

#### BENCH MARKS\*

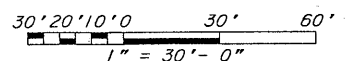
BM 13- 22' Left of Sta. 177+53, Chiseled Square  
 in N.E. wingwall abutment waterworks  
 viaduct, Elev. 764.618.

BM 14- 180' Left of Sta. 183+00, S.W. corner channel  
 bar in S. Levee abutment at R.R. Elev. 763.304

\*The Contractor shall use existing abutments and  
 expansion joints for control elevations. Bench  
 Marks and Profile Grade are from original  
 construction plans.

#### Note:

Slope protection to be provided at North Abutment  
 shall be per Missouri Standard Drawing 611.60K. The  
 slope protection shall match the edges of the existing  
 slope protection at the North Abutment of Southbound  
 Broadway over Burlington Northern Railroad.



KANSAS CITY, MISSOURI  
 DEPARTMENT OF PUBLIC WORKS  
**MISSOURI RIVER BRIDGE AT BROADWAY**  
 NORTHBOUND BROADWAY OVER  
 BURLINGTON NORTHERN RAILROAD  
 GENERAL PLAN AND ELEVATION

**HNTB**  
 HOWARD NEEDLES TAMMEN & BERGENDOFF  
 ARCHITECTS ENGINEERS PLANNERS

## GENERAL NOTES

**DESIGN:**

AASHTO Standard Specifications for Highway Bridges, Thirteenth Edition  
(1983) as amended by 1984 thru 1988 Interim Specifications.

**CONSTRUCTION:**

The construction covered by these plans shall conform to the current Standard Specifications and Design Criteria Engineering Division, Department of Public Works, Kansas City, Missouri, except that the Missouri Standard Specifications for Highway Construction, 1986 Edition with Supplement and Special Provisions shall be utilized for auxiliary specifications.

All dimensions of the existing bridge components shown on the plans are approximate and the original information given on reproductions of the original construction plans is presented in these plans as being general and approximate only. All such dimensions and information shall be verified by the Contractor prior to any intended use of such data and the Contractor shall have sole responsibility for the accuracy and reliability of such verifications.

Any damage to the existing bridges, approach roadways, pavements and medians caused by the Contractor's operations shall be repaired to the Engineer's satisfaction and shall be accomplished at the Contractor's expense.

## DESIGN LOADS:

HS20-44  
No future wearing surface.

## DESIGN UNIT STRESSES:

Concrete Class B2  $f'_c = 4,000$  psi  
Reinforcing steel ASTM A615 Grade 60  $f_y = 60,000$  psi

CONCRETE:

Concrete in the bridge deck, approach slab repair, abutment repairs and barrier curb shall be Concrete Class B2. All exposed edges shall be chamfered 3/4" unless shown or noted otherwise.

## REINFORCING STEEL:

All reinforcing steel in the bridge deck and barrier curb shall be epoxy coated. All reinforcing steel shall be 2" clear to face of concrete except where otherwise noted. Reinforcing steel shall conform to the requirements of ASTM A615, Grade 60.

STRUCTURAL STEEL:

All miscellaneous structural steel shall conform to the requirements of ASTM A36 steel.

HAUNCH:

A variable depth haunch shall be formed by the contractor on Unit girders to provide for anticipated dead load deflection and other deviations.

SCOPE OF WORK:

Scope of work to be done shall include the following:

- (1) Remove existing bridge deck and replace with a new bridge deck and new barrier curbs. Junction boxes and conduit not required in new bridge deck.
- (2) Provide and install new preformed compression seal at abutments.
- (3) Extend existing finger expansion joints and sliding plate expansion joints to accommodate new roadway width and barrier curbs.
- (4) Extend existing deck drains to accommodate new roadway width.
- (5) Reconstruct ends of approach slabs as shown in plans.
- (6) Perform miscellaneous superstructure steel repairs as shown in plans.
- (7) Make Units 1-5 and Unit 7 composite by installation of shear studs to the top flange of all longitudinal beams.
- (8) Repair abutment and pier concrete as shown in plans.
- (9) Seal top of concrete piers and abutment seats with a protective coating.
- (10) Repair abutment wingwalls to accommodate new barrier curb and three beam transition.
- (11) Spot paint bridge as described in the Special Provisions.
- (12) Place slope protection at North Abutment.

[illegible]

\*Quantity shown is estimated. Actual repair quantity shall be determined by the Engineer in the field.

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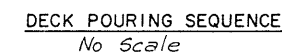
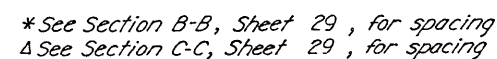
**MISSOURI RIVER BRIDGE AT BROADWAY**

NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
GENERAL NOTES AND  
SUMMARY OF QUANTITIES

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**HNTB**  
HOWARD NEEDLES TAMMEN & BERGENDOFF  
ARCHITECTS ENGINEERS PLANNERS

SHEET 26

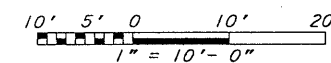


Notes:  
Pours 12, 13, and 14 may be made (in that sequence) any time after pour 11 is made.  
Pour 15 may be made at any time.

Pours 16, 17, and 18 (in that sequence) may be made at any time.

All transverse construction joints to be parallel to slab transverse steel in so far as practical.

The Contractor may submit an alternate pouring sequence to the Engineer for approval, providing he has the necessary equipment to pour and satisfactorily finish the deck concrete. Barrier curbs and wearing surface may be placed in any sequence.



Notes:  
For Section D-D see Sheet 29.  
For additional notes see Sheet 27.

### DECK PLAN

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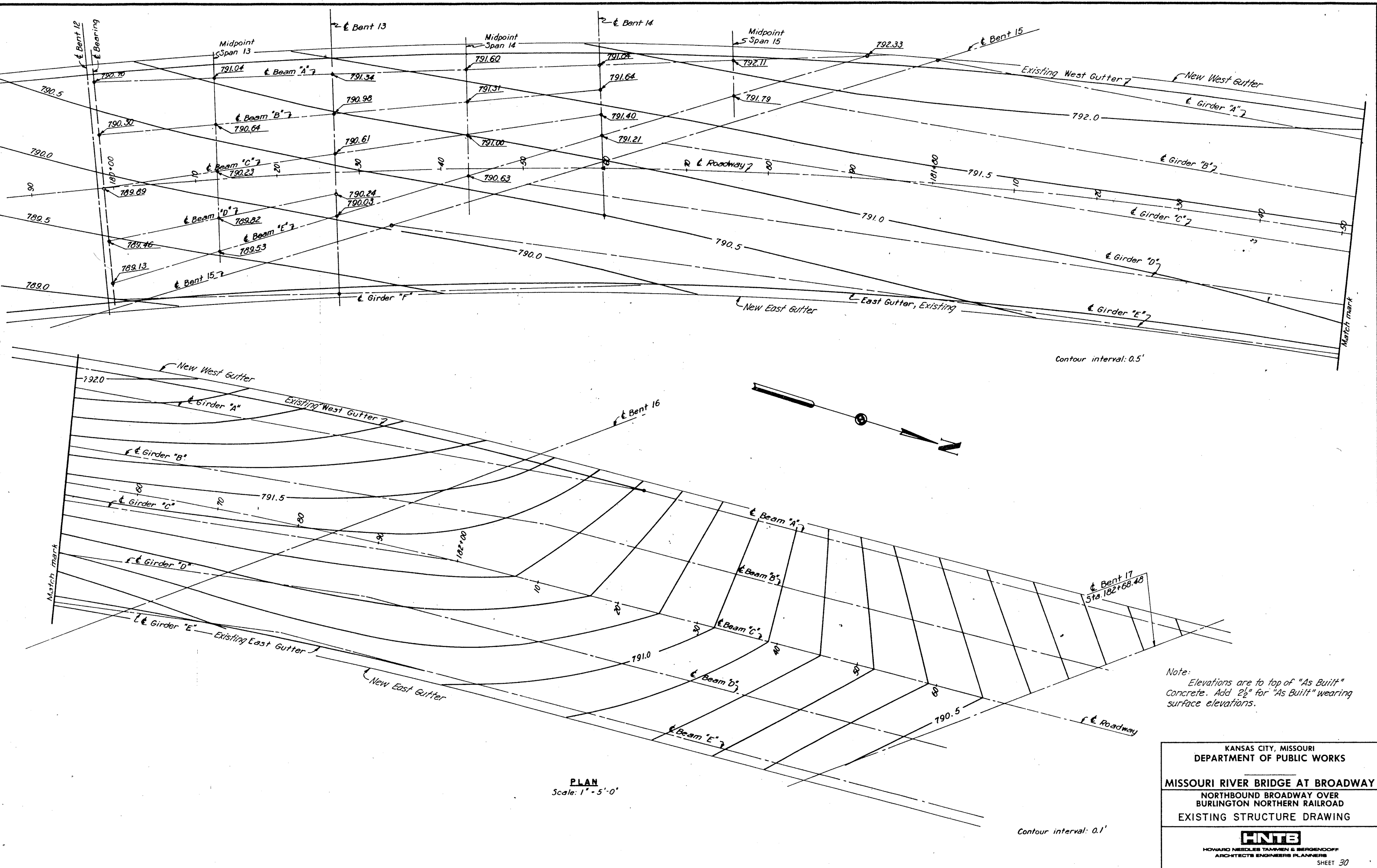
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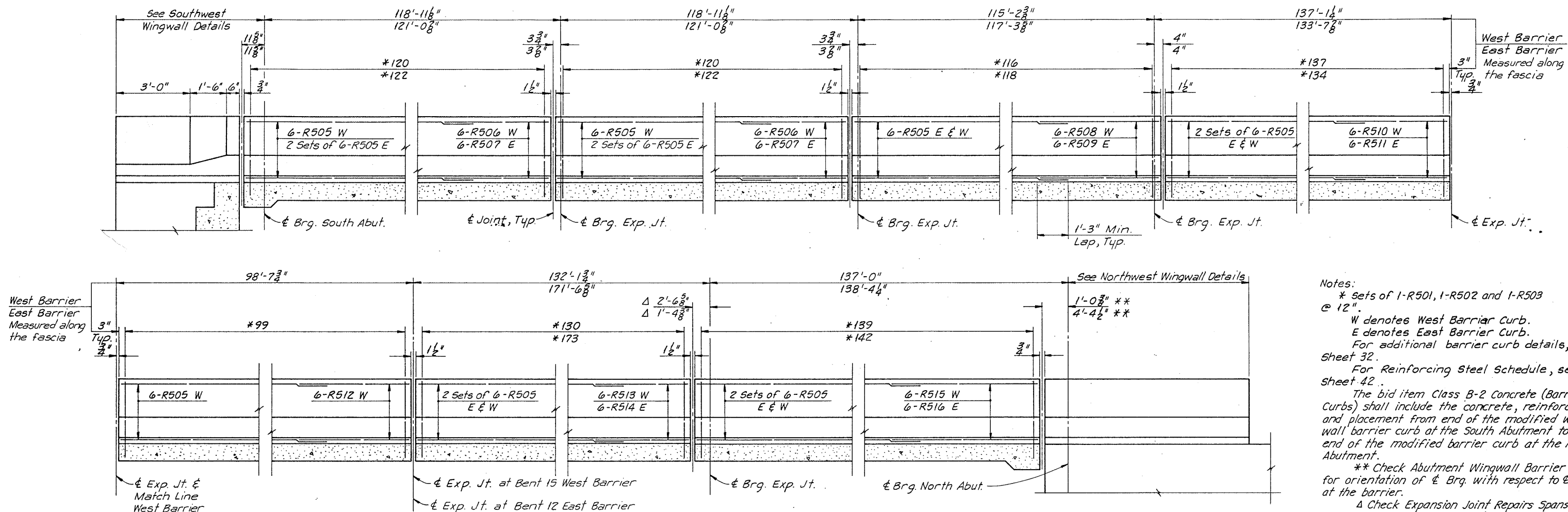
**MISSOURI RIVER BRIDGE AT BROADWAY**

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NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
DECK PLAN - UNIT 5 TO UNIT 7

**HNTB**  
HOWARD NEEDLES TAMMEN & BERGENDOFF  
ARCHITECTS ENGINEERS PLANNERS





Notes:

\* Sets of 1-R501, 1-R502 and 1-R503 @ 12".

W denotes West Barrier Curb.

E denotes East Barrier Curb.

For additional barrier curb details, see Sheet 32.

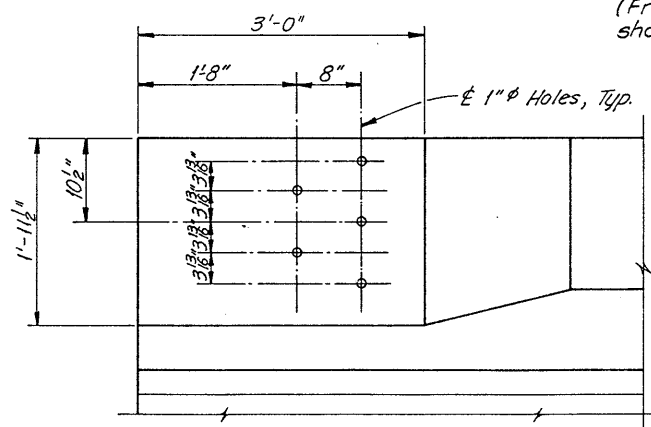
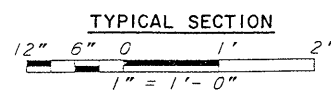
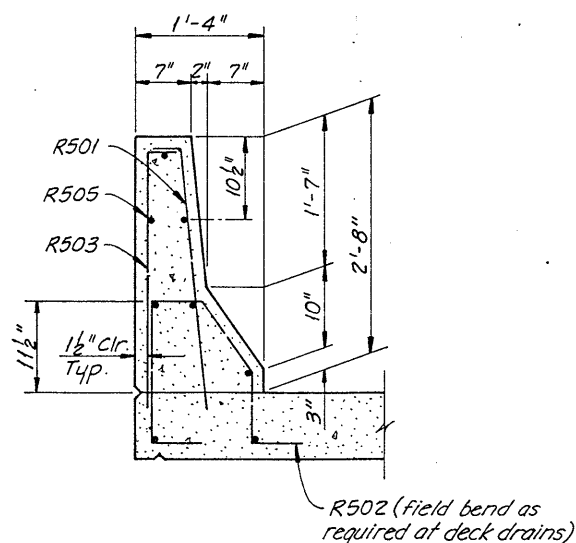
For Reinforcing Steel Schedule, see Sheet 42.

The bid item Class B-2 Concrete (Barrier Curbs) shall include the concrete, reinforcement and placement from end of the modified wingwall barrier curb at the South Abutment to the end of the modified barrier curb at the North Abutment.

\*\* Check Abutment Wingwall Barrier Details for orientation of 6 Brg. with respect to 6 Joint at the barrier.

Δ Check Expansion Joint Repairs Spans 4, 7, 9 and 17 for orientation of 6 Brg. with respect to 6 Joint at the barrier.

ELEVATION  
No Scale  
(Front face West Barrier shown, East Barrier similar)



GUARD RAIL ATTACHMENT DETAIL  
(Southwest wingwall shown, others similar)

Note:

See Mo. State Highway and Transportation Department Std. Dwg. No. 606.22 F for details of Thrie Beam Guardrail.

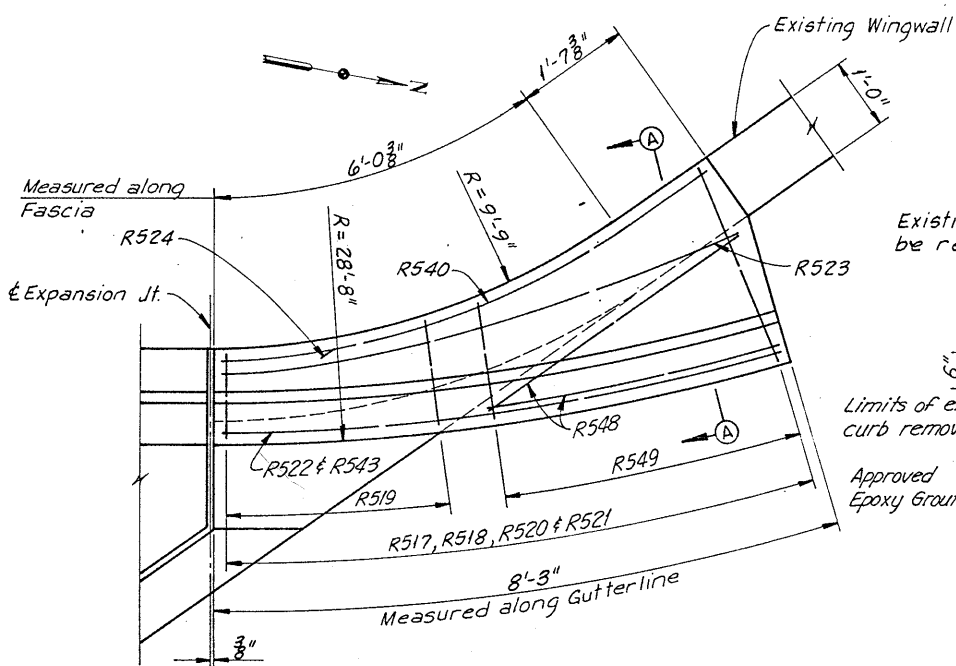
KANSAS CITY, MISSOURI  
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MISSOURI RIVER BRIDGE AT BROADWAY

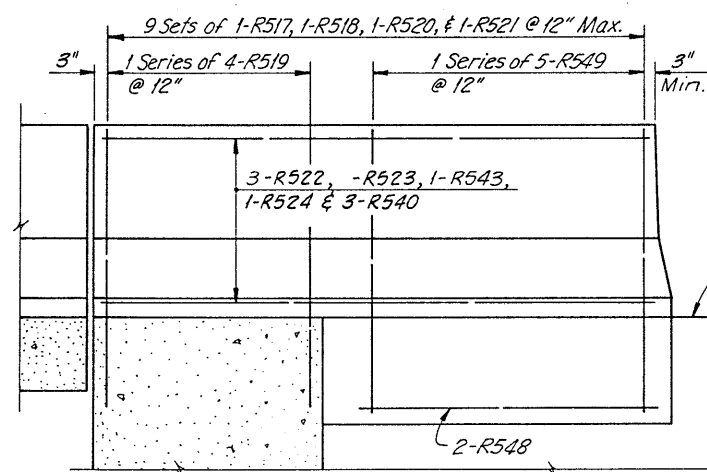
NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD

BARRIER CURB DETAILS

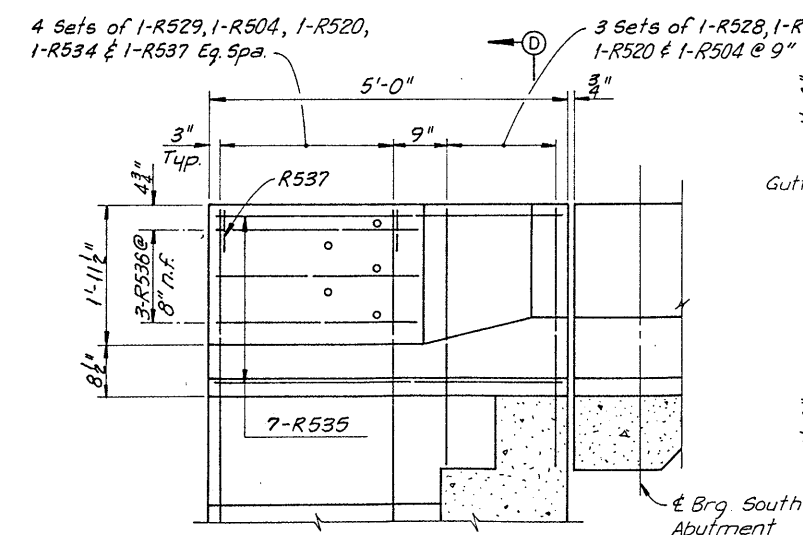
**HNTB**  
HOWARD NEEDLES TAMMEN & BERGENDOFF  
ARCHITECTS ENGINEERS PLANNERS



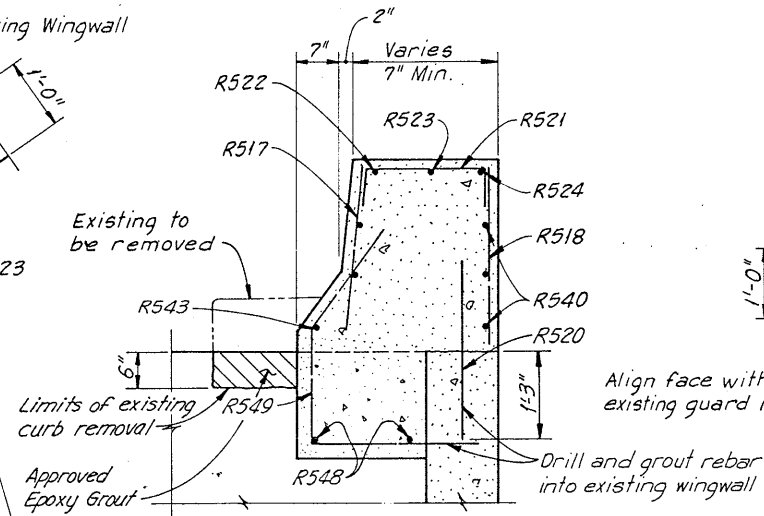
NORTHWEST WINGWALL PLAN



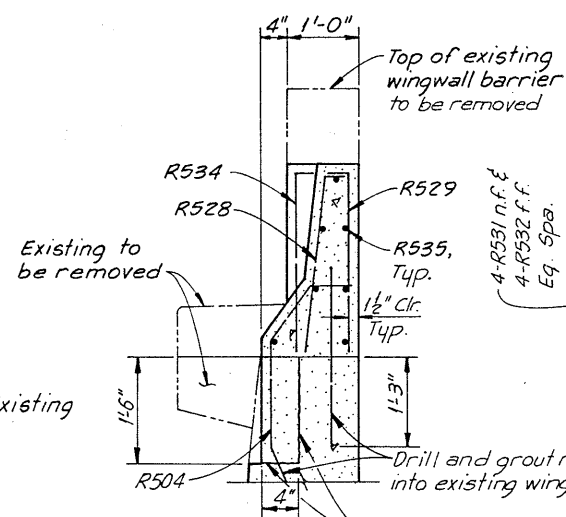
NORTHWEST WINGWALL ELEVATION



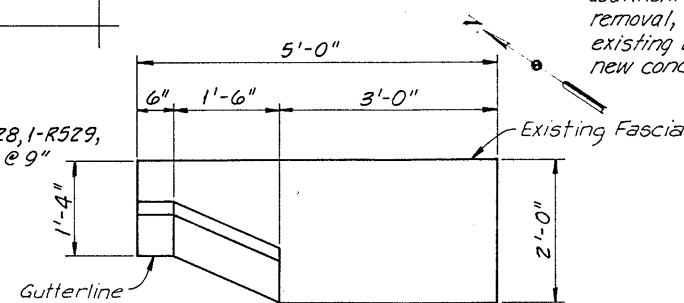
SOUTHWEST WINGWALL ELEVATION



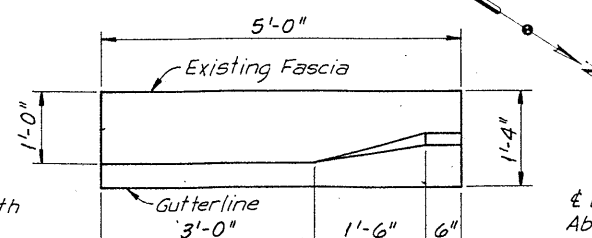
SECTION A-A



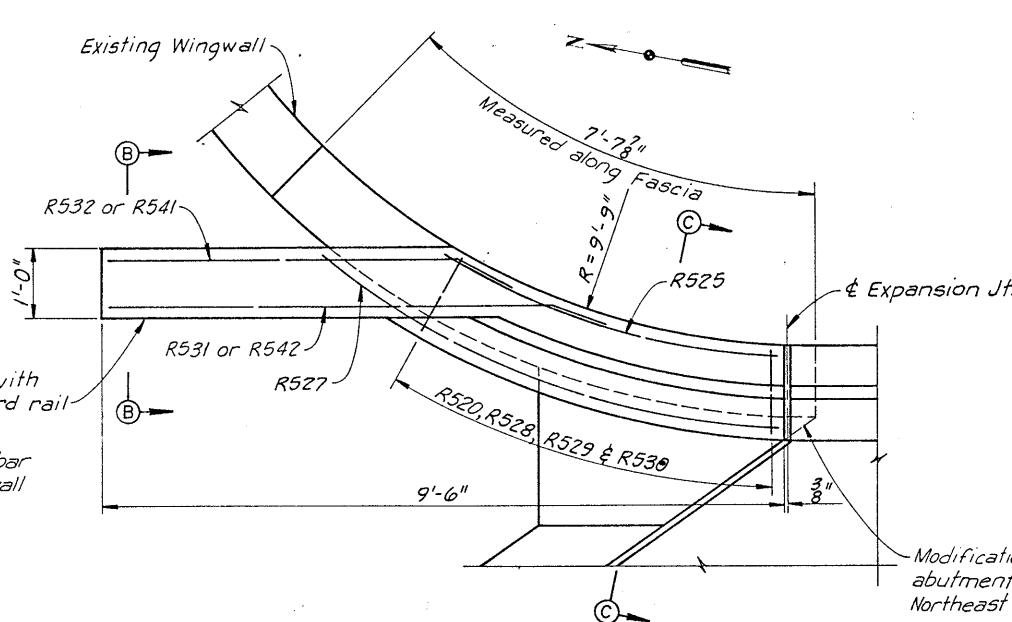
SECTION D-D



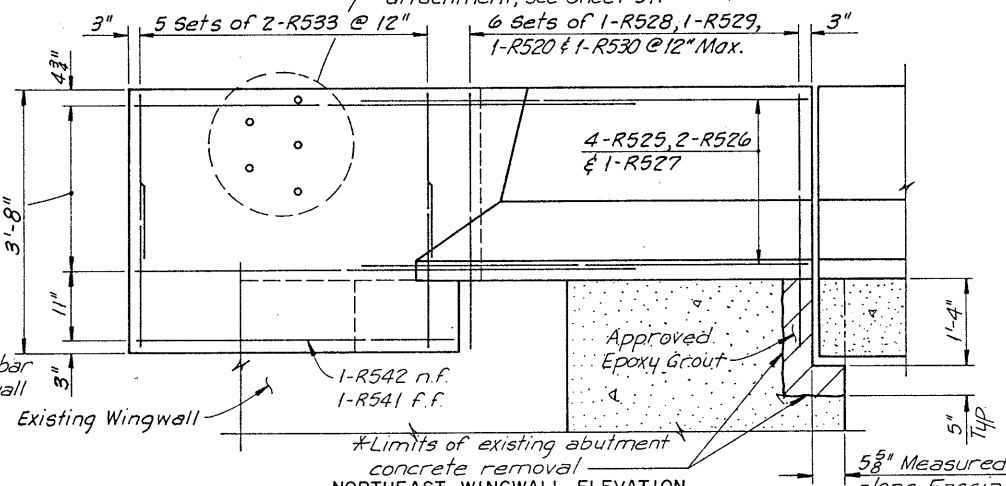
SOUTHEAST WINGWALL PLAN



SOUTHWEST WINGWALL PLAN

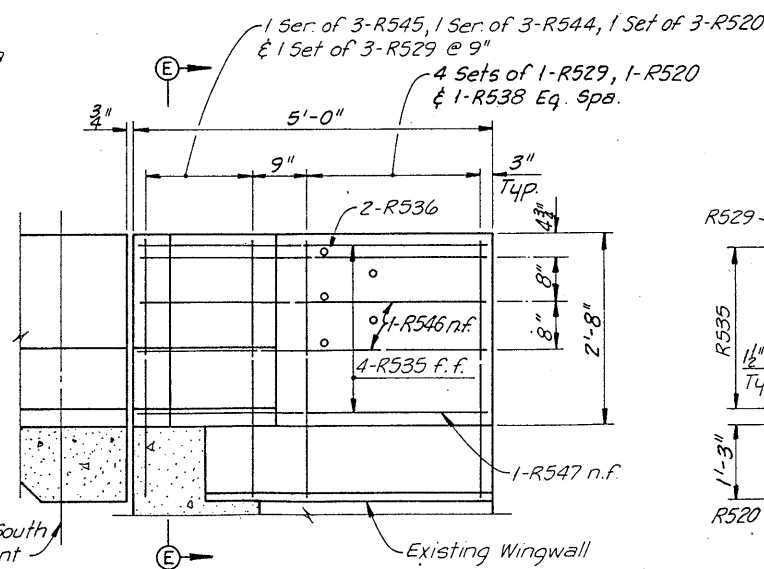


NORTHEAST WINGWALL PLAN

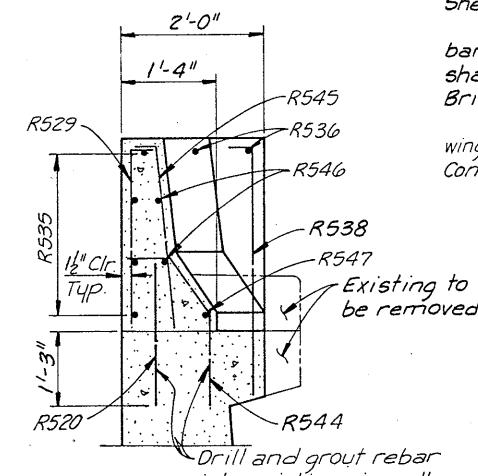


NORTHEAST WINGWALL ELEVATION

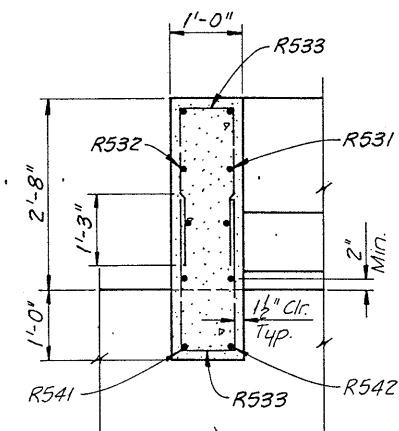
\*Note: Existing abutment reinforcing steel shall be cut as required to provide 1/2" clear cover to new finished surface.



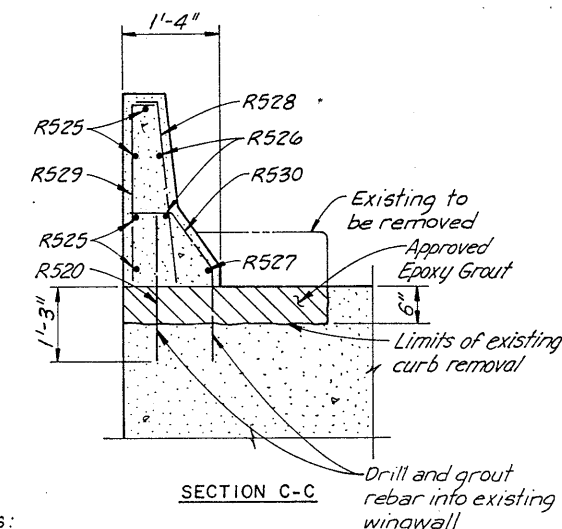
SOUTHEAST WINGWALL ELEVATION



SECTION E-E

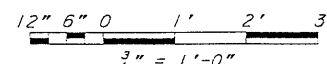


SECTION B-B



SECTION C-C

Notes:  
n.f. denotes near face.  
f.f. denotes far face.  
For additional barrier curb details, see Sheet 31.  
For Reinforcing Steel Schedule, see Sheet 42.  
Payment for removal of the existing wingwall barrier curbs at all four corners of the bridge shall be included with the bid item "Removal of Bridge Deck".  
Cost for drilling and grouting rebar into existing wingwalls to be included in the unit price bid for Class B-2 Concrete (Barrier Curbs).

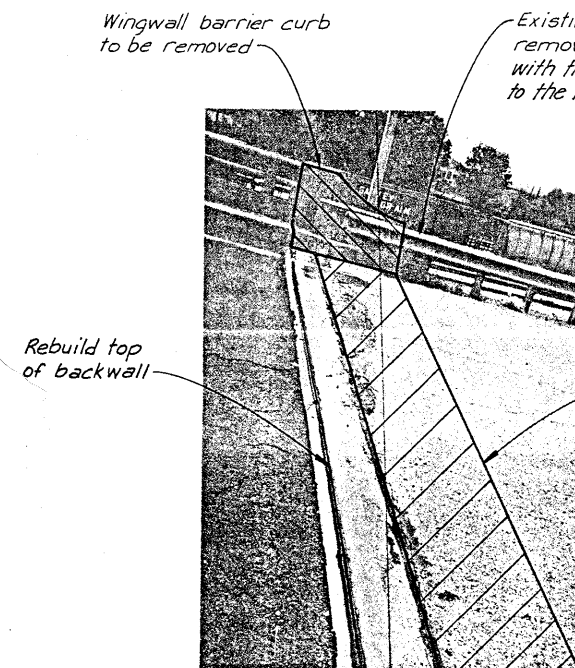


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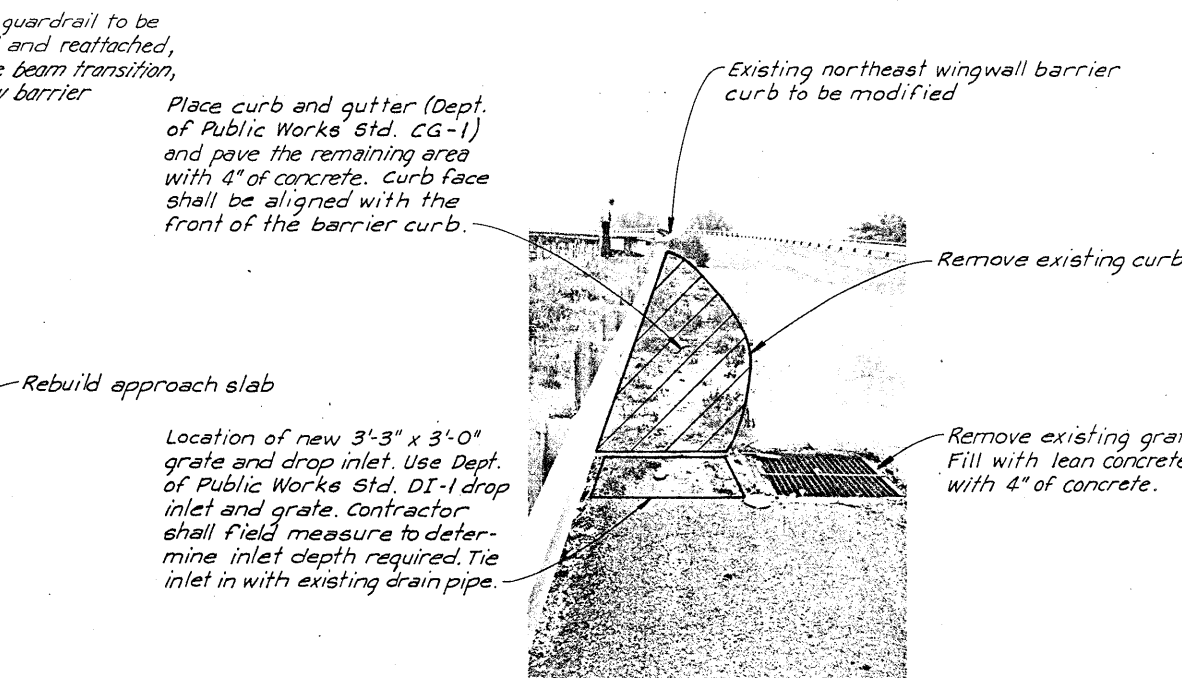
MISSOURI RIVER BRIDGE AT BROADWAY  
NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
ABUTMENT WINGWALL  
BARRIER DETAILS

HNTB  
HOWARD NEEDLES TAMMEN & BERENDOFF  
ARCHITECTS ENGINEERS PLANNERS

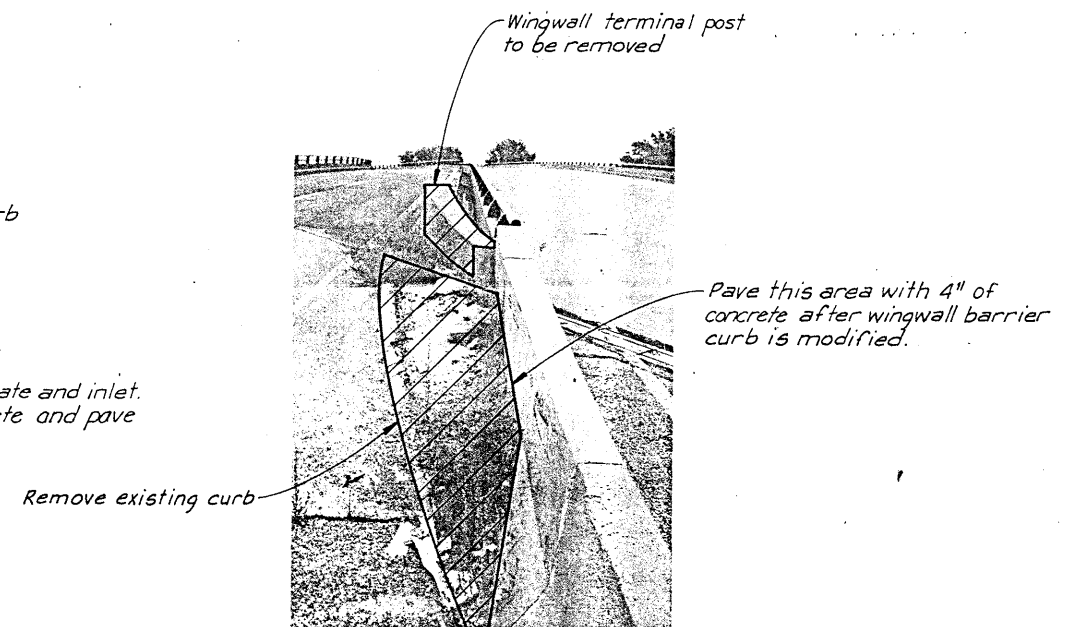




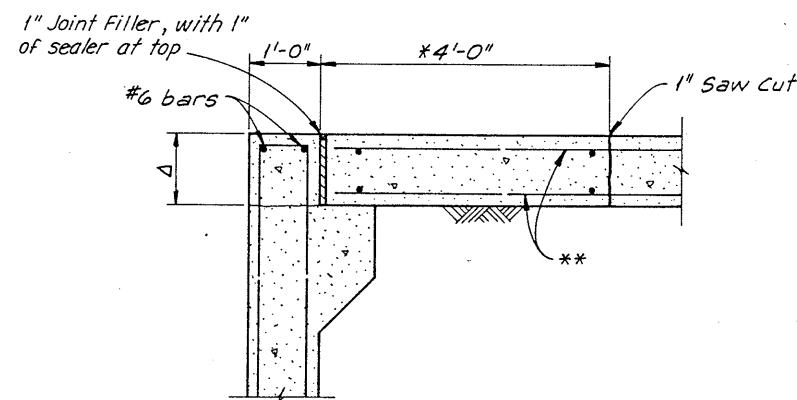
SOUTH ABUTMENT APPROACH SLAB  
SOUTHEAST WINGWALL



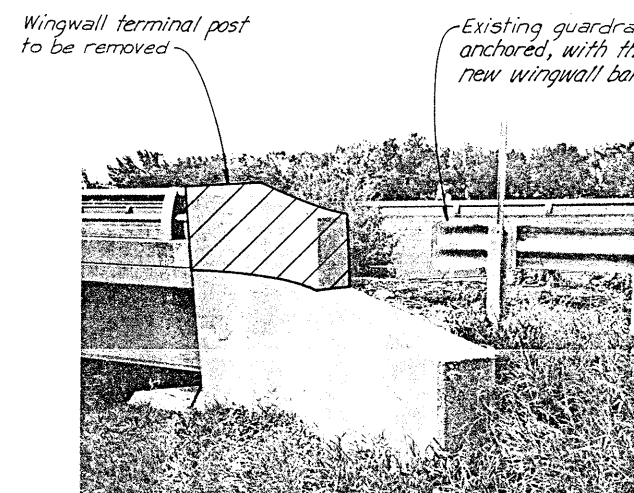
NORTHEAST APPROACH



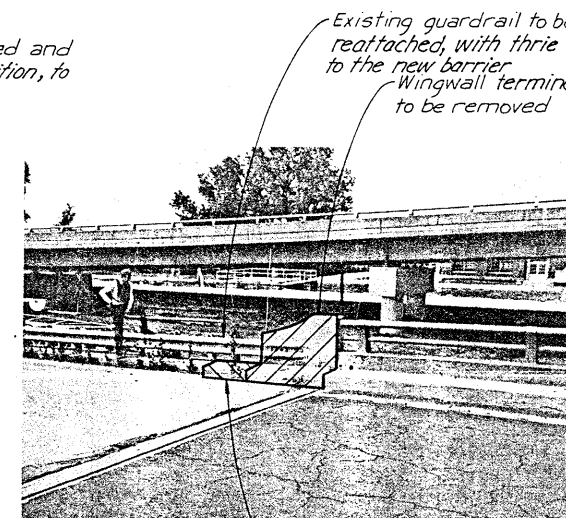
NORTHWEST APPROACH



ABUTMENT SECTION



NORTHEAST WINGWALL



SOUTHWEST WINGWALL

- Notes:  
The following items shall be paid for under the bid item "Approach Modifications":
1. Curb and gutter at northeast approach.
  2. Concrete shoulders at northeast and northwest approaches.
  3. Guardrail extensions required to make attachment to modified wingwall barrier curb at the southwest, southeast and northeast wingwalls, with a three beam transition section and terminal connector.
  4. Approach slab repair and backwall repair at abutments.
  5. Existing grate replacement at Northeast Approach.

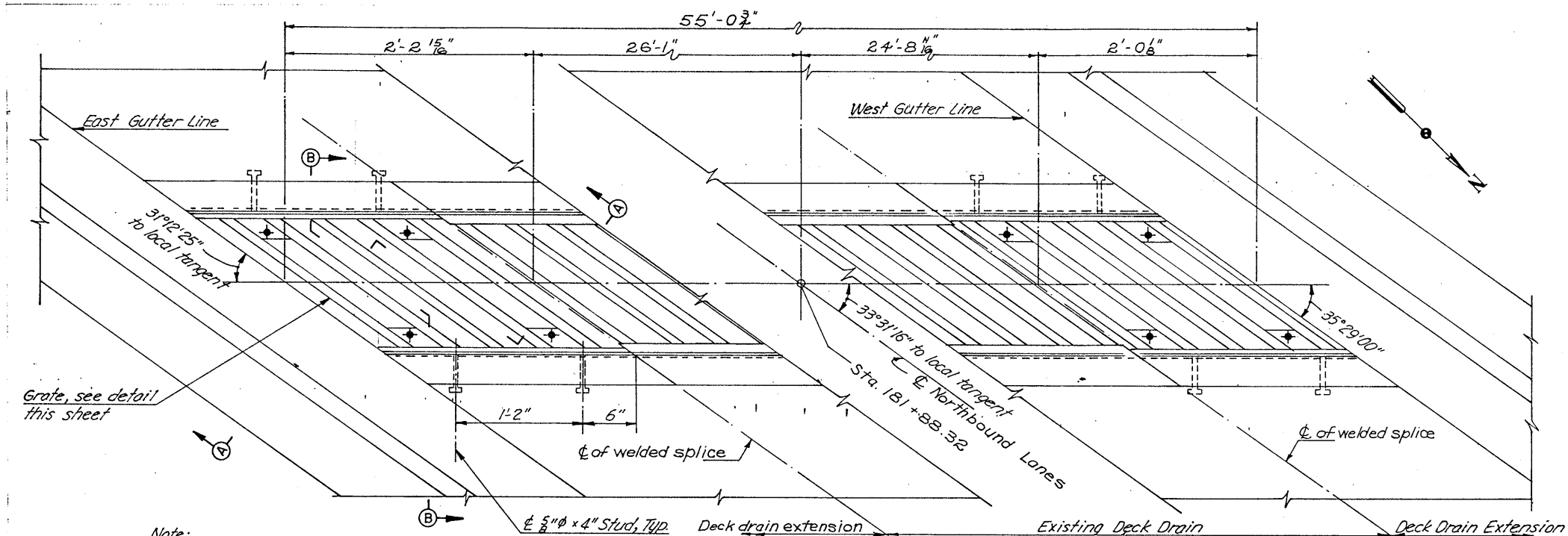
Δ Rebuild top 1'-0" of backwall by removing concrete. Care shall be taken not to damage reinforcement, except transverse #6 bars may be replaced at the Contractor's option.

\* Rebuild approach slab by removing concrete. South Abutment only.

\*\* At Contractors option, existing longitudinal bars may be cut 2'-0" from 1" saw cut and new bars lapped with existing, at no additional cost to project.

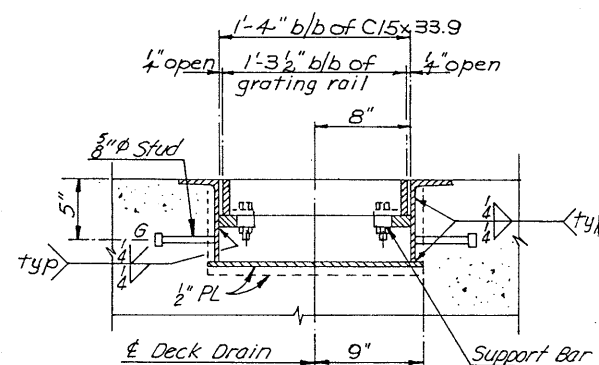
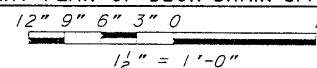
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**MISSOURI RIVER BRIDGE AT BROADWAY**  
NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
APPROACH MODIFICATION DETAILS

**HNTB**  
HOWARD NEEDLES TAMMEN & BERGENDOFF  
ARCHITECTS ENGINEERS PLANNERS  
SHEET 33

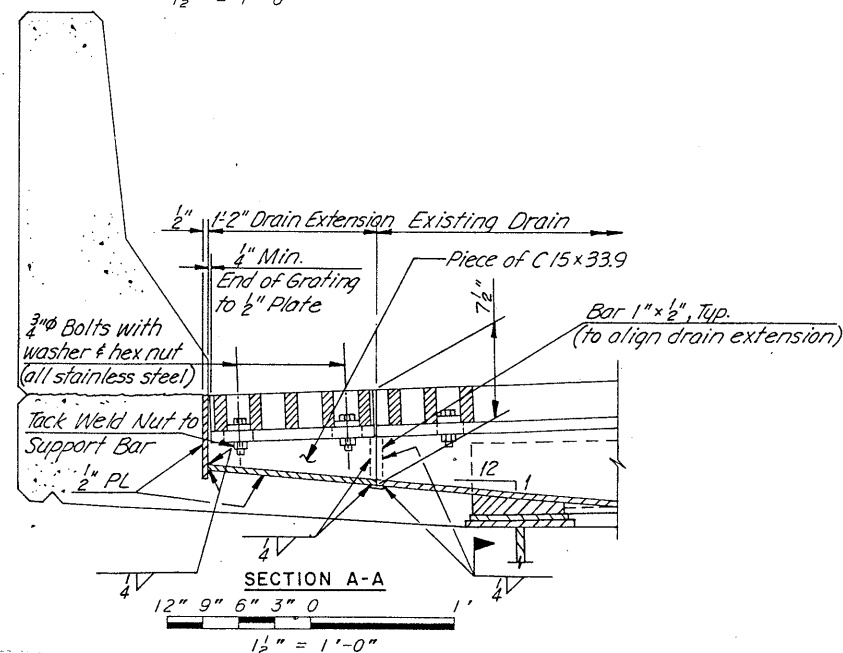
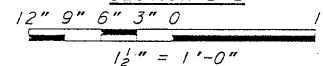


Note:  
Deck drain repairs shown shall be paid for under the bid item "Drainage Repairs".  
The existing deck drains shall be reused to the extent shown.  
All new steel used shall conform to the requirements of ASTM A36.  
The deck drains shall be blast cleaned and painted after modifications. See Special Provisions.  
Sections A-A and B-B shown for Spans 4, 7 & 9, Deck Drain Span 17 similar.

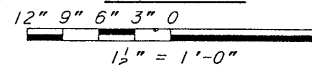
PART PLAN OF DECK DRAIN SPAN 17



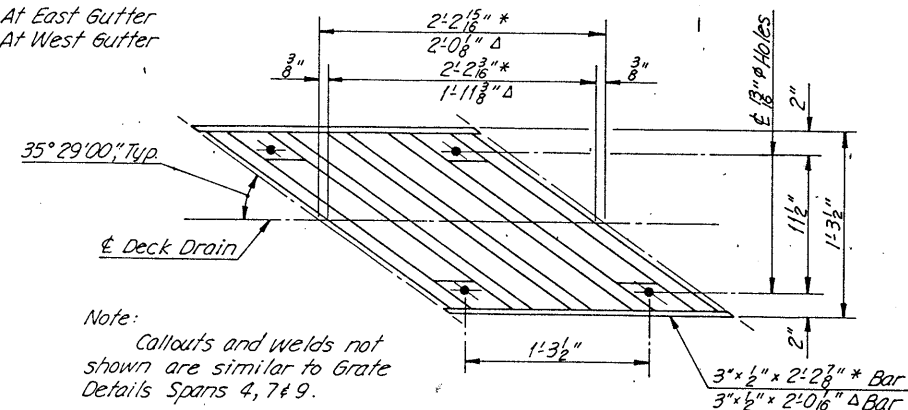
SECTION B-B



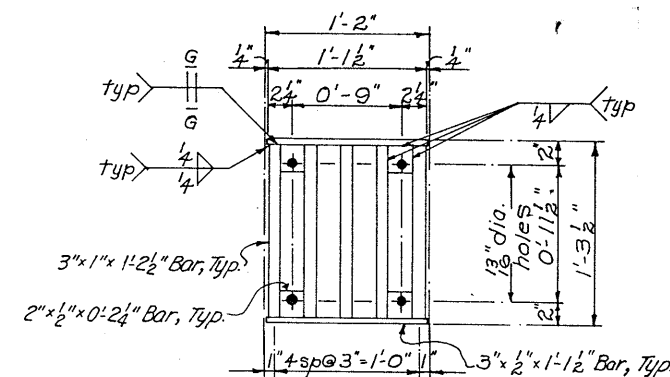
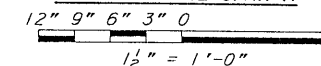
SECTION A-A



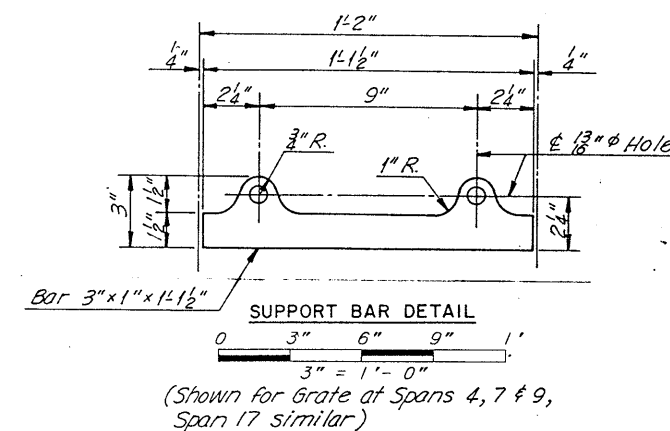
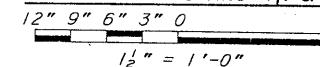
\* At East Gutter  
Δ At West Gutter



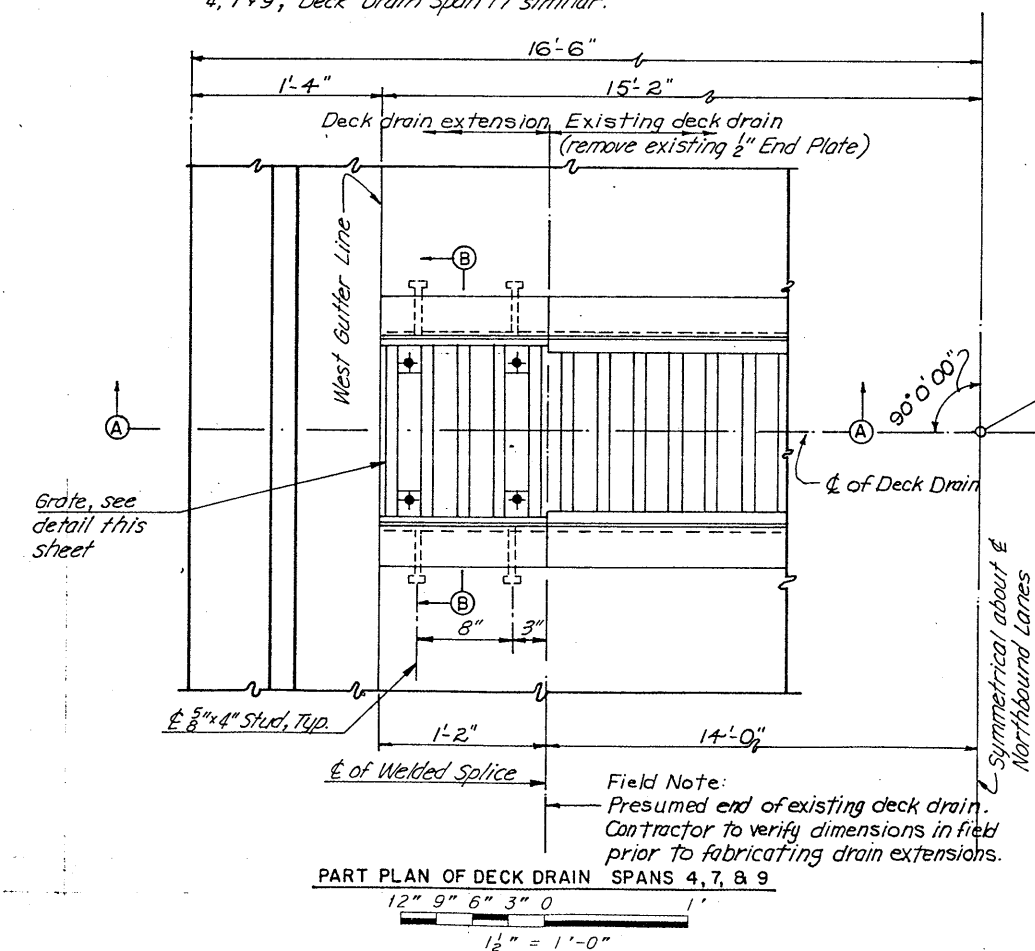
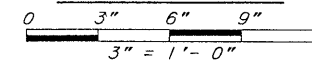
GRATE DETAIL SPAN 17



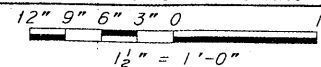
GRATE DETAIL SPANS 4, 7 & 9



SUPPORT BAR DETAIL



PART PLAN OF DECK DRAIN SPANS 4, 7, & 9



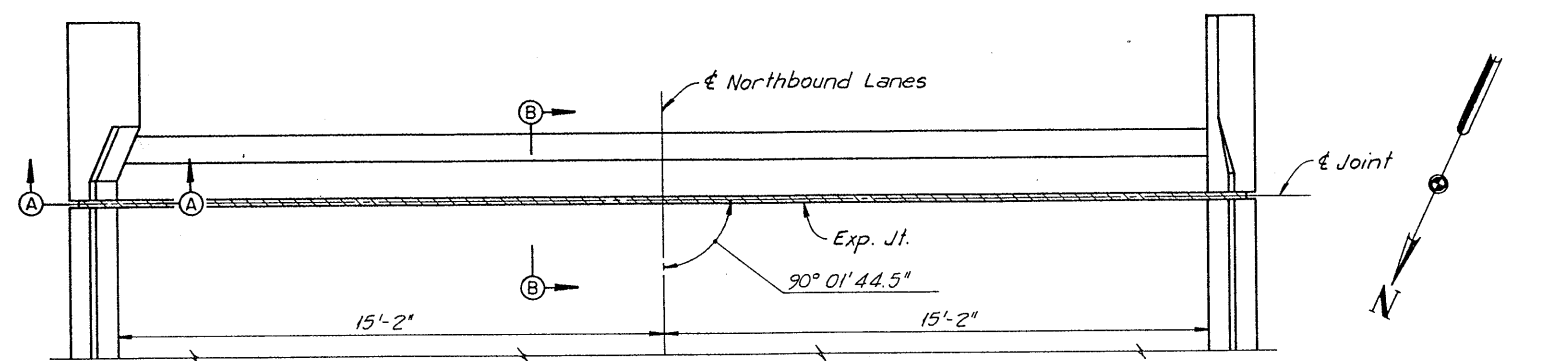
KANSAS CITY, MISSOURI  
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DEPARTMENT OF TRANSPORTATION  
MISSOURI RIVER BRIDGE AT BROADWAY  
NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
DRAINAGE REPAIRS

HNTB

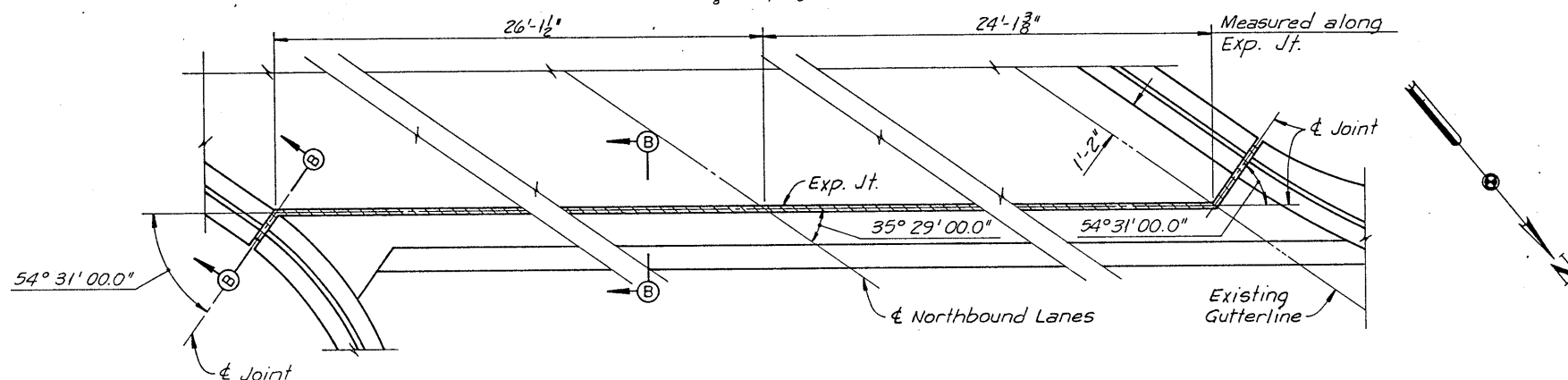
HOWARD NEEDLES TAMMEN & BERGENOFF  
ARCHITECTS ENGINEERS PLANNERS

SHEET 34

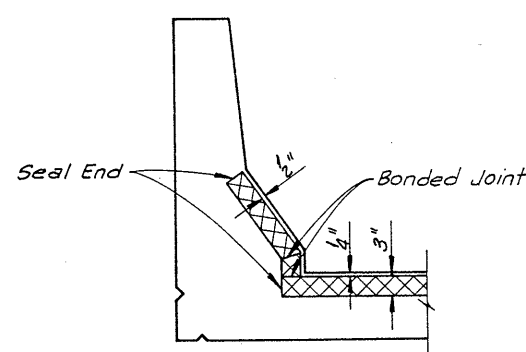




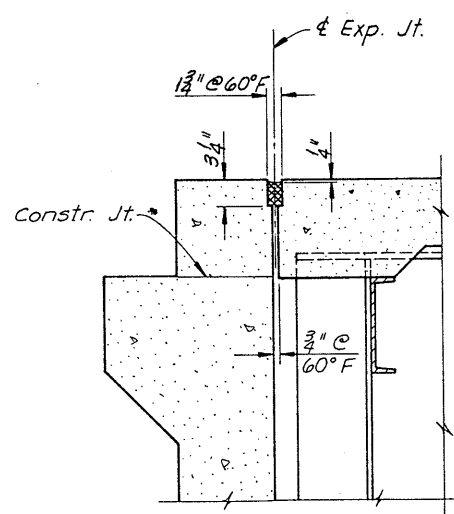
PLAN SOUTH ABUTMENT  
12" 6" 0 1' 2' 3' 4' 5' 6' 7'  
3/8" = 1'-0"



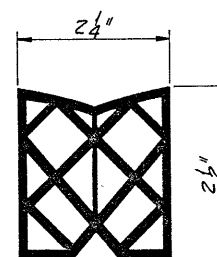
PLAN NORTH ABUTMENT  
12" 6" 0 1' 2' 3' 4' 5' 6' 7'  
3/8" = 1'-0"



SECTION A-A  
12" 6" 0 1' 2'  
1" = 1'-0"

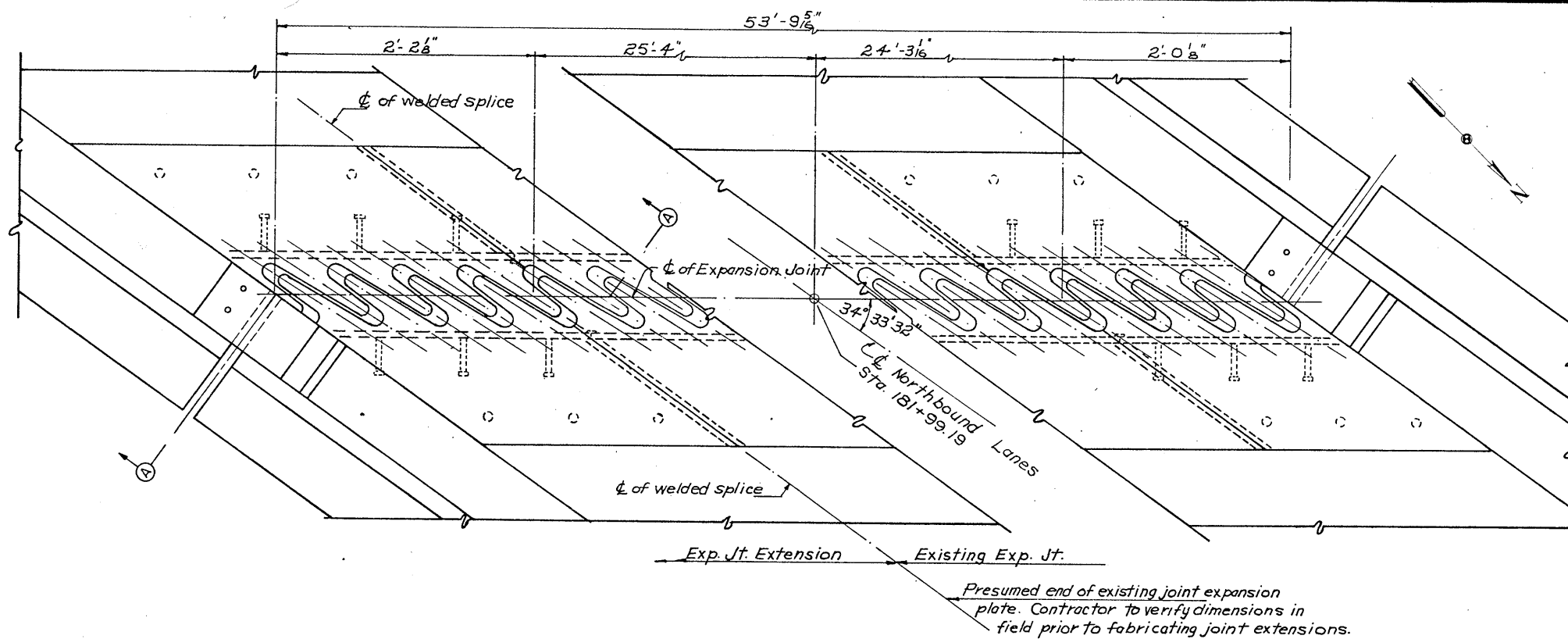


SECTION B-B  
12" 6" 0 1' 2'  
1" = 1'-0"

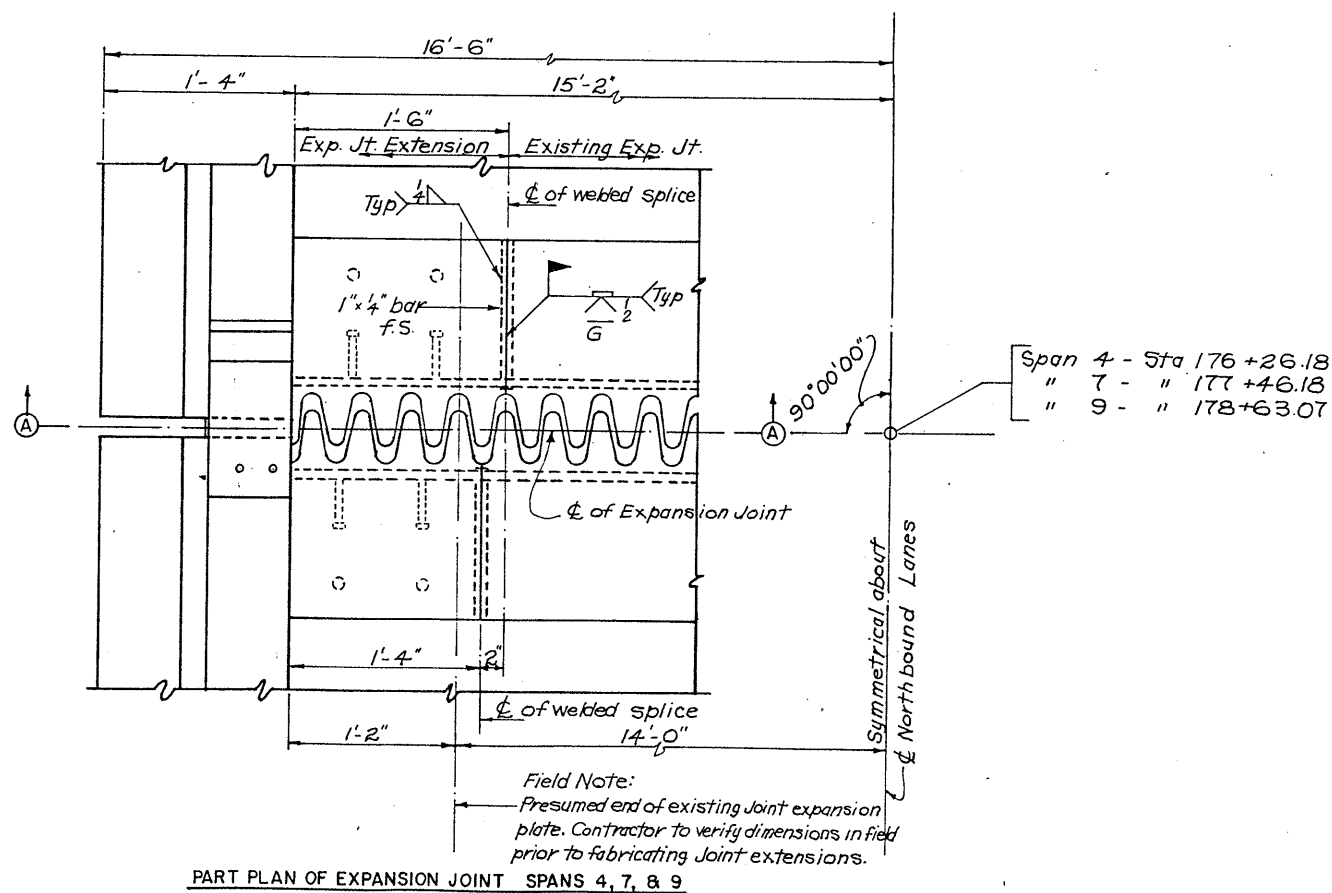


SEAL DETAIL  
(Un-compressed)  
No Scale

Notes:  
Existing expansion joints shall be replaced with compression seal expansion joints equal to CV-2250 (D.S. Brown Co.) or WA-250 (Watson Bowman ACME).  
Seal detail shown is for CV-2250 (D.S. Brown Co.), dimensions may vary depending on manufacturer.  
Seals shall be fabricated and installed in accordance with the manufacturer's recommendations.  
All compression seal joints shall be replaced. (2 Total).  
For joint locations, see Sheet 25.



PART PLAN OF EXPANSION JOINT SPAN 17  
(for welds not shown, see Spans 4, 7, and 9)



PART PLAN OF EXPANSION JOINT SPANS 4, 7, & 9

Notes:

Expansion joint repairs shown at Spans 4, 7, 9, and 17 shall be paid for under the bid item "Expansion Joint Repairs".

The existing expansion joints shall be reused to the extent shown. New steel shims shall be provided as required in resetting the joints on the existing beams.

All new steel used shall conform to the requirements of ASTM A-36.

The expansion joints shall be sandblasted and painted after modifications. See Special Provisions.

F.S. denotes far side.

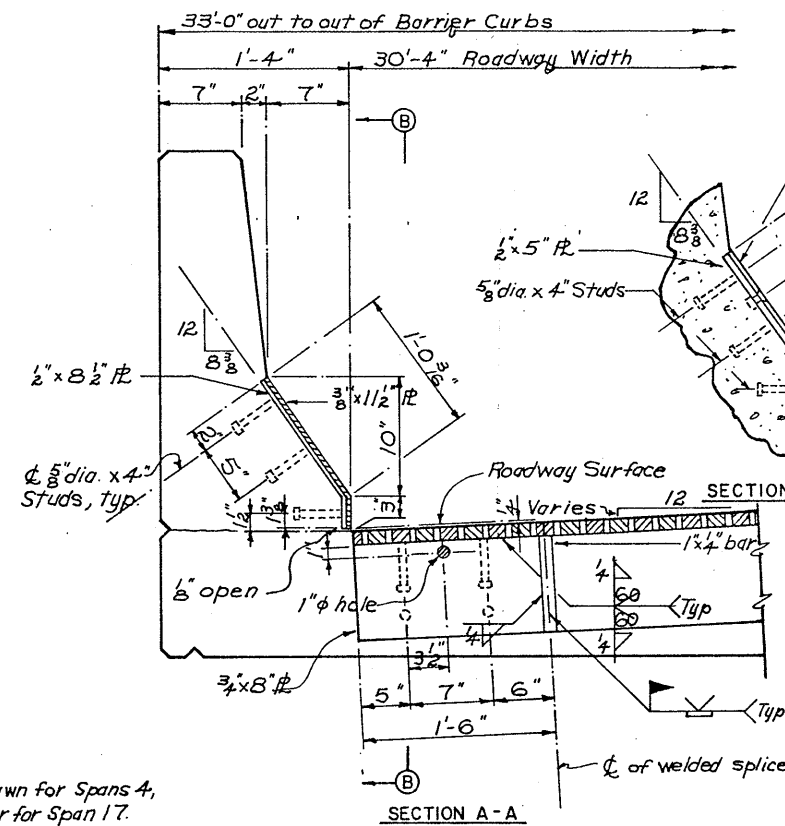
For Section A-A, see sheet 37.

12" 9" 6" 3" 0" 1'  
1/2" = 1'-0"

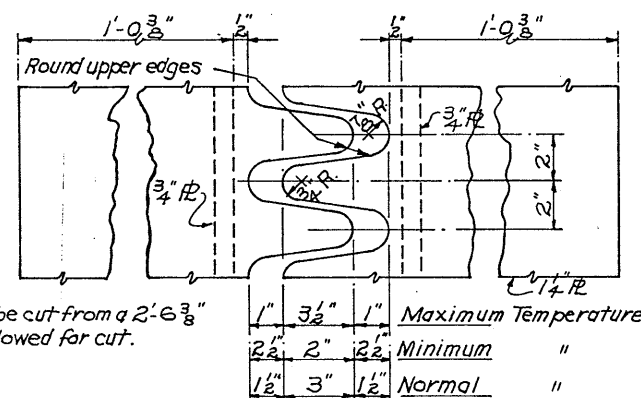
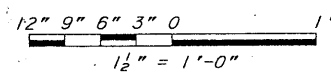
KANSAS CITY, MISSOURI  
DEPARTMENT OF PUBLIC WORKS

MISSOURI RIVER BRIDGE AT BROADWAY  
NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
EXPANSION JOINT REPAIRS  
SPANS 4, 7, 9, AND 17

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ARCHITECTS ENGINEERS PLANNERS  
SHEET 36

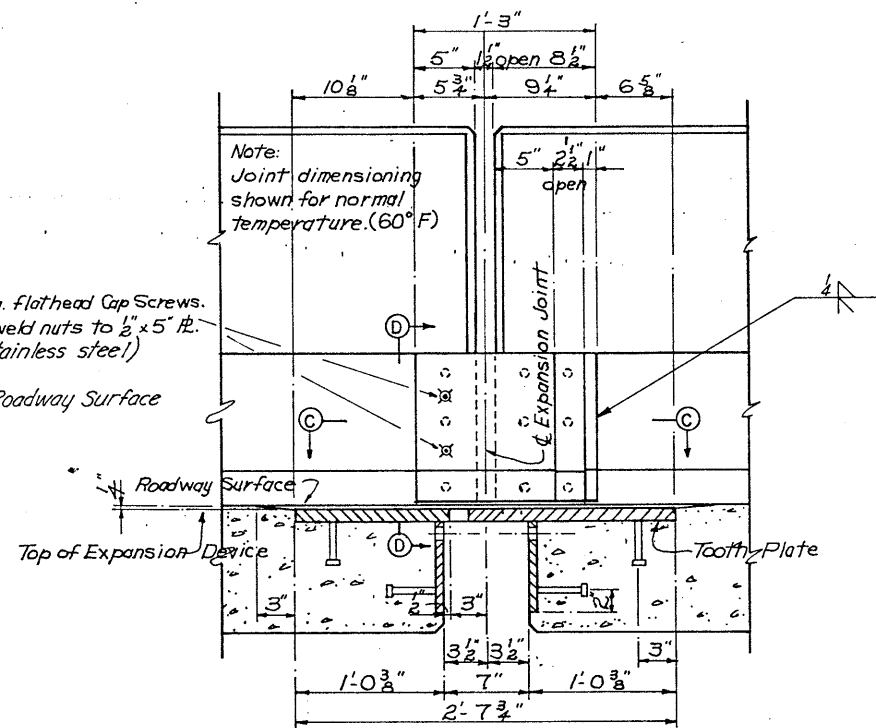
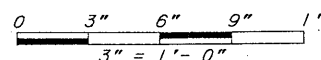


Note:  
Section A-A drawn for Spans 4,  
7, and 9. Similar for Span 17.

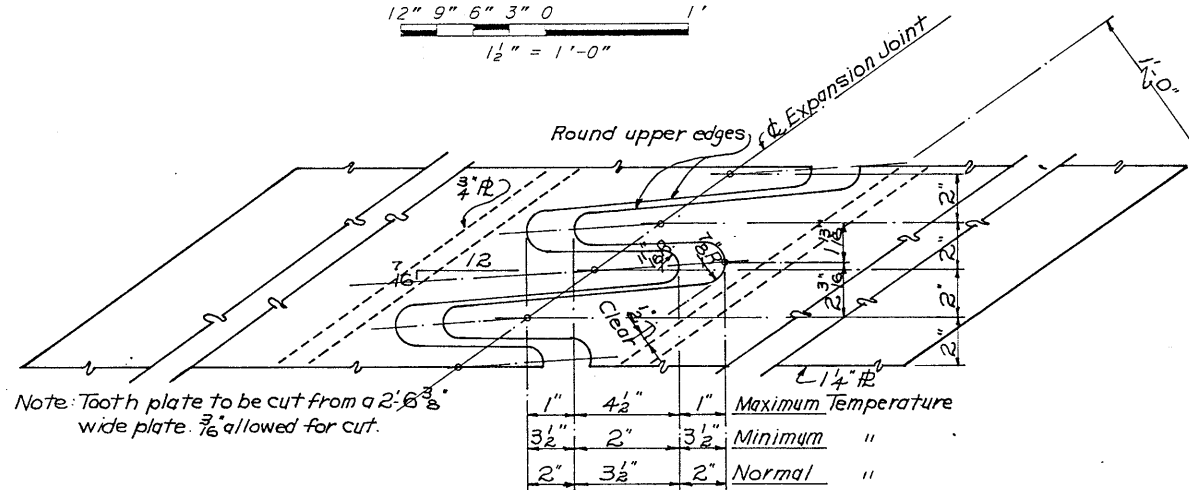
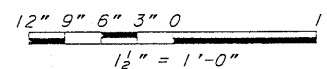


Note: Tooth plate to be cut from a 2'-6 3/8" wide plate. 1/8" allowed for cut.

TOOTH PLATE DETAIL - SPANS 4, 7, 8, 9

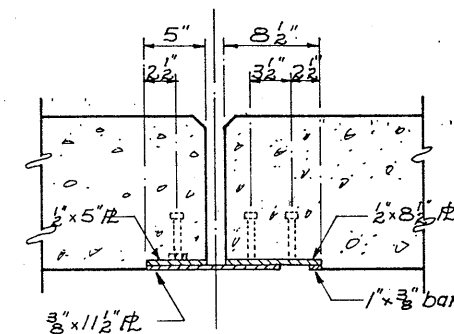
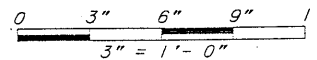


SECTION B-B

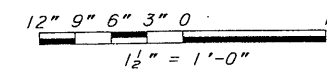


Note: Tooth plate to be cut from a 2'-6 3/8" wide plate. 7/16" allowed for cut.

TOOTH PLATE DETAIL - SPAN 17



SECTION C-C



Notes:  
For location of Section A-A, see sheet 36.  
Curb plates shall be galvanized after fabrication.

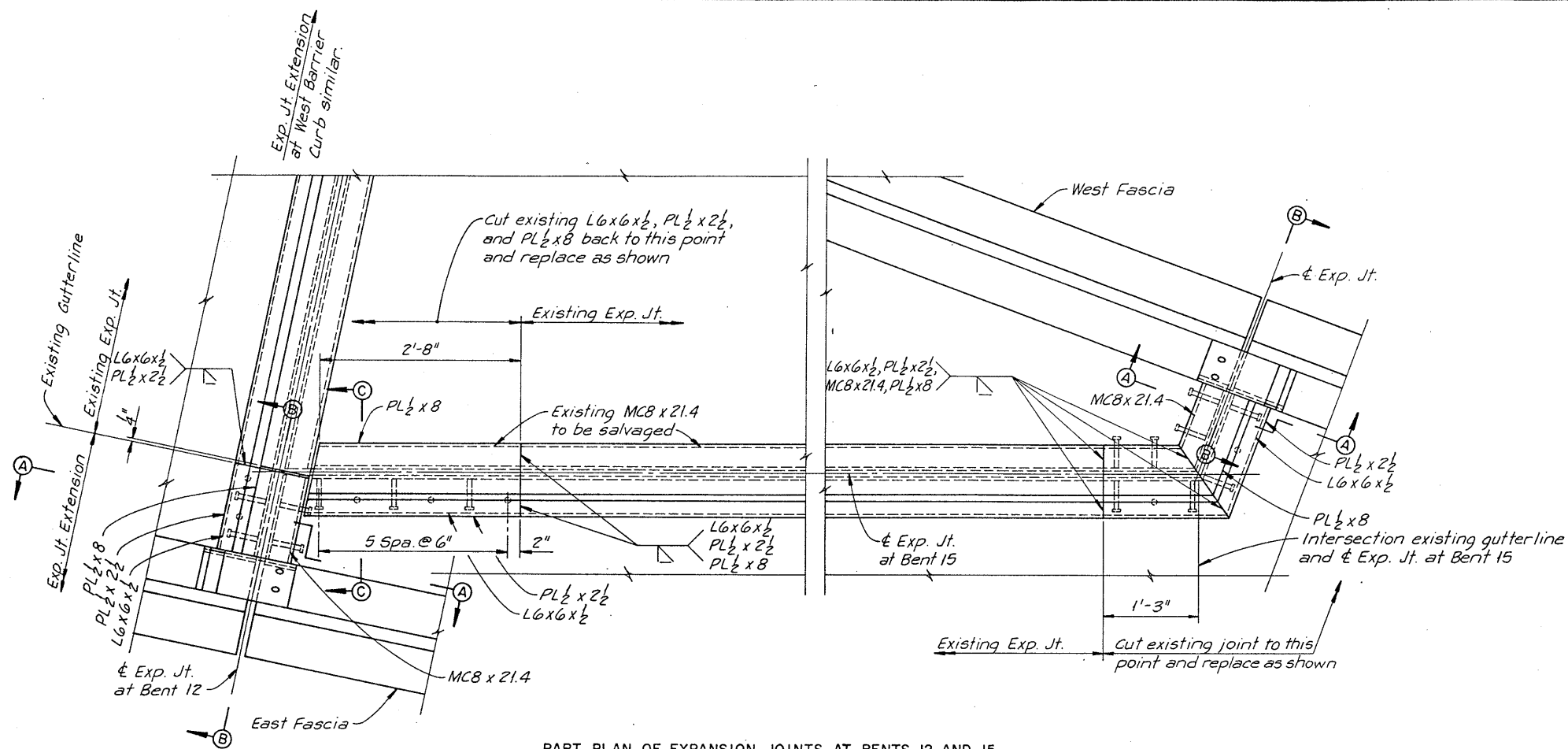
KANSAS CITY, MISSOURI  
DEPARTMENT OF PUBLIC WORKS

MISSOURI RIVER BRIDGE AT BROADWAY  
NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
EXPANSION JOINT REPAIRS  
SPANS 4, 7, 9, AND 17

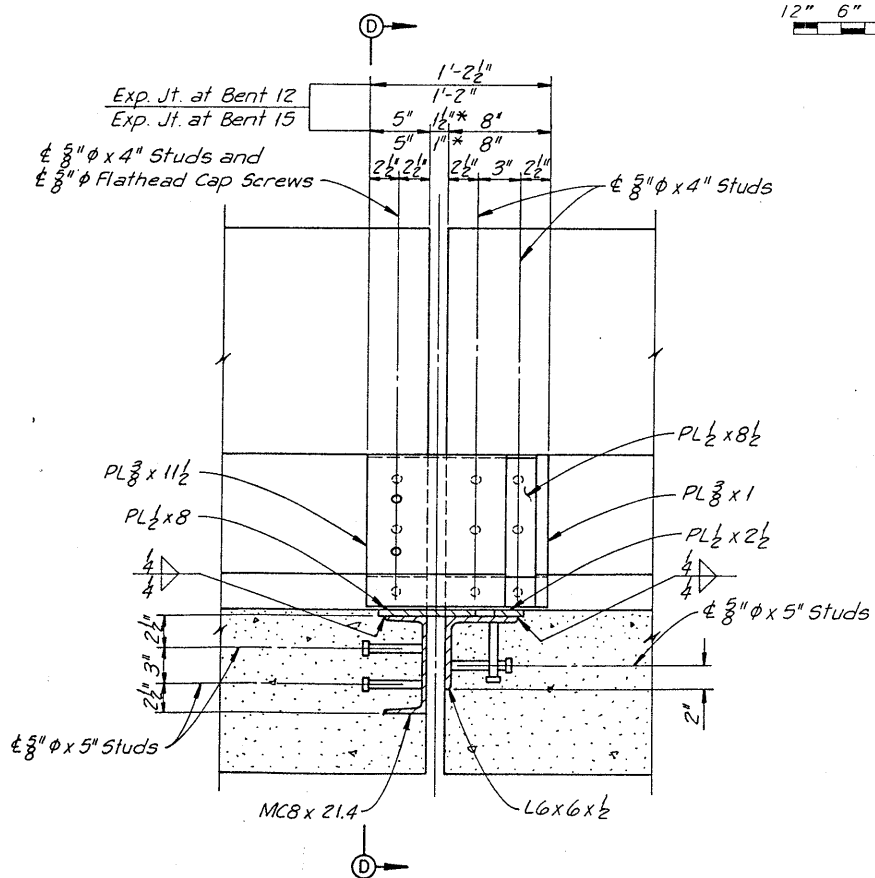
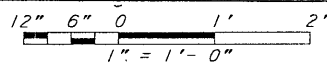
HNTB

HOWARD NEEDLES TAMMEN & BERGENDOFF  
ARCHITECTS ENGINEERS PLANNERS

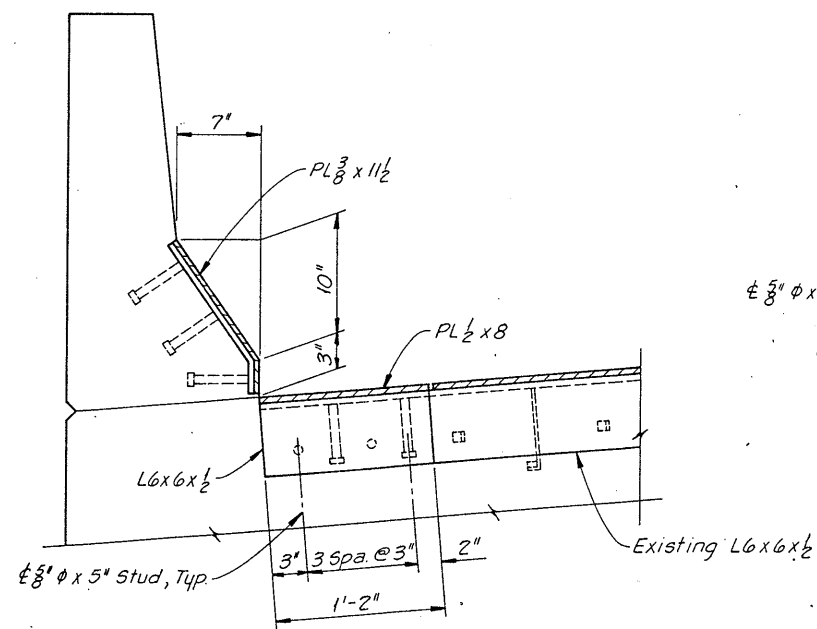
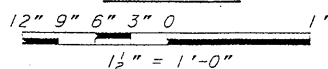
SHEET 37



PART PLAN OF EXPANSION JOINTS AT BENTS 12 AND 15

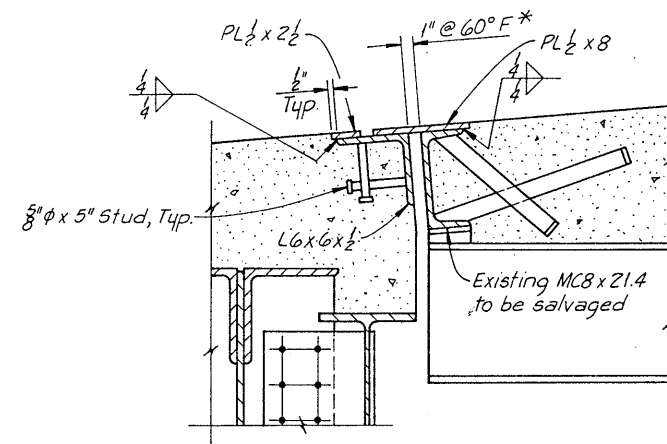
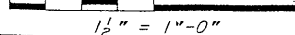


SECTION A-A

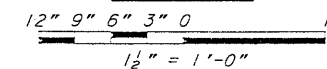


SECTION B-B

(Exp. Jt. at Bent 12 shown, Exp. Jt. at Bent 15 similar.)



SECTION C-C



* EXPANSION JOINT OPENING CHART			
BENT 12		BENT 15	
TEMPERATURE	JOINT OPENING	TEMPERATURE	JOINT OPENING <sup>Δ</sup>
30°F	2"	30°F	1 3/8"
40°F	1 7/8"	40°F	1 1/4"
50°F	1 11/16"	50°F	1 1/8"
60°F	1 1/2"	60°F	1"
70°F	1 5/16"	70°F	7/8"
80°F	1 1/8"	80°F	3/4"
90°F	1"	90°F	5/8"

<sup>Δ</sup> Measured normal to Exp. Joint.

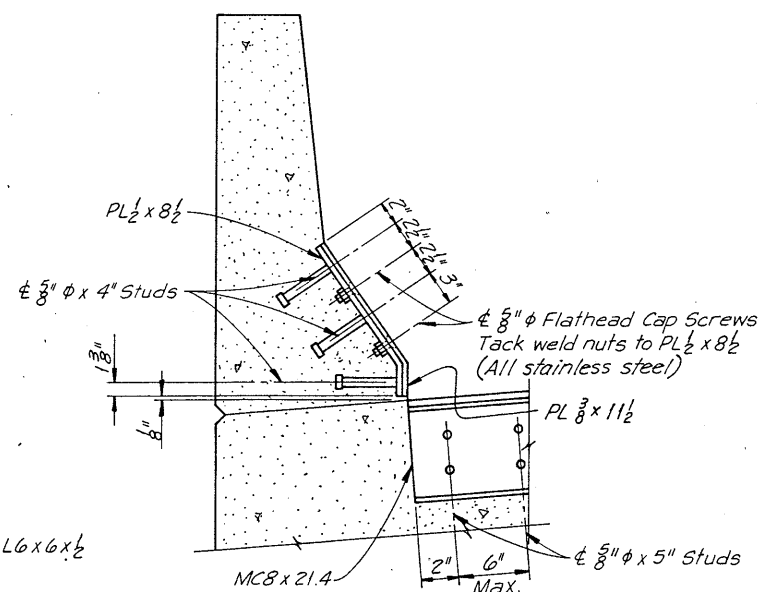
Notes:

Expansion joint repairs shown at Bents 12 and 15 shall be paid for under the bid item "Expansion Joint Repair".

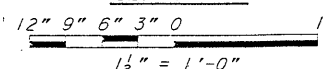
The existing expansion joints shall be reused to the extent shown. New steel shims shall be provided as required in resetting the joints on the existing beams or girders.

All new steel shall conform to the requirements of ASTM A36.

The expansion joints shall be sandblasted and painted after modifications. See Special Provisions.



SECTION D-D



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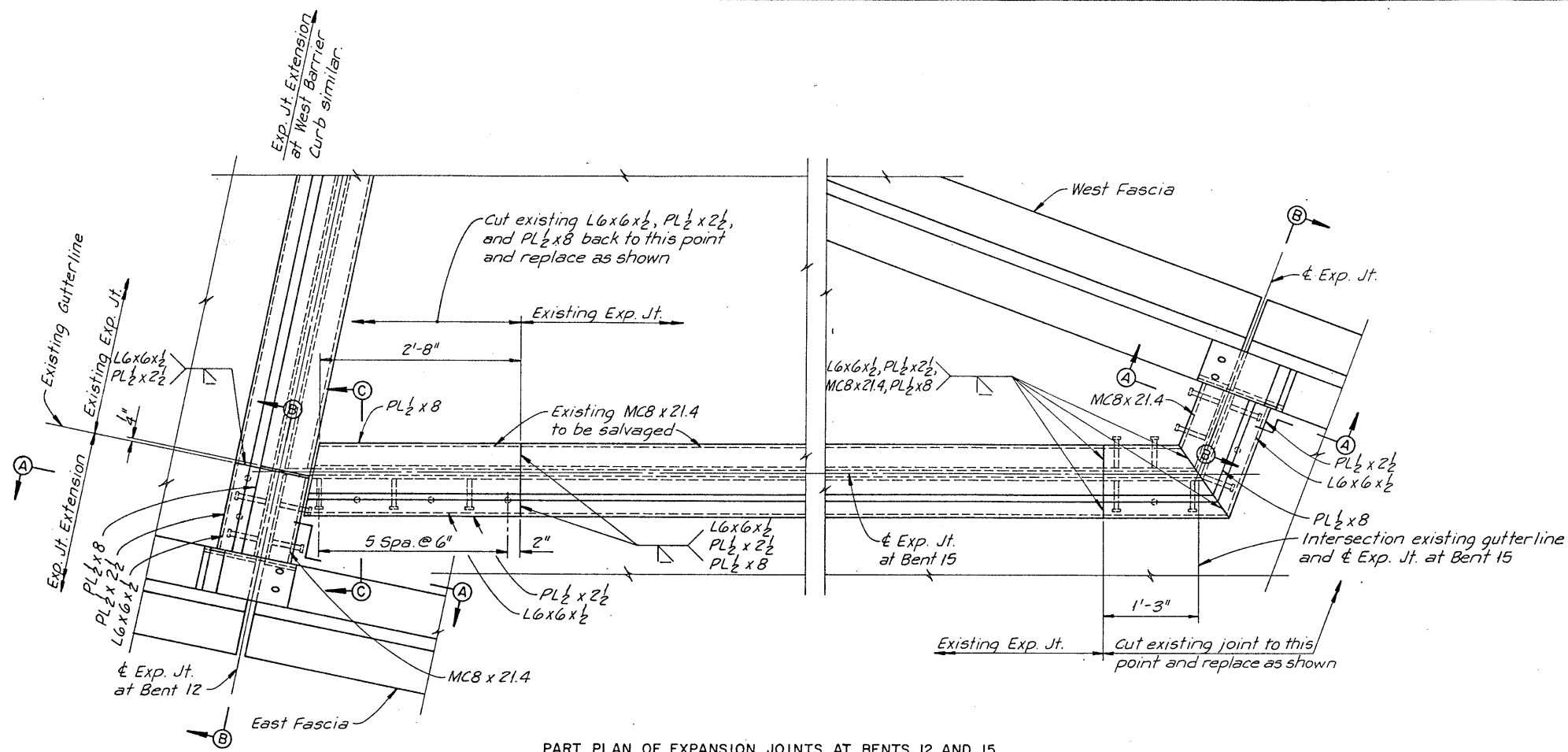
MISSOURI RIVER BRIDGE AT BROADWAY

NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
EXPANSION JOINT REPAIRS  
AT BENTS 12 AND 15

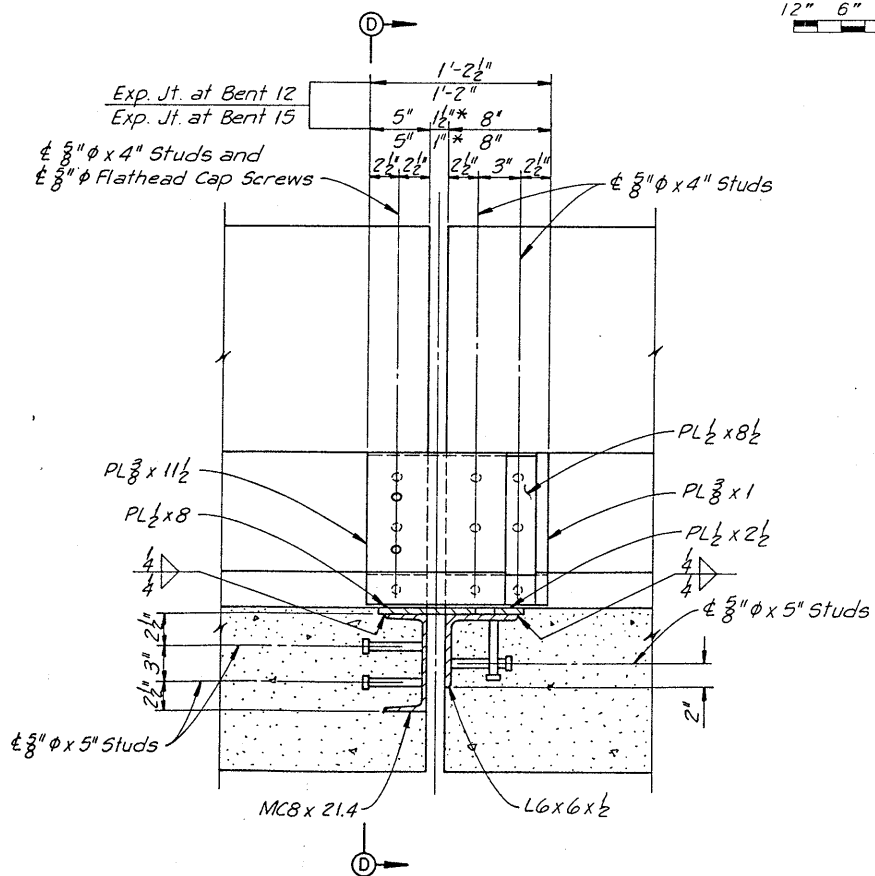
**HNTB**

HOWARD NEEDLES TAMMEN & BERGENOFF  
ARCHITECTS ENGINEERS PLANNERS

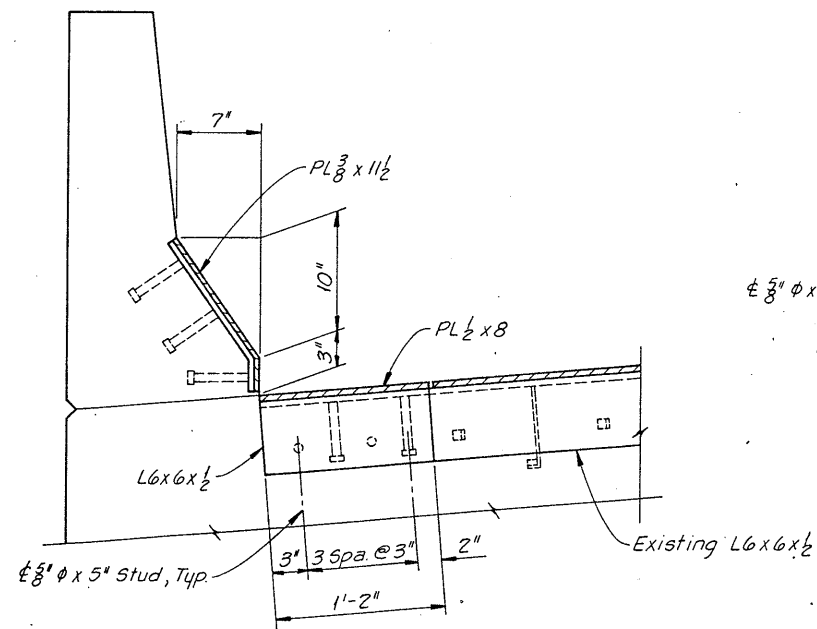
SHEET 38



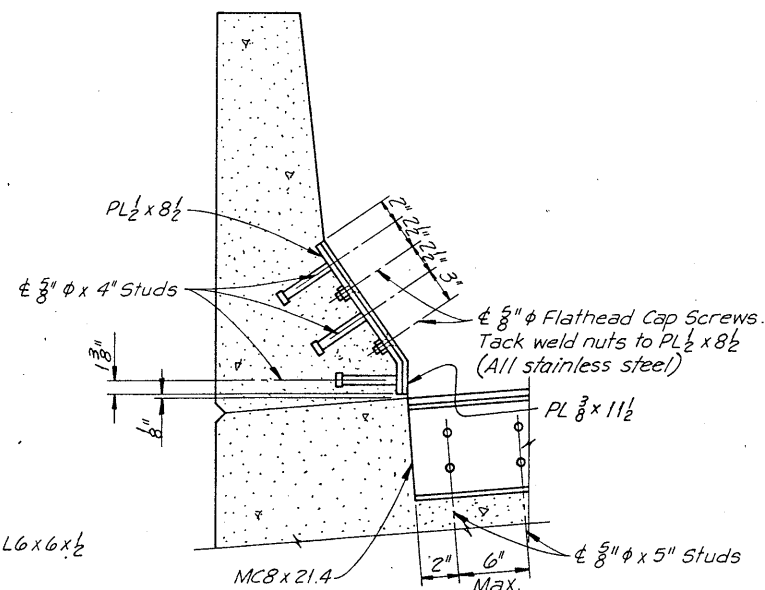
PART PLAN OF EXPANSION JOINTS AT BENTS 12 AND 15



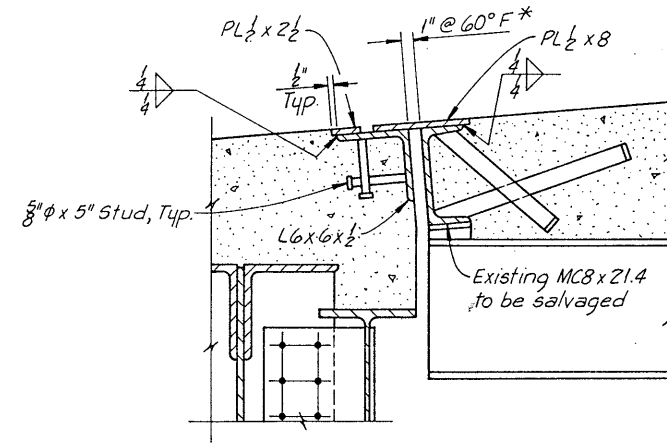
SECTION A-A



SECTION B-B  
(Exp. Jt. at Bent 12 shown, Exp. Jt. at Bent 15 similar.)



SECTION D-D



SECTION C-C

* EXPANSION JOINT OPENING CHART			
BENT 12		BENT 15	
TEMPERATURE	JOINT OPENING	TEMPERATURE	JOINT OPENING <sup>Δ</sup>
30°F	2"	30°F	1 3/8"
40°F	1 3/8"	40°F	1 1/4"
50°F	1 1/8"	50°F	1 1/8"
60°F	1 1/2"	60°F	1"
70°F	1 5/8"	70°F	7/8"
80°F	1 3/4"	80°F	3/4"
90°F	1"	90°F	5/8"

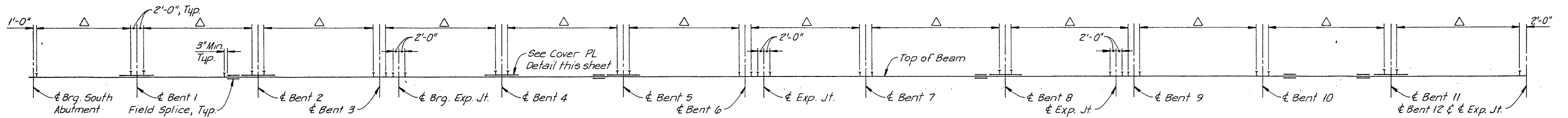
<sup>Δ</sup> Measured normal to  $\perp$  Joint.

Notes:  
Expansion joint repairs shown at Bents 12 and 15 shall be paid for under the bid item "Expansion Joint Repair".  
The existing expansion joints shall be reused to the extent shown. New steel shims shall be provided as required in resetting the joints on the existing beams or girders.  
All new steel shall conform to the requirements of ASTM A36.  
The expansion joints shall be sandblasted and painted after modifications. See Special Provisions.

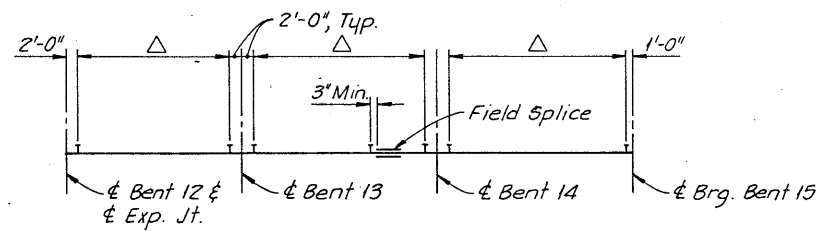
KANSAS CITY, MISSOURI  
DEPARTMENT OF PUBLIC WORKS

MISSOURI RIVER BRIDGE AT BROADWAY  
NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
EXPANSION JOINT REPAIRS  
AT BENTS 12 AND 15

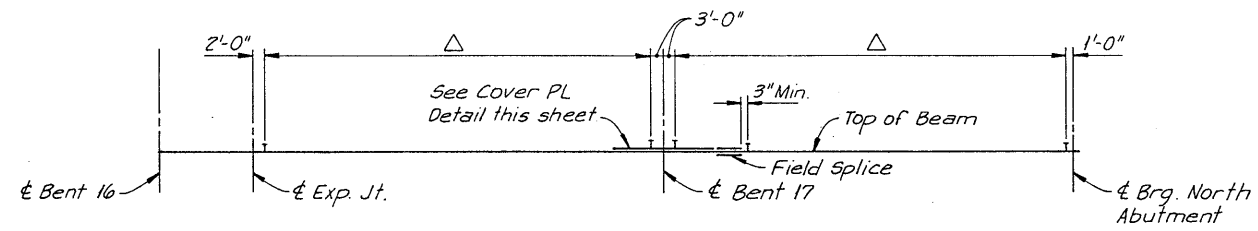
**HNTB**  
HOWARD NEEDLES TAMMEN & BERGENOFF  
ARCHITECTS ENGINEERS PLANNERS  
SHEET 38



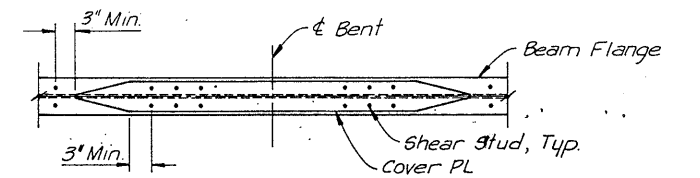
UNITS 1 THRU 4  
No Scale



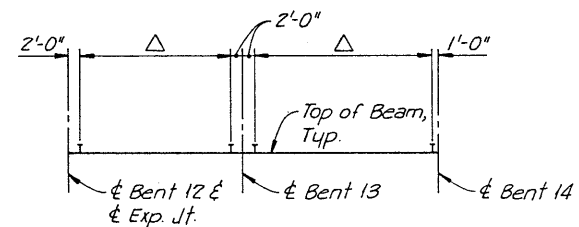
BEAM A



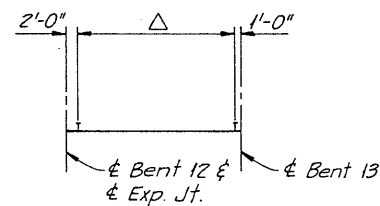
UNIT 7  
No Scale



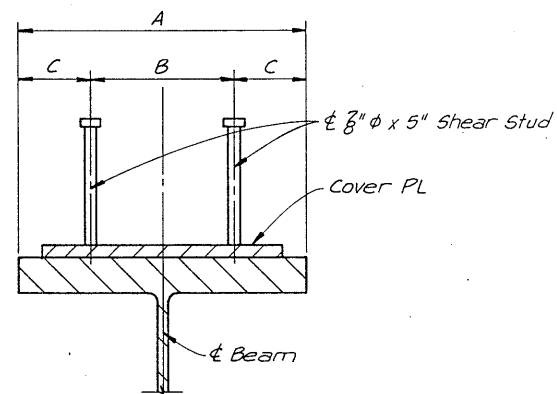
COVER PLATE DETAIL  
No Scale



BEAMS B & C



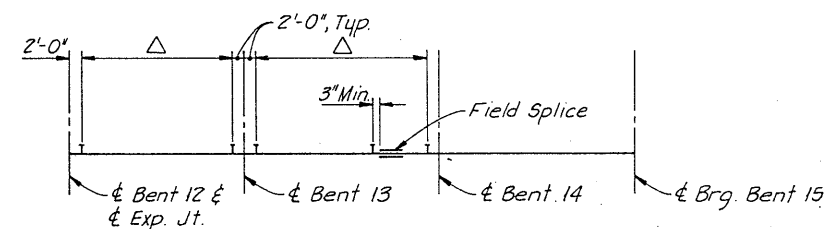
BEAM D



SHEAR STUD DETAIL  
No Scale

DIMENSION TABLE			
FLANGE WIDTH	A	B	C
9"	9"	5"	2"
12"	12"	6"	3"

Notes:  
 Δ denotes shear stud spacing @ 8" max.  
 Shear studs shall not be placed on splice plates.  
 Shear studs shall be placed in pairs.



BEAM E

UNIT 5  
No Scale



# DEAD LOAD DEFLECTIONS-BEAM SPANS

SPAN	.25 SPAN	.50 SPAN	.75 SPAN	% DUE TO STEEL
1 and 4	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{1}{16}$ "	15%
	$\frac{1}{4}$ "	$\frac{5}{16}$ "	$\frac{3}{16}$ "	10%
2 and 5	0"	$\frac{1}{8}$ "	0"	15%
	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{1}{8}$ "	10%
3 and 6	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{1}{8}$ "	15%
	$\frac{3}{16}$ "	$\frac{3}{8}$ "	$\frac{1}{4}$ "	10%
7	$\frac{1}{8}$ "	$\frac{1}{8}$ "	0"	15%
	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{1}{8}$ "	8%
8	$\frac{3}{16}$ "	$\frac{1}{16}$ "	$\frac{3}{16}$ "	15%
	$\frac{5}{16}$ "	$\frac{1}{2}$ "	$\frac{5}{16}$ "	8%
9	0"	$\frac{1}{8}$ "	$\frac{1}{8}$ "	15%
	$\frac{1}{8}$ "	$\frac{1}{4}$ "	$\frac{1}{4}$ "	8%
10	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{1}{8}$ "	15%
	$\frac{5}{16}$ "	$\frac{3}{8}$ "	$\frac{1}{4}$ "	10%
11	0"	0"	0"	15%
	$\frac{1}{16}$ "	$\frac{1}{8}$ "	0"	10%
12	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{5}{16}$ "	15%
	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	10%
13				
Beam A	$\frac{1}{8}$ "	$\frac{1}{8}$ "	0"	10%
Beam B	0"	0"	0"	10%
Beam C	0"	0"	0"	10%
Beam D	$\frac{1}{8}$ "	$\frac{3}{16}$ "	$\frac{1}{8}$ "	10%
Beam E	0"	0"	0"	15%
14				
Beam A	$\frac{1}{16}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	10%
Beam B	$\frac{1}{16}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	10%
Beam C	$\frac{1}{16}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	10%
Beam E	0"	0"	0"	15%
15				
Beam A	$\frac{1}{4}$ "	$\frac{7}{16}$ "	$\frac{5}{16}$ "	10%
Beam E	$\frac{1}{16}$ "	$\frac{1}{8}$ "	$\frac{1}{8}$ "	15%
17	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{1}{4}$ "	20%
	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{7}{16}$ "	15%
18	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	20%
	$\frac{7}{16}$ "	$\frac{1}{2}$ "	$\frac{3}{4}$ "	15%

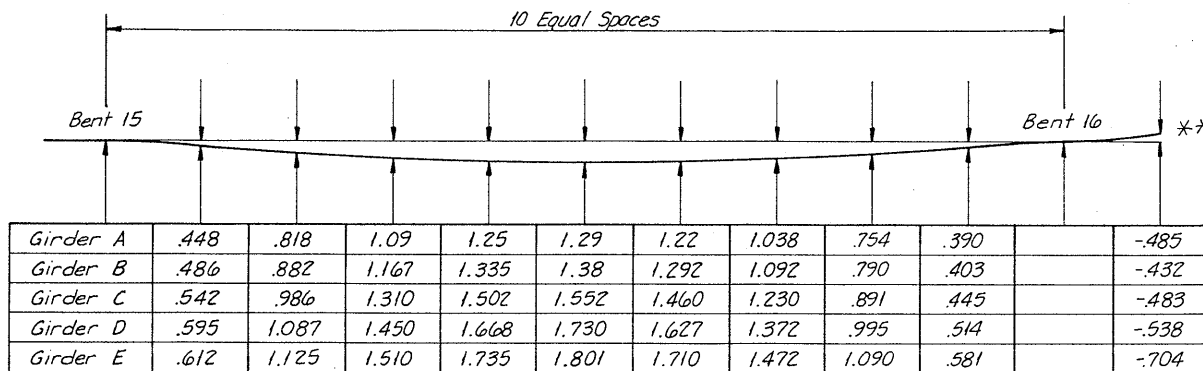
Top Figure for Roadway Beams  
Bottom Figure for Curb Beams

## Notes:

Spans 4, 7, 9, and 18 in above table taken from  $\frac{1}{2}$  Bearing at Expansion Joint to farthest adjacent bent.

Deflection at  $\frac{1}{2}$  Bearing Expansion Joint equals zero, except in Span 17 (See Dead Load Deflections-Unit 6). No allowance has been made above for upward deflection at expansion joint in Span 17. \*\*

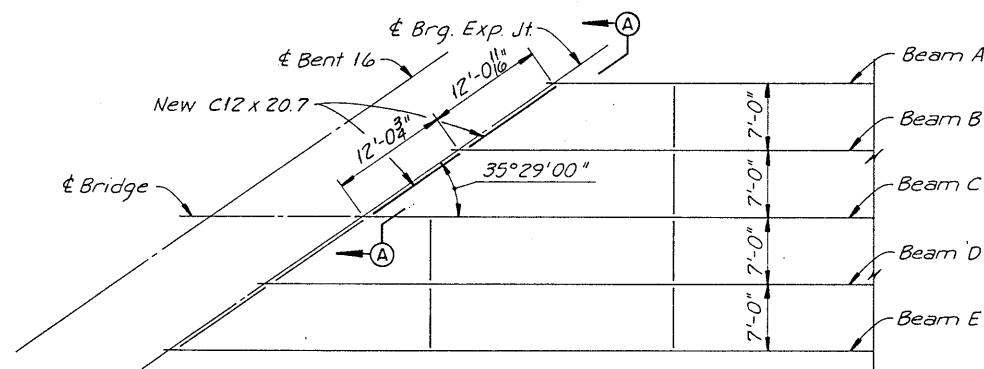
For beam locations, see Sheet 44.



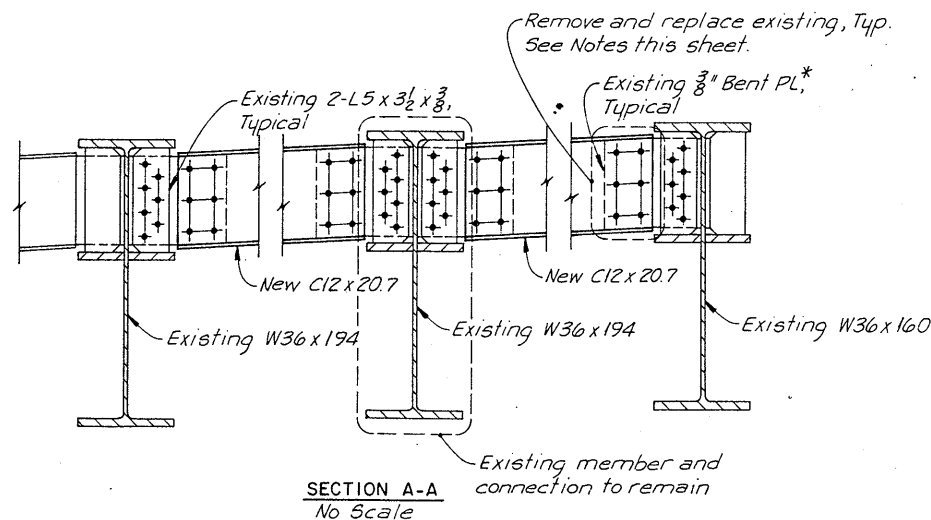
## DEAD LOAD DEFLECTIONS-UNIT 6

### Notes:

33% Steel deflection.  
67% Other deflection.  
Total deflections are given in inches for above table.



PART FRAMING PLAN UNIT 7  
No Scale



SECTION A-A  
No Scale

## Note:

The bid item "Structural Steel Repairs" shall include removing inactive utility lines attached to the steel beams, and removal of the utility brackets. Welded bracket connections shall be cut  $\frac{1}{4}$ " from structure surface, ground flush with structure and spot painted. The spot painting shall be paid for under the bid item "Painting". There are approximately 40 brackets to be removed. This bid item shall be performed as directed by the Engineer.

## Notes:

Structural steel shall conform to the requirements of ASTM A36 unless otherwise noted.

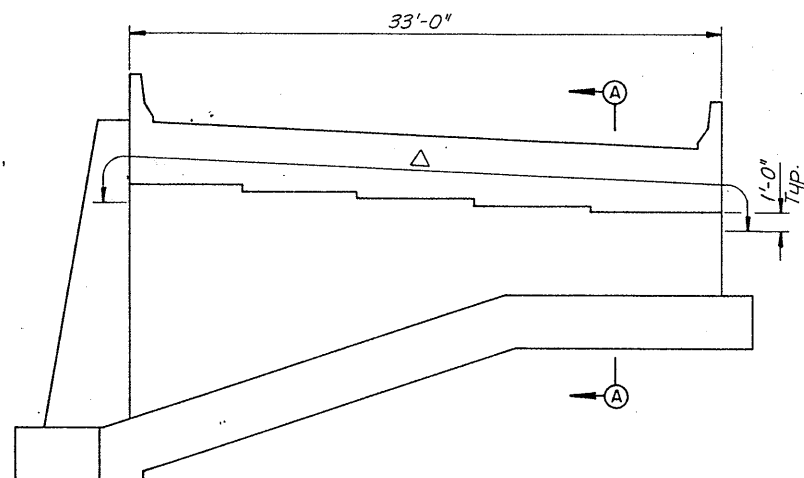
Remove existing rivets and replace with new high strength bolts, nuts and washers conforming to ASTM A325. Size of H.S. Bolts to match existing rivets. Rivet removal and installation of A325 bolts to be paid for as incidental to "Expansion Joint Repair." Rivet removal shall not damage holes in plates to be salvaged.

\*If desired the Contractor may replace  $\frac{3}{8}$ " Bent PL at his own expense.

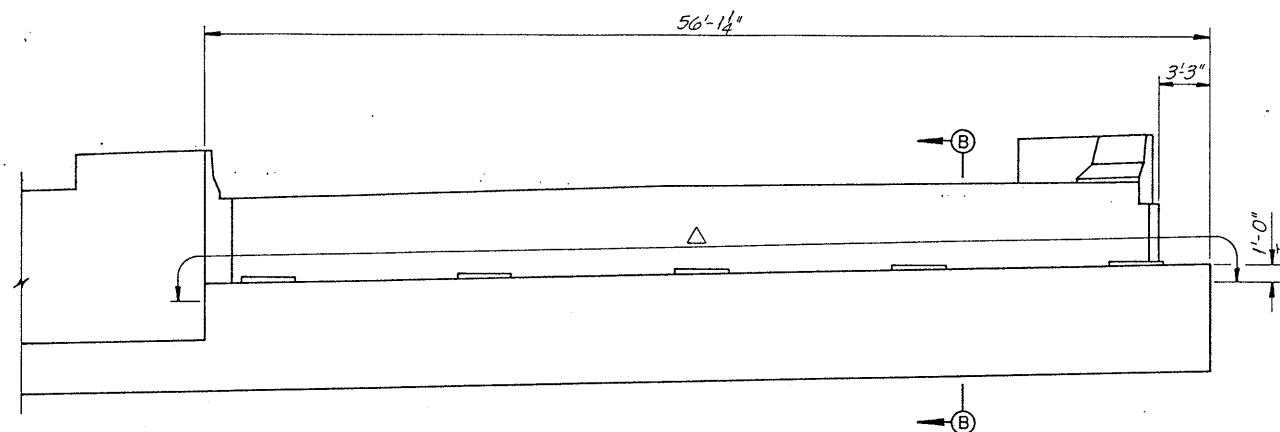
KANSAS CITY, MISSOURI  
DEPARTMENT OF PUBLIC WORKS

MISSOURI RIVER BRIDGE AT BROADWAY  
NORTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
MISCELLANEOUS STEEL DETAILS

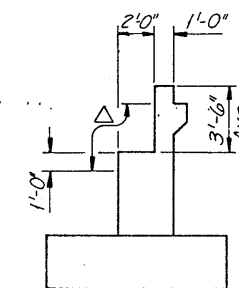
**HNTB**  
HOWARD NEEDLES TAMMEN & BERGENDOFF  
ARCHITECTS ENGINEERS PLANNERS



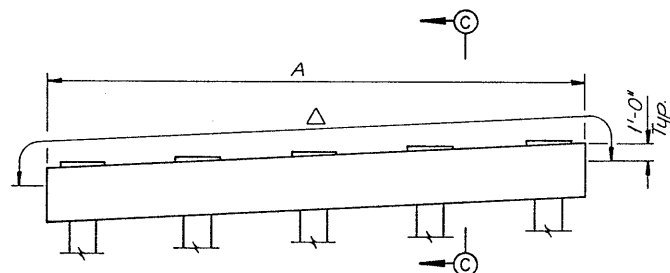
ELEVATION SOUTH ABUTMENT



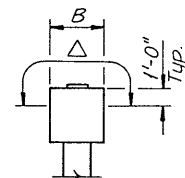
ELEVATION NORTH ABUTMENT



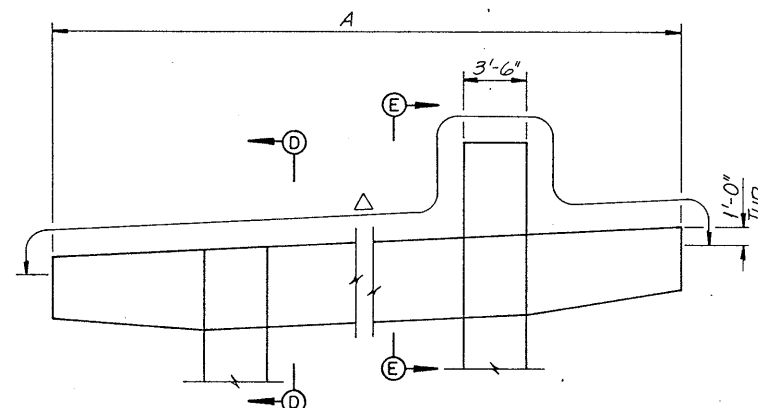
SECTION A-A



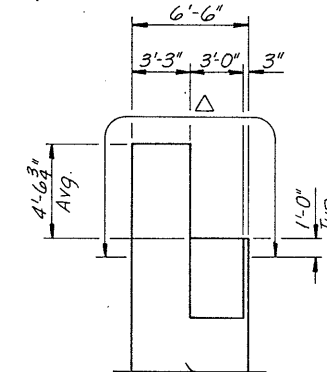
ELEVATION BENTS 1-14  
(Bent 10 shown,  
other Bents similar)



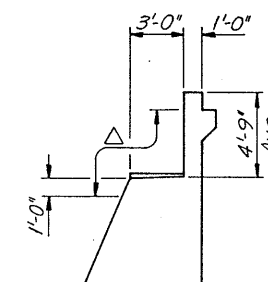
SECTION C-C



ELEVATION BENTS 15-17  
(Part Bent 15 shown,  
other Bents similar)



SECTION E-E

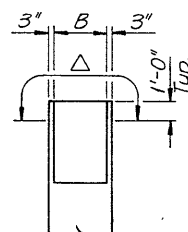


SECTION B-B

Notes:  
 Δ denotes limits of Protective Coating-Concrete Bents (Deleterious Agents).  
 Reinforcing that has been reduced by more than 25% in cross-sectional area shall be removed and repairs made as shown.  
 Repair areas shall be separated from adjacent non-repair areas by a saw cut 1" deep.  
 \* Substructure Repair Type I shall be a 1" deep repair.  
 Substructure Repair Type II shall be as shown in detail.  
 Limits of Substructure Repair Type I and Type II shall be as directed by the Engineer.  
 See Special Provisions for other information.

ESTIMATED QUANTITY SUBSTRUCTURE REPAIR		
LOCATION	* TYPE I (SQ. FT.)	TYPE II (SQ. FT.)
South Abutment	3	10
Bent 6	3	12
Bent 8	3	10
Bent 9	3	10
Bent 12	10	40
Bent 15	8	30
Bent 16	3	12
Bent 17	4	15
Total	37	139

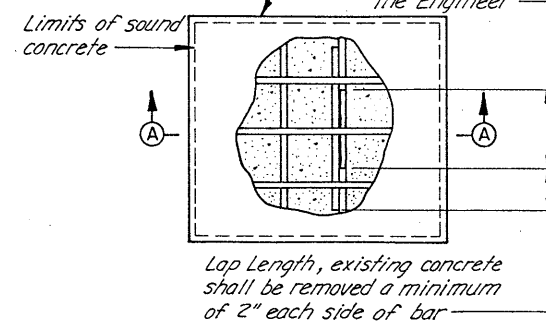
TABLE OF DIMENSIONS		
LOCATION	A	B
Bents 1,2,4-6,8-11	30'-0"	2'-6"
Bent 3	29'-6"	2'-6"
Bent 7	30'-0"	2'-9"
Bent 12	30'-0"	3'-0"
Bent 13	20'-6"	2'-6"
Bent 14	12'-0"	2'-6"
Bent 15	104'-8"	3'-0"
Bent 16	54'-0"	3'-0"
Bent 17	52'-0"	3'-0"



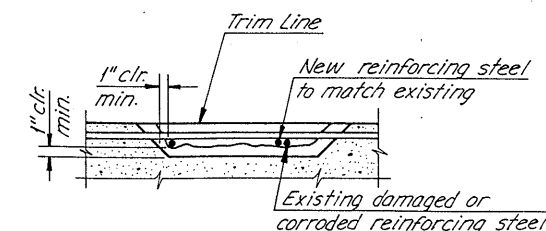
SECTION D-D  
(Bent 15)

BAR SIZE	LAP LENGTH
#4	1'-0"
#5	1'-4"
#6	1'-7"
#7	2'-1"
#8	2'-9"

Chip existing concrete to a 1" minimum clear distance around reinforcing steel and replace with shotcrete patch.  
 Remove existing damaged or corroded reinforcing steel as determined by the Engineer.



SUBSTRUCTURE REPAIR TYPE II  
No Scale



SECTION A-A  
No Scale

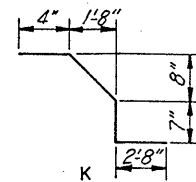
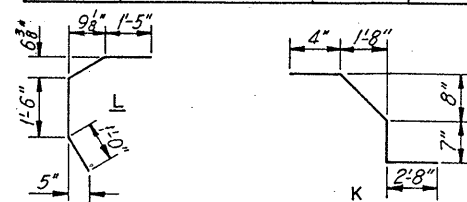
2' 1' 0' 2' 4' 6' 8' 10' 12' 14'  
 3/16" = 1'-0"

REINFORCING STEEL SCHEDULE					
MARK	LOCATION	TYPE	NUMBER	LENGTH	WEIGHT
UNIT 1					
S401	Deck	A	243	32'-8"	5303
S501		A	243	32'-8"	8279
S502		A	244	7'-0"	1781
S503		A	192	41'-2"	8244
S504		A	104	15'-0"	1627
S505	Deck	A	52	12'-0"	651
R501	Barrier Curb	C	242	2'-11 1/2"	747
R502		D	242	4'-8"	1178
R503		B	242	2'-11 1/2"	747
R504		L	7	4'-10"	35
R505		A	18	60'-0"	1126
R506		A	6	60'-5"	378
R507		A	6	3'-10"	24
R528		C	3	2'-9 1/2"	9
R529		B	14	2'-8 1/2"	40
R520		A	14	2'-6"	37
R534		B	4	2'-9 1/2"	12
R535		A	11	4'-8"	54
R536		A	5	2'-8"	14
R537		F	4	1'-8"	7
R538		B	4	4'-10"	20
R544		E	1 Ser.	2'-10" to 3'-6"	10
R545		C	1 Ser.	2'-9 1/2" to 3'-5 1/2"	10
R546		K	2	5'-7"	12
R547	Barrier Curb	G	1	4'-10"	5
Total				Unit 1	30,350
UNIT 2					
S401	Deck	A	238	32'-8"	5193
S501		A	238	32'-8"	8109
S502		A	240	7'-0"	1752
S504		A	104	15'-0"	1627
S506		A	64	3'-0"	200
S507		A	192	39'-3"	7860
S508		A	52	12'-6"	678
S542	Deck	A	6	3'-10"	24
R501	Barrier Curb	C	242	2'-11 1/2"	747
R502		D	242	4'-8"	1178
R503		B	242	2'-11 1/2"	747
R505		A	18	60'-0"	1126
R506		A	6	60'-5"	378
R507	Barrier Curb	A	6	3'-10"	24
Total				Unit 2	29,643
UNIT 3					
S401	Deck	A	232	32'-8"	5063
S501		A	232	32'-8"	7905
S502		A	234	7'-0"	1708
S504	Deck	A	104	15'-0"	1627

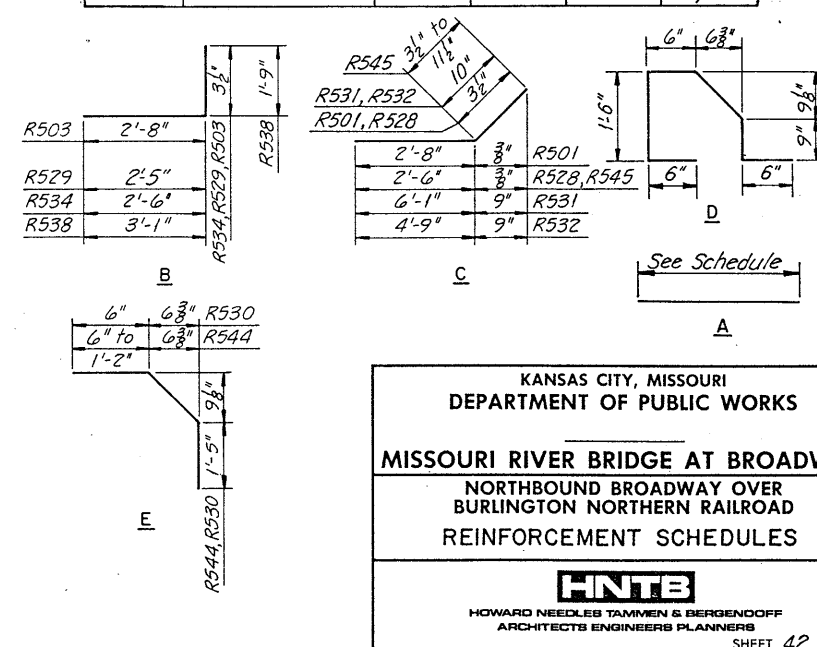
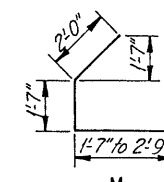
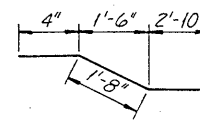
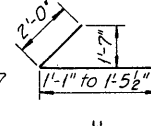
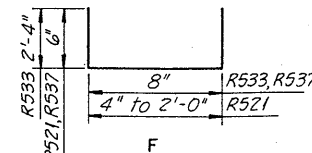
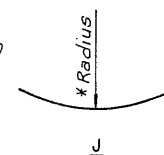
REINFORCING STEEL SCHEDULE					
MARK	LOCATION	TYPE	NUMBER	LENGTH	WEIGHT
UNIT 3 CONT.					
S506	Deck	A	64	3'-0"	200
S509	Deck	A	256	29'-0"	7743
S542	Deck	A	6	3'-10"	24
R501	Barrier Curb	C	234	2'-11 1/2"	722
R502		D	234	4'-8"	1139
R503		B	234	2'-11 1/2"	722
R505		A	12	60'-0"	751
R508		A	6	56'-8"	355
R509	Barrier Curb	A	6	58'-9"	368
Total				Unit 3	28,327
UNIT 4					
S401	Deck	A	271	32'-8"	5914
S501		A	271	32'-8"	9233
S502		A	272	7'-0"	1986
S504		A	104	15'-0"	1627
S506		A	64	3'-0"	200
S510		A	256	33'-9"	9012
S511		A	52	8'-0"	434
S542	Deck	A	6	3'-10"	24
R501	Barrier Curb	C	271	2'-11 1/2"	836
R502		D	271	4'-8"	1319
R503		B	271	2'-11 1/2"	836
R505		A	24	60'-0"	1502
R510		A	6	18'-10"	118
R511	Barrier Curb	A	6	15'-4"	96
Total				Unit 4	33,137
UNIT 5					
S502	Deck	A	168	7'-0"	1227
S504		A	52	15'-0"	814
S512		A	2 Ser.	3'-0" to 30'-0"	6540
S513		A	15	49'-8"	777
S514		A	1 Ser.	6'-0" to 49'-8"	406
S515		A	1 Ser.	11'-0" to 45'-9"	237
S516		A	28	60'-0"	1752
S517		A	15	41'-0"	641
S518	Deck	A	4	50'-8"	211
S543	Deck	A	10	3'-6"	37
R501	Barrier Curb	C	99	2'-11 1/2"	305
R502		D	99	4'-8"	482
R503		B	99	2'-11 1/2"	305
R505		A	6	60'-0"	375
R512	Barrier Curb	A	6	39'-5"	247
Total				Unit 5	14,356

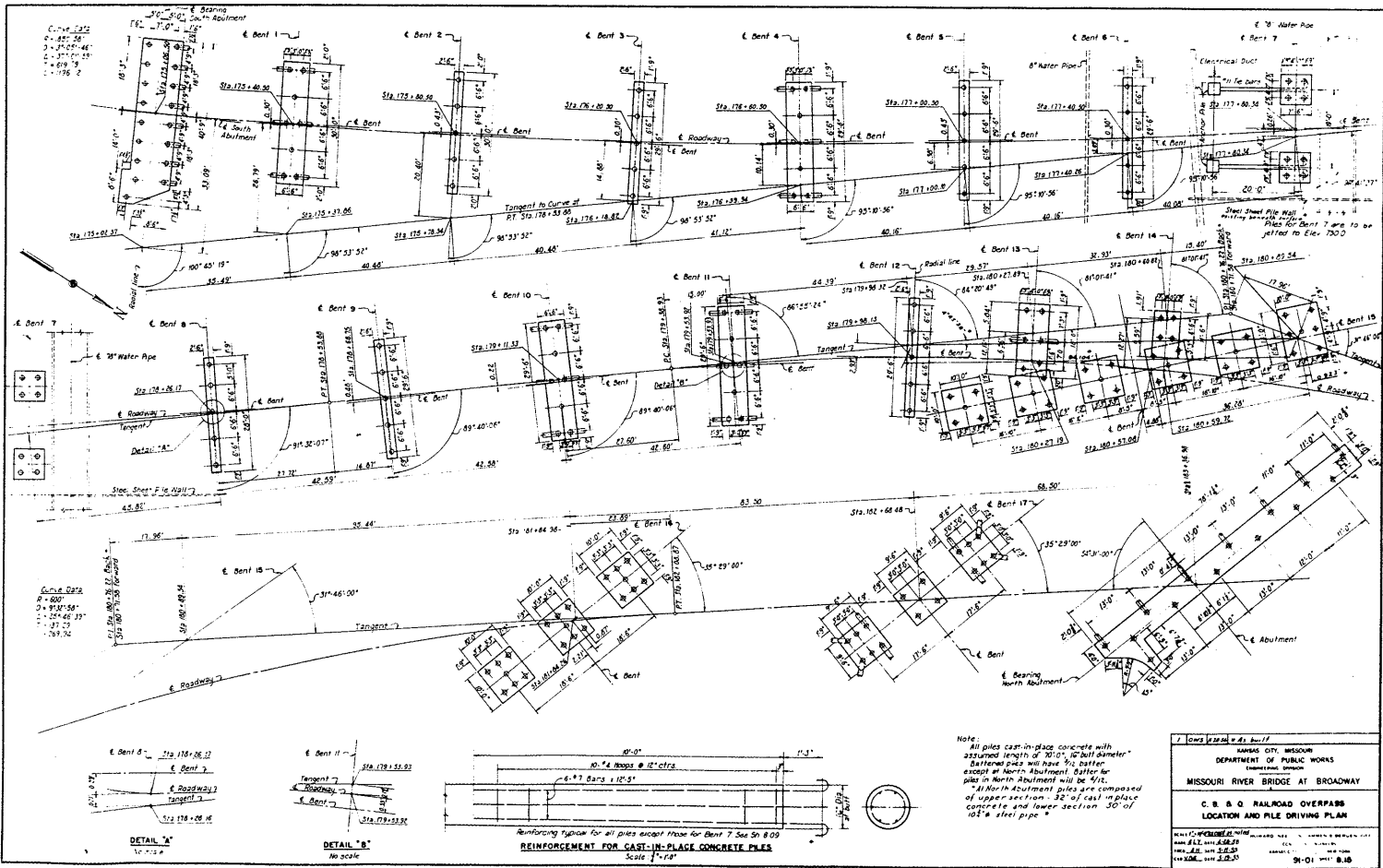
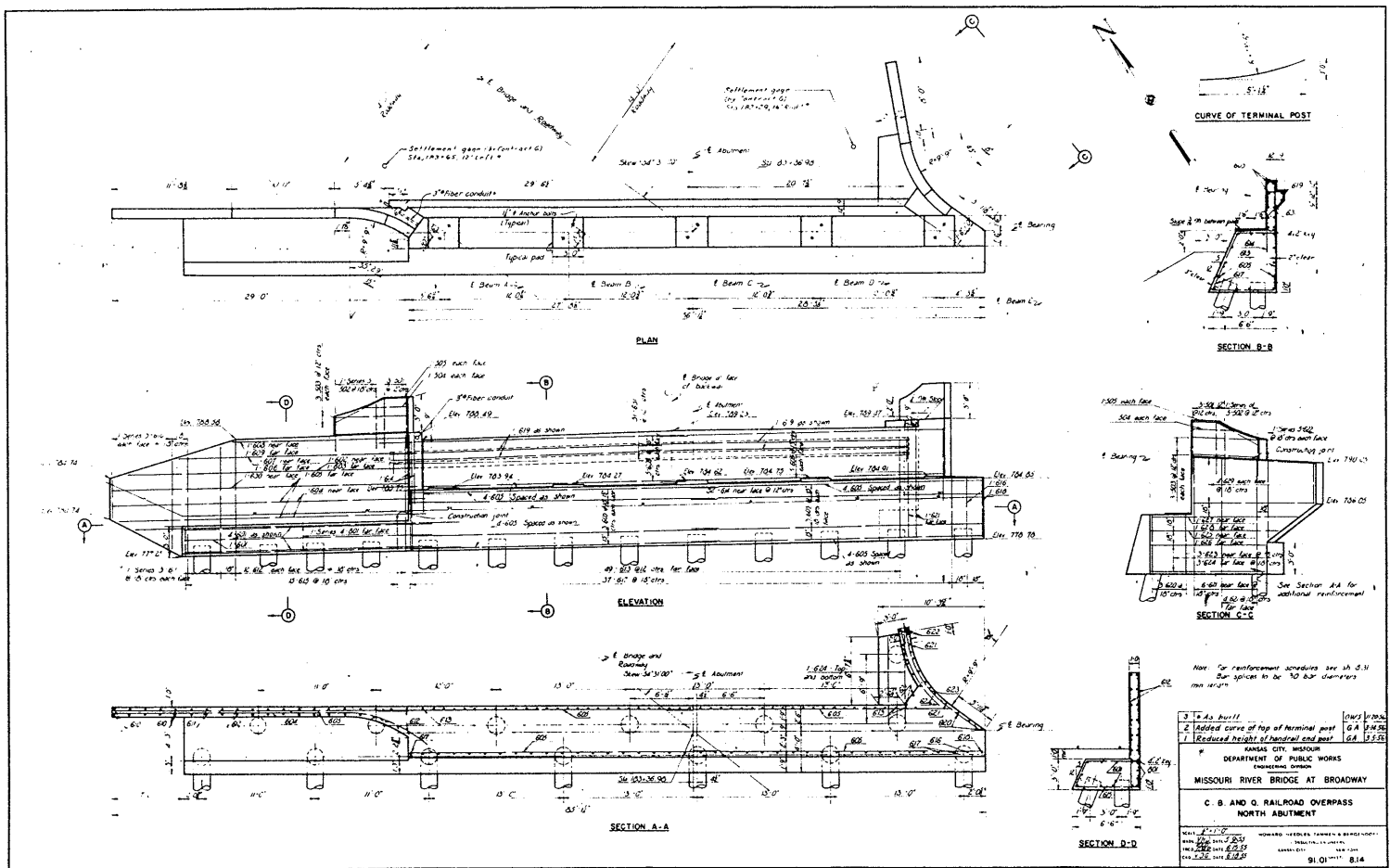
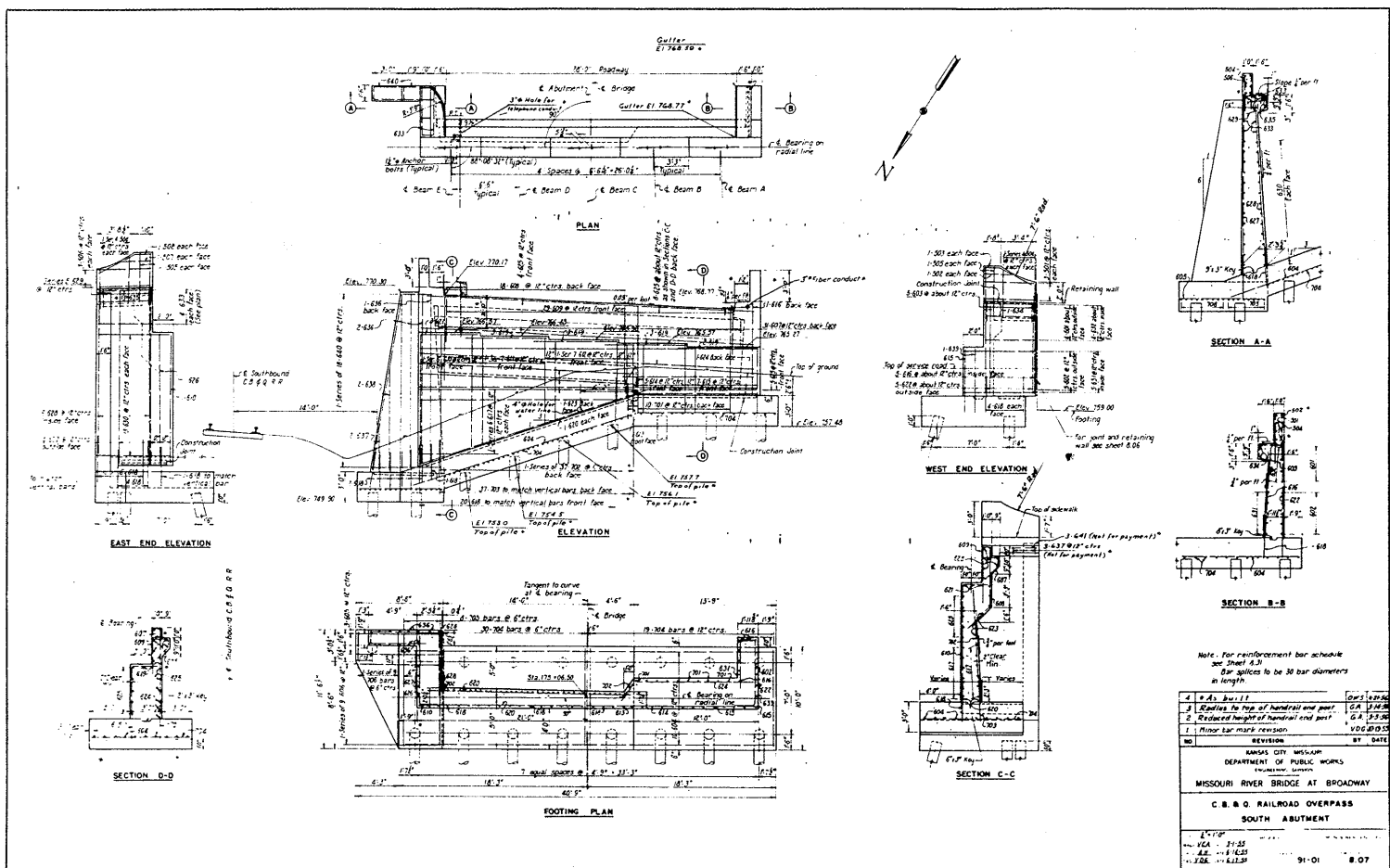
REINFORCING STEEL SCHEDULE					
MARK	LOCATION	TYPE	NUMBER	LENGTH	WEIGHT
UNIT 6					
S401	Deck	A	143	32'-8"	3120
S402		A	1 Ser.	3'-0" to 30'-1"	1967
S403		A	1 Ser.	3'-0" to 31'-4"	963
S406		A	2 Ser.	3'-1" to 7'-0"	81
S407		A	70	6'-0"	281
S408		A	11	3'-6"	26
S501		A	143	32'-8"	4872
S502		A	500	7'-0"	3651
S519		A	4	53'-8"	224
S520		A	1 Ser.	3'-0" to 30'-1"	3071
S521		A	1 Ser.	9'-0" to 47'-6"	265
S522		A	24	54'-3"	1358
S523		A	1 Ser.	5'-3" to 51'-0"	381
S524		A	1 Ser.	9'-0" to 47'-6"	383
S526		A	1 Ser.	5'-3" to 51'-0"	528
S527		A	128	36'-11"	4929
S528		A	1 Ser.	3'-0" to 31'-4"	1504
S529		A	1 Ser.	3'-0" to 47'-0"	678
S530		A	1 Ser.	4'-3" to 47'-0"	935
S531		A	6	55'-6"	347
S538		A	2 Ser.	3'-1" to 7'-0"	126
S539		A	64	9'-3"	617
S540		A	70	6'-0"	438
S541	Deck	A	6	4'-9"	30
S543	Deck	A	11	3'-6"	40
R501	Barrier Curb	C	303	2'-11 1/2"	935
R502		D	303	4'-8"	1475
R503		B	303	2'-11 1/2"	935
R505		A	24	60'-0"	1502
R513		A	6	11'-9"	74
R514	Barrier Curb	A	6	55'-0"	344
Total				Unit 6	36,080
UNIT 7					
S401	Deck	A	195	32'-8"	4255
S404		A	1 Ser.	3'-1" to 31'-4"	897
S405		A	1 Ser.	3'-1" to 31'-4"	874
S408		A	4	3'-6"	9
S501		A	195	32'-8"	6644
S532	Deck	A	2	55'-6"	116

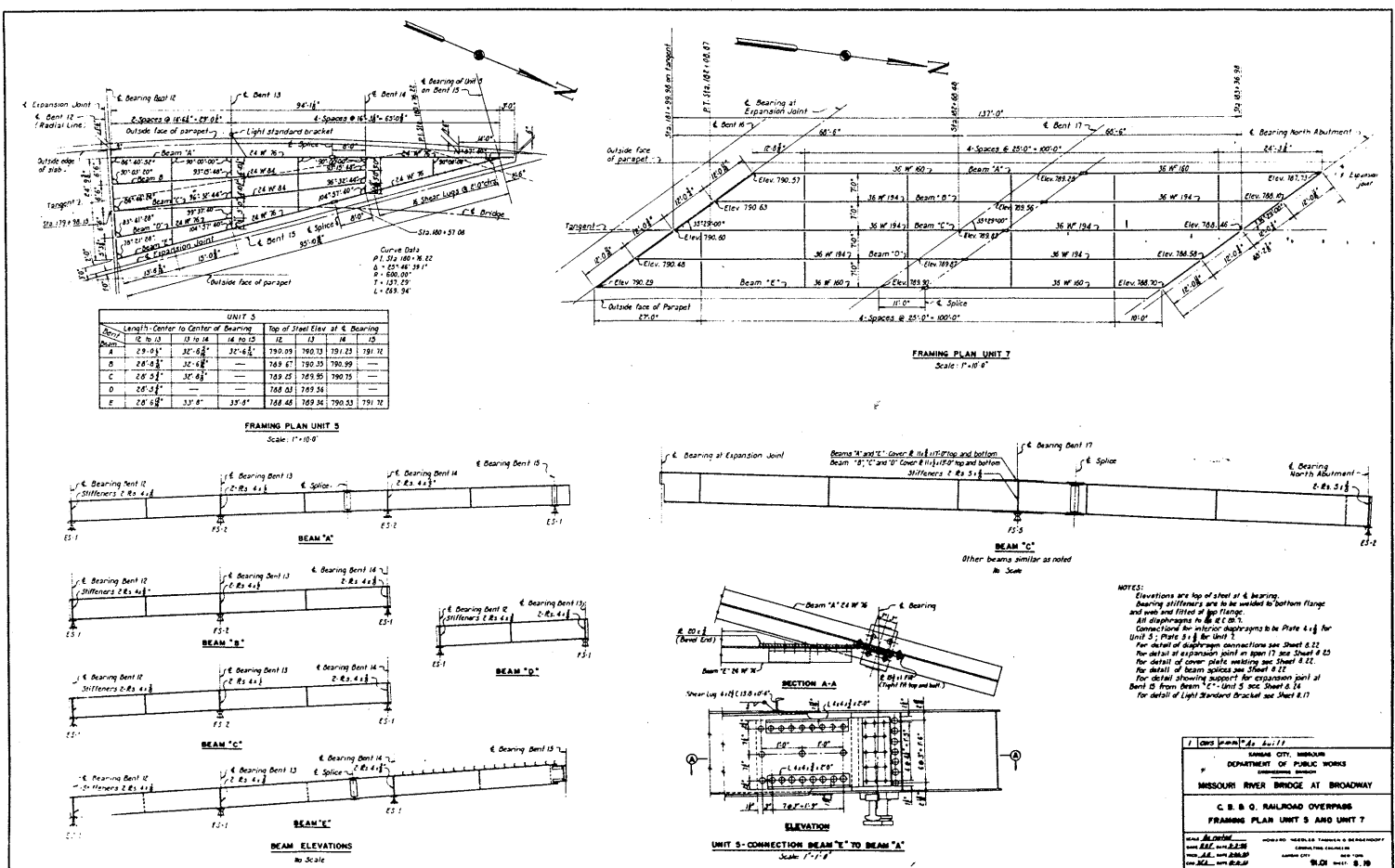
REINFORCING STEEL SCHEDULE					
MARK	LOCATION	TYPE	NUMBER	LENGTH	WEIGHT
UNIT 7 CONT.					
S533	Deck	A	1 Ser.	3'-1" to 31'-4"	1400
S534		A	195	47'-10"	9729
S535		A	52	23'-0"	1247
S536		A	2	52'-0"	108
S537	Deck	A	1 Ser.	3'-1" to 31'-4"	1364
S543	Deck	A	4	3'-6"	15
R501	Barrier Curb	C	281	2'-11 1/2"	867
R502		D	281	4'-8"	1368
R503		B	281	2'-11 1/2"	867
R548		A	2	4'-3"	9
R505		A	24	60'-0"	1502
R515		A	6	20'-8"	129
R516		A	6	23'-7"	148
R517		A	9	2'-6"	23
R518		A	9	2'-5"	23
R519		H	1 Ser.	3'-1" to 3'-5 1/2"	14
R520		A	15	2'-6"	39
R521		F	1 Ser.	1'-4" to 3'-0"	20
R522		J	3	7'-11"	25
R523		J	1	7'-6"	8
R524		J	1	6'-0"	6
R525		J	4	4'-9"	20
R526		J	2	5'-8"	12
R527		J	1	6'-9"	7
R528		C	6	2'-9 1/2"	17
R529		B	6	2'-8 1/2"	17
R530		E	6	2'-10"	18
R531		C	4	6'-11"	29
R532		C	4	5'-7"	23
R533		F	10	5'-4"	56
R540		J	3	7'-3"	23
R541		A	1	3'-1"	3
R542		A	1	4'-0"	4
R543	Barrier Curb	J	1	8'-1"	8
R549	Barrier Curb	M	1 Ser.	5'-2" to 6'-4"	30
Total				Unit 7	31,973



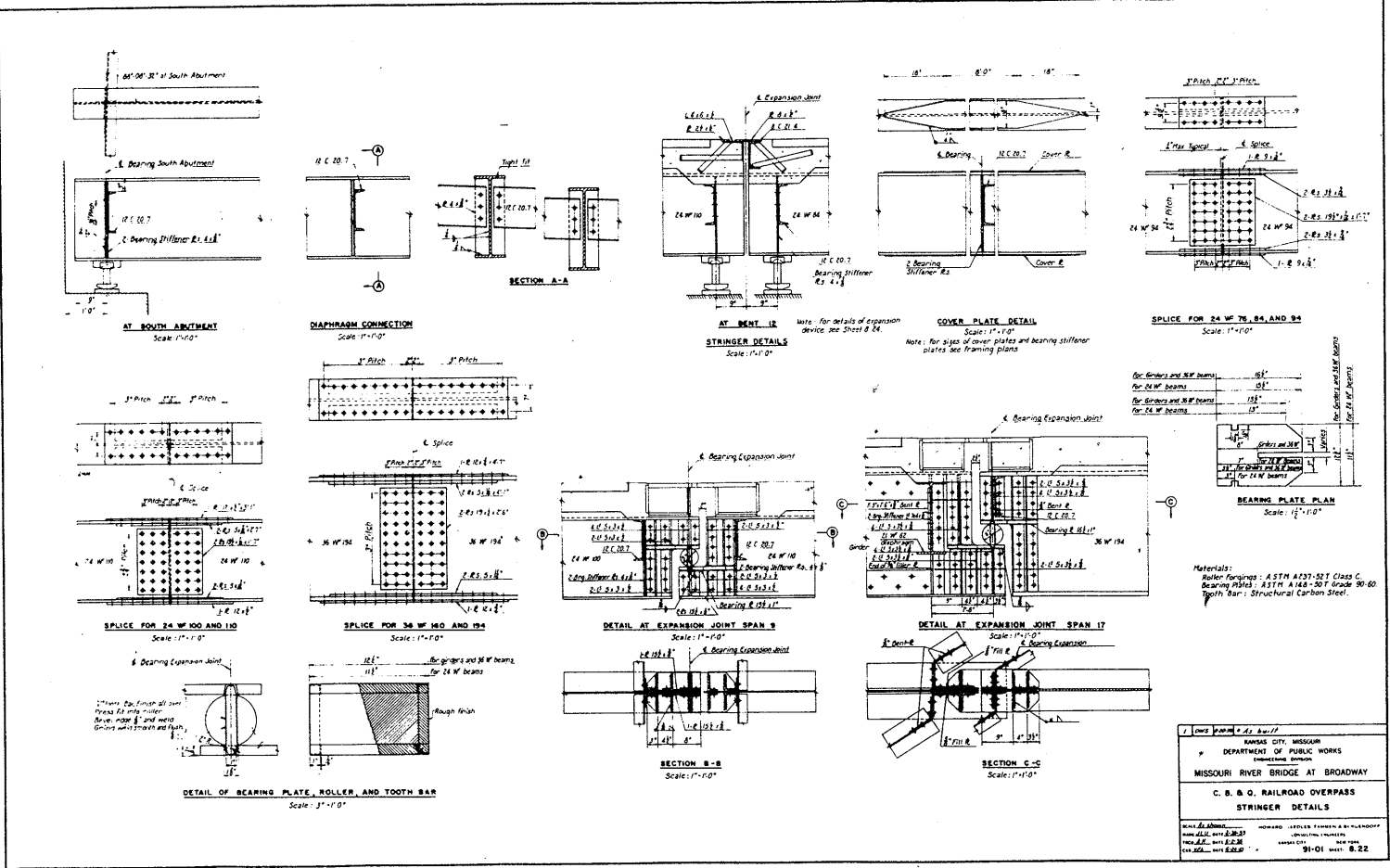
\* Radius  
9'-11" R524, R525, R540  
27'-11" R522  
27'-6" R523  
10'-4" R526  
10'-11" R527  
28'-6" R543



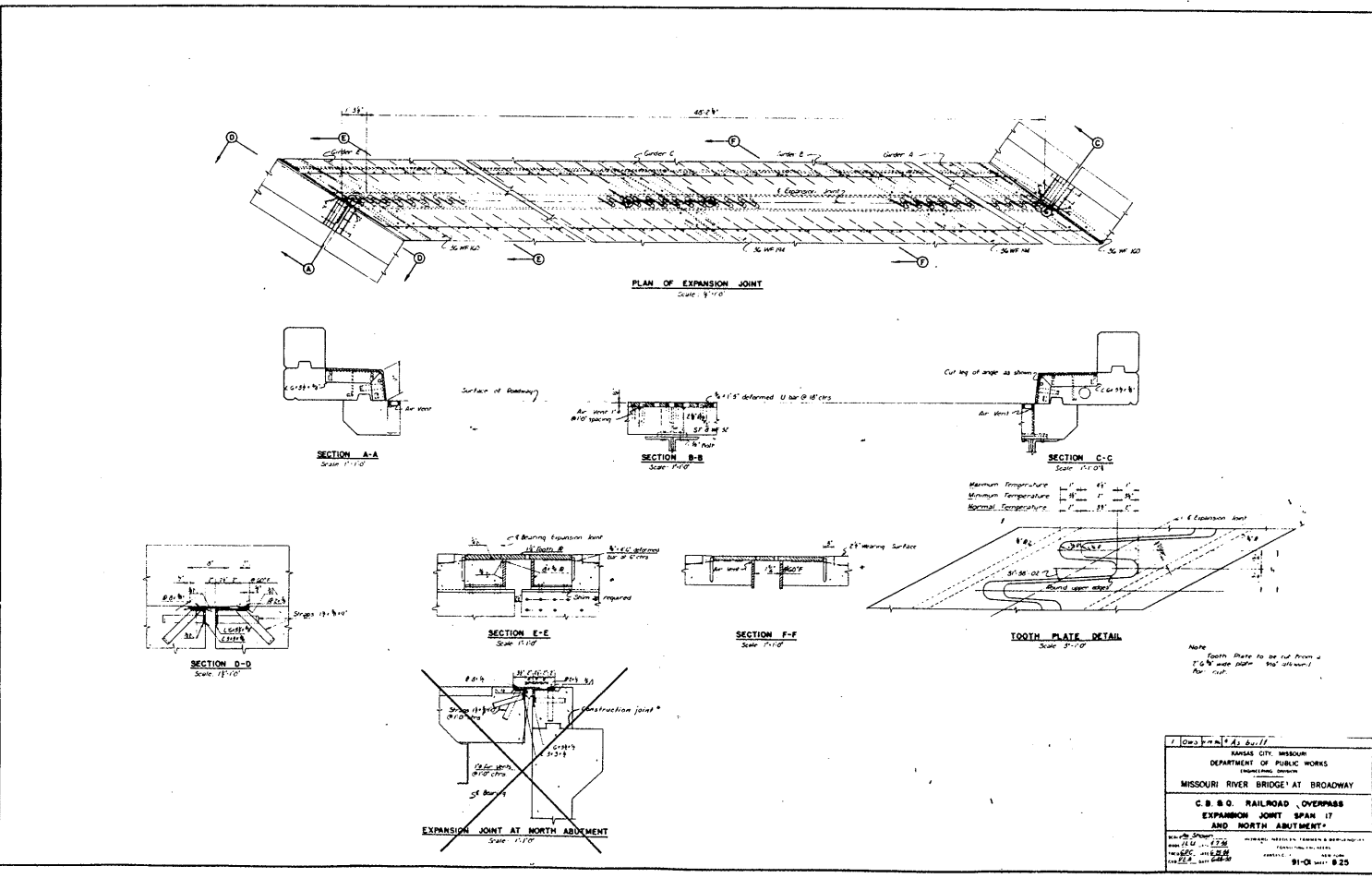
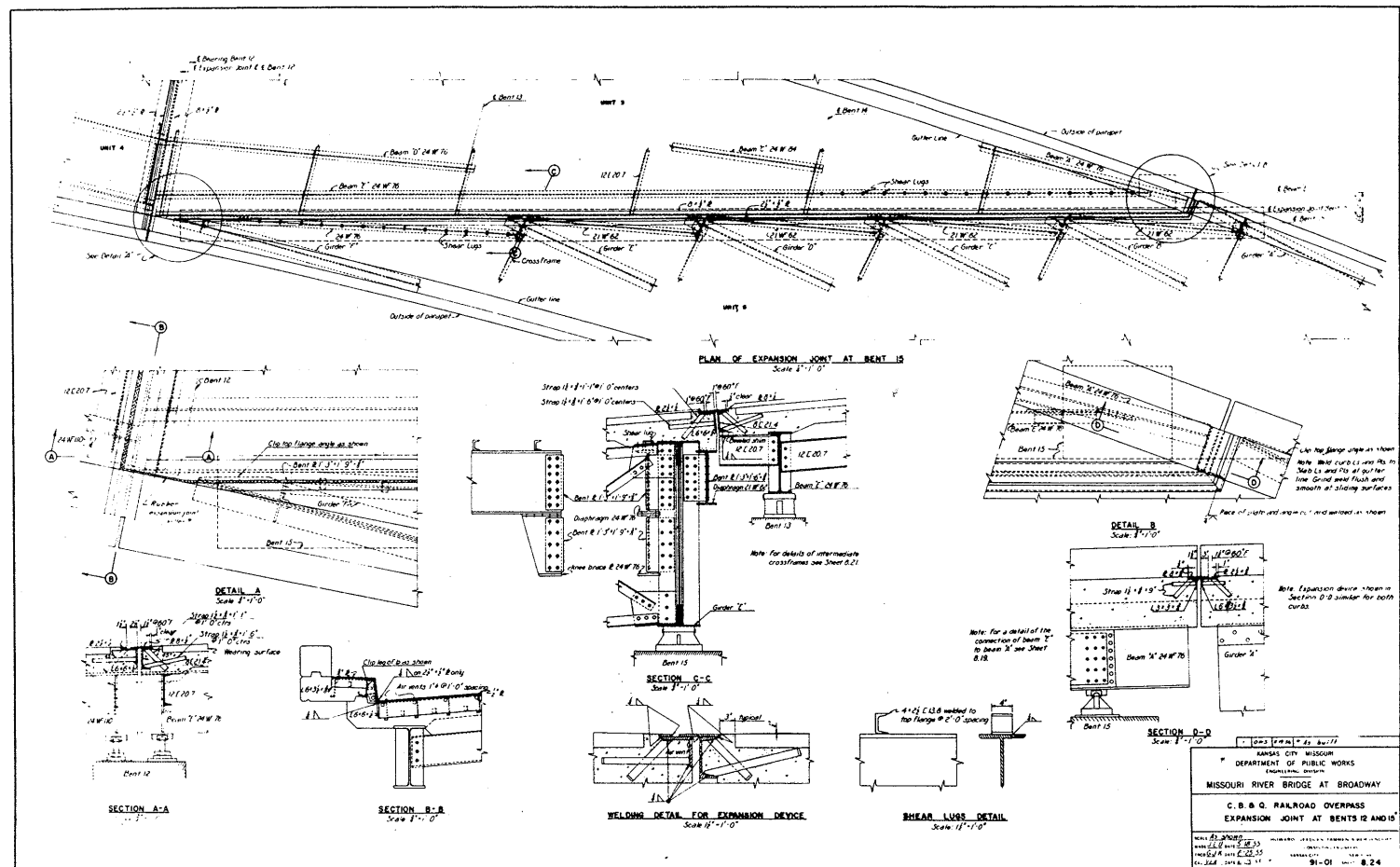
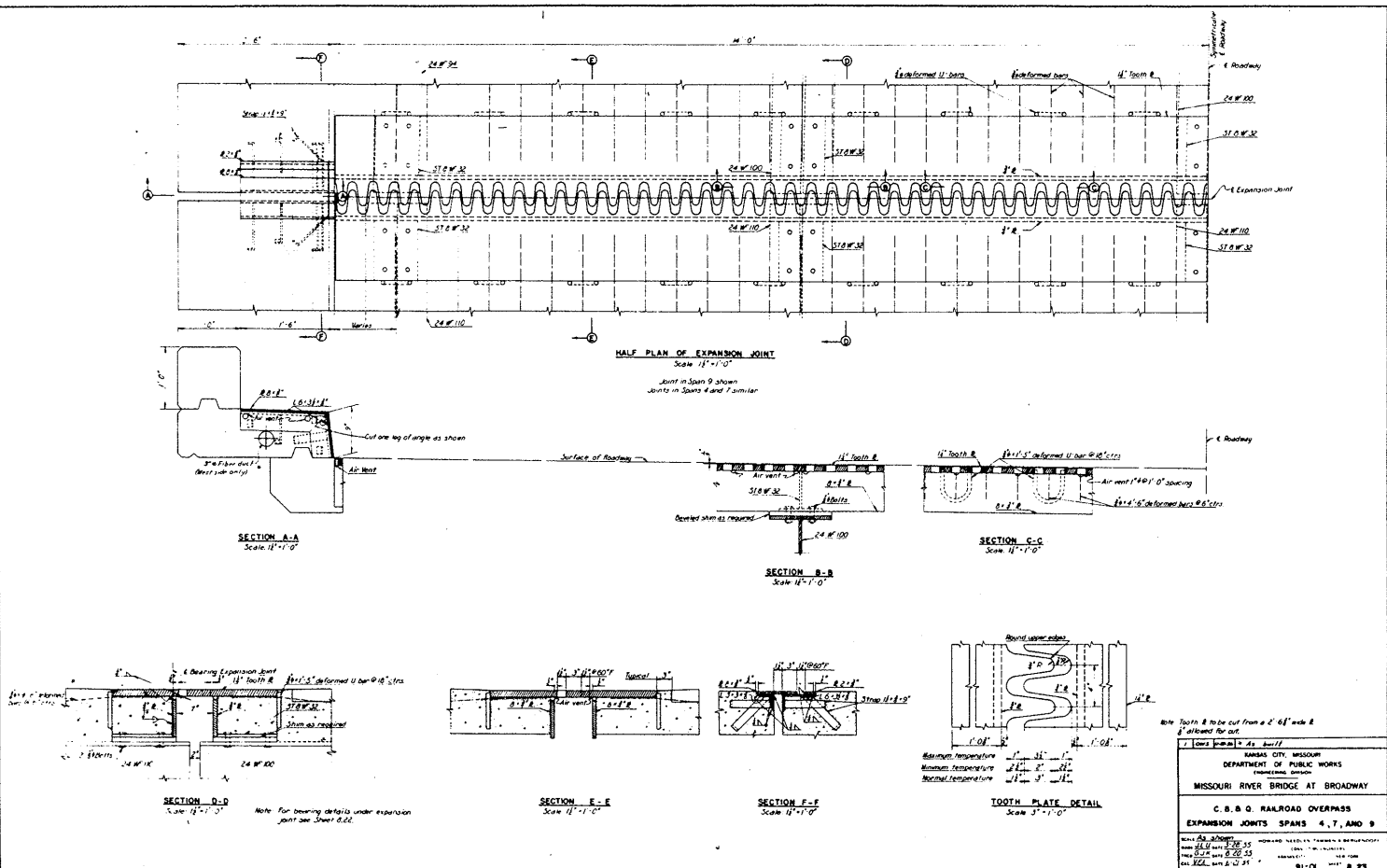


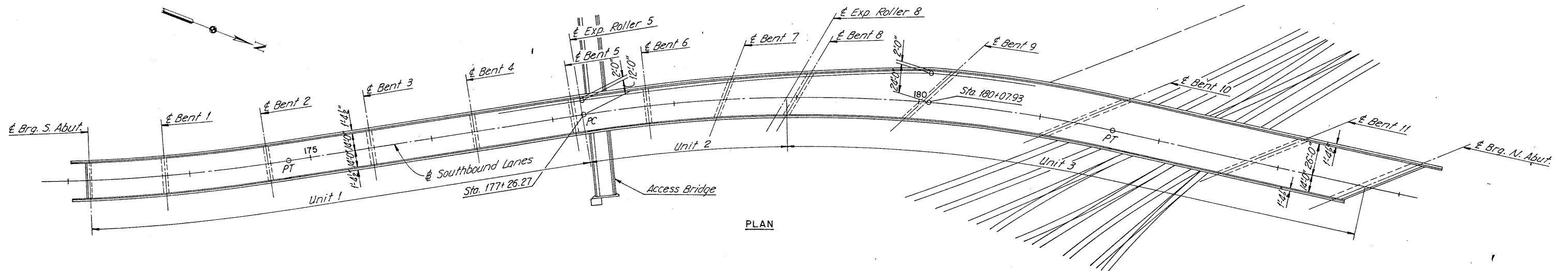




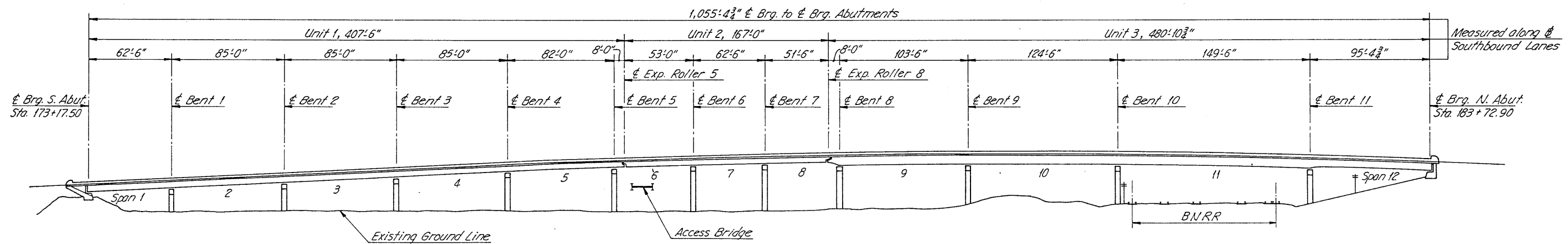




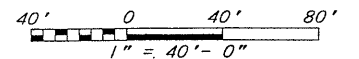




PLAN



ELEVATION



KANSAS CITY, MISSOURI  
DEPARTMENT OF PUBLIC WORKS

MISSOURI RIVER BRIDGE AT BROADWAY  
SOUTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
GENERAL PLAN AND ELEVATION

**HNTB**

HOWARD NEEDLES TAMMEN & BERGENDOFF  
ARCHITECTS ENGINEERS PLANNERS

SHEET 47

### GENERAL NOTES

#### DESIGN:

AASHTO Standard Specifications for Highway Bridges, Thirteenth Edition (1983) as amended by 1984 thru 1988 Interim Specifications.

#### CONSTRUCTION:

The construction covered by these plans shall conform to the current Standard Specifications and Design Criteria Engineering Division, Department of Public Works, Kansas City, Missouri, except that the Missouri Standard Specifications for Highway Construction, 1986 Edition with Supplement and Special Provisions shall be utilized for auxiliary specifications.

All dimensions of the existing bridge components shown on the plans are approximate. All such dimensions and information shall be verified by the Contractor prior to any intended use of such data and the Contractor shall have sole responsibility for the accuracy and reliability of such verifications.

Any damage to the existing bridges, approach roadways, pavements and medians caused by the Contractor's operations shall be repaired to the Engineer's satisfaction and shall be accomplished at the Contractor's expense.

#### DESIGN LOADS:

HS20-44

#### DESIGN UNIT STRESSES:

Concrete Class B2	$f'c = 4,000$ psi
Low Slump Concrete Wearing Surface	$f'c = 4,000$ psi
Reinforcing steel ASTM A615 Grade 60	$f_y = 60,000$ psi

#### BACKGROUND:

An inspection of the bridge deck was performed in 1987 utilizing a delamination detection device. Subjective analysis of the inspection data, supplemented by a visual inspection, was used to determine the probable extent of deterioration of the concrete deck and to predict the types of repair required throughout the bridge.

#### SCOPE OF WORK:

Scope of work to be done shall include the following:

- (1) Repair the deck using these three types as detailed in the plans.
  - (a) Scarification of Bridge Deck
  - (b) Repairing Concrete Deck (Half-Soling)
  - (c) Full Depth Repair
- (2) Overlay deck with a low slump concrete wearing surface.
- (3) Repair substructure concrete as shown in plans.
- (4) Seal top of concrete piers and abutment seats with a protective coating.
- (5) Spot paint bridge as required.

See Special Provisions for other information.

SUMMARY OF QUANTITIES		
ITEM	UNIT	QUANTITY
Scarification of Bridge Deck	Sq. Yds.	3,976
Repairing Concrete Deck (Half-Soling)	Sq. Ft. *	5,364
Full Depth Repair	Sq. Ft. *	348
Low Slump Concrete Wearing Surface	Sq. Yds.	3,976
Substructure Repair Type I	Sq. Ft. *	5
Protective Coating-Concrete Bents (Deleterious Agents)	Lump Sum	1
Substructure Repair Type II	Sq. Ft. *	2
Painting	Lump Sum	1

\*Quantity shown is estimated. Actual repair quantity shall be determined by the Engineer in the field.

KANSAS CITY, MISSOURI  
DEPARTMENT OF PUBLIC WORKS

### MISSOURI RIVER BRIDGE AT BROADWAY

SOUTHBOUND BROADWAY OVER  
BURLINGTON NORTHERN RAILROAD  
GENERAL NOTES AND  
SUMMARY OF QUANTITIES

**HNTB**

HOWARD NEEDLES TAMMEN & BERGENDOFF  
ARCHITECTS ENGINEERS PLANNERS

SHEET 48

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
U.I.P. AND REHAB. EXISTING VARIABLE LENGTH STEEL GIRDER SPANS

SEC/SUR 10 TWP 50W RGE 33W



THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY

DATE PREPARED  
2/13/12

ROUTE 169 STATE MO

DISTRICT BR SHEET NO. 1

COUNTY CLAY

JOB NO. J4U1314B

CONTRACT ID.

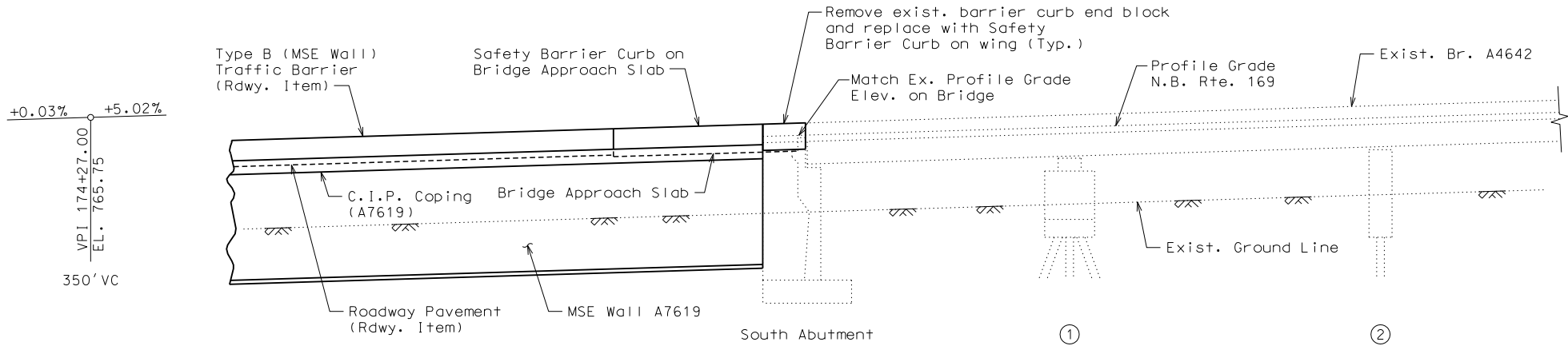
PROJECT NO.

BRIDGE NO. A46421

DESCRIPTION	DATE

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

HDR HDR Engineering, Inc.  
4435 Main Street  
Suite 1000  
Kansas City, MO 64111-1856  
816-380-2700  
Certificate of Authority: 000856



PARTIAL GENERAL ELEVATION

GENERAL NOTES:

DESIGN SPECIFICATIONS:  
2010 AASHTO LRFD Bridge Design Specifications  
and 2010 Interims.

DESIGN LOADING:  
HL-93

DESIGN UNIT STRESSES:  
Class B-1 Concrete (Safety Barrier Curb)  $f'c = 4,000$  psi  
Reinforcing Steel (Grade 60)  $fy = 60,000$  psi

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.

MISCELLANEOUS:  
"Sec" refers to the sections in the standard  
and supplemental specifications unless specified  
otherwise.

Outline of old work is indicated by light dashed  
lines. Heavy lines indicate new work.

Contractor shall verify all dimensions in field  
before ordering new material.

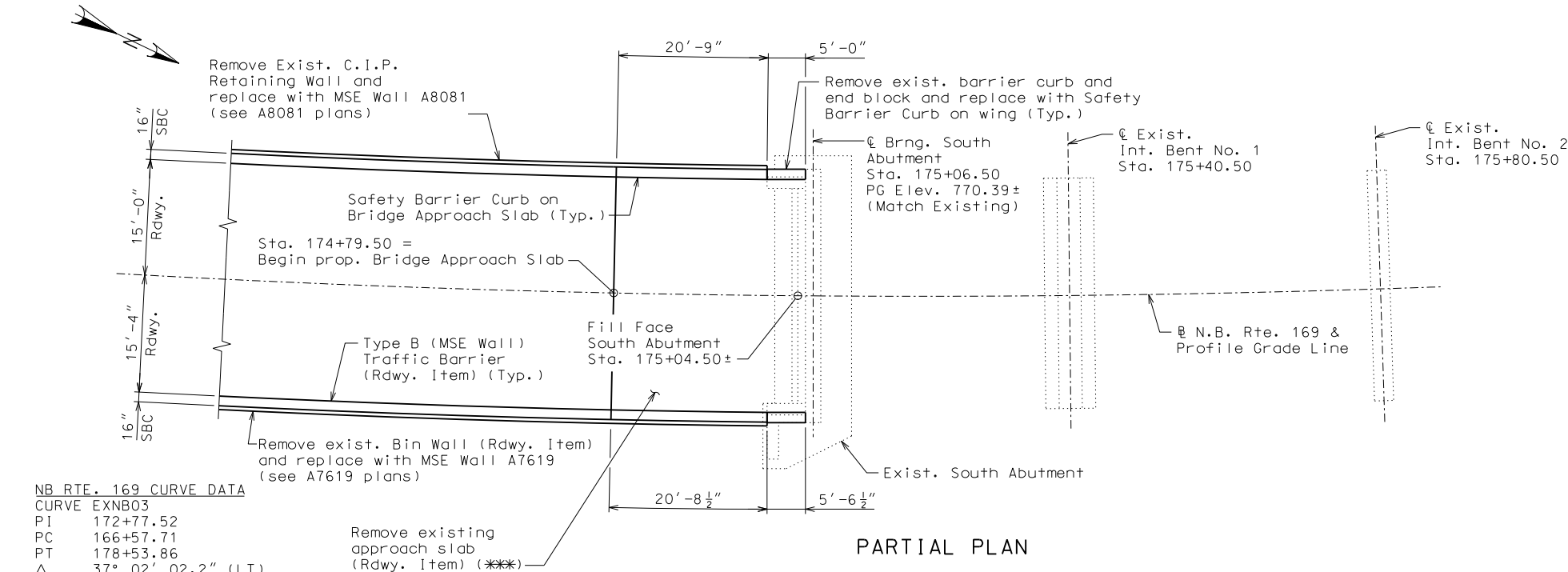
Bars bonded in old concrete not removed shall be  
cleanly stripped and embedded into new concrete  
where possible. If length is available, old bars  
shall extend into new concrete at least  
40 diameters for plain bars and 30 diameters for  
deformed bars, unless otherwise noted.

The area exposed by the removal of concrete and  
not covered with new concrete shall be coated  
with an approved qualified special mortar in  
accordance with Sec 704.

Contractor to refer to Informational Plans for  
C.B. & Q. Railroad overpass for as-built plans of  
structure.

REPAIRS TO BRIDGE NEXT TO BNSF MURRAY YARD

STATE ROAD FROM HIGHWAY 9 TO INTERSTATE 35  
ABOUT 0.5 MILES SOUTH OF HIGHWAY 9  
STA. 175+04.50  
RTE. N.B.169



PARTIAL PLAN

(\*\*\*) Included with roadway item  
Removal of Improvements.

NB RTE. 169 CURVE DATA

CURVE	EXNB03
PI	172+77.52
PC	166+57.71
PT	178+53.86
$\Delta$	37° 02' 02.2" (LT)
D	3° 05' 46.0"
L	1,196.15'
T	619.81'
R	1,850.58'
SE	5%

ESTIMATED QUANTITIES

Item	Unit	Substr.	Superstr.	Total
(*) Partial Removal of Substructure Concrete	Lump Sum	1		1
Curb Removal	Lin. Ft.		11	11
Bridge Approach Slab	Sq. Yd.		90	90
(**) Safety Barrier Curb	Lin. Ft.		52	52

\* Includes removal of Cast-in-place Retaining Wall concrete.  
\*\* Safety Barrier Curb shall be cast-in-place or slip-form option.

B.M. #1 - ELEV. 761.01'  
CHISELED "Q" CUT IN NORTH CENTER  
CONCRETE STRUCTURE NORTHWEST OF  
SOUTH ABUTMENT SB-169 HIGHWAY  
118.43' LT., STA. 174+21.00, @ NB U.S. 169

B.M. #2 - ELEV. 765.41'  
CHISELED "Q" CUT ON SOUTHEAST CORNER  
ABUTMENT OF BRIDGE  
28.17' LT., STA. 177+57.91, @ NB U.S. 169

B.M. #3 - ELEV. 765.68'  
FOUND "+" CUT ON SW CORNER OF SEVENTH PIER  
NORTH OF SOUTH ABUTMENT, NB - 169 HIGHWAY  
13.07' LT., STA. 178+25.30, @ NB U.S. 169

GENERAL ELEVATION AND PLAN

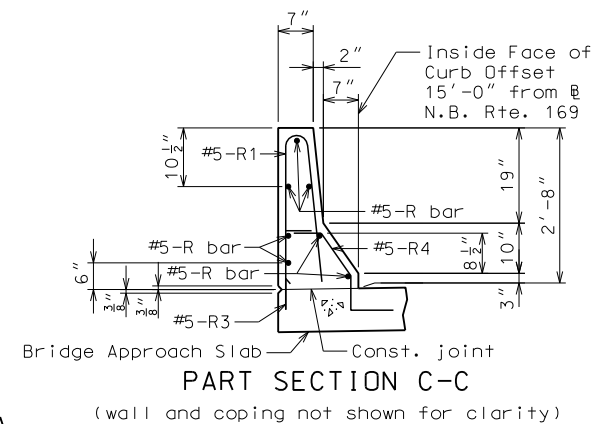
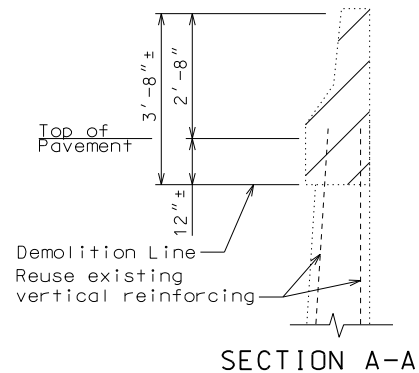
Detailed December 2011  
Checked December 2011

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

Sheet No. 1 of 6

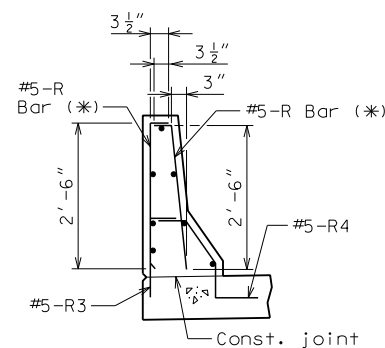
STD. 617.10

STD. 706.35

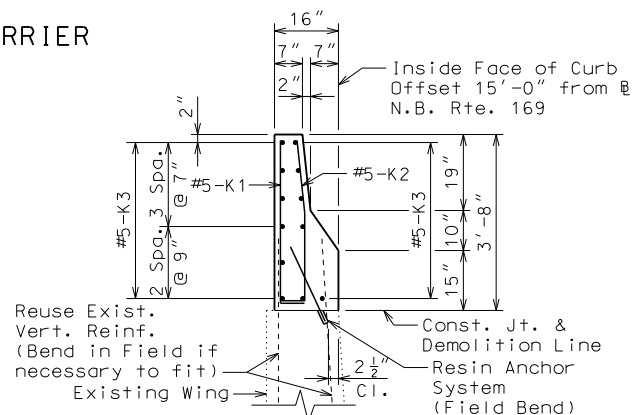
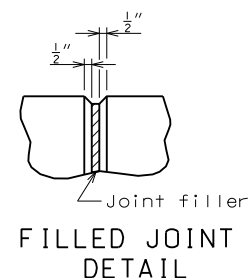


The cross sectional area above the appr.  
slab = 2.28 sq. ft.

Payment for the removal of the barrier curb and end block is completely covered by the contract unit price for Curb Removal per Lin. Ft.

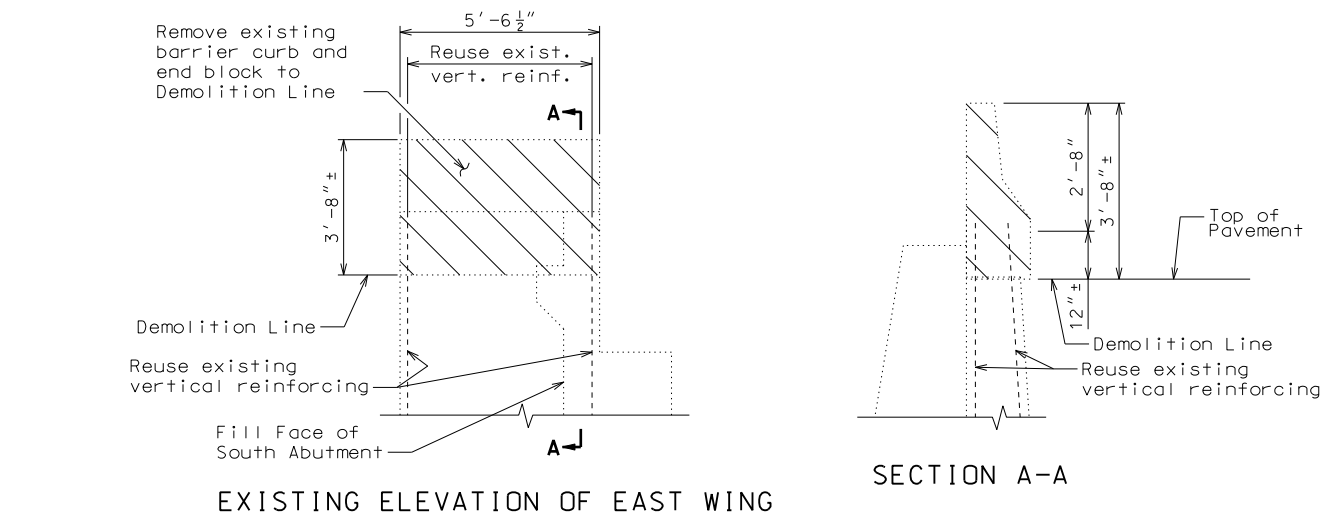


(\*) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)



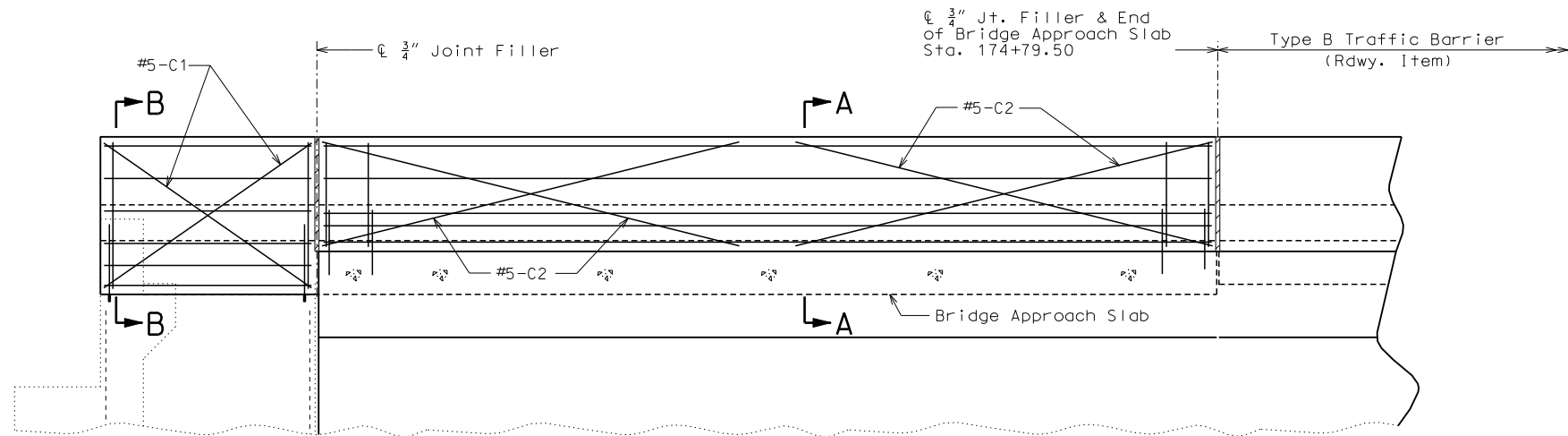
## SECTION B-B

Sheet No. 2 of 6



100





ELEVATION OF WEST SAFETY BARRIER CURB AT SUPPORT LOCATIONS  
(OPTIONAL SLIP FORM BRIDGE SAFETY BARRIER CURB)

Notes:

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

Payment for all concrete and reinforcement, complete-in-place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from front of backwall to end of Bridge Approach Slab.

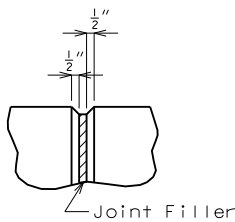
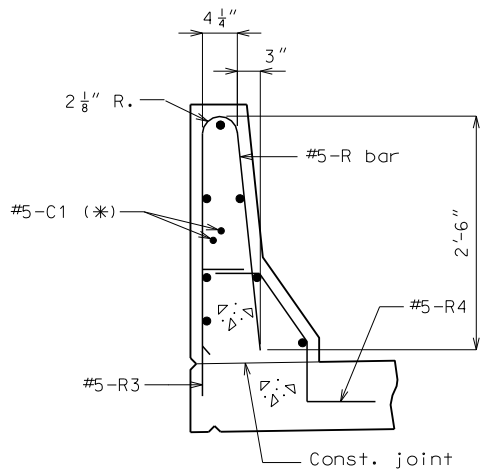
Notes:

Plastic waterstop shall not be used with slip-form option.

C Bars (Slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb.

For Slip-Form option, all sides of the safety barrier curb shall have a vertically broomed finish and the curb top shall have a transversely broomed finish.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".



FILLED JOINT  
DETAIL

Notes:

(\*) Each side of joint location.

OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB  
(West barrier curb shown, East barrier curb similar.)

Detailed December 2011  
Checked December 2011

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

Sheet No. 4 of 6



THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY

DATE PREPARED  
2/13/12

ROUTE 169 STATE MO

DISTRICT BR SHEET NO. 4

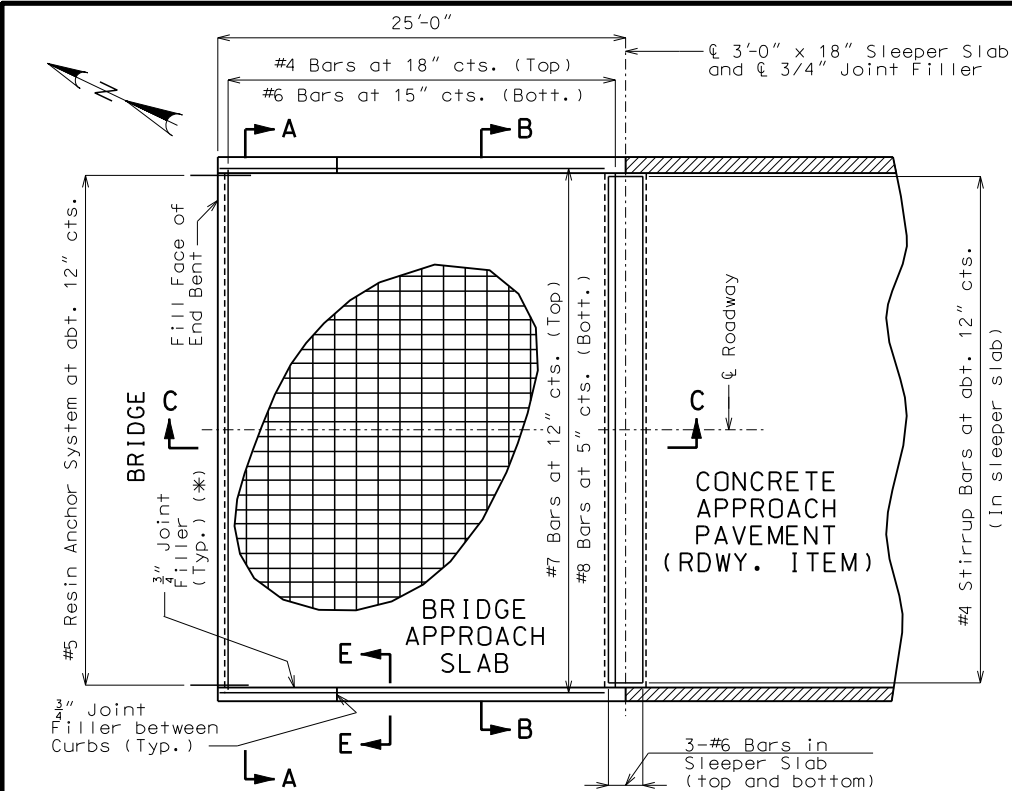
COUNTY CLAY

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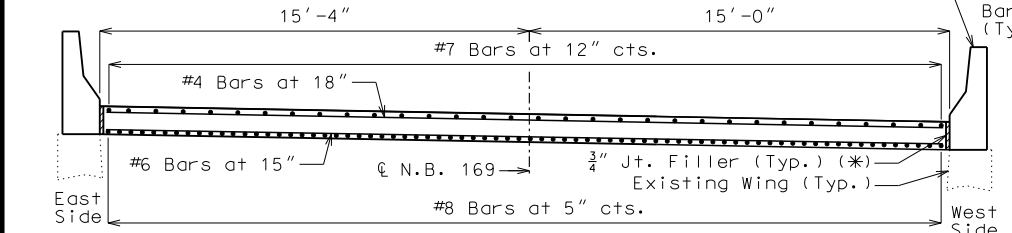
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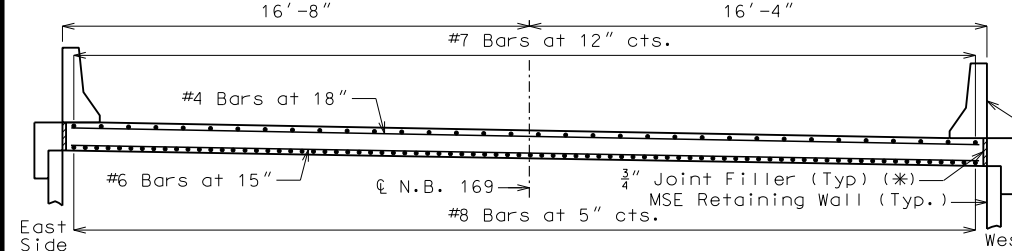
BRIDGE NO. A46421



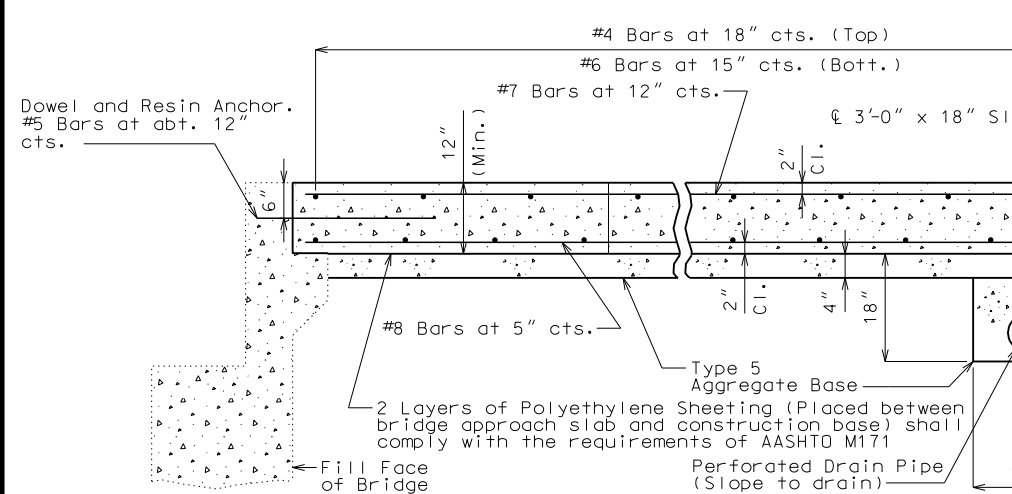
PART PLAN SHOWING REINFORCEMENT



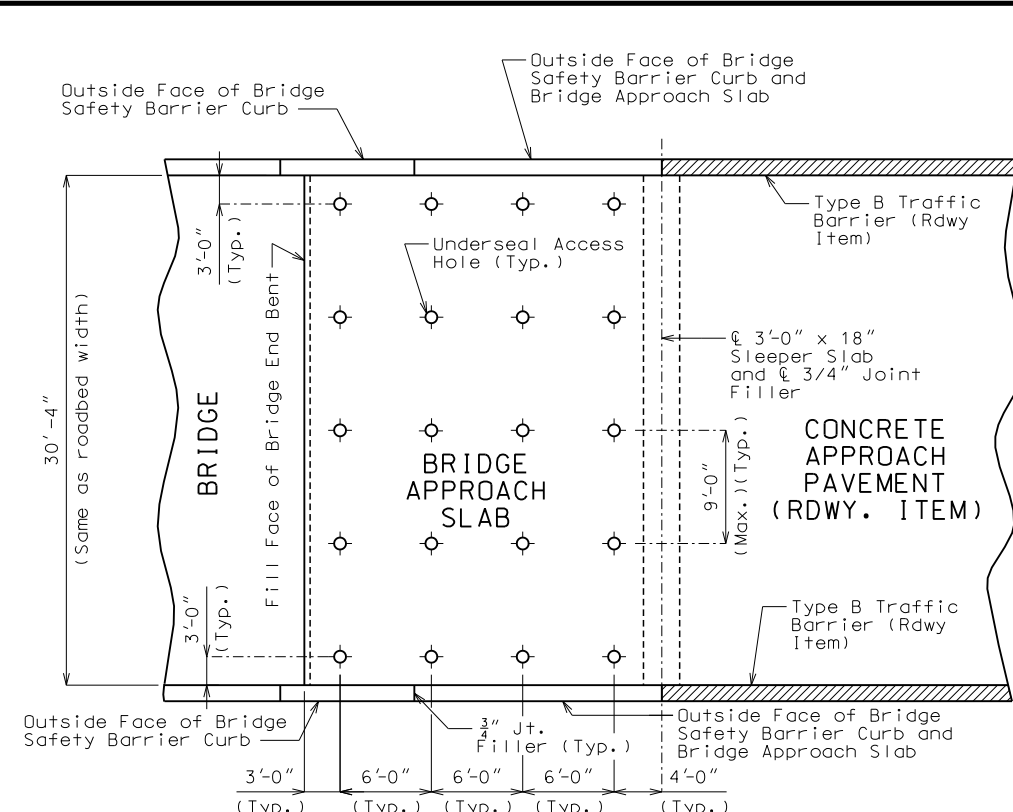
SECTION A-A



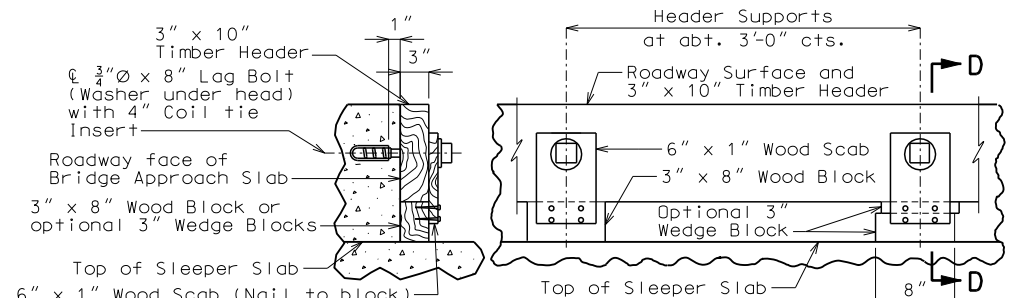
SECTION B-B



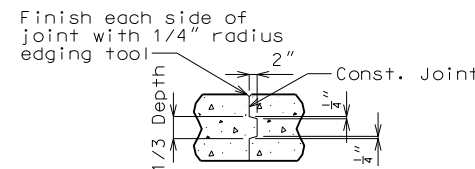
SECTION C-C



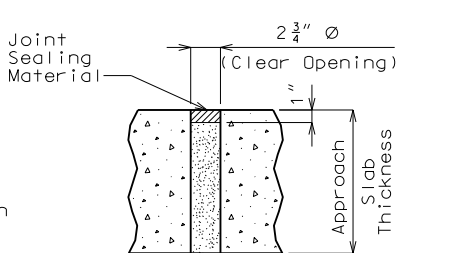
PART PLAN (SHOWING TYPICAL UNDERSEAL ACCESS HOLE LOCATIONS)



SECTION D-D  
PART ELEVATION  
DETAILS OF TIMBER HEADER



CONST. JOINT DETAIL (IF REQUIRED)



TYPICAL UNDERSEAL ACCESS HOLE DETAIL

## GENERAL NOTES:

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

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

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

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 lap splicing the #4 & #6 bars 18" and 2'-2", respectively.

Mechanical bar splices shall be in accordance with Sec 706.

(\*) Seal joint between vertical face of approach slab and wing with "Silicone Joint Sealant for Saw Cut and Formed Joints" in accordance with Sec 717.

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

Longitudinal construction joints in approach slab and sleeper slab shall be aligned with longitudinal construction joints in bridge or semi-deep slab.

Payment for furnishing all materials, labor and excavation necessary to construct the approach slab, including the timber header, sleeper slab, underdrain, Type 5 aggregate base, joint filler and all other appurtenances and incidental work as shown on this sheet, complete in place, will be considered completely covered by the contract unit price for Bridge Approach Slab (Bridge) per square yard.

For Concrete Approach Pavement details, see roadway plans.

At the contractor's option, Grade 40 reinforcement may be substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge abutment. No additional payment will be made for this substitution.

When Grade 40 reinforcement is substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge abutment, the reinforcement may be bent up to 90 degrees with a 2" minimum radius near the abutment to allow compaction of the backfill material near the abutment. Damage to epoxy coating shall be repaired in accordance with Sec 710.

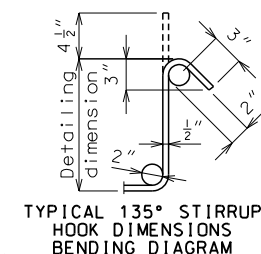
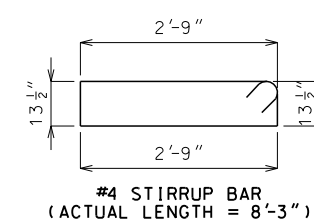
Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

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

Cost of furnishing and installing resin anchor system complete-in-place will be considered completely covered by the contract unit price for Bridge Approach Slab.

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".

An epoxy coated #5 Grade 60 Reinforcing bar 2'-6" long shall be substituted for the 5/8" dia. threaded rod.



Note: Nominal lengths are based on out-to-out dimensions shown in bending diagram and are listed for fabricators use (nearest inch).

THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY

DATE PREPARED  
2/13/12

ROUTE 169 STATE MO  
DISTRICT BR SHEET NO. 5

COUNTY CLAY  
JOB NO. J4U1314B  
CONTRACT ID.

PROJECT NO.

BRIDGE NO. A46421

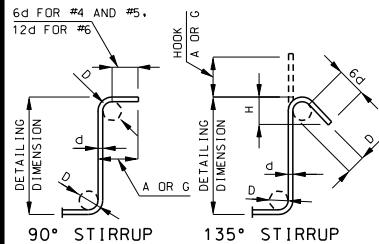
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

HDR Engineering, Inc.

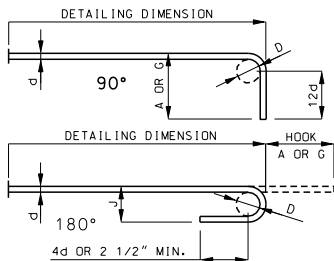
4435 Main Street  
Suite 1000  
Kansas City, MO 64111-1856  
816-360-2700  
Certificate of Authority: 000856

BILL OF REINFORCING STEEL																				
NO.	REQ'D.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS								NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
										B	C	D	E	F	H	K				
																	FT.			
SAFETY BARRIER CURB																				
4	5	C1	Slip Form	E	20					5	10.000						5	10	24	
8	5	C2	Slip Form	E	20					10	0.000						10	0	83	
21	5	K1	Barrier	E	19	S				3	4.000	5.125					3	9	80	
21	5	K2	Barrier	E	14	S					5.125	22.125	18.000			2.000	17.875	3	78	
12	5	K3	Barrier	E	20					4	9.000						4	9	59	
12	5	K4	Barrier	E	20					5	3.000						5	3	66	
44	5	R1	Barrier	E	26	S				2	6.000	4.250				2	6.000	3.000	241	
44	5	R3	Barrier	E	19	S					17.000	6.000					1	11	84	
44	5	R4	Barrier	E	27	S					6.000	11.250	7.000	12.000	9.250	6.375	3	0	130	
7	5	R5	Barrier	E	20					20	6.000						20	6	150	
9	5	R6	Barrier	E	20					20	5.000						20	5	192	
SAFETY BARRIER CURB																				
5				E															1187	



STIRRUP HOOK DIMENSIONS				
GRADES 40 - 50 - 60 KSI				
BAR SIZE	D (IN.)	90° HOOK A OR G	135° HOOK A OR G	APPROX. H
#4	2"	4 1/2"	4 1/2"	3"
#5	2 1/2"	6"	5 1/2"	3 3/4"
#6	4 1/2"	12"	8"	4 1/2"

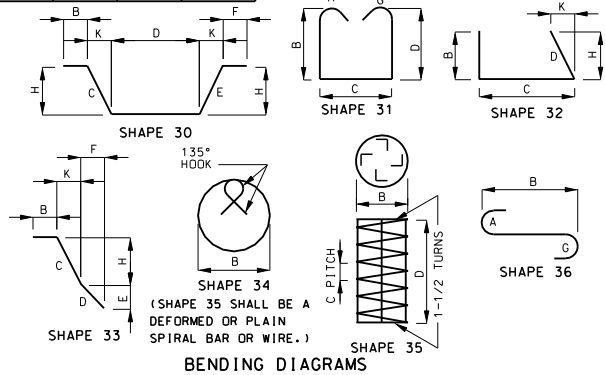
NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



END HOOK DIMENSIONS				
ALL GRADES				
BAR SIZE	D (IN.)	180° HOOKS A OR G	90° HOOKS J	A OR G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	14"
#8	6"	11"	8"	16"
#9	9 1/2"	15"	11 3/4"	19"
#10	10 3/4"	17"	13 1/4"	22"
#11	12"	19"	14 3/4"	2'-0"
#14	18 1/4"	2'-3"	21 3/4"	2'-7"

TWO ADDITIONAL #5-R6 ARE INCLUDED IN THE BAR BILL FOR TESTING.

**NOTE:**  
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.  
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.  
E = EPOXY COATED REINFORCEMENT.  
S = STIRRUP.  
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.  
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.  
NO. EA. = NUMBER OF BARS OF EACH LENGTH.  
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAMS AND ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)  
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.  
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.  
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 (GRADE 60) F<sub>y</sub> = 60,000 PSI.



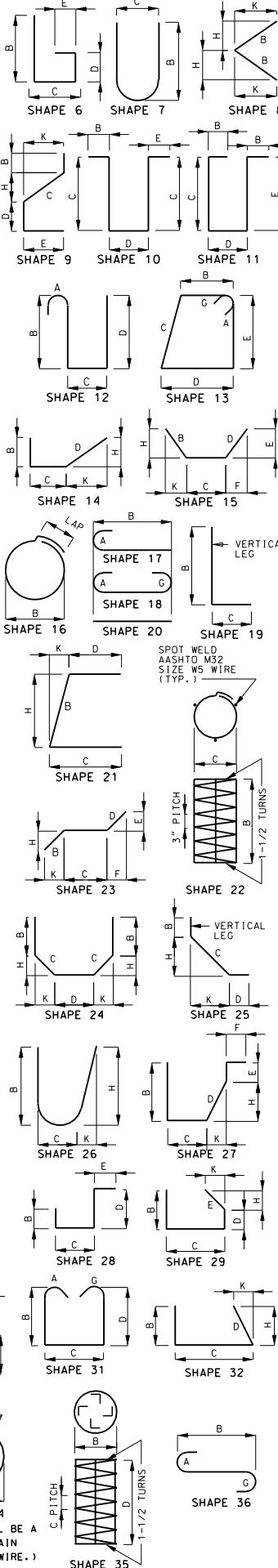
BENDING DIAGRAMS

Detailed December 2011  
Checked December 2011

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

Sheet No. 6 of 6

BILL OF REINFORCING STEEL																			
NO.	REQ'D.	MARK NO.	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS									
										B	C	D	E	F	H	K	NOMINAL LENGTH	ACTUAL LENGTH	WEIGHT
										FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.	FT.	IN.



THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY

DATE PREPARED

2/13/12

ROUTE

169

STATE

MO

DISTRICT

BR

SHEET NO.

6

COUNTY

CLAY

JOB NO.

J4U1314B

CONTRACT ID.

PROJECT NO.

BRIDGE NO.

A46421

DESCRIPTION

DATE

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

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

105 WEST CAPITOL

JEFFERSON CITY, MO 65102

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

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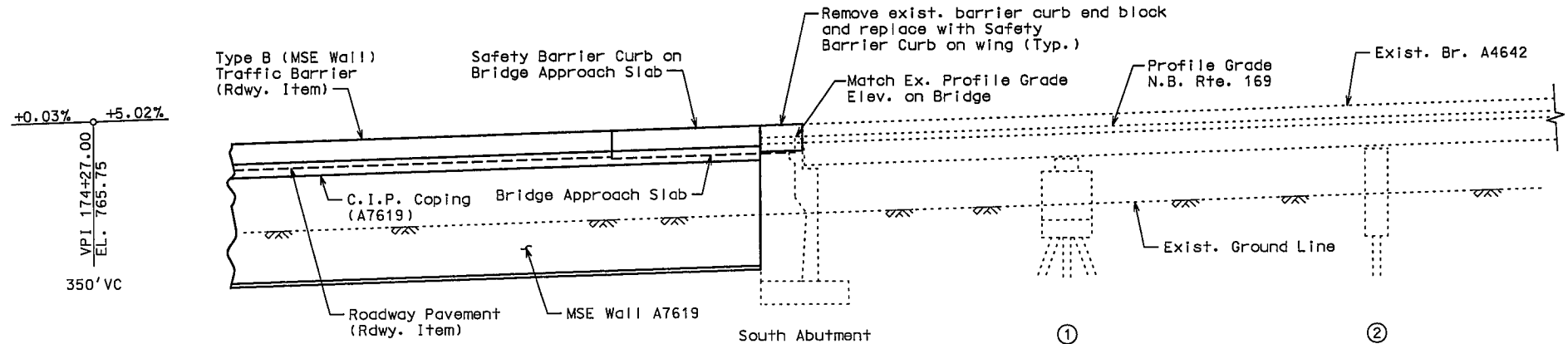
1-888-ASK-MODOT (1-888-275-6636)

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

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION  
U.I.P. AND REHAB. EXISTING VARIABLE LENGTH STEEL GIRDER SPANS

SEC/SUR 10 TWP 50W RGE 33W

FIANL PLANS



PARTIAL GENERAL ELEVATION

GENERAL NOTES:

DESIGN SPECIFICATIONS:  
2010 AASHTO LRFD Bridge Design Specifications  
and 2010 Interims.

DESIGN LOADING:  
HL-93

DESIGN UNIT STRESSES:  
Class B-1 Concrete (Safety Barrier Curb)  $f'_c = 4,000$  psi  
Reinforcing Steel (Grade 60)  $f_y = 60,000$  psi

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.

MISCELLANEOUS:  
"Sec" refers to the sections in the standard  
and supplemental specifications unless specified  
otherwise.

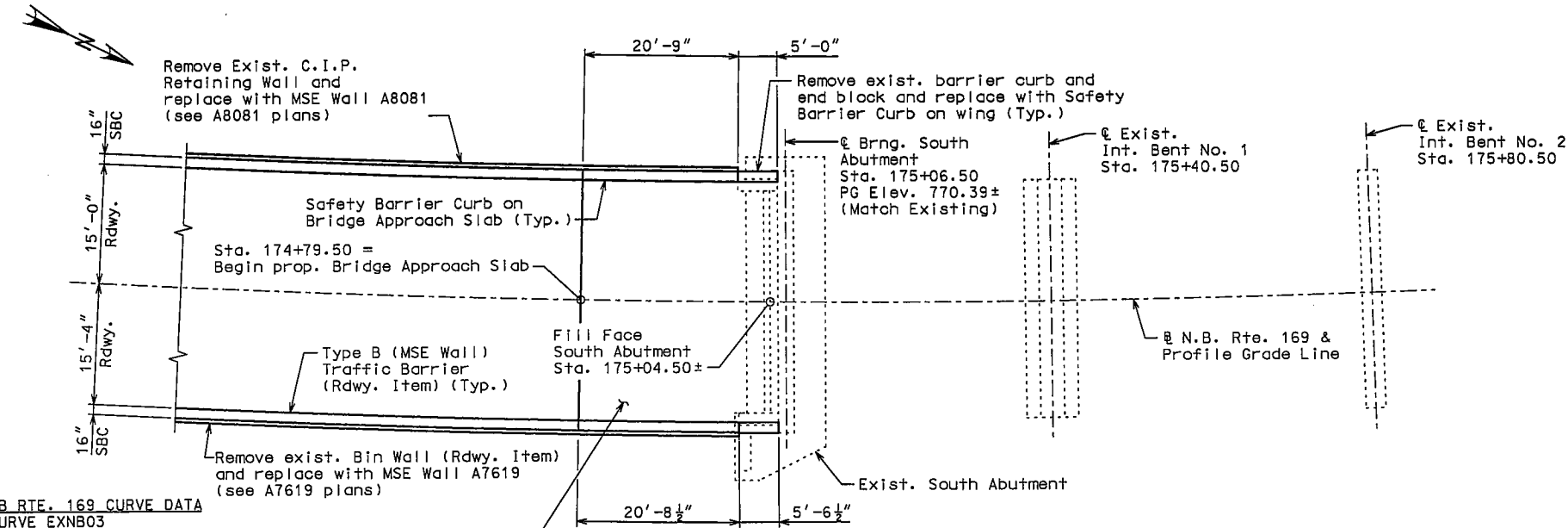
Outline of old work is indicated by light dashed  
lines. Heavy lines indicate new work.

Contractor shall verify all dimensions in field  
before ordering new material.

Bars bonded in old concrete not removed shall be  
cleanly stripped and embedded into new concrete  
where possible. If length is available, old bars  
shall extend into new concrete at least  
40 diameters for plain bars and 30 diameters for  
deformed bars, unless otherwise noted.

The area exposed by the removal of concrete and  
not covered with new concrete shall be coated  
with an approved qualified special mortar in  
accordance with Sec 704.

Contractor to refer to Informational Plans for  
C.B. & O. Railroad overpass for as-built plans of  
structure.



PARTIAL PLAN

(\*\*\*) Included with roadway item  
Removal of Improvements.

NB RTE. 169 CURVE DATA  
CURVE EXNB03

PI	172+77.52
PC	166+57.71
PT	178+53.86
Δ	37° 02' 02.2" (LT)
D	3° 05' 46.0"
L	1,196.15'
T	619.81'
R	1,850.58'
SE	5%

FINAL QUANTITIES

Item	Unit	Substr.	Superstr.	Total
(*) Partial Rem. of Substructure Concrete	Line No. 1000	Lump Sum	1	1
Curb Removal	Line No. 1010	Lin. Ft.	11	11
Bridge Approach Slab	Line No. 1020	Sq. Yd.	90	90
(**) Safety Barrier Curb	Line No. 1030	Lin. Ft.	52	52
MISC. REMOVAL OF BACKWALL	Line No. 5103	Lump Sum	1	1

\* Includes removal of Cast-in-place Retaining Wall concrete.  
\*\* Safety Barrier Curb shall be cast-in-place or slip-form option.

B.M. #1 - ELEV. 761.01'  
CHISELED "C" CUT IN NORTH CENTER  
CONCRETE STRUCTURE NORTHWEST OF  
SOUTH ABUTMENT SB-169 HIGHWAY  
118.43' LT., STA. 174+21.00, & NB U.S. 169

B.M. #2 - ELEV. 765.41'  
CHISELED "C" CUT ON SOUTHEAST CORNER  
ABUTMENT OF BRIDGE  
28.17' LT., STA. 177+57.91, & NB U.S. 169

B.M. #3 - ELEV. 765.68'  
FOUND "+" CUT ON SW CORNER OF SEVENTH PIER  
NORTH OF SOUTH ABUTMENT, NB - 169 HIGHWAY  
13.07' LT., STA. 178+25.30, & NB U.S. 169

GENERAL ELEVATION AND PLAN

REPAIRS TO BRIDGE NEXT TO BNSF MURRAY YARD

STATE ROAD FROM HIGHWAY 9 TO INTERSTATE 35  
ABOUT 0.5 MILES SOUTH OF HIGHWAY 9  
STA. 175+04.50  
RTE. N.B.169

STD. 617.10  
STD. 706.35

Detailed December 2011  
Checked December 2011

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

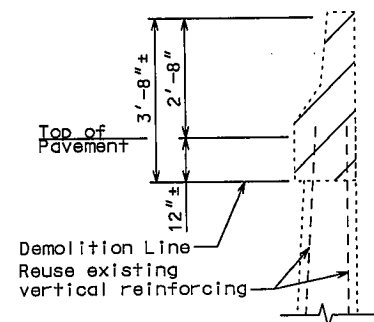
Sheet No. 1 of 6

MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION

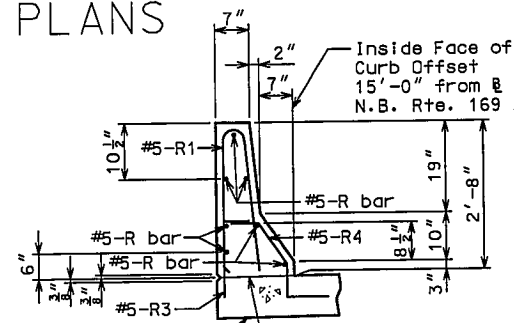
105 WEST CAPITAL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

HDR Engineering, Inc.  
4435 Main Street  
Suite 1000  
Kansas City, MO 64111-1556  
816-360-2700  
Certificate of Authority: 000856

# FINAL PLANS



SECTION A-A



PART SECTION C-C

(wall and coping not shown for clarity)

Note:

Use a min. lap of 2'-11" for #5 horizontal safety barrier curb bars.

The cross sectional area above the appr. slab = 2.28 sq. ft.

Notes:

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

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

Payment for all concrete and reinforcement, complete-in-place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Reinforcing Steel shall be Grade 60.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from front face of backwall to end of Bridge Approach Slab.

Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".

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

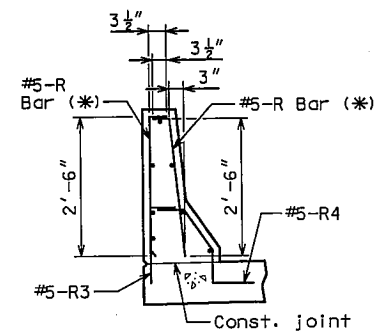
Cost of furnishing and installing resin anchor system complete-in-place will be considered completely covered by the contract unit price for Safety Barrier Curb.

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".

An epoxy coated #5 Grade 60 Reinforcing bar 2'-6" long shall be substituted for the 5/8" dia. threaded rod.

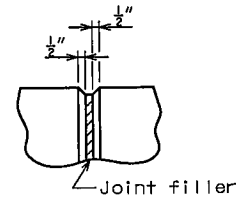
Payment for the removal of Existing C.I.P. Retaining Wall to limit shown is completely covered by the Lump Sum Price for Partial Removal of Substructure Concrete.

Payment for the removal of the barrier curb and end block is completely covered by the contract unit price for Curb Removal per Lin. Ft.

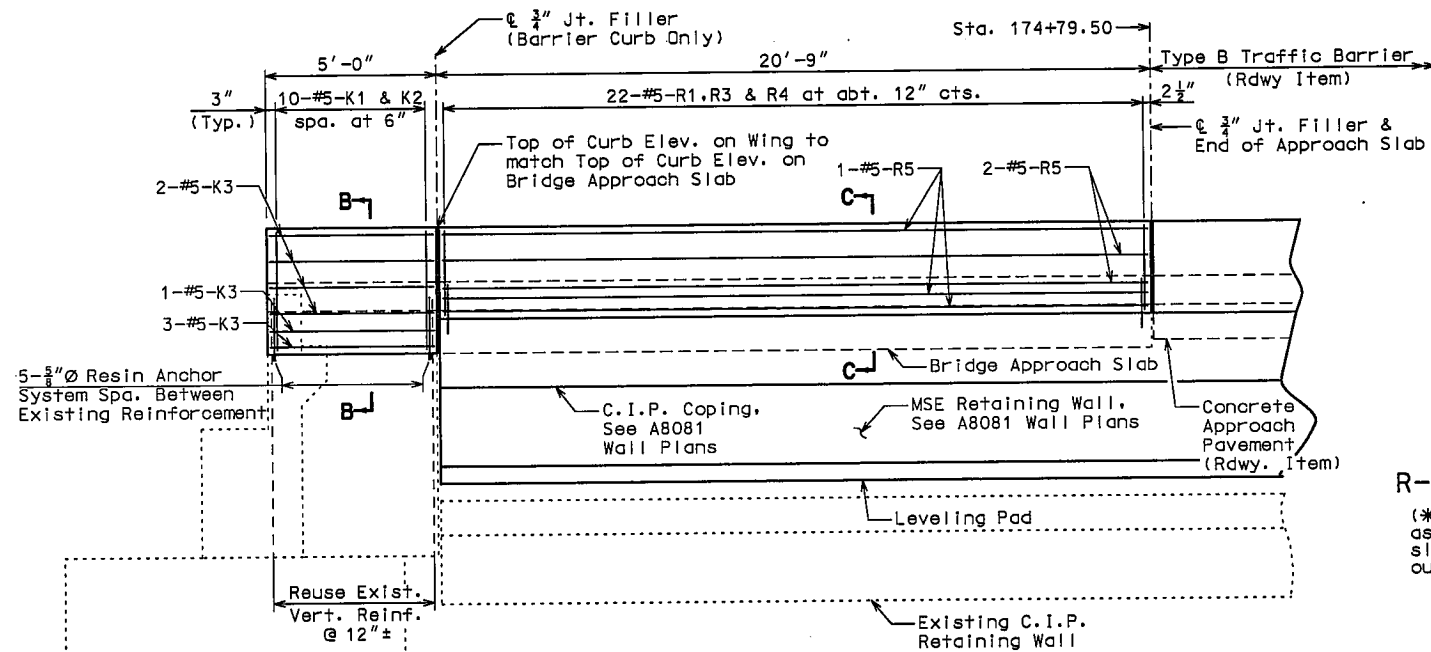


## R-BAR PERMISSIBLE ALTERNATE SHAPE

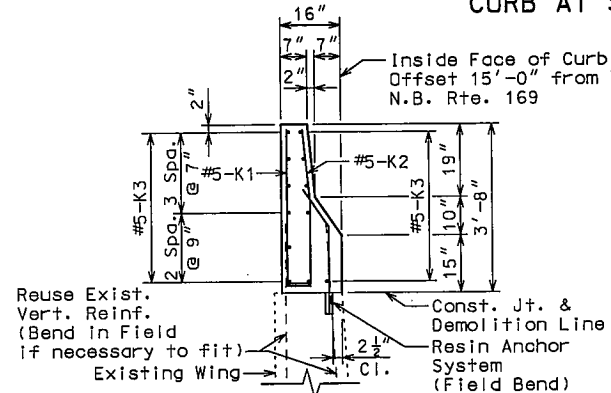
(\*) The R1 bar may be separated into two bars as shown, at the contractor's option, only when slip forming is not used. (All dimensions are out to out.)



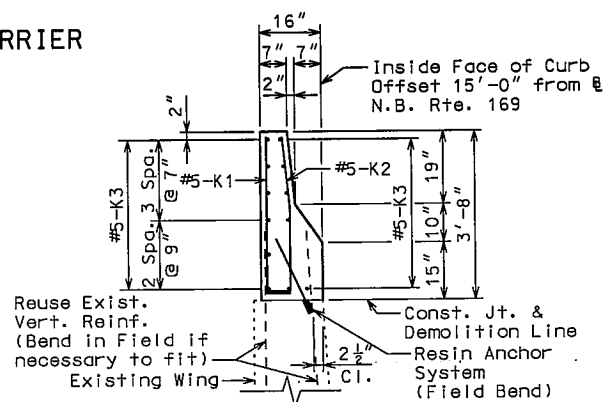
FILLED JOINT  
DETAIL



ELEVATION OF WEST SAFETY BARRIER  
CURB AT SOUTH ABUTMENT



SECTION B-B



OPTIONAL SECTION B-B

## WEST SAFETY BARRIER CURB DETAILS

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

Sheet No. 2 of 6

P:\J4U1314B & J4S1070B\A46421\Final Plans Sheets\B\_A46421\_002FP\_J4U1314B.dgn 6:42:14 AM 3/12/2013

Detailed December 2011  
Checked December 2011


DATE PREPARED	
2/13/12	
ROUTE	STATE
169	MO
DISTRICT	SHEET NO.
BR	2
COUNTY	
CLAY	
JOB NO.	
J4U1314B	
CONTRACT ID.	
120420-C01	
PROJECT NO.	
FAF-169-1(79)	
BRIDGE NO.	
A46421	

DESCRIPTION
-------------

DATE \_\_\_\_\_

MISSOURI HIGHWAYS AND TRANSPORTATION

**HDR** HDR Engineering, Inc.



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

REV.

FINAL PLANS

Inside Face of Curb Offset 15'-4" from N.B. Rte. 169

Reuse Exist. Vert. Reinf. (Bend in Field if necessary to fit)

Const. Jt. & Demolition Line

Resin Anchor System (Field Bend)

Existing Wing

CI.

2 1/2"

#5-K4

2 Spacing @ 9"

#5-K2

#5-K1

16"

7" 7"

2"

15" 10" 19"

3'-8"

15'-4"

N.B. Rte. 169

OPTIONAL SECTION B-B

The cross sectional area above the  
appr. slab = 2.28 sq. ft.

Payment for the removal of barrier curb and end block is completely covered by the Contract Unit Price for Curb Removal per Lin. Ft.

Sta 174+79.50

Type B Traffic Barrier  
(Rdwy. Item)

20'-8 1/2"

5'-6 1/2"

3 1/2"

22-#5-R1, R3 & R4 at abt. 12" cts.

Top of Curb Elev. on Wing to  
match Top of Curb Elev. on  
Bridge Approach Slab

1-#5-R6

2-#5-R6

11-#5-K1 & K2  
at 6"

2-#5-K4

1-#5-K4

3-#5-K4

6-#5-Ø  
System  
Existing

Bridge Approach Slab

C.I.P. Coping,  
See A7619  
Wall Plans

Concrete  
Approach  
Pavement  
(Rdwy. Item)

MSE Retaining Wall,  
See A7619 Wall Plans

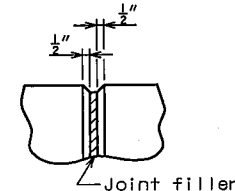
Reuse exist.  
vert. reinf.  
at 12" ±

Fill Face  
of Abutment

ELEVATION OF EAST SAFETY BARRIER  
CURB AT SOUTH ABUTMENT

ELEVATION OF EAST SAFETY BARRIER  
CURB AT SOUTH ABUTMENT

(\*) 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.)



FILLED JOINT  
DETAIL

## EAST SAFETY BARRIER CURB DETAILS

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DATE PREPARED	
2/13/12	
ROUTE	STATE
169	MO
DISTRICT	SHEET NO.
BR	3
COUNTY	
CLAY	
JOB NO.	
J4U1314B	
CONTRACT ID.	
120420-C01	
PROJECT NO.	
FAF-169-1(79)	
BRIDGE NO.	
A46421	

[illegible]

**MISSOURI HIGHWAYS AND TRANSPORTATION  
COMMISSION**

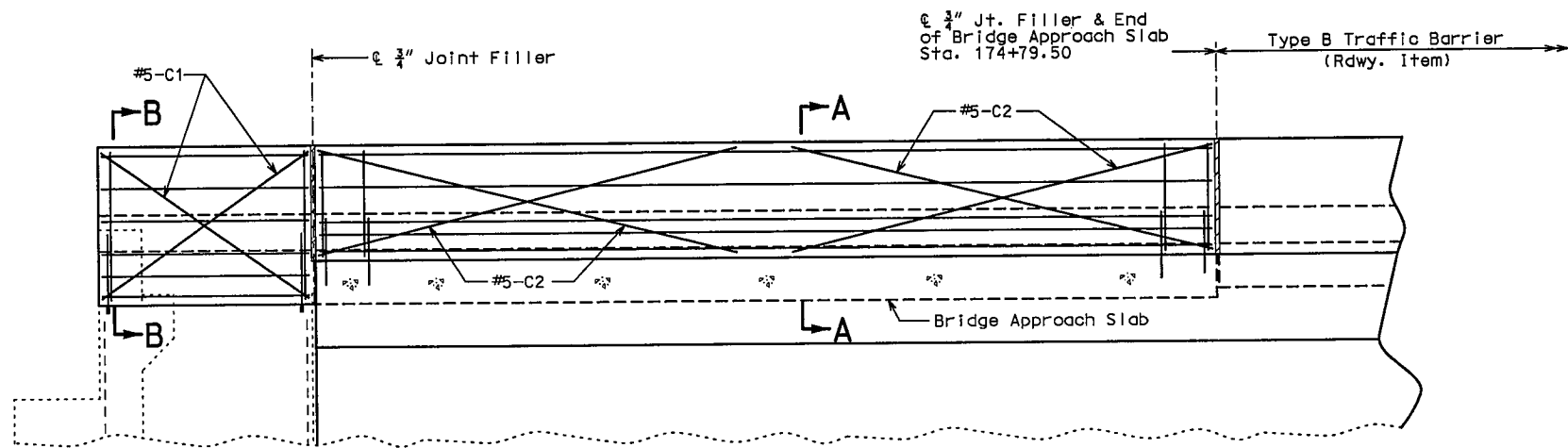
**MoDOT**

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

**HDR**  
HDR Engineering, Inc.  
44435 Main Street  
Suite 1000  
Kansas City, MO 64111-1856  
816-360-2700  
Certificate of Authority: 0003556

REV.





ELEVATION OF WEST SAFETY BARRIER CURB AT SUPPORT LOCATIONS  
(OPTIONAL SLIP FORM BRIDGE SAFETY BARRIER CURB)

Notes:

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

Payment for all concrete and reinforcement, complete-in-place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from front of backwall to end of Bridge Approach Slab.

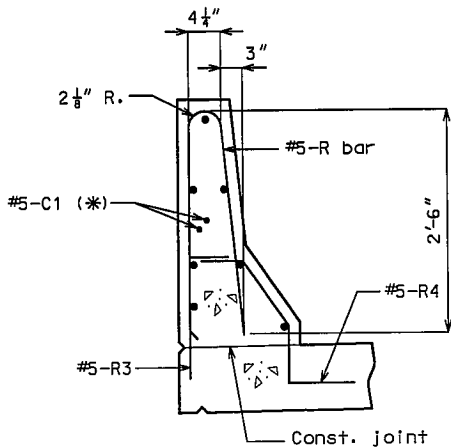
Notes:

Plastic waterstop shall not be used with slip-form option.

C Bars (Slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb.

For Slip-Form option, all sides of the safety barrier curb shall have a vertically broomed finish and the curb top shall have a transversely broomed finish.

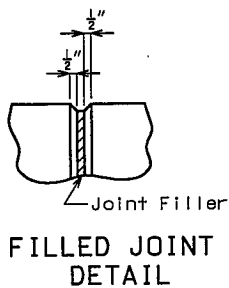
Concrete traffic barrier delineators shall be placed on top of the safety barrier curb as shown on Missouri Standard Plans 617.10 and in accordance with Sec 617. Delineators on bridges with two-lane, two-way traffic shall have retroreflective sheeting on both sides. Concrete traffic barrier delineators will be considered completely covered by the contract unit price for "Safety Barrier Curb".



PART SECTION A-A  
(Part Section B-B similar)

Notes:

(\*) Each side of joint location.



OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB  
(West barrier curb shown. East barrier curb similar.)

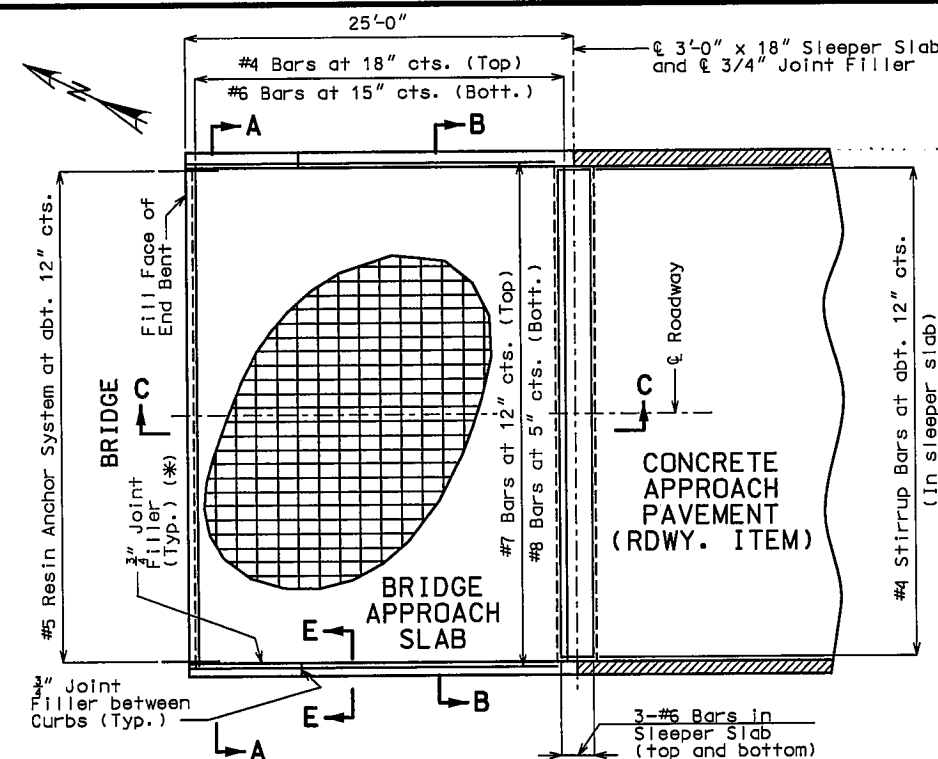
Detailed December 2011  
Checked December 2011

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

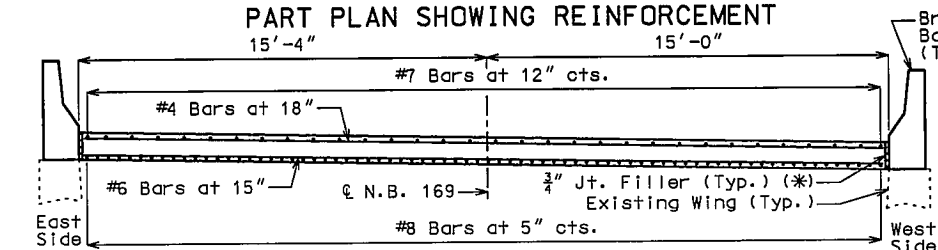
Sheet No. 4 of 6

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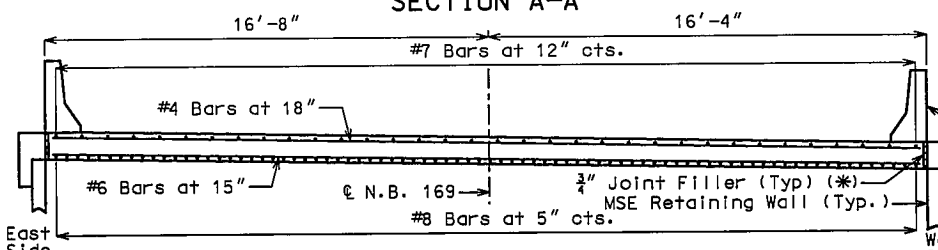
DATE PREPARED 2/13/12	
ROUTE 169	STATE MO
DISTRICT BR	SHEET NO. 4
COUNTY CLAY	
JOB NO. J4U1314B	
CONTRACT ID. 120420-C01	
PROJECT NO. FAF-169-1(79)	
BRIDGE NO. A46421	
DESCRIPTION	
DATE	
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION	
MODOT	
105 WEST CAPITAL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6656)	
HDR Engineering, Inc. 4435 Main Street Suite 1000 Kansas City, MO 64111-1856 816-380-2700 Certificate of Authority: 000856	



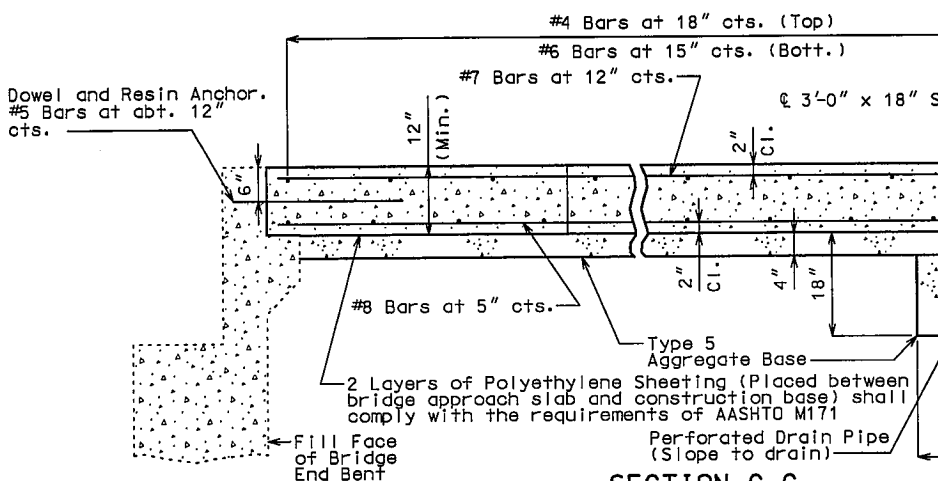
PART PLAN SHOWING REINFORCEMENT



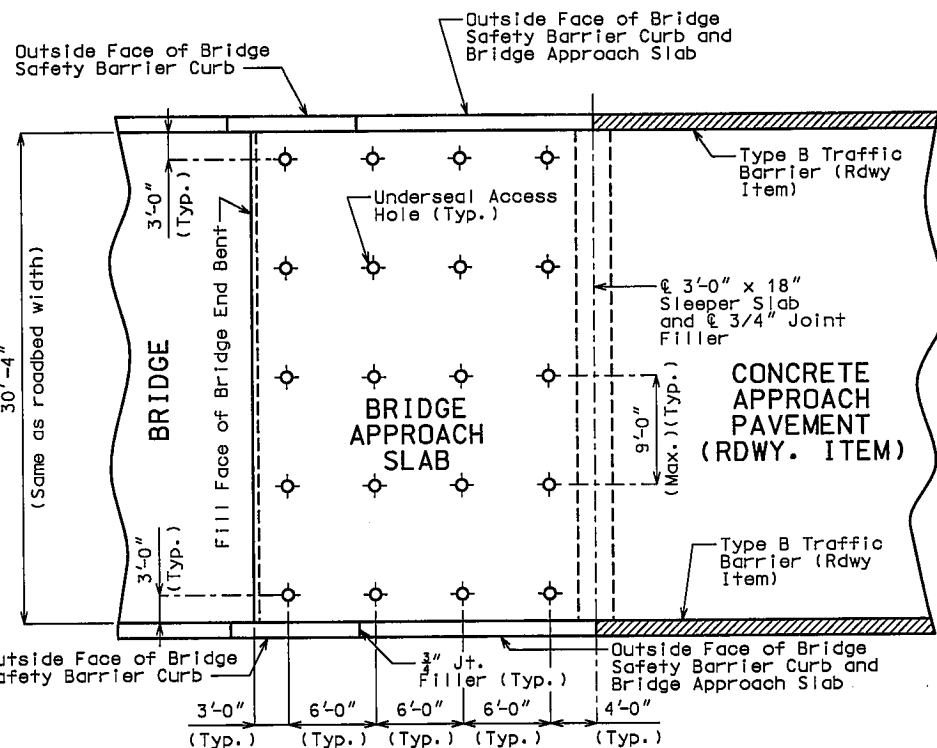
SECTION A-A



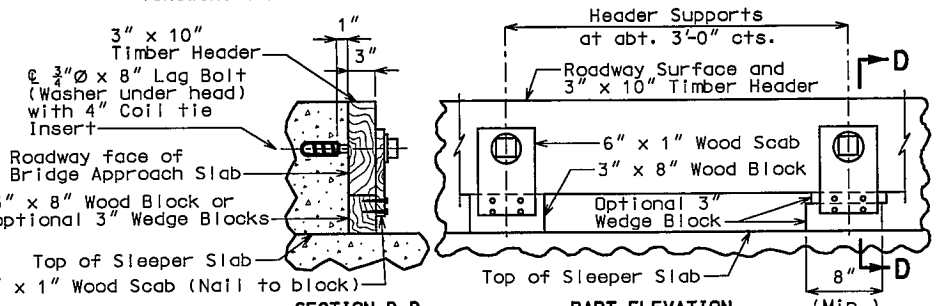
SECTION B-B



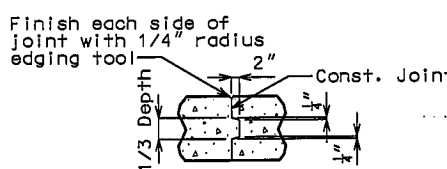
SECTION C-C



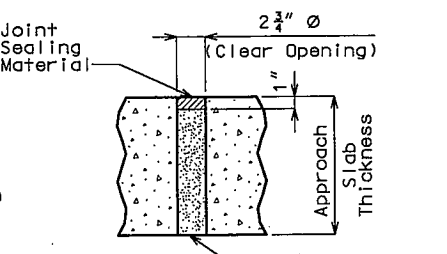
PART PLAN (SHOWING TYPICAL UNDERSEAL ACCESS HOLE LOCATIONS)



SECTION D-D  
PART ELEVATION  
DETAILS OF TIMBER HEADER



CONST. JOINT DETAIL (IF REQUIRED)



TYPICAL UNDERSEAL ACCESS HOLE DETAIL

# FINAL PLANS

## GENERAL NOTES:

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

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

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

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 lap splicing the #4 & #6 bars 18" and 2'-2", respectively.

Mechanical bar splices shall be in accordance with Sec 706.

(\*) Seal joint between vertical face of approach slab and wing with "Silicone Joint Sealant for Saw Cut and Formed Joints" in accordance with Sec 717.

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

Longitudinal construction joints in approach slab and sleeper slab shall be aligned with longitudinal construction joints in bridge or semi-deep slab.

Payment for furnishing all materials, labor and excavation necessary to construct the approach slab, including the timber header, sleeper slab, underdrain, Type 5 aggregate base, joint filler and all other appurtenances and incidental work as shown on this sheet, complete in place, will be considered completely covered by the contract unit price for Bridge Approach Slab (Bridge) per square yard.

For Concrete Approach Pavement details, see roadway plans.

At the contractor's option, Grade 40 reinforcement may be substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge abutment. No additional payment will be made for this substitution.

When Grade 40 reinforcement is substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge abutment, the reinforcement may be bent up to 90 degrees with a 2" minimum radius near the abutment to allow compaction of the backfill material near the abutment. Damage to epoxy coating shall be repaired in accordance with Sec 710.

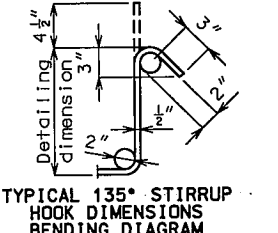
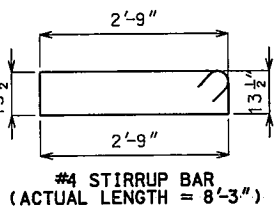
Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

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

Cost of furnishing and installing resin anchor system complete-in-place will be considered completely covered by the contract unit price for Bridge Approach Slab.

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".

An epoxy coated #5 Grade 60 Reinforcing bar 2'-6" long shall be substituted for the 5/8" dia. threaded rod.



Note: Nominal lengths are based on out to out dimensions shown in bending diagram and are listed for fabricators use (nearest inch).

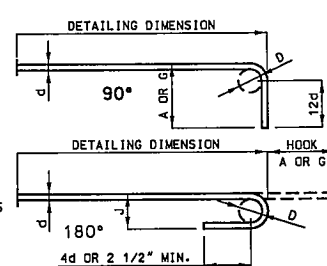
Detailed December 2011  
Checked December 2011

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

Sheet No. 5 of 6

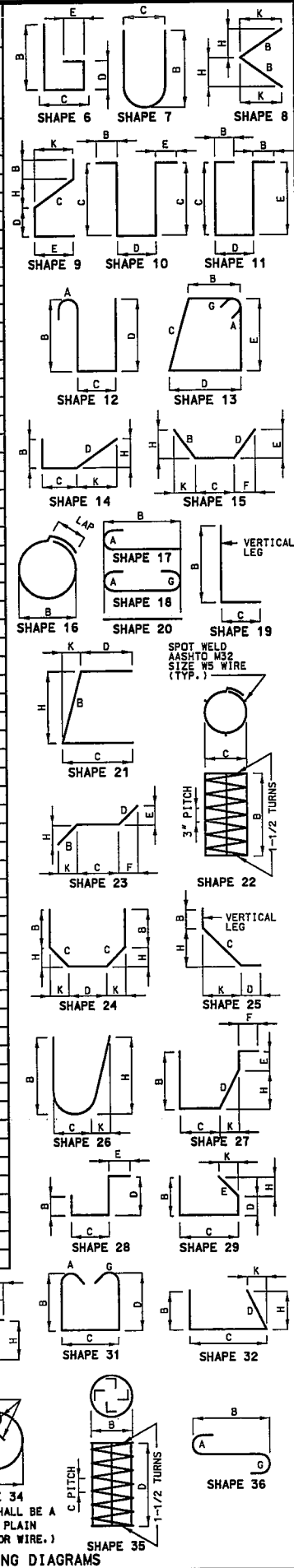
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DATE PREPARED	2/13/12	
	ROUTE	STATE
	169	MO
	DISTRICT	SHEET NO.
COUNTY	CLAY	
	JOB NO.	
	J4U1314B	
	CONTRACT ID.	
PROJECT NO.	120420-C01	
	PROJECT NO.	
	FAF-169-1(79)	
	BRIDGE NO.	
DESCRIPTION	A46421	
DATE		
MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION		
105 WEST CAPITAL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)		
HDR Engineering, Inc. 4435 Main Street Suite 1000 Kansas City, MO 64111-1856 816-360-2700 Certificate of Authority: 000856		

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END HOOK DIMENSIONS					
BAR SIZE	D. (IN.)	ALL GRADES			
		180°		90° HOOKS	
		A OR G	C	A OR G	C
#3	2 1/4"	5"	3"	5"	3"
#4	3"	6"	4"	8"	6"
#5	3 3/4"	7"	5"	10"	7"
#6	4 1/2"	8"	6"	12"	8"
#7	5 1/4"	10"	7"	14"	10"
#8	6"	11"	8"	16"	11"
#9	9 1/2"	15"	11 3/4"	19"	15"
#10	10 3/4"	17"	13 1/4"	22"	17"
#11	12"	19"	14 3/4"	21"-0"	19"
#14	18 1/4"	23"	21 3/4"	21"-0"	23"

**NOTE:**  
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEGREE ARE TO BE BENT WITH SAME  
PROCEDURE AS FOR 90 DEGREE STANDARD HOOKS.  
HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH THE PROCEDURES AS SHOWN ON THIS SHEET.  
E = EPOXY COATED REINFORCEMENT.  
S = STIRRUP.  
X = BAR IS INCLUDED IN SUBSTRUCTURE QUANTITIES.  
V = BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE  
AND THE FOLLOWING LINE.  
NO. E.A. = NUMBER OF BARS OF EACH LENGTH.  
NOMINAL LENGTHS ARE BASED ON OUT TO OUT DIMENSIONS SHOWN IN BENDING DIAGRAM AND  
ARE LISTED FOR FABRICATORS USE. (NEAREST INCH)  
ACTUAL LENGTHS ARE MEASURED ALONG CENTERLINE BAR TO THE NEAREST INCH.  
PAYWEIGHTS ARE BASED ON ACTUAL LENGTHS.  
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 (GRADE 60) FY = 60,000 PSI.

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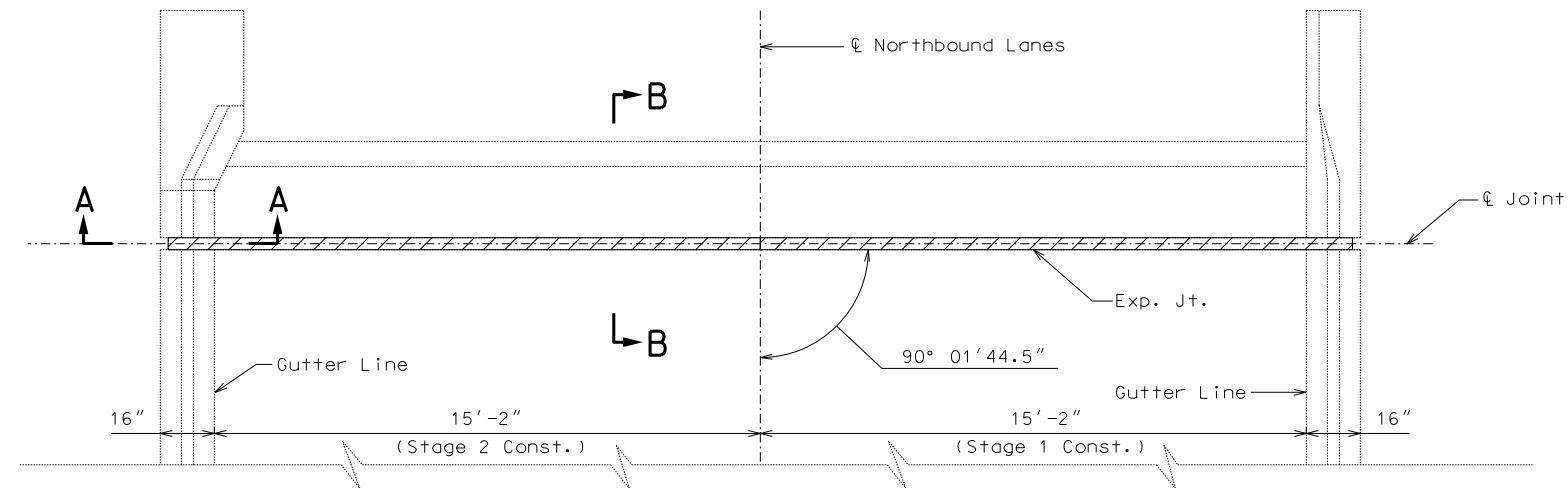
**HDR**  
HDR Engineering, Inc.  
44435 Main Street  
Suite 1000  
Kansas City, MO 64111-1856  
816-360-2700  
Certificate of Authority: 000856

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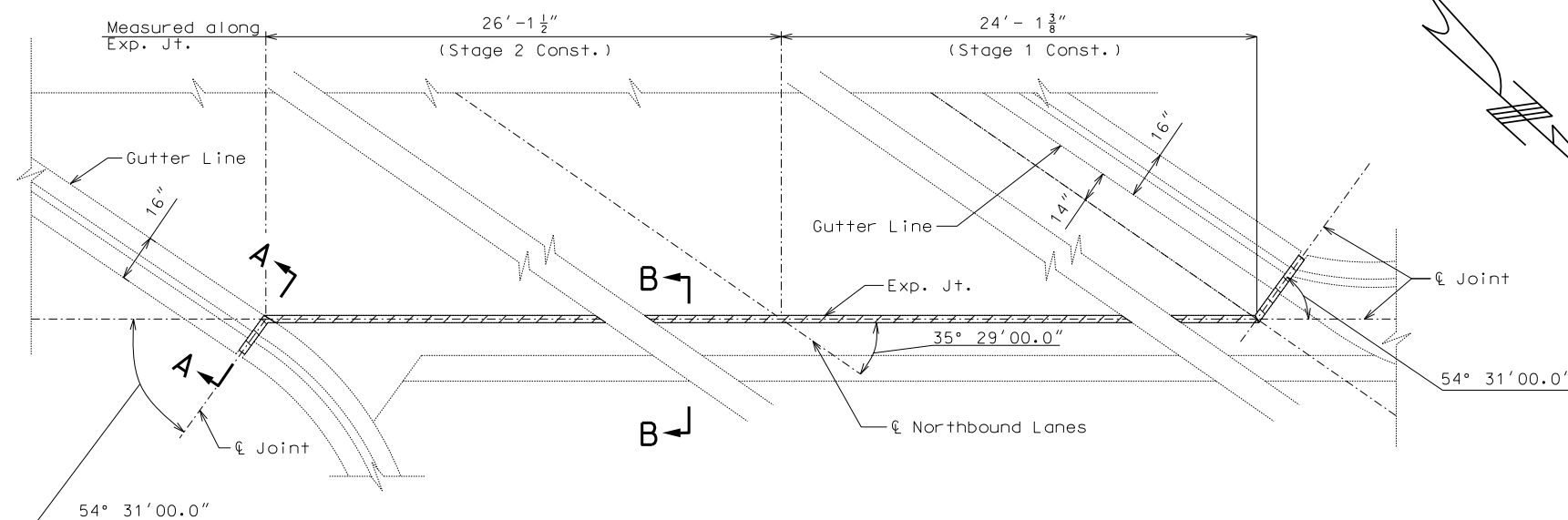
REV.







PLAN SOUTH ABUTMENT



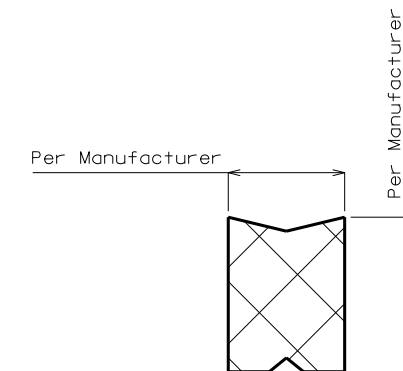
PLAN NORTH ABUTMENT

Notes:

Existing expansion joints shall be replaced with preformed silicone or EPDM expansion joint seal.

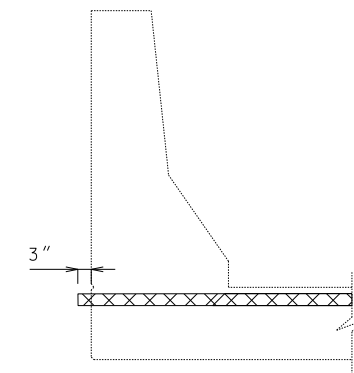
Seals shall be fabricated and installed in accordance with the manufacturer's recommendations. Plan dimension is based on installation at 60°F. The expansion gap may be increased or decreased  $\frac{1}{16}$ " for each 10°F fall or rise in temperature at installation.

All compression seal joints shall be replaced.(2 Total).

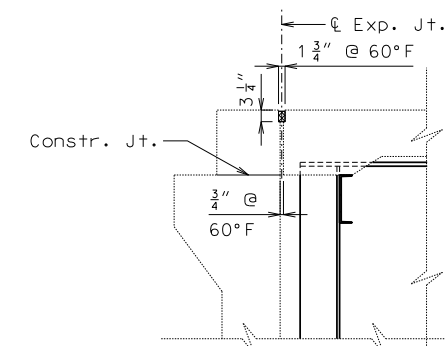


### SEAL DETAIL

(Showing uncompressed configuration.  
Cross section varies per manufacturer.)



SECTION A-A



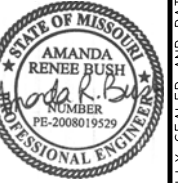
SECTION B-B

DETAILED: CMS Sept. 2014  
CHECKED: ARB Sept. 2014

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

Sheet No. 3 of 4

\\leighokane\production\Current Projects\14-18 44 Bridge Repair\Structural\Microstation\A46422\B\_A46422\_003\_J4I3028\_Expansion\_Jt\_details.dgn 2:31:47 PM 10/31/2014




DATE PREPARED  
October 31, 2014

ROUTE 69 NB	STATE MO
DISTRICT BR	SHEET NO. 3

COUNTY	CLAY
JOB NO.	J413028
CONTRACT ID.	

PROJECT NO.	SHEET

BRIDGE NO.  
A46422

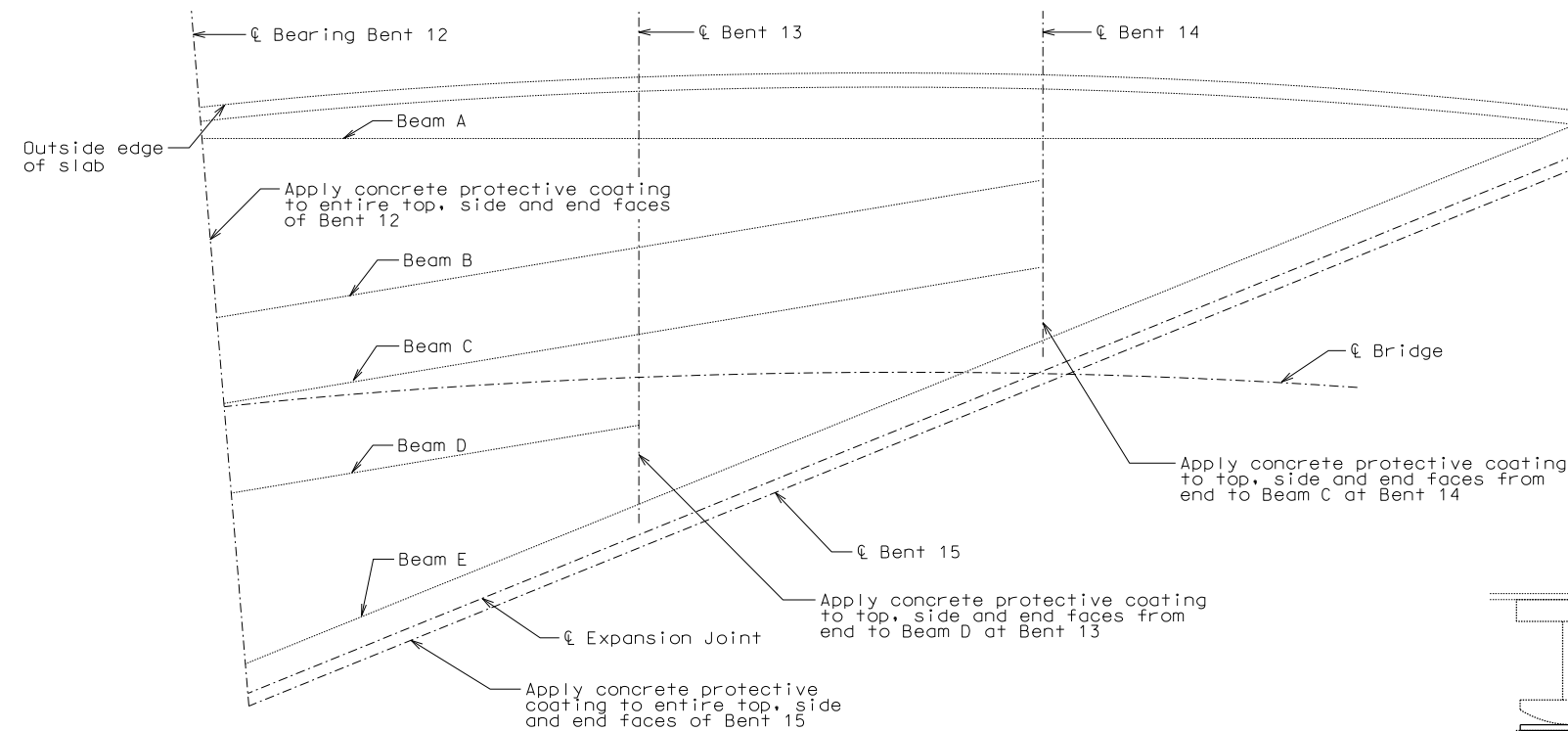
105 WEST CAPITAL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MDOT (1-888-275-6636)

**Leigh & O'Kane, LLC**  
**Structural Engineers**  
 MO State Certificate of Authority #001644  
 9201 Ward Parkway, Suite 301  
 Kansas City, MO 64114  
 816.444.3144 P  
 816.444.9655 F  
[www.leok.com](http://www.leok.com)



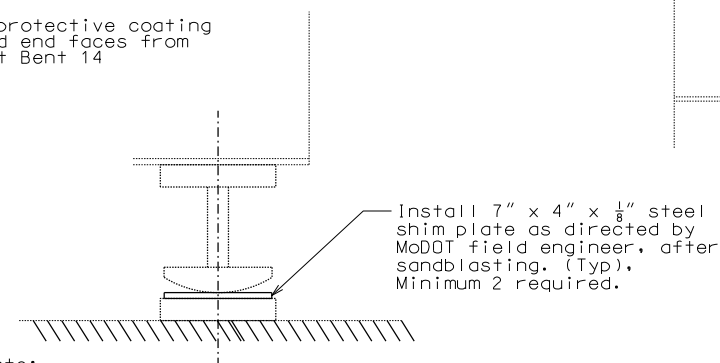
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

REV.



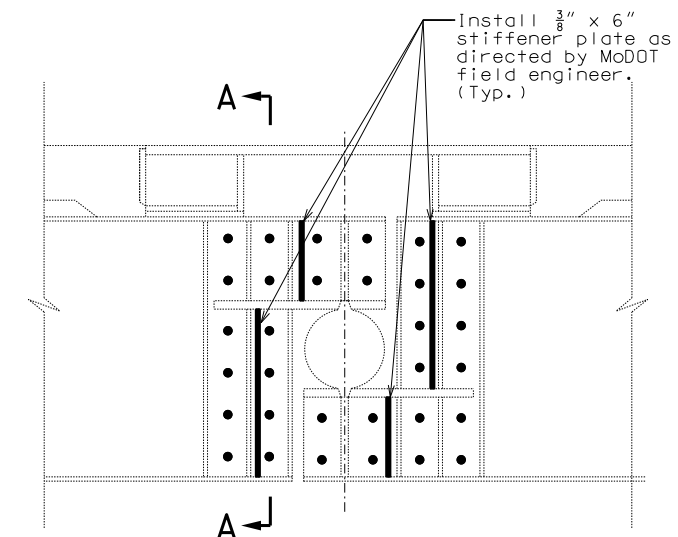
## LIMITS OF CONCRETE PROTECTIVE COATING

Note: Top, ends & sides of entire cap for Bents 3, 6, 9, 12, 15 & 16 shall be coated.

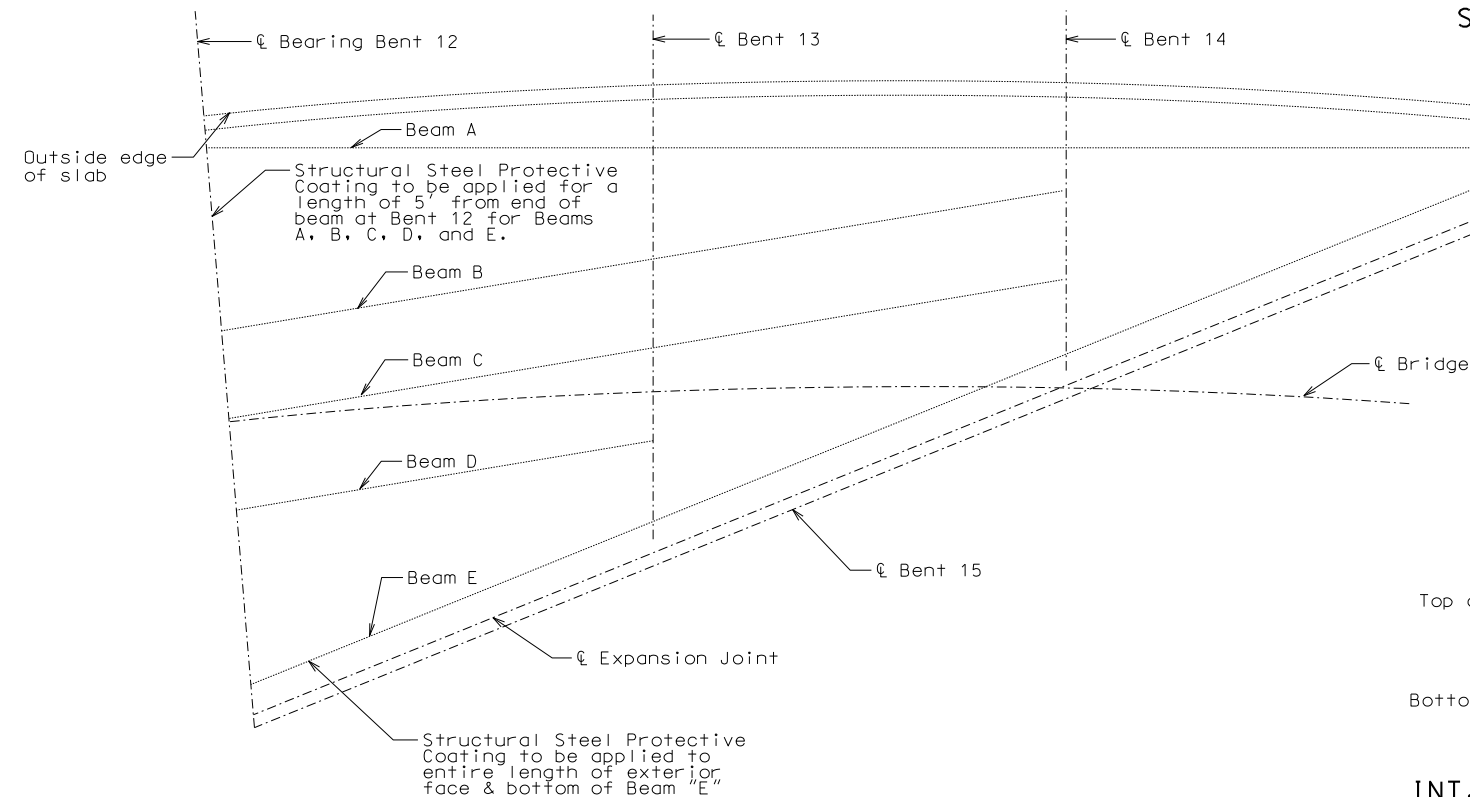


Note:

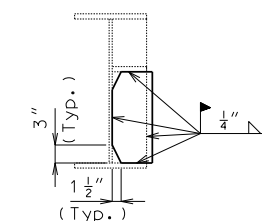
Payment for shim plate, complete-in-place, will be considered covered, by the contract unit price for Fabricated Structural Carbon Steel.



### STIFFENER INSTALLATION - DETAIL AT EXPANSION JOINT



## LIMITS OF STRUCTURAL STEEL PROTECTIVE COATING

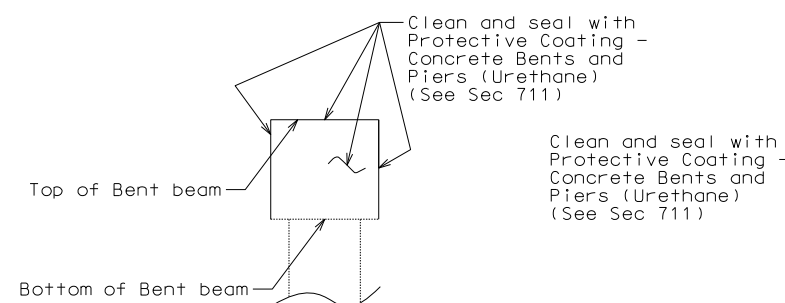


SECTION A-A

Notes:

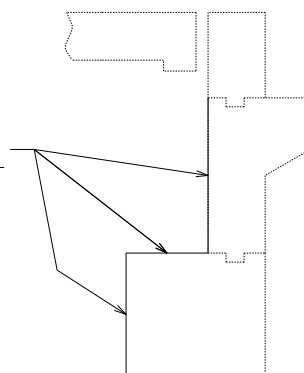
$\frac{3}{8}$ " x 6" stiffener plates to be placed against and welded to backside of existing angles. Contractor shall field verify required length of plate.  
Minimum 60 required.

Payment for stiffener plate, complete-in-place, will be considered covered by the contract unit price for Fabricated Structural Carbon Steel.



PART END ELEVATION OF  
INT. BENTS NO. 3, 6, 9, 12, 15 & 16  
PROTECTIVE COATING

Note: Bents 13 & 14 similar



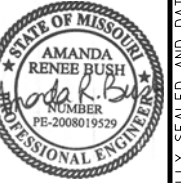
TYPICAL SECTION THRU  
SOUTH & NORTH END BENTS  
SHOWING PROTECTIVE COATING

DETAILED: CMS Sept. 2014  
CHECKED: ARB Sept. 2014

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

Sheet No. 4 of 4

\\leighokane\production\Current Projects\14-18 44 Bridge Repair\Structural\Microstation\A46422\B\_A46422\_004\_J4I3028\_Misc\_details.dgn 2:26:25 PM 10/31/2014



DATE PREPARED  
October 31, 2014


ROUTE 69 NB	STATE MO
DISTRICT BR	SHEET NO. 4

COUNTY	CLAY
JOB NO.	J413028
CONTRACT ID.	

PROJECT NO.	SHEET

BRIDGE NO.  
A46422


IF A SEAL IS PRESENT ON \_\_\_\_\_



COMMISSION

105 WEST CAPITOL  
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