

# 2016 UNDERWATER BRIDGE INSPECTION REPORT



## BRIDGE # 58520 CSAH 61 over KETTLE RIVER

DISTRICT: District 1

COUNTY: Pine

CITY/TOWNSHIP: KETTLE RIVER

STATE: Minnesota

Date of Inspection: 09/23/2016

Equipment Used:

Owner: County Highway Agency

Inspected By: Stromberg, Dan

Report Written By: Dan Stromberg

Report Reviewed By:

Final Report Date:



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## UNDERWATER INSPECTION

### REPORT SUMMARY

The substructure units inspected at Bridge No. 58520, Piers 1 and 2, were found to be in good to satisfactory condition with no defects of structural significance below water. The steel piles exhibited coating failure with mostly light to at times moderate corrosion and some minor pitting. A moderate accumulation of timber debris was observed at the upstream ends of Piers 1 and 2, and along the south side of Pier 2. Overall, the channel bottom configuration appeared to be in stable condition with no notable scour depressions observed and no significant changes in configuration since the last inspection.

### INSPECTION FINDINGS

- A. The steel piles exhibited coating failure on 80% to 100% of the surface area from 5 feet above the waterline to the channel bottom.
- B. The steel piles exhibited mostly light to at times moderate corrosion with rust nodules and up to 1/8 inch deep pitting on up to 50% of the surface area from 3 feet above the waterline to the channel bottom. Deterioration was heaviest from 1 foot below waterline to 5 foot below waterline.
- C. The channel bottom material consisted of sandy gravel and approximately 4-inch-diameter cobbles with random larger rocks on the banks allowing up to 2 inches of probe rod penetration.
- D. Timber debris with pieces up to 9 inches in diameter extended from the channel bottom up 4 feet at the upstream nose and along the south side of Pier 2.
- E. Timber debris consisting of a 9 inch diameter log located on the on the channel bottom extended along the north side of Pier 1 from the upstream nose to the fourth from upstream pile.
- F. Minor accumulation of timber debris consisting of sticks and branches extended from the channel bottom up 3 feet located west of the upstream nose of Pier 1.

### RECOMMENDATIONS

- (A) Monitor timber debris accumulations at Piers 1 and 2 for any significant increases in size or extent. If timber debris accumulation increases removal may be warranted at that time to reduce excessive lateral loads on the pier, limit further debris accumulation, and reduce the likelihood of channel bottom degradation resulting from obstructed flow.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Contractor: Daniel G. Stromberg

Contractor Job Number: 9687

## UNDERWATER INSPECTION

### 1. BRIDGE DATA

Bridge #: 58520  
Feature Intersected: KETTLE RIVER  
Facility Carried: CSAH 61  
District: District 1  
County: 058 - Pine

#### Bridge Description:

The superstructure consists of three spans of multiple concrete beams supporting a reinforced concrete deck. The superstructure is supported by two abutments and two concrete-filled, steel shell pile, bent piers. The piers are numbered 1 and 2 starting from the south.

### 2. INSPECTION DATA

Professional Engineer/Team Leader: Garrett R. Owens  
Inspection Diver: Garrett R. Owens  
Date of Underwater Inspection: 09/23/2016  
Weather Conditions: Cloudy, 60°F  
Underwater Visibility (feet): 2.0 feet  
Waterway Velocity (ft/sec): 0.5 ft/sec

### 3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 1 and 2

#### General Shape:

The piers each consist of a single line of ten concrete-filled steel shell piles supporting a reinforced concrete pier cap.

Maximum Water Depth at Substructure(s) Inspected (feet): 10.8 feet

### 4. WATERLINE DATUM

Water Level Reference: The top of the pier cap at the upstream end of Pier 1.  
Waterline Elevation (feet): 1012.6 feet  
Description: The waterline was located approximately 18.2 feet below the reference.

### 5. NBIS CODING INFORMATION

(Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code: 6  
Item 61: Channel and Channel Protection: Code: 6  
Item 62: Culvert: Code:  
Item 92B: Underwater Inspection: Code: Y 48 09/2016

Item 113: Scour Critical Bridge:

Code: I

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

Yes

No

(Mark your selection with an X)

6. STRUCTURAL ELEMENT CONDITION RATING

ELEM #	Element Description	Quantity	Unit	Conditions			
				CS1	CS2	CS3	CS4
225	Steel Pile	20	EA		20		
885	Scour	1	EA	1			

## UNDERWATER INSPECTION

### INSPECTION PROCEDURES

The routine underwater inspection of Bridge 58520 (CSAH 61 over Kettle River) was completed on September 23, 2016. The underwater inspection was conducted from the shore. The inspection was conducted by a team consisting of a Professional Engineer Diver with a valid MnDOT Team Leader certification, a backup diver and dive tender. The inspection utilized commercial dive equipment and techniques (SSA and/or SCUBA) in accordance with OSHA regulations. Profiles were taken along the upstream and downstream faces of the bridge and around the periphery of substructure units to determine the presence, location, and area of scour.

The bridge elements inspected consisted of two concrete-filled, steel shell pile, bent piers. According to design drawings, the inspected substructure units are designated as Piers 1 and 2 from south to north. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. The maximum routine underwater inspection frequency is recommended to remain at 60 months based on those findings and risk factors. Also, inspection procedures should continue to follow the above approach and standard guidance with 100% Level I and 10% Level II intensity efforts.

# Minnesota Structure Inventory Report

Bridge ID: 58520

CSAH 61 over KETTLE RIVER

Date: 01/17/2017

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
<b>Agency Br. No.</b> S71 <b>Crew</b> <b>District</b> 01 <b>Maint. Area</b> <b>County</b> 058 - Pine <b>City</b> <b>Township</b> 58017 - KETTLE RIVER <b>Desc. Loc.</b> 0.1 MI S OF JCT CSAH 33 <b>Sect., Twp., Range</b> 27 - 044N - 20W <b>Latitude</b> 46 ° 16 ' 6.37 " <b>Longitude</b> 92 ° 51 ' 41.25 " <b>Custodian</b> 02 - County Highway Agency <b>Owner</b> 02 - County Highway Agency <b>BMU Agreement</b> <b>Year Built</b> 1980 <b>MN Year Reconstructed</b> <b>FHWA Year Reconstructed</b> <b>MN Temporary Status</b> <b>Bridge Plan Location</b> 3 - COUNTY <b>Date Opened to Traffic</b> <b>On - Off System</b> 1 - ON <b>Legislative District</b> 08A <b>Potential ABC</b> 2 - N/A	<b>Bridge Match ID (TIS)</b> 0 <b>Roadway O/U Key</b> Route On Structure <b>Route Sys</b> 04 - CSAH <b>Number</b> 61 <b>Roadway Name or Description</b> COUNTY HIGHWAY 61 <b>Level of Service</b> 1 - MAINLINE <b>Roadway Type</b> 2 - 2-way traffic <b>Control Section (TH Only)</b> <b>Reference Point</b> 039+00.227 <b>Detour Length</b> 13.0 <b>mi.</b> <b>Lanes</b> <b>ON</b> 2 <b>UNDER</b> 0 <b>ADT</b> 1200 <b>YEAR</b> 2008 <b>HCA DT</b> <b>ADTT</b> % <b>Functional Class</b> 07 - Rural - Major Collector	<b>Userkey</b> 98 <b>Structurally Deficient</b> N <b>Functionally Obsolete</b> N <b>Sufficiency Rating</b> 89.6 <b>Routine Inspection Date</b> 11/09/2015 <b>Routine Inspection Frequency</b> 12 <b>Inspector Name</b> Stromberg, Dan <b>Status</b> A - Open																				
		+ NBI      CONDITION      RATINGS +																				
		<b>Deck</b> 6 <b>Unsound Deck %</b> <b>Superstructure</b> 6 <b>Substructure</b> 6 <b>Channel</b> 6 <b>Culvert</b> N																				
		+ NBI      APPRAISAL      RATINGS +																				
		<b>Structure Evaluation</b> 6 <b>Deck Geometry</b> 9 <b>Underclearances</b> N <b>Waterway Adequacy</b> 8 <b>Approach Alignment</b> 8																				
		+ SAFETY      FEATURES +																				
		<b>Bridge Railing</b> 1 - MEETS STANDARDS <b>GR Transition</b> 1 - MEETS STANDARDS <b>Appr. Guardrail</b> 1 - MEETS STANDARDS <b>GR Termini</b> 0 - SUBSTANDARD																				
		+ IN      DEPTH      INSP. +																				
		<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;"></th> <th style="width: 10%; text-align: center;">Y/N</th> <th style="width: 10%; text-align: center;">Freq</th> <th style="width: 20%; text-align: center;">Date</th> </tr> </thead> <tbody> <tr> <td><b>Frac. Critical</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Underwater</b></td> <td style="text-align: center;">Y</td> <td style="text-align: center;">60</td> <td style="text-align: center;">09/23/2016</td> </tr> <tr> <td><b>Pinned Asbly.</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td><b>Spec. Feat.</b></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		Y/N	Freq	Date	<b>Frac. Critical</b>				<b>Underwater</b>	Y	60	09/23/2016	<b>Pinned Asbly.</b>				<b>Spec. Feat.</b>			
	Y/N	Freq	Date																			
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<b>Underwater</b>	Y	60	09/23/2016																			
<b>Pinned Asbly.</b>																						
<b>Spec. Feat.</b>																						
		+ WATERWAY +																				
		<b>Drainage Area (sq. mi.)</b> 530.0 <b>Waterway Opening (sf.)</b> 2760 <b>Navigation Control</b> 0 - No nav. control on <b>Pier Protection</b> - <b>Nav. Clr. (ft.)</b> <b>Vert.</b> 0.0 <b>Horiz.</b> 0.0 <b>Nav. Vert. Lift Bridge Clear. (ft.)</b> <b>MN Scour Code</b> I - LOW RISK <b>Year</b> 1997																				
		+ CAPACITY      RATINGS +																				
		<b>Design Load</b> 5 - HS 20 <b>Operating Rating</b> 2 - HS TRUCK      29.6 <b>Inventory Rating</b> 2 - HS TRUCK      14.2 <b>Posting VEH:</b> <b>SEMI:</b> <b>DBL:</b> <b>Rating Date</b> 04/14/2015 <b>Overweight Permit Codes</b> <b>A</b> N - N/A <b>B</b> N - N/A <b>C</b> N - N/A																				
+ STRUCTURE +	+ RDWY      DIMENSIONS +																					
<b>Service On</b> 1 - Highway <b>Service Under</b> 5 - Waterway <b>Main Span Type</b> 5 - Prestress or Precast <b>Main Span Design</b> 22 - Bulb Tee <b>Main Span Detail</b> <b>Appr. Span Type</b> <b>Appr. Span Design</b> <b>Appr. Span Detail</b> <b>Skew</b> 0 <b>Culvert Type</b> <b>Barrel Length</b> <b>Cantilever ID</b>  <b>Number of Spans</b> <b>MAIN:</b> 3 <b>APPR:</b> 0 <b>TOTAL:</b> <b>Main Span Length</b> 65.3 ft. <b>Structure Length</b> 197.3 ft. <b>Deck Width (Out-to-Out)</b> 48.0 ft. <b>Deck Material</b> 1 - Concrete Cast-in-Place <b>Wear Surf Type</b> 6 - Bituminous <b>Wear Surf Install Year</b> 2001 <b>Wear Course/Fill Depth</b> 0.25 ft. <b>Deck Membrane</b> 0 - None <b>Deck Rebars</b> 0 - None <b>Deck Rebars Install Year</b> <b>Structure Area (Out-to-Out)</b> 9470 <b>sq. ft.</b> <b>Roadway Area (Curb-to-Curb)</b> 8805 <b>sq. ft.</b> <b>Sidewalk Width</b> 50A. Lt 0.00 ft.      50B. Rt 0.00 ft. <b>Curb Height</b> Lt 0.00 ft.      Rt 0.00 ft. <b>Rail Type</b> Lt 22      Rt 22	<b>If Divided</b> <b>NB-EB</b> <b>SB-WB</b> <b>Roadway Width</b> 44.60 ft.      ft. <b>Vertical Clearance</b> ft.      ft. <b>Max. Vert. Clear.</b> ft.      ft. <b>Horizontal Clear.</b> ft.      ft. <b>Lateral Clearance</b> ft.      ft. <b>Appr. Surface Width</b> 44.0 ft. <b>Bridge Roadway Width</b> 44.6 ft. <b>Median Width On Bridge</b> ft.																					
	+ MISC.      BRIDGE      DATA +																					
	<b>Structure Flared</b> 0 - No flare <b>Parallel Structure</b> N - No parallel structure <b>Field Conn. ID</b> <b>Abutment Foundation (Material/Type)</b> 3 - FTG PILE <b>Pier Foundation (Material/Type)</b> 8 - CIP 4 - PILE BENT <b>Historic Status</b> 5 - Not eligible																					
	+ PAINT +																					
	<b>Year Painted</b> <b>Unsound Paint %</b> <b>Painted Area</b> <b>sq. ft.</b> <b>Primer Type</b> <b>Finish Type</b>																					
	+ BRIDGE      SIGNS +																					
	<b>Posted Load</b> 0 - Not Required <b>Traffic</b> 0 - Not Required <b>Horizontal</b> 1 - Object Markers <b>Vertical</b> N - Not Applicable																					

MINNESOTA BRIDGE INSPECTION REPORT

01/25/2017

BRIDGE 58520 CSAH 61 OVER KETTLE RIVER

County: Pine Location: 0.1 MI S OF JCT CSAH 33 Length: 197.3 ft.  
 City: Route: 04 - CSAH 61 Ref. Pt.: 039+00.227 Deck Width: 48.0 ft.  
 Township: 58017 - KETTLE RIVER Control Section: Rdwy. Area/ Pct. Unsnd: 8805 sq. ft. / %  
 Section: 27 Township: 044N Range: 20W Maint. Area: Paint Area/ Pct. Unsnd: sq. ft. / %  
 Span Type: 5 - Prestressed Concrete 2 - Local Agency Bridge Nbr.: S71 Culvert: N/A  
 List: Stringer/Multi-beam or Girder Postings:  
 NBI Deck: 6 Super: 6 Sub: 6 Chan: 6 Culv: N  
 Open, Posted, Closed: A - Open  
 MN Scour Code: I - LOW RISK

Appraisal Ratings - Approach: 8 Waterway: 8 Unofficial Structurally Deficient N  
 Required Bridge Signs - Load Posting: 0 - Not Required Traffic: 0 - Not Required Unofficial Functionally Obsolete N  
 Horizontal: 1 - Object Markers Vertical: N - Not Applicable Unofficial Sufficiency Rating 89.6

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
15	Prestressed Concrete Top Flange	Underwater	09/23/2016	9470 SF	9470	0	0	0
		Migrated Values		9470 SF	9470	0	0	0
Notes: [2016] Migrator assumed CS1.								
Underside of Concrete Deck Notes: 2015 SOME LEAKING JOINTS, SOUTH ABUT WEST AND EAST BEAM JOINT LEAKAGE STAINING. MINOR CHIPS AT SOME JOINTS.								
510	Wearing Surfaces	Underwater	09/23/2016	8805 SF	7925	0	881	0
		Migrated Values		8805 SF	7925	0	881	0
Notes: Bituminous Overlay Notes: 2012 SEVERAL POTHoles ARE APPEARING IN THE OVERLAY. 2014 SEVERAL TRANSVERSE CRACKS IN BIT OVERLAY, SEVERAL ARE UNSEALED. POTHoles APPEARING IN OVERLAY, MAINLY OVER PIERS. MANY LONGITUDINAL\MAP CRACKS IN WHEEL PATHS. MOST OF THESE CRACKS ARE TIGHT. 2015 Cracks are continuing to open up. Bituminous beginning to pop out in several locations.								
109	Prestressed Concrete Open Girder/Beam	Underwater	09/23/2016	1578 LF	5	1573	0	0
		Migrated Values		1578 LF	5	1573	0	0
Notes: [2016] Migrator estimated the quantity of the bulb tees. Verify the quantity by multiplying the number of vertical beams by the deck length. SOME CHIPS AT BEAM JOINTS.								
2014 HAIRLINE CRACKS IN BEAM ENDS AT ABUTMENTS, SOME THROUGH WITH STAINING. SEE ATTACHED BEAM CRACK REFERENCE DRAWING								
2015 REFERENCE DRAWING UPDATED AS CRACKS ARE MORE VISIBLE AND SOME MIRROR THROUGH TO OTHER SIDE OF BEAMS. BEAM ENDS ALSO SHOWING CRACKING OVER PIERS. EAST SIDE OF NORTH PIER HAS DELAMINATION AREA. SEE PICTURES 301-303 AND 306 FOR CRACK CONFIGURATIONS. SOME JOINT LEAKING THROUGHOUT.								
215	Reinforced Concrete Abutment	Underwater	09/23/2016	138 LF	0	138	0	0
		Migrated Values		138 LF	0	138	0	0
Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:0 CS2:40 CS3:0 CS4:0). 2015 NORTH ABUTMENT HAS 4 LARGER CRACKS WITH STAINING AND SEVERAL SMALL VERTICAL CRACKS. DIAPHRAGM ON NORTH ABUTMENT HAS PIECES OF CONCRETE CRACKED LOOSE, EXPOSING REBAR ON EAST END. 1 ft. DELAMINATION IN WEST CORNER OF NORTH ABUTMENT WITH TREE GROWING FROM IT. THE SOUTH ABUTMENT HAS SEVERAL SMALL VERTICAL CRACKS. STAINING FROM LEAKAGE AT EAST BEAM JOINTS NORTH ABUTMENT. SMALL DELAMINATION AREA IN THE DIAPHRAM ON THE WEST SIDE OF 6TH BEAM FROM WEST ON THE NORTH ABUTMENT. MINOR CHIPS\DELAMINATIONS IN CONCRETE END DIAPHRAM AT BEAM JUNCTION LOCATIONS.								
Wingwall notes: 2015 CONCRETE IN GOOD SHAPE, CORK DETERIORATING AT ABUTMENT JUNCTION ALLOWING FILL TO SILT THROUGH								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
225	Steel Pile	Underwater	09/23/2016	20 EA	0	20	0	0
		Migrated Values		20 EA	0	20	0	0
Notes: PAINT DETERIORATED TO +/-6 ft. ABOVE WATERLINE. SOME RUSTING. 2015 CONTINUED RUSTING								
515 -	Steel Protective Coating	Underwater	09/23/2016	999 SF	999	0	0	0
		Migrated Values		999 SF	999	0	0	0
Notes: [2016] Migrator assumed CS1 and a quantity of 999 SF.								
234	Reinforced Concrete Pier Cap	Underwater	09/23/2016	95 LF	95	0	0	0
		Migrated Values		95 LF	95	0	0	0
Notes: 2015 NO DISTRESS NOTED								
310	Elastomeric Bearing	Underwater	09/23/2016	24 EA	24	0	0	0
		Migrated Values		24 EA	24	0	0	0
Notes: 2015 NO DISTRESS NOTED								
313	Fixed Bearing	Underwater	09/23/2016	12 EA	12	0	0	0
		Migrated Values		12 EA	12	0	0	0
Notes: SOLE PLATE AND PINTLES ON ELASTOMERIC BEARING PADS WITH ANCHOR RODS. 2015 NO DISTRESS NOTED								
331	Reinforced Concrete Bridge Railing	Underwater	09/23/2016	394 LF	0	394	0	0
		Migrated Values		394 LF	0	394	0	0
Notes: 2015 SEVERAL CRACKS IN RAILING AND ALSO ABRASION ON FACE AND CURB FROM SNOWPLOW. MANY SMALL AGGREGATE POP-OUTS IN RAIL FACE.								
800	Critical Deficiencies or Safety Hazards	Underwater	09/23/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: No critical structural deficiencies or serious safety hazards are present on this structure.								
822	Bituminous Approach Roadway	Underwater	09/23/2016	2 EA	0	2	0	0
		Migrated Values		2 EA	0	2	0	0
Notes: 2015 CRACKS AND SOME SETTLEMENT OF APPROACHES, HAVE BEEN PATCHED.								
855	Secondary Members (Superstructure)	Underwater	09/23/2016	35 EA	35	0	0	0
		Migrated Values		35 EA	35	0	0	0
Notes: CONCRETE DIAPHRAGMS. 2015 NO DISTRESS TO INTERIOR DIAPHRAGMS NOTED. END DIAPHRAM WALLS CHIPPING\DELAMINATING AT SOME BEAM END JUNCTIONS.								
883	Concrete Shear Cracking	Underwater	09/23/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: QUANTITY BASED ON NUMBER OF BEAMS. 2014 BEAM 3&4 FROM WEST IN SOUTH ABUTMENT HAVE HAIRLINE CRACKS IN SHEAR DIRECTION, SEE BEAM NOTES AND REFERENCE DRAWING. 2015 BEAM REFERENCE UPDATED.								
891	Other Bridge Signing	Underwater	09/23/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 2015 DELINEATORS AND GUARDRAIL MARKERS ARE INPLACE.								
892	Slopes & Slope Protection	Underwater	09/23/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: WASHOUT AT NORTHEAST CORNER OF SLOPE, BRUSH UNDER BRIDGE. APPEARS RIPRAP IS UNDER SILT AND SAND ON NORTH SLOPE. WASHOUT BEHIND SOUTHWEST AND NORTHEAST WINGWALLS. 2015 SAME CONDITIONS, SLOPES SHOULD BE BRUSHED.								

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
893	Guardrail	Underwater	09/23/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: 2015 MINOR DAMAGE TO W-BEAM IN VARIOUS LOCATIONS. NORTHEAST GUARDRAIL, NORTH TWO POSTS ARE BROKEN BELOW GROUND AND ARE LOOSE. SE, SW, AND NE RAIL HAS TRAFFIC HITS.								
894	Deck & Approach Drainage	Underwater	09/23/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 2015 DRAINS ARE OPEN.								
899	Miscellaneous Items	Underwater	09/23/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: TREE GROWING AT JCT. OF NORTH ABUTMENT AND NW WINGWALL. 2014 LARGE TREE MAROONED UNDER SOUTH ABUTMENT. BRANCHES AND BRUSH ACCUMULATED IN AREA OF SOUTH PIER. 2015 SAME SITUATION								
900	Protected Species	Underwater	09/23/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to track the presence of protected species living on this structure.								

General Notes: THERE IS AN UNDERWATER INSPECTION REPORT FOR 1992, 1997 , 2002 & 2007 & 2012 ON FILE.  
INSPECTOR - TODD LINDSTROM

SCOUR PROBE DONE ON 6-25-2012 DURING HIGH WATER EVENT, NO EVIDENCE OF SCOUR OF RIVER BED.

NBI SUBSTRUCTURE AND CHANNEL RATED TO MATCH UNDER WATER INSP.

2014 OUTER EDGE OF DECK AND RAILING COVERED WITH SNOW. NO VISIBLE SIGNS OF DISTRESS, WILL RE-EVALUATE IN SPRING.

2015 items 013, 331 984 inspected due to snow conditions during routine inspection.

58. Deck NBI: 2015 bituminous overlay showing longitudinal and transverse cracking. several map type cracks at beam junctions. some bituminous beginning to pop out of crack locations

36A. Brdg Railings NBI:

36B. Transitions NBI:

36C. Appr Guardrail NBI:

36D. Appr Guardrail  
Terminal NBI:

59. Superstructure NBI: concrete beams showing cracking and staining at beam ends. beam joints leaking. end diaphragms have concrete chips\delaminations at beam end junctions.

60. Substructure NBI: AS PER UNDERWATER INSPECTION 7-28-12

61. Channel NBI: AS PER UNDERWATER INSPECTIN 7-28-12

62. Culvert NBI:

71. Waterway Adeq NBI:

72. Appr Roadway  
Alignment NBI:

Inspector's Signature

Reviewer's Signature

# Pictures



Photo 1 - Overall View of Downstream Fascia, Looking Northwest



Photo 2 - Overall View of Upstream Fascia, Looking Southeast

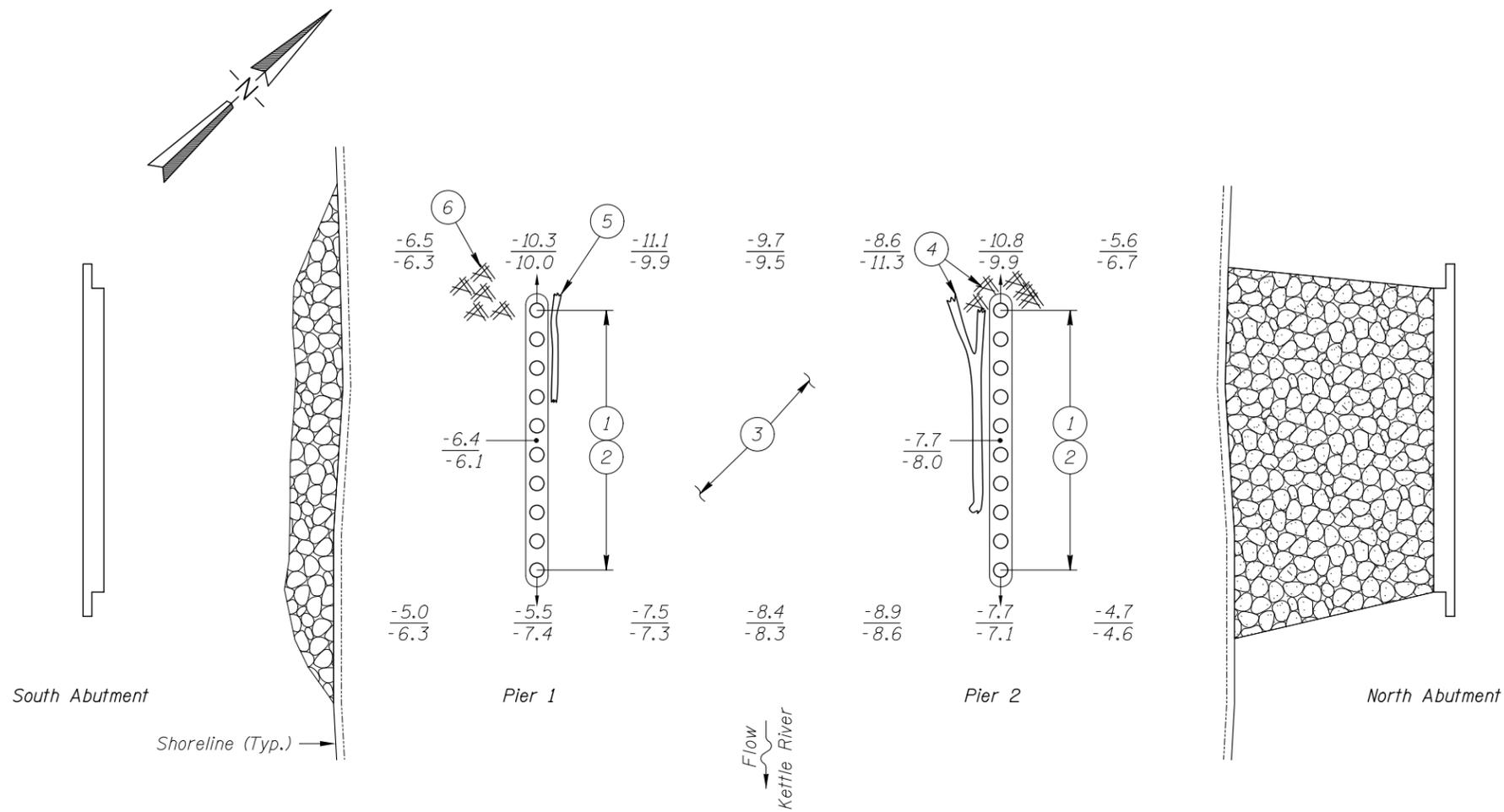
# Pictures



Photo 3 - View of Pier 1, Looking Southeast



Photo 4 - View of Pier 2, Looking Northwest



**SOUNDING PLAN**

**GENERAL NOTES:**

- Piers 1 and 2 were inspected underwater.
- At the time of inspection on September 23, 2016, the waterline was located approximately 18.2 feet below the top of the pile cap on the upstream end of Pier 1. This corresponds to a waterline elevation of 1012.6 feet based on the previous report dated August 23, 2007.
- Soundings indicate the water depth at the time of inspection and are measured in feet.
- Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

**INSPECTION NOTES:**

- The steel piles exhibited coating failure on 80% to 100% of the surface area from 5 feet above the waterline to the channel bottom.
- The steel piles exhibited mostly light to at times moderate corrosion with rust nodules and up to 1/8 inch deep pitting on up to 50% of the surface area from 3 feet above the waterline to the channel bottom. Deterioration was heaviest from 1 foot below waterline to 5 foot below waterline.
- The channel bottom material consisted of sandy gravel and approximately 4-inch-diameter cobbles with random larger rocks on the banks allowing up to 2 inches of probe rod penetration.
- Timber debris with pieces up to 9 inches in diameter extended from the channel bottom up 4 feet at the upstream nose and along the south side of Pier 2.
- Timber debris consisting of a 9 inch diameter log located on the on the channel bottom extended along the north side of Pier 1 from the upstream nose to the fourth from upstream pile.
- Minor accumulation of timber debris consisting of sticks and branches extended from the channel bottom up 3 feet located west of the upstream nose of Pier 1.

South Abutment

Shoreline (Typ.)

Pier 1

Pier 2

North Abutment

Flow  
Kettle River

**Legend**

- 2.0 Sounding Depth (9/23/16)
- 5.2 Sounding Depth (7/28/12)
- Concrete Filled Steel Pile
- Concrete Filled Battered Steel Pile
- Timber Debris
- Sand Infilled Riprap
- Riprap

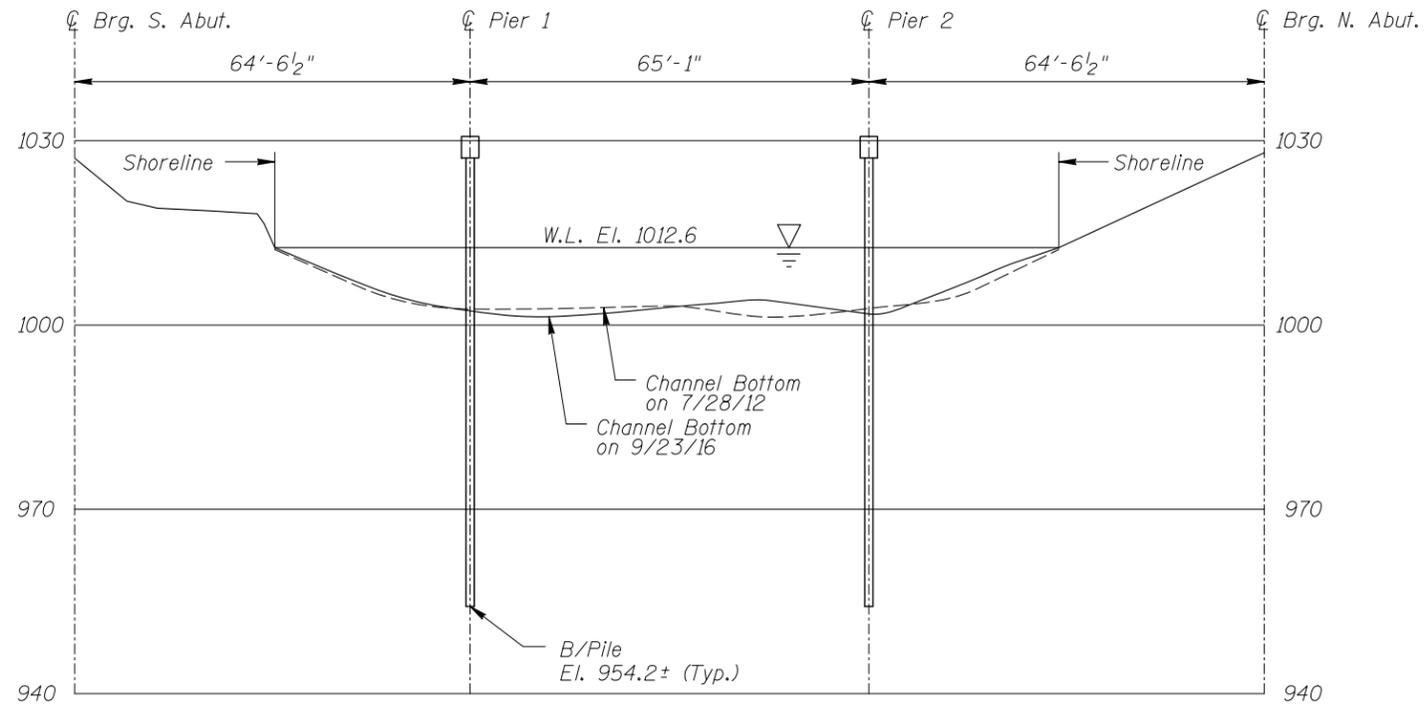
**Note:**

All soundings based on 2016 waterline location.

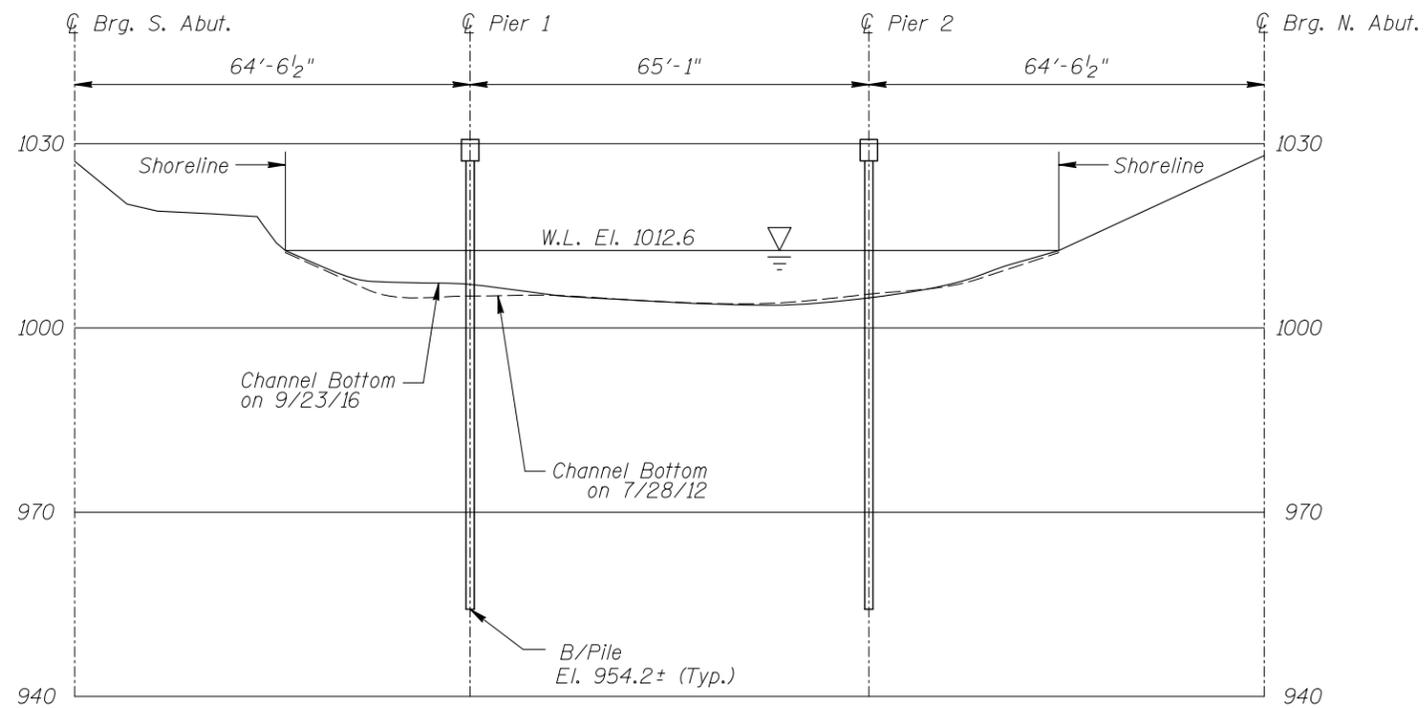


**TYPICAL END VIEW OF PIERS**

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 58520 CSAH 61 OVER THE KETTLE RIVER DISTRICT I, PINE COUNTY		
<b>INSPECTION AND SOUNDING PLAN</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 764-9300 www.collinsengr.com</small>	Date: SEPT., 2016
Checked By: DGS		Scale: NTS
Code: 968758520		Figure No.: I



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 58520 CSAH 61 OVER THE KETTLE RIVER DISTRICT I, PINE COUNTY		
<b>UPSTREAM AND DOWNSTREAM FASCIA PROFILES</b>		
Drawn By: PRH	<b>COLLINS ENGINEERS</b> <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: SEPT., 2016
Checked By: DGS		Scale: 1"=30'
Code: 968758520		Figure No.: 2