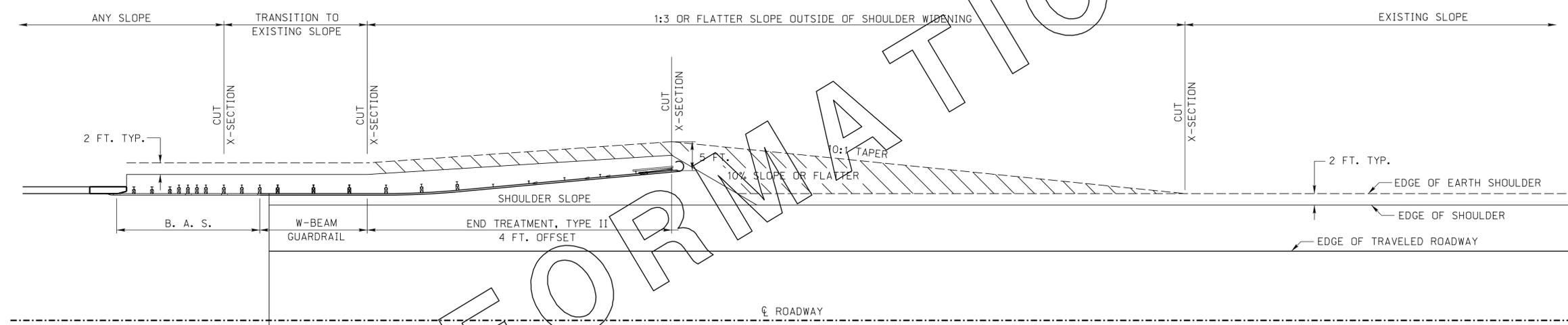


GRADING FOR GUARDRAIL END TREATMENT, TYPE I  
FOR 3R PROJECTS

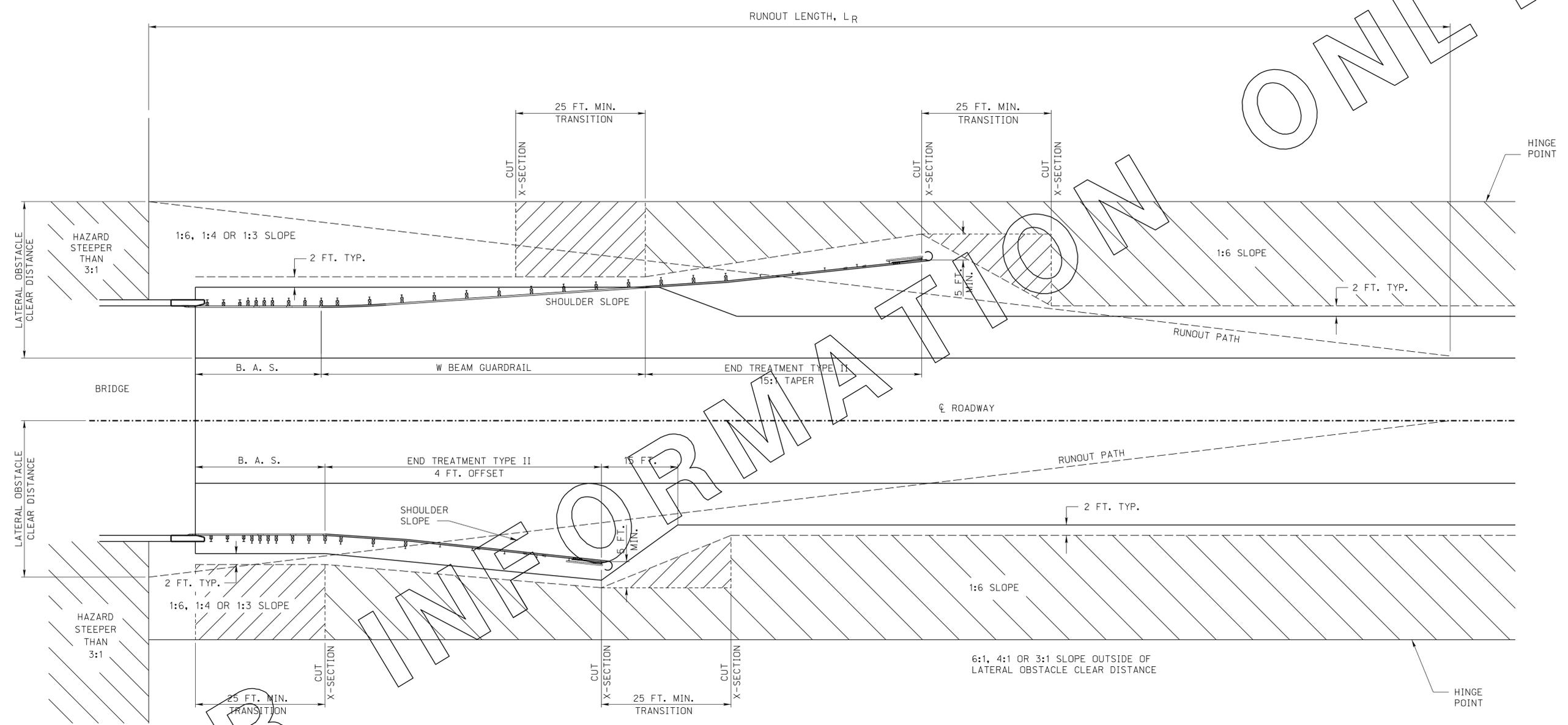


GRADING FOR GUARDRAIL END TREATMENT, TYPE II  
FOR 3R PROJECTS

FOR INFORMATION ONLY

ROADWAY DESIGN DIVISION  
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 User: dcr13017  
 Date: 18-APR-2016 08:33  
 File: 17006e03.dgn  
 Scale: 1:100  
 SHEET 1 OF 1

File: 17106e03.dgn  
 Scale: 1:100  
 SHEET TOP  
 Date: 18-APR-2016 08:33  
 User: dcr13017  
 Computer: DRDESIGN147  
 ROADWAY DESIGN DIVISION



FOR INFORMATION ONLY

**EARTHWORK FOR GUARDRAIL END TREATMENT, TYPE II**  
 (NEW & RECONSTRUCTED PROJECTS)

NOTE: SLOPES ARE H:V

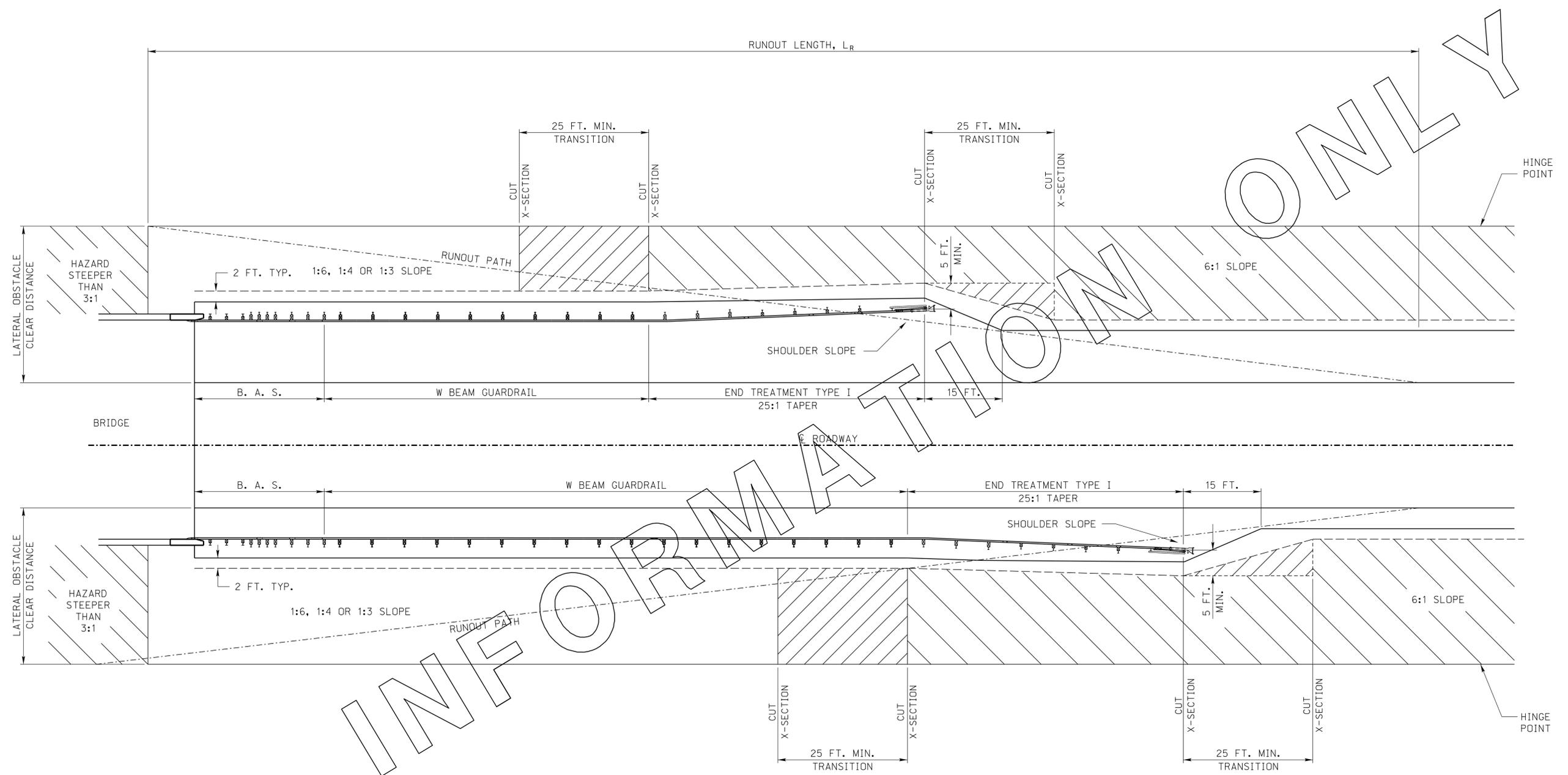
ROADWAY DESIGN DIVISION

Computer: DRDESIGN147

User: ddr13017

Date: 18-APR-2016 08:33

File: 17116e01.dgn  
Scale: 1:100  
SHEET 1 OF 1



EARTHWORK FOR GUARDRAIL END TREATMENT, TYPE I  
(NEW & RECONSTRUCTED PROJECTS)

NOTE: SLOPES ARE V:H

ROADWAY DESIGN DIVISION

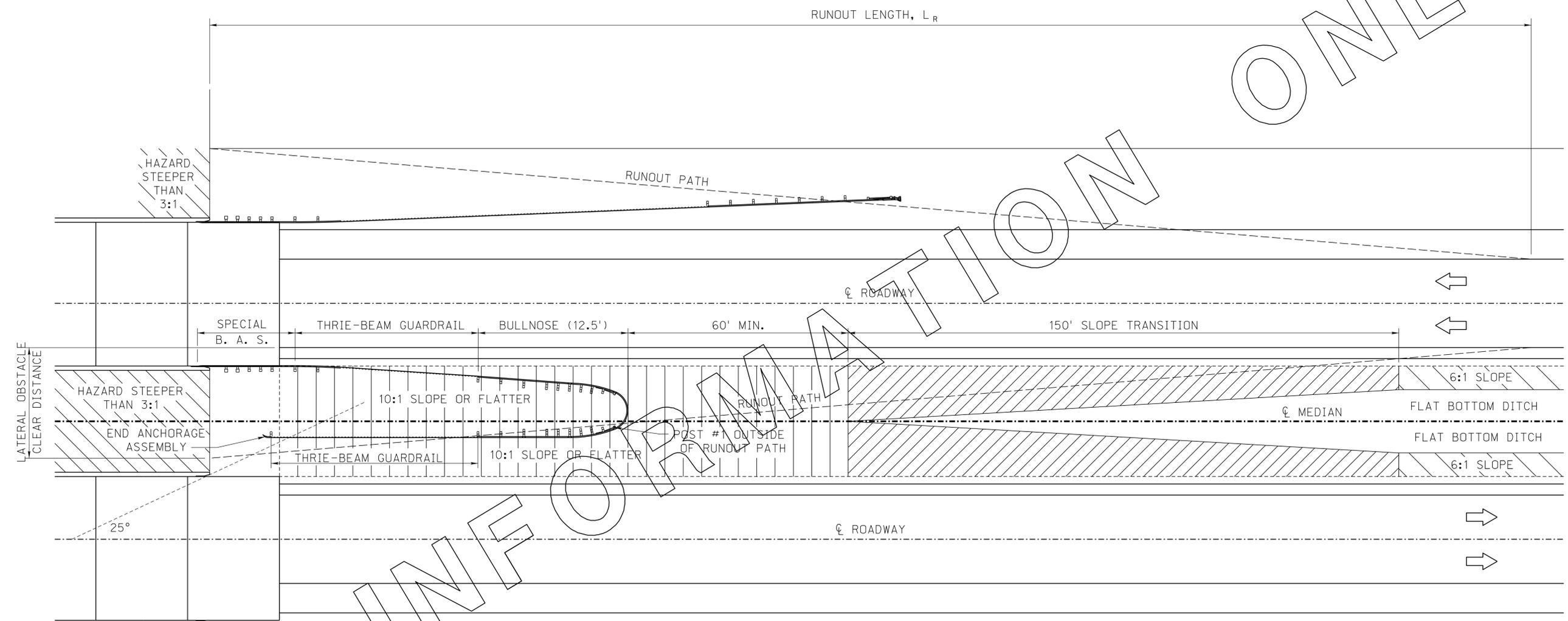
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User: ddr13017

Date: 18-APR-2016 08:33

File: 17126e00.dgn  
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SHEET 1 OF 1

ONLY



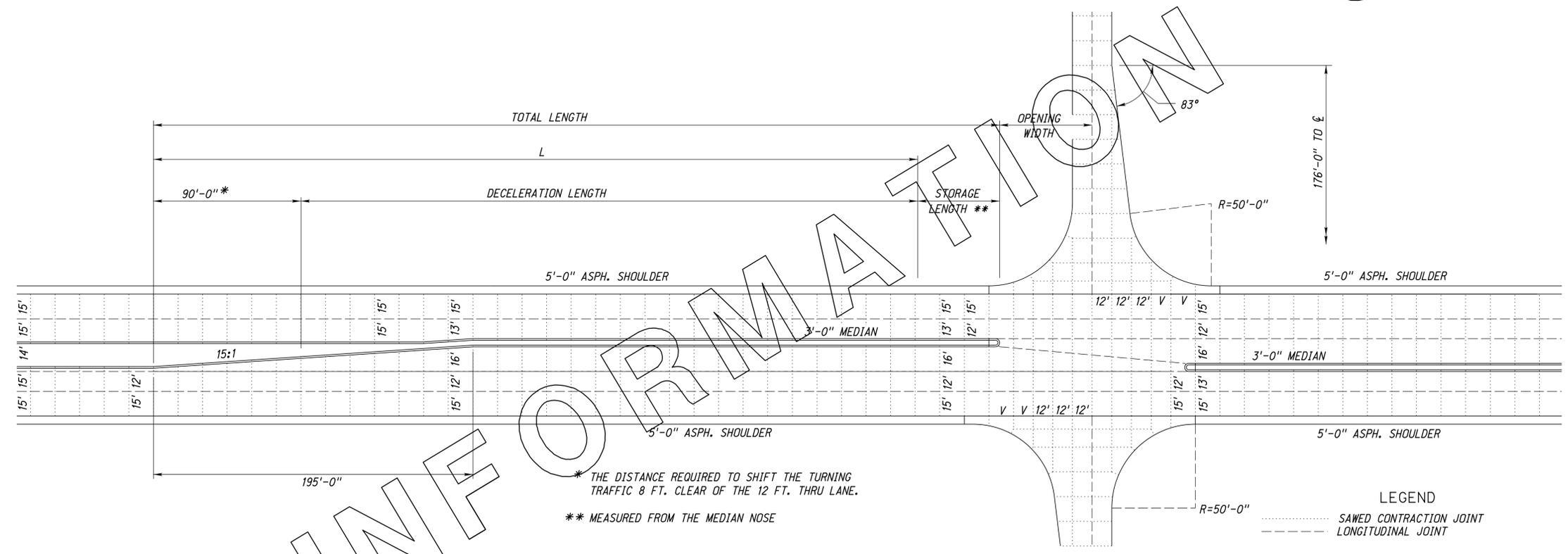
# EARTHWORK FOR BULLNOSE GUARDRAIL ON NEW AND RECONSTRUCTED PROJECTS

NOTE: SLOPES ARE H:V

FOR INFORMATION ONLY

MINIMUM MEDIAN VALUES		
	HIGH-SPEED 4 IN. CURB	LOW-SPEED 6 IN. CURB
DESIGN VEHICLE	WB-62	WB-62
L	410 FT. ①	240 FT. ②
STORAGE LENGTH	③	③
OPENING WIDTH	56 FT. ④	56 FT. ④
TOTAL LENGTH	⑤	⑤

- ① INCLUDES A DECELERATION LENGTH OF 290 FT. BASED ON A SPEED REDUCTION IN THE TURN LANE OF 55 MPH (SEE "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS"). THIS LENGTH ASSUMES A 10 MPH SPEED REDUCTION IN THE THRU LANE.
- ② INCLUDES A DECELERATION LENGTH OF 120 FT. BASED ON A SPEED REDUCTION IN THE TURN LANE OF 35 MPH (SEE "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS"). THIS LENGTH ASSUMES A 10 MPH SPEED REDUCTION IN THE THRU LANE.
- ③ THE MINIMUM STORAGE LENGTH SHOULD BE 50 FT. (PROVIDING STORAGE FOR TWO CARS AT 25 FT./CAR) OR 100 FT. IF THE PERCENTAGE OF TRUCKS EXCEEDS 10% (PROVIDING STORAGE FOR ONE CAR AT 25 FT./CAR AND ONE TRUCK AT 75 FT./TRUCK).
- ④ BASED ON THE GIVEN DESIGN VEHICLE AND A TWO-LANE ROADWAY INTERSECTING AT A 90° ANGLE. THE OPENING WIDTH AND INTERSECTION GEOMETRY SHALL BE DETERMINED BASED ON THE ACTUAL APPROACH ROAD GEOMETRICS AND DESIGN VEHICLE USED.
- ⑤ THE TRAFFIC ENGINEERING DIVISION SHALL BE CONSULTED FOR THE REQUIRED TOTAL LENGTH IF IT IS ANTICIPATED THAT THE INTERSECTION WILL BE SIGNALIZED IN THE NEAR FUTURE. THE TRAFFIC ENGINEERING SHOULD BE CONSULTED FOR THE TOTAL LENGTH IF THE MAINLINE TRAFFIC VOLUME IS OVER 9000 ADT, IF THE OPPOSING PEAK HOUR VOLUME IS OVER 500, AND/OR IF THE PEAK HOUR TURNING TRAFFIC VOLUME IS 100 VPH OR GREATER. TRAFFIC ENGINEERING SHOULD ALSO BE CONSULTED FOR THE TOTAL LENGTH AT COMMERCIAL DRIVEWAYS.



TYPICAL JOINT LAYOUT  
**MEDIAN BREAK FOR A 14 FT. RAISED MEDIAN**

**NOTES:**

16'-6" TRANSVERSE JOINT SPACING IS THE STANDARD SPACING REGARDLESS OF THE PAVEMENT THICKNESS.

V VARIES FROM 10'-0" TO MAXIMUM 16'-6".

VARIABLE SPACING IS USED AROUND INTERSECTIONS AND LARGE DRIVEWAYS WHICH ARE TIED TO THE CONCRETE LANES OR SHOULDERS TO MATCH THE JOINTS.

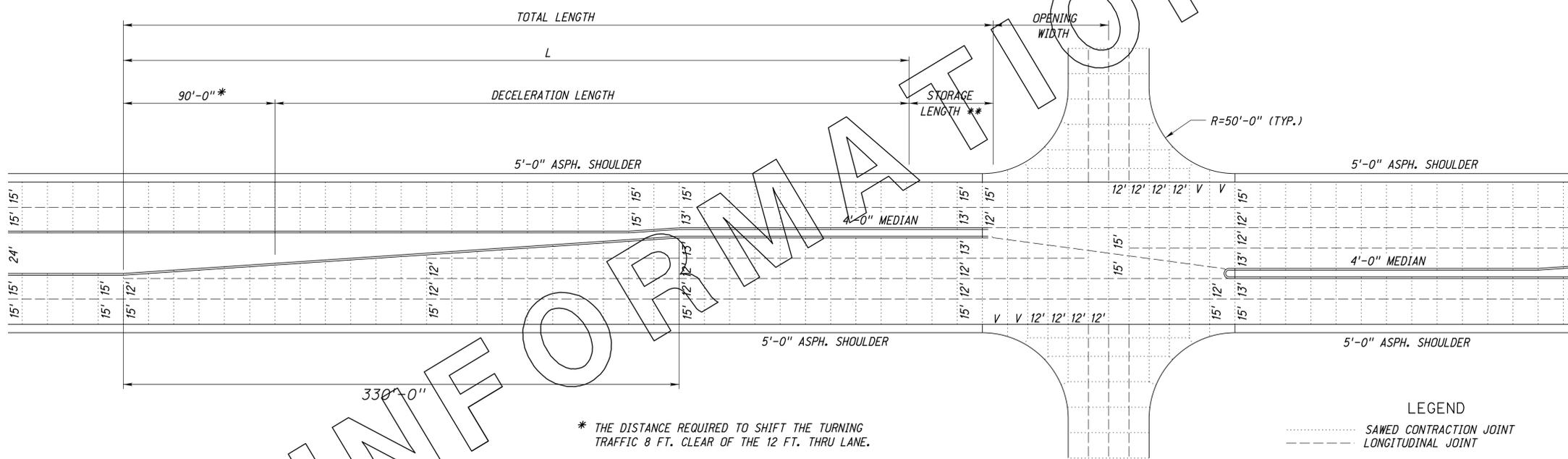
FOR DETAILS NOT SHOWN, SEE STANDARD PLAN 329.

File: 32906e00.dgn  
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 Date: 18-APR-2016 08:33  
 User: ddr13017  
 Computer: DRDESIGN147  
 ROADWAY DESIGN DIVISION

FOR INFORMATION ONLY

MINIMUM MEDIAN VALUES		
	HIGH-SPEED 4 IN. CURB	LOW-SPEED 6 IN. CURB
DESIGN VEHICLE	WB-62	WB-62
L	410 FT. ①	240 FT. ②
STORAGE LENGTH	③	③
OPENING WIDTH	56 FT. ④	56 FT. ④
TOTAL LENGTH	⑤	⑤

- ① INCLUDES A DECELERATION LENGTH OF 290 FT. BASED ON A SPEED REDUCTION IN THE TURN LANE OF 55 MPH (SEE "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS"). THIS LENGTH ASSUMES A 10 MPH SPEED REDUCTION IN THE THRU LANE.
- ② INCLUDES A DECELERATION LENGTH OF 120 FT. BASED ON A SPEED REDUCTION IN THE TURN LANE OF 35 MPH (SEE "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS"). THIS LENGTH ASSUMES A 10 MPH SPEED REDUCTION IN THE THRU LANE.
- ③ THE MINIMUM STORAGE LENGTH SHOULD BE 50 FT. (PROVIDING STORAGE FOR TWO CARS AT 25 FT./CAR) OR 100 FT. IF THE PERCENTAGE OF TRUCKS EXCEEDS 10% (PROVIDING STORAGE FOR ONE CAR AT 25 FT./CAR AND ONE TRUCK AT 75 FT./TRUCK).
- ④ BASED ON THE GIVEN DESIGN VEHICLE AND A TWO-LANE ROADWAY INTERSECTING AT A 90° ANGLE. THE OPENING WIDTH AND INTERSECTION GEOMETRY SHALL BE DETERMINED BASED ON THE ACTUAL APPROACH ROAD CONDITIONS AND DESIGN VEHICLE USED.
- ⑤ THE TRAFFIC ENGINEERING DIVISION SHALL BE CONSULTED FOR THE REQUIRED TOTAL LENGTH.



TYPICAL JOINT LAYOUT  
MEDIAN BREAK FOR A 24 FT. RAISED MEDIAN, DUAL LEFT-TURN LANES

LEGEND  
 ..... SAWED CONTRACTION JOINT  
 - - - - - LONGITUDINAL JOINT

NOTES:  
 16'-6" TRANSVERSE JOINT SPACING IS THE STANDARD SPACING REGARDLESS OF THE PAVEMENT THICKNESS.  
 V VARIES FROM 10'-0" TO MAX. 16'-6".  
 VARIABLE SPACING IS USED AROUND INTERSECTIONS AND LARGE DRIVEWAYS WHICH ARE TIED TO THE CONCRETE LANES OR SHOULDERS TO MATCH THE JOINTS.  
 FOR DETAILS NOT SHOWN, SEE STANDARD PLAN 329.

ROADWAY DESIGN DIVISION

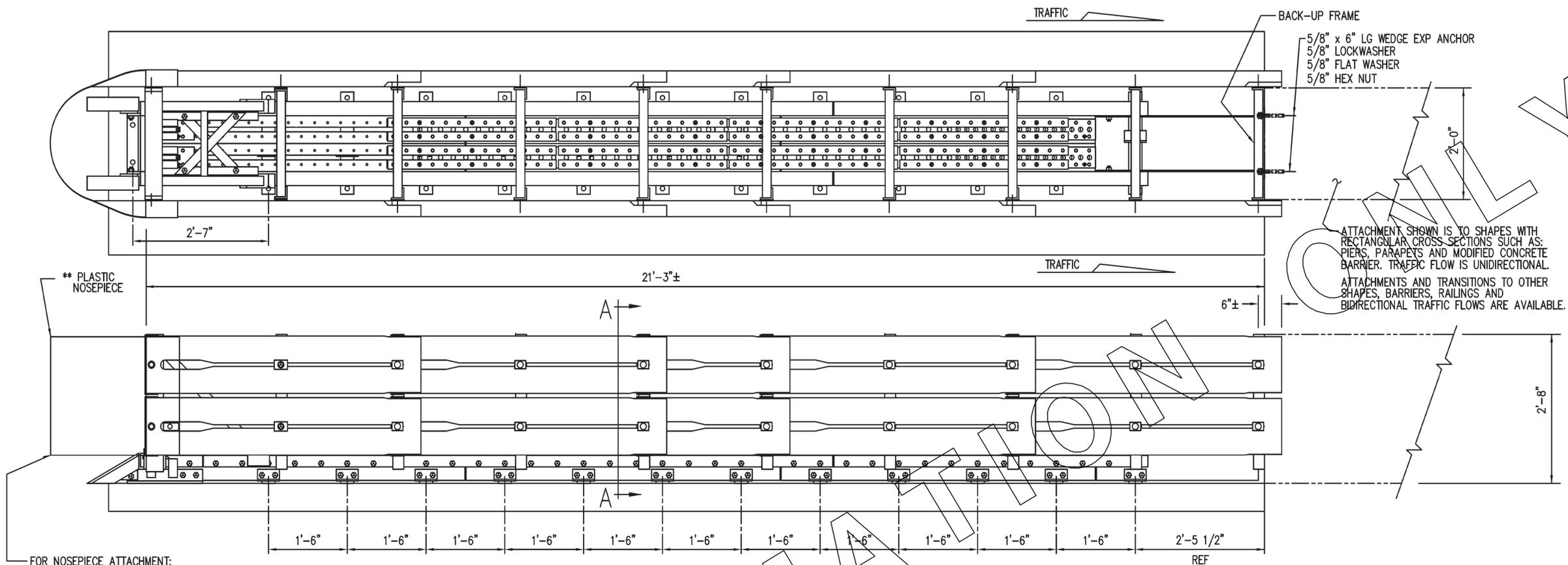
Computer: DRDESIGN147

User: ddr13017

Date: 18-APR-2016 08:33

File: 32906e00.dgn  
 SHEET 2 OF 2

FOR INFORMATION ONLY



TRACC BILL OF MATERIAL		
PART NUMBER	QTY	DESCRIPTION
25980A	1	TRACC UNIT (FULLY ASSEMBLED)
3310G	4	5/8" LOCKWASHER
4451G	4	5/8" x 6" WEDGE EXP ANCHOR
6825B	4	REFLECTIVE TAPE
6532B	1	PLASTIC NOSEPIECE

\*\* ANCHOR HARDWARE (FULL CONCRETE BASE)

5204G	26	5/8" x 7 1/16" ANCHOR STUD
3310G	26	5/8" LOCKWASHER
3361G	26	5/8" HEX NUT
3300G	26	5/8" FLAT WASHER
★ 5206B	3	ADHESIVE HIT HY 150(CARTRIDGE)

\*\* ANCHOR HARDWARE (ASPHALT BASE)

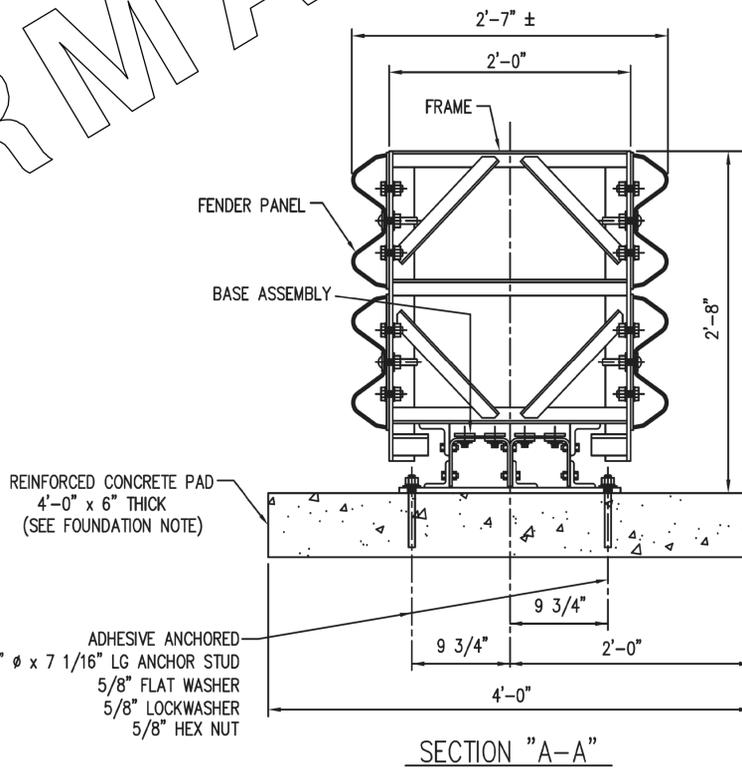
6380G	26	5/8" x 18" ALL THD ROD
3310G	26	5/8" LOCKWASHER
3361G	26	5/8" HEX NUT
3300G	26	5/8" FLAT WASHER
★ 5206B	5	ADHESIVE HIT HY 150(CARTRIDGE)

\*\* SEE PRODUCT MANUAL

★ EACH CARTRIDGE INCLUDES 1 EACH: MIXER HY 150 CARTRIDGE (NOZZLE)  
FILLER HIT HY 150 (FILLER TUBE)

EACH TRACC UNIT SHIPS 100 % ASSEMBLED  
(PLASTIC NOSE INSTALLED AFTER PLACEMENT)

OPTIONAL TRACC ANCHOR ITEMS	
PART NUMBER	DESCRIPTION
5205B	ADHESIVE DISPENSER
5207B	MIXER HIT HY150 (NOZZLE)
5208B	FILLER HIT HY150 (FILLER TUBE)
5209B	BIT TE-C+ 11/16-18 (11/16" Ø BIT)



**FOUNDATION NOTE:**

6" REINFORCED CONCRETE PAD IS SHOWN  
OTHER OPTIONS ARE :

- a) 8" THICK MINIMUM UNREINFORCED CONCRETE
- b) 8" MINIMUM THICK ASPHALT
- c) 3" THICK (MIN) ASPHALT OVER 3" (MIN) CONCRETE
- d) 6" THICK ASPHALT OVER 6" COMPACTED SUBBASE.

REV.	CHK'D	BY	DATE	REMARKS

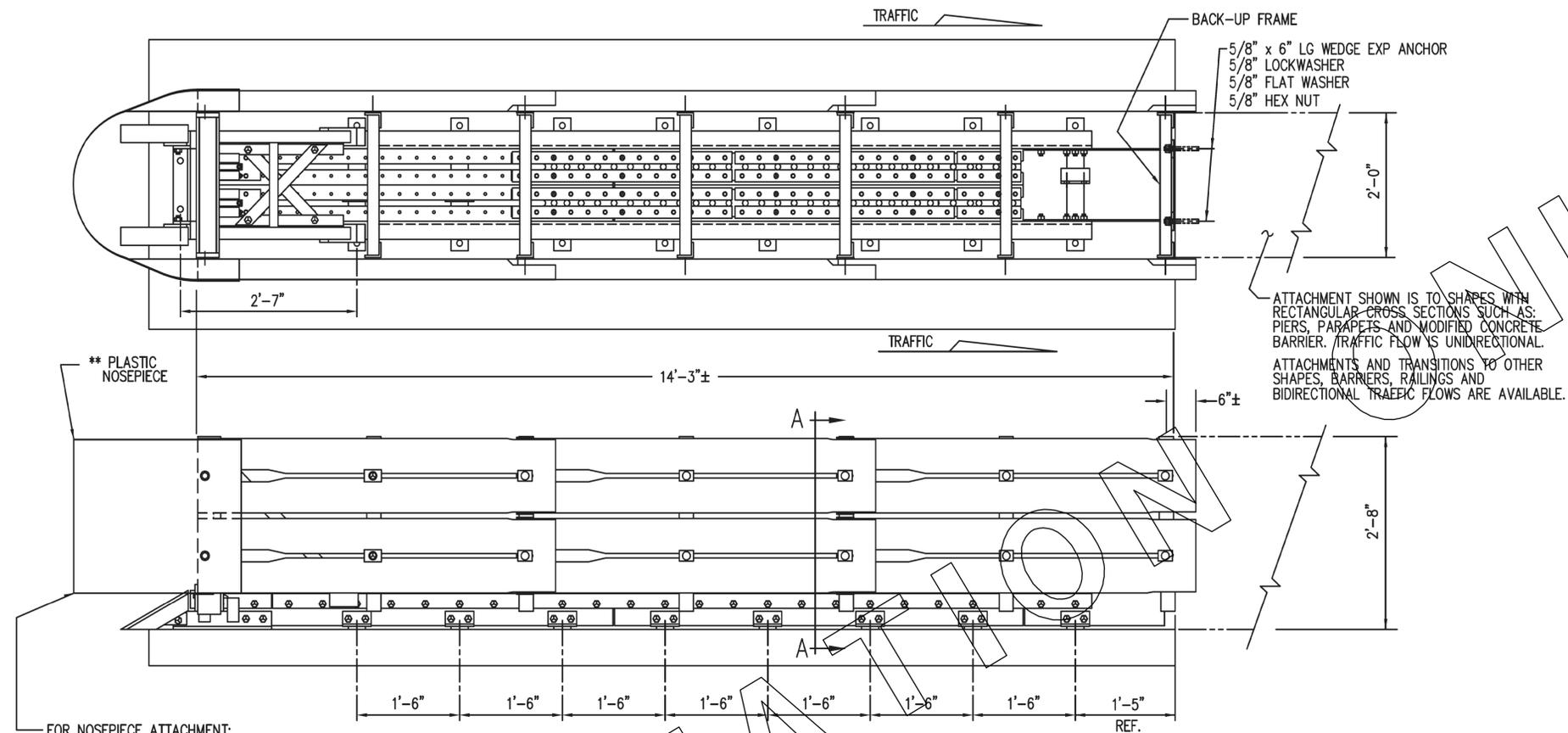
**TRACC**

**TRACC**  
CRASH-CUSHION ATTENUATING TERMINAL  
PLAN, ELEVATION & SECTIONS  
(UNIDIRECTIONAL, DIRECT ATTACHMENT)

DRAWN	BT/LH
CHECKED	B.T.
APPROVED	
DATE	04/25/05
ENG. FILE #	SS1003-01E
SHT.No.	E1 OF 1
DRAWING NO.	SS 1003
REV.	0

TRINITY INDUSTRIES, INC.  
HIGHWAY SAFETY PRODUCTS  
2525 STEMMONS FREEWAY, DALLAS, TX 75207

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FOR NOSEPIECE ATTACHMENT:  
REMOVE EXISTING 5/8" Ø BOLTS (4 TOTAL)  
AND RE-INSERT THROUGH NOSEPIECE.

TRACC BILL OF MATERIAL

PART NUMBER	QTY	DESCRIPTION
25997A	1	TRACC UNIT (FULLY ASSEMBLED)
3310G	4	5/8" LOCKWASHER
4451G	4	5/8" x 6" WEDGE EXP ANCHOR
6825B	4	REFLECTIVE TAPE
6532B	1	PLASTIC NOSEPIECE
** ANCHOR HARDWARE (FULL CONCRETE BASE)		
5204G	18	5/8" x 7 1/16" ANCHOR STUD
3310G	18	5/8" LOCKWASHER
3361G	18	5/8" HEX NUT
3300G	18	5/8" FLAT WASHER
★ 5206B	2	ADHESIVE HIT HY 150(CARTRIDGE)
** ANCHOR HARDWARE (ASPHALT BASE)		
6380G	18	5/8" x 18" ALL THD ROD
3310G	18	5/8" LOCKWASHER
3361G	18	5/8" HEX NUT
3300G	18	5/8" FLAT WASHER
★ 5206B	4	ADHESIVE HIT HY 150(CARTRIDGE)

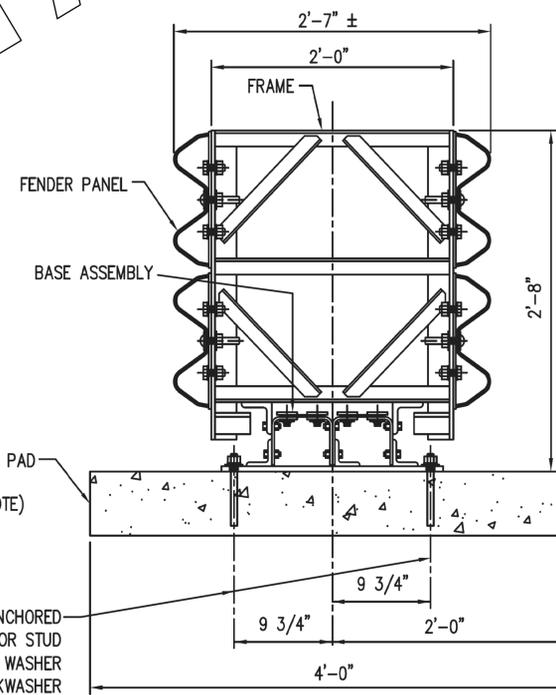
EACH TRACC UNIT SHIPS 100 % ASSEMBLED  
(PLASTIC NOSE INSTALLED AFTER PLACEMENT)

OPTIONAL TRACC ANCHOR ITEMS

PART NUMBER	DESCRIPTION
5205B	ADHESIVE DISPENSER
5207B	MIXER HIT HY150 (NOZZLE)
5208B	FILLER HIT HY150 (FILLER TUBE)
5209B	BIT TE-C+ 11/16-18 (11/16" Ø BIT)

\*\* SEE PRODUCT MANUAL

★ EACH CARTRIDGE INCLUDES 1 EACH: MIXER HY 150 CARTRIDGE (NOZZLE)  
FILLER HIT HY 150 (FILLER TUBE)



FOUNDATION NOTE:

6" REINFORCED CONCRETE PAD IS SHOWN  
OTHER OPTIONS ARE :

- a) 8" THICK MINIMUM UNREINFORCED CONCRETE
- b) 8" MINIMUM THICK ASPHALT
- c) 3" THICK (MIN) ASPHALT OVER 3" (MIN) CONCRETE
- d) 6" THICK ASPHALT OVER 6" COMPACTED SUBBASE.

REV.	CHK'D	BY	DATE	REMARKS

**TRACC**

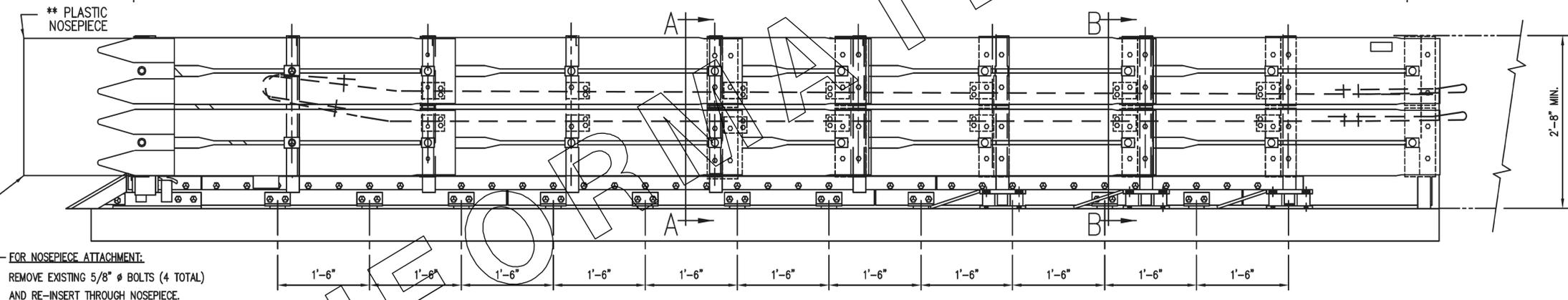
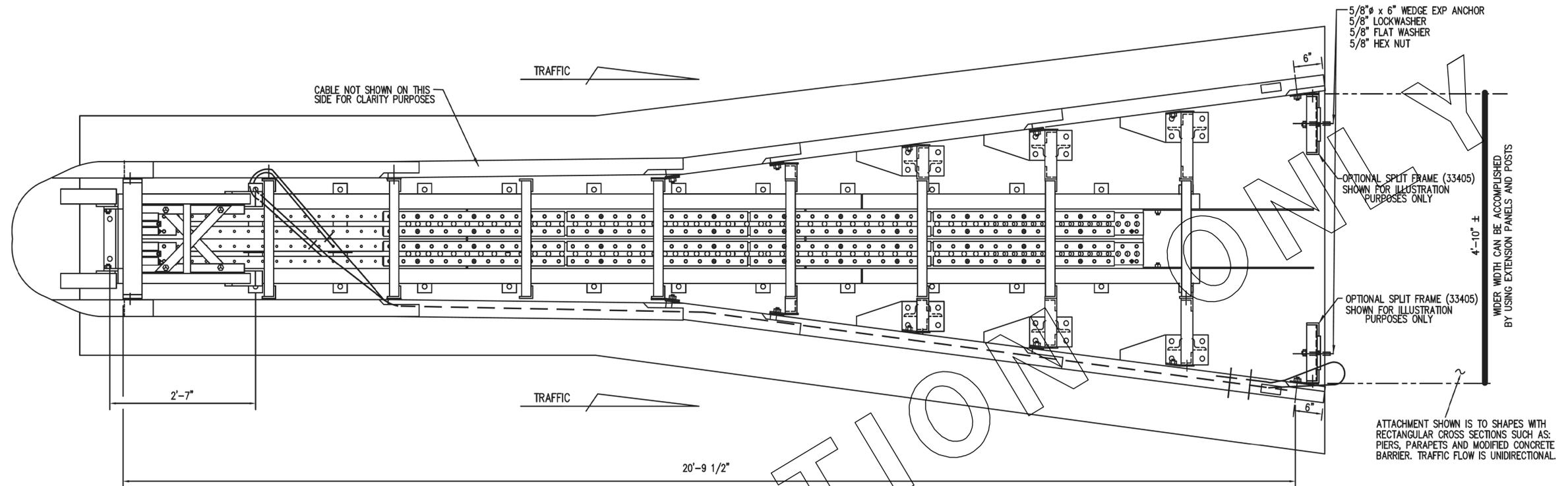
**SHORTRACC**  
CRASH-CUSHION ATTENUATING TERMINAL  
PLAN, ELEVATION & SECTIONS  
(UNIDIRECTIONAL, DIRECT ATTACHMENT)

TRINITY INDUSTRIES, INC.  
HIGHWAY SAFETY PRODUCTS  
2525 STEMMONS FREEWAY, DALLAS, TX 75207

DRAWN	LH
CHECKED	B.T.
APPROVED	
DATE	05/24/05
ENG. FILE #	SS1006-01E
SHT.No.	E1 OF 1
DRAWING NO.	SS 1006
REV.	0

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FOR NOSEPIECE ATTACHMENT:  
REMOVE EXISTING 5/8" Ø BOLTS (4 TOTAL)  
AND RE-INSERT THROUGH NOSEPIECE.

**WIDE TRACC BILL OF MATERIAL**

PRODUCT CODE	QTY	DESCRIPTION
25939A	1	58" WIDETRACC UNIT ASS'LY
6825B	4	REFLECTIVE TAPE
6532B	1	PLASTIC NOSEPIECE

**OPTIONAL TRACC ANCHOR ITEMS**

PRODUCT CODE	DESCRIPTION
5205B	ADHESIVE DISPENSER
5207B	MIXER HIT HY150 (NOZZLE)
5208B	FILLER HIT HY150 (FILLER TUBE)
5209B	BIT TE-CA 11/16-18 (11/16" Ø BIT)

EACH TRACC UNIT SHIPS 100% ASSEMBLED  
(PLASTIC NOSE INSTALLED AFTER PLACEMENT)

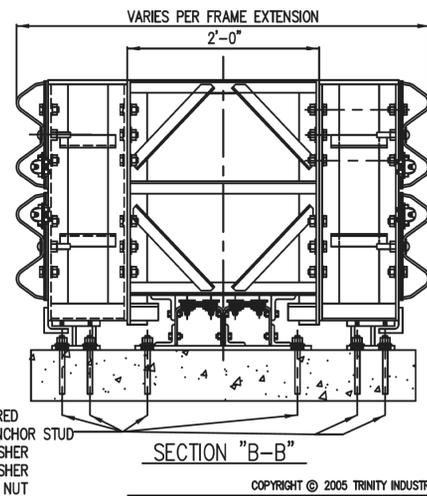
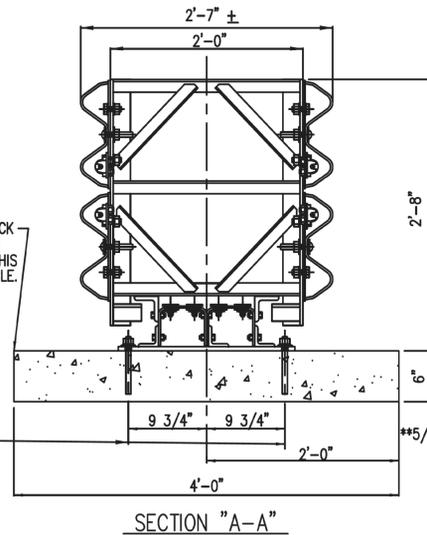
★ EACH CARTRIDGE INCLUDES 1 EACH : MIXER HY 150 CARTRIDGE(NOZZLE)  
: FILLER HIT HY 150 (FILLER TUBE)

** ANCHOR HARDWARE (CONCRETE BASE)		
5204B	50	5/8" Ø x 7 1/16" ANCHOR STUD
3310G	50	5/8" LOCKWASHER
3361G	50	5/8" HEX NUT
3300G	50	5/8" FLAT WASHER
★ 5206B	4	ADHESIVE HIT HY150(CARTRIDGE)
** ANCHOR HARDWARE (ASPHALT BASE)		
6380G	50	5/8" Ø x 18" ALL THD ROD
3310G	50	5/8" LOCKWASHER
3361G	50	5/8" HEX NUT
3300G	50	5/8" FLAT WASHER
★ 5206B	11	ADHESIVE HIT HY150(CARTRIDGE)

\*\* SEE PRODUCT MANUAL

REINFORCED CONCRETE PAD 6" THICK  
(8" THICK IF NOT REINFORCED)  
REINFORCEMENT DRAWINGS FOR THIS  
PAD AND OTHER SIZES ARE AVAILABLE.

ADHESIVE ANCHORED  
\*\* 5/8" Ø x 7 1/16" ANCHOR STUD  
5/8" FLAT WASHER  
5/8" LOCKWASHER  
5/8" HEX NUT



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FOUNDATION NOTE:  
6" REINFORCED CONCRETE PAD IS SHOWN

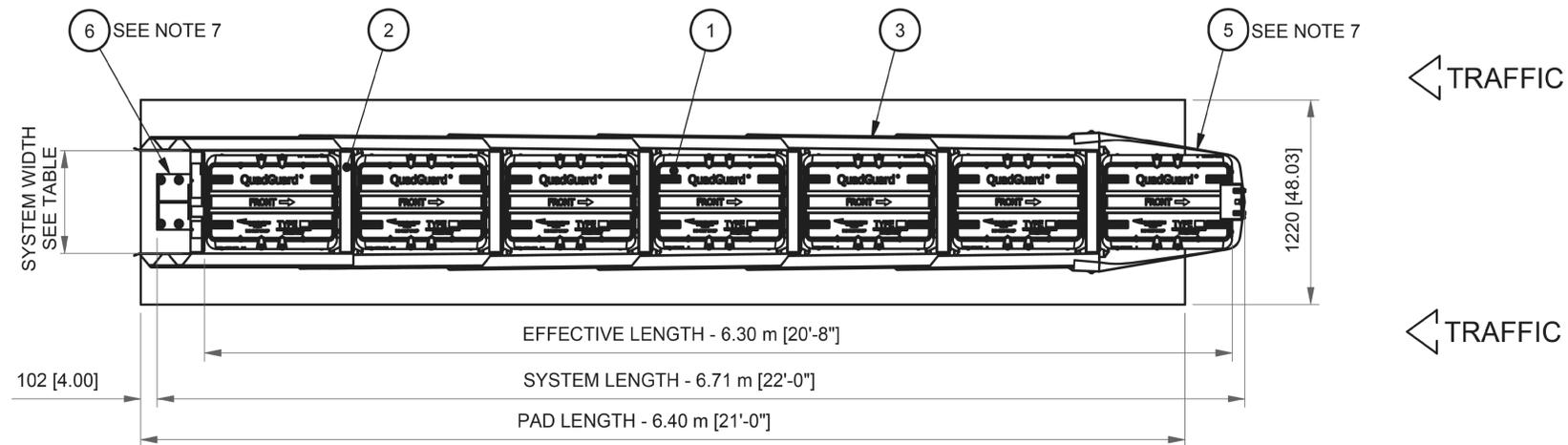
- OTHER OPTIONS ARE :
- a) 8" THICK MINIMUM UNREINFORCED CONCRETE
  - b) 8" MINIMUM THICK ASPHALT
  - c) 3" THICK (MIN) ASPHALT OVER 3" (MIN) CONCRETE
  - d) 6" THICK ASPHALT OVER 6" COMPACTED SUBBASE.

REV.	CHK'D	BY	DATE	REMARKS

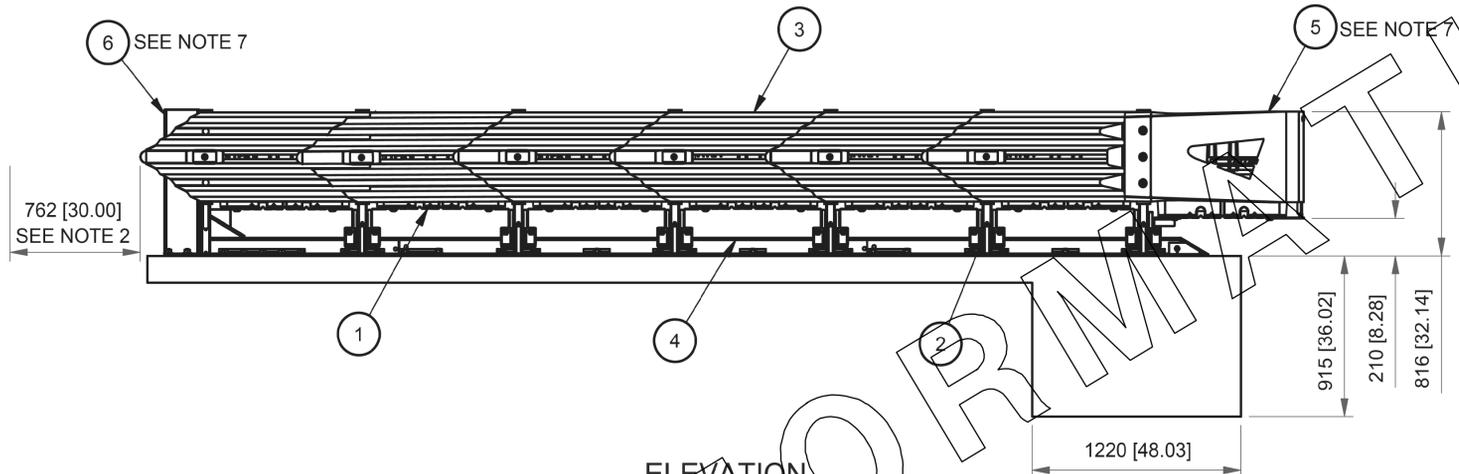
**58" WIDETRACC DOUBLE FLARE**  
CRASH-CUSHION ATTENUATING TERMINAL  
PLAN, ELEVATION & SECTIONS  
(UNIDIRECTIONAL, DIRECT ATTACHMENT)

DRAWN	L.H.
CHECKED	C.C.
APPROVED	
DATE	08-12-05
ENG. FILE #	SS1019-01E
SHT.No.	E1 OF 1
DRAWING NO.	SS1019
REV.	0

TRINITY INDUSTRIES, INC.  
HIGHWAY SAFETY PRODUCTS  
2525 STEMMONS FREEWAY, DALLAS, TX 75207



PLAN



ELEVATION  
LEFT SIDE

NOTES:

1. IN COMPLIANCE WITH THE AASHTO 2002 ROADSIDE DESIGN GUIDE, MANUFACTURER RECOMMENDS REMOVAL OF ALL CURBS AND ISLANDS TO ENSURE PROPER IMPACT PERFORMANCE.
2. PROVISION SHALL BE MADE FOR REAR FENDER PANELS TO SLIDE REARWARD UPON IMPACT 762 [30.00] MIN.
3. 150 [6.00] MIN. REINFORCED 28 MPa [4000 PSI] P.C. CONCRETE PAD OR 200 [8.00] MIN. NON-REINFORCED 28MPa [4000 PSI] P.C. CONCRETE ROADWAY, MEASURING AT LEAST 3.66 m [12'-0"] WIDE BY 15.24 m [50'-0"] LONG.
4. SEE THE "QUADGUARD M10 SYSTEM PRODUCT MANUAL" FOR A DESCRIPTION OF ITS IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS BEFORE PLACING A SYSTEM AT A GIVEN SITE. INFORMATION AND COPIES OF ABOVE MANUAL ARE AVAILABLE BY CALLING CUSTOMER SERVICE DEPARTMENT AT (888) 323-6374.
5. WHERE NECESSARY, THE CUSTOMER SHALL SUPPLY AN ADEQUATE TRANSITION FROM THE QUADGUARD M10 SYSTEM TO THE OBJECT BEING SHIELDED.
6. UNITS OF MEASUREMENT ARE MILLIMETERS [INCHES] UNLESS OTHERWISE NOTED.
7. BACKUP, MONORAIL, AND NOSE ASSEMBLIES ARE NOT INCLUDED IN MODEL NUMBER, ORDER SEPARATELY.
8. THE QUADGUARD M10 SYSTEM HAS BEEN TESTED TO MASH.
9. TENSION STRUT SHOWN. ALSO AVAILABLE WITH CONCRETE BACKUP.

ONLY

BAYS	610 [24"] WIDTH	762 [30"] WIDTH	914 [36"] WIDTH	MAX DESIGN SPEED	NO. OF CARTRIDGES	
**	MODEL #	MODEL #	MODEL #	K/m/h [MPH]	TYPE M-I	TYPE M-II
6	QM10524	QM10530	QM10536	100 [62]	4	3

Revision	Date	Rev	By	Chk.	App.

1 CARTRIDGE	4 MONORAIL
2 DIAPHRAGM	5 NOSE ASSEMBLY
3 FENDER PANEL	6 BACKUP

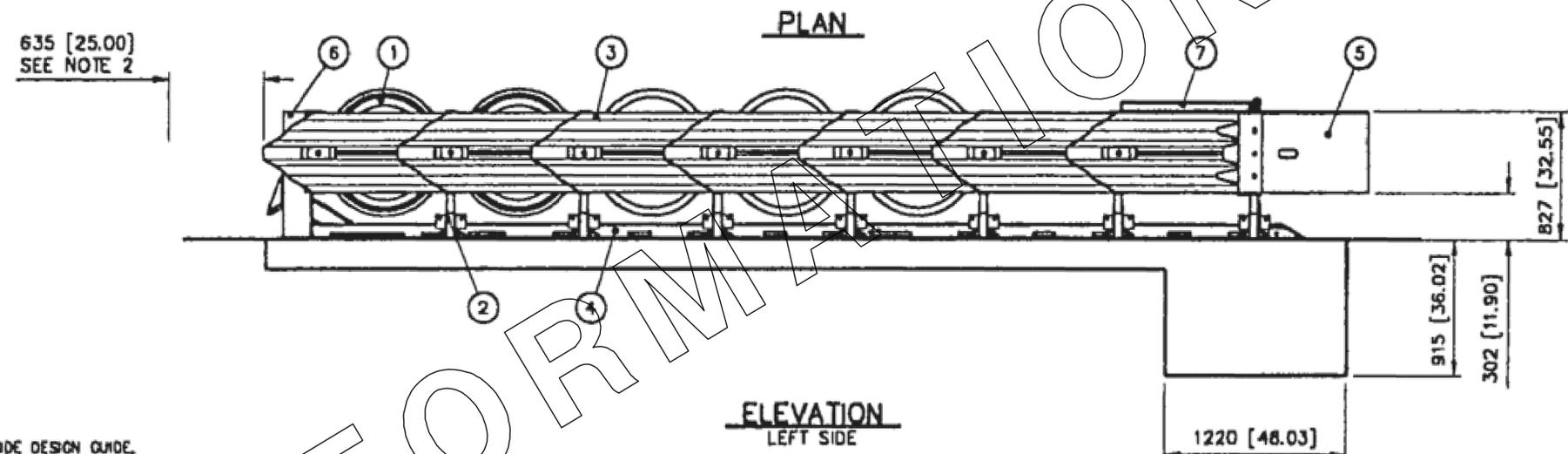
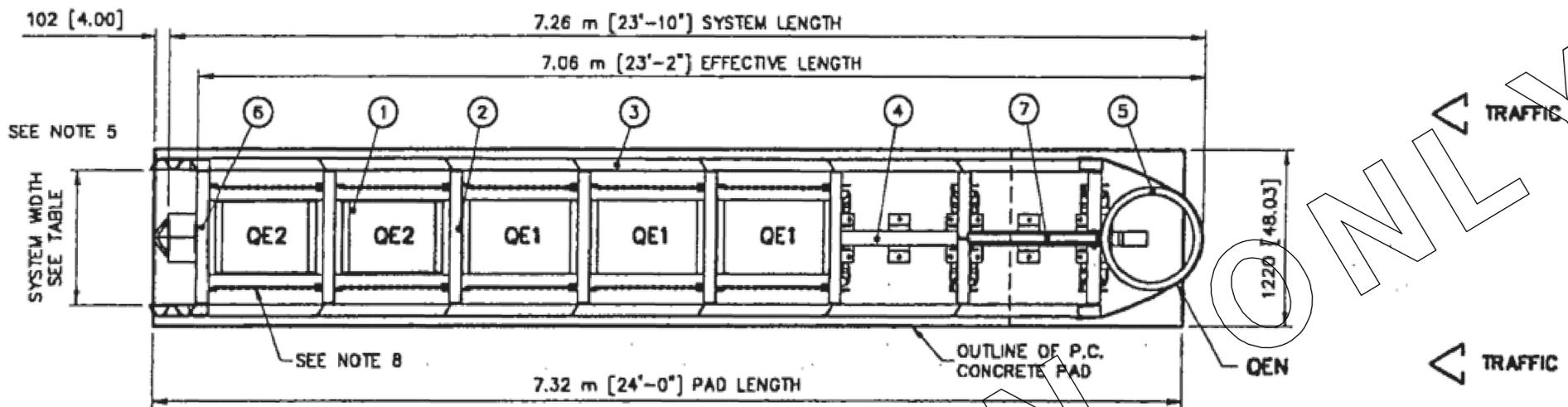
REFERENCES	
DIAPHRAGM ASSY.	35-40-07
SHIM KIT, DIAPHRAGM	3540078-0000
NOSE ASSY.	617385
FENDER PANEL ASSY.	35-40-04
BACKUP ASSY.	35-40-03
MONORAIL ASSY.	35-40-75
CONCRETE PAD	35-40-76

DRAWN:	D. Standridge	DATE:	4/21/2010
DESIGNED:	S. Thompson	DATE:	12/15/2009
CHECKED:		DATE:	
APPROVED:		DATE:	
FILE:	QMTSCVR-U.idw		

UNIDIRECTIONAL

**QUADGUARD M10 SYSTEM**  
NARROW SYSTEM WITH TENSION STRUT BACKUP

SCALE:	DRAWING:	SHEET:	REV:
	QMTSCVR-U3	1 of 1	



**NOTES:**

- IN COMPLIANCE WITH THE AASHTO 1988 ROADSIDE DESIGN GUIDE, MANUFACTURER RECOMMENDS REMOVAL OF ALL CURBS AND ISLANDS TO ENSURE PROPER IMPACT PERFORMANCE.
- PROVISION SHALL BE MADE FOR REAR FENDER PANELS TO SLIDE REARWARD UPON IMPACT 635 [25.00] MIN.
- 150 [6.00] MIN. REINFORCED 28 MPa [4000 PSI] P.C. CONCRETE PAD OR 200 [8.00] MIN. NON-REINFORCED 28 MPa [4000 PSI] P.C. CONCRETE ROADWAY.
- SEE THE "QUADGUARD ELITE SYSTEM DESIGN MANUAL" FOR A DESCRIPTION OF ITS IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS BEFORE PLACING A SYSTEM AT A GIVEN SITE. INFORMATION AND COPIES OF ABOVE MANUAL ARE AVAILABLE BY CALLING CUSTOMER SERVICE DEPARTMENT AT 1-888-32-ENERG.

- WHERE NECESSARY, THE CUSTOMER SHALL SUPPLY A TRANSITION FROM THE QUADGUARD SYSTEM TO THE OBJECT BEING SHIELDED.
- UNITS OF MEASUREMENT ARE MILLIMETERS [INCHES] UNLESS OTHERWISE NOTED.
- BACKUP ASSEMBLY NOT INCLUDED IN MODEL NUMBER.
- CHAINS INCLUDED ONLY ON 36" SYSTEMS.

MODEL#	SYSTEM WIDTH
QS2407E*	610 [24.00]
QS3007E*	762 [30.00]
QS3607E*	914 [36.00]

\* Y=YELLOW NOSE  
G=GRAY NOSE

UNIDIRECTIONAL  
MODEL NO. QS\_\_07E (SEE CHART)

**ENERGY ABSORPTION SYSTEMS, INC.**  
ENGINEERING AND RESEARCH DEPARTMENT

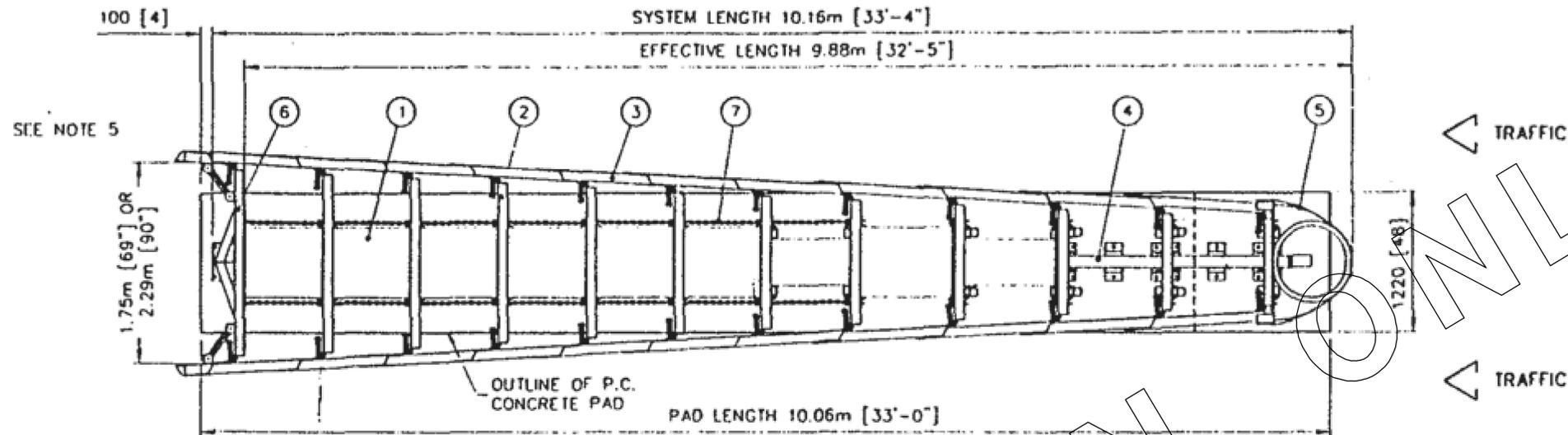
**QUADGUARD® ELITE™ SYSTEM**  
W/ TENSION STRUT BACKUP

Revisions	Date	Rev.	By	Ckd.	App.

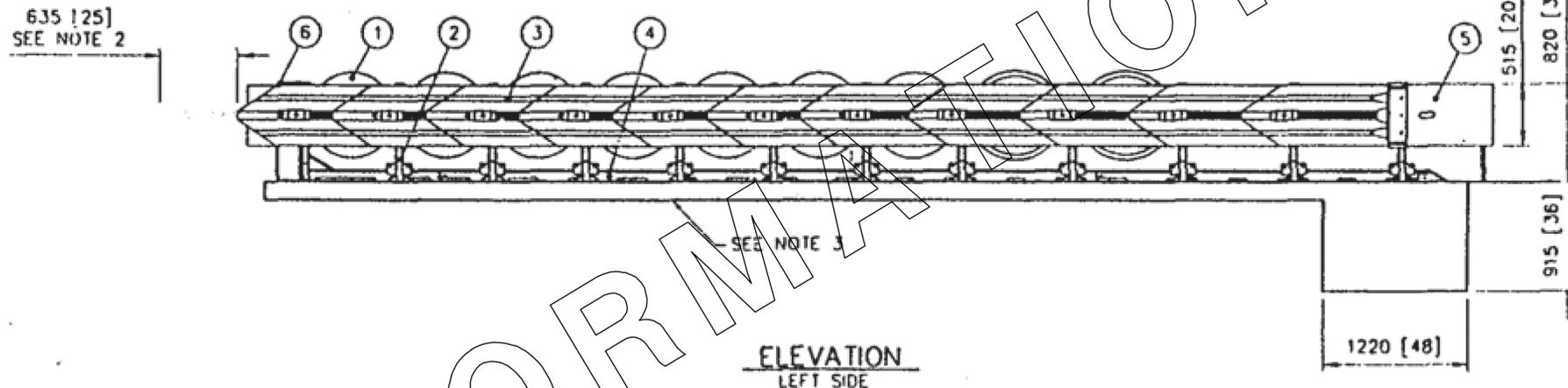
REFERENCES	
SERIAL#	FENDER PANEL ASSY. 3540454-0000
SALES ORDER#	BACKUP ASSY. 3540484-0000
EH PROJECT#	RAIL ASSY. 3540482-0000
DESIGN SPEED	CONCRETE PAD 3540483-0000
NOSE COLOR	BAY ASSY. 3540483-0000
NUMBER OF UNITS	CHAIN ASSY. 3540491-0000
DIAPHRAGM ASSY.	HIT INDICATOR ASSY. 3540463-0000
	NOSE ASSY. 3540495-0000

DESIGNED BY	S. Von Ogle	DATE	11/12/98
DESIGNED BY	R. Blaski	DATE	11/12/98
DESIGNED BY	KRM	DATE	2/3/99
APPROVED BY	RBB	DATE	2/3/99
CAD FILE:	QL2TSCVR-U.dwg		

KEY	① QUADGUARD ELITE CURB	④ MONORAIL	⑦ HIT INDICATOR
	② DIAPHRAGM	⑤ NOSE ASSEMBLY	
	③ FENDER PANEL	⑥ BACKUP	



PLAN



ELEVATION  
LEFT SIDE

NOTES:

- IN COMPLIANCE WITH THE AASHTO 1996 ROADSIDE DESIGN GUIDE, MANUFACTURER RECOMMENDS REMOVAL OF ALL CURBS AND ISLANDS TO ENSURE PROPER IMPACT PERFORMANCE.
- PROVISION SHALL BE MADE FOR REAR FENDER PANELS TO SLIDE REARWARD UPON IMPACT 635 [25.00] MIN.
- 150 [6.00] MIN. REINFORCED 28 MPa [4000 PSI] P.C. CONCRETE PAD OR 200 [8.00] MIN. NON-REINFORCED 28 MPa [4000 PSI] P.C. CONCRETE ROADWAY.
- SEE THE "QUADGUARD LMC SYSTEM DESIGN MANUAL" CODED FOR A DESCRIPTION OF ITS IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS BEFORE PLACING A SYSTEM AT A GIVEN SITE. INFORMATION AND COPIES OF ABOVE MANUAL ARE AVAILABLE BY CALLING CUSTOMER SERVICE DEPARTMENT AT 1-888-32-ENERG.
- WHERE NECESSARY, THE CUSTOMER SHALL SUPPLY A TRANSITION FROM THE QUADGUARD SYSTEM TO THE OBJECT BEING SHIELDED.
- UNITS OF MEASUREMENT ARE MILLIMETERS [INCHES] UNLESS OTHERWISE NOTED.
- BACKUP ASSEMBLY NOT INCLUDED IN MODEL NUMBER.

UNIDIRECTIONAL  
MODEL NO. QF6911L  
MODEL NO. QF9011L

KEY	① ELASTOMERIC CYLINDERS	④ MONORAIL	⑦ CHAIN ASSEMBLY		
	② DIAPHRAGM	⑤ NOSE ASSEMBLY			
	③ FENDER PANEL	⑥ BACKUP			
Revisions	Date	Rev.	By	Ckd.	App.

REFERENCES

SERIAL#	DIAPHRAGM ASSY	3540342-0000
SALES ORDER#	NOSE ASSY.	3540457-0000
EN PROJECT#	FENDER PANEL ASSY	3540370-0000
DESIGN SPEED	BACKUP ASSY	3540393-0000
NOSE COLOR	RAIL ASSY	35-40-46
NUMBER OF UNITS	CONCRETE PAD	35-40-47
	CYLINDER ASSY	35-09-54
	BAY ASSY.	3540456-0000
	CHAIN ASSY.	3540455-0000

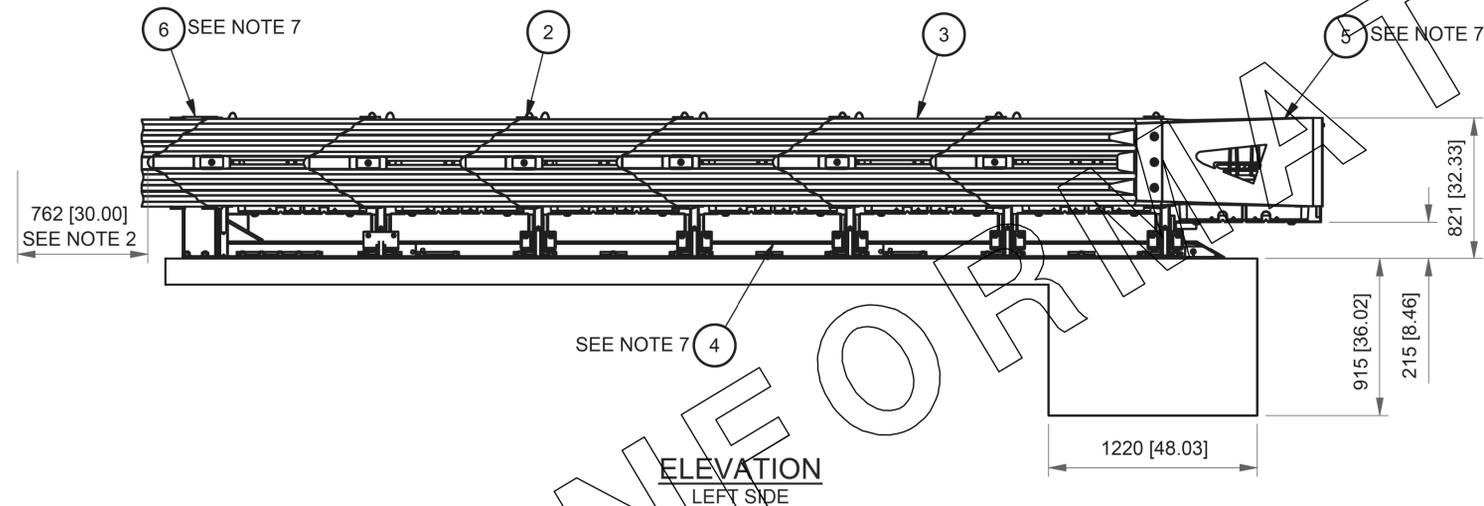
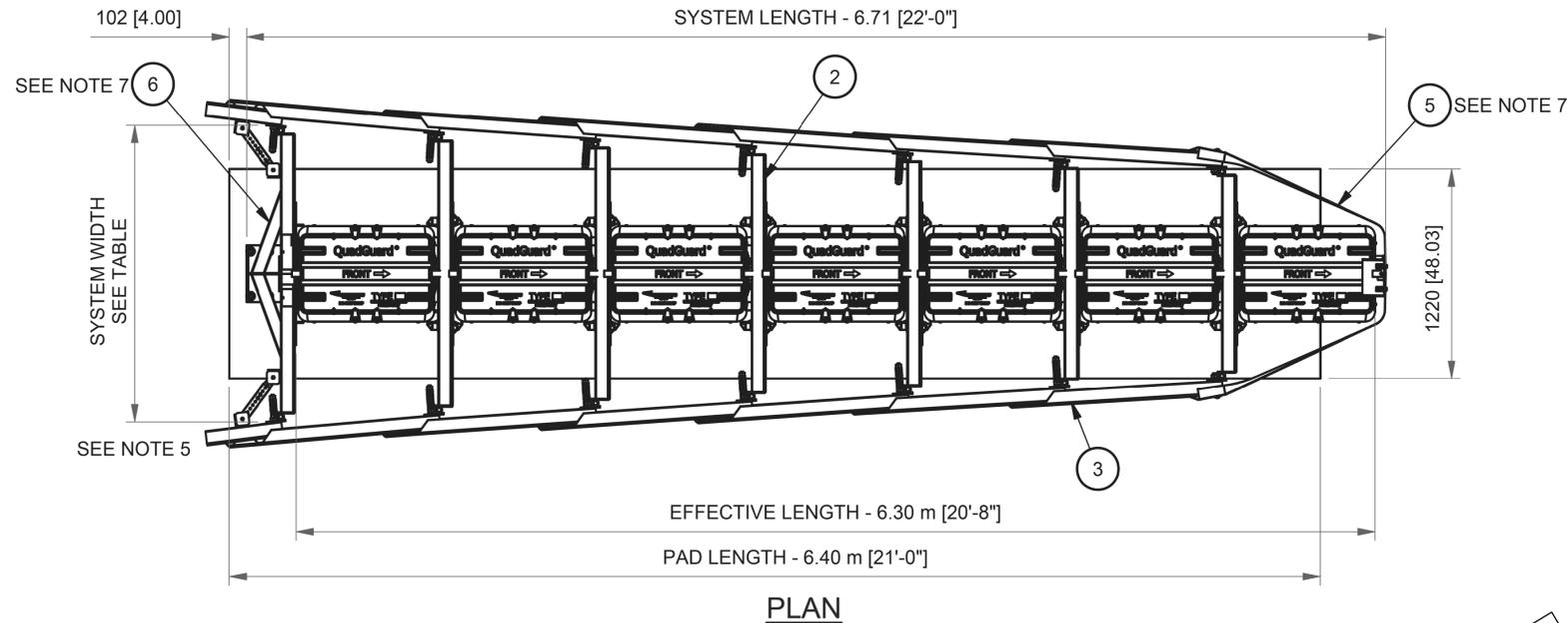
D. Staus	3/5/98
R. Blowski	3/5/98
KRM	3-6-98
AL	J-6-98
OLF TSCVR-U dwg	



ENERGY ABSORPTION SYSTEMS, INC.  
ENGINEERING AND RESEARCH DEPARTMENT

QUADGUARD® 69/90 LMC SYSTEM  
W/ 69" or 90" TENSION STRUT BACKUP

1-50      OLF TSCVR-U      1 of 1



← TRAFFIC

← TRAFFIC

NOTES:

1. IN COMPLIANCE WITH THE AASHTO 2006 ROADSIDE DESIGN GUIDE, MANUFACTURER RECOMMENDS REMOVAL OF ALL CURBS AND ISLANDS TO ENSURE PROPER IMPACT PERFORMANCE.
2. PROVISION SHALL BE MADE FOR REAR FENDER PANELS TO SLIDE REARWARD UPON IMPACT 762 [30.00] MIN.
3. 150 [6.00] MIN. REINFORCED 28 MPa [4000 PSI] P.C. CONCRETE PAD OR 200 [8.00] MIN. NON-REINFORCED 28 MPa [4000 PSI] P.C. CONCRETE ROADWAY, MEASURING AT LEAST 3.66 m [12'-0"] WIDE BY 15.24 m [50'-0"] LONG.
4. SEE THE "QUADGUARD M10 SYSTEM PRODUCT MANUAL" FOR A DESCRIPTION OF ITS IMPACT PERFORMANCE CHARACTERISTICS AND DESIGN LIMITATIONS BEFORE PLACING A SYSTEM AT A GIVEN SITE. INFORMATION AND COPIES OF ABOVE MANUAL ARE AVAILABLE BY CALLING CUSTOMER SERVICE DEPARTMENT AT (888) 323-6374.
5. WHERE NECESSARY, THE CUSTOMER SHALL SUPPLY AN ADEQUATE TRANSITION FROM THE QUADGUARD M10 SYSTEM TO THE OBJECT BEING SHIELDED.
6. UNITS OF MEASUREMENT ARE MILLIMETERS [INCHES] UNLESS OTHERWISE NOTED.
7. BACKUP, MONORAIL, AND NOSE ASSEMBLIES ARE NOT INCLUDED IN MODEL NUMBER, ORDER SEPARATELY.
8. THE QUADGUARD M10 HAS BEEN TESTED TO MASH.
9. TENSION STRUT SHOWN. ALSO AVAILABLE WITH A CONCRETE BACKUP.

ONLY

Revision	Date	Rev	By	Chk.	App.

BAYS	1753 [69"] WIDTH	2286 [90"] WIDTH	MAX DESIGN SPEED	NO. OF CARTRIDGES	
**	MODEL #	MODEL #	Km/h [MPH]	TYPE M-I	TYPE M-II
6	QM10569	QM10590	105 [65]	4	3

SERIAL NO.		REFERENCES	
		DIAPHRAGM ASSY.	3540340-0000
		SHIM KIT, DIAPHRAGM	3540078-0000
		NOSE ASSY.	617386
		FENDER PANEL ASSY.	35-40-04
		BACKUP ASSY.	3540390-0000
		MONORAIL ASSY.	35-40-75
		CONCRETE PAD	35-40-76

DRAWN:	D. Standridge	DATE:	4/21/2010
DESIGNED:	S. Thompson	DATE:	12/15/2009
CHECKED:		DATE:	
APPROVED:		DATE:	
FILE:	QFMTSCVR-U.idw		

UNIDIRECTIONAL

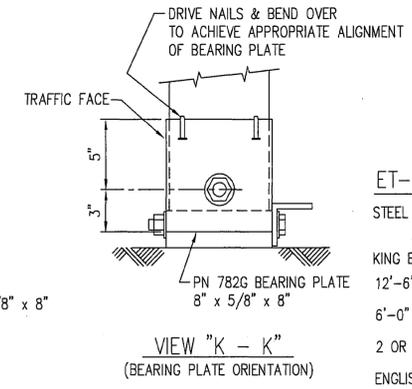
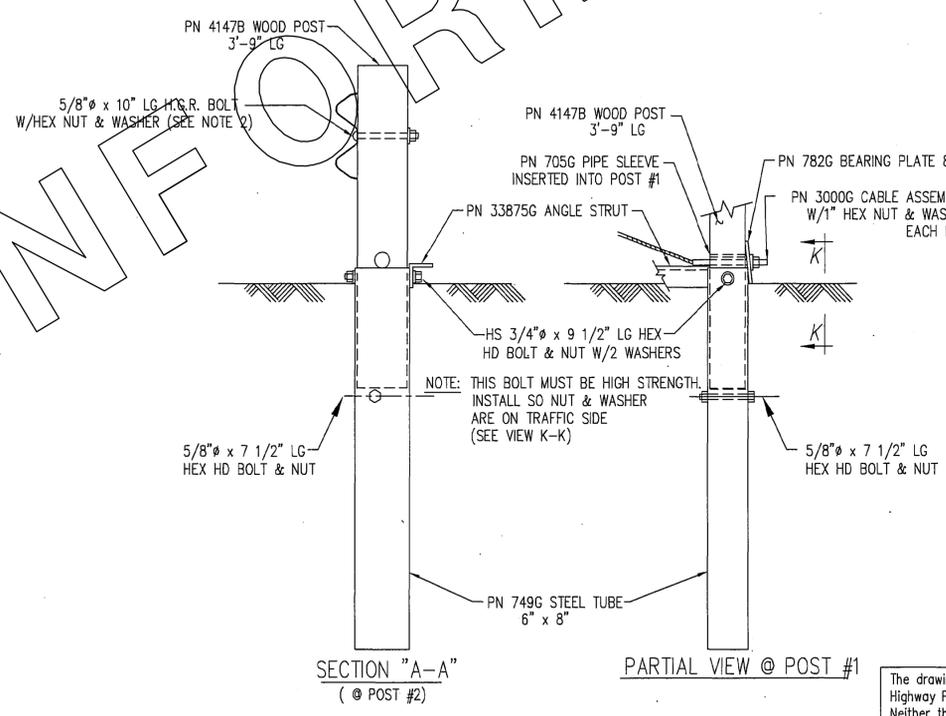
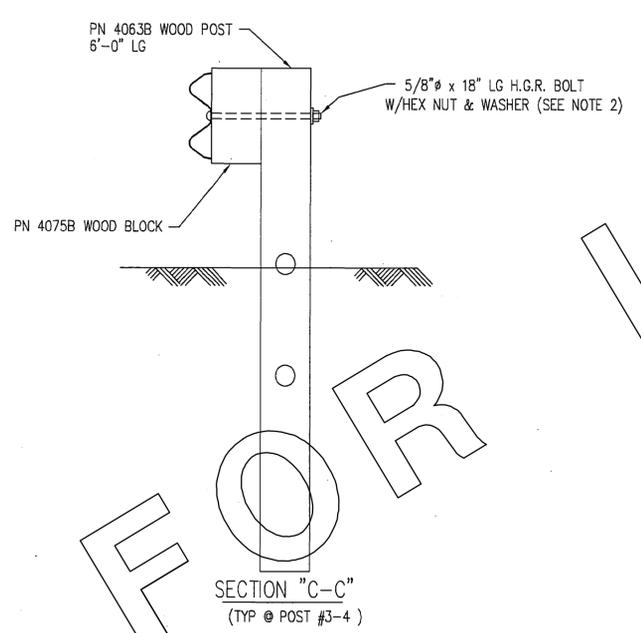
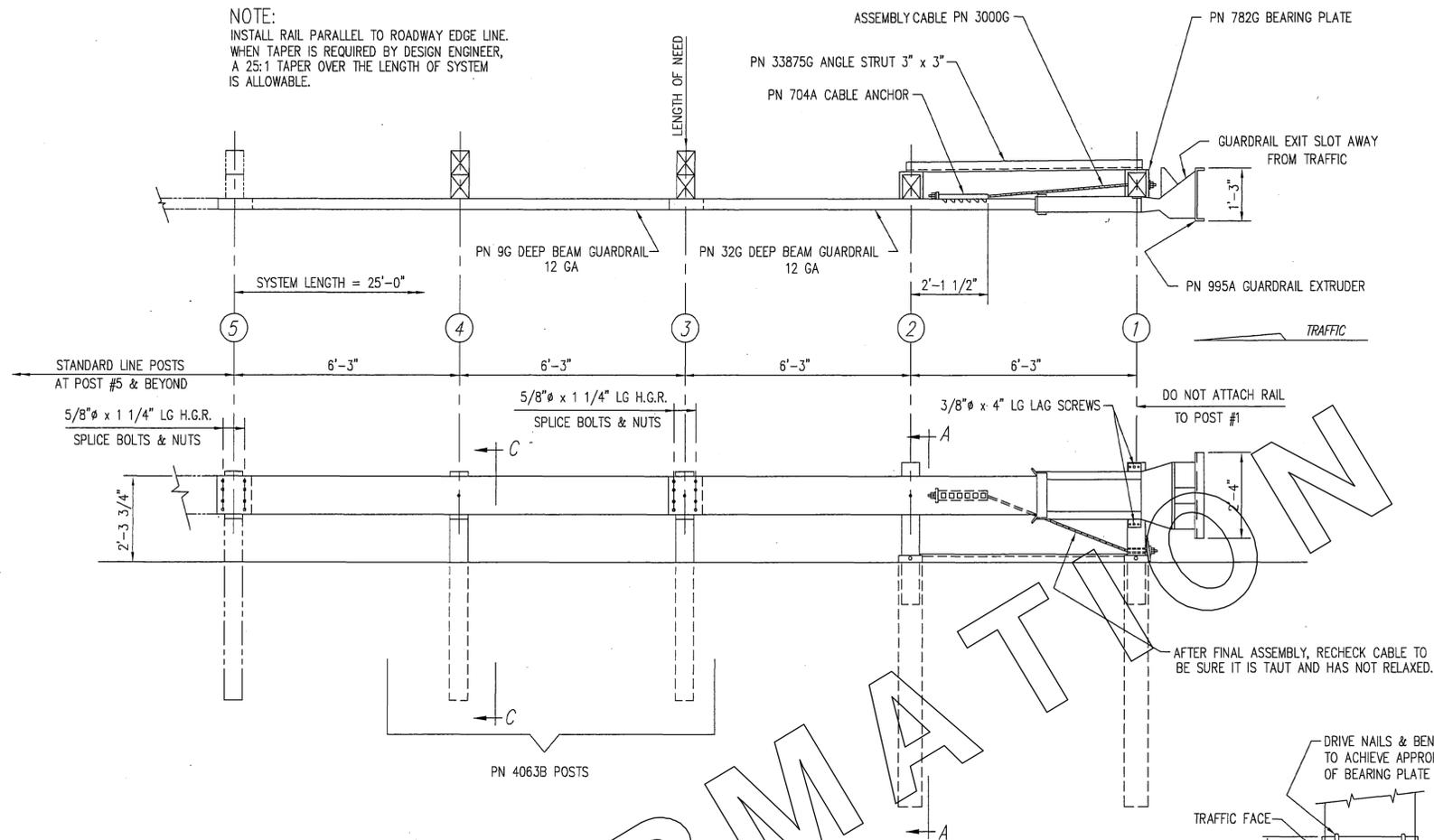


**ENERGY ABSORPTION SYSTEMS, INC.**  
ENGINEERING AND RESEARCH DEPARTMENT

**QUADGUARD M10 SYSTEM**  
WIDE SYSTEM WITH TENSION STRUT BACKUP

SCALE:	DRAWING:	SHEET:	REV:
	QFMTSCVR-U	1 of 1	

**NOTE:**  
INSTALL RAIL PARALLEL TO ROADWAY EDGE LINE.  
WHEN TAPER IS REQUIRED BY DESIGN ENGINEER,  
A 25:1 TAPER OVER THE LENGTH OF SYSTEM  
IS ALLOWABLE.



- NOTES:**
- 1.) DO NOT ATTACH GUARDRAIL TO POST # 1.
  - 2.) THE 5/8" FLAT WASHER IS USED UNDER THE NUT, BEHIND THE POST ONLY. NO WASHER IS USED AT THE RAIL.
  - 3.) MANUFACTURER SUGGESTS CUSTOMER TO PROVIDE REFLECTORIZAION OF TERMINAL.

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**BILL OF MATERIAL**

PN	QTY	DESCRIPTION
9G	1	12/12'6/6'3/S (GUARDRAIL)
32G	1	12/12'6/6'3/S ANC (GUARDRAIL)
704A	1	CABLE ANCHOR BRACKET
705G	1	2" x 5 1/2" PIPE
749G	2	6" TUBE SLEEVE
782G	1	8" x 5/8" x 8" BEARING PLATE
995A	1	ET-PLUS EXTRUDER
3000G	1	CABLE 3/4 x 6'6"
3300G	3	5/8" WASHER
3340G	21	5/8" HEX NUT
3360G	16	5/8" x 1 1/4" SPLICE BOLT
3478G	2	5/8" x 7 1/2" HEX HD BOLT
3500G	1	5/8" x 10" POST BOLT
3880G	2	5/8" x 18" POST BOLT
3700G	4	3/4" WASHER
3704G	2	3/4" HEX NUT
3900G	2	1" WASHER
3910G	2	1" HEX NUT
4063B	2	WD 6'0 POST 6 x 8
4075B	2	WD BLOCK 1'2 x 6 x 8 DR
4147B	2	WD 3'9 POST 5 1/2 x 7 1/2
4228G	2	3/8" x 4" LAG SCREW
5148G	2	3/4" x 9 1/2" HEX HD BOLT
33875G	1	ANGLE STRUT

**ET-PLUS, OTHER AVAILABLE OPTIONS:**

- STEEL HINGED BREAKAWAY (HBA) AND/OR STEEL YIELDING POSTS (SYTP) POSTS AT LOCATIONS 1-2, 1-4
- KING BLOCKS (COMPOSITE)
- 12'-6" OR 25'-0" GUARDRAIL PANELS
- 6'-0" POST FOUNDATION TUBES WITHOUT SOIL PLATES OR 4'-6" TUBES W/SOIL PLATES (#1 & 2)
- 2 OR 4 POST FOUNDATION TUBES (SOIL PLATES OPTIONAL ON POSTS #3 & 4)
- ENGLISH OR METRIC DRAWINGS
- CONTACT TRINITY FOR FURTHER INFORMATION CONCERNING AVAILABLE OPTIONS.

REV.	CHK'D	BY	DATE	REMARKS

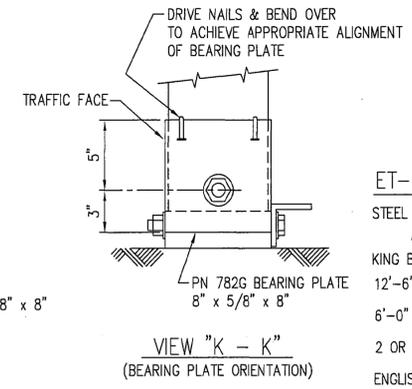
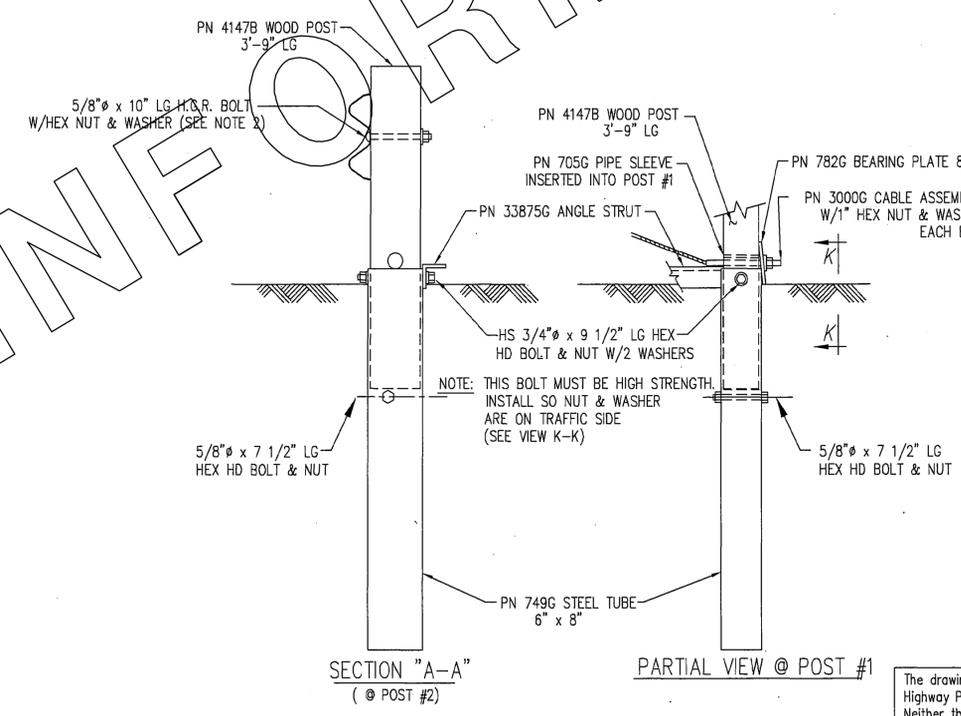
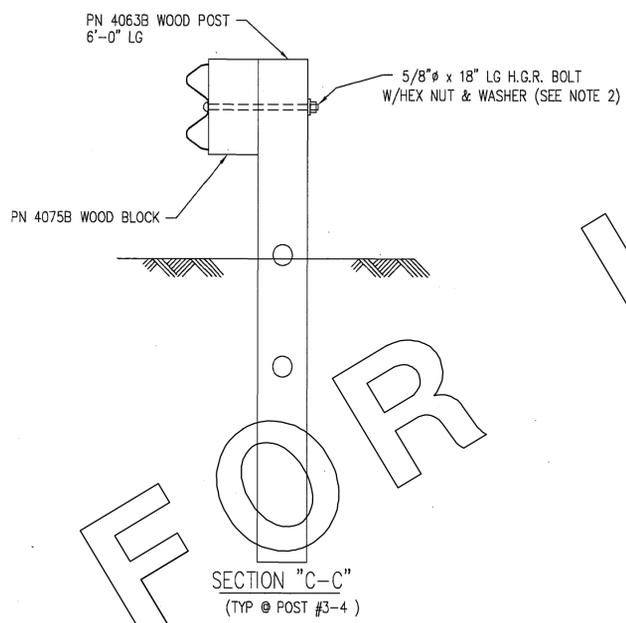
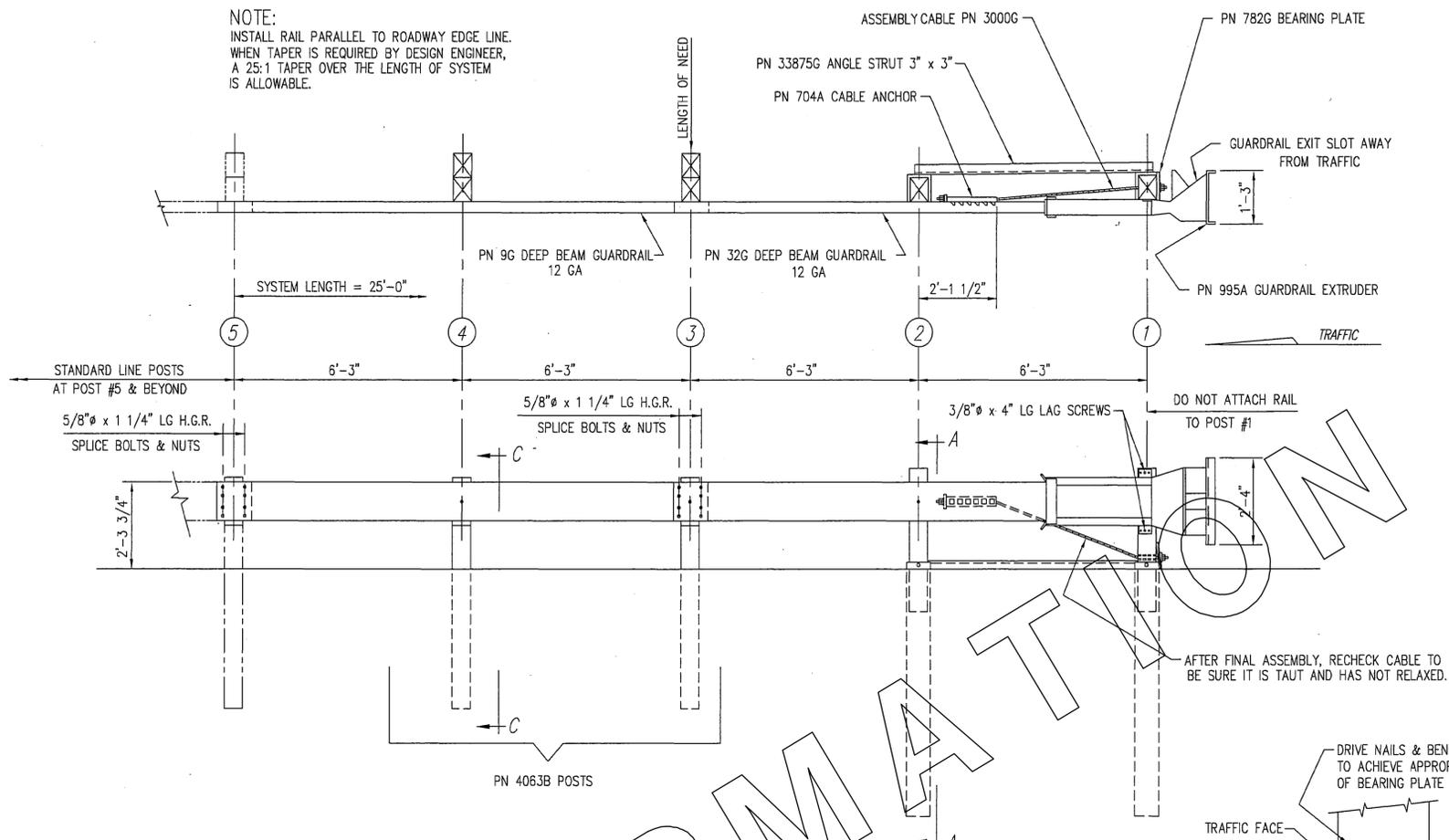
**ET-PLUS**

ET-PLUS  
PLAN, ELEVATION & SECTION  
NCHRP 350 TEST LEVEL 2  
AVAILABLE OPTIONS

DRAWN	BT
CHECKED	S.G.
SCALE	N.T.S.
DATE	1-31-13
ENG. FILE #	ET TL-2
SHT.No.	E1 OF 1
DRAWING NO.	ET TL-2
REV.	0

**TRINITY HIGHWAY PRODUCTS, LLC.**  
2525 STEMMONS FREEWAY  
DALLAS, TX 75207

NOTE:  
INSTALL RAIL PARALLEL TO ROADWAY EDGE LINE.  
WHEN TAPER IS REQUIRED BY DESIGN ENGINEER,  
A 25:1 TAPER OVER THE LENGTH OF SYSTEM  
IS ALLOWABLE.



- NOTES:
- 1.) DO NOT ATTACH GUARDRAIL TO POST # 1.
  - 2.) THE 5/8" FLAT WASHER IS USED UNDER THE NUT, BEHIND THE POST ONLY. NO WASHER IS USED AT THE RAIL.
  - 3.) MANUFACTURER SUGGESTS CUSTOMER TO PROVIDE REFLECTORIZAION OF TERMINAL.

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ET-PLUS, OTHER AVAILABLE OPTIONS:  
 STEEL HINGED BREAKAWAY (HBA) AND/OR STEEL YIELDING POSTS (SYTP) POSTS AT LOCATIONS 1-2, 1-4  
 KING BLOCKS (COMPOSITE)  
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 ENGLISH OR METRIC DRAWINGS  
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REV.	CHK'D	BY	DATE	REMARKS

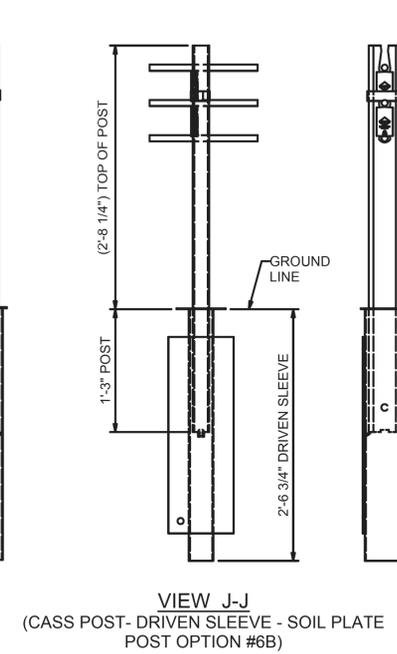
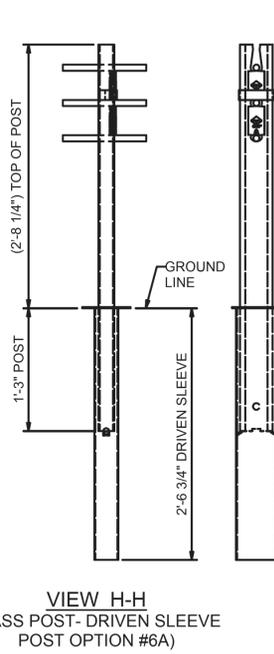
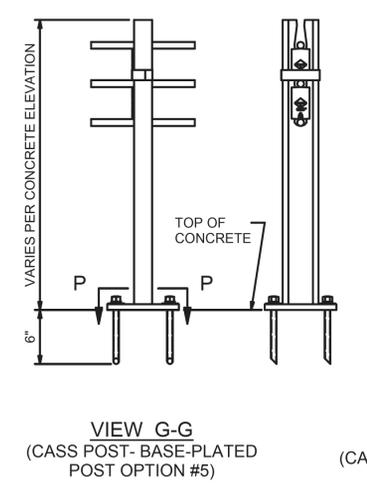
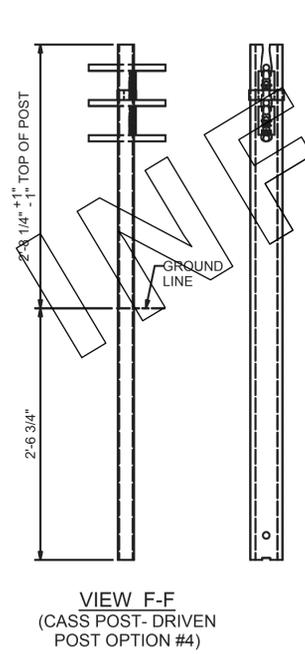
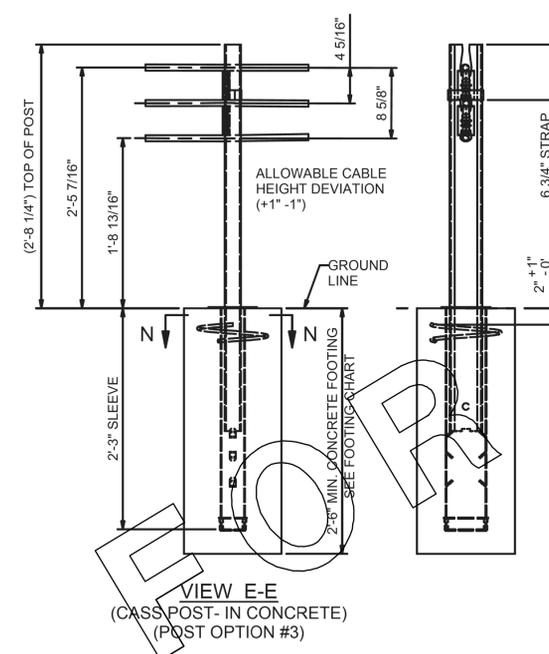
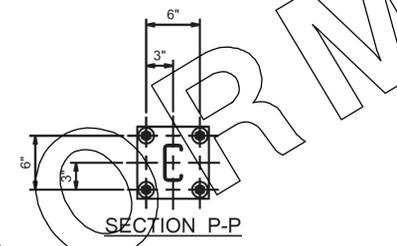
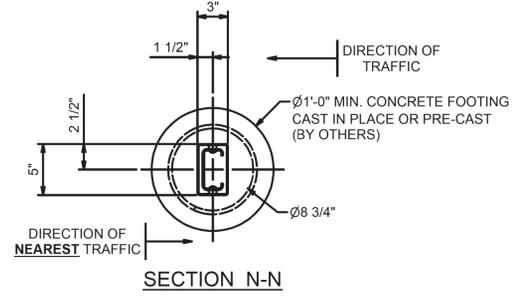
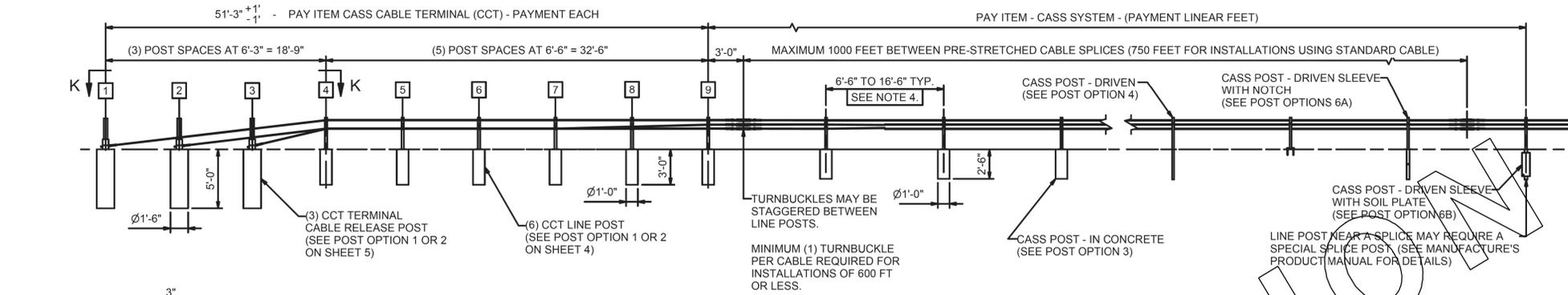
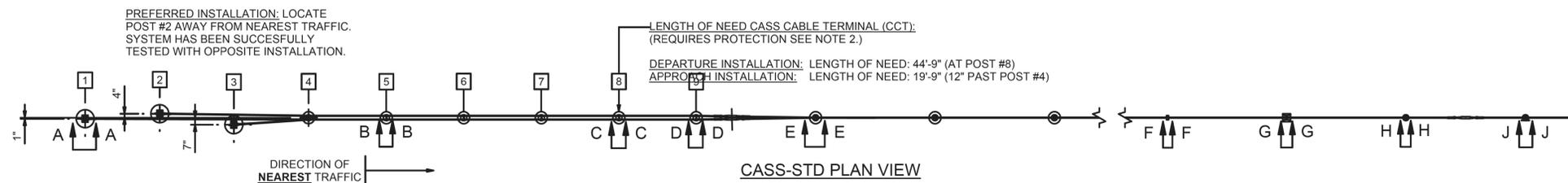
**ET-PLUS**

ET-PLUS  
PLAN, ELEVATION & SECTION  
NCHRP 350 TEST LEVEL 2  
AVAILABLE OPTIONS

DRAWN	BT
CHECKED	S.G.
SCALE	N.T.S.
DATE	1-31-13
ENG. FILE #	ET TL-2
SHT.No.	E1 OF 1
DRAWING NO.	ET TL-2
REV.	0

**TRINITY HIGHWAY PRODUCTS, LLC.**  
2525 STEMMONS FREEWAY  
DALLAS, TX 75207





- NOTES:
- CASS HAS BEEN SUCCESSFULLY TESTED TO NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 TEST LEVEL 3 (NCHRP 340 TL3) AND ACCEPTED BY FHWA FOR VARIOUS POST SPACINGS. CASS CABLE TERMINAL (CCT) HAS BEEN SUCCESSFULLY TESTED AND APPROVED TO NCHRP TL3.
  - AN NCHRP 350 TL3 APPROVED TERMINAL (CCT) OR CASS TRANSITION (VARIOUS) SHALL BE USED ON APPROACH AND DEPARTURE TERMINATIONS WHEN CASS IS INSTALLED ON THE NATIONAL HIGHWAY SYSTEM (NHS). IF THE TERMINATION POINT IS LOCATED OUTSIDE THE CLEAR ZONE AND/OR PROTECTED BY OTHER MEANS (CRASHWORTHY BARRIER, TERMINALS, ETC.), A NON-NCHRP 350 TL3 ANCHOR (CCA) MAY BE USED ON APPROACH AND DEPARTURE TERMINATIONS.
  - CASS SHALL BE INSTALLED ON SHOULDERS OR MEDIANS WITH SLOPES OF 6:1 OR FLATTER WITHOUT OBSTRUCTIONS, DEPRESSIONS, ETC. THAT MAY SIGNIFICANTLY AFFECT THE STABILITY OF AN ERRANT VEHICLE. GRADING OF SITE AND/OR APPROPRIATE FILL MATERIALS MAY BE REQUIRED. THE DESIGNER/INSTALLER SHALL "FLATTEN" OR "ROUND" VARIOUS TOPOGRAPHICAL INCONSISTENCIES THAT COULD INTERFERE WITH THE ABILITY OF THE INSTALLER TO CONSISTENTLY MAINTAIN THE DESIGN HEIGHT (IN RELATION TO THE TERRAIN) OF THE CABLES. PLEASE CONSULT THE CASS MANUAL(S) FOR INSTALLATIONS IN "DITCH SECTIONS".
  - CASS POST SPACING MAY BE MODIFIED TO AVOID OBSTACLES THAT CONFLICT WITH THE INSTALLATION OF CASS LINE POSTS. NO POST SPACE CAN EXCEED THE MAXIMUM POST SPACE LIMIT OF 16'-6", OR MAXIMUM POST SPACING ALLOWED BY PROJECT ENGINEER - WHICHEVER IS LESS. REDUCING OR INCREASING POST SPACING AFFECTS DEFLECTION. CASS MAY BE LATERALLY TRANSFERRED AT A RATE NOT TO EXCEED 30:1.
  - POST FOUNDATIONS MAY BE DRILLED THROUGH EXISTING PAVEMENT. TRINITY MAY ALLOW THE USE OF ALTERNATE LINE POST FOOTINGS IF SYSTEM IS INSTALLED WITH AN ACCEPTABLE MOWSTRIP APPLICATION - PLEASE CONTACT TRINITY.
  - FOR AESTHETIC PURPOSES TRINITY RECOMMENDS ALL SLEEVES, DRIVEN POSTS, AND LOWER CABLE RELEASE POSTS TO BE INSTALLED REASONABLY PLUMB (APPROXIMATELY 1/8" PER FOOT).
  - ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 P.S.I. PRIOR TO TENSIONING THE SYSTEM. TRINITY RECOMMENDS THE CONCRETE TO BE VIBRATED IN ACCORDANCE WITH THE LATEST APPLICABLE AGENCY SPECIFICATION.
  - CASS SHALL BE INSTALLED IN WELL-DRAINED, COMPACTED, NCHRP REPORT 350 STANDARD SOILS. IF SOIL DOESN'T MEET THIS CLASSIFICATION, IF SOLID ROCK/CONCRETE IS ENCOUNTERED BELOW GRADE OR IF SOIL IS SUSCEPTABLE TO SEVERE FREEZE/THAW CYCLES, PLEASE CONTACT TRINITY ABOUT ALTERNATE FOOTING DESIGN(S). TRINITY SUGGESTS THE USE OF "MOW STRIPS" FOR EROSION PREVENTION AND EASE OF MAINTENANCE / INSTALLATION.
  - PLEASE SEE SPECIFYING AGENCY (OR MUTCD) FOR PROPER "BARRIER" DELINEATION.
  - CASS POSTS SHALL BE ALTERNATELY ROTATED 180 DEGREES SO THAT EVERY OTHER POST IS FACING THE TRAFFIC FLOW. CASS MAY BE INSTALLED ON EITHER SIDE OF THE ROADWAY OR IN THE MEDIAN WITHOUT MODIFYING POST ORIENTATION.
  - PLEASE CONTACT TRINITY OR CONSULT THE DESIGN, INSTALLATION, OR REPAIR MANUAL(S) FOR ADDITIONAL INFORMATION.

TRINITY HIGHWAY PRODUCTS, LLC. EMAIL: 2525 STEMMONS FREEWAY PRODUCT.INFO@TRIN.NET DALLAS, TX 75207 PHONE: (800) 644-7976

MOW STRIP DETAIL*		CONCRETE FOOTING CHART		
MOW STRIP	DEPTH	FOOTING	TUBE SLEEVE	REBAR RING
NONE		30" MIN.	27" MIN.	YES
HMA	6" MIN.	3" MIN.	27" MIN.	NO
HMA	8" MIN.	3" MIN.	24" MIN.	NO
RC	3" MIN.	3" MIN.	24" MIN.	NO

CHART DOES NOT APPLY TO TERMINAL POSTS 1 THRU 9  
\* MOW STRIP OR PAVEMENT  
HMA = HOT MIX ASPHALT (NOT RECYCLED ASPHALT PAVEMENT)  
RC = REINFORCED CONCRETE (3,000 P.S.I. MINIMUM)

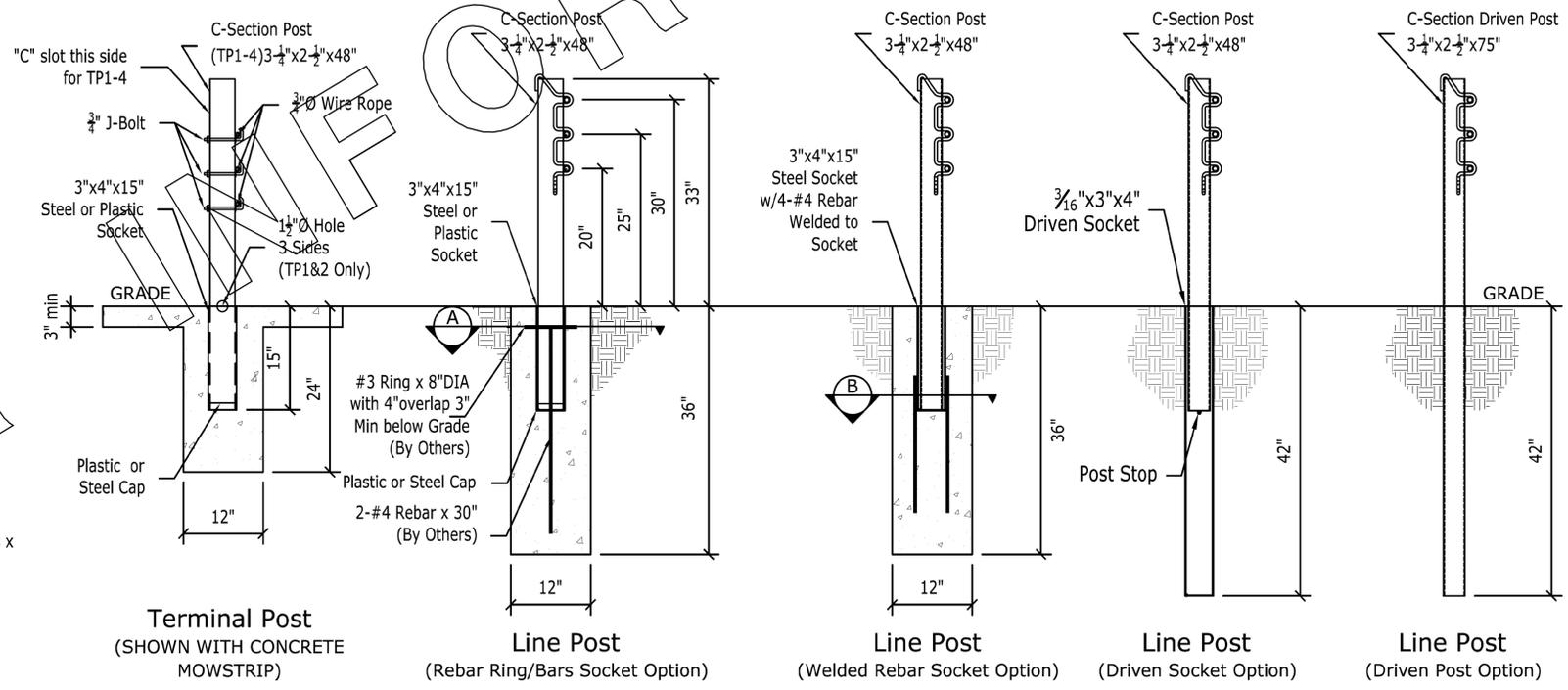
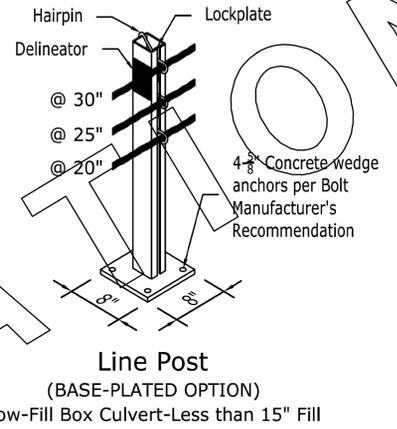
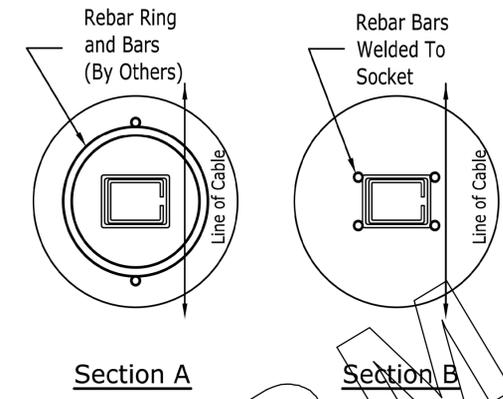
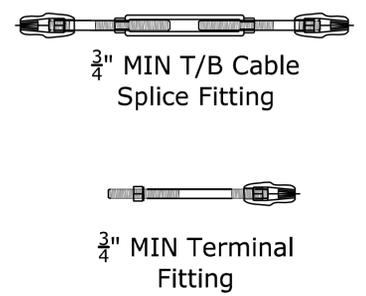
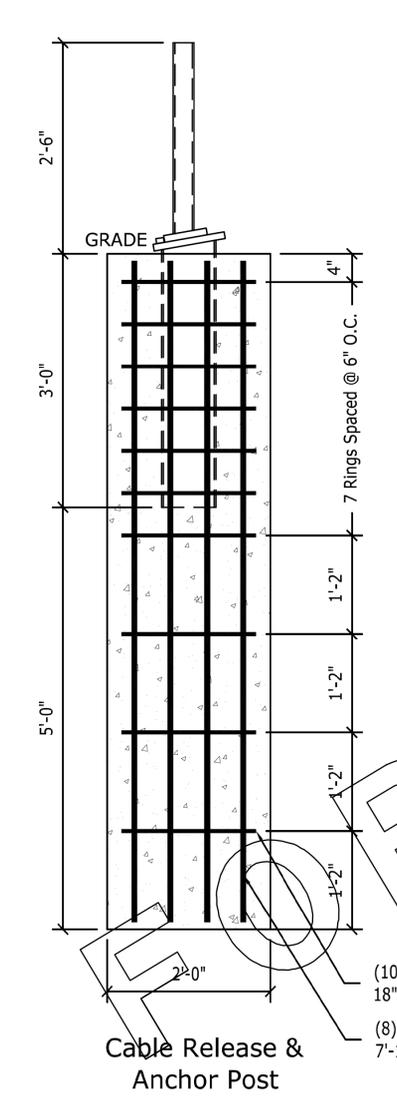
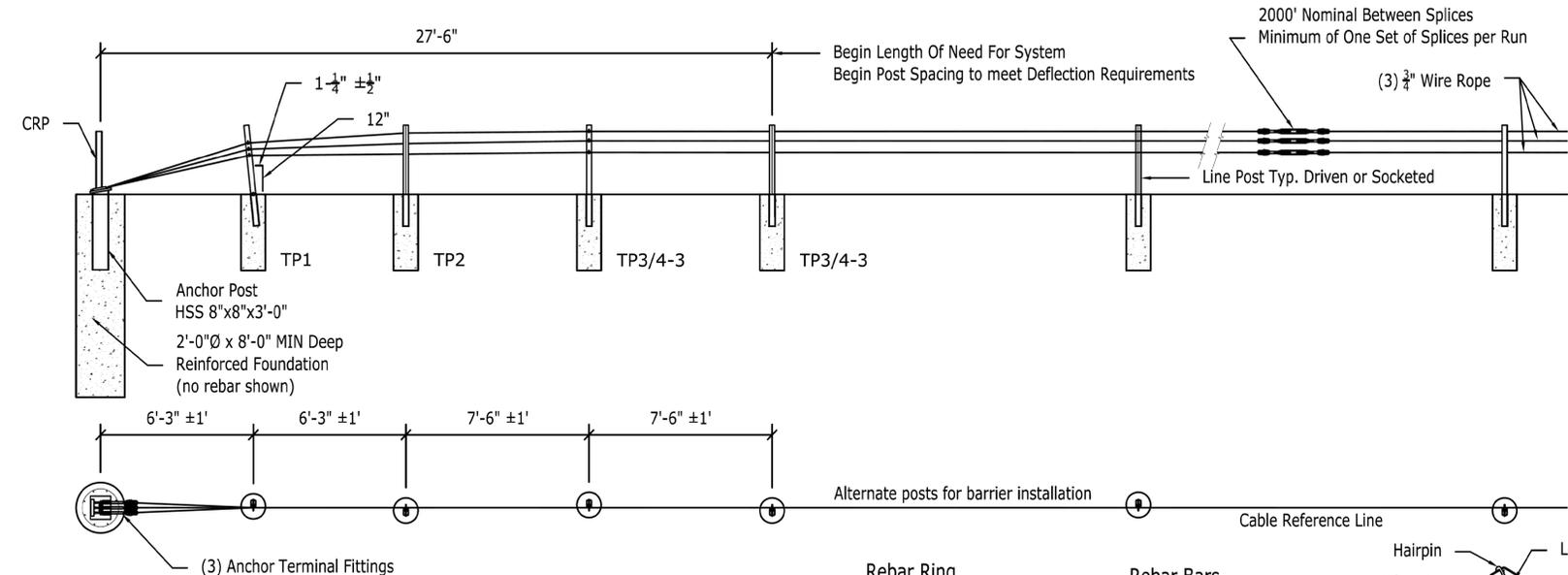
No.	CASS POST OPTIONS
1	CCT - TERMINAL POST 1 - 9 - IN CONCRETE
2	CCT - TERMINAL POST 1 - 9 - WITH SOIL PLATE
3	CASS POST - IN CONCRETE
4	CASS POST - DRIVEN
5	CASS POST - BASE-PLATED
6	CASS POST - IN DRIVEN SLEEVE
	6A - DRIVEN SLEEVE - WITH NOTCH
	6B - DRIVEN SLEEVE - WITH SOIL PLATE

PROJ: CASS-STD

GALV SPEC:  
SHIPPING WT:  
DRW: E.A.S. 4/11/2008  
CHK: G.N. 4/11/2008  
SHT: 1 OF 5 SIZE: D  
DWG NO: SS-720

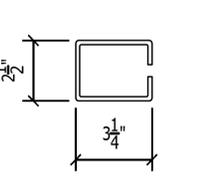
**TRINITY HIGHWAY PRODUCTS, LLC**

Sheet: <b>01 OF 01</b>	Rev: <b>10</b>	Rev Date: <b>8-5-11</b>	Approver: <b>BH</b>
Job # <b>XXX</b>	Gibraltar Job # <b>XXX</b>	County: <b>XXX</b>	<b>##/##/## -</b>



**GENERAL NOTES**

- For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
- All concrete shall be per specification; minimum 2,500psi.
- The Cable Barrier System shall be installed on shoulders or on medians with slopes of 6:1 or flatter.
- The Cable Barrier System is accepted by the FHWA Test Level - 3.
- See specification for delineation requirements.
- Rock Clause Where solid rock is encountered:
  - For socketed post, continue digging 12" diameter, 15" deep into rock or the required plan depth, whichever comes first.
  - For driven post and driven socket, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
  - For Anchor post, continue digging 24" diameter, 30" deep into rock or the required plan depth, whichever comes first.
- Tolerances:
  - LP= 3"(max) out of plumb, at top
  - Cable height= ±1"
  - Anchor Post ± 5" off of Cable Reference Line
- The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
- All non-welded rebar by others.
- Minimum recommended line post foundation.
  - Without mowstrip, 36" Deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long or 30" welded rebar socket.
  - With 4" minimum depth hot mix asphalt, 30" deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long or 30" welded rebar socket.
  - With 3" minimum depth concrete mowstrip, 24" deep x 12" diameter foundations. (No rebar required).
  - Direct drive driven post and driven socket 42" deep.



C-Section Post

Deflection	
Deflection	Post Spacing
9'-3"	30 FT
9'-0"	28 FT
8'-0"	20 FT
7'-0"	12 FT
6'-8"	10 FT

Cable Tension Chart*	
-10 °F	8000
0 °F	7600
10 °F	7200
20 °F	6800
30 °F	6400
40 °F	6000
50 °F	5600
60 °F	5200
70 °F	4800
80 °F	4400
90 °F	4000
100 °F	3600
110 °F	3200

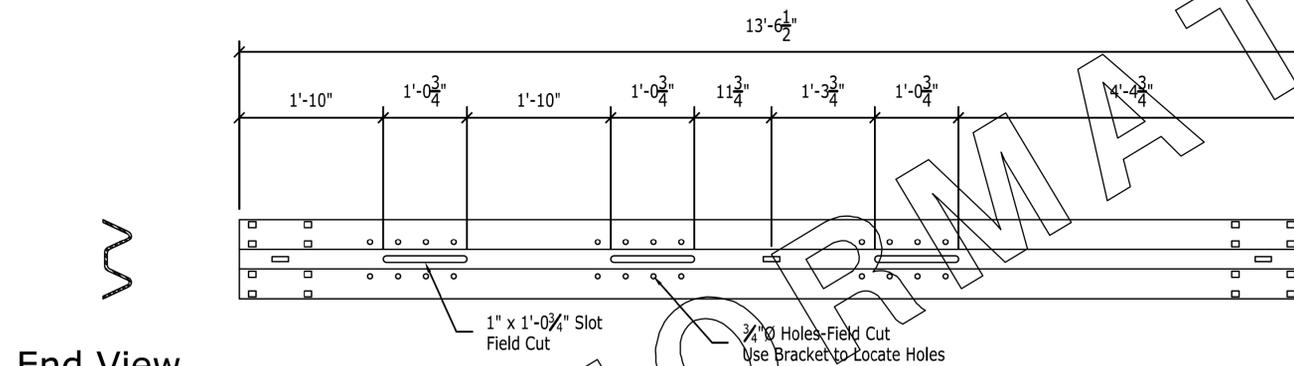
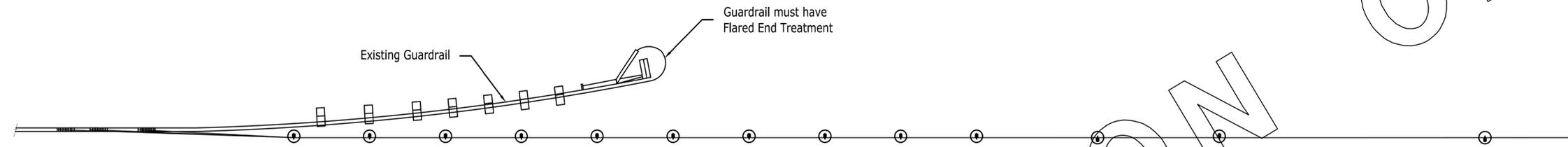
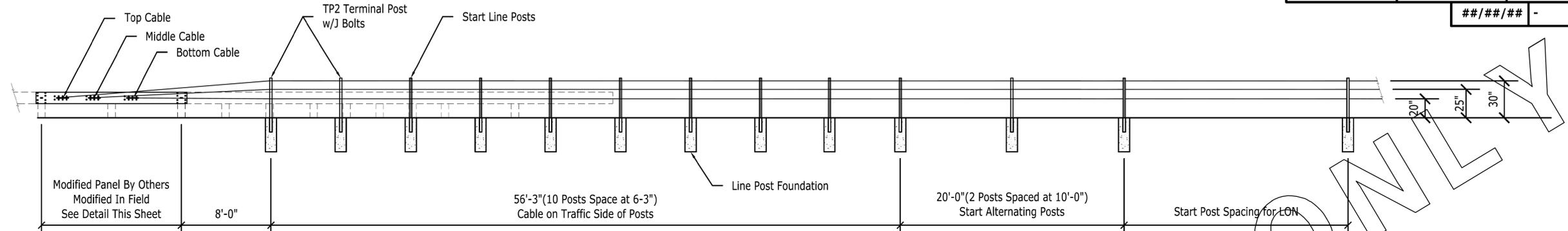
\*Allowable Deviation from Chart +/- 10%

**PROPRIETARY TO GIBRALTAR**

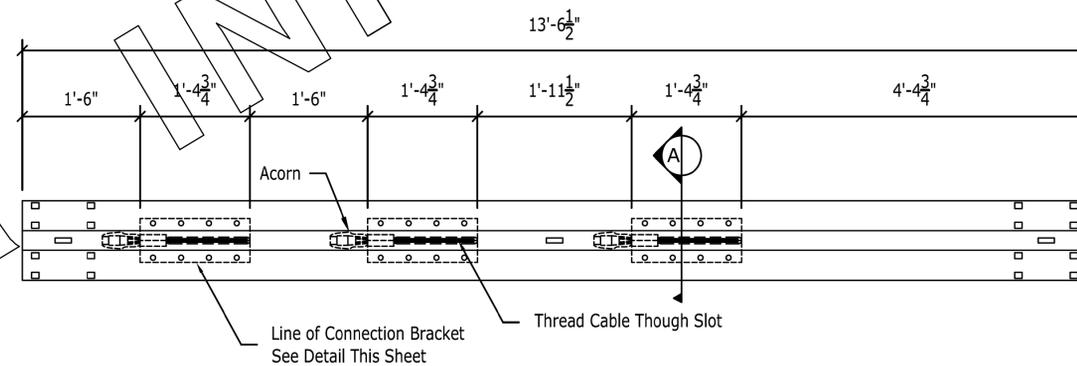


<b>TL-3 Cable System Layout</b>	
Gibraltar Cable Barrier Systems	
Scale: <b>NTS</b>	Date: <b>8-5-11</b>
Layout: <b>ANSI B</b>	Drafter: <b>BH</b>

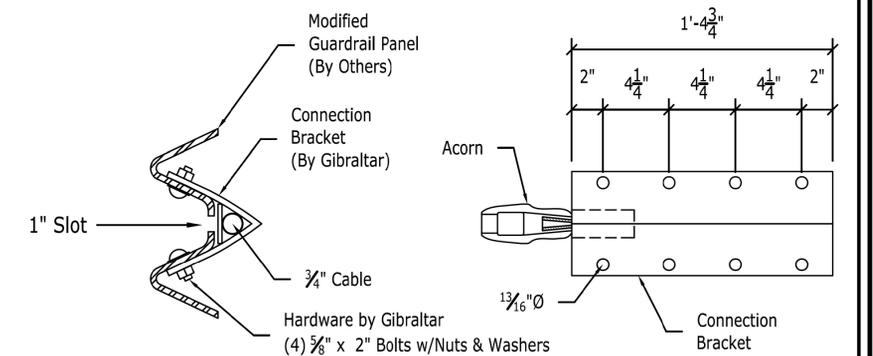
Sheet:	01 OF 01	Rev:	10	Rev Date:	8-5-11	Approver:	BH
Job #	XXX	Gibraltar Job #	XXX	County:	XXX		
						##/##/##	-



Modified Guardrail Panel

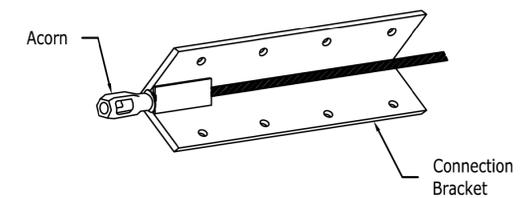


Modified Guardrail Panel  
w/Connection Bracket Shown



Section A

Connection Bracket



Connection Bracket

PROPRIETARY TO GIBRALTAR

	<b>TL3 Guardrail Transition</b>	
	Gibraltar Cable Barrier Systems	
	Scale: NTS	Date: 1-18-12
	Layout: ANSI B	Drafter: BH

FOR INFORMATION

FOR INFORMATION

FOR INFORMATION

FOR INFORMATION

ROADWAY DESIGN DIVISION

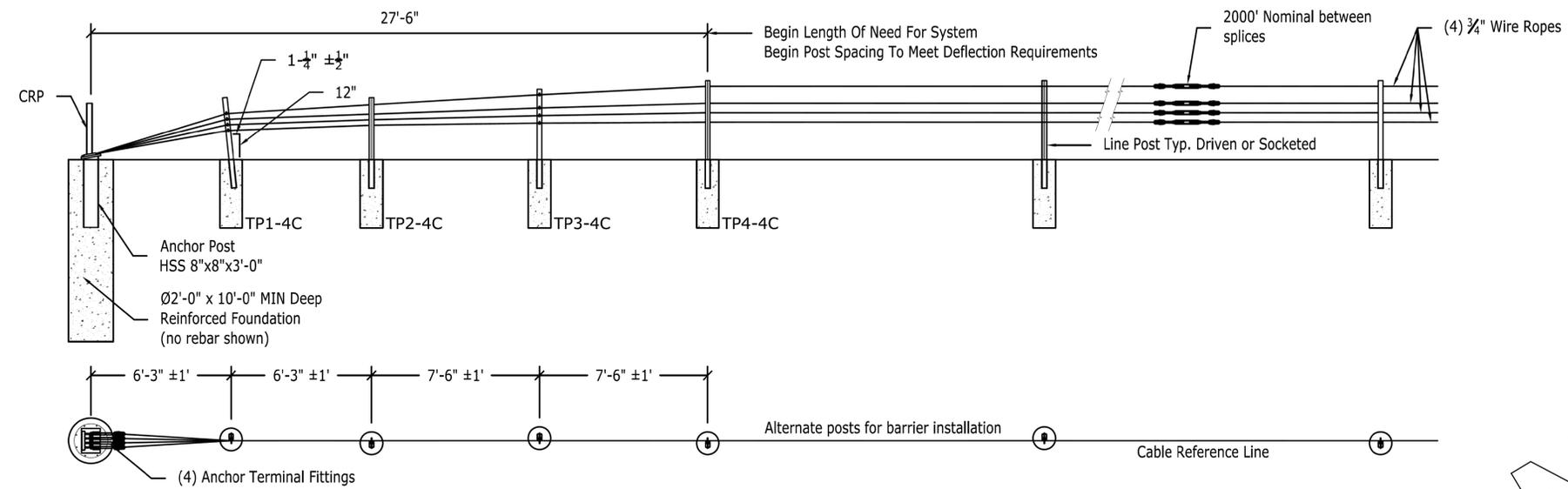
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User: dcr13017

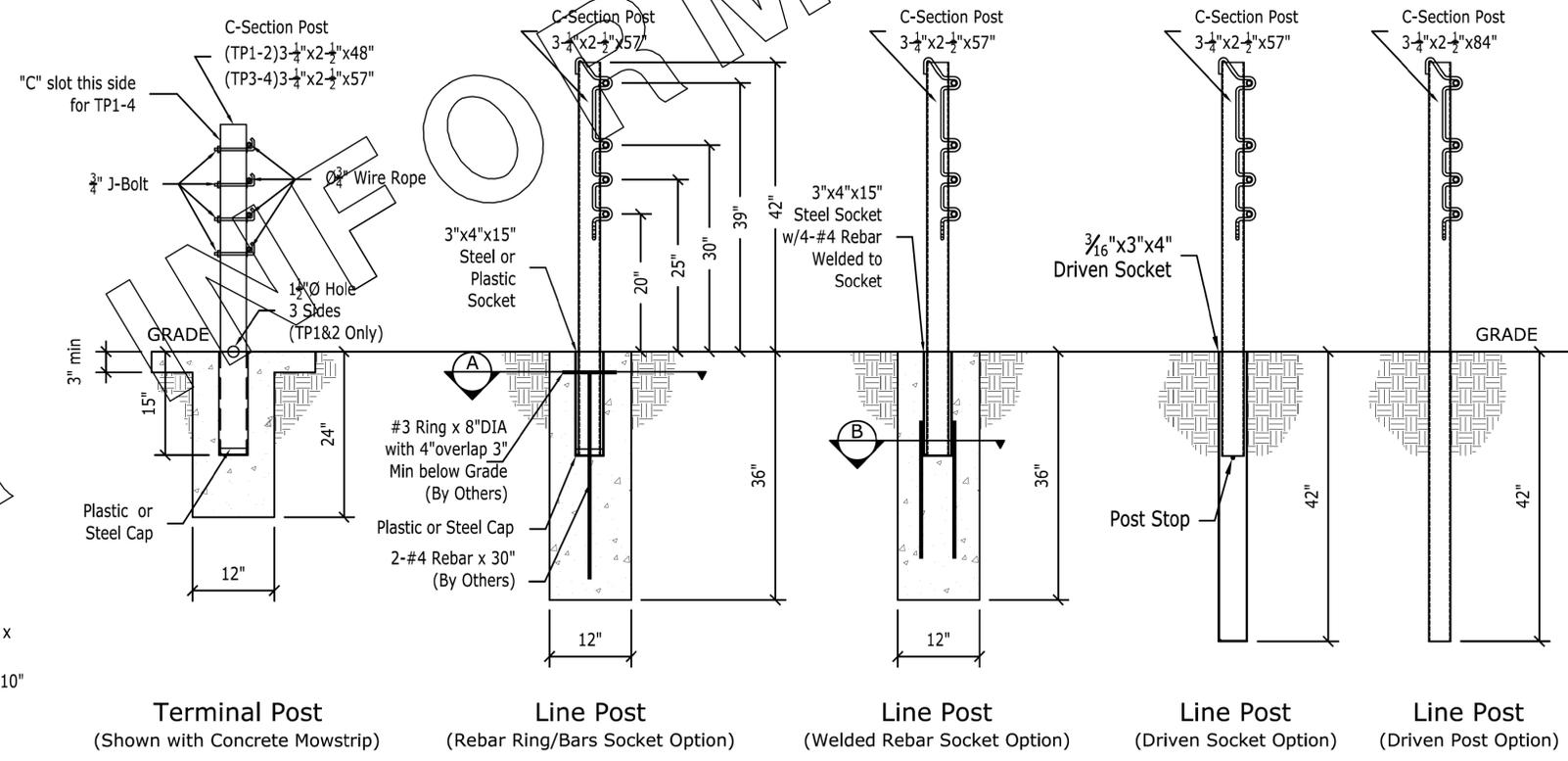
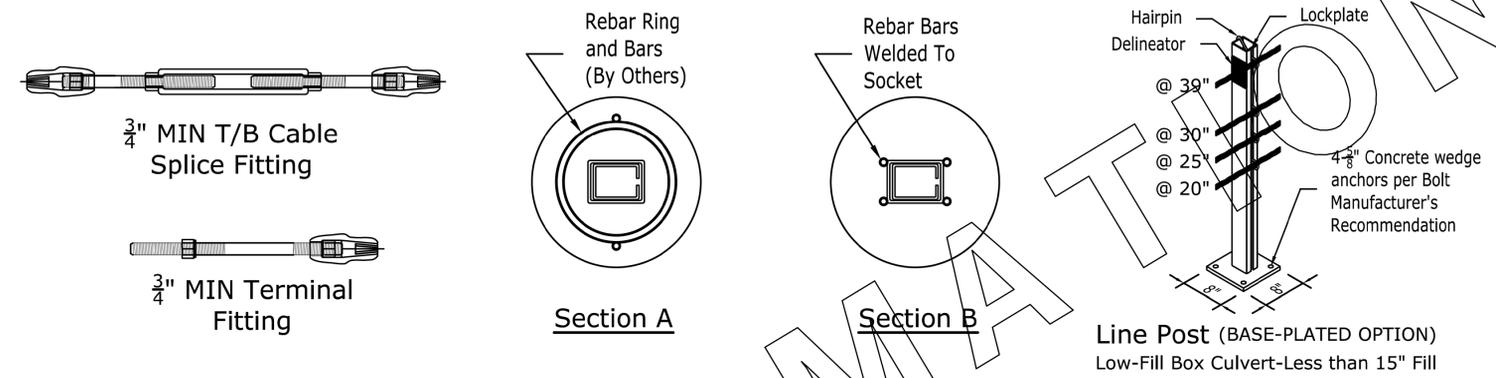
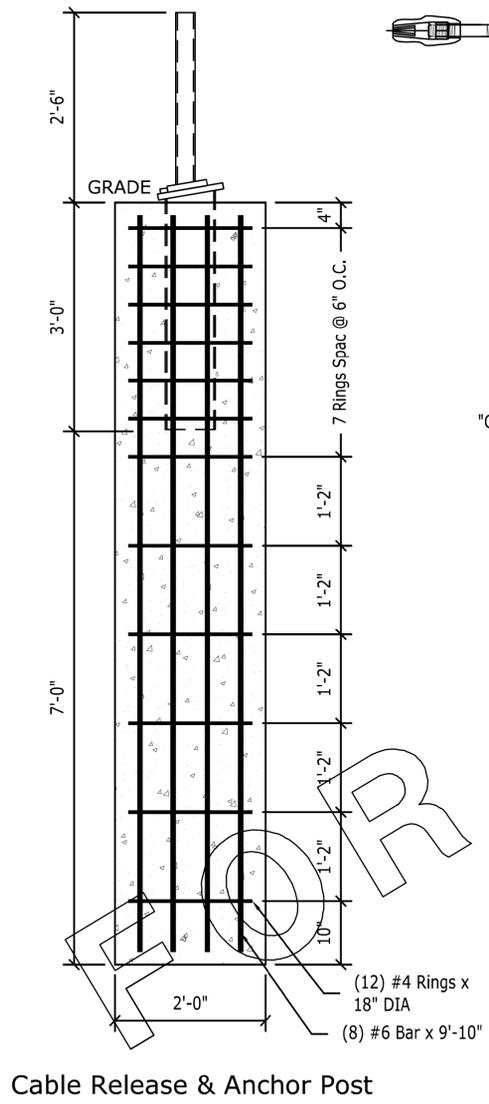
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File: 77836e01.dgn  
Scale: 1:100

Sheet: <b>01 OF 01</b>	Rev: <b>10</b>	Rev Date: <b>8-5-11</b>	Approver: <b>BH</b>
Job # <b>XXX</b>	Gibraltar Job # <b>XXX</b>	County: <b>XXX</b>	
##/##/## -			



- GENERAL NOTES:**
- For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
  - All concrete shall be per specification, minimum 2500 PSI.
  - The Cable Barrier System shall be installed on shoulders or on medians with slopes of 6:1 or flatter. If installed on slopes steeper than 6:1 up to 4:1 the TL-4 system performs as a TL-3 and Gibraltar must be contacted for various guidelines related to placement.
  - The Cable Barrier System is accepted by the FHWA Test Level - 4.
  - See the specification for delineation.
  - Rock Clause: Where solid rock is encountered:
    - For socketed post, continue digging 12" diameter, 15" deep into rock or the required plan depth, whichever comes first.
    - For driven post, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
    - For Anchor post, continue digging 24" diameter, 30" deep into rock or the required plan depth, whichever comes first.
  - Tolerances:
    - LP= 3"(max) out of plumb, at top
    - Cable height= ±1"
    - Anchor Post ± 5" off of Cable Reference Line
  - The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
  - All non-welded rebar by others.
  - Minimum recommended line post foundation.
    - Without mowstrip, 36" Deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long or 30" welded rebar socket.
    - With 4" minimum depth hot mix asphalt, 30" deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long or 30" welded rebar socket.
    - With 3" minimum depth concrete mowstrip, 24" deep x 12" diameter foundations. (No rebar required).
    - Direct drive driven post and driven socket 42" deep.



-10 °F	8000
0 °F	7600
10 °F	7200
20 °F	6800
30 °F	6400
40 °F	6000
50 °F	5600
60 °F	5200
70 °F	4800
80 °F	4400
90 °F	4000
100 °F	3600
110 °F	3200

Deflection	Post Spacing
9'-3"	30 FT
9'-0"	28FT
8'-0"	20 FT
7'-0"	12 FT
6'-8"	10 FT

**PROPRIETARY TO GIBRALTAR**

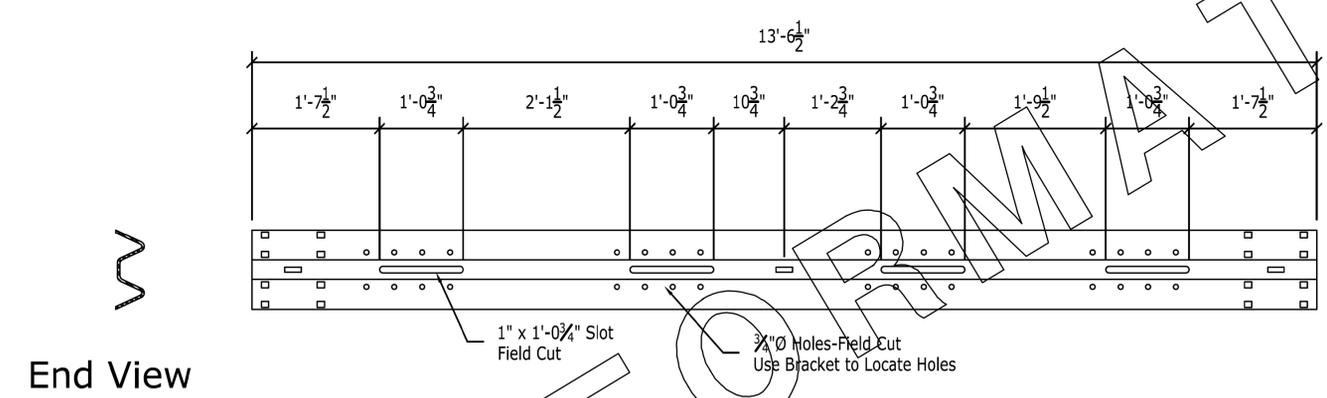
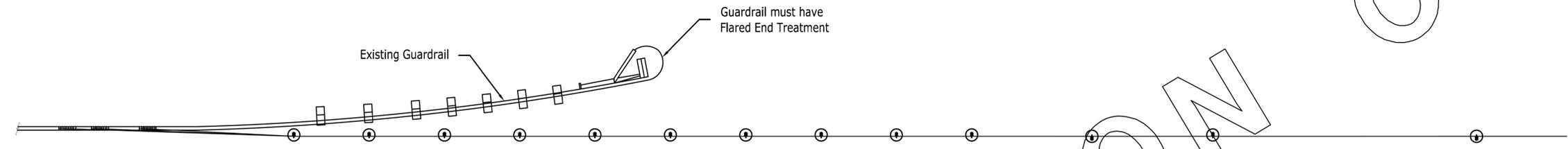
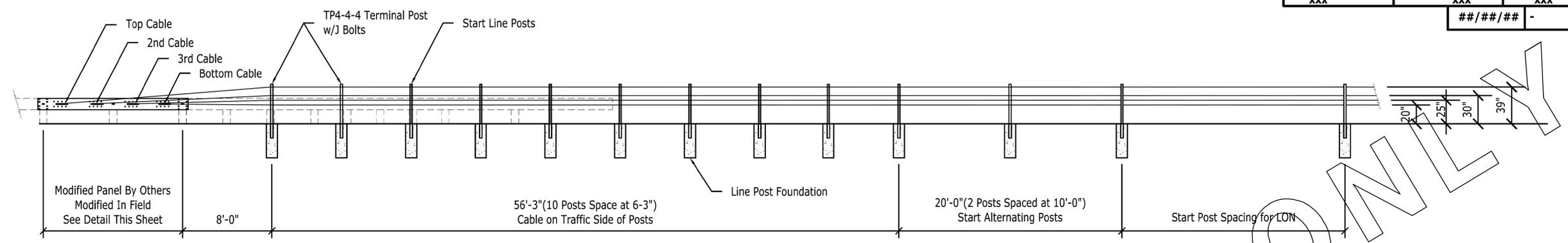
**TL-4 4 Cable System Layout**

Gibraltar Cable Barrier Systems

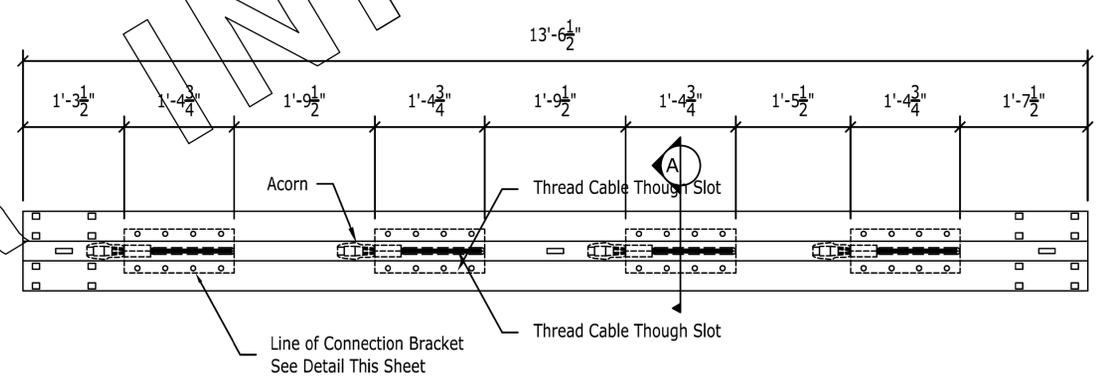
Scale: **NTS** Date: **8-5-11**

Layout: **ANSI B** Drafter: **BH**

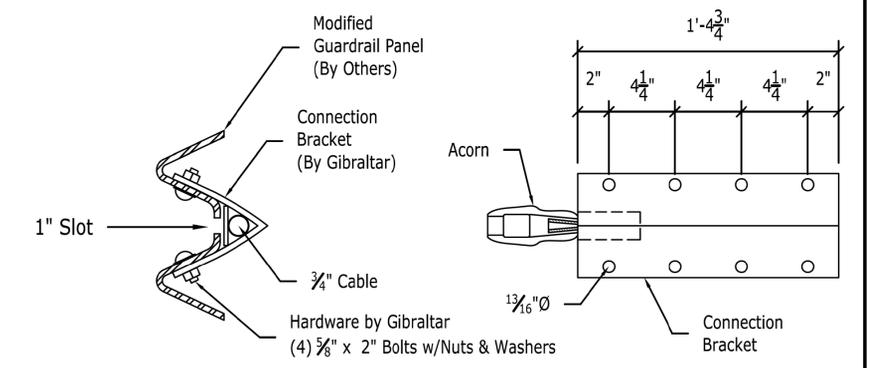
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Job # <b>XXX</b>	Gibraltar Job # <b>XXX</b>	County: <b>XXX</b>	
##/##/## -			



Modified Guardrail Panel

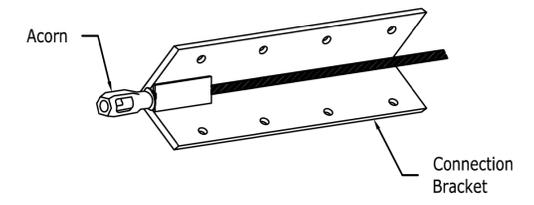


Modified Guardrail Panel  
w/Connection Bracket Shown



Section A

Connection Bracket



Connection Bracket

**PROPRIETARY TO GIBRALTAR**

**TL4 4 Cable  
Guardrail Transition**

Gibraltar Cable Barrier Systems

Scale: **NTS** Date: **1-18-12**

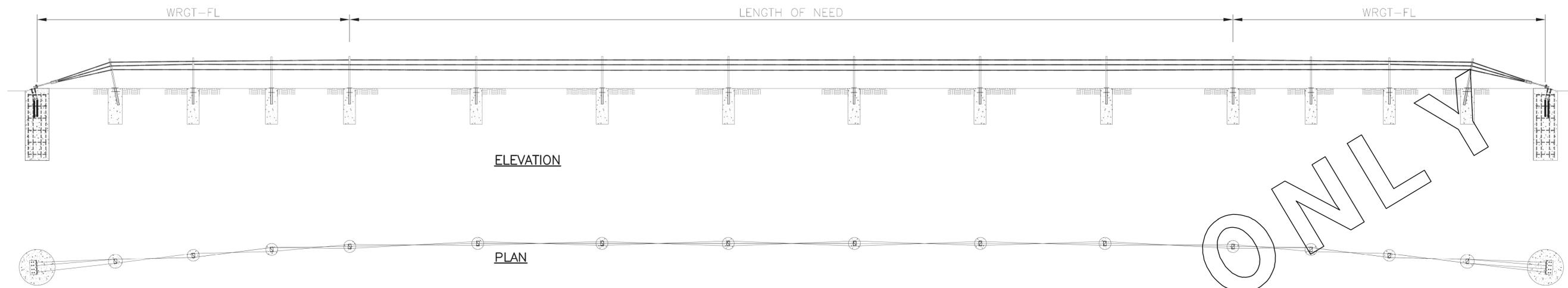
Layout: **ANSI B** Drafter: **BH**

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 User: dcr13017  
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 File: 77836e01.dgn  
 Scale: 1:100

FOR INFORMATION

FOR INFORMATION

FOR INFORMATION



ELEVATION

PLAN

WRGT-FL END ANCHOR

ROPE TENSION TABLE		
ROPE TEMP. (F°)	TENSION (LBS)	TENSION (kN)
0	5700	25.4
5	5550	24.7
10	5400	24.0
15	5250	23.4
20	5100	22.7
25	4950	22.0
30	4800	21.4
35	4650	20.74
40	4500	20.0
45	4350	19.3
50	4200	18.7
55	4050	18.0
60	3900	17.3
65	3750	16.7
70	3600	16.0
75	3450	15.3
80	3300	14.7
85	3150	14.0
90	3000	13.3
95	2850	12.7
100	2700	12.0
105	2550	11.3
110	2400	10.7
115	2250	10.0
120	2100	9.3
125	1950	8.7
130	1800	8.0
135	1650	7.3
140	1500	6.7

\* ROPE TENSION: ±20% AFTER 2-WEEK INTERVAL

GENERAL NOTES:

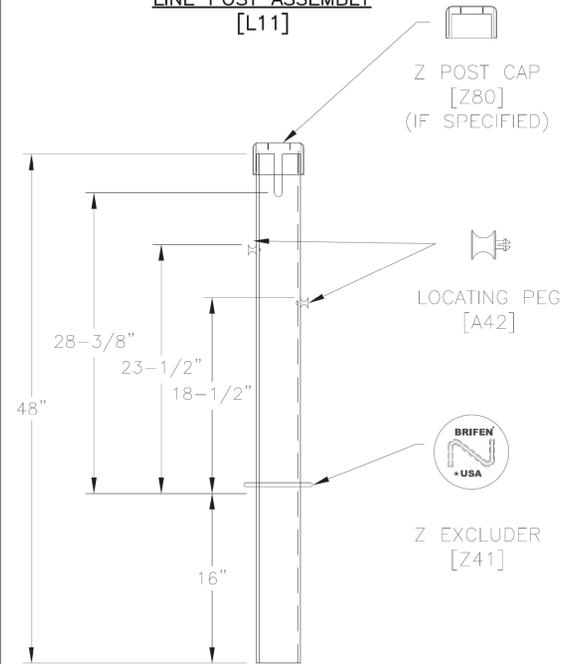
- BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4336.
- THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS ON SLOPES 6:1 OR FLATTER.
- BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACT MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.
- THE WRGT-FL END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 3'-0" FROM THE END ANCHOR. POSTS A THROUGH POST B3, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.
- ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.
- ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.
- REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS.
- FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.
- TAPER RATES FOR THE BRIFEN WRSF ARE AS FOLLOWS:  
HORIZONTAL: 25:1 MAXIMUM, 50:1 PREFERABLE  
VERTICAL: 25:1 MAXIMUM, 50:1 PREFERABLE

\* SEE SHEET 3 OF 3 FOR FURTHER INFORMATION

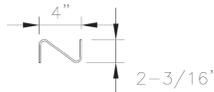
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Revision			BRIFEN WRSF NCHRP 350 TL-3 (3-ROPE) INSTALLATION & LAYOUT DETAILS		
No.	Date	By	Date	Drawn By	Scale
1.			2.8.12	Manita Elizondo	None
2.			VERSION 12.0		
3.					
4.			Dwg. No.	WRGTFL-12-004b	Sheet No 1 OF 3
5.					

**LINE POST ASSEMBLY [L11]**



**ELEVATION**

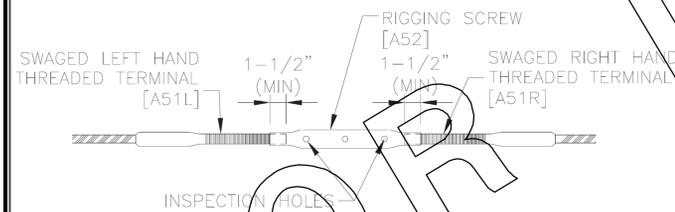


**PLAN**

**NOTES SPECIFIC TO LINE POST ASSEMBLY**

1. ROPE HEIGHTS SHALL BE  $\pm 1"$  TO GROUND LINE.
2. POST SHALL BE  $\pm 4"$  FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.

**ROPE CONNECTION DETAIL**

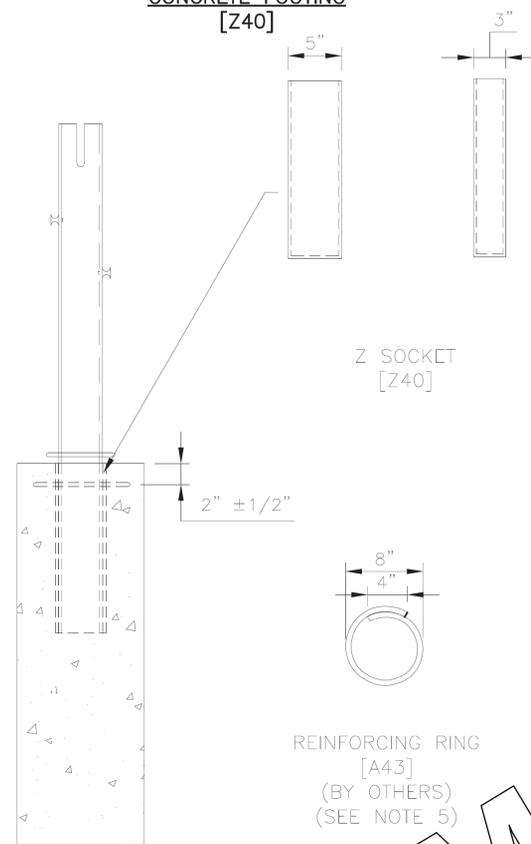


**NOTES SPECIFIC TO ROPE CONNECTION DETAIL**

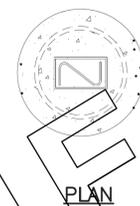
1. THE WIRE ROPE TERMINALS SHALL BE THREADED A MINIMUM OF 1-1/2" INTO RIGGING SCREW.
2. AFTER FINAL TENSIONING, THE TERMINALS SHALL BE VISIBLE IN THE INSPECTION HOLES.

**SOCKET ASSEMBLY**

**CONCRETE FOOTING [Z40]**



**ELEVATION**

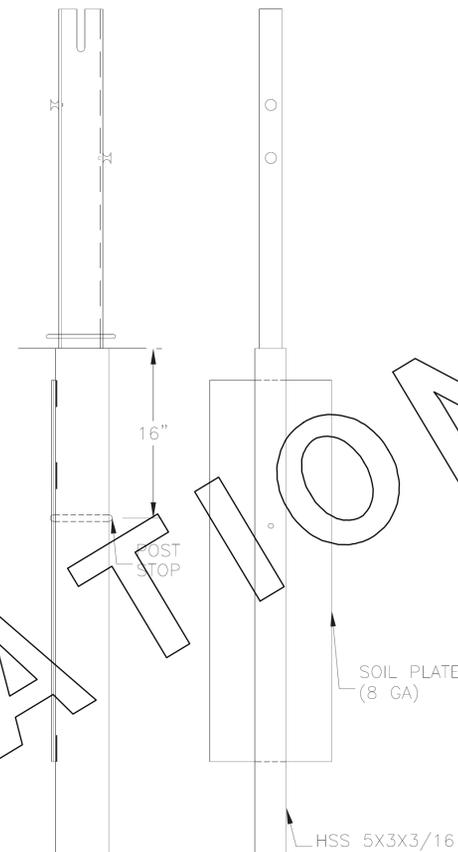


**PLAN**

**NOTES SPECIFIC TO CONCRETE FOOTING**

1. SIZE OF FOOTING WILL BE DETERMINED BY SOIL CONDITIONS, FOUNDATION TYPE AND PROJECT CONDITIONS.
2. CONCRETE BASED ON AGENCY SPECIFICATIONS.
3. CONCRETE BY OTHERS.
4. REINFORCING RING (BY OTHERS) WILL BE USED ACCORDING TO FOUNDATION SIZE AND TYPE.
5. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
6. SOCKET SHALL BE  $\pm 2'$  OF VERTICAL PLUMB.

**DRIVE SOCKET [L44]**



**ELEVATION**

**SIDE**



**PLAN**

**NOTES SPECIFIC TO DRIVE SOCKETS**

1. SIZE OF SOIL PLATE WILL BE DETERMINED BY SOIL CONDITIONS AND PROJECT CONDITIONS.
2. THE SOIL PLATE SHALL BE PARALLEL TO ROADWAY AND CAN FACE TOWARD OR AWAY FROM THE TRAVEL LANE.
3. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
4. SOCKET SHALL BE  $\pm 2'$  OF VERTICAL PLUMB.
5. SOCKETS SHALL BE DRIVEN IN A MANNER TO NOT DISTORT OR DESTROY THE TOP OF SOCKET TO A DEGREE THAT PLACES THE SOCKET OR LINE POST OUT OF CONSTRUCTION TOLERANCES.

**GENERAL NOTES:**

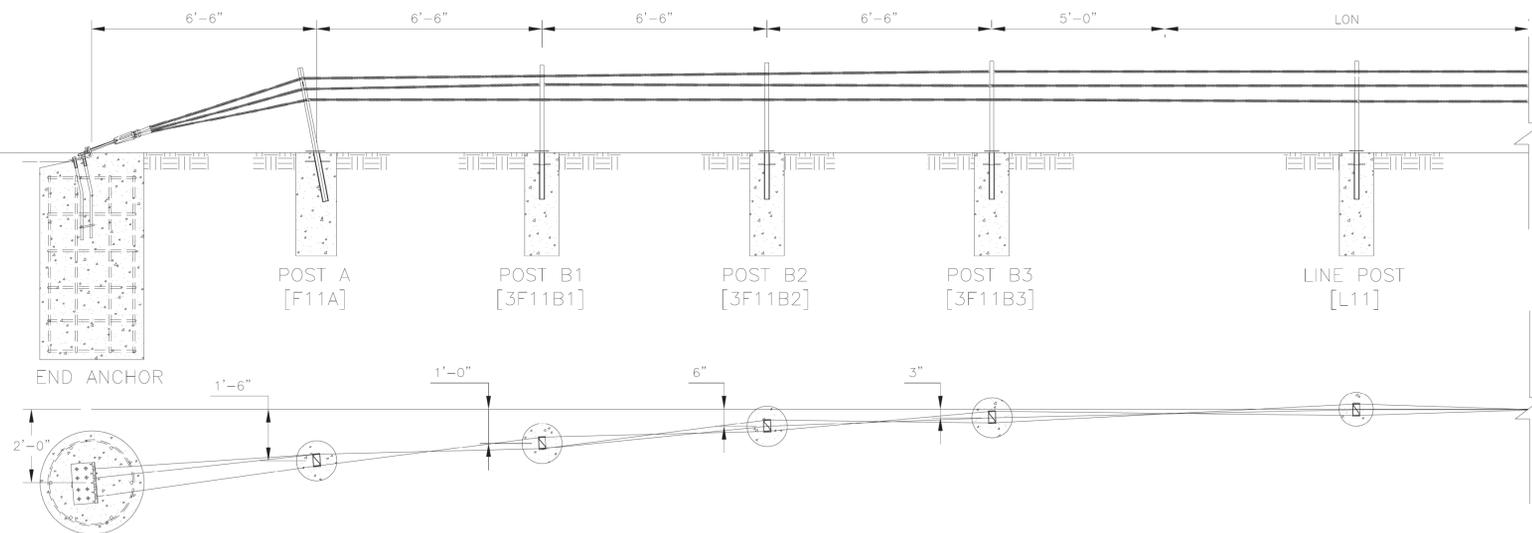
1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4336.
2. THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS ON SLOPES 6:1 OR FLATTER.
3. BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACTON MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.

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**BRIFEN USA INC.**

Revision			BRIFEN WRSF NCHRP 350 TL-3 (3-ROPE) LENGTH OF NEED COMPONENTS		
No.	Date	By	Date	Drawn By	Scale
1.			2.8.12	Manita Elizondo	None
2.			VERSION 12.0		
3.					
4.			Dwg. No.	WRGTFL-12-005b	Sheet No 2 OF 3
5.					

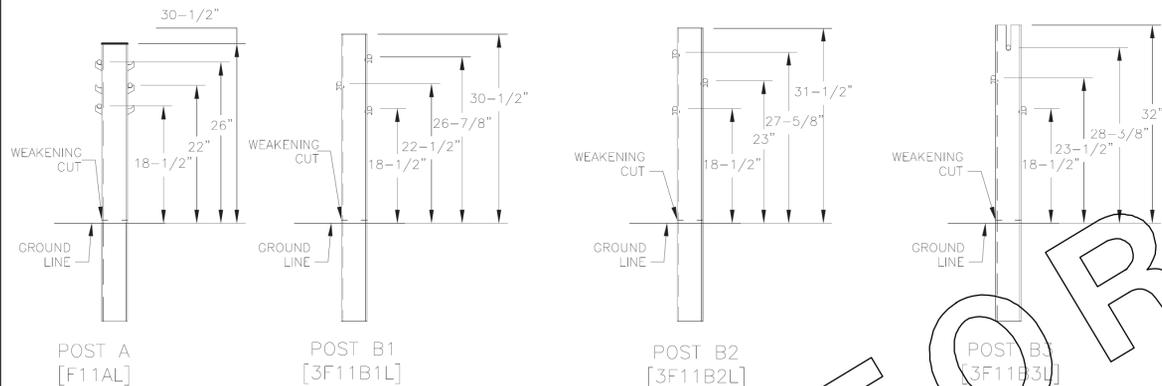
**WRGT-FL END ANCHOR LAYOUT**



GENERAL NOTES:

1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4336.
2. THE WRGT-FL END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 31'-0" FROM THE END ANCHOR. POSTS A THROUGH POST B3, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.
3. ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.
4. ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.
5. REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS.
6. FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.

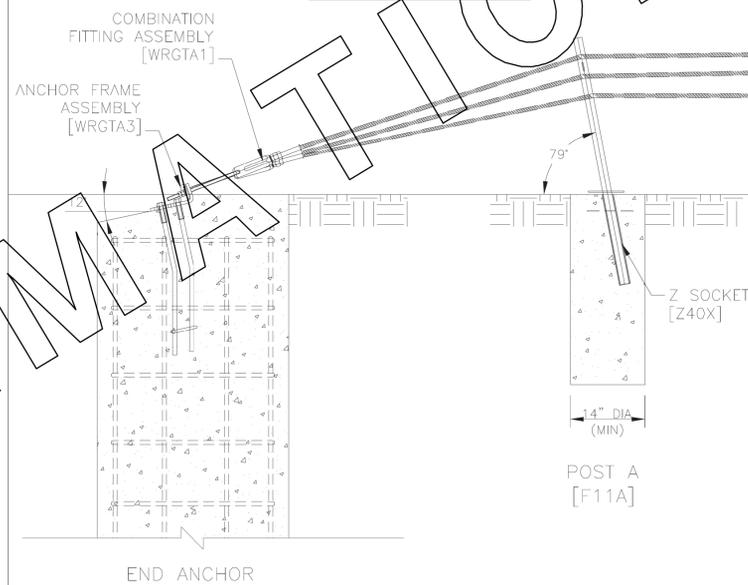
**WRGT-FL POST DETAILS**



NOTES SPECIFIC TO WRGT-FL POST DETAIL

1. ROPE HEIGHTS SHALL BE  $\pm 1"$  TO GROUND LINE.
2. POST SHALL BE  $\pm 4"$  FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.
6. Z EXCLUDER (Z41) SHALL BE USED.
7. POST A & SOCKET SHALL BE PLACED 79° ( $\pm 4^\circ$ ) TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
8. POST A SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.
9. FOUNDATIONS FOR POST B1 THRU B3 SHALL BE THE SAME AS THE LINE POST ASSEMBLY'S FOR THE PROJECT.
10. WEAKENED CUTS SHALL FACE END ANCHOR.

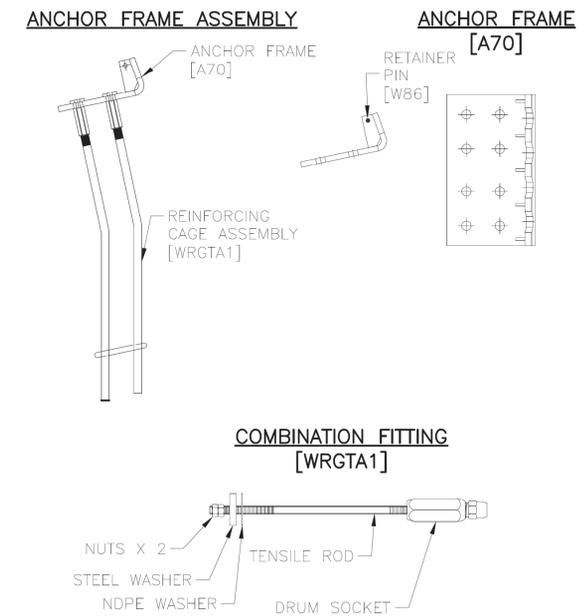
**END ANCHOR DETAILS**



NOTES SPECIFIC TO END ANCHOR DETAIL

1. THE END ANCHOR ASSEMBLY SHALL BE PLACED 12" (+3", -1") BELOW HORIZONTAL PLANE.
2. POST A & SOCKET SHALL BE PLACED 79° ( $\pm 4^\circ$ ) TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
3. POST A SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.

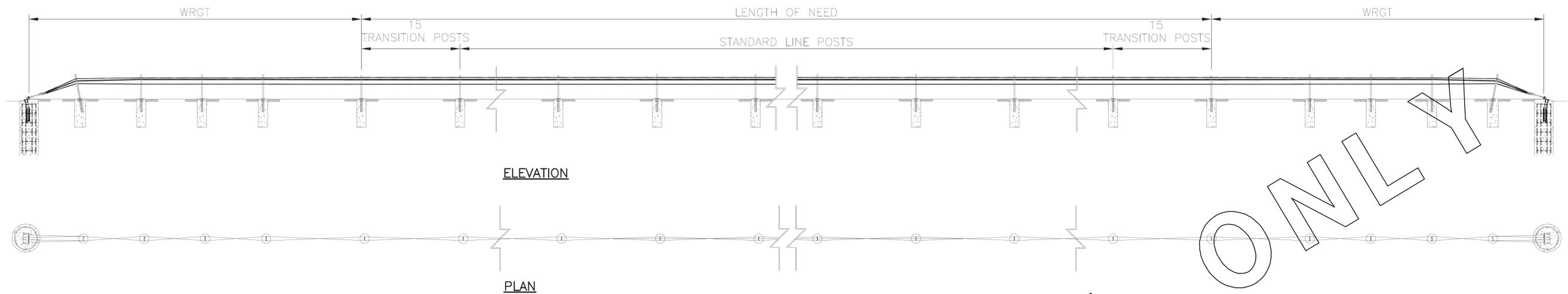
**END ANCHOR COMPONENTS**



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**BRIFEN★USA INC.**

Revision			BRIFEN WRGT-FL END TERMINAL INSTALLATION & LAYOUT DETAILS		
No.	Date	By	Date	Drawn By	Scale
1.			2.8.12	Manita Elizondo	None
2.			VERSION 12.0		
3.					
4.			Dwg. No.	WRGTFL-12-006b	Sheet No 3 OF 3
5.					



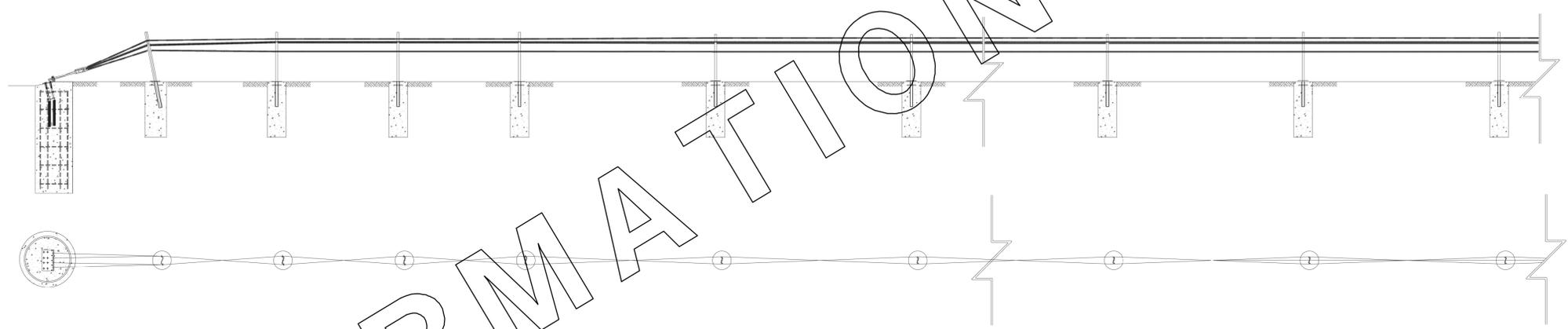
ELEVATION

PLAN

WRGT END ANCHOR

ROPE TENSION TABLE		
ROPE TEMP. (°F)	TENSION (LBS)	TENSION (kN)
0	5700	25.4
5	5550	24.7
10	5400	24.0
15	5250	23.4
20	5100	22.7
25	4950	22.0
30	4800	21.4
35	4650	20.74
40	4500	20.0
45	4350	19.3
50	4200	18.7
55	4050	18.0
60	3900	17.3
65	3750	16.7
70	3600	16.0
75	3450	15.3
80	3300	14.7
85	3150	14.0
90	3000	13.3
95	2850	12.7
100	2700	12.0
105	2550	11.3
110	2400	10.7
115	2250	10.0
120	2100	9.3
125	1950	8.7
130	1800	8.0
135	1650	7.3
140	1500	6.7

\* ROPE TENSION: ±20% AFTER 2-WEEK INTERVAL



\* SEE SHEET 3 OF 3 FOR FURTHER INFORMATION

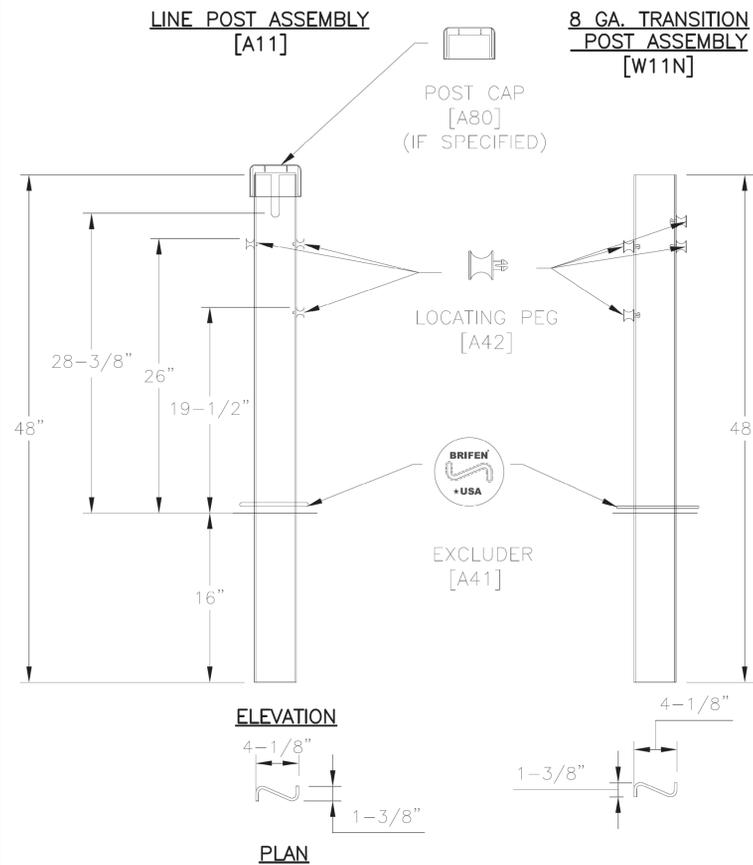
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- BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMP, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACT MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.
- THE WRGT END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 30'-6" FROM THE END ANCHOR. POST A THROUGH POST B2, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.
- THE 4 WRGT END ANCHOR POSTS AND THE 15 TRANSITION LINE POSTS DO NOT HAVE TOP ROPE SLOT. ALL ROPES WEAVE ON EITHER SIDE OF POSTS UNTIL THE FIRST STANDARD LINE POST WITH A SLOT (POST 20). BEYOND POST 20, THE TOP ROPE IS PLACED IN SLOT AT TOP OF POST AND OTHER ROPE WEAVE.
- ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.
- ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.
- REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS
- FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.
- TAPER RATES FOR THE BRIFEN WRSF ARE AS FOLLOWS:  
HORIZONTAL: 25:1 MAXIMUM, 50:1 PREFERABLE  
VERTICAL: 25:1 MAXIMUM, 50:1 PREFERABLE

The information herein is proprietary to BRIFEN USA, and shall not be disclosed, duplicated or used otherwise without the express written consent of BRIFEN USA, Inc.

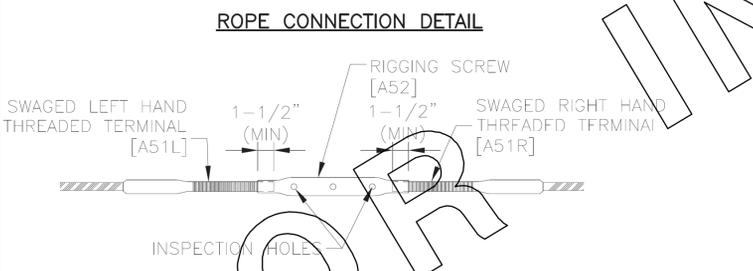
**BRIFEN★USA INC.**

Revision			BRIFEN WRSF NCHRP 350 TL-3 (4-ROPE) INSTALLATION & LAYOUT DETAILS		
No.	Date	By	Date	Drawn By	Scale
1.			2.8.12	Manita Elizondo	None
2.					
3.					
4.			VERSION 12.0		
5.			Dwg. No.	WRGT-12-001a	Sheet No 1 OF 3



NOTES SPECIFIC TO LINE POST AND TRANSITION POST ASSEMBLY

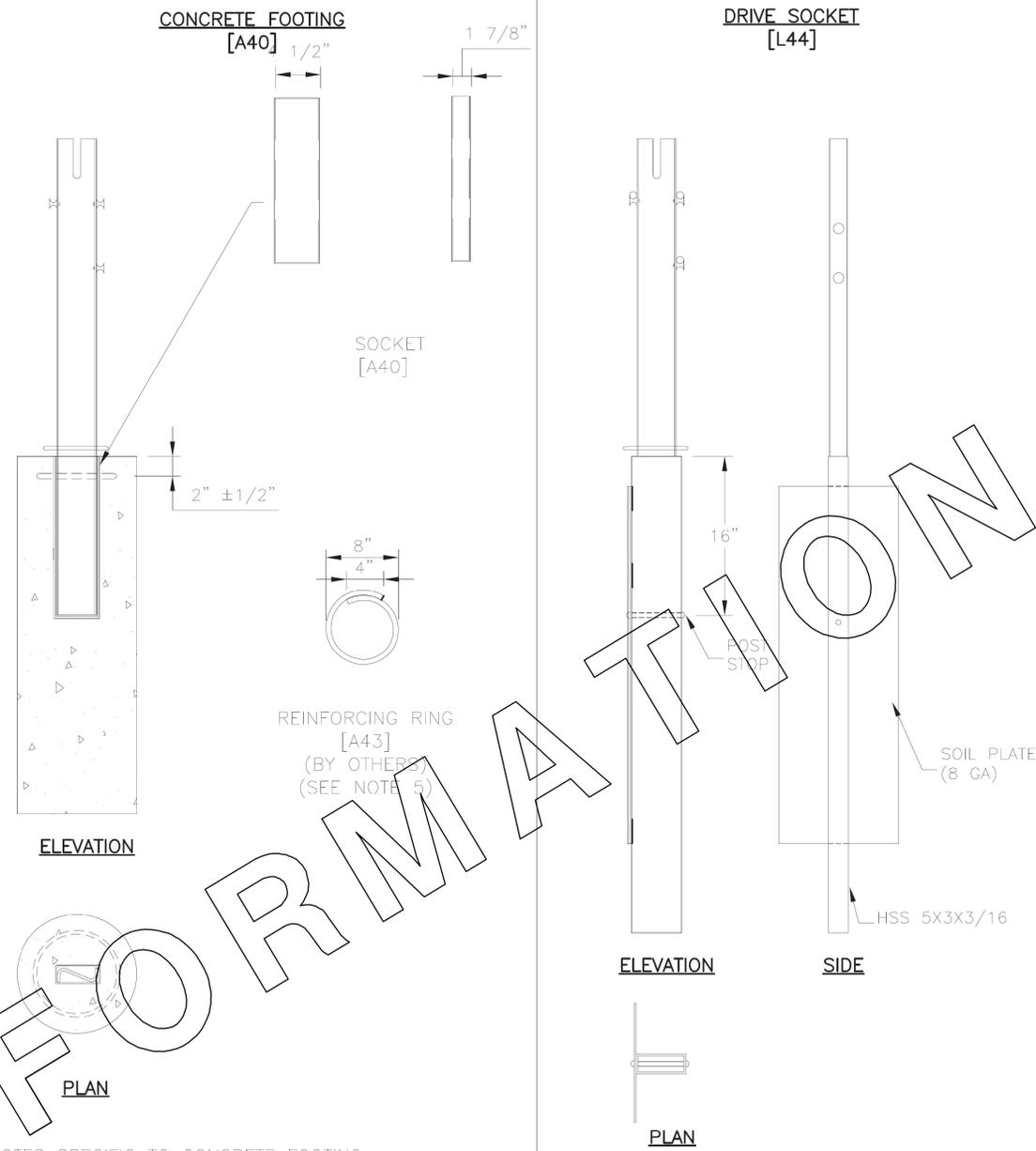
1. ROPE HEIGHTS FOR BOTH LINE POST AND TRANSITION POST ARE THE SAME.
2. ROPE HEIGHTS SHALL BE  $\pm 1"$  TO GROUND LINE.
3. POST SHALL BE  $\pm 4"$  FROM VERTICAL PLUMB.
4. POST CAPS SHALL BE USED IF SPECIFIED.
5. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
6. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.



NOTES SPECIFIC TO ROPE CONNECTION DETAIL

1. THE WIRE ROPE TERMINALS SHALL BE THREADED A MINIMUM OF 1-1/2" INTO RIGGING SCREW.
2. AFTER FINAL TENSIONING, THE TERMINALS SHALL BE VISIBLE IN THE INSPECTION HOLES.

SOCKET ASSEMBLY



NOTES SPECIFIC TO CONCRETE FOOTING

1. SIZE OF FOOTING WILL BE DETERMINED BY SOIL CONDITIONS, FOUNDATION TYPE AND PROJECT CONDITIONS.
2. CONCRETE BASED ON AGENCY SPECIFICATIONS.
3. CONCRETE BY OTHERS.
4. REINFORCING RING (BY OTHERS) WILL BE USED ACCORDING TO FOUNDATION SIZE AND TYPE.
5. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
6. SOCKET SHALL BE  $\pm 2'$  OF VERTICAL PLUMB.

NOTES SPECIFIC TO DRIVE SOCKETS

1. SIZE OF SOIL PLATE WILL BE DETERMINED BY SOIL CONDITIONS AND PROJECT CONDITIONS.
2. THE SOIL PLATE SHALL BE PARALLEL TO ROADWAY AND CAN FACE TOWARD OR AWAY FROM THE TRAVEL LANE.
3. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
4. SOCKET SHALL BE  $\pm 2'$  OF VERTICAL PLUMB.
5. SOCKETS SHALL BE DRIVEN IN A MANNER TO NOT DISTORT OR DESTROY THE TOP OF SOCKET TO A DEGREE THAT PLACES THE SOCKET OR LINE POST OUT OF CONSTRUCTION TOLERANCES.

GENERAL NOTES:

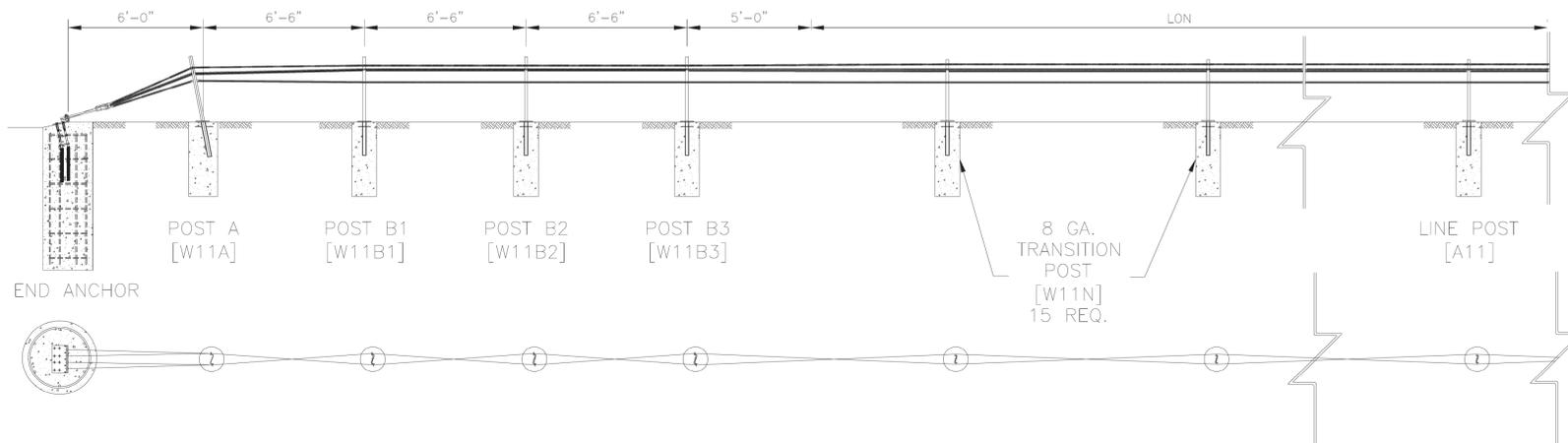
1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4370.
2. THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS ON SLOPES 6:1 OR FLATTER.
3. BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACTION MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.

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Revision			BRIFEN WRSF NCHRP 350 TL-3 (4-ROPE) LENGTH OF NEED COMPONENTS		
No.	Date	By	Date	Drawn By	Scale
1.			2.8.12	Manita Elizondo	None
2.			VERSION 12.0		
3.					
4.			Dwg. No.	WRGT-12-002a	Sheet No 2 OF 3
5.					

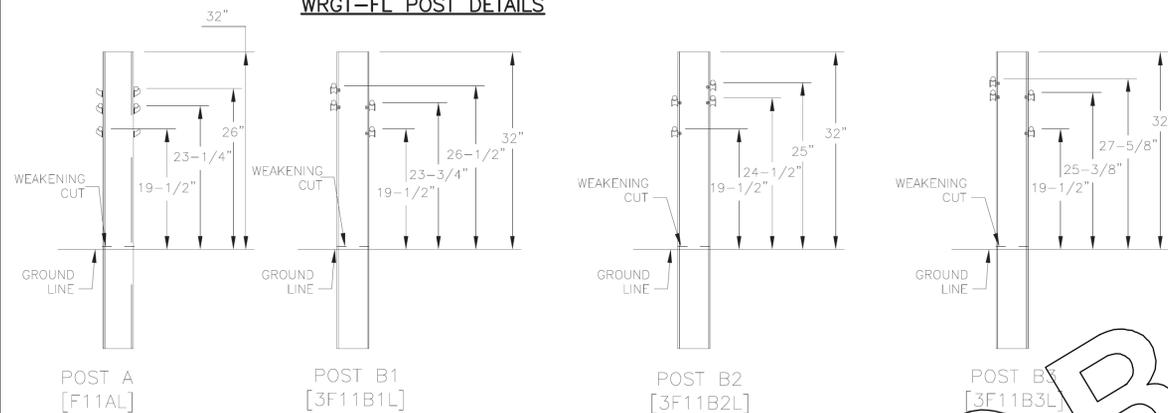
**WRGT-FL END ANCHOR LAYOUT**



GENERAL NOTES:

1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4336.
2. THE WRGT END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 30'-6" FROM THE END ANCHOR. POSTS A THROUGH POST B3, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.
3. ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.
4. ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.
5. REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS.
6. FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.

**WRGT-FL POST DETAILS**

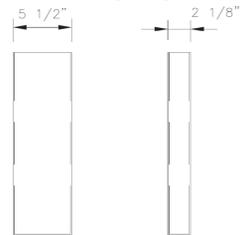


NOTES SPECIFIC TO WRGT POST DETAIL

1. ROPE HEIGHTS SHALL BE  $\pm 1"$  TO GROUND LINE.
2. POST SHALL BE  $\pm 4"$  FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.
6. LARGE EXCLUDER (W42) AND LARGE SOCKET (W40) SHALL BE USED FOR POST A TO POST B3.
7. POST A & SOCKET SHALL BE PLACED TO  $(\pm 4")$  TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
8. POST A SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.
9. FOUNDATIONS FOR POST B1 THRU B3 SHALL BE THE SAME AS THE LINE POST ASSEMBLY'S FOR THE PROJECT.
10. WEAKENED CUTS SHALL FACE END ANCHOR.

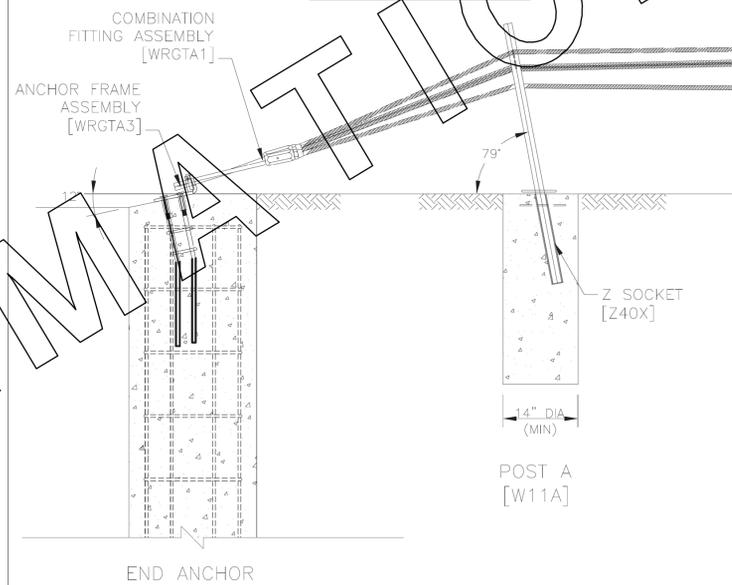
PLAN

LARGE EXCLUDER [W42]



LARGE SOCKET [W40]

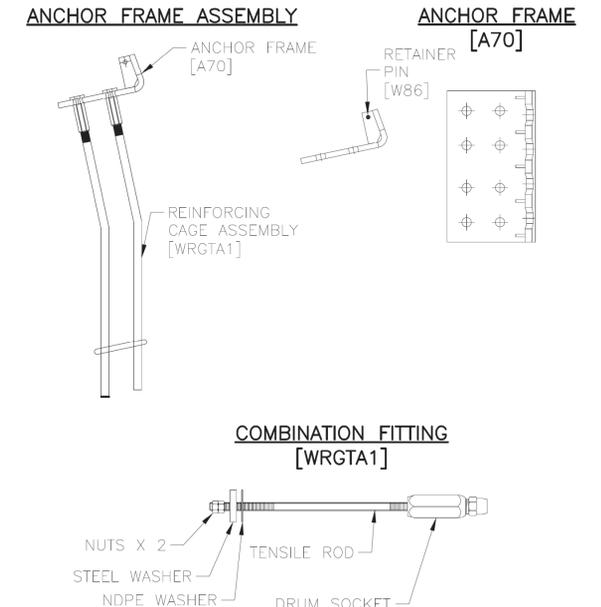
**END ANCHOR DETAILS**



NOTES SPECIFIC TO END ANCHOR DETAIL

1. THE END ANCHOR ASSEMBLY SHALL BE PLACED 12" (+3", -1") BELOW HORIZONTAL PLANE.
2. POST A & SOCKET SHALL BE PLACED 79° ( $\pm 4"$ ) TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
3. POST A SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.

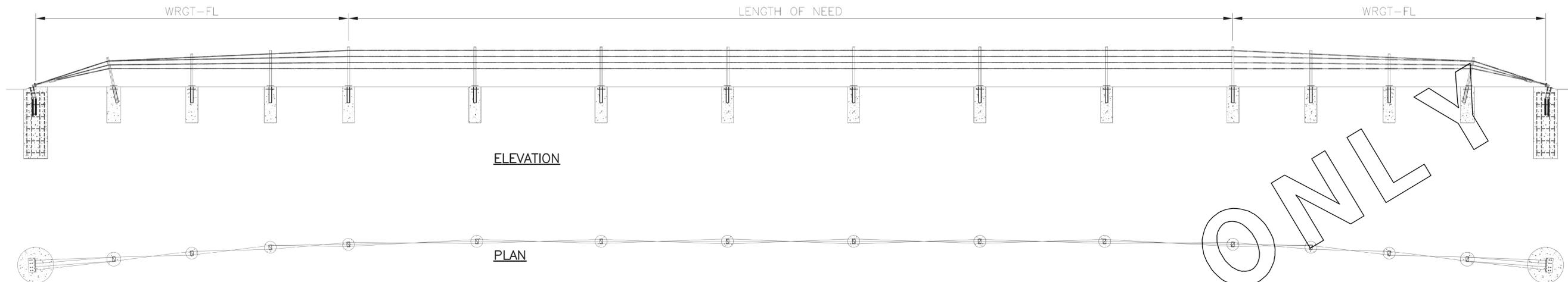
**END ANCHOR COMPONENTS**



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**BRIFEN★USA INC.**

Revision			BRIFEN WRGT END TERMINAL INSTALLATION & LAYOUT DETAILS		
No.	Date	By	Date	Drawn By	Scale
1.			2.8.12	Manita Elizondo	None
2.			VERSION 12.0		
3.					
4.			Dwg. No.	WRGT-12-003a	Sheet No 3 OF 3
5.					



ELEVATION

PLAN

WRGT-FL END ANCHOR

ROPE TENSION TABLE		
ROPE TEMP. (F)	TENSION (LBS)	TENSION (kN)
0	5700	25.4
5	5550	24.7
10	5400	24.0
15	5250	23.4
20	5100	22.7
25	4950	22.0
30	4800	21.4
35	4650	20.74
40	4500	20.0
45	4350	19.3
50	4200	18.7
55	4050	18.0
60	3900	17.3
65	3750	16.7
70	3600	16.0
75	3450	15.3
80	3300	14.7
85	3150	14.0
90	3000	13.3
95	2850	12.7
100	2700	12.0
105	2550	11.3
110	2400	10.7
115	2250	10.0
120	2100	9.3
125	1950	8.7
130	1800	8.0
135	1650	7.3
140	1500	6.7

\* ROPE TENSION: ±20% AFTER 2-WEEK INTERVAL

GENERAL NOTES:

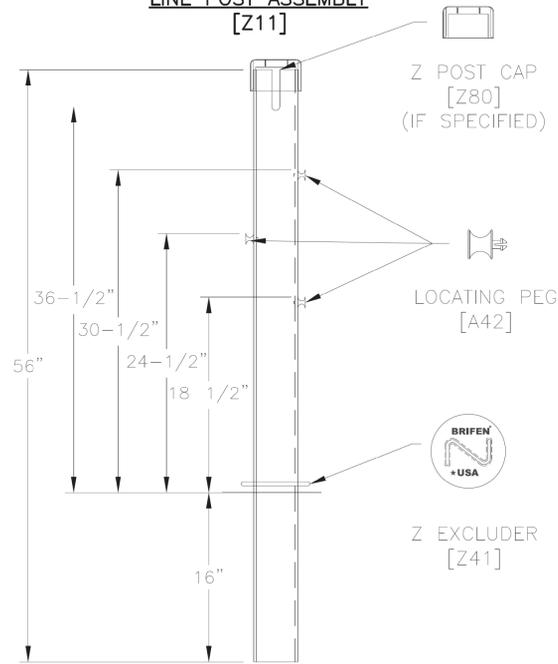
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- THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-4 CONDITIONS ON SLOPES 6:1 OR FLATTER AND NCHRP 350 TL-3 CONDITIONS ON SLOPES 4:1 TO 6:1.
- THE POST SPACING SHALL BE DETERMINED BY THE SPECIFYING AGENCY. POST SPACING MAY BE DECREASED TO AVOID OBSTRUCTIONS OR UTILITIES. IN NO EVENT SHALL THE POST SPACING EXCEED 21'-0".
- BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACT MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.
- THE WRGT-FL END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 31'-0" FROM THE END ANCHOR. POSTS A THROUGH POST B3, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.
- ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.
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- FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.
- TAPER RATES FOR THE BRIFEN WRSF ARE AS FOLLOWS:  
HORIZONTAL: 25:1 MAXIMUM, 50:1 PREFERABLE  
VERTICAL: 25:1 MAXIMUM, 50:1 PREFERABLE

\* SEE SHEET 3 OF 3 FOR FURTHER INFORMATION

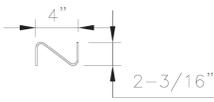
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Revision			BRIFEN WRSF NCHRP 350 TL-4 INSTALLATION & LAYOUT DETAILS		
No.	Date	By	Date 6.27.12	Drawn By Manita Elizondo	Scale None
1.			VERSION 12.0		Sheet No 1 OF 3
2.			Dwg. No.	WRGTFL-11-001b	
3.					
4.					
5.					

**LINE POST ASSEMBLY [Z11]**



**ELEVATION**

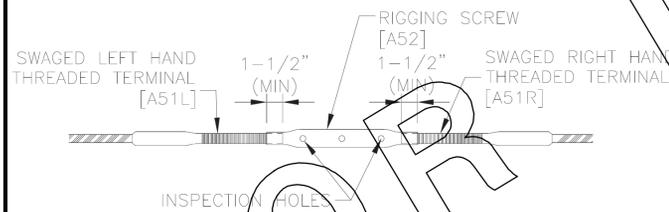


**PLAN**

NOTES SPECIFIC TO LINE POST ASSEMBLY

1. ROPE HEIGHTS SHALL BE  $\pm 1"$  TO GROUND LINE.
2. POST SHALL BE  $\pm 4"$  FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.

**ROPE CONNECTION DETAIL**

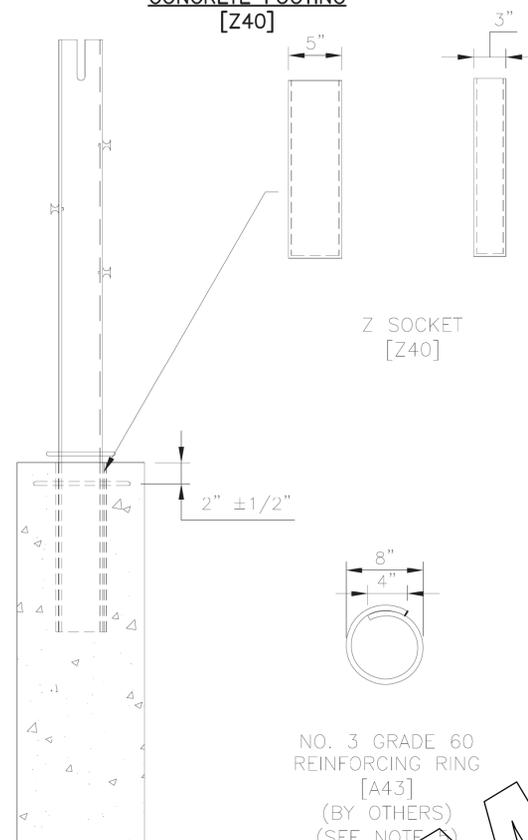


NOTES SPECIFIC TO ROPE CONNECTION DETAIL

1. THE WIRE ROPE TERMINALS SHALL BE THREADED A MINIMUM OF 1-1/2" INTO RIGGING SCREW.
2. AFTER FINAL TENSIONING, THE TERMINALS SHALL BE VISIBLE IN THE INSPECTION HOLES.

**SOCKET ASSEMBLY**

**CONCRETE FOOTING [Z40]**



**ELEVATION**

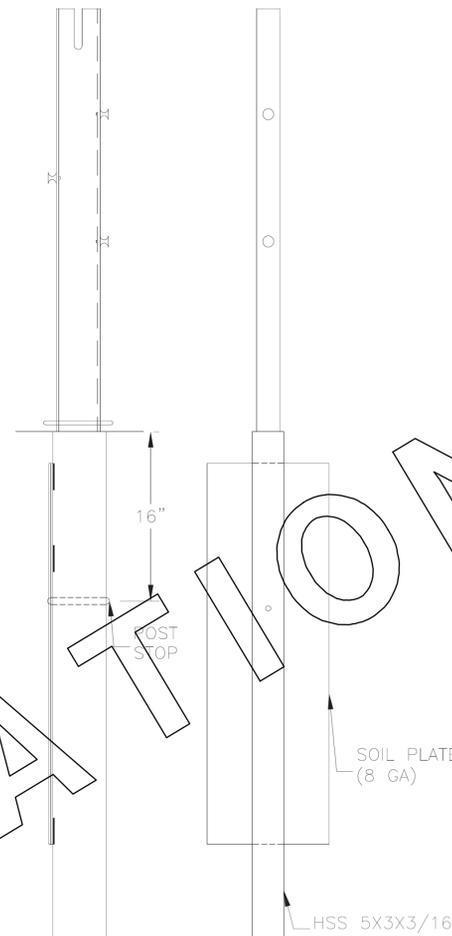


**PLAN**

NOTES SPECIFIC TO CONCRETE FOOTING

1. SIZE OF FOOTING WILL BE DETERMINED BY SOIL CONDITIONS, FOUNDATION TYPE AND PROJECT CONDITIONS.
2. CONCRETE BASED ON AGENCY SPECIFICATIONS.
3. CONCRETE BY OTHERS.
4. REINFORCING RING (BY OTHERS) WILL BE USED ACCORDING TO FOUNDATION SIZE AND TYPE.
5. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
6. SOCKET SHALL BE  $\pm 2'$  OF VERTICAL PLUMB.

**DRIVE SOCKET [Z44]**



**ELEVATION**

**SIDE**



**PLAN**

NOTES SPECIFIC TO DRIVE SOCKETS

1. SIZE OF SOIL PLATE WILL BE DETERMINED BY SOIL CONDITIONS AND PROJECT CONDITIONS.
2. THE SOIL PLATE SHALL BE PARALLEL TO ROADWAY AND CAN FACE TOWARD OR AWAY FROM THE TRAVEL LANE.
3. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
4. SOCKET SHALL BE  $\pm 2'$  OF VERTICAL PLUMB.
5. SOCKETS SHALL BE DRIVEN IN A MANNER TO NOT DISTORT OR DESTROY THE TOP OF SOCKET TO A DEGREE THAT PLACES THE SOCKET OR LINE POST OUT OF CONSTRUCTION TOLERANCES.

GENERAL NOTES:

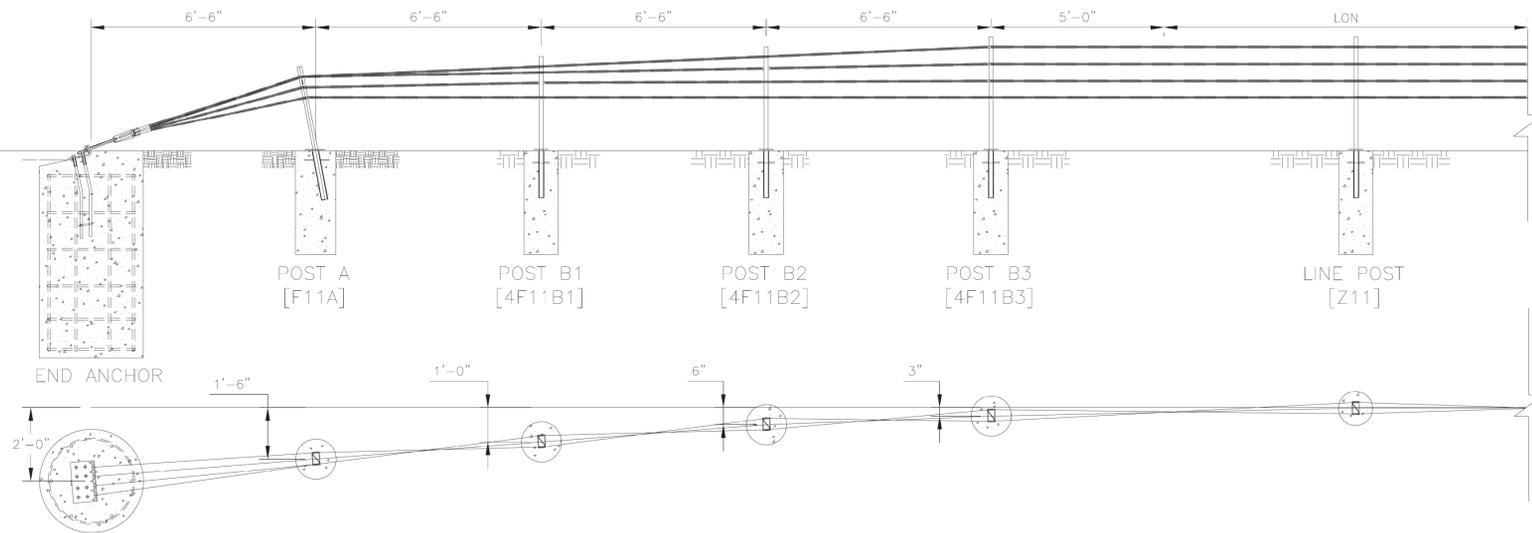
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2. THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-4 CONDITIONS ON SLOPES 6:1 OR FLATTER AND NCHRP 350 TL-3 CONDITIONS ON SLOPES 4:1 TO 6:1.
3. THE POST SPACING SHALL BE DETERMINED BY THE SPECIFYING AGENCY. POST SPACING MAY BE DECREASED TO AVOID OBSTRUCTIONS OR UTILITIES. IN NO EVENT SHALL THE POST SPACING EXCEED 24'-0".
4. BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACTION MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.

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**BRIFEN★USA INC.**

Revision			BRIFEN WRSF NCHRP 350 TL-4 LENGTH OF NEED COMPONENTS		
No.	Date	By	Date	Drawn By	Scale
1.			6.27.12	Manita Elizondo	None
2.			VERSION 12.0		
3.					
4.			Dwg. No.	WRGTFL-11-002b	Sheet No 2 OF 3
5.					

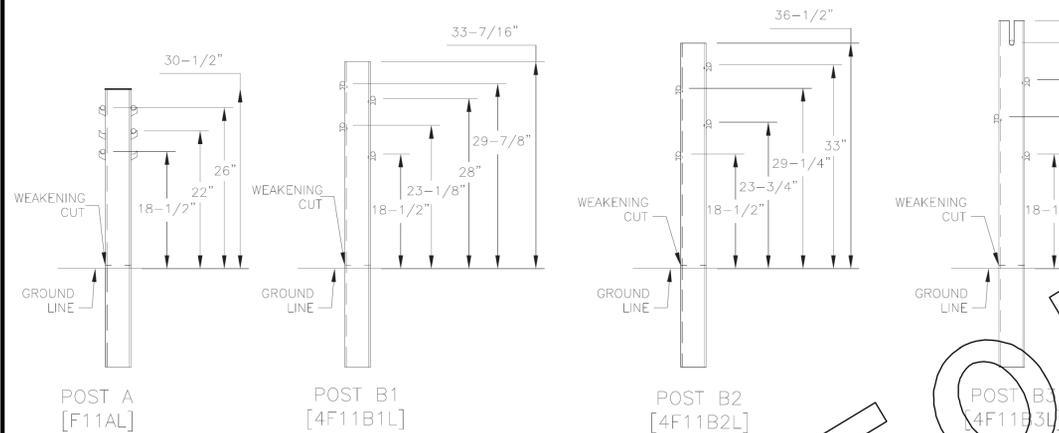
**WRGT-FL END ANCHOR LAYOUT**



GENERAL NOTES:

1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4336.
2. THE WRGT-FL END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO ANCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 31'-0" FROM THE END ANCHOR. POSTS A THROUGH POST B3, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.
3. ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.
4. ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.
5. REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS.
6. FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.

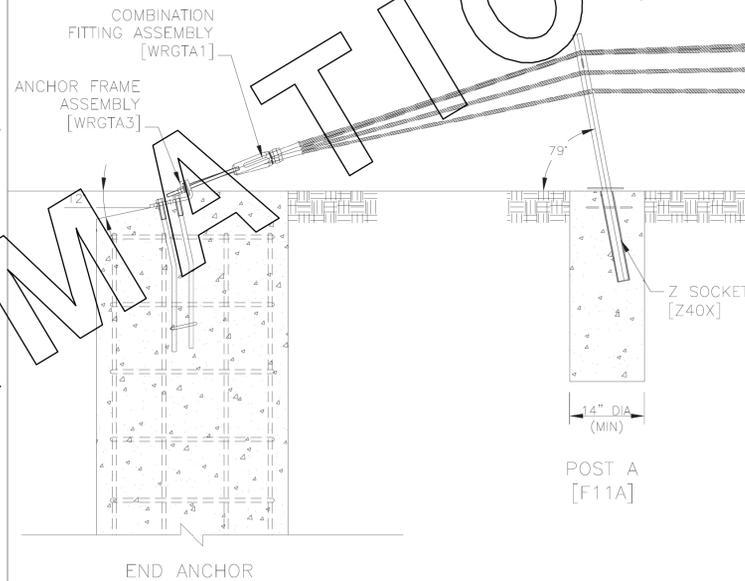
**WRGT-FL POST DETAILS**



NOTES SPECIFIC TO WRGT-FL POST DETAIL

1. ROPE HEIGHTS SHALL BE  $\pm 1"$  TO GROUND LINE.
2. POST SHALL BE  $\pm 4"$  FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.
6. Z EXCLUDER (Z41) SHALL BE USED.
7. POST A & SOCKET SHALL BE PLACED 79" ( $\pm 4"$ ) TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
8. POST A SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.
9. FOUNDATIONS FOR POST B1 THRU B3 SHALL BE THE SAME AS THE LINE POST ASSEMBLY'S FOR THE PROJECT.
10. WEAKENED CUTS SHALL FACE END ANCHOR.

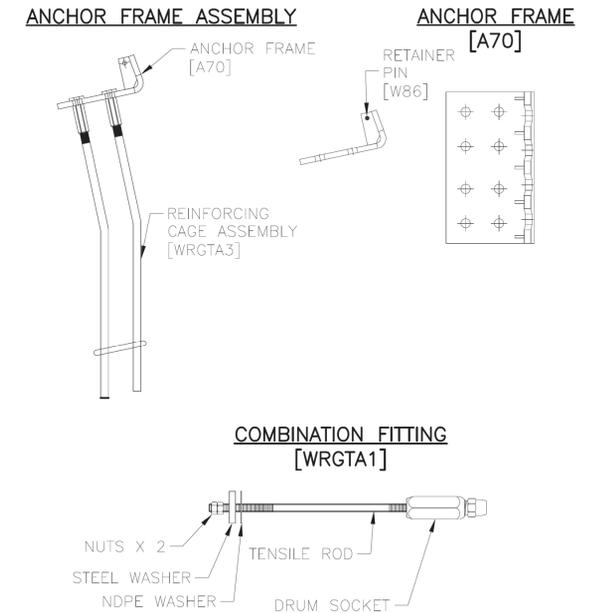
**END ANCHOR DETAILS**



NOTES SPECIFIC TO END ANCHOR DETAIL

1. THE END ANCHOR ASSEMBLY SHALL BE PLACED 12" (+3", -1") BELOW HORIZONTAL PLANE.
2. POST A & SOCKET SHALL BE PLACED 79" ( $\pm 4"$ ) TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
3. POST A SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.

**END ANCHOR COMPONENTS**

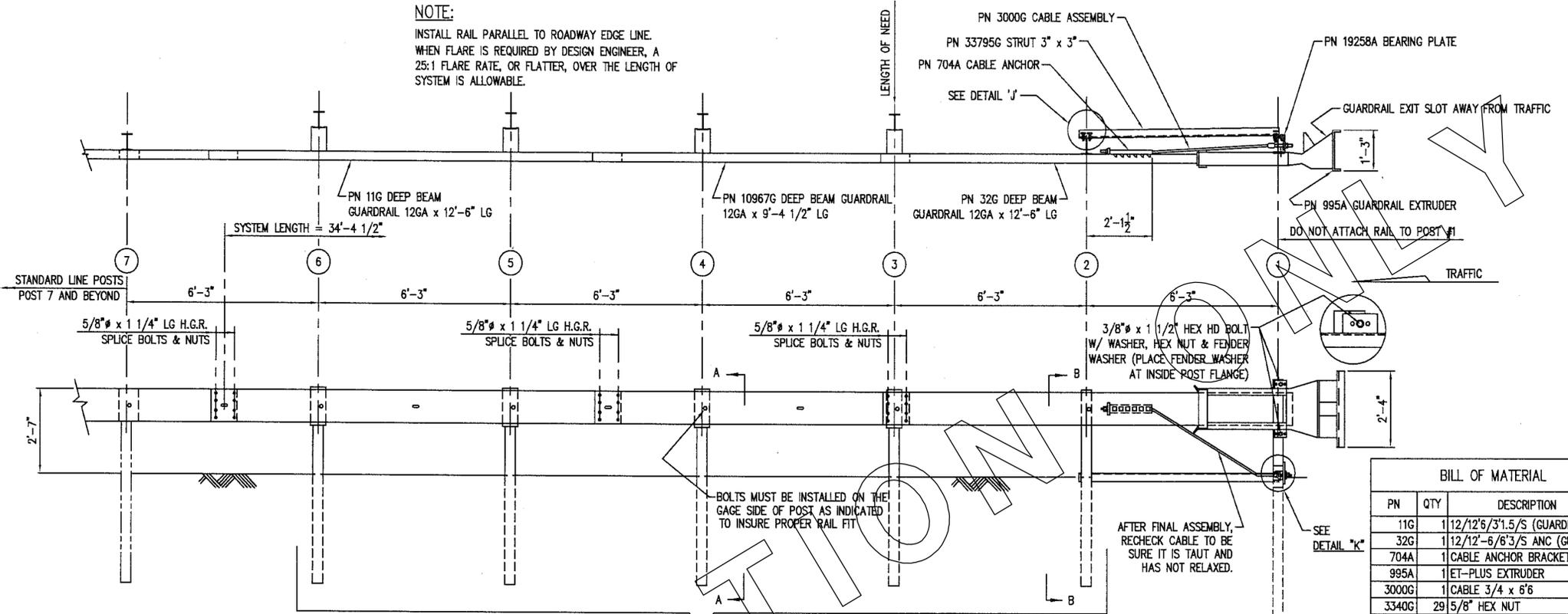


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**BRIFEN USA INC.**

Revision			BRIFEN WRGT-FL END TERMINAL INSTALLATION & LAYOUT DETAILS		
No.	Date	By	Date	Drawn By	Scale
1.			6.27.12	Manita Elizondo	None
2.			VERSION 12.0		
3.					
4.			Dwg. No.	WRGTFL-11-003b	Sheet No 3 OF 3
5.					

**NOTE:**  
INSTALL RAIL PARALLEL TO ROADWAY EDGE LINE.  
WHEN FLARE IS REQUIRED BY DESIGN ENGINEER, A  
25:1 FLARE RATE, OR FLATTER, OVER THE LENGTH OF  
SYSTEM IS ALLOWABLE.



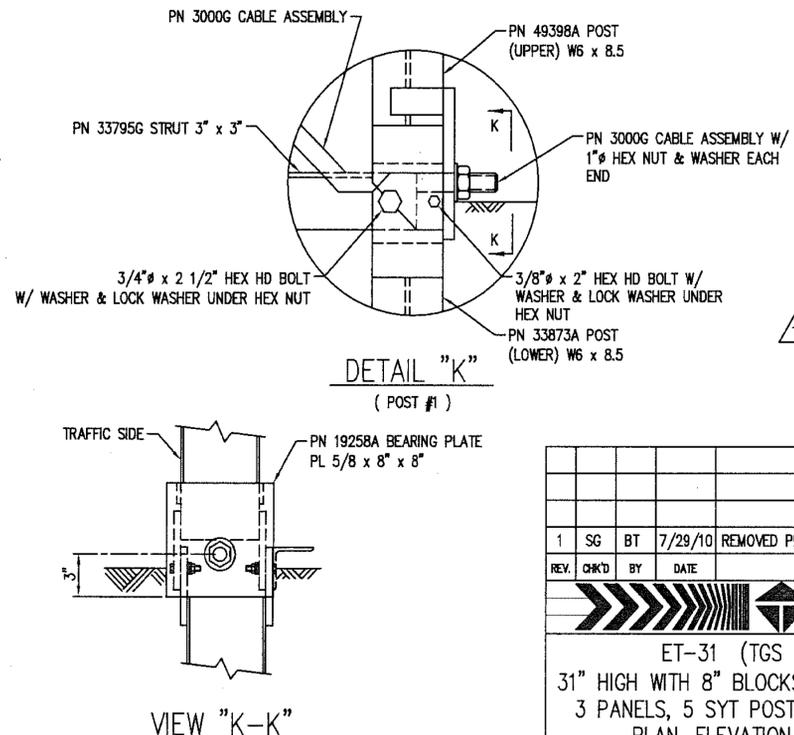
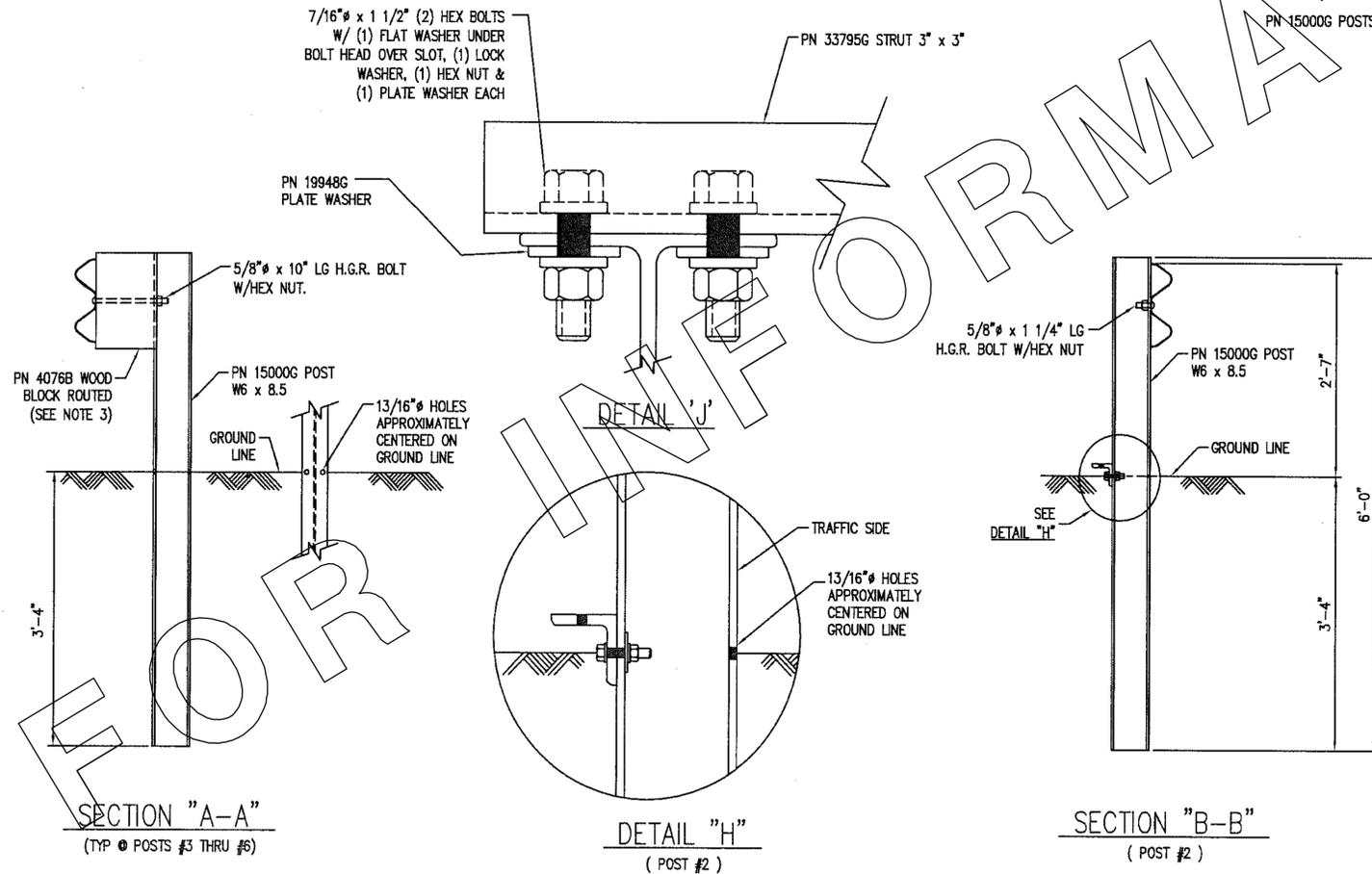
**NOTES:**

- 1.) DO NOT ATTACH GUARDRAIL TO POST # 1.
- 2.) MANUFACTURER SUGGESTS CUSTOMER TO PROVIDE REFLECTORIZATION OF TERMINAL.
- 3.) 8" DEEP PLASTIC OFFSET BLOCKS (ROUTED) ARE ACCEPTABLE ALTERNATES.

BOLTS MUST BE INSTALLED ON THE GAGE SIDE OF POST AS INDICATED TO INSURE PROPER RAIL FIT

AFTER FINAL ASSEMBLY, RECHECK CABLE TO BE SURE IT IS TAUT AND HAS NOT RELAXED.

BILL OF MATERIAL		
PN	QTY	DESCRIPTION
11G	1	1 1/2/12/6/3/1.5/S (GUARDRAIL)
32G	1	1 1/2/12-6/6/3/S ANC (GUARDRAIL)
704A	1	CABLE ANCHOR BRACKET
995A	1	ET-PLUS EXTRUDER
3000G	1	CABLE 3/4 x 6'6"
3340G	29	5/8" HEX NUT
3360G	25	5/8" x 1 1/4" SPLICE BOLT
3500G	4	5/8" x 10" POST BOLT
3701G	2	3/4" FLAT WASHER
3704G	2	3/4" HEX NUT
3717G	2	3/4" x 2 1/2" HEX HD BOLT(A-325)
3900G	2	1" FLAT WASHER
3910G	2	1" HEX NUT
4076B	4	WOOD BLOCK 1'2 x 6 x 8" DR
4254G	4	3/8" FLAT WASHER
4255G	2	3/8" FENDER WASHER (1 1/2 OD)
4258G	2	3/8" LOCKWASHER
4261G	2	3/8" x 1 1/2" HEX HD BOLT(GR-5)
4389G	2	7/16" FLAT WASHER
4390G	2	7/16" x 1 1/2" HEX HD BOLT
4393G	2	7/16" LOCK WASHER
4396G	2	7/16" HEX NUT
4699G	2	3/4" LOCK WASHER
6321G	2	3/8" x 2" HEX HD BOLT(GR-5)
6405G	4	3/8" HEX NUT
10967G	1	1 1/2/9/4.5/3/1.5/S (GUARDRAIL)
15000G	5	POST SYT #2-#6
19258A	1	5/8" x 8" x 8" BEARING PLATE
19948G	2	PLATE WASHER
33795G	1	ANGLE STRUT (ET/SYTP/HBA)
33873A	1	POST ET PLUS HBA #1 BOTTOM
49398A	1	POST ET PLUS HBA #1 TOP



1	SG	BT	7/29/10	REMOVED PN 782, ADDED PN 19258, CHANGED SYSTEM LENGTH
REV.	CHK'D	BY	DATE	REMARKS

**ET-31**

ET-31 (TGS & T-31)  
31" HIGH WITH 8" BLOCKS, 34'-4 1/2" WITH  
3 PANELS, 5 SYT POSTS & 1 HBA POST  
PLAN, ELEVATION & SECTION

DRAWN	B.T.
CHECKED	R.T.
SCALE	N.T.S.
DATE	12/04/06
ENG. FILE #	SS309-0E1
SHT. NO.	E1 OF 1
DRAWING NO.	SS-309
REV.	1

TRINITY HIGHWAY PRODUCTS, LLC.  
2525 STEMMONS FREEWAY,  
DALLAS, TX 75207

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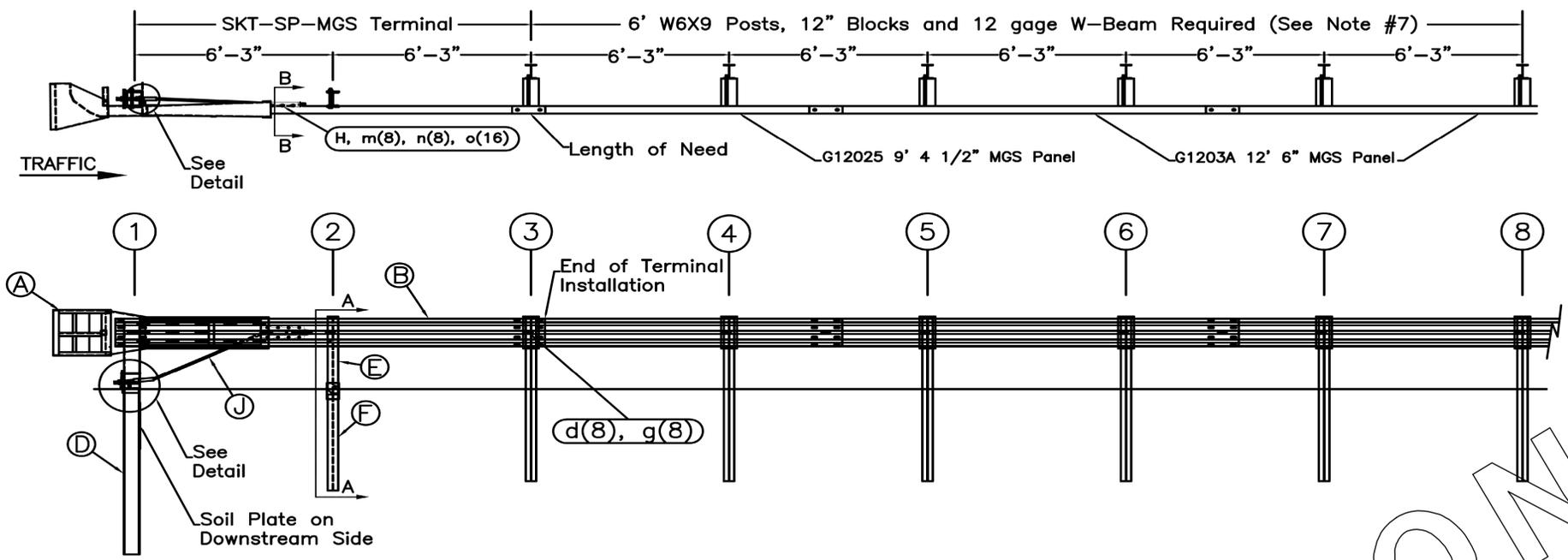
ROADWAY DESIGN DIVISION

Computer: DRDESIGN147

User: dcr13017

Date: 18-APR-2016 09:02

File: 76036e00.dgn  
Scale: 1:100  
SHEET 1 OF 1



ITEM	QTY	BILL OF MATERIALS (TERMINAL)	ITEM NO.
A	1	IMPACT HEAD	S3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	FIRST POST TOP (6X6X $\frac{1}{4}$ Tube)	TPHP1A
D	1	FIRST POST BOTTOM (6' W6X15)	TPHP1B
E	1	SECOND POST ASSEMBLY TOP	UHP2A
F	1	SECOND POST ASSEMBLY BOTTOM	HP3B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	BEARING PLATE RETAINER TIE	CT-100S

HARDWARE (ALL DIMENSIONS IN INCHES)			
a	2	5/16 x 1 HEX BOLT GRD 5	B5160104A
b	4	5/16 WASHER	W0516
c	2	5/16 HEX NUT	N0516
d	8	5/8 Dia. x 1 1/4 SPLICE BOLT	B580122
e	1	5/8 Dia. x 9 HEX BOLT GRD 5	B580904A
f	3	5/8 WASHER	W050
g	10	5/8 Dia. H.G.R NUT	N050
h	1	3/4 Dia. x 8 1/2 HEX BOLT GRD A449	B340854A
j	1	3/4 Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	CABLE ANCHOR BOX SHOULDER BOLT	SB58A
n	8	1/2 A325 STRUCTURAL NUT	N055A
o	16	1 1/16 OD x 9/16 ID A325 STR. WASHER	W050A

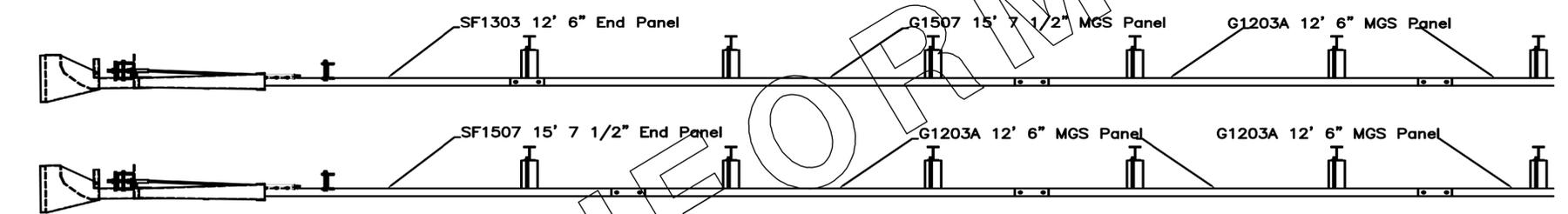
**GENERAL NOTES:**

- All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
- The lower sections of the Posts 1&2 shall not protrude more than 4 in above the ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
- The lower sections of the hinged posts should not be driven with the upper post attached. If the post is placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
- When competent rock is encountered, a 12"  $\varnothing$  post hole, 20 in. deep cored into the rock surface may be used if approved by the engineer for post 1. Granular material will be placed in the bottom of the hole, approximately 2.5' deep to provide drainage. The first post can be field cut to length, placed in the hole and backfilled with suitable backfill. The soil plate may be trimmed if required.
- A site evaluation should be considered if there is less than 25' between the outlet side of the terminal and any adjacent driving lane.
- The breakaway cable assembly must be taut. A locking device (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening nuts.
- Additional components required downstream of terminal (see plan for required w-beam rail sections):

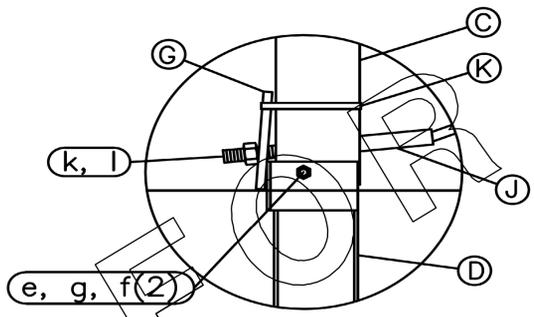
QTY	Desc.	Item#
16	5/8" x 1 1/4" Splice Bolt	B580122
22	5/8" Dia. H.G.R. Nut	N030
6	6x9 Steel Post	P621
6	MGS Blocks	P618
6	5/8" x 14" H.G.R. Bolt	B581402

0 to 24" Rail Offset Over 50'  
0 to 18" Rail Offset Over 37.5'

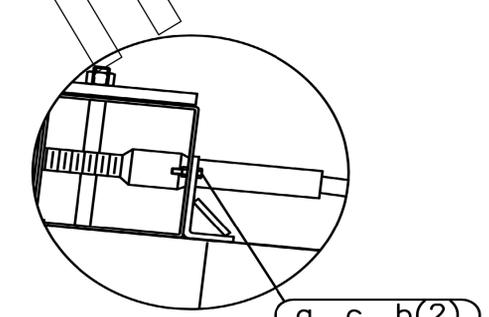
**OPTIONAL FLARED INSTALLATION**  
25:1 maximum flare rate



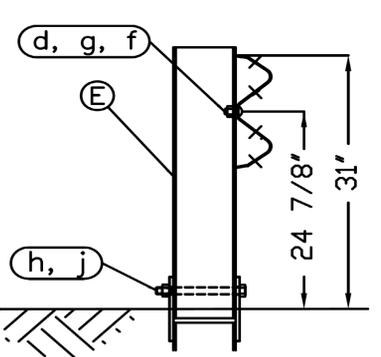
**OPTIONAL PANEL CONFIGURATIONS**



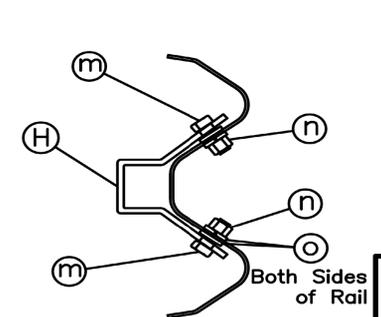
Post #1 Connection Detail



Impact Head Connection Detail



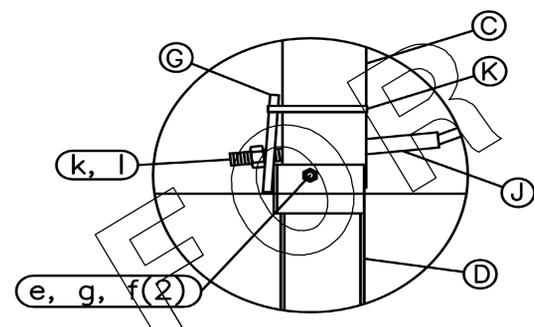
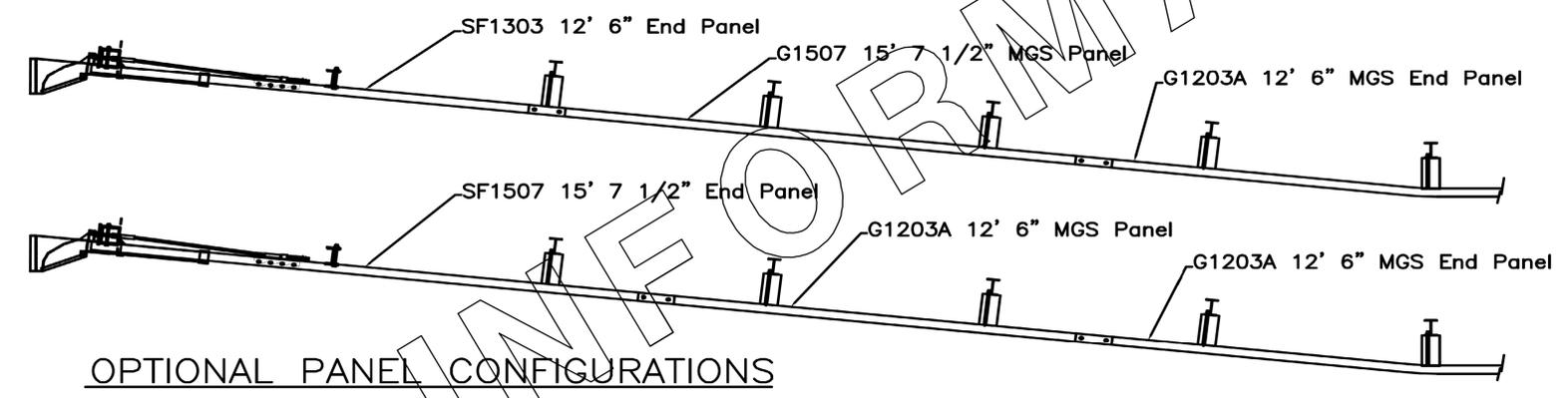
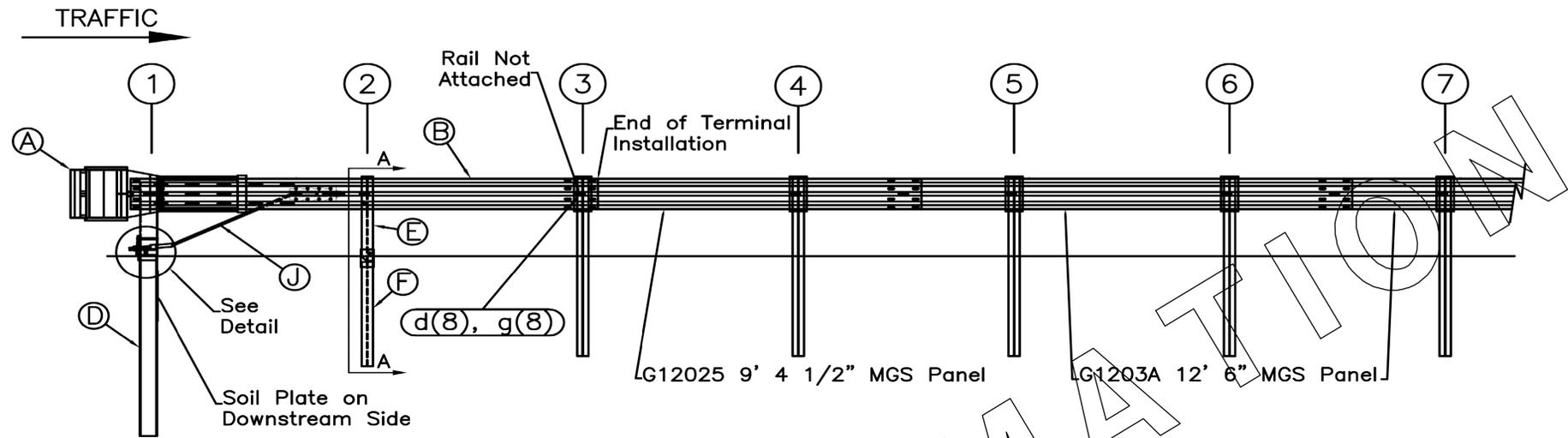
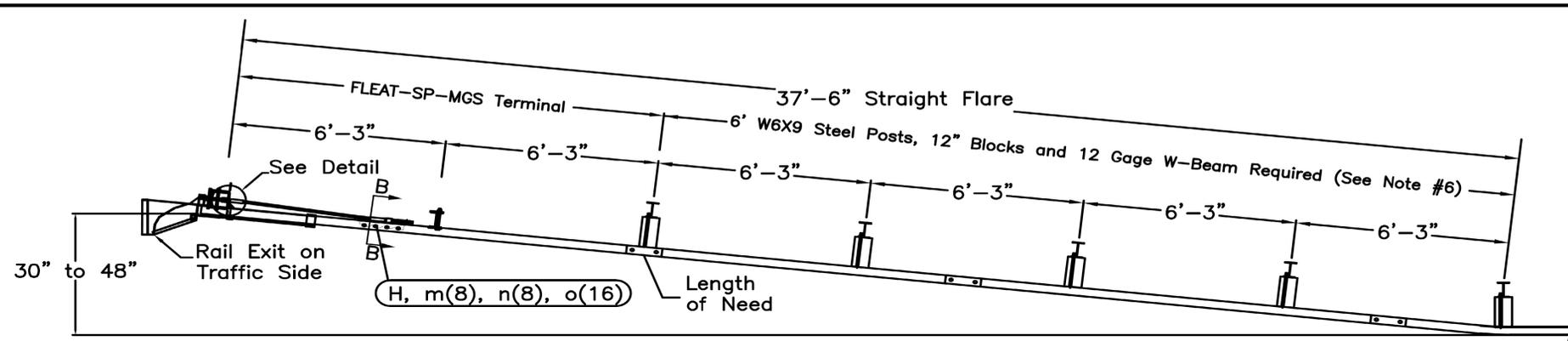
SECTION A-A  
Post #2



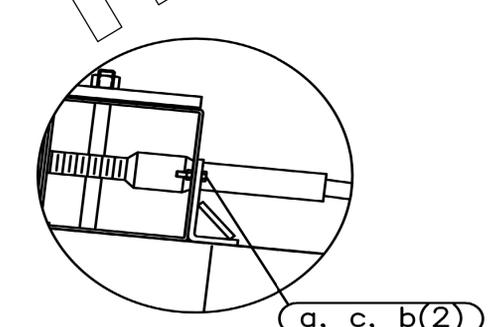
SECTION B-B  
Anchor Bracket

**RSI**  
**Road Systems, Inc.**  
Big Spring, TX  
Sales: 432-263-2435  
Technical: 330-346-0721

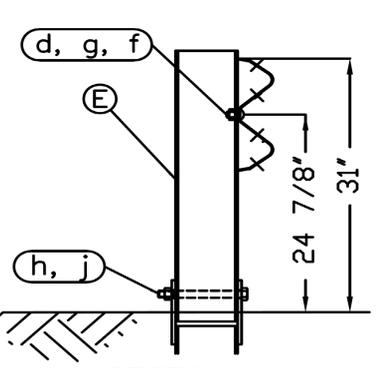
SKT-SP-MGS Terminal Midwest Guardrail System 31" Top of Rail		Sheet: 1
Drawing Name: SKT-SP-S-MGS		Date: 01/15/12
Scale: None		By: JRR
		Rev: 0



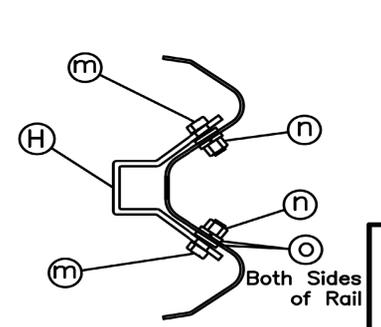
Post #1 Connection Detail



Impact Head Connection Detail



SECTION A-A  
Post #2



SECTION B-B  
Anchor Bracket

ITEM	QTY	BILL OF MATERIALS (TERMINAL)	ITEM NO.
A	1	IMPACT HEAD	F3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	FIRST POST TOP (6X6X $\frac{1}{2}$ " Tube)	TPHP1A
D	1	FIRST POST BOTTOM (6" W6X15)	TPHP1B
E	1	SECOND POST ASSEMBLY TOP	UHP2A
F	1	SECOND POST ASSEMBLY BOTTOM	HP3B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	BEARING PLATE RETAINER TIE	CT-100S

HARDWARE (ALL DIMENSIONS IN INCHES)			
a	2	5/16" x 1 HEX BOLT GRD 5	B5160104A
b	4	5/16" WASHER	W0516
c	2	5/16" HEX NUT	N0516
d	8	5/8" Dia. x 1 1/4" SPLICE BOLT	B580122
e	1	5/8" Dia. x 9" HEX BOLT GRD 5	B580904A
f	3	5/8" WASHER	W050
g	10	5/8" Dia. H.G.R. NUT	N050
h	1	3/4" Dia. x 8 1/2" HEX BOLT GRD A449	B340854A
j	1	3/4" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	CABLE ANCHOR BOX SHOULDER BOLT	SB58A
n	8	1/2" A325 STRUCTURAL NUT	N055A
o	16	1 1/16" OD x 9/16" ID A325 STR. WASHER	W050A

**GENERAL NOTES:**

- All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
- The lower sections of the Posts 1&2 shall not protrude more than 4 in above the ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
- The lower sections of the hinged posts should not be driven with the upper post attached. If the post is placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
- When competent rock is encountered, a 12" Ø post hole, 20 in. deep cored into the rock surface may be used if approved by the engineer for post 1. Granular material will be placed in the bottom of the hole, approximately 2.5" deep to provide drainage. The first post can be field cut to length, placed in the hole and backfilled with suitable backfill. The soil plate may be trimmed if required.
- The breakaway cable assembly must be taut. A locking device (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening nuts.
- Additional components required downstream of terminal (see plan for required w-beam rail sections):

QTY	Desc.	Item#
8	5/8" x 1 1/4" Splice Bolt	B580122
13	5/8" Dia. H.G.R. Nut	N030
5	6x9 Steel Post	P621
5	MGS Block	P618
5	5/8" x 14" H.G.R. Bolt	B581402

**RSI**  
**Road Systems, Inc.**  
Big Spring, TX  
Sales: 432-283-2435  
Technical: 330-346-0721

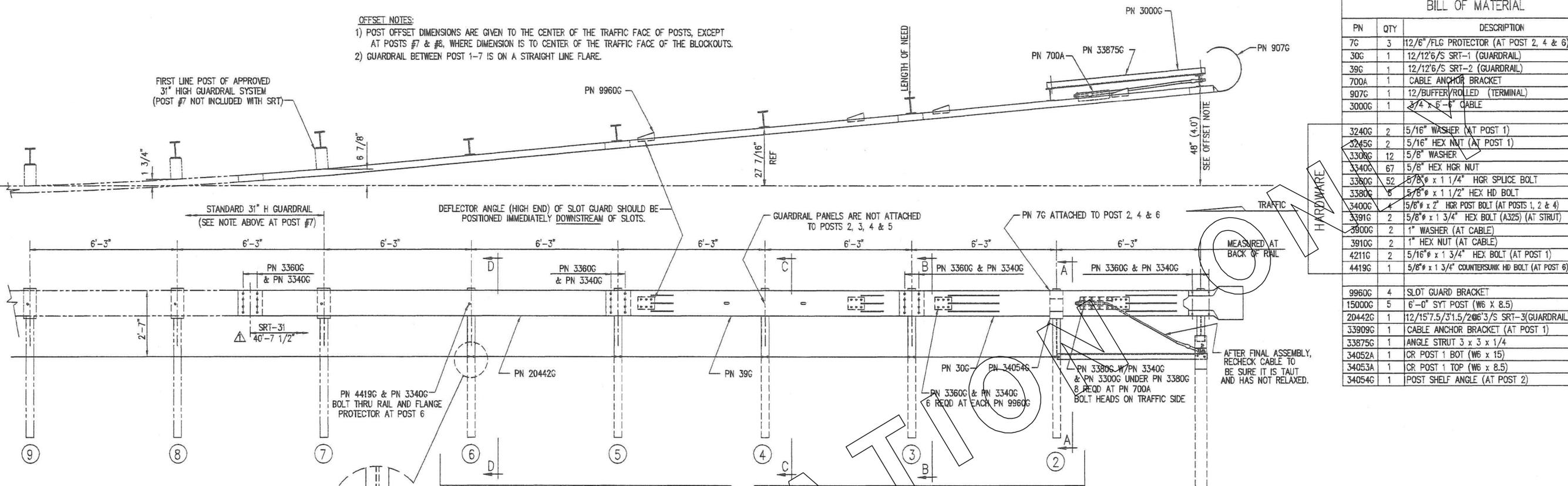
**FLEAT-SP-MGS Terminal**  
**Midwest Guardrail System**  
**31" Top of Rail**

Sheet: 1
Date: 01/15/12
By: JRR
Rev: 0

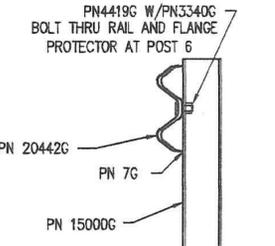
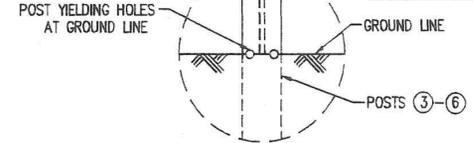
Drawing Name: FLT-SP-S-MGS  
Scale: None

**OFFSET NOTES:**  
 1) POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF POSTS, EXCEPT AT POSTS #7 & #8, WHERE DIMENSION IS TO CENTER OF THE TRAFFIC FACE OF THE BLOCKOUTS.  
 2) GUARDRAIL BETWEEN POST 1-7 IS ON A STRAIGHT LINE FLARE.

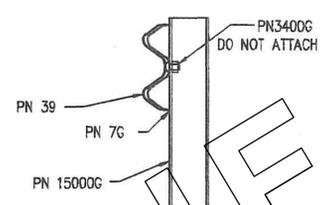
FIRST LINE POST OF APPROVED 31" HIGH GUARDRAIL SYSTEM (POST #7 NOT INCLUDED WITH SRT)



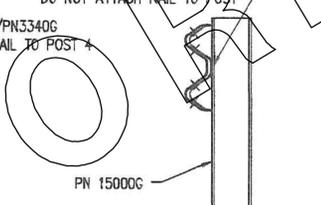
BILL OF MATERIAL		
PN	QTY	DESCRIPTION
7G	3	12/16" FLG PROTECTOR (AT POST 2, 4 & 6)
30G	1	12/12/6/S SRT-1 (GUARDRAIL)
39G	1	12/12/6/S SRT-2 (GUARDRAIL)
700A	1	CABLE ANCHOR BRACKET
907G	1	12/BUFFER/ROLLED (TERMINAL)
3000G	1	3/4" x 6'-8" CABLE
<b>HARDWARE</b>		
3240G	2	5/16" WASHER (AT POST 1)
3245G	2	5/16" HEX NUT (AT POST 1)
3300G	12	5/8" WASHER
3340G	67	5/8" HEX HGR NUT
3380G	52	5/8" x 1 1/4" HGR SPLICE BOLT
3380G	8	5/8" x 1 1/2" HEX HD BOLT
3400G	4	5/8" x 2" HGR POST BOLT (AT POSTS 1, 2 & 4)
3391G	2	5/8" x 1 3/4" HEX BOLT (A325) (AT STRUT)
3900G	2	1" WASHER (AT CABLE)
3910G	2	1" HEX NUT (AT CABLE)
4211G	2	5/16" x 1 3/4" HEX BOLT (AT POST 1)
4419G	1	5/8" x 1 3/4" COUNTERSUNK HD BOLT (AT POST 6)
9960G	4	SLOT GUARD BRACKET
15000G	5	6'-0" SYT POST (W6 X 8.5)
20442G	1	12/15/7.5/31.5/206/3/S SRT-3(GUARDRAIL)
33909G	1	CABLE ANCHOR BRACKET (AT POST 1)
33875G	1	ANGLE STRUT 3 x 3 x 1/4
34052A	1	CR POST 1 BOT (W6 x 15)
34053A	1	CR POST 1 TOP (W6 x 8.5)
34054G	1	POST SHELF ANGLE (AT POST 2)



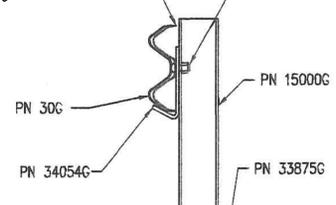
SECTION "D-D"  
(@ POST #6)



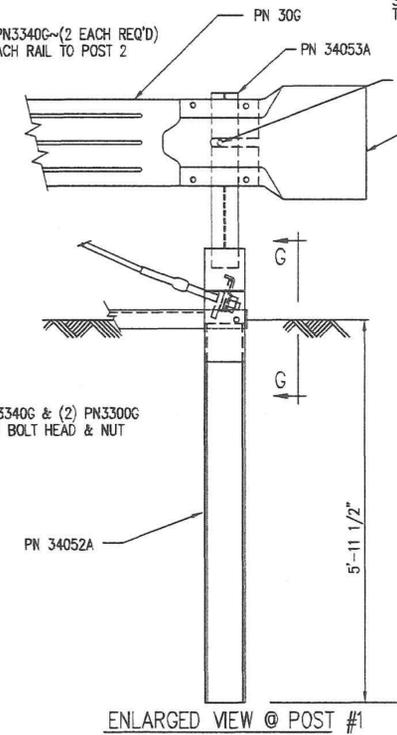
SECTION "C-C"  
(@ POST #4)



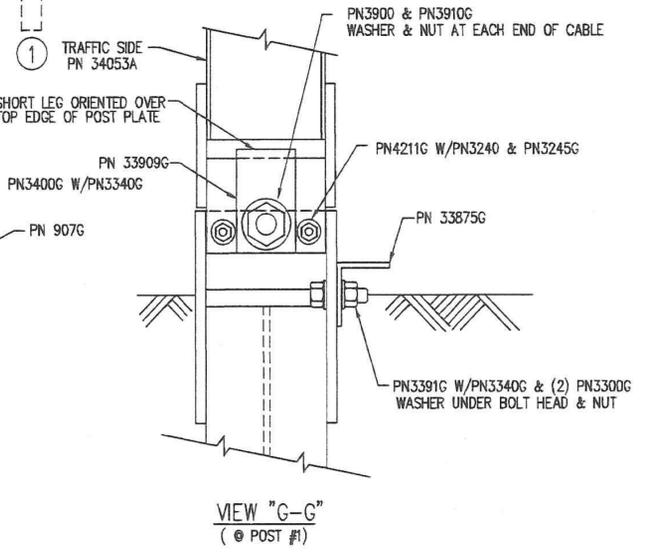
SECTION "B-B"  
(@ POST #5 & #5)



SECTION "A-A"  
(@ POST #2)



ENLARGED VIEW @ POST #1



VIEW "G-G"  
(@ POST #1)

1	BT	SSny	8/5/13	DIM MOVED TO CORRECT POSITION
REV.	CHK'D	BY	DATE	REMARKS
<b>SRT-31</b>				
SRT-31 (31" H, 40'-7 1/2") SLOTTED RAIL TERMINAL ERECTION DETAILS (3 PANELS, 1 CR AND 5 SYT POSTS)				
DRAWN		BT		
CHECKED		SG		
SCALE		NTS		
DATE		1-11-13		
ENG. FILE #		SS616-01E		
SHT. No.		E1 OF 1		
DRAWING NO.		SS 616		
REV.		1		

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