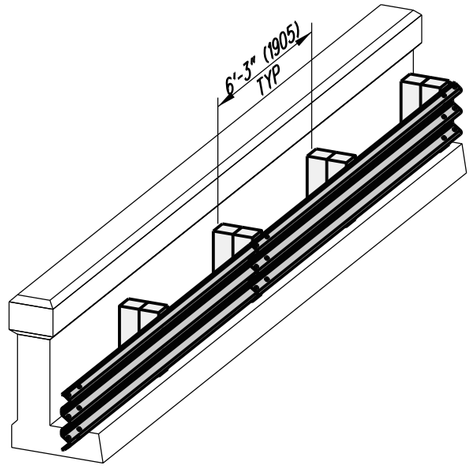
5). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR ⅝" BOLT) BETWEEN BOLT HEADS AND RUBRAIL.

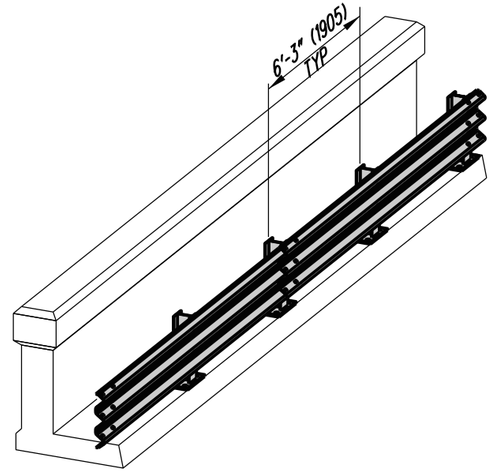
6). PLACE P.C.C. CURB,TYPE 1-8, STARTING AT PARAPET WALL AND TERMINATING AFTER POST 5. TAPER CURB TO FLUSH AT A 1:1 RATIO.

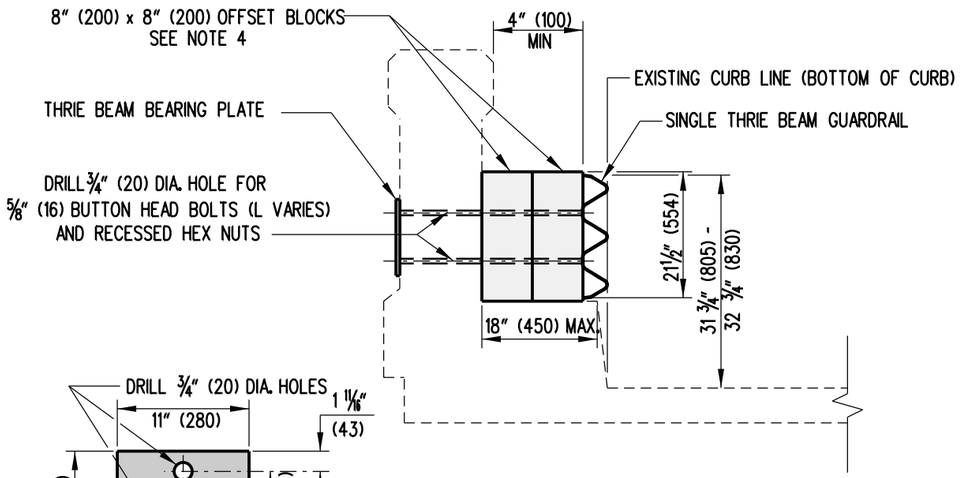
DELAWARE DEPARTMENT OF TRANSPORTATION	BRIDGE RAIL RETROFIT, ENTRANCE AND END APPLICATIONS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. B-6 (2013)	SHT. 1 OF 5	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : N.T.S.

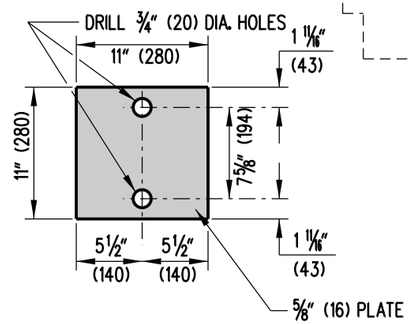




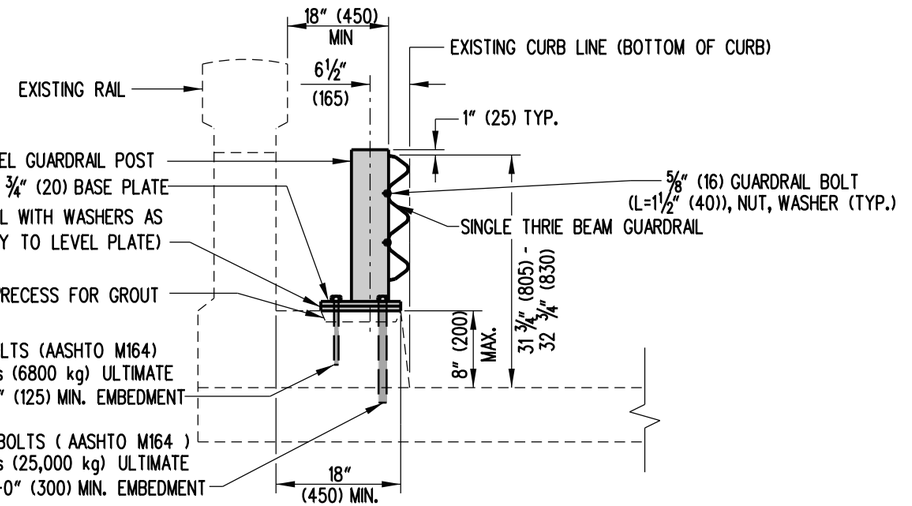


BRIDGE RAIL RETROFIT, TYPE 1

SEE NOTE 1



THRIE BEAM BEARING PLATE DETAIL



BRIDGE RAIL RETROFIT, TYPE 2

SEE NOTE 2

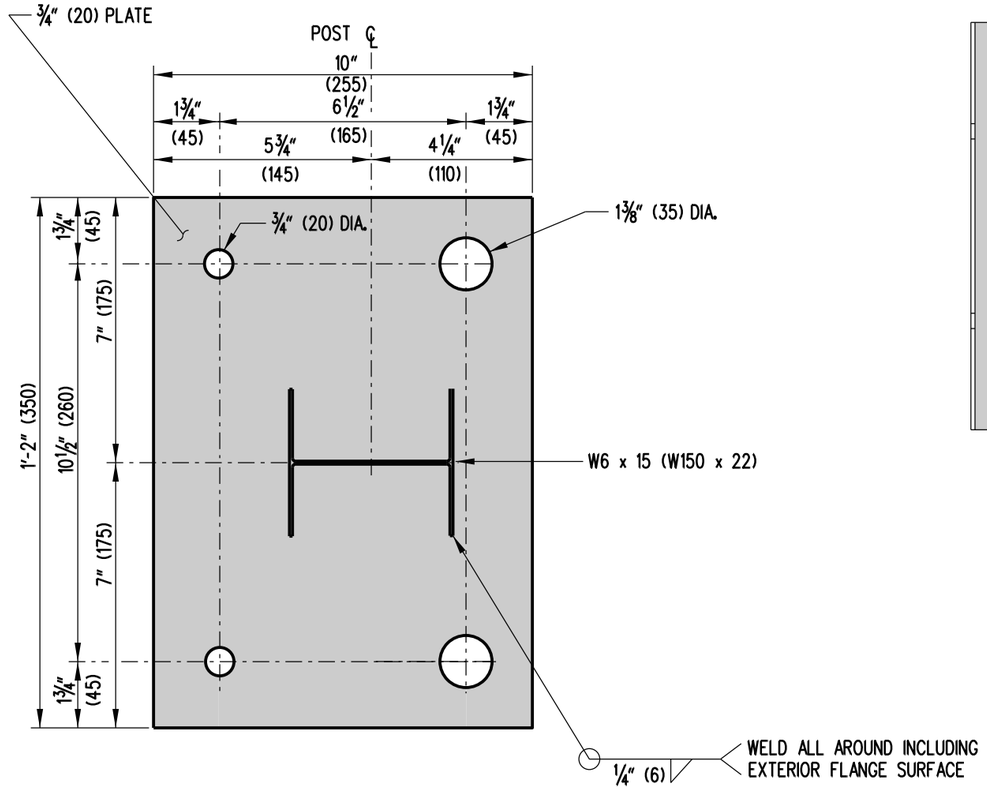
NOTES:

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.

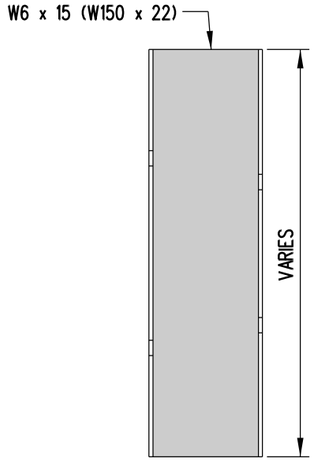
DELAWARE DEPARTMENT OF TRANSPORTATION	BRIDGE RAIL RETROFIT, TYPES 1 & 2		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-6 (2010)	SHT. 2 OF 5	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/06/2010

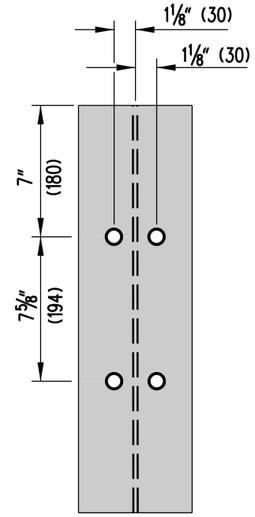
SCALE : N.T.S.



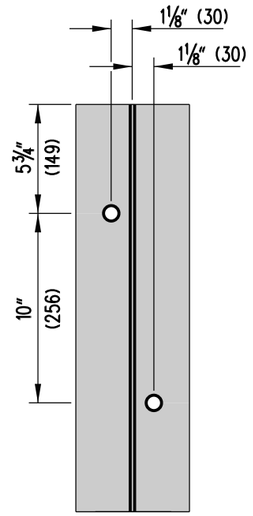
BASE PLATE DETAIL



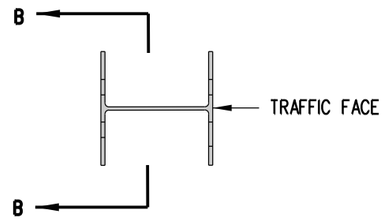
SIDE



FRONT



SECTION B-B



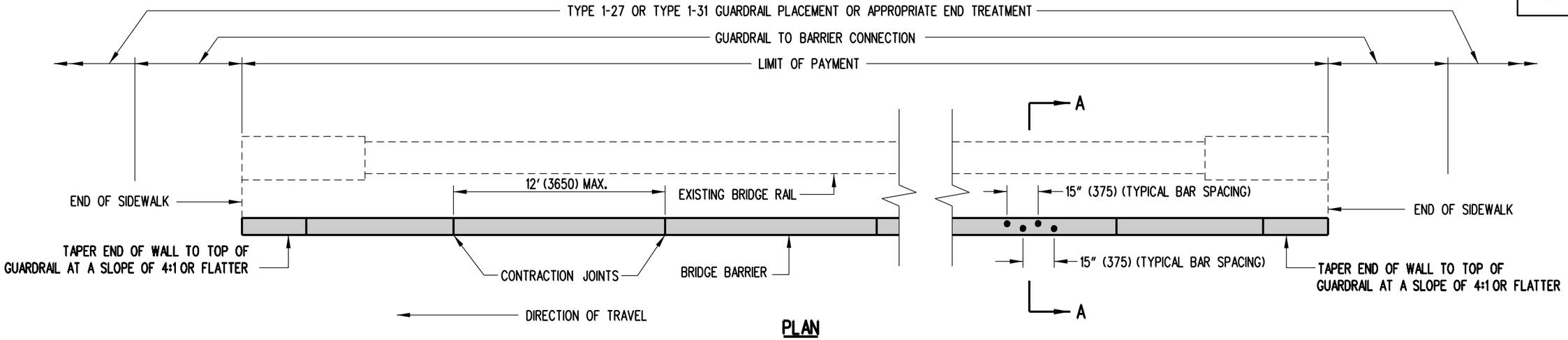
PLAN

W6 x 15 (W150 x 22) STEEL GUARDRAIL POST

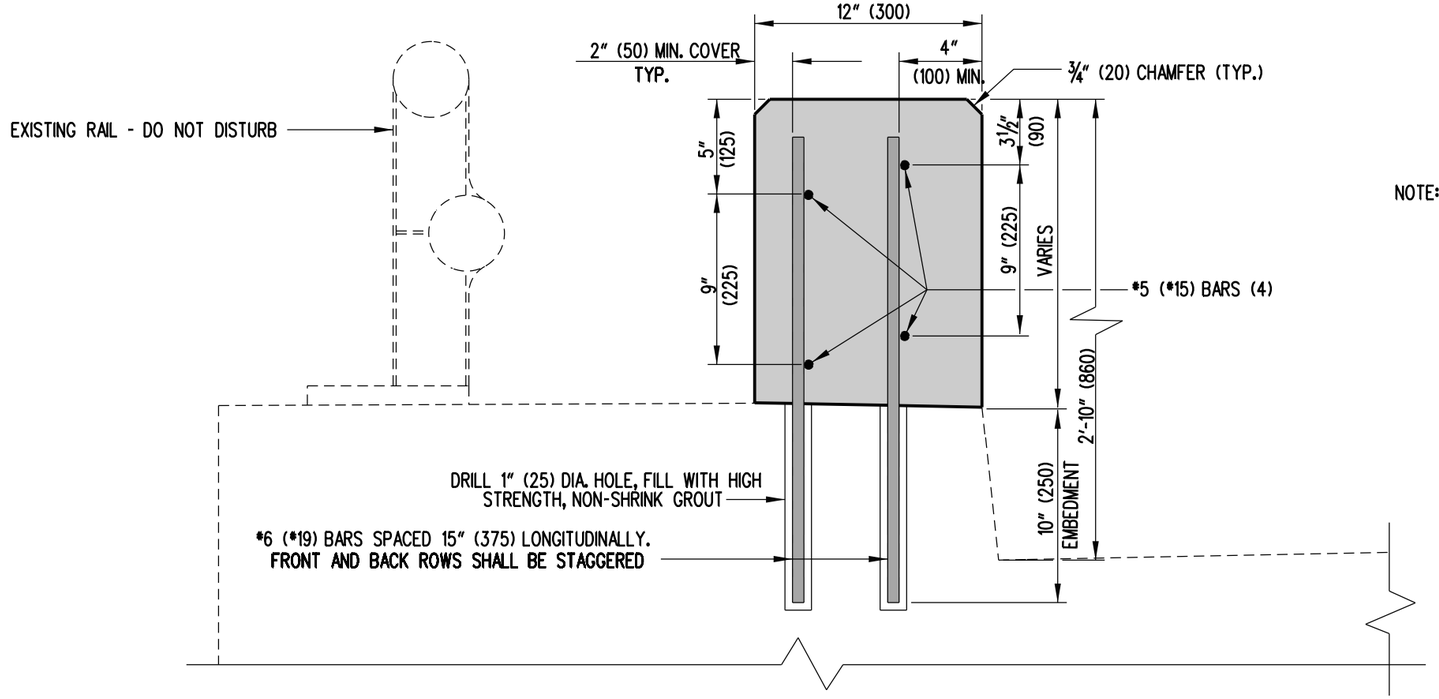
DELAWARE DEPARTMENT OF TRANSPORTATION	BRIDGE RAIL RETROFIT, TYPE 2 HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-6 (2010)	SHT. 3 OF 5	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/16/2010

SCALE : N.T.S.



PLAN



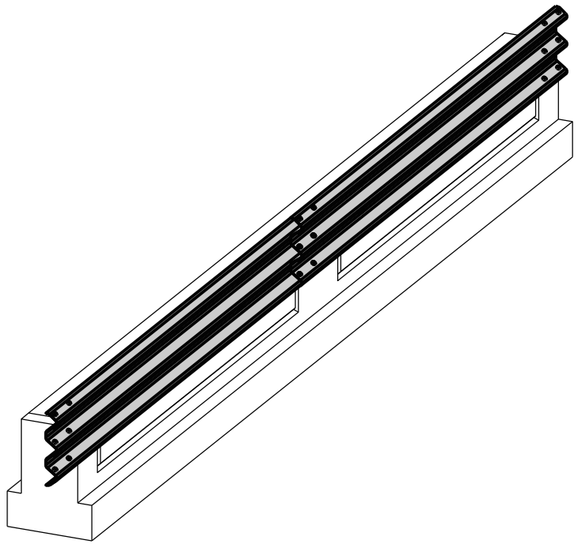
SECTION A-A

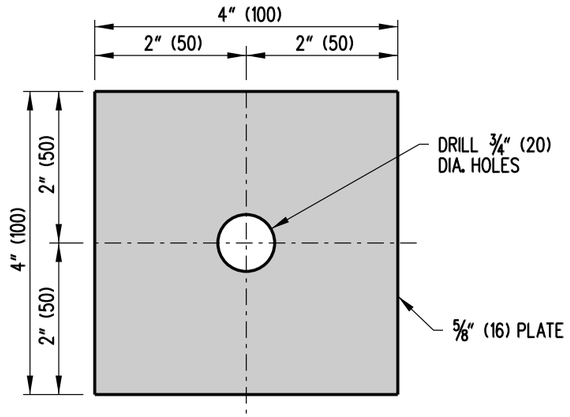
NOTE: STANDARD GUARDRAIL TO BARRIER CONNECTIONS SHALL BE CONNECTED TO THE ENDS OF THE NEW BRIDGE BARRIER AND TRANSITIONED TO THE EXISTING GUARDRAIL.

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)

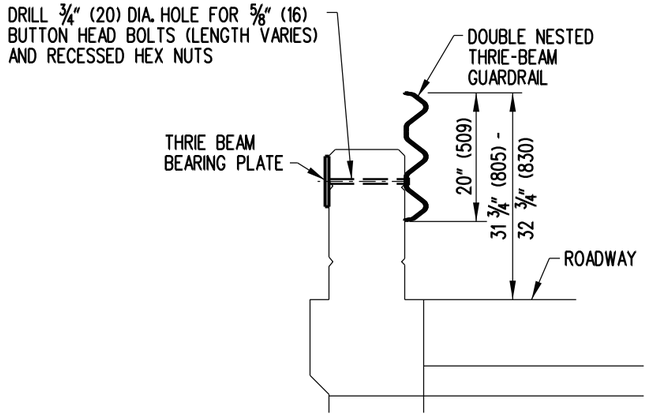
12/06/2010

SCALE : N.T.S.





THRIE-BEAM BEARING PLATE DETAIL



SECTION VIEW

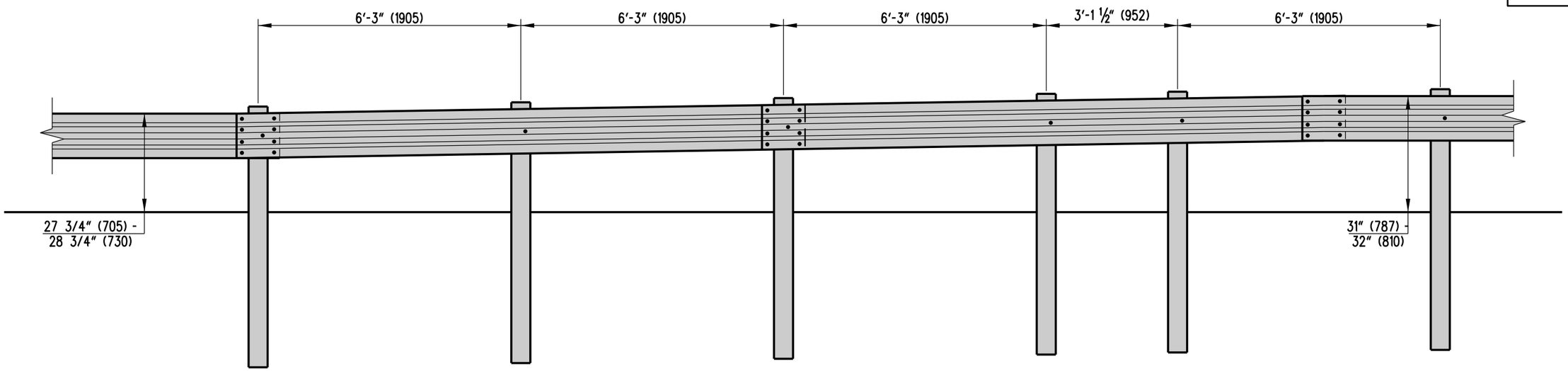
NOTES:

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.

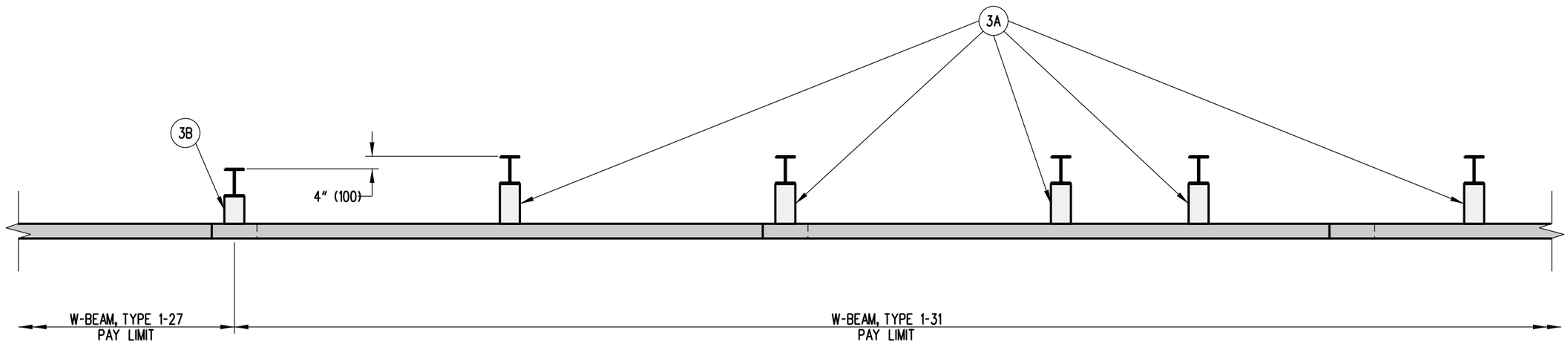
DELAWARE DEPARTMENT OF TRANSPORTATION	BRIDGE RAIL RETROFIT, TYPE 4	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-6 (2010) SHT. 5 OF 5	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/06/2010

SCALE : N.T.S.



ELEVATION

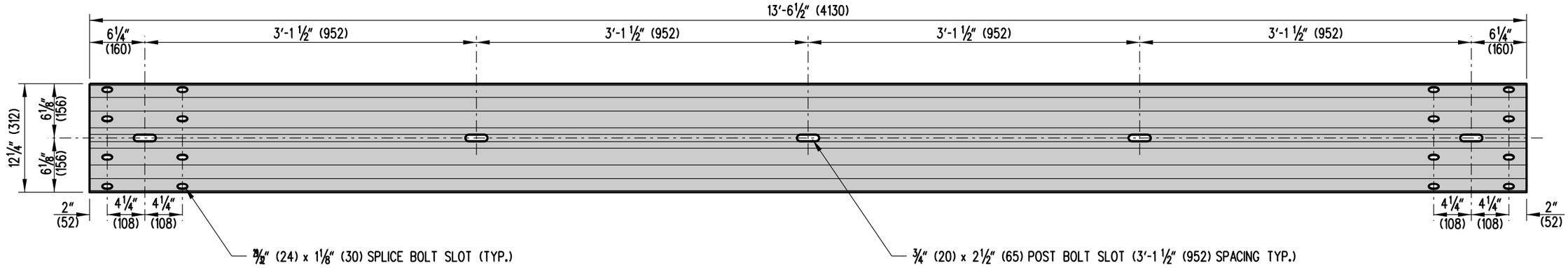


PLAN

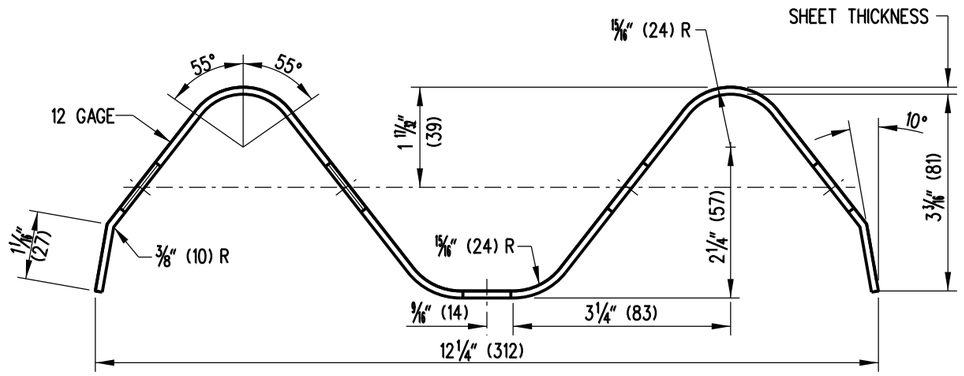
DELAWARE DEPARTMENT OF TRANSPORTATION	W-BEAM, TYPE 1-27 TO TYPE 1-31 TRANSITION SECTION	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-7 (2010) — SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/16/2010

SCALE : N.T.S.



W-BEAM ELEVATION



W-BEAM SECTION

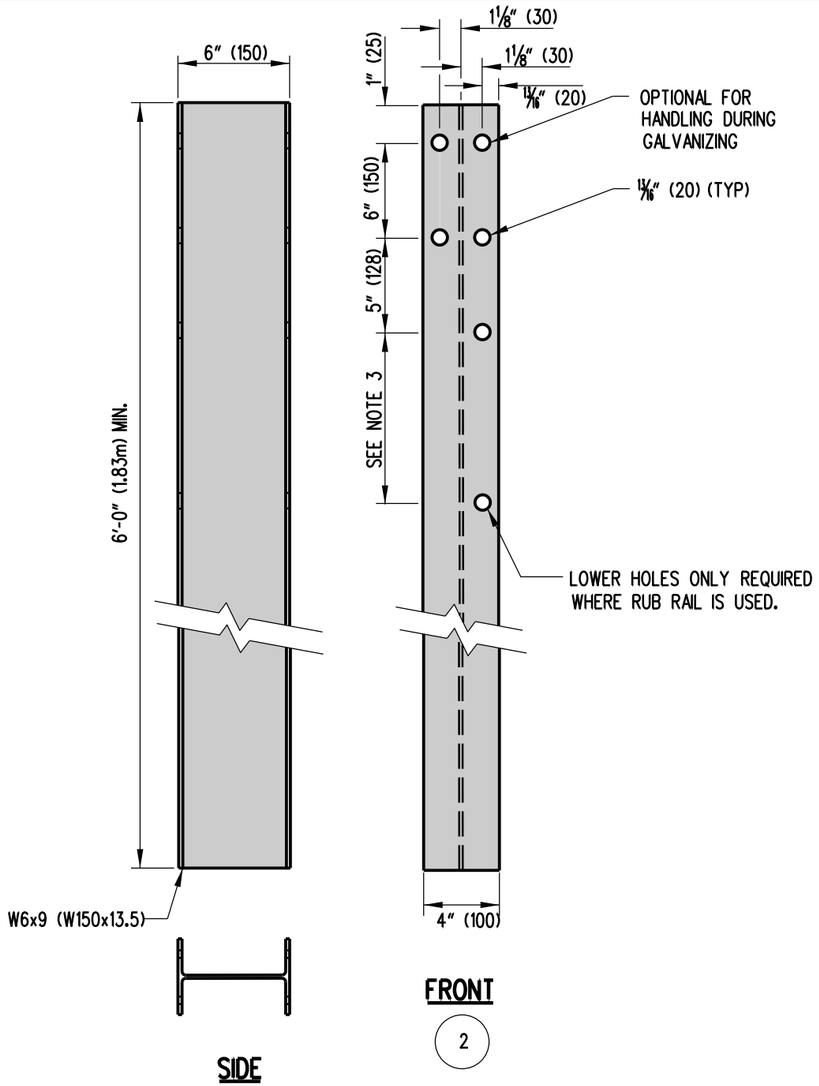
NOTE:

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.

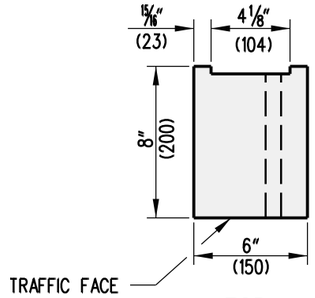


SIDE

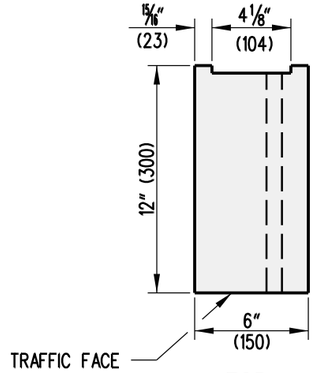
FRONT

2

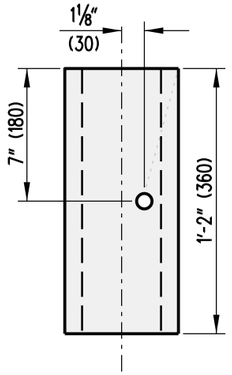
POST



TOP



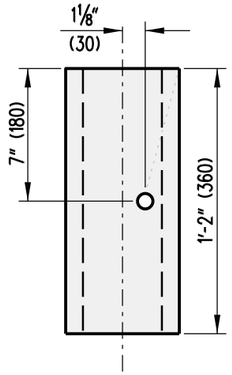
TOP



FRONT

OFFSET BLOCK, TYPE 27

3B



FRONT

OFFSET BLOCK, TYPE 31

3A

W-BEAM STEEL POST AND OFFSET BLOCK

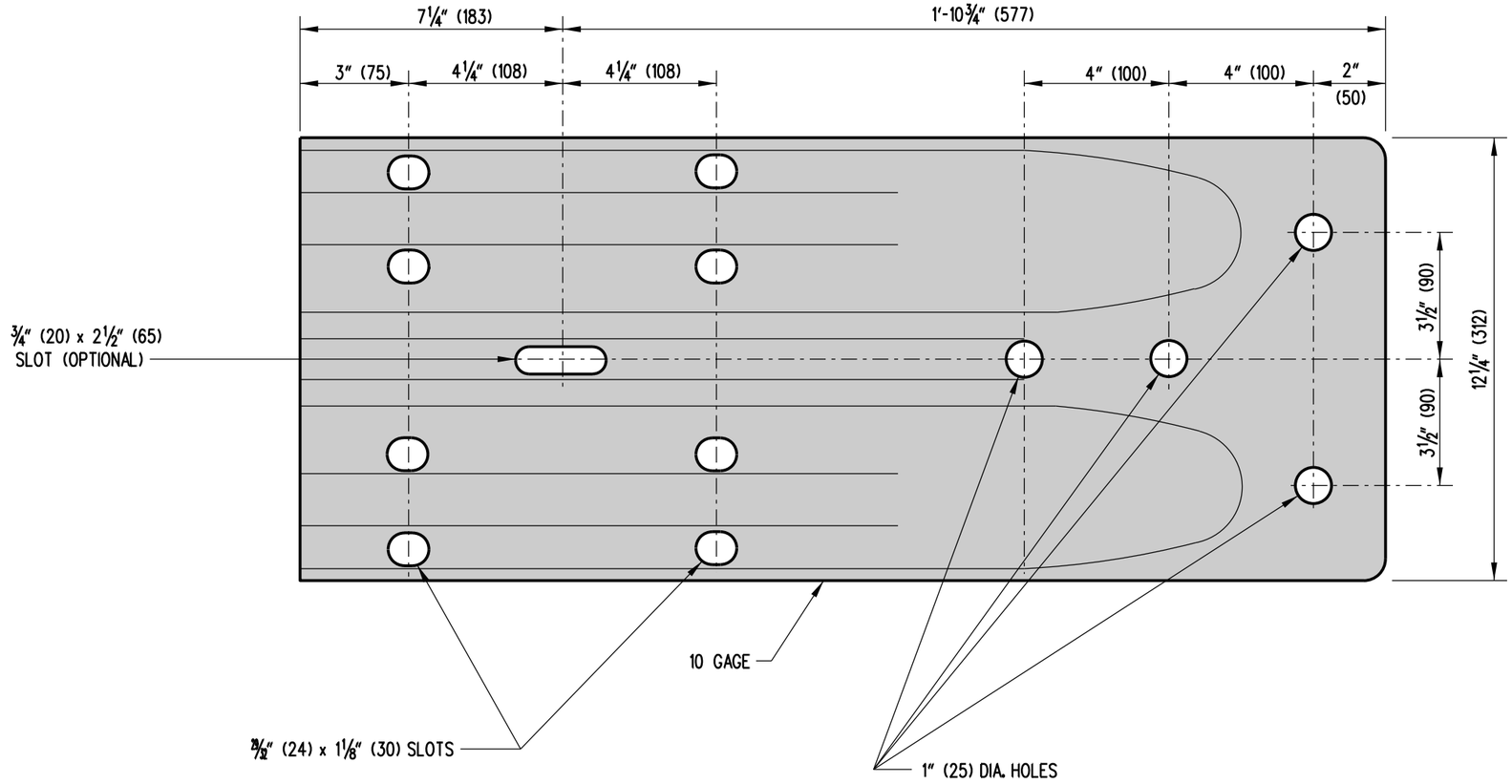
NOTE:

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.

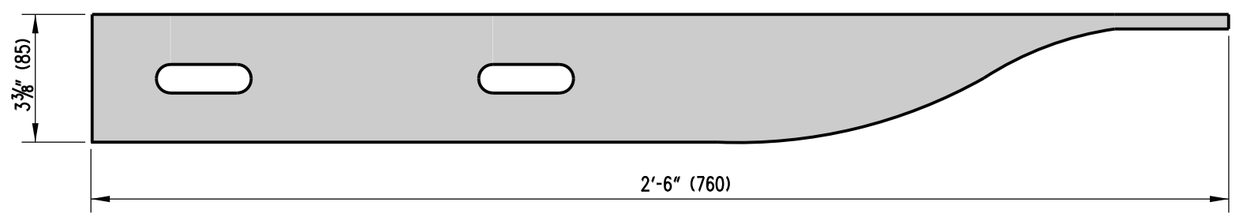
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010) SHT. 2 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

08/25/2010

SCALE : N.T.S.



ELEVATION



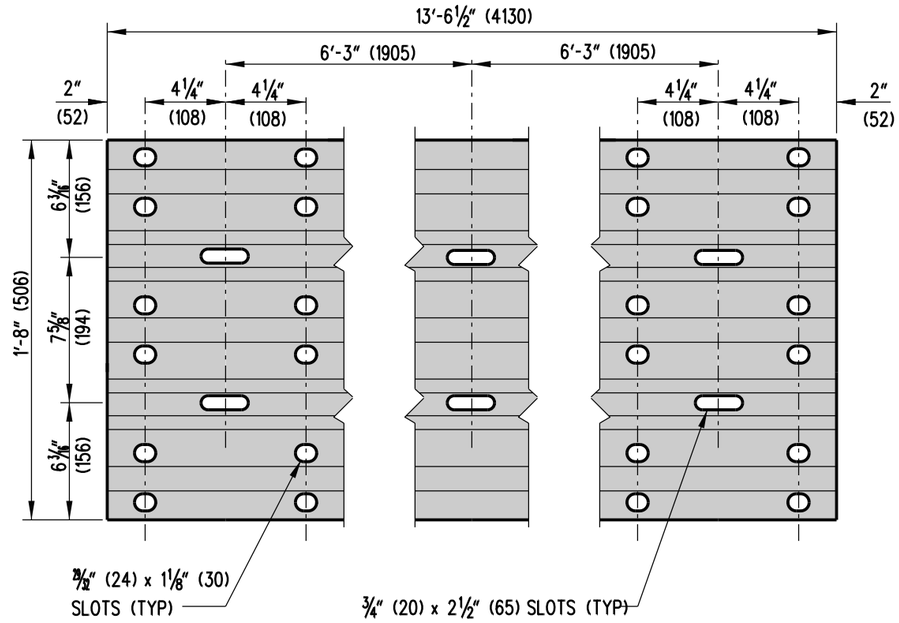
PLAN

W-BEAM TERMINAL CONNECTOR (5)

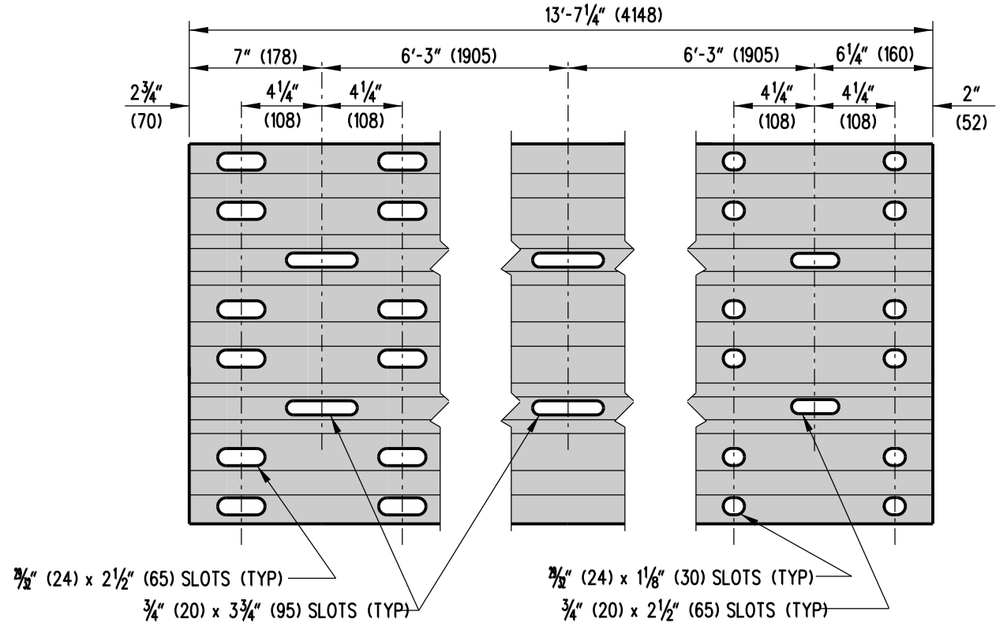
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 3 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

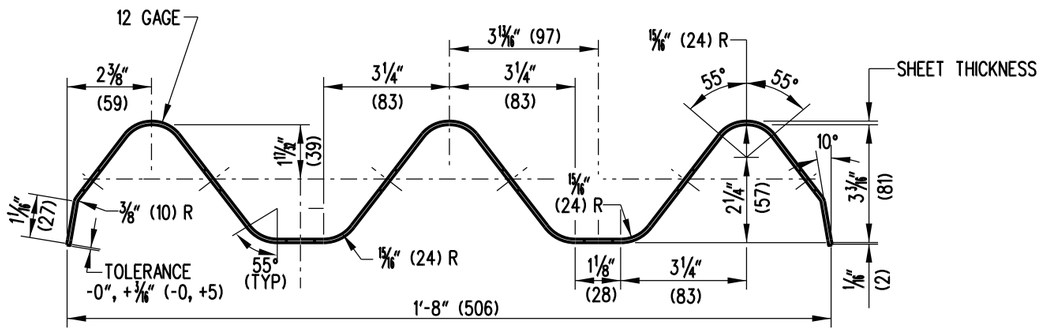
SCALE : N.T.S.



THRIE BEAM ELEVATION



THRIE BEAM EXPANSION ELEMENT

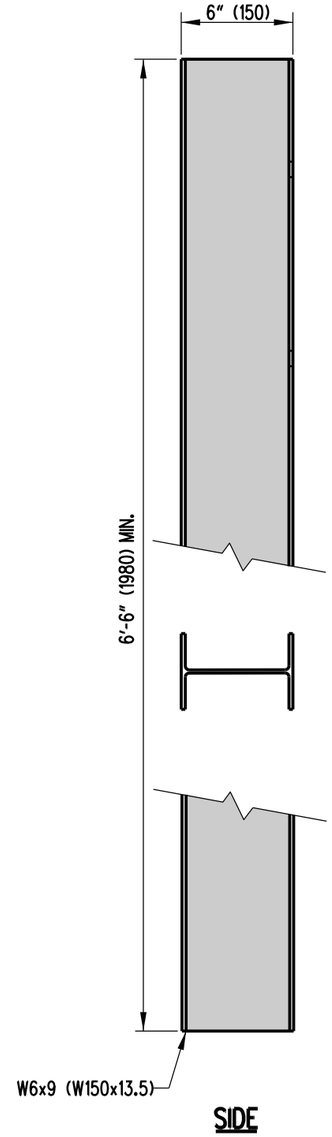


THRIE BEAM SECTION

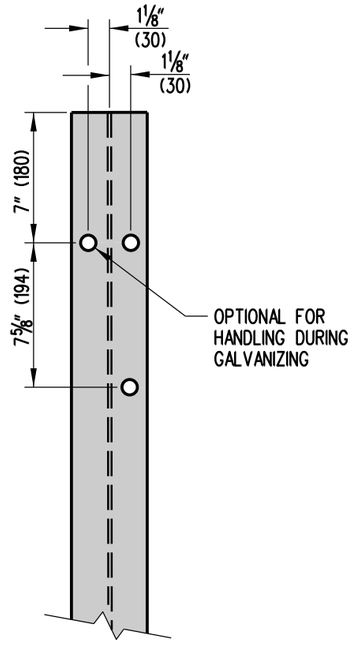
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE			APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER)	12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 4	OF 10	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER)	12/27/2010 (DATE)

09/17/2010

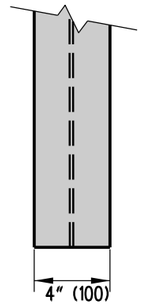
SCALE : N.T.S.



SIDE

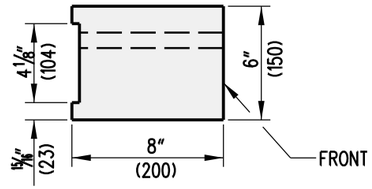


NOTE:
WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)

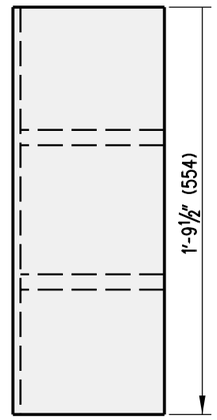


FRONT

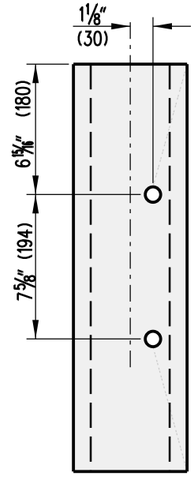
POST (2)



TOP



SIDE



FRONT

OFFSET BLOCK

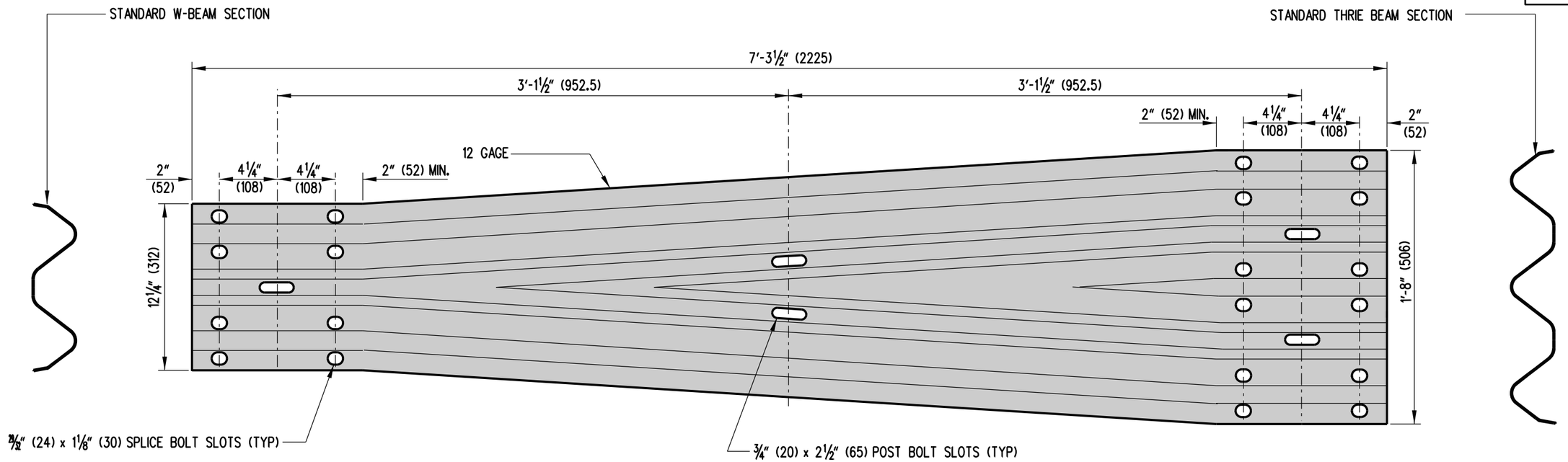
THRIE BEAM STEEL POST AND OFFSET BLOCK

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

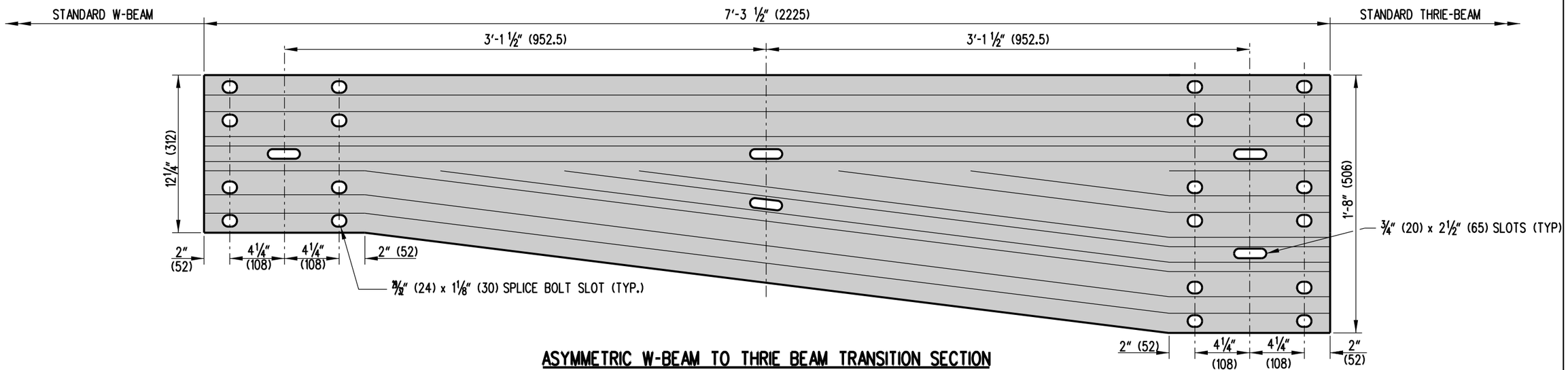
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 5 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

SCALE : N.T.S.



SYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION

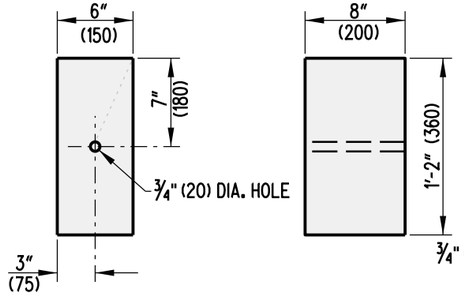


ASYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION

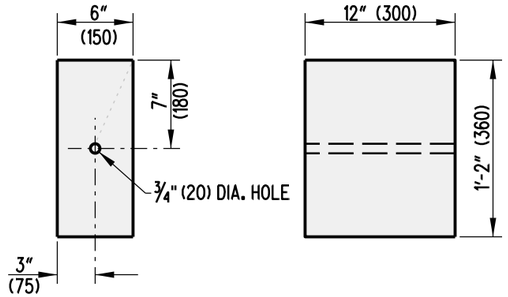
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 6 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

SCALE : N.T.S.

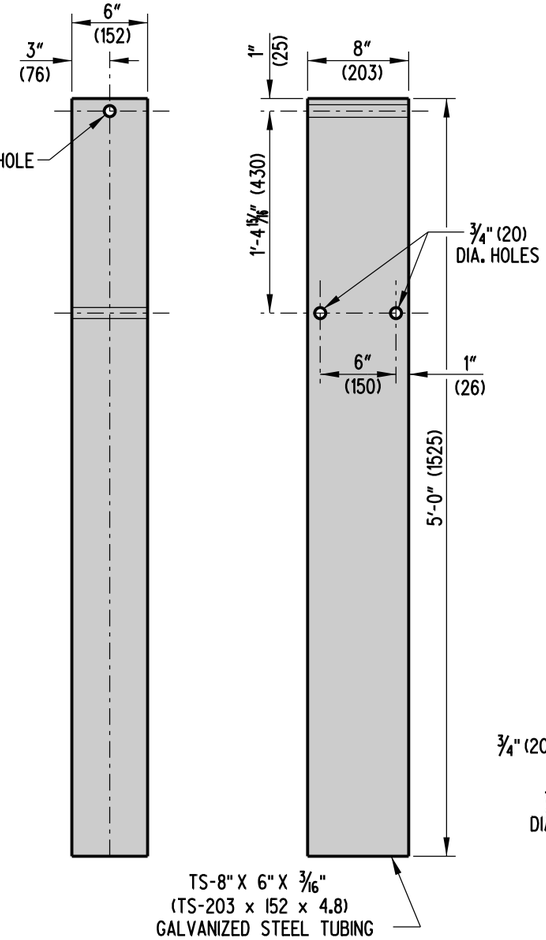


OFFSET BLOCK,
TYPE 27

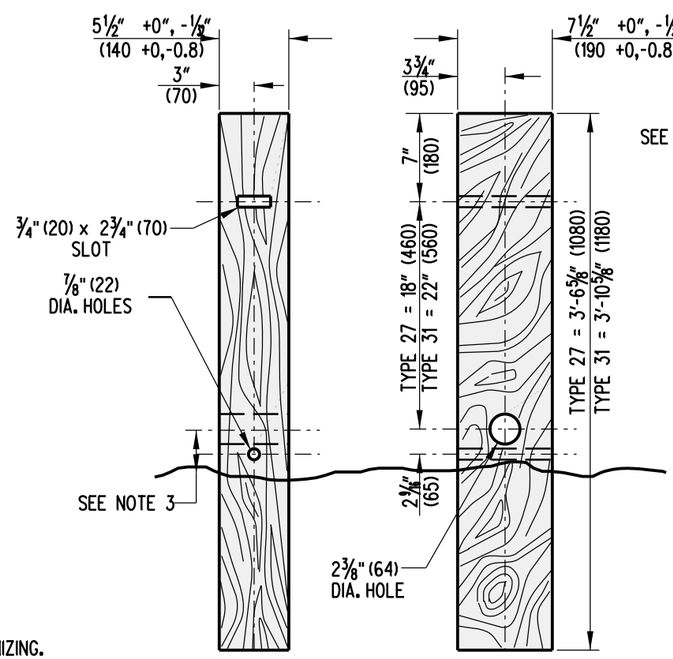


OFFSET BLOCK,
TYPE 31

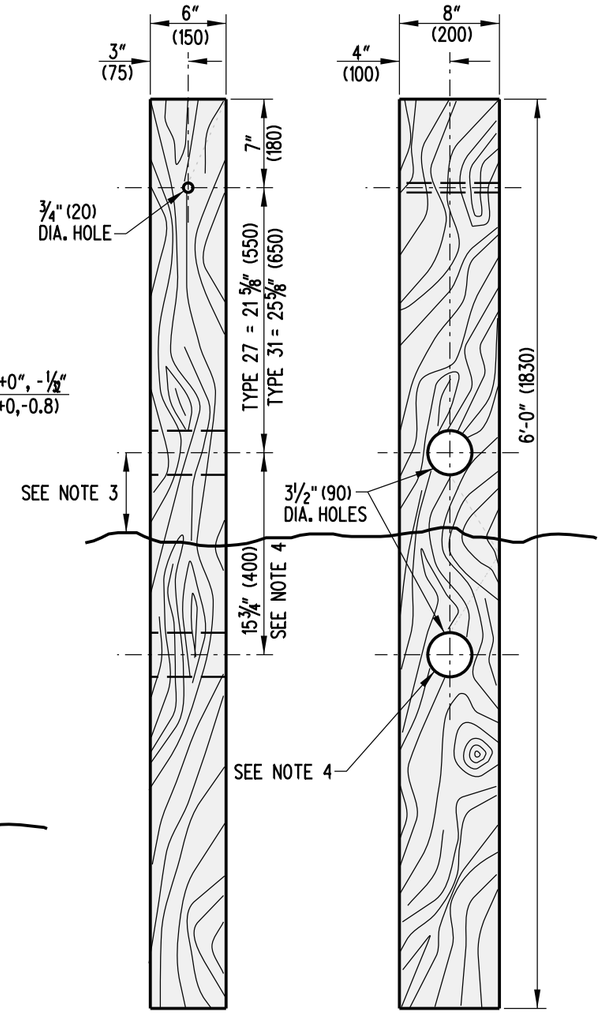
SOIL PLATE



STEEL TUBE



SHORT WOOD BREAKAWAY POST



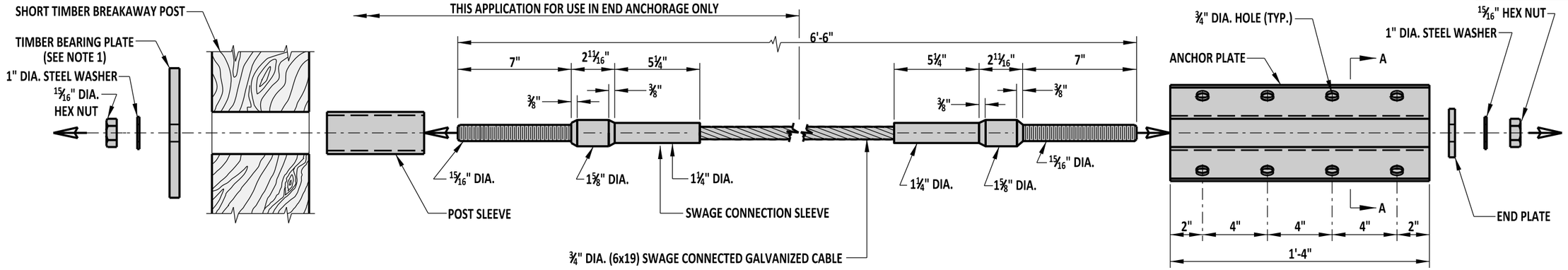
LONG WOOD BREAKAWAY POST

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.

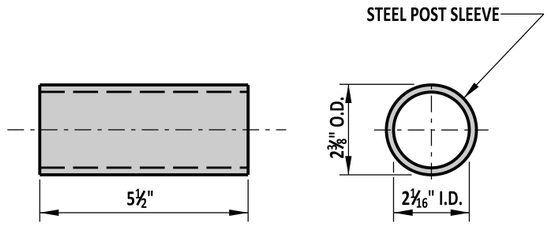
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 7 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/17/2010

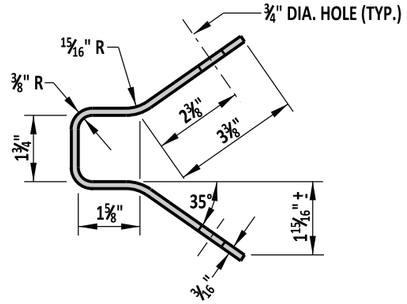
SCALE : NTS



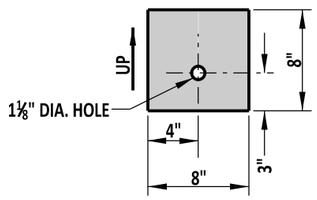
SWAGED CABLE ASSEMBLAGE AND RELATED HARDWARE ASSEMBLY



POST SLEEVE

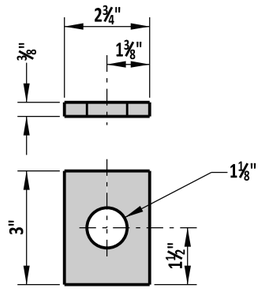


SECTION A-A

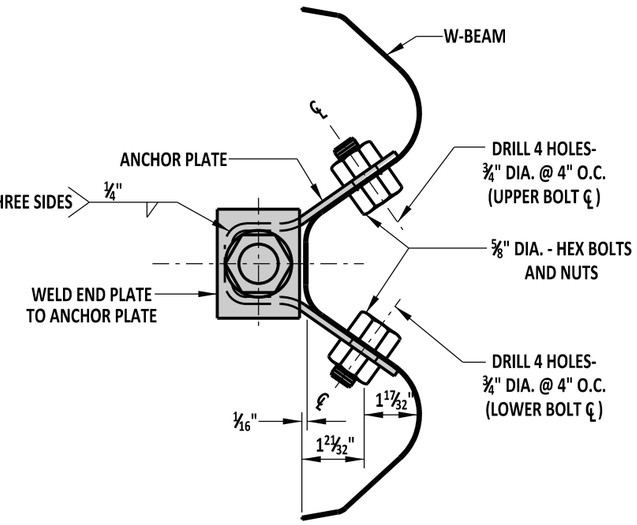


TIMBER BEARING PLATE

5/8" THICKNESS



END PLATE



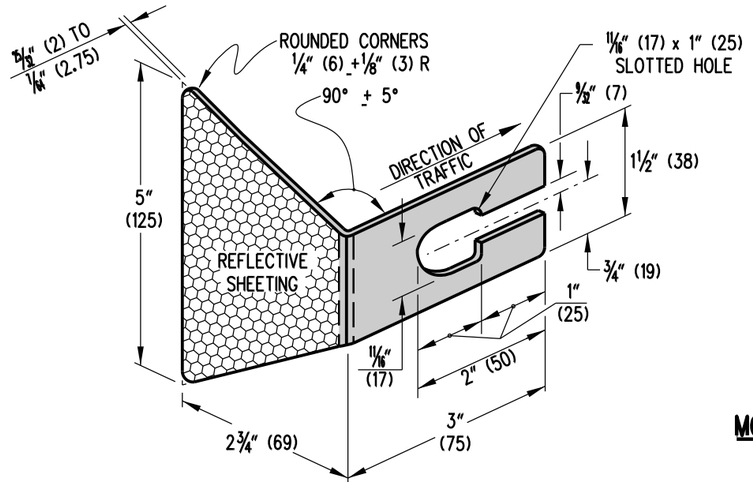
ANCHOR PLATE TO W-BEAM CONNECTION DETAIL

NOTES:
1). PLACE A ½" WIDE GALVANIZED RETAINING TIE STRAP AROUND THE SHORT TIMBER BREAKAWAY POST AND TIMBER BEARING PLATE TO ENSURE PROPER ORIENTATION OF THE TIMBER BEARING PLATE.
2). TIGHEN ASSEMBLY UNTIL CABLE IS TAUGHT.
3). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

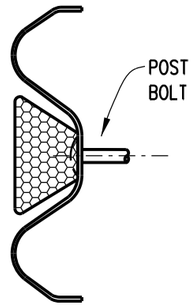
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER)	01/07/2013 (DATE)
	STANDARD NO. B-13 (2012)	SHT. 8 OF 10	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER)	12/20/2012 (DATE)

12/4/2012

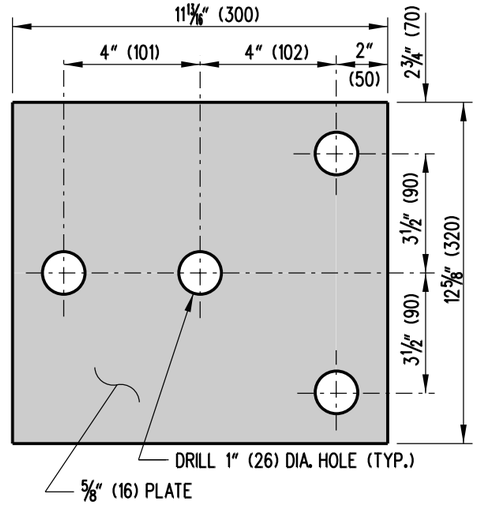
SCALE : N.T.S.



GUARDRAIL DELINEATOR



MOUNTING POSITION

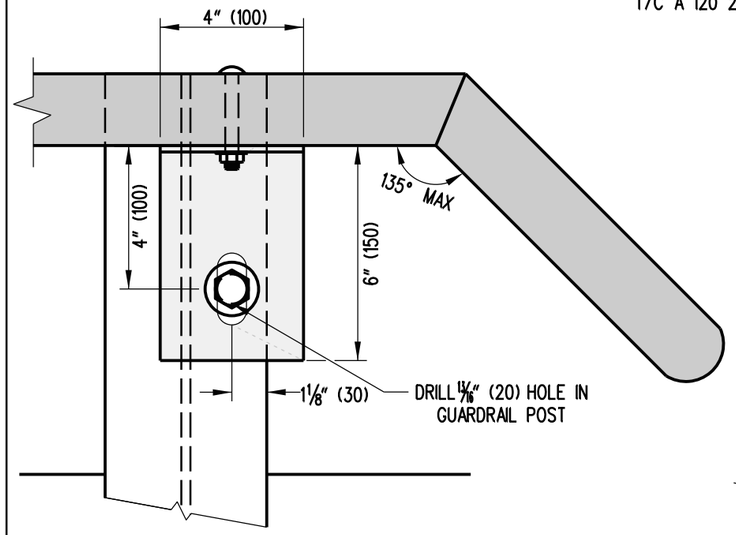


W-BEAM BEARING PLATE DETAIL (11)

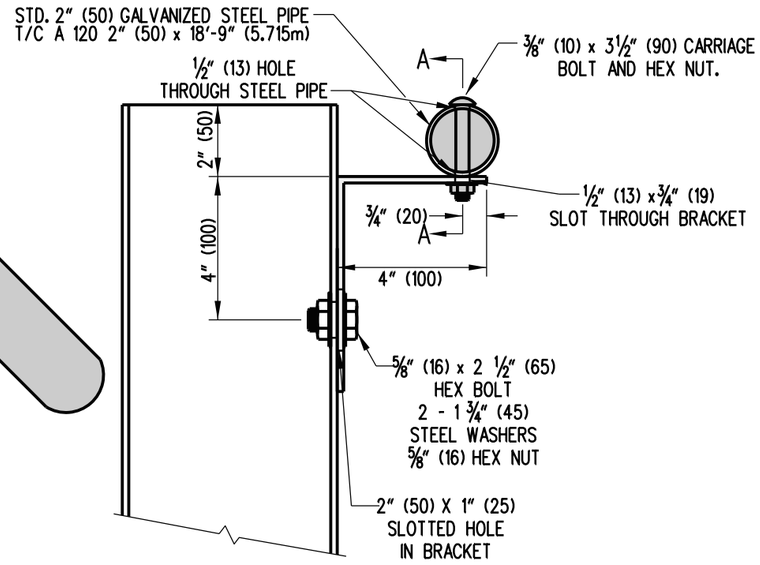
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010)	SHT. 9 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/14/2010

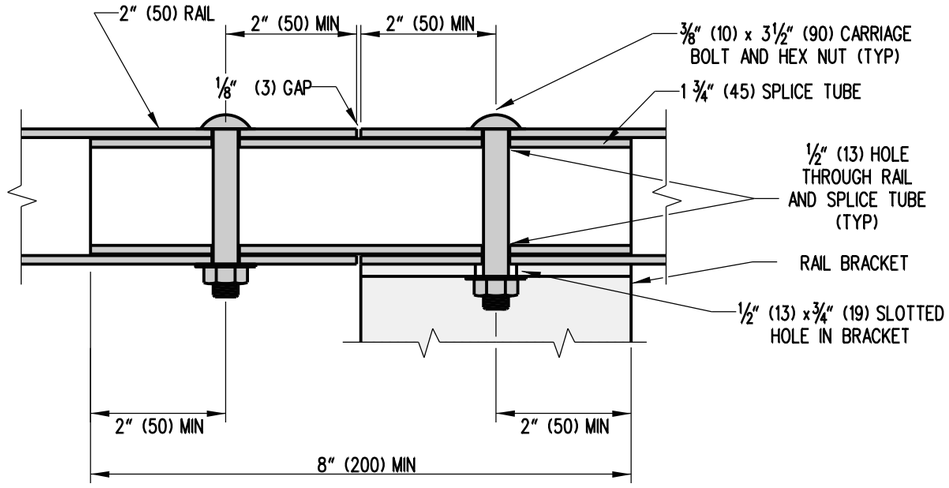
SCALE : N.T.S.



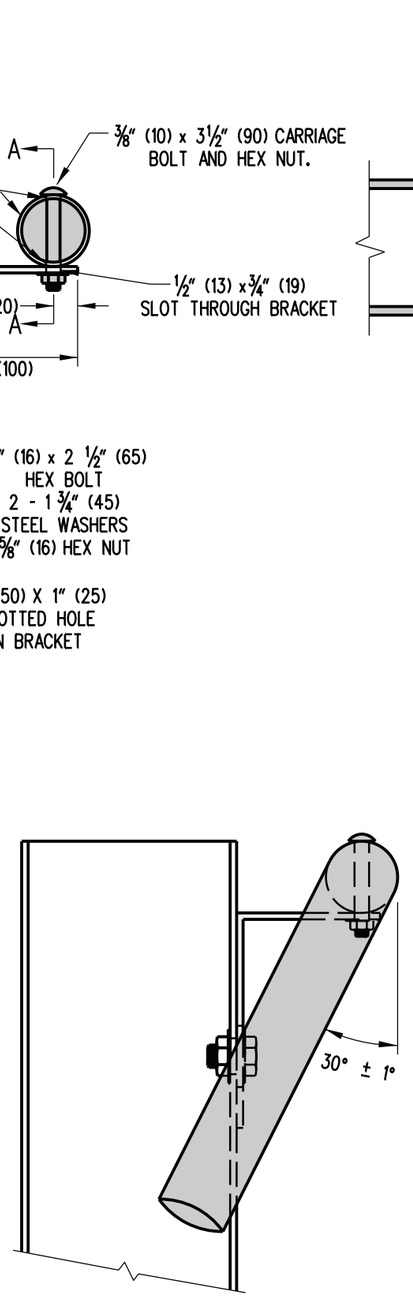
REAR VIEW WITH START & END SECTION



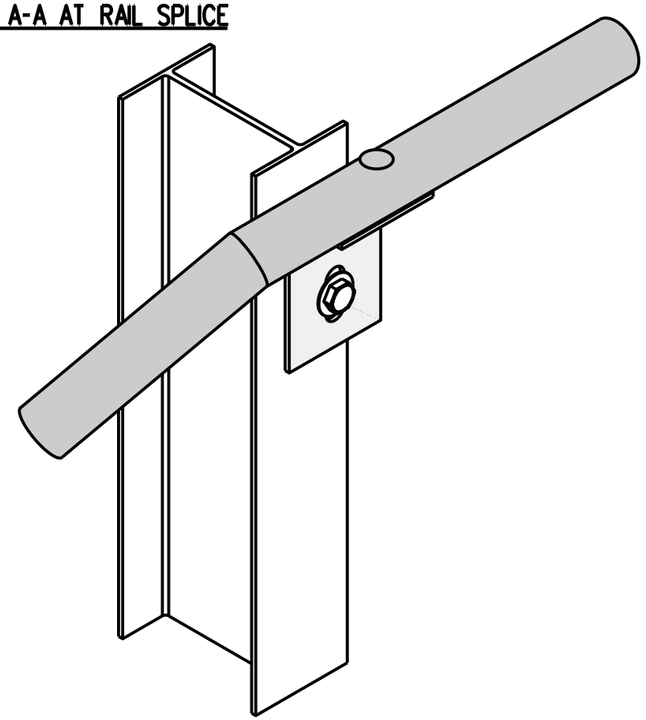
SIDE VIEW



SECTION A-A AT RAIL SPLICE



SIDE VIEW WITH START & END SECTION



ISOMETRIC VIEW WITH START & END SECTION

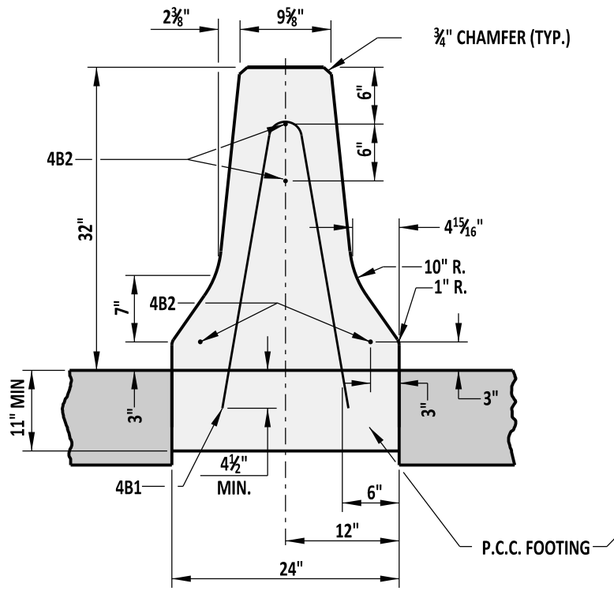
NOTES:

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.

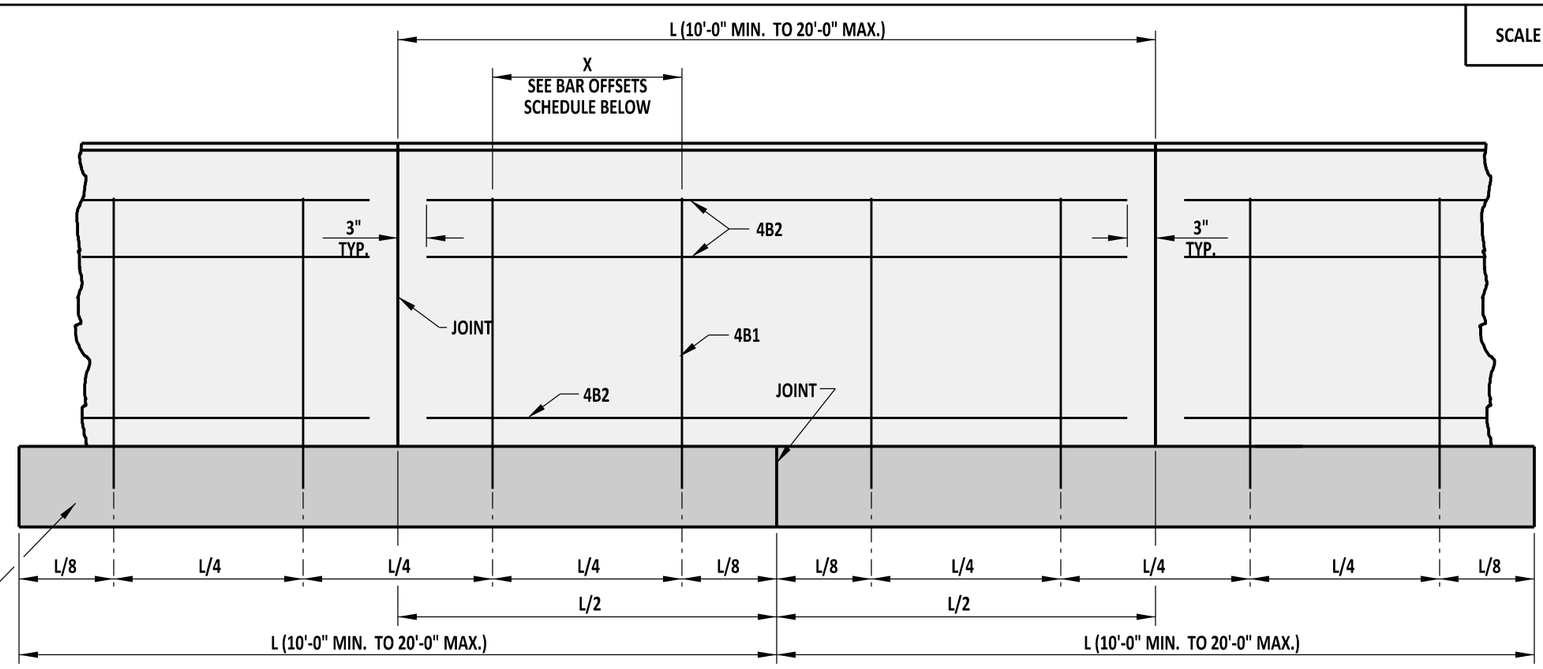
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL MOUNTED RAIL	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-13 (2010) SHT. 10 OF 10	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

08/25/2010

SCALE : NTS

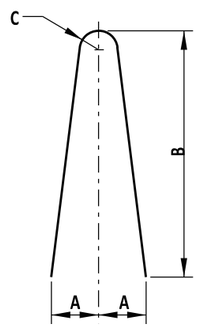


SECTION



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'-0"	5' - 0"	4
18'-0"	4' - 6"	4
16'-0"	4' - 0"	4
14'-0"	3' - 6"	4
12'-0"	3' - 0"	4
10'-0"	2' - 6"	4

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

* THE LENGTH OF BAR 4B2 SHALL BE 6" 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" MIN.
2). FOR SLIP-FORM CONSTRUCTION, THE 4B2 BARS SHALL BE PLACED AS ONE CONTINUOUS PIECE. THE BARS SHALL OVERLAP A MINIMUM OF 12" IN THIS CASE.
3). FOR SLIP-FORM CONSTRUCTION, A JOINT SHALL BE CUT IN THE BARRIER EVERY 10'-0" AT A MAX DEPTH OF ½"

DELAWARE
DEPARTMENT OF TRANSPORTATION

32" CONCRETE SAFETY BARRIER (F SHAPE)

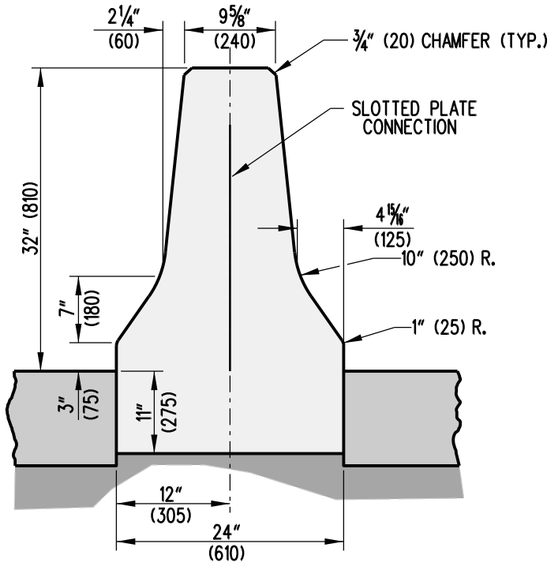
STANDARD NO. B-14 (2012) | SHT. 1 OF 4

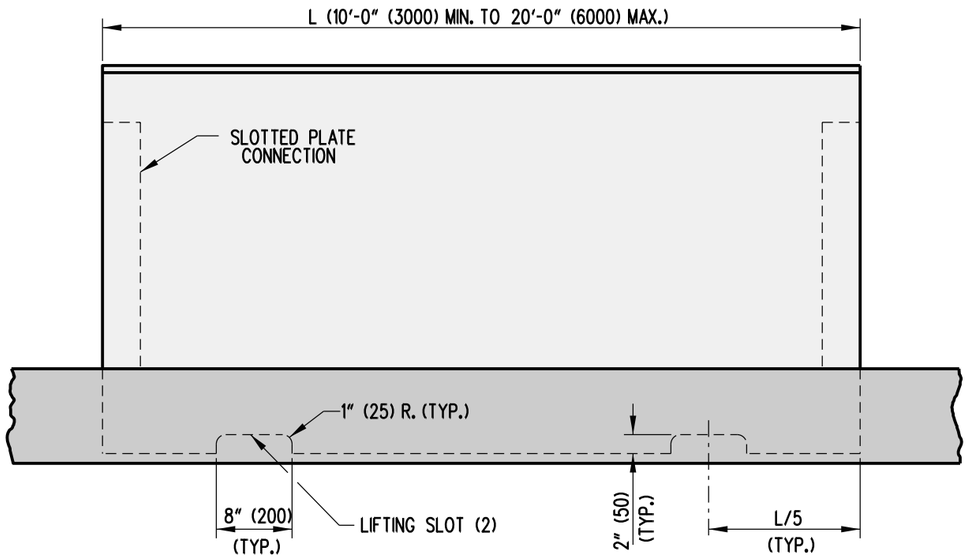
APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)

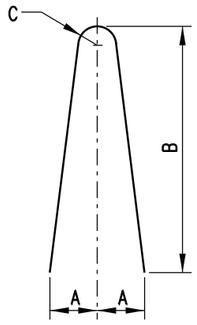
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

SCALE : N.T.S.

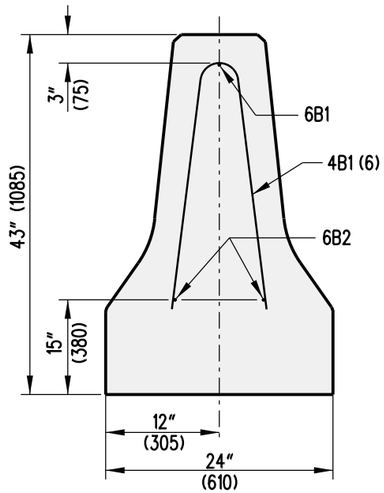




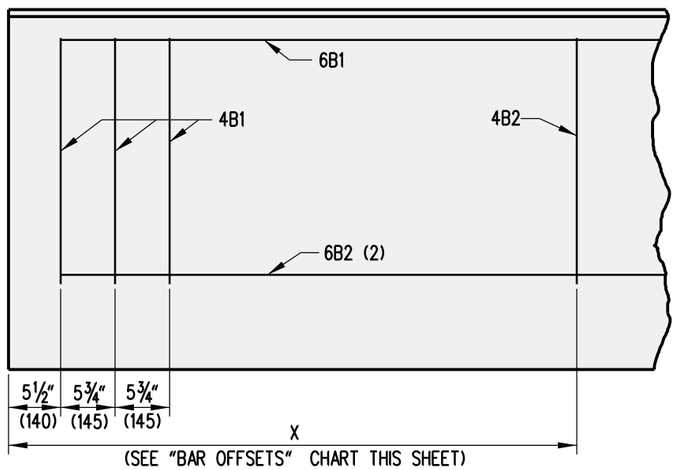


TYPE '1' BAR

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)

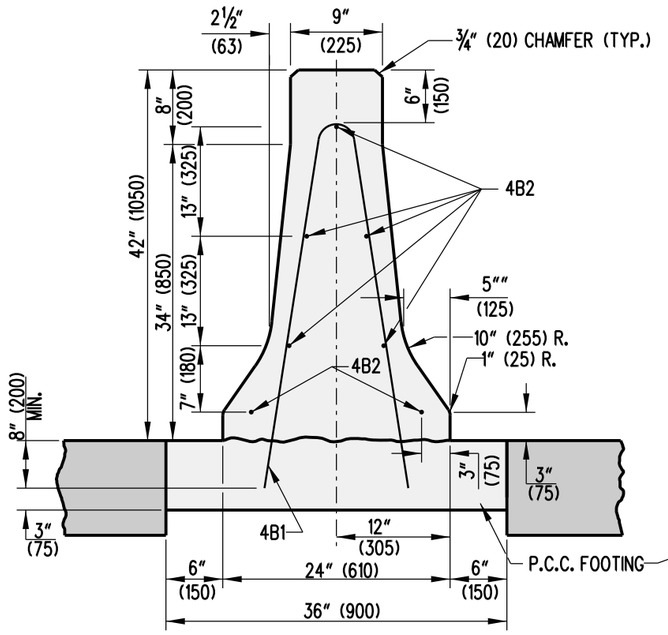
STANDARD NO. B-14 (2009) | SHT. 2 OF 4

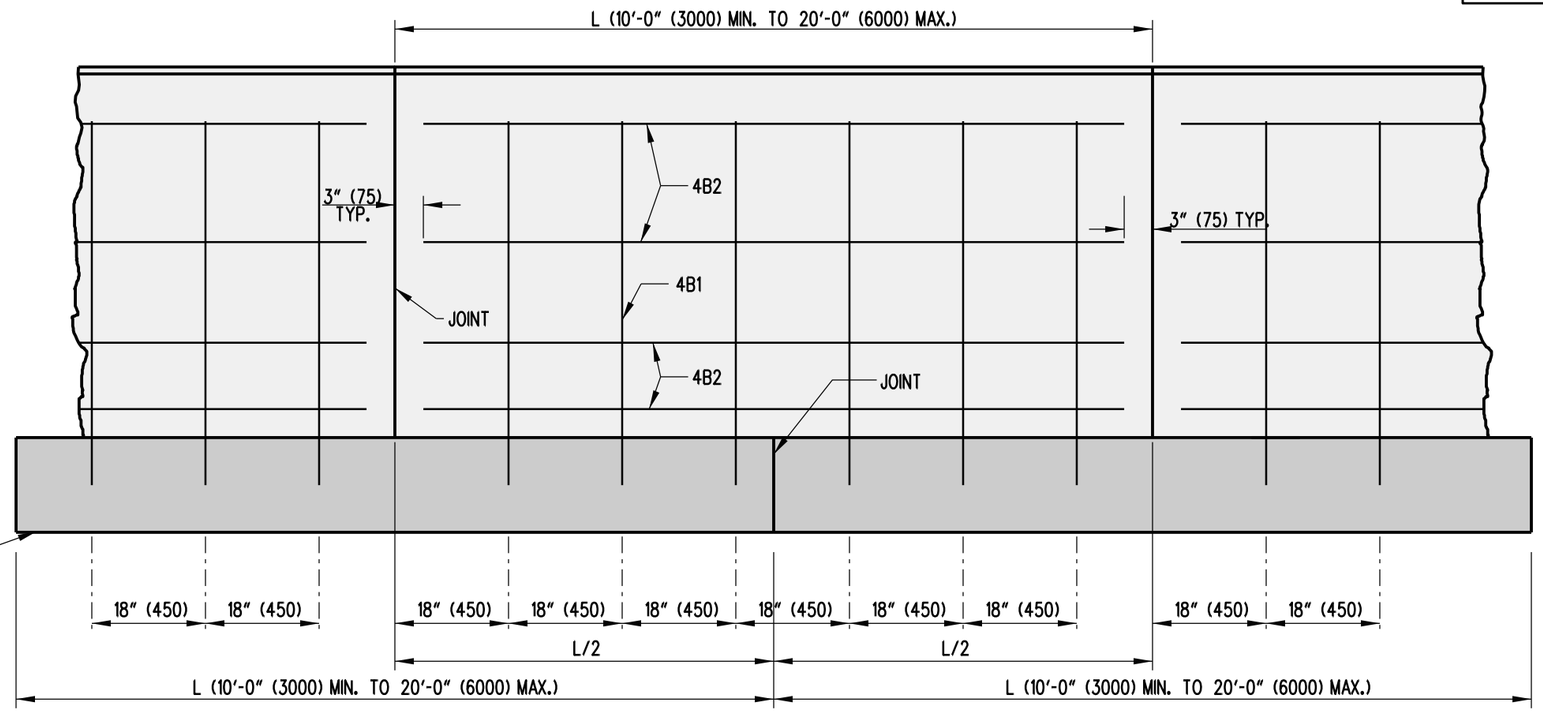
APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE

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

09/18/2009

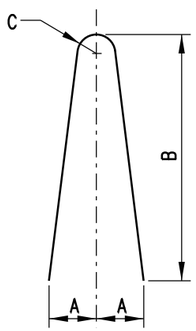
SCALE : N.T.S.





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.

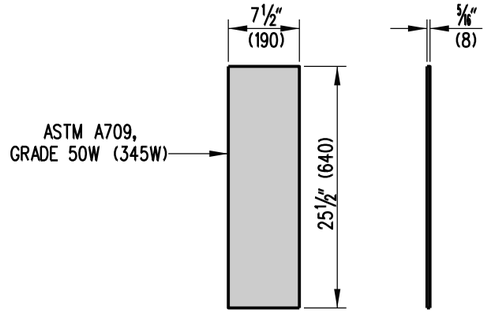
TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

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.

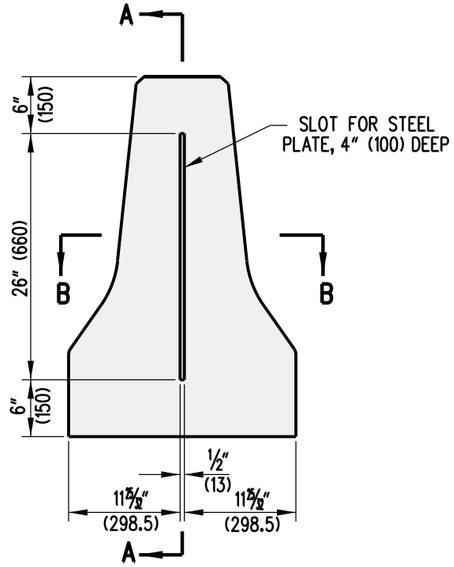
DELAWARE DEPARTMENT OF TRANSPORTATION	42" (1050) CONCRETE BARRIER DETAILS (F-SHAPE)	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-14 (2009) SHT. 3 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/21/2009

SCALE : N.T.S.

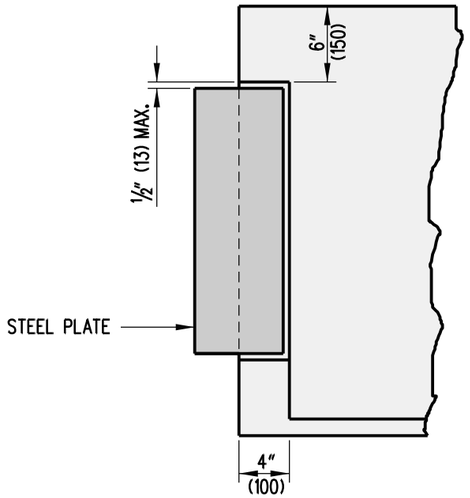


STEEL CONNECTOR PLATE

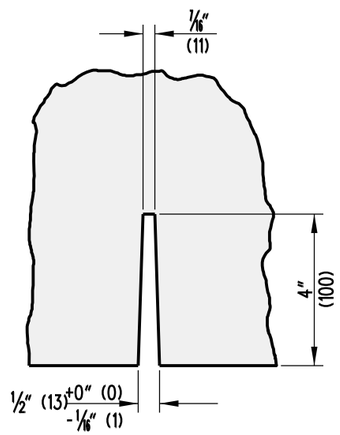


SLOT DIMENSIONS

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



SECTION A-A

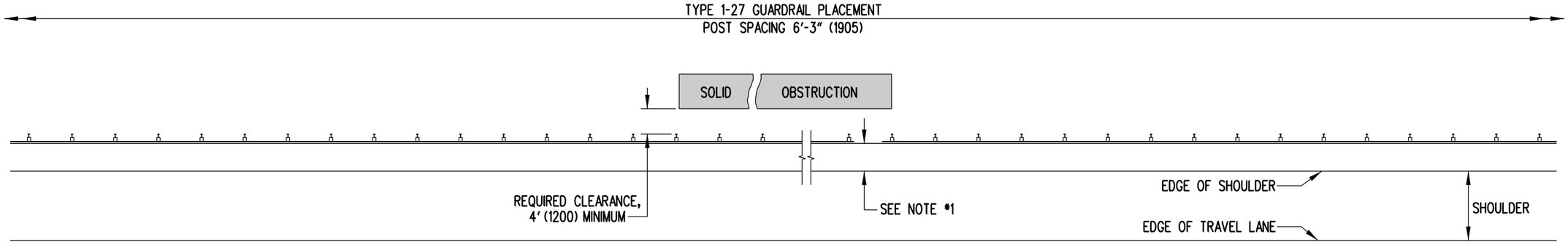


SECTION B-B

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)

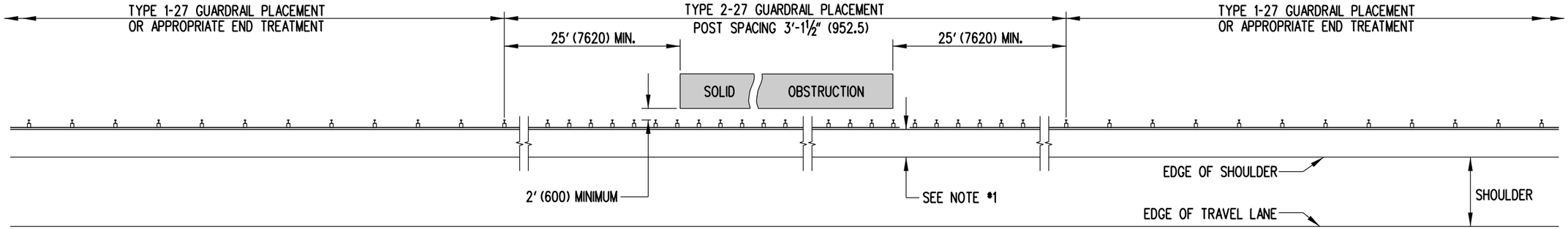
09/18/2009

SCALE : N.T.S.



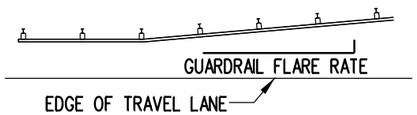
TYPE 1-27 GUARDRAIL

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

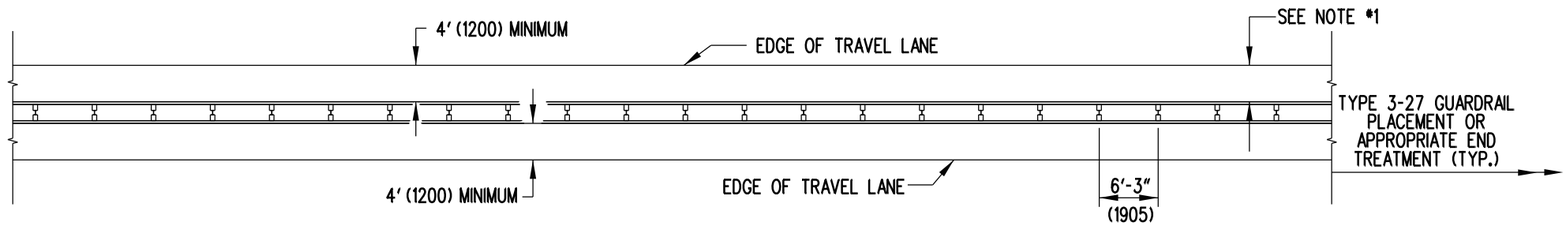


TYPE 2-27 GUARDRAIL

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

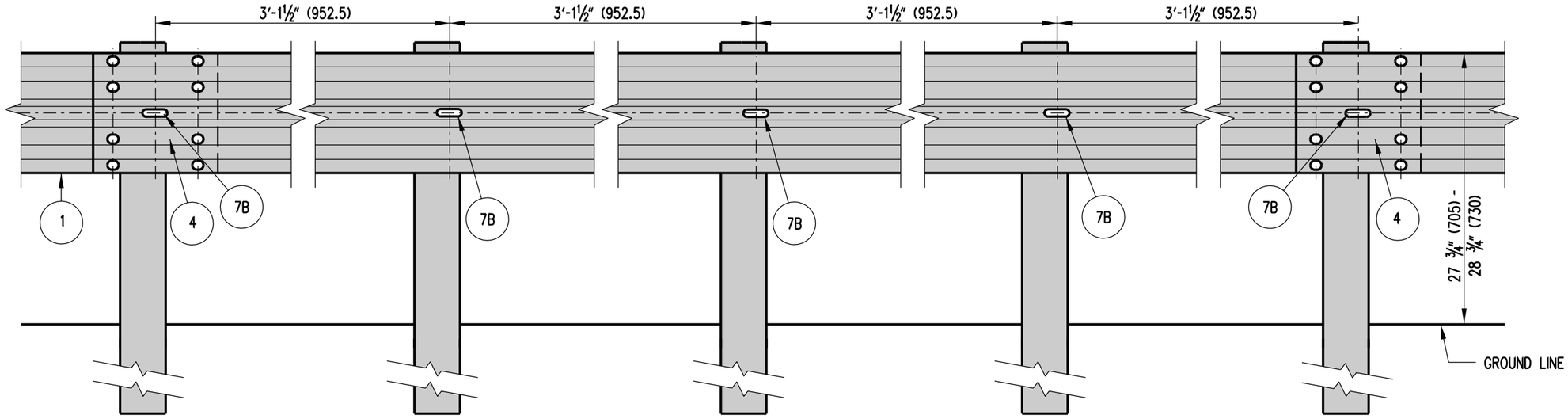
STANDARD NO. B-15 (2010) | **SHT. 1 OF 3**

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

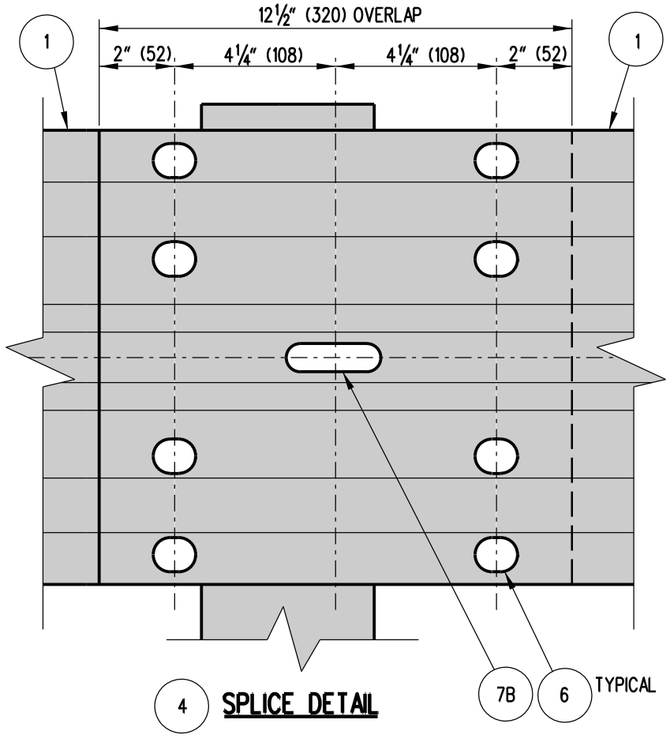
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/03/2010

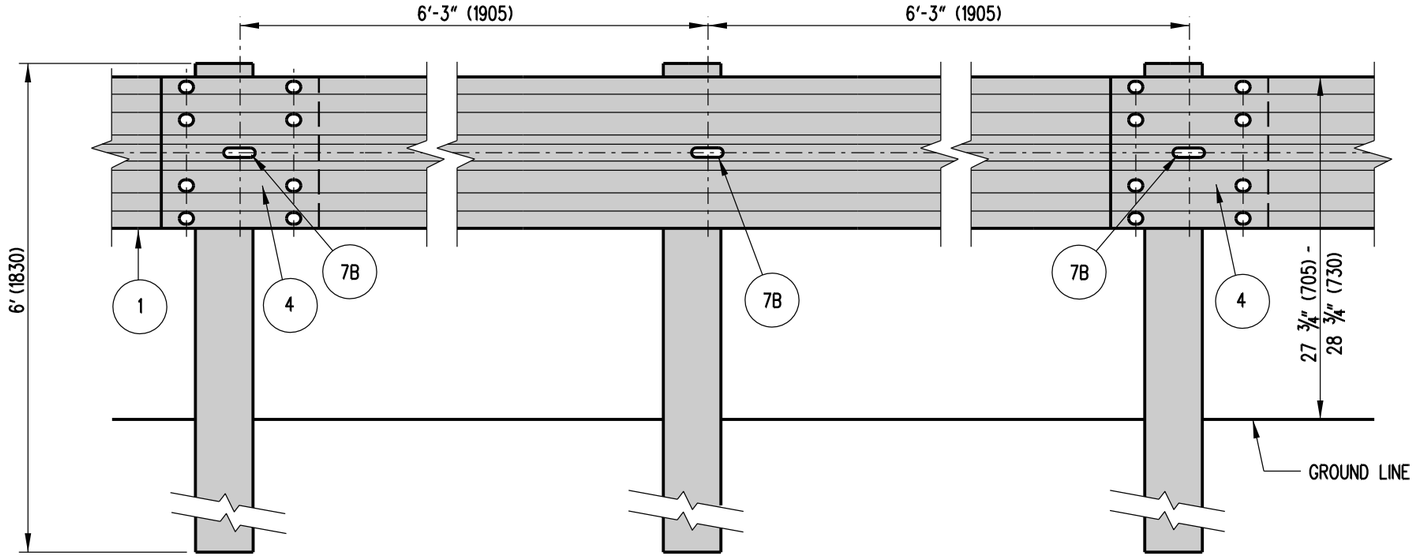
SCALE : N.T.S.



TYPE 2-27



4 SPLICE DETAIL



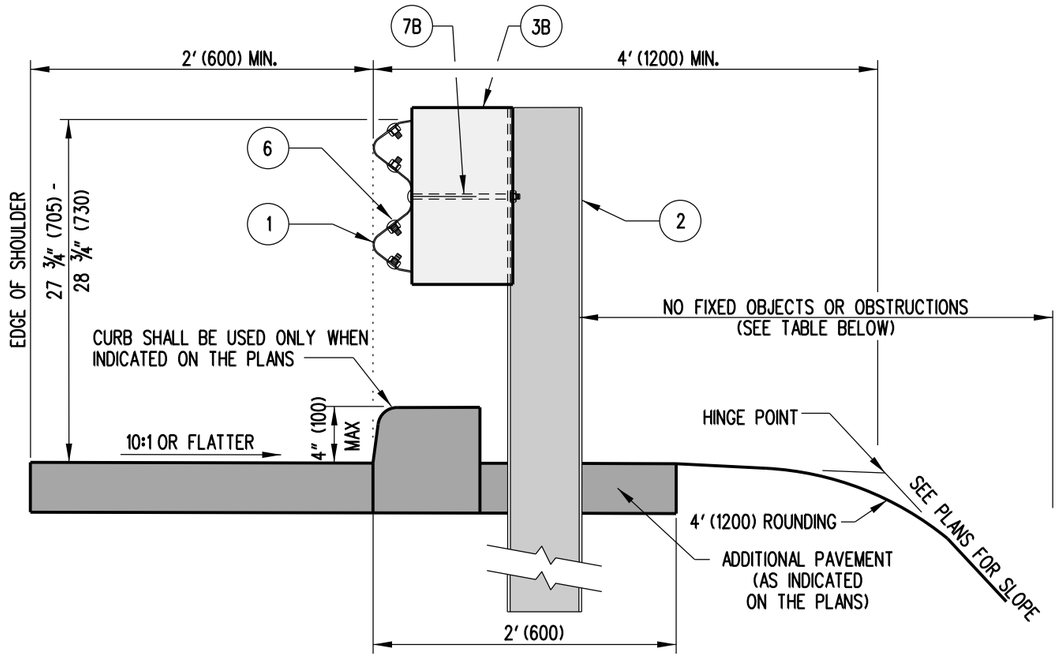
TYPE 1-27 OR 3-27

NOTE : OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.

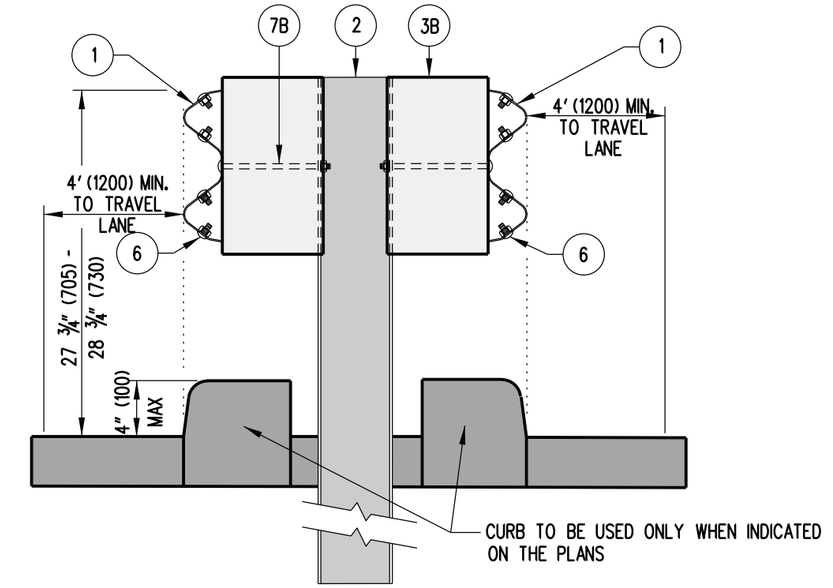
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL APPLICATIONS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-15 (2010)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/20/2010

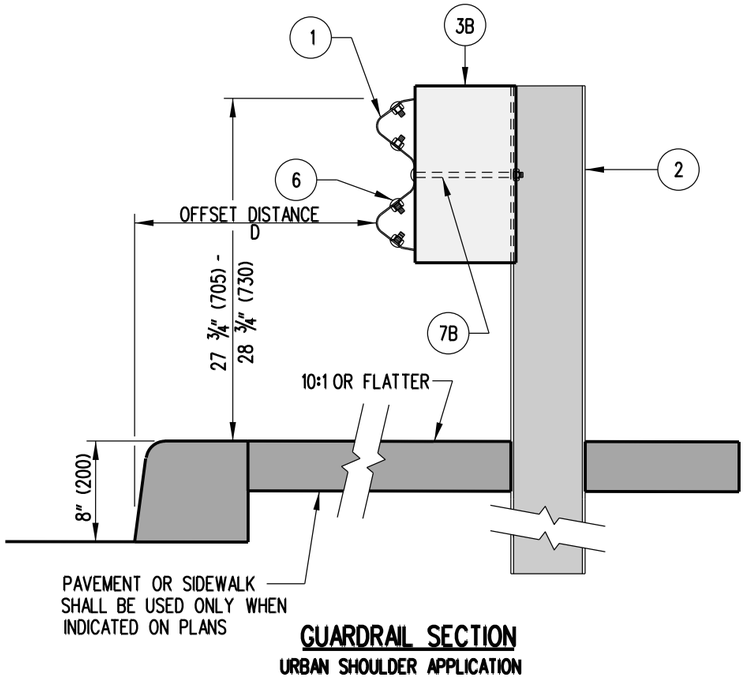
SCALE : N.T.S.



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

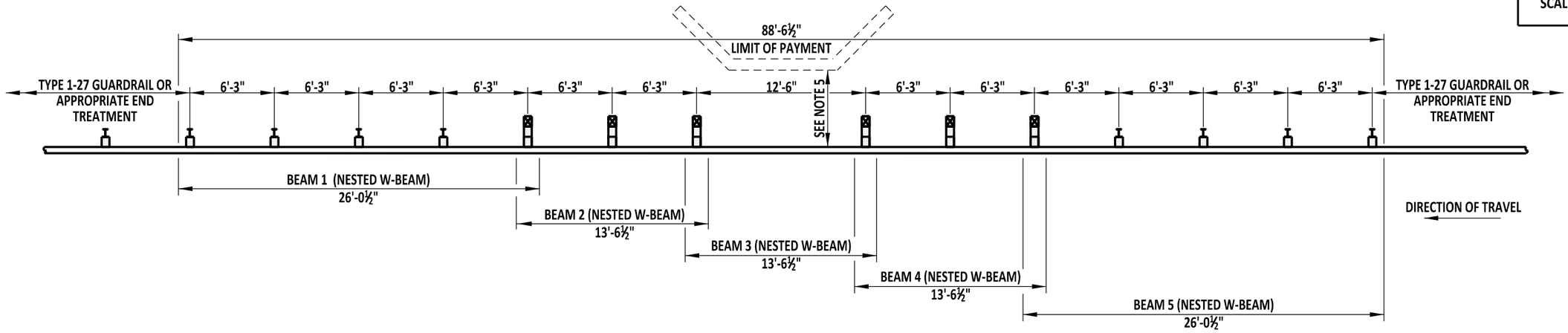
STANDARD NO. B-15 (2010) SHT. 3 OF 3

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

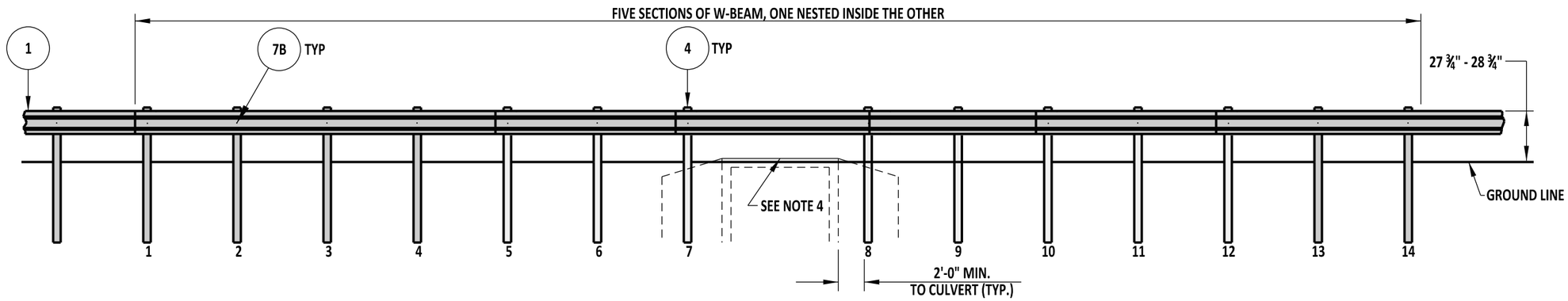
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/20/2010

SCALE : NTS



PLAN



ELEVATION

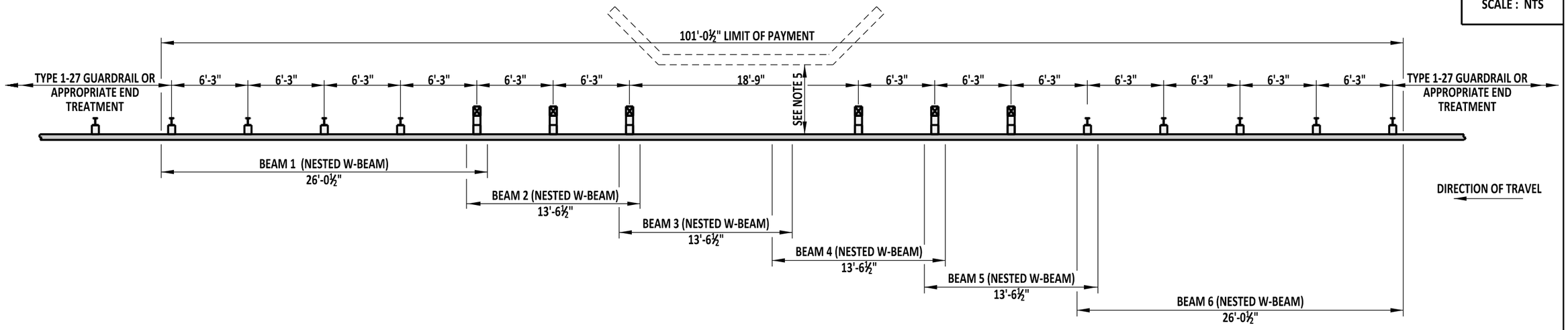
NOTES:

1). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2). POSTS 1 THRU 4 AND 11 THRU 14 ARE TO BE W6X9 STEEL POSTS. POSTS 5 THRU 10 ARE TO BE 6"x8"x6'-0" 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" GUARDRAIL BOLT (L=26").
4). TOP OF HEADWALL SHALL NOT EXCEED 2" ABOVE FINISHED GRADE.
5). TOP OF HEADWALL OR TOP OF BANK SHALL NOT BE CLOSER THAN 5'-0" TO FACE OF GUARDRAIL.

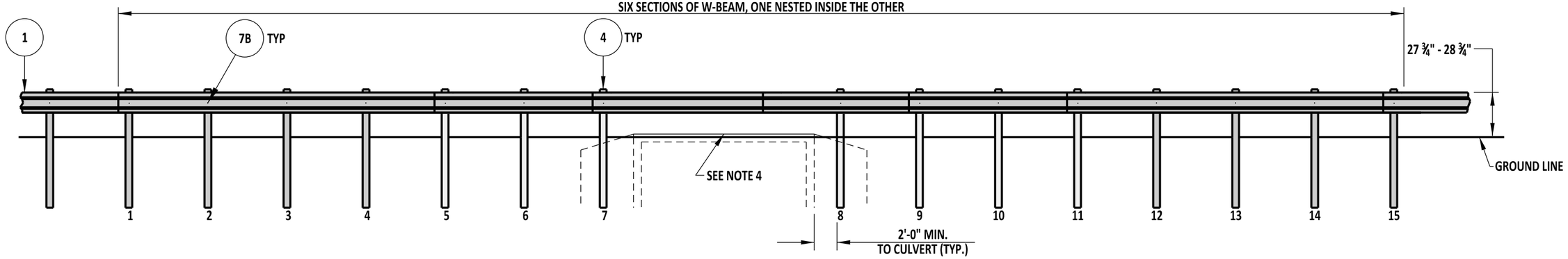
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 1-27		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. B-16 (2013)	SHT. 1 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



PLAN



ELEVATION

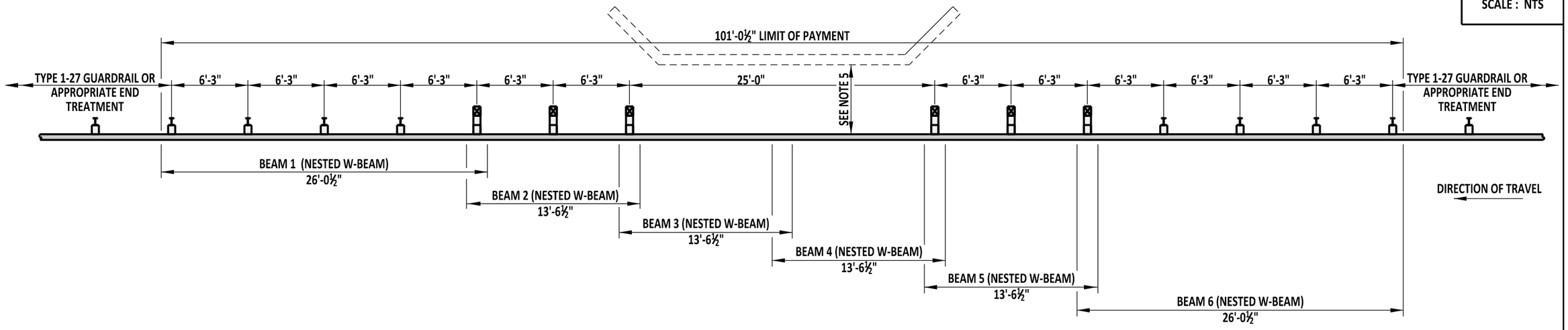
NOTES:

1). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2). POSTS 1 THRU 4 AND 11 THRU 15 ARE TO BE W6X9 STEEL POSTS. POSTS 5 THRU 10 ARE TO BE 6"x8"x6'-0" BREAKAWAY WOOD POSTS WITH 2 WOOD BLOCKS AT EACH OF THESE 6 POSTS.
3). THE SPLICES AT POSTS 5, 7, & 9 ARE TO USE ⅝" GUARDRAIL BOLT (L=26").
4). TOP OF HEADWALL SHALL NOT EXCEED 2" ABOVE FINISHED GRADE.
5). TOP OF HEADWALL OR TOP OF BANK SHALL NOT BE CLOSER THAN 5'-0" TO FACE OF GUARDRAIL.

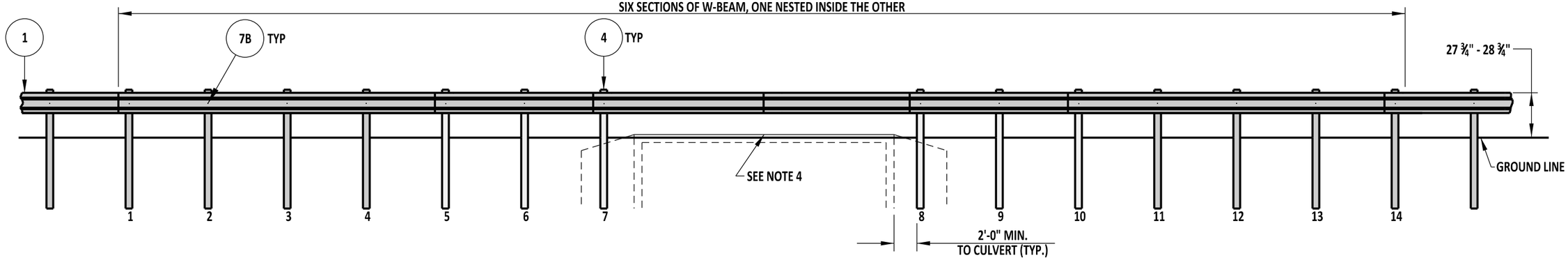
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERTS, TYPE 2-27		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. B-16 (2013)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



PLAN



ELEVATION

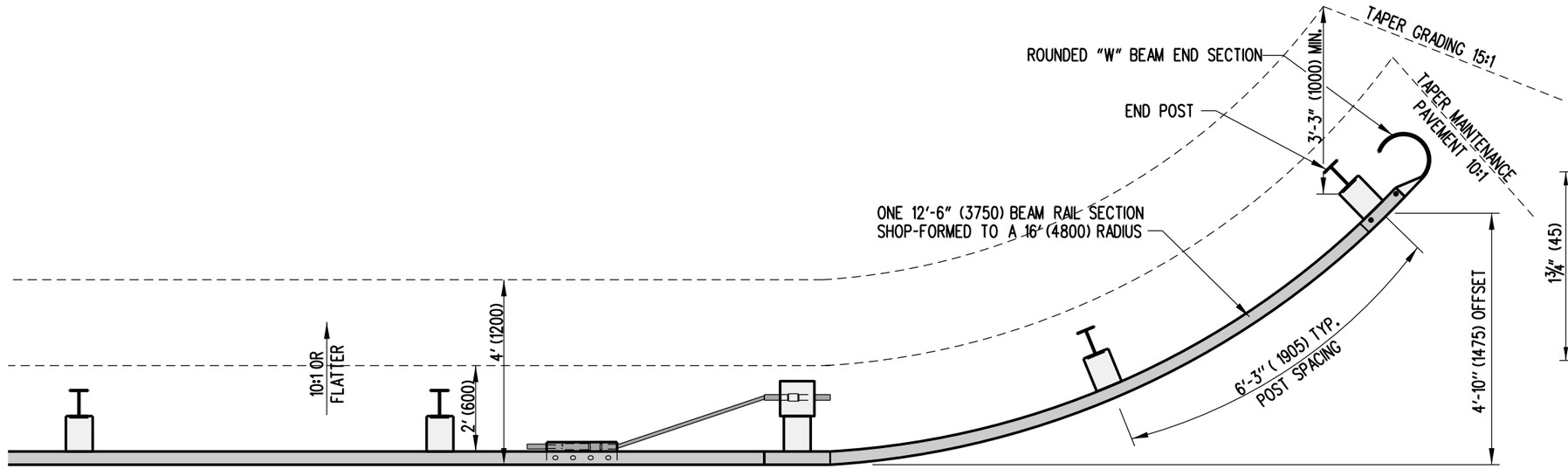
NOTES:

1). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2). POSTS 1 THRU 4 AND 11 THRU 14 ARE TO BE W6X9 STEEL POSTS. POSTS 5 THRU 10 ARE TO BE 6"x8"x6'-0" 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" GUARDRAIL BOLT (L=26").
4). TOP OF HEADWALL SHALL NOT EXCEED 2" ABOVE FINISHED GRADE.
5). TOP OF HEADWALL OR TOP OF BANK SHALL NOT BE CLOSER THAN 5'-0" TO FACE OF GUARDRAIL.

DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL OVER CULVERT, TYPE 3-27		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. B-16 (2013)	SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : N.T.S.



PLAN

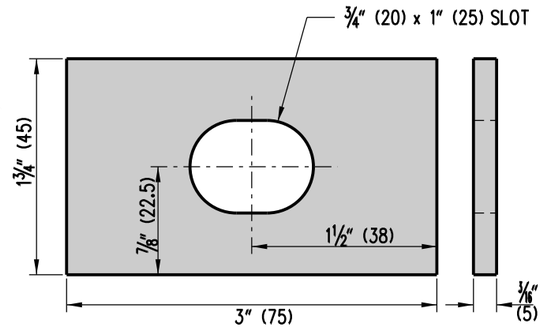
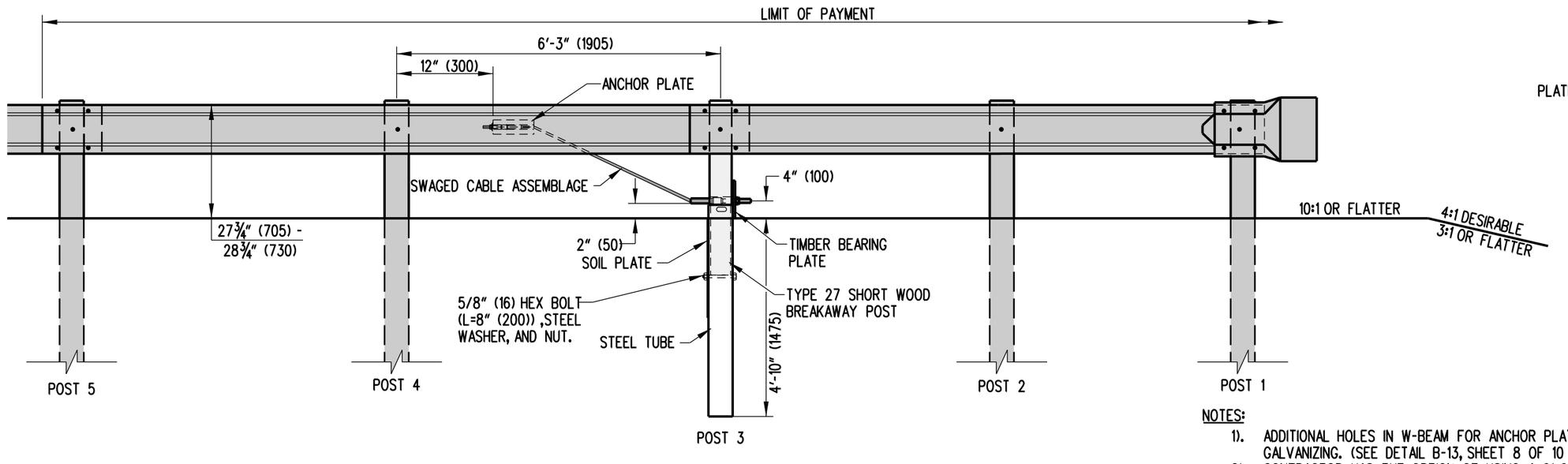


PLATE WASHER DETAIL



ELEVATION

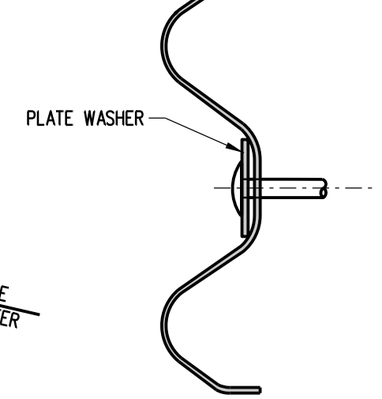


PLATE WASHER MOUNTING POSITION

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

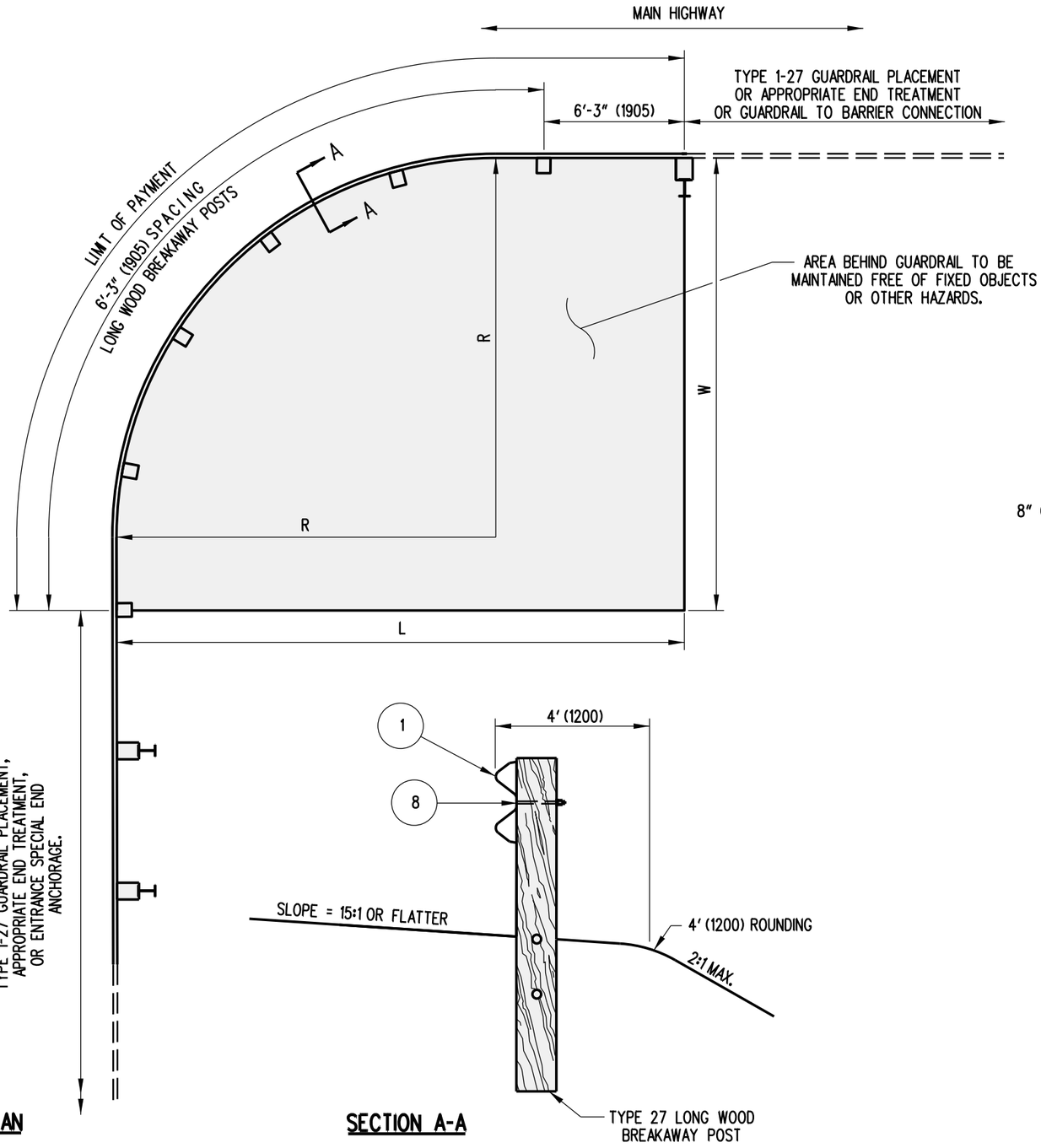
STANDARD NO. B-17 (2010) | **SHT. 1 OF 1**

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.

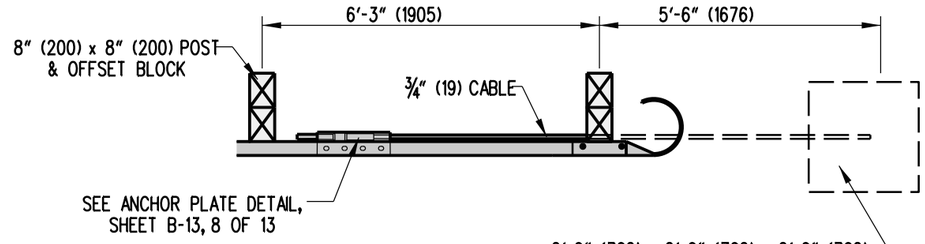


PLAN

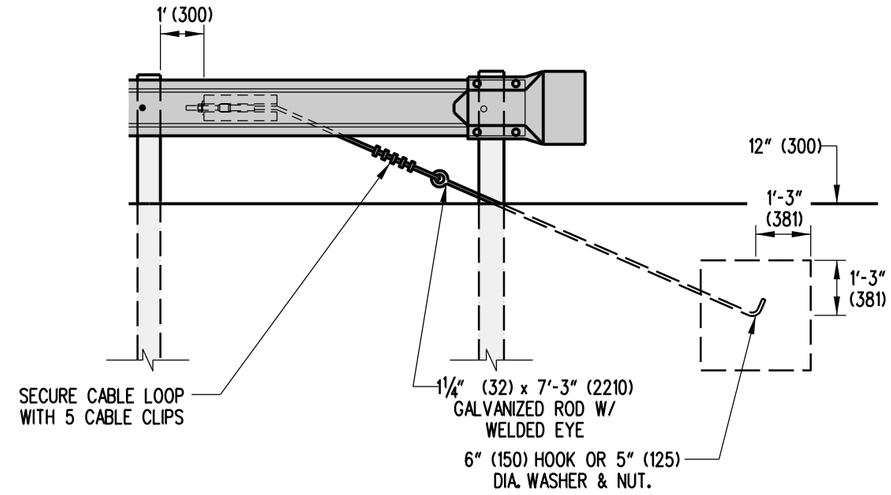
RADIUS	MIN. REQUIRED AREA FREE OF FIXED OBJECTS
	L x W
8'-6" (2600)	25' x 15' (7600 x 4500)
17'-0" (5200)	30' x 15' (9144 x 4500)
25'-6" (7800)	40' x 20' (1200 x 6000)
35'-0" (10700)	50' x 20' (15200 x 6000)

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

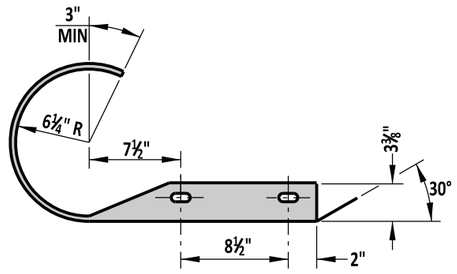
STANDARD NO. B-18 (2010) | **SHT. 1 OF 1**

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

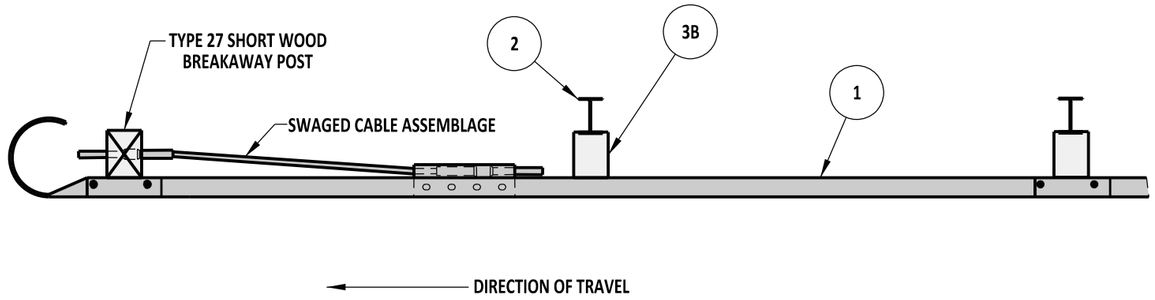
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/03/2010

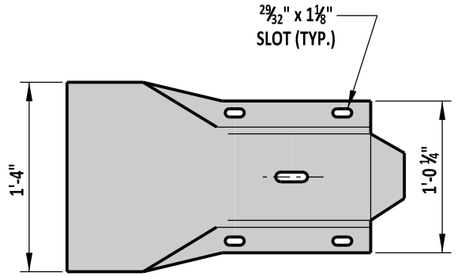
SCALE : NTS



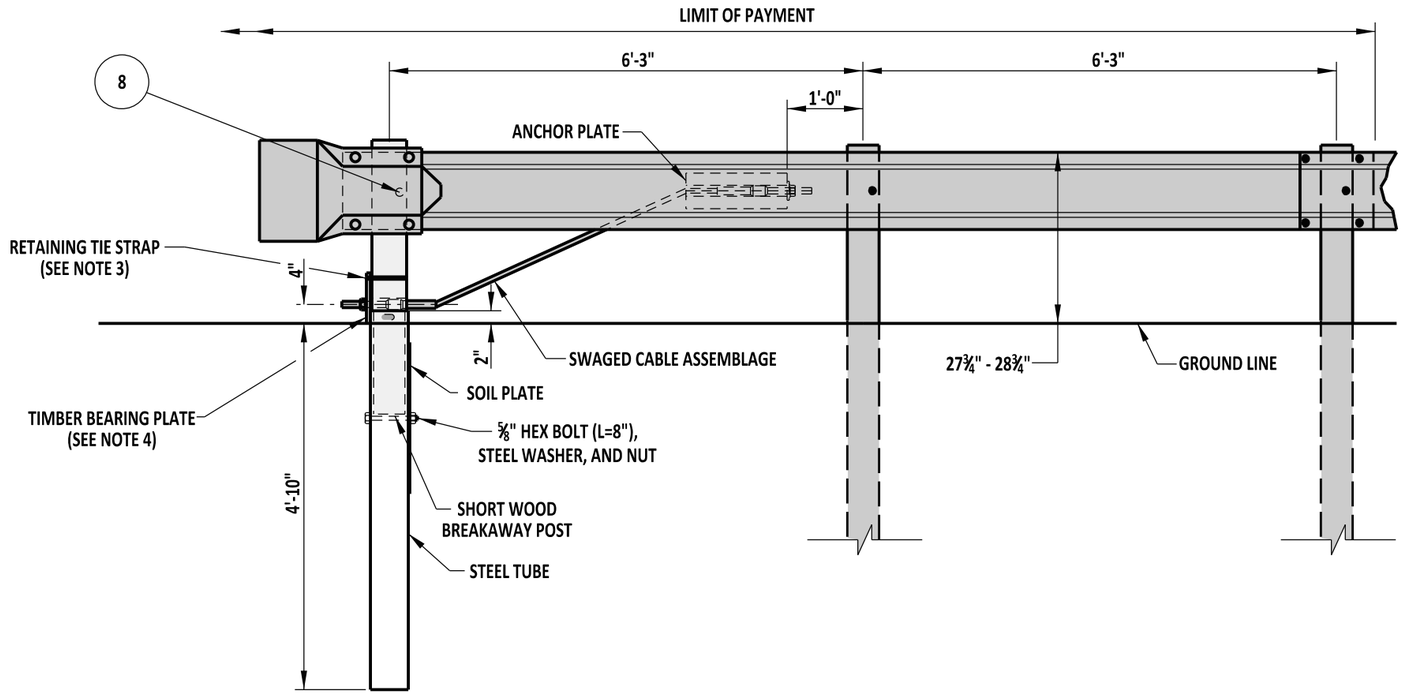
END SECTION PLAN



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'-0" STEEL TUBE WITHOUT A SOIL PLATE OR A 5'-0" STEEL TUBE WITH A SOIL PLATE.
3). PLACE A ½" WIDE PLASTIC RETAINING TIE STRAP AROUND THE SHORT TIMBER BREAKAWAY POST AND TIMBER BEARING PLATE TO ENSURE THE PROPER ORIENTATION OF THE TIMBER BEARING PLATE.
4). REFER TO DETAIL B-13, SHEET 8 OF 10 FOR PROPER TIMBER BEARING PLATE ORIENTATION.

DELAWARE
DEPARTMENT OF TRANSPORTATION

END ANCHORAGE, TYPE 27

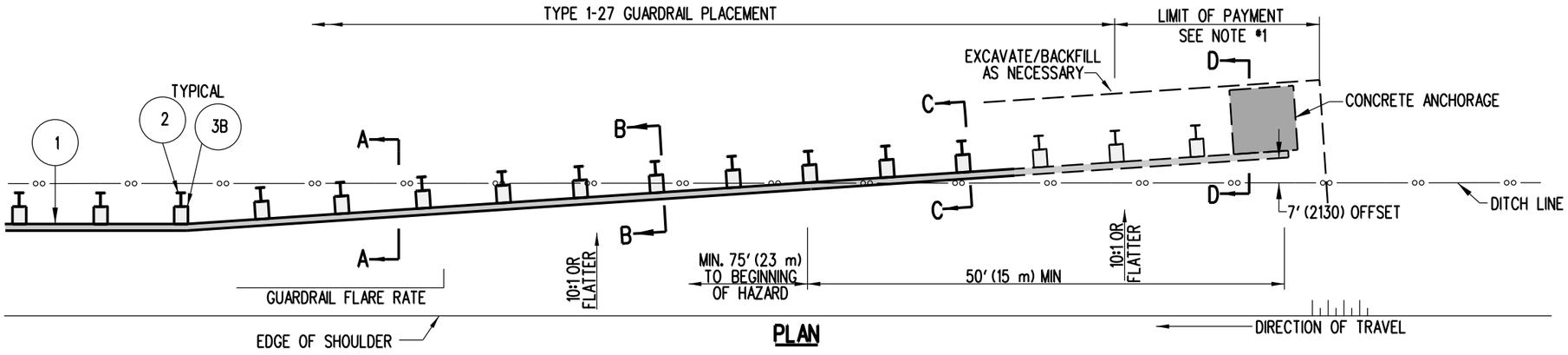
STANDARD NO. B-19 (2012) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)

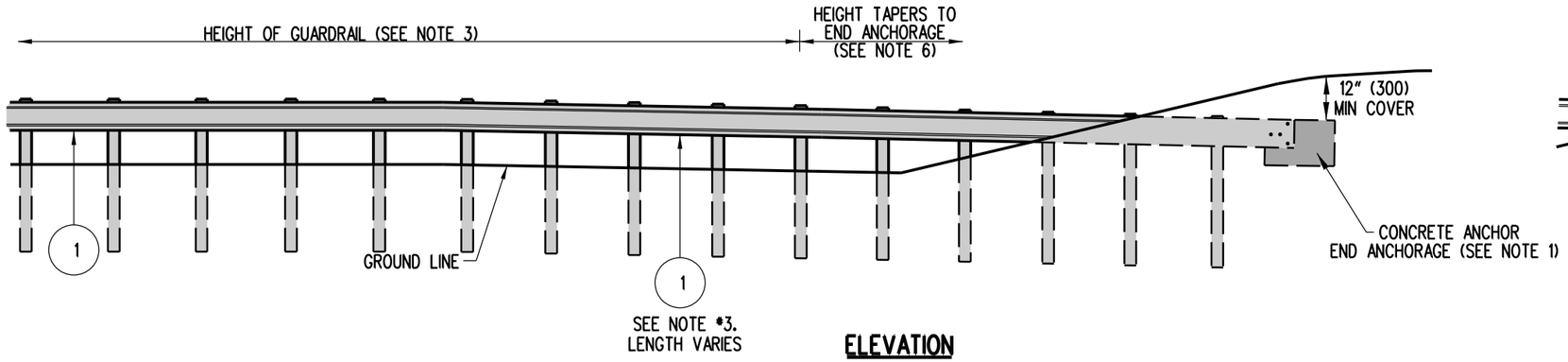
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

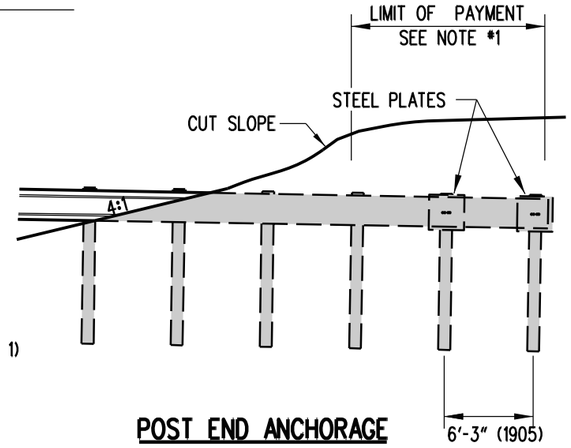
SCALE : N.T.S.



PLAN



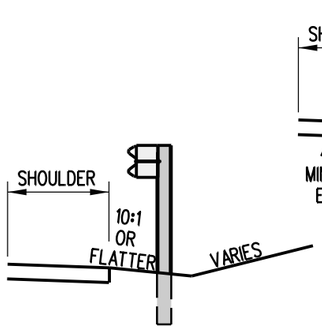
ELEVATION



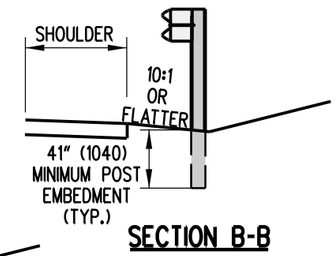
POST END ANCHORAGE

(SINGLE RAIL)

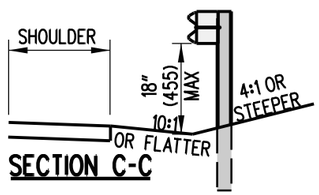
FLARE RATES	
DESIGN SPEED	FLARE RATE
70 MPH (110 km/h)	15:1
60 MPH (100 km/h)	14:1
55 MPH (90 km/h)	12:1
50 MPH (80 km/h)	11:1
45 MPH (70 km/h)	10:1
40 MPH (60 km/h)	9:1
30 MPH (50 km/h)	7:1



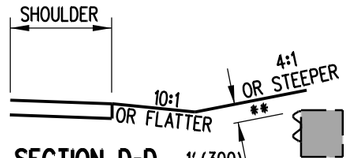
SECTION A-A



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

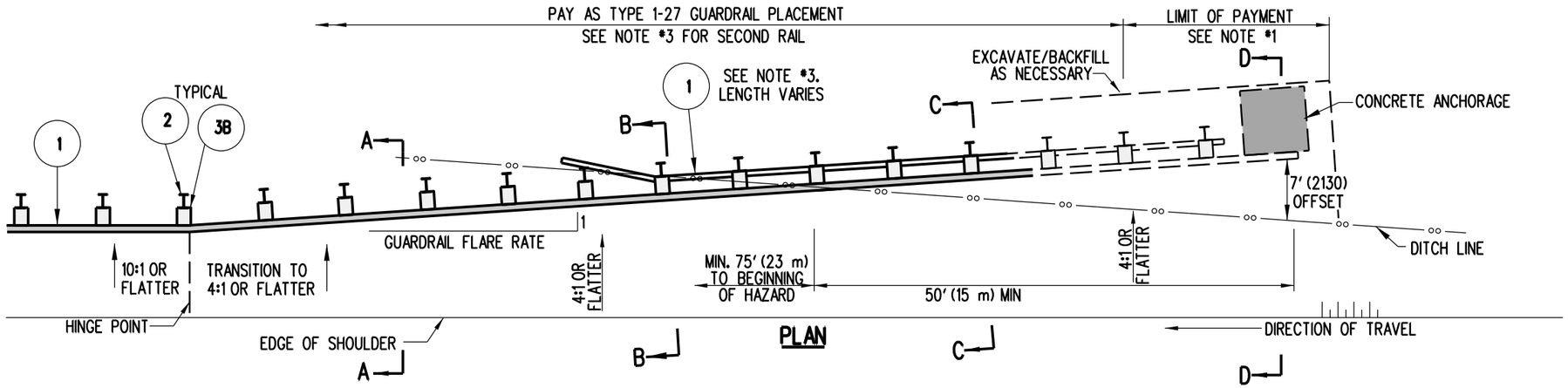
STANDARD NO.	B-20 (2010)	SHT. 1	OF 3

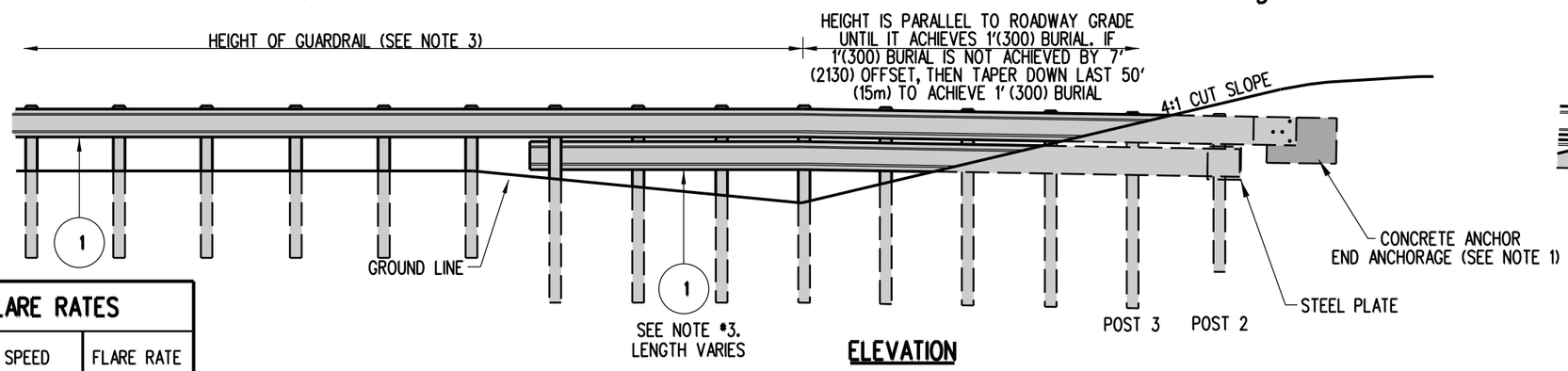
APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 — DATE

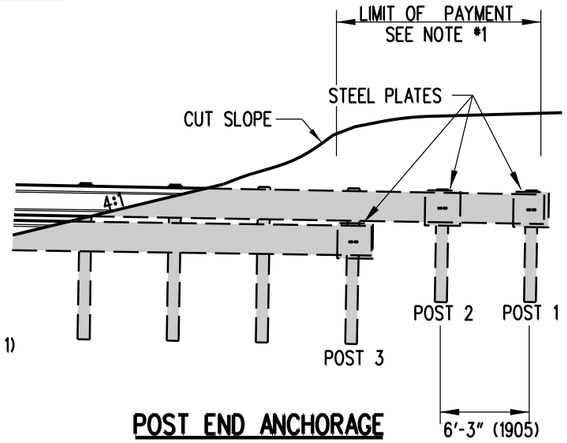
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 — DATE

09/03/2010

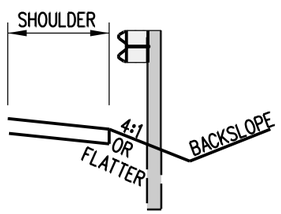
SCALE : N.T.S.

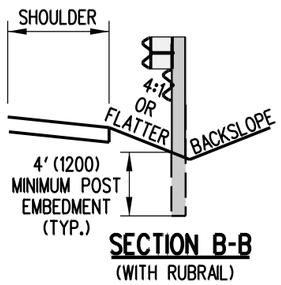


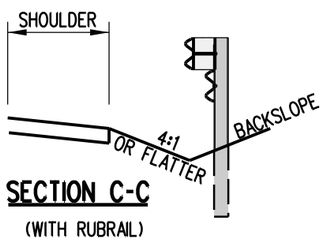


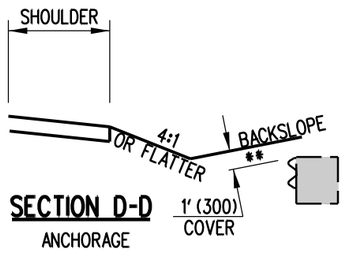


FLARE RATES	
DESIGN SPEED	FLARE RATE
70 MPH (110 km/h)	15:1
60 MPH (100 km/h)	14:1
55 MPH (90 km/h)	12:1
50 MPH (80 km/h)	11:1
45 MPH (70 km/h)	10:1
40 MPH (60 km/h)	9:1
30 MPH (50 km/h)	7:1









** 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

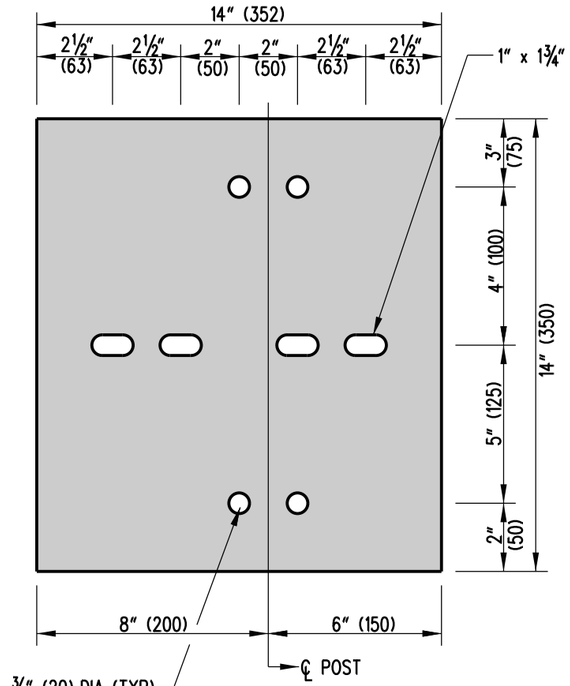
STANDARD NO. B-20 (2010) | **SHT.** 2 **OF** 3

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

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

09/03/2010

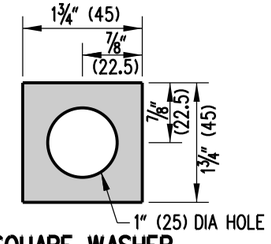
SCALE : N.T.S.



STEEL PLATE - ½" (13) THICK

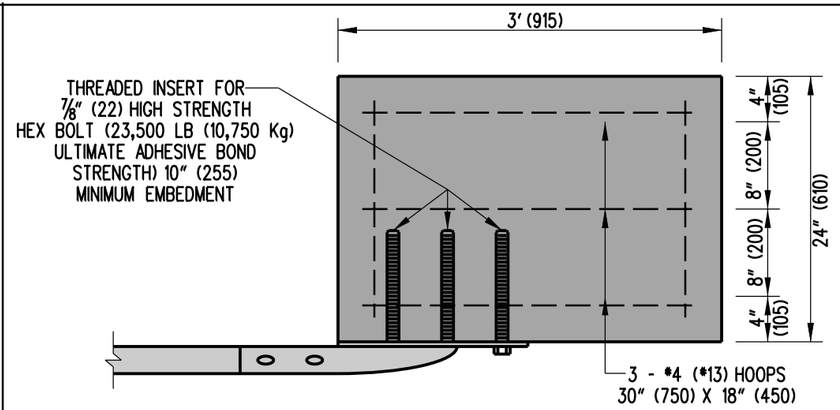
GALVANIZED

NOTE: ALL HOLES TO BE DRILLED PRIOR TO GALVANIZING.

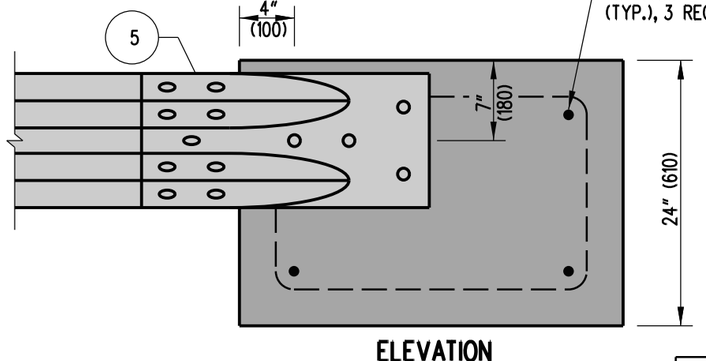


SQUARE WASHER

¼" (6) THICK - GALVANIZED

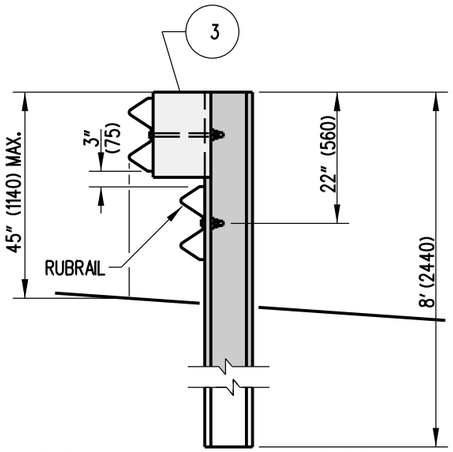


PLAN

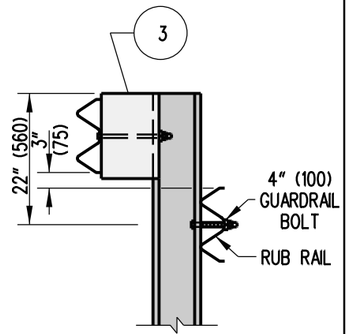


ELEVATION

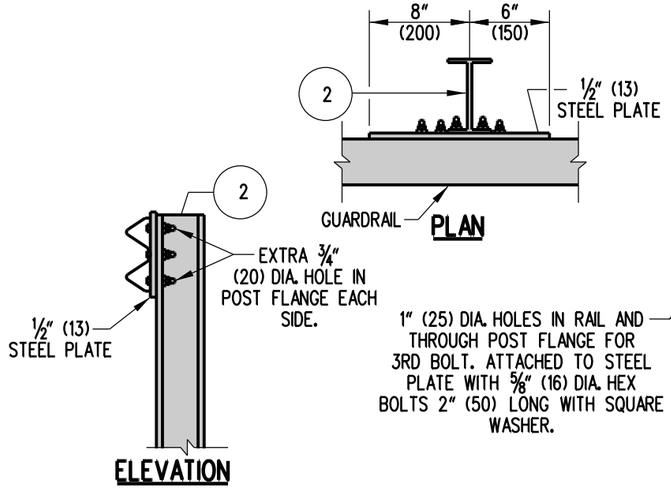
CONCRETE BLOCK ANCHOR



TYPICAL ELEVATION WITH RUBRAIL

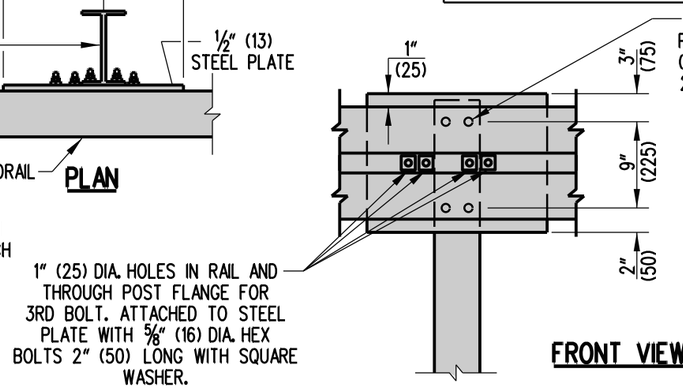


ELEVATION



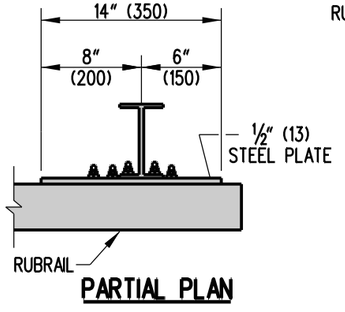
PLAN

ELEVATION

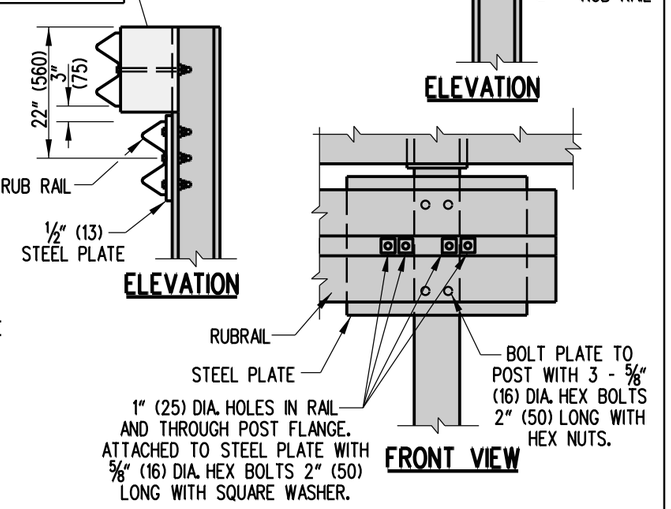


FRONT VIEW

POST ANCHOR DETAIL



PARTIAL PLAN



ELEVATION

FRONT VIEW

RUBRAIL ANCHOR ATTACHMENT

DELAWARE
DEPARTMENT OF TRANSPORTATION

BURIED END SECTION

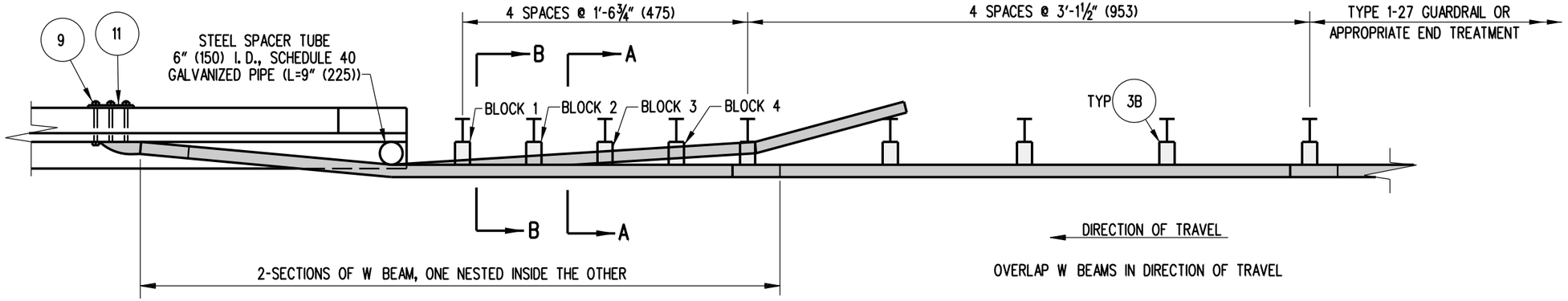
STANDARD NO.	**B-20 (2010)**	**SHT. 3**	**OF 3**

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

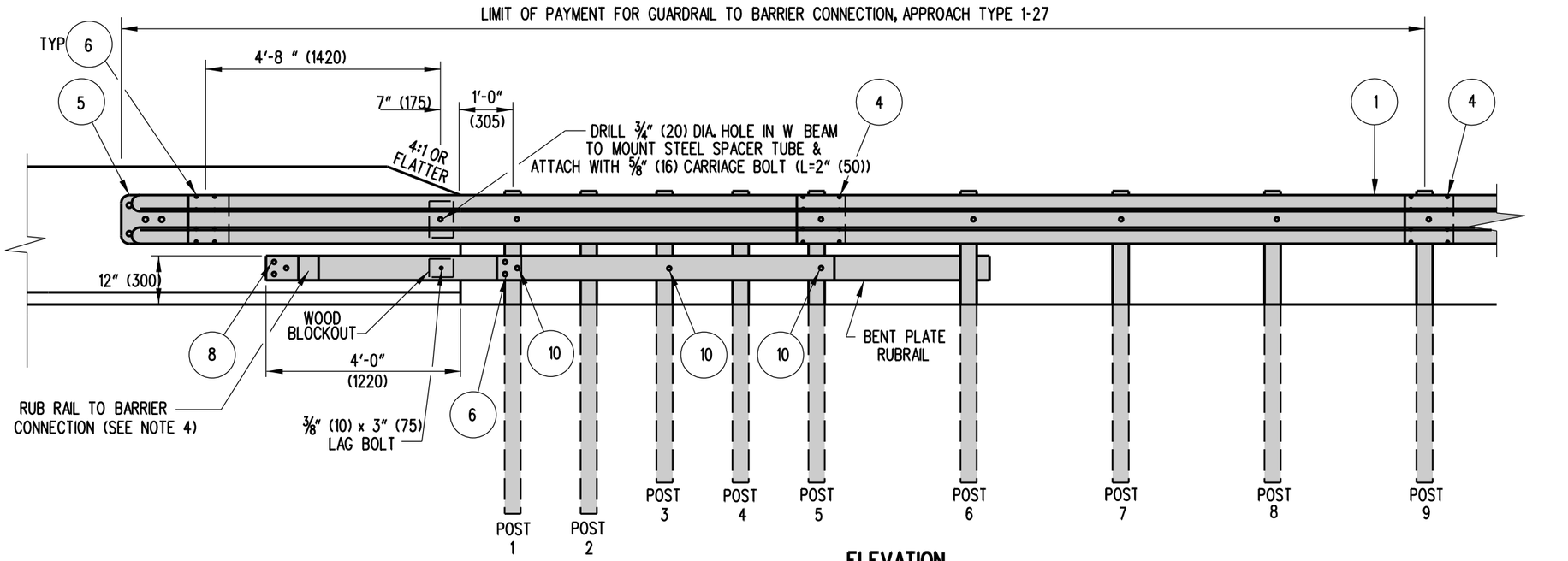
RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

12/17/2010

SCALE : N.T.S.



PLAN



ELEVATION

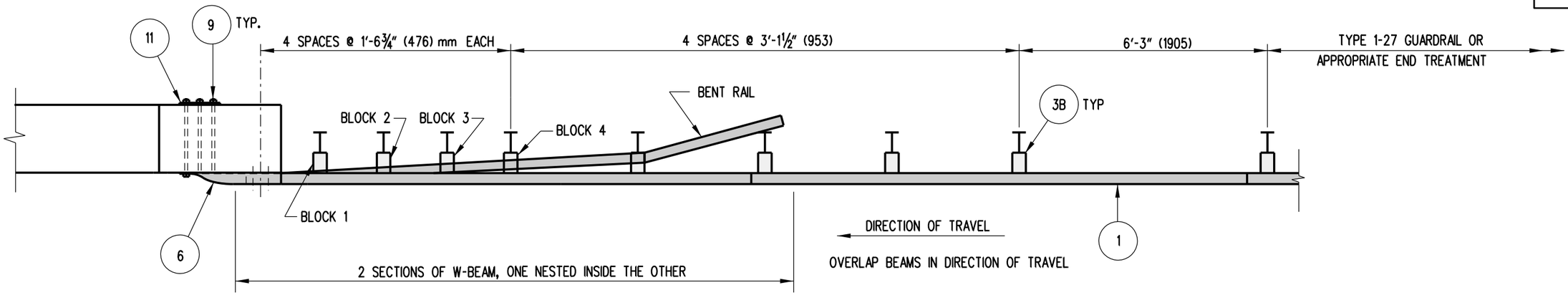
NOTES:

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.

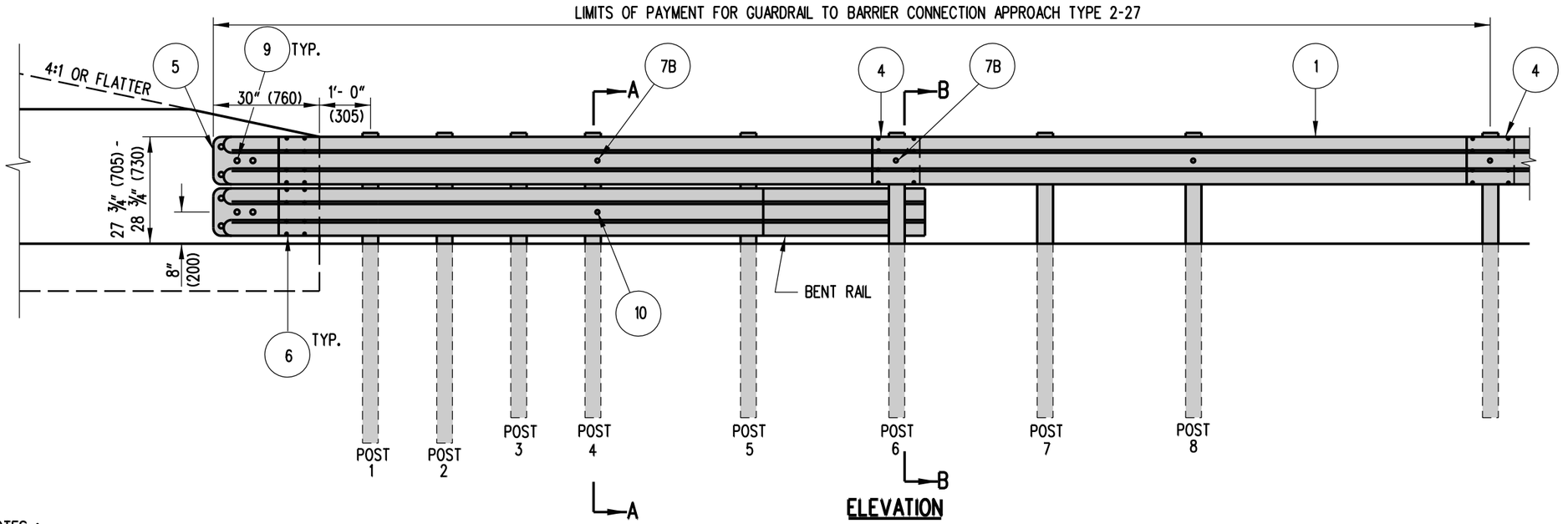
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-27		APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE
	STANDARD NO. B-21 (2010)	SHT. 1 OF 3	RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

09/20/2010

SCALE : N.T.S.



PLAN



ELEVATION

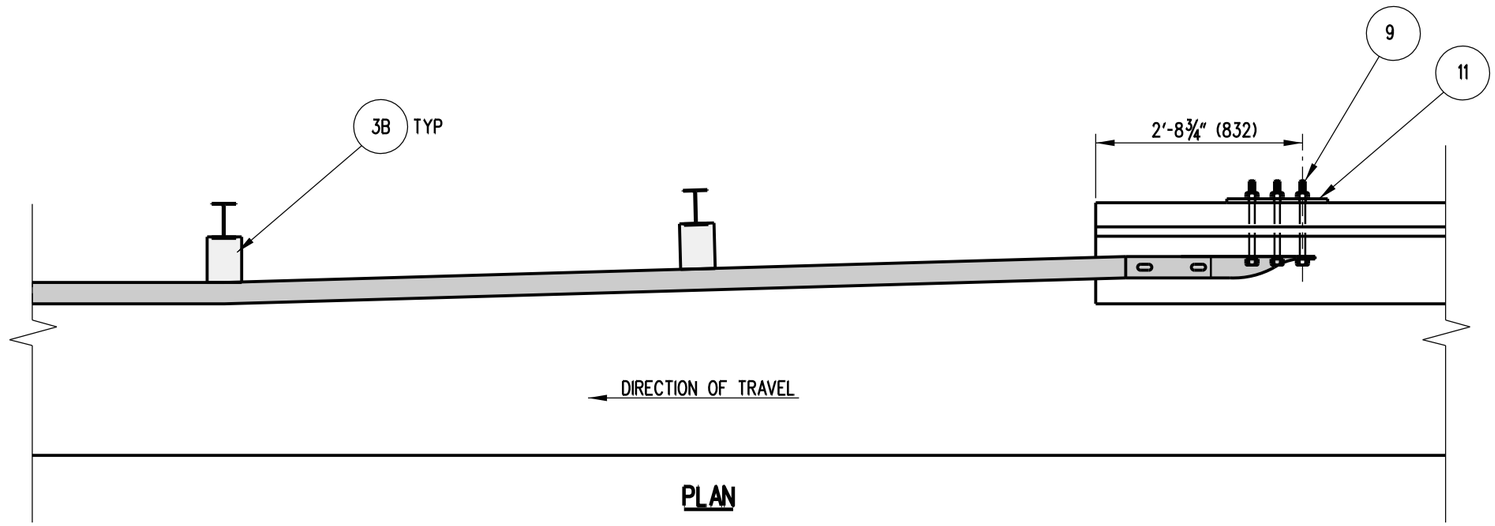
NOTES :

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.

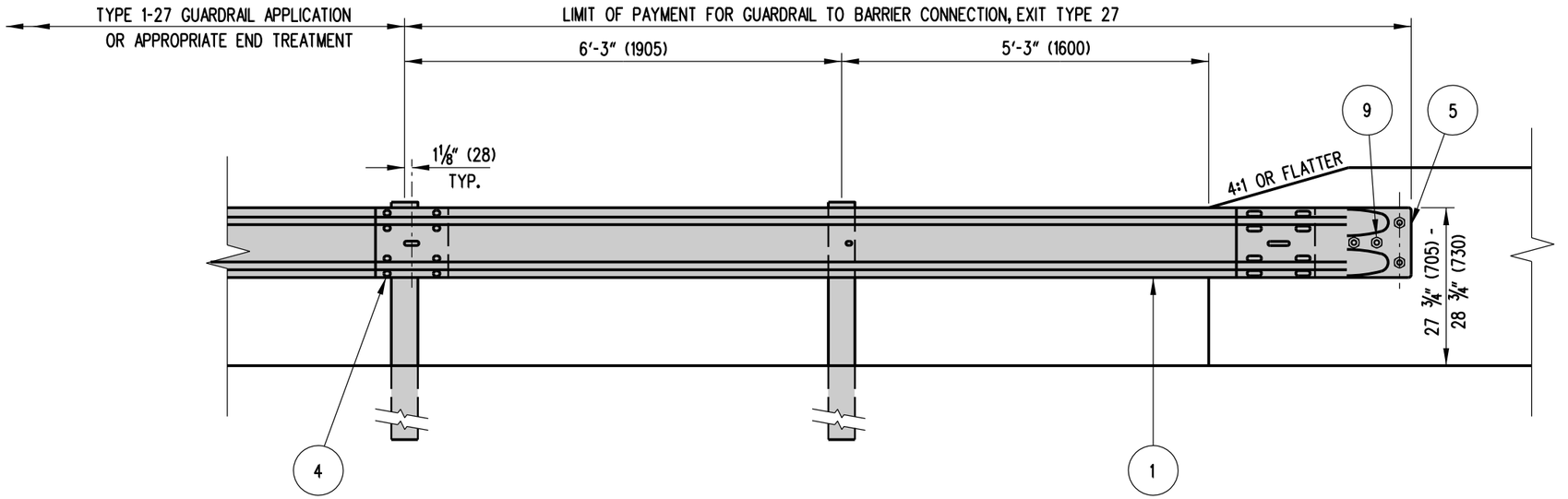
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-27		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-21 (2010)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/20/2010

SCALE : N.T.S.



PLAN



ELEVATION

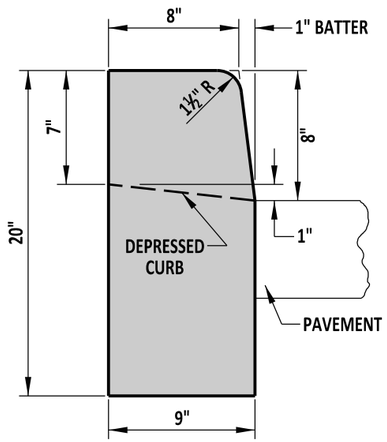
NOTES:

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.

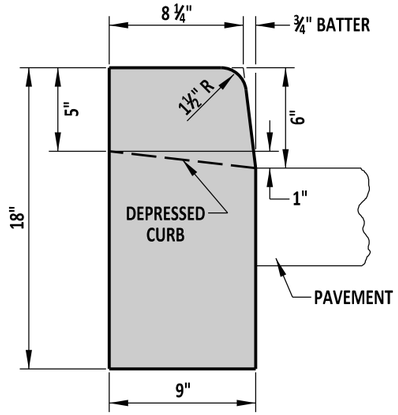
DELAWARE DEPARTMENT OF TRANSPORTATION	GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 27	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. B-21 (2010) SHT. 3 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

09/20/2010

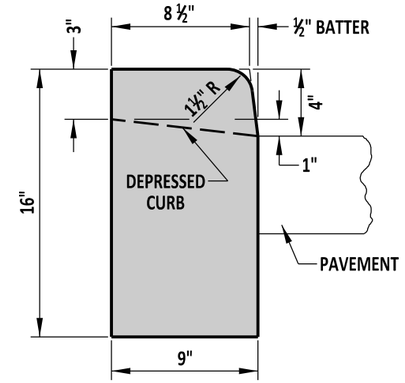
SCALE : NTS



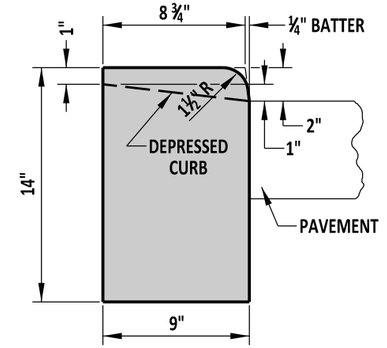
P.C.C. CURB
TYPE 1-8



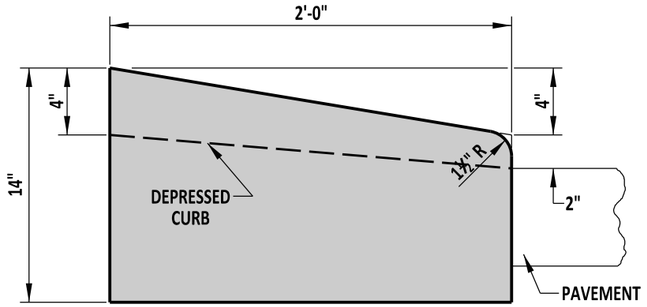
P.C.C. CURB
TYPE 1-6



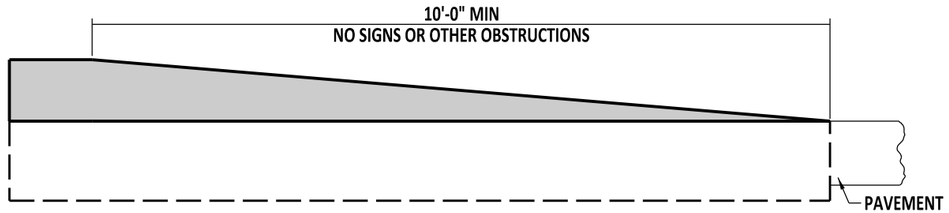
P.C.C. CURB
TYPE 1-4



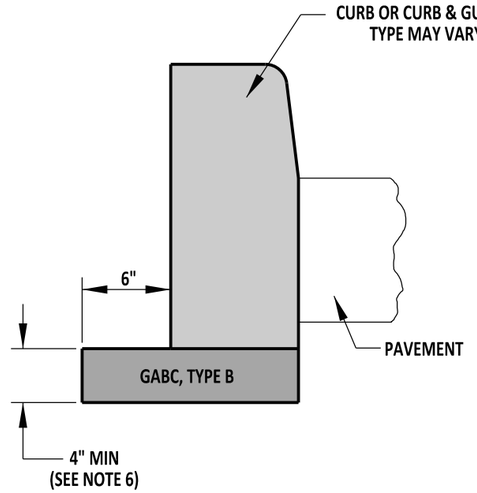
P.C.C. CURB
TYPE 1-2



P.C.C. CURB
TYPE 2



TYPICAL TAPER SECTION AT NOSE OF MEDIANS
TYPE 1-8 CURB SHOWN



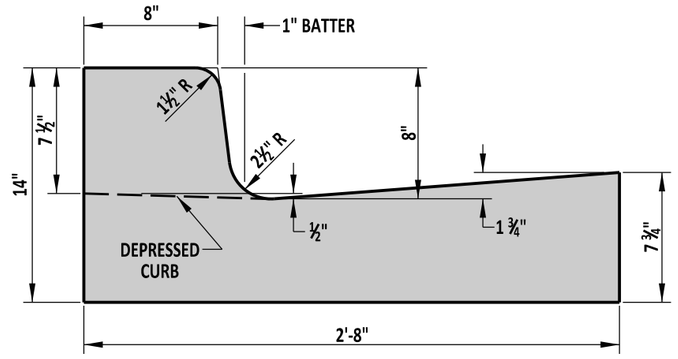
TYPICAL CURB SECTION

NOTES:
1). WHEN P.C.C. CURB OR INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON DETAIL P-2, SHEET 3 OF 5. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.
2). DEPRESS CURB AT ENTRANCES AS DETAILED ON THIS SHEET.
3). DEPRESS CURB FLUSH WITH PAVEMENT AT CURB RAMPS. MAXIMUM SLOPE OF CURB AT CURB RAMPS IS 20:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL. SEE DETAIL C-2, SHEET 1 OF 4.
4). DEPRESS CURB FLUSH WITH PAVEMENT OR ADJACENT AREA AT LEADING EDGE OF TRIANGULAR ISLANDS, TAPERING BACK TO FULL HEIGHT AT A SLOPE OF 4:1.
5). DEPRESS END OF CURB RUNS NOT PART OF AN ISLAND OR MEDIAN FLUSH WITH PAVEMENT OR ADJACENT AREA AT A SLOPE OF 12:1.
6). FOR SUBDIVISION APPLICATIONS, A MINIMUM OF 6" OF STONE IS REQUIRED.

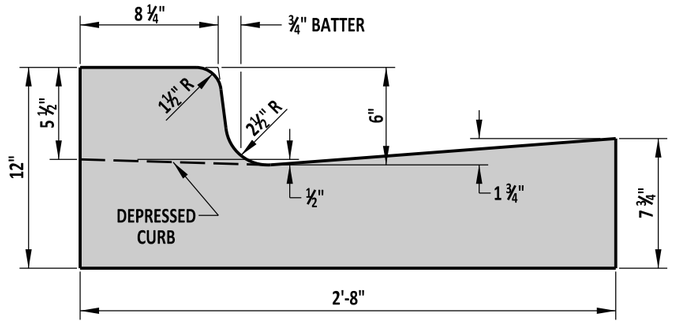
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. CURB		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. C-1 (2013)	SHT. 1 OF 2	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

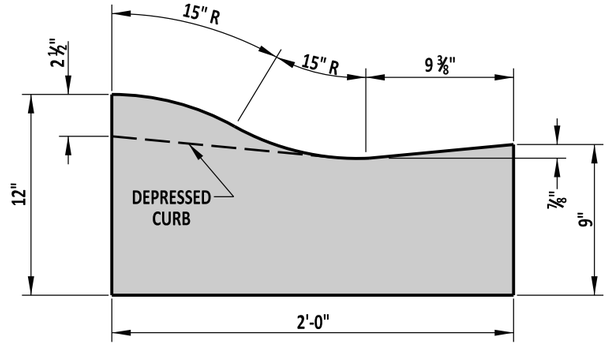
SCALE : NTS



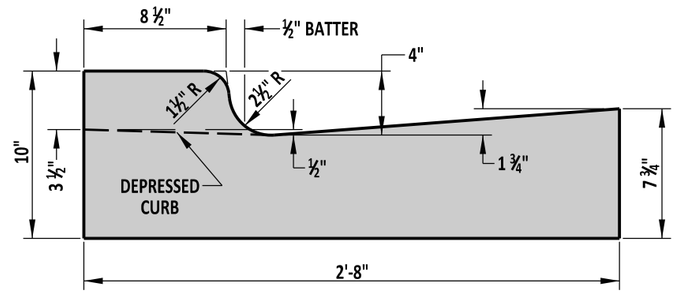
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 1-8



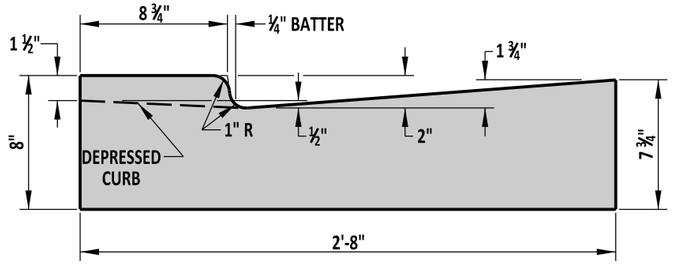
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 1-6



INTEGRAL P.C.C. CURB AND GUTTER
TYPE 2



INTEGRAL P.C.C. CURB AND GUTTER
TYPE 1-4



INTEGRAL P.C.C. CURB AND GUTTER
TYPE 1-2

NOTES:

1). WHEN P.C.C. CURB OR INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON DETAIL P-2, SHEET 3 OF 5. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.

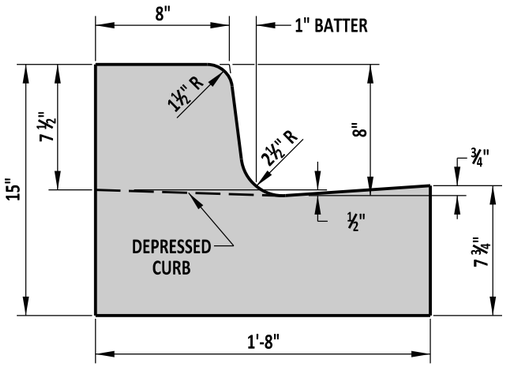
2). DEPRESS CURB AT ENTRANCES AS DETAILED ON THIS SHEET.

3). DEPRESS CURB FLUSH WITH PAVEMENT AT CURB RAMPS. MAXIMUM SLOPE OF CURB AT CURB RAMPS IS 20:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL. SEE DETAIL C-2, SHEET 1 OF 4.

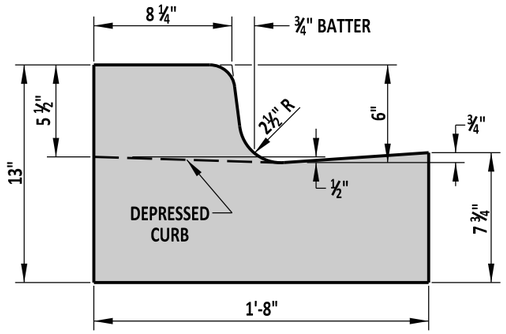
4). DEPRESS CURB FLUSH WITH PAVEMENT OR ADJACENT AREA AT LEADING EDGE OF TRIANGULAR ISLANDS, TAPERING BACK TO FULL HEIGHT AT A SLOPE OF 4:1. SEE DETAIL C-1, SHEET 1 OF 2 FOR TYPICAL SECTION OF TAPER AT NOSE OF MEDIAN ISLANDS.

5). 4" OF GABC, TYPE B SHALL BE PLACED UNDER ALL P.C.C. CURB AND P.C.C. CURB AND GUTTER. SEE DETAIL C-1, SHEET 1 OF 2 FOR TYPICAL SECTION.

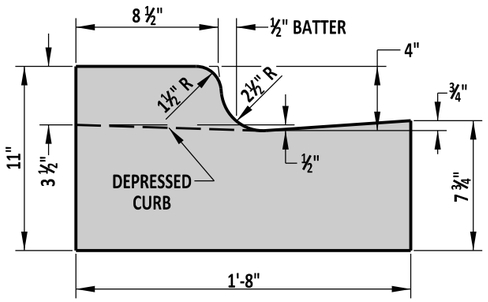
6). DEPRESS END OF CURB RUNS NOT PART OF AN ISLAND OR MEDIAN FLUSH WITH PAVEMENT OR ADJACENT AREA AT A SLOPE OF 12:1.



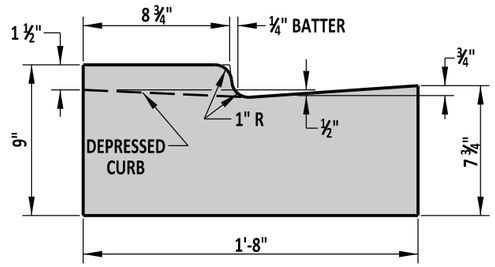
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 3-8



INTEGRAL P.C.C. CURB AND GUTTER
TYPE 3-6



INTEGRAL P.C.C. CURB AND GUTTER
TYPE 3-4

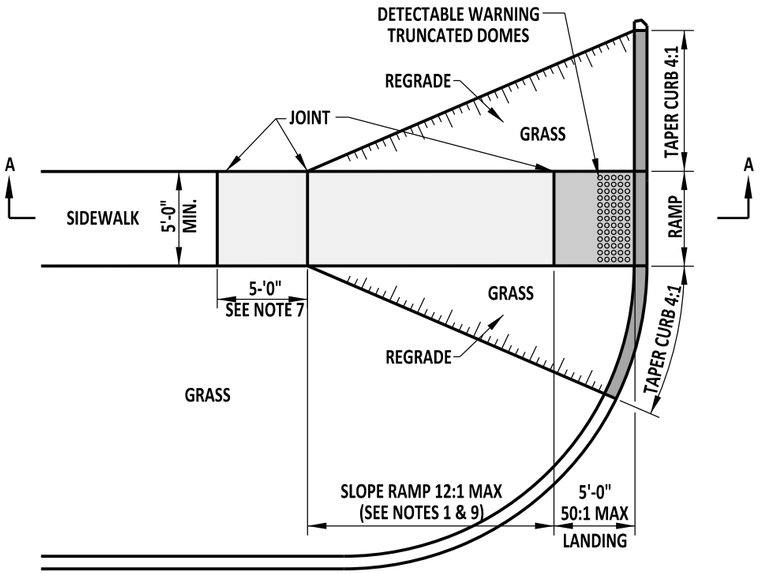


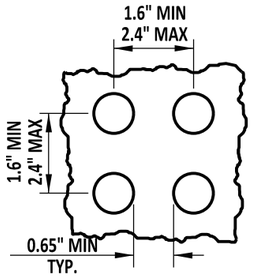
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 3-2

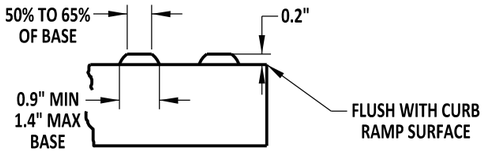
DELAWARE DEPARTMENT OF TRANSPORTATION	INTEGRAL P.C.C. CURB & GUTTER		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)
	STANDARD NO. C-1 (2012)	SHT. 2 OF 2	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

SCALE : NTS





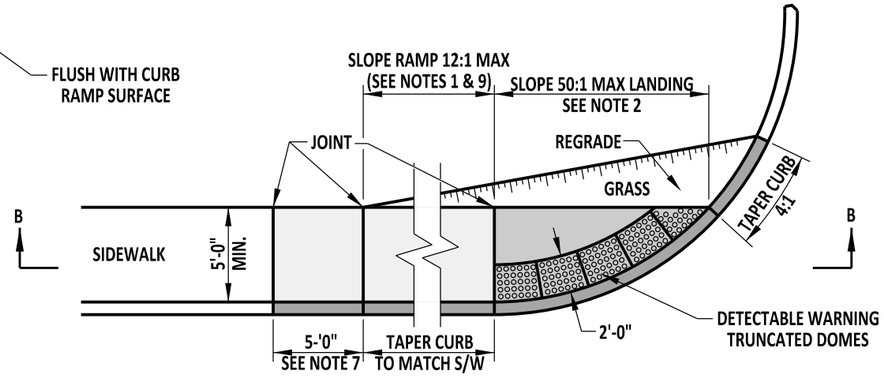


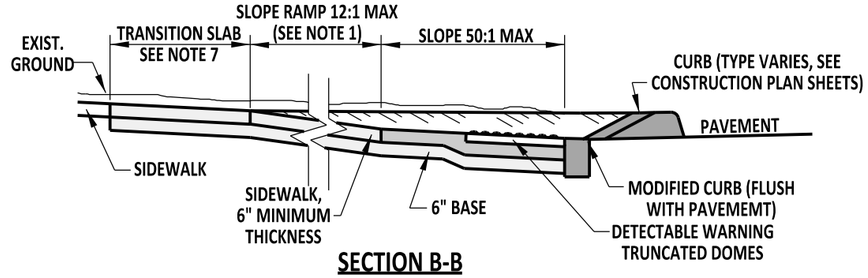
DETECTABLE WARNING TRUNCATED DOME DETAILS

NOTES:

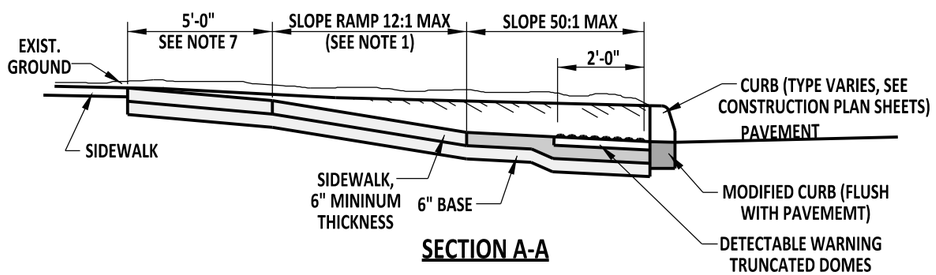
A). THE AREA OF DETECTABLE WARNING TRUNCATED DOMES SHALL BE 2'-0" LONG AND THE FULL WIDTH OF THE RAMP OR DEPRESSED CURB.

B). SEE SPECIFICATION FOR ADDITIONAL INFORMATION.

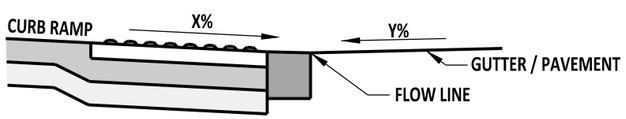




SECTION B-B



SECTION A-A



MAXIMUM DIFFERENCE IN GRADE FOR ALL CURB RAMP TYPES

FOR EXAMPLE, IF THE CURB RAMP AND DEPRESSED CURB SLOPE AT THE FLOW LINE (X) IS 8.1% AND THE PAVEMENT SLOPE (Y) IS 4.0%, THEN TO DETERMINE THE DIFFERENCE IN GRADE, ADD X + Y TO GET 12.1%, WHICH IS GREATER THAN THE 11% PREFERRED BUT LESS THAN THE 13% MAXIMUM.

CURB RAMP, TYPE 1

NOTES:

1). FOR ALTERATIONS WITHOUT A GRASS STRIP OR WHERE THE EXISTING ROAD PROFILE IS STEEPER THAN 7% AND A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15'-0", THE RAMP LENGTH MAY BE LIMITED TO 15'-0" AT A CONSTANT SLOPE, AND ALLOWED TO EXCEED 12:1.

2). RAMP AND SIDEWALK CROSS SLOPE SHALL BE 50:1 (2%) MAXIMUM. FOR REHABILITATION WORK, THE RAMP CROSS SLOPE SHALL MATCH THE SLOPE OF THE ADJACENT ROADWAY.

3). A 6:1 GRADE IS REQUIRED FOR A MINIMUM OF 2'-0" IMMEDIATELY ADJACENT TO RAMP. IF THAT IS NOT FEASIBLE, THEN A CURB OR RETAINING WALL SHOULD BE USED TO ELIMINATE THE NEED FOR THE STEEP SLOPE.

4). THE MAXIMUM DIFFERENCE IN GRADE BETWEEN THE CURB RAMP OR MODIFIED CURB AT THE FLOW LINE AND THE PAVEMENT SHALL BE 13%, HOWEVER 11% IS PREFERRED. SEE DETAIL ON THIS SHEET.

5). LANDING AREA SHALL BE EXTENDED 18" MIN BEYOND THE PEDESTRIAN PUSH BUTTON FOR ALL CURB RAMP TYPES. WHEN NO PEDESTRIAN PUSH BUTTON EXISTS, THE 18" EXTENSION CAN BE OMITTED.

6). LANDING AREA SHALL BE DELINEATED WITH JOINTS.

7). FOR REHABILITATION WORK, PLACE TRANSITION SLAB TO TRANSITION FROM THE NEW RAMP TO THE EXISTING SIDEWALK WHEN THE EXISTING SIDEWALK HAS A NON-CONFORMING RUNNING SLOPE, CROSS SLOPE, OR WIDTH. ADJACENT CURB TAPER SHOULD MATCH THE SLOPE OF THE TRANSITION SLAB.

8). REFER TO THE DELAWARE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES FOR DETAILS REGARDING THE LOCATION OF PEDESTRIAN PUSH BUTTONS.

9). CONSTRUCTION JOINTS ARE REQUIRED ON RAMPS AT THE INTERVAL SPECIFIED IN NOTE 6 ON DETAIL M-3, SHEET 1 OF 1. HOWEVER, EXPANSION MATERIAL SHALL NOT BE USED IN THE RAMP SECTION.

10). PEDESTRIAN SIGNALS SHALL BE ACCESSIBLE WITH A LEVEL LANDING, WHOSE EDGE IS NO MORE THAN 10" FROM ALL PEDESTRIAN PUSH BUTTONS.

DELAWARE
DEPARTMENT OF TRANSPORTATION

CURB RAMP, TYPE 1 AND SECTIONS

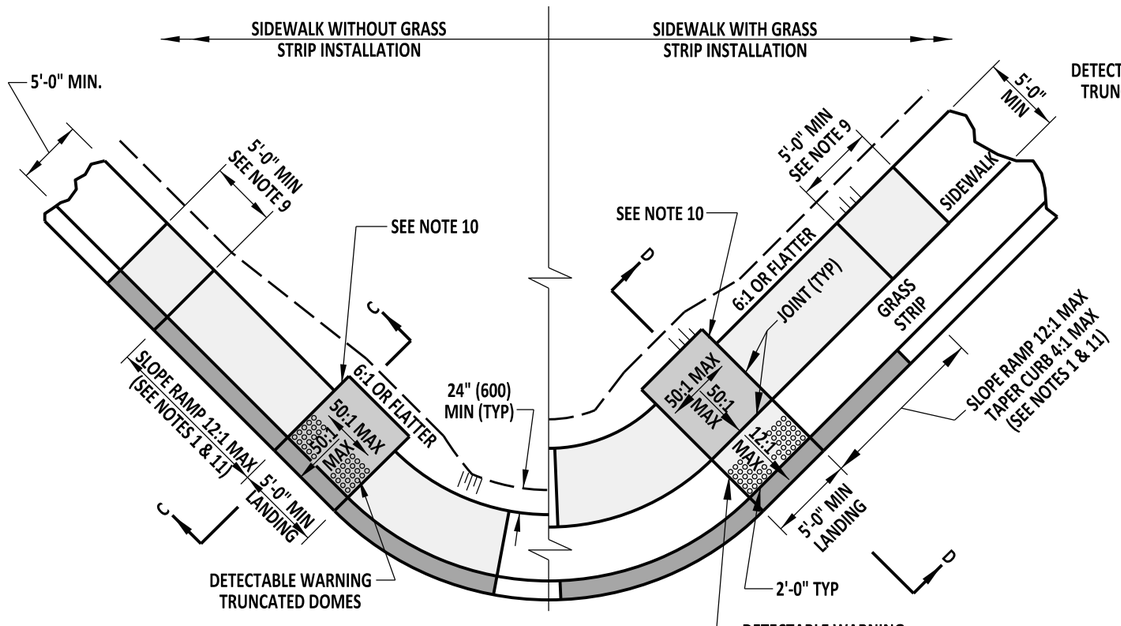
STANDARD NO. C-2 (2013) | SHT. 1 OF 3

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

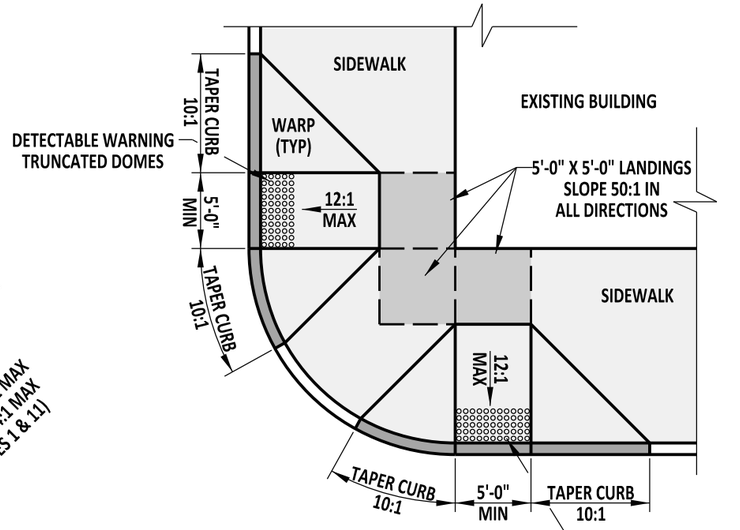
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS

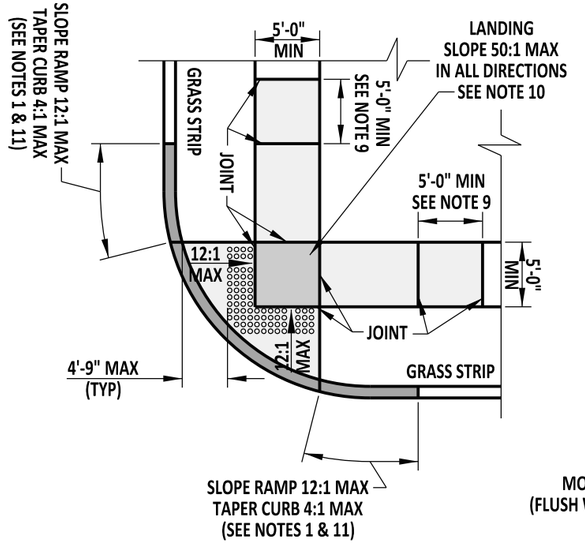


CURB RAMP, TYPE 2

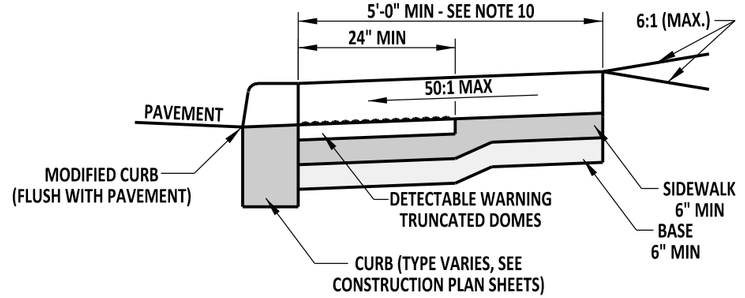


CURB RAMP, TYPE 4

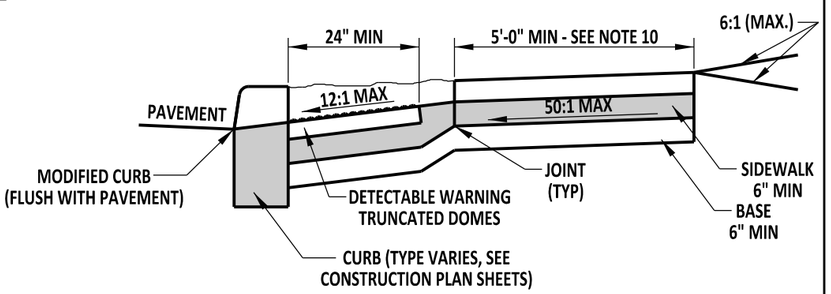
** - DASHED LINES DO NOT INDICATE JOINTS



CURB RAMP, TYPE 3



SECTION C-C



SECTION D-D

NOTES:

1). FOR ALTERATIONS WITHOUT A GRASS STRIP OR WHERE THE EXISTING ROAD PROFILE IS STEEPER THAN 7% AND A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15'-0", THE RAMP LENGTH MAY BE LIMITED TO 15'-0" AT A CONSTANT SLOPE, AND THE RAMP SLOPE ALLOWED TO EXCEED 12:1.

2). RAMP AND SIDEWALK CROSS SLOPE SHALL BE 50:1 (2%) MAXIMUM. FOR REHABILITATION WORK, THE RAMP CROSS SLOPE SHALL MATCH THE SLOPE OF THE ADJACENT ROADWAY.

3). IF GRADING WILL BE STEEPER THAN 6:1 ADJACENT TO THE CURB RAMP OR SIDEWALK, THEN A TYPE 1-8 CURB OR RETAINING WALL SHOULD BE USED TO ELIMINATE THE NEED FOR THE STEEP SLOPE.

4). ENTIRE DEPRESSED AREA OF CURB SHALL HAVE DETECTABLE WARNING TRUNCATED DOMES.

5). THE MAXIMUM DIFFERENCE IN GRADE BETWEEN THE SIDEWALK OR CURB AND THE PAVEMENT SHALL BE 13%, HOWEVER 11% IS PREFERRED. SEE STANDARD NO. C-2, SHEET 1 OF 3.

6). REFER TO DELAWARE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES FOR DETAILS REGARDING THE LOCATION OF PEDESTRIAN PUSH BUTTONS.

7). LANDING AREA SHALL BE DELINEATED WITH JOINTS.

8). THE EDGE OF THE LANDING SHALL BE A MAXIMUM OF 10'-0" FROM THE FACE OF THE CURB.

9). FOR REHABILITATION WORK, PLACE TRANSITION SLAB TO TRANSITION FROM THE NEW RAMP TO THE EXISTING SIDEWALK WHEN THE EXISTING SIDEWALK HAS A NON-CONFORMING RUNNING SLOPE, CROSS SLOPE, OR WIDTH. ADJACENT CURB SHOULD MATCH THE SLOPE OF THE TRANSITION SLAB.

10). LANDING AREAS SHALL BE EXTENDED 18" MIN BEYOND THE PEDESTRIAN PUSH BUTTON FOR ALL CURB RAMP TYPES. WHEN NO PEDESTRIAN PUSH BUTTON EXISTS, THE 18" EXTENSION CAN BE OMITTED.

11). CONSTRUCTION JOINTS ARE REQUIRED AT THE INTERVALS SPECIFIED IN NOTE 6 ON DETAIL M-3, SHEET 1 OF 1. HOWEVER, EXPANSION MATERIAL SHALL NOT BE USED IN THE RAMP SECTION.

12). PEDESTRIAN SIGNALS SHALL BE ACCESSIBLE WITH A LEVEL LANDING, WHOSE EDGE IS NO MORE THAN 10" FROM ALL PEDESTRIAN BUTTONS.

DELAWARE
DEPARTMENT OF TRANSPORTATION

CURB RAMPS, TYPES 2, 3, & 4

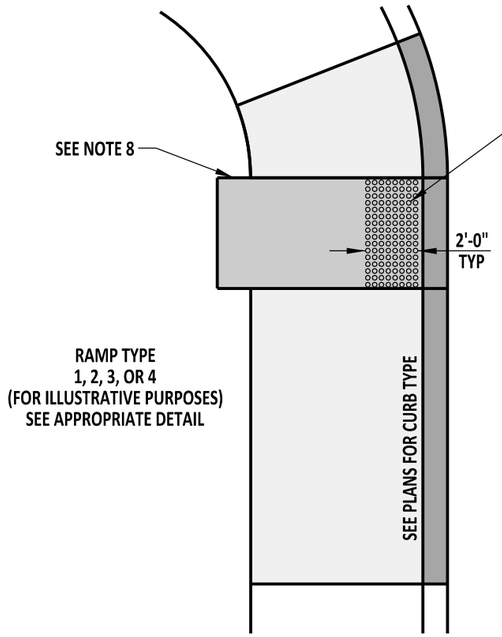
STANDARD NO. C-2 (2013) | SHT. 2 OF 3

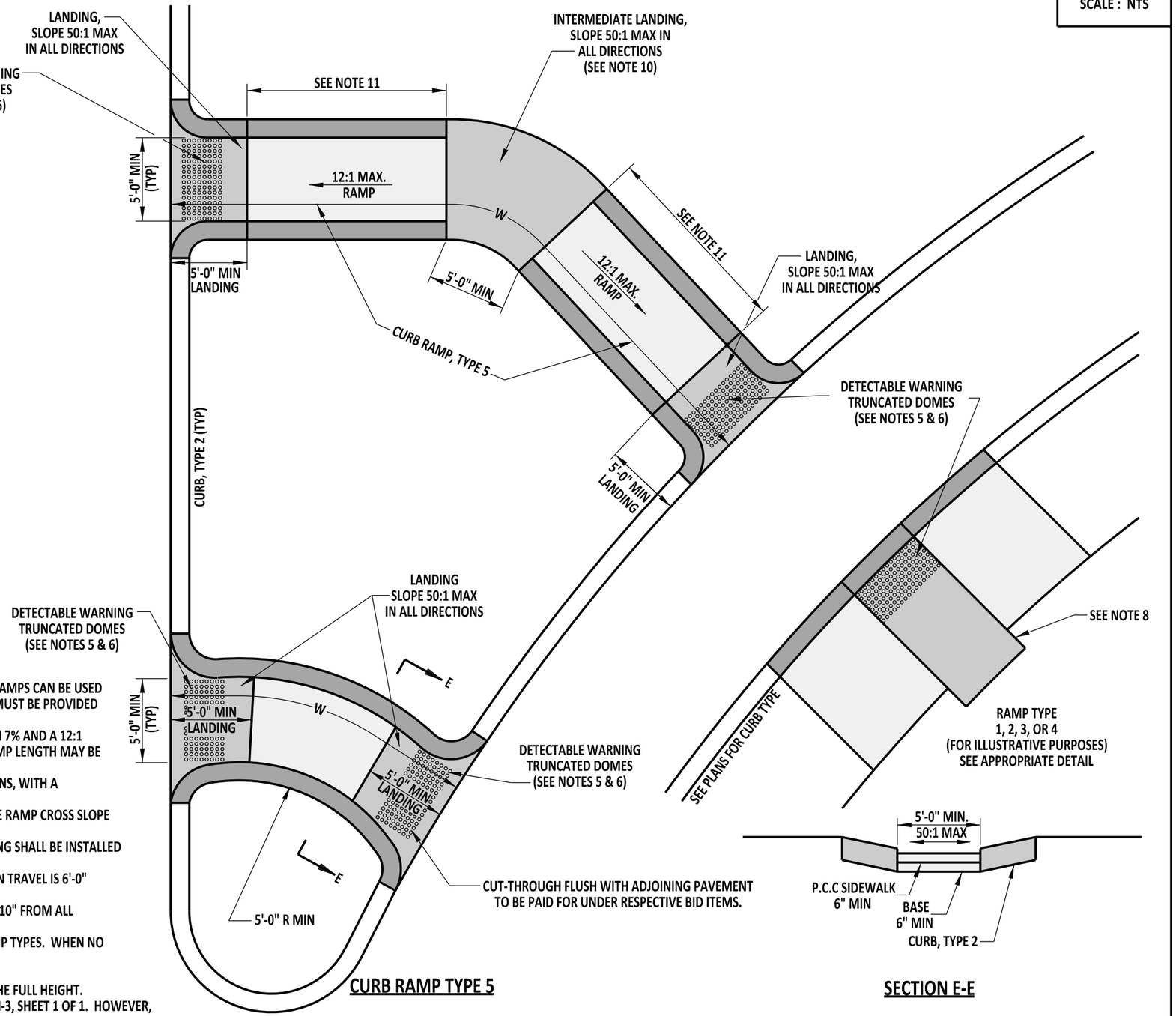
APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS





CURB RAMP TYPE 5

SECTION E-E

NOTES:

1). A CUT-THROUGH LEVEL WITH THE STREET IS THE PREFERRED TREATMENT FOR ISLANDS, ALTHOUGH, RAMPS CAN BE USED WHERE THE ISLAND WIDTH IS SUFFICIENT TO ACCOMMODATE THEM. POSITIVE SURFACE DRAINAGE MUST BE PROVIDED FOR EITHER TREATMENT. EITHER TREATMENT IS ACCEPTABLE.

2). FOR ALTERATIONS WITHOUT A GRASS STRIP OR WHERE THE EXISTING ROAD PROFILE IS STEEPER THAN 7% AND A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15'-0", THE RAMP LENGTH MAY BE LIMITED TO 15'-0" AT A CONSTANT SLOPE, AND ALLOWED TO EXCEED 12:1.

3). A CONTINUOUS PATH MUST BE PROVIDED BETWEEN ADJACENT CURB RAMPS IN ISLANDS AND MEDIANS, WITH A MAXIMUM RUNNING SLOPE OF 20:1.

4). RAMP AND SIDEWALK CROSS SLOPE SHALL BE 50:1 (2%) MAXIMUM. FOR REHABILITATION WORK, THE RAMP CROSS SLOPE SHALL MATCH THE SLOPE OF THE ADJACENT ROADWAY.

5). WHERE THERE IS NO DEPRESSED CURB AT A CUT-THROUGH OR CURB RAMP, THE DETECTABLE WARNING SHALL BE INSTALLED 3" FROM THE ROADWAY PAVEMENT.

6). DETECTABLE WARNINGS SHALL BE INSTALLED WHEN THE LENGTH W IN THE DIRECTION OF PEDESTRIAN TRAVEL IS 6'-0" OR GREATER.

7). PEDESTRIAN SIGNALS SHALL BE ACCESSIBLE WITH A LEVEL LANDING, WHOSE EDGE IS NO MORE THAN 10" FROM ALL PEDESTRIAN PUSH BUTTONS.

8). LANDING AREA SHALL BE EXTENDED 18" MIN BEYOND PEDESTRIAN PUSH BUTTON FOR ALL CURB RAMP TYPES. WHEN NO PEDESTRIAN PUSH BUTTON EXISTS, THE 18" EXTENSION CAN BE OMITTED.

9). LANDING AREA SHALL BE CLEARLY DELINEATED WITH JOINTS.

10). INTERMEDIATE LANDING IS ONLY REQUIRED WHEN THE TWO RAMPS INTERSECT BEFORE REACHING THE FULL HEIGHT.

11). CONSTRUCTION JOINTS ARE REQUIRED ON RAMP AT THE INTERVAL SPECIFIED IN NOTE 6 ON DETAIL M-3, SHEET 1 OF 1. HOWEVER, EXPANSION MATERIAL SHALL NOT BE USED IN THE RAMP SECTION.

DELAWARE
DEPARTMENT OF TRANSPORTATION

CURB RAMP, TYPE 5 & SECTIONS

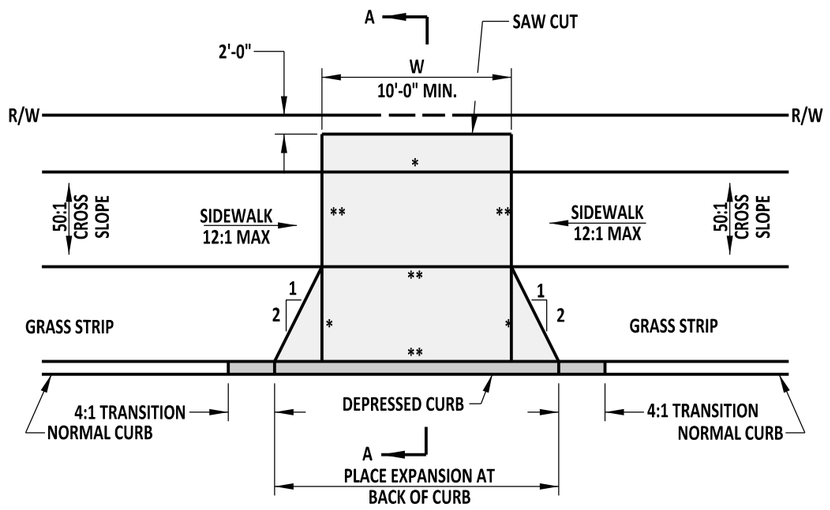
STANDARD NO. C-2 (2013) | SHT. 3 OF 3

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

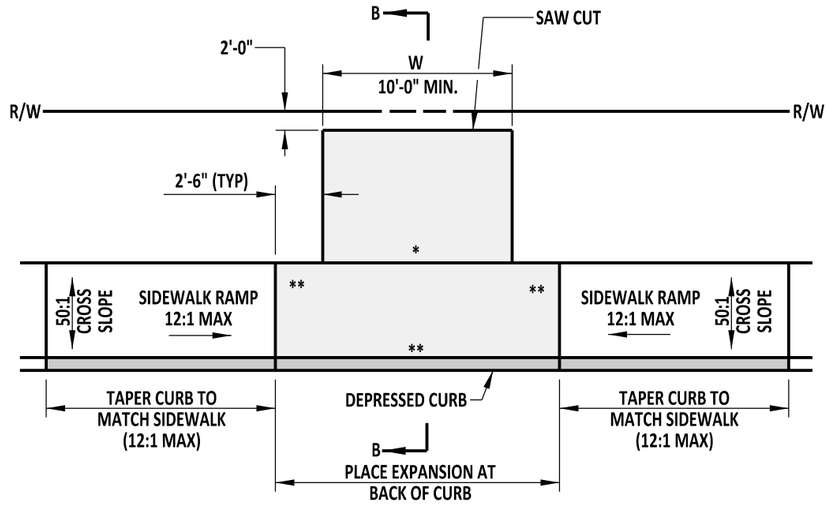
1/9/2014

SCALE : NTS



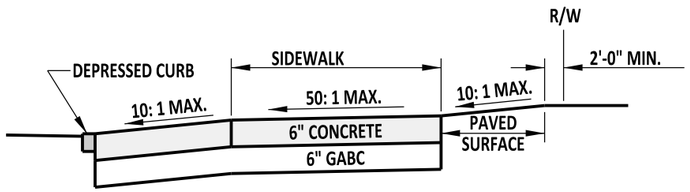
ENTRANCE WITH SIDEWALK AND GRASS STRIP

* - JOINT
** - EXPANSION MATERIAL

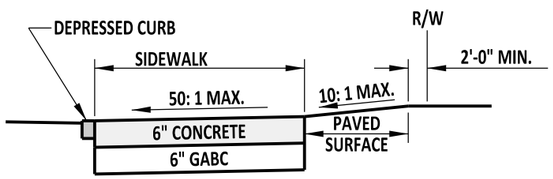


ENTRANCE WITH SIDEWALK AND NO GRASS STRIP

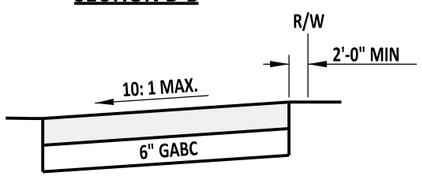
* - JOINT
** - EXPANSION MATERIAL



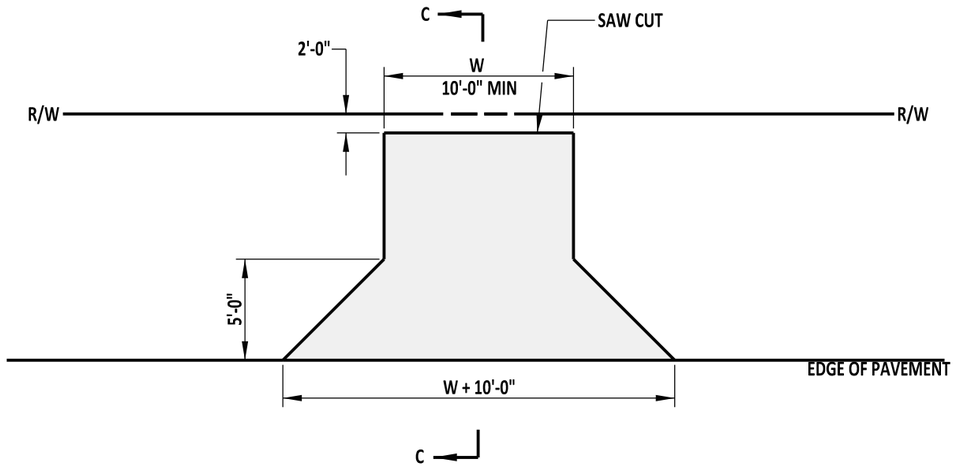
SECTION A-A



SECTION B-B



SECTION C-C



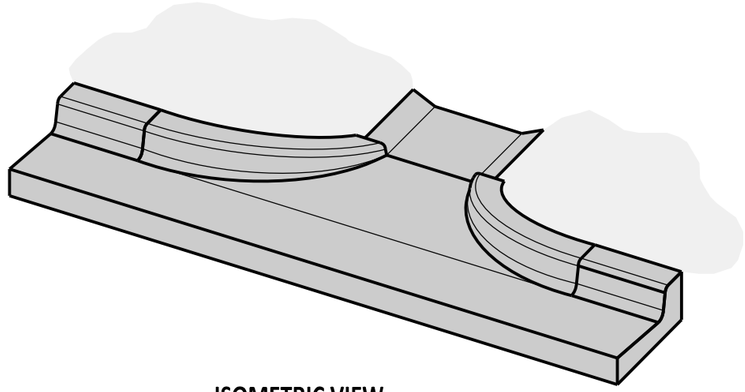
ENTRANCE WITHOUT SIDEWALK

NOTE:
IF WIDTH OF DRIVEWAY IS 15'-0" OR GREATER, THE FLARE AND EXTENSIONS CAN BE OMITTED.

DELAWARE DEPARTMENT OF TRANSPORTATION	ENTRANCES		APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER)	01/07/2013 (DATE)
	STANDARD NO. C-3 (2012)	SHT. 1 OF 1	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER)	12/20/2012 (DATE)

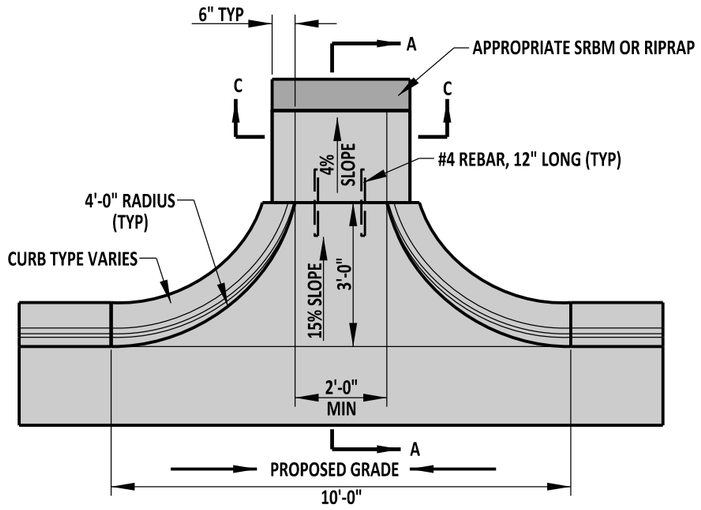
12/4/2012

SCALE : NTS



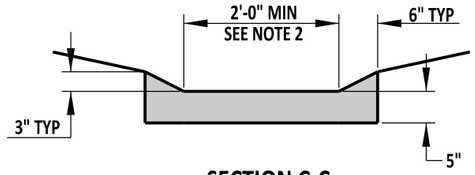
ISOMETRIC VIEW

SHOWN WITH INTEGRAL CURB & GUTTER, TYPE 1-8

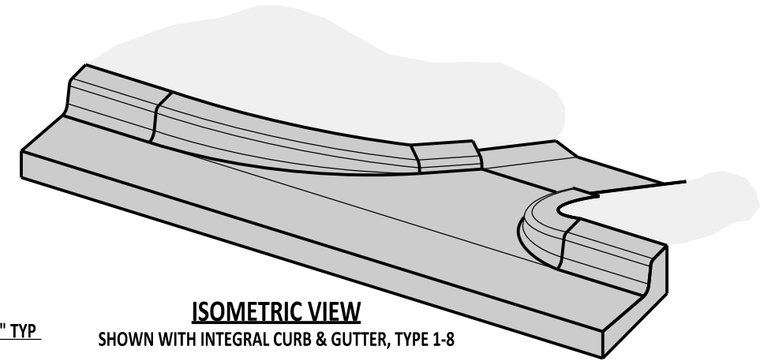


PLAN VIEW

IN SUMP LOCATION

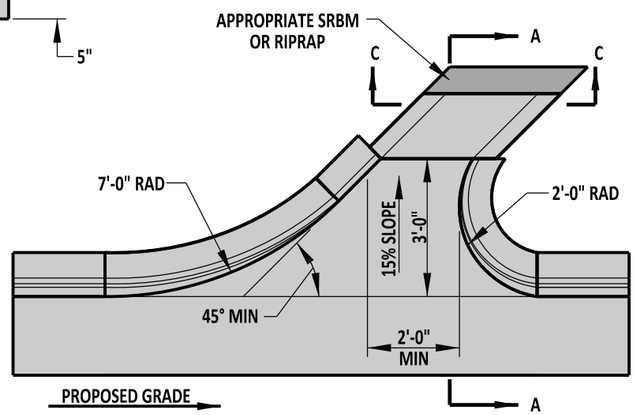


SECTION C-C



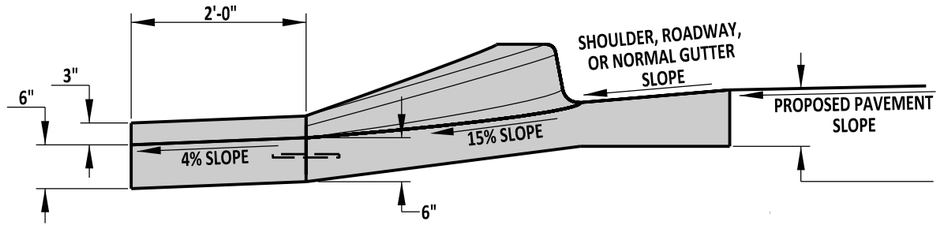
ISOMETRIC VIEW

SHOWN WITH INTEGRAL CURB & GUTTER, TYPE 1-8



PLAN VIEW

ON GRADE OR SLOPE



SECTION A-A

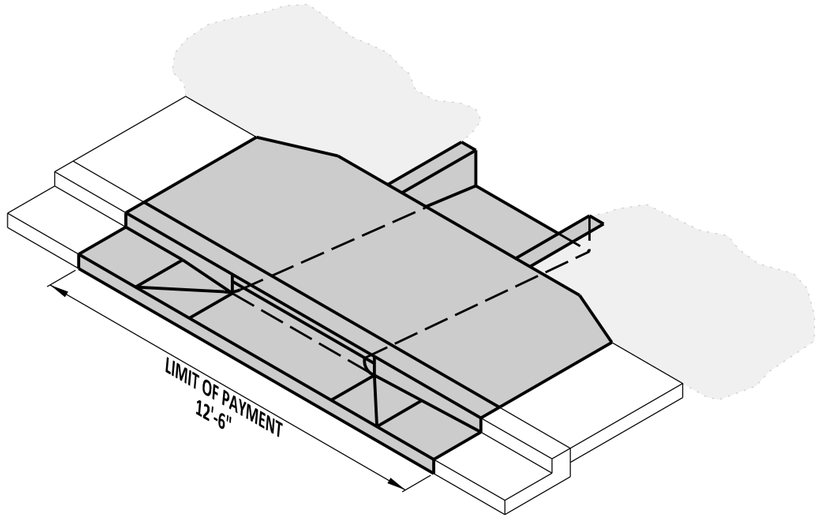
NOTES:

1). DESIGNER SHALL ESTABLISH WIDTH OF OPENING BASED ON DRAINAGE CALCULATIONS.
2). THE WIDTH OF THE APRON (SHOWN IN SECTION C-C) SHALL MATCH THE WIDTH OF THE CURB OPENING (SHOWN IN PLAN VIEW).

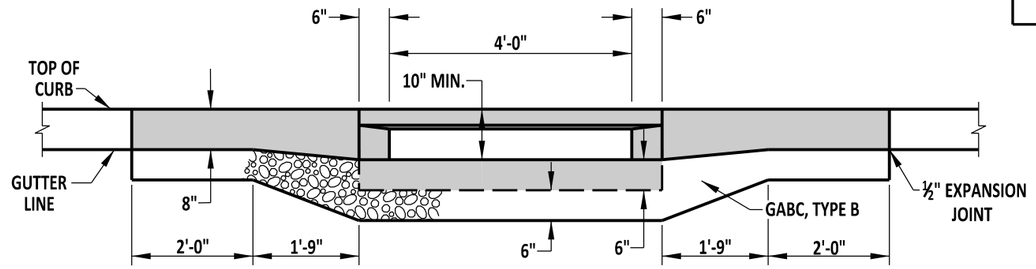
DELAWARE DEPARTMENT OF TRANSPORTATION	CURB OPENING DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)
	STANDARD NO. C-4 (2012)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

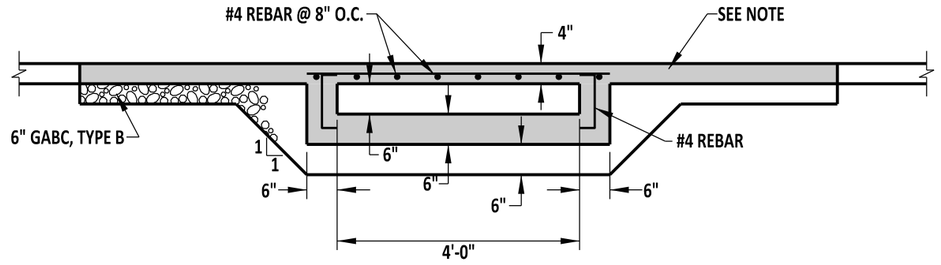
SCALE : NTS



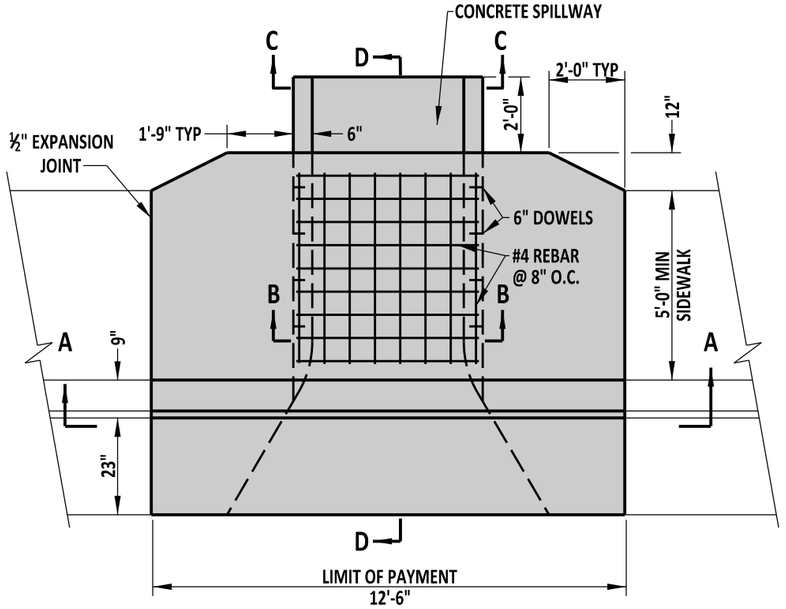
ISOMETRIC



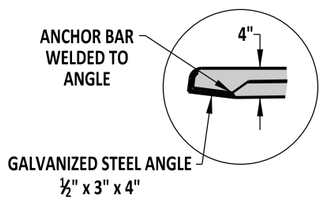
SECTION A-A

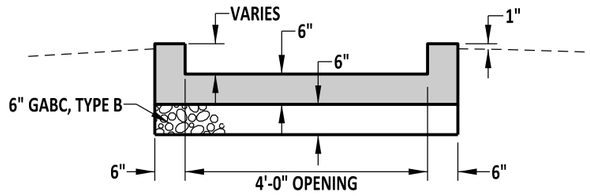


SECTION B-B

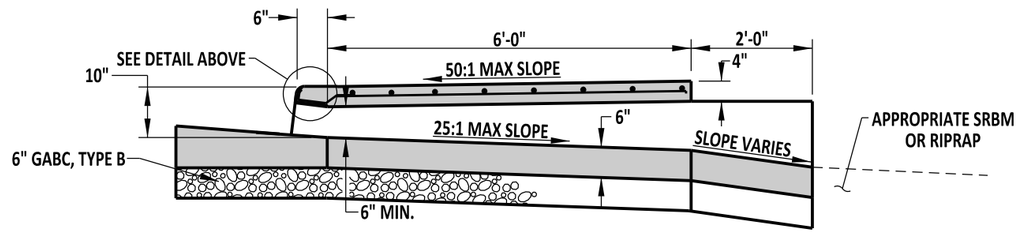


PLAN





SECTION C-C



SECTION D-D

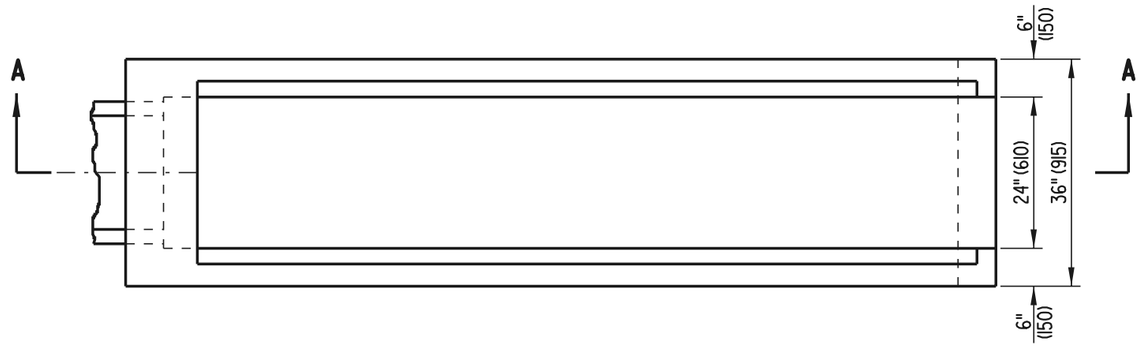
CURB / SIDEWALK OPENING

NOTE:
WHEN A GRASS STRIP IS PRESENT BETWEEN THE BACK OF CURB AND SIDEWALK, THE SIDEWALK PORTION OF THIS STRUCTURE MAY BE PRECAST. HOWEVER, WHEN THE SIDEWALK IS DIRECTLY BEHIND THE CURB, THE ENTIRE UNIT MUST BE CAST-IN-PLACE.

DELAWARE DEPARTMENT OF TRANSPORTATION	CURB OPENING WITH SIDEWALK DETAIL		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/22/2011 (DATE)
	STANDARD NO. C-5 (2011)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/21/2011 (DATE)

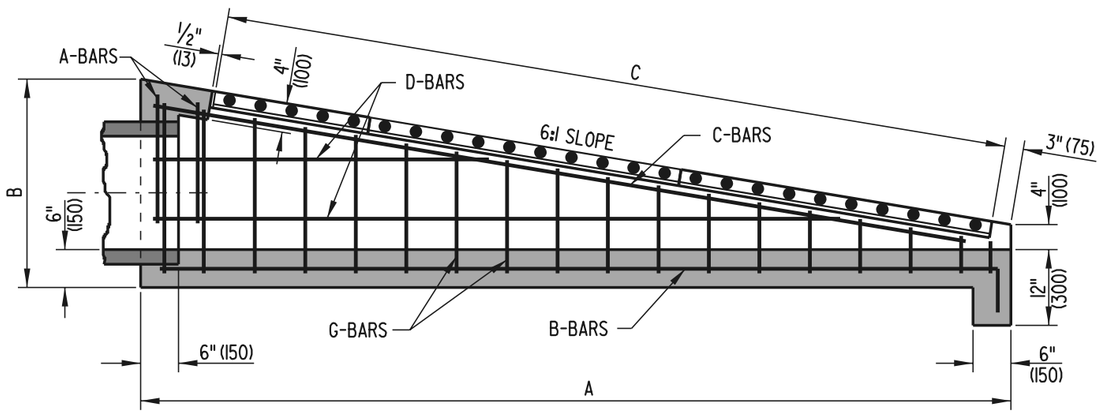
12/12/2011

SCALE : N.T.S.

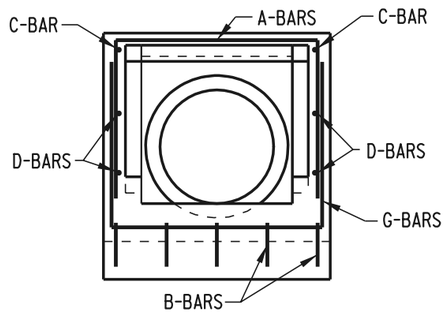


PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 6:1 SAFETY END STRUCTURE TO BE PRECAST



SECTION A-A



FRONT VIEW

DELAWARE DEPARTMENT OF TRANSPORTATION	6:1 SAFETY END STRUCTURE		APPROVED Lynne M. Hastings CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. D-1 (2001)	SHT. 1 OF 2	RECOMMENDED DESIGN ENGINEER DATE 6/15/01

04/17/2001

SCALE : N.T.S.

DIMENSIONS

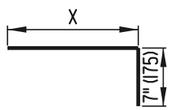
PIPE SIZE	A	B	C
15" (375)	9'-6" (2895)	2'-5" (735)	8'-4" (2540)
18" (450)	11'-6" (3505)	2'-9" (840)	10'-5" (3175)
21" (525) OR 24" (600)	14'-4" (4370)	3'-2⅝" (980)	12'-6" (3810)

APPROXIMATE QUANTITIES

PIPE SIZE	CONCRETE FT³ (m³)		REINF. STEEL LBS. (kg)	NO. OF GRATES	LENGTH TO BE CUT FROM 1 GRATE	WEIGHT OF FULL SIZE GRATE LBS. (kg)	WEIGHT OF CUT GRATE LBS. (kg)
	CONC. PIPE	C.M. PIPE					
15" (375)	25 (0.708)	25.43 (0.720)	121.12 (54.94)	2	--	270.92 (122.89)	--
18" (450)	31.5 (0.892)	32.07 (0.908)	156.7 (71.08)	3	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
21" (525) OR 24" (600)	40.75 (1.154)	39.87 (1.129)	194.0 (88.00)	3	--	270.92 (122.89)	--

BENDING DIAGRAM

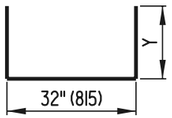
PIPE SIZE	X
15" (375)	9'-2" (2795)
18" (450)	11'-2" (3405)
21" (525) OR 24" (610)	14'-0" (4265)

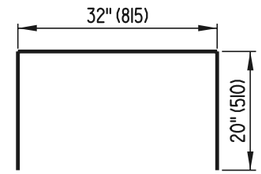


B-BARS

PIPE SIZE	Y
15" (375)	VARIES 25" (635) TO 4" (100)
18" (450)	VARIES 29" (735) TO 4" (100)
21" (525) OR 24" (610)	VARIES 34" (865) TO 4" (100)

G-BARS





A-BARS

SCHEDULE OF REINFORCING STEEL

PIPE SIZE	A-BARS				B-BARS				C-BARS				D-BARS				G-BARS			
	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH
15" (375)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	9'-9" (2970)	#4 (#13)	2	-	9'-3" (2820)	#4 (#13)	4	8" (200)	VARIES 50" (1270) TO 100" (2540)	#4 (#13)	15	8" (200)	VARIES 40" (1015) TO 82" (2085)
18" (450)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	11'-9" (3580)	#4 (#13)	2	-	11'-5" (3480)	#4 (#13)	6	8" (200)	VARIES 43½" (1105) TO 130½" (3315)	#4 (#13)	18	8" (200)	VARIES 40" (1015) TO 90" (2285)
21" (525) OR 24" (600)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	14'-7" (4445)	#4 (#13)	2	-	14'-3" (4345)	#4 (#13)	6	8" (200)	VARIES 51" (1295) TO 153" (3885)	#4 (#13)	22	8" (200)	VARIES 40" (1015) TO 100" (2540)

DELAWARE
DEPARTMENT OF TRANSPORTATION

6:1 SAFETY END STRUCTURE

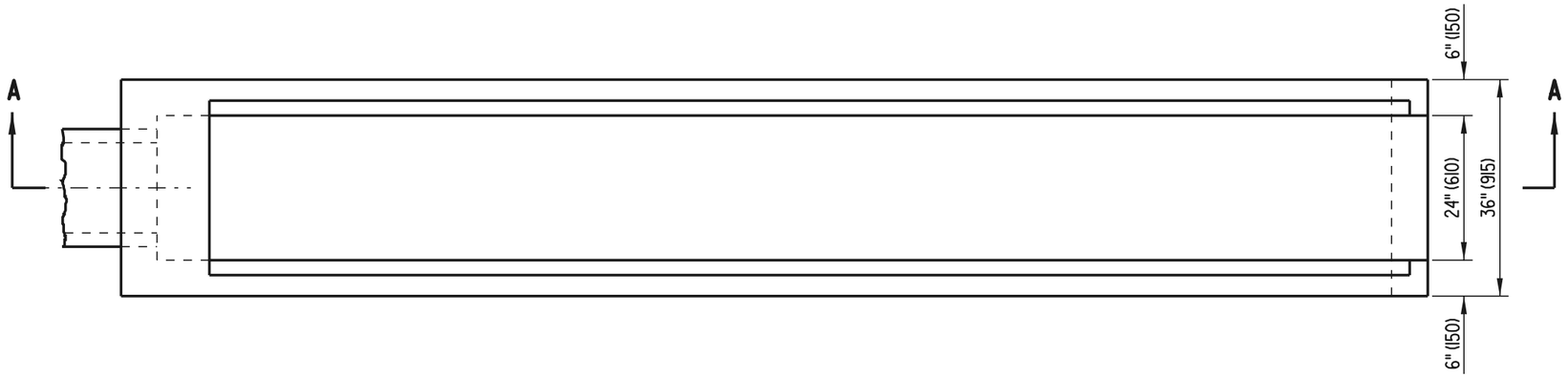
STANDARD NO. D-1 (2001) SHT. 2 OF 2

APPROVED Lynne M. Hastings CHIEF ENGINEER DATE 6/18/01

RECOMMENDED [signature] DESIGN ENGINEER DATE 6/15/01

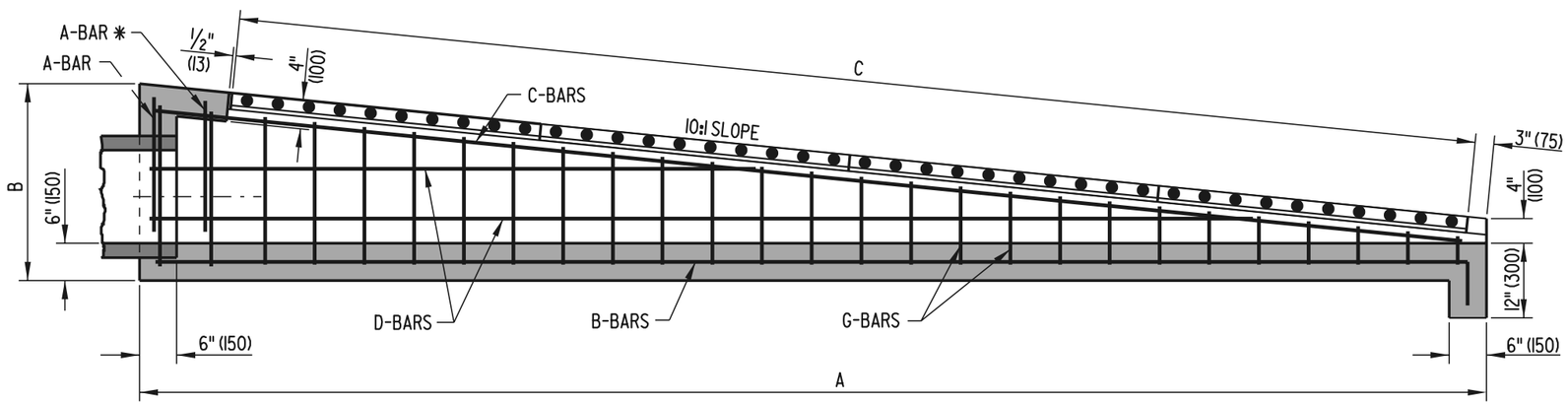
04/17/2001

SCALE : N.T.S.



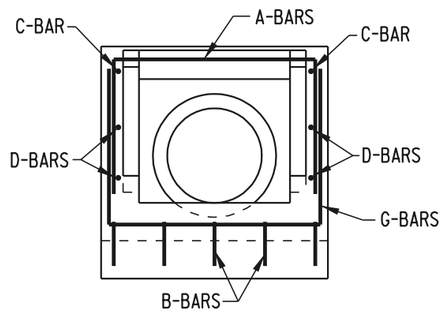
PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 10:1 SAFETY END STRUCTURE TO BE PRECAST



SECTION A-A

* REQUIRED ONLY FOR PIPE SIZE OF 21" (525) OR 24" (600)



FRONT VIEW

DELAWARE DEPARTMENT OF TRANSPORTATION	10:1 SAFETY END STRUCTURE		APPROVED Lyme M. Hastings CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. D-2 (2001)	SHT. 1 OF 2	RECOMMENDED DESIGN ENGINEER DATE 6/15/01

04/17/2001

SCALE : N.T.S.

DIMENSIONS

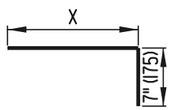
PIPE SIZE	A	B	C
15" (375)	15'-4" (4675)	2'-4 3/8" (720)	14'-7" (4445)
18" (450)	19'-6" (5945)	2'-9 3/8" (850)	18'-9" (5715)
21" (525) OR 24" (600)	24'-0" (7315)	3'-2 13/16" (985)	22'-11" (6985)

APPROXIMATE QUANTITIES

PIPE SIZE	CONCRETE FT³ (m³)		REINF. STEEL LBS. (kg)	NO. OF GRATES	LENGTH TO BE CUT FROM I GRATE	WEIGHT OF FULL SIZE GRATE LBS. (kg)	WEIGHT OF CUT GRATE LBS. (kg)
	CONC. PIPE	C.M. PIPE					
15" (375)	41.35 (1.171)	41.78 (1.183)	175.0 (79.38)	4	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
18" (450)	50.11 (1.419)	50.68 (1.435)	227.0 (102.98)	5	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
21" (525) OR 24" (600)	69.43 (1.966)	70.31 (1.991)	310.4 (140.79)	6	2'-1" (635)	270.92 (122.89)	135.47 (61.45)

BENDING DIAGRAM

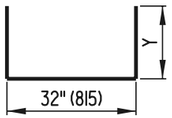
PIPE SIZE	X
15" (375)	15'-0" (4570)
18" (450)	19'-2" (5840)
21" (525) OR 24" (600)	23'-8" (7215)

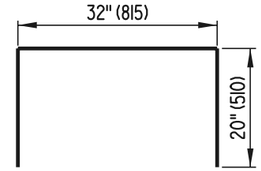


B-BARS

PIPE SIZE	Y
15" (375)	VARIES 21 1/2" (545) TO 4" (100)
18" (450)	VARIES 26 7/16" (670) TO 4" (100)
21" (525) OR 24" (600)	VARIES 31 3/4" (805) TO 4" (100)

G-BARS





A-BARS

SCHEDULE OF REINFORCING STEEL

PIPE SIZE	A-BARS				B-BARS				C-BARS				D-BARS				G-BARS			
	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH
15" (375)	#4 (#13)	1	-	72" (1830)	#4 (#13)	5	8" (200)	15'-7" (4750)	#4 (#13)	2	-	15'-1 1/16" (4600)	#4 (#13)	4	8" (200)	VARIES 72 13/16" (1850) TO 145 5/8" (3700)	#4 (#13)	24	8" (200)	VARIES 40" (1015) TO 75 11/16" (1920)
18" (450)	#4 (#13)	1	-	72" (1830)	#4 (#13)	5	8" (200)	19'-9" (6020)	#4 (#13)	2	-	19'-3 3/8" (5875)	#4 (#13)	4	8" (200)	VARIES 89 5/8" (2275) TO 179 3/16" (4550)	#4 (#13)	30	8" (200)	VARIES 40" (1015) TO 85 3/4" (2180)
21" (525) OR 24" (600)	#4 (#13)	2	-	72" (1830)	#4 (#13)	5	8" (200)	24'-3" (7390)	#4 (#13)	2	-	23'-9 5/8" (7255)	#4 (#13)	6	8" (200)	VARIES 80 3/4" (2050) TO 242 1/8" (6150)	#4 (#13)	37	8" (200)	VARIES 40" (1015) TO 96 5/16" (2455)

DELAWARE
DEPARTMENT OF TRANSPORTATION

10:1 SAFETY END STRUCTURE

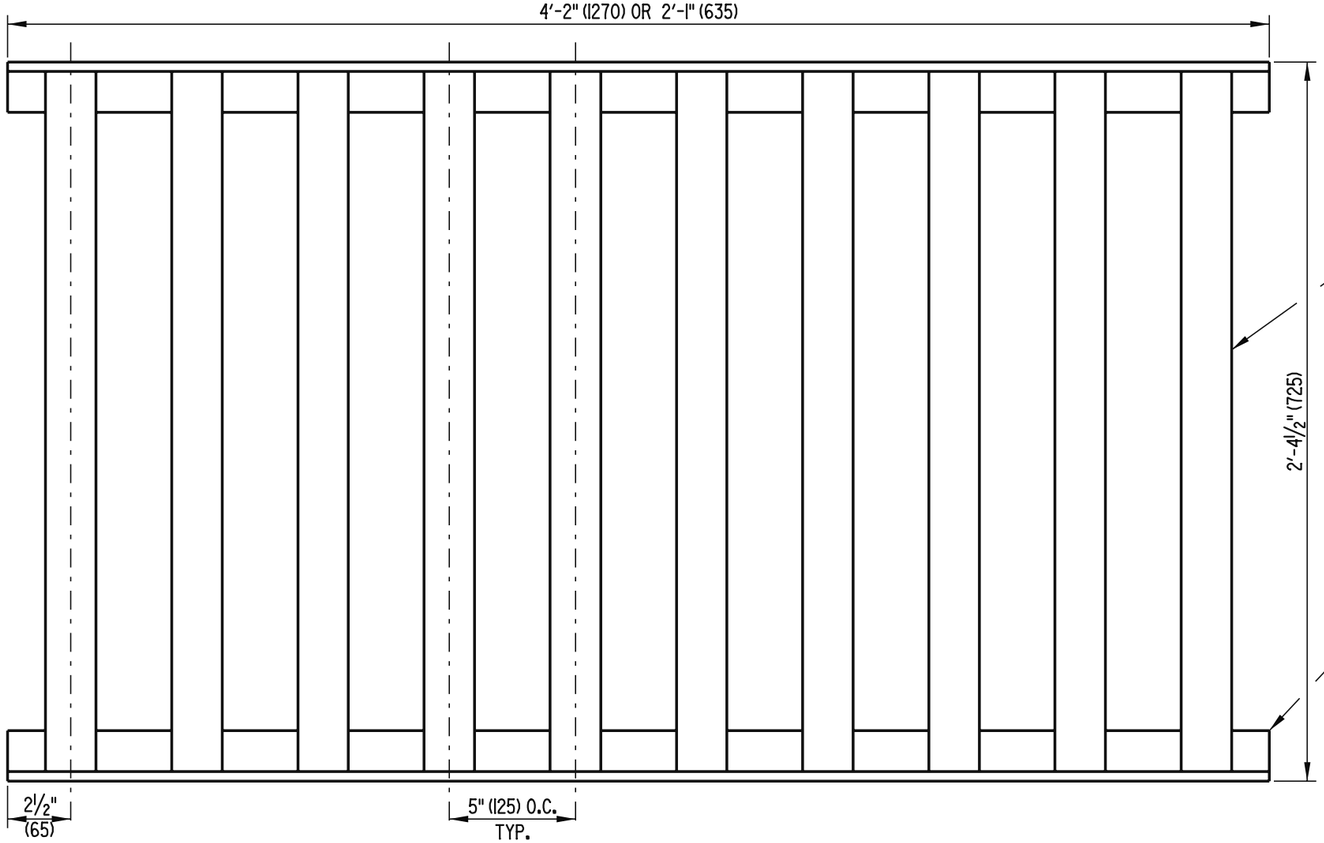
STANDARD NO. D-2 (2001) SHT. 2 OF 2

APPROVED Eugene M. Hastings CHIEF ENGINEER DATE 6/18/01

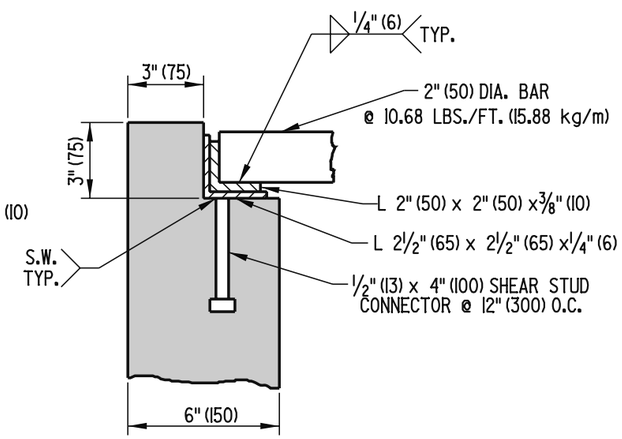
RECOMMENDED Michael A. Pigott DESIGN ENGINEER DATE 6/15/01

04/17/2001

SCALE : N.T.S.



GRATE DETAIL

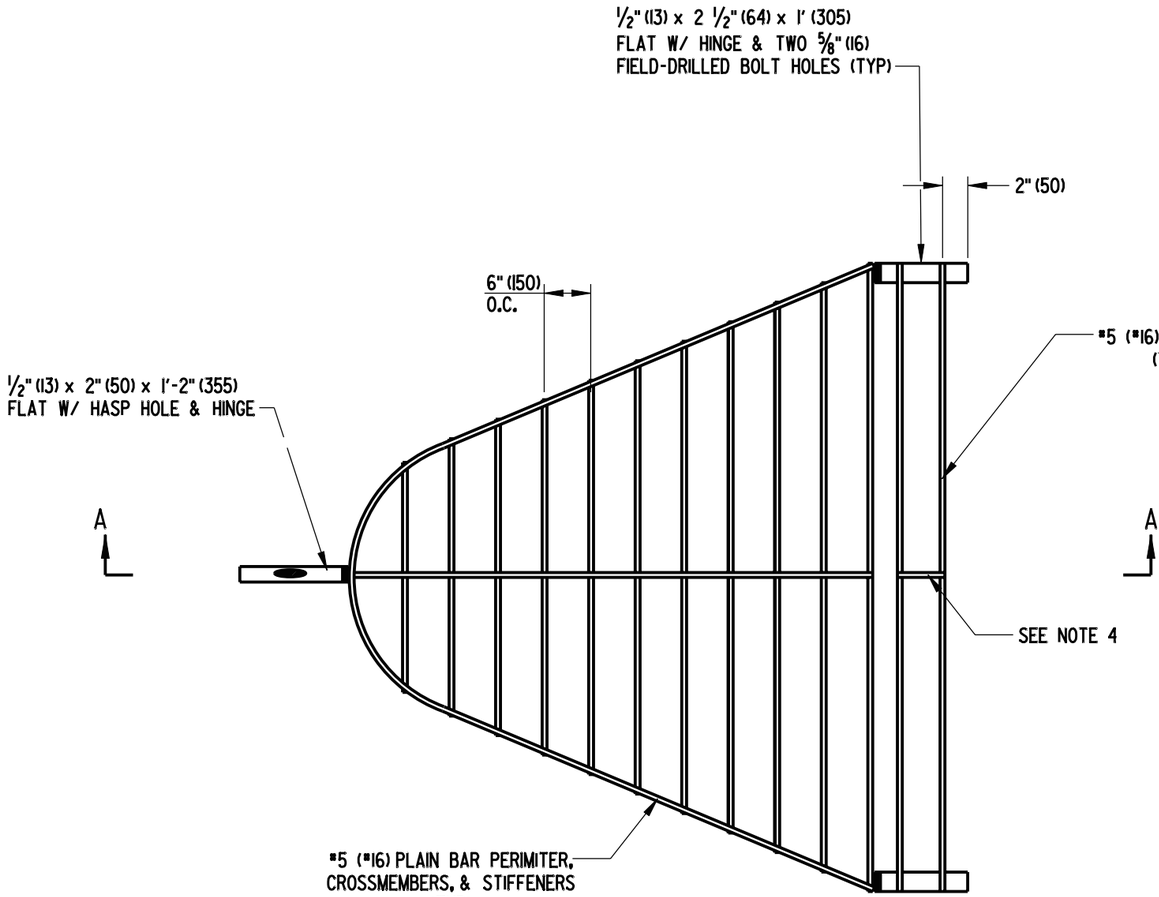


FRAME & GRATE ASSEMBLY DETAIL

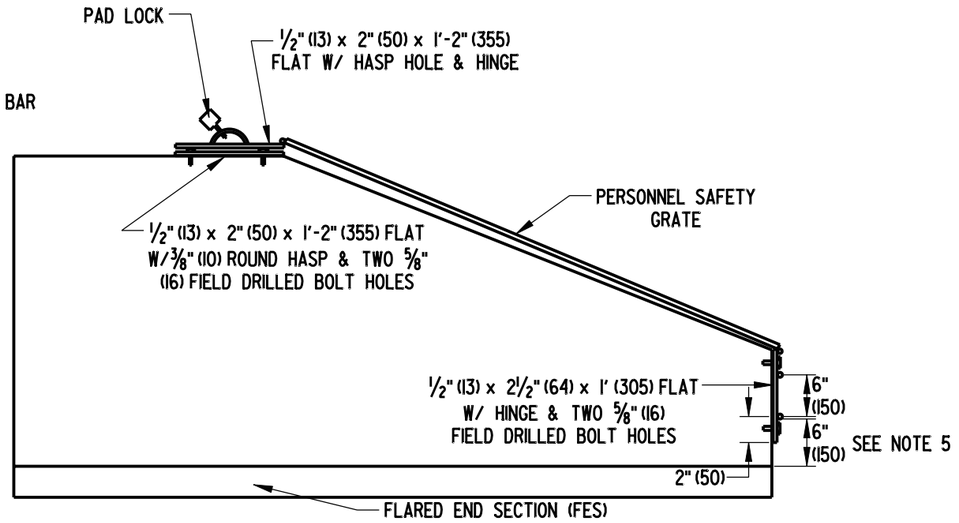
DELAWARE DEPARTMENT OF TRANSPORTATION	SAFETY GRATES		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. D-3 (2005)	SHT. 1 OF 2	RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

11/23/2005

SCALE : N.T.S.



PLAN VIEW



SECTION A-A

NOTES:

1). PERSONNEL SAFETY GRATES (PSG) SHALL ONLY BE INSTALLED ON THE INLETS OF STORM WATER PIPES 12" (300) OR LARGER IN DIAMETER THAT ARE NOT STRAIGHT FROM THE INLET TO THE OPEN OUTLET, REGARDLESS OF THE LENGTH.
2). THE GRATE SHALL BE MADE TO FIT THE OUTSIDE PERIMETER OF THE FLARED END SECTION (FES) ± ½" (13).
3). ALL BOLT HOLES ARE TO BE DRILLED IN THE FIELD.
4). A STIFFENER IS TO BE INSTALLED WHERE TWO OR MORE BARS ARE USED.
5). BOTTOM BAR SHALL BE 6" (150) ABOVE INVERT OF FES.
6). ALL HARDWARE ATTACHED TO CONCRETE SHALL BE ATTACHED USING APPROVED TAMPER PROOF ANCHORS.

DELAWARE DEPARTMENT OF TRANSPORTATION	SAFETY GRATES		APPROVED CHIEF ENGINEER	10/24/07 DATE
	STANDARD NO. D-3 (2007)	SHT. 2 OF 2	RECOMMENDED DESIGN ENGINEER	10/23/07 DATE

08/01/2007

SCALE : NTS

INLET BOX SIZE		COVER SLAB SIZE (L X W)	DRAINAGE INLET TOP UNIT	INLET TOP UNIT REBAR LENGTH	INLET TOP UNIT LIMIT OF PAYMENT	INLET TOP UNIT BAR BENDING DIAGRAM	FRAME & GRATE (FOUND ON DETAIL D-5, SHEET 2)	MAXIMUM PIPE SIZE (SEE NOTE 1)		MAXIMUM HEIGHT (TO TOP OF BOX)
L	W							L	W	
17⅝"	11⅛"	NO COVER SLAB	TYPE 5 (FRAME & GRATE COMBO)	N/A	N/A	N/A	TYPE 5 (FRAME & GRATE COMBO)	N/A	N/A	4'-0"
24"	24"	NO COVER SLAB	TYPE 6 (FRAME & GRATE COMBO)	N/A	N/A	N/A	TYPE 6 (FRAME & GRATE COMBO)	15"	15"	4'-0"
34"	18"	NO COVER SLAB	TYPES A, C, D, & E (DETAIL D-5, SHEET 7)	79"	82"	S504 (DETAIL D-5, SHEET 7)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	24"	12"	11'-4"
34"	24"	NO COVER SLAB	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 6)	79"	82"	S503 (DETAIL D-5, SHEET 6)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	24"	15"	11'-4"
48"	30"	60" x 42" (DETAIL D-5, SHEET 4)	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 3)	93"	96"	S501 (DETAIL D-5, SHEET 6)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	36"	21"	11'-4"
48"	48"	60" x 60" (DETAIL D-5, SHEET 4)	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 3)	93"	96"	S501 (DETAIL D-5, SHEET 3)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	36"	36"	11'-4"
66"	30"	78" x 42" (DETAIL D-4, SHEET 4)	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 3)	111"	114"	S501 (DETAIL D-5, SHEET 3)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	48"	21"	11'-4"
66"	48"	78" x 60" (DETAIL D-5, SHEET 4)	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 3)	111"	114"	S501 (DETAIL D-5, SHEET 3)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	48"	36"	11'-4"
66"	66"	78" x 78" (DETAIL D-5, SHEET 4)	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 3)	111"	114"	S501 (DETAIL D-5, SHEET 3)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	48"	48"	11'-4"
72"	24"	84" x 36" DETAIL D-5, SHEET 5)	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 3)	117"	120"	S502 (DETAIL D-5, SHEET 5)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	54"	15"	11'-4"
72"	48"	84" x 60" (DETAIL D-5, SHEET 5)	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 3)	117"	120"	S502 (DETAIL D-5, SHEET 5)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	54"	36"	11'-4"
72"	72"	84" x 84" (DETAIL D-5, SHEET 5)	TYPES A, B, C, D, & E (DETAIL D-5, SHEET 3)	117"	120"	S502 (DETAIL D-5, SHEET 5)	TYPES 1 THRU 4 GRATE STANDARD DRAINAGE INLET FRAME	54"	54"	11'-4"

NOTES :

1). MAXIMUM PIPE SIZES ARE CALCULATED USING REINFORCED CONCRETE PIPE PERPENDICULAR TO THE BOX WALL. FOR OTHER PIPE SIZES, TYPES AND SKEW ANGLES OTHER THAN PERPENDICULAR, SEE CHART ON DELDOT DESIGN RESOURCE CENTER.

2). STEPS ARE REQUIRED ON ALL BOXES WHOSE DEPTH IS GREATER THAN 4'-0" (1219).

3). SEE DETAIL D-4 OR APPROPRIATE DETAIL SHEET FOR ADDITIONAL NOTES.

DELAWARE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET REFERENCE SHEET

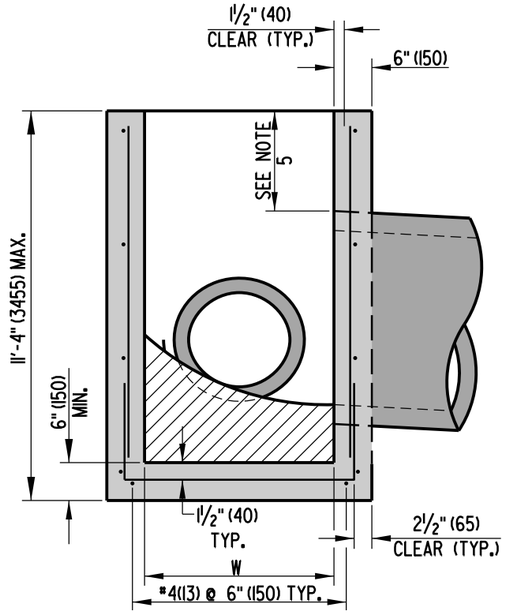
STANDARD NO. D-R (2012) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)

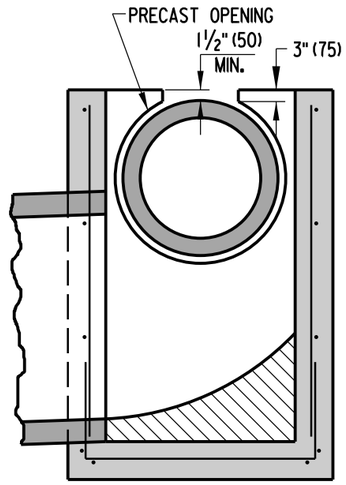
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

SCALE : N.T.S.



SECTION A-A



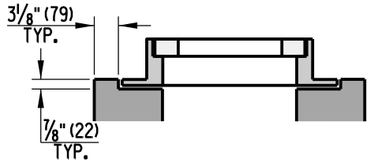
OPTIONAL PIPE OPENING DETAIL

SEE NOTE 5

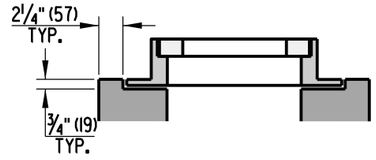
INLET BOX SCHEDULE			
L	W	FABRICATION TOLERANCE	
17⅝" (450)	11⅝" (295)	+1" (25)	*
24" (610)	24" (610)	+1" (25)	*
34" (865)	18" (455)	-1" (25)	
34" (865)	24" (610)	-1" (25)	
48" (1220)	30" (760)	+6" (150)	
48" (1220)	48" (1220)	+6" (150)	
66" (1675)	30" (760)	+6" (150)	
66" (1675)	48" (1220)	+6" (150)	
66" (1675)	66" (1675)	+6" (150)	
72" (1830)	24" (610)	-1" (25)	
72" (1830)	48" (1220)	-1" (25)	
72" (1830)	72" (1830)	-1" (25)	

* - THESE BOXES ARE TO BE USED FOR LAWN INLETS AND ARE NOT INTENDED TO BE USED IN THE TRAVELWAY. THE MAX DEPTH FOR THESE BOXES IS 4' (1220). SEE NOTE 8 FOR REINFORCEMENT.

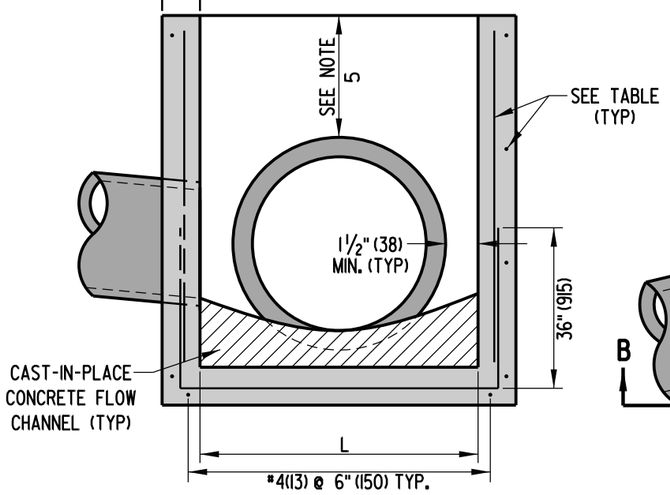
WALL REINFORCEMENT SCHEDULE		
INTERIOR WALL DIMENSION	AREA OF HORIZONTAL REINFORCEMENT PER FOOT (mm^2)	AREA OF VERTICAL REINFORCEMENT PER FOOT (mm^2)
	IN^2 (mm^2)	IN^2 (mm^2)
LESS THAN 4' (1220)	0.132 (85)	0.132 (85)
4' (1220) TO 4.5' (1370)	0.163 (105)	0.132 (85)
4.5' (1370) TO 5' (1525)	0.198 (128)	0.132 (85)
5' (1525) TO 5.5' (1675)	0.239 (154)	0.132 (85)
5.5' (1675) TO 6' (1830)	0.284 (183)	0.132 (85)



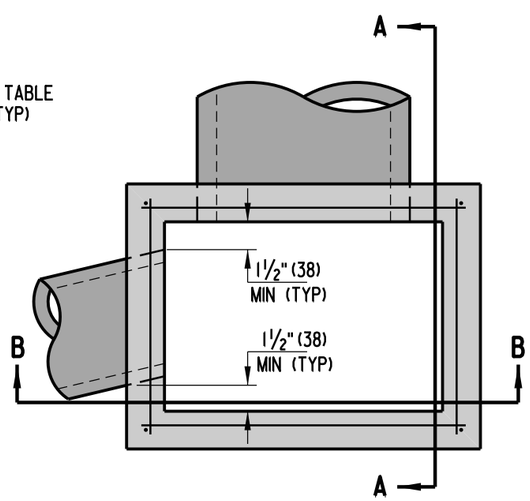
24" (610) x 24" (610) LAWN INLET BOX DETAIL



17⅝" (450) X 11⅝" (295) LAWN INLET BOX DETAIL



SECTION B-B



TOP VIEW

NOTES:

1). INLET BOXES SHALL BE PRECAST OR CAST-IN-PLACE.
2). PIPES SHALL NOT BE INSTALLED THROUGH ANY CORNER OF THE INLET BOX.
3). RISER SECTIONS MAY BE USED FOR DEEP INLET BOXES.
4). PIPES MAY BE INSTALLED NEAR OR THROUGH JOINTS FOR RISER SECTIONS.
5). WHEN THE COVER ABOVE THE PIPE IS LESS THAN 4" (100) TO THE COVER SLAB OR TOP UNIT OPENING, THE PORTION OF BOX WALL ABOVE THE PIPE MAY BE REMOVED AS SHOWN IN THE OPTIONAL PIPE OPENING DETAIL. THE AREA ABOVE THE PIPE SHALL THEN BE FORMED AND FILLED WITH HIGH-STRENGTH, NON-SHRINK GROUT MIXED WITH COARSE AGGREGATE IN A 1:1 RATIO BY WEIGHT.
6). CONCRETE FLOW CHANNEL SHALL BE WARPED FOR POSITIVE DRAINAGE.
7). WHEN INLET BOX IS PRECAST, PIPE OPENING SHALL BE BETWEEN 3" (75) AND 4" (100) LARGER THAN OUTSIDE DIAMETER OF PIPE AND SHALL NOT ENCROACH ON ADJACENT WALL.
8). REINFORCEMENT FOR LAWN INLET BOXES SHALL BE 4" (102) X 4" (102), W4 X W4 (W26 X W26) WELDED WIRE.

DELAWARE
DEPARTMENT OF TRANSPORTATION

INLET BOX DETAILS

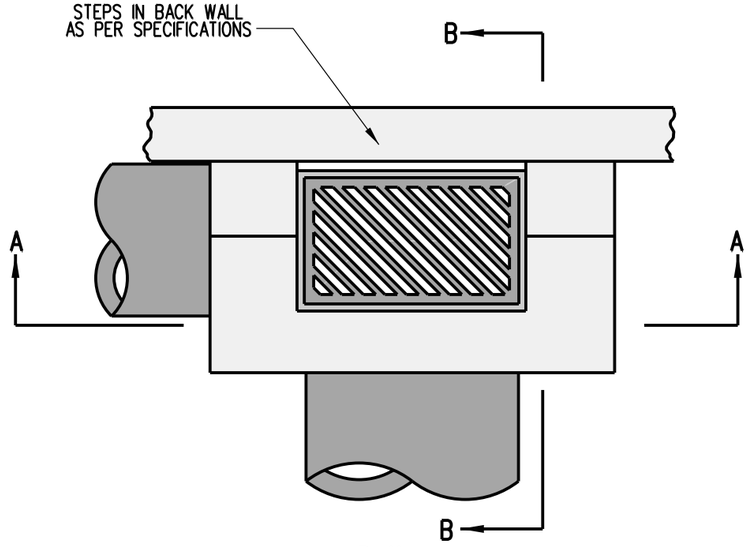
STANDARD NO. D-4 (2009) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/19/2010 (DATE)

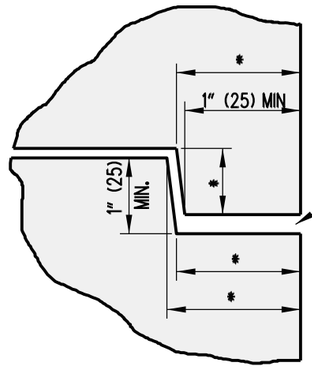
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2010 (DATE)

08/19/2009

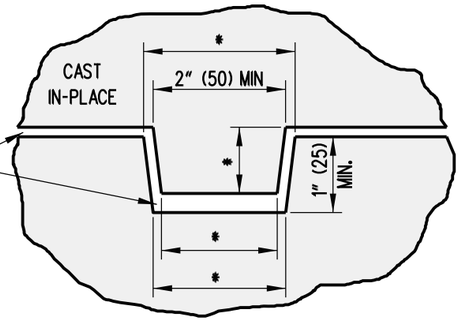
SCALE : N.T.S.



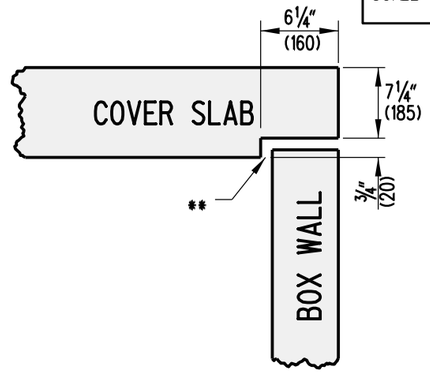
PLAN



TYPE 1 JOINT DETAIL



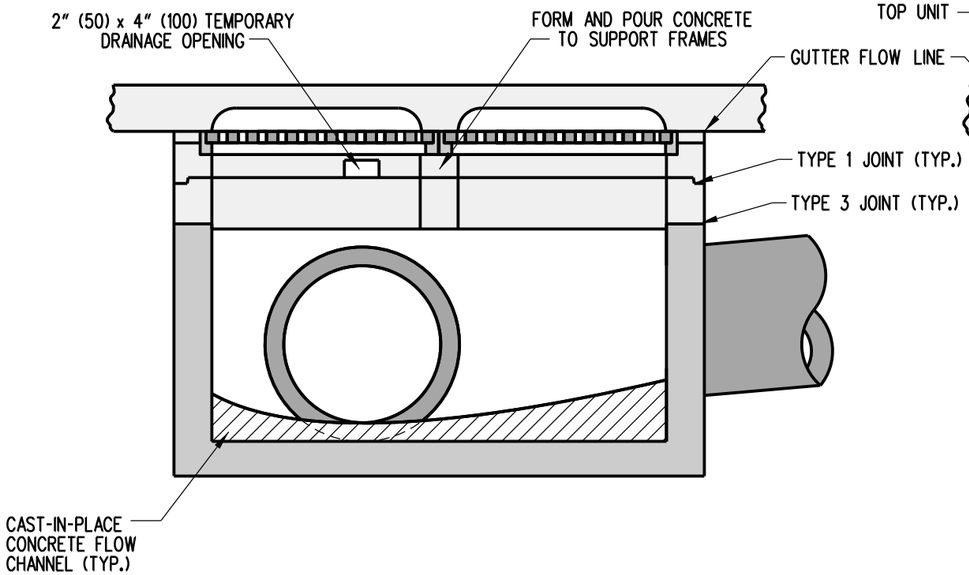
TYPE 2 JOINT DETAIL



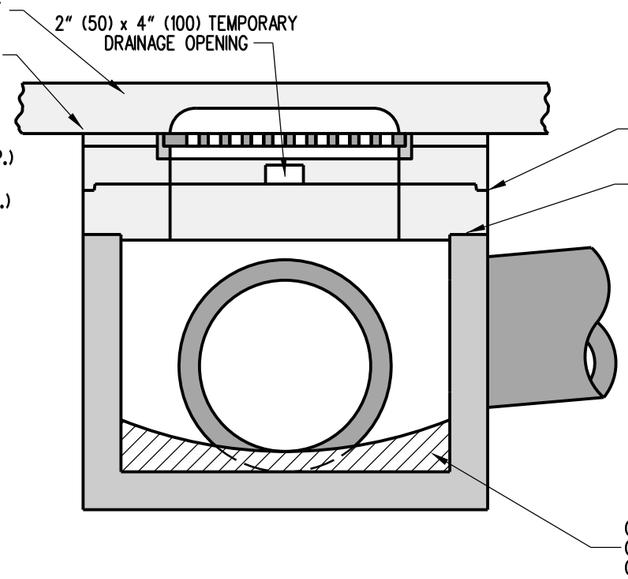
TYPE 3 JOINT DETAIL

* DIMENSIONS WILL VARY

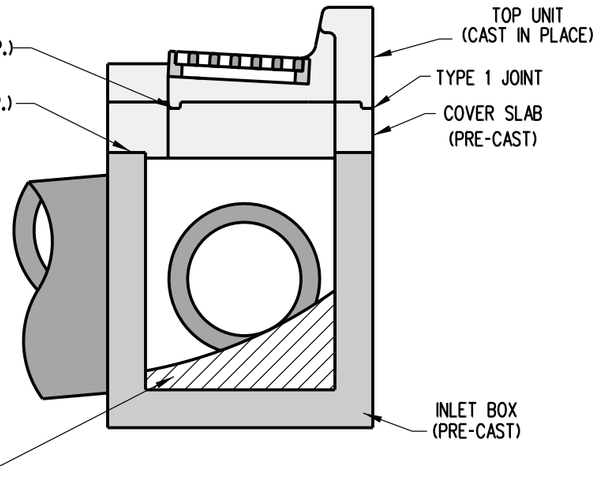
** JOINT SEALANT AS PER SPECIFICATIONS
ONLY BETWEEN 2 PRECAST UNITS



DOUBLE INLET SECTION



SECTION A-A



SECTION B-B

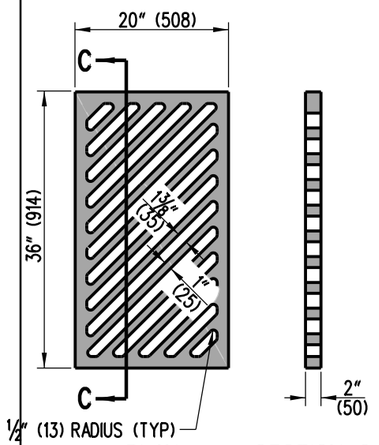
DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET ASSEMBLY		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-5 (2010)	SHT. 1 OF 9	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/26/2010

DRAINAGE INLET FRAME AND GRATES

SCALE : N.T.S.

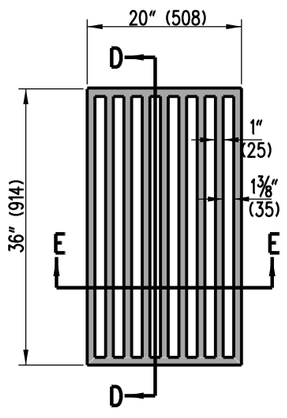
TYPE 1



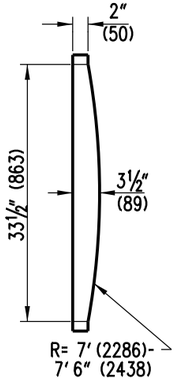
PLAN

SECTION C-C

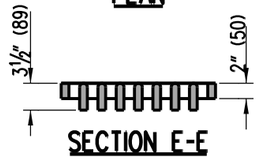
TYPE 2



PLAN

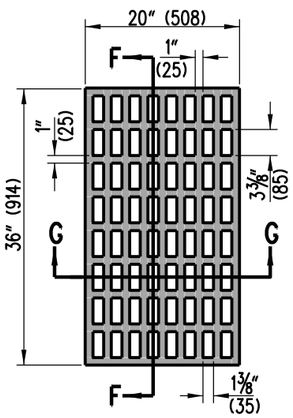


SECTION D-D

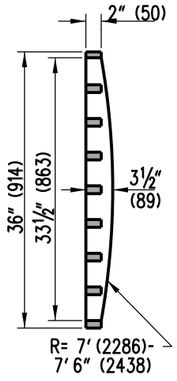


SECTION E-E

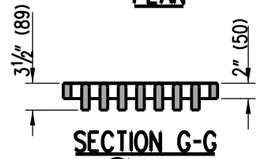
TYPE 3



PLAN

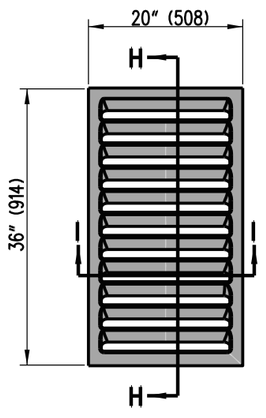


SECTION F-F

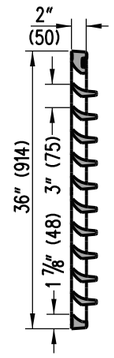


SECTION G-G

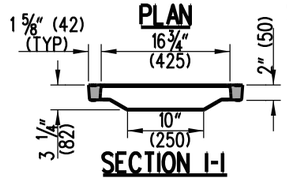
TYPE 4



PLAN

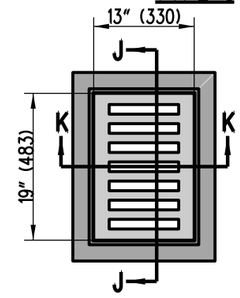


SECTION H-H

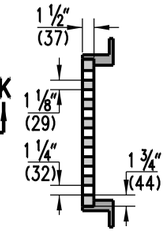


SECTION I-I

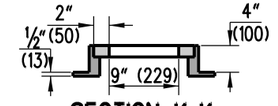
TYPE 5



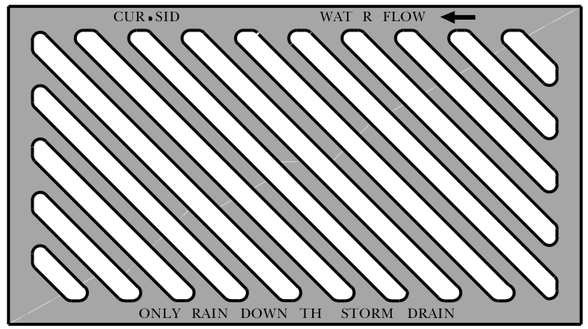
PLAN



SECTION J-J

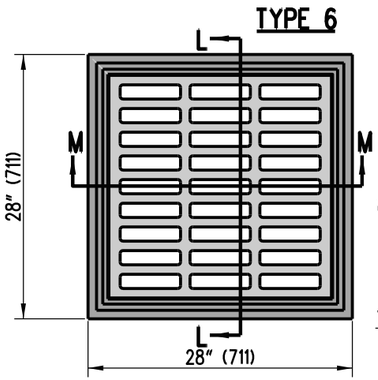


SECTION K-K

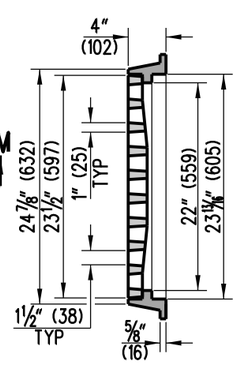


DRAINAGE GRATE LABELING EXAMPLE DETAIL

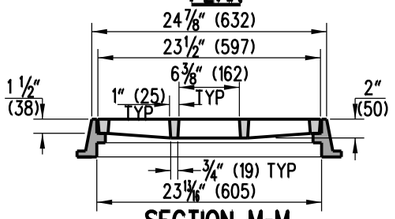
TYPE 6



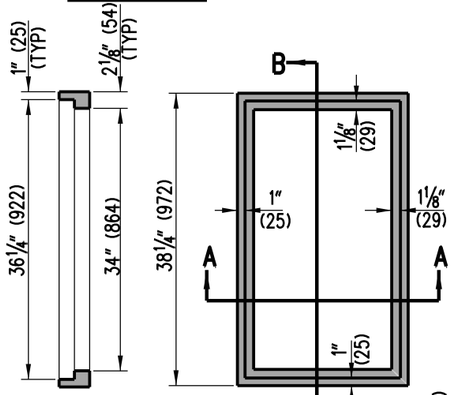
PLAN



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

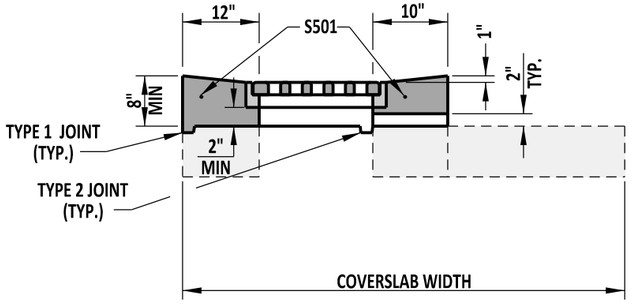
DRAINAGE INLET FRAME AND GRATES

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

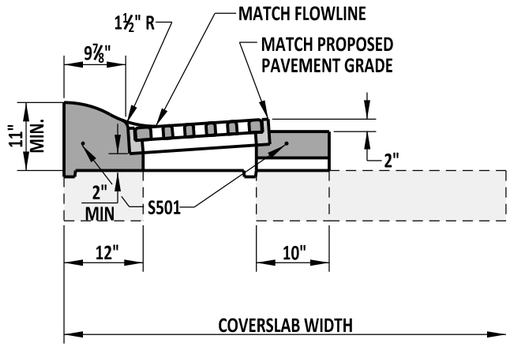
APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)

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

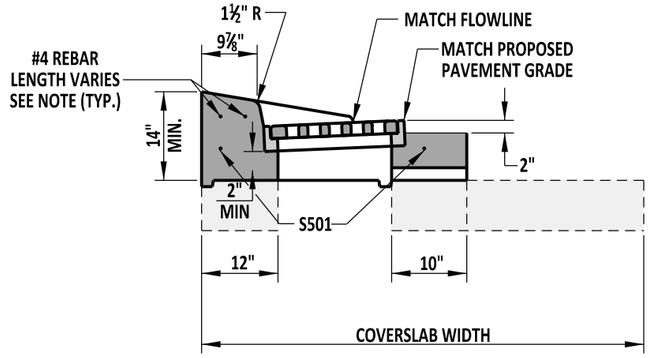
SCALE : NTS



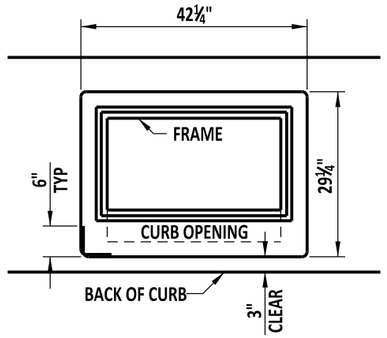
TYPE A



TYPE D

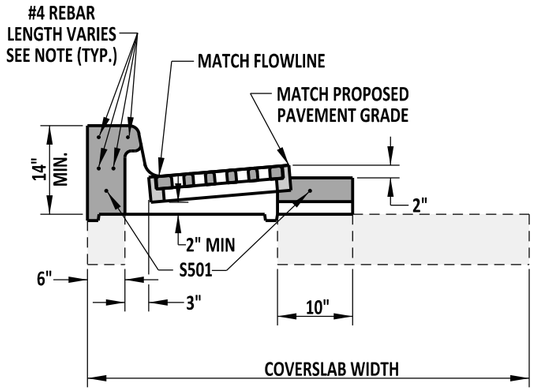


TYPE E



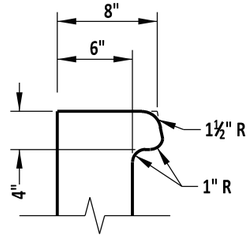
S501 BENDING DIAGRAM

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



TYPE B

SEE CURB OPENING DETAIL ON THIS SHEET

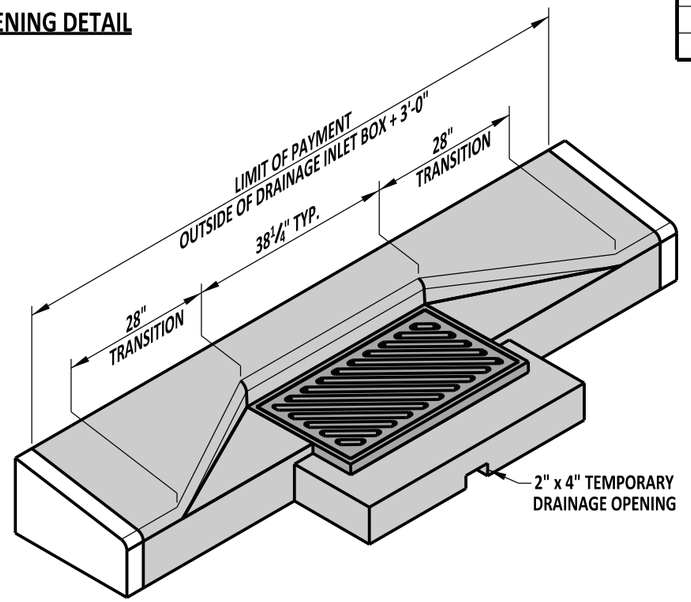


CURB OPENING DETAIL

INLET TOP UNIT APPLICATIONS	
TOP UNIT	CURB
TYPE A	USE IN DRAINAGE SWALE
TYPE B	INTEGRAL PCC CURB & GUTTER, TYPE 1-8 & 3-8, PCC CURB TYPE 1-8
TYPE C	INTEGRAL PCC CURB & GUTTER, TYPES 1-6, 3-6, 1-4, 3-4 , 1-2 AND 3-2 AND PCC CURB TYPE 1-6, 1-4, AND 1-2.
TYPE D	INTEGRAL PCC CURB & GUTTER, TYPE 2
TYPE E	PCC CURB TYPE 2

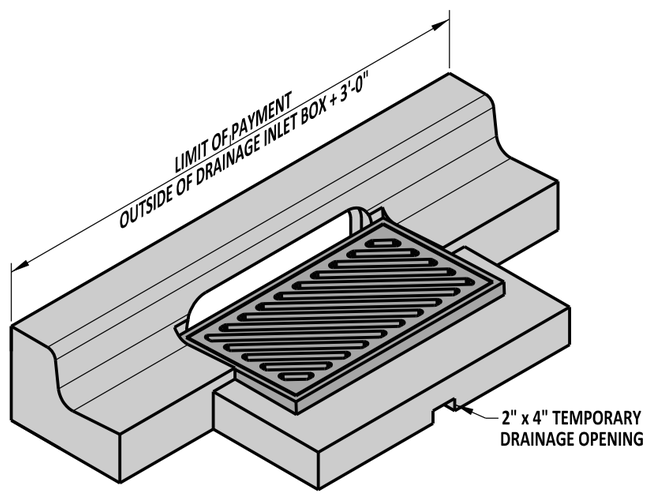
TYPE C

* - THIS DIMENSION VARIES BASED ON THE HEIGHT OF THE CURB AND GUTTER OR CURB USED:
- INTEGRAL P.C.C. CURB AND GUTTER, TYPES 1-6 AND 3-6 & CURB, TYPE 1-6 - 12" MIN.
- INTEGRAL P.C.C. CURB AND GUTTER, TYPES 1-4 AND 3-4 & CURB, TYPE 1-4 - 10" MIN.
- INTEGRAL P.C.C. CURB AND GUTTER, TYPES 1-2 AND 3-2 & CURB, TYPE 1-2 - 8" MIN.



ISOMETRIC VIEW

TYPE E UNIT SHOWN



ISOMETRIC VIEW

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

NOTE: LENGTH OF #4 REBAR SHALL BE THE OUTSIDE OF THE DRAINAGE INLET BOX PLUS 2'-9".

DELAWARE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET TOP UNITS

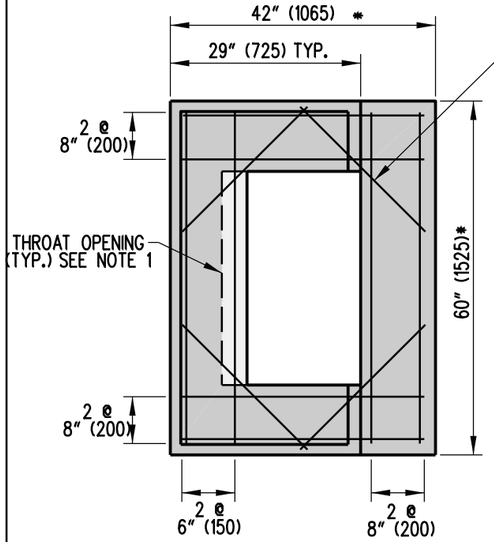
STANDARD NO. D-5 (2012) | SHT. 3 OF 9

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)

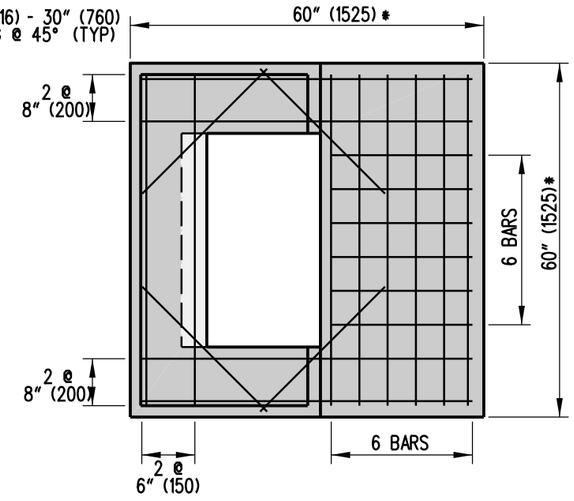
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

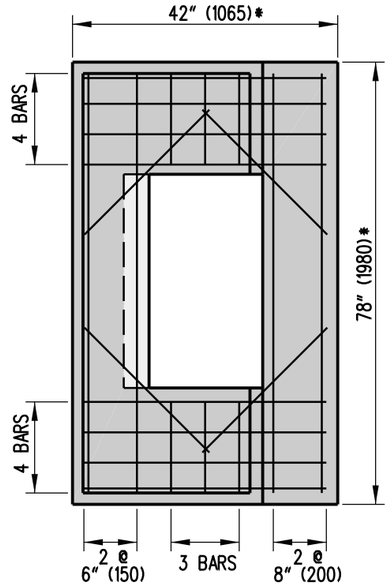
SCALE : N.T.S.



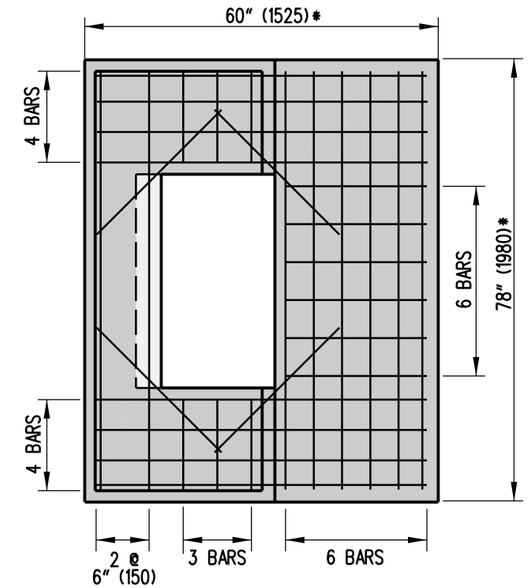
48" (1220) x 30" (760) INLET



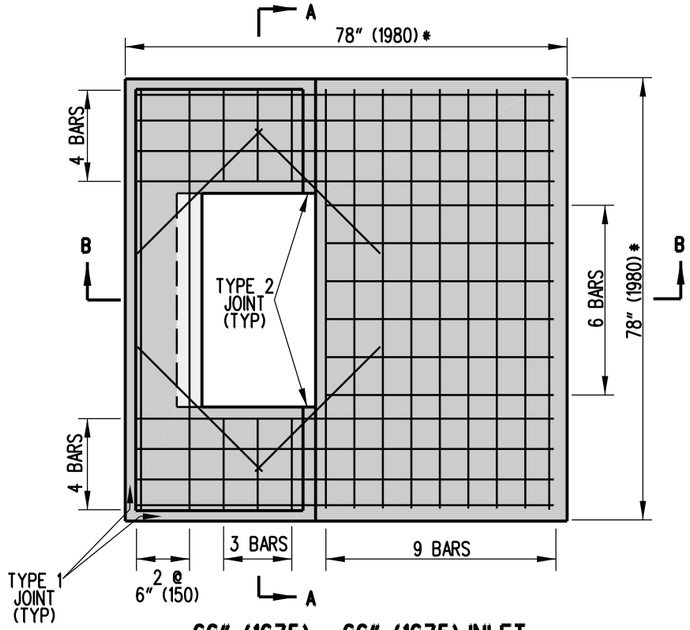
48" (1220) x 48" (1220) INLET



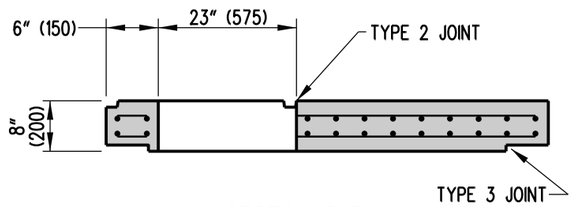
66" (1675) x 30" (760) INLET



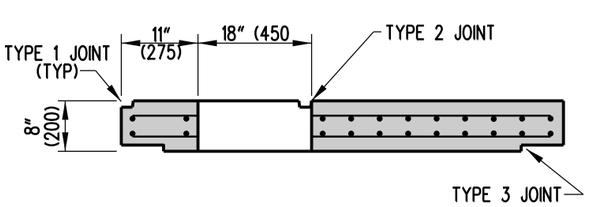
66" (1675) x 48" (1220) INLET



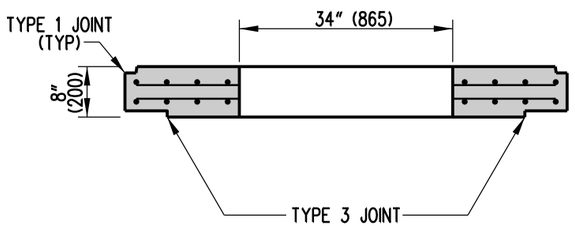
66" (1675) x 66" (1675) INLET



SECTON B-B
FOR TYPE B TOP UNITS



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



SECTION A-A

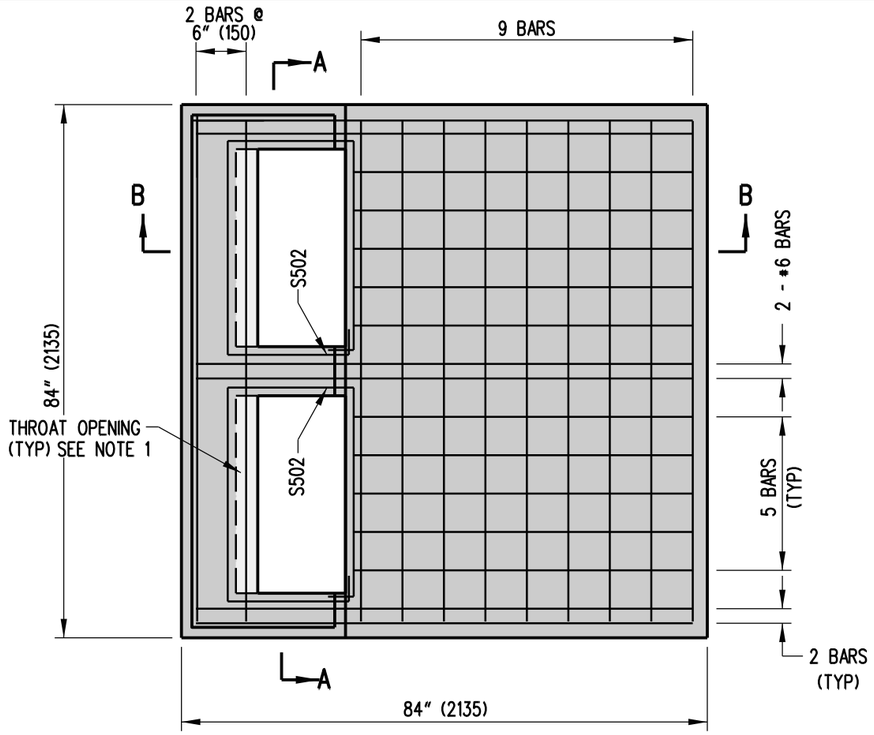
NOTES :

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).

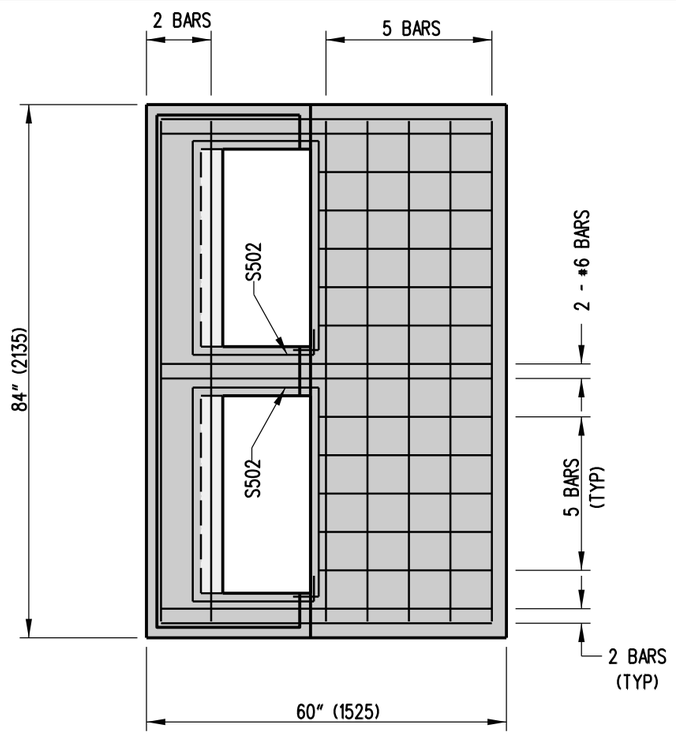
* - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

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)

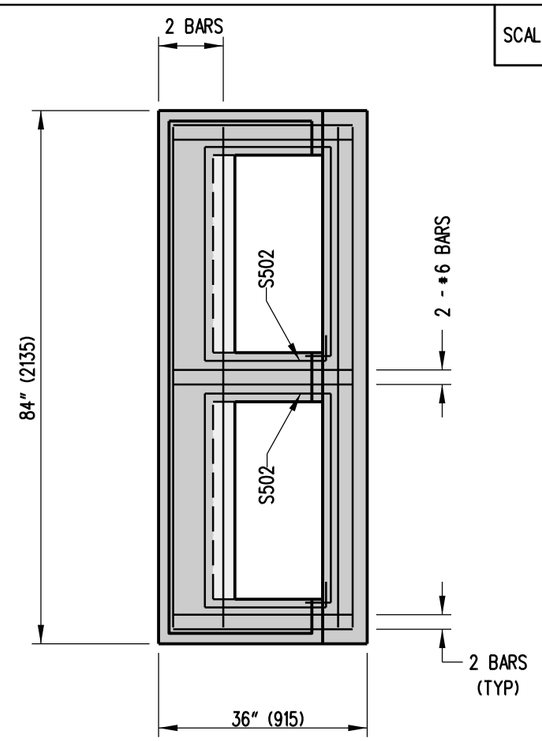
SCALE : N.T.S.



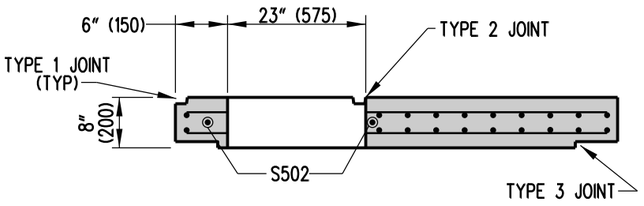
72" (1830) x 72" (1830) INLET



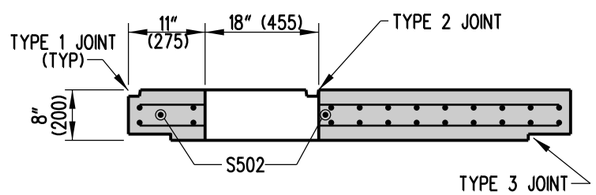
72" (1830) x 48" (1220) INLET



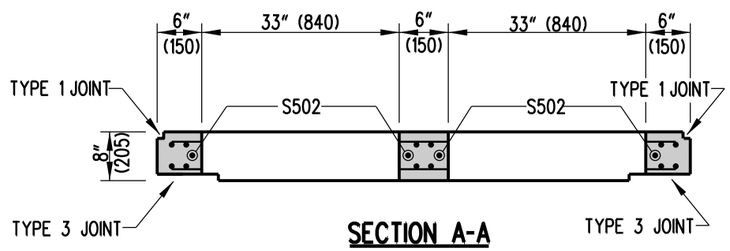
72" (1830) x 24" (610) INLET



SECTON B-B
FOR TYPE B TOP UNITS



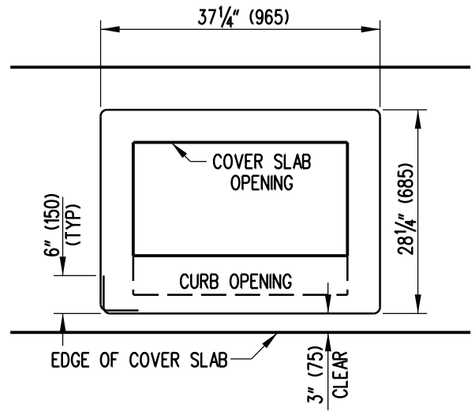
SECTON B-B
FOR TYPES A, C, D, & E TOP UNITS



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).



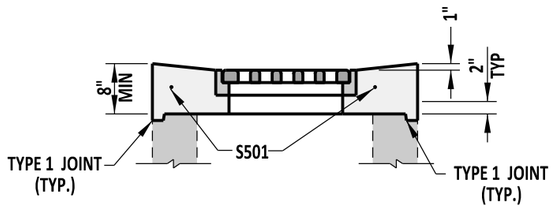
S502 BENDING DIAGRAM

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.

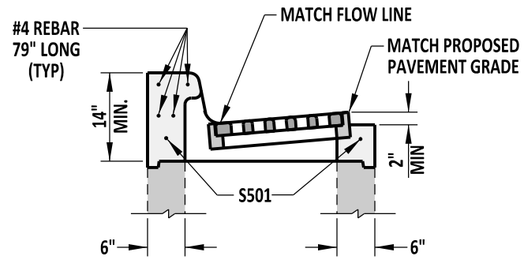
DELAWARE DEPARTMENT OF TRANSPORTATION	DOUBLE INLET COVER SLAB DETAILS	APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-5 (2010) SHT. 5 OF 9	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

12/23/2010

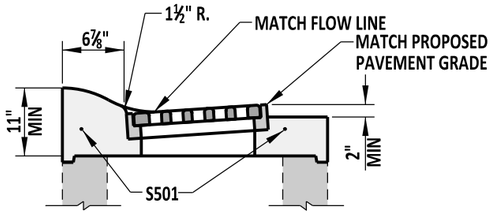
SCALE : NTS



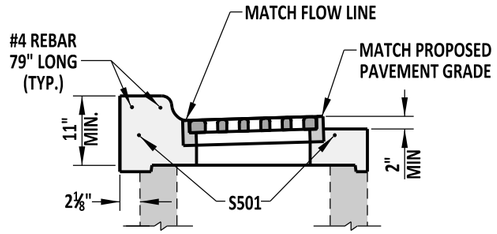
TYPE A



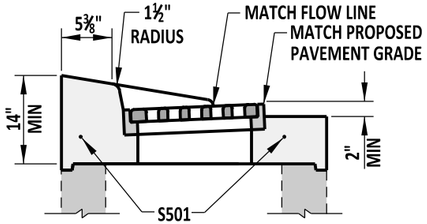
TYPE B



TYPE D



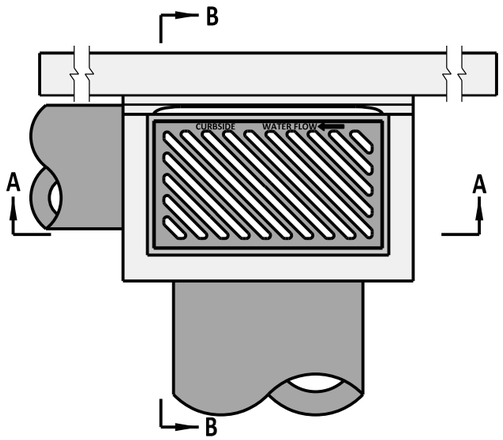
TYPE C



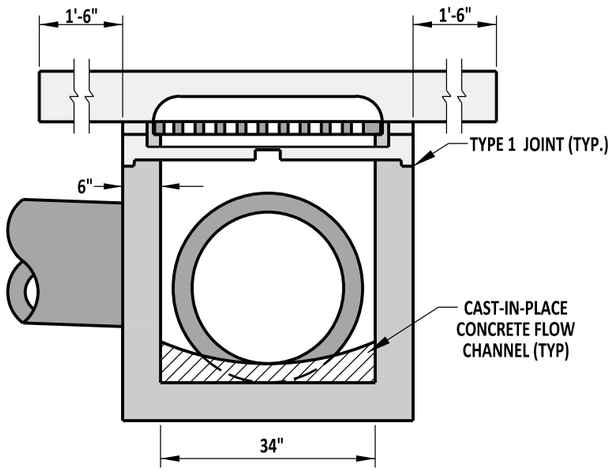
TYPE E

TOP UNIT DETAILS

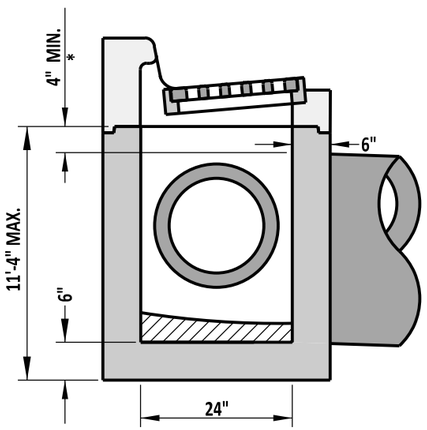
NOTE: SEE DETAIL D-5, SHEET 3 OF 9 FOR INLET TOP UNIT APPLICATIONS.



TOP VIEW



SECTION A-A



SECTION B-B

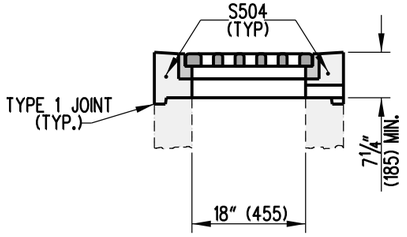
DRAINAGE INLET DETAILS

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

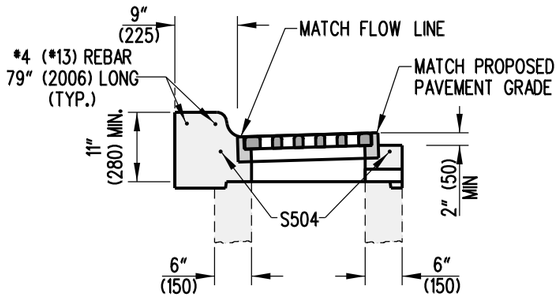
DELAWARE DEPARTMENT OF TRANSPORTATION	34" x 24" DRAINAGE INLET DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)
	STANDARD NO. D-5 (2012)	SHT. 6 OF 9	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

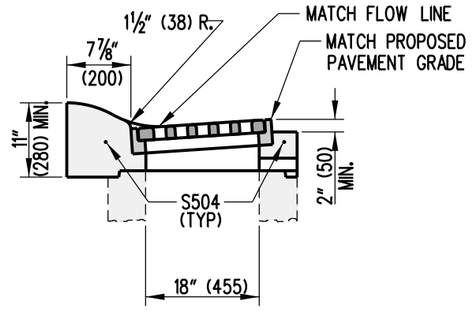
SCALE : N.T.S.



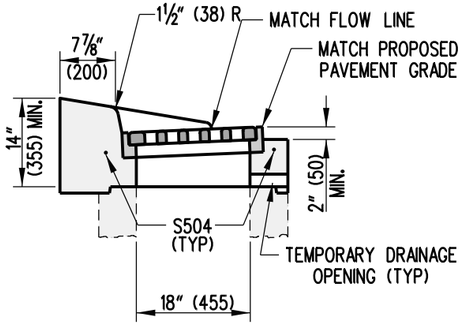
TYPE A



TYPE C

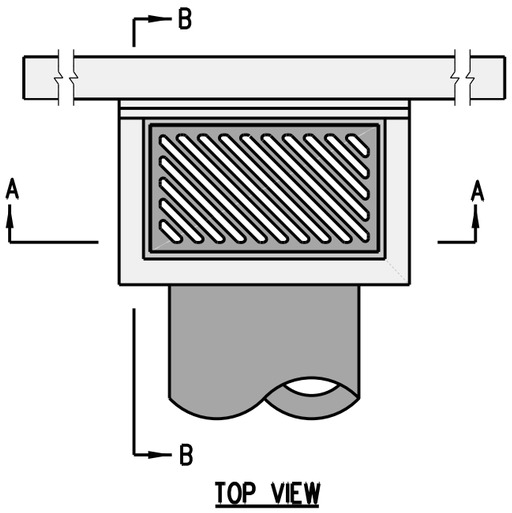


TYPE D

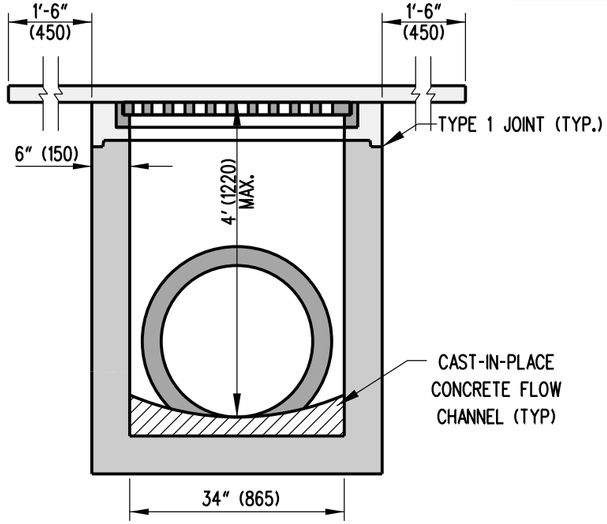


TYPE E

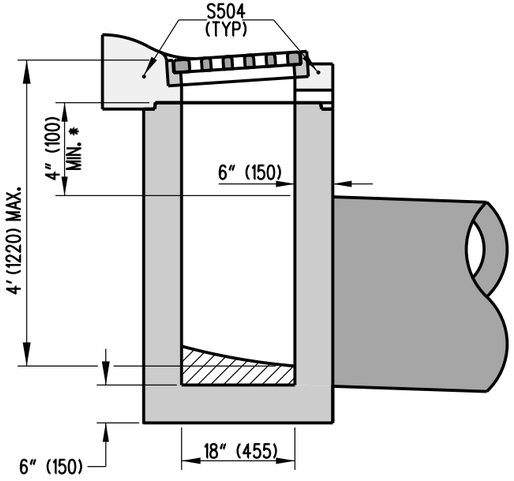
TOP UNIT DETAILS



TOP VIEW

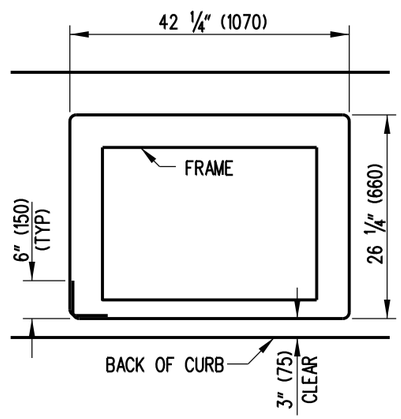


SECTION A-A



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.

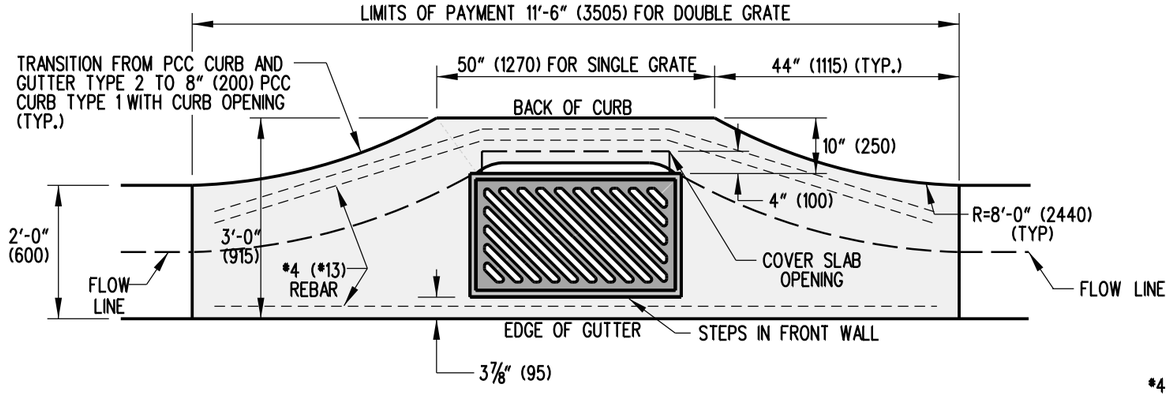
NOTES:

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.

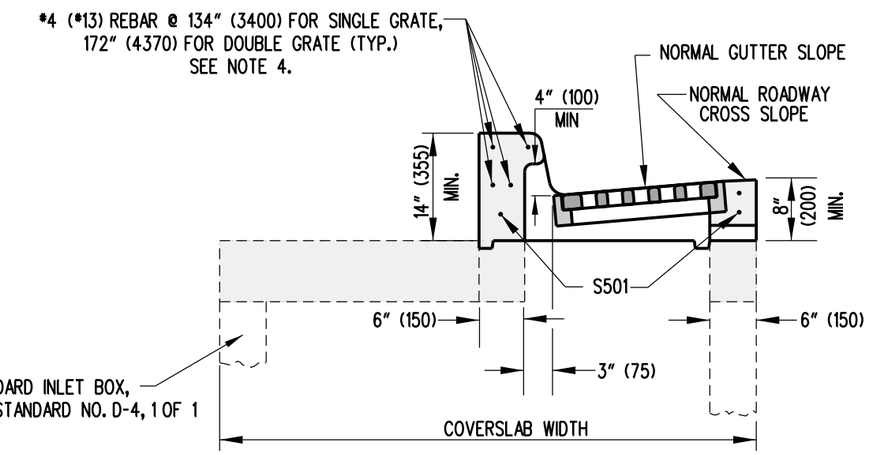
DELAWARE DEPARTMENT OF TRANSPORTATION	34" (865) x 18" (455) DRAINAGE INLET DETAILS	APPROVED SIGNATURE ON FILE — CHIEF ENGINEER — 12/28/2010 DATE
	STANDARD NO. D-5 (2010) — SHT. 7 OF 9	RECOMMENDED SIGNATURE ON FILE — DESIGN ENGINEER — 12/27/2010 DATE

10/28/2010

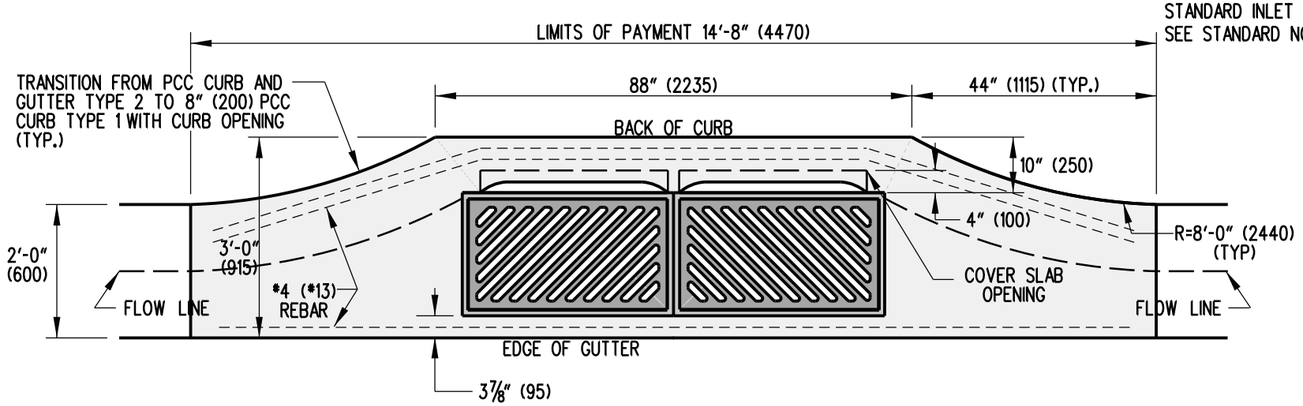
SCALE : N.T.S.



SINGLE GRATE SETUP



SUBDIVISION TOP & CONFIGURATION



DOUBLE GRATE SETUP

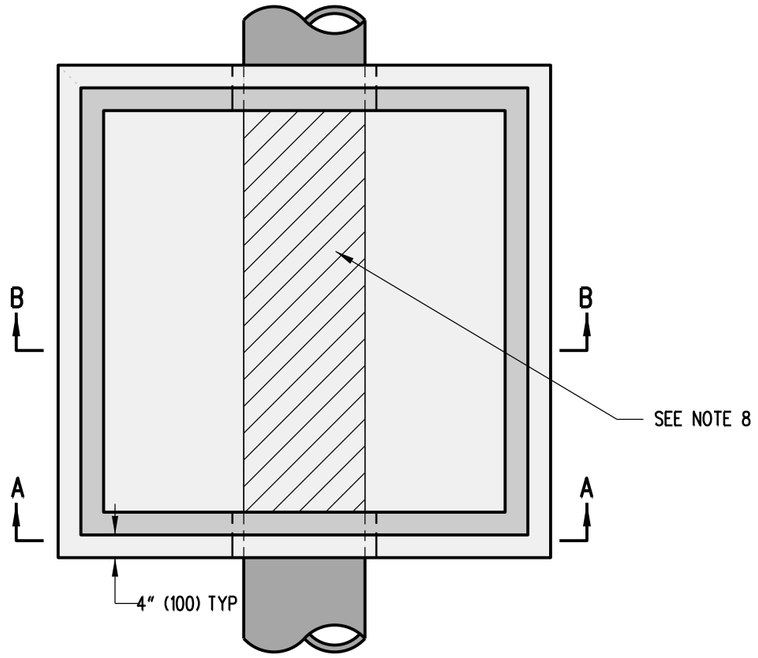
NOTES:

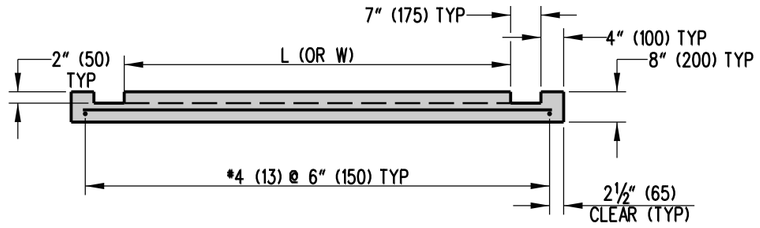
1). MINIMUM BOX SIZE TO BE 34" (850) x 24" (600).
2). PIPE OPENINGS IN THE FRONT WALL SHALL NOT INTERFERE WITH THE STEPS. THE PIPE SHALL BE SHIFTED HORIZONTALLY TO AVOID THE STEPS. IT MAY BE NECESSARY TO USE A LARGER BOX TO AVOID CONFLICT BETWEEN STEPS AND PIPE OPENING.
3). SEE DETAIL D-5, SHEET 3 OF 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)

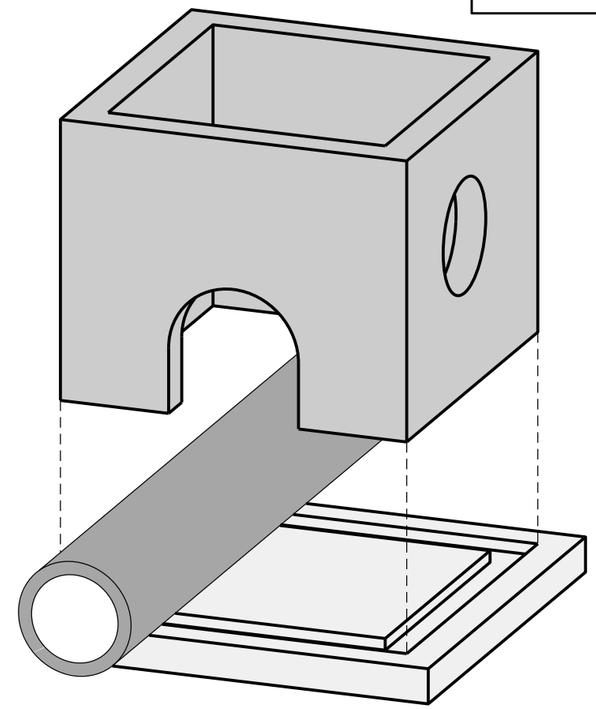
12/23/2010

SCALE : N.T.S.



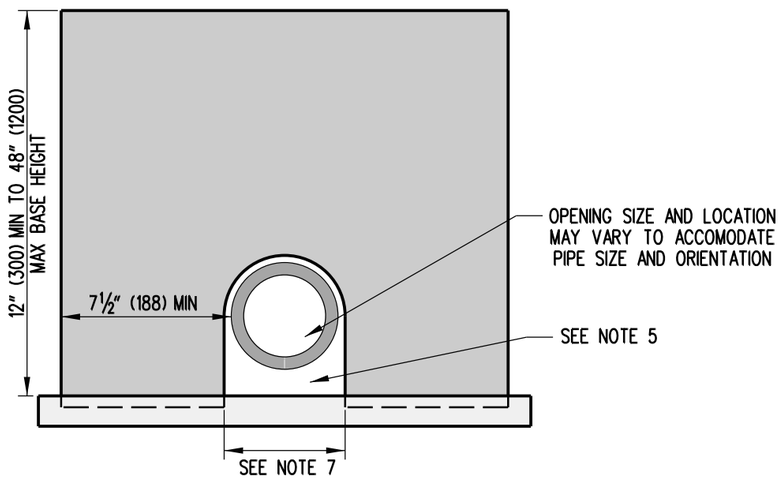


CAST-IN-PLACE BOTTOM
SECTION VIEW

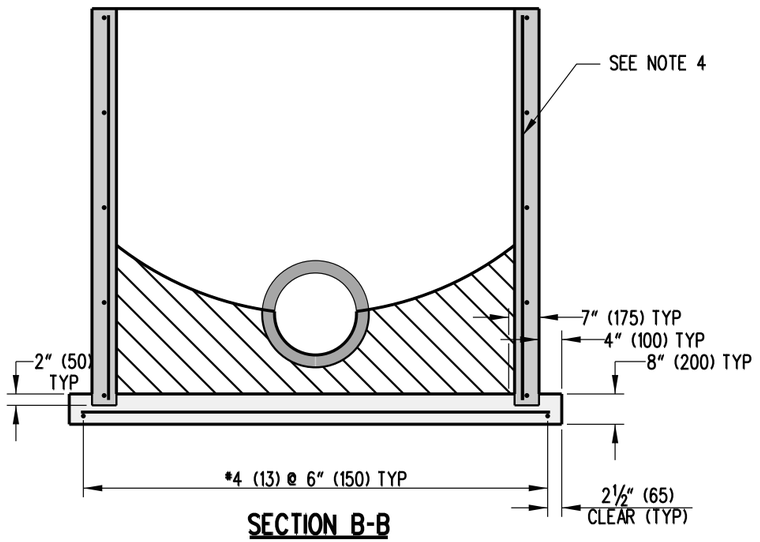


ISOMETRIC VIEW

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

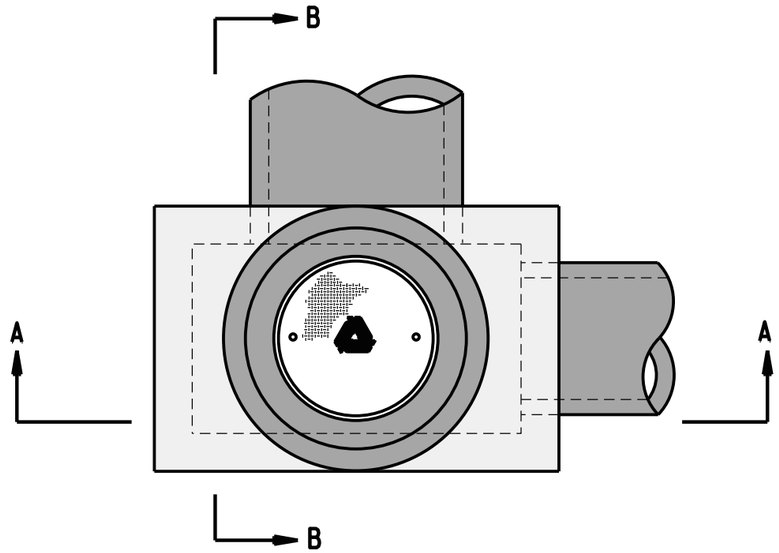
STANDARD NO. D-5 (2010) | SHT. 9 OF 9

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

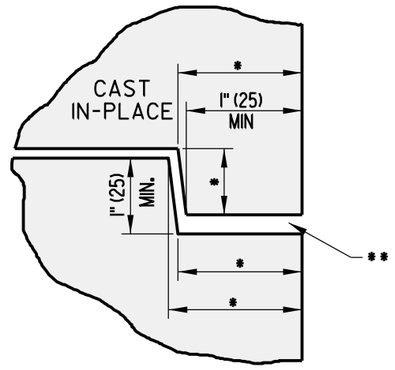
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

08/08/2010

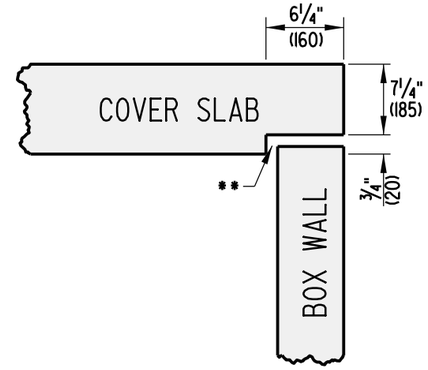
SCALE : N.T.S.



PLAN

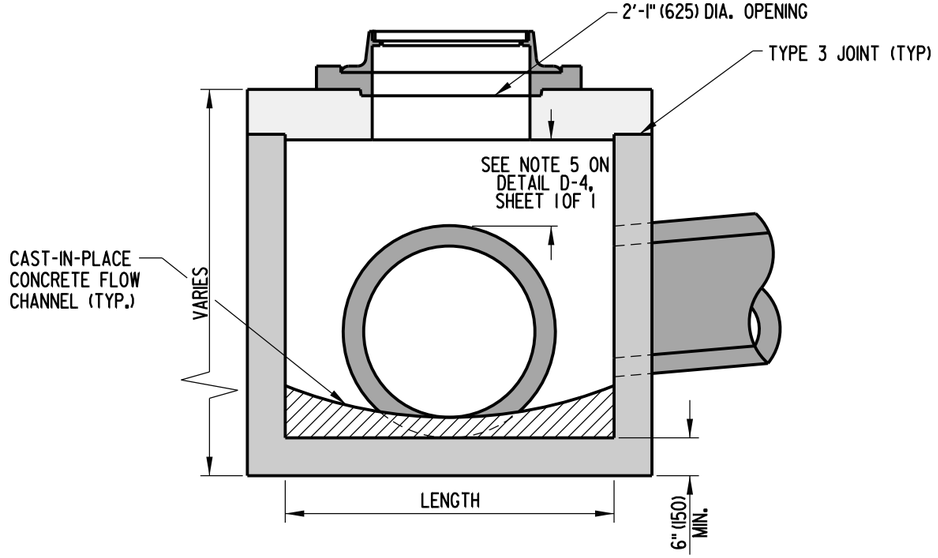


TYPE 1 JOINT DETAIL



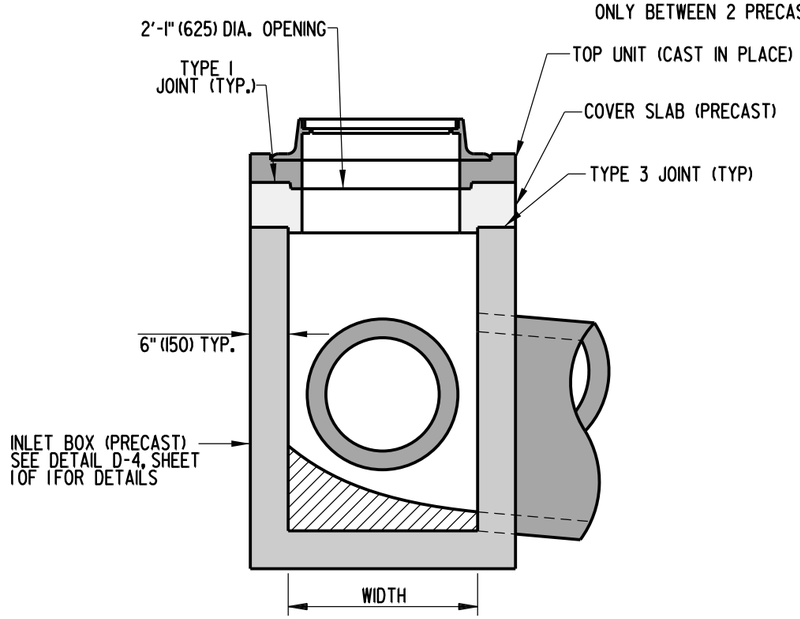
TYPE 3 JOINT DETAIL

* DIMENSIONS MAY VARY
** JOINT SEALANT AS PER SPECIFICATIONS ONLY BETWEEN 2 PRECAST UNITS



SECTION A-A

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



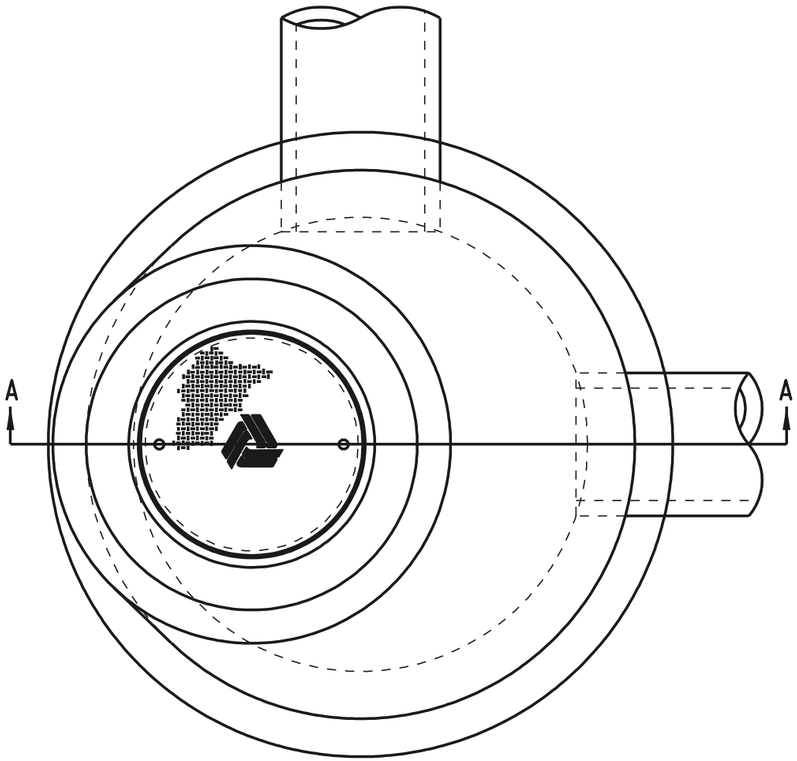
SECTION B-B

BOX MANHOLE ASSEMBLY

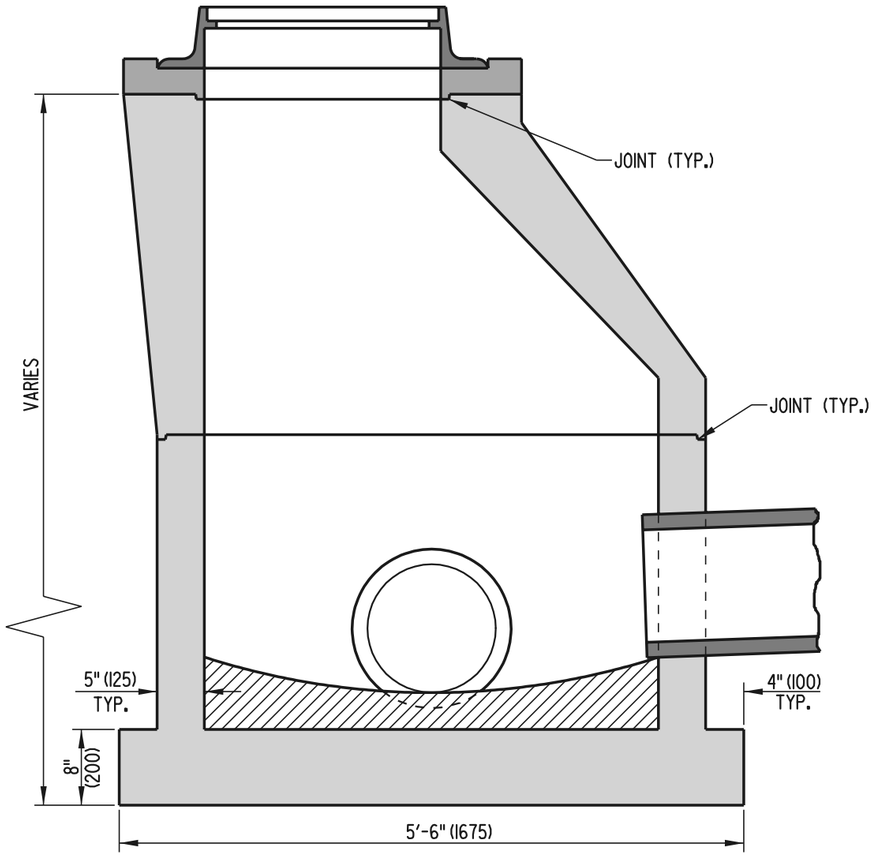
DELAWARE DEPARTMENT OF TRANSPORTATION	MANHOLE DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/19/2010 (DATE)
	STANDARD NO. D-6 (2009)	SHT. 1 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2010 (DATE)

10/20/2009

SCALE : N.T.S.



PLAN



SECTION A-A

ROUND MANHOLE ASSEMBLY

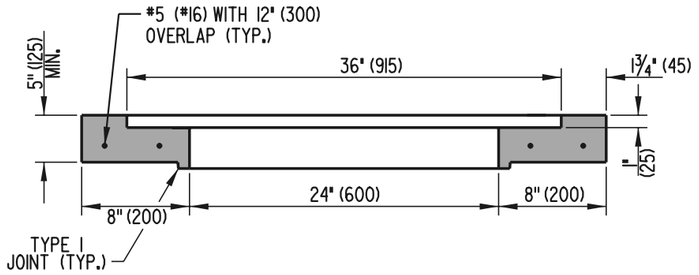
NOTE: ROUND MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.

DELAWARE DEPARTMENT OF TRANSPORTATION	MANHOLE DETAILS	APPROVED Eugene M. Hurlburt CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. D-6 (2001) SHT. 2 OF 4	RECOMMENDED Michael A. Hyde DESIGN ENGINEER 6/15/01 DATE

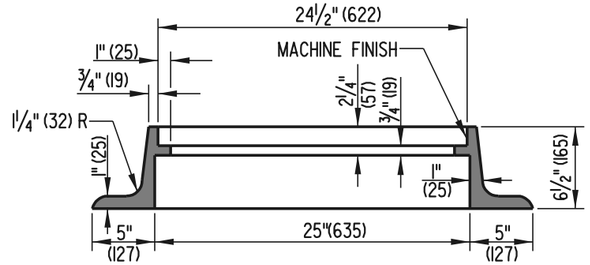
06/06/2001

SCALE : N.T.S.

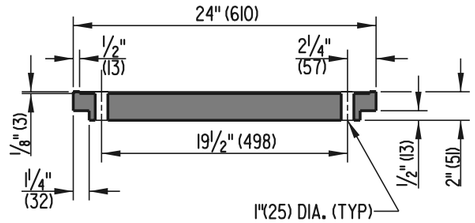
NOTE: TOP UNIT IS TO BE CAST IN PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.



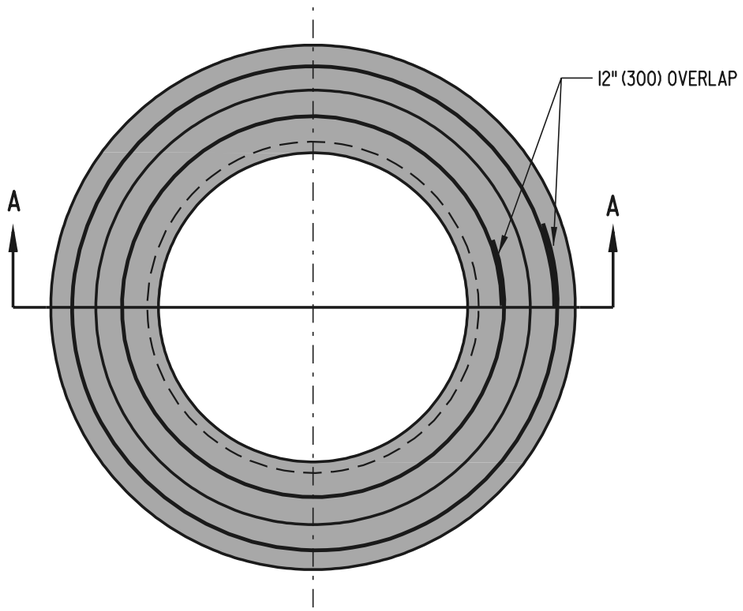
SECTION A-A



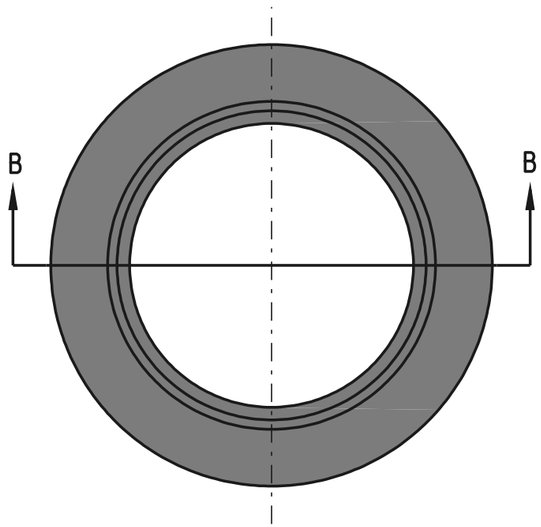
SECTION B-B



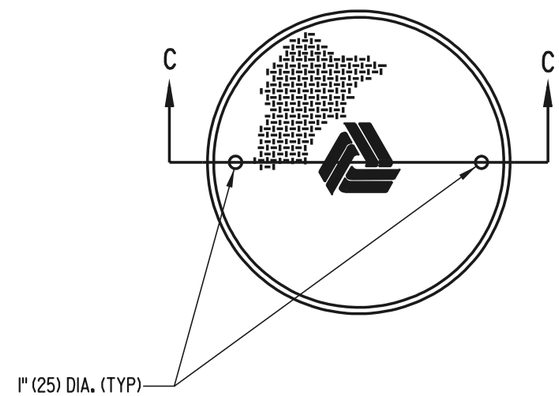
SECTION C-C



TOP UNIT



FRAME

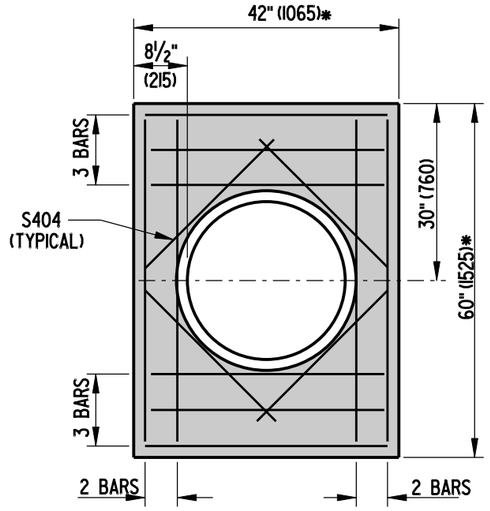


COVER

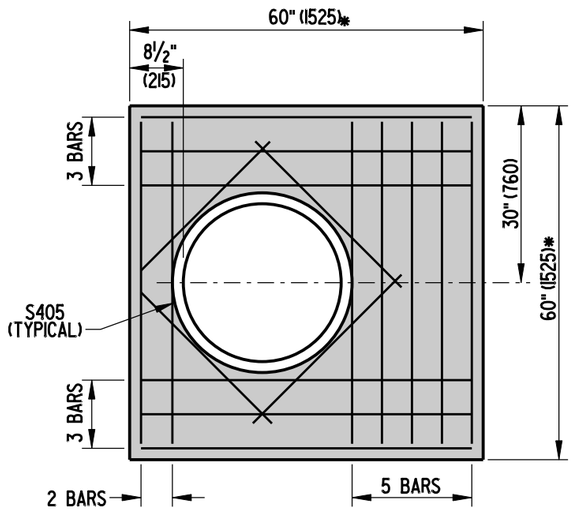
DELAWARE DEPARTMENT OF TRANSPORTATION	MANHOLE DETAILS		APPROVED CHIEF ENGINEER — DATE 6/18/01
	STANDARD NO. D-6 (2001)	SHT. 3 OF 4	RECOMMENDED DESIGN ENGINEER — DATE 6/15/01

05/21/2001

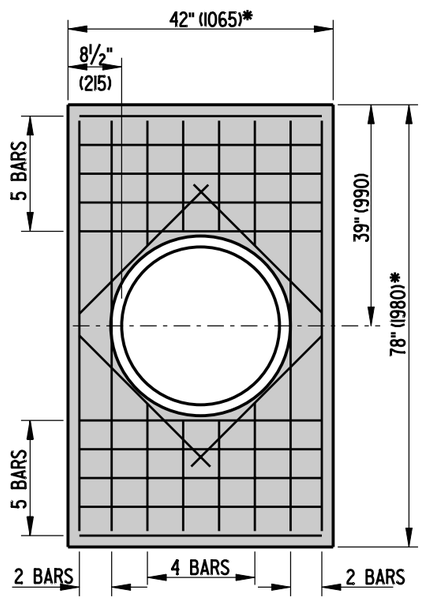
SCALE : N.T.S.



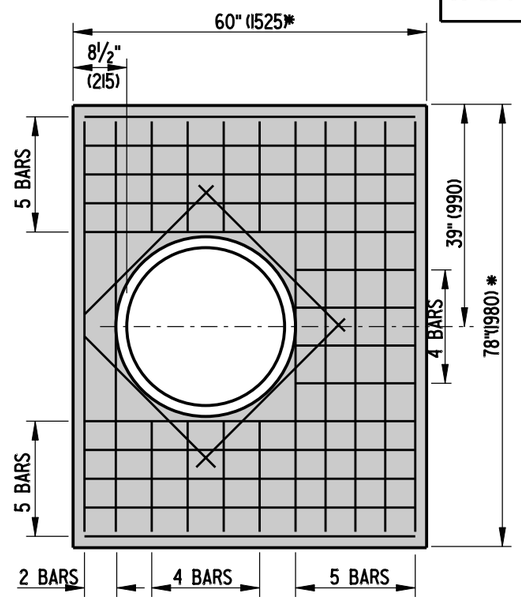
48" (1220) X 30" (760) MANHOLE



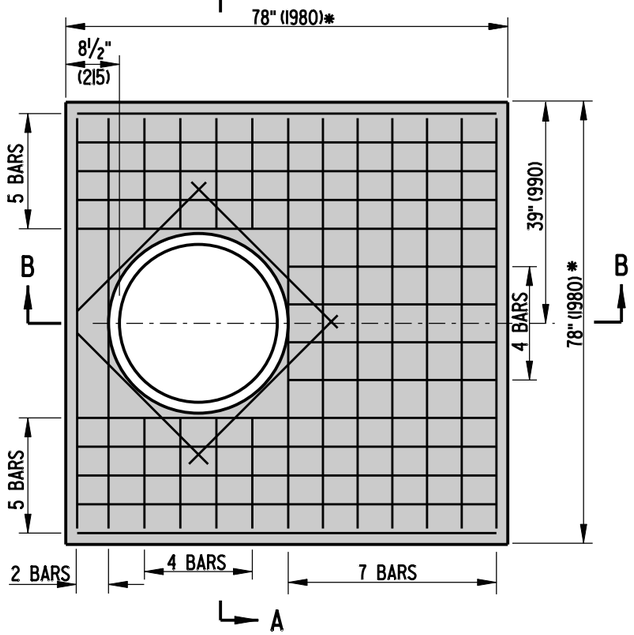
48" (1220) X 48" (1220) MANHOLE



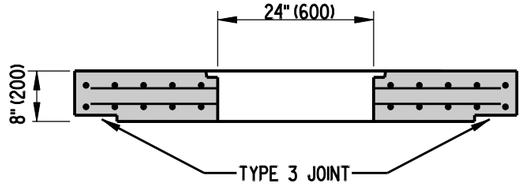
66" (1675) x 30" (760) MANHOLE



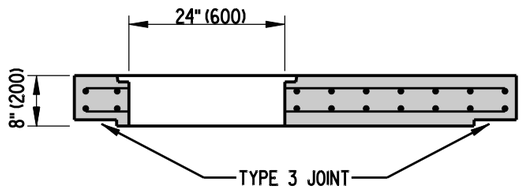
66" (1675) x 48" (1220) MANHOLE



66" (1675) x 66" (1675) MANHOLE



SECTION A-A



SECTION B-B

BOX MANHOLE COVER SLAB DETAILS

NOTES:

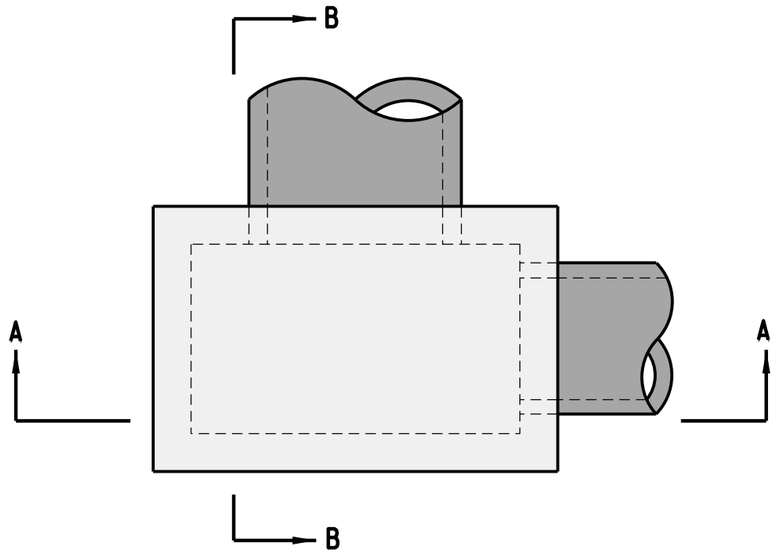
1. COVER SLABS SHALL BE PRE-CAST.
2. ALL BARS SHALL BE #5 (#16) SPACED AT 6" (150) ± UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1½" (38).

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

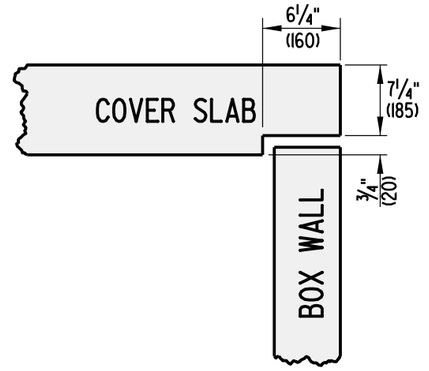
DELAWARE DEPARTMENT OF TRANSPORTATION	MANHOLE DETAILS	APPROVED _____ CHIEF ENGINEER 10/24/07 DATE
	STANDARD NO. D-6 (2007) SHT. 4 OF 4	RECOMMENDED _____ DESIGN ENGINEER 10/23/07 DATE

08/01/2007

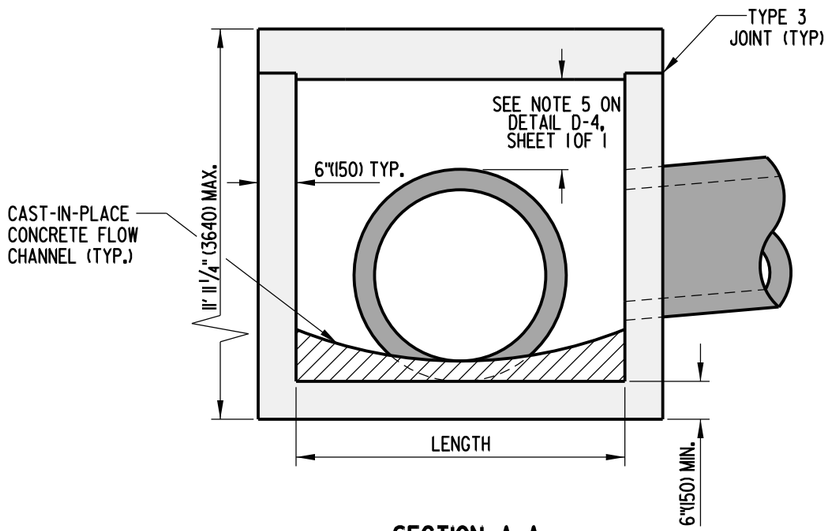
SCALE : N.T.S.



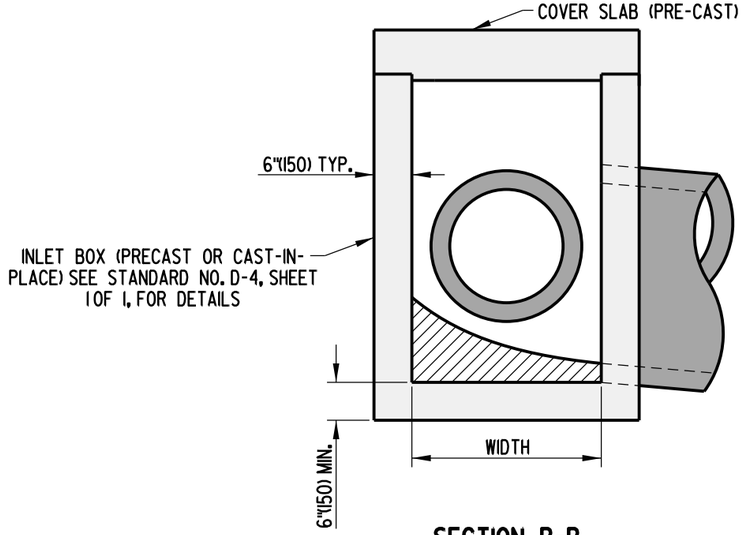
PLAN



TYPE 3 JOINT DETAIL



SECTION A-A



SECTION B-B

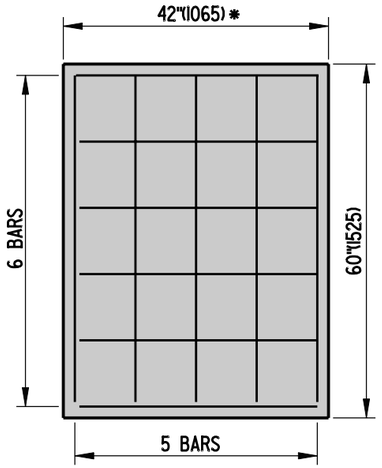
• - SEE OPTIONAL PIPE OPENING DETAIL ON STANDARD NO. D-4, SHEET 1 OF 1.

JUNCTION BOX ASSEMBLY

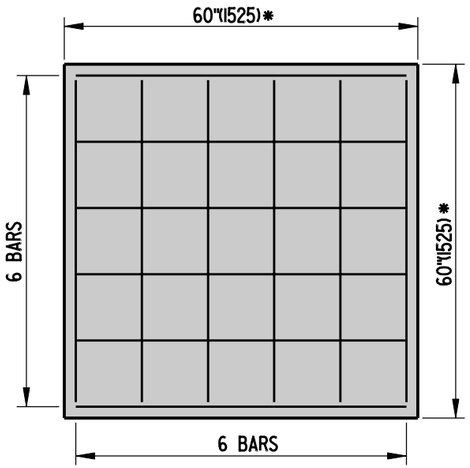
DELAWARE DEPARTMENT OF TRANSPORTATION	JUNCTION BOX DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/19/2010 (DATE)
	STANDARD NO. D-7 (2009)	SHT. 1 OF 2	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2010 (DATE)

10/20/2009

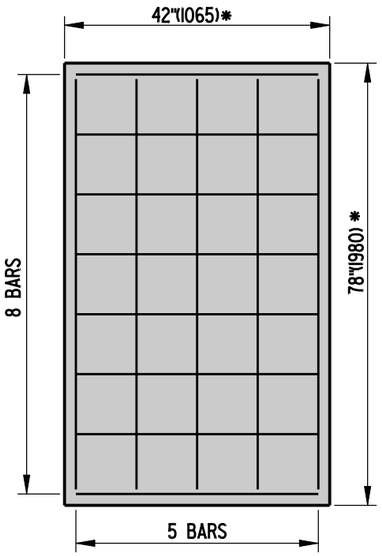
SCALE : N.T.S.



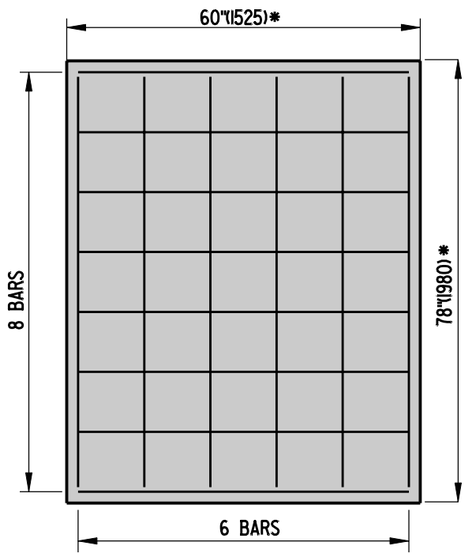
48" (1220) x 30" (760)
JUNCTION BOX



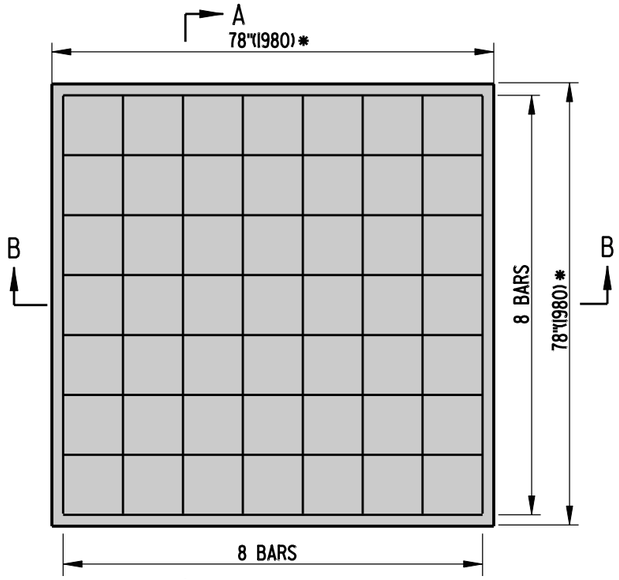
48" (1220) x 48" (1220)
JUNCTION BOX



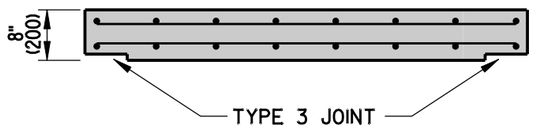
66" (1675) x 30" (760)
JUNCTION BOX



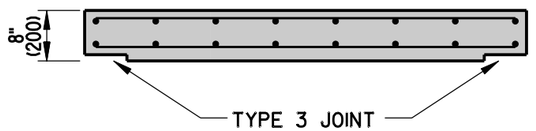
66" (1675) x 48" (1220)
JUNCTION BOX



66" (1675) x 66" (1675)
JUNCTION BOX



SECTION A-A



SECTON B-B

JUNCTION BOX COVER SLAB DETAILS

NOTES:

1. COVER SLABS ARE TO BE PRE-CAST.
2. ALL BARS ARE TO BE #5 (#16) SPACED @ 12" (305) ± UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = $1\frac{1}{2}$" (38).
* - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

DELAWARE
DEPARTMENT OF TRANSPORTATION

JUNCTION BOX DETAILS

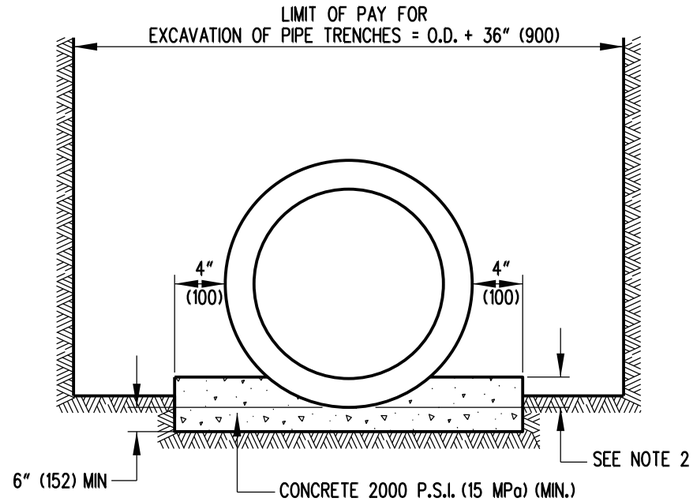
STANDARD NO. D-7 (2007) | SHT. 2 OF 2

APPROVED _____ CHIEF ENGINEER 10/24/07 DATE

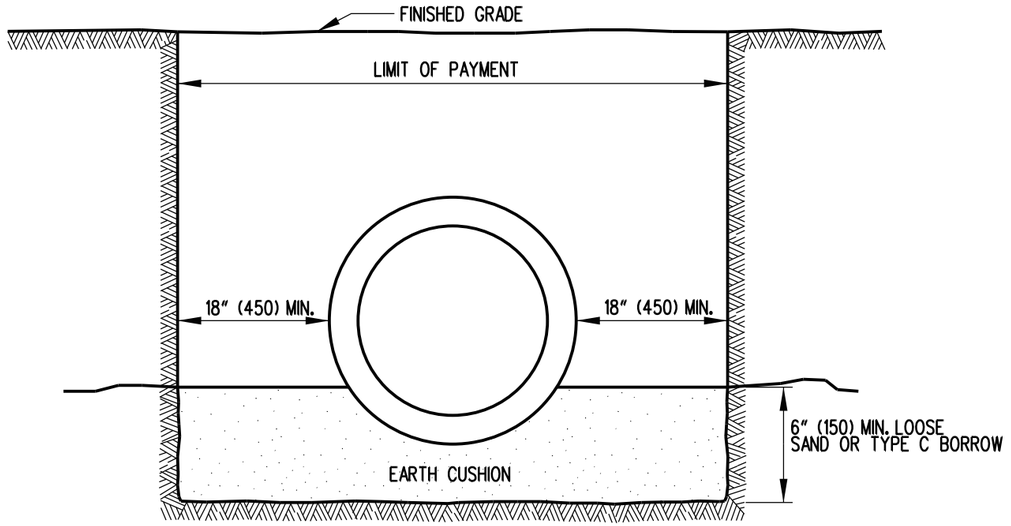
RECOMMENDED _____ DESIGN ENGINEER 10/23/07 DATE

08/01/2007

SCALE : N.T.S.



CLASS A BEDDING



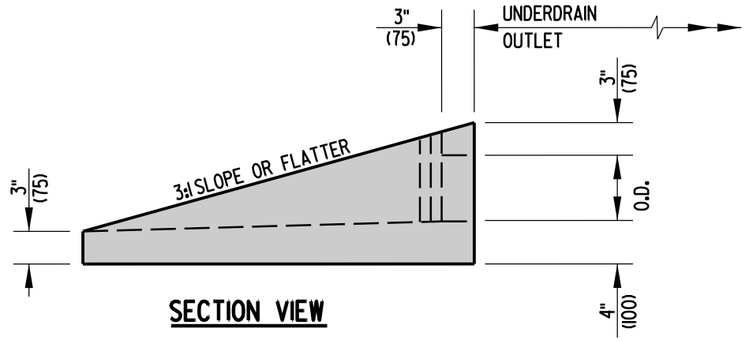
CLASS C BEDDING

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.

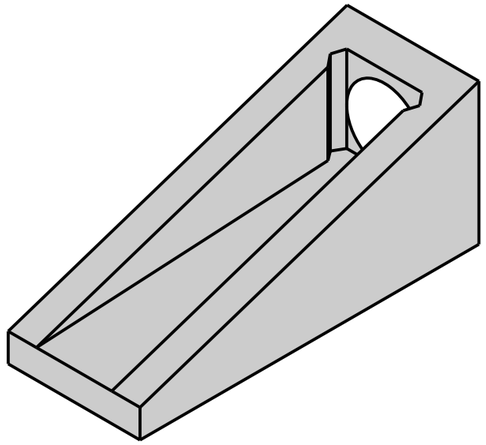
DELAWARE DEPARTMENT OF TRANSPORTATION	PIPE BEDDING		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/28/2010 (DATE)
	STANDARD NO. D-8 (2010)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/27/2010 (DATE)

10/25/2010

SCALE : N.T.S.

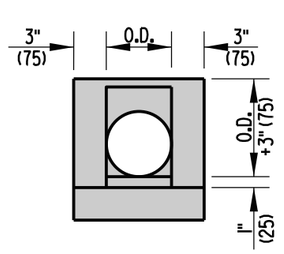


SECTION VIEW

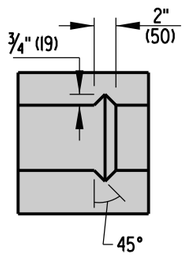


ISOMETRIC VIEW

UNDERDRAIN OUTLET

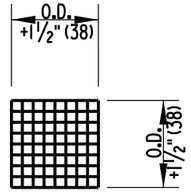


FRONT VIEW



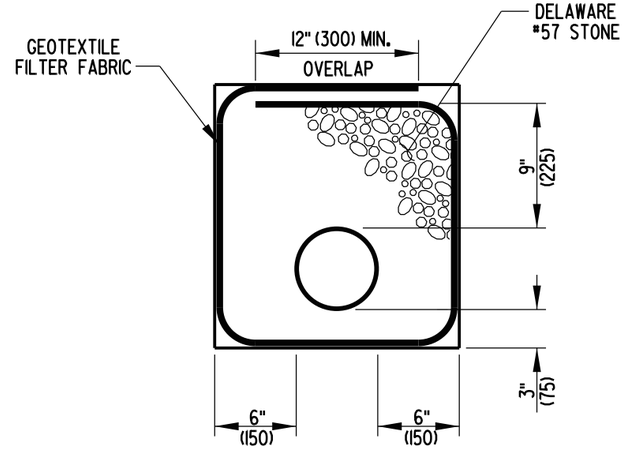
TOP VIEW

SLOTTED HEADWALL DETAIL

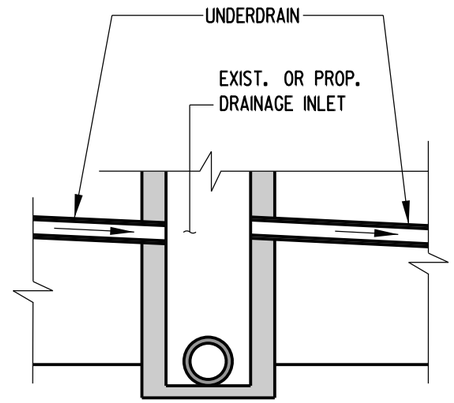


FRONT VIEW

RODENT SCREEN



SECTION



ELEVATION

PERFORATED PIPE UNDERDRAIN

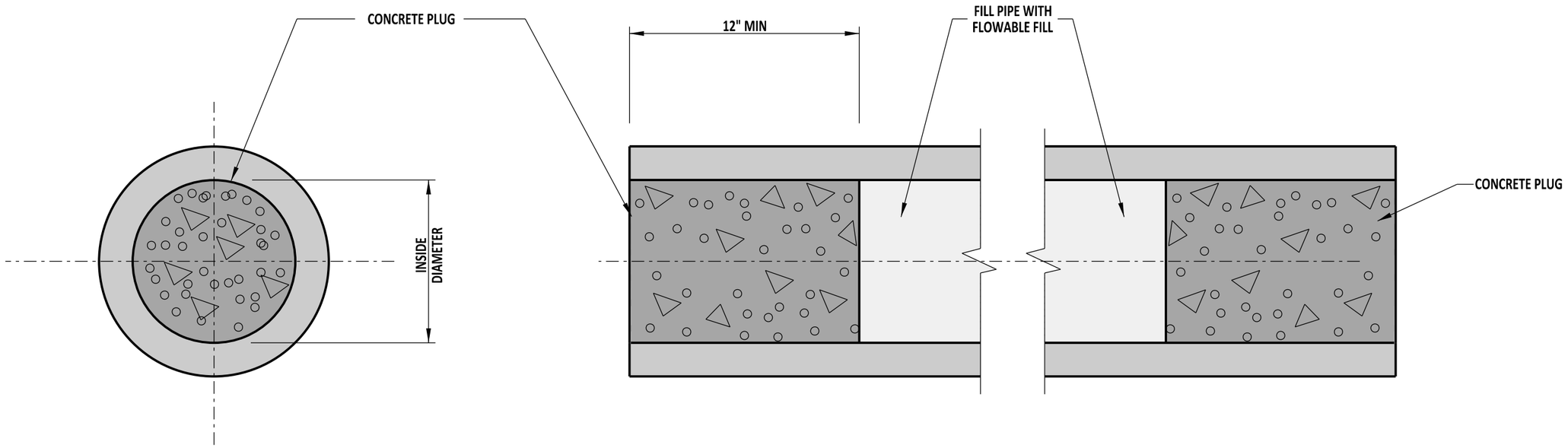
NOTES:

1). THE PERFORATED PIPE UNDERDRAIN SHALL BE LOCATED AS SHOWN ON THE TYPICAL SECTIONS OF THE CONSTRUCTION PLANS.
2). GEOTEXTILE FILTER FABRIC SHALL BE PLACED ENTIRELY OVER THE TOP OF UNDERDRAIN TRENCH AND LAPPED AS SHOWN.
3). SLOPE OF UNDERDRAINS SHALL MATCH ROADWAY GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
4). OUTLET PIPE CONFIGURATIONS SHALL USE 45 DEGREE ELBOWS OR SHALL USE STRAIGHT PIPE WITH A MINIMUM RADIUS OF 3' (900) TO DIRECT UNDERDRAIN PIPE INTO SIDE OF DRAINAGE INLET OR TO POSITIVE GRADE. PIPE SHALL ALSO BE NON-PERFORATED AND HAVE A SMOOTH INTERIOR.
5). RODENT SCREEN SHALL SNUGLY FIT THE PROVIDED SLOT WITH THE SCREEN LIP FITTING TIGHT TO THE BOTTOM FLOW LINE.
6). A 4' (1200) FLEXIBLE DELINEATOR SHALL BE FURNISHED AND INSTALLED AT THE DIRECTION OF THE ENGINEER TO MARK THE LOCATION OF THE CONCRETE HEADWALL.
7). WHEN TWO LINES OF PIPE UNDERDRAIN DRAIN TO A LOW POINT, EACH PIPE MUST HAVE ITS OWN OUTLET.
8). PERFORATED PIPE UNDERDRAIN SHALL NOT BE PLACED UNDER GUARDRAIL IN ORDER TO AVOID PUNCTURING.

DELAWARE DEPARTMENT OF TRANSPORTATION	PERFORATED PIPE UNDERDRAIN DETAIL		APPROVED CHIEF ENGINEER — DATE 11/18/08
	STANDARD NO. D-9 (2008)	SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER — DATE 11/17/08

10/23/2008

SCALE : NTS



SECTION

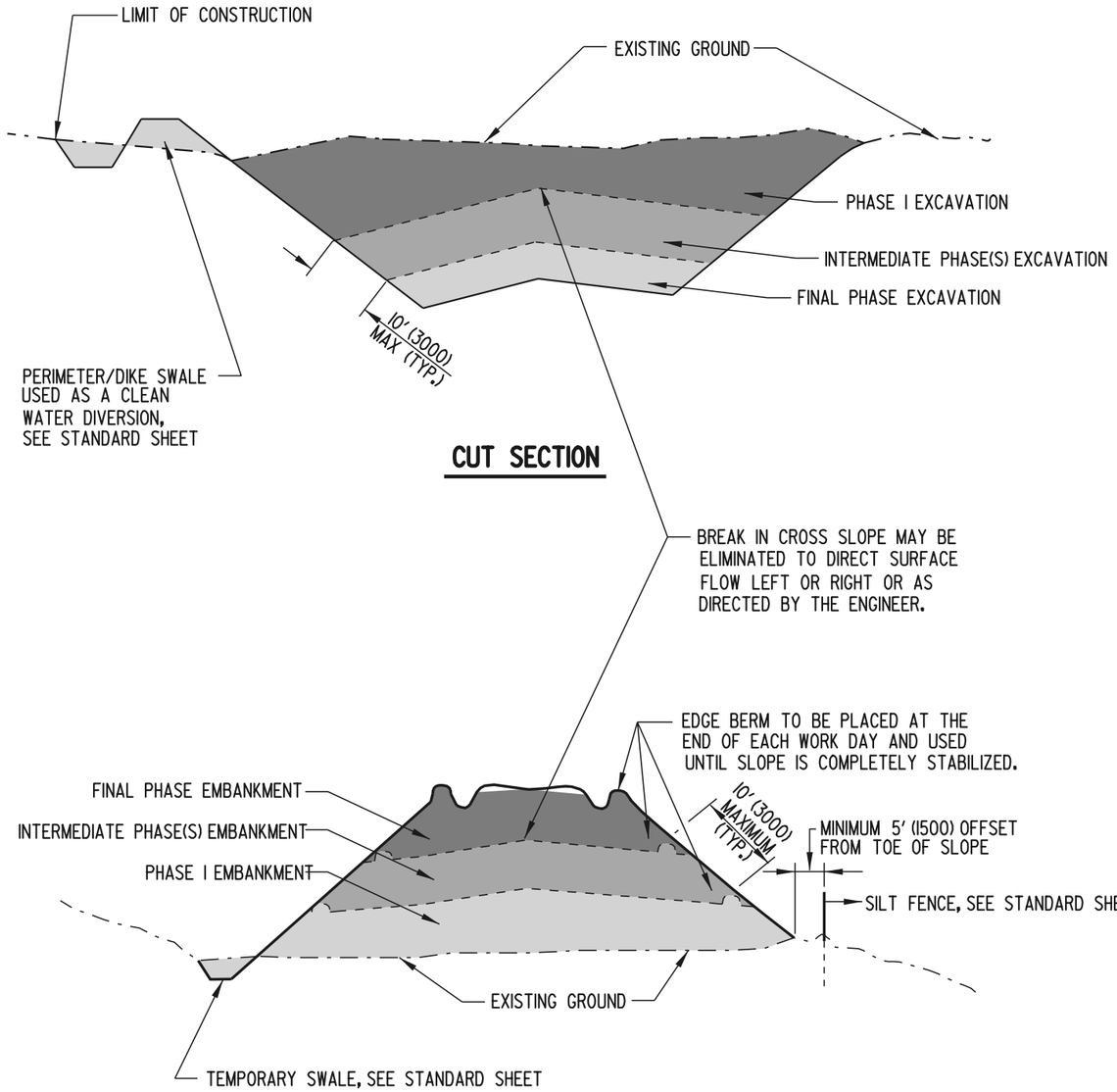
ELEVATION

NOTE:
THE CONTRACTOR SHALL FURNISH MATERIAL AND PLUG ABANDONED DRAINAGE PIPES WITH CONCRETE AS DIRECTED BY THE ENGINEER.

DELAWARE DEPARTMENT OF TRANSPORTATION	PIPE PLUGGING DETAIL		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/22/2011 (DATE)
	STANDARD NO. D-10 (2011)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/21/2011 (DATE)

04/27/2011

SCALE : N.T.S.



CUT SECTION

FILL SECTION

NOTES: 1.) EDGE BERMS AND TEMPORARY SLOPE DRAINS SHALL BE CONSTRUCTED ALONG THE TOP OF ALL SLOPES TO INTERCEPT RUNOFF AND CONVEY IT DOWN THE SLOPE FACES WITHOUT CREATING GULLIES OR WASHOUTS.

2.) SLOPE FACES SHALL BE TRACKED WITH CLEATED EQUIPMENT SUCH THAT THE CLEAT MARKS ARE ORIENTED HORIZONTALLY.

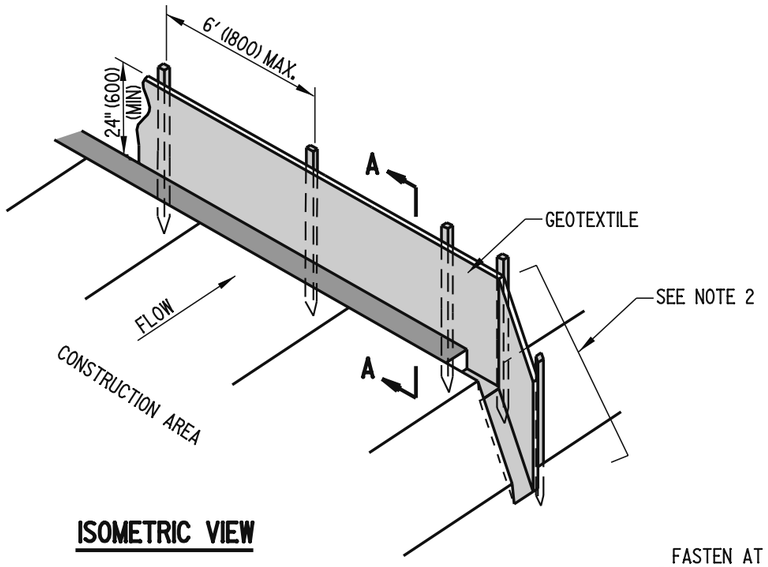
3.) ALL CUT AND FILL SLOPES OF THE HIGHWAY EMBANKMENT SHALL BE PERMANENTLY STABILIZED AS THE WORK PROGRESSES IN INCREMENTS NOT TO EXCEED 10' (3000) MEASURED ALONG THE SLOPE.

4.) CROSS SLOPES SHALL BE 2% MINIMUM, 6% MAXIMUM.

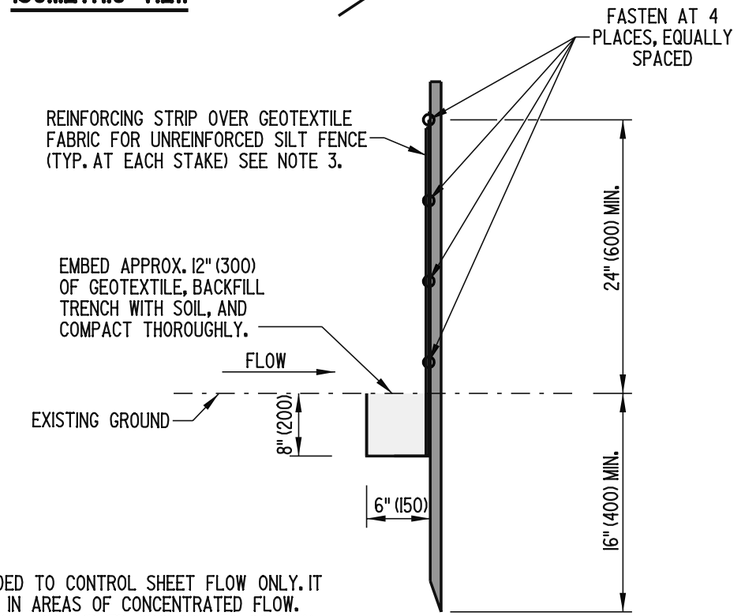
DELAWARE DEPARTMENT OF TRANSPORTATION	INCREMENTAL STABILIZATION		APPROVED Lynne M. Hartnett CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. E-1 (2001)	SHT. 1 OF 1	RECOMMENDED Herbert A. Sparks DESIGN ENGINEER DATE 6/15/01

05/30/2001

SCALE : N.T.S.



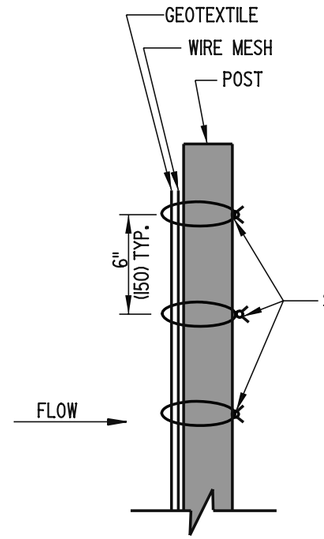
ISOMETRIC VIEW



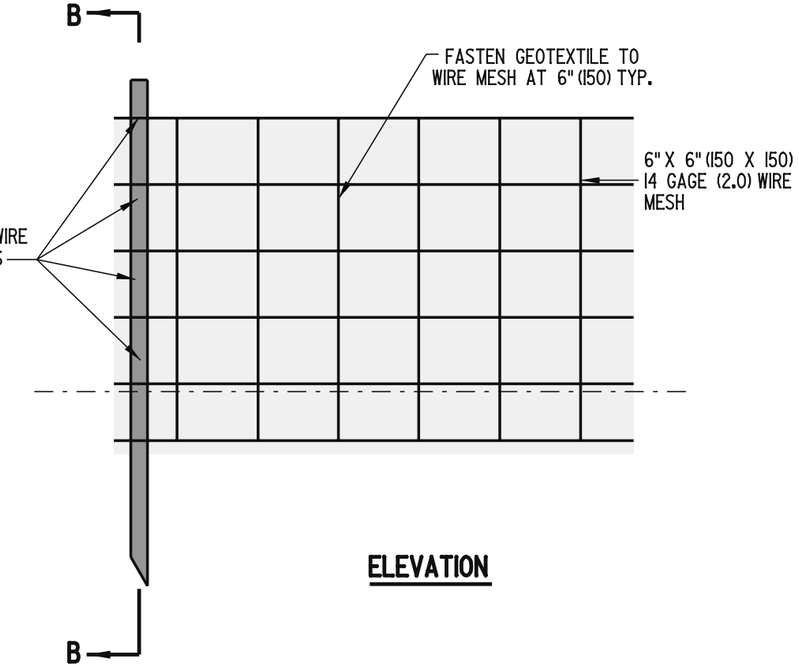
NOTES:

1). THIS DEVICE IS INTENDED TO CONTROL SHEET FLOW ONLY. IT SHALL NOT BE USED IN AREAS OF CONCENTRATED FLOW.
2). SILT FENCE ENDS SHALL BE TURNED UPSLOPE TO CONTAIN RUNOFF.
3). REINFORCING STRIP IS TO BE ONE COMPLETE STRIP COVERING ALL GEOTEXTILE FABRIC AT POST.

SECTION A-A

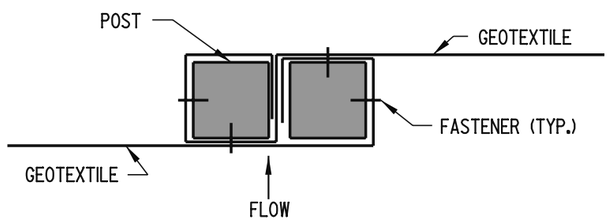


SECTION B-B

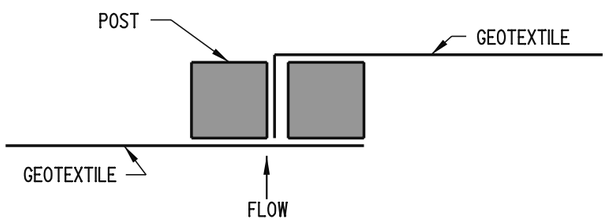


ELEVATION

WIRE MESH DETAIL
(REINFORCED SILT FENCE ONLY)



UNREINFORCED SILT FENCE CONNECTON DETAIL

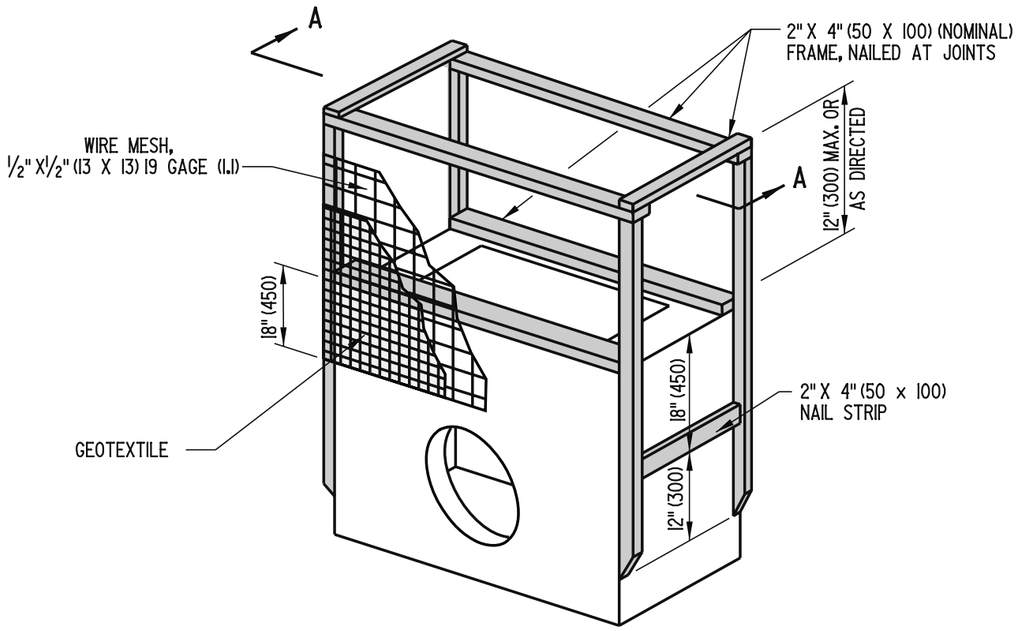


REINFORCED SILT FENCE CONNECTON DETAIL

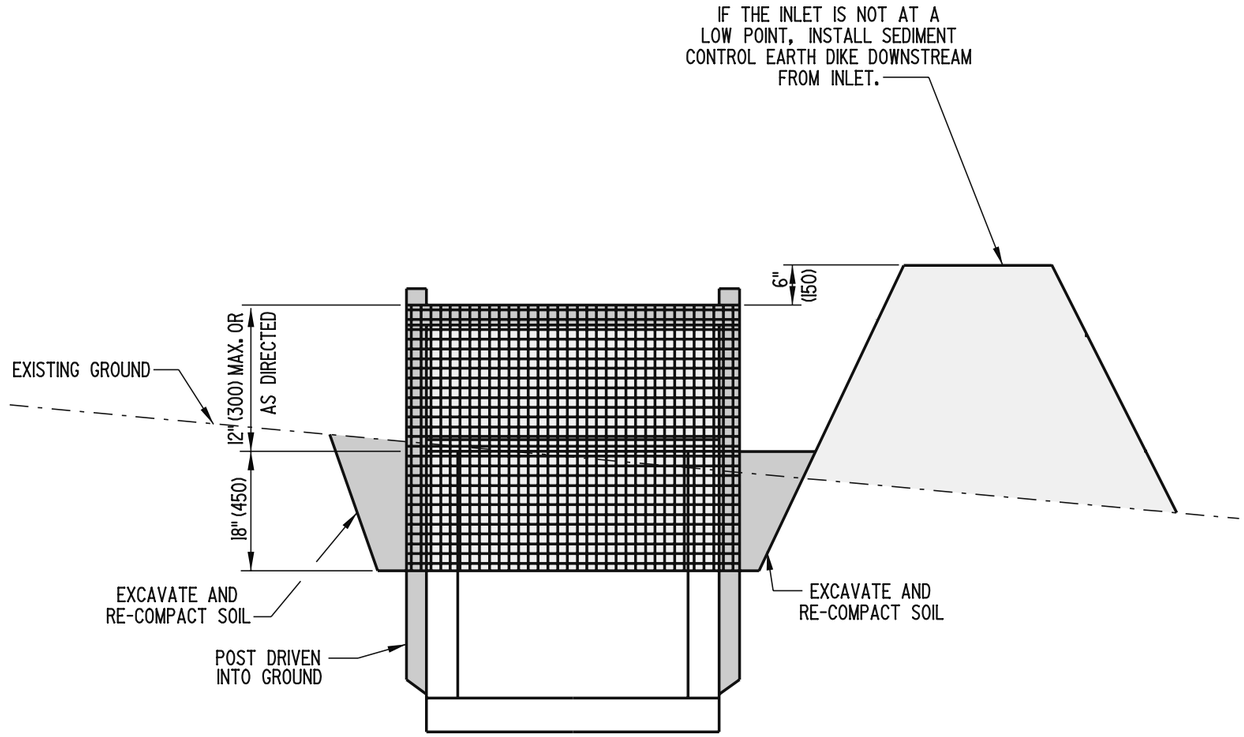
DELAWARE DEPARTMENT OF TRANSPORTATION	SILT FENCE		APPROVED CHIEF ENGINEER	DATE 10/10/06
	STANDARD NO. E-2 (2006)	SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER	DATE 10/9/06

10/02/2006

SCALE : N.T.S.



ISOMETRIC VIEW

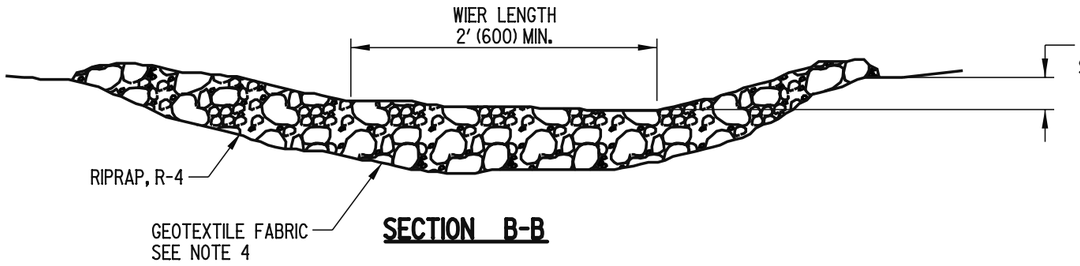


SECTION A-A

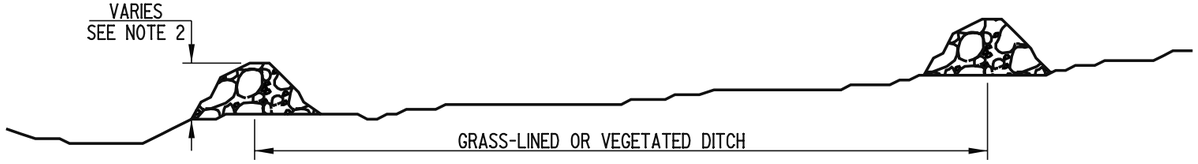
DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET SEDIMENT CONTROL		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-3 (2005)	SHT. 1 OF 1	RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

01/19/2006

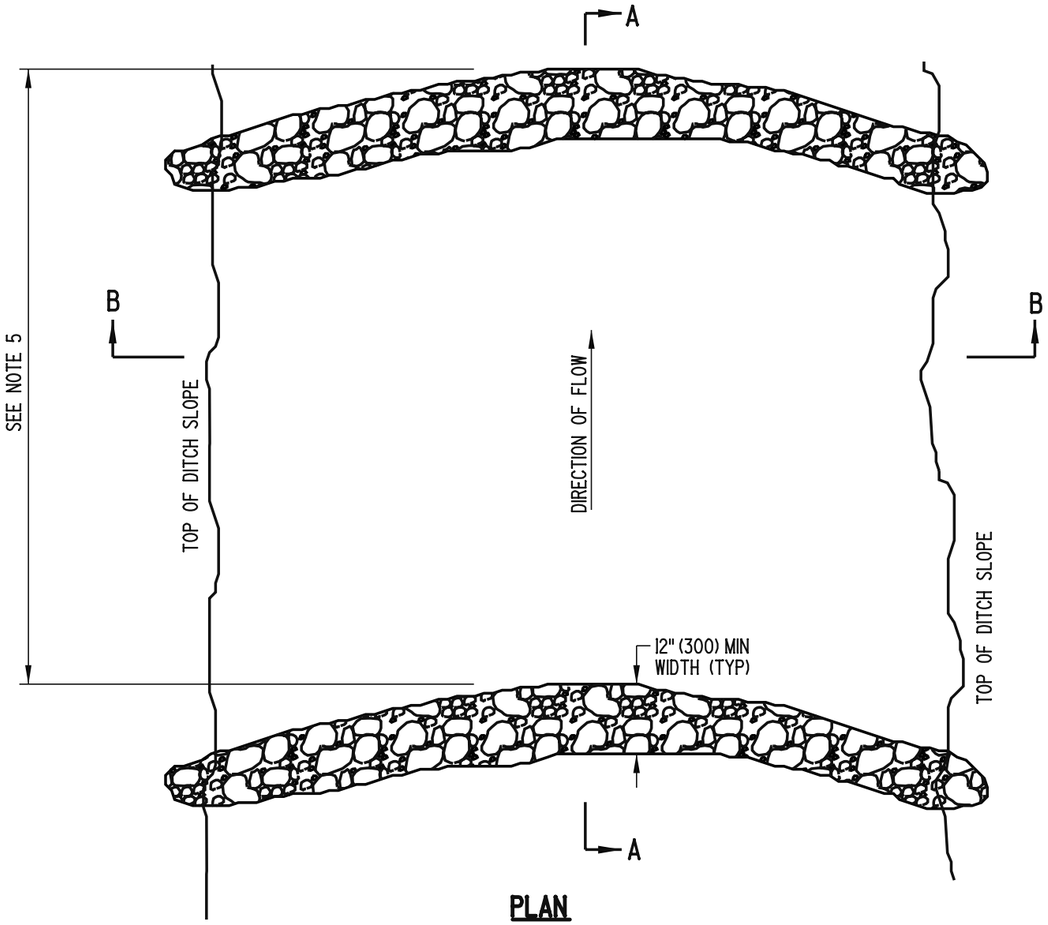
SCALE : N.T.S.



SECTION B-B



SECTION A-A



PLAN

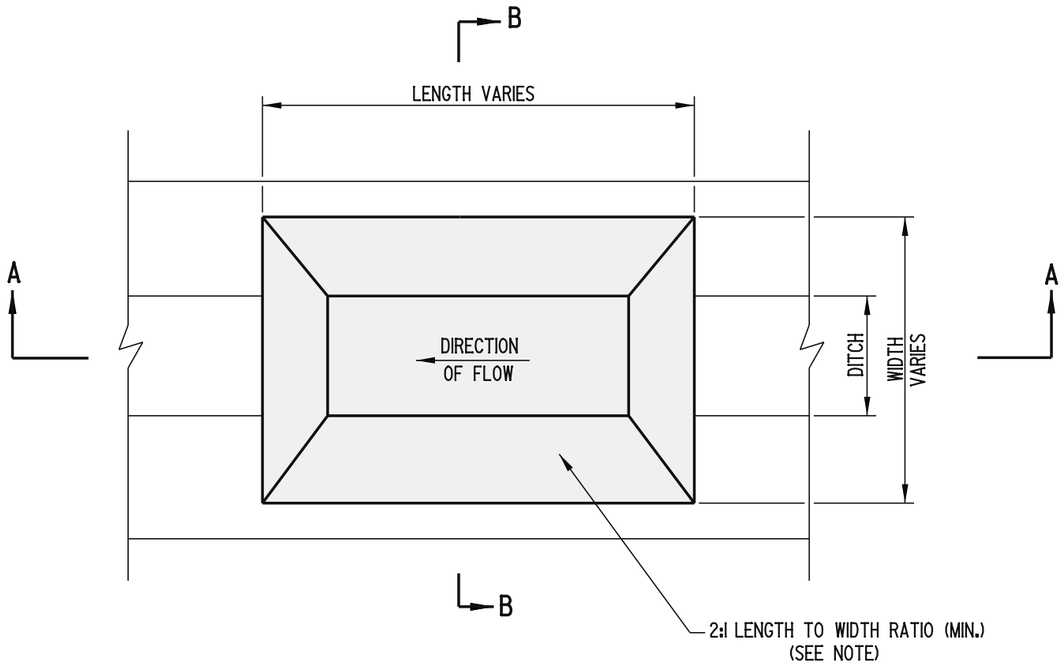
NOTES:

1). FOR DITCHES LESS THAN 30" (750) IN DEPTH, PLACE DAM AS DIRECTED BY THE ENGINEER.
2). THE CHECK DAM HEIGHT MUST NOT EXCEED 2' (600) AT THE CENTER OF THE WEIR.
3). THE CHECK DAM IS TO BE CONSTRUCTED SO THAT THE CENTER IS 6" (150) MIN. LOWER THAN THE OUTER EDGES, FORMING A WEIR THAT WATER CAN FLOW ACROSS.
4). GEOTEXTILE FABRIC IS TO BE INSTALLED UNDERNEATH RIPRAP ON PERMANENT CHECK DAMS ONLY.
5). THE MAXIMUM SPACING BETWEEN DAMS SHALL BE THE DISTANCE IN THE DITCH WHERE THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM DAM AT THE CENTER OF THE WEIR.

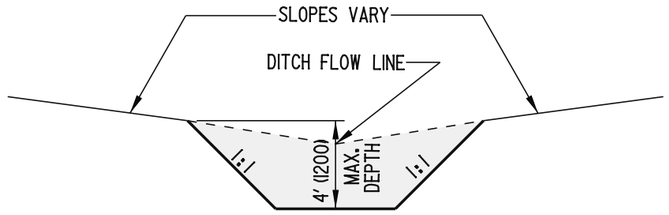
DELAWARE DEPARTMENT OF TRANSPORTATION	STONE CHECK DAM		APPROVED _____ CHIEF ENGINEER _____ DATE 10/10/06
	STANDARD NO. E-5 (2006)	SHT. 1 OF 1	RECOMMENDED _____ DESIGN ENGINEER _____ DATE 10/3/06

08/14/2006

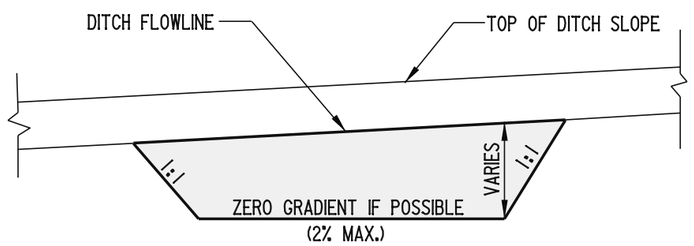
SCALE : N.T.S.



PLAN



SECTION B-B



SECTION A-A

NOTES: 1). SEDIMENT TRAPS ARE INTENDED FOR USE IN EXISTING, PROPOSED, AND TEMPORARY DITCHES OF ALL TYPES WITH A MAXIMUM DRAINAGE AREA OF 15 ACRES (6 HECTARES), AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

2). SIDE SLOPES SHALL BE STABILIZED WITH "TEMPORARY GRASS SEEDING, DRY GROUND" AND STRAW MULCH.

3). AN OUTLET STRUCTURE IS REQUIRED. STONE CHECK DAMS, PERFORATED RISER PIPES, SKIMMER DEWATERING DEVICES, OR DRAINAGE INLETS MAY BE USED. SEE APPROPRIATE STANDARD SHEET FOR ADDITIONAL INFORMATION.

4). FOR SIZE, LOCATION, ETC. OF SEDIMENT TRAP, SEE CONSTRUCTION PHASING, M.O.T., AND EROSION CONTROL PLANS.

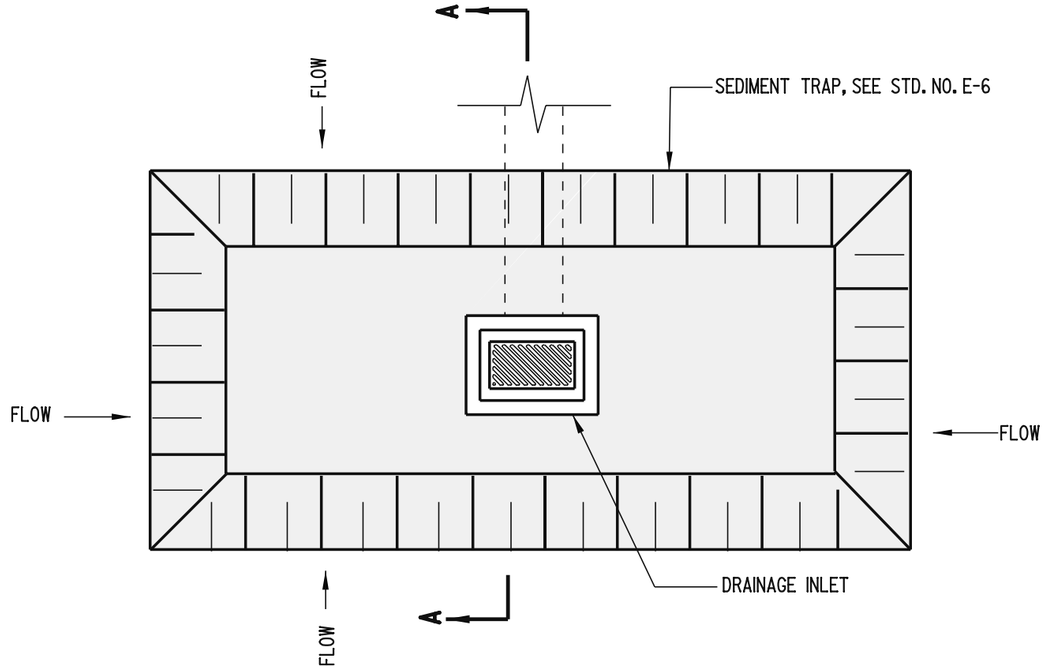
5). ALL FILL SLOPES SHALL BE 2:1.

6). A 2:1 LENGTH TO WIDTH RATIO SHOULD BE ACHIEVED WHERE POSSIBLE. IF THIS IS NOT POSSIBLE, THE USE OF BAFFLES OR OTHER SPECIAL DESIGNS SHOULD BE INCORPORATED TO INCREASE FLOW TIME.

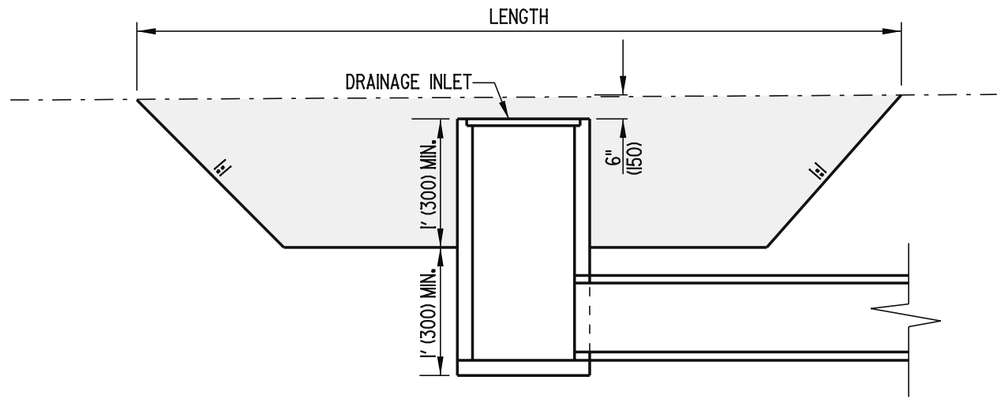
DELAWARE DEPARTMENT OF TRANSPORTATION	SEDIMENT TRAP		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-6 (2005)	SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER 11/29/05 DATE

08/19/2005

SCALE : N.T.S.



PLAN



SECTION A-A

NOTES: 1). THE WORK SHALL CONSIST OF THE CONSTRUCTION OF A SEDIMENT TRAP AROUND A DRAINAGE INLET TO ALLOW SEDIMENTATION TO OCCUR BEFORE RUNOFF ENTERS THE DRAINAGE INLET.

2). DRAINAGE INLET SEDIMENT TRAPS SHALL BE LIMITED TO A THREE (3) ACRE (1.2 HECTRARE) MAXIMUM DRAINAGE AREA.

3). THE DIMENSIONS OF THE DRAINAGE INLET SEDIMENT TRAP ARE TO BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

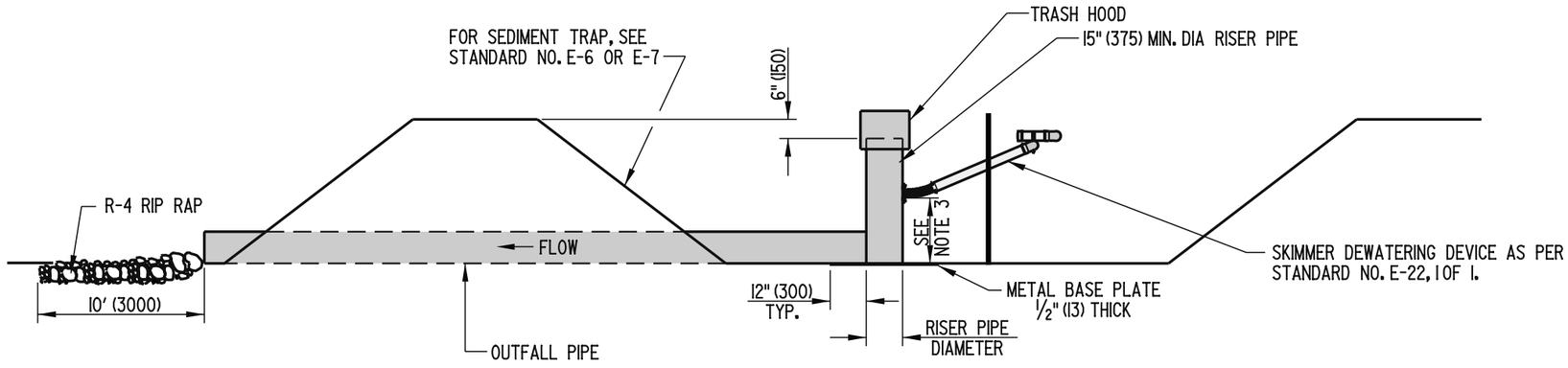
DELAWARE DEPARTMENT OF TRANSPORTATION	SEDIMENT TRAP, USING DRAINAGE INLET AS OUTLET		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-7 (2005)	SHT. 1 OF 1	RECOMMENDED James M. Oiffer DESIGN ENGINEER 11/29/05 DATE

01/19/2006

SCALE : N.T.S.

MIN. ✳ OUTFALL PIPE DIA.	MIN. RISER DIA.	MAX. DRAINAGE AREA ACRES (ha)
12" (300)	15" (375)	1 (0.4)
15" (375)	18" (450)	2 (0.8)
18" (450)	21" (525)	3 (1.2)
21" (525)	24" (600)	4 (1.6)
24" (600)	27" (675)	5 (2.0)

✳ OUTFALL PIPE DIAMETER MAY BE SAME SIZE AS RISER DIAMETER.



ELEVATION

NOTES:

1). THIS DEVICE IS INTENDED TO BE USED AS AN OUTLET FOR SEDIMENT TRAPS.
2). THE PIPE OUTLET SHOWN SHALL ONLY BE USED WITH SEDIMENT TRAPS WITH DRAINAGE AREAS OF 5 ACRES (2.0 HECTARES) OR LESS. LARGER DRAINAGE AREAS REQUIRE AN ENGINEERED DESIGN.
3). THE HEIGHT OF THE SKIMMER DEWATERING DEVICE SHALL BE SPECIFIED BY THE ENGINEER IN THE FIELD.

DELAWARE
DEPARTMENT OF TRANSPORTATION

RISER PIPE ASSEMBLY FOR SEDIMENT TRAP

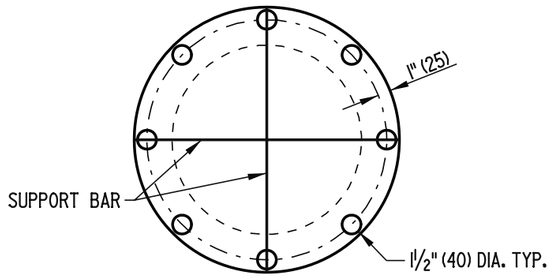
STANDARD NO. E-8 (2006) | SHT. 1 OF 2

APPROVED _____ CHIEF ENGINEER DATE 10/10/06

RECOMMENDED _____ DESIGN ENGINEER DATE 10/9/06

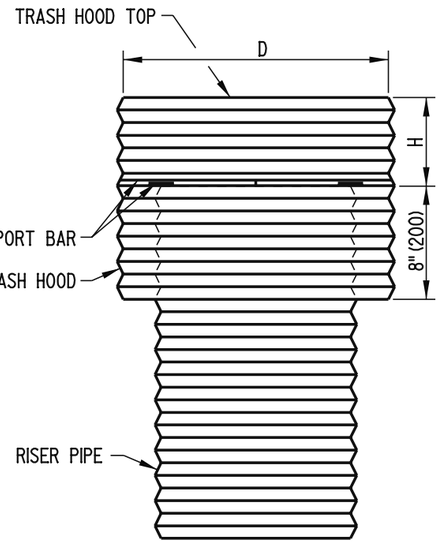
10/02/2006

SCALE : N.T.S.

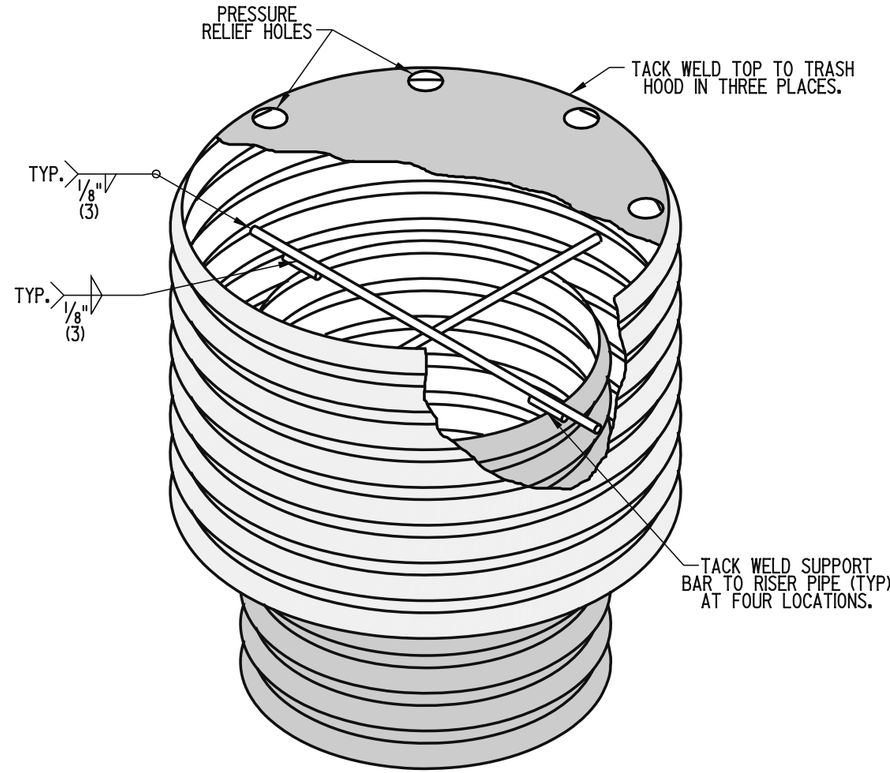


PLAN

TRASH HOOD CHART					
RISER PIPE DIAMETER	D	H	TRASH HOOD THICK. (GAGE)	MINIMUM SIZE SUPPORT BAR	MINIMUM TOP THICK. (GAGE)
15" (375)	21" (525)	7" (175)	16 (1.6)	#6 (#19) REBAR	16 (1.6)
18" (450)	27" (675)	8" (200)	16 (1.6)	#6 (#19) REBAR	16 (1.6)
21" (525)	30" (750)	11" (275)	16 (1.6)	#6 (#19) REBAR	16 (1.6)
24" (600)	36" (900)	13" (330)	16 (1.6)	#6 (#19) REBAR	14 (2.0)
27" (675)	42" (1050)	15" (380)	16 (1.6)	#6 (#19) REBAR	14 (2.0)
36" (900)	54" (1350)	17" (430)	14 (2.0)	#8 (#25) REBAR	12 (2.7)



FRONT



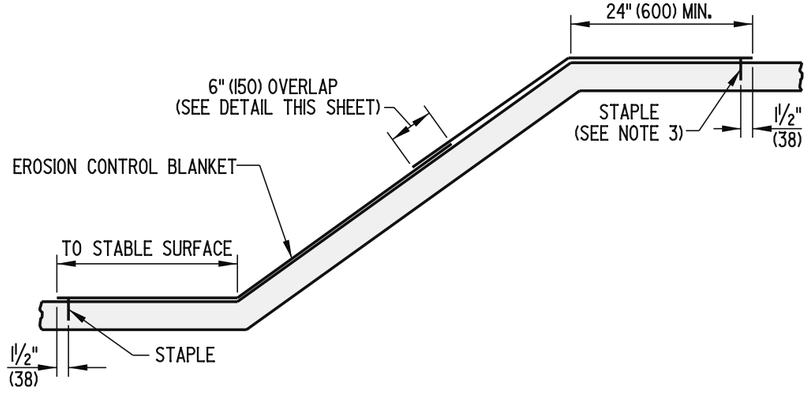
ISOMETRIC VIEW

TRASH HOOD DETAILS

DELAWARE DEPARTMENT OF TRANSPORTATION	RISER PIPE ASSEMBLY FOR SEDIMENT TRAP		APPROVED _____ CHIEF ENGINEER DATE 10/10/06
	STANDARD NO. E-8 (2006)	SHT. 2 OF 2	RECOMMENDED _____ DESIGN ENGINEER DATE 10/3/06

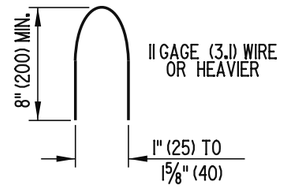
10/02/2006

SCALE : N.T.S.

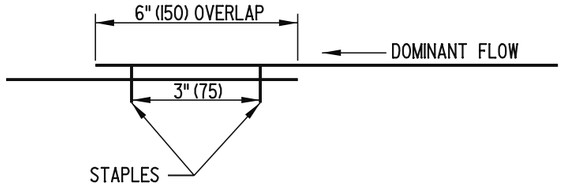


STABILIZATION OF EMBANKMENTS

NOTES: 1. STAPLES TO BE STAGGERED AT 18" (450) SPACING.
2. TOPSOIL UNDER EROSION CONTROL BLANKET IS TO BE TRACKED AND SEEDED.
3. WHEN OFFSITE RUNOFF OCCURS, ADDITIONAL MEASURES AS DIRECTED BY THE ENGINEER SHALL BE USED TO ENSURE STABILITY OF EMBANKEMENT.

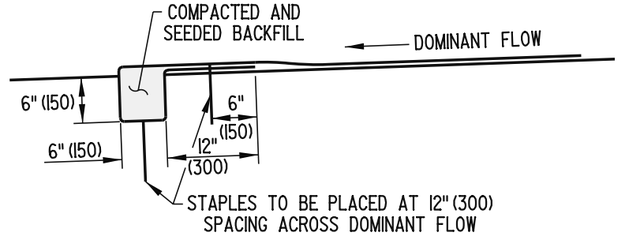


STAPLE DETAIL



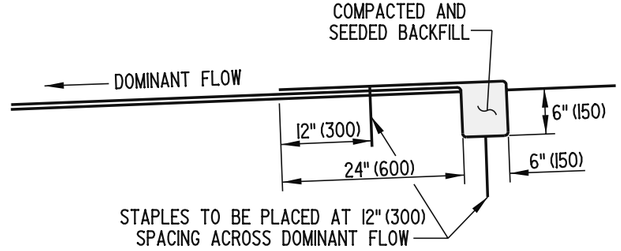
OVERLAP DETAIL

STAPLES TO BE STAGGERED AT 6" (150) SPACING.



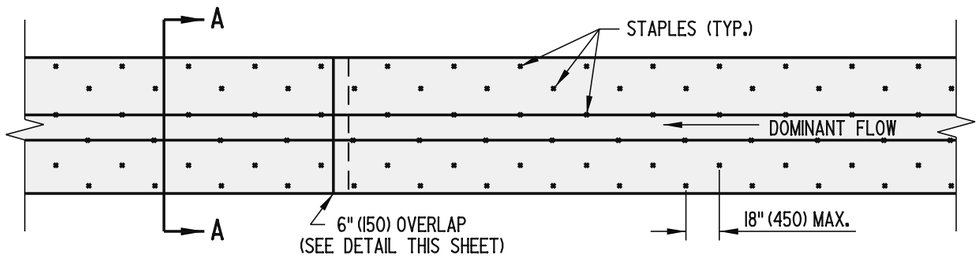
INITIAL TRENCH ANCHOR DETAIL

APPLIED AT THE DOWNSTREAM END OF DITCH



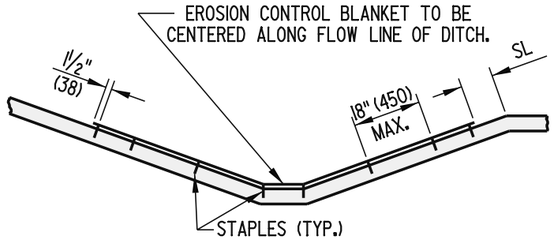
TERMINAL TRENCH ANCHOR DETAIL

APPLIED AT THE UPSTREAM END OF DITCH



STABILIZATION OF DITCHES PLAN

NOTES: 1. ADDITIONAL STAPLES NOT SHOWN ARE REQUIRED AT OVERLAPS. SEE OVERLAP DETAIL FOR STAPLE PLACEMENT.
2. STAPLES ARE TO BE STAGGERED.
3. TOPSOIL UNDER EROSION CONTROL BLANKET IS TO BE TRACKED AND SEEDED.



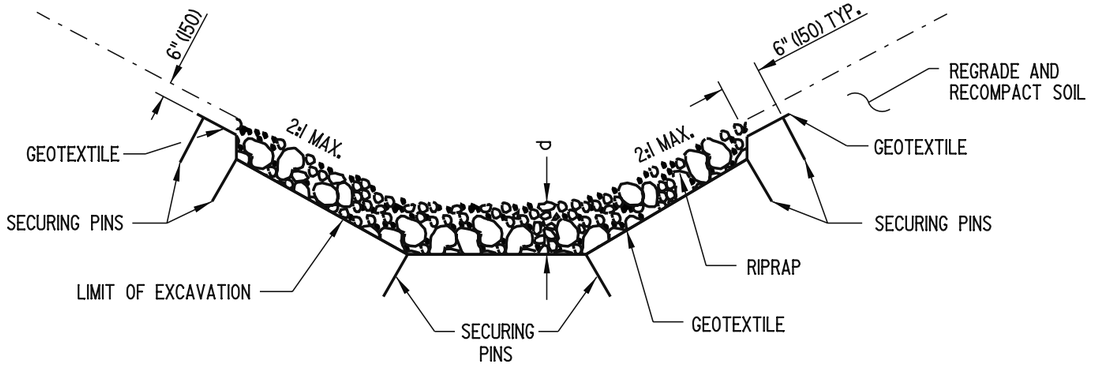
STABILIZATION OF DITCHES SECTION A-A

STAPLES ALONG LONGITUDINAL EDGES SHALL BE SPACED AS FOLLOWS:
18" (450) WHEN SL ≤ 20' (6000)
9" (225) WHEN SL > 20' (6000)

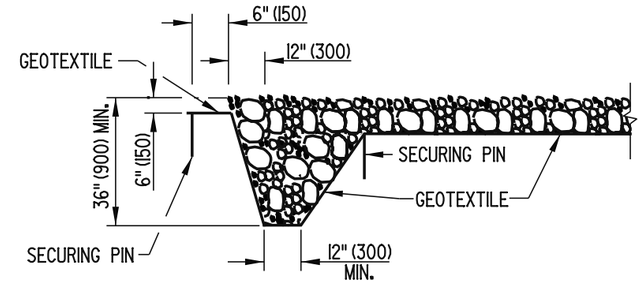
DELAWARE DEPARTMENT OF TRANSPORTATION	EROSION CONTROL BLANKET APPLICATIONS		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-9 (2005)	SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER 11/29/05 DATE

08/30/2005

SCALE : N.T.S.

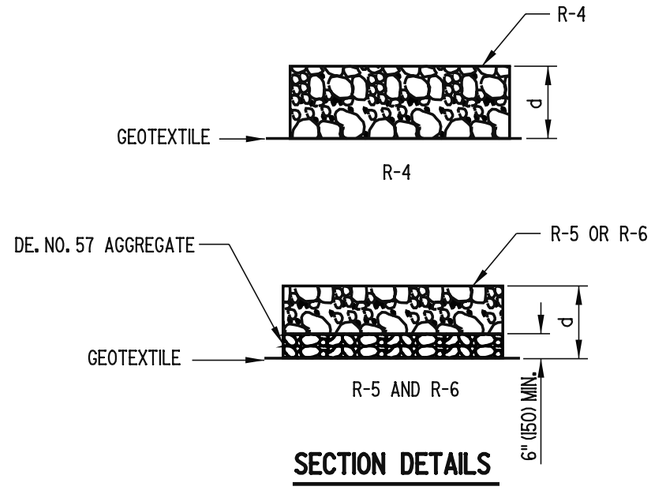


SECTION A-A



SECTION B-B

PLAN



SECTION DETAILS

CLASS RIPRAP

R-4 d = 14" (350) MIN.

R-5 d = 26" (650) MIN.

R-6 d = 34" (850) MIN.

NOTES:

1). SECURING PINS ARE TO BE PLACED AT LOCATIONS SHOWN AND AT 24" (600) LONGITUDINAL AND LATERAL SPACING.

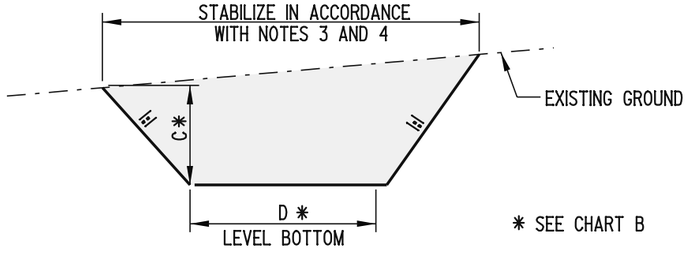
2). SEE PLANS FOR LOCATION, DIMENSIONS, GRADES, ETC.

3). USE OF R-7 RIPRAP WILL REQUIRE A SEPARATE PROFESSIONAL ENGINEERING DESIGN FOR SIGHT SPECIFIC CONDITIONS.

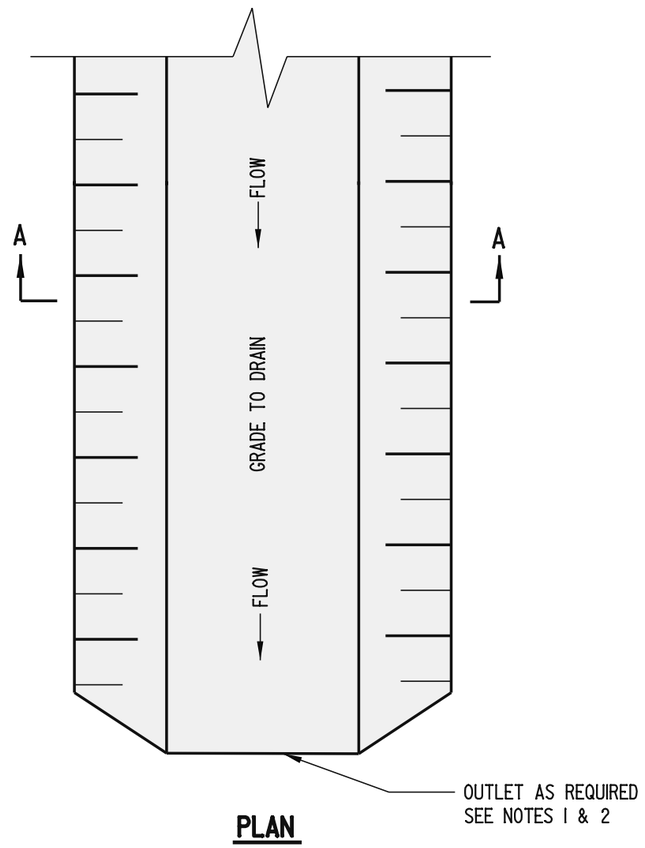
DELAWARE DEPARTMENT OF TRANSPORTATION	RIPRAP DITCH		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-10 (2005)	SHT. 1 OF 1	RECOMMENDED James M. Ojeda DESIGN ENGINEER 11/29/05 DATE

08/30/2005

SCALE : N.T.S.



SECTION A-A



PLAN

CHART A - STABILIZATION			
SYMBOL	SWALE GRADE	TYPE OF TREATMENT	
		DRAINAGE AREA A (5 AC (2 ha) OR LESS)	DRAINAGE AREA B (5 AC - 10 AC (2 ha - 4 ha))
1	0.5-2.0%	SEED USED WITH EROSION CONTROL BLANKET	SEED USED WITH EROSION CONTROL BL.
2	2.1-8.0%	R-4 RIRRAP	R-4 RIRRAP
3	8.1-20%	ENGINEERED DESIGN	ENGINEERED DESIGN

CHART B - SWALE DIMENSIONS		
SYMBOL	SWALE A	SWALE B
C	1' (300) MIN.	1' (300) MIN.
D	4' (1200) MIN.	6' (1800) MIN.

SEE SECTION A - A

NOTES:

1). DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.

2). DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.

3). IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR MORE THAN 14 DAYS, THEY SHALL BE STABILIZED IN ACCORDANCE WITH CHART A PRIOR TO BECOMING OPERATIONAL.

4). IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR LESS THAN 14 DAYS, THEY SHALL BE STABILIZED WITH GEOTEXTILE IN ACCORDANCE WITH THE STANDARD DETAIL, "GEOTEXTILE-LINED CHANNEL DIVERSION".

DELAWARE
DEPARTMENT OF TRANSPORTATION

TEMPORARY SWALE

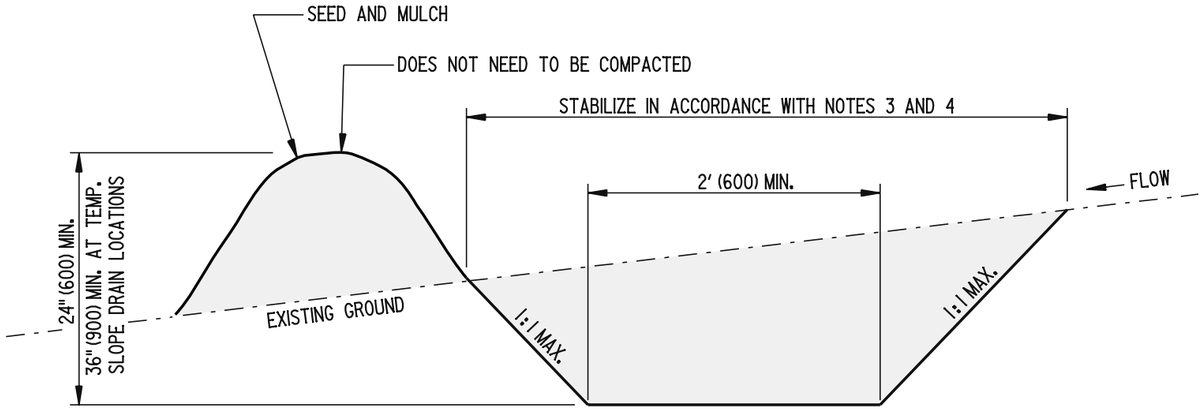
STANDARD NO. E-11 (2005) | SHT. 1 OF 1

APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE

RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

08/30/2005

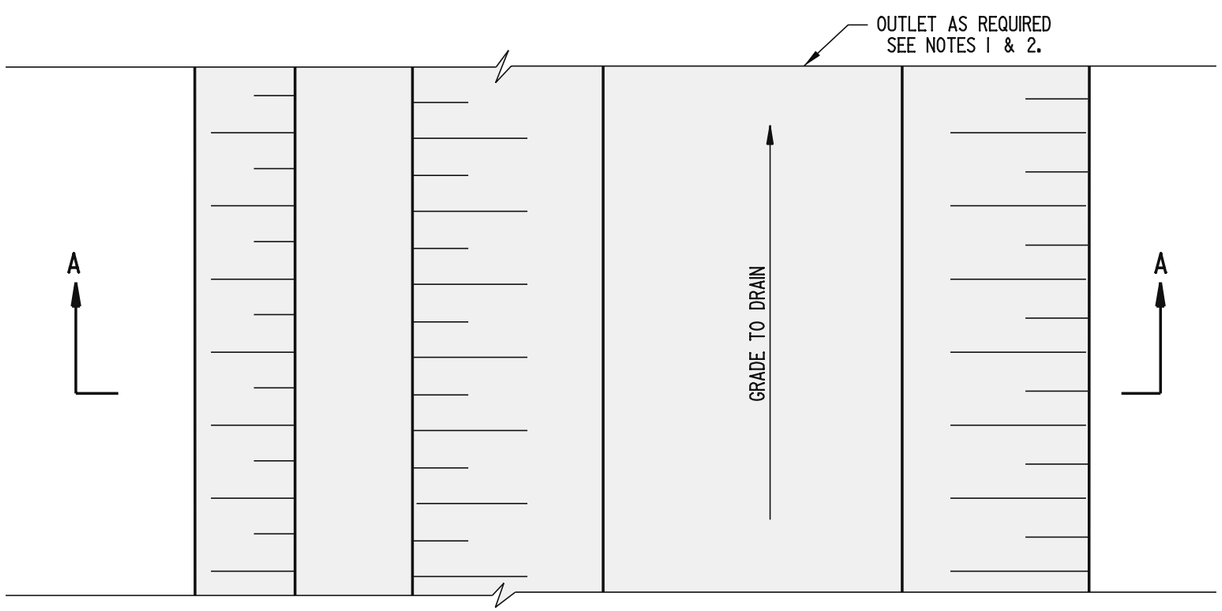
SCALE : N.T.S.



SECTION A-A

CHART A - SWALE STABILIZATION		
SYMBOL	SWALE GRADE	TYPE OF TREATMENT
A-1	0.5-2.0%	SEED AND EROSION CONTROL BLANKET
A-2	2.1-8.0%	LINED R-4 RIPRAP
A-3	8.1-20%	ENGINEERED DESIGN

MAXIMUM DRAINAGE AREA: 2 ACRES (0.8 ha)



PLAN

NOTES:

1). DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.

2). DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.

3). IF PERIMETER DIKE SWALES ARE TO BE OPERATIONAL FOR MORE THAN 14 DAYS, THEY SHALL BE STABILIZED IN ACCORDANCE WITH CHART A PRIOR TO BECOMING OPERATIONAL.

4). IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR LESS THAN 14 DAYS, THEY SHALL BE STABILIZED WITH GEOTEXTILE IN ACCORDANCE WITH THE STANDARD DETAIL, "GEOTEXTILE-LINED CHANNEL DIVERSION".

DELAWARE
DEPARTMENT OF TRANSPORTATION

PERIMETER DIKE / SWALE

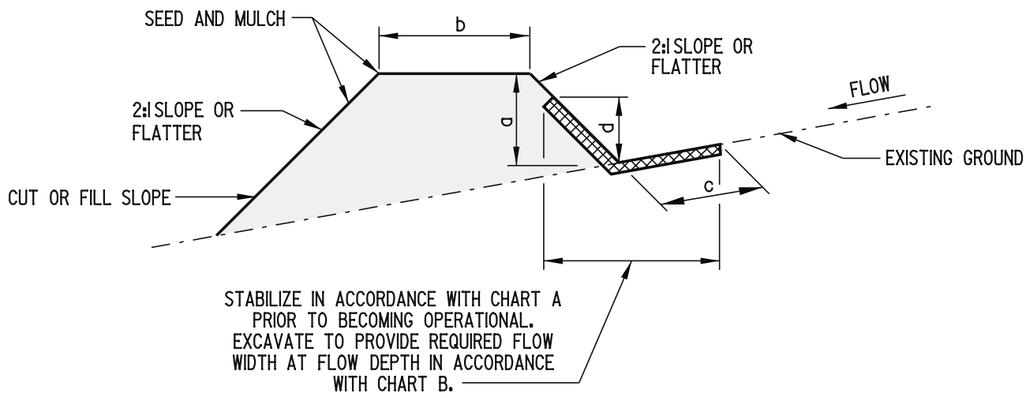
STANDARD NO. E-12 (2005) | SHT. 1 OF 1

APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE

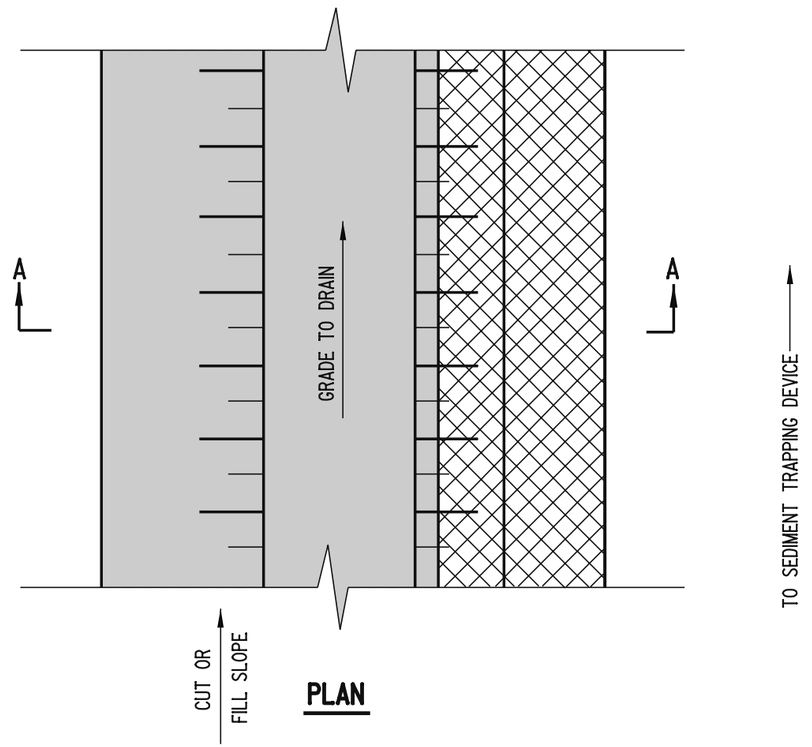
RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

09/02/2005

SCALE : N.T.S.



SECTION A-A



PLAN

CHART A - FLOW CHANNEL STABILIZATION		
TYPE	CHANNEL GRADE	TYPE OF TREATMENT
1	0.5-2.0%	SEED AND EROSION CONTROL BLANKET
2	2.1-8.0%	R-4 RIPRAP
3	8.1-20%	ENGINEERED DESIGN

CHART B - EARTH DIKE DIMENSIONS		
SYMBOL	DIKE A (5 ac (2 ha) or less)	DIKE B (5-10ac(2-4 ha))
a-DIKE HEIGHT	12" (300)	18" (450)
b-DIKE WIDTH	12" (300)	24" (600)
c-FLOW WIDTH	48" (1200)	72" (1800)
d-FLOW DEPTH	14" (350)	27" (680)

NOTES: 1). IF DESIRED, TOP WIDTH MAY BE WIDER AND SIDE SLOPES MAY BE FLATTER TO FACILITATE CROSSING BY CONSTRUCTION TRAFFIC.

2). FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO INSURE A STABILIZED OUTFALL.

DELAWARE
DEPARTMENT OF TRANSPORTATION

EARTH DIKE

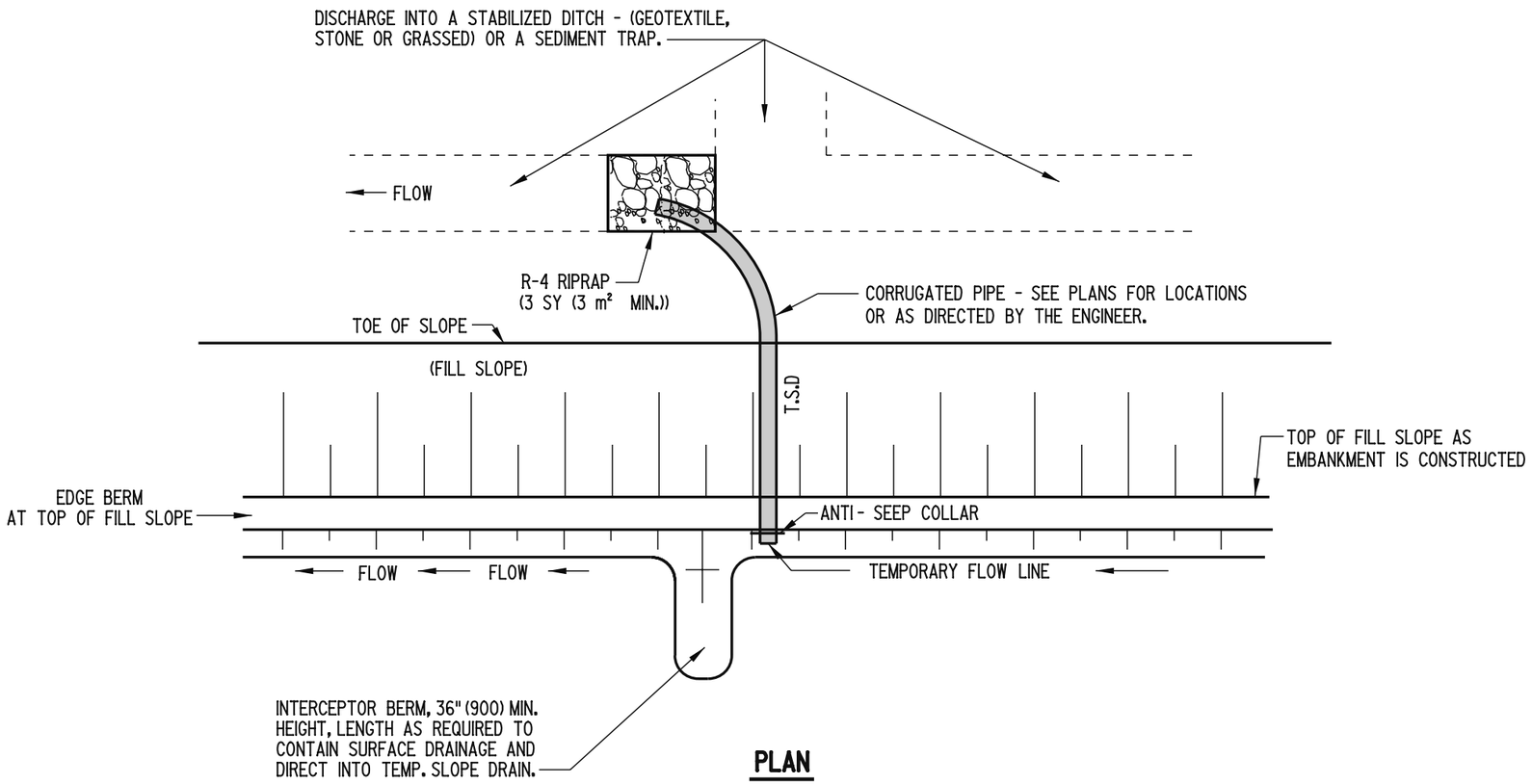
STANDARD NO. E-13 (2005) | SHT. 1 OF 1

APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE

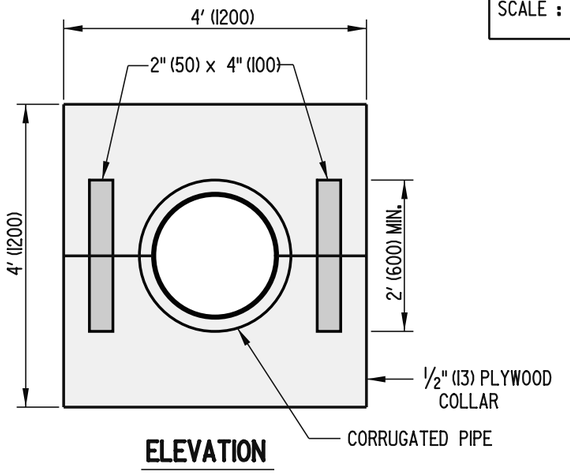
RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

09/02/2005

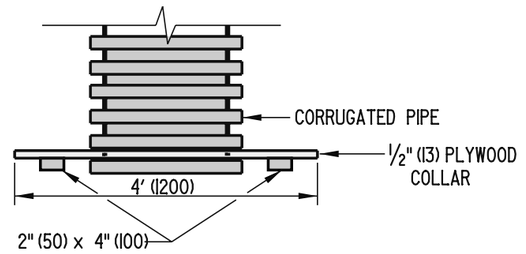
SCALE : N.T.S.



PLAN

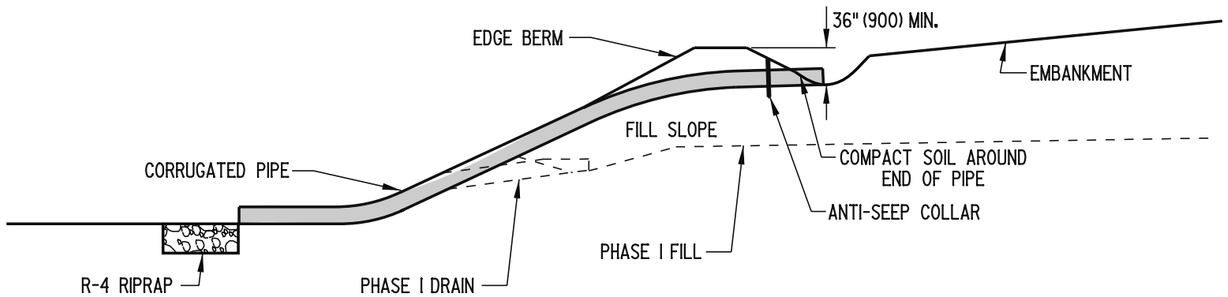


ELEVATION



PLAN

ANTI-SEEP COLLAR



SLOPE DRAIN PROFILE

(FOR FILL SLOPES)

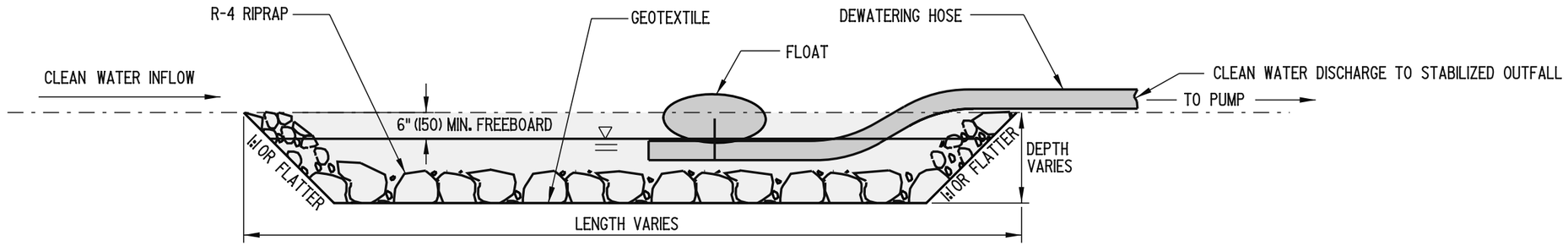
NOTES: 1). ALL TEMPORARY SLOPE DRAINS SHALL DISCHARGE INTO THE BACK OF SEDIMENT TRAPS, INTO SEDIMENT BASINS OR DITCHES DISCHARGING INTO TRAPS OR BASINS.

2). TEMPORARY SLOPE DRAINS SHALL BE USED AT THE TOP OF FILL SLOPES AS EMBANKMENT IS CONSTRUCTED, TO PREVENT EXCESSIVE EROSION UNTIL SHOULDERS ARE CONSTRUCTED AND THE SLOPES ARE SEEDED AND MULCHED.

DELAWARE DEPARTMENT OF TRANSPORTATION	TEMPORARY SLOPE DRAIN			APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-14 (2005)	SHT. 1	OF 1	RECOMMENDED DESIGN ENGINEER 11/29/05 DATE

09/02/2005

SCALE : N.T.S.



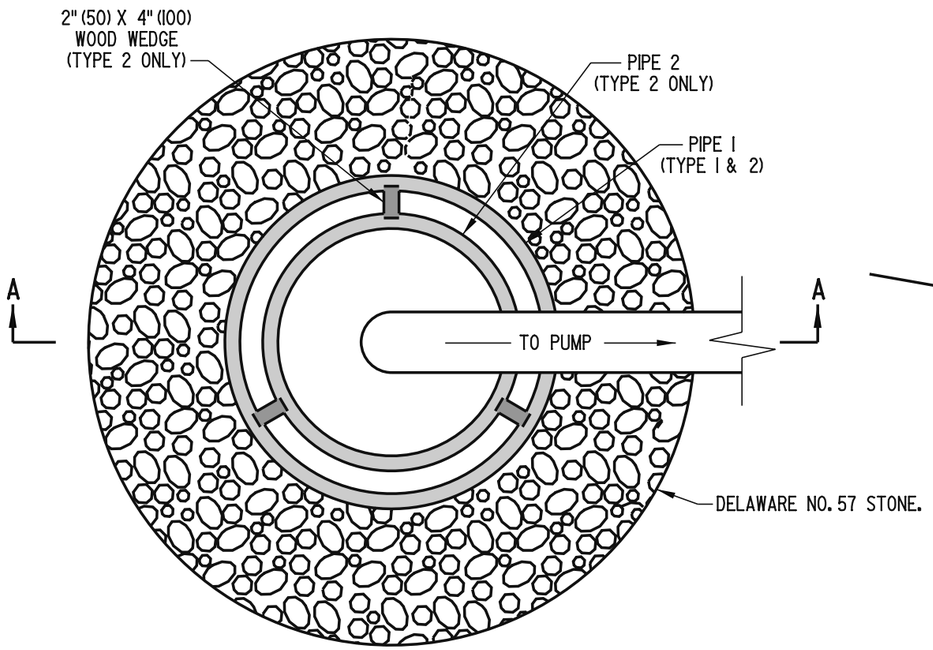
NOTES: 1). THE WORK SHALL CONSIST OF CONSTRUCTING A STILLING WELL FOR THE PURPOSE OF PUMPING CLEAN WATER AROUND A DISTURBED CONSTRUCTION AREA TO A STABILIZED OUTFALL.

2). THE DIMENSIONS OF THE STILLING WELL SHALL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

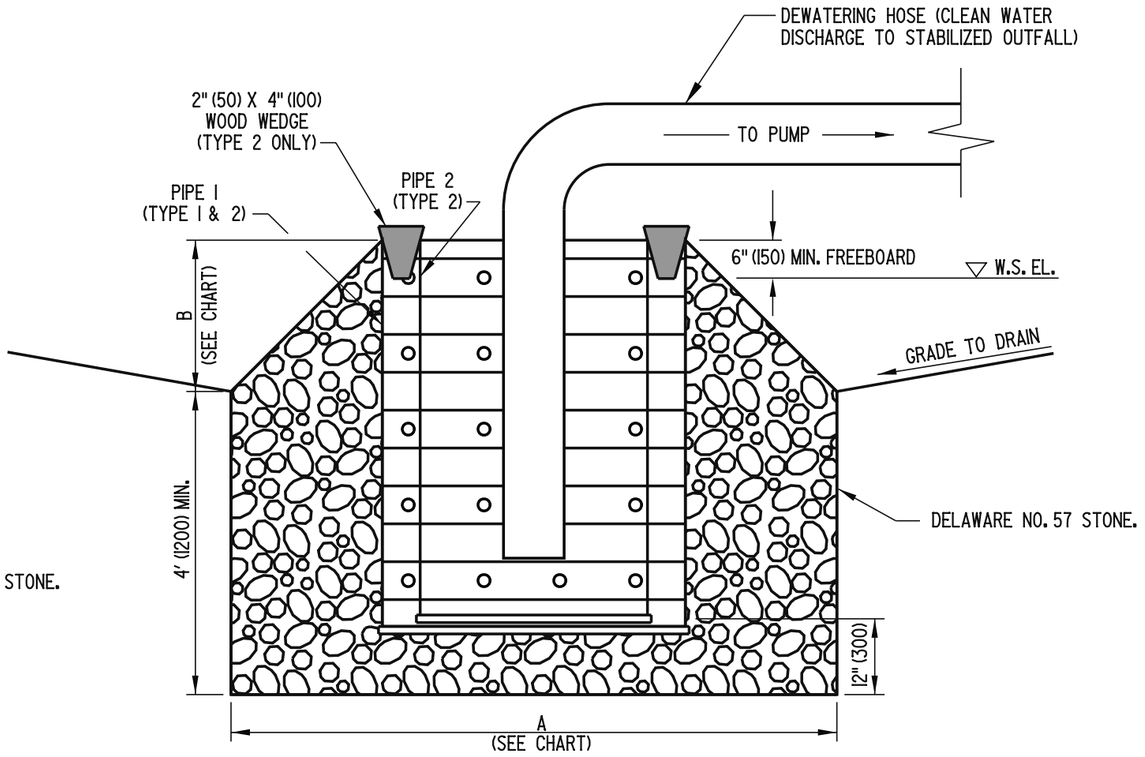
DELAWARE DEPARTMENT OF TRANSPORTATION	STILLING WELL		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-15 (2005)	SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER 11/29/05 DATE

09/07/2005

SCALE : N.T.S.



PLAN



SECTION A-A

SUMP PIT CHART				
TYPE	PIPE 1	PIPE 2	A	B
1	PERFORATED 24" (600) CMP WITH PERFORATED CAP WELDED ON BOTTOM AND COMPLETELY WRAPPED WITH GEOTEXTILE.	N/A	4' (1200) MIN.	12" (300)
2	PERFORATED 48" (1200) CMP WITH PERFORATED CAP WELDED ON BOTTOM	REMOVABLE PERFORATED 36" (900) CMP WITH PERFORATED CAP WELDED ON BOTTOM AND COMPLETELY WRAPPED WITH GEOTEXTILE.	8' (2400) MIN.	24" (600)

NOTES:

1). THE WORK SHALL CONSIST OF CONSTRUCTING A SUMP PIT FOR THE PURPOSE OF FILTERING AND PUMPING WATER TO A STABILIZED OUTFALL.

2). GEOTEXTILE FOR THE 36" (900) CMP SHALL BE REPLACED WHEN CLOGGED WITH SEDIMENT.

3). ½" x ½" (13 x 13) 19 GAGE (I.I) WIRE MESH SHALL BE PLACED AROUND THE REMOVABLE 36" (900) CMP BEFORE ATTACHING THE GEOTEXTILE TO INCREASE FLOW THROUGH THE GEOTEXTILE.

4). ALL PERFORATIONS SHALL BE 1" (25) IN DIAMETER AND 12" (300) ON CENTER IN ALL DIRECTIONS.

5). TYPE 1 SUMP PIT SHALL BE USED ONLY WHEN PUMPING IS NEEDED FOR LESS THAN 7 DAYS.

DELAWARE
DEPARTMENT OF TRANSPORTATION

SUMP PIT, TYPE 1 & 2

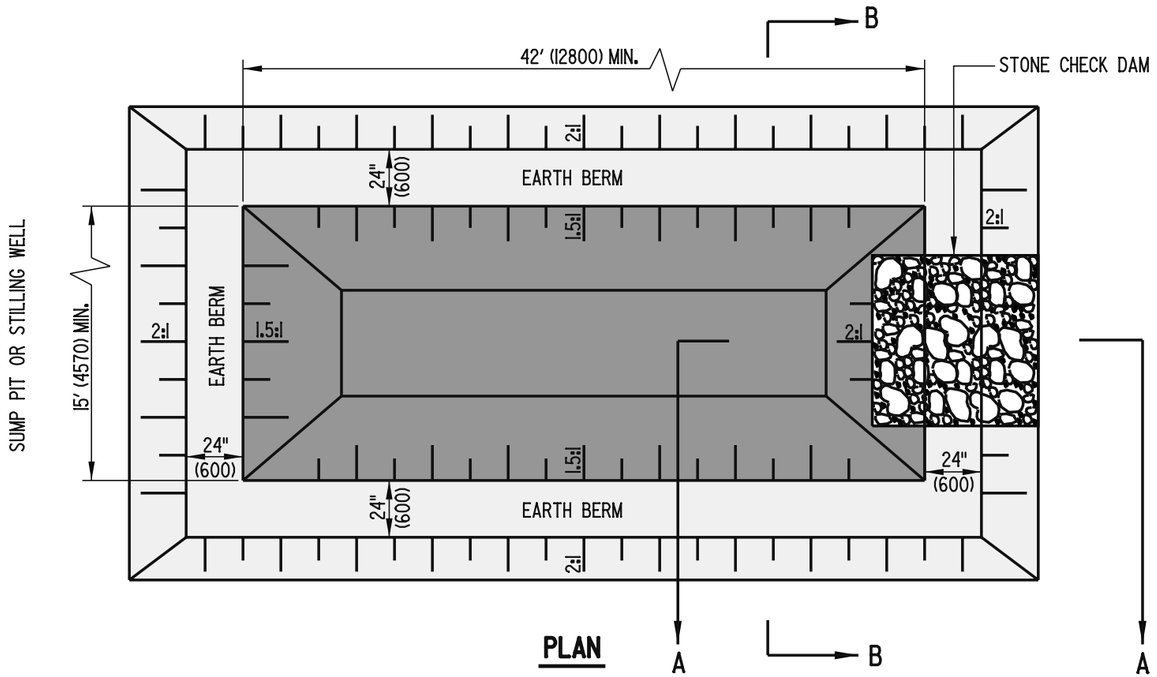
STANDARD NO. E-16 (2005) | SHT. 1 OF 1

APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE

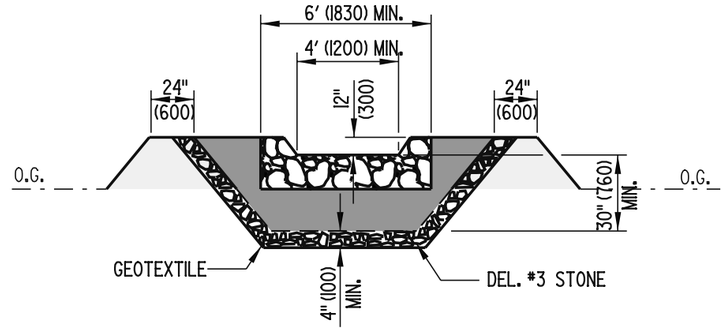
RECOMMENDED [signature] DESIGN ENGINEER 11/29/05 DATE

09/07/2005

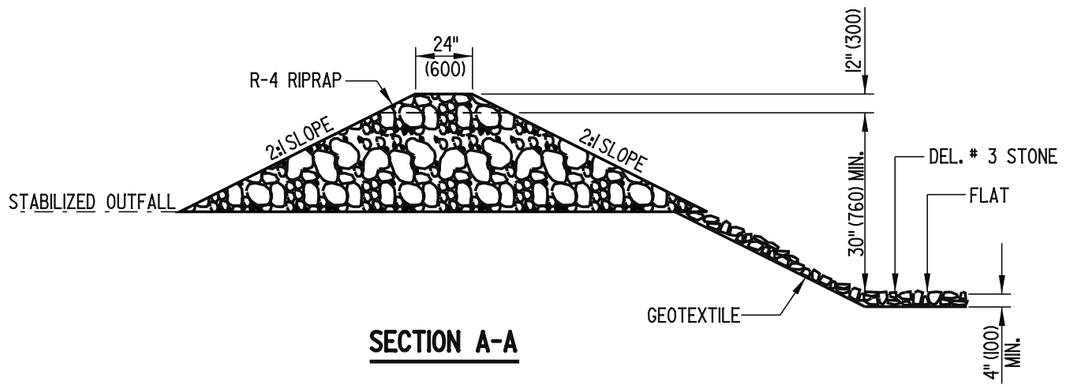
SCALE : N.T.S.



PLAN



SECTION B-B



SECTION A-A

NOTES: 1.) A DEWATERING BASIN (DWB) IS USED TO REMOVE SEDIMENT FROM SEDIMENT-LADEN WATER PUMPED FROM A CONSTRUCTION SITE BEFORE THE WATER RE-ENTERS THE WATERWAY. THE DWB SHALL HAVE A MINIMUM TOP WIDTH OF 15' (4570) AND A MINIMUM DEPTH OF 3.5' (1065). THE MINIMUM TOP LENGTH SHOWN IN THE PLAN IS USED ONLY FOR QUANTITY CALCULATIONS BY THE ENGINEER. THE ACTUAL TOP LENGTH IN THE FIELD SHALL BE CALCULATED BY THE EQUATION:

US CUSTOMARY : TOP LENGTH (FEET) = 26' + .01 x Y
METRIC : TOP LENGTH (mm) = 7930 + 48300 x Y

WHERE Y IS THE MAXIMUM CAPACITY IN GALLONS PER MINUTE (CUBIC METERS PER SECOND) OF THE DEWATERING PUMP.

2.) THE OUTFALL FROM THE BASIN TO THE RECEIVING WATERS SHALL BE STABILIZED. PUMPING INTO THE DWB SHALL CEASE WHEN THE EFFLUENT FROM THE BASIN BECOMES SEDIMENT-LADEN.

3.) A SUMP PIT OR STILLING WELL (SEE STANDARD SHEETS) SHALL BE USED IN CONJUNCTION WITH A DWB. THE BASIN MAY BE BYPASSED INTO THE STABILIZED OUTFALL IF THE WATER BEING PUMPED IS NON-SEDIMENT-LADEN. DIRECT DISCHARGE TO THE RECEIVING WATERS SHALL CEASE AND BE REDIRECTED TO THE DWB WHEN EFFLUENT FROM THE PUMP BECOMES SEDIMENT-LADEN.

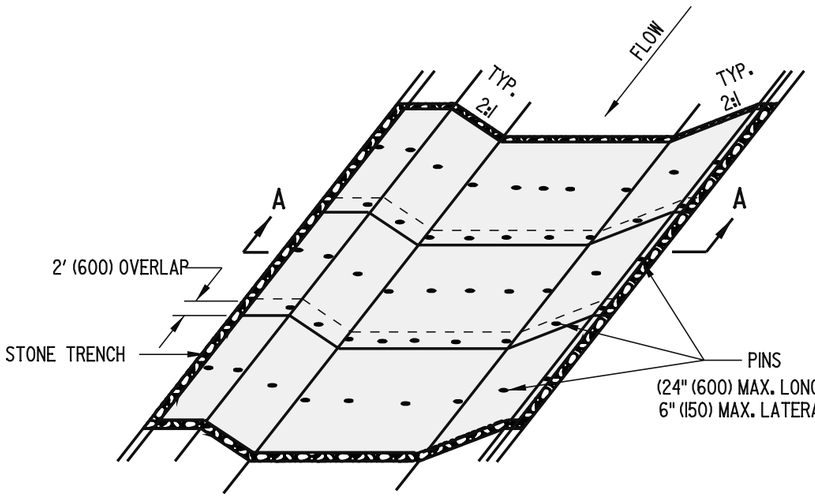
4.) MAINTENANCE MUST BE PERFORMED IN ORDER FOR THE DWB TO FUNCTION PROPERLY. ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED DISPOSAL AREA WHEN THE BASIN IS FILLED TO WITHIN 12" (300) FROM THE CREST.

5.) WHEN USED IN CONJUNCTION WITH A COFFERDAM, DEWATERING SHALL BEGIN NO SOONER THAN 12 HOURS AFTER COFFERDAM INSTALLATION IN ORDER TO ALLOW SEDIMENT PRODUCED DURING INSTALLATION TO SETTLE COMPLETELY.

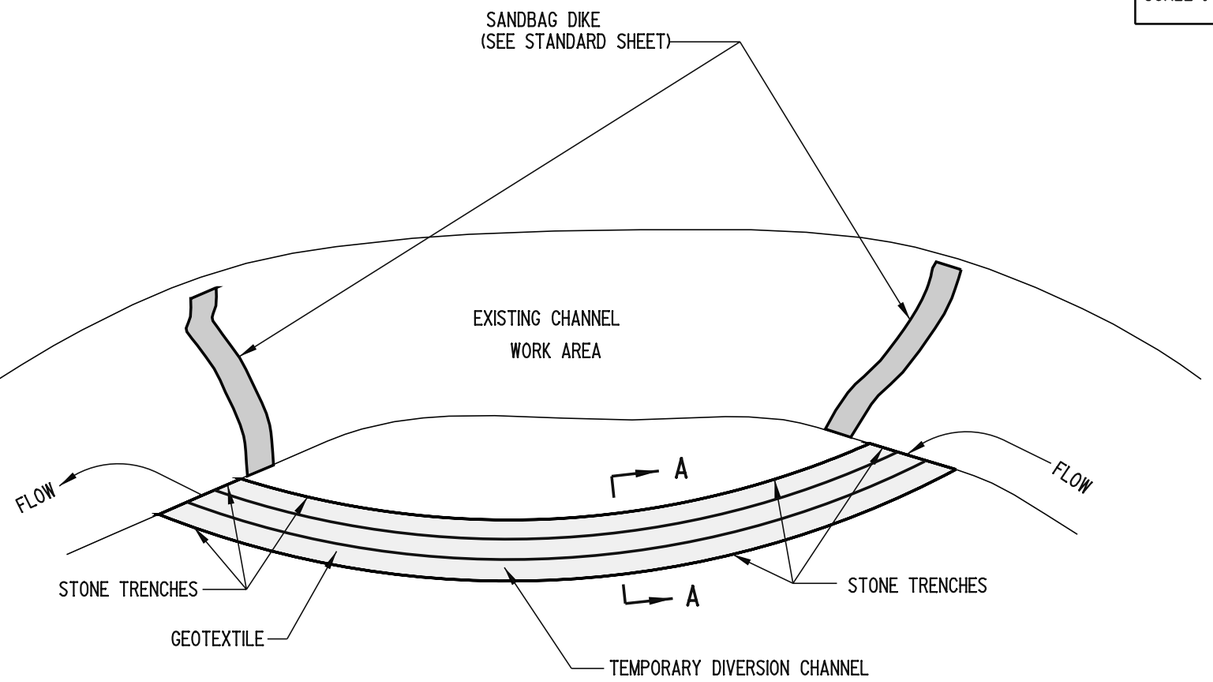
DELAWARE DEPARTMENT OF TRANSPORTATION	DEWATERINGBASIN	APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-17 (2005) SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER 11/29/05 DATE

09/07/2005

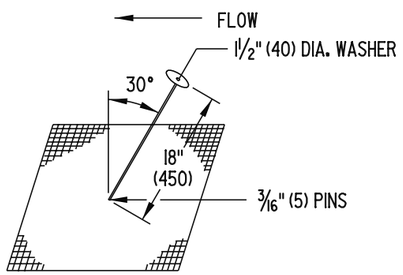
SCALE : N.T.S.



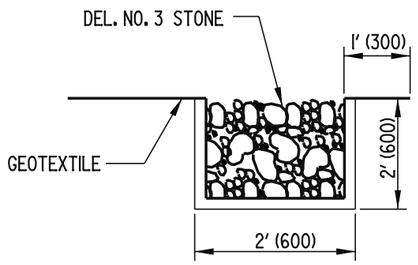
OBLIQUE VIEW



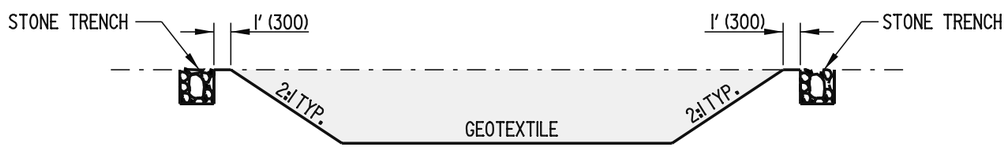
PLAN



FASTENING DETAIL



TRENCHING DETAIL



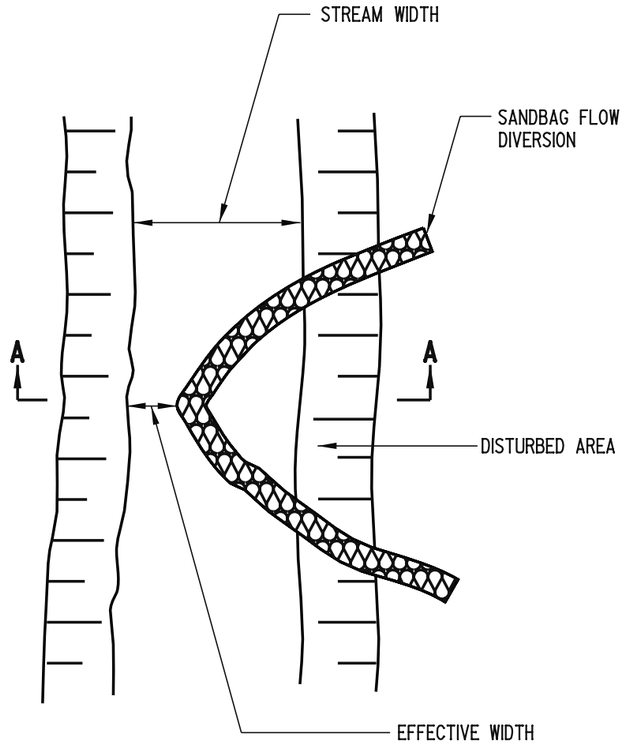
SECTION A-A

NOTE: SEE PLANS FOR LOCATION, DIMENSIONS, GRADES, ETC.

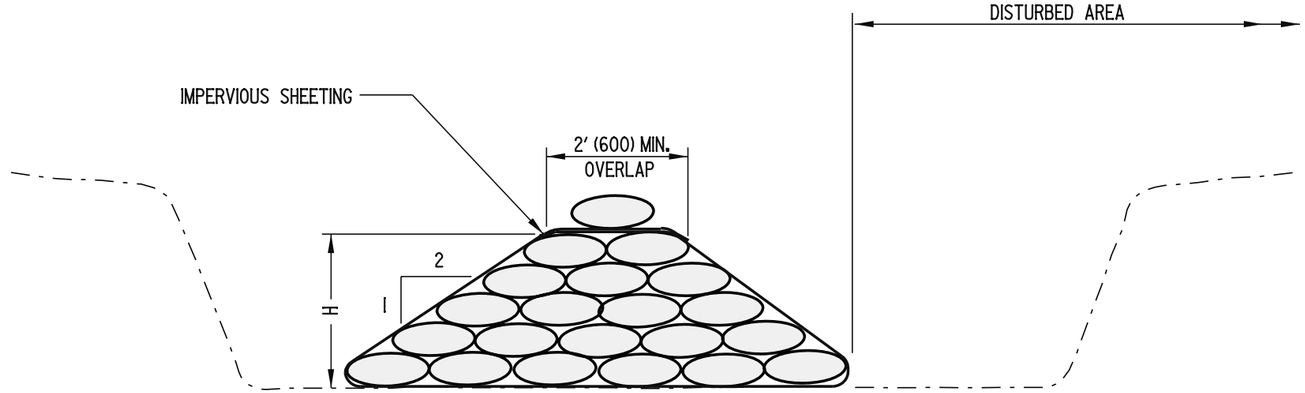
DELAWARE DEPARTMENT OF TRANSPORTATION	GEOTEXTILE-LINED CHANNEL DIVERSION	APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-18 (2005) SHT. 1 OF 1	RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

09/08/2005

SCALE : N.T.S.



PLAN



SECTION A-A

NOTES:

1). THE WORK SHALL CONSIST OF INSTALLING FLOW DIVERSIONS FOR THE PURPOSE OF EROSION CONTROL WHEN CONSTRUCTION ACTIVITIES TAKE PLACE WITHIN THE STREAM CHANNEL SUCH AS BANK STABILIZATION OR BRIDGE ABUTMENT CONSTRUCTION.

2). THE DIVERSION STRUCTURE SHALL BE INSTALLED FROM UPSTREAM TO DOWNSTREAM.

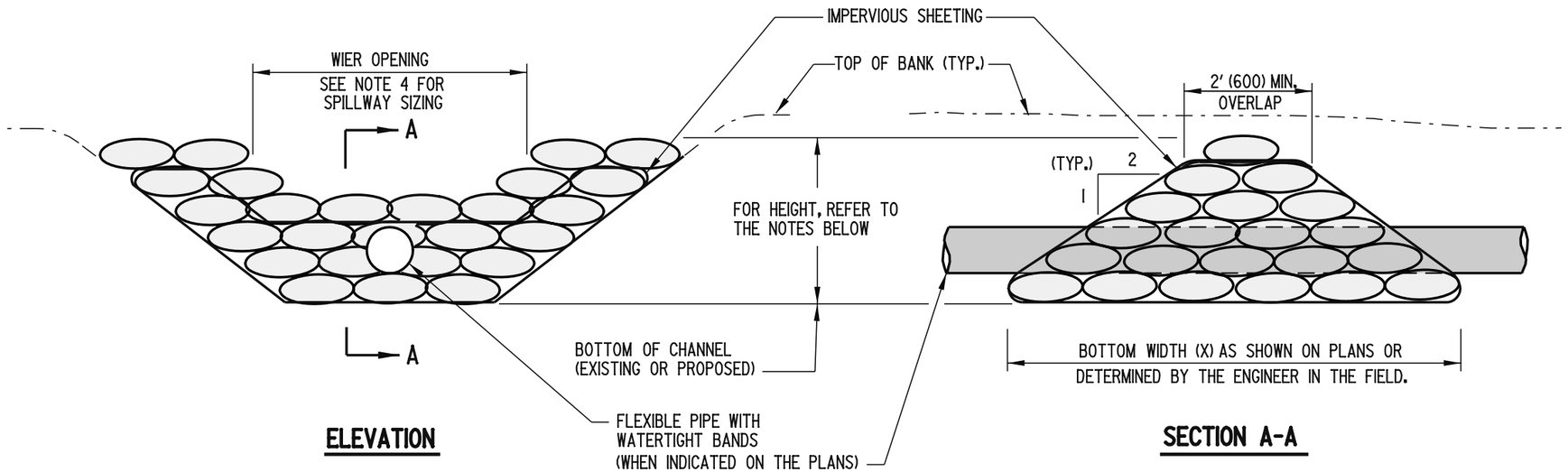
3). THE EFFECTIVE CHANNEL WIDTH SHALL BE SIZED TO PASS A ONE YEAR STORM EVENT PEAK FLOW, OR 1/3 OF STREAM WIDTH, WHICHEVER IS GREATER.

4). THE SANDBAG DIVERSION HEIGHT (H) SHALL BE 1' (300) ABOVE THE PEAK ELEVATION OF THE ONE YEAR STORM.

DELAWARE DEPARTMENT OF TRANSPORTATION	SANDBAG DIVERSION		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-19 (2005)	SHT. 1 OF 1	RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

09/08/2005

SCALE : N.T.S.



ELEVATION

SECTION A-A

NOTES: 1). THE WORK SHALL CONSIST OF INSTALLING A SANDBAG DIKE FOR THE PURPOSE OF EROSION CONTROL WHEN CONSTRUCTION ACTIVITIES TAKE PLACE WITHIN THE STREAM CHANNEL SUCH AS BANK STABILIZATION OR BRIDGE ABUTMENT CONSTRUCTION.

2). THE SANDBAG DIKE SHALL BE INSTALLED AT THE UPSTREAM LOCATION FIRST.

3). THE HEIGHT OF THE SANDBAG DIKE SHALL BE 1' (300) ABOVE THE PEAK ELEVATION OF THE ONE YEAR STORM, OR EQUAL WITH THE TOP OF BANK, WHICHEVER IS LESS. SEE PLANS FOR INFORMATION.

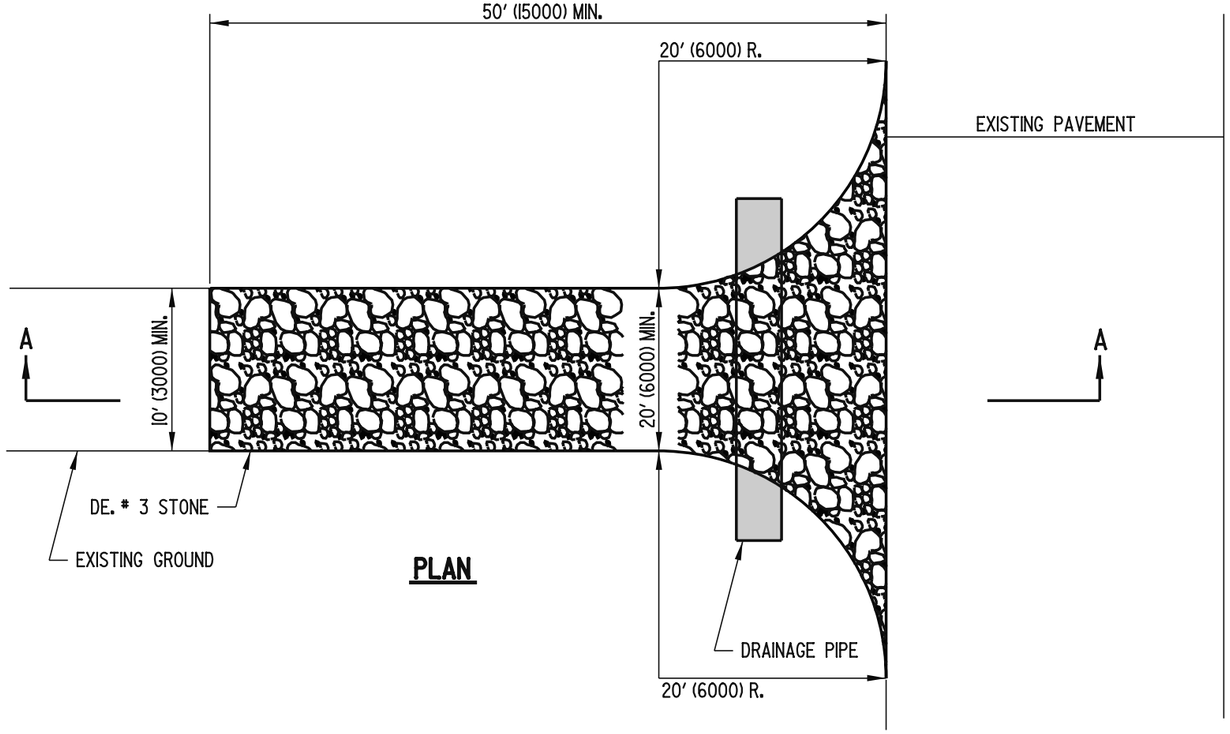
4). THE SPILLWAY SHALL BE SIZED TO PASS A (1) ONE YEAR STORM EVENT PEAK FLOW, SEE PLANS.

5). THE PIPE, WHEN UTILIZED, SHALL BE SIZED TO PASS THE STREAM BASE FLOW.

DELAWARE DEPARTMENT OF TRANSPORTATION	SANDBAG DIKE		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-20 (2005)	SHT. 1 OF 1	RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

09/08/2005

SCALE : N.T.S.



PLAN

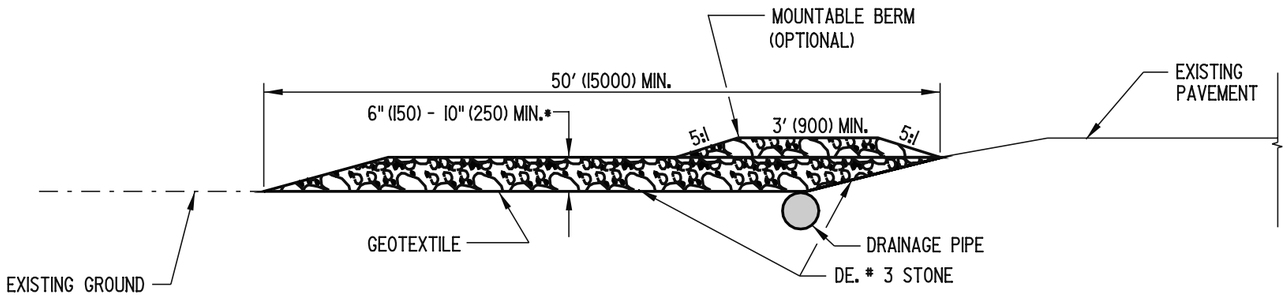
NOTES:

1). ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED UNDER THE ENTRANCE. IF NECESSARY, A MOUNTABLE BERM WITH 5:1 SLOPES SHALL BE ALLOWED TO FACILITATE PLACEMENT OF PIPES IN SHALLOW CONDITIONS.

2). THE LOCATION AND NUMBER OF STABILIZED CONSTRUCTION ENTRANCES SHALL BE AS INDICATED ON THE PLANS. ANY CHANGE IN LOCATION, ADDITION, OR DELETION OF AN ENTRANCE SHALL BE APPROVED IN ADVANCE BY THE ENGINEER.

3). DRAINAGE PIPE, IF UTILIZED, SHALL BE PAID FOR SEPARATELY UNDER THE APPROPRIATE BID ITEM.

4). THE TOP 2" (50) OF STONE SHALL BE REMOVED AND REPLACED WITH 2" (50) OF CLEAN STONE WHEN VOIDS ARE FILLED OR AS DIRECTED BY THE ENGINEER.



SECTION A-A

* 6" (150) MIN. (≤ 3 AXLE)
10" (250) MIN. (> 3 AXLE)

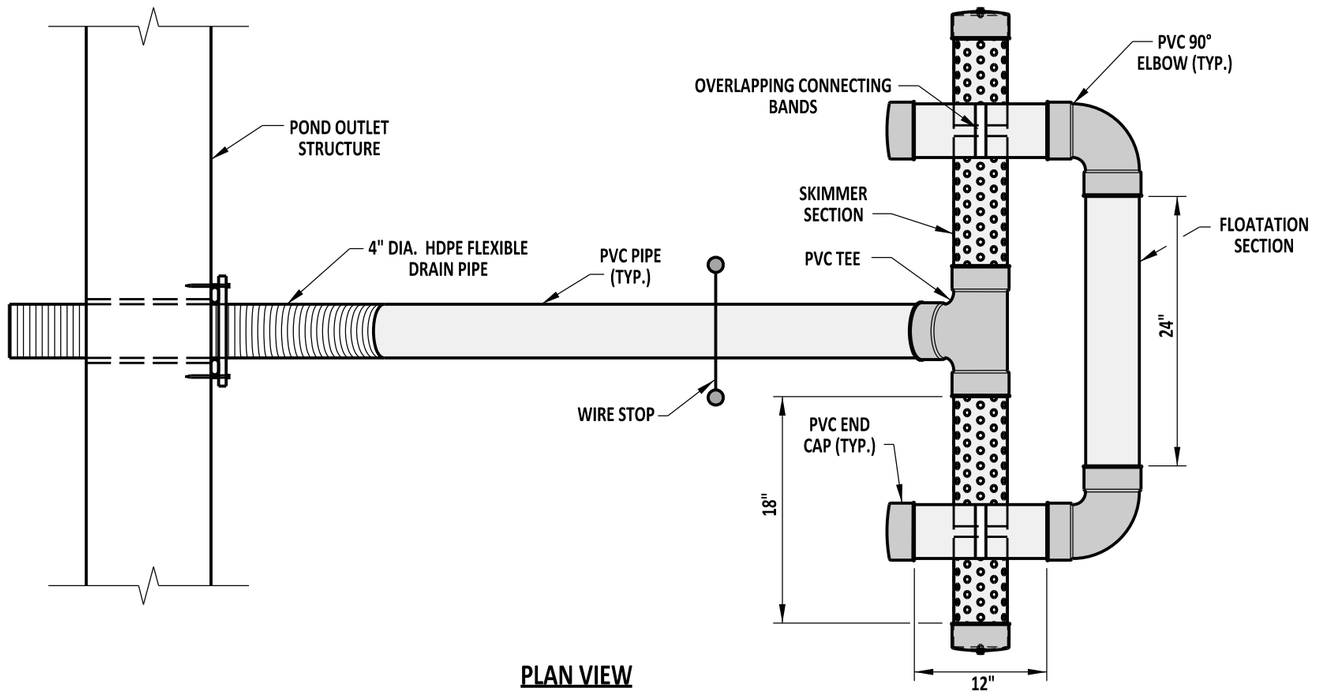
DELAWARE DEPARTMENT OF TRANSPORTATION	STABILIZED CONSTRUCTION ENTRANCE			APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-21 (2005)	SHT. 1 OF 1		RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

09/08/2005

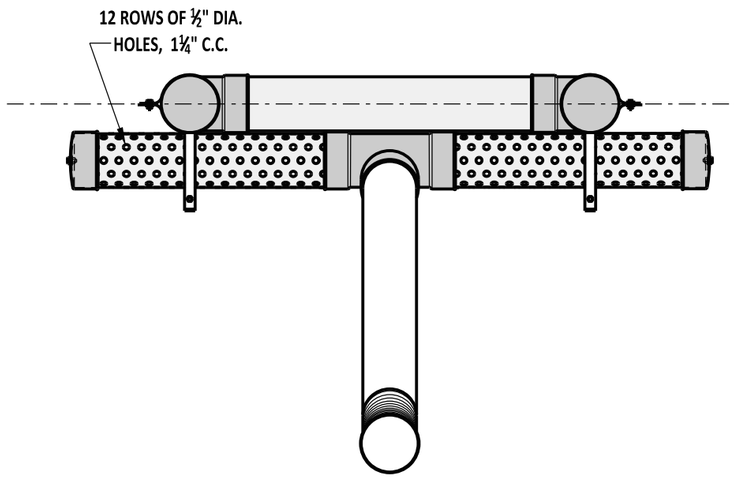
SCALE : NTS

NOTES:

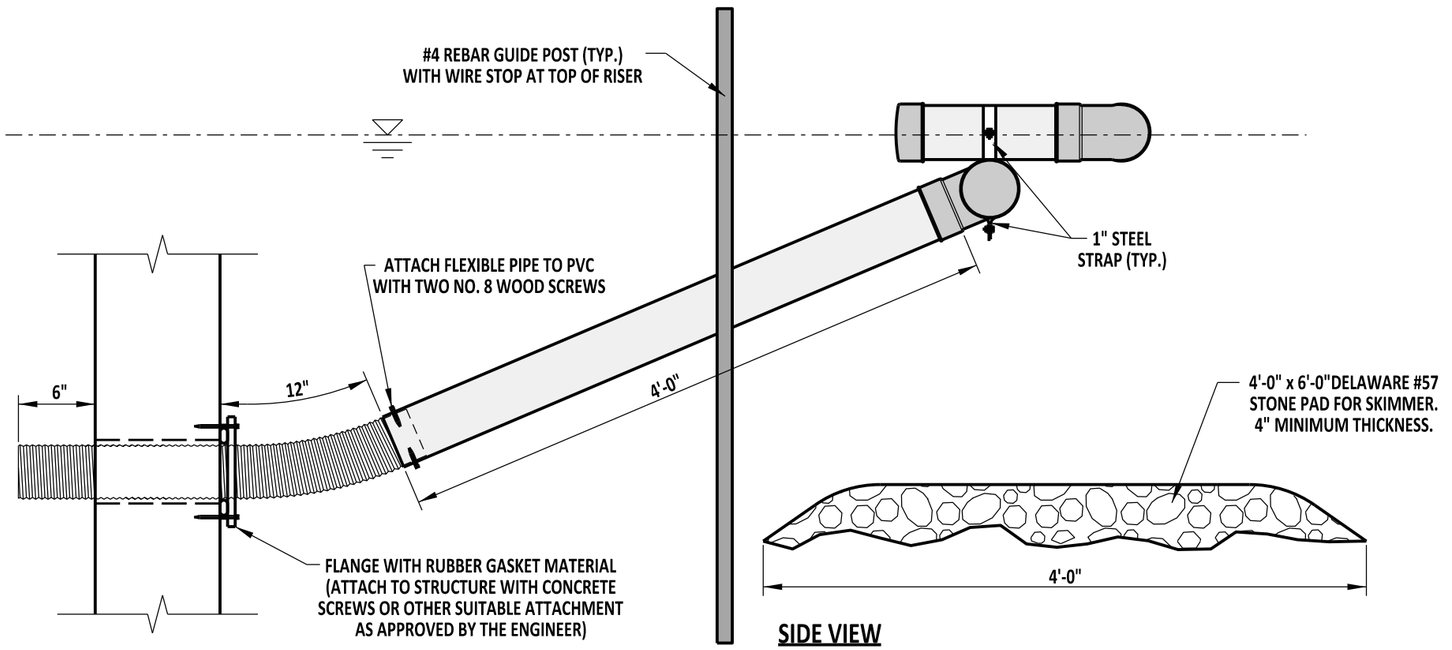
1). ALL P.V.C. PIPES ARE TO BE 4" I.D., SCHEDULE 40.
2). ALL JOINTS OF THE FLOATATION SECTION SHALL BE SOLVENT WELDED.
3). 4" HDPE FLEXIBLE DRAIN PIPE IS TO BE ATTACHED TO THE POND OUTLET STRUCTURE WITH WATER TIGHT CONNECTIONS



PLAN VIEW



FRONT VIEW

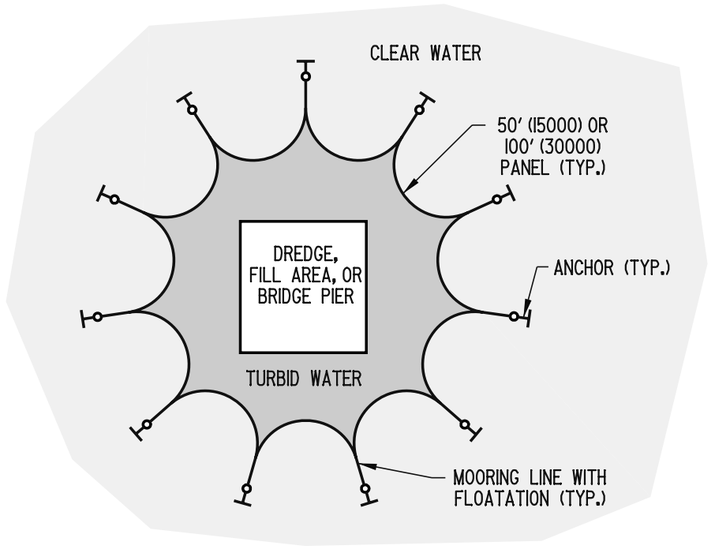


SIDE VIEW

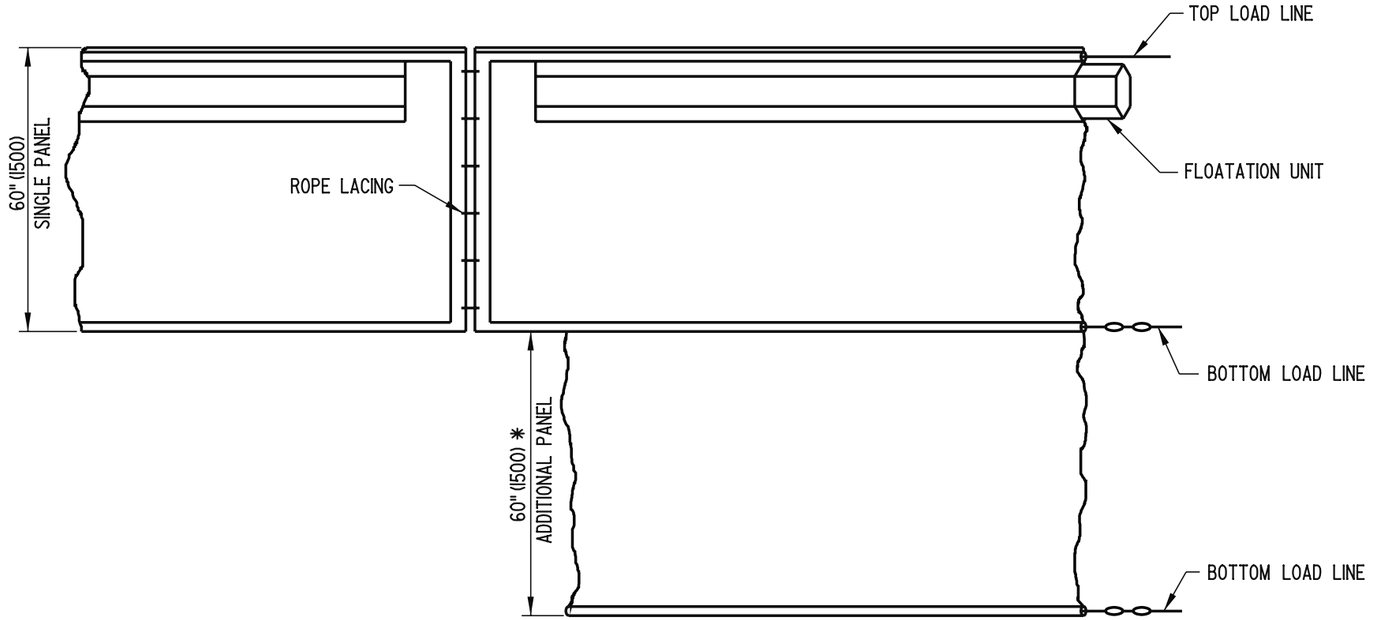
DELAWARE DEPARTMENT OF TRANSPORTATION	SKIMMER DEWATERING DEVICE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)
	STANDARD NO. E-22 (2012)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

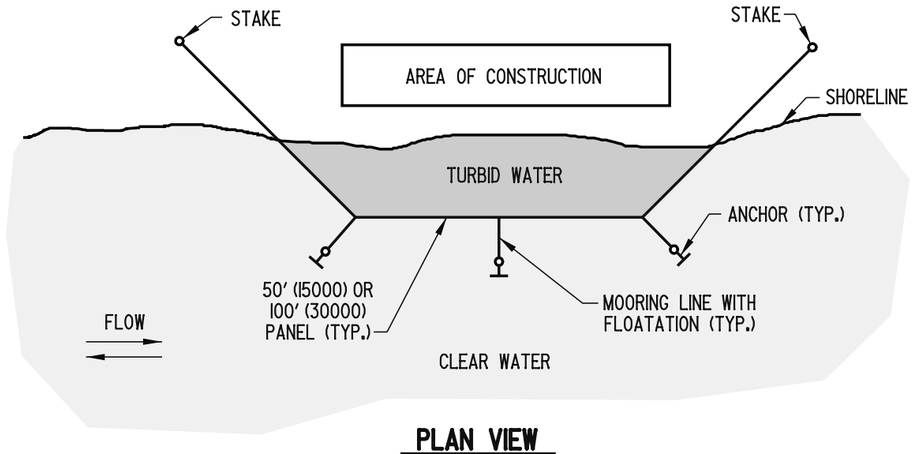
SCALE : N.T.S.



PLAN VIEW
OPEN WATER APPLICATION



ELEVATION



PLAN VIEW
SHORELINE APPLICATION

FLOATING TURBIDITY CURTAIN

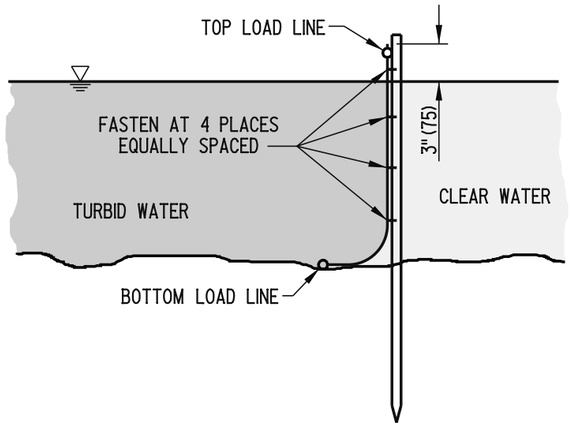
NOTE: 1.) ADDITIONAL PANEL REQUIRED FOR DEPTHS GREATER THAN 5' (1500).

2.) FLOATING TURBIDITY CURTAIN SHALL REACH BOTTOM UP TO DEPTHS OF 10' (3000) BY USING TWO PANELS. DEPTHS GREATER THAN 10' (3000) SHALL REQUIRE SPECIAL DEPTH CURTAINS SPECIFICALLY CALLED FOR IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

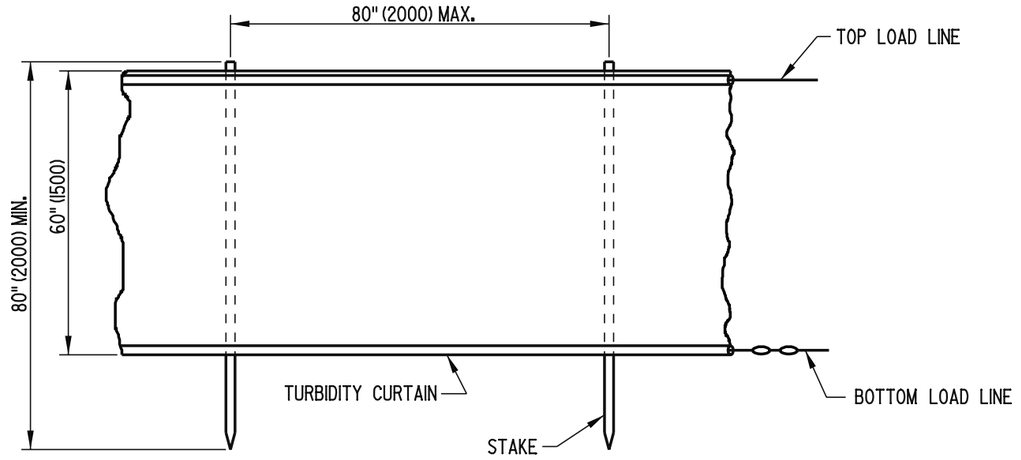
DELAWARE DEPARTMENT OF TRANSPORTATION	TURBIDITY CURTAIN		APPROVED Caroline Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-23 (2005)	SHT. 1 OF 2	RECOMMENDED DESIGN ENGINEER 11/29/05 DATE

09/08/2005

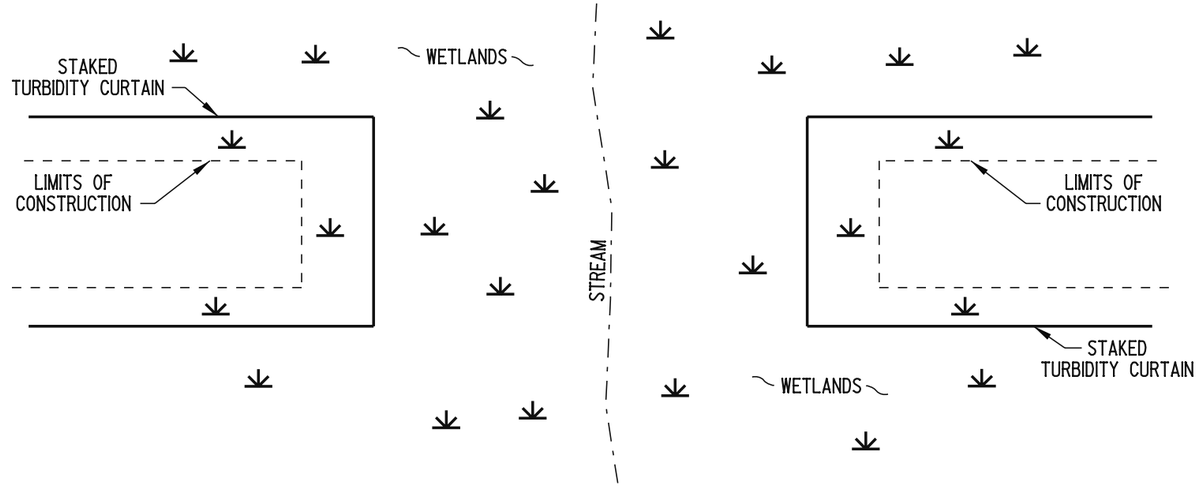
SCALE : N.T.S.



SECTION



ELEVATION



PLAN VIEW

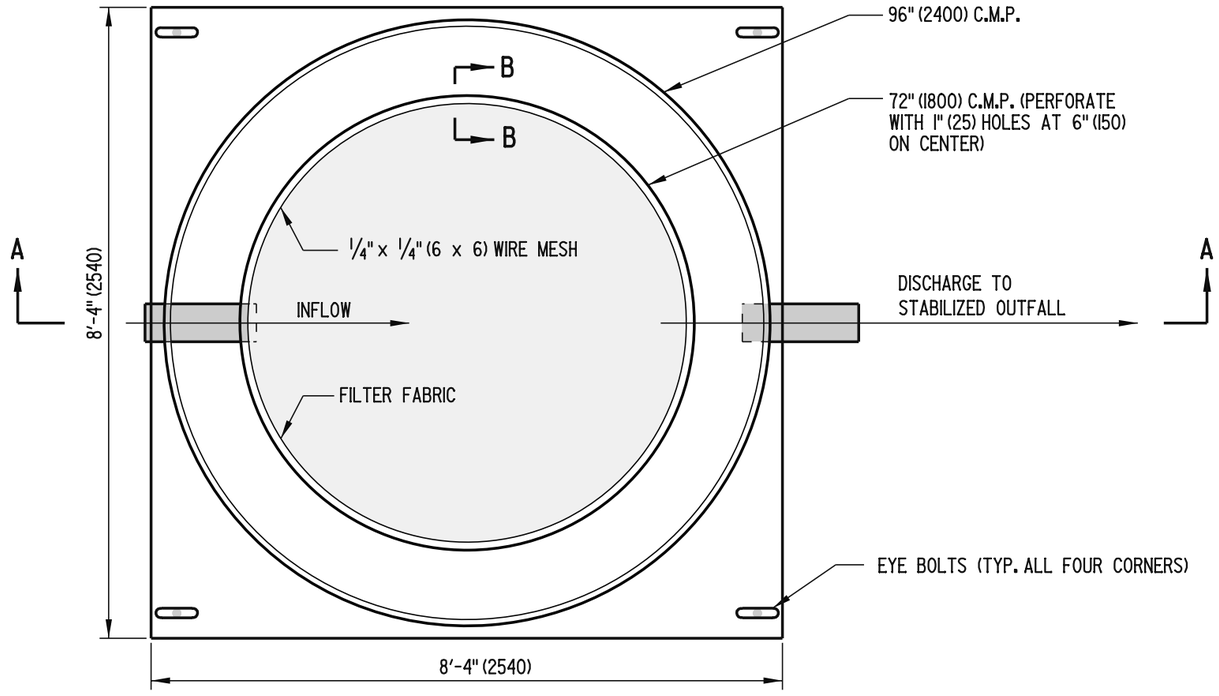
SHALLOW WATER/MARSH APPLICATION

STAKED TURBIDITY CURTAIN

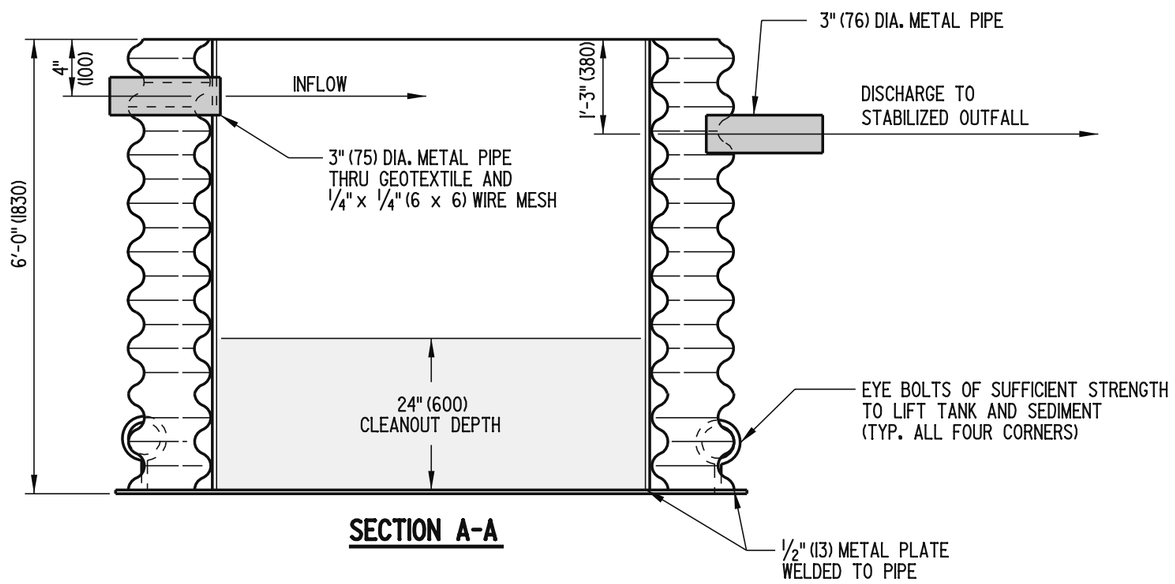
DELAWARE DEPARTMENT OF TRANSPORTATION	TURBIDITY CURTAIN		APPROVED Carolann Wicks CHIEF ENGINEER — 12/5/05 DATE
	STANDARD NO. E-23 (2005)	SHT. 2 OF 2	RECOMMENDED Duane M. O'Donnell DESIGN ENGINEER — 11/29/05 DATE

09/08/2005

SCALE : N.T.S.



PLAN



SECTION A-A

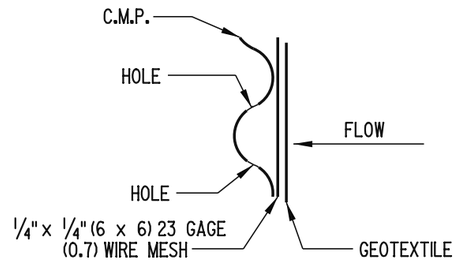
NOTES:

1). THE PORTABLE SEDIMENT TANK SHOWN MAY BE USED IN SITES WHERE SPACE IS LIMITED TO CONSTRUCT A DEWATERING BASIN.

2). THE MAXIMUM PUMP DISCHARGE INTO THIS TYPICAL PORTABLE SEDIMENT TANK SHALL BE 425 GALLONS PER MINUTE (26 LITERS PER SECOND). THE FILTER FABRIC SHALL BE REPLACED WHEN THE PORTABLE SEDIMENT TANK CAN NO LONGER ALLOW THIS FLOW RATE, WHEN THERE IS A TEAR, OR WHEN DIRECTED BY THE ENGINEER.

3). SEVERAL UN-CONNECTED OR CONNECTED IN PARALLEL PORTABLE SEDIMENT TANKS MAY BE USED WHEN A HIGHER FLOW RATE IS NEEDED TO DE-WATER THE JOB.

4). OTHER DESIGNS MAY BE USED PROVIDED THE HYDRAULIC DESIGN IS SUBMITTED TO AND APPROVED BY THE STORMWATER ENGINEER.

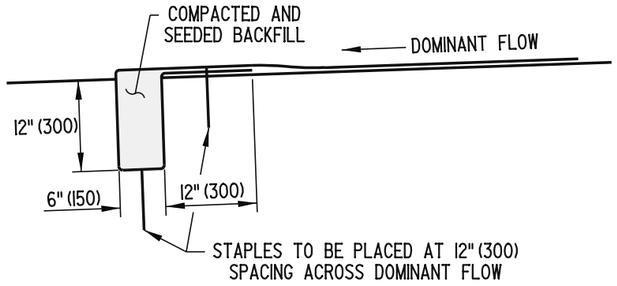


SECTION B-B

DELAWARE DEPARTMENT OF TRANSPORTATION	PORTABLE SEDIMENT TANK			APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-24 (2005)	SHT. 1 OF 1		RECOMMENDED James M. Ojeda DESIGN ENGINEER 11/29/05 DATE

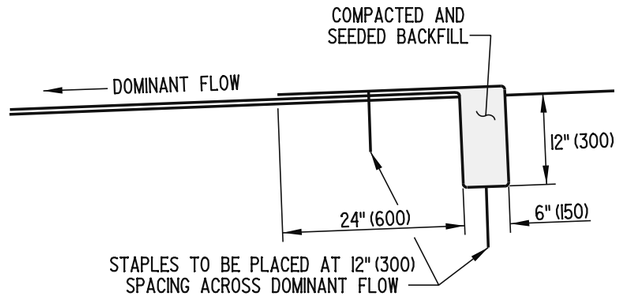
09/08/2005

SCALE : N.T.S.



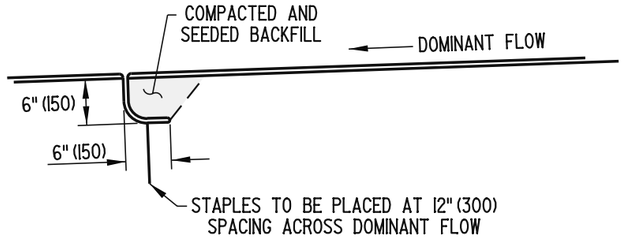
INITIAL TRENCH ANCHOR DETAIL

APPLIED AT THE DOWNSTREAM END OF DITCH



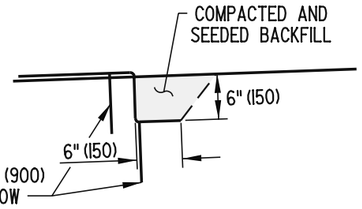
TERMINAL TRENCH ANCHOR DETAIL

APPLIED AT THE UPSTREAM END OF DITCH

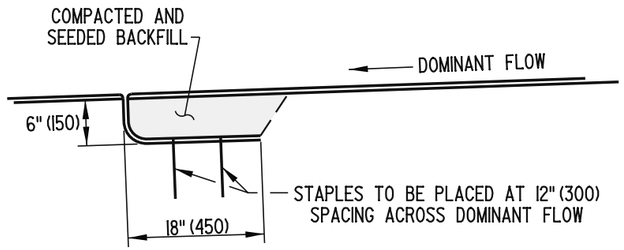


CHECK SLOT DETAIL

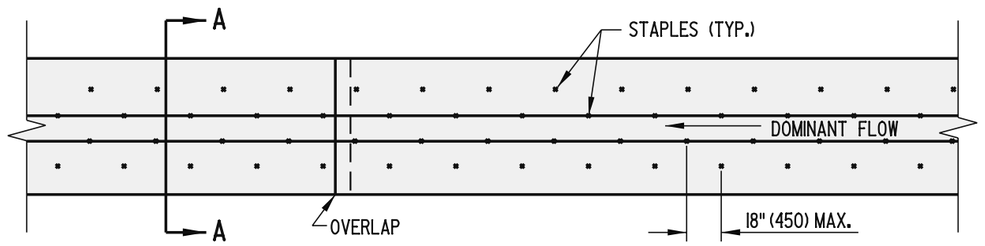
(AS NEEDED PER PLANS)



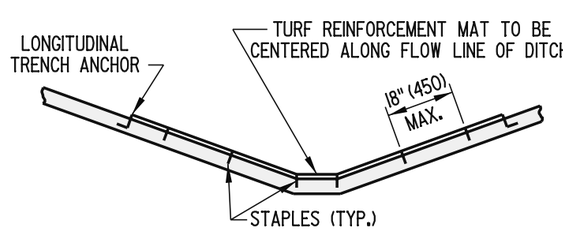
LONGITUDINAL TRENCH ANCHOR DETAIL



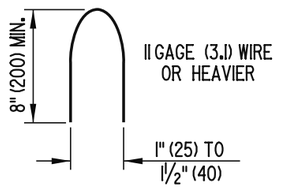
OVERLAP DETAIL



STABILIZATION OF DITCHES PLAN



STABILIZATION OF DITCHES SECTION A-A



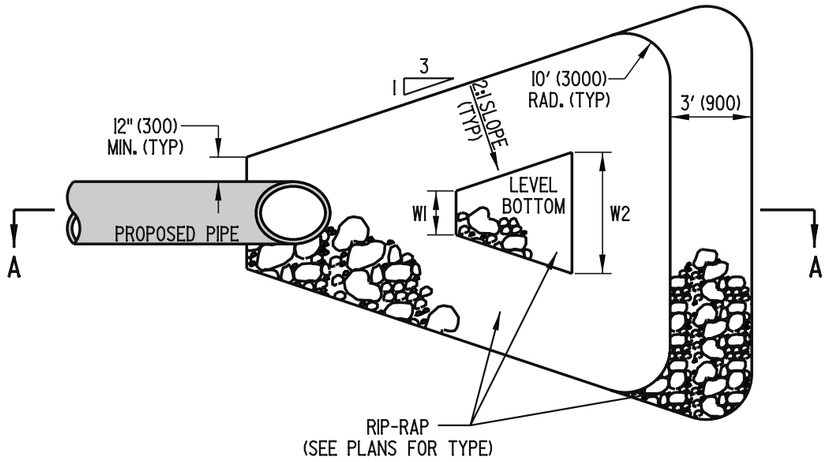
STAPLE DETAIL

NOTES: 1. ADDITIONAL STAPLES NOT SHOWN ARE REQUIRED AT OVERLAPS, ENDS, CHECK SLOTS AND EDGES. SEE APPROPRIATE DETAILS FOR STAPLE PLACEMENT.
2. STAPLES ARE TO BE STAGGERED.
3. TOPSOIL UNDER TURF REINFORCEMENT MAT IS TO BE TRACKED AND SEEDED.

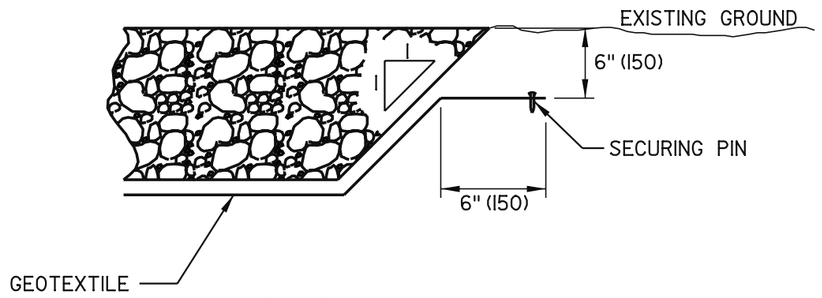
DELAWARE DEPARTMENT OF TRANSPORTATION	TURF REINFORCEMENT MAT APPLICATIONS	APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. E-25 (2005) SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER 11/29/05 DATE

09/08/2005

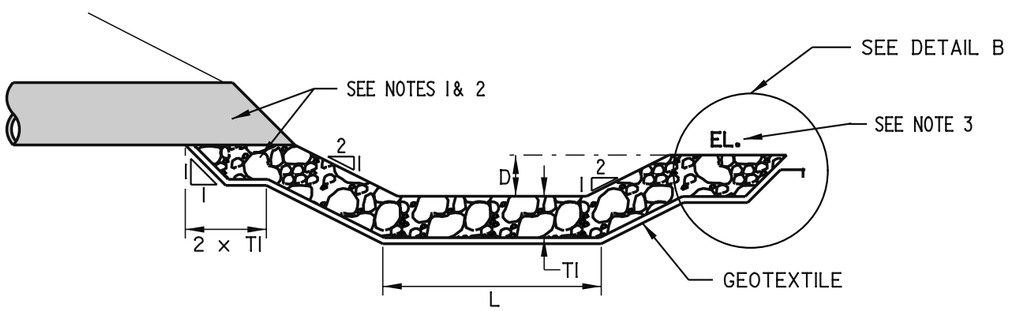
SCALE : N.T.S.



PLAN VIEW



DETAIL B



SECTION A-A

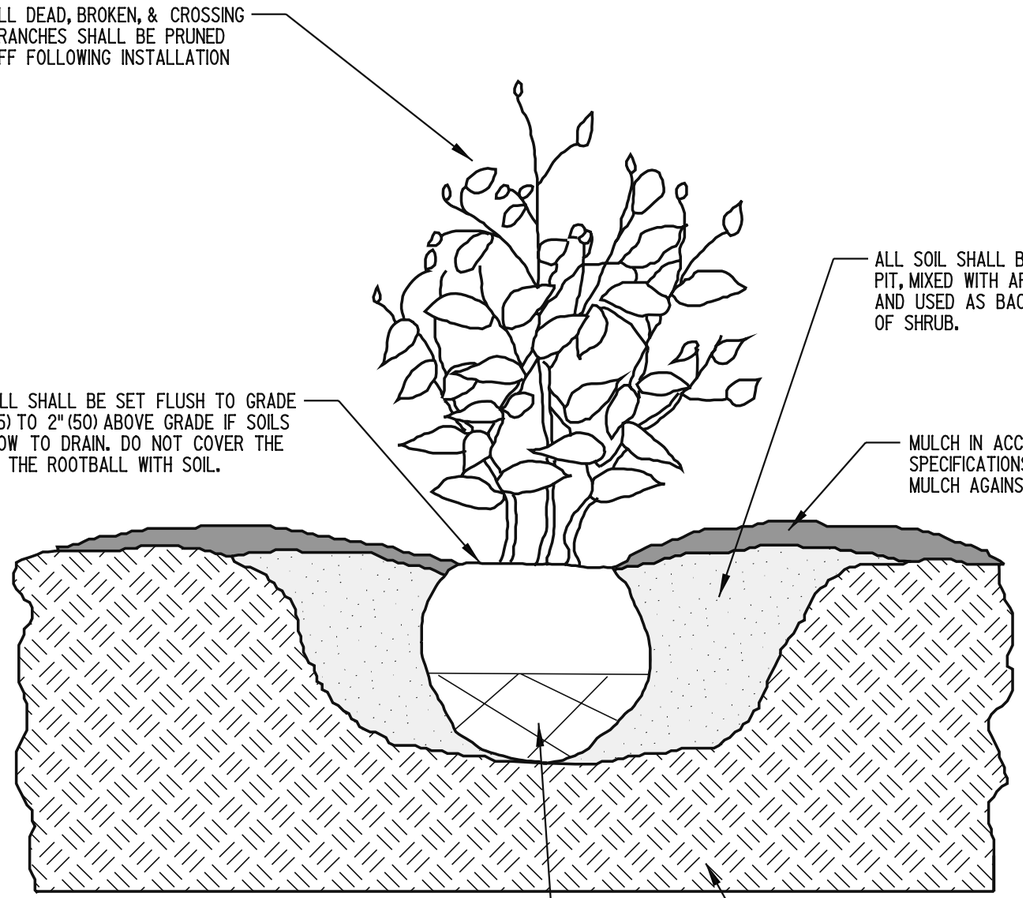
NOTES:

1. RIPRAP IS TO BE PLACED PRIOR TO PLACING PIPE.
2. PLACE DELAWARE NO. 3 STONE UNDER PIPE.
3. ELEVATION (EL.) SHOULD NOT BE HIGHER THAN PIPE INVERT.
4. REFER TO THE PIPE ENERGY DISSIPATOR SCHEDULE ON THE CONSTRUCTION PLANS FOR THE VALUE OF DIMENSION VARIABLES.

DELAWARE DEPARTMENT OF TRANSPORTATION	RIPRAP ENERGY DISSIPATOR DETAIL		APPROVED CHIEF ENGINEER	10/10/06 DATE
	STANDARD NO. E-26 (2006)	SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER	10/9/06 DATE

08/04/2006

SCALE : N.T.S.



NOTES:

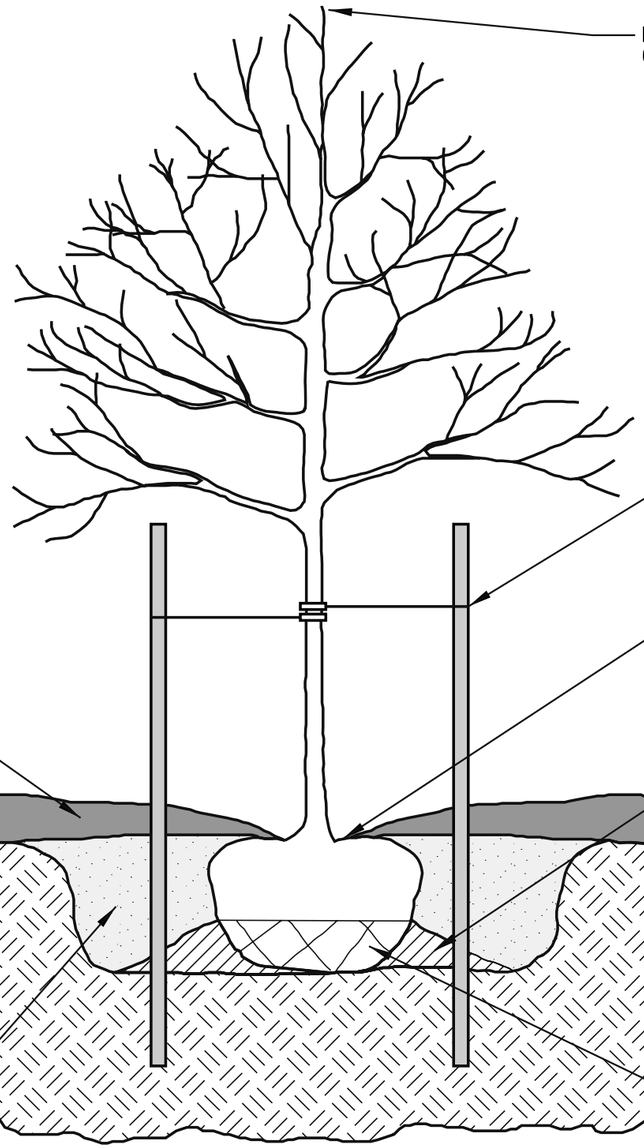
1). BASE OF PLANTING PIT SHALL BE A MINIMUM WIDTH OF TWICE THE ROOT BALL SIZE AND A MAXIMUM OF THREE TIMES THE ROOT BALL SIZE.
2). SHRUBS SHALL BE INSTALLED IN MASSES OF NO LESS THAN 3 PLANTS. A MINIMUM OF 6' (1800) WIDTH IS REQUIRED FROM THE BACK OF CURB TO THE EDGE OF SIDEWALK FOR INSTALLATION OF SHRUBS.
3). ALL PRUNING SHALL BE DONE BY AN I.S.A. CERTIFIED ARBORIST, CERTIFIED NURSERY PROFESSIONAL, OR UNDER THE DIRECTION THEREOF. DO NOT HEAVILY PRUNE SHRUBS AT PLANTING.
4). AUGERED HOLES SHALL BE HAND DUG TO FINAL WIDTH AND TO ELIMINATE GLAZING.
5). ALL SHRUB MASSES SHALL BE MULCHED AS ONE CONTINUOUS BED.

ROADSIDE SHRUB PLANTING DETAIL

DELAWARE DEPARTMENT OF TRANSPORTATION	PLANTING DETAILS		APPROVED CHIEF ENGINEER — DATE 10/10/06
	STANDARD NO. L-1 (2006)	SHT. 1 OF 3	RECOMMENDED DESIGN ENGINEER — DATE 10/9/06

08/04/2006

SCALE : N.T.S.



DO NOT PRUNE THE DOMINANT LEADER OR TERMINAL BUDS OF THE CROWN.

STAKE & GUY TREES. GUY WIRE, STAKES, & RUBBER HOSE SHALL BE AS SPECIFIED IN SECTION 737.

SET ROOT BALL FLUSH TO GRADE OR 1" (25) TO 2" (50) ABOVE GRADE IF SOILS ARE SLOW TO DRAIN. PLANT TREES SUCH THAT THE TRUNK FLARE IS VISIBLE. ANY TREE WHERE TRUNK FLARE IS NOT VISIBLE SHALL BE REJECTED. DO NOT COVER THE TOP OF THE ROOT BALL WITH SOIL.

MULCH IN ACCORDANCE WITH SPECIFICATIONS. DO NOT PLACE MULCH AGAINST THE TRUNK.

TAMP SOIL AROUND THE ROOT BALL BASE WITH FOOT PRESSURE SO ROOT BALL DOES NOT SHIFT.

ALL SOIL SHALL BE EXCAVATED FROM THE PIT, MIXED WITH APPROVED AMENDMENTS AS PER SPECIFICATIONS AND USED AS BACKFILL DURING INSTALLATION OF TREES. PLACE ROOT BALL ON TAMPED OR UNEXCAVATED SOIL.

REMOVE BURLAP AND BASKETS TO 1/2 OF THE ROOT BALL. DO NOT BURY EXCESS BURLAP, ROPE OR REMNANTS OF BASKET IN THE PLANTING PIT.

NOTES

1). ALL PRUNING SHALL BE DONE BY OR UNDER THE DIRECTION OF, AN I.S.A. CERTIFIED ARBORIST OR CERTIFIED NURSERY PROFESSIONAL. DO NOT HEAVILY PRUNE TREES AT PLANTING.
2). ALL DEAD, BROKEN, & CROSSING BRANCHES SHALL BE PRUNED OFF FOLLOWING INSTALLATION.
3). BASE OF PLANTING PIT SIZE SHALL BE A MINIMUM WIDTH OF TWICE THE ROOT BALL SIZE AND A MAXIMUM OF THREE TIMES THE ROOT BALL SIZE.
4). WHEN PLANTING TREES ALONG STREETS, THERE MUST BE A MINIMUM OF 6' (1800) BETWEEN THE BACK OF CURB AND THE EDGE OF SIDEWALK AND SHALL BE CENTERED BETWEEN THE BACK OF CURB AND THE EDGE OF SIDEWALK.
5). WHEN PLANTING TREES ALONG SIDEWALKS, THE TREE SHALL BE LIMBED TO 7' (2100) FOR PEDESTRIAN CLEARANCE.

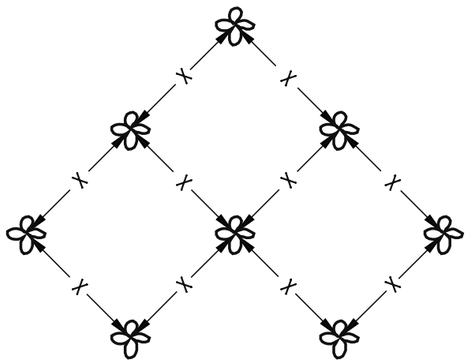
TREE PLANTING DETAIL

DELAWARE DEPARTMENT OF TRANSPORTATION	PLANTING DETAILS		APPROVED CHIEF ENGINEER	DATE 10/10/06
	STANDARD NO. L-1 (2006)	SHT. 2 OF 3	RECOMMENDED DESIGN ENGINEER	DATE 10/9/06

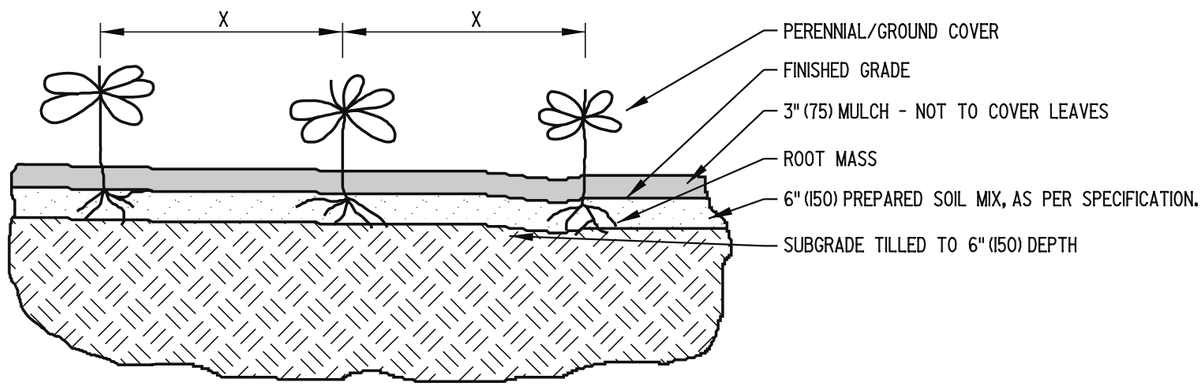
08/04/2006

SCALE : N.T.S.

NOTE:
1). SEE PLANT LIST FOR SPACING (X).



PLAN VIEW



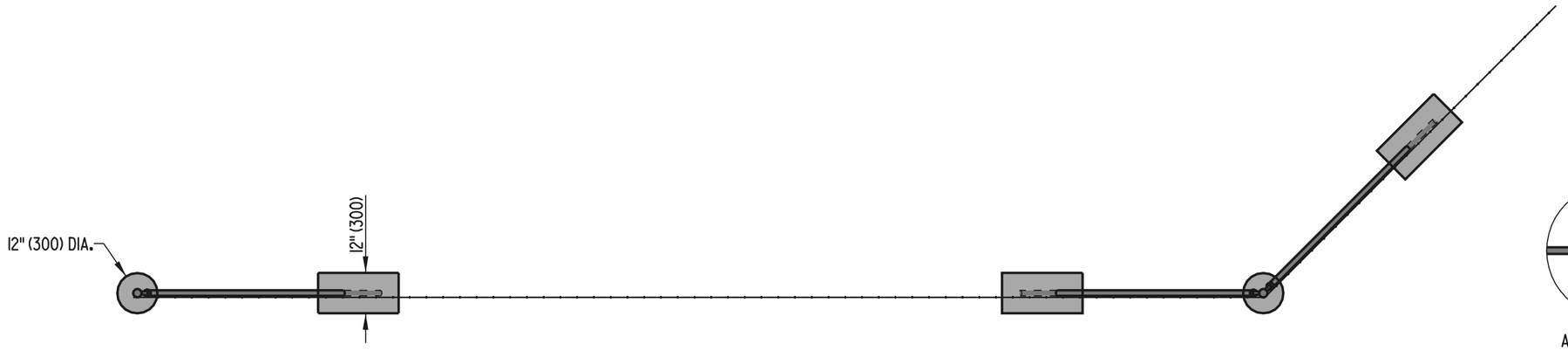
SECTION VIEW

PERENNIAL/GROUNDCOVER PLANTING DETAIL

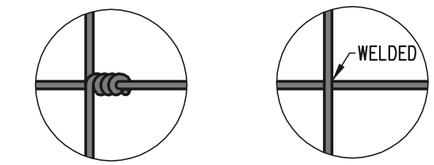
DELAWARE DEPARTMENT OF TRANSPORTATION	PLANTING DETAILS		APPROVED CHIEF ENGINEER	10/10/06 DATE
	STANDARD NO. L-1 (2006)	SHT. 3 OF 3	RECOMMENDED DESIGN ENGINEER	10/3/06 DATE

06/27/2006

SCALE : N.T.S.

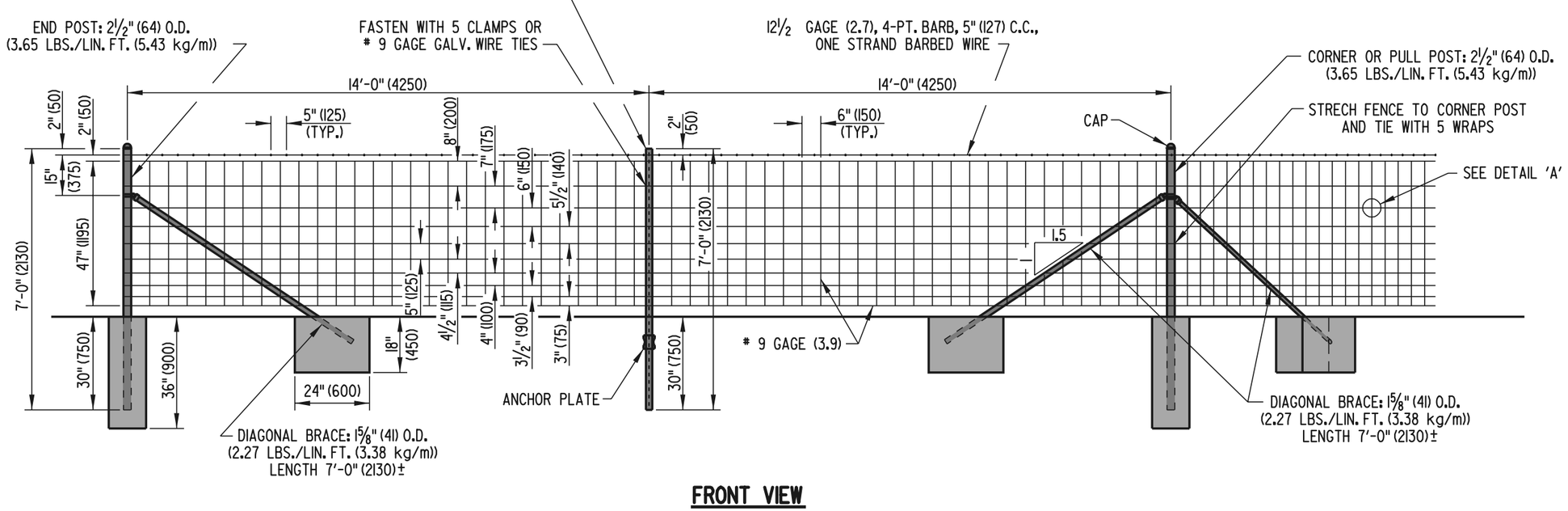


TOP VIEW



ALTERNATE METHODS OF SECURING VERTICAL
STAY WIRES TO THE HORIZONTAL WIRES OF THE FABRIC.

DEATAIL 'A'



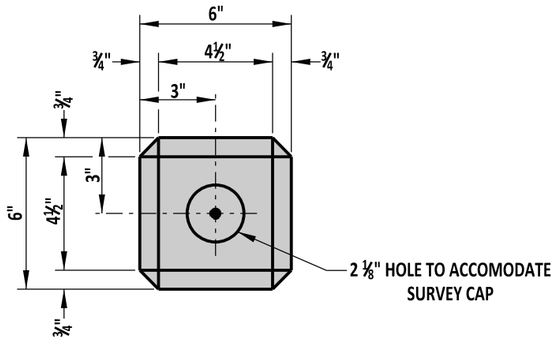
FRONT VIEW

DELAWARE DEPARTMENT OF TRANSPORTATION	RIGHT-OF-WAY FENCE		APPROVED Eugene M. Hardesty CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. M-1 (2001)	SHT. 1 OF 1	RECOMMENDED Michael A. Ayers DESIGN ENGINEER DATE 6/15/01

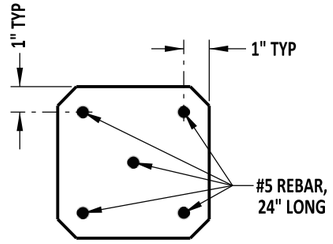
05/21/2001

SCALE : NTS

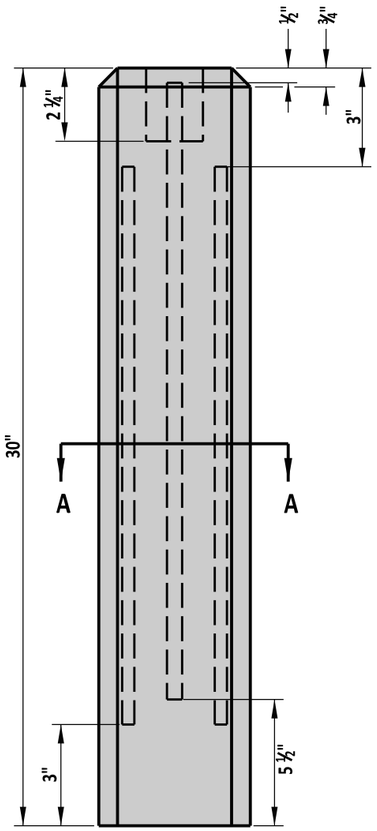
NOTES :
1). LONGITUDINAL STEEL SHALL BE HELD IN PLACE BY CRADLES.
2). LETTERS ON CONCRETE MONUMENT TO BE COUNTERSUNK IN TOP OF MARKER ¼".
3). FLEXIBLE DELINEATORS ARE ONLY TO BE USED ON ROADS WITH A SPECIFIED DENIAL OF ACCESS OR CLASSIFIED AS MINOR ARTERIALS OR HIGHER. ON ALL OTHER ROAD CLASSIFICATIONS, A WOODEN STAKE SHALL BE PLACED WITH "ROW" HANDWRITTEN VERTICALLY IN 1" TALL LETTERS.
4). PLACE CAP ON CONCRETE MONUMENT SO THAT TOP OF CAP IS FLUSH WITH THE TOP OF THE CONCRETE MONUMENT.



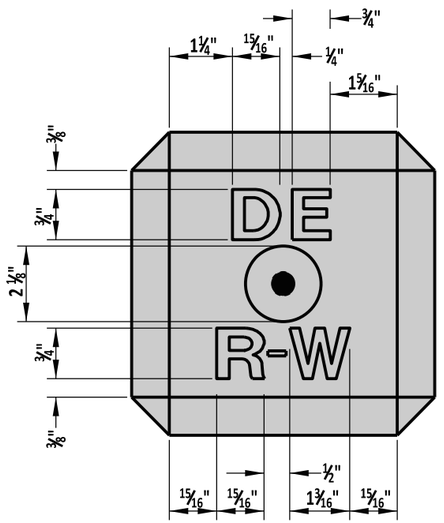
TOP



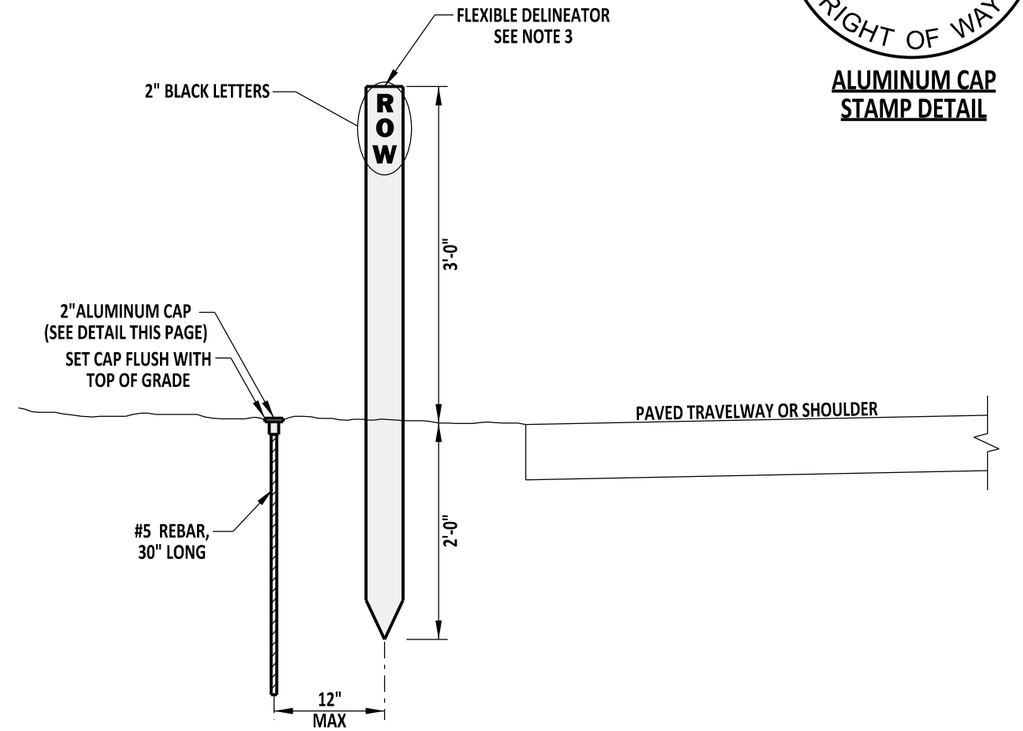
SECTION A-A



ELEVATION



TOP DETAIL



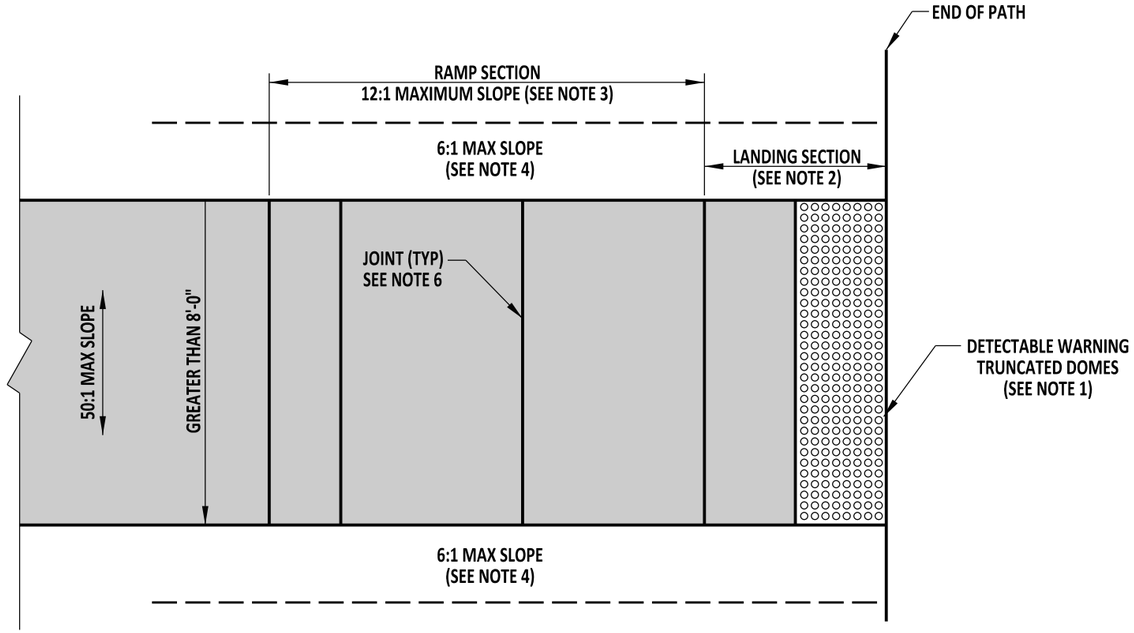
ALUMINUM CAP STAMP DETAIL

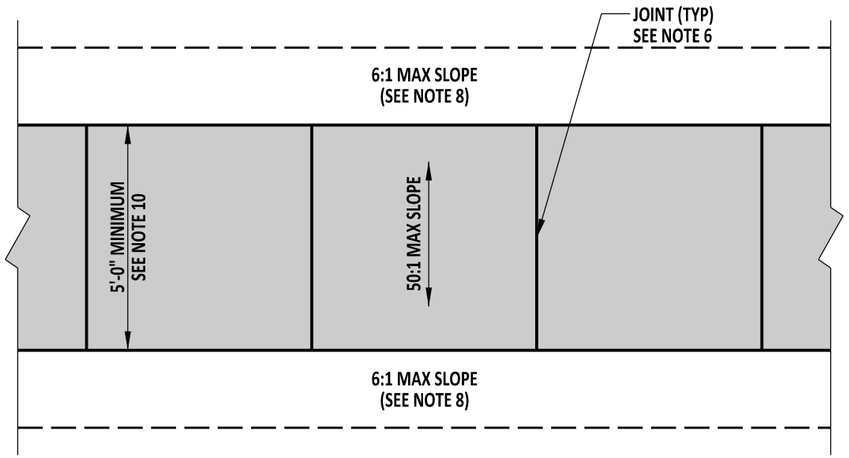
REBAR AND CAP WITH FLEXIBLE DELINEATOR DETAIL

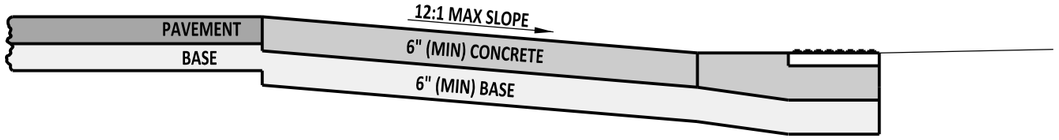
DELAWARE DEPARTMENT OF TRANSPORTATION	RIGHT OF WAY MONUMENTATION			APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER) 12/22/2011 (DATE)
	STANDARD NO. M-2 (2011)	SHT. 1	OF 1	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER) 12/21/2011 (DATE)

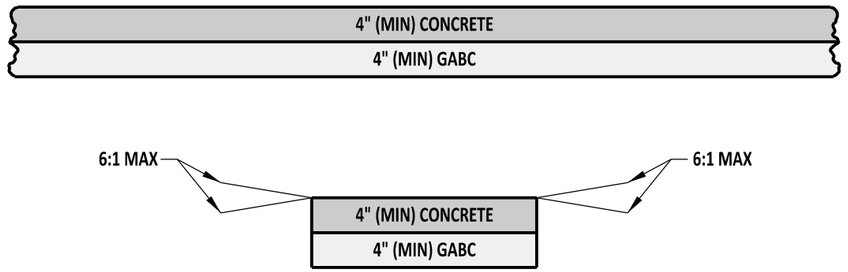
12/12/2011

SCALE : NTS









SHARED-USE PATH

NOTES:

1). IF THE SHARED-USE PATH ENDS AT A ROADWAY OR RAILROAD CROSSING, THEN DETECTABLE WARNING TRUNCATED DOMES 24" LONG AND THE FULL WIDTH OF THE PATH SHALL BE INSTALLED. SEE DETAIL C-2.
2). THE LANDING SECTION SHALL BE A MINIMUM OF 5'-0" IN LENGTH AND SHALL HAVE A MAXIMUM CROSS SLOPE AND RUNNING SLOPE OF 2%. THE ENTIRE LANDING SECTION MUST ALSO BE CONCRETE.
3). THE RAMP SECTION SHALL HAVE A MAXIMUM CROSS SLOPE OF 2% AND A MAXIMUM RUNNING SLOPE OF 12:1. HOWEVER, IF A 12:1 RUNNING SLOPE DOES NOT ALLOW THE RAMP TO MEET EXISTING GRADE WITHIN 15'-0", THE RUNNING SLOPE MAY EXCEED 12:1.
4). A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON BOTH SIDES OF THE SHARED-USE PATH. WHERE A 6:1 SLOPE CANNOT BE ACHIEVED, AN APPROVED HANDRAIL OR HEADWALL SHALL BE REQUIRED.
5). TOPSOIL, SEED, & MULCH ANY DISTURBED AREA ADJACENT TO THE SHARED-USE PATH UP TO A MAXIMUM OF 2'-0".
6). FOR SIDEWALKS AND CONCRETE SHARED-USE PATHS, CONSTRUCTION JOINTS SHALL BE PLACED EVERY 10'-0" AND EXPANSION MATERIAL EVERY 20'-0". HOWEVER, EXPANSION MATERIAL SHALL NOT BE USED IN THE RAMP SECTION.

SIDEWALK

7). SEE DETAIL C-2, SHEETS 1, 2 OR 3 FOR CURB RAMP TREATMENTS WHEN THE SIDEWALK INTERSECTS WITH A TRAVELWAY.
8). A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON BOTH SIDES OF THE SIDEWALK.
9). TOPSOIL, SEED, & MULCH ANY DISTURBED AREA ADJACENT TO THE SIDEWALK UP TO A MAXIMUM OF 2'-0".
10). ON REHABILITATION PROJECTS, WHEN EXISTING OBSTRUCTIONS (FIRE HYDRANT, UTILITY POLE, ETC...) ARE LOCATED IN THE SIDEWALK, THE SIDEWALK PATH SHALL NOT BE LESS THAN 32" WIDE AND THE OBSTRUCTION SHALL NOT EXTEND FOR MORE THEN 2'-0".

DELAWARE
DEPARTMENT OF TRANSPORTATION

SHARED-USE PATH & SIDEWALK DETAILS

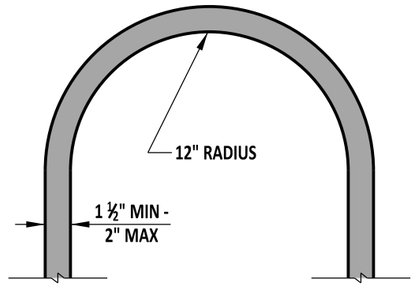
STANDARD NO. M-3 (2013) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

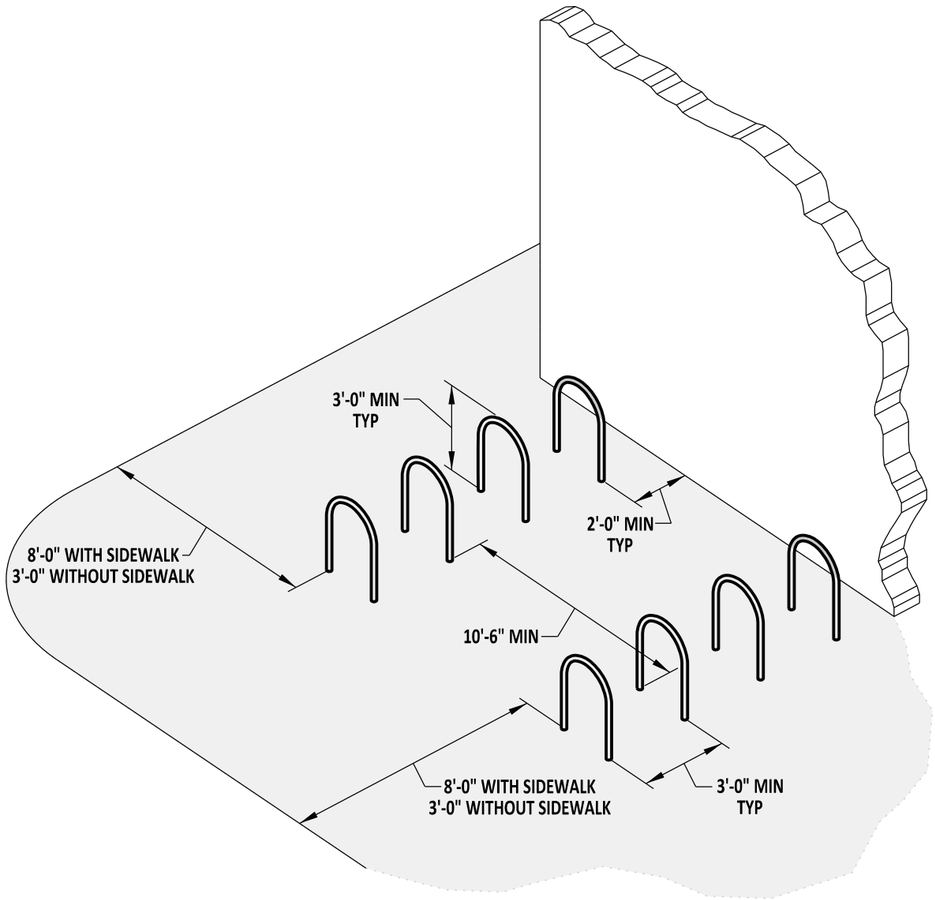
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

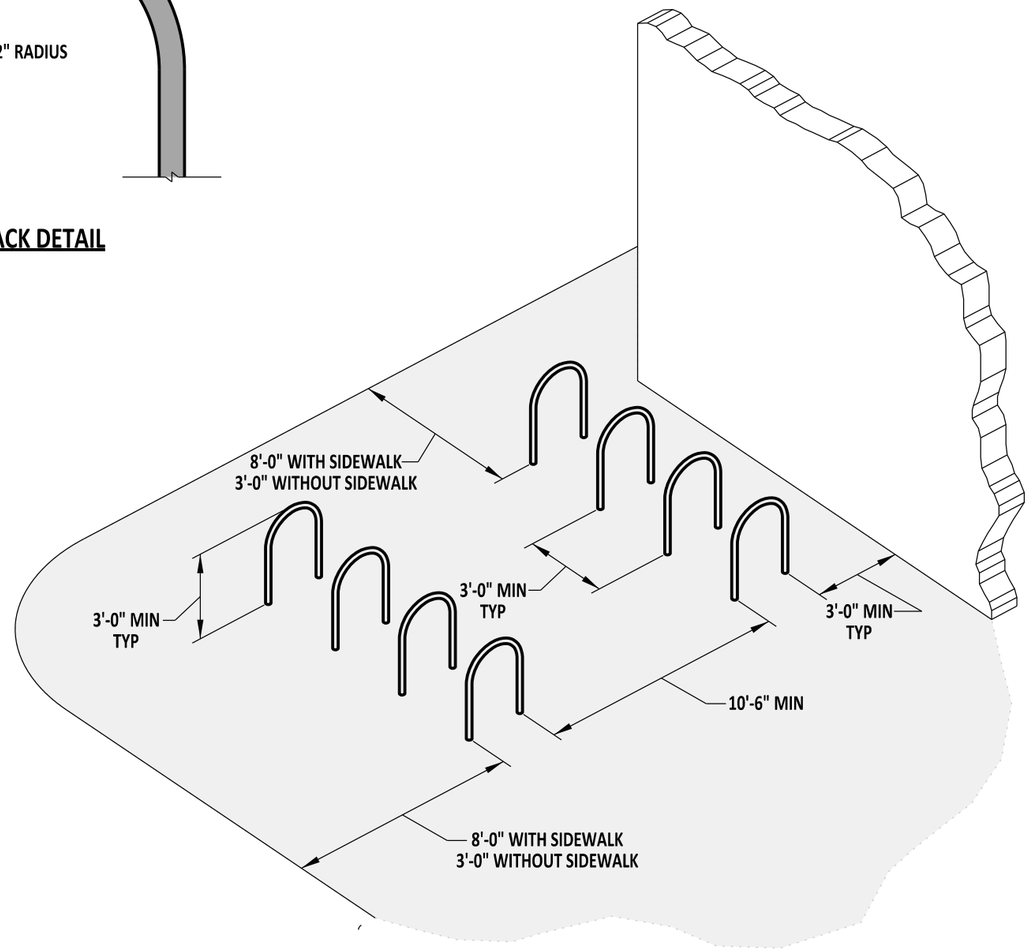
1/9/2014

SCALE : NTS



BIKE RACK DETAIL





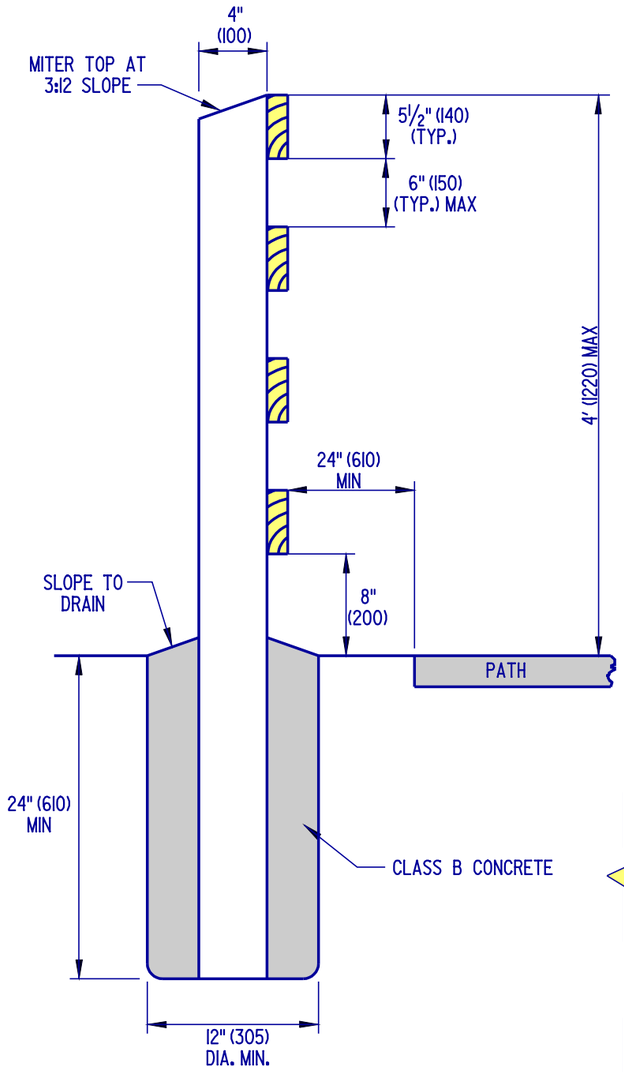
NOTES:

1). BIKE RACK SHALL BE ANCHORED AS PER MANUFACTURER'S RECOMMENDATIONS AFTER APPROVAL FROM ENGINEER IN THE FIELD.
2). DETAIL SHOWN WITH P.C.C. CURB TYPE 1-8, HOWEVER ACTUAL CURB VARIES AND SHOULD BE PLACED AS SHOWN ON PLANS.
3). SPECIAL CONSIDERATIONS SHOULD BE TAKEN WHEN PLACING BIKE RACKS NEAR CURB RAMPS AND MAY REQUIRE A DETAIL ON THE PLANS.

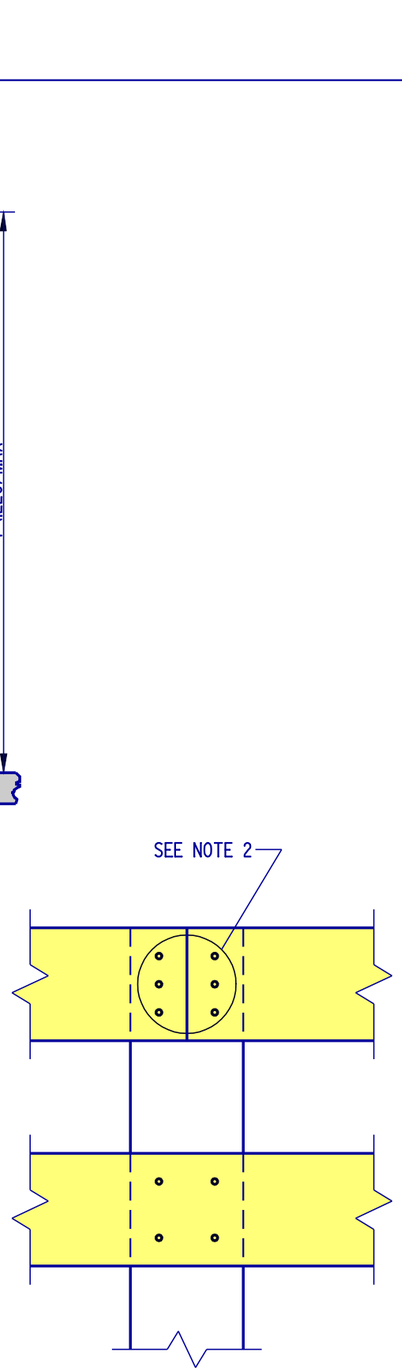
DELAWARE DEPARTMENT OF TRANSPORTATION	BIKE RACK LAYOUT DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/22/2011 (DATE)
	STANDARD NO. M-4 (2011)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/21/2011 (DATE)

04/15/2011

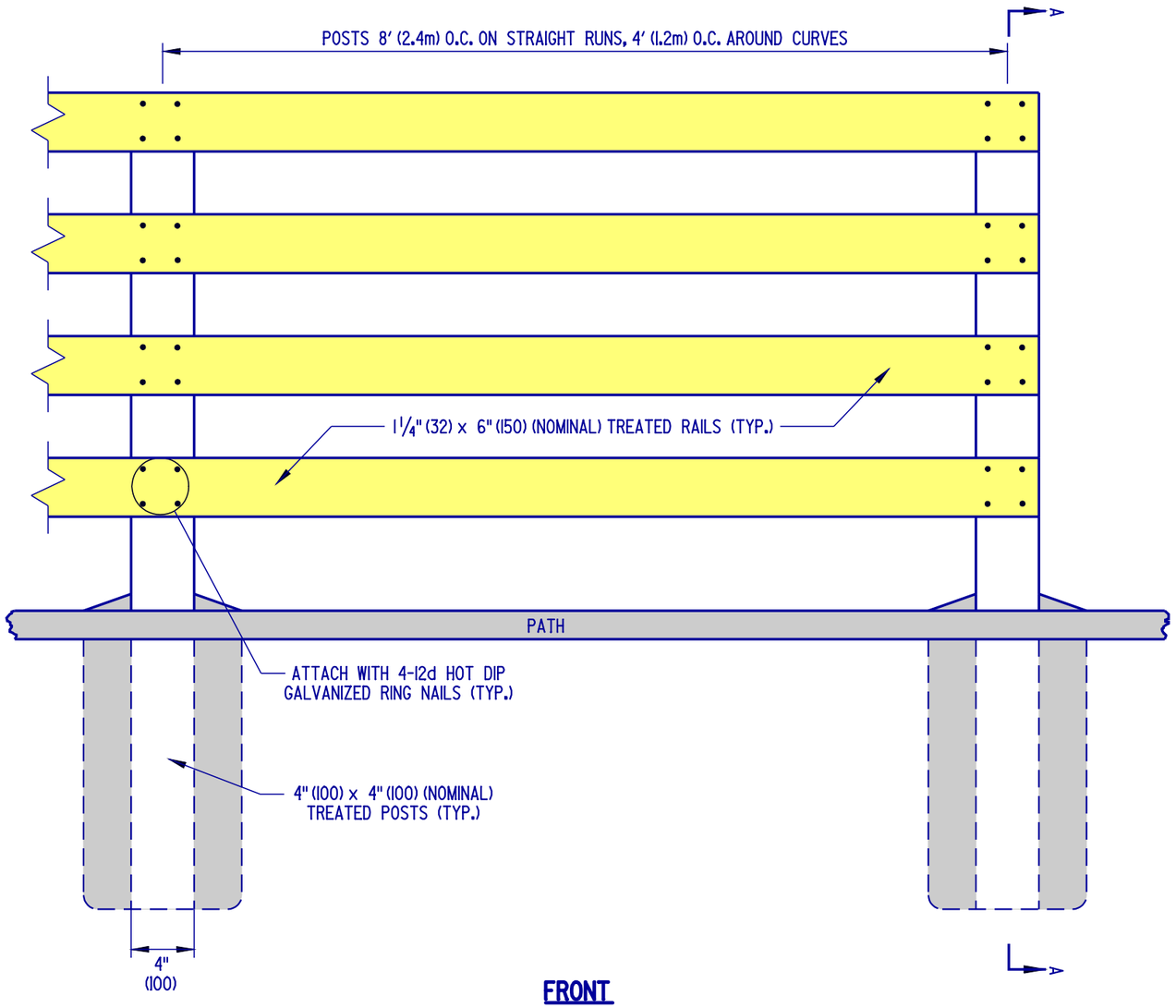
SCALE : N.T.S.



SECTION A-A



TYPICAL JOINT DETAIL



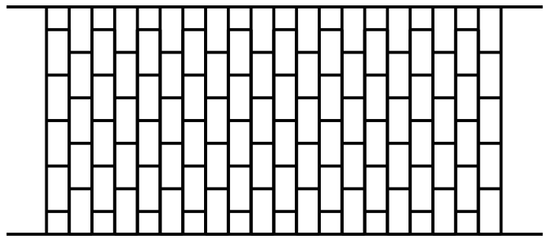
FRONT

NOTES:
1. ALL RAIL JOINTS SHALL BE CENTERED AT THE POSTS.
2. ALL JOINTS SHALL BE ATTACHED WITH 3 - 12d NAILS AND TWO ADJACENT RAILS SHALL NOT END ON THE SAME POST.
3. RAILS SHALL BE FLUSH TO THE POSTS AT THE END POSTS.

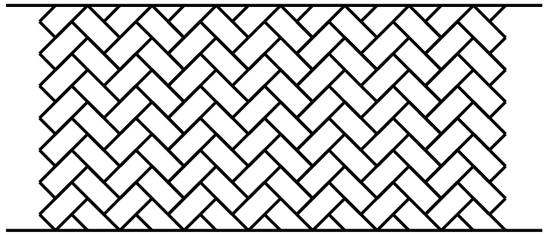
DELAWARE DEPARTMENT OF TRANSPORTATION	WOOD RAIL FENCE DETAILS		APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. M-5 (2004)	SHT. 1 OF 1	RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

09/27/2004

SCALE : NTS



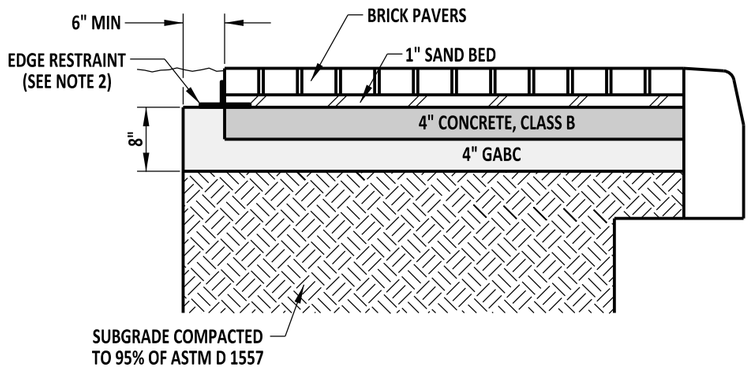
4" x 8" RUNNING BOND PATTERN



4" x 8" HERRINGBONE PATTERN

NOTES:

1. ACTUAL PATTERN TO BE USED SHALL BE SPECIFIED ON THE PLANS. COLOR IS TO BE "BRICK RED" UNLESS OTHERWISE NOTED ON THE PLANS.
2. MATERIALS AND PAVEMENT BOX VARY DEPENDING ON PLANS.
3. FOR CROSSWALK APPLICATIONS, REFER TO THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STRIPING WIDTH.
4. THE PATTERNS ABOVE ARE THE PREFERRED PATTERNS AVAILABLE FOR SIDEWALK OR CROSSWALK APPLICATIONS.



BRICK PAVER SIDEWALK DETAIL

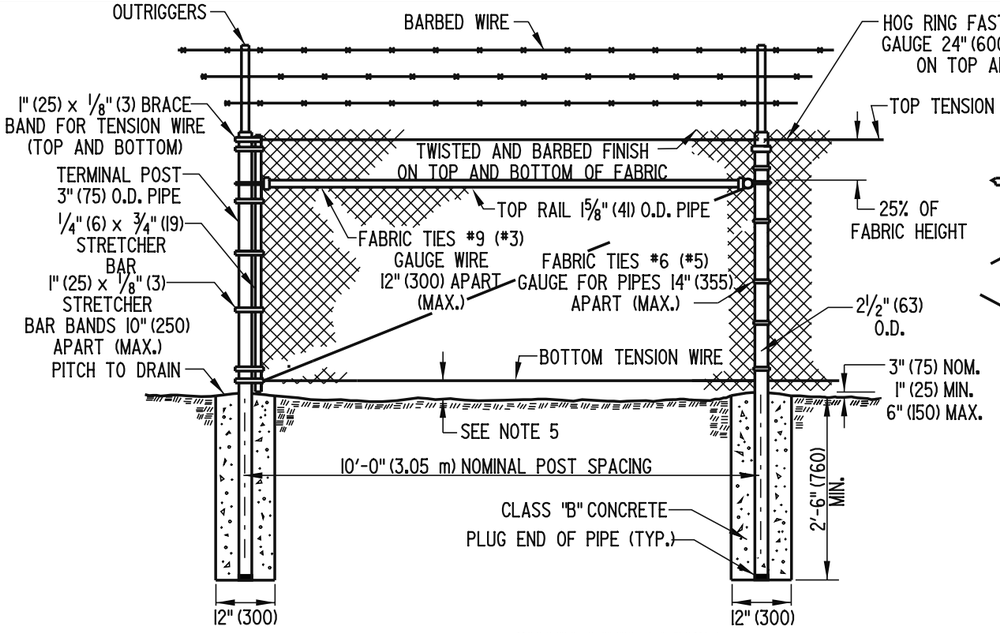
NOTES:

1. WHEN SIDEWALK IS CONFINED BY A RIGID STRUCTURE ON BOTH SIDES, EXPANSION JOINT MATERIAL SHALL BE USED FROM TOP OF BRICK TO BOTTOM OF CONCRETE BASE ON AT LEAST ONE SIDE OF THE SIDEWALK.
2. EDGE RESTRAINT MUST BE APPROVED BY THE ENGINEER IN THE FIELD AND SHALL BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS.

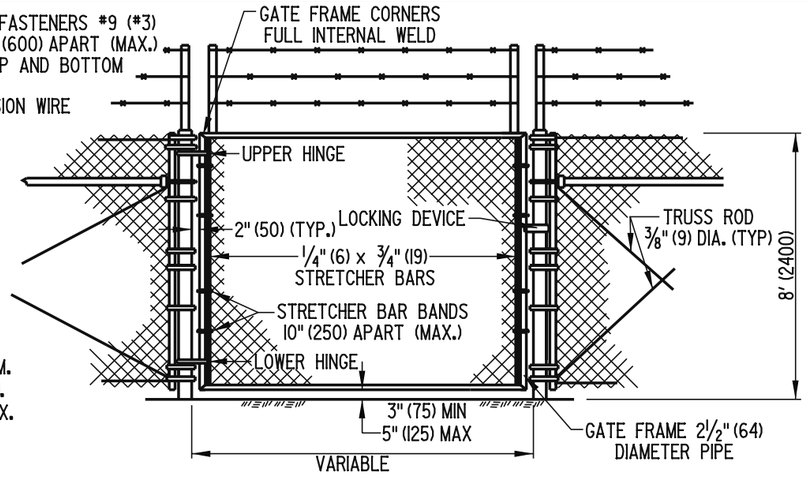
DELAWARE DEPARTMENT OF TRANSPORTATION	PATTERNED HOT-MIX OR CONCRETE & BRICK PAVER DETAILS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/17/2012 (DATE)
	STANDARD NO. M-6 (2011)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/17/2012 (DATE)

09/06/2011

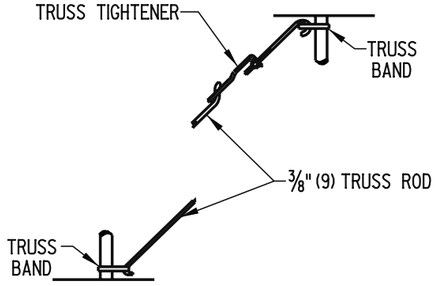
SCALE : N.T.S.



CHAIN-LINK FENCE



GATES, CHAIN-LINK FENCE

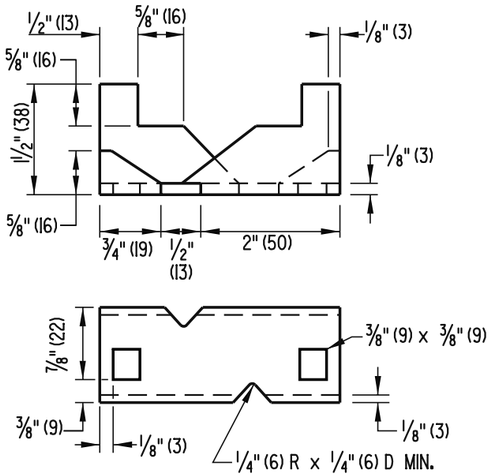


3/8" (9) TRUSS ROD ASSEMBLY

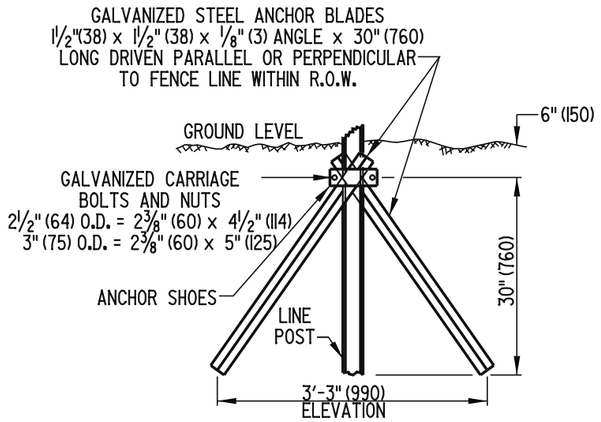
CHAIN-LINK FENCE ASSEMBLIES



TENSION WIRE CONNECTION AT ROUND INTERMEDIATE OR CORNER POST



ANCHOR SHOE



DRIVE ANCHOR SHOE ASSEMBLY

(SEE NOTE 4)

GENERAL NOTES

1). POSTS

	TERMINAL, CORNER AND GATE POSTS	LINE POSTS	TOP OR BRACE RAIL
	3" (75) O.D. PIPE	2 1/2" (64) O.D. PIPE	1 5/8" (41) O.D. PIPE
AASHTO TYPE	1 OR II	1 OR II	1 OR II
AASHTO GRADE	1 OR 2	1 OR 2	1 OR 2
MINIMUM LENGTH OF POST:	10'-8" (3250)	10'-8" (3250)	N/A
ACTUAL OUTSIDE DIAMETER	2 7/8" (73)	2 3/8" (60)	1.660" (42)
WALL THICKNESS	GRADE 1 = .203" (5.2) GRADE 2 = .160" (4)	GRADE 1 = .154" (3.9) GRADE 2 = .120" (3)	GRADE 1 = .140" (3.5) GRADE 2 = .111" (2.8)

2). THE DEPTH OF CONCRETE FOOTERS IN SOLID ROCK MAY BE REDUCED TO 12" (300) BELOW THE TOP OF ROCK AND THE DIAMETER OF THE HOLE IN ROCK MAY BE REDUCED TO 6" (150).
3). BRACE BANDS AND STRETCHER BAR BANDS SHALL BE FURNISHED WITH 5/16" (8) DIA. CARRIAGE BOLTS AND ELASTIC STOP NUTS.
4). DRIVE ANCHOR SHOE ASSEMBLY ONLY TO BE USED IN WET AREAS AND WITH PRIOR APPROVAL OF THE ENGINEER.
5). THE BOTTOM OF THE FENCE SHALL BE 2" (50) MAX ABOVE HARD GROUND OR PAVEMENT. WHERE THERE IS SOFT GROUND, THE BOTTOM OF THE FENCE SHALL EXTEND INTO THE GROUND IN ORDER TO BE FIRM DUE TO SHIFTING SOIL OR SAND.
6). NUTS AND BOLTS SHALL BE TACK WELDED OR BURRED TO PREVENT REMOVAL.
7). IF THERE ARE ANY OPENINGS IN THE FENCE LARGER THAN 96 SQ. IN. (620 sq. cm) DUE TO UTILITIES OR GRADED TERRAIN, THE OPENINGS SHALL BE SECURED WITH A METAL GRILL THAT IS LOCKED OR PERMANENTLY WELDED.
8). VEGETATION AND PERMANENT STRUCTURES (SUCH AS BUILDINGS, LIGHT POLES, AND UTILITY POLES) SHALL BE AT LEAST 14' (4.2 m) FROM THE FENCE. ANY EXCEPTIONS SHALL REQUIRE THE CONSTRUCTION OF TOP GUARDS.

DELAWARE
DEPARTMENT OF TRANSPORTATION

CHAIN LINK FENCE DETAILS

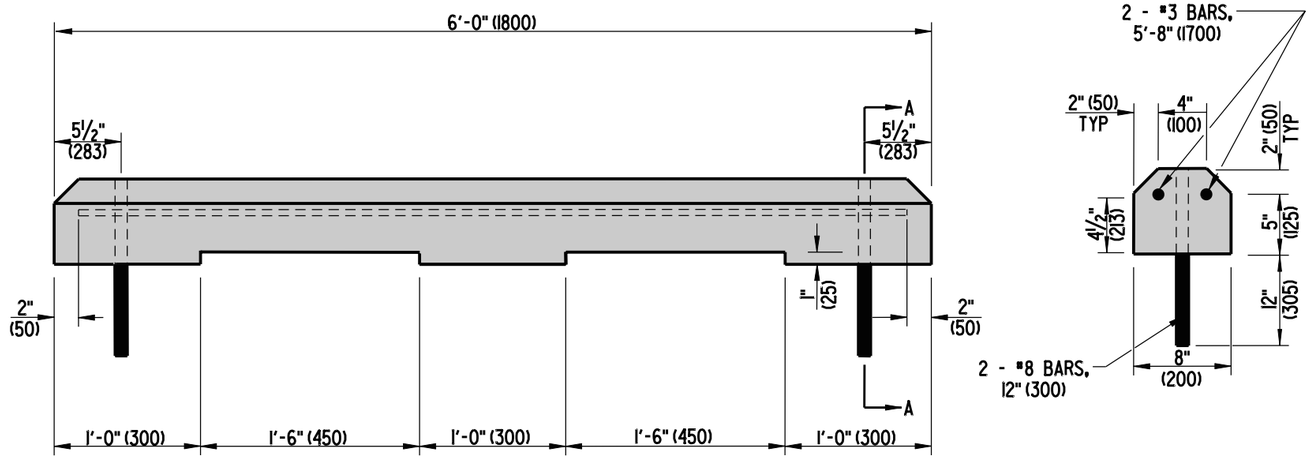
STANDARD NO. M-7 (2006) | SHT. 1 OF 1

APPROVED _____ CHIEF ENGINEER DATE 10/10/06

RECOMMENDED _____ DESIGN ENGINEER DATE 10/3/06

06/27/2006

SCALE : N.T.S.



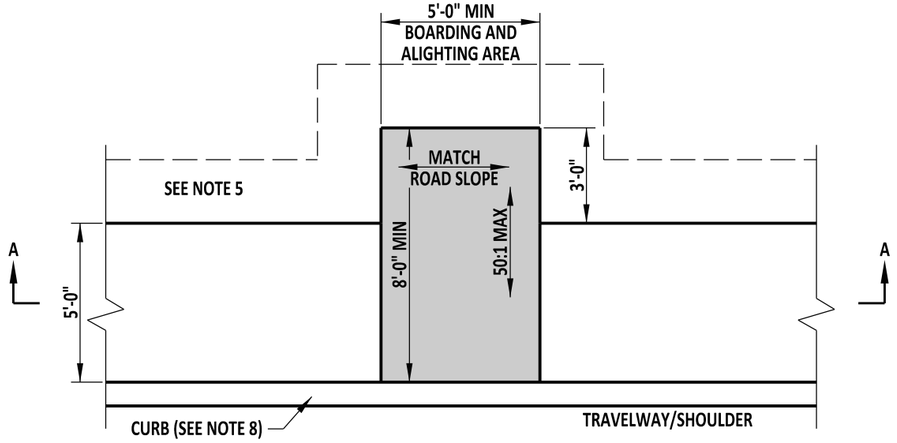
ELEVATION

SECTION A-A

DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PARKING BUMPER		APPROVED CHIEF ENGINEER 10/24/07 DATE
	STANDARD NO. M-8 (2007)	SHT. 1 OF 1	RECOMMENDED DESIGN ENGINEER 10/23/07 DATE

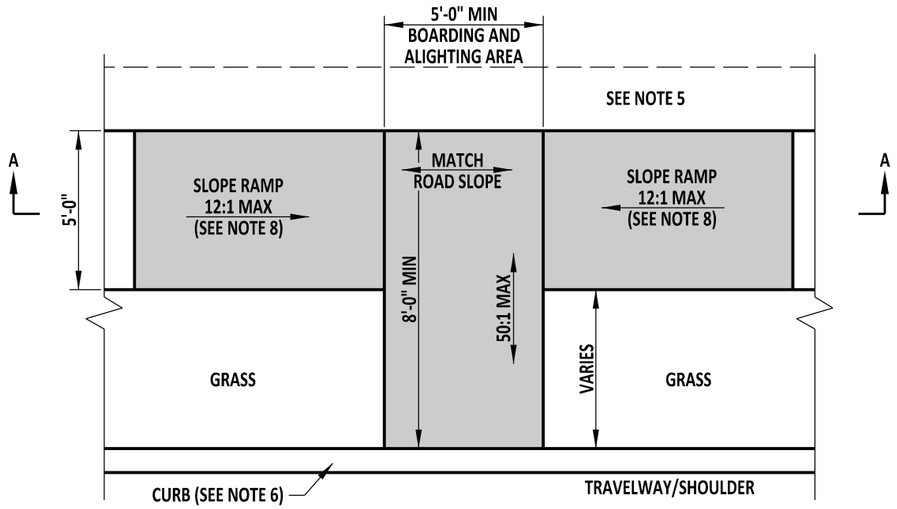
08/01/2007

SCALE : NTS



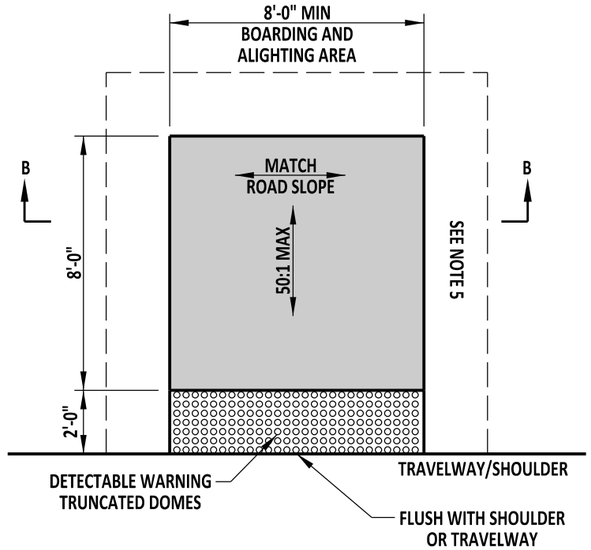
BUS STOP PAD, TYPE 1

* - TO BE USED WHEN THE PAD IS PLACED BEHIND CURB AND INCLUDES A SIDEWALK WITHOUT A GRASS STRIP



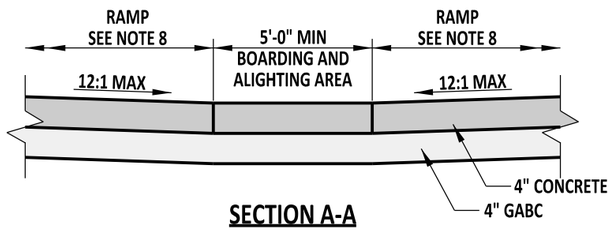
BUS STOP PAD, TYPE 2

* - TO BE USED WHEN THE PAD IS PLACED BEHIND CURB AND INCLUDES A SIDEWALK WITH A GRASS STRIP

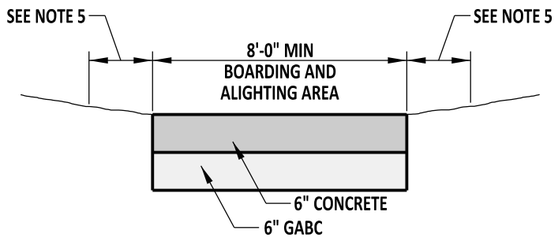


BUS STOP PAD , TYPE 3

* - TO BE USED WHEN THE PAD IS PLACED FLUSH WITH THE TRAVELWAY AND NO CURB OR SIDEWALK IS INCLUDED



SECTION A-A



SECTION B-B

NOTES:

1). BUS STOP PAD LOCATIONS MUST BE APPROVED BY BOTH DART AND DELDOT PRIOR TO ANY CONSTRUCTION.
2). REFERENCE THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR GENERAL INFORMATION ON PLACEMENT OF SIGNS.
3). SEE CONSTRUCTION PLAN SIGNING AND STRIPING SHEETS FOR SPECIFIC SIGN AND SIGN LOCATION DETAILS.
4). TYPICAL BUS STOP PADS MAY BE USED IN CONJUNCTION WITH BUS STOP SHELTER LOCATIONS IN THE EVENT OF LAND CONSTRAINTS AT THE SHELTER LOCATIONS. AN INTERCONNECTING PEDESTRIAN ACCESS PATH MUST EXIST THAT IS ACCESSIBLE TO BUS STOP ALIGHTING AREAS, SHELTERS, CURB RAMPS, CROSSWALKS, AND SIDEWALKS.
5). A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON ALL SIDES OF THE BUS STOP PAD AND APPROACHING SIDEWALK. WHERE THIS CANNOT BE ACHIEVED, AN APPROVED HANDRAIL OR CURB / HEADWALL IS REQUIRED.
6). CURB TYPE VARIES, SEE PLANS FOR CORRECT CURB TYPE.
7). SEE DETAIL M-3, SHEET 1 OF 1 FOR ADDITIONAL SIDEWALK DETAILS AND REQUIREMENTS.
8). RAMPS ARE ONLY REQUIRED WHEN THE VERTICAL HEIGHT OF THE APPROACHING SIDEWALK DIFFERS FROM THAT OF THE ADJACENT CURB AND THE BUS STOP PAD MUST BE RAISED OR LOWERED TO MATCH THE CURB HEIGHT.

DELAWARE
DEPARTMENT OF TRANSPORTATION

BUS STOP PAD DETAILS

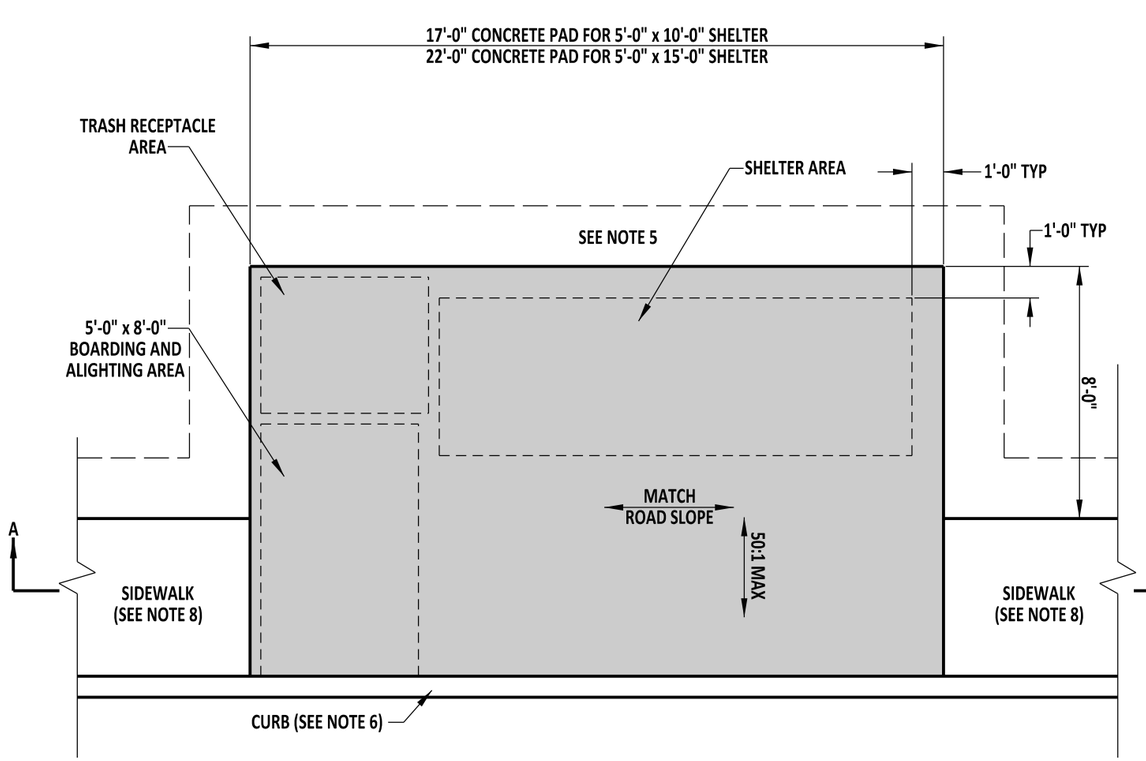
STANDARD NO. M-9 (2013) | SHT. 1 OF 2

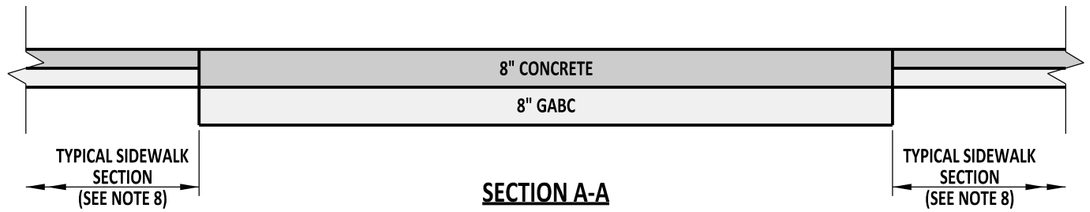
APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

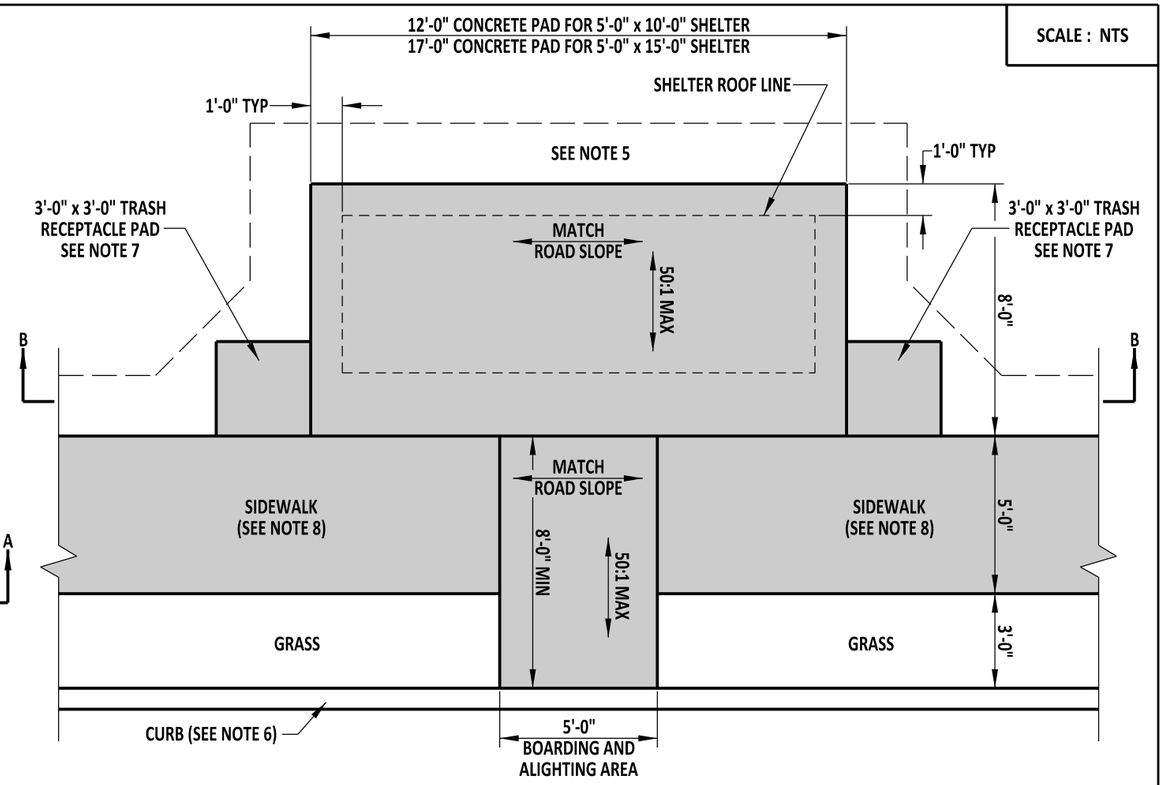
SCALE : NTS

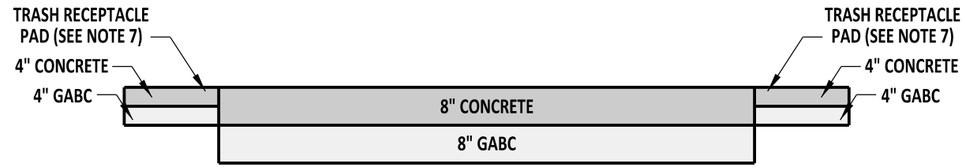




SECTION A-A

BUS STOP WITH SHELTER PAD, TYPE 1





SECTION B-B

BUS STOP WITH SHELTER PAD, TYPE 2

NOTES:

1). BUS STOP SHELTER PAD LOCATIONS MUST BE APPROVED BY DART AND DELDOT PRIOR TO ANY CONSTRUCTION.
2). REFERENCE THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR GENERAL INFORMATION ON PLACEMENT OF SIGNS.
3). SEE CONSTRUCTION PLANS SIGNING AND STRIPING SHEETS FOR SPECIFIC SIGN AND SIGN LOCATION DETAILS
4). BUS STOP CONFIGURATIONS MAY VARY DUE TO TOPOGRAPHIC OBSTRUCTIONS OR GRADES. CONSULT DART OR DELDOT FOR OPTIONAL PAD DETAILS.
5). A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON ALL SIDES OF THE BUS STOP PAD AND APPROACHING SIDEWALKS. WHERE THIS CANNOT BE ACHIEVED, AN APPROVED HANDRAIL OR HEADWALL IS REQUIRED.
6). CURB TYPE VARIES. SEE PLANS FOR CORRECT CURB TYPE.
7). TRASH RECEPTACLE PAD CAN BE PLACED ON EITHER SIDE OF THE SHELTER PAD, AT THE DIRECTION OF THE ENGINEER IN THE FIELD.
8). SEE DETAIL M-3, SHEET 1 FOR ADDITIONAL SIDEWALK DETAILS.

DELAWARE
DEPARTMENT OF TRANSPORTATION

BUS STOP PAD WITH SHELTER DETAILS

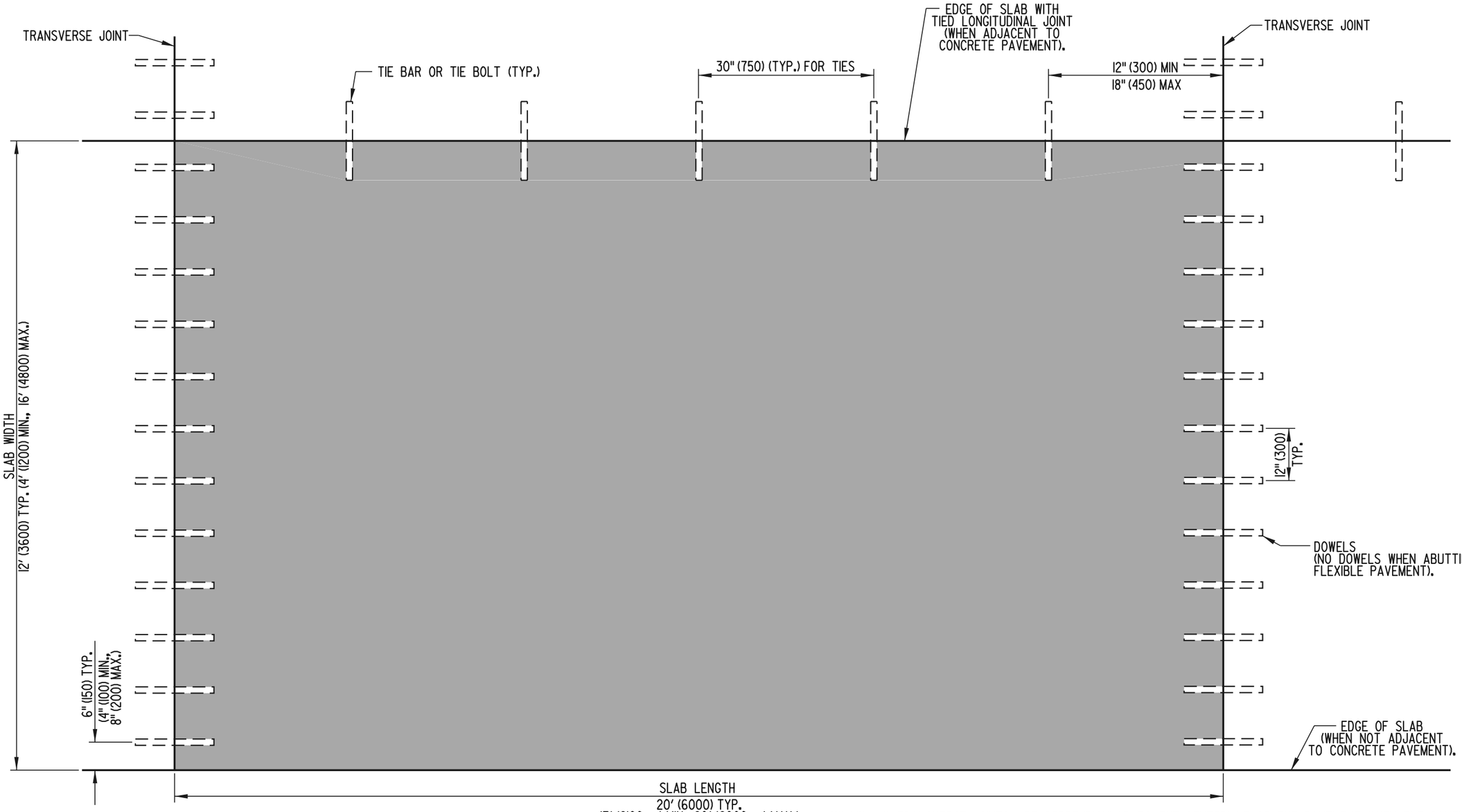
STANDARD NO. M-9 (2013) | SHT. 2 OF 2

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : N.T.S.



NOTES:

1). TRANSVERSE JOINTS ARE PERPENDICULAR TO THE CENTERLINE OF THE PAVEMENT WHEN THE PAVEMENT IS STRAIGHT.

2). TRANSVERSE JOINTS ARE PERPENDICULAR TO A TANGENT LINE TO THE OUTSIDE ARC OF THE PAVEMENT WHEN THE PAVEMENT IS CURVED.

3). ALIGN THE TRANSVERSE JOINTS FOR ALL ADJACENT SLABS WITH EACH OTHER.

4). ABRUPT CHANGES IN PAVEMENT WIDTH MAY OCCUR ONLY AT THE TRANSVERSE JOINT LINE; LONGITUDINAL JOINTS SHALL BE CONTINUOUS WHENEVER POSSIBLE.

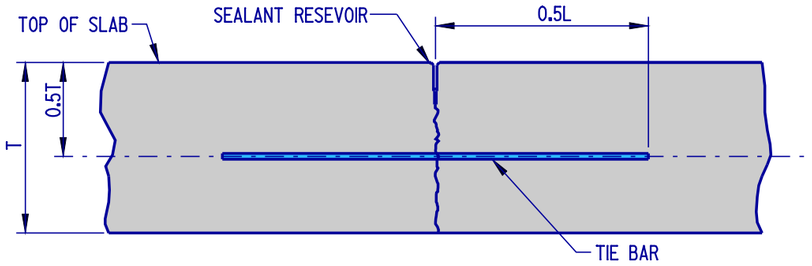
5). LONGITUDINAL JOINTS SHOULD NOT BE LOCATED WITHIN PROPOSED WHEEL PATHS. THE WHEEL PATH IS GENERALLY LOCATED 2' (600) INSIDE OF THE LANE EDGELINE OR CENTERLINE.

SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)

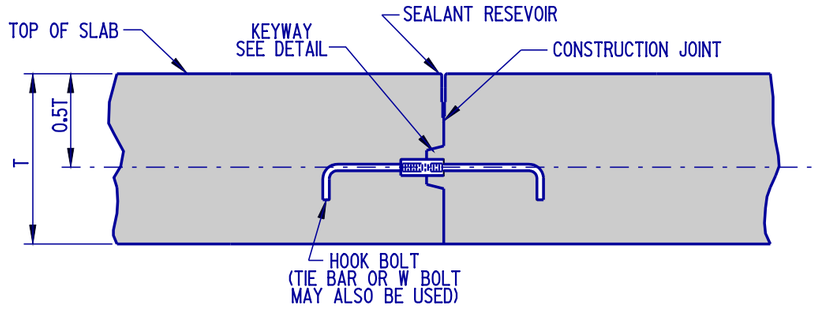
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT		APPROVED Lynne M. Hartnett CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. P-1 (2001)	SHT. 1 OF 5	RECOMMENDED DESIGN ENGINEER 6/15/01 DATE

04/18/2001

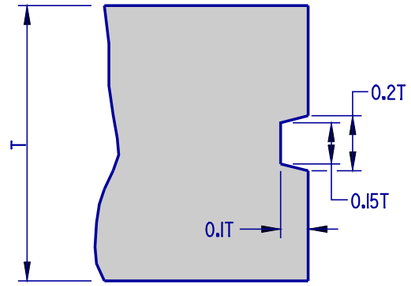
SCALE : N.T.S.



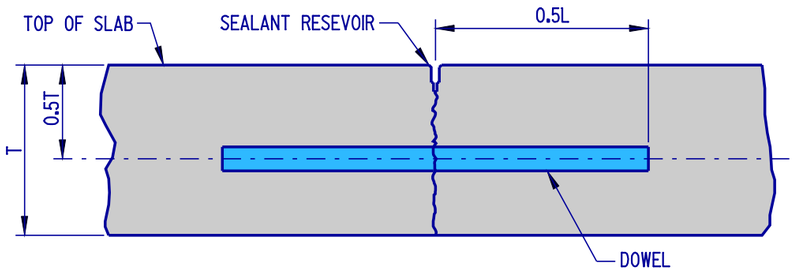
LONGITUDINAL SAW-CUT JOINT DETAIL



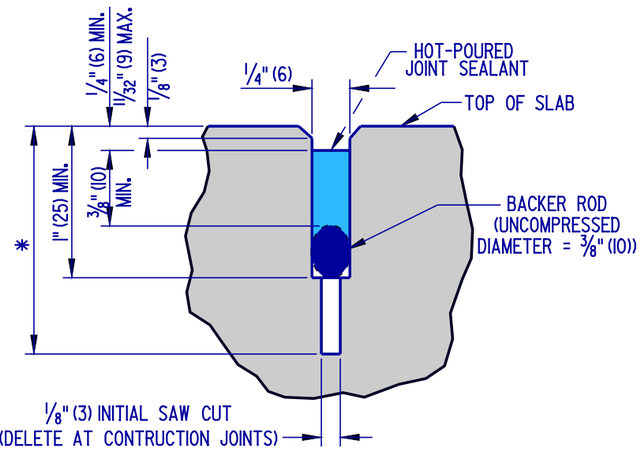
LONGITUDINAL CONSTRUCTION JOINT DETAIL



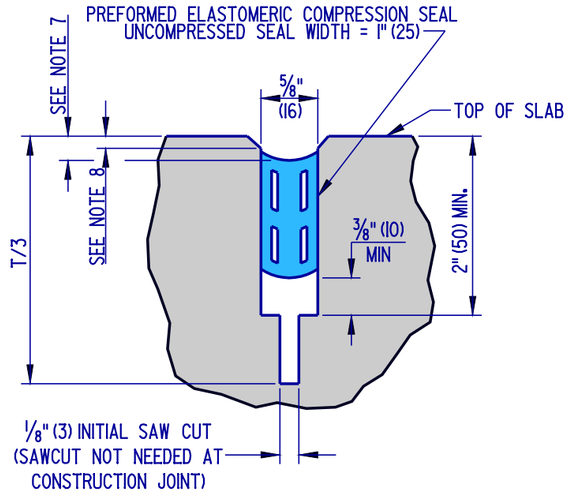
KEYWAY DETAIL



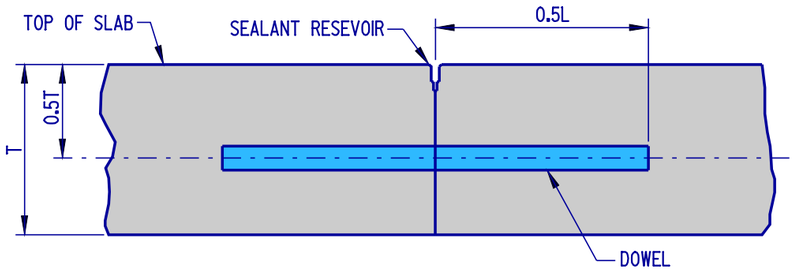
TRANSVERSE SAW-CUT JOINT DETAIL



SEALANT DETAIL- LONGITUDINAL JOINT



SEALANT DETAIL- TRANSVERSE JOINT



TRANSVERSE CONSTRUCTION JOINT DETAIL

* - 0.3T (10" (250) P.C.C. PAVEMENT)
0.4T (12" (300) P.C.C. PAVEMENT)

NOTES:

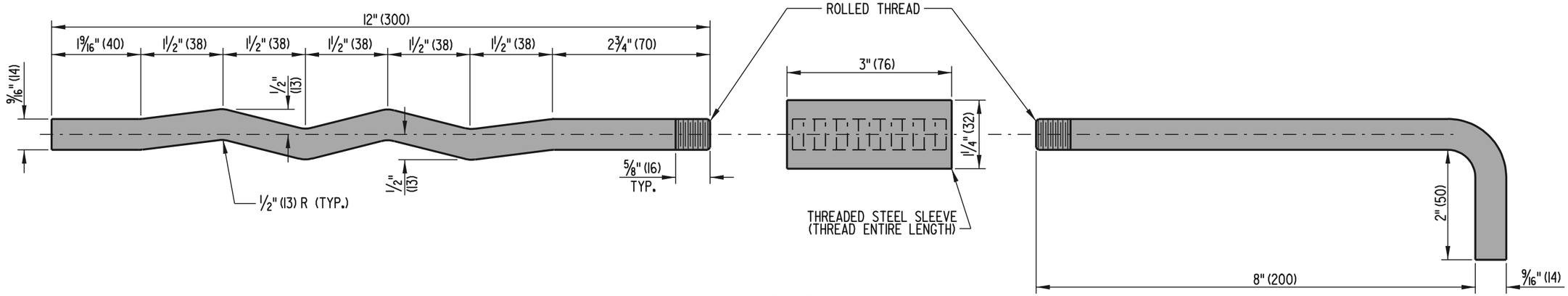
1). AS DIMENSIONED, THE WIDTH OF THE TRANSVERSE SEALANT RESERVOIR IS APPLICABLE WHEN THE TEMPERATURE OF THE PAVEMENT SURFACE IS BETWEEN 60°F (16°C) AND 80°F (27°C). WHEN THE TEMPERATURE IS BELOW 60°F (16°C), THE SEALANT RESERVOIR SHALL BE CUT 1/16" (2) WIDER. WHEN THE TEMPERATURE IS ABOVE 80°F (27°C), THE SEALANT RESERVOIR SHALL BE CUT 1/16" (2) NARROWER.
2). "T" REFERS TO THE ACTUAL CONSTRUCTED SLAB THICKNESS.
3). TOLERANCE ON ALL JOINT SEALANT DETAIL DIMENSIONS SHOWN WITHOUT RANGES SHALL BE PLUS 1/16" (2), MINUS 0" (0).
4). THE TOP EDGES OF THE CONTACT SURFACES OF THE SEALANT MATERIAL ON BOTH SIDES OF THE JOINT RESERVOIR SHALL BE AT THE SAME ELEVATION.
5). TRANSVERSE JOINT MATERIAL SHALL BE PLACED BEFORE LONGITUDINAL JOINT MATERIAL; THE TRANSVERSE JOINT MATERIAL SHALL BE CONTINUOUS FOR THE FULL WIDTH OF ALL ADJACENT P.C.C. PAVEMENT SLABS.
6). LONGITUDINAL JOINT MATERIAL SHALL BE PLACED WITHOUT GAPS WHENEVER INTERRUPTED BY THE TRANSVERSE JOINT MATERIAL.
7). TRANSVERSE JOINT SEAL TO BE RECESSED 3/16" (5) TO 5/16" (8) BELOW THE TOP OF THE SLAB.
8). A 45° CHAMFER SHALL BE CUT 1/8" (3) TO 1/4" (6) DEEP AT THE TOP OF THE SLAB ALONG BOTH SIDES OF THE TRANSVERSE SEALANT RESERVOIR.
9). THE TOP EDGES OF THE COMPRESSION SEAL SHALL BE IN FULL CONTACT WITH THE SLAB SIDES.

JOINT AND SEALANT DETAILS

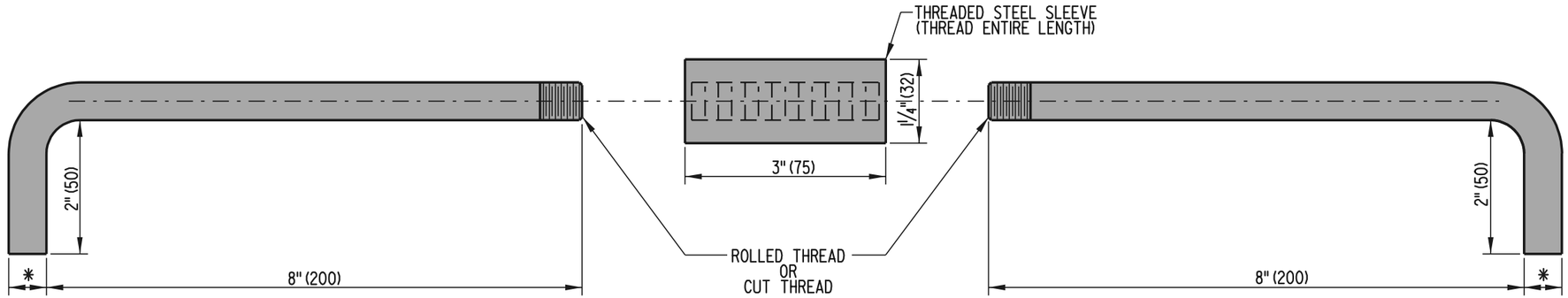
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT		APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. P-1 (2004)	SHT. 2 OF 5	RECOMMENDED Dennis M. Office DESIGN ENGINEER 1/3/05 DATE

10/01/2004

SCALE : N.T.S.

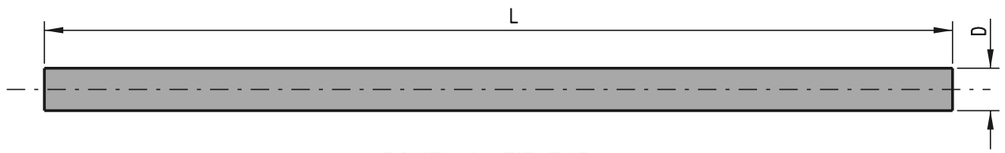


W BOLT



HOOK BOLT

* -11/16" (17) ROLLED THREADS
  3/4" (19) CUT THREADS



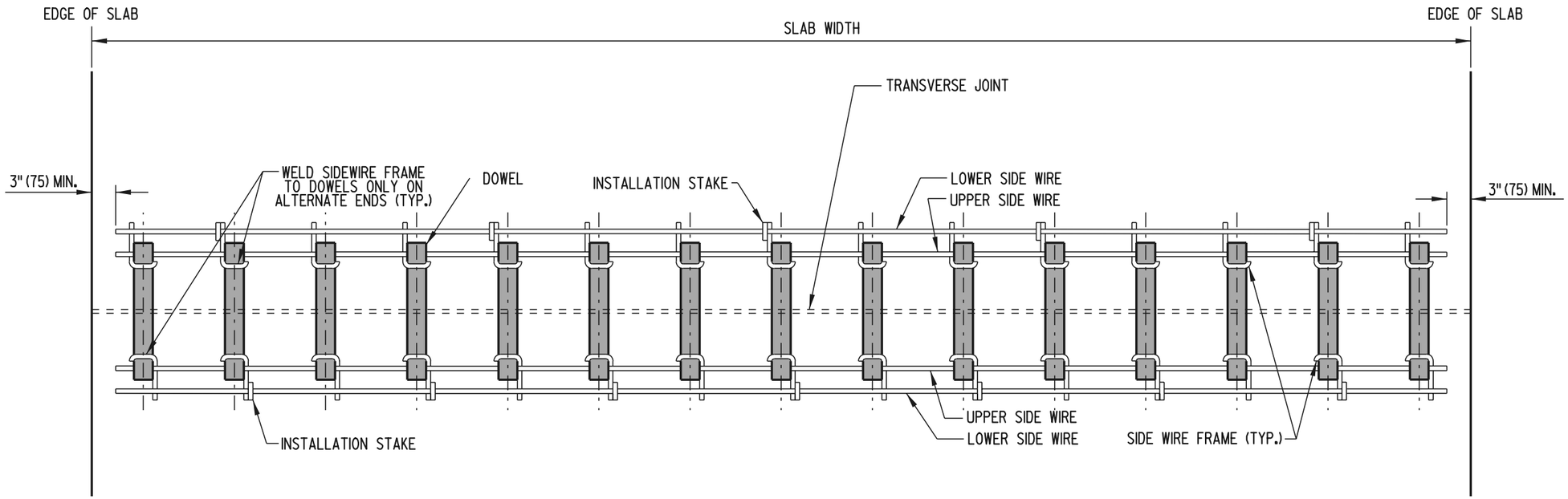
DOWEL & TIE BAR

DOWEL & TIE BAR CHART				
SLAB THICKNESS	DOWEL		TIE BAR	
	D	L	D	L
10" (250)	1 1/4" (32)	18" (450)	5/8" (16)	30" (750)
12" (300)	1 1/2" (38)	20" (500)	5/8" (16)	30" (750)

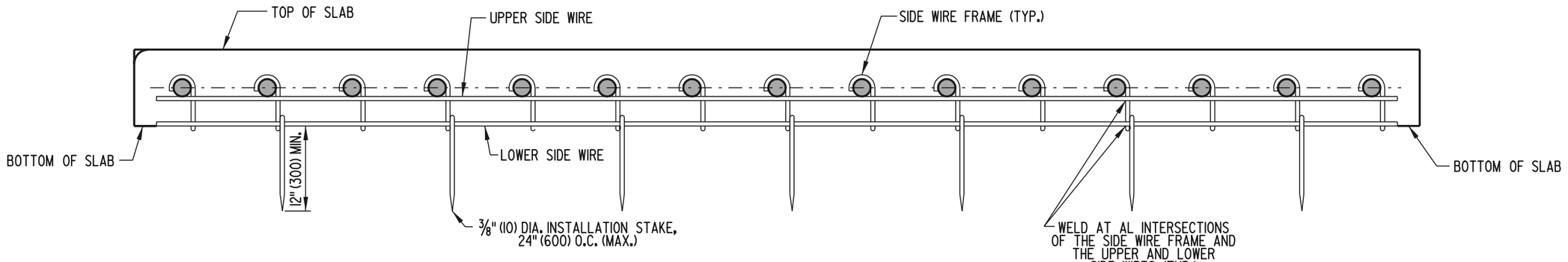
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT		APPROVED Lynne M. Harbeson CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. P-1 (2001)	SHT. 3 OF 5	RECOMMENDED Michael A. Agostini DESIGN ENGINEER 6/15/01 DATE

05/22/2001

SCALE : N.T.S.



PLAN



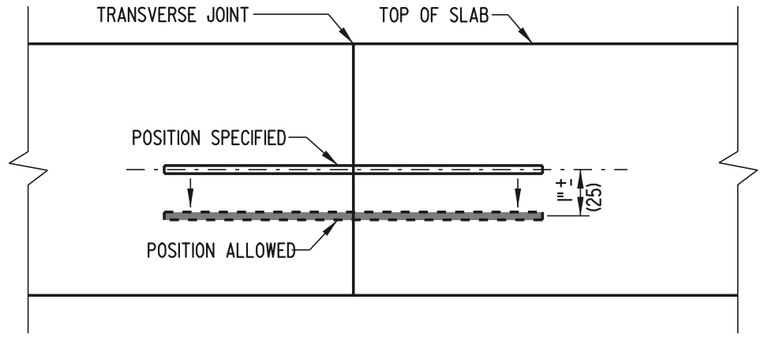
ELEVATION

DOWEL SUPPORT BASKET

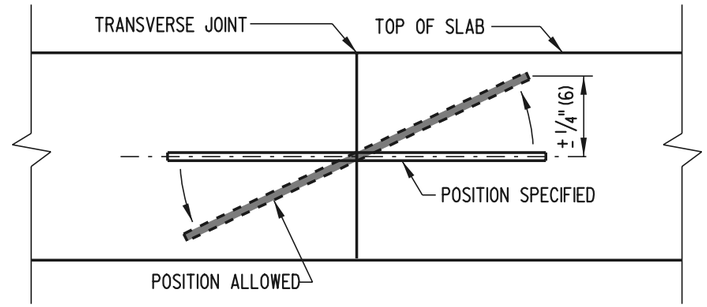
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT		APPROVED Lynne M. Hastings CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. P-1 (2001)	SHT. 4 OF 5	RECOMMENDED [signature] DESIGN ENGINEER DATE 6/15/01

04/18/2001

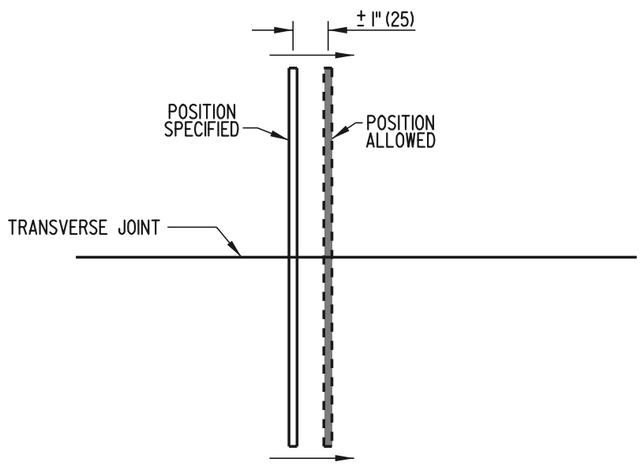
SCALE : N.T.S.



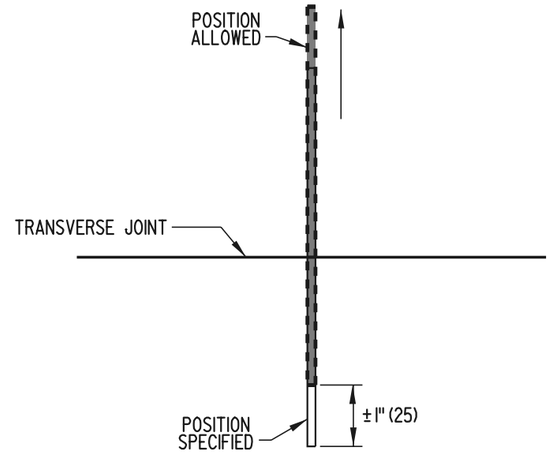
VERTICAL TRANSLATION



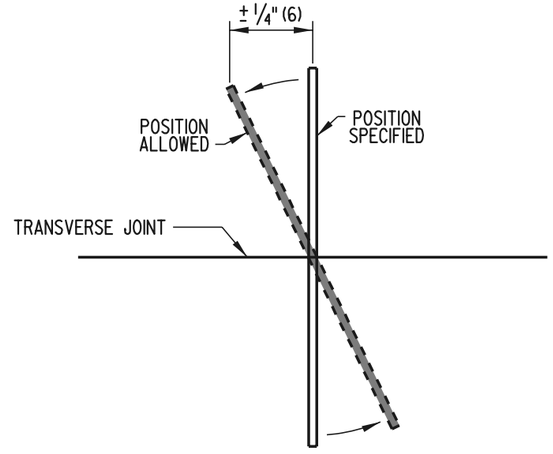
VERTICAL ROTATION



HORIZONTAL TRANSLATION



LONGITUDINAL TRANSLATION

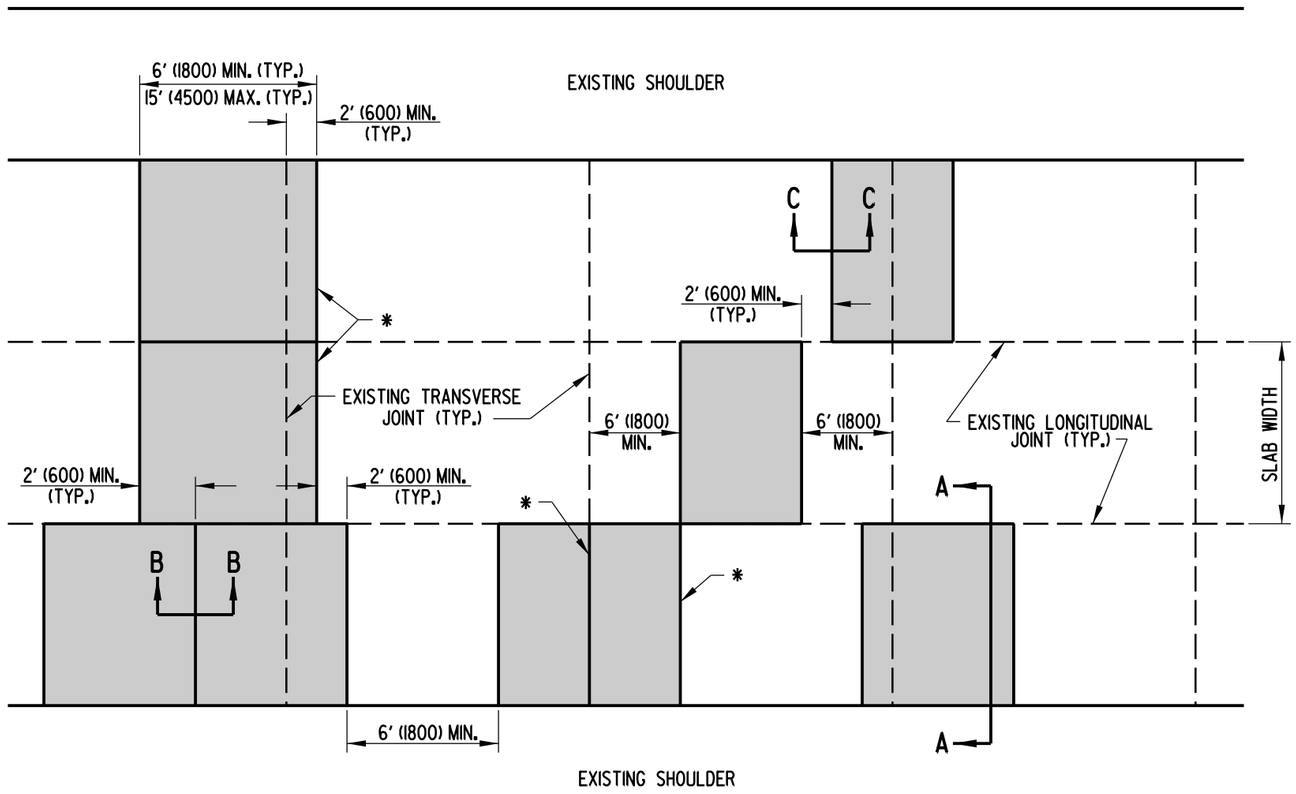


HORIZONTAL ROTATION

DOWEL & TIE BAR PLACEMENT TOLERANCES

DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT			APPROVED Lynne M. Hartnett CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. P-1 (2001)	SHT. 5	OF 5	RECOMMENDED [signature] DESIGN ENGINEER DATE 6/15/01

04/18/2001



PLAN

* - PROPOSED LOCATIONS FOR TRANSVERSE JOINTS SHALL EXACTLY MATCH THE ALIGNMENT OF THE FINAL (EXISTING OR RELOCATED) TRANSVERSE JOINTS IN ALL IMMEDIATELY ADJACENT LANES.

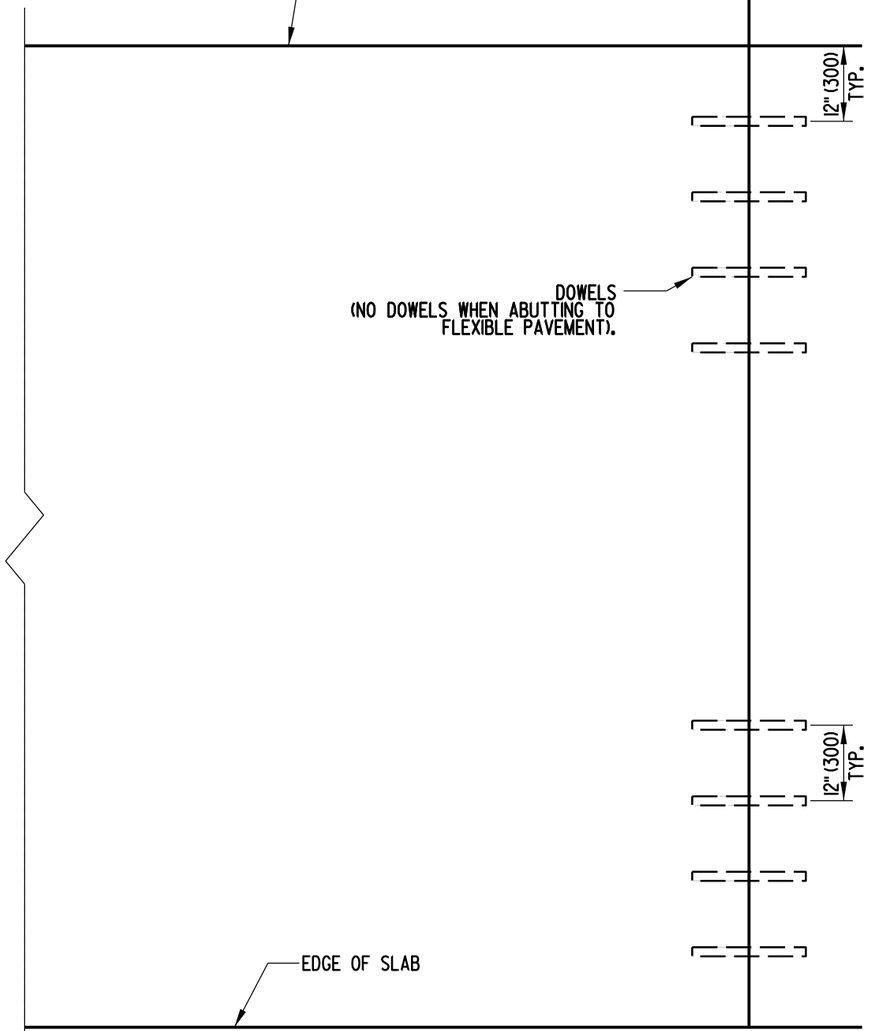
NOTES:

1). WHEN REPAIRING EXISTING TRANSVERSE JOINTS, THE PATCH SHALL EXTEND A MINIMUM OF 24" (600) THROUGH THE EXISTING JOINT, WHICH WILL RELOCATE THE JOINT.

2). PROPOSED LOCATIONS FOR TRANSVERSE JOINTS, WHEN NOT ALIGNED WITH THE FINAL EXPECTED TRANSVERSE JOINT LOCATIONS IN THE IMMEDIATELY ADJACENT LANES, SHALL BE OFFSET A MINIMUM OF 2' (600) FROM THE AFFORMENTIONED JOINTS.

3). THE LONGITUDINAL JOINT ALIGNMENT SHALL BE STRAIGHT AND CONTINUOUS THROUGH THE REPAIRED AREA.

SCALE : N.T.S.



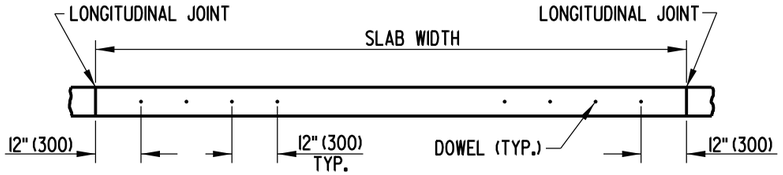
SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)

FULL DEPTH PATCH

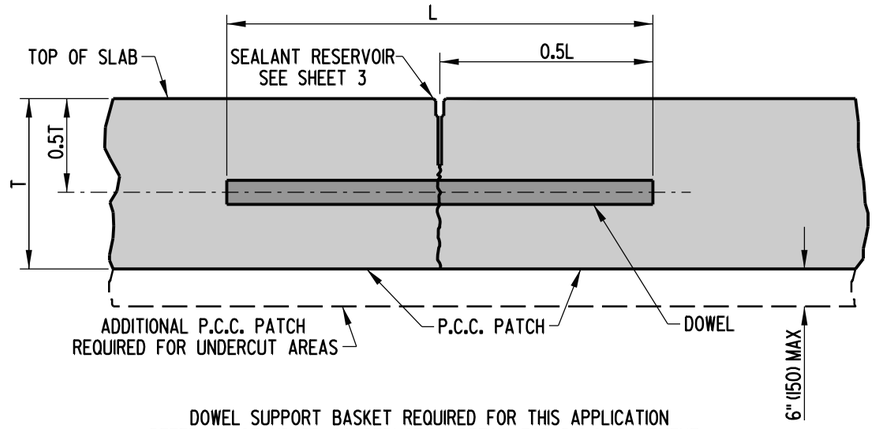
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT PATCHING			APPROVED CHIEF ENGINEER	DATE 11/18/08
	STANDARD NO. P-2 (2008)	SHT. 1	OF 5	RECOMMENDED DESIGN ENGINEER	DATE 11/17/08

11/14/2008

SCALE : N.T.S.



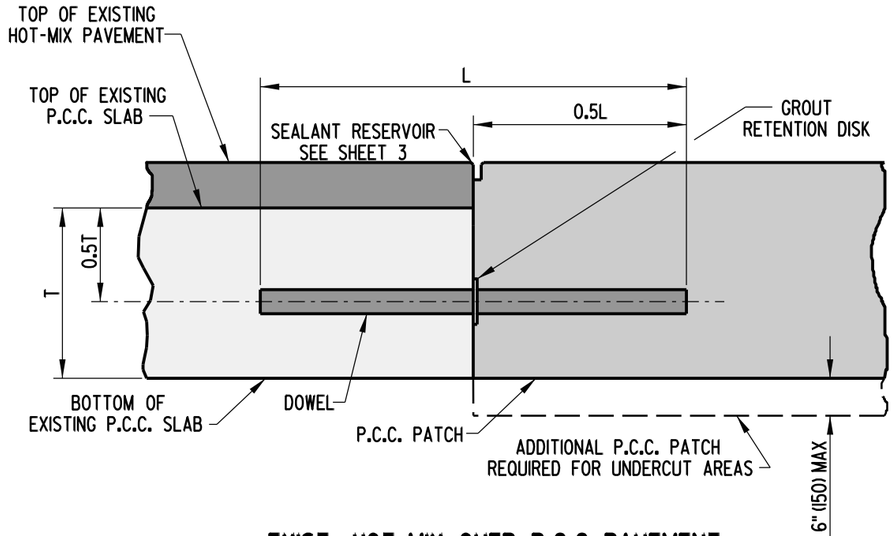
SECTION A-A



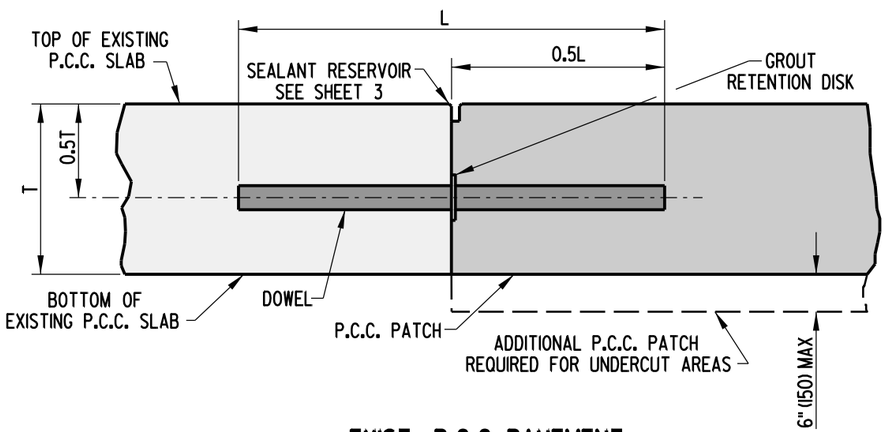
DOWEL SUPPORT BASKET REQUIRED FOR THIS APPLICATION
(REFER TO STANDARD CONSTRUCTION DETAIL FOR P.C.C. PAVEMENT.)

SECTION B-B

TRANSVERSE SAW-CUT USED FOR
JOINTS LOCATED WITHIN THE PATCH



EXIST. HOT-MIX OVER P.C.C. PAVEMENT



EXIST. P.C.C. PAVEMENT

SECTION C-C

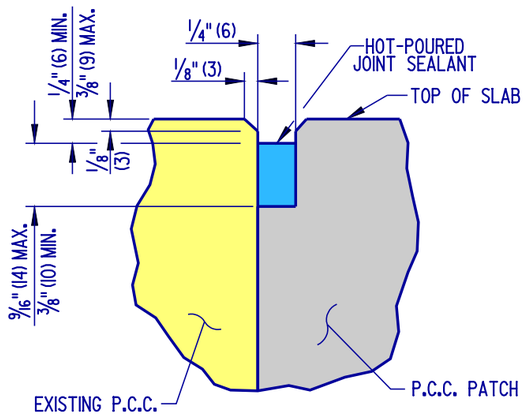
TRANSVERSE CONSTRUCTION JOINT USED ON
JOINTS BETWEEN EXISTING PAVEMENT AND PATCH

FULL DEPTH PATCH

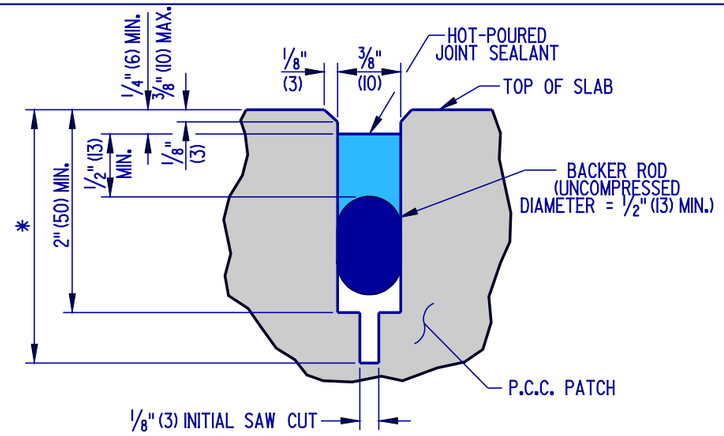
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT PATCHING		APPROVED CHIEF ENGINEER — DATE 11/18/08
	STANDARD NO. P-2 (2008)	SHT. 2 OF 5	RECOMMENDED DESIGN ENGINEER — DATE 11/17/08

11/14/2008

SCALE : N.T.S.

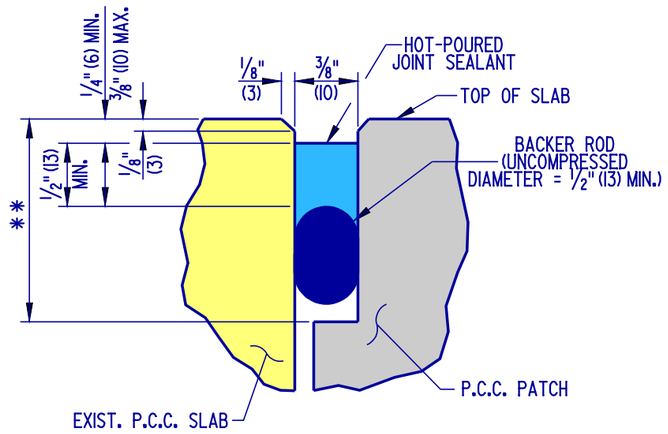


SEALANT DETAIL- LONGITUDINAL JOINT



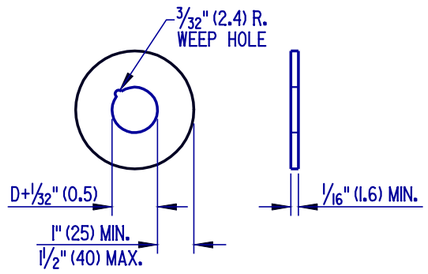
* - 0.3T (T ≤ 10" (250) P.C.C. PAVEMENT)
0.4T (T > 10" (250) P.C.C. PAVEMENT)

SEALANT DETAIL- TRANSVERSE SAW-CUT JOINT



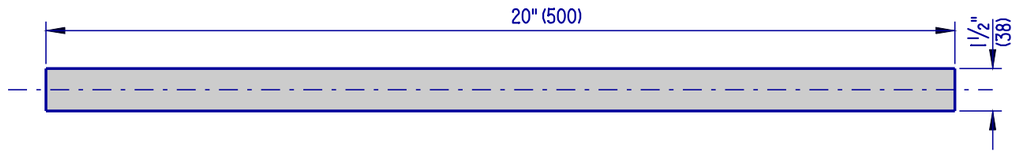
** - 2" (50) MIN. WITH BACKER ROD
5/8" (16) MIN. WITH BOND BREAKER TAPE

SEALANT DETAIL- TRANSVERSE CONSTRUCTION JOINT



D - DOWEL DIAMETER (INCLUDING PROTECTING COATINGS, IF ANY.)

GROUT RETENTION DISK



DOWEL BAR

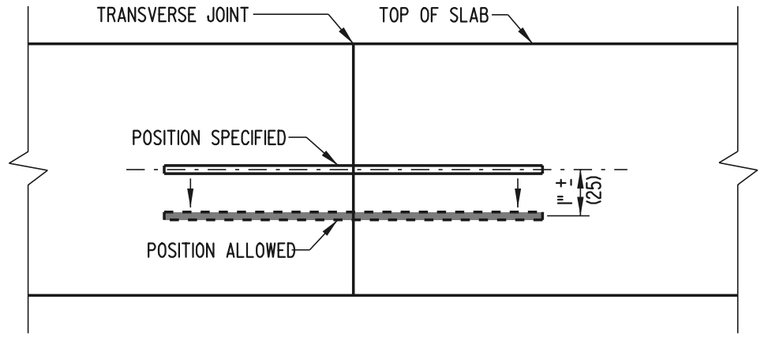
NOTES:
1). AS DIMENSIONED, THE WIDTH OF THE TRANSVERSE SEALANT RESERVOIR IS APPLICABLE WHEN THE TEMPERATURE OF THE PAVEMENT SURFACE IS BETWEEN 60°F (16°C) AND 80°F (27°C). WHEN THE TEMPERATURE IS BELOW 60°F (16°C), THE SEALANT RESERVOIR SHALL BE CUT 1/16" (2) WIDER. WHEN THE TEMPERATURE IS ABOVE 80°F (27°C), THE SEALANT RESERVOIR SHALL BE CUT 1/16" (2) NARROWER.
2). "T" REFERS TO THE EXISTING "AS-BUILT" SLAB THICKNESS.
3). TOLERANCE ON ALL JOINT SEALANT DETAIL DIMENSIONS SHOWN WITHOUT RANGES SHALL BE PLUSS1/16" (2), MINUS 0" (0).
4). THE TOP EDGES OF THE CONTACT SURFACES OF THE SEALANT MATERIAL ON BOTH SIDES OF THE JOINT RESERVOIR SHALL BE AT THE SAME ELEVATION.

FULL DEPTH PATCH

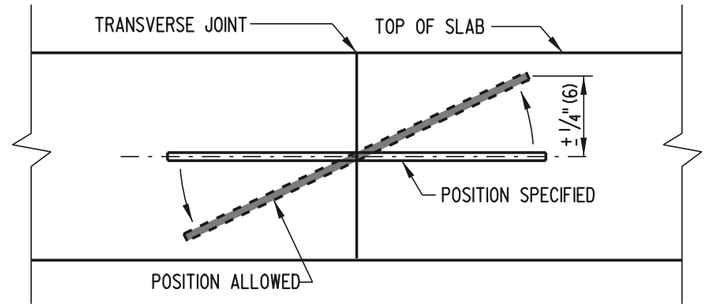
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT PATCHING	APPROVED Carolann Wicks (CHIEF ENGINEER) 1/10/05 (DATE)
	STANDARD NO. P-2 (2004) SHT. 3 OF 5	RECOMMENDED Dennis M. Office (DESIGN ENGINEER) 1/3/05 (DATE)

10/01/2004

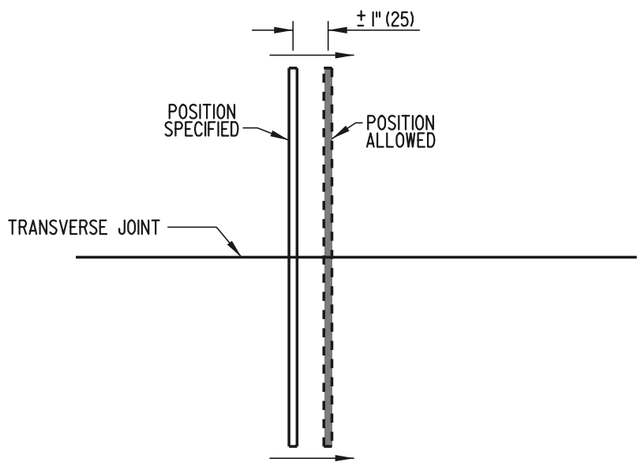
SCALE : N.T.S.



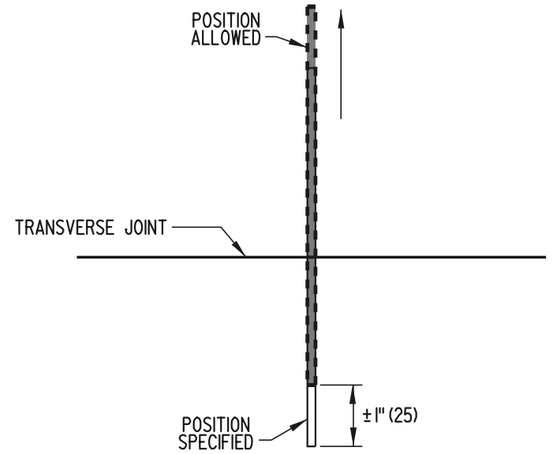
VERTICAL TRANSLATION



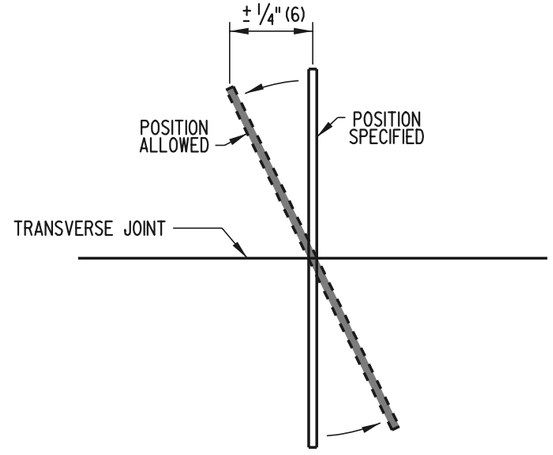
VERTICAL ROTATION



HORIZONTAL TRANSLATION



LONGITUDINAL TRANSLATION



HORIZONTAL ROTATION

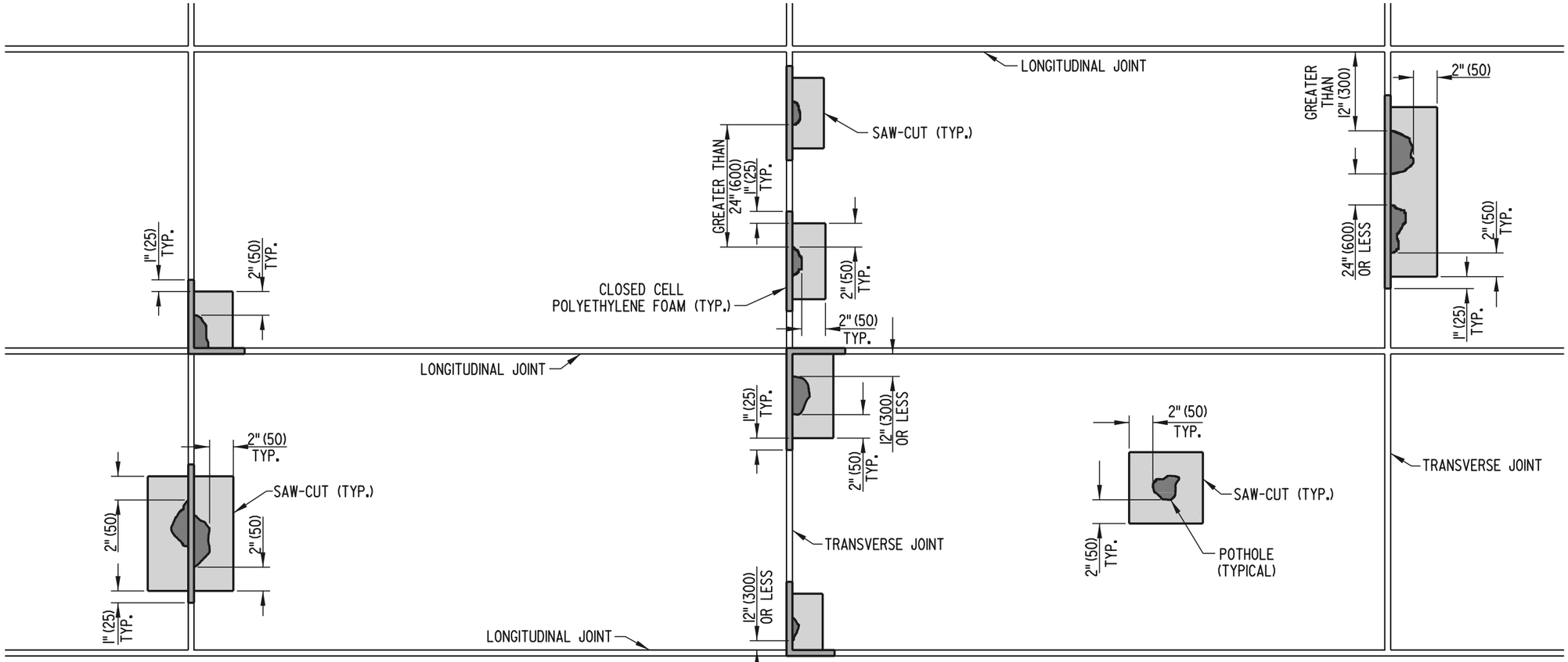
DOWEL & TIE BAR PLACEMENT TOLERANCES

FULL DEPTH PATCH

DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT PATCHING		APPROVED _____ CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. P-2 (2001)	SHT. 4 OF 5	RECOMMENDED _____ DESIGN ENGINEER DATE 6/15/01

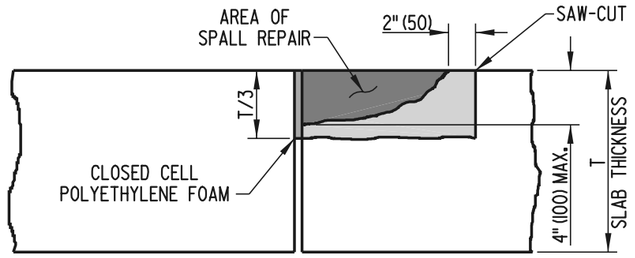
04/18/2001

SCALE : N.T.S.

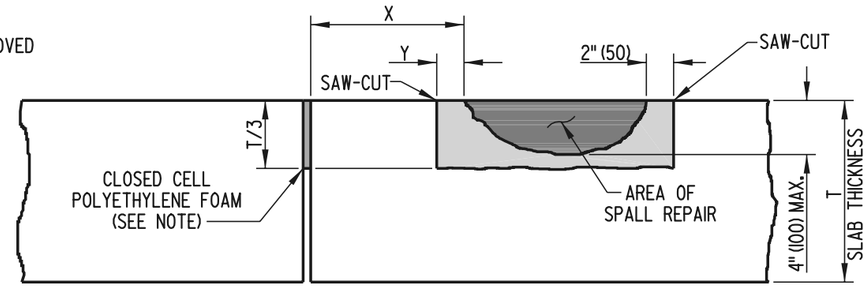


PLAN

NOTE: CLOSED CELL POLYETHYLENE FOAM SHALL BE THE SAME WIDTH AS THE JOINT AND 5" (125) IN DEPTH. AFTER THE CONCRETE IN THE REPAIR AREA HAS ACHIEVED THE SPECIFIED STRENGTH, THE FOAM SHALL BE REMOVED AND REPLACED WITH BACKER ROD AND HOT-POUR SEALANT MEETING ALL APPLICABLE STANDARD DETAILS AND SPECIFICATIONS.



SECTION WITH SPALL ADJACENT TO JOINT



SECTION WITH SPALL NOT ADJACENT TO JOINT

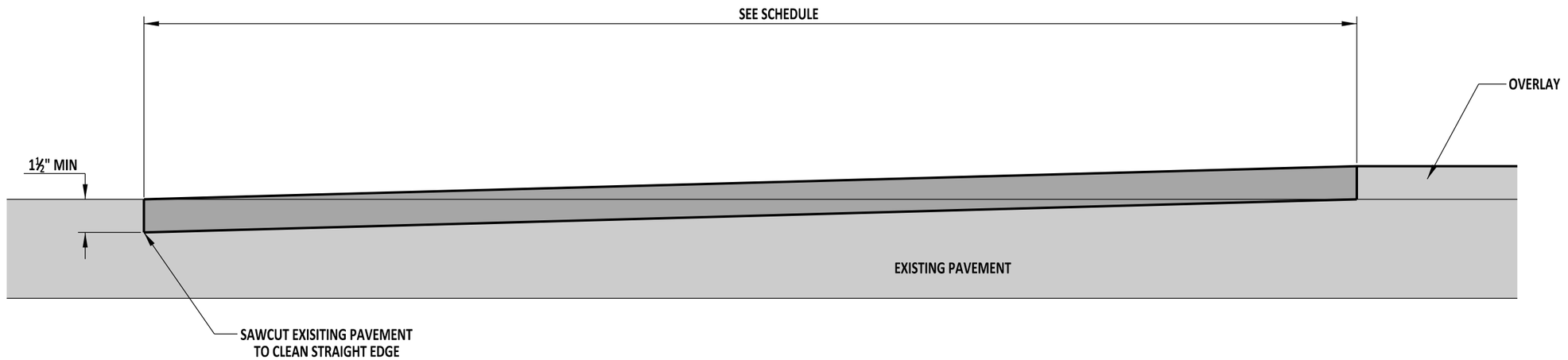
NOTE: WHEN X > 12" (300), THEN Y=1" (25) AND POLYETHYLENE FOAM IS NOT USED.
WHEN X ≤ 12" (300), THEN Y=X AND POLYETHYLENE FOAM IS USED.

PARTIAL DEPTH PATCH

DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. PAVEMENT PATCHING		APPROVED Lynne M. Hastings CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. P-2 (2001)	SHT. 5 OF 5	RECOMMENDED Michael A. Pepe DESIGN ENGINEER DATE 6/15/01

05/22/2001

SCALE : NTS



NOTE:
THE PROFILE OF THE OVERLAY PAVING SHALL BE ADJUSTED TO ASSURE A SMOOTH TRANSITION THROUGH THE BUTT JOINT.

CONDITION	SLOPE
GREATER THAN OR EQUAL TO 55 MPH	40:1
LESS THAN 55MPH	30:1
STOP OR INTERSECTION	15:1

DELAWARE
DEPARTMENT OF TRANSPORTATION

BUTT JOINTS

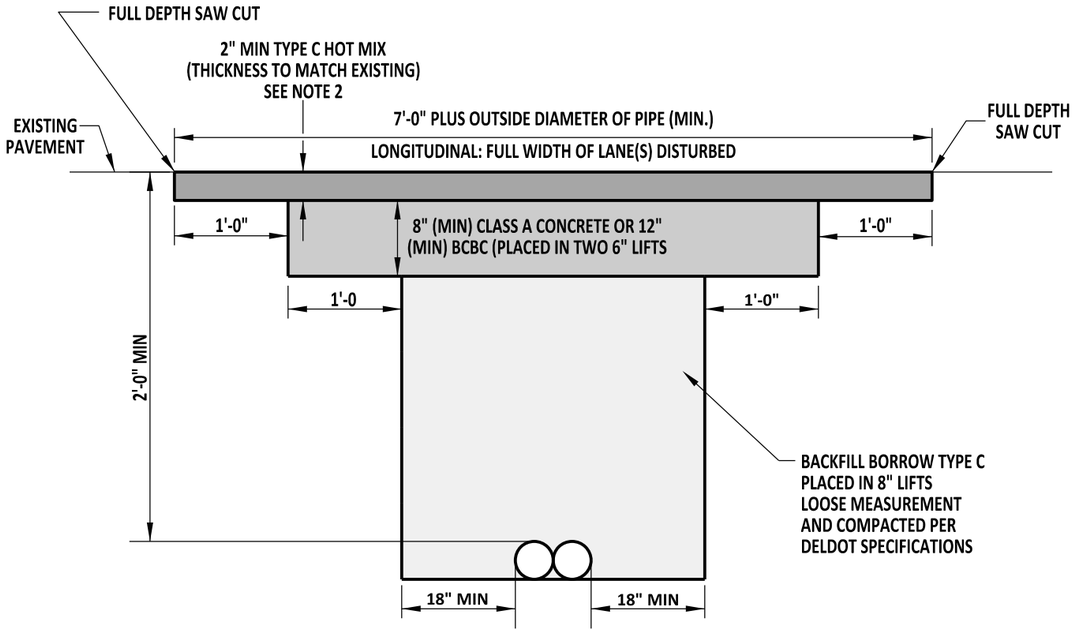
STANDARD NO. P-3 (2012) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)

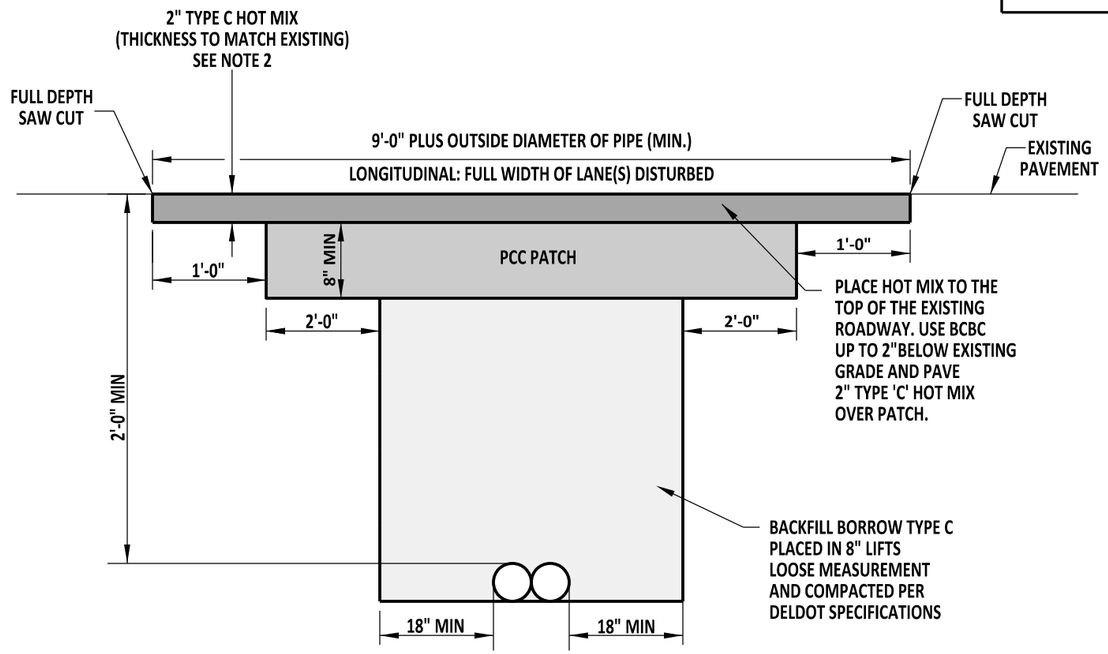
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

SCALE : NTS



PERMANENT CROSS-ROAD OR LONGITUDINAL PATCH DETAIL



PERMANENT CROSS-ROAD OR LONGITUDINAL PATCH DETAIL

* EXISTING CONCRETE PAVEMENT OVERLAYED WITH HOTMIX LOCATIONS

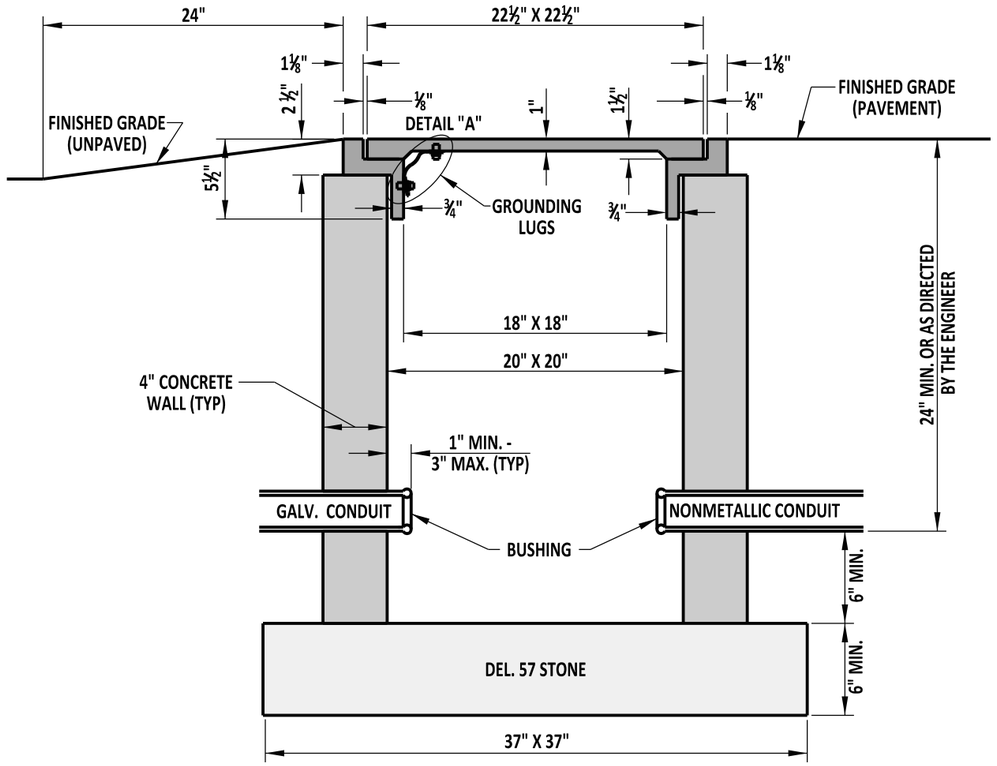
NOTES:

1). PATCH WIDTHS ARE MEASURED ALONG THE ROADWAY CENTERLINE AND SHALL BE THE FULL WIDTH OF THE LANE OR LANES DISTURBED.
2). THIS IS A MINIMUM PATCH. IF THE EXISTING ROADWAY HAS A HEAVIER CROSS SECTION THAN SHOWN HERE, IT WILL BE REPLACED WITH THAT CROSS SECTION, OR AS DIRECTED BY THE ENGINEER.
3). SEE DETAIL D-8, SHEET 1 FOR PIPE BEDDING DETAILS.

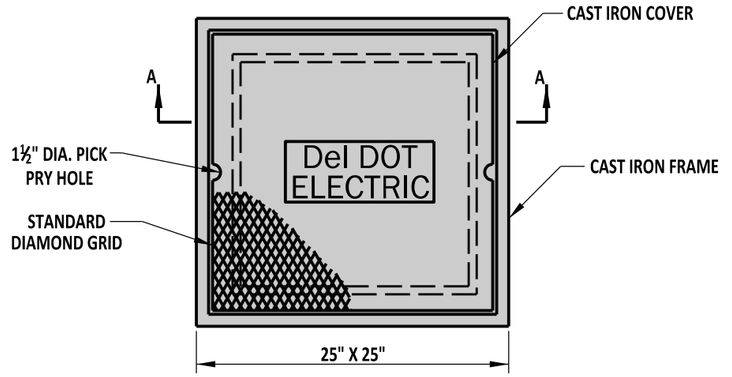
DELAWARE DEPARTMENT OF TRANSPORTATION	PERMANENT CROSS-ROAD PATCH OVER PIPE TRENCH DETAIL		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. P-4 (2013)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

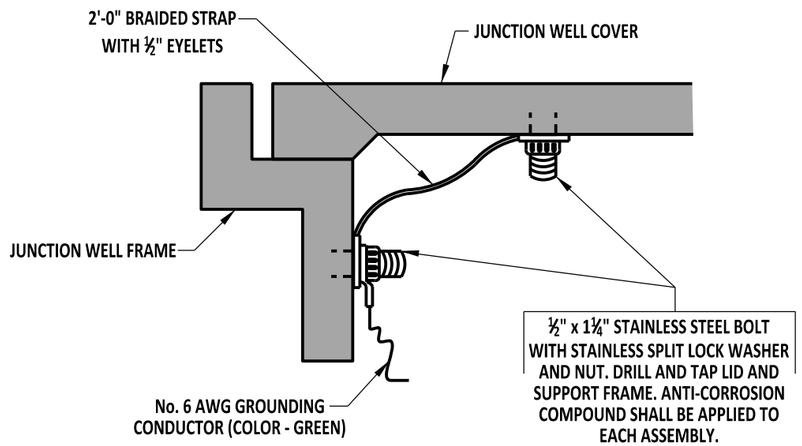
SCALE : NTS



SECTION A-A



PLAN VIEW



DETAIL "A"

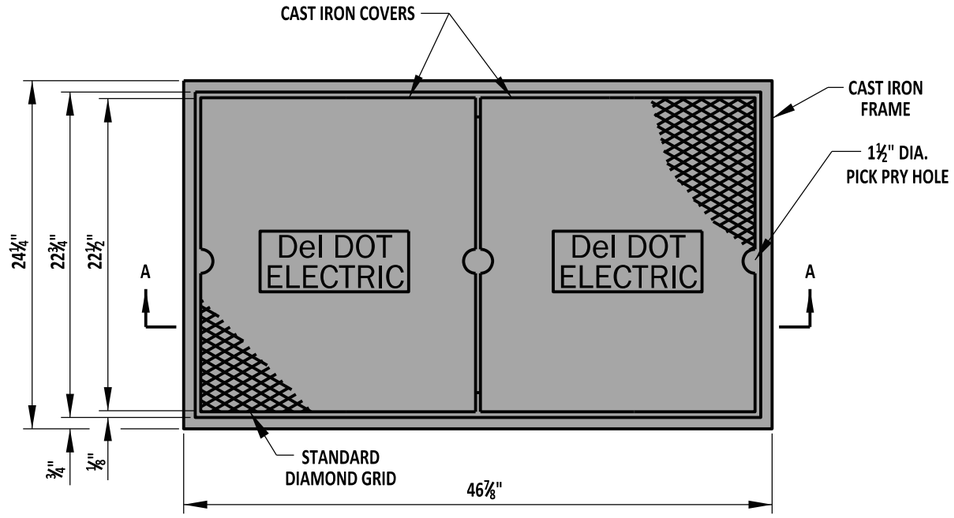
NOTES:

1). TYPE 1 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.
2). CONDUIT JUNCTION WELLS SHALL NOT BE PLACED UNDER A TRAVELWAY.
3). ALL CONDUIT JUNCTION WELLS PLACED IN PAVED AREAS SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GRADE. ALL CONDUIT JUNCTION WELLS PLACED IN UNPAVED AREAS SHALL BE CONSTRUCTED ABOVE FINISHED GRADE AND GRADED TO DRAIN AWAY FROM THE WELL, AS DETAILED.
4). ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.

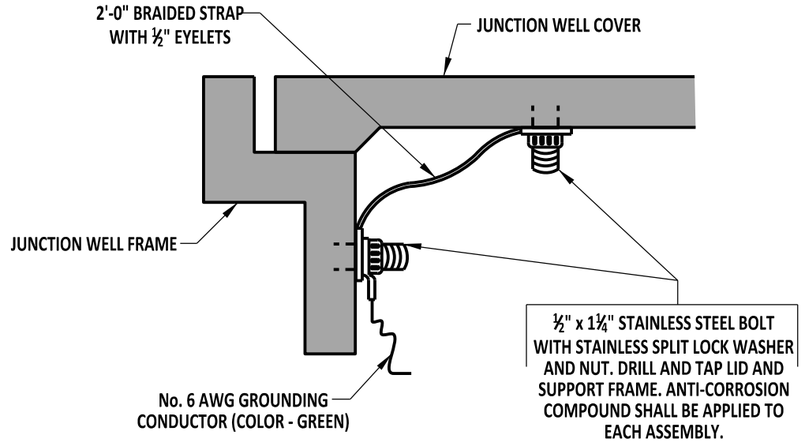
DELAWARE DEPARTMENT OF TRANSPORTATION	CONDUIT JUNCTION WELL, TYPE 1		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-1 (2013)	SHT. 1 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

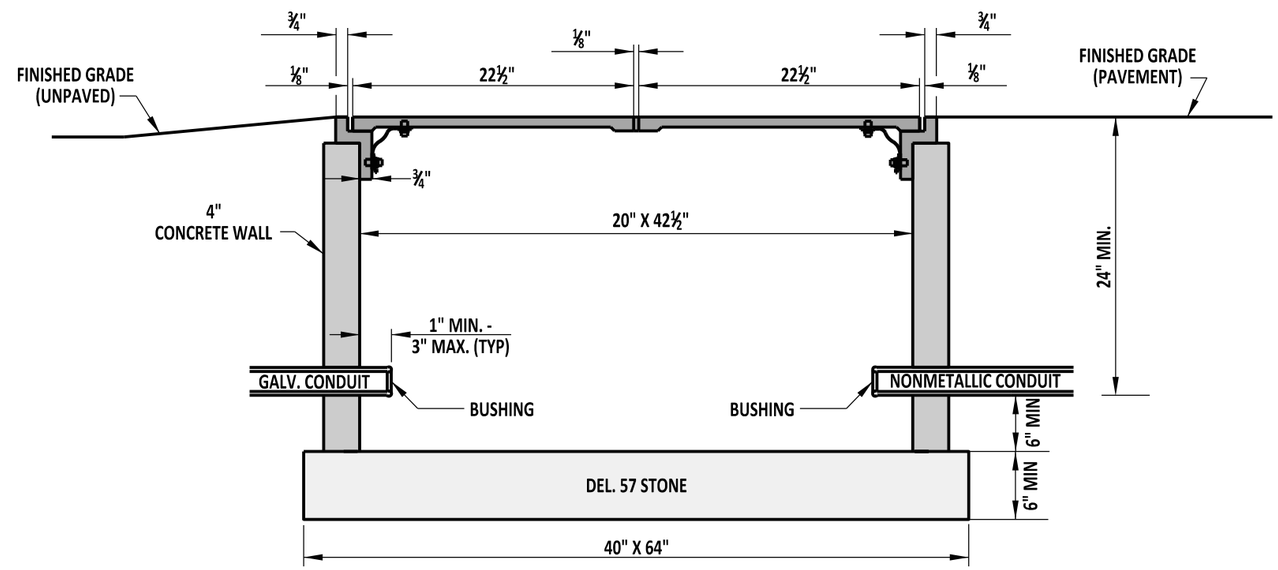
SCALE : NTS

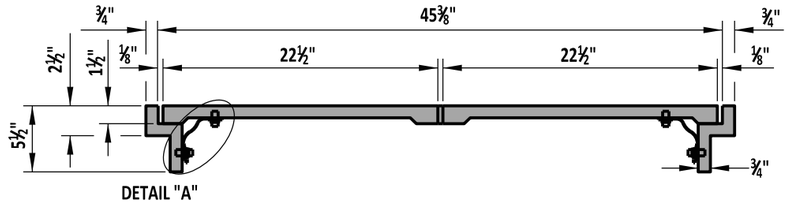


PLAN VIEW



DETAIL "A"





SECTION A-A

NOTES:

1). TYPE 4 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.

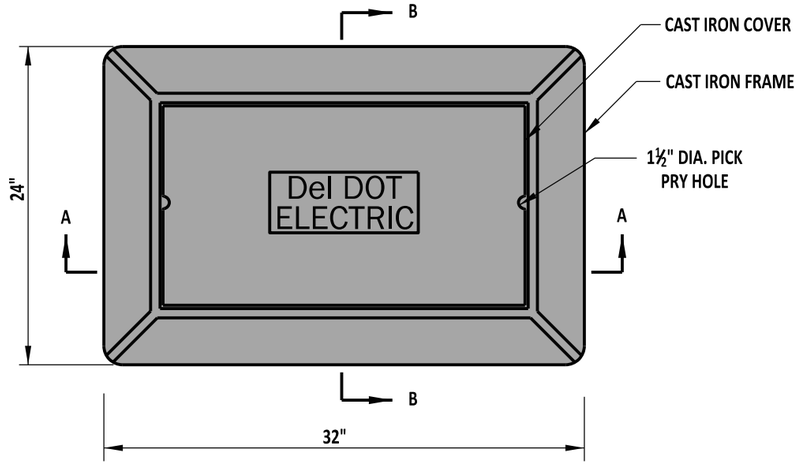
2). ALL CONDUIT JUNCTION WELLS PLACED IN PAVED AREAS SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GRADE. ALL CONDUIT JUNCTION WELLS PLACED IN UNPAVED AREAS SHALL BE CONSTRUCTED ABOVE FINISHED GRADE, AND GRADED TO DRAIN AWAY FROM THE WELL, AS DETAILED.

3). ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.

DELAWARE DEPARTMENT OF TRANSPORTATION	CONDUIT JUNCTION WELL, TYPE 4		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-1 (2013)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



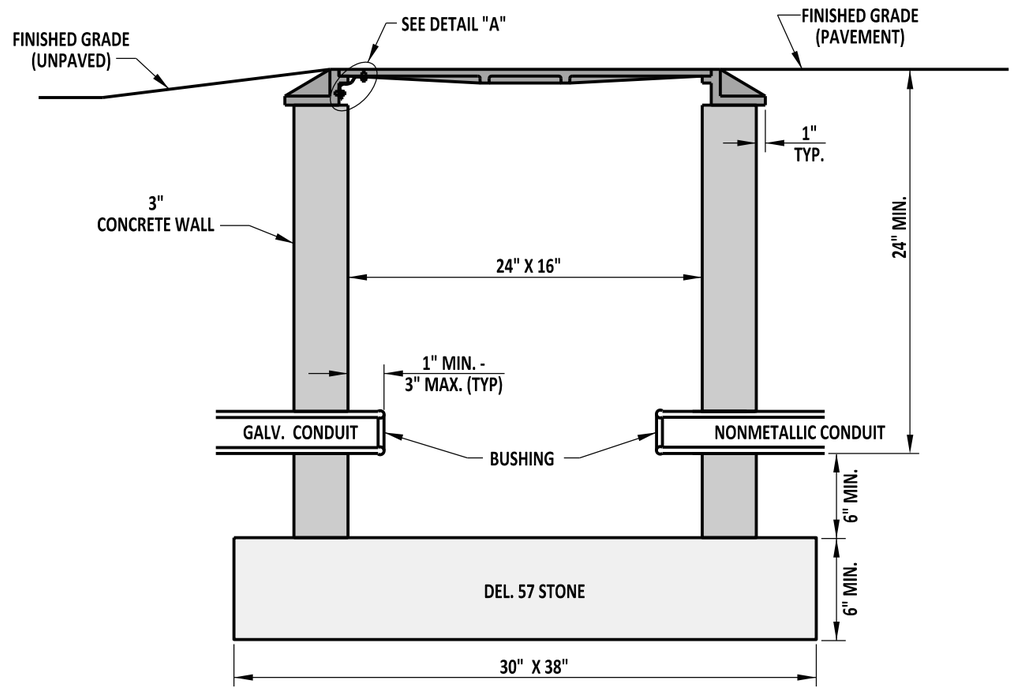
PLAN VIEW

NOTES:

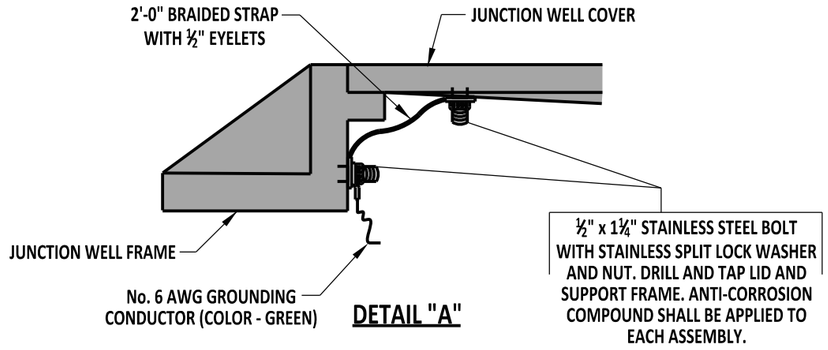
1). TYPE 5 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.

2). ALL CONDUIT JUNCTION WELLS PLACED IN PAVED AREAS SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GRADE. ALL CONDUIT JUNCTION WELLS PLACED IN UNPAVED AREAS SHALL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM THE WELL, AS DETAILED.

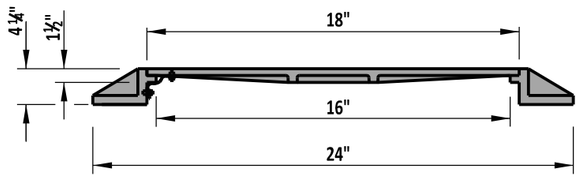
3). ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.



SECTION A-A



DETAIL "A"

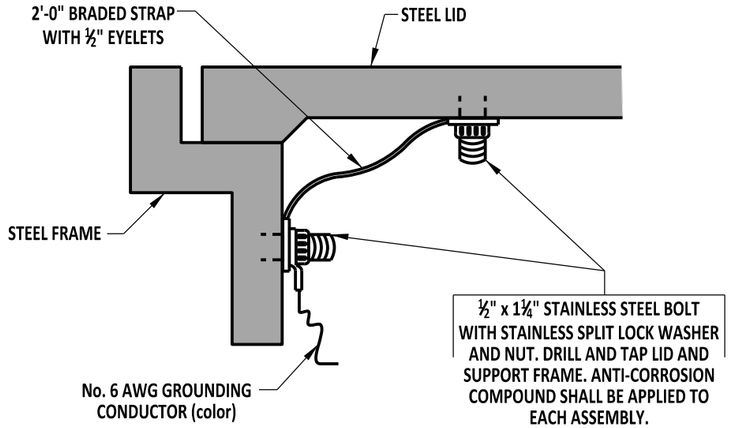


SECTION B-B

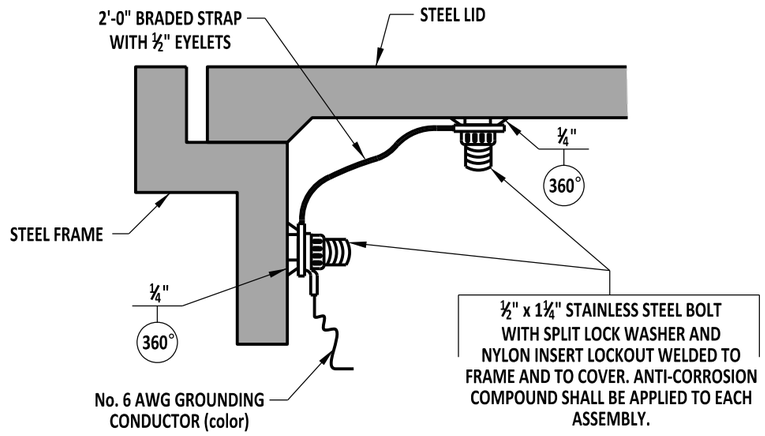
DELAWARE DEPARTMENT OF TRANSPORTATION	CONDUIT JUNCTION WELL, TYPE 5			APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-1 (2013)	SHT. 3	OF 3	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

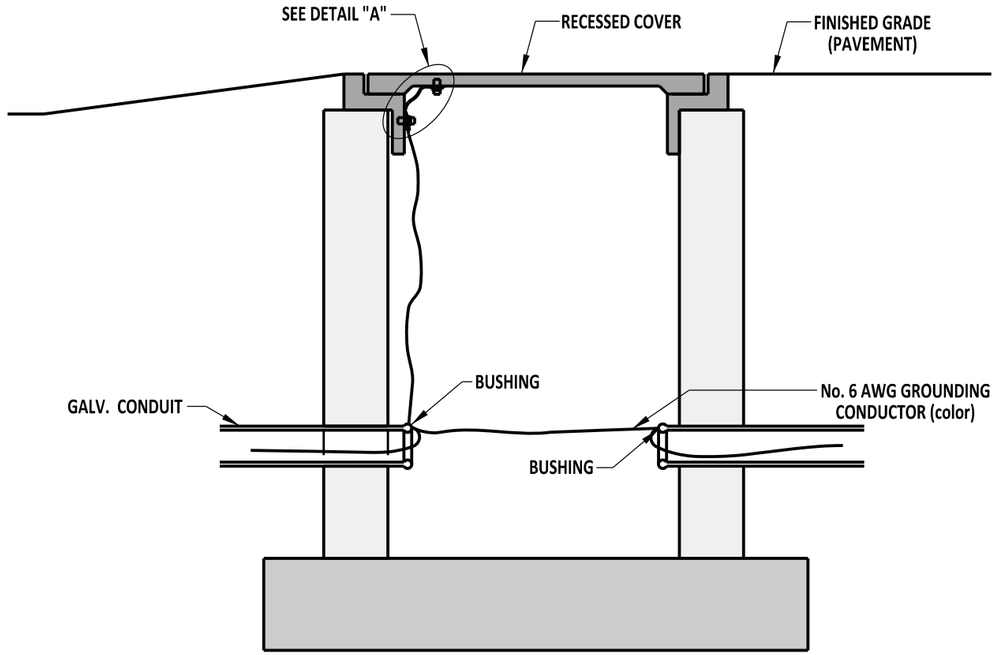
SCALE : NTS



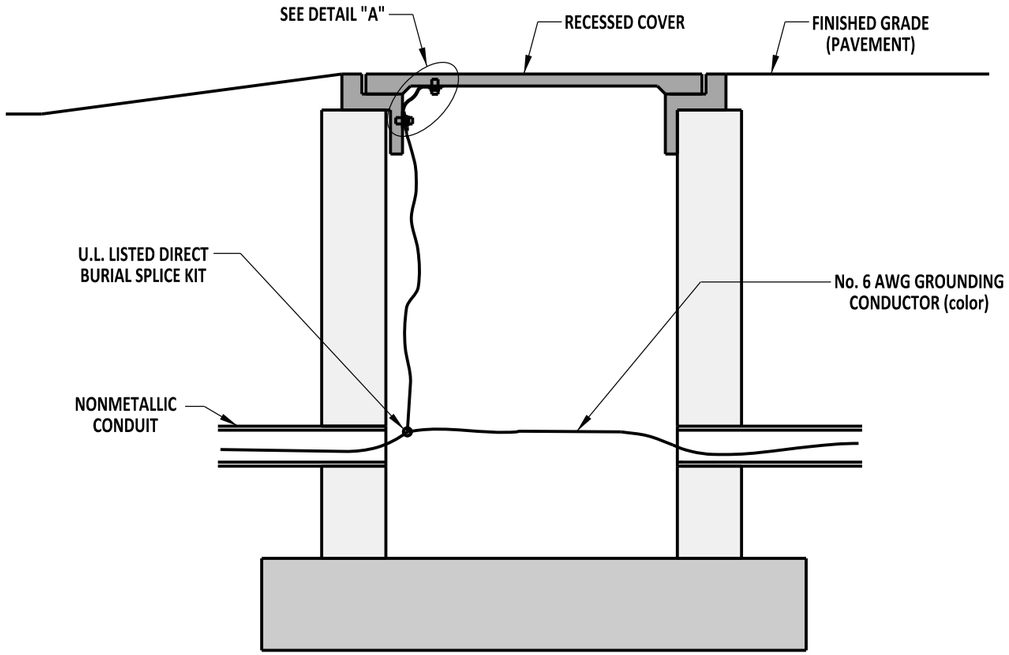
DETAIL "A"



BONDING AN EXISTING JUNCTION WELL COVER & FRAME



JUNCTION WELL BONDING GALVANIZED TO GALVANIZED

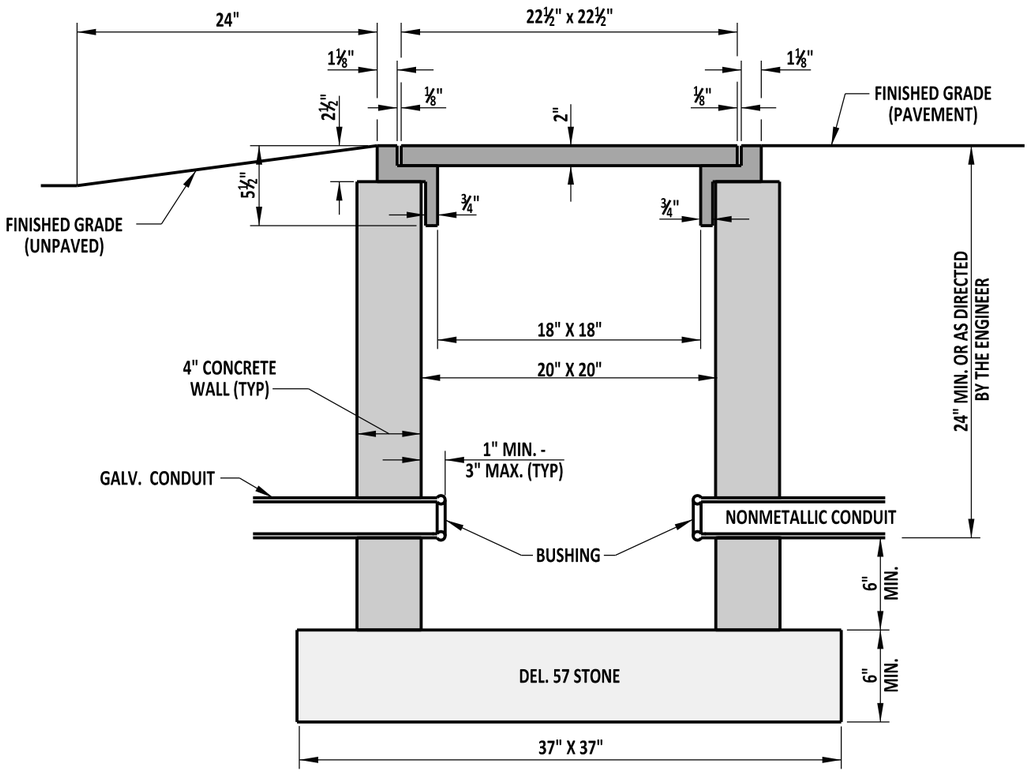


JUNCTION WELL BONDING NONMETALLIC CONDUIT

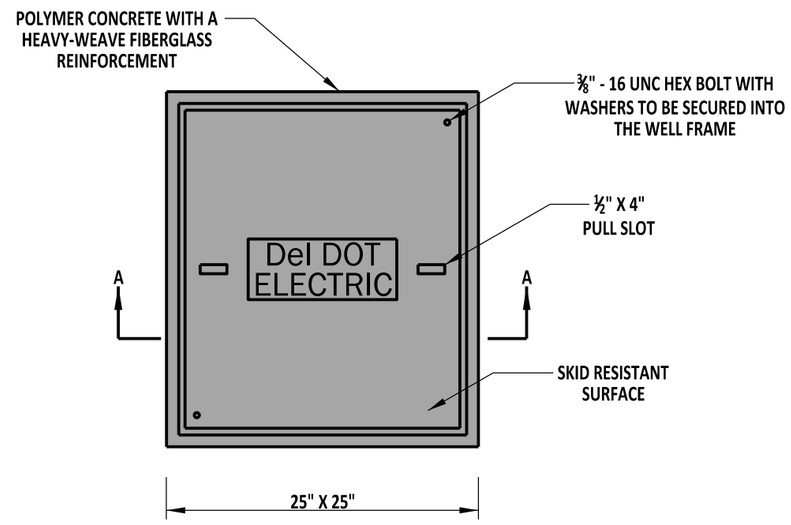
DELAWARE DEPARTMENT OF TRANSPORTATION	JUNCTION WELL, GROUNDING & BONDING FOR STEEL FRAMES & LIDS		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/22/2011 (DATE)
	STANDARD NO. T-2 (2011)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/21/2011 (DATE)

11/14/2011

SCALE : NTS



SECTION A-A



PLAN VIEW

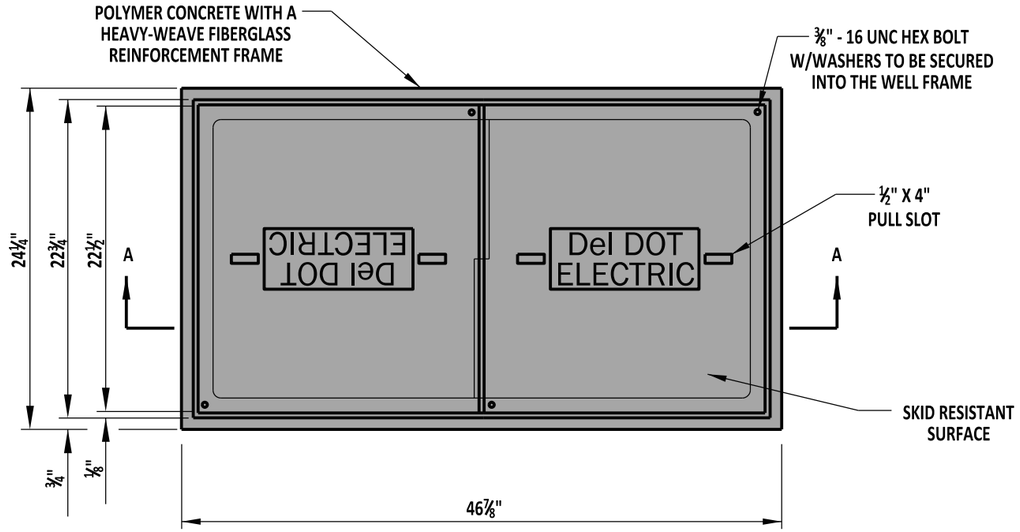
NOTES:

1). TYPE 11 CONDUIT JUNCTION WELL LID SHALL BE PRECAST POLYMER CONCRETE WITH A HEAVY-WEAVE FIBERGLASS FRAME. INSTALLED ON A PRECAST CONCRETE WELL.
2). TYPE 11 CONDUIT JUNCTION WELL BODY SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.
3). ALL CONDUIT JUNCTION WELLS PLACED IN PAVED AREAS SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GRADE. ALL CONDUIT JUCTION WELLS PLACED IN UNPAVED AREAS SHALL BE CONSTRUCTED ABOVE FINISHED GRADE AND GRADED TO DRAIN AWAY FROM THE WELL, AS DETAILED.
4). ALL CRACKS, GAPS, OR OPENING IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.

DELAWARE DEPARTMENT OF TRANSPORTATION	CONDUIT JUNCTION WELL, TYPE 11		APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-3 (2013)	SHT. 1 OF 3	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

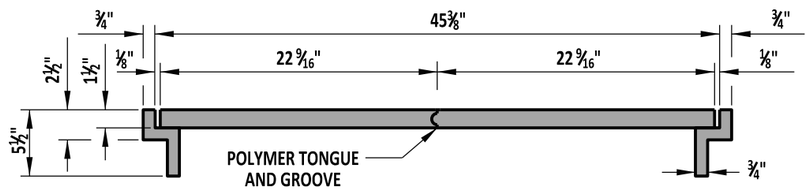
SCALE : NTS



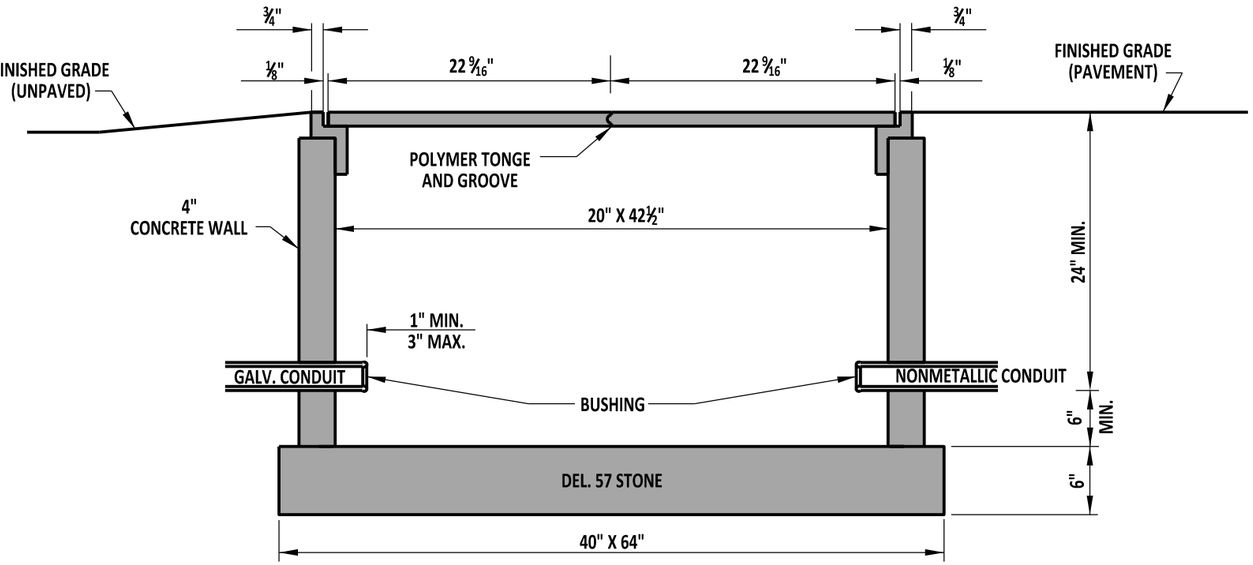
PLAN VIEW

NOTES:

1). TYPE 14 CONDUIT JUNCTION WELL LID SHALL BE PRECAST POLYMER CONCRETE WITH A HEAVY-WEAVE FIBERGLASS FRAME. INSTALLED ON A PRECAST CONCRETE WELL.
2). TYPE 14 CONDUIT JUNCTION WELL BODY SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.
3). TYPE 14 CONDUIT JUNCTION WELLS SHALL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM THE CONDUIT JUNCTION WELL.
4). ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.



SECTION A-A

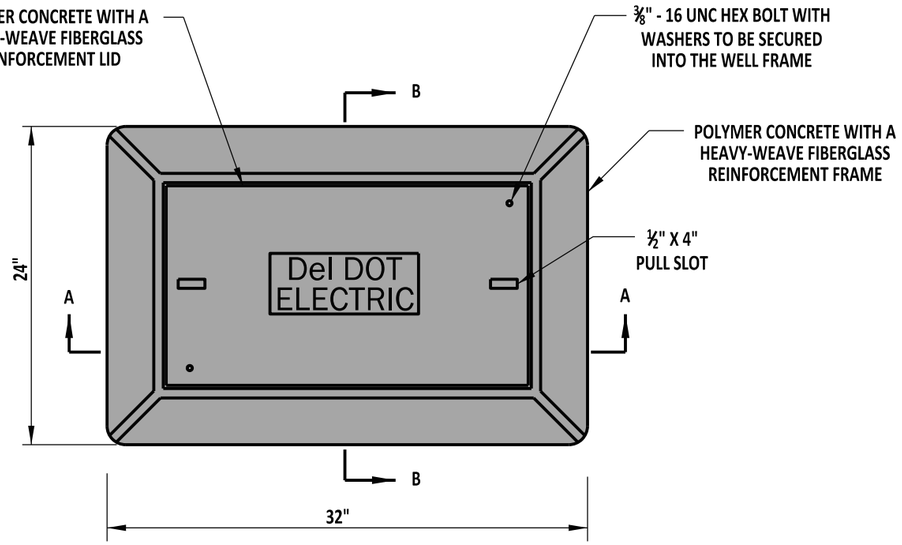


SECTION A-A

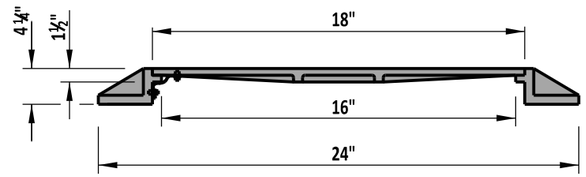
DELAWARE DEPARTMENT OF TRANSPORTATION	CONDUIT JUNCTION WELL, TYPE 14			APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER) — 01/07/2013 (DATE)
	STANDARD NO. T-3 (2012)	SHT. 2	OF 3	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER) — 12/20/2012 (DATE)

12/4/2012

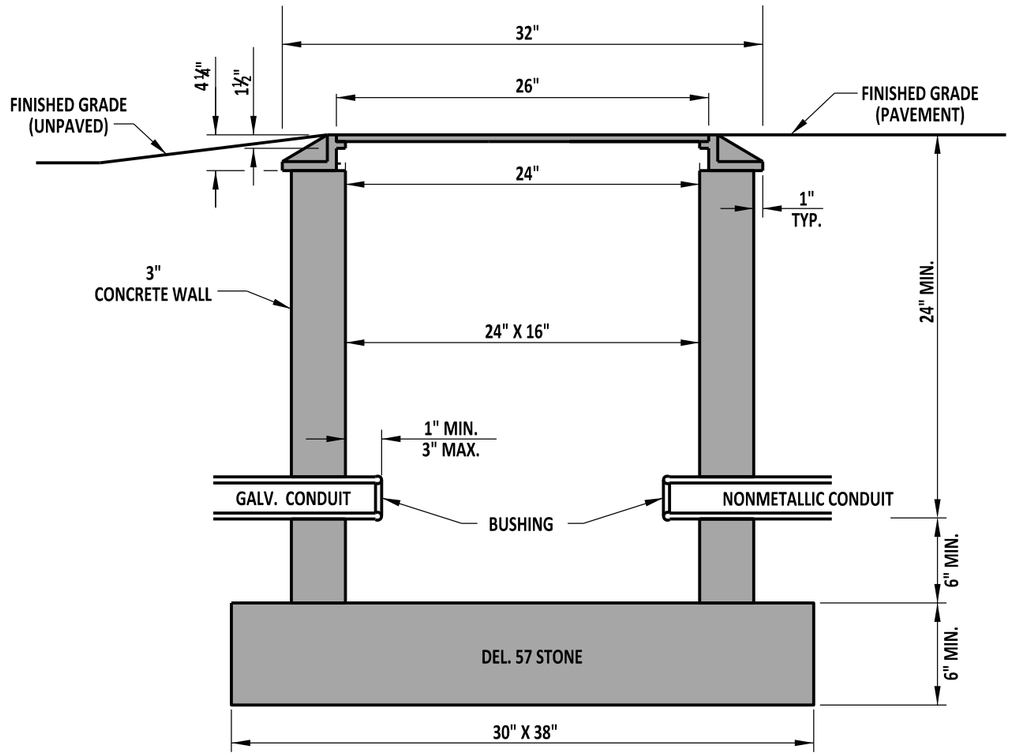
SCALE : NTS



PLAN VIEW



SECTION B-B



SECTION A-A

NOTES:

1). TYPE 15 CONDUIT JUNCTION WELL LID SHALL BE PRECAST POLYMER CONCRETE WITH A HEAVY-WEAVE FIBERGLASS FRAME. INSTALLED ON A PRECAST CONCRETE WELL.
2). TYPE 15 CONDUIT JUNCTION WELL BODY SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.
3). TYPE 15 CONDUIT JUNCTION WELLS SHALL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM THE CONDUIT JUNCTION WELL.
4). ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.

DELAWARE
DEPARTMENT OF TRANSPORTATION

CONDUIT JUNCTION WELL, TYPE 15

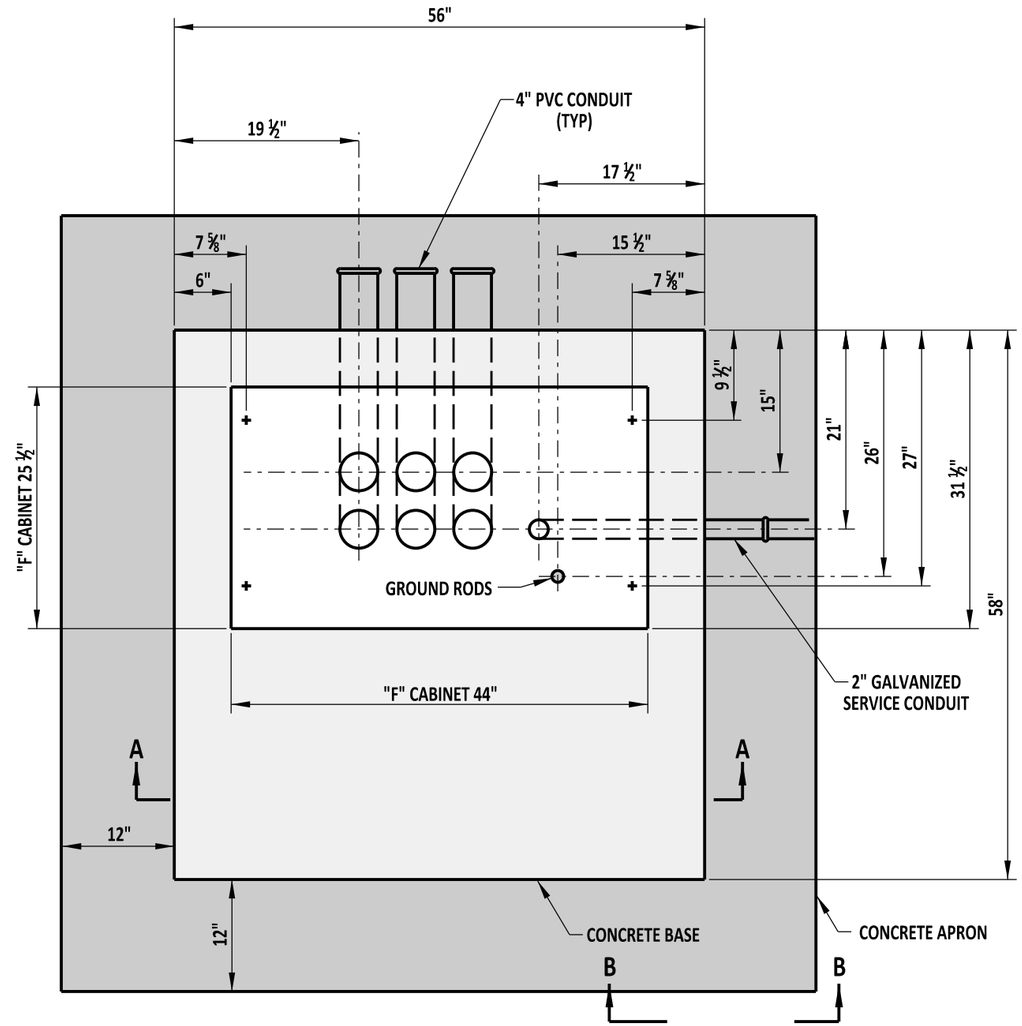
STANDARD NO. T-3 (2012) | SHT. 3 OF 3

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 01/07/2013 (DATE)

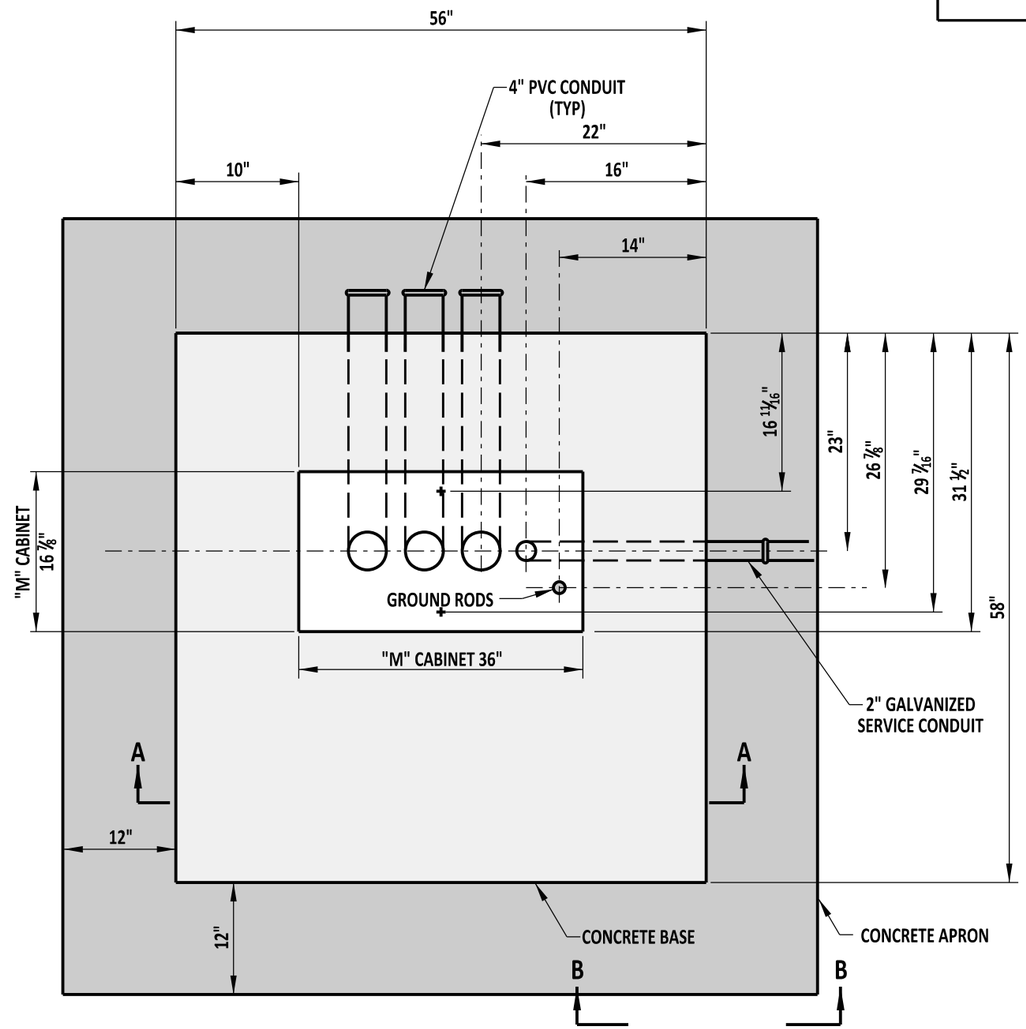
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/20/2012 (DATE)

12/4/2012

SCALE : NTS



"F" CABINET
PLAN VIEW



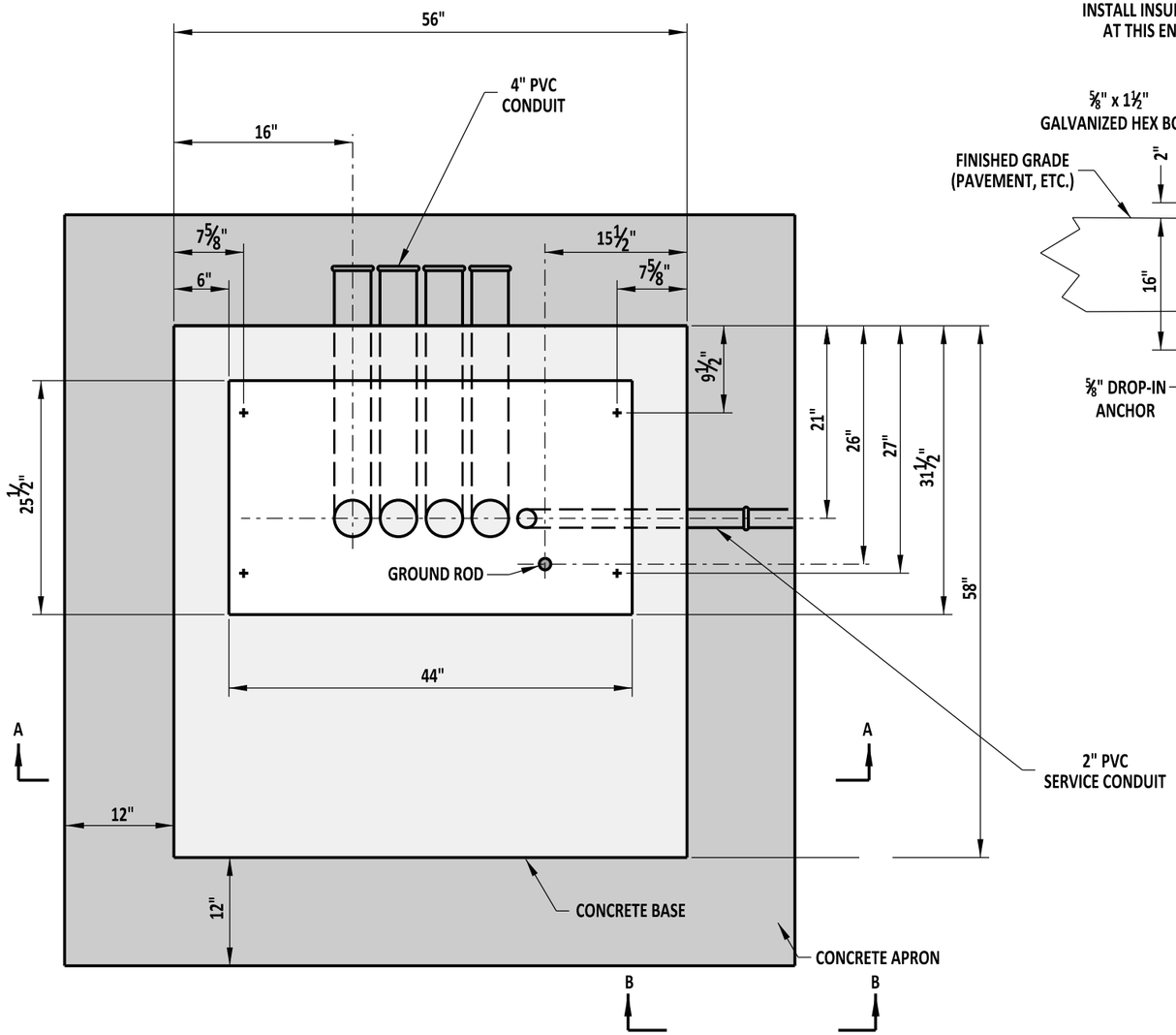
"M" CABINET
PLAN VIEW

NOTE:
1). CONCRETE APRON IS REQUIRED ONLY WHEN CABINET BASE IS INSTALLED IN UNPAVED AREAS OR AS DIRECTED ON PLAN.
2). CONDUITS SHALL BE EVENLY SPACED, WITH MINIMUM 2" WIDTH SPACING ESTABLISHED BETWEEN ALL CONDUITS.
3). FOR VIEW OF SECTION A-A AND SECTION B-B, SEE DETAIL T-4, SHEET 2 OF 2.

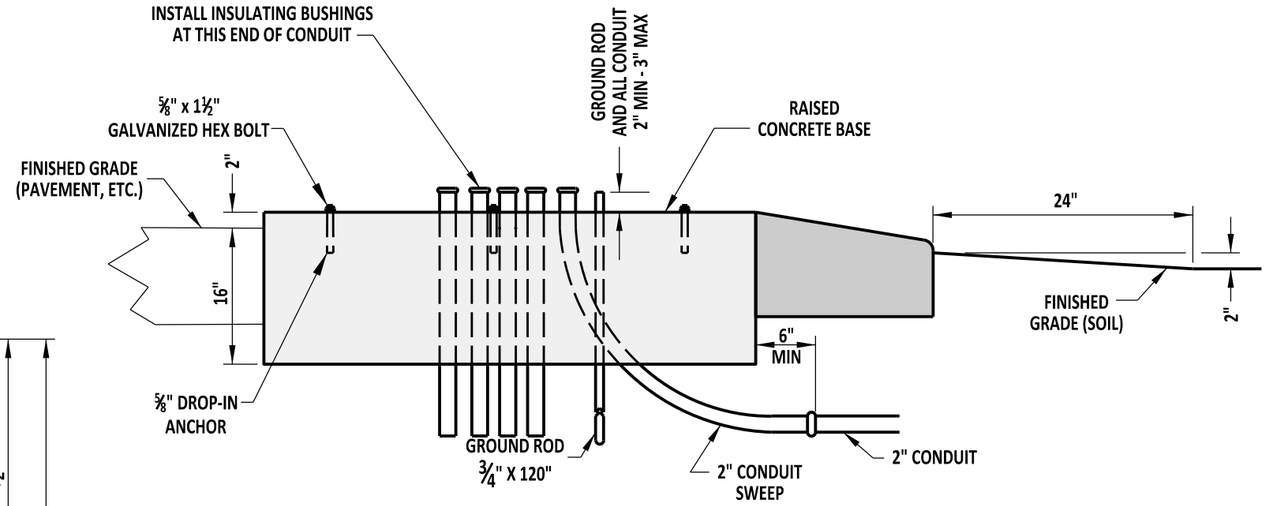
DELAWARE DEPARTMENT OF TRANSPORTATION	CABINET BASES, TYPES M & F		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-4 (2013)	SHT. 1 OF 2	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

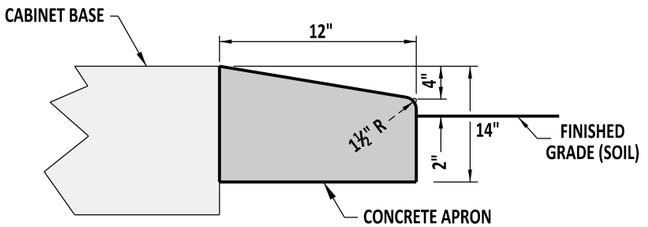
SCALE : NTS



"P & R" CABINET PLAN VIEW



SECTION A-A



SECTION B-B

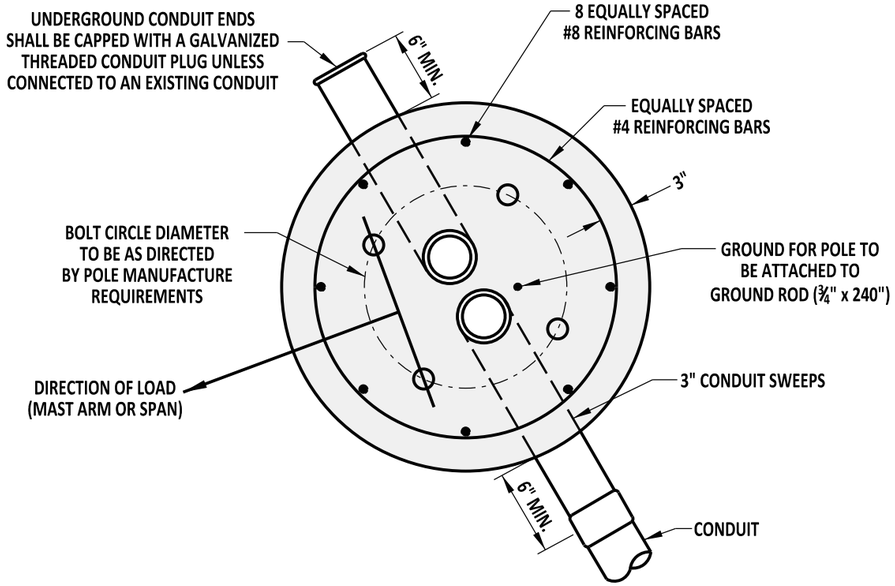
NOTE:

1). CONCRETE APRON IS REQUIRED ONLY WHEN CABINET BASE IS INSTALLED IN EARTH AREAS OR AS DIRECTED ON PLAN.
2). CONDUITS SHALL BE EVENLY SPACED, WITH MINIMUM 2" WIDTH ESTABLISHED BETWEEN ALL CONDUITS.

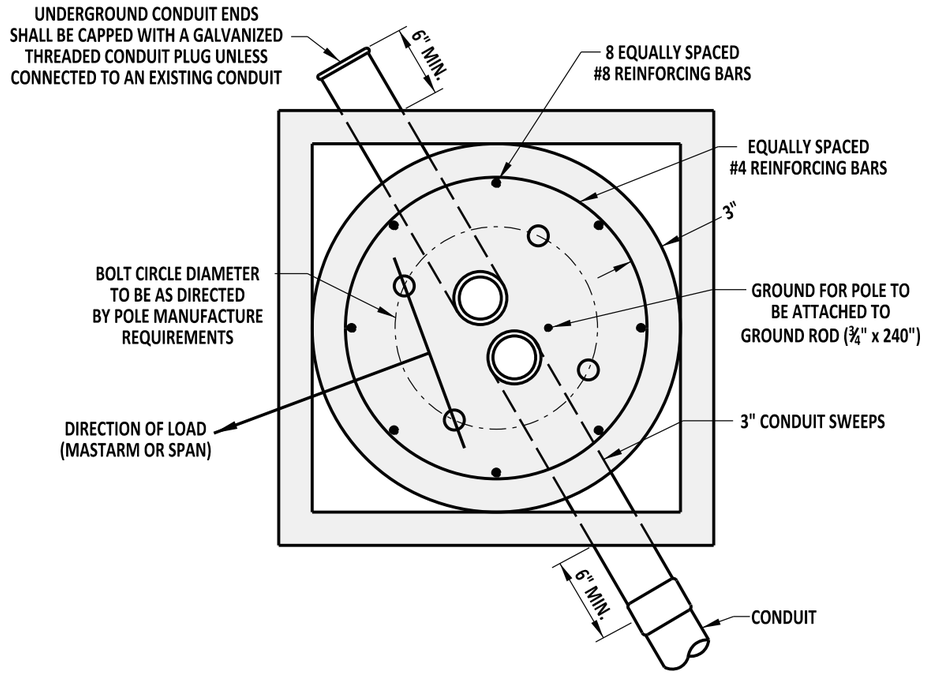
DELAWARE DEPARTMENT OF TRANSPORTATION	CABINET BASES, TYPES P & R		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-4 (2013)	SHT. 2 OF 2	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



ROUND BASE



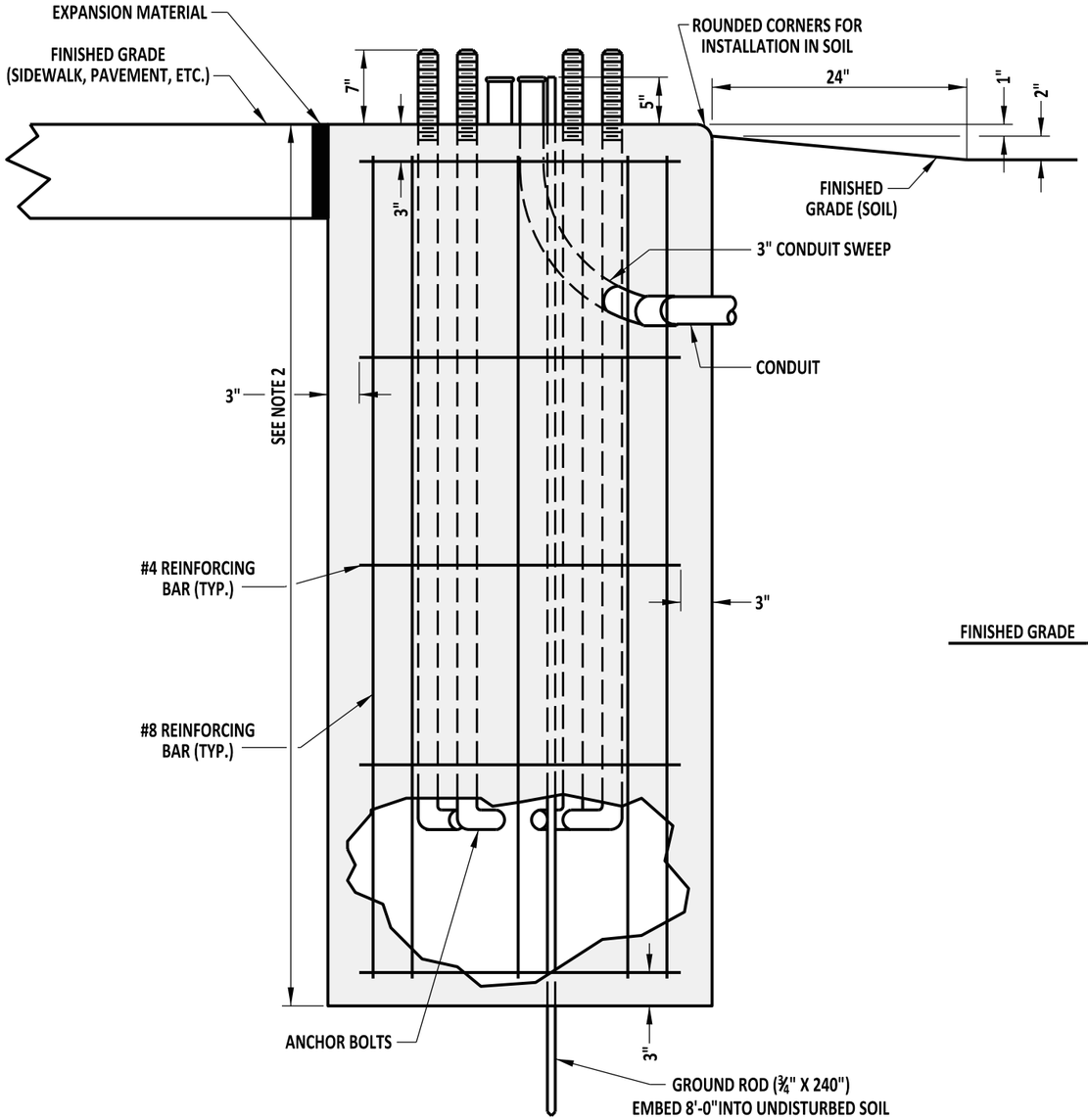
ROUND BASE w/ SQUARE FOUNDATION HEADER

NOTE: SQUARE FOUNDATION HEADER SHALL HAVE A 6" MINIMUM DEPTH.

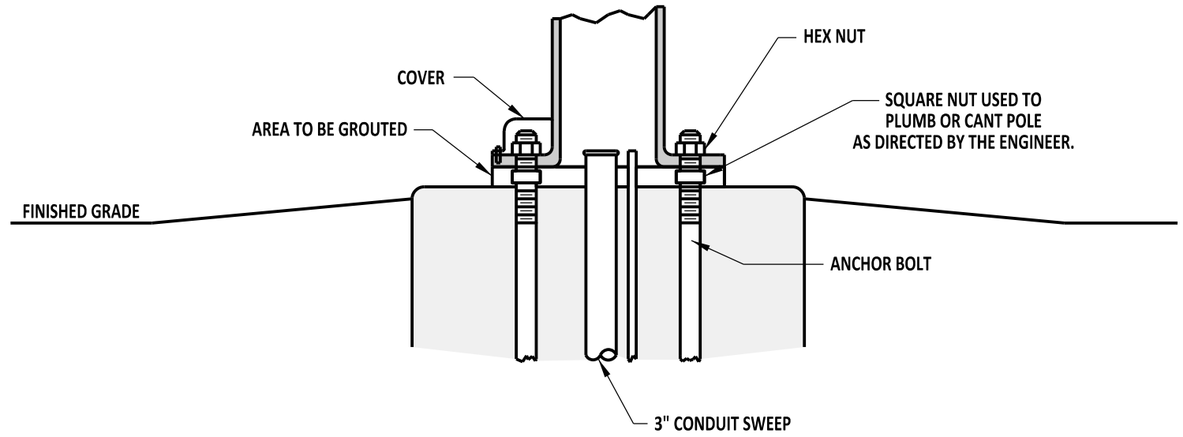
DELAWARE DEPARTMENT OF TRANSPORTATION	POLE BASES		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-5 (2013)	SHT. 1 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



TYPICAL SECTION (BASES 1,2,2A,2B,3,3A, AND 3B)



TYPICAL INSTALLATION (BASES 1,2,2A,2B,3,3A, AND 3B)

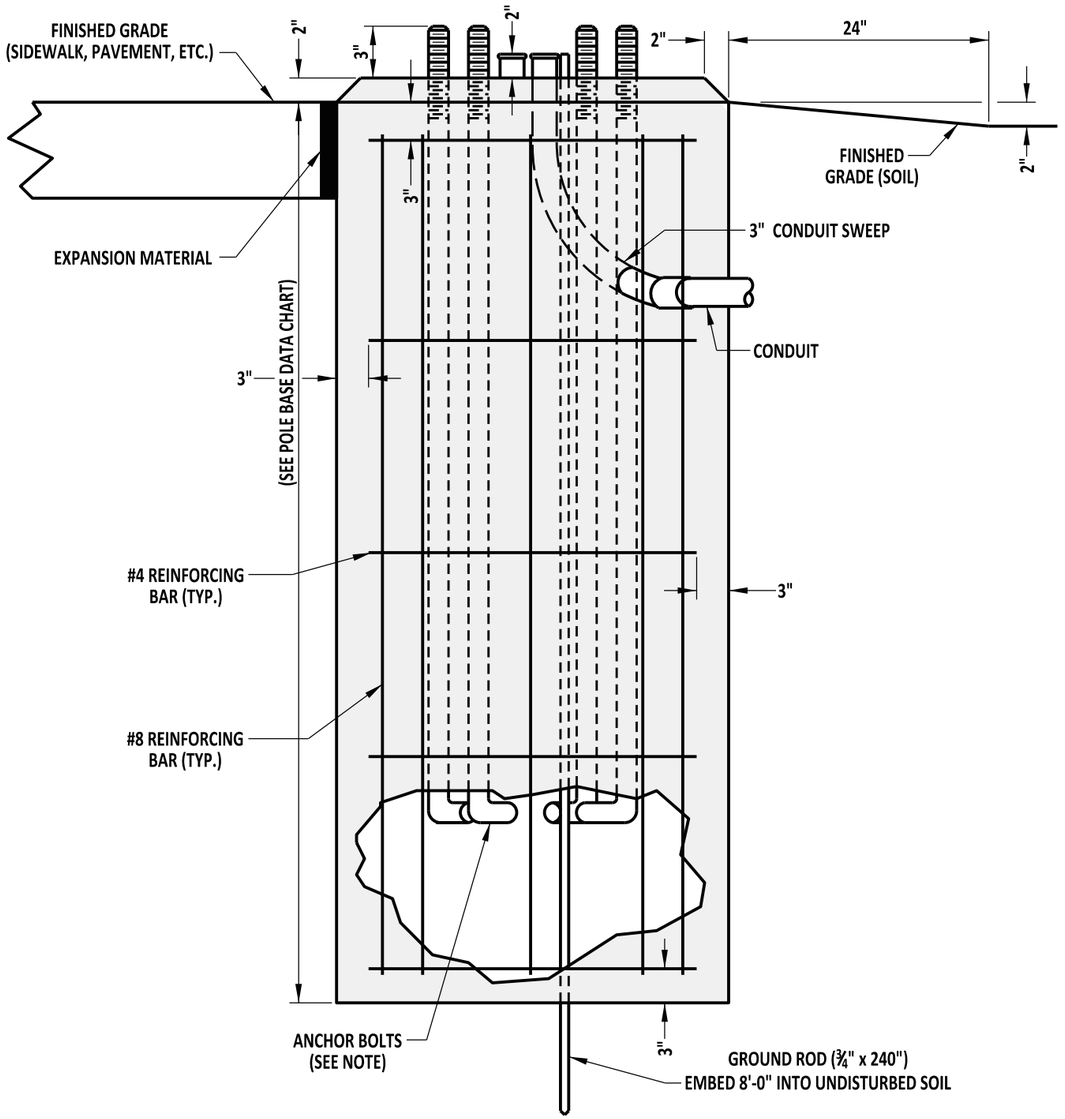
NOTES:

1). PLACE 2 EACH 6" LONG x ½" DIA. P.V.C., SCHEDULE 40 (TYP) VENTS IN THE GROUT AS DIRECTED IN THE FIELD BY ENGINEER.
2). SEE POLE BASE DATA CHART ON DETAIL T-5, SHEET 3 OF 4, FOR POLE BASE DIMENSIONS.
3.) ANCHOR BOLTS AND BOLT PATTERN TO BE PROVIDED BY DELDOT'S SIGNAL CONSTRUCTION INSPECTOR UNLESS NOTED OTHERWISE.

DELAWARE DEPARTMENT OF TRANSPORTATION	POLE BASES		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-5 (2013)	SHT. 2 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



TYPICAL SECTION (BASE 6)

POLE BASE DATA CHART

POLE BASE TYPE #	DIAMETER	DEPTH	#4 HORIZONTAL REINFORCING BARS	#8 VERTICAL REINFORCING BARS	CONDUITS
1	36"	7'-0"	5	8	2 - 3"
2	36"	10'-0"	6	8	2 - 3"
2A	48"	8'-0"	5	8	2 - 3"
2B	60"	7'-0"	5	8	2 - 3"
3	48"	10'-0"	6	8	2 - 3"
3A	60"	9'-0"	6	8	2 - 3"
3B	72"	7'-0"	5	8	2 - 3"
4A & 4B	24"	2'-4"	NONE	NONE	2 - 2.5"
6	24"	6'-0"	4	8	2 - 3"

NOTE:
ANCHOR BOLTS AND BOLT PATTERN FOR TYPES 5, 6, & 7 POLE BASES TO BE PROVIDED BY THE MANUFACTURER.

DELAWARE
DEPARTMENT OF TRANSPORTATION

POLE BASES

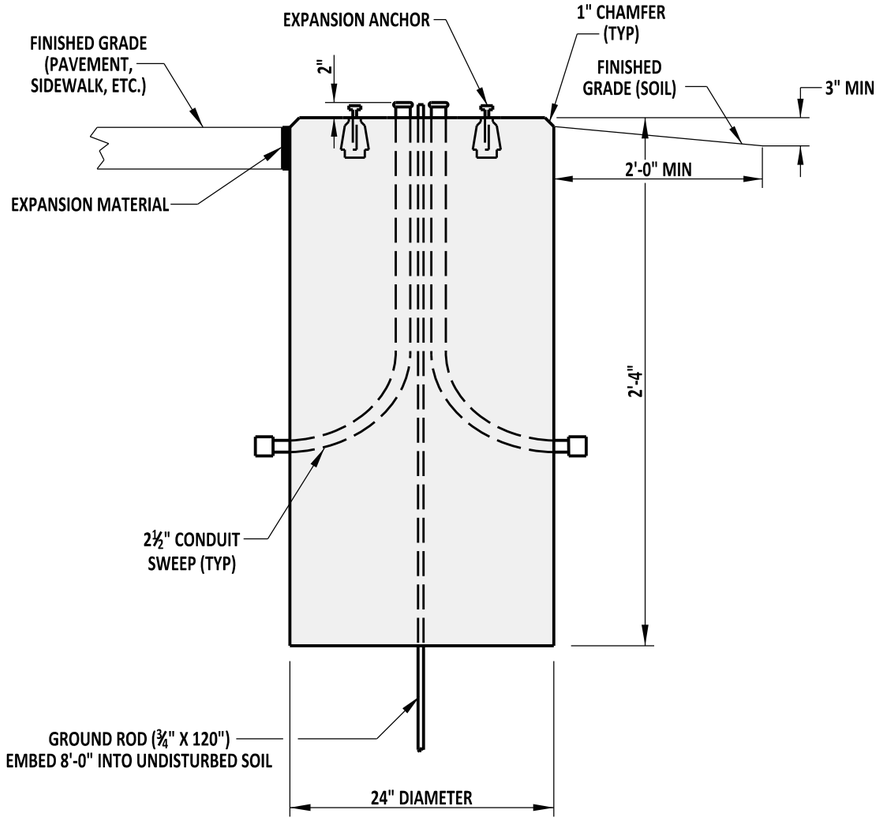
STANDARD NO. T-5 (2013) | SHT. 3 OF 4

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

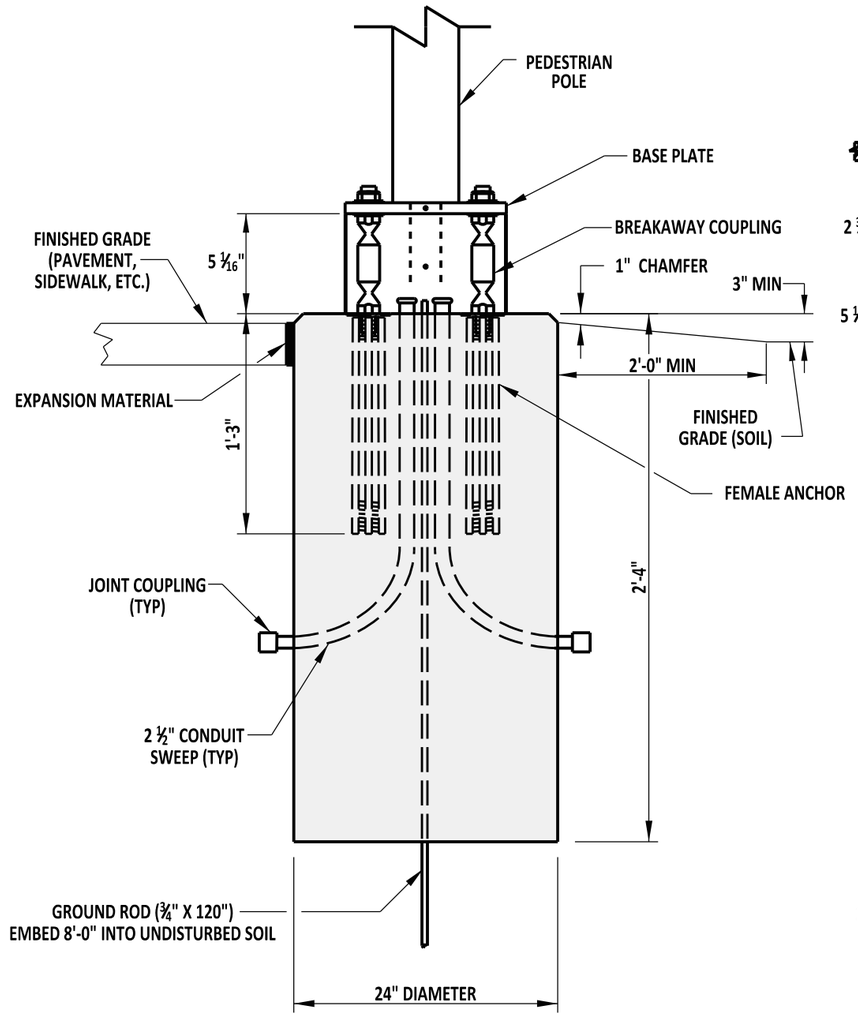
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

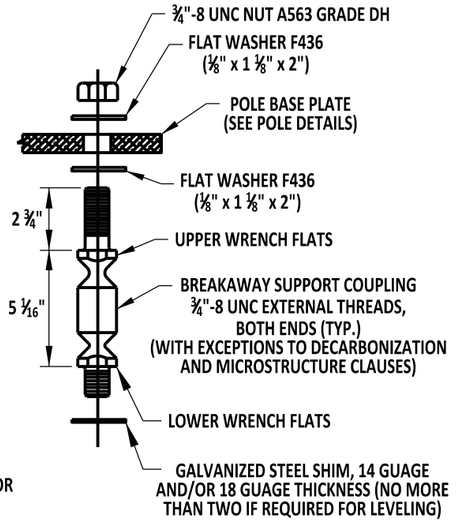
SCALE : NTS



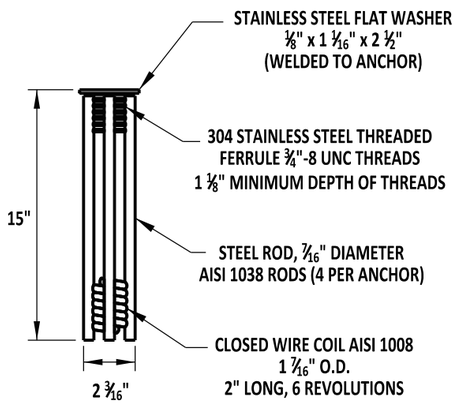
TYPICAL SECTION (BASE 4A)



TYPICAL SECTION (BASE 4B)



BREAKAWAY COUPLING DETAIL



ANCHOR DETAIL

NOTE:
BOLT PATTERN TO BE PROVIDED BY DELDOT'S SIGNAL CONSTRUCTION INSPECTOR.

NOTE:
BOLT PATTERN TO BE PROVIDED BY DELDOT'S SIGNAL CONSTRUCTION INSPECTOR.

DELAWARE
DEPARTMENT OF TRANSPORTATION

POLE BASES

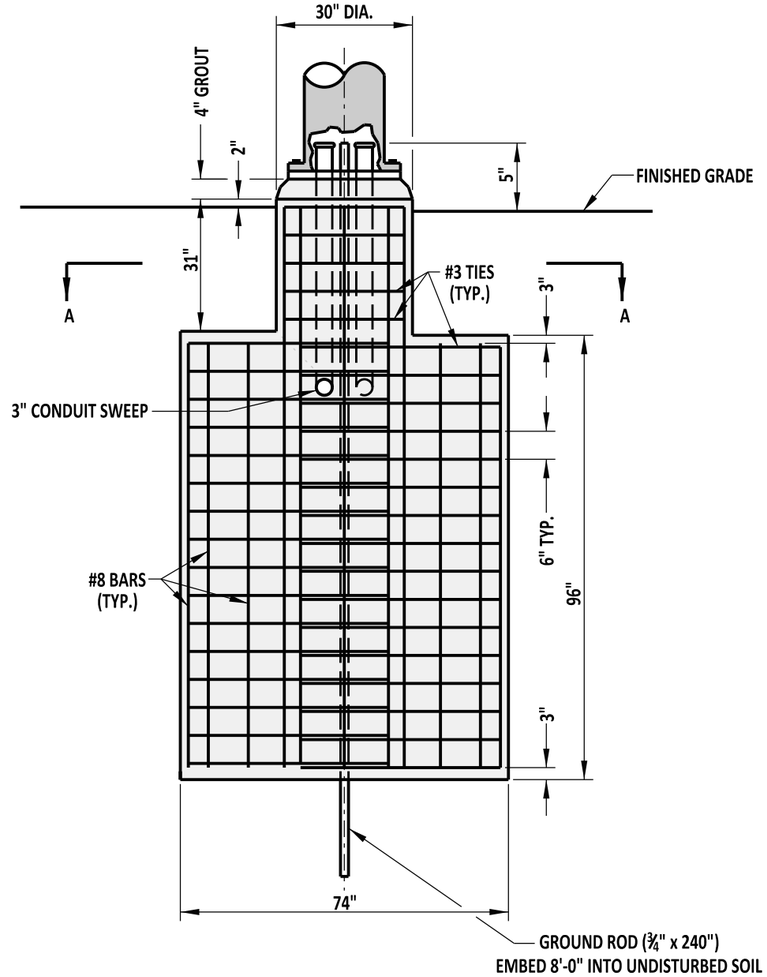
STANDARD NO. T-5 (2013) | SHT. 4 OF 4

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

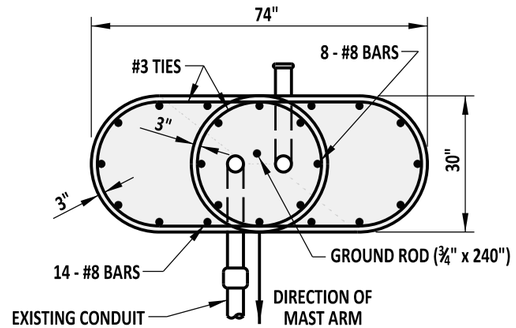
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



FOUNDATION DETAILS



SECTION A-A

NOTES:

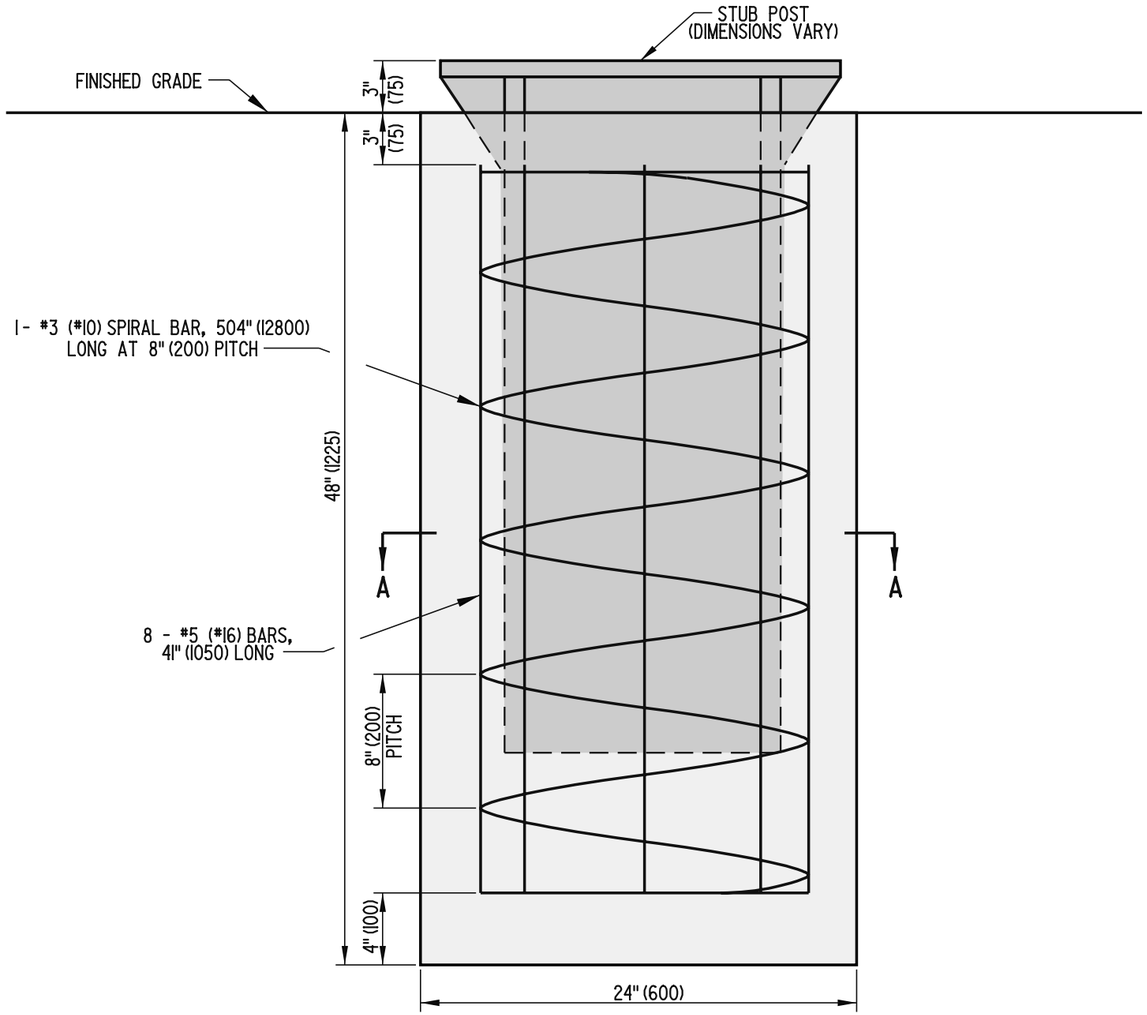
1). UNDERGROUND CONDUIT ENDS SHALL BE CAPPED WITH A GALVANIZED THREADED CONDUIT PLUG UNLESS CONNECTED TO AN EXISTING CONDUIT.

2). PLACE 2 EACH 6" x ½" P.V.C., SCHEDULE 40 (TYP) VENTS IN THE GROUT AS DIRECTED IN THE FIELD BY THE ENGINEER.

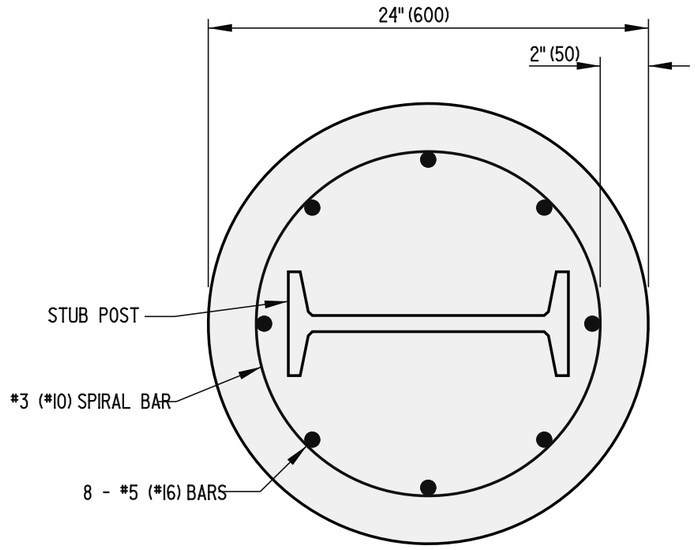
DELAWARE DEPARTMENT OF TRANSPORTATION	SPECIAL POLE BASE		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 12/22/2011 (DATE)
	STANDARD NO. T-6 (2011)	SHT. 1 OF 1	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 12/21/2011 (DATE)

11/15/2011

SCALE : N.T.S.



NOTES: 1). STUB POST TO BE SUPPLIED BY THE DEPARTMENTS TRAFFIC, ENGINEERING, AND MANAGEMENT SECTION.



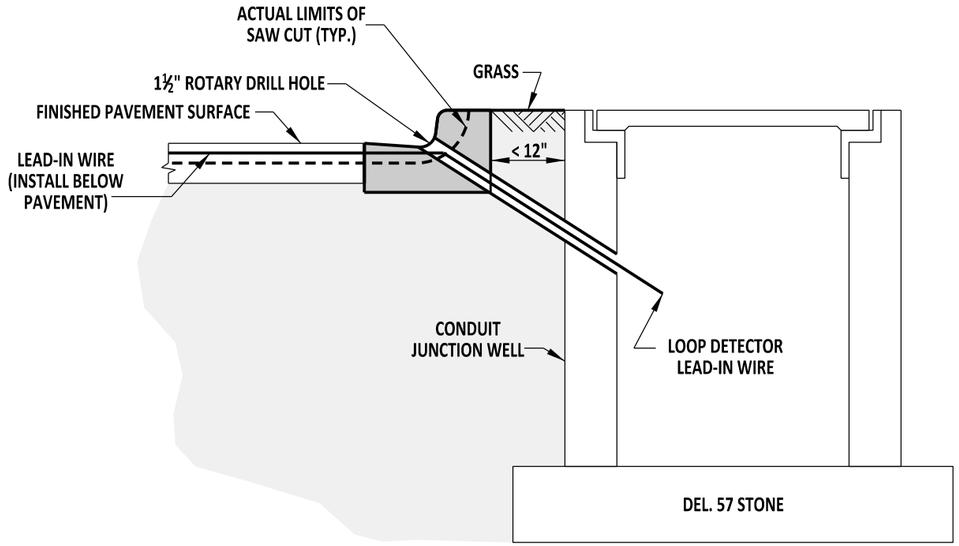
SECTION A-A

DELAWARE DEPARTMENT OF TRANSPORTATION	SIGN FOUNDATION		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. T-7 (2005)	SHT. 1 OF 1	RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

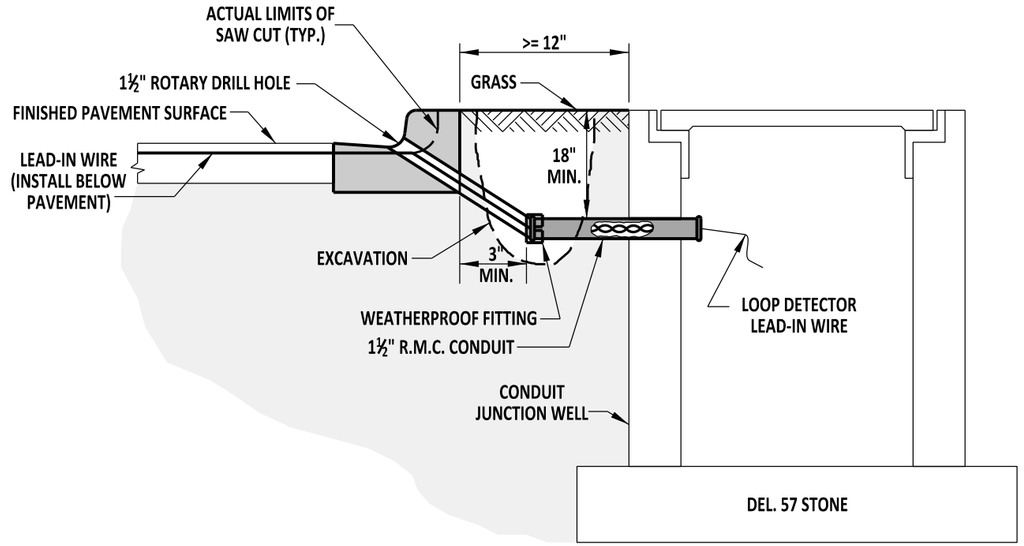
09/09/2005

SCALE : NTS

test



LOOP DETECTOR
LEAD-IN WIRE INSTALLATION



LOOP DETECTOR
LEAD-IN WIRE INSTALLATION

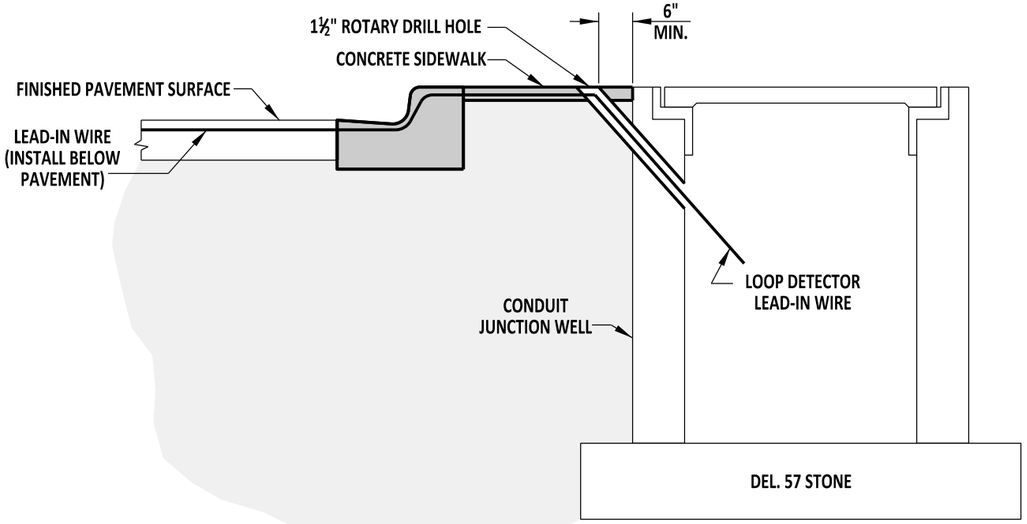
NOTES:

1). ALL SAWCUTS SHALL BE A DEPTH OF 3½" ON ALL SURFACES.
2). CONTRACTOR SHALL INSTALL LEAD-IN WIRE IN THE MOST DIRECT ROUTE TO THE JUNCTION WELL USING THE CLOSEST CONCRETE CURB JOINT.
3). ALL SAWCUTS SHALL BE PATCHED WITH NON-SHRINK CONCRETE CAULK.
4). CONTRACTOR SHALL CORE AT FULL DEPTH OF SAWCUT, 3½".
5). CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHENEVER FEASIBLE.
6). CONTRACTOR SHALL INSTALL DETECTABLE WARNING TAPE IN TRENCH FOR LEAD-IN CONDUIT.

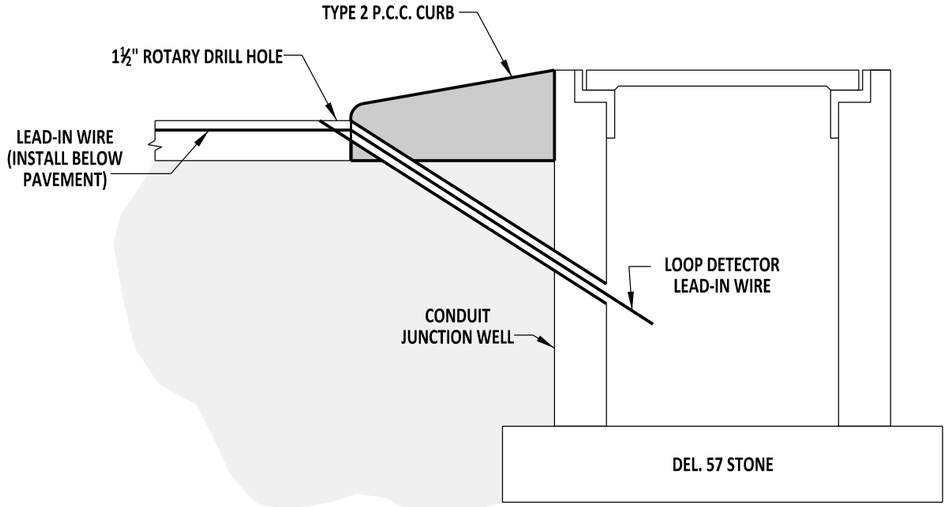
DELAWARE DEPARTMENT OF TRANSPORTATION	LOOP DETECTOR LEAD-IN WIRE INSTALLATION		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-8 (2013)	SHT. 1 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



LOOP DETECTOR
LEAD-IN WIRE INSTALLATION



LOOP DETECTOR
LEAD-IN WIRE INSTALLATION

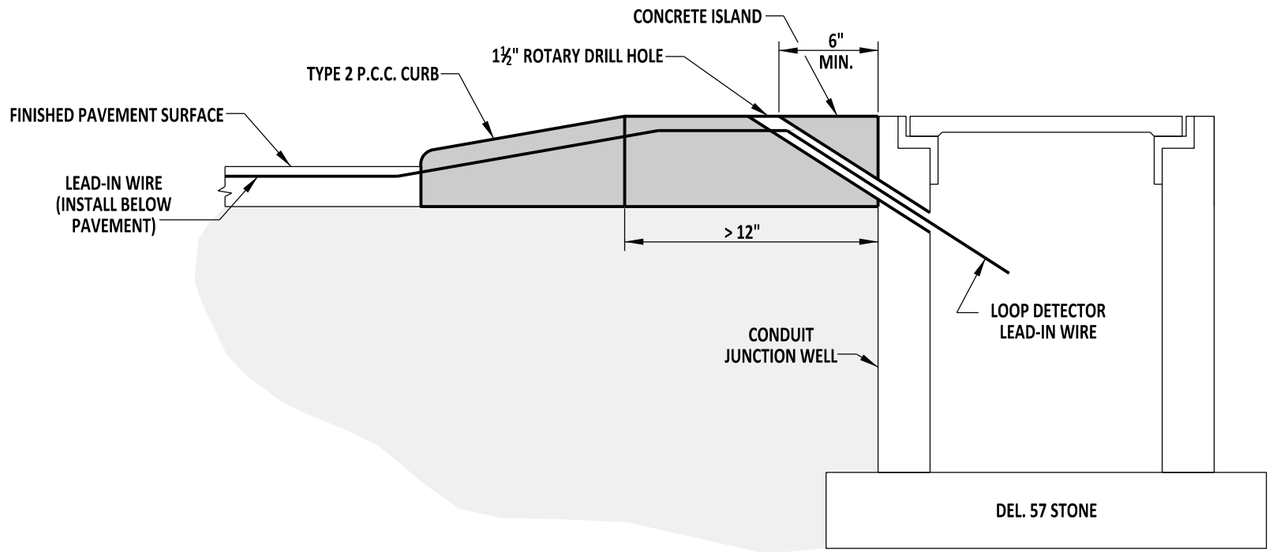
NOTES:

1). ALL SAWCUTS SHALL BE A DEPTH OF 3½" ON ALL SURFACES.
2). CONTRACTOR SHALL INSTALL LEAD-IN WIRE IN THE MOST DIRECT ROUTE TO THE JUNCTION WELL USING THE CLOSEST CONCRETE CURB JOINT.
3). ALL SAWCUTS SHALL BE PATCHED WITH NON-SHRINK CONCRETE CAULK.
4). CONTRACTOR SHALL CORE AT FULL DEPTH OF SAWCUT, 3½".
5). CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHENEVER FEASIBLE.

DELAWARE DEPARTMENT OF TRANSPORTATION	LOOP DETECTOR LEAD-IN WIRE INSTALLATION		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-8 (2013)	SHT. 2 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



LOOP DETECTOR
LEAD-IN WIRE INSTALLATION

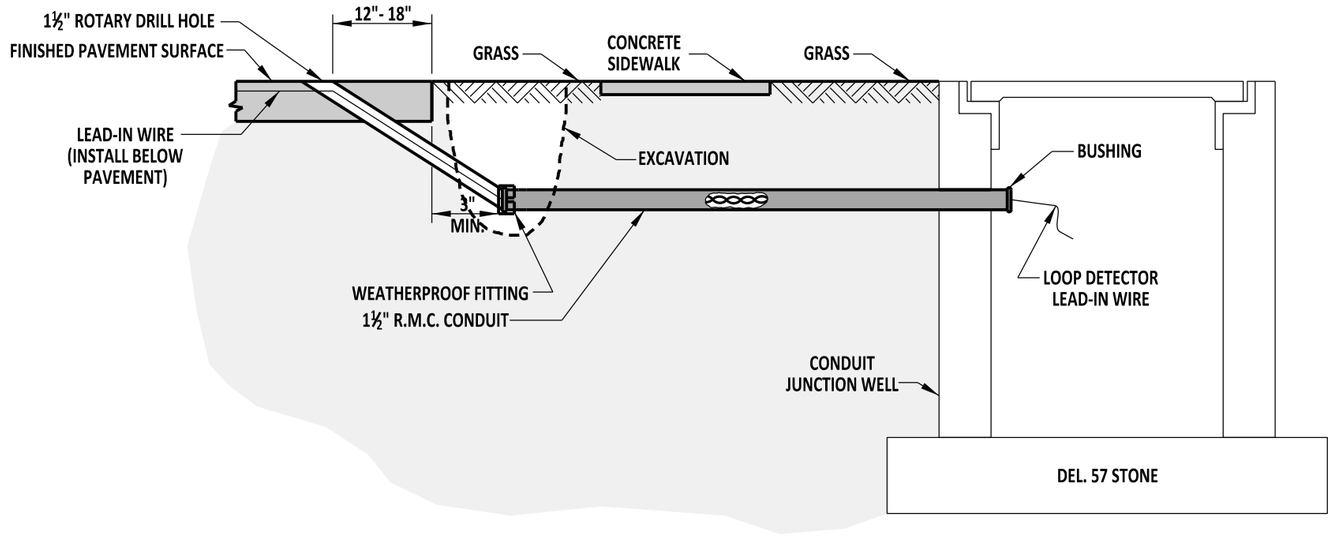
NOTES:

1). ALL SAWCUTS SHALL BE A DEPTH OF 3½" ON ALL SURFACES.
2). CONTRACTOR SHALL INSTALL LEAD-IN WIRE IN THE MOST DIRECT ROUTE TO THE JUNCTION WELL USING THE CLOSEST CONCRETE CURB JOINT.
3). ALL SAWCUTS SHALL BE PATCHED WITH NON-SHRINK CONCRETE CAULK.
4). CONTRACTOR SHALL CORE AT FULL DEPTH OF SAWCUT, 3½".
5). CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHENEVER FEASIBLE.

DELAWARE DEPARTMENT OF TRANSPORTATION	LOOP DETECTOR LEAD-IN WIRE INSTALLATION		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-8 (2013)	SHT. 3 OF 4	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

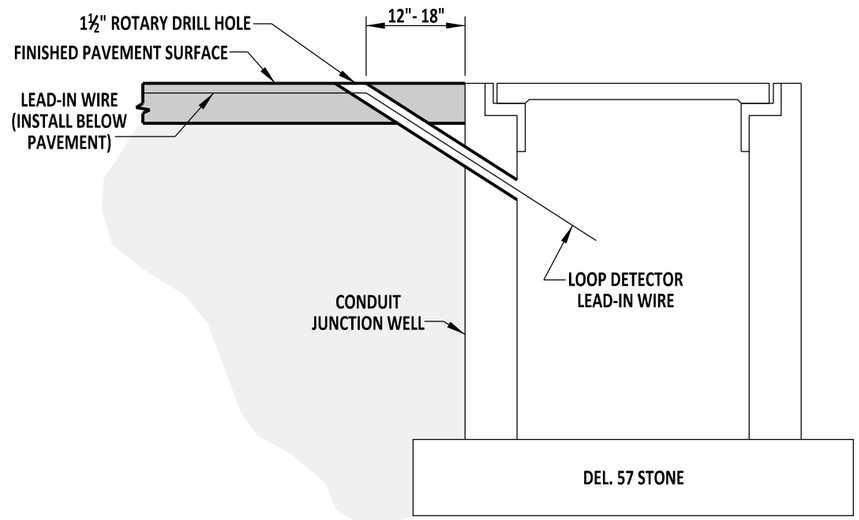
SCALE : NTS



LOOP DETECTOR
LEAD-IN WIRE INSTALLATION

NOTES:

1). ALL SAWCUTS SHALL BE A DEPTH OF 3½" ON ALL SURFACES.
2). CONTRACTOR SHALL INSTALL LEAD-IN WIRE IN THE MOST DIRECT ROUTE TO THE JUNCTION WELL USING THE CLOSEST CONCRETE CURB JOINT.
3). ALL SAWCUTS SHALL BE SEALED WITH AN APPROVED LOOP DETECTOR SEALANT.
4). CONTRACTOR SHALL CORE AT FULL DEPTH OF SAWCUT, 3½".
5). CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHENEVER FEASIBLE.
6). CONTRACTOR SHALL INSTALL DETECTABLE WARNING TAPE IN TRENCH FOR LEAD-IN CONDUIT.

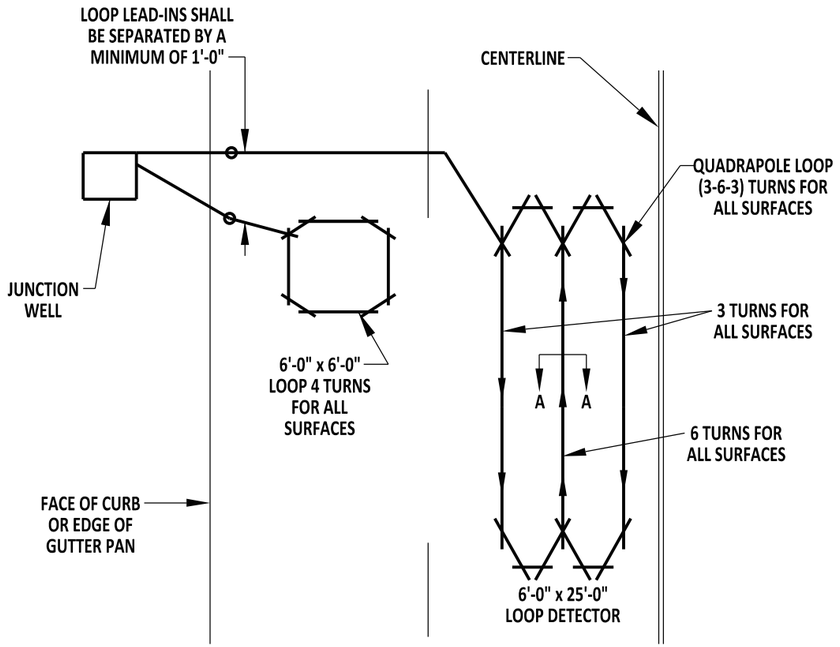


LOOP DETECTOR
LEAD-IN WIRE INSTALLATION

DELAWARE DEPARTMENT OF TRANSPORTATION	LOOP DETECTOR LEAD-IN WIRE INSTALLATION		APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER)	02/14/2014 (DATE)
	STANDARD NO. T-8 (2013)	SHT. 4 OF 4	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER)	01/14/2014 (DATE)

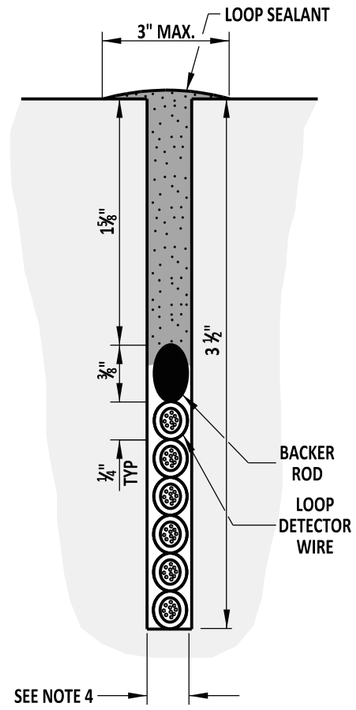
1/9/2014

SCALE : NTS

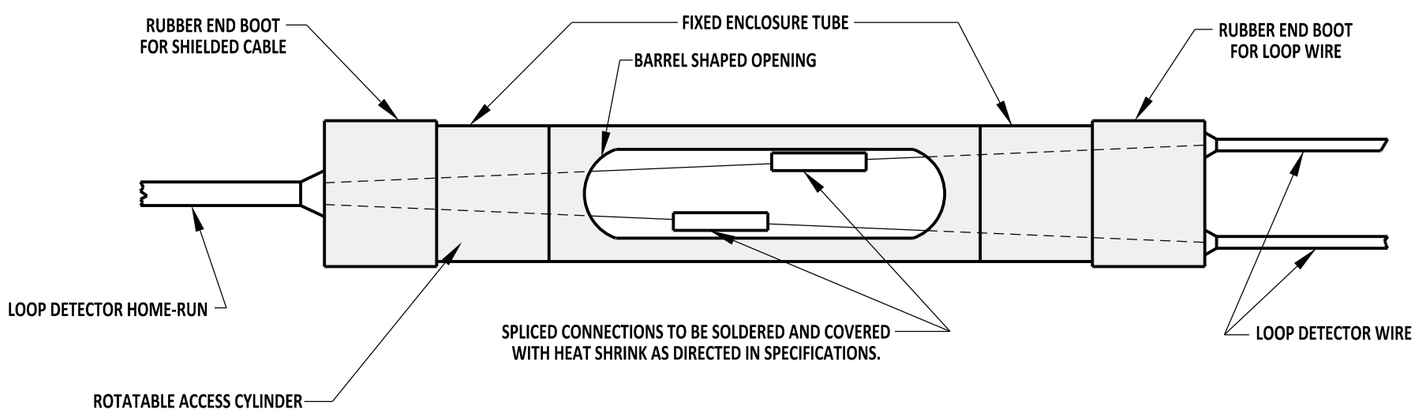


LOOP DETECTOR SAWCUT TYPICAL

REFER TO DETAIL T-8, SHEETS 1 THROUGH 4 FOR LOOP DETECTOR LEAD-IN INSTALLATION REQUIREMENTS.



SECTION A-A
HOT-MIX SURFACE



NOTES:

1). WHEN A PROPOSED LOOP DETECTOR SAWCUT CROSSES A LATERAL ROADWAY JOINT OR OTHER OBSTRUCTION (VALVE COVER, MANHOLE, JUNCTION WELL, ETC.), LOOP DETECTOR INSTALLATION SHALL BE MODIFIED INTO TWO SEPARATE LOOP DETECTORS WHICH SHALL NOT TRAVERSE JOINTS OR OBSTRUCTION.

2). THE LOOPS SHALL BE PLACED IN THE CENTER OF THE LANE UNLESS NOTED OTHERWISE ON PLANS.

3). PRESENCE LOOP DETECTORS ARE TO BE PLACED 12" BEHIND THE EXISTING OR PROPOSED STOP LINE.

4). LOOP DETECTOR AND LEAD-IN SAWCUTS SHALL BE ⅜" WIDE.

DELAWARE
DEPARTMENT OF TRANSPORTATION

LOOP DETECTOR INSTALLATION & SPLICE KIT

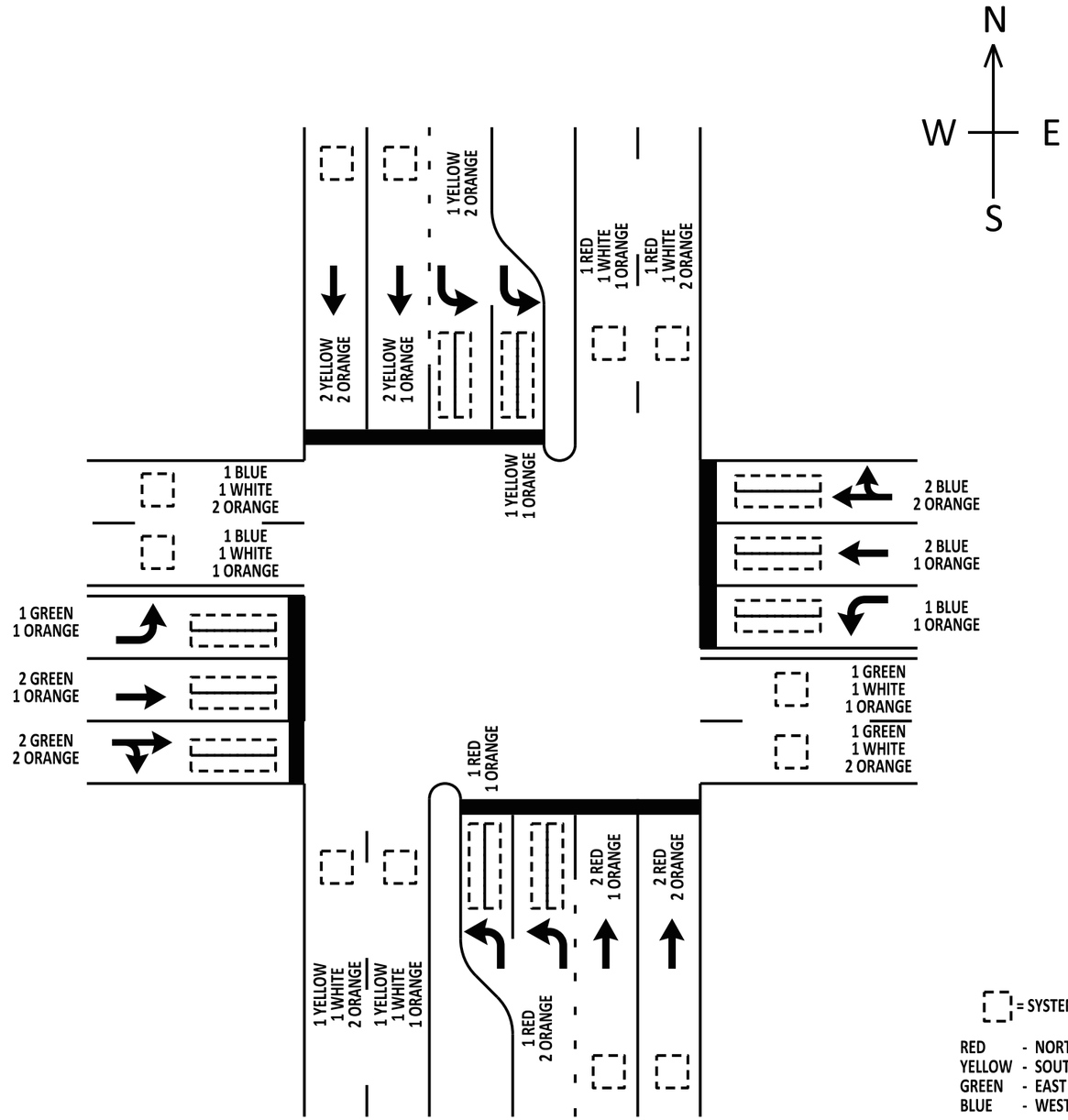
STANDARD NO. T-9 (2013) | SHT. 1 OF 3

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS



NOTES

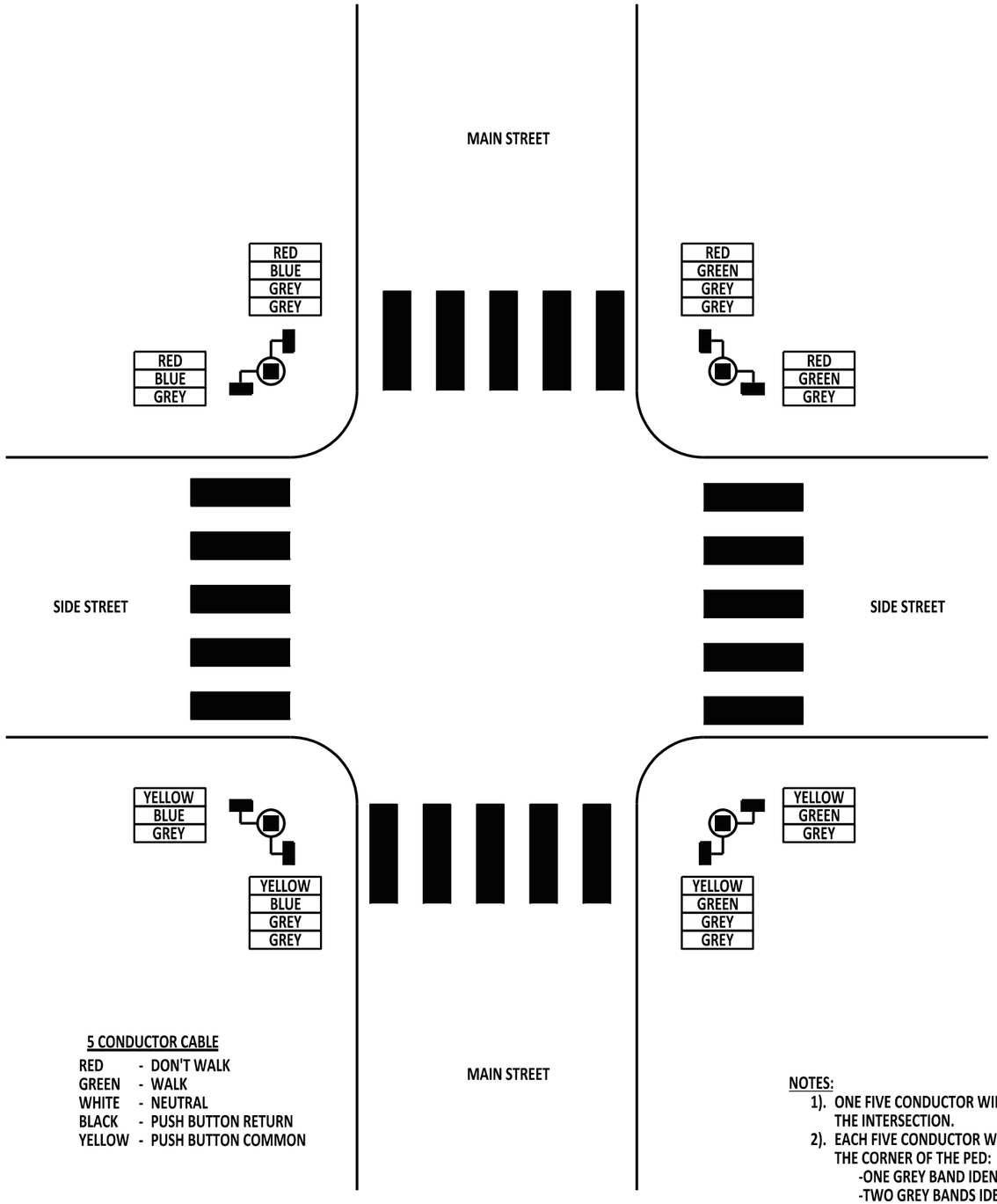
1). ORANGE BANDS SHALL DESIGNATE THE LANE ASSIGNMENT. ALL LANES SHALL BE DESIGNATED FROM LEFT TO RIGHT IN THE DIRECTION OF TRAVEL. EXAMPLE: FOR A DOUBLE LEFT TURN WITH 2 THRU LANES FOR NORTHBOUND, THE CABLES WILL BE IDENTIFIED AS 1-RED W/ 1-ORANGE (LT LANE 1) 1-RED W/ 2-ORANGE (LT LANE 2), 2-RED W/ 1-ORANGE (THRU LANE 1) AND 2-RED W/ 2-ORANGE (THRU LANE 2). THIS CODE IS THEN FOLLOWED FOR THE REMAINING APPROACHES TO THE INTERSECTION.

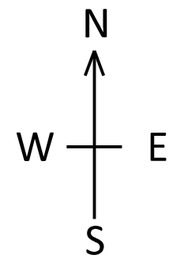
2). THE OPTICAL PRE-EMPTION DETECTOR "HOME RUN" CABLE(S) SHALL BE IDENTIFIED WITHIN THE CONTROL CABINET BY A VIOLET BAND PLUS A COLOR BAND, AS NOTED TO DENOTE THE DIRECTION OF THE DETECTOR.

DELAWARE DEPARTMENT OF TRANSPORTATION	LOOP DETECTOR INSTALLATION & SPLICE KIT		APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)
	STANDARD NO. T-9 (2013)	SHT. 2 OF 3	RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

SCALE : NTS





RED - NORTH
YELLOW - SOUTH
GREEN - EAST
BLUE - WEST

5 CONDUCTOR CABLE

RED - DON'T WALK
GREEN - WALK
WHITE - NEUTRAL
BLACK - PUSH BUTTON RETURN
YELLOW - PUSH BUTTON COMMON

NOTES:

1). ONE FIVE CONDUCTOR WIRE WILL BE PULLED TO EACH PED MODULE OF THE INTERSECTION.
2). EACH FIVE CONDUCTOR WIRE WILL HAVE COLOR BANDS INDICATING THE CORNER OF THE PED:
-ONE GREY BAND IDENTIFYING MAIN STREET
-TWO GREY BANDS IDENTIFYING SIDE STREET.

DELAWARE
DEPARTMENT OF TRANSPORTATION

LOOP DETECTOR INSTALLATION & SPLICE KIT

STANDARD NO. T-9 (2013) | SHT. 3 OF 3

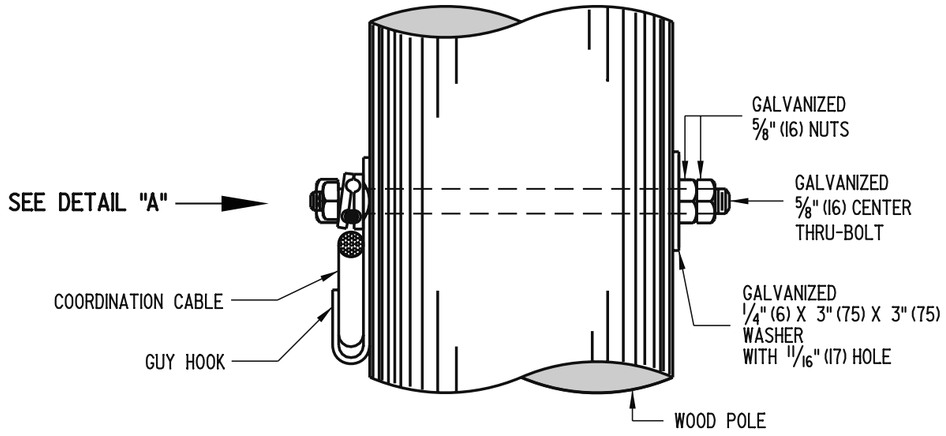
APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

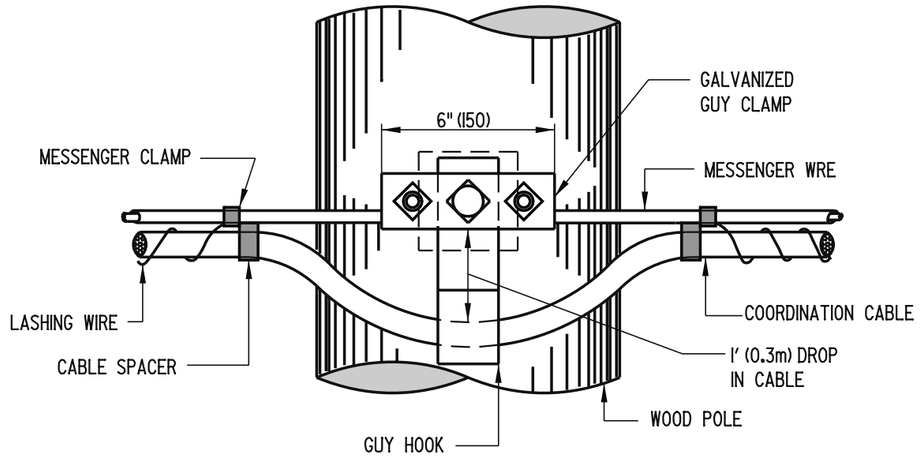
1/9/2014

SCALE : N.T.S.

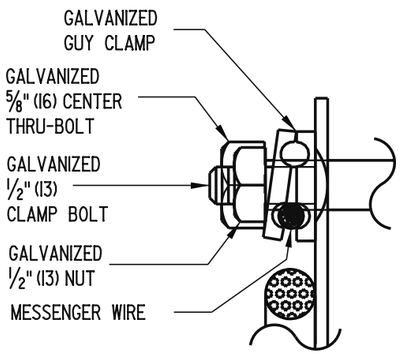
INTERMEDIATE



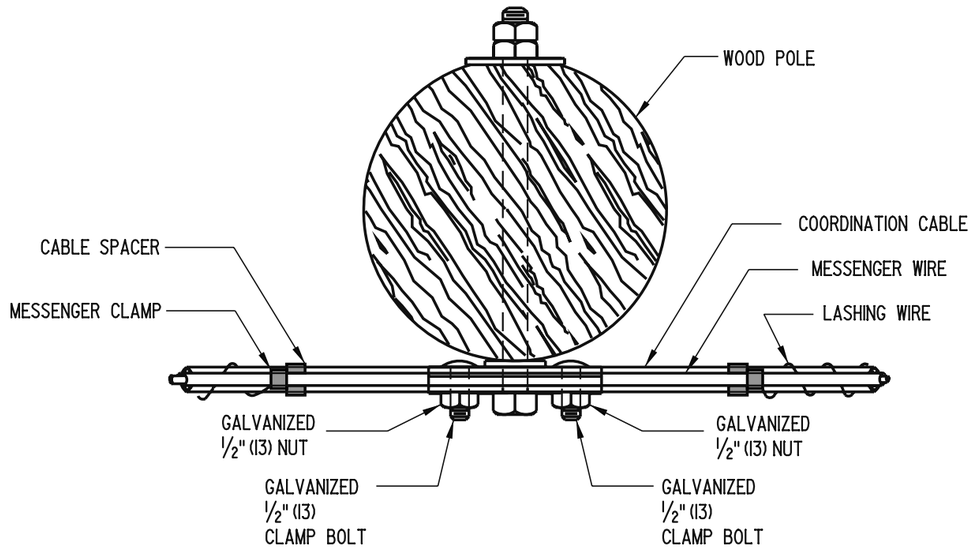
SIDE VIEW



FRONT VIEW



DETAIL "A"

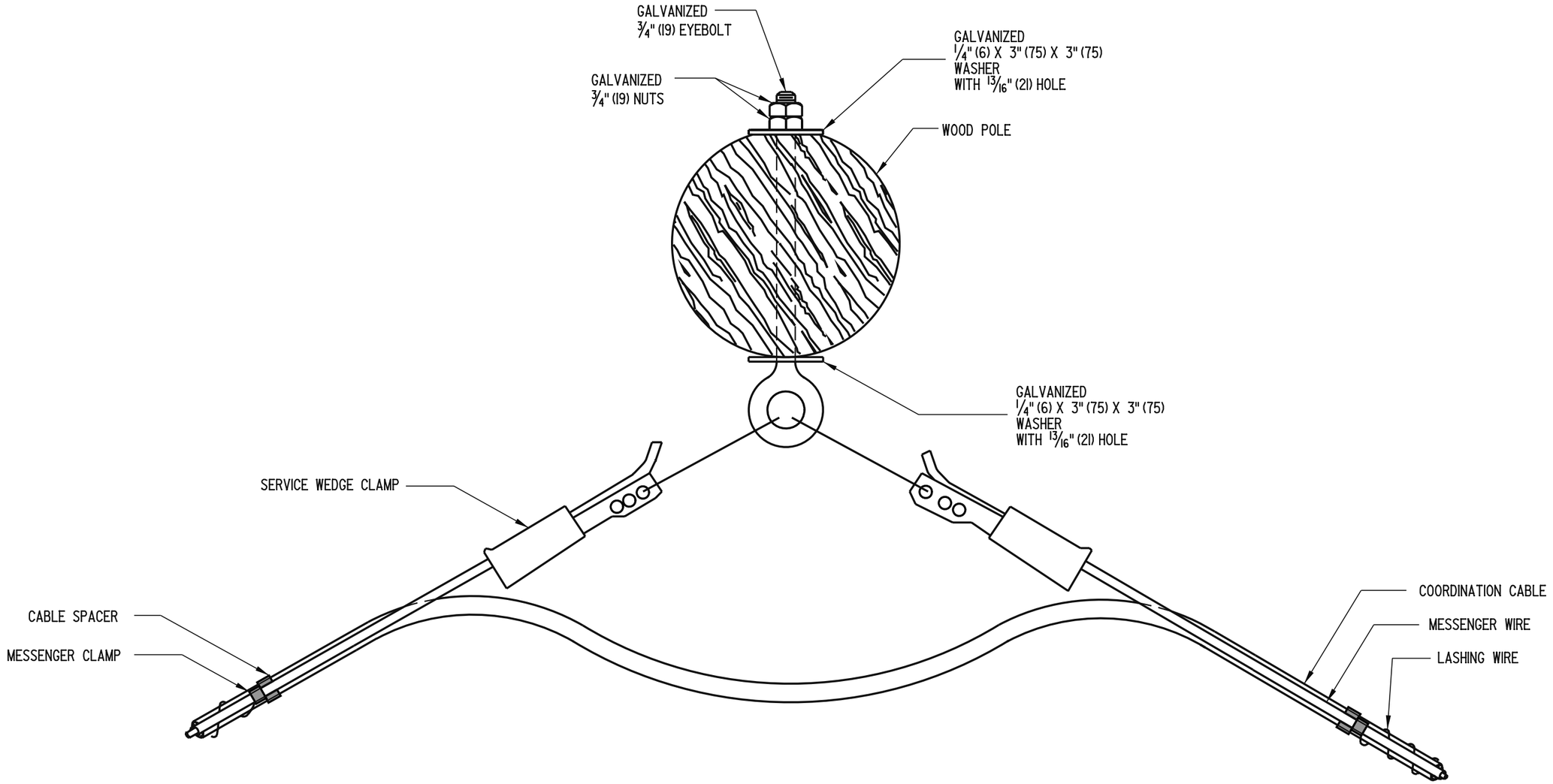


TOP VIEW

DELAWARE DEPARTMENT OF TRANSPORTATION	INTERMEDIATE MESSENGER WIRE ATTACHMENT ON WOOD POLES	APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. T-11 (2005) SHT. 1 OF 2	RECOMMENDED James M. Ojeda DESIGN ENGINEER 11/29/05 DATE

09/09/2005

SCALE : N.T.S.

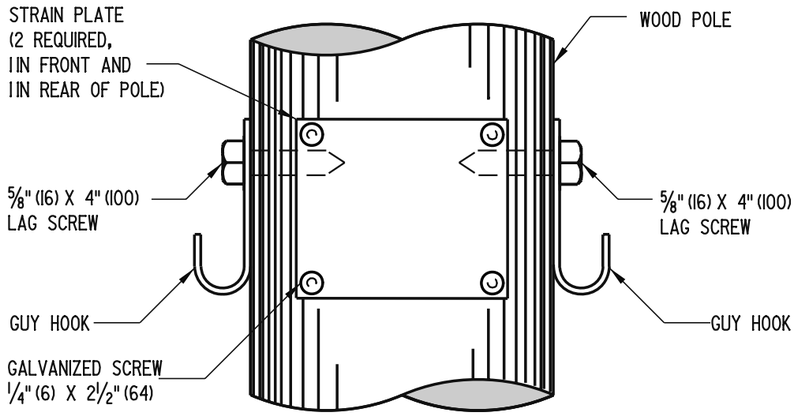


TOP VIEW

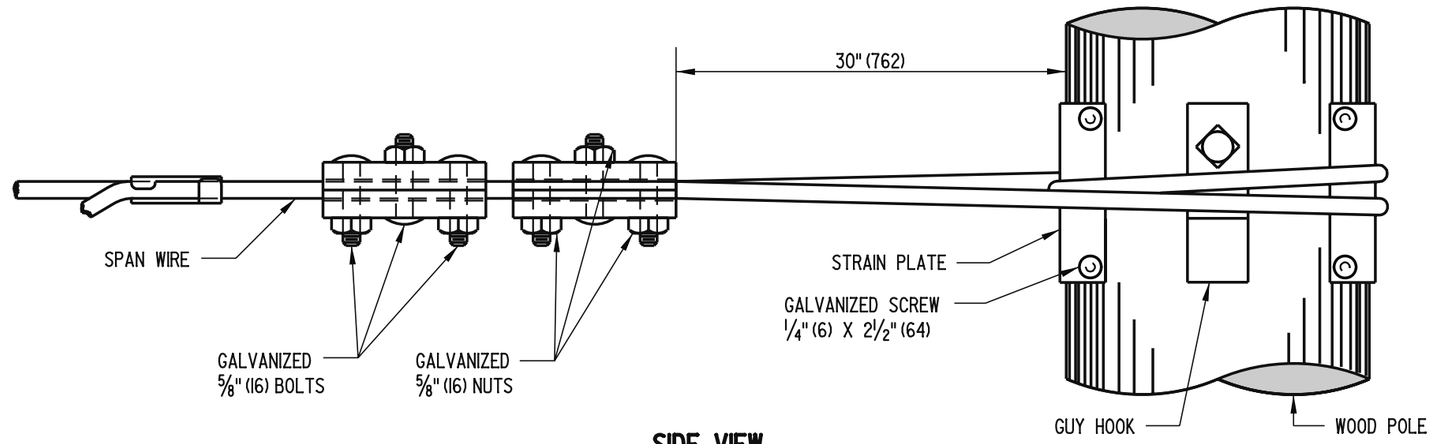
DELAWARE DEPARTMENT OF TRANSPORTATION	ANGULAR INTERMEDIATE MESSENGER WIRE ATTACHMENT		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. T-11 (2005)	SHT. 2 OF 2	RECOMMENDED DESIGN ENGINEER 11/29/05 DATE

09/27/2004

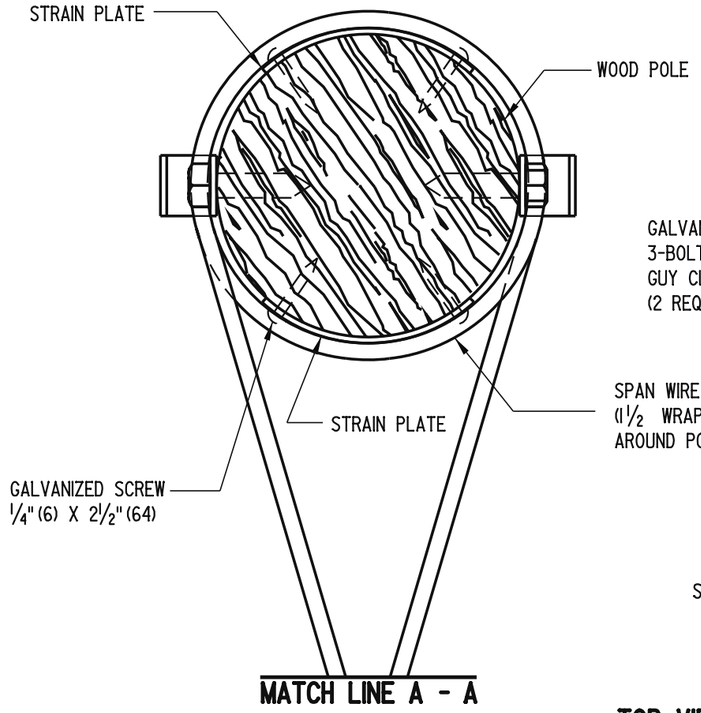
SCALE : N.T.S.



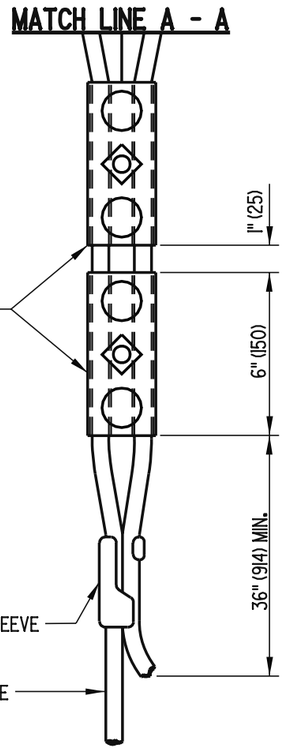
FRONT VIEW
(SPAN WIRE NOT SHOWN)



SIDE VIEW



MATCH LINE A - A



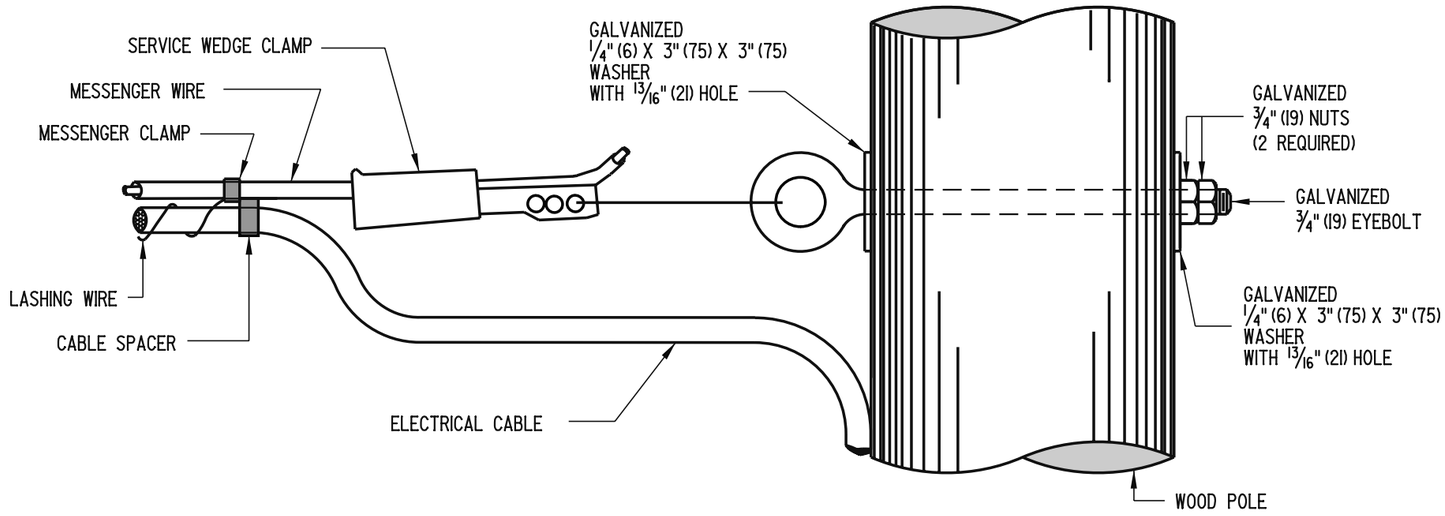
TOP VIEW

NOTE: SPAN WIRE ATTACHMENT BETWEEN METAL POLES IS THE SAME AS SHOWN FOR WOOD POLES EXCEPT THAT THE STRAIN PLATES AND GUY HOOKS ARE NOT USED. FOR DETAIL SEE T-14 SHEET 2 - "DEAD END MESSENGER WIRE ATTACHMENT, METAL POLES ".

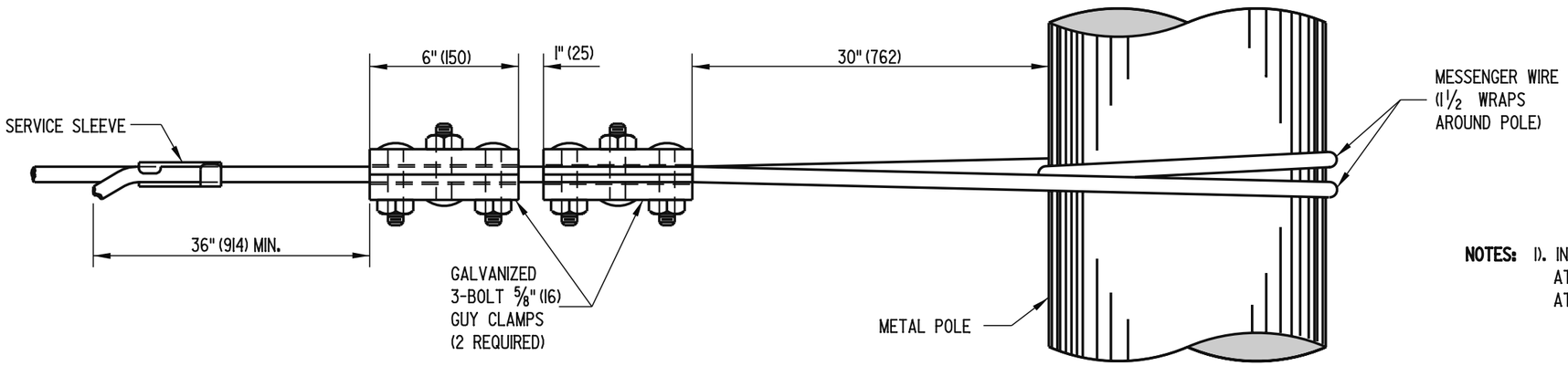
DELAWARE DEPARTMENT OF TRANSPORTATION	SPAN WIRE ATTACHMENT BETWEEN POLES	APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. T-12 (2005) SHT. 1 OF 2	RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

09/09/2005

SCALE : N.T.S.



WOOD POLES



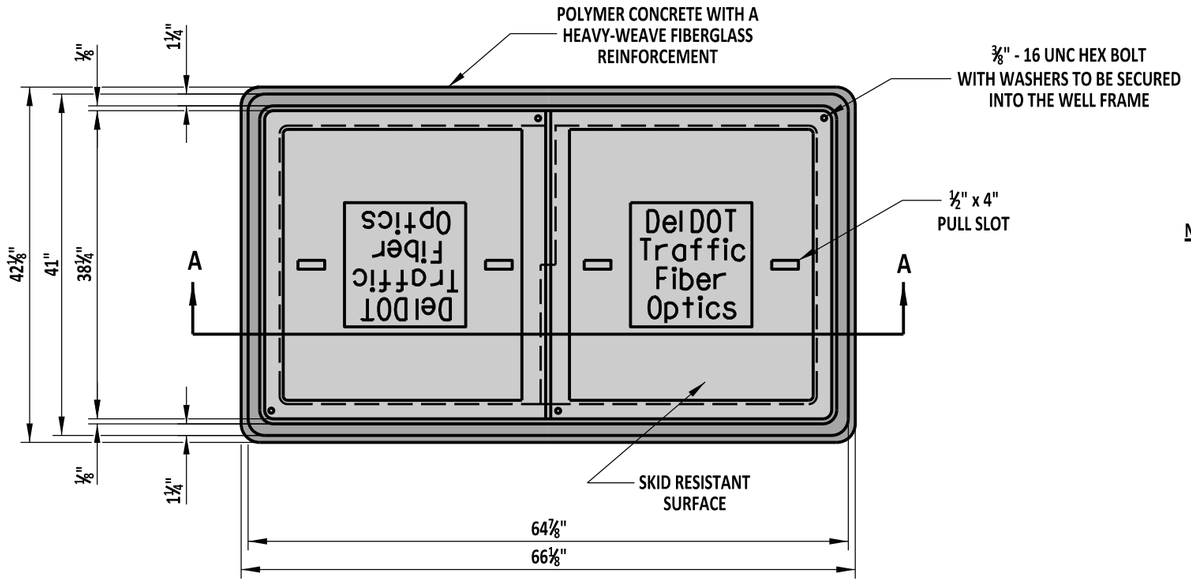
NOTES: 1). INSTALLATION METHOD SHOWN FOR DEAD END MESSENGER WIRE ATTACHMENT TO METAL POLES SHALL BE USED FOR SPAN WIRE ATTACHMENT BETWEEN METAL POLES.

METAL POLES

DELAWARE DEPARTMENT OF TRANSPORTATION	DEAD END MESSENGER WIRE ATTACHMENT		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. T-12 (2005)	SHT. 2 OF 2	RECOMMENDED James M. Ojeda DESIGN ENGINEER 11/29/05 DATE

09/09/2005

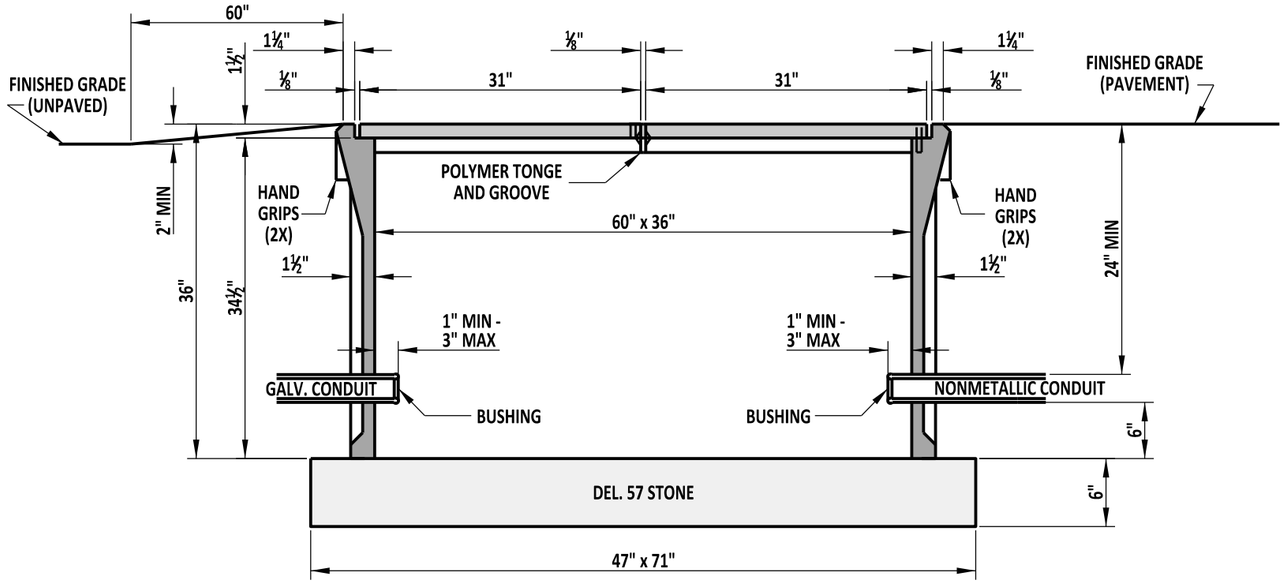
SCALE : NTS



PLAN VIEW

NOTES:

1). TYPE 7 CONDUIT JUNCTION WELL SHALL BE PRECAST POLYMER CONCRETE.
2). ALL CONDUIT JUNCTION WELLS CONSTRUCTED WITHIN PAVEMENT, SIDEWALKS, ETC. WILL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM THE CONDUIT JUNCTION WELL.
3). POLYMER CONCRETE COVERS SHALL BE THE HEAVY DUTY TYPE WITH A DESIGN LOAD OF 15,000 LBS OVER A 10" SQUARE.

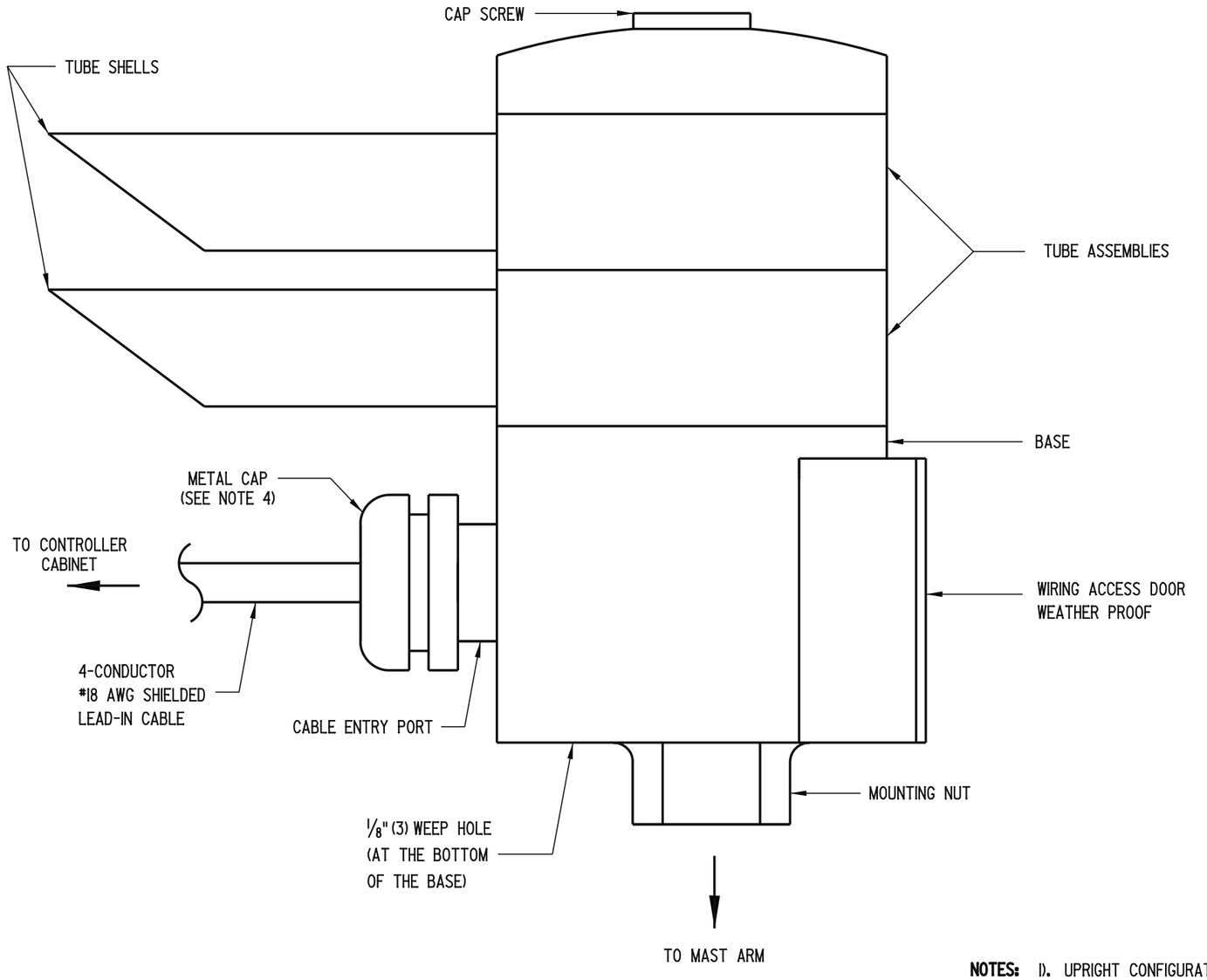


SECTION A-A

DELAWARE DEPARTMENT OF TRANSPORTATION	CONDUIT JUNCTION WELL, TYPE 7		APPROVED	SIGNATURE ON FILE (CHIEF ENGINEER)	02/14/2014 (DATE)
	STANDARD NO. T-13 (2013)	SHT. 1 OF 1	RECOMMENDED	SIGNATURE ON FILE (DESIGN ENGINEER)	01/14/2014 (DATE)

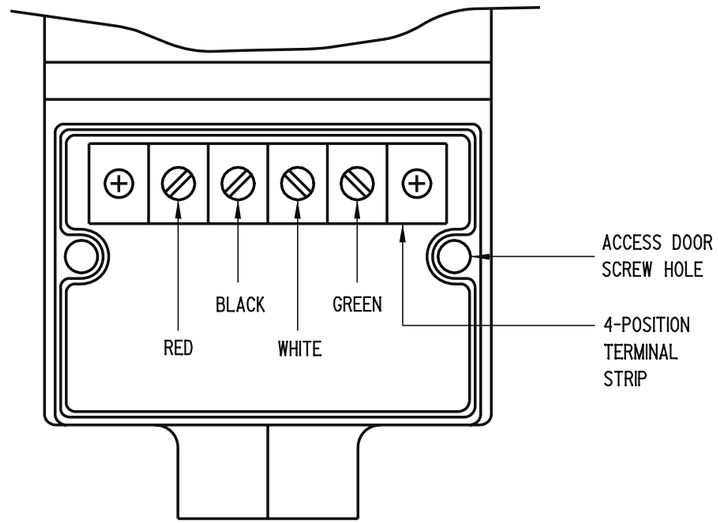
1/9/2014

SCALE : N.T.S.



SIDE VIEW

CABLE CONNECTIONS TO TERMINAL STRIP



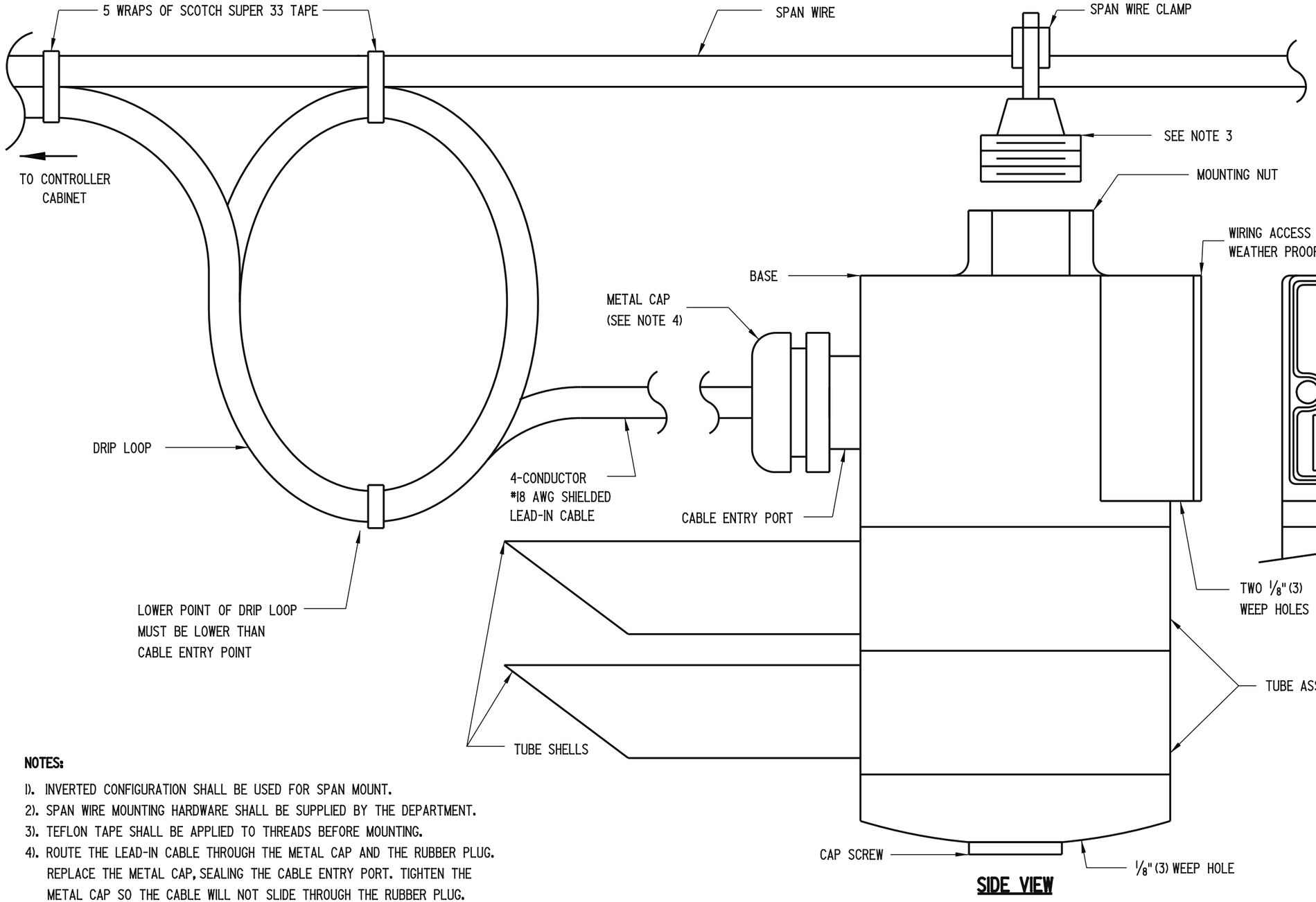
FRONT VIEW
(CABLE IS NOT SHOWN)

NOTES:
1). UPRIGHT CONFIGURATION SHALL BE USED FOR MOUNTING ON MAST ARMS, SIGNAL HEAD FRAMEWORKS AND PEDESTALS.
2). UPRIGHT MOUNTING HARDWARE SHALL BE SUPPLIED BY THE DEPARTMENT.
3). TEFLON TAPE SHALL BE APPLIED TO THREADS BEFORE MOUNTING.
4). ROUTE THE LEAD-IN CABLE THROUGH THE METAL CAP AND THE RUBBER PLUG. REPLACE THE METAL CAP, SEALING THE CABLE ENTRY PORT. TIGHTEN THE METAL CAP SO THE CABLE WILL NOT SLIDE THROUGH THE RUBBER PLUG.

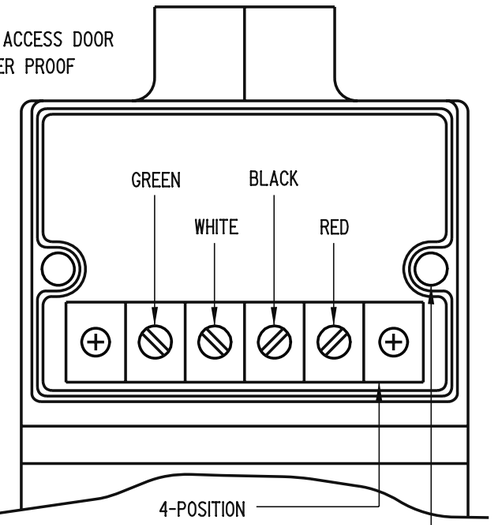
DELAWARE DEPARTMENT OF TRANSPORTATION	EMERGENCY PREEMPTION RECEIVER, UPRIGHT MOUNT		APPROVED CHIEF ENGINEER 10/10/06 DATE
	STANDARD NO. T-14 (2006)	SHT. 1 OF 2	RECOMMENDED DESIGN ENGINEER 10/3/06 DATE

06/27/2006

SCALE : N.T.S.



CABLE CONNECTIONS TO TERMINAL STRIP



FRONT VIEW
(CABLE IS NOT SHOWN)

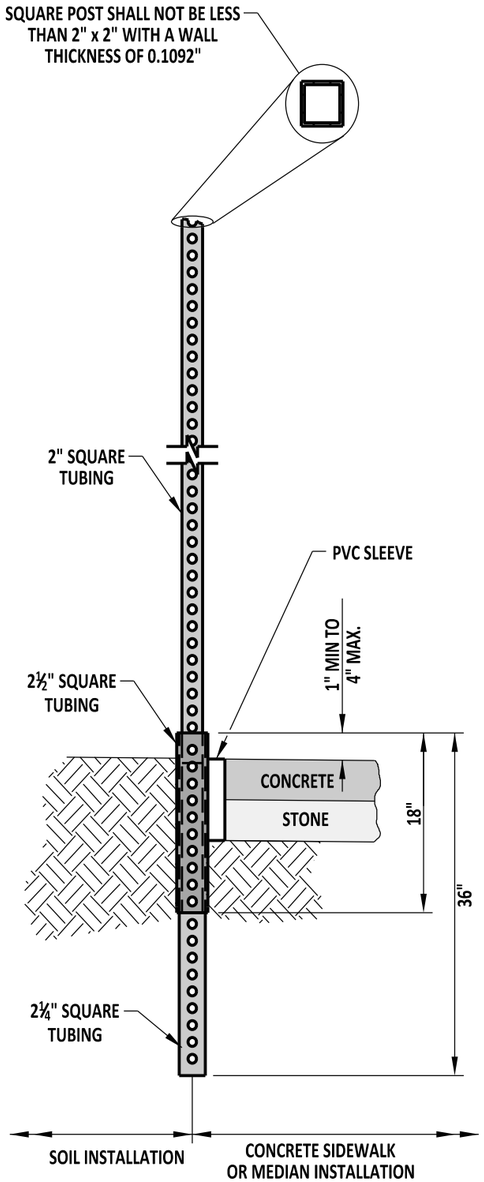
NOTES:

1). INVERTED CONFIGURATION SHALL BE USED FOR SPAN MOUNT.
2). SPAN WIRE MOUNTING HARDWARE SHALL BE SUPPLIED BY THE DEPARTMENT.
3). TEFLON TAPE SHALL BE APPLIED TO THREADS BEFORE MOUNTING.
4). ROUTE THE LEAD-IN CABLE THROUGH THE METAL CAP AND THE RUBBER PLUG. REPLACE THE METAL CAP, SEALING THE CABLE ENTRY PORT. TIGHTEN THE METAL CAP SO THE CABLE WILL NOT SLIDE THROUGH THE RUBBER PLUG.

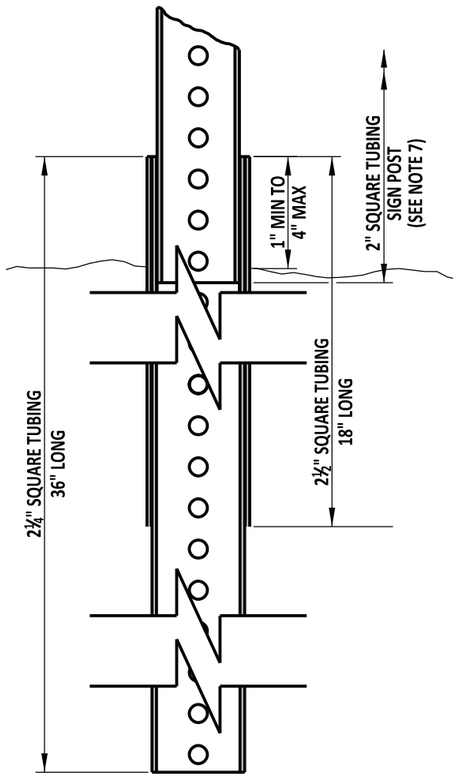
DELAWARE DEPARTMENT OF TRANSPORTATION	EMERGENCY PREEMPTION RECEIVER, INVERTED MOUNT		APPROVED Carolann Wicks CHIEF ENGINEER 12/5/05 DATE
	STANDARD NO. T-14 (2005)	SHT. 2 OF 2	RECOMMENDED James M. O'Neill DESIGN ENGINEER 11/29/05 DATE

09/09/2005

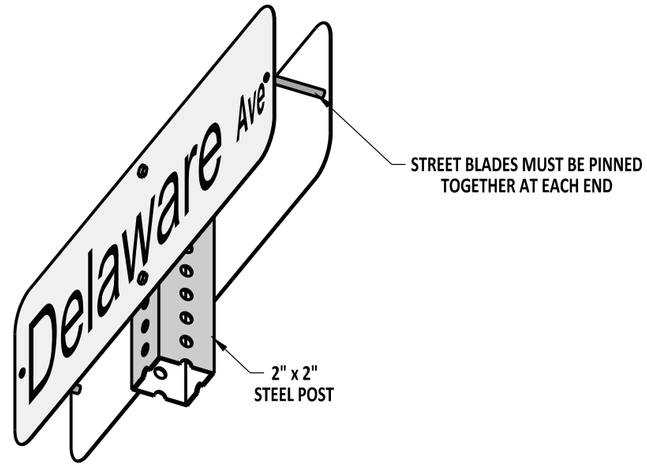
SCALE : NTS



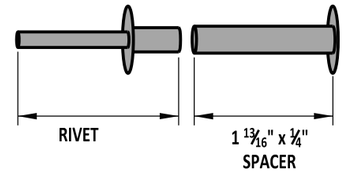
BREAK-AWAY ASSEMBLY ELEVATION VIEW



BREAK-AWAY ASSEMBLY SECTION VIEW



TYPICAL ASSEMBLY



PIN ASSEMBLY

NOTE: THE PIN ASSEMBLY IS TO BE USED WITH THE INSTALLATION OF BACK TO BACK STREET BLADE SIGNS WITH 6" LETTERS.

NOTES:

1). SQUARE TUBES ARE TO BE FORMED FROM GALVANIZED SHEET STRUCTURAL (PHYSICAL) QUALITY, ASTM A 446, GRADE A, COATING DESIGNATION G 90, REGULAR SPANGLE, OR HOT ROLLED CARBON SHEET STEEL STRUCTURAL (PHYSICAL) QUALITY, ASTM A 57, GRADE 33.

2). NOMINAL OUTSIDE DIMENSIONS ARE AS FOLLOWS:
   A). 2" x 2" +/- 0.008
   B). 2¼" x 2¼" +/- 0.010
   C). 2½" x 2½" +/- 0.010

3). ALL FOUR SIDES ARE TO HAVE EVENLY SPACED 7/16" DIAMETER HOLES ON 1" CENTERS THE ENTIRE LENGTH OF THE TUBE.

4). STANDARD CORNER RADIUS SHALL BE 5/32".

5). THE FASTENERS TO BE SUPPLIED UNDER THIS SPECIFICATION SHALL BE 5/16", GRADE 5 UNC CORNER BOLTS WITH CADMIUM OR ZINC PLATING. INSTALLATION OF SIGNS SHALL BE WITH 3/8" x 2½" BOLT WITH LOCKNUT AND WASHER.

6). THE CONTRACTOR SHALL PROVIDE AND INSTALL PVC SLEEVES (4" INSIDE DIAMETER MINIMUM, 6" INSIDE DIAMETER MAXIMUM) IN PROPOSED CONCRETE SIDEWALKS, ISLANDS, AND MEDIANS FOR FUTURE TRAFFIC SIGN POSTS AS DIRECTED BY THE ENGINEER. THE LOWER END OF THE SLEEVE SHALL BE SET ON TOP OF THE SOIL.

7). THE SIGN POST SHALL EXTEND A MINIMUM OF 4" INTO THE 2½" SQUARE TUBING.

DELAWARE
DEPARTMENT OF TRANSPORTATION

BREAKWAY SIGN POST AND PIN ASSEMBLY DETAILS

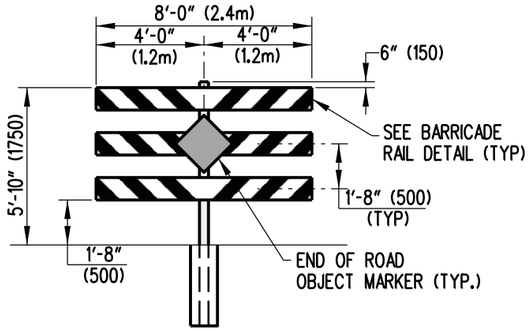
STANDARD NO. T-15 (2013) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

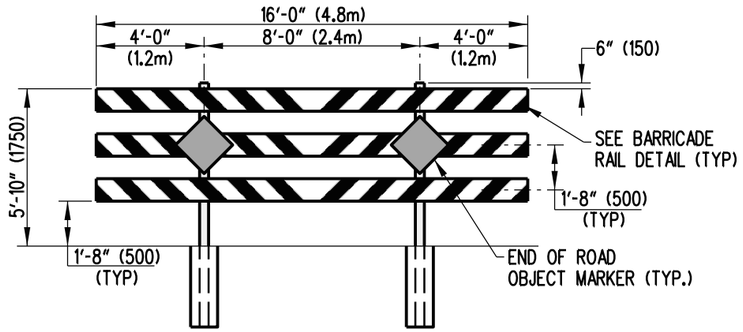
RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014

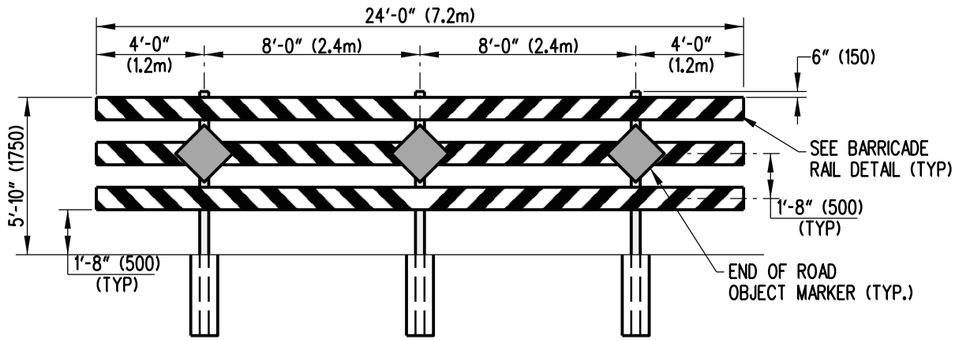
SCALE : N.T.S.



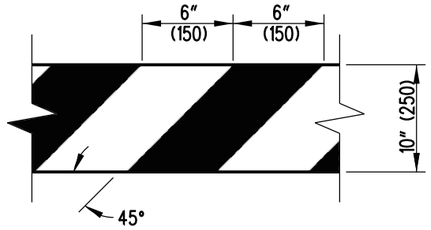
1-POST PERMANENT WOOD BARRICADE DETAIL



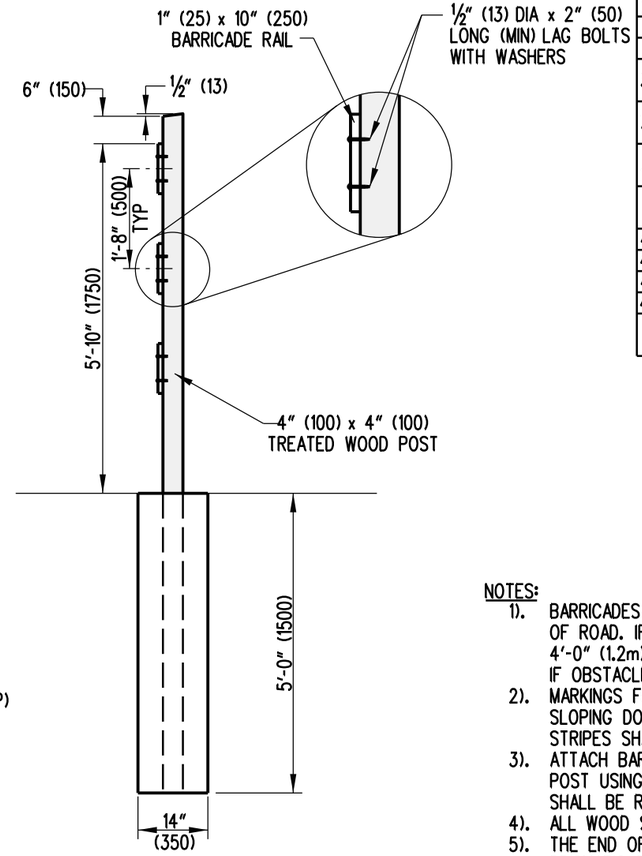
2-POST PERMANENT WOOD BARRICADE DETAIL



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

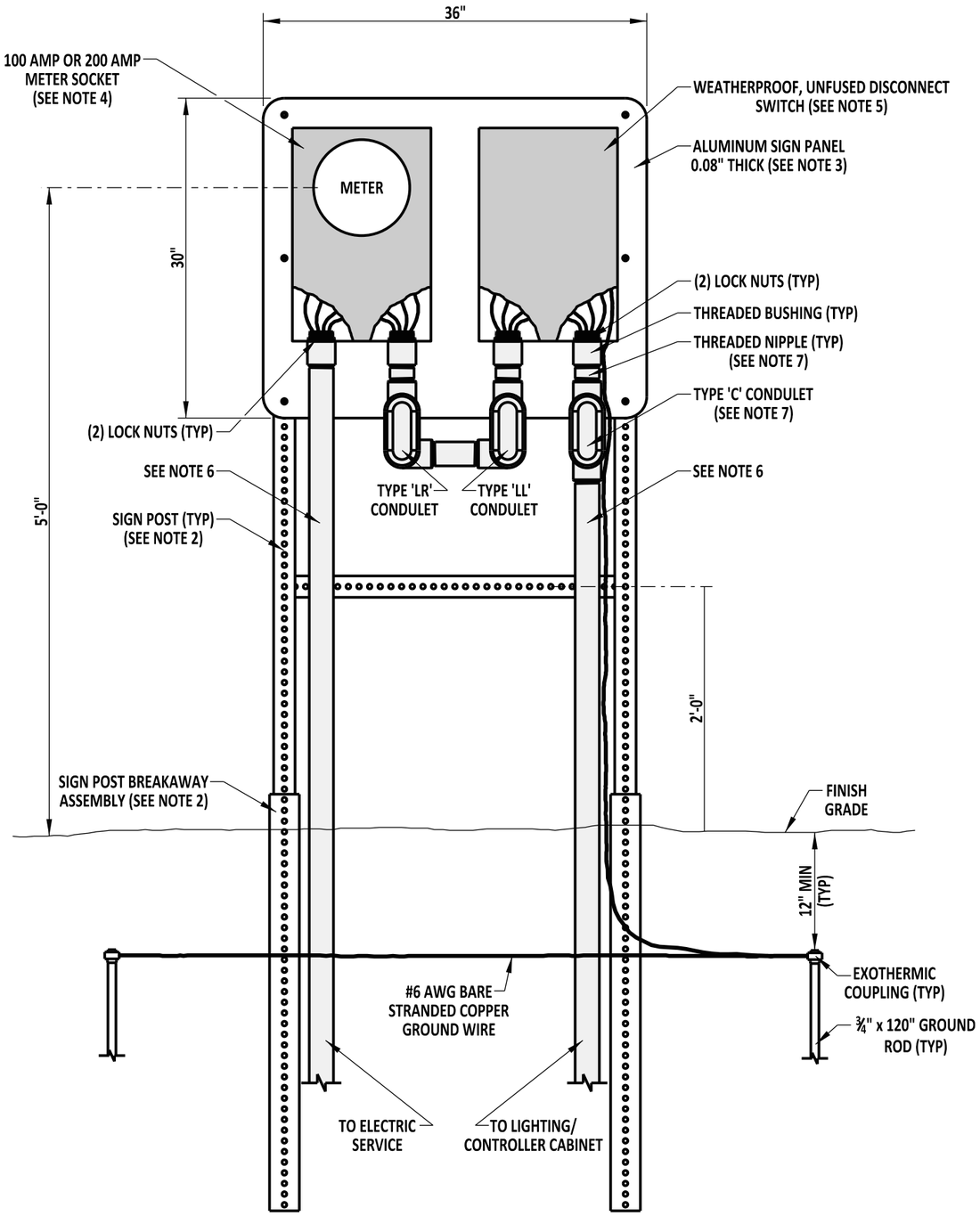
STANDARD NO. T-16 (2010) | SHT. 1 OF 1

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

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

10/19/2010

SCALE : NTS



NOTES:

1). INSTALLATION OF EQUIPMENT BETWEEN SERVICE PEDESTAL AND LIGHTING/CONTROLLER CABINET SHALL BE AS PER CONTRACT DRAWINGS/DETAILS.
2). SEE DETAIL T-15, SHEET 1, FOR SIGN POST AND BREAKAWAY ASSEMBLY DETAILS.
3). ATTACH ALUMINUM PANEL TO SIGN POSTS WITH (6) $\frac{5}{16}$" x 2½" LONG GRADE 5 BOLTS, FLAT WASHERS, AND NYLON LOCK NUTS, 3 ON EACH SIDE.
4). MOUNT METER SOCKET TO ALUMINUM PANEL WITH (4) $\frac{5}{16}$" x ¾" STAINLESS STEEL BOLTS AND NYLON LOCK NUTS.
5). MOUNT DISCONNECT SWITCH TO ALUMINUM PANEL WITH (4) $\frac{5}{16}$" x ¾" STAINLESS STEEL BOLTS AND NYLON LOCK NUTS.
6). ALL CONDUIT, CONDULETS AND OTHER ASSOCIATED PIECES SHALL BE 2" GALVANIZED UNLESS SPECIFIED DIFFERENTLY ON THE PLANS OR BY LOCAL UTILITY COMPANY.
7). FOR SIGNAL AND 'ITMS' COMPONENT INSTALLATIONS, TYPE 'C' CONDULET SHALL HOUSE INLINE FUSE KITS FOR EACH DEVICE POWERED.

DELAWARE
DEPARTMENT OF TRANSPORTATION

ELECTRICAL SERVICE PEDESTAL -
LIGHTING, SIGNAL & 'ITMS' COMPONENT INSTALLATIONS

STANDARD NO. T-17 (2013) | SHT. 1 OF 1

APPROVED SIGNATURE ON FILE (CHIEF ENGINEER) 02/14/2014 (DATE)

RECOMMENDED SIGNATURE ON FILE (DESIGN ENGINEER) 01/14/2014 (DATE)

1/9/2014