

DETAILED DRAWINGS

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SUPPLEMENT TO THE SEPTEMBER 2014 EDITION
EFFECTIVE: APRIL 2019

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*STANDARD SPECIFICATION SECTION AND
DRAWING TITLE*

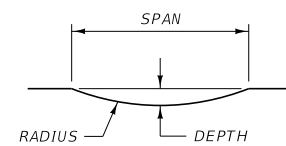
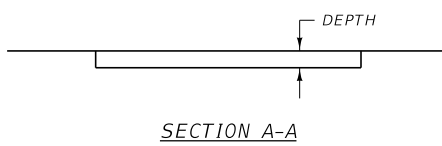
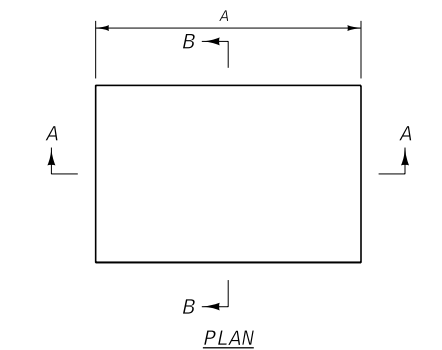
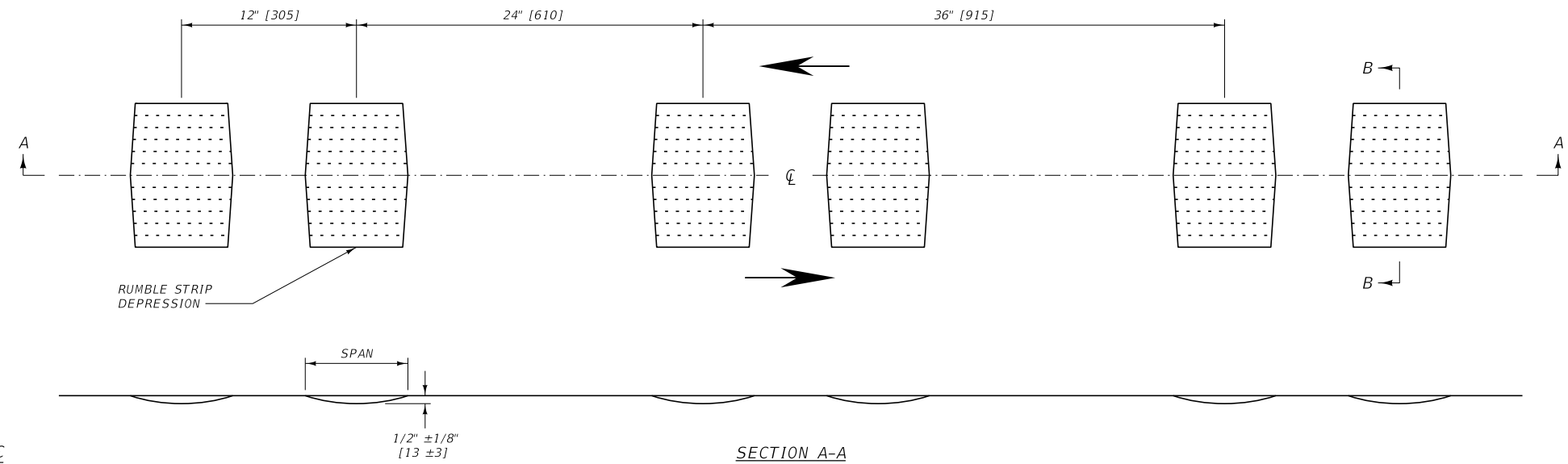
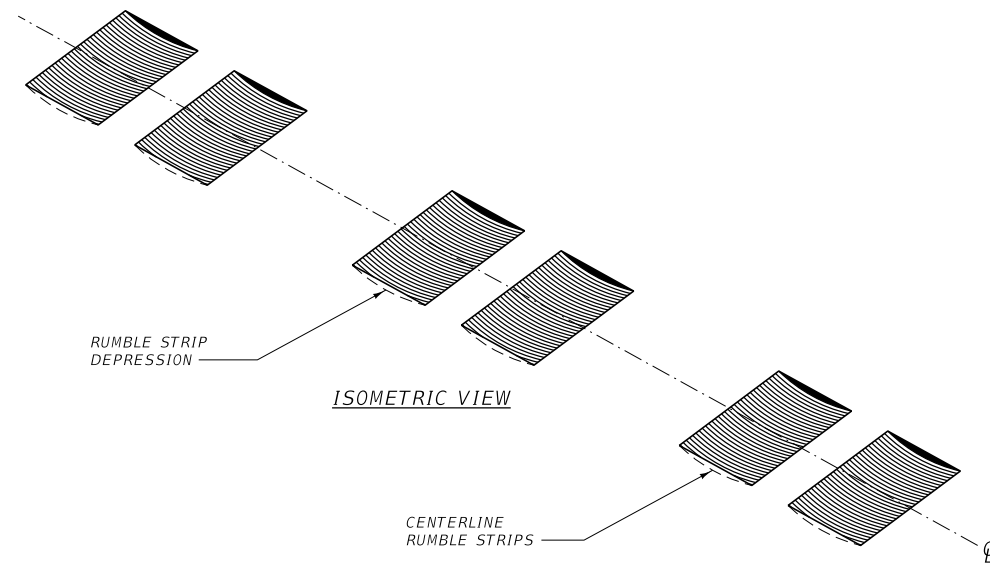
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MISCELLANEOUS

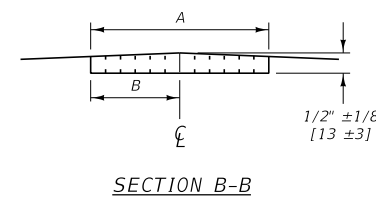
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	DEPTH	SPAN
ASPHALT	1/2" ±1/8"	6" TO 7"

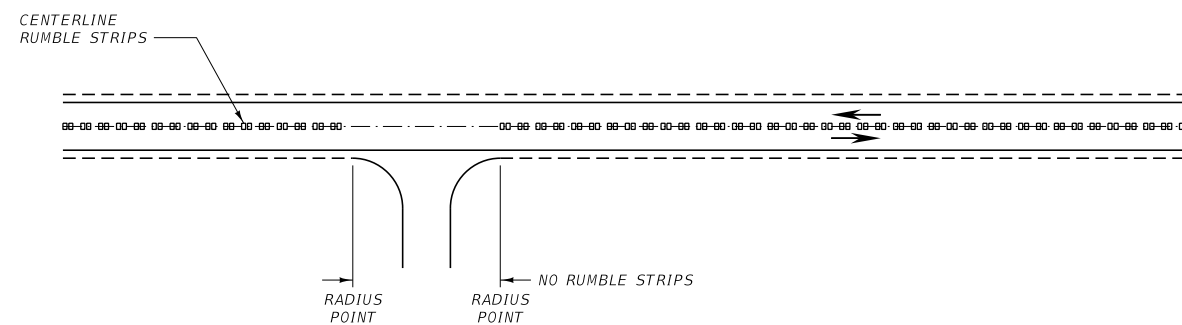
	DEPTH (mm)	SPAN (mm)
ASPHALT	13 ±3	150 TO 175

RUMBLE STRIP DETAIL



TYPE		INCHES	
		A	B
1	NO SHOULDER	6	3
2	≤ 2.0' SHOULDER	8	4
3	> 2.0' SHOULDER	12	6

TYPE		mm	
		A	B
1	NO SHOULDER	150	75
2	≤ 0.6 m SHOULDER	200	100
3	> 0.6 m SHOULDER	300	150



PUBLIC APPROACH 2

NOTES:

- ① ROUTES WITHIN DESIGNATED CITY OR URBAN LIMITS, USE ENGINEERING JUDGEMENT ON A CASE-BY-CASE BASIS TO DETERMINE IF CENTERLINE RUMBLE STRIP INSTALLATION IS APPROPRIATE.
- ② BREAK CENTERLINE RUMBLE STRIPS FOR PUBLIC APPROACHES ONLY.
- ③ CONSIDER REMILLING EXISTING CENTERLINE RUMBLE STRIPS PRIOR TO A SECOND SEAL AND COVER APPLICATION.
- ④ DO NOT INSTALL CENTERLINE RUMBLE STRIPS ON CONCRETE BRIDGE DECKS.

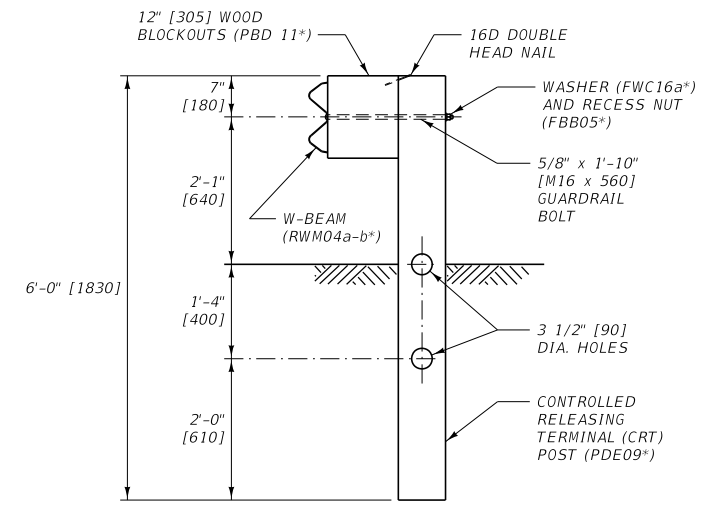
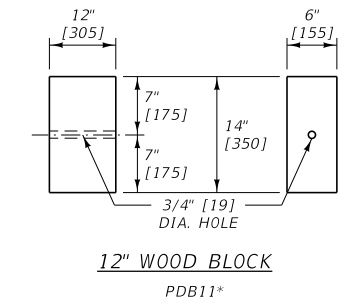
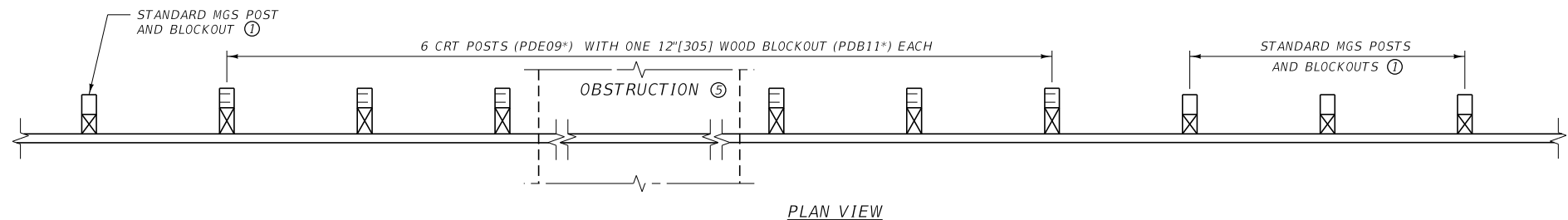
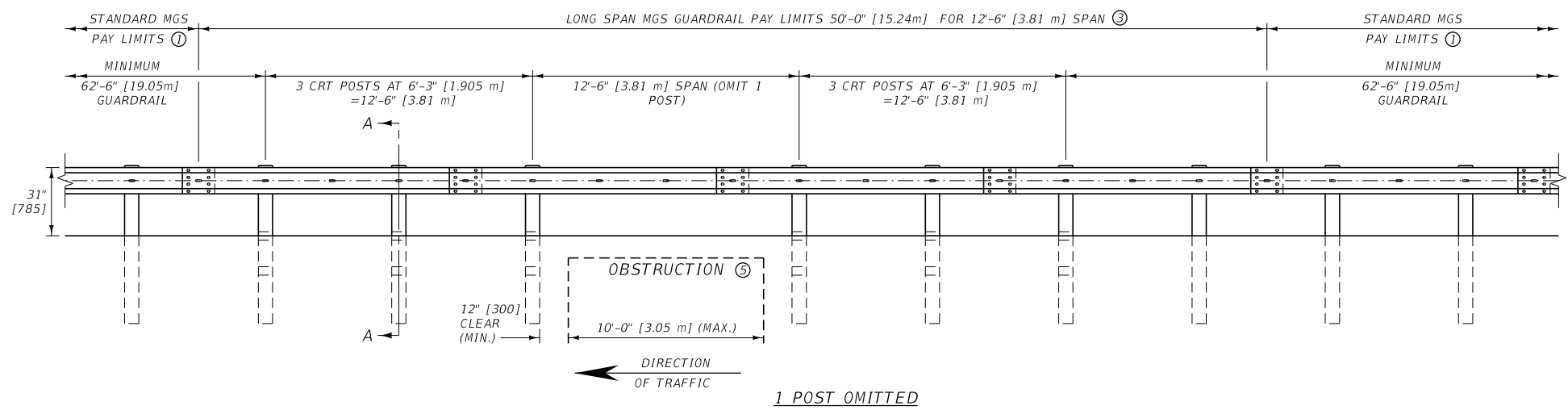
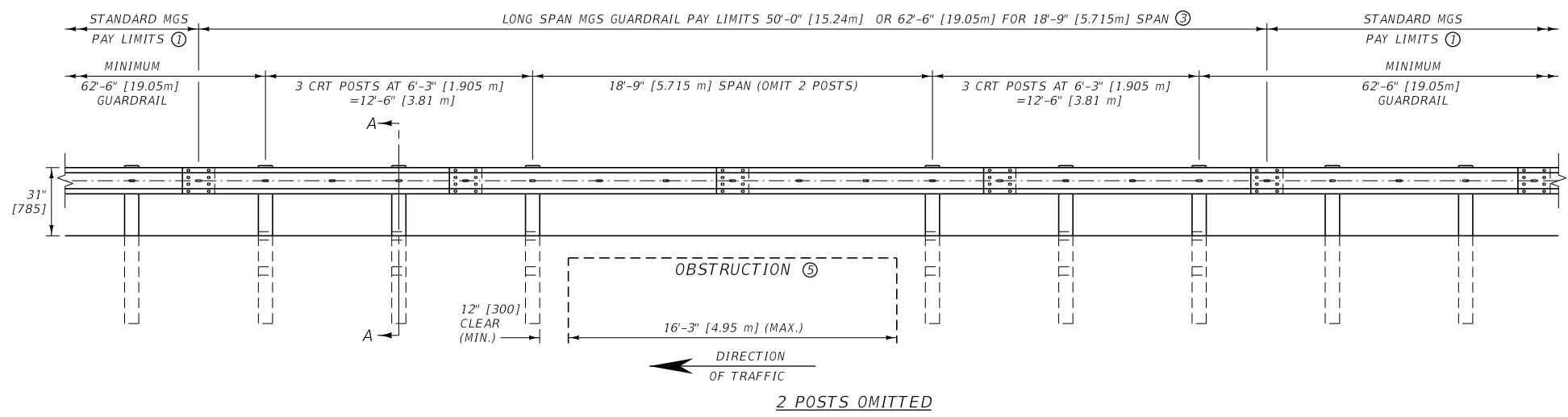
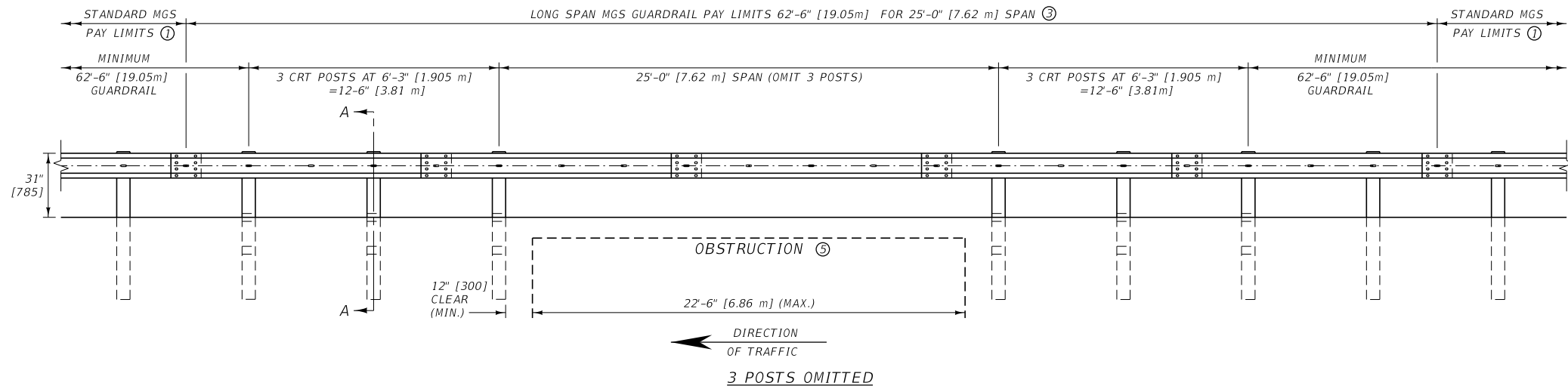
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

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DETAILED DRAWING
REFERENCE DWG. NO.
STANDARD SPEC. 411-05
SECTION 411

CENTERLINE RUMBLE STRIPS

EFFECTIVE: SEPTEMBER 2014
MDTA MONTANA DEPARTMENT OF TRANSPORTATION

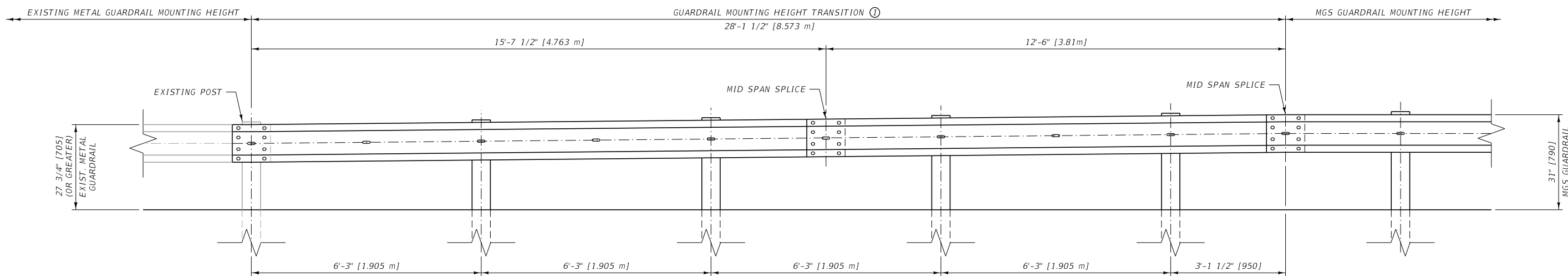


- NOTES:
- SEE DTL. DWG. NO. 606-05A AND 606-05B FOR STANDARD MGS GUARDRAIL AND ASSOCIATED HARDWARE.
 - LAP ALL RAIL IN THE DIRECTION OF ADJACENT TRAFFIC.
 - TYPICAL SPLICE LOCATIONS SHOWN, MAY VARY BASED ON ACTUAL RAIL SEGMENTS INSTALLED. PAY LIMITS NOT DEPENDENT ON SPLICE LOCATION.
 - DO NOT INSTALL MGS LONG SPAN GUARDRAIL FOR ABOVE-GRADE OBSTACLES WITHIN 8' [2.4m] OF THE FACE OF THE RAIL.
 - 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)	
EFFECTIVE: SEPTEMBER 2014	
MONTANA DEPARTMENT OF TRANSPORTATION	

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

NOTES:

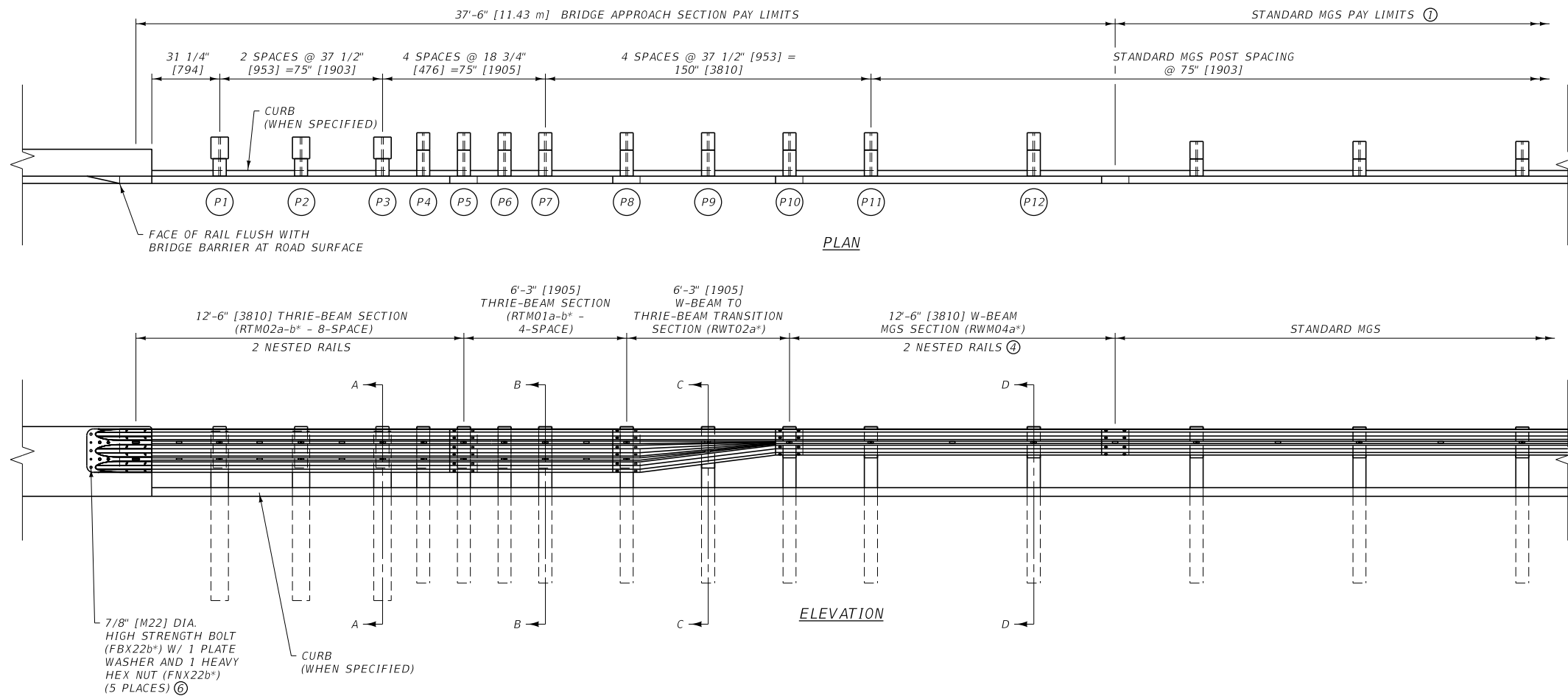
- ① THE MGS TO METAL GUARDRAIL TRANSITION IS PAID FOR AS LINEAR FEET OF MGS GUARDRAIL.
- ② SEE DTL. DWG. NO. 606-05A, 606-05B, 606-11A, AND 606-11B FOR MGS GUARDRAIL AND ASSOCIATED HARDWARE.
- ③ LAP ALL W-BEAM RAIL IN THE DIRECTION OF ADJACENT TRAFFIC.

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

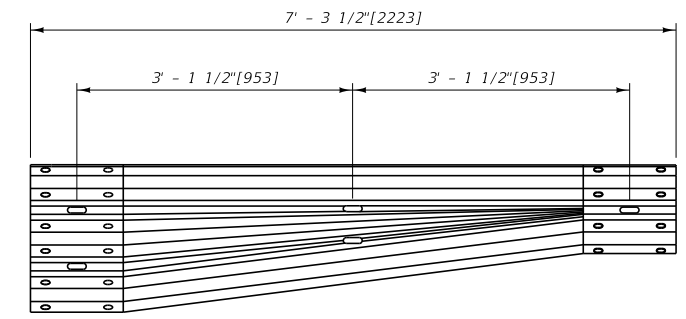
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-20

MGS TO METAL GUARDRAIL TRANSITION

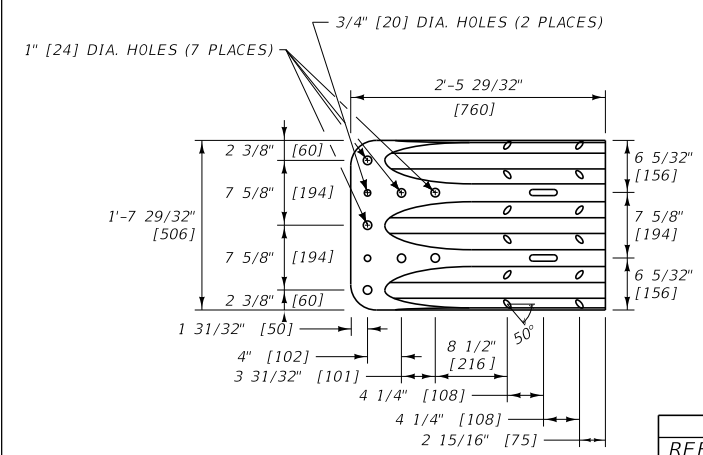
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 MDTA MONTANA DEPARTMENT OF TRANSPORTATION	



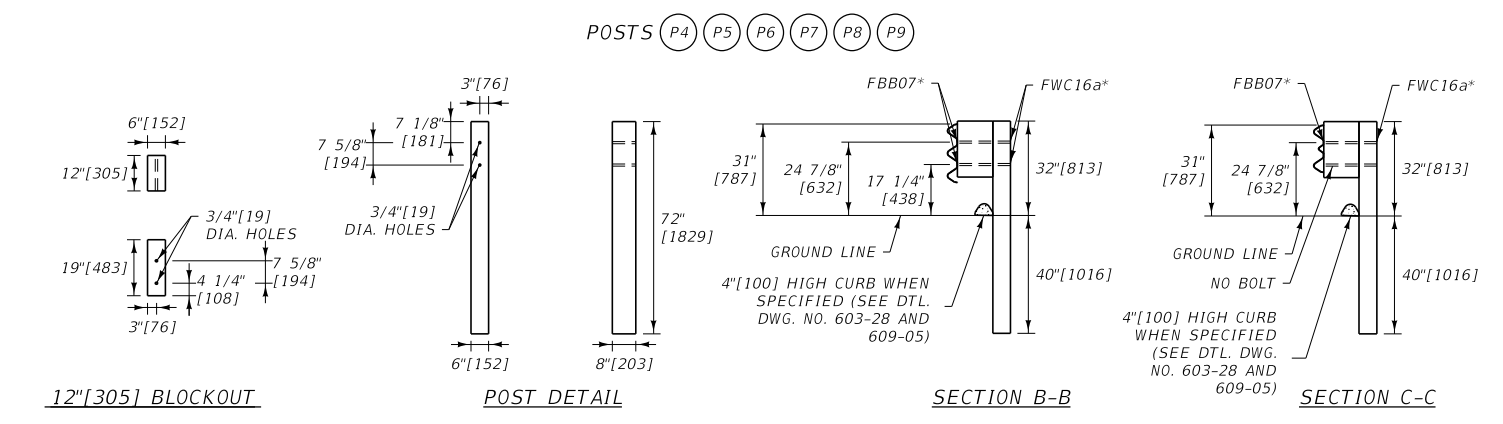
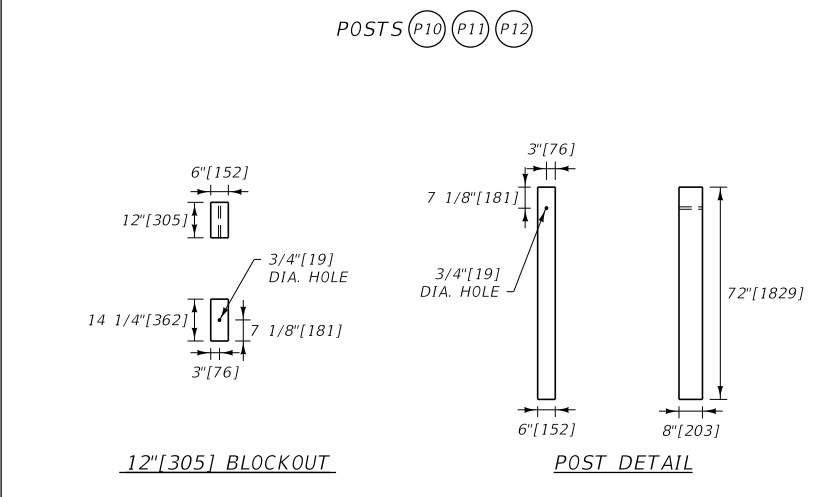
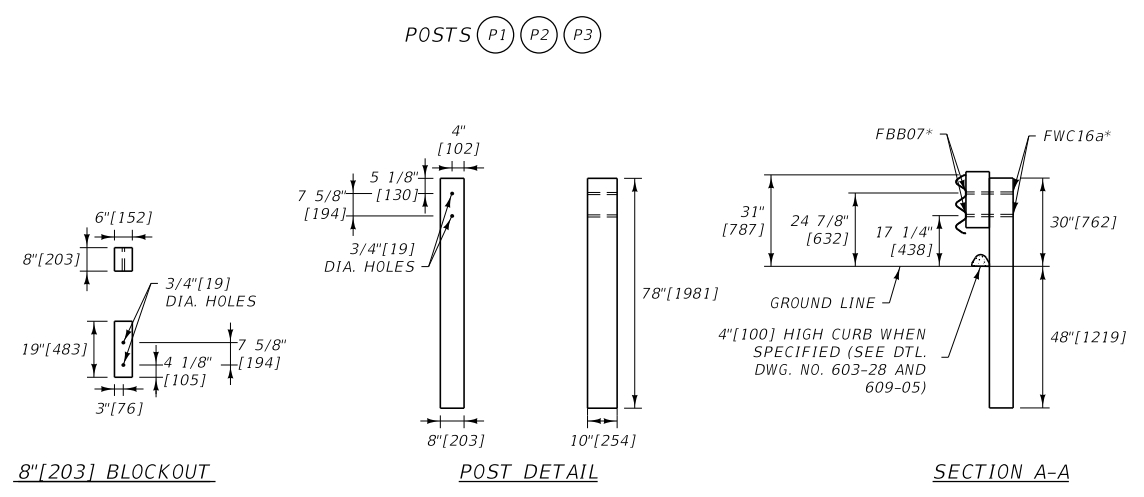
- NOTES:
- SEE DTL. DWG. NO. 606-05A FOR STANDARD MGS GUARDRAIL AND ASSOCIATED HARDWARE.
 - LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
 - DO NOT FLARE BRIDGE APPROACH SECTIONS.
 - WHERE CURB EXTENDS UPSTREAM OF POST NO. 5, FURNISH 2 NESTED 12-GAUGE W-BEAM RAILS FOR THIS 12'-6" [3810]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



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

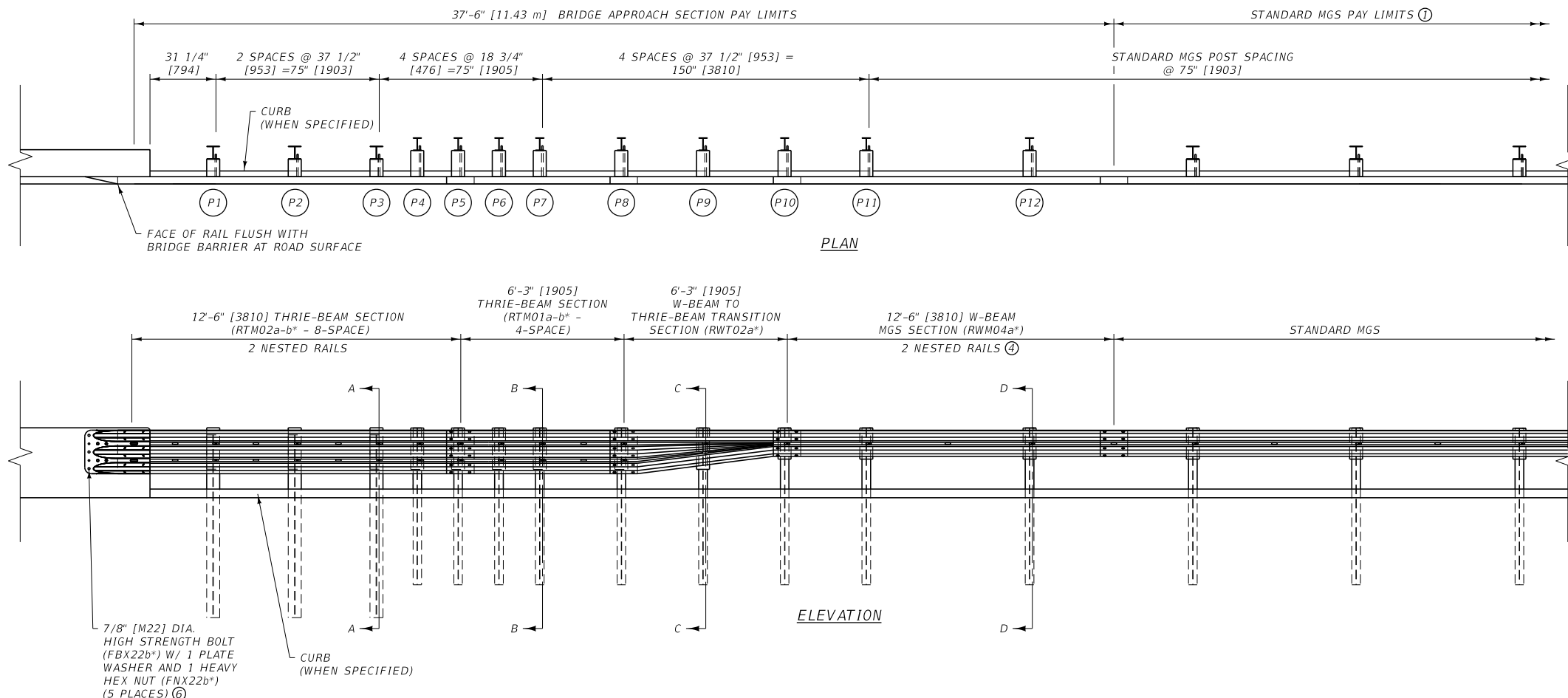


THRIE-BEAM TERMINAL CONNECTOR
RTE01b*

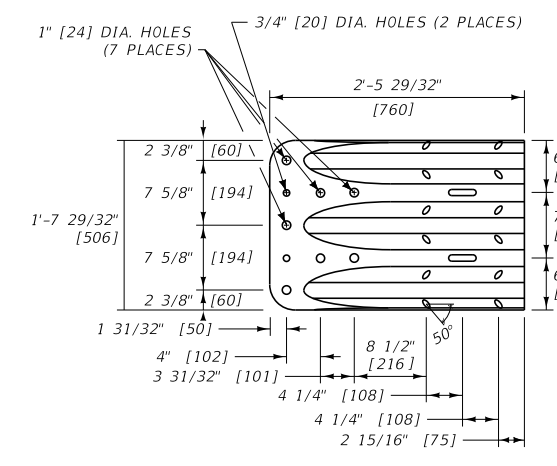
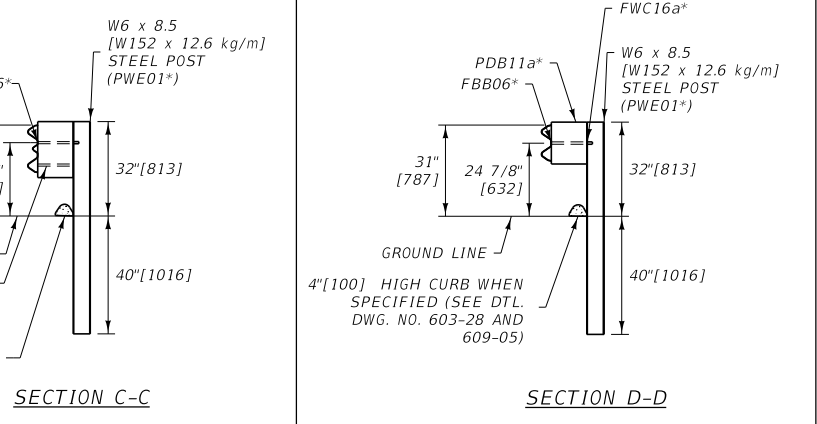
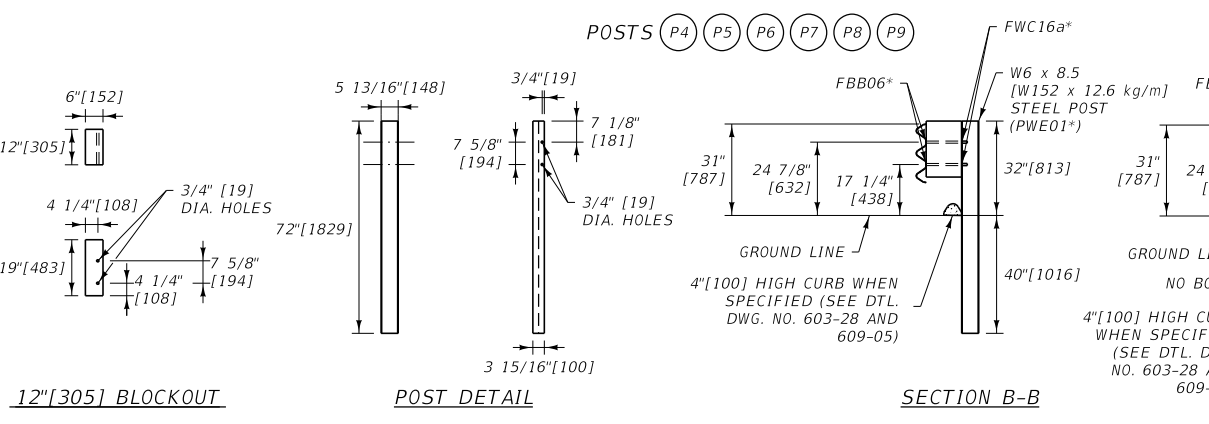
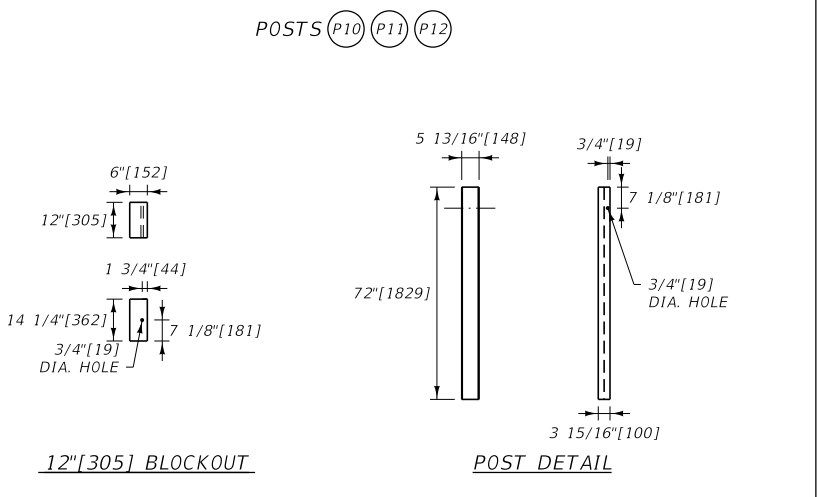
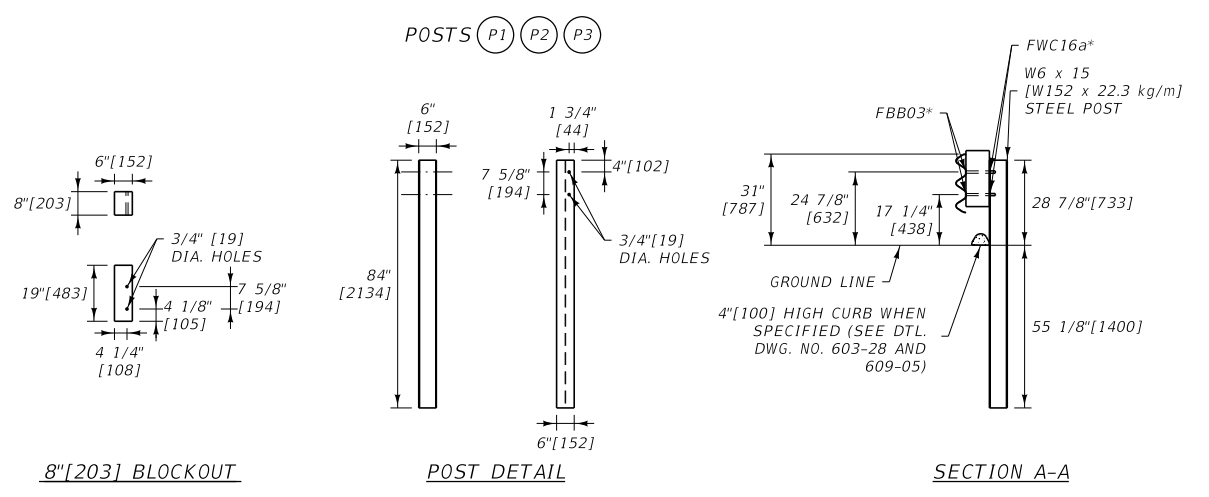
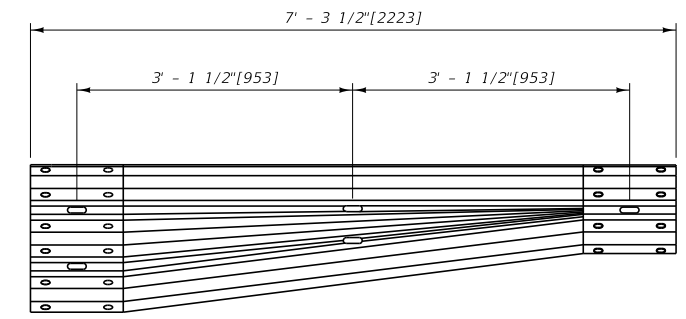


UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-23A
MGS THRIE BEAM BRIDGE APPROACH SECTION - WOOD POSTS	
---REVISED--- APRIL 2019	EFFECTIVE: JANUARY 2018
MONTANA DEPARTMENT OF TRANSPORTATION	



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

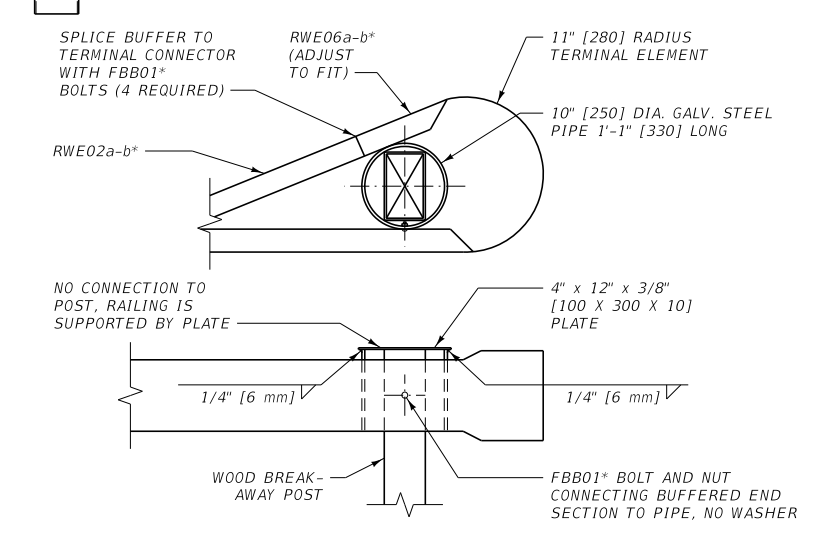
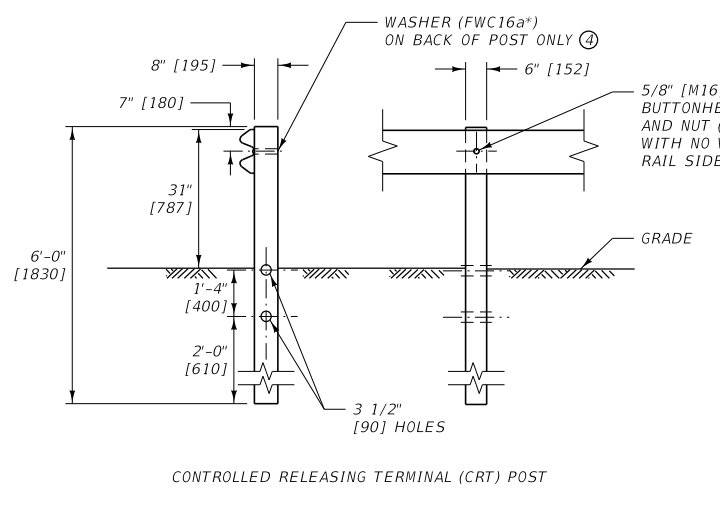
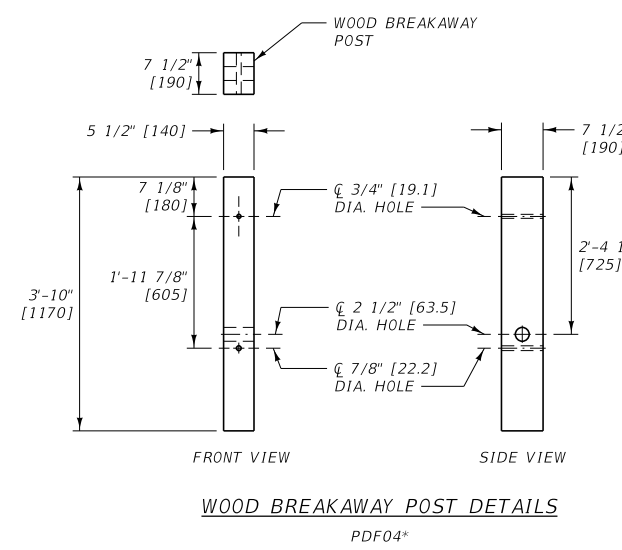
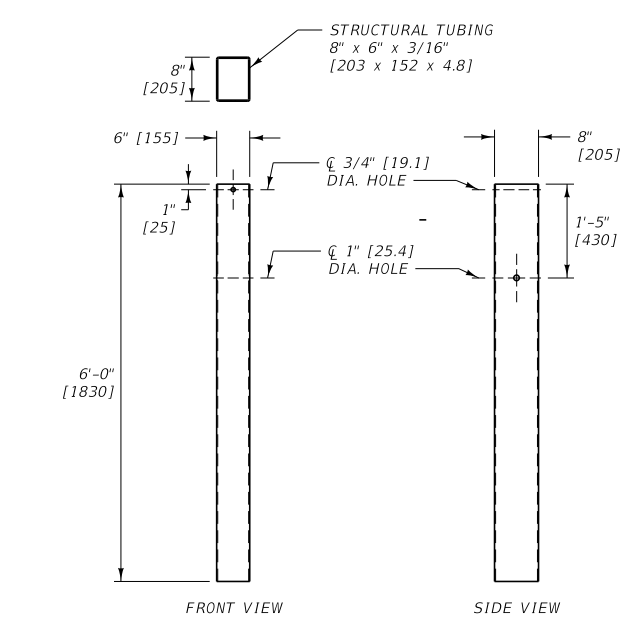
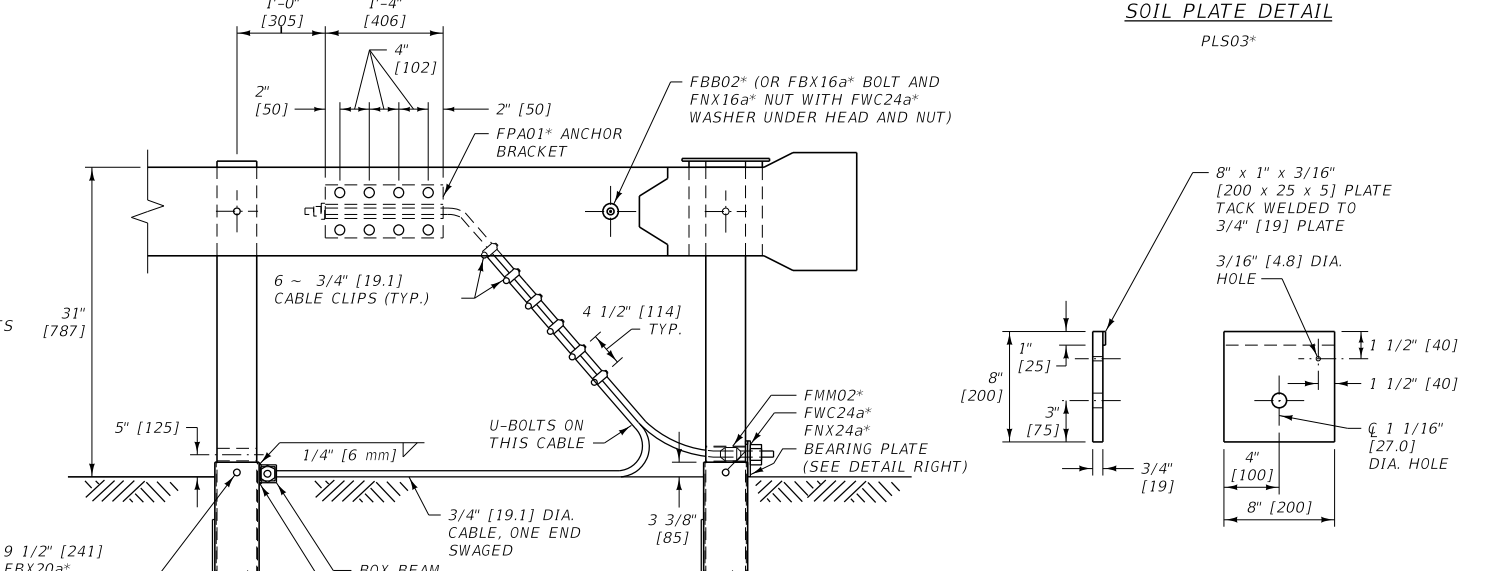
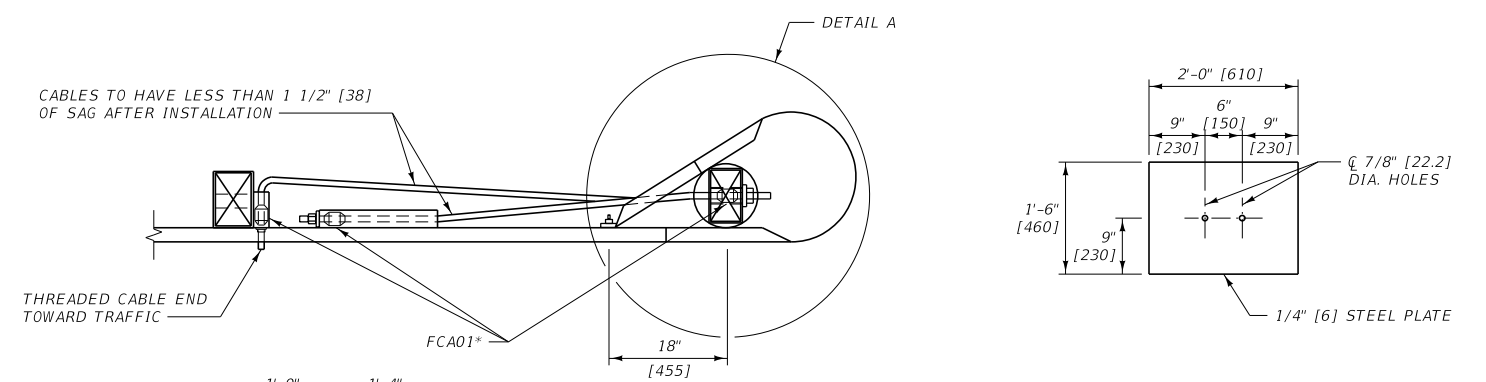
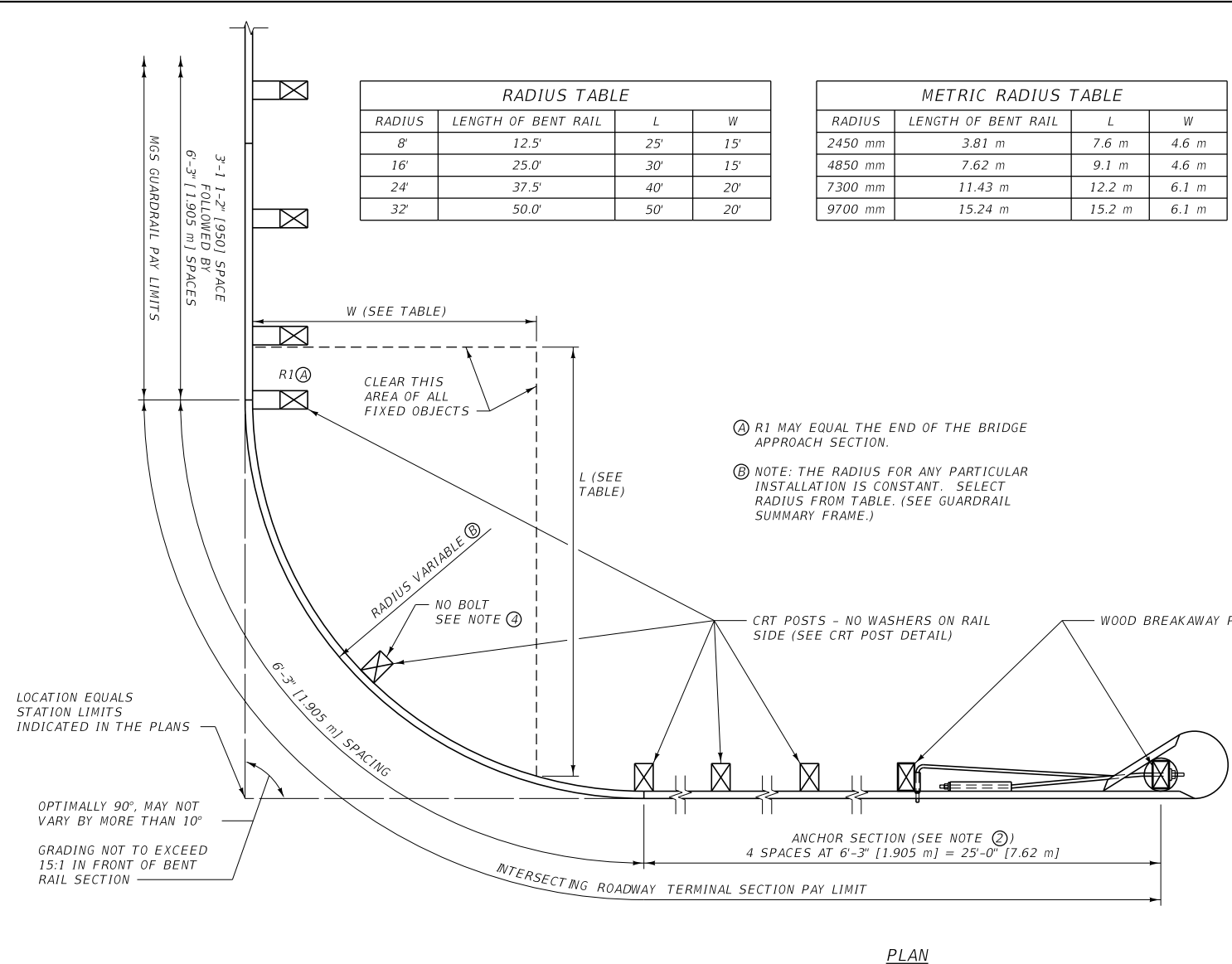


DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-23B
MGS THRIE BEAM BRIDGE APPROACH SECTION - STEEL POSTS	
EFFECTIVE: JANUARY 2018	
--REVISED-- APRIL 2019	
MDTA MONTANA DEPARTMENT OF TRANSPORTATION	

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

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

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



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

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

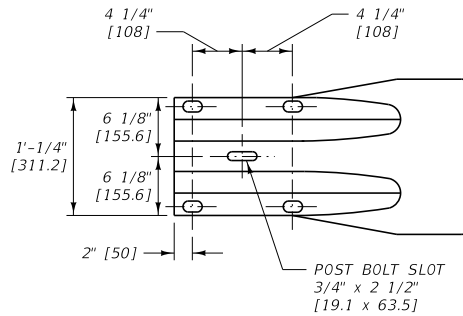
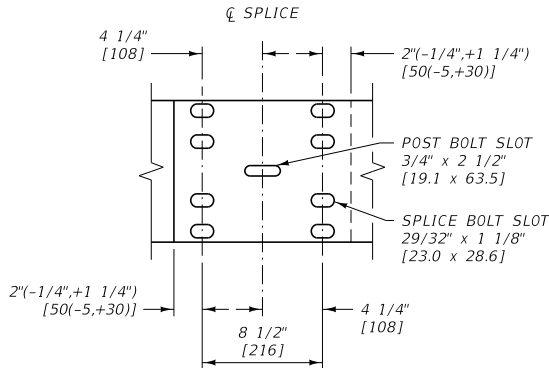
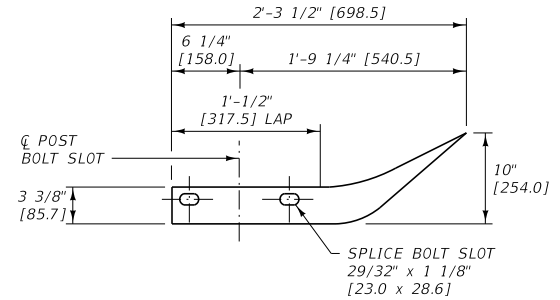
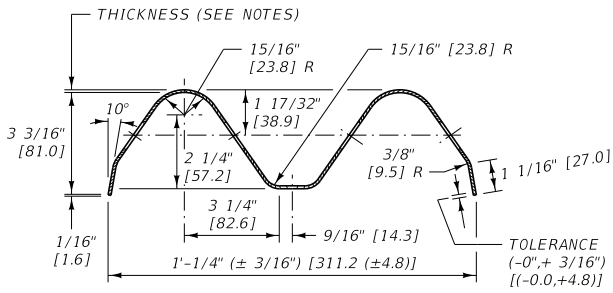
---REVISED---
JANUARY 2018
APRIL 2019

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

INTERSECTING ROADWAY TERMINAL SECTION (MGS)

EFFECTIVE: SEPTEMBER 2014

MDTA MONTANA DEPARTMENT OF TRANSPORTATION

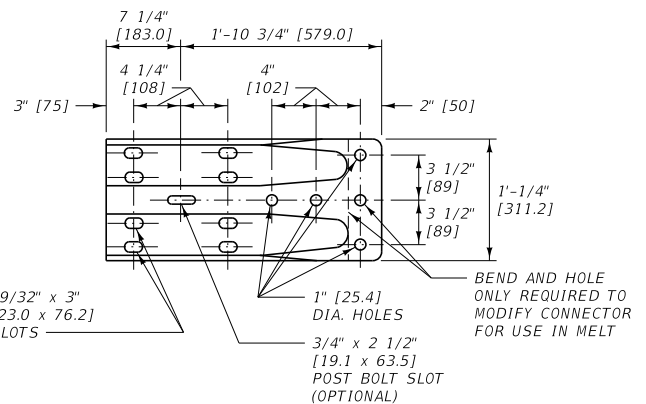
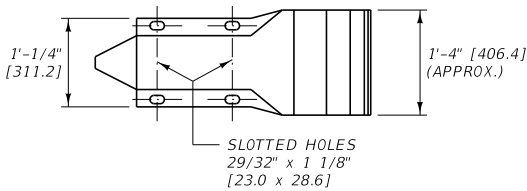
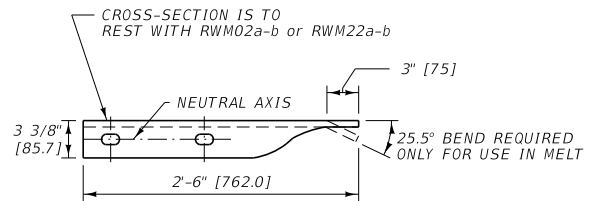
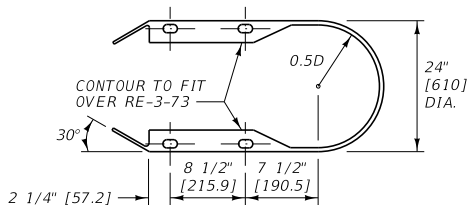


W-BEAM

W-BEAM END SECTION (FLARED)

RWM02a-b*
 RWM04a-b* OR RWM22a-b*
 RWM08a-b*
 (12'-6" [3.81 m] LENGTH) (25'-0" [7.62 m] LENGTH)

RWE01a-b*



W-BEAM END SECTION (BUFFER)

W-BEAM TERMINAL CONNECTOR

RWE06a-b*

RWE02a-b*

NOTES:

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

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

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

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

W-BEAM METAL GUARDRAIL HARDWARE

--REVISED--
 APRIL 2019

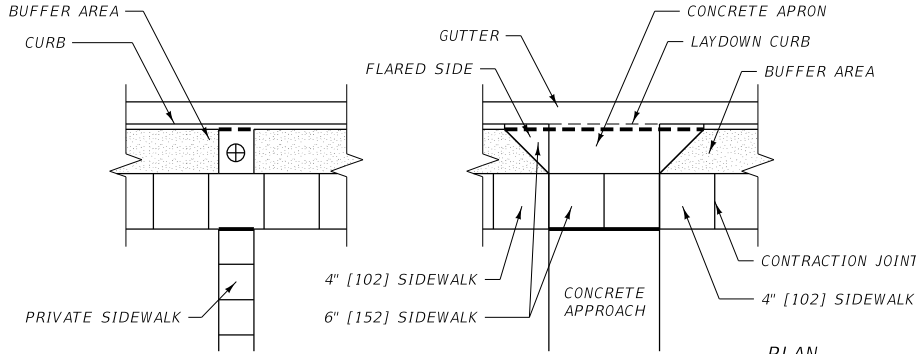
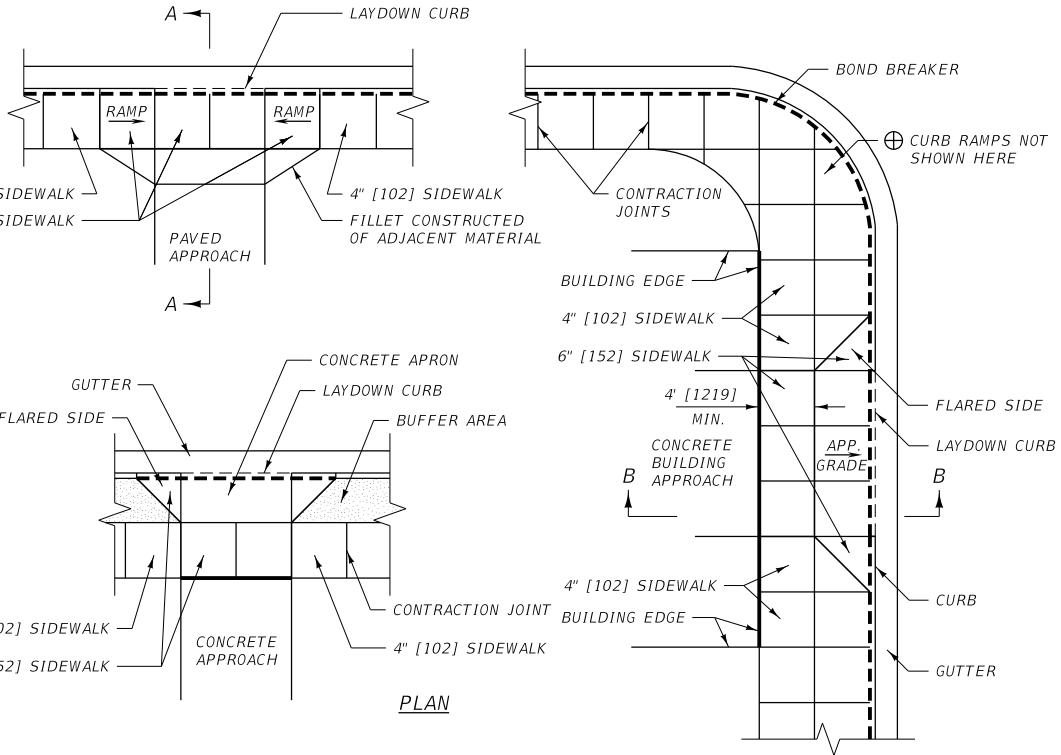
EFFECTIVE: SEPTEMBER 2014

MDT MONTANA DEPARTMENT OF TRANSPORTATION

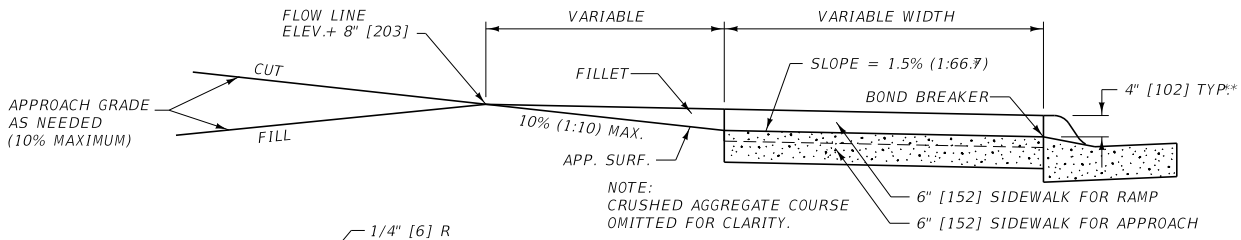
NOTES:

1/2" [13] EXPANSION JOINTS ARE SHOWN AS DARK SOLID LINES FOR VISUAL PURPOSES.

BOND BREAKER IS SHOWN AS DARK DASHED LINES FOR VISUAL PURPOSES.

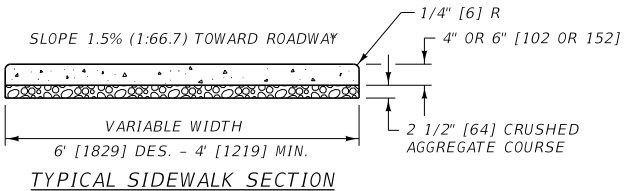


PLAN

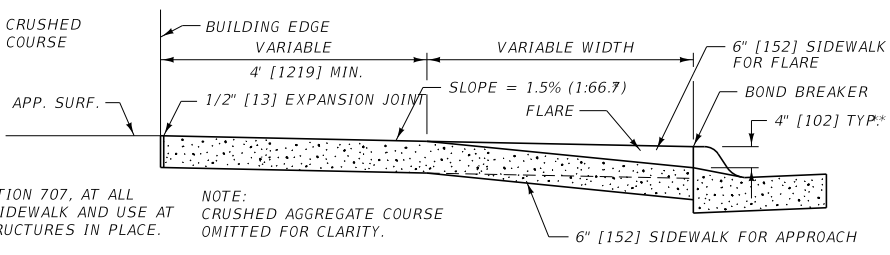


SECTION A-A 1/2" [13] EXPANSION JOINTS BOND BREAKER

NOTE: SEE DTL. DWG. NO. 609-05 FOR CURB & GUTTER DETAILS.



TYPICAL SIDEWALK SECTION



SECTION B-B

NOTES:

- ① INSTALL PREFORMED EXPANSION JOINT FILLER, PER SECTION 707, AT ALL EXPANSION JOINTS, FOR THE FULL THICKNESS OF THE SIDEWALK AND USE AT ALL JOINTS BETWEEN NEW CONCRETE SIDEWALK AND STRUCTURES IN PLACE.
- ② INSTALL A BOND BREAKER FOR THE FULL THICKNESS OF THE SIDEWALK AT LOCATIONS SPECIFIED ON THIS DETAIL. USE A 15 OR 30 POUND [6.8 OR 13.6 kg] ROOFING FELT MATERIAL, OR OTHER PRODUCT AS APPROVED BY THE PROJECT MANAGER, FOR THE BOND BREAKER. DO NOT USE EXPANSION JOINT MATERIAL AS A BOND BREAKER.
- ③ CONSTRUCT ALL JOINTS STRAIGHT AND PERPENDICULAR TO THE CENTERLINE AND THE SURFACE OF THE SIDEWALK. WHERE PRACTICAL, ALIGN ALL JOINTS WITH LIKE JOINTS IN ADJOINING WORK. USE JOINTS TO OUTLINE ALL PANELS IN THE SIDEWALK, WHICH ARE TO BE, SO FAR AS POSSIBLE, SQUARE. THE LENGTHS OF THE PANELS ARE DETERMINED BY THE WIDTH OF THE SIDEWALK.
- ④ THE MINIMUM WIDTH OF NEW SIDEWALK IS 4 FEET [1219]. THE CONTINUOUS CLEAR WIDTH OF PEDESTRIAN ACCESS ROUTES IS 4 FEET [1219] MIN. THE CLEAR WIDTH BETWEEN OBSTRUCTIONS OR AN OBSTRUCTION AND THE EDGE OF SIDEWALK IS 4' [1219] MIN.
- ⑤ WHERE FACTORS SUCH AS LIMITED RIGHT-OF-WAY DICTATE THE INSTALLATION OF A NEW SIDEWALK LESS THAN 5 FEET [1525] IN WIDTH THE NEW SIDEWALK MUST HAVE PASSING AREAS AT A MAXIMUM SPACING OF 200 FEET [61 m]. A PASSING AREA IS A MINIMUM OF 5 FEET BY 5 FEET [1524 BY 1524] IN SIZE.
- ⑥ PROVIDE CONTRACTION JOINTS NO LESS THAN 1/8" [3] WIDE AND NO MORE THAN 1/4" [6] WIDE AND NO LESS THAN 1" [25] IN DEPTH. CONTRACTION JOINTS MAY BE CUT BY A GROOVE FORMING TOOL.
- ⑦ LOCATE EXPANSION JOINTS EVERY 100 FEET (± 30 FT.) [30 m (± 10 m)] AT INTERVALS EQUAL TO THE NEAREST MULTIPLE OF THE CONTRACTION JOINT INTERVAL.
- ⑧ USE A LONGITUDINAL CONTRACTION JOINT IN THE CENTERLINE OF ALL SIDEWALKS 8 FEET [2438] WIDE AND WIDER.

* THE MAXIMUM CONSTRUCTED CROSS SLOPE OF THE SIDEWALK IS 2% (1:50).

** THIS DEPTH IS STANDARD IN NEW CONSTRUCTION. ALTERATIONS TO EXISTING FACILITIES MAY RESULT IN A LARGER DEPTH, WHICH WILL REQUIRE A GREATER RAMP LENGTH.

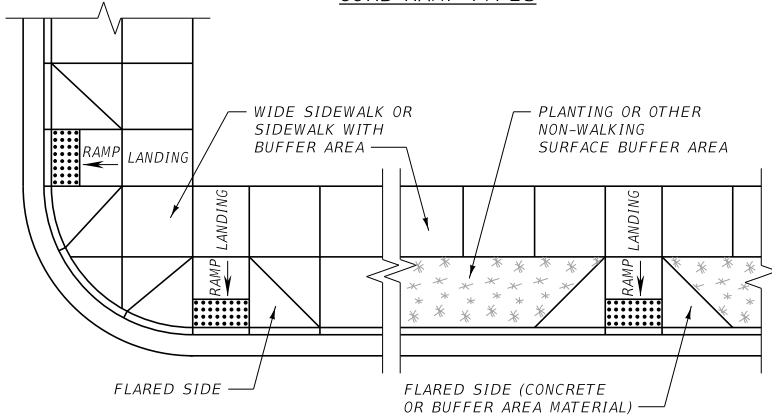
⊕ SEE DTL. DWG. NO. 608-15 AND 608-20 FOR GUIDELINES ON RAMP DESIGN WHEN RAMPS ARE REQUIRED FOR ADA ACCESSIBILITY.

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

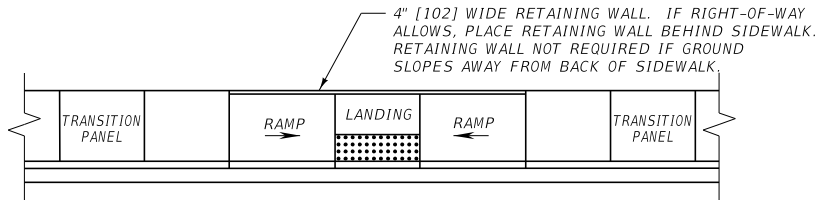
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 608	DWG. NO. 608-05
CONCRETE SIDEWALK	
EFFECTIVE: SEPTEMBER 2014	
MDT MONTANA DEPARTMENT OF TRANSPORTATION	

--REVISED--
APRIL 2019

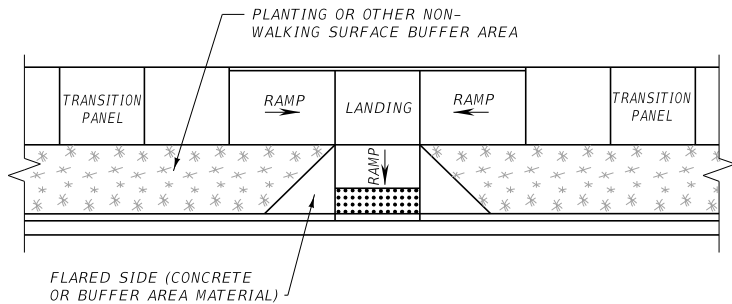
CURB RAMP TYPES



PERPENDICULAR CURB RAMP (SEE DETAILED DRAWING NUMBER 608-25 FOR ADDITIONAL DETAILS)



PARALLEL CURB RAMP (SEE DETAILED DRAWING NUMBER 608-30 FOR ADDITIONAL DETAILS)



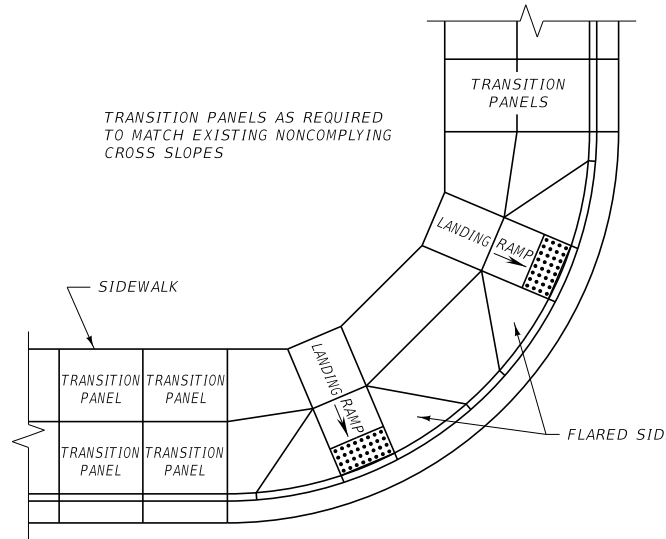
COMBINED (PARALLEL/PERPENDICULAR) CURB RAMP (SEE DETAILED DRAWING NUMBERS 608-25 AND 608-30 FOR ADDITIONAL DETAILS)

GENERAL NOTES:

- ① USE CURB RAMPS IN THE FOLLOWING ORDER OF PREFERENCE:
 - A. PERPENDICULAR CURB RAMP.
 - B. COMBINED (PARALLEL/PERPENDICULAR) CURB RAMP.
 - C. PARALLEL CURB RAMP.
- ② WHEN ALTERING EXISTING FACILITIES, MEET NEW CONSTRUCTION REQUIREMENTS FOR CURB RAMPS TO THE MAXIMUM EXTENT FEASIBLE. DOCUMENT WITH AN ADA STATEMENT OF TECHNICAL INFEASIBILITY FORM WHEN ADA STANDARDS CAN'T BE ACHIEVED.
- ③ IF POSSIBLE, DO NOT PLACE DRAINAGE STRUCTURES IN CONFLICT WITH CURB RAMPS. LOCATION OF CURB RAMPS TAKES PRECEDENCE OVER LOCATION OF DRAINAGE STRUCTURES EXCEPT WHERE EXISTING DRAINAGE STRUCTURES ARE BEING UTILIZED. IF A DRAINAGE STRUCTURE MUST BE PLACED IN THE PEDESTRIAN ACCESS ROUTE, AN ADA COMPLIANT GRATE, HAVING SLOT OPENINGS 1/2" [13] OR LESS IN ONE DIRECTION, MUST BE USED.
- ④ USE THE FLATTEST SLOPES POSSIBLE (5% MIN.) FOR ALL CURB RAMPS. MAXIMUM CONSTRUCTED RAMP SLOPES OF 8.3% ARE SHOWN FOR GUIDANCE AT DIFFICULT SITES.
- ⑤ FINAL FIELD LOCATION OF THE CURB RAMPS WILL BE DETERMINED BY THE PROJECT MANAGER.
- ⑥ PEDESTRIAN ACCESS POINTS AT CROSSWALKS ARE TO BE WHOLLY CONTAINED WITHIN THE CROSSWALK LINES.
- ⑦ FOR ADDITIONAL INFORMATION CONSULT: DRAFT PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG)

CONSTRUCTION REQUIREMENTS:

- ① OBTAIN A SURFACE TEXTURE ON THE RAMP BY COARSE BROOMING, TRANSVERSE TO THE RAMP SLOPE.
- ② TAKE CARE DURING CONSTRUCTION TO ASSURE UNIFORM RAMP GRADES, FREE OF SAGS AND SHARP GRADE CHANGES.

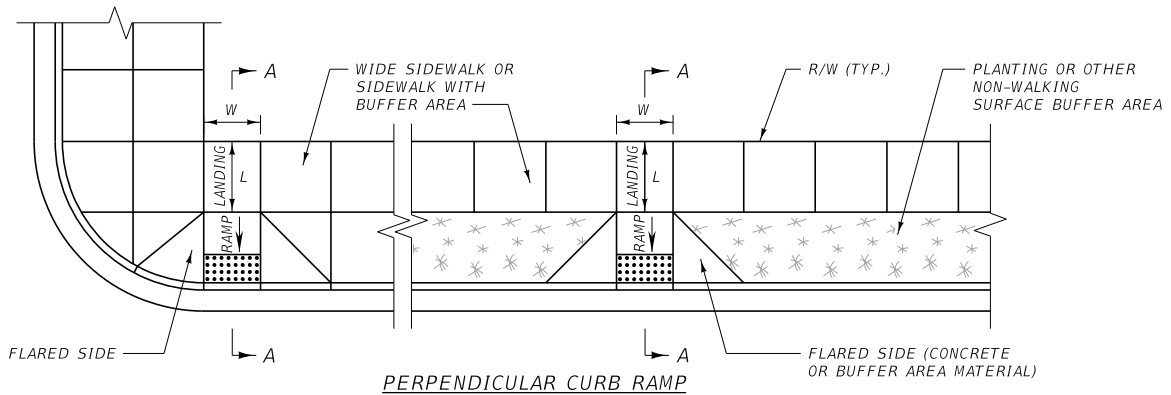


PERPENDICULAR CURB RAMP USED ON LARGE RADIUS CORNER WITH WIDE SIDEWALK (SEE DETAILED DRAWING NUMBER 608-35 FOR ADDITIONAL DETAILS)

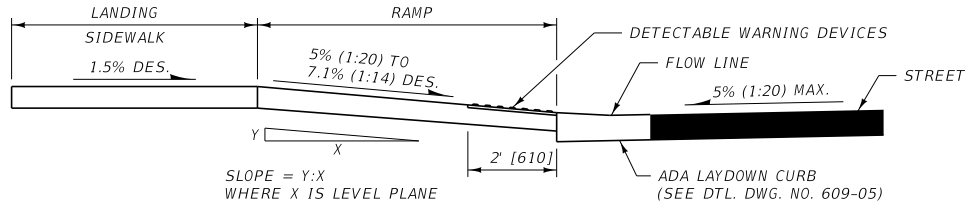
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SECTION 608	DWG. NO. 608-15
NEW CONSTRUCTION CURB RAMPS	
EFFECTIVE: SEPTEMBER 2014	
MONTANA DEPARTMENT OF TRANSPORTATION	

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APRIL 2019



PERPENDICULAR CURB RAMP



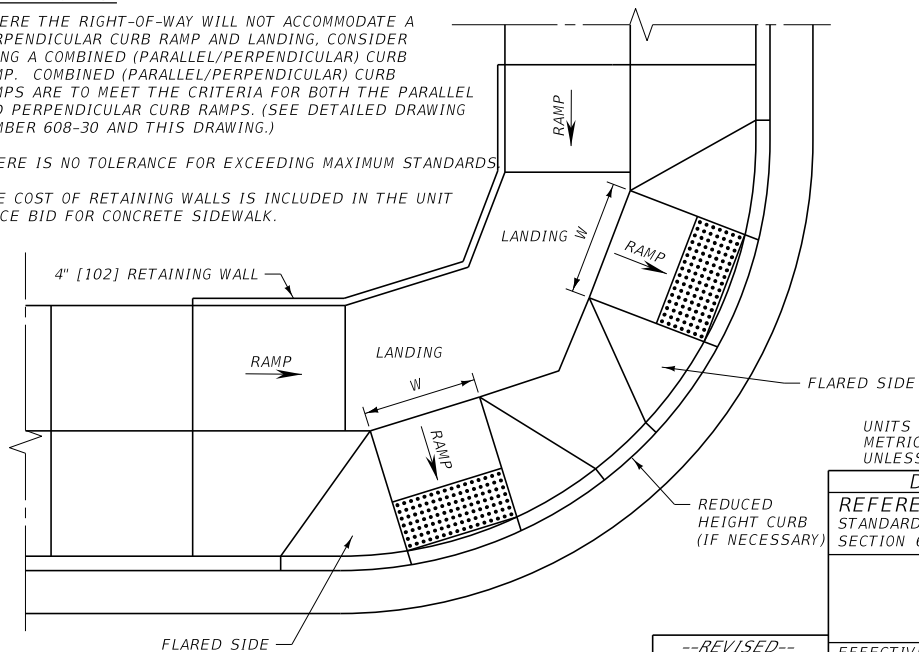
SECTION A-A

CONSTRUCTION REQUIREMENTS:

- ① THE DESIRABLE WIDTH OF THE CURB RAMP (DIMENSION "W" ABOVE) IS 5 FEET [1524] OR WIDER. THE MINIMUM WIDTH ("W") IS 4 FEET [1219].
- ② THE DESIRABLE LENGTH OF THE LANDING AT THE TOP OF THE CURB RAMP (DIMENSION "L" ABOVE) IS 5 FEET [1524]. THE MINIMUM LENGTH "L" IS 4 FEET [1220]. IF THE LANDING IS CONSTRAINED AT THE BACK OF SIDEWALK, THE MINIMUM LENGTH "L" IS 5 FEET [1524]. THE LANDING WIDTH IS EQUAL TO THE RAMP WIDTH.
- ③ THE DESIRABLE RUNNING SLOPE FOR THE CURB RAMP IS BETWEEN 5% (1:20) AND 7.1% (1:14). THE MAXIMUM CONSTRUCTED CURB RAMP SLOPE IS 8.3% (1:12).
- ④ THE DESIRABLE SLOPE FOR THE FLARED SIDE OF THE CURB RAMP IS 8.3% (1:12) OR FLATTER. THE MAXIMUM CONSTRUCTED FLARED SIDE SLOPE IS 10% (1:10).
- ⑤ THE DESIRABLE CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 1.5% (1:66.7) OR LESS. THE MAXIMUM CONSTRUCTED CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 2% (1:50).
- ⑥ THE RUNNING SLOPE OF THE SIDEWALK IS EQUAL TO THE STREET GRADE OR FLATTER.
- ⑦ PROVIDE DETECTABLE WARNING DEVICES ON THE BOTTOM 2 FEET [610] OF EACH RAMP AS SHOWN ABOVE. SEE DETAILED DRAWING NUMBER 608-40 FOR DETECTABLE WARNING DEVICES DETAILS.
- ⑧ WHERE EXISTING SITE DEVELOPMENT CONDITIONS PROHIBIT THE STRICT AND FULL COMPLIANCE OF ALL ADA CRITERIA, PROVIDE ACCESSIBILITY TO THE MAXIMUM EXTENT FEASIBLE. DOCUMENT WITH AN ADA STATEMENT OF TECHNICAL INFEASIBILITY FORM WHEN ADA STANDARDS CANT BE ACHIEVED.

GENERAL NOTES:

- ① WHERE THE RIGHT-OF-WAY WILL NOT ACCOMMODATE A PERPENDICULAR CURB RAMP AND LANDING, CONSIDER USING A COMBINED (PARALLEL/PERPENDICULAR) CURB RAMP. COMBINED (PARALLEL/PERPENDICULAR) CURB RAMP ARE TO MEET THE CRITERIA FOR BOTH THE PARALLEL AND PERPENDICULAR CURB RAMP. (SEE DETAILED DRAWING NUMBER 608-30 AND THIS DRAWING.)
- ② THERE IS NO TOLERANCE FOR EXCEEDING MAXIMUM STANDARDS.
- ③ THE COST OF RETAINING WALLS IS INCLUDED IN THE UNIT PRICE BID FOR CONCRETE SIDEWALK.

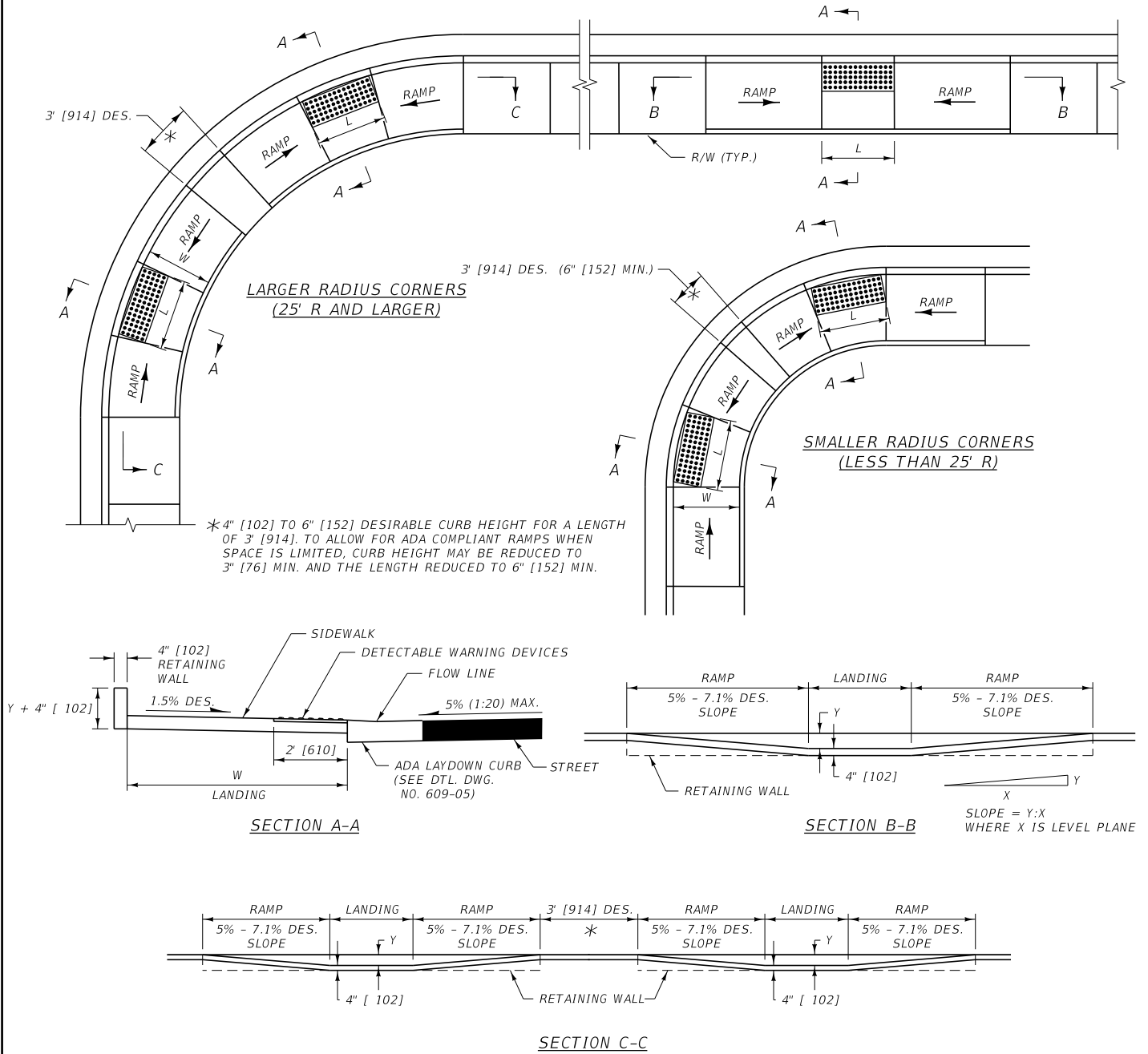


COMBINED (PARALLEL / PERPENDICULAR) CURB RAMP

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

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 608	DWG. NO. 608-25
PERPENDICULAR CURB RAMP	
--REVISED-- APRIL 2019	
EFFECTIVE: SEPTEMBER 2014	
MDT MONTANA DEPARTMENT OF TRANSPORTATION	

PARALLEL CURB RAMPS



* 4" [102] TO 6" [152] DESIRABLE CURB HEIGHT FOR A LENGTH OF 3' [914]. TO ALLOW FOR ADA COMPLIANT RAMPS WHEN SPACE IS LIMITED, CURB HEIGHT MAY BE REDUCED TO 3" [76] MIN. AND THE LENGTH REDUCED TO 6" [152] MIN.

CONSTRUCTION REQUIREMENTS

NOTE: WHEREVER POSSIBLE, ALTER EXISTING FACILITIES TO COMPLY WITH THE NEW CONSTRUCTION REQUIREMENTS.

- ① THE DESIRABLE LENGTH OF THE LANDING (DIMENSION "L" ABOVE) IS 5 FEET [1524]. THE MINIMUM LANDING LENGTH IS 4 FEET [1219].
- ② THE DESIRABLE WIDTH OF THE LANDING (DIMENSION "W" ABOVE) IS 5 FEET [1524]. THE MINIMUM LANDING WIDTH IS 4 FEET [1219]. IF THE LANDING IS CONSTRAINED ON ONE OR MORE SIDES, THE MINIMUM WIDTH IS 5 FEET [1524].
- ③ THE DESIRABLE SLOPE FOR THE CURB RAMPS IS 5% (1:20) TO 7.1% (1:14). THE MAXIMUM CONSTRUCTED CURB RAMP SLOPE IS 8.3% (1:12).
- ④ THE DESIRABLE CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 1.5% (1:66.7) OR LESS. THE MAXIMUM CONSTRUCTED CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 2% (1:50).
- ⑤ PROVIDE DETECTABLE WARNING DEVICES AT THE BACK OF CURB ON EACH LANDING AS SHOWN ABOVE. SEE DETAILED DRAWING NUMBER 608-40 FOR DETECTABLE WARNING DEVICES DETAILS.
- ⑥ WHERE EXISTING SITE DEVELOPMENT CONDITIONS PROHIBIT THE STRICT AND FULL COMPLIANCE OF ALL ADA CRITERIA, PROVIDE ACCESSIBILITY TO THE MAXIMUM EXTENT FEASIBLE AND DOCUMENT WITH AN ADA STATEMENT OF TECHNICAL INFEASIBILITY FORM WHEN ADA STANDARDS CAN'T BE ACHIEVED.

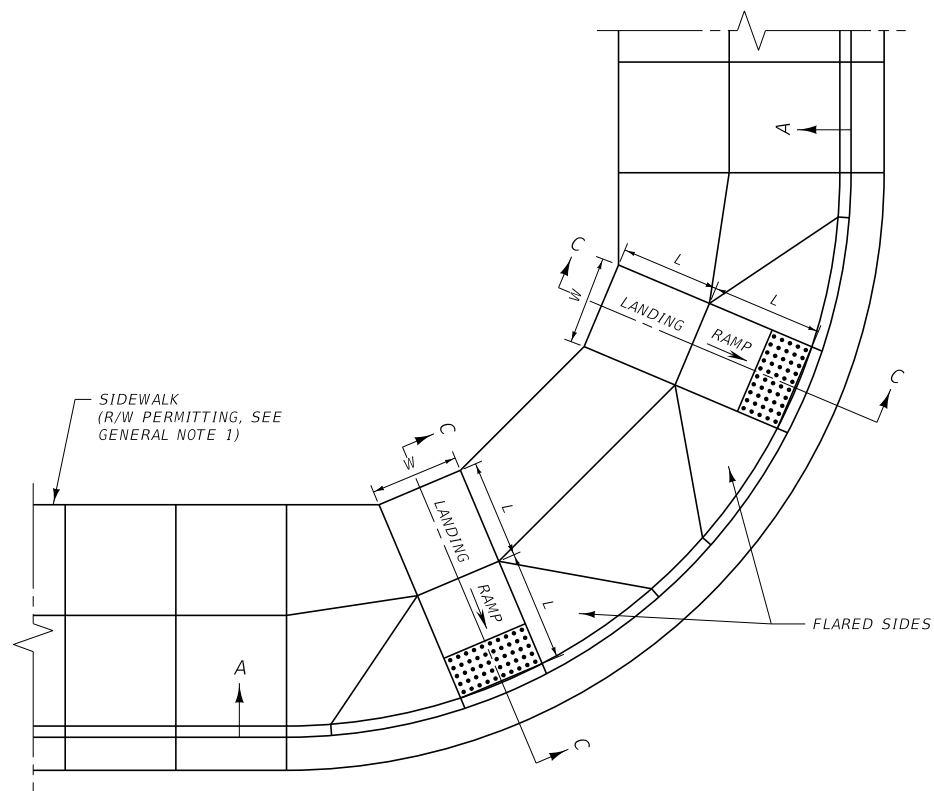
GENERAL NOTES:

- ① THE COST OF RETAINING WALLS IS INCLUDED IN THE UNIT PRICE BID FOR CONCRETE SIDEWALK.
- ② THERE IS NO TOLERANCE FOR EXCEEDING MAXIMUM STANDARDS.

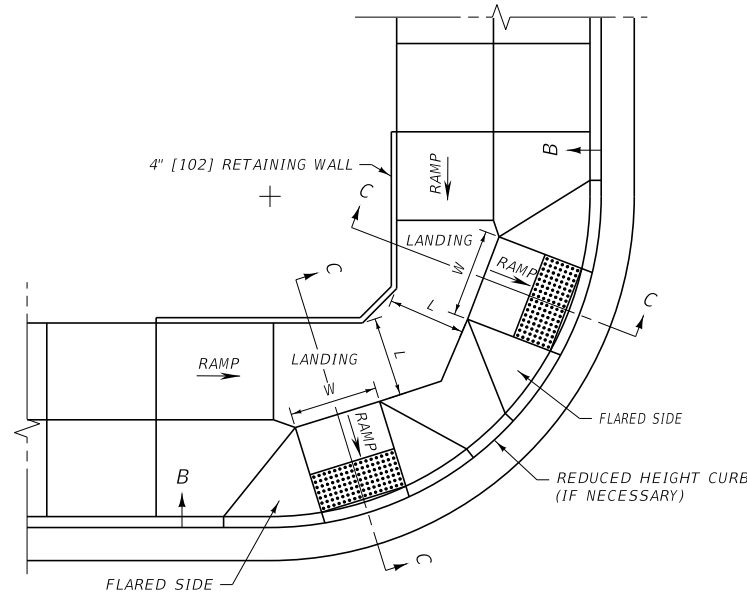
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	608-30
SECTION 608	
PARALLEL CURB RAMPS	
EFFECTIVE: SEPTEMBER 2014	
MDT MONTANA DEPARTMENT OF TRANSPORTATION	

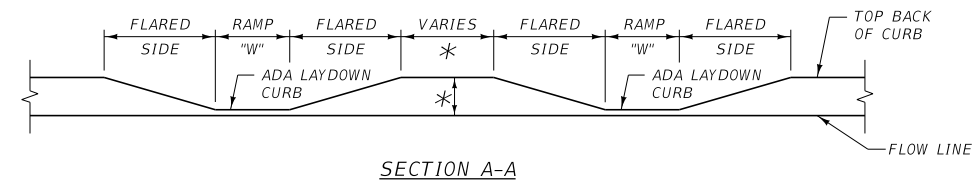
--REVISED--
APRIL 2019



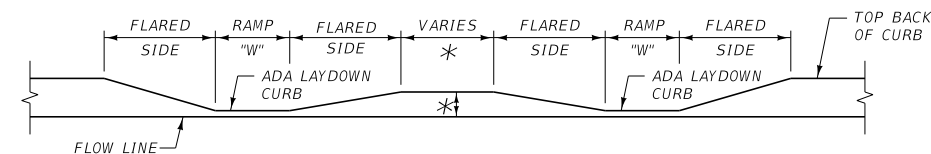
PERPENDICULAR CURB RAMP



COMBINED (PARALLEL / PERPENDICULAR) CURB RAMP

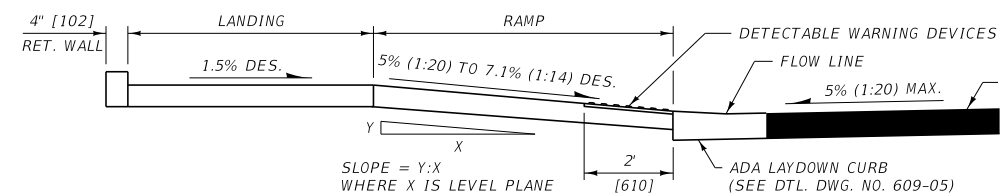


SECTION A-A

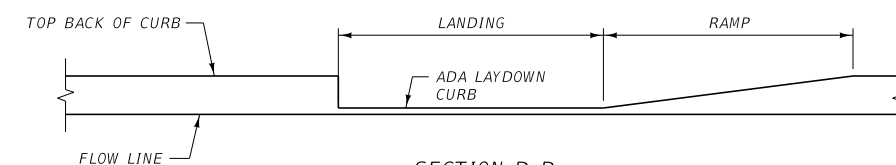


SECTION B-B

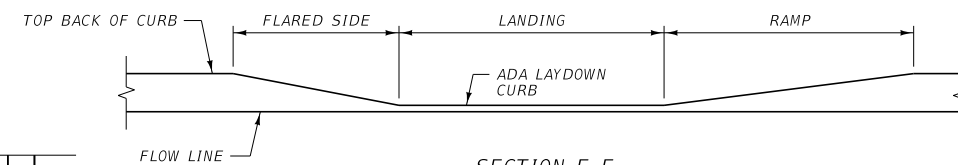
*4" [102] TO 6" [152] DESIRABLE CURB HEIGHT FOR A LENGTH OF 3.0' [914] BETWEEN RAMP. TO ALLOW FOR ADA COMPLIANT RAMP WHEN SPACE IS LIMITED, CURB HEIGHT MAY BE REDUCED TO 3" [76] MIN. AND THE LENGTH REDUCED TO 6" [152] MIN.



SECTION C-C



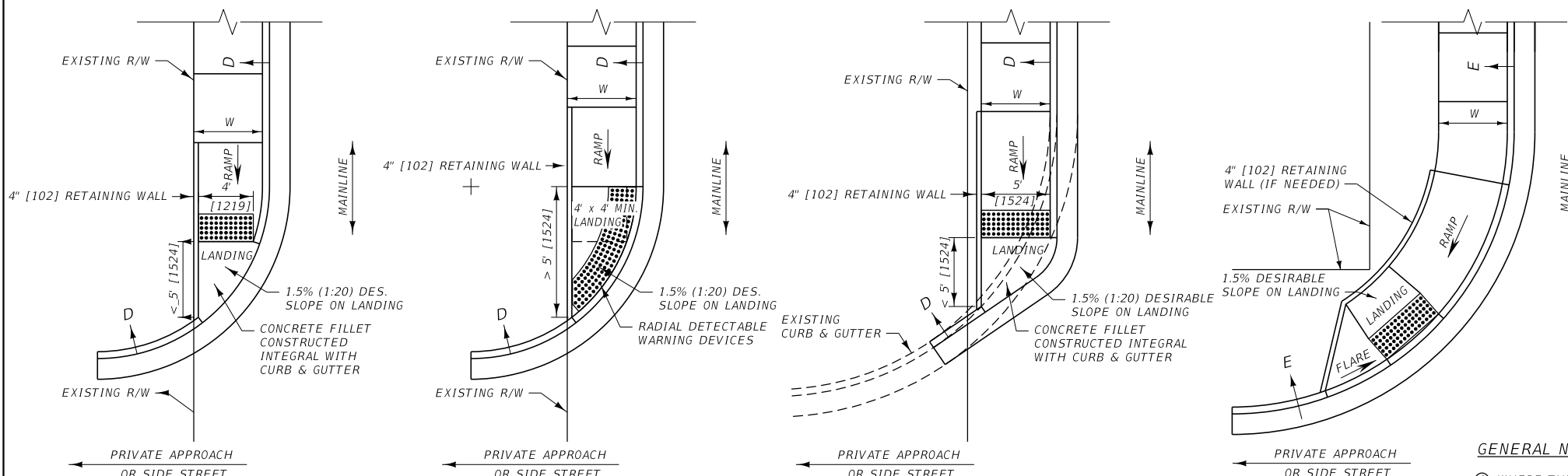
SECTION D-D



SECTION E-E

REQUIREMENTS FOR NEW CONSTRUCTION AND ALTERATIONS TO EXISTING FACILITIES:

- 1 THE DESIRABLE WIDTH OF THE CURB RAMP (DIMENSION "W" ABOVE) IS 5 FEET [1524] OR WIDER. THE MINIMUM WIDTH ("W") IS 4 FEET [1219]. THE LANDING WIDTH IS EQUAL TO THE RAMP WIDTH.
- 2 THE DESIRABLE LENGTH OF THE LANDING AT THE TOP OF THE CURB RAMP (DIMENSION "L" ABOVE) IS 5 FEET [1524]. THE MINIMUM LENGTH "L" OF THE LANDING IS 4 FEET [1219]. IF THE LANDING IS CONSTRAINED AT THE BACK OF SIDEWALK, THE MINIMUM LENGTH "L" IS 5 FEET [1524].
- 3 THE DESIRABLE SLOPE FOR THE CURB RAMP IS BETWEEN 5% (1:20) AND 7.1% (1:14). THE MAXIMUM CONSTRUCTED CURB RAMP SLOPE IS 8.3% (1:12).
- 4 THE DESIRABLE SLOPE FOR THE FLARED SIDE OF THE CURB RAMP IS 8.3% (1:12) OR FLATTER. THE MAXIMUM CONSTRUCTED FLARED SIDE SLOPE IS 10% (1:10).
- 5 THE DESIRABLE CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 1.5% (1:66.7) OR LESS. THE MAXIMUM CONSTRUCTED CROSS SLOPE OF THE SIDEWALK, RAMP, OR LANDING IS 2% (1:50).
- 6 PROVIDE DETECTABLE WARNING DEVICES ON THE BOTTOM 2 FEET [610] OF EACH RAMP OR AT THE BACK OF CURB ON CURB SIDE LANDINGS AS SHOWN. SEE DETAILED DRAWING NUMBER 608-40 FOR DETECTABLE WARNING DEVICES DETAILS.
- 7 WHERE EXISTING SITE DEVELOPMENT CONDITIONS PROHIBIT THE STRICT AND FULL COMPLIANCE OF ALL ADA CRITERIA, PROVIDE ACCESSIBILITY TO THE MAXIMUM EXTENT FEASIBLE. DOCUMENT WITH AN ADA STATEMENT OF TECHNICAL INFEASIBILITY FORM WHEN ADA STANDARDS CAN'T BE ACHIEVED.



CURB RAMP OPTIONS FOR PRIVATE APPROACH OR SIDE STREETS WITH CURB RETURNS BUT WITHOUT SIDEWALK

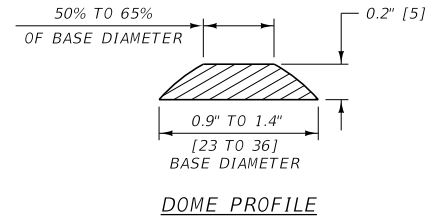
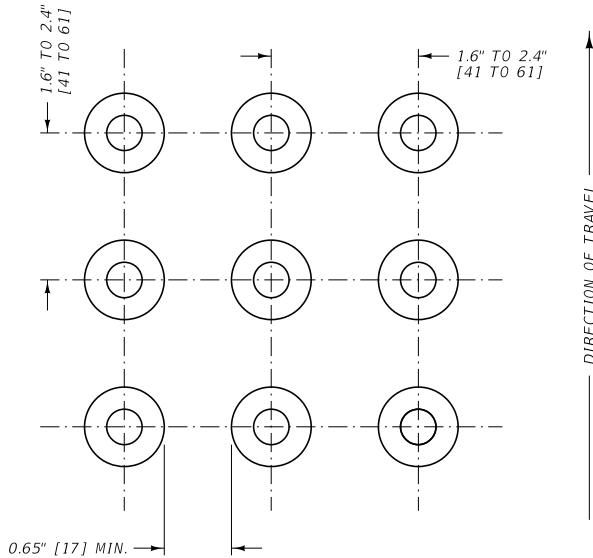
GENERAL NOTES:

- 1 WHERE THE RIGHT-OF-WAY WILL NOT ACCOMMODATE A PERPENDICULAR CURB RAMP AND LANDING MEETING THESE REQUIREMENTS, CONSIDER USING A COMBINED (PARALLEL / PERPENDICULAR) CURB RAMP DESIGN.
- 2 TRIM PRECAST DETECTABLE WARNING DEVICES PANELS TO FIT ON PRIVATE APPROACH SIDEWALK CURB RAMPS AS SHOWN ABOVE.
- 3 THE COST OF RETAINING WALLS IS INCLUDED IN THE UNIT PRICE BID FOR CONCRETE SIDEWALK.
- 4 THERE IS NO TOLERANCE FOR EXCEEDING MAXIMUM STANDARDS.

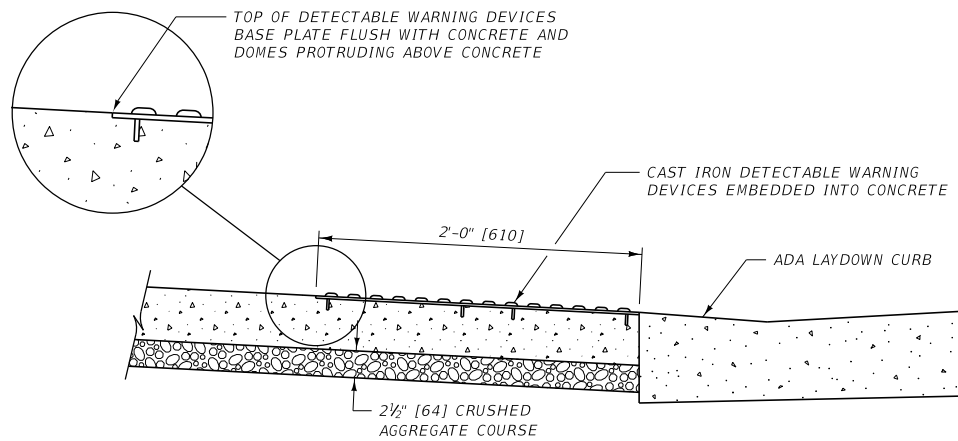
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 608	DWG. NO. 608-35
CURB RAMP DESIGN OPTIONS FOR CURB-TIGHT SIDEWALKS	
EFFECTIVE: SEPTEMBER 2014	
--REVISED-- APRIL 2019	
MDTA MONTANA DEPARTMENT OF TRANSPORTATION	

SQUARE PATTERN
PARALLEL ALIGNMENT



DETECTABLE WARNING DEVICES ALIGNMENT AND PATTERN



SIDE VIEW

CONSTRUCTION REQUIREMENTS:

- ① INSTALL DETECTABLE WARNING DEVICES THAT EXTEND THE FULL WIDTH OF THE RAMP, 2 FEET [610] IN DEPTH.
- ② INSTALL THE DETECTABLE WARNING DEVICES ADJACENT TO THE BACK OF CURB UNLESS OTHERWISE SHOWN IN THE PLANS.
- ③ EMBED THE DETECTABLE WARNING DEVICES DIRECTLY INTO THE CONCRETE, SO THE TOP OF THE BASE PLATE IS FLUSH WITH THE CONCRETE AND THE DOMES PROTRUDE ABOVE THE ADJACENT CONCRETE SURFACE.
- ⑤ USE CAST IRON DETECTABLE WARNING DEVICES FROM THE DEPARTMENT'S QUALIFIED PRODUCTS LIST (QPL).
- ④ ENSURE A UNIFORM GRADE ON THE DETECTABLE WARNING DEVICES FREE OF SAGS AND IRREGULAR EDGES.
- ⑥ USE DETECTABLE WARNING DEVICES THAT VISUALLY CONTRAST WITH ADJACENT WALKWAY SURFACES.
- ⑦ ENSURE THE ALIGNMENT AND PATTERN OF THE DOMES IS CONTINUED ACROSS ANY JOINTS BETWEEN DETECTABLE WARNING DEVICES BASE PLATE.

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

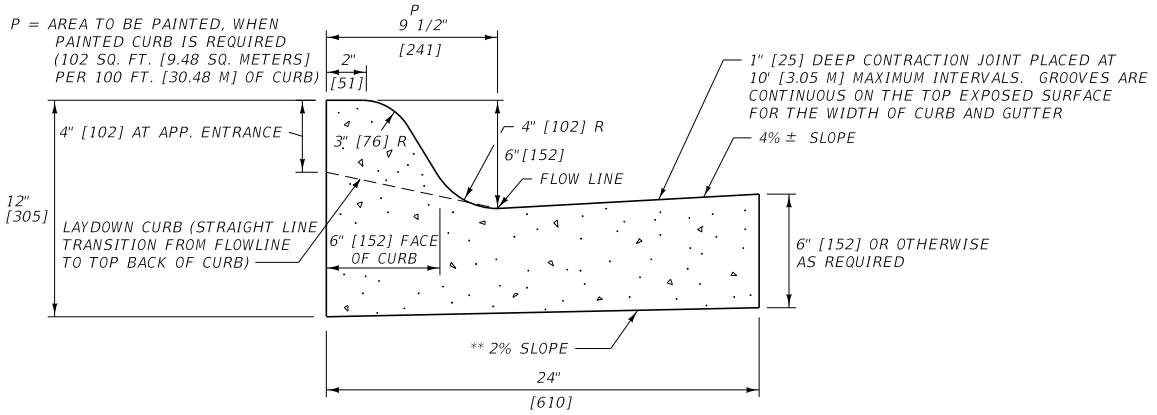
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 608	DWG. NO. 608-40

**DETECTABLE WARNING
DEVICES**

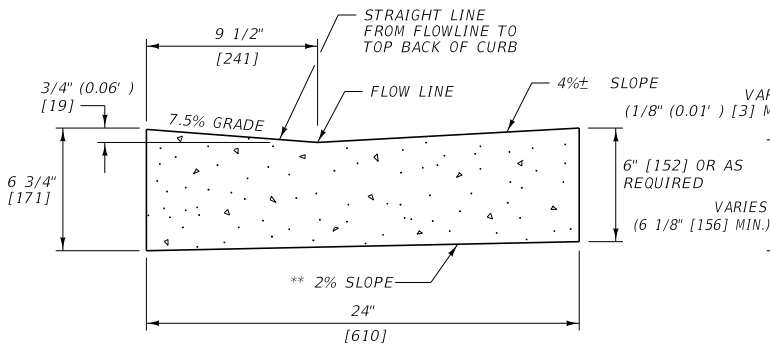
--REVISED--
APRIL 2019

EFFECTIVE: SEPTEMBER 2014

CONCRETE CURBS

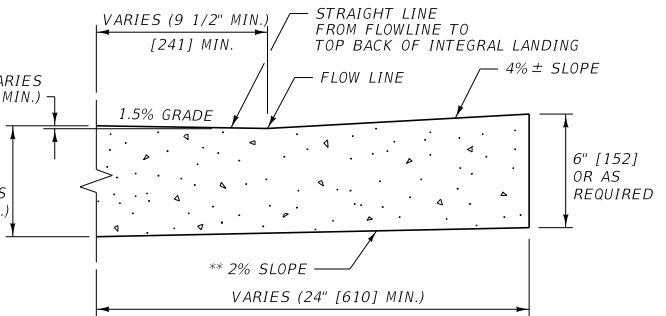


CONCRETE ADA LAYDOWN CURBS



CONCRETE ADA LAYDOWN CURBS

USE WHEN LANDING IS PLACED INTEGRAL WITH CURB & GUTTER (SEE DTL. DWG. NO. 608-35)



JOINTS:

- (A) WHEN INTEGRAL WITH, TIED TO, OR PLACED AGAINST PORTLAND CEMENT CONCRETE PAVEMENT (P.C.C.P.): MATCH TRANSVERSE CONTRACTION AND/OR EXPANSION JOINTS IN THE ADJACENT P.C.C.P. SLAB. IF REQUIRED, EXTEND 1/2" [13] MIN. WIDTH PREFORMED EXPANSION JOINTS COMPLETELY THROUGH CURB AND GUTTER THE SAME WIDTH AS THE P.C.C.P. SLAB JOINT. FILL CURB AND GUTTER EXPANSION JOINTS WITH PREFORMED EXPANSION JOINT FILLER.
- (B) ALL OTHER CASES: SPACE CONTRACTION JOINTS IN CURB AND GUTTER AT 10 FOOT [3.05 m] INTERVALS OR LESS EXCEPT AS SPECIFIED IN (A) ABOVE. EXTEND 1/2" [13] MIN. WIDTH EXPANSION JOINTS COMPLETELY THROUGH CURB AND GUTTER EVERY 100 FEET [30.48 m] (± 30 FEET [9.14 m]), AT INTERVALS EQUAL TO THE NEAREST MULTIPLE OF THE CONTRACTION JOINT INTERVAL, AND FILL WITH EXPANSION JOINT FILLER.
- (C) CONTRACTION JOINTS: CONTRACTION JOINTS ARE 1/8" [3] MIN. AND 3/8" [10] MAX. IN WIDTH. FORM JOINTS BY SAWING OR SCORING TO A MINIMUM DEPTH OF 1" [25]. FORM SCORED JOINTS BY A TOOL WHICH WILL LEAVE ROUNDED CORNERS AND DESTROY AGGREGATE INTERLOCK TO A MINIMUM DEPTH OF 1" [25].
- (D) OTHER JOINTS: SEPARATE THE CURB AND GUTTER FROM ADJACENT SIDEWALK AT POINTS SHOWN ON DTL. DWG. NO. 608-05 WITH A BOND BREAKER MATERIAL, EXCEPT AT APPROACH LAYDOWN CURB LOCATIONS, WHICH REQUIRE SEPARATION USING 1/2" [13] MIN. WIDTH PREFORMED EXPANSION JOINT MATERIAL. PLACE 1/2" [13] MIN. WIDTH PREFORMED EXPANSION JOINT MATERIAL AT ALL CURB RETURNS, BRIDGES, DROP INLETS, AND WHERE MEETING CURB AND GUTTER IN PLACE.

EXPANSION JOINT FILLER MATERIAL: USE PREFORMED EXPANSION JOINT FILLER MEETING THE REQUIREMENTS OF SECTION 707.

BOND BREAKER MATERIAL: USE A 15 OR 30 POUND [6.8 OR 13.6 KILOGRAM] ROOFING FELT MATERIAL, OR OTHER PRODUCT AS APPROVED BY THE PROJECT MANAGER. DO NOT USE EXPANSION JOINT MATERIAL.

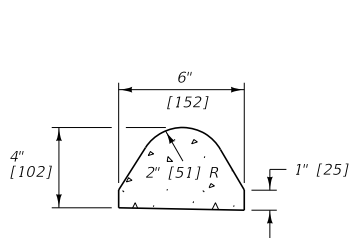
RADII: MINIMUM CURB RETURN RADII = 10' [3.05 m]. 15' [4.57 m] RADII ARE DESIRABLE FOR STREETS.

CONCRETE: UNLESS OTHERWISE SPECIFIED, CONSTRUCT CONCRETE CURBS AND CONCRETE INTEGRAL CURB AND GUTTER WITH CLASS GENERAL CONCRETE OR APPROVED EQUAL.

* QUANTITIES FOR ESTIMATING PURPOSES ONLY.

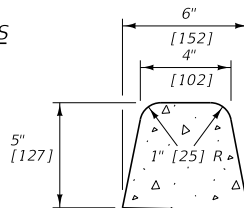
** THE SLOPE OF THE BOTTOM OF THE CURB AND GUTTER SHOULD MATCH THE SUPERELEVATION OF THE ROADWAY.

CONCRETE CURBS



CURB SECTION

1 CUBIC FOOT [0.305 cu m] OF CONCRETE WILL MAKE ABOUT 8 LINEAR FEET [2.44 lin m] OF CURB.*



CURB SECTION

1 CUBIC FOOT [0.305 cu m] OF CONCRETE WILL MAKE ABOUT 5 LINEAR FEET [1.52 lin m] OF CURB.

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

NOTES:

- ① WHEN CURB IS USED IN CONJUNCTION WITH GUARDRAIL, USE THE 4" [102] HIGH TYPE. OTHERWISE, THE CONTRACTOR MAY USE EITHER SECTION.
- ② CONFORM ALL MATERIALS AND CONSTRUCTION PER SECTION 609.
- ③ PROVIDE CONTRACTION JOINTS IN CONCRETE CURBS AS DESCRIBED IN NOTE (B) ABOVE.

DETAILED DRAWING

REFERENCE DWG. NO. STANDARD SPEC. SECTION 609, 707 609-05

MISCELLANEOUS CURBS

--REVISED--
APRIL 2019

EFFECTIVE: SEPTEMBER 2014

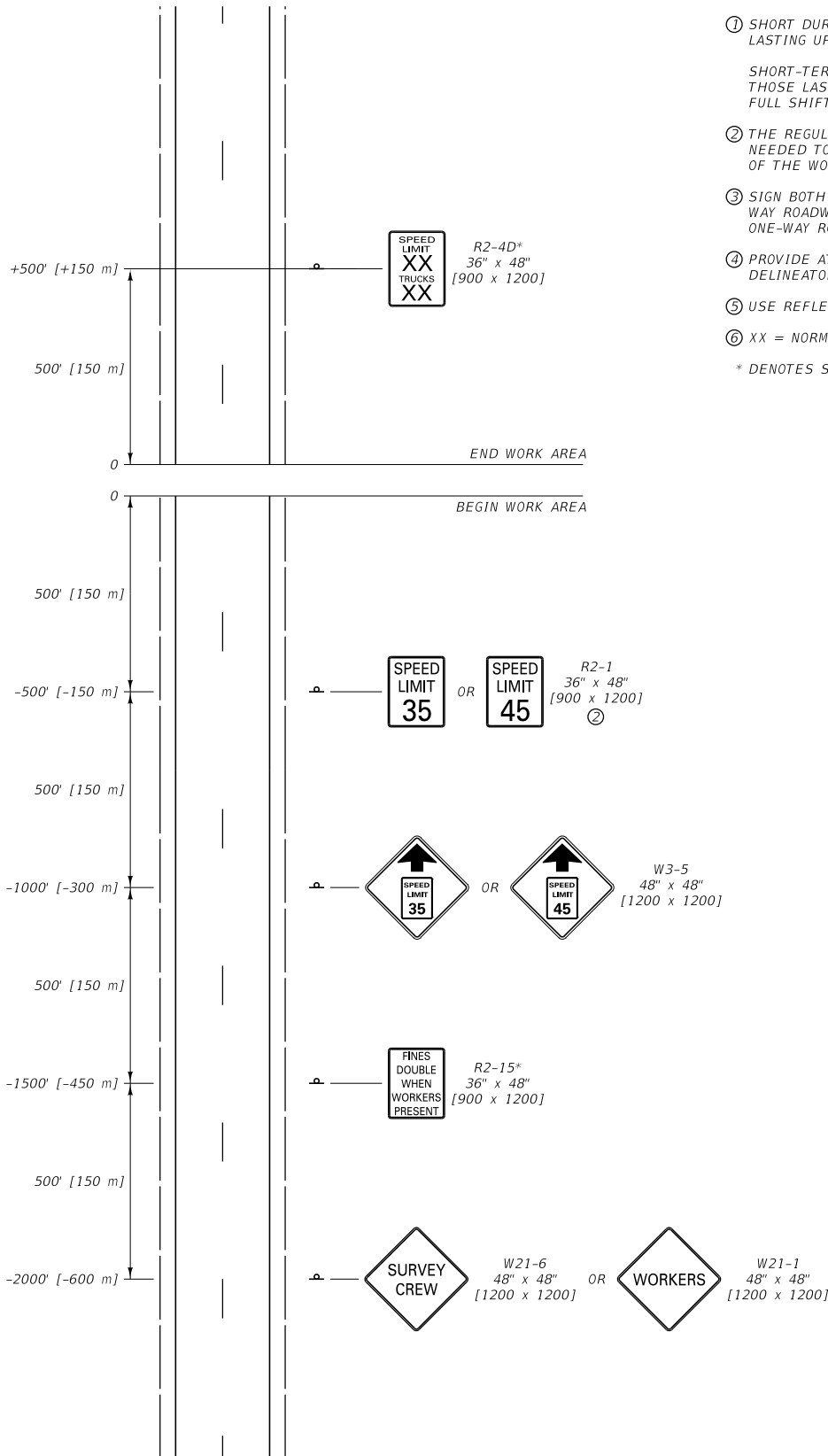
MDT MONTANA DEPARTMENT OF TRANSPORTATION

NOTES:

- ① SHORT DURATION ACTIVITIES ARE DEFINED AS THOSE LASTING UP TO ONE HOUR.

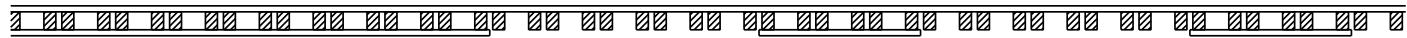
SHORT-TERM STATIONARY ACTIVITIES ARE DEFINED AS THOSE LASTING GREATER THAN ONE HOUR, UP TO A FULL SHIFT.
- ② THE REGULATORY SPEED SIGNS MUST MOVE AS NEEDED TO REMAIN WITHIN 500 FEET [150 m] OF THE WORK AREA.
- ③ SIGN BOTH TRAVEL DIRECTIONS ON TWO-LANE, TWO-WAY ROADWAYS OR BOTH SHOULDERS ON TWO-LANE, ONE-WAY ROADWAYS.
- ④ PROVIDE AT LEAST THE DISTANCE SHOWN FOR DELINEATOR MOUNTED SIGNS.
- ⑤ USE REFLECTIVE DEVICES.
- ⑥ XX = NORMAL POSTED SPEED LIMIT(S).

* DENOTES SIGNS THAT ARE UNIQUE TO MONTANA.



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

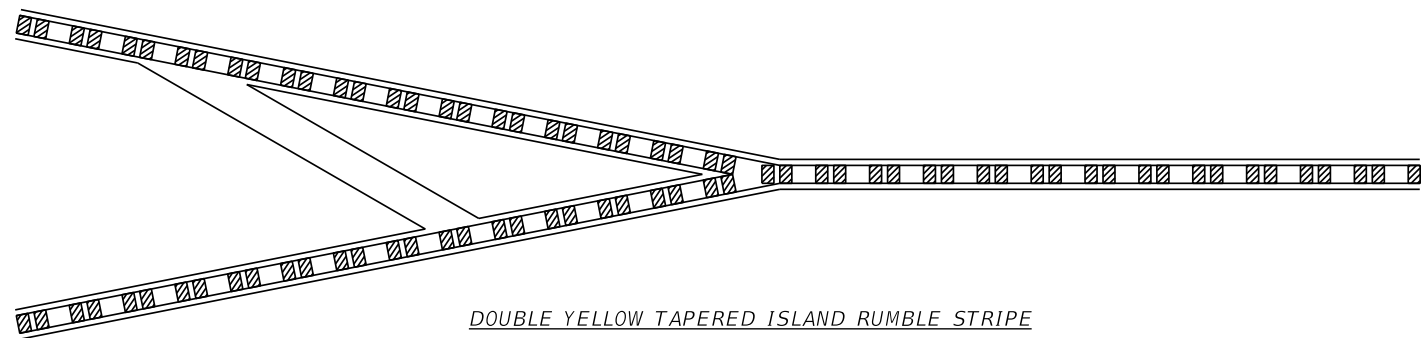
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 618	DWG. NO. 618-34
SHORT DURATION OR SHORT-TERM STATIONARY CREW SIGNING	
--REVISED--	EFFECTIVE: SEPTEMBER 2014
OCTOBER 2017	MDT MONTANA DEPARTMENT OF TRANSPORTATION
APRIL 2019	



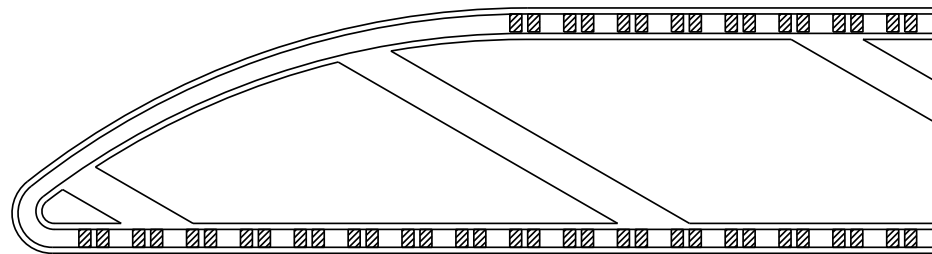
DOUBLE YELLOW AND NO PASSING RUMBLE STRIPE



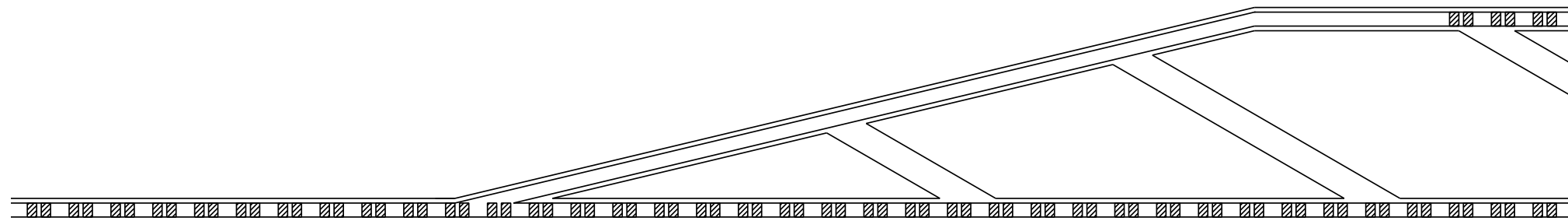
YELLOW SKIP RUMBLE STRIPE



DOUBLE YELLOW TAPERED ISLAND RUMBLE STRIPE



DOUBLE YELLOW BULLNOSE ISLAND RUMBLE STRIPE



DOUBLE YELLOW TURN LANE RUMBLE STRIPE

NOTES:

- ① SEE CENTERLINE RUMBLE STRIPS DTL. DWG. NO. 411-05 FOR ADDITIONAL INFORMATION.
- ② ALL PAVEMENT MARKINGS ARE TO CONFORM TO THE REQUIREMENTS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND "STANDARD HIGHWAY SIGNS" PUBLICATIONS, FROM THE FEDERAL HIGHWAY ADMINISTRATION.

<i>DETAILED DRAWING</i>	
REFERENCE STANDARD SPEC. SECTION 620	DWG. NO. 620-30
CENTERLINE RUMBLE STRIPING	
EFFECTIVE: APRIL 2019	
MDT MONTANA DEPARTMENT OF TRANSPORTATION	