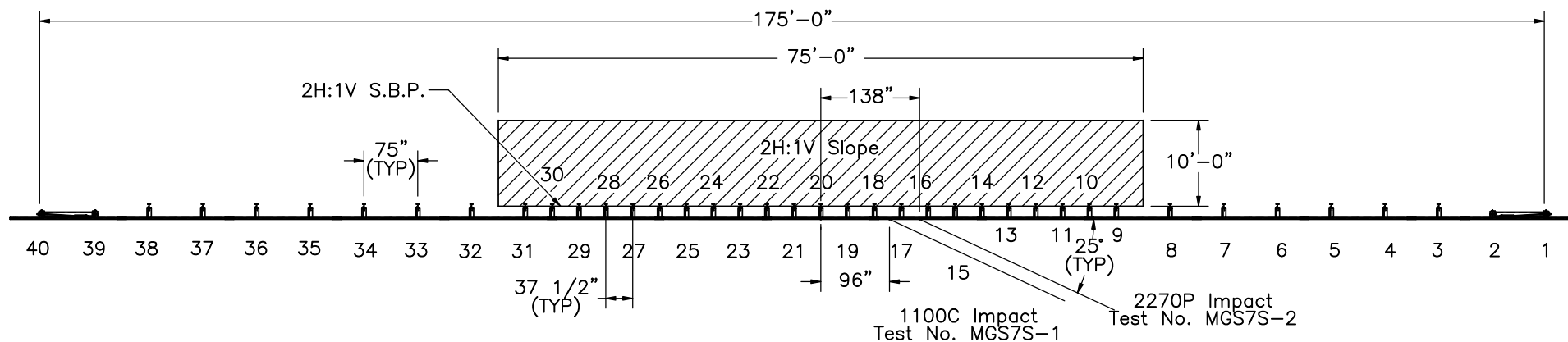
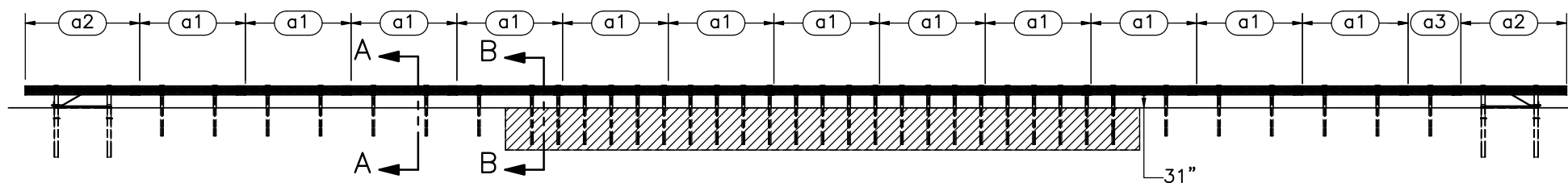




PLAN VIEW



ELEVATION VIEW

- Notes: (1) Test No. MGS7S-1 shall be performed according to test designation no. 3-10 of MASH criteria.
- (2) Test No. MGS7S-2 shall be performed according to test designation no. 3-11 of MASH criteria.
- (3) The impact locations are 8' upstream of post no. 20 (MGS7S-1) and 11'-6" upstream of post no. 20 (MGS7S-2).
- (4) BCT anchors are placed in ϕ 3' holes, then backfilled and tamped with soil.
- (5) Critical region is between post nos. 9 and 31 (ϕ 3' holes). All posts on slope (post nos. 9 through 31) need to be spaced at 37 1/2'.
- (6) The compacted slope shall be constructed prior to installing the posts. Auger holes and place the posts at the slope break point. Backfill and compact soil around the posts, recreating the 2H:1V fill slope.



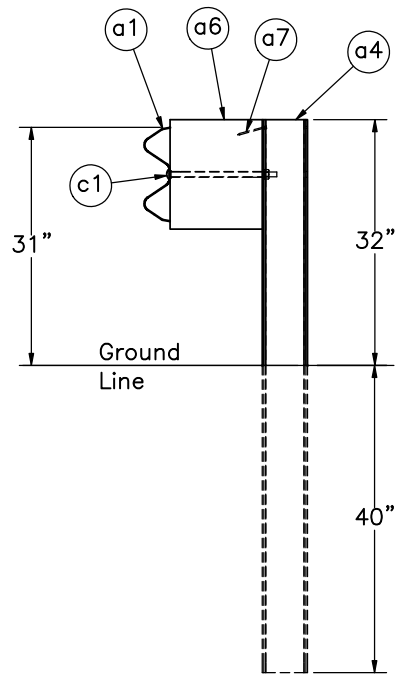
Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2
System Layout

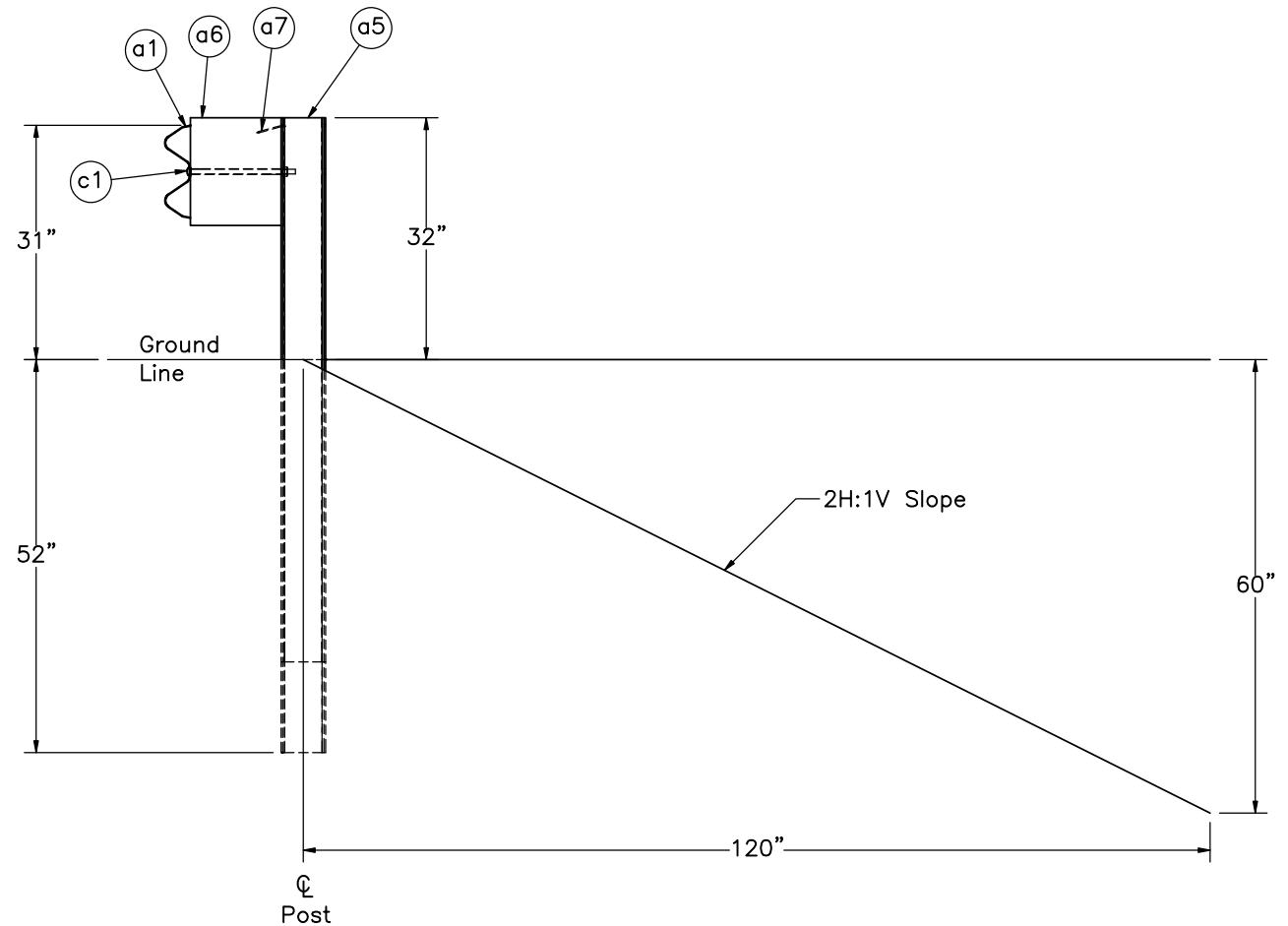
DWG. NAME.
MGS7S_R5

SCALE: 1:220
UNITS: in.

SHEET:
1 of 13
DATE:
1/20/2022
DRAWN BY:
MJM/JRF/G
HR
REV. BY:
RWB/JCH



SECTION A-A
Post Nos. 3-8 and 32-38



SECTION B-B
Post Nos. 9-31



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

Post Details

DWG. NAME.
MGS7S_R5

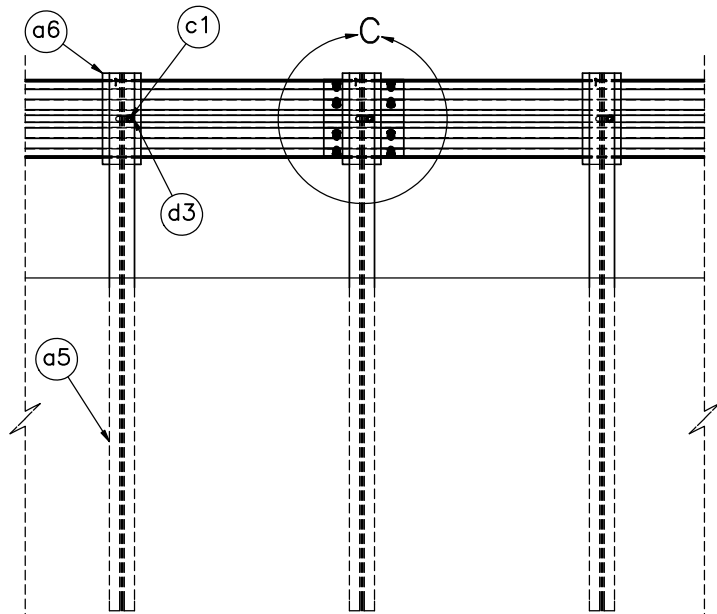
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SHEET:
2 of 13

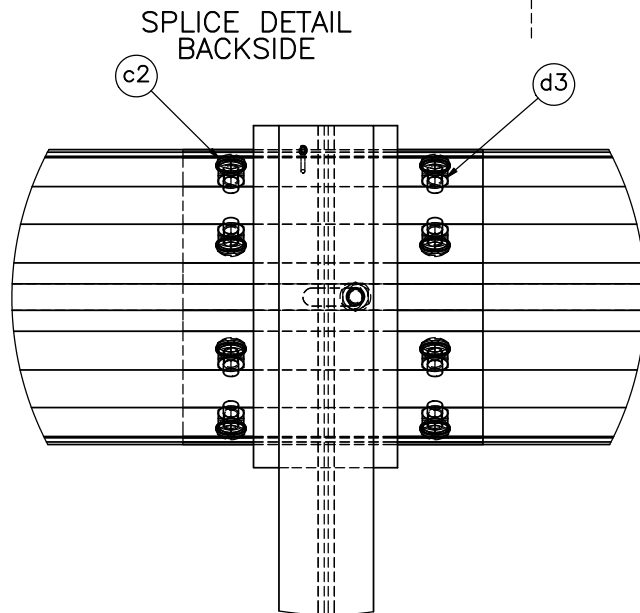
DATE:
1/20/2022

DRAWN BY:
MJM/JRF/G
HR

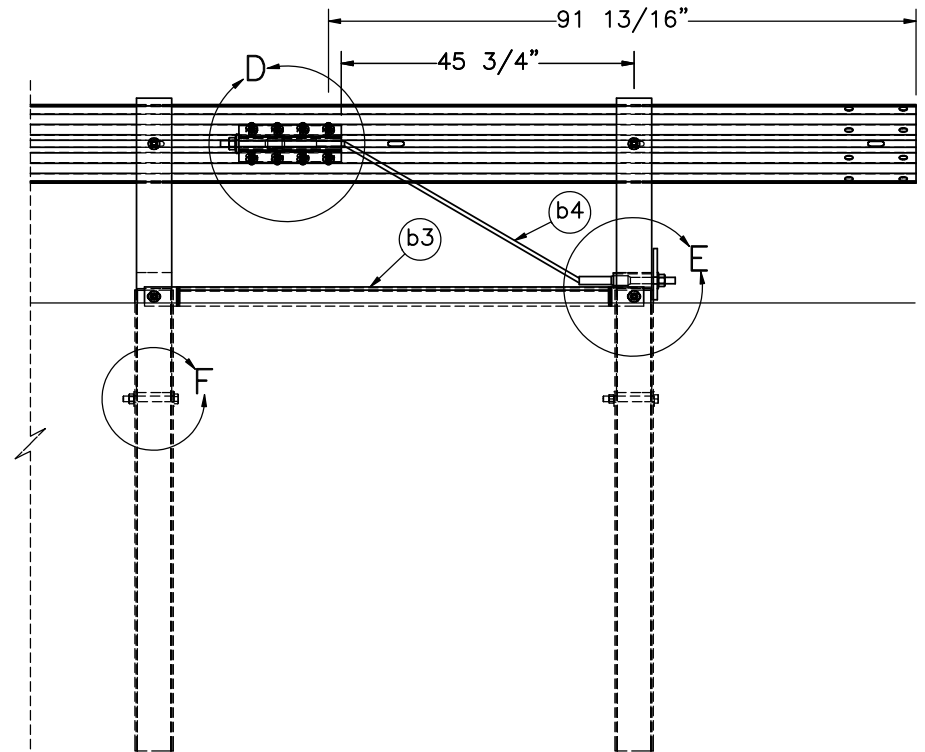
REV. BY:
RWB/JCH



Post No. 29 Post No. 30 Post No. 31



DETAIL C
SCALE 1:8



Post No. 2 Post No. 1

END SECTION DETAIL
BACKSIDE



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

End Section & Splice Detail

DWG. NAME.
MGS7S_R5

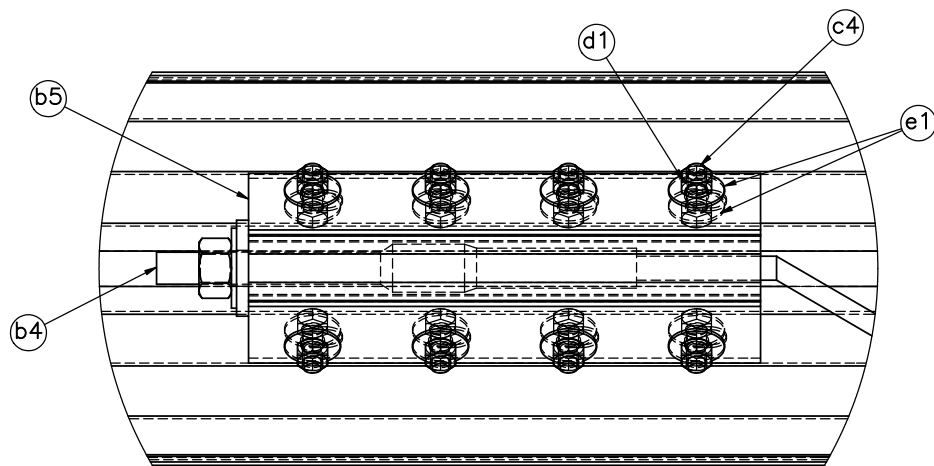
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SHEET:
3 of 13

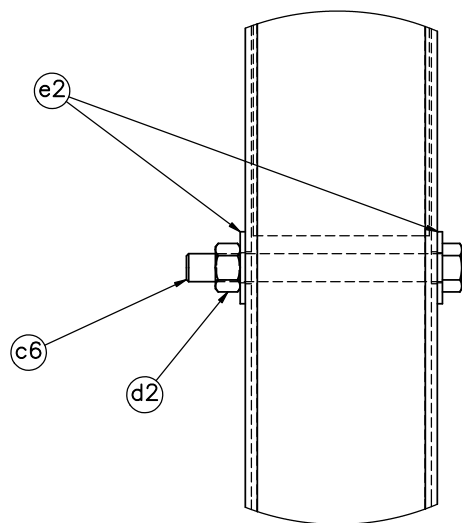
DATE:
1/20/2022

DRAWN BY:
MJM/JRF/G
HR

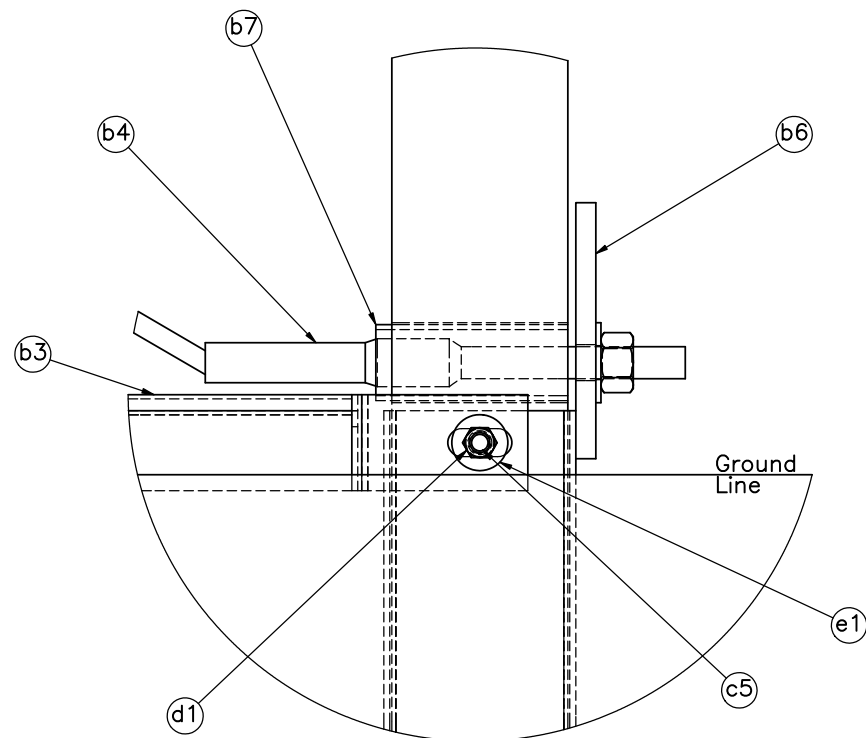
REV. BY:
RWB/JCH



DETAIL D



DETAIL F



DETAIL E



Midwest Roadside
Safety Facility

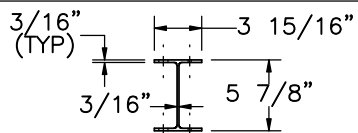
WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

BCT Anchor Details

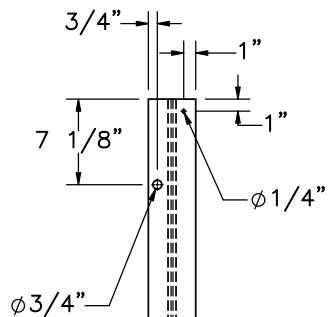
DWG. NAME.
MGS7S_R5

SCALE: 1:6
UNITS: in.

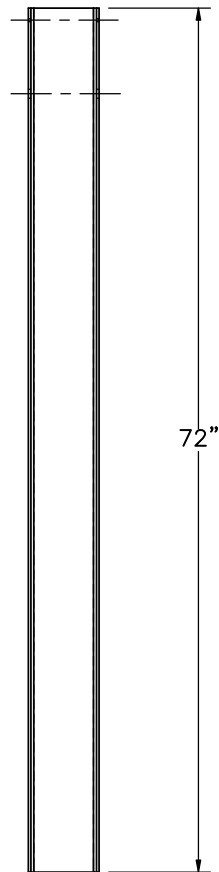
SHEET:
4 of 13
DATE:
1/20/2022
DRAWN BY:
MJM/JRF/G
HR
REV. BY:
RWB/JCH



PLAN VIEW

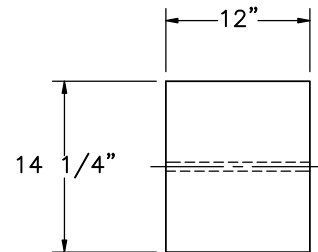


ELEVATION VIEW

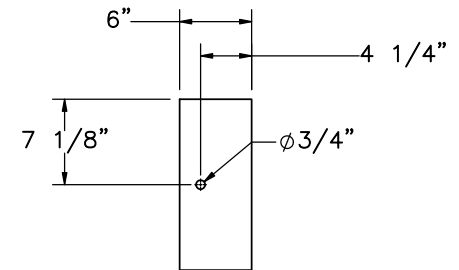


PROFILE VIEW

Part a4

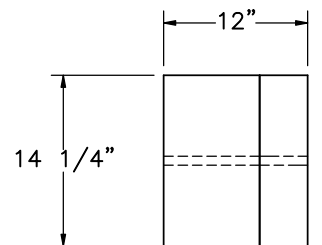


PROFILE VIEW

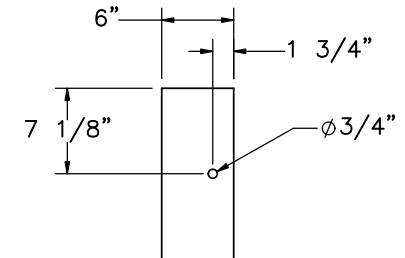


ELEVATION VIEW

Part a6

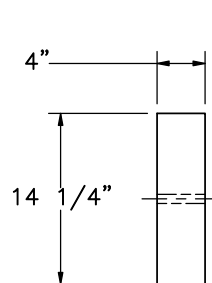


PROFILE VIEW

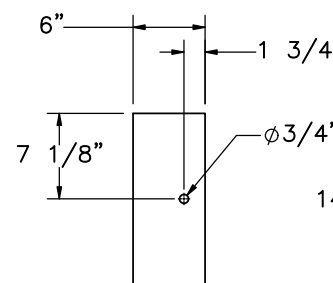


ELEVATION VIEW

Alternate Blockout Option –
6"x4"x14 1/4" Blockout
with 6"x8"x14 1/4" Blockout

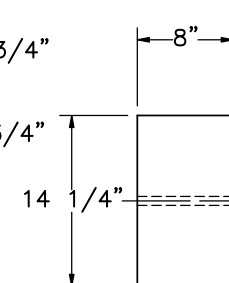


PROFILE VIEW

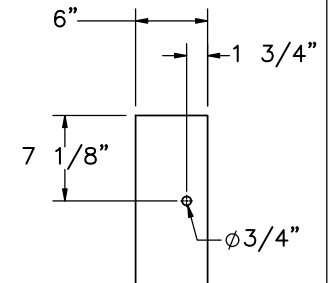


ELEVATION VIEW

6"x4"x14 1/4"
Blockout



PROFILE VIEW



ELEVATION VIEW

6"x8"x14 1/4"
Blockout



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

Post Components

DWG. NAME.
MGS7S_R5

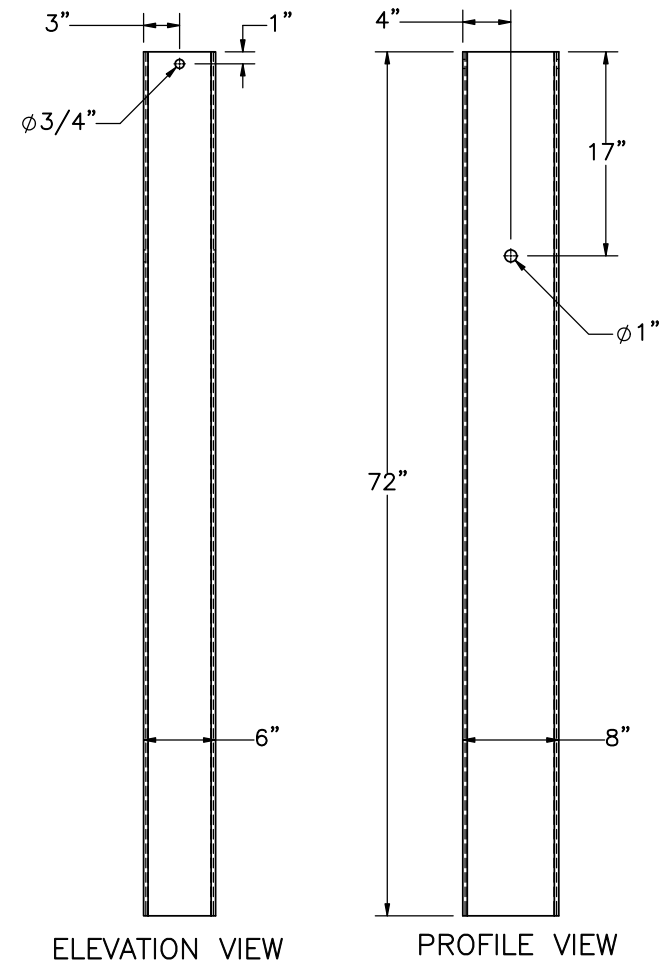
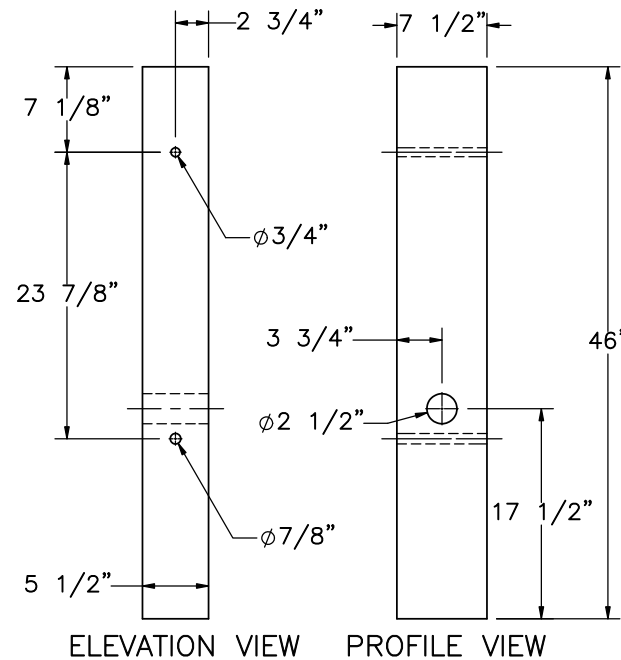
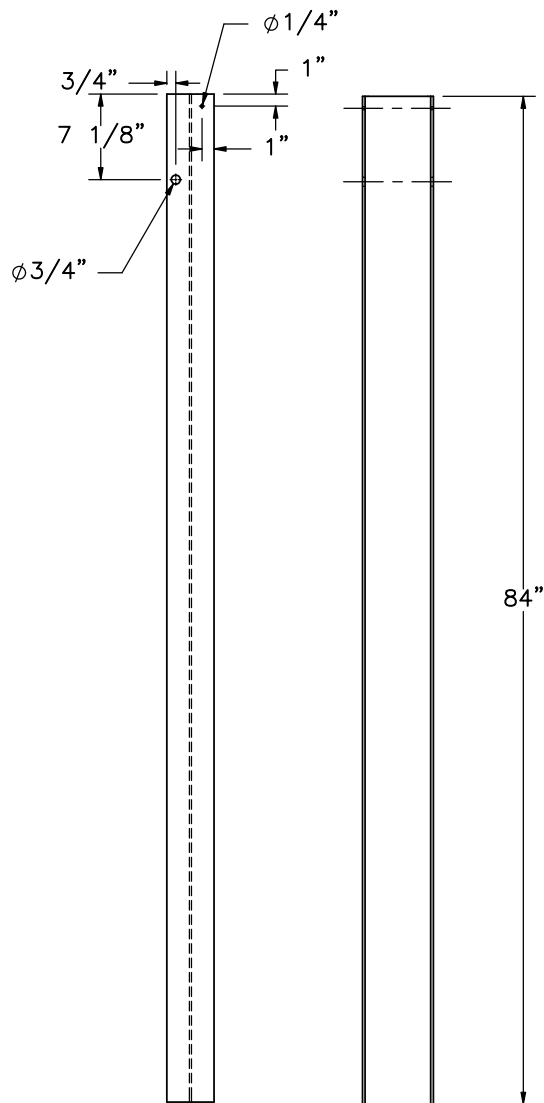
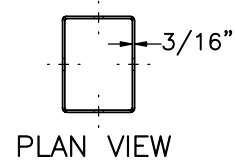
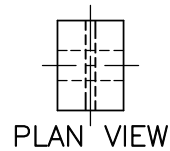
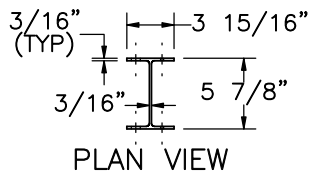
SCALE: 1:16
UNITS: in.

SHEET:
5 of 13

DATE:
1/20/2022

DRAWN BY:
MJM/JRF/G
HR

REV. BY:
RWB/JCH



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

BCT Timber Post, Foundation
Tube, and Slope Post Details

DWG. NAME:
MGS7S_R5

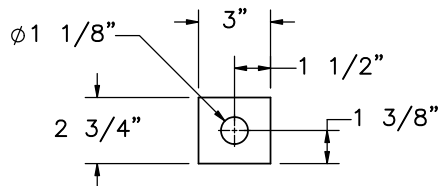
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SHEET:
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DATE:
1/20/2022

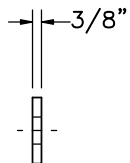
DRAWN BY:
MJM/JRF/G
HR

REV. BY:
RWB/JCH

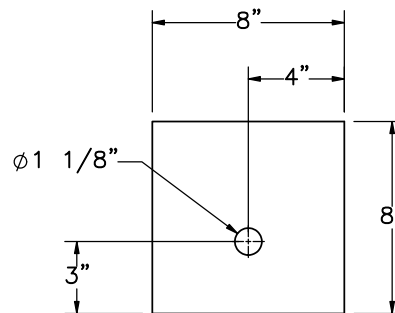


ELEVATION VIEW

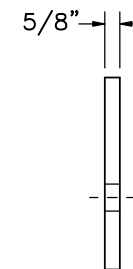
Anchor Bracket End Plate



PROFILE VIEW

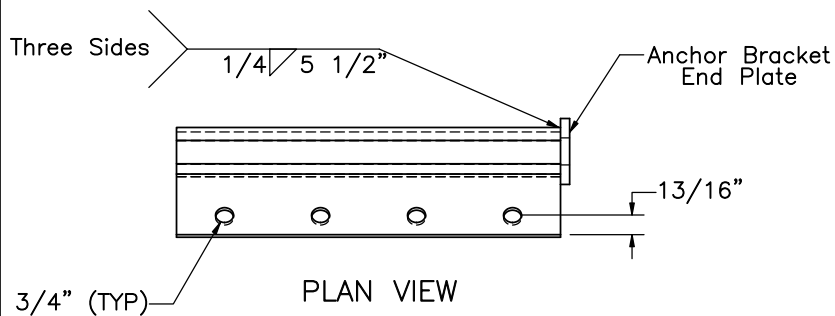


ELEVATION VIEW

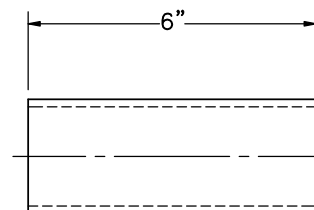


PROFILE VIEW

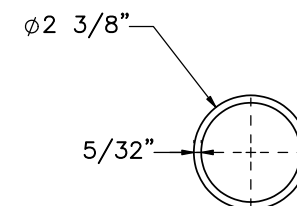
Part b6



PLAN VIEW

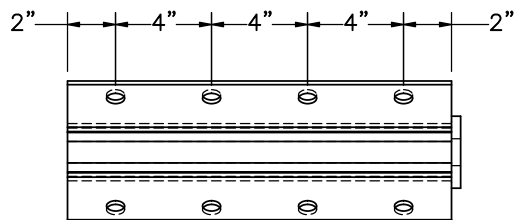


ELEVATION VIEW

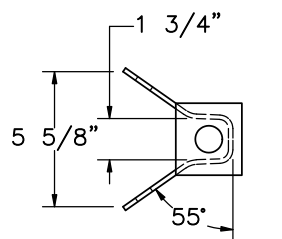


PROFILE VIEW

Part b7
SCALE 1:4



ELEVATION VIEW



PROFILE VIEW

Part b5



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

BCT Post Components &
Anchor Bracket

DWG. NAME:
MGS7S_R5

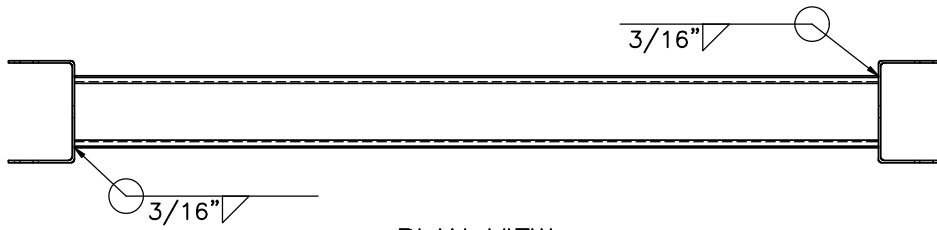
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UNITS: in.

SHEET:
7 of 13

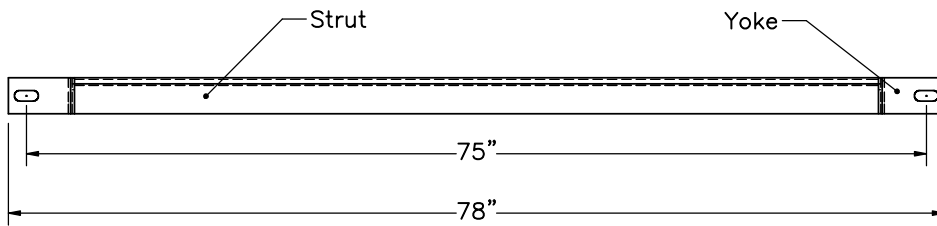
DATE:
1/20/2022

DRAWN BY:
MJM/JRF/G
HR

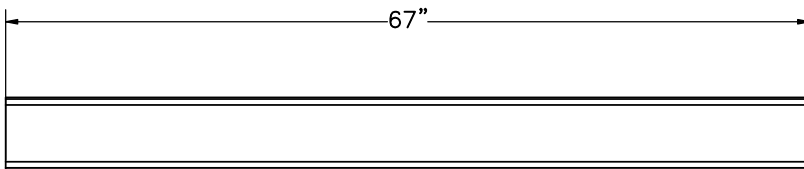
REV. BY:
RWB/JCH



PLAN VIEW

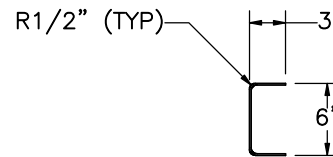


ELEVATION VIEW
Part b3

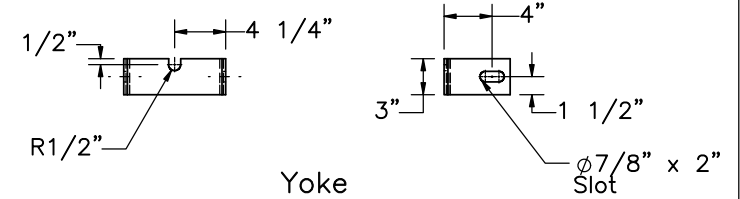
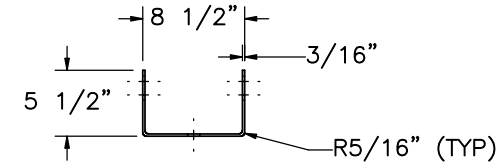


ELEVATION VIEW

6"x3" 10 Gauge Strut



PROFILE VIEW



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

Ground Strut Details

DWG. NAME.
MGS7S_R5

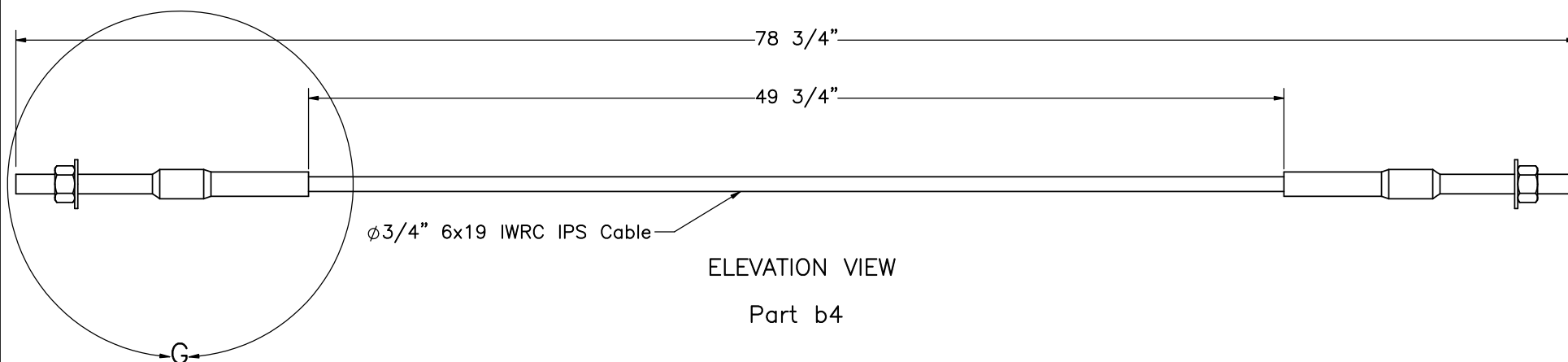
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UNITS: in.

SHEET:
8 of 13

DATE:
1/20/2022

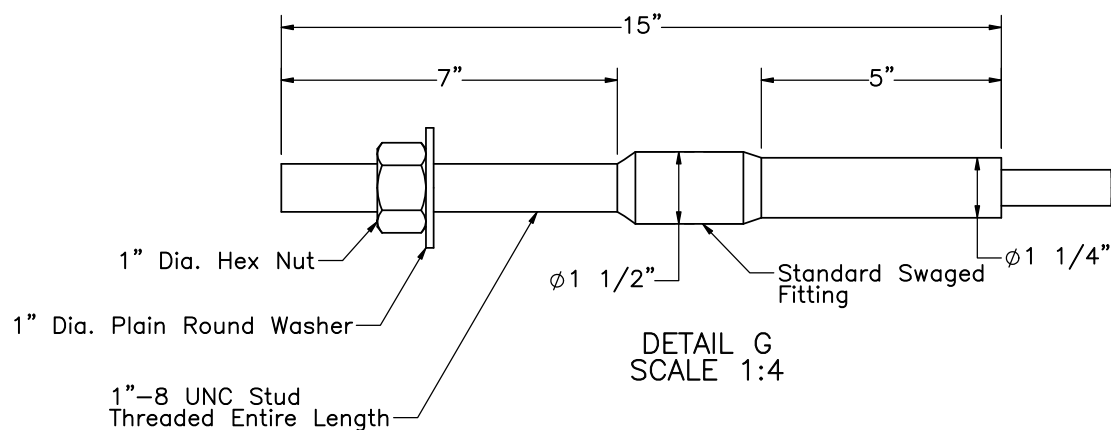
DRAWN BY:
MJM/JRF/G
HR

REV. BY:
RWB/JCH



ELEVATION VIEW

Part b4



DETAIL G
SCALE 1:4

Note: (1) 6x25 IWRC meet the minimum breaking strength of 42.7 kips and may be substituted for the 6x19 IPS cables.



Midwest Roadside
Safety Facility

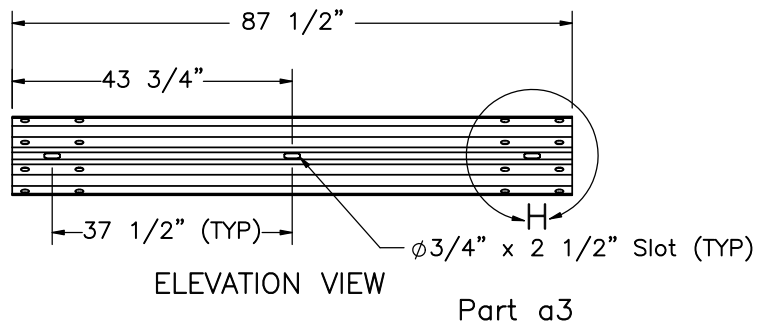
WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

BCT Anchor Cable

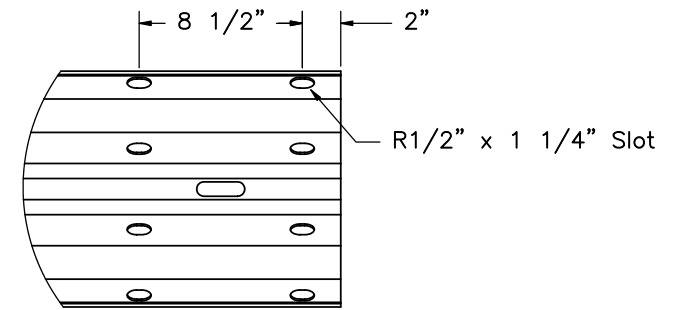
DWG. NAME.
MGS7S_R5

SCALE: 1:8
UNITS: in.

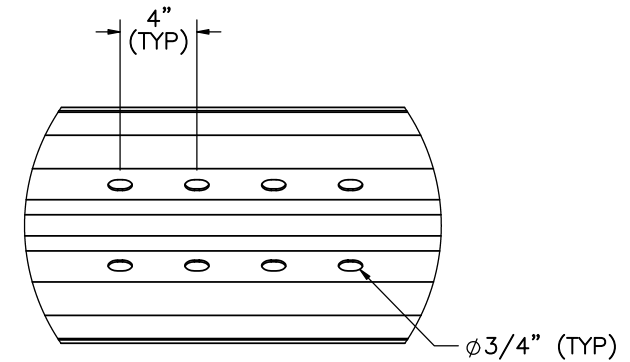
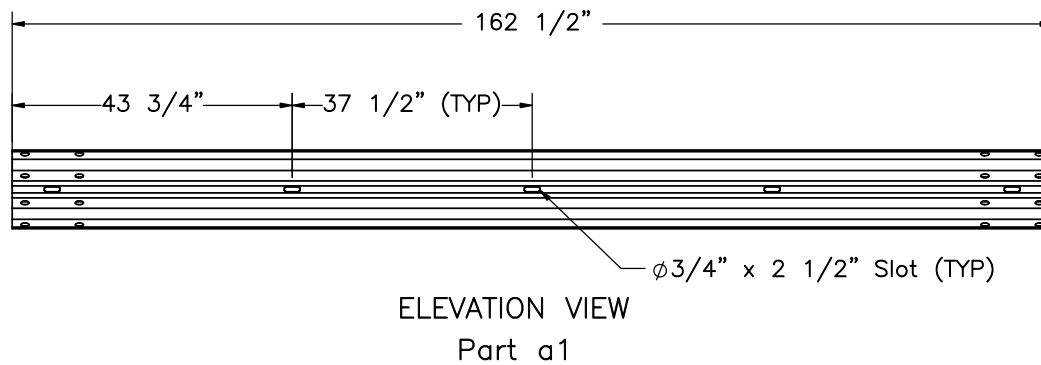
SHEET:
9 of 13
DATE:
1/20/2022
DRAWN BY:
MJM/JRF/G
HR
REV. BY:
RWB/JCH



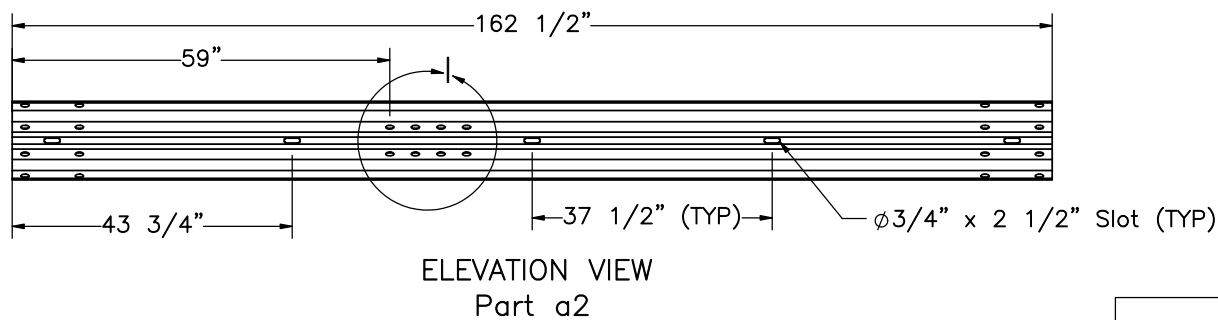
PROFILE VIEW



DETAIL H
SCALE 1:10



DETAIL I
SCALE 1:10



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

Rail Section Details

DWG. NAME.
MGS7S_R5

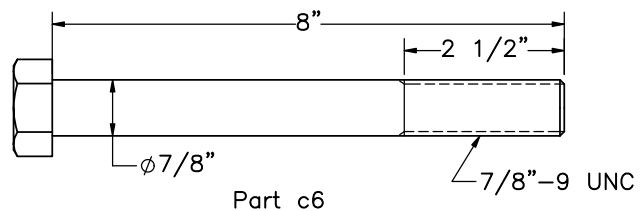
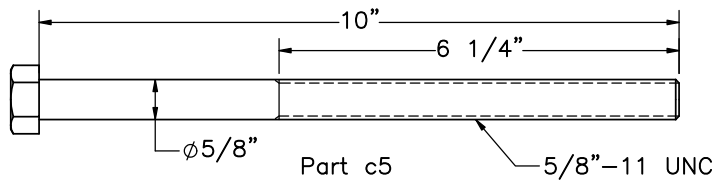
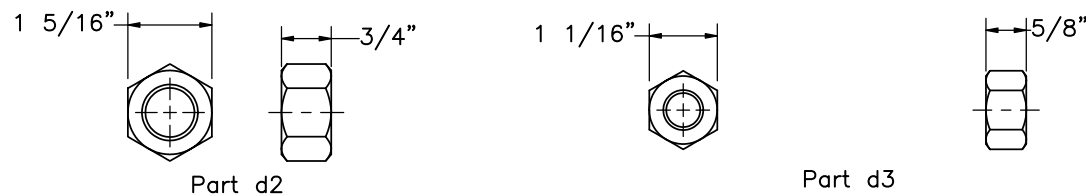
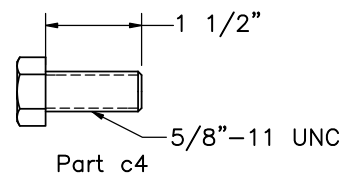
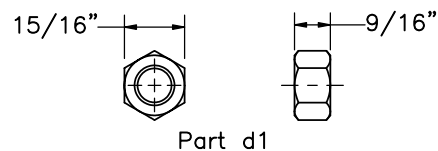
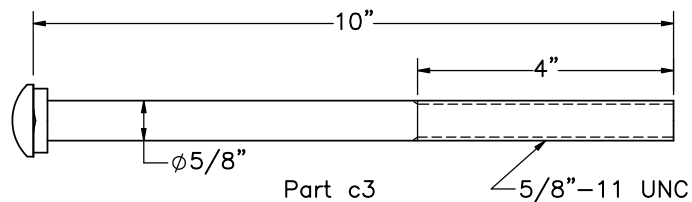
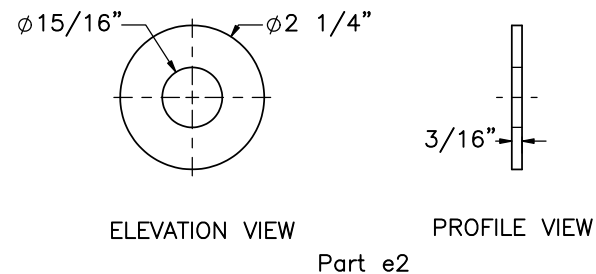
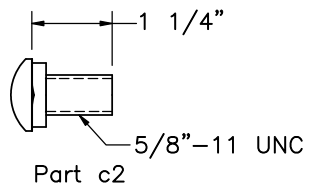
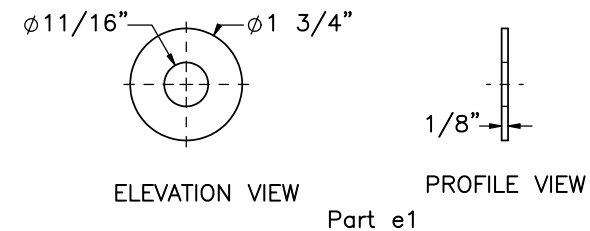
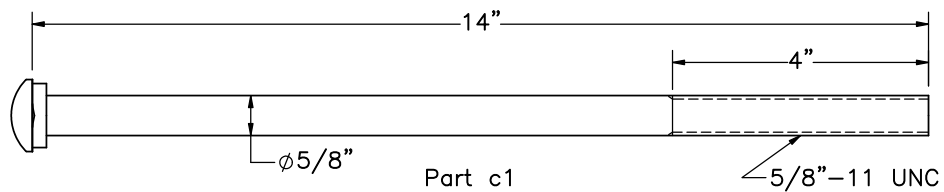
SCALE: 1:30
UNITS: in.

SHEET:
10 of 13

DATE:
1/20/2022

DRAWN BY:
MJM/JRF/G
HR

REV. BY:
RWB/JCH



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

Fasteners

DWG. NAME.
MGS7S_R5

SCALE: 1:3
UNITS: in.

SHEET:
11 of 13

DATE:
1/20/2022

DRAWN BY:
MJM/JRF/G
HR

REV. BY:
RWB/JCH

Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
a1	12	12'-6" 12-gauge W-Beam MGS Section	AASHTO M180	ASTM A123 or A653	RWM04a
a2	2	12'-6" 12-gauge W-Beam MGS End Section	AASHTO M180	ASTM A123 or A653	RWM14a
a3	1	6'-3" 12-gauge W-Beam MGS Section	AASHTO M180	ASTM A123 or A653	RWM04a
a4	13	W6x9 or W6x8.5, 72" Long Steel Post	ASTM A992 Min. 50 ksi or ASTM A36 Min. 36 ksi	ASTM A123	PWE06
a5	23	W6x9 or W6x8.5, 84" Long Steel Post	ASTM A992 Min. 50 ksi or ASTM A36 Min. 36 ksi	ASTM A123	PWE07
a6	36	6x12x14 1/4" Timber Blockout for Steel Posts	AASHTO M168 or SYP Grade No.1 or better	AASHTO M133	PDB10a
a7	36	16D Double Head Nail	—	—	—
b1	4	BCT Timber Post — MGS Height	AASHTO M168 or SYP Grade No. 1 or better	AASHTO M133	PDF01
b2	4	72" Long Foundation Tube	ASTM A500 Gr. B	ASTM A123	PTE06
b3	2	Strut and Yoke Assembly	ASTM A36	ASTM A123	PFP02
b4	2	BCT Cable Anchor Assembly	—	—	FCA01
b5	2	Anchor Bracket Assembly	ASTM A36	ASTM A123	FPA01
b6	2	8"x8"x5/8" Anchor Bearing Plate	ASTM A36	ASTM A123	FPB01
b7	2	2 3/8" O.D. x 6" Long BCT Post Sleeve	ASTM A53 Gr. B	ASTM A123	FMM02
c1	36	5/8" Dia. UNC, 14" Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBB06
c2	112	5/8" Dia. UNC, 1 1/4" Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBB01
c3	4	5/8" Dia. UNC, 10" Long Guardrail Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBB03
c4	16	5/8" Dia. UNC, 1 1/2" Long Hex Head Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBX16a
c5	4	5/8" Dia. UNC, 10" Long Hex Head Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	FBX16a
c6	4	7/8" Dia. UNC, 8" Long Hex Head Bolt	ASTM A307 Gr. A	ASTM A153 or B695 Class 55 or F1941 or F2329	—



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

Bill of Materials

DWG. NAME.
MGS7S_R5

SCALE: None
UNITS: in.

SHEET:
12 of 13

DATE:
1/20/2022

DRAWN BY:
MJM/JRF/G
HR

REV. BY:
RWB/JCH

Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
d1	24	5/8" Dia. Hex Nut	ASTM A563A	ASTM A153 or B695 Class 55 or F1941 or F2329	FNX16a
d2	4	7/8" Dia. Hex Nut	ASTM A563A	ASTM A153 or B695 Class 55 or F1941 or F2329	—
d3	148	5/8" Dia. Heavy Hex Nut	ASTM A563A	ASTM A153 or B695 Class 55 or F1941 or F2329	FNX16b
e1	44	5/8" Dia. Plain USS Washer	ASTM F844	ASTM A123 or A153 or F2329	FWC16a
e2	8	7/8" Dia. Plain USS Washer	ASTM F844	ASTM A123 or A153 or F2329	FWC20a



Midwest Roadside
Safety Facility

WI MGS with Half Post
Spacing
Test Nos. MGS7S-1-2

Bill of Materials

DWG. NAME.
MGS7S_R5

SCALE: None
UNITS: in.

SHEET:
13 of 13
DATE:
1/20/2022
DRAWN BY:
MJM/JRF/G
HR
REV. BY:
RWB/JCH

REV.	DATE OF ISSUE	Page	NATURE OF CHANGES	REVIEWER	REVISED BY
0	3/10/2020	—	Original Document created.	—	MJM
1	3/25/2020	1	Edited note 5 to say critical region is between post nos. 9 and 31.	RWB	MJM
		3	Removed nut from detail C.		
		6	Moved dimensions on part a5 for clarity.		
		11	Edited part e1 inner diameter to be 11/16".		
2	4/1/2020	1	Edited note 1 and impact descriptions.	KAL	MJM
		BOM	Edited part c6 description to match part dimension.		
3	4/2/2020	1	Edited note 5. Flipped the impact direction to be coming from the right and changed post numbering to reflect this change.	KAL	MJM
		5	Edited part a1 label to part a4.		
4	6/10/2020	1	Slope was shifted longitudinally such that it starts between post nos. 8 and 9 and ends between post nos. 31 and 32. A post was added between 9 and 10, and post no 31 was removed.	KAL	JRF
5	1/20/2022	3	Removed note on hidden post. Labeled post nos. in splice detail.	KAL	GHR
		4	Hid ground in Detail F.		
		5	Added dimensions to Plan View for Part a4. Swapped labels for blockouts. Moved dimensions to within page boundaries.		
		6	Added dimensions to Plan View for Part a5. Added centerlines to Plan View for Part b2.		
		11	Added centerlines to Parts d1, d2, and d3.		
		BoM	Updated quantities and HWG descriptions		