

(54.6' - 99.9' - 88.5') PRESTRESSED CONCRETE NU GIRDER SPANS (SKEW VARIES)

SEC/SUR 8 TWP 48 N RGE 12 W



12/23/2024 10:46:58 AM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 1

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A - PRELIMINARY REVIEW

REV. B - FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

REV. 1 - NDC-002 - REVISED DIMENSIONS

DATE

06/10/24

09/13/24

10/01/24

12/23/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

ModOT

BRIDGE NO. A9542

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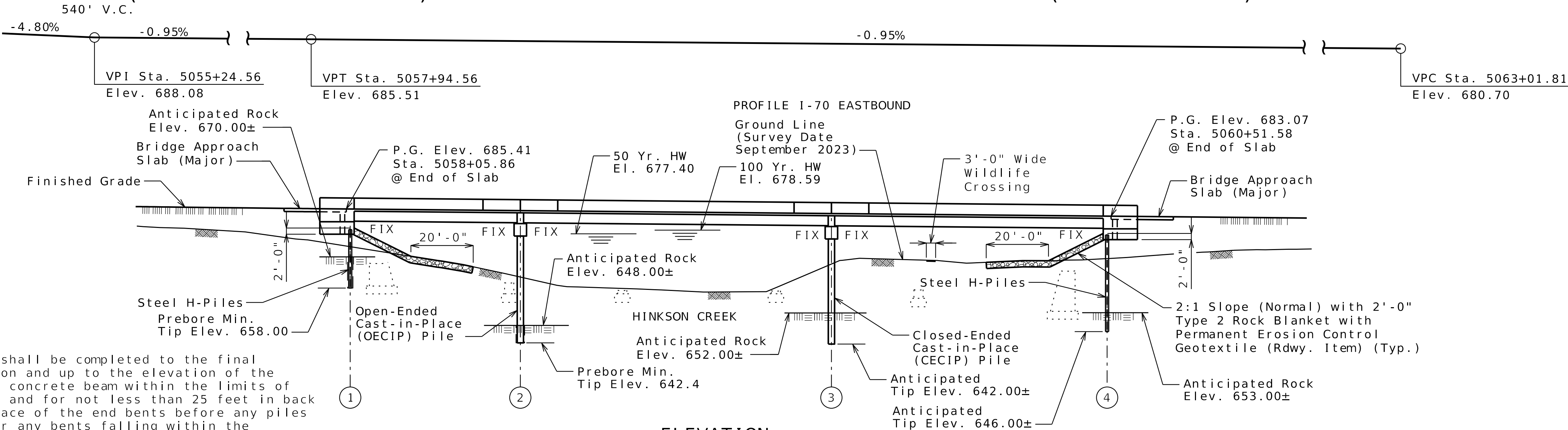
BRIDGE NO. A9542

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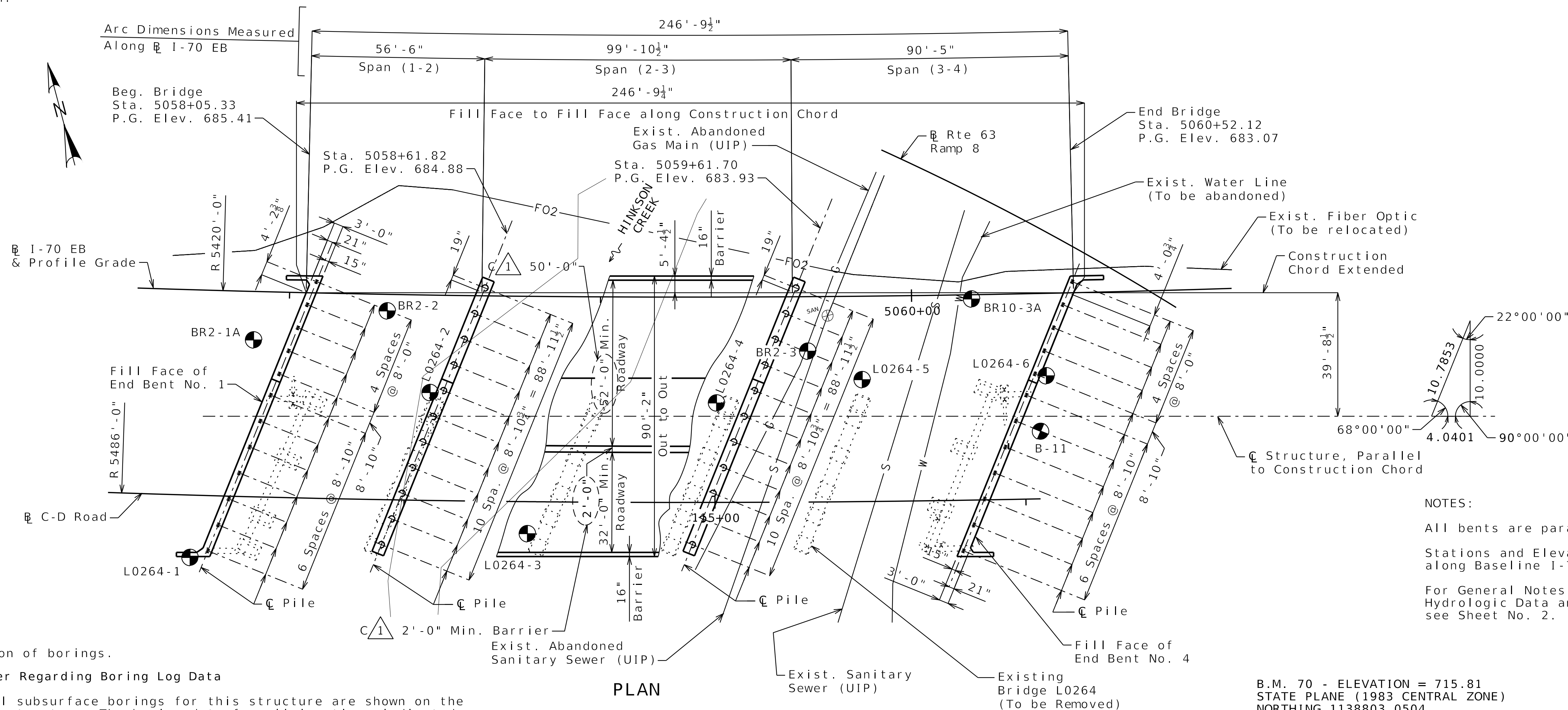
BRIDGE NO. A9542

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ELEVATION



PLAN

NOTES:

All bents are parallel.

Stations and Elevations are measured along Baseline I-70 Eastbound.

For General Notes, Foundation Data, Hydrologic Data and Location Sketch, see Sheet No. 2.

B.M. 70 - ELEVATION = 715.81
STATE PLANE (1983 CENTRAL ZONE)
NORTHING 1138803.0504
EASTING 1700592.2071
LATITUDE 38.96086552 DEGREES
LONGITUDE -92.28837098 DEGREES
POINT DESCRIPTION 74/IR

BRIDGE: I-70 EB OVER HINKSON CREEK

I-70 EB FROM ROUTE 63 TO ROUTE 54
ABOUT 0.1 MILES WEST OF ROUTE 63
BEG. STA. 5058+05.33

Indicates location of borings.

Notice and Disclaimer Regarding Boring Log Data

The locations of all subsurface borings for this structure are shown on the plan sheet for this structure. The boring data for all locations indicated, as well as any other boring logs or other factual records of subsurface data and investigations performed by the Design-Build Team for the design of the project, are shown on Sheet Nos. 52 thru 56 and may be included in the Electronic Bridge Deliverables. Additional borings performed by the department will also be available from the Project Contact upon written request. No greater significance or weight should be given to the boring data depicted on the plan sheets than is given to the subsurface data available from the district or elsewhere.

Detailed AUG 2024
Checked AUG 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 1 of 56

C 1 REVISED 12-23-24

General Notes:

Design Specifications:

2020 AASHTO LRFD Bridge Design Specifications (9th Ed.)
Seismic Design Category = A
Design earthquake response spectral acceleration coefficient at 1.0 second period, SD1 = 0.088
Acceleration Coefficient (effective peak ground acceleration coefficient), As = 0.060

Design Loading:

Vehicular = HL-93
Future Wearing Surface = 35 lb/sf
Earth = 120 lb/cf
Equivalent Fluid Pressure = 45 lb/cf
Superstructure: Non-Composite for dead load. Continuous Composite for live load.

Design Unit Stress:

Class B Concrete (Substructure) f'c = 3,000 psi
Class B-1 Concrete (Barrier Curb and Median Barrier) f'c = 4,000 psi
Class B-2 Concrete (Superstructure, except Prestressed Beams, Barrier Curb and Median Barrier) f'c = 4,000 psi
Class B-1 Concrete (Substructure) f'c = 4,000 psi

Reinforcing Steel (ASTM A615 Grade 60) fy = 60,000 psi

Structural Steel HP Pile (ASTM A709 Grade 50) fy = 50,000 psi

Welded or Seamless steel shell (pipe) for CIP pile (ASTM A252 Grade 3) fy = 45,000 psi

For precast prestressed panel stresses, see Sheet No. 33.

For prestressed girder stresses, see Sheet Nos. 25 thru 30.

Neoprene Pads:

Neoprene bearing pads shall be 60 durometer and shall be in accordance with Sec 716.

Joint Filler:

All joint filler shall be in accordance with Sec 1057 for preformed sponge rubber expansion and partition joint filler, except as noted.

Reinforcing Steel:

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

MBS refers to mechanical bar splices. Mechanical bar splices shall be in accordance with Sec 706 or 710.

Traffic Handling:

Structure to be closed during construction. During Stage 1 Construction, traffic to be maintained on I70 Eastbound. During Stage 2 Construction, traffic to be maintained on Stage 1 Construction. See roadway plans for traffic control details.

Miscellaneous:

Construction personnel will indicate the type of joint filler option used under the precast panels for this structure:
☐ Constant Joint Filler
☐ Variable Joint Filler

Method of forming the slab shall be as shown on the plans and in accordance with Sec 703. All hardware for forming the slab to be left in place as a permanent part of the structure shall be coated in accordance with ASTM A123 or ASTM B633 with a thickness class SC 4 and a finish type I, II or III.

Slab shall be cast-in-place with conventional forms or stay-in-place corrugated steel forms in bays located under the median barrier. Precast prestressed panels will not be permitted under the median barrier.

Stay-In-Place Corrugated Steel Forms:

Corrugated steel forms, supports, closure elements and accessories shall be in accordance with grade requirement and coating designation G165 of ASTM A653. Complete shop drawings of the permanent steel deck forms shall be required in accordance with Sec 1080.

Corrugations of stay-in-place forms shall be filled with an expanded polystyrene material. The polystyrene material shall be placed in the forms with an adhesive in accordance with the manufacturer's recommendations.

Form sheets shall not rest directly on the top of girder flanges. Sheets shall be securely fastened to form supports with a minimum bearing length of one inch on each end. Form supports shall be placed in direct contact with the flange. Welding on or drilling holes in the girder flanges will not be permitted. All steel fabrication and construction shall be in accordance with Sec 1080 and 712. Certified field welders will not be required for welding of the form supports.

The design of stay-in-place corrugated steel forms is per manufacturer which shall be in accordance with Sec 703 for false work and forms. Maximum actual weight of corrugated steel forms allowed shall be 4 psf assumed for girder loading.

Foundation Data						
Type	Design Data	Bent Number				
		1	2	3	4	
Load Bearing Pile	Pile Type and Size	HP 12x53	OECIP 24"	CECIP 24"	HP 12x53	
	Number	12	11	11	12	
	Approximate Length Per Each	ft 24	39	38	33	
	Pile Point Reinforcement	ea All	All	All	All	
	Min. Galvanized Penetration (Elev.)	ft Full Length	Full Length	Full Length	Full Length	
	Est. Max. Scour Depth (Elev.)	ft ----	657.4	661.9	----	
	Minimum Tip Penetration (Elev.)	ft 658.0	642.4	646.0	654.0	
	Criteria for Min. Tip Penetration	Min. Embed.	Min. Embed.	Min. Embed.	Min. Embed.	
	Approximate Prebore Depth per Each	ft 15	15	----	----	
	Approximate Prebore Length in Rock per Each	ft 12	10	----	----	
	Pile Driving Verification Method	DF	DT	DT	DF	
	Resistance Factor	0.4	0.65	0.65	0.4	
	Minimum Nominal Axial Compressive Resistance	kip 444	884	1,013	572	

DF = FHWA-Modified Gates Dynamic Pile Formula

DT = Dynamic Testing

CECIP = Closed Ended Cast-in-Place concrete pile.

OECIP = Open Ended Cast-in-Place concrete pile.

Minimum Nominal Axial Compressive Resistance = $\frac{\text{Maximum Factored Loads}}{\text{Resistance Factor}}$

Estimated Maxumum Scour Depth (Elevation) shown is for verifying Minimum Nominal Axial Compressive Resistance using dynamic testing only when pile resistance contribution above this elevation shall not be considered.

Pile point reinforcement need not be galvanized. Shop drawings will not be required for pile point reinforcement.

All piles shall be galvanized full length.

All piles shall be driven to practical refusal.

HP piles are anticipated to be driven to refusal on rock. Review all borings for depth of rock and restrict driving as appropriate to comply with hard rock driving criteria in accordance with Sec 702. When pile refusal on rock occurs, as approved by the engineer, the minimum nominal axial compressive resistance is verified and no additional pile driving verification method is required.

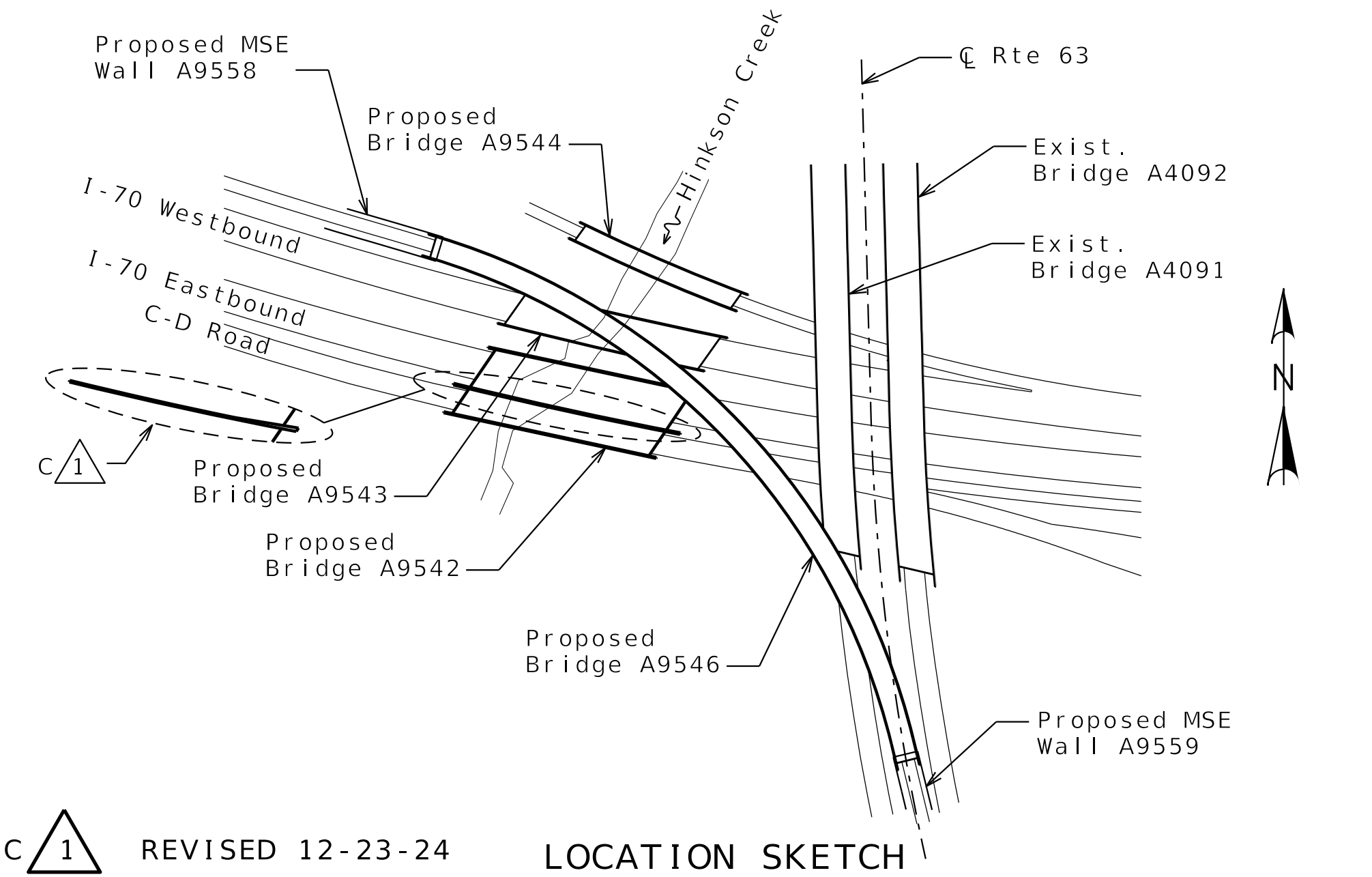
After any required excavation or grading, the contractor shall prebore the holes for the piles at Bents 1 and 2. Prebore shall extend a minimum of 5-feet into limestone. The prebored holes shall be filled with sand prior to being driven to practical refusal.

Piles at Bents 3 and 4 shall be driven to practical refusal at or below the minimum tip elevation. if the minimum tip elevation listed in the Foundation Data Table is not achieved, stop pile driving activities and notify the Engineer for further direction.

The contractor shall make every effort to achieve the minimum galvanized penetration (elevation) shown on the plans for all piles. Deviations in penetration less than 5 feet of the minimum will be considered acceptable provided the contractor makes the necessary corrections to ensure the minimum penetration is achieved on subsequent piles.

Pipe pile spacers shall meet the requirements in Sec 720.4.7.

Hydrologic Data
Drainage Area = 43.2 mi ²
Design Flood Frequency = 50 years
Design Flood Discharge = 12,907 cfs
Design Flood (D.F.) Elevation = 677.40
Base Flood (100-year)
Base Flood Elevation = 678.59
Base Flood Discharge = 15,085 cfs
Estimated Backwater = 0.10 ft
Average Velocity thru Opening = 5.4 ft/s
Freeboard (50-year)
Freeboard = 2.10 ft
Roadway Overtopping
Overtopping Flood Discharge = N/A
Overtopping Flood Frequency = 500 years
Overtopping Flood Elevation = N/A



Detailed AUG 2024
Checked AUG 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 2 of 56

STATE OF MISSOURI

MATTHEW J. MUENKS

NUMBER PE-2017000338

12/23/2024 10:59:30 AM

Matthew Muenks

MO PE-2017000338

DATE PREPARED

23-DEC-2024

ROUTE 70EB

STATE MO

DISTRICT BR

SHEET NO. 2

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A-FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

REV. 1 - NDC-002 - REVISED BARRIER

DATE

09/13/24

10/01/24

12/23/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

MODOT IMPROVE I-70 DB PROJECT 1

JACOBS

MILLSTONE WEBER

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING



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Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE	STATE
70EB	MO
DISTRICT	SHEET NO.
BR	3

COUNTY
BOONE

JOB NO.
JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION
12/23/24	REV. 1 - NDC-002 - REVISED BARRIER

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

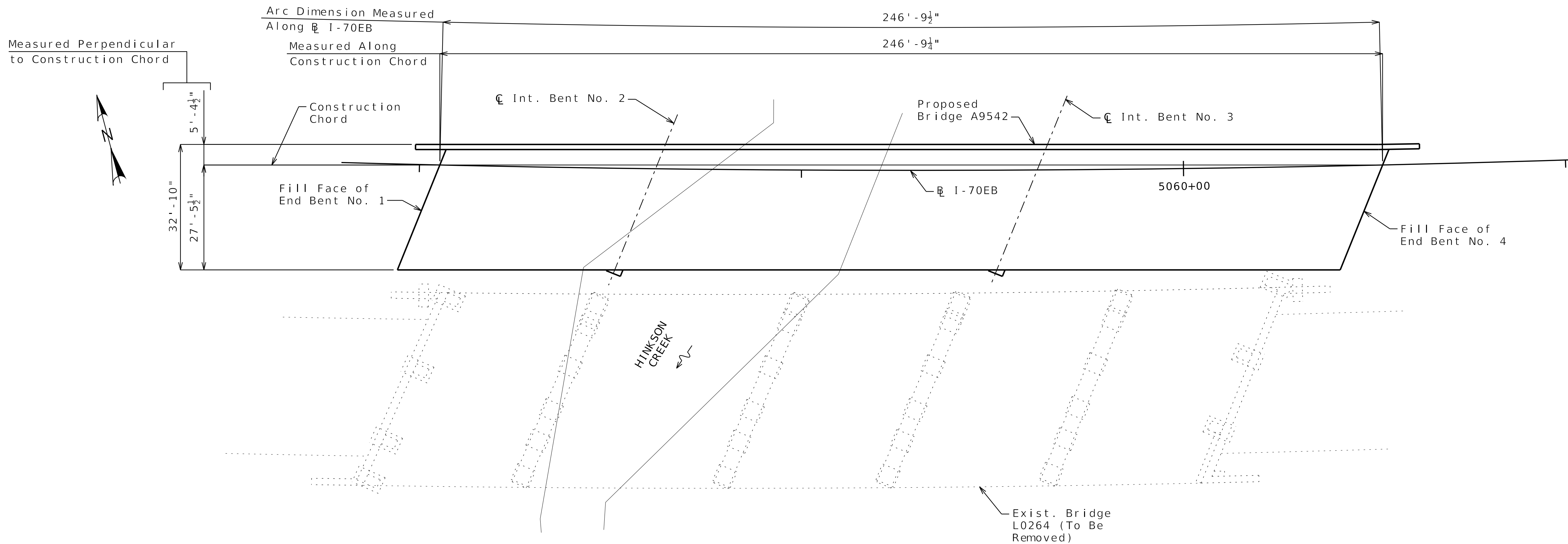
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MODOT IMPROVE I-70 DB PROJECT 1

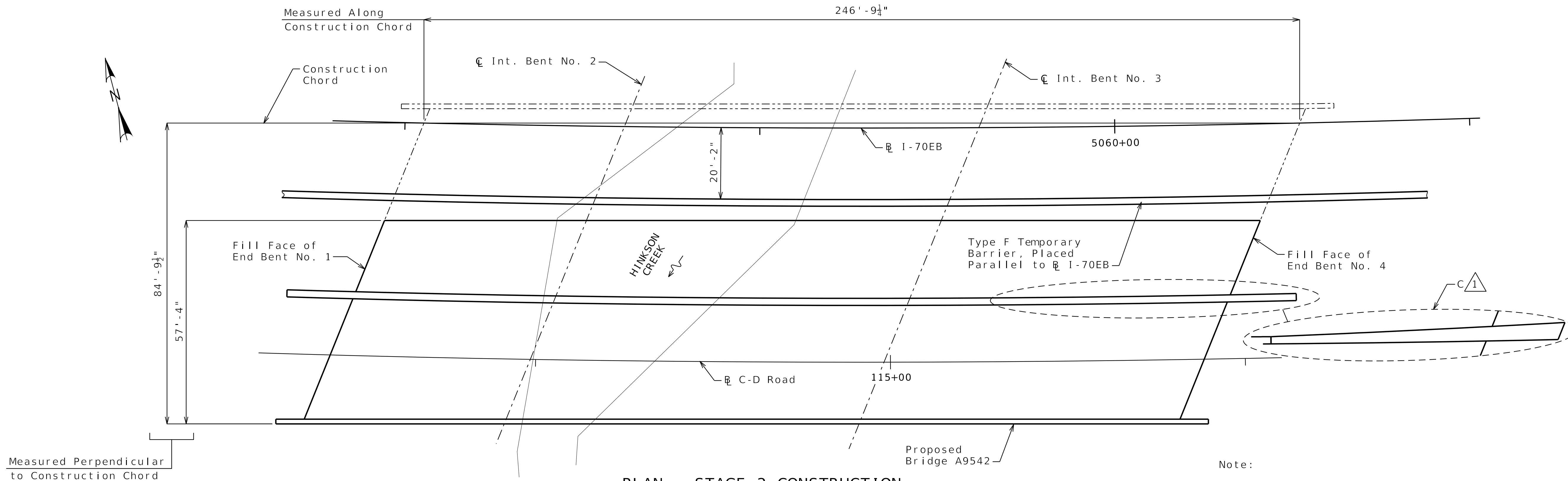
Jacobs

MILLSTONE
WEBER

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING



PLAN - STAGE 1 CONSTRUCTION



PLAN - STAGE 2 CONSTRUCTION

Note:
For Staging Sections, see Sheet No. 4.

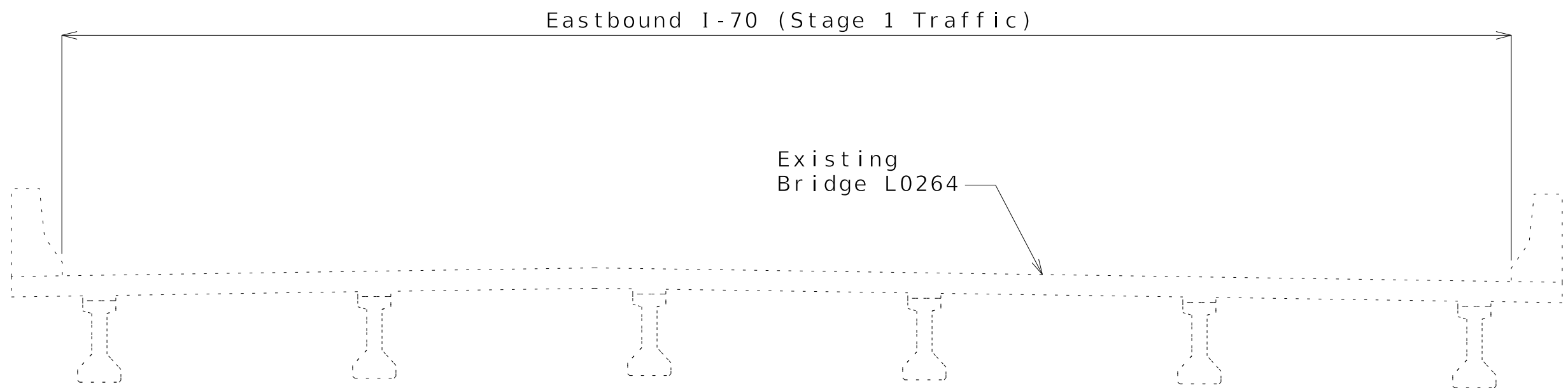
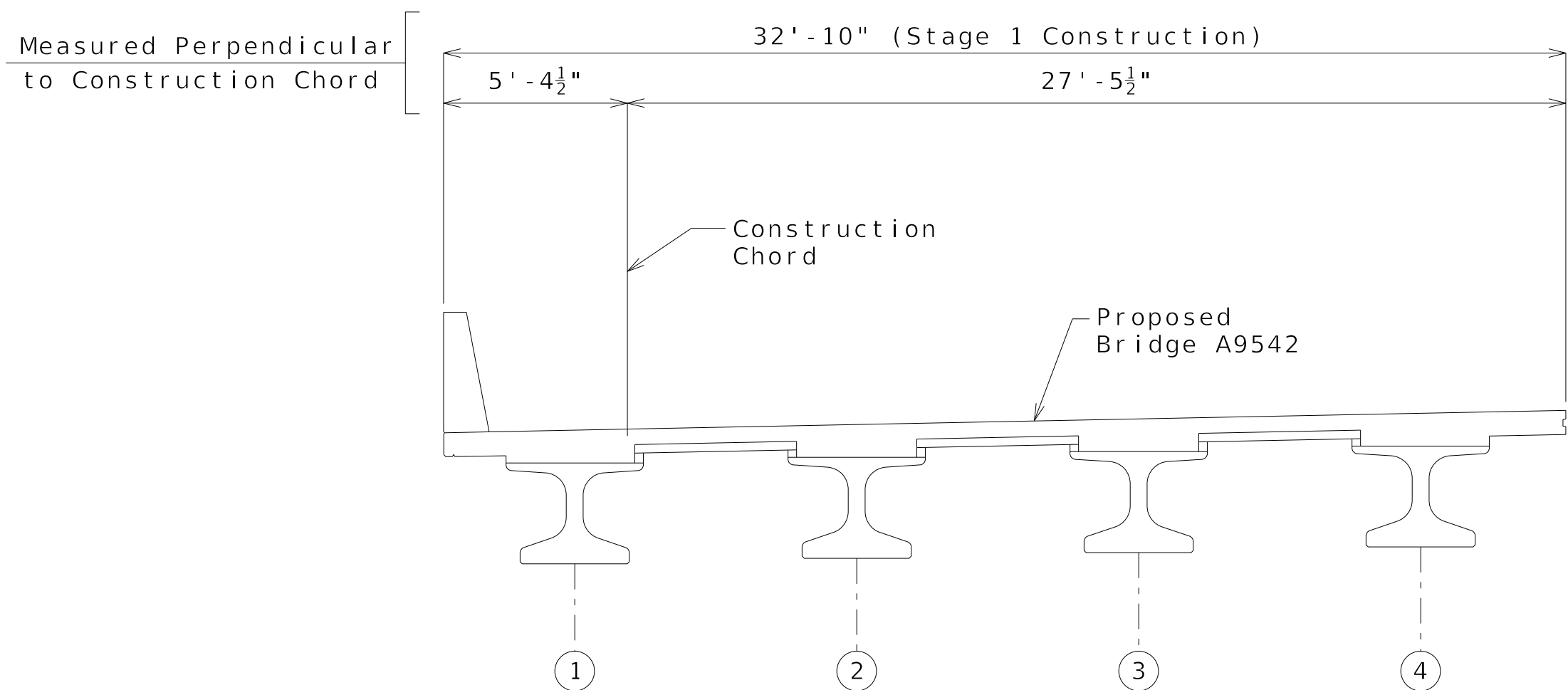
DETAILS OF STAGED CONSTRUCTION

Detailed AUG 2024
Checked AUG 2024

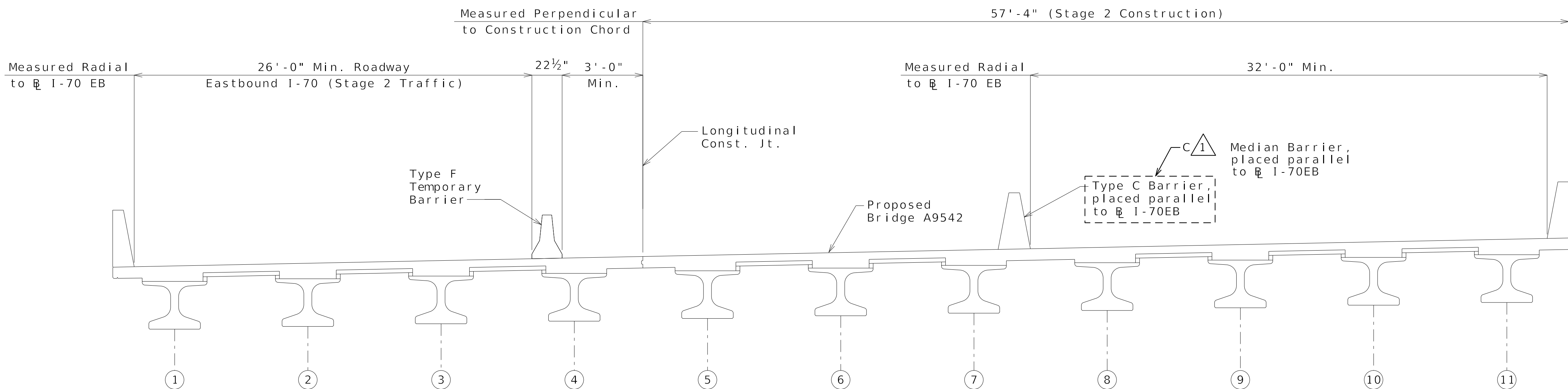
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 3 of 56

C 1 REVISED 12-23-24



STAGE 1 CONSTRUCTION



STAGE 2 CONSTRUCTION

Note:

- After Eastbound Traffic has been routed to Bridge A9542 and prior to placement of Stage 2 Construction, contractor shall remove Existing Bridge L0264 with the approval of the Engineer, to complete Stage 2 Construction.

DETAILS OF STAGED CONSTRUCTION

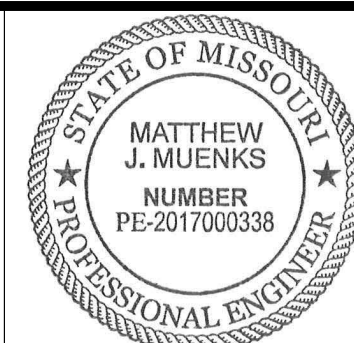
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Sheet No. 4 of 56

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Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 4

COUNTY Boone

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A - PRELIMINARY REVIEW

REV. B - FINAL REVIEW

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REV. 1 - NDC-002 - REVISED BARRIER

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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

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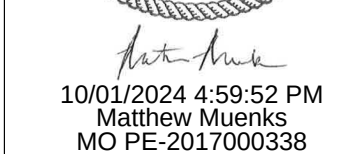
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MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

REV.

MODOT IMPROVE I-70 DB PROJECT 1



DATE PREPARED
1 - OCT - 2024

ROUTE	STATE
70FB	MO

DISTRICT	SHEET NO
BR	6

COUNTY
BOONE

JOB NO.
1ST0021

5310021
CONTRACT ID.

PROJECT NO.

BRIDGE NO.

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

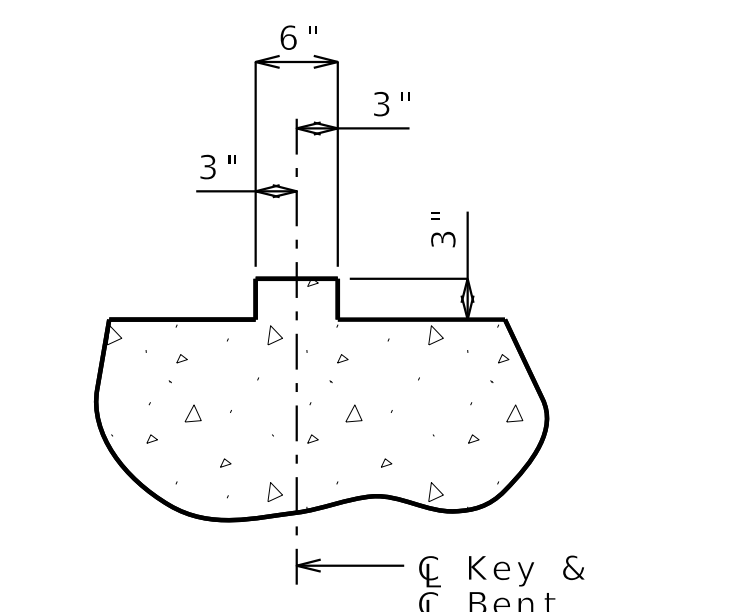
MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

 M&DOT

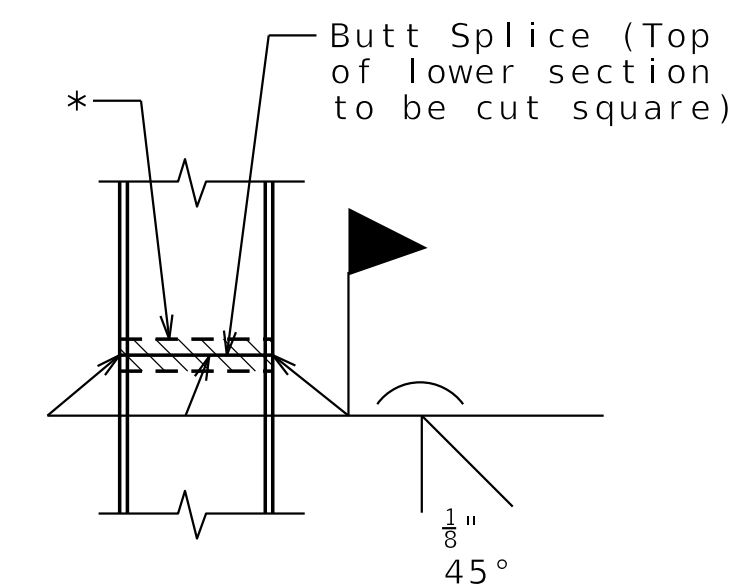
105 WEST CAPITOL
JEFFERSON CITY, MO 65102



 MoDOT IMPROVE 1-70 DB PROJECT 1

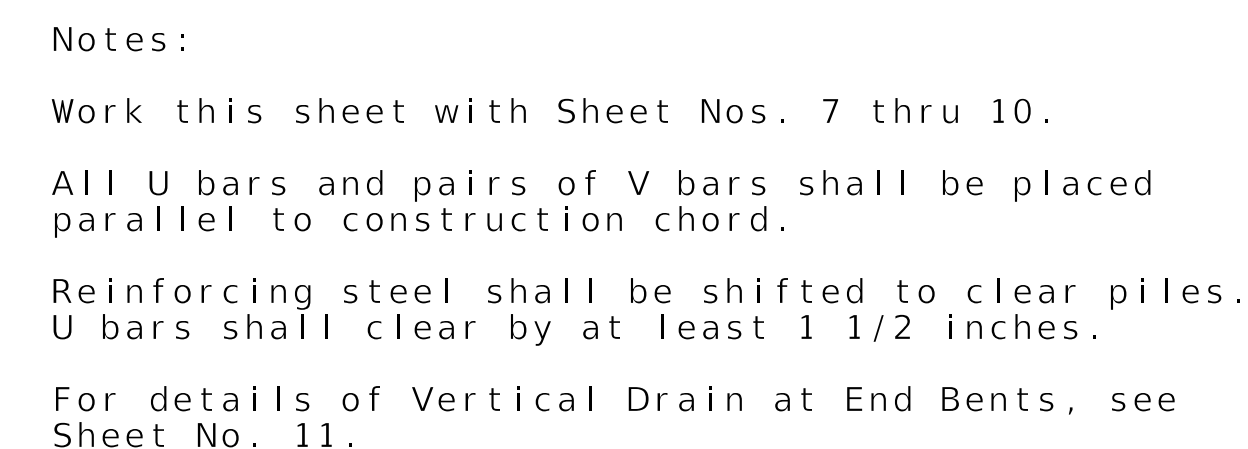


SECTION THRU KEY



STEEL PILE SPLICE
(If required)

* Galvanizing material shall be omitted or removed one inch clear of weld locations in accordance with Sec 702.



PLAN OF BEAM SHOWING REINFORCEMENT
Keys not shown for clarity.

DETAILS OF END BENT 1

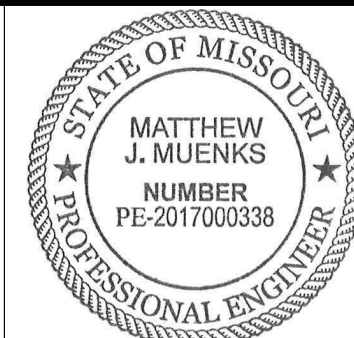
Detailed AUG 2024
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Note: This drawing is not to scale. Follow dimensions.

Sheet No. 6 of 56

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15:55 1-OCT-2024



12/23/2024 10:59:31 AM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 7

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A - FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

REV. 1 - NDC-002 - REVISED REINFORCING

DATE

09/13/24

10/01/24

12/23/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

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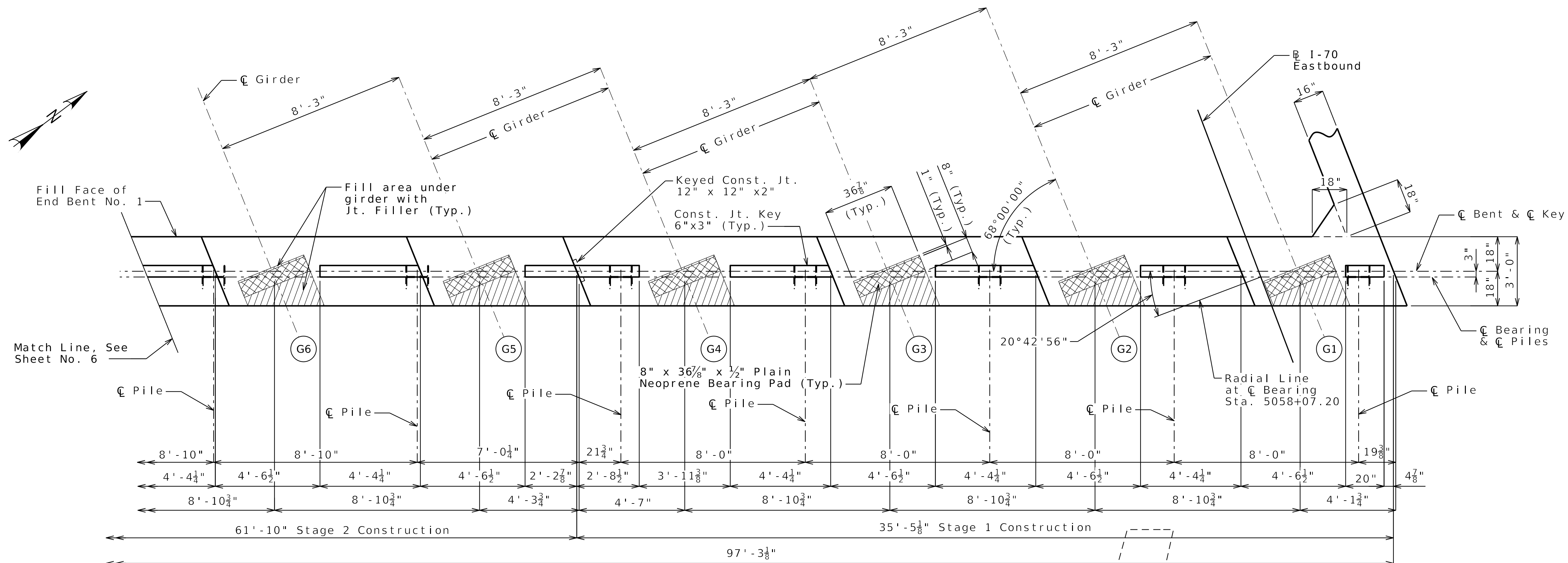
PROJECT 1

MILLSTONE WEBER

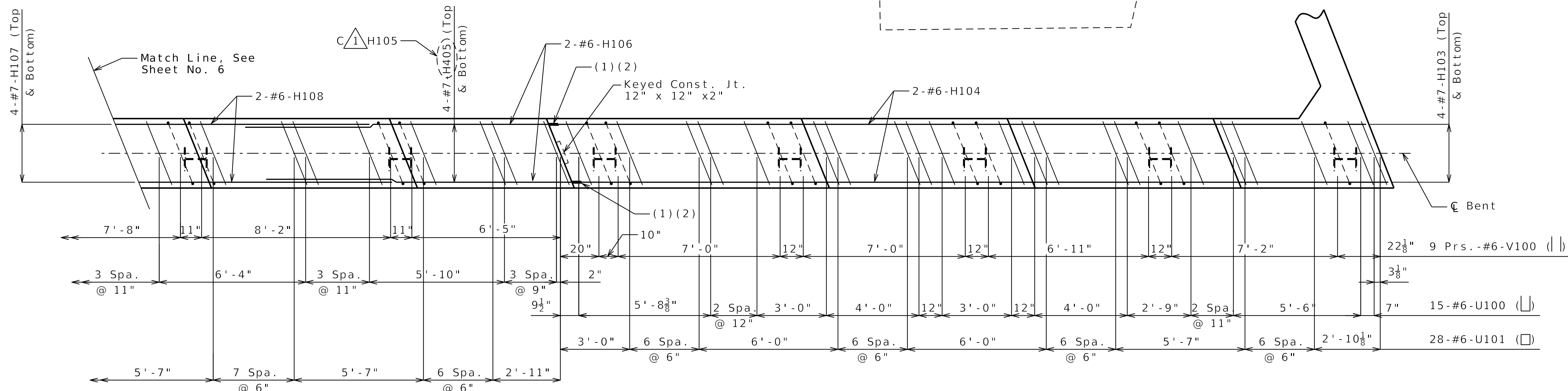
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MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

REV.



PLAN OF BEAM



PLAN OF BEAM SHOWING REINFORCEMENT

- (1) 4-MBS H103-H105 (Top & Bott.)
(2) 2-MBS H104-H106 (Each Face)

Keys not shown for clarity.

Notes:

Work this sheet with Sheet Nos. 6, 8 thru 10.

All U bars and pairs of V bars shall be placed parallel to construction chord.

Reinforcing steel shall be shifted to clear piles. U bars shall clear by at least 1 1/2 inches.

For details of Vertical Drain at End Bents, see Sheet No. 11.

DETAILS OF END BENT 1

Detailed AUG 2024
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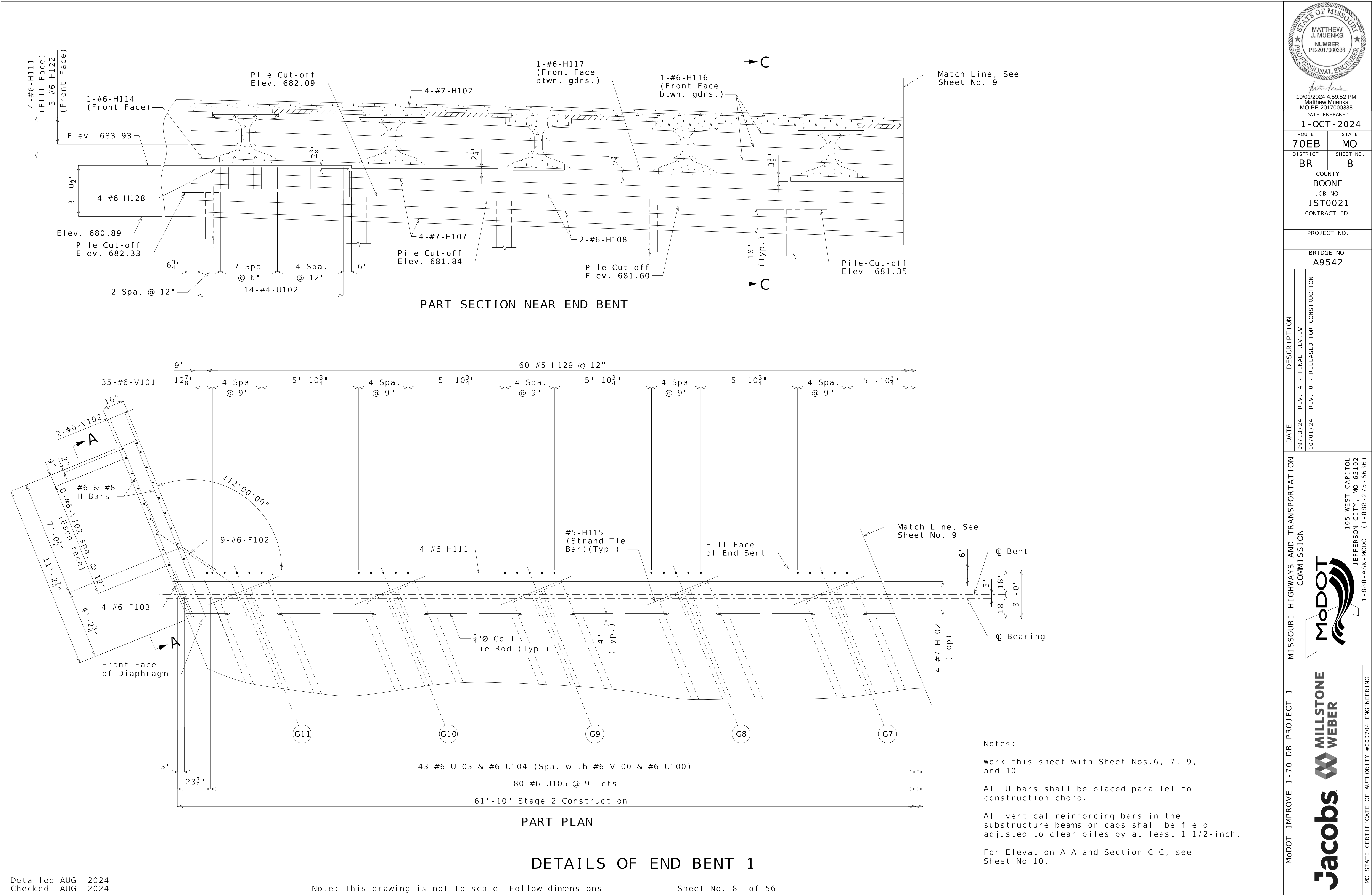
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Sheet No. 7 of 56

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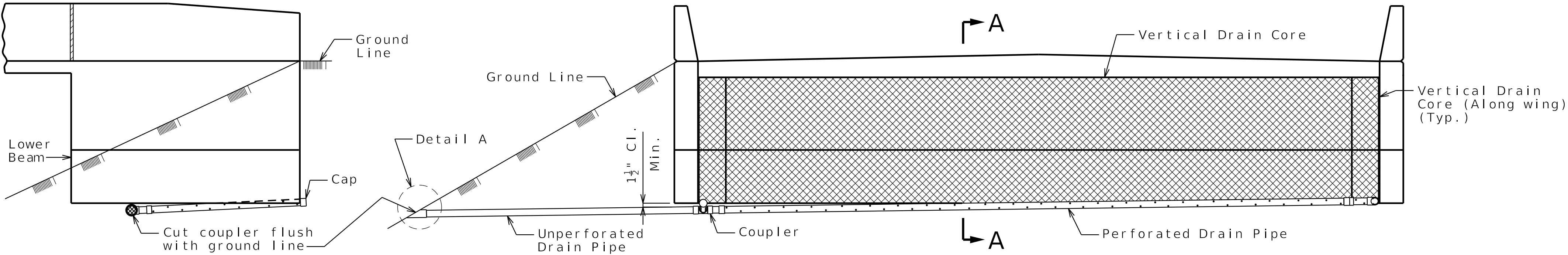




* #8-H Bars at 3" cts.
(Each face)(Place with grade)

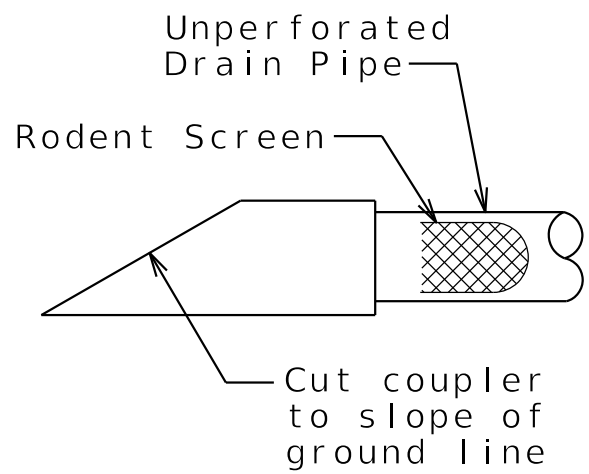


For reinforcement of the barriers, see Sheet
Nos. 43 thru 46.

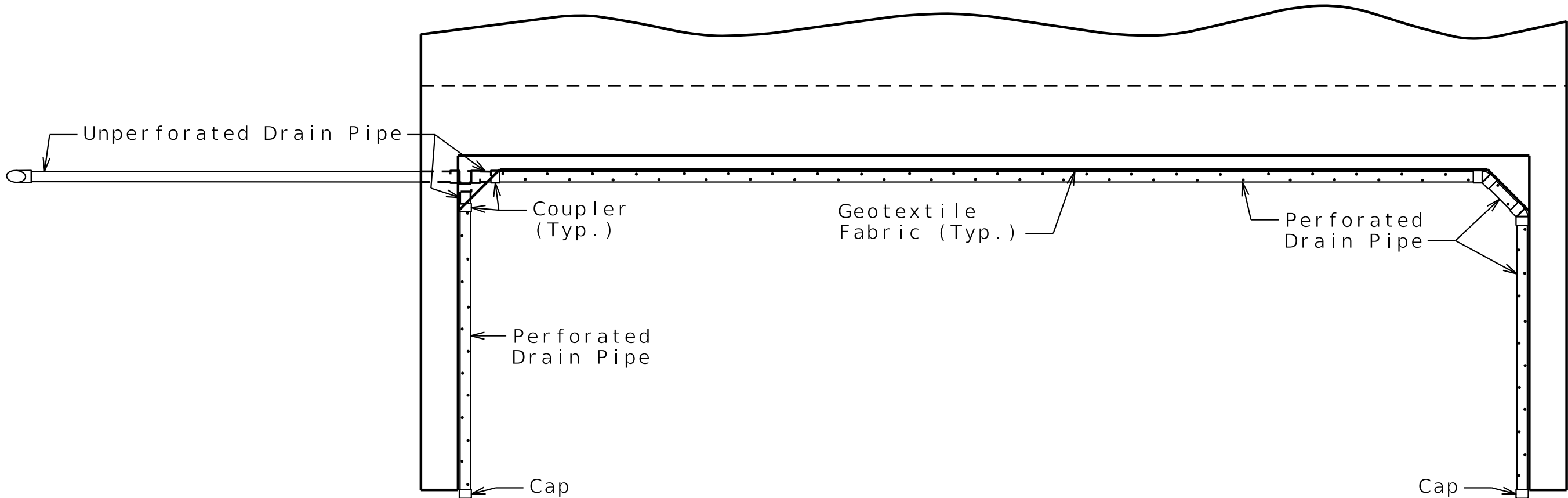


ELEVATION OF WING

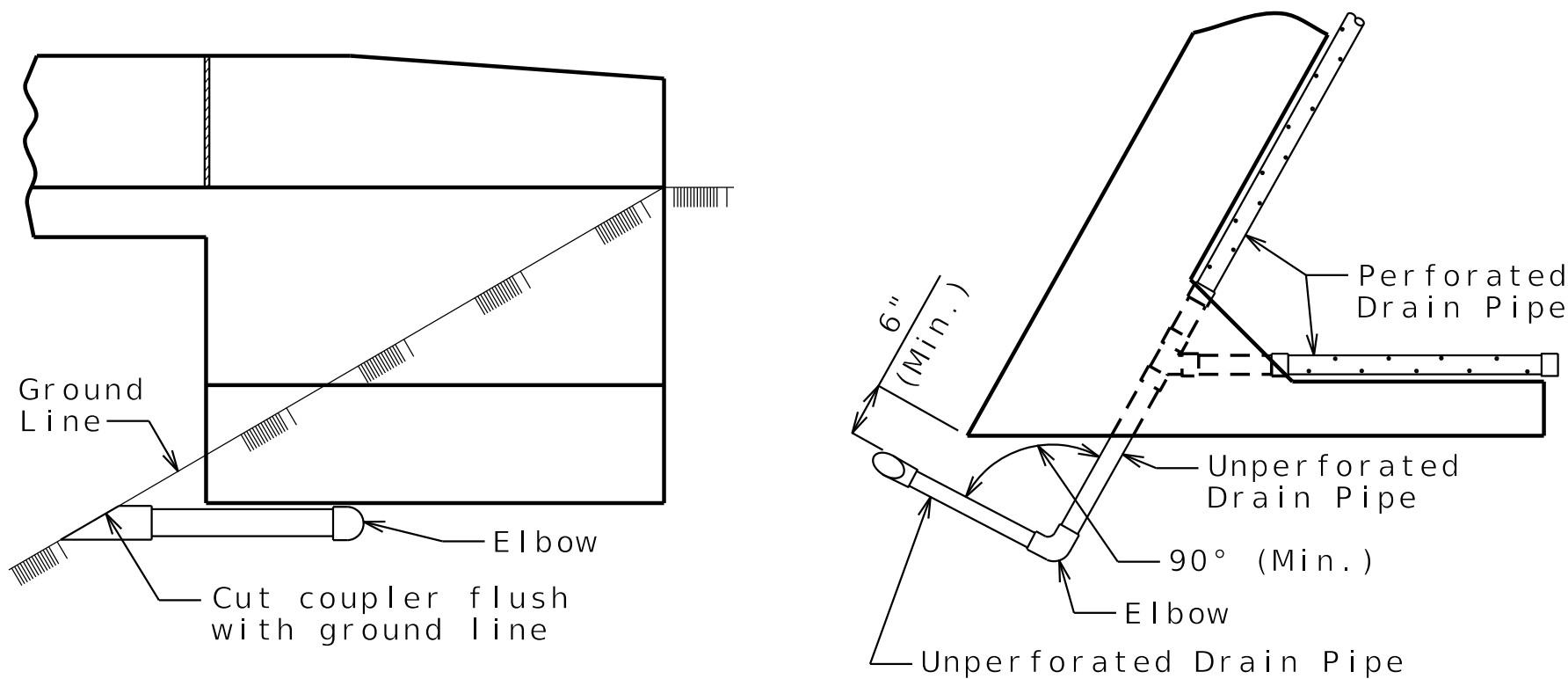
ELEVATION OF END BENT



DETAIL A



PLAN OF END BENT

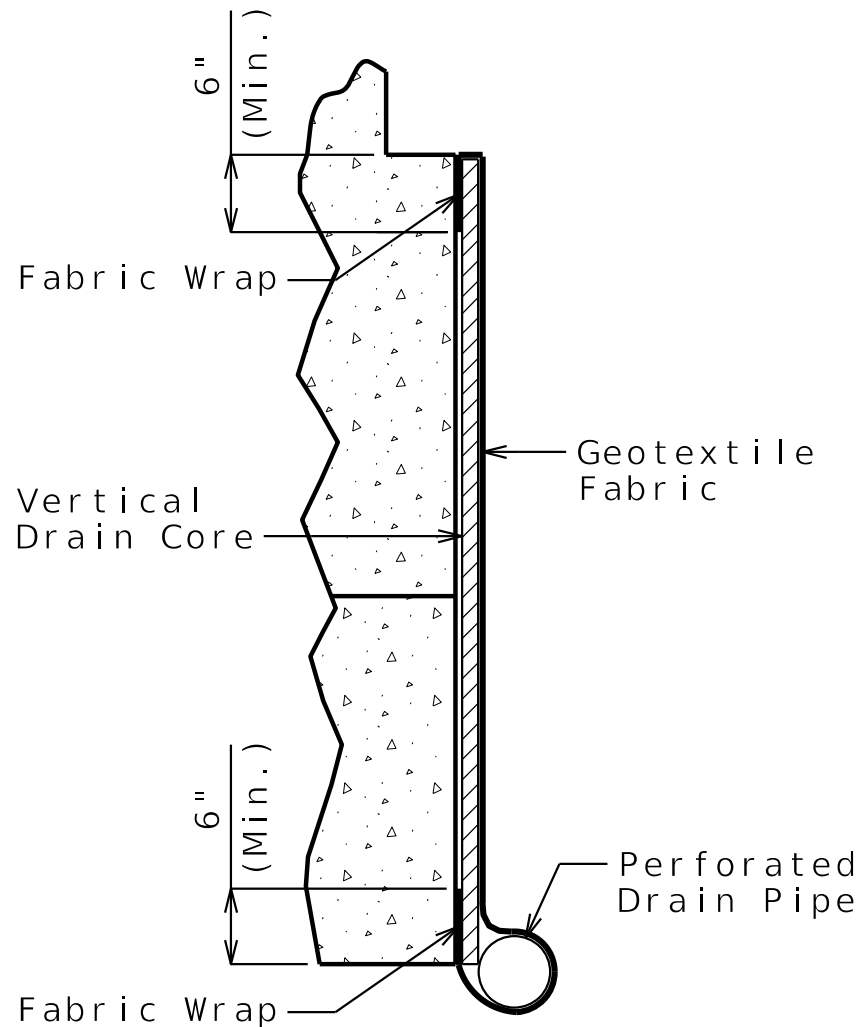


ELEVATION OF WING

PART PLAN

OPTIONAL TURNED DRAIN

(Use only when straight drain is not practical.)



PART SECTION A-A
(Section thru wing similar)

General Notes:

All drain pipe shall be sloped 1 to 2 percent.

Drain pipe may be either 6-inch diameter corrugated metallic-coated steel pipe underdrain, 4-inch diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4-inch diameter corrugated polyethylene (PE) drain pipe.

Drain pipe shall be placed at fill face of end bent and inside face of wings. The pipe shall slope to lowest grade of ground line, also missing the lower beam of end bent by a minimum of 1 1/2 inches.

Perforated pipe shall be placed at fill face side and inside face of wings at the bottom of end bent and plain pipe shall be used where the vertical drain ends to the exit at ground line.



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338

DATE PREPARED

1-OCT-2024

ROUTE STATE

70EB MO

DISTRICT SHEET NO.

BR 11

COUNTY

BOONE

JOB NO.

JST0021

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1-888-ASK-MODOT (1-888-275-6636)

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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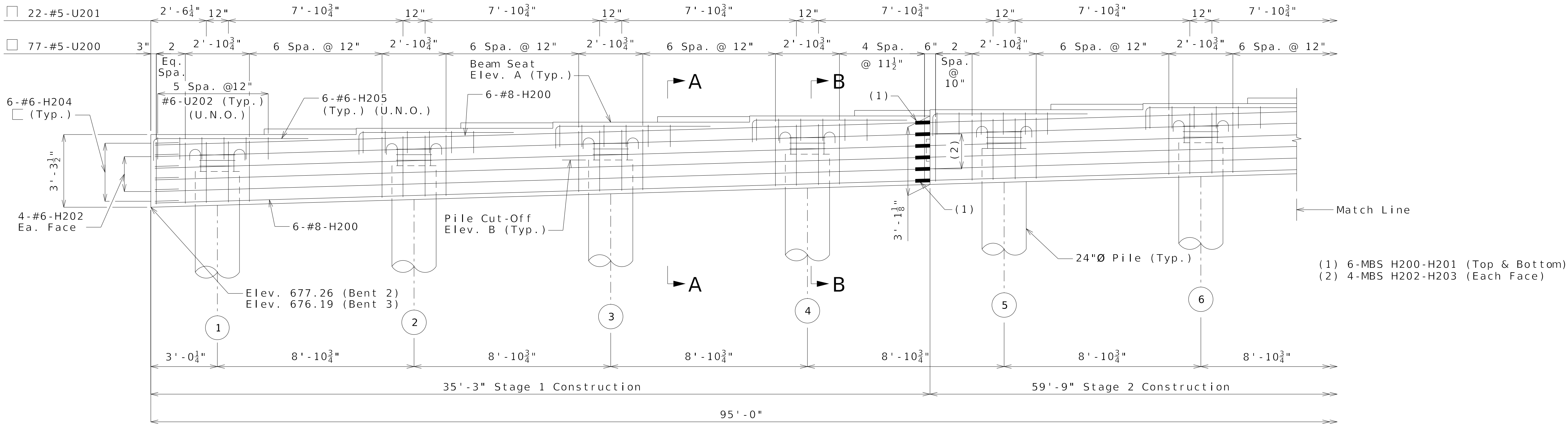
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

ModOT

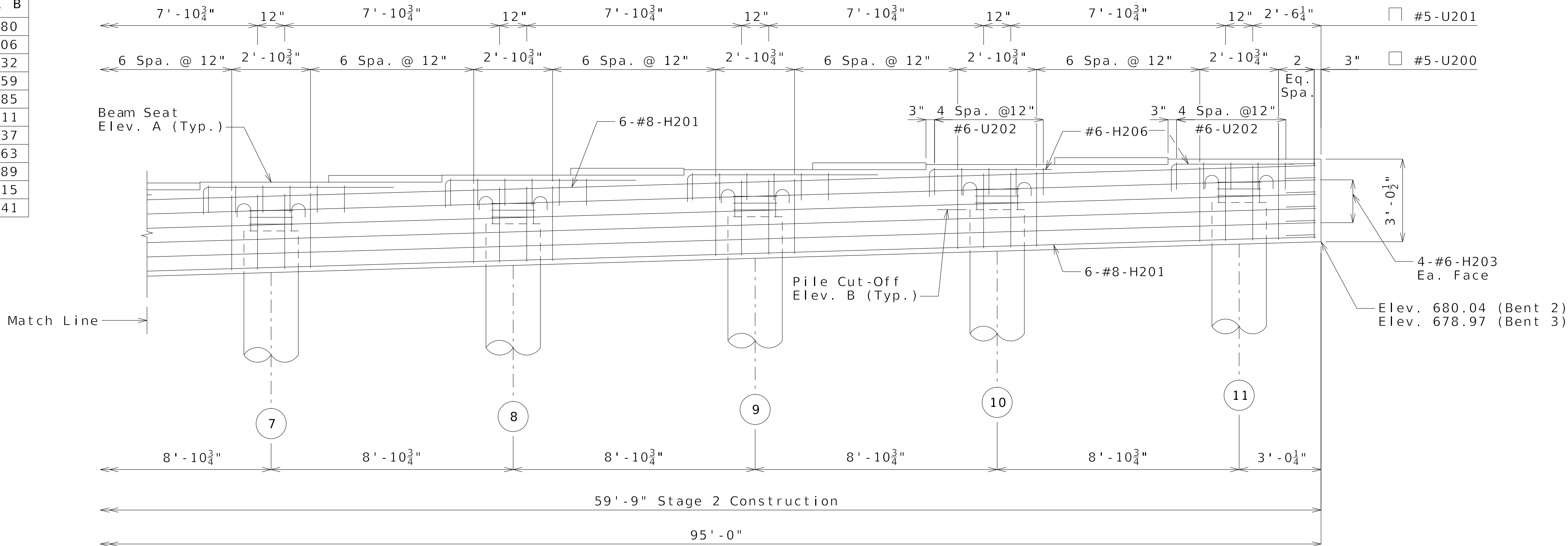
105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)



Beam Seat/ Pile	Int. Bent No. 2		Int. Bent No. 3	
	Elev. A	Elev. B	Elev. A	Elev. B
1	680.55	678.88	679.48	677.80
2	680.83	679.14	679.76	678.06
3	681.11	679.40	680.04	678.32
4	681.39	679.66	680.32	678.59
5	681.67	679.92	680.59	678.85
6	681.95	680.12	680.88	679.11
7	682.23	680.44	681.15	679.37
8	682.49	680.70	681.42	679.63
9	682.69	680.96	681.62	679.89
10	682.88	681.22	681.82	680.15
11	683.08	681.48	682.01	680.41



Notes:

For details of Intermediate Bents not shown, see Sheet Nos. 13 thru 15.

For Detail of Open Ended Cast-In-Place (OECIP) at Bent 2 see Sheet No. 16.

For Detail of Closed Ended Cast-In-Place (CECIP) at Bent 3 see Sheet No. 17.

Detailed JULY 2024
Checked AUG 2024

Note: This drawing is not to scale. Follow dimensions. Sheet No. 12 of 56



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MO PE-2017000338
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1-OCT-2024

ROUTE 70EB STATE MO
DISTRICT BR SHEET NO. 12

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION	REV.	A-FINAL REVIEW	REV.	0 - RELEASED FOR CONSTRUCTION
09/13/24					
10/01/24					

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

MoDOT

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

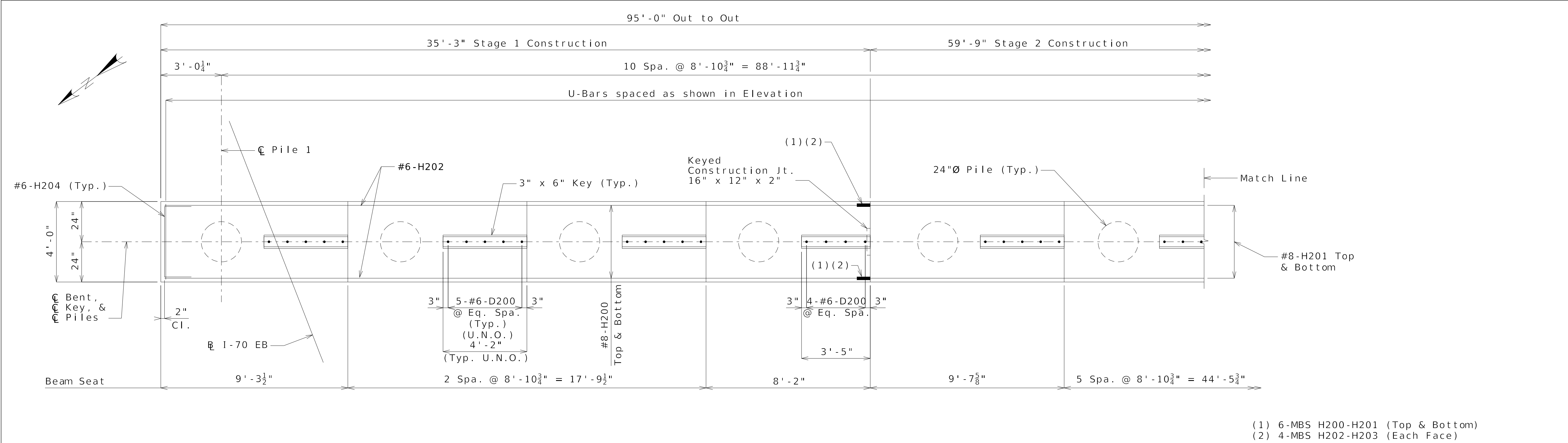
MoDOT IMPROVE I-70 DB PROJECT 1

JACOBS

MILLSTONE WEBER

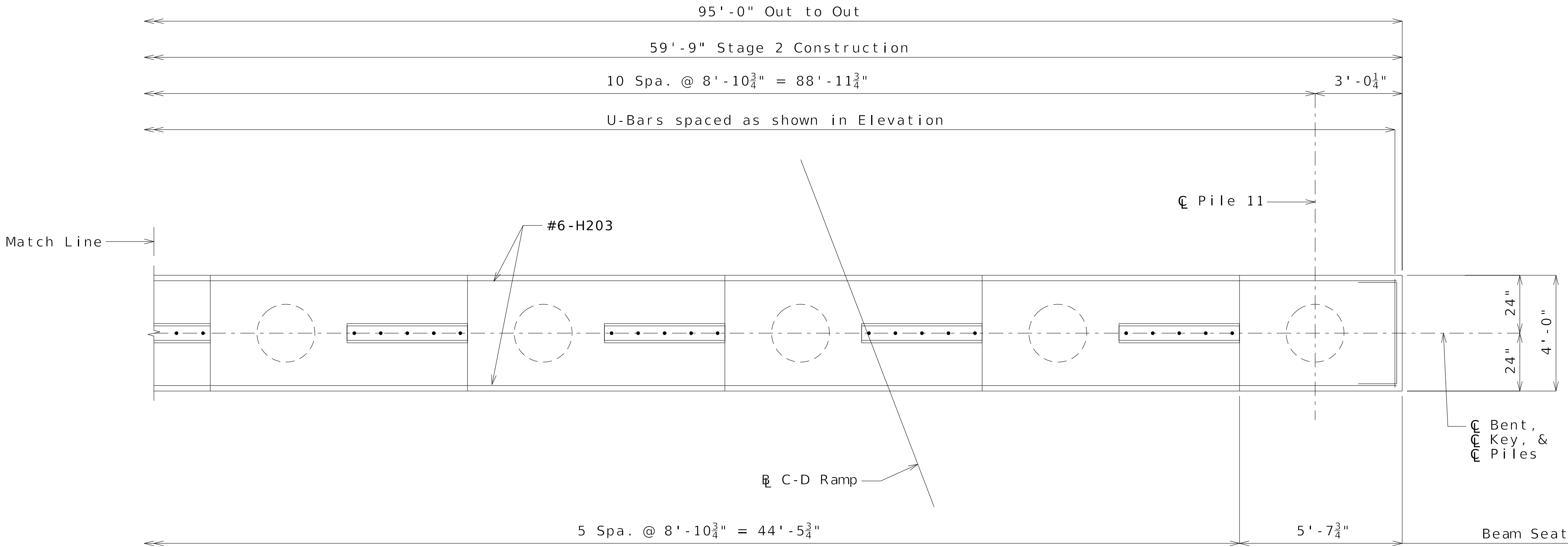
MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

16:01 1-OCT-2024



PLAN OF BEAM

- (1) 6-MBS H200-H201 (Top & Bottom)
(2) 4-MBS H202-H203 (Each Face)



PLAN OF BEAM

Notes:
For details not shown, see Sheet Nos. 12, 14 and 15.

DETAILS OF INTERMEDIATE BENTS 2 & 3

STATE OF MISSOURI

MATTHEW J. MUENKS

NUMBER PE-2017000338

PROFESSIONAL ENGINEER

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Matthew Muenks

MO PE-2017000338

DATE PREPARED

1-OCT-2024

ROUTE 70EB

STATE MO

DISTRICT BR

SHEET NO. 13

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A-FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

DATE

09/13/24

10/01/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

MoDOT

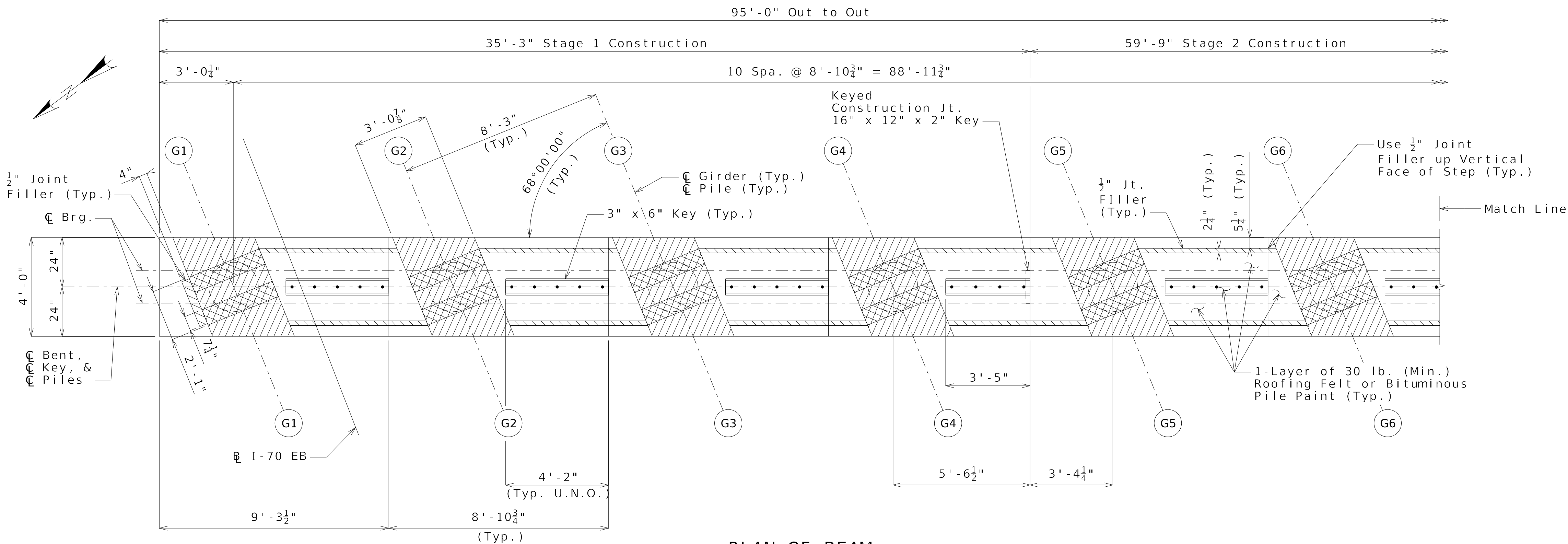
PROJECT 1

MILLSTONE WEBER

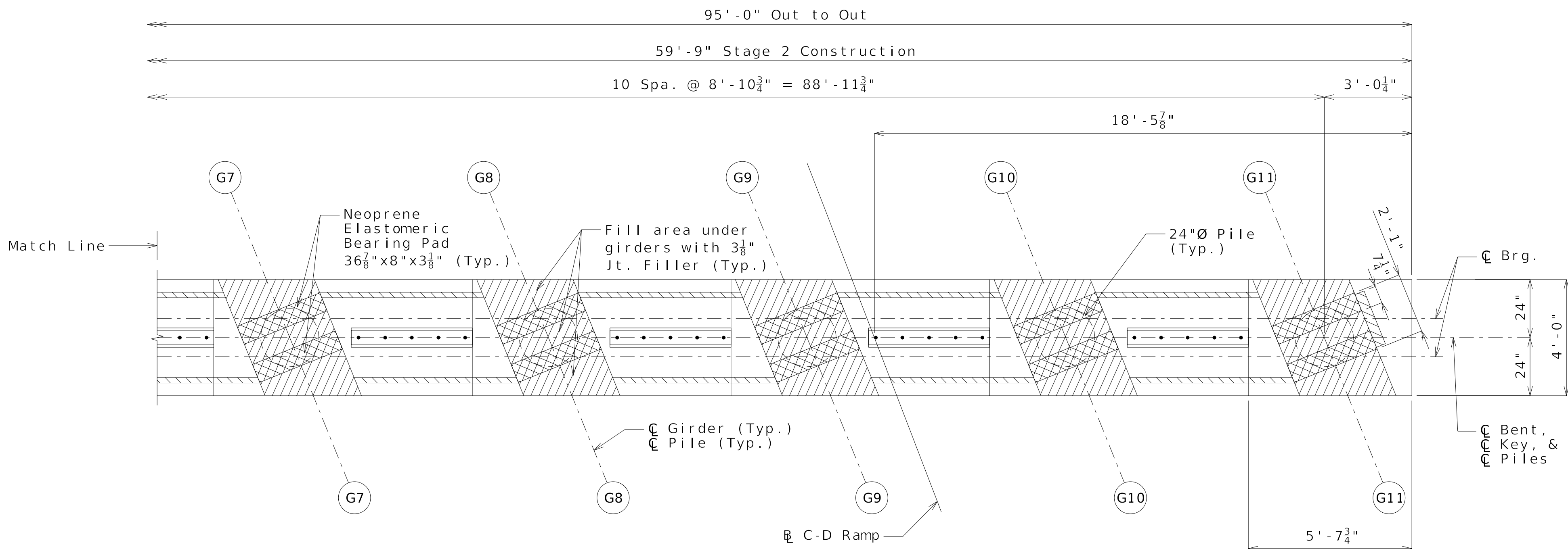
Jacobs

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

REV.



PLAN OF BEAM



PLAN OF BEAM

DETAILS OF INTERMEDIATE BENT 2

Notes:
For details of Intermediate Bents not shown, Sheet Nos. 12, 13 and 15.
For details of Concrete Diaphragms see Sheet Nos. 31 and 32.
For Details of Laminated Neoprene bearing Pads see Sheet No. 23.

Detailed JULY 2024
Checked AUG 2024

Note: This drawing is not to scale. Follow dimensions. Sheet No. 14 of 56



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ROUTE 70EB STATE MO
DISTRICT BR SHEET NO. 14

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

Detailed JULY 2024
Checked AUG 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 15 of 56

DETAILS OF INTERMEDIATE BENTS 2 & 3

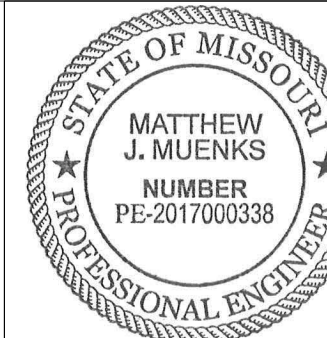
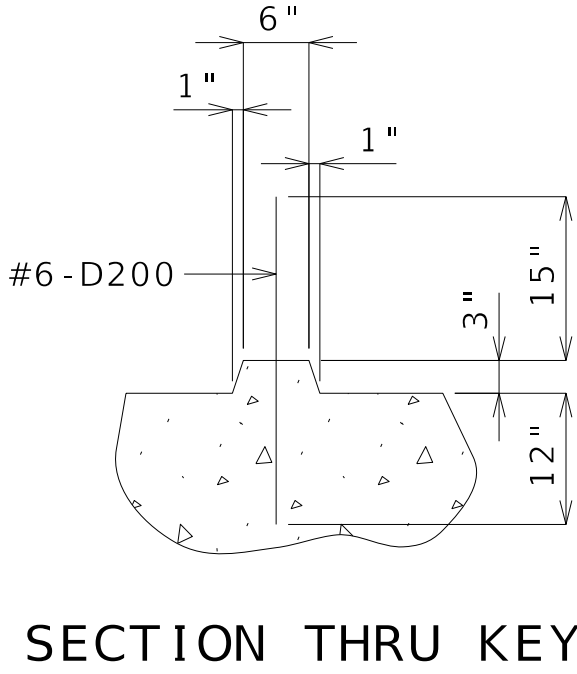
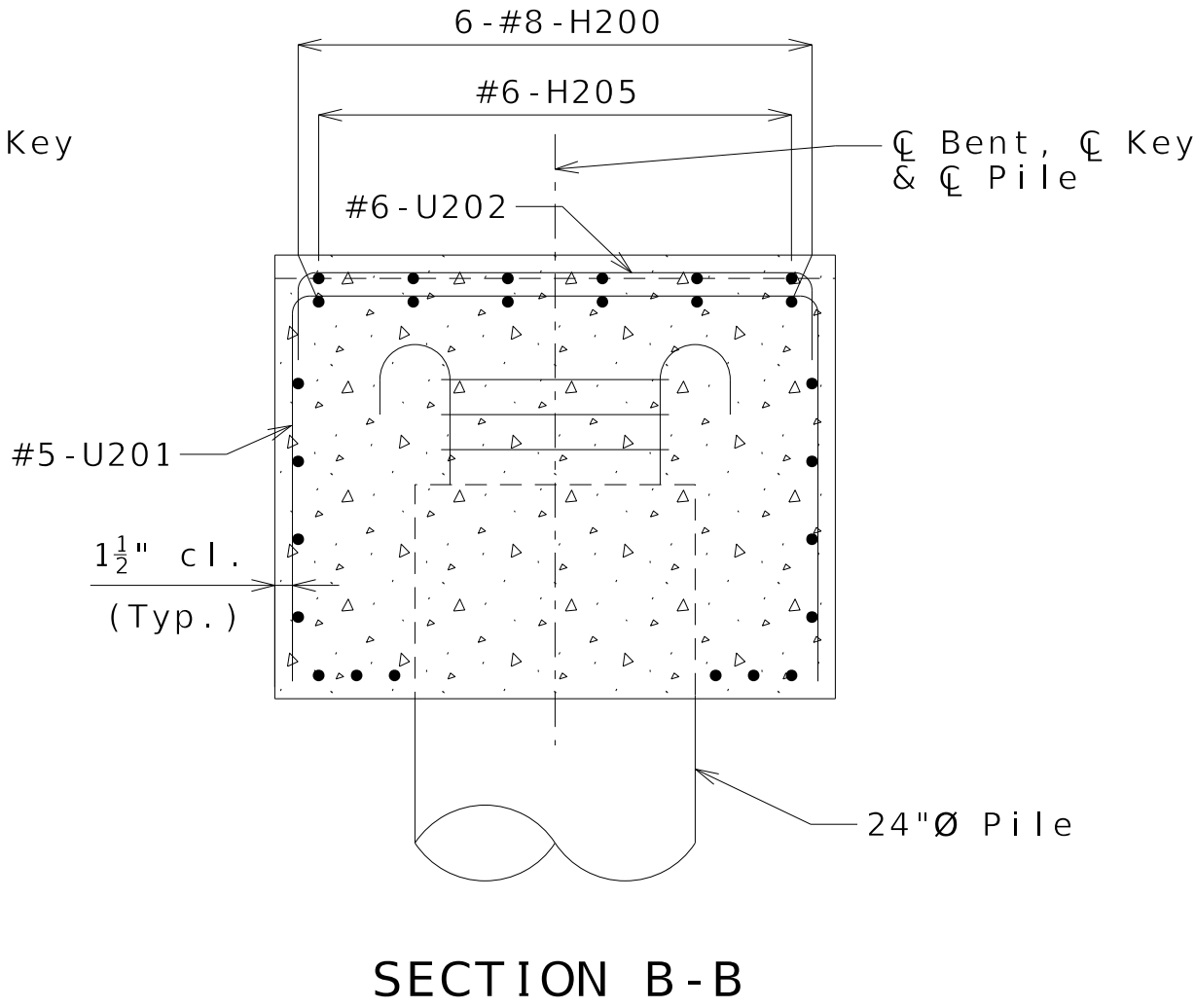
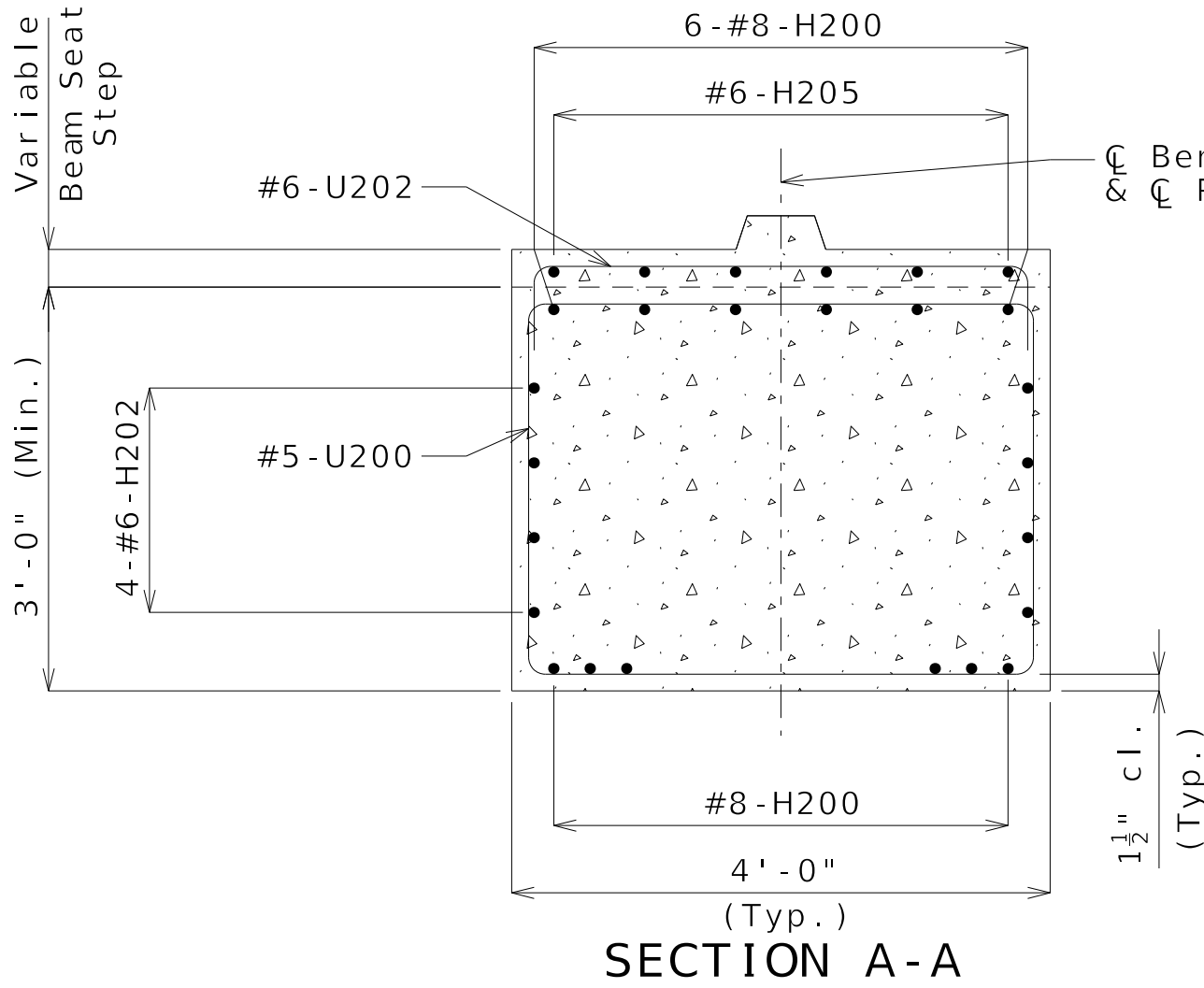
Notes:

For location of Elevations A-A & B-B, see Sheet No. 12.

For details of Intermediate Bents not shown, see Sheet Nos. 12 thru 14.

For details of Piles see Sheet Nos. 16 & 17.

Bar marks shown (200 Series) are for Intermediate Bent No. 2.
Bar marks for Intermediate Bent No. 3 are 300 series.



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ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 15

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A-FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

DATE

09/13/24

10/01/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

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JACOBS

MILLSTONE WEBER

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REV.

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ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 15

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A-FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

DATE

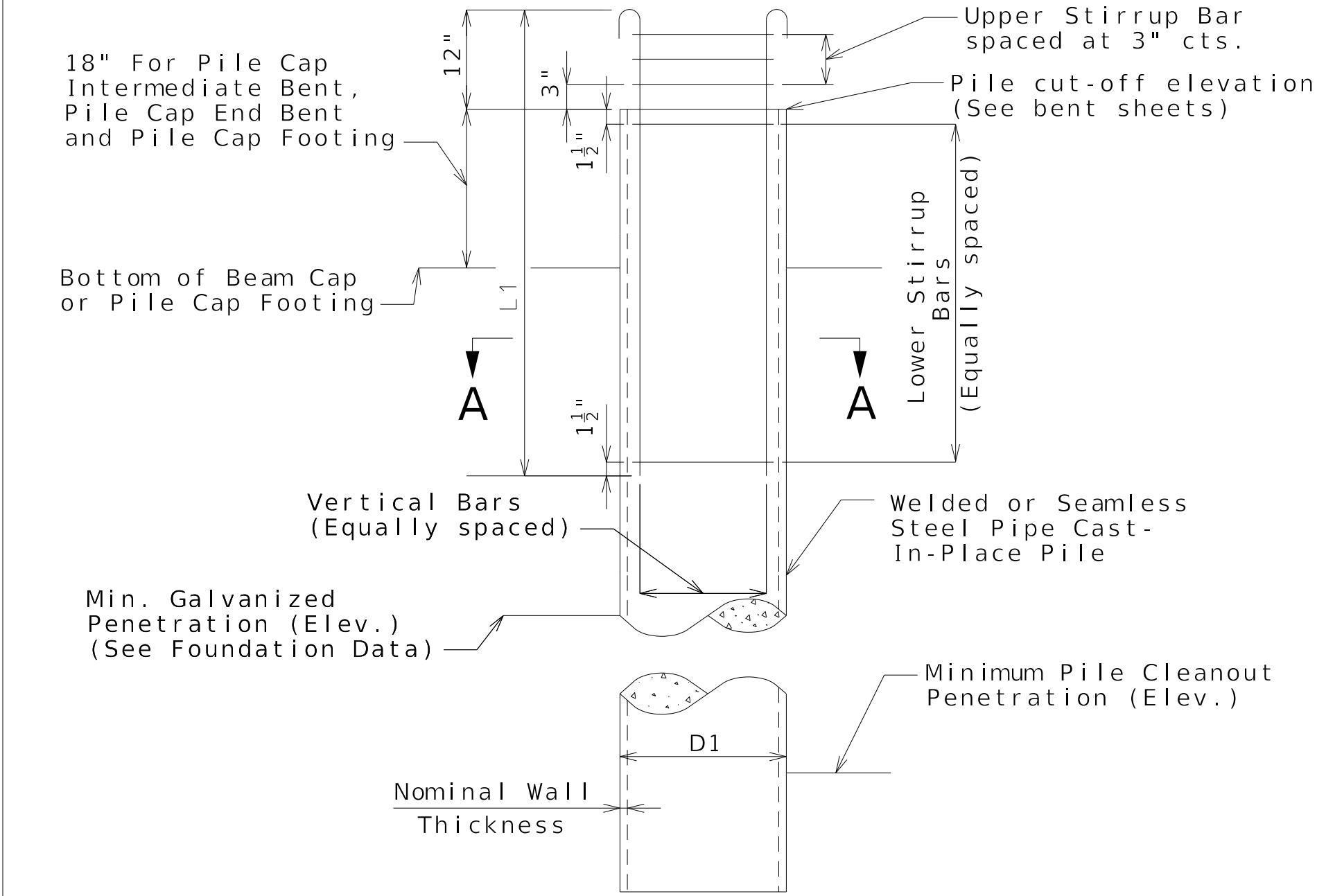
09/13/24

10/01/24

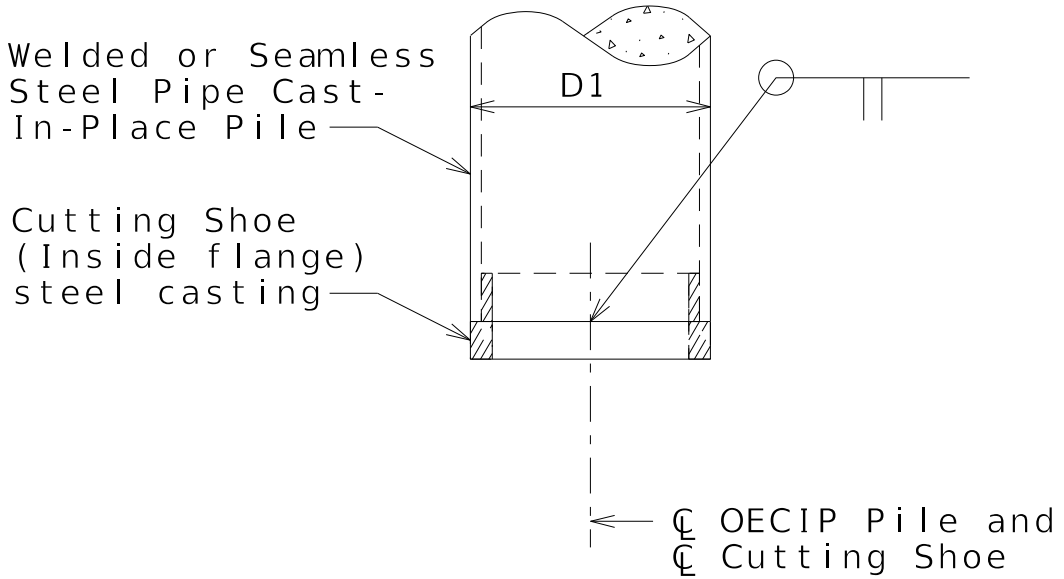
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102

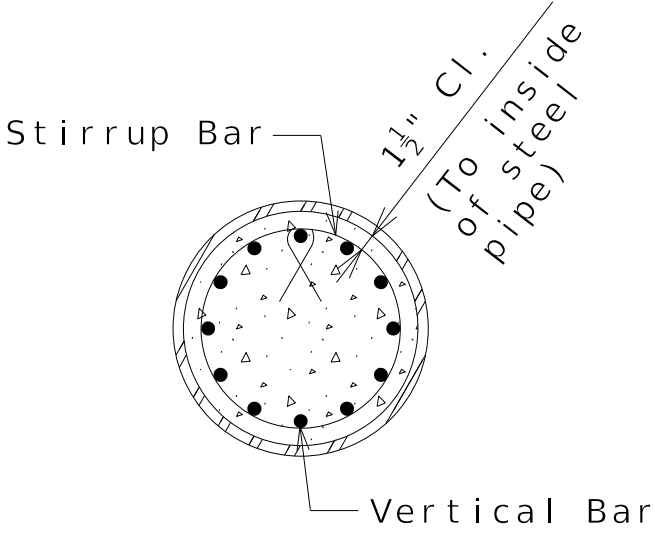
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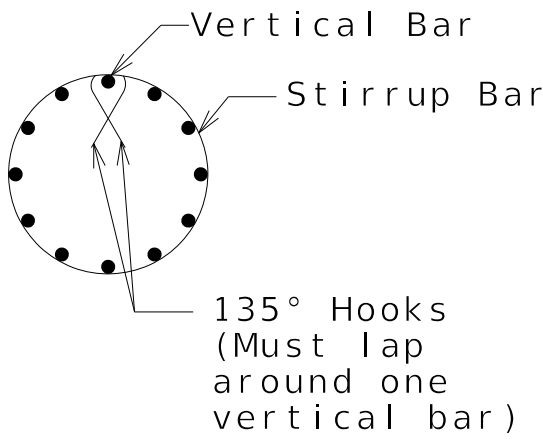
GALVANIZED OPEN ENDED CAST-IN-PLACE (OECIP)
CONCRETE PILE
WITHOUT PILE POINT REINFORCEMENT



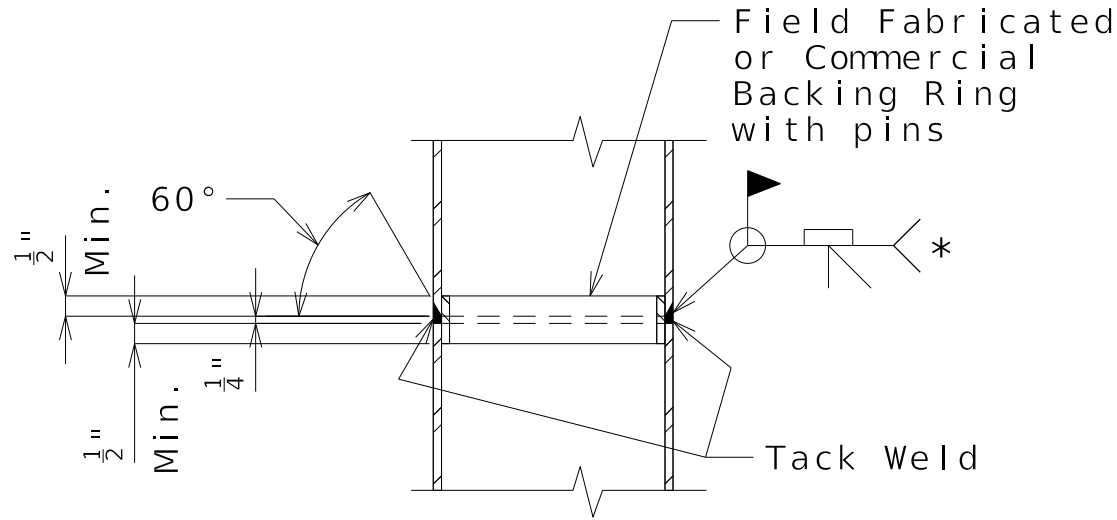
MANUFACTURED OPEN ENDED
CUTTING SHOE (INSIDE FLANGE)



SECTION A-A



DETAIL OF SEISMIC
STIRRUP BAR



STEEL PIPE PILE SPLICE

* Galvanizing material shall be omitted or removed one inch clear of weld locations in accordance with Sec 702.

GALVANIZED OPEN ENDED CAST-IN-PLACE (OECIP) CONCRETE PILE DATA	
Bent Number	2
D1, OECIP Pile (O.D.)	24"
Min. Nominal Wall Thickness	5/8"
Pile Point Reinforcement	None
Min. Pile Cleanout Penetration (Elev.)	Bottom of Prebore
Vertical Bars	12-#6-V200
L1, Length of Vertical Bars	7'-3"
Upper Stirrup Bars	3-#4-P200
Lower Stirrup Bars	7-#4-P200

Notes:

Welded or seamless steel shell (pipe) shall be ASTM A252 Grade 3 (fy = 45,000 psi).

Open ended pile shall be set in prebored holes and augered out to the minimum pile cleanout penetration elevation if necessary and filled with Class B-1 concrete.

Concrete for cast-in-place pile shall be Class B-1.

The minimum wall thickness of any spot or local area of any type shall not be more than 12.5% under the specified nominal wall thickness.

Splices of pipe for cast-in-place pipe pile shall be made watertight and to the full strength of the pipe above and below the splice to permit hard driving without damage. Pipe damaged during driving shall be replaced. Pipe sections used for splicing shall be at least 5 feet in length.

At the contractor's option, the hooks of vertical bars embedded in the beam cap may be oriented inward or outward.

Reinforcing steel for cast-in-place pile is included in the Bill of Reinforcing Steel.

For Foundation Data table, see Sheet No. 2.



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ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 16

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION	REV.	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW		
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION		

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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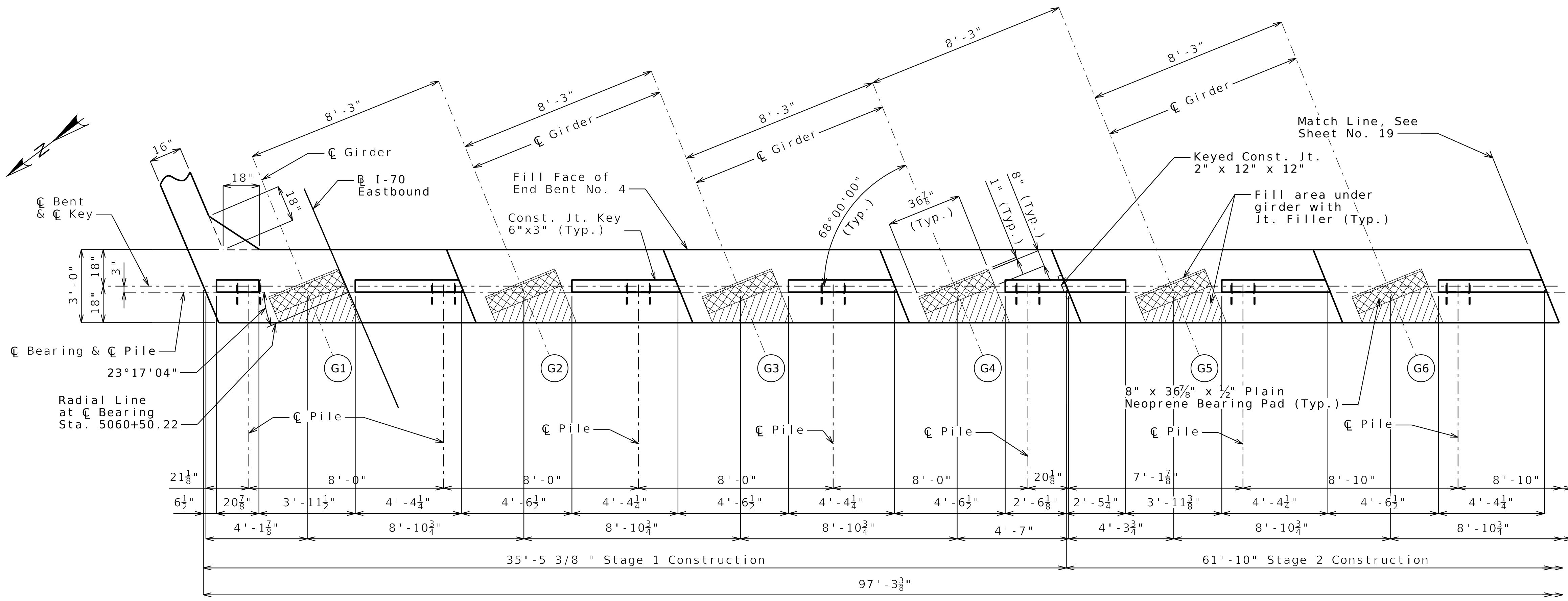
MoDOT

MoDOT IMPROVE I-70 DB PROJECT 1

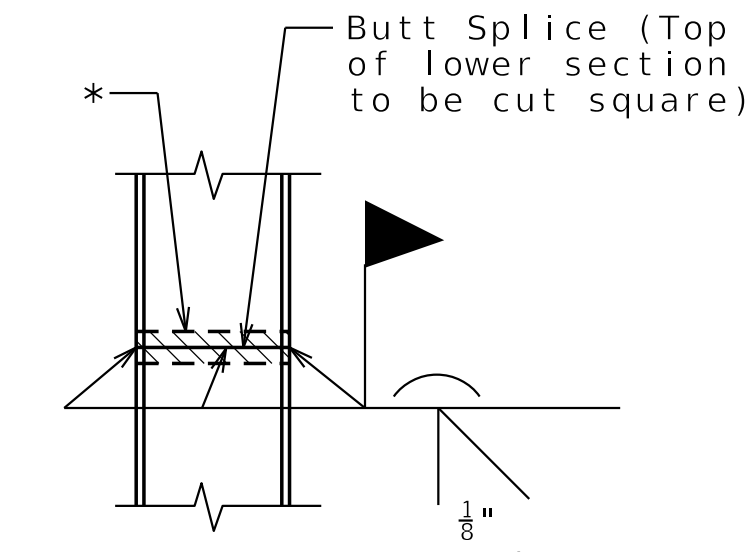
Jacobs

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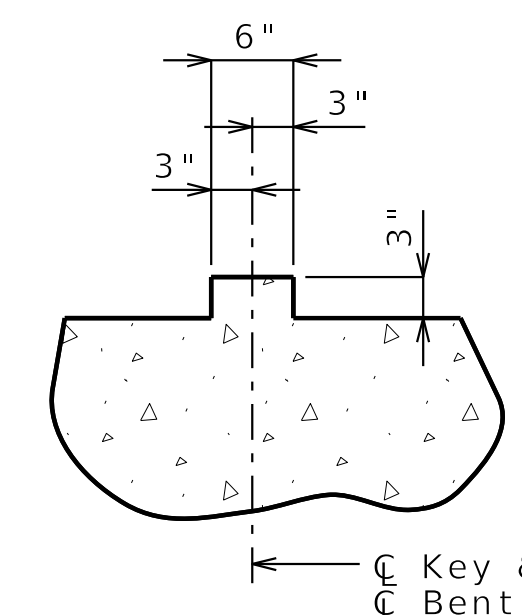


PLAN OF BEAM

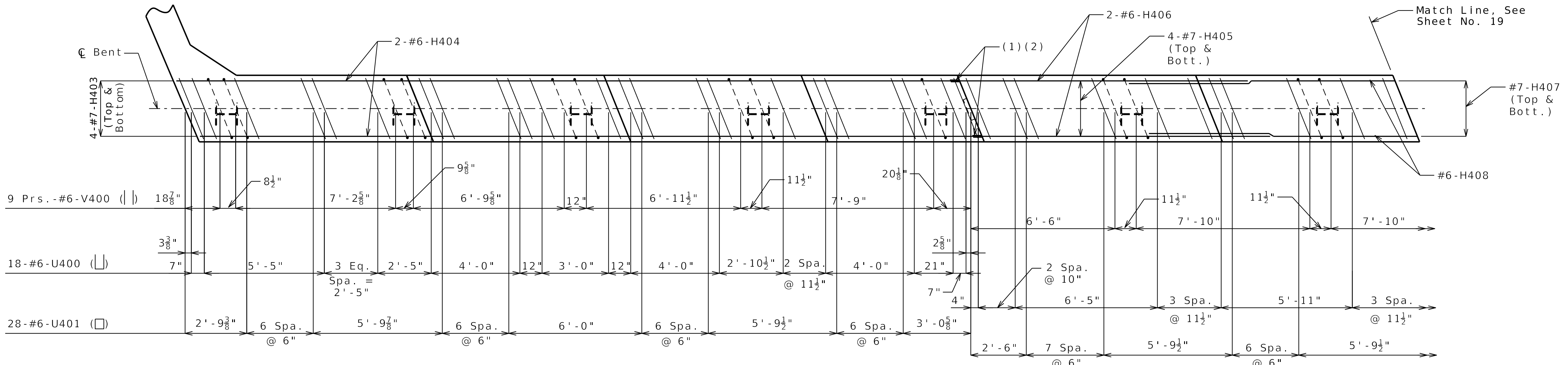


STEEL PILE SPLICE
(If required)

* Galvanizing material shall be omitted or removed one inch clear of weld locations in accordance with Sec 702.



SECTION THRU KEY



PLAN OF BEAM SHOWING REINFORCEMENT

- (1) 4-MBS H403-H405 (Top & Bott.)
- (2) 2-MBS H404-H406 (Each Face)

Keys not shown for clarity.

Notes:

Work this sheet with Sheets No. 19, 20, 21 and 22.

All U bars and pairs of V bars shall be placed parallel to construction chord.

Reinforcing steel shall be shifted to clear piles. U bars shall clear by at least 1 1/2 inches.

For details of Vertical Drain at End Bents, see Sheet No. 11.

DETAILS OF END BENT 4

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 18 of 56

Detailed AUG 2024
Checked AUG 2024



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1-OCT-2024	
ROUTE 70EB	STATE MO
DISTRICT BR	SHEET NO. 18
COUNTY BOONE	
JOB NO. JST0021	
CONTRACT ID.	

PROJECT NO.	
BRIDGE NO. A9542	

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

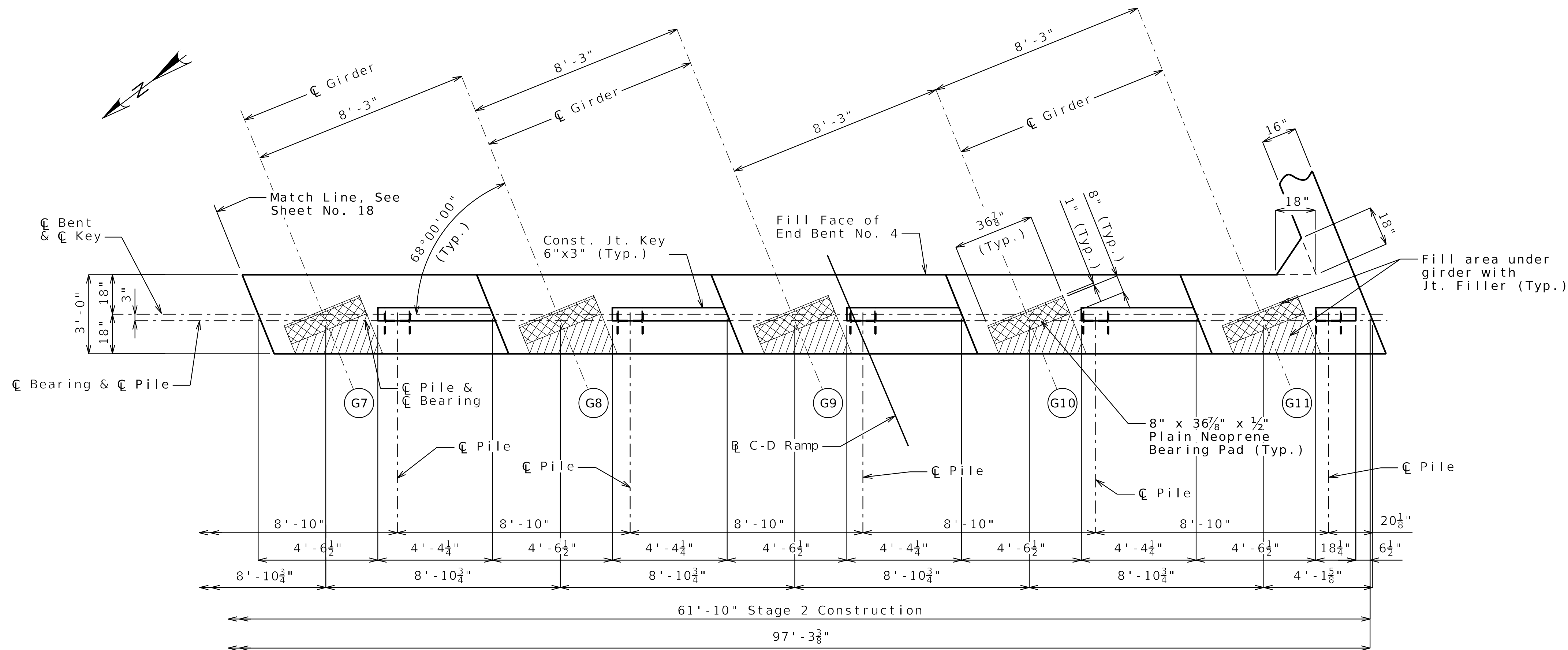
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MODOT IMPROVE I-70 DB PROJECT 1

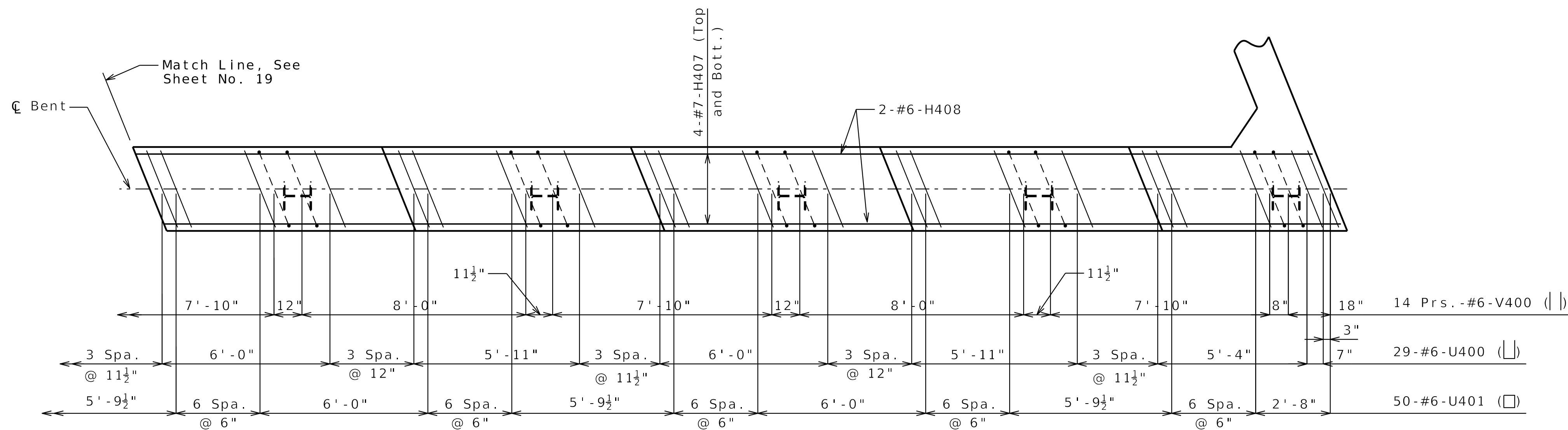
MILLSTONE WEBER

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PLAN OF BEAM



PLAN OF BEAM SHOWING REINFORCEMENT
Keys not shown for clarity.

DETAILS OF END BENT 4

Notes:

Work this sheet with Sheets No. 18, 20 thru 22.

All U bars and pairs of V bars shall be placed parallel to construction chord.

Reinforcing steel shall be shifted to clear piles. U bars shall clear by at least 1 1/2 inches.

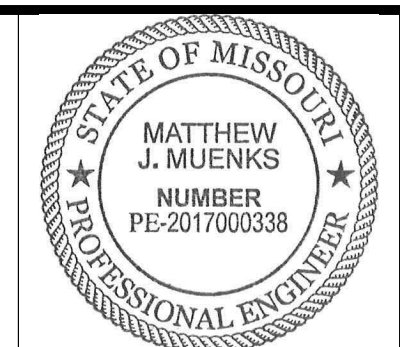
For details of Vertical Drain at End Bents, see Sheet No. 11.

Detailed AUG 2024
Checked AUG 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 19 of 56

pw://jacobs-us-va-pw.bentley.com:jacobs-us-va-pw-04/Documents/F3X03001 - Improve I-70 Columbia to Kingdom City/30 Project Data/AAA_Packages/B2200 (Bridge 2-EB I-70 & CD Rd over Hinkson Creek)/B_A9542_019_JST0021_End Bent_4-2.dgn



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DATE PREPARED

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ROUTE STATE

70EB MO

DISTRICT SHEET NO.

BR 19

COUNTY

BOONE

JOB NO.

JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.

A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
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MoDOT

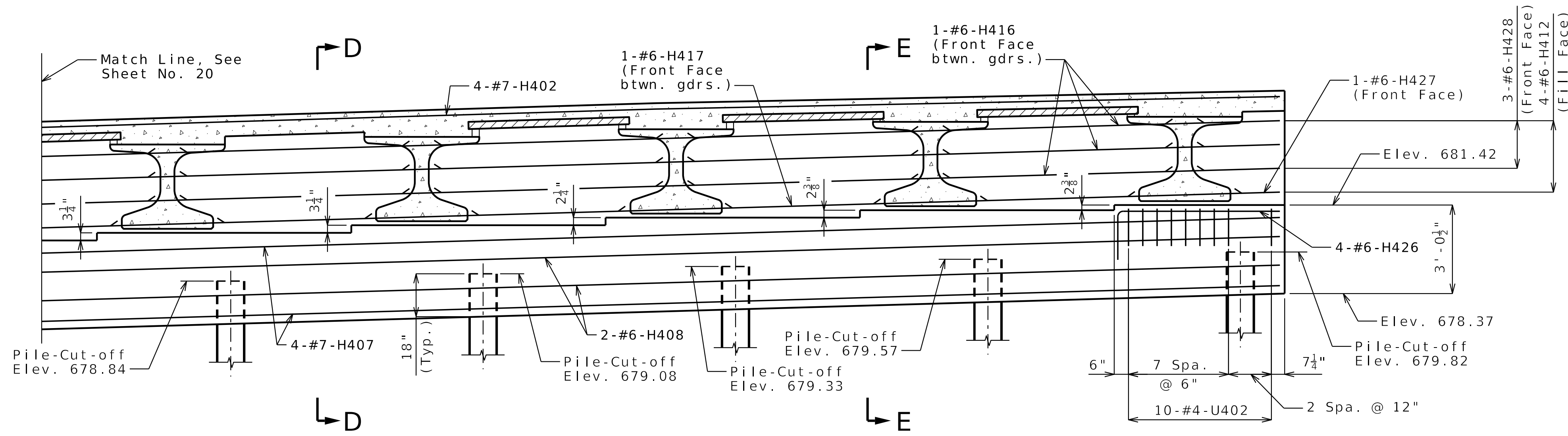
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MILLSTONE WEBER

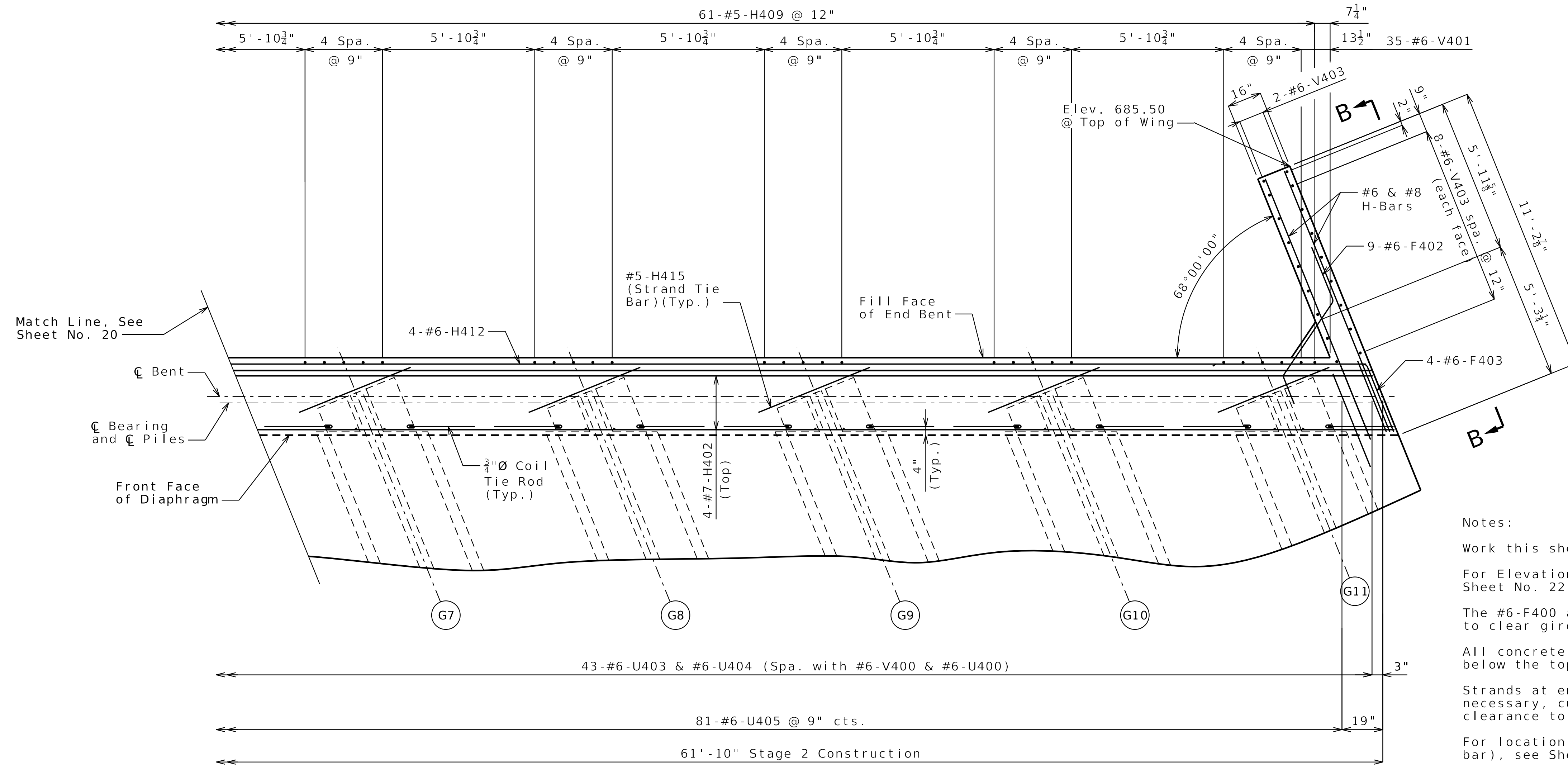
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PART SECTION NEAR END BENT



PART PLAN

DETAILS OF END BENT 4

- Notes:
- Work this sheet with Sheet Nos. 18 thru 20 and 22.
 - For Elevation B-B and Sections D-D and E-E, see Sheet No. 22.
 - The #6-F400 and #6-F402 bars shall be bent in the field to clear girders.
 - All concrete in the end bent above the top of beam and below the top of slab shall be Class B-2.
 - Strands at end of girders shall be field bent, or if necessary, cur in field to maintain 1 1/2-inch minimum clearance to fill face of end bent.
 - For location of coil tie rods and #5-H415 (strand tie bar), see Sheets No. 29 and 30.
 - For details of vertical drain at end bents, see Sheet No. 11.
 - For details of bridge approach slab, see Sheet No. 47.

STATE OF MISSOURI

MATTHEW J. MUENKES

NUMBER PE-2017000338

PROFESSIONAL ENGINEER

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MO PE-2017000338

DATE PREPARED

1-OCT-2024

ROUTE 70EB

STATE MO

DISTRICT BR

SHEET NO. 21

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION
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MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

MODOT

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

MODOT IMPROVE I-70 DB PROJECT 1

JACOBS

MILLSTONE WEBER

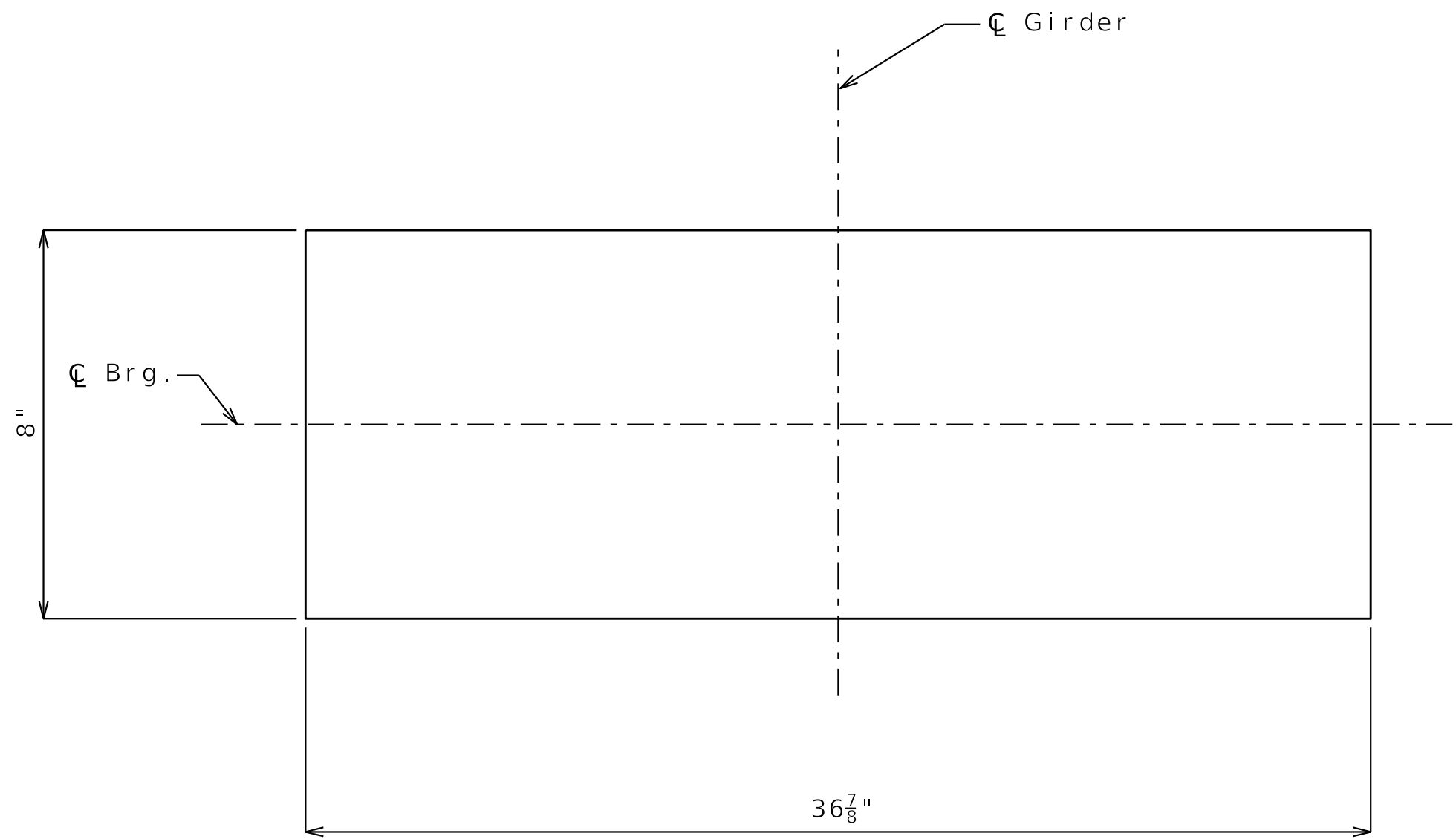
Detailed AUG 2024
Checked AUG 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 21 of 56

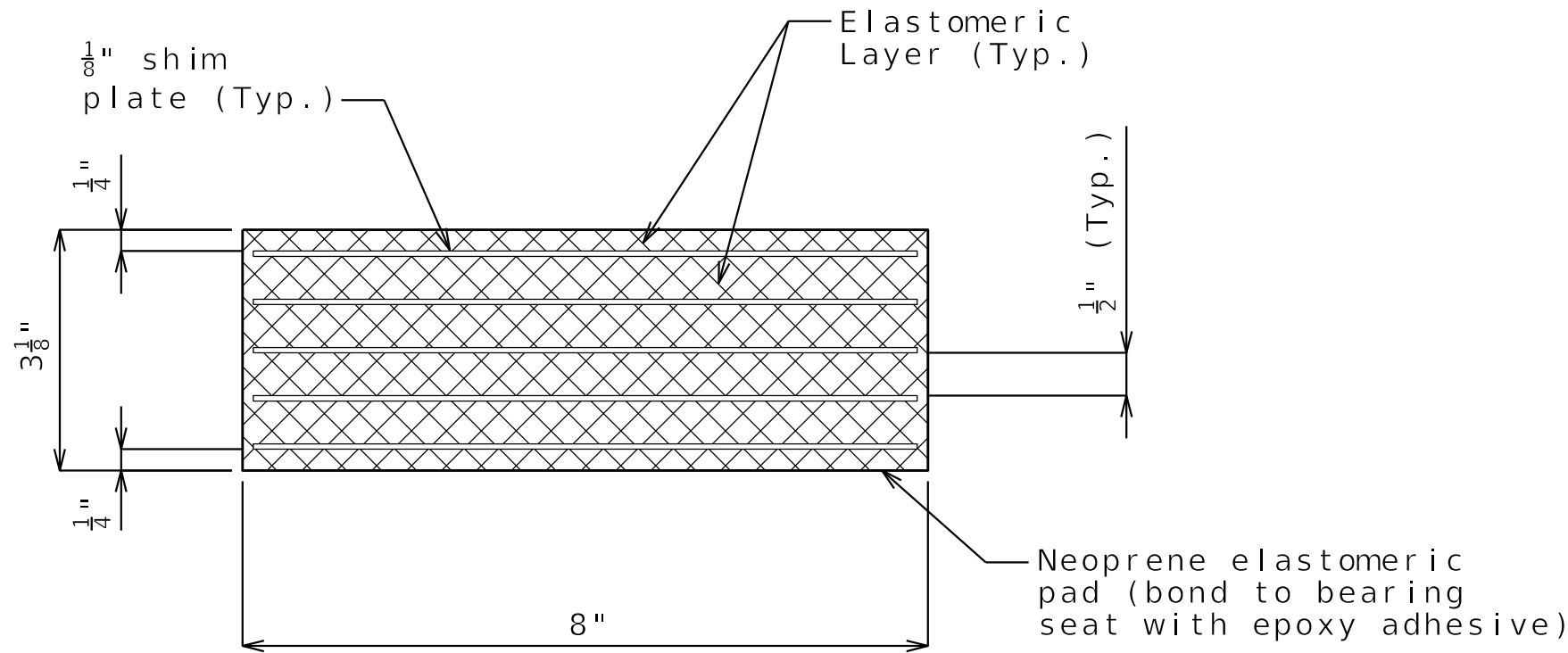
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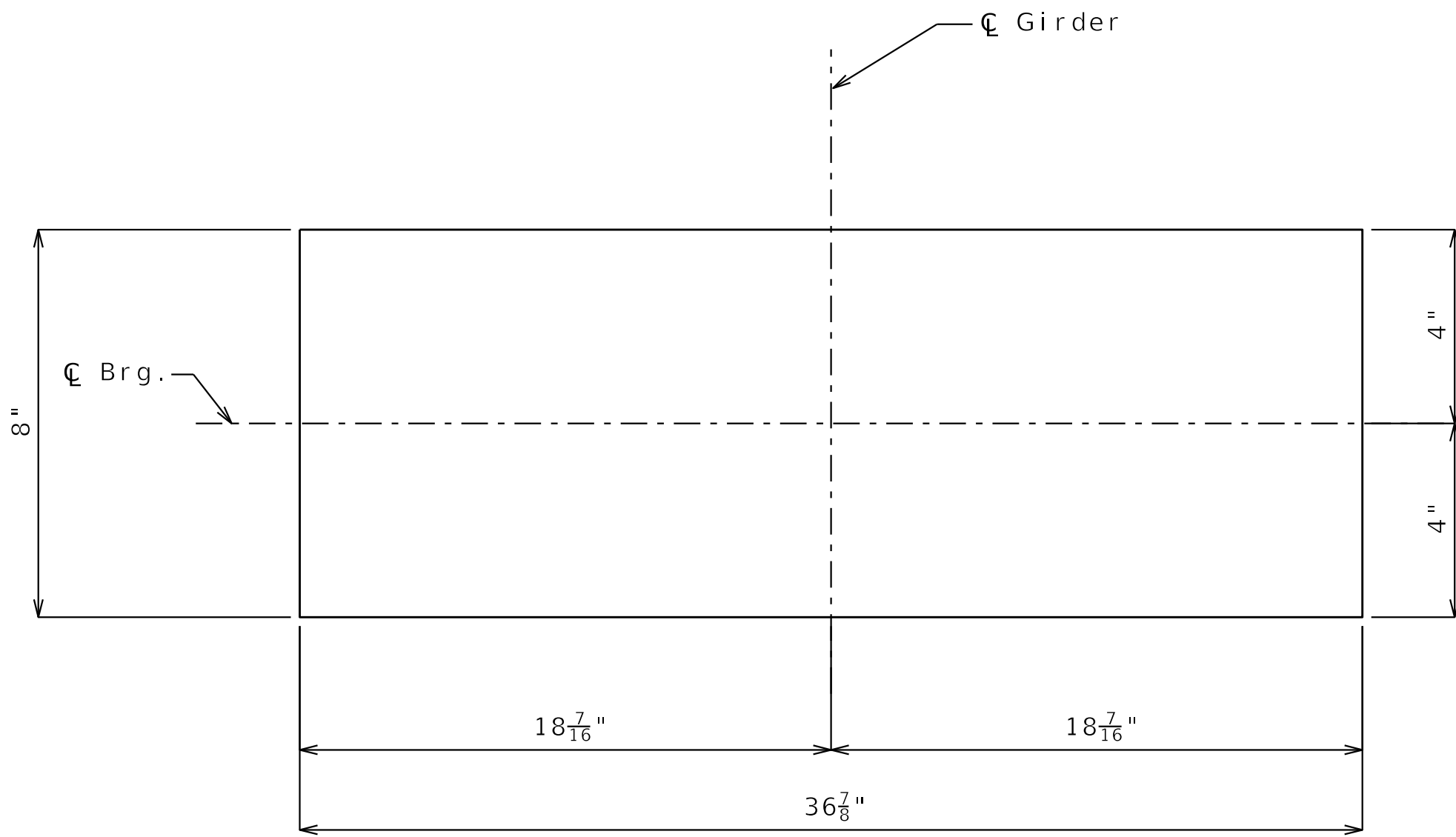
TYPICAL PLAN OF BEARINGS

Note: Neoprene Elastomeric Pads shall be 60 Durometer.



END VIEW OF BEARINGS

BEARING PADS AT FIXED BENTS



BEARING PADS AT END BENTS

Note: Neoprene Elastomeric Pads shall be 1/2" 60 Durometer.



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1-OCT-2024

ROUTE STATE

70EB MO

DISTRICT SHEET NO.

BR 23

COUNTY

BOONE

JOB NO.

JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.

A9542

DESCRIPTION

REV. A - FINAL REVIEW

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09/13/24

10/01/24

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

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REV.

NEOPRENE BEARING PADS

Detailed APR 2024
Checked JUN 2024

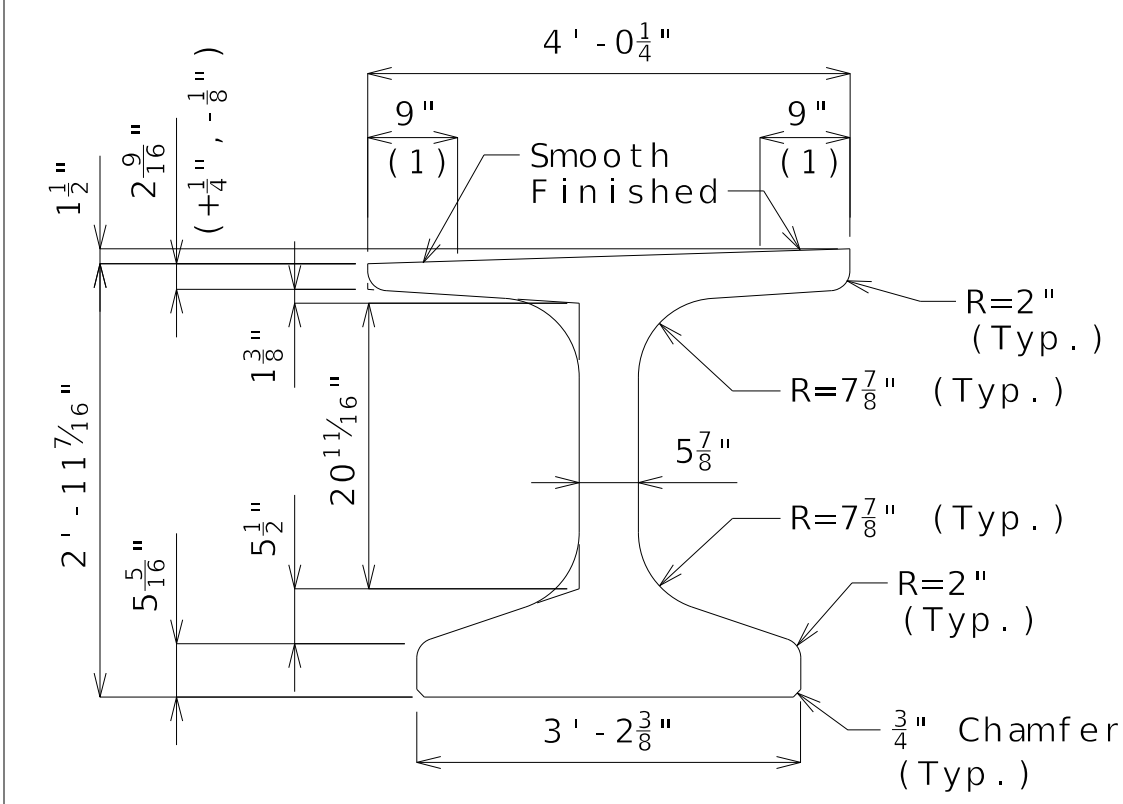
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 23 of 56



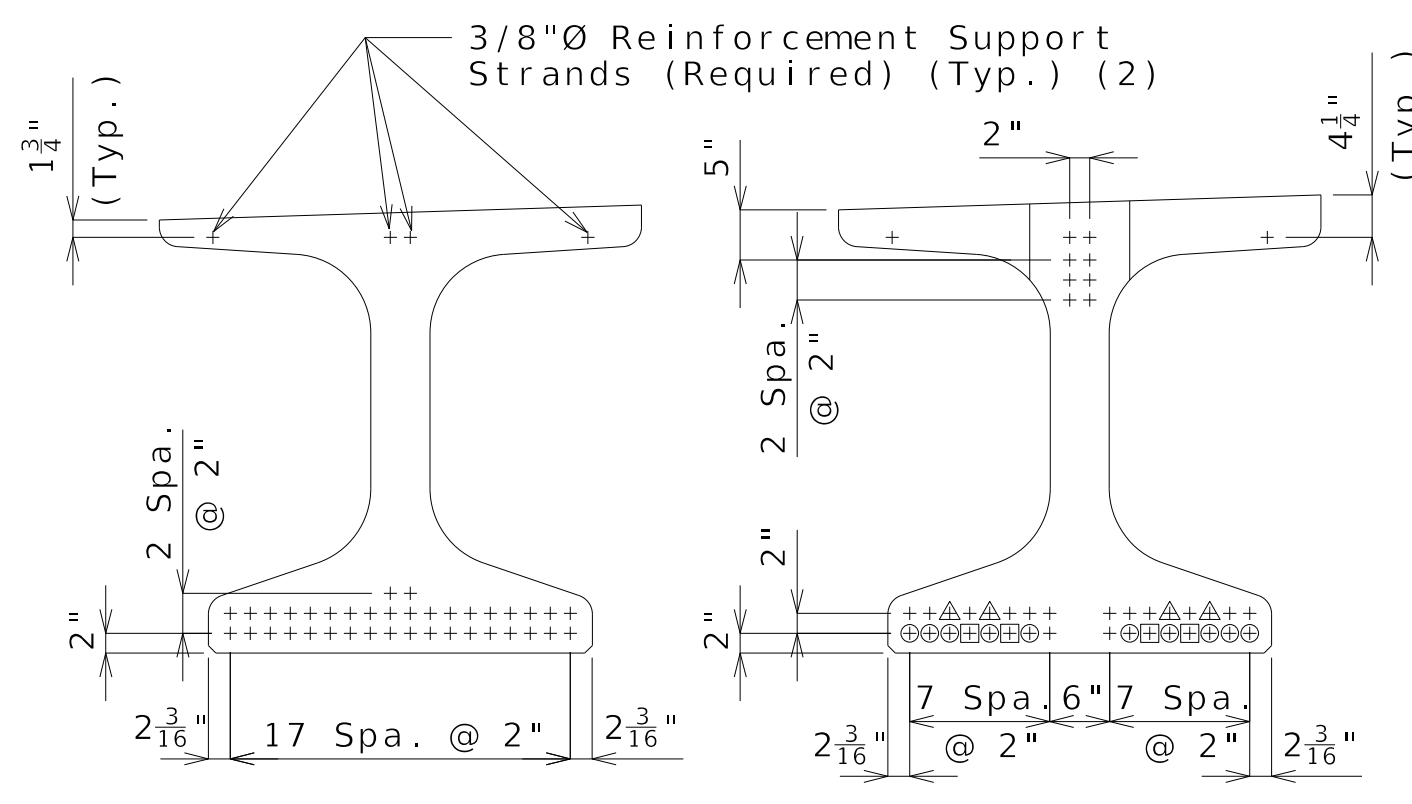
16:13 1-OCT-2024

(1) Fabricator shall apply a bond breaker to this region excluding where joint filler will be applied.



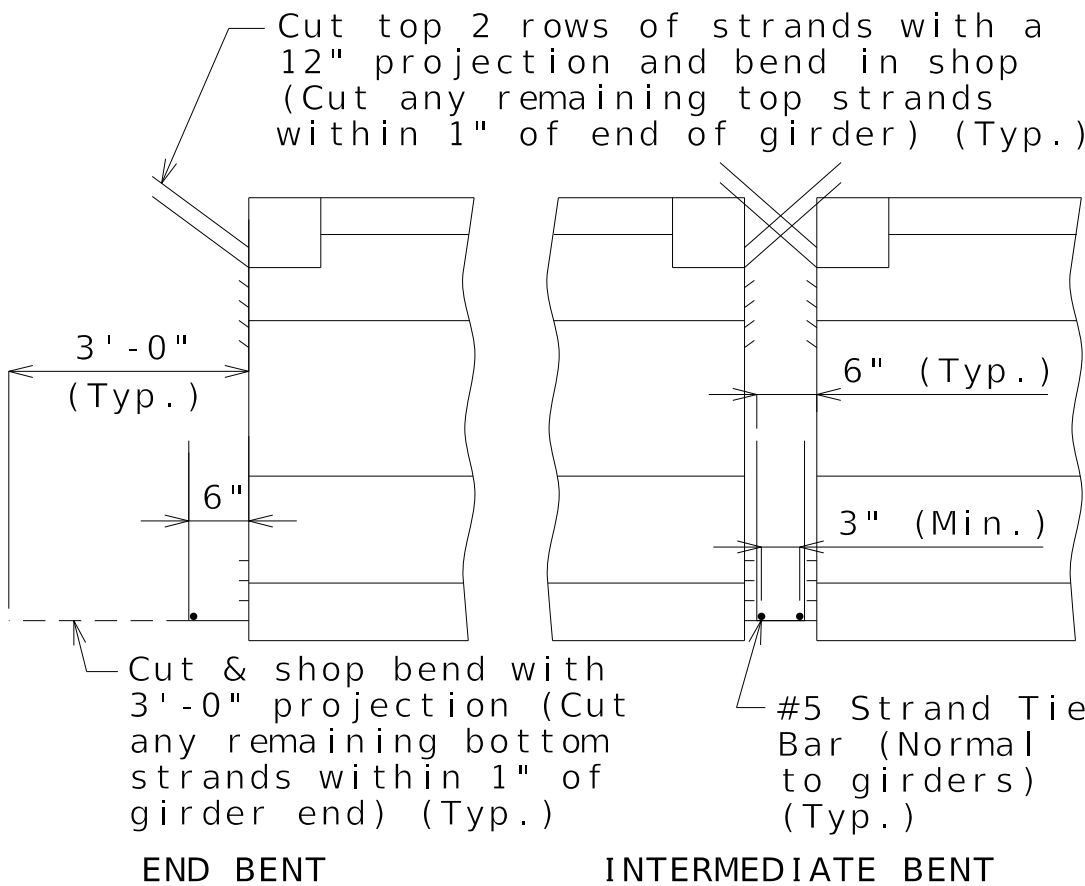
GIRDER DIMENSIONS
AT CL GIRDER

(2) Outer strands tensioned to 2.02 kips/strand and inner strands to 8 kips/strand. Placed symmetrical about CL Girder. May be moved laterally in pairs.

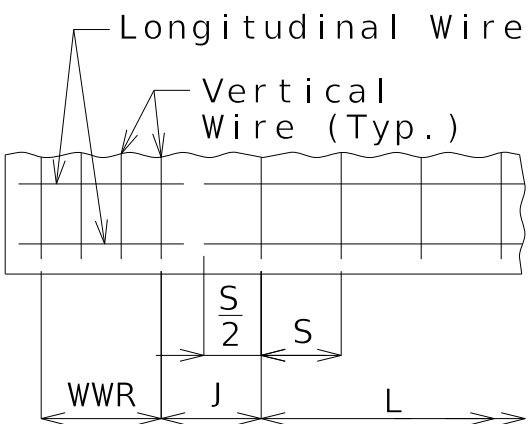


CL GIRDER
STRAND ARRANGEMENT

- + Indicates prestressing strand.
- Indicates cut & shop bend with 3'-0" projection.
- Indicates debonded for 7'-0" from end of girder
- △ Indicates debonded for 3'-6" from end of girder

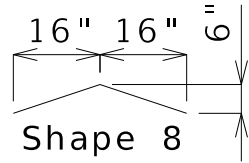


END BENT
INTERMEDIATE BENT
STRANDS AT GIRDER ENDS

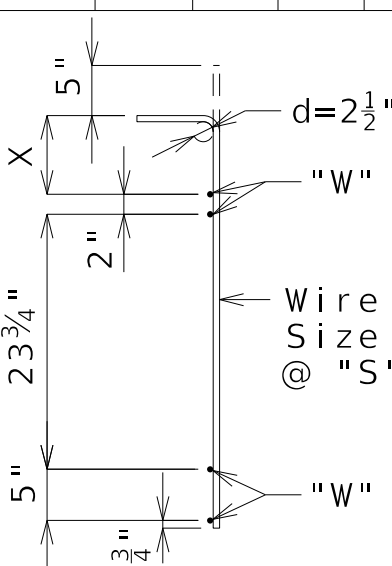


WELDED WIRE
PLACEMENT

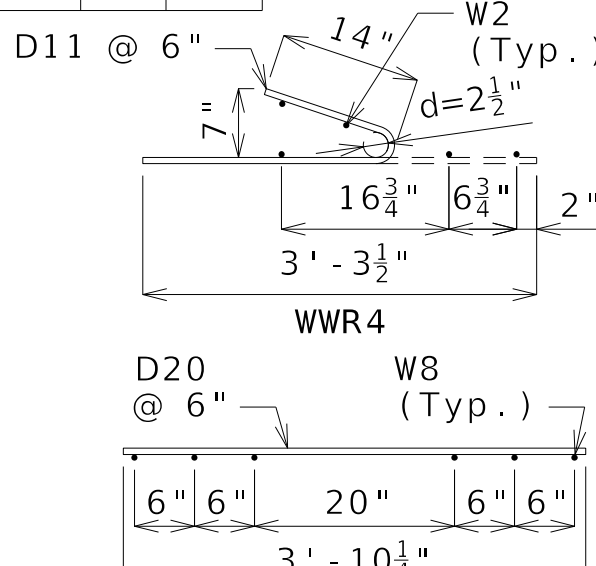
- S = Vertical wire spacing
- L = Length of WWR mats
- J = Distance between WWR mats

Bill of Reinforcing Steel				
Bars Each Girder				Bending Diagrams  Shape 8
No.	Size/Mark	Length	Shape	
120	3 G1	2' - 10"	8	
2	4 G3	4' - 1 $\frac{1}{8}$ "	20	
2	4 G4	2' - 3"	20	
2	4 G5	2' - 10 $\frac{5}{8}$ "	20	
3	4 G6	Varies	20	

Welded Wire Each Girder						
Mark	Size	S	W	L	J	X
WWR1	D31	4"	W12	10' - 8"	6"	10 $\frac{1}{2}$ "
WWR2	D31	8"	W12	8' - 0"	9 $\frac{3}{4}$ "	10 $\frac{1}{2}$ "
WWR3	D31	12"	W12	56' - 0"	-	9 $\frac{1}{2}$ "
WWR6	D31	2"	W12	16"	3"	8 $\frac{1}{2}$ "



WWR1, WWR2,
WWR3 & WWR6



WWR4

WWR5

All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1", unless otherwise shown.

All bar reinforcement shall be Grade 60.

WWR shall not be epoxy coated.

G4 and G5 not required for interior girders. G3 and G6 not required for exterior girders of intermediate spans.

General Notes:

Concrete for prestressed beams shall be Class A-1 with f'c = 8000 psi and f'ci = 6500 psi.

Use 38 strands, 0.6"Ø Grade 270, with an initial prestress force of 1670 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

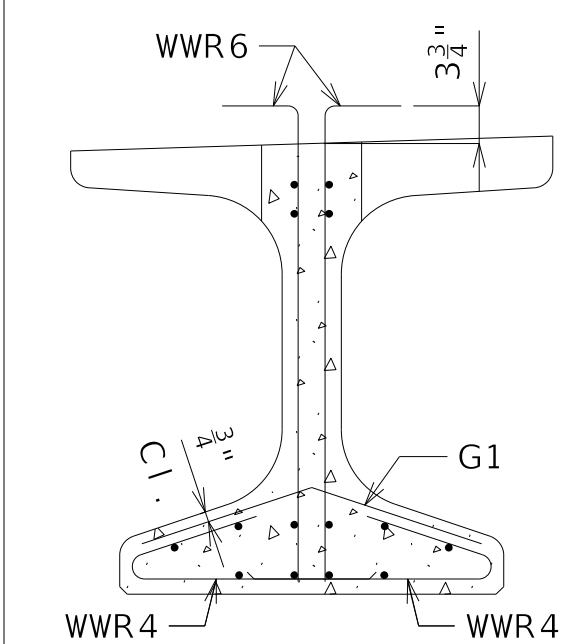
Exterior and interior girders are the same except: coil ties, top flange blackout, application of bond breaker, coil inserts for slab drains.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders.

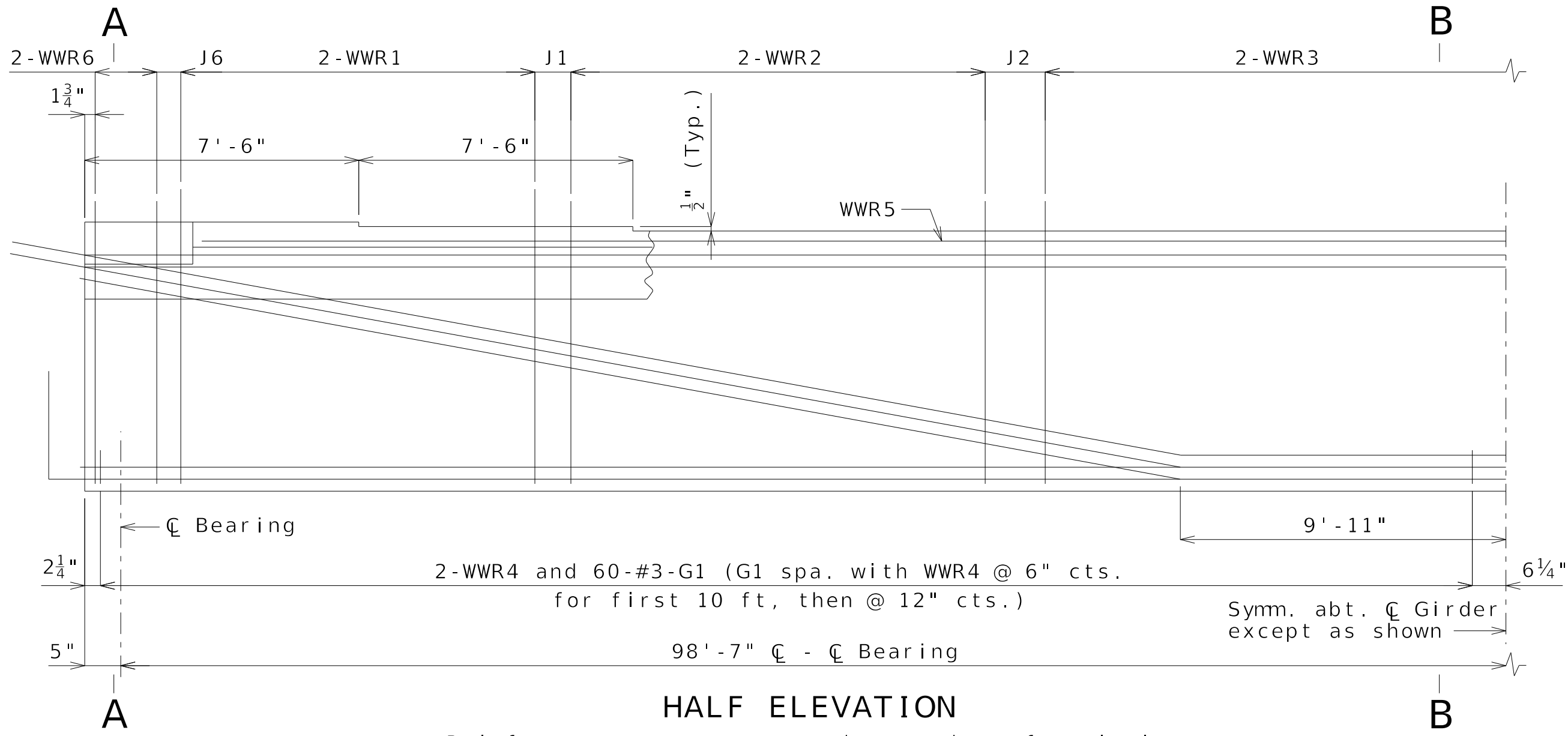
For Girder Camber Diagram, see Sheet No. 36.

For location of coil inserts at slab drains, see Sheet No. 35.

For location of coil ties at concrete diaphragms, see Sheet Nos. 31 and 32.

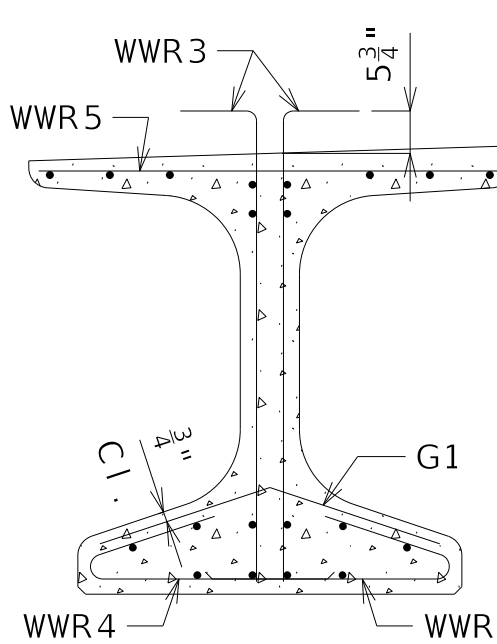


SECTION A-A
Strands not shown for clarity.

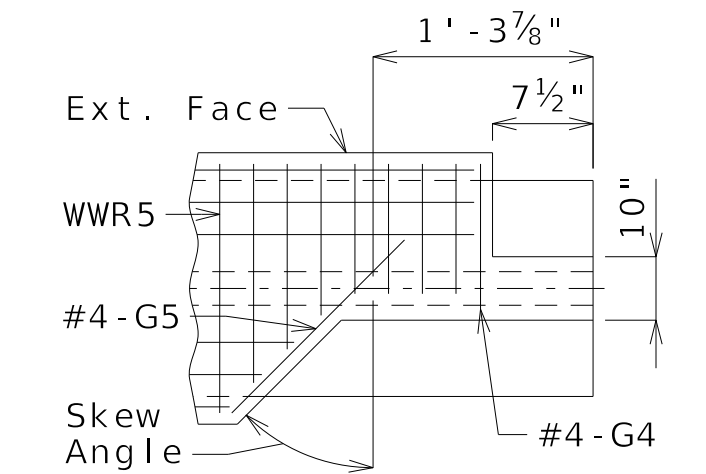
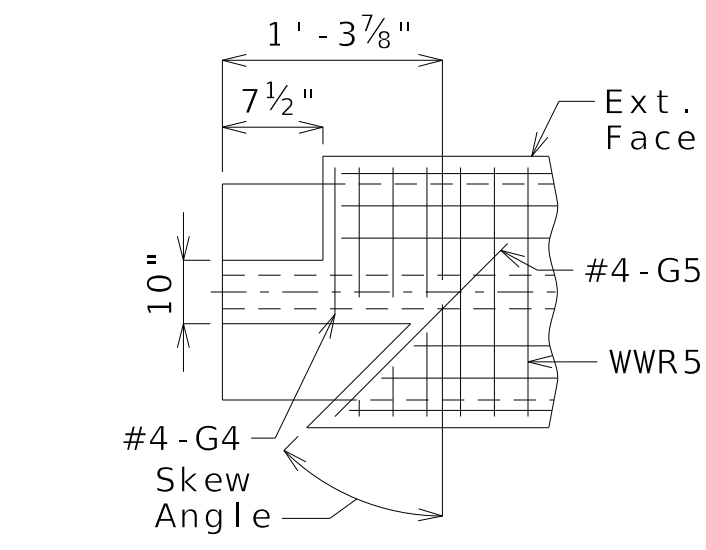


HALF ELEVATION

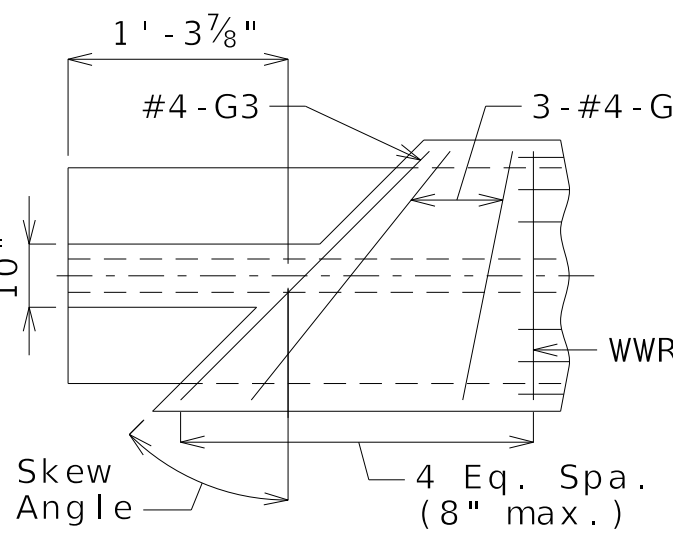
Reinforcement support strands not shown for clarity.



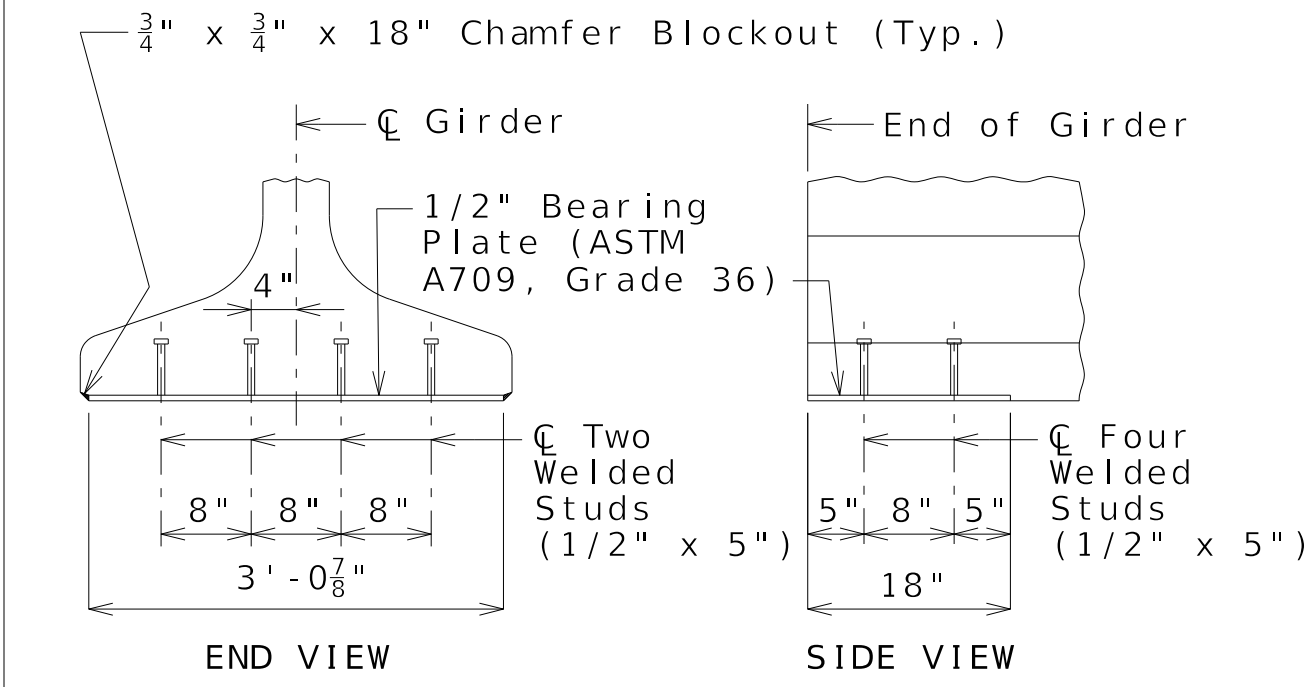
SECTION B-B
Strands not shown for clarity.



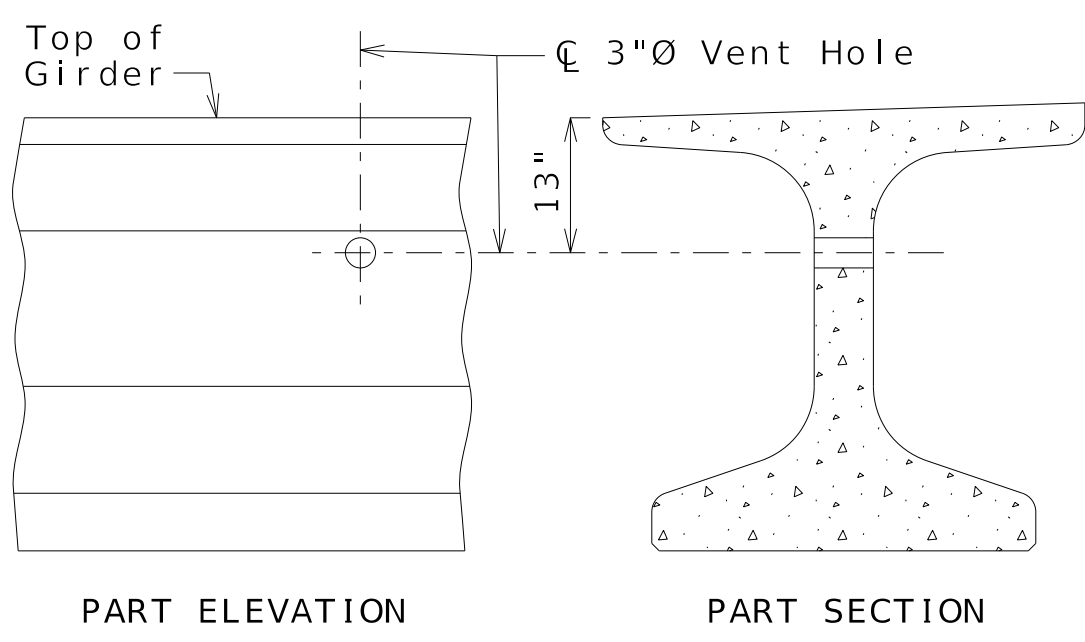
LEFT EXTERIOR GIRDER
Rotate 180° for right ext.



INTERIOR GIRDER AT ALL BENTS
TOP FLANGE BLOCKOUT
Mirror for right advanced.

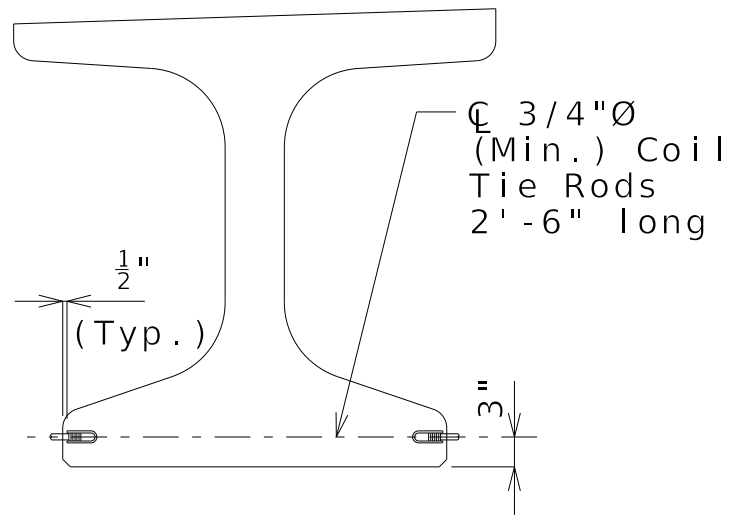


BEARING PLATE



VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2" minimum.



COIL TIES

Exclude coil tie at exterior face of exterior girders.

NU-GIRDERS - SPAN (2-3)-GIRDERS 1-7

Detailed APR 2024
Checked JUNE 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 27 of 56

STATE OF MISSOURI
MATTHEW J. MUENKS
NUMBER
PE-2017000338
PROFESSIONAL ENGINEER

10/1/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED
1-OCT-2024

ROUTE
70EB
DISTRICT
BR

STATE
MO
SHEET NO.
27

COUNTY
BOONE
JOB NO.
JST0021
CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9542

DESCRIPTION
REV. A - FINAL REVIEW
REV. 0 - RELEASED FOR CONSTRUCTION

DATE
09/13/24
10/01/24

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

MoDOT
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

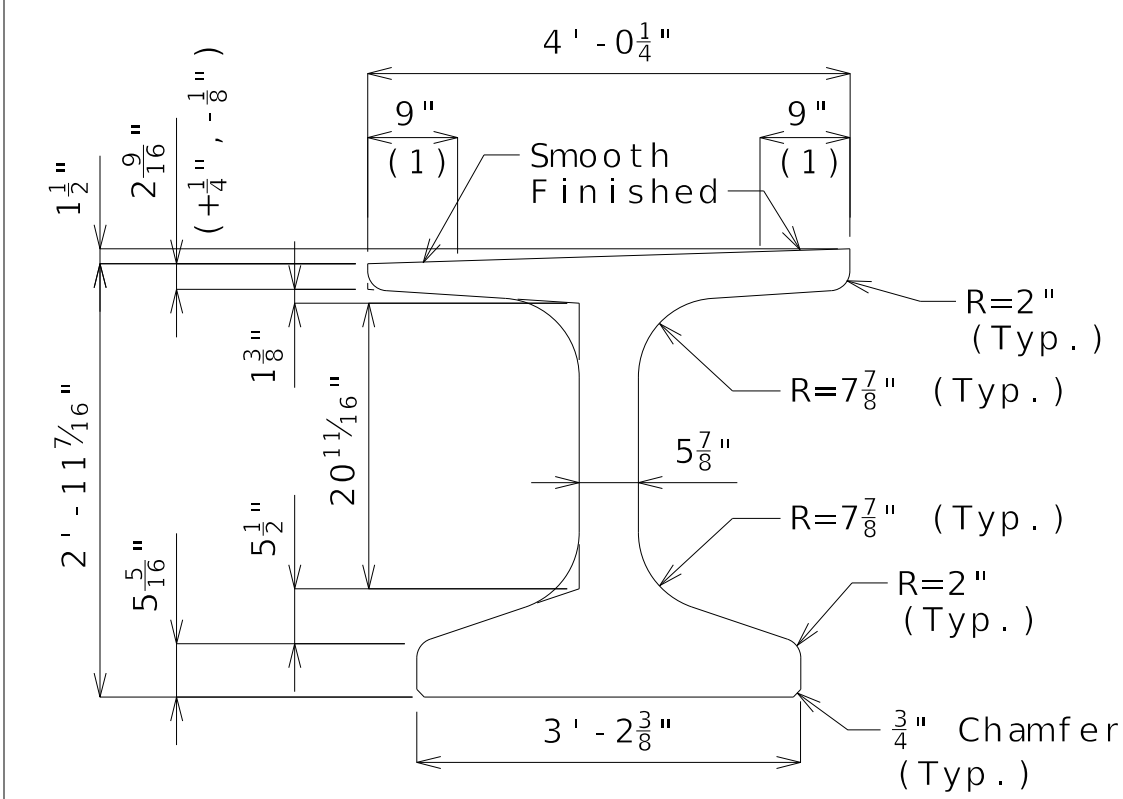
MoDOT
MILLSTONE
WEBER
JACOBS

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

MODOT IMPROVE I-70 DB PROJECT 1

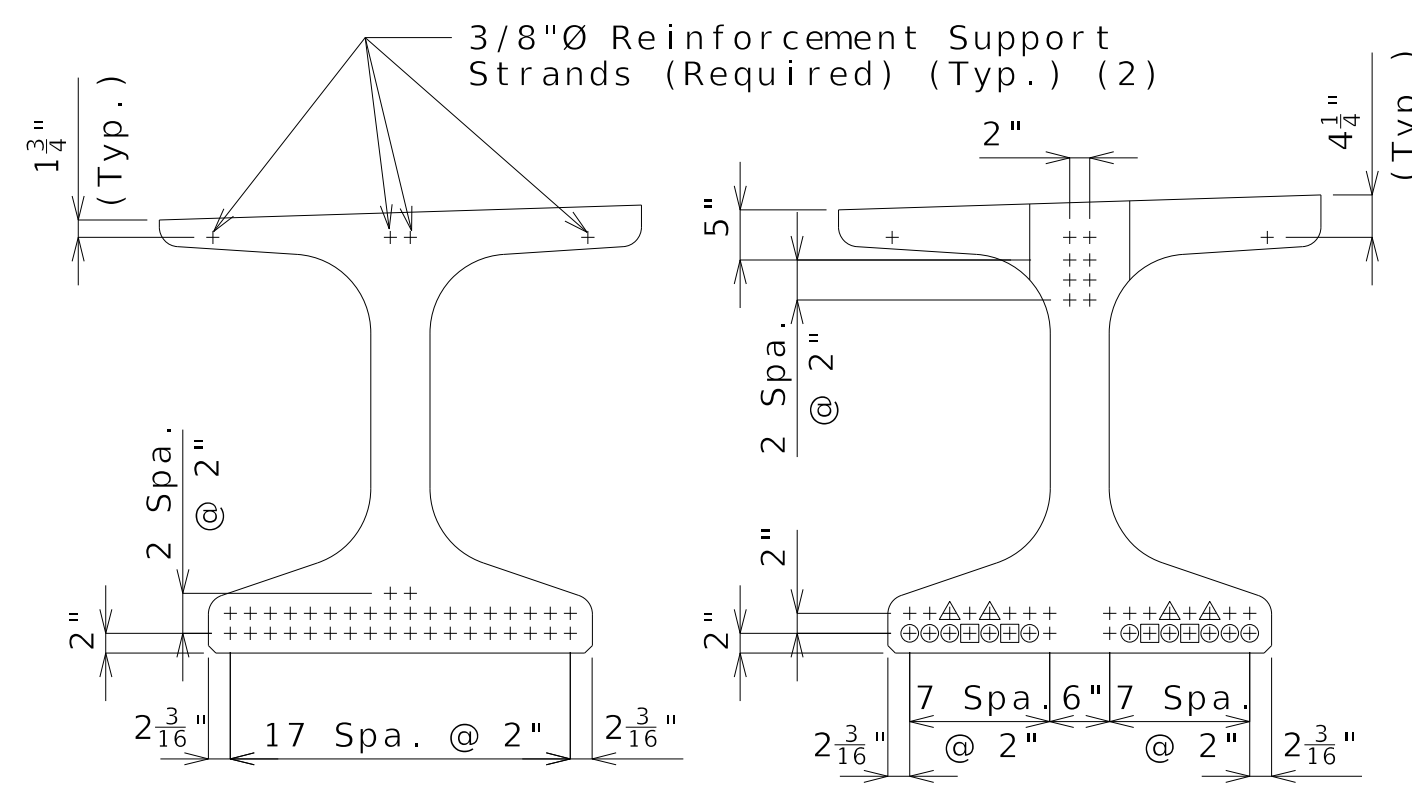
16:17 1-OCT-2024

(1) Fabricator shall apply a bond breaker to this region excluding where joint filler will be applied.



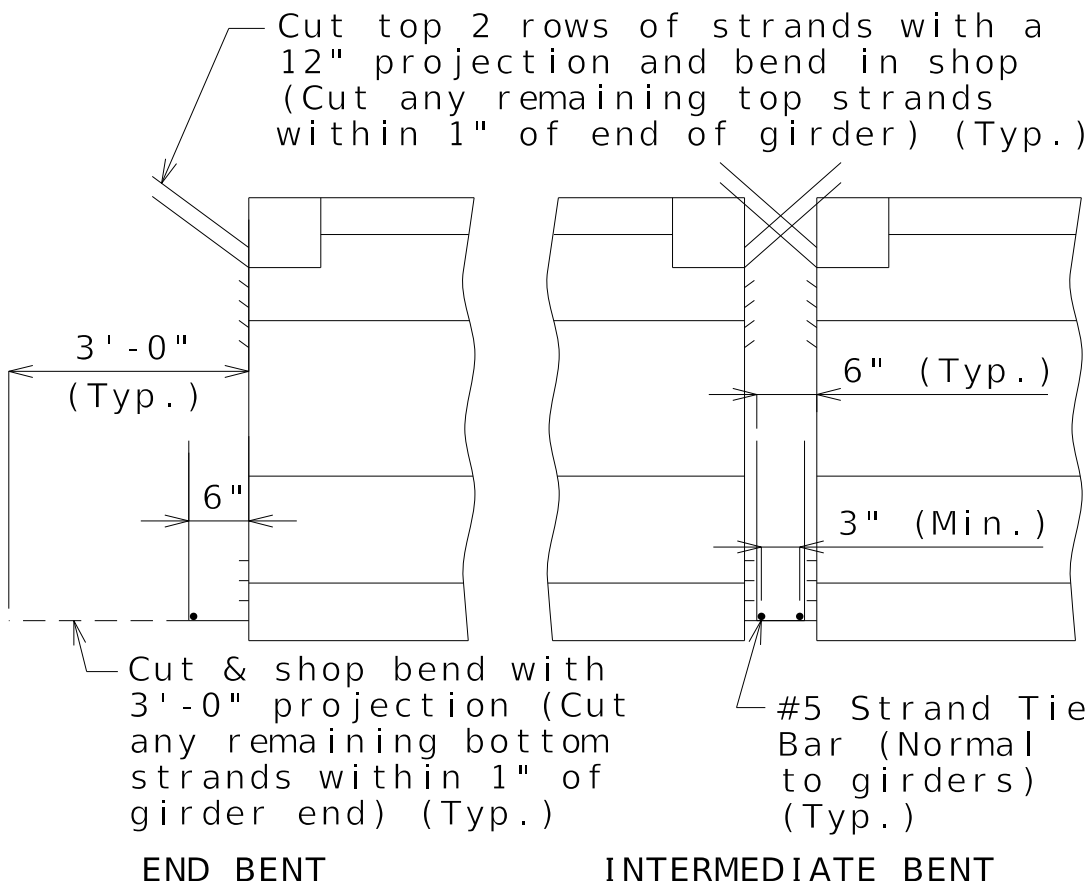
GIRDER DIMENSIONS AT CL GIRDER

(2) Outer strands tensioned to 2.02 kips/strand and inner strands to 8 kips/strand. Placed symmetrical about CL Girder. May be moved laterally in pairs.

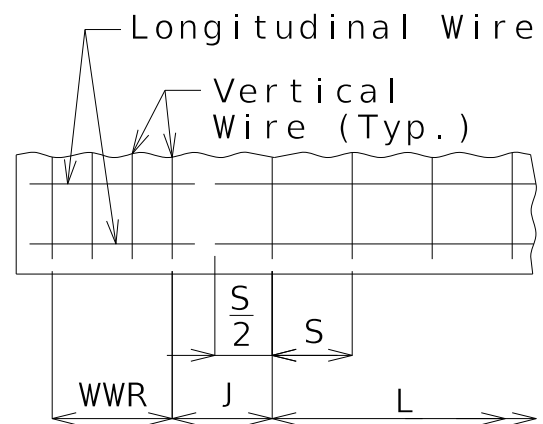


CL GIRDER STRAND ARRANGEMENT

- + Indicates prestressing strand.
- o Indicates cut & shop bend with 3'-0" projection.
- Indicates debonded for 7'-0" from end of girder
- △ Indicates debonded for 3'-6" from end of girder



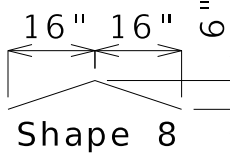
STRANDS AT GIRDER ENDS

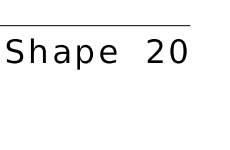


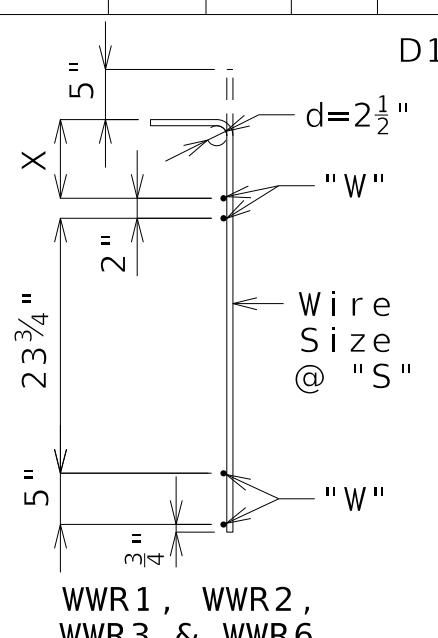
WELDED WIRE PLACEMENT

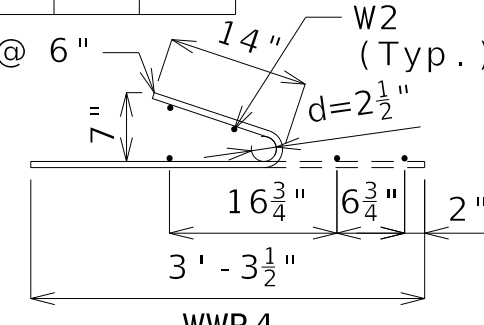
- S = Vertical wire spacing
- L = Length of WWR mats
- J = Distance between WWR mats

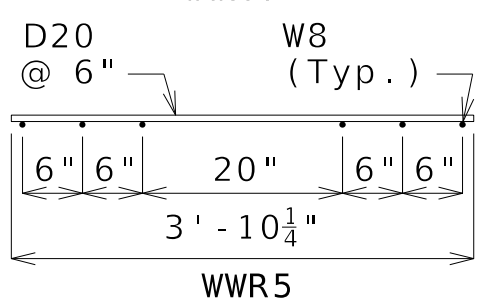
Bill of Reinforcing Steel							Bending Diagrams
Bars Each Girder							
No.	Size	Mark	Length	Shape			
110	3	G1	2' - 10"	8			
2	4	G3	4' - 1 1/8"	20			
1	4	G4	2' - 3"	20			
1	4	G5	2' - 10 3/8"	20			
6	4	G6	Varies	20			
Welded Wire Each Girder							
Mark	Size	S	W	L	J	X	
WWR1	D31	4"	W12	10' - 8"	8"	10 1/2"	
WWR2	D31	8"	W12	8' - 0"	12"	9 1/2"	
WWR3	D31	12"	W12	44' - 0"	-	9 1/2"	
WWR6	D31	2"	W12	16"	3"	8 1/2"	











All dimensions are out to out.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

Actual bar lengths are measured along centerline of bar to the nearest inch.

Minimum clearance to reinforcing shall be 1", unless otherwise shown.

All bar reinforcement shall be Grade 60.

WWR shall not be epoxy coated.

G4 and G5 not required for interior girders. Half no. of G3 and G6 not required for exterior girders of end spans.

General Notes:

Concrete for prestressed beams shall be Class A-1 with f'c = 8000 psi and f'ci = 6500 psi.

Use 38 strands, 0.6"Ø Grade 270, with an initial prestress force of 1670 kips.

Pretensioned members shall be in accordance with Sec 1029.

Fabricator shall be responsible for location and design of lifting devices.

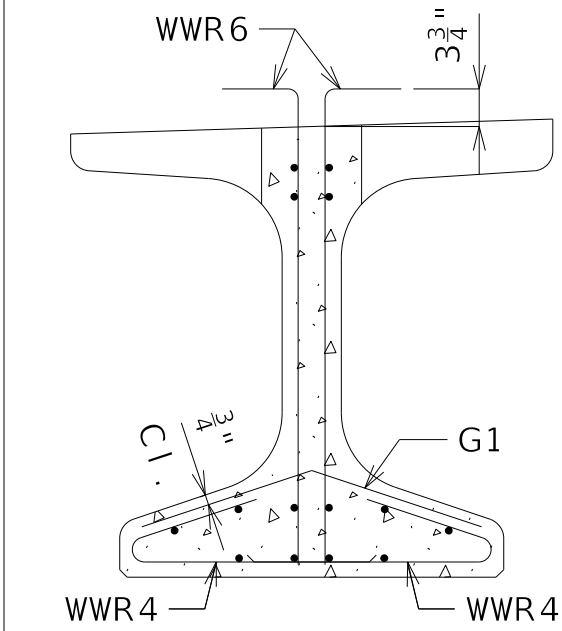
Exterior and interior girders are the same except: coil ties, top flange blackout, application of bond breaker, coil inserts for slab drains.

The contractor shall provide bracing necessary for lateral and torsional stability of the girders during construction of the concrete slab and remove the bracing after the slab has attained 75% design strength. Contractor shall not drill holes in the girders.

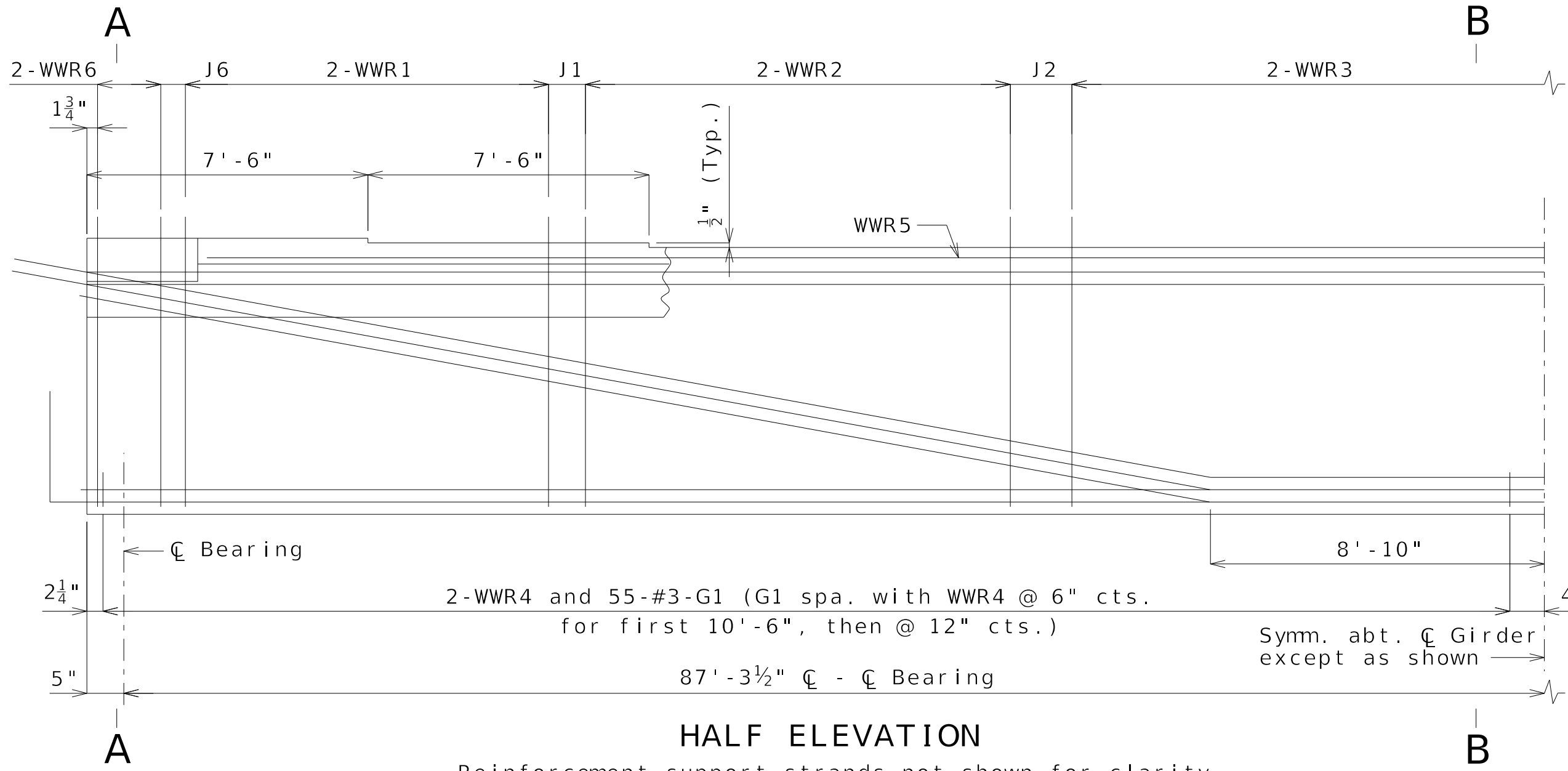
For Girder Camber Diagram, see Sheet No. 36.

For location of coil inserts at slab drains, see Sheet No. 35.

For location of coil ties at concrete diaphragms and integral bents, see Sheets No. 20, 21, 31 AND 32.

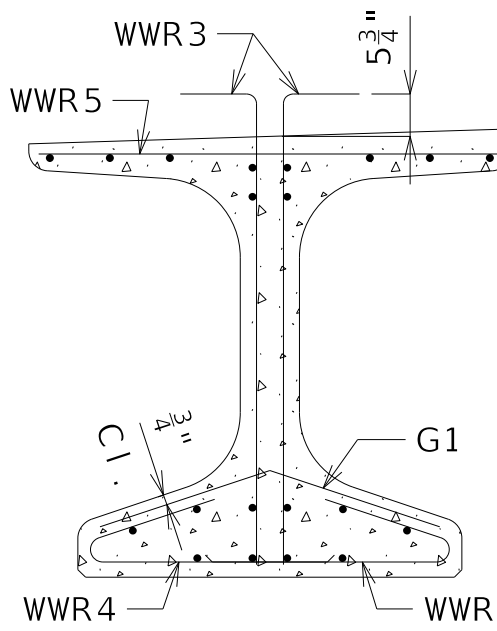


SECTION A-A
Strands not shown for clarity.

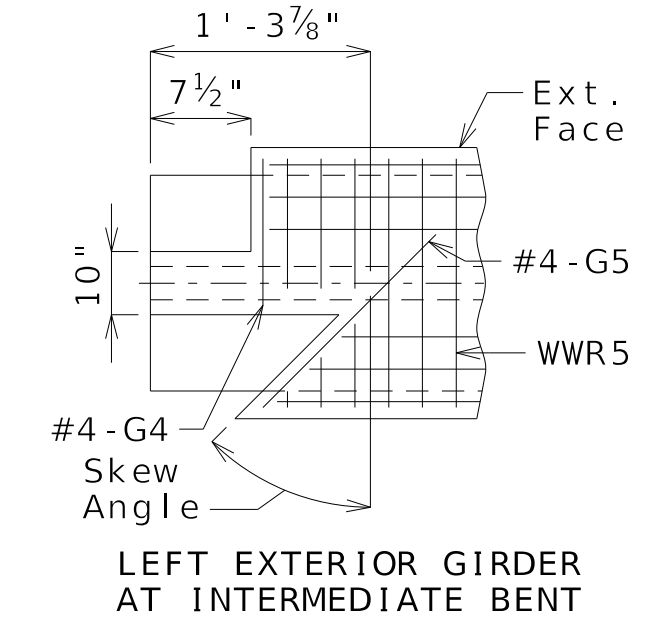


HALF ELEVATION

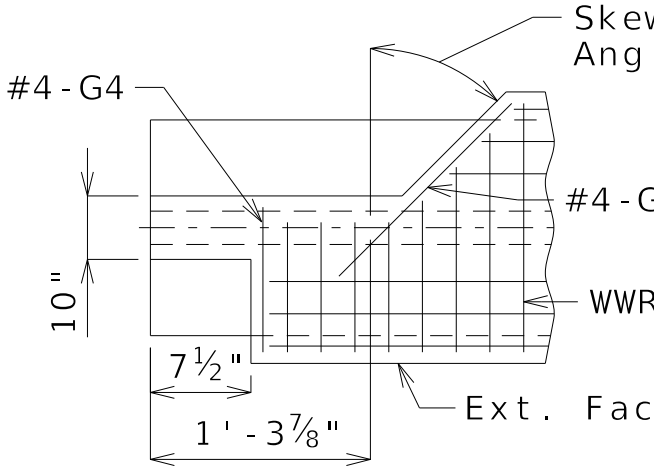
Reinforcement support strands not shown for clarity.



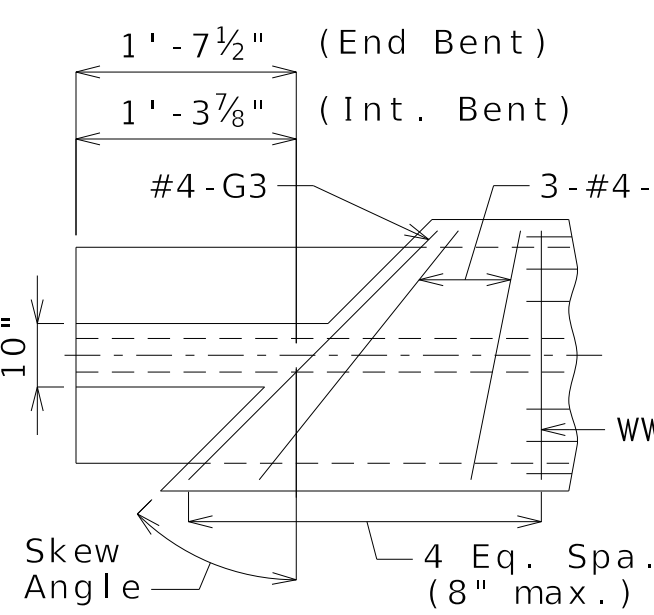
SECTION B-B
Strands not shown for clarity.



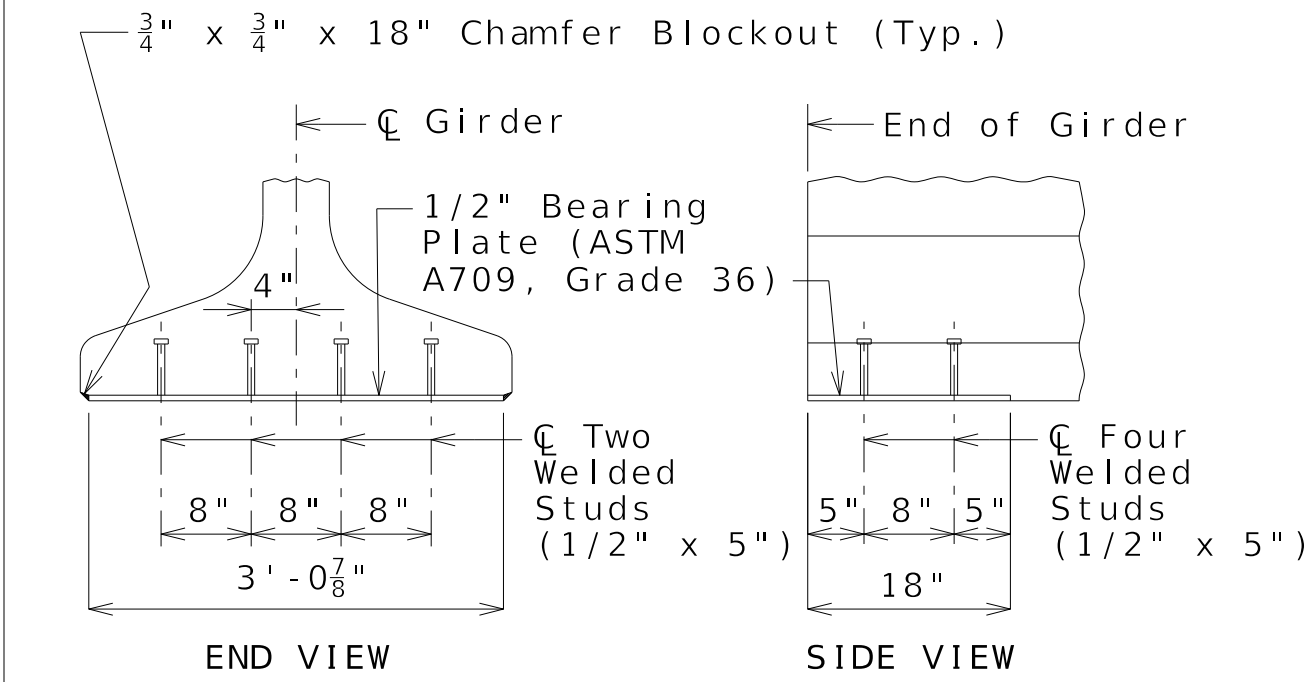
LEFT EXTERIOR GIRDER AT INTERMEDIATE BENT



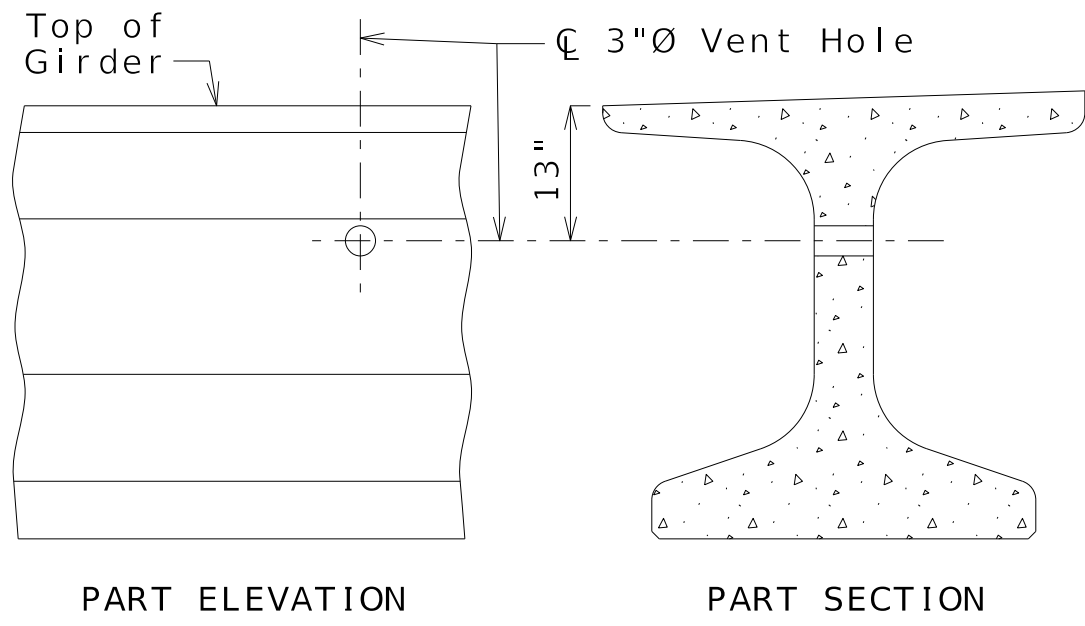
RIGHT EXTERIOR GIRDER AT INTERMEDIATE BENT



INTERIOR GIRDER AT ALL BENTS & EXTERIOR GIRDER AT END BENT
TOP FLANGE BLOCKOUT
Mirror for right advanced.

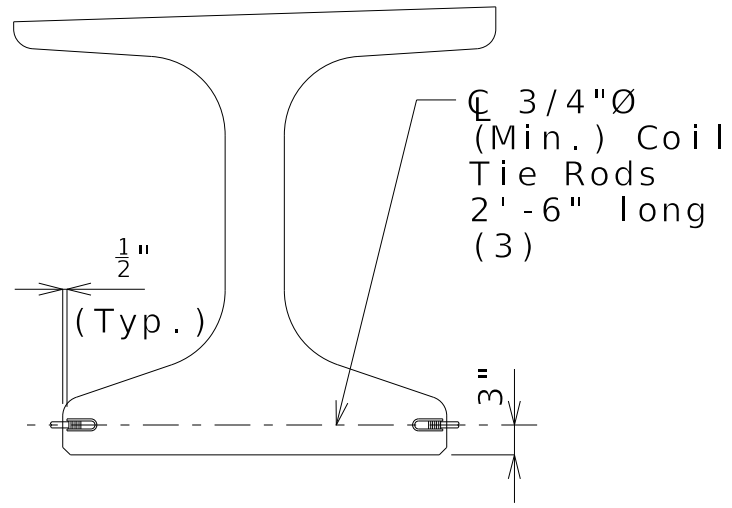


BEARING PLATE



VENT HOLE

Place vent holes at or near upgrade 1/3 point of girders and clear reinforcing steel or strands by 1 1/2" minimum.



COIL TIES

Exclude coil tie at exterior face of exterior girders except at integral end bents.

(3) 2'-0" at exterior face of exterior girders at end bents.

NU-GIRDERS - SPAN (3-4)-GIRDERS 1-7

Detailed APR 2024
Checked JUNE 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 29 of 56

10/1/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED
1-OCT-2024
ROUTE 70EB
STATE MO
DISTRICT BR
SHEET NO. 29
COUNTY BOONE
JOB NO. JST0021
CONTRACT ID.
PROJECT NO.
BRIDGE NO. A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

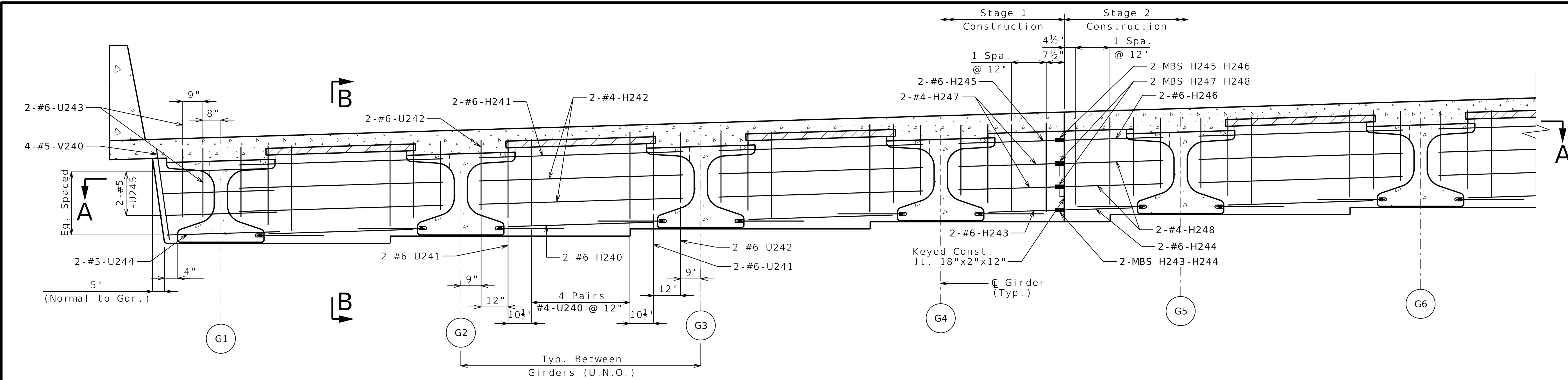
MODOT IMPROVE I-70 DB PROJECT 1

MILLSTONE WEBER

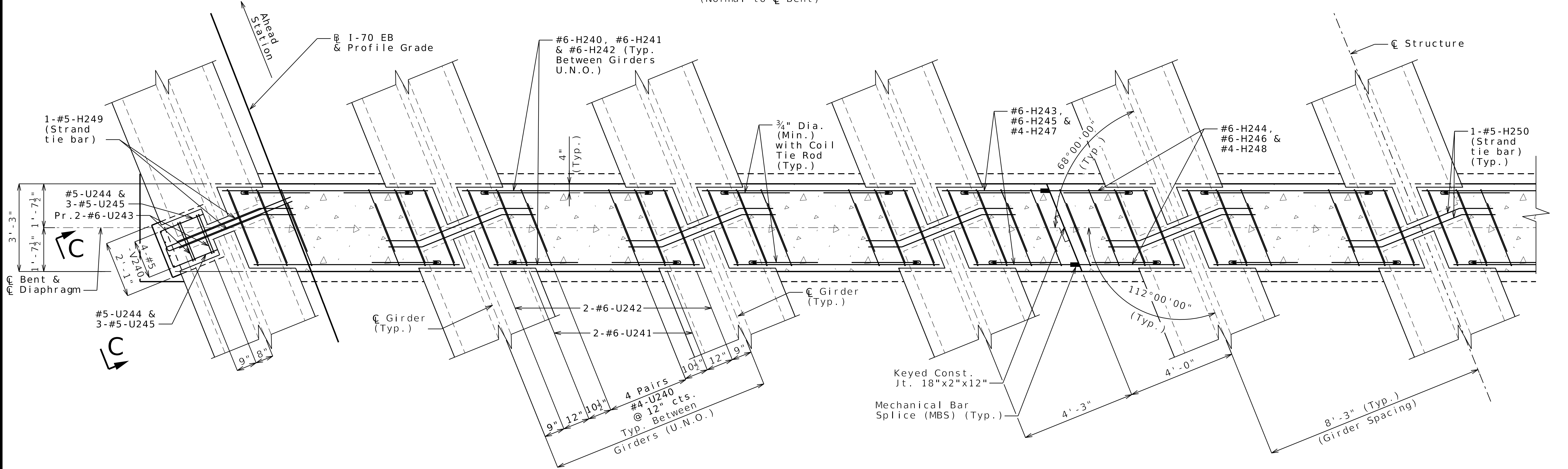
MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

REV.

16:18 1-OCT-2024



CONCRETE INTERMEDIATE DIAPHRAGM
(Normal to $\bar{C}$ Bent)



SECTION A-A

DIAPHRAGM AT INTERMEDIATE BENTS

General Notes:

Longitudinal dimensions shown are horizontal.

Work this sheet with Sheet No. 32

For location of Strand Tie Bars and Coil Tie Rods, see Sheets No. 25 thru 30.

All U-Bars in diaphragms shall be placed parallel to $\bar{C}$ Girders.

Diaphragms at intermediate bents shall be built vertical.

Bar marks shown (200 Series) are for Intermediate Bent No. 2. Bar marks for Intermediate Bent No. 3 are 300 Series.

STATE OF MISSOURI

MATTHEW J. MUENKS

NUMBER PE-2017000338

PROFESSIONAL ENGINEER

10/01/2024 4:59:52 PM

Matthew Muenks

MO PE-2017000338

DATE PREPARED

1-OCT-2024

ROUTE 70EB

DISTRICT BR

STATE MO

SHEET NO. 31

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

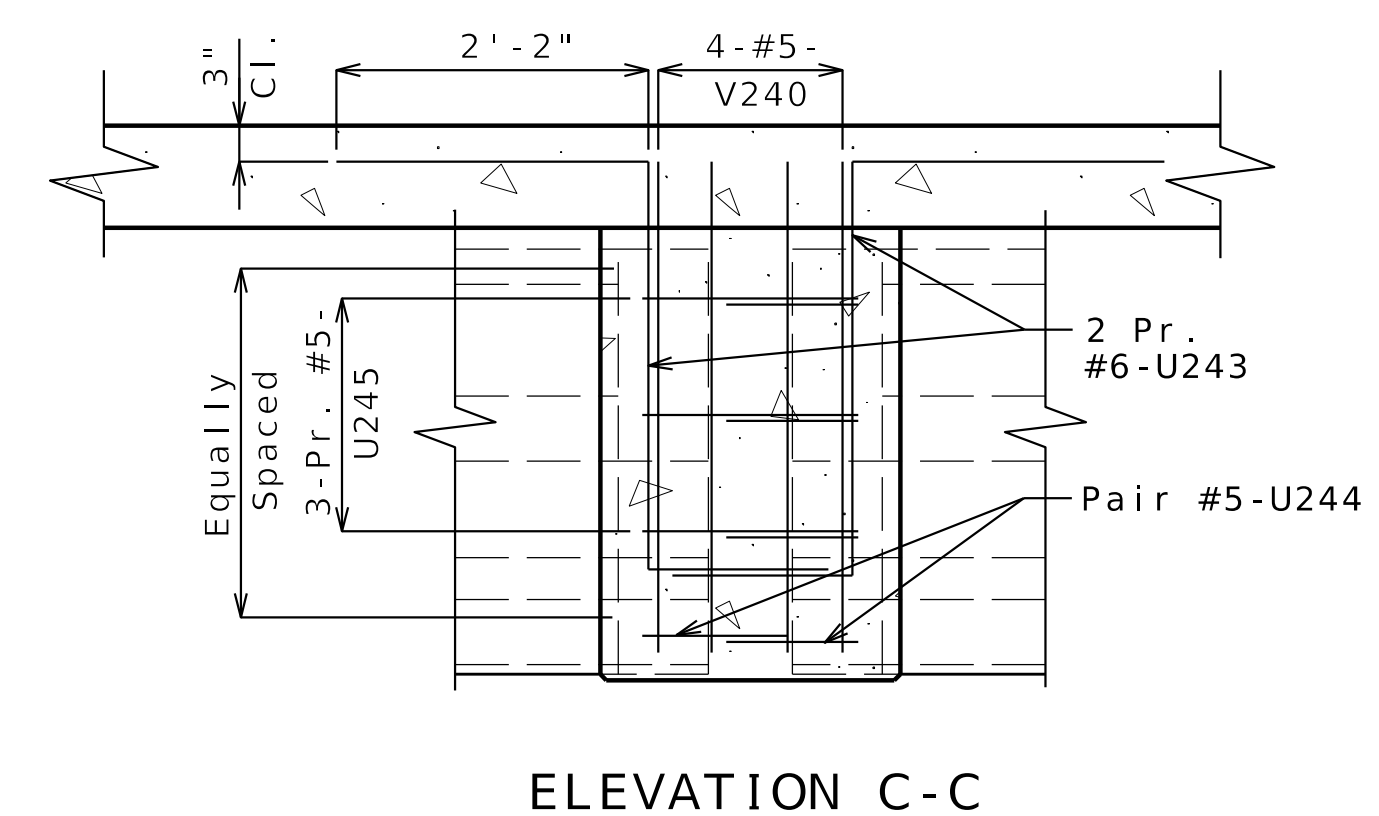
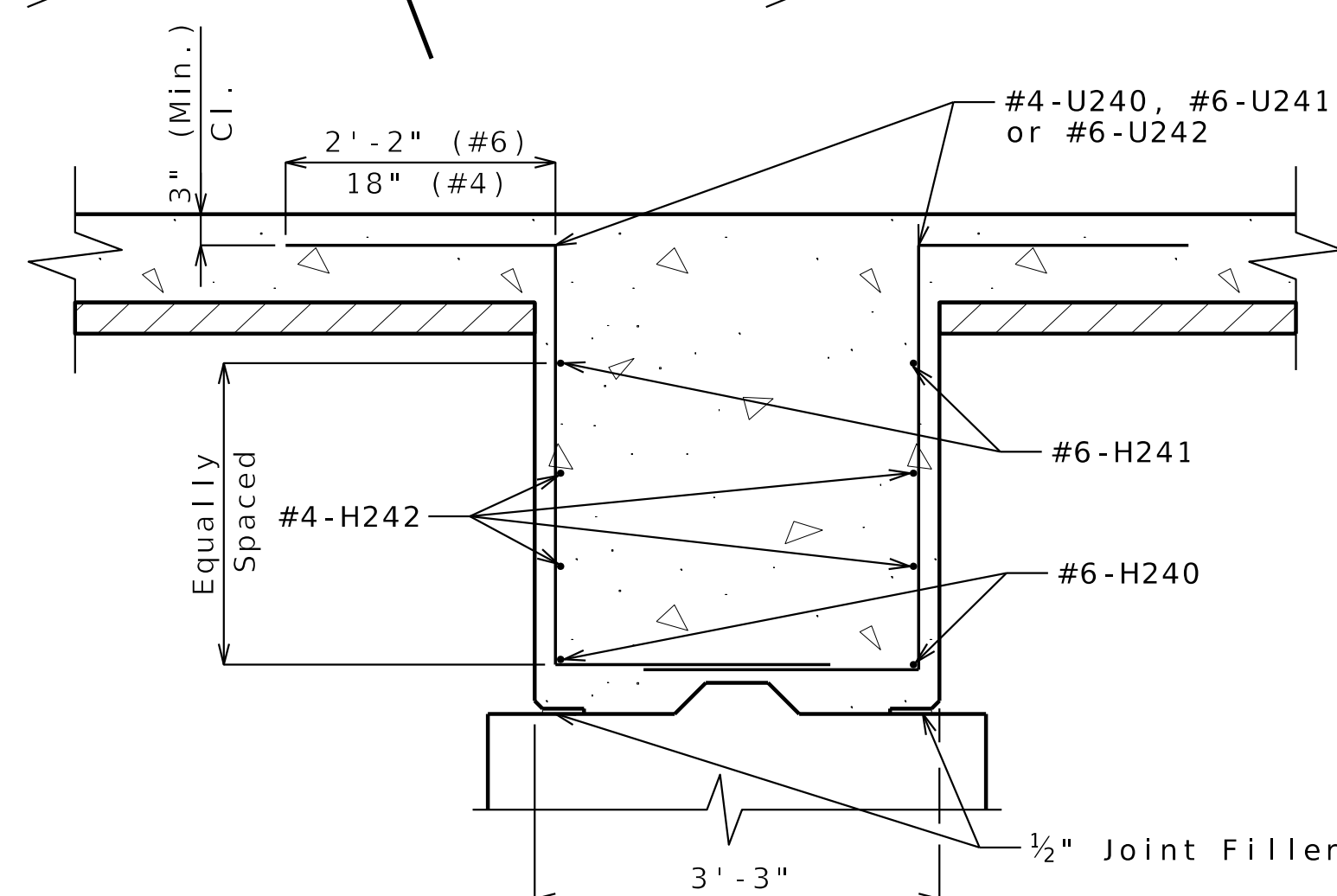
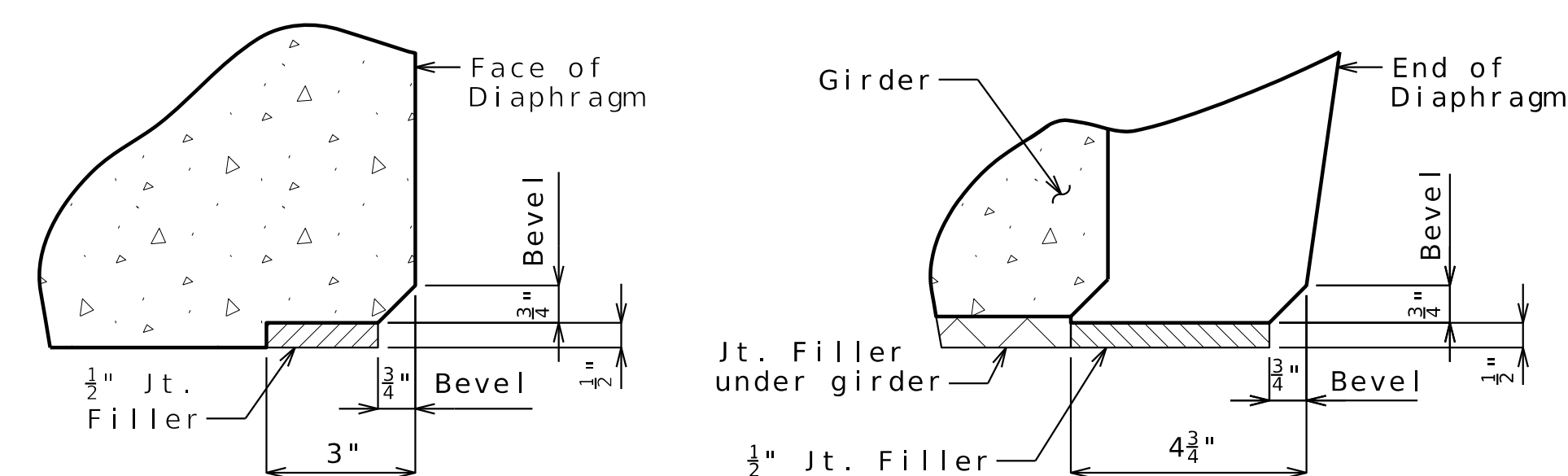
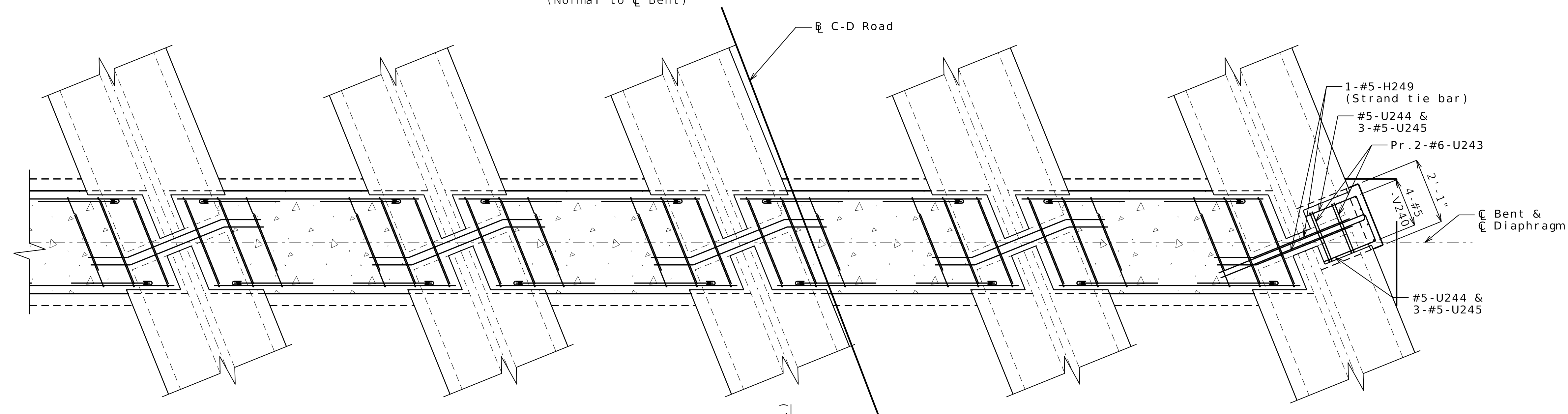
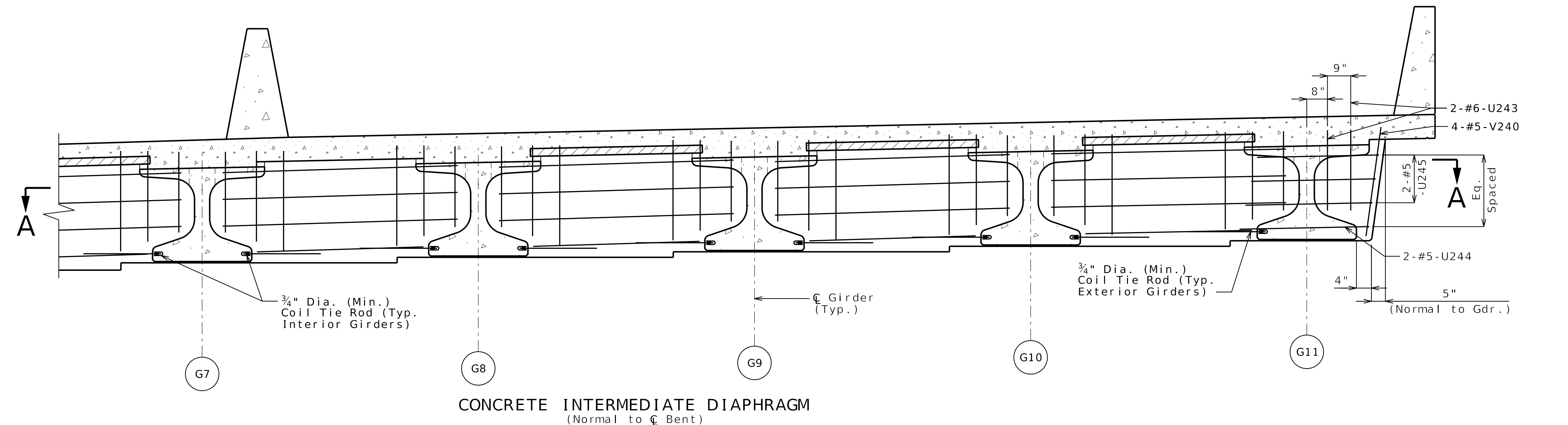
MODOT

JACOBS

MILLSTONE WEBER

MODOT IMPROVE I-70 DB PROJECT 1

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING



Notes:
For Notes and Details not shown, see Sheet No. 31.



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338

DATE PREPARED
1 - OCT - 2024

ROUTE 70EB	STATE MO
DISTRICT BR	SHEET NO. 32

COUNTY
BOONE

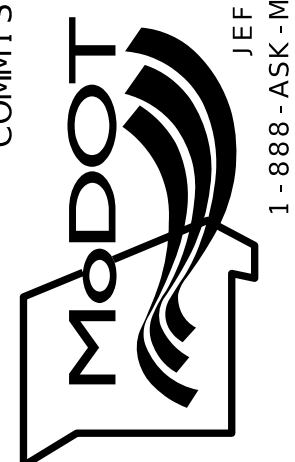
JOB NO.
JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.	A9542
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DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

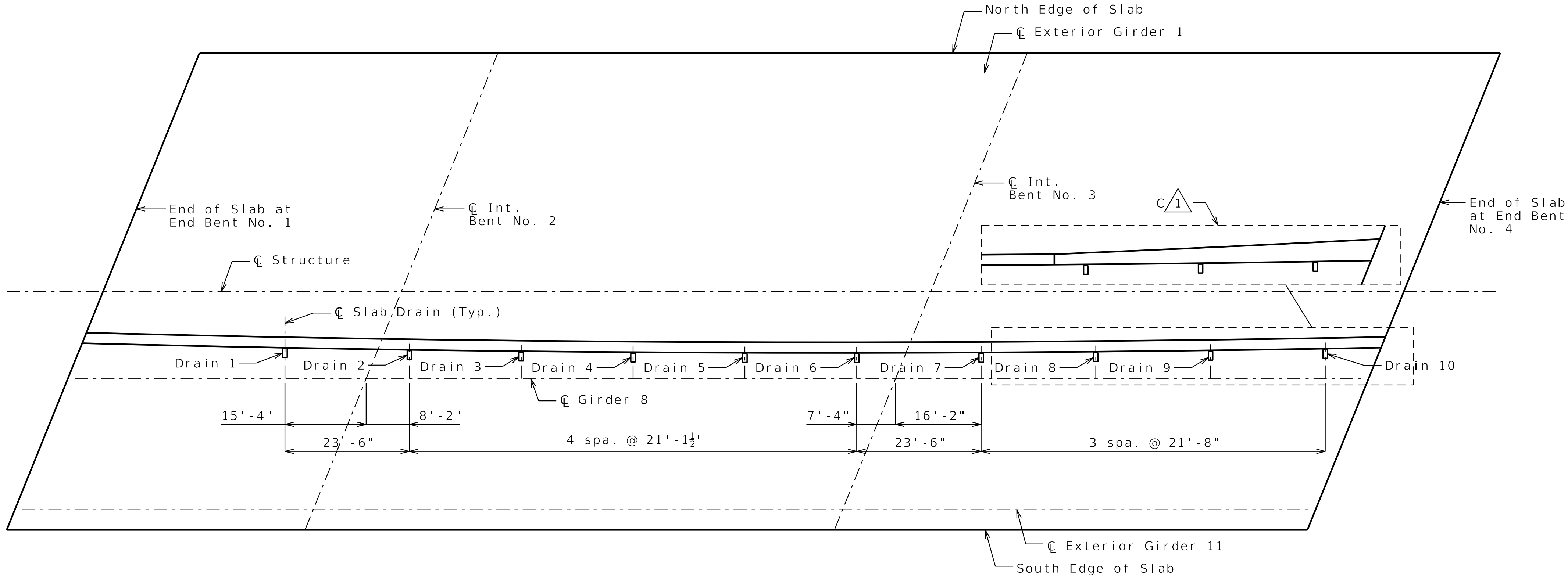
MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

M0DOT IMPROVE I-70 DB PROJECT 1



REV. ,
#0000/04 ENGINEERING



PLAN OF SLAB SHOWING SLAB DRAIN LOCATIONS

Drain No.	Dim. A
1	4' - 6"
2	4' - 2 1/4"
3	3' - 11 5/8"
4	3' - 9 5/8"
5	3' - 8 5/8"
6	3' - 8 3/8"
7	3' - 9 3/8"
8	3' - 10 5/8"
9	4' - 1 1/4"
10	4' - 4 3/8"

General Notes:

Slab drain bracket assembly shall be ASTM A709 Grade 36 steel.

Locate drains in slab by dimensions shown in Part Section Near Drain.

Reinforcing steel shall be shifted to clear drains.

The coil inserts and bracket assembly shall be galvanized in accordance with ASTM A123.

All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

All 1/2"Ø bolts shall be ASTM A307.

Shop drawings will not be required for the slab drains and the bracket assembly.

The coil insert required for the bracket assembly attachment shall be located on the prestressed girder shop drawings.

Coil inserts shall have a concrete pull-out strength (ultimate load) of at least 2,500 pounds in 5,000 psi concrete.

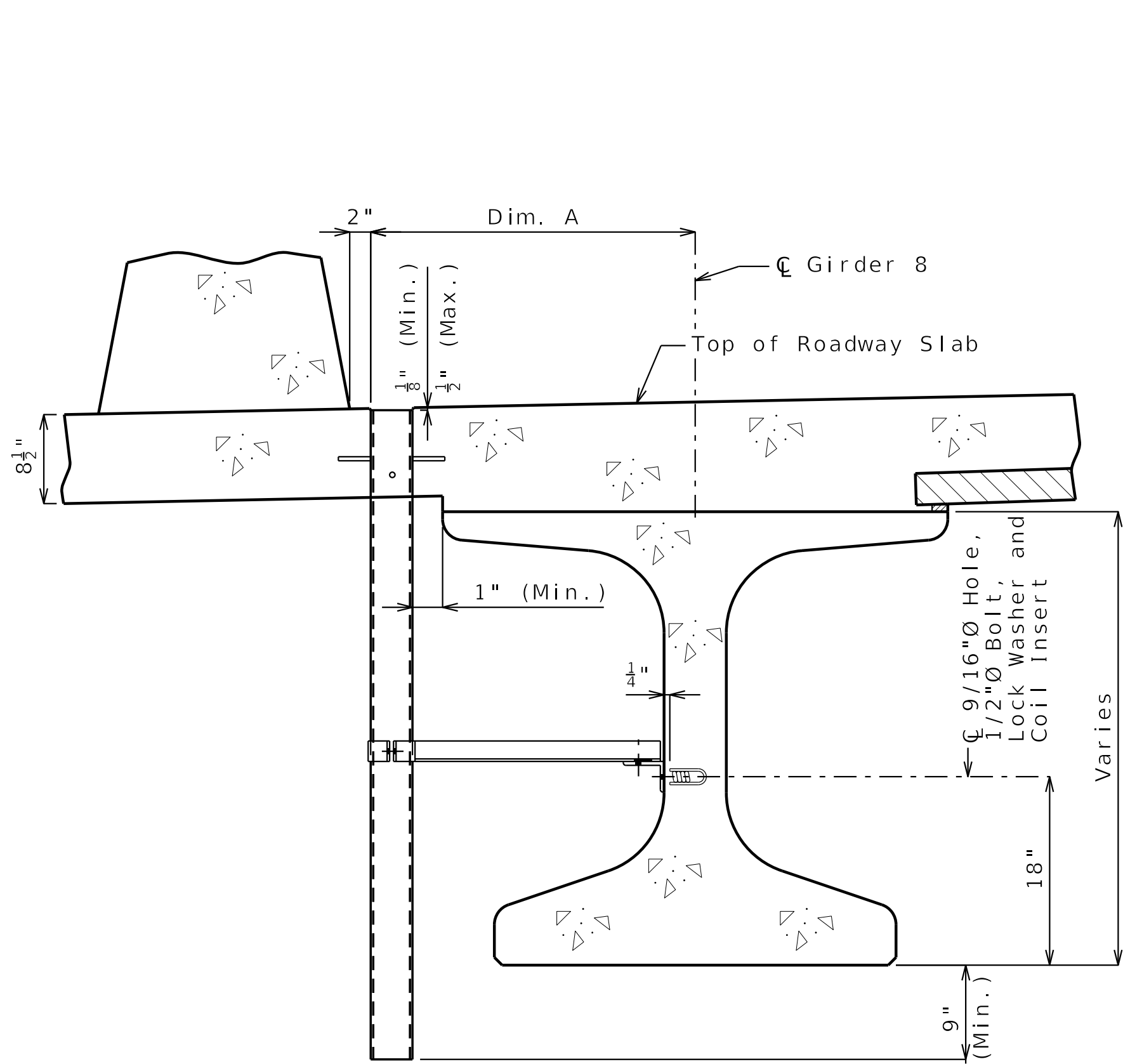
The bolt required to attach the slab drain bracket assembly to the prestressed girder web shall be supplied by the prestressed girder fabricator.

Notes for Steel Drain:

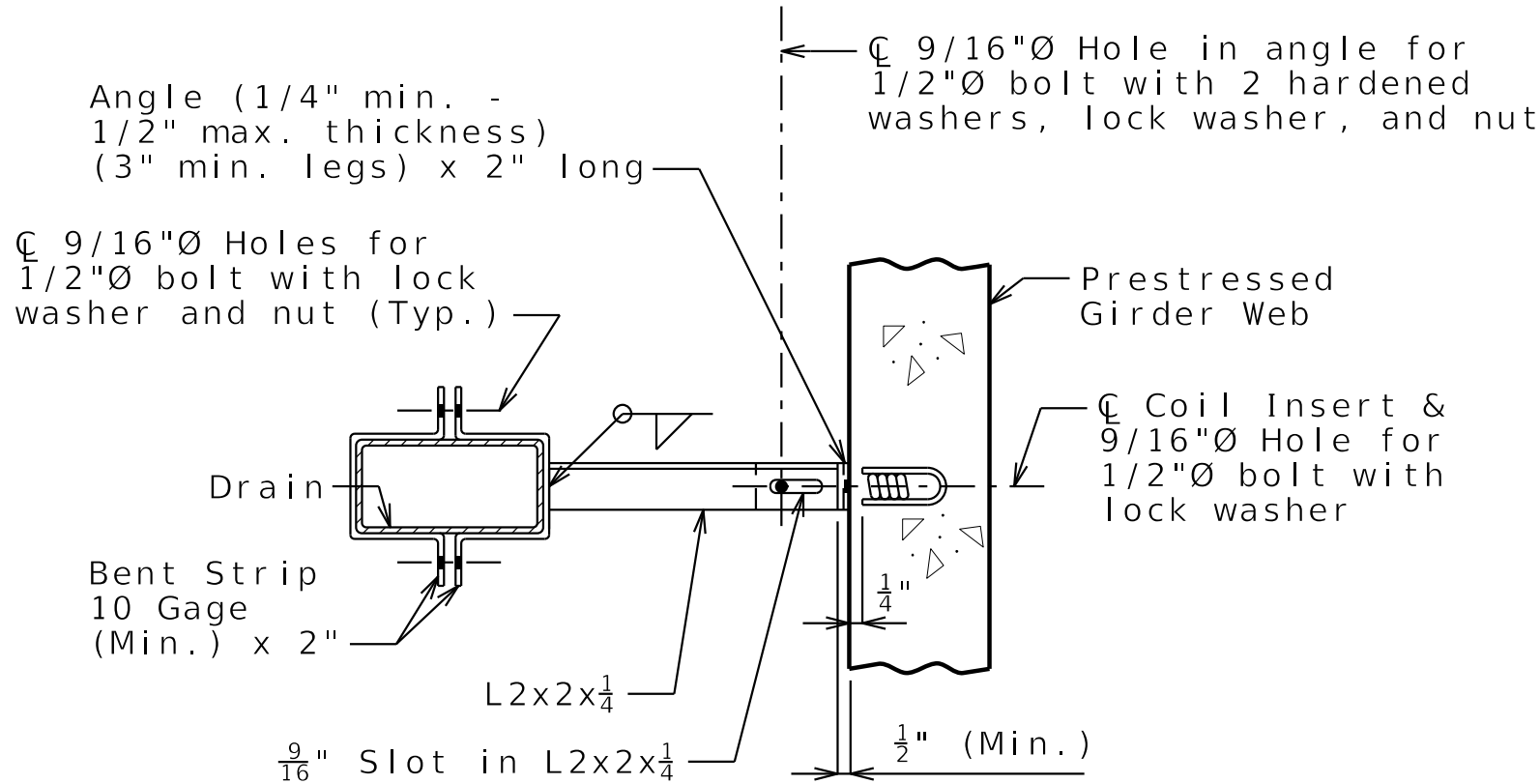
Slab drains may be fabricated of either 1/4" welded sheets of ASTM A709 Grade 36 steel or from 1/4" structural steel tubing ASTM A500 or A501.

Outside dimensions of drains are 8" x 4".

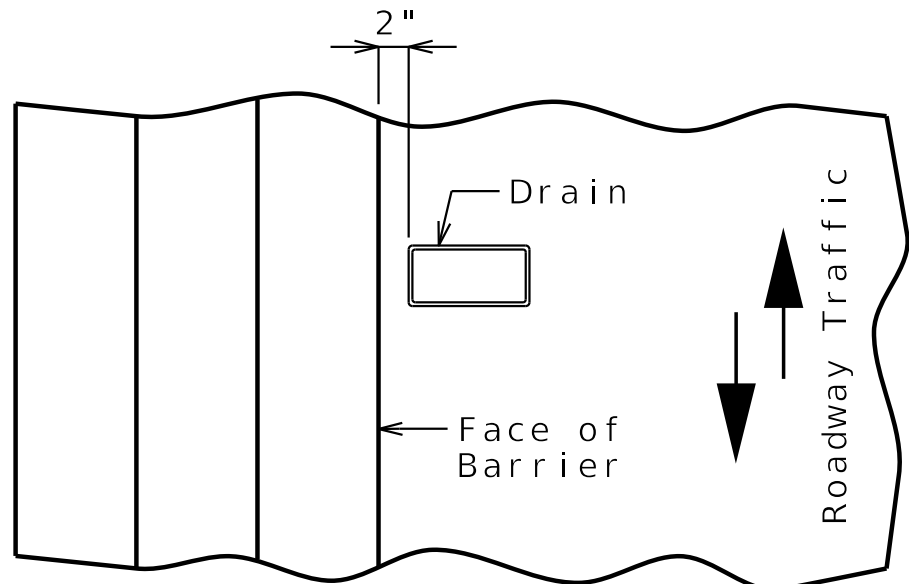
The drains shall be galvanized in accordance with ASTM A123.



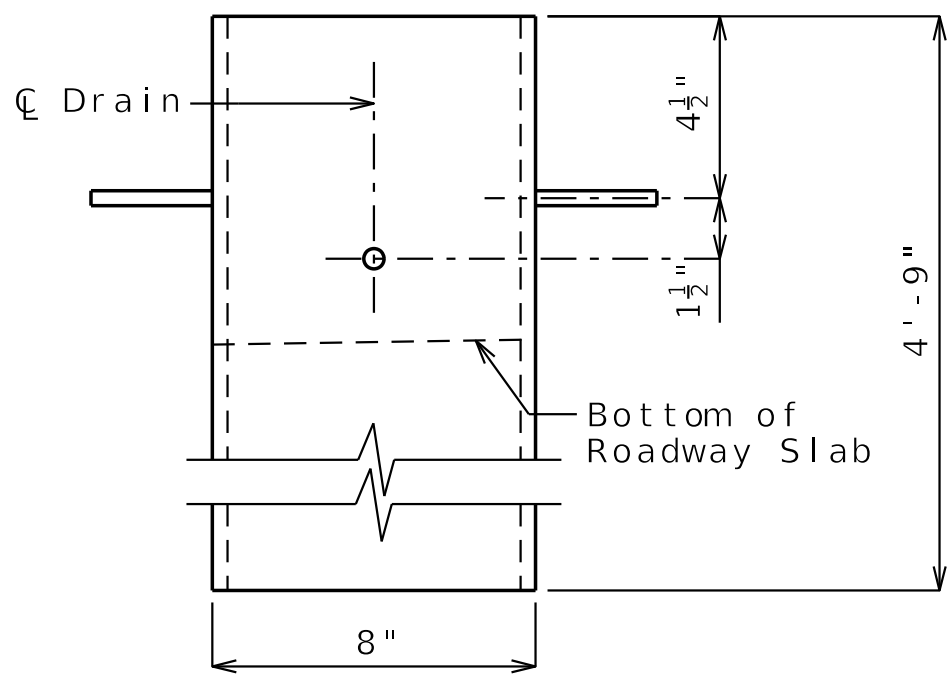
PART SECTION NEAR DRAIN



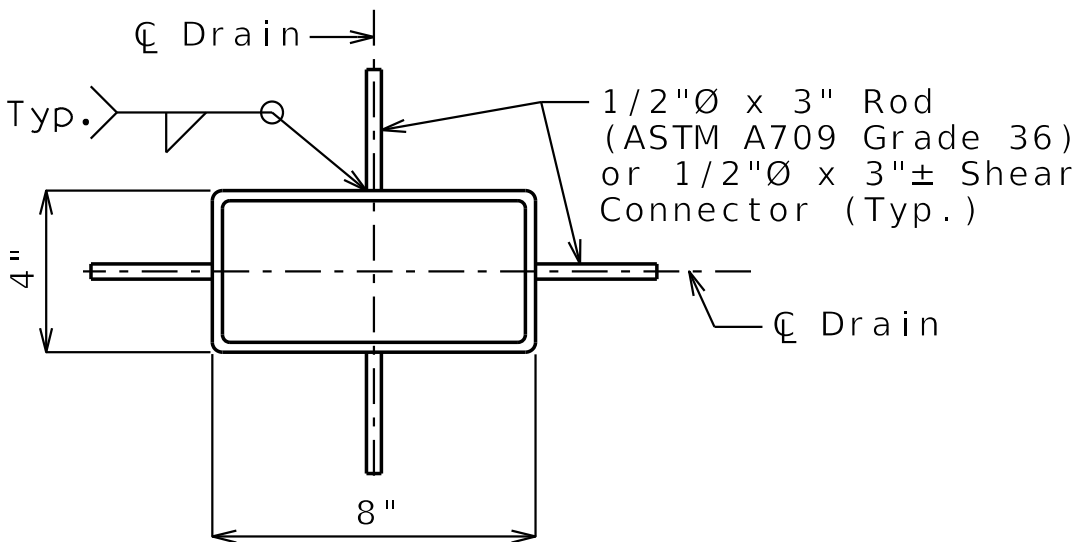
PART SECTION SHOWING BRACKET ASSEMBLY



PART PLAN OF SLAB AT DRAIN



ELEVATION OF DRAIN



PLAN OF STEEL DRAIN OPTION

SLAB DRAINS

C 1 REVISED 12-23-24

Detailed JULY 2024
Checked JULY 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 34 of 56



12/23/2024 10:59:31 AM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB
DISTRICT BR
STATE MO
SHEET NO. 34

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

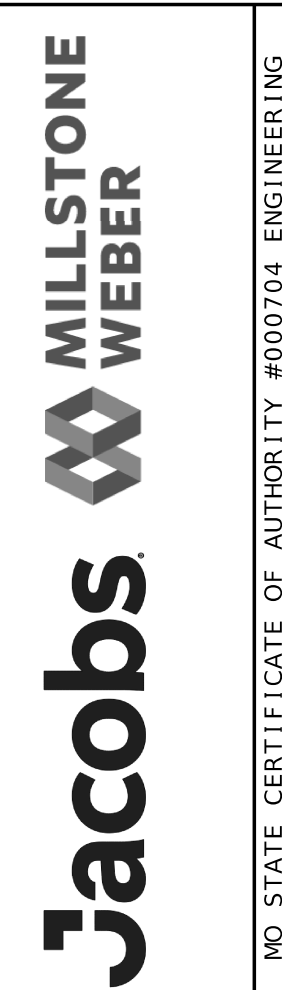
BRIDGE NO. A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION
12/23/24	REV. 1 - NDC-002 - REVISED BARRIER

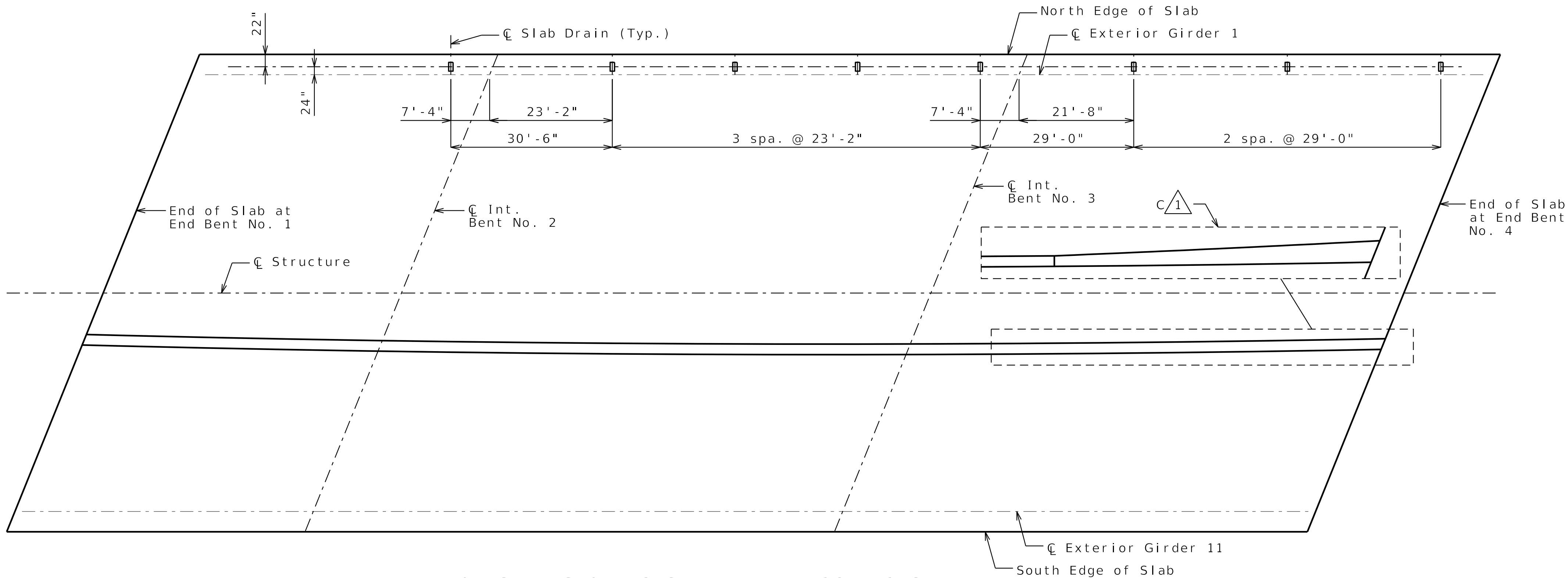
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



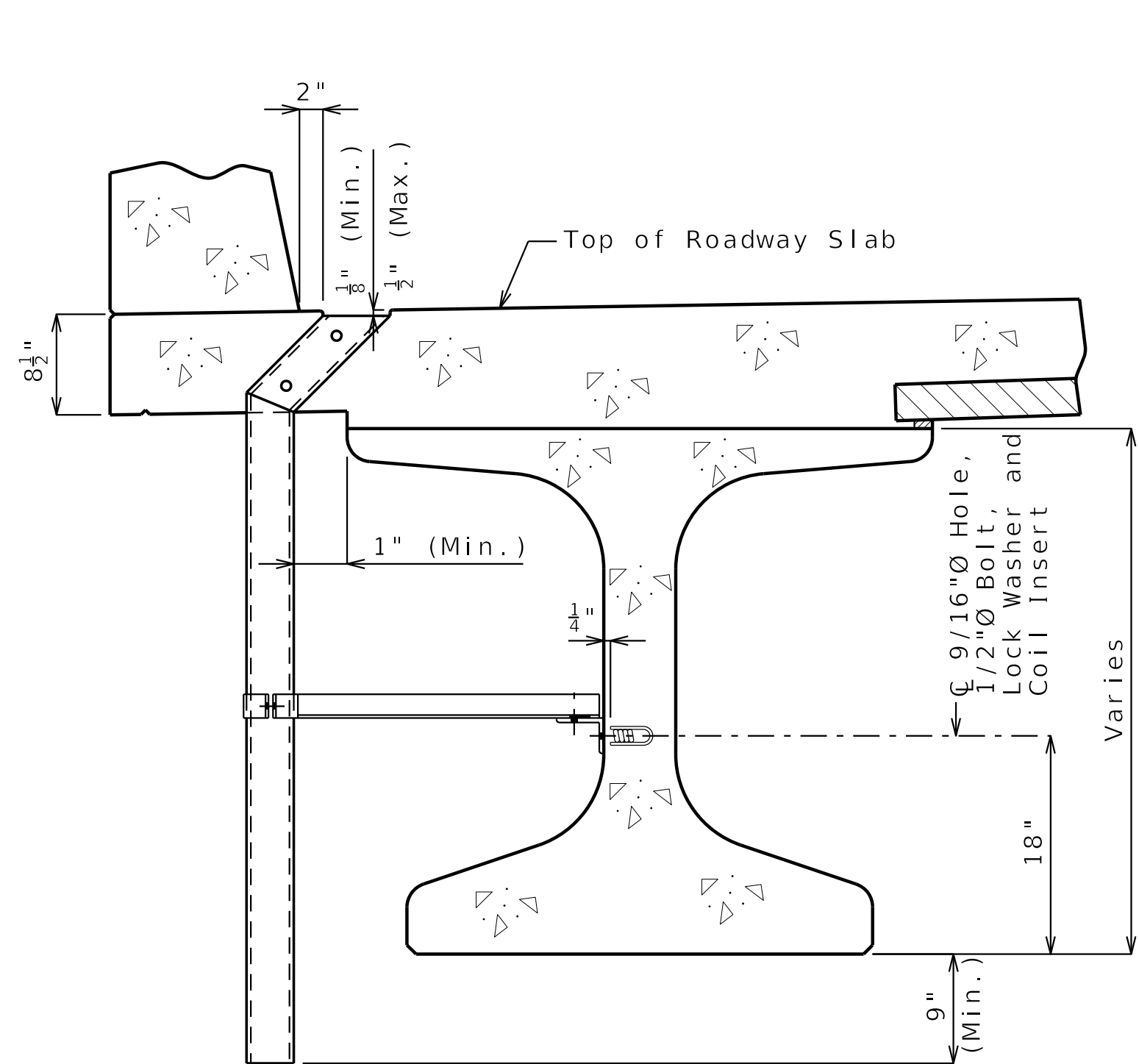
MODOT IMPROVE I-70 DB PROJECT 1



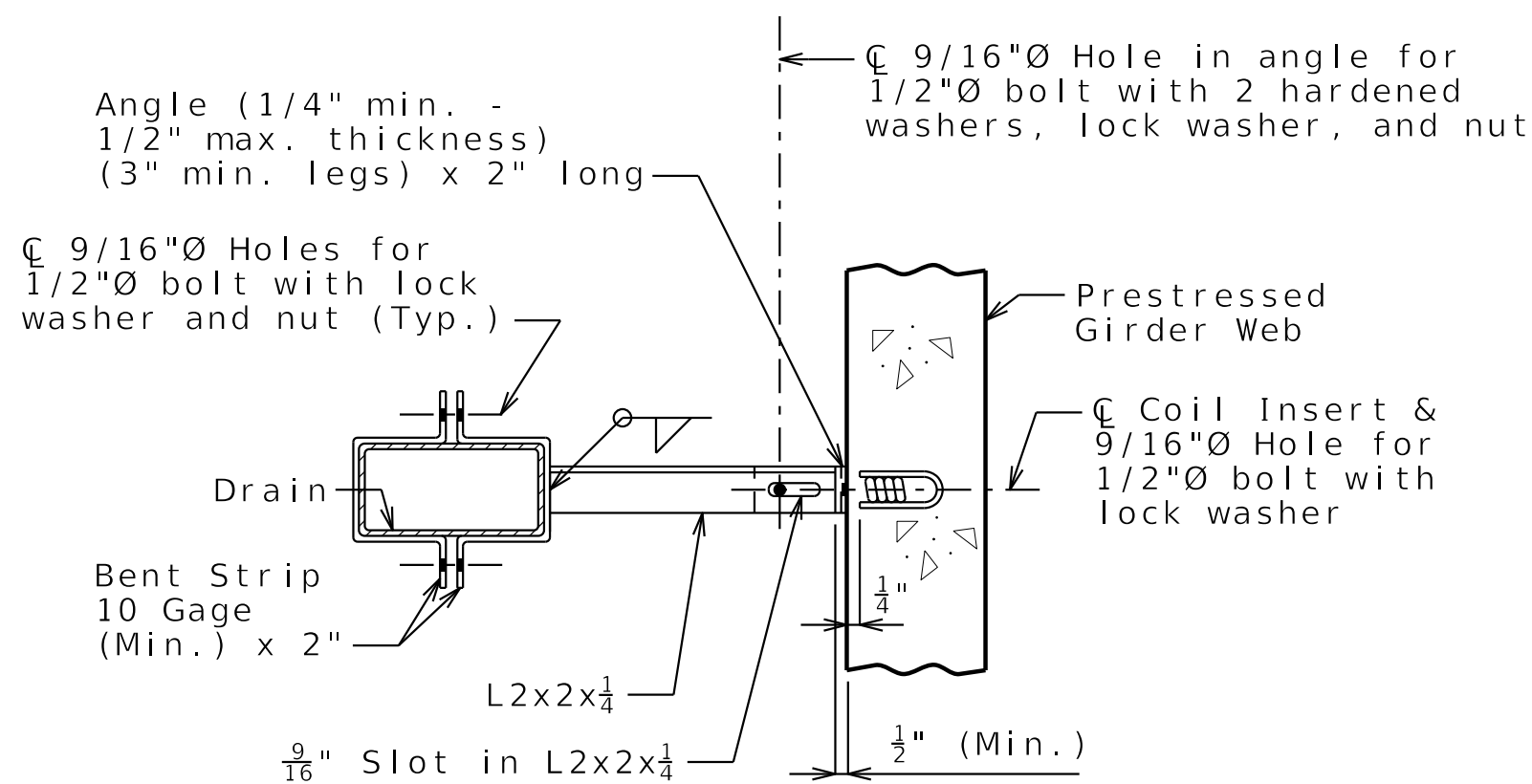
MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING REV.



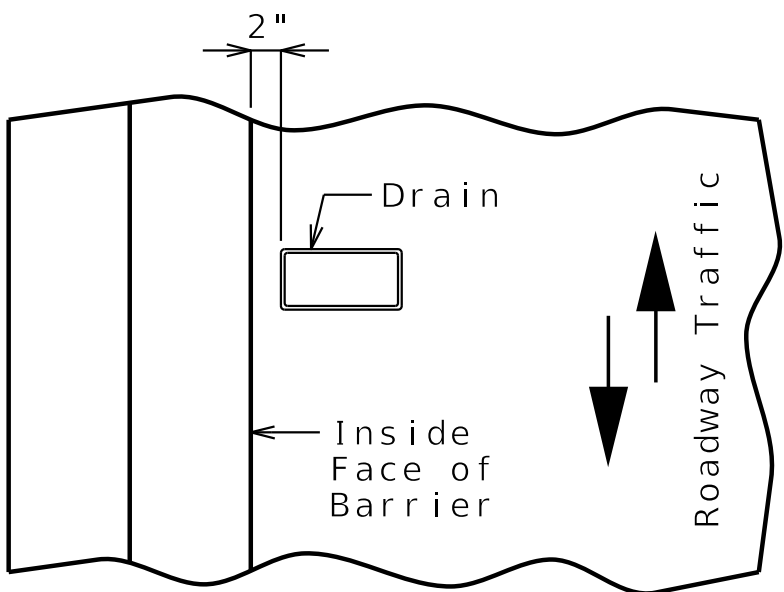
PLAN OF SLAB SHOWING SLAB DRAIN LOCATIONS



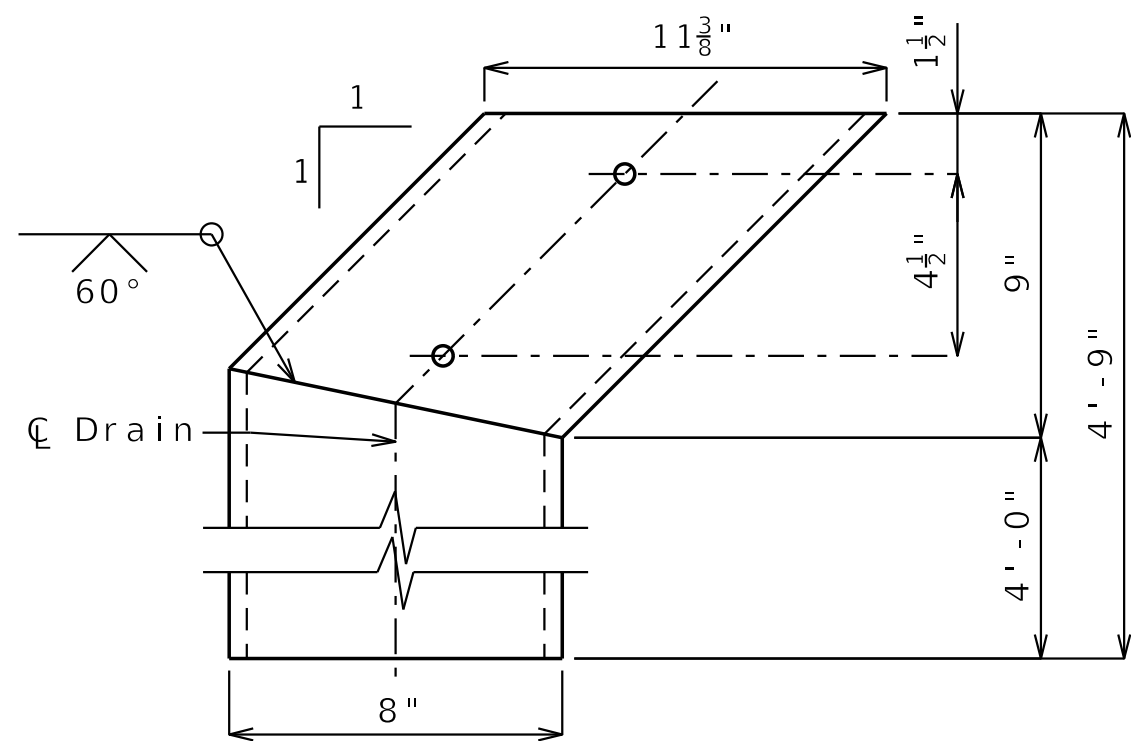
PART SECTION NEAR DRAIN



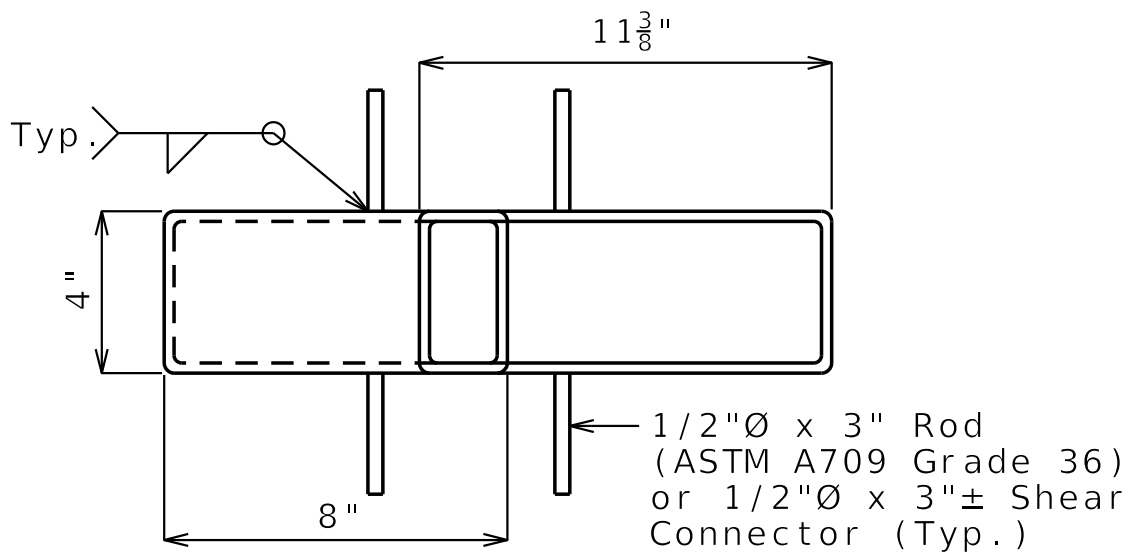
PART SECTION SHOWING BRACKET ASSEMBLY



PART PLAN OF SLAB AT DRAIN



ELEVATION OF DRAIN



PLAN OF STEEL DRAIN OPTION

General Notes:

Slab drain bracket assembly shall be ASTM A709 Grade 36 steel.

Locate drains in slab by dimensions shown in Part Section Near Drain.

Reinforcing steel shall be shifted to clear drains.

The coil inserts and bracket assembly shall be galvanized in accordance with ASTM A123.

All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with AASHTO M 232 (ASTM A153), Class C.

All 1/2"Ø bolts shall be ASTM A307.

Shop drawings will not be required for the slab drains and the bracket assembly.

The coil insert required for the bracket assembly attachment shall be located on the prestressed girder shop drawings.

Coil inserts shall have a concrete pull-out strength (ultimate load) of at least 2,500 pounds in 5,000 psi concrete.

The bolt required to attach the slab drain bracket assembly to the prestressed girder web shall be supplied by the prestressed girder fabricator.

Notes for Steel Drain:

Slab drains may be fabricated of either 1/4" welded sheets of ASTM A709 Grade 36 steel or from 1/4" structural steel tubing ASTM A500 or A501.

Outside dimensions of drains are 8" x 4".

The drains shall be galvanized in accordance with ASTM A123.

SLAB DRAINS

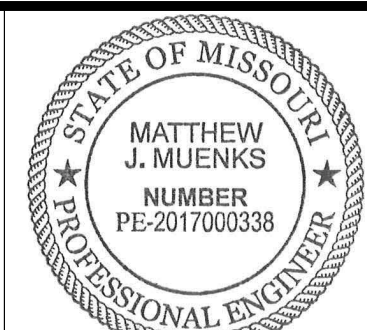
C 1 REVISED 12-23-24

Detailed JULY 2024
Checked JULY 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 35 of 56

pw:///jacobs-us-va-pw.bentley.com:jacobs-us-va-pw-04/Documents/F3X03001 - Improve I-70 Columbia to Kingdom City/30 Project Data/AAA_Packages/B2200 (Bridge 2-EB I-70 & CD Rd over Hinkson Creek)/B_A9542_035_JST0021_SlabDrainAngle_C001.dgn



12/23/2024 10:59:31 AM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB
DISTRICT BR
STATE MO
SHEET NO. 35

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

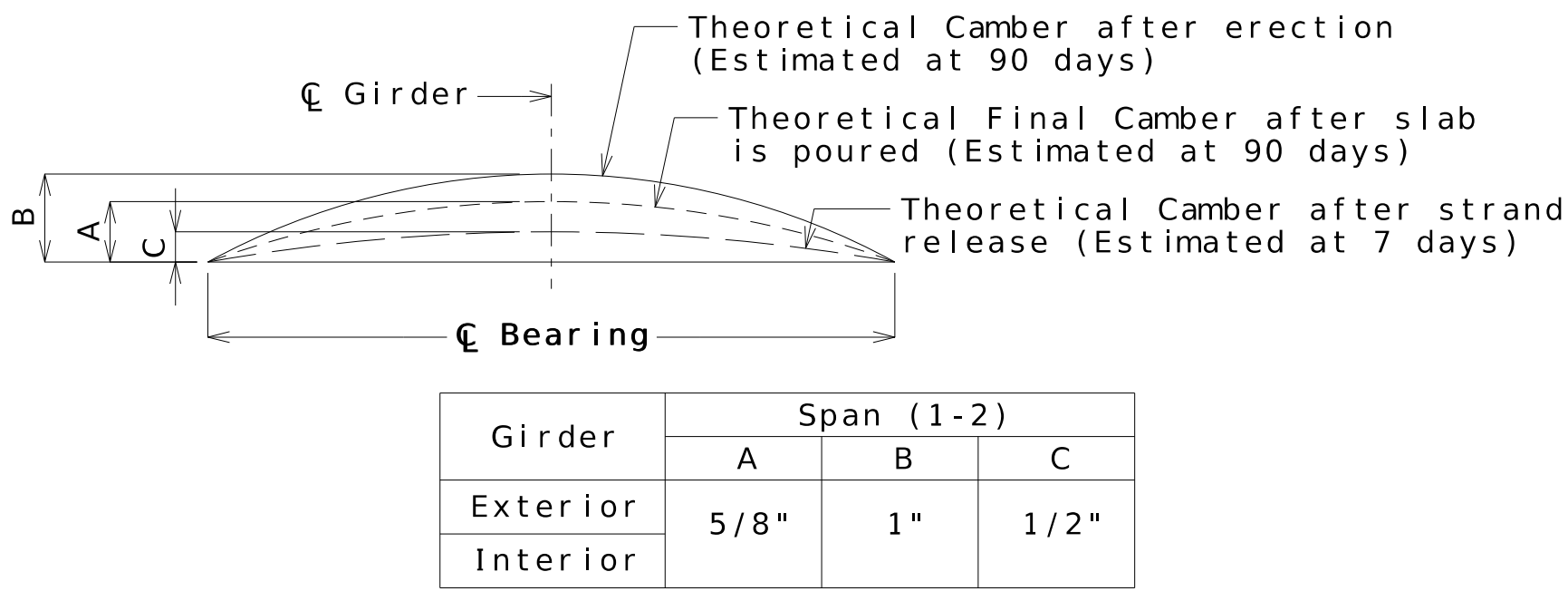
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09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION
12/23/24	REV. 1 - NDC-002 - REVISED BARRIER

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



MODOT IMPROVE I-70 DB PROJECT 1
JACOBS
MILLSTONE WEBER
MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

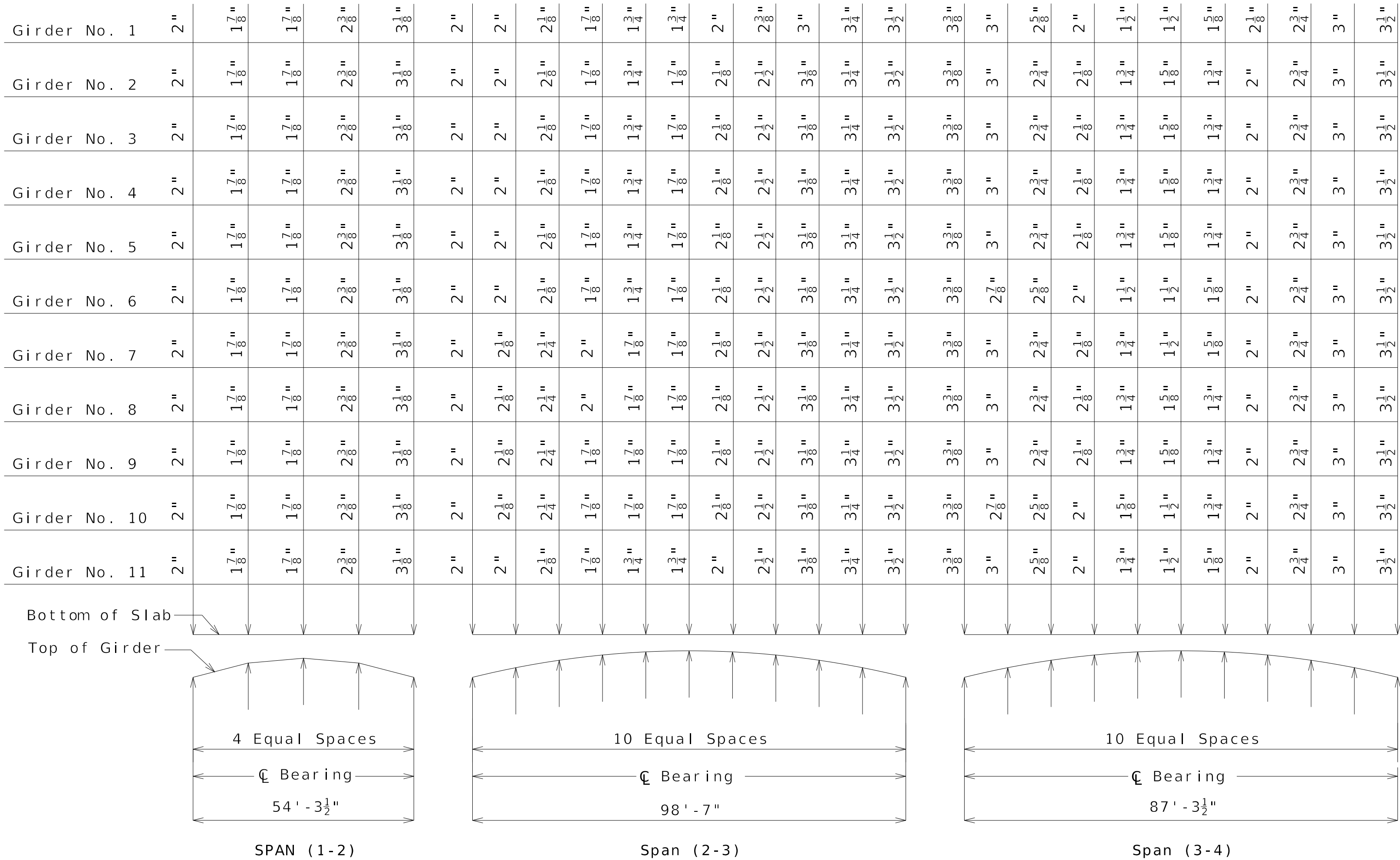
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GIRDER CAMBER DIAGRAM

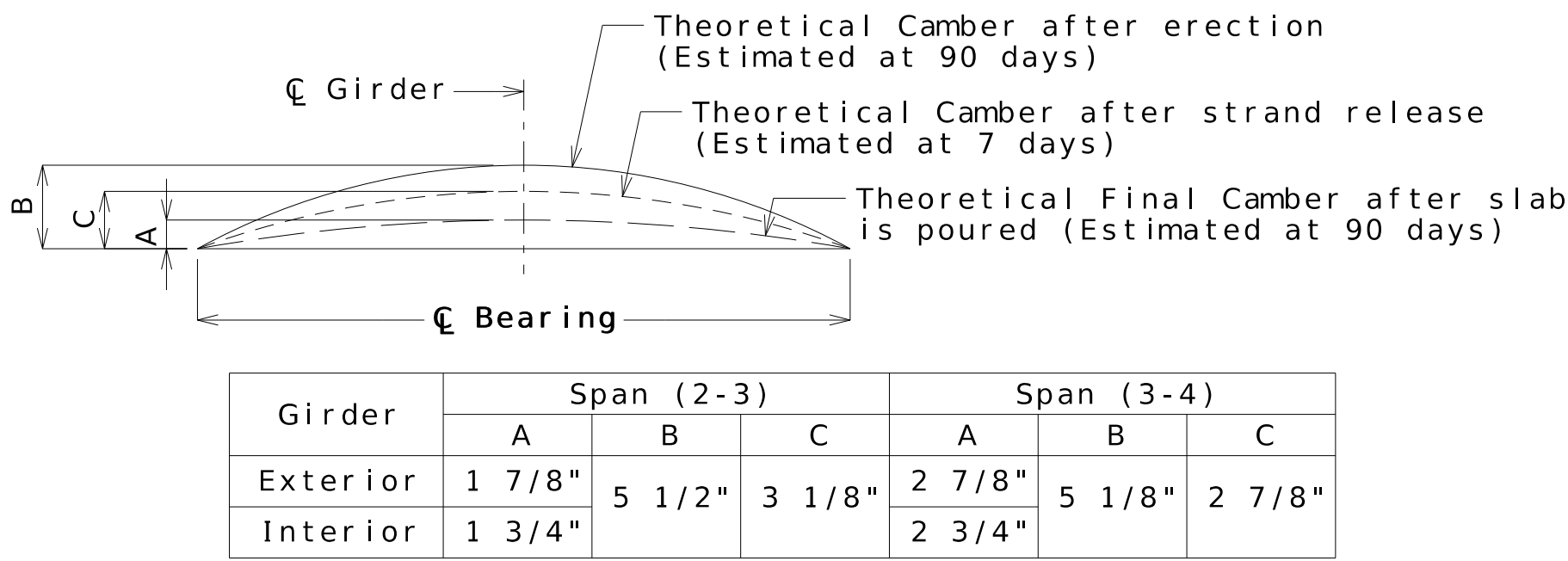
Conversion Factors for Girder Camber (Estimated at 90 days):

0.25 pt. = 0.7125 x 0.5 pt.



THEORETICAL SLAB HAUNCHING DIAGRAM (ESTIMATED AT 90 DAYS)

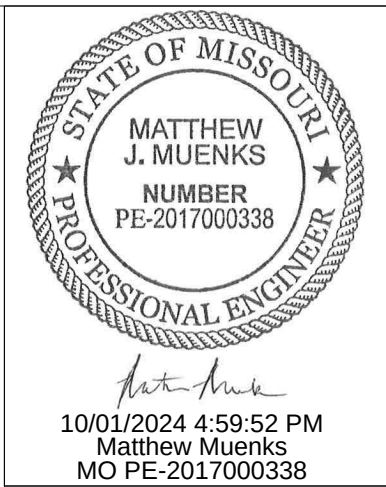
If girder camber is different from that shown in the camber diagram, in order to maintain minimum slab thickness, an adjustment of the slab haunches, an increase in slab thickness or a raise in grade uniformly throughout the structure shall be necessary. The haunch shall be limited to ensure the projecting girder reinforcement is embedded into slab at least 2 inches.



GIRDER CAMBER DIAGRAM

Conversion Factors for Girder Camber (Estimated at 90 days):

0.1 pt. = 0.314 x 0.5 pt.
0.2 pt. = 0.593 x 0.5 pt.
0.3 pt. = 0.813 x 0.5 pt.
0.4 pt. = 0.952 x 0.5 pt.



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Matthew Muenks
MO PE-2017000338
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1-OCT-2024

ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 36

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION	REV. A - FINAL REVIEW			
		09/13/24	10/01/24		
	REV. 0 - RELEASED FOR CONSTRUCTION				

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

ModOT

JACOBS

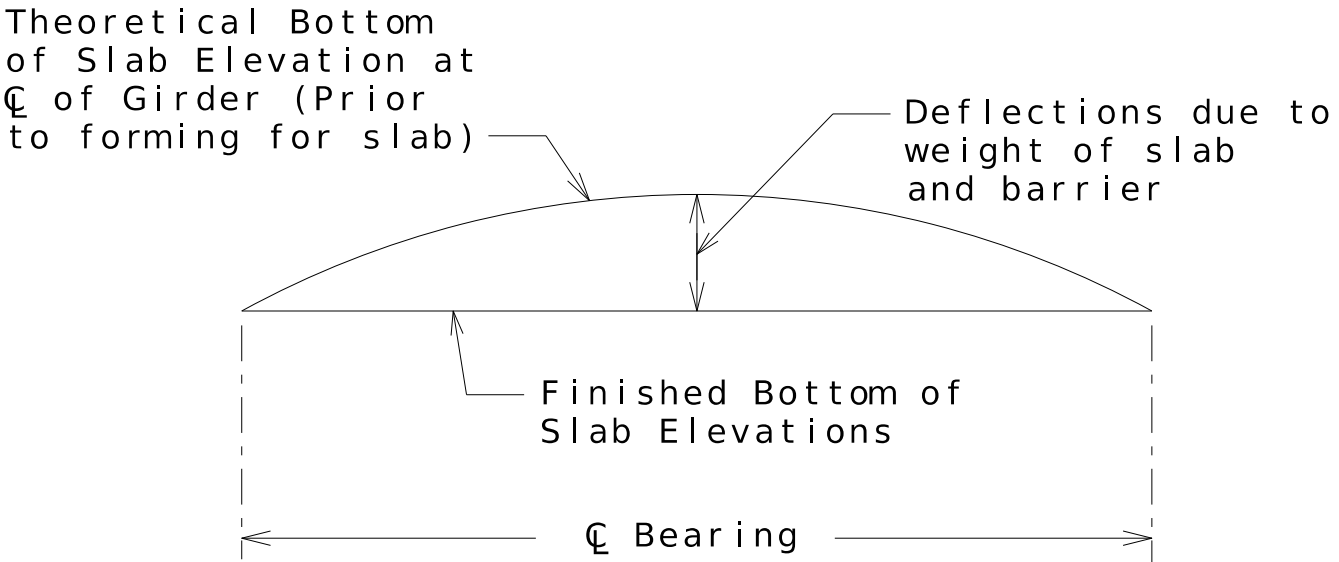
MILLSTONE WEBER

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

Theoretical Bottom of Slab Elevations at Centerline of Girder
(Prior to forming for slab) (Estimated at 90 days)

Girder Number	Span (1-2) (54'-3½" C Brg. - C Brg.)										
	C Brg.	.25	.50	.75	C Brg.						
1	684.63	684.51	684.38	684.24	684.09						
2	684.91	684.79	684.67	684.52	684.37						
3	685.19	685.08	684.94	684.80	684.65						
4	685.47	685.35	685.22	685.08	684.93						
5	685.75	685.63	685.50	685.36	685.21						
6	686.03	685.91	685.78	685.64	685.48						
7	686.31	686.19	686.06	685.92	685.76						
8	686.50	686.39	686.26	686.12	685.97						
9	686.70	686.58	686.46	686.32	686.16						
10	686.89	686.78	686.65	686.51	686.36						
11	687.09	686.97	686.85	686.71	686.56						
Girder Number	Span (2-3) (98'-7" C Brg. - C Brg.)										
	C Brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	C Brg.
1	684.07	684.07	684.06	684.03	683.97	683.89	683.78	683.65	683.49	683.31	683.13
2	684.35	684.35	684.34	684.31	684.26	684.18	684.07	683.94	683.77	683.60	683.41
3	684.63	684.63	684.62	684.59	684.54	684.46	684.35	684.21	684.05	683.88	683.69
4	684.91	684.91	684.90	684.87	684.82	684.74	684.63	684.49	684.33	684.15	683.97
5	685.19	685.19	685.18	685.15	685.10	685.02	684.91	684.77	684.61	684.43	684.24
6	685.47	685.47	685.46	685.43	685.38	685.30	685.19	685.05	684.89	684.71	684.52
7	685.75	685.75	685.74	685.71	685.66	685.58	685.47	685.33	685.17	684.99	684.80
8	685.95	685.96	685.95	685.92	685.87	685.79	685.68	685.54	685.38	685.20	685.01
9	686.15	686.15	686.14	686.11	686.06	685.98	685.87	685.74	685.58	685.40	685.21
10	686.35	686.35	686.34	686.31	686.26	686.18	686.07	685.93	685.77	685.59	685.41
11	686.54	686.54	686.53	686.50	686.45	686.37	686.26	686.12	685.97	685.79	685.60
Girder Number	Span (3-4) (87'-3½" C Brg. - C Brg.)										
	C Brg.	.10	.20	.30	.40	.50	.60	.70	.80	.90	C Brg.
1	683.12	683.09	683.06	683.02	682.97	682.90	682.81	682.71	682.59	682.46	682.32
2	683.39	683.37	683.35	683.31	683.25	683.18	683.10	682.99	682.87	682.74	682.60
3	683.67	683.65	683.62	683.59	683.53	683.46	683.37	683.27	683.15	683.02	682.88
4	683.95	683.93	683.90	683.87	683.81	683.74	683.65	683.55	683.43	683.30	683.16
5	684.23	684.21	684.18	684.14	684.09	684.02	683.93	683.83	683.71	683.58	683.44
6	684.52	684.49	684.46	684.42	684.37	684.30	684.21	684.11	683.98	683.85	683.72
7	684.79	684.77	684.74	684.70	684.65	684.58	684.49	684.39	684.26	684.13	683.99
8	685.00	684.98	684.95	684.91	684.86	684.79	684.70	684.59	684.47	684.34	684.20
9	685.20	685.17	685.15	685.11	685.05	684.98	684.89	684.79	684.66	684.53	684.39
10	685.40	685.37	685.34	685.30	685.25	685.18	685.09	684.98	684.86	684.73	684.59
11	685.59	685.56	685.54	685.50	685.44	685.37	685.28	685.17	685.05	684.92	684.79

Elevations are based on a constant slab thickness of 8 1/2" and include allowance for theoretical dead load deflections due to weight of slab (including precast panel) and barrier.



TYPICAL SLAB ELEVATIONS DIAGRAM



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338

DATE PREPARED
1-OCT-2024

ROUTE 70EB
DISTRICT BR
STATE MO
SHEET NO. 37

COUNTY
BOONE

JOB NO.
JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9542

DATE	DESCRIPTION	REV.				
		REV.	A	FINAL	REVIEW	CONSTRUCTION
09/13/24						
10/01/24						

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

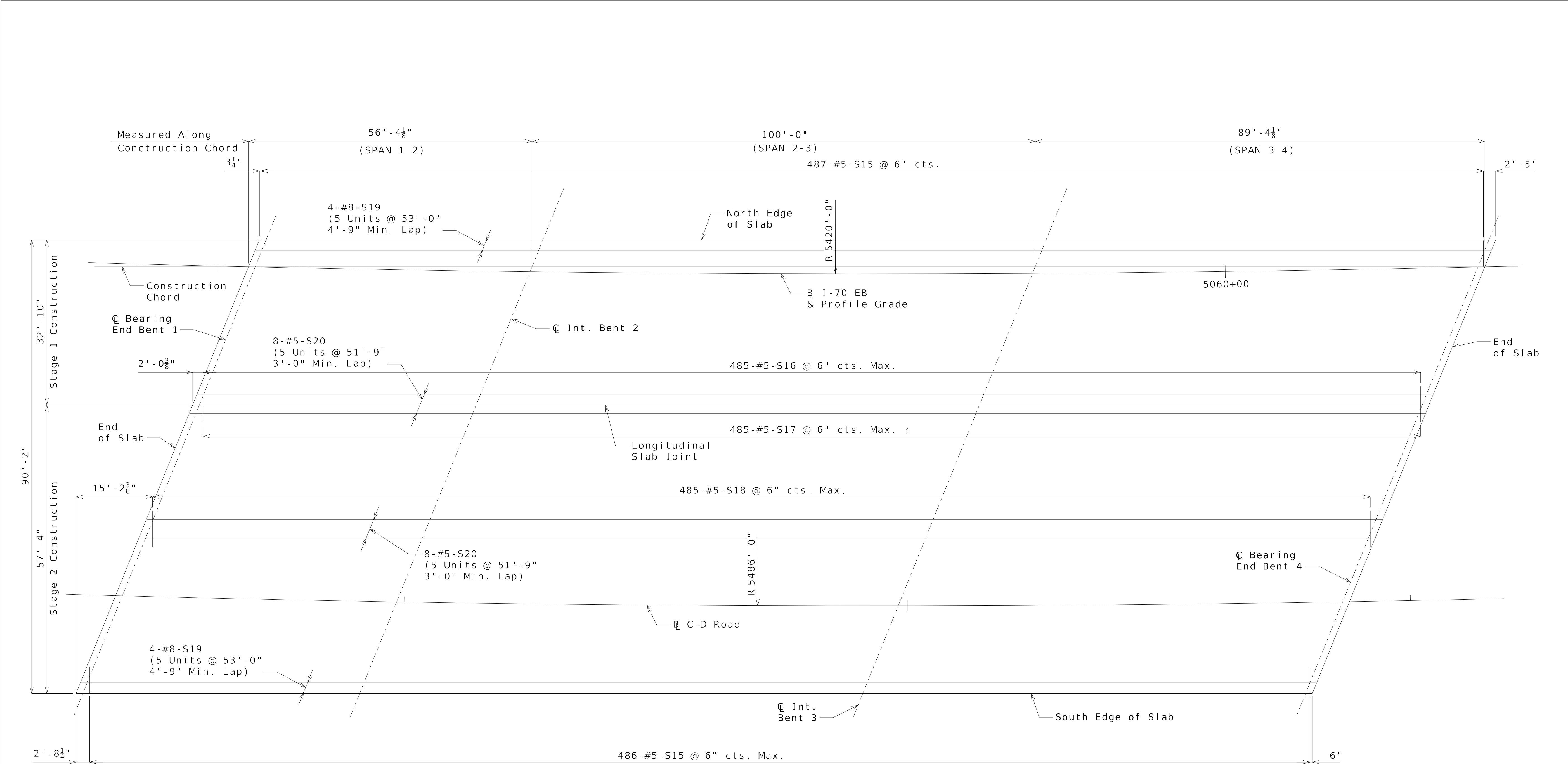
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

MoDOT IMPROVE I-70 DB PROJECT 1

JACOBS

MILLSTONE WEBER

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING



Notes:
For General Notes and Details not shown, see Sheet No. 38.

BOTTOM SLAB REINFORCEMENT PLAN

STATE OF MISSOURI
MATTHEW J. MUENKS
NUMBER
PE-2017000338
PROFESSIONAL ENGINEER

10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

1-OCT-2024

ROUTE
70EB

DISTRICT
BR

STATE
MO

SHEET NO.
39

COUNTY
BOONE

JOB NO.
JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9542

DESCRIPTION
REV. A - FINAL REVIEW
REV. 0 - RELEASED FOR CONSTRUCTION

DATE
09/13/24
10/01/24

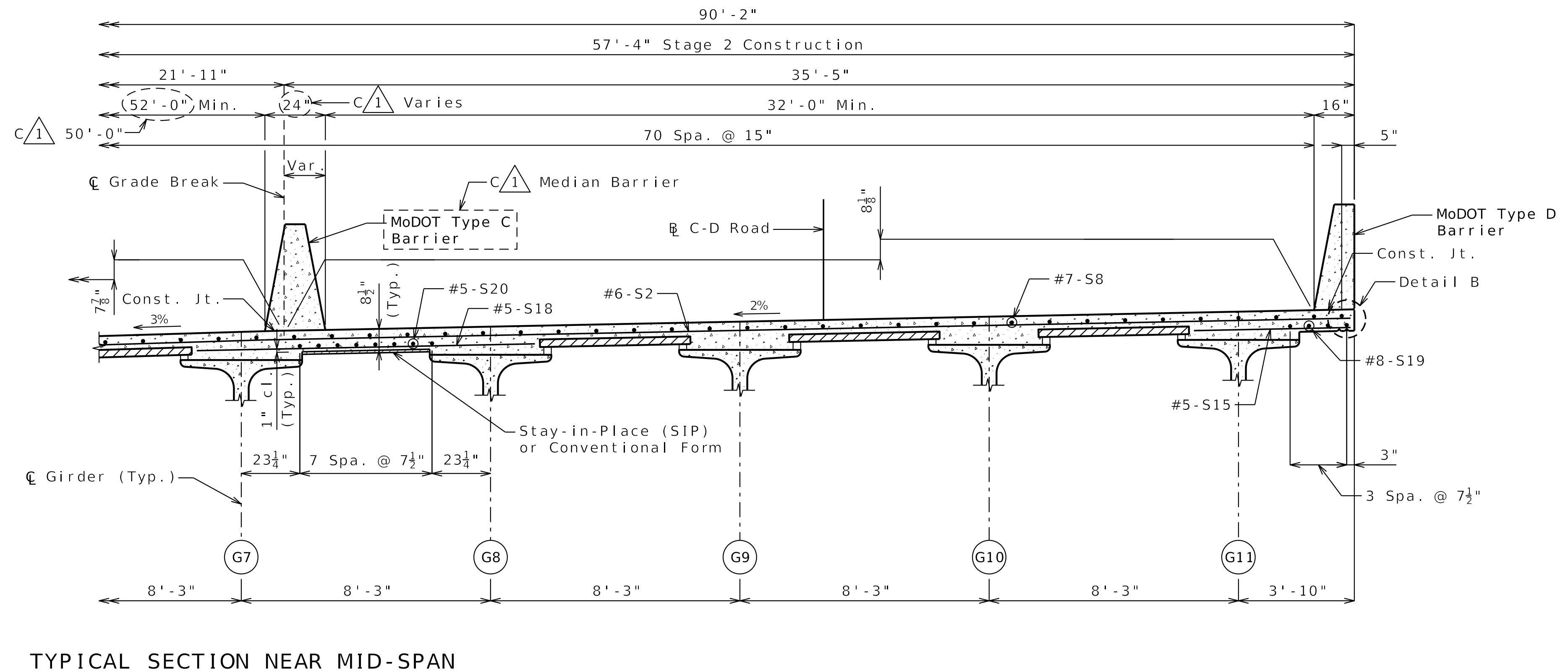
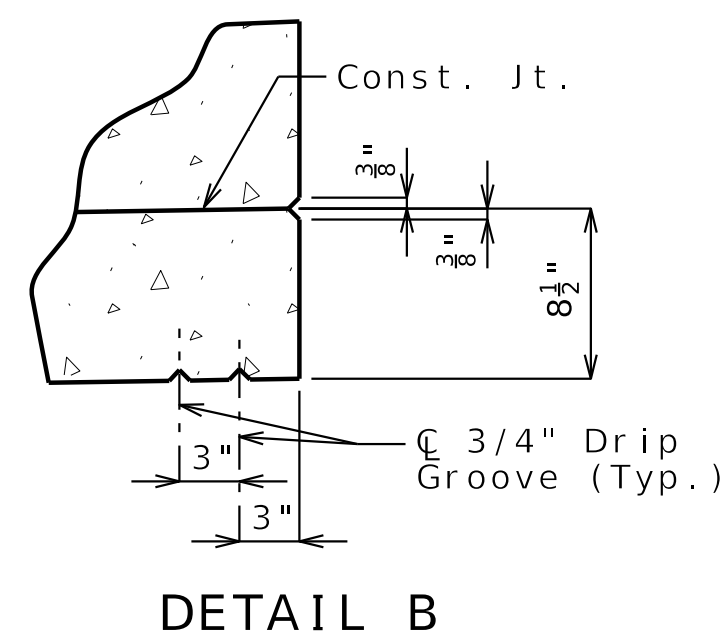
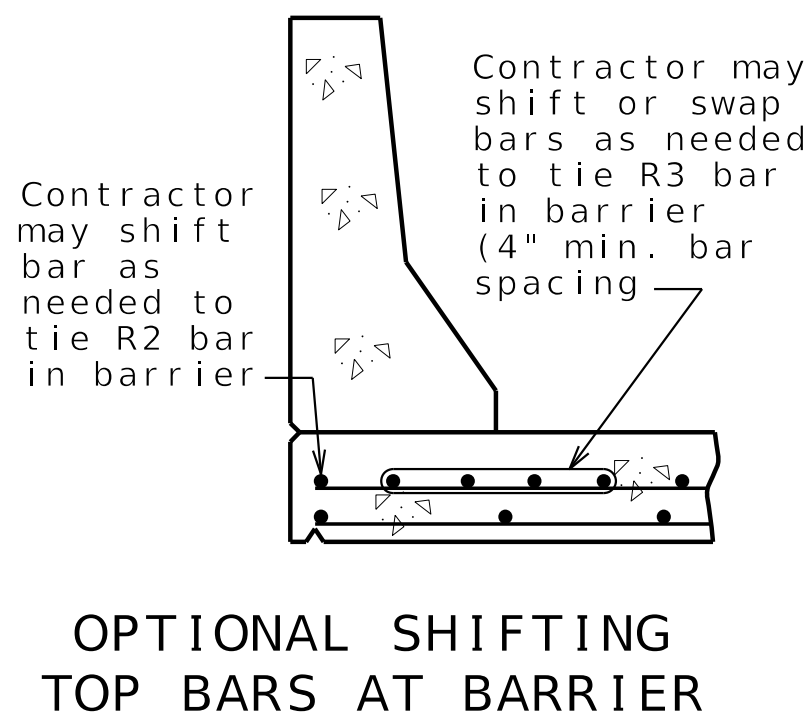
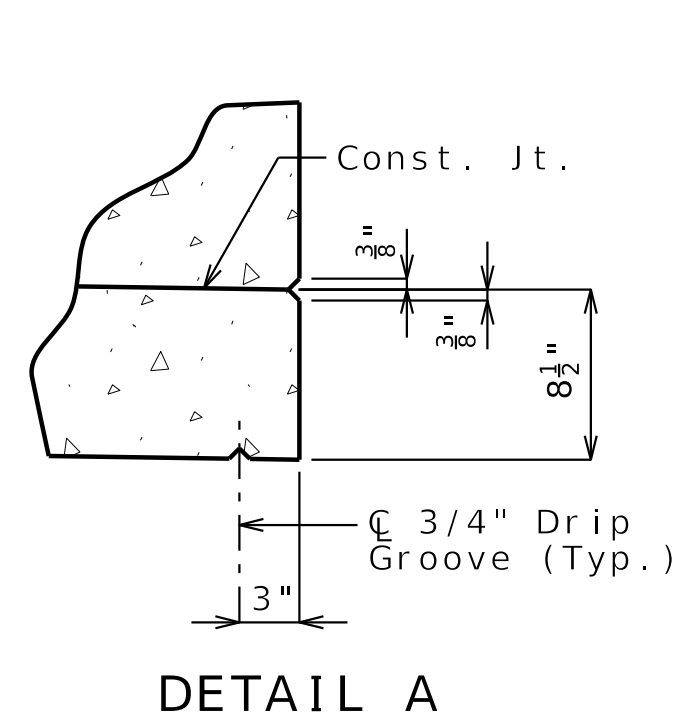
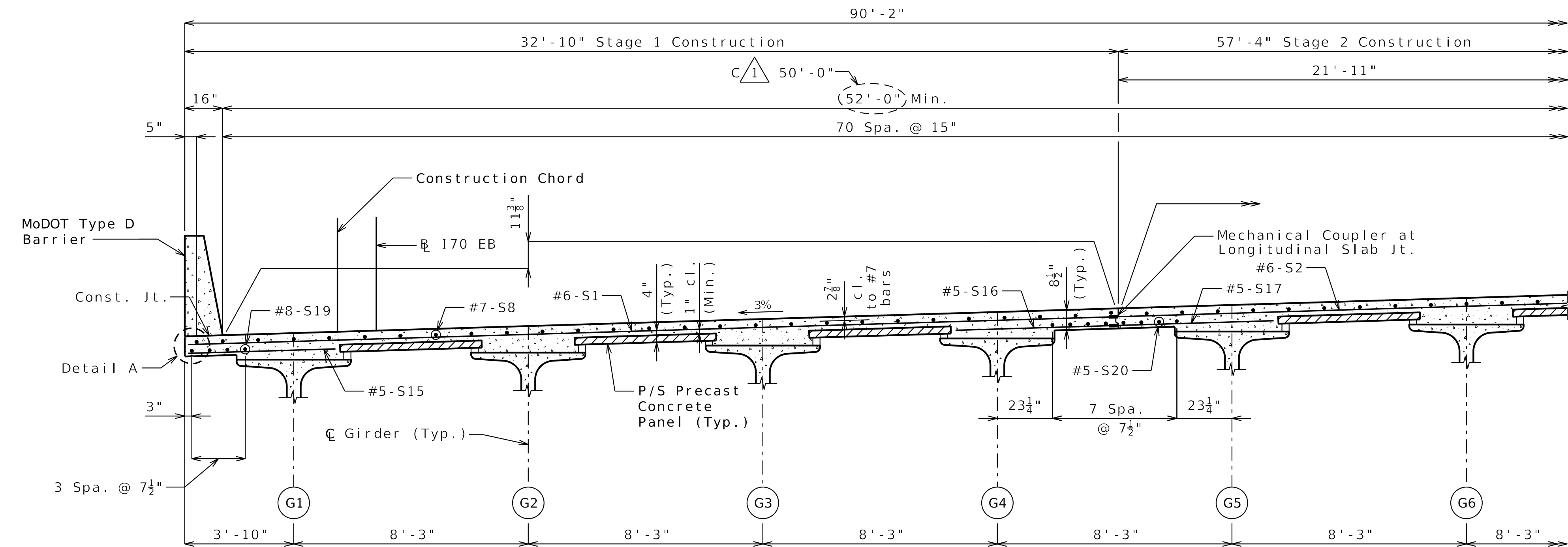
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

MoDOT
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

MoDOT IMPROVE I-70 DB PROJECT 1

Jacobs
MILLSTONE
WEBER

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Notes:

For General Notes, see Sheet No. 38.

For Slab Plans Showing Reinforcement, Details and Notes not shown here, see Sheet Nos. 38 & 39.

For Details of Slab Section Near Intermediate Bents not shown here, see Sheet No. 41.

SLAB REINFORCEMENT DETAILS

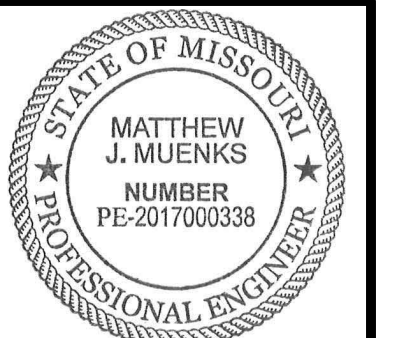
C 1 REVISED 12-23-24

Detailed JUNE 2024
Checked JULY 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 40 of 56

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12/23/2024 10:59:32 AM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 40

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A - FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

REV. 1 - NDC-002 - REVISED BARRIER

DATE

09/13/24

10/01/24

12/23/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

MODOT

JACOBS

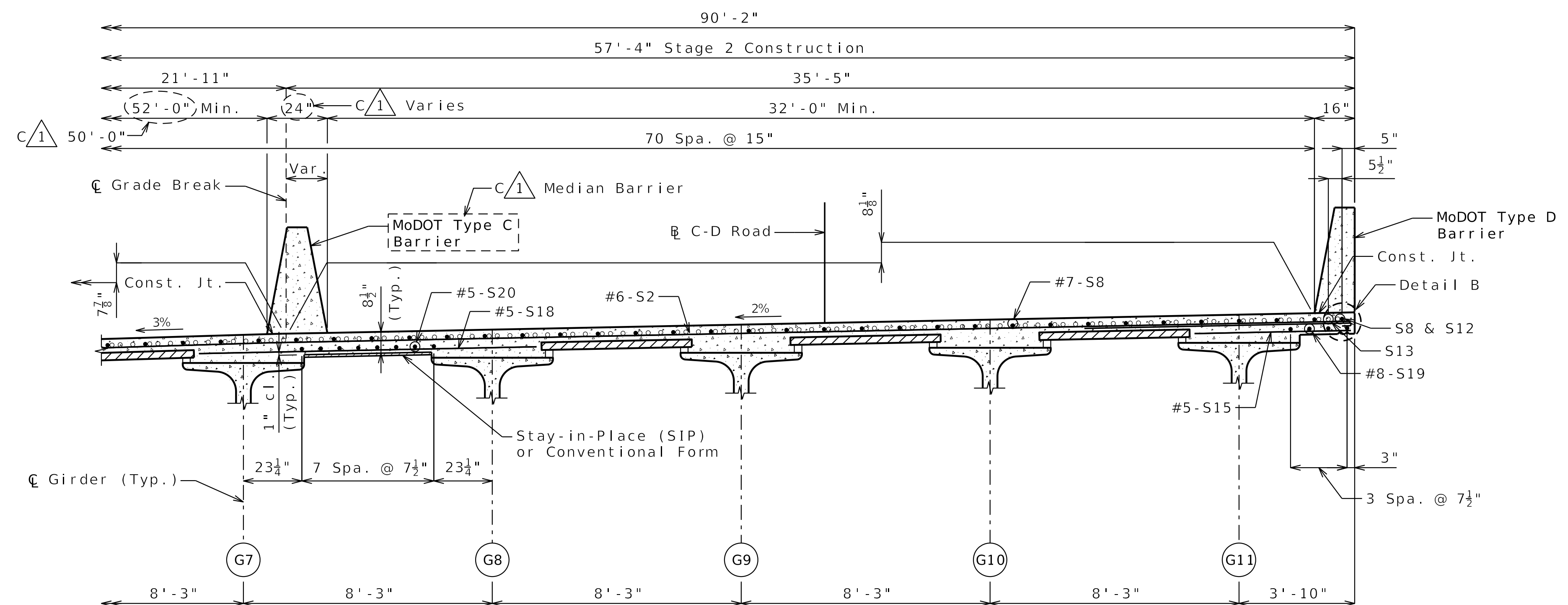
MILLSTONE WEBER

MODOT IMPROVE I-70 DB PROJECT 1

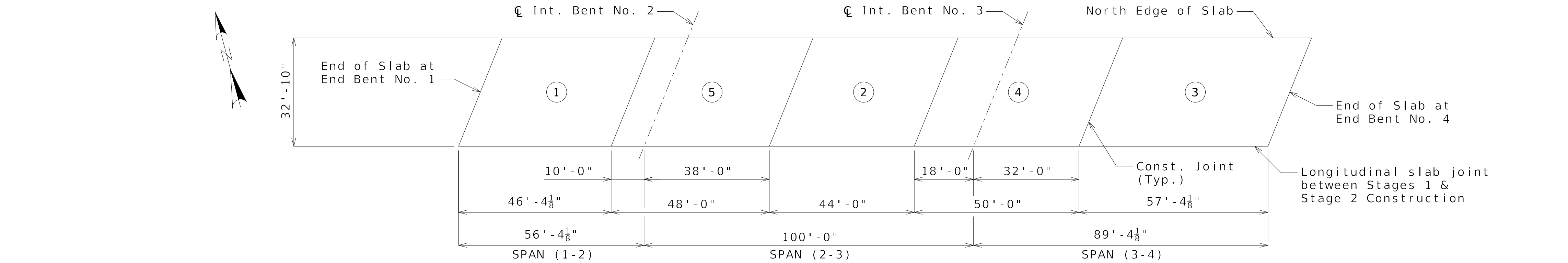
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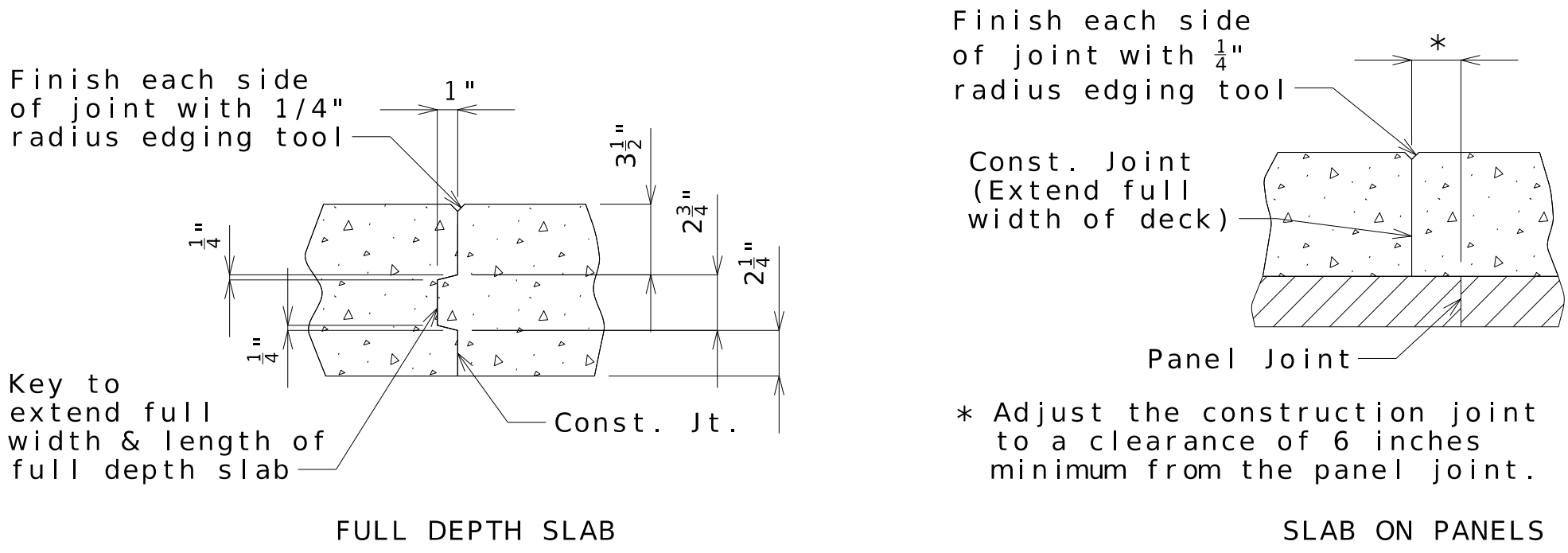


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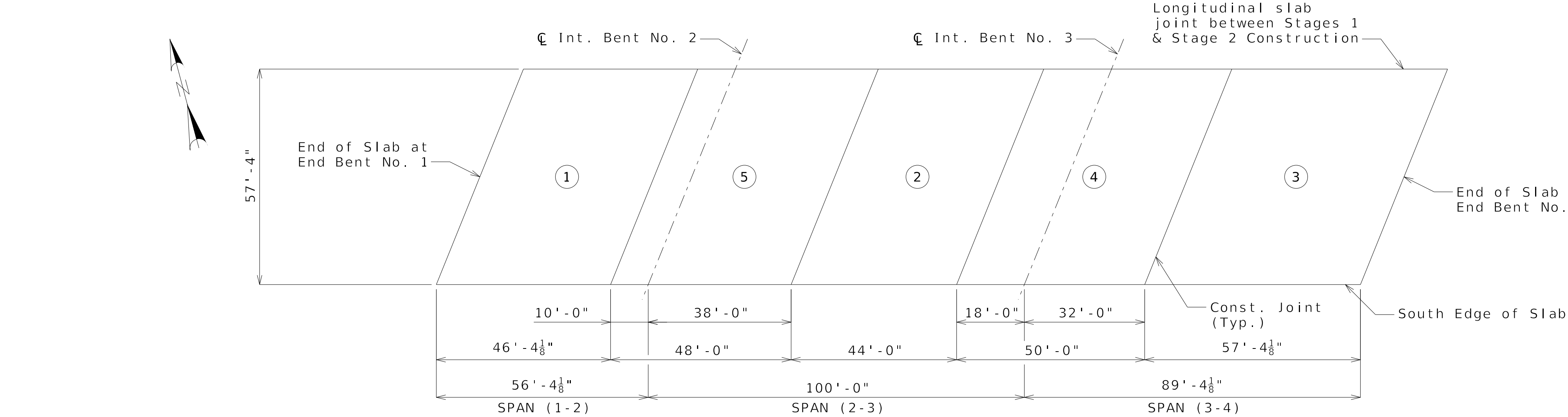


STAGE 1 CONSTRUCTION PLAN

	Sequence of Pours - Stage 1					Min. Rate of Pour Cu. Yds./Hr.
	Direction					
Basic Sequence	1	2	3	4	5	With Retarder
	Either Direction					25
Alternate pours to the basic skip sequence are subject to the approval of the engineer in accordance with Sec 703.						
Alternate A Pours	1		5 + 2		4 + 3	25
	End to 5		1 to 4		2 to End	
Alternate B Pours	1 + 5 + 2			4 + 3		25
	End to 4			2 to End		
Alternate C Pours	1 + 5 + 2 + 4 + 3					25
	End to End					



SLAB CONSTRUCTION JOINT



STAGE 2 CONSTRUCTION PLAN

Basic Sequence	Sequence of Pours - Stage 2					Min. Rate of Pour Cu. Yds./Hr.
	Direction					With Retarder
	1	2	3	4	5	25
Alternate pours to the basic skip sequence are subject to the approval of the engineer in accordance with Sec 703.						
Alternate A Pours	1 End to 5		5 + 2 1 to 4		4 + 3 2 to End	34
	1 + 5 + 2 End to 4		4 + 3 2 to End			
Alternate B Pours	1 + 5 + 2 + 4 + 3 End to End					34

General Notes:

1. The contractor shall furnish an approved retarder to retard the set of the concrete to 2.5 hours and shall pour and satisfactorily finish the slab pours at the rate given.
2. The concrete diaphragm at the intermediate bent and integral end bents shall be poured a minimum of 30 minutes and a maximum of 2 hours before the slab is poured.

SLAB POURING SEQUENCE

Detailed AUG 2024
Checked AUG 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 42 of 56

pw:///jacobs-us-va-pw.bentley.com:jacobs-us-va-pw-04/Documents/F3X03001 - Improve I-70 Columbia to Kingdom City/30 Project Data/AAA_Packages/B2200 (Bridge 2-EB I-70 & CD Rd over Hinkson Creek)/B_A9542_042_JST0021_Slab Pouring Sequence 1.dgn

STATE OF MISSOURI

MATTHEW J. MUENKS

NUMBER PE-2017000338

PROFESSIONAL ENGINEER

10/01/2024 4:59:52 PM

Matthew Muenks

MO PE-2017000338

DATE PREPARED

1-OCT-2024

ROUTE

70EB

DISTRICT

BR

STATE

MO

SHEET NO.

42

COUNTY

BOONE

JOB NO.

JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.

A9542

DESCRIPTION

REV. A - FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

DATE

09/13/24

10/01/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)

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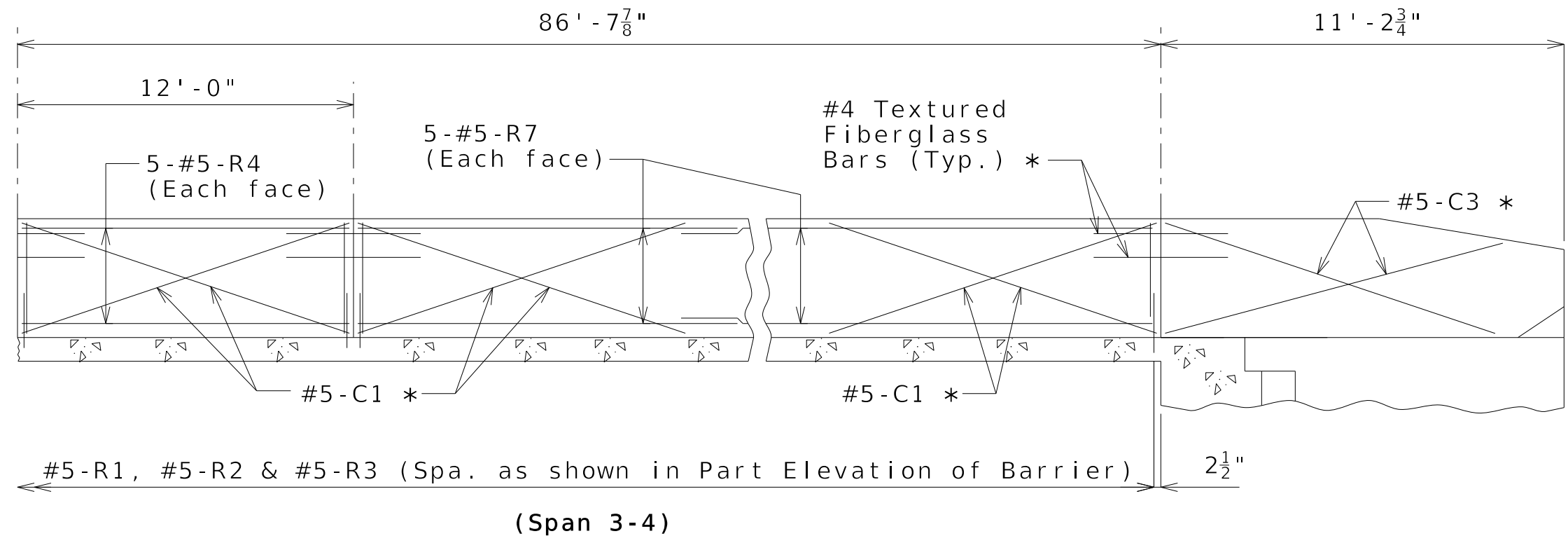
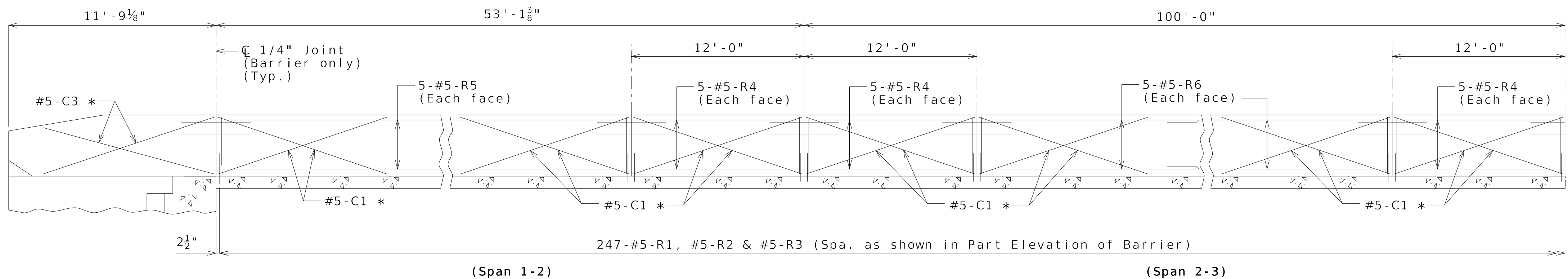
IMPROVE I-70 DB PROJECT 1

Jacobs

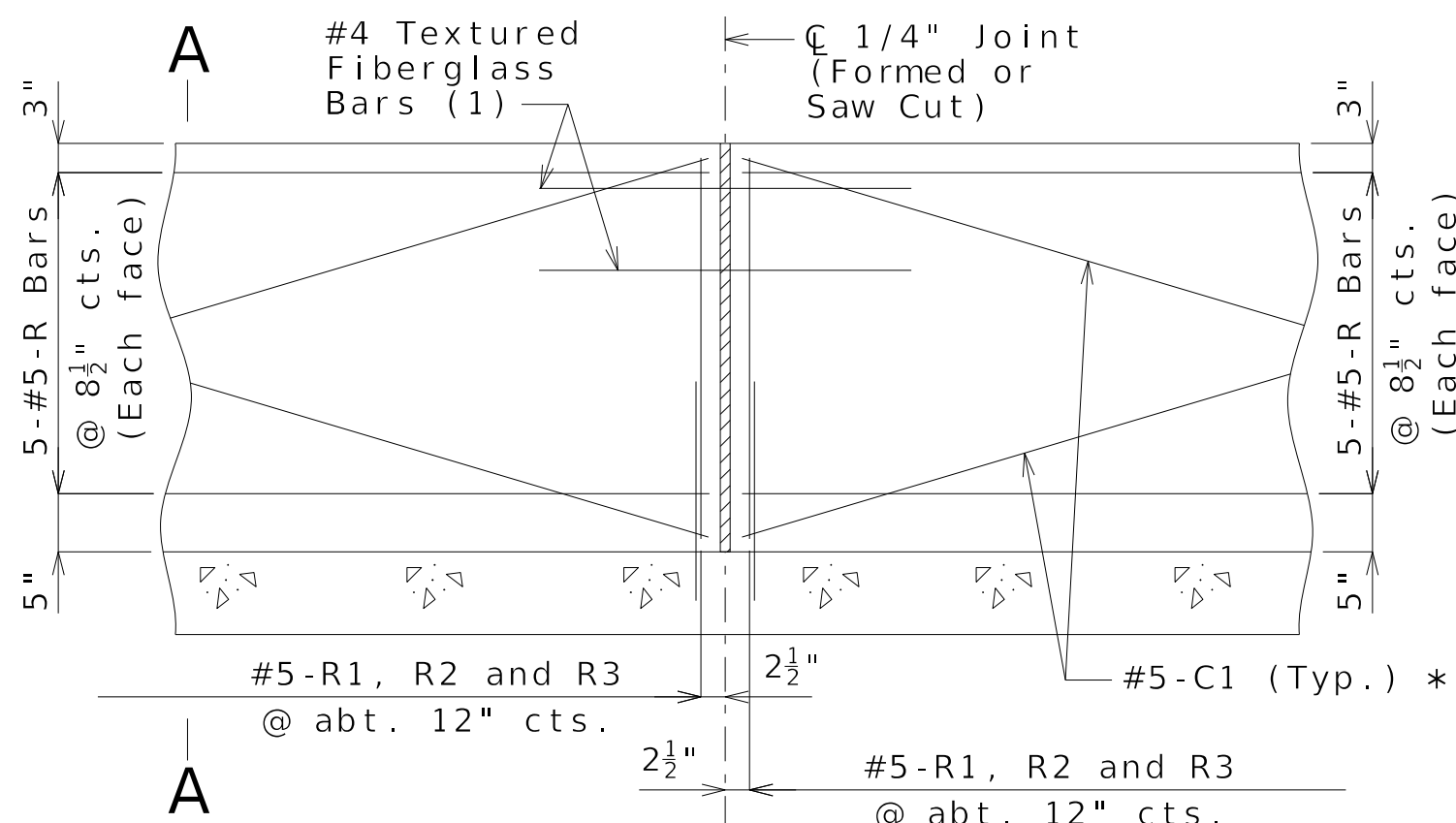
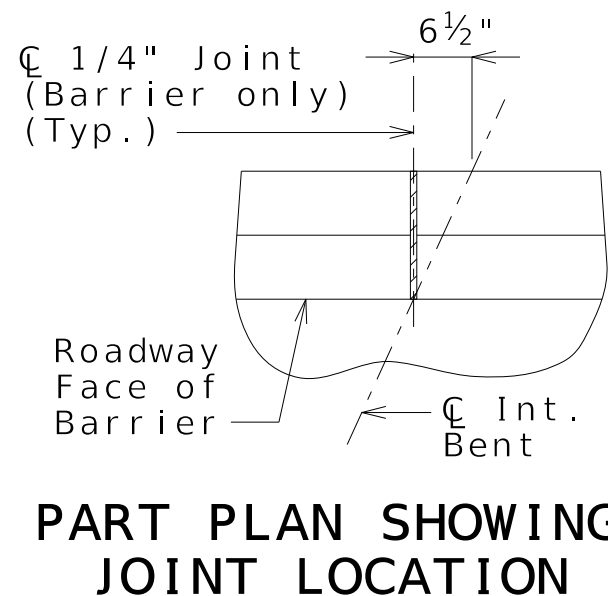
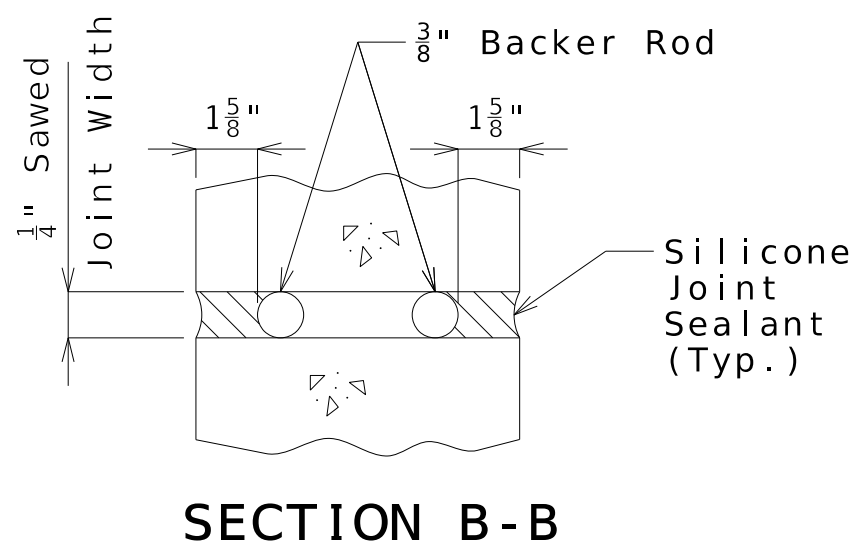
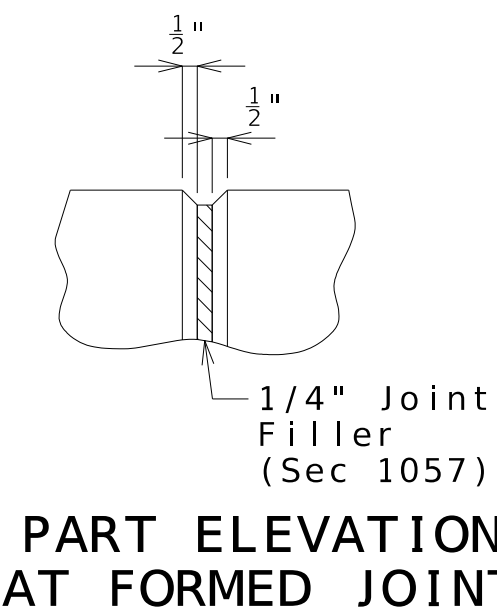
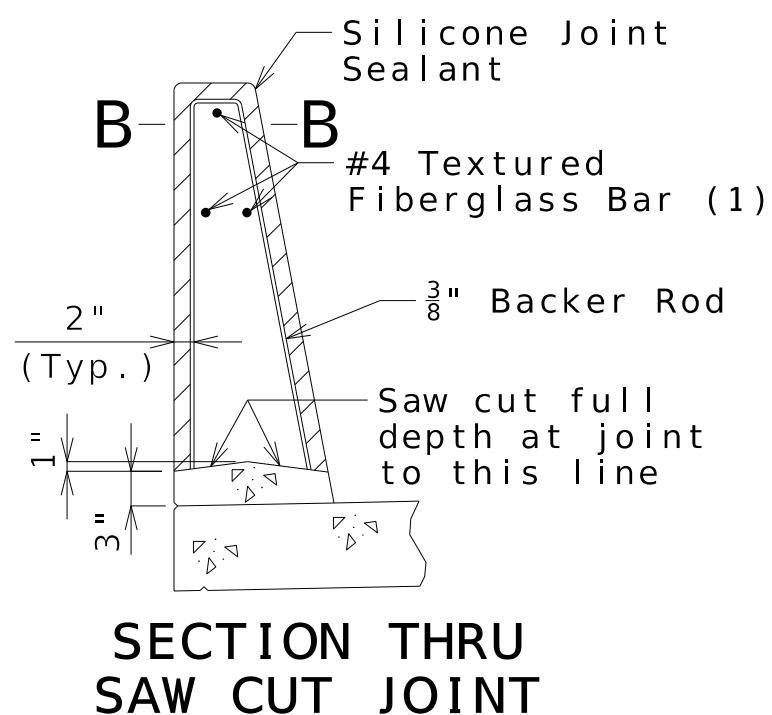
MILLSTONE WEBER

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

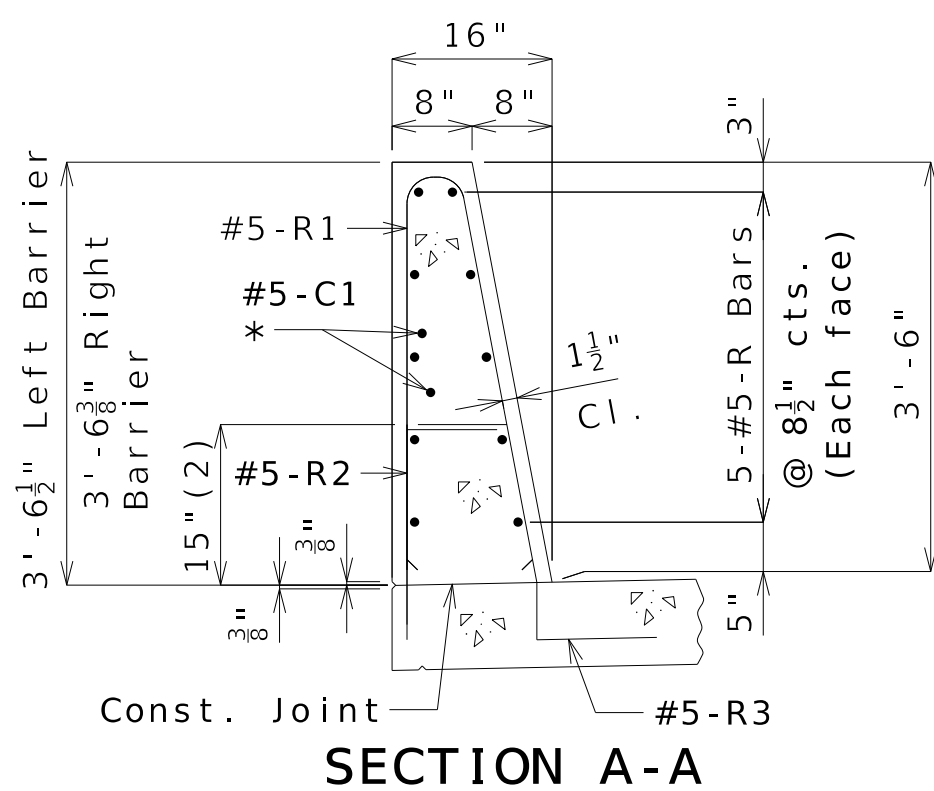
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ELEVATION OF LEFT BARRIER
Longitudinal dimensions are horizontal.



PART ELEVATION OF BARRIER
(1) Four feet long, centered on joint, slip-formed option only



SECTION A-A
Use a minimum lap of 3'-1" for #5 horizontal barrier bars.

The cross-sectional area above the slab is 3.52 square feet for the Right Barrier.

The cross-sectional area above the slab is 3.53 square feet for the Left Barrier.

(2) To top of bar.

TYPE D BARRIER

R-BAR PERMISSIBLE ALTERNATE SHAPE

- (3) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)
- (4) The R2 bar and #5 bottom transverse slab bar in cantilever (prestressed panels only) combination may be furnished as one bar as shown, at the contractor's option.

General Notes:

* Slip-formed option only.

Conventional forming or slip forming may be used. Saw cut joints may be used with conventional forming.

Top of barrier shall be built parallel to grade and barrier joints (except at end bents) normal to grade.

All exposed edges of barrier shall have either a 1/2-inch radius or a 3/8-inch bevel, unless otherwise noted.

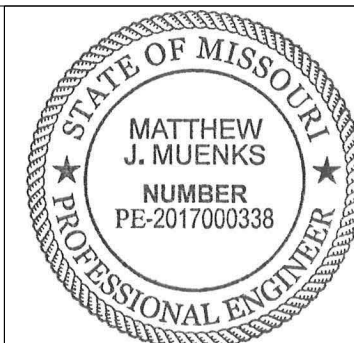
Concrete in barrier shall be Class B-1.

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides.

Joint sealant and backer rods shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

For slip-formed option, both sides of barrier shall have a vertically broomed finish and the top shall have a transversely broomed finish.

For Elevation of Right Barrier, see Sheet No. 44.



10/1/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

1-OCT-2024

ROUTE 70EB STATE MO
DISTRICT BR SHEET NO. 43

COUNTY BOONE
JOB NO. JST0021
CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

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Jacobs MILLSTONE WEBER

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

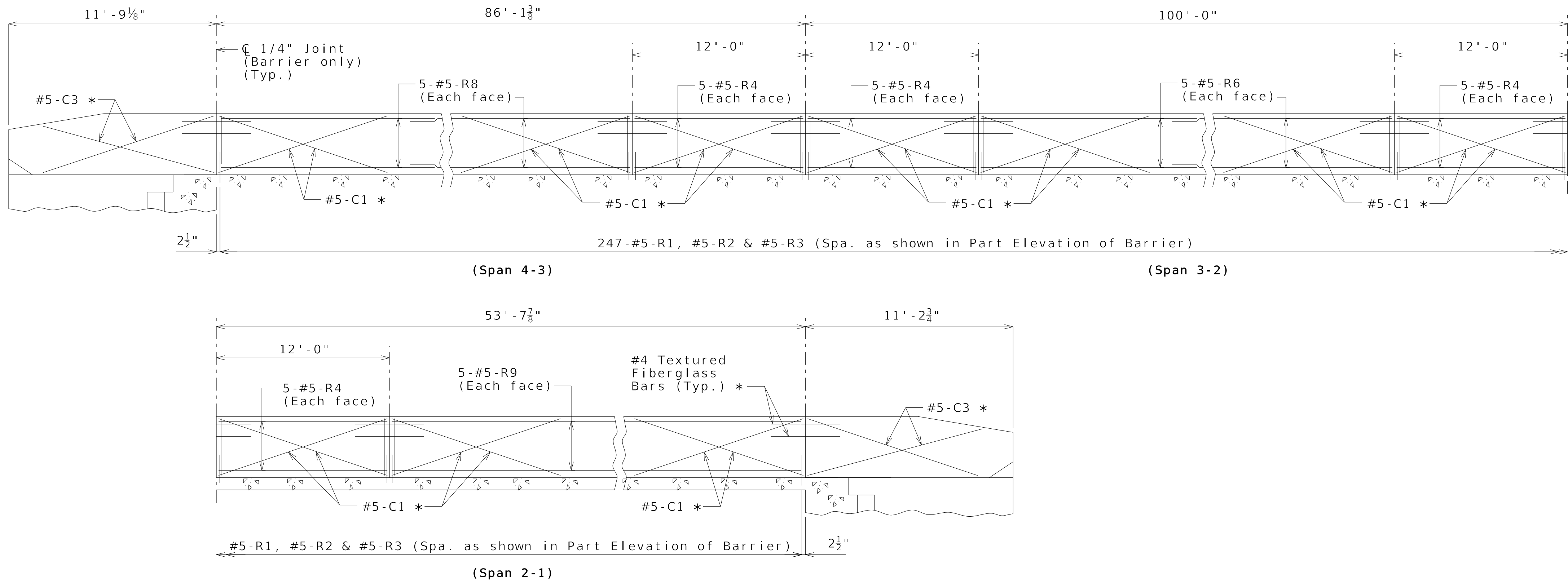
Detailed APR 2024
Checked JULY 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 43 of 56

pw://jacobs-us-va-pw.bentley.com:jacobs-us-va-pw-04/Documents/F3X03001 - Improve I-70 Columbia to Kingdom City/30 Project Data/AAA_Packages/B2200 (Bridge 2-EB I-70 & CD Rd over Hinkson Creek)/B_A9542_043_JST0021_BarrierElevLeft.dgn

16:26 1-OCT-2024



ELEVATION OF RIGHT BARRIER
Longitudinal dimensions are horizontal.

TYPE D BARRIER

Detailed APR 2024
Checked JULY 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 44 of 56

pw://jacobs-us-va-pw.bentley.com:jacobs-us-va-pw-04/Documents/F3X03001 - Improve I-70 Columbia to Kingdom City/30 Project Data/AAA_Packages/B2200 (Bridge 2-EB I-70 & CD Rd over Hinkson Creek)/B_A9542_044_JST0021_BarrierElevRight.dgn

Notes:
For General Notes and Details not shown,
see Sheet No. 43.



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

1-OCT-2024

ROUTE 70EB
DISTRICT BR
STATE MO
SHEET NO. 44

COUNTY BOONE
JOB NO. JST0021
CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION	REV. A - FINAL REVIEW			
		REV.	0	RELEASED FOR CONSTRUCTION	
09/13/24					
10/01/24					

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

MoDOT

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

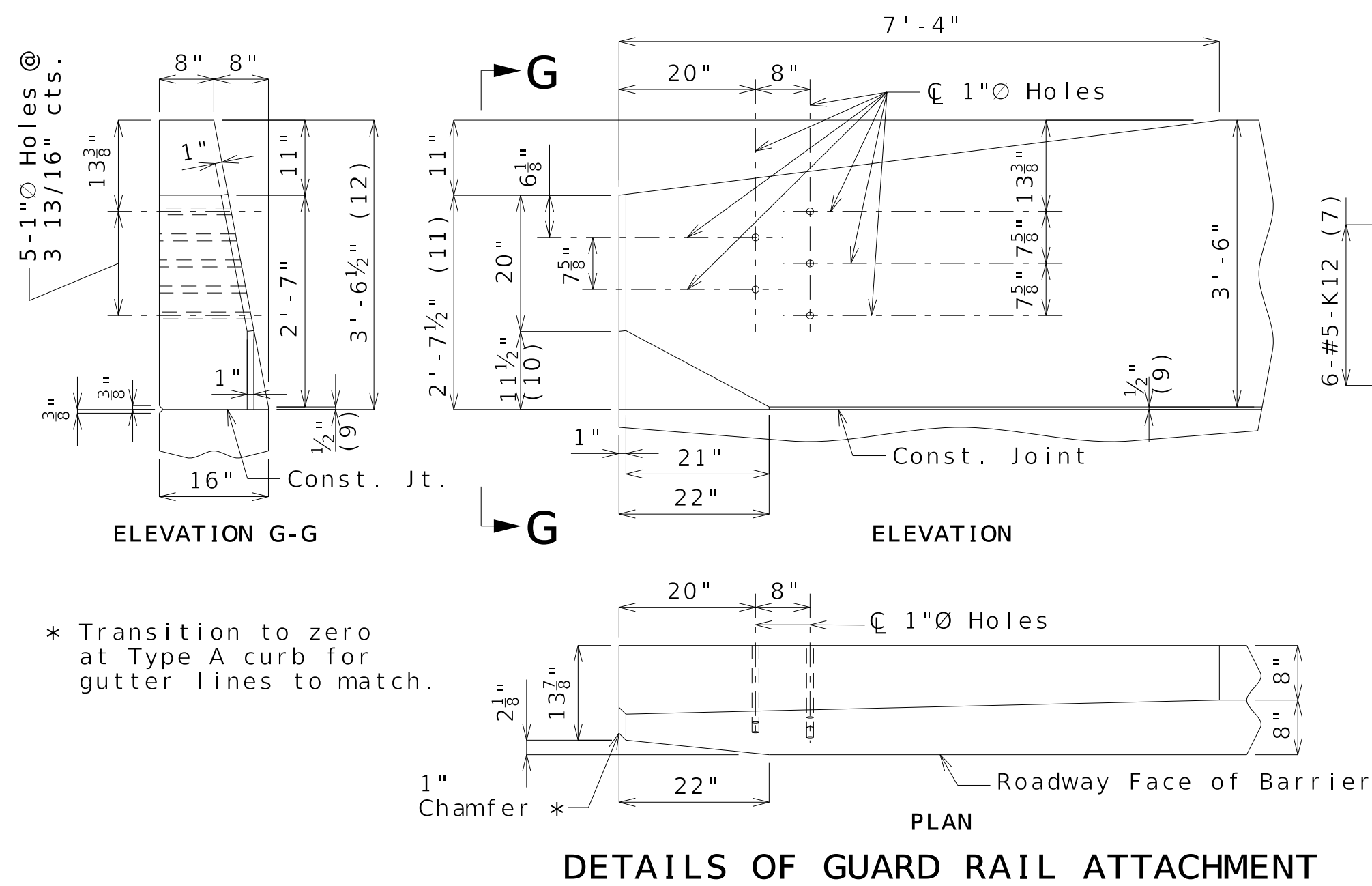
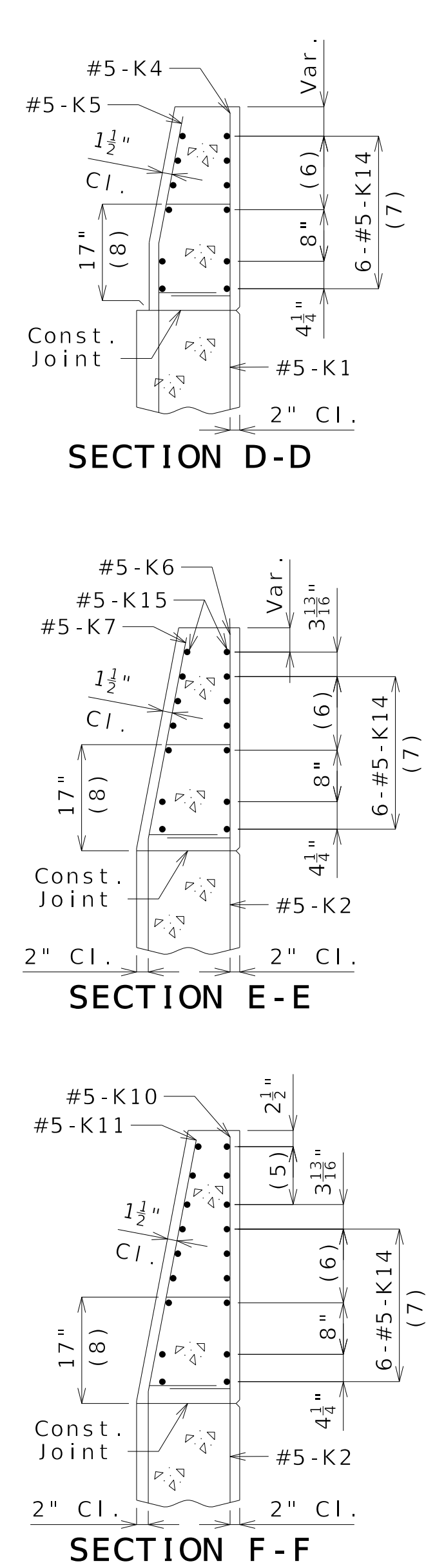
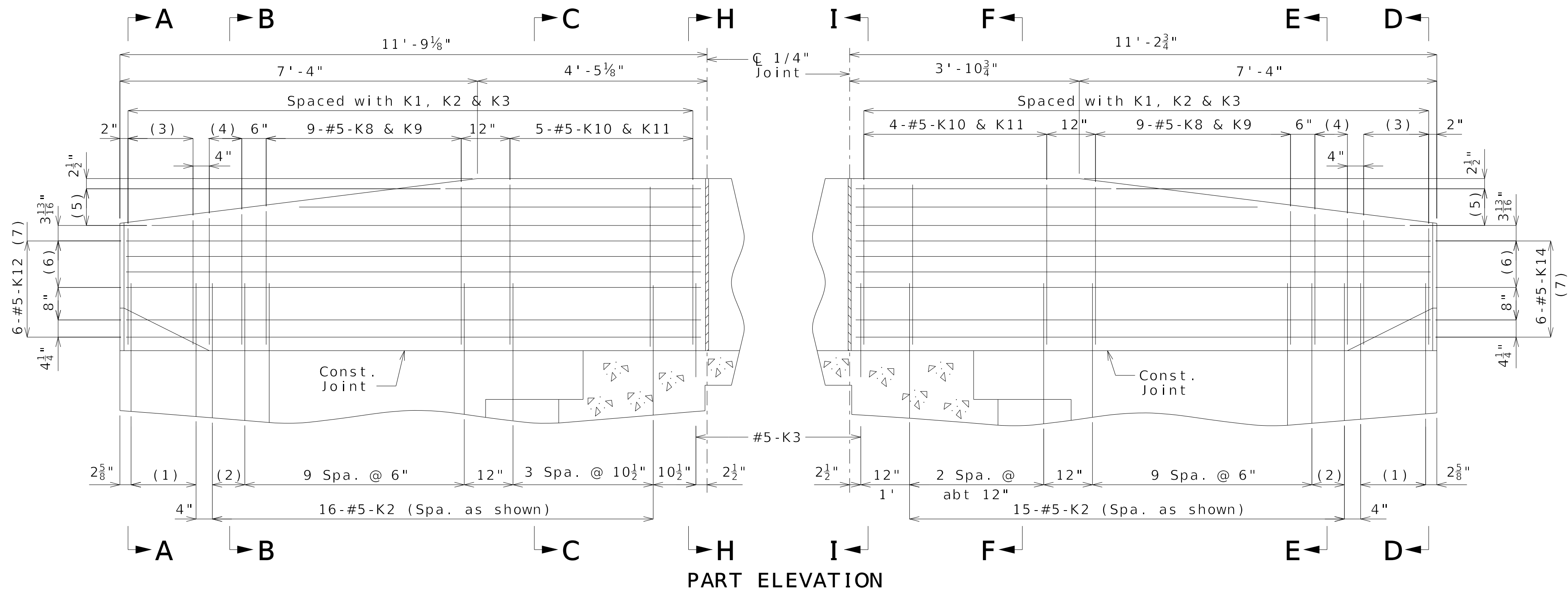
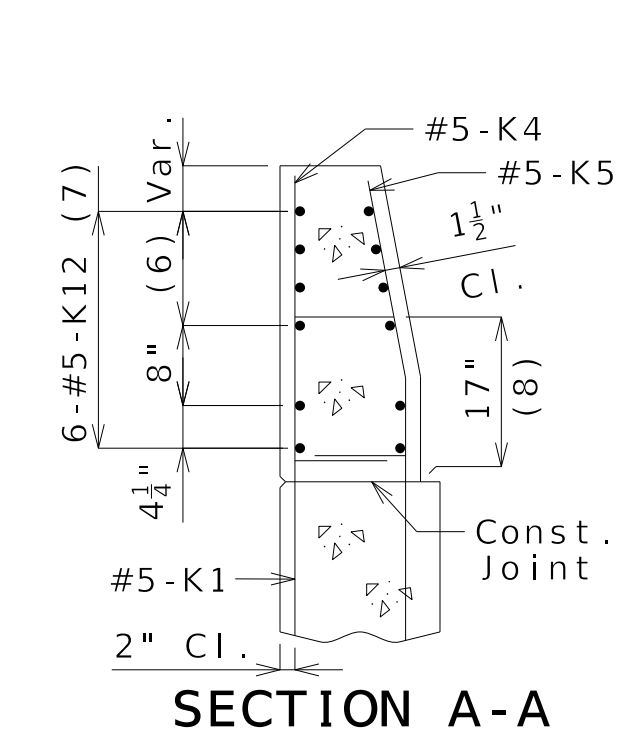
MoDOT IMPROVE I-70 DB PROJECT 1

Jacobs

MILLSTONE WEBER

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

16:26 1-OCT-2024

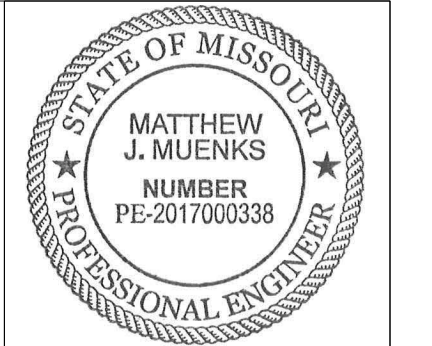
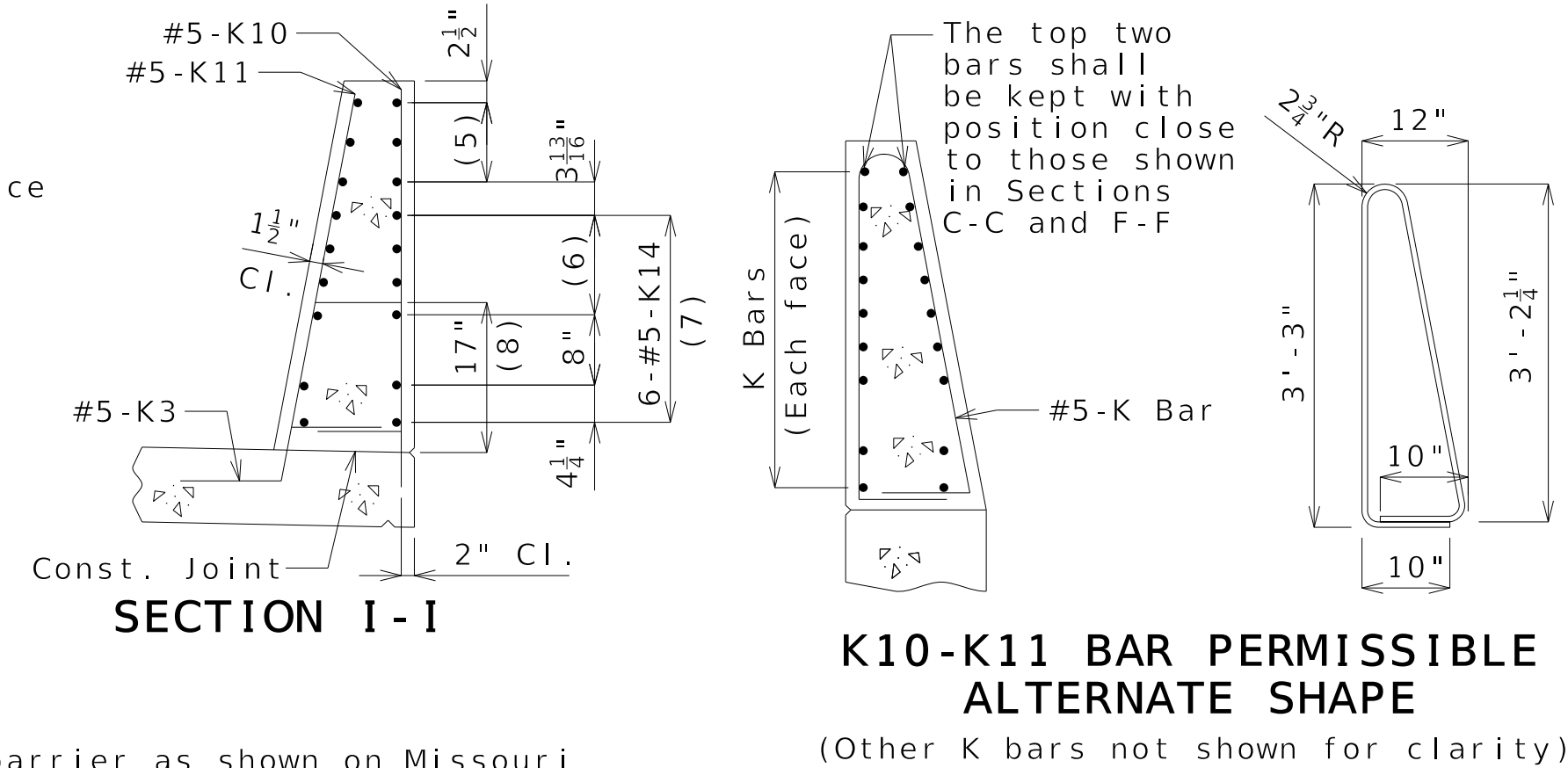


- (1) 5-#5-K1 @ 4" cts.
- (2) 2 spaces @ 4"
- (3) 5-#5-K4 & K5
- (4) 3-#5-K6 & K7
- (5) 3-#5-K13 or K15 @ $4\frac{1}{2}$ " cts., each face
- (6) 3 spaces @ $3\frac{1}{16}$ "
- (7) Spaced as shown, each face
- (8) To top of bar
- (9) $\frac{3}{8}$ " at Right Barrier
- (10) $11\frac{3}{8}$ " at Right Barrier
- (11) $2'-7\frac{3}{8}$ " at Right Barrier
- (12) $3'-6\frac{3}{8}$ " at Right Barrier

General Notes:

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides.

TYPE D BARRIER AT END BENTS



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338

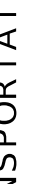
DATE PREPARED
1 - OCT - 2024

ROUTE 70EB	STATE MO
DISTRICT BR	SHEET NO. 45
COUNTY BOONE	
JOB NO. JST0021	
CONTRACT ID.	

PROJECT NO.

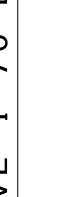
BRIDGE NO.
A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION



**MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION**

105 WEST CAPITAL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

 	MODOT IMPROVE I-70 DB PROJECT 1
MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING REV.	



12/23/2024 10:59:33 AM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB STATE MO
DISTRICT BR SHEET NO. 46

COUNTY BOONE

JST0021

CONTRACT ID.

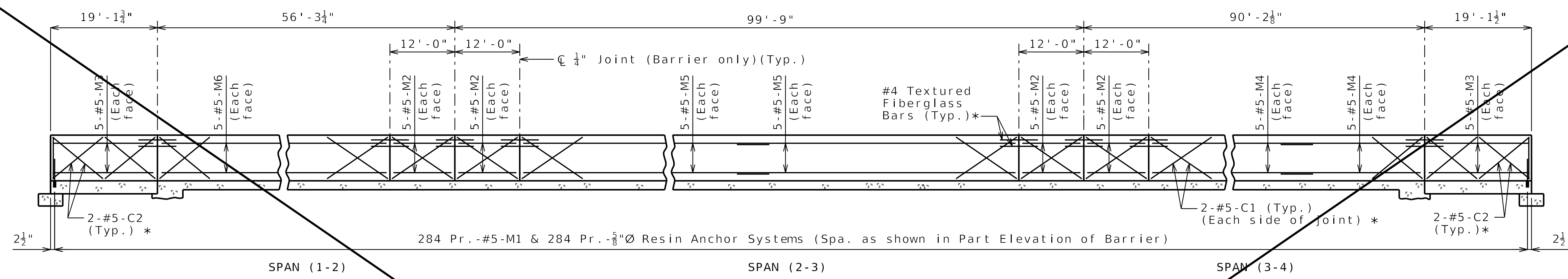
PROJECT NO.

BRIDGE NO. A9542

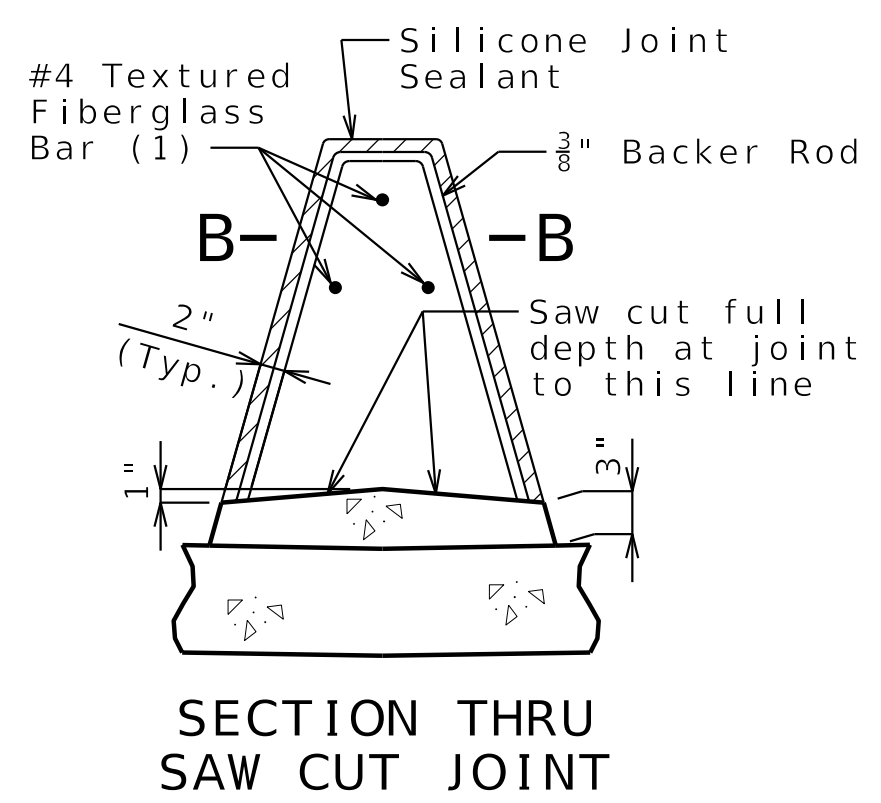
DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION
12/23/24	REV. 1 - NDC-002 - SHEET DELETED

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

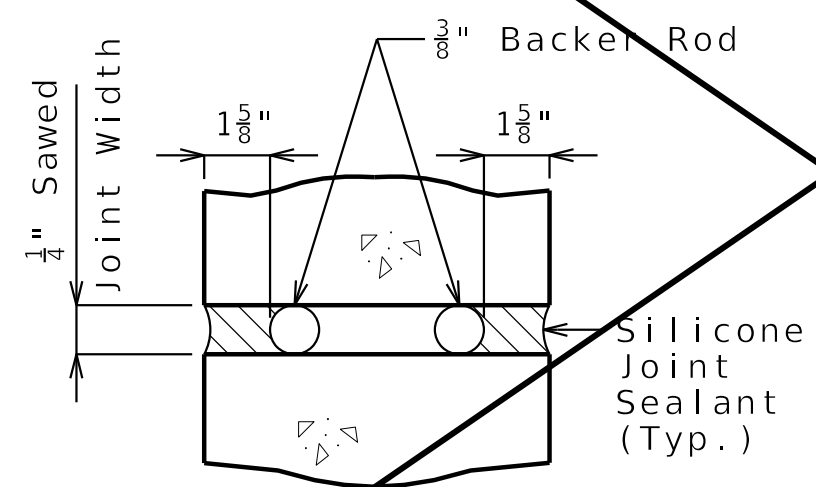
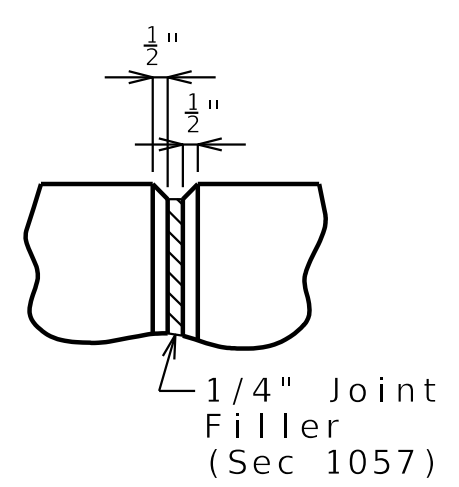
MODOT IMPROVE I-70 DB PROJECT 1
JACOBS
MILLSTONE WEBER
MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING



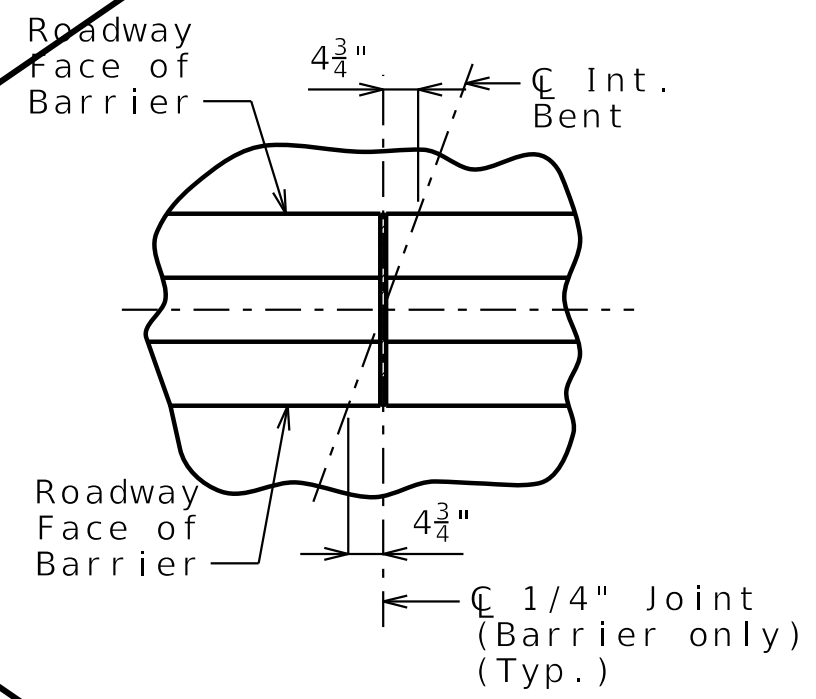
ELEVATION OF BARRIER
Longitudinal dimensions are horizontal along centerline of barrier.



PART ELEVATION AT FORMED JOINT



SECTION B-B



PART PLAN SHOWING JOINT LOCATION

General Notes:
* Slip-formed option only.

Conventional forming or slip forming may be used. Saw cut joints may be used with conventional forming.

Top of barrier shall be built parallel to grade with barrier joints normal to grade.

All exposed edges of barrier shall have either a 1/2-inch radius or a 3/8-inch bevel, unless otherwise noted.

Concrete in the barrier shall be Class B-1.

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators shall have retroreflective sheeting on both sides.

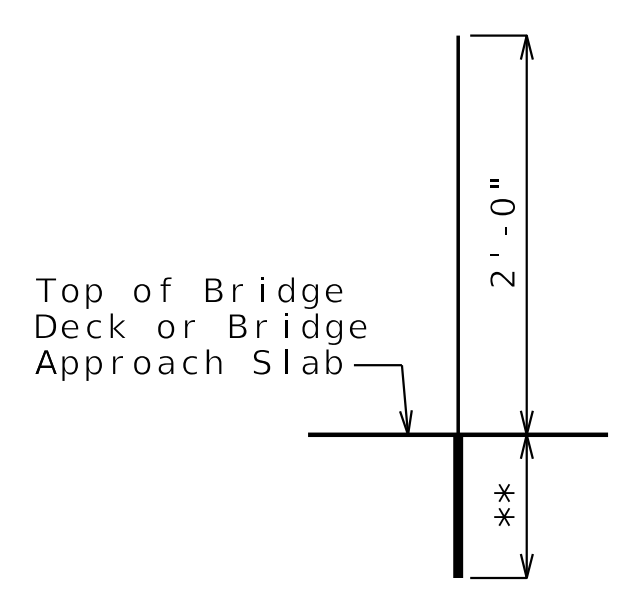
Joint sealant and backer rods shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

For slip-formed option, both sides of barrier shall have a vertically broomed finish and the top shall have a transversely broomed finish.

The contractor shall use one of the qualified resin anchor systems in accordance with 1039.

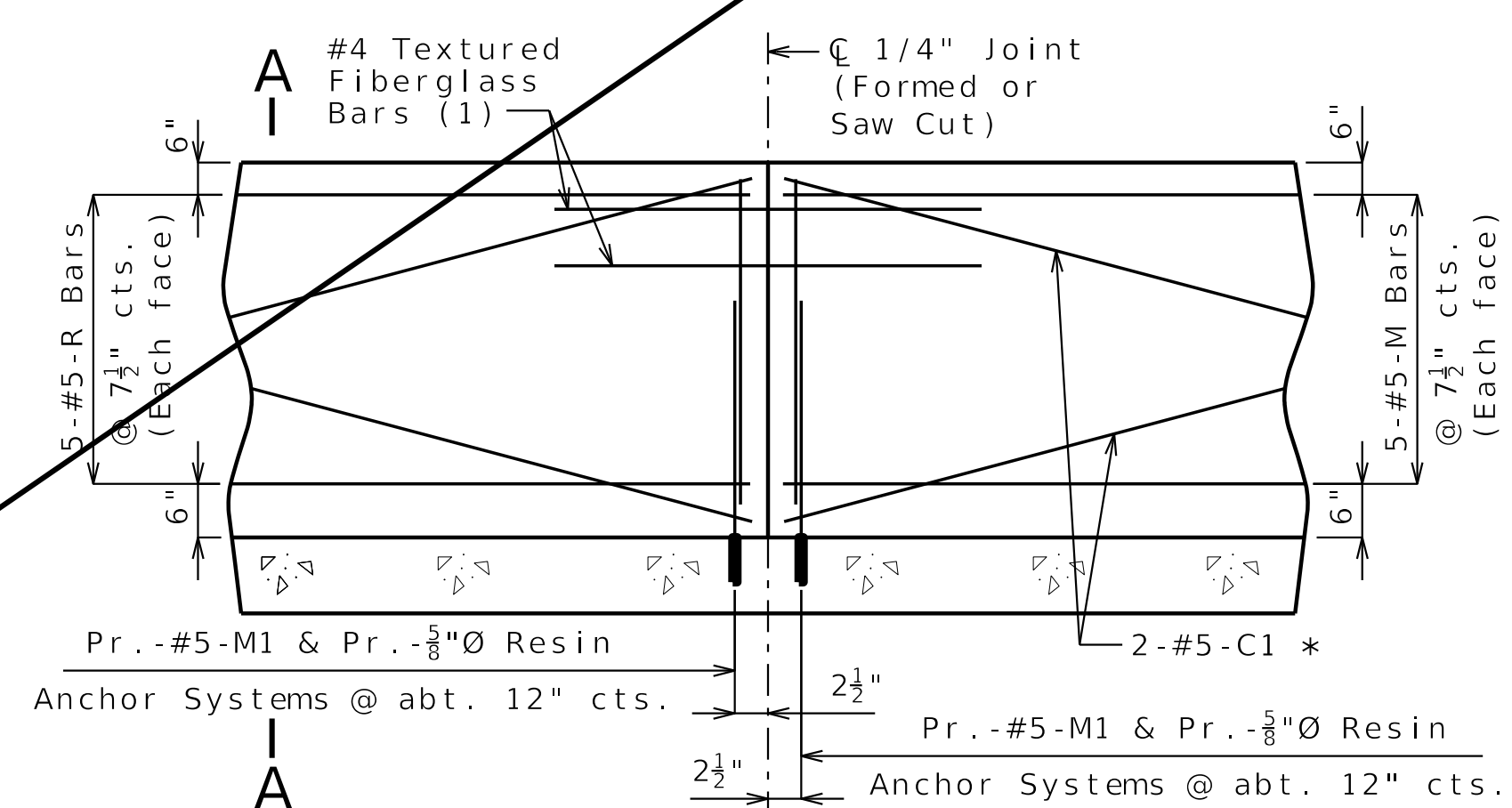
The minimum embedment depth in concrete with f'c = 4,000 psi for the resin anchor system shall be that required to meet the minimum ultimate pullout strength in accordance with Sec 1039 but shall not be less than 5 inches.

An epoxy coated #5 Grade 60 reinforcing bar shall be substituted for the 5/8-inch diameter threaded rod.



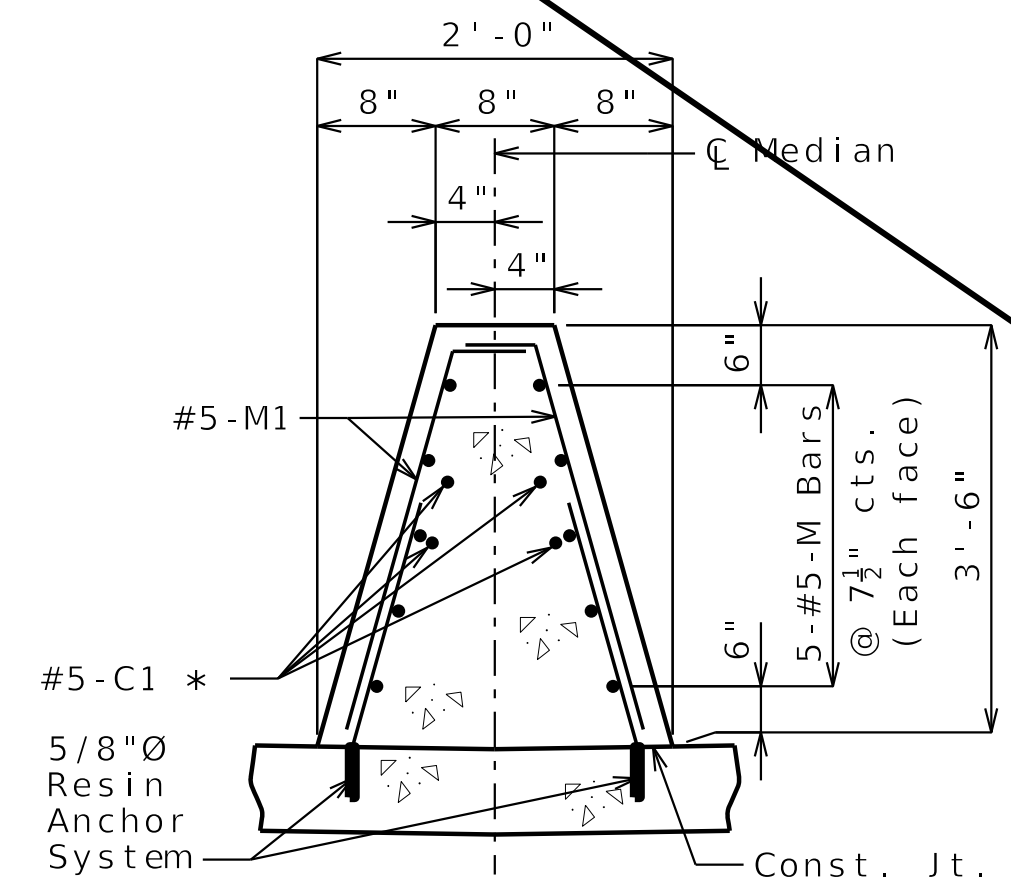
RESIN ANCHOR SYSTEM
(568 required)

** Manufacturer's embedment length (5" minimum)



PART ELEVATION OF BARRIER

(1) Four feet long, centered on joint, slip-formed option only



SECTION A-A

Use a minimum lap of 3'-1" for #5 horizontal barrier bars.

The cross-sectional area above the slab is 4.69 square feet.

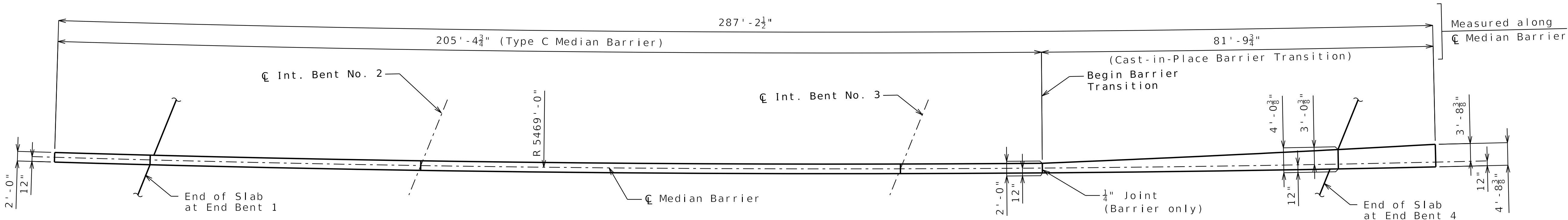
TYPE C BARRIER

C 1 SHEET DELETED 12-23-24

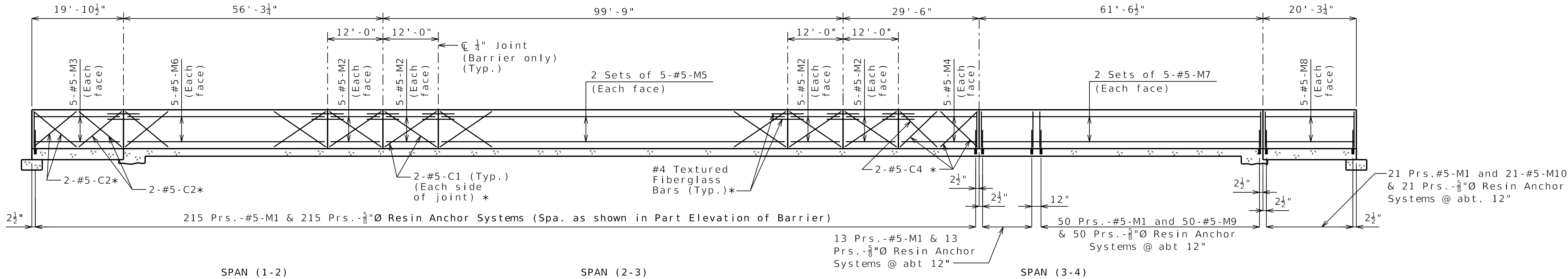
Detailed JULY 2024
Checked JULY 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 46 of 56



PLAN OF MEDIAN BARRIER



ELEVATION OF BARRIER - SHOWING REINFORCEMENT
Longitudinal dimensions are horizontal along CL of barrier.

General Notes:

* Slip-formed option only.

Conventional forming or slip forming may be used for Type C Median Barrier. Saw cut joints may be used with conventional forming.

Top of barrier shall be built parallel to grade with barrier joints normal to grade.

All exposed edges of barrier shall have either a 1/2-inch radius or a 3/8-inch bevel, unless otherwise noted.

Concrete in the barrier shall be Class B-1.

Concrete traffic barrier delineators shall be placed on top of the barrier as shown on Missouri Standard Plan 617.10 and in accordance with Sec 617. Delineators shall have retroreflective sheeting on both sides.

Joint sealant and backer rods shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

For slip-formed option, both sides of barrier shall have a vertically broomed finish and the top shall have a transversely broomed finish.

The contractor shall use one of the qualified resin anchor systems in accordance with 1039.

The minimum embedment depth in concrete with $f'c = 4,000$ psi for the resin anchor system shall be that required to meet the minimum ultimate pullout strength in accordance with Sec 1039 but shall not be less than 5 inches.

An epoxy coated #5 Grade 60 reinforcing bar shall be substituted for the 5/8-inch diameter threaded rod.

Note:

Work this sheet with Sheet No. 46B.

MEDIAN BARRIER DETAILS

Detailed DEC 2024
Checked DEC 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 46A of 56

pw:///jacobs-us-va-pw.bentley.com:jacobs-us-va-pw-04/Documents/F3X03001 - Improve I-70 Columbia to Kingdom City/30 Project Data/AAA_Packages/B2200 (Bridge 2-EB I-70 & CD Rd over Hinkson Creek)/B_A9542_046A_JST0021_Med Barrier-1_C001.dgn



12/23/2024 10:59:33 AM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 46A

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. 0 - NDC-002 - SHEET ADDED

DATE

12/23/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

REV.

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

JACOBS

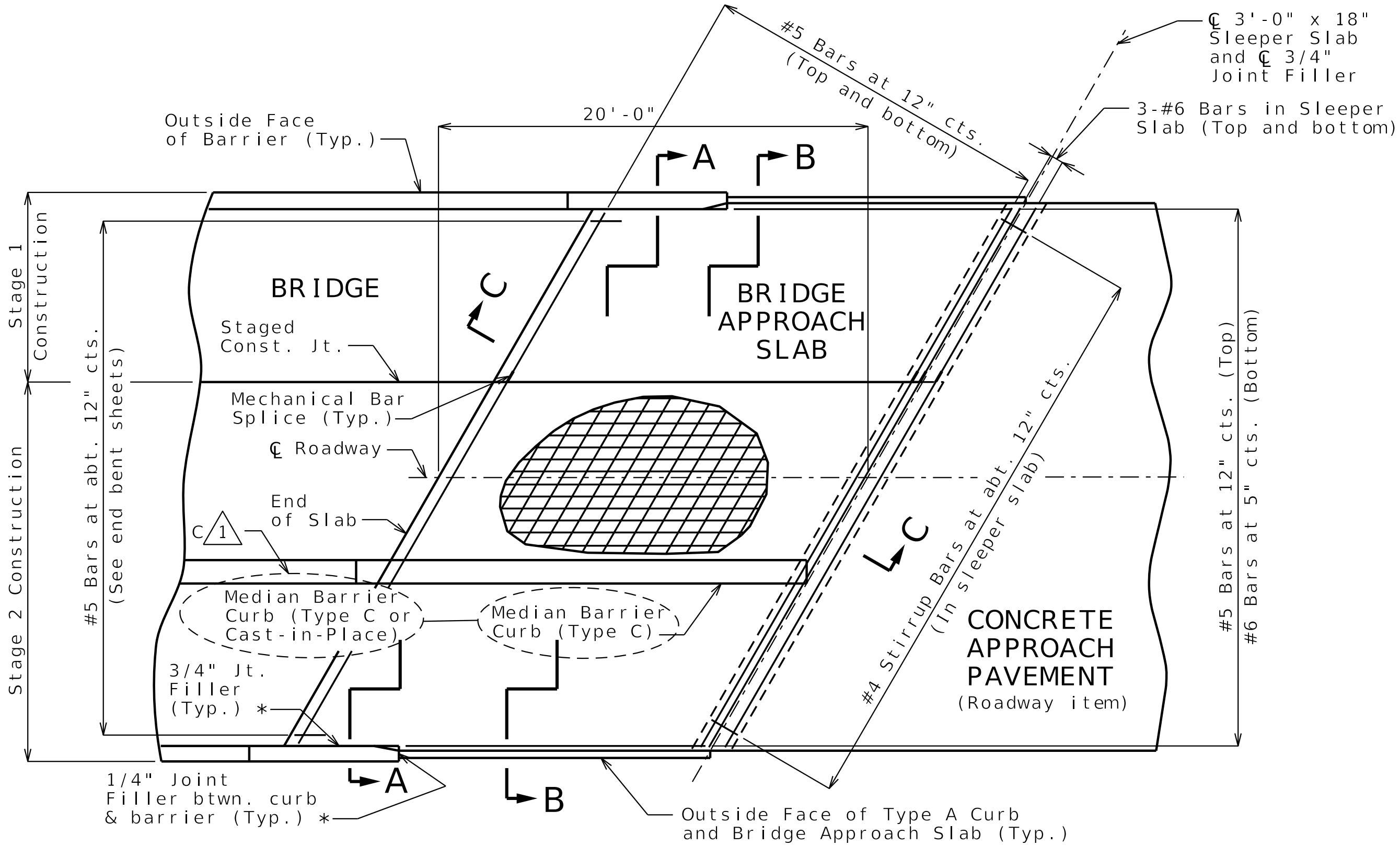
MILLSTONE WEBER

PROJECT 1

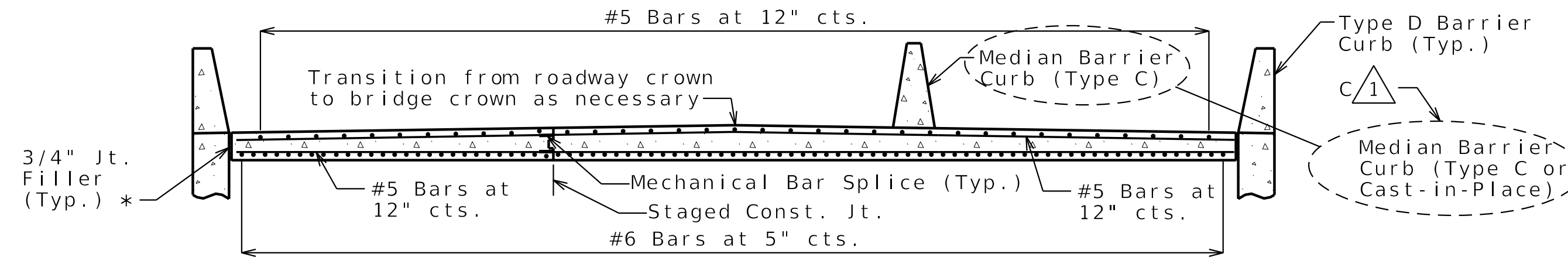
MODOT IMPROVE I-70 DB PROJECT 1

SHEET ADDED 12-23-24

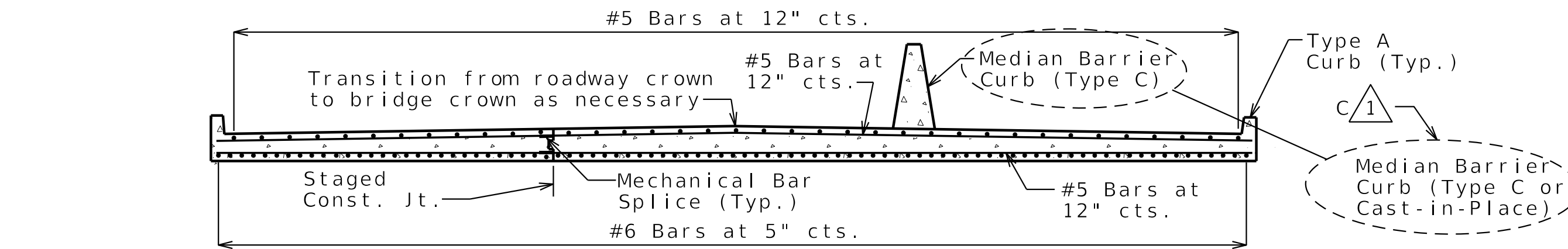
08:39 23-DEC-2024



PART PLAN SHOWING REINFORCEMENT

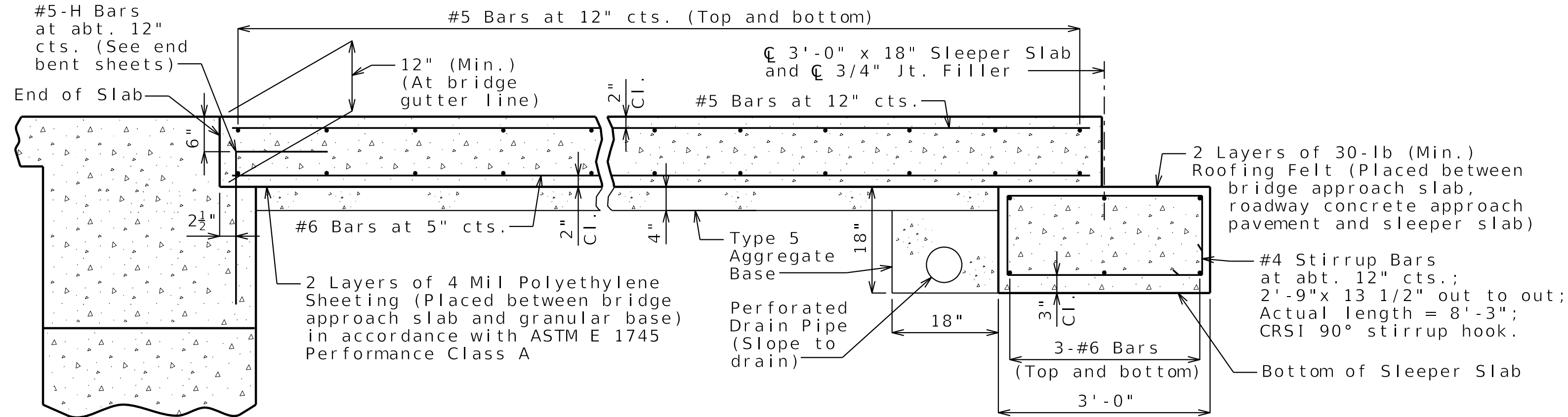


SECTION A-A



SECTION B-B

The contractor may crown the bottom of the approach slab to match the crown of the roadway surface.



SECTION C-C

BRIDGE APPROACH SLAB (MAJOR)

Detailed MAY 2024
Checked JUL 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 47 of 56

C 1

REVISED 12-23-24

General Notes:

All concrete for the bridge approach slab and sleeper slab shall be in accordance with Sec 503 ($f'c = 4,000$ psi).

The reinforcing steel in the bridge approach slab and the sleeper slab shall be epoxy coated Grade 60 with $fy = 60,000$ psi.

Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

Minimum clearance to reinforcing steel shall be 1 1/2", unless otherwise shown.

The reinforcing steel in the bridge approach slab and the sleeper slab shall be continuous. The transverse reinforcing steel may be made continuous by providing a minimum lap splice of 29 inches for #5 bars and 44 inches for #6 bars, or by mechanical bar splice.

Mechanical bar splices shall be in accordance with Sec 710. (Estimated 46 splices per slab.)

All joint filler shall be in accordance with Sec 1057 for preformed fiber expansion joint filler except as noted.

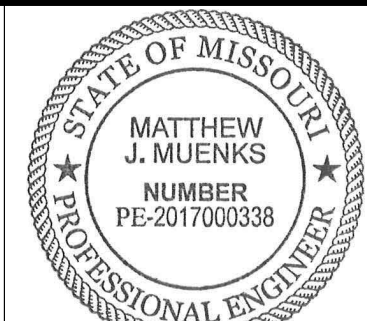
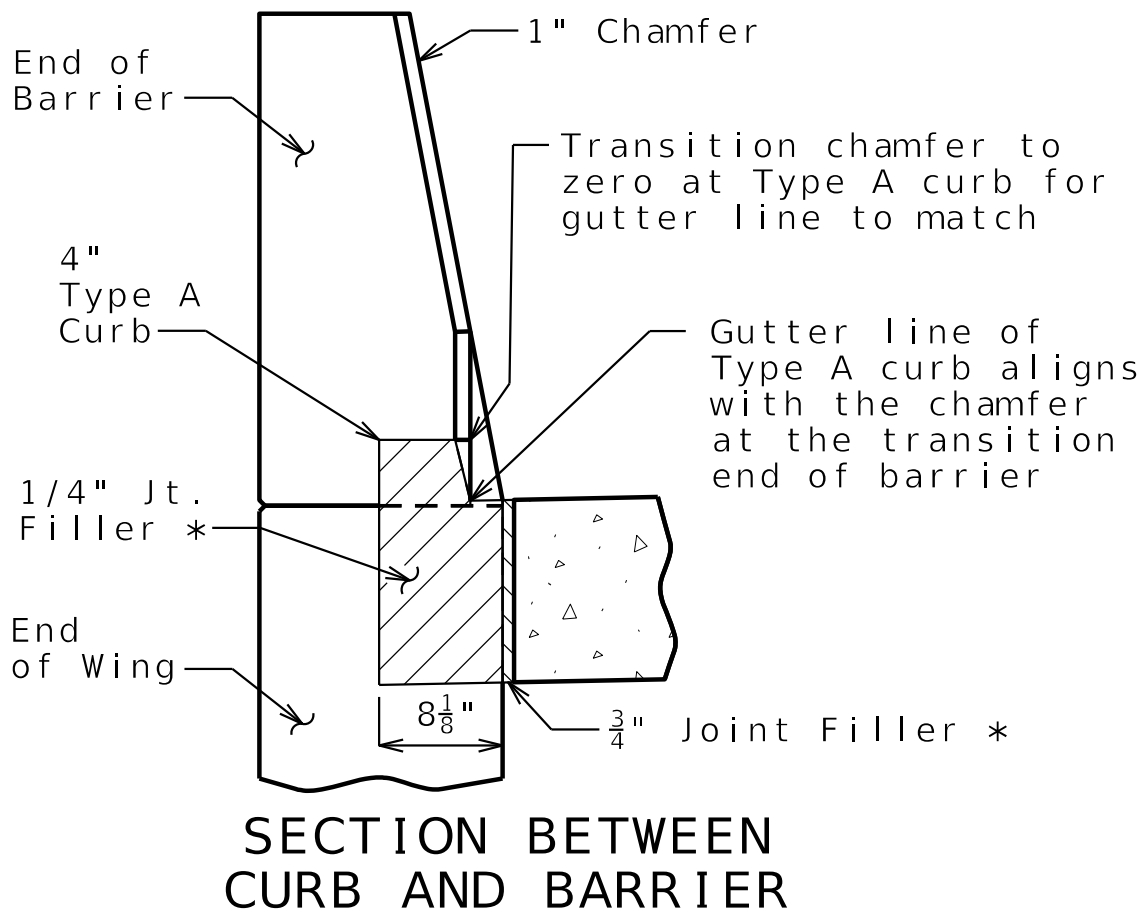
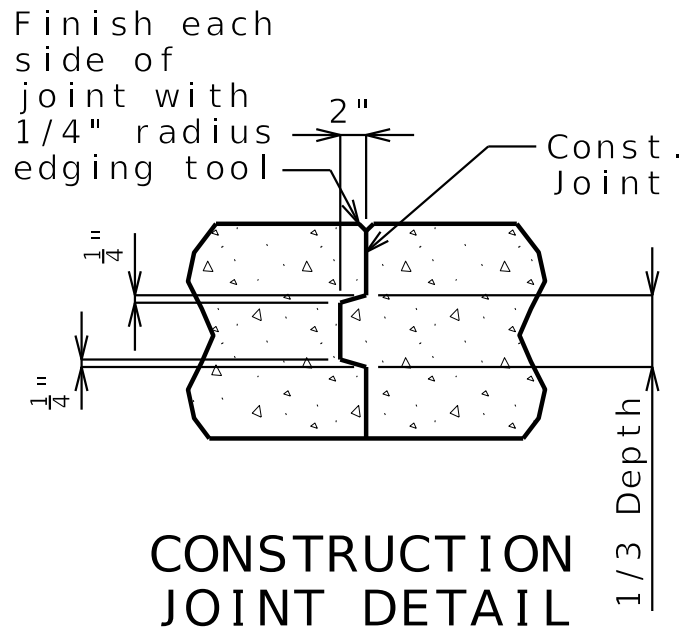
The contractor shall pour and satisfactorily finish the bridge slab before placing the bridge approach slab.

Longitudinal construction joints in approach slab and sleeper slab shall be aligned with longitudinal construction joints in bridge slab.

For concrete approach pavement details, see roadway plans.

See Missouri Standard Plan 609.00 for details of Type A curb.

* Seal joint between vertical face of approach slab and wing with sealant in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.



12/23/2024 10:59:34 AM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

23-DEC-2024

ROUTE 70EB STATE MO

DISTRICT BR SHEET NO. 47

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DESCRIPTION

REV. A - FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

REV. 1 - NDC-002 REVISED BARRIER

DATE

09/13/24

10/01/24

12/23/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

MoDOT

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

PROJECT 1

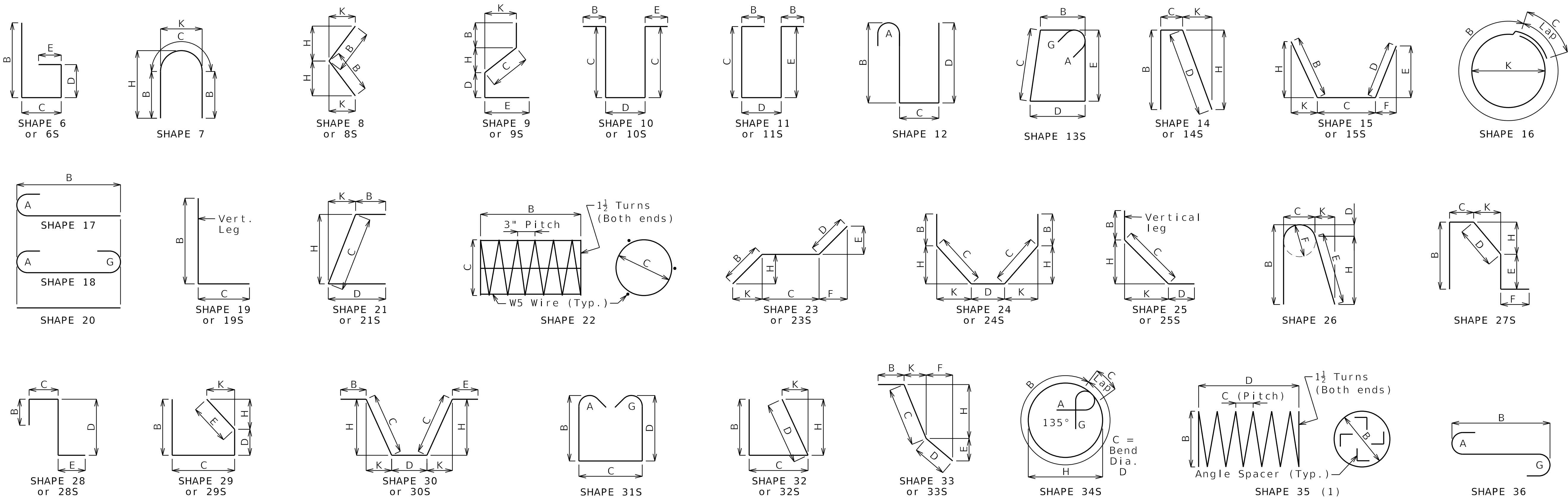
IMPROVE I-70 DB

JACOBS

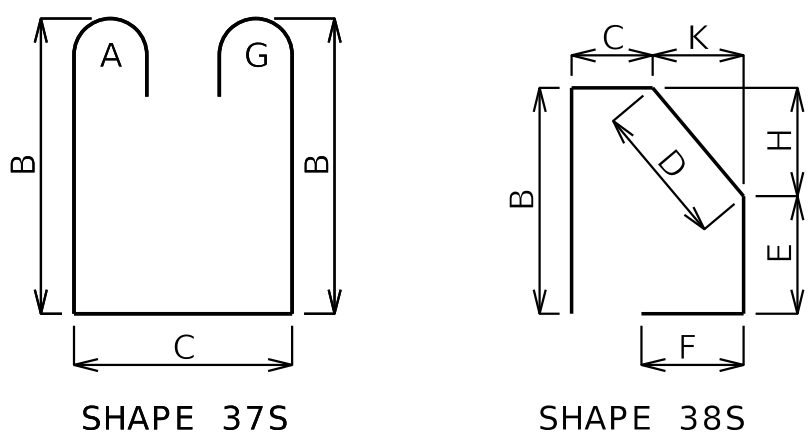
MILLSTONE WEBER

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

REV.



Finished Bend Diameters D and Hook Dimensions						
Standard Pin Bend Shapes						
Size	Case	D	A or G		J	
			90°	180°	180°	
#4	1	3"	8"	6"	4"	
#5	1	3 3/4"	10"	7"	5"	
#6	1	4 1/2"	12"	8 1/4"	6"	
#7	2	5 1/4"	14"	9 3/4"	7"	
	3	7"	15"	11 1/2"	8 3/4"	
#8	2	6"	16"	11"	8"	
	3	8"	17"	13 1/4"	10"	
#9	1	9 1/2"	19 1/2"	15 1/2"	11 3/4"	
#10	1	10 3/4"	22"	17 1/2"	13 1/4"	
#11	1	12"	24 1/2"	19 1/2"	14 7/8"	
#14	1	18 1/4"	31 1/4"	27 1/2"	21 5/8"	
#18	1	24"	41 1/2"	36 1/4"	28 1/2"	
Stirrup Pin Bend Shapes (S)						
Size	Case	D	A or G			J
			90°	135°	180°	
#4	2	2"	4 1/2"	4 1/2"	5"	2 7/8"
	3	3"	5"	5 1/4"	6"	3"
#5	2	2 1/2"	5 3/4"	5 3/4"	5 3/4"	3 3/8"
	3	3 3/4"	6 1/4"	6 1/2"	7"	3 5/8"
#6	1	4 1/2"	12"	7 3/4"	8 1/4"	4 5/8"
Applicable for all grades of steel.						
Case 1 applies to all reinforcement. Case 2 applies to all reinforcement except for galvanized bars. Case 3 applies to galvanized bars only.						



BENDING DIAGRAMS

All dimensions are out to out. (1) Shall be a deformed or plain spiral bar or wire.

Shapes ending with an S shall be bent in accordance with stirrup pin bend shapes.

Unless otherwise noted, finished bending diameter D is the same for all bends of a shape.

Four angle or channel spacers are required for each column spiral. Spacers are to be placed on inside of spirals. Length and weight of column spirals do not include splices or spacers.

Reinforcing Steel Totals (Pounds)									
By Size	Size	Substructure		Superstructure			Entire Bridge		
		Plain	Epoxy	Slab		Slip Form	Plain	Epoxy	
				Plain	Epoxy				
	W5	0	0	0	0	0	0	0	
	4	0	1,719	0	627	0	0	2,346	
	5	0	3,348	0	20,549	19,718	0	44,522	
	6	0	28,115	0	66,743	0	0	94,858	
	7	0	5,023	0	39,292	0	0	44,315	
	8	0	7,010	0	57,686	0	0	64,696	
	9	0	0	0	0	0	0	0	
	10	0	0	0	0	0	0	0	
	11	0	0	0	0	0	0	0	
	14	0	0	0	0	0	0	0	
By Type	0	0	45,215	0	184,897	19,718	907	0	250,737
All steel shall be epoxy coated unless otherwise specified.									

BENDING DIAGRAMS AND REINFORCING STEEL TOTALS

Detailed SEP 2024
Checked SEP 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 48 of 56

C 1 REVISED 12-23-24

STATE OF MISSOURI

MATTHEW J. MUENKS

NUMBER

PE-2017000338

PROFESSIONAL ENGINEER

12/23/2024 10:59:34 AM

Matthew Muenks

MO PE-2017000338

DATE PREPARED

23-DEC-2024

ROUTE

70EB

STATE

MO

DISTRICT

BR

SHEET NO.

48

COUNTY

BOONE

JOB NO.

JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.

A9542

DESCRIPTION

REV. A - FINAL REVIEW

REV. 0 - RELEASED FOR CONSTRUCTION

REV. 1 - NDC-002 - REVISED QUANTITIES

DATE

09/13/24

10/01/24

12/23/24

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

1-888-ASK-MODOT (1-888-275-6636)

MODOT

MILLSTONE WEBER

Jacobs

MODOT IMPROVE I-70 DB PROJECT 1

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

REV.

08:40 23-DEC-2024

No. Req.	Size/ Mark	Location	Codes			Dimensions								Nom. Length	Actual Length	Weight								
						B	C	D	E	F	H	K												
			C	SH	V	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	lb		
		SUBSTRUCTURE																						
		End Bent 1																						
9	6 F100	WINGWALL	E	23		2	3.000	3	6.000	1	2.000	0	11.500	0	7.875	1	10.375	1	3.125	6	11	6	10	92
4	6 F101	WINGWALL	E	9				6	0.000	2	10.000			2	3.000	5	6.750	8	10	8	8		52	
9	6 F102	WINGWALL	E	23		2	3.000	5	4.375	1	2.000	0	8.000	0	11.500	1	3.000	1	10.500	8	9	8	9	118
4	6 F103	WINGWALL	E	21				2	10.125	6	0.000					2	7.375	1	1.375	8	10	8	6	51
		C 1 18																C 1 105						
4	7 H100	BEAM	E	20		35	3.000									35	3	35	3	35	3		288	
4	7 H101	BEAM	E	20		10	6.000									10	6	10	6	10	6		86	
4	7 H102	BEAM	E	20		56	7.000									56	7	56	7	56	7		463	
8	7 H103	BEAM	E	20		35	3.000									35	3	35	3	35	3		576	
4	6 H104	BEAM	E	20		35	3.000									35	3	35	3	35	3		212	
8	7 H105	BEAM	E	20		13	0.000									13	0	13	0	13	0		213	
4	6 H106	BEAM	E	20		13	0.000									13	0	13	0	13	0		78	
8	7 H107	BEAM	E	20		54	1.000									54	1	54	1	54	1		884	
4	6 H108	BEAM	E	20		53	4.000									53	4	53	4	53	4		320	
4	6 H109	DIAPHRAGM	E	20		35	3.000									35	3	35	3	35	3		212	
4	6 H110	DIAPHRAGM	E	20		10	6.000									10	6	10	6	10	6		63	
4	6 H111	DIAPHRAGM	E	20		55	10.000									55	10	55	10	55	10		335	
3	6 H112	DIAPHRAGM	E	20		3	6.000									3	6	3	6	3	6		16	
1	6 H113	DIAPHRAGM	E	20		2	2.000									2	2	2	2	2	2		3	
1	6 H114	DIAPHRAGM	E	20		2	2.000									2	2	2	2	2	2		3	
11	5 H115	STRAND TIE BAR	E	20		5	8.000									5	8	5	8	5	8		65	
27	6 H116	DIAPHRAGM	E	20		7	10.000									7	10	7	10	7	10		318	
9	6 H117	DIAPHRAGM	E	20		5	0.000									5	0	5	0	5	0		68	
3	6 H118	DIAPHRAGM	E	20		4	1.000									4	1	4	1	4	1		18	
1	6 H119	DIAPHRAGM	E	20		2	8.000									2	8	2	8	2	8		4	
3	6 H120	DIAPHRAGM	E	20		3	9.000									3	9	3	9	3	9		17	
1	6 H121	DIAPHRAGM	E	20		2	5.000									2	5	2	5	2	5		4	
3	6 H122	DIAPHRAGM	E	20		3	6.000									3	6	3	6	3	6		16	
4	6 H123	BEAM	E	19		10	8.000	1	8.000							12	4	12	2	12	2		73	
	H124	NOT USED																						
28	6 H125	BEAM	E	19		11	3.000	1	8.000							12	11	12	9	12	9		536	
4	6 H126	BEAM	E	19		9	2.000	1	8.000							10	10	10	8	10	8		64	
4	6 H127	BEAM	E	19		9	0.000	1	8.000							10	8	10	6	10	6		63	
4	6 H128	BEAM	E	19		10	2.000	1	8.000							11	10	11	8	11	8		70	
94	5 H129	DIAPHRAGM	E	19		2	0.000	1	3.000							3	3	3	1	3	1		302	
18	6 H130	WINGWALL	E	20		10	11.000									10	11	10	11	10	11		295	
8	8 H131	WINGWALL	E	20		10	11.000									10	11	10	11	10	11		233	
20	6 H132	WINGWALL	E	20		10	11.000									10	11	10	11	10	11		328	
8	8 H133	WINGWALL	E	20		10	11.000									10	11	10	11	10	11		233	
45	6 U100	BEAM	E	37S		5	0.000	2	9.000							14	2	14	0	14	0		946	
78	6 U101	BEAM	E	13S		2	9.000	2	8.000	2	9.000	2	8.000			12	2	11	8	11	8		1367	
140	4 U102	BEAM	E	10S				1	0.000	2	9.000					4	9	4	7	4	7		429	
67	6 U103	DIAPHRAGM	E	37S		3	2.625	2	5.000							10	3	10	1	10	1		1015	
67	6 U104	DIAPHRAGM	E	19S		2	11.000	2	7.000							5	6	5	4	5	4		537	
125	6 U105	DIAPHRAGM	E	19S		3	0.000	4	6.000							7	6	7	4	7	4		1377	
		C 1 126														C 1 1388								
44	6 V100	BEAM	E	17		5	0.000									5	8	5	8	5	8		374	
65	6 V101	DIAPHRAGM	E	20		2	6.000									2	6	2	6	2	6		244	
18	6 V102	WINGWALL	E	20		6	8.000									6	8	6	8	6	8		180	
18	6 V103	WINGWALL	E	20		6	10.000									6	10	6	10	6	10		185	
		C 1 155																						
		Int. Bent 2																						
49	6 D200	KEY	E	20		2	6.000									2	6	2	6	2	6		184	
12	8 H200	CAP	E	20		35	1.500									35	2	35	2	35	2		1,127	
12	8 H201	CAP	E	20		59	7.500									59	8	59	8	59	8		1,912	
8	6 H202	CAP	E	20		35	1.500									35	2	35	2	35	2		423	
8	6 H203	CAP	E	20		59	7.500									59	8	59	8	59	8		717	
12	6 H204	CAP	E	10S				1	10.000	3	7.750					7	4	7	0	7	0		126	
54	6 H205	CAP	E	19S		7	0.000	1	6.000							8	6	8	4	8	4		676	
12	6 H206	CAP	E	19S		4	6.000	1	6.000							6	0	5	10	5	10		105	
110	4 P200	PILE	E	34S		5	2.000	0	0.500						1	7.750			5	11	5	10	429	
77	5 U200	CAP	E	13S		3	9.000	2	9.000	3	9.000	2	9.000			14	0	13	8	13	8		1,098	
22	5 U201	CAP	E	10S				2	9.000	3	9.000					9	3	9	0	9	0		207	
64	6 U202	CAP	E	10S				1	0.000	3	9.000					5	9	5	5	5	5		521	
132	6 V200	PILE	E	17		7	3.000									7	11	7	11	7	11		1,570	

Nominal lengths are based on out to out dimensions shown in bending diagrams and are listed to the nearest inch for fabricator's use. Actual lengths are measured along centerline bar to the nearest inch. Weights are based on actual lengths.

All bars shall be Grade 60.

Codes: C = Required coatings, where E = Epoxy Coated and G = Galvanized.

C 1 REVISED 12-23-24 SH = Required shape, see bending diagrams.

For bending diagrams and steel reinforcing totals, see Sheet No. 48.

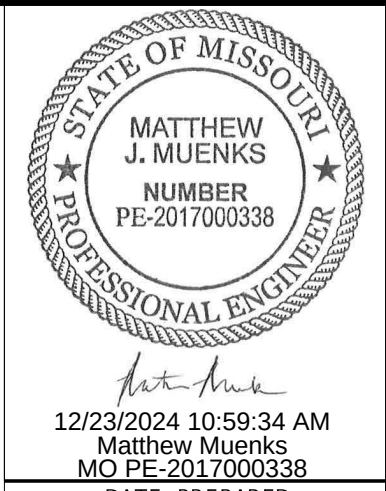
BILL OF REINFORCING STEEL

V = Sets of varied bars and number of bars of each length. Bar dimensions vary in equal increments between dimensions shown on this line and the following line and the actual length dimension shown on this line and the following line vary by the specified increment.

Detailed SEP 2024
Checked SEP 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 49 of 56



23-DEC-2024	
ROUTE	STATE
70EB	MO
DISTRICT	SHEET NO.
BR	49
COUNTY	
BOONE	
JOB NO.	
JST0021	
CONTRACT ID.	

PROJECT NO.
BRIDGE NO.
A9542

DATE	DESCRIPTION				
	REV. A - FINAL REVIEW	REV. 0 - RELEASED FOR CONSTRUCTION	REV. 1 - NDC-002 - REVISED REINFORCING		
	09/13/24	10/01/24	12/23/24		

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)
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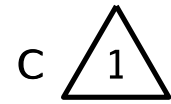
MODOT IMPROVE I-70 DB PROJECT 1	JACOBS	MILLSTONE WEBER
---------------------------------	--------	-----------------

No. Req.	Size/ Mark	Location	Codes			Dimensions							Nom. Length	Actual Length	Weight
			C	SH	V	B ft in.	C ft in.	D ft in.	E ft in.	F ft in.	H ft in.	K ft in.	ft in.	ft in.	lb
		SUPERSTRUCTURE													
		Int. Diaphragm at Int. Bent 2													
20	6 H240	DIAPHRAGM	E	20		5 1.000							5 1	5 1	153
20	6 H241	DIAPHRAGM	E	20		7 8.000							7 8	7 8	230
40	4 H242	DIAPHRAGM	E	20		8 0.000							8 0	8 0	214
2	6 H243	DIAPHRAGM	E	20		2 8.000							2 8	2 8	8
2	6 H244	DIAPHRAGM	E	20		2 5.000							2 5	2 5	7
2	6 H245	DIAPHRAGM	E	20		3 11.500							4 0	4 0	12
2	6 H246	DIAPHRAGM	E	20		3 8.500							3 9	3 9	11
4	4 H247	DIAPHRAGM	E	20		4 1.500							4 2	4 2	11
4	4 H248	DIAPHRAGM	E	20		3 10.500							3 11	3 11	10
4	5 H249	STRAND TIE	E	95			1 3.125	3 6.000			1 2.000	0 5.625	4 9	4 9	20
18	5 H250	STRAND TIE	E	23S		1 3.125	3 6.000	1 3.125	0 5.625	1 2.000	0 5.625	1 2.000	6 0	6 0	113
80	4 U240	DIAPHRAGM	E	28S			1 6.000	3 5.500	2 7.000				7 7	7 4	392
40	6 U241	DIAPHRAGM	E	28S			2 2.000	3 1.000	3 0.000				8 3	7 11	476
40	6 U242	DIAPHRAGM	E	28S			2 2.000	2 7.000	3 0.000				7 9	7 5	446
8	6 U243	DIAPHRAGM	E	28S			2 2.000	2 7.000	1 6.000				6 3	5 11	71
4	5 U244	DIAPHRAGM	E	19S		5 0.000	1 0.000						6 0	5 11	25
12	5 U245	DIAPHRAGM	E	28S		1 6.000	1 0.000	5 0.000					7 6	7 3	91
8	5 V240	DIAPHRAGM	E	20		3 8.000							3 8	3 8	31
		Int. Diaphragm at Int. Bent 3													
20	6 H340	DIAPHRAGM	E	20		5 1.000							5 1	5 1	153
20	6 H341	DIAPHRAGM	E	20		7 8.000							7 8	7 8	230
40	4 H342	DIAPHRAGM	E	20		8 0.000							8 0	8 0	214
2	6 H343	DIAPHRAGM	E	20		2 8.000							2 8	2 8	8
2	6 H344	DIAPHRAGM	E	20		2 5.000							2 5	2 5	7
2	6 H345	DIAPHRAGM	E	20		3 11.500							4 0	4 0	12
2	6 H346	DIAPHRAGM	E	20		3 8.500							3 9	3 9	11
4	4 H347	DIAPHRAGM	E	20		4 1.500							4 2	4 2	11
4	4 H348	DIAPHRAGM	E	20		3 10.500							3 11	3 11	10
4	5 H349	STRAND TIE	E	95			1 3.125	3 6.000			1 2.000	0 5.625	4 9	4 9	20
18	5 H350	STRAND TIE	E	23S		1 3.125	3 6.000	1 3.125	0 5.625	1 2.000	0 5.625	1 2.000	6 0	6 0	113
80	4 U340	DIAPHRAGM	E	28S			1 6.000	3 7.000	2 7.000				7 8	7 6	401
40	6 U341	DIAPHRAGM	E	28S			2 2.000	3 2.000	3 0.000				8 4	8 0	481
40	6 U342	DIAPHRAGM	E	28S			2 2.000	3 8.500	3 0.000				7 11	7 7	456
8	6 U343	DIAPHRAGM	E	28S			2 2.000	2 8.500	1 6.000				6 5	6 1	73
4	5 U344	DIAPHRAGM	E	19S		5 0.000	1 0.000						6 0	5 11	25
12	5 U345	DIAPHRAGM	E	28S		1 6.000	1 0.000	5 0.000					7 6	7 3	91
8	5 V340	DIAPHRAGM	E	20		3 8.000							3 8	3 8	31
		Slab													
463	6 S1	SLAB	E	20		32 8.500							32 9	32 9	22,775
443	6 S2	SLAB	E	20		57 2.500							57 3	57 3	38,093
26	6 S3	SLAB	E	20	1	2 3.000							2 3	2 3	683
		INCR.=				32 8.500							32 9	32 9	
		14.625 in													
26	6 S4	SLAB	E	20	1	2 0.000							2 0	2 0	679
		INCR.=				32 8.500							32 9	32 9	
		14.75 in													
46	6 S5	SLAB	E	20	1	2 6.500							2 7	2 7	2,067
		INCR.=				57 2.500							57 3	57 3	
		14.625 in													
45	6 S6	SLAB	E	20	1	2 8.000							2 8	2 8	2,025
		INCR.=				57 2.500							57 3	57 3	
		14.875 in													
149	5 S7	SLAB	E	17		8 10.000							9 5	9 5	1,463
365	7 S8	SLAB	E	20		52 8.000							52 8	52 8	39,292
143	8 S9	SLAB	E	20		16 4.000							16 4	16 4	6,236
72	8 S10	SLAB	E	20		33 2.000							33 2	33 2	6,376
70	8 S11	SLAB	E	20		55 0.000							55 0	55 0	10,280
143	8 S12	SLAB	E	20		26 8.000							26 8	26 8	10,182
72	8 S13	SLAB	E	20		40 3.000							40 3	40 3	7,738
70	8 S14	SLAB	E	20		60 0.000							60 0	60 0	11,214

Nominal lengths are based on out to out dimensions shown in bending diagrams and are listed to the nearest inch for fabricator's use. Actual lengths are measured along centerline bar to the nearest inch. Weights are based on actual lengths.

For bending diagrams and steel reinforcing totals, see Sheet No. 48.

Detailed SEP 2024
Checked SEP 2024



SHEET DELETED 12-23-24

Note: This drawing is not to scale. Follow dimensions.

All bars shall be Grade 60.

BILL OF REINFORCING STEEL

Sheet No. 50 of 56

No. Req.	Size/ Mark	Location	Codes			Dimensions							Nom. Length	Actual Length	Weight									
						B		C	D	E		F				H	K							
			C	SH	V	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	lb				
		Slab (cont'd)																						
973	5 S15	SLAB	E	20		5	3.000							5	3	5	3	5,328						
485	5 S16	SLAB	E	20		5	9.500							5	10	5	10	2,951						
485	5 S17	SLAB	E	20		5	6.500							5	7	5	7	2,824						
485	5 S18	SLAB	E	20		11	3.000							11	3	11	3	5,691						
40	8 S19	SLAB	E	20		53	0.000							53	0	53	0	5,660						
40	5 S20	SLAB	E	20		51	9.000							51	9	51	9	2,159						
		Type D Barrier Curb																						
20	5 K1	BARRIER CURB	E	27S		3	8.000	0	9.250	0	5.375	3	2.750			0	5.250	0	1.000	8	1	7	11	165
62	5 K2	BARRIER CURB	E	27S		3	8.000	0	9.250	1	2.500	2	5.750			1	2.250	0	2.750	8	2	7	11	512
4	5 K3	BARRIER CURB	E	27S		1	10.500	0	9.250	1	2.500	0	7.750	1	0.000	1	2.250	0	2.750	5	6	5	2	22
20	5 K4	BARRIER CURB	E	19S	4	2	4.250	0	10.000											3	2	3	1	66
	5 K4	INCR.=		19S		2	6.250	0	10.000											3	4	3	3	
		.5 in																						
20	5 K5	BARRIER CURB	E	9S	4		1	6.500	0	9.500	0	8.250				1	6.000	0	4.000	3	0	2	11	63
	5 K5	INCR.=		9S			1	8.500	0	9.500	0	8.250				1	8.000	0	4.500	3	2	3	1	
		.5 in																						
12	5 K6	BARRIER CURB	E	19S		2	6.750	0	10.000											3	5	3	4	42
12	5 K7	BARRIER CURB	E	32S			0	10.000	2	6.625				2	6.000	0	6.250			3	5	3	2	40
36	5 K8	BARRIER CURB	E	19S	4	2	8.500	0	10.000											3	7	3	5	138
	5 K8	INCR.=		19S		3	2.500	0	10.000											4	1	3	11	
		.75 in																						
36	5 K9	BARRIER CURB	E	32S	4		0	10.000	2	8.500				2	7.750	0	6.750			3	7	3	3	131
	5 K9	INCR.=		32S			0	10.000	3	2.500				3	1.750	0	7.750			4	1	3	9	
		.75 in																						
18	5 K10	BARRIER CURB	E	19S		3	3.000	0	10.000											4	1	4	0	75
18	5 K11	BARRIER CURB	E	32S			0	10.000	3	3.000				3	2.250	0	7.750			4	1	3	10	72
28	5 K12	BARRIER CURB	E	20		11	6.000													11	6	11	6	336
12	5 K13	BARRIER CURB	E	20	4	10	9.000													10	9	10	9	97
	5 K13	INCR.=		20		4	9.000													4	9	4	9	
		36. in																						
28	5 K14	BARRIER CURB	E	20		10	11.750													11	0	11	0	321
12	5 K15	BARRIER CURB	E	20	4	10	2.750													10	3	10	3	91
	5 K15	INCR.=		20		4	2.750													4	3	4	3	
		36. in																						
494	5 R1	BARRIER CURB	E	26		3	3.000	0	5.500	0	2.250	3	1.375	0	5.500	3	0.750	0	6.750	6	10	6	9	3,478
494	5 R2	BARRIER CURB	E	19S		1	8.500	0	9.500											2	6	2	5	1,245
494	5 R3	BARRIER CURB	E	27S			0	9.500	1	3.250	0	5.000	1	0.000	1	3.000	0	3.000		3	6	3	4	1,717
80	5 R4	BARRIER CURB	E	20		11	9.000													11	9	11	9	980
10	5 R5	BARRIER CURB	E	20		40	10.500													40	11	40	11	427
40	5 R6	BARRIER CURB	E	20		39	7.000													39	7	39	7	1,651
20	5 R7	BARRIER CURB	E	20		39	0.000													39	0	39	0	814
40	5 R8	BARRIER CURB	E	20		38	9.000													38	9	38	9	1,617
10	5 R9	BARRIER CURB	E	20		41	5.000													41	5	41	5	432
		Type C Barrier Curb																						
568	5 M1	BARRIER CURB	E	14S			0	5.000	3	3.750				3	3.000	0	7.500			3	9	3	8	2,172
40	5 M2	BARRIER CURB	E	20		11	9.000													11	9	11	9	490
20	5 M3	BARRIER CURB	E	20		18	10.750													18	11	18	11	395
20	5 M4	BARRIER CURB	E	20		40	8.000													40	8	40	8	848
20	5 M5	BARRIER CURB	E	20		39	5.000													39	5	39	5	822
10	5 M6	BARRIER CURB	E	20		44	0.000													44	0	44	0	459
		Slip Form Barrier																						
60	5 C1	SLIP FORM	E	20		12	0.000													12	0	12	0	751
8	5 C2	SLIP FORM	E	20		10	0.000													10	0	10	0	83
8	5 C3	SLIP FORM	E	20		8	9.000													8	9	8	9	73
			</																					

No. Req.	Size/ Mark	Location	Codes			Dimensions							Nom. Length	Actual Length	Weight
			C	SH	V	B ft in.	C ft in.	D ft in.	E ft in.	F ft in.	H ft in.	K ft in.	ft in.	ft in.	lb
		SUPERSTRUCTURE													
		Int. Diaphragm at Int. Bent 2													
18	6 H240	DIAPHRAGM	E	20		5 1.000							5 1	5 1	137
18	6 H241	DIAPHRAGM	E	20		7 8.000							7 8	7 8	207
36	4 H242	DIAPHRAGM	E	20		8 0.000							8 0	8 0	192
2	6 H243	DIAPHRAGM	E	20		2 8.000							2 8	2 8	8
2	6 H244	DIAPHRAGM	E	20		2 5.000							2 5	2 5	7
2	6 H245	DIAPHRAGM	E	20		3 11.500							4 0	4 0	12
2	6 H246	DIAPHRAGM	E	20		3 8.500							3 9	3 9	11
4	4 H247	DIAPHRAGM	E	20		4 1.500							4 2	4 2	11
4	4 H248	DIAPHRAGM	E	20		3 10.500							3 11	3 11	10
4	5 H249	STRAND TIE	E	95			1 3.125	3 6.000			1 2.000	0 5.625	4 9	4 9	20
18	5 H250	STRAND TIE	E	23S		1 3.125	3 6.000	1 3.125	0 5.625	1 2.000	0 5.625	1 2.000	6 0	6 0	113
80	4 U240	DIAPHRAGM	E	28S			1 6.000	3 5.500	2 7.000				7 7	7 4	392
40	6 U241	DIAPHRAGM	E	28S			2 2.000	3 1.000	3 0.000				8 3	7 11	476
40	6 U242	DIAPHRAGM	E	28S			2 2.000	2 7.000	3 0.000				7 9	7 5	446
8	6 U243	DIAPHRAGM	E	28S			2 2.000	2 7.000	1 6.000				6 3	5 11	71
4	5 U244	DIAPHRAGM	E	19S		5 0.000	1 0.000						6 0	5 11	25
12	5 U245	DIAPHRAGM	E	28S		1 6.000	1 0.000	5 0.000					7 6	7 3	91
8	5 V240	DIAPHRAGM	E	20		3 8.000							3 8	3 8	31
		Int. Diaphragm at Int. Bent 3													
18	6 H340	DIAPHRAGM	E	20		5 1.000							5 1	5 1	137
18	6 H341	DIAPHRAGM	E	20		7 8.000							7 8	7 8	207
36	4 H342	DIAPHRAGM	E	20		8 0.000							8 0	8 0	192
2	6 H343	DIAPHRAGM	E	20		2 8.000							2 8	2 8	8
2	6 H344	DIAPHRAGM	E	20		2 5.000							2 5	2 5	7
2	6 H345	DIAPHRAGM	E	20		3 11.500							4 0	4 0	12
2	6 H346	DIAPHRAGM	E	20		3 8.500							3 9	3 9	11
4	4 H347	DIAPHRAGM	E	20		4 1.500							4 2	4 2	11
4	4 H348	DIAPHRAGM	E	20		3 10.500							3 11	3 11	10
4	5 H349	STRAND TIE	E	95			1 3.125	3 6.000			1 2.000	0 5.625	4 9	4 9	20
18	5 H350	STRAND TIE	E	23S		1 3.125	3 6.000	1 3.125	0 5.625	1 2.000	0 5.625	1 2.000	6 0	6 0	113
80	4 U340	DIAPHRAGM	E	28S			1 6.000	3 7.000	2 7.000				7 8	7 6	401
40	6 U341	DIAPHRAGM	E	28S			2 2.000	3 2.000	3 0.000				8 4	8 0	481
40	6 U342	DIAPHRAGM	E	28S			2 2.000	3 8.500	3 0.000				7 11	7 7	456
8	6 U343	DIAPHRAGM	E	28S			2 2.000	2 8.500	1 6.000				6 5	6 1	73
4	5 U344	DIAPHRAGM	E	19S		5 0.000	1 0.000						6 0	5 11	25
12	5 U345	DIAPHRAGM	E	28S		1 6.000	1 0.000	5 0.000					7 6	7 3	91
8	5 V340	DIAPHRAGM	E	20		3 8.000							3 8	3 8	31
		Slab													
463	6 S1	SLAB	E	20		32 8.500							32 9	32 9	22,775
443	6 S2	SLAB	E	20		57 2.500							57 3	57 3	38.093
26	6 S3	SLAB	E	20	1	2 3.000							2 3	2 3	683
		INCR.=				32 8.500							32 9	32 9	
		14.625 in													
26	6 S4	SLAB	E	20	1	2 0.000							2 0	2 0	679
		INCR.=				32 8.500							32 9	32 9	
		14.75 in													
46	6 S5	SLAB	E	20	1	2 6.500							2 7	2 7	2,067
		INCR.=				57 2.500							57 3	57 3	
		14.625 in													
45	6 S6	SLAB	E	20	1	2 8.000							2 8	2 8	2,025
		INCR.=				57 2.500							57 3	57 3	
		14.875 in													
149	5 S7	SLAB	E	17		8 10.000							9 5	9 5	1,463
365	7 S8	SLAB	E	20		52 8.000							52 8	52 8	39,292
143	8 S9	SLAB	E	20		16 4.000							16 4	16 4	6,236
72	8 S10	SLAB	E	20		33 2.000							33 2	33 2	6,376
70	8 S11	SLAB	E	20		55 0.000							55 0	55 0	10,280
143	8 S12	SLAB	E	20		26 8.000							26 8	26 8	10,182
72	8 S13	SLAB	E	20		40 3.000							40 3	40 3	7,738
70	8 S14	SLAB	E	20		60 0.000							60 0	60 0	11,214

Nominal lengths are based on out to out dimensions shown in bending diagrams and are listed to the nearest inch for fabricator's use. Actual lengths are measured along centerline bar to the nearest inch. Weights are based on actual lengths.

For bending diagrams and steel reinforcing totals, see Sheet No. 48.

Detailed SEP 2024
Checked SEP 2024

Note: This drawing is not to scale. Follow dimensions.

All bars shall be Grade 60.

Codes: C = Required coatings, where E = Epoxy Coated and G = Galvanized.

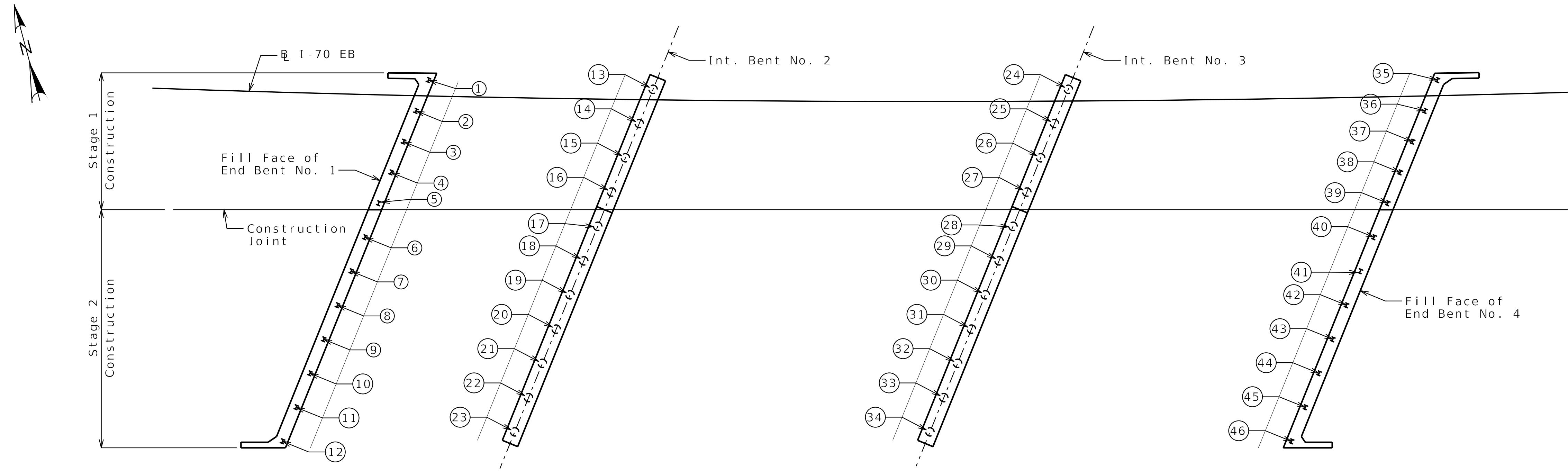
C 1 SHEET ADDED 12-23-24 SH = Required shape, see bending diagrams.

BILL OF REINFORCING STEEL

Sheet No. 50A of 56

V = Sets of varied bars and number of bars of each length. Bar dimensions vary in equal increments between dimensions shown on this line and the following line and the actual length dimension shown on this line and the following line vary by the specified increment.

No. Req.	Size/ Mark	Location	Codes			Dimensions							Nom.		Actual		Weight lb							
						B		C		D		E		F		H		K		Length	Length			
			C	SH	V	ft	in.	ft	in.	ft	in.	ft	in.	ft	in.	ft		in.	ft	in.	ft	in.		
		Slab (cont'd)																						
973	5 S15	SLAB	E	20		5	3.000							5	3	5	3	5,328						
485	5 S16	SLAB	E	20		5	9.500							5	10	5	10	2,951						
485	5 S17	SLAB	E	20		5	6.500							5	7	5	7	2,824						
485	5 S18	SLAB	E	20		11	3.000							11	3	11	3	5,691						
40	8 S19	SLAB	E	20		53	0.000							53	0	53	0	5,660						
80	5 S20	SLAB	E	20		51	9.000							51	9	51	9	4,318						
		Type D																						
		Barrier Curb																						
20	5 K1	BARRIER CURB	E	27S		3	8.000	0	9.250	0	5.375	3	2.750		0	5.250	0	1.000	8	1	7	11	165	
62	5 K2	BARRIER CURB	E	27S		3	8.000	0	9.250	1	2.500	2	5.750		1	2.250	0	2.750	8	2	7	11	512	
4	5 K3	BARRIER CURB	E	27S		1	10.500	0	9.250	1	2.500	0	7.750	1	0.000	1	2.250	0	2.750	5	6	5	2	22
20	5 K4	BARRIER CURB	E	19S	4	2	4.250	0	10.000										3	2	3	1	66	
		INCR.=			19S	2	6.250	0	10.000										3	4	3	3		
		.5 in																						
20	5 K5	BARRIER CURB	E	9S	4		1	6.500	0	9.500	0	8.250			1	6.000	0	4.000	3	0	2	11	63	
		INCR.=			9S		1	8.500	0	9.500	0	8.250			1	8.000	0	4.500	3	2	3	1		
		.5 in																						
12	5 K6	BARRIER CURB	E	19S		2	6.750	0	10.000										3	5	3	4	42	
12	5 K7	BARRIER CURB	E	32S			0	10.000	2	6.625					2	6.000	0	6.250	3	5	3	2	40	
36	5 K8	BARRIER CURB	E	19S	4	2	8.500	0	10.000										3	7	3	5	138	
		INCR.=			E 19S	3	2.500	0	10.000										4	1	3	11		
		.75 in																						
36	5 K9	BARRIER CURB	E	32S	4		0	10.000	2	8.500					2	7.750	0	6.750	3	7	3	3	131	
		INCR.=			32S		0	10.000	3	2.500					3	1.750	0	7.750	4	1	3	9		
		.75 in																						
18	5 K10	BARRIER CURB	E	19S		3	3.000	0	10.000										4	1	4	0	75	
18	5 K11	BARRIER CURB	E	32S			0	10.000	3	3.000					3	2.250	0	7.750	4	1	3	10	72	
24	5 K12	BARRIER CURB	E	20		11	6.000												11	6	11	6	288	
12	5 K13	BARRIER CURB	E	20	4	10	9.000												10	9	10	9	97	
		INCR.=			20	4	9.000												4	9	4	9		
		36. in																						
24	5 K14	BARRIER CURB	E	20		10	11.750												11	0	11	0	275	
12	5 K15	BARRIER CURB	E	20	4	10	2.750												10	3	10	3	91	
		INCR.=			20	4	2.750												4	3	4	3		
		36. in																						
494	5 R1	BARRIER CURB	E	26		3	3.000	0	5.500	0	2.250	3	1.375	0	5.500	3	0.750	0	6.750	6	10	6	9	3,478
494	5 R2	BARRIER CURB	E	19S		1	8.500	0	9.500										2	6	2	5	1,245	
494	5 R3	BARRIER CURB	E	27S			0	9.500	1	3.250	0	5.000	1	0.000	1	3.000	0	3.000	3	6	3	4	1,717	
80	5 R4	BARRIER CURB	E	20		11	9.000												11	9	11	9	980	
10	5 R5	BARRIER CURB	E	20		40	10.500												40	11	40	11	427	
40	5 R6	BARRIER CURB	E	20		39	7.000												39	7	39	7	1,651	
20	5 R7	BARRIER CURB	E	20		39	0.000												39	0	39	0	814	
40	5 R8	BARRIER CURB	E	20		38	9.000												38	9	38	9	1,617	
10	5 R9	BARRIER CURB	E	20		41	5.000												41	5	41	5	432	
		Median																						
		Barrier Curb																						
598	5 M1	BARRIER CURB	E	14S			0	5.000	3	3.750					3	3.000	0	7.500	3	9	3	8	2,287	
40	5 M2	BARRIER CURB	E	20		11	9.000												11	9	11	9	490	
10	5 M3	BARRIER CURB	E	20		19	6.000												19	6	19	6	203	
10	5 M4	BARRIER CURB	E	20		17	2.000												17	2	17	2	179	
20	5 M5	BARRIER CURB	E	20		39	5.000												39	5	39	5	822	
10	5 M6	BARRIER CURB	E	20		44	0.000												44	0	44	0	459	
20	5 M7	BARRIER CURB	E	20		32	4.000												32	4	32	4	674	
10	5 M8	BARRIER CURB	E	20		19	11.000												19	11	19	11	208	
50	5 M9	BARRIER CURB	E	20	1	0	10.000												0	10	0	10	85	
		INCR.=			20	2	5.000												2	5	2	5		
		0.375 in																						
21	5 M10	BARRIER CURB	E	20	1	2	5.000												2	5	2	5	60	
		INCR.=			20	3	1.000												3	1	3	1		
		0.375 in																						
		Slip Form																						
		Barrier																						
72	5 C1	SLIP FORM	E	20		12	0.000												12	0	12	0	901	
8	5 C2	SLIP FORM	E	20		10	0.000												10	0	10	0	83	
8	5 C3	SLIP FORM	E	20		8	9.000												8	9	8	9	73	
8	5 C4	SLIP FORM	E	20		9	0.000												9	0	9	0	75	



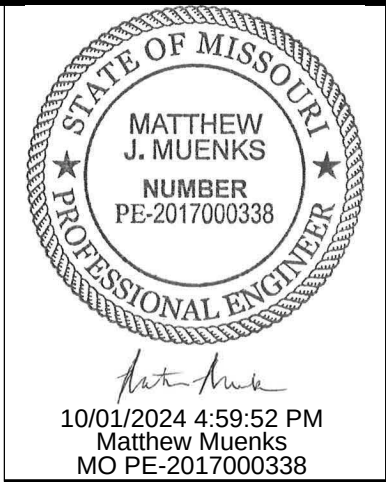
PART PLAN SHOWING PILE NUMBERING FOR RECORDING AS-BUILT PILE DATA

As-Built Pile Data			
Pile No.	Length in Place (ft)	Computed Nominal Axial Compressive Resistance (kips)	Remarks
End Bent No. 1			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
-			
-			
End Bent No. 4			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
-			
-			

As-Built Pile Data					
Pile No.	Length in Place (ft)	PDA Nom. Axial Compressive Resistance (kips)	PDA End of Drive Blow Count (blows/in.)	Actual End of Drive Blow Count (blows/in.)	Remarks
Intermediate Bent No. 2					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
-					
-					
Intermediate Bent No. 3					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
-					
-					

Note:
Indicate in remarks column:
A. Pile type and grade
B. Batter
C. Driven to practical refusal
D. PDA test pile
E. Minimum tip elevation controlled
(Use when actual blow count is less than PDA blow count due to minimum tip elevation requirement. A plus sign (+) shall be placed after the PDA nominal axial compressive resistance value indicating actual value is higher than PDA value.)

This sheet to be completed by MoDOT construction personnel.



DATE PREPARED	
1-OCT-2024	
ROUTE	STATE
70EB	MO
DISTRICT	SHEET NO.
BR	51
COUNTY	
BOONE	
JOB NO.	
JST0021	
CONTRACT ID.	
PROJECT NO.	
BRIDGE NO.	
A9542	

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

BORING LOGS



Job No.: 20241040.00

Design: _____

Bent: _____

Station: _____

Offset: _____

Elevation: 677 Estimated

Requested Station: _____

Requested Offset: _____

Requested Elevation: _____

Drill No.: _____

Missouri Department of Transportation
Construction and Materials

County: Boone

Skew: _____

Logged By: SO

Northing: _____

Easting: _____

Requested Northing: _____

Requested Easting: _____

Equipment: CME 550X Split-Spoon Sampler, Shelby Tube

Location Note: (38.9623550°, -92.2964048°)

Hammer Efficiency: 90%

BORING NO. BR 2-1A
Page 1 of 1

Route: I-70

Location: Columbia, Missouri

Operator: LRK

Date of Work: 04/16/24-04/16/24

Depth to Water: _____

Depth Hole Open: _____

Time Change: _____

Drilling Method: HSA

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Data	Field Tests	Index Tests
0									
		0.0-4.0' (CH) FILL: Brown, fat CLAY, trace sand, gravel, and concrete cobble	675		50	4-5-6 (17)		PP = 2.25 tsf	
					0				
5		4.0-6.3' (CH) FILL: Brown, fat CLAY, with gravel 4.0' -rough drilling below 4.0 ft.							
		6.3-7.2' LIMESTONE, highly weathered	670		75	50/0.3'		PP = 1.75 tsf	
		7.2-16.5' LIMESTONE, gray, hard to very hard, moderately to slightly weathered, finely crystalline to aphanitic, thin to thick bedded, dense, with chert nodules and seams			90 (40)				
10			665						
		12.7' -highly weathered chert seam from 12.7 to 13.2 ft.			100 (48)				
15					100 (67)				
		Refusal at 6.5 feet. Bottom of borehole at 16.5 feet.							

N₆₀ = (Em/60)Nm N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: _____ Coordinate Zone: _____ Coordinate Proj. Factor: _____

Coordinate Datum: _____ Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

1 - OCT - 2024

ROUTE	STATE
70EB	MO
DISTRICT	SHEET NO.
BR	52

COUNTY
BOONE

JOB NO.
JST0021

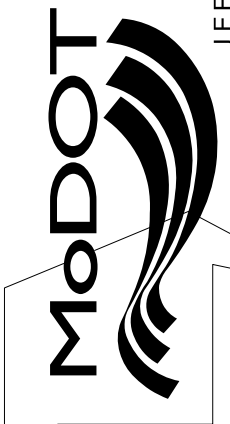
CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9542

DATE	DESCRIPTION	REV.	A - FINAL REVIEW	REV.	0 - RELEASED FOR CONSTRUCTION
09/13/24					
10/01/24					

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION



105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

MILLSTONE WEBER



MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

BORING LOGS



TSI
geotechnical, inc.

Job No.: 20241040.00

Design:

Bent:

Station:

Offset:

Elevation: 669.0

Requested Station:

Requested Offset:

Requested Elevation:

Drill No.:

**Missouri Department of Transportation
Construction and Materials**

County: Boone

Skew:

Logged By: SO

Northing:

Easting:

Requested Northing:

Requested Easting:

Equipment: CME 550X Split-Spoon Sampler

Location Note: (38.9623850, -92.2961972)

Hammer Efficiency: 90%

Drilling Method: HSA

BORING NO. BR 2-2
Page 1 of 2

Route: I-70

Location: Columbia, Missouri

Operator: LRK

Date of Work: 06/10/24-06/10/24

Depth to Water:

Depth Hole Open:

Time Change:

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (ROD %)	Blow Counts (N ₆₀)	Shear Data	Field Tests	Index Tests
0		0.0-3.0' (CH) Brown and gray, fat CLAY, trace sand and gravel							
					39	3-2-2 (6)		PP = 2.00 tsf	
		3.0-7.3' (CL) Brown and gray, lean CLAY, with sand	665		100	3-2-3 (8)		PP = 1.50 tsf	
5		6.0' -with gravel below 6.0 ft.			100	3-3-48 (77)		PP = 1.50 tsf	
		7.3-10.0' LIMESTONE, highly weathered 7.5' -rough drilling from 7.5 to 8.5 ft.	660		0	50/0.1'			
10		9.5' -10 " rod drop at 9.5 ft.			61 (39)				
		10.0-12.3' Gray and brown, completely weathered clayey SHALE, with limestone fragments 10.0' -rotary wash from 10.0 to 12.3 ft.			71	15-13-50/0.4'			
		12.3-25.0' LIMESTONE, gray, moderately hard to very hard, slightly weathered, fine to medium crystalline, thin to medium bedded, dense, with occasional chert nodules or bands	655			88 (56)			
15		15.0' -fine to coarse crystalline below 15.0 ft.				98 (78)			
			650			90 (60)			
20									
25			645						

$N_{60} = (Em/60)N_m$ N_{60} - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: **Coordinate Zone:** **Coordinate Proj. Factor:**

Coordinate Datum: **Coordinate Units:** U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.



TSI
geotechnical, inc.

Job No.: 20241040.00

Design:

Bent:

Station:

Offset:

Elevation: 669.0

Requested Station:

Requested Offset:

Requested Elevation:

Drill No.:

**Missouri Department of Transportation
Construction and Materials**

County: Boone

Skew:

Logged By: SO

Northing:

Easting:

Requested Northing:

Requested Easting:

Equipment: CME 550X Split-Spoon Sampler

Location Note: (38.9623850, -92.2961972)

Hammer Efficiency: 90%

Drilling Method: HSA

BORING NO. BR 2-2
Page 2 of 2

Route: I-70

Location: Columbia, Missouri

Operator: LRK

Date of Work: 06/10/24-06/10/24

Depth to Water:

Depth Hole Open:

Time Change:



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

1 - OCT - 2024

ROUTE	STATE
70EB	MO
DISTRICT	SHEET NO.
BR	53

COUNTY
BOONE

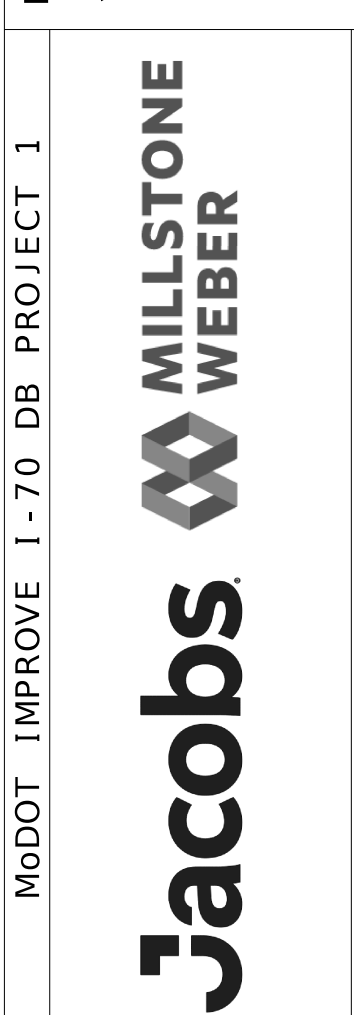
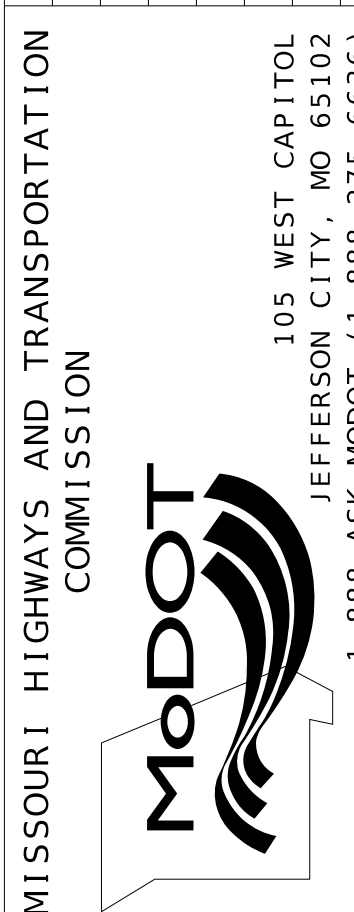
JOB NO.
JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO.
A9542

DATE	DESCRIPTION	REV.	A - FINAL REVIEW	REV.	0 - RELEASED FOR CONSTRUCTION
09/13/24					
10/01/24					





Job No.: 20241040.00

Design:

Bent:

Station:

Offset:

Elevation: 670.0

Requested Station:

Requested Offset:

Requested Elevation:

Drill No.:

Missouri Department of Transportation
Construction and Materials

County: Boone

Skewed:

Logged By: SO

Northing:

Easting:

Requested Northing:

Requested Easting:

Equipment: CME 550X Split-Spoon Sampler, Shelby Tube

Location Note: (38.9622544, -92.2957516)

Hammer Efficiency: 90%

Route: I-70

Location: Columbia, Missouri

Operator: LRK

Date of Work: 06/07/24-06/07/24

Depth to Water: 13.0

Depth Hole Open:

Time Change:

Drilling Method: HSA

BORING NO. BR 2-3
Page 1 of 2

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (ROD %)	Blow Counts (N ₆₀)	Shear Data	Field Tests	Index Tests
0			670						
		0.0-5.5' (CL) Brown, lean CLAY, with gravel, trace sand			11	4-4-4 (12)		PP = 2.00 tsf	
		3.5' -sandy below 3.5 ft.				4-6-5 (17)		PP = 3.50 tsf	
5			665						
		5.5-12.0' (SC) Brown, clayey SAND			100			PP = 1.75 tsf	
		8.5' -with gravel below 8.5 ft.			44	7-15-10 (38)		PP = 0.50 tsf	
10			660						
		12.0-13.8' (GC) Gray, clayey GRAVEL, with sand							
		13.8-25.0' Gray, highly weathered SHALE, with gravel			33	18-11-19 (45)			
15			655						
					56	7-9-15 (36)		PP >4.50 tsf	
20			650						
		23.5' -trace gravel below 23.5 ft.							
25			645						

N₆₀ = (Em/60)N_m N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; N_m - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Coordinate Zone: Coordinate Proj. Factor:

Coordinate Datum: Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.



Job No.: 20241040.00

Design:

Bent:

Station:

Offset:

Elevation: 670.0

Requested Station:

Requested Offset:

Requested Elevation:

Drill No.:

Missouri Department of Transportation
Construction and Materials

County: Boone

Skewed:

Logged By: SO

Northing:

Easting:

Requested Northing:

Requested Easting:

Equipment: CME 550X Split-Spoon Sampler, Shelby Tube

Location Note: (38.9622544, -92.2957516)

Hammer Efficiency: 90%

Route: I-70

Location: Columbia, Missouri

Operator: LRK

Date of Work: 06/07/24-06/07/24

Depth to Water: 13.0

Depth Hole Open:

Time Change:

Drilling Method: HSA

BORING NO. BR 2-3
Page 2 of 2

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (ROD %)	Blow Counts (N ₆₀)	Shear Data	Field Tests	Index Tests
25			645						
		25.0-27.0' Gray, highly weathered SHALE, trace gravel							
		27.0-29.0' Highly weathered LIMESTONE							
		29.0-48.0' Cherty LIMESTONE, highly weathered, with shale			21 (6)				
30			640						
					23 (12)				
35			635						
					23 (6)				
40			630						
					55 (10)				
45			625						
		48.0-50.0' Cherty LIMESTONE, gray, moderately hard, slightly weathered, fine to medium crystalline, thin bedded, dense to pitted							
50			620						

N₆₀ = (Em/60)N_m N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; N_m - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System: Coordinate Zone: Coordinate Proj. Factor:

Coordinate Datum: Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

1 - OCT - 2024

ROUTE 70EB
DISTRICT BR
STATE MO
SHEET NO. 54

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION
MoDOT
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

MoDOT IMPROVE I-70 DB PROJECT 1
JACOBS
MILLSTONE WEBER
MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

BORING LOGS

Detailed SEP 2024
Checked SEP 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 54 of 56

pw://jacobs-us-va-pw.bentley.com:jacobs-us-va-pw-04/Documents/F3X03001 - Improve I-70 Columbia to Kingdom City/30 Project Data/AAA_Packages/B2200 (Bridge 2-EB I-70 & CD Rd over Hinkson Creek)/B_A9542_054_JST0021_Boring_003.dgn

16:36 1-OCT-2024



Job No.: 20241040.00
Design:
Bent:
Station:
Offset:
Elevation: 670.0
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.:

Missouri Department of Transportation
Construction and Materials

County: Boone
Skew:
Logged By: SO
Northing:
Easting:
Requested Northing:
Requested Easting:
Equipment: CME 550X Split-Spoon Sampler, Shelby Tube
Location Note:
Hammer Efficiency: 90%
Drilling Method: HSA

BORING NO. BR 10-3A
Page 1 of 3

LETTER BOREHOLE - MODOT 20150728.GDT - 6/13/24 18:34 - \\TSI\PROJECTS\STL\GEO\TECH\2024\PROJECTS\20241040.00 - I-70 THIRD LANE (KINGDOM CITY TO COLUMBIA)\WORKING FILES\MODOT I-70 3RD LANE 20241040.GPJ

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (ROD %)	Blow Counts (N ₆₀)	Shear Data	Field Tests	Index Tests
0			670						
		0.0-3.5' (CL) Brown, lean CLAY, with sand, gravel, and coal			44	3-3-4 (11)		PP = 3.00 tsf	
		3.0' -with concrete below 3.0 ft.			100				
		3.5-5.0' CONCRETE			17	50/0.5'			
5			665						
		5.0-7.7' (ML) Brown and gray, sand SILT			67	0-0-0 (0)		PP = 0.50 tsf	
		7.7-13.8' (SP) Coarse SAND, with gravel			79				
10			660						
		13.8-25.0' Gray, SHALE, highly weathered	655		28	7-5-6 (17)		PP = 4.50 tsf	
15									
		18.5' -with crystalline lenses from 18.5 to 20.0 ft.	650		44	21-11-15 (39)		PP >4.50 tsf	
20									
		23.5' -slightly weathered below 23.5 ft.			100	50/0.3'		PP >4.50 tsf	
25		24.0' -rough drilling from 24.0 to 25.0 ft.	645						

N₆₀ = (Em/60)N_m N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; N_m - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System:
Coordinate Zone:
Coordinate Proj. Factor:
Coordinate Datum:
Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.



Job No.: 20241040.00
Design:
Bent:
Station:
Offset:
Elevation: 670.0
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.:

Missouri Department of Transportation
Construction and Materials

County: Boone
Skew:
Logged By: SO
Northing:
Easting:
Requested Northing:
Requested Easting:
Equipment: CME 550X Split-Spoon Sampler, Shelby Tube
Location Note:
Hammer Efficiency: 90%
Drilling Method: HSA

BORING NO. BR 10-3A
Page 2 of 3

LETTER BOREHOLE - MODOT 20150728.GDT - 6/13/24 18:34 - \\TSI\PROJECTS\STL\GEO\TECH\2024\PROJECTS\20241040.00 - I-70 THIRD LANE (KINGDOM CITY TO COLUMBIA)\WORKING FILES\MODOT I-70 3RD LANE 20241040.GPJ

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (ROD %)	Blow Counts (N ₆₀)	Shear Data	Field Tests	Index Tests
25			645						
		25.0-31.0' Gray, SHALE, slightly weathered							
		28.5' -calcareous below 28.5 ft.			100	50/0.1'			
30			640						
		30.0' -rough drilling from 30.0 to 31.0 ft.							
		31.0-32.0' SHALE, gray, very soft							
		32.0-50.0' Cherty LIMESTONE, gray, moderately hard to very hard, slightly weathered, fine to medium crystalline, thin bedded, dense to pitted			94 (63)				
35			635						
		35.0' -highly weathered, interbedded shale below 35.0 ft.			30 (0)				
40			630			20 (10)			
45			625			32 (8)			
50			620						

N₆₀ = (Em/60)N_m N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; N_m - Observed N-value
(1) = Assumed, (2) = Actual

Coordinate System:
Coordinate Zone:
Coordinate Proj. Factor:
Coordinate Datum:
Coordinate Units: U.S. Survey Feet

* Persons using this information are cautioned that the materials shown are determined by the equipment noted and accuracy of the "log of materials" is limited thereby and by judgement of the operator. THIS INFORMATION IS FOR DESIGN PURPOSES ONLY.

BORING LOGS

Detailed SEP 2024
Checked SEP 2024

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 55 of 56

pw://jacobs-us-va-pw.bentley.com:jacobs-us-va-pw-04/Documents/F3X03001 - Improve I-70 Columbia to Kingdom City/30 Project Data/AAA_Packages/B2200 (Bridge 2-EB I-70 & CD Rd over Hinkson Creek)/B_A9542_055_JST0021_Boring_004.dgn



10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

1 - OCT - 2024

ROUTE 70EB
DISTRICT BR
STATE MO
SHEET NO. 55

COUNTY BOONE

JOB NO. JST0021

CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

MISSOURI HIGHWAYS AND TRANSPORTATION
COMMISSION
MoDOT
105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

MODOT IMPROVE I-70 DB PROJECT 1
JACOBS
MILLSTONE WEBER
MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

16:37 1-OCT-2024



Job No.: 20241040.00
Design:
Bent:
Station:
Offset:
Elevation: 670.0
Requested Station:
Requested Offset:
Requested Elevation:
Drill No.:

Missouri Department of Transportation
Construction and Materials

County: Boone
Skew:
Logged By: SO
Northing:
Easting:
Requested Northing:
Requested Easting:
Equipment: CME 550X Split-Spoon Sampler, Shelby Tube
Location Note:
Hammer Efficiency: 90%
Drilling Method: HSA

BORING NO. BR 10-3A
Page 3 of 3

Depth (ft)	Graphic	Description	Elevation (ft)	Sample Type	REC % (RQD %)	Blow Counts (N ₆₀)	Shear Data	Field Tests	Index Tests
50			620						
		50.0-63.0' LIMESTONE, gray, moderately hard, slightly weathered, fine to coarse crystalline, medium to thick bedded, dense to pitted			100 (100)				
55			615						
					100 (100)				
60		60.0' -fine to medium crystalline, thin to medium bedded below 60.0 ft.	610						
		61.6' -7" chert seam at 61.6 ft.			100 (100)				
		Refusal at 31.0 feet. Bottom of borehole at 63.0 feet.							

N₆₀ = (Em/60)Nm N₆₀ - Corrected N value for standard 60% SPT efficiency; Em - Measured hammer efficiency in percent; Nm - Observed N-value
(1) = Assumed, (2) = Actual
Coordinate System: Coordinate Zone: Coordinate Proj. Factor:
Coordinate Datum: Coordinate Units: U.S. Survey Feet

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10/01/2024 4:59:52 PM
Matthew Muenks
MO PE-2017000338
DATE PREPARED

1-OCT-2024
ROUTE 70EB
STATE MO
DISTRICT BR
SHEET NO. 56

COUNTY BOONE
JOB NO. JST0021
CONTRACT ID.

PROJECT NO.

BRIDGE NO. A9542

DATE	DESCRIPTION
09/13/24	REV. A - FINAL REVIEW
10/01/24	REV. 0 - RELEASED FOR CONSTRUCTION

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

105 WEST CAPITOL
JEFFERSON CITY, MO 65102
1-888-ASK-MODOT (1-888-275-6636)

MoDOT IMPROVE I-70 DB PROJECT 1

MO STATE CERTIFICATE OF AUTHORITY #000704 ENGINEERING

Detailed SEP 2024
Checked SEP 2024

Note: This drawing is not to scale. Follow dimensions. Sheet No. 56 of 56

BORING LOGS