

# 2016 UNDERWATER BRIDGE INSPECTION REPORT



## **BRIDGE # 27A63 Minnetonka Blvd over Carsons Bay**

**DISTRICT:** Metro

**COUNTY:** Hennepin

**CITY/TOWNSHIP:** Deephaven

**STATE:** Minnesota

**Date of Inspection:** 09/13/2016

**Equipment Used:**

**Owner:** City or Municipal Highway Agency

**Inspected By:** Stuber, Cory

**Report Written By:** Cory Stuber

**Report Reviewed By:**

**Final Report Date:**



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## UNDERWATER INSPECTION

### REPORT SUMMARY

The substructure units inspected at Bridge 27A63, East and West Abutments and Piers 1 through 4, exhibited minor to moderate deterioration. The concrete of each pier exhibited moderate to severe spalling, with a maximum penetration of 6 inches with exposed reinforcement observed on Pier 1. Each spall per pier is detailed in the inspection findings. The concrete of Pier 2 and the East Abutment exhibited light to moderate scaling with up to 4 inches maximum penetration. Scour was observed around Piers 2, 3, and 4, typically with a 3 foot depth and a 4 to 5 foot diameter.

### INSPECTION FINDINGS

- (A) Spall observed on the south end of Pier 3 at the waterline, measuring 1 foot long by 3 feet high with up to 2 inches of penetration.
- (B) Spall observed on the north end of Pier 3 at the waterline, measuring 1 foot long by 1 foot high with up to 2 inches of penetration.
- (C) Spall observed on the northwest corner of Pier 2, 4 feet below the waterline, measuring 5 feet long by 4 feet high with up to 6 inches of penetration.
- (D) Moderate scaling observed on the west face of Pier 2, 2 feet above the mud line, measuring 5 feet long by 2 feet high with up to 4 inches of penetration. Scaling defect was 5 to 10 feet from the northern nose of Pier 2.
- (E) Spall observed on the north nose of Pier 1 at the waterline, measuring 6 feet long by 4 feet high with up to 4 inches of penetration.
- (F) Spall with exposed reinforcement observed wrapping around the south nose of Pier 1 at the waterline, measuring 6 feet long by 3 feet high with up to 6 inches of penetration.
- (G) Spall with exposed reinforcement observed at the midpoint on both the east and west faces of Pier 1 at the mud line, measuring 4 feet long by 1 foot high with up to 6 inches of penetration.
- (H) Random scaling observed on east abutment's west face, with up to 2 inches penetration measured.
- (I) Spall observed on the east face of Pier 4, 10 to 15 feet from the north nose at the mud line, measuring 1 square foot with up to 4 inches of penetration.
- (J) Scour observed on the south nose of Pier 2, with a 4 foot diameter and 3 foot depth.
- (K) Scour observed on the north nose of Pier 3, with a 5 foot diameter and 3 foot depth.
- (L) Scour observed around the entire perimeter on Pier 4, with a 4 foot diameter and 3 foot depth.

### RECOMMENDATIONS

- (A) Monitor the scour at Piers 2, 3 and 4 during future underwater inspections.
- (B) Monitor areas of spalling and scaling during future inspections.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Contractor: Collins Engineers Inc.

Contractor Job Number: 9687

## UNDERWATER INSPECTION

### 1. BRIDGE DATA

Bridge #: 27A63  
Feature Intersected: Carsons Bay  
Facility Carried: Minnetonka Blvd  
District: Metro  
County: 027 - Hennepin  
Bridge Description:

The superstructure consists of five spans of multiple prestressed concrete beams supporting a reinforced concrete deck. The bridge is supported by two reinforced concrete abutments and four reinforced concrete wall piers.

### 2. INSPECTION DATA

Professional Engineer/Team Leader: Cory Stuber P.E.  
Inspection Diver: Cory Stuber P.E.  
Date of Underwater Inspection: 09/13/2016  
Weather Conditions: Sunny, 65°F  
Underwater Visibility (feet): 10.0  
Waterway Velocity (ft/sec): Negligible

### 3. SUBSTRUCTURE INSPECTION DATA

Substructure(s) Inspected: Piers 1 through 4, East and West Abutments

General Shape:

The pier consisted of a CIP pile supported oblong rectangular pier wall with rounded north and south ends. The abutments consisted of CIP pile supporting reinforced concrete abutments.

Maximum Water Depth at Substructure(s) Inspected (feet): 12.4

### 4. WATERLINE DATUM

Water Level Reference: Top of the pier cap on the North end of Pier 4.  
Waterline Elevation (feet): 929.6  
Description: The waterline was approximately 4.7 feet below reference.

### 5. NBIS CODING INFORMATION

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

Item 60: Substructure: Code: 5  
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
210	Reinforced Concrete Pier Wall	223	LF	156		67	
215	Reinforced Concrete Abutments	155	LF	143	12		
885	Scour	1	EA		1		

## UNDERWATER INSPECTION

### INSPECTION PROCEDURES

The routine underwater inspection of Bridge 27A63 (Minnetonka Boulevard over Carsons Bay on Lake Minnetonka) was completed on September 13, 2016. The underwater inspection was conducted from 14 ft boat. The inspection was conducted by a team consisting of a PE-Diver with a valid MnDOT Team Leader certification, a backup diver and a dive tender. The inspection utilized commercial dive equipment and techniques (SSA and/or SCUBA) in accordance with OSHA regulations. Profiles were taken along the north and south 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 four reinforced concrete piers and two reinforced concrete abutments. According to the design drawings, Piers 1 through 4 are founded on an oblong rectangular pier wall supported by CIP concrete piles, and the east and west abutments are founded on CIP concrete piles. Inspection procedures followed FHWA guidance and the MnDOT Bridge and Structure Inspection Program Manual with channel bottom probing to search for foundations. The routine underwater inspection frequency is recommended to remain at a maximum of 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: 27A63

Minnetonka Blvd over Carsons Bay

Date: 01/19/2017

+ GENERAL +	+ ROADWAY +	+ INSPECTION +																				
<b>Agency Br. No.</b> Crew <b>District</b> 05 <b>Maint. Area</b> <b>County</b> 027 - Hennepin <b>City</b> Deephaven <b>Township</b> <b>Desc. Loc.</b> 0.4 mi NE of jct TH 7 <b>Sect., Twp., Range</b> 24 - 117N - 23W <b>Latitude</b> 44 ° 55 ' 24.82 " <b>Longitude</b> 93 ° 31 ' 48.76 " <b>Custodian</b> 04 - City or Municipal Highway <b>Owner</b> 04 - City or Municipal Highway <b>BMU Agreement</b> <b>Year Built</b> 2002 <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> 33B <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> 10 - MUN <b>Number</b> 87C <b>Roadway Name or Description</b> MUN 87C <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> 000+00.515 <b>Detour Length</b> 1.0 mi. <b>Lanes</b> ON 2 UNDER 0 <b>ADT</b> 4707 <b>YEAR</b> 2000 <b>HCA DT</b> <b>ADTT</b> % <b>Functional Class</b> 17 - Urban - Collector	<b>Userkey</b> 67 <b>Structurally Deficient</b> N <b>Functionally Obsolete</b> N <b>Sufficiency Rating</b> 87.5 <b>Routine Inspection Date</b> 07/29/2015 <b>Routine Inspection Frequency</b> 24 <b>Inspector Name</b> Stuber, Cory <b>Status</b> A - Open																				
		<b>+ NBI CONDITION RATINGS +</b>																				
		<b>Deck</b> 7 <b>Unsound Deck %</b> <b>Superstructure</b> 8 <b>Substructure</b> 5 <b>Channel</b> 6 <b>Culvert</b> N																				
	<b>+ RDWY DIMENSIONS +</b>	<b>+ NBI APPRAISAL RATINGS +</b>																				
	<b>If Divided</b> NB-EB SB-WB <b>Roadway Width</b> 39.40 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> 39.4 ft. <b>Bridge Roadway Width</b> 39.4 ft. <b>Median Width On Bridge</b> ft.	<b>Structure Evaluation</b> 5 <b>Deck Geometry</b> 5 <b>Underclearances</b> N <b>Waterway Adequacy</b> 9 <b>Approach Alignment</b> 8																				
<b>+ STRUCTURE +</b>	<b>+ MISC. BRIDGE DATA +</b>	<b>+ SAFETY FEATURES +</b>																				
<b>Service On</b> 5 - Highway-pedestrian <b>Service Under</b> 5 - Waterway <b>Main Span Type</b> 5 - Prestress or Precast <b>Main Span Design</b> 01 - Beam Span <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> 5 <b>APPR:</b> 0 <b>TOTAL:</b> <b>Main Span Length</b> 68.3 ft. <b>Structure Length</b> 347.4 ft. <b>Deck Width (Out-to-Out)</b> 55.3 ft. <b>Deck Material</b> 1 - Concrete Cast-in-Place <b>Wear Surf Type</b> 4 - Low Slump Concrete <b>Wear Surf Install Year</b> 2002 <b>Wear Course/Fill Depth</b> 0.16 ft. <b>Deck Membrane</b> 0 - None <b>Deck Rebars</b> 1 - Epoxy Coated Reinforcing <b>Deck Rebars Install Year</b> 2001 <b>Structure Area (Out-to-Out)</b> 19235 sq. ft. <b>Roadway Area (Curb-to-Curb)</b> sq. ft. <b>Sidewalk Width</b> 50A. Lt 0.00 ft. 50B. Rt 11.80 ft. <b>Curb Height</b> Lt 0.00 ft. Rt 0.00 ft. <b>Rail Type</b> Lt 22 Rt 22	<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> 1 - CONC 3 - FTG PILE <b>Pier Foundation (Material/Type)</b> 1 - CONC 3 - FTG PILE <b>Historic Status</b> 5 - Not eligible	<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> 1 - MEETS STANDARDS																				
	<b>+ PAINT +</b>	<b>+ IN DEPTH INSP. +</b>																				
	<b>Year Painted</b> <b>Unsound Paint %</b> <b>Painted Area</b> sq. ft. <b>Primer Type</b> <b>Finish Type</b>	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Y/N</th> <th style="text-align: center;">Freq</th> <th style="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></td> <td style="text-align: center;">60</td> <td style="text-align: center;">09/13/2016</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>		60	09/13/2016	<b>Pinned Asbly.</b>				<b>Spec. Feat.</b>			
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<b>Spec. Feat.</b>																						
	<b>+ BRIDGE SIGNS +</b>	<b>+ WATERWAY +</b>																				
	<b>Posted Load</b> 0 - Not Required <b>Traffic</b> 0 - Not Required <b>Horizontal</b> 0 - Not Required <b>Vertical</b> N - Not Applicable	<b>Drainage Area (sq. mi.)</b> <b>Waterway Opening (sf.)</b> <b>Navigation Control</b> 0 - No nav. control on <b>Pier Protection</b> ! <b>Nav. Clr. (ft.)</b> Vert. 0.0 Horiz. 0.0 <b>Nav. Vert. Lift Bridge Clear. (ft.)</b> <b>MN Scour Code</b> 1 - LOW RISK <b>Year</b> 2003																				
		<b>+ CAPACITY RATINGS +</b>																				
		<b>Design Load</b> 9 - HS 25 (OR GREATER) <b>Operating Rating</b> 2 - HS TRUCK 42.0 <b>Inventory Rating</b> 2 - HS TRUCK 25.0 <b>Posting VEH:</b> SEMI: DBL: <b>Rating Date</b> 5/13/2009 <b>Overweight Permit Codes</b> A N - N/A B N - N/A C N - N/A																				

**MINNESOTA BRIDGE INSPECTION REPORT**

01/30/2017

**BRIDGE 27A63 Minnetonka Blvd OVER Carsons Bay**

County: Hennepin	Location: 0.4 mi NE of jct TH 7	Length: 347.4 ft.
City: Deephaven	Route: 10 - MUN 87C Ref. Pt.: 000+00.515	Deck Width: 55.3 ft.
Township:	Control Section:	Rdwy. Area/ Pct. Unsnd: sq. ft. / %
Section: 24 Township: 117N Range: 23W Maint. Area:		Paint Area/ Pct. Unsnd: sq. ft. / %
Span Type: 5 - Prestressed Concrete 2 - Stringer/Multi-beam or Girder	Local Agency Bridge Nbr.:	Culvert: N/A
List:		Postings:
NBI Deck: 7 Super: 8 Sub: 5 Chan: 6 Culv: N		
	Open, Posted, Closed: A - Open	
	MN Scour Code: I - LOW RISK	

Appraisal Ratings - Approach: 8 Waterway: 9	Unofficial Structurally Deficient	N
Required Bridge Signs - Load Posting: 0 - Not Required	Unofficial Functionally Obsolete	N
Horizontal: 0 - Not Required	Unofficial Sufficiency Rating	87.5
Traffic: 0 - Not Required		
Vertical: N - Not Applicable		

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
12	Reinforced Concrete Deck	Underwater	09/13/2016	19235 SF	18850	0	385	0
		Migrated Values		19235 SF	18850	0	385	0
Notes: 359. One spall on north coping. Numerous trans cracks, some w/ efflor in deck and copings. '13-trans cracks spaced every 4'-10'. Small diag crack w/ efflor in SE. 15'-no change								
510	Wearing Surfaces	Underwater	09/13/2016	999 SF	999	0	0	0
		Migrated Values		999 SF	999	0	0	0
Notes: Low Slump Overlay with Epoxy Rebar Notes: 377. Deck originally tined transversely, now long planed in travel lanes-2005. Few trans and long cracks. '13-many trans cracks & few long cracks. 15'-no change								
109	Prestressed Concrete Open Girder/Beam	Underwater	09/13/2016	2067 LF	2067	0	0	0
		Migrated Values		2067 LF	2067	0	0	0
Notes: 109. 15'-OK								
210	Reinforced Concrete Pier Wall	Underwater	09/13/2016	223 LF	155	1	67	0
		Migrated Values		223 LF	222	1	0	0
Notes: 210. Some minor forming and spalling problems. Some minor honeycomb problems. 1 vertical crack in 1st and 2nd pier from east and @ N end 2nd pier from east. 1 SF spall @ S end of 2nd pier from east @ waterline. '13-spall on 2nd pier from E. 15'-3 minor vert cracks on W side of P1, hairline vert cracks on w side of P3, E side of P4 has punky, conc spalls								
[2016] Underwater Inspection - Moderate to severe spalls and scale. Spalls: Pier 1, max pen 6 inches, max 24 SF; Pier 2, max pen 6 inches, max 20 SF; Pier 3, max pen 2 inches, max 3 SF; Pier 4, max pen 4 inches, max 1 SF. Detailed in underwater summary and drawings. Scale: Moderate scaling west face of Pier 2, 2 feet above the mud line, measuring 10 SF with up to 4 inches of pen.								
215	Reinforced Concrete Abutment	Underwater	09/13/2016	155 LF	143	12	0	0
		Migrated Values		155 LF	155	0	0	0
Notes: [2016] Migrator added 40 LF to abutment quantity to account for wingwalls (CS1:40 CS2:0 CS3:0 CS4:0). 215. Abuts have critter x-ings-both underwater. '13-vert crack in both abuts. East-numerous hairline vert cracks. 15'-no change								
Wingwall notes: 387. 15'-OK								
[2016] Underwater Inspection - Random scaling east abutment's west face, up to 2 inches pen.								
234	Reinforced Concrete Pier Cap	Underwater	09/13/2016	223 LF	223	0	0	0
		Migrated Values		223 LF	223	0	0	0
Notes: 234. '13-hairline vert cracks in all. Surface finish peeling on top of N & S ends. Hairline horiz cracks on S ends. 15'-no change								

**BRIDGE 27A63 Minnetonka Blvd OVER Carsons Bay**

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
300	Strip Seal Expansion Joint	Underwater	09/13/2016	108 LF	0	108	0	0
		Migrated Values		108 LF	0	108	0	0
Notes: 300. Joints full of sand. '13-no change. '15-no change								
301	Pourable Joint Seal	Underwater	09/13/2016	236 LF	181	55	0	0
		Migrated Values		236 LF	181	55	0	0
Notes: 301. 4 joints. Large areas of deteriorated pourable joint need resealing. '13-all joints have sections of material missing and/or deteriorated. '15-15 LF is spalled								
310	Elastomeric Bearing	Underwater	09/13/2016	12 EA	12	0	0	0
		Migrated Values		12 EA	12	0	0	0
Notes: 310. Abutments. 15'-OK								
313	Fixed Bearing	Underwater	09/13/2016	48 EA	48	0	0	0
		Migrated Values		48 EA	48	0	0	0
Notes: 313. Piers. 15'-OK								
321	Reinforced Concrete Approach Slab	Underwater	09/13/2016	1576 SF	788	788	0	0
		Migrated Values		1576 SF	788	788	0	0
Notes: [2016] Migrator assumed an approach slab length of 20FT and used the inventory quantity of 39FT for the width. 321. Small spalls in approach roadway @ ends of panels. '13-approach roadways on both ends have minor spalling & settlement. West-Moderate spalls in middle. '13-spalls in WB lane. Joint material missing @ construction joints. East-'13-no change. '15-no change								
330	Metal Bridge Railing	Underwater	09/13/2016	351 LF	351	0	0	0
		Migrated Values		351 LF	351	0	0	0
Notes: [2016] Migrator assumed concrete/metal combination type rail. 333. A steel fence w/ vert slats is on top of a conc railbase S of trail. Chain link is attached to steel fence. '13-no change. 15'-minor paint chips on metal								
515	Steel Protective Coating	Underwater	09/13/2016	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.								
331	Reinforced Concrete Bridge Railing	Underwater	09/13/2016	1086 LF	1085	1	0	0
		Migrated Values		1086 LF	1085	1	0	0
Notes: 331. Rock spall @ 8th section. Staining and vert cracks. Some small popouts. Spall @ guardrail connection in SE corner. Few horiz cracks. '13-11 sections of rail have a minor horiz crack +/- 6" from top. There is +/-90 LF of minor vert cracks in the rails, some w/ efflor. '15-Surface finish scaled and peeling in areas, spalling is now occurring at the SE and SW guardrail connection. [2016] Migrator assumed concrete/metal combination type rail. 333. A steel fence w/ vert slats is on top of a conc railbase S of trail. Chain link is attached to steel fence. '13-no change. 15'-minor paint chips on metal								
800	Critical Deficiencies or Safety Hazards	Underwater	09/13/2016	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.								
810	Concrete Decks - Cracking & Sealing	Underwater	09/13/2016	0 LF	0	0	0	0
		Migrated Values		0 LF	0	0	0	0
Notes: 358. '13-cracks are minor in size, 5'-10' in density. 15'-no change								
855	Secondary Members (Superstructure)	Underwater	09/13/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 380. Concrete diaphragms @ abuts. Steel diaphragms. '13-some conc diaphragms have hairline vert cracks, some w/ poorly consolidated concrete. 15'-no change								

**BRIDGE 27A63 Minnetonka Blvd OVER Carsons Bay**

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
883	Concrete Shear Cracking	Underwater	09/13/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to monitor the presence of shear cracking on concrete elements. Pay particular attention to the prestressed concrete beams.								
885	Scour	Underwater	09/13/2016	1 EA	0	1	0	0
Notes: [2016] Underwater Inspection - Scour exists, but is of little concern to the structural integrity of the bridge. Piers 2,3 and 4; max depth of 3 feet, max radius of 5 feet. Detailed in drawing and underwater summary. Note, areas of the channel bottom have significant aquatic growth.								
891	Other Bridge Signing	Underwater	09/13/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 981. X4-4 Horizontal clearance markers @ ends of guardrail. '13-Three River Park Trail & Carson's Bay signs in SE & SW. '15-no change								
892	Slopes & Slope Protection	Underwater	09/13/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 985. '13-rip rap @ abut side slopes. '15-OK								
893	Guardrail	Underwater	09/13/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 982. Guardrail w/ crashworthy end treatments @ all corners. Decal on NE and SW ends is deteriorated. '13-no change. '15-no change								
894	Deck & Approach Drainage	Underwater	09/13/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: Use this element to rate the condition, function, and adequacy of the drainage system.								
895	Sidewalk, Curb, & Median	Underwater	09/13/2016	1 EA	0	1	0	0
		Migrated Values		1 EA	0	1	0	0
Notes: 986. Numerous minor trans cracks in walk. Curb in NW corner is settled. Deep, long groove in middle of walk. '13-cracks are sealed. Approach curb in NW and SE is settled. '15-CL5 app trail @ E end is rutted from erosion								
899	Miscellaneous Items	Underwater	09/13/2016	1 EA	1	0	0	0
		Migrated Values		1 EA	1	0	0	0
Notes: 988. Water depth = 7' @ center of bridge, N side. Modular block walls @ all corners of wingwalls. Wall @ SE corner tipping out 8" appears to have cracked footing, SW is out 2" and NW has settled. Watermain or san sewer pipe hung from deck in 3rd bay from S. Three Rivers Park District Regional Trail on S side of bridge. '11-cover missing from handhole in NE behind guardrail/railing connection. Fill is washing out behind block wall in SE. On 7/20/11, City of Deephaven was contacted(Dana Young-Administrator) concerning the handhole cover in NE and washout and block wall problems in SE. Graffiti on SE abut corner. '13-retaining wall in SE has been repaired. Handhole cover in NE has been replaced. '15-no change								
900	Protected Species	Underwater	09/13/2016	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: 27A63 Minnetonka Blvd/Carsons Bay @ Lake Mtka - Deephaven. 7/29/15. JDE and PTH. Used our boat.

Recommended repairs:

- 300. Clean sand out of strip seal joint.
- 301. Reseal pourable joints.
- 321. Repair spalls in approach panels.
- 377. Seal deck cracks.
- 988. Repair NW modular block wall.

58. Deck NBI: Spall in underside. Frequency of cracks w/ efflor in underdeck. Frequency and severity of cracks in deck.

36A. Brdg Railings NBI:

36B. Transitions NBI:

**BRIDGE 27A63 Minnetonka Blvd OVER Carsons Bay**

ELEM NBR	ELEMENT NAME	REPORT TYPE	INSP. DATE	QUANTITY	QTY CS 1	QTY CS 2	QTY CS 3	QTY CS 4
36C.	Appr Guardrail NBI:							
36D.	Appr Guardrail Terminal NBI:							
59.	Superstructure NBI:							
60.	Substructure NBI:	[2016] Underwater Inspection - Moderate concrete deterioration on all piers and abutments.						
61.	Channel NBI:	[2016] Underwater Inspection - Minor Scour observed around 3 of 4 piers.						
62.	Culvert NBI:							
71.	Waterway Adeq NBI:							
72.	Appr Roadway Alignment NBI:							

\_\_\_\_\_  
Inspector's Signature

\_\_\_\_\_  
Reviewer's Signature

# Pictures



Photo 1 - South Elevation, Looking North.



Photo 2 - North Elevation, Looking South.

## Pictures



Photo 3 - West Abutment, Looking West.



Photo 4 - Pier 1, Looking Northeast.

## Pictures



Photo 5 - Pier 2, Looking Northeast.



Photo 6 - Pier 3, Looking Northeast.

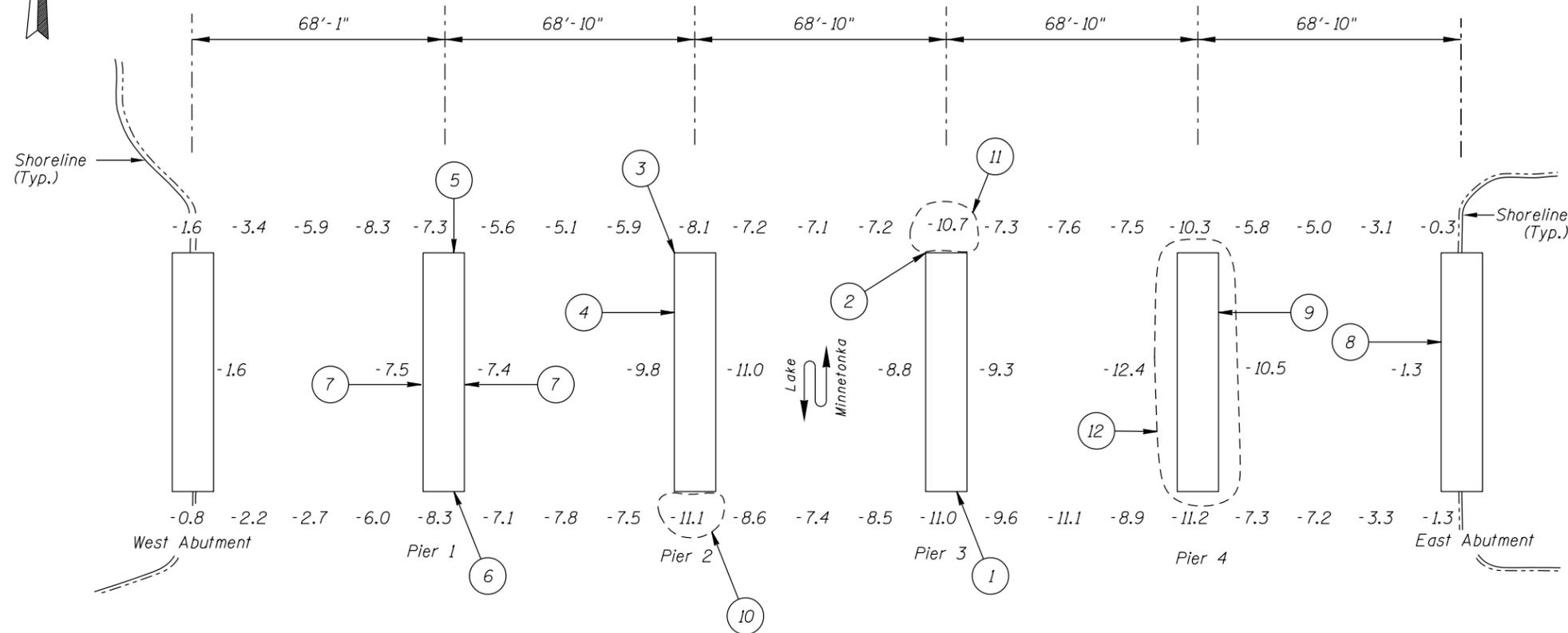
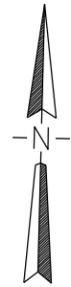
## Pictures



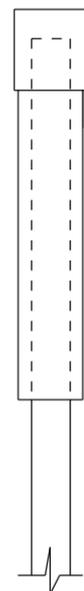
Photo 7 - Pier 4, Looking Northeast.



Photo 8 - East Abutment, Looking East.



SOUNDING PLAN



TYPICAL END VIEW OF PIERS

GENERAL NOTES:

1. East and West Abutments and Piers 1, 2, 3, and 4 were inspected underwater.
2. At the time of inspection on September 13, 2016 the waterline was located approximately 4.7 feet below the top of the pier cap on the North end of Pier 4. This corresponds with a waterline elevation of 929.6 feet based on plans dated to May 17, 2001.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

Legend

-2.0 Sounding Depth from Waterline (9/13/2016)

Scour

Note

All soundings based on 2016 waterline location.

INSPECTION NOTES:

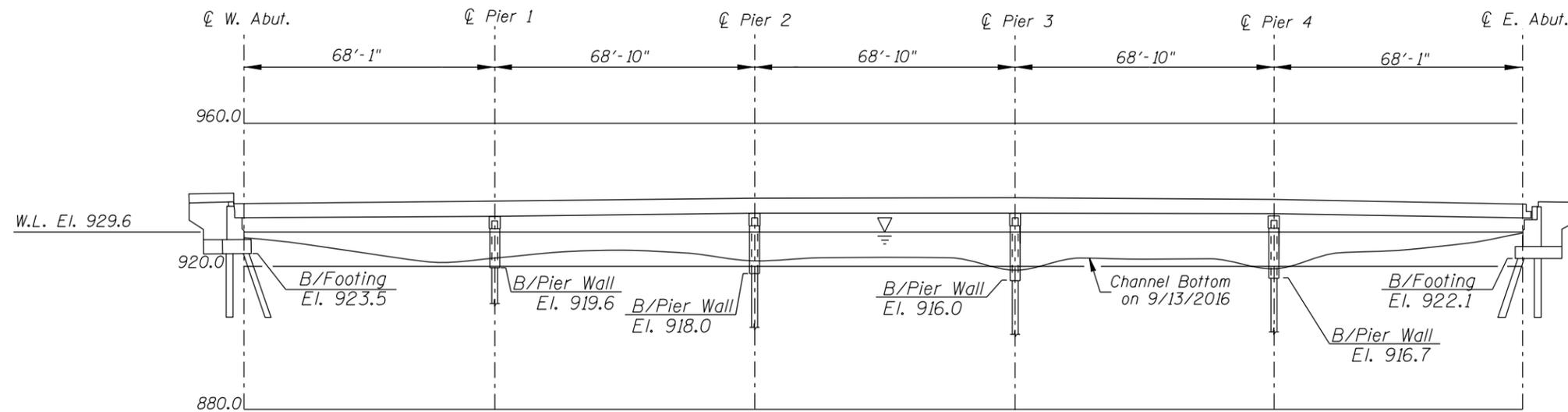
- 1 Spall observed on the south end of Pier 3 at the waterline, measuring 1 foot long by 3 feet high with up to 2 inches of penetration.
- 2 Spall observed on the north end of Pier 3 at the waterline, measuring 1 foot long by 1 foot high with up to 2 inches of penetration.
- 3 Spall observed on the northwest corner of Pier 2, 4 feet below the waterline, measuring 5 feet long by 4 feet high with up to 6 inches of penetration.
- 4 Moderate scaling observed on the west face of Pier 2, 2 feet above the mud line, measuring 5 feet long by 2 feet high with up to 4 inches of penetration. Scaling defect was 5 to 10 feet from the northern nose of Pier 2.
- 5 Spall observed on the north nose of Pier 1 at the waterline, measuring 6 feet long by 4 feet high with up to 4 inches of penetration.
- 6 Spall with exposed reinforcement observed wrapping around the south nose of Pier 1 at the waterline, measuring 6 feet long by 3 feet high with up to 6 inches of penetration.
- 7 Spall with exposed reinforcement observed at the midpoint on both the east and west faces of Pier 1 at the mud line, measuring 4 feet long by 1 foot high with up to 6 inches of penetration.
- 8 Random scaling observed on east abutment's west face, with up to 2 inches penetration measured.
- 9 Spall observed on the east face of Pier 4, 10 to 15 feet from the north nose at the mud line, measuring 1 square foot with up to 4 inches of penetration.
- 10 Scour observed on the south nose of Pier 2, with a 4 foot diameter and 3 foot depth.
- 11 Scour observed on the north nose of Pier 3, with a 5 foot diameter and 3 foot depth.
- 12 Scour observed around the entire perimeter on Pier 4, with a 4 foot diameter and 3 foot depth.

MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

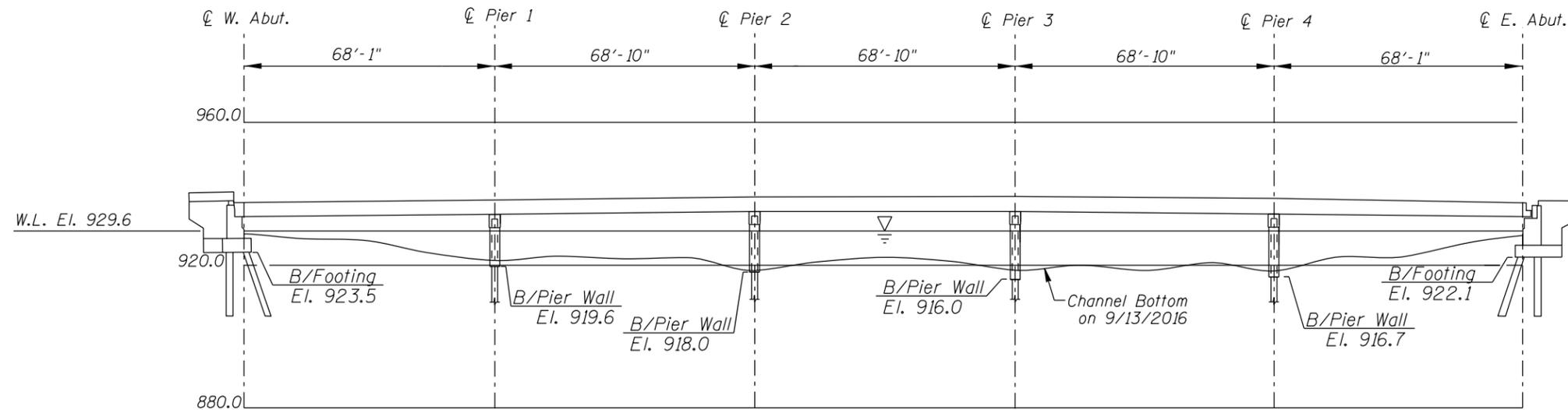
STRUCTURE NO. 27A63  
MINNETONKA BLVD. OVER CARSONS BAY  
METRO DISTRICT, HENNEPIN COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: JMF		Date: JAN. 2017
Checked By: BRL		Scale: NTS
Project: 63-9687		Figure No.: 1



NORTH FASCIA PROFILE



SOUTH FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

<b>MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION</b>		
STRUCTURE NO. 27A63 MINNETONKA BLVD. OVER CARSONS BAY METRO DISTRICT, HENNEPIN COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: JMF	<b>COLLINS ENGINEERS</b> <small>1599 Selby Avenue Suite 206 St. Paul, MN 55104 (651) 646-8502 www.collinsengr.com</small>	Date: JAN. 2017
Checked By: BRL		Scale: 1"=40'
Project: 63-9687		Figure No.: 2