KNIFE RIVER
AN MDU RESOURCES COMPANY

1/24/2014

5450 W. GOWEN ROAD
BOISE, ID 83709
O: 208.362.6152
F: 208.562.5045

PROJECT: Project No. C009(822); Key No. 09822; I-84, Gowen Rd IC

ATTN: Daris Bruce, P.E.

TO: Idaho Transportation Department
P.O. Box 8028
Boise, ID 83709

SUBJECT: Barrier Modification Request

Mr. Bruce,

Knife River requests to use G-2-A-1 detail barrier, modified as described below, in lieu of the Montana 606-60 detail concrete barrier rail.

Knife River proposes modifications to both the 10 ft and 20 ft standard G-2-A-1 barrier for consideration of approval:

1. G-2-A-1, 10 ft concrete barrier

    a. Modify the barrier opening at the bottom of the barrier in accordance with the Montana 606-60 detail, 3'-10" wide by 2-1/4" tall opening centered in the barrier. This detail, incidentally, is very similar to the ITD standard G-2-A drawing, which is the same width, but slightly taller at 3".

    b. The Montana 606-60 rail provides 0.072 square feet of opening per linear foot of barrier. This same opening ratio would be provided, at a minimum, using the 3'-10" by 2-1/4" opening for the G-2-A-1 barrier.

2. G-2-A-1, 20 ft concrete barrier

    a. Modify the barrier opening at the bottom of the barrier to allow a single opening 8' wide by 2-1/4" tall centered in the barrier, or two openings, each 4' wide by 2-1/4" tall centered between the longitudinal centerline of the barrier and the anchoring slot details on the two respective halves of the barrier.

    b. Either configuration, the single 8' or double 4', would provide roughly 0.076 square feet of opening per linear foot of barrier, exceeding the maximum provided by the Montana 606-60 rail.

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Attached are schematic drawings conceptually detailing the proposed modifications.

Additional reinforcing bar may or may not be needed to accommodate the larger openings.

If the request is conditionally approved, the remaining details can be addressed for final approval.

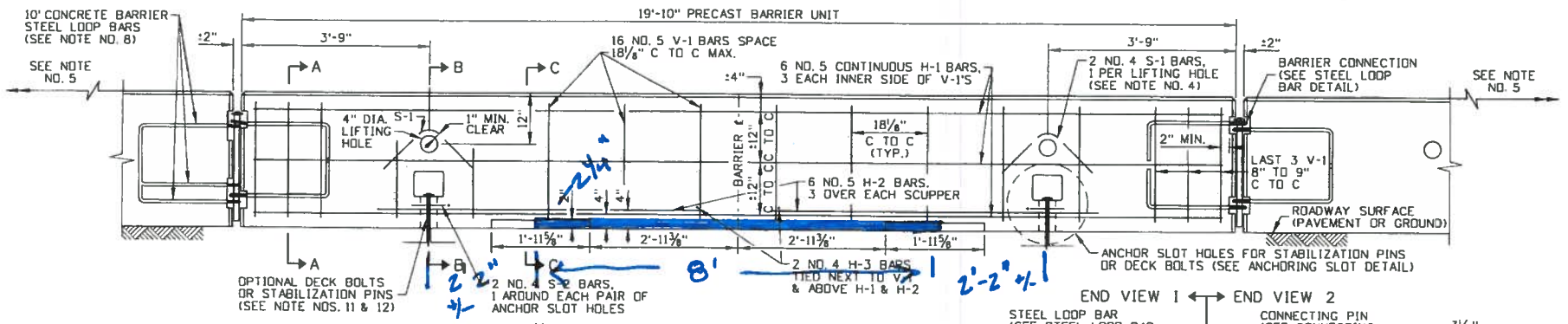
Please contact me if you have any questions or concerns.

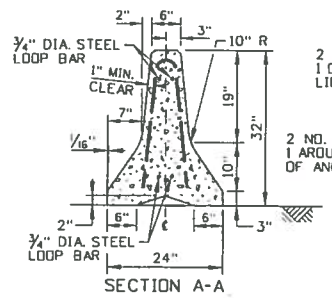
Sincerely,

Zach Cooper

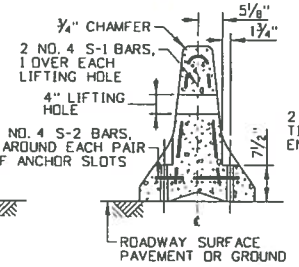
Attachments (5)

PROPOSED 4" 8FT OPENING TO 20' RAIL

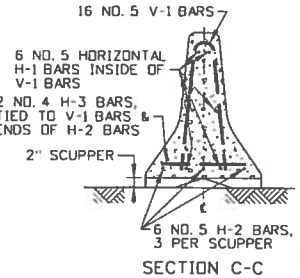




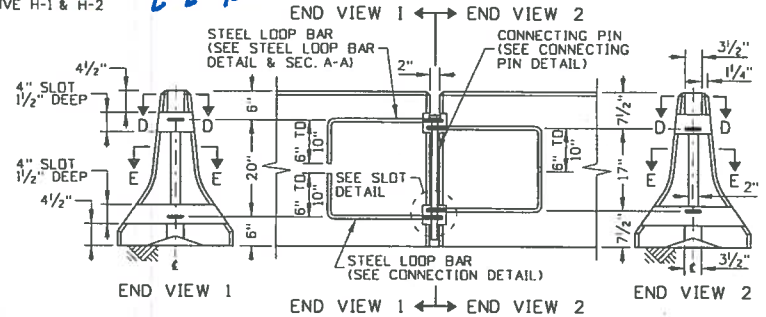
SECTION A-A



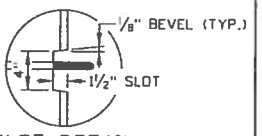
SECTION B-B



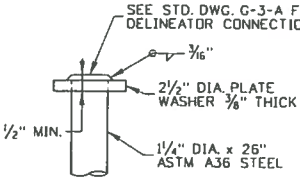
SECTION C-C



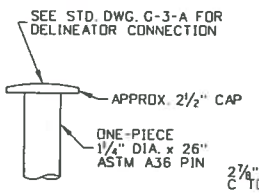
CONNECTION LOOP DETAIL



SLOT DETAIL

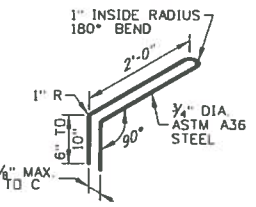


FABRICATED CONNECTING PIN

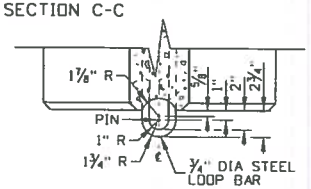


ONE-PIECE CONNECTING PIN

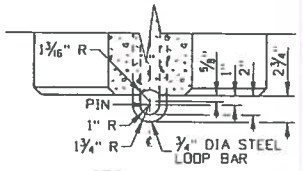
CONNECTING PIN DETAIL
(SEE NOTE NO. 6)



STEEL LOOP BAR DETAIL



SECTION D-D



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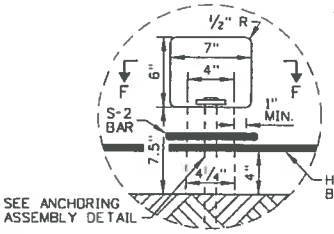
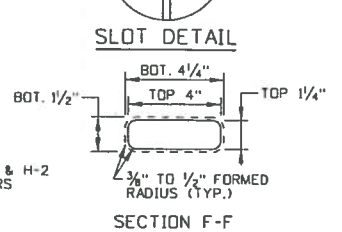


ANCHORING SLOT DETAILS
(SEE NOTE NOS. 10 AND 11)



SECTION F-F

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

ORIGINAL SIGNED BY: RYAN O. LANCASTER DATE ORIGINAL SIGNED: MAY 9, 2013

REVISIONS								
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1	8-00	MSM	6	6-04	MSM			
2	12-01	MSM	7	10-04	MSM			
3	7-02	MSM	8	9-10	PLR			
4	7-03	MSM	9	03-13	RDL			
5	9-03	MSM						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: g2a1_0613.std

DRAWING DATE: NOVEMBER, 1999

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

20' CONCRETE BARRIER

REQUIRES SHEET 2 OF 2

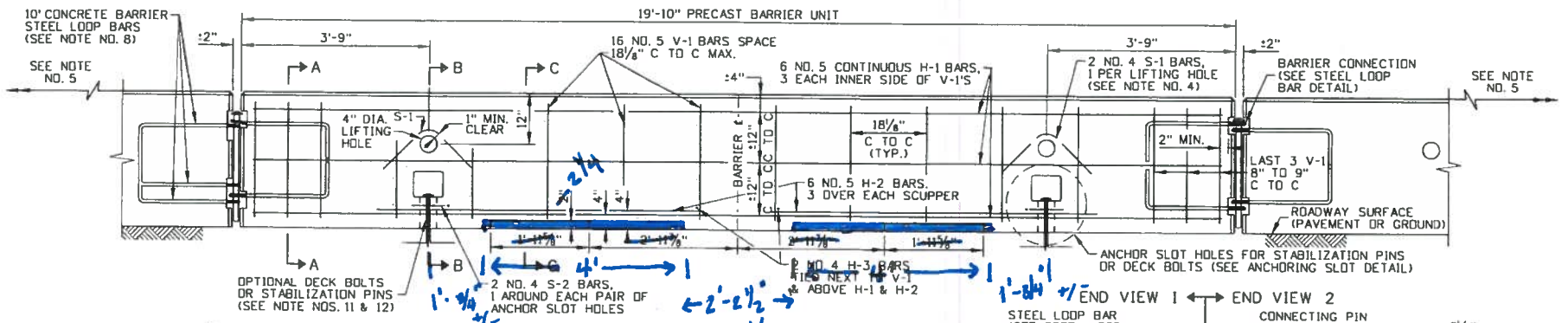
English

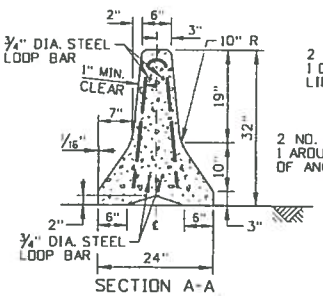
STANDARD DRAWING NO.

G-2-A-1

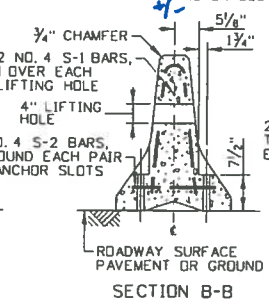
SHEET 1 OF 2

PROPOSED 2x4 FT OPENINGS TO 20' RAIL





SECTION A-A



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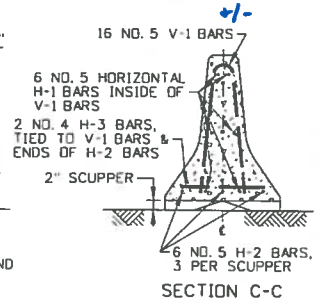
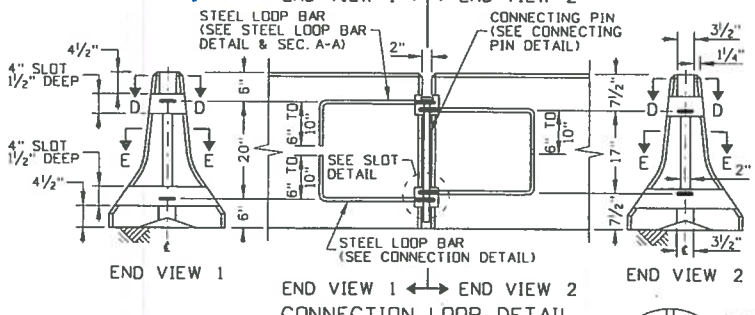
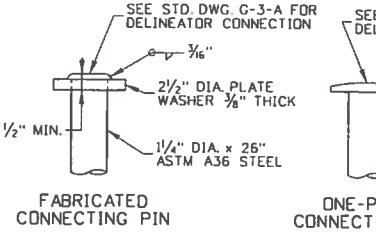


SECTION C-C



END VIEW 1 ↔ END VIEW 2
CONNECTION LOOP DETAIL



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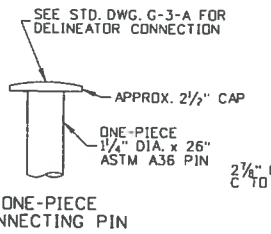
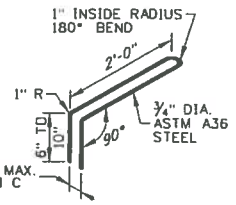
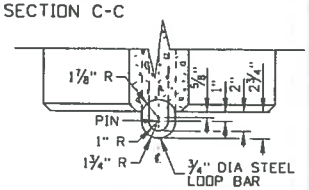


ONE-PIECE CONNECTING PIN

CONNECTING PIN DETAIL
(SEE NOTE NO. 6)



STEEL LOOP BAR DETAIL



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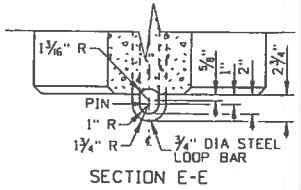

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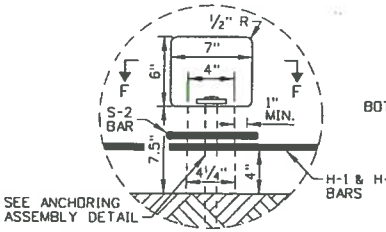
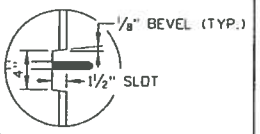
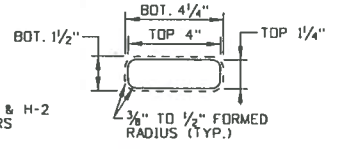


ANCHORING SLOT DETAILS
(SEE NOTE NOS. 10 AND 11)



SLOT DETAIL



SECTION F-F

REVISIONS								
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4	7-03	MSM	9	03-13	RDL			
5	9-03	MSM						

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CADD FILE NAME: g2at_0613.std
DRAWING DATE: NOVEMBER, 1999

IDAHO TRANSPORTATION DEPARTMENT
BOISE IDAHO

ORIGINAL SIGNED BY LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER
ORIGINAL SIGNED BY TOM COLE
CHIEF ENGINEER

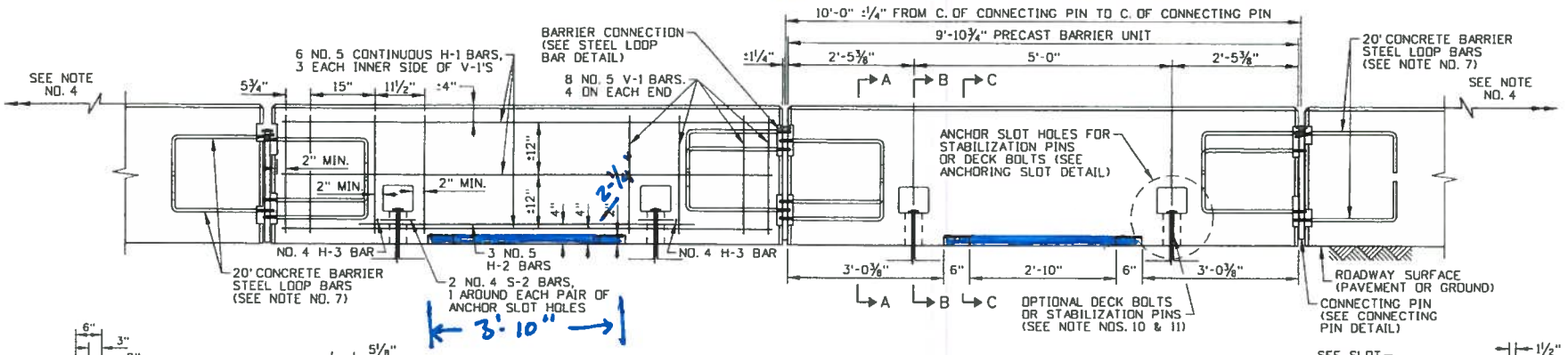
STANDARD DRAWING
20' CONCRETE BARRIER
REQUIRES SHEET 2 OF 2

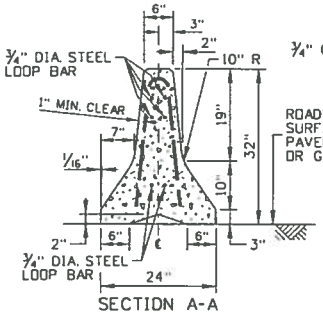
English
STANDARD DRAWING NO.
G-2-A-1
SHEET 1 OF 2

ORIGINAL STORED AT: ITD, Headquarters 3311 West State Boise, Idaho

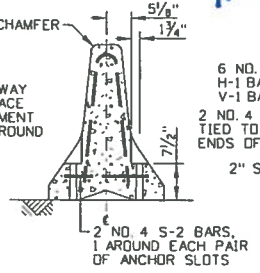
ORIGINAL SIGNED BY: RYAN D. LANCASTER
DATE ORIGINAL SIGNED: MAY 9, 2013

PROPOSED MODIFICATION TO 10' RAIL





SECTION A-A



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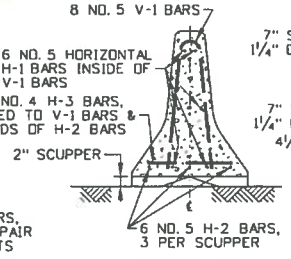

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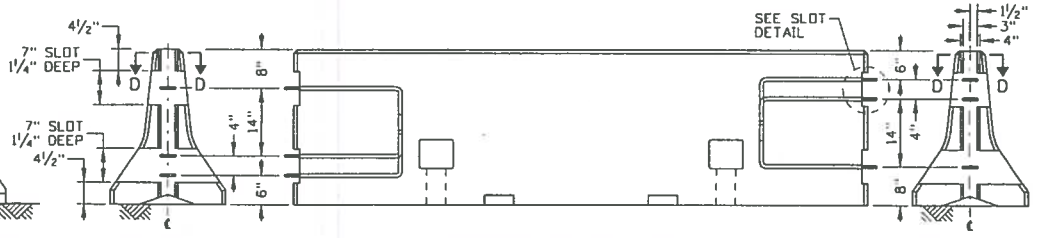
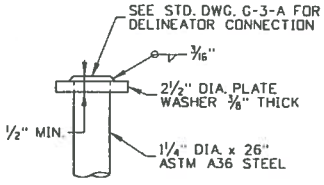
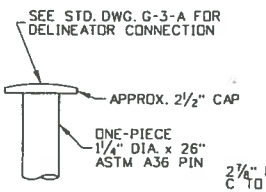


END VIEW 1 — CONNECTION LOOP DETAIL — END VIEW 2

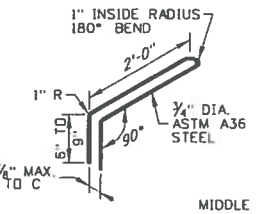


FABRICATED CONNECTING PIN

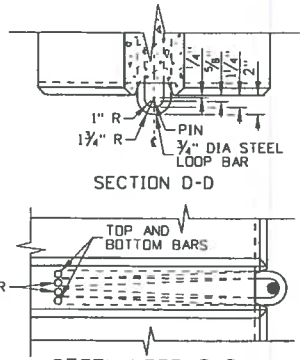


ONE-PIECE CONNECTING PIN

CONNECTING PIN DETAIL
(SEE NOTE NO. 5)

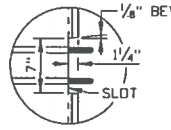


STEEL LOOP BAR DETAIL

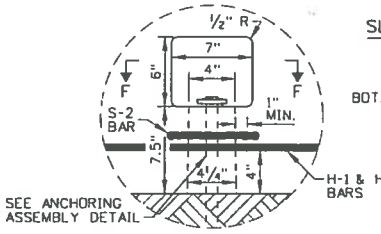


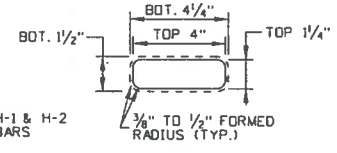
SECTION D-D

STEEL LOOP BAR PLACEMENT DETAIL



SLOT DETAIL





SECTION F-F

ANCHORING SLOT DETAILS
(SEE NOTE NOS. 10 AND 11)

ORIGINAL STORED AT ITD, Headquarters 3311 West State Boise, Idaho

ORIGINAL SIGNED BY: RYAN D LANCASTER DATE ORIGINAL SIGNED: MAY 9, 2013

REVISIONS									
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	6-02	MSM	6	03-13	RDL			
2	7-03	MSM						
3	6-04	MSM						
4	11-04	MSM						
5	9-10	PLR						

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: g2a2_0613.std

DRAWING DATE: APRIL, 2002

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ORIGINAL SIGNED BY: LOREN THOMAS
HIGHWAYS PROGRAM OVERSIGHT ENGINEER

ORIGINAL SIGNED BY: TOM COLE
CHIEF ENGINEER

STANDARD DRAWING

10' CONCRETE BARRIER

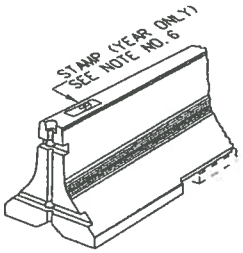
REQUIRES SHEET 2 OF 2

English

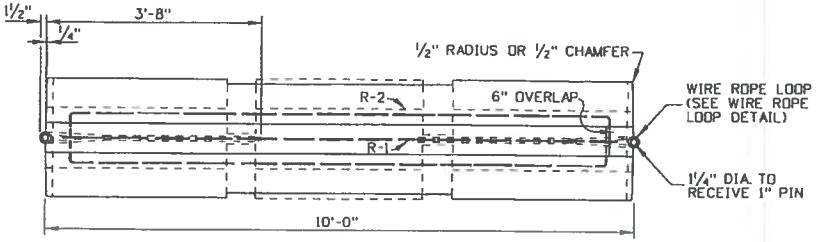
STANDARD DRAWING NO.

G-2-A-2

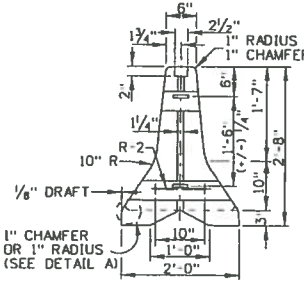
SHEET 1 OF 2



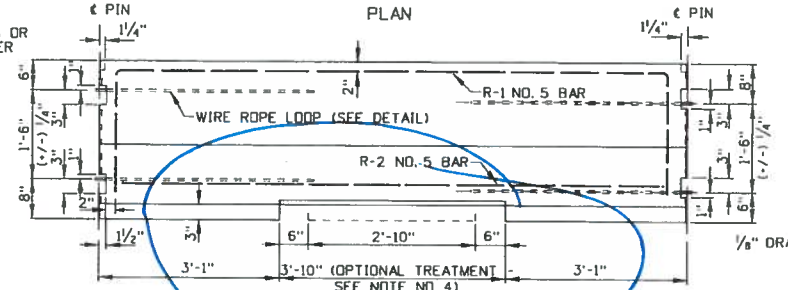
ISOMETRIC VIEW



PLAN

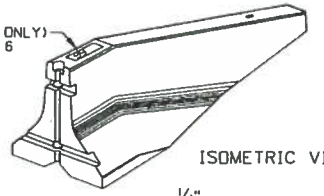


END VIEW

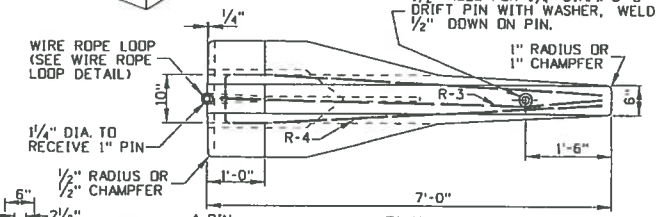


ELEVATION

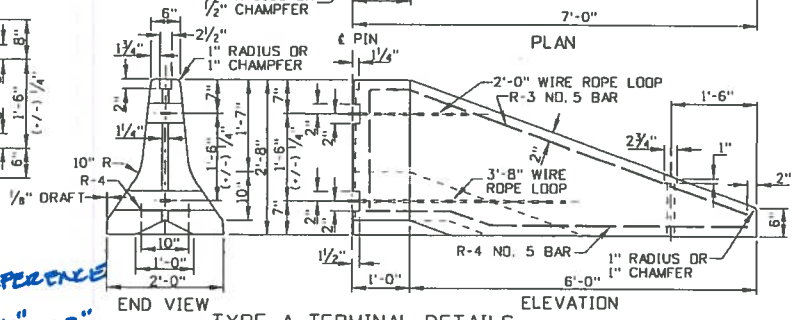
CONCRETE BARRIER DETAILS



ISOMETRIC VIEW



PLAN



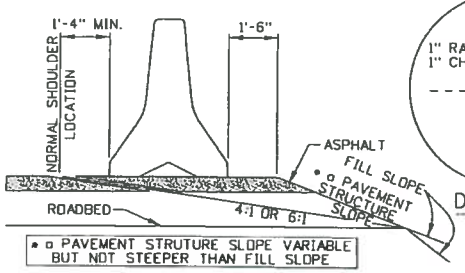
END VIEW

ELEVATION

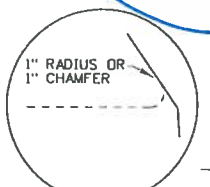
TYPE A TERMINAL DETAILS

FOR REFERENCE
3'-10" x 3"
LARGE SCUPPER
AS STANDARD

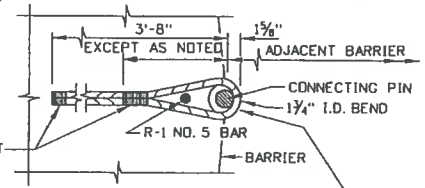
TABLE OF MAXIMUM TAPERS FOR CONCRETE BARRIER	
DESIGN SPEED (MPH)	TAPER
70	20:1
60	17:1
50	14:1
40	11:1



LOCATION OF BARRIER AT SHOULDER

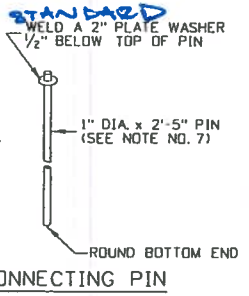


DETAIL A



½" DIA. 6x19 OR 6x25 - IMPROVED PLOW STEEL W/IND. WIRE ROPE
CORE 5•8" DIA. - IMPROVED PLOW STEEL W/IND. FIBER CORE

WIRE ROPE DETAIL



CONNECTING PIN

NOTES

1. THE 10' CONCRETE BARRIER AND TYPE A TERMINAL ARE LIMITED USE ITEMS AND DO NOT MEET NCHRP 350 TL-3 REQUIREMENTS.
2. THE UNIT SHALL BE PRECAST USING CONCRETE CLASS 30. THE MINIMUM CONCRETE COVER OVER REINFORCEMENT STEEL SHALL BE 2".
3. TERMINAL SECTION TYPE A IS A RESTRICTED USE ITEM. WHEN THE BARRIER IS FLARED USE THE "TABLE OF MAXIMUM TAPERS FOR CONCRETE BARRIER".
4. WHEN PREFERRED, THE OPEN BOTTOM PORTION OF THE BARRIER NOTED IN THE ELEVATION VIEW MAY BE FILLED EXCEPT FOR TWO 6" SLOTS WHICH ARE TO BE RETAINED.
5. ALL SECTIONS INCLUDING TERMINALS SHALL BE CLEARLY AND PERMANENTLY STAMPED TO IDENTIFY THE MANUFACTURING COMPANY'S NAME AND THE DATE (YEAR) OF MANUFACTURE. WHEN THE COMPANY HAS MORE THAN ONE PLANT THE STAMP SHALL INDICATE THE SPECIFIC LOCATION OF MANUFACTURE.
6. THE YEAR OF MANUFACTURER SHALL BE SET IN THE TOP OF EACH SECTION. THE STAMP SHALL BE 2" BLOCK LETTERING, ¼" WIDE AND ¼" DEEP.
7. THE STEEL CONNECTOR PIN SHALL CONFORM TO ASTM A 36 REQUIREMENTS.
8. NOT TO SCALE.

REVISIONS										
NO.	DATE	BY	NO.	DATE	BY	NO.	DATE	BY
1	1-86	GB	6	12-92	MSM	11	9-10	PLR
2	8-86	GB	7	9-93	MSM			
3	6-87	GB	8	2-96	MSM			
4	4-89	GB	9	1-00	MSM			
5	1-91	GB	10	12-04	MSM			

SCALES SHOWN ARE FOR 11" X 17" PRINTS ONLY

CADD FILE NAME: g2a_1010.std

DRAWING DATE: NOVEMBER, 1974

IDAHO TRANSPORTATION DEPARTMENT

BOISE IDAHO

ASSISTANT CHIEF ENGINEER (DEVELOPMENT)

CHIEF ENGINEER

STANDARD DRAWING

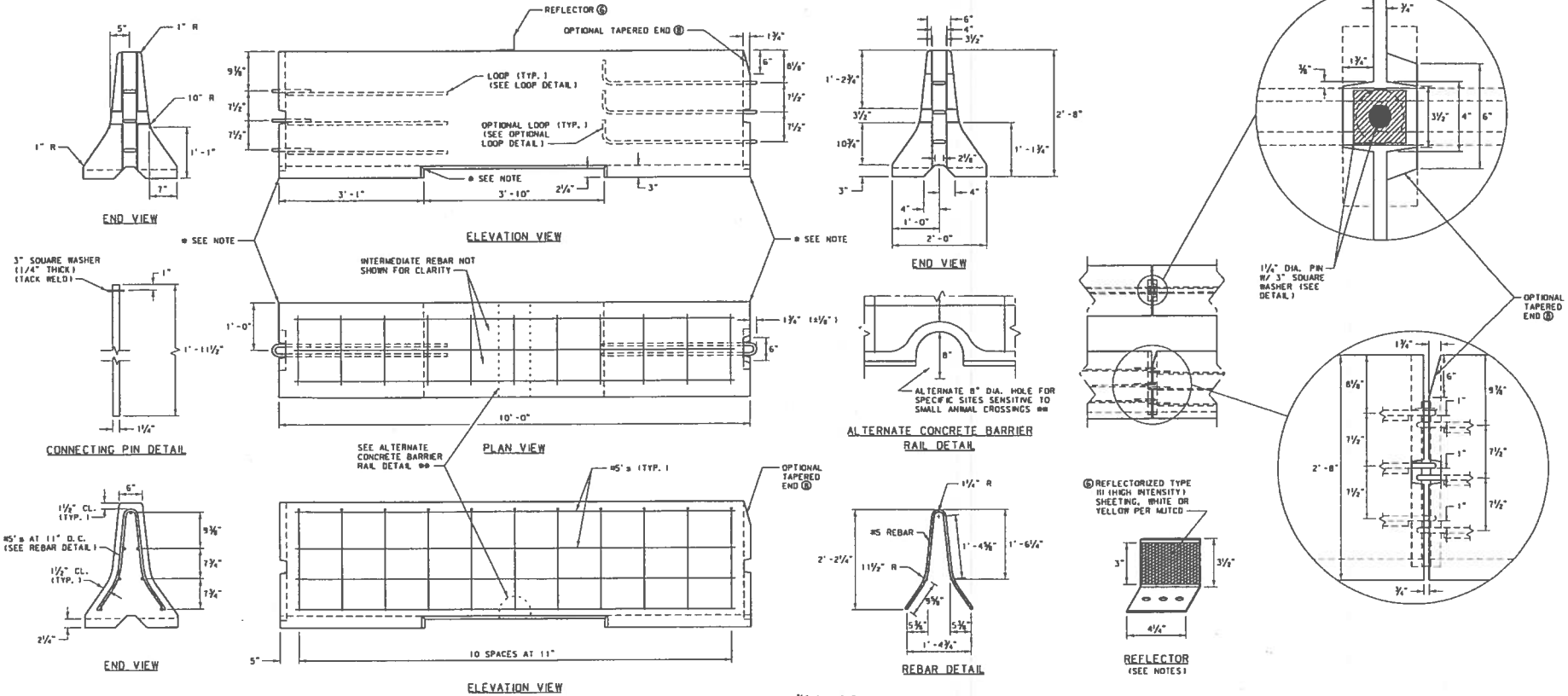
CONCRETE BARRIER & TERMINAL TYPE A

English

STANDARD DRAWING NO. G-2-A

SHEET 1 OF 1

PROFESSIONAL ENGINEER REGISTERED 6506 10/26/2010 STATE OF IDAHO TED E. MASON



LOOP FABRICATION REQUIREMENTS:

1. USE REINFORCING STEEL CONFORMING TO ASTM A 706, GRADE 60 FOR REBAR BEING WELDED TO LOOPS.
2. LOOP ENDS CONSIST OF SMOOTH ROUND BARS CONFORMING TO AASHTO M 270, GRADE 36.
3. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
4. WELD REBAR TO LOOPS USING 1/8" DIA. E8018 ROD. DO NOT TACK WELD THE PIECES TOGETHER PRIOR TO WELDING.
5. USE A CERTIFIED WELDER IN ACCORDANCE WITH THE CURRENT EDITION OF AWS D1.4. DO NOT PLACE THE WELDED ASSEMBLY IN THE FORM UNTIL IT HAS BEEN INSPECTED.
6. NO ADDITIONAL WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.

OPTIONAL LOOP FABRICATION REQUIREMENTS:

1. USE CONTINUOUS SMOOTH ROUND BARS CONFORMING TO AASHTO M 270, GRADE 36 TO FABRICATE THE OPTIONAL LOOPS.
2. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
3. NO WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.

NOTES:

① USE CLASS "DD" CONCRETE OR EQUIVALENT.

② REINFORCING STEEL CONSISTS OF DEFORMED BARS CONFORMING TO AASHTO M 31, GRADE 60.

③ CONNECT EACH 10' SECTION WITH CONNECTING PINS AS DETAILED AND CONFORMING TO AASHTO M 270, GRADE 36 OR BETTER. CONNECTING PINS NEED NOT BE PAINTED.

④ CUTOUTS ON ENDS OF EACH SECTION ARE SHOWN WITH SLIGHT TAPER TO FACILITATE FORM REMOVAL. RECTANGULAR CUTOUTS ARE ACCEPTABLE.

⑤ THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER FIT-UP OF THE PRECAST CONCRETE BARRIER RAIL. ASSEMBLE AND PIN SUFFICIENT NUMBER OF PRECAST SECTIONS IN THE FABRICATORS PLANT TO DETERMINE THAT PROPER FIT-UP CAN BE MAINTAINED ON ALL ROADWAY ALIGNMENT, CURVES AS WELL AS ON TANGENT. THIS IS TO BE DETERMINED EARLY IN FABRICATION.

⑥ ATTACH REFLECTORS TO RAIL EVERY 30'. FOLLOW THE MANUFACTURER'S SPECIFICATIONS FOR ADHESIVE MOUNTING. IN NARROW PAVED (FLUSH) MEDIAN APPLICATIONS, REFLECTORIZE BOTH SIDES.

⑦ DO NOT INSTALL UN-ANCHORED CONCRETE BARRIER RAIL FOR OBSTACLES WITHIN 6.5' OF THE BASE (TRAFFIC SIDE) OF THE RAIL. SEE DTL. DWG. NO. 606-62 FOR CONCRETE BARRIER RAIL ANCHORS.

⑧ THE OPTIONAL TAPERED END SHOWN IS AN ACCEPTABLE ALTERNATE TO THE VERTICAL END FOR ALL CONCRETE BARRIER RAIL ENDS.

* 3/4" CHAMFER ENTIRE OPENING (OR SUFFICIENTLY ROUNDED SO THAT A SMOOTH EDGE RESULTS.) 1/2" CHAMFER IS ACCEPTABLE.

** USE THE ALTERNATE 8" DIA. HOLE IN THIS RAIL ON A CASE-BY-CASE BASIS AS SPECIFIED IN THE PLANS.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 554, 606

DWG. NO. 606-60

CONCRETE BARRIER RAIL

--REVISED-- January 2008

EFFECTIVE: APRIL 2006

MONTANA DEPARTMENT OF TRANSPORTATION