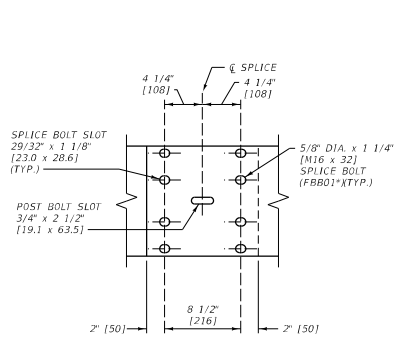


- NOTES:
- ① INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
  - ② USE WOOD BLOCKS OR OTHER "WASH" APPROVED BLOCKS. AFFIX BLOCKS TO POSTS WITH TWO 16 PENNY GALV. NAILS OR 14 GAUGE WIRE WRAP.
  - ③ ATTACH REFLECTORS TO POSTS EVERY 25 FEET (7.62 m), INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FABRICATE REFLECTORS FROM 0.063\"/>
  - ④ ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 27 3/4\"/>
  - ⑤ WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0\"/>
  - ⑥ DO NOT INSTALL W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5.3' (1.6 m) OF THE FACE OF THE RAIL.
  - ⑦ USE LOWER HOLE ON NEW CONSTRUCTION INSTALLATIONS.
  - ⑧ USE 6\"/>
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

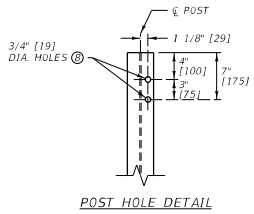
UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

② STANDARD UNLESS SPECIFIED OTHERWISE IN PLANS.

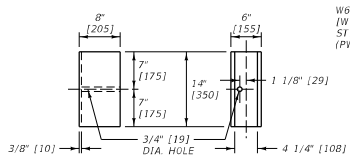
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606, 704	DWG. NO. 606-05A
METAL GUARDRAIL - WOOD POSTS (MGS)	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



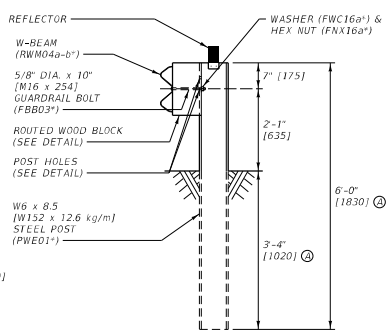
**BEAM SPLICE**  
(LAP IN DIRECTION OF ADJACENT TRAFFIC)



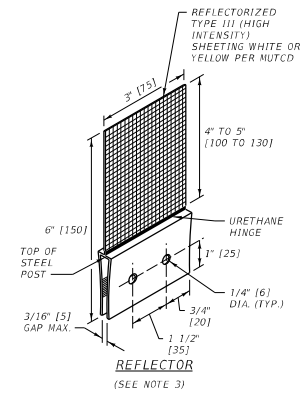
**POST HOLE DETAIL**



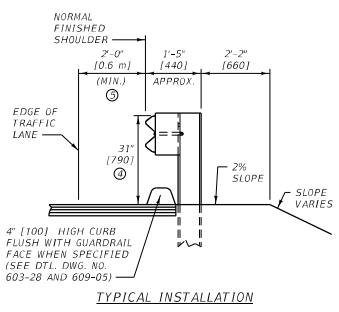
**ROUTED WOOD BLOCK**  
PDB01\*



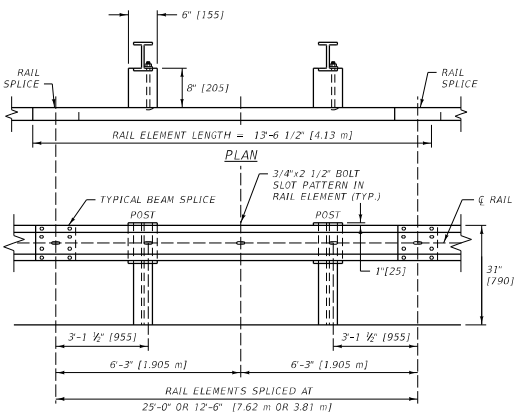
**STEEL POST AND MOUNTING DETAIL**  
ⓐ STANDARD UNLESS SPECIFIED OTHERWISE IN PLANS.



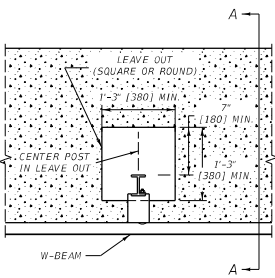
**REFLECTOR**  
(SEE NOTE 3)



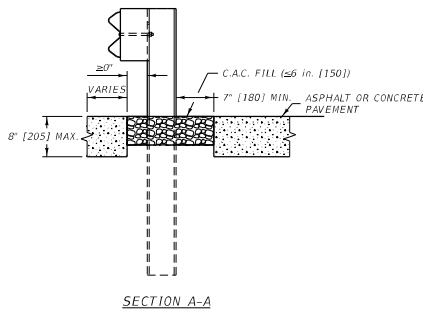
**TYPICAL INSTALLATION**



**ELEVATION**  
DIRECTION OF ADJACENT TRAFFIC



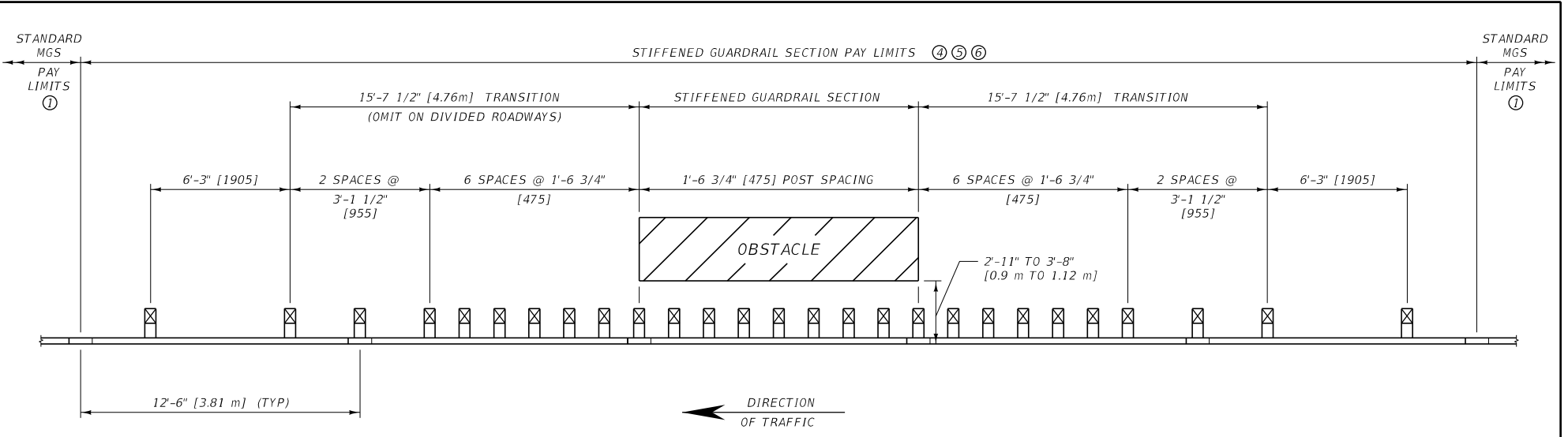
**POST DETAIL IN PAVEMENT APPLICATIONS**



**SECTION A-A**

- NOTES:
- ① INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
  - ② USE ROUTED WOOD BLOCKS OR OTHER "MASH" APPROVED BLOCKS.
  - ③ ATTACH REFLECTORS TO POSTS EVERY 25 FEET (7.62 m), INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FASTEN REFLECTOR TO STEEL POST USING AN APPROVED ADHESIVE. REFLECTORS MAY BE BOLTED TO POSTS PROVIDED HOLES IN POSTS ARE DRILLED BEFORE BEING GALVANIZED.
  - ④ ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 27.3-4" (705).
  - ⑤ WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" (0.6 m) FROM THE TRAFFIC LANE.
  - ⑥ STEEL POSTS WITH OTHER POST HOLE CONFIGURATIONS MAY BE ACCEPTED, PROVIDED THEY HAVE AT LEAST THE HOLES DETAILED ON THIS DRAWING AND THEY MEET AASHTO'S PUBLICATION, "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" AND "MASH" REQUIREMENTS.
  - ⑦ DO NOT INSTALL W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5.3 (1.6 m) OF THE FACE OF THE RAIL.
  - ⑧ USE LOWER HOLE ON NEW CONSTRUCTION INSTALLATIONS.
  - ⑨ USE 6" (1830) POSTS FOR STANDARD INSTALLATIONS.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-05B
METAL GUARDRAIL - STEEL POSTS (MGS)	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

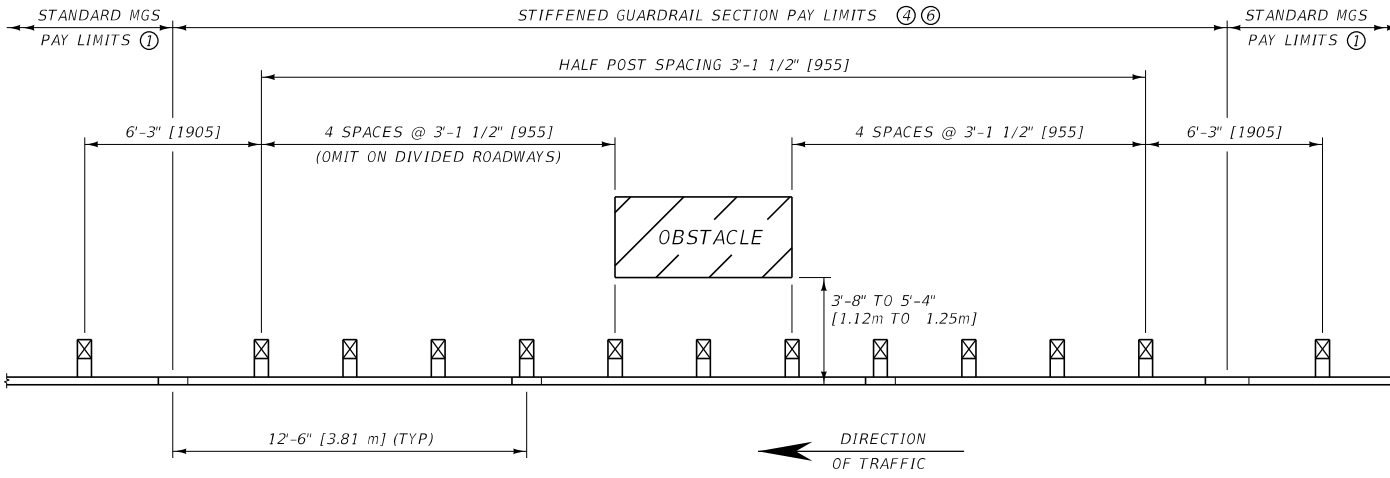


QUARTER POST SPACING

NOTES:

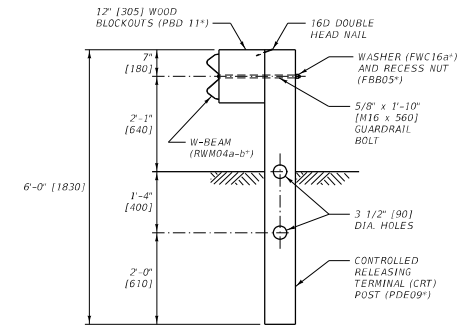
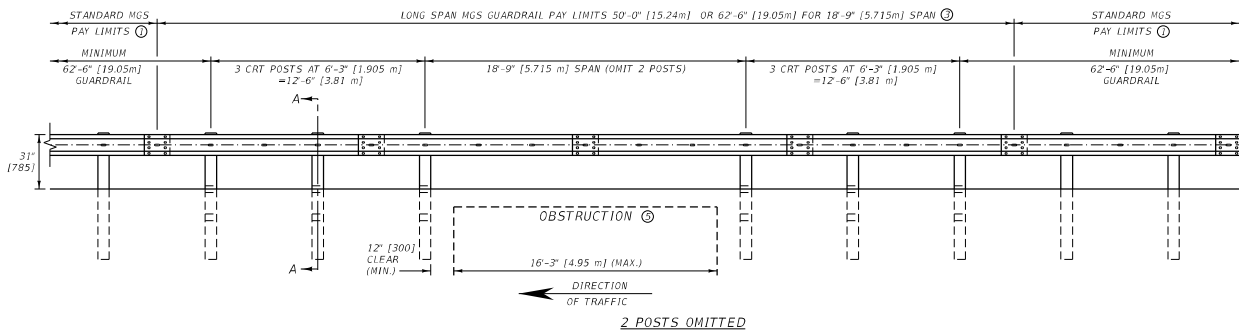
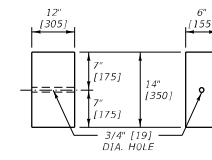
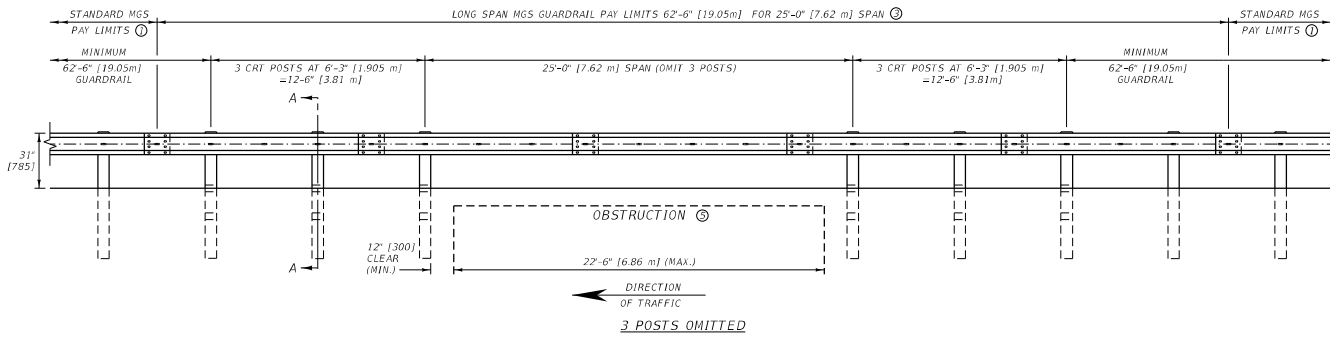
- ① SEE DTL. DWG. NO. 606-05A AND 606-05B FOR STANDARD MGS GUARDRAIL AND ASSOCIATED HARDWARE.
- ② OBSTACLES CLOSER TO THE FACE OF RAIL THAN THE INDICATED LIMITS REQUIRE THE USE OF A RIGID BARRIER SYSTEM WITH LITTLE TO NO DYNAMIC DEFLECTION.
- ③ LAP ALL RAIL IN THE DIRECTION OF ADJACENT TRAFFIC.
- ④ ALL POSTS AND BLOCKS ARE STANDARD DIMENSIONS AS PER DETAILED DRAWING NO. 606-05A AND 606-05B.
- ⑤ RAIL IS RWM08a-b\*.
- ⑥ PAY LIMIT DEFINED BY RAILS CONTAINING A SECTION OF REDUCED POST SPACING. LIMITS SHOWN ARE FOR EXAMPLE ONLY, ACTUAL PAY LIMITS WILL DIFFER DEPENDING UPON SPLICE LOCATIONS.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.



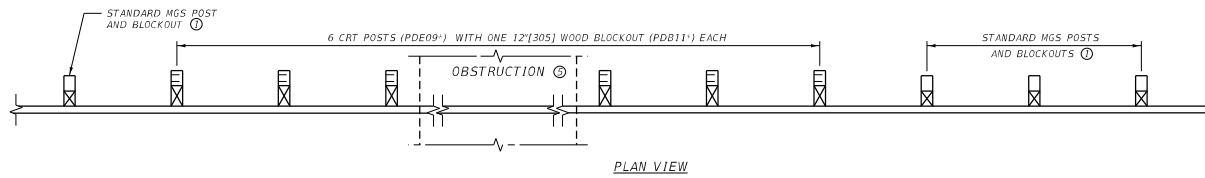
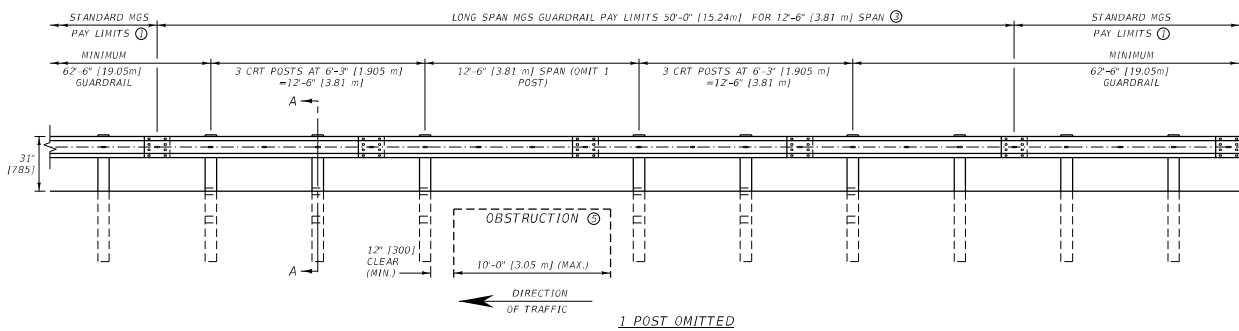
HALF POST SPACING

<b>DETAILED DRAWING</b>	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-07
STIFFENED GUARDRAIL SECTIONS (MGS)	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



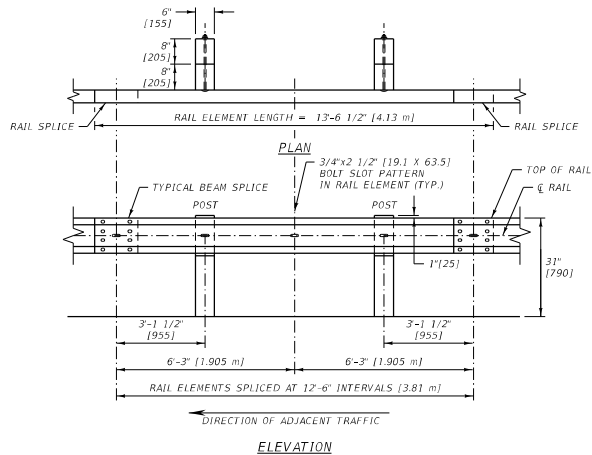
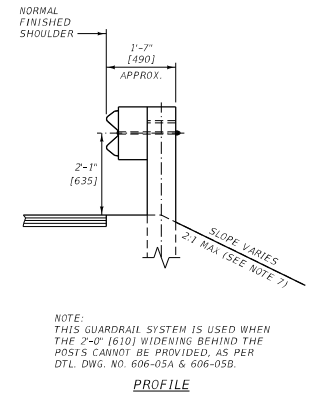
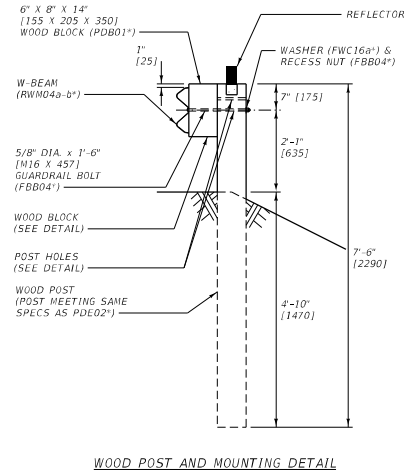
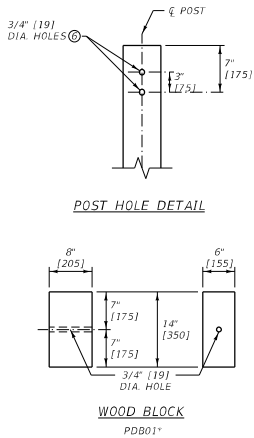
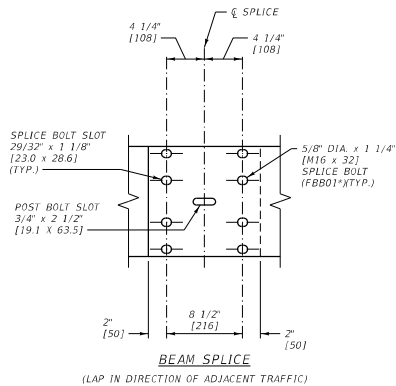
NOTES:

- (1) SEE DTL. DWG. NO. 606-05A AND 606-05B FOR STANDARD MGS GUARDRAIL AND ASSOCIATED HARDWARE.
- (2) LAP ALL RAIL IN THE DIRECTION OF ADJACENT TRAFFIC.
- (3) TYPICAL SPLICE LOCATIONS SHOWN, MAY VARY BASED ON ACTUAL RAIL SEGMENTS INSTALLED. PAY LIMITS NOT DEPENDENT ON SPLICE LOCATION.
- (4) DO NOT INSTALL MGS LONG SPAN GUARDRAIL FOR ABOVE-GRADE OBSTACLES WITHIN 8' [2.4m] OF THE FACE OF THE RAIL.
- (5) THE OBSTRUCTION (CULVERT OPENING OR EDGE OF BRIDGE DECK) MUST BE LOCATED AT OR BEYOND THE BACK OF THE CRT POSTS.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



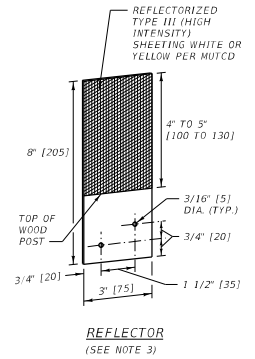
UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-09
LONG SPAN GUARDRAIL (MGS)	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



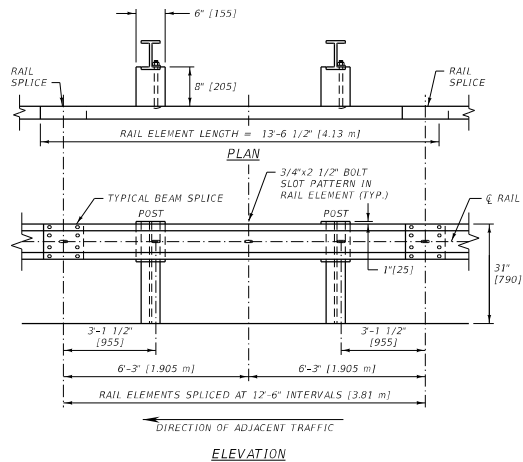
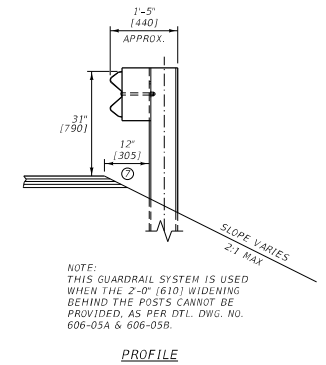
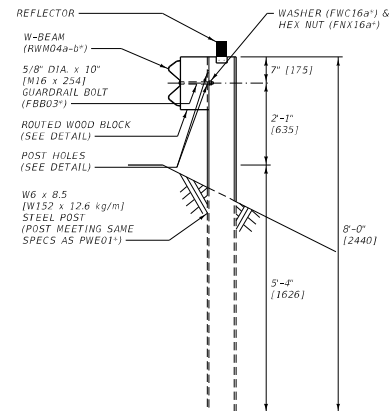
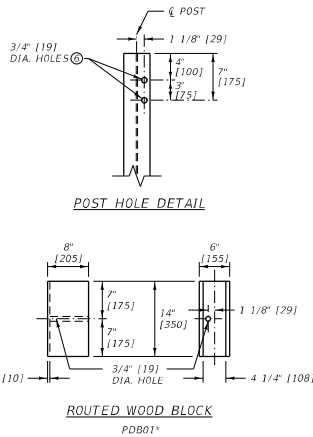
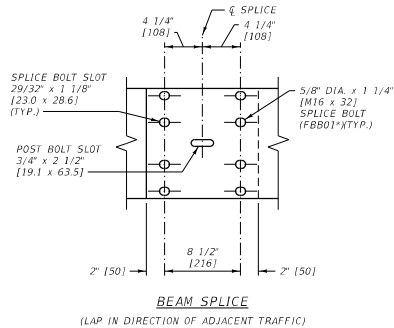
- NOTES:
- INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
  - USE WOOD BLOCKS OR OTHER "MASH" APPROVED BLOCKS. AFFIX BLOCKS TO POSTS WITH TWO 16 PENNY GALV. NAILS OR 14 GAUGE WIRE WRAP.
  - ATTACH REFLECTORS TO POSTS EVERY 25' [7.62 m], INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FABRICATE REFLECTORS FROM 0.063" [1.6] THICK ALUMINUM ALLOY PER SECTION 704 OR PLASTIC REFLECTORS WITH A URETHANE HINGE. FASTEN REFLECTOR TO WOOD POST USING TWO 16 PENNY RING-SHANKED GALVANIZED NAILS AND TWO 3/16" [4.8] DIA. WASHERS IN PRE-DRILLED HOLES.
  - ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 27 3/4" [705].

- DO NOT INSTALL LONG POST W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5'-6" [1.65 m] OF THE FACE OF THE RAIL.
  - USE LOWER HOLE ON NEW CONSTRUCTION INSTALLATIONS.
  - BEGIN INSLOPE BREAK AT CENTER OF POST.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

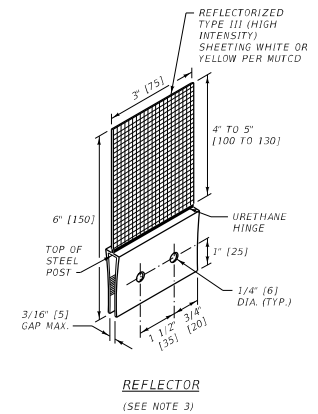
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606.704	DWG. NO. 606-11A
METAL GUARDRAIL - LONG POSTS - WOOD (MGS)	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



**NOTES:**

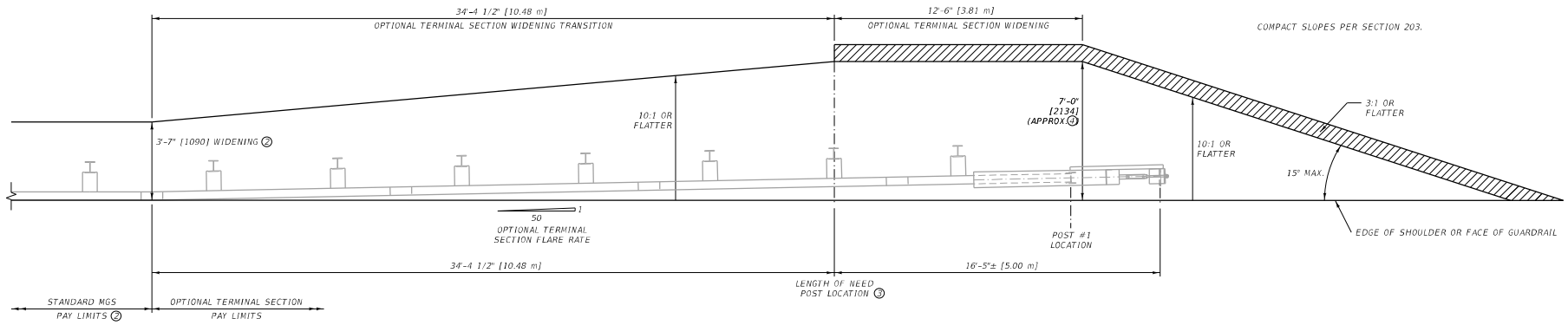
- 1 INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
- 2 USE ROUTED WOOD BLOCKS OR OTHER "MASH" APPROVED BLOCKS.
- 3 ATTACH REFLECTORS TO POSTS EVERY 28' (7.62 m), INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FASTEN REFLECTOR TO STEEL POST USING AN APPROVED ADHESIVE. REFLECTORS MAY BE BOLTED TO POSTS PROVIDED HOLES IN POSTS ARE DRILLED BEFORE BEING GALVANIZED.
- 4 ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 27 3/4" (705).
- 5 DO NOT INSTALL LONG POST W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5'-6" (1.65 m) OF THE FACE OF THE RAIL.
- 6 USE LOWER HOLE ON NEW CONSTRUCTION INSTALLATIONS.
- 7 LOCATE POST 12" (305) FROM INSLOPE BREAK.
- 8 STEEL POSTS WITH OTHER POST HOLE CONFIGURATIONS MAY BE ACCEPTED, PROVIDED THEY HAVE AT LEAST THE HOLES DETAILED ON THIS DRAWING AND THEY MEET AASHTO'S PUBLICATION, "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" AND "MASH" REQUIREMENTS.

\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

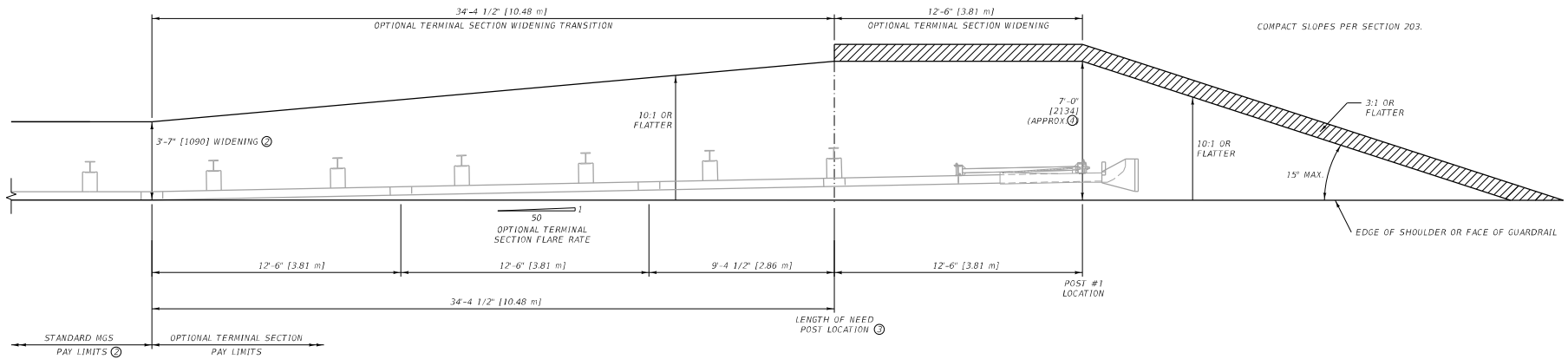


UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (MM) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SECTION	DWG. NO. 606-11B
METAL GUARDRAIL - LONG POSTS - STEEL (MGS)	
MDT MONTANA DEPARTMENT OF TRANSPORTATION	



TRINITY SOFTSTOP ①

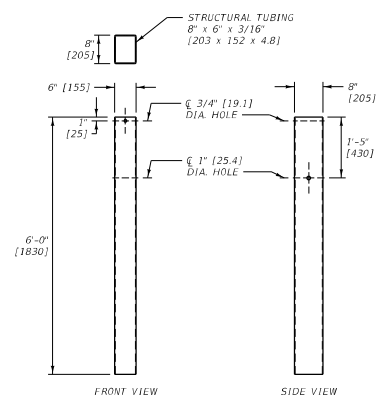
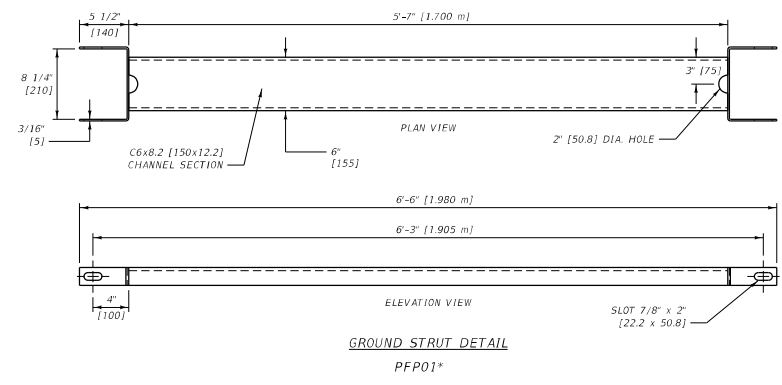
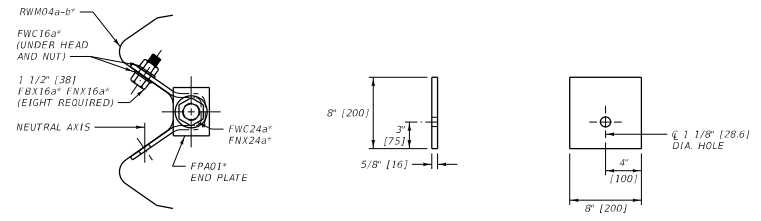
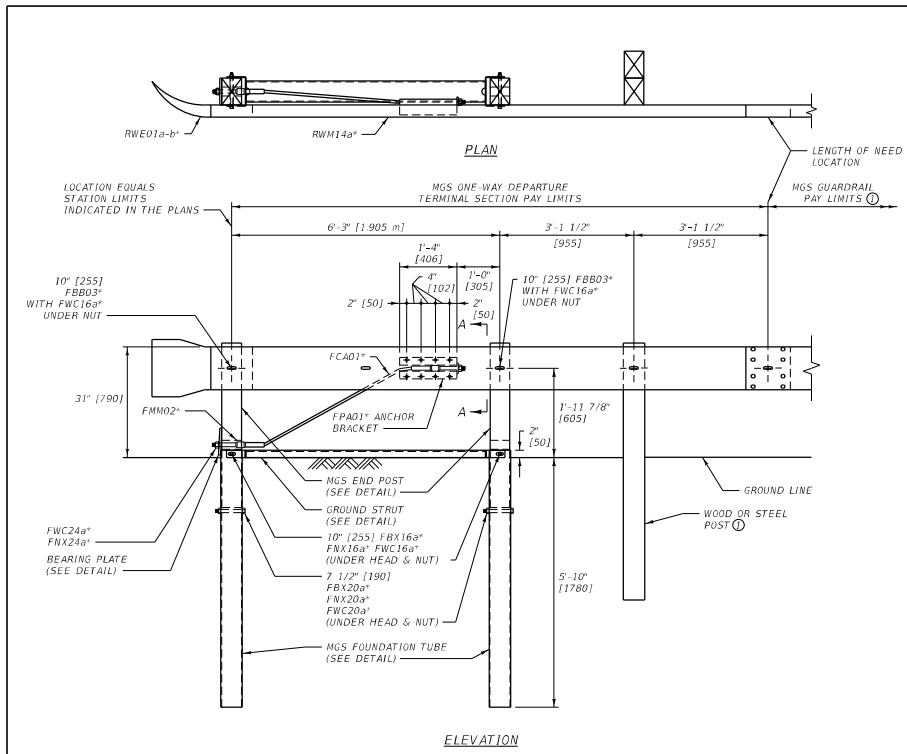


ROAD SYSTEMS MSKT WITH 9'-4 1/2" RAIL PANEL ①

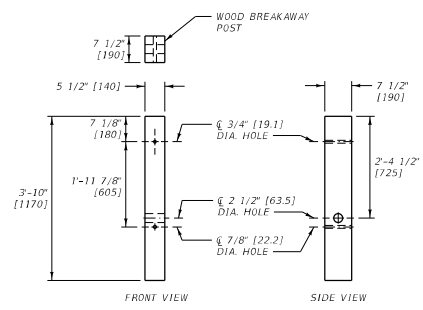
- ① OPTIONAL TERMINAL SECTION SYSTEMS VARY, REFER TO MANUFACTURER'S DETAIL AND ASSEMBLY INSTRUCTIONS.
- ② SEE DTL. DWG. NO. 606-05A AND 606-05B FOR MGS GUARDRAIL. SEE DTL. DWG. NO. 606-20 IF CONNECTING TO EXISTING RAIL THAT IS NOT WITHIN THE MANUFACTURER'S HEIGHT TOLERANCE.
- ③ LENGTH OF NEED POST LOCATION EQUALS STATION LIMITS INDICATED IN THE PLANS.
- ④ 7'-0" [2.13m] WIDENING DIMENSION ALLOWS FOR OPTIONAL TERMINAL SECTION FLARE AND SYSTEM WIDTH. A MINIMUM WIDENING DISTANCE OF 5'-0" [1.52m] IS REQUIRED BEHIND POST LOCATION #1.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-13
SECTION 606.203	
MASH OPTIONAL TERMINAL SECTIONS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



MGS FOUNDATION TUBE DETAILS  
PTE06\*



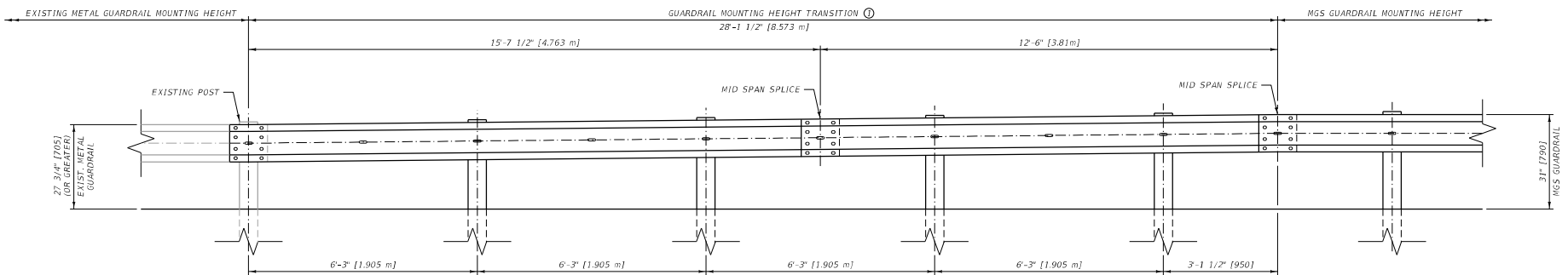
MGS END POST DETAILS  
PDF01\* - MGS HEIGHT

- NOTES:
- ① SEE DTL. DWG. NO. 606-05A AND 606-05B FOR MGS GUARDRAIL.
  - ② LAP GUARDRAIL IN THE DIRECTION OF ADJACENT TRAFFIC LANE.
  - \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-18
ONE-WAY DEPARTURE TERMINAL SECTION (MGS)	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	





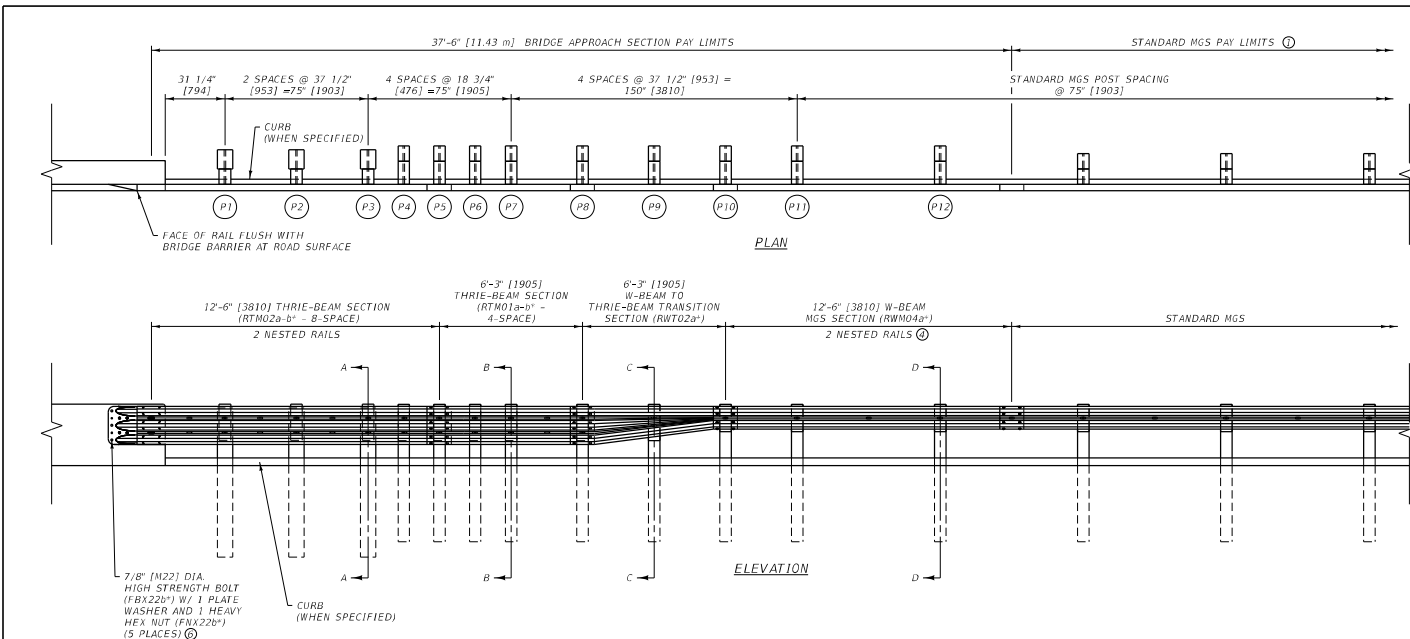
TRANSITION FROM 27 3/4" [705] (OR GREATER) TO 31" [775] GUARDRAIL MOUNTING HEIGHT

NOTES:

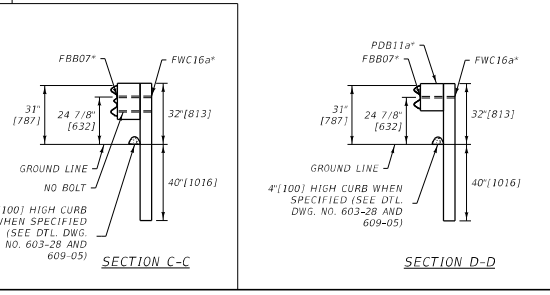
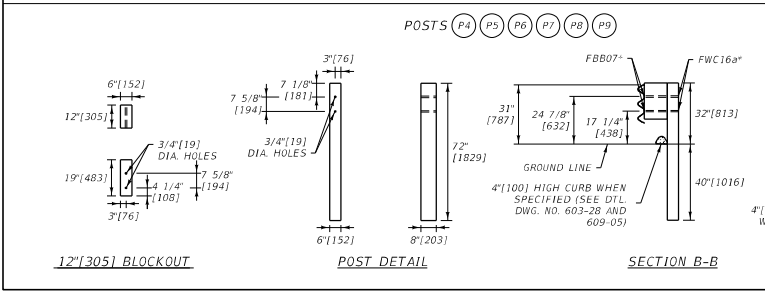
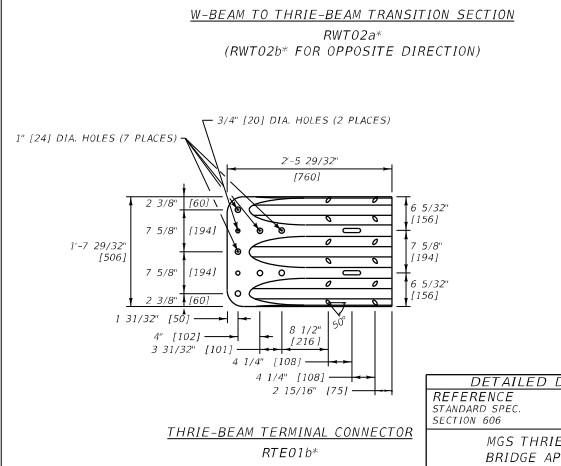
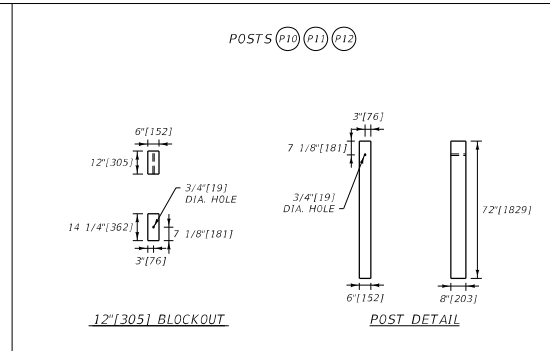
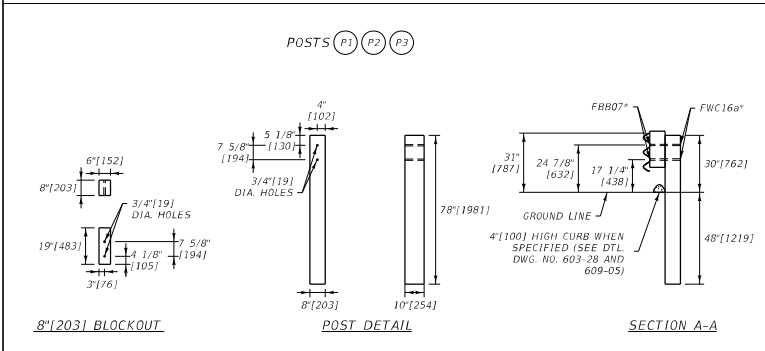
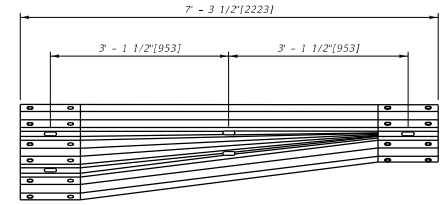
- ① THE MGS TO METAL GUARDRAIL TRANSITION IS PAID FOR AS LINEAR FEET OF MGS GUARDRAIL.
- ② SEE DTL DWG. NO. 606-05A, 606-05B, 606-11A, AND 606-11B FOR MGS GUARDRAIL AND ASSOCIATED HARDWARE.
- ③ LAP ALL W-BEAM RAIL IN THE DIRECTION OF ADJACENT TRAFFIC.

UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-20
SECTION 606	
MGS TO METAL GUARDRAIL TRANSITION	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

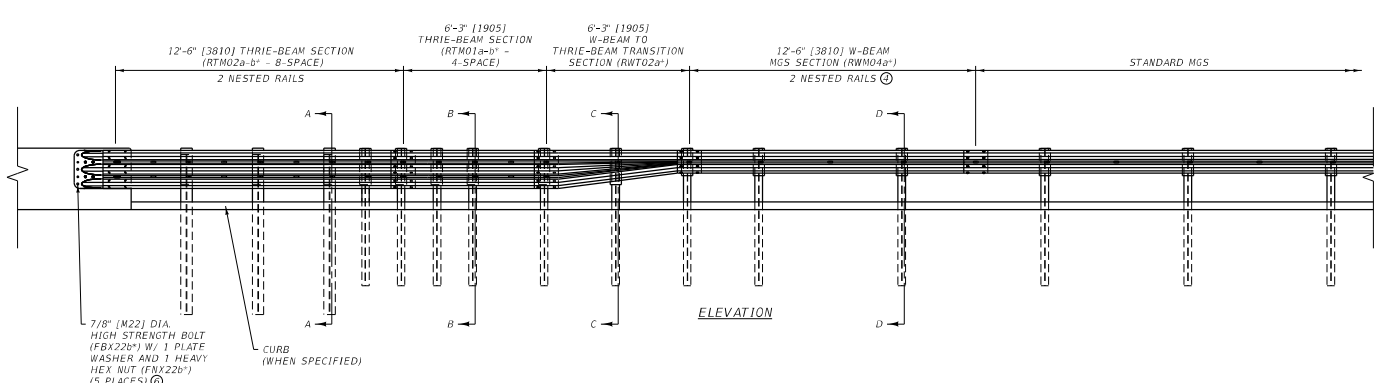
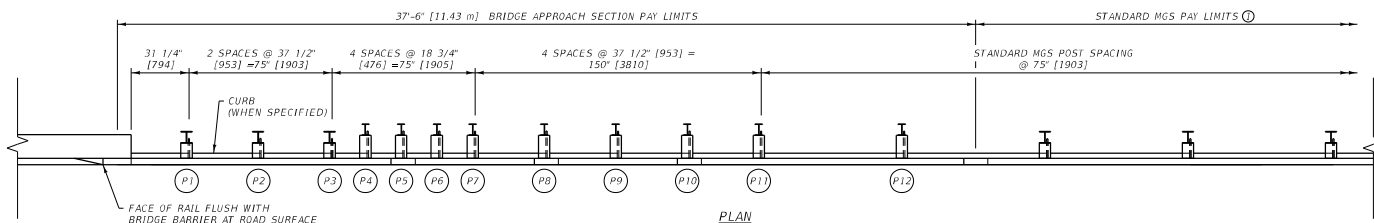


- NOTES:
- SEE DTL. DWG. NO. 606-05A FOR STANDARD MGS GUARDRAIL AND ASSOCIATED HARDWARE.
  - LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
  - DO NOT FLARE BRIDGE APPROACH SECTIONS.
  - WHERE CURB EXTENDS UPSTREAM OF POST NO. 5, FURNISH 2 NESTED 12-GAUGE W-BEAM RAILS FOR THIS 12'-6" [3810] SECTION. INCLUDE THIS ADDITIONAL RAIL IN THE COST OF THE BRIDGE APPROACH SECTION.
  - USE WOOD BLOCKS OR OTHER "MASH" APPROVED BLOCKS AFTER BLOCKS TO POSTS WITH TWO 16 PENNY GALV. NAILS OR 14 GAUGE WIRE WRAP.
  - SEE BRIDGE PLANS FOR CONNECTION DETAILS AND BOLT LOCATIONS.
  - SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

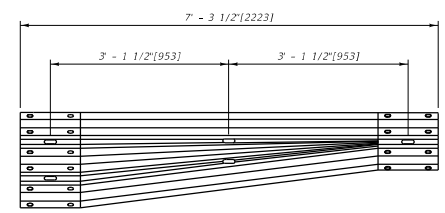


UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

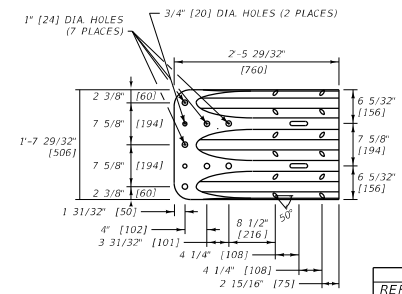
DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-23A
SECTION	606
MGS THRIE BEAM BRIDGE APPROACH SECTION - WOOD POSTS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



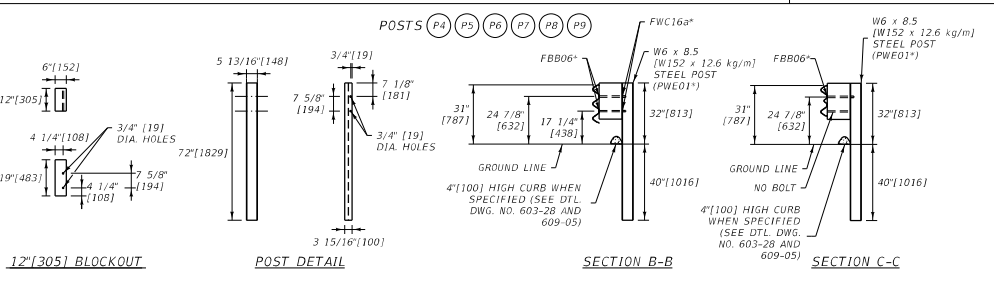
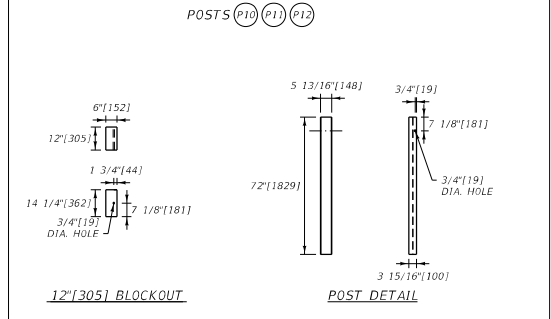
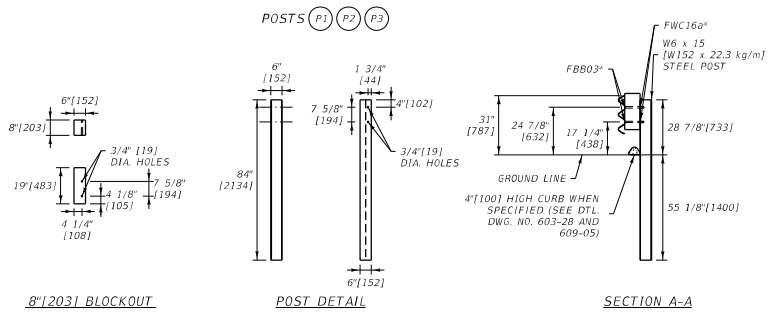
- NOTES:
- ① SEE DTL. DWG. NO. 606-05A FOR STANDARD MGS GUARDRAIL AND ASSOCIATED HARDWARE.
  - ② LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
  - ③ DO NOT FLARE BRIDGE APPROACH SECTIONS.
  - ④ WHERE CURB EXTENDS UPSTREAM OF POST NO. 5, FURNISH 2 NESTED 12-GAUGE W-BEAM RAILS FOR THIS 12'-6\"/>
  - ⑤ USE WOOD BLOCKS OR OTHER "MASH" APPROVED BLOCKS. AFFIX BLOCKS TO POSTS WITH TWO 16 PENNY GALV. NAILS OR 14 GAUGE WIRE WRAP.
  - ⑥ SEE BRIDGE PLANS FOR CONNECTION DETAILS AND BOLT LOCATIONS.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



W-BEAM TO THRIE-BEAM TRANSITION SECTION  
RWT02a\*  
(RWT02b\* FOR OPPOSITE DIRECTION)

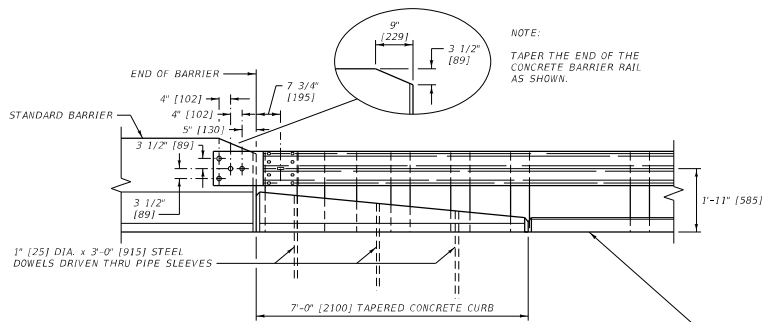


THRIE-BEAM TERMINAL CONNECTOR  
RTE01b\*

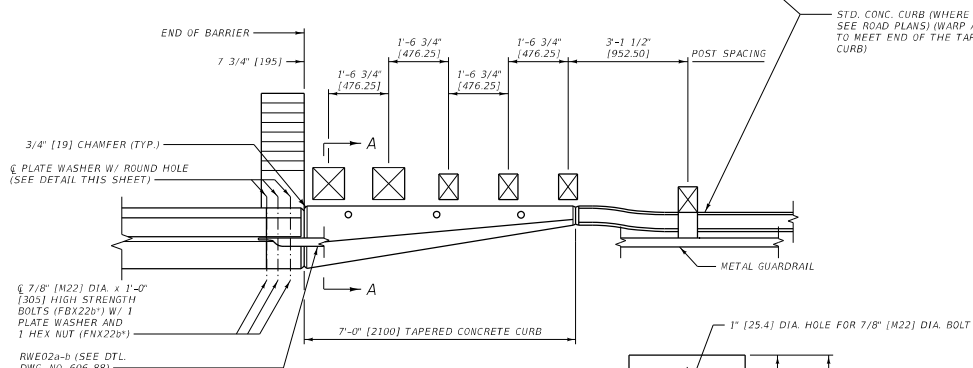


DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-23B
SECTION 606	
MGS THRIE BEAM BRIDGE APPROACH SECTION - STEEL POSTS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

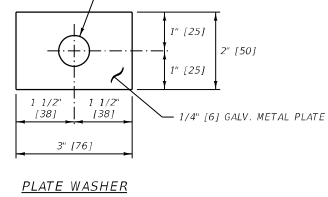
UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.



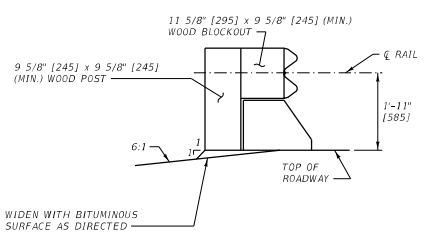
ELEVATION



PLAN



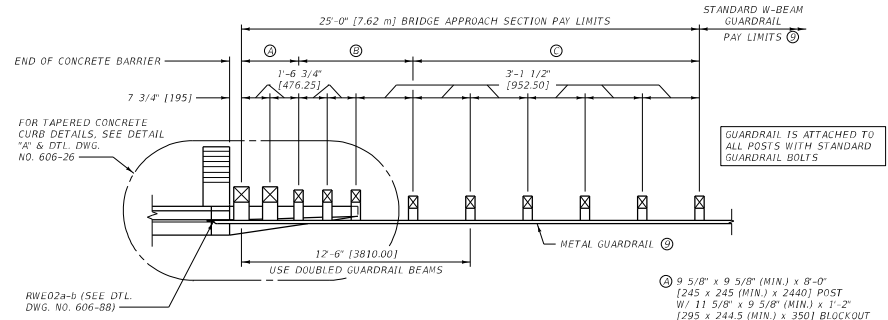
DETAIL "A"



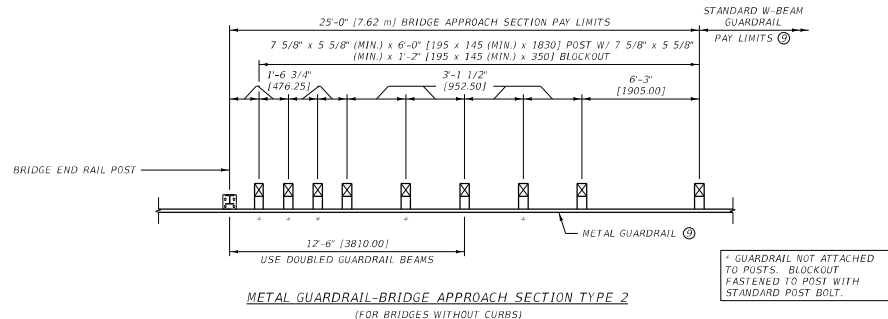
SECTION A-A

- NOTES:
- TAPERED CONCRETE CURBS: TYPE 1, SEE DTL. DWG. NO. 606-26; TYPE 3, SEE DTL. DWG. NO. 606-27
  - TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.
  - PORTIONS OF GUARDRAIL & BLOCKOUTS ARE OMITTED FOR CLARITY.
  - LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE. (SEE DTL. DWG. NO. 606-05A).
  - LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
  - USE WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.
  - DO NOT FLARE BRIDGE APPROACH SECTIONS.
  - SEE DTL. DWG. NO. 606-25A FOR SKEWED BRIDGES.
  - SEE DTL. DWG. NO. 606-05A FOR METAL GUARDRAIL (W-BEAM).

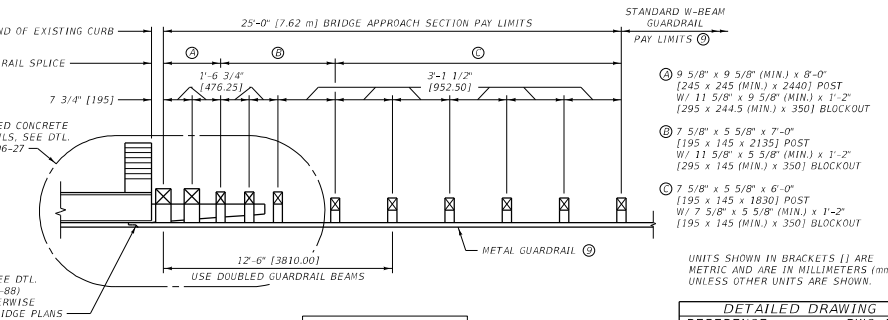
\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1  
(FOR BRIDGES USING CONCRETE BARRIER RAIL)



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 2  
(FOR BRIDGES WITHOUT CURBS)



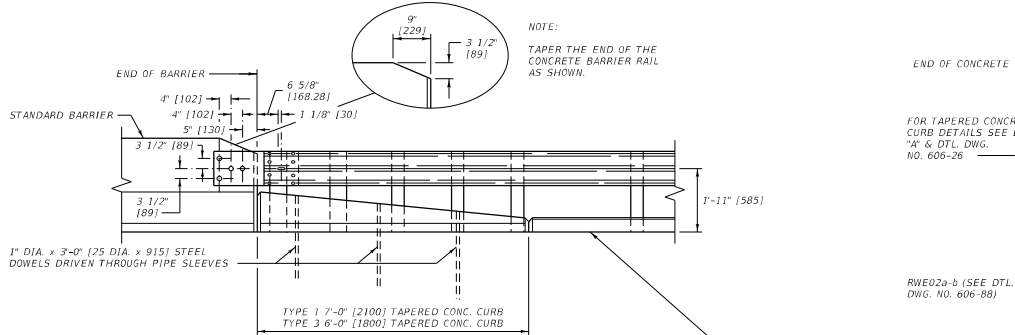
METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3  
(FOR BRIDGES WITH EXISTING CONCRETE CURBS)

- STANDARD W-BEAM GUARDRAIL PAY LIMITS
- GUARDRAIL IS ATTACHED TO ALL POSTS WITH STANDARD GUARDRAIL BOLTS
- Ⓐ 9 5/8" x 9 5/8" (MIN.) x 8'-0" [245 x 245 (MIN.) x 2440] POST W/ 11 5/8" x 9 5/8" (MIN.) x 1'-2" [295 x 244.5 (MIN.) x 350] BLOCKOUT
  - Ⓑ 7 5/8" x 5 5/8" x 7'-0" [195 x 145 x 2135] POST W/ 11 5/8" x 5 5/8" (MIN.) x 1'-2" [295 x 145 (MIN.) x 350] BLOCKOUT
  - Ⓒ 7 5/8" x 5 5/8" x 6'-0" [195 x 145 x 1830] POST W/ 7 5/8" x 5 5/8" (MIN.) x 1'-2" [195 x 145 (MIN.) x 350] BLOCKOUT

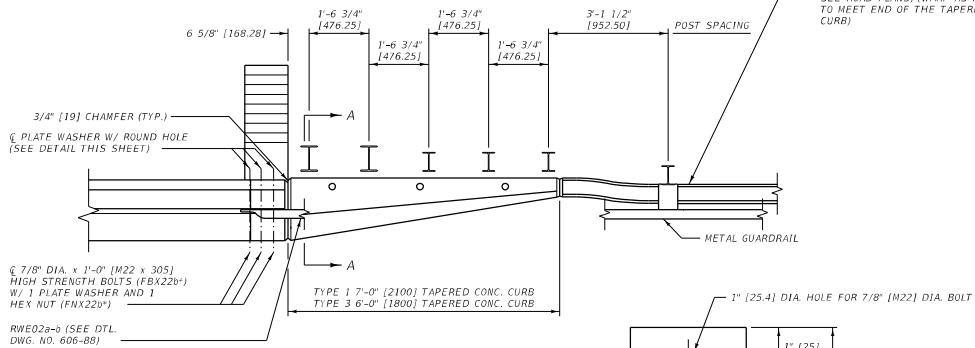
\* GUARDRAIL NOT ATTACHED TO POSTS. BLOCKOUT FASTENED TO POST WITH STANDARD POST BOLT.

UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-24A
SECTION	606
BRIDGE APPROACH SECTIONS - WOOD POSTS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

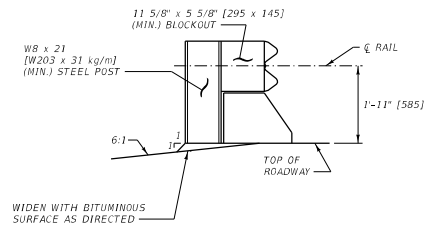


ELEVATION



PLAN

DETAIL "A"



SECTION A-A

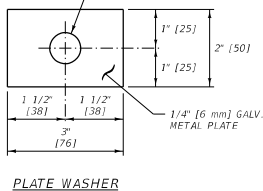
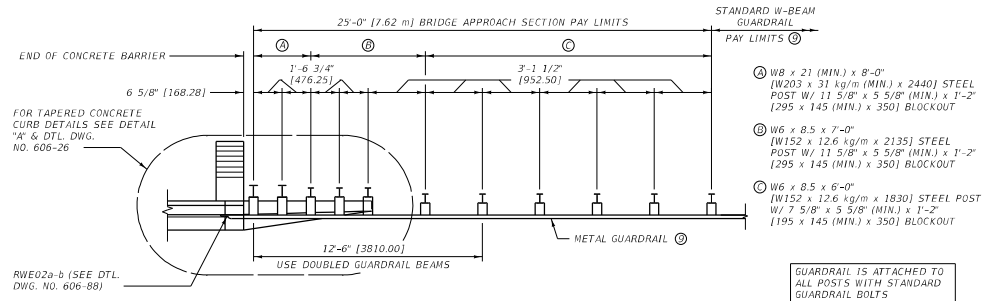
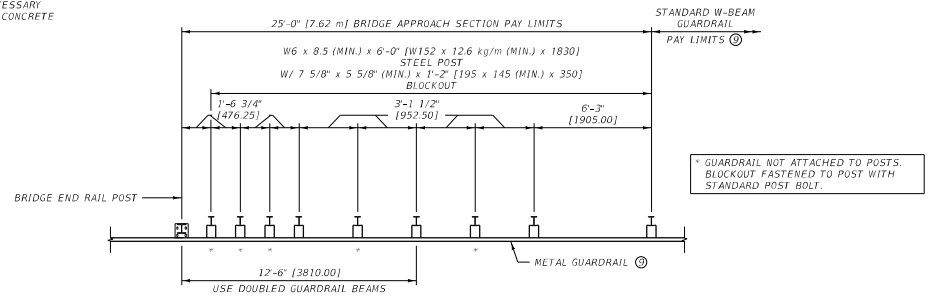


PLATE WASHER

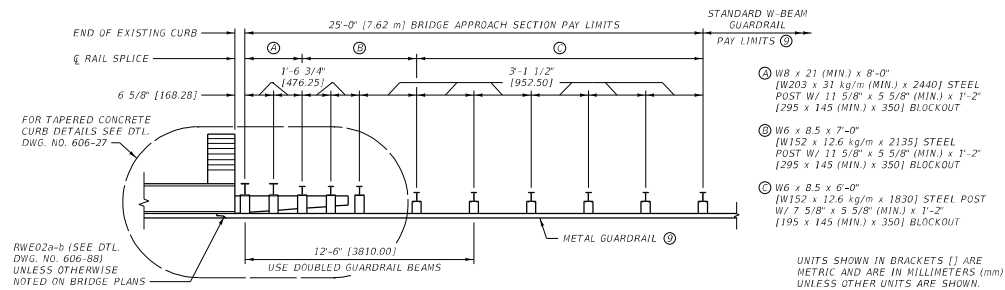
- NOTES:
- ① TAPERED CONCRETE CURBS:  
TYPE 1, SEE DTL. DWG. NO. 606-26  
TYPE 3, SEE DTL. DWG. NO. 606-27
  - ② TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.
  - ③ PORTIONS OF GUARDRAIL & BLOCKOUTS ARE OMITTED FOR CLARITY.
  - ④ LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE. (SEE DTL. DWG. NO. 606-05B).
  - ⑤ LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
  - ⑥ USE ROUTED WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.
  - ⑦ DO NOT FLARE BRIDGE APPROACH SECTIONS.
  - ⑧ SEE DTL. DWG. NO. 606-25B FOR SKEWED BRIDGES.
  - ⑨ SEE DTL. DWG. NO. 606-05B FOR METAL GUARDRAIL (W-BEAM).
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1  
(FOR BRIDGES USING CONCRETE BARRIER RAIL)



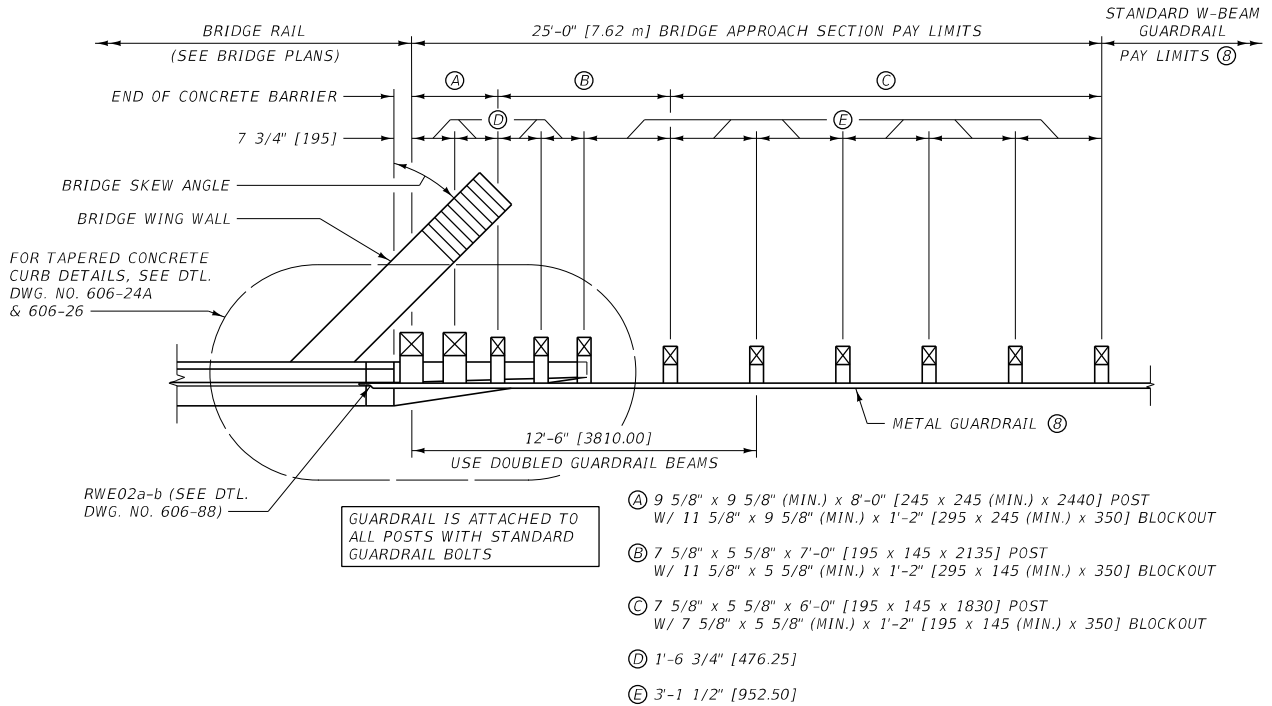
METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 2  
(FOR BRIDGES WITHOUT CURBS)



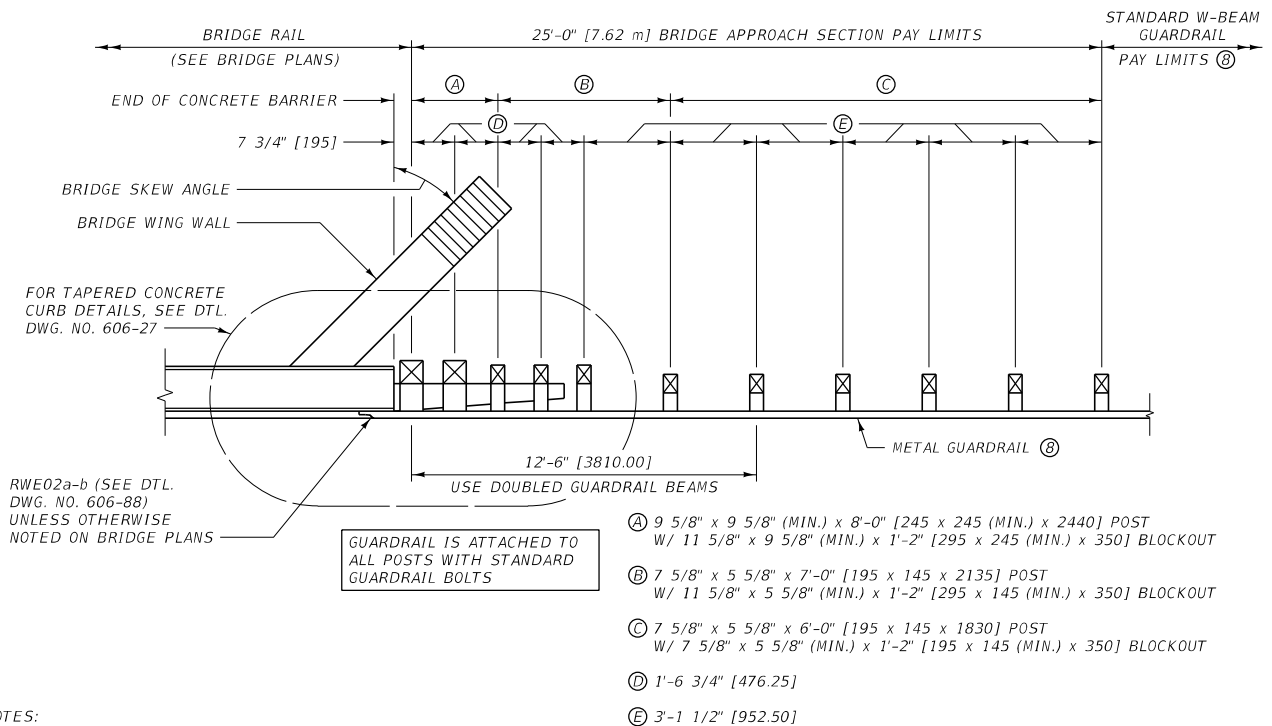
METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3  
(FOR BRIDGES WITH EXISTING CONCRETE CURBS)

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-24B
SECTION	606
BRIDGE APPROACH SECTIONS - STEEL POSTS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



**METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1**  
(FOR SKEWED BRIDGES USING CONCRETE BARRIER RAIL)



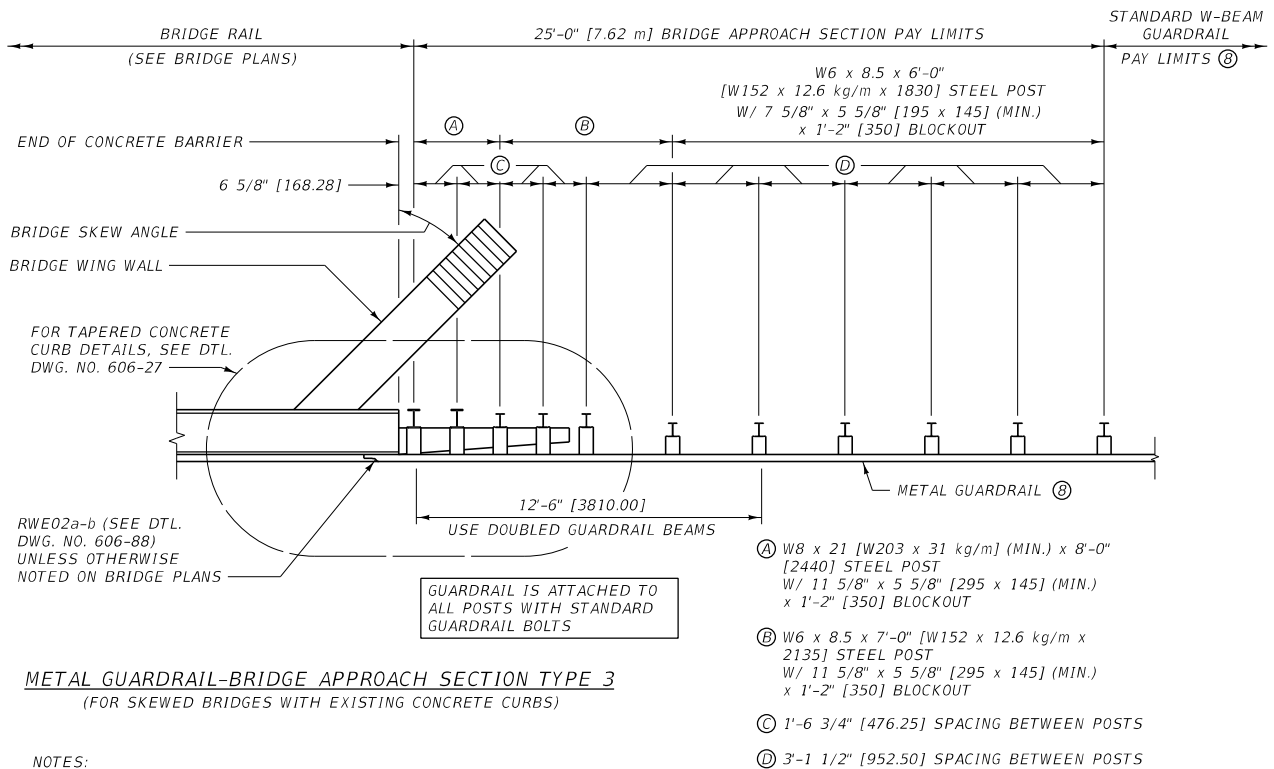
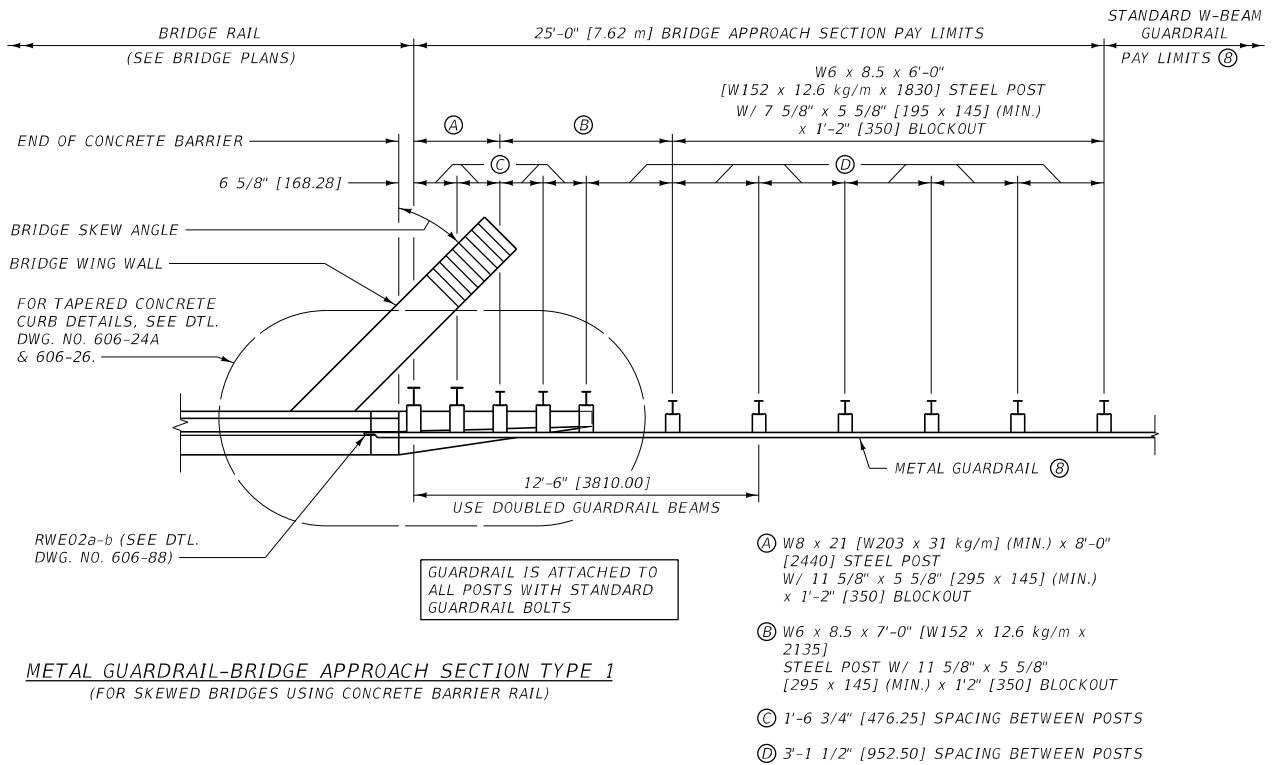
**METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3**  
(FOR SKEWED BRIDGES WITH EXISTING CONCRETE CURBS)

NOTES:

- ① TAPERED CONCRETE CURBS:  
TYPE 1, SEE DTL. DWG. NO. 606-26  
TYPE 3, SEE DTL. DWG. NO. 606-27
- ② TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.
- ③ LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE. (SEE DTL. DWG. NO. 606-05A).
- ④ LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
- ⑤ USE WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.
- ⑥ DO NOT FLARE BRIDGE APPROACH SECTIONS.
- ⑦ SEE DTL. DWG. NO. 606-24A FOR ADDITIONAL INFORMATION.
- ⑧ SEE DTL. DWG. NO. 606-05A FOR METAL GUARDRAIL (W-BEAM).

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-25A
SKEWED BRIDGE APPROACH SECTIONS - WOOD POSTS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

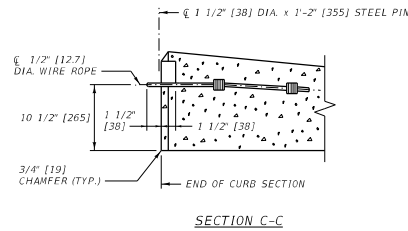
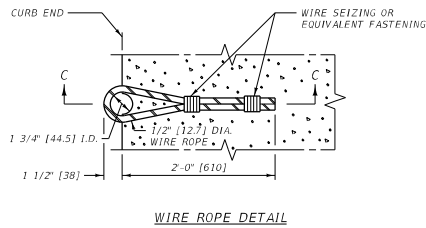
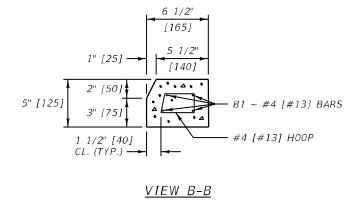
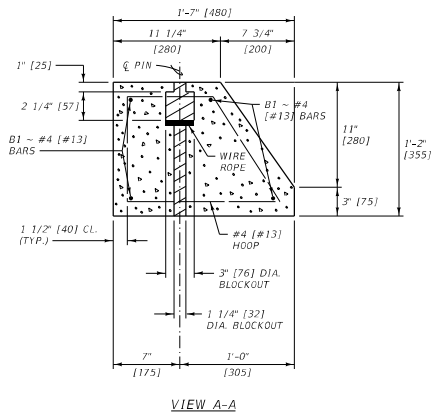
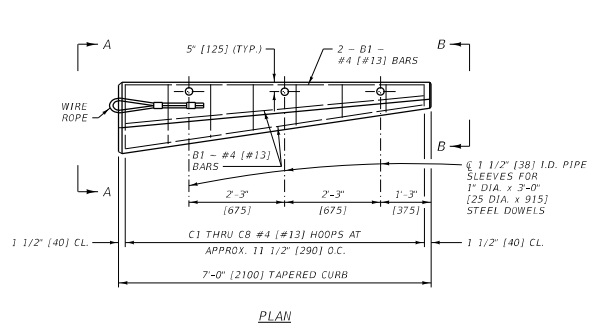


NOTES:

- ① TAPERED CONCRETE CURBS:  
TYPE 1, SEE DTL. DWG. NO. 606-26  
TYPE 3, SEE DTL. DWG. NO. 606-27
- ② TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.
- ③ LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE. (SEE DTL. DWG. NO. 606-05B).
- ④ LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
- ⑤ USE WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.
- ⑥ DO NOT FLARE BRIDGE APPROACH SECTIONS.
- ⑦ SEE DTL. DWG. NO. 606-24B FOR ADDITIONAL INFORMATION.
- ⑧ SEE DTL. DWG. NO. 606-05B FOR METAL GUARDRAIL (W-BEAM).

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-25B
SECTION 606	
SKEWED BRIDGE APPROACH SECTIONS - STEEL POSTS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



- NOTES:
- ① TAPERED CONCRETE CURB IS USED WITH BRIDGE APPROACH SECTION TYPE 1 (SEE DTL. DWG. NO. 606-24A AND 606-24B).
  - ② FURNISH WIRE ROPE MEETING SECTION 705.
  - ③ FURNISH GRADE 60 (420) REINFORCING STEEL MEETING SECTION 711.
  - ④ ALL CONCRETE IS CLASS GENERAL.  
TOTAL CONCRETE PER 7' (2100 mm) TAPERED CURB EST. = 0.2 CY (10.17 m<sup>3</sup>)  
TOTAL REBAR WEIGHT PER 7' (2100 mm) TAPERED CURB EST. = 34 LB (15.1 kg).

**BILL OF REINFORCING STEEL (ONE SECTION ONLY)**

TYPE 1

BENT BARS (ALL DIMENSIONS ARE OUT TO OUT)

MARK	SIZE	NO.	TYPE	LENGTH	A	B	C	D	E
C1	#4	1	1	4'-8"	11"	7'-4"	1'-1"	9"	3 1/2"
C2				4'-2"	9 1/2"	1'-2"	11 1/2"	8"	
C3				3'-9"	8 1/2"	1'-1/2"	10"	7"	
C4				3'-3"	7"	10 1/2"	8"	6 1/2"	
C5				2'-11"	6"	9"	7"	6"	
C6				2'-4"	4"	7"	5"	5"	
C7				2'-0"	3 1/2"	5 1/2"	3 1/2"	4 1/2"	3 1/2"
C8		1	1	1'-6"	2"	3 1/2"	2"	3 1/2"	1 1/2"
B1	#4	4	STRAIGHT	6'-9"	-	-	-	-	-

**METRIC BILL OF REINFORCING STEEL (ONE SECTION ONLY)**

TYPE 1

BENT BARS (ALL DIMENSIONS ARE OUT TO OUT IN mm)

MARK	SIZE	NO.	TYPE	LENGTH	A	B	C	D	E
C1	#13	1	1	1360	270	395	330	205	80
C2				1225	240	350	290	185	
C3				1090	205	310	255	160	
C4				955	175	265	215	140	
C5				820	145	220	175	120	
C6				695	115	180	140	100	
C7				555	80	135	100	80	80
C8		1	1	415	50	90	60	55	40
B1	#13	4	STRAIGHT	2020	-	-	-	-	-

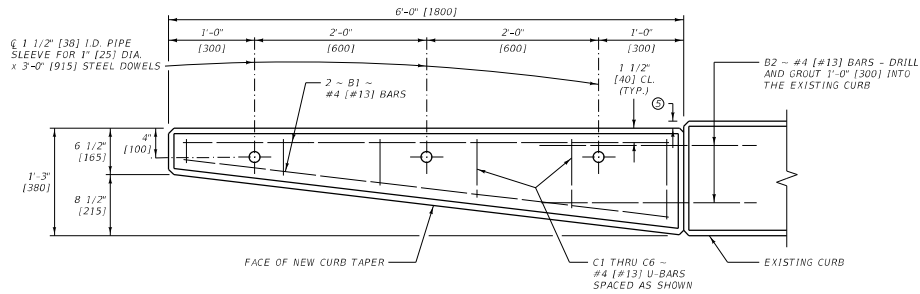
UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

**DETAILED DRAWING**

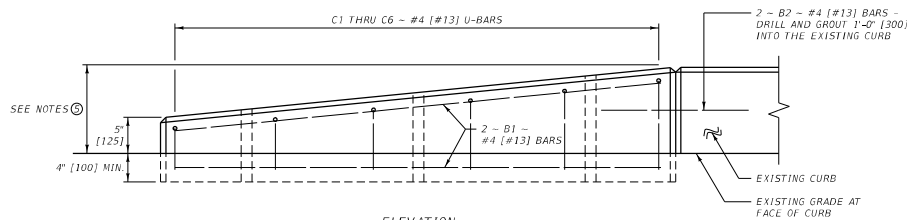
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-26
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TAPERED CONCRETE CURB DETAIL

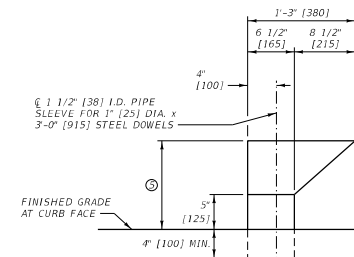




PLAN



ELEVATION



END VIEW

NOTES:

- ① REMOVE THE EXISTING SURFACE UNDER THE NEW TAPERED CONCRETE CURB AS APPROVED BY THE PROJECT MANAGER. EMBED THE TAPERED CONCRETE CURB A MINIMUM OF 4" [100] BELOW THE GRADE MEASURED AT THE INSIDE FACE OF THE TAPER.
- ② FURNISH GRADE 60 [420] REINFORCING STEEL MEETING SECTION 555 AND 711.
- ③ ALL CONCRETE IS CLASS GENERAL.  
TOTAL CONCRETE PER 6' [1800] TAPERED CURB EST. = 0.2 C.Y. [0.16 m<sup>3</sup>]  
TOTAL REBAR WEIGHT PER 6' [1800] TAPERED CURB EST. = 27 LB. [11.7 kg]
- ④ TAPERED CONCRETE CURB IS USED WITH BRIDGE APPROACH SECTION TYPE 3 (SEE DTL. DWG. NO. 606-24A AND 606-24B).
- ⑤ ADJUST DIMENSION TO MATCH EXISTING CURB.

BILL OF REINFORCING STEEL (ONE SECTION ONLY)

MARK	SIZE	NO.	TYPE	LENGTH	A	B
C1	#4	1	1	1'-4"	6"	4"
C2	↑	↑	↑	1'-8"	7"	6"
C3	↑	↑	↑	1'-11"	8"	7"
C4	↑	↑	↑	2'-3"	9"	9"
C5	↑	↑	↑	2'-6"	10"	10"
C6	↑	1	1	2'-10"	11"	1'-0"
B1	↓	4	STRAIGHT	5'-8"	-	-
B2	#4	2	STRAIGHT	2'-0"	-	-

METRIC BILL OF REINFORCING STEEL (ONE SECTION ONLY)

MARK	SIZE	NO.	TYPE	LENGTH (mm)	A (mm)	B (mm)
C1	#13	1	1	390	150	90
C2	↑	↑	↑	480	175	130
C3	↑	↑	↑	570	200	170
C4	↑	↑	↑	665	225	215
C5	↑	↑	↑	755	250	255
C6	↑	1	1	845	270	295
B1	↓	4	STRAIGHT	1720	-	-
B2	#13	2	STRAIGHT	600	-	-

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

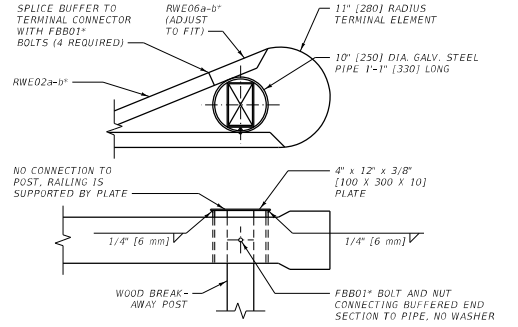
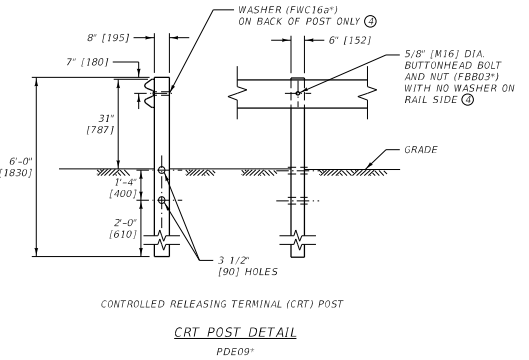
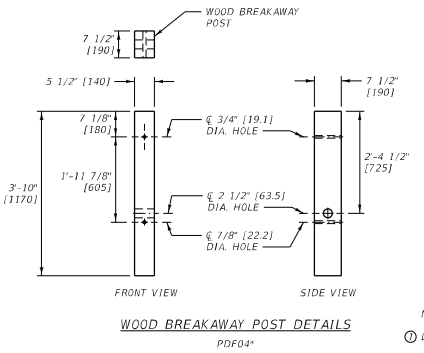
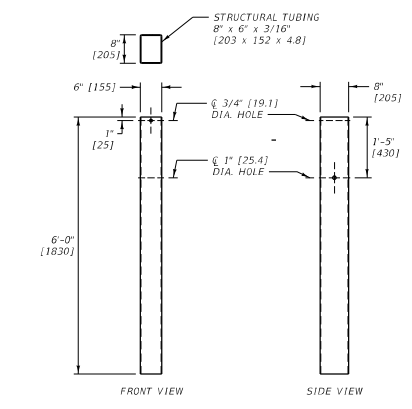
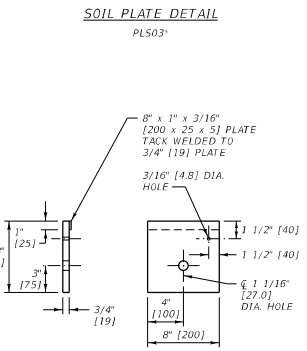
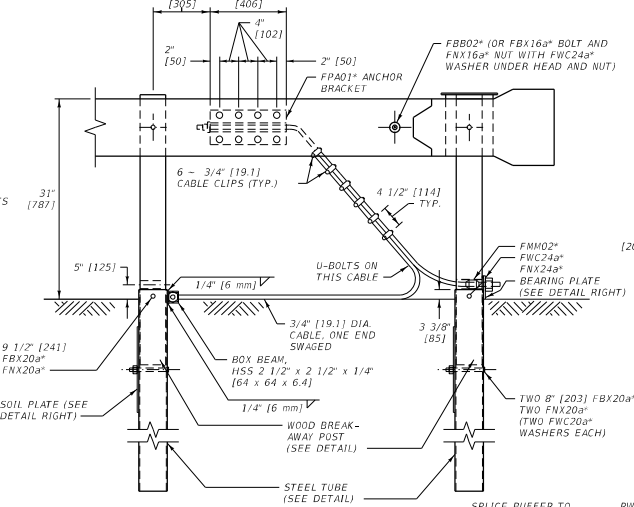
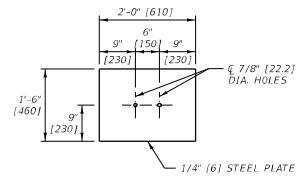
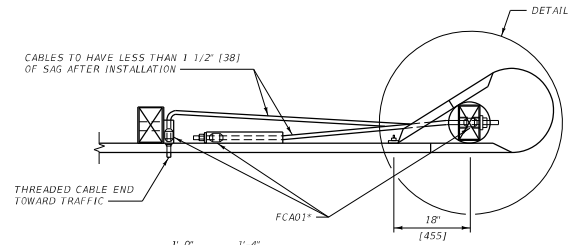
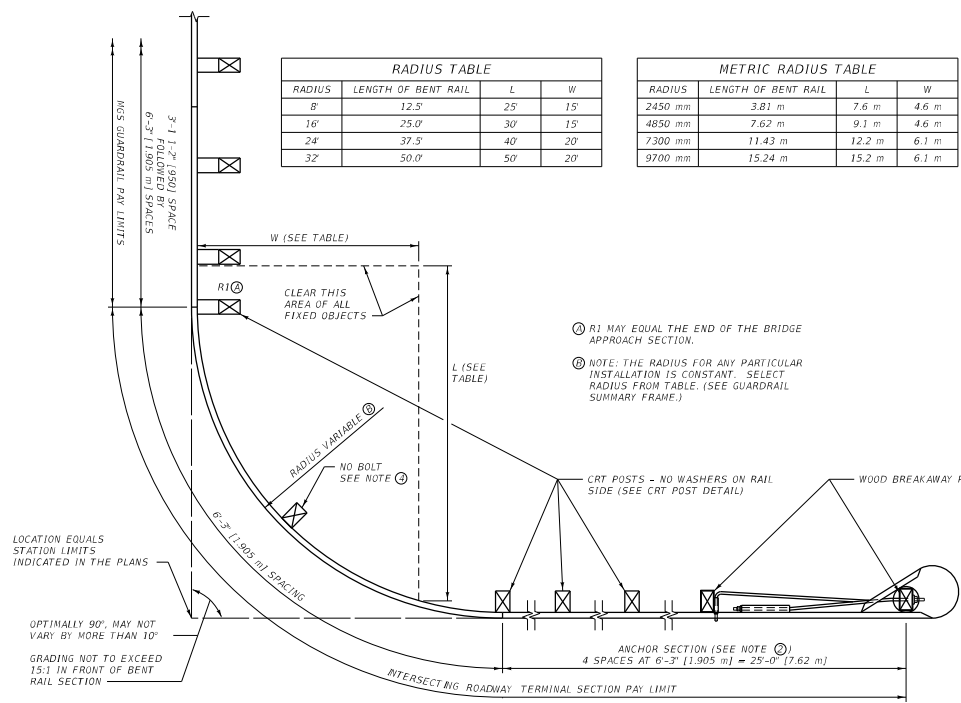
DETAILED DRAWING  
REFERENCE DWG. NO.  
STANDARD SPEC. 606-27  
SECTION 606

TAPERED CONCRETE  
CURB DETAIL

MDT MONTANA DEPARTMENT OF TRANSPORTATION

RADIUS TABLE			
RADIUS	LENGTH OF BENT RAIL	L	W
8'	12.5'	25'	15'
16'	25.0'	30'	15'
24'	37.5'	40'	20'
32'	50.0'	50'	20'

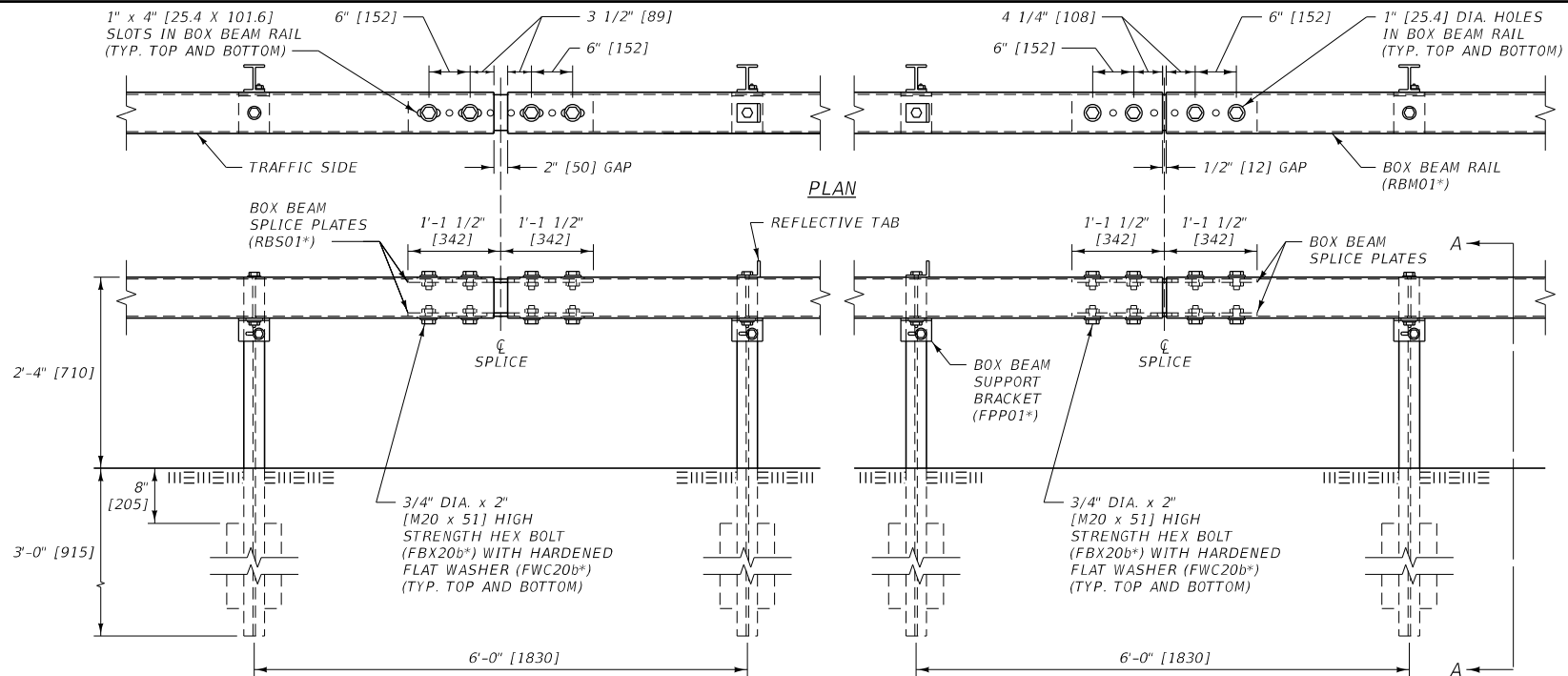
METRIC RADIUS TABLE			
RADIUS	LENGTH OF BENT RAIL	L	W
2450 mm	3.81 m	7.6 m	4.6 m
4850 mm	7.62 m	9.1 m	4.6 m
7300 mm	11.43 m	12.2 m	6.1 m
9700 mm	15.24 m	15.2 m	6.1 m



- NOTES:
- DO NOT INSTALL ON SLOPES STEEPER THAN 2:1.
  - DO NOT OMIT OR SHORTEN ANCHOR SECTION.
  - SEE DTL. DWG. NO. 606-05A FOR GUARDRAIL WIDENING REQUIREMENTS.
  - DO NOT BOLT THE RAIL TO THE CRT POST LOCATED AT THE CENTER OF THE BENT RAIL.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE SECTION 606	DWG. NO. 606-46
INTERSECTING ROADWAY TERMINAL SECTION (MGS)	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

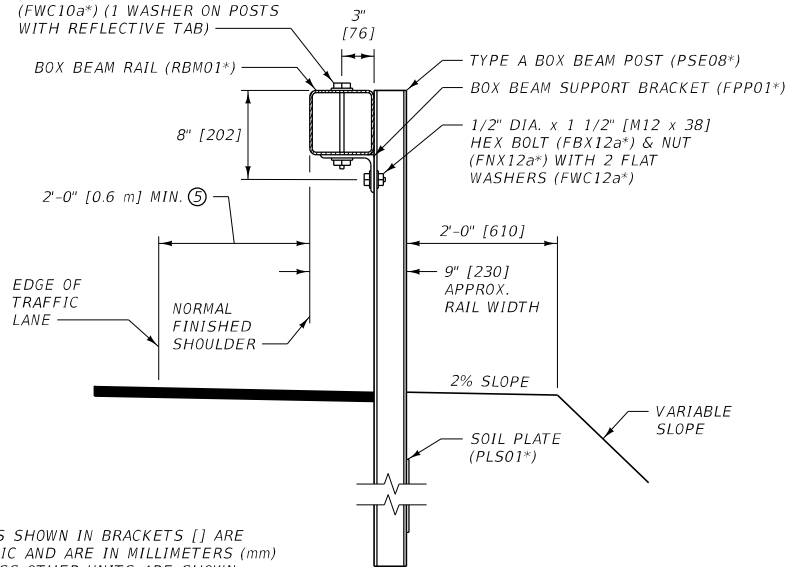


1/2" [12.7] DIA. HOLES FOR 3/8" DIA. x 7 1/2" [M10 x 191] HEX BOLT (FBX10a\*) AND NUT (FNX10a\*) WITH 2 FLAT WASHERS (FWC10a\*) (1 WASHER ON POSTS WITH REFLECTIVE TAB)

**EXPANSION JOINT**

**ELEVATION**

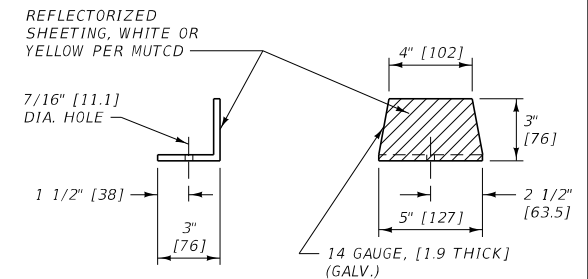
**SPLICE DETAIL**



**NOTES:**

- ① USE BOX BEAM RAIL IN MINIMUM NOMINAL LENGTHS OF 18 FT. [5.49 m] UNLESS APPROVED BY THE PROJECT MANAGER.
- ② INSTALL EXPANSION JOINTS ON ALL BOX BEAM GUARDRAIL INSTALLATIONS GREATER THAN 300 FT. [90 m] IN LENGTH AT INTERVALS NOT TO EXCEED 500 FT. [150 m].
- ③ ATTACH REFLECTIVE TABS TO EVERY FOURTH POST (24 FT. [7.32 m] TYP.). ANGLE TABS SLIGHTLY TOWARDS TRAFFIC. DO NOT USE REFLECTIVE TABS ON WY-BET TERMINALS. WY-BET TERMINALS RECEIVE REFLECTIVE CHANNELS.
- ④ DO NOT INSTALL BOX BEAM GUARDRAIL FOR OBSTACLES WITHIN 5.8' [1.8 m] OF THE FACE OF THE RAIL.
- ⑤ WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" [0.6 m] FROM THE TRAFFIC LANE.
- ⑥ PROVIDE SHOP BENT BOX BEAM RAIL FOR ROADWAY CURVATURE WITH RADII OF LESS THAN 715 FEET [218 m].

\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

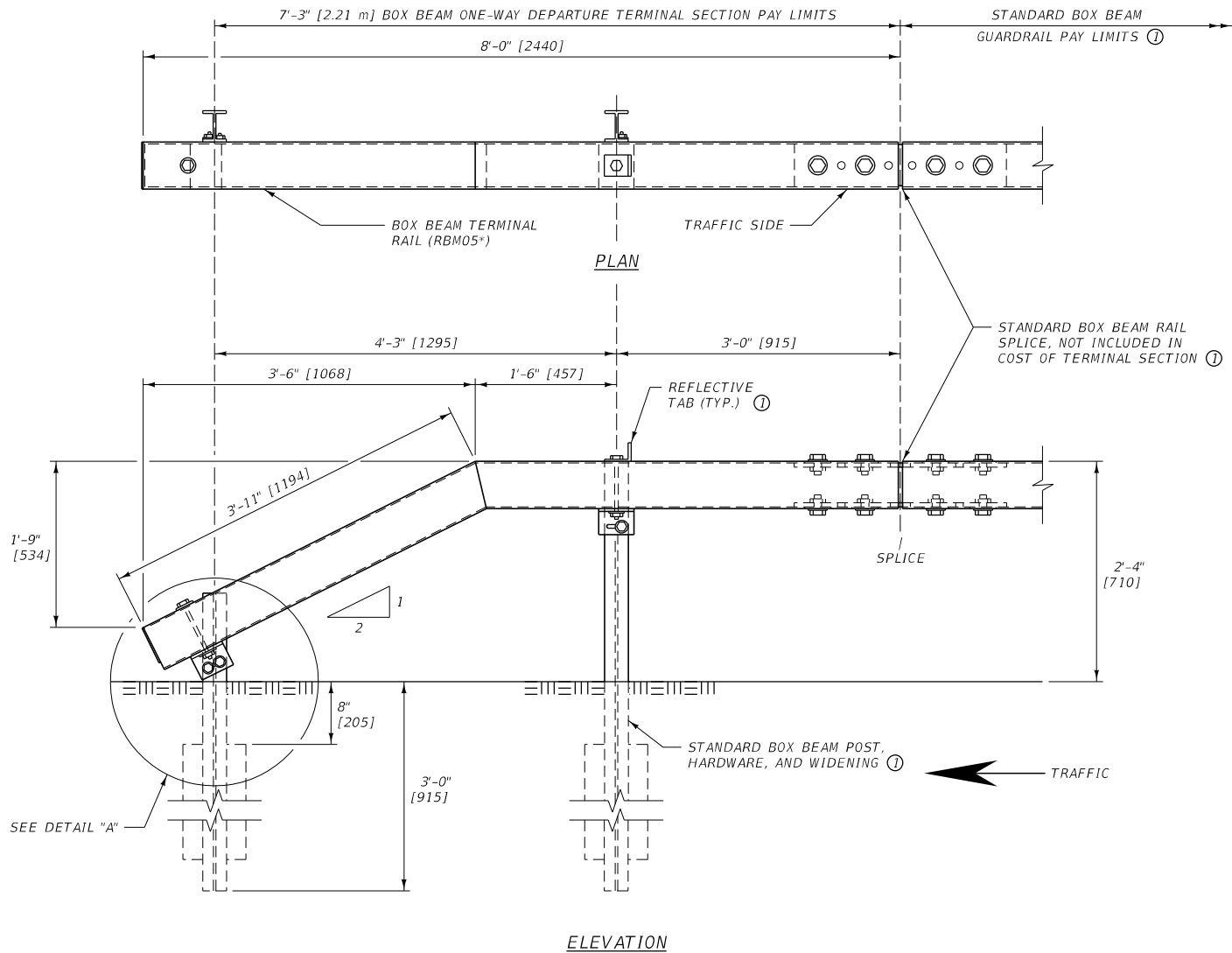


**REFLECTIVE TAB**

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

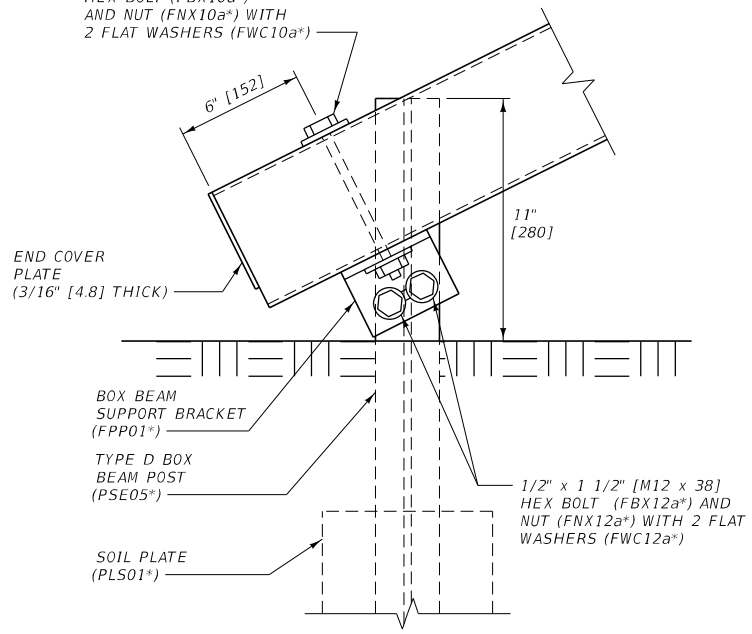
**SECTION A-A**

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-50
BOX BEAM GUARDRAIL	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



ELEVATION

1/2" [12.7] DIA. HOLES FOR  
 3/8" DIA. x 7 1/2" [M10 x 191]  
 HEX BOLT (FBX10a\*)  
 AND NUT (FNX10a\*) WITH  
 2 FLAT WASHERS (FWC10a\*)



DETAIL "A"

NOTES:

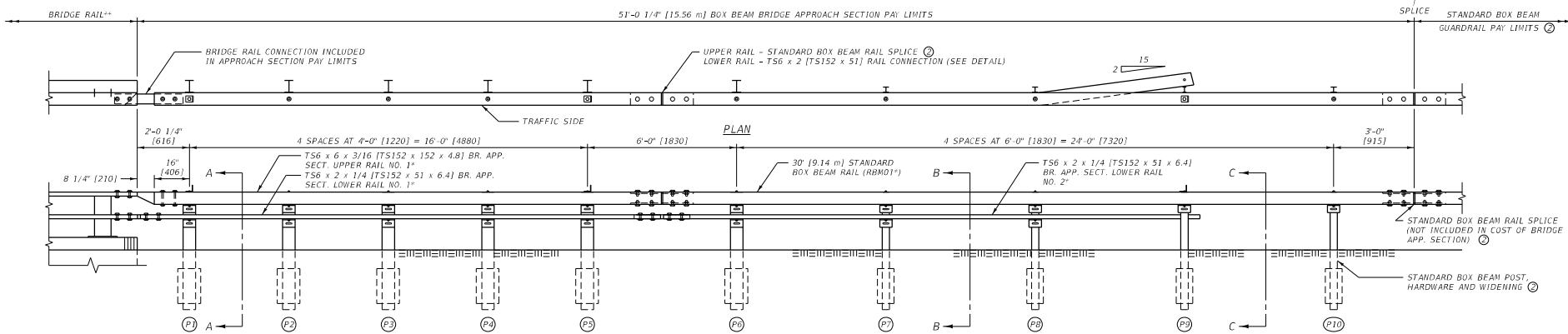
① SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.

\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

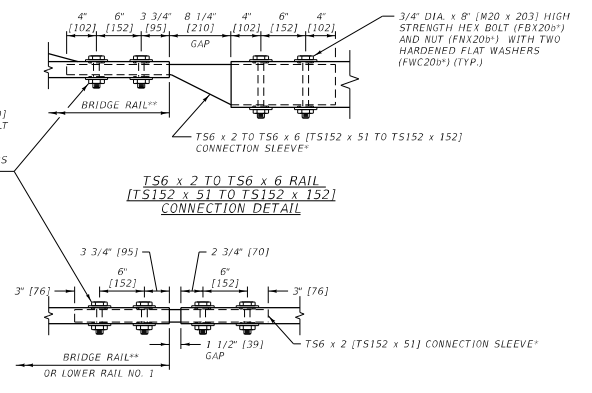
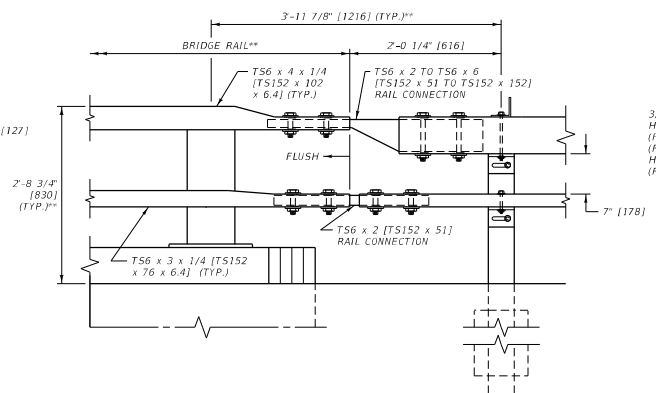
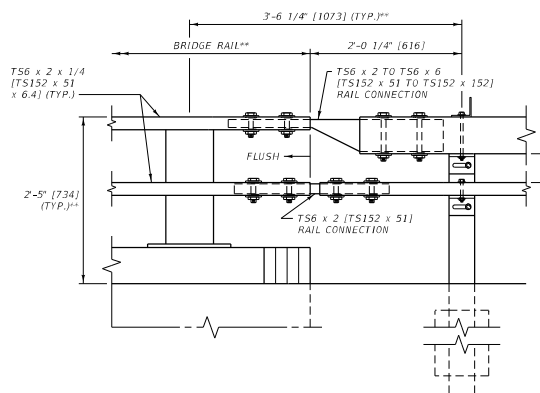
UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-52
SECTION 606	

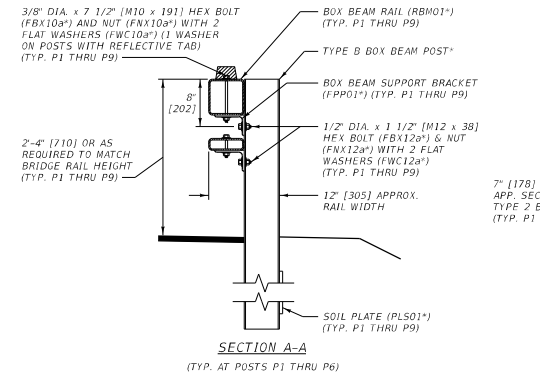
BOX BEAM ONE-WAY DEPARTURE TERMINAL SECTION



ELEVATION

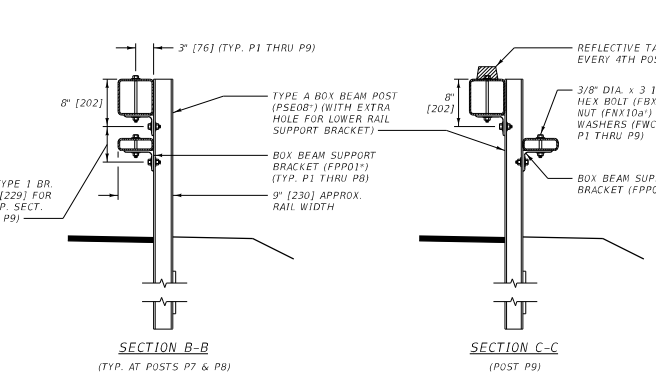


BOX BEAM - BRIDGE APPROACH SECTION TYPE 1



SECTION A-A  
(TYP. AT POSTS P1 THRU P6)

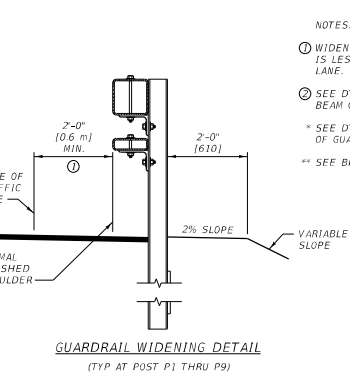
BOX BEAM - BRIDGE APPROACH SECTION TYPE 2



SECTION B-B  
(TYP. AT POSTS P7 & P8)

SECTION C-C  
(POST P9)

T56 x 2 [TS152 x 51] RAIL CONNECTION DETAIL



GUARDRAIL WIDENING DETAIL  
(TYP. AT POST P1 THRU P9)

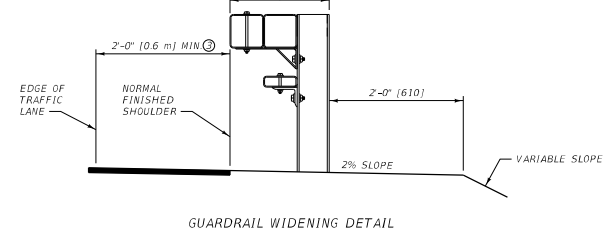
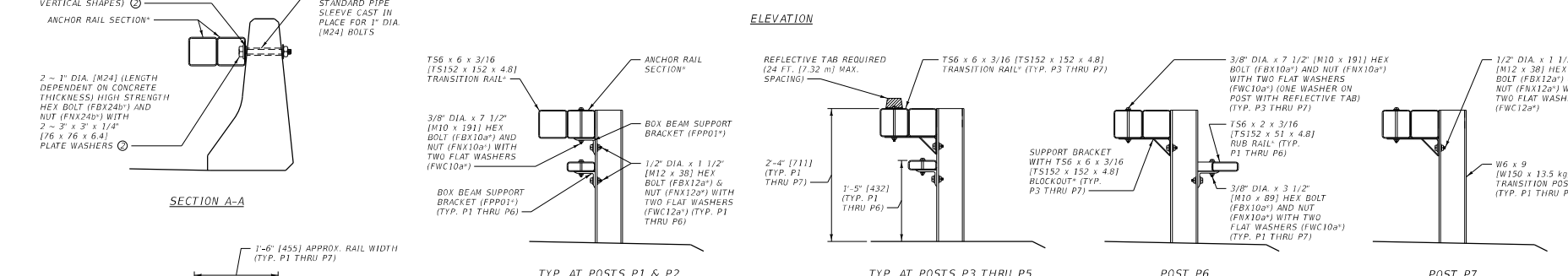
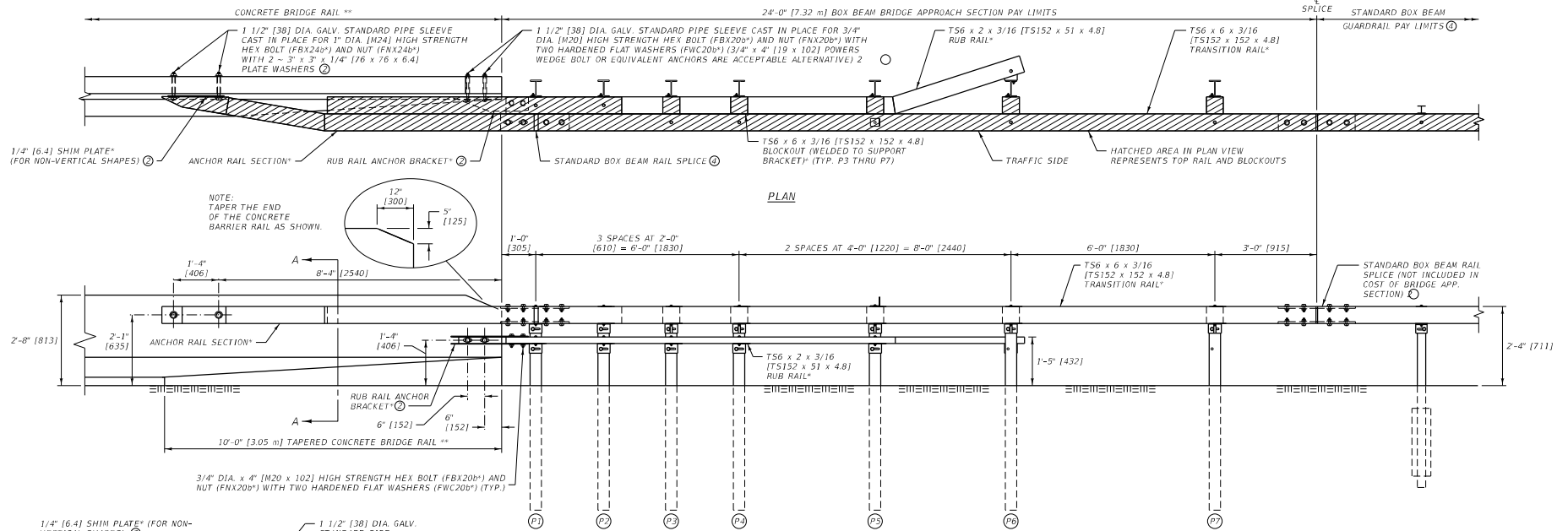
- NOTES:
- ① WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" (0.6 m) FROM THE TRAFFIC LANE.
  - ② SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.
  - \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.
  - \*\* SEE BRIDGE PLANS.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-53
SECTION 606	

BOX BEAM BRIDGE APPROACH SECTION - TYPES 1 & 2





**NOTES:**

- INCLUDE COST OF ENTIRE ANCHOR RAIL SECTION, ALONG WITH ALL HARDWARE NECESSARY FOR ATTACHMENT TO CONCRETE BRIDGE RAIL, IN COST OF BRIDGE APPROACH SECTION.
- THE LENGTHS OF CONCRETE ANCHOR BOLTS, TYPE OF RUB RAIL ANCHOR BRACKET AND THE NEED FOR THE 1/4" (6.4) SHIM PLATE IS DEPENDENT UPON THE SHAPE AND THE THICKNESS OF THE CONCRETE BRIDGE RAIL.
- WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" (0.6 m) FROM THE TRAFFIC LANE.
- SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.
- SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

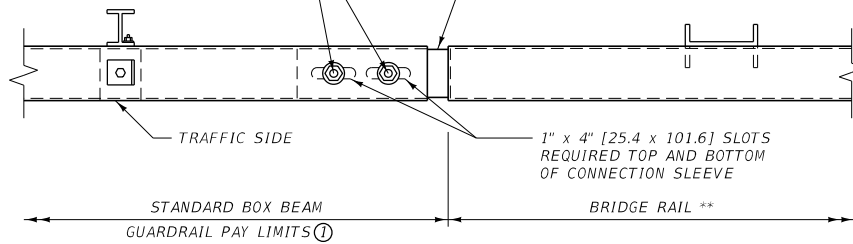
UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN

\*\* SEE BRIDGE PLANS.

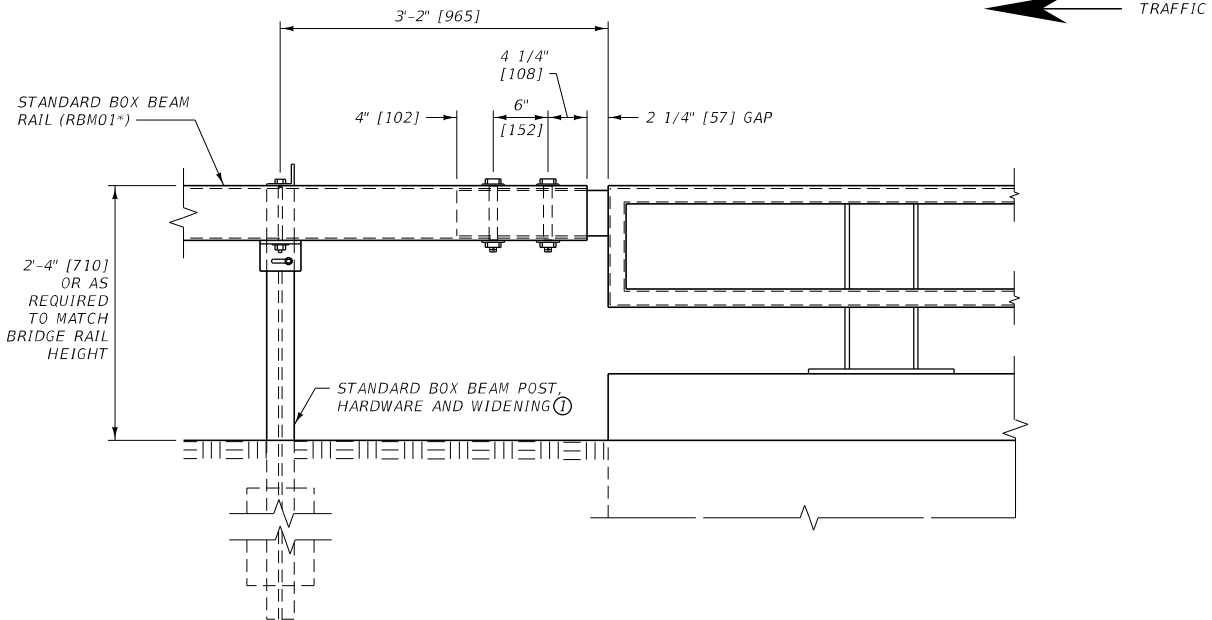
DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-53A
SECTION 606	
BOX BEAM BRIDGE APPROACH SECTION - TYPE 3	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

1" [25.4] DIA. HOLES IN BOX BEAM RAIL FOR 3/4" DIA. x 8" [M20 x 203] HIGH STRENGTH HEX BOLT (FBX20b\*) AND NUT (FNX20b\*) WITH TWO HARDENED FLAT WASHERS (FWC20b\*)

CONNECTION SLEEVE ATTACHED TO BRIDGE RAIL (TYP.)\*\* (1/4" [6.4] THICK STEEL FORM FIT TUBE TO RECEIVE T56 x 6 x 3/16 [TS152 x 152 x 4.8] BOX BEAM RAIL)



PLAN



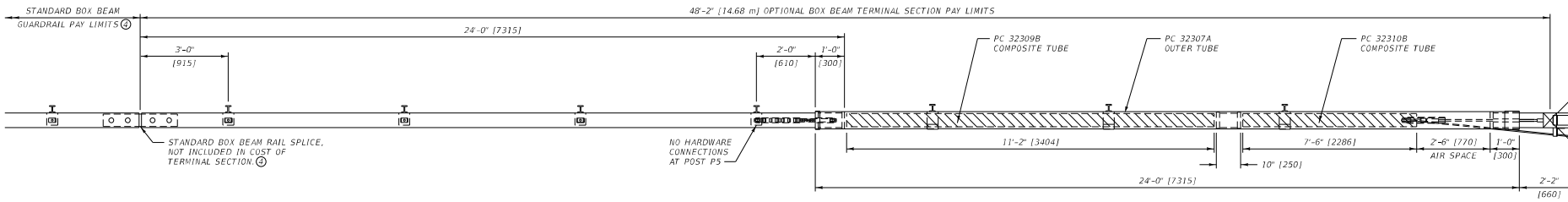
ELEVATION

NOTES:

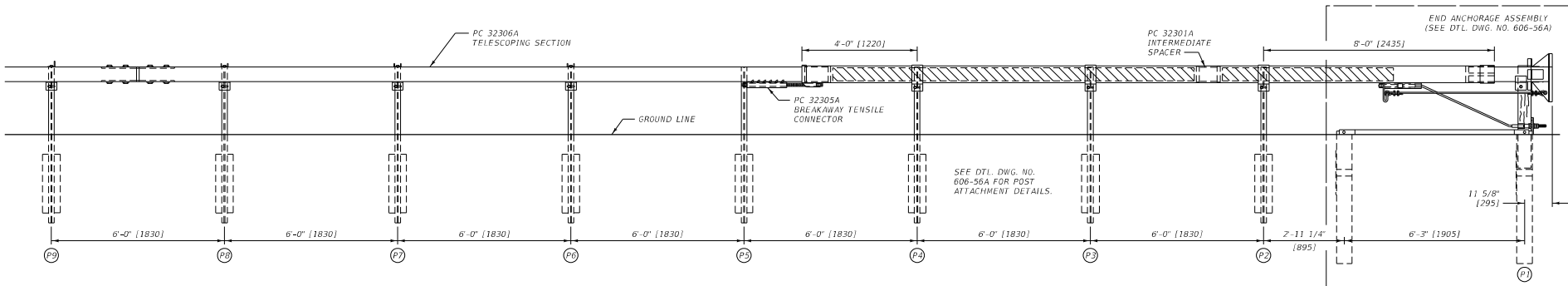
- ① SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.
- ② USE ON EXIT END OF ONE-WAY TRAFFIC BRIDGES ONLY.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.
- \*\* SEE BRIDGE PLANS FOR MORE DETAILED INFORMATION ON BRIDGE RAIL AND CONNECTION DETAILS.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

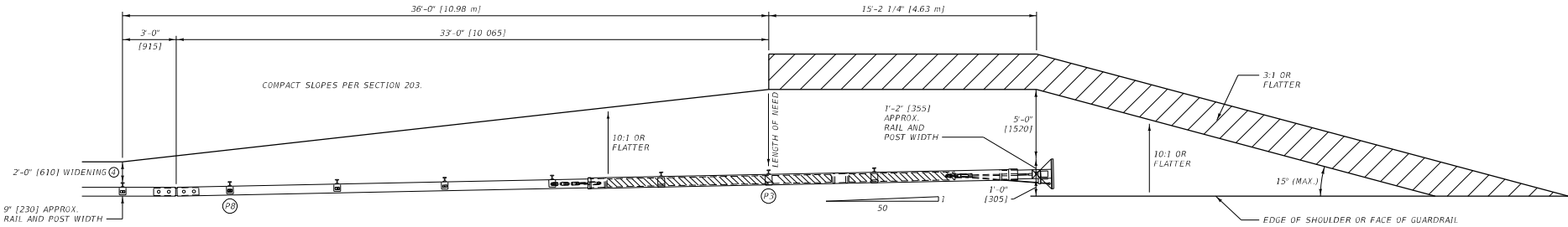
<b>DETAILED DRAWING</b>	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-54
BOX BEAM ONE-WAY BRIDGE DEPARTURE SECTION	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



PLAN



ELEVATION



GUARDRAIL WIDENING

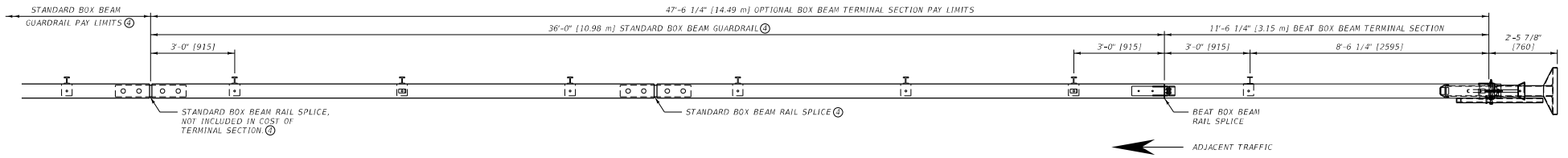
NOTES:

- ① PLACE A SELF-ADHESIVE OBJECT MARKER ON THE FACE OF THE NOSE ASSEMBLY, HAVING ALTERNATING RETRO-REFLECTIVE BLACK AND YELLOW STRIPES SLOPED DOWNWARD AT AN ANGLE OF 45° TOWARDS THE SIDE ON WHICH TRAFFIC IS TO PASS.
- ② FLARE THE END SECTION AWAY FROM TRAFFIC AT A RATE OF 50:1 FOR 50 FEET [15.24 m] (ILLUSTRATED). FLARES OF 30:1 FOR 100 FEET [30.48 m] MAY ALSO BE USED. THE FLARE MAY BE OMITTED ON ROADS WITH SHOULDERS GREATER THAN 2 FEET [0.6 m] IN WIDTH.
- ③ OBTAIN PROJECT MANAGER'S APPROVAL OF MANUFACTURER INSTALLATION OPTIONS WHEN SITE CONDITIONS PREVENT THE USE OF THE OPTION SHOWN ON THIS DETAIL.
- ④ SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.
- ⑤ USE WOOD OR OTHER NCHRP 350/MASH APPROVED BLOCKS.

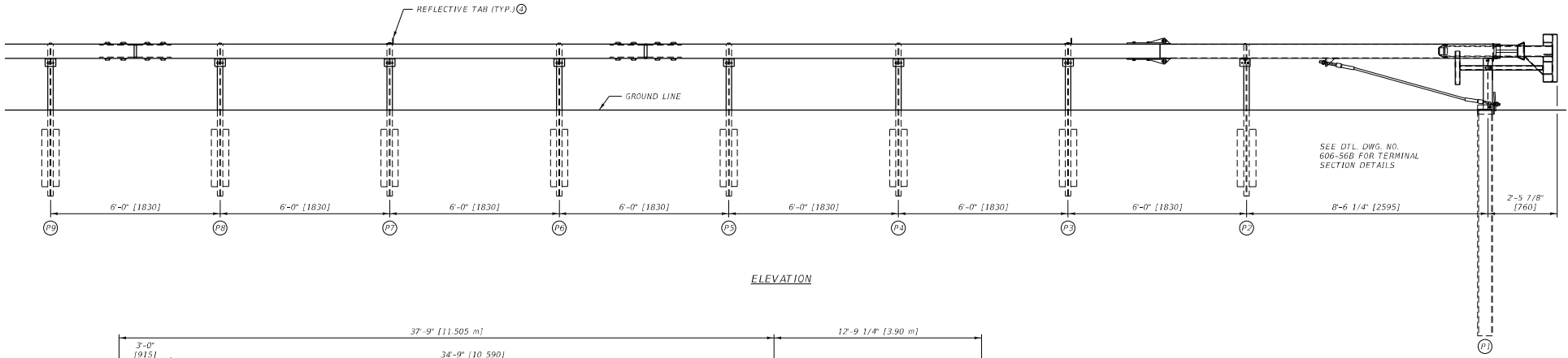
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-55A
OPTIONAL BOX BEAM TERMINAL SECTION - WY-BET	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

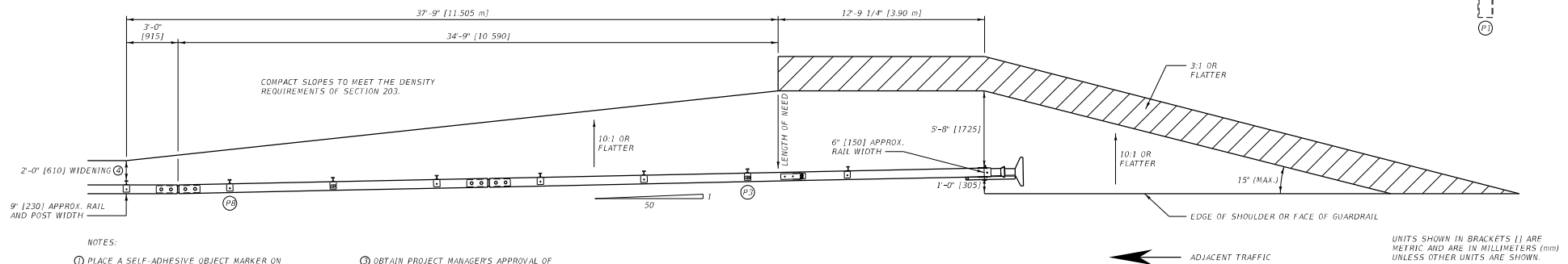




PLAN



ELEVATION

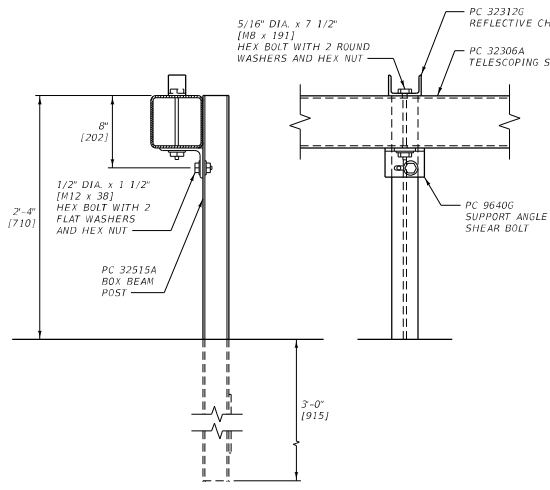


GUARDRAIL WIDENING

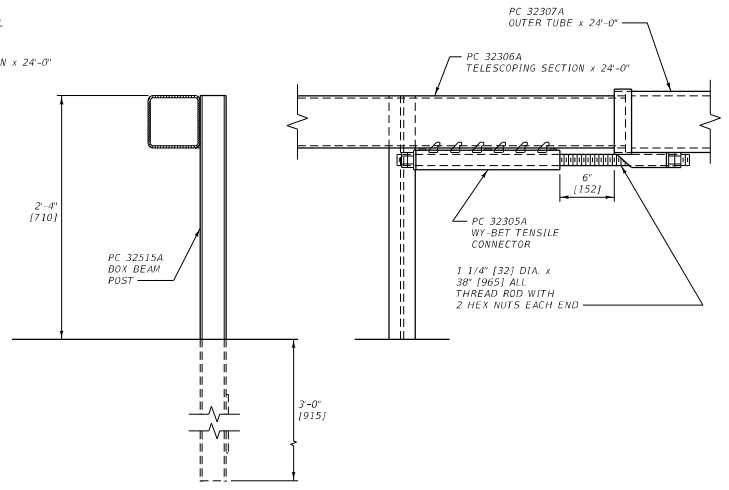
- NOTES:
- ① PLACE A SELF-ADHESIVE OBJECT MARKER ON THE FACE OF THE NOSE ASSEMBLY, HAVING ALTERNATING RETRO-REFLECTIVE BLACK AND YELLOW STRIPES SLOPED DOWNWARD AT AN ANGLE OF 45° TOWARDS THE SIDE ON WHICH TRAFFIC IS TO PASS.
  - ② FLARE THE END SECTION AWAY FROM TRAFFIC AT A RATE OF 50:1 FOR 50 FEET (15.24 m) (ILLUSTRATED). FLARES OF 50:1 FOR 100 FEET (30.48 m) MAY ALSO BE USED. THE FLARE MAY BE OMITTED ON ROADS WITH SHOULDERS GREATER THAN 2 FEET (0.6 m) IN WIDTH.
  - ③ OBTAIN PROJECT MANAGER'S APPROVAL OF MANUFACTURER INSTALLATION OPTIONS WHEN SITE CONDITIONS PREVENT THE USE OF THE OPTION SHOWN ON THIS DETAIL.
  - ④ SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.

UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

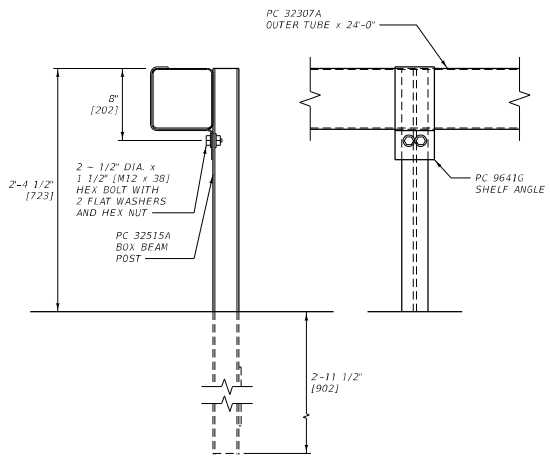
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-55B
OPTIONAL BOX BEAM TERMINAL SECTION - BEAT	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



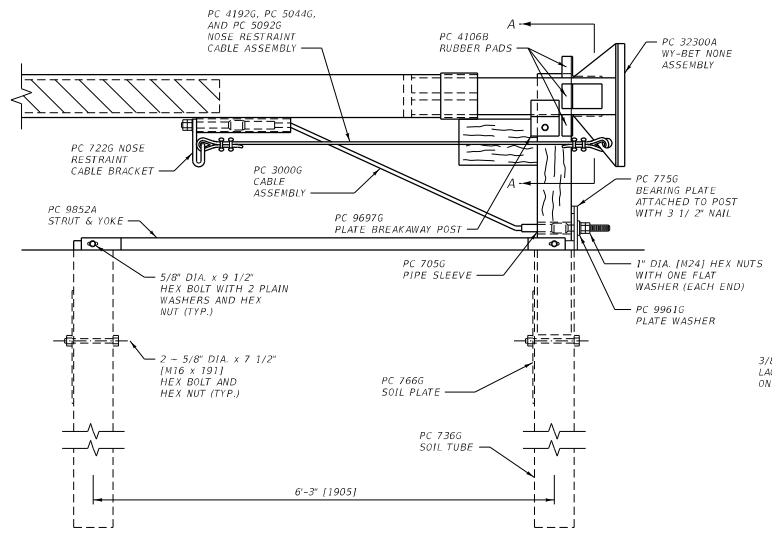
**POST ATTACHMENT DETAIL**  
(TYP. AT POSTS P6, P7 AND P8)



**POST ATTACHMENT DETAIL**  
(POST P5)

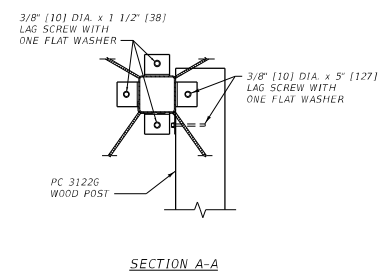


**POST ATTACHMENT DETAIL**  
(TYP. AT POSTS P2, P3 AND P4)



**END ANCHORAGE ASSEMBLY**

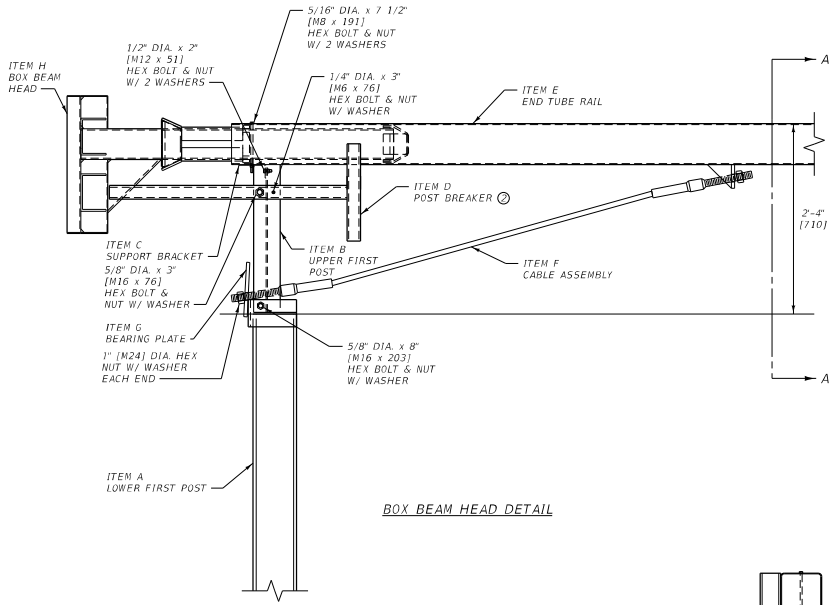
BILL OF MATERIAL			
PC	QTY	DESCRIPTION	METRIC DESCRIPTION (mm)
705G	1	PIPE SLEEVE - WOOD POST	PIPE SLEEVE - WOOD POST
722G	1	NOSE RESTRAINT CABLE BRACKET	NOSE RESTRAINT CABLE BRACKET
736G	2	SOIL TUBE	SOIL TUBE
766G	2	SOIL PLATE	SOIL PLATE
775G	1	BEARING PLATE	BEARING PLATE
3000G	1	3/4" DIA. CABLE ASSEMBLY x 6'-6"	CABLE ASSEMBLY
3042B	6	DELINEATER TAPE-AMBER 1.25" X 1.75"	DELINEATER TAPE-AMBER
3121G	1	WOOD BLOCK	WOOD BLOCK
3122G	1	WOOD POST	WOOD POST
3177G	1	ET REFLECTOR 18" x 18" YELLOW/BLACK	ET REFLECTOR
3240G	6	5/16" DIA. ROUND WASHER WIDE (F844)	M8 ROUND WASHER
3245G	3	5/16" DIA. HEX NUT (A563)	M8 HEX NUT
3254G	3	3/8" DIA. x 1 1/2" LAG SCREW (A307)	10 DIA. x 38 LAG SCREW
3255G	3	3/8" DIA. FLAT WASHER (F844)	M10 FLAT WASHER
3300G	4	5/8" PLAIN WASHER TYPE A WIDE (F844)	M10 PLAIN WASHER
3350G	6	5/8" DIA. HEX NUT (A563)	M16 HEX NUT
3478G	4	5/8" DIA. x 7 1/2" HEX BOLT (A307)	M16 x 191 HEX BOLT
3497G	2	5/8" DIA. x 9 1/2" HEX BOLT (A307)	HEX BOLT
4044G	4	1 1/4" DIA. HEX NUT (A194 2H)	32 DIA. HEX NUT
4106B	3	RUBBER PAD	RUBBER PAD
4192G	4	1/4" CABLE CLAMP	6.4 CABLE CLAMP
4300G	26	1/2" DIA. FLAT WASHER (F844)	M12 FLAT WASHER
4303G	13	1/2" DIA. HEX NUT (A563)	M12 HEX NUT
4308G	9	1/2" DIA. x 1 1/2" HEX BOLT (A307)	M12 x 38 HEX BOLT
4902G	2	1" DIA. FLAT WASHER (F436)	M24 FLAT WASHER
4903G	4	1" DIA. HEX NUT (A194 2H)	M24 HEX NUT
5044G	1	AIRCRAFT CABLE, 1/4" DIA. x 6'-10"	AIRCRAFT CABLE, 6.4 DIA. x 2080
5092G	2	1/4" AIRCRAFT CABLE THIMBLE	6.4 AIRCRAFT CABLE THIMBLE
5107G	1	ROD, ALL THREAD 1 1/4" DIA. x 38"	ROD
5188G	3	5/16" DIA. x 7 1/2" HEX BOLT (A307)	M8 x 191 HEX BOLT
5299G	4	1/2" DIA. x 9 1/2" HEX BOLT (A307)	HEX BOLT
5968C	2	NAIL 16d (3 1/2")	NAIL
6260G	1	COMPRESSION SPRING	COMPRESSION SPRING
9640G	3	SUPPORT ANGLE SHEAR BOLT	SUPPORT ANGLE SHEAR BOLT
9641G	3	SHELF ANGLE	SHELF ANGLE
9697G	2	PLATE BREAKAWAY POST	PLATE BREAKAWAY POST
9852A	1	STRUT AND YOKE ASSEMBLY	STRUT AND YOKE ASSEMBLY
9961G	1	PLATE WASHER (A36)	PLATE WASHER
32300A	1	WY-BET NOSE ASSEMBLY	WY-BET NOSE ASSEMBLY
32301A	1	INTERMEDIATE SPACER x 10"	INTERMEDIATE SPACER
32305A	1	WY-BET TENSILE CONNECTOR	WY-BET TENSILE CONNECTOR
32306A	1	TELESCOPING SECTION x 24'-0"	TELESCOPING SECTION
32307A	1	OUTER TUBE x 24'-0"	OUTER TUBE
32309B	1	COMPOSITE TUBE x 11'-2" WITH CAP	COMPOSITE TUBE
32310B	1	COMPOSITE TUBE x 7'-6" WITH CAP	COMPOSITE TUBE
32312G	3	REFLECTOR CHANNEL	REFLECTOR CHANNEL
32515A	7	BOX BEAM POST	BOX BEAM POST



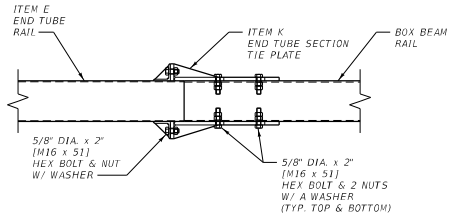
**SECTION A-A**

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

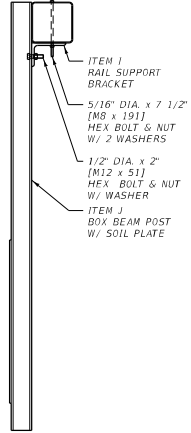
DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-56A
SECTION 606	
WY-BET BOX BEAM TERMINAL SECTION DETAILS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



BOX BEAM HEAD DETAIL



FIRST RAIL TIE DETAIL



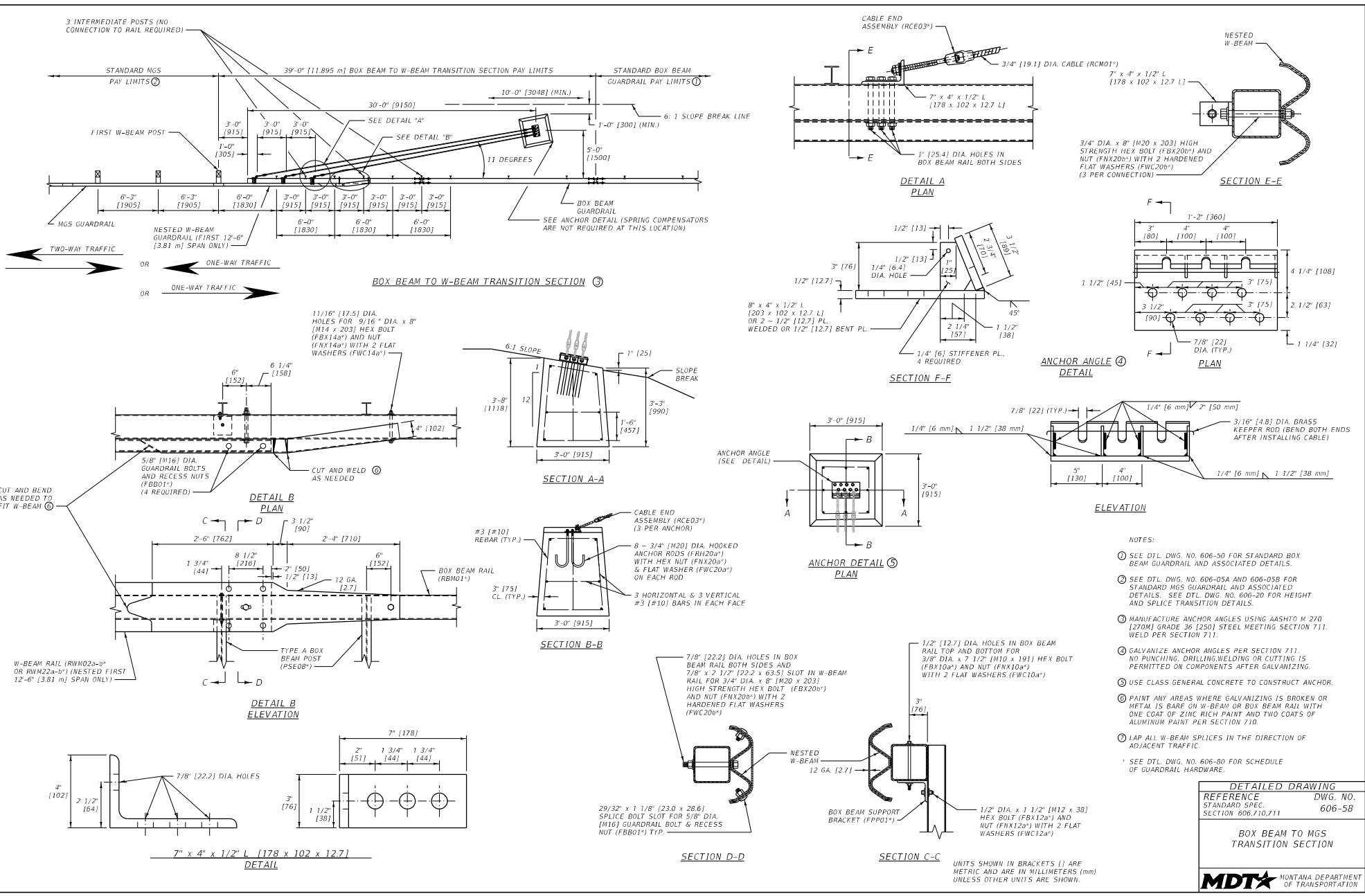
SECTION "A-A"

BILL OF MATERIAL			
ITEM	QTY	DESCRIPTION	METRIC DESCRIPTION
A	1	LOWER FIRST POST, W6x15, 8'-0" LG.	LOWER FIRST POST, W152 x 22.3 kg/m, 2440 LG.
B	1	UPPER FIRST POST, W6x9, 1'-9 1/2" LG.	UPPER FIRST POST, W152 x 13.4 kg/m, 546 LG.
C	1	SUPPORT BRACKET, 10 GAUGE BENT PLATE	SUPPORT BRACKET, 10 GA. (3.5 THK.) BENT PLATE
D	1	POST BREAKER	POST BREAKER
E	1	END TUBE RAIL, TS 6" x 6" x 1/8" x 12'-0"	END TUBE RAIL, TS 152 x 152 x 3.2 x 3660
F	1	CABLE ASSEMBLY	CABLE ASSEMBLY
G	1	BEARING PLATE	BEARING PLATE
H	1	BOX BEAM HEAD	BOX BEAM HEAD
I	1	RAIL SUPPORT BRACKET, L 5' x 3 1/2" x 3/8" x 4 1/2"	RAIL SUPPORT BRACKET, L 127 x 89 x 9.5 x 115
J	1	BOX BEAM POST W/ SOIL PLATE	BOX BEAM POST W/ SOIL PLATE
K	2	END TUBE SECTION TIE PLATE	END TUBE SECTION TIE PLATE
a	2	5/16" DIA. x 7 1/2" HEX BOLT (GRADE 5)	M8 x 191 HEX BOLT (GRADE 5)
b	1	1/4" DIA. x 3" HEX BOLT (GRADE 2)	M6 x 76 HEX BOLT (GRADE 2)
c	2	1/2" DIA. x 2" HEX BOLT (GRADE 2)	M12 x 51 HEX BOLT (GRADE 2)
d	8	5/8" DIA. x 2" HEX BOLT (GRADE 5)	M16 x 51 HEX BOLT (GRADE 5)
e	1	5/8" DIA. x 8" HEX BOLT (GRADE 5)	M16 x 203 HEX BOLT (GRADE 5)
f	1	5/8" DIA. x 3" HEX BOLT (GRADE 5)	M16 x 76 HEX BOLT (GRADE 5)
g	2	5/16" DIA. HEX NUT	M8 HEX NUT
h	1	1/4" DIA. HEX NUT	M6 HEX NUT
j	2	1/2" DIA. HEX NUT	M12 HEX NUT
k	14	5/8" DIA. HEX NUT	M16 HEX NUT
n	2	1" DIA. ANCHOR CABLE HEX NUT	M24 ANCHOR CABLE HEX NUT
p	4	5/16" DIA. WASHER	M8 WASHER
q	1	1/4" DIA. WASHER	M6 WASHER
r	3	1/2" DIA. WASHER	M12 WASHER
s	10	5/8" DIA. WASHER	M16 WASHER
u	2	1" DIA. ANCHOR CABLE WASHER	M24 ANCHOR CABLE WASHER

- NOTES:
- ① BEAT TERMINAL SECTION TO INCLUDE 36'-0" [11.09 m] OF BOX BEAM GUARDRAIL AS SHOWN ON DTL. DWG. NO. 606-55B.
  - ② PLACE POST BREAKER ON TRAFFIC SIDE OF FIRST POST.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-56B
BEAT BOX BEAM TERMINAL SECTION DETAILS	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



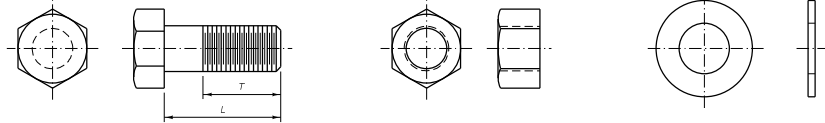
- NOTES:
- SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.
  - SEE DTL. DWG. NO. 606-05A AND 606-05B FOR STANDARD MGS GUARDRAIL AND ASSOCIATED DETAILS. SEE DTL. DWG. NO. 606-20 FOR HEIGHT AND SPLICE TRANSITION DETAILS.
  - MANUFACTURE ANCHOR ANGLES USING AASHTO M 270 (270M) GRADE 36 (250) STEEL MEETING SECTION 711. WELD PER SECTION 711.
  - GALVANIZE ANCHOR ANGLES PER SECTION 711. NO PINCHING, DRILLING, WELDING OR CUTTING IS PERMITTED ON COMPONENTS AFTER GALVANIZING.
  - USE CLASS GENERAL CONCRETE TO CONSTRUCT ANCHOR.
  - PAINT ANY AREAS WHERE GALVANIZING IS BROKEN OR METAL IS BARE ON W-BEAM OR BOX BEAM RAIL WITH ONE COAT OF ZINC RICH PAINT AND TWO COATS OF ALUMINUM PAINT PER SECTION 710.
  - LAP ALL W-BEAM SPLICES IN THE DIRECTION OF ADJACENT TRAFFIC.
  - SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-58
SECTION	606.710,711
BOX BEAM TO MGS TRANSITION SECTION	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	

UNITS SHOWN IN BRACKETS ( ) ARE METRIC AND ARE IN MILLIMETERS (MM) UNLESS OTHER UNITS ARE SHOWN.



GUARDRAIL HARDWARE



HEX BOLTS

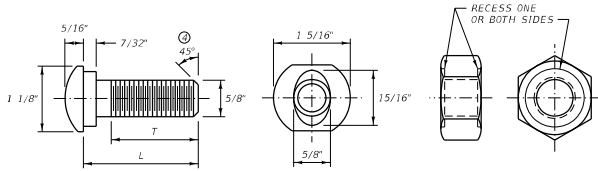
HEX NUT

FLAT WASHERS

BOLT SIZE	DESIGNATION	L	T (MIN.)
REGULAR HEX BOLTS			
3/8" DIA.	FBX10a	3 1/2"	1 1/2"
3/8" DIA.	FBX10a	7 1/2"	1 1/2"
1/2" DIA.	FBX12a	1 1/2"	FULL
1/2" DIA.	FBX12a	2 1/2"	1 3/4"
9/16" DIA.	FBX14a	8"	2"
5/8" DIA.	FBX16a	1 1/2"	FULL
3/4" DIA.	FBX20a	8"	2"
3/4" DIA.	FBX20a	9 1/2"	2"
HIGH STRENGTH HEX BOLTS			
3/4" DIA.	FBX20b	2"	1 1/2"
3/4" DIA.	FBX20b	4"	2"
3/4" DIA.	FBX20b	8"	2"
7/8" DIA.	FBX22b	1'-0"	AS REQUIRED
1" DIA.	FBX24b	AS REQUIRED	AS REQUIRED

NUT SIZE	DESIGNATION
REGULAR HEX NUTS	
3/8" DIA.	FNX10a
1/2" DIA.	FNX12a
9/16" DIA.	FNX14a
5/8" DIA.	FNX16a
3/4" DIA.	FNX20a
1" DIA.	FNX24a
HIGH STRENGTH HEX NUTS	
3/4" DIA.	FNX20b
7/8" DIA.	FNX22b
1" DIA.	FNX24b

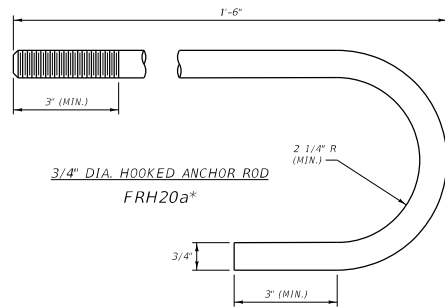
WASHER SIZE	DESIGNATION
REGULAR FLAT WASHERS	
3/8" DIA.	FWC10a
1/2" DIA.	FWC12a
9/16" DIA.	FWC14a
5/8" DIA.	FWC16a
3/4" DIA.	FWC20a
1" DIA.	FWC24a
HARDENED FLAT WASHERS	
3/4" DIA.	FWC20b



5/8" DIA. GUARDRAIL BOLT & RECESSED NUT  
FBB01-07\*

DESIGNATION	L	T (MIN.)
FBB01	1 1/4"	1 1/8"
FBB02	2"	1 3/4"
FBB03	10"	4"
FBB04	1'-6"	4"
FBB05	2'-1"	4"
FBB06	1'-2"	4 1/16"
FBB07	1'-9"	4 1/16"

3/4" DIA. SQUARE NUT  
FNS20\*



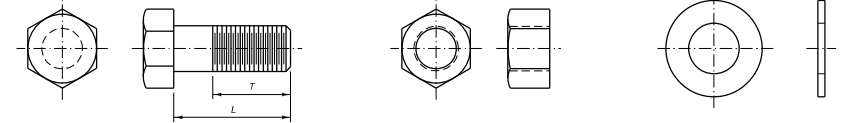
3/4" DIA. HOOKED ANCHOR ROD  
FRH20a\*

NOTES:

- ① FURNISH BOLTS AND ANCHOR RODS MEETING THE REQUIREMENTS OF SUBSECTION 705.01.1.
- ② FURNISH HIGH STRENGTH BOLTS MEETING THE REQUIREMENTS OF SUBSECTION 711.06.
- ③ GALVANIZE BOLTS, NUTS AND WASHERS IN ACCORDANCE WITH SUBSECTION 705.01.1.
- ④ 35° THREAD ANGLE FOR BOLTS FBB06-07.

\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

METRIC GUARDRAIL HARDWARE



HEX BOLTS

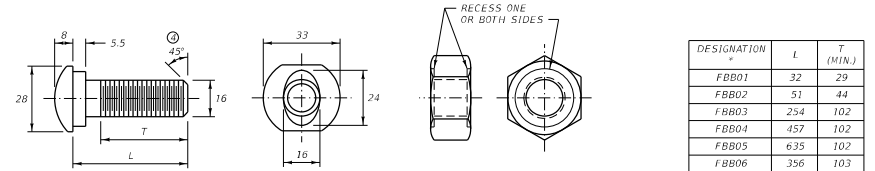
HEX NUT

FLAT WASHERS

BOLT SIZE	DESIGNATION	L	T (MIN.)
REGULAR HEX BOLTS			
M10	FBX10a	89	38
M10	FBX10a	191	38
M12	FBX12a	38	FULL
M12	FBX12a	63	44
M14	FBX14a	203	51
M16	FBX16a	38	FULL
M20	FBX20a	203	51
M20	FBX20a	241	51
HIGH STRENGTH HEX BOLTS			
M20	FBX20b	51	38
M20	FBX20b	102	51
M20	FBX20b	203	51
M22	FBX22b	305	AS REQUIRED
M24	FBX24b	AS REQUIRED	AS REQUIRED

NUT SIZE	DESIGNATION
REGULAR HEX NUTS	
M10	FNX10a
M12	FNX12a
M14	FNX14a
M16	FNX16a
M20	FWC20a
M24	FWC24a
HIGH STRENGTH HEX NUTS	
M20	FNX20b
M22	FNX22b
M24	FNX24b

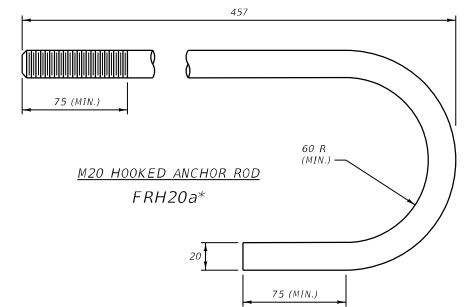
WASHER SIZE	DESIGNATION
REGULAR FLAT WASHERS	
M10	FWC10a
M12	FWC12a
M14	FWC14a
M16	FWC16a
M20	FWC20a
M24	FWC24a
HARDENED FLAT WASHERS	
M20	FWC20b



M16 GUARDRAIL BOLT & RECESSED NUT  
FBB01-07\*

DESIGNATION	L	T (MIN.)
FBB01	32	29
FBB02	51	44
FBB03	254	102
FBB04	457	102
FBB05	635	102
FBB06	356	103
FBB07	533	103

M20 SQUARE NUT  
FNS20\*



M20 HOOKED ANCHOR ROD  
FRH20a\*

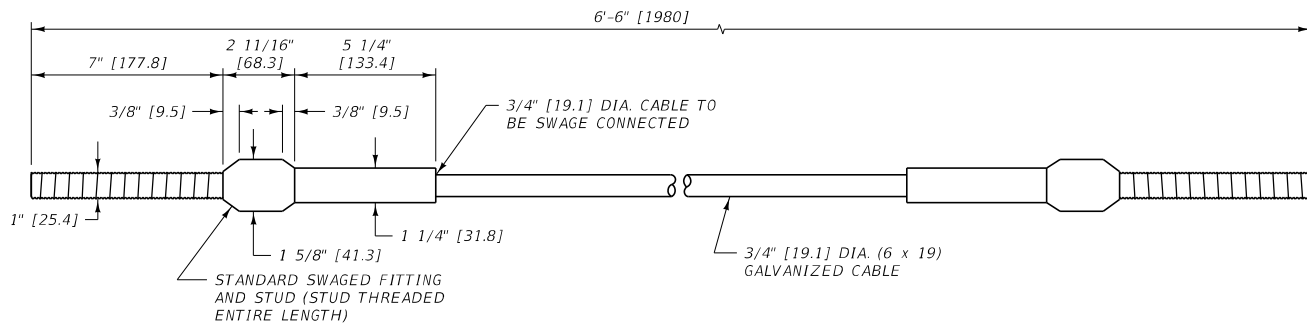
NOTES:

- ① FURNISH BOLTS AND ANCHOR RODS MEETING THE REQUIREMENTS OF SUBSECTION 705.01.1.
- ② FURNISH HIGH STRENGTH BOLTS MEETING THE REQUIREMENTS OF SUBSECTION 711.06.
- ③ GALVANIZE BOLTS, NUTS AND WASHERS IN ACCORDANCE WITH SUBSECTION 705.01.1.
- ④ 35° THREAD ANGLE FOR BOLTS FBB06-07.

\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606, 705, 711	DWG. NO. 606-82
GUARDRAIL HARDWARE	

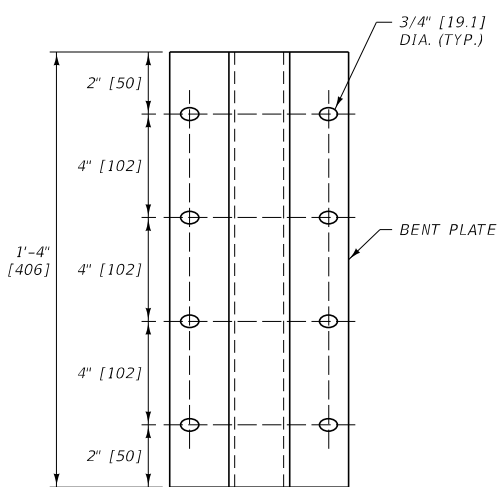


NOTES:

- ① FOR RELATED FASTENER HARDWARE SEE FWC24a\*, FNX24a\* AND FPA01\*.
- ② MACHINE THE SWAGED FITTING FROM HOT-ROLLED CARBON STEEL CONFORMING TO THE REQUIREMENTS OF ASTM A576 [A576 M], GRADE 1035, AND ANNEAL SUITABLE FOR COLD SWAGING. GALVANIZE THE SWAGED FITTING IN ACCORDANCE WITH SUBSECTION 711.08 BEFORE SWAGING. DRILL A LOCK PIN HOLE TO ACCOMMODATE A 1/4" [6.4 mm], PLATED SPRING STEEL PIN THROUGH THE HEAD OF THE SWAGED FITTING TO RETAIN THE STUD IN THE PROPER POSITION.
- ③ THE SWAGED FITTING, STUD AND NUT (FNX24a\*) MUST DEVELOP THE BREAKING STRENGTH OF THE WIRE ROPE.
- ④ WIRE ROPE IS TO CONFORM TO THE REQUIREMENTS OF AASHTO M30 [M30M] AND BE 3/4" [19.1 mm] PREFORMED, 6 x 19, WIRE STRAND CORE OR INDEPENDENT WIRE ROPE CORE (IWRC), GALVANIZED, RIGHT REGULAR LAY, MANUFACTURED OF IMPROVED PLOW STEEL WITH A MINIMUM BREAKING STRENGTH OF 42,800 POUNDS [190.4 kN].
- ⑤ THE STUD IS TO CONFORM TO THE REQUIREMENTS OF ASTM F568 [F568M] CLASS 8.8 AND BE GALVANIZED IN ACCORDANCE WITH AASHTO M232 [M232M] (ASTM A153 [153M]), PRIOR TO GALVANIZING, MILL A 3/8" [9.5 mm] SLOT INTO THE STUD END FOR THE LOCKING PIN.

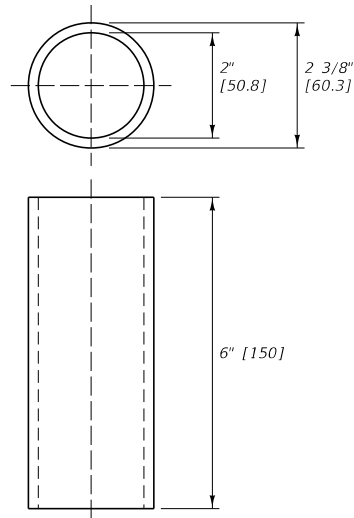
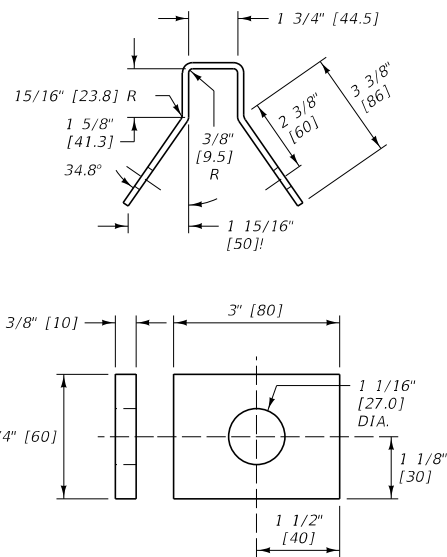
**CABLE ASSEMBLY**

FCA01\*



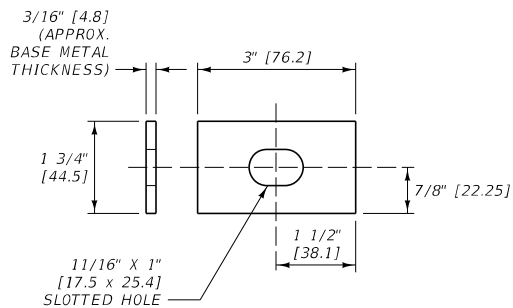
**ANCHOR BRACKET & END PLATE**

FPA01\*



**POST SLEEVE**

FMM02\*



**RECTANGULAR PLATE WASHER**

FWR03\*

NOTES:

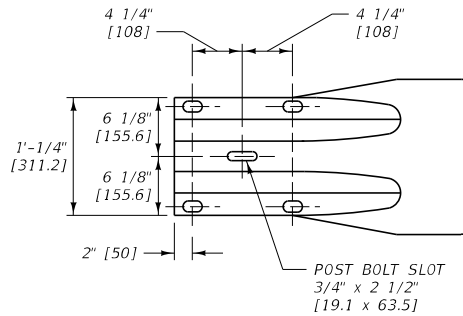
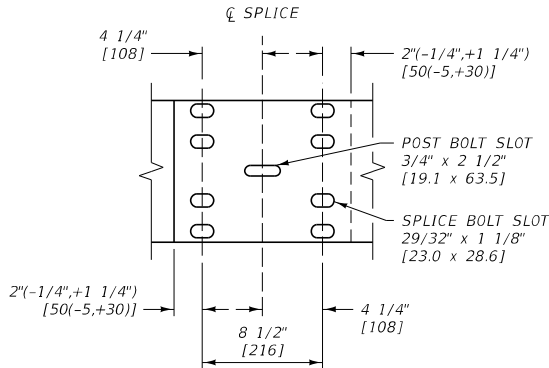
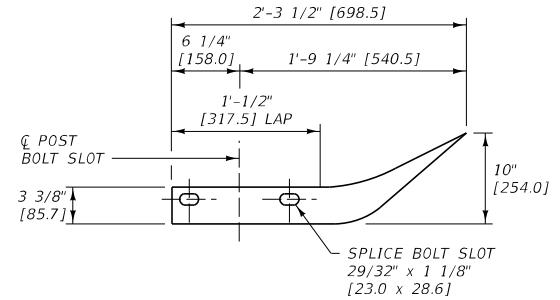
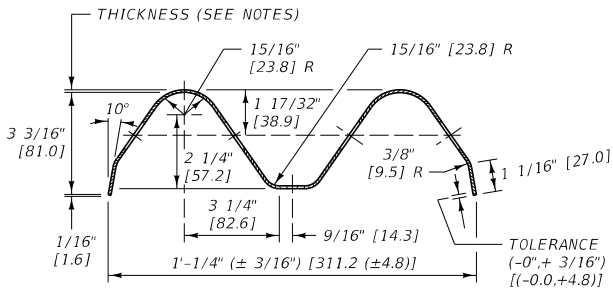
- ⑥ ANCHOR BRACKETS, END PLATES AND RECTANGULAR PLATE WASHERS ARE TO CONFORM TO THE REQUIREMENTS OF AASHTO M270 [M270M] (ASTM A709 [A709M]) GRADE 36 [250] STEEL PLATE. POST SLEEVES ARE TO CONFORM TO THE REQUIREMENTS OF ASTM A53 [A53M] GRADE B.
- ⑦ GALVANIZE FABRICATED PARTS IN ACCORDANCE WITH SUBSECTION 711.08. DO NOT PUNCH, DRILL, OR CUT AFTER GALVANIZING.

\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606, 711	DWG. NO. 606-84

W-BEAM METAL GUARDRAIL HARDWARE

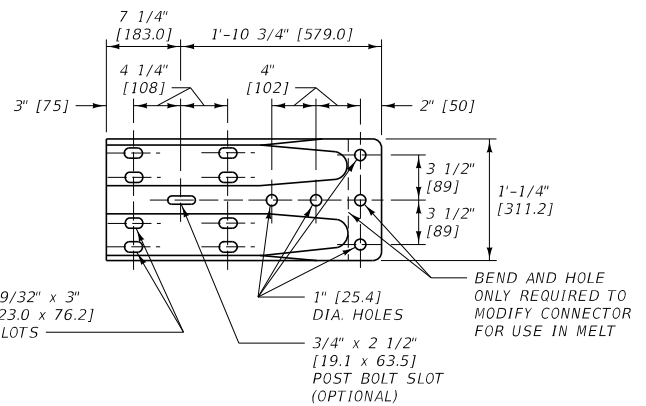
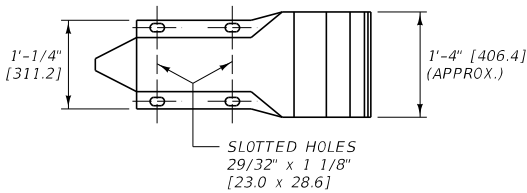
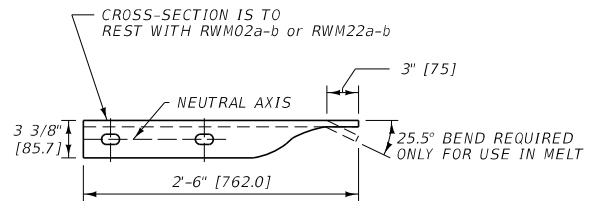
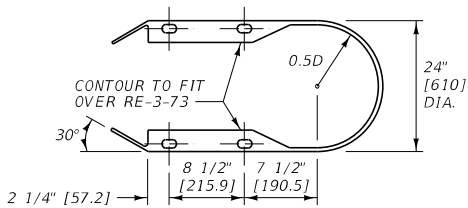


**W-BEAM**

**W-BEAM END SECTION (FLARED)**

RWM02a-b\*  
 RWM04a-b\* OR RWM22a-b\*  
 RWM08a-b\*  
 (12'-6" [3.81 m] LENGTH)

**RWE01a-b\***



**W-BEAM END SECTION (BUFFER)**

**W-BEAM TERMINAL CONNECTOR**

**RWE06a-b\***

**RWE02a-b\***

**NOTES:**

* DESTINATION SUFFIX	METAL THICKNESS
a	12 GAUGE [2.7 mm]
b	10 GAUGE [3.5 mm]

\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

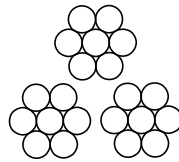
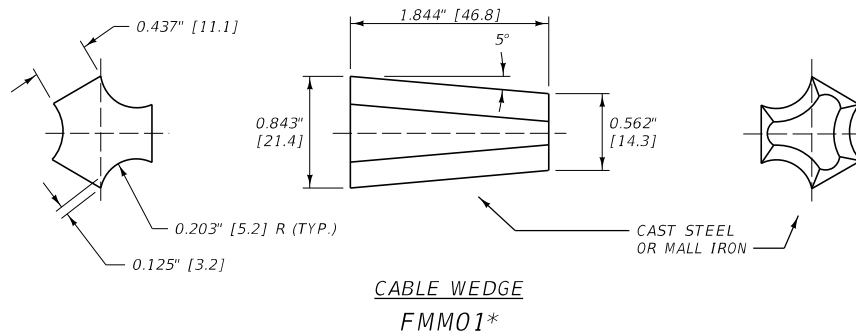
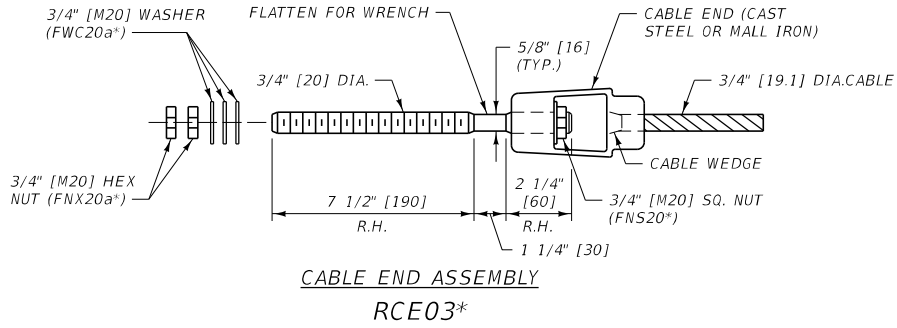
UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-88

W-BEAM METAL GUARDRAIL HARDWARE



R.H. = RIGHT HAND  
L.H. = LEFT HAND



3/4" [19.1] DIA. - 3 x 7 WIRE ROPE

**3/4" [19.1] DIA. CABLE**  
**RCM01\***

NOTES:

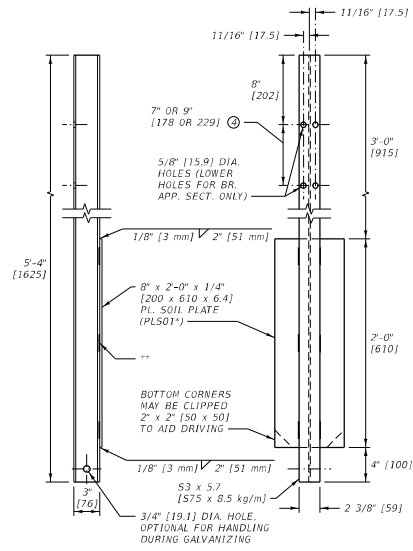
- ① WIRE ROPE AND CONNECTING HARDWARE ARE TO CONFORM TO THE REQUIREMENTS OF AASHTO M30 [M30M] TYPE 1 CLASS A, 3/4" [19.1] ROPE. CONNECTING HARDWARE MUST DEVELOP THE FULL STRENGTH OF A SINGLE CABLE (25,000 LB [111.2 kN]). CAST STEEL COMPONENTS ARE TO CONFORM TO THE REQUIREMENTS OF AASHTO M103 [M103M] (ASTM A27 [A27M]). MALLEABLE IRON CASTINGS ARE TO CONFORM TO THE REQUIREMENTS OF ASTM A47 [A47M].
- ② AT ALL LOCATIONS WHERE THE CABLE IS CONNECTED TO A CABLE SOCKET WITH A WEDGE TYPE CONNECTION, CRIMP ONE WIRE OF THE CABLE OVER THE BASE OF THE WEDGE TO HOLD IT FIRMLY IN PLACE.
- ③ DESIGN SOCKET BASKETS FOR USE WITH THE WEDGE DETAILED IN THIS DRAWING.
- ④ ALTERNATE HARDWARE DESIGNS WILL BE CONSIDERED FOR APPROVAL PROVIDED THEIR CONNECTION DETAILS, FOR THE PURPOSE OF MAINTENANCE SUBSTITUTIONS, ARE COMPATIBLE WITH THE DETAILS OF THIS DRAWING AND THEIR OPERATING CHARACTERISTICS ARE SIMILAR TO THOSE OF THE HARDWARE IN THIS DRAWING.

\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

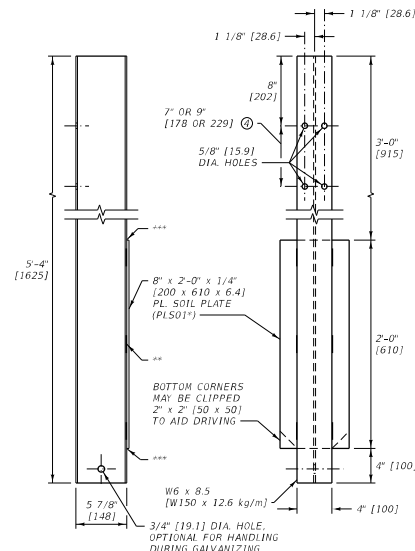
UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-94

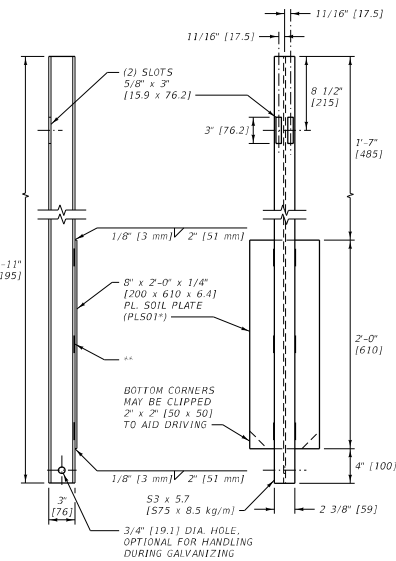
LOW-TENSION CABLE  
GUARDRAIL HARDWARE



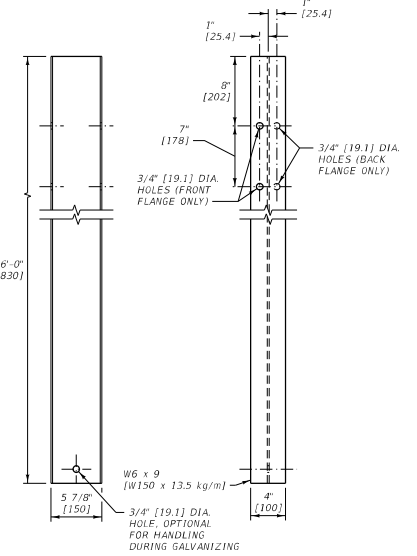
TYPE A BOX BEAM POST AND SOIL PLATE  
PSE08\* AND PLS01\*



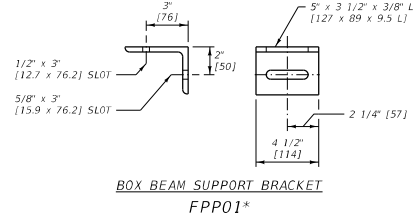
TYPE B BOX BEAM  
POST AND SOIL PLATE  
PLS01\*



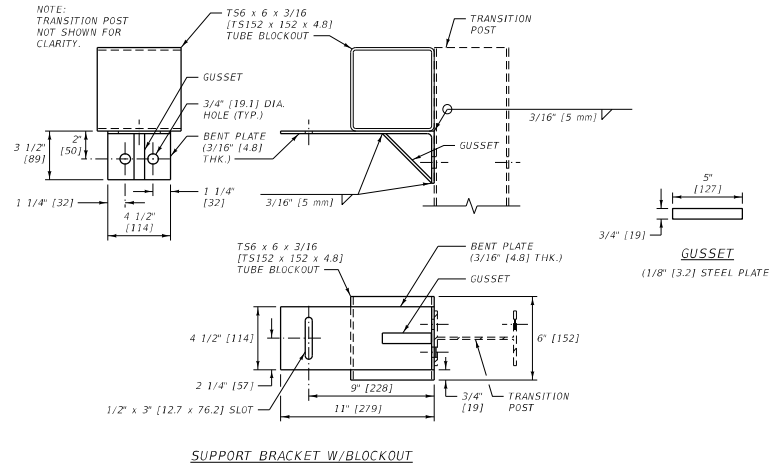
TYPE D BOX BEAM POST AND SOIL PLATE  
PSE05\* AND PLS01\*



TRANSITION POST



BOX BEAM SUPPORT BRACKET  
FPP01\*



SUPPORT BRACKET W/BLOCKOUT

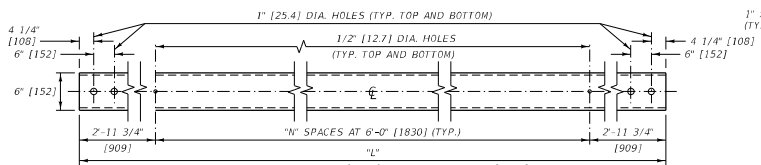
NOTES:

- ① MANUFACTURE POSTS USING STEEL CONFORMING TO AASHTO M 183 [183M] (ASTM A 36 [36M]). MANUFACTURE SOIL PLATES, SUPPORT BRACKETS AND MISC. COMPONENTS USING AASHTO M 270 [270M] (ASTM A 709 [709M]) GRADE 36 [250] STEEL. ALL WELDING IS TO CONFORM TO THE APPLICABLE AWS CODE.
  - ② MANUFACTURE BLOCKOUTS FROM EITHER ASTM A 500 GRADE B COLD-ROLLED TUBING, ASTM A 501 HOT-ROLLED TUBING OR AUTOMOTIVE ROLL-OVER PROTECTIVE STEEL (ROPS). WHEN ASTM A 500 GRADE B STEEL IS USED, TEST THE MATERIAL PER ASTM E 436.
  - ③ GALVANIZE FABRICATED POSTS, BLOCKOUTS, BRACKETS AND MISC. COMPONENTS IN ACCORDANCE WITH SUBSECTION 711.08. DO NOT PUNCH, DRILL, OR CUT AFTER GALVANIZING.
  - ④ SEE DTL. DWG. NO. 606-53 (BOX BEAM BR. APP. SECT.) FOR REQUIRED LOCATION OF LOWER HOLES IN TYPE A AND B POSTS.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

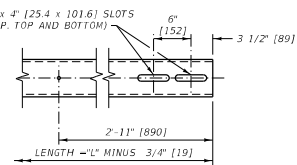
- \*\* 1/8" [3 mm] 2-10" [254 mm]
- 1/8" [3 mm] 2-10" [254 mm]
- \*\*\* 1/8" [3 mm] 3 1/2" [89 mm]

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

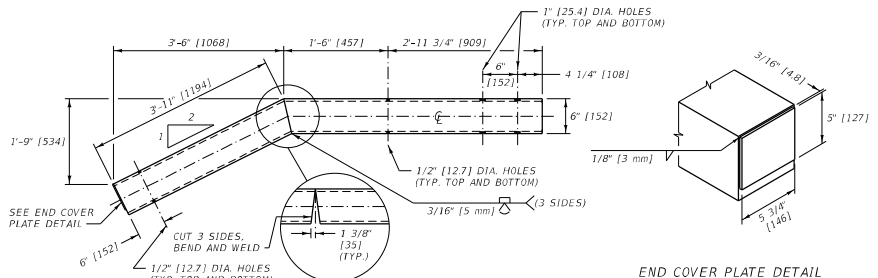
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-97
BOX BEAM GUARDRAIL HARDWARE	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



**BOX BEAM RAIL (TS6 x 6 x 3/16 [TS152 x 152 x 4.8])**  
**RBMO1\***

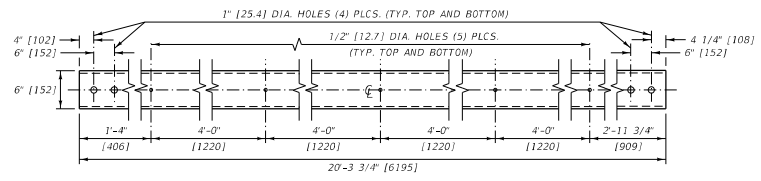


**BOX BEAM EXPANSION SPLICE END**  
 ONE END OF BOX BEAM RAIL ONLY. REQUIRED FOR BOTH RAILS AT THE EXPANSION SPLICE.

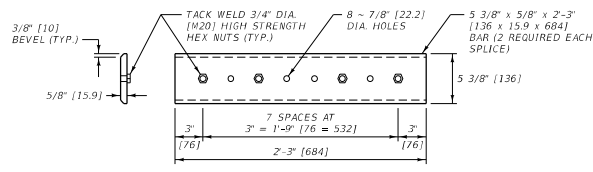


**BOX BEAM TERMINAL RAIL (TS6 x 6 x 3/16 [TS152 x 152 x 4.8])**  
**RBMO5\***

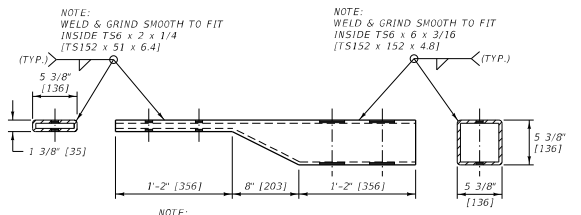
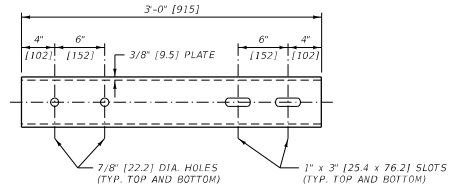
**END COVER PLATE DETAIL**  
 (BAR 5" x 3/16" x 0-5 3/4" [127 x 4.8 x 146])



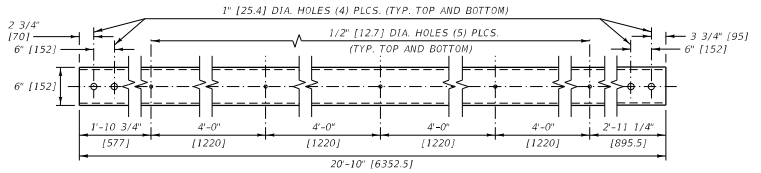
**TS6 x 6 x 3/16 [TS152 x 152 x 4.8] BR, APP. SECT. UPPER RAIL NO. 1**



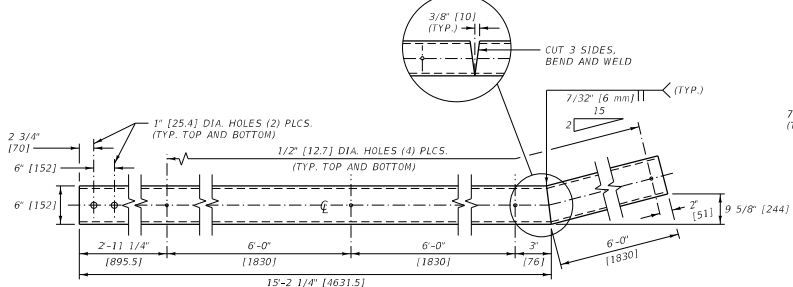
**BOX BEAM SPLICE PLATE**  
**RBS01\***



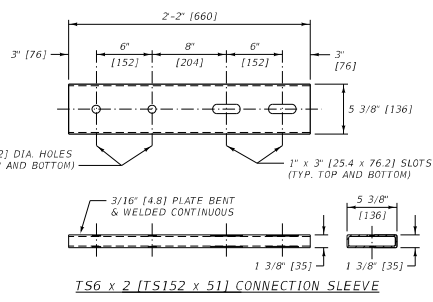
**TS6 x 2 TO TS6 x 6 [TS152 x 51 TO TS152 x 152] CONNECTION SLEEVE**



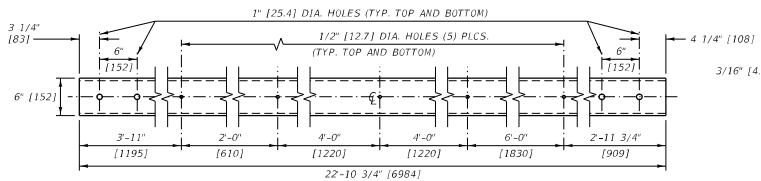
**TS6 x 2 x 1/4 [TS152 x 51 x 6.4] BR, APP. SECT. LOWER RAIL NO. 1**



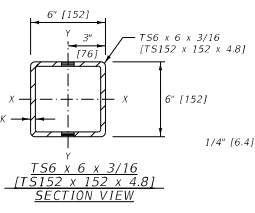
**TS6 x 2 x 1/4 [TS152 x 51 x 6.4] BR, APP. SECT. LOWER RAIL NO. 2**



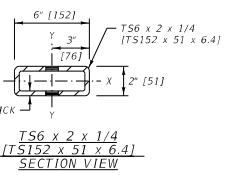
**TS6 x 2 [TS152 x 51] CONNECTION SLEEVE**



**TRANSITION RAIL (TS6 x 6 x 3/16 [TS152 x 152 x 4.8])**



**TS6 x 6 x 3/16 [TS152 x 152 x 4.8] SECTION VIEW**



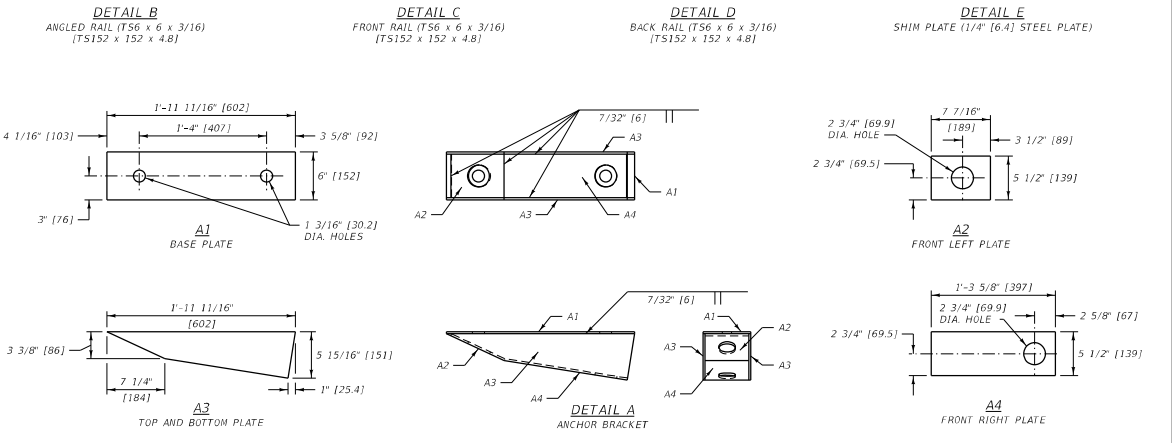
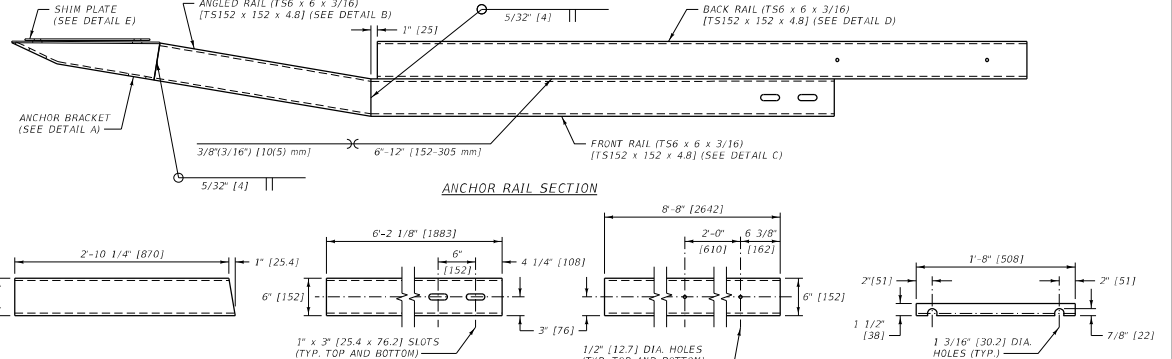
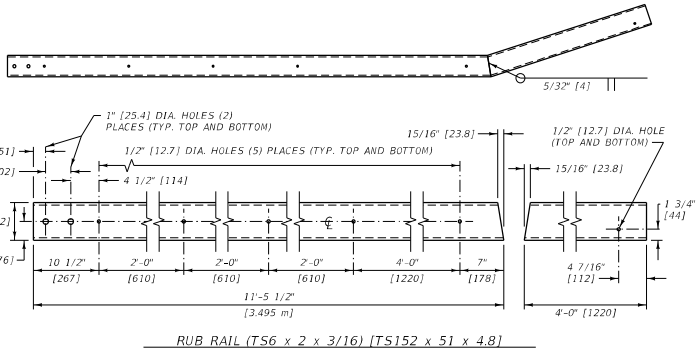
**TS6 x 2 x 1/4 [TS152 x 51 x 6.4] SECTION VIEW**

- NOTES:
- ① MANUFACTURE BOX BEAM RAIL ELEMENTS FROM EITHER ASTM A 500 GRADE B COLD ROLLED TUBING, ASTM A 501 HOT-ROLLED TUBING OR AUTOMOTIVE ROLLOVER PROTECTIVE STEEL (ROPS). WHEN ASTM A 500 GRADE B STEEL IS USED, TEST THE MATERIAL PER ASTM E 436.
  - ② FABRICATE SPLICE PLATES AND CONNECTION SLEEVES FROM AASHTO M 270 [270M] (ASTM A 709 [709M]) GRADE 36 [250] STEEL PLATE. THE NUTS ARE TO BE PLAIN UN-COATED 3/4" DIA. [M20] HIGH STRENGTH HEX NUTS. WELD THE NUTS TO THE PLATES IN ACCORDANCE WITH THE APPLICABLE AWS CODE.
  - ③ GALVANIZE FABRICATED RAIL, CONNECTION SLEEVES, AND SPLICE PLATES IN ACCORDANCE WITH SUBSECTION 711.08. DO NOT PUNCH, DRILL, OR CUT AFTER GALVANIZING.

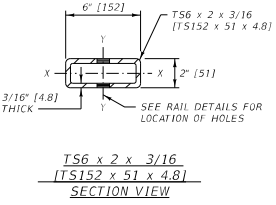
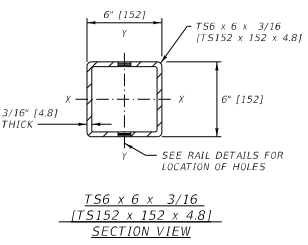
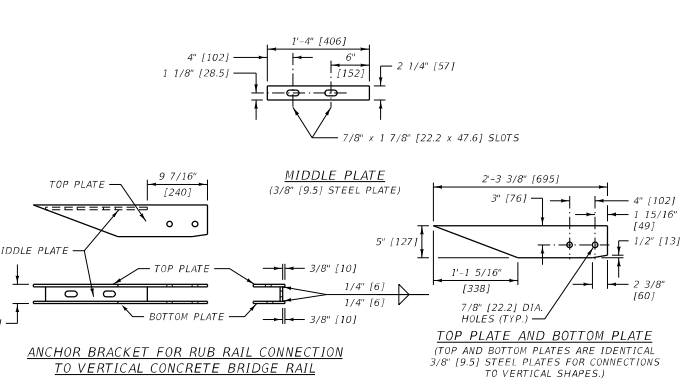
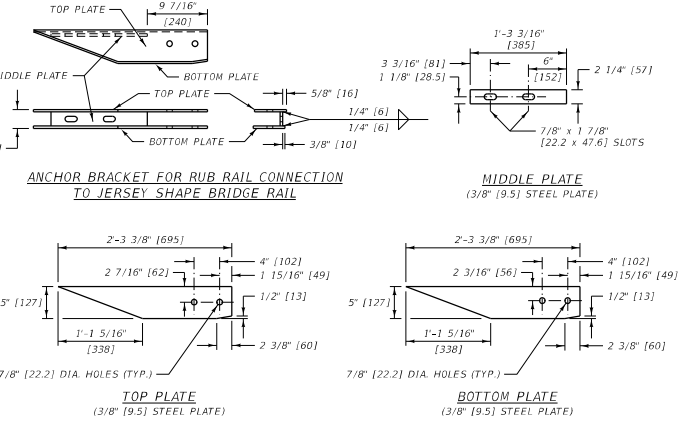
\* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606, 711	DWG. NO. 606-98
BOX BEAM GUARDRAIL HARDWARE	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	



NOTE:  
ALL ANCHOR BRACKET COMPONENTS ARE FABRICATED FROM 1/2" [6.4] STEEL PLATE MATERIAL.



- NOTES:
- ① MANUFACTURE BOX BEAM RAIL ELEMENTS FROM EITHER ASTM A 500 GRADE B COLD ROLLED TUBING, ASTM A 501 HOT-ROLLED TUBING OR AUTOMOTIVE ROLL-OVER PROTECTIVE STEEL (ROPS) WHEN ASTM A 500 GRADE B STEEL IS USED. TEST THE MATERIAL PER ASTM E 436.
  - ② FABRICATE ANCHOR BRACKET AND RUB RAIL CONNECTION COMPONENTS FROM AASHTO M 270 [270M] (ASTM A 709 [709M]) GRADE 36 [250] STEEL PLATE.
  - ③ GALVANIZE FABRICATED RAIL, ANCHOR BRACKET, AND RUB RAIL IN ACCORDANCE WITH SUBSECTION 711.08. DO NOT PUNCH, DRILL, WELD OR CUT AFTER GALVANIZING.
- \* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

UNITS SHOWN IN BRACKETS [ ] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-99
SECTION 606.711	
BOX BEAM GUARDRAIL HARDWARE	
<b>MDT</b> MONTANA DEPARTMENT OF TRANSPORTATION	