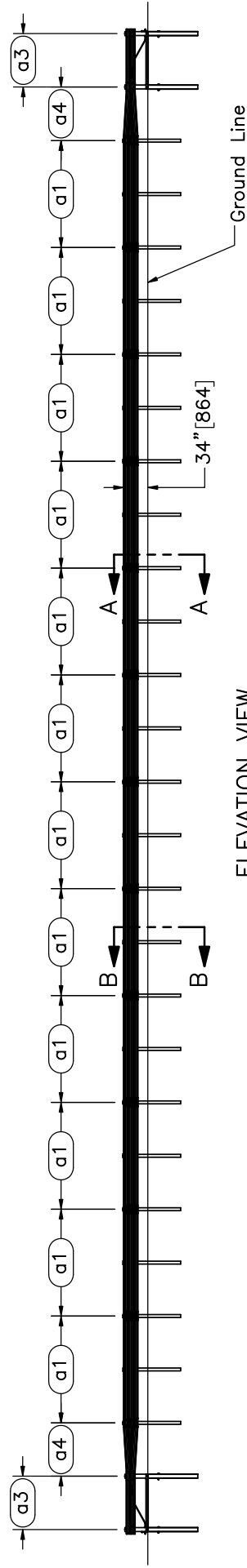


PLAN VIEW



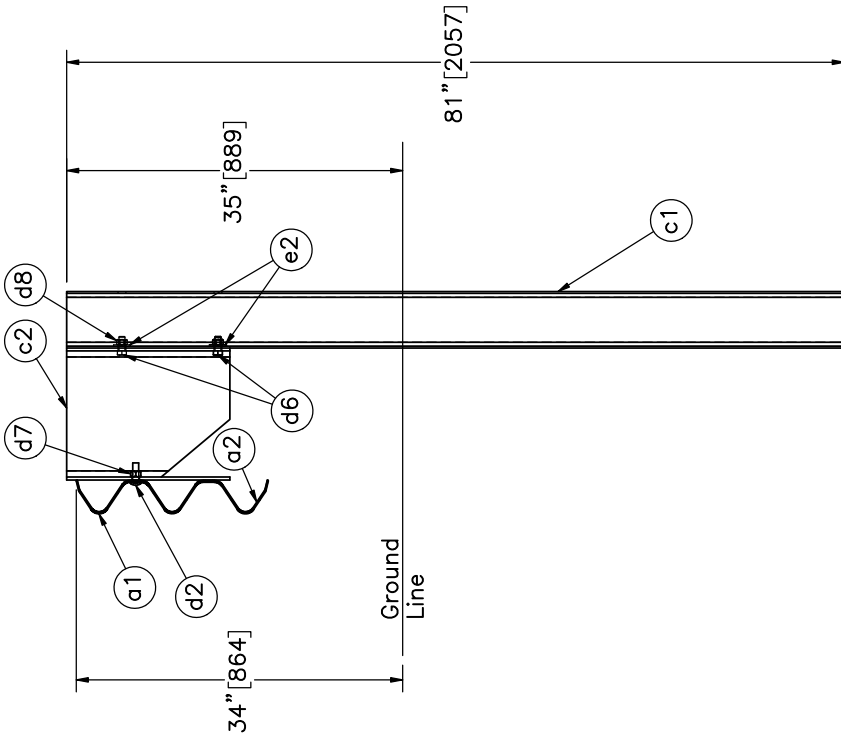
ELEVATION VIEW

- Note: (1) Test shall be performed according to test designation no. 3-11 using MASH 2016 criteria.
 (2) The impact location is 138" [3505] upstream from post no. 13.
 (3) BCT anchors are placed in $\phi 3'$ [914] holes, then backfilled and tamped with soil.
 (4) Critical region is between post nos. 9 and 17.

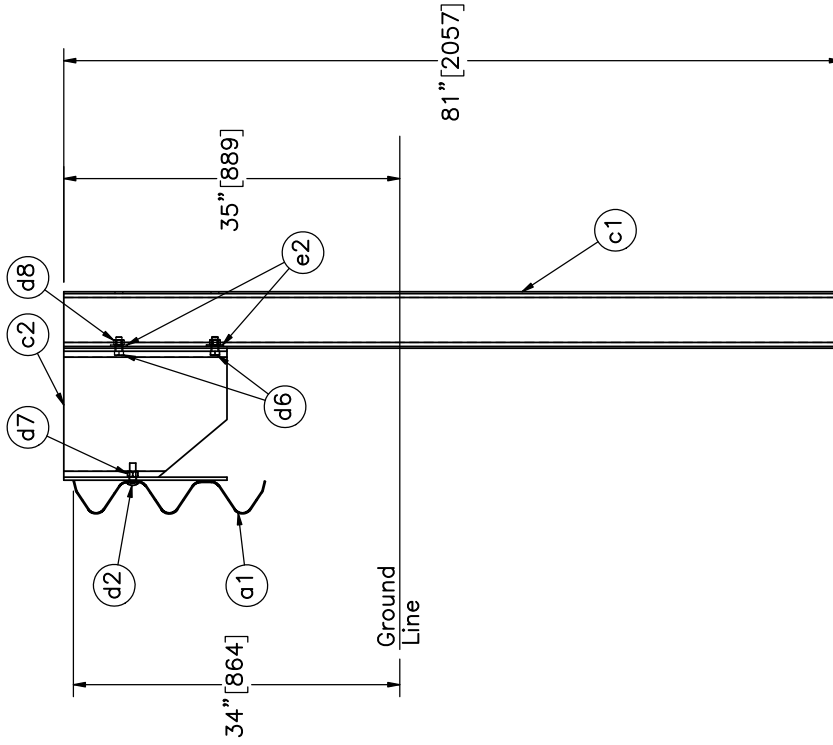


Midwest Roadside Safety Facility

NJ/CA Modified Thrie Beam Test No. MTB-1 System Layout	SHEET: 1 of 13
	DATE: 11/2/2018
DWG. NAME: MTB-1_R9	DRAWN BY: MBD/GRL/ JEK
	REV. BY: JEK/RWB/ KAL/JCH
SCALE: 1:220 UNITS: in.[mm]	




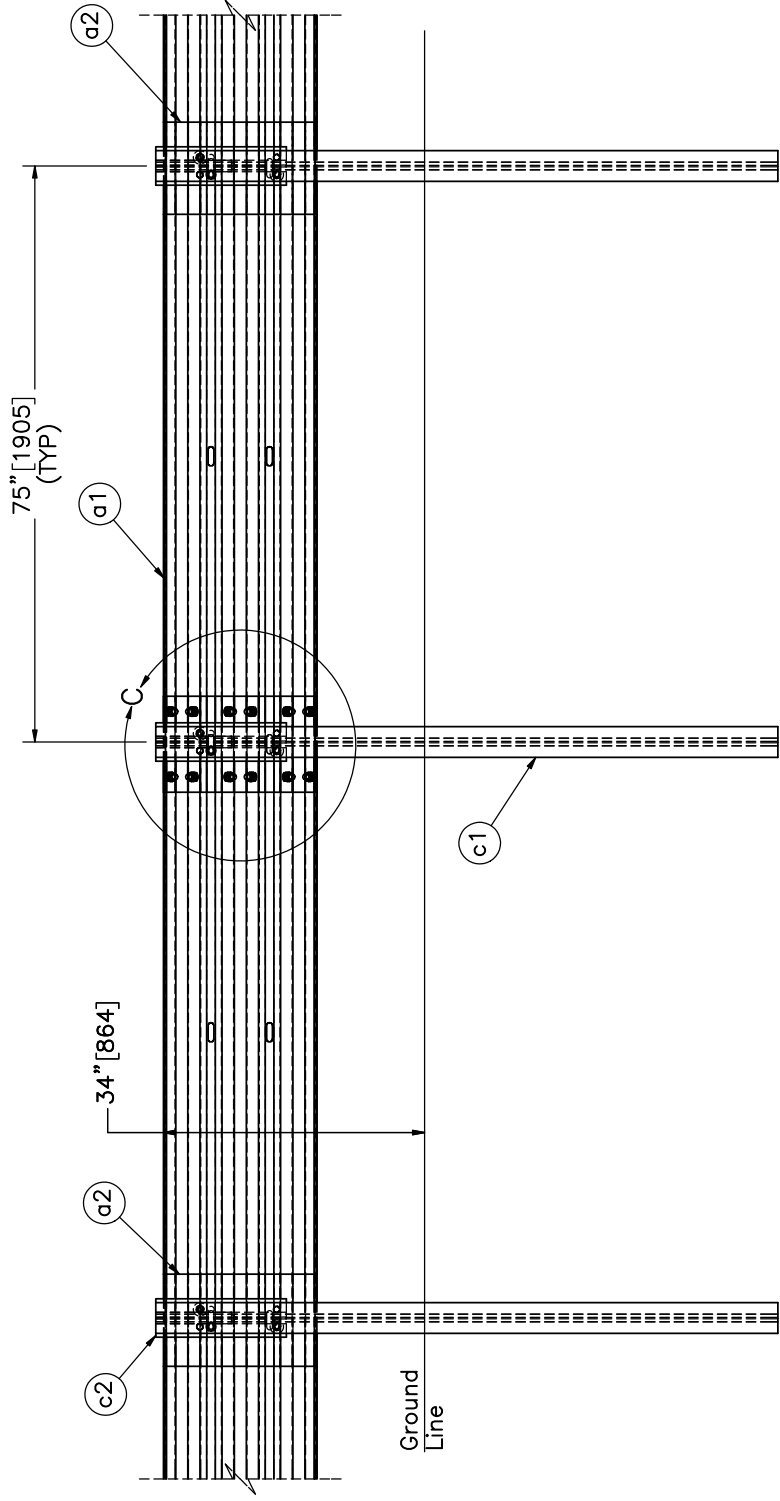
SECTION B-B
All Even Post Nos. Excluding Post Nos. 2 & 28



SECTION A-A
All Odd Post Nos. Excluding Post Nos. 1 & 29

Note: (1) Backup plates (part a2) are placed at non-splice post locations.
 (2) Two post bolts (part d6) diagonally opposite (both sides) with washer (part e2) under post nut.

	NJ/CA Modified Thrie Beam Test No. MTB-1 Section Views	SHEET: 2 of 13
		DATE: 11/2/2018
Midwest Roadside Safety Facility	DWG. NAME: MTB-1_R9	DRAWN BY: MBD/GRL/ JEK
		SCALE: 1:20 UNITS: in.[mm]
		REV. BY: JEK/RWB/ KAL/JCH

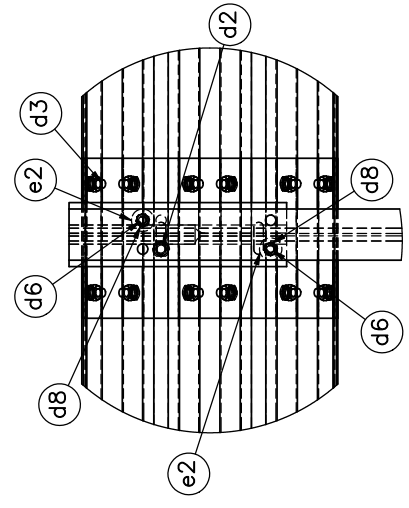


Post No. 22

Post No. 23

Post No. 24

SPLICE DETAIL
BACKSIDE



DETAIL C
SCALE 1:15

Note: (1) Guardrail bolts (part d2) on the upstream side of the web.
 (2) Upper blockout attachment bolt (part d6) on the downstream side of the web. Lower bolt on upstream side of the web.

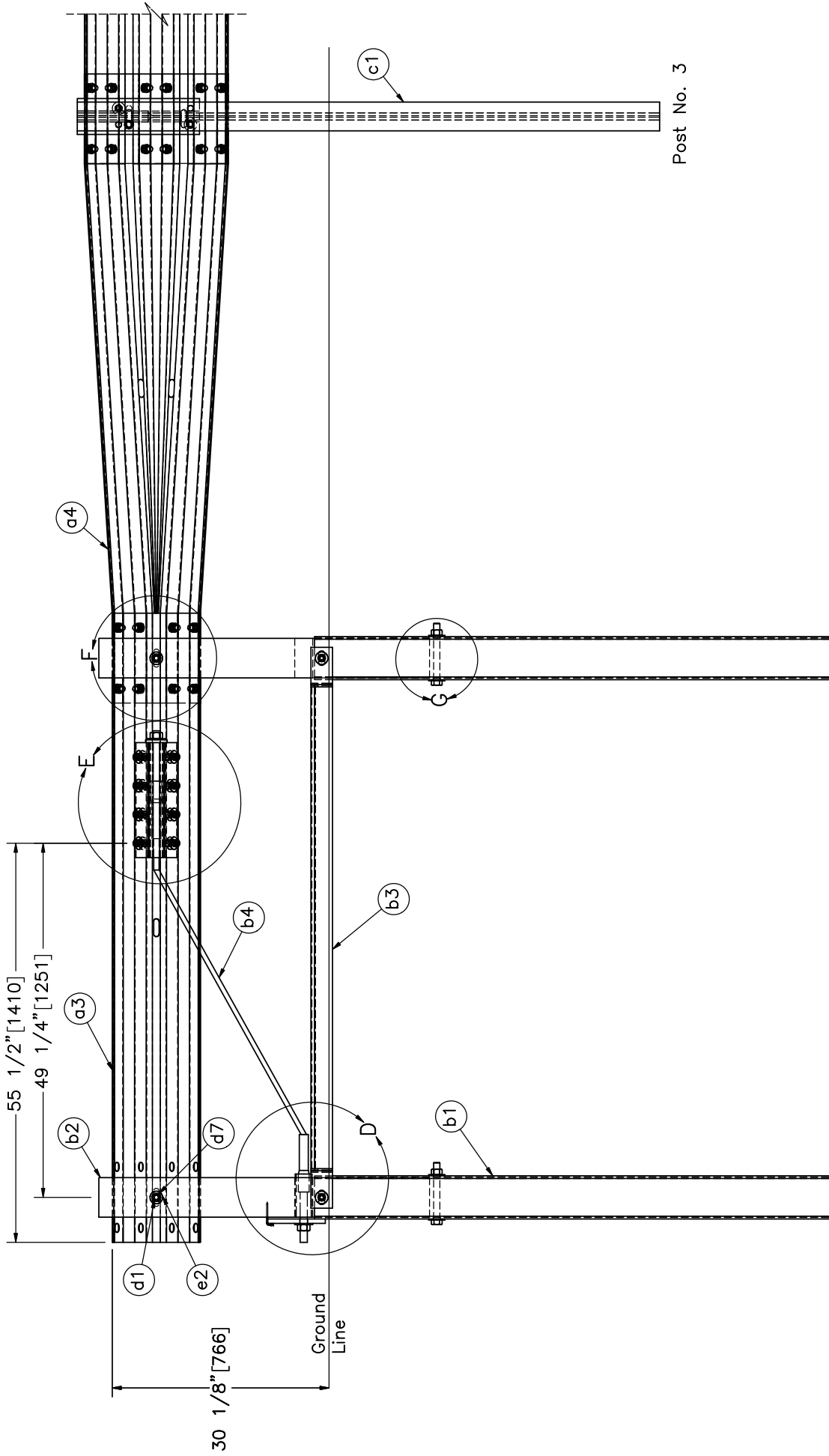


NJ/CA Modified
 Thrie Beam
 Test No. MTB-1
 Splice and Post Detail

DWG. NAME:
 MTB-1_R9

SCALE: 1:25
 UNITS: in, [mm]

SHEET:	3 of 13
DATE:	11/2/2018
DRAWN BY:	MBD/GRL/ JEK
REV. BY:	JEK/RWB/ KAL/JCH



Post No. 3

Post No. 2

Post No. 1

END SECTION DETAIL
BACKSIDE



Midwest Roadside Safety Facility

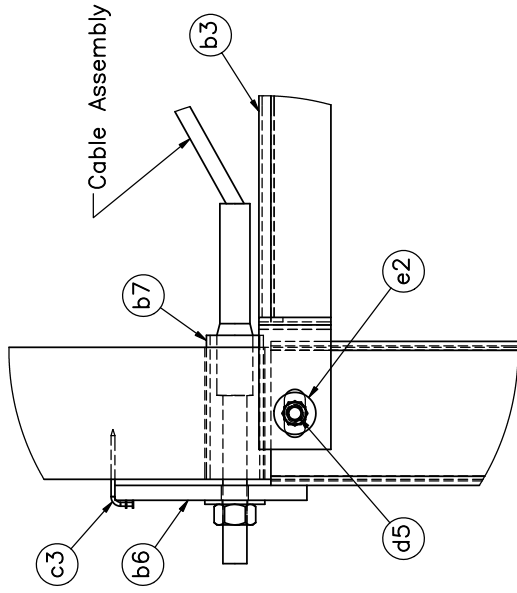
NJ/CA Modified
Thrie Beam
Test No. MTB-1
End Section Details

DWG. NAME:
MTB-1_R9

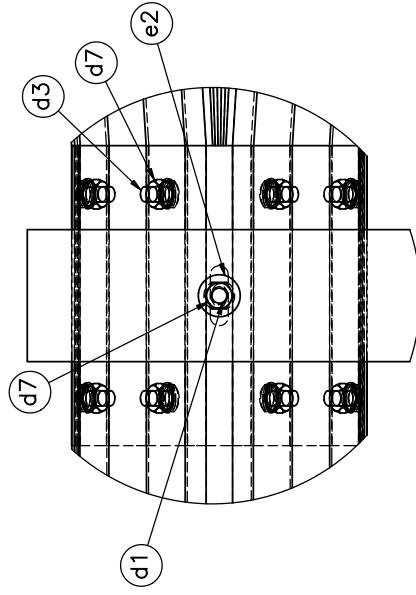
SCALE: 1:20
UNITS: in, [mm]

SHEET: 4 of 13
DATE: 11/2/2018
DRAWN BY: MBD/GRL/JEK
REV. BY: JEK/RWB/KAL/JCH

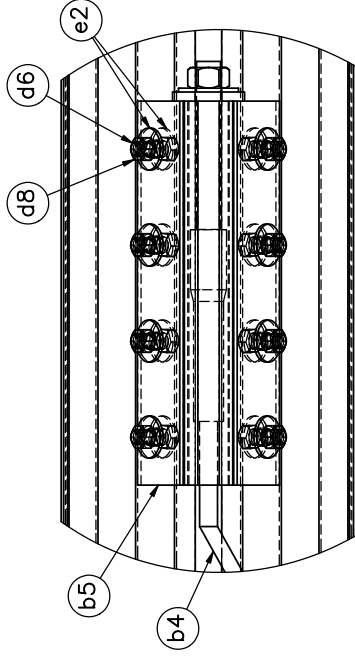
Note: (1) Downstream end section (post nos. 28 & 29) is mirrored.
(2) BCT post (part b2) is modified to achieve 30 1/8" [765] rail height.



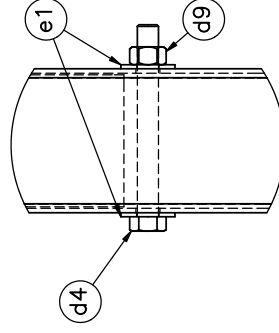
DETAIL D



DETAIL F



DETAIL E



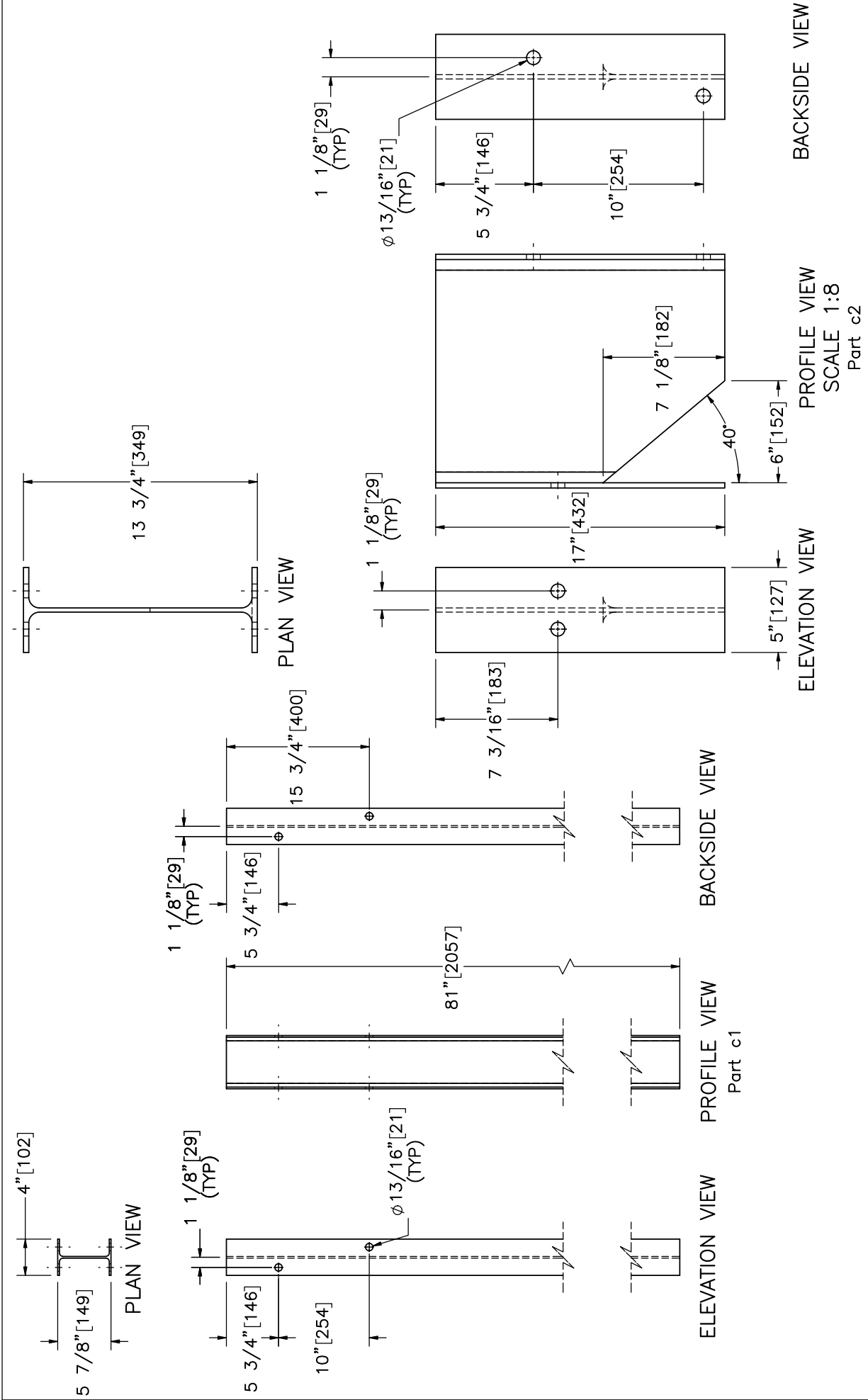
DETAIL G



Midwest Roadside Safety Facility

NJ/CA Modified Thrie Beam Test No. MTB-1	SHEET: 5 of 13
	DATE: 11/2/2018
BCT Anchor and Splice Details	DRAWN BY: MBD/GRL/ JEK
	REV. BY: JEK/RWB/ KAL/JCH
DWG. NAME: MTB-1_R9	SCALE: 1:8 UNITS: in,[mm]

Note: (1) Additional washer (part e2) on the opposite side under the head of bolt (part d5).



PROFILE VIEW
 SCALE 1:8
 Part c2


ELEVATION VIEW

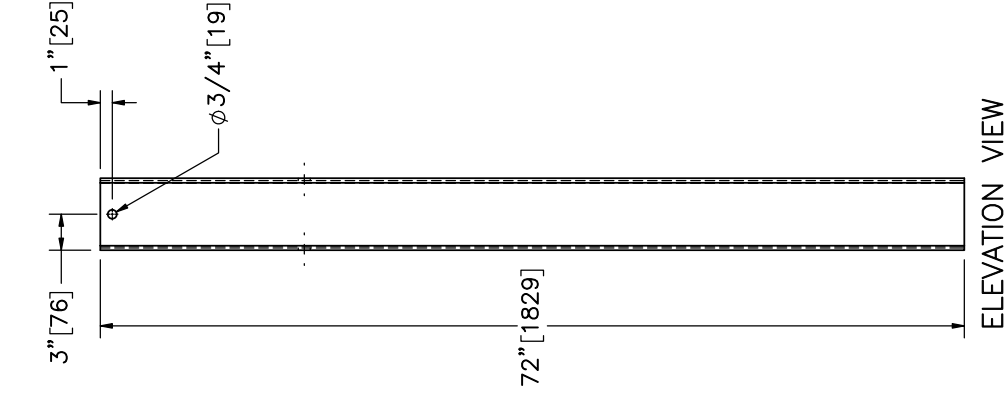
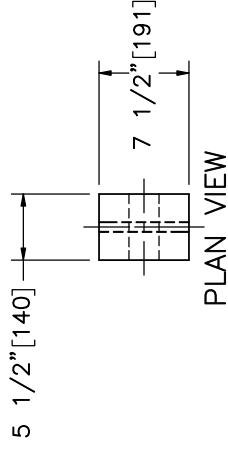
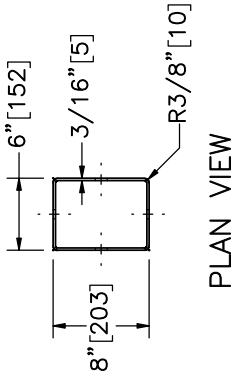
BACKSIDE VIEW

PROFILE VIEW
 SCALE 1:8
 Part c1

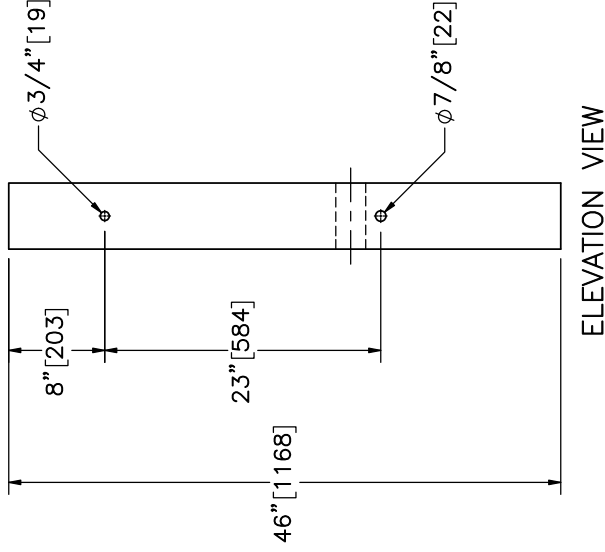
ELEVATION VIEW

BACKSIDE VIEW

	NJ/CA Modified Thrie Beam Test No. MTB-1	SHEET: 6 of 13 DATE: 11/2/2018
	Post Nos. 3-27 Components	DRAWN BY: MBD/GRL/ JEK REV. BY: JEK/RWB/ KAL/JCH
Midwest Roadside Safety Facility	DWG. NAME: MTB-1_R9	SCALE: 1:15 UNITS: in./mm



Part b1



Part b2

Note: (1) BCT post (part b2) is modified for new rail height.



NJ/CA Modified
Thrie Beam
Test No. MTB-1

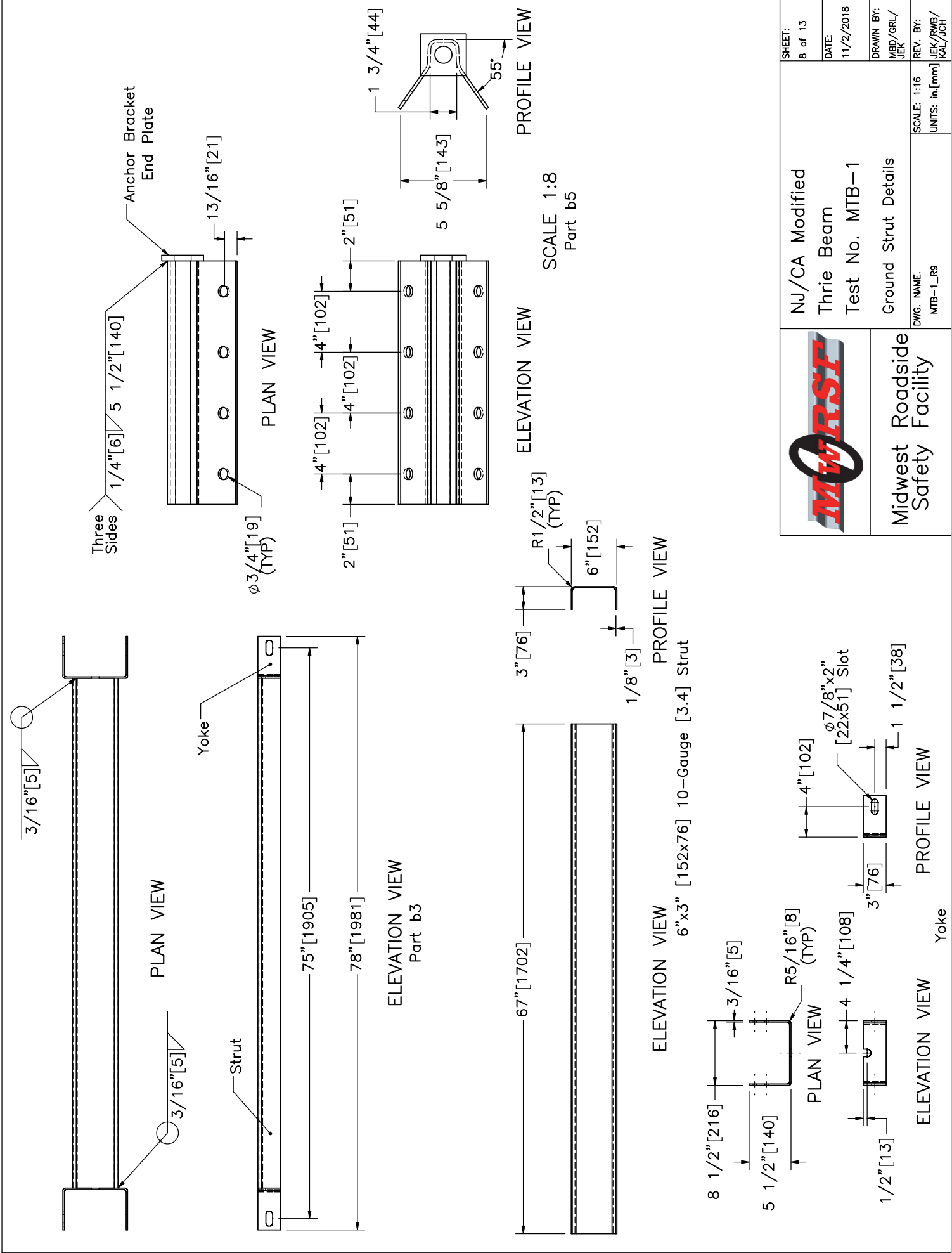
Midwest Roadside
Safety Facility


SHEET:	7 of 13
DATE:	11/2/2018
DRAWN BY:	MBD/GRL/ JEK
REV. BY:	JEK/RWB/ KAL/JCH

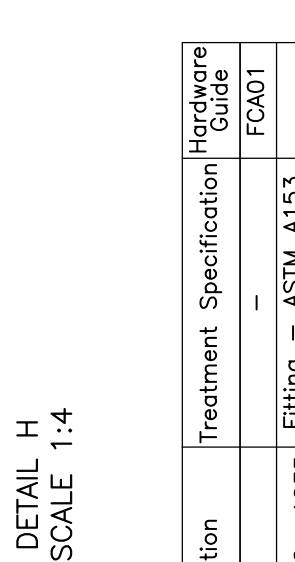
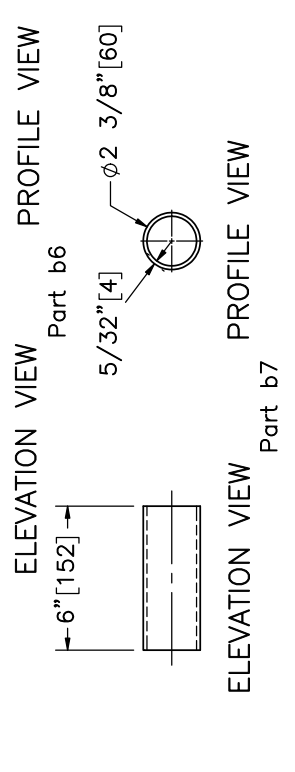
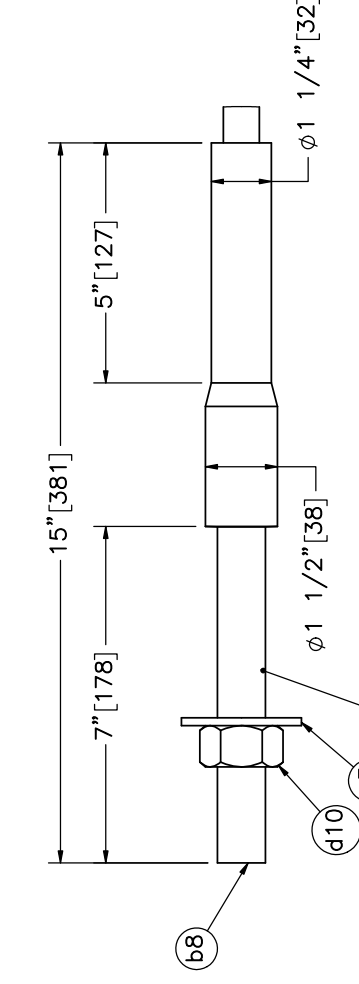
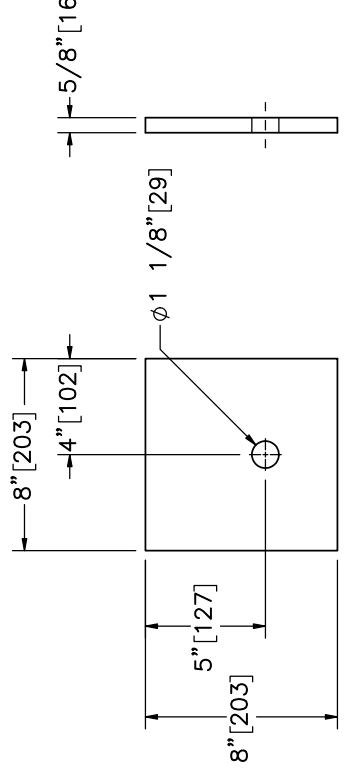
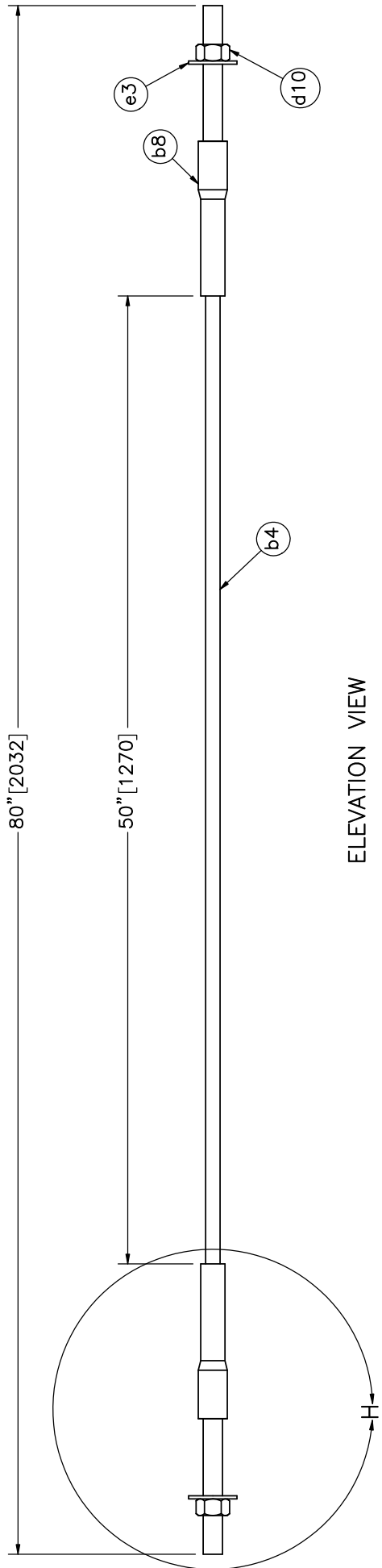
SCALE: 1:16
UNITS: in, [mm]

DWG. NAME:
MTB-1_R9


Foundation Tube and BCT
Timber Post Details



	NJ/CA Modified Thrie Beam Test No. MTB-1 Ground Strut Details	SHEET: 8 of 13
		DATE: 11/2/2018
Midwest Roadside Safety Facility	DWG. NAME: MTB-1_R9	DRAWN BY: MBD/GRJ/JEK
		REV. BY: JEK/RWB/KAL/JCH
SCALE: 1:16 UNITS: in./mm		



Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
-	2	Cable Assembly	-	-	FCA01
b8	2	BCT Anchor Cable End Swaged Fitting	Fitting - ASTM A576 Gr. 1035 Stud - ASTM F568 Class C	-	-
b4	1	3/4" [19] Dia. 6x19 WRC Wire Rope	ASTM A741 Type II	Class A Coating	-
d10	2	1"-8 UNC [M24x3] Hex Nut	ASTM A563A or equivalent	ASTM A153 or B695 Class 55 or F2329	FNX24a
e3	2	1" [25] Dia. Plain USS Washer	ASTM F844	ASTM A123 or A153 or F2329	FWC24a

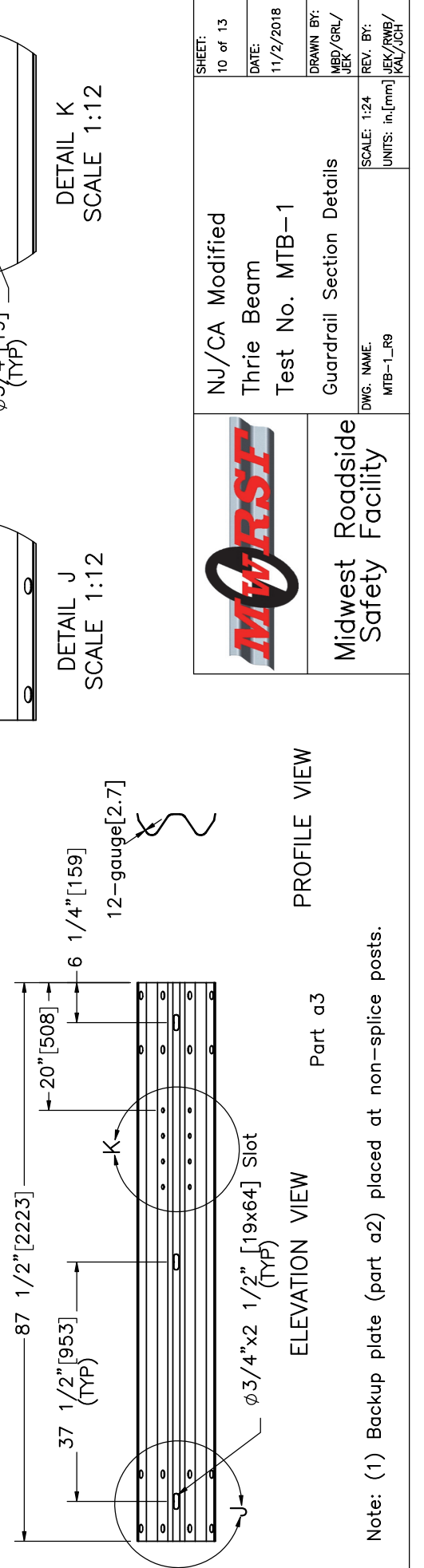
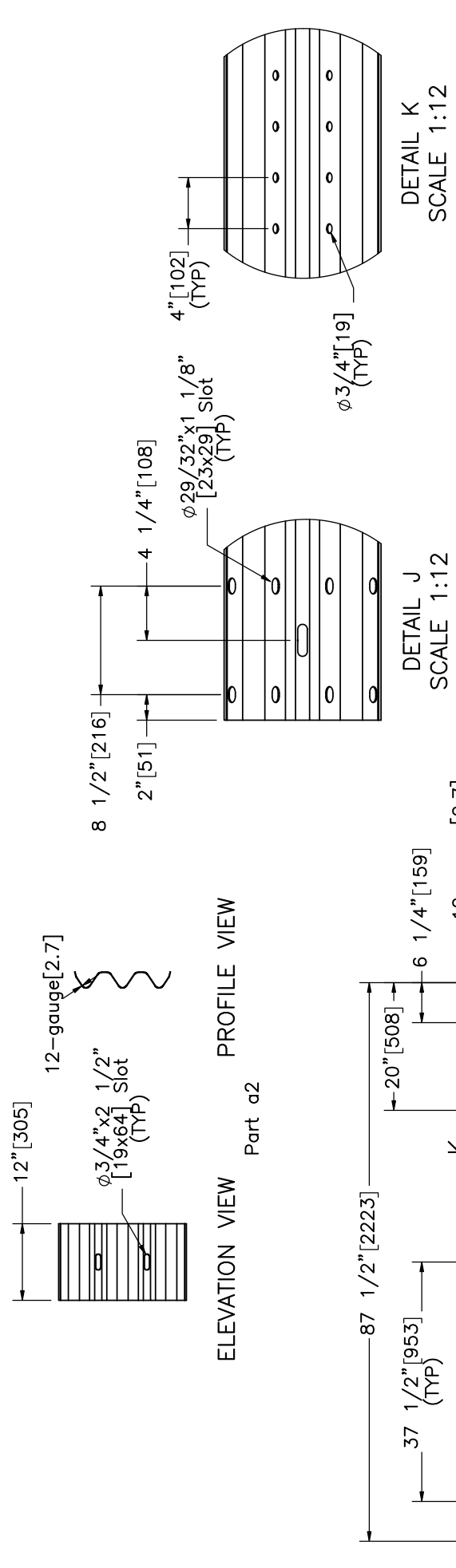
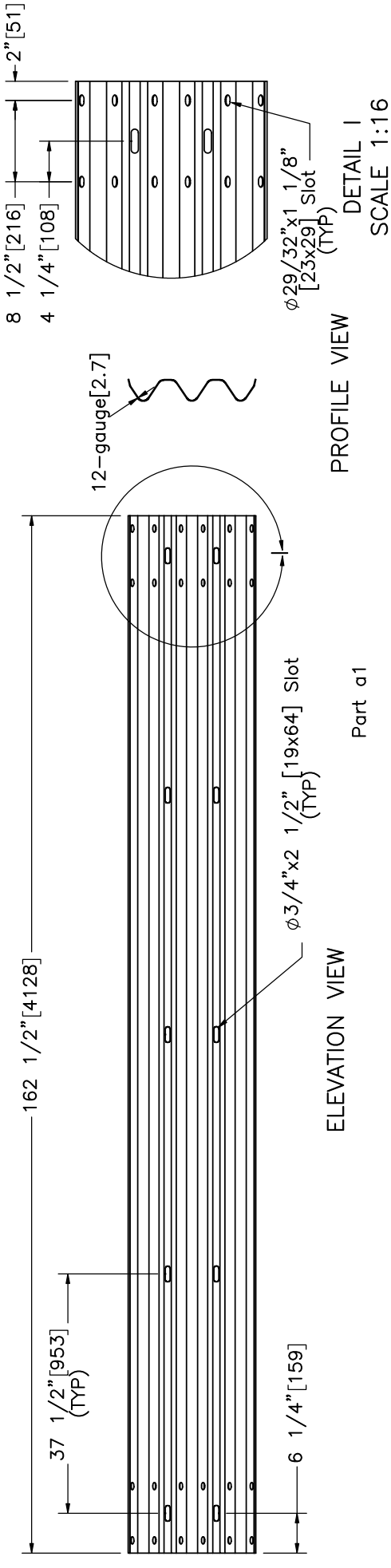



Midwest Roadside Safety Facility

NJ/CA Modified
Thrie Beam
Test No. MTB-1
Cable Assembly

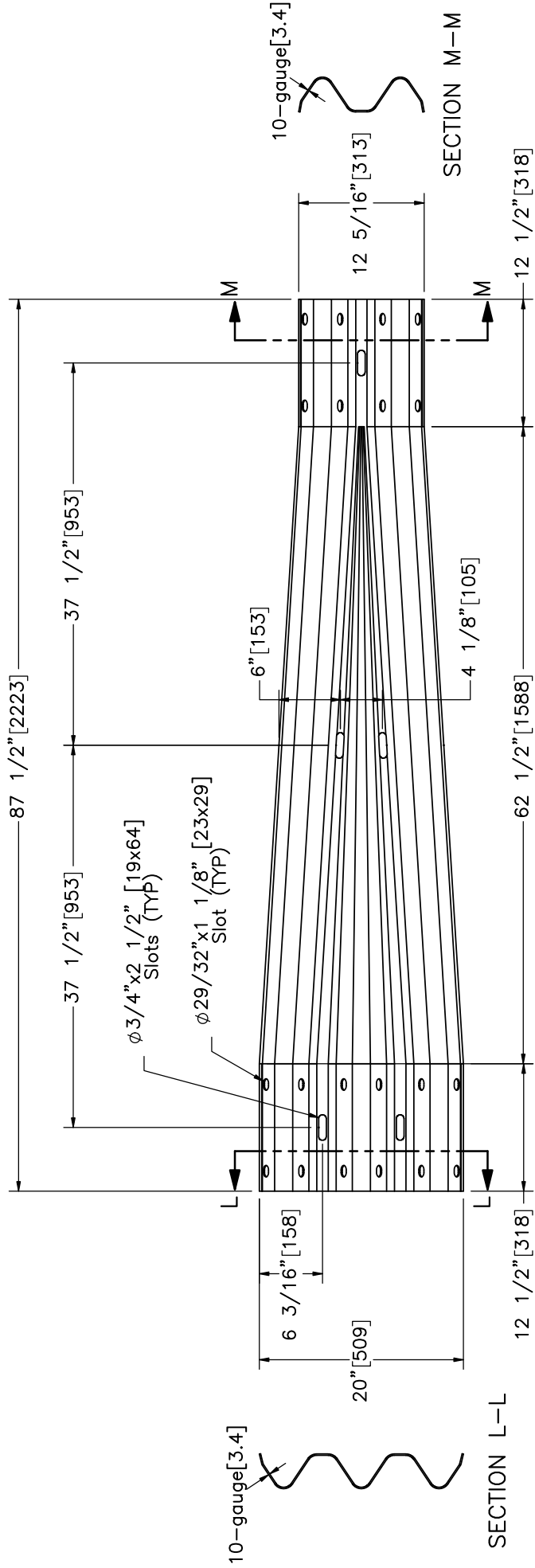
DWG. NAME: MTB-1_R9
SCALE: 1:8
UNITS: in./mm

REV. BY: JEK/RWB/KAL/JCH
DRAWN BY: MBD/GRL/JEK
DATE: 11/2/2018
SHEET: 9 of 13



	NJ/CA Modified Thrie Beam Test No. MTB-1	
	Guardrail Section Details	
DWG. NAME: MTB-1_R9	SCALE: 1:24 UNITS: in./mm	DRAWN BY: MBD/GRL/ JEK
SHEET: 10 of 13		REV. BY: JEK/RWB/ KAL/JCH
DATE: 11/2/2018		REV. BY: JEK/RWB/ KAL/JCH

Note: (1) Backup plate (part a2) placed at non-splice posts.

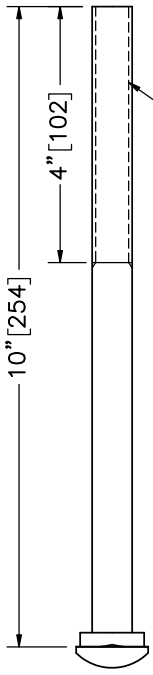


ELEVATION VIEW
Part a4



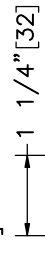
Midwest Roadside
Safety Facility

NJ/CA Modified Thrie Beam Test No. MTB-1 Rail Transition Details	SHEET: 11 of 13
	DATE: 11/2/2018
DWG. NAME: MTB-1_R9	DRAWN BY: MBD/GRL/ JEK
	REV. BY: JEK/RWB/ KAL/JCH
SCALE: 1:15 UNITS: in.[mm]	



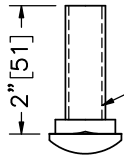
5/8"-11 UNC [M16x2]

Part d1



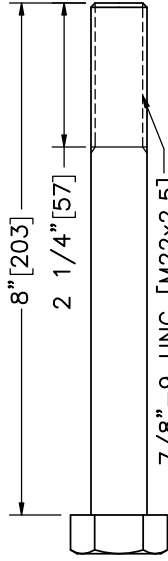
5/8"-11 UNC [M16x2]

Part d3



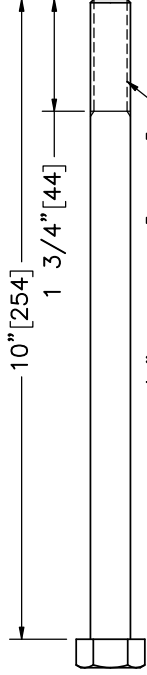
5/8"-11 UNC [M16x2]

Part d2



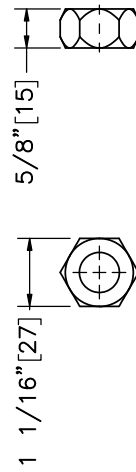
7/8"-9 UNC [M22x2.5]

Part d4

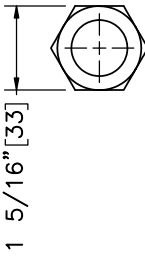


5/8"-11 UNC [M16x2]

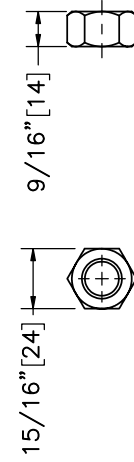
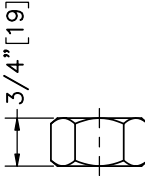
Part d5



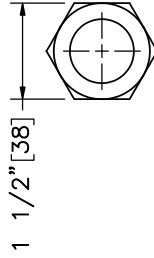
Part d7



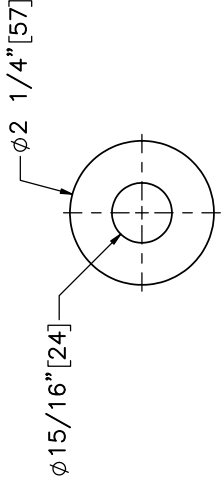
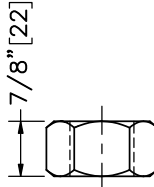
Part d9



Part d8



Part d10

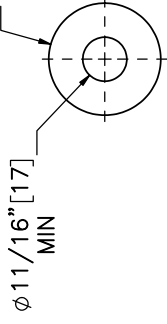


ELEVATION VIEW

Part e1

PROFILE VIEW

3/4" [44] MAX



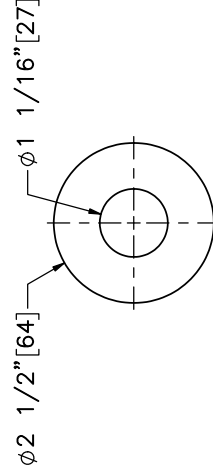
MIN

Part e2

ELEVATION VIEW

Part e2

PROFILE VIEW



ELEVATION VIEW

Part e3

PROFILE VIEW



Midwest Roadside Safety Facility

NJ/CA Modified Thrie Beam Test No. MTB-1

Hardware

SHEET: 12 of 13
DATE: 11/2/2018
DRAWN BY: MBD/GRL/JEK
REV. BY: JEK/RWB/KAL/JCH
SCALE: 1:3
UNITS: in, [mm]

DWG. NAME: MTB-1_R9

Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
a1	12	12'-6" [3,810] 12-gauge [2.7] Thrie Beam Section	AASHTO M180	ASTM A123 or A653	RTM04a
a2	12	12" [305] 12-gauge [2.7] Thrie Beam Backup Plate	AASHTO M180	ASTM A123 or A653	RTB01a
a3	2	6'-3" [3,810] 12-gauge [2.7] W-Beam MGS End Section	AASHTO M180	ASTM A123 or A653	-
a4	2	10-gauge [3.4] Symmetrical W-beam to Thrie Beam Transition	AASHTO M180	ASTM A123 or A653	RWT01b
b1	4	72" [1,829] Long Foundation Tube	ASTM A500 Gr. B	ASTM A123	PTE06
b2	4	BCT Timber Post - MGS Height - Not Standard	SYP Grade, No. 1 or better (No knots 18" [457] above or below ground tension face)	-	-
b3	2	Ground Strut Assembly	ASTM A36	ASTM A123	PFP01
b4	2	3/4" [19] Dia. 6x19 IWRC Wire Rope	ASTM A741 Type II	Class A Coating	-
b5	2	Anchor Bracket Assembly	ASTM A36	ASTM A123	FPA01
b6	2	8"x8"x5/8" [203x203x16] Anchor Bearing Plate	ASTM A36	ASTM A123	FPB01
b7	2	2 3/8" [60] O.D. x 6" [152] Long BCT Post Sleeve	ASTM A53 Gr. B Schedule 40	ASTM A123	FMM02
b8	4	BCT Anchor Cable End Swaged Fitting	Fitting - ASTM A576 Gr. 1035 Stud - ASTM F568 Class C	Fitting - ASTM A153 Stud - ASTM A153 or B695	-
c1	25	W6x8.5 [W152x12.6], 81" [2,057] Long Steel Post	ASTM A36	ASTM A123	-
c2	25	W14x22 [356x32.7], 17" [432] Long Steel Blockout	ASTM A992	ASTM A123	-
c3	2	16D Double Head Nail	-	-	-
d1	4	5/8"-11 UNC [M16x2], 10" [254] Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F2329	FBB03
d2	25	5/8"-11 UNC [M16x2], 2" [51] Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F2329	FBB02
d3	172	5/8"-11 UNC [M16x2], 1 1/4" [32] Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F2329	FBB01
d4	4	7/8"-9 UNC [M22x2.5], 8" [203] Long Hex Head Bolt	ASTM A307 Gr. A or equivalent	ASTM A153 or B695 Class 55 or F2329	-
d5	4	5/8"-11 UNC [M16x2], 10" [254] Long Hex Head Bolt	ASTM A307 Gr. A or equivalent	ASTM A153 or B695 Class 55 or F2329	FBX16a
d6	66	5/8"-11 UNC [M16x2], 1 1/2" [38] Long Hex Head Bolt	ASTM A307 Gr. A or equivalent	ASTM A153 or B695 Class 55 or F2329	FBX16a
d7	201	5/8"-11 UNC [M16x2] Heavy Hex Nut	ASTM A563A or equivalent	ASTM A153 or B695 Class 55 or F2329	FNX16b
d8	70	5/8"-11 UNC [M16x2] Hex Nut	ASTM A563A or equivalent	ASTM A153 or B695 Class 55 or F2329	FNX16a
d9	4	7/8"-9 UNC [M22x2.5] Hex Nut	ASTM A563A or equivalent	ASTM A153 or B695 Class 55 or F2329	FNX22a
d10	4	1"-8 UNC [M24x3] Hex Nut	ASTM A563A or equivalent	ASTM A153 or B695 Class 55 or F2329	FNX24a
e1	8	7/8" [22] Dia. Plain USS Washer	ASTM F844	ASTM A123 or A153 or F2329	-
e2	94	5/8" [16] Dia. Plain USS Washer	ASTM F844	ASTM A123 or A153 or F2329	FWC16a
e3	4	1" [25] Dia. Plain USS Washer	ASTM F844	ASTM A123 or A153 or F2329	FWC24a



Midwest Roadside Safety Facility

NJ/CA Modified
Thrie Beam
Test No. MTB-1

Bill of Materials

SHEET: 13 of 13
DATE: 11/2/2018
DRAWN BY: MBD/GRJ/JEK
REV. BY: JEK/RWB/KAL/JCH

SCALE: 1:384
UNITS: in,[mm]

DWG. NAME: MTB-1_R9