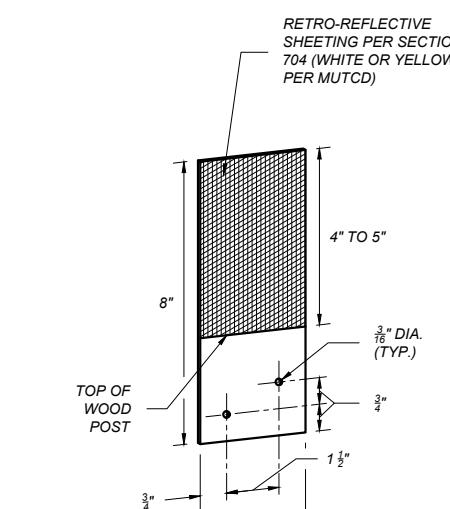
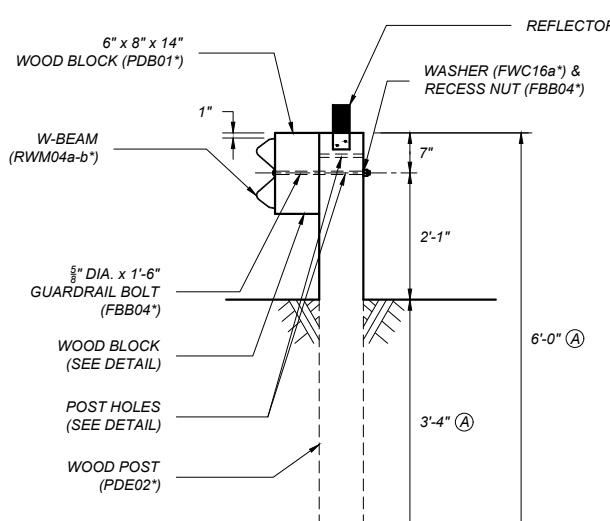
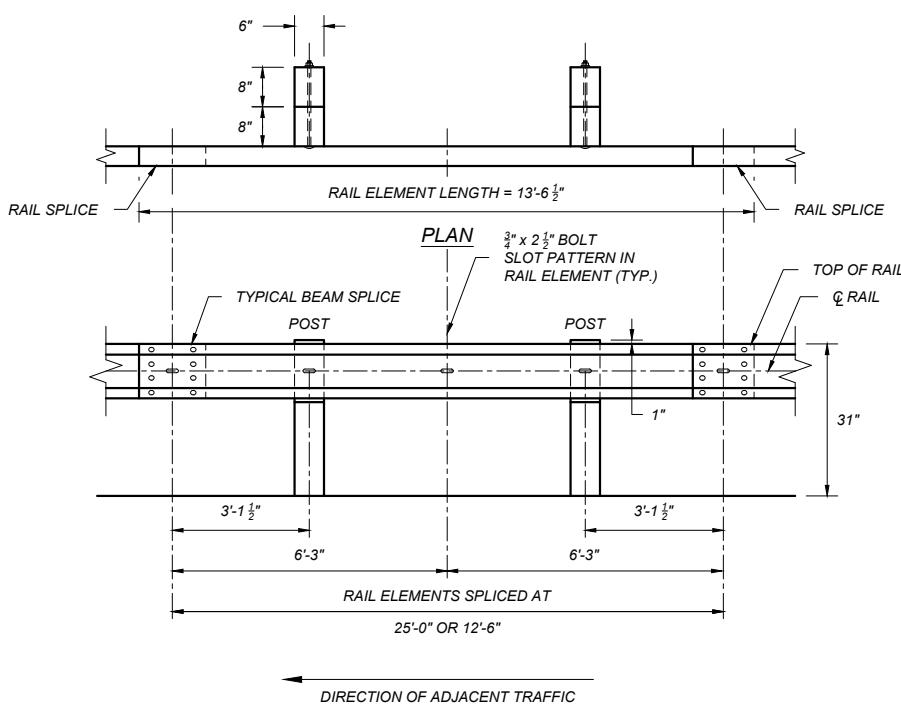


NOTES:

- ① INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
- ② USE WOOD BLOCKS OR OTHER "MASH" 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, INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FABRICATE REFLECTORS FROM 0.063" 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" DIA. WASHERS IN PRE-DRILLED HOLES.
- 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" FROM THE TRAFFIC LANE.
- ⑥ DO NOT INSTALL W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5.5' OF THE FACE OF THE RAIL.
- ⑦ USE LOWER HOLE ON NEW CONSTRUCTION INSTALLATIONS.
- ⑧ USE 6' POSTS FOR STANDARD INSTALLATIONS.
- ⑨ APPLY CRACK SEALANT PER SECTION 707 TO FULLY COVER THE C.A.C. IN LEAVE OUT AREAS.

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



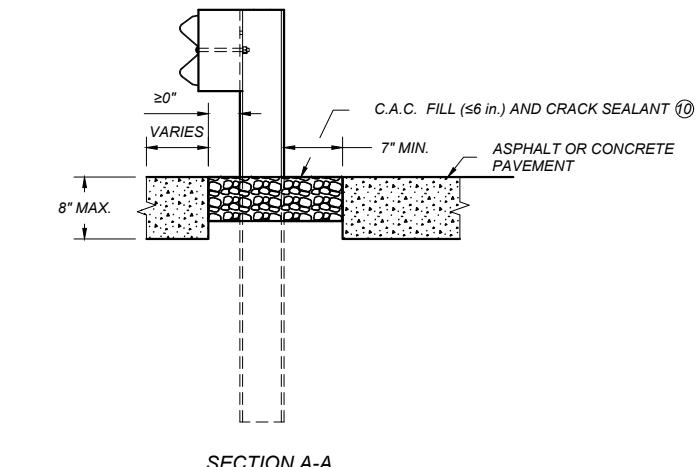
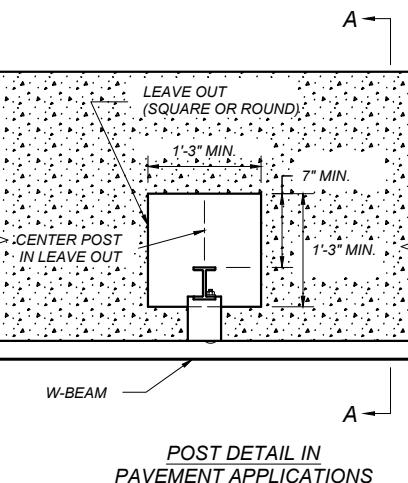
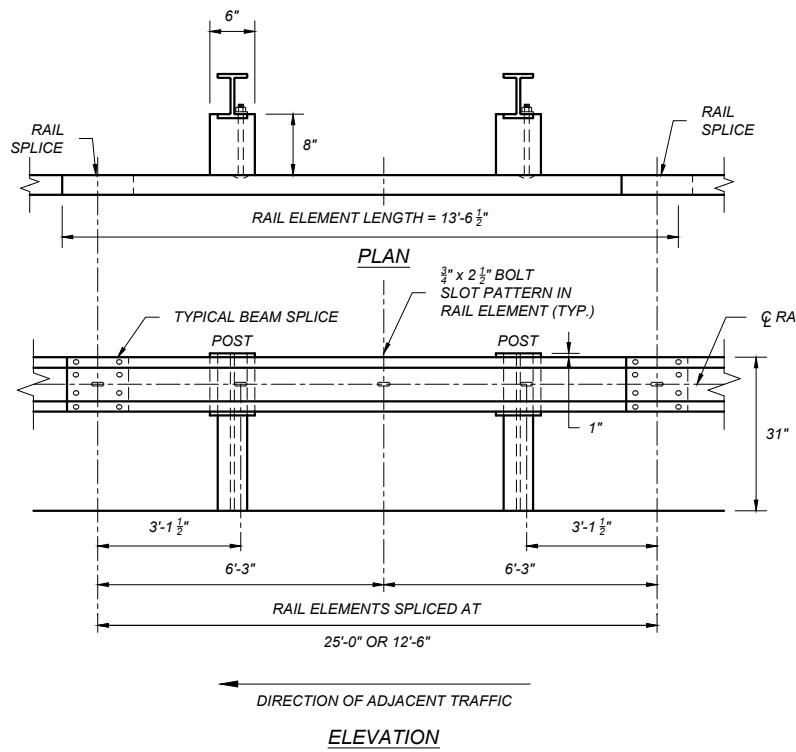
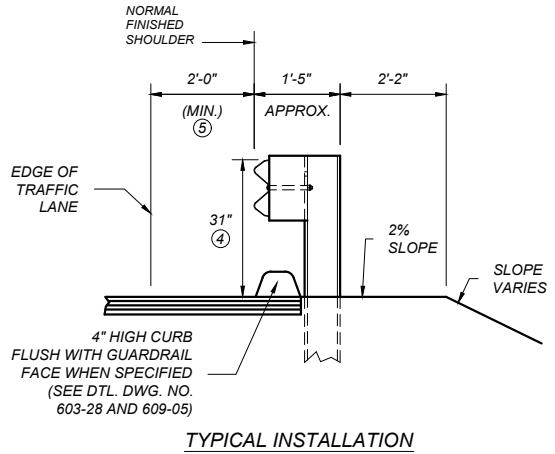
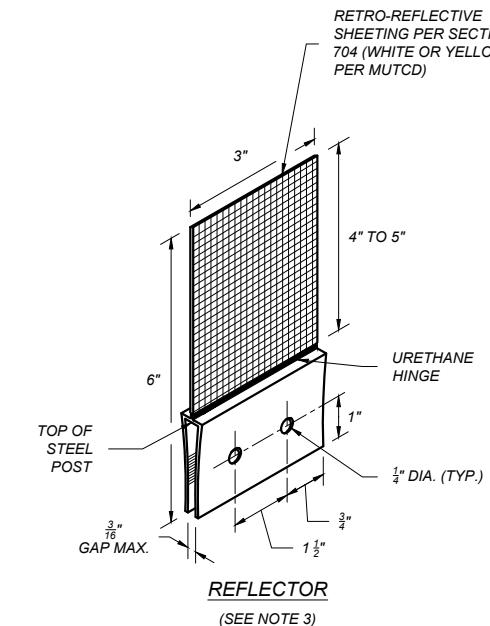
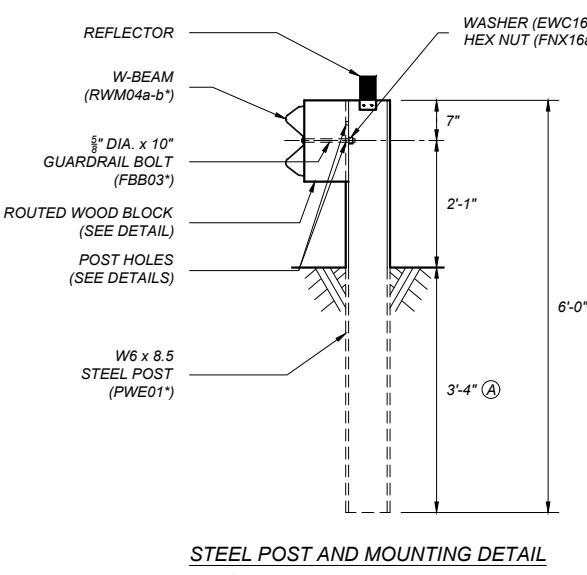
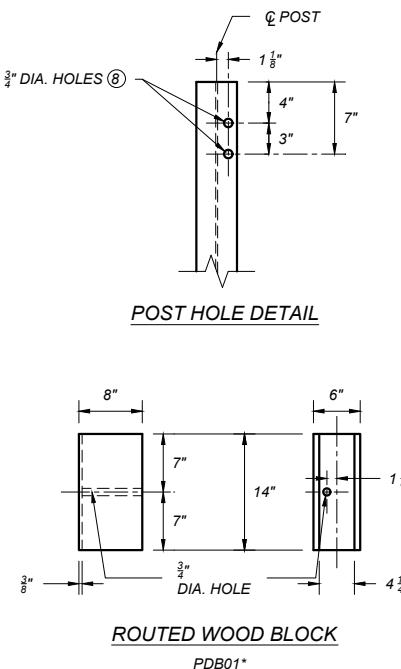
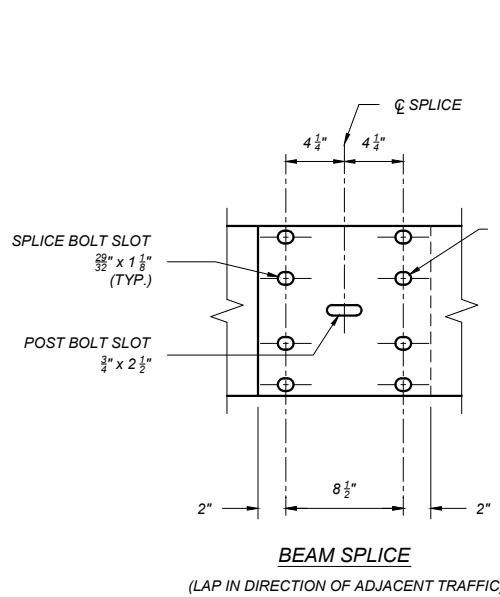
DETAILED DRAWINGS	
REFERENCE STANDARD SPEC. SECTION 606, 704, 707	DWG. NO. 606-05A

METAL GUARDRAIL - WOOD POSTS (MGS)

EFFECTIVE: JAN 23, 2020



-REVISED--
JAN 15, 2026



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, 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".
- ⑤ WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" 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 5.5' OF THE FACE OF THE RAIL.
- ⑧ USE LOWER HOLE ON NEW CONSTRUCTION INSTALLATIONS.
- ⑨ USE 6' POSTS FOR STANDARD INSTALLATIONS.
- ⑩ APPLY CRACK SEALANT PER SECTION 707 TO FULLY COVER THE C.A.C. IN LEAVE OUT AREAS.

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

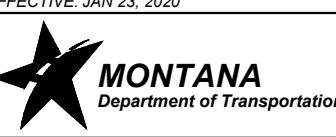
DETAILED DRAWINGS

REFERENCE STANDARD SPEC. SECTION 606, 704, 707

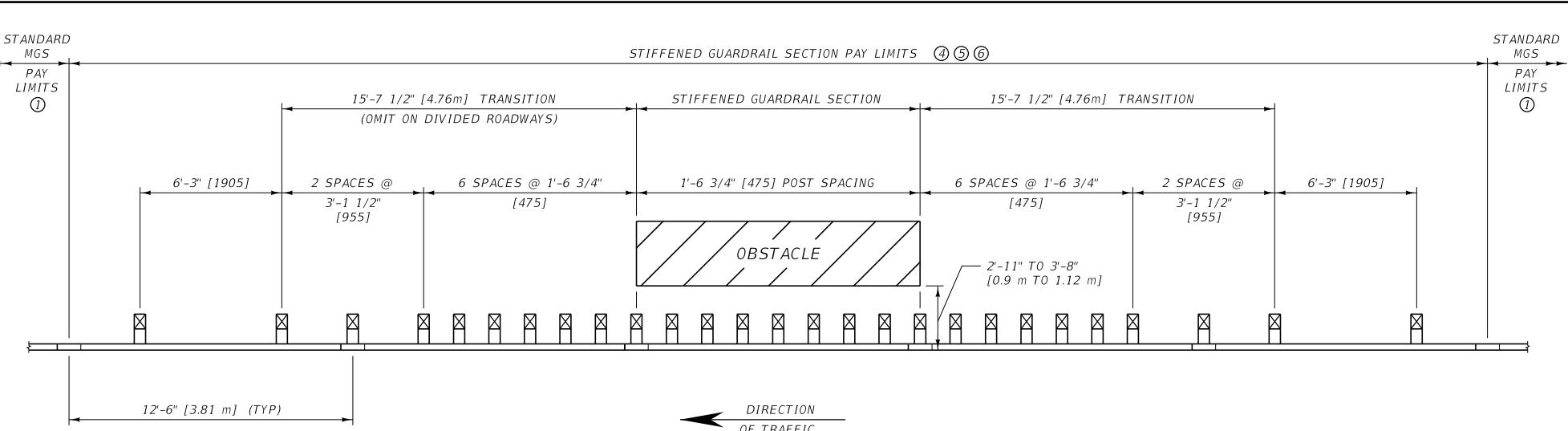
DWG. NO. 606-05B

METAL GUARDRAIL - STEEL POSTS (MGS)

EFFECTIVE: JAN 23, 2020



-REVISED-
JAN 15, 2026



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.

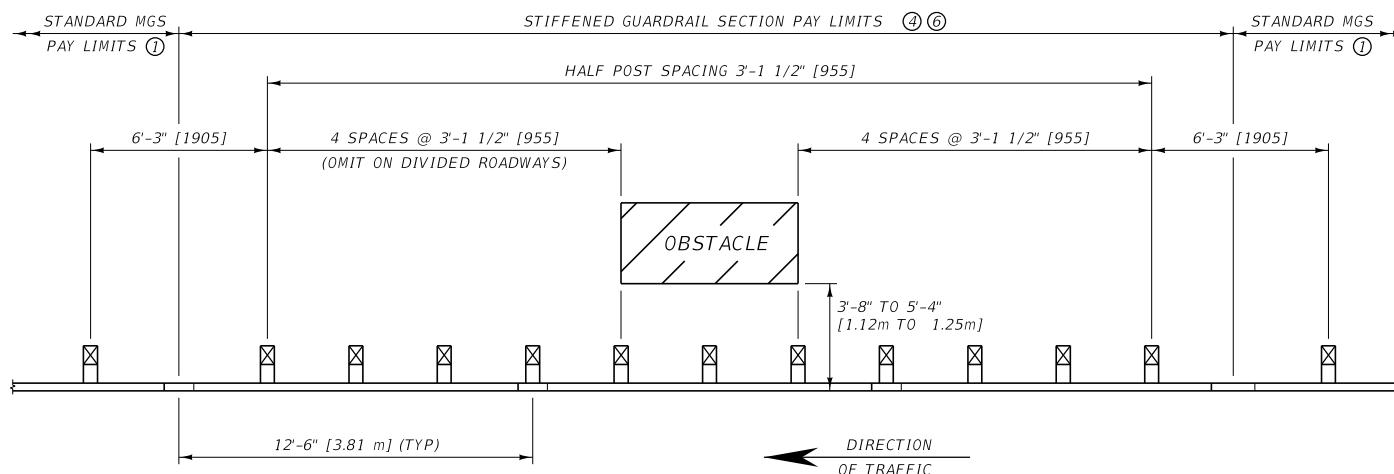
③ LAP ALL RAIL IN THE DIRECTION OF ADJACENT TRAFFIC.

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 SPLICING LOCATIONS.

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

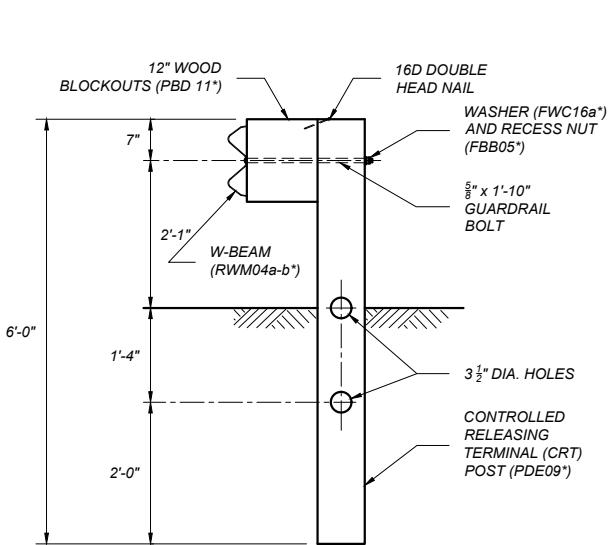
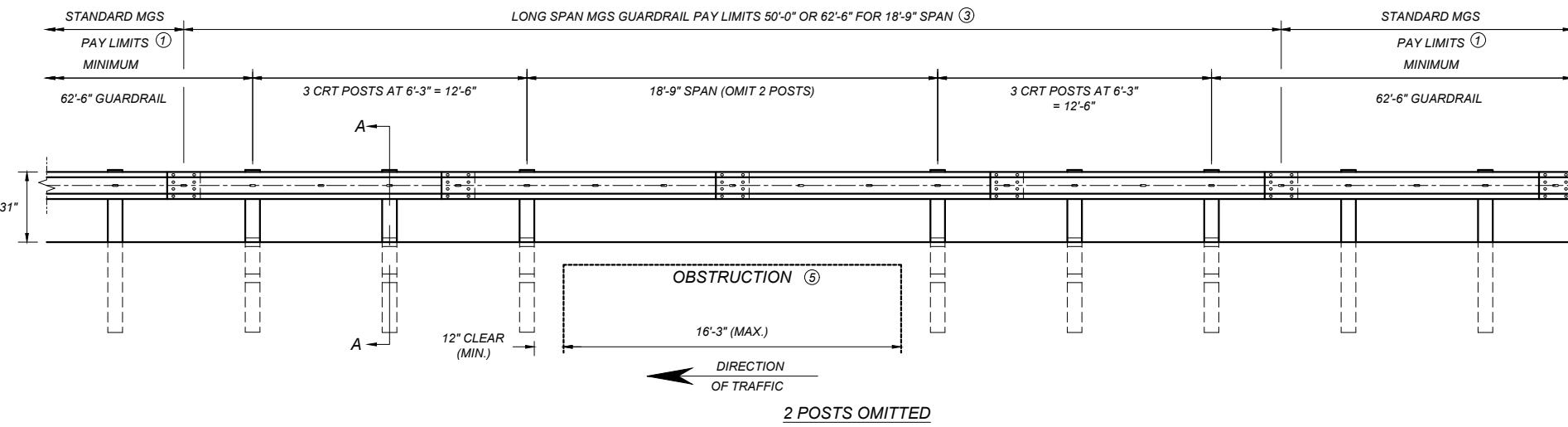
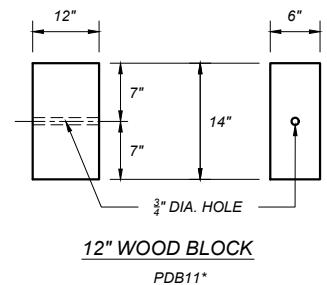
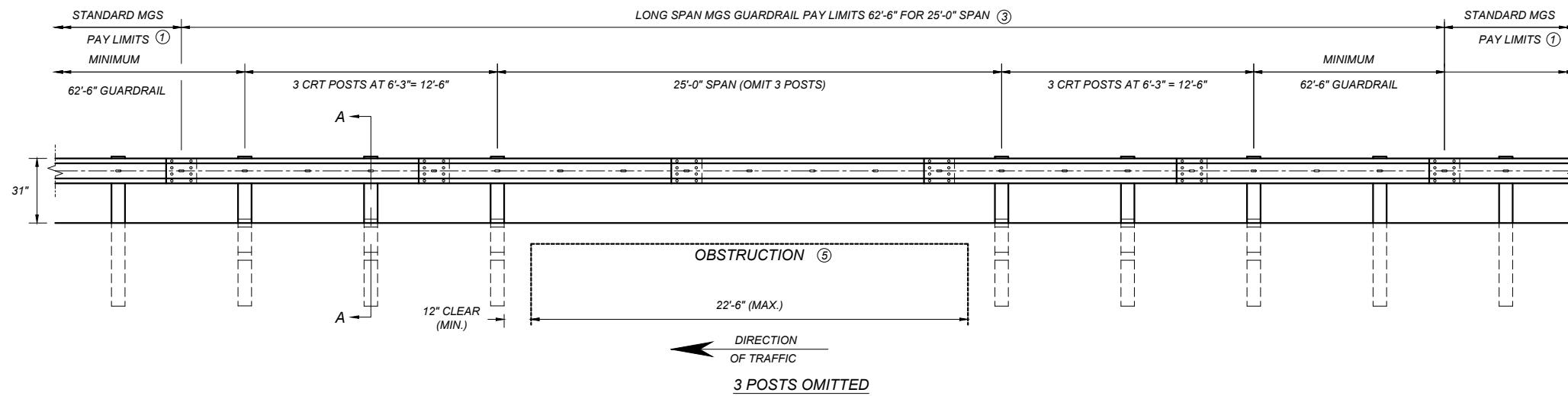


HALF POST SPACING

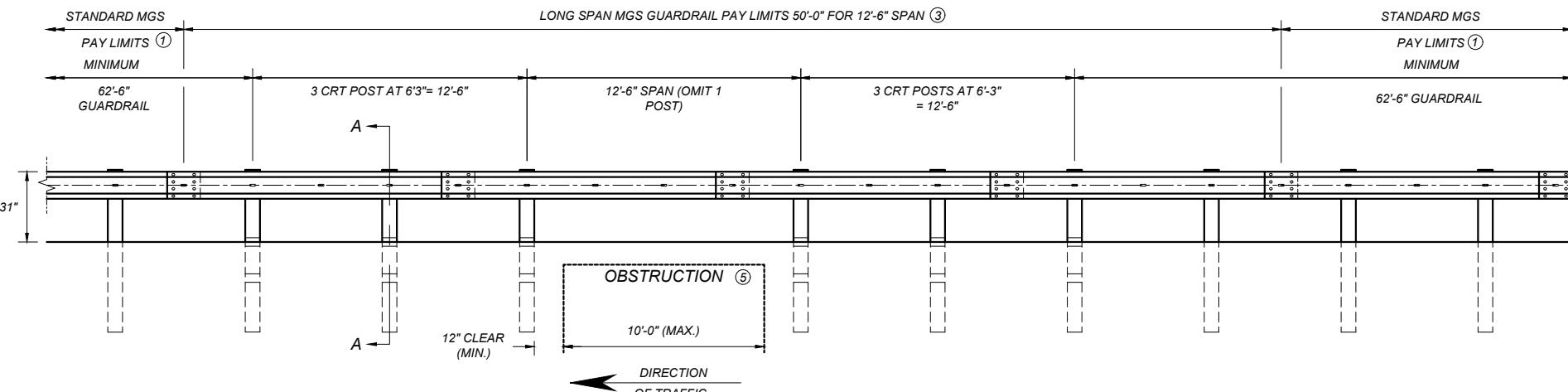
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC.	DWG. NO. 606-07

STIFFENED GUARDRAIL SECTIONS (MGS)



SECTION A-A



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 SPLICING 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 9.7' 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.

DETAILED DRAWINGS

REFERENCE DWG. NO.
STANDARD SPEC. 606-09
SECTION 606

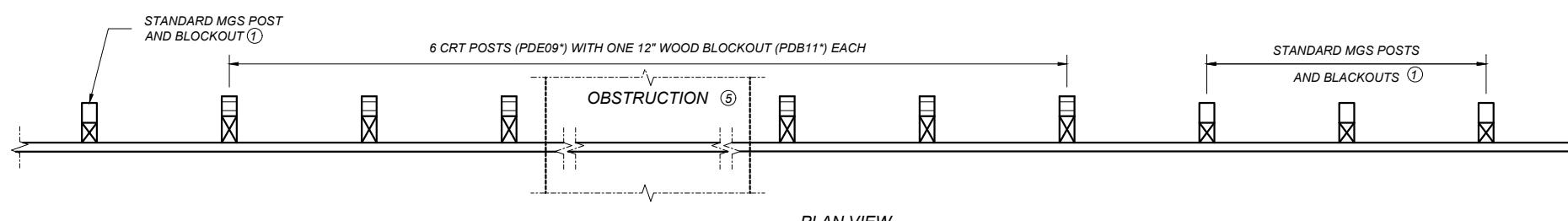
LONG SPAN GUARDRAIL (MGS)

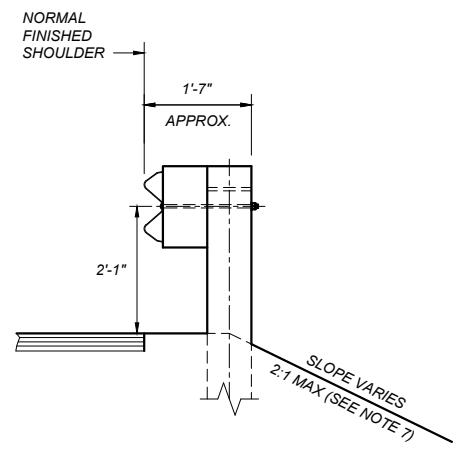
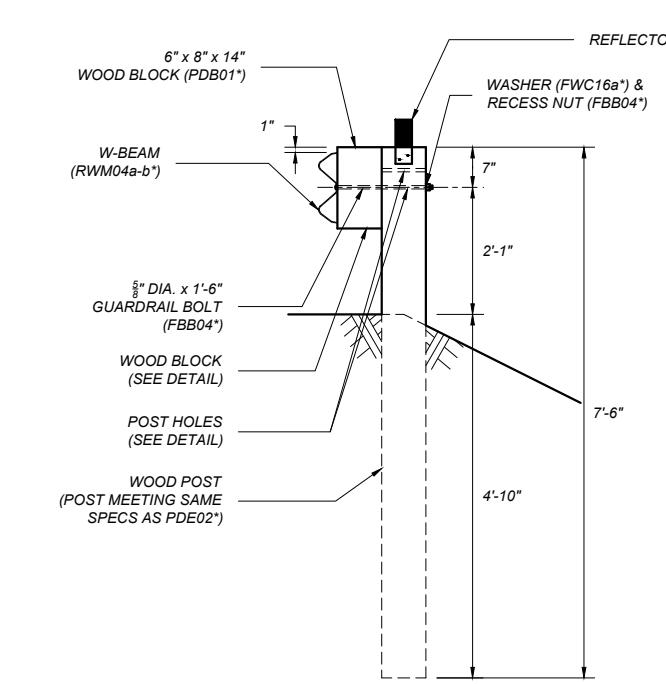
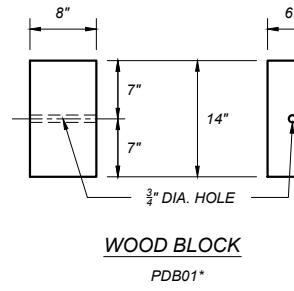
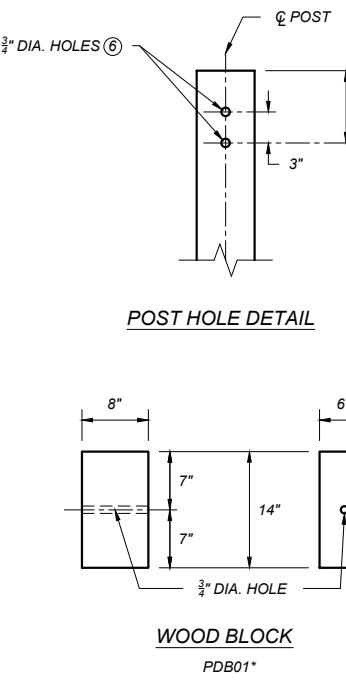
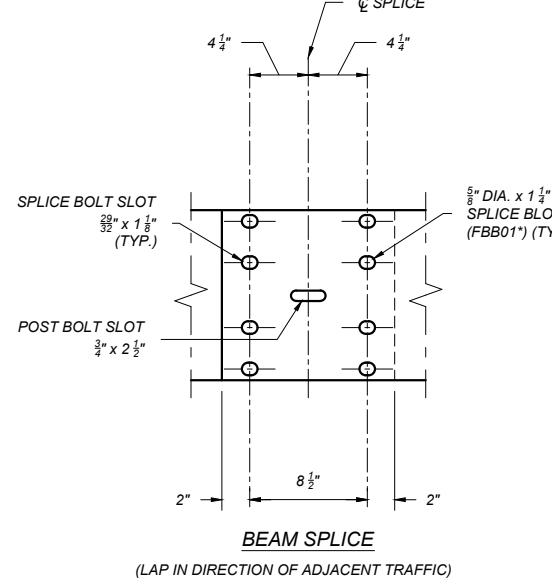
EFFECTIVE: JAN 23, 2020



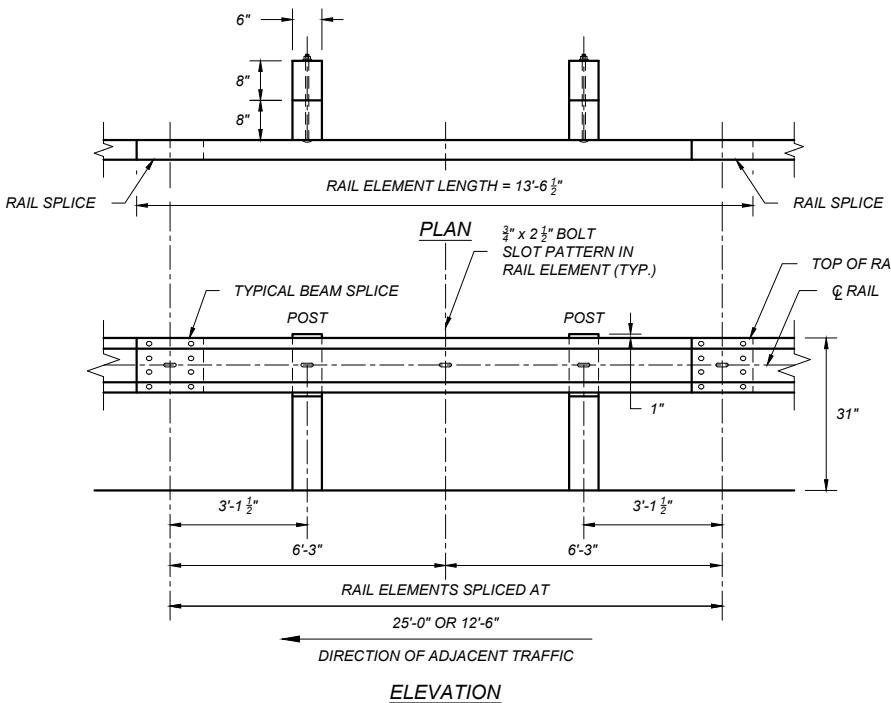
REVISED--
JAN 15, 2026

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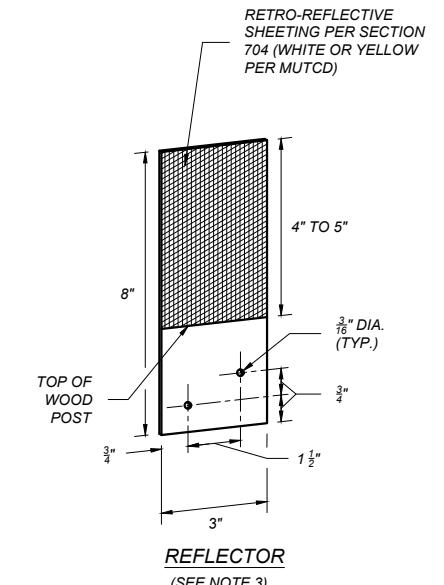
NOTE:
THIS GUARDRAIL SYSTEM IS USED WHEN
THE 2'-0" WIDENING BEHIND THE
POSTS CANNOT BE PROVIDED, AS PER
DTL. DWG. NO. 606-05A & 606-05B.



NOTES:

- ① INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
- ② USE WOOD BLOCKS OR OTHER "MASH" APPROVED BLOCKS. AFFIX BLOCKS TO POSTS WITH TWO 16 PENNY GALV. NAILS OR 14 GAUGE WIRE WRAP.
- ③ ATTACH REFLECTORS TO POSTS EVERY 25', INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FABRICATE REFLECTORS FROM 0.063" THICK ALUMINUM ALLOY PER SECTION 704 OR PLASTIC REFLECTORS WITH A URETHANE HINGE. FASTEN REFLECTORS TO WOOD POST USING TWO 16 PENNY RING-SHANKED GALVANIZED NAILS AND TWO 3/16" DIA. WASHERS IN PRE-DRILLED HOLES.
- ④ ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 27 3/4".
- ⑤ DO NOT INSTALL LONG POST W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5.9' OF THE FACE OF THE RAIL.
- ⑥ USE LOWER HOLE ON NEW CONSTRUCTION INSTALLATIONS.
- ⑦ BEGIN INSLOPE BREAK AT CENTER OF POST.

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



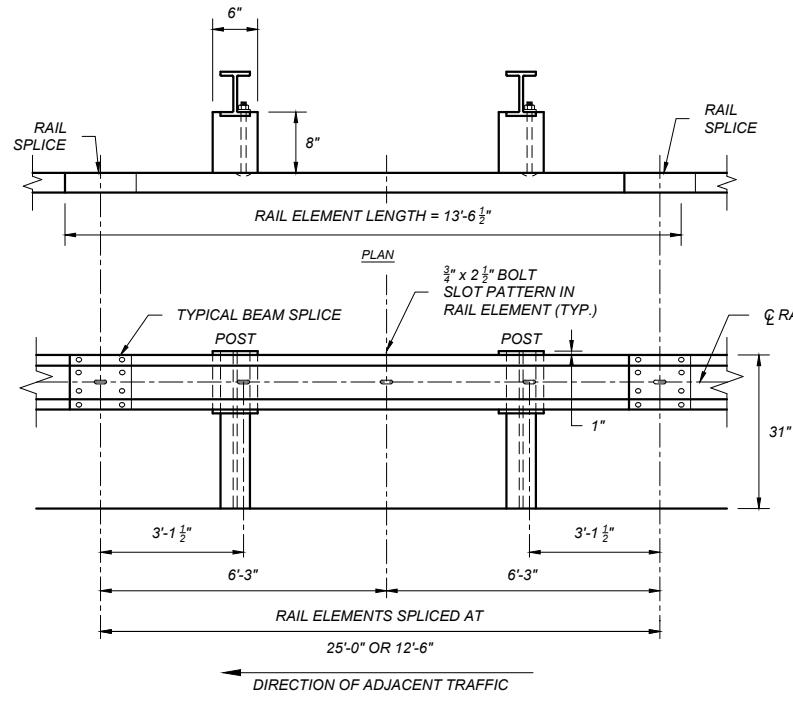
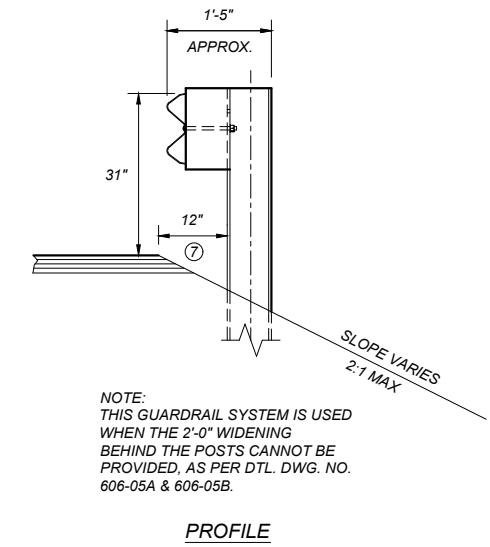
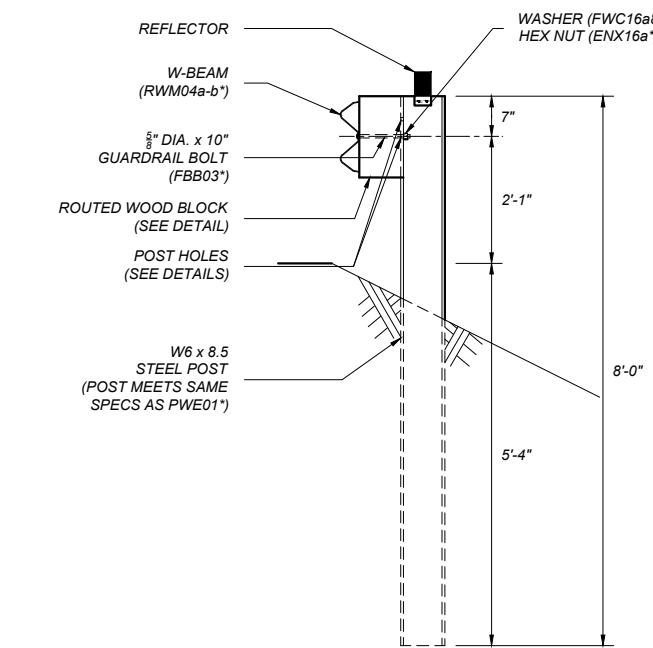
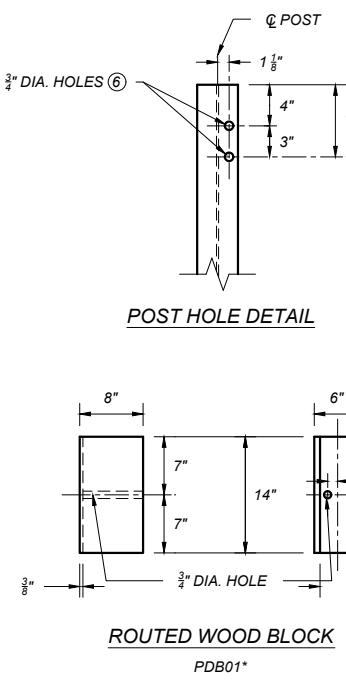
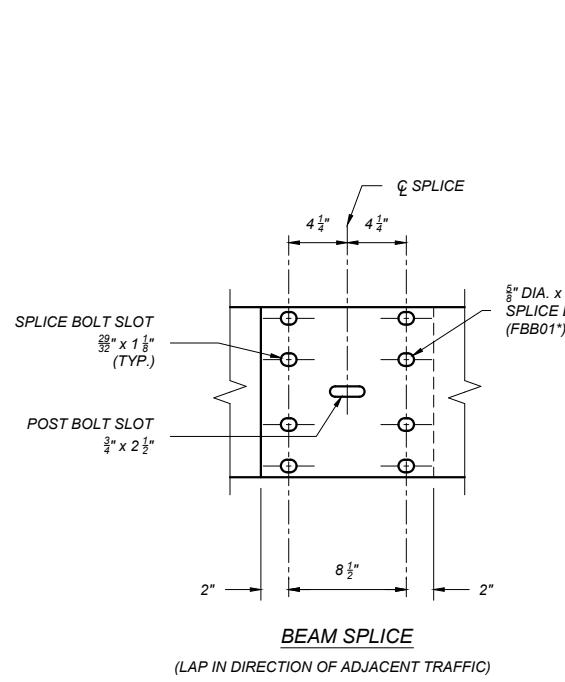
DETAILED DRAWINGS	
REFERENCE STANDARD SPEC. SECTION 606, 704	DWG. NO. 606-11A

**METAL GUARDRAIL - LONG
POSTS - WOOD (MGS)**

EFFECTIVE: JAN 23, 2020



-REVISED--
JAN 15, 2026



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', 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".

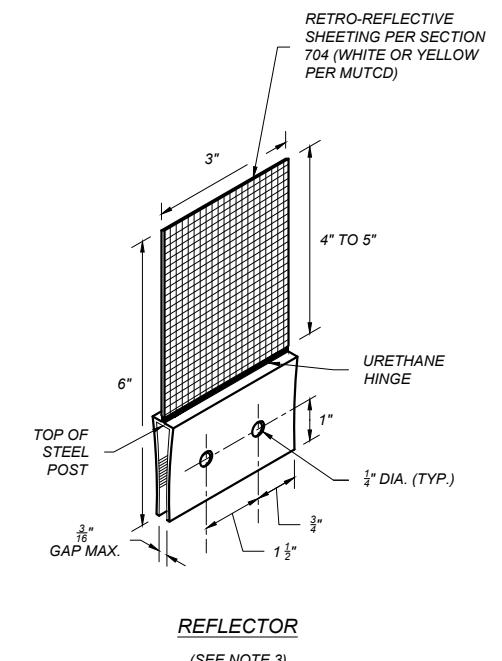
⑤ DO NOT INSTALL LONG POST W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5.9' OF THE FACE OF THE RAIL.

⑥ USE LOWER HOLE ON NEW CONSTRUCTION INSTALLATIONS.

⑦ LOCATE POST 12" (MAXIMUM) 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.

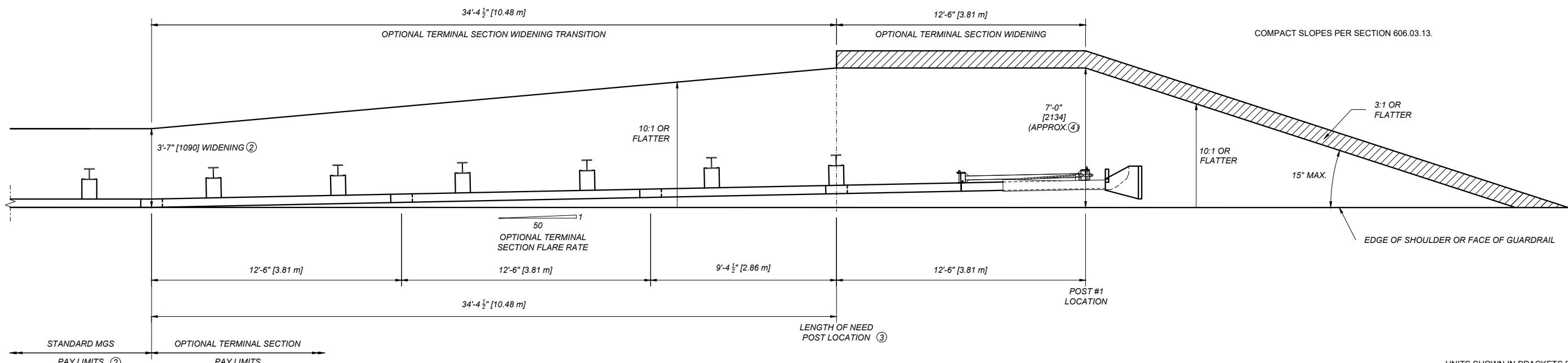
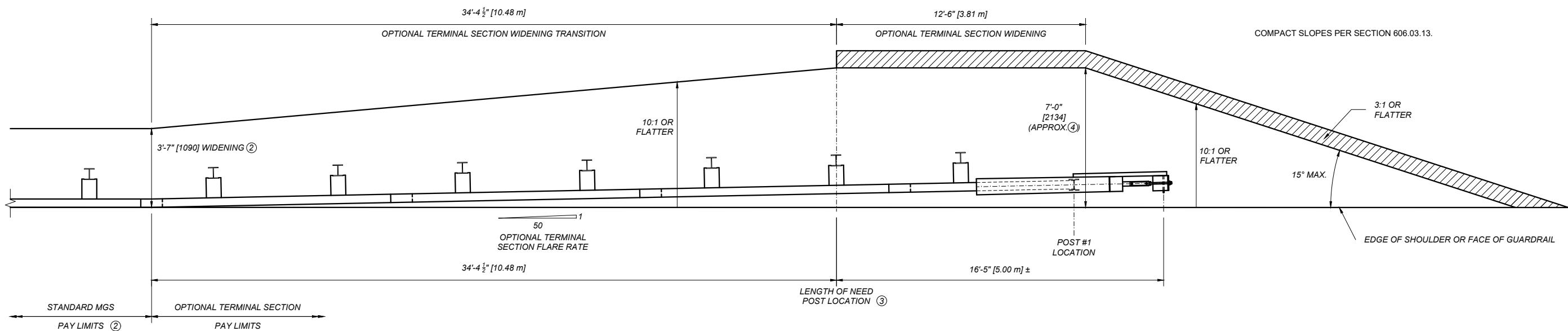
* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



REFERENCE STANDARD SPEC.	DWG. NO.
SECTION 606, 704	606-11B

METAL GUARDRAIL - LONG POSTS - STEEL (MGS)

EFFECTIVE: JAN 23, 2020



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

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.

DETAILED DRAWINGS

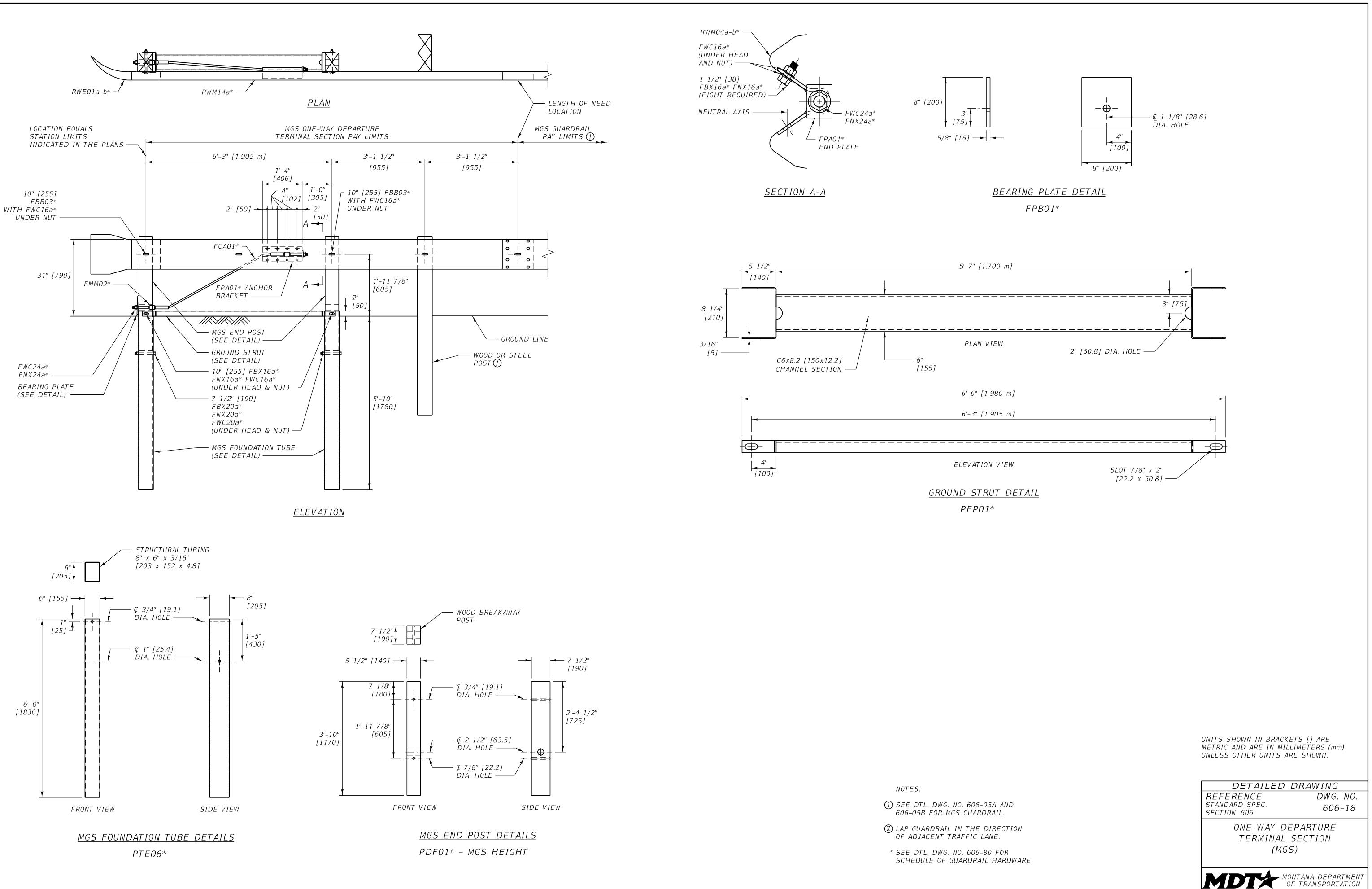
REFERENCE DWG. NO.
STANDARD SPEC. 606-13
SECTION 606, 203

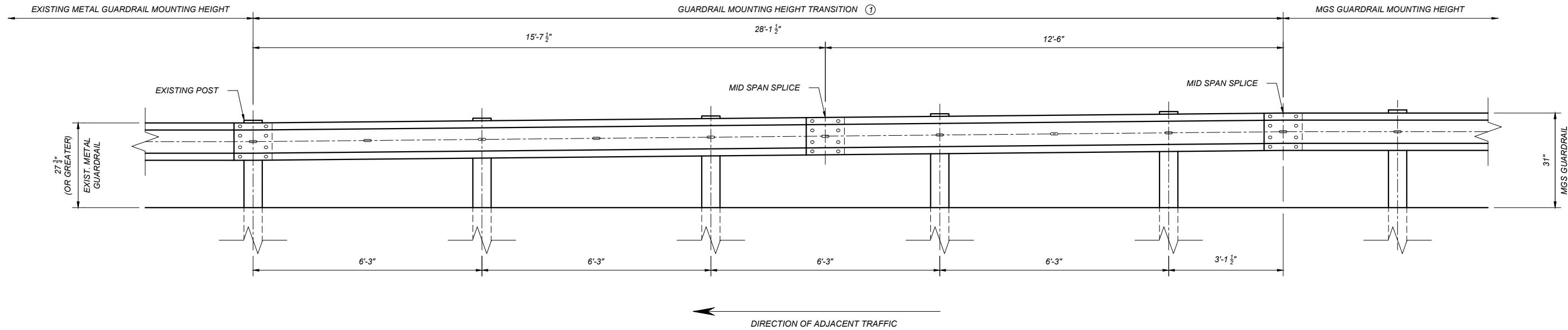
**MASH OPTIONAL TERMINAL
SECTIONS**

EFFECTIVE: JAN 23, 2020

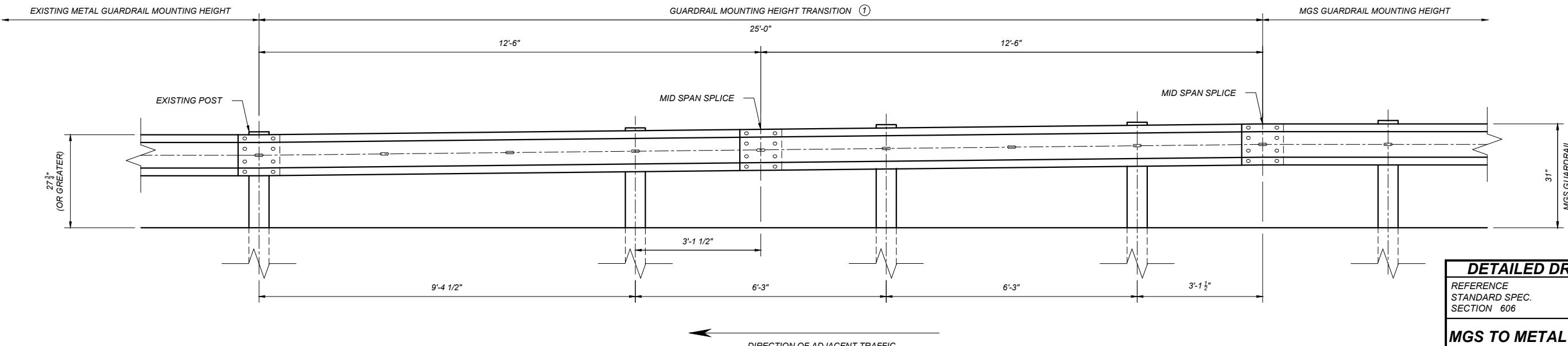


-REVISED--
JUN 27, 2024





HEIGHT TRANSITION DETAIL - IRREGULAR RAIL OPTION
(TRANSITION FROM 27 3/4" (OR GREATER) TO 31" 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.

HEIGHT TRANSITION DETAIL - IRREGULAR POST SPACING OPTION
(TRANSITION FROM 27 3/4" (OR GREATER) TO 31" GUARDRAIL MOUNTING HEIGHT)

DETAILED DRAWINGS	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-20

MGS TO METAL GUARDRAIL TRANSITION

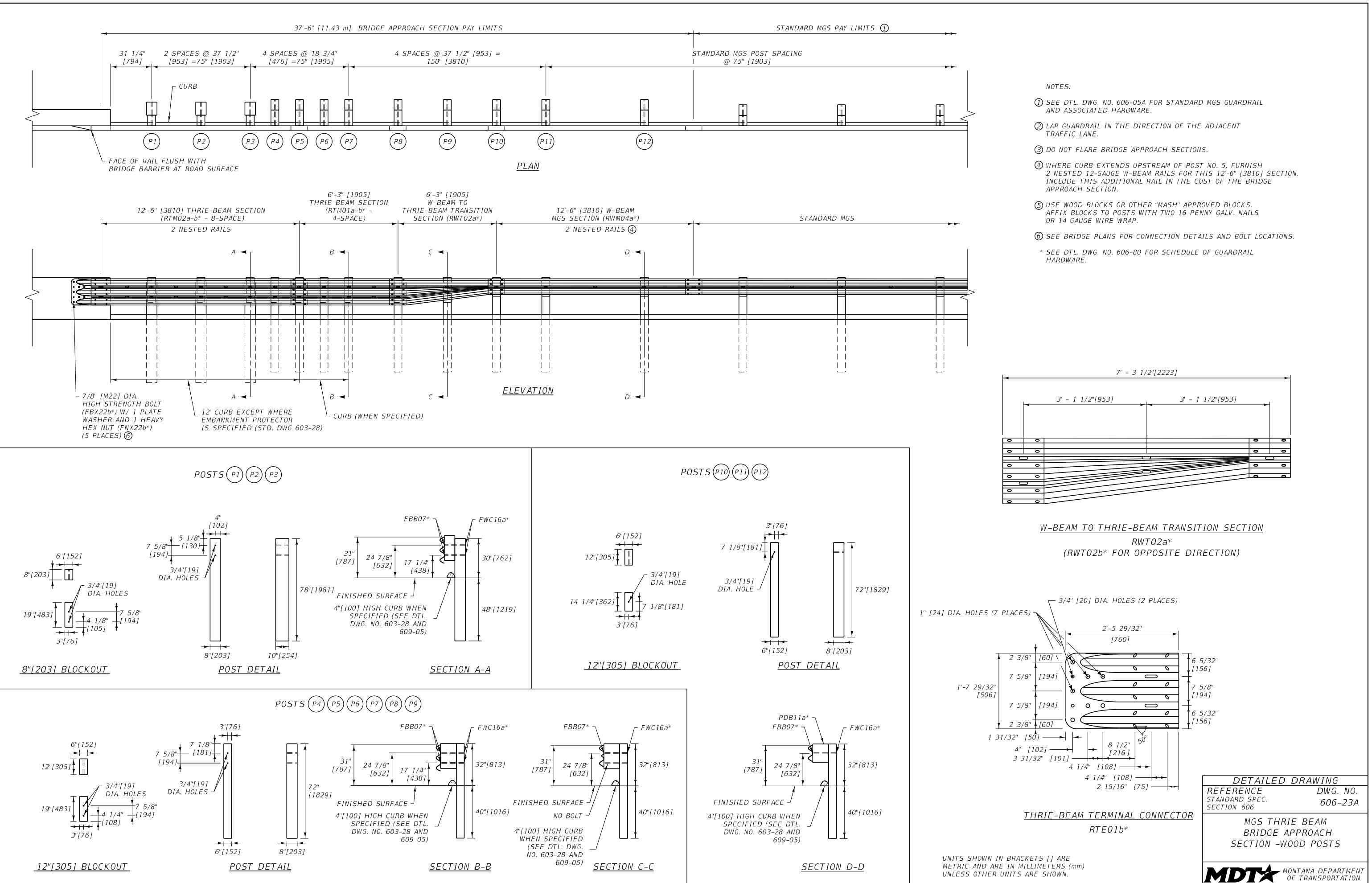
EFFECTIVE: JAN 23, 2020

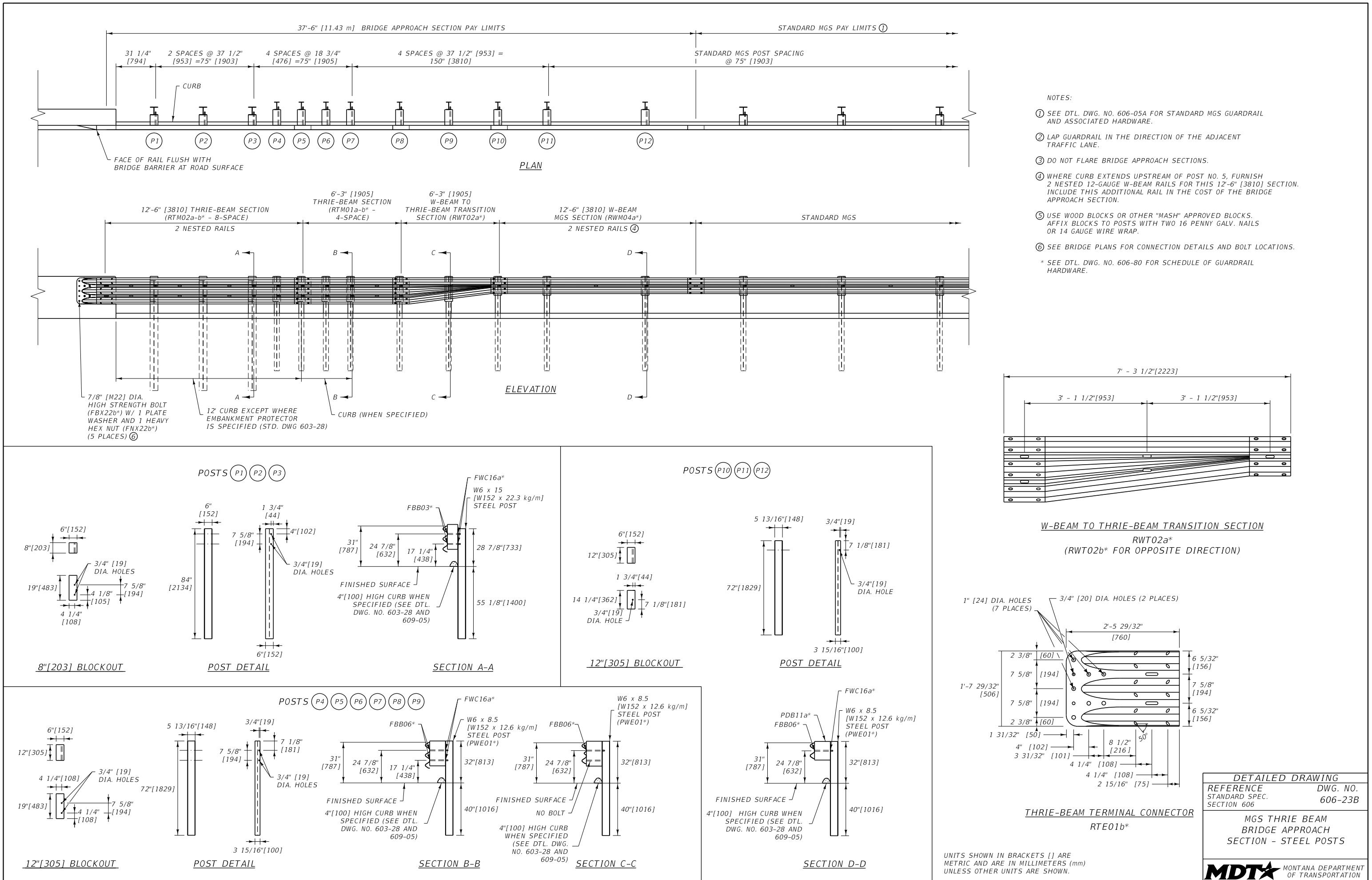


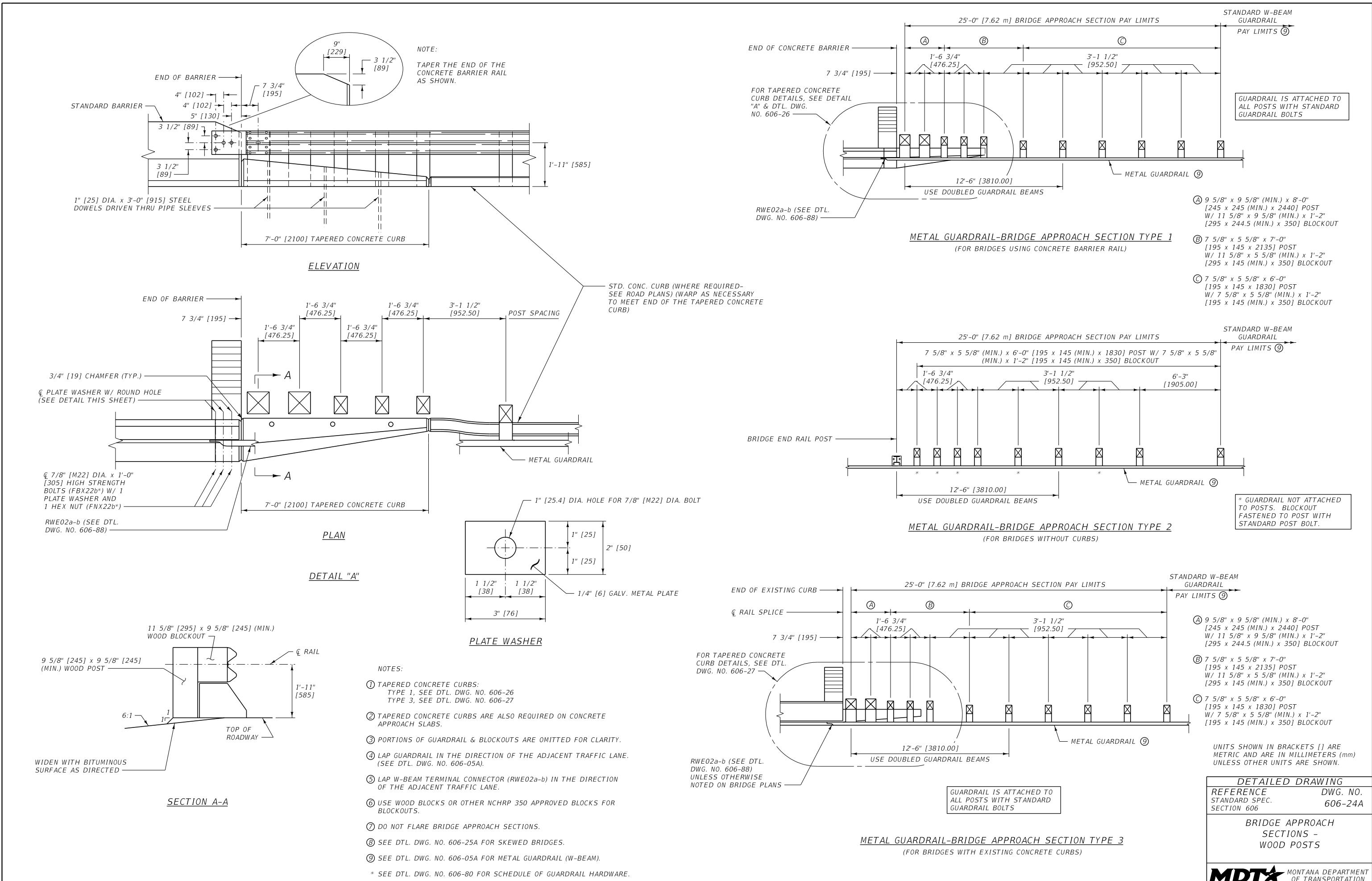
-REVISED-
JAN 15, 2026

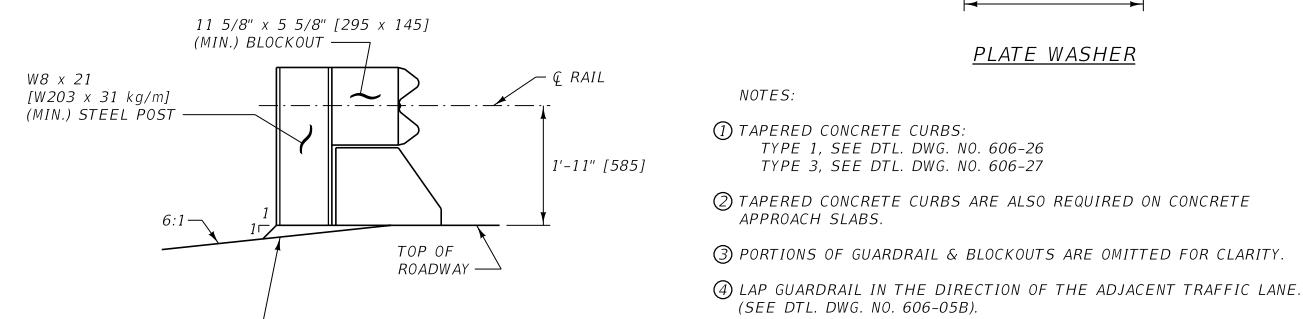
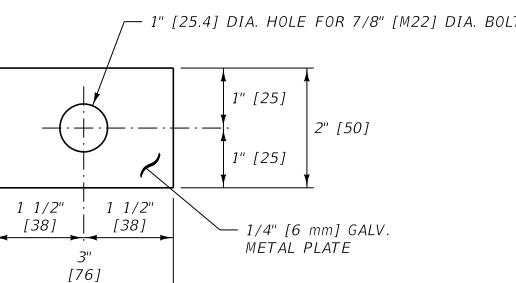
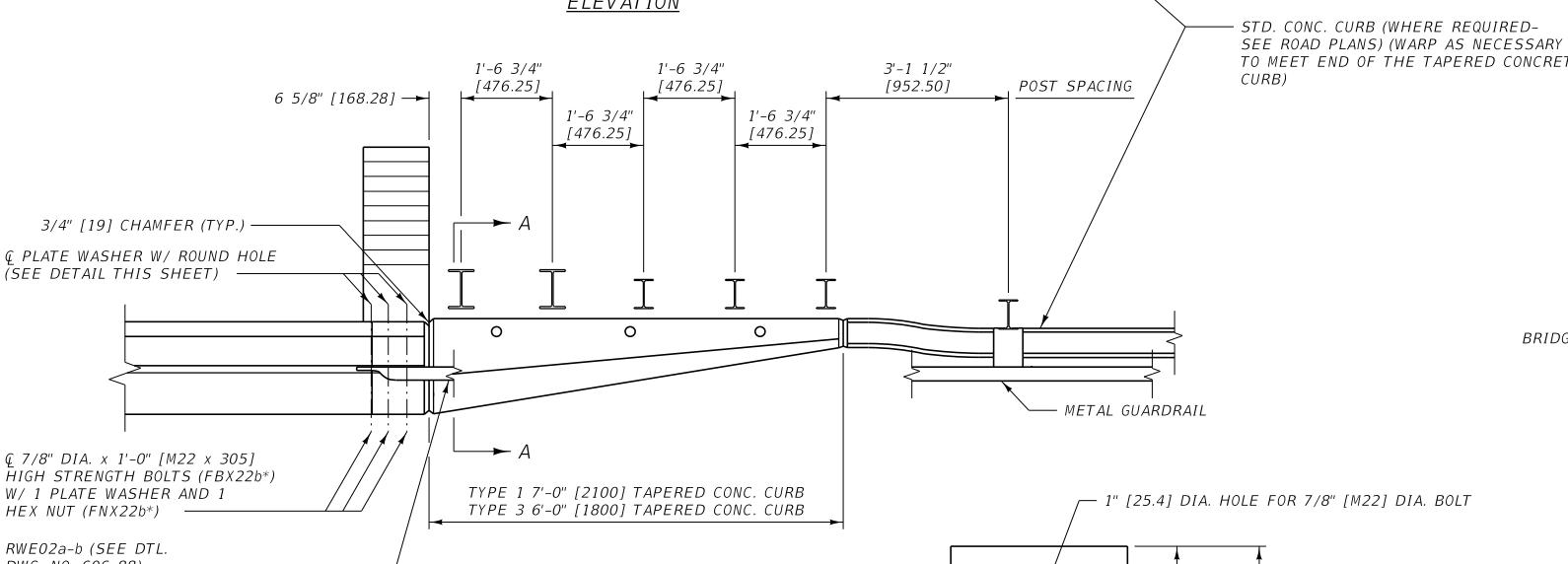
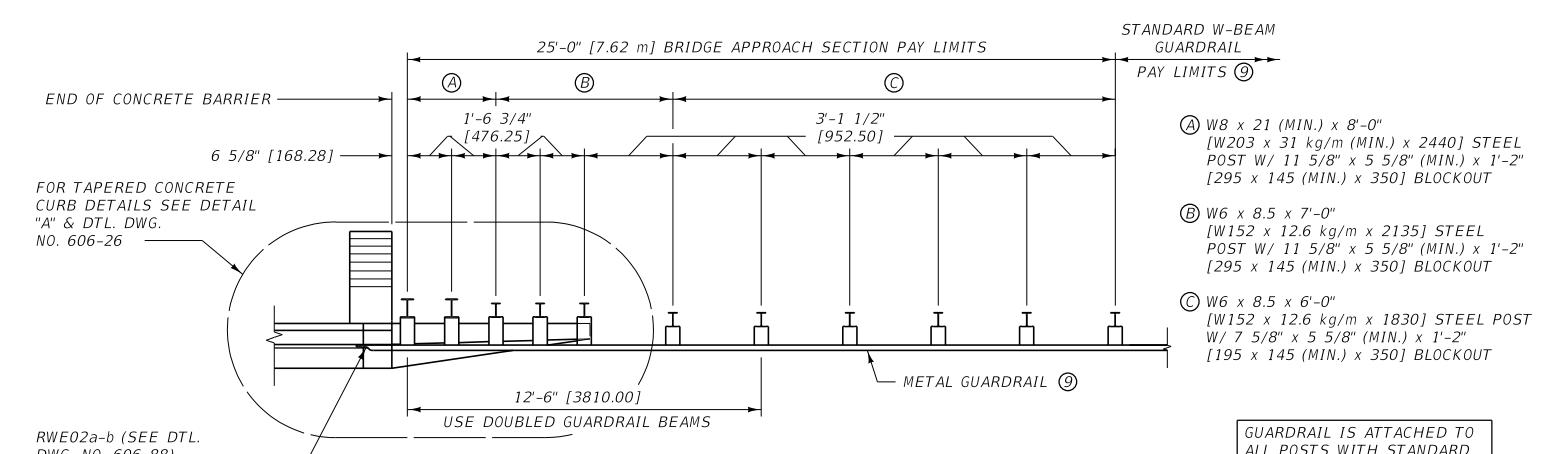
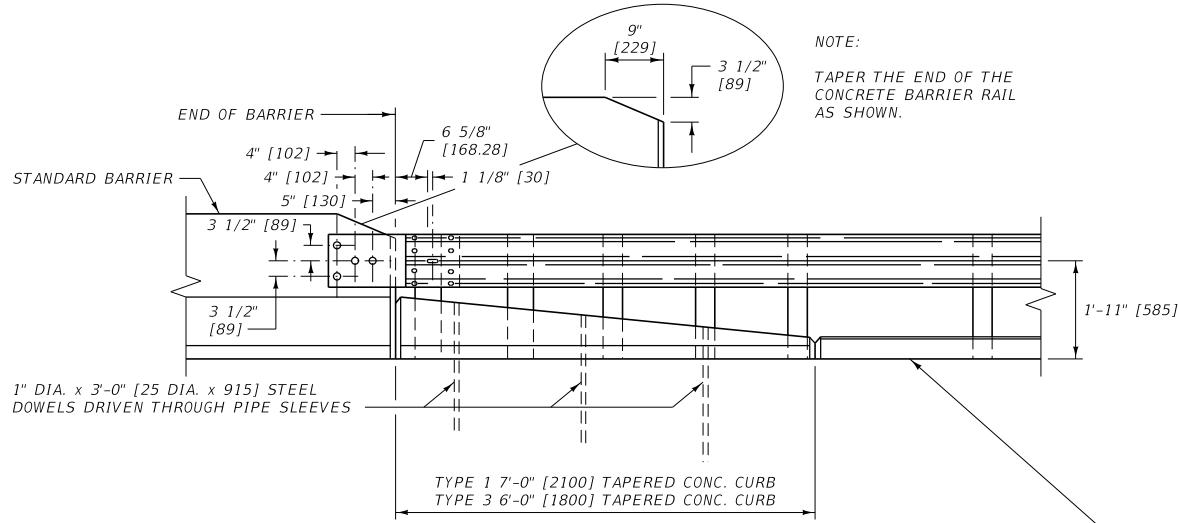
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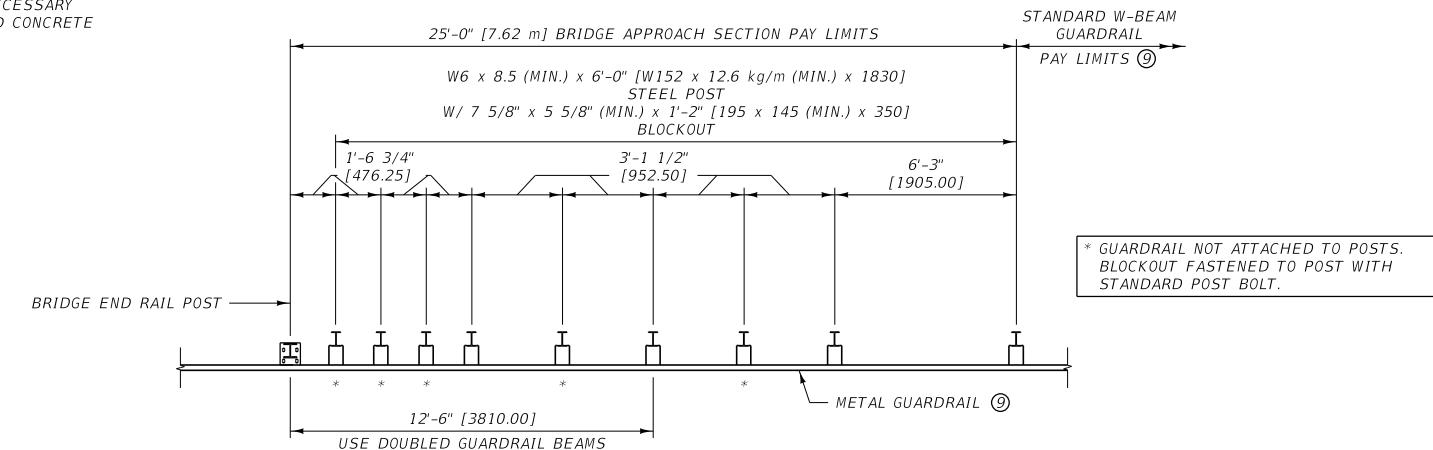


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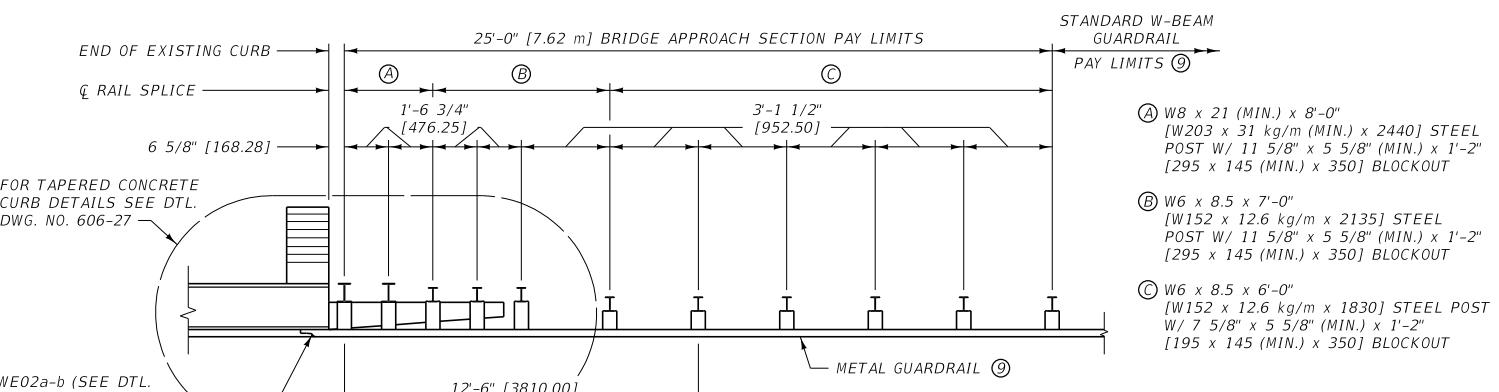
- ① TAPERED CONCRETE CURBS:
TYPE 1, SEE DTL. DWG. NO. 606-26
TYPE 3, SEE DTL. DWG. NO. 606-27
- ② TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.
- ③ PORTIONS OF GUARDRAIL & BLOCKOUTS ARE OMITTED FOR CLARITY.
- ④ LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
(SEE DTL. 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)



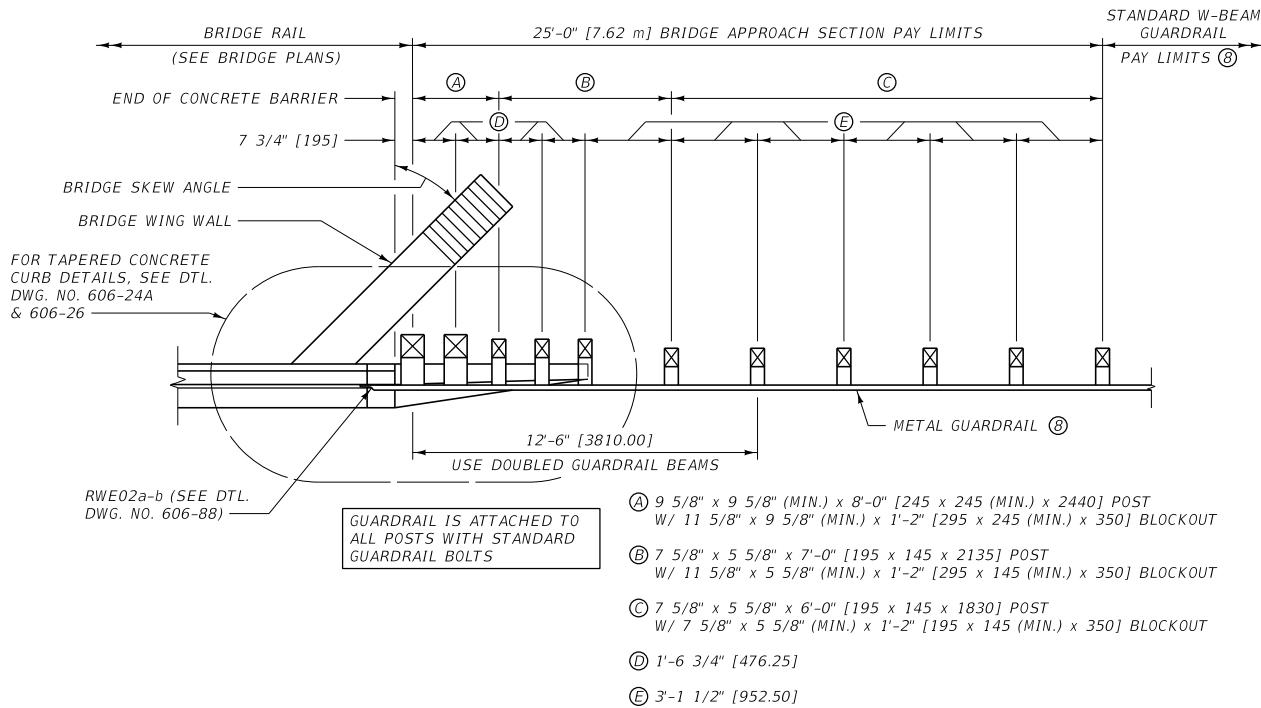
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

GUARDRAIL IS ATTACHED TO ALL POSTS WITH STANDARD GUARDRAIL BOLTS

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

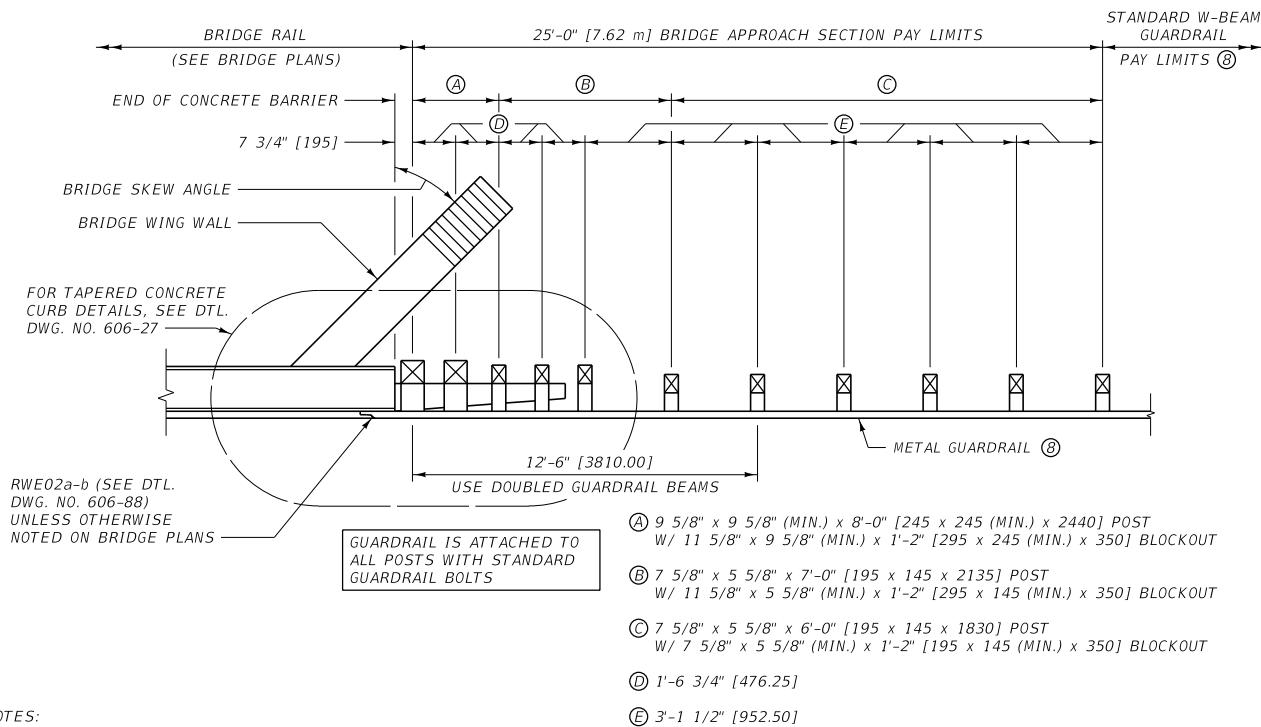
REFERENCE DWG. NO.	STANDARD SPEC.	SECTION 606
BRIDGE APPROACH SECTIONS - STEEL POSTS		

MDT MONTANA DEPARTMENT OF TRANSPORTATION



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1

(FOR SKEWED BRIDGES USING CONCRETE BARRIER RAIL)



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.

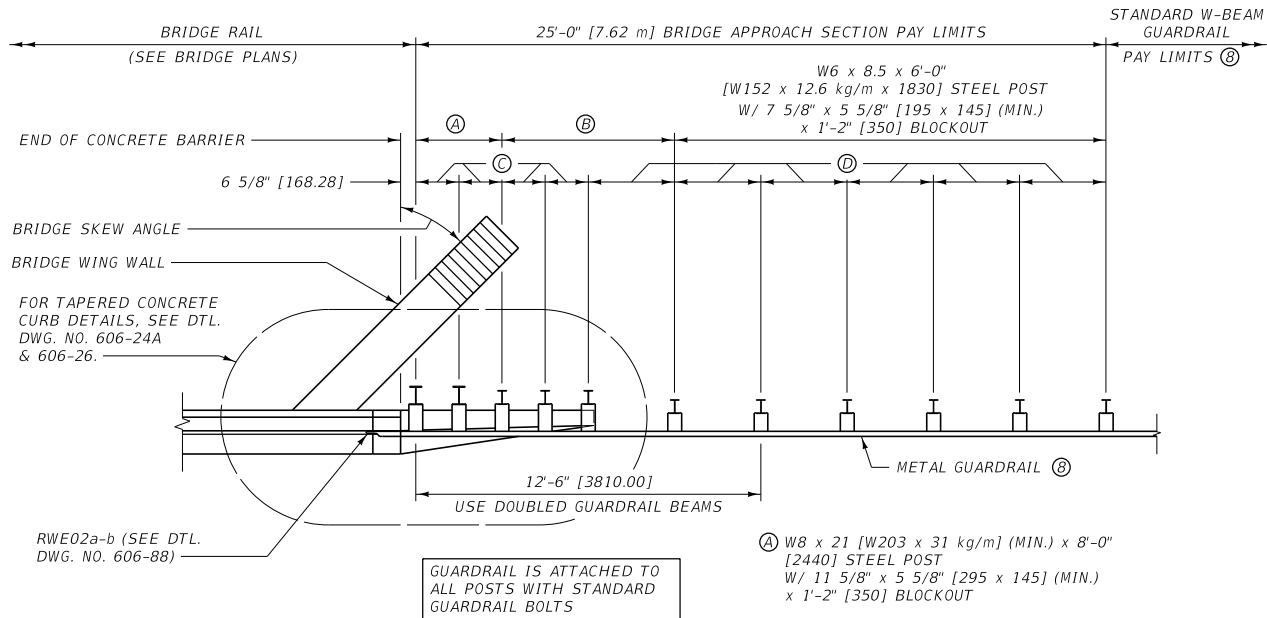
⑧ SEE DTL. DWG. NO. 606-05A FOR METAL GUARDRAIL (W-BEAM).

METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3

(FOR SKEWED BRIDGES WITH EXISTING CONCRETE CURBS)

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

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



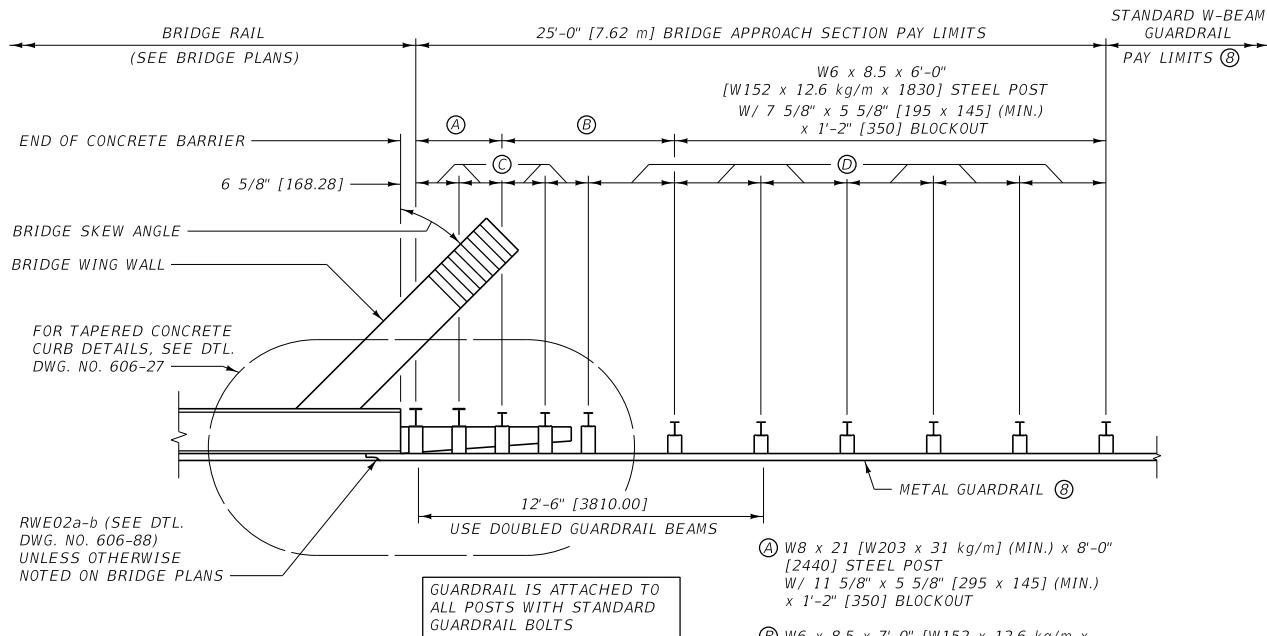
METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1
(FOR SKewed BRIDGES USING CONCRETE BARRIER RAIL)

Ⓐ W8 x 21 [W203 x 31 kg/m] (MIN.) x 8'-0"
[2440] STEEL POST
W/ 11 5/8" x 5 5/8" [295 x 145] (MIN.)
x 1'-2" [350] BLOCKOUT

Ⓑ W6 x 8.5 x 7'-0" [W152 x 12.6 kg/m x
2135]
STEEL POST W/ 11 5/8" x 5 5/8" [295 x 145] (MIN.) x 1'2" [350] BLOCKOUT

Ⓒ 1'-6 3/4" [476.25] SPACING BETWEEN POSTS

Ⓓ 3'-1 1/2" [952.50] SPACING BETWEEN POSTS



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

Ⓐ W8 x 21 [W203 x 31 kg/m] (MIN.) x 8'-0"
[2440] STEEL POST
W/ 11 5/8" x 5 5/8" [295 x 145] (MIN.)
x 1'-2" [350] BLOCKOUT

Ⓑ W6 x 8.5 x 7'-0" [W152 x 12.6 kg/m x
2135] STEEL POST
W/ 11 5/8" x 5 5/8" [295 x 145] (MIN.) x 1'2" [350] BLOCKOUT

Ⓒ 1'-6 3/4" [476.25] SPACING BETWEEN POSTS

Ⓓ 3'-1 1/2" [952.50] SPACING BETWEEN POSTS

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.

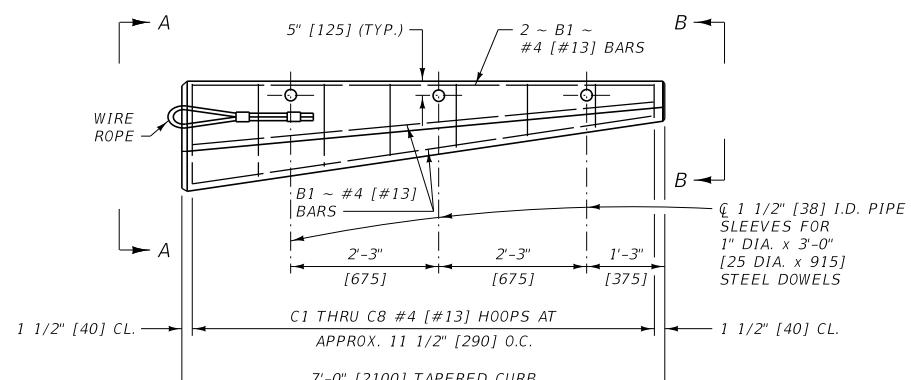
⑥ DO NOT FLARE BRIDGE APPROACH SECTIONS.

⑦ SEE DTL. DWG. NO. 606-24B FOR ADDITIONAL INFORMATION.

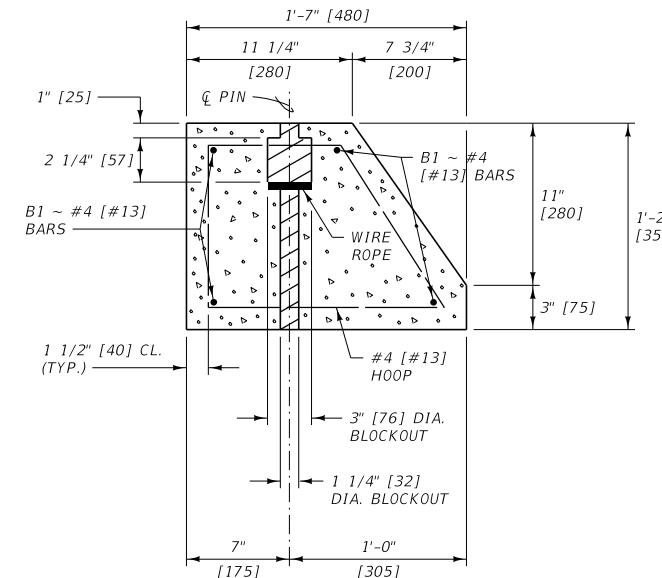
⑧ SEE DTL. DWG. NO. 606-05B FOR METAL GUARDRAIL (W-BEAM).

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

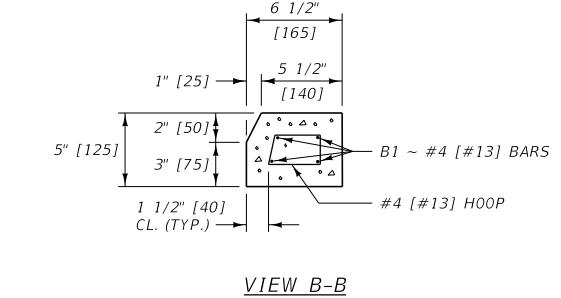
DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-25B
SECTION 606	
SKEWED BRIDGE APPROACH SECTIONS - STEEL POSTS	
MDT MONTANA DEPARTMENT OF TRANSPORTATION	



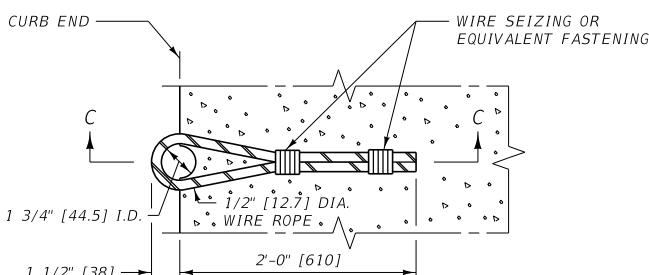
PLAN



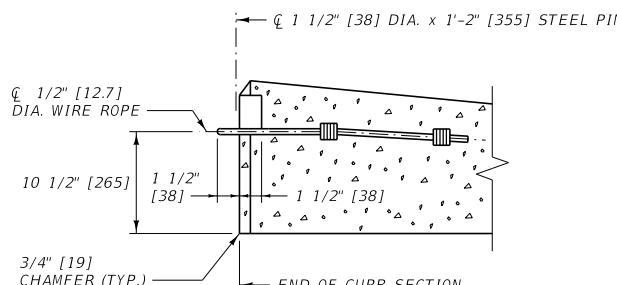
VIEW A-A



VIEW B-B



WIRE ROPE DETAIL



SECTION C-C

NOTES:

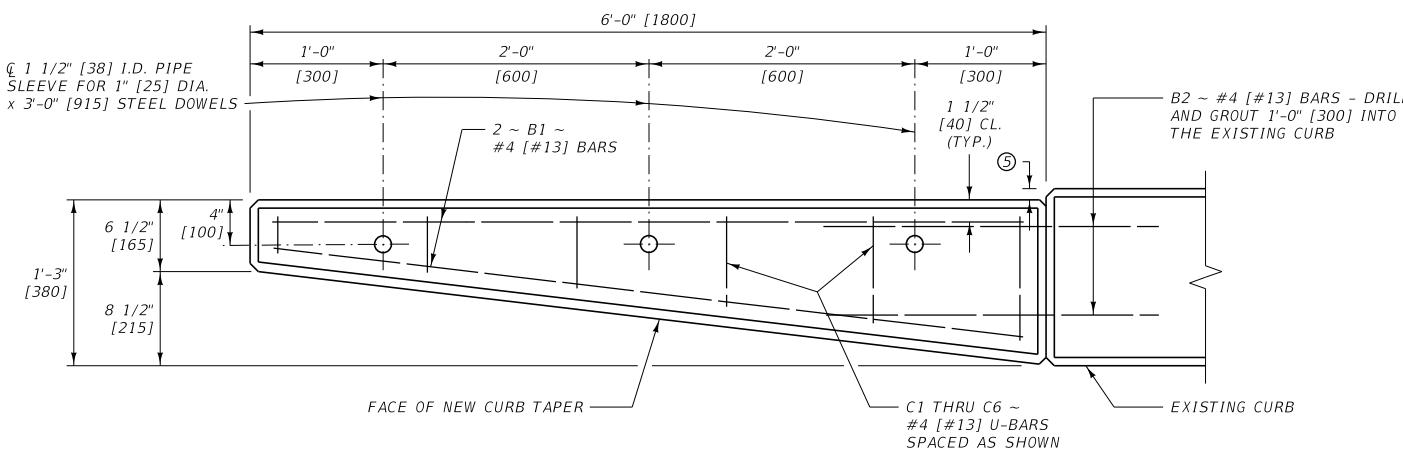
- ① TAPERED CONCRETE CURB IS USED WITH BRIDGE APPROACH SECTION TYPE 1 (SEE DTL. DWG. NO. 606-24A AND 606-24B).
- ② FURNISH WIRE ROPE MEETING SECTION 705.
- ③ FURNISH GRADE 60 [420] REINFORCING STEEL MEETING SECTION 711..
- ④ ALL CONCRETE IS CLASS GENERAL.
TOTAL CONCRETE PER 7' [2100 mm] TAPERED CURB EST. = 0.2 C.Y. [0.17 m³]
TOTAL REBAR WEIGHT PER 7' [2100 mm] TAPERED CURB EST. = 34 LB [15.1 kg].

BILL OF REINFORCING STEEL (ONE SECTION ONLY)								
BENT BARS (ALL DIMENSIONS ARE OUT TO OUT)								
MARK	SIZE	NO.	TYPE	LENGTH	A	B	C	D
C1	#4	1	1	4'-8"	11"	1'-4"	1'-1"	9"
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"
C8		1	1	1'-6"	2"	3 1/2"	2"	3 1/2"
B1	#4	4	STRAIGHT	6'-9"	~	~	~	~

METRIC BILL OF REINFORCING STEEL (ONE SECTION ONLY)								
BENT BARS (ALL DIMENSIONS ARE OUT TO OUT IN mm)								
MARK	SIZE	NO.	TYPE	LENGTH	A	B	C	D
C1	#13	1	1	1360	270	395	330	205
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
C8		1	1	415	50	90	60	55
B1	#13	4	STRAIGHT	2020	~	~	~	~

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

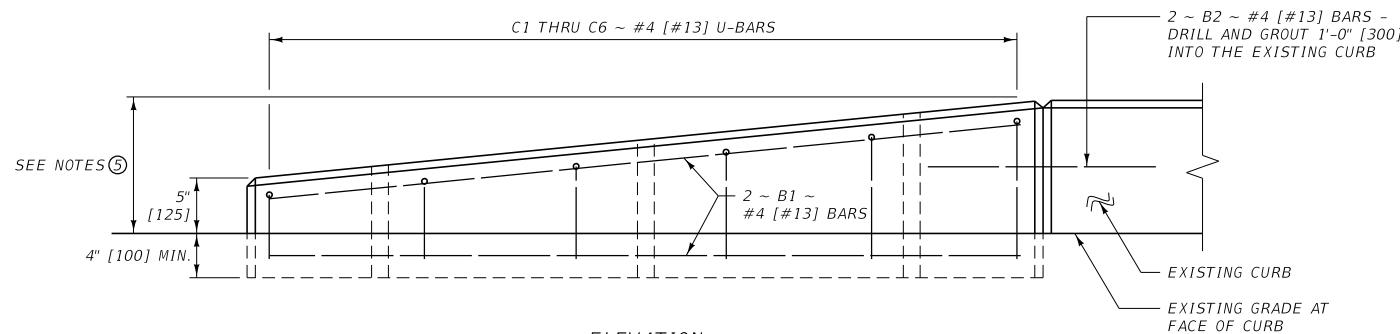
DETAILED DRAWING	REFERENCE DWG. NO.
STANDARD SPEC.	606-26
SECTION 606	
TAPERED CONCRETE CURB DETAIL	



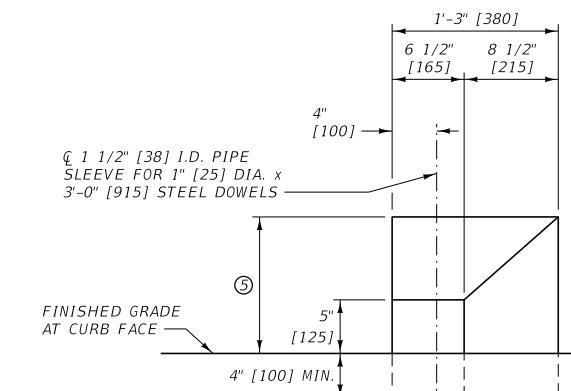
NOTES:

- 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 m³]
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.

PLAN



ELEVATION



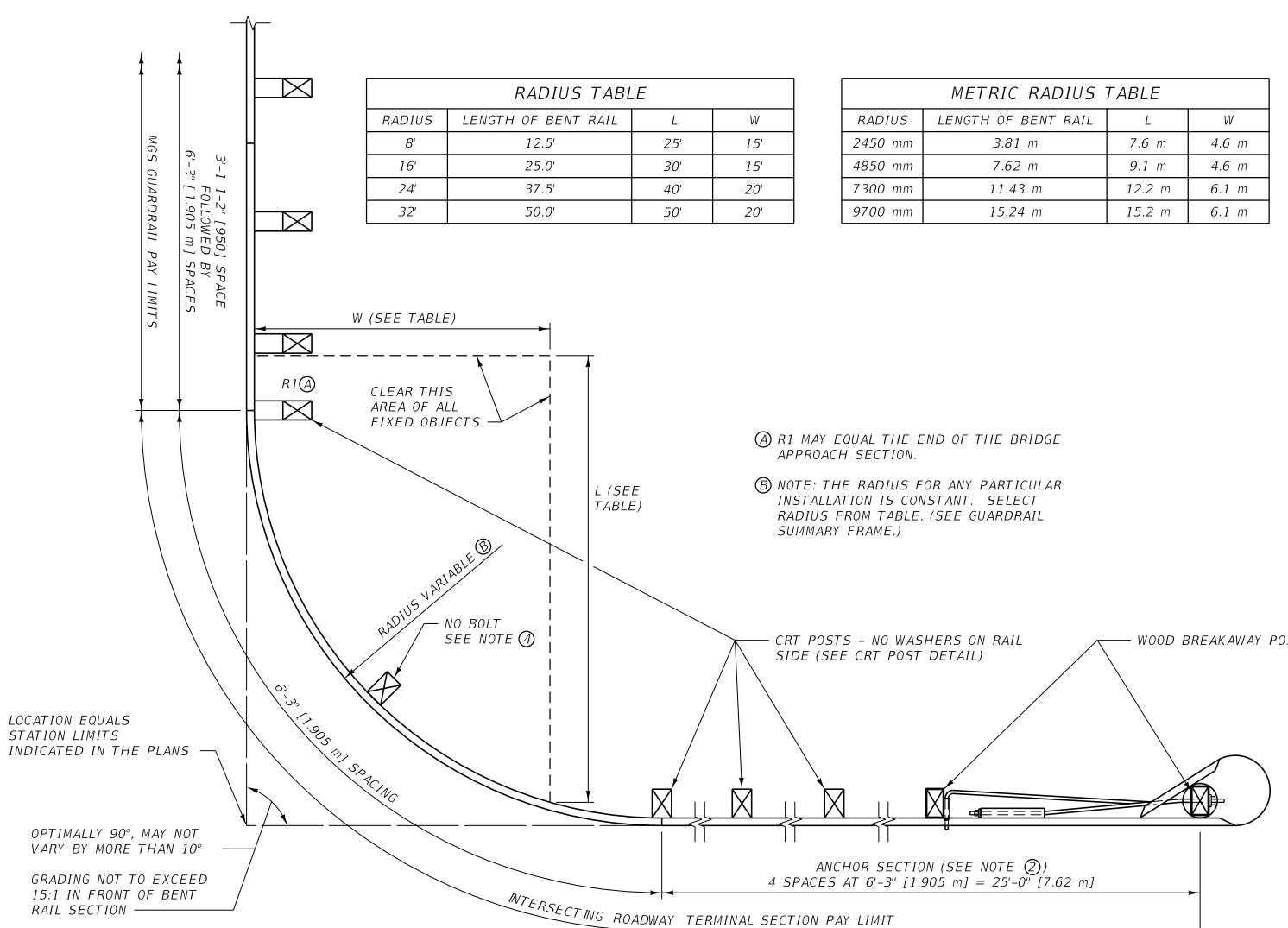
END VIEW

BILL OF REINFORCING STEEL (ONE SECTION ONLY)						
TYPE 1						
BENT BARS (ALL DIMENSIONS ARE OUT TO OUT)						
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"	~	~

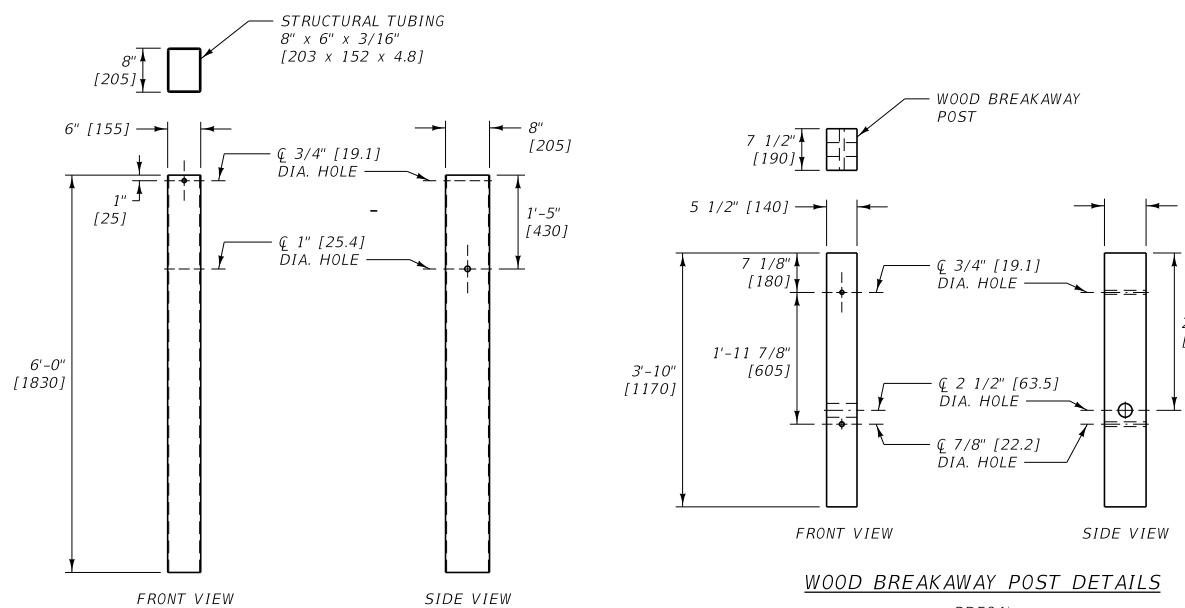
METRIC BILL OF REINFORCING STEEL (ONE SECTION ONLY)						
TYPE 1						
BENT BARS (ALL DIMENSIONS ARE OUT TO OUT)						
MARK	SIZE	NO.	TYPE	LENGTH (mm)	A (mm)	B (mm)
C1	#13	1	1	390	150	90
C2				480	175	130
C3				570	200	170
C4				665	225	215
C5				755	250	255
C6		1	1	845	270	295
B1		4	STRAIGHT	1720	~	~
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. SECTION 606
606-27	
TAPERED CONCRETE CURB DETAIL	
MDT MONTANA DEPARTMENT OF TRANSPORTATION	



PLAN



MGS FOUNDATION TUBE DETAILS

PTE06*

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

Ⓐ R1 MAY EQUAL THE END OF THE BRIDGE APPROACH SECTION.

⑧ NOTE: THE RADIUS FOR ANY PARTICULAR INSTALLATION IS CONSTANT. SELECT RADIUS FROM TABLE. (SEE GUARDRAIL SUMMARY FRAME.)

LOCATION EQUALS
STATION LIMITS
INDICATED IN THE

OPTIMALLY 90°, MAY NOT VARY BY MORE THAN 10°

ANCHOR S
4 SPACES AT 6'-3"

INTERSECTING ROADWAY TERMINAL SECTION PAY LIMIT

CABLES TO HAVE LESS THAN 1 1/2" [38] OF SAG AFTER INSTALLATION

THREADED CABLE END TOWARD TRAFFIC

FCA01*

18" [455]

1' - 0" [305] 1' - 4" [406]

2" [50] 4" [102]

2" [50]

FPA01* ANCHOR BRACKET

FBB02* (OR FBX16a* BOLT AND FNX16a* NUT WITH FWC24a* WASHER UNDER HEAD AND NUT)

31" [787]

6 ~ 3/4" [19.1] CABLE CLIPS (TYP.)

4 1/2" [114] TYP.

U-BOLTS ON THIS CABLE

FMM02* FWC24a* FNX24a* BEARING PLATE (SEE DETAIL RI)

5" [125]

1/4" [6 mm] V

9 1/2" [241] FBX20a* FNX20a*

SOIL PLATE (SEE DETAIL RIGHT)

3 3/8" [85]

3/4" [19.1] DIA. CABLE, ONE END SWAGED

BOX BEAM, HSS 2 1/2" x 2 1/2" x 1/4" [64 x 64 x 6.4]

1/4" [6 mm] V

WOOD BREAK-AWAY POST (SEE DETAIL)

TWO 8" [203] FB TWO FNX20a* (TWO FWC20a* WASHERS EACH)

CBT POST DETAIL

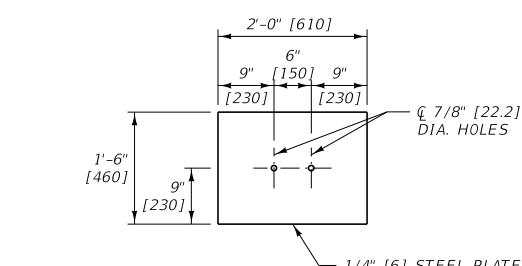
BDE00*

- ① DO NOT INSTALL ON SLOPES STEEPER THAN 2:1.
- ② DO NOT OMIT OR SHORTEN ANCHOR SECTION.
- ③ SEE DTL. DWG. NO. 606-05A FOR GUARDRAIL WIDENING REQUIREMENTS.
- ④ DO NOT BOLT THE RAIL TO THE CRT POST LOCATED AT THE CENTER OF THE BENT RAIL.

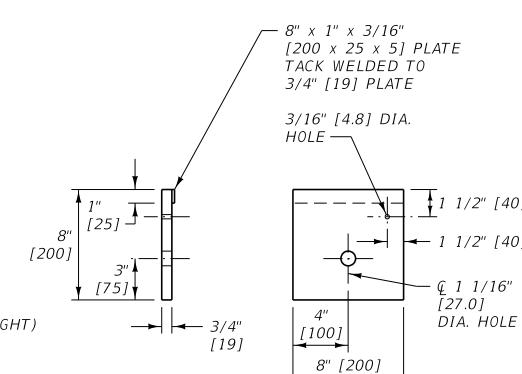
© 2005 RTI. SWIG. NO. 606-00-502. GOMERVILLE, 25. SHADBUSH, HARRIET

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

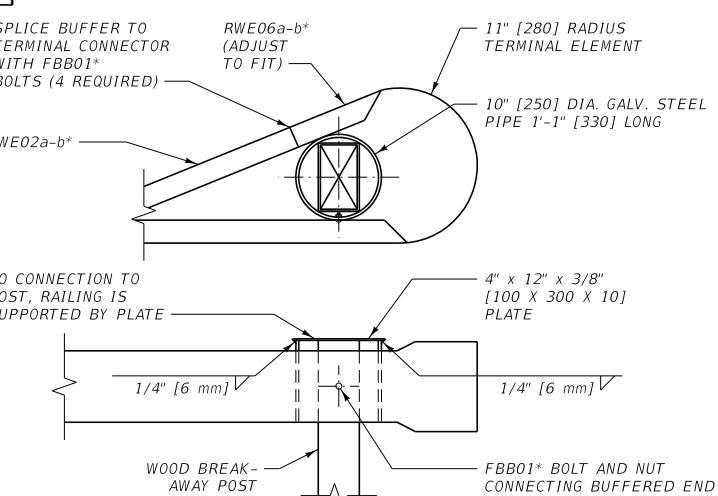
* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



SOIL PLATE DETAIL



BEARING PLATE DETAIL

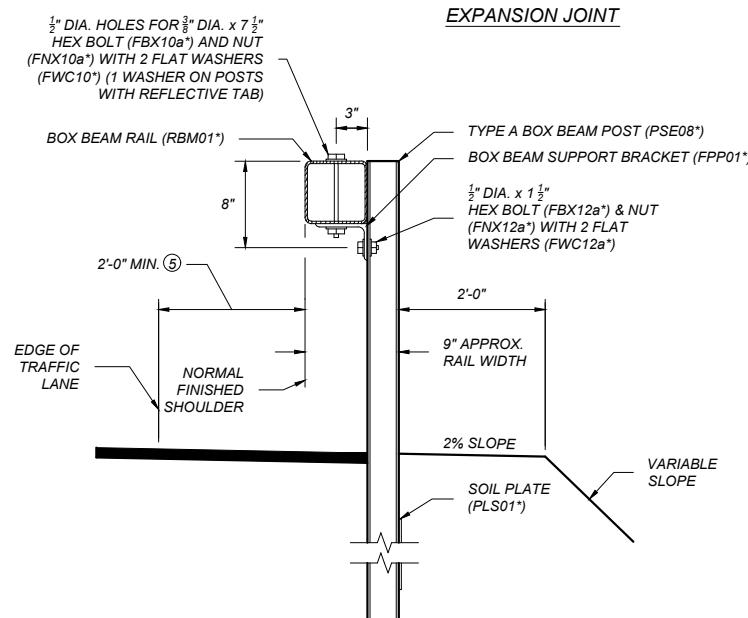
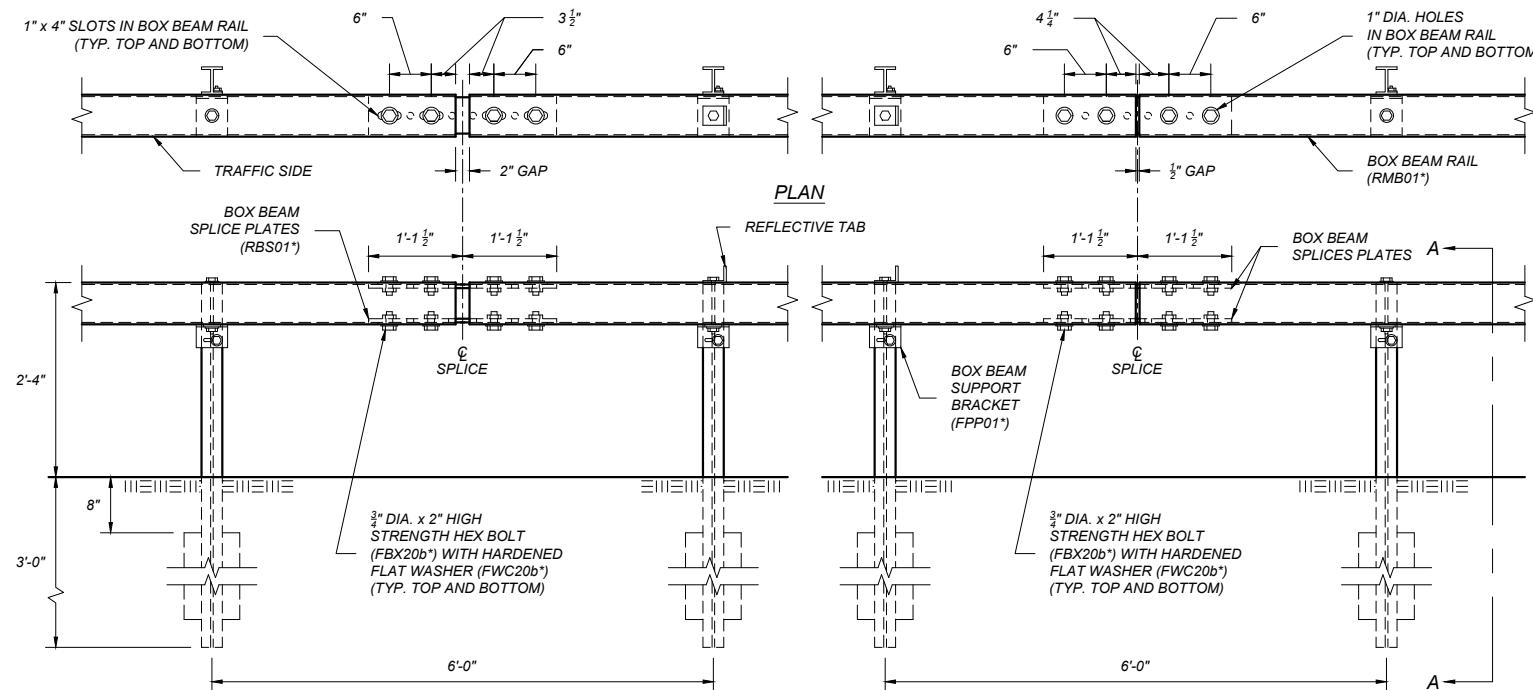


DETAIL 4

DETAILED DRAWING

REFERENCE DWG. NO.
STANDARD SPEC. 606-46
SECTION 606

INTERSECTING ROADWAY TERMINAL SECTION (MGS)



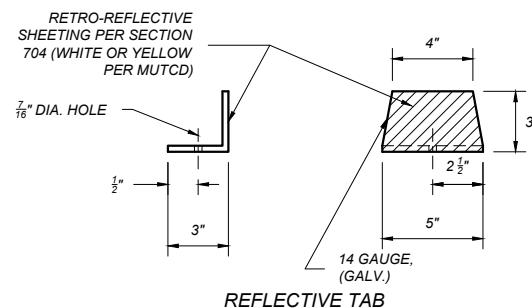
ELEVATION

NOTES:

- ① USE BOX BEAM RAIL IN MINIMUM NOMINAL LENGTHS OF 18 FEET UNLESS APPROVED BY THE PROJECT MANAGER.
- ② INSTALL EXPANSION JOINTS ON ALL BOX BEAM GUARDRAIL INSTALLATIONS GREATER THAN 300 FEET IN LENGTH AT INTERVALS NOT TO EXCEED 500 FEET.
- ③ ATTACH REFLECTIVE TABS TO EVERY FOURTH POST (24 FEET 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 5.6' OF THE FACE OF THE RAIL.
- ⑤ WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" FROM THE TRAFFIC LANE.
- ⑥ PROVIDE SHOP BENT BOX BEAM RAIL FOR ROADWAY CURVATURE WITH RADII OF LESS THAN 715 FEET.

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

SPLICE DETAIL



DETAILED DRAWINGS

REFERENCE
STANDARD SPEC.
SECTION 606, 704

DWG. NO.
606-50

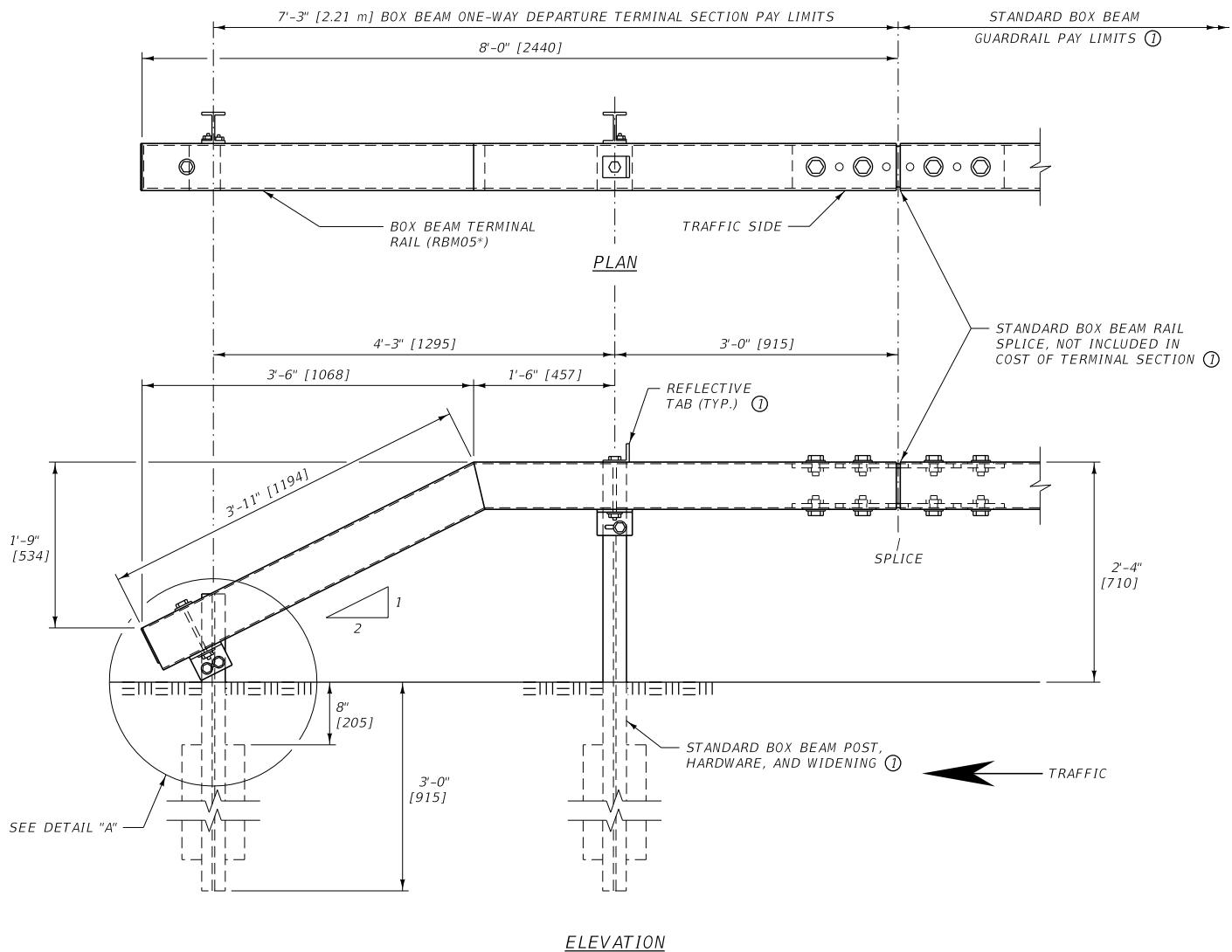
BOX BEAM GUARDRAIL

EFFECTIVE: JAN 23, 2020

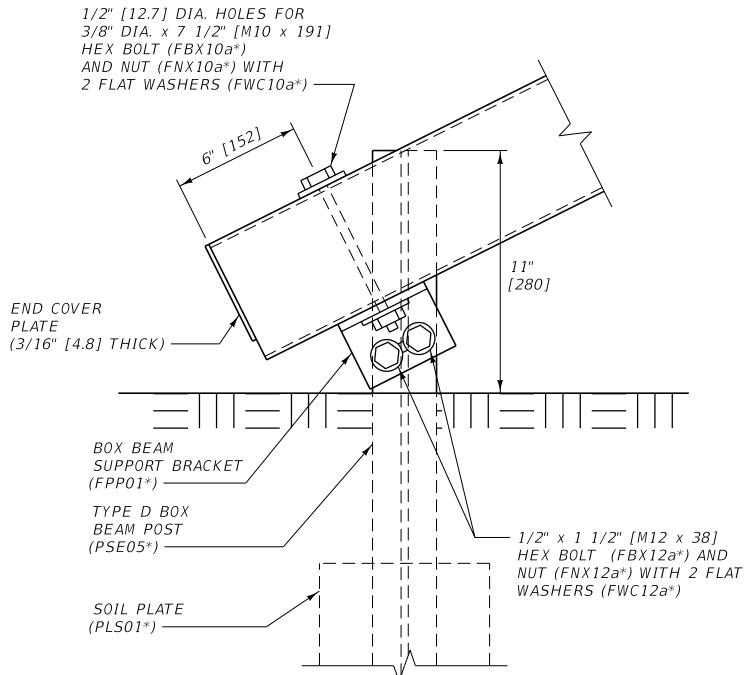


MONTANA
Department of Transportation

--REVISED--
JAN 15, 2026



ELEVATION



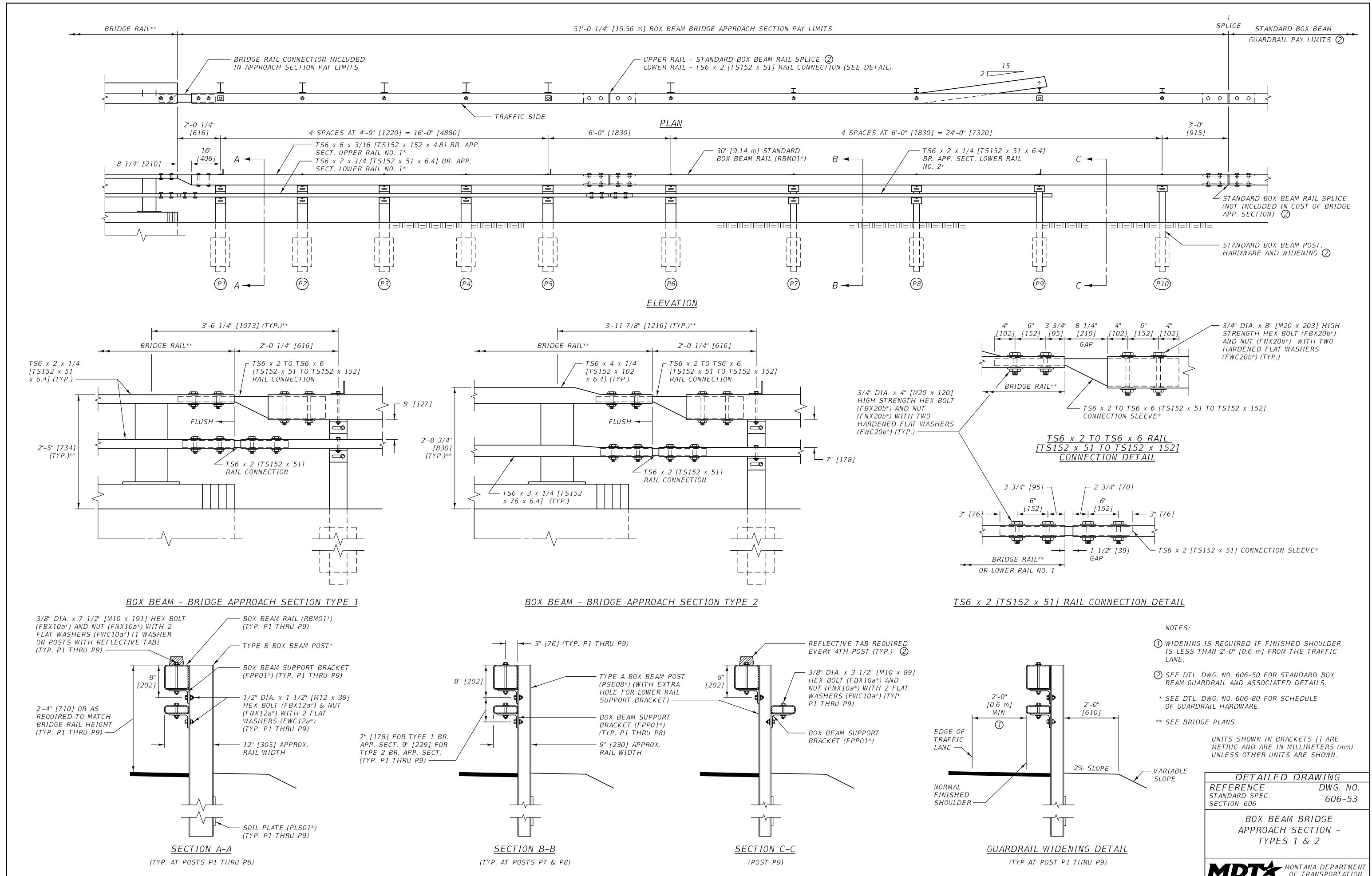
NOTES:

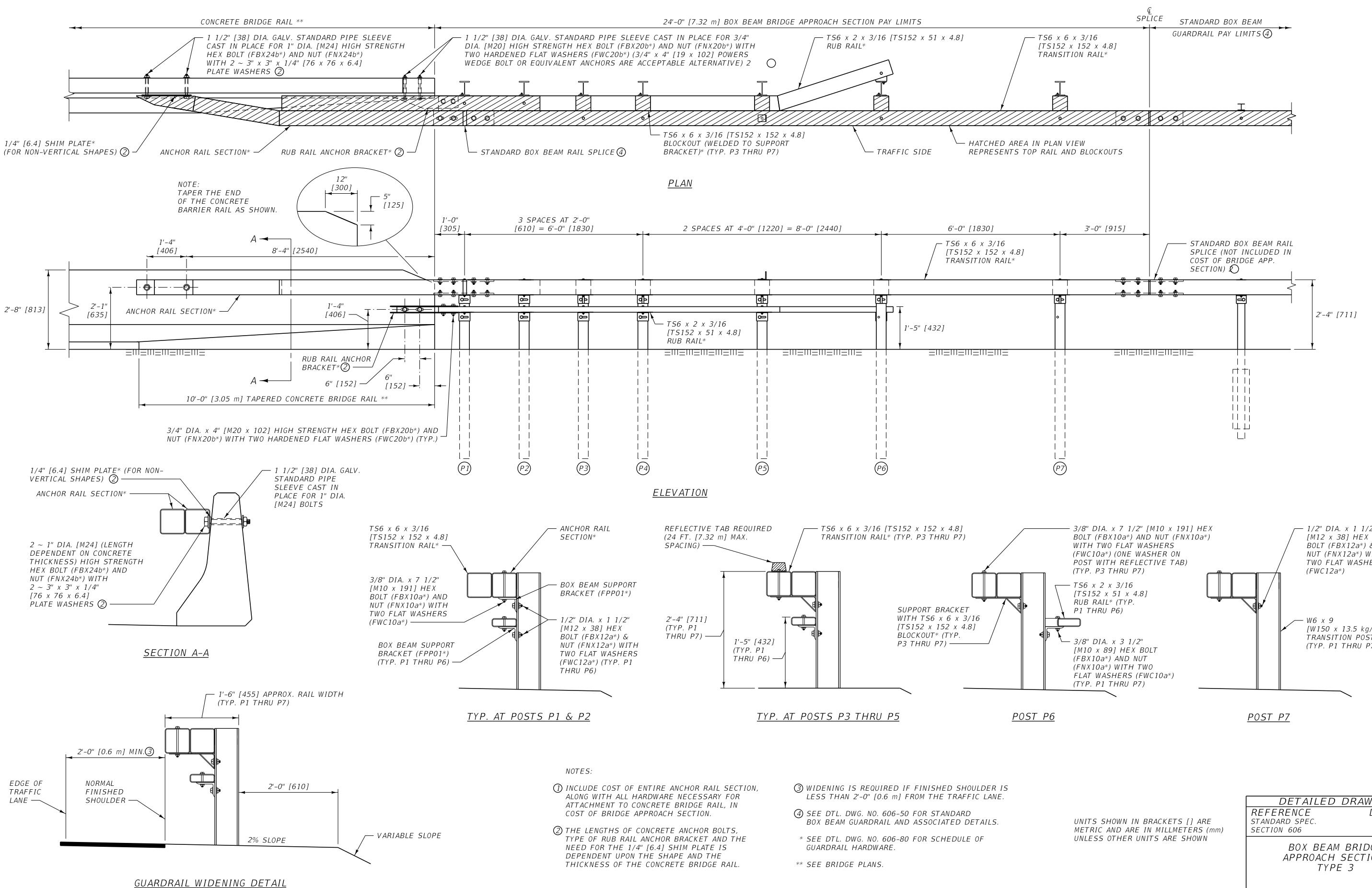
① SEE DTL. DWG. NO. 606-50 FOR
STANDARD BOX BEAM GUARDRAIL
AND ASSOCIATED DETAILS.

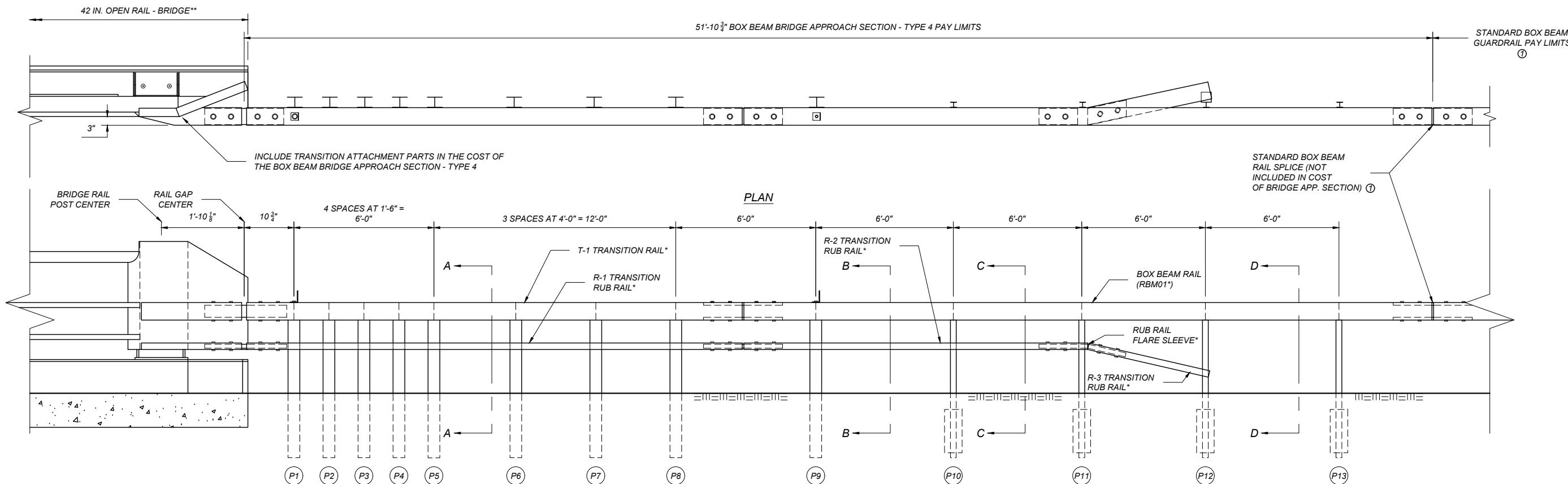
* SEE DTL. DWG. NO. 606-80 FOR
SCHEDULE OF GUARDRAIL HARDWARE.

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

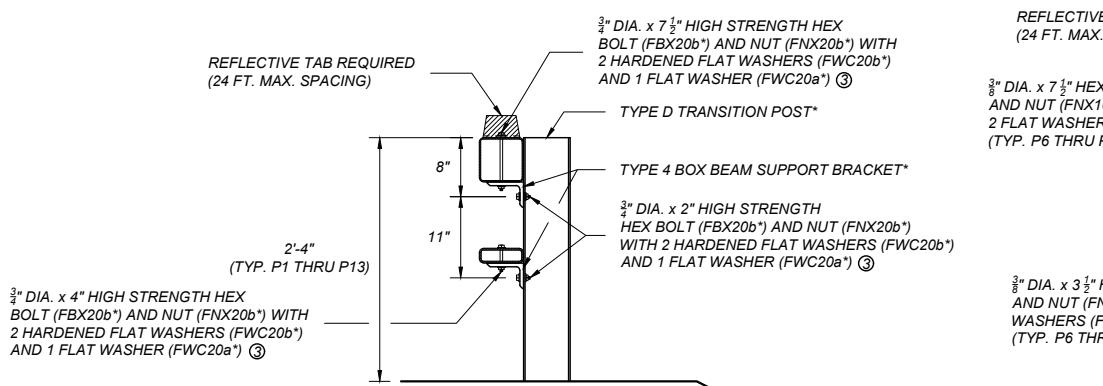
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-52
BOX BEAM ONE-WAY DEPARTURE TERMINAL SECTION	



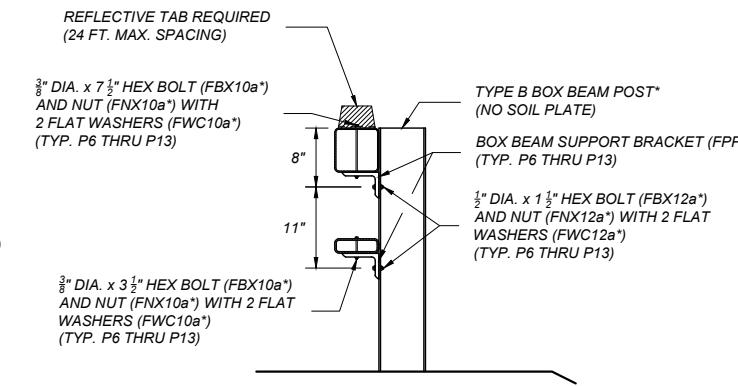




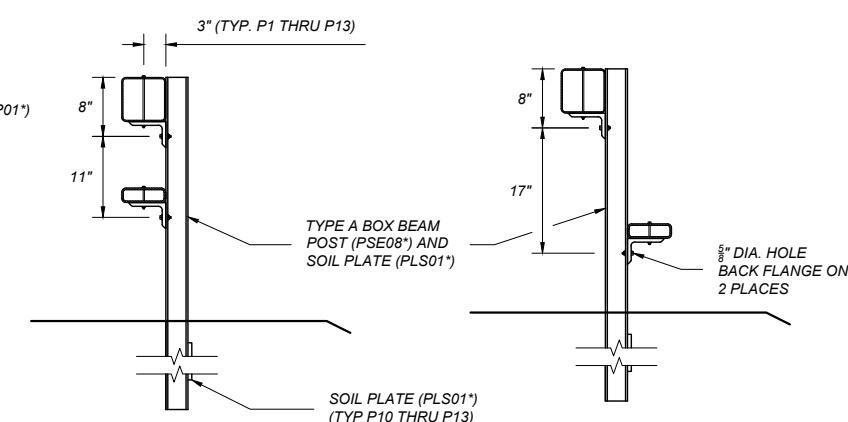
ELEVATION



SECTION A-A
(TYP. AT POSTS P1 - P5)

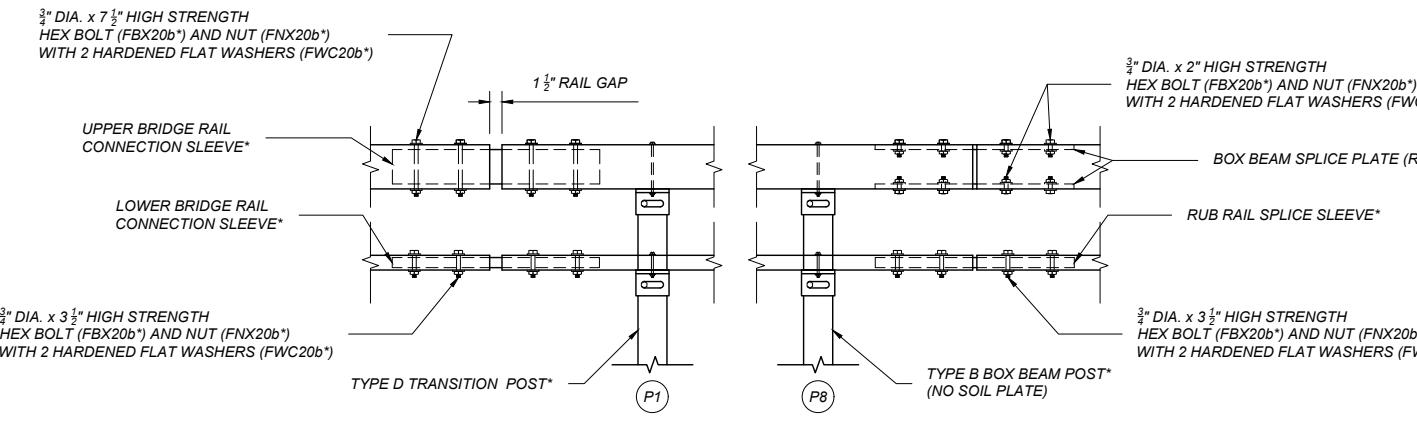


SECTION B-B
(TYP. AT POSTS P6 - P9)

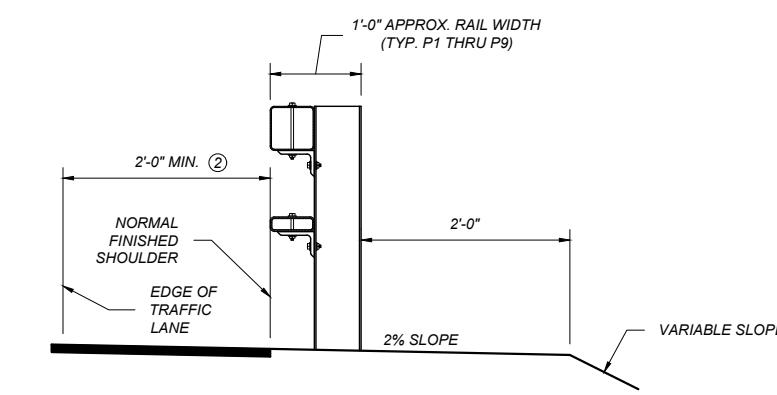


SECTION C-C
(TYP. AT POSTS P10 & P11)

SECTION D-D
(TYP. AT POST P12)



T-1 & R-1 RAIL CONNECTION DETAIL



GUARDRAIL WIDENING DETAIL

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

② WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" FROM THE TRAFFIC LANE.

③ PLACE HARDENED WASHERS (FWC20b*) UNDER BOLT HEAD AND NUT. ADD LARGER DIAMETER WASHER (FWC20a*) AGAINST BRACKET SLOT.

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

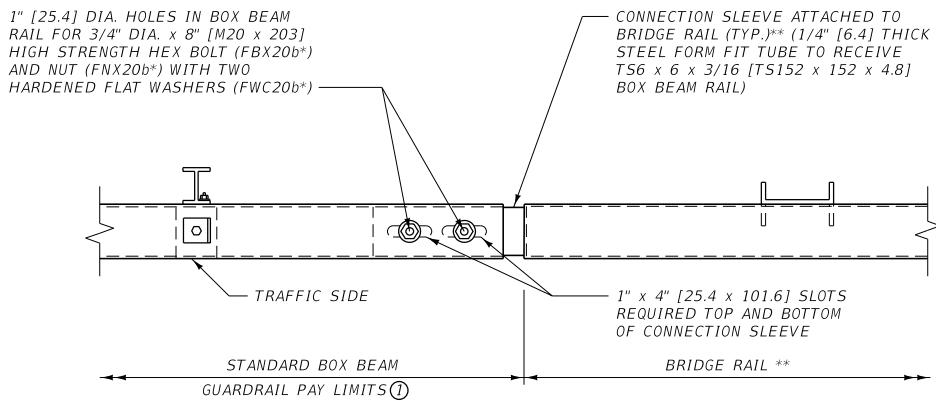
**SEE BRIDGE PLANS

DETAILED DRAWINGS

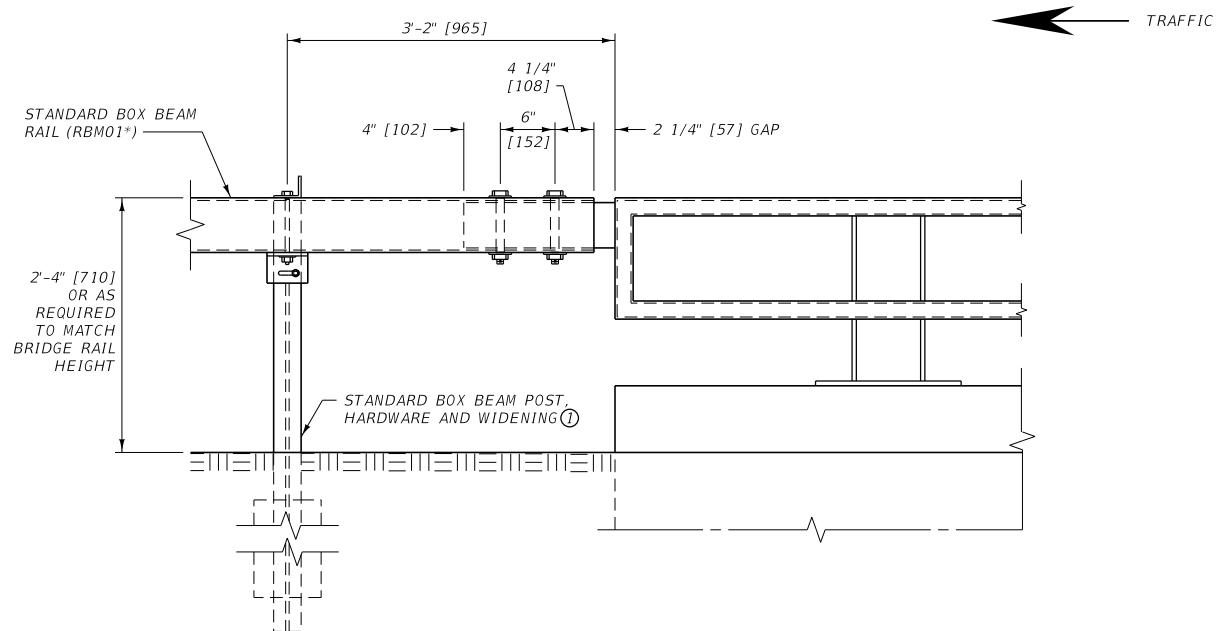
REFERENCE DWG. NO.
STANDARD SPEC. 606-53B
SECTION 606

BOX BEAM BRIDGE APPROACH SECTION - TYPE 4

EFFECTIVE: JUN 27, 2024



PLAN



ELEVATION

NOTES:

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

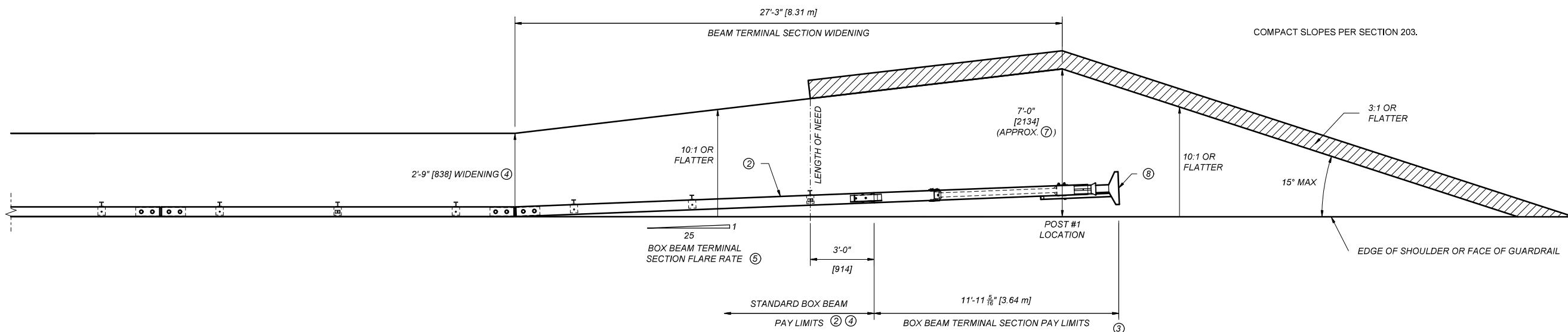
② USE ON EXIT END OF ONE-WAY TRAFFIC BRIDGES ONLY.

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

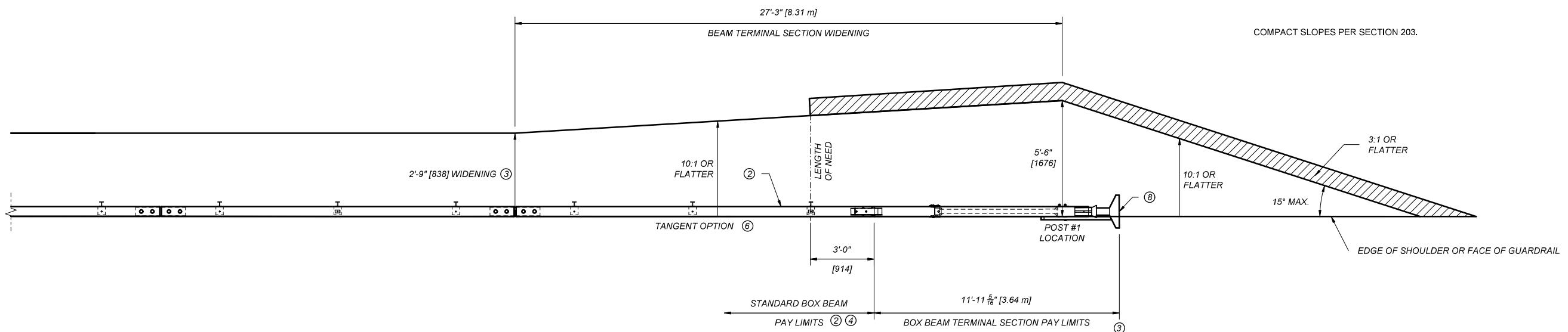
** SEE BRIDGE PLANS FOR MORE DETAILED INFORMATION ON BRIDGE RAIL AND CONNECTION DETAILS.

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

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



ROAD SYSTEMS MBEAT TERMINAL (FLARED) ①



ROAD SYSTEMS MBEAT TERMINAL (TANGENT) ①

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

① REFER TO MANUFACTURER'S DETAIL AND ASSEMBLY INSTRUCTIONS.

② THE MBEAT REQUIRES AN 18'-0" [5.49 m] LONG (MINIMUM) SECTION OF STANDARD BOX BEAM RAIL FOR MASH TEST LEVEL 3 APPLICATIONS.

③ LOCATION EQUALS STATION LIMITS INDICATED IN THE PLANS.

④ SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.

⑤ FLARE THE END SECTION AWAY FROM TRAFFIC AT A RATE OF 25:1 FOR 30 FEET [9.14 m] (ILLUSTRATED). FLARES OF 25:1 FOR 48 FEET [14.63 m] MAY ALSO BE USED.

⑥ THE FLARE MAY BE OMITTED ON ROADS WITH SHOULDERS GREATER THAN 2 FEET [0.6 m] IN WIDTH. DO NOT FLARE THE END SECTION ON INTERSTATE APPLICATIONS.

⑦ 7'-0" [2134] WIDENING DIMENSION ALLOWS FOR BOX BEAM TERMINAL SECTION FLARE AND SYSTEM WIDTH. A MINIMUM WIDENING DISTANCE OF 5'-0" [1524] IS REQUIRED BEHIND POST LOCATION #1.

⑧ 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.

DETAILED DRAWINGS

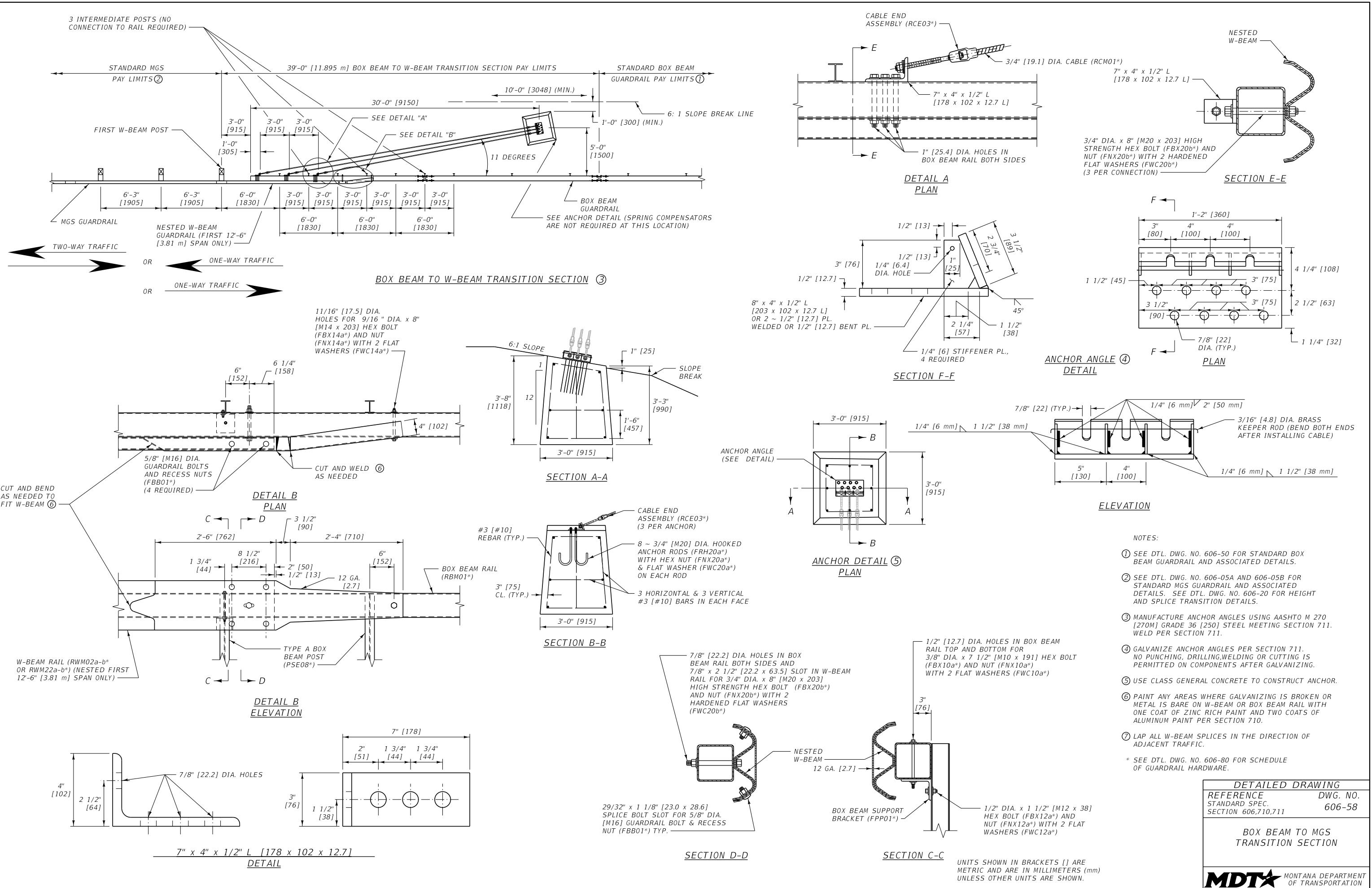
REFERENCE DWG. NO.
STANDARD SPEC. 606-55
SECTION 606

BOX BEAM TERMINAL SECTION - MBEAT

EFFECTIVE: APR 28, 2022



REVISED--
JUN 27, 2024



SCHEDULE OF GUARDRAIL HARDWARE				DTL. DWGS. WHERE PARTS USED																
DESIGNATION ①	DESCRIPTION	DTL. DWG. NO. (606-###)	GUARDRAIL TYPE ②	606-05A	606-05B	606-07	606-09	606-11A	606-11B	606-18	606-23A	606-23B	606-24A	606-24B	606-46	606-50	606-52	606-53	606-54	606-58
FBB01-05	5/8" DIA. GUARDRAIL BOLT & RECESS NUT	82	W	X		X	X								X				X	
FBB01-05	5/8" DIA. GUARDRAIL BOLT	82	W		X			X												
FBB06-07	5/8" DIA. GUARDRAIL BOLT & RECESS NUT	82	W							X	X									
FBX10a	3/8" DIA. HEX BOLT	82	B													X	X	X	X	X
FBX12a	1/2" DIA. HEX BOLT	82	B												X	X	X	X	X	
FBX14a	9/16" DIA. HEX BOLT	82	B																	X
FBX16a	5/8" DIA. HEX BOLT	82	W					X							X					
FBX20a	3/4" DIA. HEX BOLT	82	W							X					X					
FBX20b	3/4" DIA. HIGH STRENGTH HEX BOLT*	82	B												X	X	X	X	X	
FBX22b	7/8" DIA. HIGH STRENGTH HEX BOLT*	82	W							X	X	X	X						X	
FBX24b	1" DIA. HIGH STRENGTH HEX BOLT*	82	B																	
FCA01	CABLE ASSEMBLY	84	W					X							X					
FMM01	CABLE WEDGE	94	C																	X
FMM02	POST SLEEVE	84	W					X							X					
FNS20	3/4" DIA. SQUARE NUT	82	C																	X
FNX10a	3/8" DIA. HEX NUT	82	B												X	X	X	X	X	
FNX12a	1/2" DIA. HEX NUT	82	B												X	X	X	X	X	
FNX14a	9/16" DIA. HEX NUT	82	B																	X
FNX16a	5/8" DIA. HEX NUT	82	W		X		X	X							X					
FNX20a	3/4" DIA. HEX NUT	82	C,W												X					X
FNX20b	3/4" DIA. HIGH STRENGTH HEX NUT	82	B														X	X	X	X
FNX22b	7/8" DIA. HIGH STRENGTH HEX NUT	82	B							X	X	X	X							
FNX24a	1" DIA. HEX NUT	82	W					X							X					
FNX24b	1" DIA. HIGH STRENGTH HEX NUT	82	B																	X
FPA01	GUARDRAIL ANCHOR BRACKET & END PLATE	84	W							X					X					
FPP01	BEARING PLATE	18 & 46	W							X					X					
FPP01	BOX BEAM SUPPORT BRACKET	97	B												X	X	X	X	X	X
FRH20a	3/4" DIA. HOOKED ANCHOR ROD	82	C																	X
FWC10a	3/8" DIA. FLAT WASHER	82	B												X	X	X	X	X	X
FWC12a	1/2" DIA. FLAT WASHER	82	B												X	X	X	X	X	X
FWC14a	9/16" DIA. FLAT WASHER	82	B																	X
FWC16a	5/8" DIA. FLAT WASHER	82	W		X	X	X	X	X	X					X					
FWC20a	3/4" DIA. FLAT WASHER	82	C,W												X				X	X
FWC20b	3/4" DIA. HARDENED FLAT WASHER	82	B												X				X	X
FWC24a	1" DIA. FLAT WASHER	82	W					X							X					
FWR03	RECTANGULAR PLATE WASHER	84	W					X												
PDB01	8" WOOD BLOCKOUT	05A & 05B, 11A & 11B	W	X	X		X	X												
PDB11	12" WOOD BLOCKOUT	09, 23A & 23B	W			X			X	X										
PDE02	WOOD GUARDRAIL POST	05A & 11A	W	X			X													
PDE09	CRT POST	46	W			X									X					
PDF01	WOOD BREAKAWAY POST	46	W							X					X					
PPF01	STRUT AND YOKE ASSEMBLY	18	W							X										
PLS01	SOIL PLATE	92 & 97	B												X	X	X	X	X	
PLS03	SOIL PLATE	46	W												X					
PSE05	TYPE D BOX BEAM POST	97	B												X					
PSE08	TYPE A BOX BEAM POST	97	B												X	X	X	X	X	
PTE05	STEEL TUBE	46	W												X					
PTE06	STEEL TUBE	18	W							X										
PWE01	STEEL GUARDRAIL POST	05B	W		X		X								X					
RBM01	BOX BEAM RAIL	98	B												X	X	X	X	X	X
RBM05	BOX BEAM TERMINAL RAIL	98	B												X					
RBS01	BOX BEAM SPLICE PLATE	98	B												X					
RCE03	CABLE END ASSEMBLY	94	C																	X
RCM01	3/4" DIA. CABLE	94	C																	X
RTE01b	THRIE-BEAM TERMINAL CONNECTOR	23A & 23B	W							X	X									
RTM01a-b	4-SPACE THRIE-BEAM (6'-3" LENGTH)	23A & 23B	W									X								
RTM02a-b	8-SPACE THRIE-BEAM (12'-6" LENGTH)	23A & 23B	W									X								
RWE01a-b	W-BEAM END SECTION (FLARED)	88	W									X								
RWE02a-b	W-BEAM TERMINAL CONNECTOR	88	W										X	X	X	X	X			
RWE03a-b	W-BEAM END SECTION (BUFFER)	88	W												X					
RWM02a-b	2-SPACE W-BEAM (12'-6" LENGTH)	88	W																	X
RWM04a-b	4-SPACE W-BEAM (12'-6" LENGTH)	88	W		X	X	X	X	X	X	X									
RWM08a-b	8-SPACE W-BEAM (12'-6" LENGTH)	88	W			X														
RWM14a	BCT TERMINAL RAIL SECTION	18	W												X					
RWM22a-b	W-BEAM (25'-0" LENGTH)	88	W		X	X	X	X	X	X										
RWT02a-b	W-BEAM TO THRIE-BEAM TRANSITION SECTION (7'-3 1/2" LENGTH)	23A & 23B	W												X	X				

*FURNISH HIGH STRENGTH BOLTS IN ACCORDANCE WITH ASTM F3125 GRADE A325

NOTES:

① SEE AASHTO-AGC-ARTBA JOINT COMMITTEE
TASK FORCE 13 REPORT "A GUIDE TO
STANDARDIZED HIGHWAY BARRIER HARDWARE"
PUBLICATION FOR ADDITIONAL AND DETAILED
HARDWARE SPECIFICATIONS.

② GUARDRAIL TYPE CODES:

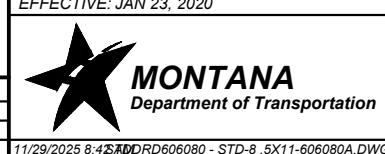
W = W-BEAM METAL GUARDRAIL
C = CABLE GUARDRAIL
B = BOX BEAM GUARDRAIL

DETAILED DRAWINGS

REFERENCE DWG. NO.
STANDARD SPEC. 606-80
SECTION 606

**SCHEDULE OF GUARDRAIL
HARDWARE**

EFFECTIVE: JAN 23, 2020



--REVISED--
JUN 27, 2024
JAN 15, 2026

11/29/2025 8:45 AM DRRD606080 - STD-8 .5X11-606080A.DWG

SCHEDULE OF GUARDRAIL HARDWARE		DTL DWG NO. (606-###)	GUARDRAIL TYPE ②	DTL DWGS. WHERE PARTS USED																		
DESIGNATIO N①	DESCRIPTION			606-054	606-055	606-07	606-09	606-11A	606-11B	606-18	606-23A	606-24A	606-24B	606-25A	606-25B	606-46	606-50	606-52	606-53	606-53A	606-53B	606-54
N/A	TYPE B BOX BEAM POST	97	B															X	X			
N/A	TYPE 4 BOX BEAM SUPPORT BRACKET	97	B																X			
N/A	SUPPORT BRACKET WITH TS6 x 6 x 3/16 BLOCKOUT	97	B																X			
N/A	TRANSITION POST	97	B																X			
N/A	TYPE D TRANSITION POST	97	B																X			
N/A	TS6 x 6 x 3/16 BR. APP. SECT. UPPER RAIL NO. 1	98	B																X			
N/A	TS6 x 2 x 1/4 BR. APP. SECT. LOWER RAIL NO. 1	98	B																X			
N/A	TS6 x 2 x 1/4 BR. APP. SECT. LOWER RAIL NO. 2	98	B																X			
N/A	TS6 x 2 TO TS6 x 6 CONNECTION SLEEVE	98	B																X			
N/A	TS6 x 2 CONNECTION SLEEVE	98	B															X				
N/A	TS6 x 6 x 3/16 TRANSITION RAIL	98	B																X			
N/A	T-1 TRANSITION RAIL	98A	B																X			
N/A	R-1 TRANSITION RUB RAIL	98A	B																X			
N/A	R-2 TRANSITION RUB RAIL	98A	B																X			
N/A	R-3 TRANSITION RUB RAIL	98A	B																X			
N/A	UPPER BRIDGE RAIL CONNECTION SLEEVE	98A	B																X			
N/A	LOWER BRIDGE RAIL CONNECTION SLEEVE	98A	B																X			
N/A	RUB RAIL SPLICE SLEEVE	98A	B																X			
N/A	RUB RAIL FLAIR SLEEVE	98A	B																X			
N/A	1/4" SHIM PLATE	99	B																X			
N/A	ANCHOR RAIL SECTION	99	B																X			
N/A	RUB RAIL ANCHOR BRACKET (JERSEY RAIL)	99	B																X			
N/A	RUB RAIL ANCHOR BRACKET (VERTICAL BRIDGE RAIL)	99	B																X			
N/A	TS6 x 2 x 3/16 RUB RAIL	99	B																X			
N/A	RUB RAIL FLARE SLEEVE	98A	B																X			
N/A	TYPE 4 TRANSITION ATTACHMENT (BENT PLATE)	99A	B																X			
N/A	TYPE 4 TRANSITION ATTACHMENT (TOP STIFFENER)	99A	B																X			
N/A	TYPE 4 TRANSITION ATTACHMENT (SIDE STIFFENER)	99A	B																X			
N/A	TYPE 4 TRANSITION ATTACHMENT (BOTTOM STIFFENER)	99A	B																X			
N/A	TYPE 4 TRANSITION ATTACHMENT (UPPER RAIL ATTACHMENT)	99A	B																X			
N/A	TYPE 4 TRANSITION ATTACHMENT (RUB RAIL ATTACHMENT)	99A	B																X			
N/A	TYPE 4 TRANSITION ATTACHMENT (MOUNTING TAB)	99A	B																X			
N/A	TYPE 4 TRANSITION ATTACHMENT (GUSSET)	99A	B																X			

* FURNISH HIGH STRENGTH BOLTS IN ACCORDANCE WITH ASTM F3125 GRADE A325

NOTES:

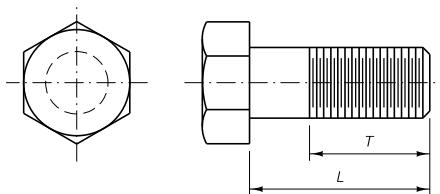
① SEE AASHTO-AGC-ARTBA JOINT COMMITTEE
TASK FORCE 13 REPORT "A GUIDE TO
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② GUARDRAIL TYPE CODES:

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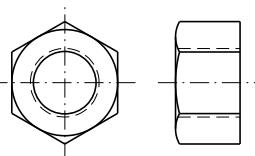
DETAILED DRAWINGS	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-80A
SCHEDULE OF GUARDRAIL HARDWARE	
EFFECTIVE: JAN 23, 2020	
 MONTANA Department of Transportation	
--REVISED-- JUN 27, 2024 JAN 15, 2026	11/29/2025 8:45 AM DRD606080 - STD-8 .5X11-606080A.DWG

GUARDRAIL HARDWARE

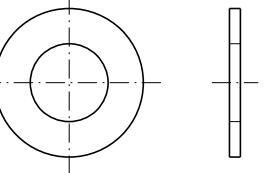


HEX BOLTS

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

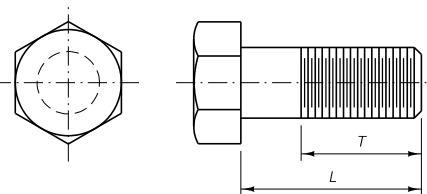


HEX NUT



FLAT WASHERS

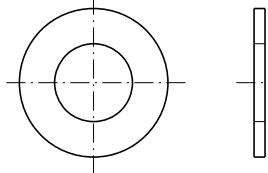
METRIC GUARDRAIL HARDWARE



HEX BOLTS

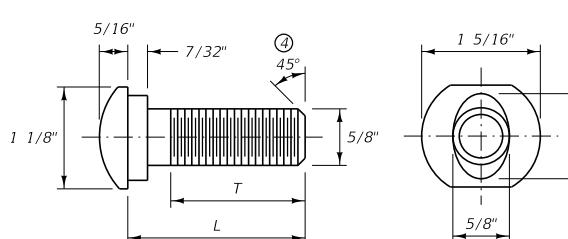
BOLT SIZE	DESIGNATION *	L	T (MIN.)
REGULAR HEX BOLTS			
M10	FBX10a	89	38
M10	FBX10a	191	38
M12	FBX12a	38	FULL
M12	FBX12a	63	44
M14	FBX14a	203	51
M16	FBX16a	38	FULL
M20	FBX20a	203	51
M20	FBX20a	241	51
HIGH STRENGTH HEX BOLTS			
M20	FBX20b	51	38
M20	FBX20b	102	51
M20	FBX20b	203	51
M22	FBX22b	305	AS REQUIRED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

HEX NUT



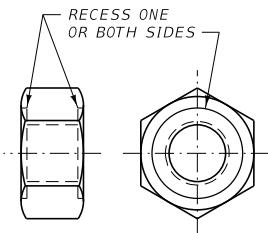
FLAT WASHERS

WASHER SIZE	DESIGNATION *
REGULAR FLAT WASHERS	
M10	FNX10a
M12	FNX12a
M14	FNX14a
M16	FNX16a
M20	FNX20a
M24	FNX24a
HARDENED FLAT WASHERS	
M20	FNX20b
M22	FNX22b
M24	FNX24b

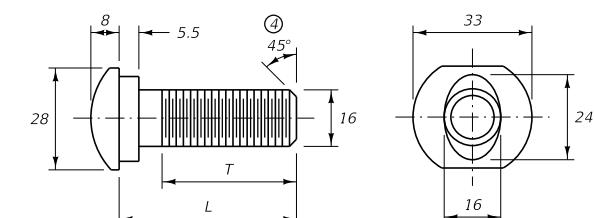


5/8" DIA. GUARDRAIL BOLT & RECESSED NUT

FBB01-07*

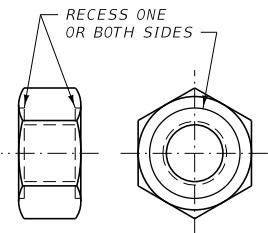


DESIGNATION *	L	T (MIN.)
FBB01	1 1/4"	1 1/8"
FBB02	2"	1 3/4"
FBB03	10"	4"
FBB04	1'-6"	4"
FBB05	2'-1"	4"
FBB06	1'-2"	4 1/16"
FBB07	1'-9"	4 1/16"

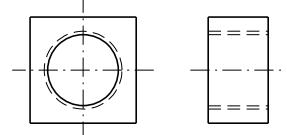


M16 GUARDRAIL BOLT & RECESSED NUT

FBB01-07*

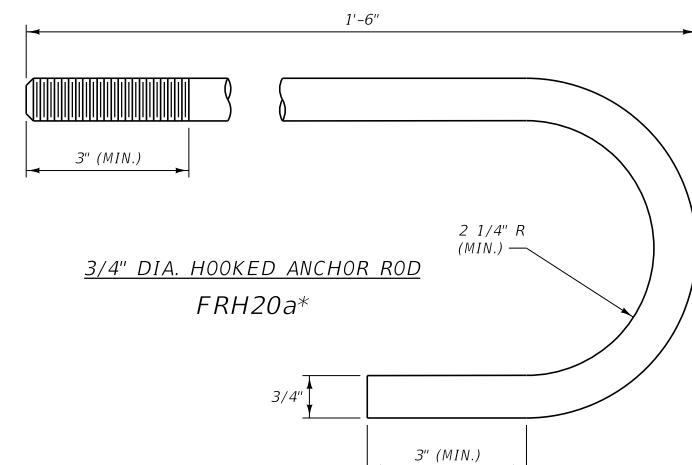


DESIGNATION *	L	T (MIN.)
FBB01	32	29
FBB02	51	44
FBB03	254	102
FBB04	457	102
FBB05	635	102
FBB06	356	103
FBB07	533	103



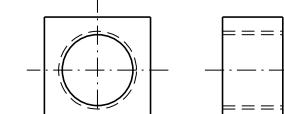
3/4" DIA. SQUARE NUT

FNS20*



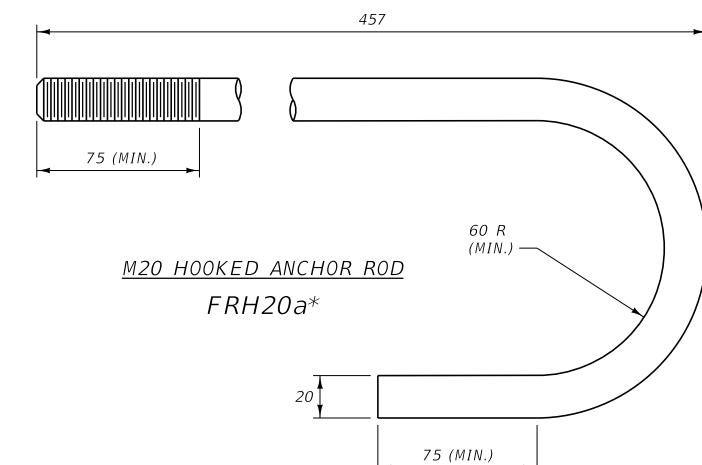
3/4" DIA. HOOKED ANCHOR ROD

FRH20a*



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.

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.

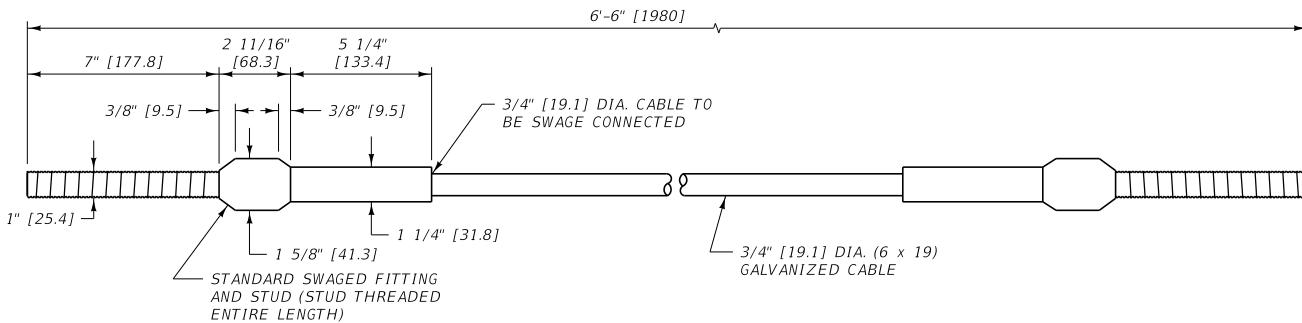
* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

ALL DIMENSIONS ARE MILLIMETERS
(mm) UNLESS OTHERWISE NOTED.

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

GUARDRAIL HARDWARE

MDT MONTANA DEPARTMENT OF TRANSPORTATION

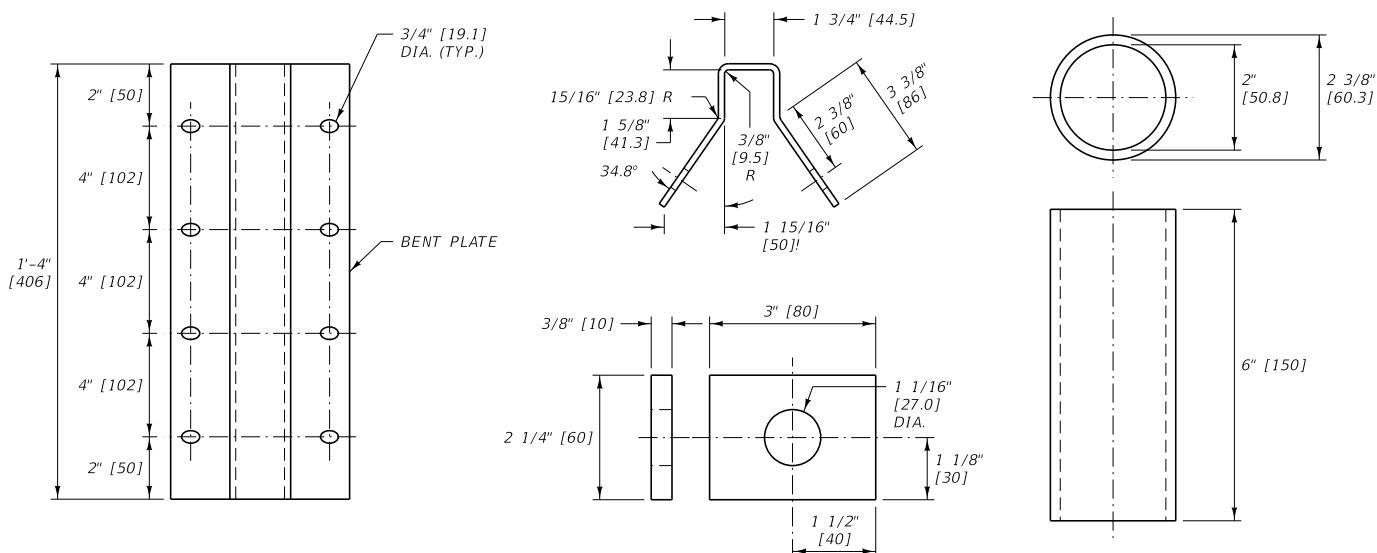


NOTES:

- 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 LOCHE 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.

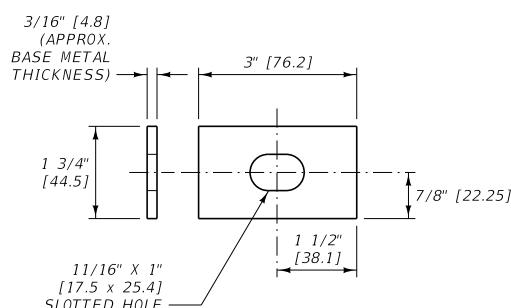
CABLE ASSEMBLY

FCA01*



ANCHOR BRACKET & END PLATE

FPA01*



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.

RECTANGULAR PLATE WASHER

FWR03*

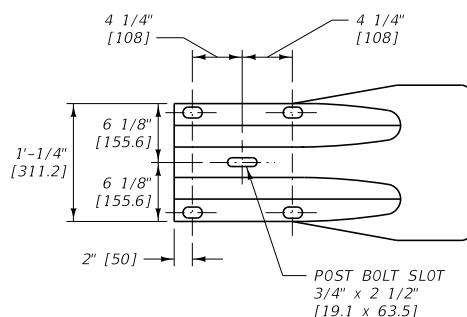
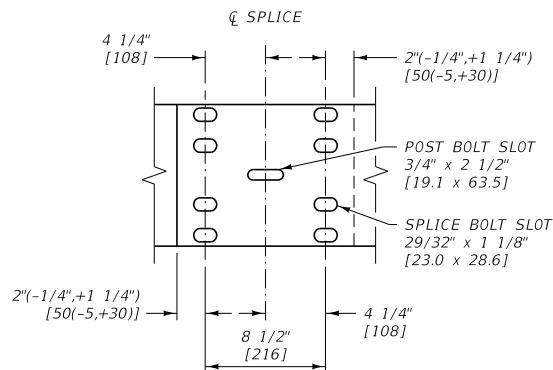
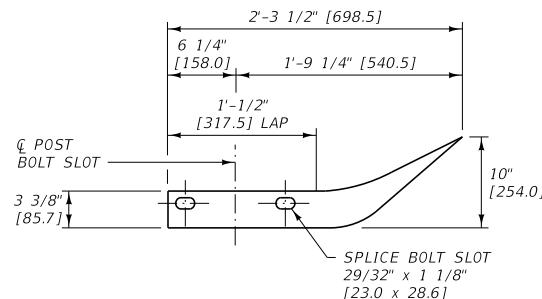
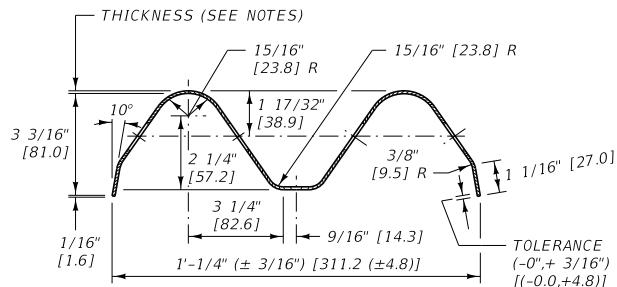
FMM02*

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	

MDT MONTANA DEPARTMENT OF TRANSPORTATION

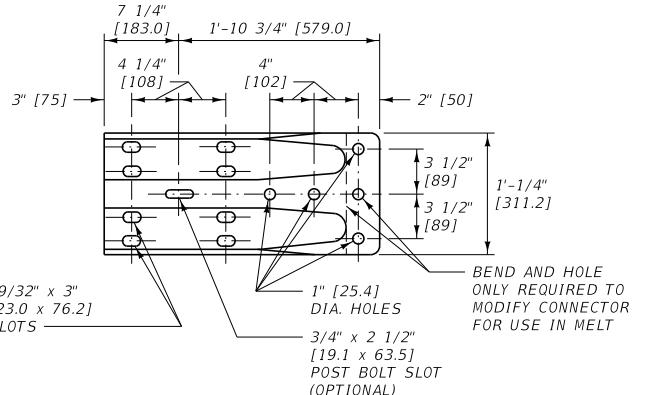
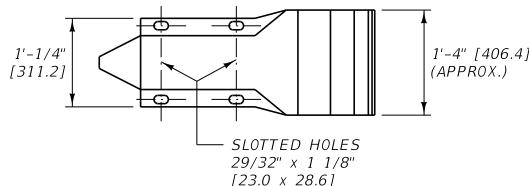
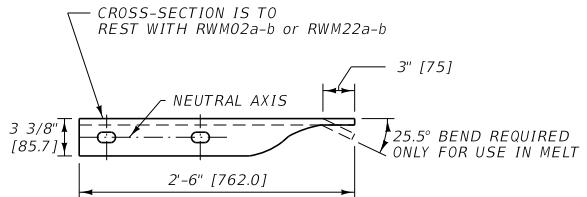
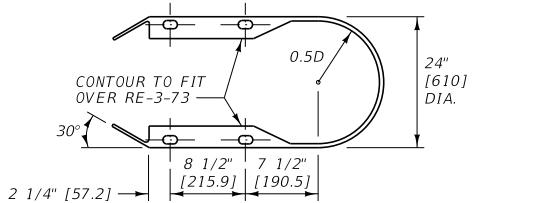
* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



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

OR
*RWM22a-b**
 (25'-0" [7.62 m] LENGTH)

W-BEAM END SECTION (FLARED)
*RWE01a-b**



W-BEAM END SECTION (BUFFER)
*RWE06a-b**

W-BEAM TERMINAL CONNECTOR
*RWE02a-b**

NOTES:

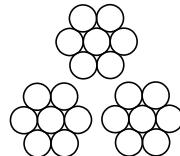
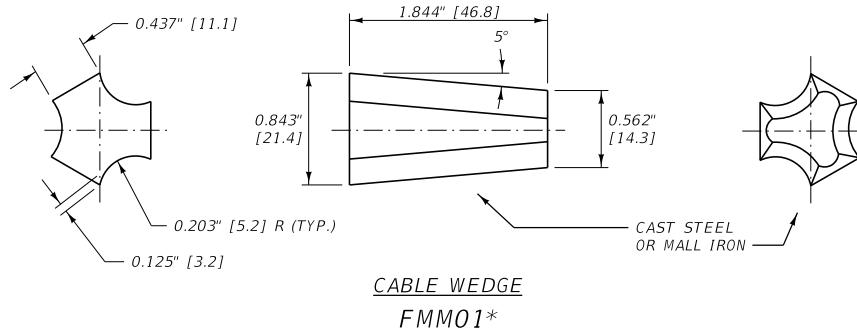
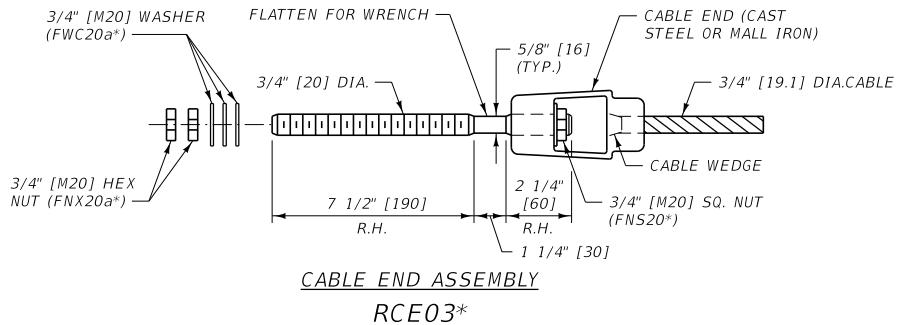
<i>* DESTINATION SUFFIX</i>	METAL THICKNESS
<i>a</i>	12 GAUGE [2.7 mm]
<i>b</i>	10 GAUGE [3.5 mm]

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

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

DETAILED DRAWING	
REFERENCE STANDARD SPEC.	DWG. NO. 606-88
SECTION 606	
W-BEAM METAL GUARDRAIL HARDWARE	
MDT MONTANA DEPARTMENT OF TRANSPORTATION	

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*

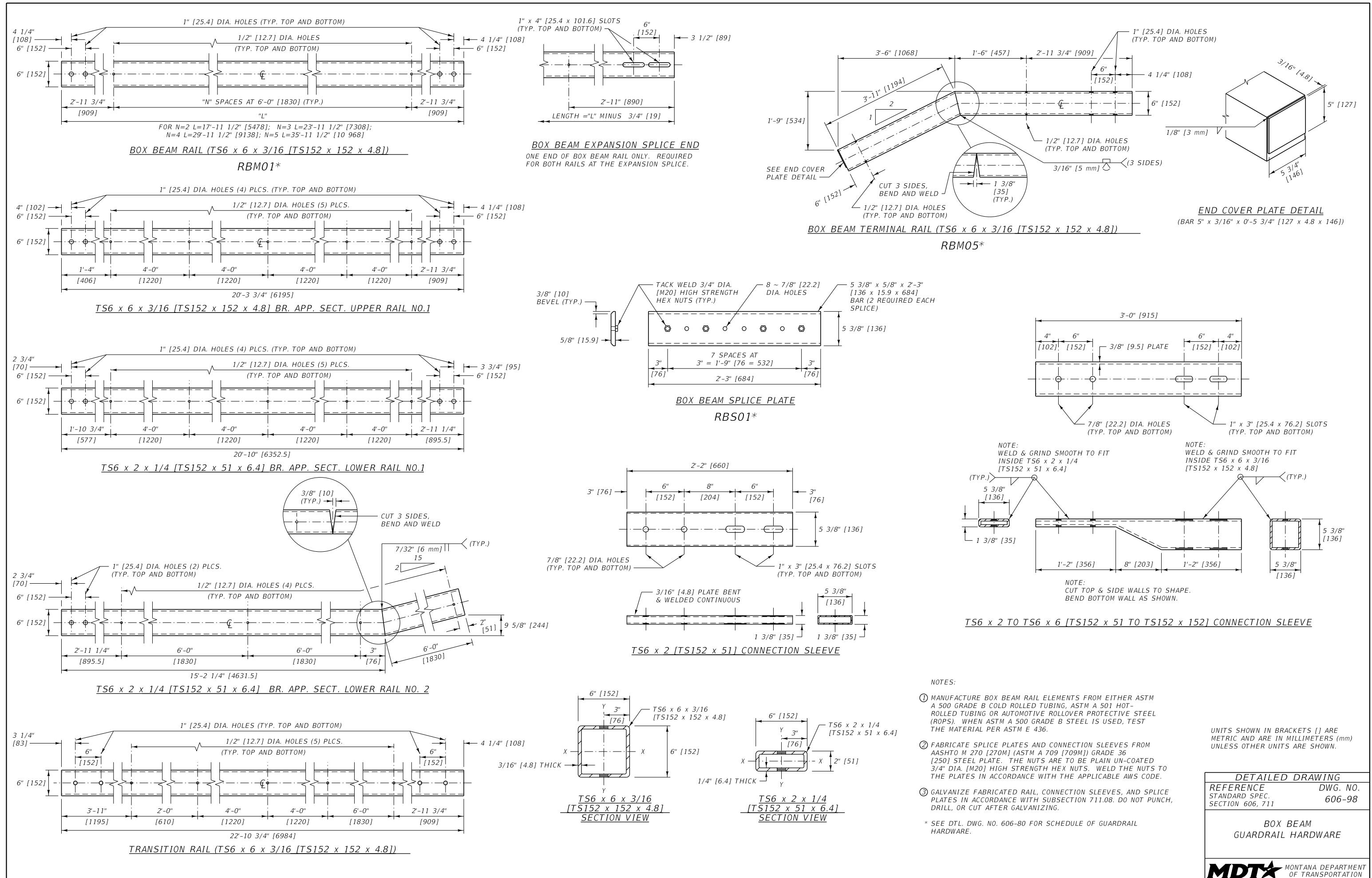
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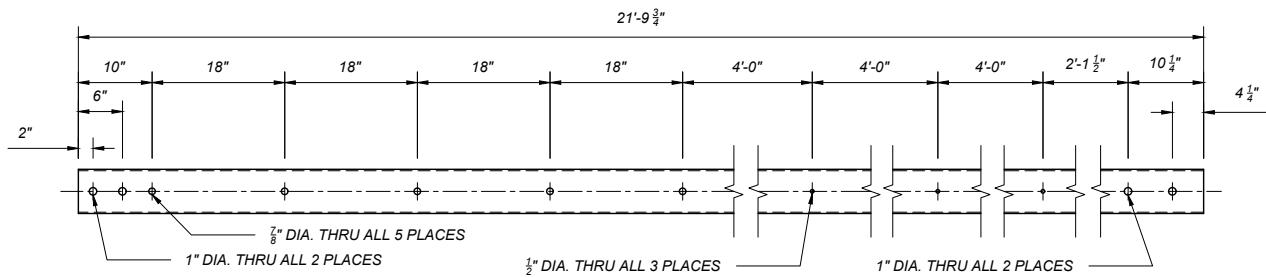
- ① WIRE ROPE AND CONNECTING HARDWARE ARE TO CONFORM TO THE REQUIREMENTS OF AASHTO M30 [M30M] TYPE 1 CLASS A, 3/4" [19.1] ROPE. CONNECTING HARDWARE MUST DEVELOP THE FULL STRENGTH OF A SINGLE CABLE (25,000 LB [111.2 kN]). CAST STEEL COMPONENTS ARE TO CONFORM TO THE REQUIREMENTS OF AASHTO M103 [M103M] (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.

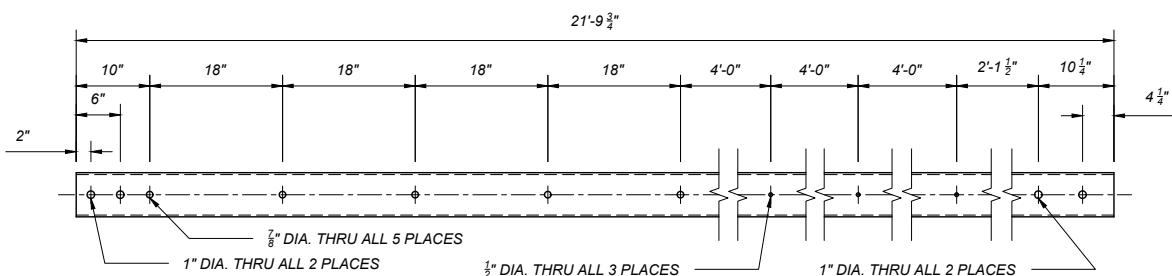
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-94
LOW-TENSION CABLE GUARDRAIL HARDWARE	





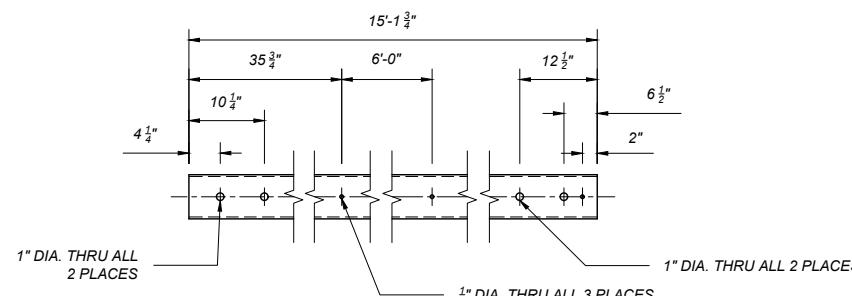
T-1 TRANSITION RAIL

HSS 6x6x $\frac{3}{16}$
ASTM A500 GRADE B



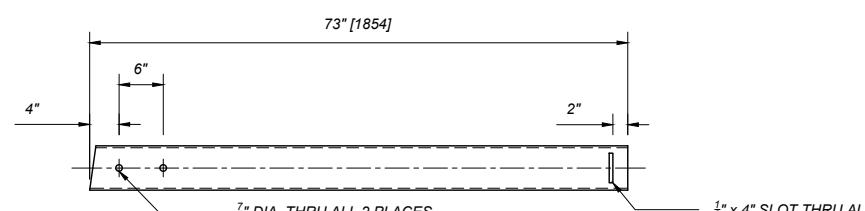
R-1 TRANSITION RUB RAIL

HSS 6x2x $\frac{3}{4}$
ASTM A500 GRADE B



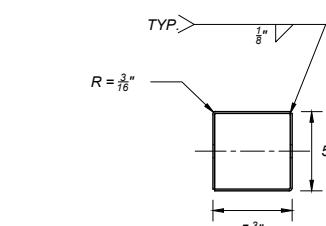
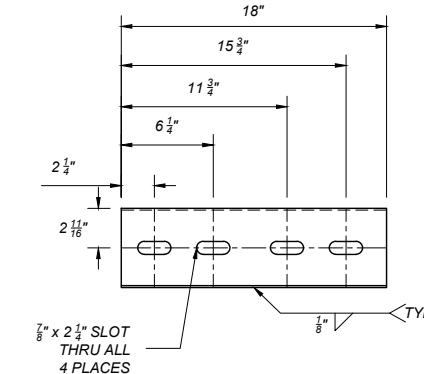
R-2 TRANSITION RUB RAIL

HSS 6x2x $\frac{3}{4}$
ASTM A500 GRADE B



R-3 TRANSITION RUB RAIL

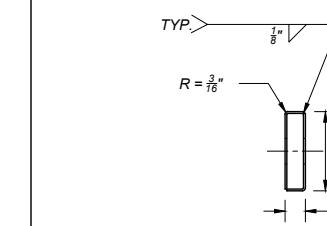
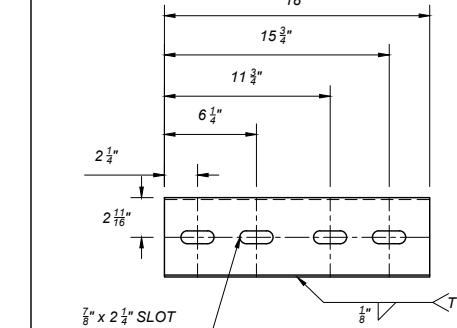
HSS 6x2x $\frac{3}{4}$
ASTM A500 GRADE B



NOTE:
WELD & GRIND SMOOTH TO FIT
INSIDE 6" x 6" x $\frac{3}{16}$ "

UPPER BRIDGE RAIL CONNECTION SLEEVE

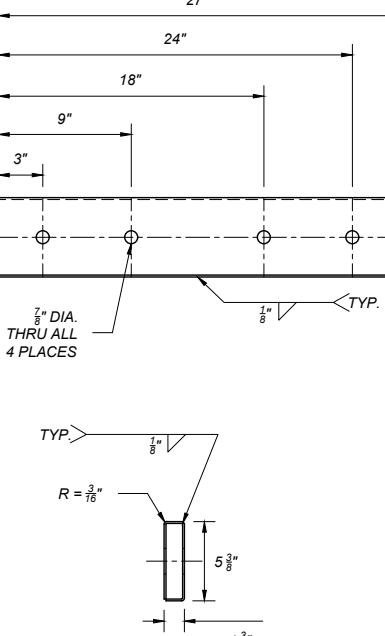
ASTM A36 PLATE, 18" x $\frac{3}{16}$ "
3/4" DIA. x 7 1/2" HIGH STRENGTH HEX BOLT (FBX20b*)
AND NUT (FNX20b*) WITH 2 HARDENED FLAT
WASHERS (FWC20b*)



NOTE:
WELD & GRIND SMOOTH TO FIT
INSIDE 6" x 2" x $\frac{1}{4}$ "

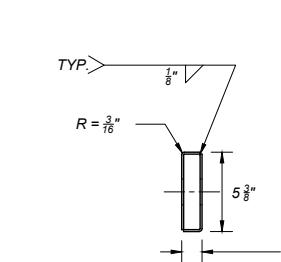
LOWER BRIDGE RAIL CONNECTION SLEEVE

ASTM A36 PLATE, 18" x $\frac{3}{16}$ "
3/4" DIA. x 3 1/2" HIGH STRENGTH HEX BOLT (FBX20b*)
AND NUT (FNX20b*) WITH 2 HARDENED FLAT
WASHERS (FWC20b*)

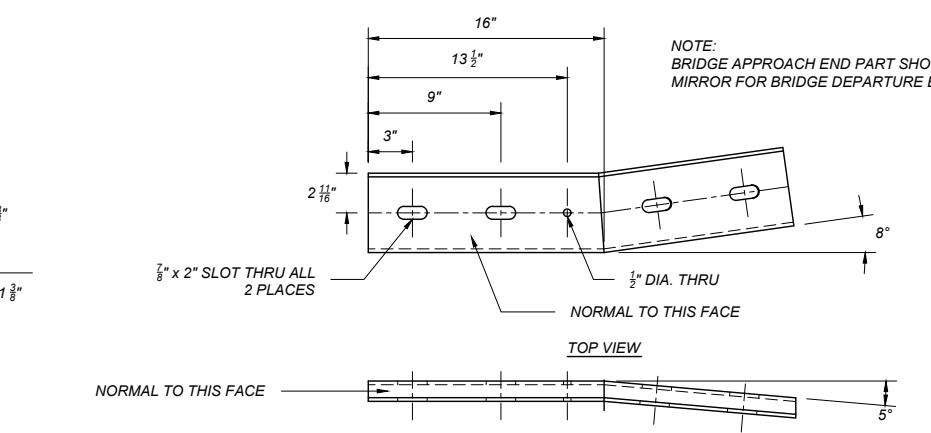


RUB RAIL SPLICE SLEEVE

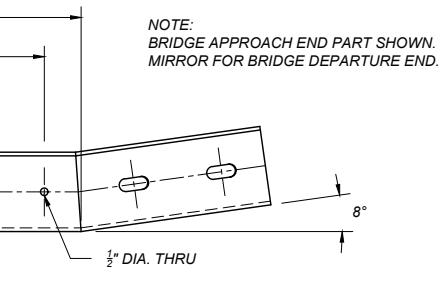
ASTM A36 PLATE, 27" x $\frac{3}{16}$ "
3/4" DIA. x 3 1/2" HIGH STRENGTH HEX BOLT (FBX20b*)
AND NUT (FNX20b*) WITH 2 HARDENED FLAT
WASHERS (FWC20b*)



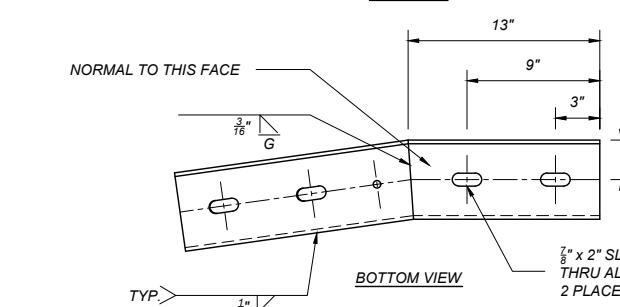
NOTE:
WELD & GRIND SMOOTH
TO FIT INSIDE 6" x 2" x $\frac{1}{4}$ "



NORMAL TO THIS FACE



TOP VIEW



RUB RAIL FLARE SLEEVE

$\frac{3}{8}$ " ASTM A36 PLATE
3/4" DIA. x 3 1/2" HIGH STRENGTH HEX BOLT (FBX20b*)
AND NUT (FNX20b*) WITH 2 HARDENED FLAT
WASHERS (FWC20b*)

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

DETAILED DRAWINGS

REFERENCE
STANDARD SPEC.
SECTION 606

DWG. NO.
606-98A

**BOX BEAM
GUARDRAIL HARDWARE**

EFFECTIVE: JUN 27, 2024



11/29/2025 8:42 AM STDDRD606098A.DWG

