

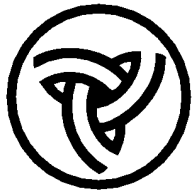


I-270 over the Mississippi River

Phase I Study - Addendum

Madison County

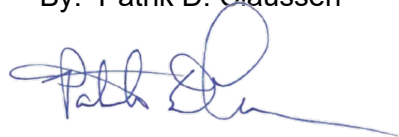
Exhibit F – IDOT BBS Approval of Hydraulic Report



Illinois Department of Transportation

Memorandum

To: Keith W. Roberts, Dist. 8 Attn: Tiffany Brase
From: D. Carl Puzey By: Patrik D. Claussen
Subject: Hydraulic Report
Date: May 18, 2020



FAI Route 270
Section 60B-1
Madison County

P-98-001-15
SNs 060-0350 (EB)
060-0351 (WB)
060-0035 (Exist.)

I-270 over Mississippi River

Reply is made to the April 8, 2020 email from Phil Coppernoll that details the posting on SharePoint of the revised Hydraulic Report (HR) provided by Parsons. There are two approved waterway information tables attached; one is for the construction stage and one for the final proposed crossing condition. Both tables meet the zero rise criteria as discussed in a meeting with the Illinois Department of Natural Resources-Office of Water Resources (IDNR-OWR) on March 5, 2018. Also attached is a table showing scour depths and scour depth elevations for all the analyzed flood frequencies along with a draft version of the GP&E.

The original HR was approved on June 29, 2018 as documented in a memo from the Bureau of Bridges and Structures to the District office. An April 24, 2020 document later provided by Parsons upon request detailed the HR revisions.

The following are the changes to the proposed bridge layout and hydraulic report since June 2018 as summarized by Parsons:

Original (Phase 1)

Length = 5,383 ft
Spans = 24
Low Beam = 443.09 ft
Skew = 0 degrees
Pier diameters = 12-ft columns
East Abutment = aligned with existing bridge

Revised/Current (Phase 2)

Length = 5,428 ft
of Spans = 26
Low Beam = 444.85 ft
Skew = varies (all aligned with flow)
Pier diameters = 9-ft columns
East Abutment = aligned with flow

Additional updates to the report included:

- The SMS model was updated for the proposed bridge only and results were used as the input variables for the scour analysis.
- The HEC-RAS model was updated for the proposed bridge and the PR+EX condition and the model was used to compute backwater impacts.
- Scour calculations were revised.
- Riprap was sized using HEC-23 DG 4 and placed at the abutments.
- WIT tables were updated showing very similar results to the Phase 1 tables.

Keith W. Roberts, Dist. 8 / Attn: Tiffany Brase
SNs 060-0350EB, -0351WB, -0035exist.
Page 2
May 18, 2020

Abutment riprap was sized as mentioned above. Please note that a check on the riprap sizing found that a minimum of A-6 riprap will be needed on the abutments based upon the design velocity. Also, it is recommended that a guidebank (or equivalent countermeasure) as suggested in the HR be installed downstream of the eastern abutment due to the turbulence shown in the results from the 2D modeling.

The Mississippi River is classified as a Public Water by the IDNR-OWR and an Individual Permit will be required. Please submit a completed Joint Application Form along with a final copy of the HR for IDNR-OWR review. The bridges will meet the IDOT vertical clearance and freeboard criteria.

The proposed structure is subject to refinement in the proposed phase. If you have any questions or care to discuss, please contact Neil VanBebber at (217) 785-2917 or neil.vanbebbber@illinois.gov.

NV/kkt0600350eb0351wb0035e-20200518



Illinois Department of Transportation

WATERWAY INFORMATION TABLE

Route: FAI 270 (I-270) Existing SN: 060-0035
Section: 60B-1 Proposed SN: TBD
County: Madison, IL & St. Louis City, MO Waterway: Mississippi River
Prepared by: C. Goodwin Date: 03/31/2020 Checked by: M. Martinez Date: 03/31/2020

1D Hydraulic Analysis for Proposed/Final Conditions				Existing Overtopping Elev.		at Sta.		838+01.46	
Drainage Area = 697,000 sq. mi.				Proposed Overtopping Elev.		= 438.32 feet		at Sta.	
Flood Event	Freq. Yr.	Discharge Ft ³ /s	Waterway Opening - ft ²		Natural H.W.E. ft.	Head - ft.		Headwater Elevation ft.	
			Existing	Proposed		Existing	Proposed	Existing	Proposed
Design	10	777,656	144,867	152,746	426.3	0.1	0.0	426.4	426.3
	50	984,883	179,011	188,380	433.3	0.1	0.1	433.4	433.4
Base	100	1,067M	188,974	198,761	435.4	0.2	0.1	435.6	435.5
Scour Design Check	200	1,146M	201,158	211,626	437.8	0.2	0.2	438.0	438.0
Overtop Existing									
Overtop Proposed									
Max. Calc.	500	1,247M	211,346	221,989	439.9	0.2	0.2	440.1	440.1

10 YEAR VELOCITY THROUGH EXISTING BRIDGE = 5.37 ft/s 10 YEAR VELOCITY THROUGH PROPOSED BRIDGE = 5.09 ft/s

ALL-TIME H.W.E. & DATE: 429.16 feet; August 1st 1993

Scope of Work: Remove and replace FAI 270 (I-270) bridge over the Mississippi River

EXISTING STRUCTURE

TYPE: Steel plate girder
LENGTH: 5,409 feet
SPANS: 43
LOW BEAM: 440.30 feet
SKEW: 0 degrees
LOW E.O.P.: 443.30 feet

PROPOSED STRUCTURE

TYPE: Steel plate girder
LENGTH: 5,428 feet
SPANS: 26
LOW BEAM: 444.85 feet
SKEW: Varies
LOW E.O.P.: 451.80

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN THE TSL STAGE.



Illinois Department of Transportation

WATERWAY INFORMATION TABLE

Route: FAI 270 (I-270) Existing SN: 060-0035

Section: 60B-1 Proposed SN: TBD

County: Madison, IL & St. Louis City, MO Waterway: Mississippi River

Prepared by: C. Goodwin Date: 3/31/2020 Checked by: M. Martinez Date: 3/31/2020

Construction		Existing Overtopping Elev.		at Sta.		838+01.46	
		Proposed Overtopping Elev.		at Sta.		867+13.13	
Flood Event	Freq. Yr.	Waterway Opening - ft ²		Head - ft.		Headwater Elevation ft.	
		Existing	Proposed	Existing	Proposed	Existing	Proposed
Design Base	10	144,867	138,552	0.1	0.1	426.4	426.4
	50	179,011	171,208	0.1	0.2	433.4	433.5
	100	188,974	180,731	0.2	0.2	435.6	435.6
Scour Design Check	200	201,158	192,385	0.2	0.2	438.0	438.0
Overtop Existing							
Overtop Proposed							
Max. Calc.	500	211,346	202,124	0.2	0.2	440.1	440.1

10 YEAR VELOCITY THROUGH EXISTING BRIDGE = 5.37 ft/s

10 YEAR VELOCITY THROUGH PROPOSED BRIDGE = 5.62 ft/s

ALL-TIME H.W.E. & DATE: 429.16 feet; August 1st 1993

Scope of Work: Remove and replace FAI 270 (I-270) bridge over the Mississippi River

EXISTING STRUCTURE

TYPE: Steel plate girder

LENGTH: 5,409 feet

SPANS: 43

LOW BEAM: 440.30 feet

SKEW: 0 degrees

LOW E.O.P.: 443.30 feet

PROPOSED STRUCTURE

TYPE: Steel plate girder with existing structure

LENGTH: 5,428 feet (proposed) and 5,409 feet (existing)

SPANS: 26 (proposed) and 43 (existing)

LOW BEAM: 444.85 feet (proposed) and 440.30 feet (existing)

SKEW: Varies

LOW E.O.P.: 451.80 feet

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN TSL STAGE.

By: CIG
Date: 4/1/20
Checked By: MHM
Date: 4/2/20

270 Bridge over Mississippi River
Madison County, IL
Job No. 648725
Pier Scour Tables

10-YEAR SCOUR DEPTH																								
West Overbank Scour - Missouri Approach					Channel Scour															East Overbank Scour - Illinois Approach				
Pier 1	Pier 2	Pier 3	Pier 4	Pier 5	Pier 6	Pier 7	Pier 8	Pier 9	Pier 10	Pier 11	Pier 12	Pier 13	Pier 14	Pier 15	Pier 16	Pier 17	Pier 18	Pier 19	Pier 20	Pier 21	Pier 22	Pier 23	Pier 24	Pier 25
372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	409.64	409.64	409.64	409.64	409.64	409.64	409.64
5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	5.60	9.57	9.57	9.57	9.57	9.57	9.57	9.57
31.51	31.51	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	20.33	17.20	17.20	17.20	17.20	17.20	17.20	17.20
6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
43.11	43.11	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	32.77	32.77	32.77	32.77	32.77	32.77	32.77
329.17	329.17	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	340.35	340.35	376.87	376.87	376.87	376.87	376.87
Elevation of Scour=																								
Channel Bed Elevation=																								
Contraction Scour=																								
Pier Scour=																								
long term degradation=																								
Total Scour Depth=																								
Elevation of Scour=																								
50-YEAR SCOUR DEPTH																								
West Overbank Scour - Missouri Approach					Channel Scour															East Overbank Scour - Illinois Approach				
Pier 1	Pier 2	Pier 3	Pier 4	Pier 5	Pier 6	Pier 7	Pier 8	Pier 9	Pier 10	Pier 11	Pier 12	Pier 13	Pier 14	Pier 15	Pier 16	Pier 17	Pier 18	Pier 19	Pier 20	Pier 21	Pier 22	Pier 23	Pier 24	Pier 25
372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	409.64	409.64	409.64	409.64	409.64	409.64	409.64
16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	16.44	3.36	3.36	3.36	3.36	3.36	3.36	3.36
33.15	33.15	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	20.73	17.16	17.16	17.16	17.16	17.16	17.16	17.16
6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
55.59	55.59	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	43.17	26.52	26.52	26.52	26.52	26.52	26.52	26.52
316.69	316.69	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	329.11	340.35	340.35	376.87	376.87	376.87	376.87	376.87
Elevation of Scour=																								
Channel Bed Elevation=																								
Contraction Scour=																								
Pier Scour=																								
long term degradation=																								
Total Scour Depth=																								
Elevation of Scour=																								
100-YEAR SCOUR DEPTH																								
West Overbank Scour - Missouri Approach					Channel Scour															East Overbank Scour - Illinois Approach				
Pier 1	Pier 2	Pier 3	Pier 4	Pier 5	Pier 6	Pier 7	Pier 8	Pier 9	Pier 10	Pier 11	Pier 12	Pier 13	Pier 14	Pier 15	Pier 16	Pier 17	Pier 18	Pier 19	Pier 20	Pier 21	Pier 22	Pier 23	Pier 24	Pier 25
372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	409.64	409.64	409.64	409.64	409.64	409.64	409.64
20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	4.22	4.22	4.22	4.22	4.22	4.22	4.22
34.30	34.30	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	20.96	17.99	17.99	17.99	17.99	17.99	17.99	17.99
6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
60.35	60.35	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	47.00	28.21	28.21	28.21	28.21	28.21	28.21	28.21
311.93	311.93	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	325.28	381.43	381.43	381.43	381.43	381.43	381.43	381.43
Elevation of Scour=																								
200-YEAR SCOUR DEPTH																								
West Overbank Scour - Missouri Approach					Channel Scour															East Overbank Scour - Illinois Approach				
Pier 1	Pier 2	Pier 3	Pier 4	Pier 5	Pier 6	Pier 7	Pier 8	Pier 9	Pier 10	Pier 11	Pier 12	Pier 13	Pier 14	Pier 15	Pier 16	Pier 17	Pier 18	Pier 19	Pier 20	Pier 21	Pier 22	Pier 23	Pier 24	Pier 25
372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	409.64	409.64	409.64	409.64	409.64	409.64	409.64
23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	4.69	4.69	4.69	4.69	4.69	4.69	4.69
34.62	34.62	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	18.79	18.79	18.79	18.79	18.79	18.79	18.79
6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
64.28	64.28	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	50.91	29.98	29.98	29.98	29.98	29.98	29.98	29.98
308.00	308.00	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	321.37	379.65	379.65	379.65	379.65	379.65	379.65	379.65
Elevation of Scour=																								
500-YEAR SCOUR DEPTH																								
West Overbank Scour - Missouri Approach					Channel Scour															East Overbank Scour - Illinois Approach				
Pier 1	Pier 2	Pier 3	Pier 4	Pier 5	Pier 6	Pier 7	Pier 8	Pier 9	Pier 10	Pier 11	Pier 12	Pier 13	Pier 14	Pier 15	Pier 16	Pier 17	Pier 18	Pier 19	Pier 20	Pier 21	Pier 22	Pier 23	Pier 24	Pier 25
372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	372.28	409.64	409.64	409.64	409.64	409.64	409.64	409.64
28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	28.12	4.69	4.69	4.69	4.69	4.69	4.69	4.69
33.94	33.94	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	22.30	19.59	19.59	19.59	19.59	19.59	19.59	19.59
6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
68.06	68.06	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	56.42	30.28	30.28	30.28	30.28	30.28	30.28	30.28
400.27	400.27	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	315.86	379.36	379.36	379.36	379.36	379.36	379.36	379.36
Elevation of Scour=																								

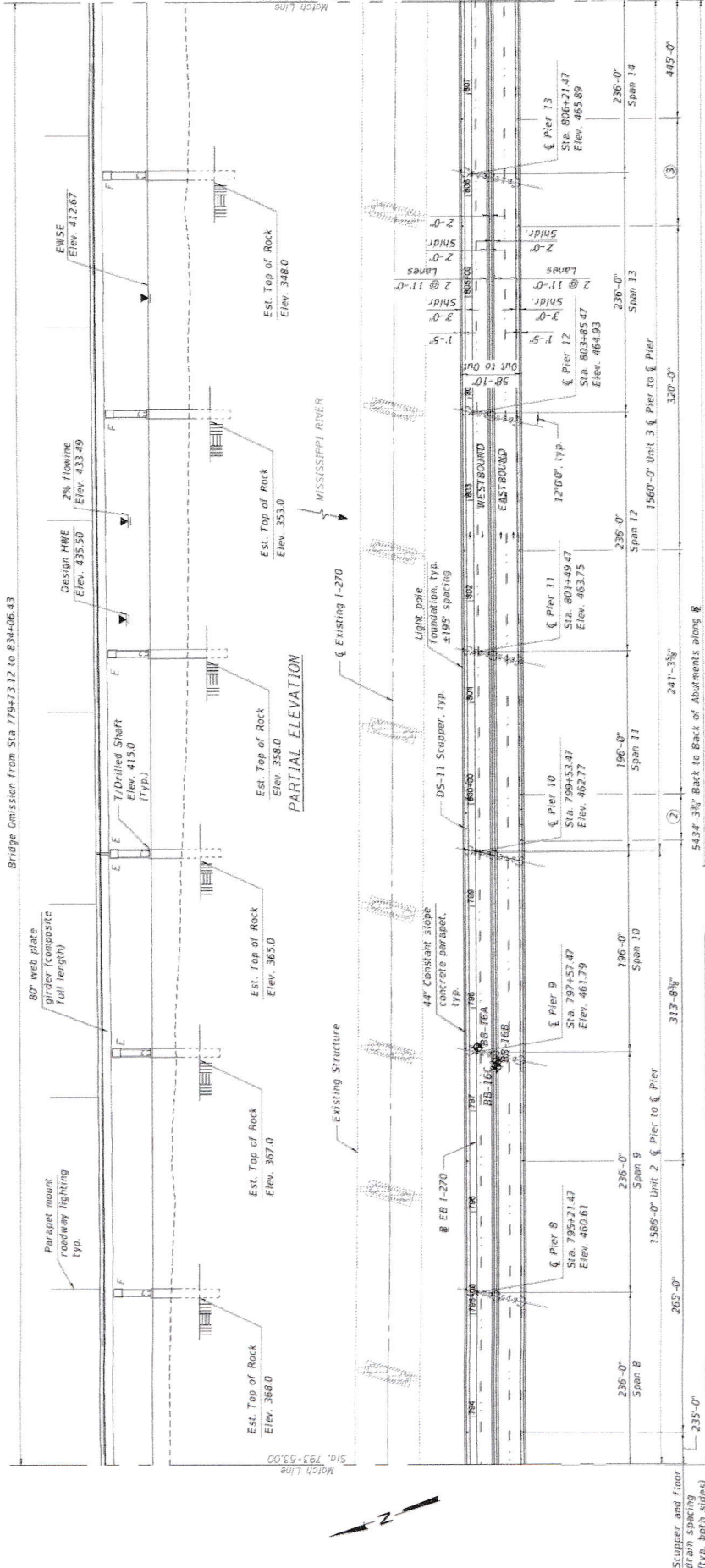
Notes: (continued)
 Proposed lighting unit: 50 ft. aluminum pole, 15" ball circle diameter, mounted on bridge parapet wall.
 Lighting unit is subject to refinement during the design phase.
 All structural steel shall be millized.
 For scupper type see Cross Sections on Sheet 6.

WATERWAY INFORMATION

Flow	Q, C.F.S.	Exist.	Prop.	Head - Ft.	Headwater Ft.
Flood	777.656	144.867	252.746	426.3	426.3
100-Yr	50	984.883	179.011	433.3	433.4
Design	50	984.883	179.011	433.3	433.4
Base	500	1,067.0	199.974	435.4	435.5
Max. Calc.	500	1,247.0	211.346	435.3	440.1

- 3 Spacing of 15' centers
- Specify 6" diameter from last floor drops of 15'-0" centers from Station 805+73.00 to 896+75.00. Unit drains that are within 10'-0" from the face of Pier 13.

Bridge Omission from Sta 779+73.12 to 834+06.43



PARTIAL PLAN

GENERAL PLAN & ELEVATION - 2
 I-270 OVER THE MISSISSIPPI RIVER
 PUBLIC WATER

F.A.I. RTE. 1270 - SEC. 608-1
 MADISON (IL) AND ST. LOUIS (MO) COUNTIES
 STATION 806+89.78
 STRUCTURE NO. 060-0350 (EB)

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
608-1	MADISON	CONTRACT NO. 76190	
278		BLDG. REQ. AND PROJECT	

DESIGNED	CHECKED	NOTED	REVISION

HORNER SHIPAN
 PARSONS
 4.06.13 PM

Notes:

- All Elevations are given in NAVD 88B Datum unless noted.
- EWSE = Estimated Water Surface Elevation.
- HWE = High Water Elevation.
- For ground elevations see Sheet 7.
- Denotes soil boring.
- For Scupper Hole see Cross Sections on Sheet 6.

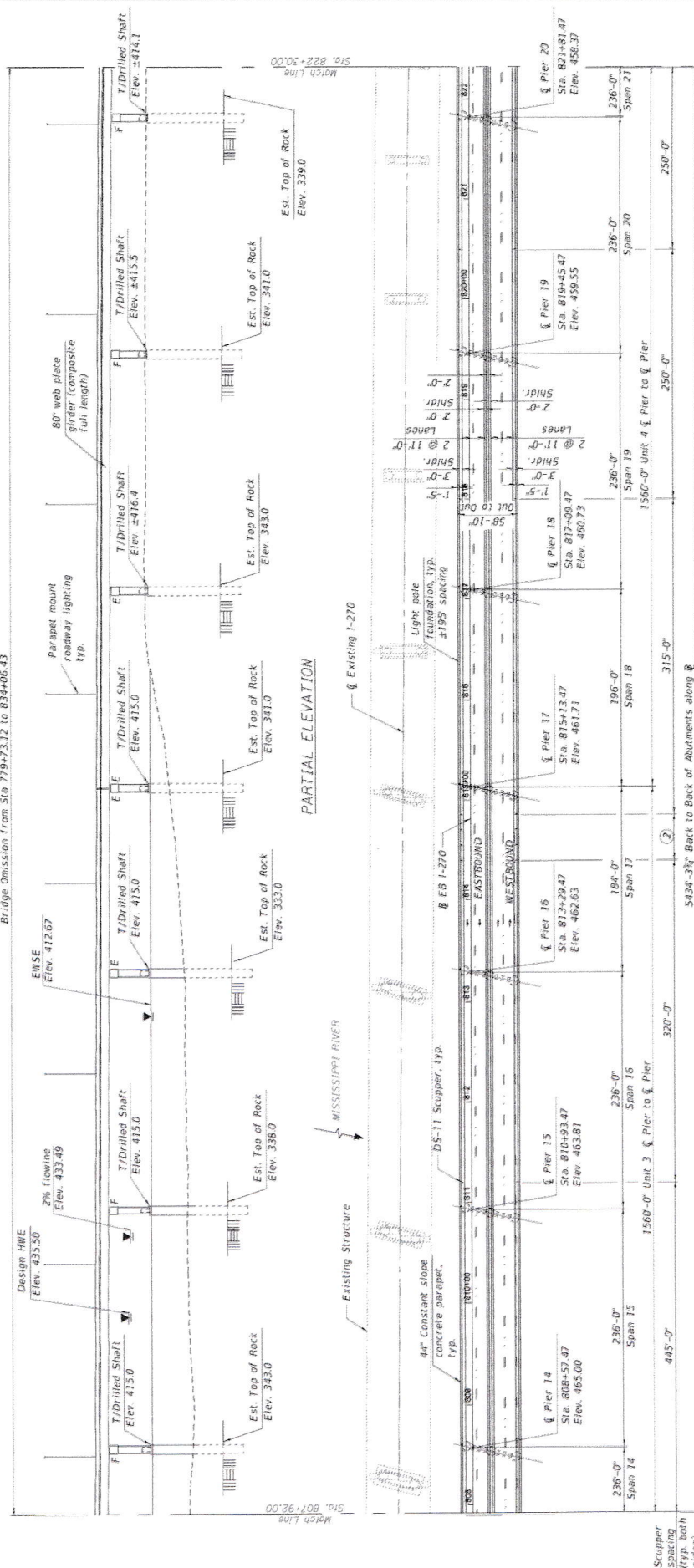
Notes (continued):

- Proposed lighting mounted on bridge.
- Lighting unit is aluminum.
- All structural steel.

Notes (continued):
Proposed lighting unit: 50 ft. aluminum pole, 15" bolt circle diameter,
mounted on bridge parapet wall.
Lighting unit is subject to refinement during the design phase.
All structural steel shall be galvanized.

Notes:
 All Elevations are given in NAVD 1988 Datum unless noted.
 EWSF = Estimated Water Surface Elevation.
 HWE = High Water Elevation.
 For ground elevations see Sheet 7.
 Denotes soil boring.
 For scraper type see Cross Sections on Sheet 6.

Bridge Omission from Sta 779+73.12 to 834+06.43



PARTIAL PLAN

GENERAL PLAN & ELEVATION - 3
1-270 OVER THE MISSISSIPPI RIVER

PUBLIC WATER

F.A.I. RTE 1270 - SEC. 60B-1

MADISON (IL) AND ST. LOUIS (MO) COUNTIES

STATION 806+89.78

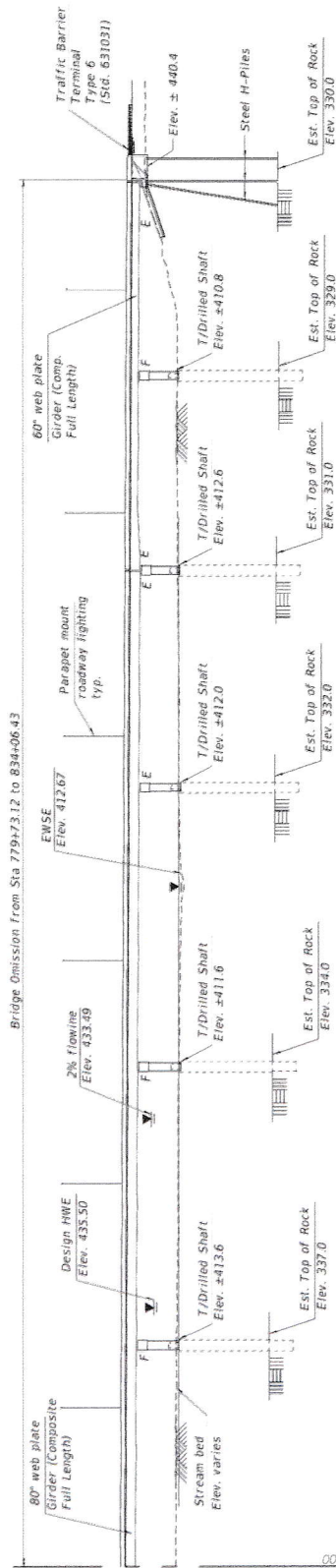
STRUCTURE NO. 060-0350 (EB)

 HORNIER-SHIFFIN	DESIGNED -	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	COUNTY SHEETS MADISON 688-1 SECTION 270	TOTAL SHEETS CONTRACT NO. 76190
	CHECKED -	REVISED -			
 PARSONS	DRAWN -	REVISED -	SHEET 24 OF 24	11.00' x 22.00'	11.00' x 22.00'
NOT SCALE	DRAWN -	REVISED -			

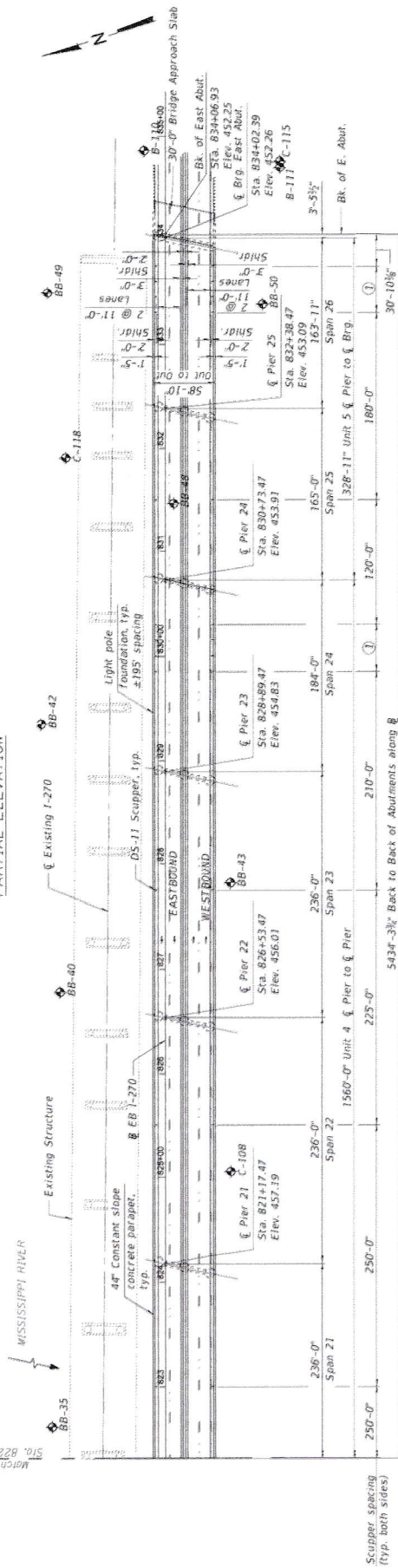
Notes: (continued)
 Proposed lighting unit: 50 ft. aluminum pole, 15" ball circle diameter, mounted on bridge parapet wall.
 Lighting unit is subject to refinement during the design phase.
 All structural steel shall be metallized.

Notes (continued):
 All Elevations are given in NAVD 88B Datum unless noted.
 EWS = Estimated Water Surface Elevation.
 HWE = High Water Elevation.
 For ground elevations see Sheet 7.
 Denotes soil boring.
 For scupper type see Cross Sections on Sheet 6.

Bridge Omission from Sta 779+73.12 to 834+06.43



PARTIAL ELEVATION



PARTIAL PLAN

GENERAL PLAN & ELEVATION - 4
 I-270 OVER THE MISSISSIPPI RIVER
 PUBLIC WATER
 F.A.I. RTE. 1270 - SEC. 60B-1
 MADISON (IL) AND ST. LOUIS (MO) COUNTIES
 STATION 806+89.78
 STRUCTURE NO. 060-0350 (EB)

HORNER-SHAFER ENGINEERS 4150 N. 10th St. Lincoln, NE 68504	DESIGNED - CHECKED - DRAWN - POST DATE -	REVISIONS REVISION REVISION REVISION REVISION	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	SHEET 4 OF 7 SHEETS	SECTION 60B-1	COUNTY MADISON	TOTAL SHEET 7	CONTRACT NO. 70590