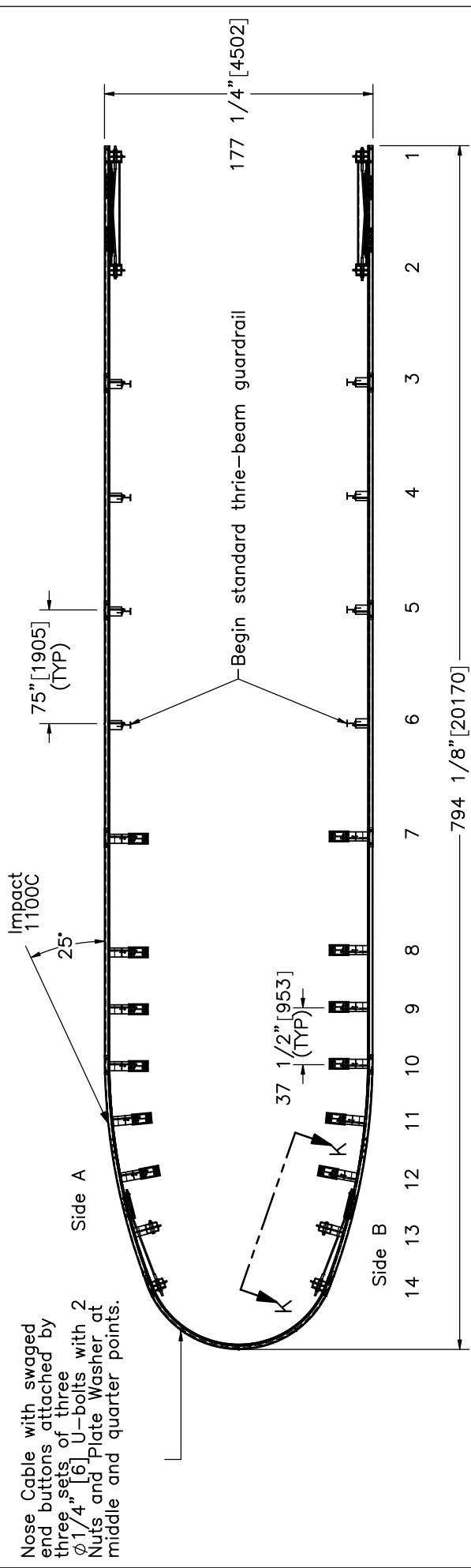
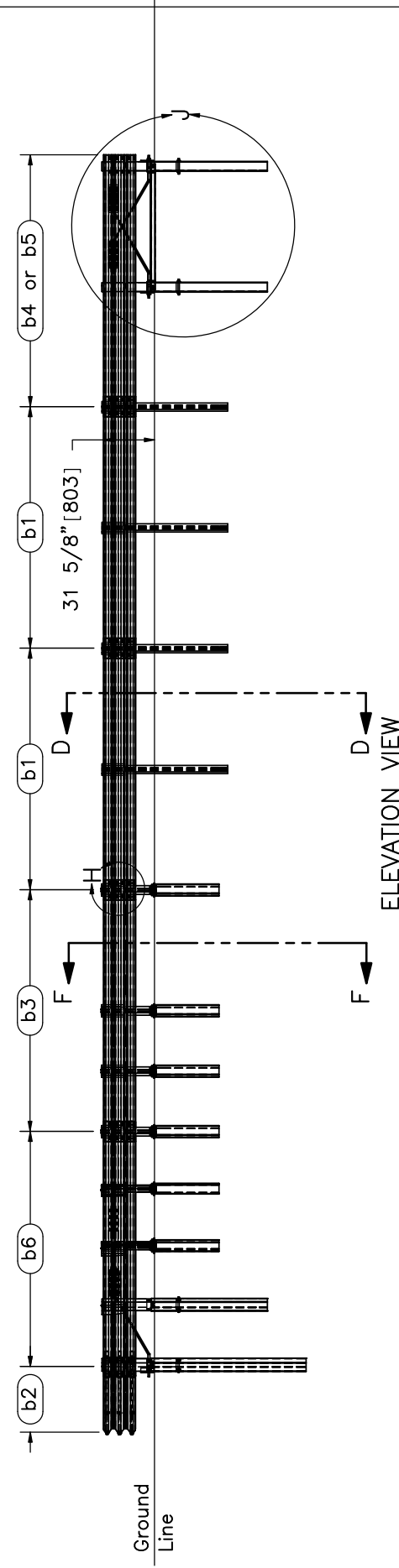




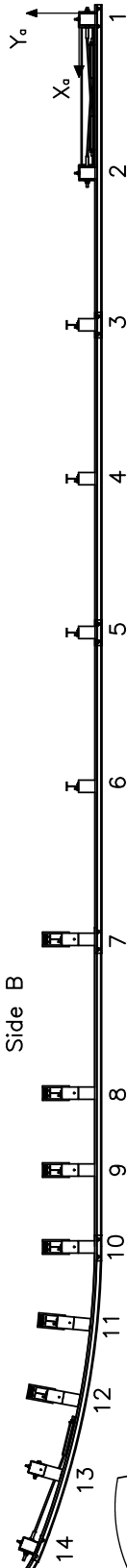
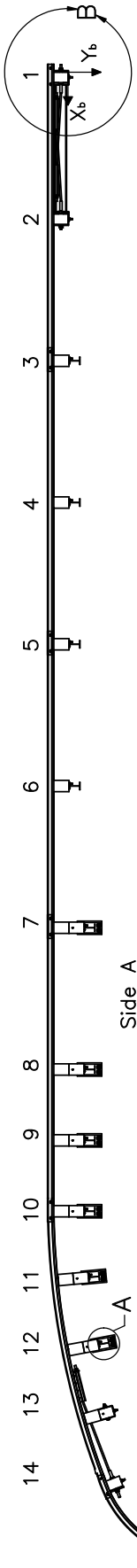
PLAN VIEW



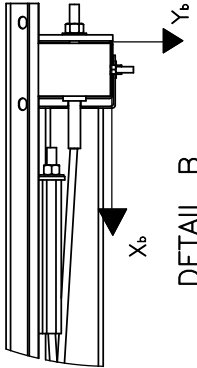
- Notes: (1) The test shall be performed to test designation no. 3-37b of MASH criteria.  
 (2) The impact location is at the centerline of post no. 11.  
 (3) All posts are to be installed using  $\phi 3'$  [914] augered holes with the HE8 compaction method.  
 (4) BCT Anchors are to be placed in  $\phi 3'$  [914] holes and backfilled with soil.

|                                                                                     |                          |              |                                |
|-------------------------------------------------------------------------------------|--------------------------|--------------|--------------------------------|
|  | Bullnose with UBSP       |              | SHEET: 1 of 24                 |
|                                                                                     | Test No. MSPBN-8         |              | DATE: 4/17/2020                |
| Midwest Road Safety Facility                                                        | System Layout            |              | DRAWN BY: CRJ/JDJ/JE K/AJS/JRF |
|                                                                                     | DWG. NAME: Bullnose-8_R6 |              | REV. BY: JCH/RWB/J EK          |
|                                                                                     |                          | SCALE: 1:100 | UNITS: in, [mm]                |

| Post No. | Side A            |            |                   |            | Side B            |            |                   |            |
|----------|-------------------|------------|-------------------|------------|-------------------|------------|-------------------|------------|
|          | Rear Face-DS Edge |            | Rear Face-US Edge |            | Rear Face-DS Edge |            | Rear Face-US Edge |            |
|          | X                 | Y          | X                 | Y          | X                 | Y          | X                 | Y          |
| 14       | 61'-10 7/8"       | 2'-3 1/8"  | 62'-4"            | 2'-5 1/8"  | 61'-10 7/8"       | 2'-3 1/8"  | 62'-4"            | 2'-5 1/8"  |
| 13       | 58'-9 3/4"        | 1'-11 1/4" | 59'-3 1/8"        | 2'-0 3/4"  | 58'-9 3/4"        | 1'-11 1/4" | 59'-3 1/8"        | 2'-0 3/4"  |
| 12       | 55'-10 1/4"       | 1'-9 3/8"  | 56'-2 1/8"        | 1'-10 1/8" | 55'-10 1/4"       | 1'-9 3/8"  | 56'-2 1/8"        | 1'-10 1/8" |
| 11       | 52'-11 1/4"       | 1'-4 3/8"  | 53'-3 1/8"        | 1'-4 3/4"  | 52'-11 1/4"       | 1'-4 3/8"  | 53'-3 1/8"        | 1'-4 3/4"  |
| 10       | 50'-0 3/4"        | 1'-2 3/8"  | 50'-4 3/4"        | 1'-2 3/8"  | 50'-0 3/4"        | 1'-2 3/8"  | 50'-4 3/4"        | 1'-2 3/8"  |
| 9        | 46'-11 1/4"       | 1'-2 3/8"  | 47'-3 1/4"        | 1'-2 3/8"  | 46'-11 1/4"       | 1'-2 3/8"  | 47'-3 1/4"        | 1'-2 3/8"  |
| 8        | 43'-9 3/4"        | 1'-2 3/8"  | 44'-1 3/4"        | 1'-2 3/8"  | 43'-9 3/4"        | 1'-2 3/8"  | 44'-1 3/4"        | 1'-2 3/8"  |
| 7        | 37'-6 3/4"        | 1'-2 3/8"  | 37'-10 3/4"       | 1'-2 3/8"  | 37'-6 3/4"        | 1'-2 3/8"  | 37'-10 3/4"       | 1'-2 3/8"  |
| 6        | 31'-3 3/4"        | 6 3/8"     | 31'-7 3/4"        | 6 3/8"     | 31'-3 3/4"        | 6 3/8"     | 31'-7 3/4"        | 6 3/8"     |
| 5        | 25'-0 3/4"        | 6 3/8"     | 25'-4 3/4"        | 6 3/8"     | 25'-0 3/4"        | 6 3/8"     | 25'-4 3/4"        | 6 3/8"     |
| 4        | 18'-9 3/4"        | 6 3/8"     | 19'-1 3/4"        | 6 3/8"     | 18'-9 3/4"        | 6 3/8"     | 19'-1 3/4"        | 6 3/8"     |
| 3        | 12'-6 3/4"        | 6 3/8"     | 12'-10 3/4"       | 6 3/8"     | 12'-6 3/4"        | 6 3/8"     | 12'-10 3/4"       | 6 3/8"     |
| 2        | 6'-3"             | 0"         | 6'-8 1/2"         | 0"         | 6'-3"             | 0"         | 6'-8 1/2"         | 0"         |
| 1        | 0"                | 0"         | 5 1/2"            | 0"         | 0"                | 0"         | 5 1/2"            | 0"         |



Note: All dimensions measured from the intersection of the rear face and downstream edge of post no. 1 on side B and post no. 1 on side A.



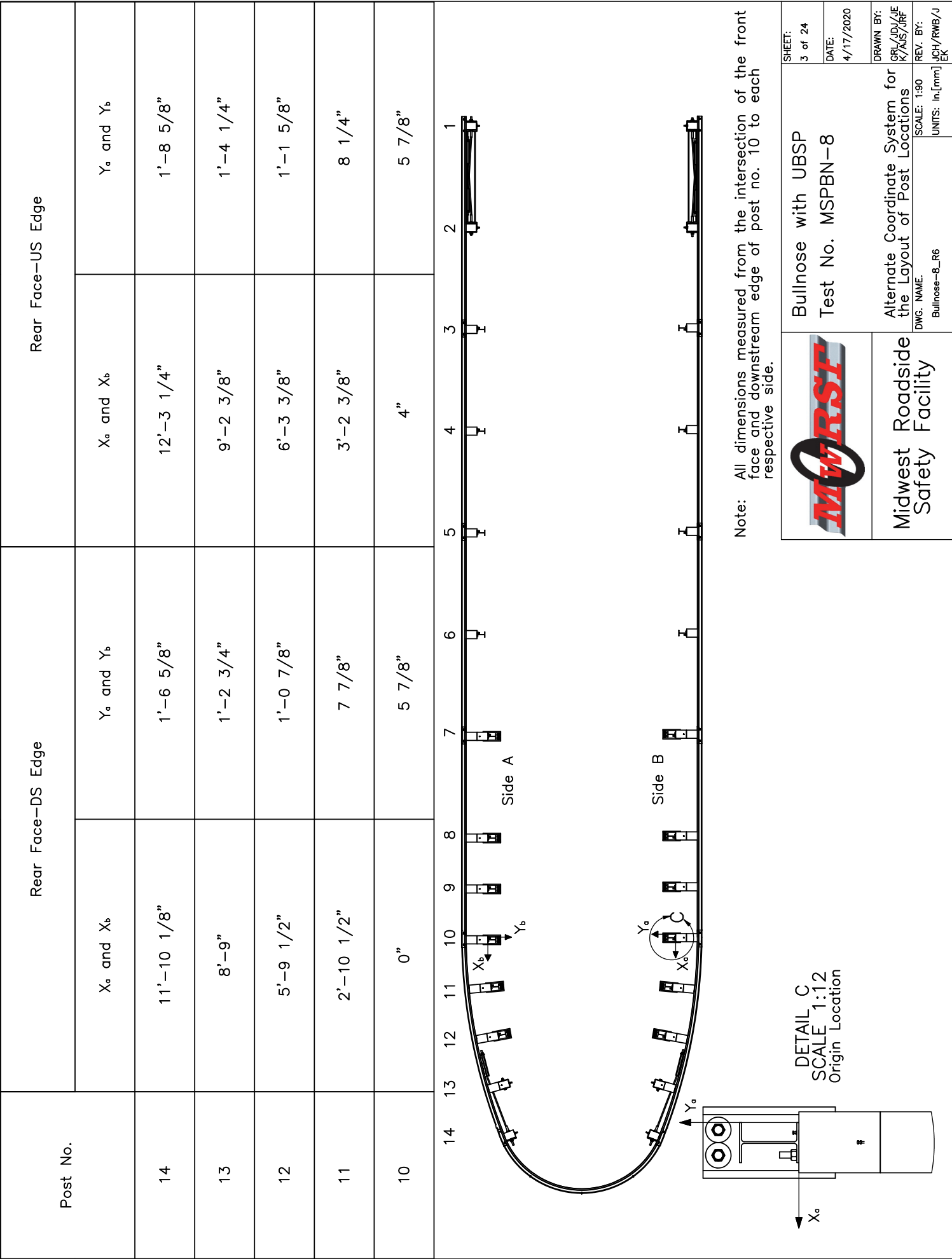
Midwest Roadside Safety Facility

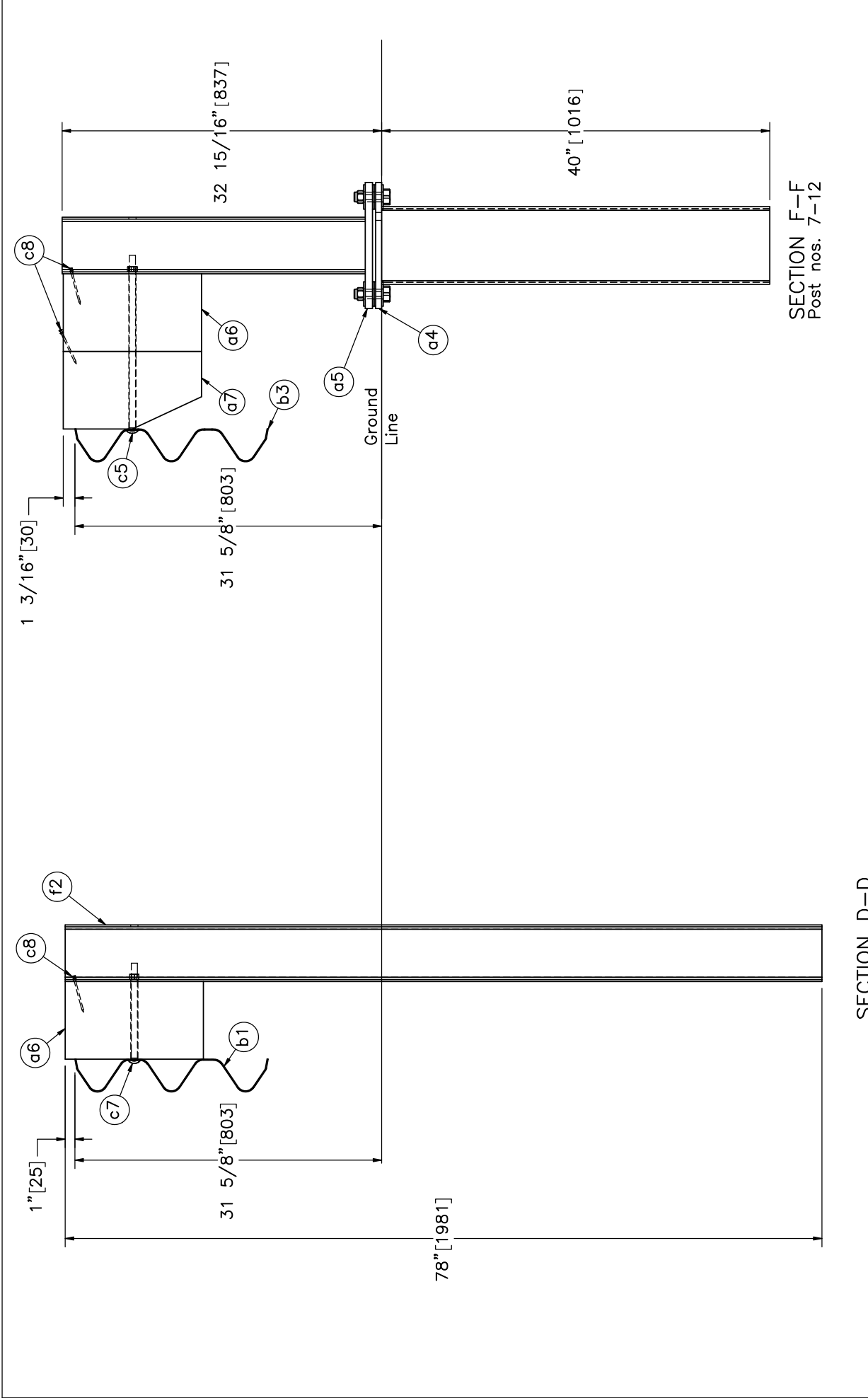
Bullnose with UBSP  
Test No. MSPBN-8

Layout for Post Locations

|           |                          |
|-----------|--------------------------|
| SHEET:    | 2 of 24                  |
| DATE:     | 4/17/2020                |
| DRAWN BY: | CR/L/ADJ/JE<br>K/AJS/JRF |
| REV. BY:  | JCH/RWB/J<br>EK          |

|            |               |
|------------|---------------|
| DWG. NAME: | Bullnose-8_R6 |
| SCALE:     | 1:30          |
| UNITS:     | in, [mm]      |

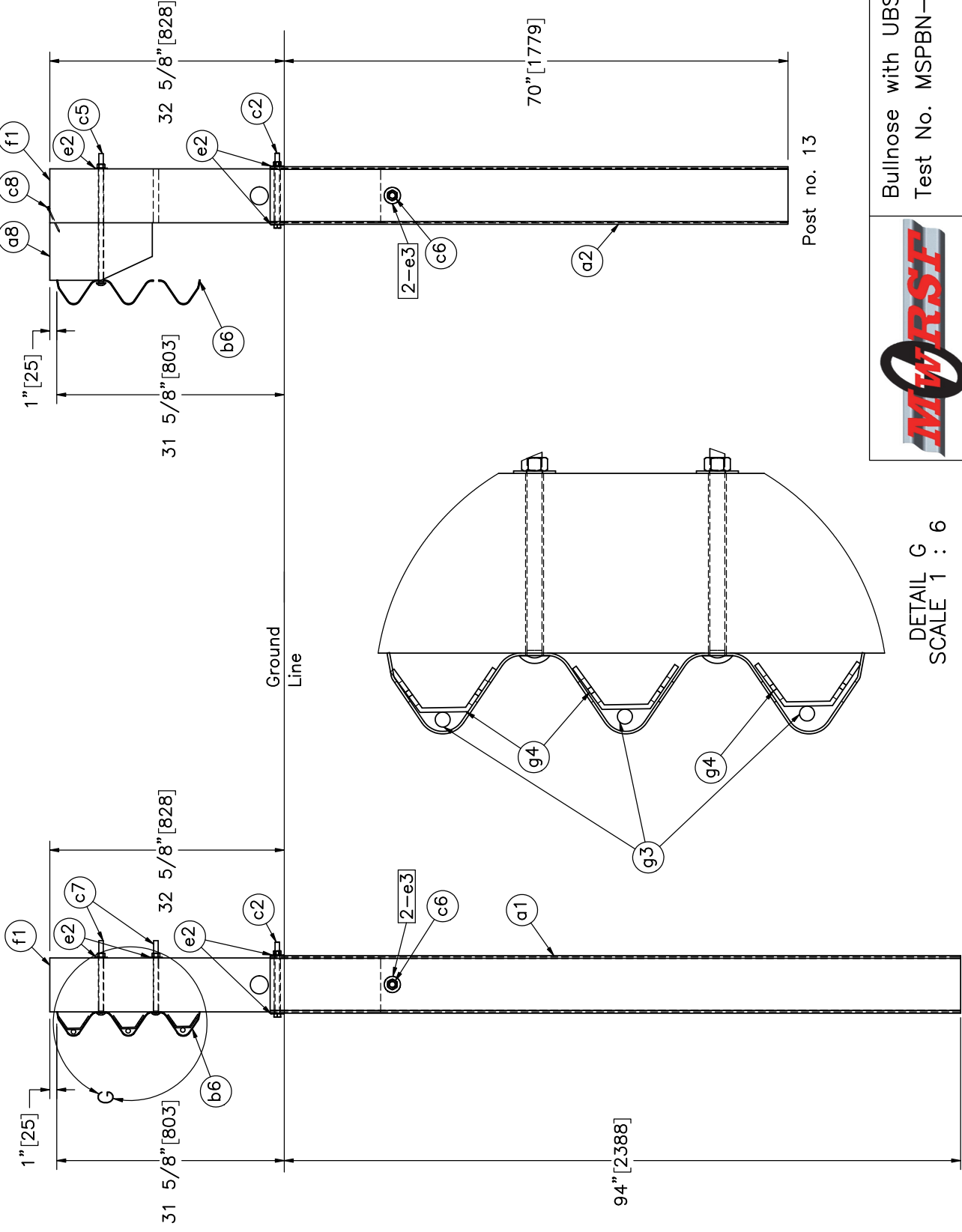




SECTION D-D  
Post nos. 3-6

SECTION F-F  
Post nos. 7-12

|                                                                                     |                                        |  |                                      |
|-------------------------------------------------------------------------------------|----------------------------------------|--|--------------------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8 |  | SHEET:<br>4 of 24                    |
|                                                                                     | Post Nos. 3-6, 7-12 Details            |  | DATE:<br>4/17/2020                   |
| Midwest Roadside<br>Safety Facility                                                 | DWG. NAME:<br>Bullnose-8_R6            |  | DRAWN BY:<br>CR/LJD/JJE<br>K/AJS/JRF |
|                                                                                     | SCALE: 1:14<br>UNITS: in, [mm]         |  | REV. BY:<br>JCH/RWB/J<br>EK          |



Midwest Roadside  
Safety Facility

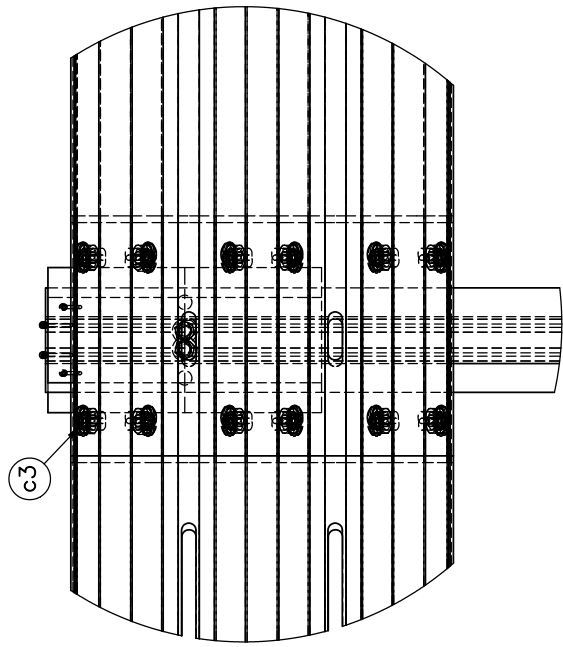
Bullnose with UBSP  
Test No. MSPBN-8

Post Nos. 13 and 14 Details

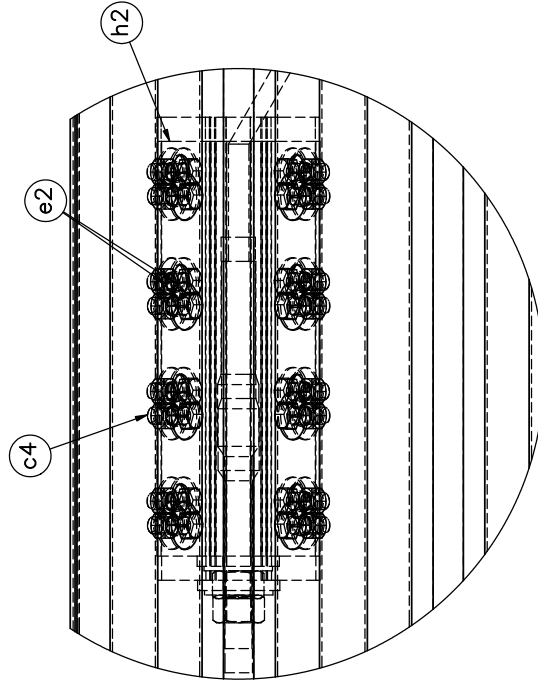
DWG. NAME:  
Bullnose-8\_R6

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

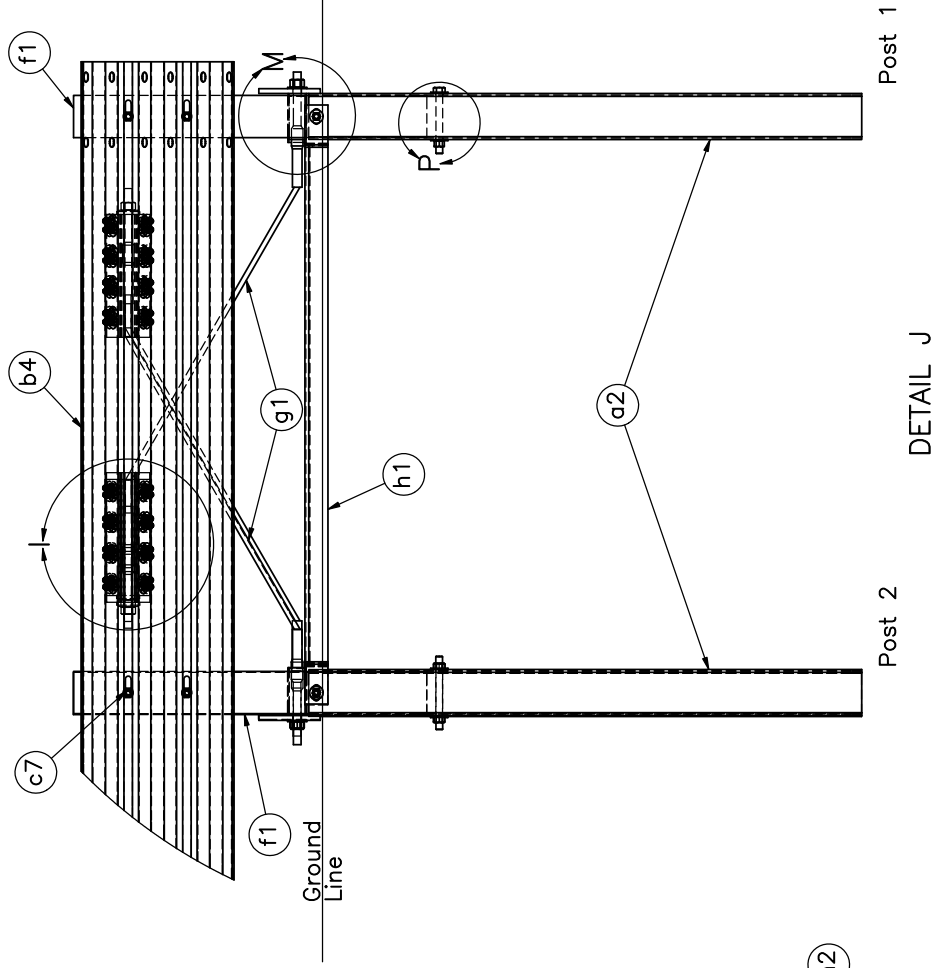
SHEET:  
5 of 24  
DATE:  
4/17/2020  
DRAWN BY:  
CRL/JDJ/JE  
K/AJS/JRF  
REV. BY:  
JCH/RWB/J  
EK



DETAIL H  
SCALE 1 : 10



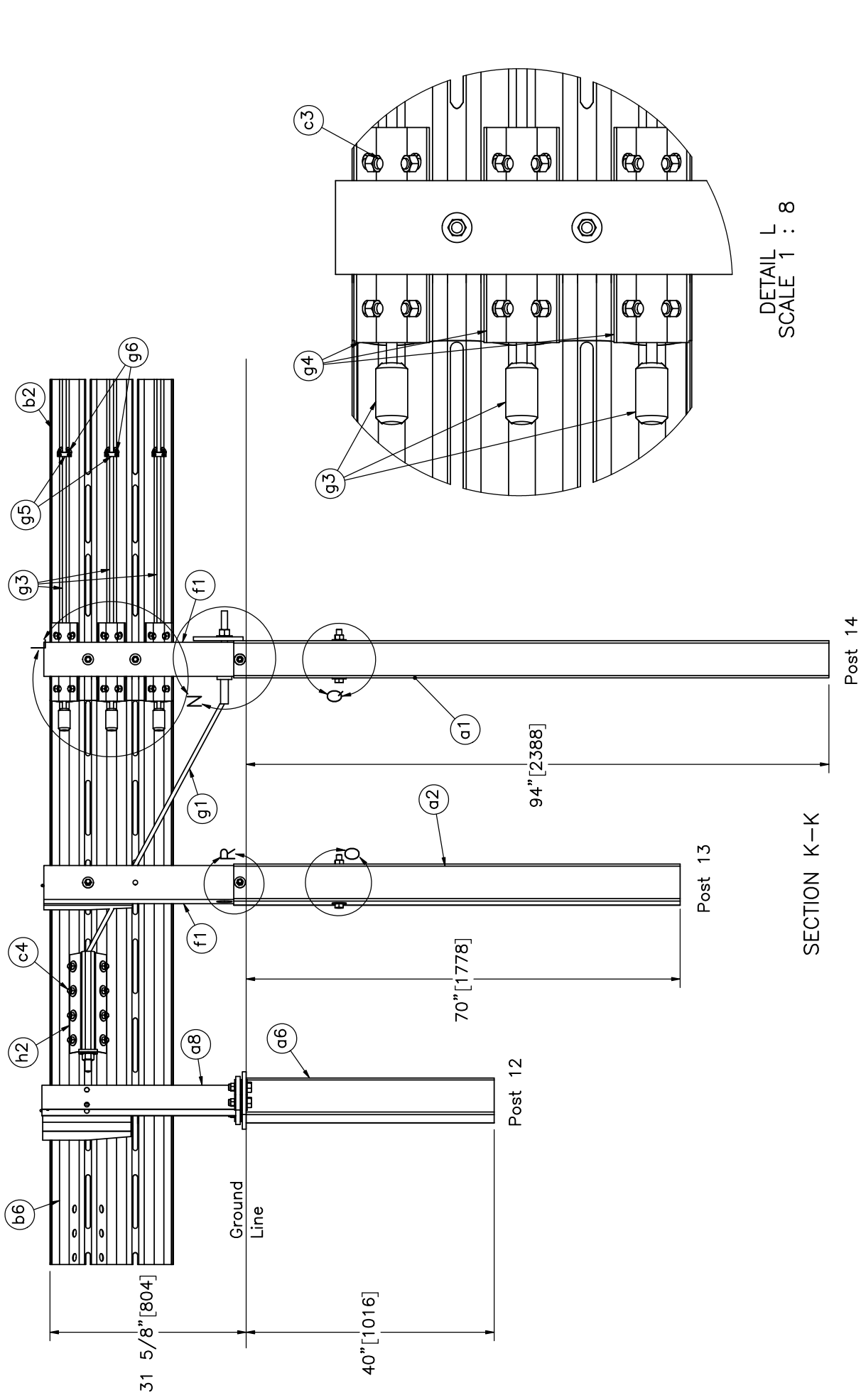
DETAIL I  
SCALE 1 : 7



DETAIL J

Notes: (1) Two nails (Part c8) bent over bearing plate (Part a3) to prevent rotation.  
(2) Components in Detail J on side B of system hidden for clarity.

|                                                                                     |                                        |             |                                      |
|-------------------------------------------------------------------------------------|----------------------------------------|-------------|--------------------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8 |             | SHEET:<br>6 of 24                    |
|                                                                                     | End Rail Splice Detail                 |             | DATE:<br>4/17/2020                   |
|                                                                                     | DWG. NAME:<br>Bullnose-8_R6            | SCALE: 1:25 | DRAWN BY:<br>CRL/UDJ/JE<br>K/AJS/JRF |
|                                                                                     |                                        |             | REV. BY:<br>JCH/RWB/J<br>EK          |



DETAIL L  
SCALE 1 : 8

SECTION K-K



Midwest Roadside  
Safety Facility

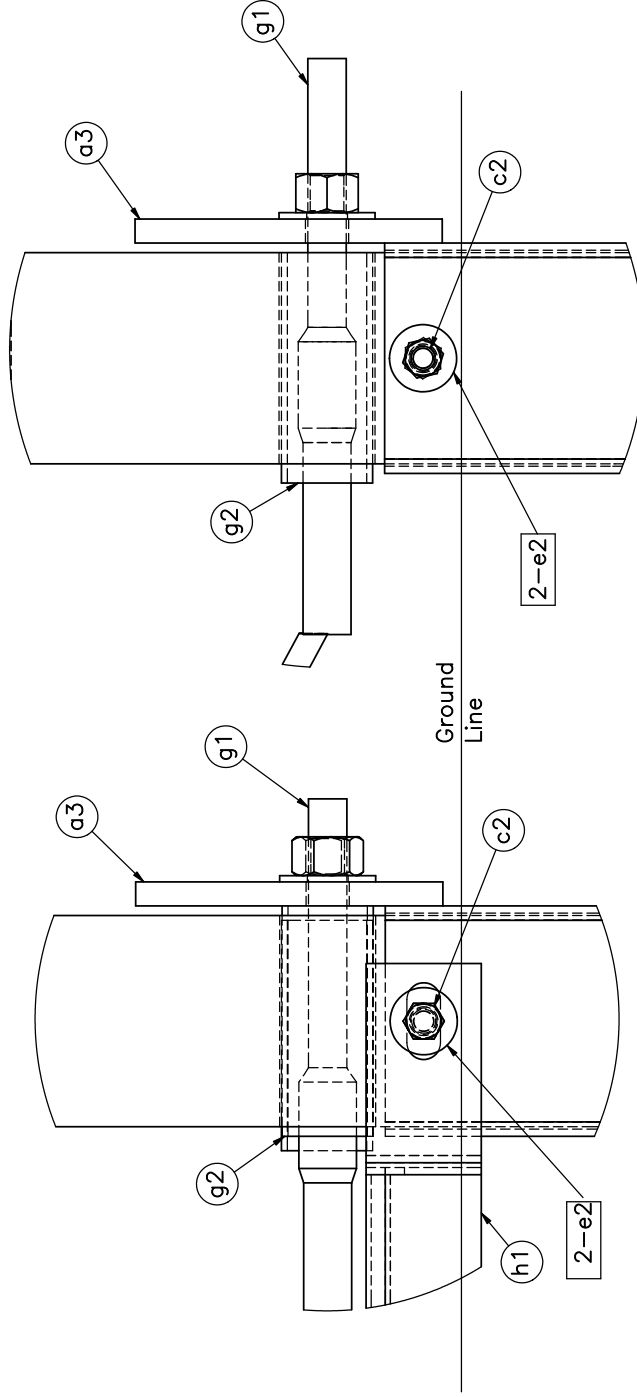
Bullnose with UBSP  
Test No. MSPBN-8

Nose Section Detail

Note: (1) Two nails (Part c8) bent over bearing plate (Part a3) to prevent rotation.

|           |                         |
|-----------|-------------------------|
| SHEET:    | 7 of 24                 |
| DATE:     | 4/17/2020               |
| DRAWN BY: | CRL/ADJ/JE<br>K/AJS/JRF |
| REV. BY:  | JCH/RWB/J<br>EK         |

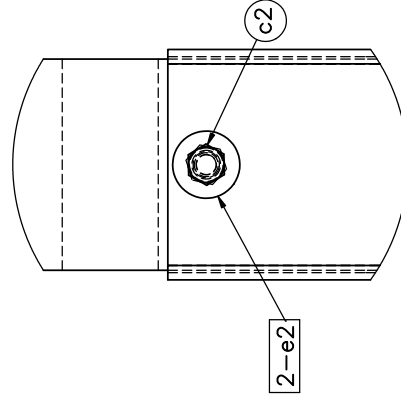
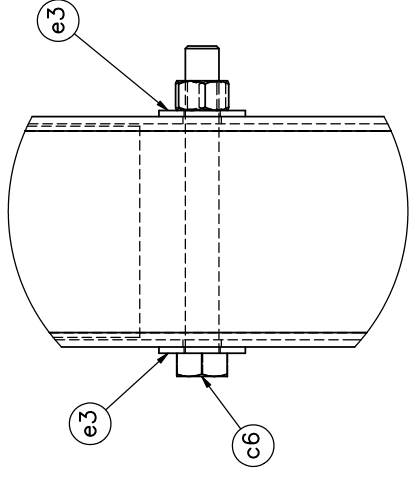
|            |               |
|------------|---------------|
| DWG. NAME: | Bullnose-8_R6 |
| SCALE:     | 1:22          |
| UNITS:     | In, [mm]      |



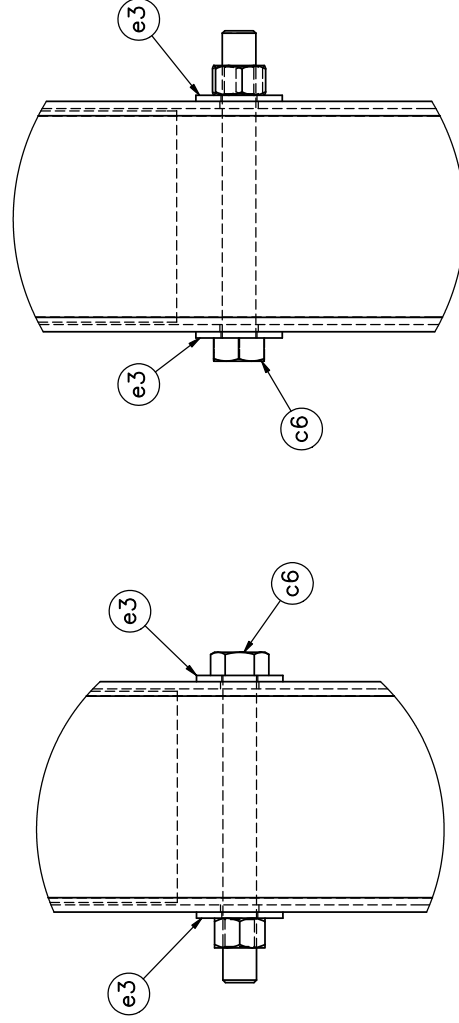
DETAIL M

DETAIL N

DETAIL O



DETAIL R



DETAIL P

DETAIL Q



Midwest Roadside  
Safety Facility

Bullnose with UBSP  
Test No. MSPBN-8

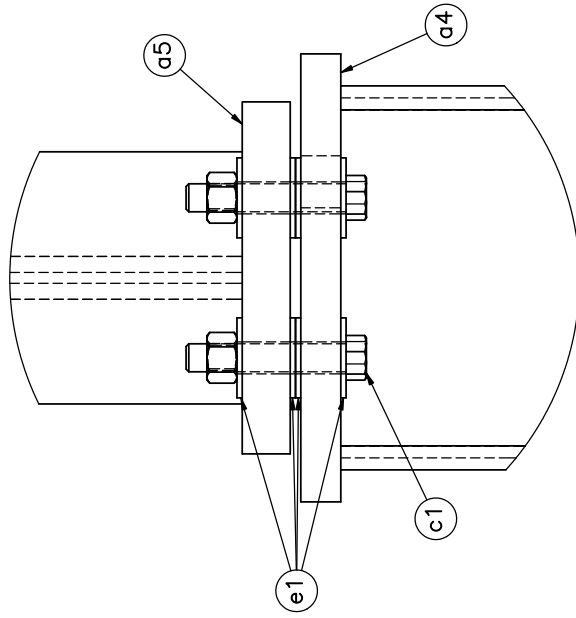
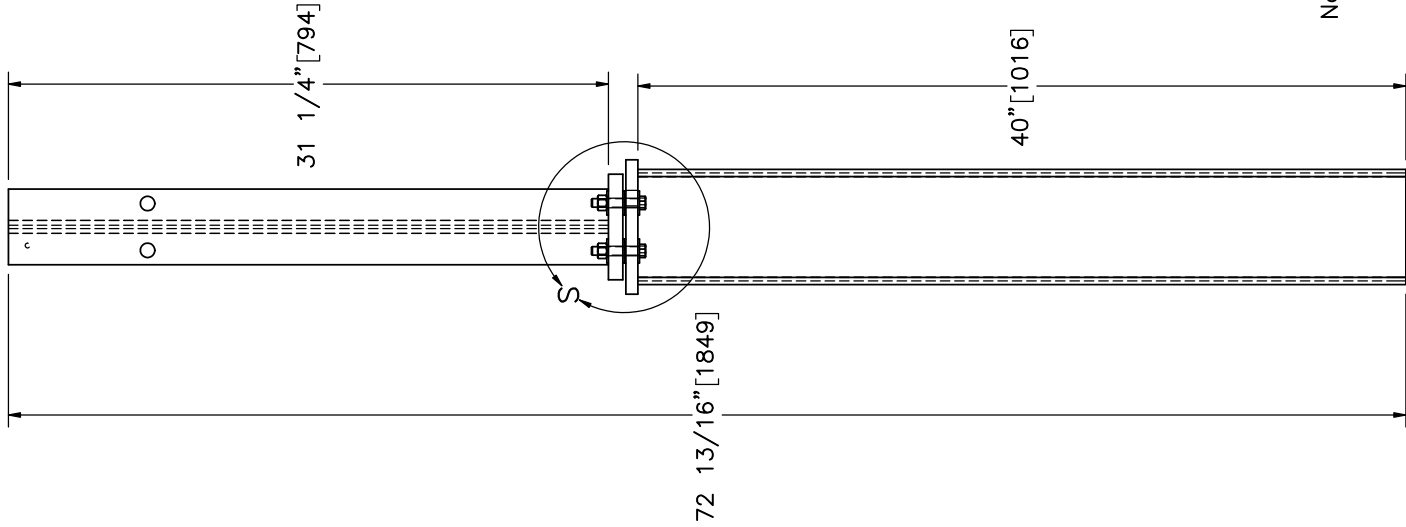
Anchor Post Details

Note: (1) Two nails (Part c8) bent over bearing plate (Part a3) to prevent rotation.

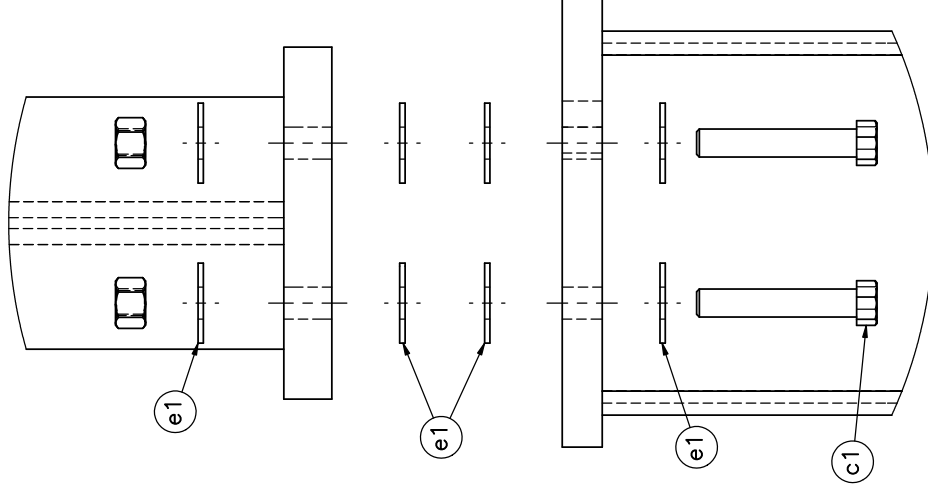
|           |                         |
|-----------|-------------------------|
| SHEET:    | 8 of 24                 |
| DATE:     | 4/17/2020               |
| DRAWN BY: | CR/LJD/JJE<br>K/AJS/JRF |
| REV. BY:  | JCH/RWB/J<br>EK         |

|            |               |
|------------|---------------|
| DWG. NAME: | Bullnose-8_R6 |
| SCALE:     | 1:5           |
| UNITS:     | In, [mm]      |





DETAIL S  
SCALE 1:3



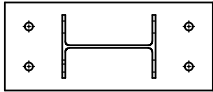
DETAIL S  
(EXPLODED)  
SCALE 1:3



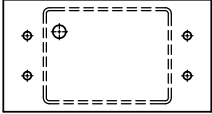
Midwest Roadside  
Safety Facility

|                                        |                                      |
|----------------------------------------|--------------------------------------|
| Bullnose with UBSP<br>Test No. MSPBN-8 | SHEET:<br>9 of 24                    |
|                                        | DATE:<br>4/17/2020                   |
| UBSP Post and Component<br>Details     | DRAWN BY:<br>CRL/ADJ/JE<br>K/AJS/JRF |
|                                        | REV. BY:<br>JCH/RWB/J<br>EK          |
| DWG. NAME:<br>Bullnose-8_R6            | SCALE: 1:10<br>UNITS: in, [mm]       |

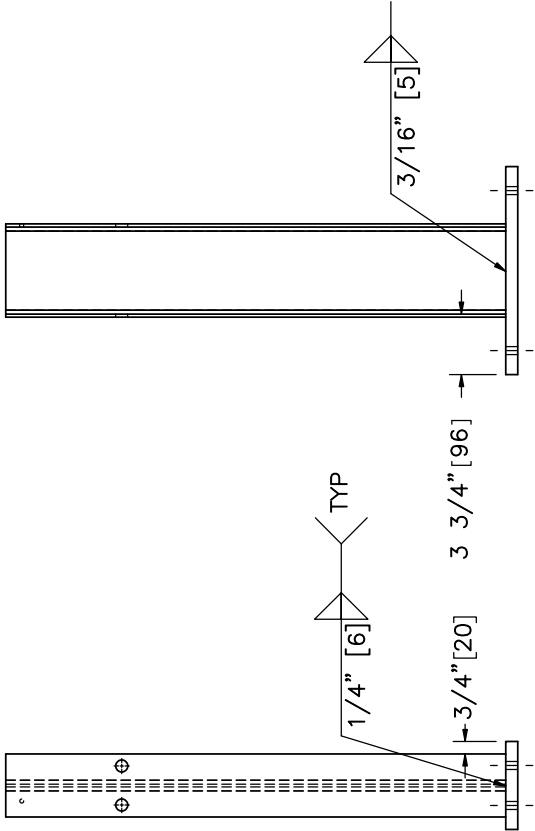
Note: Vertical through-bolts (part c1) are to be  
torqued to approximately 60-75 ft-lb  
[81.3-101.7 N-m].



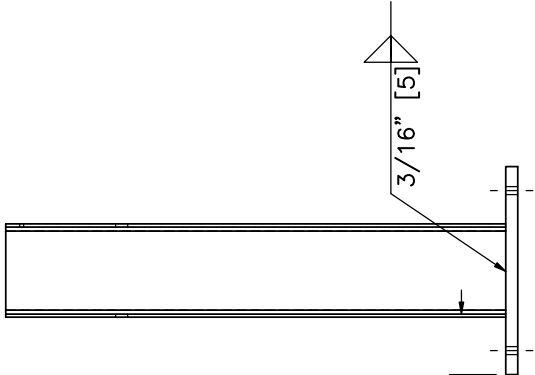
PLAN VIEW



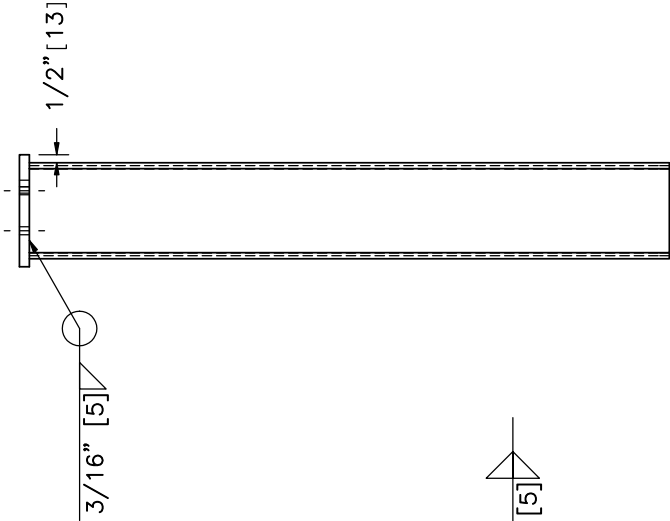
PLAN VIEW



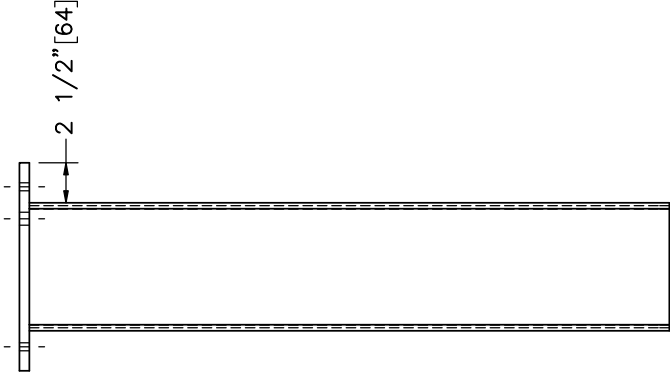
ELEVATION VIEW



PROFILE VIEW



ELEVATION VIEW



PROFILE VIEW

Part a4

Part a5



Midwest Roadside  
Safety Facility

Bullnose with UBSP  
Test No. MSPBN-8

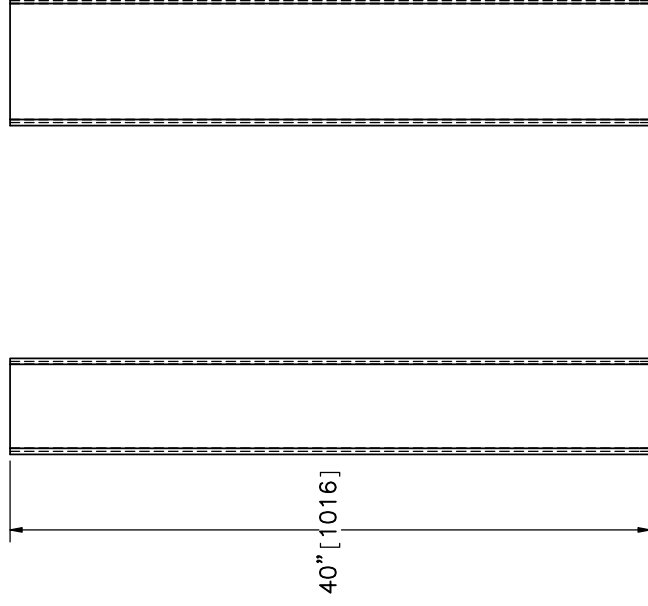
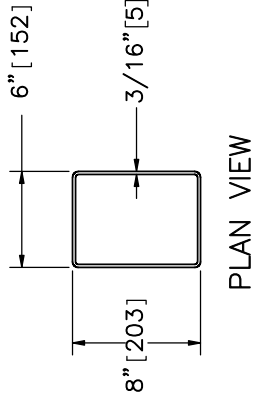
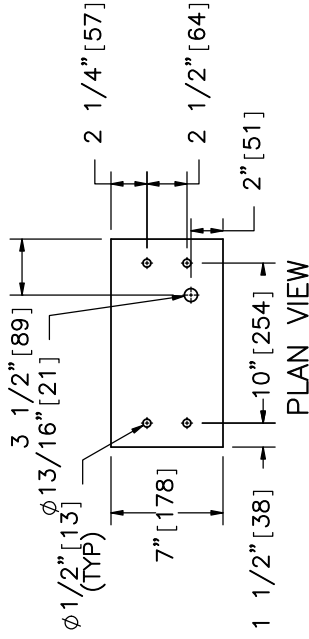
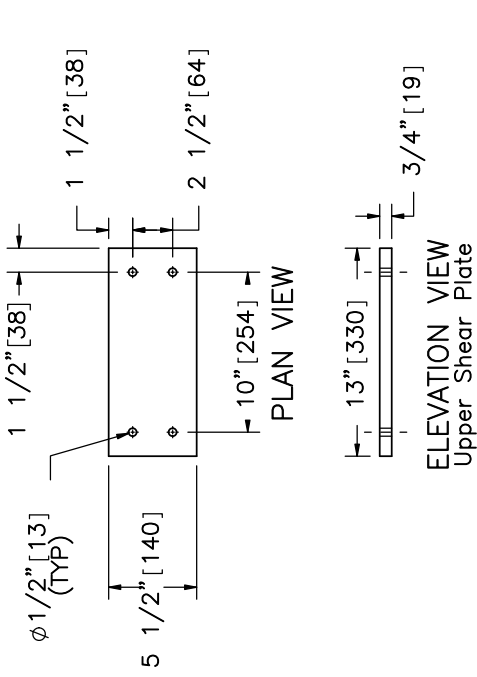
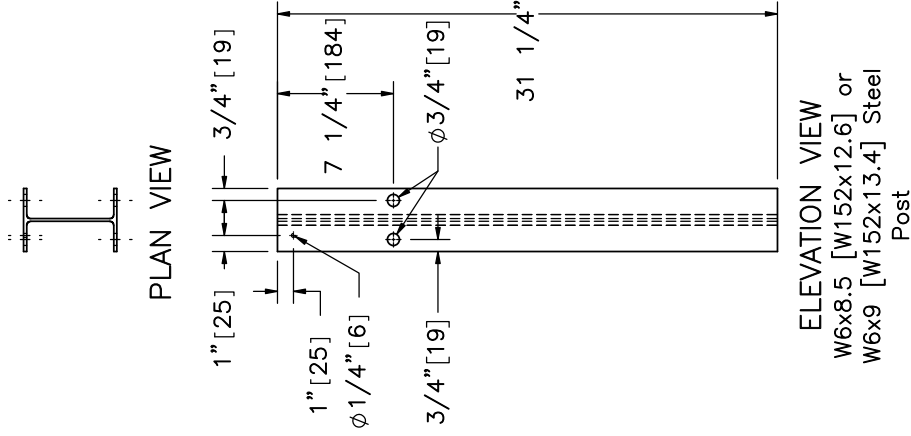
Upper and Lower Post  
Assembly Details

DWG. NAME:  
Bullnose-8\_R6

SCALE: 1:12

UNITS: in, [mm]

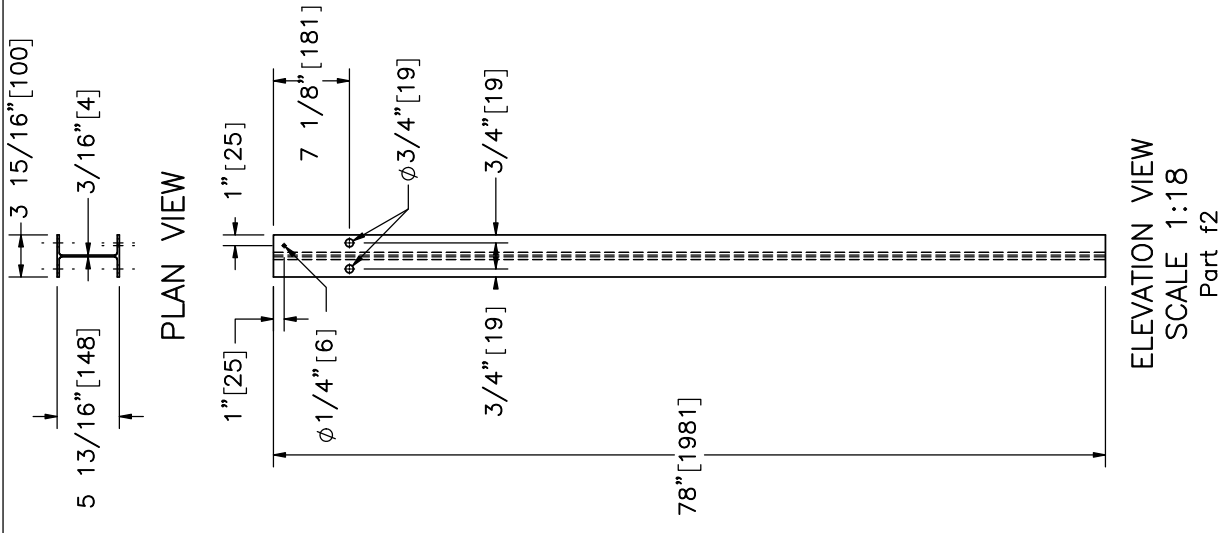
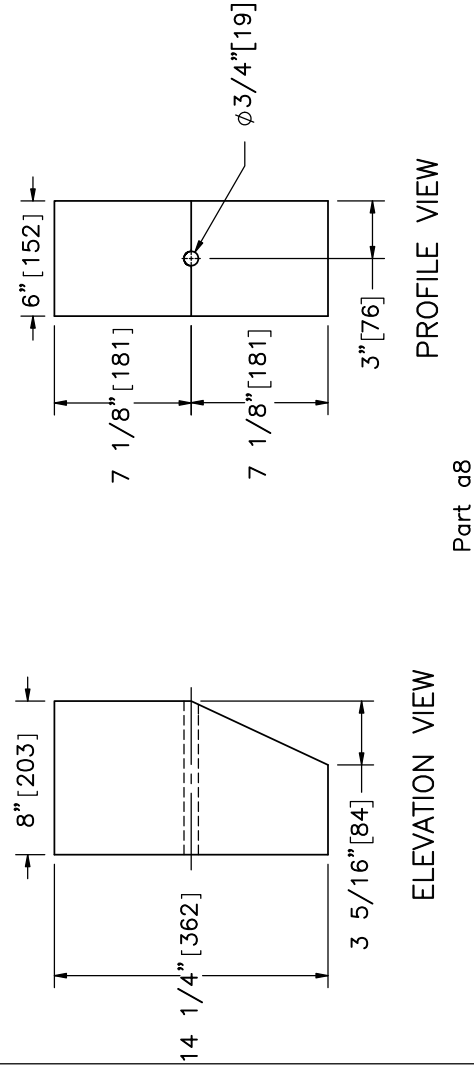
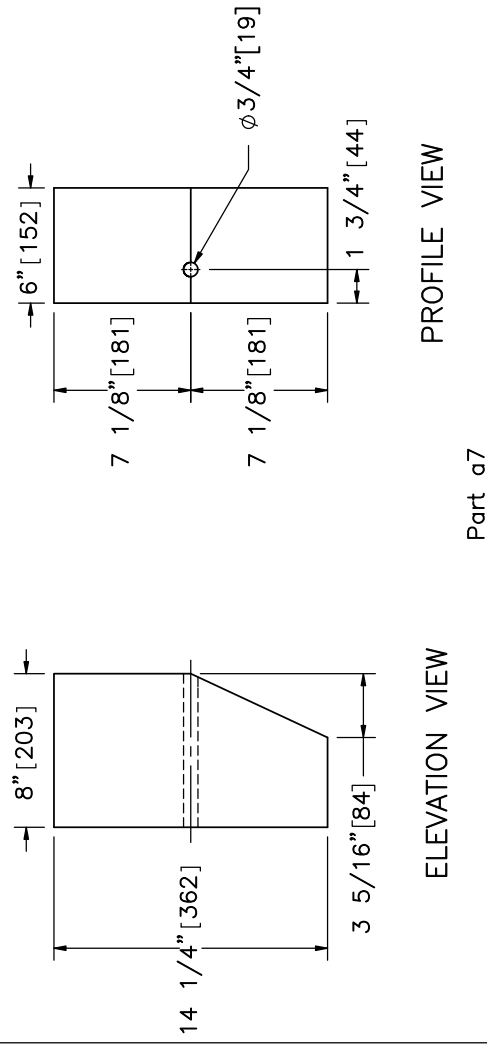
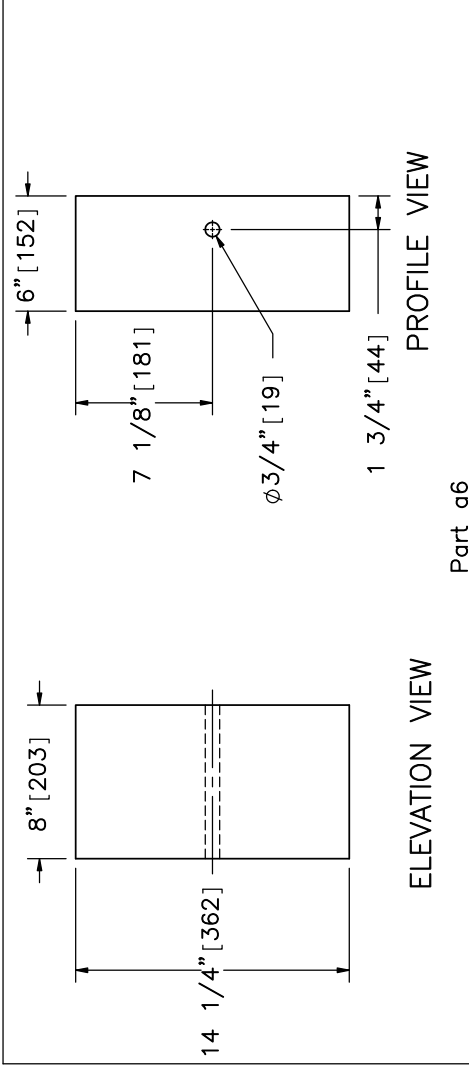
|           |                         |
|-----------|-------------------------|
| SHEET:    | 10 of 24                |
| DATE:     | 4/17/2020               |
| DRAWN BY: | CRK/ADJ/JE<br>K/AJS/JRF |
| REV. BY:  | JCH/RWB/J<br>EK         |



Midwest Roadside  
Safety Facility

|                                        |                                      |
|----------------------------------------|--------------------------------------|
| Bullnose with UBSP<br>Test No. MSPBN-8 | SHEET:<br>11 of 24                   |
|                                        | DATE:<br>4/17/2020                   |
| UBSP Component Details                 | DRAWN BY:<br>CRL/ADJ/JE<br>K/AJS/JRF |
|                                        | REV. BY:<br>JCH/RWB/J<br>EK          |
| DWG. NAME:<br>Bullnose-8_R6            | SCALE: 1:12<br>UNITS: in, [mm]       |

Note:  $\phi 3/8"$  [10] Weep Hole is to be drilled in the steel plate (Part a4) to allow for draining of the hot zinc coating during the galvanization process.



Bullnose with UBSP  
Test No. MSPBN-8

|                                  |                                |
|----------------------------------|--------------------------------|
| Midwest Roadside Safety Facility | W6x9 Post and Blockout Details |
| DWG. NAME.                       | SCALE                          |
| PROJECT NO.                      | DATE                           |

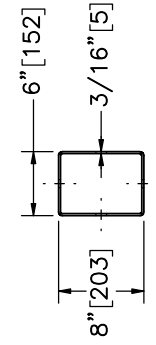
|               |
|---------------|
| SCALE: 1:10   |
| UNITS: In.[m] |

SHEET:  
12 of 24

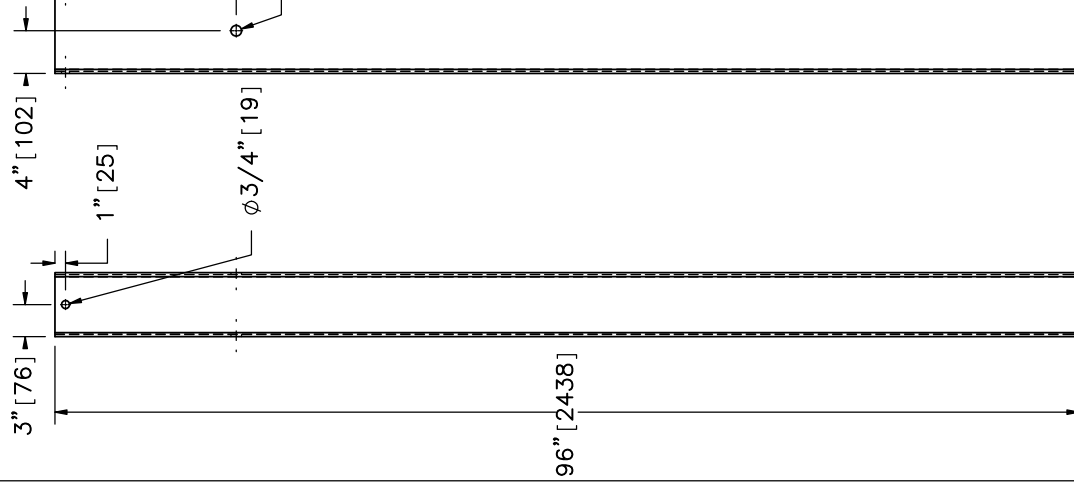
DATE: 4/17/202

|          |                  |
|----------|------------------|
| DRAWN BY | GRL/JDJ/K/AJS/JR |
|----------|------------------|

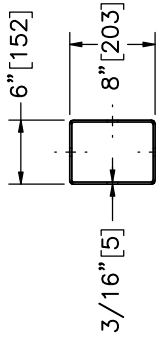
|          |                |
|----------|----------------|
| REV. BY: | JCH/RWB/<br>EK |
|----------|----------------|



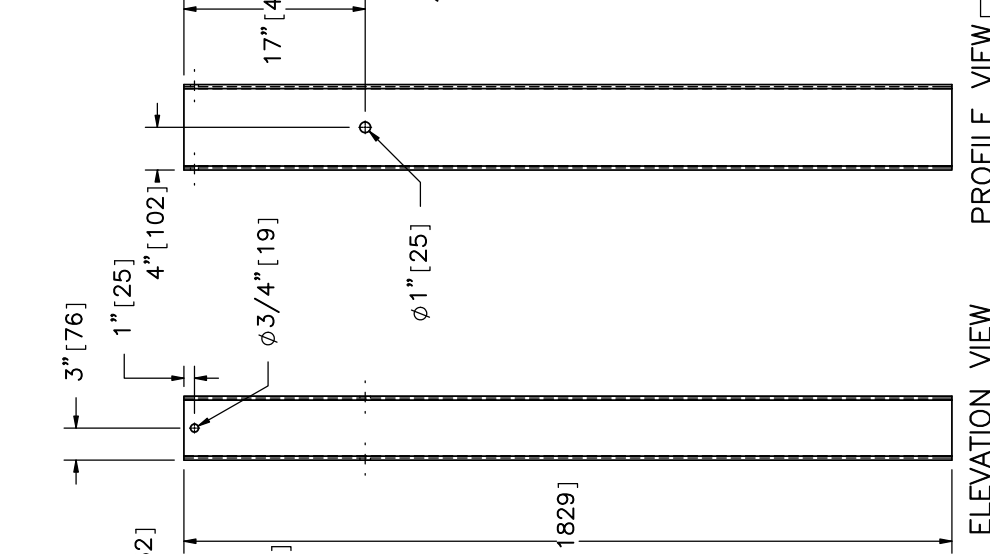
PLAN VIEW



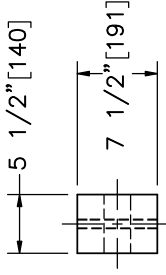
ELEVATION VIEW PROFILE VIEW  
Part a1



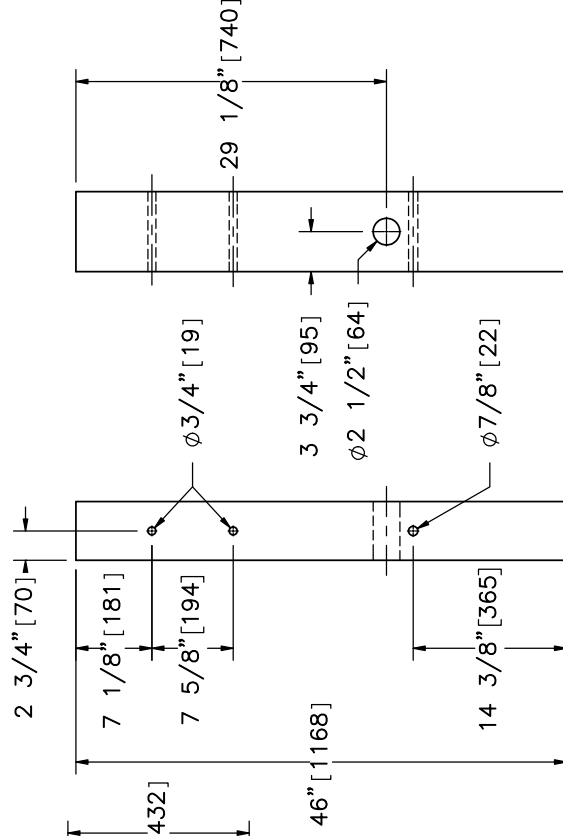
PLAN VIEW



ELEVATION VIEW PROFILE VIEW  
Part a2

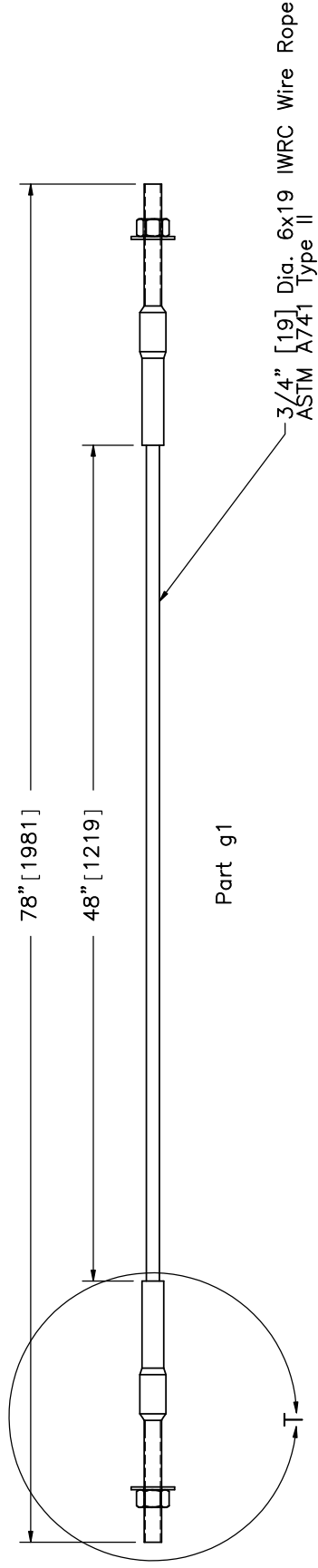


PLAN VIEW

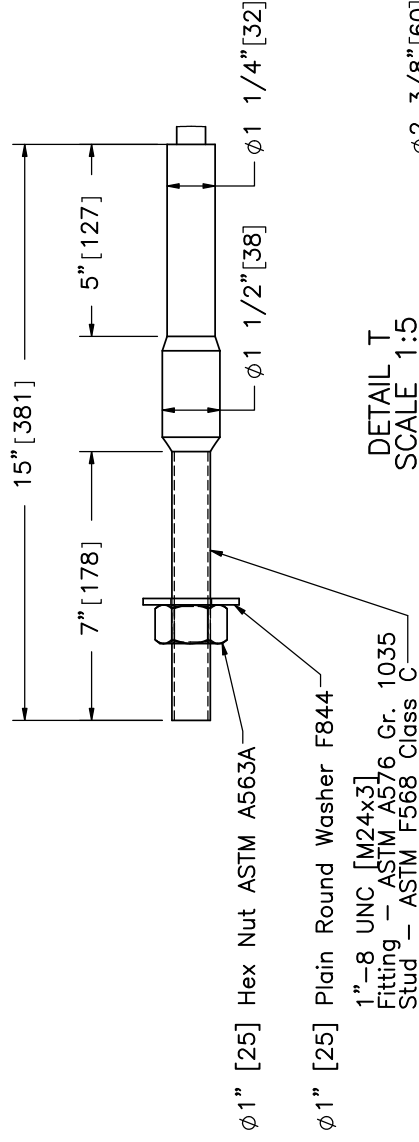


ELEVATION VIEW PROFILE VIEW  
Part f1

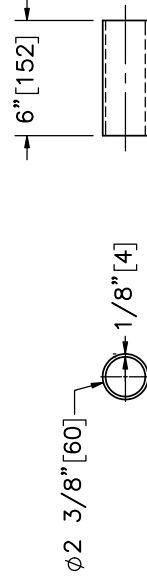
|                                                                                     |                                              |             |                       |
|-------------------------------------------------------------------------------------|----------------------------------------------|-------------|-----------------------|
|  | Bullnose with UBSP                           |             | SHEET: 13 of 24       |
|                                                                                     | Test No. MSPBN-8                             |             | DATE: 4/17/2020       |
| Midwest Roadside Safety Facility                                                    | BCT Timber Posts and Foundation Tube Details |             | DRAWN BY: CRK/ADJ/JEF |
|                                                                                     | DWG. NAME: Bullnose-8_R6                     |             | REV. BY: JCH/RWB/JEF  |
|                                                                                     |                                              | SCALE: 1:18 | UNITS: in, [mm]       |



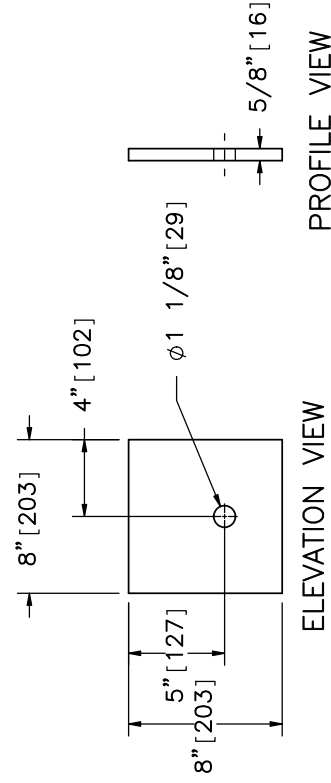
Part g1



DETAIL T  
SCALE 1:5



ELEVATION VIEW PROFILE VIEW  
Part g2



ELEVATION VIEW PROFILE VIEW  
Part a3



Midwest Roadside  
Safety Facility

Bullnose with UBSP  
Test No. MSPBN-8

BCT Anchor Cable Detail

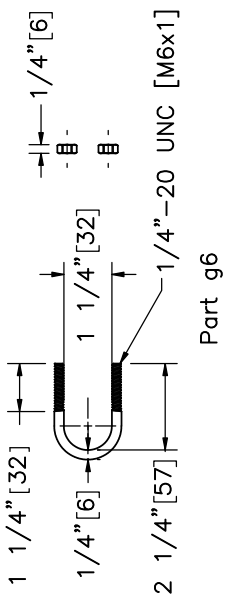
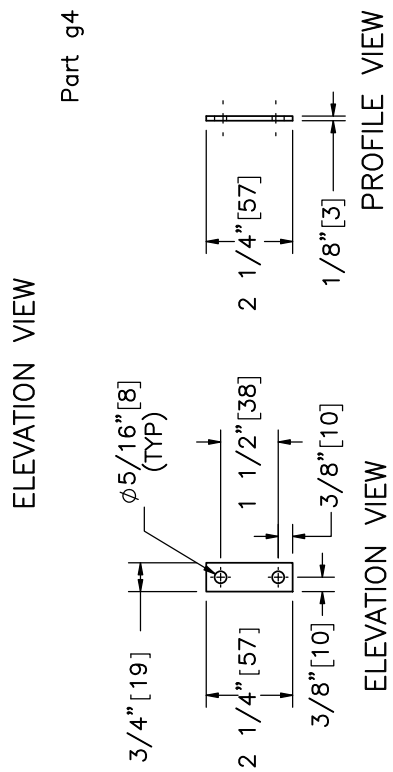
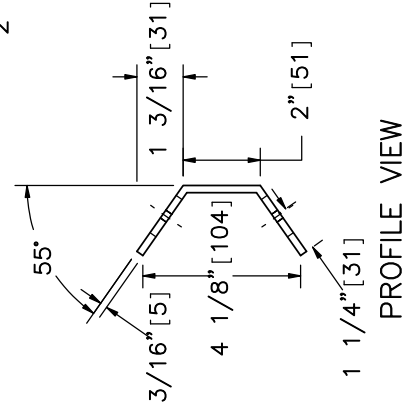
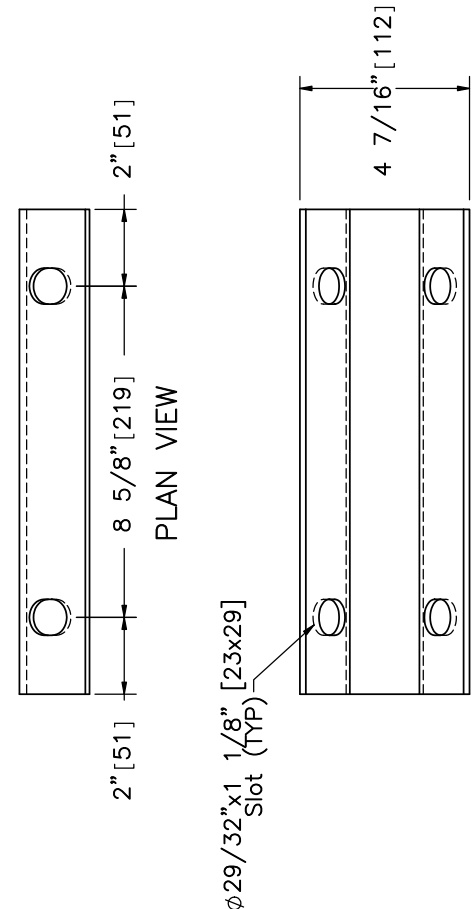
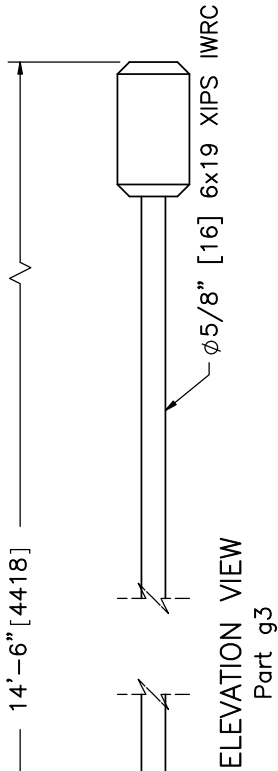
|                             |                                |                             |
|-----------------------------|--------------------------------|-----------------------------|
| DWG. NAME:<br>Bullnose-8_R6 | SCALE: 1:10<br>UNITS: in, [mm] | REV. BY:<br>JCH/RWB/J<br>EK |
|-----------------------------|--------------------------------|-----------------------------|

SHEET:  
14 of 24

DATE:  
4/17/2020

DRAWN BY:  
CRK/JDJ/JE  
K/AJS/JRF

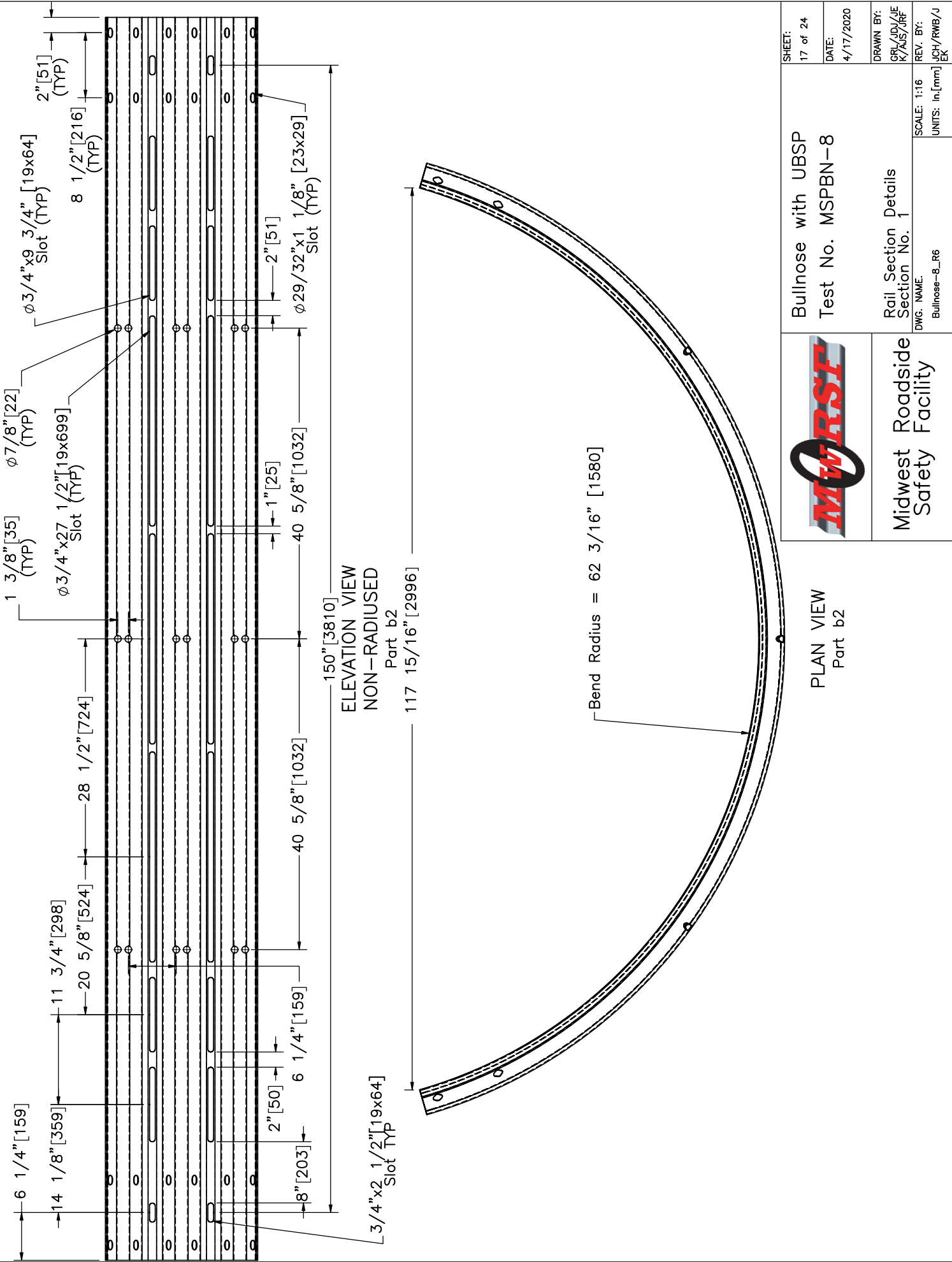
"Cold Tuff" Button, S-409  
Size No. 12 SB, Stock No.  
1040395 for  $\phi 5/8"$  [16]  
(6x19) wire rope (or any  
similarly sized swage-grip  
button ferrules)



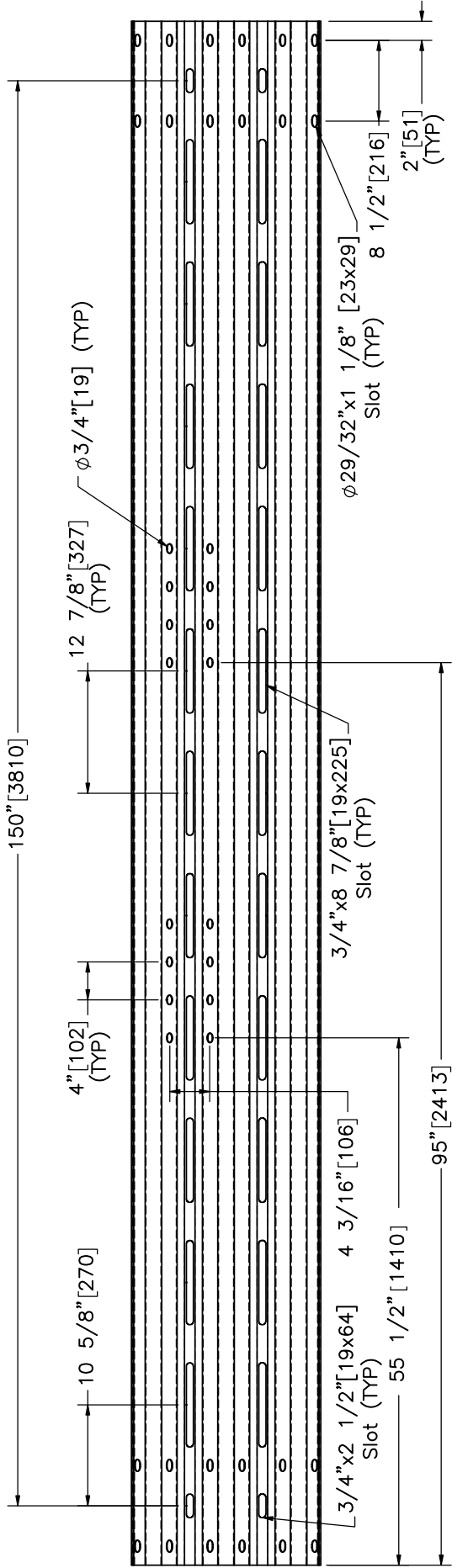
|                                                                                     |                                        |                               |                                      |
|-------------------------------------------------------------------------------------|----------------------------------------|-------------------------------|--------------------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8 |                               | SHEET:<br>15 of 24                   |
|                                                                                     | Nose Cable Detail                      |                               | DATE:<br>4/17/2020                   |
| Midwest Roadside<br>Safety Facility                                                 | DWG. NAME:<br>Bullnose-8_R6            | SCALE: 1:5<br>UNITS: In, [mm] | DRAWN BY:<br>CRJ/JDJ/JE<br>K/AJS/JRF |
|                                                                                     |                                        |                               | REV. BY:<br>JCH/RWB/J<br>EK          |



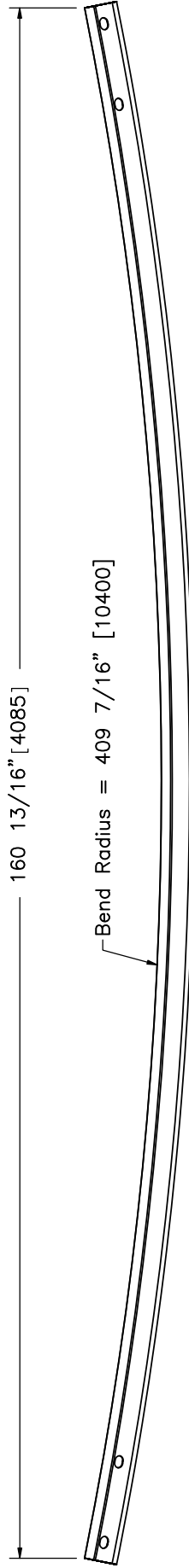




|                                                                                     |                                        |                                |
|-------------------------------------------------------------------------------------|----------------------------------------|--------------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8 |                                |
|                                                                                     | Rail Section Details<br>Section No. 1  |                                |
| DWG. NAME:<br>Bullnose-8_R6                                                         |                                        | SCALE: 1:16<br>UNITS: in, [mm] |
| DRAWN BY:<br>CRL/ADJ/JE<br>K/AJS/JRF                                                |                                        | REV. BY:<br>JCH/RWB/J<br>EK    |
| SHEET:<br>17 of 24                                                                  |                                        | DATE:<br>4/17/2020             |

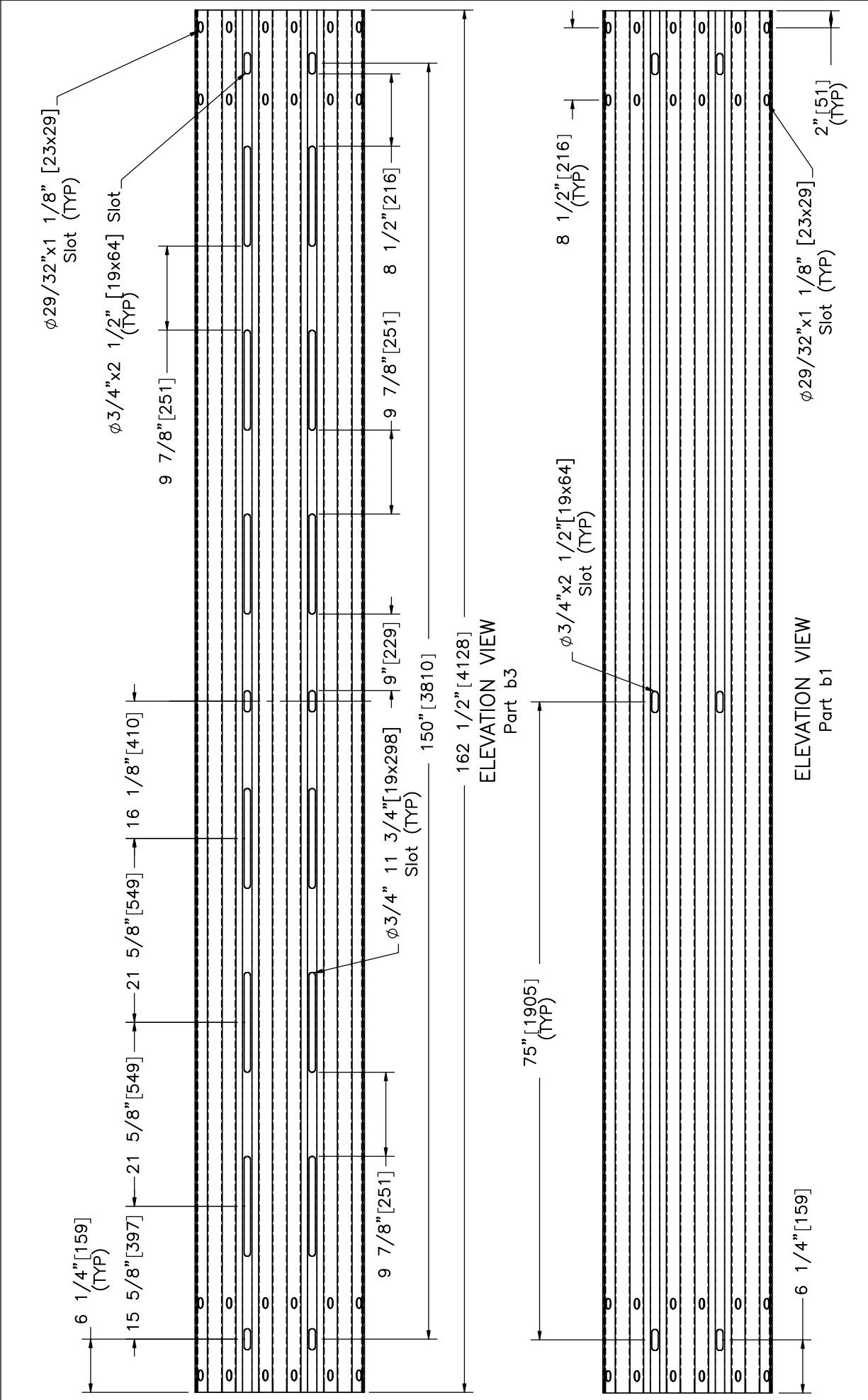


ELEVATION VIEW  
NON-RADIUSED  
Part b6

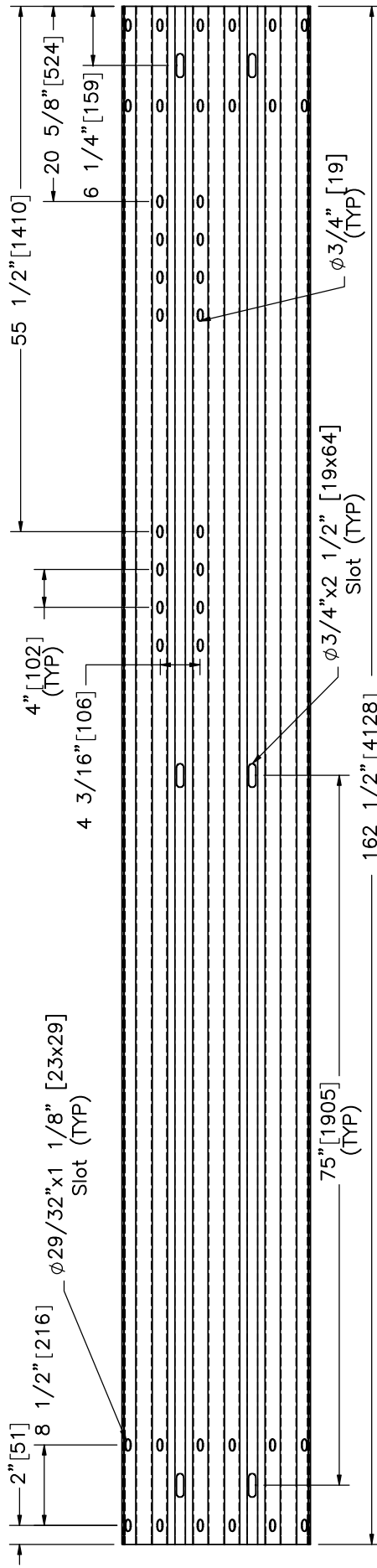


PLAN VIEW  
Part b6

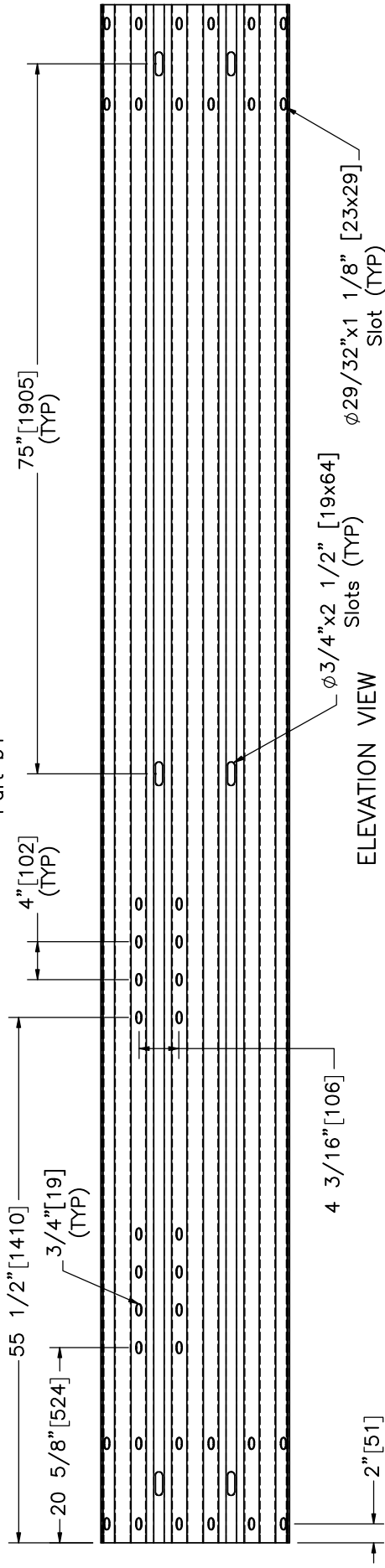
|                                                                                     |                                        |  |                                      |
|-------------------------------------------------------------------------------------|----------------------------------------|--|--------------------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8 |  | SHEET:<br>18 of 24                   |
|                                                                                     | Rail Section Details<br>Section No. 2  |  | DATE:<br>4/17/2020                   |
| Midwest Roadside<br>Safety Facility                                                 | DWG. NAME:<br>Bullnose-8_R6            |  | DRAWN BY:<br>CRJ/ADJ/JE<br>K/AJS/JRF |
|                                                                                     | SCALE: 1:17<br>UNITS: in, [mm]         |  | REV. BY:<br>JCH/RWB/J<br>EK          |



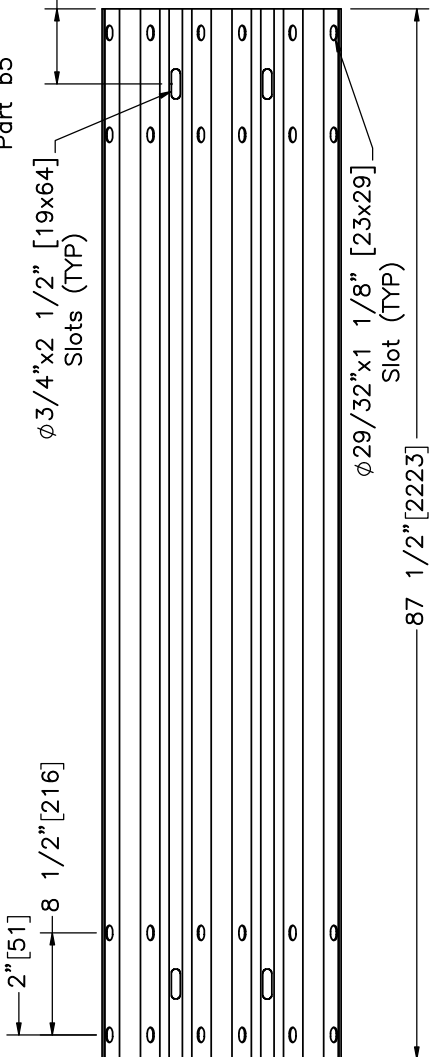
|                                                                                     |                                              |  |                                      |
|-------------------------------------------------------------------------------------|----------------------------------------------|--|--------------------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8       |  | SHEET:<br>19 of 24                   |
|                                                                                     | Rail Section Details<br>Section Nos. 3 and 4 |  | DATE:<br>4/17/2020                   |
| Midwest Roadside<br>Safety Facility                                                 | DWG. NAME:<br>Bullnose-8_R6                  |  | DRAWN BY:<br>CRL/UDJ/JE<br>K/AJS/JRF |
|                                                                                     | SCALE: 1:16<br>UNITS: in, [mm]               |  | REV. BY:<br>JCH/RWB/J<br>EK          |



ELEVATION VIEW  
Part b4

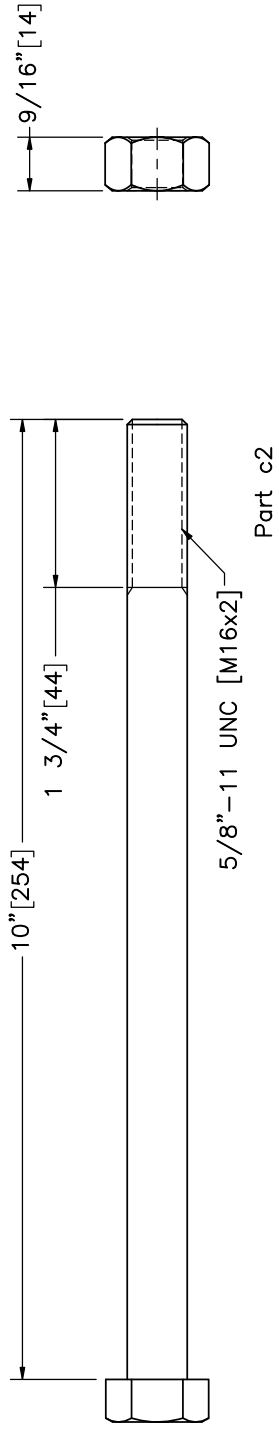
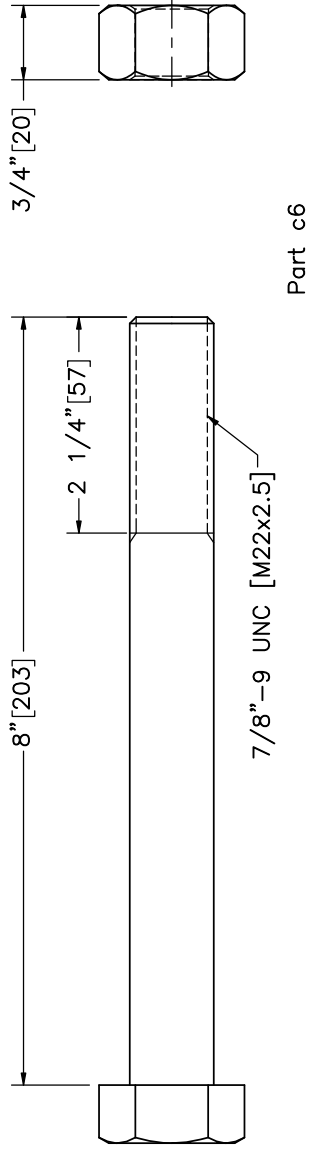
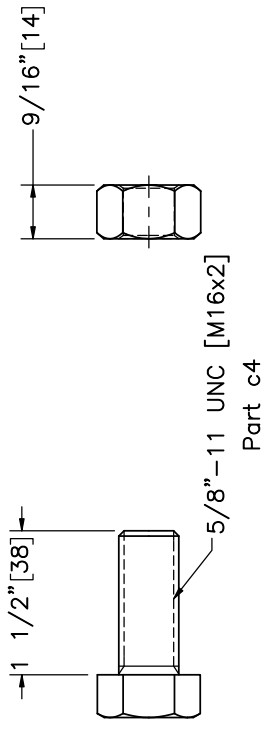


ELEVATION VIEW  
Part b5

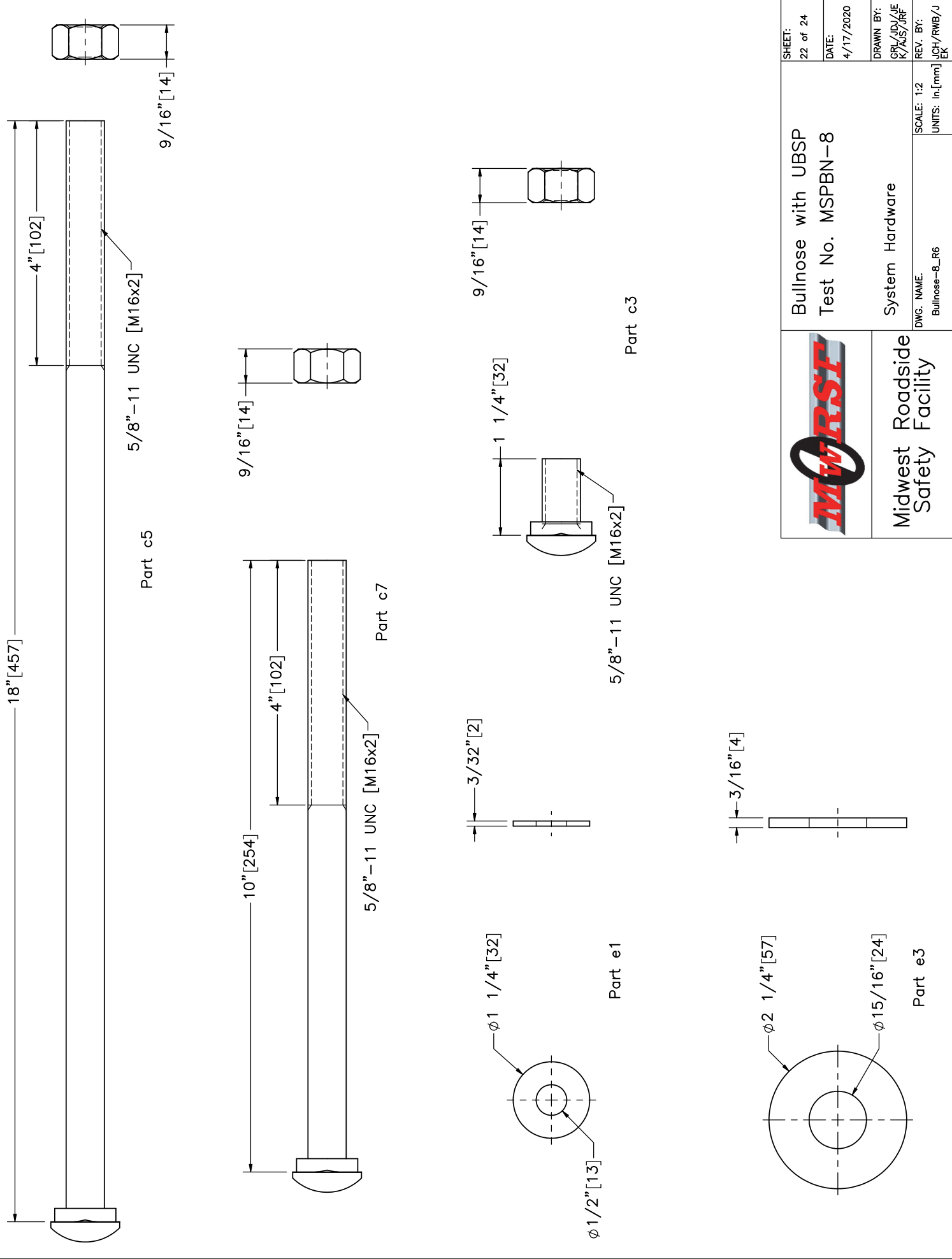


ELEVATION VIEW  
Part b7

|                                                                                     |                                                                          |                                      |                             |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------|-----------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8                                   |                                      | SHEET:<br>20 of 24          |
|                                                                                     | Rail Section Details<br>Section Nos. 5 and 6<br>DWG. NAME: Bullnose-8_R6 |                                      | DATE:<br>4/17/2020          |
| SCALE: 1:17<br>UNITS: in, [mm]                                                      |                                                                          | DRAWN BY:<br>CRJ/JDJ/JE<br>K/AJS/JRF | REV. BY:<br>JCH/RWB/J<br>EK |



|                                                                                     |                          |                              |                                |
|-------------------------------------------------------------------------------------|--------------------------|------------------------------|--------------------------------|
|  | Bullnose with UBSP       |                              | SHEET: 21 of 24                |
|                                                                                     | Test No. MSPBN-8         |                              | DATE: 4/17/2020                |
| Midwest Roadside Safety Facility                                                    | System Hardware          |                              | DRAWN BY: CRK/JDJ/JE K/AJS/JRF |
|                                                                                     | DWG. NAME: Bullnose-8_R6 | SCALE: 1:2<br>UNITS: in,[mm] | REV. BY: JCH/RWB/J EK          |



|                                                                                     |                                        |                               |                                      |
|-------------------------------------------------------------------------------------|----------------------------------------|-------------------------------|--------------------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8 |                               | SHEET:<br>22 of 24                   |
|                                                                                     | System Hardware                        |                               | DATE:<br>4/17/2020                   |
| Midwest Roadside<br>Safety Facility                                                 | DWG. NAME:<br>Bullnose-8_R6            | SCALE: 1:2<br>UNITS: In, [mm] | DRAWN BY:<br>CRL/JDJ/JE<br>K/AJS/JRF |
|                                                                                     |                                        |                               | REV. BY:<br>JCH/RWB/J<br>EK          |

| Item No. | QTY. | Description                                                                    | Material Specification                                                          | Treatment Specification             | Hardware Guide |
|----------|------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------|----------------|
| a1       | 2    | TS8"x6"x3/16" [203x152x5], 96" [2,438] Long Foundation Tube                    | ASTM A500 Gr. B                                                                 | ASTM A123                           | PTE07          |
| a2       | 6    | TS8"x6"x3/16" [203x152x5], 72" [1,829] Long Foundation Tube                    | ASTM A500 Gr. B                                                                 | ASTM A123                           | PTE06          |
| a3       | 6    | 8"x8"x5/8" [203x203x16] Anchor Bearing Plate                                   | ASTM A36                                                                        | ASTM A123                           | FPB01          |
| a4       | 12   | Lower Slip Post Assembly                                                       | Plate-ASTM A36<br>Foundation Tube-ASTM A500 Gr. B                               | ASTM A123                           | PTE08          |
| a5       | 12   | Upper Slip Post Assembly                                                       | Plate-ASTM A36<br>Post-ASTM A992                                                | ASTM A123                           | PWE11          |
| a6       | 20   | 6"x8"x14 1/4" [152x203x362] Timber Blockout                                    | SYP Grade No. 1 or better                                                       | —                                   | PDB09          |
| a7       | 12   | 6"x8"x14 1/4" [152x203x362] Tapered Timber Blockout                            | SYP Grade No. 1 or better                                                       | —                                   | PDB20          |
| a8       | 2    | 6"x8"x14 1/4" [152x203x362] Tapered Timber Blockout — Post 2                   | SYP Grade No. 1 or better                                                       | —                                   | PDB12          |
| b1       | 4    | 12'-6" [3,810] 12 gauge [2.7] Thrie Beam Section                               | AASHTO M180                                                                     | ASTM A123 or A653                   | RTM02a         |
| b2       | 1    | 12'-6" [3,810] 12 gauge [2.7] Bent Thrie Beam Section                          | AASHTO M180                                                                     | ASTM A123 or A653                   | RTM07a         |
| b3       | 2    | 12'-6" [3,810] 12 gauge [2.7] Thrie Beam Section                               | AASHTO M180                                                                     | ASTM A123 or A653                   | RTM07e         |
| b4       | 1    | 12'-6" [3,810] 12 gauge [2.7] Thrie Beam End Section — Side A                  | AASHTO M180                                                                     | ASTM A123 or A653                   | —              |
| b5       | 1    | 12'-6" [3,810] 12 gauge [2.7] Thrie Beam End Section — Side B                  | AASHTO M180                                                                     | ASTM A123 or A653                   | —              |
| b6       | 2    | 12'-6" [3,810] 12 gauge [2.7] Bent Thrie Beam Section                          | AASHTO M180                                                                     | ASTM A123 or A653                   | RTM07d         |
| c1       | 48   | 7/16"-14 UNC [M11x1.5], 2 1/2" [64] Long Hex Tap Bolt (Fully Threaded) and Nut | Bolt — ASTM A449 or SAE J429<br>Gr. 5<br>Nut — ASTM A563DH or SAE J995<br>Gr. 5 | ASTM A153 or B695 Class 55 or F2329 | FBX12b         |
| c2       | 8    | 5/8"-11 UNC [M16x2], 10" [254] Long Hex Head Bolt                              | Bolt — ASTM A307 Gr. A<br>Nut — ASTM A563A                                      | ASTM A153 or B695 Class 55 or F2329 | FBX16a         |
| c3       | 120  | 5/8"-11 UNC [M16x2], 1 1/4" [32] Long Guardrail Bolt and Nut                   | Bolt — ASTM A307 Gr. A<br>Nut — ASTM A563A                                      | ASTM A153 or B695 Class 55 or F2329 | FBB01          |
| c4       | 48   | 5/8"-11 UNC [M16x2], 1 1/2" [38] Long Hex Head Bolt and Nut                    | Bolt — ASTM A307 Gr. A<br>Nut — ASTM A563A                                      | ASTM A153 or B695 Class 55 or F2329 | FBX16a         |
| c5       | 14   | 5/8"-11 UNC [M16x2], 18" [457] Long Guardrail Bolt and Nut                     | Bolt — ASTM A307 Gr. A<br>Nut — ASTM A563A                                      | ASTM A153 or B695 Class 55 or F2329 | FBB04          |
| c6       | 8    | 7/8"-9 UNC [M22x2.5], 8" [203] Long Hex Head Bolt and Nut                      | Bolt — ASTM A307 Gr. A<br>Nut — ASTM A563A                                      | ASTM A153 or B695 Class 55 or F2329 | —              |
| c7       | 20   | 5/8"-11 UNC [M16x2], 10" [254] Long Guardrail Bolt and Nut                     | Bolt — ASTM A307 Gr. A<br>Nut — ASTM A563A                                      | ASTM A153 or B695 Class 55 or F2329 | FBB03          |
| c8       | 46   | 16D Double Head Nail                                                           | —                                                                               | —                                   | —              |



Midwest Roadside  
Safety Facility

Bullnose with UBSP  
Test No. MSPBN-8

Bill of Materials

DWG. NAME: Bullnose-8\_R6  
SCALE: None  
UNITS: in, [mm]

SHEET:  
23 of 24

DATE:  
4/17/2020

DRAWN BY:  
CRL/JDJ/JEF  
K/AJS/JRF  
REV. BY:  
JCH/RWB/J  
EK

| Item No. | QTY. | Description                                                         | Material Specification                                                                                                                                | Treatment Specification             | Hardware Guide |
|----------|------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------|
| e1       | 192  | 7/16" [11] Dia. Plain Round Washer                                  | ASTM F844                                                                                                                                             | ASTM A153 or B695 Class 55 or F2329 | FWC12a         |
| e2       | 118  | 5/8" [16] Dia. Plain Round Washer                                   | ASTM F844                                                                                                                                             | ASTM A153 or B695 Class 55 or F2329 | FWC16a         |
| e3       | 16   | 7/8" [22] Dia. Plain Round Washer                                   | ASTM F844                                                                                                                                             | ASTM A153 or B695 Class 55 or F2329 | –              |
| f1       | 8    | BCT Timber Post – MGS Height                                        | SYP Grade No. 1 or better<br>(No knots +/- 18" [457] from ground on tension face)                                                                     | –                                   | PDF04          |
| f2       | 8    | W6x8.5 [W152x12.6] or W6x9 [W152x13.4], 78" [1,981] Long Steel Post | ASTM A992                                                                                                                                             | ASTM A123                           | –              |
| g1       | 6    | BCT Anchor Cable Assembly                                           | –                                                                                                                                                     |                                     | FCA01          |
| g2       | 6    | 2 3/8" [60] O.D. x 6" [152] Long BCT Post Sleeve                    | ASTM A53 Gr. B Schedule 40                                                                                                                            | ASTM A123                           | FMM02          |
| g3       | 3    | 5/8" Dia. [15.9] x 14.4' [4.389] Long Cable and Swage Button        | "Cold Tuff" Button, S-409<br>Size No. 12 SB Stock No. 1040395 for 5/8" [16] Dia. (6x19) wire rope (or any similarly sized swage-grip button ferrules) | Wire Rope – Class A Coating         | RCM02          |
| g4       | 6    | 12 5/8"x5 13/16"x3/16" [321x148x5] Nose Cable Anchor Plate          | ASTM A36                                                                                                                                              | ASTM A123                           | FPA04          |
| g5       | 9    | 2 1/4"x3/4" [57x19] 11 gauge [3] U-Bolt Plate Washer                | ASTM A1011 CS Type B                                                                                                                                  | ASTM A123                           | –              |
| g6       | 9    | 1/4" [6] Dia. U-Bolt and Nut                                        | U-Bolt – ASTM A307 Gr. A<br>Nut – ASTM A563A                                                                                                          | ASTM A153 or B695 Class 55 or F2329 | –              |
| h1       | 2    | Ground Strut Assembly                                               | ASTM A36                                                                                                                                              | ASTM A123                           | PFP01          |
| h2       | 6    | Anchor Bracket Assembly                                             | ASTM A36                                                                                                                                              | ASTM A123                           | FPA01          |

|                                                                                     |                                        |                              |                                      |
|-------------------------------------------------------------------------------------|----------------------------------------|------------------------------|--------------------------------------|
|  | Bullnose with UBSP<br>Test No. MSPBN-8 |                              | SHEET:<br>24 of 24                   |
|                                                                                     | Bill of Materials                      |                              | DATE:<br>4/17/2020                   |
| Midwest Roadside<br>Safety Facility                                                 |                                        | DWG. NAME:<br>Bullnose-8_R6  | DRAWN BY:<br>CRJ/ADJ/JE<br>K/AJS/JRF |
|                                                                                     |                                        | SCALE: None<br>UNITS: in./mm | REV. BY:<br>JCH/RWB/J<br>EK          |