MILLER CONSTRUCTION, INC.

P.O. BOX 86 ASCUTNEY BLVD WINDSOR, VERMONT 05089-0086
TELEPHONE (802) 674-5525 / FAX (802) 674-5245

TRANSMITTAL

TO: Kristin M. Higgins, PE Project Manager Vermont Agency of Transportation	DATE	PROJECT NO.
	12/6/2013	Barnard ER BRF 0241 (39)

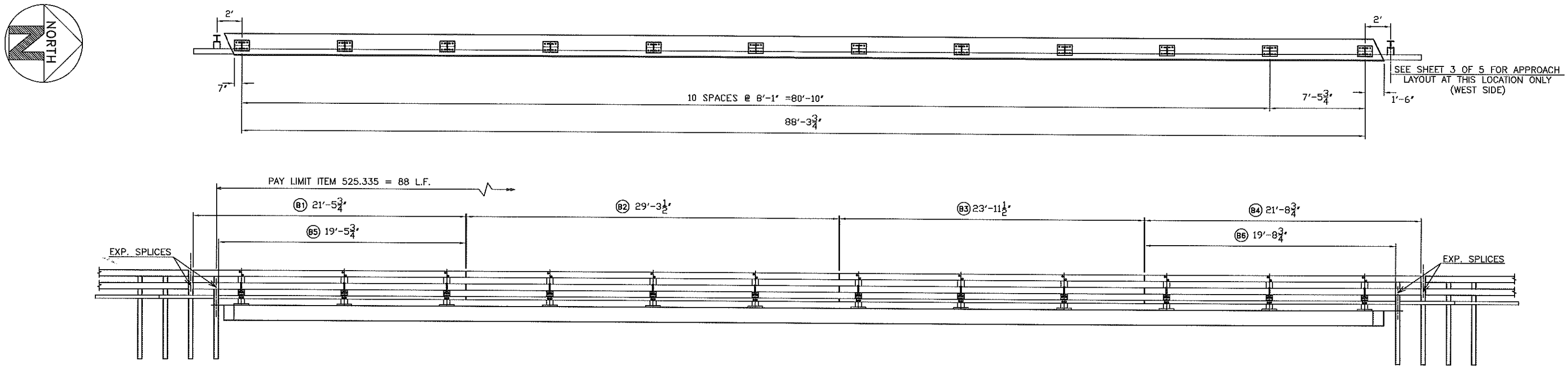
XX WE ENCLOSE THE FOLLOWING: _____ UNDER SEPARATE COVER WE ARE SENDING THE FOLLOWING

COPIES	NUMBER	DESCRIPTION	CODE
1		Rail Box Beam Shop Drawings 1 - 5 Rev 0	H
1		Rail and Post WPS	H

CODE:

A FOR INITIAL APPROVAL
B FOR FINAL APPROVAL
C APPROVED AS NOTED-RESUBMISSION REQUIRED
D APPROVED AS NOTED-RESUBMISSION NOT REQUIRED
E DISAPPROVED-RESUBMIT
F QUOTATION REQUESTED
G APPROVED
H FOR APPROVAL
I AS REQUESTED OR REQUIRED
J FOR USE IN ERECTION
K LETTER FOLLOWS
L FOR FIELD CHECK
M FOR YOUR USE

BY: Paul J. Miller



BRIDGE NO. 25

WEST RAIL ELEVATION

LOOKING AT FACE OF RAIL FROM CENTER OF ROAD
EAST RAIL ELEVATION SIMILAR LOOKING FROM CENTER OF ROAD
ALL APPROACHES TYPICAL EXCEPT AT NW CORNER (SEE SHEET 3 OF 5)

BILL OF MATERIAL – BRIDGE NO. 25 (EAST & WEST SIDE)

Qty	mk	Description	Spec.
24		PED POST W6x25 2'-9.000" OAH (GALV) w/ 1.250" x 10" x 14" B.P	A572 gr 50
12		FIXED SPLICE TUBE (6x6) GALV TS 5x5x5/16 x 2'-3" OAL w/ (3) 1/4" fill plates	A500 gr B
8		EXP SPLICE TUBE (6x6) GALV TS 5x5x5/16 x 3'-0" OAL w/ (3) 1/4" fill plates	A500 gr B
6		FIXED SPLICE BAR (5x3) GALV 2.125 x 4.25 x 27.00"	A500 gr B
4		EXPANSION SPLICE BAR (5x3) GALV 2.25 x 4.25 x 36.00	A500 gr B
24		BRIDGE RAIL SHELF ANGLE (GALV) L 5 x 5 x 5/8 x 6" LONG	A572 gr 50
4	B1	TUBE 6 x 6 x 3/16 x 21 ft - 5.750 in LG (GALV) fixed splice 1 end, exp splice 1 end	A500 gr B
4	B2	TUBE 6 x 6 x 3/16 x 29 ft - 3.500 in LG (GALV) fixed splice both ends	A500 gr B
4	B3	TUBE 6 x 6 x 3/16 x 23 ft - 11.500 in LG (GALV) fixed splice both ends	A500 gr B
4	B4	TUBE 6 x 6 x 3/16 x 21 ft - 8.750 in LG (GALV) fixed splice 1 end, exp splice 1 end	A500 gr B
2	B5	TUBE 5 x 3 x 1/4 x 19 ft - 5.750 in LG (GALV) fixed splice 1 end, exp splice 1 end	A500 gr B
2	B2	TUBE 5 x 3 x 1/4 x 29 ft - 3.500 in LG (GALV) fixed splice both ends	A500 gr B
2	B3	TUBE 5 x 3 x 1/4 x 23 ft - 11.500 in LG (GALV) fixed splice both ends	A500 gr B
2	B6	TUBE 5 x 3 x 1/4 x 19 ft - 8.750 in LG (GALV) fixed splice 1 end, exp splice 1 end	A500 gr B
3		LOWER FLAREBACK TUBE 5 x 3 x 1/4 x 9'-4" oal w/welded cap (GALV) mitered w/exp. slots 1 end	A500 gr B
1		LOWER FLAREBACK TUBE 5 x 3 x 1/4 x 9'-4" oal w/welded cap (GALV) c&w+ mitered w/exp. slots 1 end	A500 gr B
24		ANCHOR PLATE (GALV) PL 3/8" x 10.000" x 14.000"	A36
24		BEARING PAD 1/8" x 10.000" x 14.000"	DURO 80
96		THREADED STUD (2 1/4" THREAD EACH SIDE) 1.000-08 x 13.000 HDG A449	A449
192		NUT HEX HEAVY (2) HI-STRENGTH 1.000-08 GALV	A563 DH
192		WASHER ROUND SMALL (2) F436 1.000 SAE GALV	F436
96		JAM NUT (1) 1.000-08 GALV	A563 DH
112		7/8 x 8 slotted head bolt w/ HN & LW SQW	A449
24		3/4 x 8 hex bolt w/ HN & LW (A325)	A325
48		3/4 x 2.5 hex bolt w/ HN & LW (A325)	A325
40		3/4 x 4.5 hex bolt w/ HN & 2 FW (A325)	A325
80		3/4 x 7.5 hex bolt w/ HN & 2 FW (A325)	A325

ITEM 525.335 3 RAIL BOX BEAM BRIDGE RAILING(EAST & WEST) = 176 L.F.

No.	Remarks	Date
0	Initial submittal	12/5/13

REVISIONS

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860-633-9445

ITEM 525.335 3-RAIL BOX BEAM
TOWN OF BARNARD
COUNTY OF WINDSOR
VT ROUTE 12 – MAJOR COLLECTOR
BRIDGE NO. 25
PROJECT NO. ER BRF 0241(39)

AISC CERTIFIED FABRICATOR

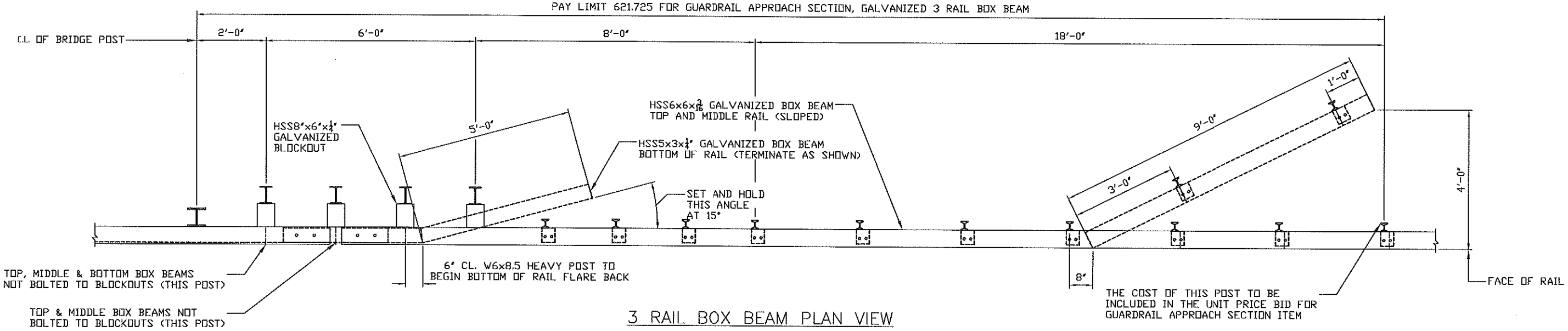
GENERAL CONTRACTOR

SUB CONTRACTOR: LAFAYETTE

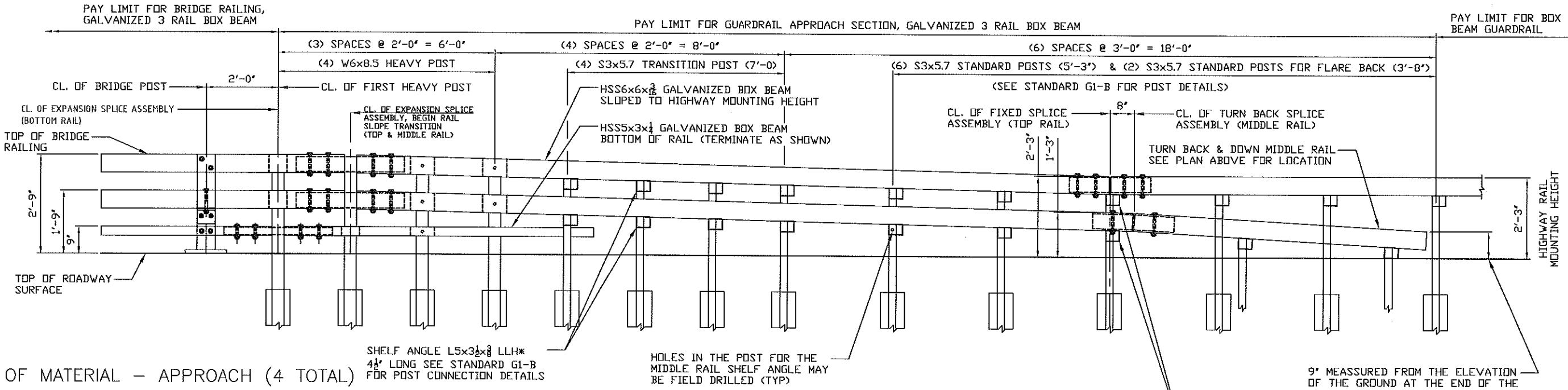
HSC JOB NO.: 1966

SHEET NO.: 1 of 5

DRAWN: RWL | CHECKED | DATE: 11-19-13 | SCALE: NONE | SIZE: D



3 RAIL BOX BEAM PLAN VIEW



3 RAIL BOX BEAM ELEVATION

SE CORNER SHOWN/SW & NE SIMILAR BUT OPPOSITE HAND
SEE SHEET 3 OF 5 FOR LAYOUT OF NW CORNER

BILL OF MATERIAL – APPROACH (4 TOTAL)

Qty	mk	Description	Spec.
4		6 X 6 BM BM TOP @ 20'-9.5" EXP	A500 gr B
4		6 X 6 BM BM BOTT @ 21'-5" EXP	A500 gr B
16		W6 X 8.5 POST @ 7'-0" W/SPADE	A992/A709 GR.50
12		3" I POST @ 7'-0" W/2-8" SPADE	A36
24		3" I POST @ 5'-3" W/SPADE STD	A36
8		3" I POST @ 3'-11" W/SPADE	A36
32		TUBE BLOCKOUT 6" X 8"-6" LONG	A500 gr B
8		TUBE BLOCKOUT 6" X 8"-3" LONG	A500 gr B
4		9' BX BM TRANS FLAREBACK END	A500 gr B
4		5 X 5 DOUBLE BEND SPLICE TUBE	A500 gr B
4		5 X 5 FIXED TUBE SPLICE 27"	A500 gr B
8		5 X 5 EXP TUBE SPLICE 36"	A500 gr B
68		BOX BEAM CLIP ANGLE STD	A36
4		BOX BEAM END ANGLE STD	A36
32		3/4 X 8 CARR BOLT - N FW LW (2 per heavy post)	A307
4		3/4 X 8 HEX BOLT - N 2FW (1 per 9'-0" flareback)	A307
72		1/2 X 1 1/2 HEX BOLT - N FW (1 per shelf / end angle)	A307
80		1/2 X 1 1/2 HEX BOLT - N 2FW LW (2 per tube block)	A307
72		3/8 X 7 1/2 HEX BOLT - N 2FW (1 per shelf angle)	A307
48		3/4 x 7 1/2 HEX BOLT W/ HN & 2 FW (A325) (4 per 6x6 splice)	A325
8		3/4 x 7 1/2 HEX BOLT W/HN & 2 FW & LW (A325) (2 per angled turnback splice)	A325

ITEM 621.725 GUARDRAIL APPR. SECTION 3 RAIL = 4 EA.

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860-633-9445

ITEM 621.725 APPROACH SECTION
TOWN OF BARNARD
COUNTY OF WINDSOR
VT ROUTE 12 – MAJOR COLLECTOR
BRIDGE NO. 25
PROJECT NO. ER BRF 0241(39)

AISC CERTIFIED FABRICATOR

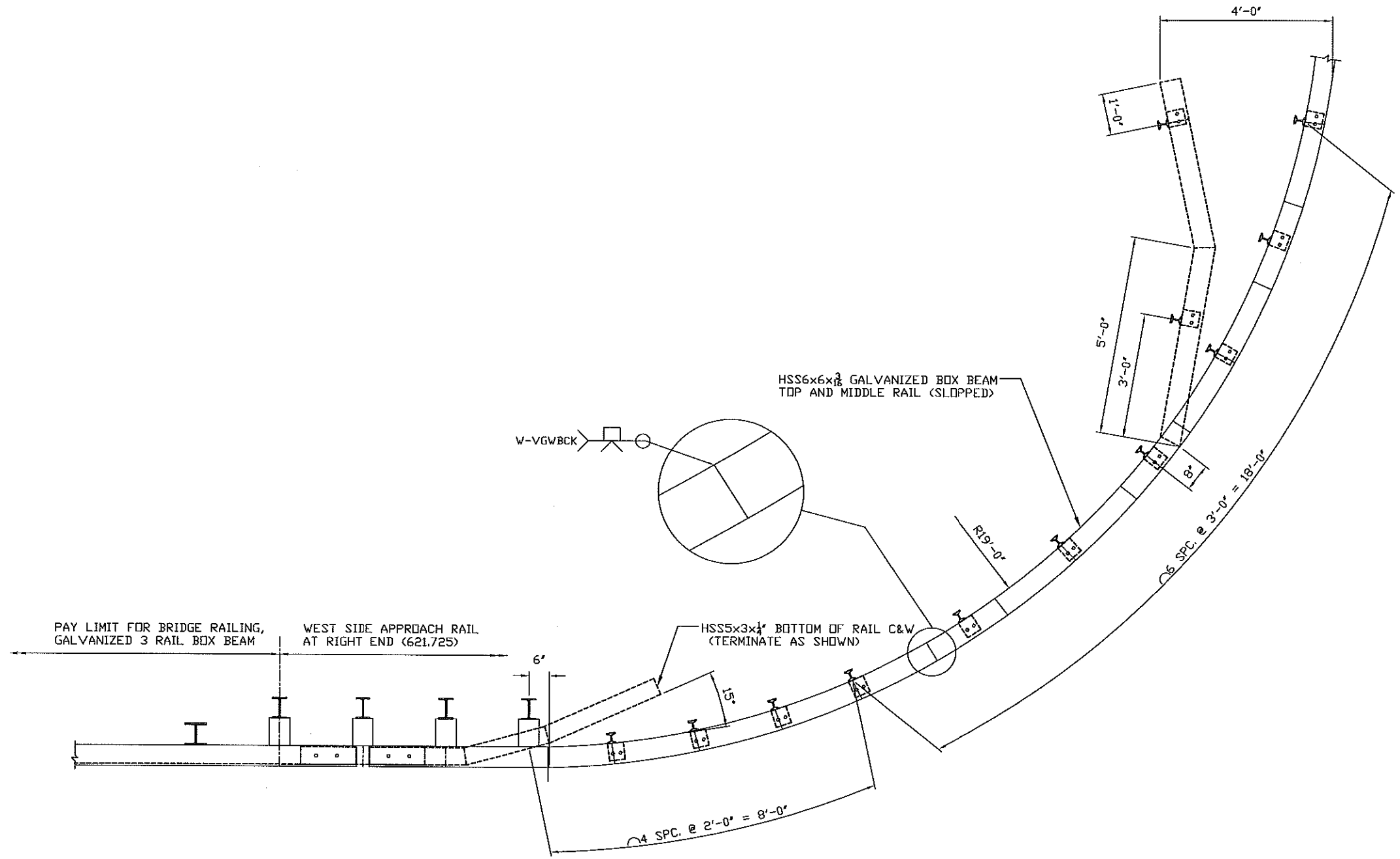
GENERAL CONTRACTOR

HSC JOB NO. 1966

SUB CONTRACTOR LAFAYETTE

SHEET NO. 2 of 5

DRAWN	CHECKED	DATE	SCALE	SIZE
RWL		11-20-13	NONE	D



3 RAIL BOX BEAM PLAN

WEST SIDE APPROACH ONLY (1 LOCATION– NW CORNER)

SEE SHEET 2 OF 4 FOR ADDITIONAL INFORMATION

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860-633-9445

ITEM 621.725 APPROACH SECTION
TOWN OF BARNARD
COUNTY OF WINDSOR
VT ROUTE 12 – MAJOR COLLECTOR
BRIDGE NO. 25
PROJECT NO. ER BRF 0241(39)

AISC CERTIFIED FABRICATOR

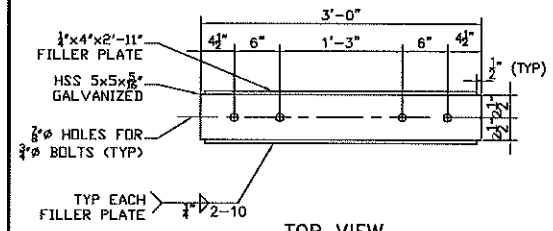
GENERAL CONTRACTOR

SUB CONTRACTOR: LAFAYETTE

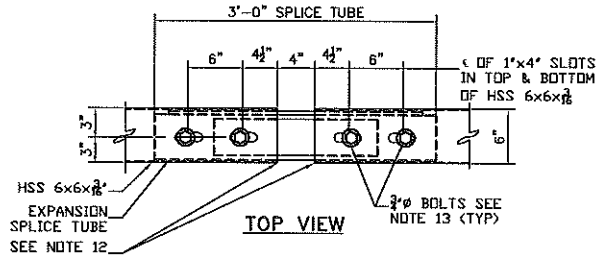
HSC JOB NO. 1966

SHEET NO. 3 of 5

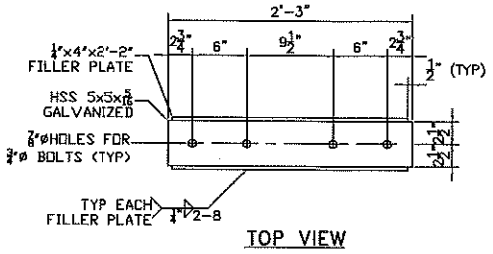
DRAWN	CHECKED	DATE	SCALE	SIZE
RWL		11-20-13	NONE	D



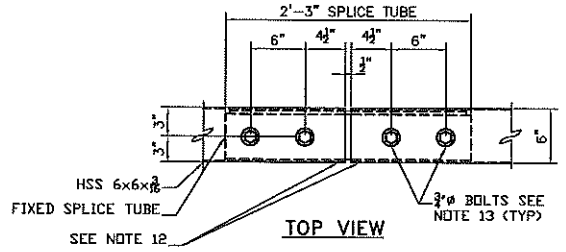
TOP VIEW



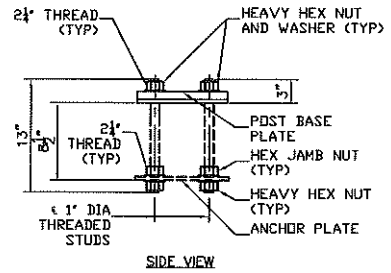
TOP VIEW



TOP VIEW

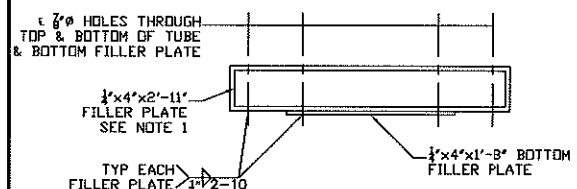


TOP VIEW



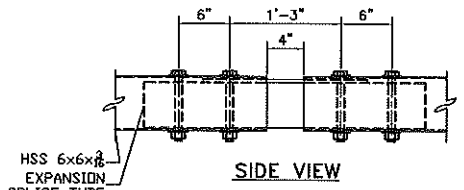
SIDE VIEW

RAILING POST ANCHORAGE



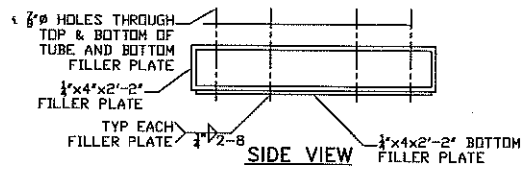
SIDE VIEW

EXPANSION SPLICE TUBE



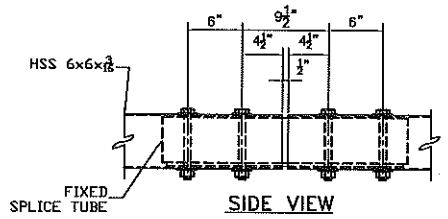
SIDE VIEW

EXPANSION SPLICE TUBE ASSEMBLY



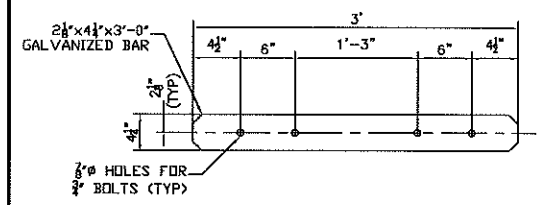
SIDE VIEW

FIXED SPLICE TUBE

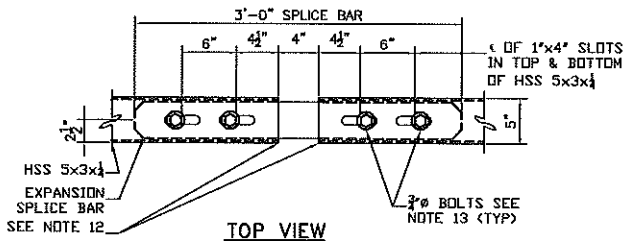


SIDE VIEW

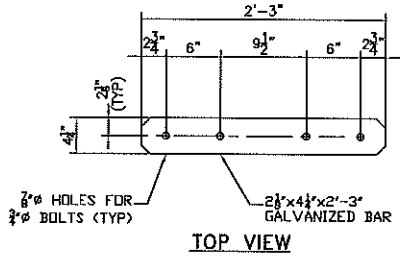
FIXED SPLICE ASSEMBLY



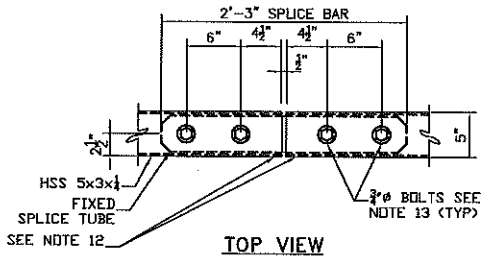
TOP VIEW



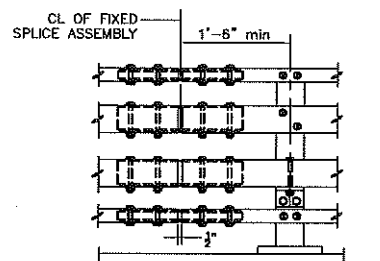
TOP VIEW



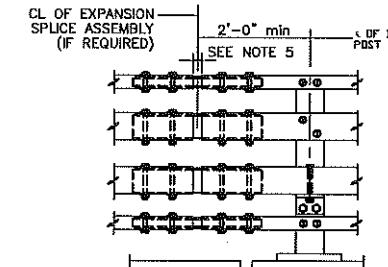
TOP VIEW



TOP VIEW



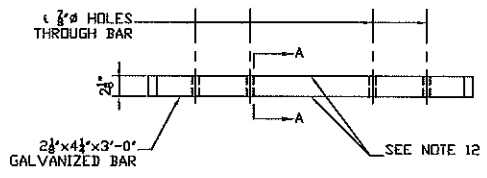
FIXED SPLICE



EXPANSION SPLICE

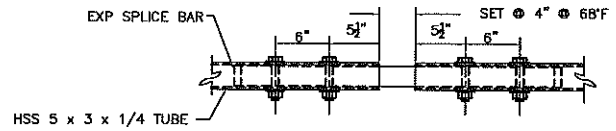
RAILING SPLICE DETAIL ELEVATION

A RAILING EXPANSION SPLICE IS REQUIRED IN ANY POST SPACING THAT CONTAINS A SUPERSTRUCTURE EXPANSION JOINT.



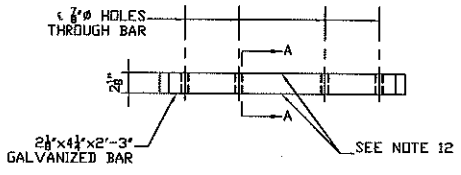
SIDE VIEW

EXPANSION SPLICE BAR



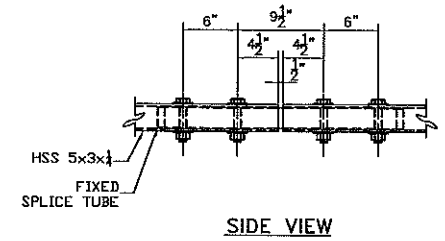
SIDE VIEW

EXPANSION SPLICE ASSEMBLY



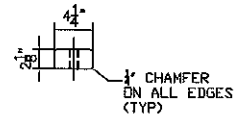
SIDE VIEW

FIXED SPLICE BAR



SIDE VIEW

FIXED SPLICE ASSEMBLY



SECTION A-A

NOTES:

1. ALL WORK AND MATERIALS SHALL CONFORM TO SECTION 525.
2. PRIOR TO GALVANIZING THE ASSEMBLED POST, GRIND ALL EDGES TOA MINIMUM RADIUS OF $\frac{1}{16}$".
3. ALL POSTS SHALL BE SET NORMAL TO GRADE. THE MAXIMUM CENTER TO CENTER SPACING OF BRIDGE RAIL POSTS IS 8'-3".
4. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO BRIDGE POST AND PREFERABLY TO AT LEAST 4 POSTS.
5. RAIL TUBE EXPANSION JOINTS SHALL BE PROVIDED IN ANY RAIL BAY SPANNING THE END OF AN INTEGRAL ABUTMENT BRIDGE AND AT ALL SUPERSTUCTURE EXPANSION JOINTS. EXPANSION JOINT WIDTH SHALL BE 4" @ 68'F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
6. HOLES IN RAILS FOR TUBE ATTACHMENT MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO INSTALLATION.
7. BOLTS SHALL BE TORQUED SNUG TIGHT (APPROXIMATELY 100 FT-LB).
8. SEE STANDARD DRAWING G-1B FOR DETAILS OF DELINEARTORS. A DELINEATOR SHALL BE INSTALLED AT 30 FOOT SPACING FOR THE NEAREST POST. WHITE IS TO BE INSTALLED ON THE DRIVER'S RIGHT. FOR ONE WAY BRIDGES, YELLOW IS TO BE INSTALLED ON TEH DRIVER'S LEFT. PAYMENT SHALL BE INCIDENTAL TO OTHER ITEMS.
9. ANY BENDING OF RAIL SHALL BE DONE AT THE FABRICATION PLANT ACCORDING TOA PROCEDURE PROVIDED BY THE FABRICATOR.
10. THE MIMIMUM DISTANCE FROM THE POST TO AN EXPANSION JOINT SHALL BE DETERMINED BY THE MINIMUM EDGE DISTANCE OF 5" FROM ANY ANCHORS STUD TO THE END OF THE SLAB, OR TO THE EXPANSION JOINT RECESS POUR, IF ONE IS USED.
11. THIS RAILING MEETS THE REQUIREMENTS FOR A TL-4 SERVICE LEVEL.

NOTES:

12. PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE BOX BEAM RAILS, SPLICE TUBES AND FILL PLATES.
13. FOUR (4) $\frac{7}{8}$" DIAMETER BOLTS, 7½" LONG WITH TWO (2) WASHERS AND HEAVY HEX NUT ON EACH BOLT. NUT TO BE FINGER TIGHT AND THE FIRST THREAD BELOW THE NUT TO BE BURRED TO PREVENT DISLODGING. FOUR (4) BOLTS AT EACH SPLICE.

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860-633-9445

BRIDGE RAIL DETAILS 525.335 & 621.725
TOWN OF BARNARD, COUNTY OF WINDSOR
VT ROUTE 12 - MAJOR COLLECTOR
BRIDGE NO. 25
PROJECT NO. ER BRF 0241(39)

AISC CERTIFIED FABRICATOR

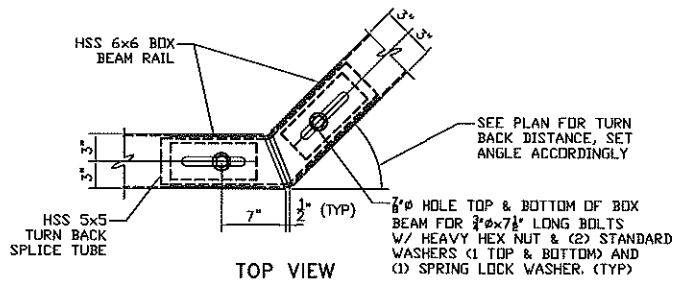
HSC JOB NO. 1966

SHEET NO. 4 of 5

GENERAL CONTRACTOR

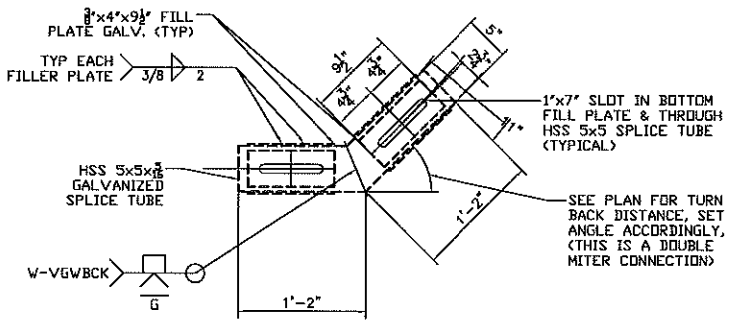
SUB CONTRACTOR LAFAYETTE

DRAWN	CHECKED	DATE	SCALE	SIZE
RWL		11/20/13	NONE	D

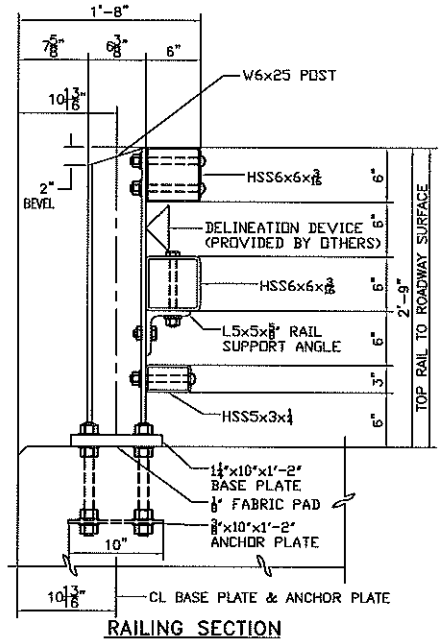


TOP VIEW

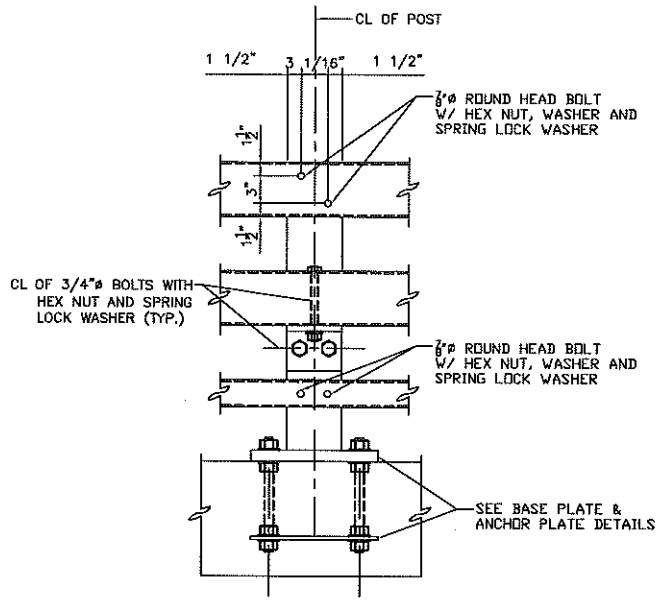
TURN BACK SPLICE TUBE ASSEMBLY



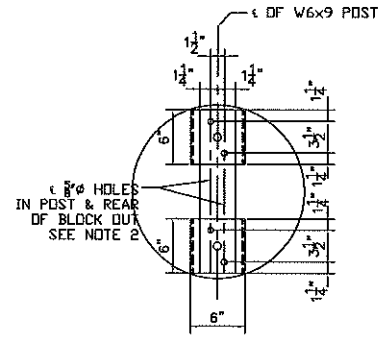
TOP VIEW

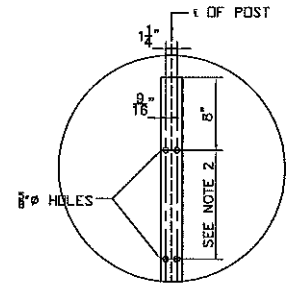


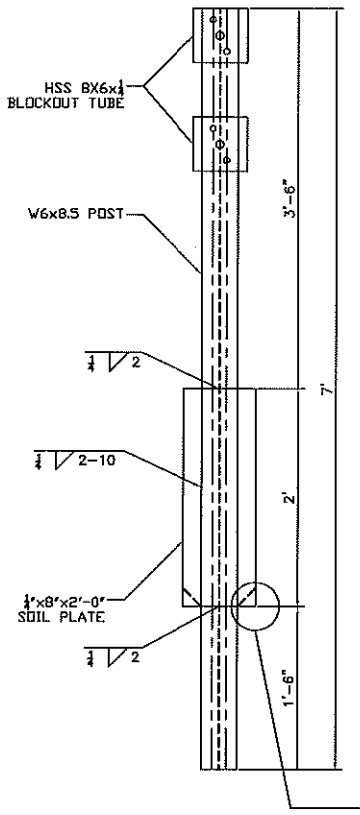
RAILING SECTION



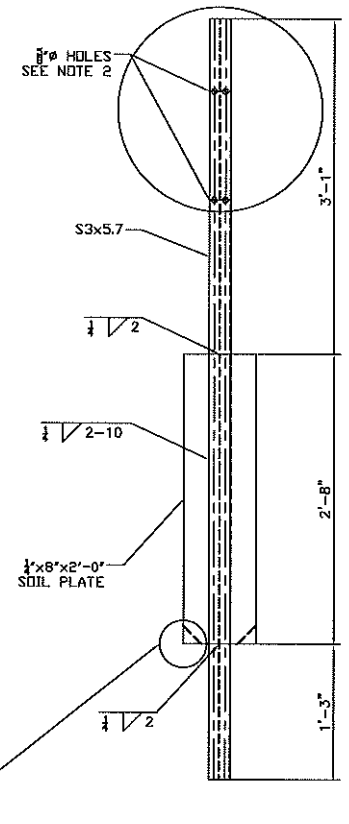
RAILING ELEVATION





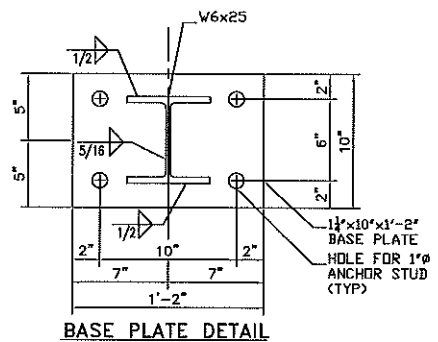


HEAVY POST DETAIL

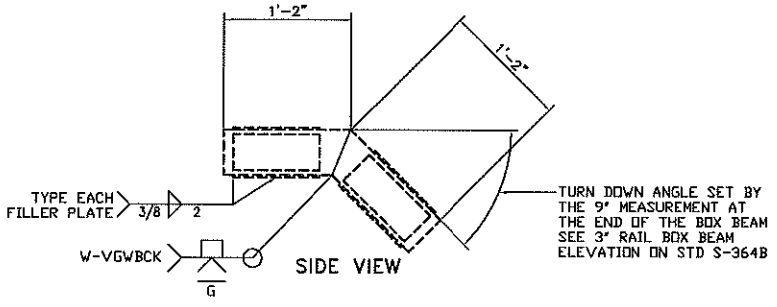


TRANSITION POST DETAIL 7'-0"

ROUND HEAD BOLT DETAIL

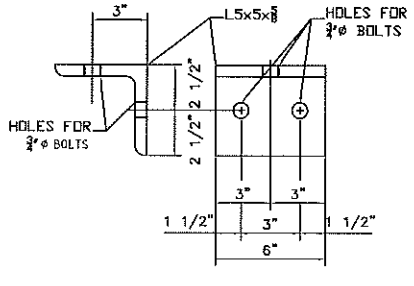


BASE PLATE DETAIL



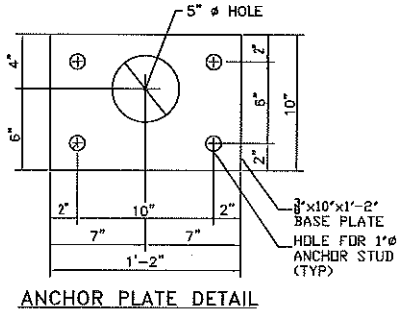
TURN BACK SPLICE TUBE DETAIL

TURN BACK & TURN TUBE JOINT

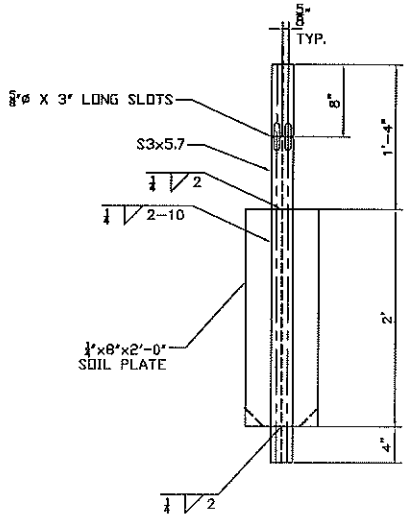


RAILING ANGLE DETAIL

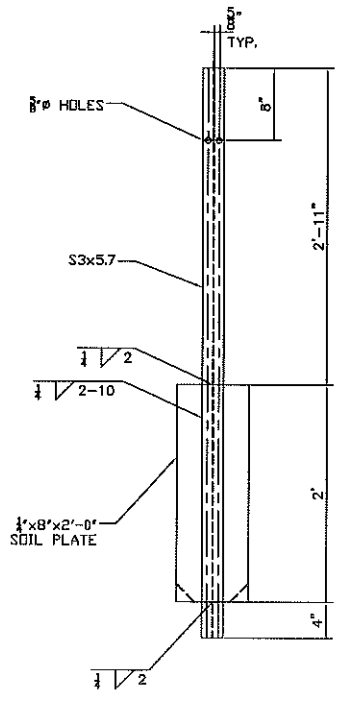
L 5 x 5 x 5/8



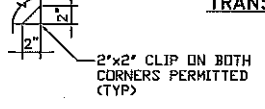
ANCHOR PLATE DETAIL



TRANSITION POST DETAIL 3'-8"



TRANSITION POST DETAIL 5'-3"



SEE ALL NOTES ON SHEET 4 OF 5 FOR ADDITONAL INFORMATION

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860-633-9445

BRIDGE RAIL DETAILS 525.335 & 621.725
TOWN OF BARNARD, COUNTY OF WINDSOR
VT ROUTE 12 – MAJOR COLLECTOR
BRIDGE NO. 25
PROJECT NO. ER BRF 0241(39)

CERTIFIED FABRICATOR

GENERAL CONTRACTOR

SUB CONTRACTOR: LAFAYETTE

HSC JOB NO. 1966

SHEET NO. 5 of 5

DRAWN	CHECKED	DATE	SCALE	SIZE
RWL		11/20/13	NONE	D

Highway Safety Corporation

Glastonbury, CT

Welding Procedure Specification

Material specification **ASTM A500 gr B**

Welding process **Gas Metal Arc Welding (GMAW)**

Manual, semi-automatic, or automatic **Semi-Automatic**

Position of welding **Flat (1F) or Horizontal (2F)**

Filler metal specification **AWS A5.18**

Filler metal classification **ER70S-6**

Electrode and manufacturer **Lincoln Electric Lincoln Weld L-56**

Flux and manufacturer **N/A**

Shielding gas **86% Argon / 14% CO2** Flow rate **35-45 CFM**

Single or multiple pass **Single**

Single or multiple arc **Single**

Welding current **DCEP**

Polarity **Reverse - electrode positive**

Welding progression **Stringers**

Root treatment **clean base metal**

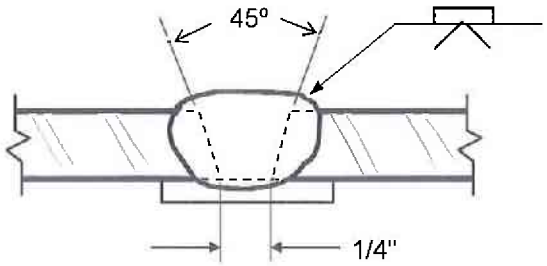
Preheat and interpass temperature **base metal up to 3/4" (50°F)**

Postheat treatment **None**

Electrode extension **3/4" ± 1/4"**

WELDING PROCEDURE

Weld size	Pass no.	Electrode size	Welding parameters		Travel speed	Joint detail
			Amperes	Volts		
	1	0.063"	300 A ± 30	29 V ± 2	15 ipm ± 2	B-U2a-GF



This procedure may vary due to fabrication sequence, fit-up, pass size, etc. within the limitation of variables given in section 5 of latest edition AWS D1.1

WPS no. **W-VGwBCK**

Revision no. **0**

Supporting PQR no. **Pre-Qualified**

Project Name **Barnard, Vermont**

Fabricator **Highway Safety Corporation**

Prepared By: **Paul Radice**

Date **12/5/13**

Project Number **ER BRF 0241 (39)**

Paul A Radice
CWI 98070221
QC1 EXP. 7/1/2018

Highway Safety Corporation

Glastonbury, CT

Welding Procedure Specification

Material specification: **ASTM A36, A709 Gr 36, A500 gr B, A709 gr 50, A572 gr 50, A992**

Welding process: **Gas Metal Arc Welding (GMAW) Spray Transfer**

Manual, semi-automatic, or automatic: **Semi-Automatic**

Position of welding: **Flat (1F) or Horizontal (2F)**

Filler metal specification: **AWS A5.18**

Filler metal classification: **ER70S-6**

Electrode and manufacturer: **Lincoln Electric Lincoln Weld L-56**

Flux and manufacturer: **N/A**

Shielding gas: **86% Argon / 14% CO2** Flow rate: **35-45 CFM**

Single or multiple pass: **Single or Multiple**

Single or multiple arc: **Single**

Welding current: **DCEP**

Polarity: **Reverse - electrode positive**

Welding progression: **Stringers**

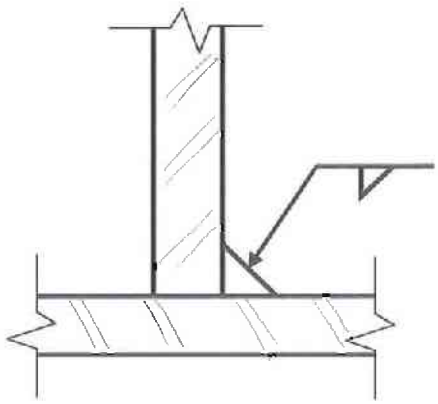
Root treatment: **clean base metal**

Preheat and interpass temperature: **base metal up to 3/4" (50°F) ; over 3/4 thru 1-1/2" (150°F) : over 1-1/2" thru 2-1/2" (225°F)**

Postheat treatment: **None**

Electrode extension: **3/4" ± 1/4"**

WELDING PROCEDURE

Weld size	Pass no.	Electrode size	Welding parameters		Travel speed	Joint detail
			Amperes	Volts		
1/4"	1	0.062"	300 A ± 30	29 V ± 2	15 ipm ± 2	TYPICAL ALL FILLET WELDS 

This procedure may vary due to fabrication sequence, fit-up, pass size, etc. within the limitation of variables given in section 5 of latest edition AWS D1.1 / D1.5

WPS no. **W-1966**

Revision no. **0**

Supporting PQR no. **Pre-Qualified**

Project Name **Barnard, Vermont**

Fabricator **Highway Safety Corporation**

Prepared By: **Paul Radice**

Date **12/5/13**

Project Number **ER BRF 0241 (39)**

Paul A Radice
WI 98070221
QCT EXP. 7/1/2016

Highway Safety Corporation

Glastonbury, CT

Welding Procedure Specification

Material specification: **A572 gr 50, A709 Gr 50**

Welding process: **Gas Metal Arc Welding (GMAW) Spray Transfer**

Manual, semi-automatic, or automatic: **Semi-Automatic**

Position of welding: **Flat (1F) or Horizontal (2F)**

Filler metal specification: **AWS A5.18**

Filler metal classification: **ER70S-6**

Electrode and manufacturer: **Lincoln Electric Lincoln Weld L-56**

Flux and manufacturer: **N/A**

Shielding gas: **86% Argon / 14% CO2** Flow rate: **35-45 CFM**

Single or multiple pass: **Single or Multiple**

Single or multiple arc: **Single**

Welding current: **DCEP**

Polarity: **Reverse - electrode positive**

Welding progression: **Stringers**

Root treatment: **clean base metal**

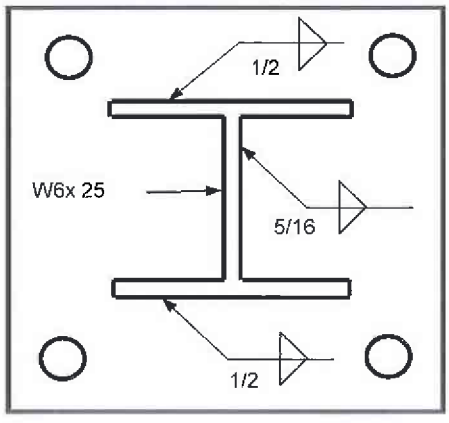
Preheat and interpass temperature: **base metal up to 3/4" (50°F) ; over 3/4 thru 1-1/2" (150°F) : over 1-1/2" thru 2-1/2" (225°F)**

Postheat treatment: **None**

Electrode extension: **3/4" ± 1/4"**

WELDING PROCEDURE

Weld size	Pass no.	Electrode size	Welding parameters		Travel speed	Joint detail
			Amperes	Volts		
5/16"	1	0.062"	300 A ± 30	29 V ± 2	15 ipm ± 2	
1/2"	1 & 2	0.062"	↓	↓	15 ipm ± 2	



This procedure may vary due to fabrication sequence, fit-up, pass size, etc. within the limitation of variables given in section 5 of latest edition AWS D1.5

WPS no. **W-VTPEDPOST2**

Revision no. **0**

Supporting PQR no. **Pre-Qualified**

Project Name **Barnard, Vermont**

Fabricator **Highway Safety Corporation**

Prepared By: **Paul Radice**

Date **12/5/13**

Project Number **ER BRF 0241 (39)**

Paul A Radice CWI 98070221 QC1 EXP. 7/1/2016