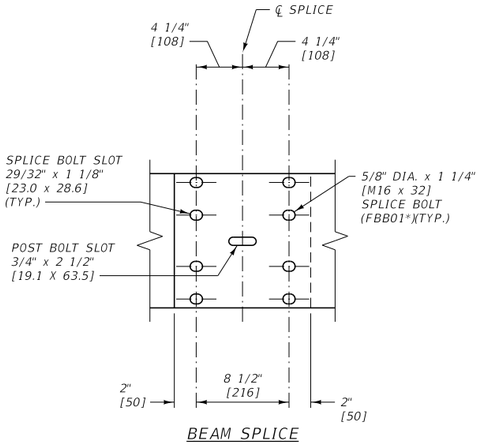
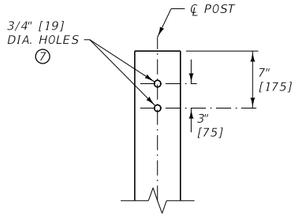
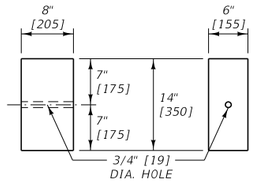



BEAM SPLICE

(LAP IN DIRECTION OF ADJACENT TRAFFIC)

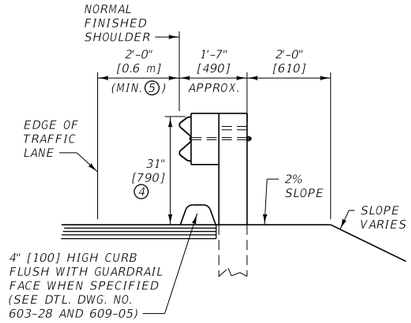



POST HOLE DETAIL

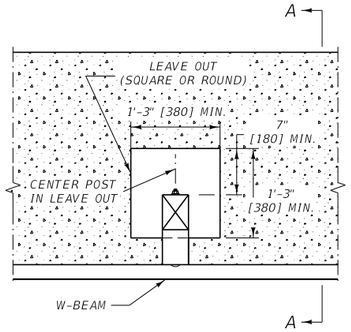



WOOD BLOCK

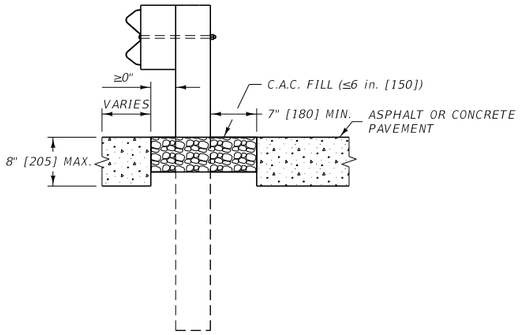
PDB01*



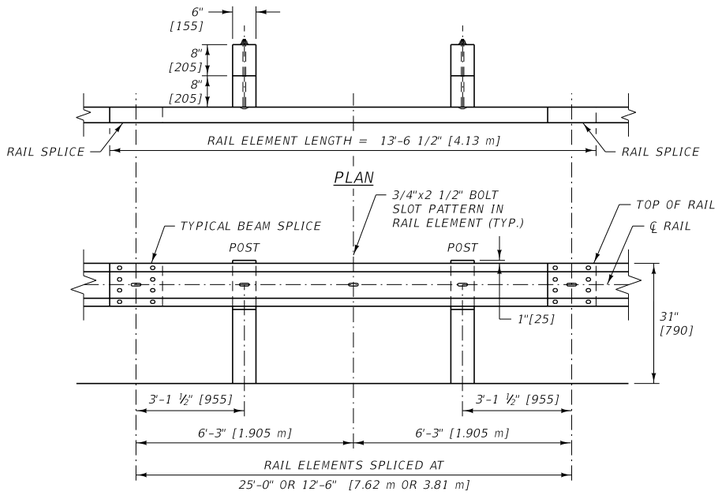

TYPICAL INSTALLATION



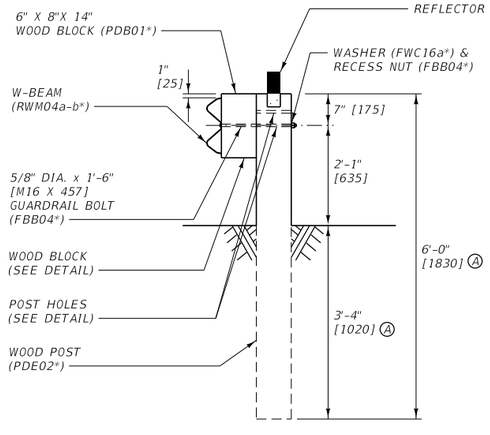

POST DETAIL IN PAVEMENT APPLICATIONS




SECTION A-A

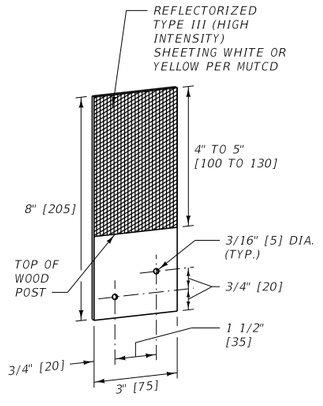



ELEVATION




WOOD POST AND MOUNTING DETAIL

Ⓐ STANDARD UNLESS SPECIFIED OTHERWISE IN PLANS.




REFLECTOR

(SEE NOTE 3)

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 [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.

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 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' [1830] POSTS FOR STANDARD INSTALLATIONS.

* 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.

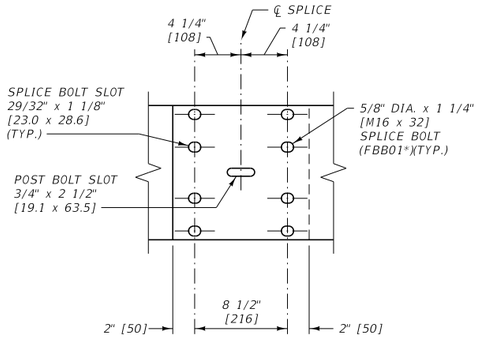
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606, 704

DWG. NO. 606-05A

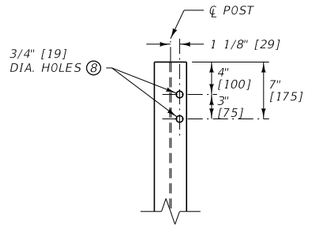
# METAL GUARDRAIL - WOOD POSTS (MGS)

MDT MONTANA DEPARTMENT OF TRANSPORTATION

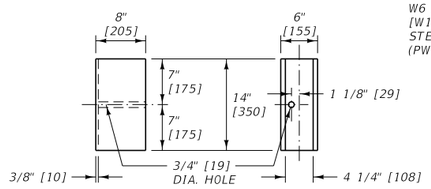



BEAM SPLICE

(LAP IN DIRECTION OF ADJACENT TRAFFIC)

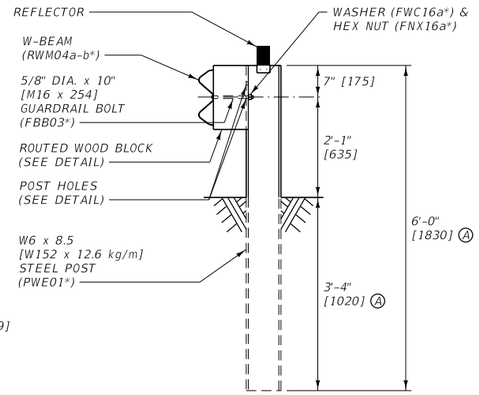



POST HOLE DETAIL



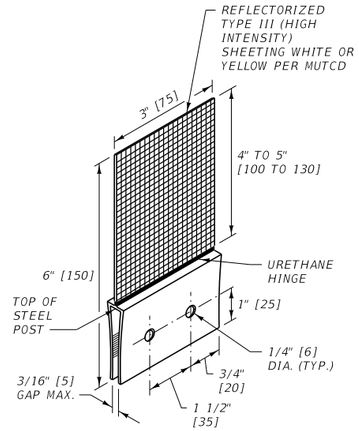

ROUTED WOOD BLOCK

PDB01*



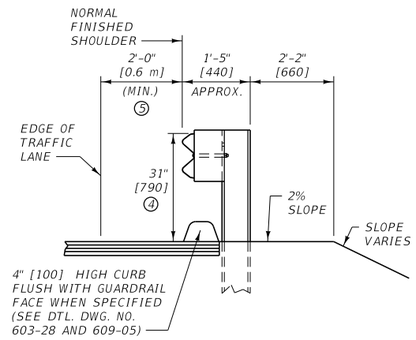

STEEL POST AND MOUNTING DETAIL

(A) STANDARD UNLESS SPECIFIED OTHERWISE IN PLANS.

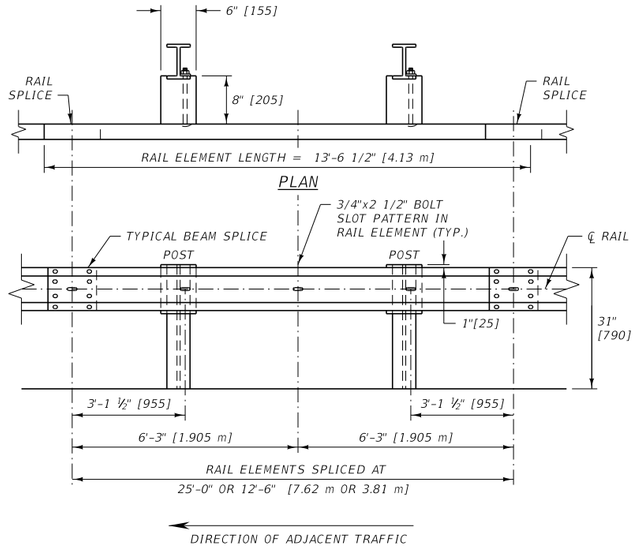



REFLECTOR

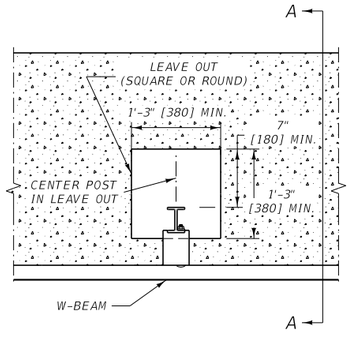
(SEE NOTE 3)



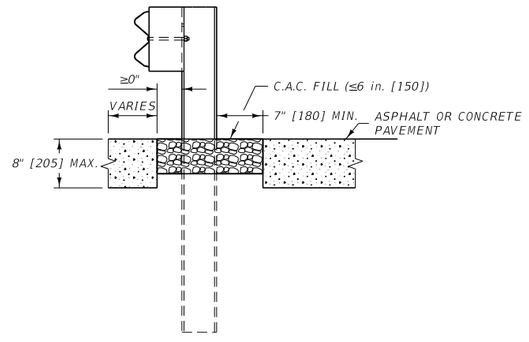

TYPICAL INSTALLATION




ELEVATION




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.

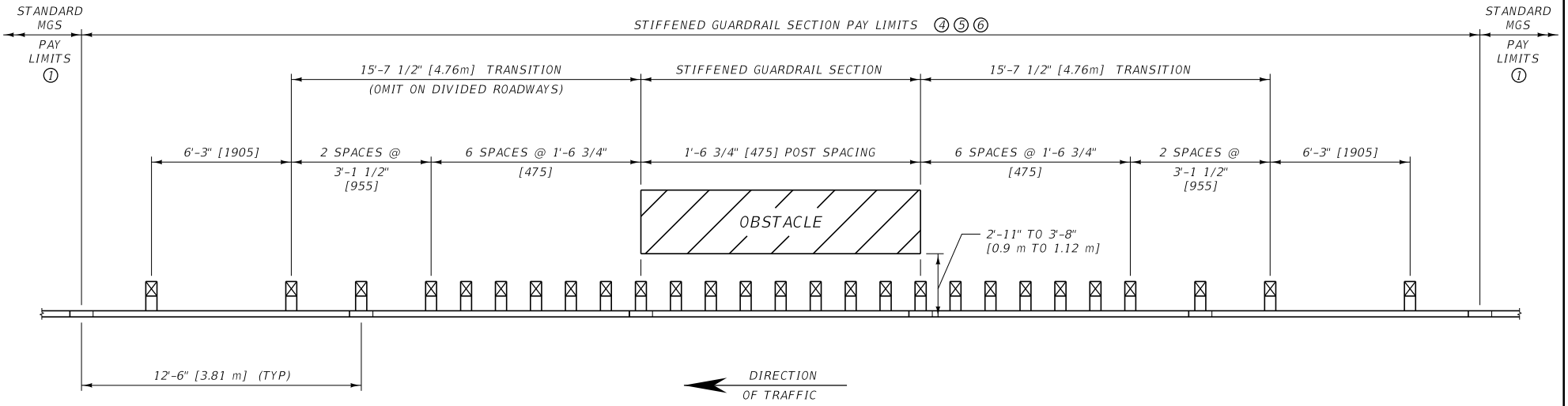
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

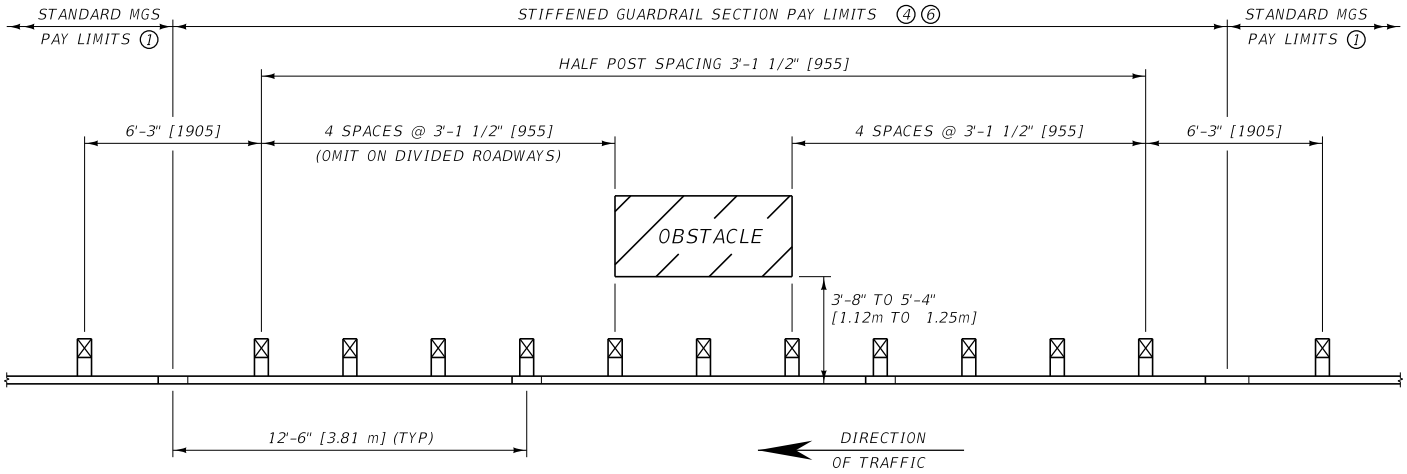
DWG. NO. 606-05B

METAL GUARDRAIL - STEEL POSTS (MGS)

MDT MONTANA DEPARTMENT OF TRANSPORTATION




QUARTER POST SPACING




HALF 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.

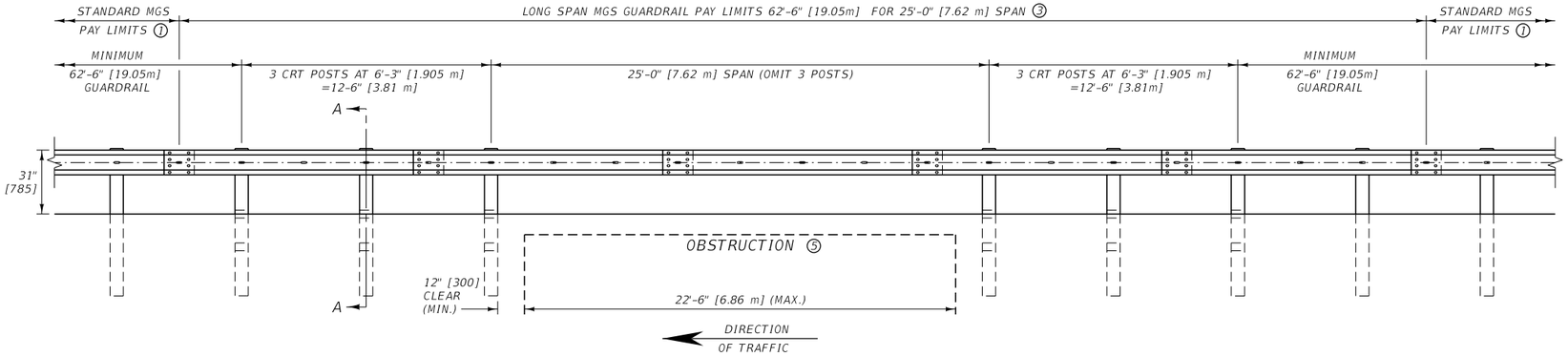
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING

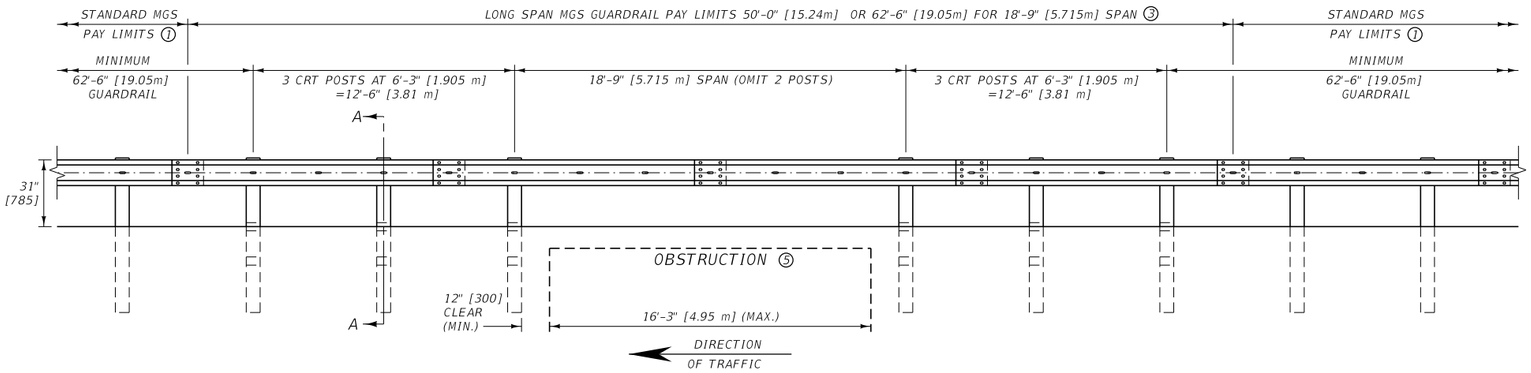
| REFERENCE | DWG. NO. |
|---|---|
| STANDARD SPEC. SECTION 606 | 606-07 |

# STIFFENED GUARDRAIL SECTIONS (MGS)

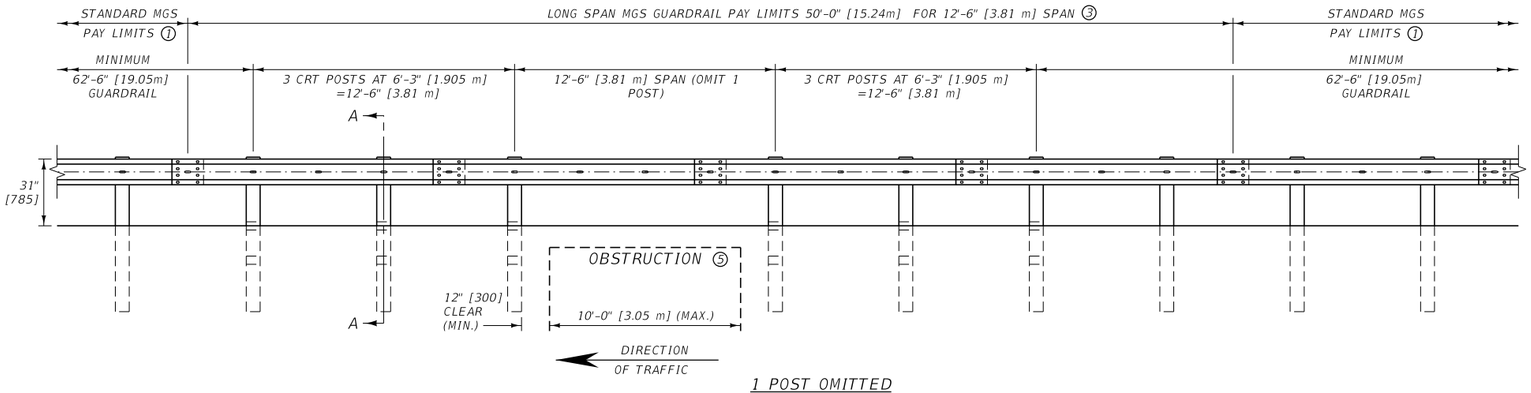
MDT MONTANA DEPARTMENT OF TRANSPORTATION



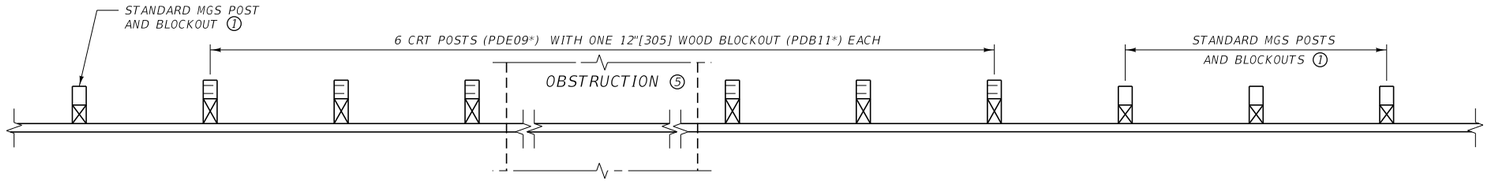

3 POSTS OMITTED



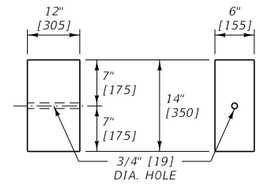

2 POSTS OMITTED




1 POST OMITTED

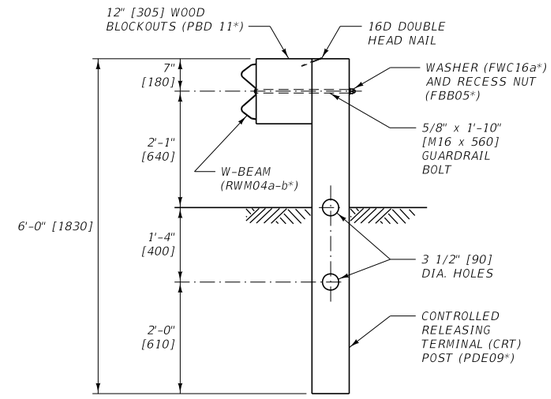



PLAN VIEW




12" WOOD BLOCK

PDB11*




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 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.

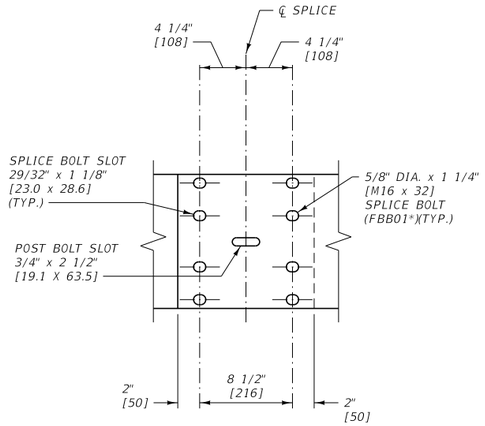
DETAILED DRAWING

REFERENCE
STANDARD SPEC.
SECTION 606

DWG. NO.
606-09

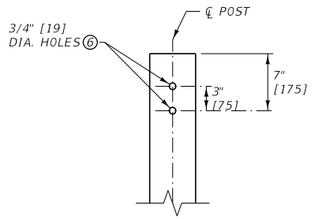
# LONG SPAN GUARDRAIL (MGS)

MDT MONTANA DEPARTMENT OF TRANSPORTATION

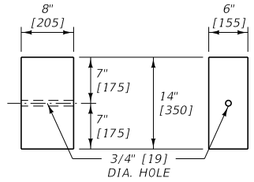



BEAM SPLICE

(LAP IN DIRECTION OF ADJACENT TRAFFIC)

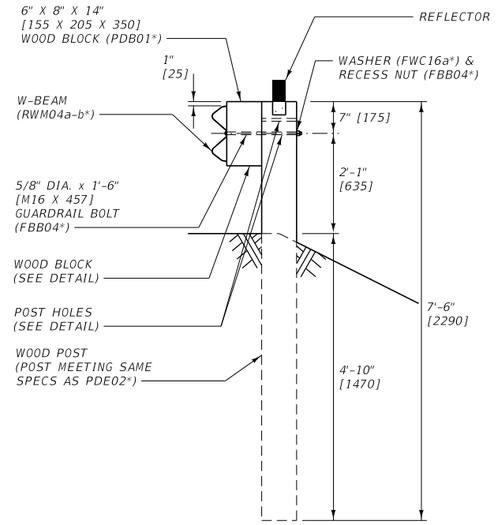



POST HOLE DETAIL

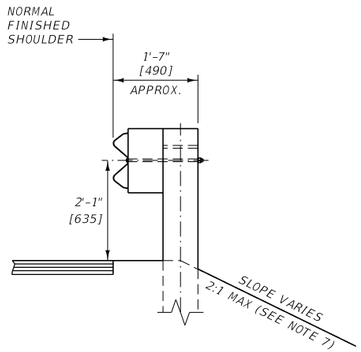



WOOD BLOCK

PDB01*

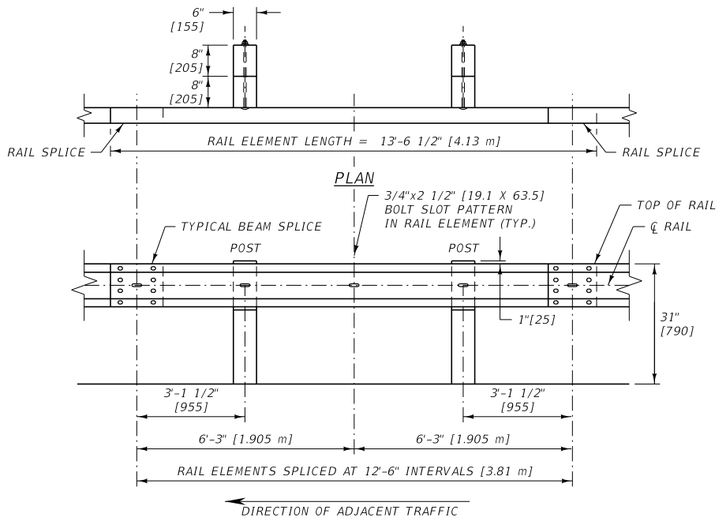



WOOD POST AND MOUNTING DETAIL




NOTE:
THIS GUARDRAIL SYSTEM IS USED WHEN THE 2'-0" [610] WIDENING BEHIND THE POSTS CANNOT BE PROVIDED, AS PER DTL. DWG. NO. 606-05A & 606-05B.

PROFILE

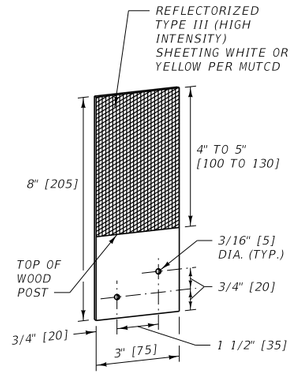



ELEVATION

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' [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.
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. BEGIN INSLOPE BREAK AT CENTER OF POST.

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




REFLECTOR

(SEE NOTE 3)

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

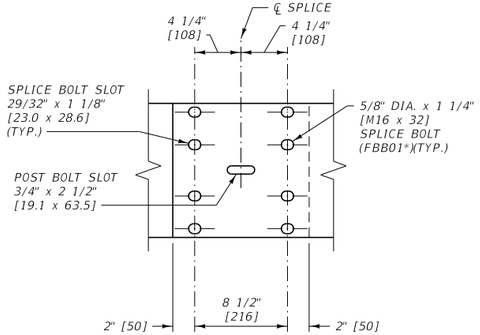
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606, 704

DWG. NO. 606-11A

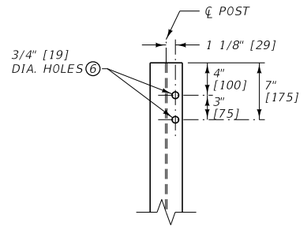
# METAL GUARDRAIL - LONG POSTS - WOOD (MGS)

MDT MONTANA DEPARTMENT OF TRANSPORTATION

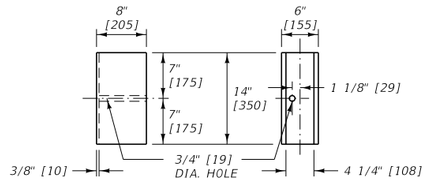



BEAM SPLICE

(LAP IN DIRECTION OF ADJACENT TRAFFIC)

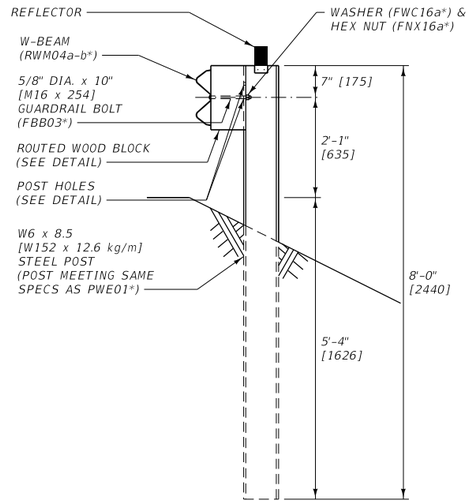


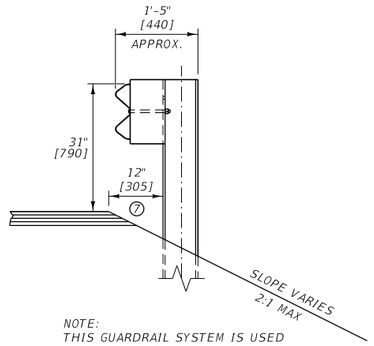

POST HOLE DETAIL




ROUTED WOOD BLOCK

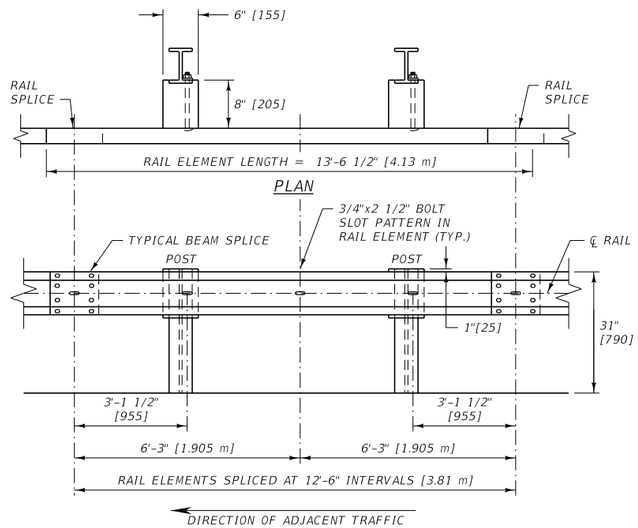
PDB01*




NOTE:
THIS GUARDRAIL SYSTEM IS USED WHEN THE 2'-0" [610] WIDENING BEHIND THE POSTS CANNOT BE PROVIDED, AS PER DTL. DWG. NO. 606-05A & 606-05B.

PROFILE




ELEVATION

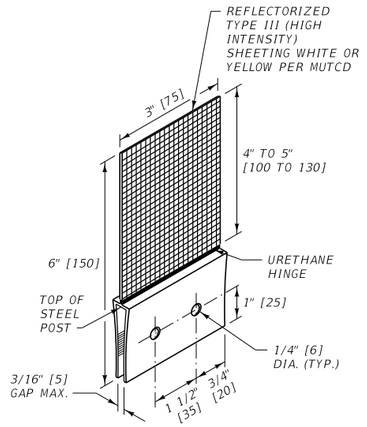
NOTES:

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' [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].

STEEL POST AND MOUNTING DETAIL

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] (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.




REFLECTOR

(SEE NOTE 3)

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

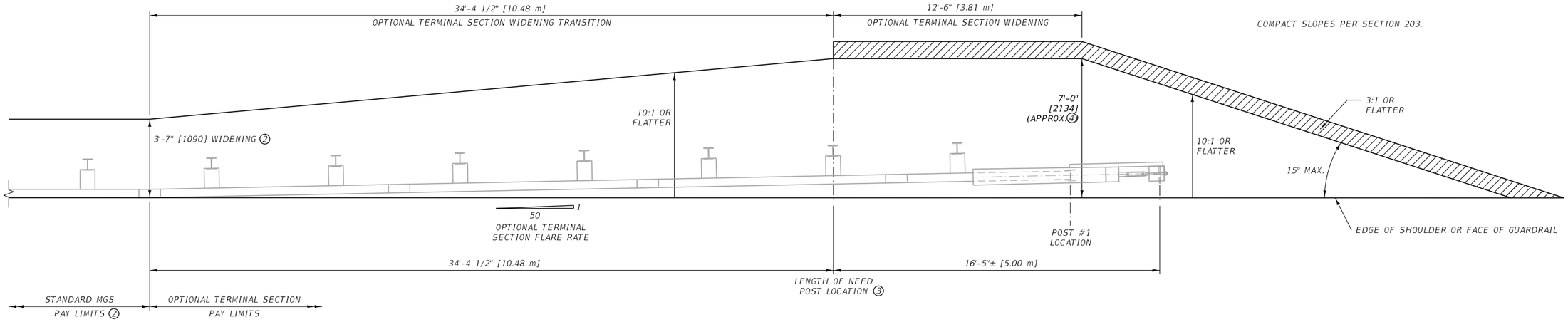
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

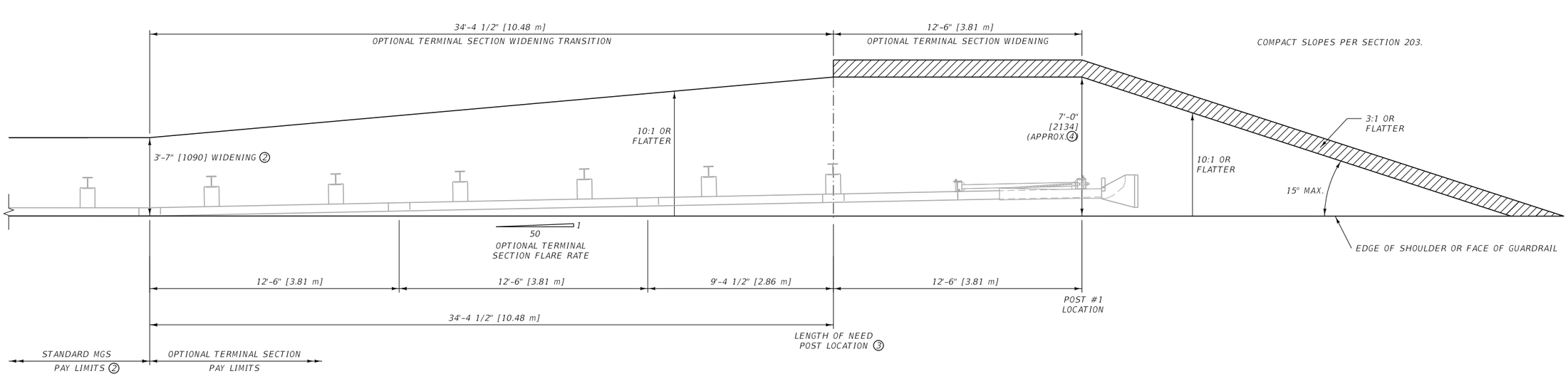
DWG. NO. 606-11B

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 MANAFACTURER'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.

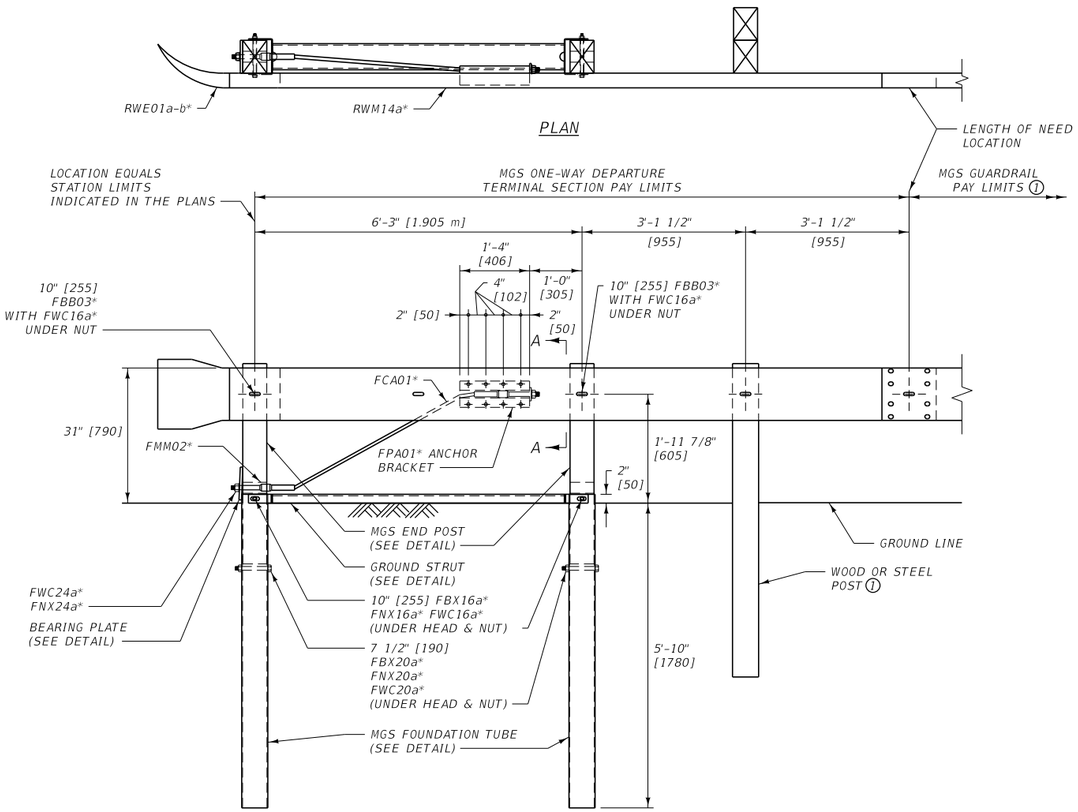
DETAILED DRAWING

REFERENCE
STANDARD SPEC.
SECTION 606, 203

DWG. NO.
606-13

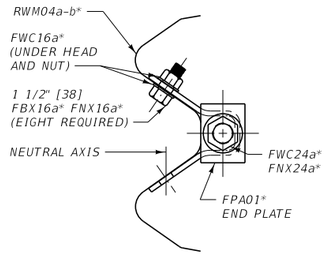
MASH OPTIONAL TERMINAL SECTIONS

MONTANA DEPARTMENT OF TRANSPORTATION

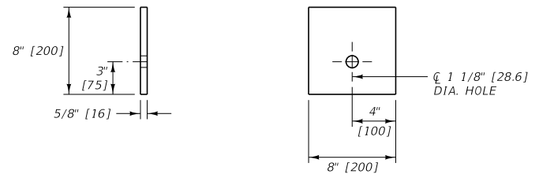



PLAN

ELEVATION

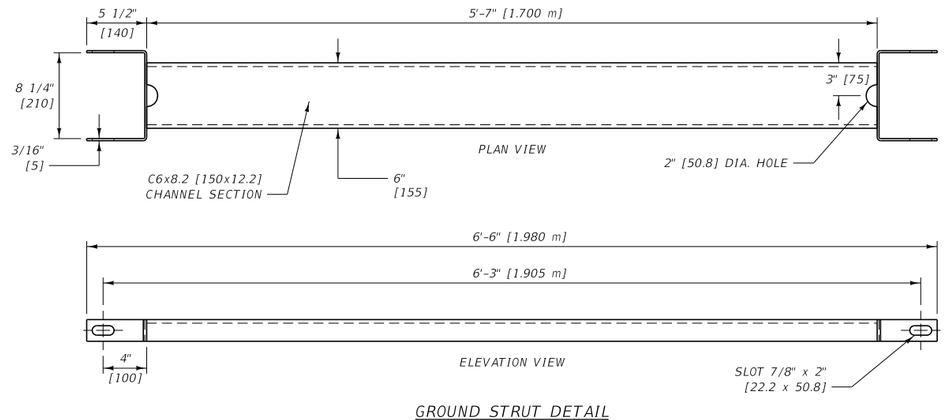



SECTION A-A



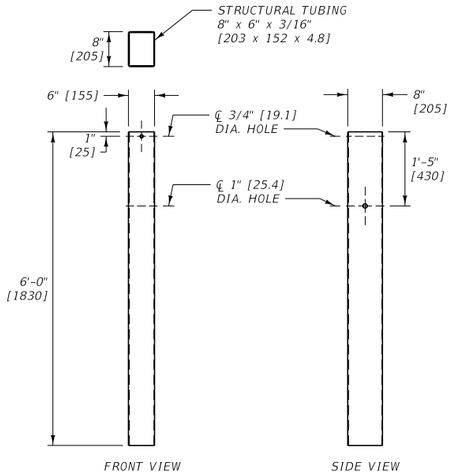

BEARING PLATE DETAIL

FPB01*



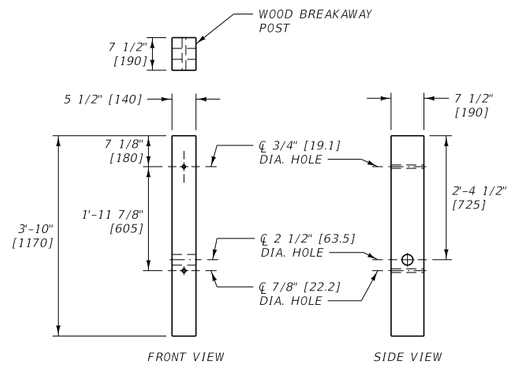

GROUND STRUT DETAIL

PFP01*




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.

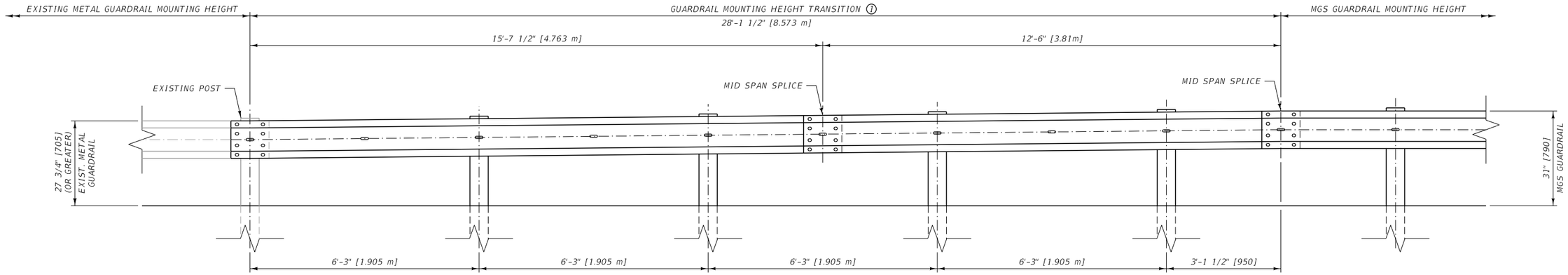
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-18

ONE-WAY DEPARTURE TERMINAL SECTION (MGS)

MDT 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.

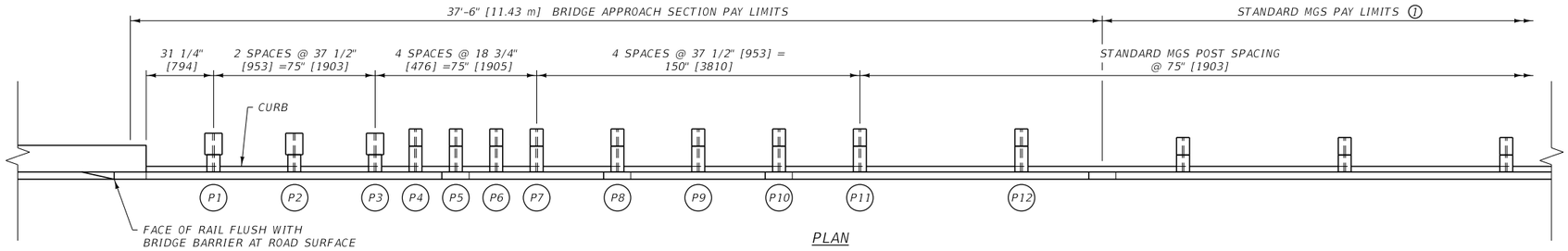
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

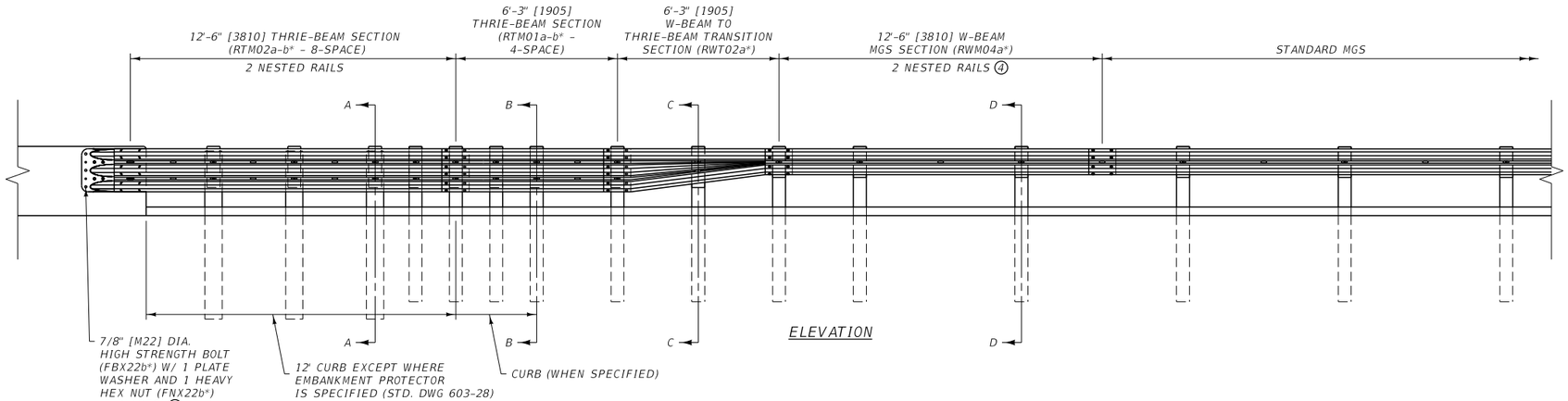
DWG. NO. 606-20

MGS TO METAL GUARDRAIL TRANSITION

MDT MONTANA DEPARTMENT OF TRANSPORTATION




PLAN




ELEVATION

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.

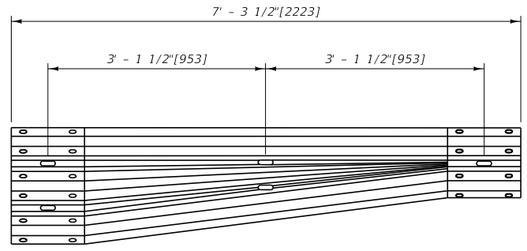
(3) DO NOT FLARE BRIDGE APPROACH SECTIONS.

(4) WHERE CURB EXTENDS UPSTREAM OF POST NO. 5, FURNISH 2 NESTED 12-GAUGE W-BEAM RAILS FOR THIS 12'-6" [3810] SECTION. INCLUDE THIS ADDITIONAL RAIL IN THE COST OF THE BRIDGE APPROACH SECTION.

(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.

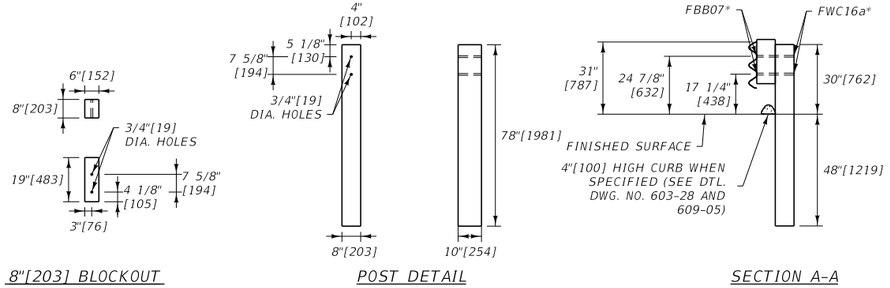



W-BEAM TO THRIE-BEAM TRANSITION SECTION

RWT02a*

(RWT02b* FOR OPPOSITE DIRECTION)

POSTS (P1) (P2) (P3)

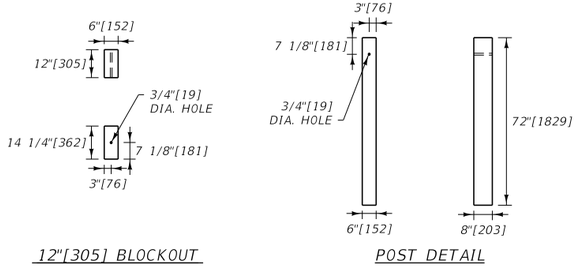



8"[203] BLOCKOUT

POST DETAIL

SECTION A-A

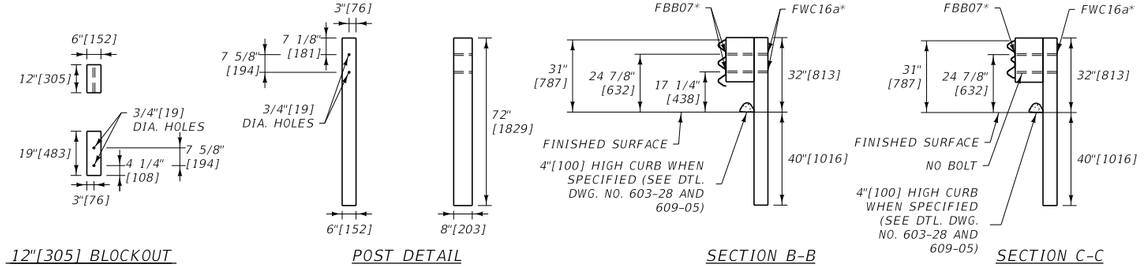
POSTS (P10) (P11) (P12)




12"[305] BLOCKOUT

POST DETAIL

POSTS (P4) (P5) (P6) (P7) (P8) (P9)

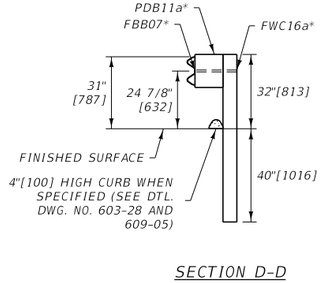



12"[305] BLOCKOUT

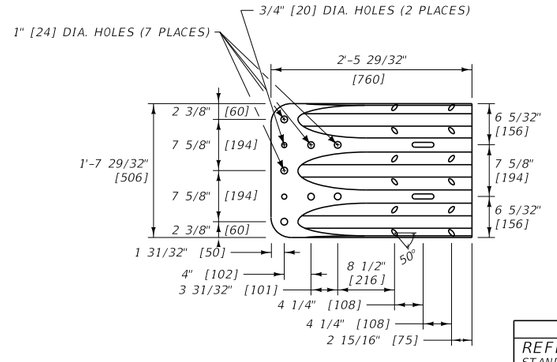
POST DETAIL

SECTION B-B

SECTION C-C




SECTION D-D




THRIE-BEAM TERMINAL CONNECTOR

RTE01b*

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

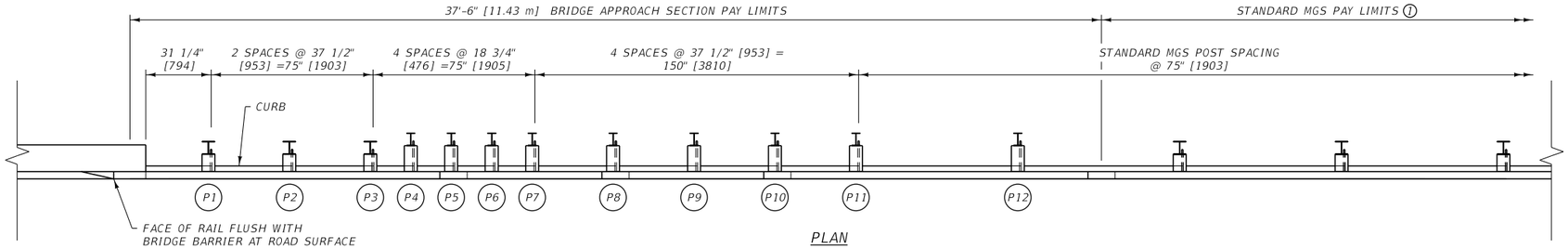
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

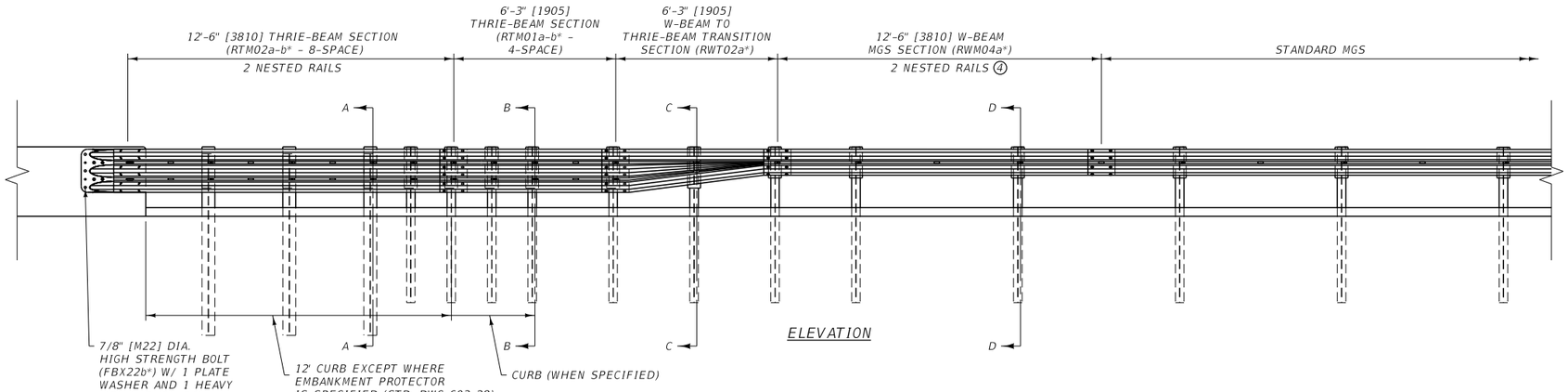
DWG. NO. 606-23A

MGS THRIE BEAM BRIDGE APPROACH SECTION -WOOD POSTS

MDT MONTANA DEPARTMENT OF TRANSPORTATION




PLAN

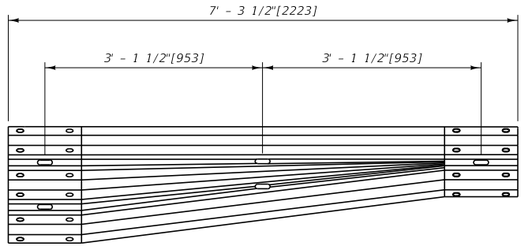



ELEVATION

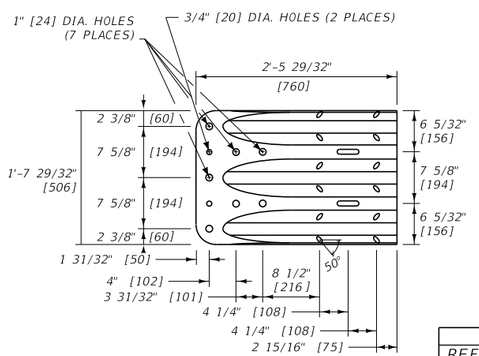
NOTES:

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" [3810] SECTION. INCLUDE THIS ADDITIONAL RAIL IN THE COST OF THE BRIDGE APPROACH SECTION.
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.

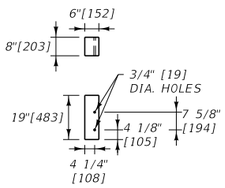



W-BEAM TO THRIE-BEAM TRANSITION SECTION
RWT02a*
(RWT02b* FOR OPPOSITE DIRECTION)

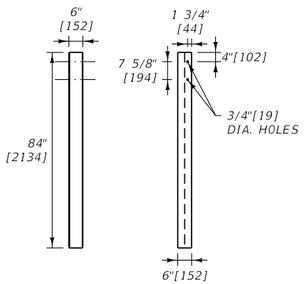



THRIE-BEAM TERMINAL CONNECTOR
RTE01b*

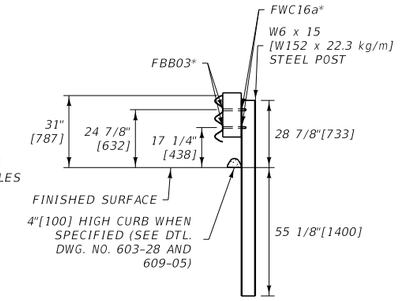
POSTS (P1) (P2) (P3)




8"[203] BLOCKOUT

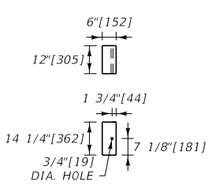



POST DETAIL

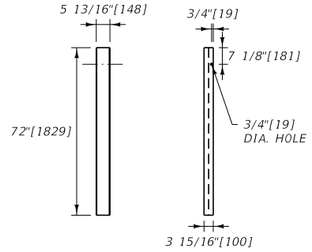



SECTION A-A

POSTS (P10) (P11) (P12)

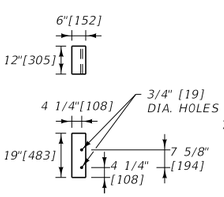



12"[305] BLOCKOUT

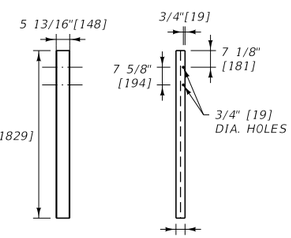



POST DETAIL

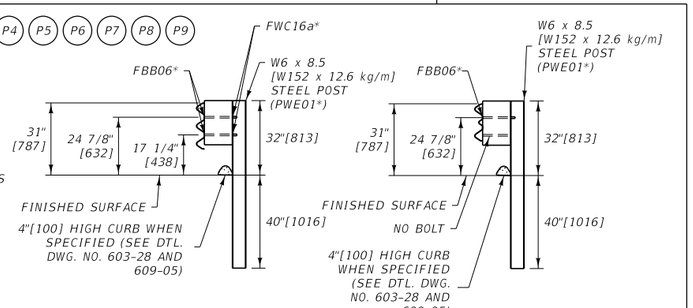
POSTS (P4) (P5) (P6) (P7) (P8) (P9)




12"[305] BLOCKOUT

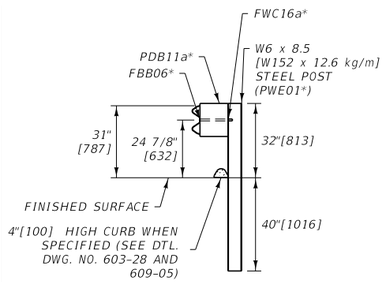



POST DETAIL




SECTION B-B

SECTION C-C



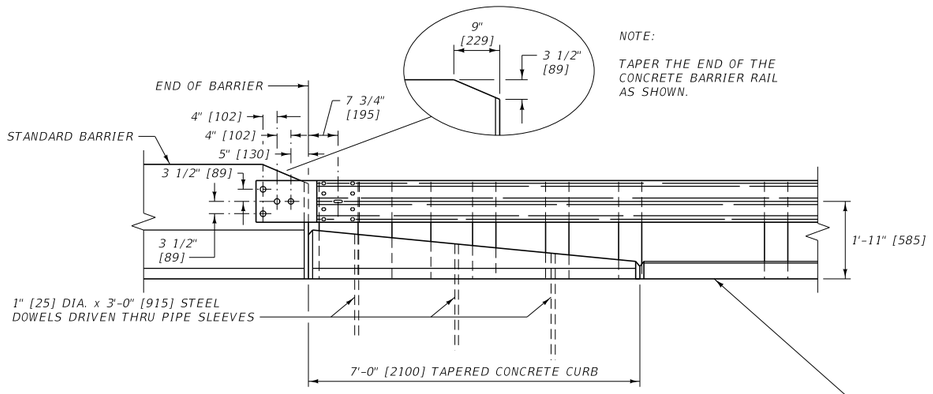

SECTION D-D

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 | 606-23B |

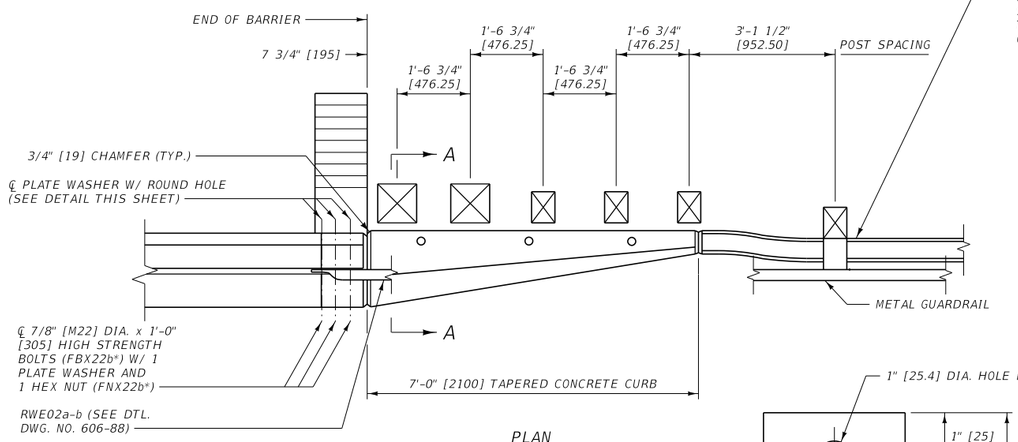
MGS THRIE BEAM BRIDGE APPROACH SECTION - STEEL POSTS

MDT MONTANA DEPARTMENT OF TRANSPORTATION

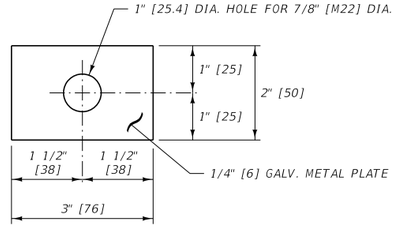



ELEVATION

STD. CONC. CURB (WHERE REQUIRED-SEE ROAD PLANS) (WARP AS NECESSARY TO MEET END OF THE TAPERED CONCRETE CURB)

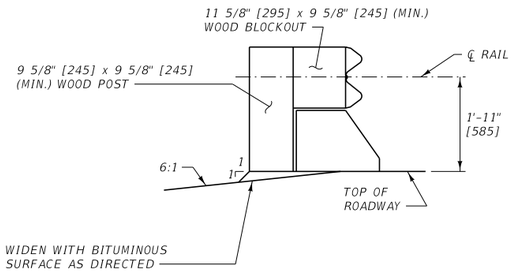



PLAN




DETAIL "A"

PLATE WASHER

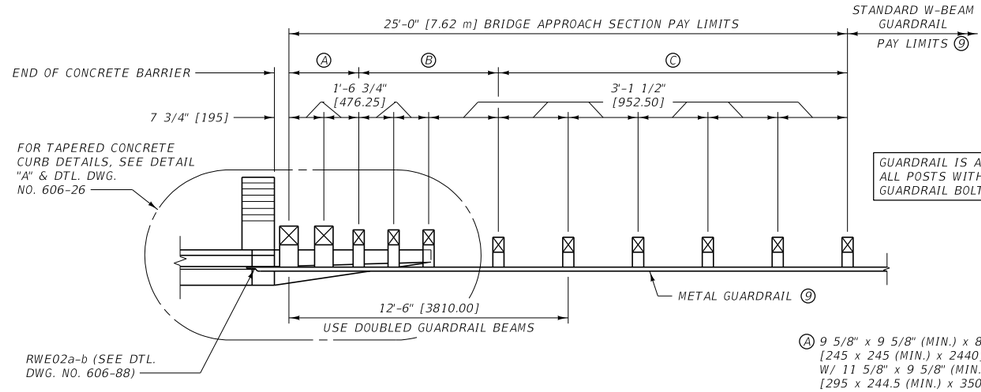



SECTION A-A

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. 606-05A).
5. LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
6. USE WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.
7. DO NOT FLARE BRIDGE APPROACH SECTIONS.
8. SEE DTL. DWG. NO. 606-25A FOR SKEWED BRIDGES.
9. SEE DTL. DWG. NO. 606-05A FOR METAL GUARDRAIL (W-BEAM).

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



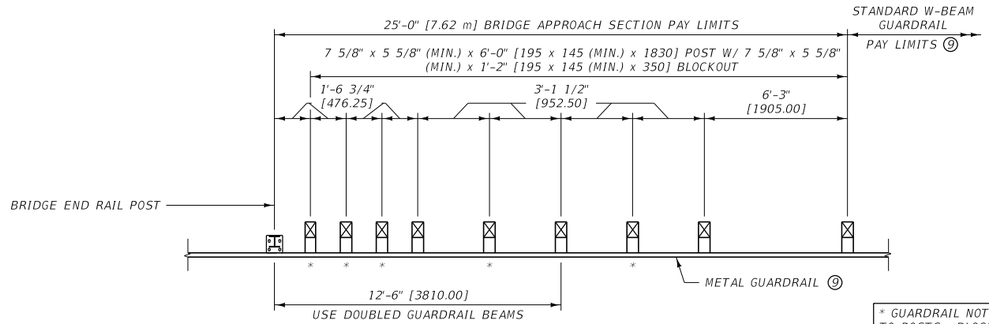

METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1

(FOR BRIDGES USING CONCRETE BARRIER RAIL)

Ⓐ 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

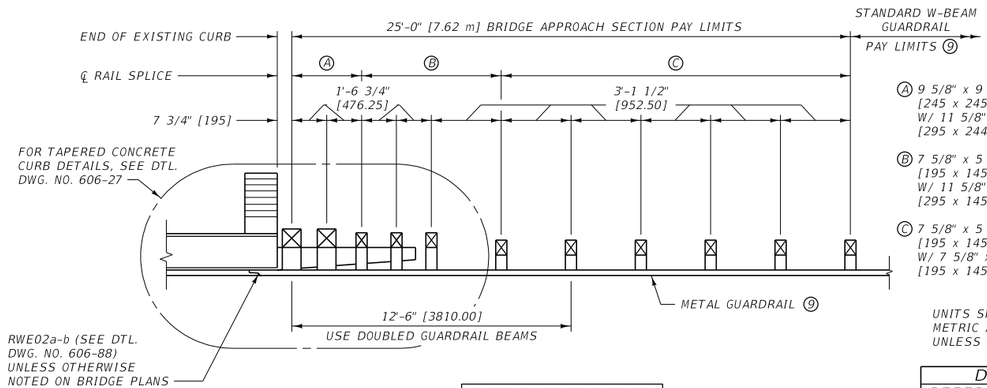
Ⓒ 7 5/8" x 5 5/8" x 6'-0"
[195 x 145 x 1830] POST
W/ 7 5/8" x 5 5/8" (MIN.) x 1'-2"
[195 x 145 (MIN.) x 350] BLOCKOUT




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

METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 2

(FOR BRIDGES WITHOUT CURBS)




METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3

(FOR BRIDGES WITH EXISTING CONCRETE CURBS)

Ⓐ 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

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

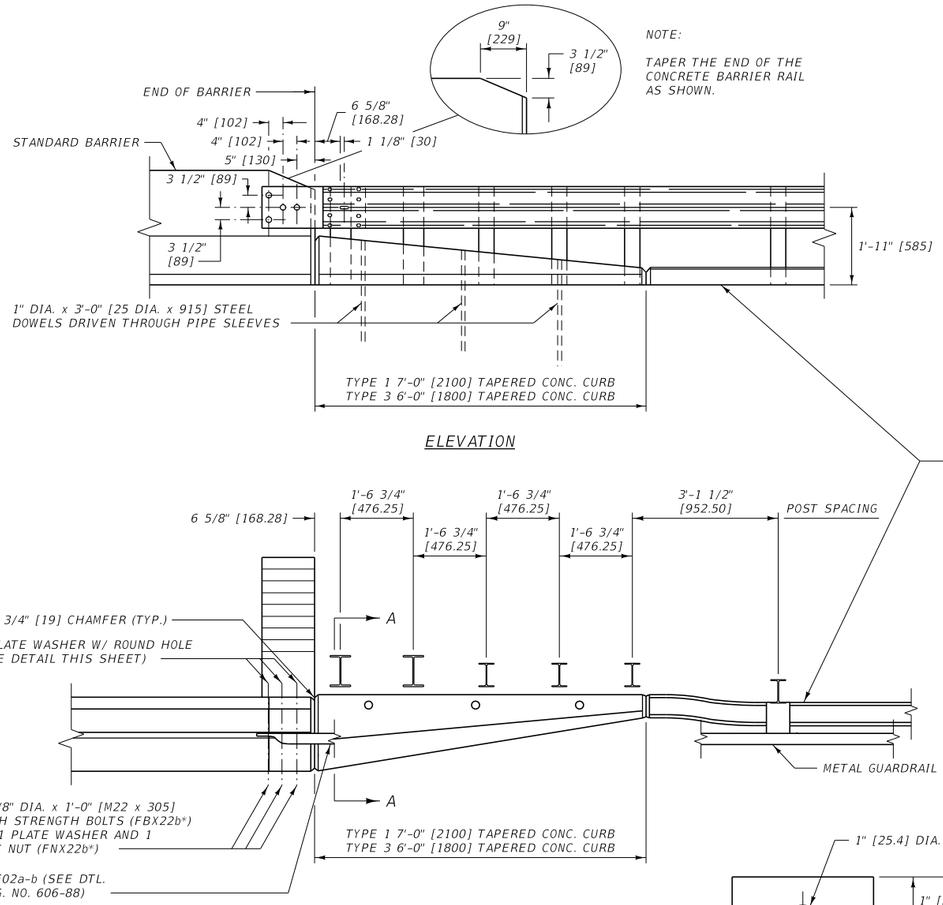
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-24A

# BRIDGE APPROACH SECTIONS - WOOD POSTS

MONTANA DEPARTMENT OF TRANSPORTATION




ELEVATION




PLAN

DETAIL "A"

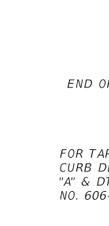
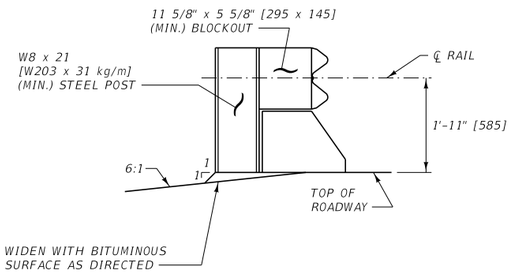



PLATE WASHER

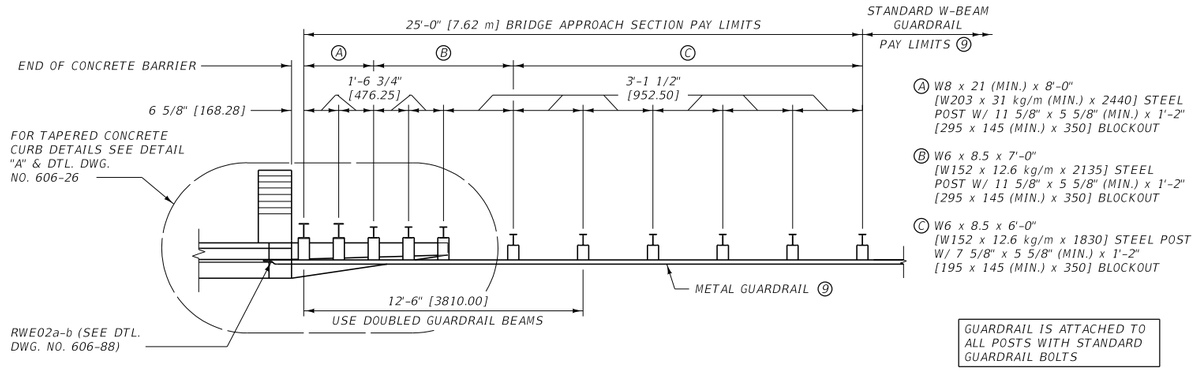



SECTION A-A

NOTES:

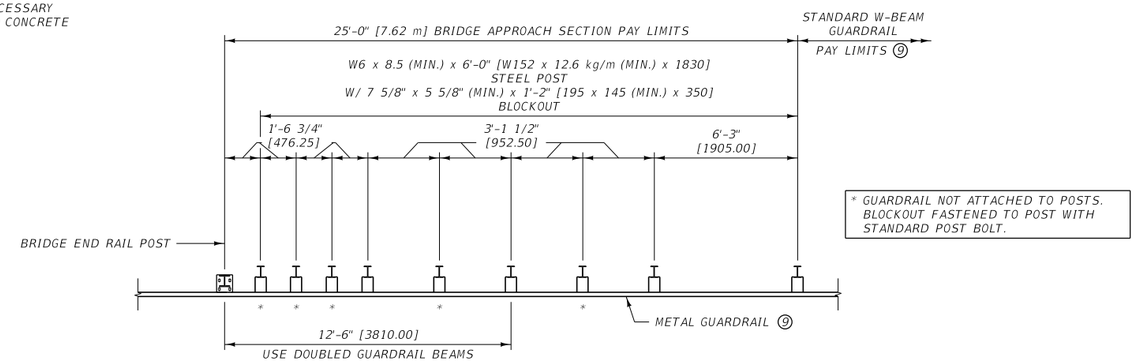
1. TAPERED CONCRETE CURBS:
   TYPE 1, SEE DTL. DWG. NO. 606-26
   TYPE 3, SEE DTL. DWG. NO. 606-27
2. TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.
3. PORTIONS OF GUARDRAIL & BLOCKOUTS ARE OMITTED FOR CLARITY.
4. LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE. (SEE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

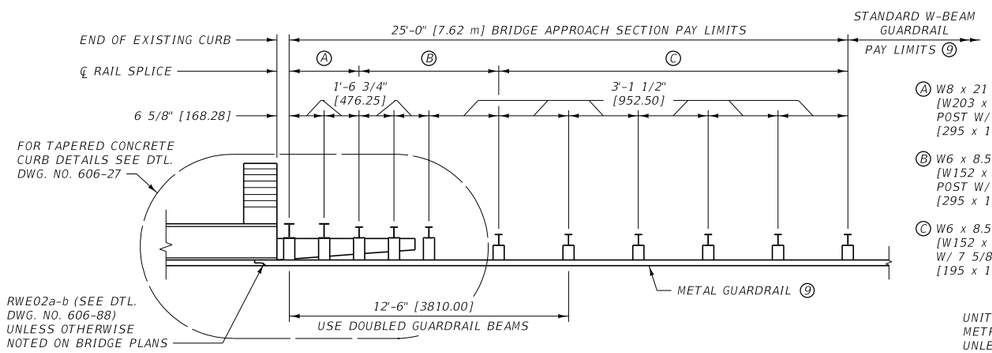
(FOR BRIDGES USING CONCRETE BARRIER RAIL)




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

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.

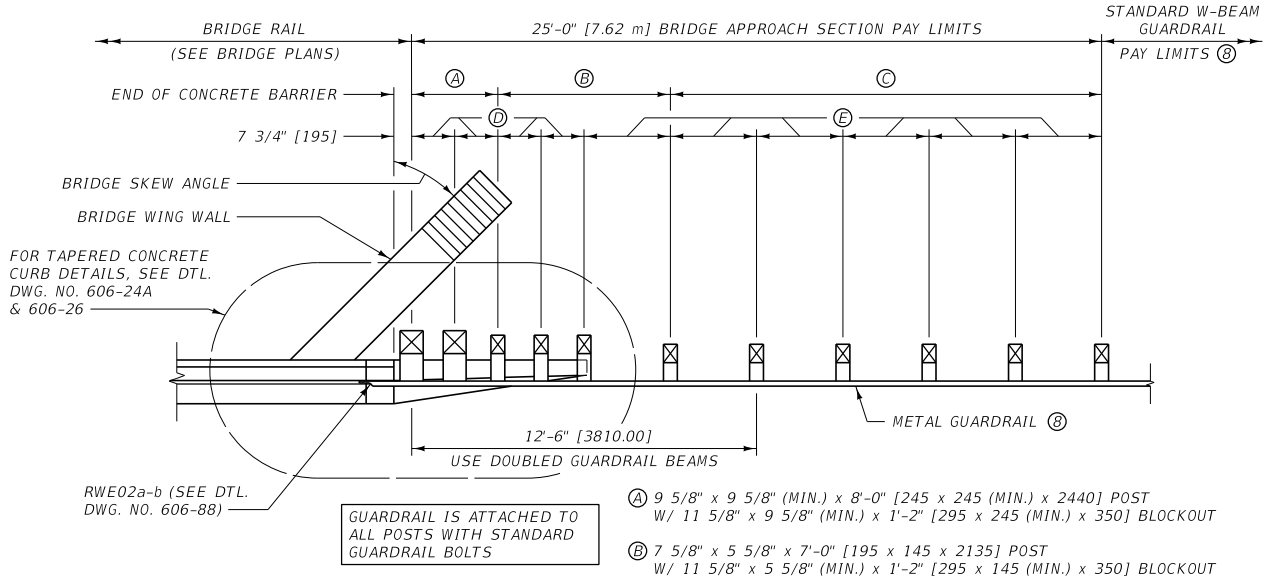
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-24B

BRIDGE APPROACH SECTIONS - STEEL POSTS

MDT MONTANA DEPARTMENT OF TRANSPORTATION




GUARDRAIL IS ATTACHED TO ALL POSTS WITH STANDARD GUARDRAIL BOLTS

(A) 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 245 (MIN.) x 350] BLOCKOUT

(B) 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

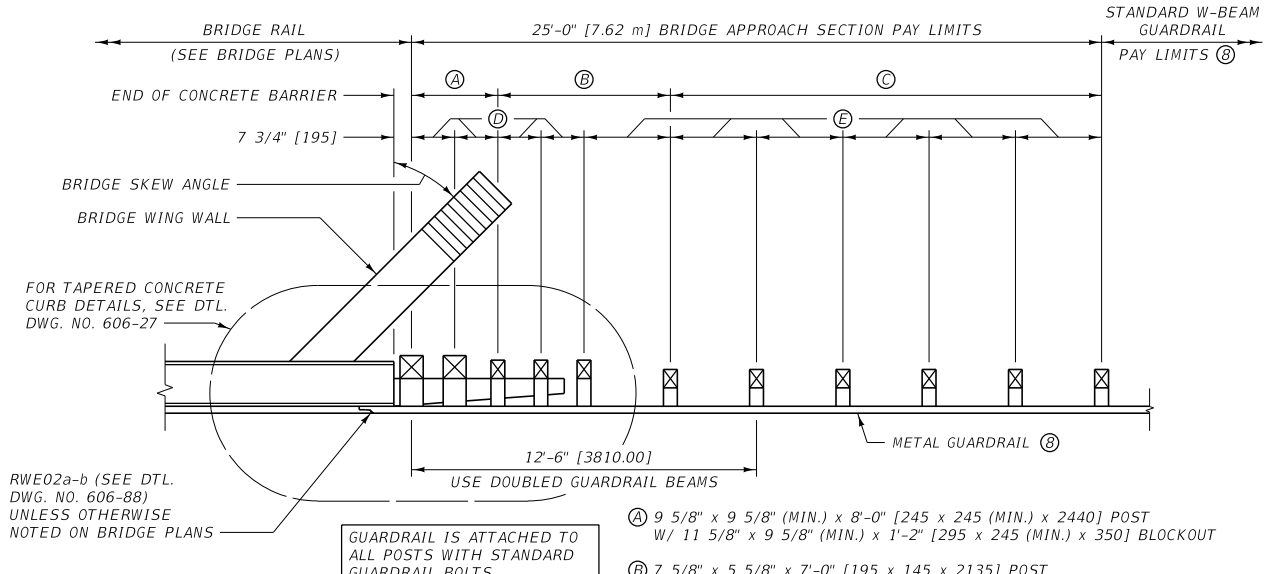
(C) 7 5/8" x 5 5/8" x 6'-0" [195 x 145 x 1830] POST
W/ 7 5/8" x 5 5/8" (MIN.) x 1'-2" [195 x 145 (MIN.) x 350] BLOCKOUT

(D) 1'-6 3/4" [476.25]

(E) 3'-1 1/2" [952.50]

## METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1

(FOR SKEWED BRIDGES USING CONCRETE BARRIER RAIL)




GUARDRAIL IS ATTACHED TO ALL POSTS WITH STANDARD GUARDRAIL BOLTS

(A) 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 245 (MIN.) x 350] BLOCKOUT

(B) 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

(C) 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

(D) 1'-6 3/4" [476.25]

(E) 3'-1 1/2" [952.50]

## 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 DIRECTON 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.

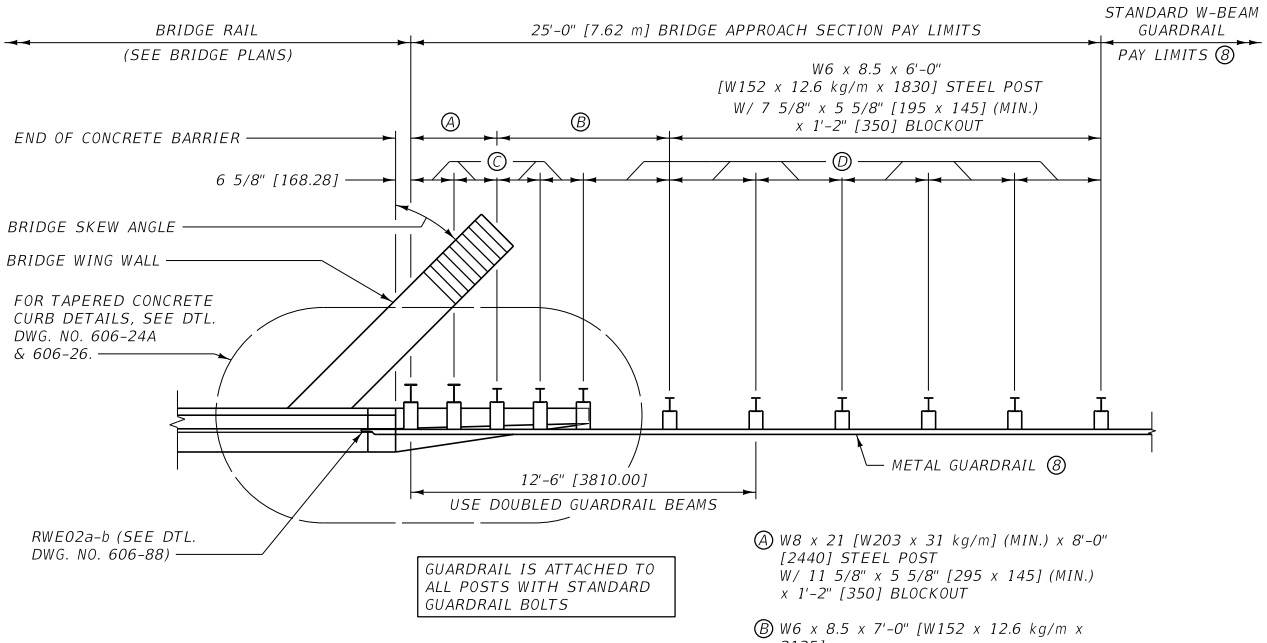
DETAILED DRAWING

REFERENCE
STANDARD SPEC.
SECTION 606

DWG. NO.
606-25A

# SKEWED BRIDGE APPROACH SECTIONS - WOOD POSTS

MDT MONTANA DEPARTMENT OF TRANSPORTATION




## METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1

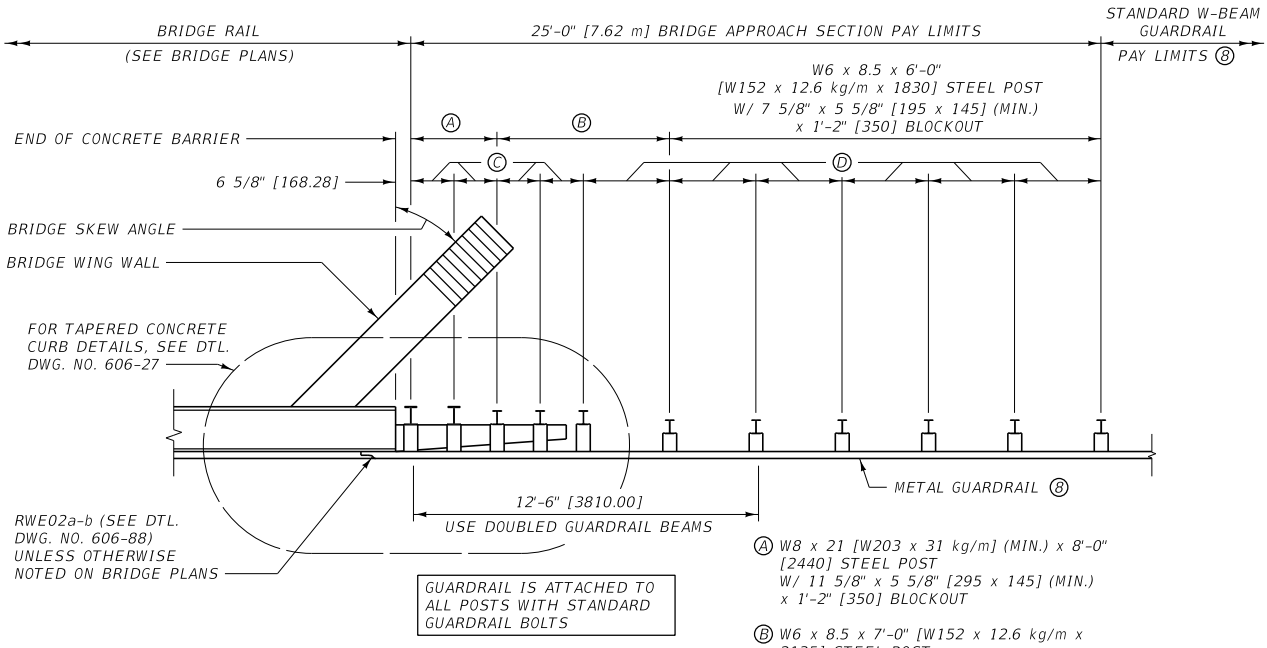
(FOR SKEWED BRIDGES USING CONCRETE BARRIER RAIL)

(A) 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

(B) 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

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

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




## METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3

(FOR SKEWED BRIDGES WITH EXISTING CONCRETE CURBS)

(A) 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

(B) 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

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

(D) 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.

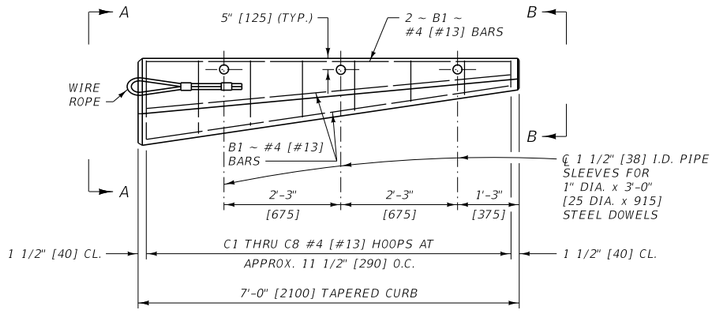
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

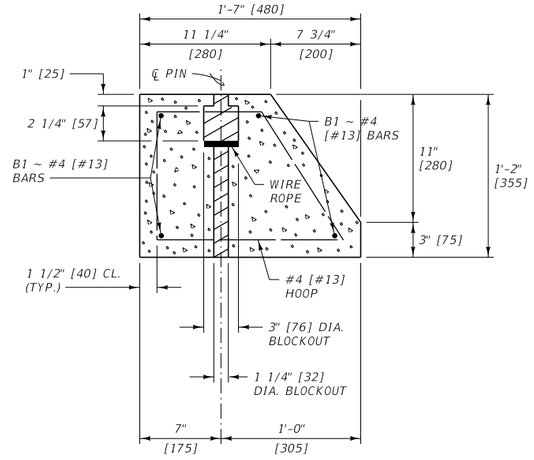
DWG. NO. 606-25B

# SKEWED BRIDGE APPROACH SECTIONS - STEEL POSTS

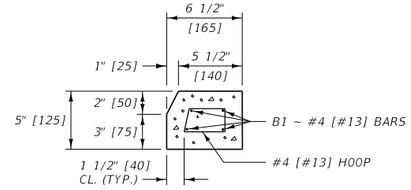
MDT MONTANA DEPARTMENT OF TRANSPORTATION



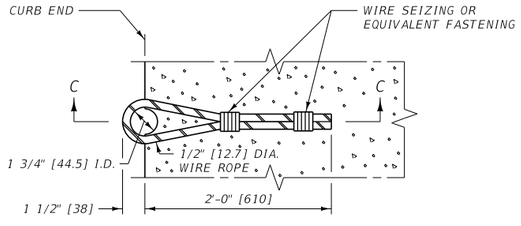

PLAN



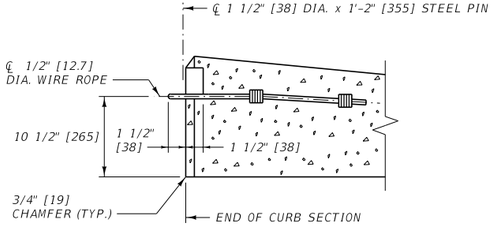

VIEW A-A




VIEW B-B




WIRE ROPE DETAIL

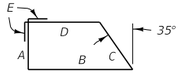



SECTION C-C

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)

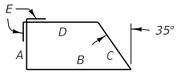



TYPE 1

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" | 1'-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.

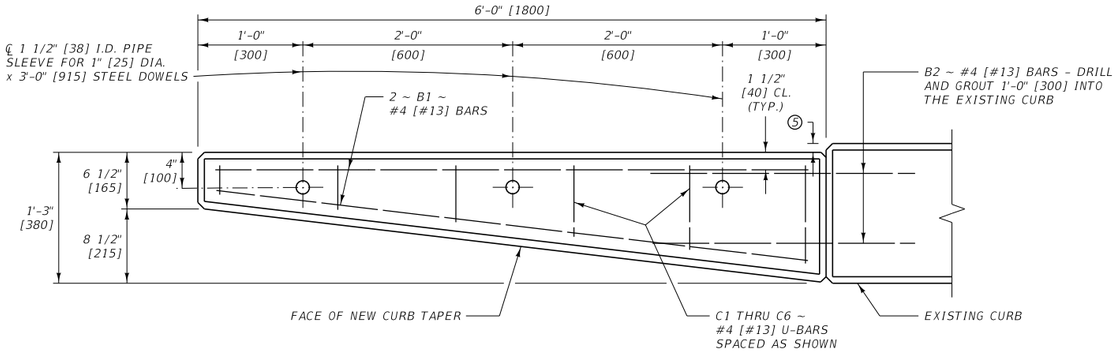
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

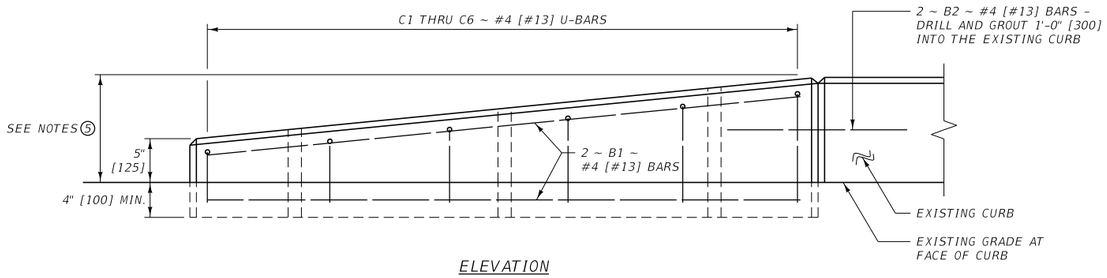
DWG. NO. 606-26

TAPERED CONCRETE CURB DETAIL

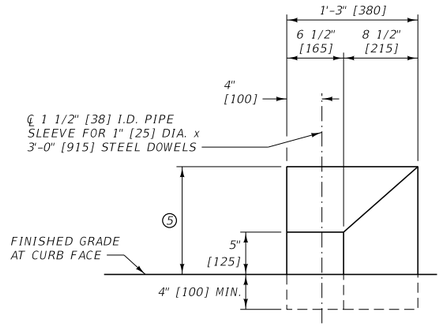
MDT MONTANA DEPARTMENT OF TRANSPORTATION




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 $m^3$]
   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)


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 STANDARD SPEC. SECTION 606

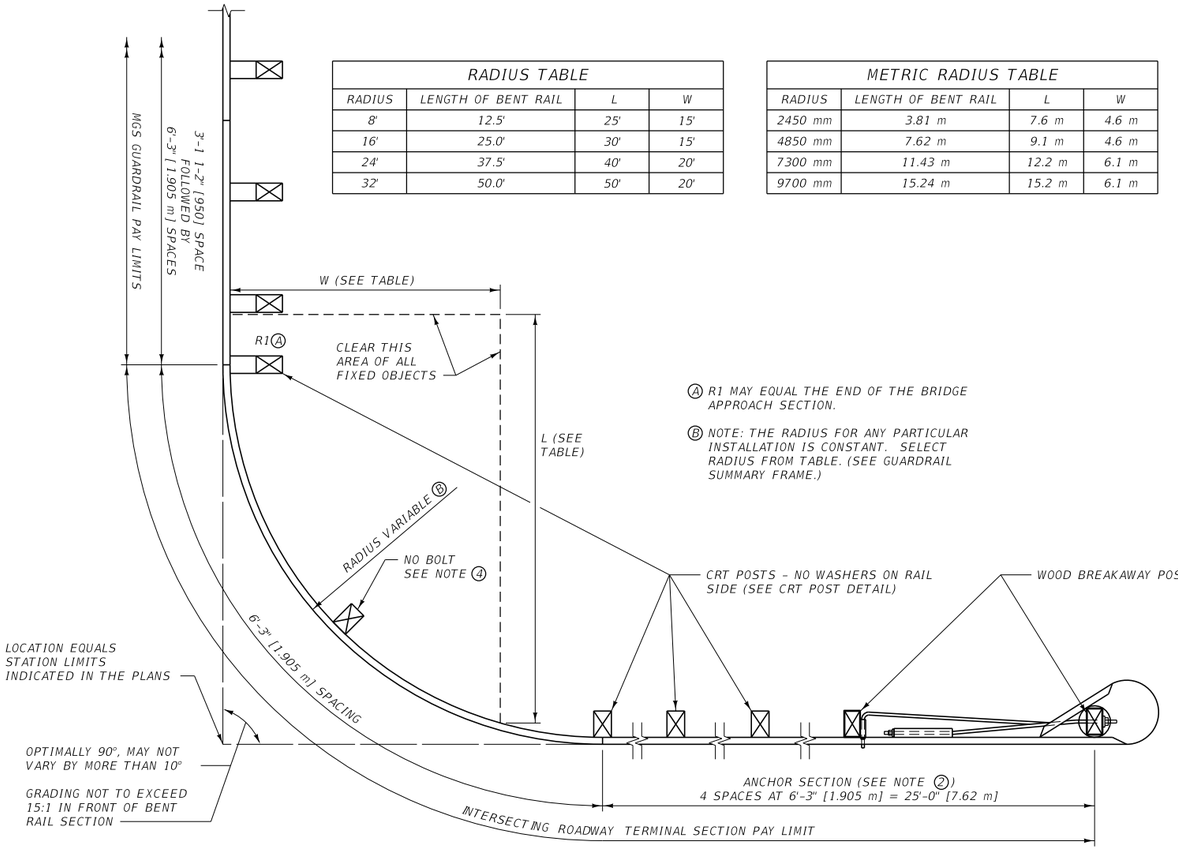
DWG. NO. 606-27

# 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' |

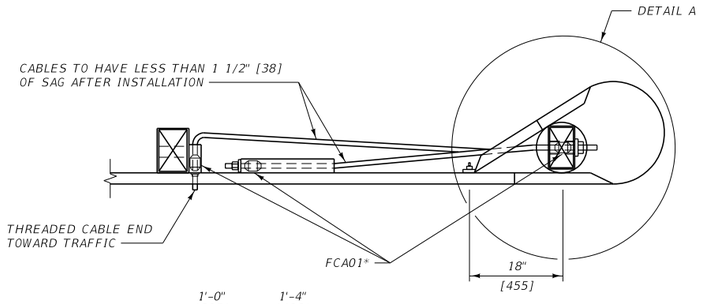
| METRIC RADIUS TABLE | | | |
|---|---|---|---|
| RADIUS | LENGTH OF BENT RAIL | L | W |
| 2450 mm | 3.81 m | 7.6 m | 4.6 m |
| 4850 mm | 7.62 m | 9.1 m | 4.6 m |
| 7300 mm | 11.43 m | 12.2 m | 6.1 m |
| 9700 mm | 15.24 m | 15.2 m | 6.1 m |

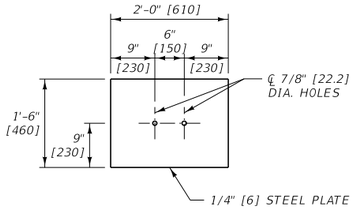



Ⓐ R1 MAY EQUAL THE END OF THE BRIDGE APPROACH SECTION.

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

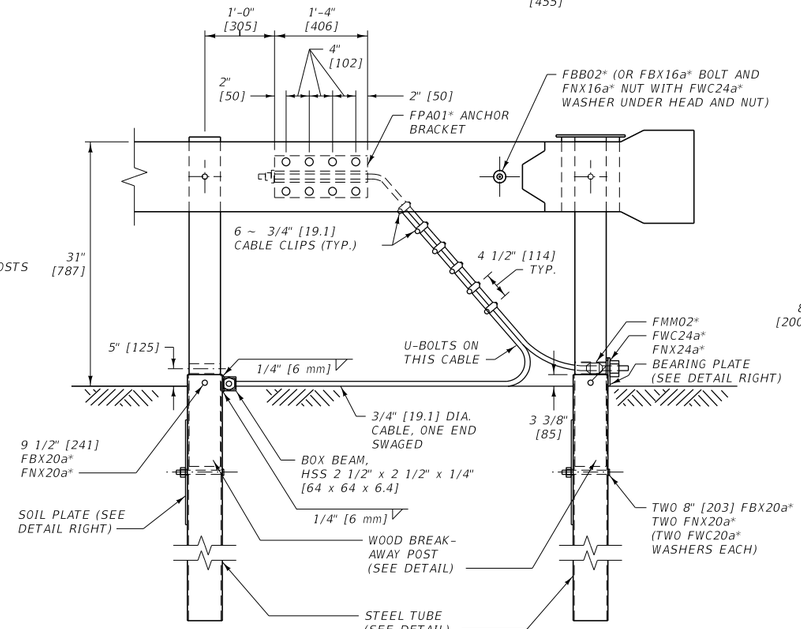
PLAN

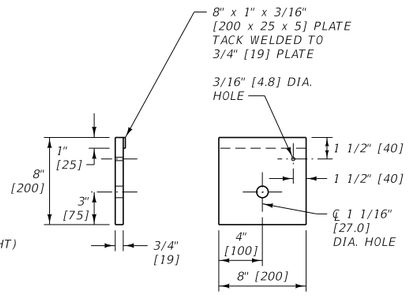



SOIL PLATE DETAIL

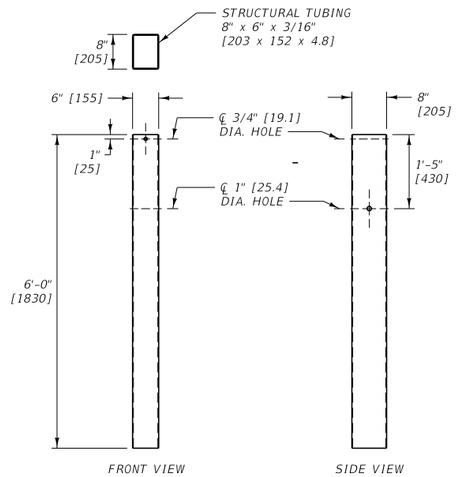
PLS03*



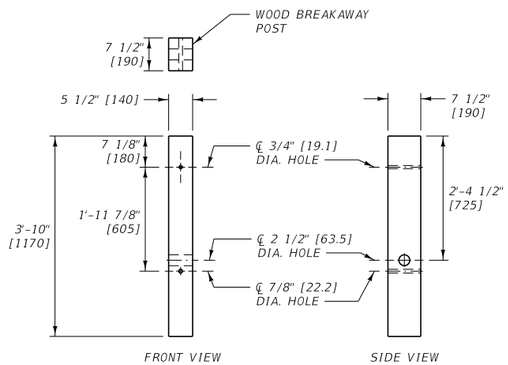

BEARING PLATE DETAIL

FPB01*



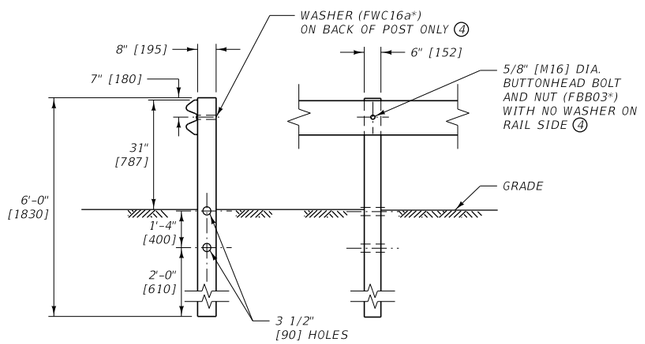

MGS FOUNDATION TUBE DETAILS

PTE06*




WOOD BREAKAWAY POST DETAILS

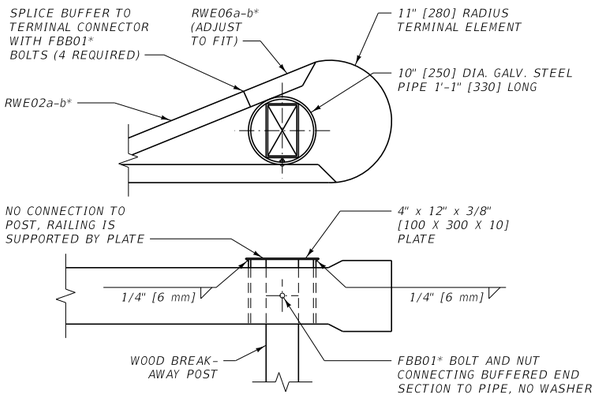
PDF04*




CONTROLLED RELEASING TERMINAL (CRT) POST

CRT POST DETAIL

PDE09*




DETAIL A

NOTES:

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.

* 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.

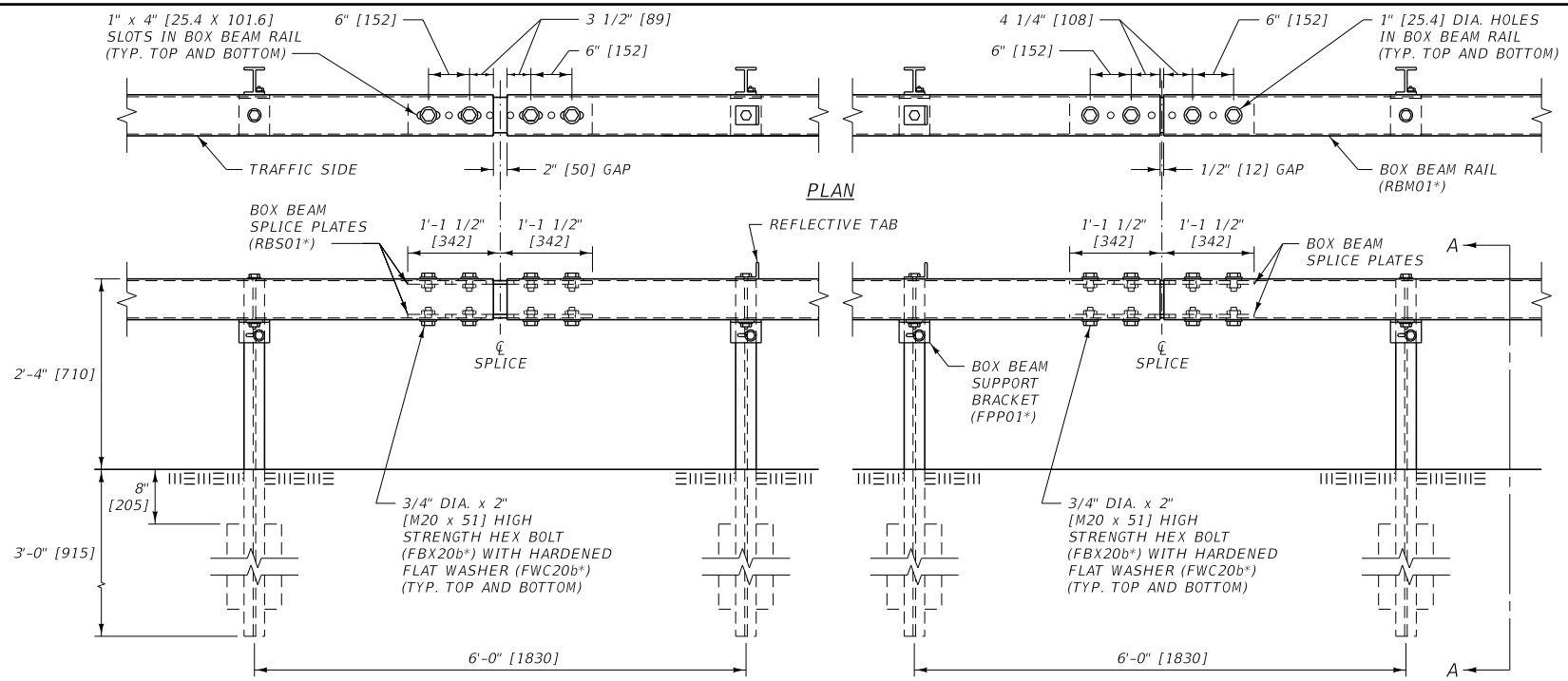
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

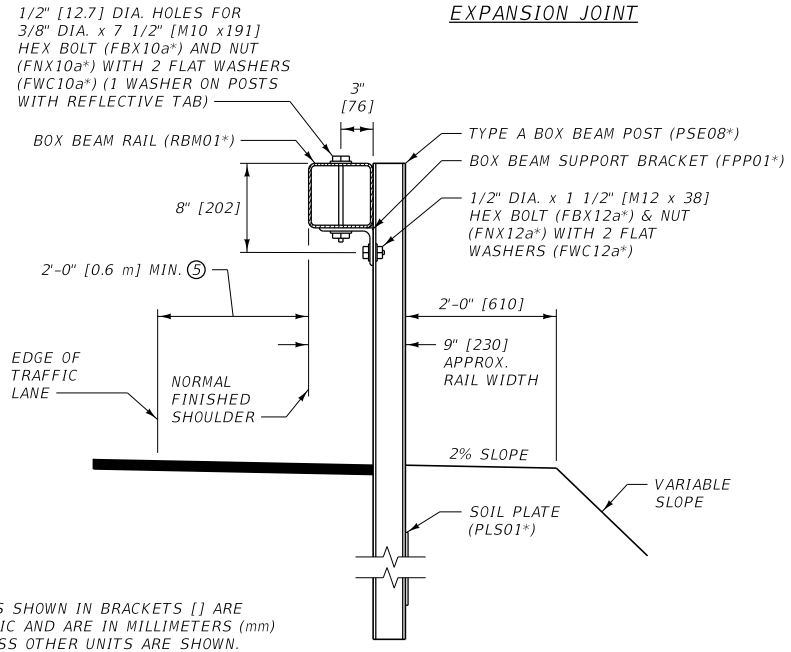
DWG. NO. 606-46

# INTERSECTING ROADWAY TERMINAL SECTION (MGS)

MONTANA DEPARTMENT OF TRANSPORTATION




EXPANSION JOINT ELEVATION SPLICE DETAIL




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

SECTION A-A

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].

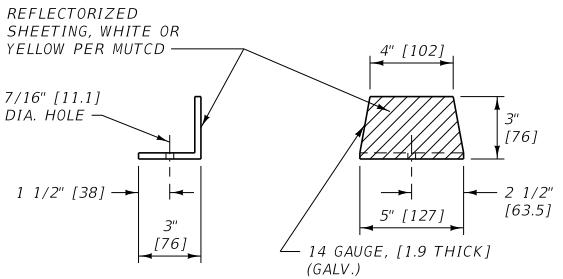
③ ATTACH REFLECTIVE TABS TO EVERY FOURTH POST (24 FT. [7.32 m] TYP.). ANGLE TABS SLIGHTLY TOWARDS TRAFFIC. DO NOT USE REFLECTIVE TABS ON WY-BET TERMINALS. WY-BET TERMINALS RECEIVE REFLECTIVE CHANNELS.

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

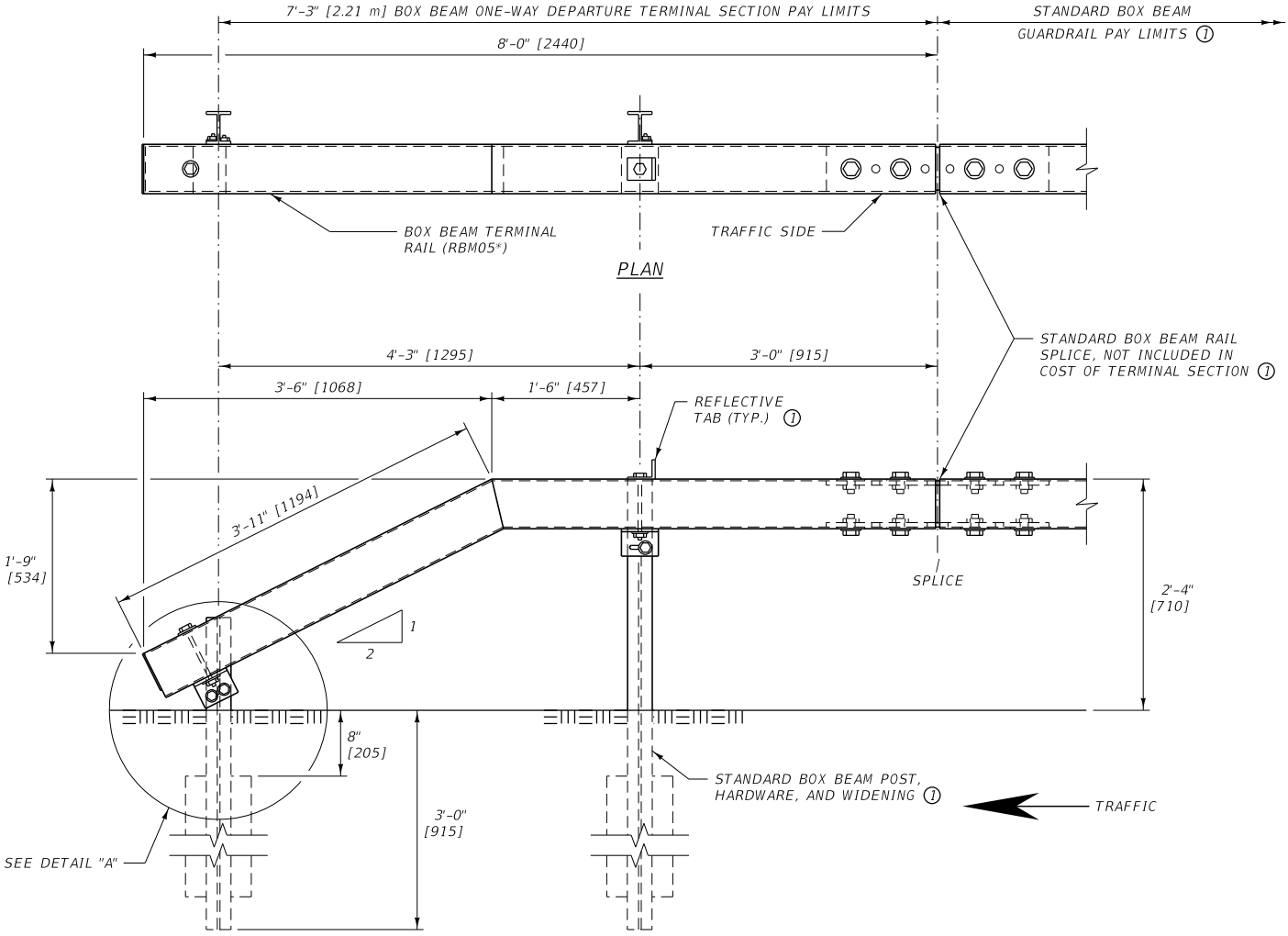
DETAILED DRAWING

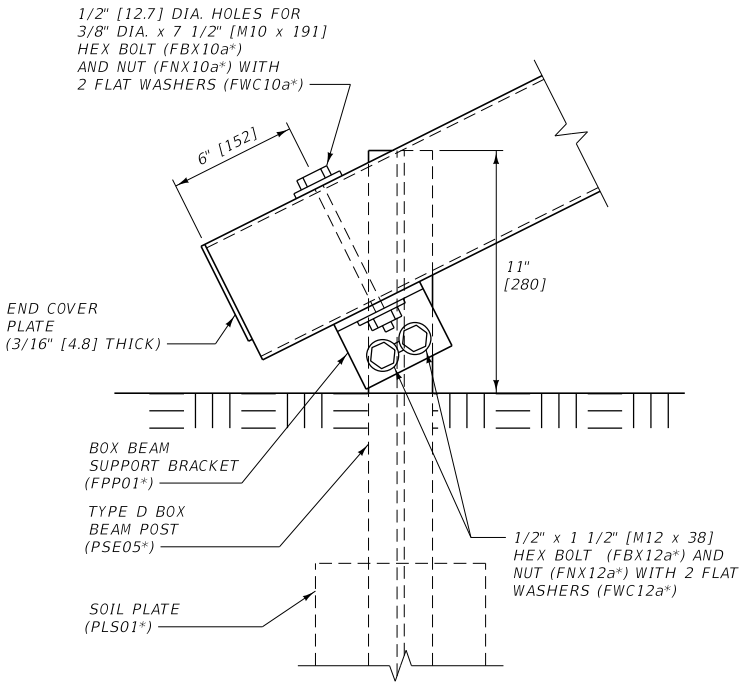
REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-50

BOX BEAM GUARDRAIL

MDT MONTANA DEPARTMENT OF TRANSPORTATION




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.

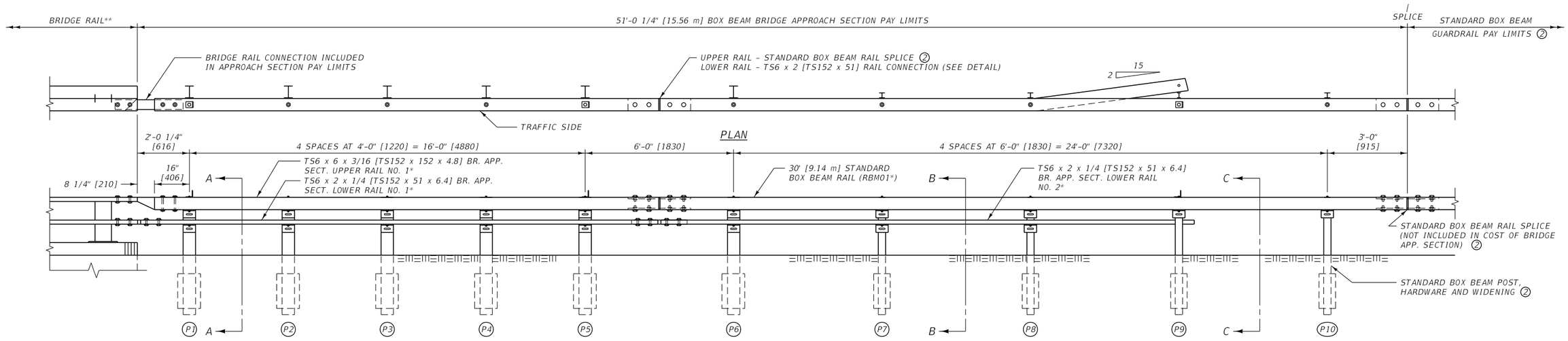
DETAILED DRAWING

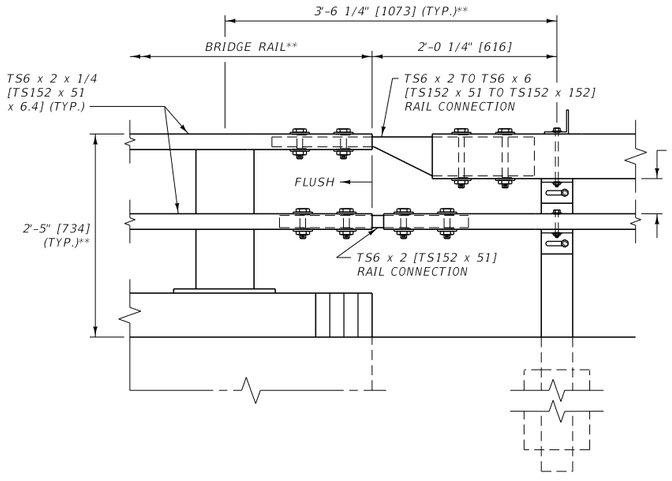
REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-52

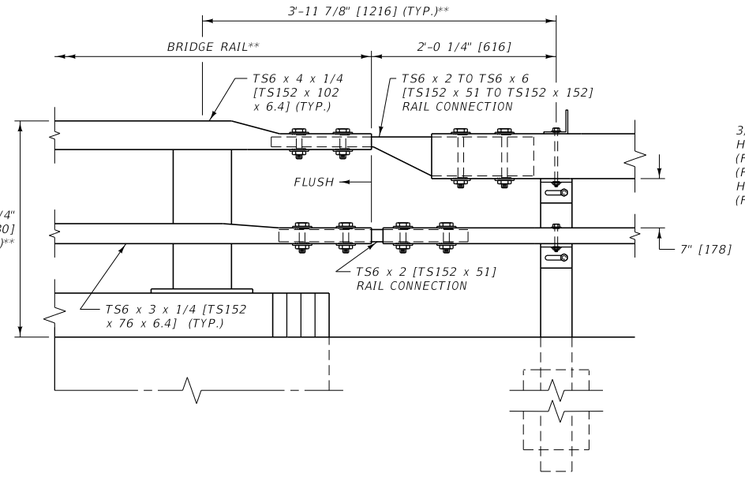
# BOX BEAM ONE-WAY DEPARTURE TERMINAL SECTION

MDT MONTANA DEPARTMENT OF TRANSPORTATION

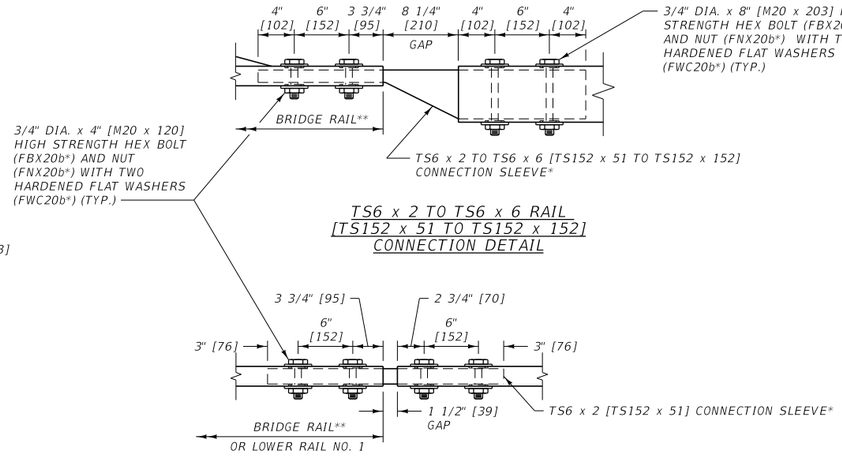



BOX BEAM - BRIDGE APPROACH SECTION TYPE 1



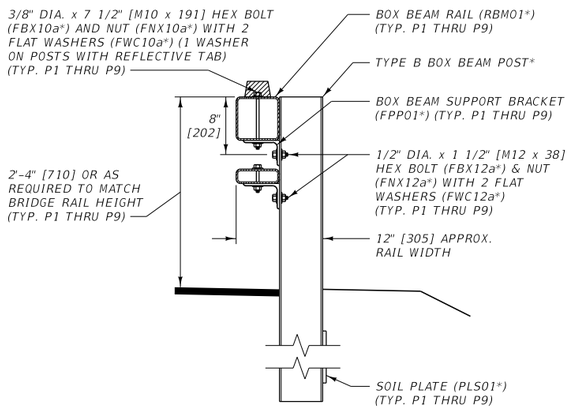

BOX BEAM - BRIDGE APPROACH SECTION TYPE 2




TS6 x 2 TO TS6 x 6 RAIL [TS152 x 51 TO TS152 x 152] CONNECTION DETAIL

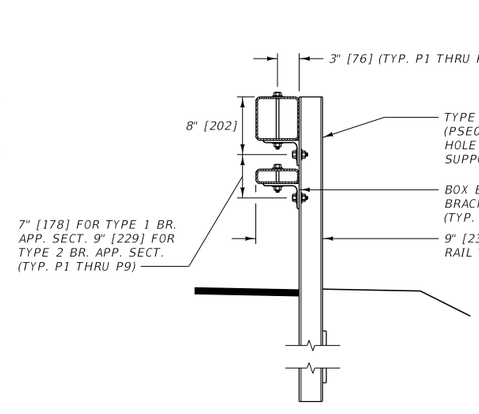



TS6 x 2 [TS152 x 51] RAIL CONNECTION DETAIL



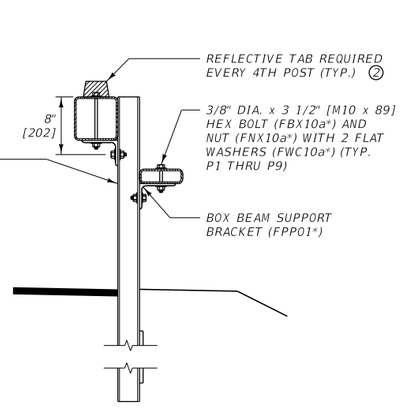

SECTION A-A

(TYP. AT POSTS P1 THRU P6)



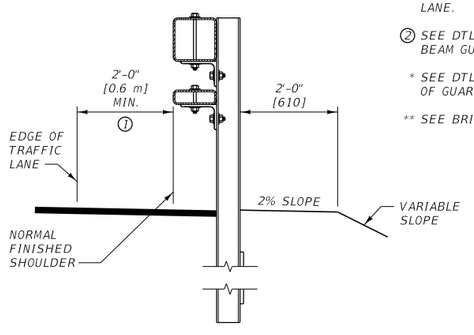

SECTION B-B

(TYP. AT POSTS P7 & P8)




SECTION C-C

(POST P9)




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.

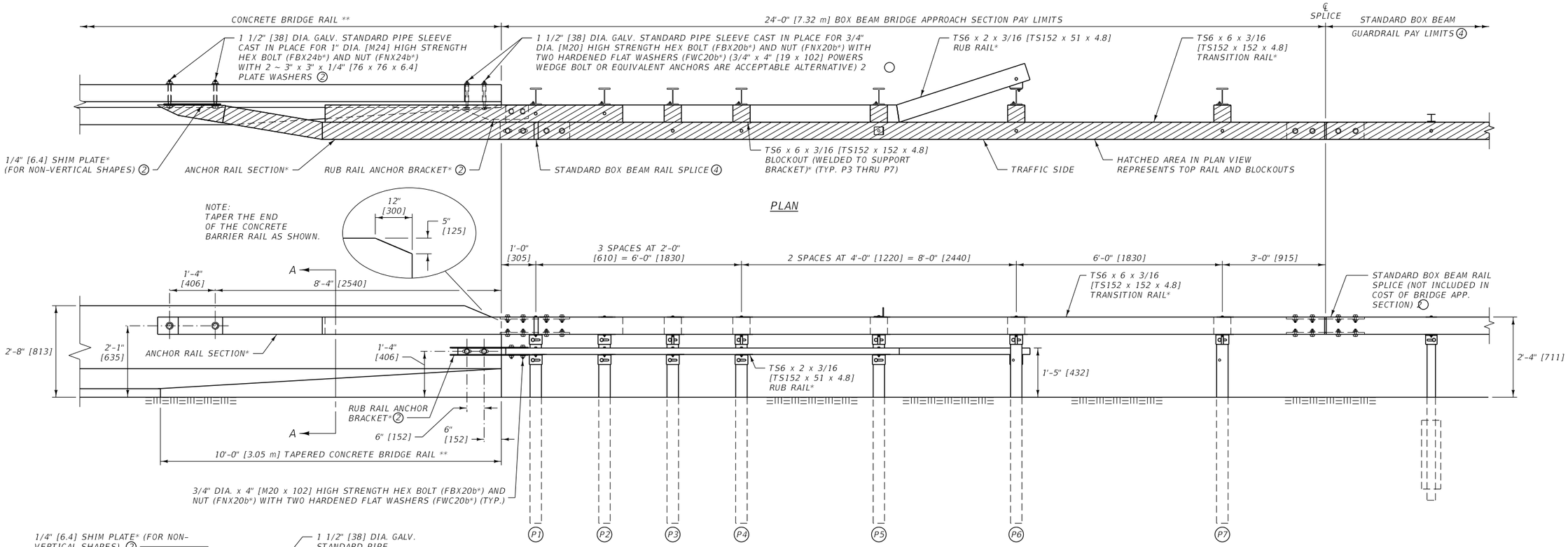
DETAILED DRAWING

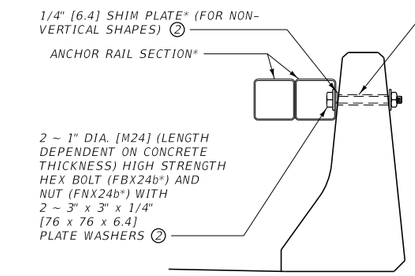
REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-53

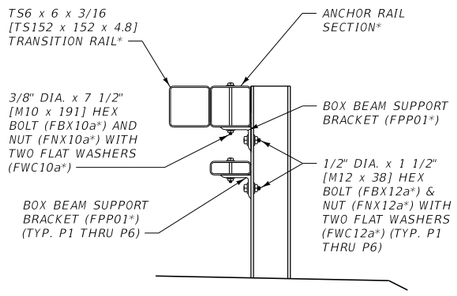
# BOX BEAM BRIDGE APPROACH SECTION - TYPES 1 & 2

MDT MONTANA DEPARTMENT OF TRANSPORTATION

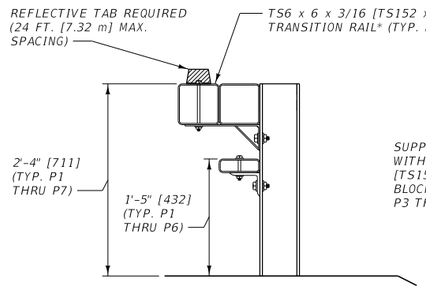


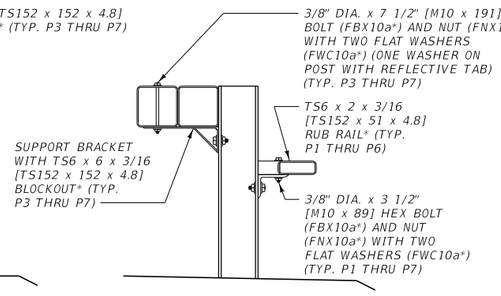

SECTION A-A



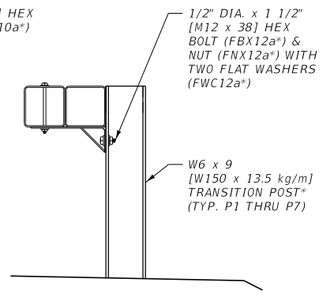

TYP. AT POSTS P1 & P2



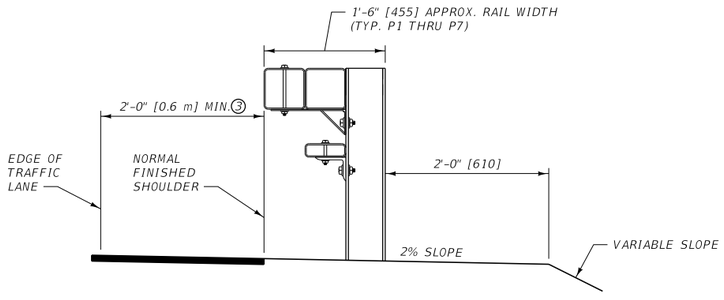

TYP. AT POSTS P3 THRU P5




POST P6




POST P7




GUARDRAIL WIDENING DETAIL

NOTES:

(1) INCLUDE COST OF ENTIRE ANCHOR RAIL SECTION, ALONG WITH ALL HARDWARE NECESSARY FOR ATTACHMENT TO CONCRETE BRIDGE RAIL, IN COST OF BRIDGE APPROACH SECTION.

(2) 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.

(3) WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" [0.6 m] FROM THE TRAFFIC LANE.

(4) 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 MILLMETERS (mm) UNLESS OTHER UNITS ARE SHOWN

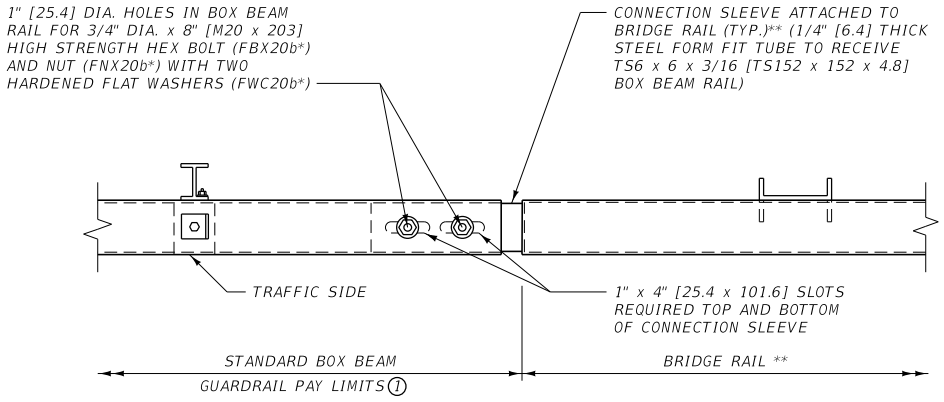
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

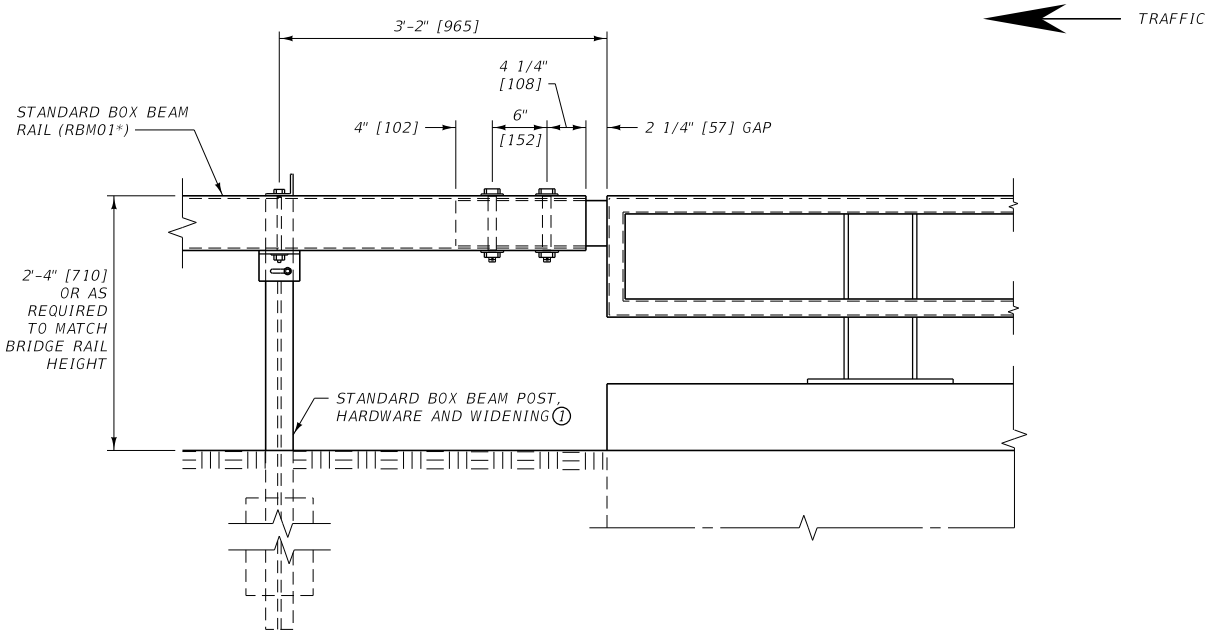
DWG. NO. 606-53A

# BOX BEAM BRIDGE APPROACH SECTION-TYPE 3

MDT MONTANA DEPARTMENT OF TRANSPORTATION




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.

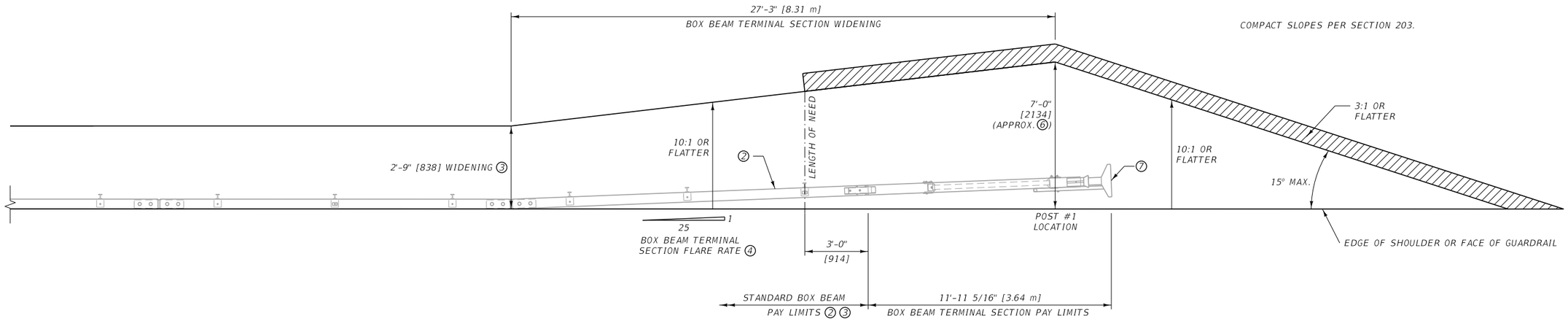
DETAILED DRAWING

REFERENCE
STANDARD SPEC.
SECTION 606

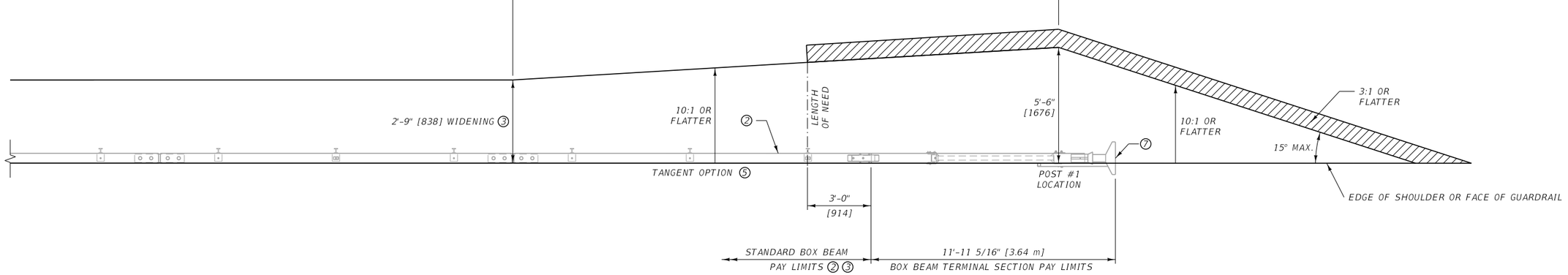
DWG. NO.
606-54

BOX BEAM ONE-WAY BRIDGE
DEPARTURE SECTION

MONTANA DEPARTMENT OF TRANSPORTATION




ROAD SYSTEMS MBEAT TERMINAL (FLARED) 1




ROAD SYSTEMS MBEAT TERMINAL (TANGENT) 1

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. SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.
4. 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.
5. 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.
6. 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.
7. 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.

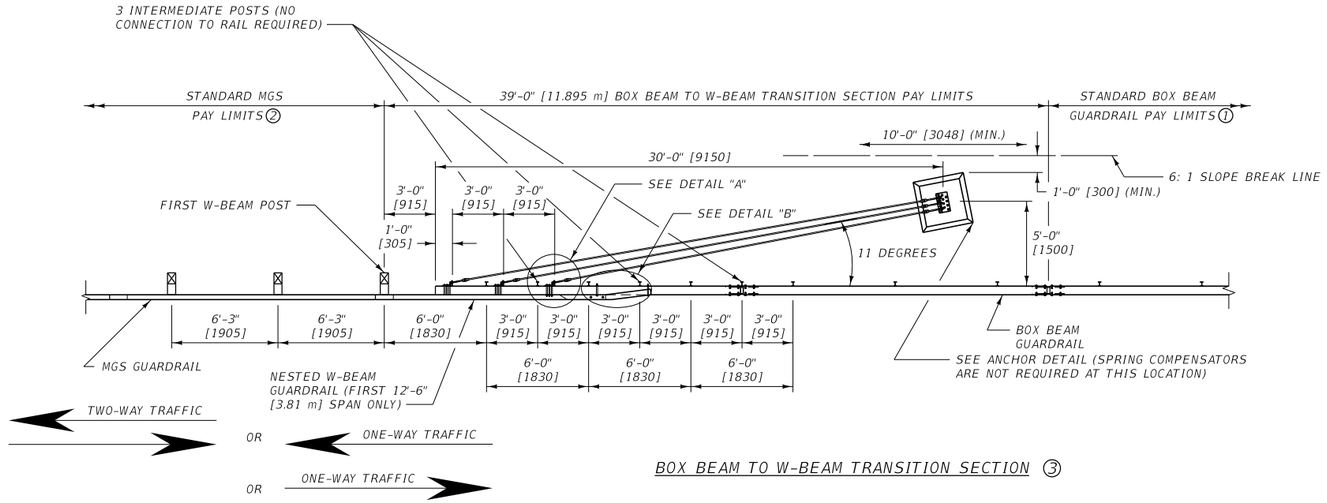
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING

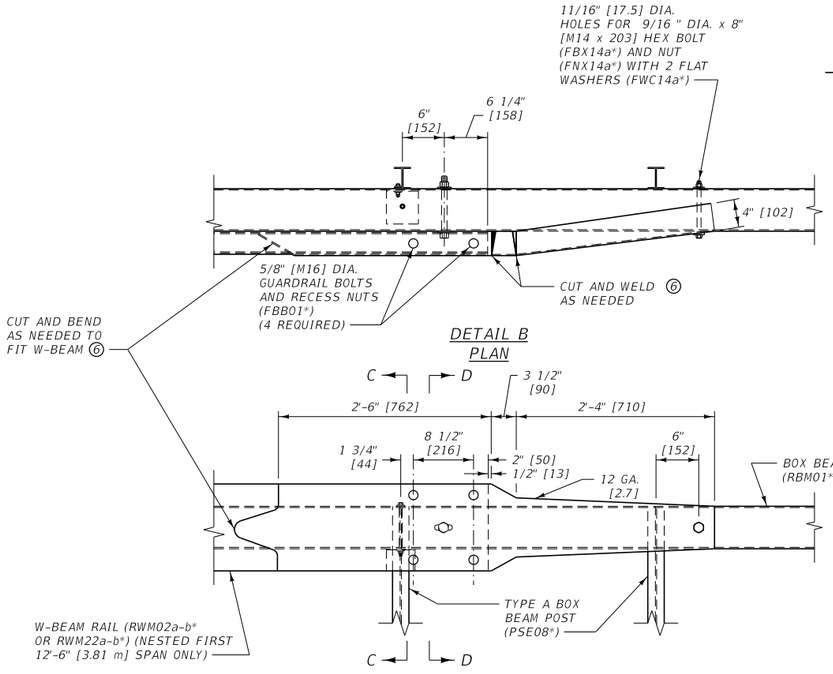
| REFERENCE | DWG. NO. |
|---|---|
| STANDARD SPEC. SECTION 606 | 606-55 |

# BOX BEAM TERMINAL SECTION - MBEAT

MDT MONTANA DEPARTMENT OF TRANSPORTATION

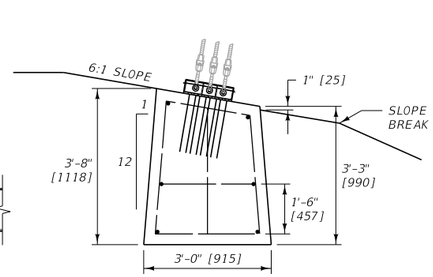



BOX BEAM TO W-BEAM TRANSITION SECTION ③

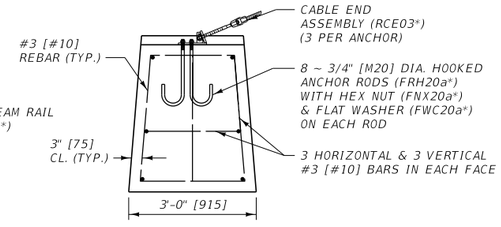



DETAIL B
PLAN

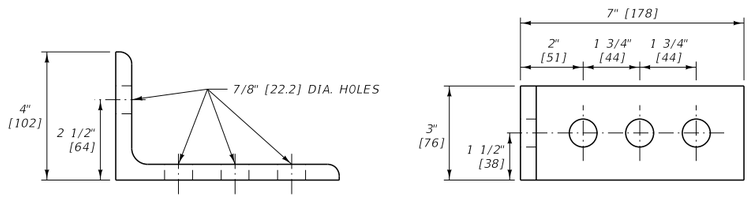
DETAIL B
ELEVATION



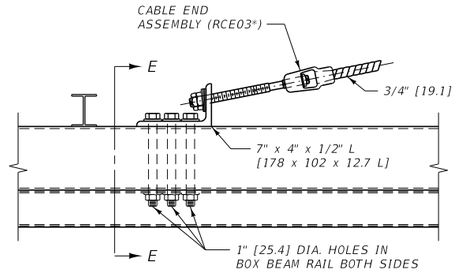

SECTION A-A



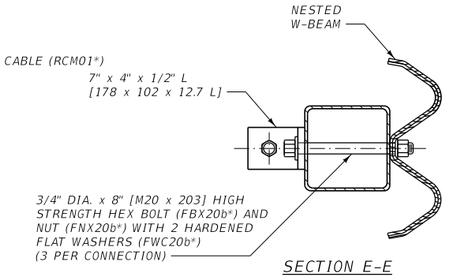

SECTION B-B



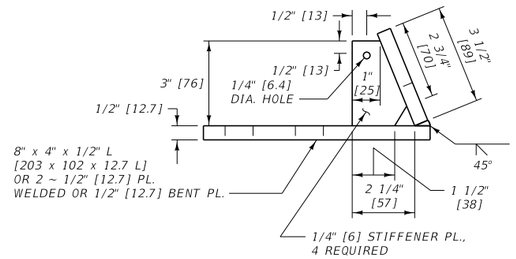

7" x 4" x 1/2" L [178 x 102 x 12.7] DETAIL



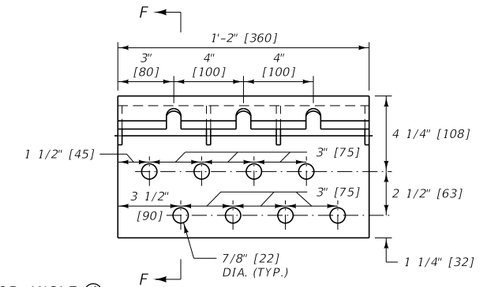

DETAIL A
PLAN




SECTION E-E

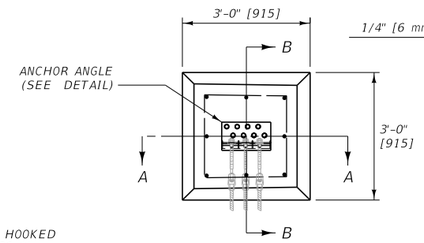



SECTION F-F

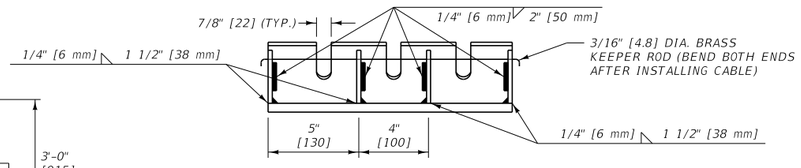



ANCHOR ANGLE ④ DETAIL

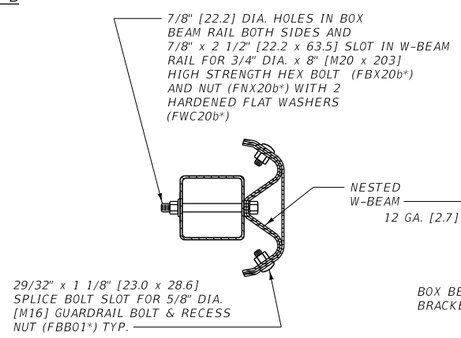
PLAN



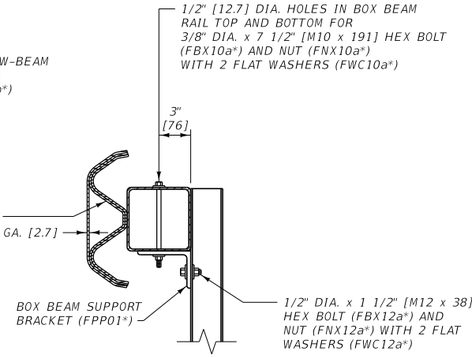

ANCHOR DETAIL ⑤
PLAN




ELEVATION




SECTION D-D




SECTION C-C

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

NOTES:

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

② 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.

③ MANUFACTURE ANCHOR ANGLES USING AASHTO M 270 [270M] GRADE 36 [250] STEEL MEETING SECTION 711. WELD PER SECTION 711.

④ GALVANIZE ANCHOR ANGLES PER SECTION 711. NO PUNCHING, DRILLING,WELDING OR CUTTING IS PERMITTED ON COMPONENTS AFTER GALVANIZING.

⑤ USE CLASS GENERAL CONCRETE TO CONSTRUCT ANCHOR.

⑥ 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.

⑦ 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 STANDARD SPEC. SECTION 606,710,711

DWG. NO. 606-58

BOX BEAM TO MGS TRANSITION SECTION

MDT MONTANA DEPARTMENT OF TRANSPORTATION

## SCHEDULE OF GUARDRAIL HARDWARE

| DESIGNATION ① | DESCRIPTION | METRIC DESCRIPTION | DTL.DWG.NO. (606-###) | GUARDRAIL TYPE ② | DTL. DWGS. WHERE PARTS USED | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 606-05A | 606-05B | 606-07 | 606-09 | 606-11A | 606-11B | 606-18 | 606-23A | 606-23B | 606-24A | 606-24B | 606-25A | 606-25B | 606-46 | 606-50 | 606-52 | 606-53 | 606-53A | 606-54 | 606-58 |
| FBB01-05 | 5/8" DIA. GUARDRAIL BOLT & RECESS NUT | M16 GUARDRAIL BOLT & RECESS NUT | 82 | W | X | | | X | X | | X | | X | | | | | X | | | | | | X |
| FBB01-05 | 5/8" DIA. GUARDRAIL BOLT | M16 GUARDRAIL BOLT | 82 | W | | X | | | | X | | | | | | | | | | | | | | |
| FBB06-07 | 5/8" DIA. GUARDRAIL BOLT & RECESS NUT | M16 GUARDRAIL BOLT & RECESS NUT | 82 | W | | | | | | | | X | X | | | | | | | | | | | |
| FBX10a | 3/8" DIA. HEX BOLT | M10 HEX BOLT | 82 | B | | | | | | | | | | | | | | | X | X | X | X | | X |
| FBX12a | 1/2" DIA. HEX BOLT | M12 HEX BOLT | 82 | B | | | | | | | | | | | | | | | X | X | X | X | | X |
| FBX14a | 9/16" DIA. HEX BOLT | M14 HEX BOLT | 82 | B | | | | | | | | | | | | | | | | | | | | X |
| FBX16a | 5/8" DIA. HEX BOLT | M16 HEX BOLT | 82 | W | | | | | | | X | | | | | | | X | | | | | | |
| FBX20a | 3/4" DIA. HEX BOLT | M20 HEX BOLT | 82 | W | | | | | | | | | | | | | | X | | | | | | |
| FBX20b | 3/4" DIA. HIGH STRENGTH HEX BOLT* | M20 HIGH STRENGTH HEX BOLT* | 82 | B | | | | | | | | | | | | | | | X | | X | X | X | X |
| FBX22a | 7/8" DIA. HEX BOLT | M22 HEX BOLT | 82 | W | | | | | | | X | | | | | | | | | | | | | |
| FBX22b | 7/8" DIA. HIGH STRENGTH HEX BOLT* | M22 HIGH STRENGTH HEX BOLT* | 82 | W | | | | | | | | X | X | X | X | | | | | | | | | |
| FBX24b | 1" DIA. HIGH STRENGTH HEX BOLT* | M24 HIGH STRENGTH HEX BOLT* | 82 | B | | | | | | | | | | | | | | | | | | X | | |
| FCA01 | CABLE ASSEMBLY | CABLE ASSEMBLY | 84 | W | | | | | | | X | | | | | | | X | | | | | | |
| FMM01 | CABLE WEDGE | CABLE WEDGE | 94 | C | | | | | | | | | | | | | | | | | | | | X |
| FMM02 | POST SLEEVE | POST SLEEVE | 84 | W | | | | | | | X | | | | | | | X | | | | | | |
| FNS20 | 3/4" DIA. SQUARE NUT | M20 SQUARE NUT | 82 | C | | | | | | | | | | | | | | | | | | | | X |
| FNX10a | 3/8" DIA. HEX NUT | M10 HEX NUT | 82 | B | | | | | | | | | | | | | | | X | X | X | X | | X |
| FNX12a | 1/2" DIA. HEX NUT | M12 HEX NUT | 82 | B | | | | | | | | | | | | | | | X | X | X | X | | X |
| FNX14a | 9/16" DIA. HEX NUT | M14 HEX NUT | 82 | B | | | | | | | | | | | | | | | | | | | | X |
| FNX16a | 5/8" DIA. HEX NUT | M16 HEX NUT | 82 | W | | X | | | | X | X | | | | | | | X | | | | | | |
| FNX20a | 3/4" DIA. HEX NUT | M20 HEX NUT | 82 | C,W | | | | | | | | | | | | | | X | | | | | | X |
| FNX20b | 3/4" DIA. HIGH STRENGTH HEX NUT | M20 HIGH STRENGTH HEX NUT | 82 | B | | | | | | | | | | | | | | | | | X | X | X | X |
| FNX22b | 7/8" DIA. HIGH STRENGTH HEX NUT | M22 HIGH STRENGTH HEX NUT | 82 | B | | | | | | | | X | X | X | X | | | | | | | | | |
| FNX24a | 1" DIA. HEX NUT | M24 HEX NUT | 82 | W | | | | | | | X | | | | | | | X | | | | | | |
| FNX24b | 1" DIA. HIGH STRENGTH HEX NUT | M24 HIGH STRENGTH HEX NUT | 82 | B | | | | | | | | | | | | | | | | | | X | | |
| FPA01 | GUARDRAIL ANCHOR BRACKET & END PLATE | GUARDRAIL ANCHOR BRACKET & END PLATE | 84 | W | | | | | | | X | | | | | | | X | | | | | | |
| FPB01 | BEARING PLATE | BEARING PLATE | 18 & 46 | W | | | | | | | X | | | | | | | X | | | | | | |
| FPP01 | BOX BEAM SUPPORT BRACKET | BOX BEAM SUPPORT BRACKET | 97 | B | | | | | | | | | | | | | | | X | X | X | X | | X |
| FRH20a | 3/4" DIA. HOOKED ANCHOR ROD | M20 HOOKED ANCHOR ROD | 82 | C | | | | | | | | | | | | | | | | | | | | X |
| FWC10a | 3/8" DIA. FLAT WASHER | M10 FLAT WASHER | 82 | B | | | | | | | | | | | | | | | X | X | X | X | | X |
| FWC12a | 1/2" DIA. FLAT WASHER | M12 FLAT WASHER | 82 | B | | | | | | | | | | | | | | | X | X | X | X | | X |
| FWC14a | 9/16" DIA. FLAT WASHER | M14 FLAT WASHER | 82 | B | | | | | | | | | | | | | | | | | | | | X |
| FWC16a | 5/8" DIA. FLAT WASHER | M16 FLAT WASHER | 82 | W | X | X | | X | X | X | X | X | X | | | | | X | | | | | | |
| FWC20a | 3/4" DIA. FLAT WASHER | M20 FLAT WASHER | 82 | C,W | | | | | | | | | | | | | | X | | | | | | X |
| FWC20b | 3/4" DIA. HARDENED FLAT WASHER | M20 HARDENED FLAT WASHER | 82 | B | | | | | | | | | | | | | | | X | | X | X | X | X |
| FWC24a | 1" DIA. FLAT WASHER | M24 FLAT WASHER | 82 | W | | | | | | | X | | | | | | | X | | | | | | |
| FWR03 | RECTANGULAR PLATE WASHER | RECTANGULAR PLATE WASHER | 84 | W | | | | | | | X | | | | | | | | | | | | | |
| PDB01 | 8" WOOD BLOCKOUT | 205 WOOD BLOCKOUT | 05A & 05B, 11A &11B | W | X | X | | | X | X | | | | | | | | | | | | | | |
| PDB11 | 12" WOOD BLOCKOUT | 305 WOOD BLOCKOUT | 09, 23A & 23B | W | | | | X | | | | X | X | | | | | | | | | | | |
| PDE02 | WOOD GUARDRAIL POST | WOOD GUARDRAIL POST | 05A & 11A | W | X | | | | X | | | | | | | | | | | | | | | |
| PDE09 | CRT POST | CRT POST | 46 | W | | | | X | | | | | | | | | | X | | | | | | |
| PDF01 | WOOD BREAKAWAY POST | WOOD BREAKAWAY POST | 46 | W | | | | | | | X | | | | | | | X | | | | | | |
| PFP01 | STRUT AND YOKE ASSEMBLY | STRUT AND YOKE ASSEMBLY | 18 | W | | | | | | | X | | | | | | | | | | | | | |
| PLS01 | SOIL PLATE | SOIL PLATE | 92 & 97 | B | | | | | | | | | | | | | | | X | X | X | | | |
| PLS03 | SOIL PLATE | SOIL PLATE | 46 | W | | | | | | | | | | | | | | X | | | | | | |
| PSE05 | TYPE D BOX BEAM POST | TYPE D BOX BEAM POST | 97 | B | | | | | | | | | | | | | | | | X | | | | |
| PSE08 | TYPE A BOX BEAM POST | TYPE A BOX BEAM POST | 97 | B | | | | | | | | | | | | | | | X | | X | | | X |
| PTE05 | STEEL TUBE | STEEL TUBE | 46 | W | | | | | | | | | | | | | | X | | | | | | |
| PTE06 | STEEL TUBE | STEEL TUBE | 18 | W | | | | | | | X | | | | | | | | | | | | | |
| PWE01 | STEEL GUARDRAIL POST | STEEL GUARDRAIL POST | 05B | W | | X | | | | X | | | | | X | | | | | | | | | |
| RBM01 | BOX BEAM RAIL | BOX BEAM RAIL | 98 | B | | | | | | | | | | | | | | | X | | X | | X | X |
| RBM05 | BOX BEAM TERMINAL RAIL | BOX BEAM TERMINAL RAIL | 98 | B | | | | | | | | | | | | | | | | X | | | | |
| RBS01 | BOX BEAM SPLICE PLATE | BOX BEAM SPLICE PLATE | 98 | B | | | | | | | | | | | | | | | X | | | | | |
| RCE03 | CABLE END ASSEMBLY | CABLE END ASSEMBLY | 94 | C | | | | | | | | | | | | | | | | | | | | X |
| RCM01 | 3/4" DIA. CABLE | 19.1 DIA. CABLE | 94 | C | | | | | | | | | | | | | | | | | | | | X |
| RTE01b | THRIE-BEAM TERMINAL CONNECTOR | THRIE-BEAM TERMINAL CONNECTOR | 23A & 23B | W | | | | | | | | X | X | | | | | | | | | | | |
| RTM01a-b | 4-SPACE THRIE-BEAM (6'-3" LENGTH) | 4-SPACE THRIE-BEAM (1.905 m LENGTH) | 23A & 23B | W | | | | | | | | X | X | | | | | | | | | | | |
| RTM02a-b | 8-SPACE THRIE-BEAM (12'-6" LENGTH) | 8-SPACE THRIE-BEAM (3.81 m LENGTH) | 23A & 23B | W | | | | | | | | X | X | | | | | | | | | | | |
| RWE01a-b | W-BEAM END SECTION (FLARED) | W-BEAM END SECTION (FLARED) | 88 | W | | | | | | | X | | | | | | | | | | | | | |
| RWE02a-b | W-BEAM TERMINAL CONNECTOR | W-BEAM TERMINAL CONNECTOR | 88 | W | | | | | | | | | | X | X | X | X | X | | | | | | |
| RWE06a-b | W-BEAM END SECTION (BUFFER) | W-BEAM END SECTION (BUFFER) | 88 | W | | | | | | | | | | | | | | X | | | | | | |
| RWM02a-b | 2-SPACE W-BEAM (12'-6" LENGTH) | 2-SPACE W-BEAM (3.81 m LENGTH) | 88 | W | | | | | | | | | | | | | | | | | | | | X |
| RWM04a-b | 4-SPACE W-BEAM (12'-6" LENGTH) | 4-SPACE W-BEAM (3.81 m LENGTH) | 88 | W | X | X | | X | X | X | X | X | | | | | | | | | | | | |
| RWM08a-b | 8-SPACE W-BEAM (12'-6" LENGTH) | 8-SPACE W-BEAM (3.81 m LENGTH) | 88 | W | | | X | | | | | | | | | | | | | | | | | |
| RWM14a | BCT TERMINAL RAIL SECTION | BCT TERMINAL RAIL SECTION | 18 | W | | | | | | | X | | | | | | | | | | | | | |
| RWM22a-b | W-BEAM (25'-0" LENGTH) | W-BEAM (7.62 m LENGTH) | 88 | W | X | X | | X | X | X | X | | | | | | | | | | | | | X |
| RWT02a-b | W-BEAM TO THRIE-BEAM TRANSITION SECTION (7'-3 1/2" LENGTH) | W-BEAM TO THRIE-BEAM TRANSITION SECTION (2.223 m LENGTH) | 23A & 23B | W | | | | | | | | X | X | | | | | | | | | | | |
| N/A | TYPE B BOX BEAM POST | TYPE B BOX BEAM POST | 97 | B | | | | | | | | | | | | | | | | | X | | | |
| N/A | SUPPORT BRACKET WITH TS6 x 6 x 3/16 BLOCKOUT | SUPPORT BRACKET WITH TS152 x 152 x 4.8 BLOCKOUT | 97 | B | | | | | | | | | | | | | | | | | | X | | |
| N/A | TRANSITION POST | TRANSITION POST | 97 | B | | | | | | | | | | | | | | | | | X | | | |
| N/A | TS6 x 6 x 3/16 BR. APP. SECT. UPPER RAIL NO. 1 | TS152 x 152 x 4.8 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 | TS152 x 51 x 6.4 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 | TS152 x 51 x 6.4 BR. APP. SECT. LOWER RAIL NO. 2 | 98 | B | | | | | | | | | | | | | | | | | X | | | |
| N/A | TS6 x 2 TO TS6 x 6 CONNECTION SLEEVE | TS152 x 51 TO TS152 x 152 CONNECTION SLEEVE | 98 | B | | | | | | | | | | | | | | | | | X | | | |
| N/A | TS6 x 2 CONNECTION SLEEVE | TS152 x 51 CONNECTION SLEEVE | 98 | B | | | | | | | | | | | | | | | | | X | | | |
| N/A | TS6 x 6 x 3/16 TRANSITION RAIL | TS152 x 152 x 4.8 TRANSITION RAIL | 98 | B | | | | | | | | | | | | | | | | | | X | | |
| N/A | 1/4" SHIM PLATE | 6.4 SHIM PLATE | 99 | B | | | | | | | | | | | | | | | | | | X | | |
| N/A | ANCHOR RAIL SECTION | ANCHOR RAIL SECTION | 99 | B | | | | | | | | | | | | | | | | | | X | | |
| N/A | RUB RAIL ANCHOR BRACKET (JERSEY RAIL) | RUB RAIL ANCHOR BRACKET (JERSEY RAIL) | 99 | B | | | | | | | | | | | | | | | | | | X | | |
| N/A | RUB RAIL ANCHOR BRACKET (VERTICAL BRIDGE RAIL) | RUB RAIL ANCHOR BRACKET (VERTICAL BRIDGE RAIL) | 99 | B | | | | | | | | | | | | | | | | | | X | | |
| N/A | TS6 x 2 x 3/16 RUB RAIL | TS152 x 51 x 4.8 RUB RAIL | 99 | 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 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

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

MDT MONTANA DEPARTMENT OF TRANSPORTATION

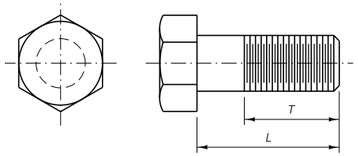
SCHEDULE OF GUARDRAIL HARDWARE

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

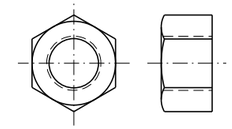
DWG. NO. 606-80

# GUARDRAIL HARDWARE



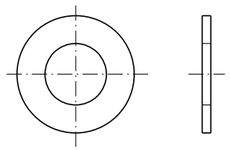

## HEX BOLTS

| 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 |



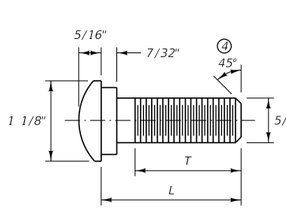
## HEX NUT

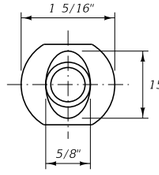
| NUT SIZE | DESIGNATION * |
|---|---|
| REGULAR HEX NUTS | |
| 3/8" DIA. | FNX10a |
| 1/2" DIA. | FNX12a |
| 9/16" DIA. | FNX14a |
| 5/8" DIA. | FNX16a |
| 3/4" DIA. | FNX20a |
| 1" DIA. | FNX24a |
| HIGH STRENGTH HEX NUTS | |
| 3/4" DIA. | FNX20b |
| 7/8" DIA. | FNX22b |
| 1" DIA. | FNX24b |

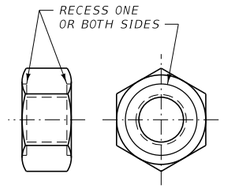


## FLAT WASHERS

| 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 |



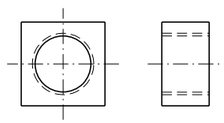




| DESIGNATION * | L | T (MIN.) |
|---|---|---|
| FBB01 | 1 1/4" | 1 1/8" |
| FBB02 | 2" | 1 3/4" |
| FBB03 | 10" | 4" |
| FBB04 | 1'-6" | 4" |
| FBB05 | 2'-1" | 4" |
| FBB06 | 1'-2" | 4 1/16" |
| FBB07 | 1'-9" | 4 1/16" |

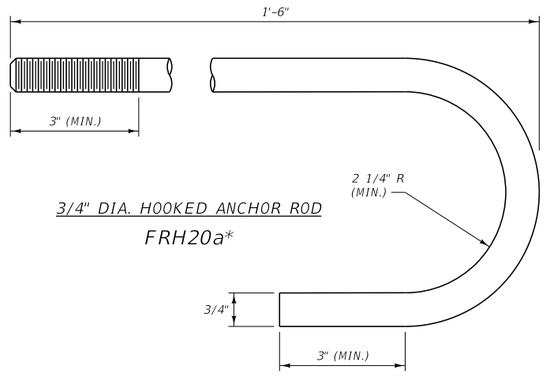
5/8" DIA. GUARDRAIL BOLT & RECESSED NUT

FBB01-07*



3/4" DIA. SQUARE NUT

FNS20*




3/4" DIA. HOOKED ANCHOR ROD

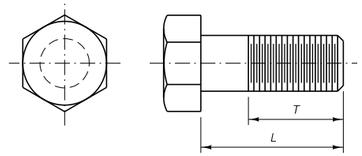
FRH20a*

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.

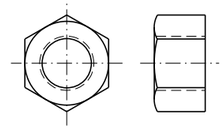
* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

# METRIC GUARDRAIL HARDWARE



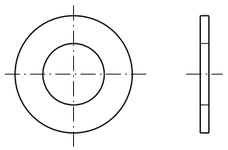

## HEX BOLTS

| 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 |



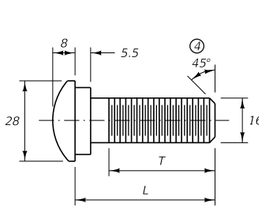
## HEX NUT

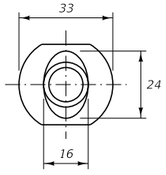
| NUT SIZE | DESIGNATION * |
|---|---|
| REGULAR HEX NUTS | |
| M10 | FNX10a |
| M12 | FNX12a |
| M14 | FNX14a |
| M16 | FNX16a |
| M20 | FNX20a |
| M24 | FNX24a |
| HIGH STRENGTH HEX NUTS | |
| M20 | FNX20b |
| M22 | FNX22b |
| M24 | FNX24b |

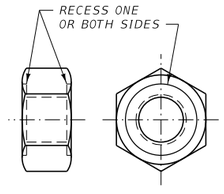


## FLAT WASHERS

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



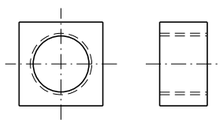




| DESIGNATION * | L | T (MIN.) |
|---|---|---|
| FBB01 | 32 | 29 |
| FBB02 | 51 | 44 |
| FBB03 | 254 | 102 |
| FBB04 | 457 | 102 |
| FBB05 | 635 | 102 |
| FBB06 | 356 | 103 |
| FBB07 | 533 | 103 |

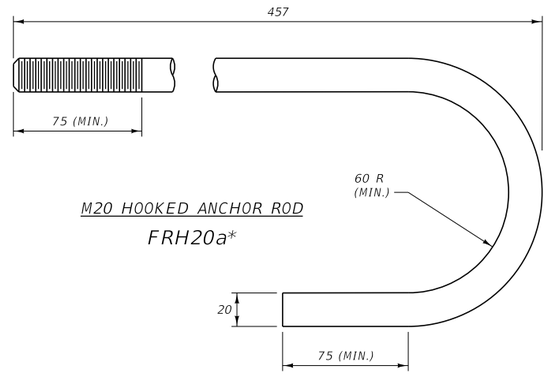
M16 GUARDRAIL BOLT & RECESSED NUT

FBB01-07*



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.

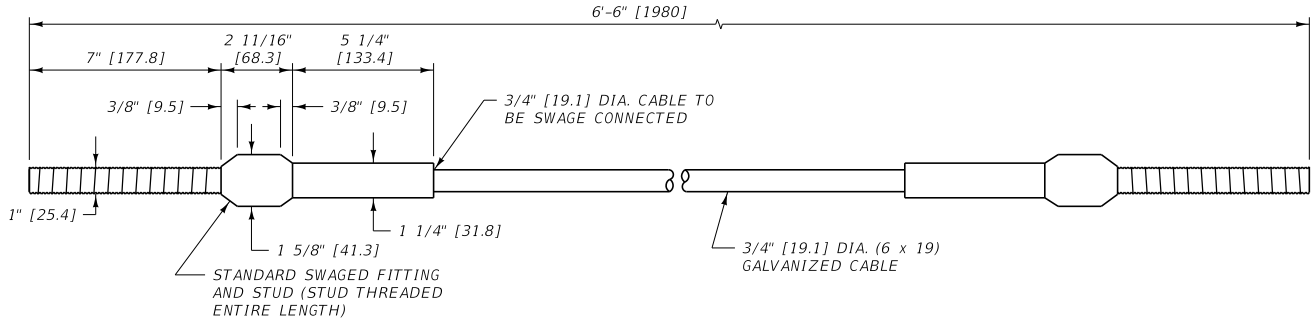
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606, 705, 711

DWG. NO. 606-82

GUARDRAIL HARDWARE

MDT MONTANA DEPARTMENT OF TRANSPORTATION

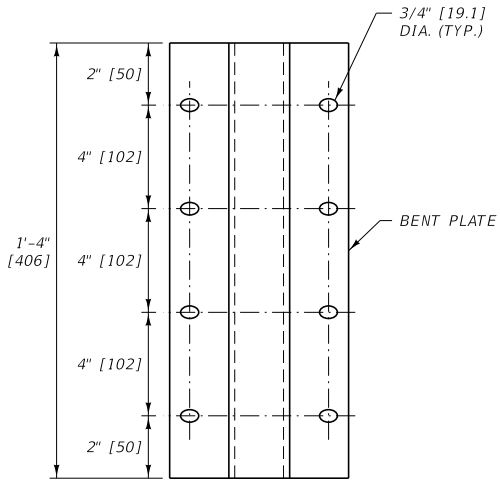


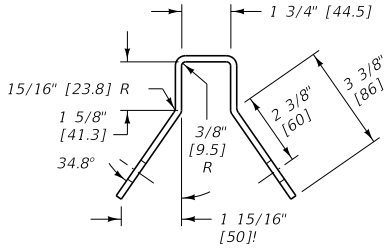

NOTES:

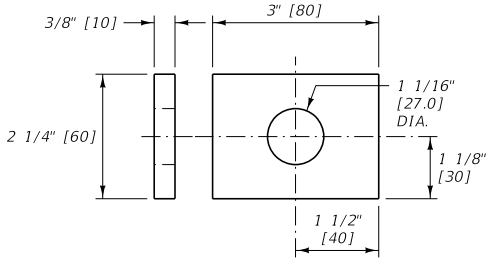
1. FOR RELATED FASTENER HARDWARE SEE FWC24a*, FNX24a* AND FPA01*.
2. MACHINE THE SWAGED FITTING FROM HOT-ROLLED CARBON STEEL CONFORMING TO THE REQUIREMENTS OF ASTM A576 [A576 M], GRADE 1035, AND ANNEAL SUITABLE FOR COLD SWAGING. GALVANIZE THE SWAGED FITTING IN ACCORDANCE WITH SUBSECTION 711.08 BEFORE SWAGING. DRILL A 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*

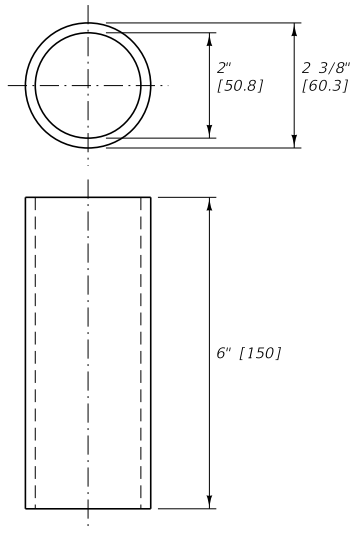


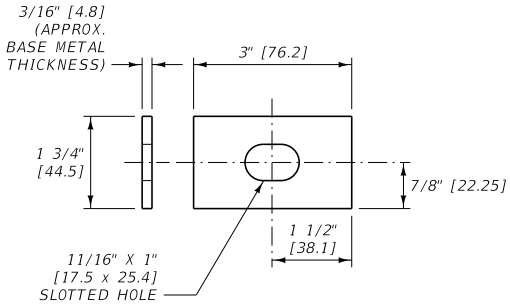

## ANCHOR BRACKET & END PLATE

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.

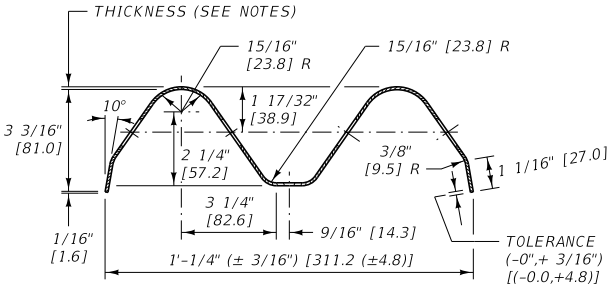
DETAILED DRAWING

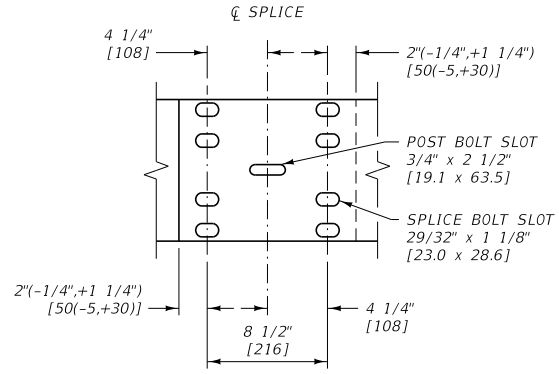
REFERENCE
STANDARD SPEC.
SECTION 606, 711

DWG. NO.
606-84

# W-BEAM METAL GUARDRAIL HARDWARE

MDT MONTANA DEPARTMENT OF TRANSPORTATION




W-BEAM

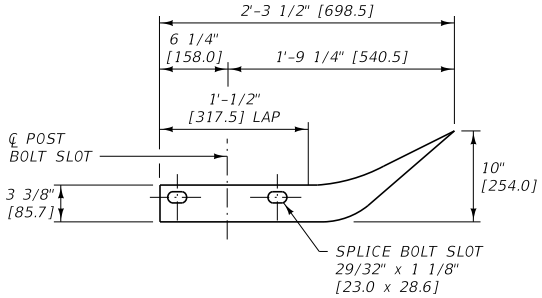
RWM02a-b*
RWM04a-b*
RWM08a-b*

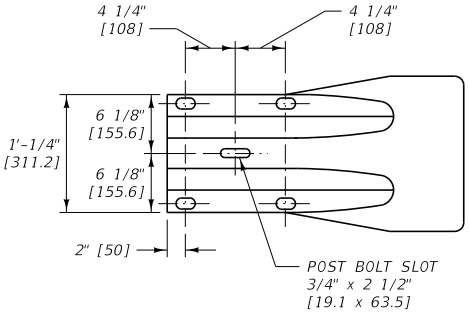
(12'-6" [3.81 m] LENGTH)

OR

RWM22a-b*

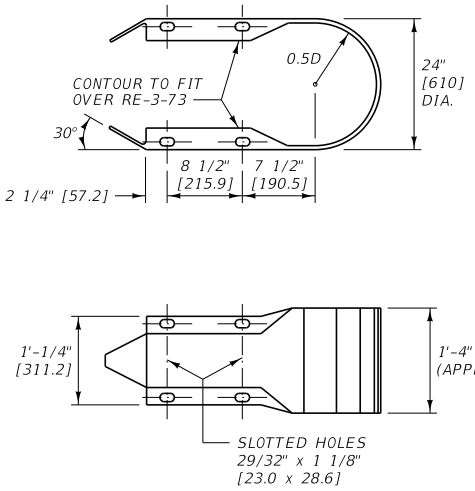
(25'-0" [7.62 m] LENGTH)



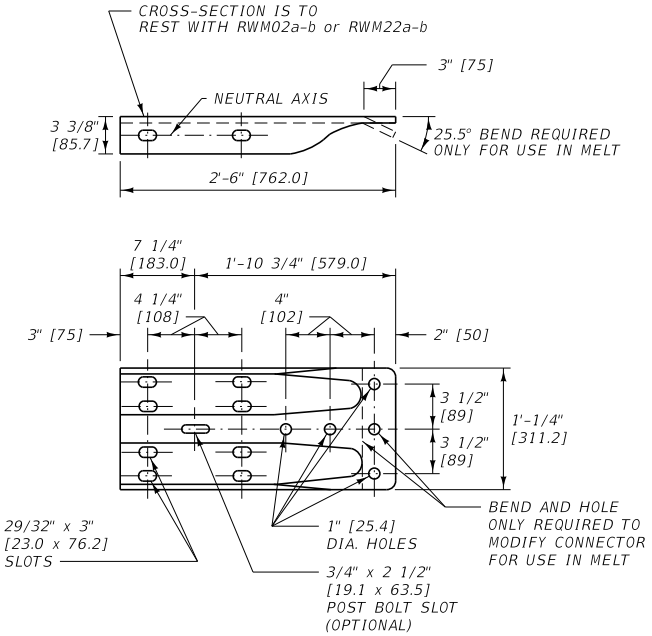

W-BEAM END SECTION (FLARED)

RWE01a-b*




W-BEAM END SECTION (BUFFER)

RWE06a-b*




W-BEAM TERMINAL CONNECTOR

RWE02a-b*

NOTES:

| * 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

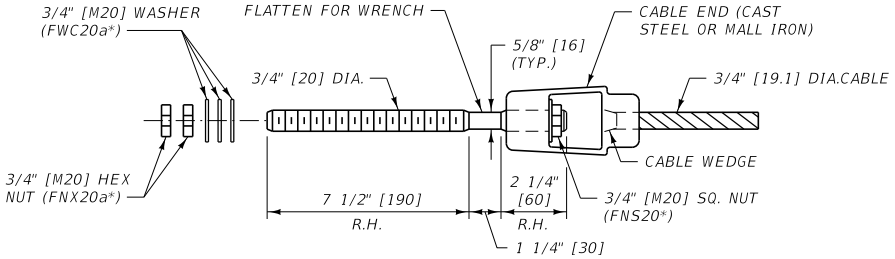
REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-88

W-BEAM METAL GUARDRAIL HARDWARE

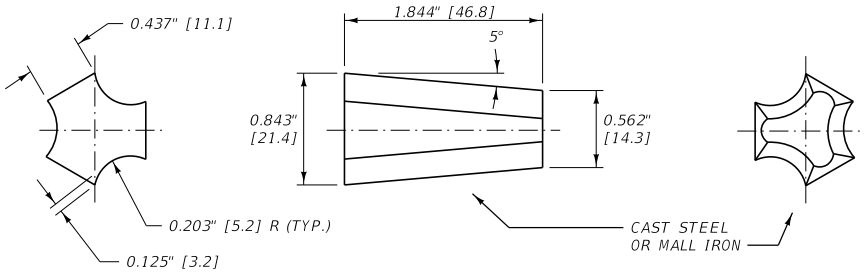
MDT MONTANA DEPARTMENT OF TRANSPORTATION

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



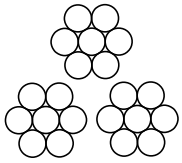

CABLE END ASSEMBLY

RCE03*




CABLE WEDGE

FMM01*



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.

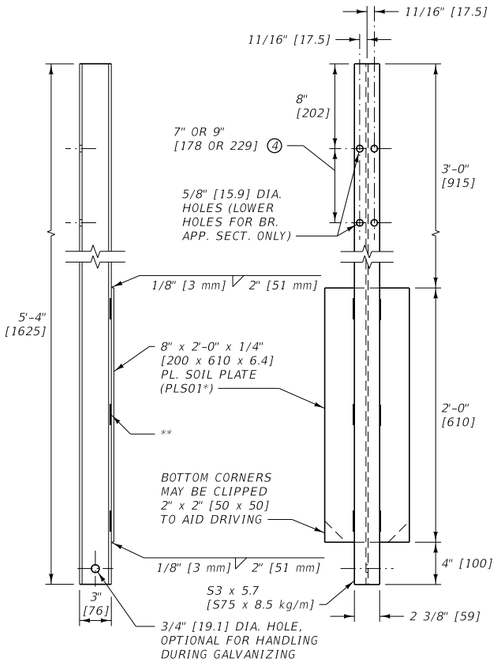
DETAILED DRAWING

REFERENCE
STANDARD SPEC.
SECTION 606

DWG. NO.
606-94

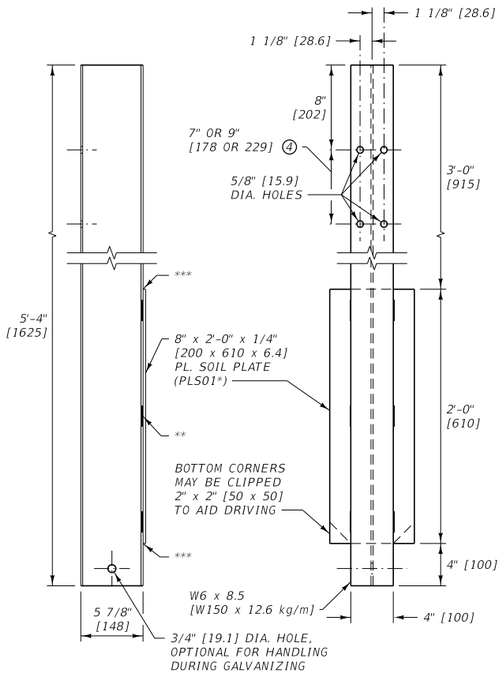
LOW-TENSION CABLE
GUARDRAIL HARDWARE

MDT MONTANA DEPARTMENT OF TRANSPORTATION



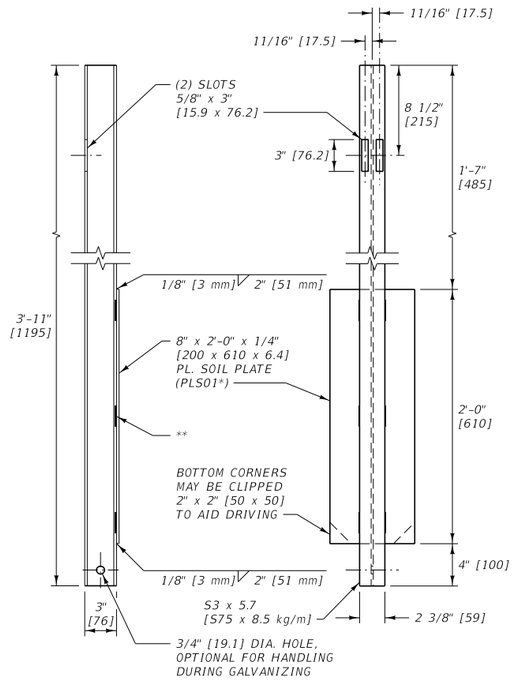

TYPE A BOX BEAM POST AND SOIL PLATE

PSE08* AND PLS01*



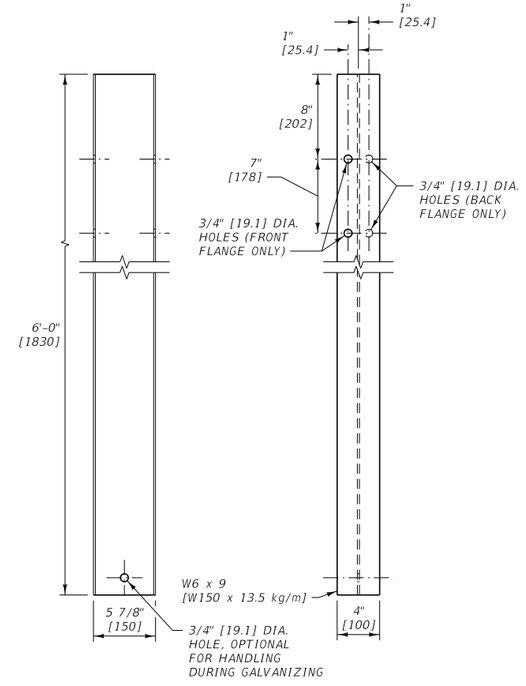

TYPE B BOX BEAM POST AND SOIL PLATE

PLS01*

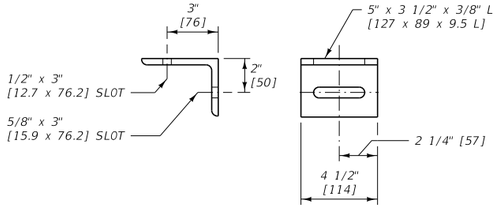



TYPE D BOX BEAM POST AND SOIL PLATE

PSE05* AND PLS01*

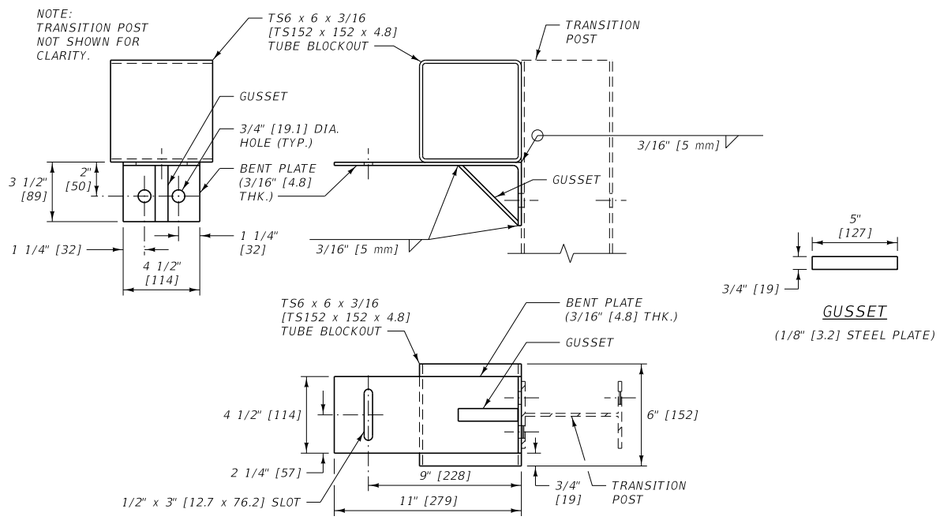



TRANSITION POST




BOX BEAM SUPPORT BRACKET

FPP01*




SUPPORT BRACKET W/BLOCKOUT




GUSSET

(1/8" [3.2] STEEL PLATE)

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 ROLLOVER 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.

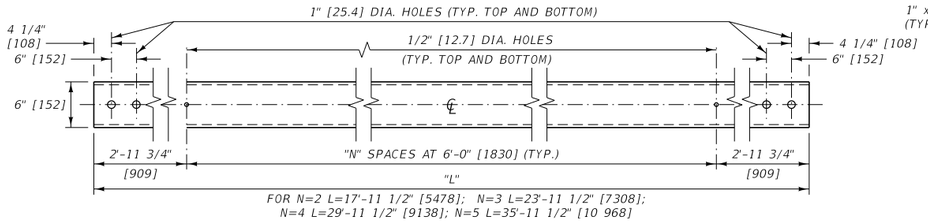
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-97

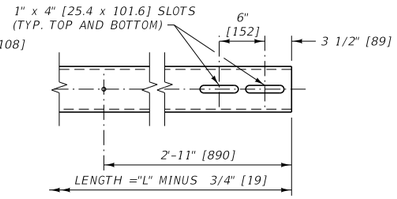
BOX BEAM GUARDRAIL HARDWARE

MDT MONTANA DEPARTMENT OF TRANSPORTATION



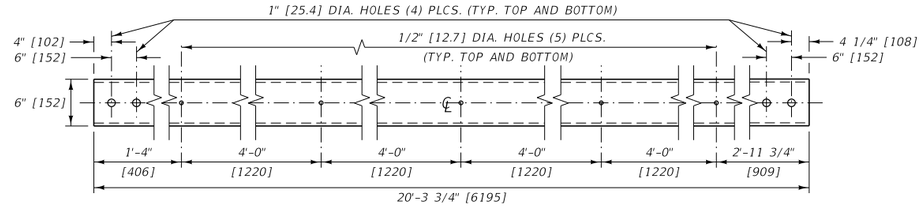

BOX BEAM RAIL (TS6 x 6 x 3/16 [TS152 x 152 x 4.8])

RBM01*

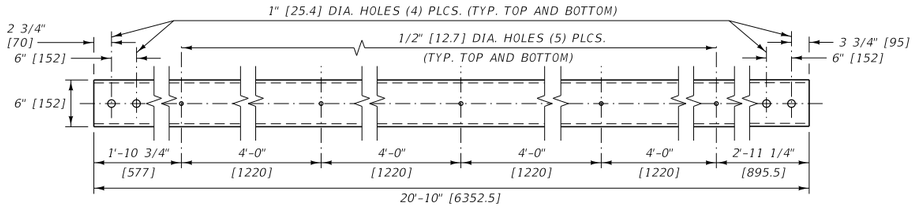



BOX BEAM EXPANSION SPLICE END

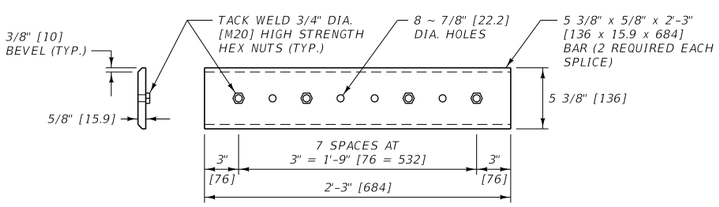
ONE END OF BOX BEAM RAIL ONLY. REQUIRED FOR BOTH RAILS AT THE EXPANSION SPLICE.




TS6 x 6 x 3/16 [TS152 x 152 x 4.8] BR. APP. SECT. UPPER RAIL N0.1

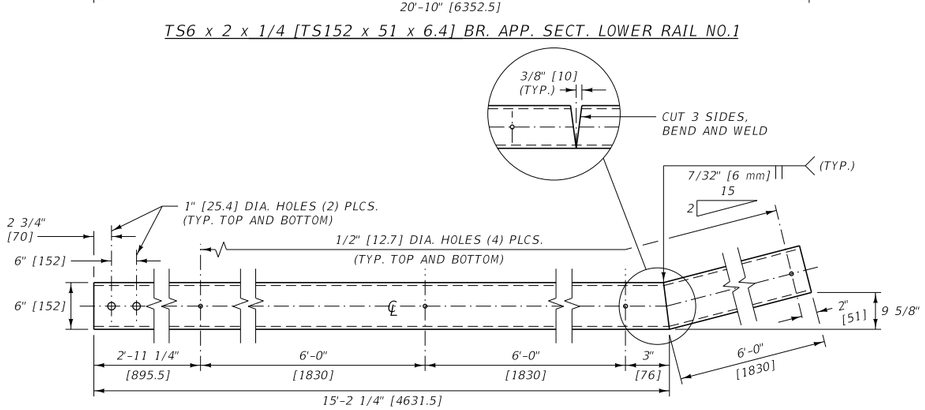



TS6 x 2 x 1/4 [TS152 x 51 x 6.4] BR. APP. SECT. LOWER RAIL NO.1

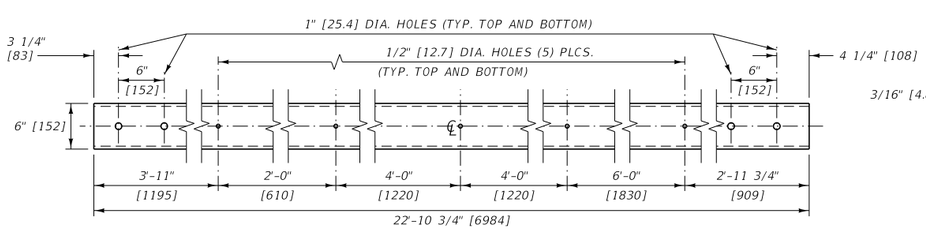



BOX BEAM SPLICE PLATE

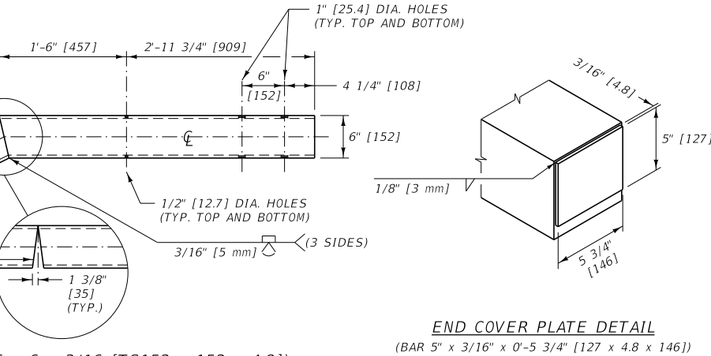
RBS01*




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




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



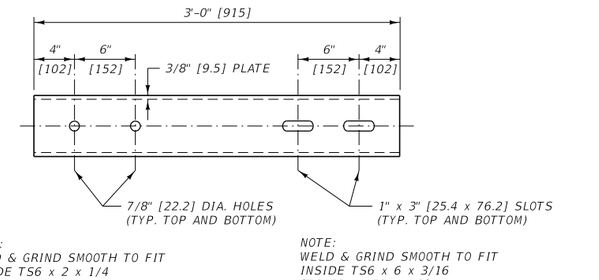

BOX BEAM TERMINAL RAIL (TS6 x 6 x 3/16 [TS152 x 152 x 4.8])

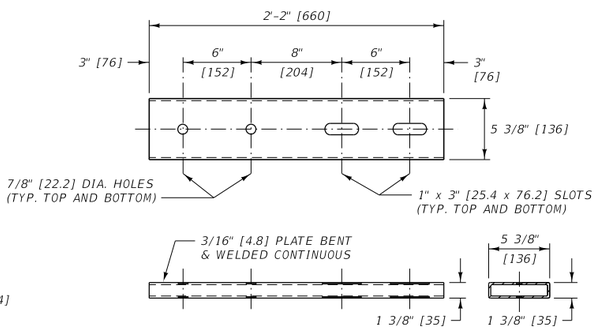
RBM05*



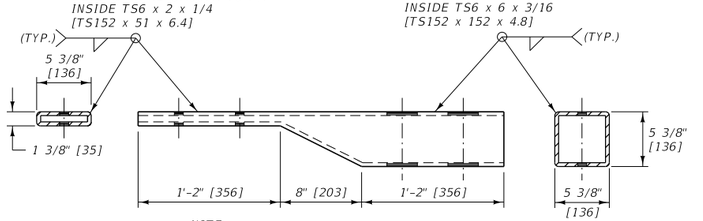

END COVER PLATE DETAIL

(BAR 5" x 3/16" x 0'-5 3/4" [127 x 4.8 x 146])

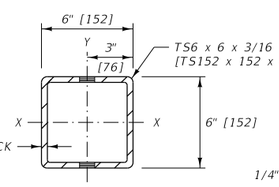


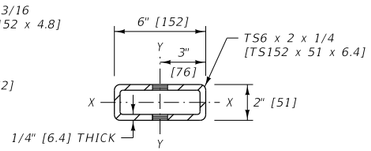

TS6 x 2 [TS152 x 51] CONNECTION SLEEVE




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




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.

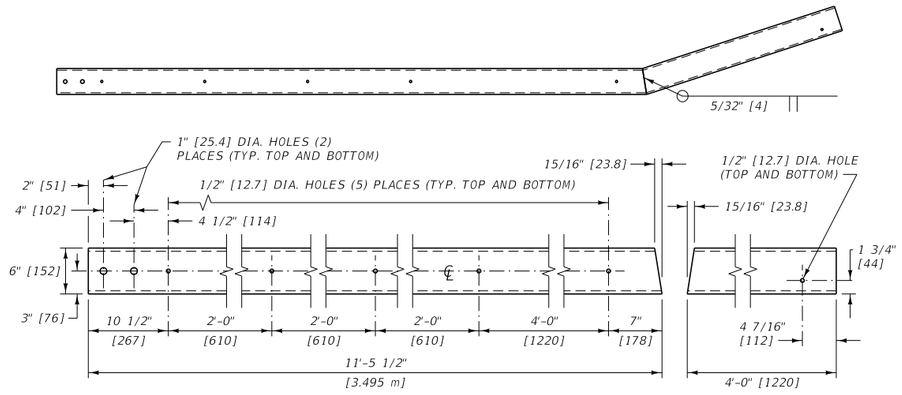
DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606, 711

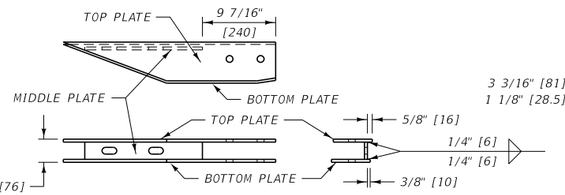
DWG. NO. 606-98

BOX BEAM GUARDRAIL HARDWARE

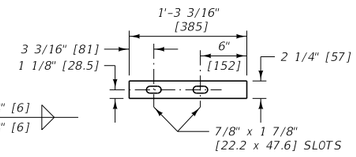
MDT MONTANA DEPARTMENT OF TRANSPORTATION



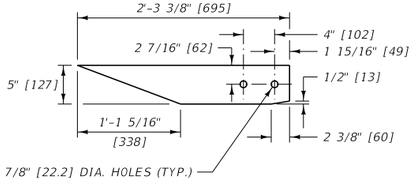

RUB RAIL (TS6 x 2 x 3/16) [TS152 x 51 x 4.8]



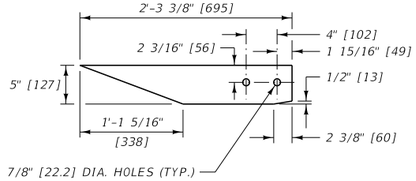

ANCHOR BRACKET FOR RUB RAIL CONNECTION TO JERSEY SHAPE BRIDGE RAIL



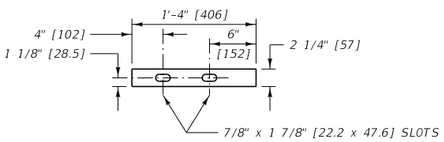

MIDDLE PLATE
(3/8" [9.5] STEEL PLATE)



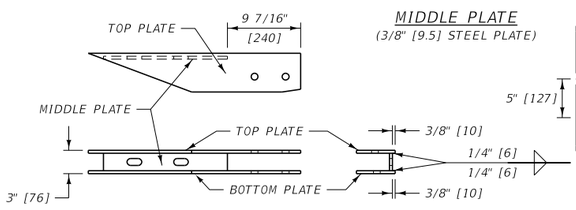

TOP PLATE
(3/8" [9.5] STEEL PLATE)



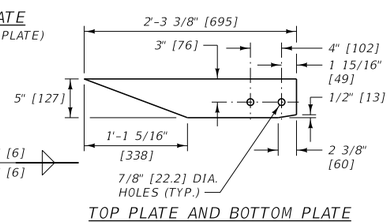

BOTTOM PLATE
(3/8" [9.5] STEEL PLATE)



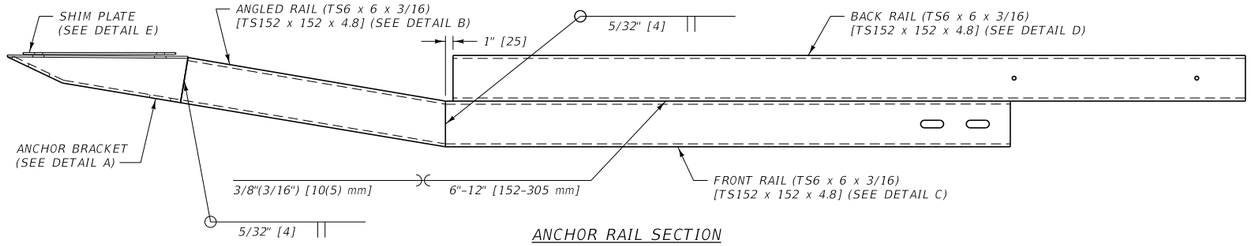

MIDDLE PLATE
(3/8" [9.5] STEEL PLATE)



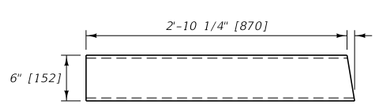

ANCHOR BRACKET FOR RUB RAIL CONNECTION TO VERTICAL CONCRETE BRIDGE RAIL



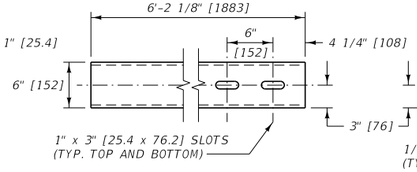

TOP PLATE AND BOTTOM PLATE
(TOP AND BOTTOM PLATES ARE IDENTICAL 3/8" [9.5] STEEL PLATES FOR CONNECTIONS TO VERTICAL SHAPES.)



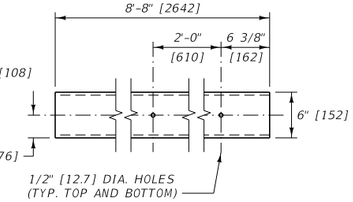

ANCHOR RAIL SECTION



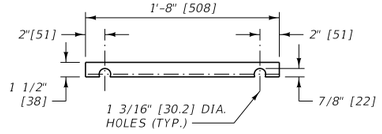

DETAIL B
ANGLED RAIL (TS6 x 6 x 3/16) [TS152 x 152 x 4.8]



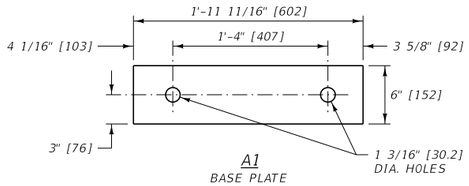

DETAIL C
FRONT RAIL (TS6 x 6 x 3/16) [TS152 x 152 x 4.8]



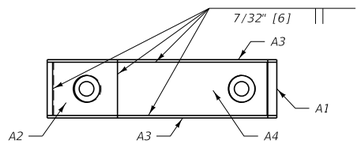

DETAIL D
BACK RAIL (TS6 x 6 x 3/16) [TS152 x 152 x 4.8]

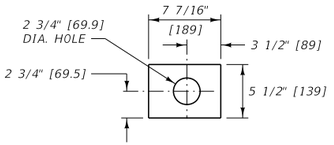



DETAIL E
SHIM PLATE (1/4" [6.4] STEEL PLATE)

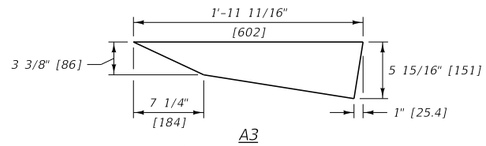



A1
BASE PLATE

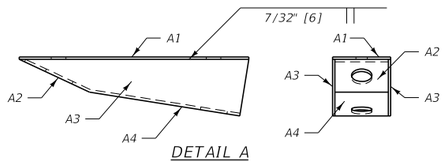


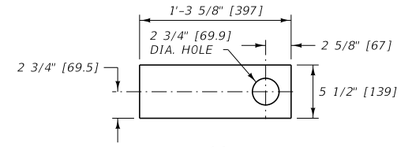

A2
FRONT LEFT PLATE




A3
TOP AND BOTTOM PLATE

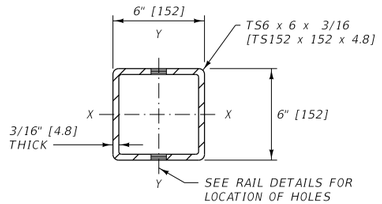



DETAIL A
ANCHOR BRACKET

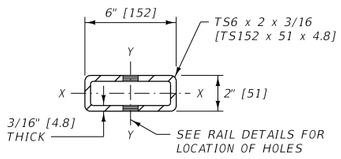



A4
FRONT RIGHT PLATE

NOTE:
ALL ANCHOR BRACKET COMPONENTS ARE FABRICATED FROM ¼" [6.4] STEEL PLATE MATERIAL.




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




TS6 x 2 x 3/16
[TS152 x 51 x 4.8]
SECTION VIEW

NOTES:

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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.
606-99

# BOX BEAM GUARDRAIL HARDWARE

MDT MONTANA DEPARTMENT OF TRANSPORTATION