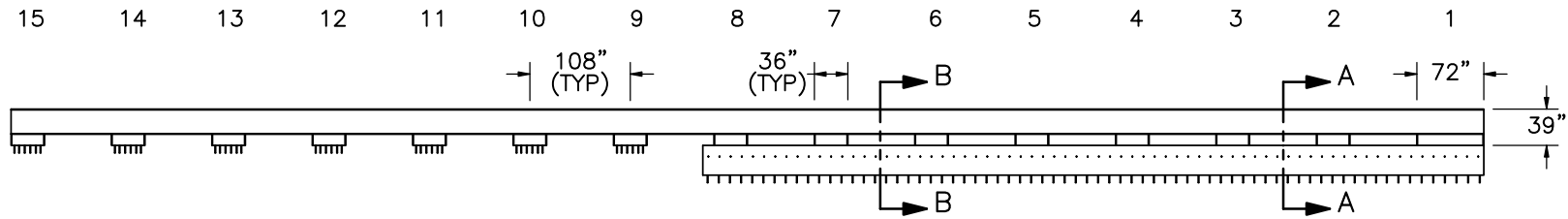


PLAN VIEW



ELEVATION VIEW

- Notes: (1) Test no. OCBR-1 shall be performed according to test designation no. 4-10 using MASH 2016 criteria.  
 (2) The impact location for test no. OCBR-1 is 43 3/16 in. upstream of the upstream edge of post 11.  
 (3) Test no. OCBR-2 shall be performed according to test designation no. 4-11 using MASH 2016 criteria.  
 (4) The impact location for test no. OCBR-2 is 51 5/8 in. upstream of the upstream edge of post 7.  
 (5) Test no. OCBR-3 shall be performed according to test designation no. 4-12 using MASH 2016 criteria.  
 (6) The impact location for test no. OCBR-3 is 18" upstream from the midspan between posts 3 and 4.  
 (7) System should be adjusted for west to east tarmac slope when constructed. Tarmac rail and bridge rail are to be aligned.



Midwest Roadside  
Safety Facility

Open Concrete Bridge  
Rail  
Test Nos. OCBR-1-3

Overall View

DWG. NAME.  
OCBR-1-3\_R18

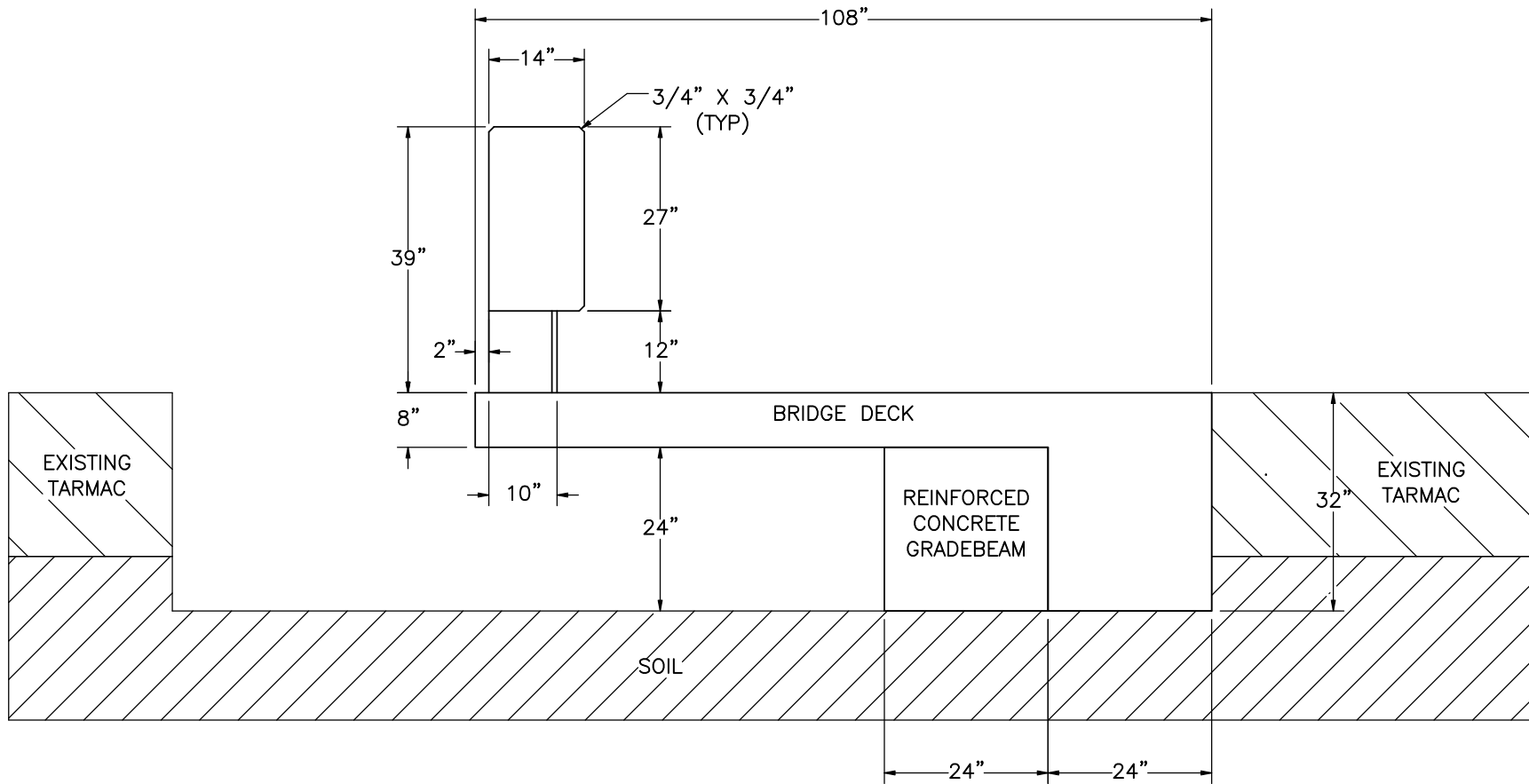
SCALE: 1:200  
UNITS: in.

SHEET:  
1 of 20

DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
JCH/RWB



SECTION A-A

Note: (1) Reinforcement not shown for clarity in section A-A.



Midwest Roadside  
Safety Facility

Open Concrete Bridge

Rail

Test Nos. OCBR-1-3

System Profile View

DWG. NAME:  
OCBR-1-3\_R18

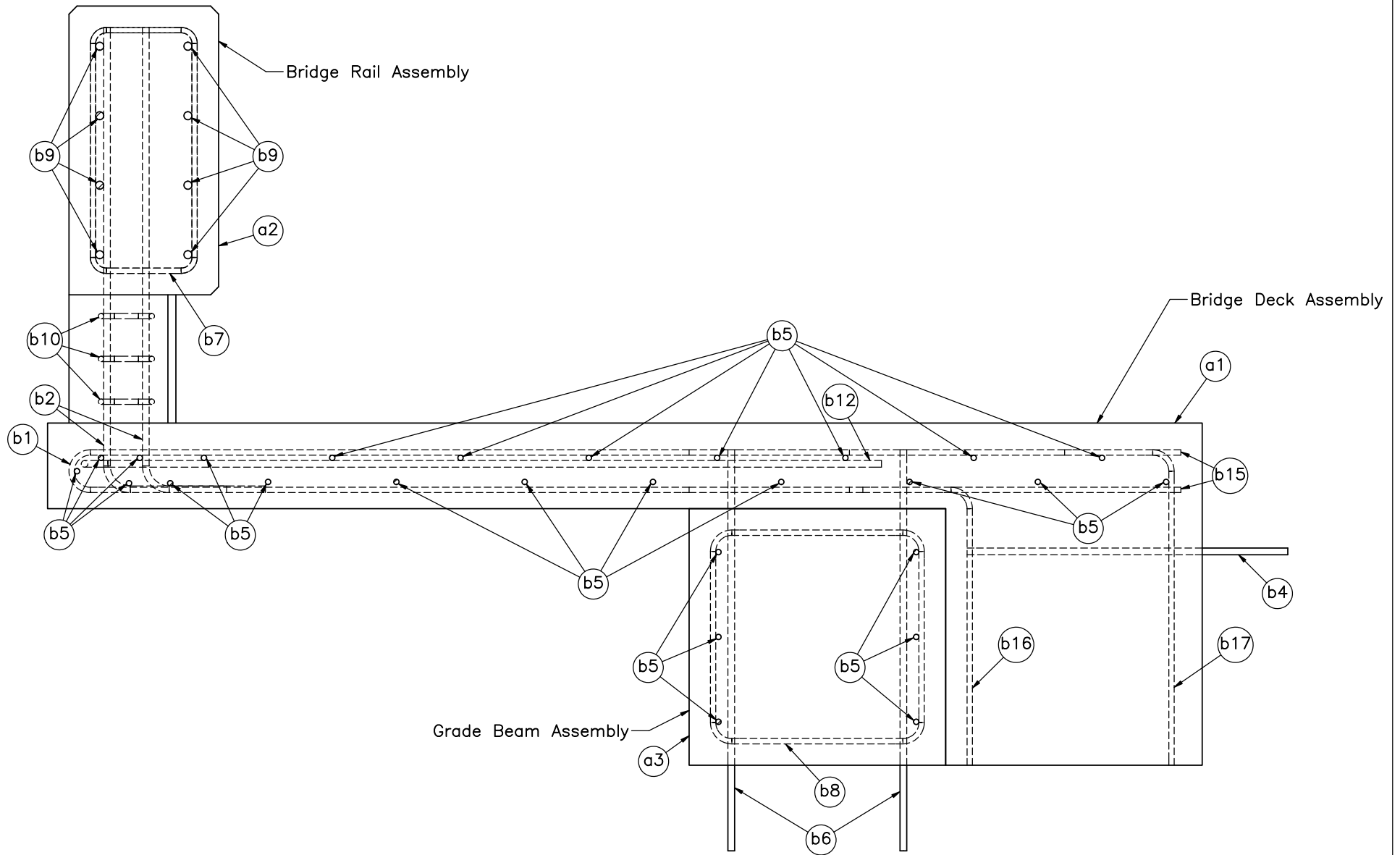
SCALE: 1:25  
UNITS: in.

SHEET:  
2 of 20

DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
/JCH/RWB



SECTION B-B

- Notes:
- (1) Reinforcement bar no. b6 is driven into soil.
  - (2) Reinforcement bar nos. b4 are anchored into the existing tarmac with chemical epoxy adhesive with a minimum bond strength of 1,450 psi.
  - (3) Bar nos. b2 will be cast in place with deck.
  - (4) Bar nos. b11 are used instead of bar nos. b10 in end section.
  - (5) Bar nos. b3 are used in place of bar nos. b12 in end section.
  - (6) Bar nos. b13 are added to end sections in between bar nos. 9.



Midwest Roadside  
Safety Facility

Open Concrete Bridge

Rail

Test Nos. OCBR-1-3

Concrete Rail, Deck, and Box  
Beam Assembly. Interior  
Section

DWG. NAME.

OCBR-1-3\_R18

SCALE: 1:13

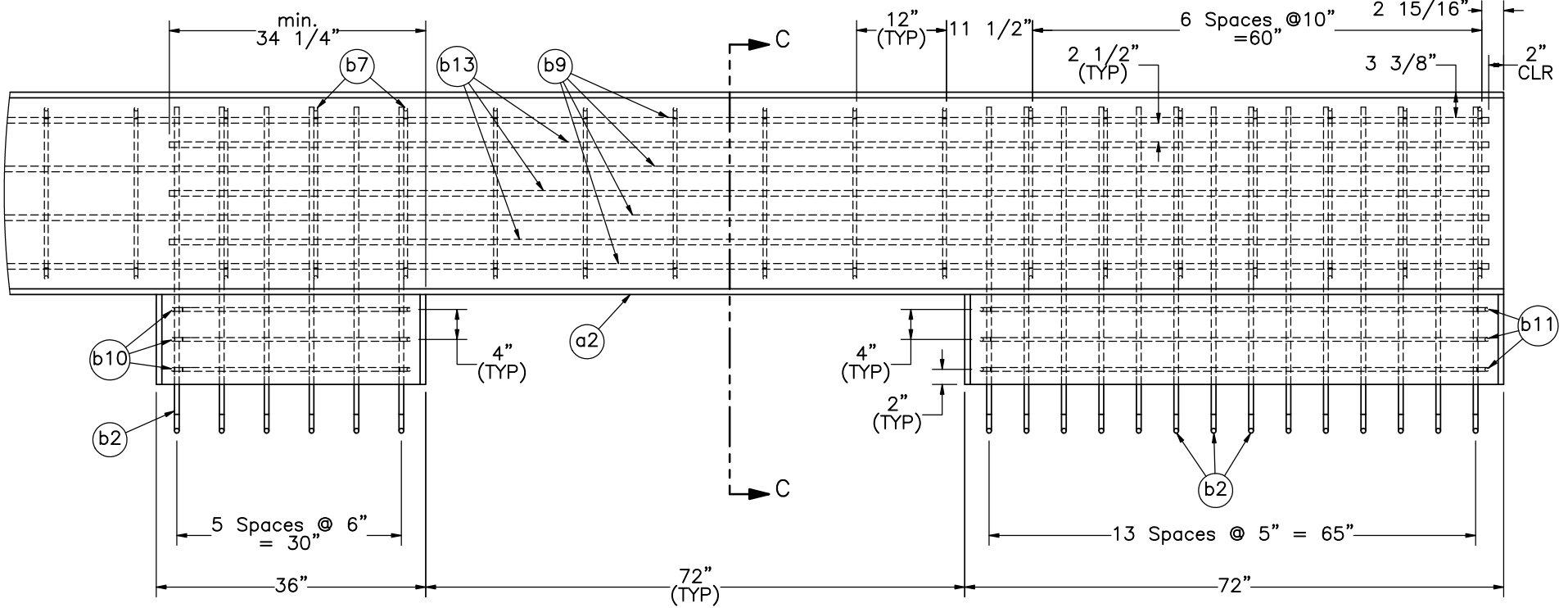
UNITS: in.

SHEET:  
3 of 20

DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
/JCH/RWB



ELEVATION VIEW  
(Cropped view upstream of Post 2)

Item No.	QTY.	Description	Material Specification	Treatment Specification
-	1	Modified Bridge Rail Assembly	-	-
a2	-	Bridge Rail Concrete	Min. f'c = 4,000 psi	-
b2	112	#5 Rebar, 53 7/16" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b7	133	#4 Bent Rebar, 73 7/8" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b9	8	#6 Rebar, 1580" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b10	42	#4 Bent Rebar, 82 3/8" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b11	3	#4 Bent Rebar, 154 3/8" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b13	6	#6 Rebar, 176 1/4" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b14	84	#5 Rebar, 45" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)

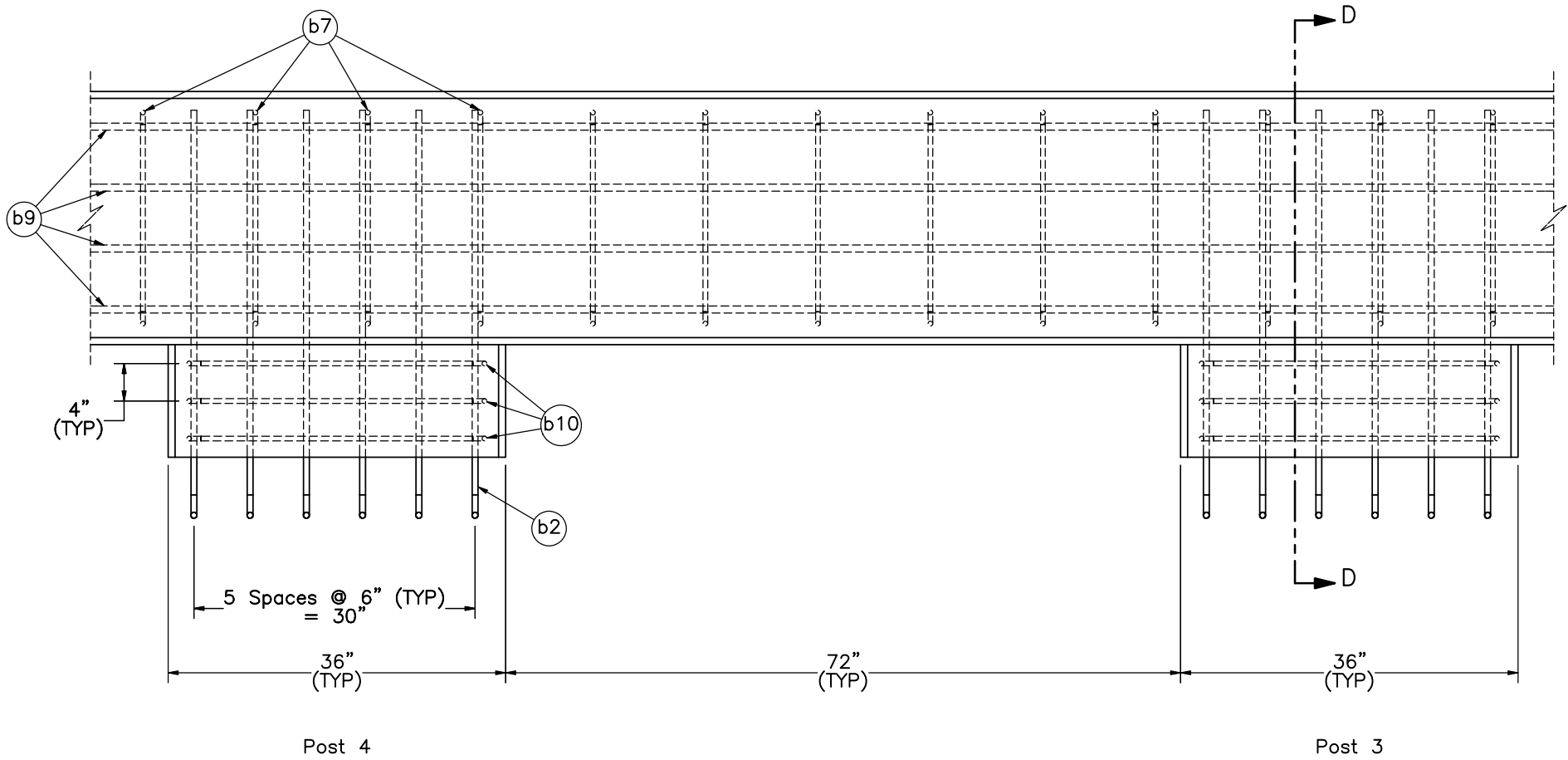
- Notes: (1) Reinforcement bar nos. b7 have lateral spacings of 12", except at end sections, as detailed above throughout the entire bridge rail.  
 (2) Reinforcement bar nos. b2 have lateral spacings of 6" as detailed above in all interior post sections throughout the bridge deck.  
 (3) Bar nos. b2 will be cast in place with deck.  
 (4) Bar nos. b2 are shown in both the bridge rail assembly and ht ebridge deck assembly.



Open Concrete Bridge  
Rail  
Test Nos. OCBR-1-3  
Modified Bridge Rail Assembly:  
Post Nos. 1-2

SHEET: 4 of 20
DATE: 8/20/2021
DRAWN BY: MJM/LJP/S BW/GHR
REV. BY: JD/JEK/SK R/JDR/KAL /JCH/RWB

DWG. NAME:  
OCBR-1-3\_R18  
SCALE: 1:21  
UNITS: in.



ELEVATION VIEW



Midwest Roadside  
Safety Facility

Open Concrete Bridge

Rail

Test Nos. OCBR-1-3

Typical Interior Post Details

DWG. NAME:  
OCBR-1-3\_R18

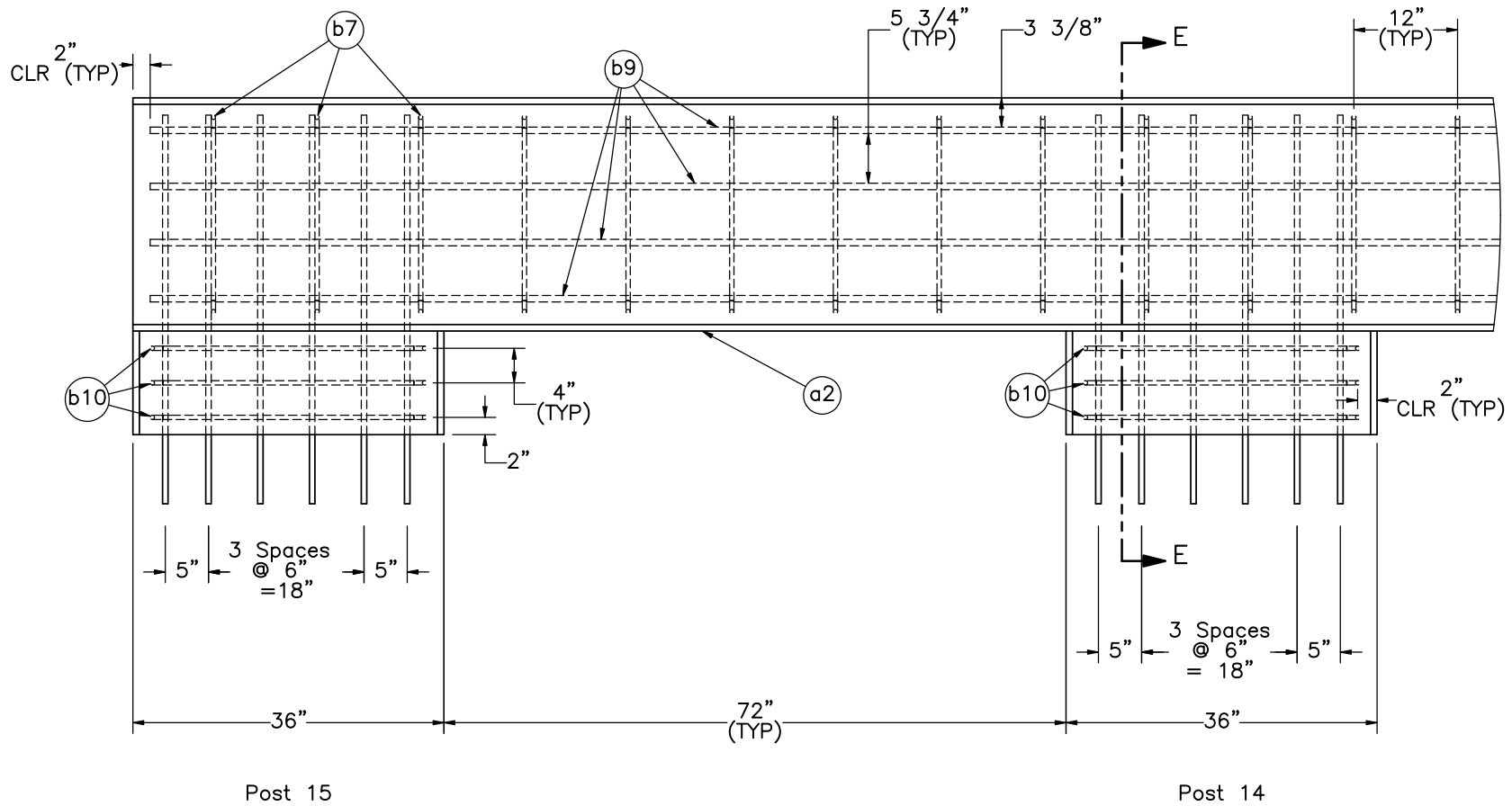
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UNITS: in.

SHEET:  
5 of 20

DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
/JCH/RWB



ELEVATION VIEW  
(Cropped view downstream of Post 14)

- Notes: (1) Reinforcement bar nos. b14 have lateral spacings of 6" as detailed above in all interior post sections on the tarmac.  
(2) Bar nos. b14 shall be epoxied 8" into the tarmac.



Midwest Roadside  
Safety Facility

Open Concrete Bridge  
Rail  
Test Nos. OCBR-1-3

Interior Post and Downstream  
End Section Assembly

DWG. NAME:  
OCBR-1-3\_R18

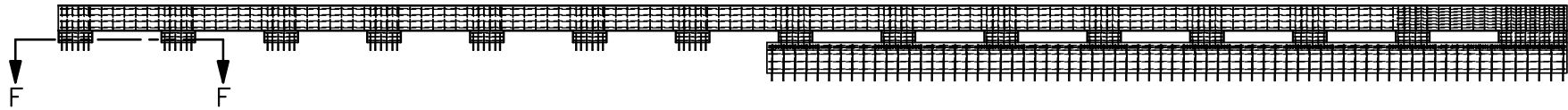
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UNITS: in.

SHEET:  
6 of 20

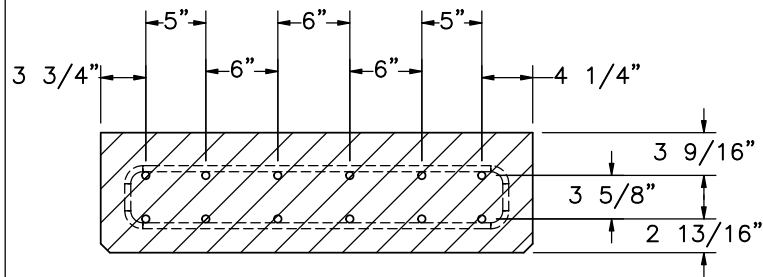
DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

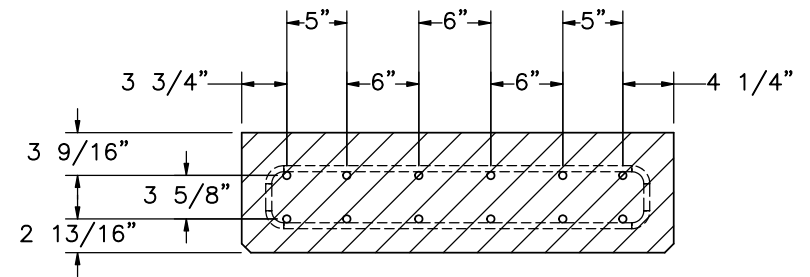
REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
JCH/RWB



ELEVATION VIEW




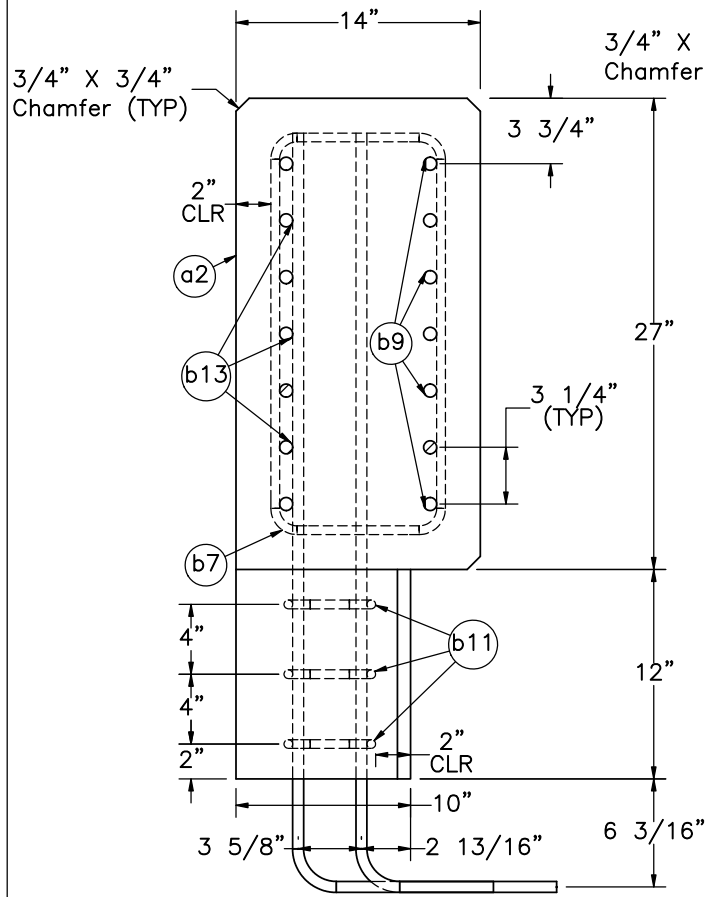
Post No. 15



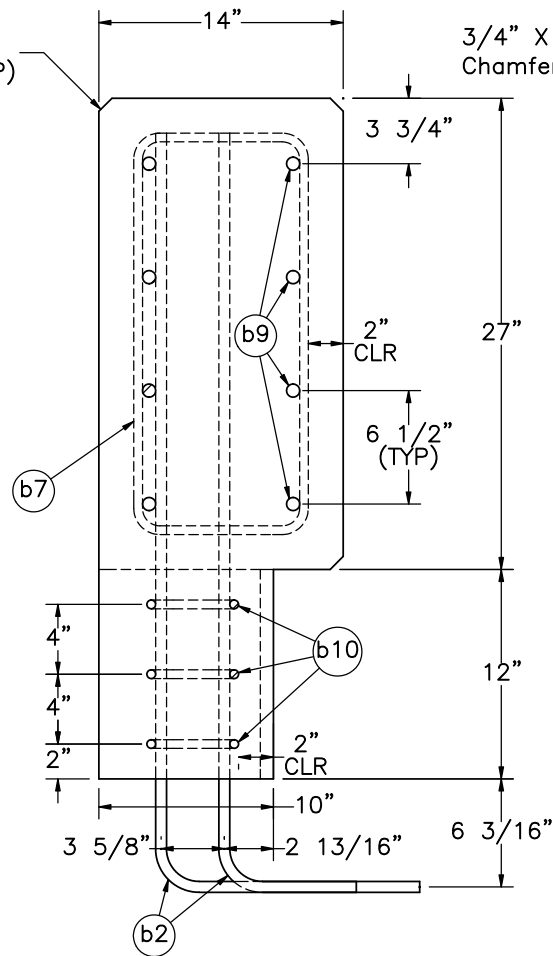
Post No. 14

SECTION F-F  
SCALE 1 : 16

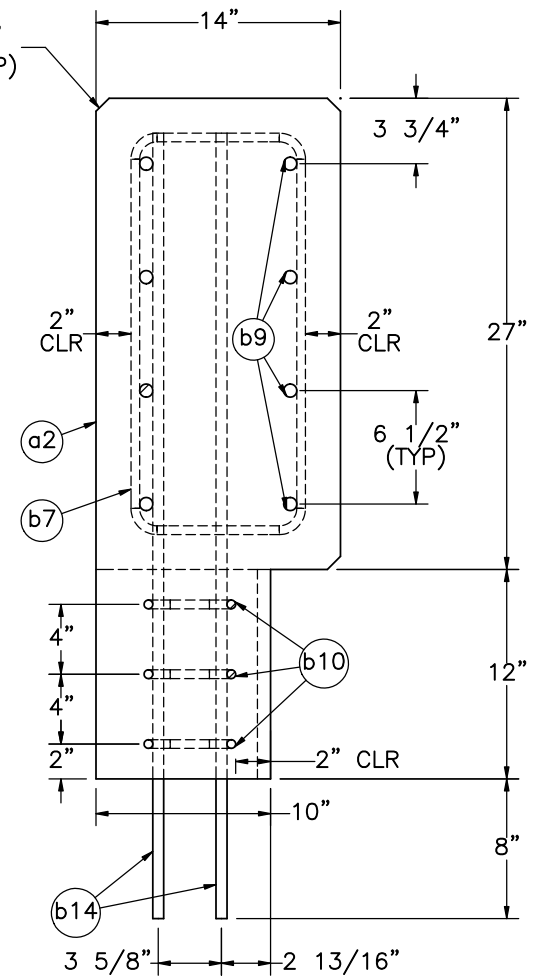
 <b>Midwest Roadside Safety Facility</b>	Open Concrete Bridge Rail Test Nos. OCBR-1-3	SHEET: 7 of 20
	Downstream Barrier Rebar	DATE: 8/20/2021
DWG. NAME: OCBR-1-3_R18	SCALE: 1:180 UNITS: in.	DRAWN BY: MJM/LJP/S BW/GHR
		REV. BY: JD/JEK/SK R/JDR/KAL JCH/RWB



SECTION C-C



SECTION D-D



SECTION E-E

- Notes: (1) Reinforcement bar no. b14 is to be anchored into the existing tarmac with chemical epoxy adhesive with a min. bond strength of 1,450 psi.  
 (2) The epoxy anchoring of bar no. b14 into the tarmac and rebar spacing is for testing purposes only and does not reflect the recommended barrier installation.  
 (3) Bar nos. b2 will be cast in place with deck.



Midwest Roadside Safety Facility

Open Concrete Bridge Rail  
 Test Nos. OCBR-1-3  
 Bridge Rail Assembly

DWG. NAME:  
 OCBR-1-3\_R18

SCALE: 1:11  
 UNITS: in.

SHEET:  
 8 of 20

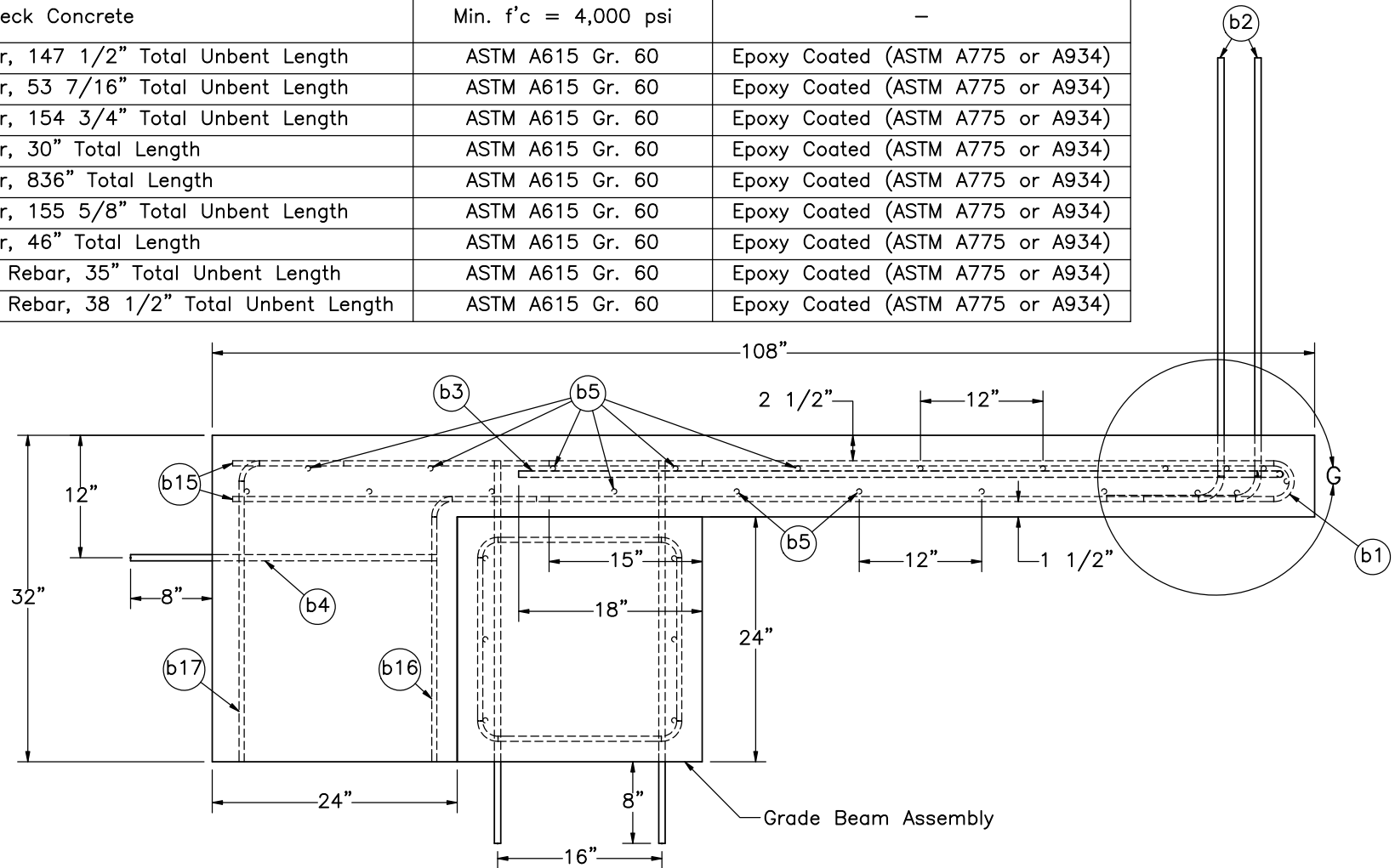
DATE:  
 8/20/2021

DRAWN BY:  
 MJM/LJP/S  
 BW/GHR

REV. BY:  
 JD/JEK/SK  
 R/JDR/KAL  
 /JCH/RWB



Item No.	QTY.	Description	Material Specification	Treatment Specification
-	1	Concrete Bridge Deck Assembly	-	-
a1	-	Bridge Deck Concrete	Min. f'c = 4,000 psi	-
b1	189	#4 Rebar, 147 1/2" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b2	112	#5 Rebar, 53 7/16" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b3	7	#5 Rebar, 154 3/4" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b4	70	#5 Rebar, 30" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b5	27	#4 Rebar, 836" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b12	21	#5 Rebar, 155 5/8" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b15	140	#4 Rebar, 46" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b16	70	#4 Bent Rebar, 35" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b17	70	#4 Bent Rebar, 38 1/2" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)



- Notes:
- (1) Reinforcement bar nos. b4 are anchored into the existing tarmac with chemical epoxy adhesive with a minimum bond strength of 1,450 psi.
  - (2) Bar nos. b12 should extend a minimum of 18" past the edge of the grade beam.
  - (3) Bar nos. b1 should extend a minimum of 15" past the edge of the grade beam.
  - (4) Bar nos. b2 may be slightly angled to prevent interference with each other in the deck. Rotation angles are to be about the vertical axis of the bars. The upper portion of the bars should not be offset. Only the lower horizontal hooks of the bar nos. b2 should be moved/angled.
  - (5) Bar nos. b12 are not shown in this view as they are behind bar nos. b3.
  - (6) Bar nos. b2 are shown in both the bridge rail assembly and the bridge deck assembly.



Midwest Roadside  
Safety Facility

Open Concrete Bridge

Rail

Test Nos. OCBR-1-3

Bridge Deck Assembly

DWG. NAME.  
OCBR-1-3\_R18

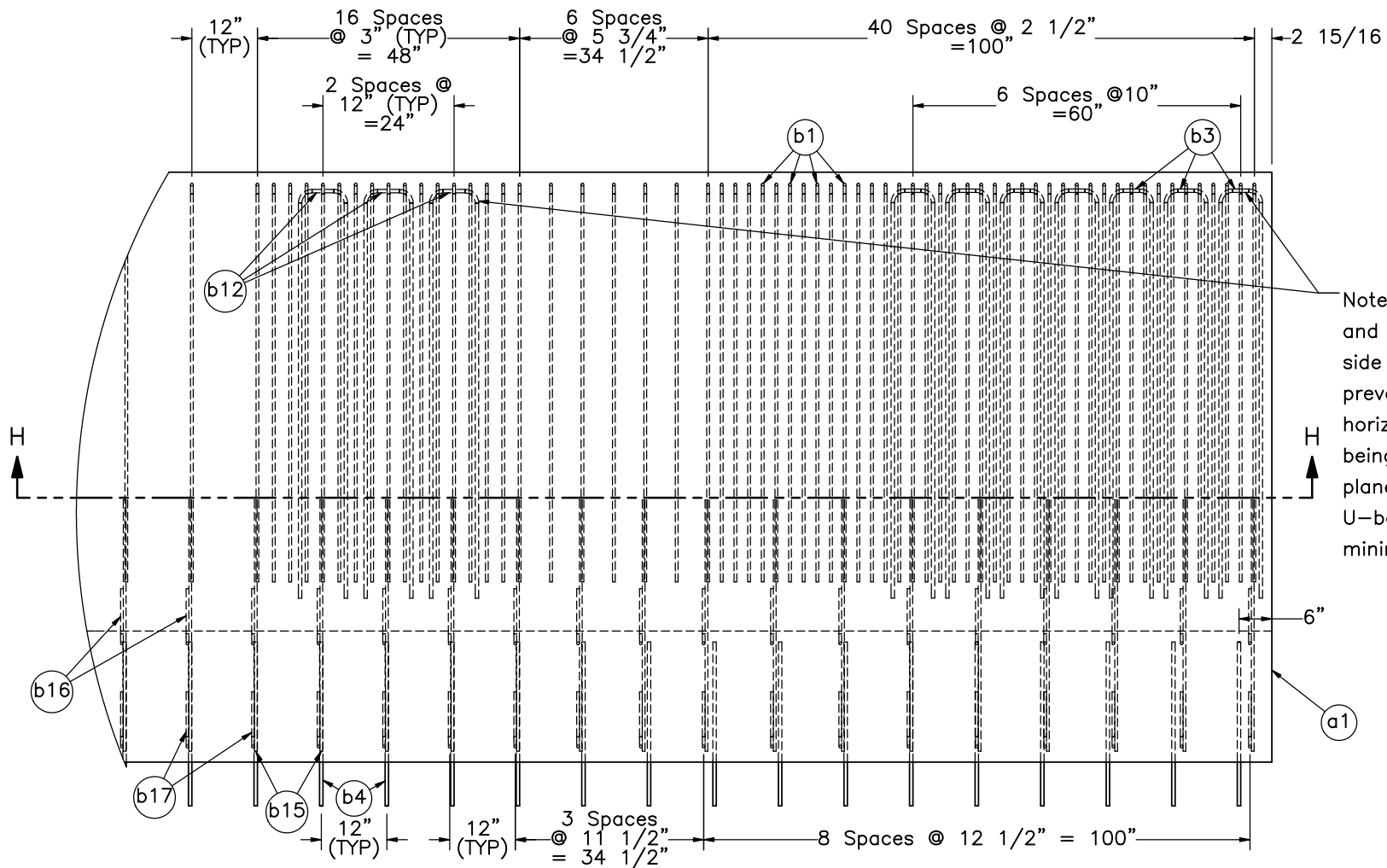
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UNITS: in.

SHEET:  
9 of 20

DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
/JCH/RWB



PLAN VIEW  
(Cropped view of upstream end)

- Notes:
- (1) Longitudinal rebar, part b5, hidden for clarity.
  - (2) Reinforcement bar nos. b1 have lateral spacings of 3" and 12" as detailed above throughout the entire deck.
  - (3) Reinforcement bar nos. b12 have a lateral spacing of 12" in all interior post sections throughout the entire deck.
  - (4) Reinforcement bars nos. b4, b6, b8, b15, b16, and b17 have lateral spacings of 12" as detailed above throughout the entire interior section of the deck.
  - (5) Bar nos. b2 are not shown on this sheet.



Midwest Roadside  
Safety Facility

Open Concrete Bridge  
Rail  
Test Nos. OCBR-1-3  
Bridge Deck Assembly: US End  
Section & First Interior Post  
Section

DWG. NAME:  
OCBR-1-3\_R18

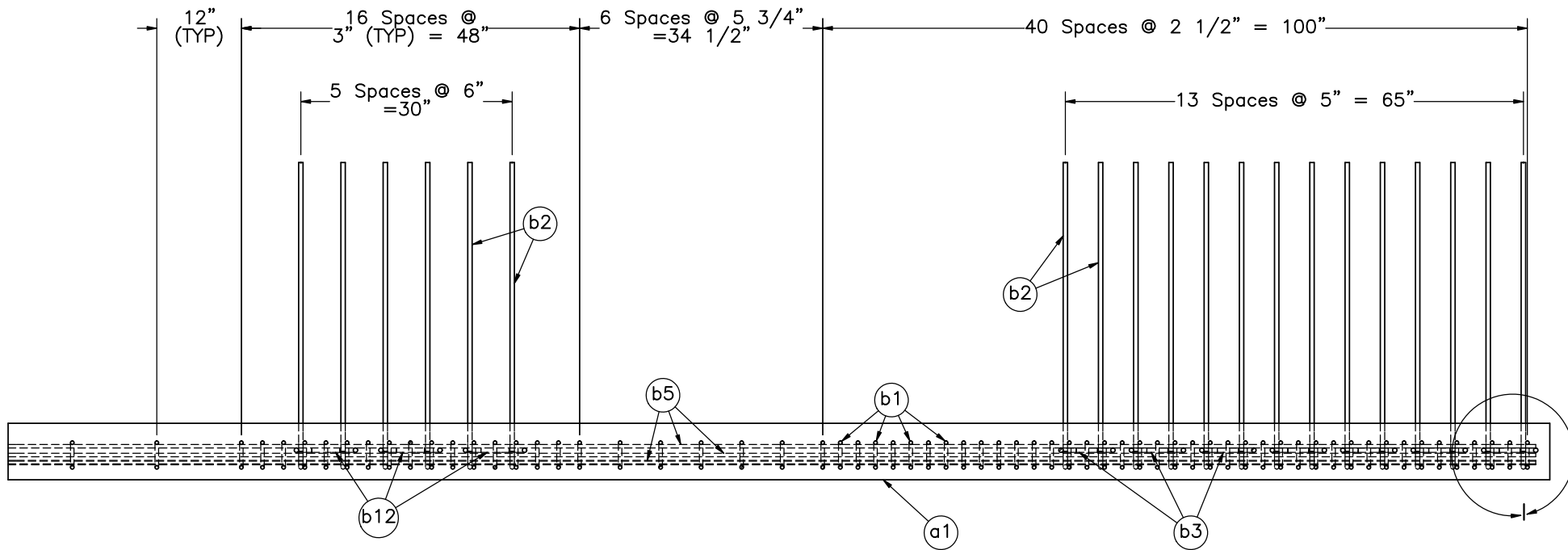
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SHEET:  
10 of 20

DATE:  
8/20/2021


DRAWN BY:  
MJM/LJP/S  
BW/GHR

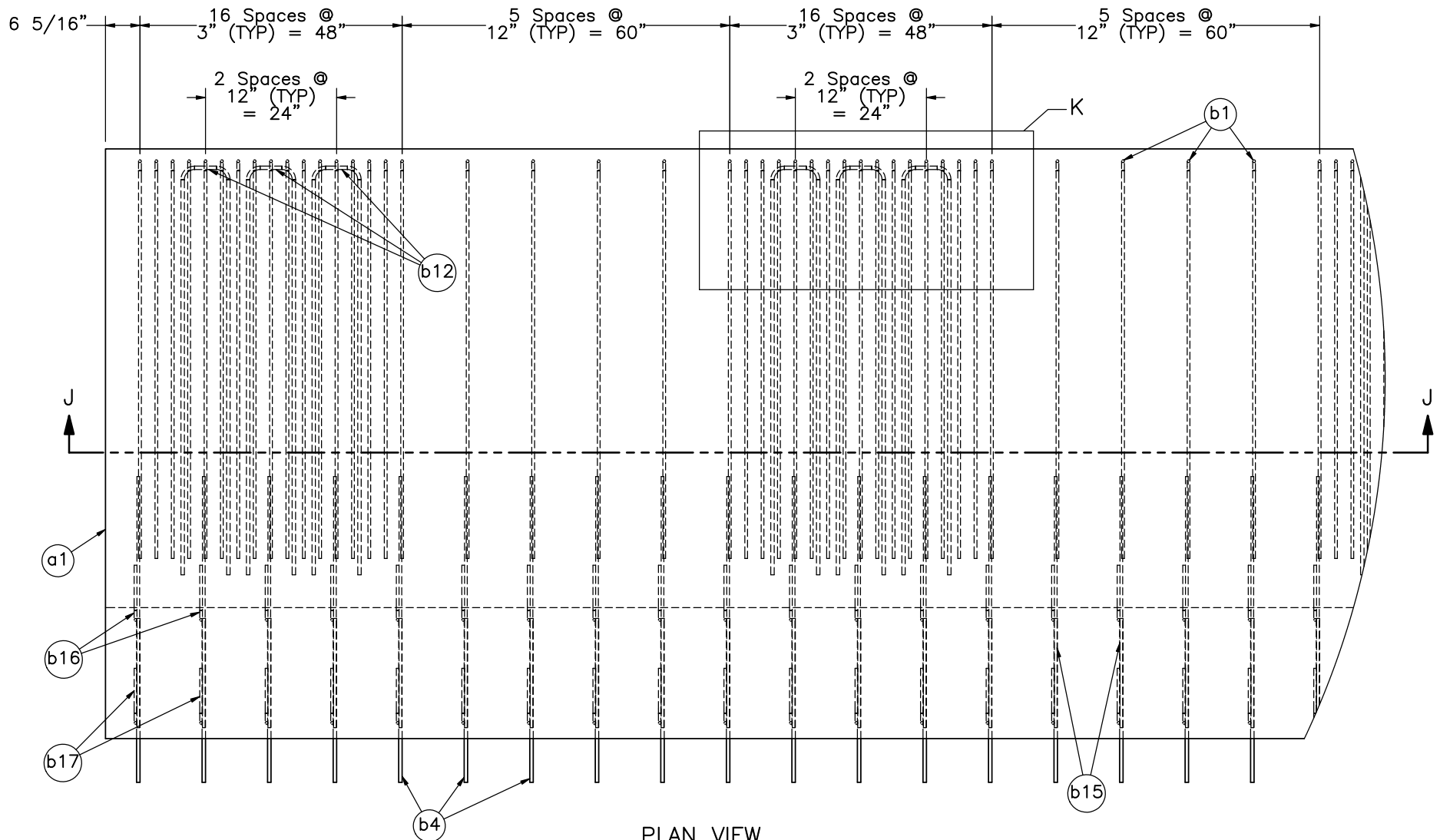
REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
JCH/RWB



SECTION H-H

Note: (1) Bar nos. b2 may be slightly angled to prevent interference with each other in the deck. Rotation angles are to be about the vertical axis of the bars. The upper portion of the bars should not be offset. Only the lower horizontal hooks of the bar nos. b2 should be moved/angled.

 <b>Midwest Roadside Safety Facility</b>	<b>Open Concrete Bridge Rail</b> Test Nos. OCBR-1-3	SHEET: 11 of 20
	Bridge Deck Assembly Details	DATE: 8/20/2021
DWG. NAME: OCBR-1-3_R18	SCALE: 1:22 UNITS: in.	DRAWN BY: MJM/LJP/S BW/GHR
		REV. BY: JD/JEK/SK R/JDR/KAL /JCH/RWB



PLAN VIEW  
(Cropped view of downstream end)

- Notes:
- (1) Longitudinal rebar, part b5, hidden for clarity.
  - (2) Reinforcement bar nos. b1 have lateral spacings of 3" at post locations and 12" otherwise, as detailed above throughout the entire deck.
  - (3) Reinforcement bar nos. b12 have a lateral spacing of 12" in all interior post sections throughout the entire deck.
  - (4) Reinforcement bars nos. b4, b6, b8, b15, b16, and b17 have lateral spacings of 12" as detailed above throughout the entire interior section of the deck.
  - (5) Bar nos. b2 are not shown on this sheet.



Midwest Roadside  
Safety Facility

Open Concrete Bridge  
Rail  
Test Nos. OCBR-1-3  
Bridge Deck Assembly: DS  
Section, Typical Interior Post  
Section on Deck

DWG. NAME:  
OCBR-1-3\_R18

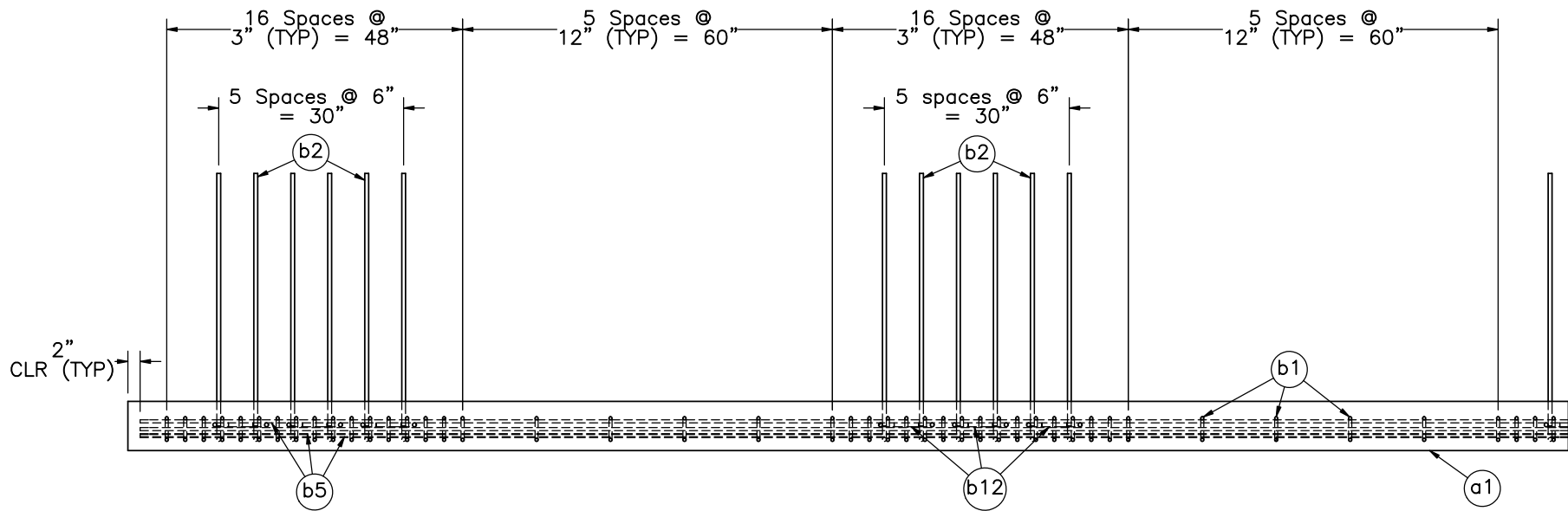
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UNITS: in.

SHEET:  
12 of 20

DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
JCH/RWB



SECTION J-J

Note: (1) Bar nos. b2 may be slightly angled to prevent interference with each other in the deck. Rotation angles are to be about the vertical axis of the bars. The upper portion of the bars should not be offset. Only the lower horizontal hooks of the bar nos. b2 should be moved/angled.



Midwest Roadside Safety Facility

Open Concrete Bridge

Rail

Test Nos. OCBR-1-3

Bridge Deck Assembly Details

DWG. NAME.  
OCBR-1-3\_R18

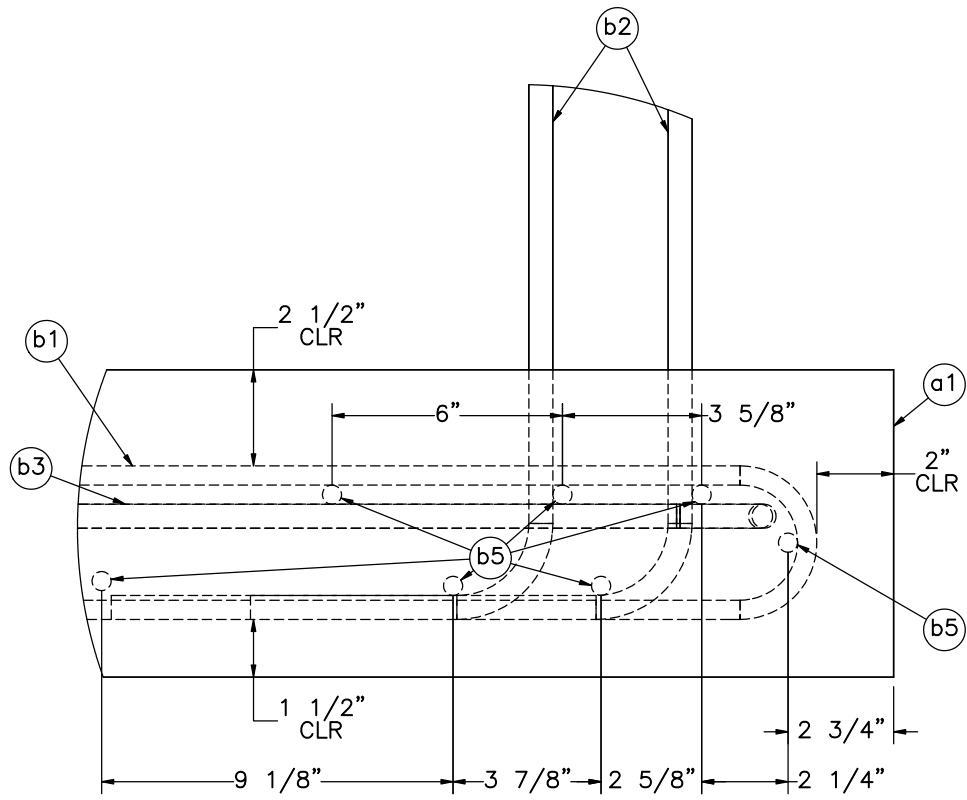
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SHEET:  
13 of 20

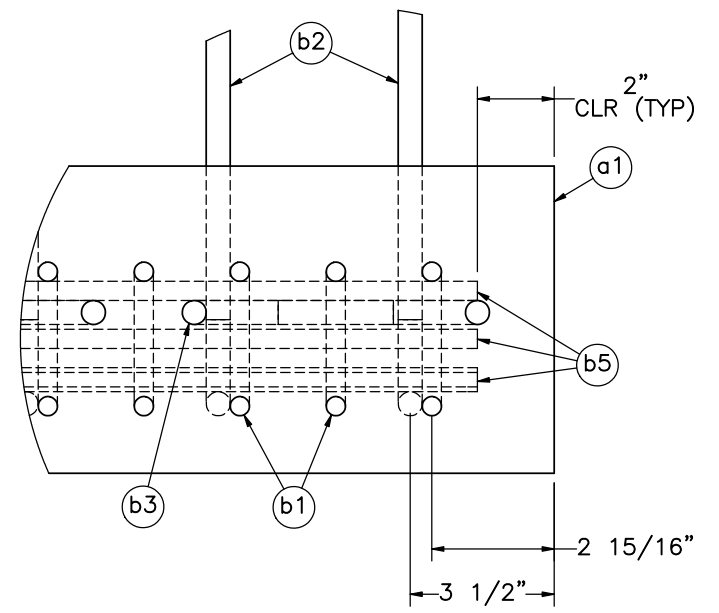
DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
/JCH/RWB




DETAIL G

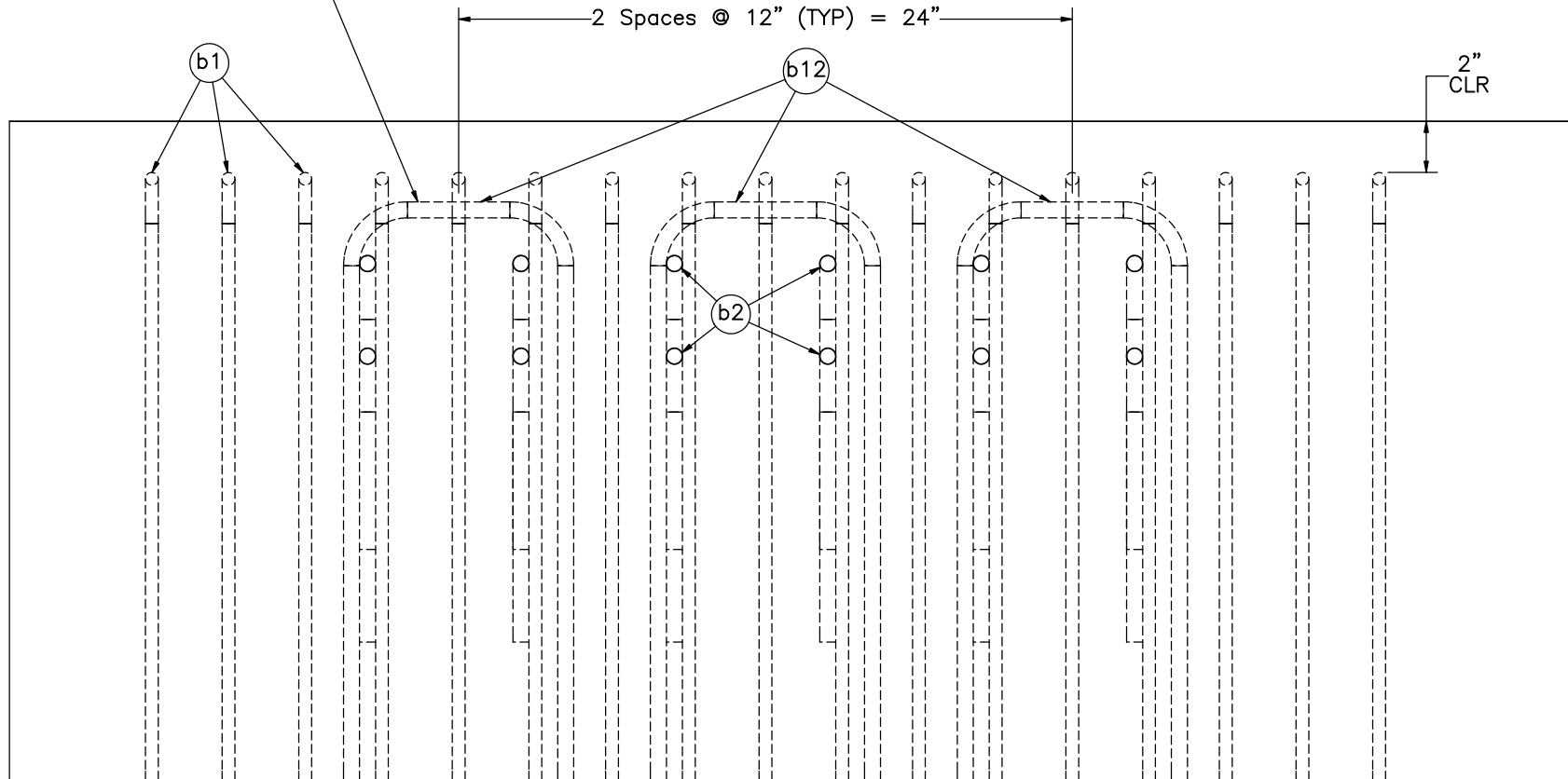


DETAIL I

Note: (1) Bar nos. b2 may be slightly angled to prevent interference with each other in the deck. Rotation angles are to be about the vertical axis of the bars. The upper portion of the bars should not be offset. Only the lower horizontal hooks of the bar nos. b2 should be moved/angled.

 <b>Midwest Roadside Safety Facility</b>	Open Concrete Bridge Rail Test Nos. OCBR-1-3	SHEET: 14 of 20  DATE: 8/20/2021  DRAWN BY: MJM/LJP/S BW/GHR
	DWG. NAME: OCBR-1-3_R18	SCALE: 1:5 UNITS: in.

Note: Horizontal U-bars b3 and b12 are shifted to one side of the vertical steel to prevent the legs of the horizontal U-bars from being in the same vertical plane as the vertical U-bars and violate minimum bar spacing.



DETAIL K

Note: (1) Bar nos. b2 may be slightly angled to prevent interference with each other in the deck. Rotation angles are to be about the vertical axis of the bars. The upper portion of the bars should not be offset. Only the lower horizontal hooks of the bar nos. b2 should be moved/angled.



Midwest Roadside  
Safety Facility

Open Concrete Bridge

Rail

Test Nos. OCBR-1-3

Bridge Deck Detail

DWG. NAME.

OCBR-1-3\_R18

SCALE: 1:7

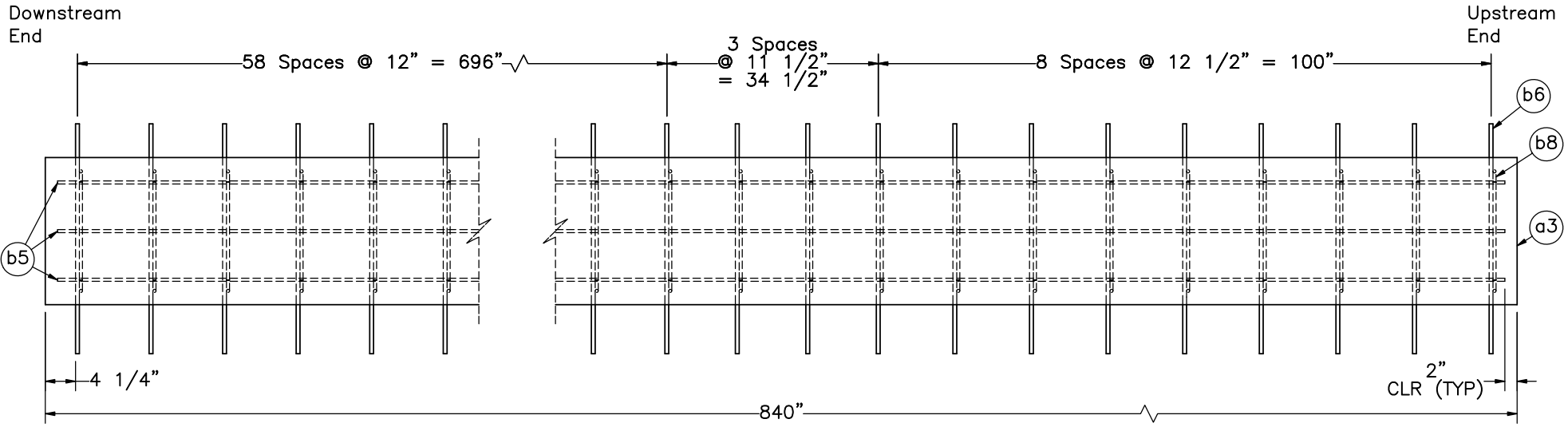
UNITS: in.

SHEET:  
15 of 20

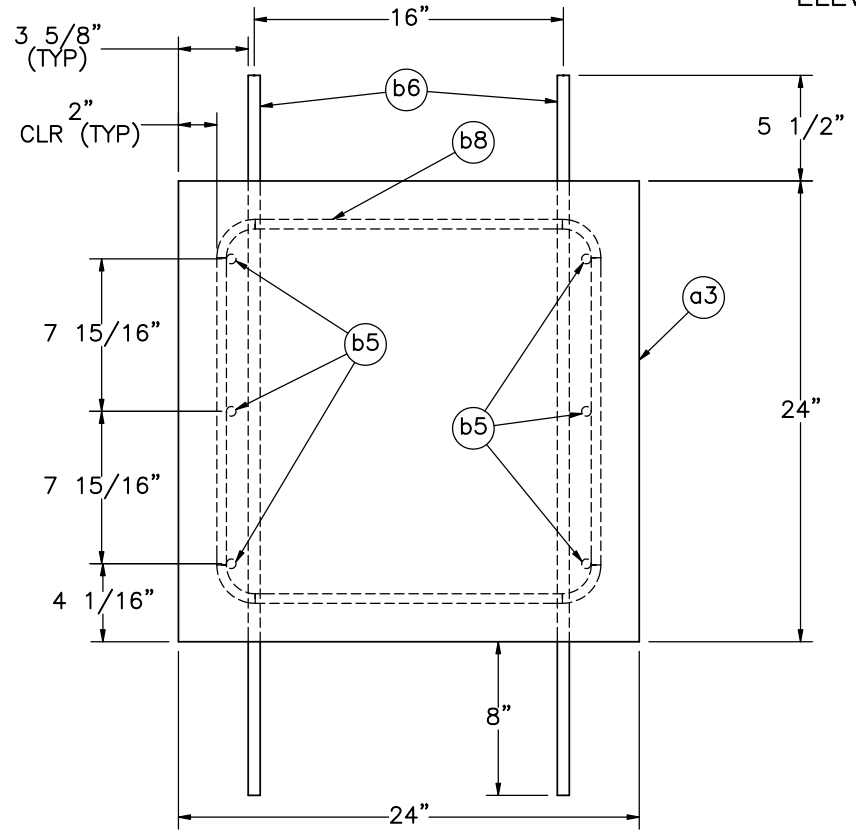
DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
JCH/RWB



ELEVATION VIEW



PROFILE VIEW  
SCALE 1:10

Item No.	QTY.	Description	Material Specification	Treatment Specification
-	1	Concrete Grade Beam Assembly	-	-
a3	-	Grade Beam Concrete	Min. f'c = 4,000 psi	-
b5	6	#4 Rebar, 836" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b6	140	#5 Rebar, 37 1/2" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b8	70	#4 Bent Rebar, 87" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)



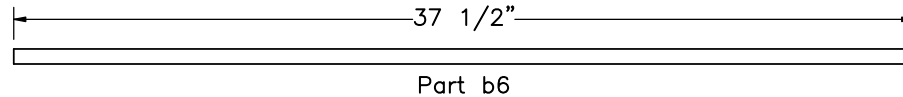
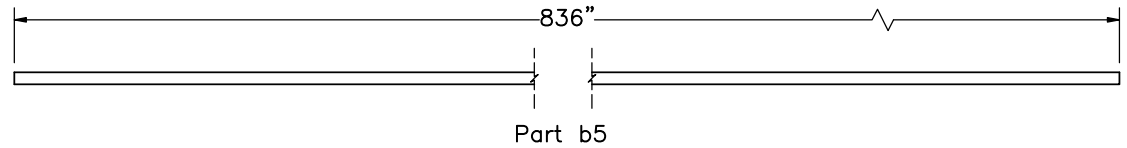
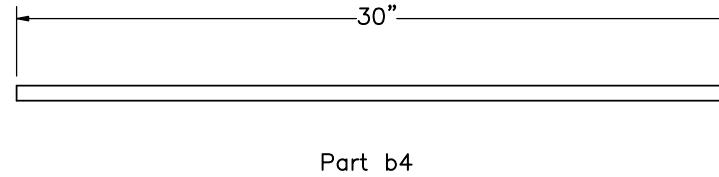
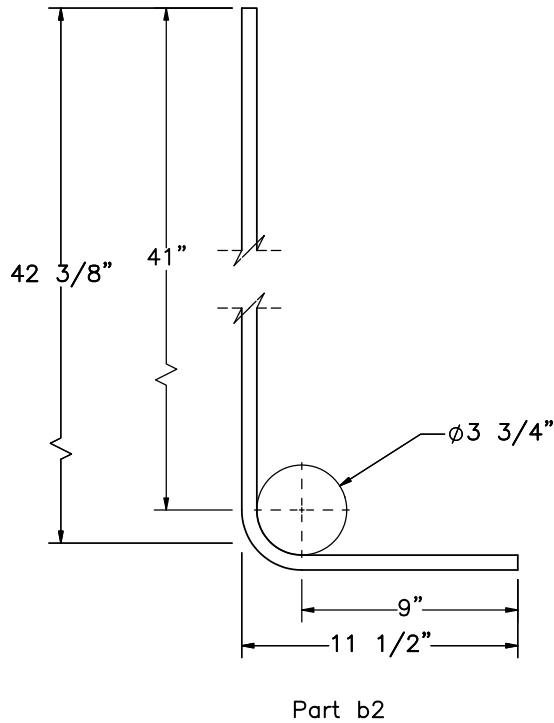
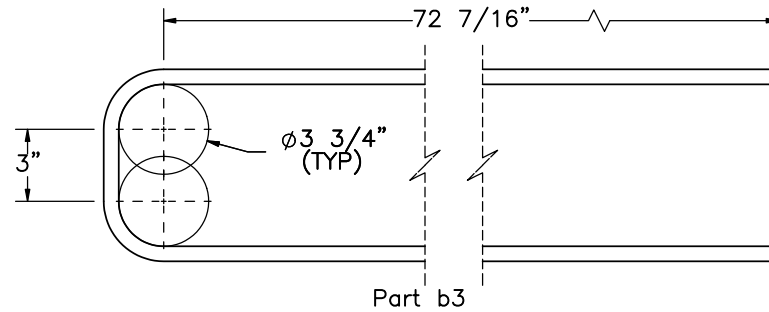
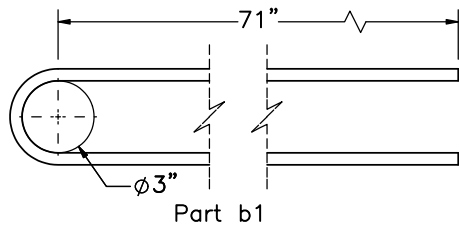
Midwest Roadside Safety Facility

Open Concrete Bridge Rail  
Test Nos. OCBR-1-3  
Concrete Grade Beam Assembly

DWG. NAME: OCBR-1-3\_R18  
SCALE: 1:25  
UNITS: in.

SHEET: 16 of 20  
DATE: 8/20/2021  
DRAWN BY: MJM/LJP/SBW/GHR  
REV. BY: JD/JEK/SKR/JDR/KAL/JCH/RWB





Bill of Bars

Bar	QTY.	Size	Total Length	Min. Lap Length	Material
b1	189	#4	147 1/2"	Epoxy Coated (ASTM A775 or A934)	ASTM A615 Gr. 60
b2	112	#5	53 7/16"	-	ASTM A615 Gr. 60
b3	7	#5	154 3/4"	Epoxy Coated (ASTM A775 or A934)	ASTM A615 Gr. 60
b4	70	#5	30"	-	ASTM A615 Gr. 60
b5	27	#4	836"	19"	ASTM A615 Gr. 60
b6	140	#5	37 1/2"	-	ASTM A615 Gr. 60



Midwest Roadside Safety Facility

Open Concrete Bridge Rail  
Test Nos. OCBR-1-3  
System Rebar

DWG. NAME:  
OCBR-1-3\_R18

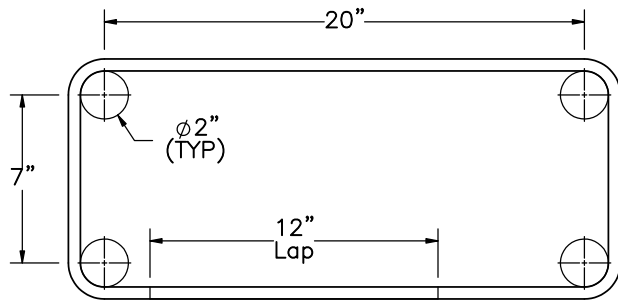
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SHEET:  
17 of 20

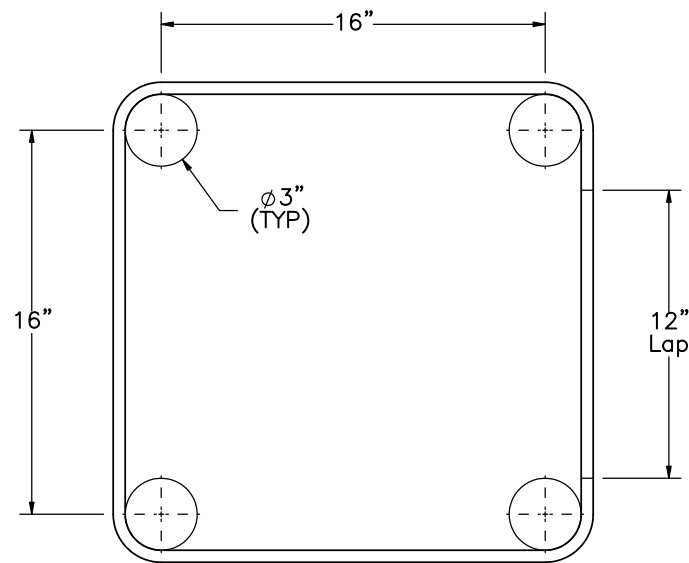
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8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

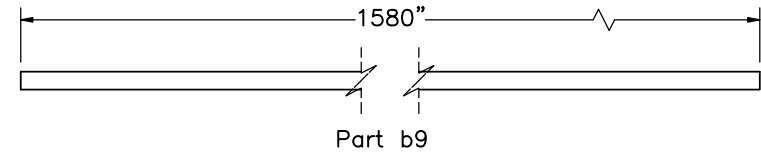
REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
/JCH/RWB



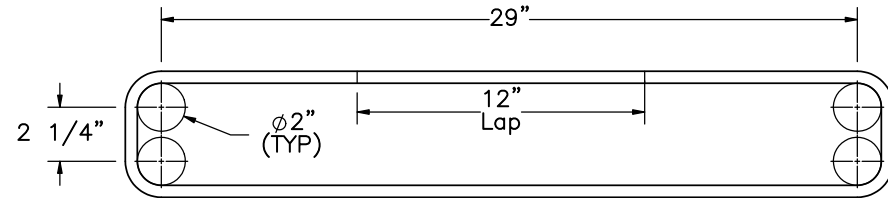
Part b7



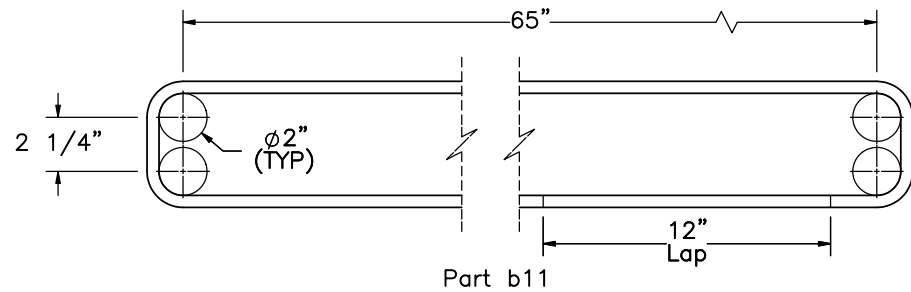
Part b8



Part b9



Part b10



Part b11

Bill of Bars

Bar	QTY.	Size	Total Length	Min. Lap Length	Material
b7	133	#4	73 7/8"	-	ASTM A615 Gr. 60
b8	70	#4	87	-	ASTM A615 Gr. 60
b9	8	#6	1580"	29"	ASTM A615 Gr. 60
b10	42	#4	82 3/8"	-	ASTM A615 Gr. 60
b11	3	#4	154 3/8"	-	ASTM A615 Gr. 60



Midwest Roadside Safety Facility

Open Concrete Bridge

Rail

Test Nos. OCBR-1-3

System Rebar

DWG. NAME:  
OCBR-1-3\_R18

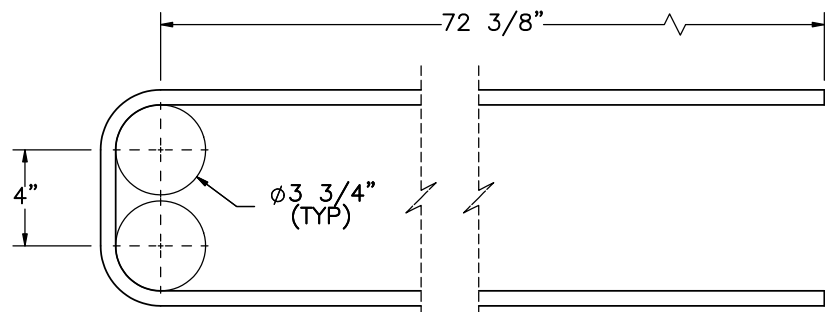
SCALE: 1:8  
UNITS: in.

SHEET:  
18 of 20

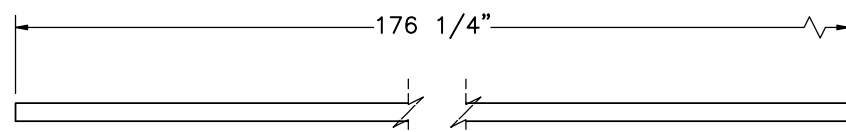
DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

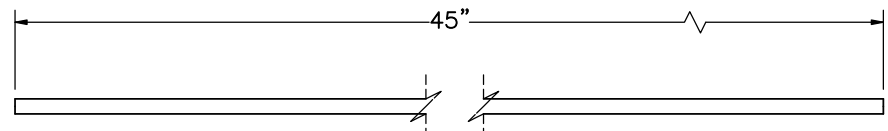
REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
JCH/RWB



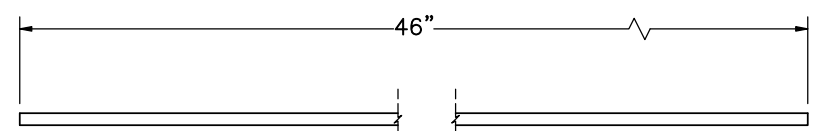
Part b12



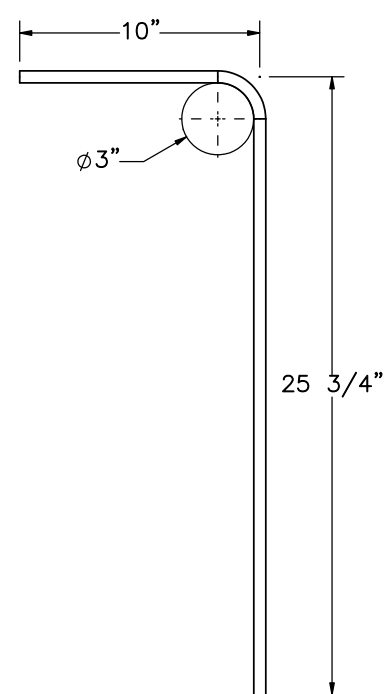
Part b13



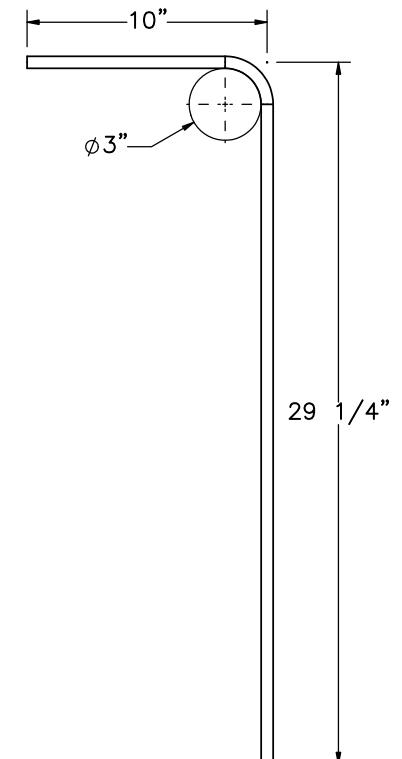
Part b14



Part b15



Part b16



Part b17

Bill of Bars

Bar	QTY.	Size	Total Length	Min. Lap Length	Material
b12	21	#5	155 5/8"	—	ASTM A615 Gr. 60
b13	6	#6	176 1/4"	29"	ASTM A615 Gr. 60
b14	84	#5	45"	—	ASTM A615 Gr. 60
b15	140	#4	46"	—	ASTM A615 Gr. 60
b16	70	#4	35"	—	ASTM A615 Gr. 60
b17	70	#4	38 1/2"	—	ASTM A615 Gr. 60



Midwest Roadside Safety Facility

Open Concrete Bridge Rail  
Test Nos. OCBR-1-3

Rebar View

DWG. NAME:  
OCBR-1-3\_R18

SCALE: 1:8  
UNITS: in.

SHEET:  
19 of 20

DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
BD/DEK/SK  
P/OBR/RWB  
/JCH/RWB

Item No.	QTY.	Description	Material Specification	Treatment Specification
a1	1	Bridge Deck Concrete*	Min. f'c = 4,000 psi	—
a2	1	Bridge Rail Concrete*	Min. f'c = 4,000 psi	—
a3	1	Grade Beam Concrete*	Min. f'c = 4,000 psi	—
b1	189	#4 Rebar, 147 1/2" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b2	112	#5 Rebar, 53 7/16" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b3	7	#5 Rebar, 154 3/4" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b4	70	#5 Rebar, 30" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b5	27	#4 Rebar, 836" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b6	140	#5 Rebar, 37 1/2" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b7	133	#4 Bent Rebar, 73 7/8" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b8	70	#4 Bent Rebar, 87" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b9	8	#6 Rebar, 1580" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b10	42	#4 Bent Rebar, 82 3/8" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b11	3	#4 Bent Rebar, 154 3/8" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b12	21	#5 Rebar, 155 5/8" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b13	6	#6 Rebar, 176 1/4" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b14	84	#5 Rebar, 45" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b15	140	#4 Rebar, 46" Total Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b16	70	#4 Bent Rebar, 35" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)
b17	70	#4 Bent Rebar, 38 1/2" Total Unbent Length	ASTM A615 Gr. 60	Epoxy Coated (ASTM A775 or A934)

\* NE Mix 47B1S/1PF4000HW was used for testing purposes.



Midwest Roadside  
Safety Facility

Open Concrete Bridge  
Rail  
Test Nos. OCBR-1-3

Bill of Materials

DWG. NAME.  
OCBR-1-3\_R18

SCALE: None  
UNITS: in.

SHEET:  
20 of 20

DATE:  
8/20/2021

DRAWN BY:  
MJM/LJP/S  
BW/GHR

REV. BY:  
JD/JEK/SK  
R/JDR/KAL  
/JCH/RWB

REV.	DATE OF ISSUE	Page	NATURE OF CHANGES	REVIEWER	REVISED BY
0	2/11/2020	–	Original drawing created	–	MJM
1	2/18/2020	–	Changed assembly to match new given dimensions. Part b7 has lateral spacings of 10” in the end post section. Part b1 has lateral spacings of 5 3/4” in the transition between interior and end post sections. Clear cover is 2” throughout all post sections. Longitudinal reinforcement spacing is reduced to 6 1/2” and 3 3/8” in the interior and end sections respectively. The length of part b13 has been reduced to 175 9/16”.	JD/JEK	MJM
		1	Changed drawing document to Open Concrete Bridge Rail and test name to OCBR-1-3. Reflected on all pages.		
		3	Added assembly names to section view.		
		4	Added assembly names to section view.		
		5	Added assembly names to section view.		
		6	All pages detailing the bridge rail assembly have been moved before the pages detailing the bridge deck assembly.		
		7	Replaced break view with a crop view for clarity.		
		8	Replaced break view with a crop view for clarity.		
		9	Moved dimension lines in profile view of bridge deck assembly for clarity.		
		10	Removed dimesion between part b5 and part b1. Added Detail View H of US end of bridge deck assembly.		
		11	Added crop views of bridge rail assembly to two new pages. Reduced break views in overall elevation views to provide better clarity.		
		12	Moved Assembly BOM to overall bridge rail assembly page. Added section views from crop views to show details of rail profile on deck and tarmac.		
		14	Added correct lap lengths to parts b1, b3, and b5. Removed b6 lap length.		
		15	Added correct lap lengths to parts b9, b10, and b11. Dimensioned lap lines on parts b7, b8, b10, and b11.		
16	Added correct lap lengths to parts b12 and b13.				

		BOM	Corrected BOM descriptions to make sure size and length match part.		
2	4/21/2020	1	Added post labels to elevation view.	JD	MJM
		4	Adjusted part b2 label position.		
		5	Deleted view. Moved Sheet 7 view here and expanded to show post 1 and 2. Added part b2 to bridge rail assembly.		
		6	Added view of two interior post sections.		
		7	Labeled part b14.		
		8	Adjusted clearance between part b9 and top of concrete rail to 3 3/4".		
		9	Deleted view. Moved sheet 13 view and BOM here and showed gradebeam.		
		10	Changed to plan view of bridge deck assembly.		
		11	Changed to section view of sheet 10 view.		
		12	Changed to plan view of bridge deck assembly.		
		13	Changed to section view of sheet 12 view.		
		BOM	Changed parts a1 and a2, material description, to 4,000 psi. Corrected to assembly to show part b10 quantity as 42. Edited part b13, total length.		
		3	5/12/2020		
1	Changed dimensions to feet. Removed tarmac and ground from drawing. Edited notes to show correct test order and impact points. Edited impact point dimensions. Removed sections B-B and C-C.				
2	Removed section view B-B.				
3	Added notes regarding different bars used in end sections. Edited bars b2 and b14 to be even with top of b7 stirrup loop. Edited bar b6 to make its top even with the top level of rebar.				
4	Edited dimensions. Edited notes. Added note 3.				
5	Edited notes. Edited dimensions.				
6	Edited dimensions. Added section G-G.				

3	5/12/2020	7	Edited bars b1, b3, and b12 to end at the specified location. Edited bar b4. Added new bars b15, b16, and b17. Added clear covers. Showed b2 bars. Added notes 2 and 3.	SKR	LJP
		8	Shifted b4 bars to be adjacent to b1 bars. Edited spacing dimensions. Added note 5.		
		9	Deleted note 1.		
		10	Added detail view L.		
		11	Removed note.		
		12	Showed bars b2.		
		13	Added sheet to show detail view L.		
		15	Replaced old b4 bar with new one.		
		17	Added bars b15, b16, and b17.		
4	5/18/2020	1	Edited notes 2 and 4. Added endpost dimension.	SKR	LJP
		2	Added note 1. Removed a dimension. Removed unnecessary line.		
		4	Edited note 1. Note: I tried to make the critical dimension a little more clear, but I'm not sure how else to show it.		
		5	Added sheet to show typical interior posts.		
		6	Deleted note 3. Labeled post 15.		
		7	Changed section D-D to show post 3.		
		8	Deleted old note 2. Edited old note 3. Added new note 3. Labeled bars b1 and b4.		
		9	Labeled bars b15, b16, and b17. Edited note 4.		
		11	Labeled bars b15, b16, and b17. Edited note 4. Added note 5.		
		15	Changed spacing of b6 and b8 bars to be the same as that of b4 bars.		
5	5/19/2020	-	Labeled crop views to make it clear they are cropped.	KAI	LJP
		1	Added upstream and downstream labels. Edited notes.		
		3	Edited notes.		
		4	Edited notes. Edited labels.		
		5	Edited labels.		
		6	Edited notes. Edited labels.		
		7	Edited notes. Fixed dimension overlap.		

	5/19/2020	8	Edited notes. Added spacing dimension for bars b6.		
		9	Edited notes. Fixed TYP spacing dimensions.		
		10	Fixed TYP spacing dimensions.		
		11	Fixed TYP spacing dimensions. Edited notes.		
		12	Fixed TYP spacing dimensions.		
		14-17	Made break views smaller.		
6	5/19/2020	3	Edited notes.	KAL	LJP
		8	Changed bar b6 dimension.		
7	5/26/2020	2	Hid stirrup reinforcement.	JDR	LJP
		4	Moved critical dimension to make it clearer.		
		8	Added note 4. Slightly reduced scale to make room for note 4.		
		10	Added note 1.		
7	5/26/2020	12	Added note 1.	JDR	LJP
		13	Added note 1.		
		14	Added note 1.		
		BOM	Description: b16 and b17		
8	6/10/2020		Revised bars b3 and b12 for aggregate clearance and altered their spacing in the model	RWB	RWB
			Fixed unconstrained rebar in deck and undefined sketch constraints in b3 and b12		
9	6/16/2020	-	Extended deck and grade beam past post 8.	RWB/SKR	LJP
		7	Removed b13 bars from section D-D.		
		12-14	Changed note 1.		
		15	Grade beam dimensions updated.		
10	6/17/2020	8	Edited note 4.	JDR/SKR	LJP
		10	Added spacing dimension. Edited note 1.		
		12-14	Edited note 1.		
		BOM	Descr.: b3, b5, b7, b12. QTY: b12, b14		
		16	Updated rebar unbent length for part b3.		



11	8/5/2020	17	Updated rebar unbent length for parts b7, b8, b10, and b11.	KAL	SBW
		18	Updated rebar unbent length for parts b12, b16, and b17.		
		BOM	Updated rebar description for parts b3, b7, b8, b10, b11, b12, b16, and b17.		
12	9/3/2020	All	Flipped system to match test pit.	JCH	SBW/LJP
		1	Added note 7 as a reminder to adjust for tarmac slope.		
		4	Added note 4 on bar b2.		
		8	Added bar b2 to BOB. Added note 5 on bars b3 and b12. Added note 6 on bar b2.		
13	11/16/2020	All	Changed spacing of part b4.	JCH	SBW
		9	Edited dimensions to reflect spacing change of b4.		
14	3/8/2021	All	Changed b1 total length from 141 1/2" to 147 1/2"	SKR	GHR
		5	Changed dimension note from '50 spaces @ 6"' to '5 spaces @ 6"		
		8	Changed note (3) from 'a minimum of 12"' to 'a minimum of 15"		
		16	Changed leg length from 68" to 71" for Part b1. Removed Min. Lap Length from bars b1 and b3 in Bill of Bars		
		17	Removed Min. Lap Length from Bill of Bars for all bars except b9.		
		18	Removed Min. Lap Length from bar b12 in Bill of Bars.		
15	3/12/2021	9	Edited spacing between rebar.	SKR	SBW
16	3/17/2021	9	Edited note.	KAL/SKR	LJP
		11-12	Added missing b1 bars. Adjusted part labels.		
		BOM	Updated concrete specs (parts a1, a2, a3). b1 QTY increased by 4.		
17	4/7/2021	11	Corrected dimensioning of spacing for bars.	KAL	CJN
18	8/20/2021	6	Updated Rebar spacing.	RWB	GHR
		7	Added sheet with section view of rebar sticking into tarmac.		