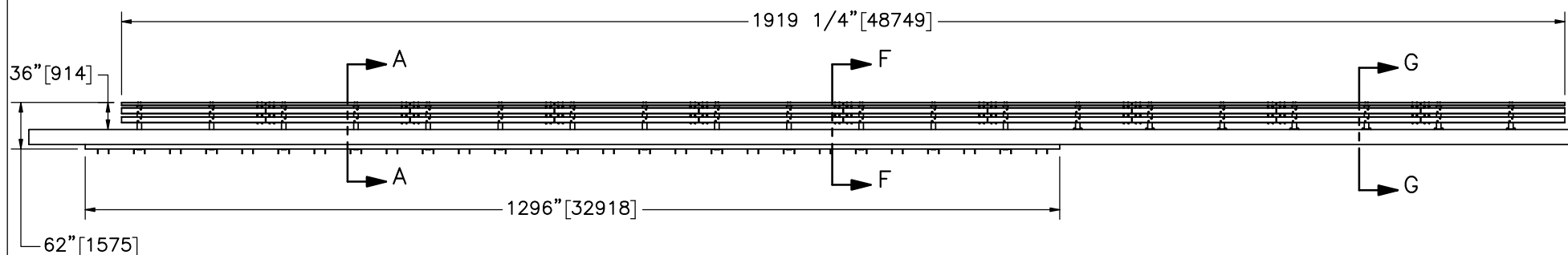


PLAN VIEW



ELEVATION VIEW

- Notes: (1) Test shall be performed according to test designation no. 4-12 using MASH 2016 criteria.
 (2) The impact location is 60" [1524] upstream from splice between post nos. 6 and 7.
 (3) Single unit truck (10000S) crash to simulate installation on a precast, reinforced concrete, box beam bridge deck with a 6" [152] thick concrete slab and a 3" [76] thick roadway overlay.
 (4) Post 9 has a different bottom anchorage. See Sheets 3, 4 and 21 for details.



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

System Layout

DWG. NAME.
STBR-4_R5

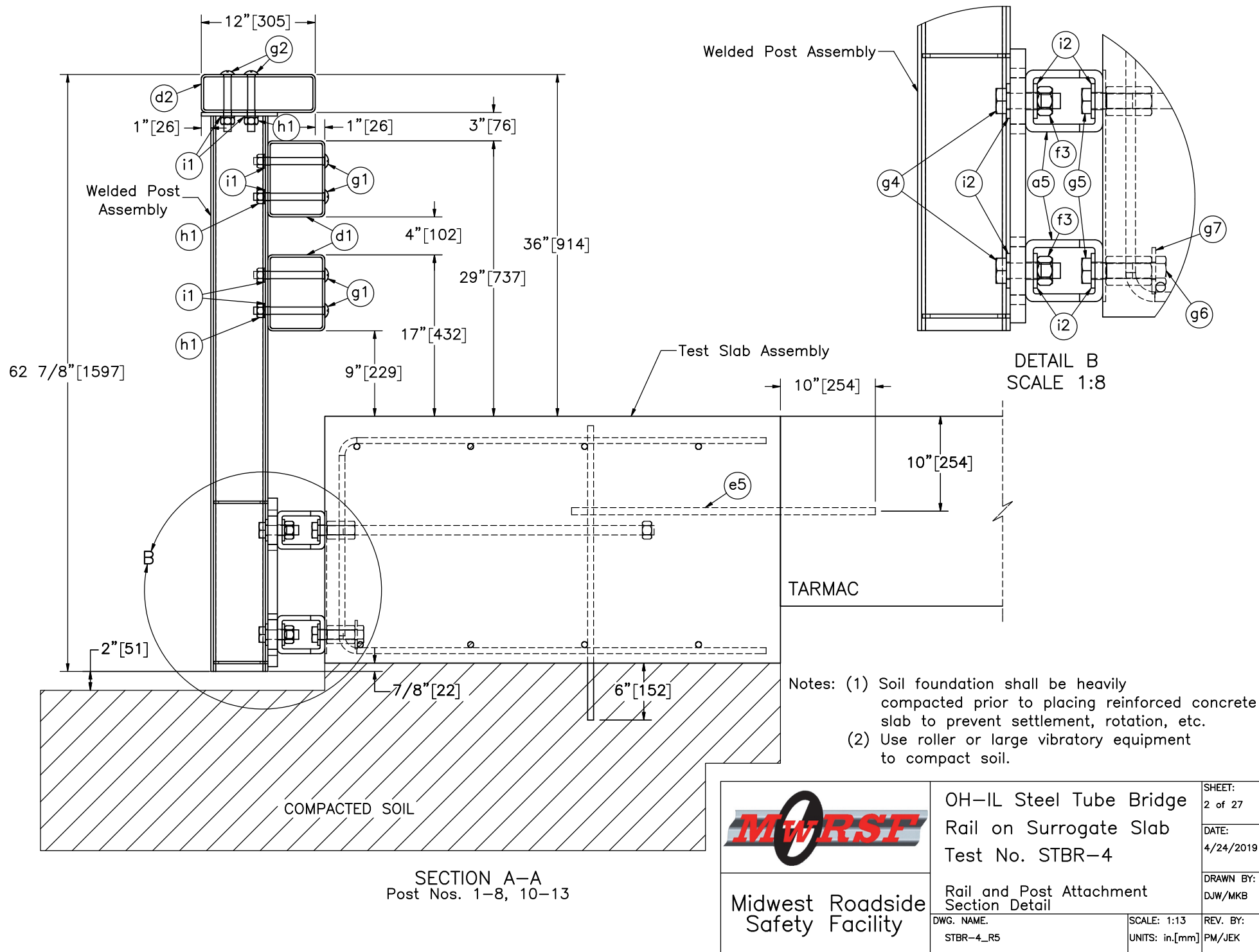
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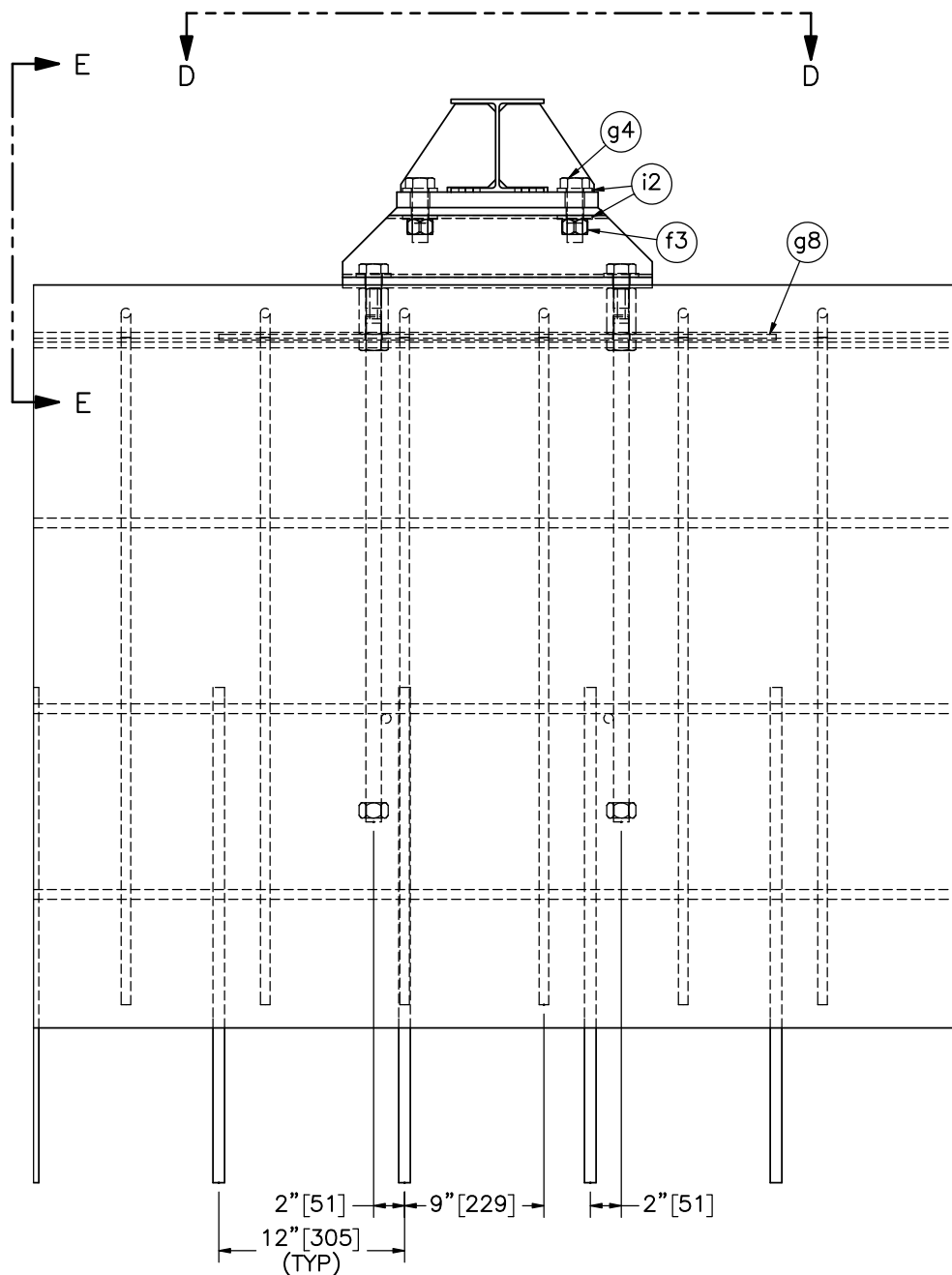
SHEET:
1 of 27

DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK

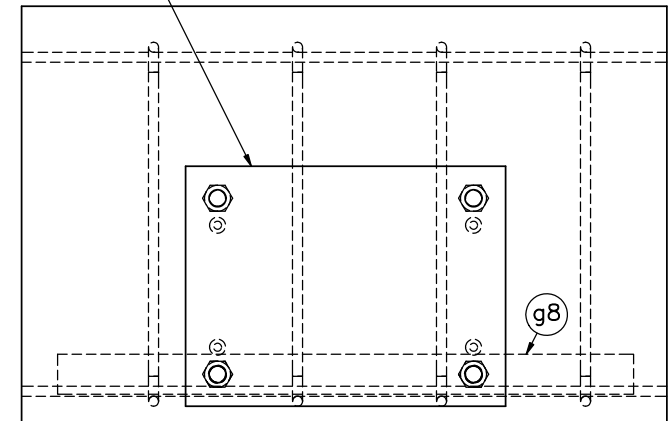




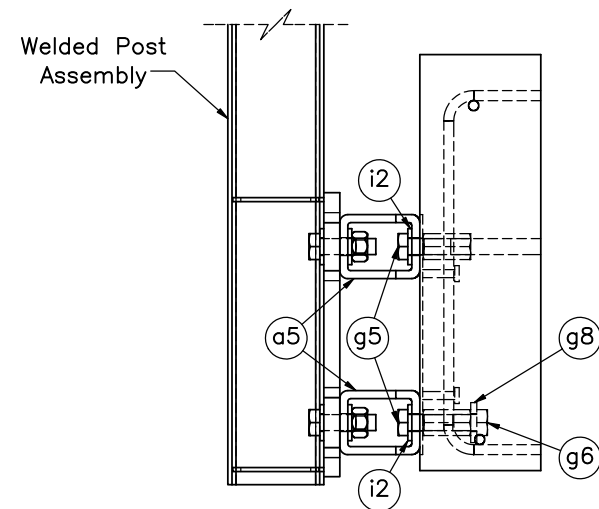
DETAIL C
Post 9

Note: (1) Rail components and hardware hidden for clarity.

Concrete Connector Plate
Assembly Post 9



SECTION D-D
(Post Assembly Hidden)



SECTION E-E



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Lateral Reinforcement and Post
9 Attachment Section
Details

DWG. NAME.
STBR-4_R5

SCALE: 1:12
UNITS: in.[mm]

SHEET:
3 of 27

DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK

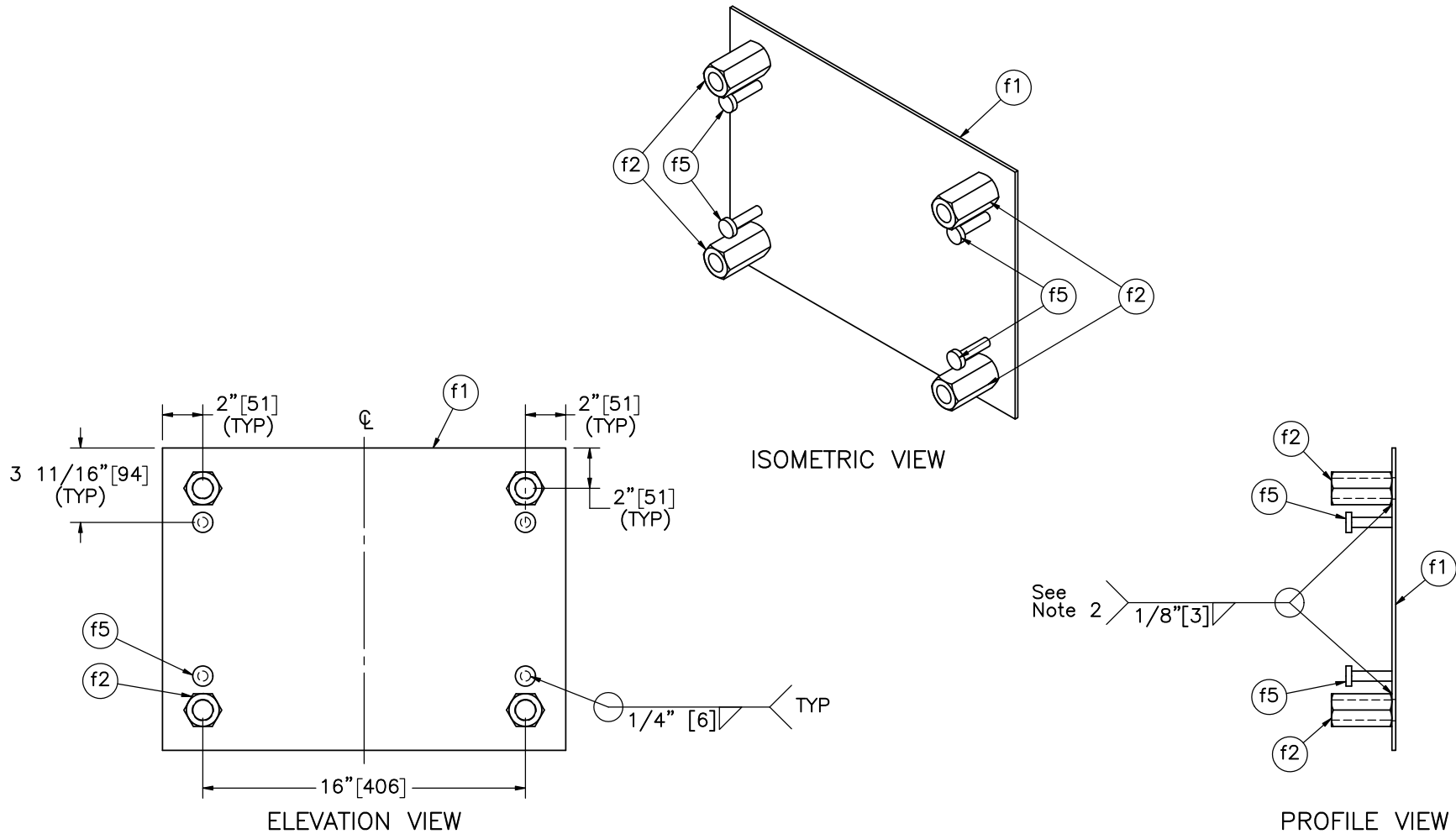
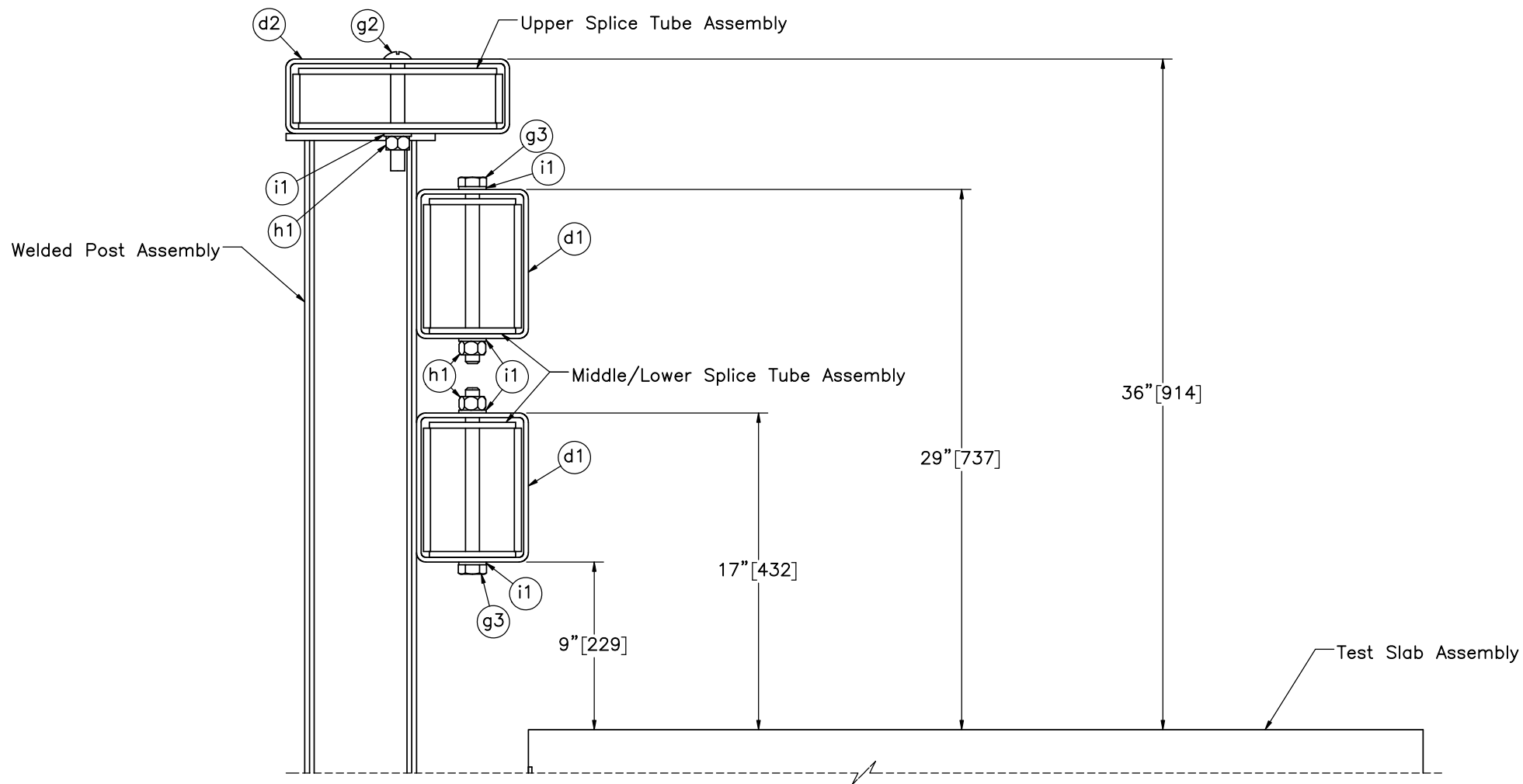


Plate Assembly
Location (Post No. 9)

- Notes: (1) Connector plate assembly is symmetric along the centerline.
(2) During casting, the nuts may be held in place by extending bolts through the formwork into the nuts, or by tack welding nuts to inside face of the plate. The welds are not structurally important.

Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide	 Midwest Roadside Safety Facility	OH-IL Steel Tube Bridge Rail on Surrogate Slab Test No. STBR-4		SHEET: 4 of 27
—	1	Post 9 Concrete Connector Plate Assembly	—	ASTM A123	—				DATE: 4/24/2019
f1	1	20"x15"x3/16" [508x381x5] Steel Plate	ASTM A572 Gr. 50	ASTM A123	—				DRAWN BY: DJW/MKB
f2	4	1"—8 UNC [M24x3] Heavy Hex Coupling Nut	ASTM A563DH	See Assembly	—		Concrete Connector Plate Assembly Post 9 Details		REV. BY: PM/JEK
f5	4	1/2" [13] Dia. Shear Stud, 2" [51] Long	ASTM A108	—	—	DWG. NAME: STBR-4_R5		SCALE: 1:8 UNITS: in.[mm]	



SECTION F-F



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Splice Section Detail

DWG. NAME.
STBR-4_R5

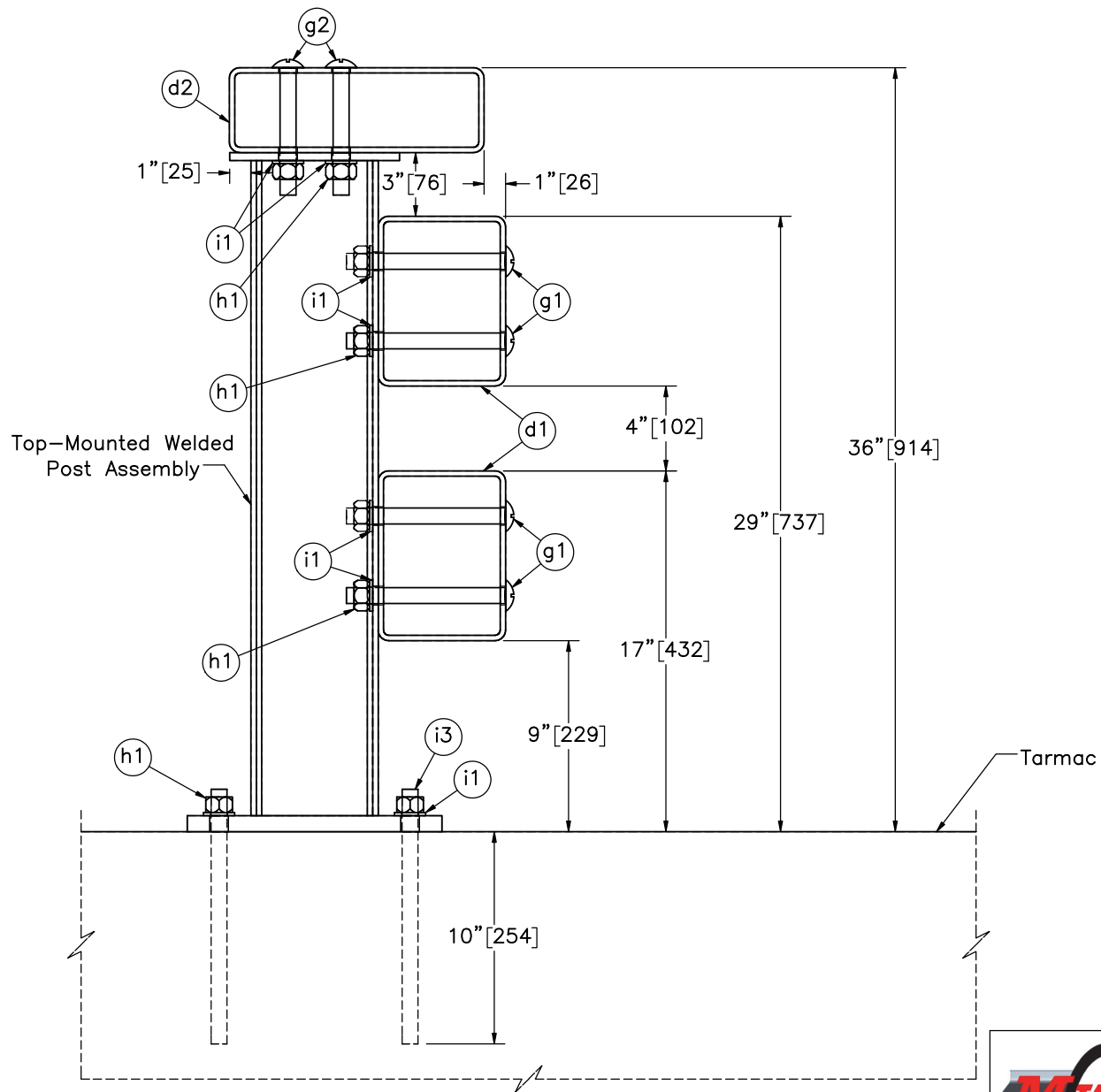
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UNITS: in.[mm]

SHEET:
5 of 27

DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



SECTION G-G
Post Nos. 14-20



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Top-Mounted Post Section

DWG. NAME.
STBR-4_R5

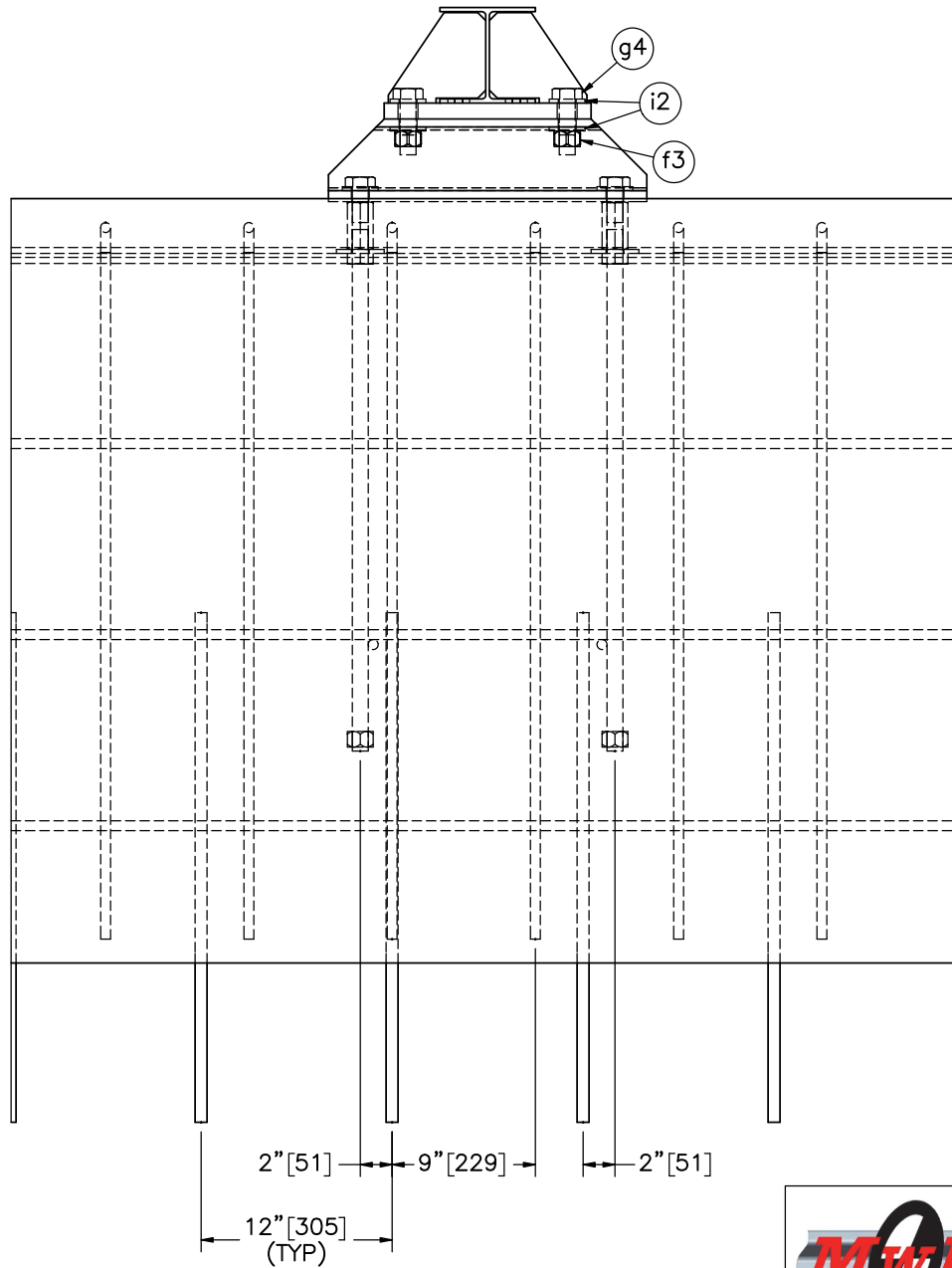
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SHEET:
6 of 27

DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



DETAIL H

Note: (1) Rail components and hardware hidden for clarity.



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Lateral Reinforcement Detail

DWG. NAME.
STBR-4_R5

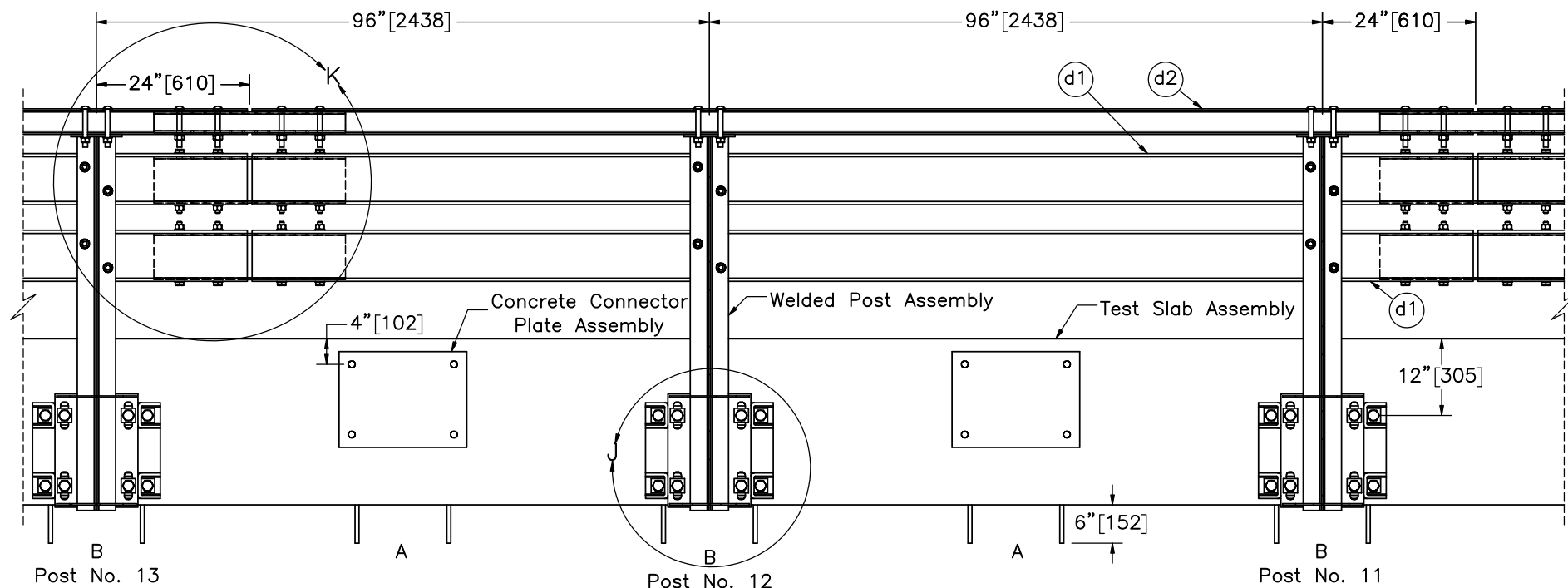
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UNITS: in.[mm]

SHEET:
7 of 27

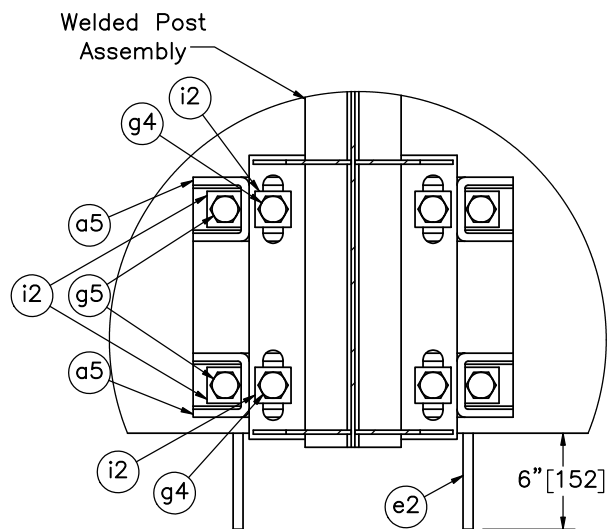
DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



SECTION I-I
BACKSIDE VIEW



DETAIL J
SCALE 1:12

- Notes: (1) Location A used for 1100C small car tests.
(2) Location B used for 2270P pickup truck and 10000S tests.



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Backside Section View

DWG. NAME.
STBR-4_R5

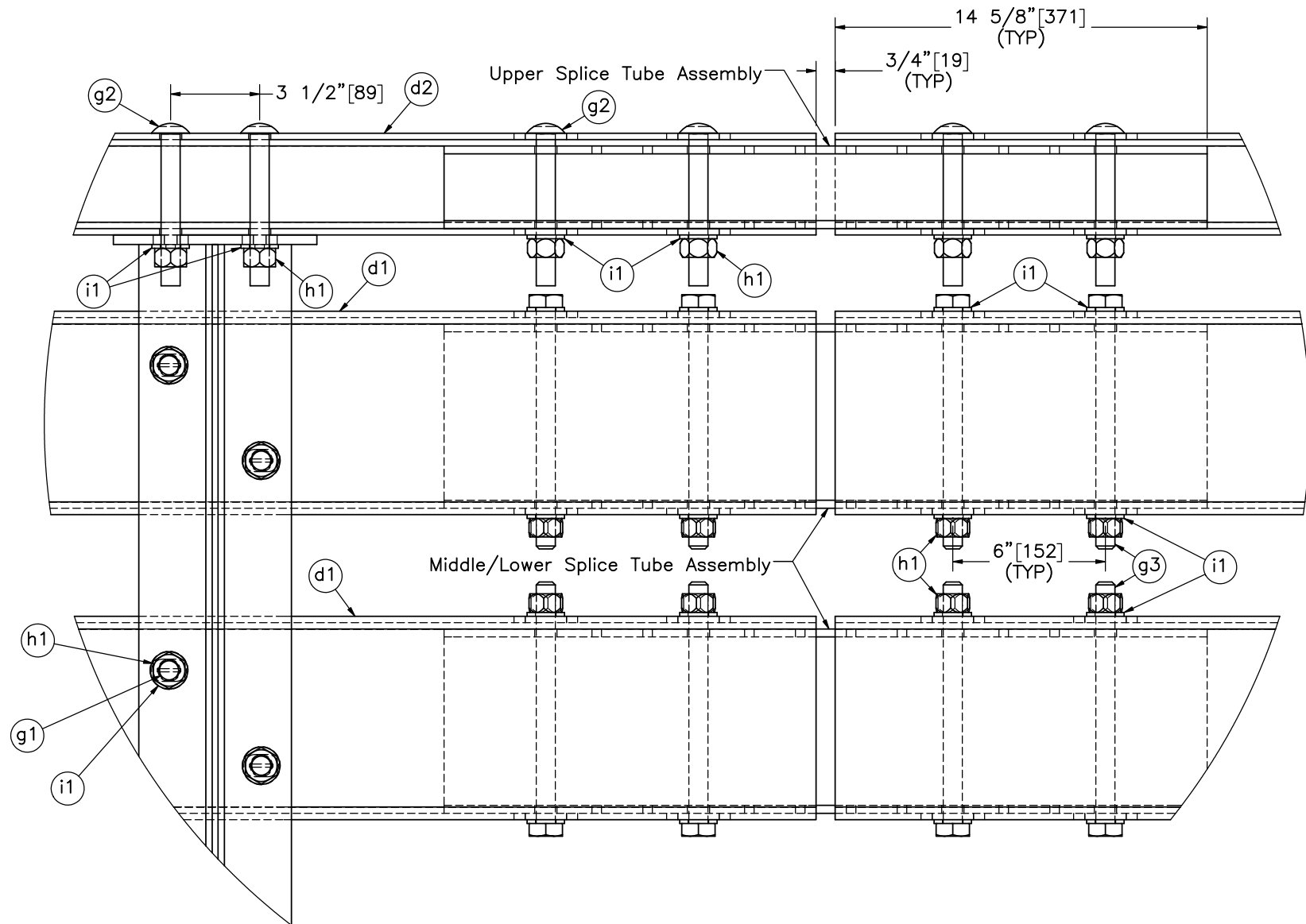
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UNITS: in.[mm]

SHEET:
8 of 27

DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



DETAIL K



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Splice Tube Details

DWG. NAME.
STBR-4_R5

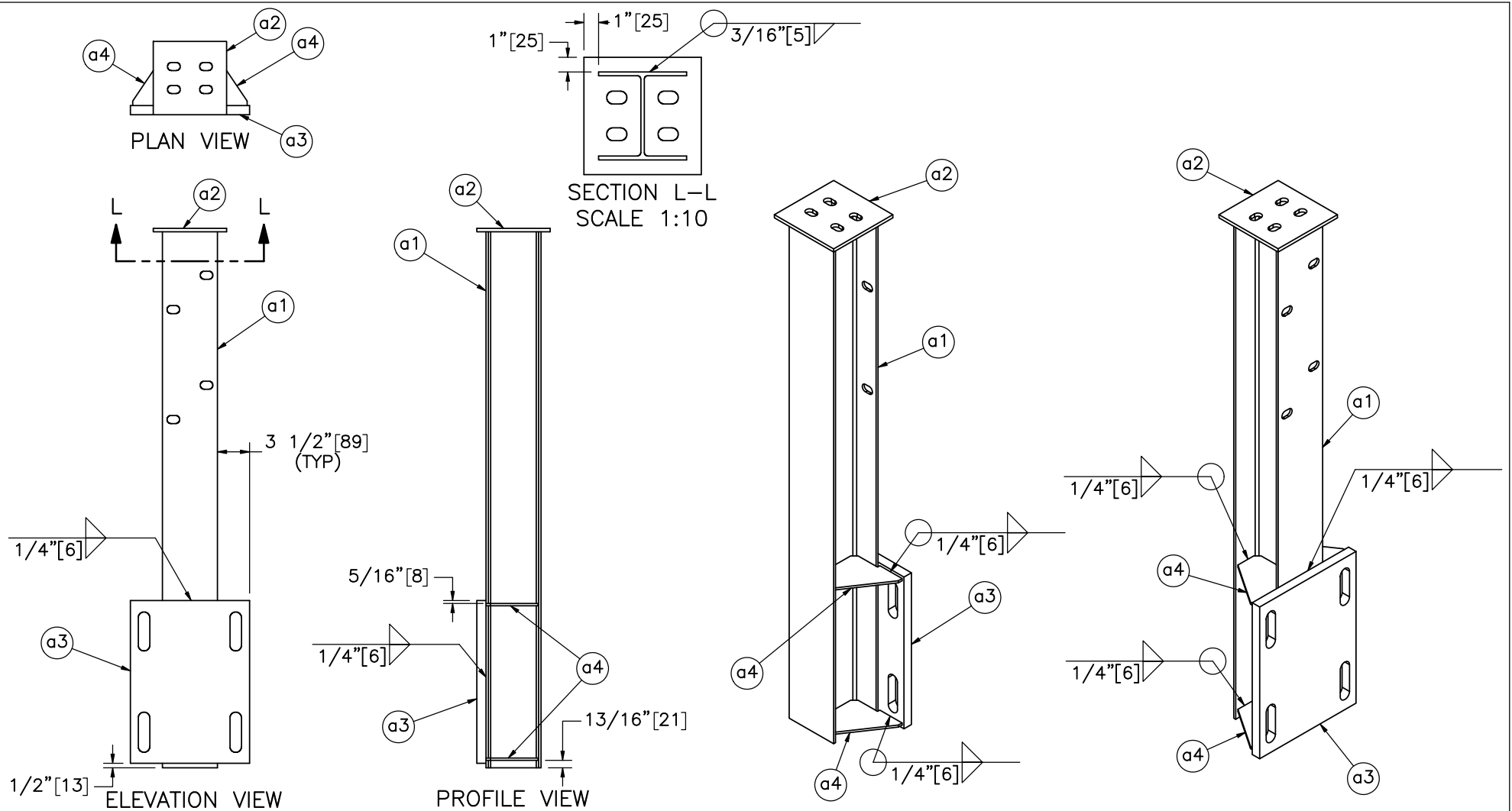
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SHEET:
9 of 27

DATE:
4/24/2019

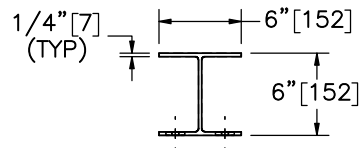
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DJW/MKB

REV. BY:
PM/JEK

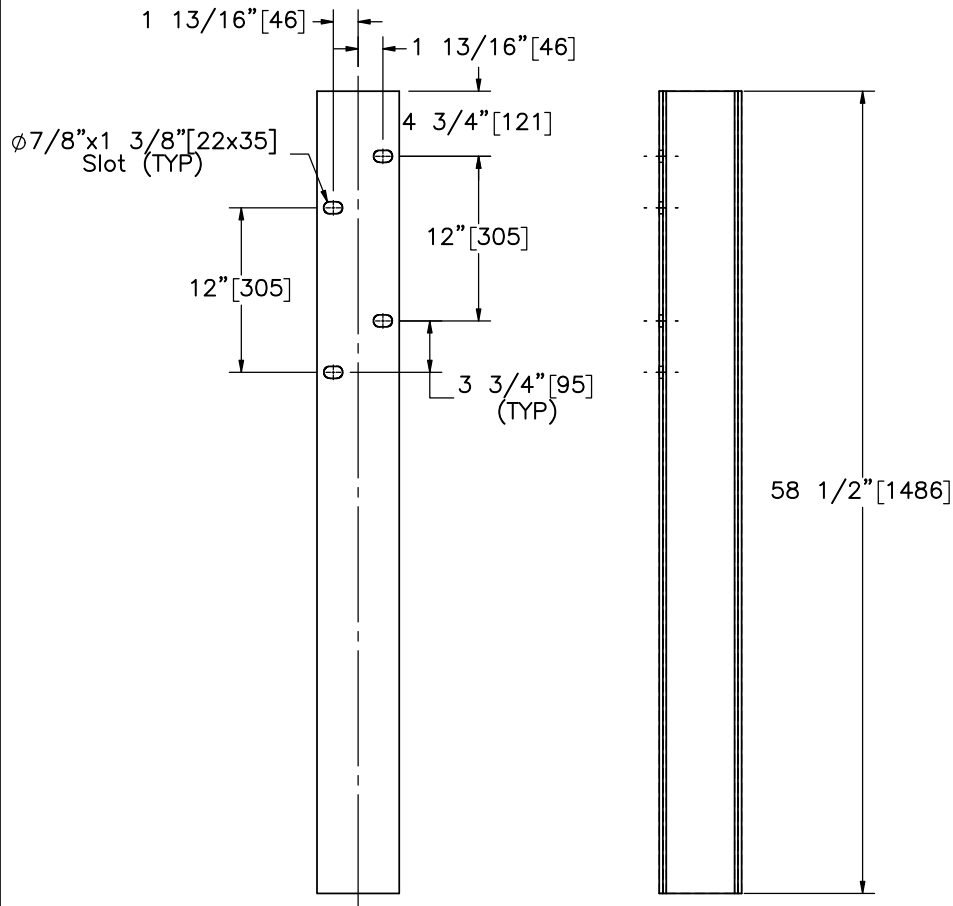


- Notes: (1) Gussets on both sides of post.
 (2) To prevent welds to end at edges of gussets, leave 5/16" [8] of base material beyond weld to edge of welded part.
 (3) Leave coped corners of gussets open for drainage. Do not fill with welds.

Item No.	QTY.	Description	Material Specification	Treatment Specification	 OH-IL Steel Tube Bridge Rail on Surrogate Slab Test No. STBR-4		
-	13	Welded Post Assembly	-	ASTM A123			
a1	1	W6x15 [W152x22], 58 1/2" [1,486] Long Post	ASTM A992	See Assembly	Midwest Roadside Safety Facility		
a2	1	8"x8"x3/8" [203x203x10] Plate	ASTM A572 Gr. 50	See Assembly			
a3	1	13"x17 3/4"x1" [330x451x25] Post Plate with Slots for 1" [25] Bolts	ASTM A572 Gr. 50	See Assembly	Welded Post Assembly Details		
a4	4	6 1/8"x5 11/16"x1/4" [156x144x6] Gusset Plate	ASTM A572 Gr. 50	See Assembly			
DWG. NAME: STBR-4_R5					SCALE: 1:16 UNITS: in./mm		SHEET: 10 of 27 DATE: 4/24/2019 DRAWN BY: DJW/MKB REV. BY: PM/JEK



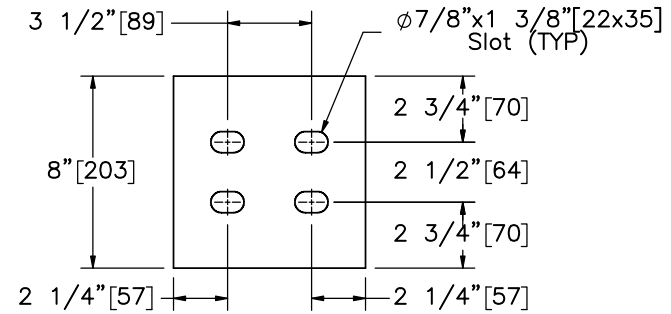
PLAN VIEW



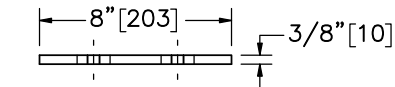
ELEVATION VIEW

PROFILE VIEW

Part a1
SCALE 1:14

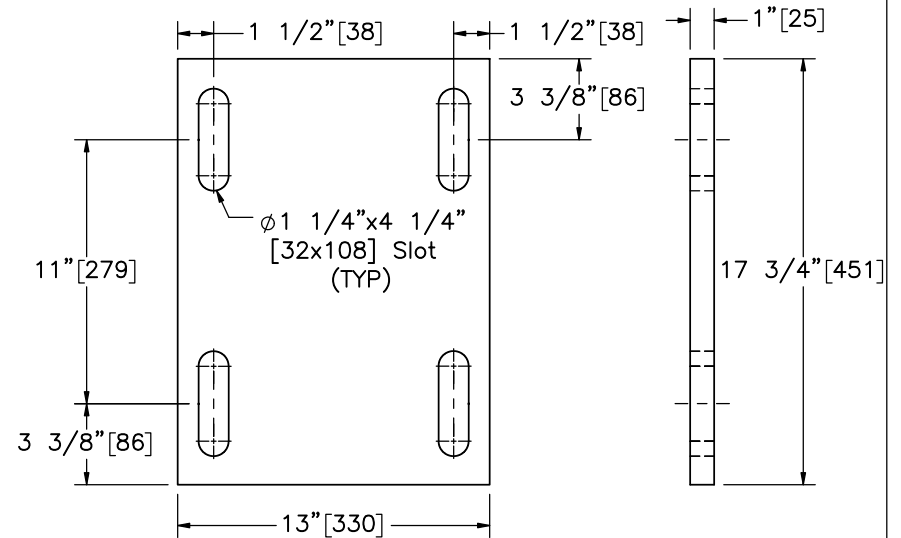


PLAN VIEW



ELEVATION VIEW

Part a2



ELEVATION VIEW

PROFILE VIEW

Part a3



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Post Components

DWG. NAME.
STBR-4_R5

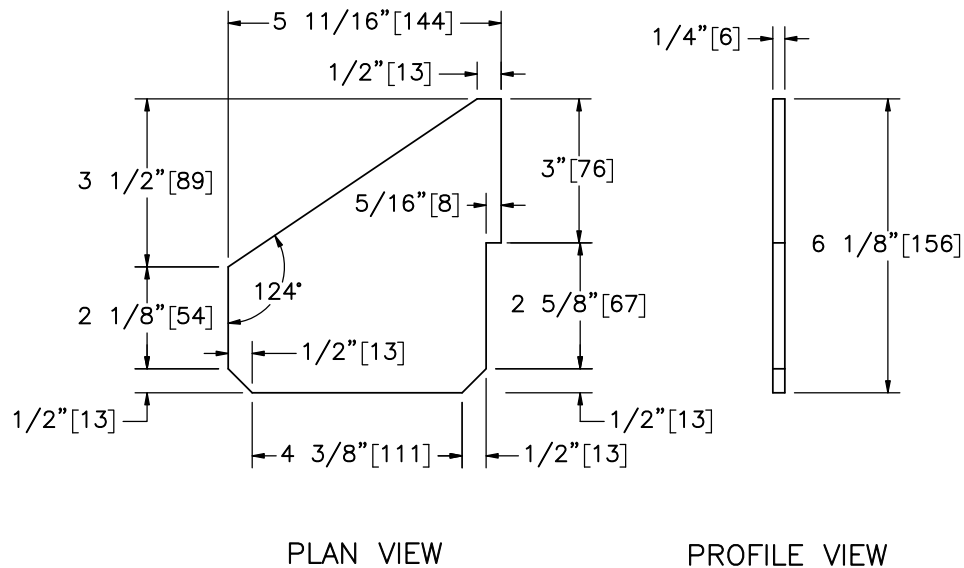
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UNITS: in.[mm]

SHEET:
11 of 27

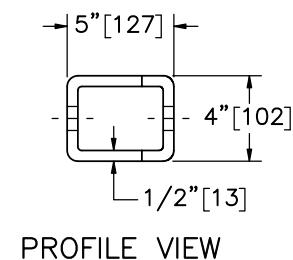
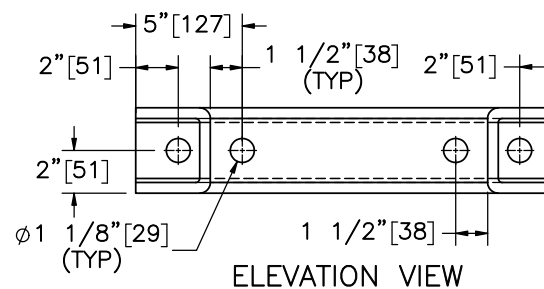
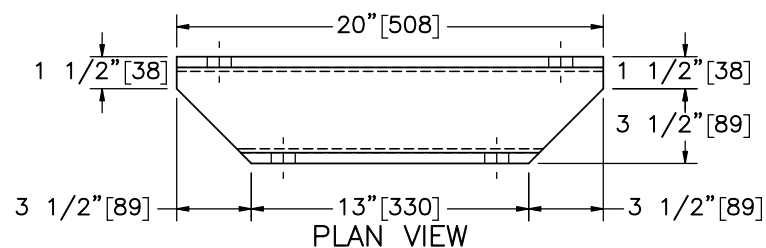
DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



Part a4
SCALE 1:4



Part a5



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Post Components

DWG. NAME.
STBR-4_R5

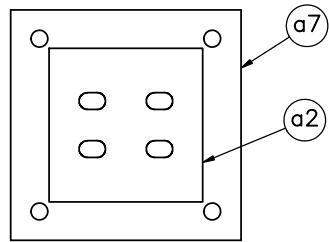
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UNITS: in.[mm]

SHEET:
12 of 27

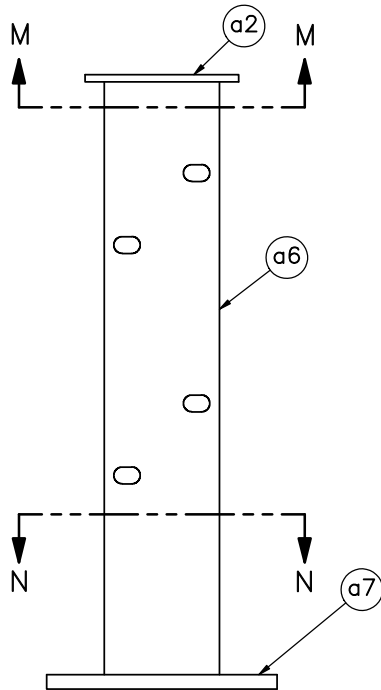
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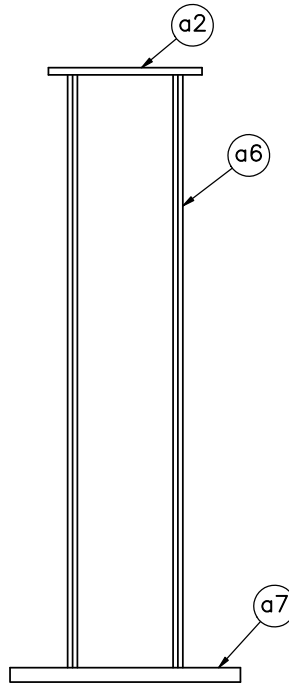
REV. BY:
PM/JEK



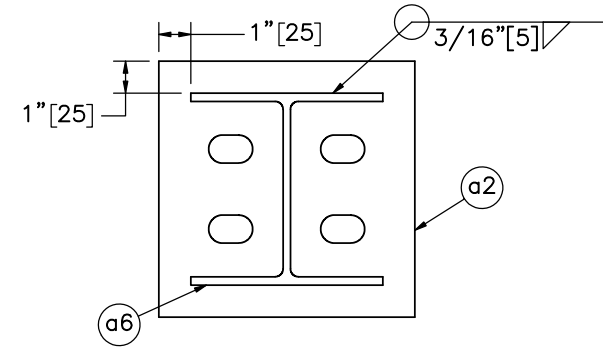
PLAN VIEW



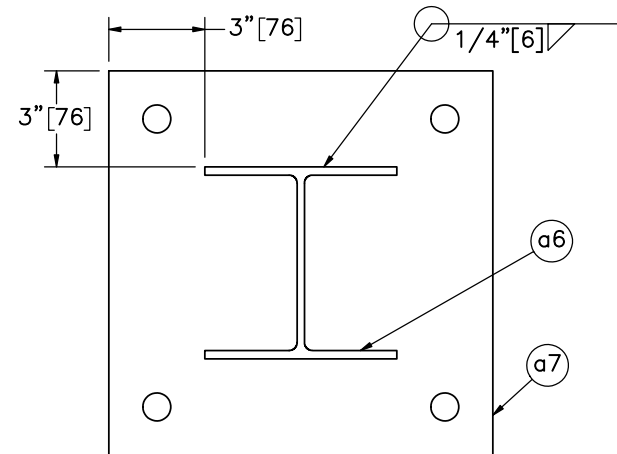
ELEVATION VIEW



PROFILE VIEW

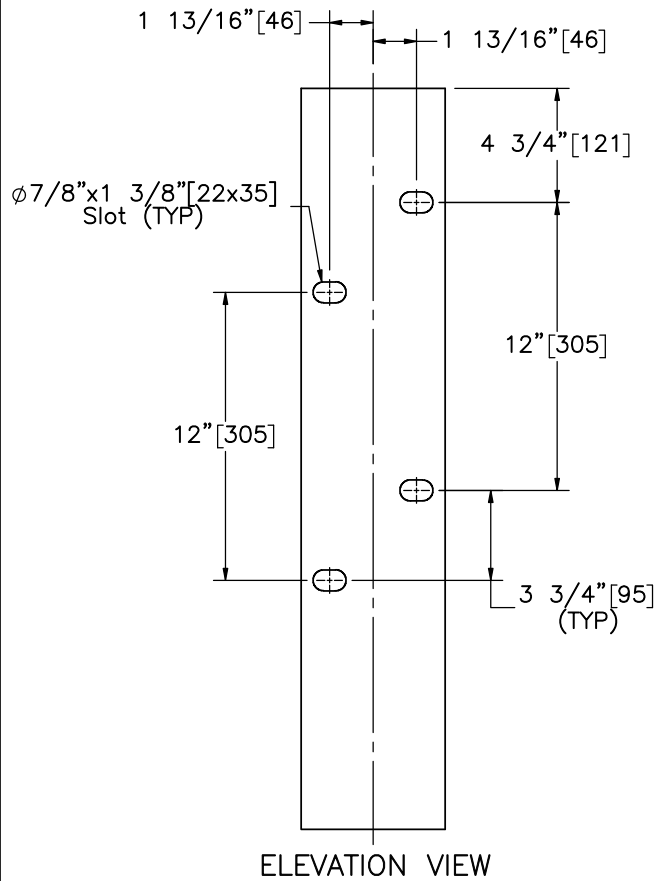
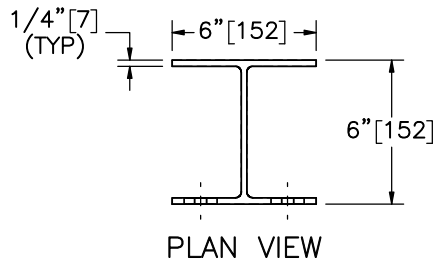


SECTION M-M
SCALE 1:6

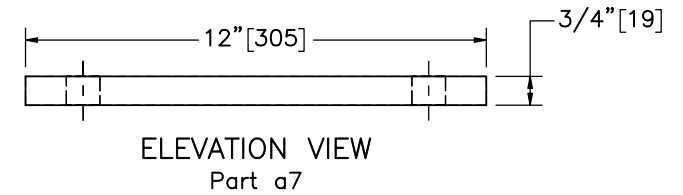
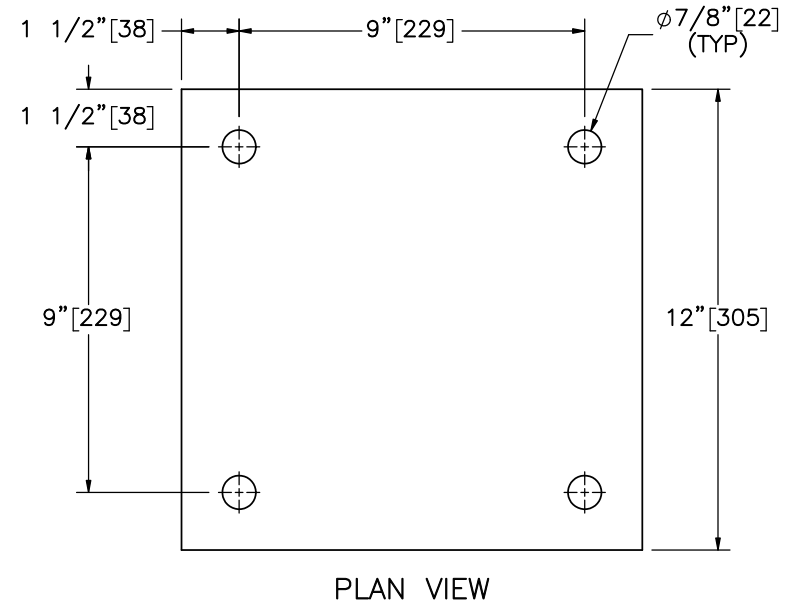
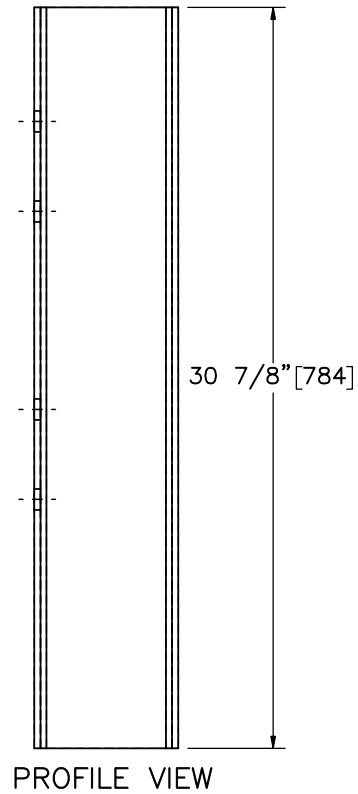


SECTION N-N
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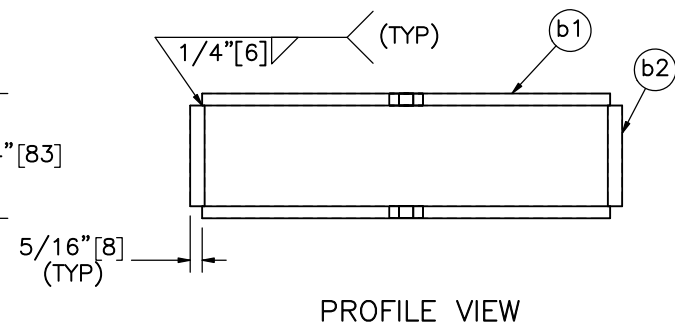
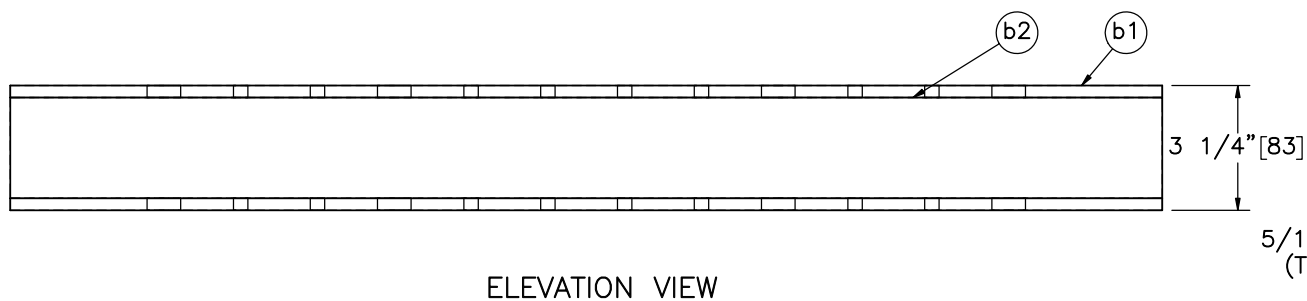
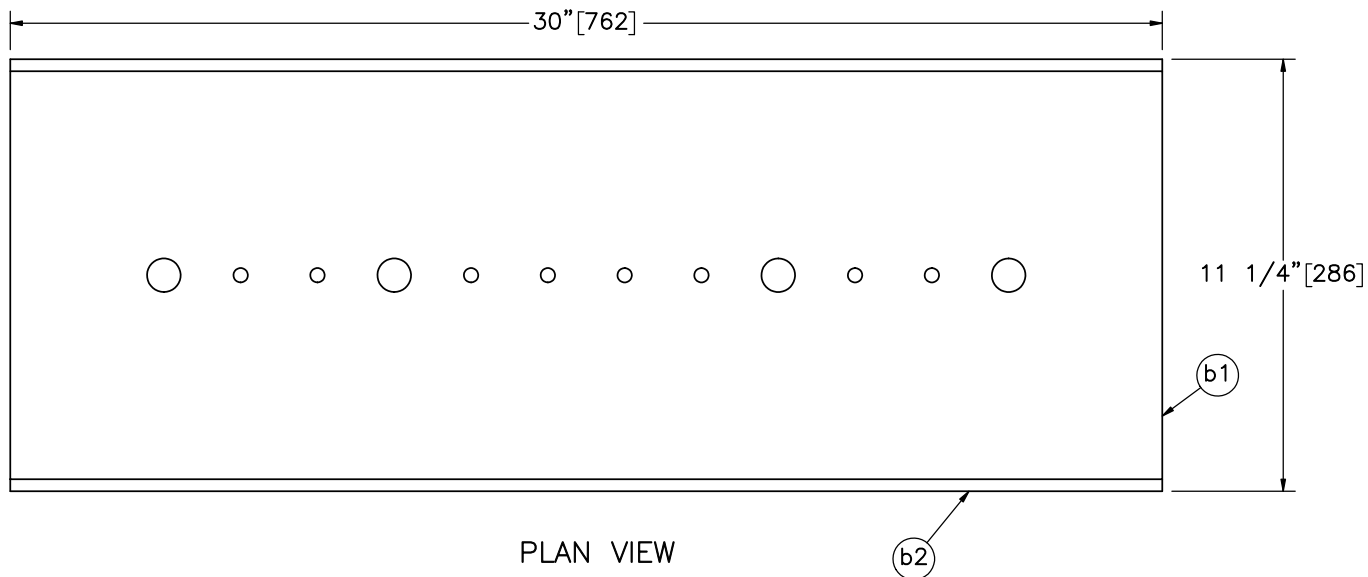
Item No.	QTY.	Description	Material Specification	Treatment Specification	 Midwest Roadside Safety Facility	OH-IL Steel Tube Bridge Rail on Surrogate Slab Test No. STBR-4		SHEET: 13 of 27
—	7	Top-Mounted Welded Post Assembly	—	ASTM A123		Top-Mounted Welded Post Assembly		DATE: 4/24/2019
a2	1	8"x8"x3/8" [203x203x10] Plate	ASTM A572 Gr. 50	See Assembly		DWG. NAME: STBR-4_R5		DRAWN BY: DJW/MKB
a6	1	W6x15 [W152x22], 30 7/8" [784] Long Post	ASTM A992	See Assembly		SCALE: 1:10 UNITS: in./mm		REV. BY: PM/JEK
a7	1	12"x12"x3/4" [305x305x19] Plate	ASTM A572 Gr. 50	See Assembly				



Part a6



	OH-IL Steel Tube Bridge		SHEET:
	Rail on Surrogate Slab		14 of 27
Midwest Roadside Safety Facility	Test No. STBR-4		DATE:
	Top-Mounted Post Components		4/24/2019
DWG. NAME:	SCALE: 1:5	DRAWN BY:	
STBR-4_R5	UNITS: in.[mm]	DJW/MKB	
		REV. BY:	
		PM/JEK	



Note: (1) To help hold the shape of the splice assembly through the welding and galvanizing processes, it is recommended to use gussets or shim blocks.

Item No.	QTY.	Description	Material Specification	Treatment Specification
—	9	Upper Splice Tube Assembly — Option 1	—	ASTM A123
b1	2	30"x10 5/8"x5/16" [762x270x8] Plate	ASTM A572 Gr. 50	See Assembly
b2	2	30"x2 5/8"x3/8" [762x67x10] Plate	ASTM A572 Gr. 50	See Assembly

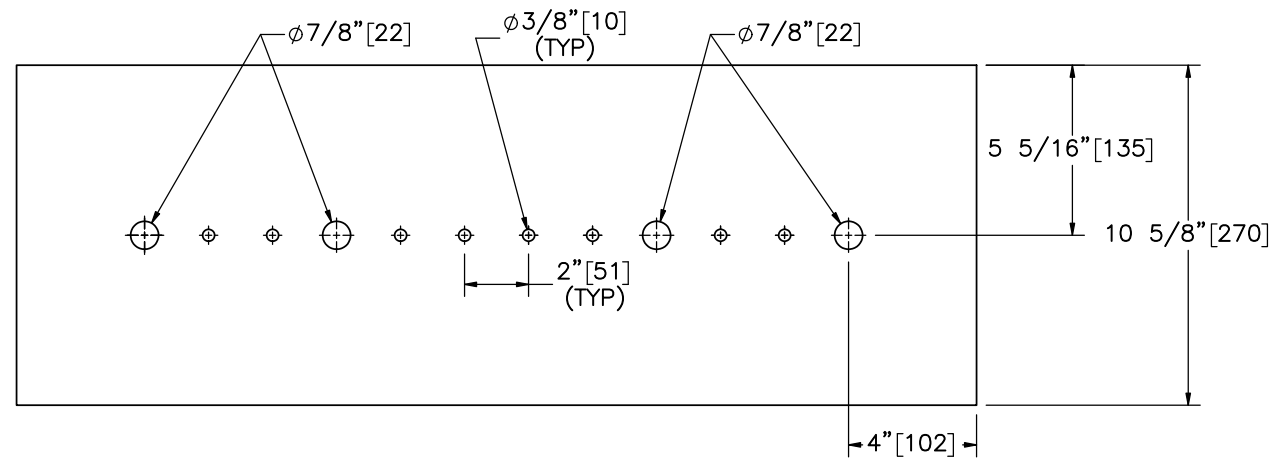


OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4
Upper Splice Tube Assembly

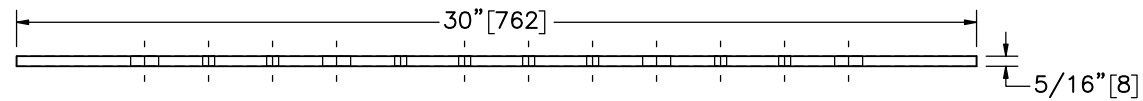
DWG. NAME.
STBR-4_R5

SCALE: 1:5
UNITS: in./mm

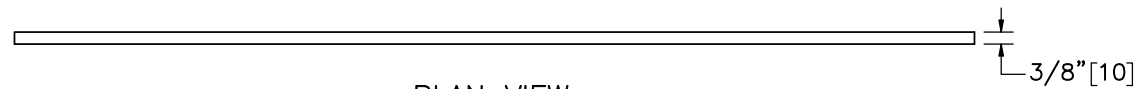
SHEET:
15 of 27
DATE:
4/24/2019
DRAWN BY:
DJW/MKB
REV. BY:
PM/JEK



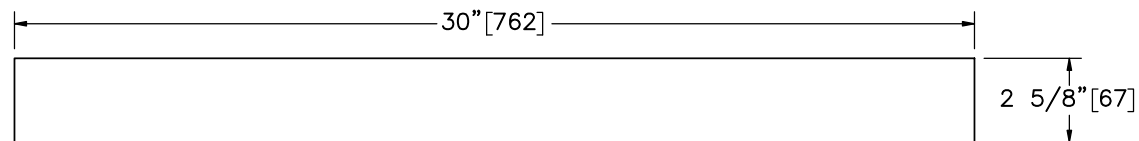
PLAN VIEW



ELEVATION VIEW
Part b1

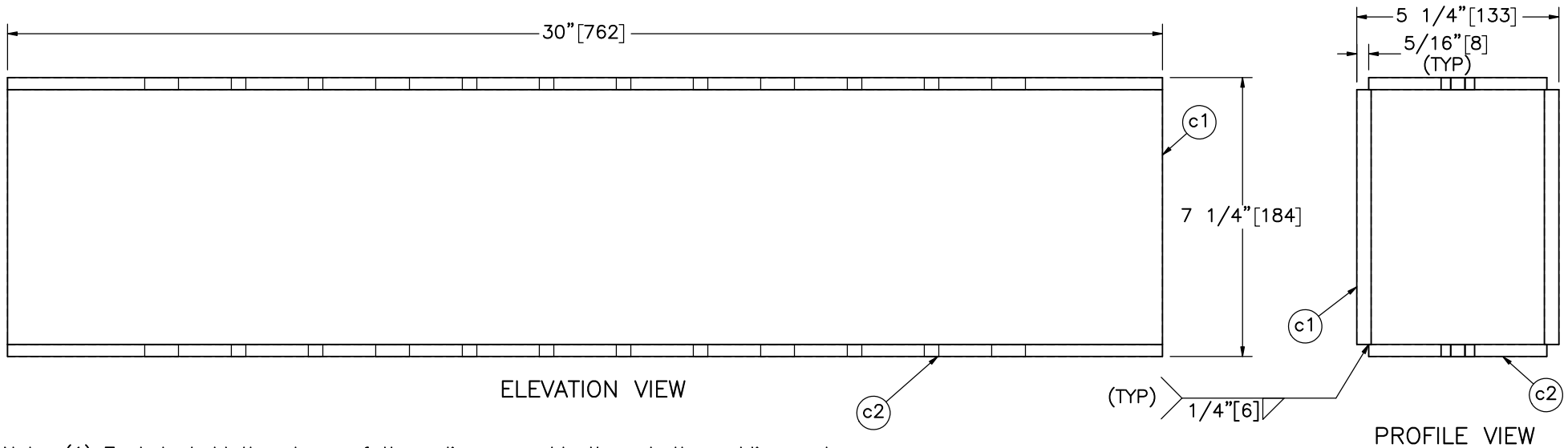
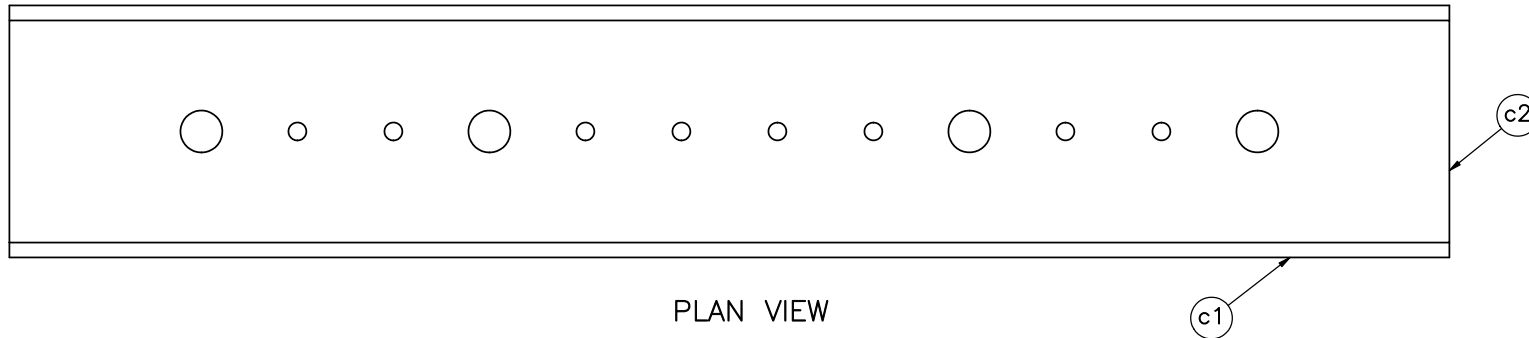


PLAN VIEW



ELEVATION VIEW
Part b2

	OH-IL Steel Tube Bridge		SHEET:
	Rail on Surrogate Slab		16 of 27
Midwest Roadside Safety Facility	Test No. STBR-4		DATE:
	Upper Splice Tube Components		4/24/2019
DWG. NAME.	SCALE: 1:6	DRAWN BY:	
STBR-4_R5	UNITS: in.[mm]	DJW/MKB	
		REV. BY:	
		PM/JEK	



Note: (1) To help hold the shape of the splice assembly through the welding and galvanizing processes, it is recommended to use gussets or shim blocks.

Item No.	QTY.	Description	Material Specification	Treatment Specification
—	18	Middle/Lower Splice Tube Assembly – Option 1	—	ASTM A123
c1	2	30"x6 5/8"x3/8" [762x168x10] Plate	ASTM A572 Gr. 50	See Assembly
c2	2	30"x4 5/8"x5/16" [762x117x8] Plate	ASTM A572 Gr. 50	See Assembly



OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Middle/Lower Splice Tube
Assembly

DWG. NAME.
STBR-4_R5

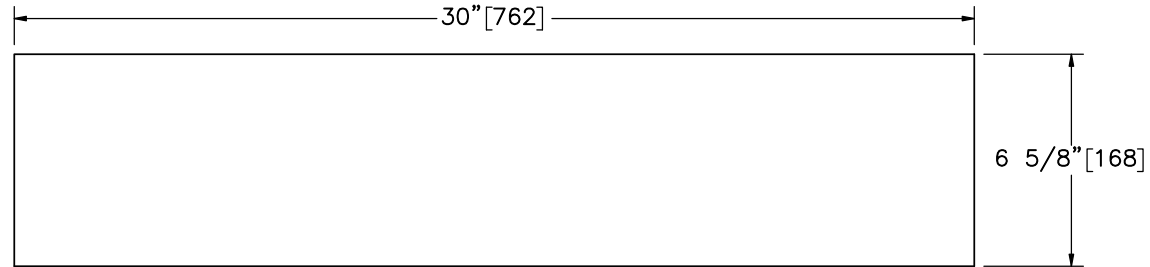
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SHEET:
17 of 27

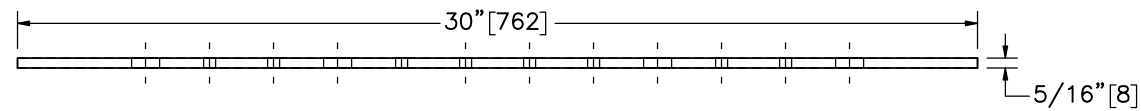
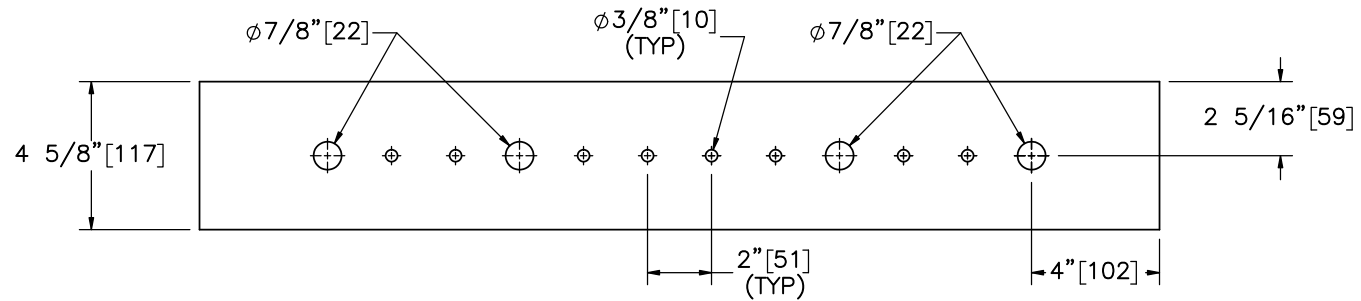
DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



Part c1



Part c2



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Middle/Lower Splice Tube
Components

DWG. NAME.
STBR-4_R5

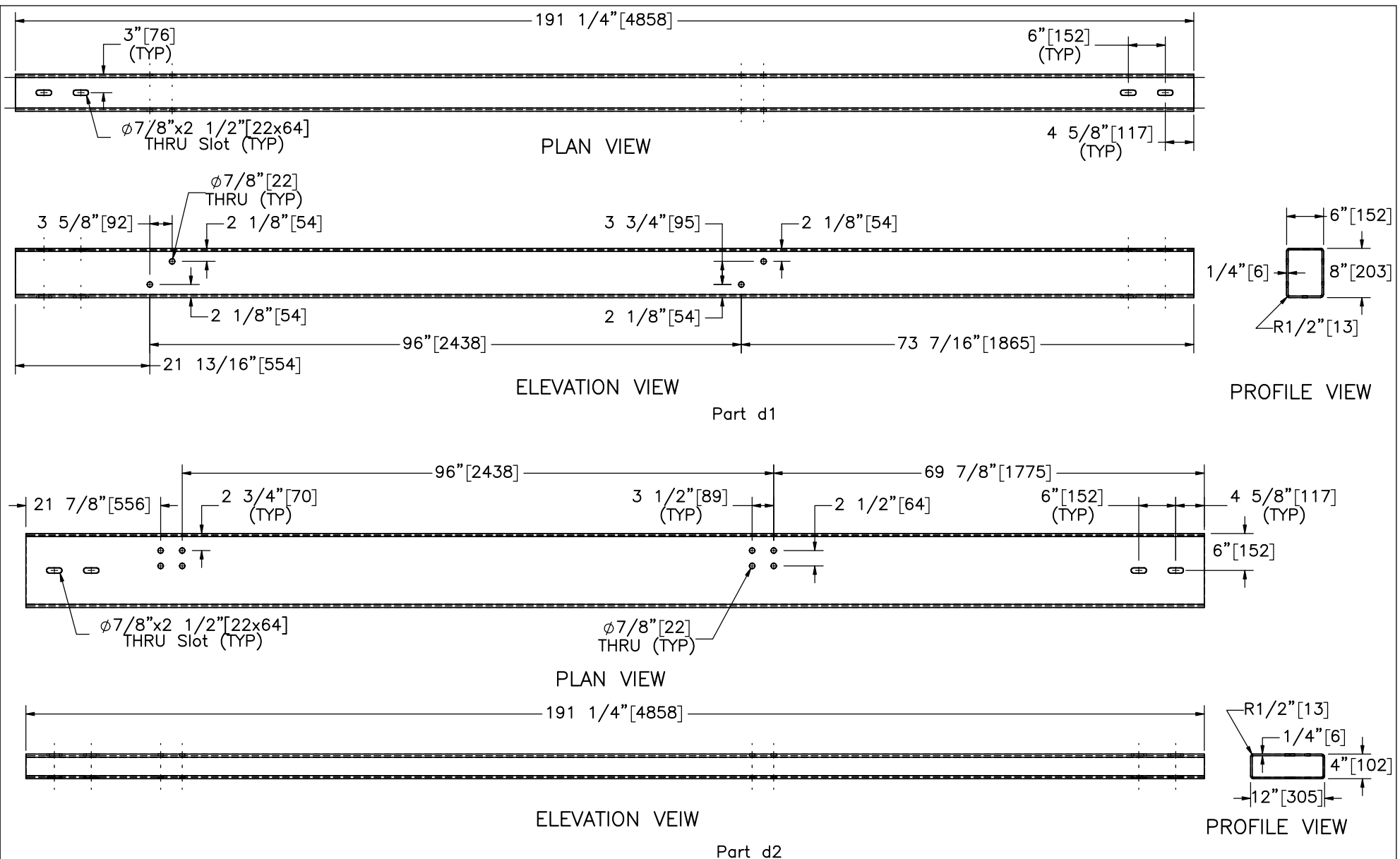
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UNITS: in.[mm]

SHEET:
18 of 27

DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Rail Components

DWG. NAME.
STBR-4_R5

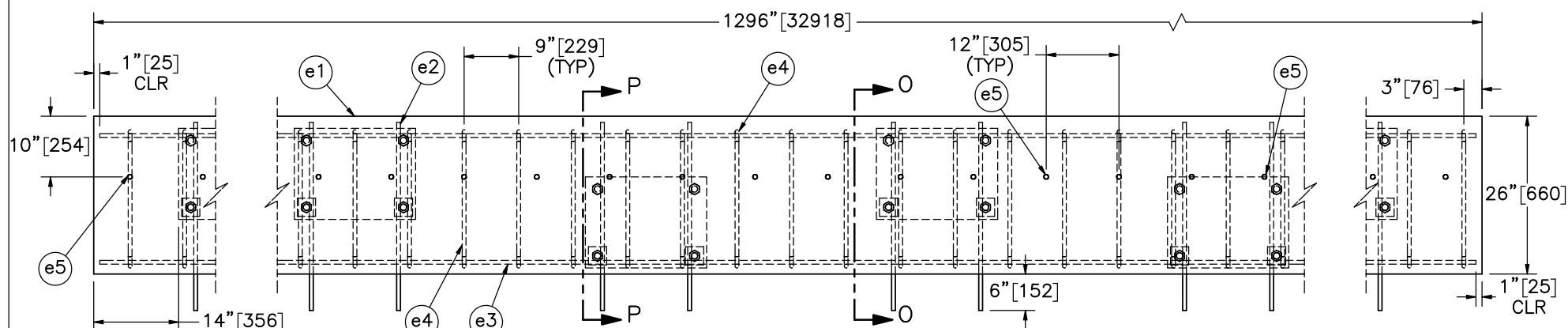
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SHEET:
19 of 27

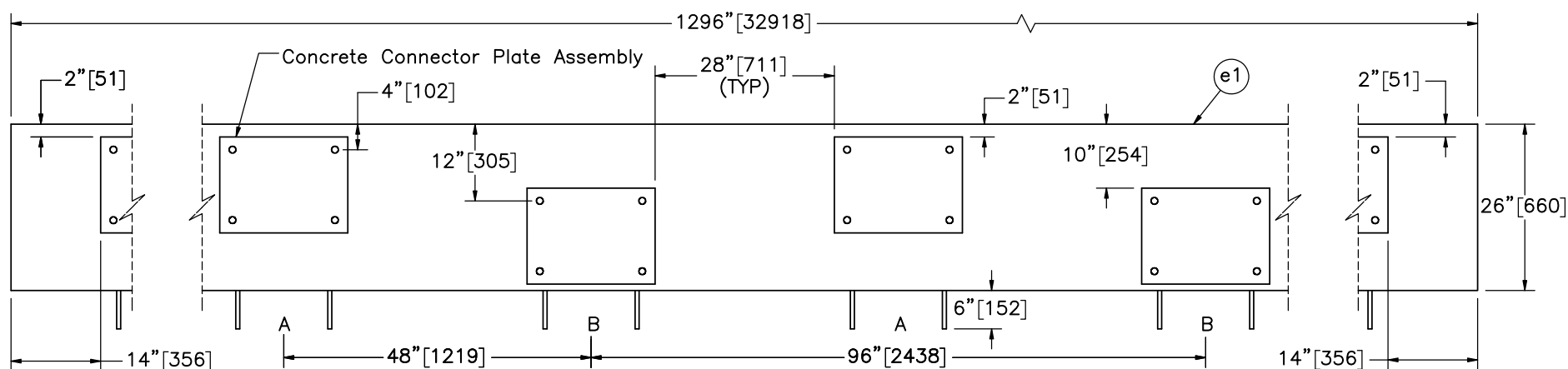
DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



ELEVATION VIEW



BACKSIDE VIEW

- Notes: (1) Place vertical bar (part no. e2) driven 6" [152] into ground tangent to the threaded rods (part no. f4) at the attachment locations. For support of f4 rods during casting only.
 (2) Location A used for 1100C small car tests.
 (3) Location B used for 2270P pickup truck and 10000S SUT tests.
 (4) Internal reinforcement not shown on backside view.



Midwest Roadside
Safety Facility

OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Test Slab Assembly Details

DWG. NAME.
STBR-4_R5

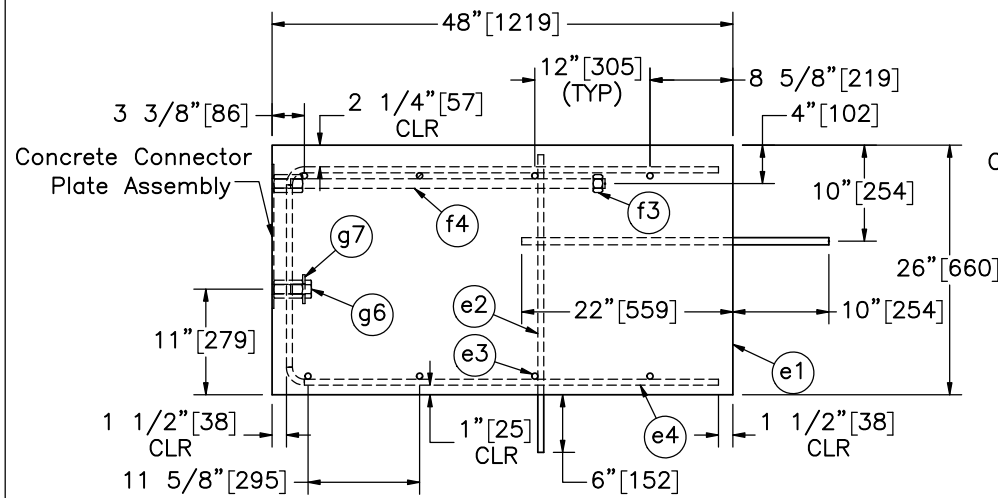
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SHEET:
20 of 27

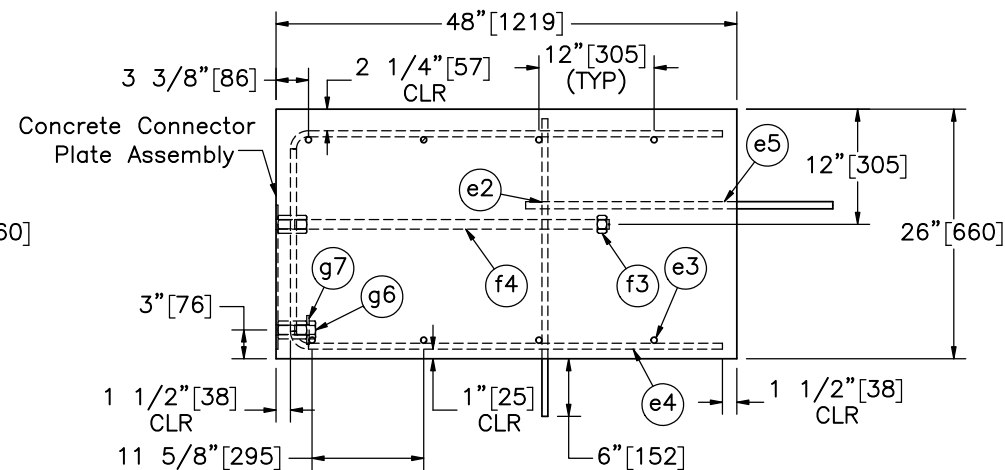
DATE:
4/24/2019

DRAWN BY:
DJW/MKB

REV. BY:
PM/JEK



SECTION O-O
LOCATION A ATTACHMENT



SECTION P-P
LOCATION B ATTACHMENT

Item No.	QTY.	Description	Material Specification	Treatment Specification
—		Test Slab Assembly	—	—
e1	1	Concrete	Min. $f'_c = 4,000$ psi [27.6 MPa]	—
e2	54	#5 [16] Bar, 31" [787] Long	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)
e3	8	#5 [16] Bar, 1,294" [32,868] Long	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)
e4	144	#5 [16] Bar, 110 3/16" [2,799] Long Unbent	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)
e5	108	#6 [19] Bar, 32" [813] Long	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)
—	26	Concrete Connector Plate Assembly	—	ASTM A123
—	1	Post 9 Concrete Connector Plate Assembly	—	ASTM A123
f3	54	1"—8 UNC [M24x3] Heavy Hex Nut	ASTM A563DH	ASTM A153 or B695 Class 55 or F2329
f4	54	1"—8 UNC [M24x3], 32 3/4" [832] Long Fully Threaded Anchor Rod	ASTM F1554 Gr. 105	ASTM A153 or B695 Class 55 or F2329
g6	54	1"—8 UNC [M24x3], 1 1/2" [38] Long Hex Head Bolt	ASTM A449	ASTM A153 or B695 Class 55 or F2329
g7	52	3"x3"x1/4" [76x76x6] Plate	ASTM A36	ASTM A123
g8	1	36"x2 1/2"x3/8" [914x64x10] Plate	ASTM A572 Gr. 50	ASTM A123

- Notes: (1) Location A used for 1100C small car tests.
(2) Location B used for 2270P pickup truck and 10000 SUT tests.
(3) For Post 9 in Location B, part g8 is used instead of g7. Post 9 also has a different Concrete Connector Plate Assembly, as detailed on Sheet 4.
(4) Place vertical bar (part no. e2) driven 6" [152] into ground tangent to the threaded rods (part no. f4) at the attachment locations. For support during casting.
(5) Part f4 is threaded 1 1/4" [32] into part f2 (coupling nut) on Concrete Connector Plate Assemblies.



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Test Slab Assembly Details

DWG. NAME.
STBR-4_R5

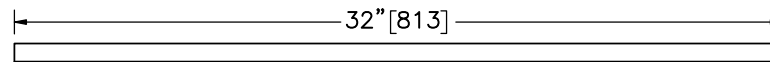
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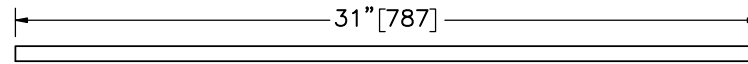
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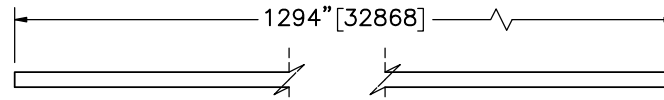
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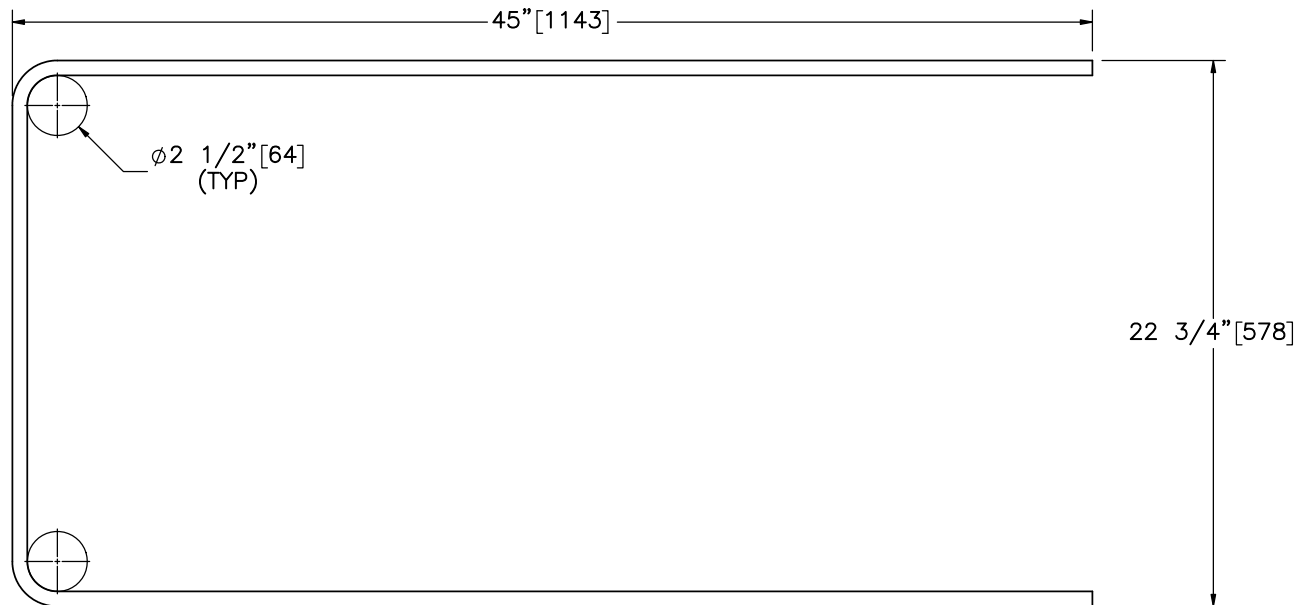
Part e5



Part e2



Part e3



Part e4

Bill of Bars

Bar	QTY.	Size	Total Unbent Length	Material Specification	Treatment Specification
e2	54	#5	31" [787]	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)
e3	8	#5	1294" [32868]	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)
e4	144	#5	110 3/16" [2799]	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)
e5	108	#6	32" [813]	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)

Note: (1) Minimum lap length for a #5 bar is 18" [457].



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Reinforcement Details

DWG. NAME.
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UNITS: in.[mm]

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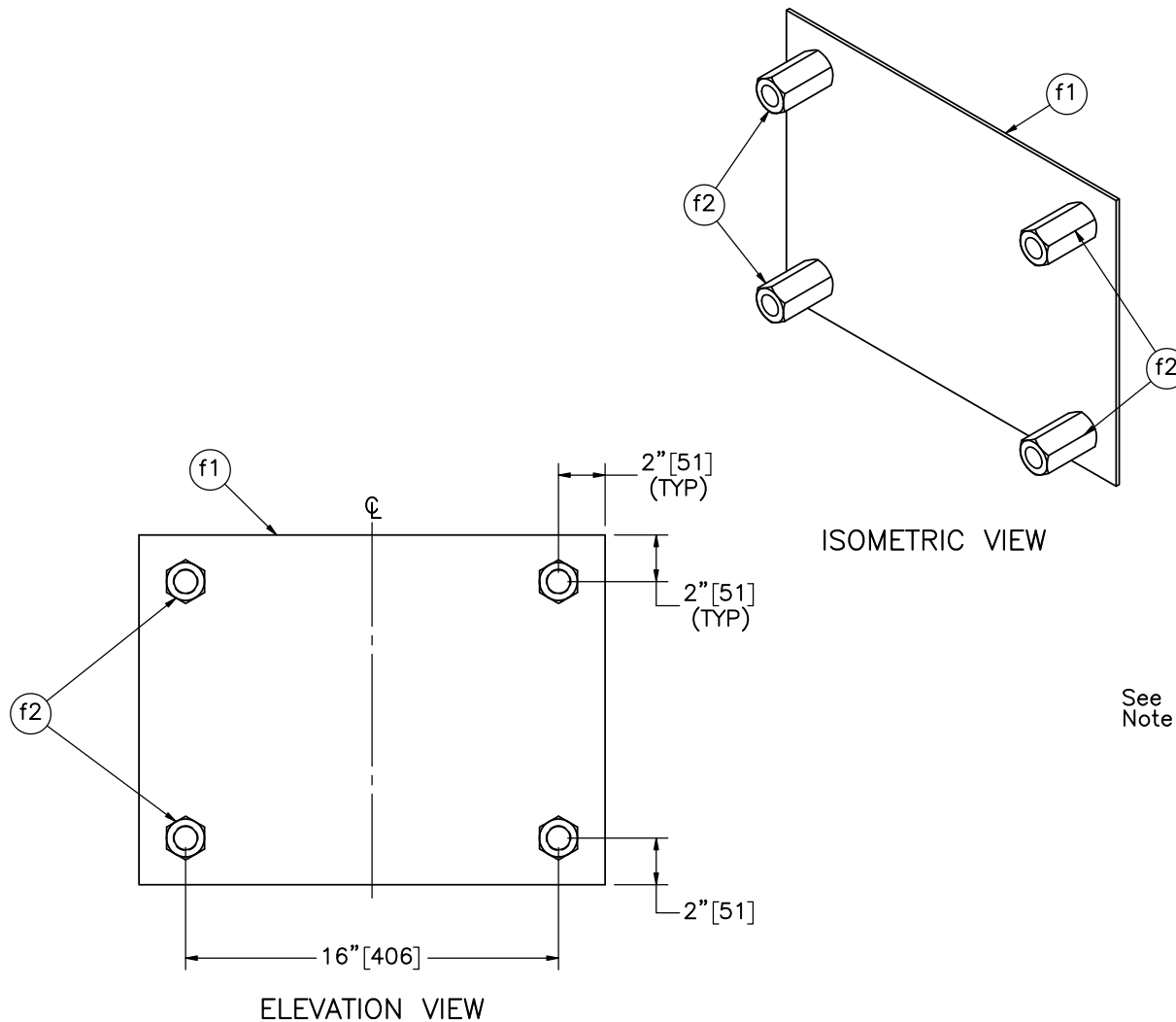


Plate Assembly
Location (Post Nos. 1–8, 10–13)

- Notes: (1) Connector plate assembly is symmetric along the centerline.
(2) During casting, the nuts may be held in place by extending bolts through the formwork into the nuts, or by tack welding nuts to inside face of the plate. The welds are not structurally important.

Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
–	26	Concrete Connector Plate Assembly	–	ASTM A123	–
f1	1	20"x15"x3/16" [508x381x5] Steel Plate	ASTM A572 Gr. 50	ASTM A123	–
f2	4	1"–8 UNC [M24x3] Heavy Hex Coupling Nut	ASTM A563DH	See Assembly	–



OH–IL Steel Tube Bridge
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Concrete Connector Plate
Assembly Details

DWG. NAME.
STBR–4_R5

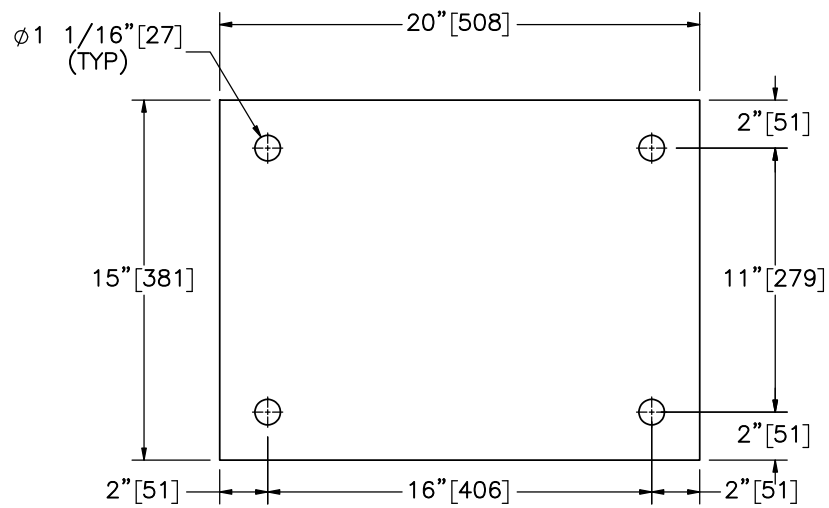
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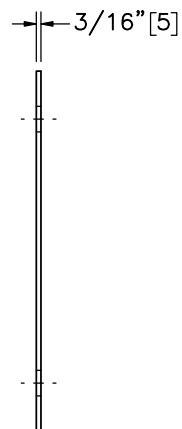
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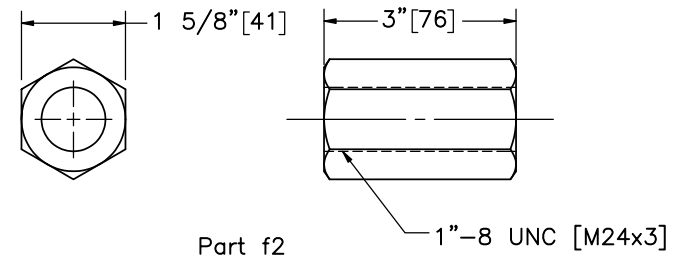


ELEVATION VIEW

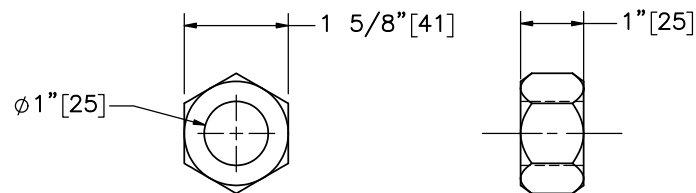
Part f1
SCALE 1:8



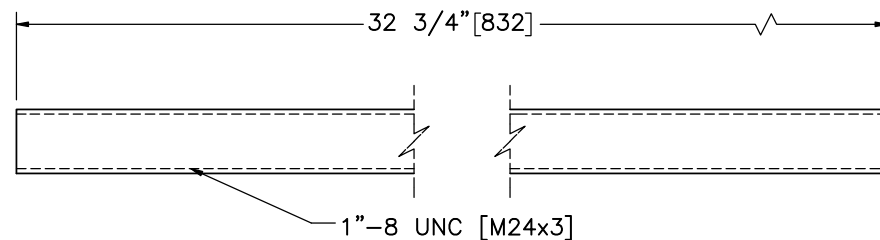
PROFILE VIEW



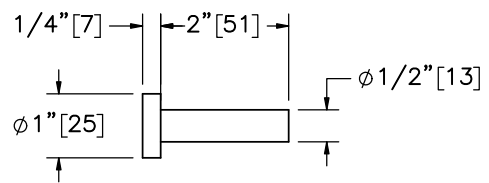
Part f2



Part f3



Part f4



Part f5



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OH-IL Steel Tube Bridge
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Test Slab Components

DWG. NAME.
STBR-4_R5

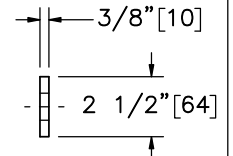
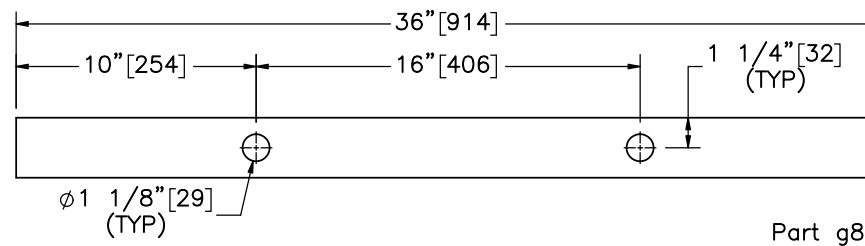
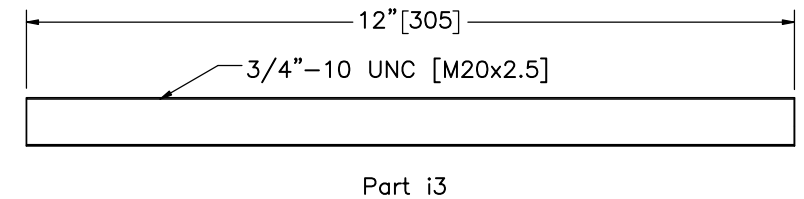
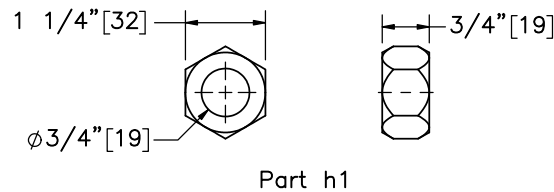
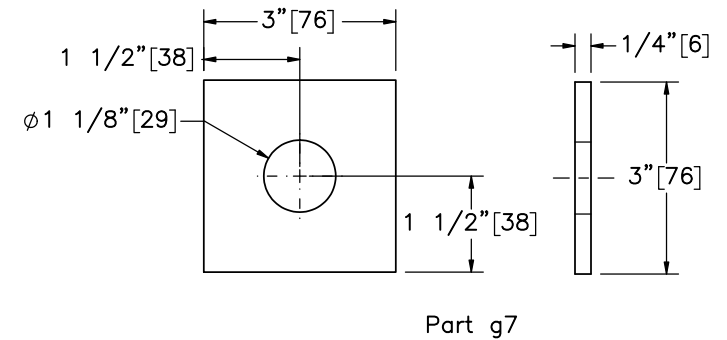
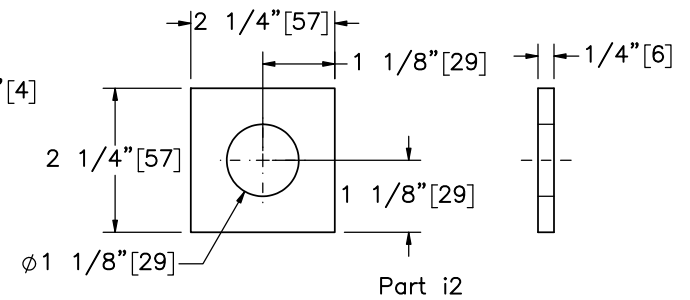
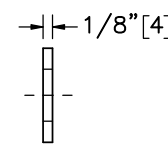
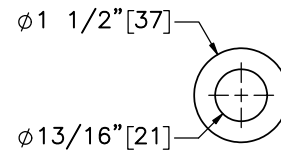
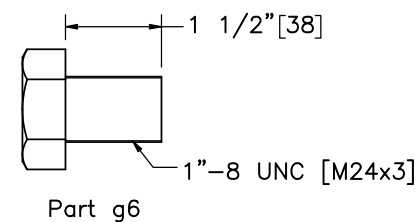
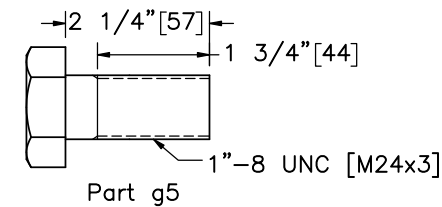
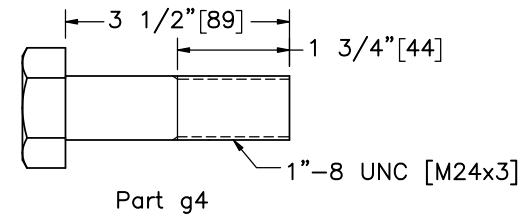
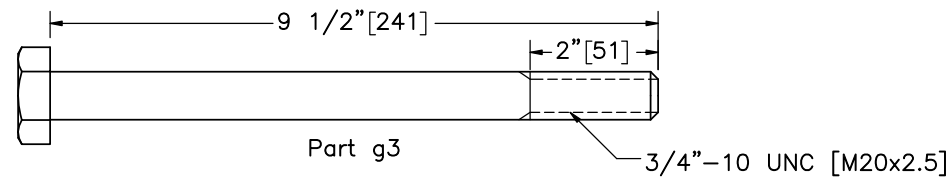
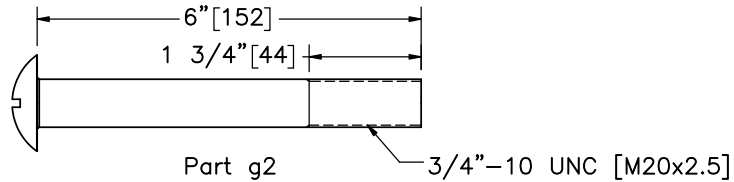
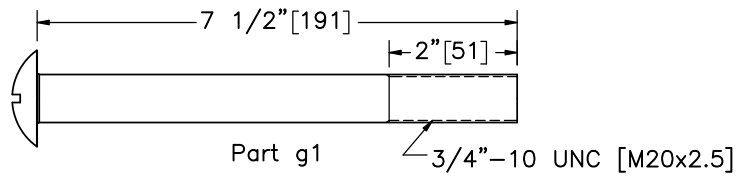
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Notes: (1) Round head bolts may have a flat head key in center region or key shapes in the heads.



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OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Hardware

DWG. NAME.
STBR-4_R5

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UNITS: in./mm

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REV. BY:
PM/JEK

Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
a1	13	W6x15 [W152x22], 58 1/2" [1,486] Long Post	ASTM A992	See Assembly	—
a2	20	8"x8"x3/8" [203x203x10] Plate	ASTM A572 Gr. 50	See Assembly	—
a3	13	13"x17 3/4"x1" [330x451x25] Post Plate with Slots for 1" [25] Bolts	ASTM A572 Gr. 50	See Assembly	—
a4	52	6 1/8"x5 11/16"x1/4" [156x144x6] Gusset Plate	ASTM A572 Gr. 50	See Assembly	—
a5	26	HSS 5"x4"x1/2" [127x102x13], 20" [508] Long with 1 1/8" [29] Holes	ASTM A500 Gr. C	ASTM A123	—
a6	7	W6x15 [W152x22], 30 7/8" [784] Long Post	ASTM A992	See Assembly	—
a7	7	12"x12"x3/4" [305x305x19] Plate	ASTM A572 Gr. 50	See Assembly	—
b1	18	30"x10 5/8"x5/16" [762x270x8] Plate	ASTM A572 Gr. 50	See Assembly	—
b2	18	30"x2 5/8"x3/8" [762x67x10] Plate	ASTM A572 Gr. 50	See Assembly	—
c1	36	30"x6 5/8"x3/8" [762x168x10] Plate	ASTM A572 Gr. 50	See Assembly	—
c2	36	30"x4 5/8"x5/16" [762x117x8] Plate	ASTM A572 Gr. 50	See Assembly	—
d1	20	HSS 8"x6"x1/4" [203x152x6], 191 1/4" [4,858] Long	ASTM A500 Gr. C	ASTM A123	—
d2	10	HSS 12"x4"x1/4" [305x102x6], 191 1/4" [4,858] Long	ASTM A500 Gr. C	ASTM A123	—
e1	1	Concrete	Min. f'c = 4,000 psi [27.6 MPa]	—	—
e2	54	#5 [16] Bar, 31" [787] Long	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)	—
e3	8	#5 [16] Bar, 1,294" [32,868] Long	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)	—
e4	144	#5 [16] Bar, 110 3/16" [2,799] Long Unbent	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)	—
e5	108	#6 [19] Bar, 32" [813] Long	ASTM A615 Gr. 60	Epoxy-Coated (ASTM A775 or ASTM A934)	—
f1	27	20"x15"x3/16" [508x381x5] Steel Plate	ASTM A572 Gr. 50	ASTM A123	—
f2	108	1"—8 UNC [M24x3] Heavy Hex Coupling Nut	ASTM A563DH	See Assembly	—
f3	106	1"—8 UNC [M24x3] Heavy Hex Nut	ASTM A563DH	ASTM A153 or B695 Class 55 or F2329	FNX24b
f4	54	1"—8 UNC [M24x3], 32 3/4" [832] Long Fully Threaded Anchor Rod	ASTM F1554 Gr. 105	ASTM A153 or B695 Class 55 or F2329	FRR24b
f5	4	1/2" [13] Dia. Shear Stud, 2" [51] Long	ASTM A108	—	—



Midwest Roadside
Safety Facility

OH—IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR—4

Bill of Materials

DWG. NAME.
STBR—4_R5

SCALE: None
UNITS: in./mm

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Item No.	QTY.	Description	Material Specification	Treatment Specification	Hardware Guide
g1	84	3/4"-10 UNC [M20x2.5], 7 1/2" [191] Long Round Head Bolt	ASTM A449	ASTM A153 or B695 Class 55 or F2329	FBX20b
g2	120	3/4"-10 UNC [M20x2.5], 6" [152] Long Round Head Bolt	ASTM A449	ASTM A153 or B695 Class 55 or F2329	FBX20b
g3	72	3/4"-10 UNC [M20x2.5], 9 1/2" [241] Long Heavy Hex Head Bolt	ASTM F3125 Gr. A325 Type 1	ASTM A153 or B695 Class 55 or F2329	FBX20b
g4	52	1"-8 UNC [M24x3], 3 1/2" [89] Long Heavy Hex Head Bolt	ASTM F3125 Gr. A325 Type 1	ASTM A153 or B695 Class 55 or F1136 Gr. 3 or F2329 or F2833 Gr. 1	FBX24b
g5	52	1"-8 UNC [M24x3], 2 1/4" [57] Long Heavy Hex Head Bolt	ASTM F3125 Gr. A325 Type 1	ASTM A153 or B695 Class 55 or F1136 Gr. 3 or F2329 or F2833 Gr. 1	FBX24b
g6	54	1"-8 UNC [M24x3], 1 1/2" [38] Long Hex Head Bolt	ASTM A449	ASTM A153 or B695 Class 55 or F2329	FBX24b
g7	52	3"x3"x1/4" [76x76x6] Plate	ASTM A36	ASTM A123	—
g8	1	36"x2 1/2"x3/8" [914x64x10] Plate	ASTM A572 Gr. 50	ASTM A123	—
h1	304	3/4 -10 UNC [M20x2.5] Heavy Hex Nut	ASTM A563DH	ASTM A153 or B695 Class 55 or F2329	FNX20b
i1	376	3/4" [19] Dia. Hardened Flat Washer	ASTM F436	ASTM A153 or B695 Class 55 or F1136 Gr. 3 or F2329	FWC20b
i2	156	2 1/4"x2 1/4"x1/4" [57x57x6] Square Washer	ASTM A36	ASTM A123	—
i3	28	3/4"-10 UNC [M20x2.5], 12" [305] Long Threaded Rod	ASTM F1554 Gr. 36	ASTM A153 or B695 Class 55 or F2329	FRR20a



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OH-IL Steel Tube Bridge
Rail on Surrogate Slab
Test No. STBR-4

Bill of Materials

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REV.	DATE OF ISSUE	Page	NATURE OF CHANGES	REVIEWER	REVISED BY
0	4/1/2019	—	New Drawing created from STBR-1_R20.	—	DJW
1	4/2/2019	—	Renamed part i4 to g8. Corrected placement of part g8.	PM	DJW
		1	Added note 4.		
		3	Corrected Detail D. Added note 1.		
		20	Added note 3. Added part g8 to BOM.		
		24	Added missing dimension to part g8.		
2	4/8/2019	3	Added Detail view to replicate Sheet 6. Added section views to further detail out placement of part g8.	PM/JEK	DJW
3	4/9/2019	—	Added shear studs to Post 9 concrete connector plate.	PM	DJW
		3	Added note to Section D-D.		
		4	New sheet for post 9 anchor plate assembly.		
		21	Added Post 9 concrete connector plate assembly. Added sentence to Note 3.		
		23	Rearranged views. Added assembly note. Upated assembly qty.		
		24	Added shear stud details (part f5).		
4	4/12/2019	BOM	Added part f5.	PM	MKB
		4	Post 9 concrete connector plate assembly componenet layout edit. QTY: f5		
		24	Part f5 edit.		
5	4/24/2019	BOM	Description: f5. QTY: f5	PM	DJW
		4	Location change for studs (Part f5) on Post 9 connector plate assembly.		