UNDERWATER BRIDGE INSPECTION
SUPPLEMENTAL REPORT
for

Bridge 2440
Minnesota Trunk Highway 65
over
Mississippi River

CONTENTS OF REPORT

PREPARED FOR:
Minnesota Department of Transportation

PERFORMED BY:
Parsons Brinckerhoff Quade and Douglas, Inc.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

John F. Elwell

John F. Elwell
Date 6-18-97 Registration No. 15382

Reviewed:
L.M. Amundson

Reviewed:
R. L. Rhodes
Diving Supervisor, Lead Inspector

I. EXECUTIVE SUMMARY

REPORT SUMMARY:

The substructure units inspected at Bridge No. 2440, Piers 1 thru 8 were found to be generally in fair condition. There was significant spalling of shotcrete repairs above the waterline and large areas of deep scaling at and below the waterline on all piers. The channel bottom around the substructures is presently stable, with the exception of Pier 5. The voids under the footing at Pier 5 appear to have enlarged since the last inspection of October 1991.

INSPECTION FINDINGS:

- Scaling of the concrete surfaces has progressed since the last inspection. All piers exhibit heavy to severe scaling with exposed and loose aggregate from the waterline to the top of the footing bell.
- Portions of the footing bell were exposed at Piers 2, 5, 6 and 7. The vertical exposure, including the footing bevel ranged from 0 to 10 feet.
- At Piers 1 and 5 there were voids present at the upstream end, with a maximum penetration under the footing of approximately 6.5 feet. The previous inspection reported only one void at Pier 5, located in the northwest corner of the footing, with a maximum penetration of ±3'. These voids may be the result of long-term erosion of the concrete and bedrock by river currents. It appears that this erosion as progressed since the last inspection, done in 1991.
- Pier 2 exhibits a spalled area with exposed reinforcing steel.
- Pier 7 footing face exhibited scaled areas up to 1 foot deep.
- Concrete and steel reinforcing debris was found around Piers 1, 2, 5 and 7.
- At Pier 5 there was a large amount of timber debris, with large trees extending 5 feet above the waterline.

RECOMMENDATIONS:

- Remove the timber debris as part of routine maintenance.
- Repair void areas in footings at Piers 1 and 5.
- Repair severely spalled areas and exposed reinforcement.
- Inspect the bridge underwater at intervals not to exceed five years.

II. INTRODUCTION

This report has been prepared by Parsons Brinckerhoff for the Minnesota Department of Transportation in accordance with the National Bridge Inspection Standards (NBIS), the Manual for Maintenance and Inspection of Bridges (AASHTO), and pertinent FHWA regulations, advisories and guidelines. The Minnesota Recording and Coding Guide and the Mn/DOT Pontis Bridge Inspection Booklet were used to determine applicable condition codes, underwater inspection codes and scour codes.

The underwater inspection was both a visual and a tactile inspection of the entire underwater portion of each substructure which was identified by the State as requiring underwater inspection. Surfaces on which marine growth impeded inspection were partially cleaned as recommended in the inspection guidelines. All observed deficiencies were noted.

Inspections included checking all concrete for erosion, wear, abrasion, scaling, spalling, exposure and deterioration, and for any exposed reinforcing steel and all cracking. All exposed structural steel and piling were checked for mis-alignment and loss of section. All submerged timber was checked for presence of marine bores, evidence of fungus decay and for excessive weathering and soundness. The channel bottom around each substructure was probed, and the presence, size, condition and limits of riprap was noted. Profiles were taken along the upstream and downstream bridge fascias and around substructure units as necessary to determine the location and approximate size of scour holes. Profiles were also taken 100 and 200' upstream and downstream, as necessary to depict the river bottom profile. submerged secondary members were inspected for soundness of the members and connections.

The level of inspection on this bridges was Level 2.

III. BRIDGE SITE AND DESCRIPTION

1. BRIDGE DATA

Bridge Number:	2440
Feature Crossed:	The Mississippi River
Feature Carried:	Minnesota Trunk Highway No. 65
Location:	District 5, Hennepin County, Minnesota
Bridge Description:	Bridge No. 2440 is a seven span concrete arch superstructure with a two span steel beam superstructure at the south end and a two span prestressed beam superstructure at the north end. The concrete arch portion is supported by eight reinforced concrete piers, numbered 1 to eight, beginning at the southerly end of the bridge.
Bridge Access:	Public boat landing at Boom Island

IV. UNDERWATER BRIDGE INSPECTION

1. INSPECTION DATA

Professional Engineer: John F. Elwell
State of Minnesota, P.E. No. 15382

Dive Team: Ritchie L. Rhodes, Kenneth F. Ulrich, Kevin Meier

Date: August 30, 1996

Weather Conditions: Clear, ± 80° F

Underwater Visibility: ±1 foot

Waterway Velocity: ± 1.0 fps

2. SUBSTRUCTURE INSPECTION DATA

Substructures Inspected: Piers 1 through 8

General Shape: The pier shafts are rectangular shafts with rounded noses and bell out to form a rectangular footing, with either a square or rounded end, that rests on rock.

Maximum Water Depth at Substructure Inspected: Approximately 15.0'

3. WATERLINE DATUM

Water Level Reference: Top of sidewalk at Pier 1, west side.
Elevation = 849.1'

Water Surface: Approximately 51.5' below reference.
Waterline Elevation = 797.6'

4. DEFICIENCIES

- Pier 1 exhibited heavy scaling around the entire pier with localized areas 2' to 3' high by 18' long by 1.0' to 1.5' deep. The aggregate is generally loose.
- There is a section of exposed sheet pile wall along the south edge of the footing on Pier 1. The sheet piling is about 18' long extending south from the north end of the pier. There is a void area above the sheet piling about 18' long x 2' high x 2.5' deep.
- At Piers 1, 2, 5 and 7 there is a large accumulation of concrete and reinforcing steel debris.
- Pier 2 exhibited heavy scaling up to 2" deep around the entire pier with localized areas of deep spalls, up to 6" deep with exposed reinforcing steel.
- Pier 3 exhibited moderate scaling 1' to 2' high around the entire pier with localized areas of severe scaling at the upstream nose with depths up to 8".
- Pier 4 exhibited moderate scaling around the entire pier.
- Pier 5 exhibited moderate scaling around the entire pier. A large accumulation of timber debris was located at the southwest corner of the pier. There were two void areas at the

upstream nose of the footing. The void in the south half of the footing nose measures 8' wide x 2.5' high x 6.5' deep. The void in the north half of the footing nose measured 8' wide x 2.5' high x 3' deep. The last inspection reported only one void located in the northwest corner and the reported depth was ±3'.

- Pier 6 exhibited a maximum vertical exposure of the footing of 4.7' at the upstream nose. The exposed face of the footing shows 1-1/2" deep scaling over entire surface. The face of the pier exhibits moderate scaling around entire pier.
- Pier 7 exhibits moderate scaling around entire pier with heavier scaling along the west face. There was vertical footing exposure along the west face with a maximum 4.5 exposure at the center of the south face. The face of the footing exhibits heavy scaling with typical depths of 3" to 4" and localized areas up to 1' deep.
- Pier 8 exhibits heavy scaling along the west face from the mudline to 1.5' above the waterline with a maximum depth of 4".

5. NBIS CODING INFORMATION (Minnesota specific codes used for 92B and 113)

Item 60:	Substructure:	Code	6
Item 61:	Channel and Channel Protection:	Code	7
Item 92B:	Underwater Inspection:	Code	B/08/96
Item 113:	Scour Critical Bridges:	Code	No Change

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site. _____Yes x No

*(**NOTE:** Bridges may also be scour critical if abutment or pier foundations are rated as unstable due to scour potential as determined by a scour evaluation study.)*

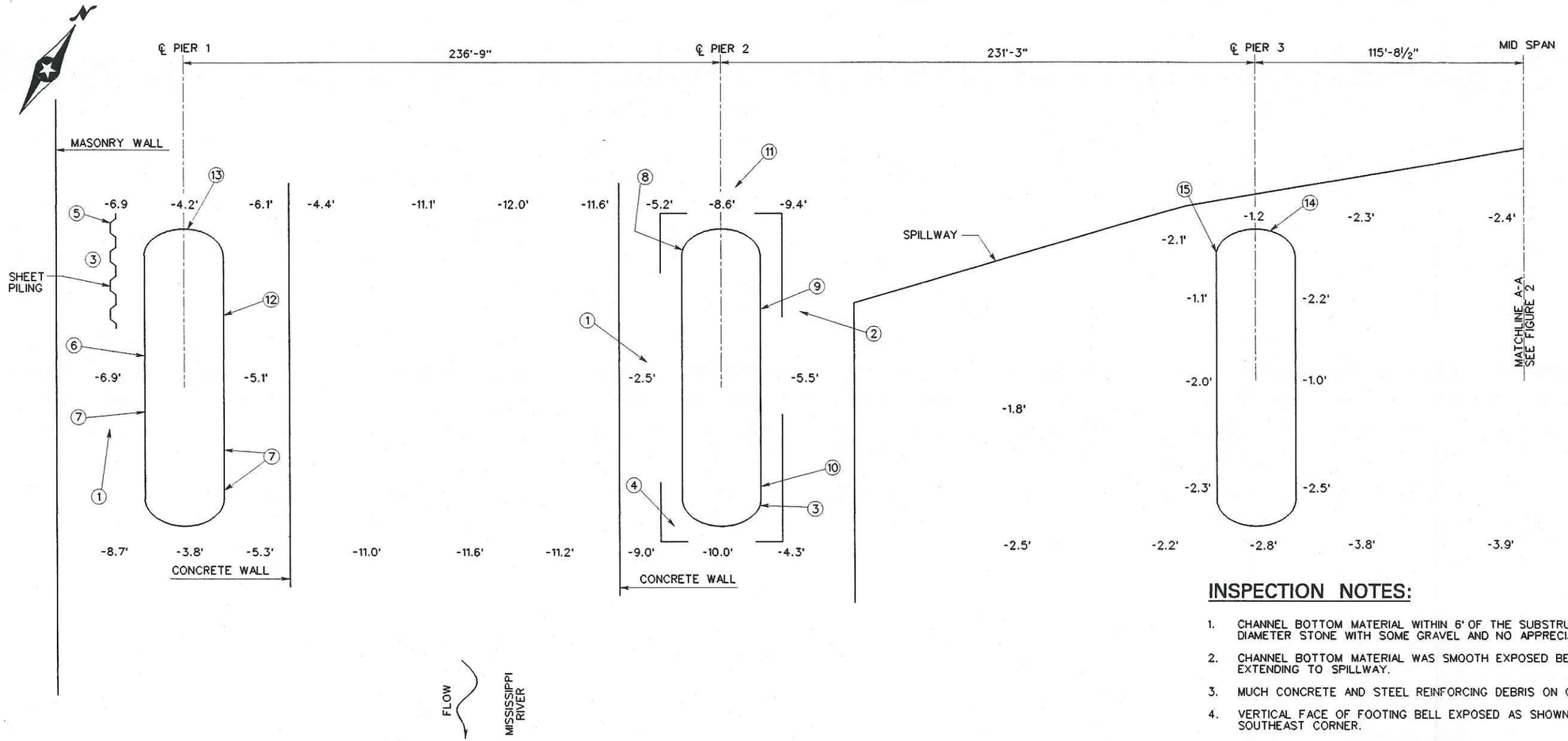
If Yes, Code "D"
If No, Code "No Change"

*It is our opinion that the voids at Piers 1 and 5 are not the result of scour. A scour and foundation stability analysis is probably not warranted.

6. PONTIS CODING INFORMATION

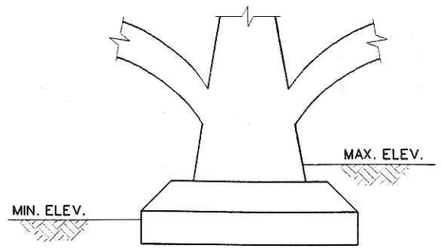
Estimated pier wall length = 1726 feet.

		Condition				
No.	*Element/Quantity*	1	2	3	4	5
60	Reinforced Concrete Pier Wall 1726 LF		1526	200		
180	Channel/Protection	7				
108	Scour	1				



SOUNDING PLAN

N.T.S.



TYPICAL END VIEW OF PIERS

N.T.S.

GENERAL NOTES:

1. PIERS 1 THRU 8 WERE INSPECTED AT THIS BRIDGE.
2. THE WATERLINE REFERENCE WAS TAKEN AT PIER 1. THE DISTANCE FROM THE TOP OF THE SIDEWALK AT THE CENTERLINE OF THE UPSTREAM PIER FACE TO THE WATERLINE AT THE TIME OF THE INSPECTION WAS APPROXIMATELY 51.5' WHICH CORRESPONDS TO A WATERLINE ELEVATION OF 797.6' BASED ON AVAILABLE DESIGN DRAWINGS. FOR SOUNDINGS AND INSPECTION NOTES THE WATERLINE ELEVATION IS ASSUMED TO BE 0.0.
3. ALL OF THE PIER SHAFTS EXHIBITED MODERATE TO HEAVY SCALING WITH EXPOSED AGGREGATE FROM THE WATERLINE TO THE TOP OF THE FOOTING BELL (EL. -2.5'). THE TYPICAL PENETRATION OF THIS SCALING WAS BETWEEN 1" AND 2". AREAS OF HEAVIER SCALING AND/OR SPALLING ARE IDENTIFIED IN THE INSPECTION NOTES.
4. THE EXPOSED FOOTING SURFACES WERE OFTEN IRREGULAR AND ROUGH.
5. SOUNDINGS WERE TAKEN ALONG BRIDGE FASCIAS AT QUARTER SPANS.
6. CHANNEL BOTTOMS SHOWN ON END VIEW ARE NOT TO SCALE, AND ARE INTENDED TO APPROXIMATE THE MAXIMUM AND MINIMUM CONDITIONS OBSERVED. SEE SOUNDING PLAN FOR ACTUAL CHANNEL BOTTOM LOCATIONS.

INSPECTION NOTES:

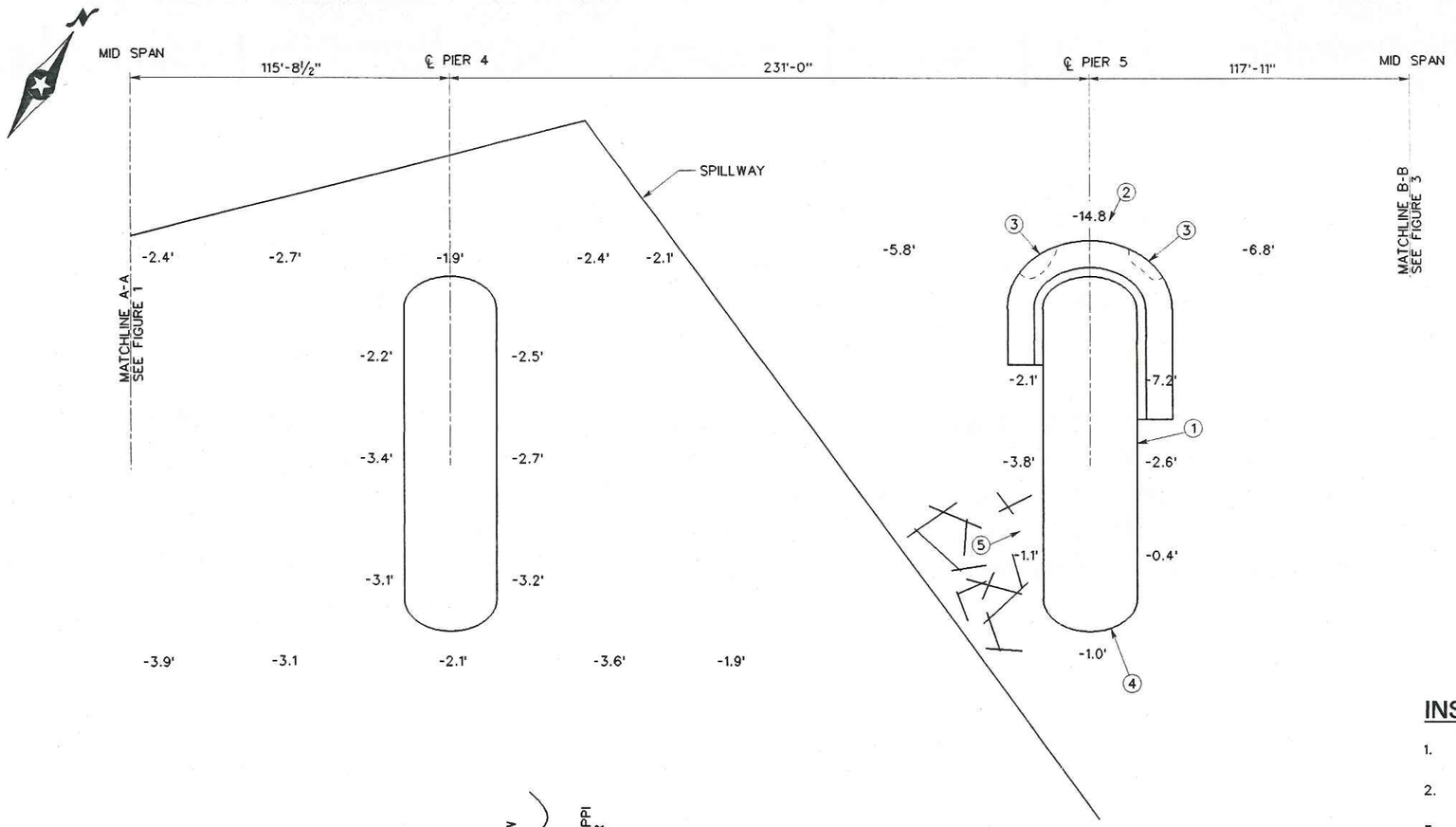
1. CHANNEL BOTTOM MATERIAL WITHIN 6' OF THE SUBSTRUCTURE UNIT WAS MOSTLY 2" TO 1" DIAMETER STONE WITH SOME GRAVEL AND NO APPRECIABLE PROBE ROD PENETRATIONS.
2. CHANNEL BOTTOM MATERIAL WAS SMOOTH EXPOSED BEDROCK AT UPSTREAM HALF OF PIER EXTENDING TO SPILLWAY.
3. MUCH CONCRETE AND STEEL REINFORCING DEBRIS ON CHANNEL BOTTOM ALL AROUND PIER.
4. VERTICAL FACE OF FOOTING BELL EXPOSED AS SHOWN WITH MAXIMUM HEIGHT OF 2.5' AT THE SOUTHEAST CORNER.
5. APPROXIMATELY 18' OF SHEET PILE WALL ALONG SOUTH EDGE OF FOOTING FROM WEST (UPSTREAM) END. THERE IS A VOID AREA ABOVE THE SHEET PILING ABOUT 18' LONG x 2' HIGH x 2.5' DEEP.
6. HEAVIER SCALING ALONG WESTERLY SIDE OF THE PIER EXTENDING FROM THE WATERLINE TO EL. -2.5'. THE TYPICAL PENETRATION OF THIS SCALING WAS BETWEEN 4" AND 6".
7. LOCALIZED AREAS OF 2' TO 3' HIGH UP TO 18' LONG x 1' TO 1.5' DEEP SCALE. PREVIOUS SHOTCRETE REPAIRS ARE SEVERELY DETERIORATED.
8. ±10' LONG SPALLED AREA EXTENDING FROM WATERLINE TO EL. -2.5, WITH MAXIMUM PENETRATION OF 4"-6".
9. ±10 LONG SPALLED AREA EXTENDING FROM EL +6' TO EL. -2.5', WITH MAXIMUM PENETRATION OF ±6" AND EXPOSED REINFORCING STEEL.
10. ±8' LONG SPALLED AREA EXTENDING FROM EL. +5' TO EL -2.5', WITH MAXIMUM PENETRATION OF ±6".
11. LIGHT ACCUMULATION OF TIMBER DEBRIS ON CHANNEL BOTTOM.
12. HEAVY SCALE 2.5' x 10' WIDE x 1.2' DEEP. AGGREGATE VERY LOOSE.
13. 1/16" WIDE CRACK FROM TOP OF PIER WALL TO FOOTING.
14. 1.4' HIGH x 8.3' WIDE x 8" DEEP SCALE @ MUDLINE
15. 1.3' HIGH x 2.7' WIDE x 4" DEEP SCALE @ MUDLINE.

PB PARSONS BRINCKERHOFF
Minneapolis, MN

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

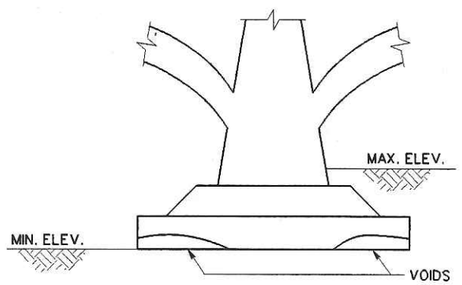
BRIDGE NO. 2440
T.H. 65 OVER THE MINNESOTA RIVER
DISTRICT 5, HENNEPIN COUNTY
INSPECTION AND SOUNDING PLAN

DRAWN BY: EAL CHECKED BY: JFE
DATE: AUGUST, 1996 FIGURE 1



SOUNDING PLAN

N.T.S.



END VIEW OF PIER 5

N.T.S.

GENERAL NOTES:

1. PIERS 1 THRU 8 WERE INSPECTED AT THIS BRIDGE.
2. THE WATERLINE REFERENCE WAS TAKEN AT PIER 1. THE DISTANCE FROM THE TOP OF THE SIDEWALK AT THE CENTERLINE OF PIER FACE TO THE WATERLINE AT THE TIME OF THE INSPECTION WAS APPROXIMATELY 51.5' WHICH CORRESPONDS TO A WATERLINE ELEVATION OF 797.6' BASED ON AVAILABLE DESIGN DRAWINGS. FOR SOUNDINGS AND INSPECTION NOTES. THE WATERLINE ELEVATION IS ASSUMED TO BE 0.0'.
3. ALL OF THE PIER SHAFTS EXHIBITED MODERATE TO HEAVY SCALING WITH EXPOSED AGGREGATE FROM THE WATERLINE TO THE TOP OF THE FOOTING BELL (EL. -2.5'). THE TYPICAL PENETRATION OF THIS SCALING WAS BETWEEN 1" AND 2". AREAS OF HEAVIER SCALING AND/OR SPALLING ARE IDENTIFIED IN THE INSPECTION NOTES.
4. THE EXPOSED FOOTING SURFACES WERE OFTEN IRREGULAR AND ROUGH.
5. SOUNDINGS WERE TAKEN ALONG BRIDGE FASCIAS AT QUARTER POINTS.
6. CHANNEL BOTTOMS SHOWN ON END VIEW ARE NOT TO SCALE, AND ARE INTENDED TO APPROXIMATE THE MAXIMUM AND MINIMUM CONDITIONS OBSERVED. SEE SOUNDING PLAN FOR ACTUAL CHANNEL BOTTOM LOCATIONS.

INSPECTION NOTES:

1. CHANNEL BOTTOM MATERIAL WITHIN 6' OF SUBSTRUCTURE UNIT WAS SAND WITH PROBE ROD PENETRATIONS OF ±6".
2. MUCH CONCRETE AND STEEL REINFORCING DEBRIS ON CHANNEL BOTTOM AROUND UPSTREAM AND NORTH SIDE OF PIER.
3. VERTICAL FACE OF FOOTING BELL EXPOSED AS SHOWN WITH UNDERMINING POCKETS AT SOUTH AND NORTH SIDES OF UPSTREAM NOSE. SOUTH CAVITY WAS 8' WIDE x 2.5' HIGH x 6.5' DEEP. NORTH CAVITY WAS 8' WIDE x 2.5' HIGH x 3' DEEP. EXPOSED VERTICAL HEIGHT OF FOOTING WAS ±10', INCLUDING THE FOOTING BEVEL.
4. ±15' LONG AREA OF HEAVIER SCALING EXTENDING BETWEEN WATERLINE AND EL. -1.5'. THE TYPCIAL PENETRATION OF THIS SCALING WAS BETWEEN 2" AND 3".
5. HEAVY ACCUMULATION OF TIMBER DEBRIS EXTENDING FROM THE CHANNEL BOTTOM TO ±5' ABOVE THE WATERLINE.

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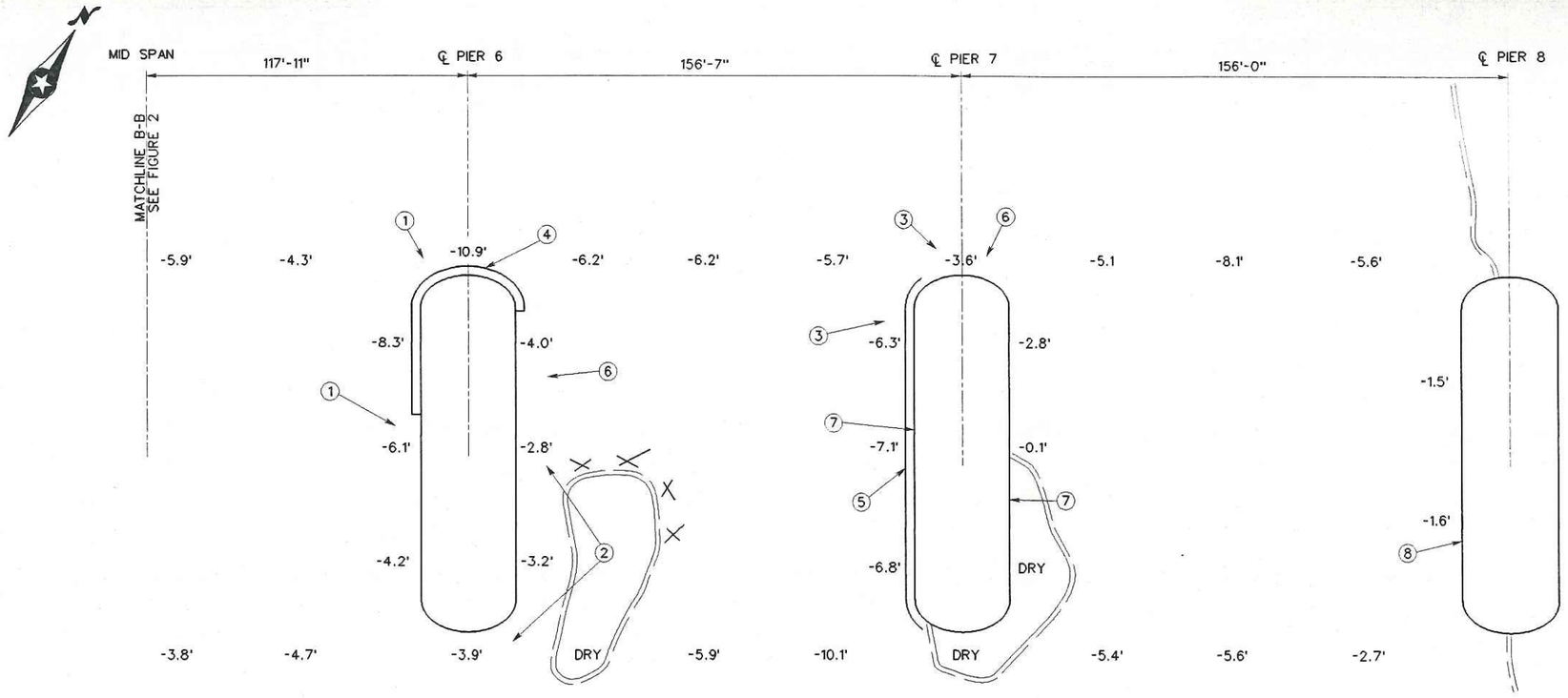
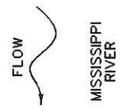
DISTRICT 5, HENNEPIN COUNTY
INSPECTION AND SOUNDING PLAN

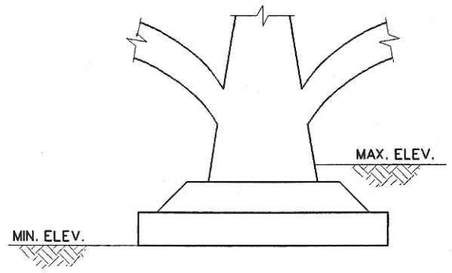
DRAWN BY: EAL CHECKED BY: JFE
DATE: AUGUST, 1996 FIGURE 2





SOUNDING PLAN

N.T.S.



END VIEW OF PIER 6

N.T.S.

GENERAL NOTES:

1. PIERS 1 THRU 8 WERE INSPECTED AT THIS BRIDGE.
2. THE WATERLINE REFERENCE WAS TAKEN AT PIER 1. THE DISTANCE FROM THE TOP OF THE SIDEWALK AT THE CENTERLINE OF PIER FACE TO THE WATERLINE AT THE TIME OF THE INSPECTION WAS APPROXIMATELY 51.5' WHICH CORRESPONDS TO A WATERLINE ELEVATION OF 797.6' BASED ON AVAILABLE DESIGN DRAWINGS. FOR SOUNDINGS AND INSPECTION NOTES, THE WATERLINE ELEVATION IS ASSUMED TO BE 0.0'.
3. ALL OF THE PIER SHAFTS EXHIBITED MODERATE TO HEAVY SCALING WITH EXPOSED AGGREGATE FROM THE WATERLINE TO THE TOP OF THE FOOTING BELL (EL. -2.5'). THE TYPICAL PENETRATION OF THIS SCALING WAS BETWEEN 1" AND 2". AREAS OF HEAVIER SCALING AND/OR SPALLING ARE IDENTIFIED IN THE INSPECTION NOTES.
4. THE EXPOSED FOOTING SURFACES WERE OFTEN IRREGULAR AND ROUGH FROM ORIGINAL FORMING WITH PENETRATIONS UP TO 1 ½".
5. SOUNDINGS WERE TAKEN ALONG BRIDGE FASCIAS AT QUARTER SPAN POINTS.
6. CHANNEL BOTTOMS SHOWN ON END VIEW ARE NOT TO SCALE, AND ARE INTENDED TO APPROXIMATE THE MAXIMUM AND MINIMUM CONDITIONS OBSERVED. SEE SOUNDING PLAN FOR ACTUAL CHANNEL BOTTOM LOCATIONS.

INSPECTION NOTES:

1. CHANNEL BOTTOM MATERIAL WITHIN 6' OF THE SUBSTRUCTURE UNIT WAS A GRAVEL AND SAND MIXTURE WITH PROBE ROD PENETRATIONS OF ±4".
2. CHANNEL BOTTOM MATERIAL WITHIN 6" OF THE SUBSTRUCTURE UNIT WAS SAND WITH PROBE ROD PENETRATIONS OF ±6".
3. MUCH CONCRETE AND STEEL REINFORCING DEBRIS ON CHANNEL BOTTOM.
4. VERTICAL FACE OF FOOTING BELL EXPOSED AS SHOWN WITH MAXIMUM HEIGHT, INCLUDING THE FOOTING BEVEL, OF 4.7' AROUND UPSTREAM NOSE. VERTICAL FACE EXHIBITS OVERALL SCALE APPROXIMATELY 1½" DEEP.
5. VERTICAL FACE OF FOOTING BELL EXPOSED AS SHOWN WITH MAXIMUM HEIGHT, INCLUDING THE FOOTING BEVEL, OF 4.5' AT MIDDLE OF SOUTH SIDE. FOOTING FACE SHOWS OVERALL SCALE 3"-4" DEEP SOME AREAS OVER 1' DEEP.
6. LIGHT ACCUMULATIONS OF TIMBER DEBRIS ON CHANNEL BOTTOM.
7. BAND OF SCALE ALONG WATERLINE 1' HIGH x 2" DEEP. LOCALIZED AREAS UP TO 4" DEEP.
8. SCALING FROM MUDLINE TO 1.5' ABOVE WATERLINE WITH A MAXIMUM DEPTH OF 4".
9. SAND BERM WITH TIMBER DEBRIS AT UPSTREAM SIDE.

PARSONS BRINCKERHOFF
Minneapolis, MN

MINNESOTA
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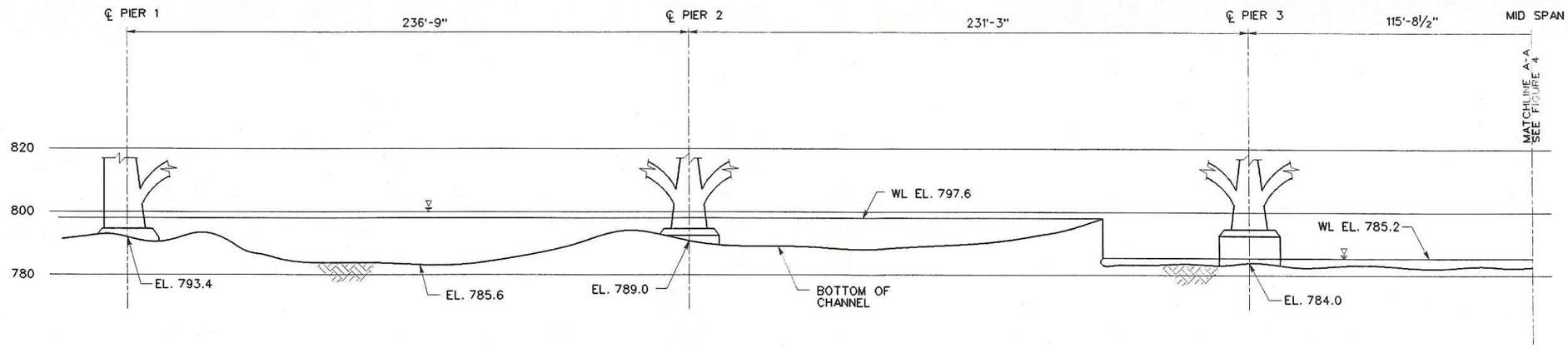
UNDERWATER BRIDGE INSPECTION

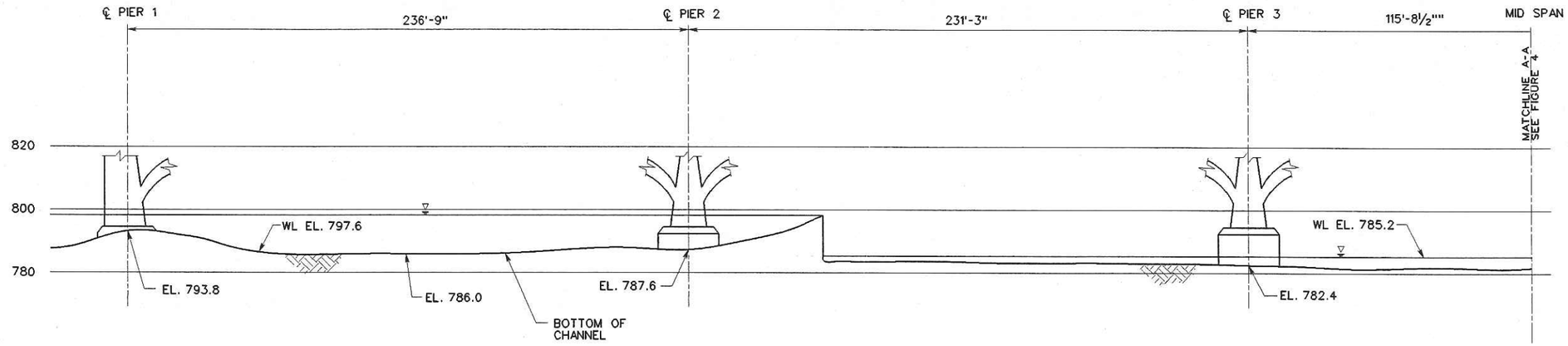
BRIDGE NO. 2440
T.H. 65 OVER THE MINNESOTA RIVER
DISTRICT 5, HENNEPIN COUNTY
INSPECTION AND SOUNDING PLAN

DRAWN BY: EAL CHECKED BY: JFE
DATE: AUGUST, 1996 FIGURE 3



UPSTREAM FASCIA PROFILE

N.T.S.



DOWNSTREAM FASCIA PROFILE

N.T.S.

NOTES:

1. PROFILES ARE BASED ON SOUNDINGS TAKEN AT SUBSTRUCTURE UNITS AND ALONG BRIDGE FASCIAS QUARTER SPAN POINTS.

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MINNESOTA
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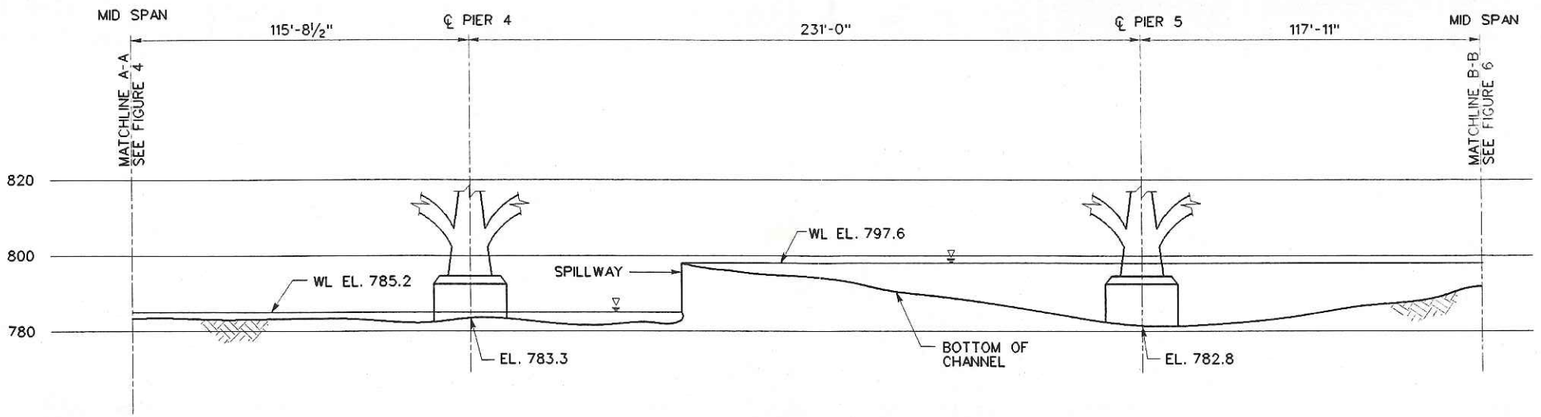
UNDERWATER BRIDGE INSPECTION

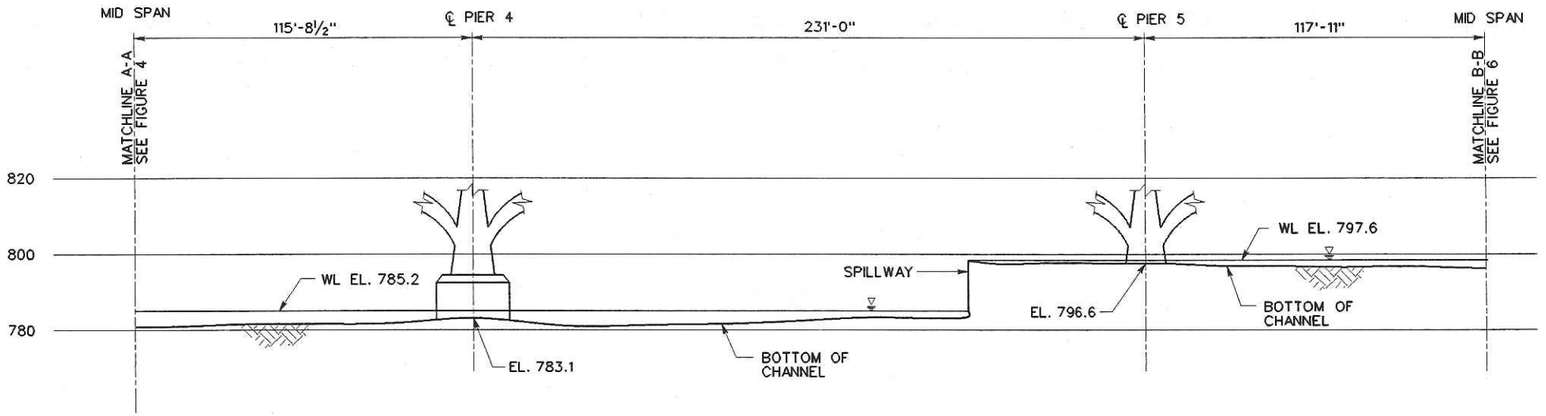
BRIDGE NO. 2440
T.H. 65 OVER THE MINNESOTA RIVER
DISTRICT 5, HENNEPIN COUNTY
UPSTREAM AND DOWNSTREAM FASCIA PROFILES

DRAWN BY: EAL CHECKED BY: JFE
DATE: AUGUST, 1996 FIGURE 4



UPSTREAM FASCIA PROFILE

N.T.S.



DOWNSTREAM FASCIA PROFILE

N.T.S.

NOTES:

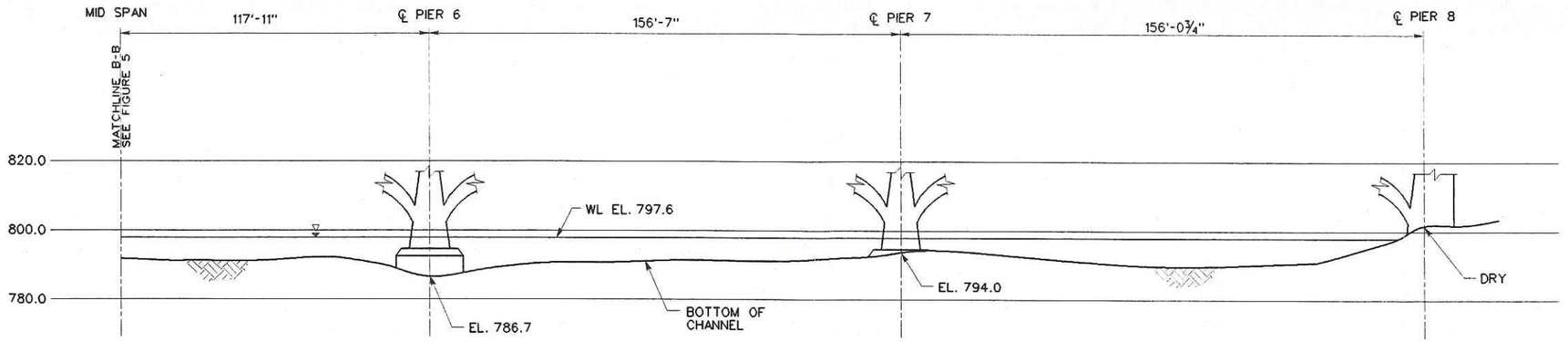
1. PROFILES ARE BASED ON SOUNDINGS TAKEN AT SUBSTRUCTURE UNITS AND ALONG BRIDGE FASCIAS AT QUARTER POINTS.

PB PARSONS BRINCKERHOFF
222 Minneapolis, MN

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

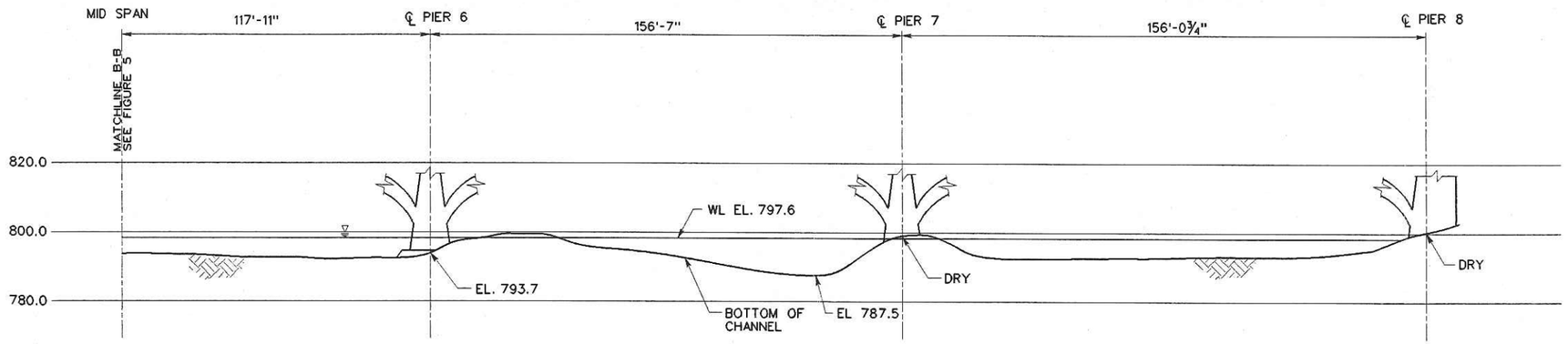
BRIDGE NO. 2440
T.H. 65 OVER THE MINNESOTA RIVER
DISTRICT 5, HENNEPIN COUNTY
UPSTREAM AND DOWNSTREAM FASCIA PROFILES

DRAWN BY: EAL CHECKED BY: JFE
DATE: AUGUST, 1996 FIGURE 5



UPSTREAM FASCIA PROFILE

N.T.S.



DOWNSTREAM FASCIA PROFILE

N.T.S.

NOTES:

1. PROFILES ARE BASED ON SOUNDINGS TAKEN AT SUBSTRUCTURE UNITS AND ALONG BRIDGE FASCIAS AT QUARTER SPAN POINTS.

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MINNESOTA
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UNDERWATER BRIDGE INSPECTION

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T.H. 65 OVER THE MINNESOTA RIVER
DISTRICT 5, HENNEPIN COUNTY
UPSTREAM AND DOWNSTREAM FASCIA PROFILES

DRAWN BY: EAL CHECKED BY: JFE
DATE: AUGUST, 1996 FIGURE 6

V. APPENDIX

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

Bridge No.: 2440

Inspectors: J.ELWELL, R.RHODES, K.ULRICH, K.MEIER

On-Site Team Leader: J.ELWELL

Waterway Crossed: MISSISSIPPI

Inspection Date: 8.30.96

Note: Use all applicable condition code definitions as defined in the Minnesota Recording and Coding Guide including general, substructure , channel and protection and culverts and wall definitions to complete this form.

CONDITION RATING

Unit Reference No.	Unit Description	Depth of Water	Substructure						Channel					General						
			Piling	Columns, Shafts, or Faces *	Footings	Displacement	Other	Overall Substructure Condition Code *	Scour	Embankment Erosion	Embankment Protection	Other (Debris)	Overall Channel & Protection Condition	Concrete	Steel	Timber	Loss of Section	Previous Repair or Maintenance	Other
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PIER 1	8.7	NA	6	7	9	NA	6	8	NA	NA	6	7	5	NA	NA	5	NA	NA
	PIER 2	2.5'-10'	NA	6	7	9	NA	6	6	NA	NA	6	6	5	NA	NA	5	NA	NA
	PIER 3	1.0'-2.0	NA	7	8	9	NA	8	8	NA	NA	6	7	7	NA	NA	7	NA	NA
	PIER 4	1.9'-3.1'	NA	8	8	9	NA	8	8	NA	NA	6	7	7	NA	NA	7	NA	NA
	PIER 5	14.8	NA	6	7	9	NA	6	7	NA	NA	6	6	5	NA	NA	5	NA	NA
	PIER 6	10.9	NA	7	7	9	NA	7	7	NA	NA	6	7	5	NA	NA	5	NA	NA

* Underwater Portion Only

Remarks: REFER TO INSPECTION NOTES FIGURES 1 THRU 3.

Notes: Attach Sketches as needed, identify remark by referring to unit reference no. and remark no.
Use general section to identify overall presence of spalls, cracks, corrosion, etc.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
UNDERWATER INSPECTION CONDITION RATING FORM

Bridge No.: 2440
Inspectors: J. ELWELL, R. RHODES, K. ULRICH, K. MEYER
On-Site Team Leader: J. ELWELL
Waterway Crossed: MISSISSIPPI RIVER

Inspection Date: 8.30.96

Note: Use all applicable condition code definitions as defined in the Minnesota Recording and Coding Guide including general, substructure , channel and protection and culverts and wall definitions to complete this form.

CONDITION RATING

Unit Reference No.	Unit Description	Depth of Water	Substructure						Channel					General					
			Piling	Columns, Shafts, or Faces *	Footings	Displacement	Other	Overall Substructure Condition Code *	Scour	Embankment Erosion	Embankment Protection	Other (Debris)	Overall Channel & Protection Condition	Concrete	Steel	Timber	Loss of Section	Previous Repair or Maintenance	Other
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	PIER 7	6.8'	NA	7	6	9	NA	6	6	NA	NA	7	7	6	NA	NA	6	NA	
	PIER 8	5.6'	NA	7	6	9	NA	6	7	NA	NA	7	7	6	NA	NA	6	NA	

* Underwater Portion Only

Remarks: REFER TO THE INSPECTION NOTES ON FIGURE 3 FOR RELATED COMMENTS & DEFICIENCIES.

Notes: Attach Sketches as needed, identify remark by referring to unit reference no. and remark no.
Use general section to identify overall presence of spalls, cracks, corrosion, etc.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS J.ELWELL, R. RHODES, K.ULRICH, K.MEIER DATE 8.30.96

ON-SITE TEAM LEADER J. ELWELL

BRIDGE NO. 2440 WEATHER CLEAR 80°

WATERWAY CROSSED MISSISSIPPI

DIVING OPERATION: X SCUBA ___ SURFACE SUPPLIED

___ OTHER

PERSONNEL R. RHODES, K. ULRICH, K MEIER

EQUIPMENT COMM. SCUBA, 25' DIVE BOAT, SOUNDING TAPE & POLE, CAMERA

TIME IN WATER 8:30 AM

TIME OUT OF WATER 2:00 PM

WATERWAY DATA VELOCITY 1.0 FPS

VISIBILITY 1.0'

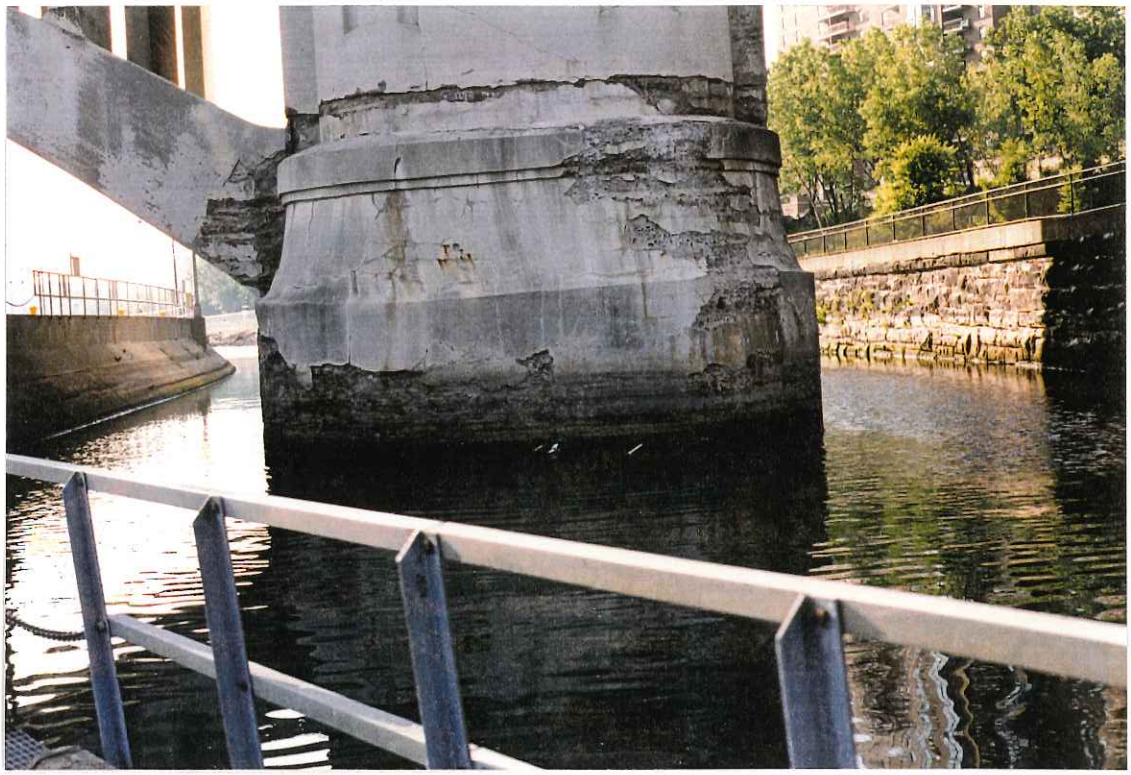
DEPTH ± 11'

ELEMENTS INSPECTED PIERS 1 THRU 8

REMARKS SEE INSPECTION NOTES FIGURES 1 THRU 3

FURTHER ACTION NEEDED X YES ___ NO

REPAIR DETERIORATED CONCRETE ON PIERS 1, 2, 5 THRU 8



Pier 1 - Upstream Nose (Scaling)

Pier 1 - West Face (Scaling)

Pier 5 - Downstream End (Debris and Scaling)

Pier 1 - Between Center and North Arches (Scaling)