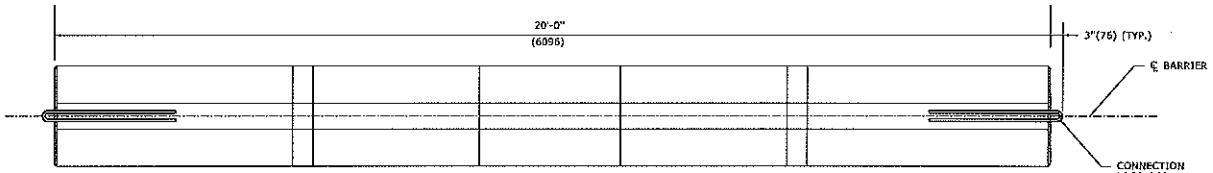
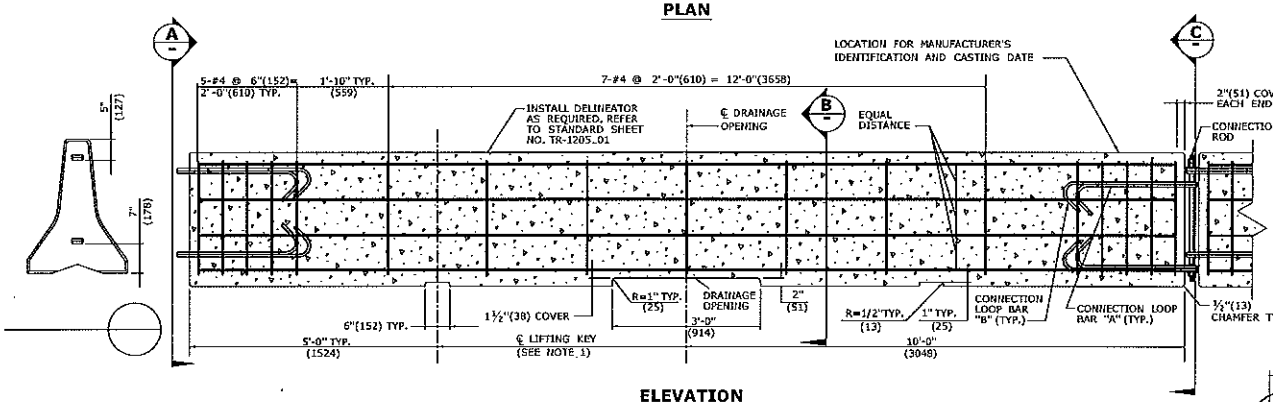
GENERAL NOTES:

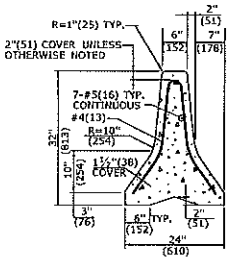
1. ALTERNATE DESIGNS FOR LIFTING KEYS, HOLES OR OTHER HANDLING DEVICES MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
2. EXPECTED PERMANENT DYNAMIC DEFLECTION IS 3'-6" (1148) BASED ON TL-3 CRASH TESTS WITH 240' (73152) OF TPCBC.



PLAN



ELEVATION



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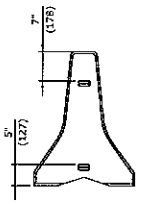
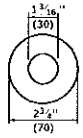
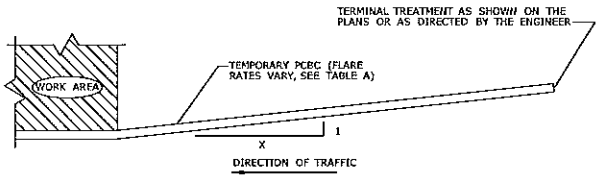


END VIEW C



WASHER DETAIL

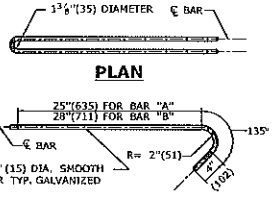


PLAN - TYPICAL INSTALLATION

TABLE A

FLARE RATES	
* SPEED	FLARE RATE (X : 1)
≤ 30MPH(48KPH)	4 : 1
> 30MPH(48KPH) <45MPH(72KPH)	6 : 1
≥ 45MPH(72KPH) NON-LIMITED ACCESS HIGHWAYS	8 : 1
ALL LIMITED ACCESS HIGHWAYS	10 : 1

* DESIGN SPEED THROUGH THE WORK AREA.

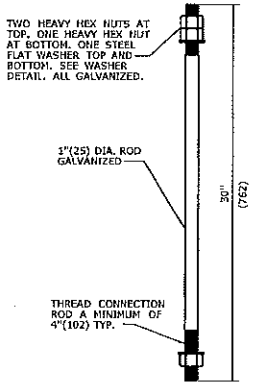


PLAN

ELEVATION

BAR "A" = 6'-0"(1829) TOTAL
BAR "B" = 6'-6"(1981) TOTAL

CONNECTION LOOP BAR



CONNECTION ROD

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

1	3/12	REVISE SLOPE NOTE & DETAIL NOTE
2	7/13	ERRATA
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS OF THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

NOT TO SCALE

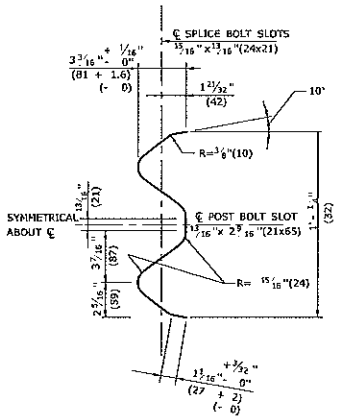
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

NAME/DATE/TIME:
Digitally signed by Lori L. Fontana
Date: 2013.07.24 11:02:24 -04'00'
APPROVED BY: NAME/DATE/TIME:
James H. Norman
2013.07.24 14:48:34-04'00'

CTDOT STANDARD SHEET
OFFICE OF ENGINEERING

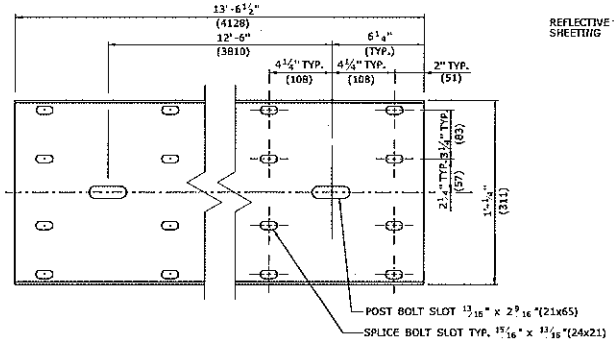
TEMPORARY PRECAST CONCRETE BARRIER CURB

HW-822_01

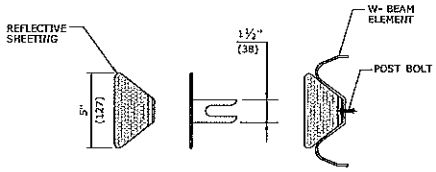


SELECTION THRU RAIL ELEMENT
END VIEW

NOTE: ALL DIMENSIONS SUBJECT TO MANUFACTURING TOLERANCES



TYPICAL W-BEAM RAIL ELEMENT
CLASS A, TYPE II



DELINEATOR DETAIL

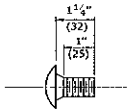
GENERAL NOTES:

1. NEW R-B 350 GUIDERAIL INCLUDING SYSTEMS, ANCHORS AND TRANSITIONS INSTALLED ON EXPRESSWAYS AND RAMPS SHALL USE CLASS B TYPE II (10 GAUGE) W-BEAM RAIL ELEMENTS.
2. W6x9 (W150x14) POSTS MAY BE USED IN PLACE OF W6 x 8.5(W150x13) POSTS.
3. W8x13 (W200x19) POSTS, 7'-6"(2286) LONG, ARE USED WITH TRANSITIONS TO VERTICAL OR SAFETY SHAPE PARAPETS (POSTS 1 AND 2) AND SYSTEM 6.
4. W6x8.5 (W150x13) POSTS, 6'-0"(1829) LONG, ARE USED WITH TRANSITIONS TO VERTICAL OR SAFETY SHAPE PARAPETS (POSTS 3 THOUGH 6), MD-B 350, SYSTEM 5 & 5A, AND STANDARD R-B 350 GUIDERAIL.

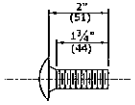
DELINEATOR NOTES:

1. DELINEATORS SHALL BE FORMED OF .080 POLY-CARBONATE OR .080 SHEET ALUMINUM IN ACCORDANCE WITH M.18.13.
2. REFLECTIVE SHEETING SHALL CONFORM TO M.18.09.2.
3. DELINEATORS SHALL BE INSTALLED ON THE POST CLOSEST TO THE DESIGNATED SPACING.
4. REFLECTIVE SHEETING SHALL BE WHITE EXCEPT ON THE LEFT SIDE OF DIVIDED STREETS, HIGHWAYS, RAMPS, AND ONE WAY ROADS IN THE DIRECTION OF TRAVEL WHERE IT SHALL BE YELLOW.
5. INSTALL DELINEATORS ON RAIL THAT IS PARALLEL TO AND NOT GREATER THAN 6'(1829) FROM THE EDGE OF THE ROADWAY. A MINIMUM OF THREE DELINEATORS MUST BE INSTALLED ON ANY RUN OF RAIL.

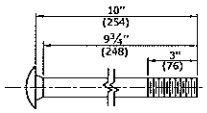
DELINEATOR SPACING:
RADIUS ≥ 300'(9144D) - SPACE EVERY 50'(15.24m)
RADIUS < 300'(9144D) - SPACE EVERY 25'(7.62m)



W-BEAM SPLICE
BOLT DETAIL

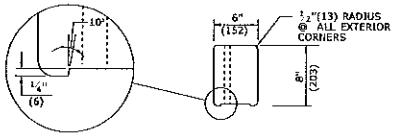


POST BOLT DETAIL
FOR R-B 350
SYSTEM 6 RUBRAIL

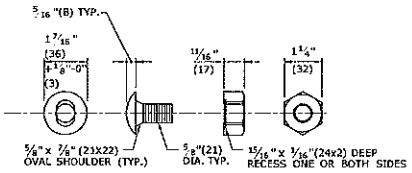


POST BOLT DETAIL FOR R-B 350
AND MD-B 350 GUIDERAIL

(UNTHREADED PORTION NOT TO EXCEED 6 3/4"(171))

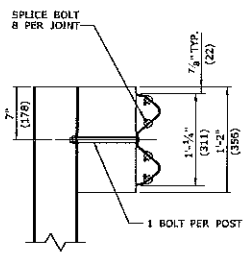


PLAN

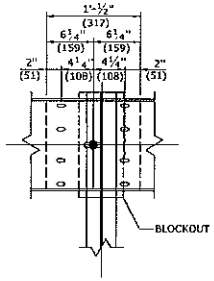


BUTTONHEAD BOLT **HEX NUT**

NOTE: AFTER GALVANIZING, THE NUT SHALL BE FREE RUNNING ON THE BOLT. DIAMETER SHOWN IS TYPICAL FOR ALL GUIDERAIL BOLTS. SEE DETAILS ABOVE FOR SPECIFIC LENGTHS.



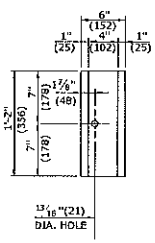
SECTION



ELEVATION

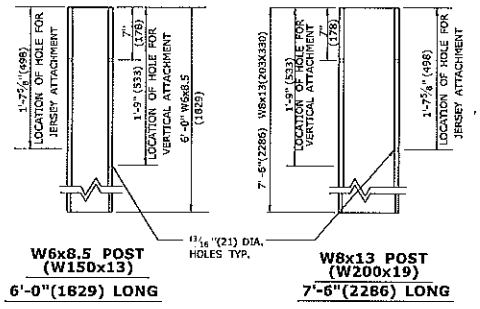
LAP DETAIL

NOTE:
LAP RAIL SECTION IN DIRECTION OF TRAFFIC



ELEVATION

R-B 350 PLASTIC
BLOCKOUT DETAIL



W6x8.5 POST (W150x13)
6'-0"(1829) LONG

W8x13 POST (W200x19)
7'-6"(2286) LONG

BOLT HOLE LAYOUT FOR W8x13(W200x19)
AND W6x8.5 (W150x13)UNIFORM POST

(REFER TO GENERAL NOTES)

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REMOVE WEATHERING STEEL NOTES

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON EXISTING INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 5/15/2014

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD_JUNE2011.dgn Model: 25-HW-910-01

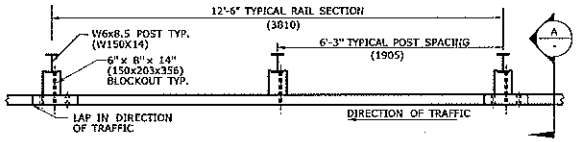
SUBMITTED BY: NAME/DATE/TITLE:
APPROVED BY: NAME/DATE/TITLE:
James H. Norman
2011.06.09 15:12:16 -04'00'

CTDOT
STANDARD SHEET

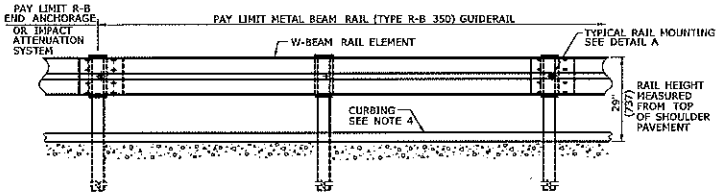
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
W-BEAM METAL BEAM RAIL HARDWARE

STANDARD SHEET NO.:
HW-910_01

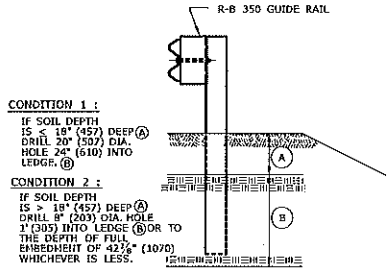


PLAN

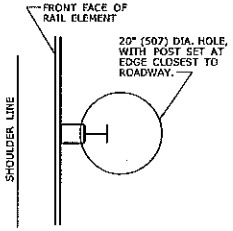


ELEVATION

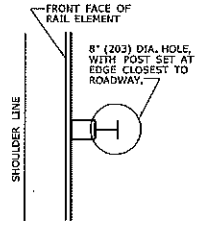
METAL BEAM RAIL (TYPE R-B 350)



ELEVATION
(SEE NOTE 8)



PLAN
CONDITION 1
(SEE NOTE 8)

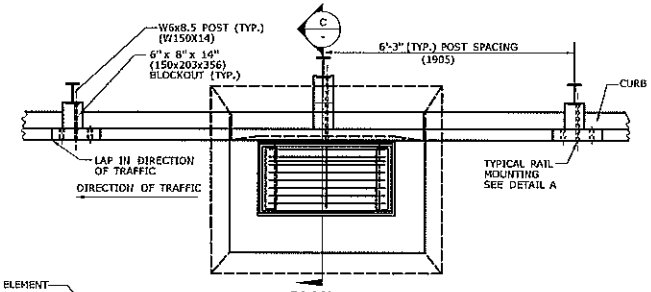


PLAN
CONDITION 2
(SEE NOTE 8)

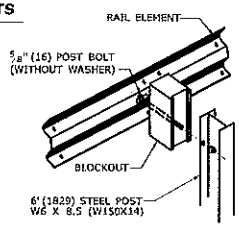
DRILLING IN ROCK FOR GUIDERAIL POSTS

GENERAL NOTES:

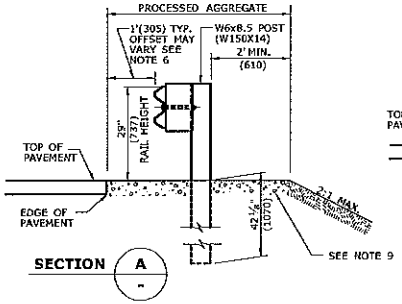
1. SEE SHEET HW-910_01 FOR HARDWARE AND DELINEATOR DETAILS.
2. MAXIMUM DESIGN DEFLECTION FOR R-B 350 GUIDERAIL AT THE STANDARD POST SPACING OF 6'-3"(1905) IS 4'-3"(1295). DEFLECTION REQUIREMENT IS MEASURED FROM THE BACK OF POST TO THE FACE OF OBJECT.
3. FOR CURVES WITH RADII OF 150'(45.7m) OR LESS, ALL RAIL ELEMENTS SHALL BE SHOP FABRICATED TO THE PROPER RADIUS AND GALVANIZED AFTER FABRICATION. RADIUS RAIL WHEN REQUIRED AND NOTED ON THE PLANS, IS INCLUDED IN THE PAY ITEM FOR GUIDERAIL.
4. RAIL HEIGHT WITH CURBING SHALL BE MEASURED FROM THE TOP OF PAVEMENT. ON HIGH SPEED ROADWAYS (≥45mph 72.4kph), 4"(102) CURBING MAY BE USED IN CONJUNCTION WITH GUIDERAIL AND THE RAIL ELEMENT SHALL BE PLACED FLUSH WITH THE FACE OF CURB. ON LOW SPEED ROADWAYS (<45mph 72.4kph), 6"(152) CURBING MAY BE USED IN CONJUNCTION WITH GUIDERAIL AND THE RAIL ELEMENT SHALL BE PLACED A MAXIMUM OF 9"(229) BEHIND THE FACE OF CURB.
5. THREE BLOCKOUTS MAY BE USED FOR ONE POST ONLY. TWO BLOCKOUTS MAY BE USED FOR A SERIES OF POSTS. THE COST OF ADDITIONAL BLOCKOUTS AND LONGER BOLTS SHALL BE INCLUDED IN THE BID PRICE PER FOOT OF GUIDERAIL. EXTRA BLOCKOUTS AT TRANSITION TO BRIDGE PARAPETS SHOULD BE AVOIDED.
6. W-BEAM GUIDERAIL MAY BE PLACED 1' (305) OR MORE FROM THE EDGE OF PAVEMENT ONLY ON SLOPES 10:1 OR FLATTER AND WITHOUT CURBING. IF THE RAIL IS INSTALLED WITHIN 2'(610) OF THE EDGE OF PAVEMENT, THE RAIL HEIGHT IS MEASURED FROM THE SHOULDER SLOPE EXTENDED TO THE RAIL. IF THE RAIL IS INSTALLED BEYOND 2'(610) FROM THE EDGE OF PAVEMENT, THE RAIL HEIGHT IS MEASURED FROM THE GROUND DIRECTLY BELOW THE RAIL.
7. ALL R-B 350 GUIDERAIL TYPES INSTALLED ON EXPRESSWAYS AND RAMPS SHALL USE CLASS B, TYPE-II (10 GAUGE) W-BEAM RAIL ELEMENTS.
8. 20" (507) DIA. EXCAVATED HOLE SHALL BE BACKFILLED WITH SUITABLE MATERIAL, OR GRANULAR FILL COMPACTED IN 6" (150) LIFTS BEFORE DRIVING POST OR POSTS MAY BE SET IN EXCAVATED HOLE AND BACKFILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM). 8" (203) DIA. HOLE SHALL BE BACKFILLED WITH SUITABLE MATERIAL.
9. AS DIRECTED BY THE ENGINEER AND WHERE PAVEMENT FOR RAILING IS NOT BEING INSTALLED, A MIN. 6" DEPTH OF PROCESSED AGGREGATE SHALL BE INSTALLED FROM THE PAVEMENT EDGE OR BACK OF CURB TO A MINIMUM OF 2'(610) BEHIND THE GUIDERAIL POST AND COMPACTED IN 6" (150) LIFTS.
10. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (737) ± 1" (25).



PLAN

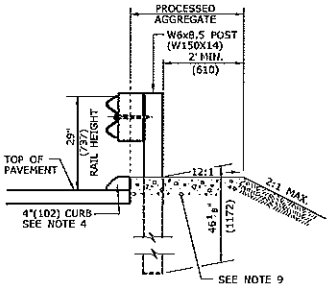


DETAIL A
RAIL MOUNTING



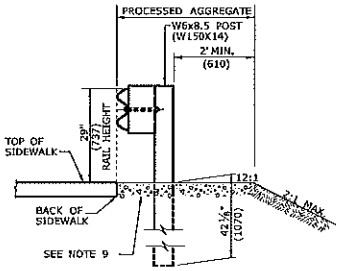
SECTION A

NO CURB APPLICATION



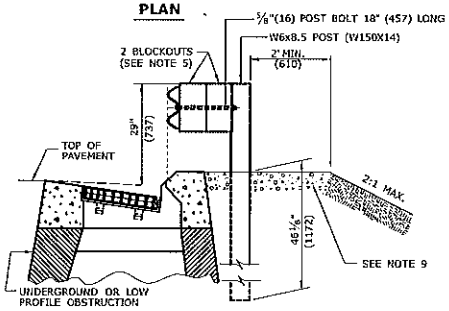
SECTION A

CURB APPLICATION



SECTION A

SIDEWALK APPLICATION



SECTION C

MULTIPLE BLOCKOUT APPLICATION (MAY BE USED TO AVOID UNDERGROUND OR LOW PROFILE OBSTRUCTION)

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISED NOTE 9 FOR USE OF PROCESSED AGGREGATE AND REMOVED NOTE 6 FOR WEATHERING STEEL

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY GUARANTEED TO INDICATE THE CONDITIONS OR ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Posted Date: 5/10/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUPPLIED BY: NAME/DATE/TIME:
APPROVED BY: NAME/DATE/TIME: James H. Norman 2011.06.09 15:12:46 -04'00'

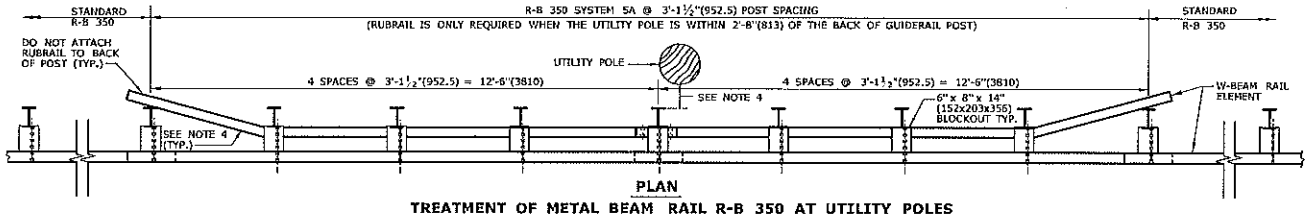
Filename: CTDOT-HOCHANY-STD-3.2.0(2011-6)-1 Model: 37- HW-910-02

CTDOT
STANDARD SHEET

OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
METAL BEAM RAIL (TYPE R-B 350) GUIDERAIL

STANDARD SHEET NO.:
HW-910_02

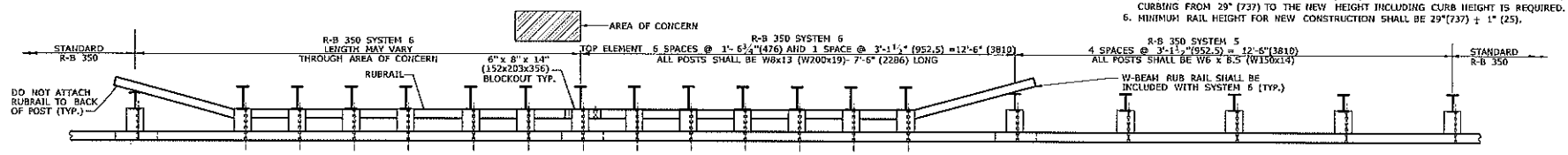


PLAN

TREATMENT OF METAL BEAM RAIL R-B 350 AT UTILITY POLES ON UNDIVIDED BI-DIRECTIONAL ROADWAYS

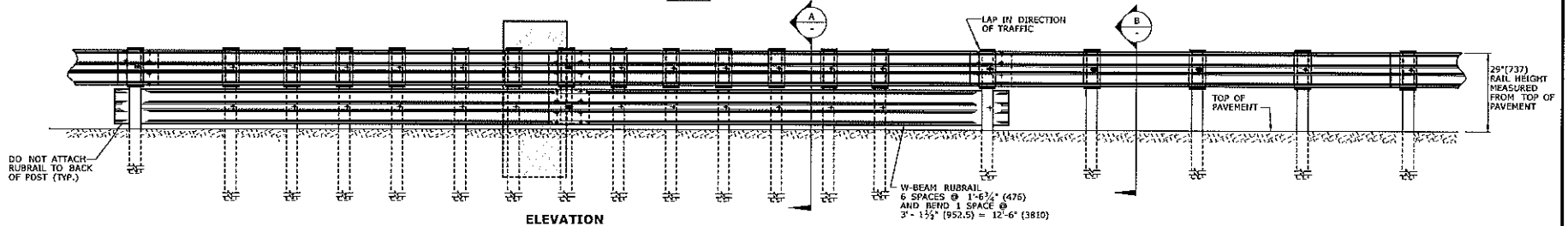
GENERAL NOTES:

1. SEE SHEET HW-910.01 FOR HARDWARE AND DELINEATOR DETAILS.
2. RAIL HEIGHT WITH CURBING SHALL BE MEASURED FROM THE TOP OF PAVEMENT. ON HIGH SPEED ROADWAYS (≥ 45 mph(72.4kph)), 4"(102) CURBING SHALL BE USED IN-CONJUNCTION WITH GUIDERAIL AND THE RAIL FACE SHALL BE INSTALLED FLUSH WITH THE FACE OF CURBING. ON LOW SPEED ROADWAYS (< 45 mph(72.4kph)), 6"(152) CURBING MAY BE USED IN-CONJUNCTION WITH GUIDERAIL AND THE RAIL FACE SHALL BE INSTALLED A MAX. OF 9"(229) BEHIND THE FACE OF CURBING. W-BEAM GUIDERAIL MAY ONLY BE INSTALLED ON SLOPES FLATTER THAN 10:1.
3. ALL R-B 350 GUIDERAIL TYPES INSTALLED ON LIMITED ACCESS HIGHWAYS AND RAMPS SHALL USE CLASS B TYPE - II (10 GAUGE) W-BEAM RAIL ELEMENTS.
4. WHEN A WARRANT EXISTS FOR RAILING AND THERE IS A UTILITY POLE THAT CAN NOT BE RELOCATED AND IT IS WITHIN THE DEFLECTION DISTANCE FOR STANDARD R-B 350 GUIDE-RAIL, R-B 350 SYSTEM 5 IS REQUIRED. THE LENGTH OF R-B 350 SYSTEM 5 SHALL BE 25'(7620) CENTERED ON THE UTILITY POLE. WHEN THE UTILITY POLE IS WITHIN 2'-8"(813) OF THE BACK OF THE POST, A 25'(7620) W-BEAM RUBRAIL CENTERED ON THE UTILITY POLE SHALL BE ADDED AND PAID FOR UNDER THE CONTRACT UNIT PRICE FOR R-B 350 SYSTEM 5A. THE RUBRAIL FLARED SECTION SHALL BE SHOP BENT AND GALVANIZED AFTER FABRICATION.
5. IF CURBING IS USED IN CONJUNCTION WITH R-B 350 SYSTEM 6 THE RAIL HEIGHT SHALL BE 29" (737) PLUS THE CURB HEIGHT. A 25' (7620) LONG HEIGHT TRANSITION PRIOR TO THE CURBING FROM 29" (737) TO THE NEW HEIGHT INCLUDING CURB HEIGHT IS REQUIRED.
6. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29"(737) ± 1" (25).



PLAN

DIRECTION OF TRAFFIC



ELEVATION

TREATMENT OF METAL BEAM RAIL R-B 350 SYSTEM 6 AT FIXED OBJECTS ON UNDIVIDED BI-DIRECTIONAL ROADWAYS

(FOR ADDITIONAL INFORMATION SEE TABLE 1)

TABLE 1
STRENGTH TRANSITION FOR METAL BEAM RAIL (TYPE R-B 350) AT FIXED OBJECTS, BRIDGE PIERS, NON-BREAKAWAY STRUCTURES, AND ABUTMENTS ON THE ROADSIDE OR MEDIAN.

"D"	"X"	R-B 350 SYSTEM 6	R-B 350 SYSTEM 5	STANDARD R-B 350	"L"
MAXIMUM DESIGN DEFLECTION	AREA OF CONCERN PLUS TWO POSTS FOR:	W8x13(W200x19) POSTS SPACED AT 1'-6¾" (476) WITH RUBRAIL	W6x8.5 (W150x14) POSTS SPACED AT 3'-1½"(952.5)	W6x8.5 (W150x14) POSTS SPACED AT 6'-3"(1905)	MINIMUM LENGTH NEEDED
1'-10"(559)	SYSTEM 6	12'-6"(3810)	12'-6"(3810)	LON	25'(7620)
2'-8"(813)	SYSTEM 5	→	25'(7620)	LON	25'(7620)
4'-3"(1295)	R-B 350	→	→	LON	LON

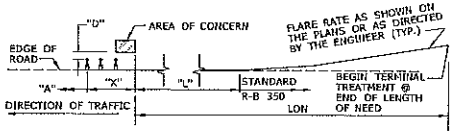
L = MINIMUM LENGTH OF GUIDE RAIL STRENGTH TRANSITION NEEDED IN FEET PRIOR TO THE AREA OF CONCERN. NOTE: WHEN DESIGNING STRENGTH TRANSITIONS ON EXPRESSWAYS AND RAMPS FOR ZONE OF INTRUSION 100'(30.5m) PRIOR TO THE AREA OF CONCERN SHALL BE PROVIDED.

X = MINIMUM LENGTH THROUGH AREA OF CONCERN PLUS TWO POST SPACES FOR A SINGLE DIRECTION ROADWAY. "X" WILL VARY DEPENDING ON LENGTH OF AREA OF CONCERN.

D = MAXIMUM DESIGN DEFLECTION MEASURED FROM THE BACK OF POST TO THE FACE OF AREA OF CONCERN.

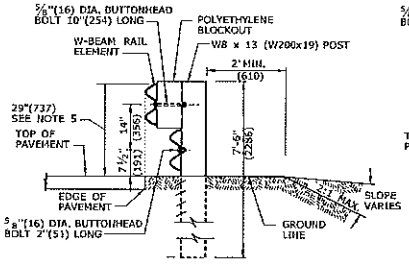
LON = LENGTH OF NEED FOR EACH SITE SHALL BE BASED ON CTDOT HIGHWAY DESIGN MANUAL AND AS SHOWN ON THE PLANS.

A = IF AREA OF CONCERN IS PROTECTED WITH SYSTEM 5 OR 6 ON A SINGLE DIRECTION ROADWAY, CONTINUE WITH STANDARD R-B 350 GUIDERAIL.

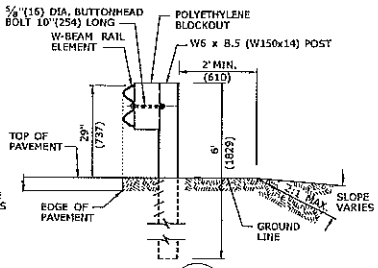


LENGTH OF NEED DIAGRAM (LON)

(SEE TABLE 1 FOR LEGEND)



SECTION A



SECTION B

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISED NOTE 4. ERRATA

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE ENCOUNTERED.

Posted Date: 6/8/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: NAME/DATE/TITLE:
APPROVED BY: NAME/DATE/TITLE: James H. Norman 2011.06.09 15:13:36-04'00'

Filename: CTDOT HIGHWAY STD 2.M.2011.dgn Model: 39-HW-910_04

CTDOT STANDARD SHEET

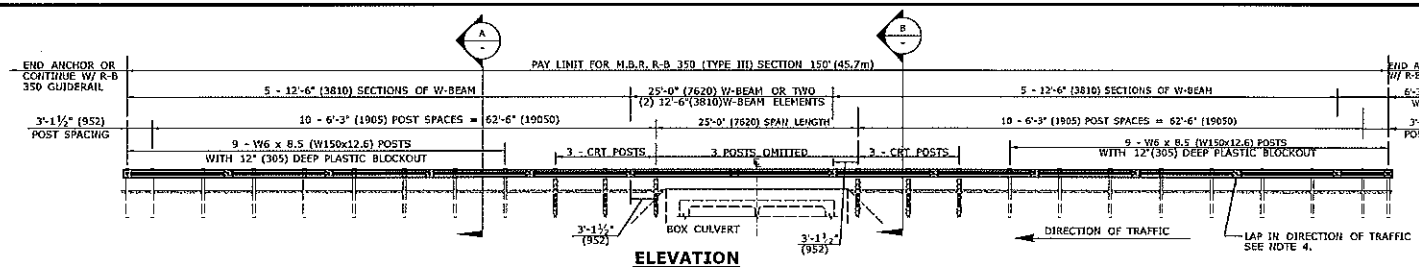
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
METAL BEAM RAIL TYPE R-B 350 SYSTEMS 5, 5A, & 6

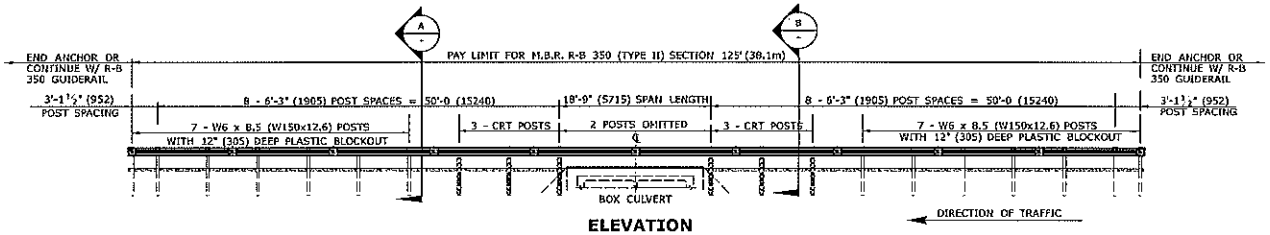
STANDARD SHEET NO.
HW-910_04

GENERAL NOTES:

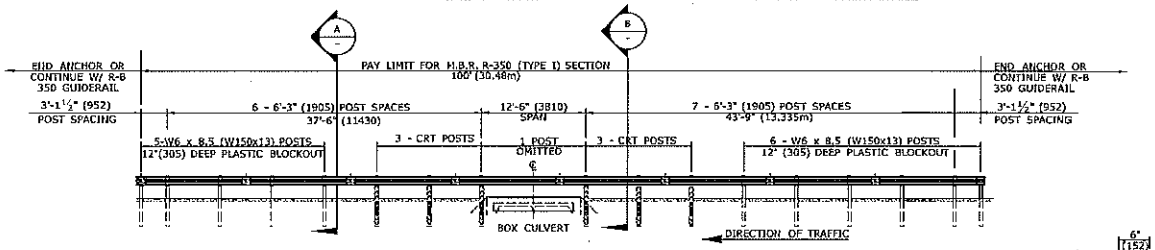
1. THIS DETAIL WAS DEVELOPED FROM MwRSF RESEARCH REPORT NO. TRP-03-187-07 FOR USE WITH THE MIDWEST GUIDERAIL SYSTEM (MGS).
2. THIS SYSTEM IS NOT FOR USE IN-CONJUNCTION WITH ANY CURB TYPE.
3. W-BEAM RAIL ELEMENTS SHALL BE FABRICATED WITH 3'-1½" POST HOLES.
4. W-BEAM RAIL SPLICES SHALL BE BOLTED TOGETHER WITHIN THE PAY LIMITS @ NON-POST LOCATIONS.
5. THIS SYSTEM IS NOT INTENDED FOR USE ON A RADIUS.



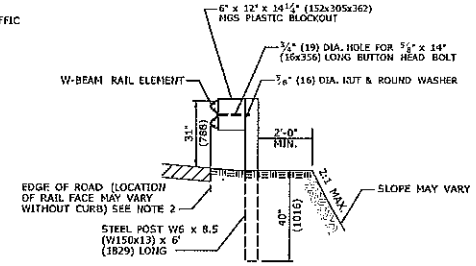
ELEVATION
3 POSTS OMITTED 25'-0" (7620) LONG SPAN



ELEVATION
2 POSTS OMITTED - 18'-9" (5715) LONG SPAN

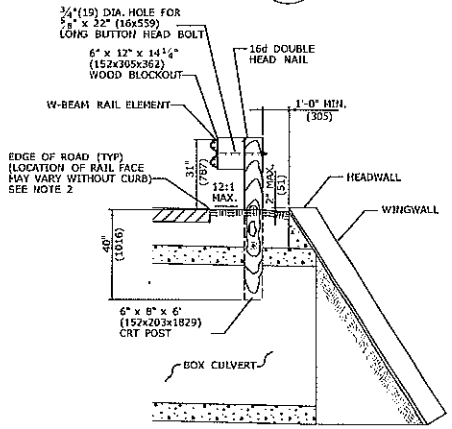


ELEVATION
1 POST OMITTED 12'-6" (3810) LONG SPAN



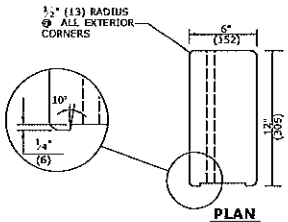
STEEL POST W/
12"(305) PLASTIC BLOCKOUT

SECTION A

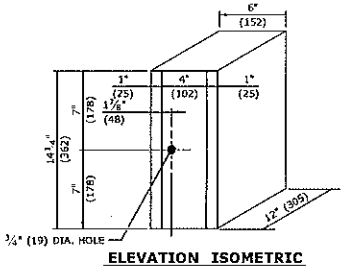


CONTROL RELEASE TIMBER (CRT) POST

SECTION B

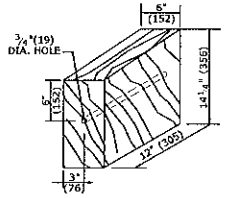


PLAN

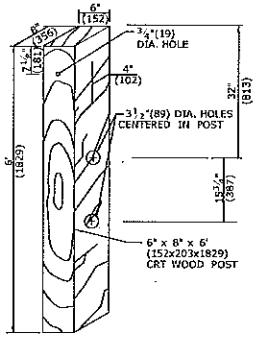


ELEVATION ISOMETRIC

12"(305) DEEP PLASTIC BLOCKOUT DETAIL



WOOD BLOCKOUT
6"x12"x14¼"
(152x305x362)



CRT POST

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	7/13	NEW SYSTEM 350 APPROVED

THE INFORMATION INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHEN WELL BE ENCOUNTERED.

Revised Date: 6/14/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STDS913.dgn Model: 46 - HW-910.65

SUBMITTED BY: NAME/DATE/TIME: Robert Arnold Bartel, Forsyth Date 2013.07.22 15:09:47-04'00'

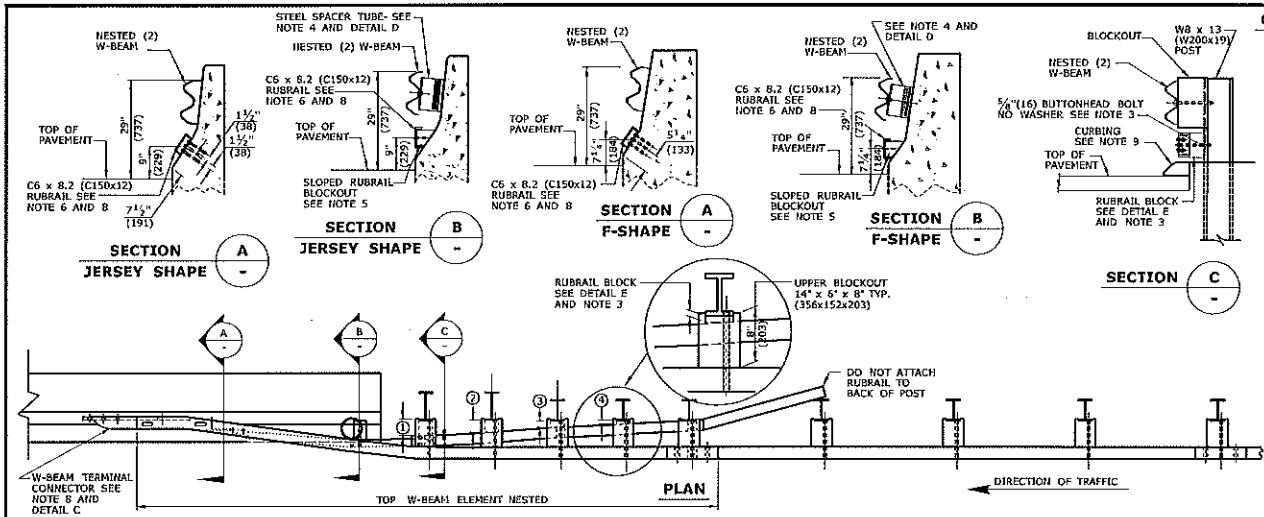
APPROVED BY: NAME/DATE/TIME: James H. Norman 2013.07.24 14:49:07-04'00'

CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

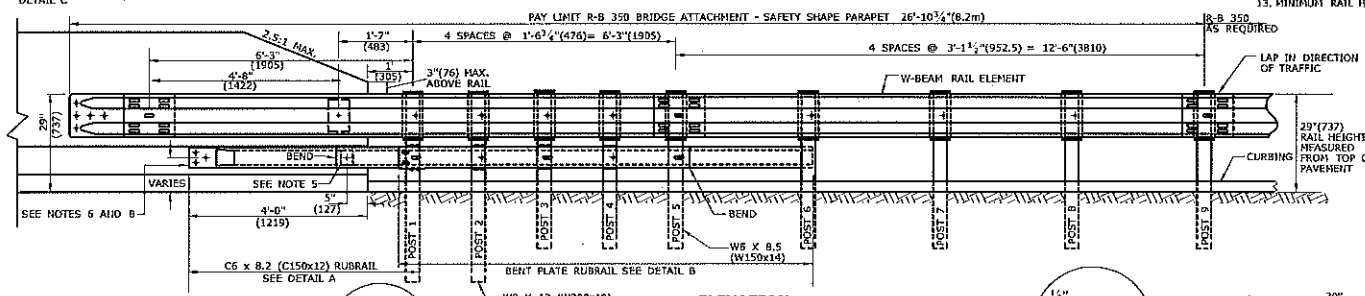
STANDARD SHEET TITLE:
MBR R-B 350 SPAN
TYPE I, II, III SECTIONS

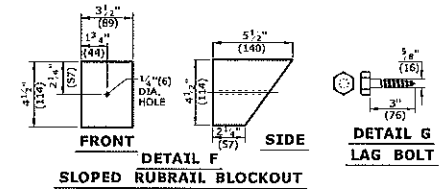
STANDARD SHEET NO.:
HW-910_05

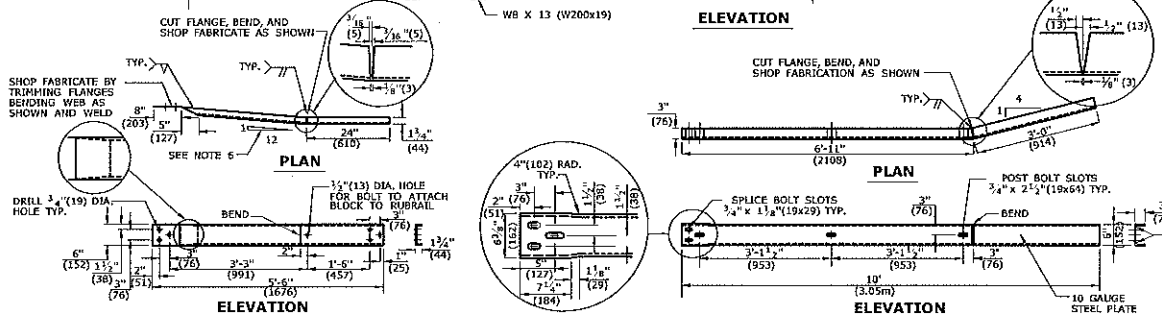


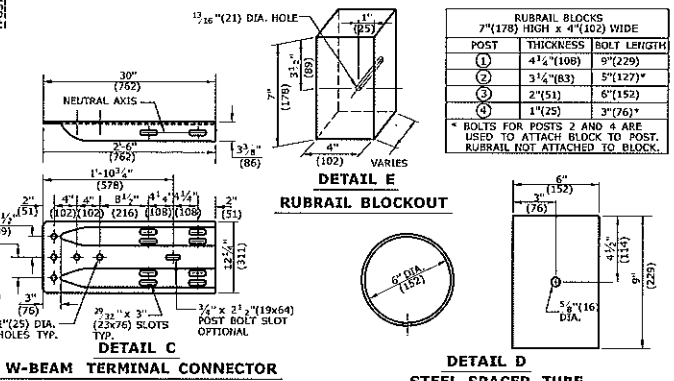
GENERAL NOTES:

1. THIS R-B 350 GUIDERAIL TRANSITION IS APPROPRIATE FOR CONNECTION AT THE FOLLOWING LOCATIONS:
   (A) JERSEY SHAPE OR F-SHAPE PARAPET OR BARRIER WITH NO ELECTRICAL JUNCTION BOX WITHIN THE LIMITS OF THE ATTACHMENT (APPROXIMATELY 8'(2.44m)).
   (B) BRIDGE PARAPETS RETROFITTED FROM SAFETY WALK TO MODIFIED SAFETY SHAPE WITH NO ELECTRICAL JUNCTION BOX WITHIN THE LIMITS OF THE ATTACHMENT (APPROXIMATELY 8'(2.44m)).
   (C) LEADING AND TRAILING ENDS ON DUAL DIRECTION ROADWAYS.
2. POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL.
3. RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH 5/8"(16) BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS TO POSTS 2 AND 4. SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A 5/8" x 4 1/2" (16x114) BUTTONHEAD BOLT. RUBRAIL IS FLARED TO BACK OF POST 6 AND NOT SECURED.
4. STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6"(152) INSIDE DIAMETER x 9"(229) LONG. ATTACH TUBE TO RAIL ONLY WITH 5/8" x 1 1/4"(16x32) LONG BUTTONHEAD BOLT AND RECTANGULAR PLATE WASHER. TUBE IS NOT ATTACHED TO PARAPET.
5. SEE DETAIL F FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE 3/8" x 3"(10x76) LAG BOLT WITH FLAT WASHER.
6. SHOP FABRICATE THE C6 x 8.2 (C150x12) RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE JERSEY SHAPE OR F-SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE PARAPET OR BARRIER.
7. USE CLASS B TYPE II W-BEAM RAIL ELEMENTS (10 GAUGE) FOR INSTALLATIONS ON EXPRESSWAYS AND RAMPS.
8. ANCHORAGE:
   (A) AT EXISTING PARAPETS OR BARRIERS, RUBRAIL SHALL BE ANCHORED USING THREE 5/8" x 6"(16x152) CHEMICALLY ANCHORED BOLTS WITH WASHERS OR AS DETAILED ON STRUCTURE SHEETS. MAXIMUM BOLT PROJECTION BEYOND THE NUT SHALL BE 1/2"(13).
   (B) AT EXISTING PARAPETS OR BARRIERS, THE W-BEAM TERMINAL CONNECTOR SHALL BE ANCHORED USING FIVE 7/8" x 12"(22x305) CHEMICALLY ANCHORED BOLTS WITH WASHERS, OR AS DETAILED ON THE STRUCTURE SHEETS. MAXIMUM BOLT PROJECTION BEYOND THE NUT SHALL BE 1/2"(13). THE 12"(305) MINIMUM LENGTH OF CHEMICALLY ANCHORED BOLTS SHALL INCLUDE A MINIMUM EMBEDMENT DEPTH OF 10"(254) INTO SUITABLY REINFORCED CONCRETE, OR AS RECOMMENDED BY MANUFACTURER OF BONDING MATERIAL.
   (C) NEW PARAPETS OR BARRIERS, THE W-BEAM TERMINAL CONNECTOR AND RUBRAIL SHALL BE ANCHORED AS DETAILED ON THE STRUCTURE PLANS.
9. FOR NEW CONSTRUCTION WHERE CURBING IS NEEDED, USE EITHER 4"(102) BITUMINOUS CONCRETE PARK CURBING OR PRECAST CONCRETE TRANSITION CURBING SET WITH A 4"(102) REVEAL. IF EXISTING CURBING IS GRANITE STONE TRANSITION CURBING, RESET CURB TO A 4"(102) REVEAL OR REMOVE IT AND REPLACE IT WITH 4"(102) CURBING.
10. POSTS 1 AND 2 ARE W8 x 13 (W200x19), 7'-6"(2286) LONG. ALL OTHER POSTS IN TRANSITION ARE W6 x 8.5 (W150x14), 6'(1829) LONG.
11. ADDITIONAL BLOCKOUTS WITH POSTS 1 THROUGH 6 SHOULD BE AVOIDED.
12. FOR SINGLE DIRECTION ROADWAY:
    INSTALL W-BEAM TERMINAL CONNECTOR BETWEEN NESTED GUIDERAIL ELEMENTS.
    FOR DUAL DIRECTION ROADWAY FOR APPROACHING TRAFFIC:
    INSTALL W-BEAM TERMINAL CONNECTOR BETWEEN NESTED GUIDERAIL ELEMENTS.
    FOR TRAILING END:
    INSTALL W-BEAM TERMINAL CONNECTOR OUTSIDE OF THE NESTED GUIDERAIL ELEMENTS.
13. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (737) + 1" (25).









RUBRAIL BLOCKS 7"(178) HIGH x 4"(102) WIDE		
POST	THICKNESS	BOLT LENGTH
1	4 3/4"(108)	9"(229)
2	3 1/4"(83)	5"(127)*
3	2"(51)	6"(152)
4	1"(25)	3"(76)*

* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACH BLOCK TO POST. RUBRAIL NOT ATTACHED TO BLOCK.

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISED NOTE 8 FOR USE OF CHEMICAL ANCHORS AND PAY ITEM CHANGED TO SAFETY SHAPE.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY GUARANTEED TO INDICATE THE CONDITIONS OR ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Revised Date: 5/16/2011

NOT TO SCALE

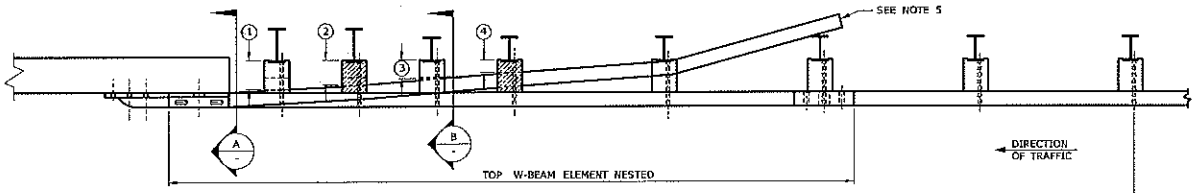
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: SIGNATURE/DATE:
APPROVED BY: SIGNATURE/DATE/TITLE: James H. Norman 2011.06.09 15:14:22 -04'00'

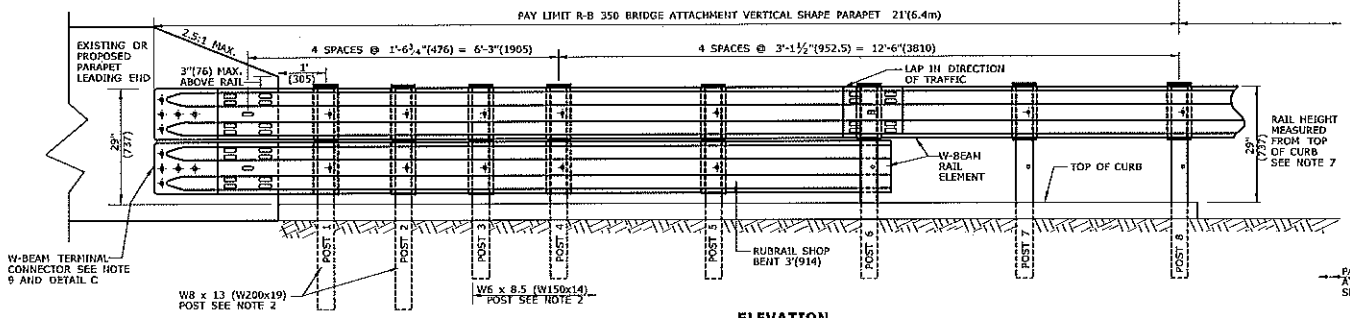
CTDOT STANDARD SHEET
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: R-B 350 BRIDGE ATTACHMENT TO SAFETY SHAPE PARAPET

STANDARD SHEET NO.: HW-910_06



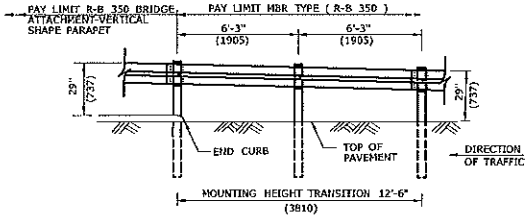
PLAN



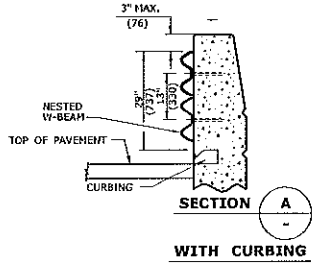
ELEVATION

GENERAL NOTES:

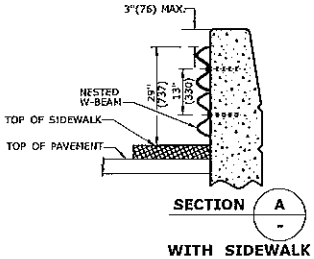
1. THIS R-B 350 GUIDERAIL TRANSITION IS APPROPRIATE FOR CONNECTION AT THE FOLLOWING LOCATIONS:
   (A) WHEN ANY SAFETY SHAPE (F-SHAPED OR JERSEY SHAPE) PARAPET HAS AN ELECTRICAL JUNCTION BOX WITHIN 8'(2438) OF THE END OF THE PARAPET, THE END OF THE PARAPET SHALL BE MODIFIED OR TRANSFORMED TO A VERTICAL SHAPE PRIOR TO GUIDERAIL ATTACHMENT.
   (B) VERTICAL WALL OR ABUTMENT FACE.
   (C) VERTICAL CONCRETE PARAPET WITH SIDEWALK.
   (D) VERTICAL FACE FOR LEADING AND TRAILING ENDS ON DUAL DIRECTION ROADWAYS.
2. POSTS 1 AND 2 ARE W8 x 13(W200x19), 7'-6"(2286) LONG. ALL OTHER POSTS IN TRANSITION ARE W6 x 8.5(W150x14), 6'(1829) LONG.
3. POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR LOWER RUBRAIL.
4. RUBRAIL BLOCKOUTS FOR POSTS 1 THROUGH 4 ARE ATTACHED TO POST AND RAIL WITH A 5/8"(16) BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTH). RUBRAIL ONLY IS ATTACHED TO POST 5 WITH A 5/8"x 1¼" (16 x 32) BUTTONHEAD BOLT.
5. THE RUBRAIL MAY BE SHOP BENT IN THE LAST 3'(914) TO FACILITATE INSTALLATION. DO NOT ATTACH RUBRAIL TO BACK OF POST 6.
6. USE CLASS B (10 GAUGE) TYPE II W-BEAM RAIL ELEMENTS FOR INSTALLATIONS ON EXPRESSWAYS AND RAMPS.
7. FOR THIS APPLICATION WHEN CURBING IS USED, R-B 350 RAIL HEIGHT MUST BE MEASURED FROM THE TOP OF CURBING TO THE TOP OF RAIL. SEE DETAIL D FOR HEIGHT TRANSITION.
8. FOR NEW CONSTRUCTION WHERE CURBING IS NEEDED, USE EITHER 4" (102) BITUMINOUS CONCRETE PARK CURBING OR PRECAST CONCRETE TRANSITION CURBING SET WITH A 4"(102) REVEAL. THE PREFERRED CURBING FOR HIGH SPEED ROADWAYS (>45 MPH (72kph)) IS 4" (102). HOWEVER, ON LOW SPEED ROADWAYS (<45 MPH (72kPH)) A 6"(152) CURBING MAY BE USED. ADJUST RAIL HEIGHT AS REQUIRED.
9. ANCHORAGE:
   (A) AT EXISTING PARAPETS EACH W-BEAM TERMINAL CONNECTOR SHALL BE ANCHORED USING FOUR 7/8"x 12" (22 x 305) CHEMICALLY ANCHORED BOLTS WITH WASHERS OR AS DETAILED ON STRUCTURE SHEETS. MAXIMUM BOLT PROJECTION BEYOND THE NUT SHALL BE ½" (13). THE 12" (305) MINIMUM LENGTH OF CHEMICALLY ANCHORED BOLTS SHALL INCLUDE A MINIMUM EMBEDMENT DEPTH OF 10" (254) INTO SUITABLY REINFORCED CONCRETE OR AS RECOMMENDED BY THE MANUFACTURER OF BONDING MATERIAL.
   (B) FOR NEW PARAPETS OR BARRIERS, THE W-BEAM TERMINAL CONNECTORS SHALL BE ANCHORED AS DETAILED ON THE STRUCTURE SHEETS.
10. ADDITIONAL BLOCKOUTS WITH POSTS 1 THROUGH 6 SHOULD BE AVOIDED.
11. FOR SINGLE DIRECTION ROADWAY:
    INSTALL W-BEAM TERMINAL CONNECTOR BETWEEN NESTED GUIDERAIL ELEMENTS.
    FOR DUAL DIRECTION ROADWAY FOR APPROACHING TRAFFIC:
    INSTALL W-BEAM TERMINAL CONNECTOR BETWEEN NESTED GUIDERAIL ELEMENTS.
    FOR TRAILING END:
    INSTALL W-BEAM TERMINAL CONNECTOR OUTSIDE OF THE NESTED GUIDERAIL ELEMENTS.
12. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (737) ± 1" (25).



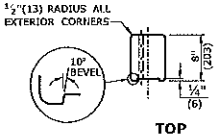
DETAIL D
HEIGHT TRANSITION



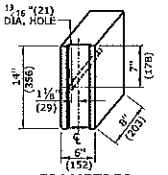
WITH CURBING



WITH SIDEWALK



TOP



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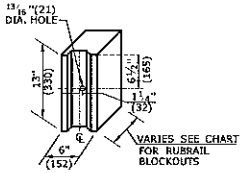
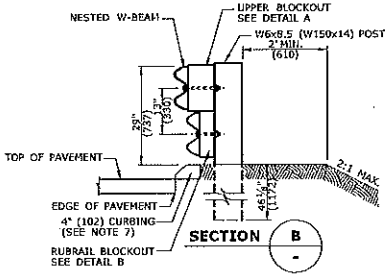
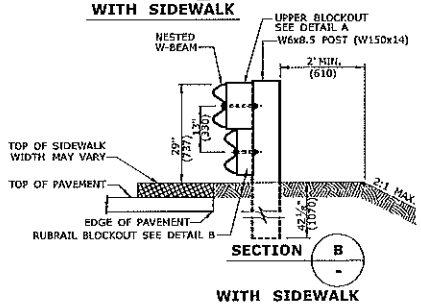


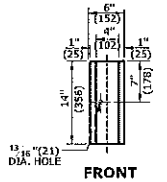
DETAIL B
RUBRAIL BLOCKOUT



WITH CURBING

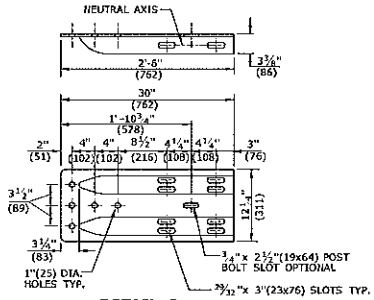


WITH SIDEWALK



FRONT
DETAIL A
UPPER BLOCKOUT

RUBRAIL BLOCKOUTS 13"(330)HIGH x 6"(152)WIDE		
POST	THICKNESS	BOLT LENGTH
1	7"(178)	9"(229)
2	6"(152)	8"(203)
3	4½"(114)	6"(152)
4	3"(76)	5"(127)



DETAIL C
W-BEAM TERMINAL CONNECTOR
CLASS B TYPE II

SEE NOTE 11

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISED NOTE 9 FOR USE OF CHEMICAL ANCHORS

THE INFORMATION INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY INTERPRETED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Printed Date: 5/10/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: NAME/DATE/TITLE

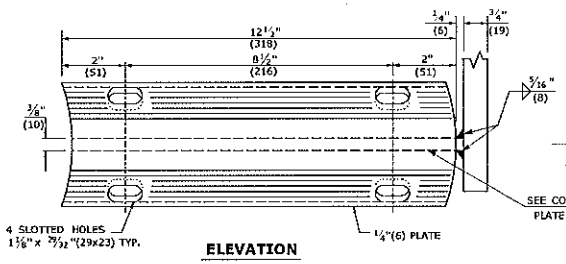
APPROVED BY: NAME/DATE/TITLE
James H. Beaman
2011.06.09 15:14:46-04'00'

CTDOT STANDARD SHEET

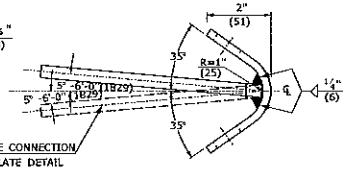
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: **R-B 350 BRIDGE ATTACHMENT VERTICAL SHAPE PARAPET**

STANDARD SHEET NO.: HW-910_07



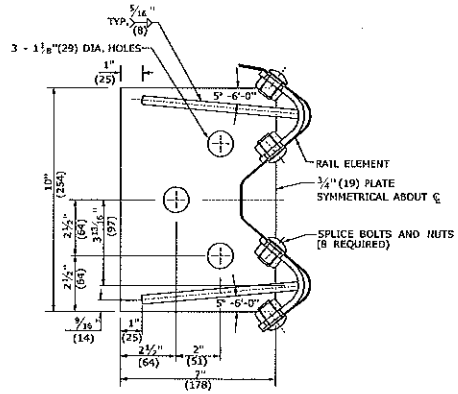
ELEVATION



SIDE

BENT PLATE

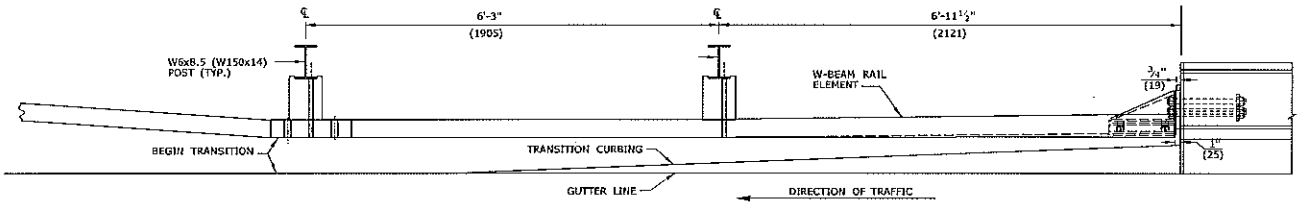
(2 REQUIRED)



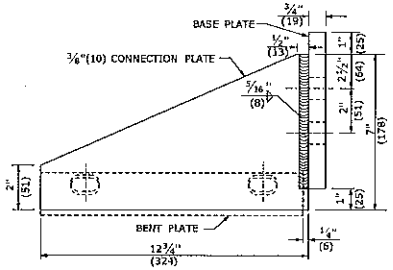
BASE PLATE AND ASSEMBLY

GENERAL NOTES:

1. SEE SHEET HW-910_01 FOR HARDWARE AND DELINEATOR DETAILS.
2. IF PROPOSED R-B 350 GUIDERAIL IS BEING ATTACHED TO A PARAPET USING EXISTING ANCHOR BOLTS FROM R-I GUIDERAIL INSTALLED AT A 39" (838) RAIL HEIGHT, A 4" (102) HEIGHT TRANSITION OVER 25' (7.62m) SHALL BE PROVIDED.
3. FOR EXISTING PARAPETS, USE THREE 1" (25) DIA. x 14" (356) LONG, FULLY THREADED, CHEMICALLY ANCHORED BOLTS AND WASHERS WITH 12" (305) EMBEDMENT DEPTH OR AS RECOMMENDED BY MANUFACTURER OF BONDING MATERIAL TO OBTAIN FULL STRENGTH OF ANCHOR BOLTS. FOR ANCHORAGE IN NEW PARAPETS, SEE STRUCTURE SHEETS.
4. USE CLASS B TYPE II (10 GAUGE) W-BEAM RAIL ELEMENT FOR INSTALLATIONS ON EXPRESSWAYS AND RAMPS.
5. TRAILING END ATTACHMENT MAY ALSO BE INSTALLED AT A VERTICAL FACE PARAPET OR RETAINING WALL ON ONE-WAY ROADWAYS ONLY.
6. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (737) ± 1" (25).



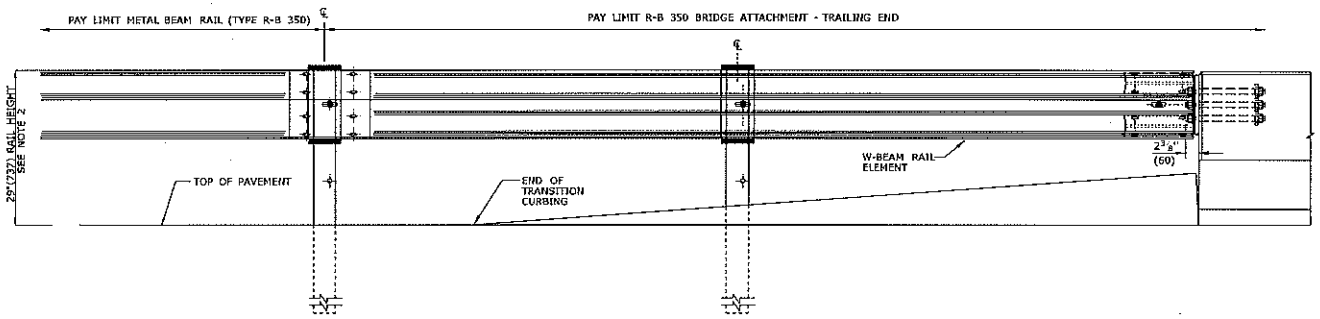
PLAN



PLAN

CONNECTION PLATE DETAIL

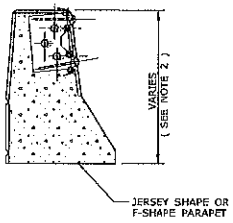
(2 REQUIRED)



ELEVATION

ATTACHMENT AT TRAILING END OF BRIDGE PARAPET

(ONE-WAY ROADWAY ONLY)



BASE PLATE AND ASSEMBLY ATTACHMENT TO TRAILING END OF CONCRETE BARRIER OR BRIDGE PARAPET (SEE NOTE 5)

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISED NOTE 3 FOR USE OF CHEMICAL ANCHORS
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Posted Date: 5/10/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: NAME/DATE/TITLE:

APPROVED BY: NAME/DATE/TITLE: James H. Norman 2011.06.09 15:15:09 -04'00'

FILENAME: CTDOT-HIGHWAY STD 3.0V(E2011.dgn) MODEL: 43 - HW-910.08

CTDOT STANDARD SHEET

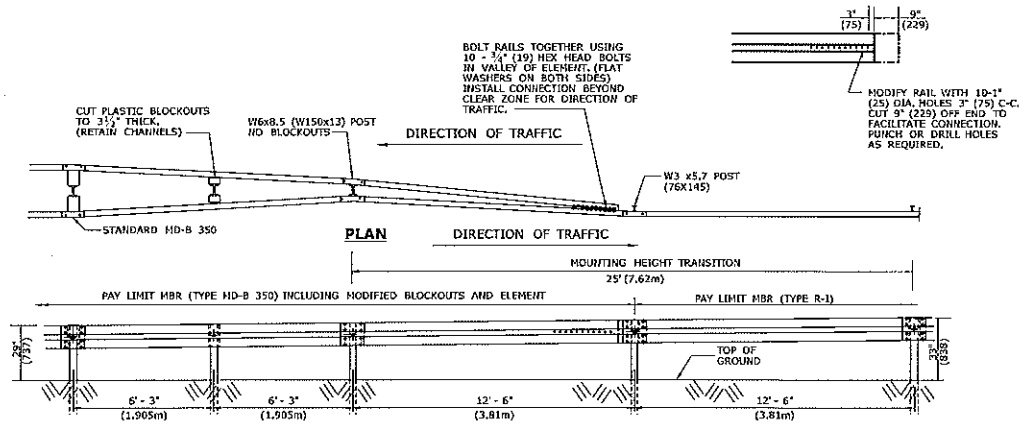
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: R-B 350 BRIDGE ATTACHMENT TRAILING END

STANDARD SHEET NO.: HW-910_08

GENERAL NOTES:

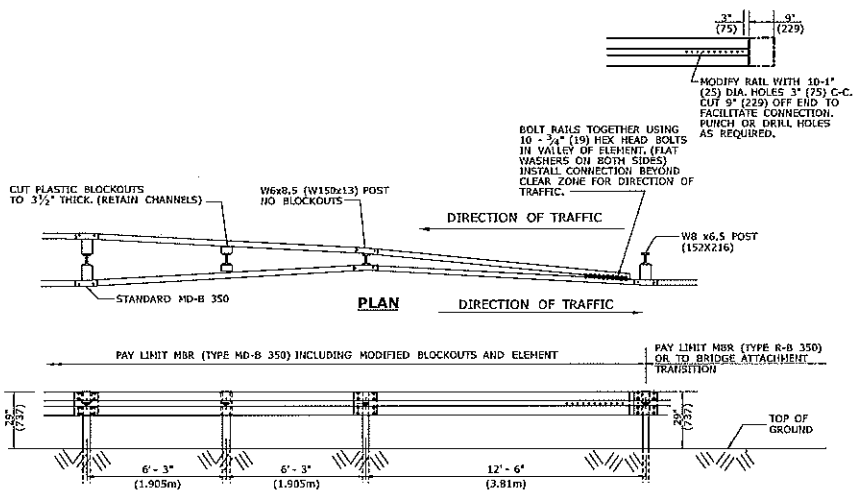
1. DETAILS SHOW CONNECTION OF RAIL THRU TRANSITION. FLARE RATES, AND LATERAL PLACEMENT IN MEDIAN SHALL BE AS SHOWN ON THE PLANS.
2. THIS DETAIL CAN BE USED TO TRANSITION MD-B 350 GUIDERAIL TO MODIFIED R-I GUIDERAIL WITH SPLICE AT MID-SPAN.



ELEVATION

TRANSITION OF METAL BEAM RAIL (TYPE MD-B 350) TO (TYPE R-I)

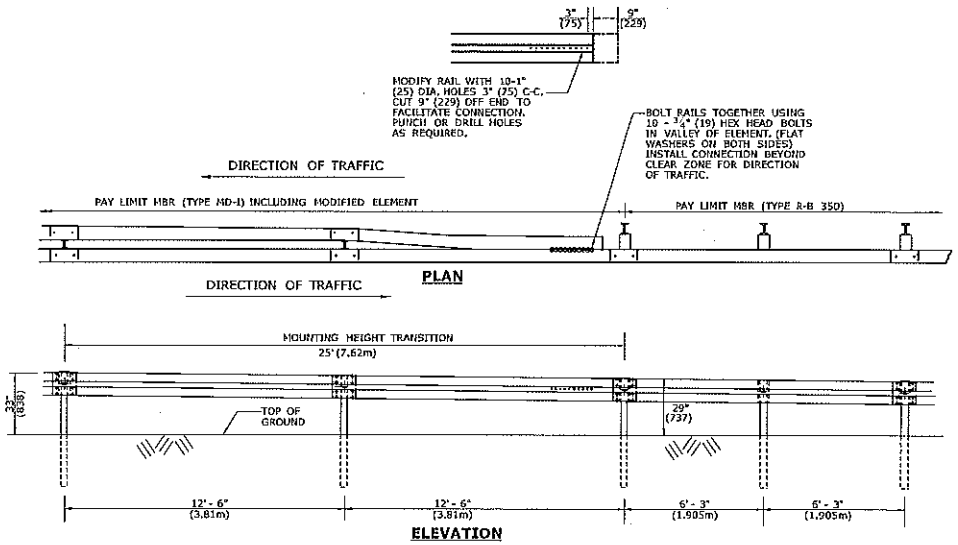
(SEE NOTE 2)



ELEVATION

TRANSITION OF METAL BEAM RAIL

(TYPE MD-B 350) TO (TYPE R-B 350) OR TO BRIDGE ATTACHMENT TRANSITION



ELEVATION

TRANSITION OF METAL BEAM RAIL (TYPE MD-I) TO (TYPE R-B 350)

ALL METRIC DEMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	9/6/11	ADD NOTE 2, REVISE TRANSITION NOTE & RESIZE NOTE -
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE ENCOUNTERED.

Revised Date: 10/15/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: working.rev.hw910_09a Model: HW-910_03a

SUBMITTED BY: NAME/DATE/TIME: Leo Fontaine 2012.01.13 13:16:49 -05'00'

APPROVED BY: NAME/DATE/TIME: James H. Norman 2012.01.26 15:29:59 -05'00'

CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

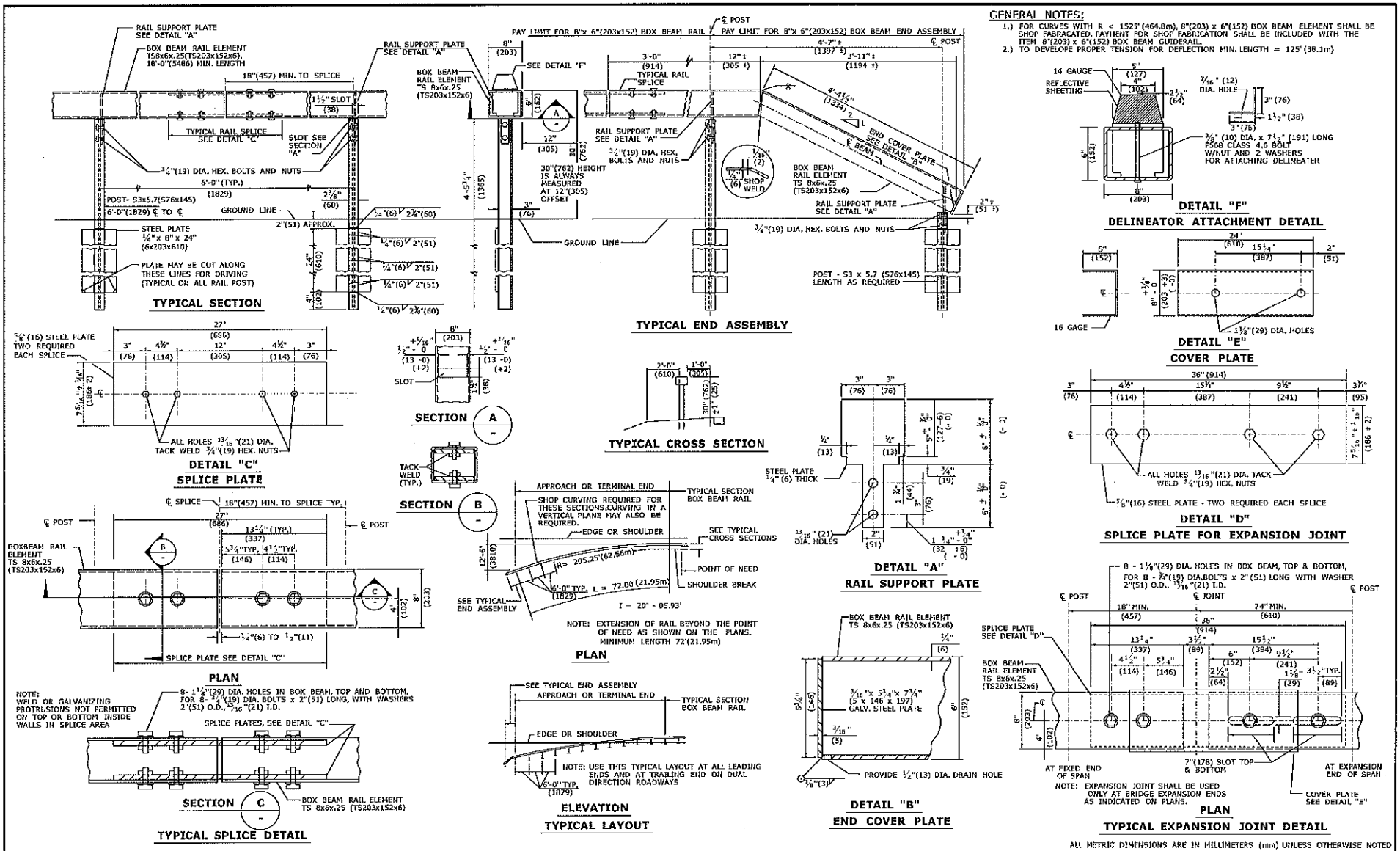
STANDARD SHEET TITLE: **MISCELLANEOUS GUIDERAIL TRANSITIONS**

STANDARD SHEET NO.: **HW-910_09a**

GENERAL NOTES:

1.) FOR CURVES WITH R < 1525' (464.8m), 8"(203) x 6"(152) BOX BEAM ELEMENT SHALL BE SHOP FABRICATED. PAYMENT FOR SHOP FABRICATION SHALL BE INCLUDED WITH THE ITEM 8"(203) x 6"(152) BOX BEAM GUIDERAIL.

2.) TO DEVELOPE PROPER TENSION FOR DEFLECTION MIN. LENGTH = 125' (38.1m)



ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED

REV.	DATE	REVISION DESCRIPTION
1	7/12	ADD NOTE 2 TO GENERAL NOTES
2	7/13	ADD DIMENSION ± 1"
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Posted Date: 3/18/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD2013.dgn Model: S3-HW-910_10

SUBMITTED BY: NAME/DATE/TIME: Highway signed by Leo L. Fonzone Date: 2013.07.24 15:23:36-04'00'

APPROVED BY: NAME/DATE/TIME: James H. Norman 2013.07.24 14:49:40-04'00'

CTDOT STANDARD SHEET

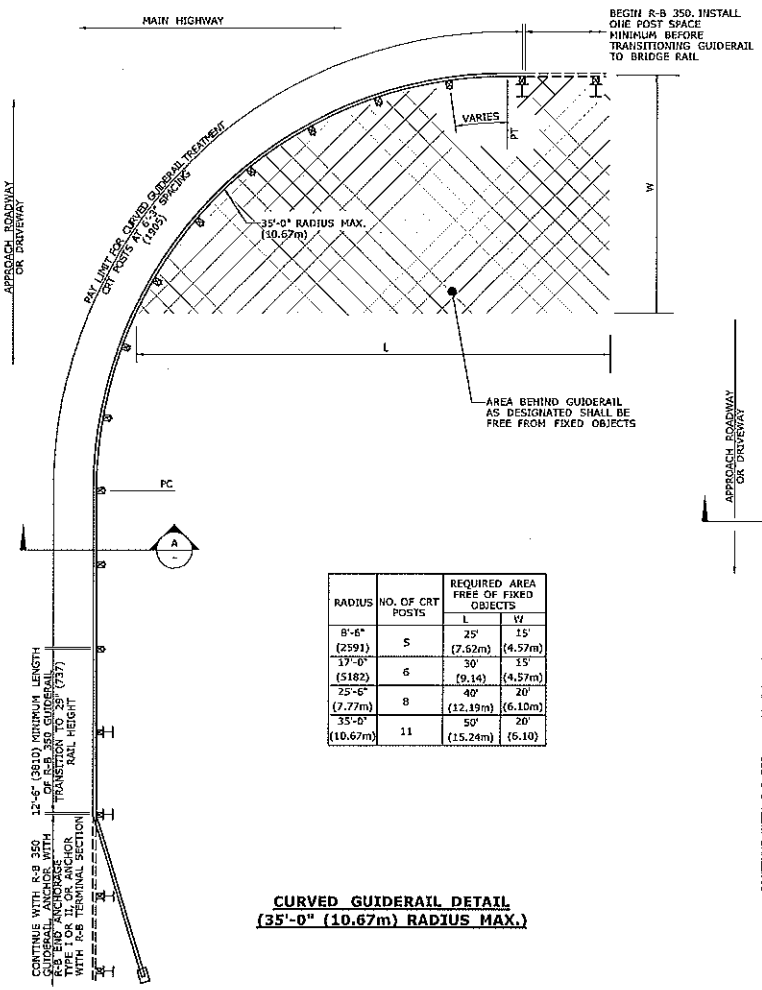
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: METAL BEAM RAIL 8" (203) X 6" (152) BOX BEAM

STANDARD SHEET NO.: HW-910_10

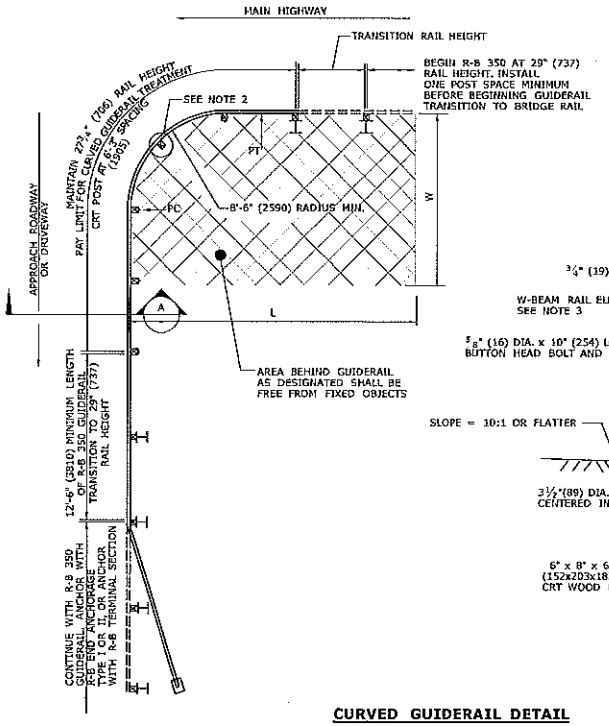
GENERAL NOTES:

1. NO WASHERS ARE USED ON THE 5/8" (16) DIA. BUTTON HEAD BOLTS CONNECTING THE RAIL TO THE CONTROLLED RELEASING TERMINAL (CRT) POSTS.
2. THE RAIL IS NOT BOLTED TO THE CRT POST AT THE CENTER OF THE NOSE AS SHOWN FOR THE 8'-6" (2590) RADIUS CURVED GUIDERAIL TREATMENT ONLY.
3. THE CURVED GUIDERAIL SECTION SHALL BE SHOP BENT.
4. THE SLOPE FROM THE EDGE OF THE SHOULDER TO THE FACE OF THE RAIL SHALL BE 10:1 OR FLATTER. NO CURBING SHALL BE INSTALLED WITHIN THE PAY LIMIT OF THE CURVED GUIDERAIL TREATMENT.
5. THIS SYSTEM SHALL BE USED ONLY ON ROADS WITH DESIGN SPEEDS ≤ 50 mph (80 kph).
6. MAINTAIN MINIMUM 27¾" (706) RAIL HEIGHT THROUGH RADIUS.

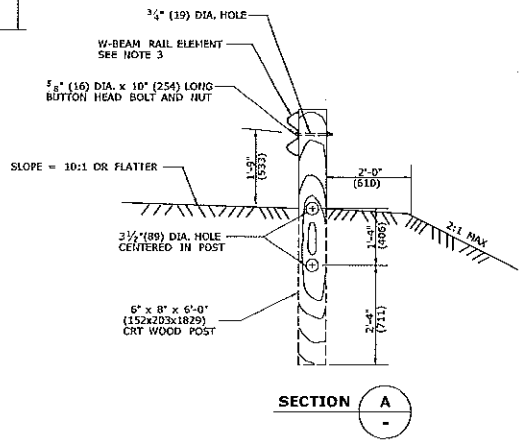


RADIUS	NO. OF CRT POSTS	REQUIRED AREA FREE OF FIXED OBJECTS	
		L	W
8'-6" (2591)	5	25' (7.62m)	15' (4.57m)
17'-0" (5182)	6	30' (9.14)	15' (4.57m)
25'-6" (7.77m)	8	40' (12.19m)	20' (6.10m)
35'-0" (10.67m)	11	50' (15.24m)	20' (6.10)

CURVED GUIDERAIL DETAIL (35'-0" (10.67m) RADIUS MAX.)



CURVED GUIDERAIL DETAIL (8'-6"(2590) RADIUS MIN.)



ALL METRIC DEMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 8/6/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD_JULY2011.dgn Model: 45 - HW-910_11

SUBMITTED BY: NAME/DATE/TIME:

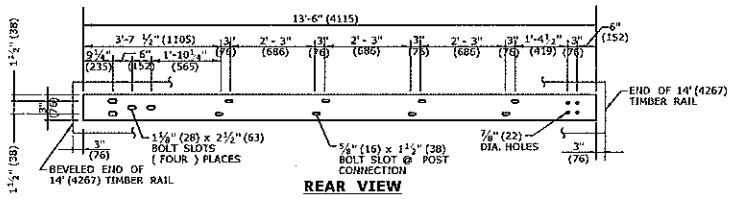
APPROVED BY: NAME/DATE/TIME: James H. Norman 2012.07.25 12:47:32 -04'00'

CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

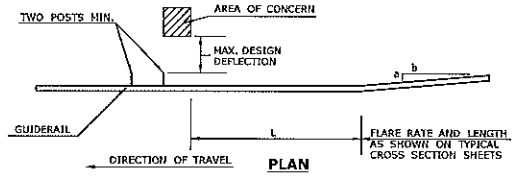
STANDARD SHEET TITLE: CURVED GUIDERAIL TREATMENT DETAIL

STANDARD SHEET NO.: HW-910_11



REAR VIEW

STEEL TRANSITION RAIL
6" x 3/8" x 13'-6" (152x9x4115)
FOR LEADING END ATTACHMENT



PLAN

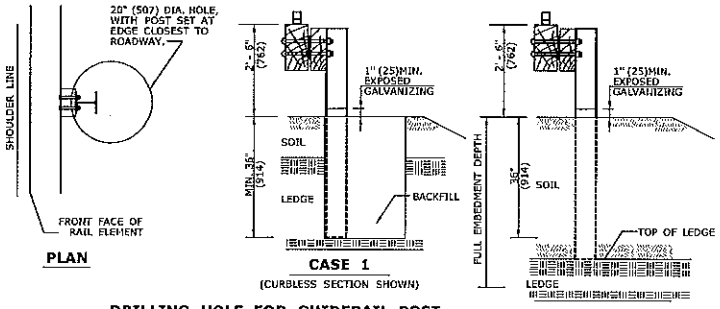
APPROACH TO FIXED OBJECTS
SYSTEM 2 AND 3

GENERAL NOTES:

1. THIS DRAWING SHOWS LEADING END ATTACHMENT TO PROPOSED BARRIER/PARAPET. AT EXISTING PARAPETS ATTACH GUIDERAIL USING D.O.T. APPROVED CHEMICAL ANCHORS.
2. PRIOR TO GUIDERAIL POST INSTALLATION THE CONTRACTOR SHALL INVESTIGATE POST LOCATIONS FOR THE PRESENCE AND DEPTH OF LEDGE.
3. 20" (507) DIA. EXCAVATED HOLE SHALL BE BACKFILLED WITH SUITABLE MATERIAL, OR GRANULAR FILL COMPACTED IN 6" (150) LIFTS BEFORE DRIVING POST OR POSTS MAY BE SET IN EXCAVATED HOLE AND BACKFILLED WITH CONTROLLED LOW STRENGTH MATERIAL (CLSM).

Maximum Design Deflection (R) (mm)	Area Of Concern Plus 2 Posts (see sketch)	SYSTEM 3	SYSTEM 2	Standard System	L
		W6x15 (W150x22) Posts Spaced at 2'- 6" (762)	W6x15 (W150x22) Posts Spaced at 5' (1524)	W6x15 (W150x22) Posts Spaced at 10' (3048)	Min. Length Needed
1' (305)	System 3	10' (3048)	10' (3048)	50' (16.40m)	70' (21.34m)
2' - 6" (762)	System 2	--	10' (3048)	60' (19.68m)	70' (21.34m)
4' (1219)	Standard System	--	--	70' (21.34m)	70' (21.34m)

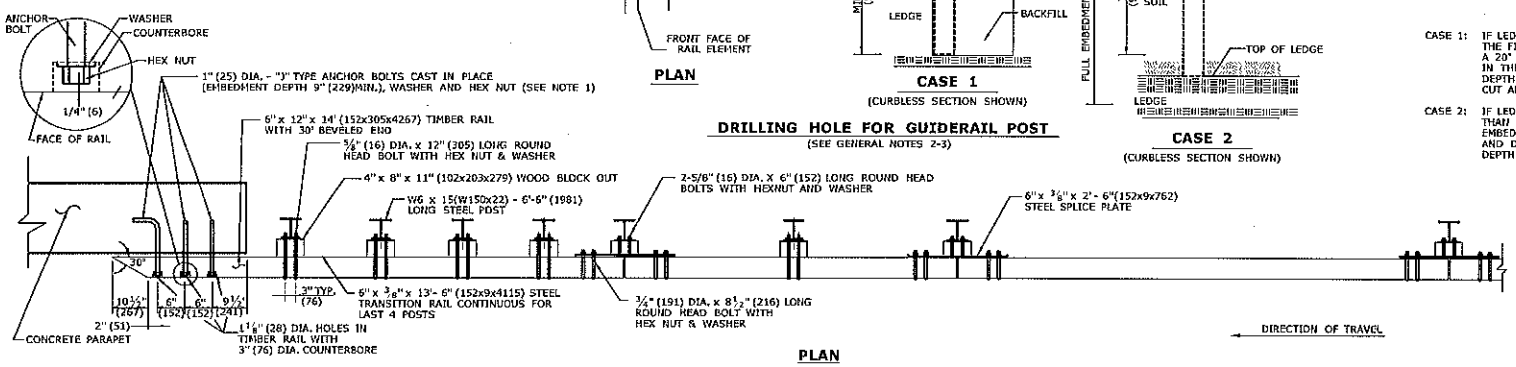
MERRITT PARKWAY GUIDERAIL
DESIGN DEFLECTION CHART



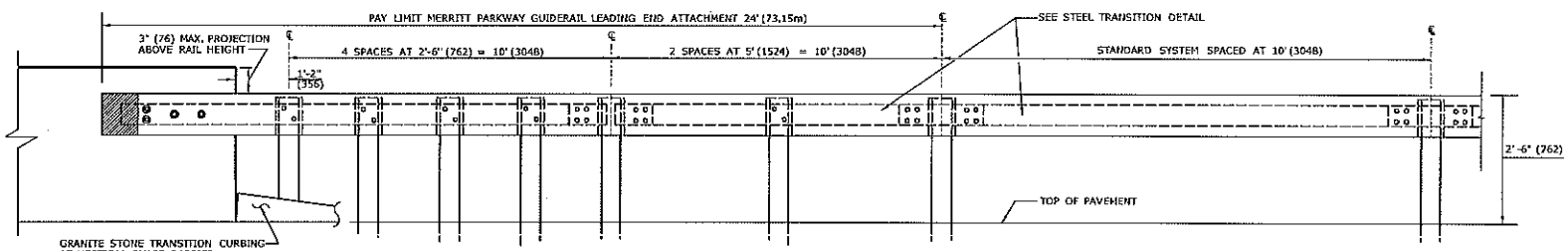
DRILLING HOLE FOR GUIDERAIL POST
(SEE GENERAL NOTES 2-3)

CASE 1: IF LEDGE IS LOCATED WITHIN 36" (914) OF THE FINISHED GRADE AT THE POST LOCATION A 20" (507) DIAMETER HOLE SHALL BE DRILLED IN THE LEDGE TO THE MINIMUM EMBEDMENT DEPTH OF 36" (914) AND THE POST SHALL BE CUT AND DRIVEN TO ACHIEVE THIS DEPTH.

CASE 2: IF LEDGE IS LOCATED AT A DEPTH GREATER THAN 36" (914) BUT LESS THAN THE FULL EMBEDMENT DEPTH THE POST SHALL BE CUT AND DRIVEN TO ACHIEVE EMBEDMENT TO THE DEPTH OF THE TOP OF LEDGE.



PLAN



ELEVATION

ATTACHMENT AT LEADING END (VERTICAL SHAPE BARRIER SHOWN)
(FRONT VIEW)
(SEE GENERAL NOTES 1)

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISED ELEVATION VIEW OF ATTACHMENT
2	7/13	REVISED POST IN LEDGE & ADDED COUNTERBORE DETAIL
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE PROVIDED.

Posted Date: 8/14/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD2013.dgn Pwidth: 35 - HW-910_12a

SUBMITTED BY: NAME/DATE/TITLE
Digitally signed by Larry L. Forbes Date: 2013.07.24 15:58:16-04'00'

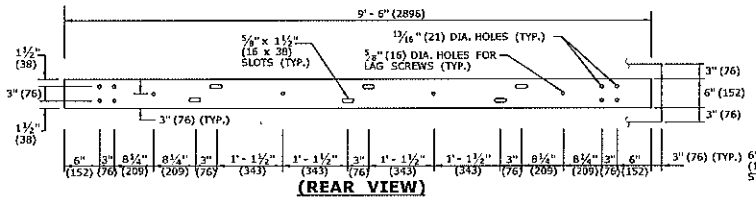
APPROVED BY: NAME/DATE/TITLE
James H. Norman 2013.07.24 14:50:14-04'00'

CTDOT STANDARD SHEET

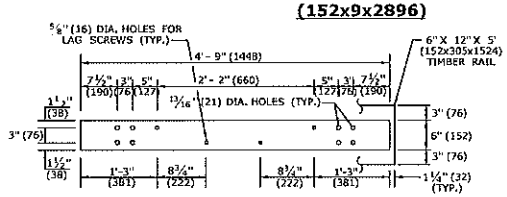
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
MERRITT PARKWAY GUIDERAIL LEADING END ATTACHMENT AND SYSTEMS 2 & 3

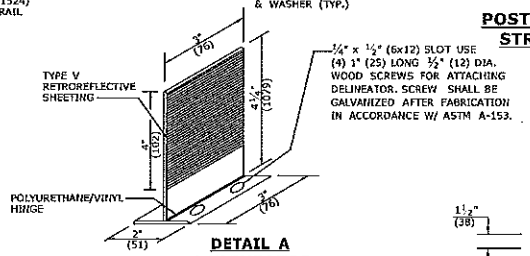
STANDARD SHEET NO.
HW-910_12a



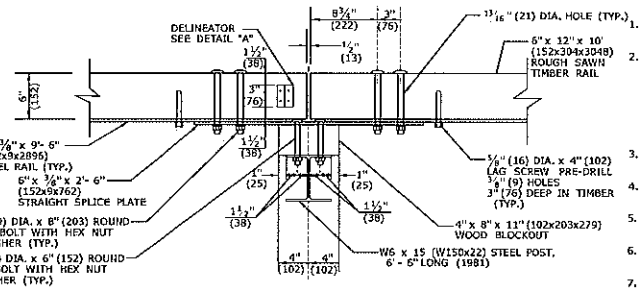
(REAR VIEW)
STANDARD STEEL RAIL DETAIL
6" x 3/8" x 9'-6"
(152x9x2896)



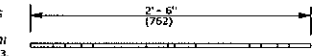
STEEL RAIL DETAIL
6' x 3/8" x 4'-9"
(1829 x 9 x 1448)
FOR CURVES WITH R < 70' (21.3m)



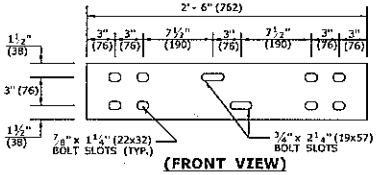
DETAIL A
DELINEATOR



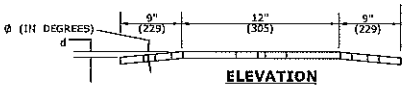
POST CONNECTION FOR
STRAIGHT SECTIONS



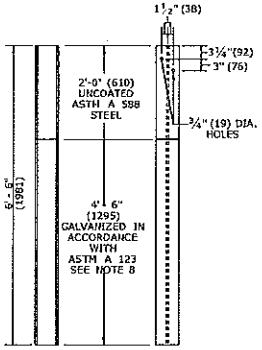
ELEVATION
STRAIGHT SPLICE PLATE



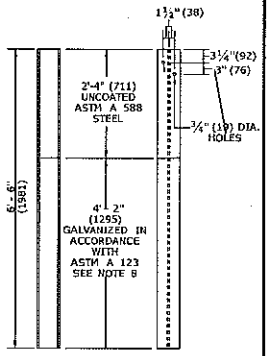
(FRONT VIEW)
STEEL SPLICE PLATE DETAIL
6" x 3/8" x 2'- 6"
(152x9x762)



ELEVATION
BENT SPLICE PLATE



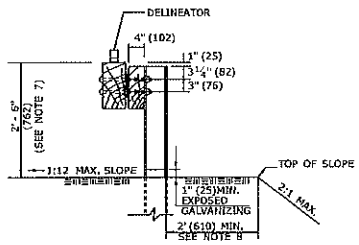
SIDE VIEW FRONT VIEW
POST DETAIL
W6 X 15
(W150x22)
WITH CURBING



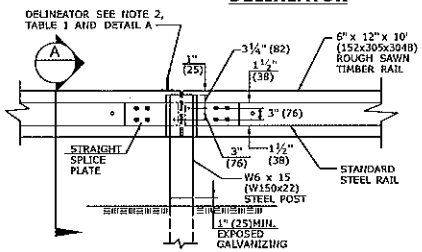
SIDE VIEW FRONT VIEW
POST DETAIL
W6 X 15
(W150x22)
NO CURBING

GENERAL NOTES:

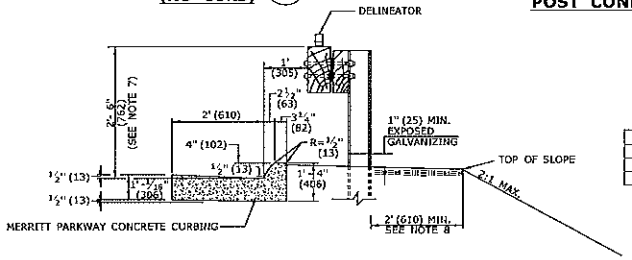
1. MATERIALS AND CONSTRUCTION OF THE MERRITT PARKWAY GUIDERAIL SHALL CONFORM TO SPECIAL PROVISION PROVIDED WITH THE PROJECT.
2. DELINEATORS SHALL BE PLASTIC INVERTED T-SECTIONS IN ACCORDANCE WITH DETAIL "A". REFLECTORS SHALL BE SPACED IN ACCORDANCE WITH TABLE 1 , AND POSITIONED PERPENDICULAR TO THE ADJACENT EDGE OF LANE. DO NOT ATTACH REFLECTORS ON FLARE OR TERMINAL SECTIONS. REFLECTIVE SHEETING SHALL BE SILVER-WHITE ON ALL RAIL SECTIONS ADJACENT TO THE RIGHT SHOULDER, AND YELLOW ON RAIL SECTIONS ADJACENT TO THE LEFT SHOULDER OF TRAVEL LANES. DELINEATORS SHALL BE INCLUDED IN THE COST FOR "MERRITT PARKWAY GUIDERAIL."
3. TWO ADDITIONAL 5/8" (16) DIA. X 4"(102) LONG LAG SCREWS AND WASHERS SHALL BE INSTALLED AT ALL MID-SPAN POINTS FOR STANDARD SYSTEMS.
4. ALL CONNECTION HARDWARE SHALL BE SUFFICIENTLY TIGHTENED TO ACCOMMODATE FOR SHRINKAGE OF THE WOOD ELEMENTS.
5. WHEN FURNISHING THE SHOP BENT SPLICE PLATES, USE THE MINIMUM BEND ANGLE AS SHOWN IN TABLE 2.
6. FOR RAILING SET ON A CURVE WITH RADII < 70' (21.3m) SPACE POSTS AT 5' (1524).
7. GUIDERAIL HEIGHT MAY VARY UP TO 2" (51) PLUS OR MINUS THE HEIGHT SHOWN IN THE DETAILS TO ACHIEVE A SMOOTH AND CONTINUOUS GUIDERAIL PROFILE.
8. 7'-6" (2286) LONG POSTS MAY BE USED IN LOCATIONS WHERE 2'(610)MIN SHELF IS NOT ATTAINABLE. GALVANIZED COATING LIMITS SHALL BE INCREASED BY 1' (305). PAYMENT FOR EXTRA LONG POSTS SHALL BE INCLUDED WITH THE ITEM FOR MERRITT PARKWAY GUIDERAIL.



SECTION (A)
(NO CURB)



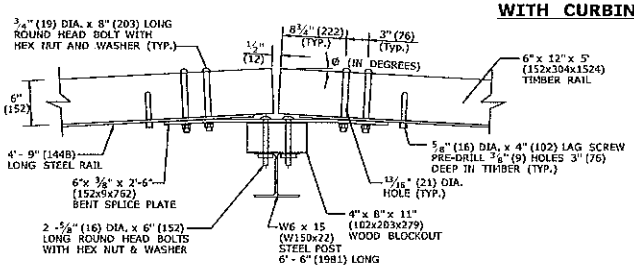
REAR VIEW ELEVATION
POST CONNECTION



MERRITT PARKWAY CONCRETE CURBING WITH MERRITT PARKWAY GUIDERAIL

TABLE 1

DELINEATOR SPACING	
CURVE RADIUS	SPACE
< 300' (91.4m)	20' (6.10m)
≥ 300' (91.4m)	50' (15.2m)



POST CONNECTION
FOR CURVES WITH R < 70' (21.3m)

TABLE 2

Radius R (ft.)(m)	Ø (Degrees)	d (in.)(mm)
35 (10.7)Min.	4.10	5/8(16)
40 (12.2)	3.58	9/16 (14)
45 (13.7)	3.18	1/2(13)
50 (15.2)	2.86	7/16 (11)
55 (16.8)	2.60	7/16 (11)
60 (18.3)	2.40	3/8(9)
65 (19.8)	2.20	3/8(9)
70 (21.3)	2.05	5/16 (8)
Over 70 (21.3)	Flat	0

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISED STEEL RAIL REAR VIEW
2	7/13	ADDED NOTE 8 AND REVISED GALVANIZE DIMENSION
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES, OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY GUARANTEED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE FOUNDED.

Plotted Date: 8/14/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: NAME/DATE/TITLE
Digitally signed by Leo L. Fontaine Date: 2013.07.24 13:59:02-04'00'

APPROVED BY: NAME/DATE/TITLE
James H. Norman 2013.07.24 14:50:49-04'00'

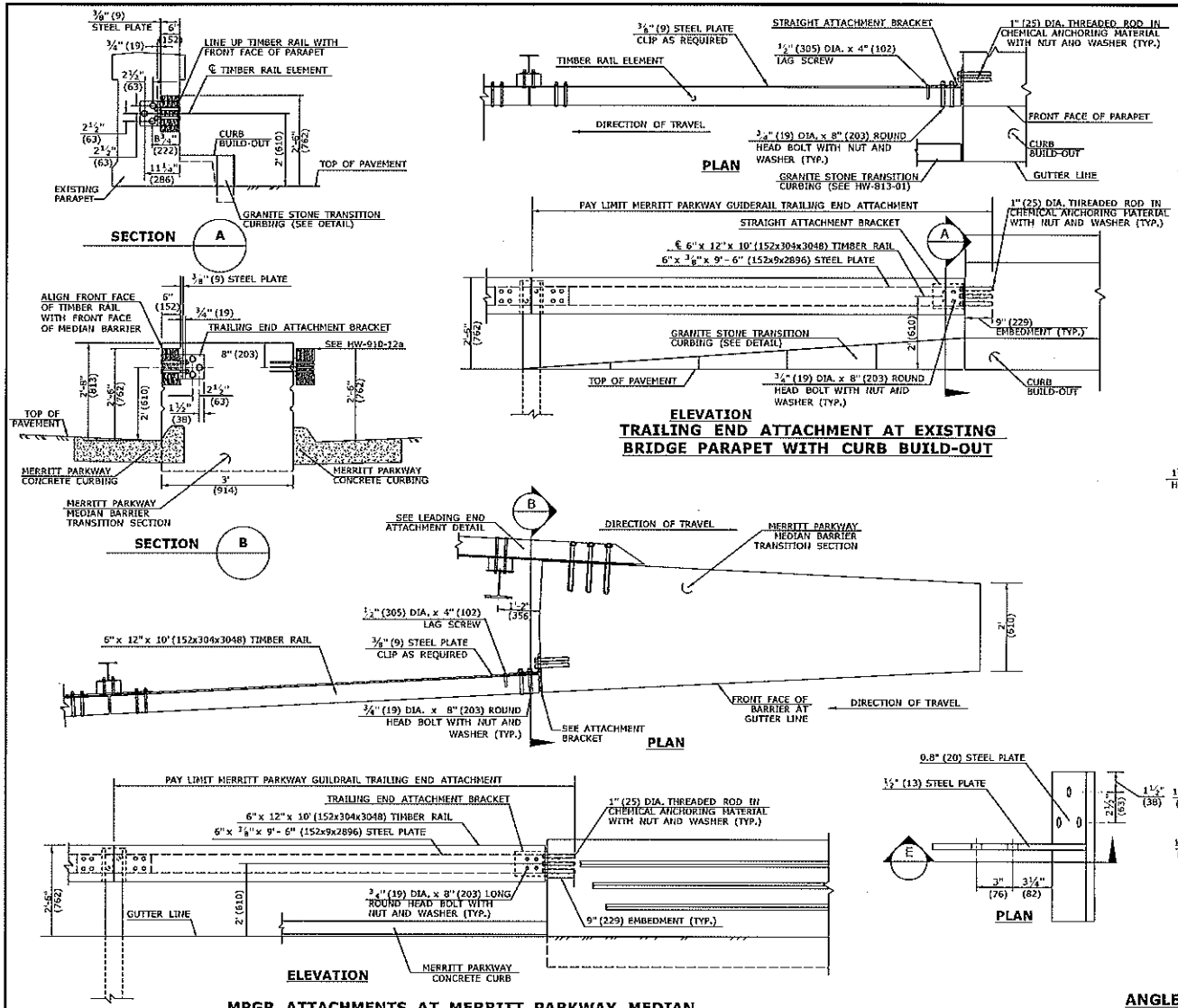
Filename: CTDOT_MORNWAY_STD2013.dgn Model: 15 - HW-910_12b

CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
MERRITT PARKWAY GUIDERAIL HARDWARE DETAILS

STANDARD SHEET NO.:
HW-910_12b



GENERAL NOTES:

1. THREADED RODS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325, WITH NUTS CONFORMING TO ASTM A563, GRADE C. CIRCULAR HARDENED WASHERS SHALL CONFORM TO ASTM F436. THREADED NUTS AND WASHERS IN CONTACT WITH CONCRETE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153. ROUND HEAD BOLTS SHALL CONFORM TO THE SPECIAL PROVISIONS PROVIDED WITH THE PROJECT.
2. CHEMICAL ANCHORING MATERIAL SHALL CONFORM TO SECTION M.03, SUBARTICLE M.03.01-15
3. ATTACHMENT BRACKETS SHALL CONFORM TO ASTM A36 AND BE GALVANIZED IN ACCORDANCE WITH ASTM A123.
4. THE PAY LIMIT FOR TRAILING END ATTACHMENT INCLUDES ALL HARDWARE AND RAIL ELEMENTS TO AND INCLUDING THE FIRST POST.
5. ALL RUNS OF MERRITT PARKWAY MEDIAN BARRIER SHALL INCLUDE MERRITT PARKWAY MEDIAN BARRIER TRANSITIONS SECTIONS AT BOTH ENDS.
6. THE END OF TIMBER RAIL ATTACHED TO THE ANGLED ATTACHMENT BRACKET FOR THE RIPAWAM RIVER SHALL BE MITERED TO MATCH THE ANGLE OF THE BRACKET AND PARAPET.

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISE DETAILS TO IMPROVE CLARITY
2	7/13	ADD MEDIAN BARRIER TRANSITION SECTION

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY GUARANTEED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Revised Date: 6/21/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD2013.dgn Model: 57 - HW-910_12c

SUBMITTED BY: NAME/DATE/TITLE: Bridge Architect Engineer Date: 2013.07.24 14:58:40 -04'00'

APPROVED BY: NAME/DATE/TITLE: James M. Norman 2013.07.24 14:51:26-04'00'

CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

STANDARD SHEET TITLE: MERRITT PARKWAY GUIDERAIL TRAILING END ATTACHMENTS

STANDARD SHEET NO.: HW-910_12c

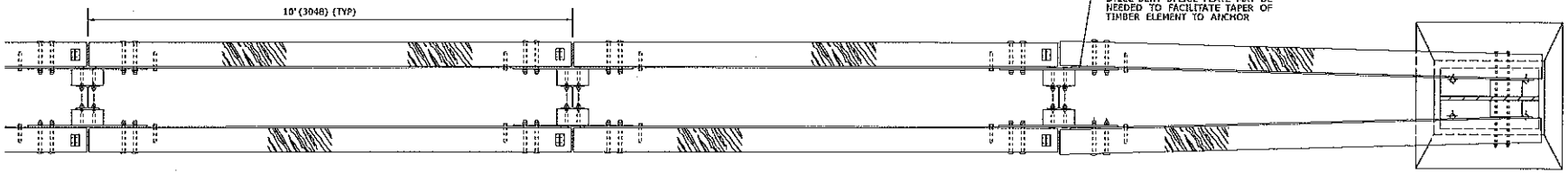
DELINEATORS SHALL BE PLASTIC INVERTED T-SECTIONS IN ACCORDANCE WITH DETAIL "A". REFLECTORS SHALL BE SPACED IN ACCORDANCE WITH TABLE 1, AND POSITIONED PERPENDICULAR TO ADJACENT EDGE OF LANE. DO NOT ATTACH REFLECTORS ON FLARE OR TERMINAL SECTIONS. REFLECTIVE SHEETING SHALL BE SILVER-WHITE ON ALL RAIL SECTIONS ADJACENT TO THE RIGHT SHOULDER, AND YELLOW ON RAIL SECTIONS ADJACENT TO LEFT SHOULDER OF TRAVEL LANES.

TABLE 1

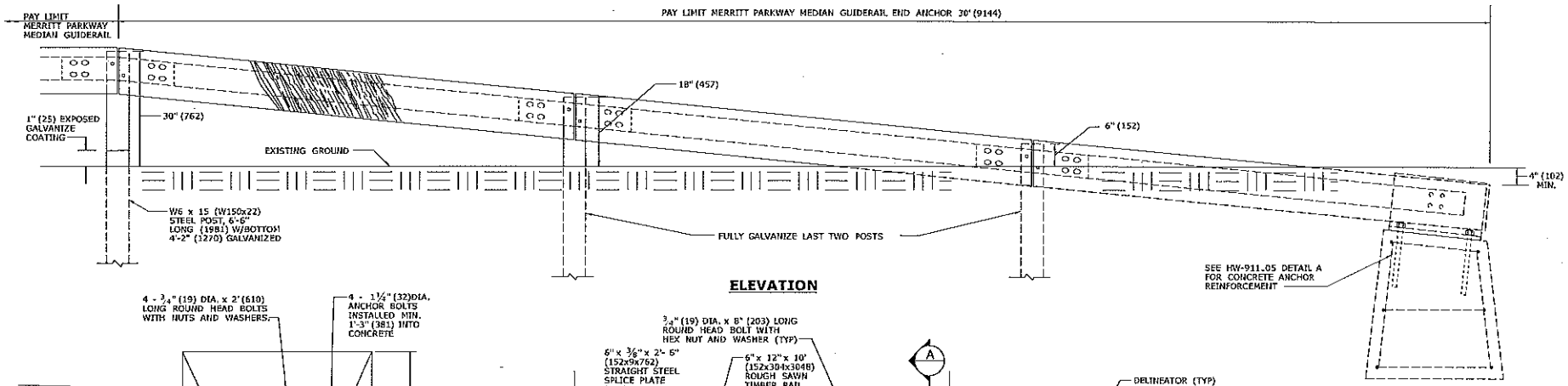
DELINEATOR SPACING	
CURVE RADIUS	SPACE
< 380' (91.4m)	20' (6.10m)
≥ 380' (91.4m)	50' (15.2m)

GENERAL NOTES:

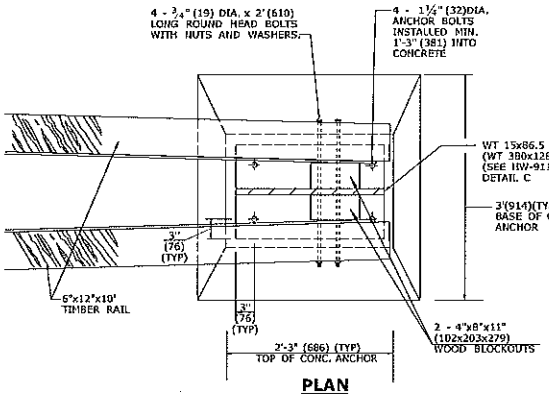
1. SEE HW-910_12a THRU 12c FOR STANDARD GUIDERAIL PARTS.
2. IF RAIL IS PLACED GREATER THAN 2' (610) FROM EDGE OF ROAD, RAIL HEIGHT IS MEASURED FROM GROUND BENEATH RAIL.
3. IF RAIL IS PLACED GREATER THAN 2'(610) FROM EDGE OF ROAD, RAIL HEIGHT IS MEASURED FROM GROUND BENEATH RAIL.



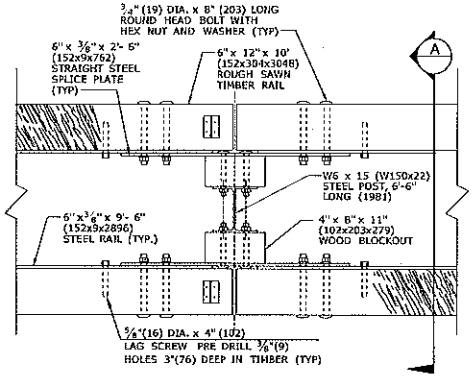
PLAN



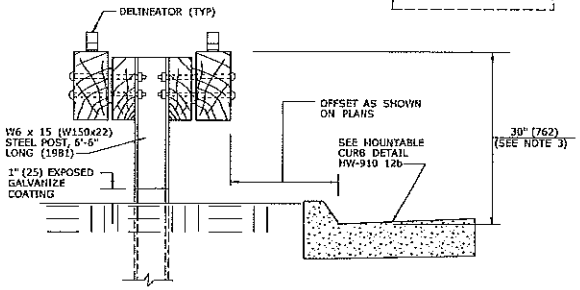
ELEVATION



PLAN
MERRITT PARKWAY MEDIAN GUIDERAIL
END ANCHOR
DETAIL A



PLAN
MERRITT PARKWAY MEDIAN GUIDERAIL



SECTION A

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED

REV.	DATE	REVISION DESCRIPTION
-	5/11	ADDED NEW SHEET FOR MEDIAN RAIL

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Revised Date: 5/13/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD_hw911_05 Model: 50 - HW-910_12d

SUBMITTED BY: NAME/DATE/TITLE

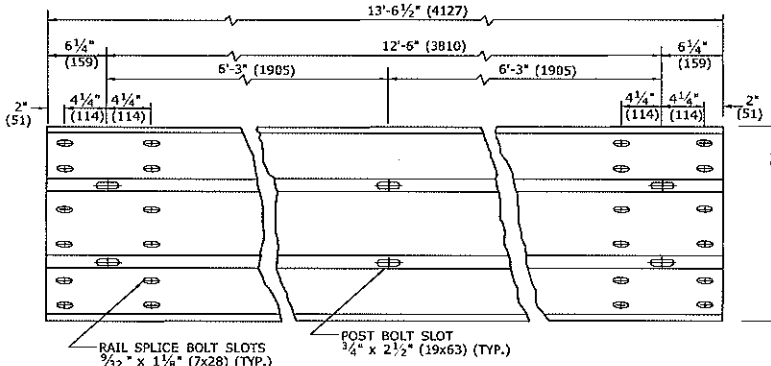
APPROVED BY: NAME/DATE/TITLE
James H. Norman
2011.06.09 15:31:37 -04'00'

CTDOT
STANDARD SHEET

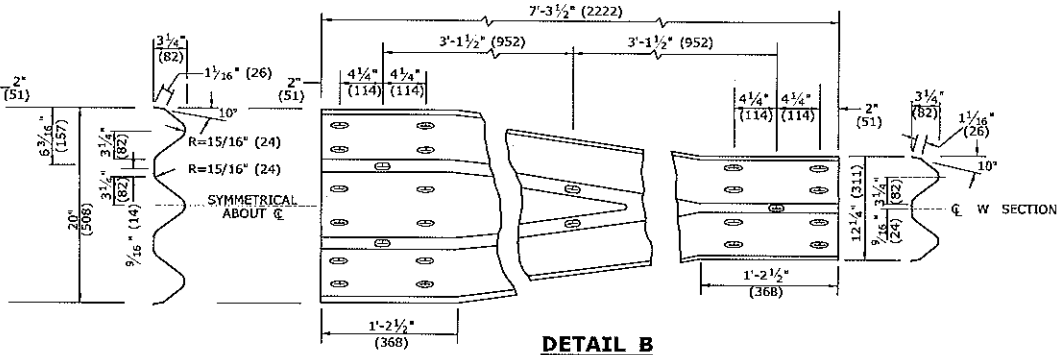
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
MERRITT PARKWAY MEDIAN GUIDERAIL AND END ANCHOR

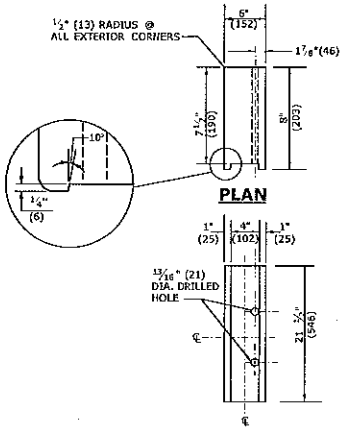
STANDARD SHEET NO.:
HW-910_12d



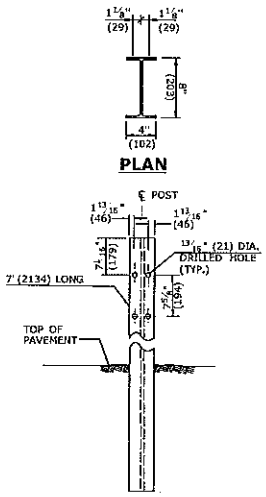
DETAIL A
THRIE-BEAM RAIL ELEMENT
(10 GAUGE)



DETAIL B
THRIE-BEAM RAIL ELEMENT
(10 GAUGE)



ELEVATION
DETAIL C
THRIE-BEAM
POLYETHYENE BLOCKOUT

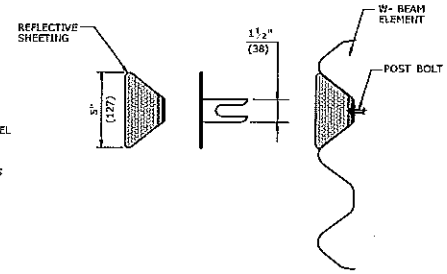


ELEVATION
DETAIL D
THRIE-BEAM POST DETAIL
W8x13 (W200x19)
BOLT HOLE LOCATION

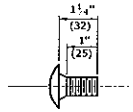
DELINEATOR NOTES:

1. DELINEATORS SHALL BE FORMED OF .080 POLY-CARBONATE OR .080 SHEET ALUMINUM III ACCORDANCE WITH M.18.13.
2. REFLECTIVE SHEETING SHALL CONFORM TO M.18.09.2.
3. DELINEATORS SHALL BE INSTALLED ON THE POST CLOSEST TO THE DESIGNATED SPACING.
4. REFLECTIVE SHEETING SHALL BE WHITE EXCEPT ON THE LEFT SIDE OF DIVIDED STREETS, HIGHWAYS, RAMPS, AND ONE WAY ROADS IN THE DIRECTION OF TRAVEL WHERE IT SHALL BE YELLOW.
5. INSTALL DELINEATORS ON RAIL THAT IS PARALLEL TO AND NOT GREATER THAN 6'(1829) FROM THE EDGE OF THE ROADWAY. A MINIMUM OF THREE DELINEATORS MUST BE INSTALLED ON ANY RUN OF RAIL.

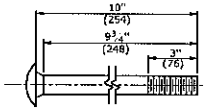
DELINEATOR SPACING:
RADIUS ≥ 300'(91440) - SPACE EVERY 50'(15.24m)
RADIUS < 300'(91440) - SPACE EVERY 25'(7.62m)



DELINEATOR DETAIL

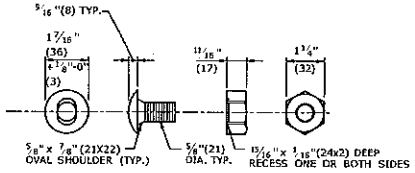


SPLICE BOLT DETAIL



POST BOLT DETAIL

(UNTHREADED PORTION NOT TO EXCEED 6¾"(171))



BUTTONHEAD BOLT **HEX NUT**

NOTE: AFTER GALVANIZING, THE NUT SHALL BE FREE RUNNING ON THE BOLT. DIAMETER SHOWN IS TYPICAL FOR ALL GUIDERAIL BOLTS. SEE DETAILS ABOVE FOR SPECIFIC LENGTHS.

ALL METRIC DIMENSIONS ARE IN MILLIMETERS [mm] UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	CREATED THRIE BEAM HARDWARE SHEET
2	7/13	DIMENSION REVISED

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 3/21/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: hw-910_13a.dgn Model: HW-910_13a

SUBMITTED BY: NAME/DATE/TITLE

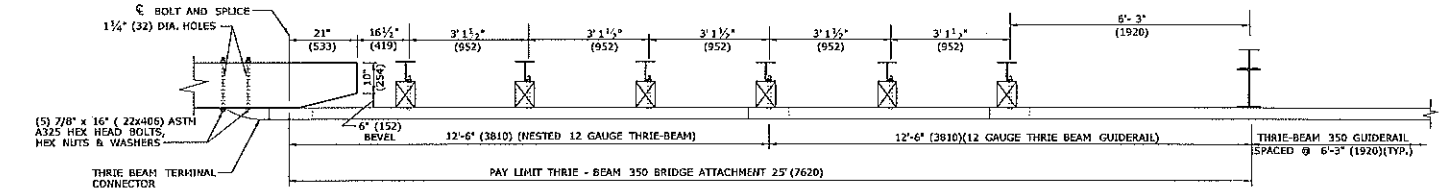
APPROVED BY: James H. Norman 2013.07.24 14:51:57-04'00'

CTDOT STANDARD SHEET

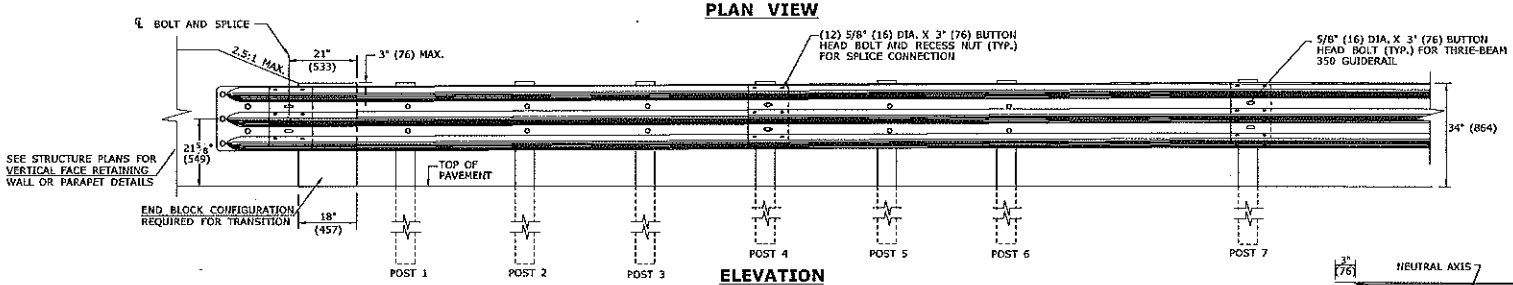
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: THRIE BEAM METAL BEAM RAIL HARDWARE

STANDARD SHEET NO.: HW-910_13a



PLAN VIEW



ELEVATION

GENERAL NOTES:

FOR SINGLE DIRECTION ROADWAY:

- INSTALL THRIE - BEAM TERMINAL CONNECTOR BETWEEN NESTED GUIDERAIL ELEMENTS.

FOR DUAL DIRECTION ROADWAY:

FOR APPROACHING TRAFFIC

- INSTALL THRIE-BEAM TERMINAL CONNECTOR BETWEEN NESTED GUIDERAIL ELEMENTS.

FOR TRAILING END:

- INSTALL THRIE-BEAM TERMINAL CONNECTOR OUTSIDE OF THE NESTED GUIDERAIL ELEMENTS.

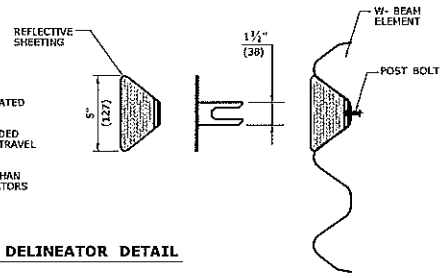
LEGEND

1. W6 x 25 x 8.5' OR W8 x 21 x 8.5' POST (W150x37x259) OR (W200x31x259) POST
2. W6 x 20 x 7' OR W8 x 18 x 7' POST (W150x30x2134) OR (W200x27x2134)
3. 6" x 8" x 18" TREATED TIMBER OFFSET BLOCK (152x203x457) (OR APPROVED EQUAL)
4. W14x 22 STEEL OFFSET BLOCK (W360x33)
5. W6 x 9 x 7' POST (W152x230x2134)

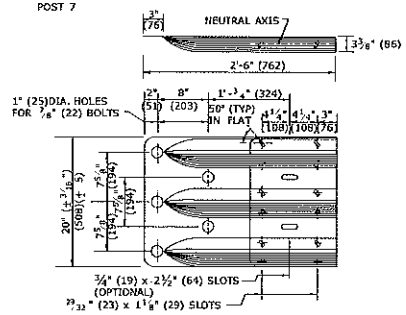
DELINEATOR NOTES:

1. DELINEATORS SHALL BE FORMED OF .080 POLY-CARBONATE OR .080 SHEET ALUMINUM IN ACCORDANCE WITH M.18.13.
2. REFLECTIVE SHEETING SHALL CONFORM TO M.18.09.2.
3. DELINEATORS SHALL BE INSTALLED ON THE POST CLOSEST TO THE DESIGNATED SPACING.
4. REFLECTIVE SHEETING SHALL BE WHITE EXCEPT ON THE LEFT SIDE OF DIVIDED STREETS, HIGHWAYS, RAMPS, AND ONE WAY ROADS IN THE DIRECTION OF TRAVEL WHERE IT SHALL BE YELLOW.
5. INSTALL DELINEATORS ON RAIL THAT IS PARALLEL TO AND NOT GREATER THAN 6'(1829) FROM THE EDGE OF THE ROADWAY. A MINIMUM OF THREE DELINEATORS MUST BE INSTALLED ON ANY RUN OF RAIL.

DELINEATOR SPACING:
RADIUS ≥ 300'(91440) - SPACE EVERY 50'(15.24m)
RADIUS < 300'(91440) - SPACE EVERY 25'(7.62m)

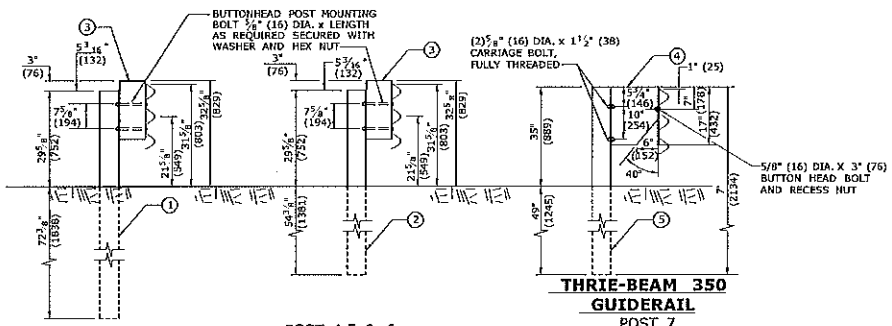


DELINEATOR DETAIL



THRIE-BEAM TERMINAL CONNECTOR

(10 GAUGE)



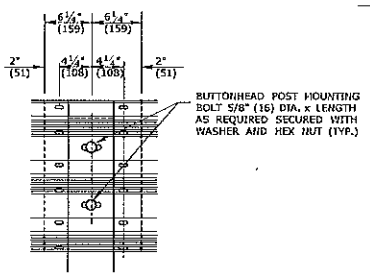
POST 1, 2 & 3

POST 4,5, & 6

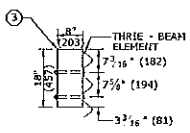
THRIE-BEAM 350 GUIDERAIL

POST 7

(SEE SHEET HW-910_14b)



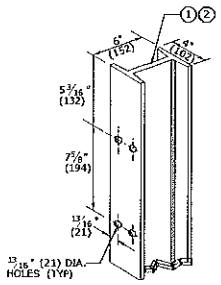
SPLICE DIAGRAM @ POST 4



TREATED TIMBER BLOCK OUT DETAIL

POSTS 1 THRU 6

(OR APPROVED EQUAL)



BOLT HOLE LOCATION FOR STEEL POST

POSTS 1 THRU 6

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISE AND ADD DIMENSIONS TO TERMINAL CONNECTOR AND REVISE BLOCKOUT DESIGNATION

THE INFORMATION INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE ENCOUNTERED.

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: NAME/DATE/TITLE

APPROVED BY: NAME/DATE/TITLE
James H. Norman
2011.06.09 15:32:46 -04'00'

CTDOT STANDARD SHEET

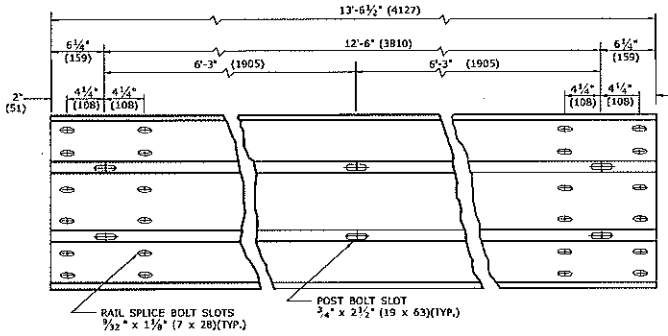
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
THRIE-BEAM 350 BRIDGE ATTACHMENT

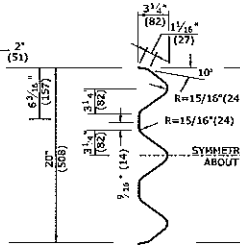
STANDARD SHEET NO.
HW-910_14a

GENERAL NOTES:

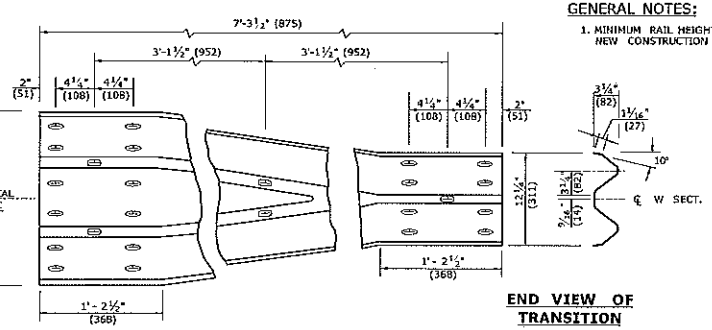
1. MINIMUM RAIL HEIGHT OF R-B 350 GUIDERAIL FOR NEW CONSTRUCTION SHALL BE 29" (737) ± 1" (25).



TYPICAL THRIE-BEAM RAIL ELEMENT
(12 GAUGE)

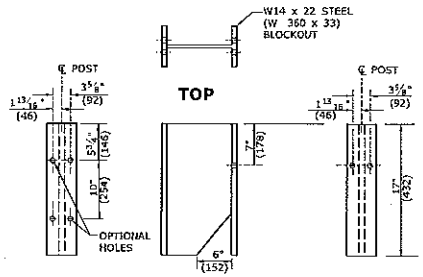


END VIEW
OF TRANSITION



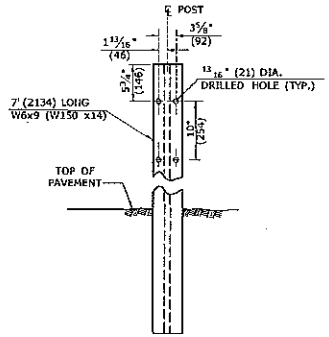
END VIEW OF
TRANSITION

TYPICAL THRIE-BEAM TRANSITION ELEMENT
(12 GAUGE)

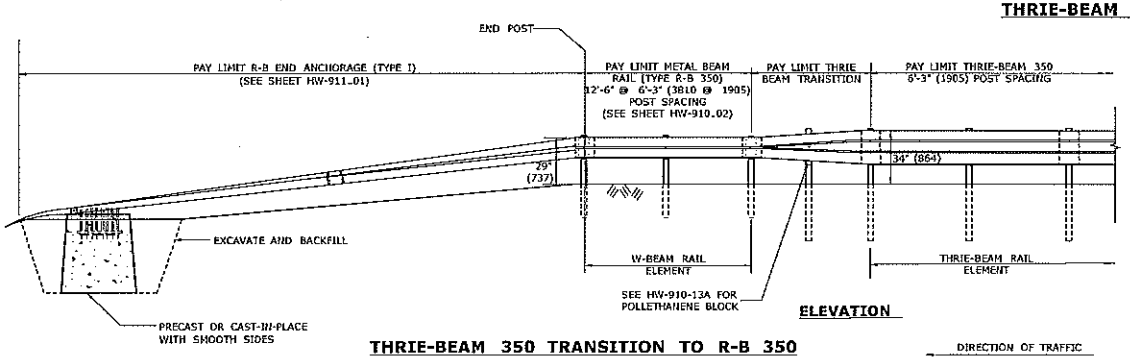


POST FACE SIDE TRAFFIC FACE

THRIE-BEAM 350 BLOCKOUT DETAIL



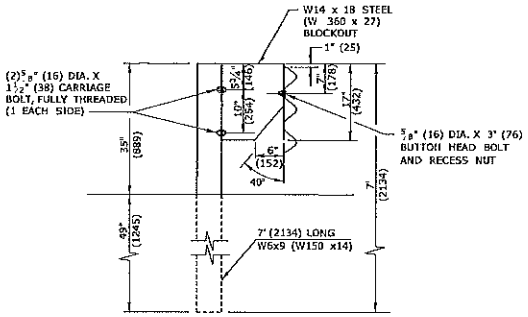
THRIE-BEAM 350
W6x9 (W150x14)
FRONT POST ELEVATION



ELEVATION

THRIE-BEAM 350 TRANSITION TO R-B 350
AND R-B END ANCHORAGE TYPE I

DIRECTION OF TRAFFIC



THRIE-BEAM 350
GUIDERAIL

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISE BLOCKOUT DESIGNATION

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 6/1/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: NAME/DATE/TITLE:

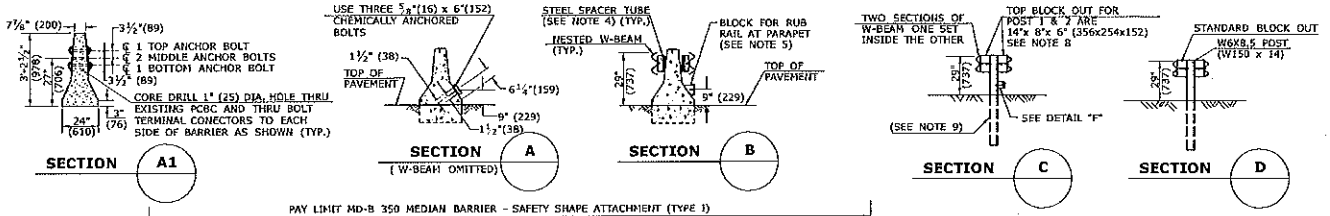
APPROVED BY: NAME/DATE/TITLE: James H. Norman 2011.06.09 15:33:06 -04'00'

CTDOT STANDARD SHEET

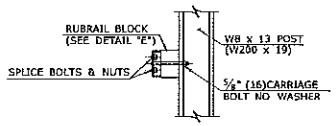
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: THRIE-BEAM 350 GUIDERAIL TRANSITION TO R-B 350 GUIDERAIL

STANDARD SHEET NO.: HW-910_14b



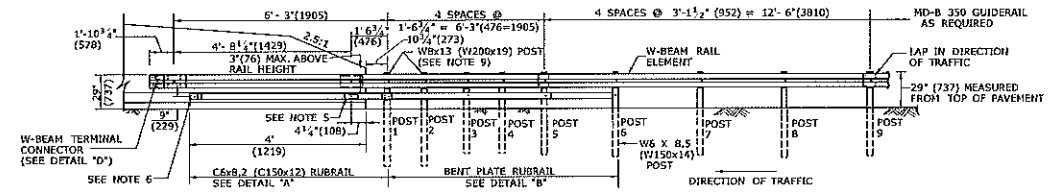
PLAN



DETAIL "F"
RUBRAIL LAP AT POST 1

GENERAL NOTES:

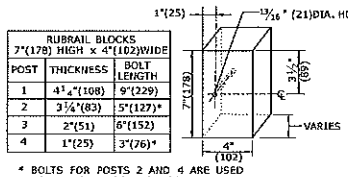
1. THIS MD-B 350 MEDIAN BARRIER - SAFETY SHAPE ATTACHMENT IS APPROPRIATE FOR CONNECTION AT THE FOLLOWING LOCATION:
   a) JERSEY SHAPED OR F-SHAPED BARRIER WITH NO ELECTRICAL JUNCTION BOX WITHIN THE LIMITS OF THE ATTACHMENT (APPROXIMATELY 8' (2438)).SEE NOTE 8.
2. POSTS 1-5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL.
3. RUBRAIL BLOCKS LOCATED ON POSTS 1-4 ARE OFFSET, DRILLED AND SECURED WITH ⅝" (16) CARRIAGE BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4. SECURE RUBRAIL WITH ⅝" (16) x 4½" (114) LONG BUTTON HEAD BOLT. FLARE RUBRAIL TO THE WEB OF POST 6.
4. STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6" (152) INSIDE DIAMETER x 9" (229) LONG. ATTACH TUBE TO RAIL ELEMENT ONLY WITH A ⅝" (16) x 1¼" (32) LONG BUTTON HEAD BOLT AND RECTANGULAR PLATE WASHER. TUBE IS NOT ATTACHED TO BARRIER.
5. SEE DETAIL "C" FOR SLOPED RUBRAIL BLOCK AT BARRIER. BLOCK IS ATTACHED TO RAIL ELEMENT ONLY. USE A ⅜" (10) x 3" (76) LAG BOLT WITH FLAT WASHER.
6. SHOP FABRICATE THE C6x8.2 (C150x12) RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE SAFETY SHAPE AND ATTACH FLUSH WITH SLOPED TOE OF THE BARRIER. RUBRAIL SHALL BE ANCHORED USING THREE ⅝" (16) x 6" (152) CHEMICALLY ANCHORED BOLTS. RUBRAIL MUST BE TWISTED 35° BETWEEN SECTION A AND B. RIGHT AND LEFT HAND TWISTS WILL BE REQUIRED.
7. THE W-BEAM TERMINAL CONNECTOR SHALL BE ANCHORED USING FOUR (4) ⅞" (22) DIA. ANCHOR BOLTS AND BEVELED WASHERS. MAXIMUM PROJECTION OF BOLTS SHALL BE ½" (13).
8. THIS DETAIL AS SHOWN, IS FOR ATTACHMENT TO JERSEY SHAPE PCBC WITH 24" (610) BASE. WHEN ATTACHING TO AN F-SHAPE PCBC WITH 30" BASE, TOP BLOCK OUTS FOR FIRST TWO POSTS SHALL BE 14" x 10" x 6" (356x254x152).
9. POSTS 1 & 2 ARE W8 x 13 (W200 x 19). ALL OTHERS ARE W6 x 8.5 (W150 x 14).
10. FOR SINGLE DIRECTION ROADWAY:
    INSTALL W-BEAM TERMINAL CONNECTOR BETWEEN NESTED GUIDERAIL ELEMENTS.
    FOR DUAL DIRECTION ROADWAY FOR APPROACHING TRAFFIC:
    INSTALL W-BEAM TERMINAL CONNECTOR BETWEEN NESTED GUIDERAIL ELEMENTS.
    FOR TRAILING END:
    INSTALL W-BEAM TERMINAL CONNECTOR OUTSIDE OF THE NESTED GUIDERAIL ELEMENTS.
11. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (237) ± 1" (25).



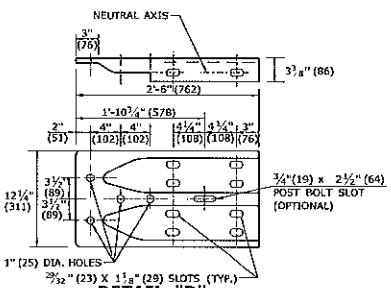
LEADING END ELEVATION
(OMIT RUBRAIL FOR TRAILING END)

RUBRAIL BLOCKS 7"(178) HIGH x 4"(102)WIDE		
POST	THICKNESS	BOLT LENGTH
1	4¼"(108)	9"(229)
2	3¼"(83)	5"(127)*
3	2"(51)	6"(152)
4	1"(25)	3"(76)*

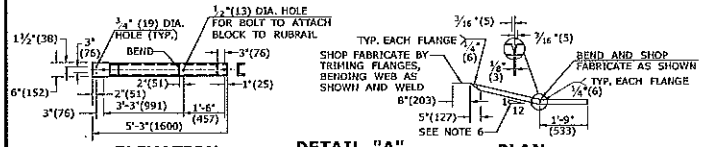
* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACH BLOCK TO POST. RUBRAIL NOT ATTACHED TO BLOCK.



DETAIL "E"
RUBRAIL BLOCK

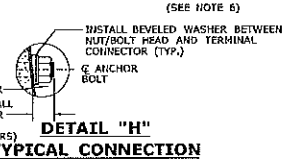


DETAIL "D"
W-BEAM TERMINAL CONNECTOR (10 GA.)
SEE NOTE 10

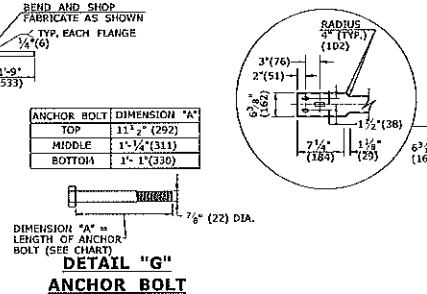


ELEVATION
DETAIL "A"
C6x8.2 (150 x 12) RUBRAIL
(SEE NOTE 6)
PLAN

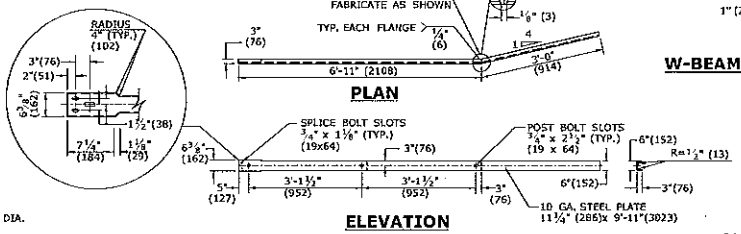
ANCHOR BOLT	DIMENSION "A"
TOP	11½" (292)
MIDDLE	1'-1¼"(311)
BOTTOM	1'- 1"(330)



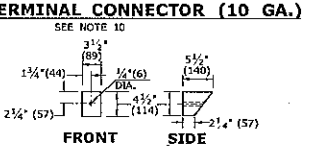
DETAIL "H"
TYPICAL CONNECTION



DETAIL "G"
ANCHOR BOLT



PLAN
ELEVATION
DETAIL "B"
BENT PLATE RUBRAIL



DETAIL "C"
SLOPED BLOCK FOR C6x8.2 (C150X12) RUBRAIL AT PARAPET

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	CHANGE NAME

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Plotted Date: 5/10/2011

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HEDNRAY_STD_2_MD2011.dgn Model: 56- HW-910 15

SUBMITTED BY: NAME/DATE/TITLE

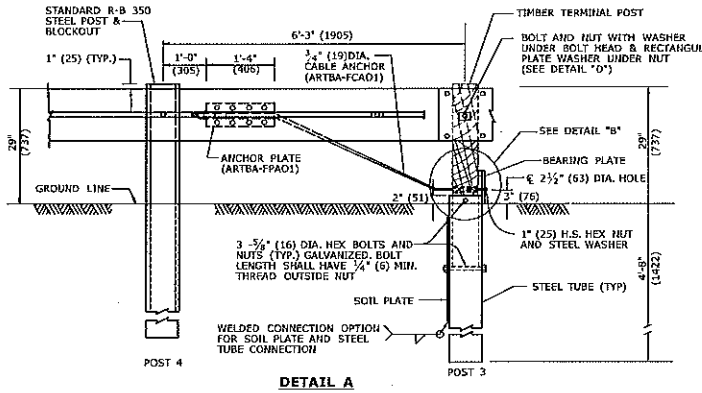
APPROVED BY: NAME/DATE/TITLE
James H. Norman
2011.06.09 15:33:49 -04'00'

CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

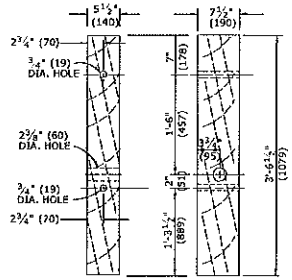
STANDARD SHEET TITLE:
MD-B 350 MEDIAN BARRIER SAFETY SHAPE ATTACHMENT TYPE I

STANDARD SHEET NO.:
HW-910_15



DETAIL A

CABLE ANCHORAGE ASSEMBLY

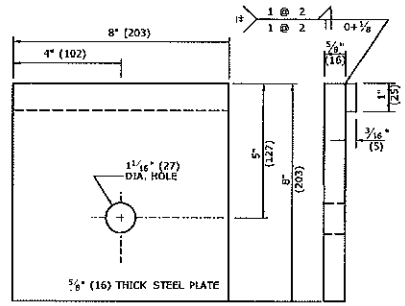


DETAIL C

TIMBER TERMINAL POST

(ARTBA-PDFO1)

(SEE NOTE 2)

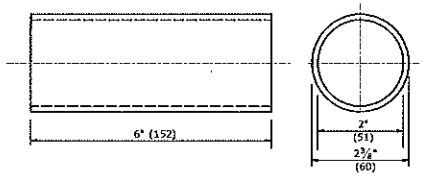


BEARING PLATE

(ARTBA-FPBO1)

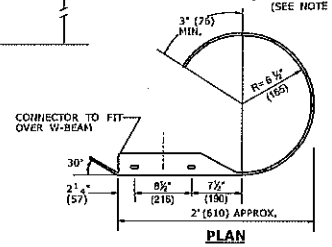
GENERAL NOTES:

1. APPROACH END R-B TERMINAL SECTION SHALL ONLY BE USED ON LOW SPEED (<45 MPH) ROADWAYS.
2. POSTS 1, 2 AND 3 ARE TIMBER TERMINAL POSTS (DETAIL "C") WITH STEEL TUBES. POSTS 4 AND 5 ARE STANDARD R-B 350 STEEL POSTS WITH BLOCKOUTS.
3. REFER TO CTDOT STANDARD SPECIFICATIONS FOR MATERIAL AND GENERAL CONSTRUCTION METHODS.
4. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (737) + 1" (25).

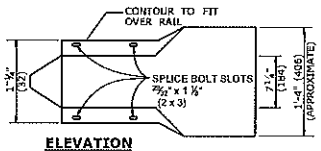


BREAKAWAY TERMINAL POST SLEEVE

(ARTBA-FMMO2)

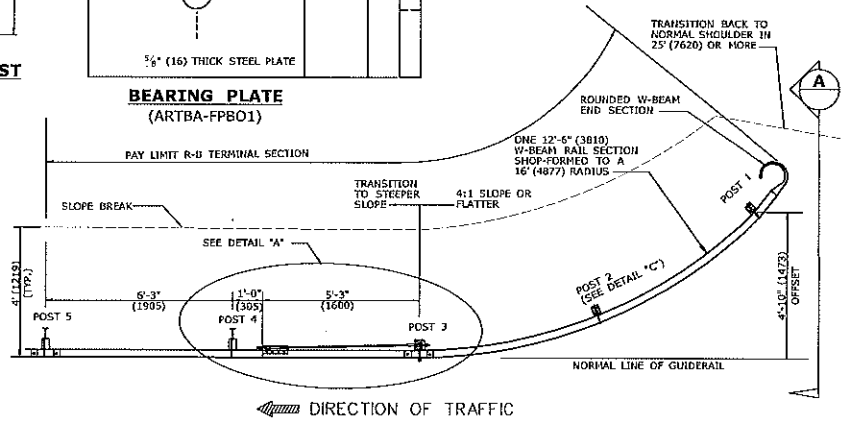


PLAN



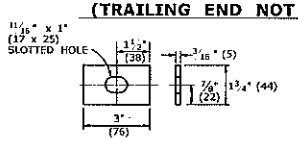
ELEVATION

ROUNDED W-BEAM END SECTION



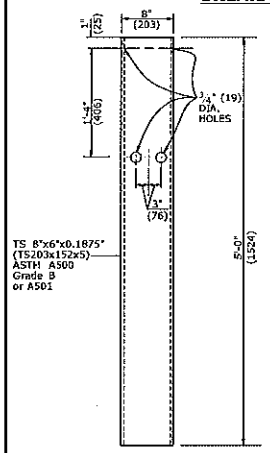
APPROACH END

(TRAILING END NOT SHOWN)

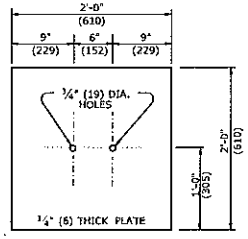


DETAIL D

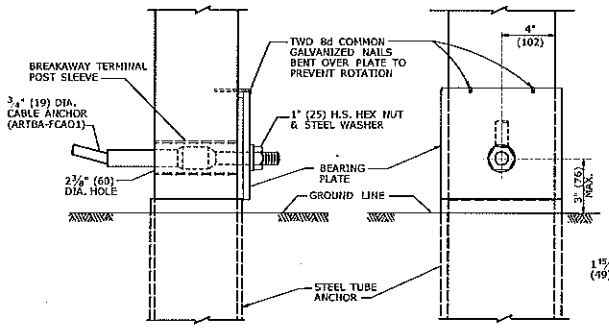
RECTANGULAR PLATE WASHER



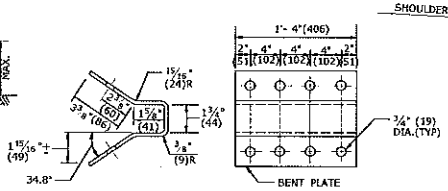
STEEL TUBE



SOIL PLATE (2 Req'd)

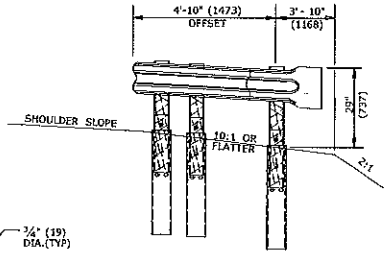


DETAIL B



ANCHOR PLATE

(ARTBA-FPAO1)



SECTION A

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISE NOTE 1
2	7/13	SHOW SPLICE ON APPROACH END
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

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Revised Date: 6/13/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD2013.dgn Model: 65 - HW-910_17

SUBMITTED BY: NAME/DATE/TITLE: Robert Egan Digitally signed by Robert L. Egan Date: 2013.07.24 13:52:06-04'00'

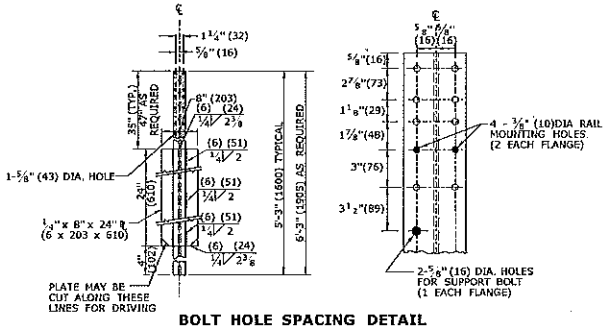
APPROVED BY: NAME/DATE/TITLE: James H. Norman 2013.07.24 14:53:17-04'00'

CTDOT STANDARD SHEET

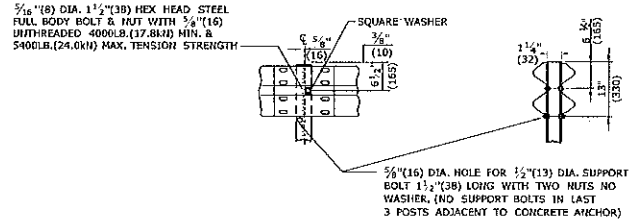
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: R-B TERMINAL SECTION

STANDARD SHEET NO.: HW-910_17



BOLT HOLE SPACING DETAIL
FRONT ELEVATION
S3 x 5.7 POST
(SEE NOTE 1)



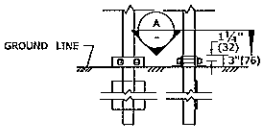
TYPICAL RAIL MOUNTING & SUPPORT BOLT FOR MD-I RAIL

GENERAL NOTES:

1. EIGHT (8) ADDITIONAL 3/8"(10) DIA. HOLES (AS REQUIRED FOR 3 CABLE GUIDERAIL) ARE ACCEPTABLE IN POSTS.
2. J-HOOK BOLTS MAY BE SUBSTITUTED FOR BOTTOM PLATE ANCHORAGE IN CONCRETE END ANCHORS OF THE SAME SIZE STRENGTH AND LENGTH AS NOTED ON THE PLANS.
3. SEE SHEET HW-910_01 FOR HARDWARE AND DELINEATOR DETAILS.

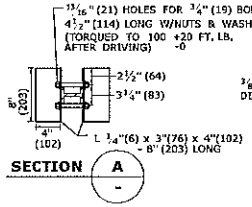
TABLE "A"	
CURVATURE (DEGREE OR RADIUS)	POST SPACING
LESS THAN 26° (220'(67m) RAD OR MORE)	12' - 6"(3810)
219'(67m) TO 111'(34m)	6' - 3"(1905)
110'(34m) TO 76'(23m)	4' - 2"(1270)
75'(23m) TO 50'(15m)	3' - 1 1/2"(952.5)
LESS THAN 50'(15m)	USE NOT RECOMMENDED

FOR CURVES WITH RADII OF 150'(45m) OR LESS ALL RAIL ELEMENTS SHALL BE SHOP FABRICATED TO THE PROPER RADIUS.

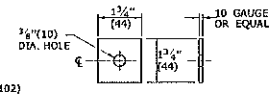


BEARING CLAMP

NOTE: BEARING CLAMP SHALL BE INSTALLED ONLY ON POST NEAREST END ANCHOR

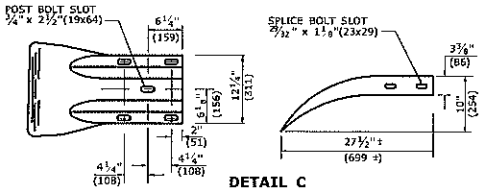


SECTION A



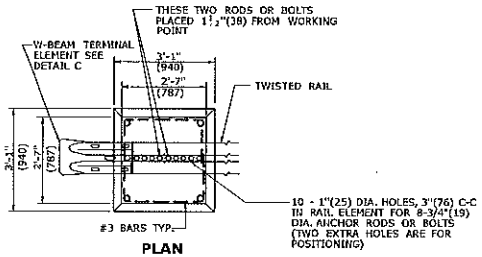
PLACE WASHER IN VALLEY OF RAIL ELEMENT FOR MOUNTING TO POST

SQUARE WASHER

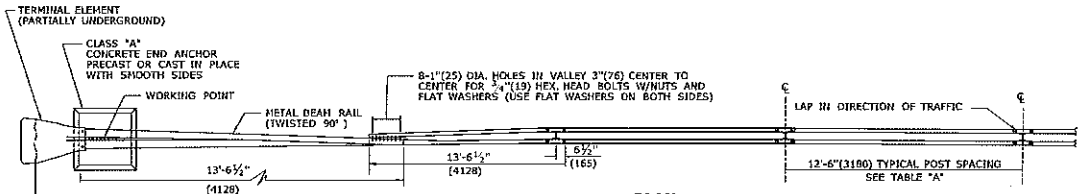


DETAIL C

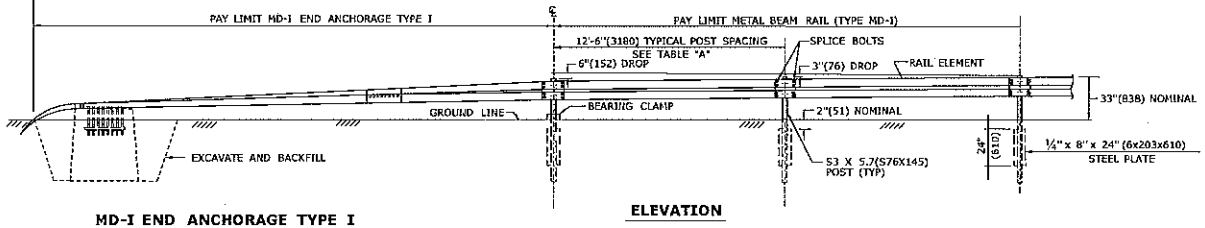
W-BEAM TERMINAL ELEMENT



PLAN

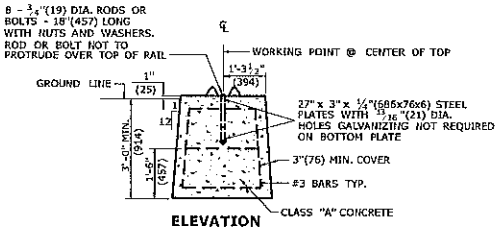


PLAN



MD-I END ANCHORAGE TYPE I

ELEVATION



ELEVATION
DETAIL B

CONCRETE END ANCHOR FOR MEDIAN

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
-	-	-
-	-	-
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THE INFORMATION INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Posted Date: 9/30/2010

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

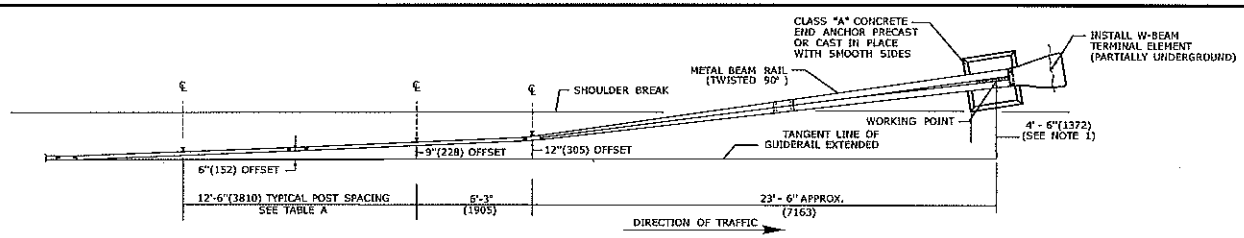
Filename: CTDOT_HDR_MAT_STD.dgn Model: HB - HW-910_18

SUBMITTED BY: NAME/DATE/TITLE
APPROVED BY: James H. Norman NAME/DATE/TITLE

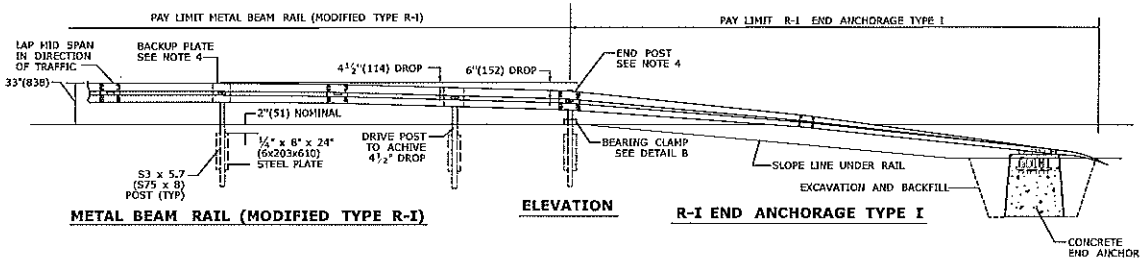
CTDOT STANDARD SHEET
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: METAL BEAM RAIL (TYPE MD-I)

STANDARD SHEET NO.: HW-910_18



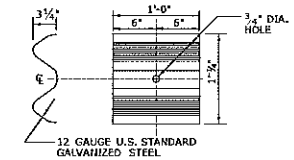
PLAN



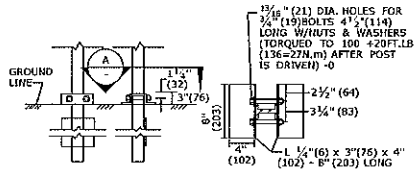
METAL BEAM RAIL (MODIFIED TYPE R-I) **ELEVATION** **R-I END ANCHORAGE TYPE I**

GENERAL NOTES:

1. OFFSET DIMENSIONS AS SHOWN FOR R-I END ANCHORAGE TYPE I APPLY TO TRAILING END. LOCATION OF LEADING END ANCHORAGE SHALL BE AS SHOWN ON THE PLANS INCLUDING THE OFFSET DIMENSION SHOWN HERE. SEE SHEET HW-911_04.
2. EIGHT (8) ADDITIONAL ⅜"(10) DIA. HOLES (AS REQUIRED FOR 3 CABLE GUIDERAIL) ARE ACCEPTABLE IN POSTS.
3. ATTACH W-BEAM RAIL ELEMENT TO EACH POST. SPLICE ONLY AT MID-SPAN AND LAP IN THE DIRECTION OF TRAFFIC.
4. USE 12 GAUGE W-BEAM BACKUP PLATES FOR ALL POSTS EXCEPT END POST. SEE DETAIL A.
5. NEW MODIFIED R-I GUIDERAIL INCLUDING SYSTEMS ANCHORS AND TRANSITIONS INSTALLED ON EXPRESSWAYS AND RAMPS SHALL USE CLASS B TYPE II (10 GAUGE) W-BEAM RAIL ELEMENTS.
6. CURVES WITH RADII OF 150' (45m) OR LESS SHALL HAVE THE ELEMENT SHOP FABRICATED TO THE PROPER RADIUS. PAYMENT FOR RADIUS RAIL SHALL BE INCLUDED WITH THE ITEM METAL BEAM RAIL (MODIFIED TYPE R-I).
7. WHEN A LEADING END TURN DOWN END ANCHORAGE CANNOT BE INSTALLED OUTSIDE THE CLEAR ZONE THE FOLLOWING WILL APPLY:
   A. INSTALL ANCHORAGE IN A CUT OR ROCK SLOPE. (SEE HW-911_03).
   B. TRANSITION TO R-B 350 GUIDERAIL (SEE HW-910_09c FOR TRANSITION LENGTH) AND ANCHOR WITH A TYPE B IMPACT ATTENUATION SYSTEM (TANGENTIAL SEE HW-1800_03) OR (FLARED SEE HW-1800_01).
8. A TYPE II 12' - 6" (3810) END ANCHOR MAY ALSO BE USED. SEE HW-910_19b.
9. MAXIMUM DESIGN DEFLECTION FOR MODIFIED R-I GUIDERAIL AT STANDARD POST SPACING OF 12'-6" (3810) IS 8' (2.44m), SEE HW-910_19c FOR STRENGTHENING SYSTEMS.

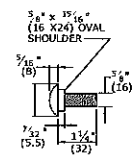


DETAIL A
W-BEAM BACKUP PLATE

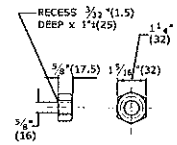


DETAIL B
BEARING CLAMP
NOTE: INSTALL BEARING CLAMP ONLY ON END POST

SECTION A



SPLICE BOLT



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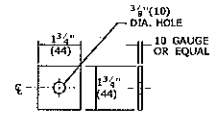
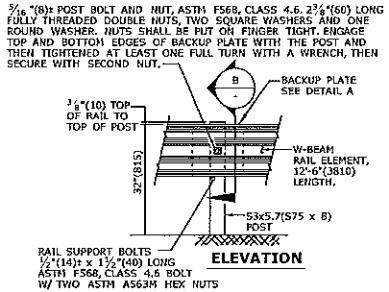
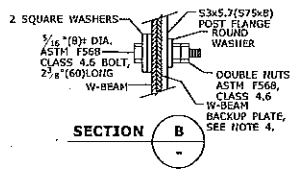


PLACE WASHER IN VALLEY OF RAIL ELEMENT FOR MOUNTING TO POST

SQUARE WASHER



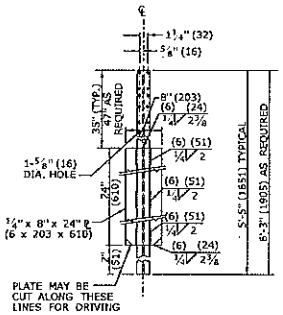
ELEVATION

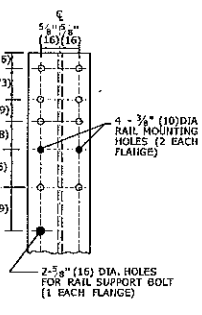


SECTION B

CONNECTION DETAIL AT POST

TYPICAL RAIL MOUNTING AT POST





S3x5.7(S75x8) UNIVERSAL POST
SEE NOTE 2

TABLE A	
CURVATURE (DEGREE OR RADIUS)	POST SPACING
R>(220°(67m)	12' - 6"(3810)
R=219'(67m) TO 111'(34m)	6' - 3'"(1905)
R=110'(34m) TO 76'(23m)	4' - 2"(1270)
R=75'(23m) TO 50'(15m)	3' - 1½"(952.5)
R=LESS THAN 50'(15m)	DO NOT INSTALL

W-BEAM ELEMENTS ON A RADIUS LESS THAN OR EQUAL TO 150' (45.72m) SHALL BE SHOP FABRICATED TO THE REQUIRED CURVATURE AND PAYMENT FOR SUCH CURVED LENGTH SHALL BE INCLUDED WITH THE PAY ITEM FOR MODIFIED R-I TYPE GUIDERAIL.

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
1	7/13	ADD NOTE 9 AND DIMENSION REVISIONS	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

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NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

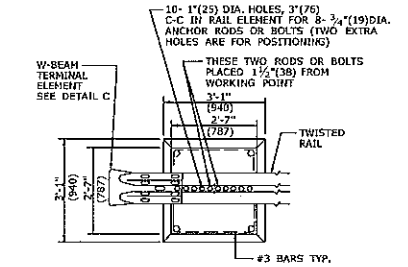
SUBMITTED BY: NAME-DATE/TIME — Digitally signed by Lisa L. Fontana DN: cn=CT, o=DOT, ou=Bridge, cn=Lisa L. Fontana, email=lisa.fontana@ct.gov Date: 2013.07.24 10:19:18 -04'00'
APPROVED BY: NAME-DATE/TIME — James H. Norman 2013.07.24 14:33:50-04'00'

CTDOT STANDARD SHEET
OFFICE OF ENGINEERING

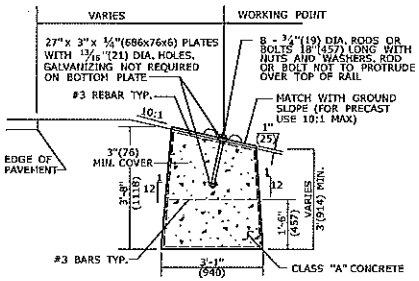
STANDARD SHEET TITLE:
METAL BEAM RAIL (MODIFIED TYPE R-I) AND END ANCHORAGE TYPE I

STANDARD SHEET NO.: HW-910_19a

Filename: CTDOT_HIGHWAY_STD2013.dgn Model: 67 - HW-910_19a Plotted Date: 6/10/2013

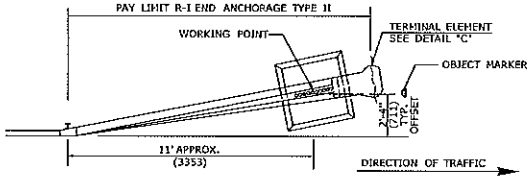


PLAN



ELEVATION

CONCRETE END ANCHOR



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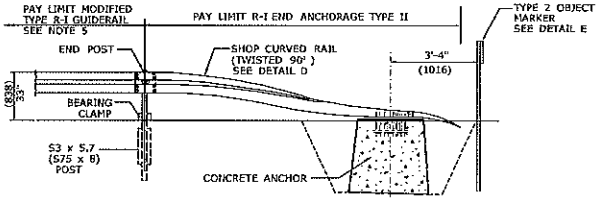


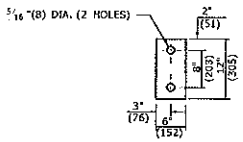
ELEVATION

R-I END ANCHORAGE TYPE II

SEE NOTE 2

GENERAL NOTES:

1. OFFSET DIMENSIONS AS SHOWN FOR R-I END ANCHORAGE TYPE II APPLY TO TRAILING END. LOCATION OF LEADING END ANCHORAGE SHALL BE AS SHOWN ON THE PLANS INCLUDING THE OFFSET DIMENSION SHOWN HERE. SEE SHEET HW-911_04.
2. R-I END ANCHORAGE TYPE II SHALL USE CLASS A (12 GAUGE) TERMINAL AND W-BEAM ELEMENTS.
3. OTHER RADII WHICH CAN BE DEMONSTRATED TO PROVIDE THE INSTALLATIONS SHOWN FOR END ANCHORAGE TYPE II MAY BE APPROVED.
4. TYPE II 12' - 6" (3810) END ANCHOR MAY BE USED ONLY ON ROADS WITH DESIGN SPEEDS LESS THAN 45 MPH.
5. MODIFIED R-I GUIDERAIL REQUIRES MID-SPAN SPLICE. REFER TO HW-910_19a FOR DETAIL OF POST SPACING AT END ANCHOR.

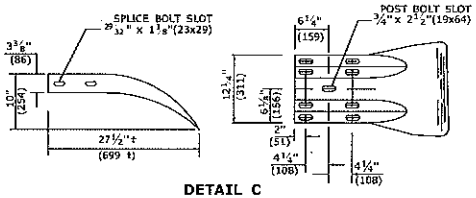


DETAIL E

TYPE 2 OBJECT MARKER

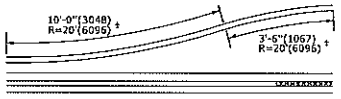
SIGN # 51-5030

OBJECT MARKER FACE SHALL BE YELLOW TYPE III RETROREFLECTORIZED. THE BOTTOM OF TYPE 2 OBJECT MARKER SHALL BE 4'(1219) ABOVE GROUND LEVEL MOUNTED ON METAL DELINEATOR POST. IT SHALL BE USED TO IDENTIFY CULVERT ENDS AND TYPE II END ANCHORS, OR AS DIRECTED BY THE ENGINEER.



DETAIL C

W-BEAM TERMINAL ELEMENT



DETAIL D

SHOP CURVED RAIL

SEE NOTE 3

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
1	7/13	ADD NOTE 5	-
-	-	-	-
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-	-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON BEST INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Posted Date: 6/11/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HOGWAY_STD2013.dgn Model: 28 - HW-910_19b

SUBMITTED BY: NAME-DATE/TIME — Digitally signed by Lee L. Pecaro, Date: 2013.07.24 13:37:29-04'00'

APPROVED BY: NAME-DATE/TIME — James H. Herman, 2013.07.24 14:54:27-04'00'

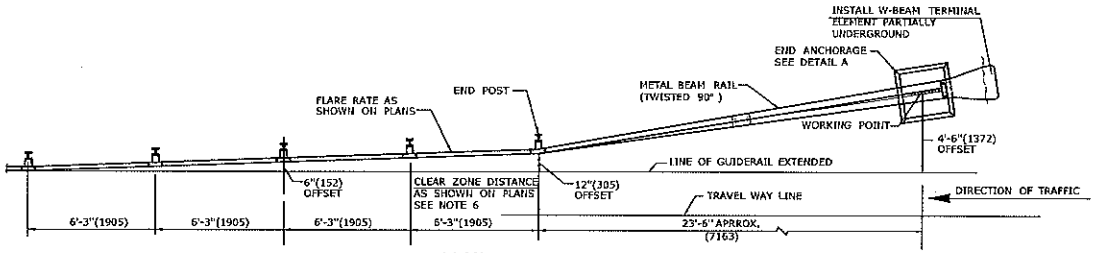
CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

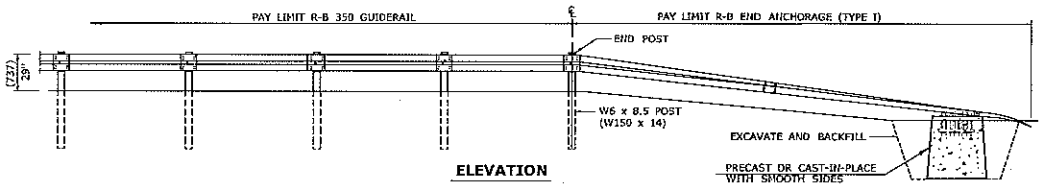
STANDARD SHEET TITLE:

METAL BEAM RAIL (MODIFIED TYPE R-I) AND END ANCHORAGE TYPE II

STANDARD SHEET NO.: HW-910_19b



PLAN



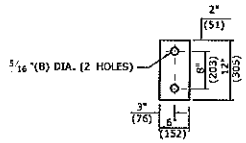
ELEVATION

R-B END ANCHORAGE TYPE I (ROADSIDE APPLICATION)

GENERAL NOTES:

1. R-B END ANCHORAGE TYPE I INSTALLED ON FREEWAYS AND RAMPS SHALL USE CLASS B (10 GAUGE) TERMINAL AND W-BEAM RAIL ELEMENTS. ALL OTHER R-B END ANCHORAGE TYPE I SHALL USE CLASS A (12 GAUGE) TERMINAL AND W-BEAM RAIL ELEMENTS.
2. R-B END ANCHORAGE TYPE II SHALL USE CLASS A (12 GAUGE) TERMINAL AND W-BEAM RAIL ELEMENTS.
3. OTHER RADII WHICH CAN BE DEMONSTRATED TO PROVIDE THE INSTALLATIONS SHOWN FOR END ANCHORAGE TYPE II MAY BE APPROVED.
4. J-HOOK BOLTS MAY BE SUBSTITUTED FOR BOTTOM PLATE ANCHORAGE IN CONCRETE END ANCHORS USING THE SAME SIZE, STRENGTH, AND LENGTH AS NOTED ON THE PLANS.
5. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (737) + 1" (25).
6. R-B TYPE I END ANCHOR: INSTALL LEADING END USING DESIGN CLEAR ZONE DISTANCE MEASURED FROM TRAVEL WAY LINE TO END POST AS SHOWN ON PLANS, THEN PLACE CONCRETE ANCHOR 4'-6"(1372) FROM THE LINE OF GUIDERAIL EXTENSION. INSTALL TRAILING END ON DUAL DIRECTION ROADWAYS IN THE SAME MANNER EXCEPT MEASURE CLEAR ZONE FROM THE DOUBLE YELLOW LINE. INSTALL TRAILING END ON SINGLE DIRECTION ROADWAYS MEASURED FROM THE GUIDERAIL LINE EXTENDED AND OFFFSET 4'-6" (1372).

   R-B TYPE II END ANCHOR: INSTALL ONLY ON ROADWAYS WITH DESIGN SPEEDS < 45mph (72kph). FOR DUAL DIRECTION ROADWAYS, INSTALL IN THE SAME MANNER AS TYPE I END ANCHOR FOR BOTH LEADING AND TRAILING END USING DESIGN CLEAR ZONE DISTANCE EXCEPT PLACE CONCRETE ANCHOR 2'-4" (711) MEASURED FROM THE LINE OF GUIDERAIL EXTENDED. INSTALL TRAILING END ON SINGLE DIRECTION ROADWAYS MEASURED FROM THE GUIDERAIL LINE EXTENDED AND OFFSET 2'-4" (711).
7. SEE HW-911_04 FOR TYPICAL END ANCHOR GRADING PLAN.

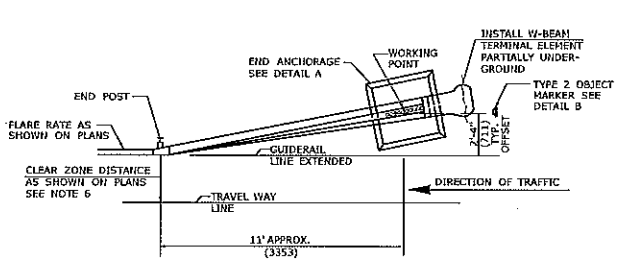


DETAIL B

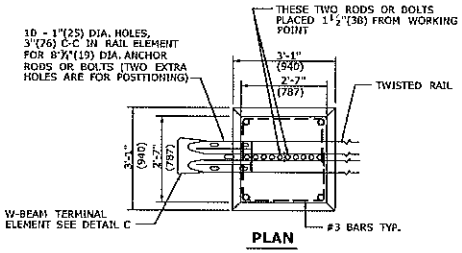
TYPE 2 OBJECT MARKER

SIGN # 51-5030

OBJECT MARKER FACE SHALL BE YELLOW TYPE III RETROREFLECTORIZED. THE BOTTOM OF TYPE 2 OBJECT MARKER SHALL BE 4'(1219) ABOVE GROUND LEVEL MOUNTED ON METAL DELINEATOR POST. IT SHALL BE USED TO IDENTIFY CULVERT ENDS AND TYPE II END ANCHORS, OR AS DIRECTED BY THE ENGINEER.



PLAN



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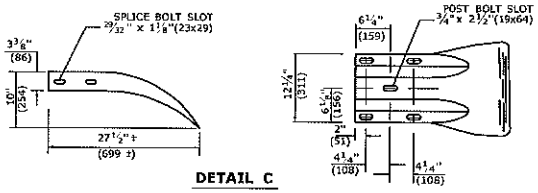
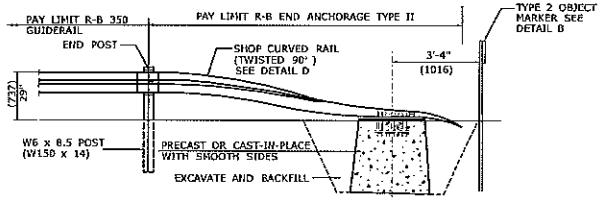


DETAIL C

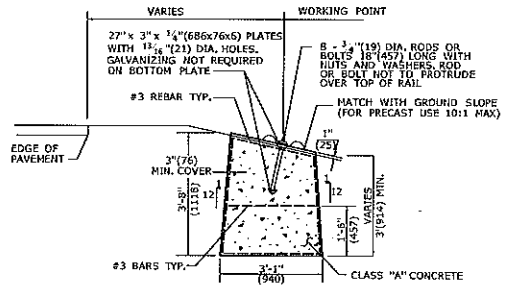
W-BEAM TERMINAL ELEMENT



ELEVATION

R-B END ANCHORAGE TYPE II

SEE NOTE 2

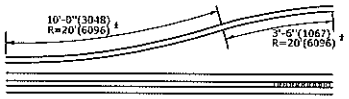


ELEVATION

DETAIL A

ROADSIDE CONCRETE END ANCHOR

SEE NOTE 4



DETAIL D

SHOP CURVED RAIL

SEE NOTE 3

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	6/11	REVISED TYPE I AND II ANCHOR FOR CLEAR ZONE PLACEMENT
2	7/13	ADD POST OFFSET DISTANCE
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Dated Date: 6/13/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD2013.dgn Model: 70 - HW-911_01

SUBMITTED BY: NAME/DATE/TITLE: Digitally signed by Lisa L. Rotsina Date: 2013.07.24 13:56:54-04'00'

APPROVED BY: NAME/DATE/TITLE: James H. Norman 2013.07.24 14:55:36-04'00'

CTDOT STANDARD SHEET

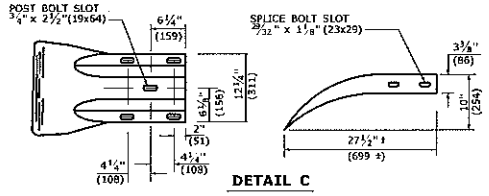
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: R-B END ANCHORAGE TYPE I AND II

STANDARD SHEET NO.: HW-911_01

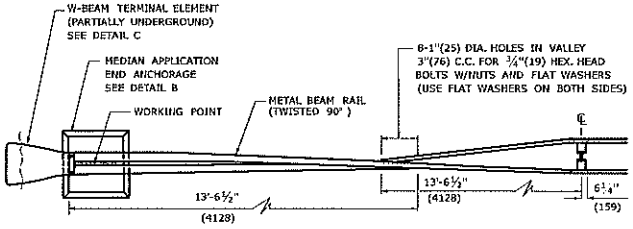
GENERAL NOTES:

1. J-HOOK BOLTS MAY BE SUBSTITUTED FOR BOTTOM PLATE ANCHORAGE IN CONCRETE END ANCHORS OUSING THE SAME SIZE, STRENGTH, AND LENGTH AS NOTED ON THE PLANS.
2. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (737) ± 1" (25).

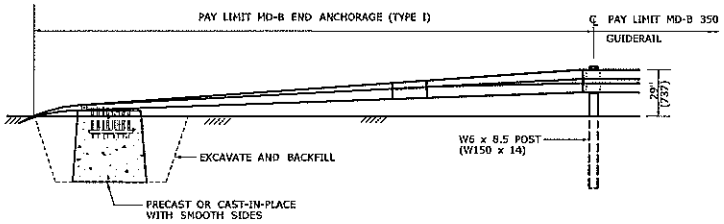


DETAIL C

W-BEAM TERMINAL ELEMENT

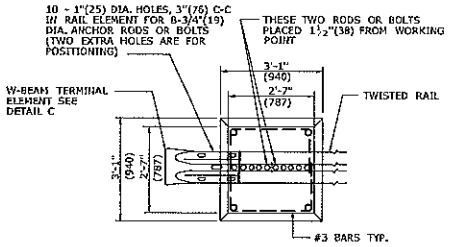


PLAN

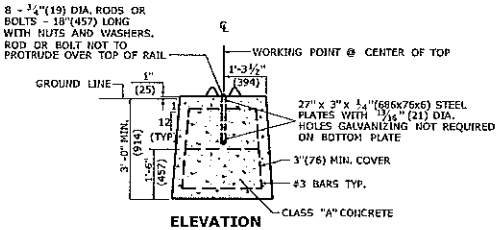


ELEVATION

MD-B END ANCHORAGE TYPE I (MEDIAN APPLICATION)



PLAN



ELEVATION
DETAIL B

CONCRETE END ANCHOR FOR MEDIAN RAIL

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Revised Date: 9/30/2010

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD.dgn
Model: 60 - hw-911_02

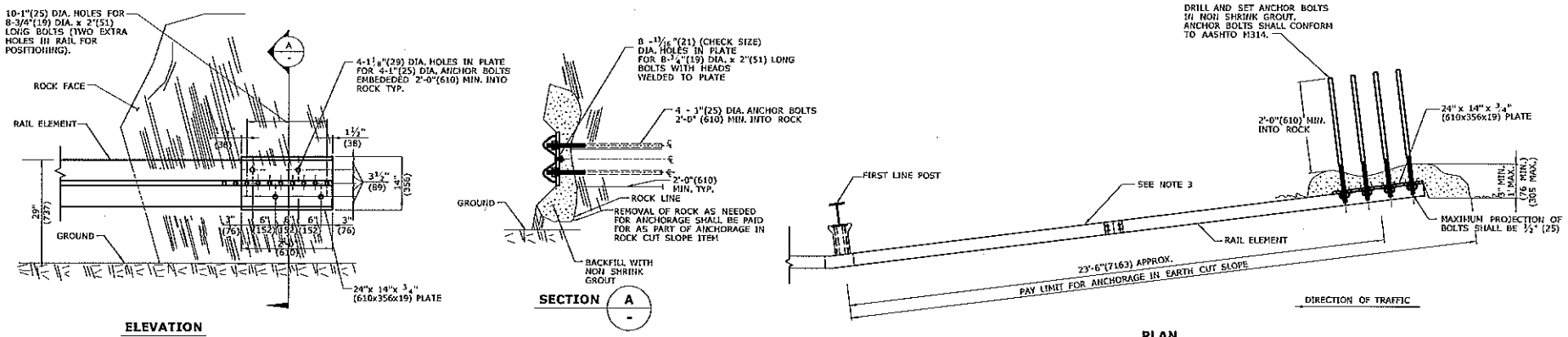
SUBMITTED BY: NAME/DATE/TITLE:
APPROVED BY: NAME/DATE/TITLE:
James H. Norman

CTDOT
STANDARD SHEET

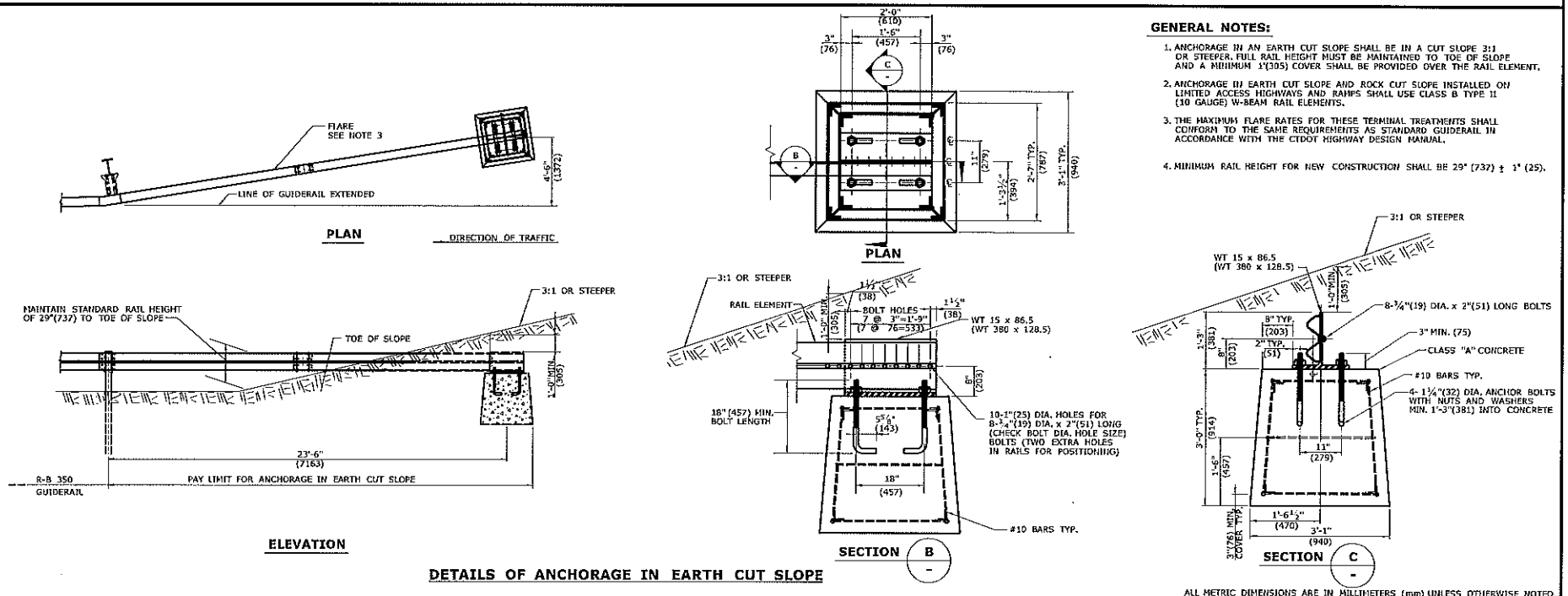
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:
MD-B END ANCHORAGE
TYPE I

STANDARD SHEET NO.:
HW-911_02



DETAILS OF ANCHORAGE IN ROCK CUT SLOPE



DETAILS OF ANCHORAGE IN EARTH CUT SLOPE

GENERAL NOTES:

1. ANCHORAGE IN AN EARTH CUT SLOPE SHALL BE IN A CUT SLOPE 3:1 OR STEEPER. FULL RAIL HEIGHT MUST BE MAINTAINED TO TOE OF SLOPE AND A MINIMUM 1'(305) COVER SHALL BE PROVIDED OVER THE RAIL ELEMENT.
2. ANCHORAGE IN EARTH CUT SLOPE AND ROCK CUT SLOPE INSTALLED ON LIMITED ACCESS HIGHWAYS AND RAMPS SHALL USE CLASS B TYPE II (10 GAUGE) W-BEAM RAIL ELEMENTS.
3. THE MAXIMUM FLARE RATES FOR THESE TERMINAL TREATMENTS SHALL CONFORM TO THE SAME REQUIREMENTS AS STANDARD GUIDERAIL IN ACCORDANCE WITH THE CTDOT HIGHWAY DESIGN MANUAL.
4. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" (737) ± 1" (25).

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 9/30/2010

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD.dgn

SUBMITTED BY: NAME/DATE/TITLE

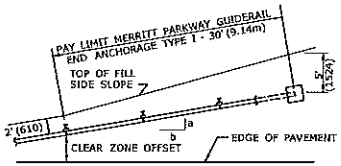
APPROVED BY: James H. Norman NAME/DATE/TITLE

CTDOT STANDARD SHEET

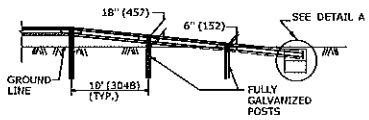
OFFICE OF ENGINEERING

STANDARD SHEET TITLE: ANCHOR IN EARTH CUT SLOPE
ANCHOR IN ROCK CUT SLOPE

STANDARD SHEET NO.: HW-911_03



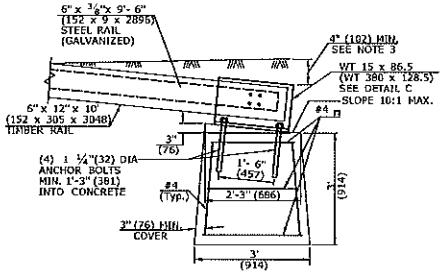
PLAN



ELEVATION

MERRITT PARKWAY GUIDERAIL END ANCHORAGE TYPE I (BURIED ANCHOR)

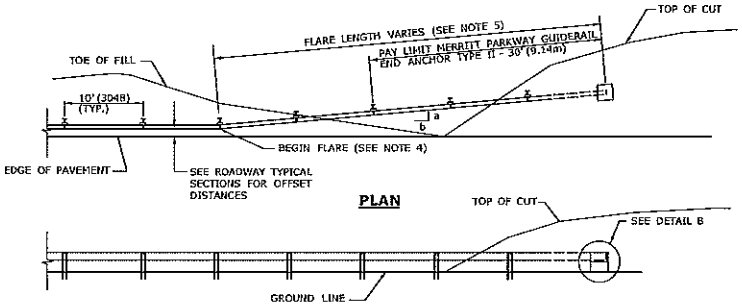
NOTE: SEE PLAN SHEETS FOR FLARE RATE a:b.



ELEVATION DETAIL A

GENERAL NOTES:

1. MATERIALS AND CONSTRUCTION OF THE MERRITT PARKWAY GUIDERAIL END ANCHORS SHALL CONFORM TO THE SPECIAL PROVISIONS PROVIDED WITH THE PROJECT. ALL HARDWARE IN CONTACT WITH THE GROUND SHALL BE GALVANIZED IN ACCORDANCE WITH THE SPECIAL PROVISION.
2. FOR THE END ANCHOR TYPE II, EXTEND THE FLARE INTO THE CUT SLOPE UNTIL A MINIMUM 12" (305) OF COVER IS OBTAINED OVER THE GUIDERAIL ELEMENT.
3. FOR THE END ANCHOR TYPE I, EXTEND THE FLARE OUTSIDE THE CLEAR ZONE AND BURY THE GUIDERAIL ANCHOR AND ELEMENT TO OBTAIN A MINIMUM COVER OF 4" (102). SEE DETAIL A.
4. BEGIN THE FLARE AT THE NEAREST POST TO A TRANSITION POINT BETWEEN FILL AND CUT AS DIRECTED BY THE ENGINEER.
5. THE GUIDERAIL FLARE SHOWN ON THE PLAN SHEETS IS THE MINIMUM LENGTH AND RATE REQUIRED AS DIRECTED BY THE ENGINEER. FLARE THE GUIDERAIL SO THAT THE TERMINAL SECTION IS OUTSIDE THE CLEAR ZONE.

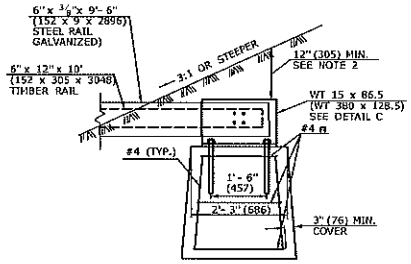


PLAN

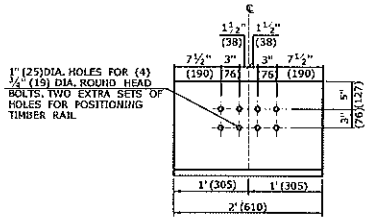
ELEVATION

MERRITT PARKWAY GUIDERAIL END ANCHORAGE TYPE II (EARTH CUT SLOPE ANCHOR)

NOTE: SEE PLAN SHEETS FOR FLARE RATE a:b.

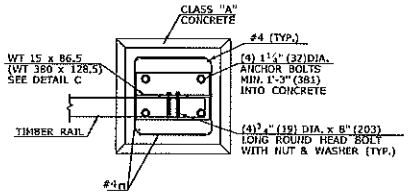


ELEVATION DETAIL B



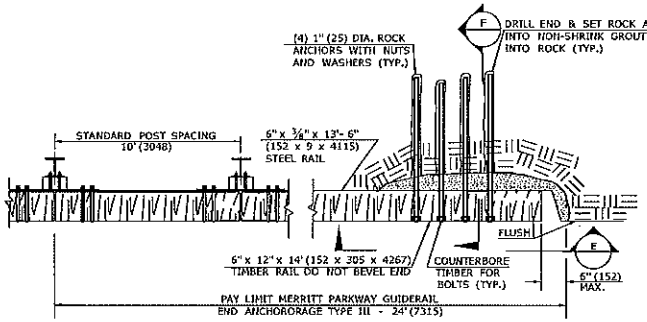
ELEVATION DETAIL C

WT 15 x 86.5 (GALVANIZED) (WT 380 X 128.5)



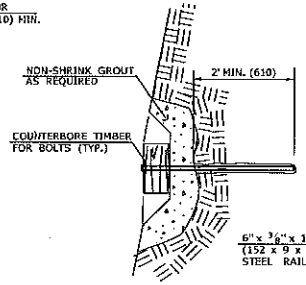
PLAN DETAIL D

PLAN VIEW FOR TYPE I & II ANCHOR

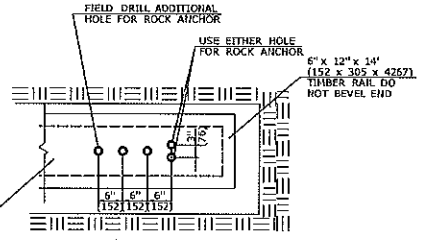


PLAN

MERRITT PARKWAY GUIDERAIL END ANCHORAGE TYPE III (ROCK CUT ANCHOR)



SECTION F



SECTION E

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	7/13	ERRATA

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 6/13/2019

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HIGHWAY_STD913.dgn Model: 73 - HW-911_05

SUBMITTED BY: NAME/DATE/TITLE: Digitally signed by Sean L. Fontaine Date: 2013.07.24 12:53:37-04'00'

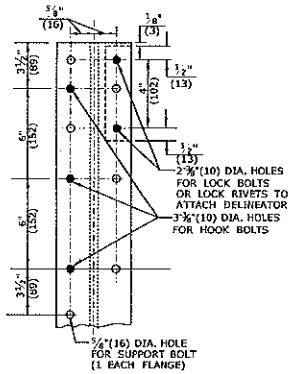
APPROVED BY: NAME/DATE/TITLE: James H. Norman 2013.07.24 14:56:06-04'00'

CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

STANDARD SHEET TITLE: MERRITT PARKWAY GUIDERAIL END ANCHORS

STANDARD SHEET NO.: HW-911_05

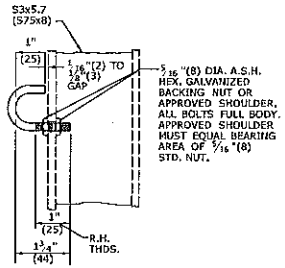


ELEVATION

DETAIL A

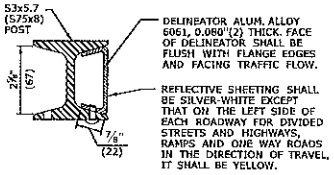
BOLT HOLE SPACING

FOR UNIVERSAL POST (SEE NOTE 5)



DETAIL B

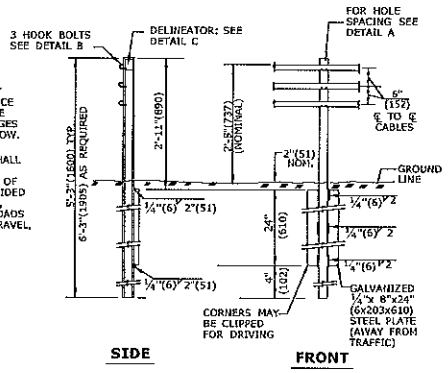
HOOK BOLT



PLAN

DETAIL C

DELINEATOR INSTALLATION DETAIL



SIDE **FRONT**

DETAIL D

POST S3x5.7 (S75x8)

GENERAL NOTES:

1. INSTALL DELINEATORS EVERY 32'(9.8m). SEE DETAIL C. DO NOT INSTALL A DELINEATOR ON POSTS THAT ARE GREATER THAN 12'(3.7m) FROM THE EDGE OF SHOULDER. IN INSTANCES WHERE THE POST SPACING DOES NOT COINCIDE WITH THE ABOVE DIMENISION, THE DELINEATORS SHOULD BE INSTALLED ON THE NEAREST POST. THE DELINEATOR SPACING SHALL REMAIN CONSISTENT THROUGHOUT THE RUN OF RAILING REGARDLESS OF CHANGES FROM ONE SYSTEM TO ANOTHER. DO NOT DELINEATE POSTS IN THE INTERMEDIATE ANCHORAGE SECTION, TYPICAL APPROACH OR TERMINAL SECTION.

2. FOR ARRANGEMENT OF SPRING CABLE ASSEMBLIES (COMPENSATING DEVICES) AND TURNBUCKLE CABLE END ASSEMBLIES, THE FOLLOWING CRITERIA SHALL APPLY: (SEE STANDARD SHEET HW-918_01b FOR DETAILS)
   - LENGTH OF CABLE RUNS UP TO 1000'(305m) - USE COMPENSATING DEVICE (DETAIL F) ON ONE END, AND TURNBUCKLE CABLE END ASSEMBLY (DETAIL H) ON THE OTHER END OF EACH INDIVIDUAL CABLE.
   - LENGTH OF CABLE RUNS 1000'(305m) TO 2000'(610m) - USE COMPENSATING DEVICE (DETAIL F) ON THE ENDS OF EACH INDIVIDUAL CABLE.
   - LENGTH OF CABLE RUNS OVER 2000'(610m) - START NEW STRETCH BY INTERLACING AT LAST PARALLEL POST (SEE TYPICAL INTERMEDIATE SECTION DETAIL). PRIOR TO FINAL ACCEPTENCE BY THE STATE AND DEPENDING ON THE TEMPERATURE AT THE TIME OF ADJUSTMENTS, THE FOLLOWING TABLE SHALL BE USED TO TIGHTEN THE TURNBUCKLES:

TEMPERATURE (DEGREES FARENHEIT)					
120° TO 100°	79° TO 60°	59° TO 40°	39° TO 20°	19° TO 0°	1° TO -20°
SPRING COMPRESSION FROM UNLOADED POSITION IN EACH SPRING = STANDARD SPRING LENGTH					
1" (25)	1 1/2" (38)	2" (51)	2 1/2" (64)	3" (76)	4" (102)

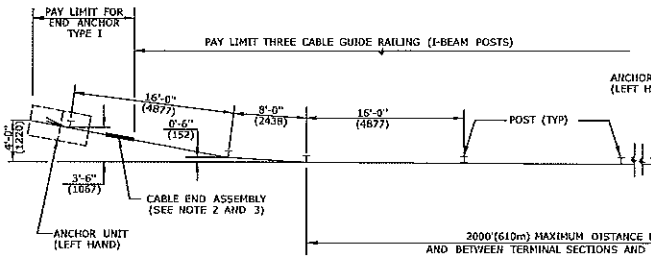
3. ALTERNATIVE DESIGNS FOR A COMBINATION OR SINGLE UNIT COMPENSATING DEVICE AND TURNBUCKLE ASSEMBLY MAY BE SUBMITTED FOR APPROVAL.

4. AT ALL LOCATIONS WHERE THE CABLE IS CONNECTED TO A CABLE SOCKET WITH A WEDGE TYPE CONNECTION, ONE WIRE OF THE WIRE ROPE SHALL BE CRIMPED OVER THE BASE OF THE WEDGE TO HOLD IT FIRMLY IN PLACE.

5. BOLT HOLES AS SHOWN IN DETAIL A ARE FOR USE AS FOLLOWS: 3-3/8" (10) DIA. HOLES FOR HOOK BOLTS AND 2-3/8" (10) DIA. DELINEATOR MOUNTING HOLES FOR EACH DIRECTION OF TRAFFIC. HOLES SHOWN SOLID ARE FOR INSTALLATIONS TO THE RIGHT OF TRAFFIC FLOW. ONE 5/8"(16) DIA. HOLE (AS REQUIRED FOR METAL BEAM RAIL) IS ACCEPTABLE.

6. ON ROADWAYS WITH DESIGN SPEED ≥ 45 MPH (72kph)THE MINIMUM LENGTH OF THREE CABLE GUIDE RAILING, EXCLUDING ANCHOR SECTIONS IS 248'(75.6m). ON ROADWAYS WITH DESIGN SPEEDS < 45 MPH (72kph) THE MINIMUM LENGTH OF THREE CABLE GUIDERAIL EXCLUDING ANCHOR SECTIONS IS 156'(47.5m) WITH AN 8' POST SPACING. WHEN SYSTEM 2 IS REQUIRED, EITHER THE ENTIRE RUN OF RAIL SHALL BE INSTALLED USING A SINGLE SYSTEM OR A 248'(75.6m) MINIMUM LENGTH OF THE SYSTEM SHALL BE PROVIDED.

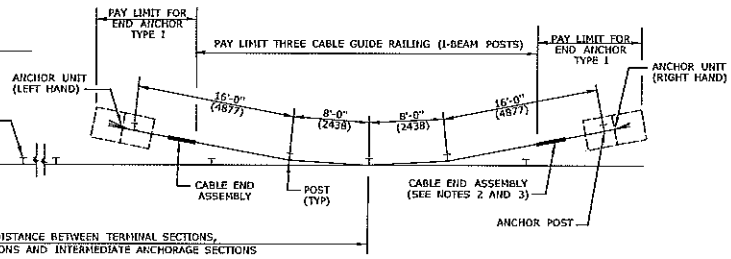
7. WHEN STAGGERING CABLE SPLICES. PROVIDE A MINIMUM OF 20'(6.1m) BETWEEN ANY PAIR. PROVIDE A MINIMUM OF 100'(30.5m) BETWEEN CABLE SPLICES ON THE SAME CABLE.



PLAN

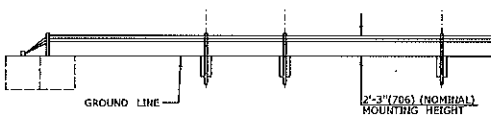
TYPICAL APPROACH & TERMINAL SECTIONS

(SHOWING LEFT HAND ANCHOR UNIT)



PLAN

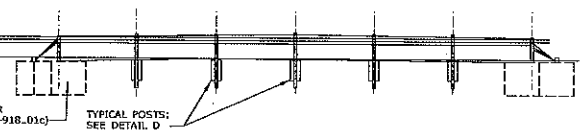
TYPICAL INTERMEDIATE SECTION



ELEVATION

TYPICAL APPROACH & TERMINAL SECTIONS

(SHOWING LEFT HAND ANCHOR UNIT)



ELEVATION

TYPICAL INTERMEDIATE SECTION

TABLE A	
RADIUS OF CURVE	POST SPACING
R > 720' (219m)	16'(4877)
R ≤ 720' (219m) BUT ≥ 440' (134m)	8'(2438)
R < 440' (134m)	DO NOT INSTALL

TABLE B		
TYPE OF SYSTEM	POST SPACING	DEFLECTION
STANDARD SYSTEM 2	16'(4877) 8'(2438)	12'(3658) 8'(2438)

NOTE: DEFLECTION DISTANCE IS BASED ON IMPACT SPEEDS OF 63mph(101kph).

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	1/12	NEW END ANCHOR
2	7/13	REVISE CABLE SPACE, HEIGHT, AND CURVATURE POST SPACING

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 7/12/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SUBMITTED BY: NAME/DATE/TITLE: Digitally signed by Lisa L. Fontana, Date: 2013.07.24 12:59:25 -04'00'

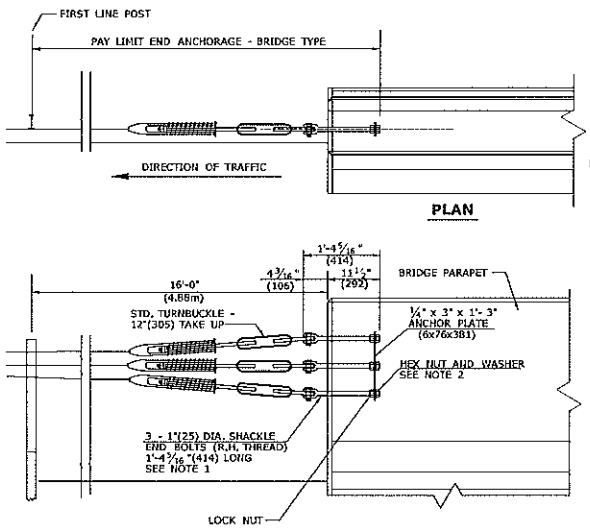
APPROVED BY: NAME/DATE/TITLE: James H. Norman 2013.07.24 14:58:35-04'00'

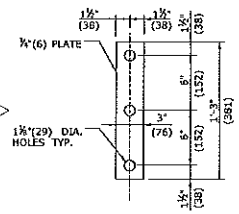
CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

STANDARD SHEET TITLE: THREE CABLE GUIDERAIL (I-BEAM POSTS) SHEET 1

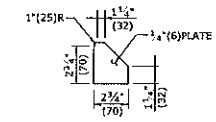
STANDARD SHEET NO.: HW-918_01a



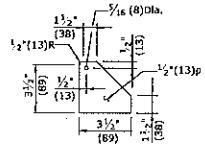


TRAILING END ATTACHMENT TO BRIDGE

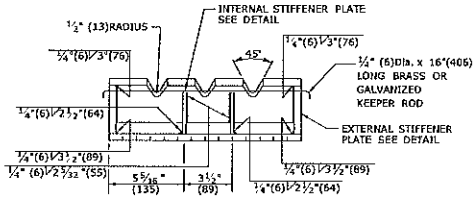
(SEE NOTES 1-5)



INTERNAL STIFFENER PLATE



EXTERNAL STIFFENER PLATE

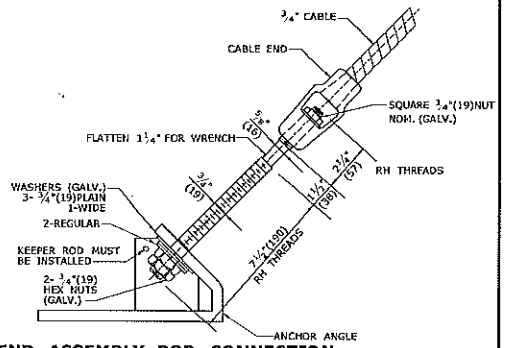


FRONT VIEW

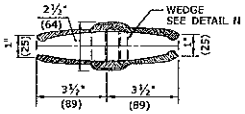
ANCHOR ANGLE DETAIL

GENERAL NOTES:

1. THE SHACKLE END BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A668 CLASS E OR AISI 1035 FORGED STEEL GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM A153.
2. THE STANDARD HEX NUTS, ANCHOR PLATES AND LOCK NUTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-36.
3. LONGITUDINAL REINFORCEMENT IN THE PARAPET SHALL CLEAR ANCHOR PLATE.
4. ALL ANCHORAGE MATERIAL SHALL BE PAID FOR AS PART OF THE PAY ITEM "END ANCHORAGE - BRIDGE TYPE" (ROADWAY ITEM).
5. THIS DETAIL SHALL BE USED TO ANCHOR THREE-CABLE GUIDE RAILING AT THE TRAILING END OF 3'-6"(1067) HIGH PARAPETS ON ONE-WAY ROADS ONLY. PARAPET HEIGHTS LOWER THAN THIS SHALL BE REFERED TO STRUCTURE DESIGN UNIT.
6. CABLE ENDS SHALL BE FABRICATED FROM MALLABLE IRON OR CAST STEEL. THE CABLE SPLICE AND WEDGE SHALL BE FABRICATED FROM MALLABLE IRON OR ASTM A536 DUCTILE IRON GRADE 65-45-122.
7. ALL CABLE ENDS AND SPLICES SHALL BE DESIGNED TO USE THE WEDGE SHOWN IN DETAIL G AND SHALL DEVELOP THE FULL STRENGTH OF THE ¾"(19) ROUND CABLE 25,000 LBS (11,340 kg). THE CABLES, ENDS, AND SPLICES SHALL BE HOT DIPPED GALVANIZED AS INDICATED IN THE MATERIAL SPECIFICATIONS FOR CABLE GUIDERAILINGS. DO NOT GALVANIZE THE CABLE WEDGE SHOWN IN DETAIL G.



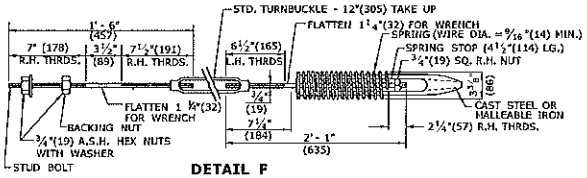
CABLE END ASSEMBLY ROD CONNECTION TO CABLE ANCHOR ANGLE DETAIL



DETAIL E

CABLE SPLICE

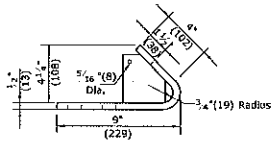
USE WITH WEDGE AS SHOWN IN DETAIL N (SEE NOTES 8,9, AND 10).



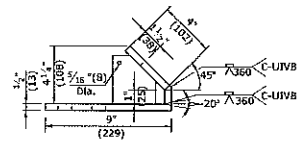
DETAIL F

SPRING CABLE END ASSEMBLY (COMPENSATING DEVICE)

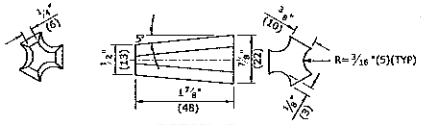
(SEE NOTE 2)



SIDE VIEW



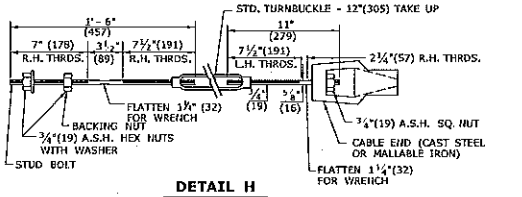
SIDE VIEW



DETAIL G

TYPICAL WEDGE FOR ALL CABLE SPLICES AND CABLE FITTINGS

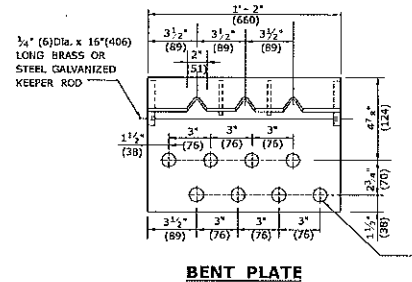
(DO NOT GALVANIZE)



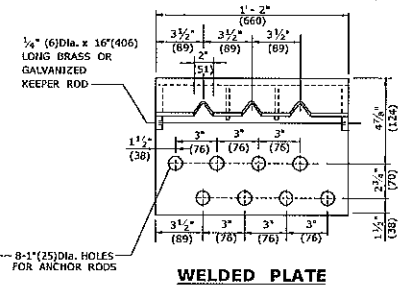
DETAIL H

STEEL TURNBUCKLE CABLE END ASSEMBLY

(SEE NOTE 2)



BENT PLATE ANCHOR ANGLE DETAILS



WELDED PLATE ANCHOR ANGLE DETAILS

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	3/12	NEW END ANCHOR

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY GUARANTEED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE ENCOUNTERED.

Plotted Date: 1/9/2012

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: 3r42012.dgn Model: hw-918_01b

SUBMITTED BY: NAME/DATE/TITLE: Lee Fontaine 2012.01.10 13:15:38 -05'00'

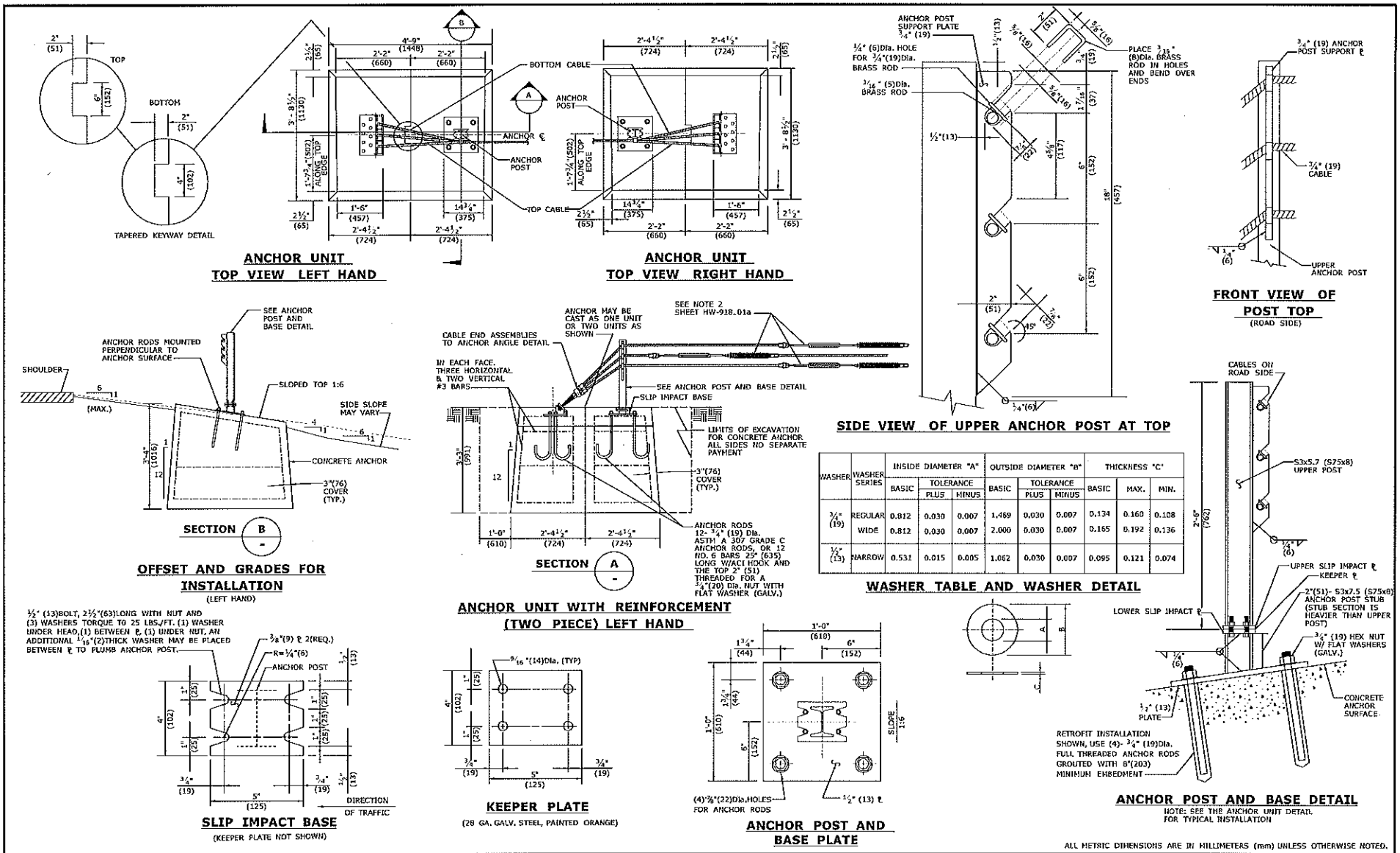
APPROVED BY: NAME/DATE/TITLE: James H. Norman 2012.01.26 15:31:52 -05'00'

CTDOT STANDARD SHEET

OFFICE OF ENGINEERING

STANDARD SHEET TITLE: THREE CABLE GUIDERAIL (I-BEAM POSTS) SHEET 2

STANDARD SHEET NO.: HW-918_01b



WASHER	WASHER SERIES	INSIDE DIAMETER "A"			OUTSIDE DIAMETER "B"			THICKNESS "C"		
		BASIC	TOLERANCE PLUS	TOLERANCE MINUS	BASIC	TOLERANCE PLUS	TOLERANCE MINUS	BASIC	MAX.	MIN.
¾" (19)	REGULAR	0.812	0.030	0.007	1.469	0.030	0.007	0.134	0.160	0.108
	WIDE	0.812	0.030	0.007	2.000	0.030	0.007	0.165	0.192	0.136
½" (13)	NARROW	0.531	0.015	0.005	1.062	0.030	0.007	0.095	0.121	0.074

WASHER TABLE AND WASHER DETAIL

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION
1	7/12	NEW END ANCHOR
2	7/13	REVISE CABLE SPACE @ ANCHOR POST
-	-	-
-	-	-
-	-	-
-	-	-

THIS INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY INTENDED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted Date: 7/12/2013

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: CTDOT_HDRWAY_STD2013.dgn Model: 78 - HW-918.01c

SUBMITTED BY: NAME/DATE/TITLE: Digitally signed by Lee L. Farmire Date: 2013.07.24 10:56:16-04'00'

APPROVED BY: NAME/DATE/TITLE: James M. Norman 2013.07.24 14:57:18-04'00'

CTDOT STANDARD SHEET

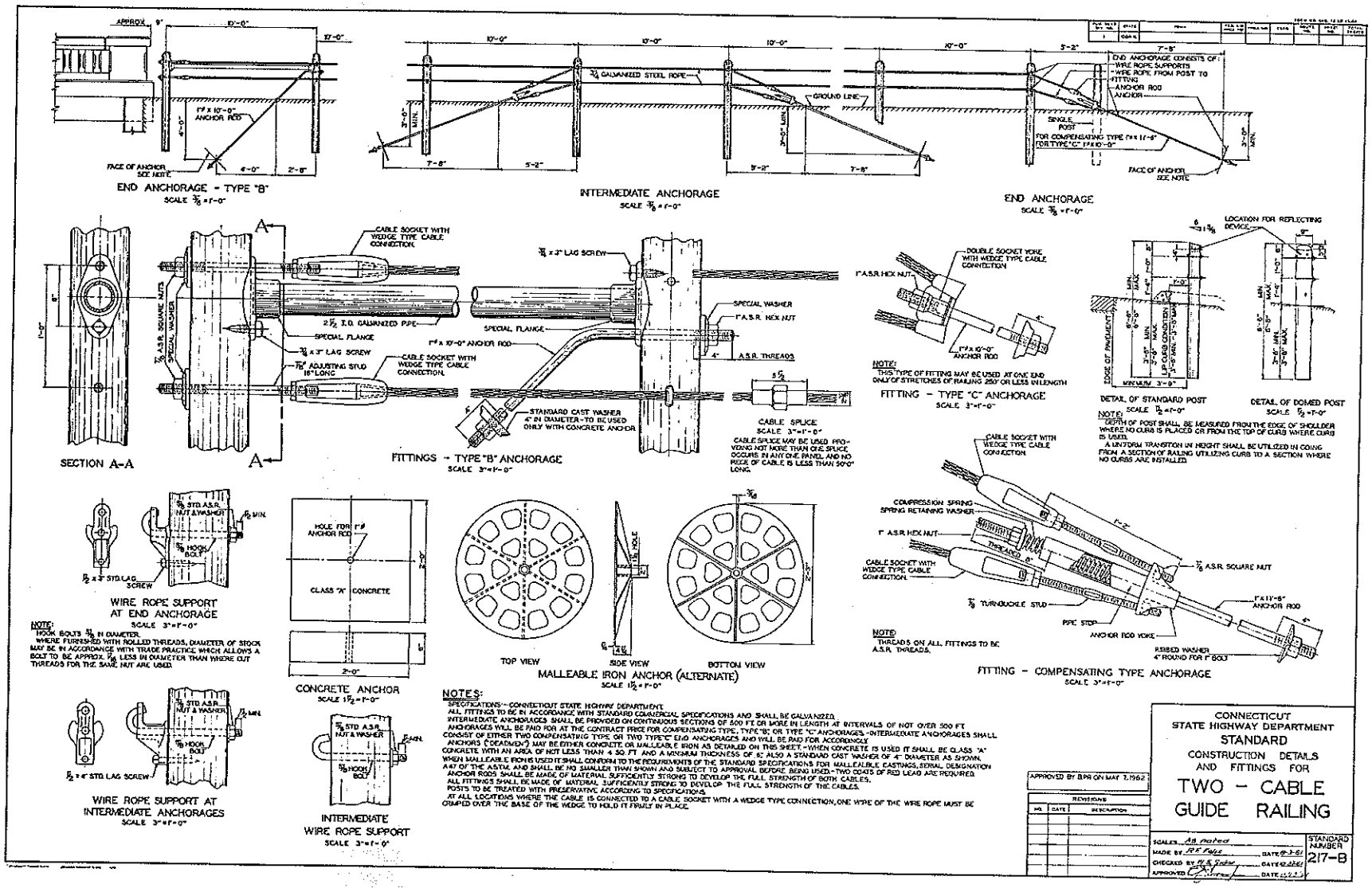
OFFICE OF ENGINEERING

STANDARD SHEET TITLE:

THREE CABLE GUIDERAIL (I-BEAM POSTS) SHEET 3

STANDARD SHEET NO.: HW-918_01c

THIS PRINT HAS BEEN REDUCED IN SIZE – SCALES SHOWN APPLY TO ORIGINAL SIZE PRINT ONLY



NOTES:

SPECIFICATIONS:- CONNECTICUT STATE HIGHWAY DEPARTMENT.
ALL FITTINGS TO BE IN ACCORDANCE WITH STANDARD COMMERCIAL SPECIFICATIONS AND SHALL BE GALVANIZED.
INTERMEDIATE ANCHORAGES SHALL BE PROVIDED ON CONTINUOUS SECTIONS OF 500 FT OR MORE IN LENGTH AT INTERVALS OF NOT OVER 500 FT.
ANCHORAGES WILL BE PAID FOR AT THE CONTRACT PRICE FOR COMPENSATING TYPE, TYPE "B" OR TYPE "C" ANCHORAGES.-INTERMEDIATE ANCHORAGES SHALL CONSIST OF EITHER TWO COMPENSATING TYPE OR TWO TYPE "C" END ANCHORAGES AND WILL BE PAID FOR ACCORDINGLY.
ANCHORS ("DEADMEN") MAY BE EITHER CONCRETE OR MALLEABLE IRON AS DETAILED ON THIS SHEET.-WHEN CONCRETE IS USED IT SHALL BE CLASS "A" CONCRETE WITH AN AREA OF NOT LESS THAN 4 SQ. FT. AND A MINIMUM THICKNESS OF 6" ALSO A STANDARD CAST WASHER OF 4" DIAMETER AS SHOWN.
WHEN MALLEABLE IRON IS USED IT SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR MALLEABLE CASTINGS, SERIAL DESIGNATION A47 OF THE A.S.T.M. AND SHALL BE NO SMALLER THAN SHOWN AND SUBJECT TO APPROVAL BEFORE BEING USED.-TWO COATS OF RED LEAD ARE REQUIRED.
ANCHOR RODS SHALL BE MADE OF MATERIAL SUFFICIENTLY STRONG TO DEVELOP THE FULL STRENGTH OF BOTH CABLES.
ALL FITTINGS SHALL BE MADE OF MATERIAL SUFFICIENTLY STRONG TO DEVELOP THE FULL STRENGTH OF THE CABLES.
POSTS TO BE TREATED WITH PRESERVATIVE ACCORDING TO SPECIFICATIONS.
AT ALL LOCATIONS WHERE THE CABLE IS CONNECTED TO A CABLE SOCKET WITH A WEDGE TYPE CONNECTION, ONE WIPE OF THE WIRE ROPE MUST BE CRIMPED OVER THE BASE OF THE WEDGE TO HOLD IT FIRMLY IN PLACE.

APPROVED BY BPR ON MAY 7, 1962

REVISIONS		
NO.	DATE	DESCRIPTION

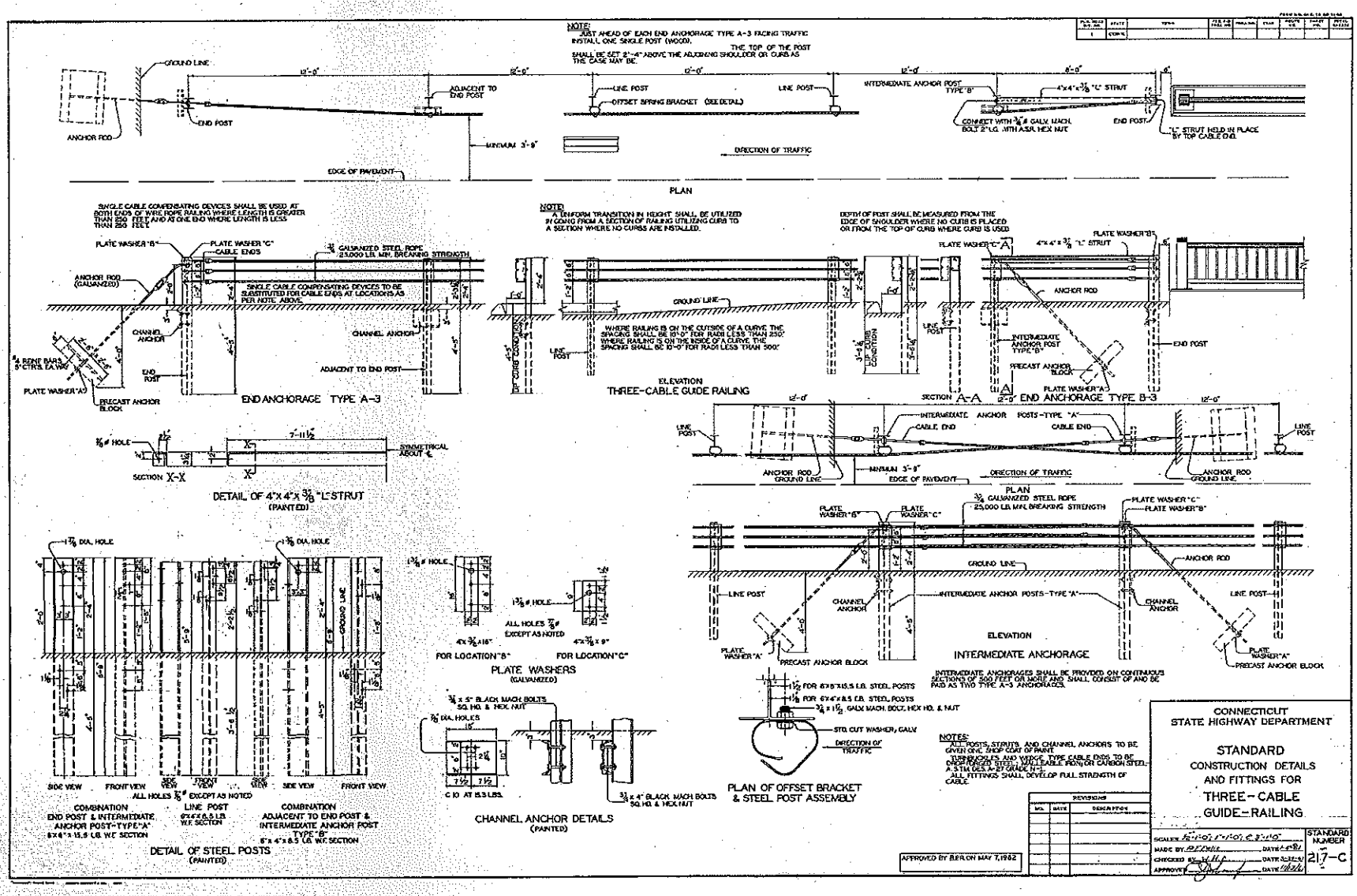
CONNECTICUT
STATE HIGHWAY DEPARTMENT
STANDARD
CONSTRUCTION DETAILS
AND FITTINGS FOR

TWO – CABLE GUIDE RAILING

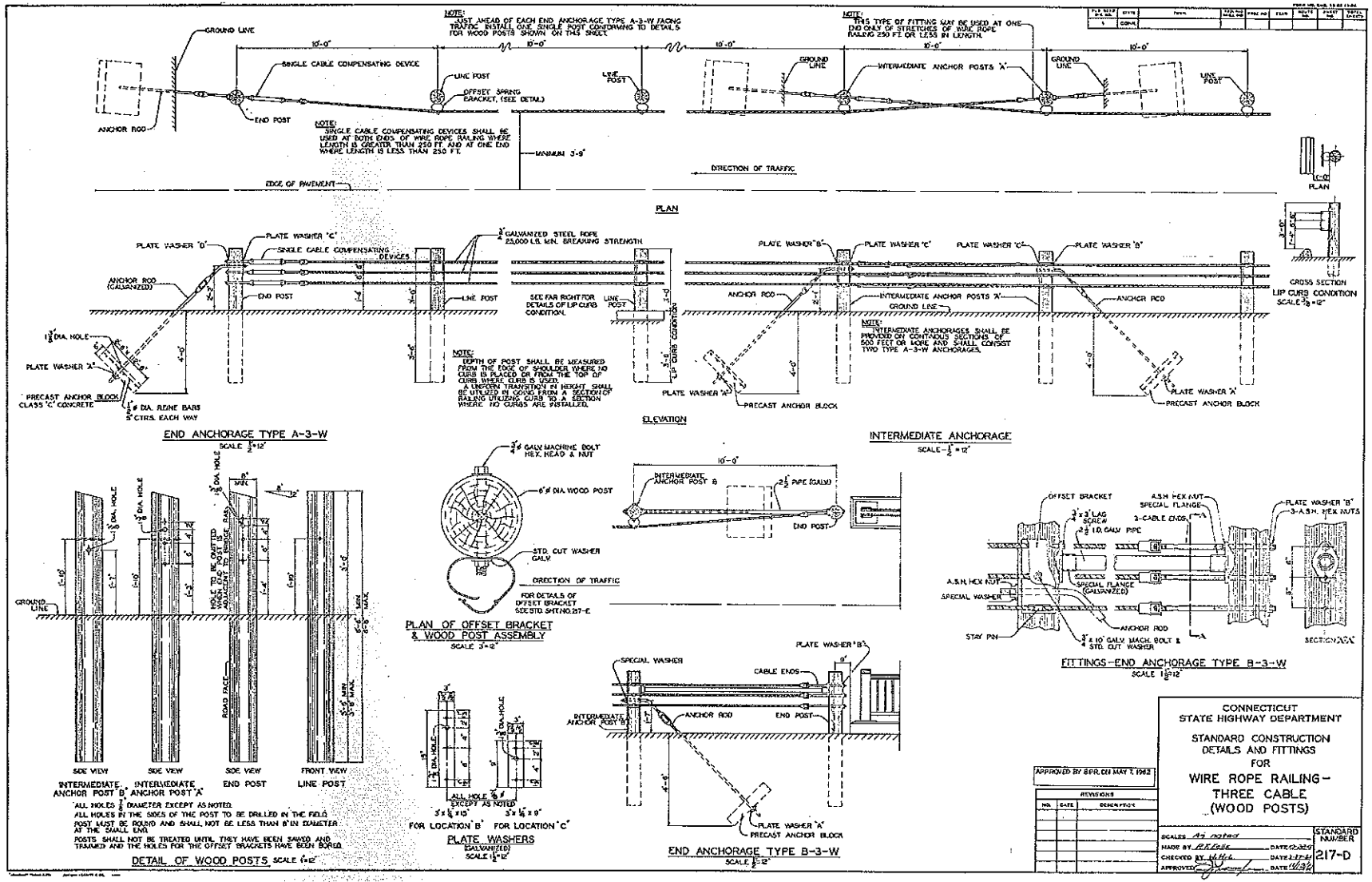
SCALES As noted
MADE BY R.F. Fuge DATE 9-3-61
CHECKED BY R.E. Fisher DATE 11-22-61
APPROVED [illegible] DATE [illegible]

STANDARD NUMBER 217-B

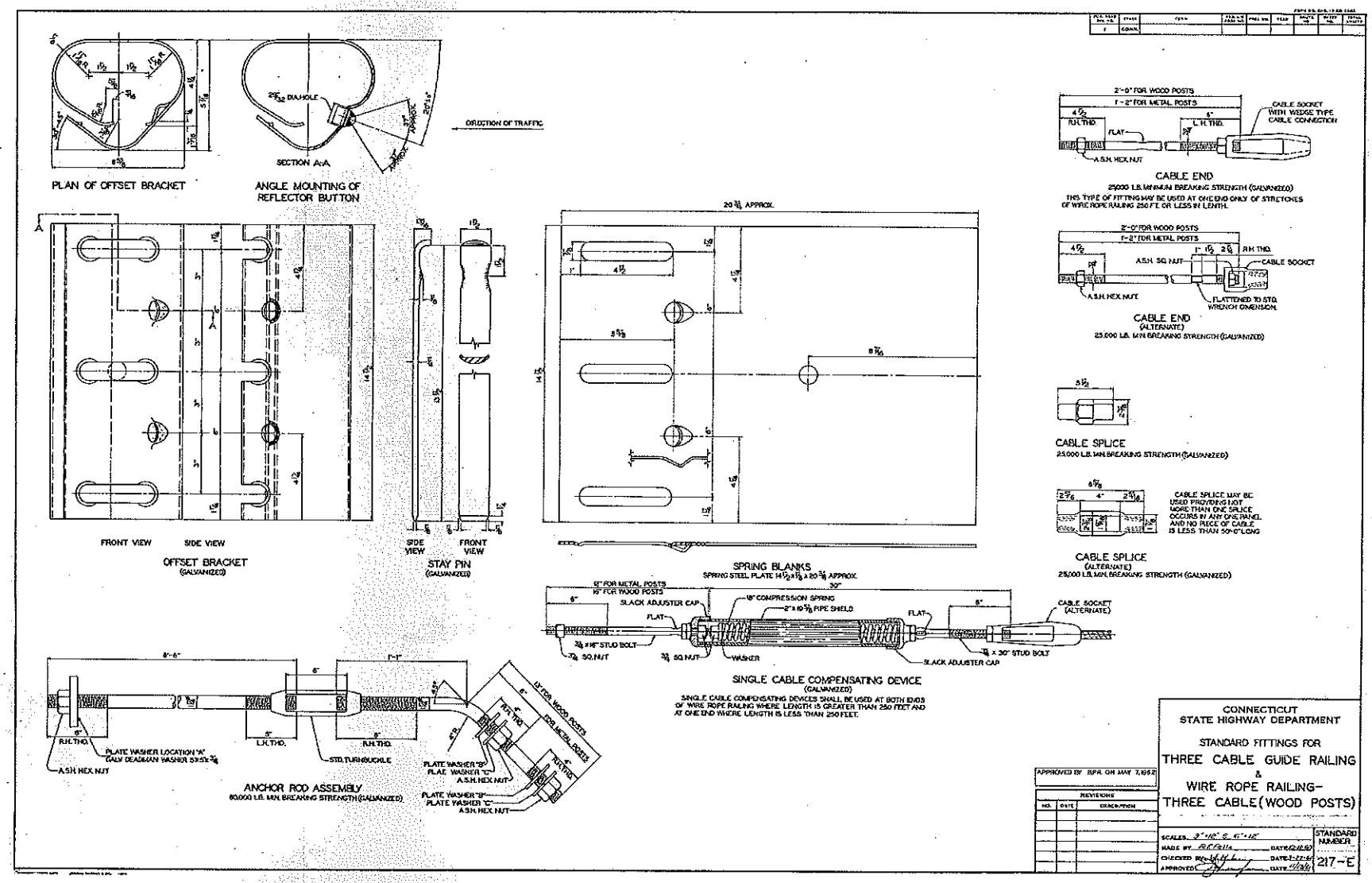
THIS PRINT HAS BEEN REDUCED IN SIZE — SCALES SHOWN APPLY TO ORIGINAL SIZE PRINT ONLY

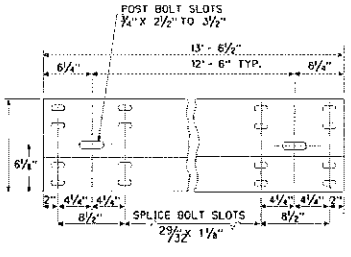


THIS PRINT HAS BEEN REDUCED IN SIZE – SCALES SHOWN APPLY TO ORIGINAL SIZE PRINT ONLY

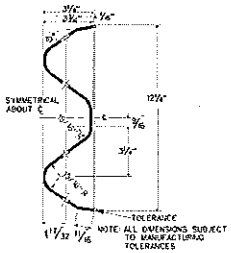


THIS PRINT HAS BEEN REDUCED IN SIZE — SCALES SHOWN APPLY TO ORIGINAL SIZE PRINT ONLY



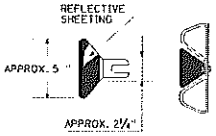


TYPICAL RAIL ELEMENT
CLASS A, TYPE 2



SECTION THRU RAIL ELEMENT

NOTE: REFLECTIVE SHEETING SHALL BE APPROX. 8 SQ.IN.



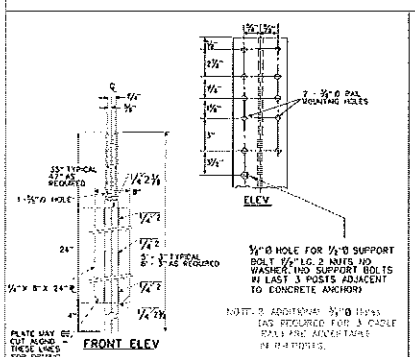
DELINEATOR

DELINEATORS MAY BE OF 12 GUAGE GALVANIZED STEEL, .080 POLY CARBONATE OR SHEET ALUMINUM IN ACCORDANCE WITH M.18.13. REFLECTIVE SHEETING SHALL CONFORM TO M.18.09 FOR TYPE II - REFLECTIVE SHEETING.

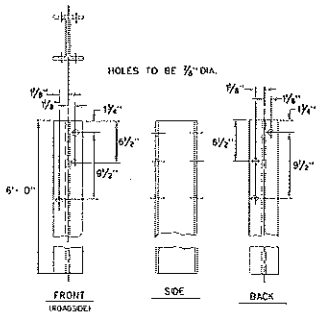
DELINEATOR SPACING	
RADIUS OF CURVE	SPACING ON CURVE
150'	25'
300'	50'
700'	75'
1000'	100'
2000'	150'
3000' OR FLATTER	200'
DELINEATOR TO BE INSTALLED ON POST CLOSEST TO DESIGNATED SPACING.	

GENERAL NOTES

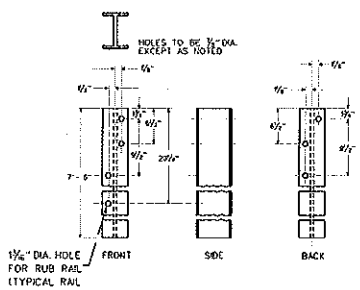
1) TERMINAL ELEMENT TO BE CLASS A (12 GA.)
2) BACK UP PIECES TO BE CLASS A (12 GA.) FOR ALL RAIL, AND TO BE PLACED BEHIND RAIL ELEMENTS AT NON-SPLICE POSTS.
3) FOR CURVES WITH RADII OF 150' OR LESS ALL RAIL MEMBERS SHALL BE SHOP FABRICATED TO THE PROPER RADIUS.
4) RELECTIVE SHEETING TO BE WHITE, EXCEPT REFLECTIVE SHEETING ON STREETS, HIGHWAYS, RAMPS, AND ONEWAY ROADWAYS (IN THE DIRECTION OF TRAVEL) SHALL BE YELLOW. INSTALL DELINEATORS ONLY ON RAIL THAT IS PARALLEL TO AND NOT GREATER THAN 6' FROM THE EDGE OF SHOULDER. A MINIMUM OF 3 DELINEATORS MUST BE INSTALLED ON ANY RUN OF RAIL.



S3 X 5.7 POST BOLT HOLE SPACING

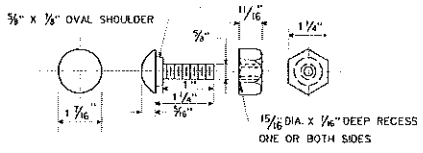


BOLT HOLE SPACING
W6 X 8.5



DETAIL SHOWING LOCATION OF HOLES FOR ATTACHING BRACKET TO POST

NOTES:
① W5 X 15 MAY BE USED IN PLACE OF W6 X 15.5 POSTS.
② W6 X 9 MAY BE USED IN PLACE OF W6 X 8.5 POSTS.
③ C9 X 15 OR C8 X 18.75 IN PLACE OF C9 X 20



SPLICE BOLT AND NUT

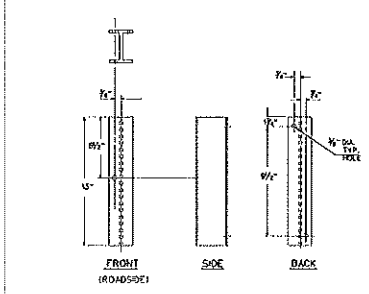
NOTE: AFTER GALVANIZING, THE NUT SHALL BE FREE RUNNING ON THE BOLT.

POST BOLT SHALL BE THE SAME AS THE SPLICE BOLT, EXCEPT THE LENGTH WILL BE 2".

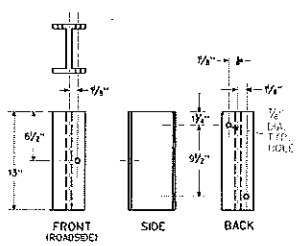
GUIDE RAIL PLACEMENT

DESIGN SPEED (mph)	FACE OF RAIL TO FACE OF CURB
≤ 35	NO RESTRICTION ON PLACEMENT
40	DO NOT INSTALL BETWEEN 1' AND 8' FROM CURB
50	DO NOT INSTALL BETWEEN 1' AND 10' FROM CURB
60	DO NOT INSTALL BETWEEN 1' AND 12' FROM CURB
70	DO NOT INSTALL BETWEEN 1' AND 15' FROM CURB

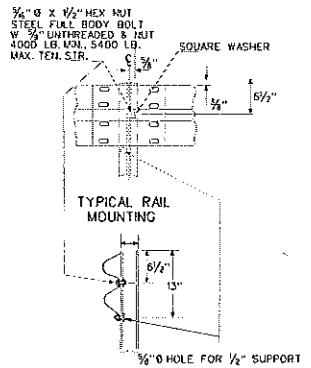
NOTE: These ranges apply to all types of curbs, except the 4" X 2" Mountable Curb.



BRACKET
S3 X 5.7

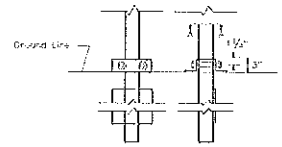


BRACKET
W6 X 8.5

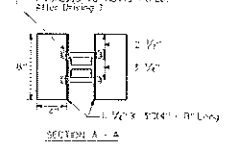


MOUNTING & SUPPORT BOLT

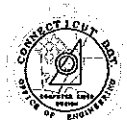
WASHERS

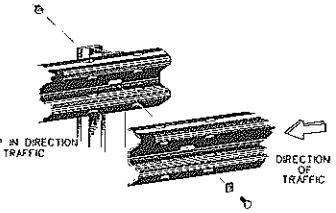


BEARING CLAMP
NABLE To Be Installed Only On Post Nearest End Anchor



SECTION A - A





STANDARD SHEET
CONN. DEPT. OF TRANSPORTATION

METAL BEAM RAIL ELEMENTS

NO	DATE	REVISION

DESIGNED		
DRAWN		
CHECKED		
TRACED		

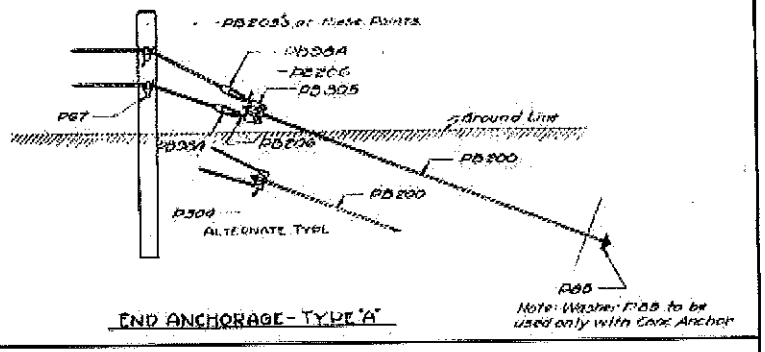
NOT TO SCALE

910

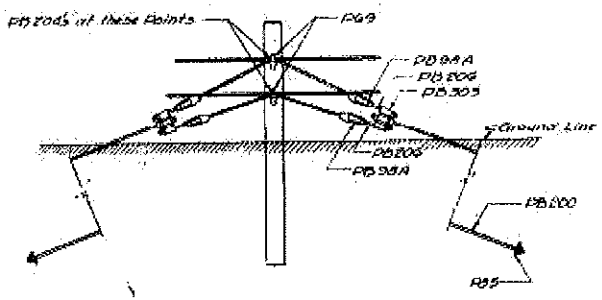
STANDARD WIRE ROPE RAILING

ASSEMBLY DRAWING

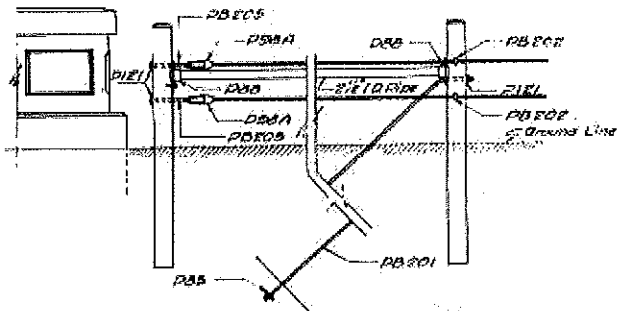
2.20



END ANCHORAGE - TYPE "A"



INTERMEDIATE ANCHORAGE

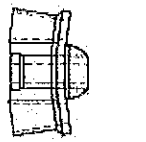


END ANCHORAGE - TYPE "B"

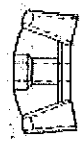
STANDARD WIRE ROPE RAILING

PART NUMBERS

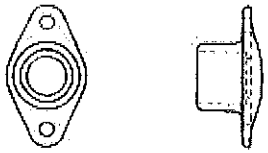
2.21



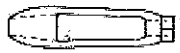
PB 306
TAKE UP BLOCK



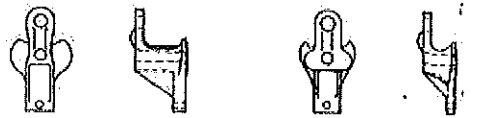
P 304
CABLE SOCKET BLOCK



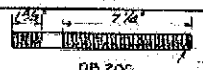
P68
SPECIAL FLANGE



PB 98 A
CLOSED END SOCKET

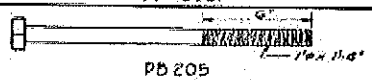


P69 P67
OFFSET BLOCKS

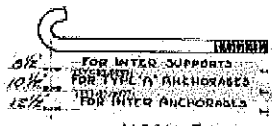


PB 206
STUD BOLT

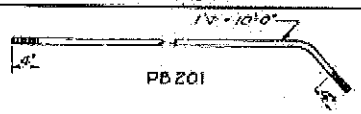
P85 P121
SPECIAL WASHERS



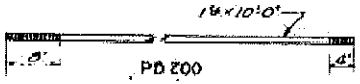
PB 205
STANDARD BOLT



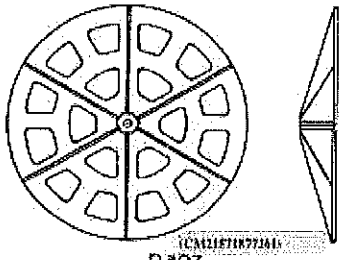
PB202
PB203
PB204
HOOK BOLTS



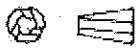
PB 201



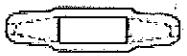
PB 200
ANCHOR RODS



P 307
MALLEABLE IRON ANCHOR



P98W
WEDGE

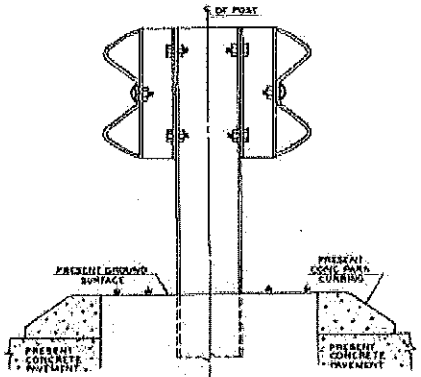


P99
CABLE CONNECTOR

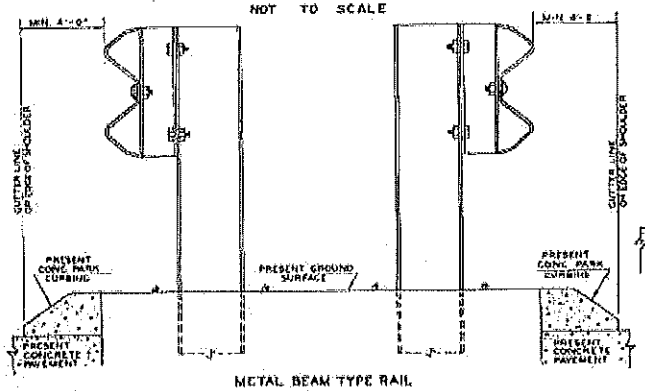
M

MISCELLANEOUS DETAILS

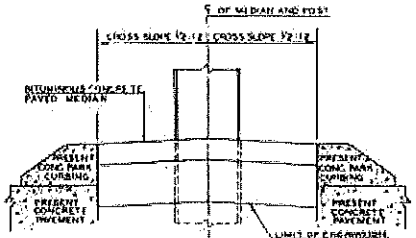
NOT TO SCALE



METAL BEAM TYPE RAIL
TYPE MD-B
IN MEDIAN



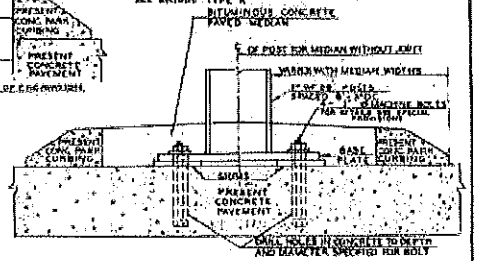
METAL BEAM TYPE RAIL
TYPE R-B
IN MEDIAN



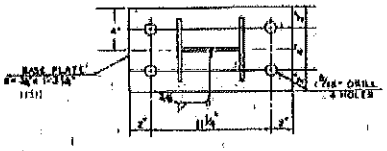
METAL BEAM TYPE RAIL
TYPE MD-B IN MEDIAN
TO BE PAVED

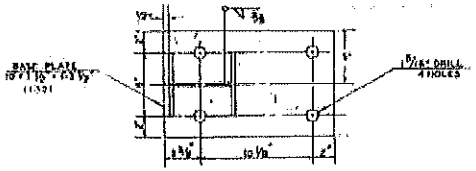
GENERAL NOTES

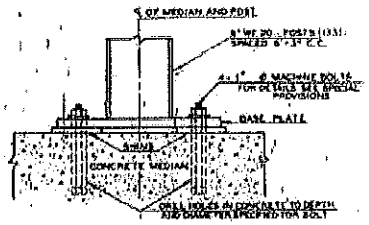
1. FOR DETAILS OF METAL BEAM TYPE RAIL (TYPE A, B, TYPE MD-B, BRIDGE TYPE "A" AND BRIDGE TYPE "B") NOT SHOWN ON THIS SHEET SEE STANDARD SHEET NO. 2-0-A AND SPECIAL PROVISIONS.
2. GALVANIZED STEEL HORSESHOE SHIMS SHALL BE USED TO LEVEL BASE PLATE FOR POSTS AS DIRECTED BY THE ENGINEER.
3. ALL DIMENSIONS CALL FOR INSTALLATION OF METAL BEAM TYPE RAIL (TYPE MD-B) UNLESS OTHERWISE NOTED.
4. FOR OTHER DETAILS NOT SHOWN IN BRIDGE TYPE "B" OR "C" SEE BRIDGE TYPE "A".



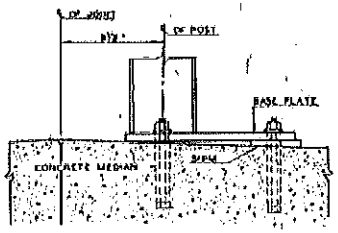
TYPE "A" OR "B" AT OVERPASS



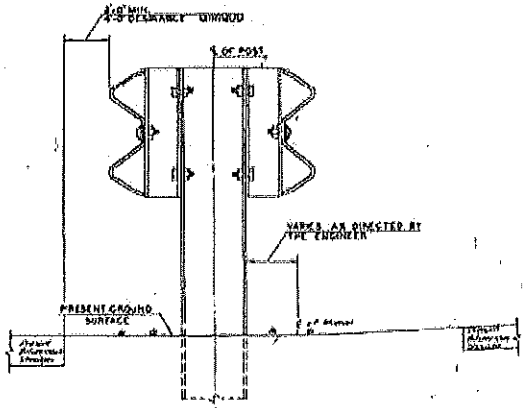




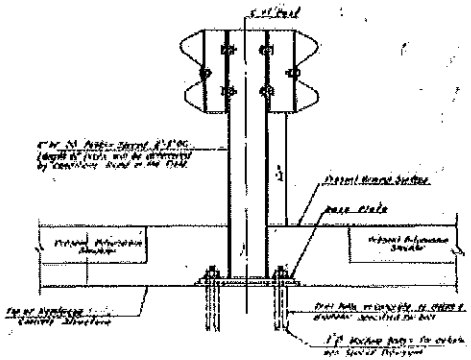
METAL BEAM TYPE RAIL
(BRIDGE TYPE "A")



METAL BEAM TYPE RAIL
(BRIDGE TYPE "B")



METAL BEAM TYPE RAIL
TYPE MD-B
IN MEDIAN



METAL BEAM TYPE RAIL (BRIDGE TYPE "C")

REVISIONS			
NO.	DATE	DESCRIPTION	REF. DWG. NO.
1		Conform to Revised Standard Drawing	