Bill Burton Fishing Pier
Cambridge, Maryland
Modified Underwater Inspection Report
February 2022

For:

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By:

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03/26/2022

Date

PROFESSIONAL CERTIFICATION:
“I hereby certify that this document was prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 52301; Expiration Date: 02/14/2024.˝

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Appendices

1 Introduction

Marine Solutions, Inc. (Marine Solutions) was retained by EBA Engineering, Inc. (EBA Engineering) to perform a modified underwater inspection of the substructure units that comprise the Bill Burton Fishing Pier near Cambridge, Maryland. The modified underwater inspection was to perform a Level I Inspection of 32 bents out of the 151 bents (approximately 20%), complete a Level II inspection (cleaning three 12" high bands near the splash zone, mid-height, and near mudline) on 32 piles (approximately 20%), and document water depth measurements at both ends of each bent during the dates of February 22nd through the 24th 2022. The purpose of the inspection was to document existing structural conditions, assess the overall site conditions, and provide recommendations for future actions. This report includes a description of the facility, inspection procedures, condition assessment criteria, observed conditions, and recommendations for repairs.

Previous inspection reports and facility plans were available and provided by EBA Engineering and used for comparison during the modified underwater inspection. For reporting purposes, bents and piles were numbered from the south and the east, respectively.

1.1 Description of the Facility

The Bill Burton Fishing Pier was originally constructed in 1935 as the Emerson C. Harrington Bridge. The original bridge was approximately two miles long spanning across the Choptank River connecting the Maryland towns of Trappe and Cambridge. Due to increased traffic demands, the four-lane Frederick C. Mulkus Bridge was constructed in 1987 adjacent to the original bridge and became the current Route 50 bridge. The draw bridge section was removed from the original bridge to allow vessel traffic to pass through. The structure was turned into a pedestrian fishing pier and later named after Bill Burton, a local fisherman, writer, and reporter.

The Bill Burton Fishing Pier is currently comprised of two separate structures. The south structure is approximately 3,000' long and is supported by 56 bents (Photo 1). The south pier is approximately 5,000' long and supported by 95 bents (Photo 2). The bents are typically comprised of 5 square reinforced concrete piles with a horizontal concrete strut that encompasses all five piles (Photos 3 and 4). The struts are located 4' below the top of the piles within the tidal zone. Several bents appear to have had the strut removed and pile jackets installed (Photo 5). Approximately every 8 bents consist of a 10-pile double bent with a reinforced concrete strut (Photo 6).

Pier Wall 1 (Bent 56) is the northern most bent on the south structure and consists of two reinforced concrete columns orientated east and west (Photo 7). The columns are connected by a full-height reinforced concrete web wall. The columns and the web wall are founded on a reinforced concrete footing and subfooting. Pier Wall 6 (Bent 57) is the southernmost bent on the north structure and consists of two reinforced concrete columns orientated east and west (Photo 8). The columns are connected by a partial height reinforced concrete strut that extends from 7' below the high-water mark down to the top of the footing. The columns are founded on a footing and subfooting. The North Abutment (Bent 151) is comprised of a reinforced concrete stem, two reinforced concrete wingwalls, and a footing (Photo 9). The South Abutment was dry and did not require an underwater inspection.

1.2 Inspection Procedures

The underwater inspection was performed by a three-person dive team lead by a Professional Engineer/Dive Supervisor. Diving operations were conducted using surface-supplied diving equipment with hardwire communications between the diver and topside personnel, and in accordance with all applicable ADCI, OSHA, and USCG regulations. The operations were staged from a fully equipped diving support vessel (DSV). All Marine Solutions on-site personnel were

experienced in the inspection, maintenance, rehabilitation, and construction of waterfront structures.

The inspection was performed in general accordance with ASCE Manuals and Reports on Engineering Practice No. 130: *Waterfront Facilities Inspection and Assessment* (ASCE Manual). The purpose of the inspection was to document existing structural conditions, assess the overall site conditions, and provide recommendations for future actions.

The underwater inspection included 35 randomly selected bents which included Pier Wall 1, Pier Wall 6, and the North Abutment. A Level I inspection effort (visual/tactile) was performed on 100% of the accessible structural elements within the selected bents from the high-water mark down to the mudline. A Level II inspection effort (visual inspection of cleaned areas) was performed on approximately 20% of the accessible structural elements within the selected bents. Water depths measurements were recorded at the east and west ends of each selected bents using a diver carried depth gauge. See Appendix A for detailed inspection notes and water depth measurements.

1.3 Condition Assessment Criteria

In accordance with ASCE, the inspection condition and assessment criteria use a six-point standardized rating system provided in the ASCE Manual. The condition assessment of the facility is determined based on the findings during the underwater inspection. These ratings are required to categorize the results of the inspection and to provide a basis for comparison of new deficiencies in future inspections or other facilities. The condition assessment ratings as defined in the ASCE manual are described in Table 1 below.

Table 1: ASCE Condition Assessment Ratings.

Rating	Description
6 – Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
5 – Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
4 – Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to major deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
3 – Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2 – Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of primary structural components. Local failures are possible, and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
1 - Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and loading restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

Each structural element was evaluated and assessed an element level damage rating (minor, moderate, major, or severe). See Appendix C for the ASCE Manual Element Level Damage Rating Figure. The element damage ratings were utilized to give an overall condition rating to each structural element inspected based on the marine environment, overall use, redundancy, section loss, bearing capacity, physical damage, and deterioration of each individual element.

2 Observed Conditions

The observed conditions of each structural element inspected at the Bill Burton Fishing Pier is discussed in the following sections. Please refer to Appendix A for Field Note Data detailing the exact locations, type, and extend of the observed defects. Refer to Appendix B for photographs of observed defects. Refer to Appendix C for ASCE Element Level Damage Rating Figure.

2.1 Reinforced Concrete Pile Bents

Marine Solutions inspected 27 reinforced concrete five pile bents and 5 reinforced concrete ten pile bents. Seven out of the 32 reinforced concrete bents did not have reinforced concrete struts. The reinforced concrete piles and struts are discussed in more detail in the sections below.

2.1.1 Reinforced Concrete Struts

The reinforced concrete struts are in overall **Poor** condition. The north and south faces of the struts typically have severe spalling that extends full length x full height and up to 10" deep (full-

depth) with the deepest areas of spalling concentrated in a 2' high band at the bottom of the strut (Photos 10 and 11). The spalling exposes all the main longitudinal bars and stirrups, which exhibit severe corrosion and section loss. The exposed stirrups typically are debonded and have areas of 100% section loss. The exposed longitudinal reinforcing bars are intermittently debonded and have 50% section loss throughout with isolated areas of up to 90% section loss. Areas without spalling typically have corrosion cracks with rust staining up to 1/4" wide with associated delamination.

The east and west faces of the struts typically have severe spalling that extends full width x full height and up to 20" deep (full-depth) with the deepest areas of spalling concentrated within the top and bottom 1' of the strut (Photos 12 through15). The spalling exposes several horizontal and vertical steel reinforcing bars which exhibit severe corrosion and section loss. The exposed reinforcing bars are intermittently debonded in random areas and have up to 100% section loss. Areas without spalling typically have corrosion cracks with rust staining up to 1/4" wide with associated delamination.

2.1.1 Square Reinforced Concrete Piles

The square reinforced concrete piles are in overall **Fair** condition. This is due to widespread minor to moderate abrasion, spalling, and cracking (Photos 16 through 19). Most of these defects are located within the top 4' of the pile above the reinforced concrete strut. Piles that do not have a strut or repairs in the tidal zone typically have abrasion up to 2" deep most notably at the corners. Bent 148, Pile 4 has an area of abrasion with exposed reinforcement where the strut is missing due to deterioration (Photo 20). Approximately 18% of the piles have corner spalls within the top 5' of the piles (Photos 21). The spalls are up to 5'-0" high x up to 10" wide x up to 7" deep with exposed reinforcement that exhibits 50% to 75% section loss. Three piles (Bent 90 Pile 1 and 5; Bent 149 Pile 5) have several spalling and deterioration from 3' to 7' below the top of the piles (Photo 22). These spalls are approximately 4'-0" long x full-width x 7" deep with exposed and corroded reinforcement with up to 50% section loss. Approximately 75% of the piles have cracking typically 1/8" to 1/4" wide with isolated 1/2" wide cracks within the top 4' of the pile. As a result of the cracking, there are areas of associated delamination and spalling on all faces of the affected piles (Photos 18 through 22). See Table 3 for total quantities and percentages of piles with observed defects.

Table 2: Type and Number of Pile Defects.

Defect Type	No. of Piles	Percentage of Piles with Defect
Abrasion	15	8%
Spall	34	18%
Cracking	138	75%
< 1/8" Wide	15	8%
1/8" to 1/4" Wide	112	61%
>=3/8" Wide	11	6%
With Spalling and Delamination	36	19%

Approximately 92% of the piles have been previously repaired with either a square epoxy filled fiberglass jacket or a grout filled fabric bag with welded wire mesh. Piles within bents without a strut typically have the square epoxy filled fiberglass jackets. These jacket repairs typically extend

from 3' to 10' below the top of the pile (Photo 23). Isolated piles with these repairs have areas of missing or damaged epoxy epoxy jackets typically from 4' to 9' below the top of the pile (Photos 24 and 25). Piles within bents with a strut typically have the grout filled fabric bag repairs. The bag repairs typically extend from the bottom of the strut to 13' below the top of the pile. Isolated bag repairs have voids up to 1'-0' high x 8" wide x 2" deep exposing the wire mesh within the grout (Photo 26). At these locations the underlying pile is not exposed. For specific repair numbers and percentages, see Table 3.

Table 3: Number of Pile Repairs and Defects.

Repair Type	No. of Piles	No. of Pile with Damage/Missing Area	Percentage of Total Piles Inspected	Percentage of Total Repairs with Defects
No Repair	15	0	8%	0%
Square Epoxy Jacket	34	5	18%	15%
Grout Filled Fabric Bag	136	3	74%	2%
Totals:	**185**	**8**	**100%**	**4%**

2.2 Pier Wall 1 (Bent 56)

Pier Wall 1 (Bent 56) is in **Poor** condition. The west column exhibits random areas of scale up to full height x 3" deep. Full circumference of the footing/column interface, there is spalling up to 10'-0" wide x 2'-6" high x 6" deep with exposed and corroded reinforcement. The east column exhibits random areas of scale up to full height x 3" deep. Full circumference of the footing/column interface, there is spalling up to 10'-0" wide x 3'-0" high x 10" deep with exposed and corroded reinforcement.

The web wall exhibits random areas of scaling 1" deep and isolated areas 9" deep concentrated at the waterline (Photo 27). The top of the footing is approximately 5'-6" below the waterline and approximately 8'-0" high. There are random areas of scaling up to 8" deep throughout with exposed and loose aggregate. The footing has large areas of latent concrete throughout resulting in small voids and removal of the concrete matrix when sounded with a hammer. At the west face near the centerline, there is an area of undermining 3'-0" long x 1'-6" high x 2'-0" deep.

2.3 Pier Wall 6 (Bent 57)

Pier Wall 6 (Bent 57) is in **Poor** condition. The west and east columns have 9'-0" high grout filled fiberglass jackets that begin 4' above the waterline and extend within 4" to the top of the strut. In the tidal zone, there are random areas of missing jacket throughout exposing the underlying grout layer. The grout exhibits 3" deep scale; however, is not deep enough to reach the original column This deterioration is most notable on the west faces of both columns (Photo 28).

The top of the reinforced concrete strut is located approximately 7' below the high water mark and has random areas of voids and spalling up to 1'-0" diameter x 3" deep (Photo 29). The top of the footing is located approximately 15' below the high-water mark. The footing is 5'-0" high x 4'-0" wide and encompasses both columns. The footing has large areas of latent concrete throughout resulting in small voids and removal of the concrete matrix when sounded with a hammer. There are random up to 1'-0" diameter x 3" deep voids throughout (Photos 30 and 31).

The top of the subfooting is located approximately 20' below the high-water mark. The subfooting is exposed up to 7'-0" x 2'-0" wide and encompasses the entire footing. The subfooting has large areas of latent concrete throughout resulting in small voids and removal of the concrete matrix when sounded with a hammer. There are random up to 5'-0" diameter x 1'-6" deep voids throughout (Photo 32). No signs of undermining were observed during the inspection.

2.4 North Abutment (Bent 151)

The North Abutment (Bent 151) is in **Fair** condition. The footing of the North Abutment and both wingwalls is exposed full-length x up to 3'-0" high with no signs of undermining and up to 3" deep scale. At the centerline of the stem wall and extending to the footing, there is a 6'-0" high x 2'-0" wide x 2" deep spall. At the east end of the stem wall, there is a spall of similar size. At the west end of the stem wall, there is a 2'-0" high x 1'-0" wide x 3" deep spall (Photos 33 and 34). At the interface of the stem wall and Northwest Wingwall near the waterline, there is a 2'-0" high x 1'-0" wide x 2" deep spall.

3 Conclusions and Recommendations

The Bill Burton Fishing Pier was assigned a combined overall Condition Assessment Rating (CAR). The CAR is assigned based on the type and level of severity of the deterioration observed on the individual structural components of each structure. Recommendations are provided based on the facilities current use, redundancy of structural elements, known history and age of the facility, and based on the areas inspected during this modified underwater inspection.

3.1 Overall Condition Assessment Rating

The Bill Burton Fishing Pier is in overall **Poor** condition. This CAR is given due to widespread areas of minor to moderate deterioration and isolated areas of major to severe deterioration on the primary structural elements.

3.2 Recommendations

Marine Solutions has developed recommendations for additional actions and rehabilitation to the various structures or areas at the Bill Burton Fishing Pier based on observed conditions. The following recommendations should be compared with facility use and production parameters to determine the most practical and economical allocation of funds.

Recommendations have been separated by immediate, priority, and routine repair items. It is recommended that immediate repair items be performed as soon as possible within the next six months. Immediate recommendations typically include action items to increase the facilities overall safety or to address significant structural concerns. Priority repair items should be executed within the next two years to minimize the potential for facility limitations or load restrictions. Typically, structural components which are observed with major to severe deterioration are included in the priority repair category due to potential loss of capacity to the element. Routine repair items are maintenance items which should be executed within the next five years. Routine maintenance items help extend the service life of the facilities and minimize the need for structural repairs and rehabilitation which are often costly and can involve temporary facility shutdowns.

3.2.1 Immediate (Within 6 months)

Based on the inspection limits and observed conditions at the time of inspection, Marine Solutions recommends the following repair items on an immediate basis:

- Due to the age of the structure and the overall CAR of poor, the Bill Burton Fishing Pier should have a complete underwater inspection of the remaining piers not included within this inspection.

- Perform a load rating analysis to determine if the current loading criteria requires the reinforced concrete struts to provide adequate structural capacity to the piers. If the struts are required, then they should be repaired on all bents where they remain. If they are not required, then they should be removed, and the underlying pile section should be inspected.
- Even though the struts are in overall poor condition and several struts have severe deterioration, some struts only had moderate to major deterioration and act as a protective element around the piles in the tidal zone. If the load rating determines the struts are not required for structural capacity, then struts with moderate to major damage could be left in place.
- Three piles have severe deterioration with exposed and debonded main reinforcing members. These piles should be repaired with new reinforcing bars and a grout filled structural jacket.

3.2.2 Priority (Within 2 years)

Based on the inspection limits and the observed conditions at the time of inspection, Marine Solutions recommends the following repair items on a priority basis:

- Replace all damaged or missing square epoxy filled fiberglass jackets with new grout filled fiberglass jackets.
- At Pier Wall 1 (Bent 56), there is an area of undermining. Backfill and place scour protection countermeasures to prevent further undermining.
- Remove areas of unsound concrete, clean corroded reinforcement, and patch the areas of deep (>1" deep) spalling on the piles, pier walls, and North Abutment (Bent 151).
- At Pier Wall 1 (Bent 56) and Pier Wall 6 (Bent 57), repair the areas of voids in the footing and subfooting.

3.2.3 Routine (Within 5 years)

Based on the inspection limits and observed conditions at the time of inspection, Marine Solutions recommends the following repair items on a routine basis:

- Epoxy seal all cracks equal to and greater than 1/8" wide on the piles.
- Continue to monitor the condition of the Bill Burton Fishing Pier by maintaining a consistent underwater inspection cycle.

Appendix A – Field Inspection Notes

Abbreviations Used in the Field Inspection Notes:
N – North
S - South
W – West
E – East
NE – Northeast
NW – Northwest
SW – Southwest
SE - Southeast
SEC – Southeast Corner
SWC – Southwest Corner
NWC – Northwest Corner
NEC – Northeast Corner
SL – Section Loss
FL – Full-Length
FW – Full Width
FD – Full Depth
FH – Full Height
ML – Mudline
CRX – Cracks
HL – Hairline
ISO – Isolated
B1 – Bent Number 1
P1 – Pile Number 1

nventory Data					Leve Data			Defect Cond t on Data																					
								Abras on Sca e				Spa					Vert ca Crack ng					Ex s ting Repa rs				Manua Damage Ra ng	Concrete Strut Notes	Add t ona Notes
Ben No	P e No	Top o WL ( )	Wes End Ben ML Dep h ( ) WL TO ML	Eas End Ben ML Dep h ( ) WL TO ML	Org X sec (n)	M n X Sec (n)	ML Dep h ( )	Dep h (n)	De ec Top	De ec Bo om	Exp Stee	Dep h (n)	Face	De ec Top	De ec Bo om	Exp Stee	W d h (n)	Face	De ec Top	De ec Bo om	Rus Sta n	Yes No	Repa r Top	Repa r Bo om	Repa r Type			
8	1	5		3				1	6	ML	No						3/16	S,E	0	4	Yes						**SOUTH FACE:** FULL LENGTH STIRRUP EXPOSED, TOP AND BOTTOM REINF. EXPOSED. STIRRUPS 100% SL AT BOTTOM; SCALE UP TO 6" DEEP; **NORTH FACE:** SPALLING FL X FH X 6" DEEP, STIRRUPS 100% SL, OTHER REINF. 50% SL	6' TO ML SCALE ON CORNERS 1" DEEP
	2	5			22	18	2	2	6	8	No																	SCALE 1" DEEP ON CORNERS OF PILE
	3	5						1.5	6	8	No						>= 1/2	SEC, SWC	0	4	Yes							
	4	5						1	6	8	No																	SOUTH AND EAST FACES P 0 TO 4 HEAVY DELAM AND IMMINENT SPALLS WITH INTERMITTENT REINFORCING EXPOSURE
	5	5						1.5	6	8	No						3/16	SEC, NWC	0	4	Yes							SCALE 1" DEEP ON CORNERS
	6	5						1.5	6	8	No	3.5	NEC	0	5	Yes w/ SL												5'H X 2' W X 3.5" D SPALL, REINF. 75% SL
	7	5						1.5	6	8	No						1/8	NWC	0	4	No							DELAM NE CORNER 0 TO 4 4' H X 8" W
	8	5						1	6	8	No																	
	9	5						1	6	8	No																	SCALE 1" DEEP ON CORNERS
	10	5	3.2'					1.5	6	8	No						1/8	N	2	5	Yes							SCALE 1" DEEP ON CORNERS
9	1	5		4	22	20	2	1	6	7	No																**SE CORNER** FH X 10'L X UP TO 2.5" D SPALL WITH STIRRUPS AND REINF. EXPOSED 40% SL ON BAR; SCALE UP TO 3/4" DEEP; **SOUTH FACE BELOW P4** SPALL 3.5' W X 2' H X 4" D WITH 3 STIRRUPS EXPOSED AND 25% SL; **BELOW P5 S FACE** SCALE 2" DEEP; WEST NOSE 2' HIGH X 3' WIDE X 4" DEEP REINF EXPOSED 40% SL; **NORTH FACE:** ISO AREAS AT PILES 3,4,5 SCALE 1.5" DEEP	SCALE 1" DEEP ON CORNERS
	2	5						1	6	7	No						3/16	W,N	0	4								
	3	5						1	6	7	No						1/8	S,E	0	4	Yes							
	4	5						1	6	7	No						3/8	S,W,E,N	0	4	Yes							
	5	5	3.9'					1	6	7	No						1/16	S	0	3	No							
10	1	5		3.5													HL	NEC	0	2		Y	6	8.5	BAG		**EAST FACE:** FH X FW X 3.5" DEEP REINF EXPOSED 40% SL... **SOUTH FACE:** FL X 2'H X 3" DEEP SCALE WITH RANDOM REINF EXPOSED 25% SL WITH ADJACENT DELAM AND HORIZ CRX FL.. **WEST NOSE** 6'L AREA SCALE 3.5" DEEP WITH 100% SL ON STIRRUPS... **NORTH FACE** SAME AS SOUTH	FAILED BAG REPAIR TOP 3"
	2	5															1/8	N	0	4		Y	6	8.5	BAG			DELAM 0 TO 4, 4'H X 10" W SEC
	3	5																				Y	6	8.5	BAG			
	4	5			22	22	3															Y	6	8.5	BAG			
	5	5	4.4														1/16	E,N	0	3	Yes	Y	6	8.5	BAG			
18	1	5.25		8													1/4	N,W	0	3	Yes	Y	6	11	BAG		**SOUTH FACE:** SCALE UP 12 TO 15" DEEP HARDWARE GONE... **NORTH FACE** SAME	WITH ASSOCIATED SPALLING 2"W X 2" D
	2	5.25															1/8	S,W,E,N	0	3	Yes	Y	6	11	BAG			DELAM SOUTH FACE 2' DIA P=1
	3	5.25															1/16	N,W	0	4	Yes	Y	6	11	BAG			
	4	5.25																				Y	6	11	BAG			
	5	5.25	7		22	22	7										1/4	W,S	0	6	Yes	Y	6	11	BAG			NEC DELAM 2'H X 10" W
19	1	5.25		11	22	22	11										1/8	N,S,W	0	3	No	Y	3	8	SQ EPOXY		NO STRUT HERE	1.5" ANNULUS ON JACKET
	2	5.25										0.75	SWC	3	3		1/4	W, N	0	3	Yes	Y	3	8	SQ EPOXY			SPALL 6" DIA X 3/4" D
	3	5.25															1/16	S,E,N	0	2	Yes	Y	2	9	BAG			
	4	5.25															1/8	W,S,E,N	0	3	Yes	Y	3	6	SQ EPOXY			
	5	5.25	10														1/8	E,N,W	0	3	Yes	Y	3	6	SQ EPOXY			WITH ASSOCIATED SPALLING 3"W X 1.5" D
20	1	5.25		11													1/16	E,N	0	4	Yes	Y	6	13	BAG		**ALL FACES:** FH X 9" D SCALE WITH INTERMITTENT AREAS FD, STIRRUPS 100% SL MAIN REINFORCING 75 TO 90% SL	
	2	5.25			22	22	12										1/8	W,N	0	4	Yes	Y	6	12	BAG			
	3	5.25															1/16	E	12	17	No	Y	6	12	BAG			VC SOUTH FACE 1/16" W 0 TO 3
	4	5.25															1/4	N,S	0	4	Yes	Y	6	12	BAG			
	5	5.25	11														1/8	W,N	0	4	Yes	Y	6	12	BAG			ASSOCIATED DELAM AND SPALLING 4"W X 2"D
28	1	5.5		10								2	S, NWC	0	4		1/4	S,W	0	4		Y	6	11	BAG		**NORTH AND SOUTH FACE:** BOTTOM 2' SCALE UP TO 2" INTERMITTENT STRUT EXPOSED 25% SL. . **WEST END:** SPALLING/SCALE 10'L X FD (10") DEBONDED REINR WITH UP TO 100% SL... **EAST NOSE:** 12'L X FH X FD SCALE/SPALLING WITH MULTIPLE REINF AND STIRRUPS EXPOSED WITH 100% SL	8"H X 6"W X 2.5" D NWC SPALL
	2	5.5										0.25	N	0	4		>= 1/2	W,S	0	2	Yes	Y	6	13	BAG			NORTH FACE SHALLOW SPALLING; CRACKS HAVE ASSOC. HONEYCOMBING
	3	5.5																				Y	6	13	BAG			
	4	5.5			22	22	11															Y	6	13	BAG			
	5	5.5	11														1/16	S,E	0	4	No	Y	6	13	BAG			
29	1	5.5		10													1/16	E,N,S	0	2	No	Y	6	12	BAG		**NORTH AND SOUTH FACES:** BOTTOM 1' 2"D SCALE INTERMITTENT STRUT EXPOSED... **EAST NOSE:** FH X FL X 8" DEEP SCALE WITH EXPOSED REINF 80% TO 100% SL... WEST NOSE SAME AS EAST	
	2	5.5															3/8	S,NWC	0	4	Yes	Y	6	12	BAG			
	3	5.5			22	22	9										3/8	NWC	0	4	Yes	Y	6	11	BAG			CRACK WITH ASSOCIATED SPALLING 6" DIA X 3" DEEP
	4	5.5															1/16	S	0	3	Yes	Y	6	12	BAG			
	5	5.5	10					1	6	7							3/8	E,SWC	0	4	Yes	Y	7	12	BAG			ABOVE BAG REPAIR UP TO 1" DEEP SCALE AT CORNERS

nventory Data					Leve Data			Defect Cond t on Data																				
								Abras on Sca e				Spa					Vert ca Crack ng					Ex s tng Repa rs				Manua Damage Ra ng	Concrete Strut Notes	Add t ona Notes
Ben No	P e No	Top o WL ( )	Wes End Ben ML Dep h ( ) WL TO MI	Eas End Ben ML Dep h ( ) WL TO MI	Org X sec (n)	M n X Sec (n)	ML Dep h ( )	Dep h (n)	De ec Top	De ec Bo om	Exp Stee	Dep h (n)	Face	De ec Top	De ec Bo om	Exp Stee	W d h (n)	Face	De ec Top	De ec Bo om	Rus Sta n	Yes No	Repa r Top	Repa r Bo om	Repa r Type			
30	1	5.5		11	22	22	11															Y	6	12	BAG		**NORTH AND SOUTH FACES:** BOTTOM 1' UP TO 2" DE SCALE STIRRUPS EXPOSED AND INTERMITTENT FL HORIZONTAL CRACK 1/4" WIDE NEAR THE TOP EDGE... **EAST NOSE:** FH X 6' L X 4" DEEP SCALE EXPOSING STIRRUPS WITH 50% SL	
	2	5.5						1	6	7												Y	7	12	BAG			
	3	5.5																				Y	6	12	BAG			
	4	5.5															1/16	S,E,N	0	4	Yes	Y	6	12	BAG			
	5	5.5	11														1/8	N,W,S	0	4	Yes	Y	6	12	BAG			WEST FACE ASSOCIATED SPALLING 2" DIA X 2"D; NE CORNER AND EAST FACE HC 6" DIA X 1" D
38	1	6.25		14	22	22	14					0.5	NW	3	4		1/4	S, E, N	0	7	Yes	Y	6	12	BAG		**SOUTH FACE**, FULL LENGTH X FULL HEIGHT X 5" DEEP SPALLING WITH EXPOSED REBAR., STIRRUPS HAVE 100% SECTION LOSS. **EAST FACE** OF STRUT MISSING. **WEST END** MISSING. **NORTH FACE** FULL LENGTH X FULL HEIGHT X 5" DEEP SPALL WITH EXPOSED REBAR, STIRRUPS 100% SECTION LOSS.	NE CORNER, CRACK WITH ADJACENT SPALLING. SHALLOW SPALL ON NORTH FACE 1' HGIH 0.5 WIDE 1/2" DEEP.
	2	6.25																				Y	7	13	BAG			
	3	6.25															1/4	S, N	0	4	Yes	Y	7	13	BAG			2 CRACKS ON SOUTH FACE.
	4	6.25										0.5	N	3	3.5							Y	7	13	BAG			TYP BAG NOTE: TOP 10% OF FABRIC IS WEARING AWAY BUT GROUT UNDERNEATH IS OK. SE CORNER LIGHT HONEY COMBING ABOVE STRUT.
	5	6.25	15									1.5	NW	2	4	NO	1/8	S, NW	0	6	Yes	Y	Y	13	BAG			NORTH WEST CORNER HAS CRACKS WITH ASSOCIATED SPALLING HAIRLINE CRACKS ON NORTH FACE (0 TO 5).
39	1	6.25		15								0.25	S	3	4	NO	3/16	ALL	0	6	YES	Y	7	13	BAG		**EAST END** OF STRUT MISSING. **SOUTH AND NORTH FACE** HEAVY SPALLING AND SCALE FULL HEIGHT X FULL LENGTH UP TO 6" DEEP, REBAR EXPOSED STIRRUPS 100% SECTION LOSS, LONGITUDINAL BARS DEBONDED AND 100% SECTION LOSS. **WEST END** OF STRUT MISSING.	VC ON S, E, N AND W FACES 0 TO 6 UP TO 3/16" WIDE WITH RUST STAINING. N FACE VC 1/4" WIDE WITH RUST STAINING. NW CORNER HAS LIGHT SPALLING AND DELAM (1 TO 4) 4" WIDE X 3/4" DEEP.
	2	6.25															3/16	S	0	4	YES	Y	7	13	BAG			VC ON S (0 TO 4). N CORNER CRACKS UP TO 1/6" WIDE. NW CORNER SCALE AND DELAM (1 TO 4) 8" WIDE X 1" DEEP.
	3	6.25																				Y	7	13	BAG			
	4	6.25										0	W	0	2	NO	1/8	SE	0	4	YES	Y	7	13	BAG			W FACE DELAM (0 TO 2) 1' HIGH X 6" WIDE. N FACE VERTICAL CRACKS (0 TO 6) WITH ASSOCIATED SPALLING UP TO 1/4" WIDE CRACKS.
	5	6.25	14		22	22	14		2	3	NO						3/16	N, E, W	0	4	YES	Y	7	13	BAG			SCALE ON NW CORNER 1' HIGH 3" WIDE 1" DEEP.
40	1	6.25		14													1/4	SW, SE	0	4	YES	Y	7	13	BAG		**SOUTH AND NORTH FACE** FULL HEIGHT X FULL LENGTH X 6" DEEP. BOTTOM 1' HAS ADDITIONAL SCALING 2" DEEP, STIRRUPS ARE EXPOSED WITH 100% SECTION LOSS, REINFORCING ALSO HAS 100% SECTION LOSS. **EAST END** OF STRUT TOP 1' HAS HEAVY SPALLING 1' HIGH X FULL WIDTH X FULL DEPTH (8" DEEP). **EAST FACE** HEAVY SPALL AND SCALE TOP 1' -8" DEEP.	BAG REPAIR: AT TOP OF BAG AT THE SE CORNER, REBAR HAS DEBONDED FROM THE GROUTH 1' HIGH X 4" WIDE X 1.5" DEEP.
	2	6.25																				Y	7	13	BAG			
	3	6.25																				Y	7	13	BAG			
	4	6.25																				Y	7	13	BAG			BAG REPAIR: TOP OF BAG REPAIR HAS A VOID 1' HIGH X 8" WIDE X 2" DEEP.
	5	6.25	15					1.5	2	4	NO						1/4	S	0	4	NO	Y	7	13	BAG			NE CONER HAS SCALE. 2 CRACKS ON S FACE.
	6	6.25																				Y	7	13	BAG			
	7	6.25																				Y	7	13	BAG			
	8	6.25															3/16	N	0	4	YES	Y	7	13	BAG			
	9	6.25															1/4	N	0	4	YES	Y	7	13	BAG			
	10	6.25			22	22	15					2	NW	2	3	NO	1/4	NW	0	5	NO	Y	7	13	BAG			VERTICAL CRACKS ON N FACE AND ASSOCIATED SPALL 8" WIDE.
48	1	6.5		14													1/8	S, W	0	5	YES	Y	7	13	BAG		**SOUTH FACE** SCALE/SPALLING FULL LENGTH X FULL HEIGHT, WORSE ALONG BOTTOM 2' UP TO 8" DEEP. **TOP OF STRUT ON SOUTH FACE** AT PILES 1 AND 3. STIRRUPS 100% SECTION LOSS AND REINFORCING 50% SECTION LOSS. **WEST AND EAST ENDS** OF THE STRUT HAVE SPALLING UP TO 8" DEEP STIRRUPS AND REINFORCING 100% SECTION LOSS. **NORTH FACE** HAS SCALE SPALLING HAS FULL LENGTH X FULL HIEGHT UP TO 4" DEEP WITH INTERMITTENT AREAS OF REINFORCMENT EXPOSED. **AT PILE 4, NORTH FACE** HEAVY SPALLING 8" DEEP.	HAIRLINE CRACKS ON W FACE.
	2	6.5																				Y	7	13	BAG			
	3	6.5			22	22	15										3/16	S, W	0	4	YES	Y	7	13	BAG			W FACE HAS A 1/8" WIDE DIAGONAL CRACK WITH ASSOCIATED 1' DIA DELAM.
	4	6.5																				Y	7	13	BAG			
	5	6.5	15														1/4	NW, SW	0	4	YES	Y	7	13	BAG			SW AND NW CORNERS HAVE CRACKS AND DELAM UP TO 1/4" WITH RUST STAINING. DELAM 4' H X 10" WIDE.
	6	6.5															1/16	N, W	0	4		Y	7	13	BAG			
	7	6.5																				Y	7	13	BAG			
	8	6.5															3/16	NW	0	4	No	Y	7	13	BAG			
	9	6.5																				Y	7	13	BAG			
	10	6.5															1/4	NW	0	4	Y	Y	7	13	BAG			CRACK ON N FACE HAS ASSOCIATED DELAM.

nventory Data					Leve Data			Defect Cond t on Data																					
								Abras on Sca e				Spa					Vert ca Crack ng					Ex s tng Repa rs				Manua Damage Ra ng	Concrete Strut Notes	Add t ona Notes
Ben No	P e No	Top o WL ( )	Wes End Ben ML Dep h ( ) WL TO MI	Eas End Ben ML Dep h ( ) WL TO MI	Org X sec (n)	M n X Sec (n)	ML Dep h ( )	Dep h (n)	De ec Top	De ec Bo om	Exp Stee	Dep h (n)	Face	De ec Top	De ec Bo om	Exp Stee	W d h (n)	Face	De ec Top	De ec Bo om	Rus Sta n	Yes No	Repa r Top	Repa r Bo om	Repa r Type			
49	1	6.5		13	22	22	13					2	NE	1	2		1/8	S, E	0	4	NO	Y	7	13	BAG		**EAST END** HAS HEAVY SPALLING, TOP 1' UP TO 8" DEEP WITH EXPOSED AND DEBONDED REINFORCEMENT WITH 100% SECTION LOSS. **SOUTH FACE** HAS SCALING/SPALLING FULL LENGTH X FULL HIEGHT UP TO 6" DEEP ALONG THE BOTTOM 2 FEET. **WEST END** OF STRUT 100% MISSING. **NORTH FACE** HAS HEAVY SPALLING UP TO 6" DEEP FULL HEIGHT X FULL LENGTH.	SPALL ON NE CORNER 1' H X 10" WIDE X 2" DEEP.
	2	6.5															1/8	S, E	0	4	NO	Y	7	13	BAG			
	3	6.5															1/8	S, E, W, N	0	4	NO	Y	7	13	BAG			
	4	6.5																				Y	7	13	BAG			
	5	6.5	14									1.5	NW	2	4	NO	1/4	W	0	5	Yes	Y	7	13	BAG			W FACE HAS ASSOCIATED SPALLING AT NW CRACK,
50	1	6.5		15													1/8	S, E	0	4	YES	Y	7	13	BAG		**EAST END** HAS HORIZONTAL CRACK 8' LONG WITH ASSOCIATED DELAM... **S FACE** HAS ABRASION UP TO 3 INCHES DEEP NO REBAR EXPOSED. SAME ON **NORTH FACE**. **WEST END** SCALE UP TO 2" DEEP NO REBAR.	
	2	6.5																				Y	7	13	BAG			
	3	6.5																				Y	7	13	BAG			
	4	6.5																				Y	7	13	BAG			
	5	6.5	15		22	22	13										1/8	S,, N FACE	0	4	YES	Y	7	13	BAG			
N. Abutment		4.5																										NWWW: footing (2' thick) exposed FL x 2'-0"H. scale. At NWWW/abutment interface - 2'-0"H x 1'-0"W x 2"D spall at waterline. Abutment stem: -at west end, 2'-0"H x 1'-0"W x 3"D spall. Footing exposed FL x up to 3'-0"H with scale up to 3" deep throughout. 6'-0"H x 2'-0"w x 2"D spall at centerline and similar spall at east end. NEWW footing exposed FL x 2'-6"H with scale up to
		4.5																										
		4.5																										
		4.5																										
		4.5																										
150	1	4.5		5.5								4	E	4	7	Yes	1/4	E	0	4	Yes	Y	7	10	BAG		**ALL FACES** FULL LENGTH X FULL HEIGHT X FULL DEPTH SCALE/SPALLING. STIRRUPS HAVE 100% SL	
	2	4.5			22	22	5.5										1/4	S,E	0	4	Yes	Y	7	10	BAG			
	3	4.5																				Y	7	10	BAG			
	4	4.5															1/16	N	1	4	Yes	Y	7	10	BAG			
	5	4.5	5.5									5	W	4	7	Yes	1/4	S,W	1	4	Yes	Y	7	10	BAG			
149	1	4.5		5.5								4	SE	0	5	Yes w/ SL	1/8	N,E,S	0	4	Yes	Y	7	10	BAG		**ALL FACES** FULL LENGTH X FULL HEIGHT X FULL DEPTH SCALE/SPALLING. STIRRUPS HAVE 100% SL	
	2	4.5															1/4	W,S	0	4	Yes	Y	7	10	BAG			
	3	4.5			22	22	5.5															Y	7	10	BAG			
	4	4.5															1/4	N,W	0	4	Yes	Y	7	10	BAG			
	5	4.5	5.5									6	W	3	6	Yes w/ SL	1/4	W,N,S	0	4	Yes	Y	7	10	BAG			FULL WIDTH SPALL WITH FULL REBAR CAGE EXPOSED
148	1	4.5		6								3	E	4	6	Yes	1/4	E,N	0	4	Yes	Y	7	10	BAG		**ALL FACES** FULL LENGTH X FULL HEIGHT X FULL DEPTH SCALE/SPALLING. STIRRUPS HAVE 100% SL	
	2	4.5											NW, SW	0	4		1/4	N,W,S	0	4	Yes	Y	7	10	BAG			DELAM WITH RUST STAINING
	3	4.5			22	22	6															Y	7	10	BAG			
	4	4.5						2	5	6	Yes						1/8	W	0	4		Y	7	10	BAG			ABRASION WHERE STRUT IS MISSING REBAR IS EXPOSED
	5	4.5	6									4	N,W,S	3	7	Yes w/ SL	3/16	N,W	0	4		Y	7	10	BAG			
131	1	4.5		11													1/4	NW, E	0	4		Y	4	10	SQ EPOXY		NO STRUT THIS BENT	ASSOC DELAM WITH CRACKS
	2	4.5															1/8	ALL	0	4	Yes	Y	4	10	SQ EPOXY			
	3	4.5															1/4	ALL	0	4	Yes	Y	4	10	SQ EPOXY			
	4	4.5			22	22	11										1/4	ALL	0	4	Yes	Y	4	10	SQ EPOXY			
	5	4.5	11														1/4	N,W,S	0	3		Y	4	10	SQ EPOXY			JACKET MISSING ON S. FACE WITH 1" OF SCALE ON GROUT
130	1	4.5		12								1.5	SW	2	3		3/16	ALL	0	4		Y	4	10	SQ EPOXY		NO STRUT THIS BENT	JACKET IS DAMAGED FROM 4 TO 7
	2	4.5			22	22	10	1.5	7	9							1/4	ALL	0	5		Y	4	10	SQ EPOXY			JACKET IS MISSING FROM 4 TO 9 SCALE ON PILE
	3	4.5						1.5	7	9		1.5	SW	3	4		1/4	ALL	0	5		Y	4	10	SQ EPOXY			JACKET IS MISSING FROM 4 TO 9. SCALE ON PILE
	4	4.5															1/4	ALL	0	4		Y	4	10	SQ EPOXY			JACKET DAMAGED FROM 4 TO 7
	5	4.5	12														1/4	N,S	0	4	Yes	Y	4	10	SQ EPOXY			
129	1	4.5		14													1/4	ALL	0	4		Y	4	10	SQ EPOXY		NO STRUT THIS BENT	
	2	4.5															1/4	ALL	0	4	YES	Y	4	10	SQ EPOXY			
	3	4.5			22	22	12					1.5	NW,SW	3	4		3/16	ALL	0	4	YES	Y	4	10	SQ EPOXY			
	4	4.5										1.5	NW	1	4		1/4	S,W,N	0	4	Yes	Y	4	10	SQ EPOXY			
	5	4.5	13														1/4	ALL	0	4	YES	Y	4	10	SQ EPOXY			

Inventory Data					Level Data			Defect Condition Data																		Manual Damage Rating	Concrete Strut Notes	Additional Notes
								Abrasion Scale				Spall					Vertical Cracking					Existing Repairs						
Bent No	Pile No	Top to WL (ft)	West End Bent MLW Depth (ft) WL TO MI	East End Bent MLW Depth (ft) WL TO MI	Orig X sec (in)	Min X Sec (in)	MLW Depth (ft)	Depth (in)	Deg Top	Deg Bottom	Exp Steel	Depth (in)	Face	Deg Top	Deg Bottom	Exp Steel	Width (in)	Face	Deg Top	Deg Bottom	Rust Stain	Yes No	Repair Top	Repair Bottom	Repair Type			
128	1	4.5		12													3/8	N,W,S	0	4	YES	Y	4	10	SQ EPOXY		NO STRUT THIS BENT	
	2	4.5															3/16	S	0	4	Yes	Y	4	10	SQ EPOXY			
	3	4.5										1	NW	2	4	RS	1/8	N,W	0	4		Y	4	10	SQ EPOXY			
	4	4.5			22	22	11										1/2	S,W	0	4	Yes	Y	4	10	SQ EPOXY			
	5	4.5	13														1/4	E,S	0	4	YES	Y	4	10	SQ EPOXY			
111	1	4.5		14				0.5	4	7							3/16	S	0	4		Y	7	13	BAG		**EAST AND WEST ENDS:** STRUT MISSING… **NORTH AND SOUTH FACES:** FULL LENGTH X FULL HEIGHT X FULL DEPTH SCALE/SPALLING. STIRRUPS HAVE 100% SL	
	2	4.5			22	22	14															Y	7	13	BAG			
	3	4.5															1/4	W,S	0	4	YES	Y	7	13	BAG			ASSOC SPALLING WITH CRACK
	4	4.5															1/4	W,E,S	0	4	YES	Y	7	13	BAG			
	5	4.5		14				1	4	7							1/4	N,S	0	4	YES	Y	7	13	BAG			
	6	4.5			22	22	14	1	6	7							3/8	N	0	4		Y	7	13	BAG			ASSOC DELAM/IMMINENT SPALL NW CORNER
	7	4.5															1/8	N,W	0	4	YES	Y	7	13	BAG			
	8	4.5															1/16	E,N,W	0	4		Y	7	13	BAG			
	9	4.5															3/16	W,E	0	4	YES	Y	7	13	BAG			
	10	4.5	15														1/4	N,S	0	4	Yes	Y	7	13	BAG			
110	1	5		14				0.5	4	7		2	SW	0	4		1/2	ALL	0	4	YES	Y	7	13	BAG		**EAST AND WEST ENDS:** STRUT MISSING… **NORTH AND SOUTH FACES:** FULL LENGTH X FULL HEIGHT X FULL DEPTH SCALE/SPALLING. STIRRUPS HAVE 100% SL	
	2	5																				Y	7	13	BAG			
	3	5															1/8	S	0	4	YES	Y	7	13	BAG			
	4	5			22	22	15										1/4	N,W,S	0	4	YES	Y	7	15	BAG			
	5	5	15					1.5	4	7		3	SW	3	7		1/4	S,N				Y	7	13	BAG			
109	1	5		14													3/8	N,S,	0	4	Yes	Y	7	13	BAG		**EAST AND WEST ENDS:** STRUT MISSING… **NORTH AND SOUTH FACES:** FULL LENGTH X FULL HEIGHT X 4"D SCALE/SPALLING. STIRRUPS HAVE 100% SL RANDOMLY EXPOSED	
	2	5																				Y	7	13	BAG			
	3	5																				Y	7	13	BAG			
	4	5															1/16	W	0	4	YES	Y	7	13	BAG			
	5	5	13		22	22	13	2	4	7		4	NW,SW	0	4	Yes w/ SL						Y	7	13	BAG			
108	1	5		14				0.5	4	7							3/16	ALL	0	4	Yes	Y	7	13	BAG		**NORTH AND SOUTH FACES:** FULL LENGTH X FULL HEIGHT X 4"D SCALE/SPALLING. STIRRUPS HAVE 100% SL RANDOMLY EXPOSED… **EAST AND WEST ENDS:** STRUT MISSING	
	2	5																				Y	7	13	BAG			
	3	5															3/8	N,W	0	4		Y	7	13	BAG			
	4	5			22	22	13					2	NW,SW	0	4		3/8	N,S,W	0	4	Yes	Y	7	13	BAG			
	5	5	15					1	4	7							3/16	N,W,S	0	4	YES	Y	7	13	BAG			
90	1	5		19								5	S,E,N	3	7	Yes w/ SL	1/4	ALL	0	4	Yes	Y	7	13	BAG		**EAST AND WEST SIDES:** STRUSTS MISSING… **NORTH AND SOUTH FACES:** FULL LENGTH X FULL HEIGHT X 4"D SCALE/SPALLING. STIRRUPS HAVE 100% SL AND RANDOMLY EXPOSED	SPALLS REBAR CAGE EXPOSED DEBONDED REBAR WITH 50% SL
	2	5			22	22	19															Y	7	13	BAG			
	3	5															1/4	N,W	0	4	Yes	Y	7	13	BAG			EAST FACE ASSOCIATED SPALLING 4" WIDE X 2" DEEP WITH RUST STAINING
	4	5															1/8	S,W,N	0	4	Yes	Y	7	13	BAG			
	5	5	18									7	W,N,S	3	7	Yes w/ SL	1/8	N,S,W	0	4	Yes	Y	7	13	BAG	SV		SPALL REBAR CAGE EXPOSED 50% SL
89	1	5		19				1.5	6	7	No						1/8	ALL	0	4	Yes	Y	7	13	BAG		**EAST AND WEST SIDE:** MISSING… **NORTH AND SOUTH FACES:** FULL LENGTH X FULL HEIGHT X 4"D SCALE/SPALLING	
	2	5																				Y	7	13	BAG			
	3	5															1/4	ALL	0	4	Yes	Y	7	13	BAG			CRACKS ASSOCIATED DELAM
	4	5			22	22	16					DELAM	SEC	0	4		1/4	N,E,S	0	4	Yes	Y	7	13	BAG			DELAM/IMMINENT SPALL 4' HIGH X 8" WIDE
	5	5	19					1.5	4	7	No						1/4	W,E,S	0	4	Yes	Y	7	13	BAG			SWC CRACK SPALLING 4" WIDE X 2.5" DEEP
88	1	5		18													1/4	ALL	0	4	Yes	Y	7	13	BAG		**EAST AND WEST SIDES:** 4" DEEP SCALE OVER FULL LENGTH…**NORTH AND SOUTH FACES:** FULL LENGTH X FULL HEIGHT X 4"D SCALE/SPALLING	CRACKS HAVE ASSOCIATED SPALLING 2" DIA
	2	5			22	22	18										1/4	N,W	0	4	Yes	Y	7	13	BAG			
	3	5										0.75	N	2	3	No	1/8	W,N	0	4	Yes	Y	7	13	BAG			SPALL 1' HIGH X 6" WIDE X 3/4" DEEP
	4	5															1/8	N,E	0	4	Yes	Y	7	13	BAG			
	5	5	18									1.5	W	2	3	No	>= 1/2	W,S,E	0	4	Yes	Y	7	13	BAG			NWC SPALL 5" DIA X 3/4" DEEP

nventory Data					Leve Data			Defect Cond t on Data																					
								Abras on Sca e				Spa					Vert ca Crack ng					Ex s ting Repa rs							
Ben No	P e No	Top o WL ( )	Wes End Ben ML Dep h ( ) WL TO MI	Eas End Ben ML Dep h ( ) WL TO MI	Org X sec (n)	M n X Sec (n)	ML Dep h ( )	Dep h (n)	De ec Top	De ec Bo om	Exp Stee	Dep h (n)	Face	De ec Top	De ec Bo om	Exp Stee	W d h (n)	Face	De ec Top	De ec Bo om	Rus Sta n	Yes No	Repa r Top	Repa r Bo om	Repa r Type	Manua Damage Ra ng	Concrete Strut Notes	Add t ona Notes
71	1	5		18				0.5	6	7	No	4	S/E FACES	3	7	Yes w/ SL	>= 1/2	ALL	0	3	Yes	Y	7	13	BAG		**WEST AND EAST SIDES:** COMPLETLEY GONE...**NORTH AND SOUTH FACES:** FULL LENGTH X FULL HEIGHT X 4"D SCALE/SPALLING	25% SL
	2	5															1/8	N	0	4	Yes	Y	7	13	BAG			
	3	5						0.5	6	7	No						1/16	W,SEC	0	4	Yes	Y	7	13	BAG			
	4	5						0.5	6	7	No						1/8	W,S,N	0	4	Yes	Y	7	13	BAG			
	5	5			22	21	17	0.5	6	7	No						1/4	NWC,S	0	4	Yes	Y	7	13	BAG			CRX WITH ASSOCIATED SPALLING 3" WIDE X 1.5" DEEP
	6	5		18				0.5	6	7	No						1/8	E	0	4	Yes	Y	7	13	BAG			
	7	5						0.5	6	7	No						1/8	E,N	0	4	Yes	Y	7	13	BAG			
	8	5			22	21	16	0.5	6	7	No						1/8	ALL	0	4	Yes	Y	7	13	BAG			ASSOCIATED SPALLING 2" WIDE X 2" DEEP
	9	5						0.5	6	7	No						1/4	N,W	0	4	Yes	Y	7	13	BAG			
	10	5	17					0.5	6	7	No						1/4	S,E,W	0	6	Yes	Y	7	13	BAG			ASSOCIATED SPALLING 2" WIDE X 2" DEEP
70	1	5		19													1/8	E,S	0	4	Yes	Y	4	9	SQ EPOXY		NO STRUT HERE	
	2	5															1/4	N, SWC	0	4	Yes	Y	4	9	SQ EPOXY			ASSOCIATED SPALLING 8" HIGH X 3" WIDE X 1" DEEP
	3	5			22	22	18										1/4	W,S	0	4	Yes	Y	4	9	SQ EPOXY			
	4	5										1	NEC	2.5	4	No	1/8	ALL	0	4	Yes	Y	4	9	SQ EPOXY			1.5' HIGH X 8" WIDE X 1" DEEP SPALL
	5	5	20					1	4	6	No	0.75	NEC	0	2	No	1/8	S,W	0	4	Yes	Y	6	9	SQ EPOXY			MISSING JACKET ON SOUTH AND WEST FACES
69	1	5		17													1/8	S,E,N	0	3	Yes	Y	3	9	SQ EPOXY		NO STRUT HERE	
	2	5															1/8	ALL	0	3	Yes	Y	3	9	SQ EPOXY			
	3	5																				Y	3	9	SQ EPOXY			
	4	5			22	22	17										1/8	E,N,S	0	3	Yes	Y	3	9	SQ EPOXY			
	5	5	18														1/8	W	0	3	Yes	Y	3	9	SQ EPOXY			

Appendix B - Photos

Photo 1: Overall of the South Half of the Pier (East Elevation).

Photo 2: Overall of the North Half of the Pier (East Elevation).

Photo 3: Typical 5-Pile Bent (Bent 8, North Elevation Shown).

Photo 4: Typical 5-Pile Bent (Bent 10, South Elevation Shown).

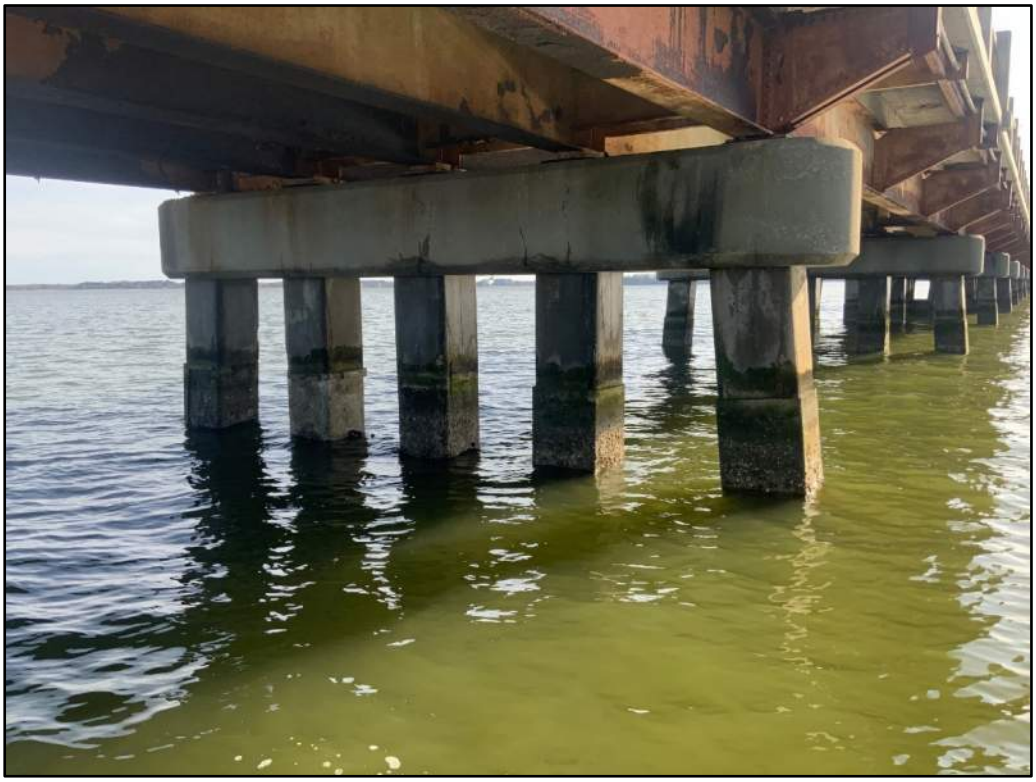

Photo 5: Typical Bent without a Reinforced Concrete Strut (Bent 129 Shown).

Photo 6: Typical 10-Pile Double Bent (Bent 8, North Elevation Shown).

Photo 7: South Elevation of Pier Wall 1 (Bent 56).

Photo 8: North Elevation of Pier Wall 6 (Bent 57).

Photo 9: North Abutment Elevation Looking Northeast.

Photo 10: Typical Spalling and Exposed Reinforcement on Strut (Bent 149 Shown).

Photo 11: Typical Spalling and Exposed Reinforcement on Strut (Bent 147 Shown).

Photo 12: Typical Spalling, Exposed Reinforcement, and Missing West and East Ends on Strut (Bent 111 Shown).

Photo 13: Typical Spalling and Exposed Reinforcement on Strut (Bent 28 Shown).

Photo 14: Typical Missing Strut on East and West Faces (Bent 39 Shown).

Photo 15: Typical Spalling and Exposed Reinforcement on West and East Ends of the Strut (Bent 30 Shown).

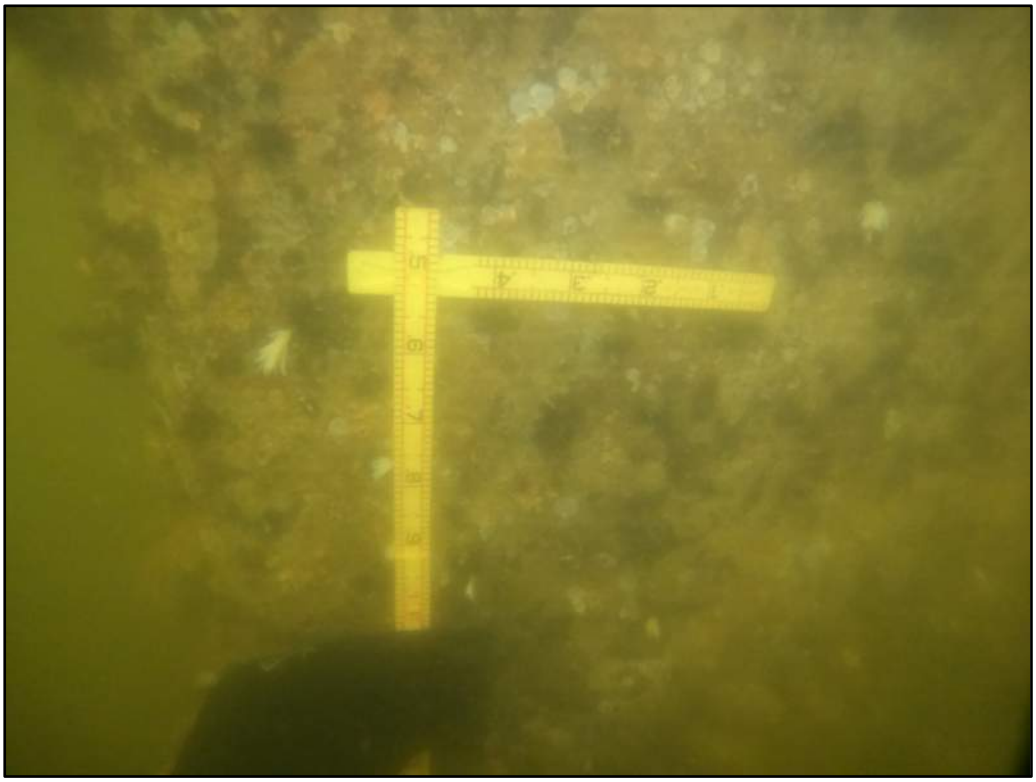

Photo 16: Typical Condition of Pile Underwater (Bent 30, Pile 1 Shown).

Photo 17: Bent 130, Pile 1, Corner Spall and Delamination.

Photo 18: Typical Vertical Cracking at the Top of Pile (Bent 150, Pile 5 Shown).

Photo 19: Bent 109, Pile 5, Area of Spalling and Delamination at the Top of Pile.

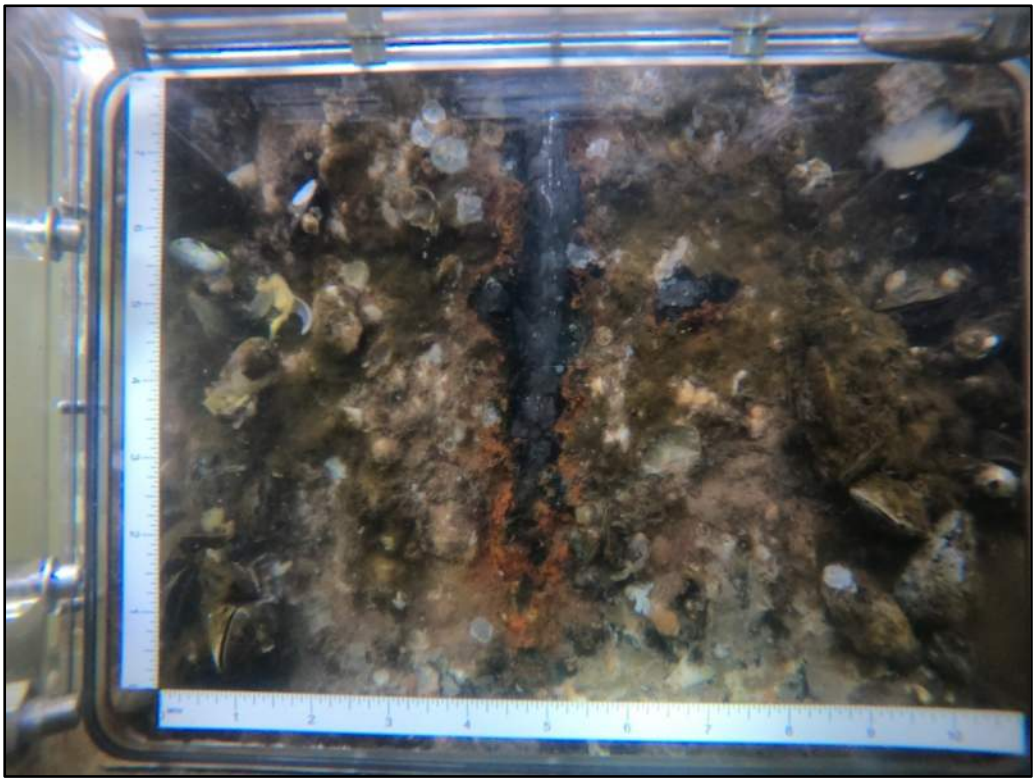

Photo 20: Bent 148, Pile 4, Area of Abrasion with Exposed Reinforcement (Underwater).

Photo 21: Bent 8, Pile 5, Corner Spall with Exposed and Corroded Reinforcement.

Photo 22: Bent 149, Pile 5, Spall with Exposed, Corroded, and Debonded Reinforcement.

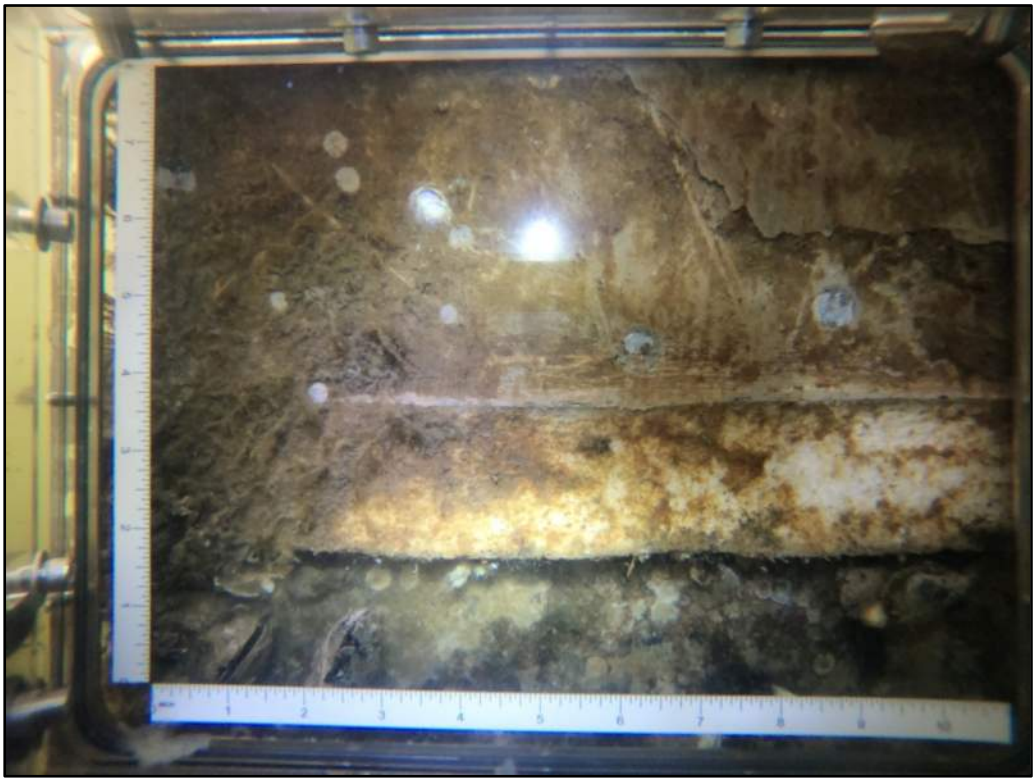

Photo 23: Typical Condition of Square Epoxy Jacket Underwater (Bent 130, Pile 4 Shown).

Photo 24: Bent 130, Pile 2, Missing Jacket and Abrasion in the Tidal Zone.

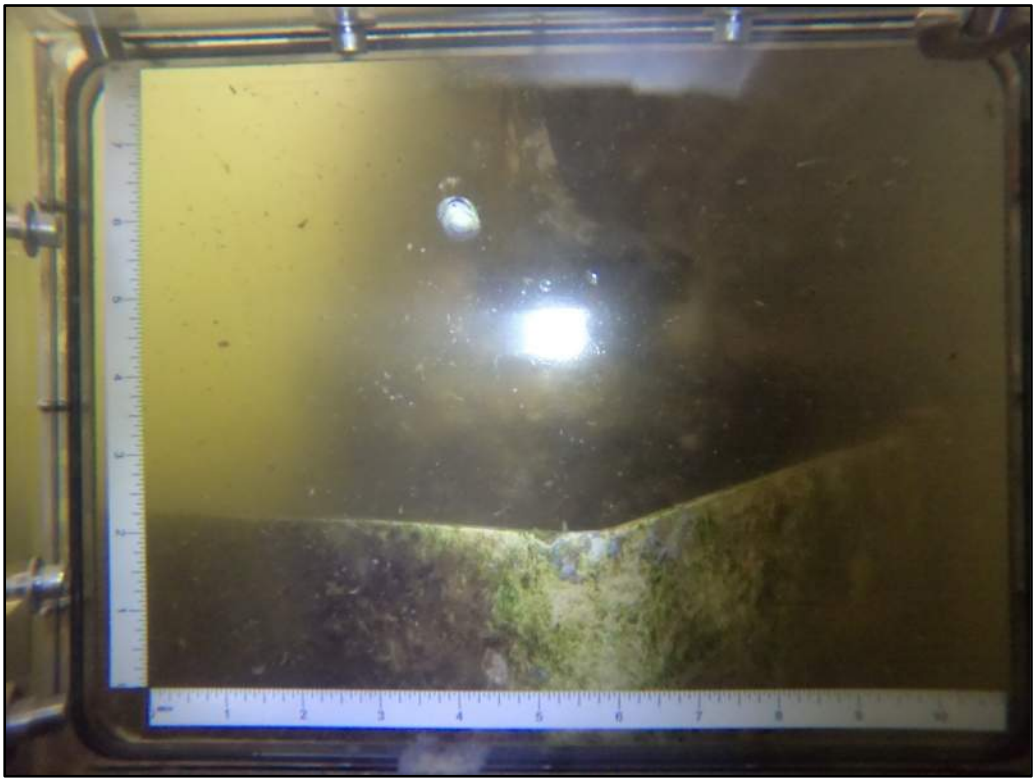

Photo 25: Bent 130, Pile 2, Failed Square Epoxy Jacket (Underwater).

Photo 26: Bent 40, Pile 1, Void at the Top of the Grout Filled Fabric Bag Repair (Underwater).

Photo 27: Pier Wall 1 (Bent 56), Scaling and Voids at the Waterline.

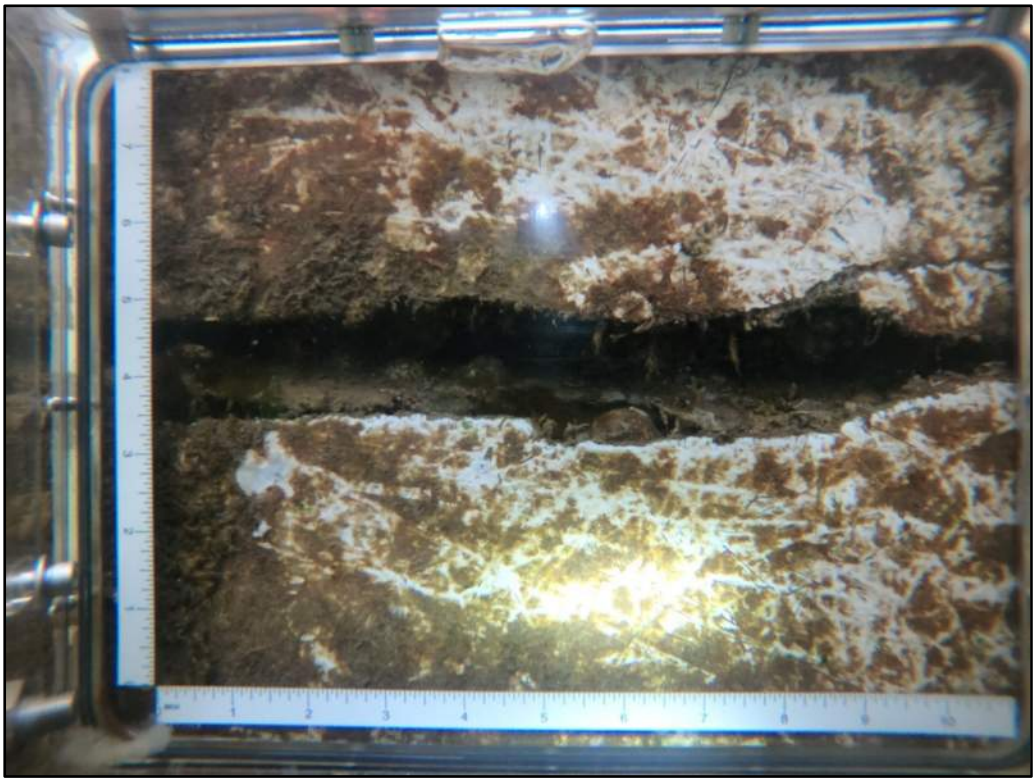

Photo 28: Pier Wall 6 (Bent 57), Typical Void in Fiberglass Jacket at the Columns (Underwater).

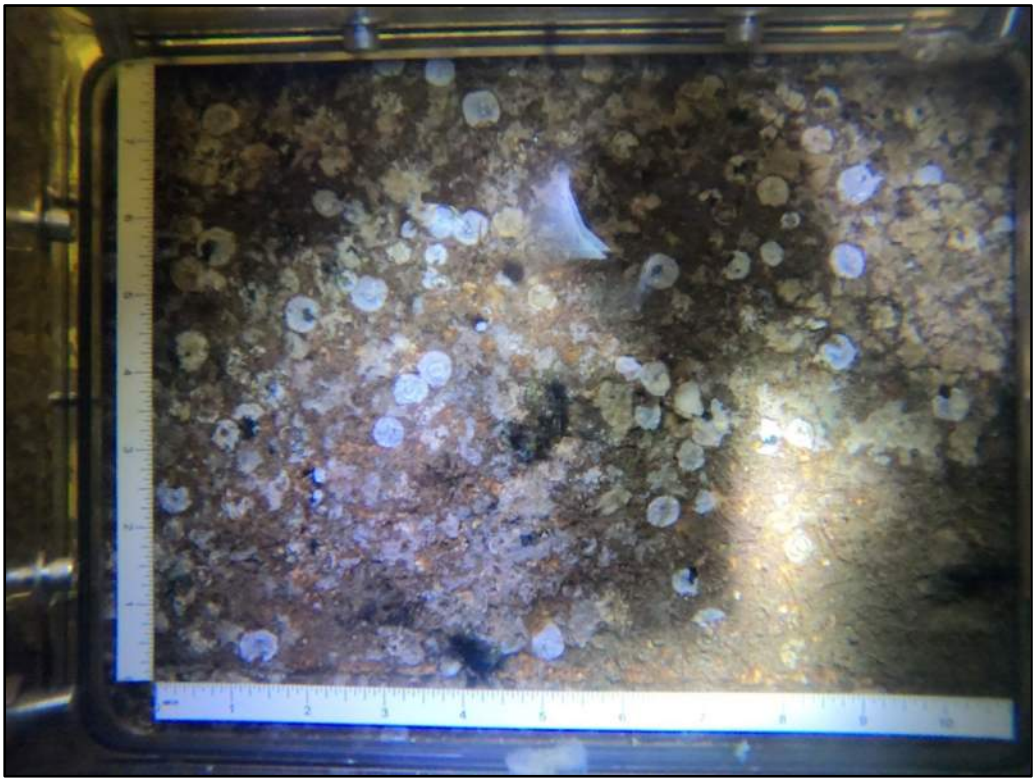

Photo 29: Pier Wall 6 (Bent 57), Typical Condition of Reinforced Concrete Strut (Underwater).

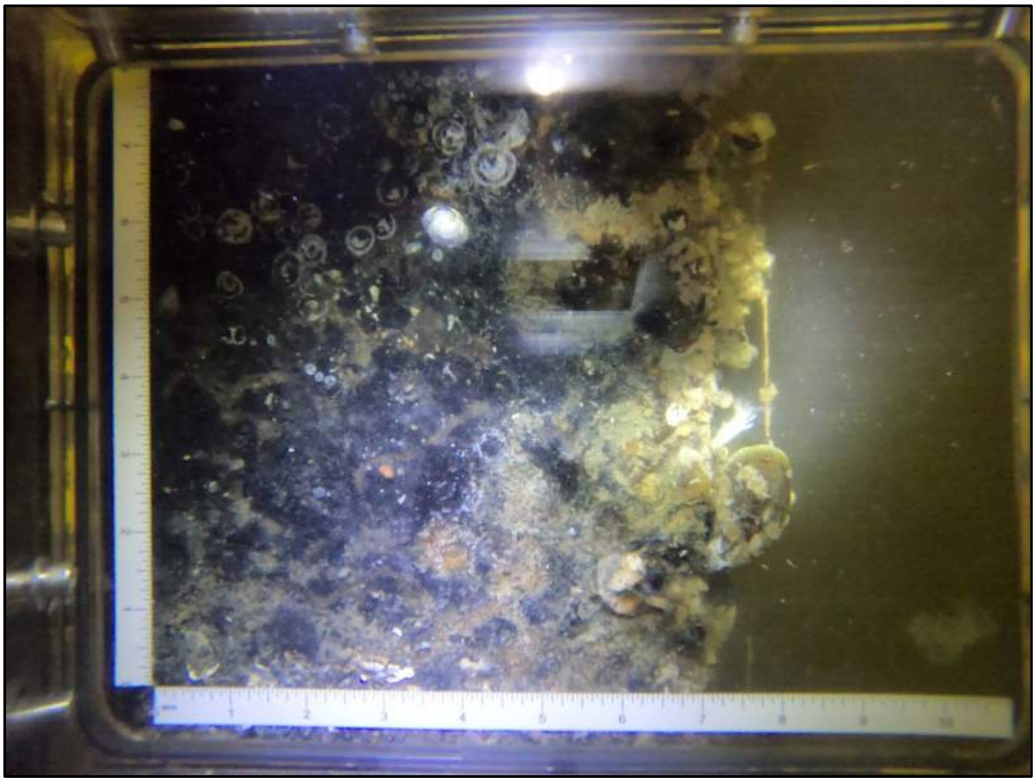

Photo 30: Pier Wall 6 (Bent 57), Typical Condition of Footing (Underwater).

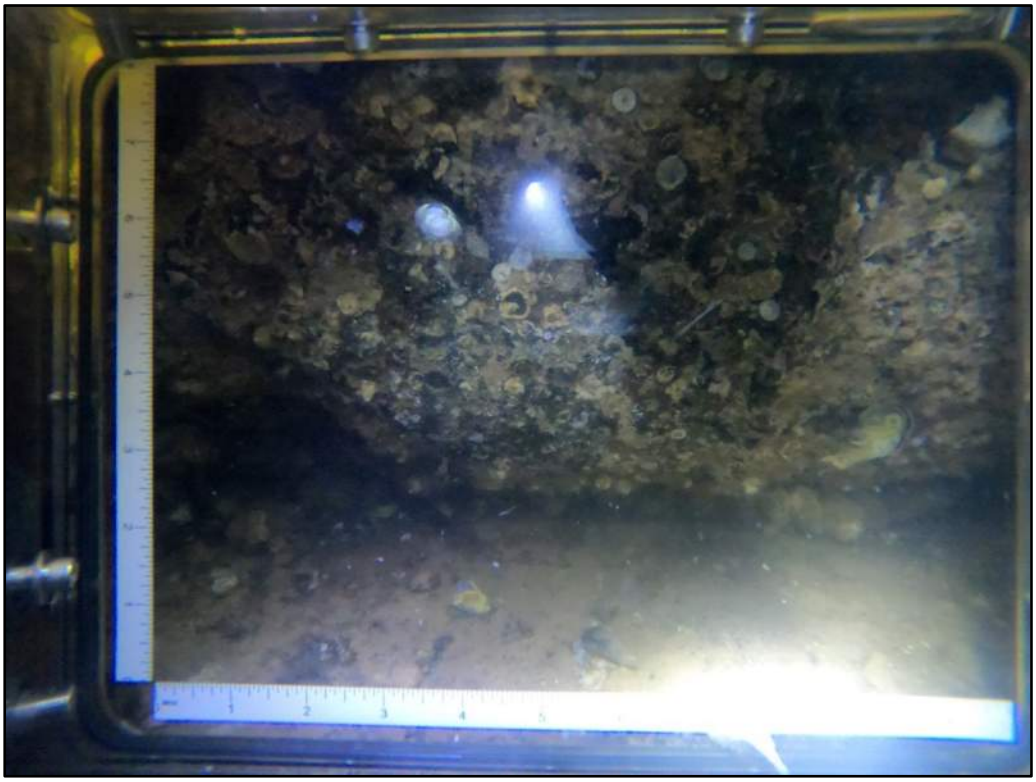

Photo 31: Pier Wall 6 (Bent 57), Void at Footing Subfooting Interface (Underwater).

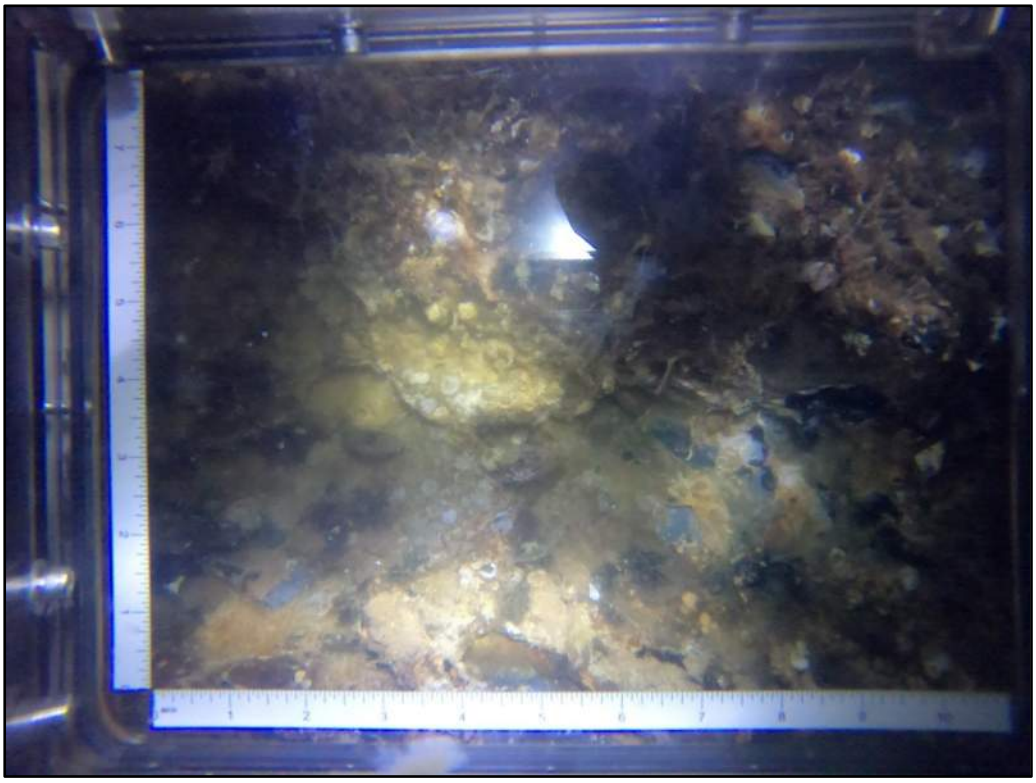

Photo 32: Pier Wall 6 (Bent 57), Void in the Subfooting (Underwater).

Photo 33: North Abutment (Bent 151), Spalling at the Waterline.

Photo 34: North Abutment (Bent 151), Spalling at the Waterline.

Appendix C– ASCE Damage Rating Figure

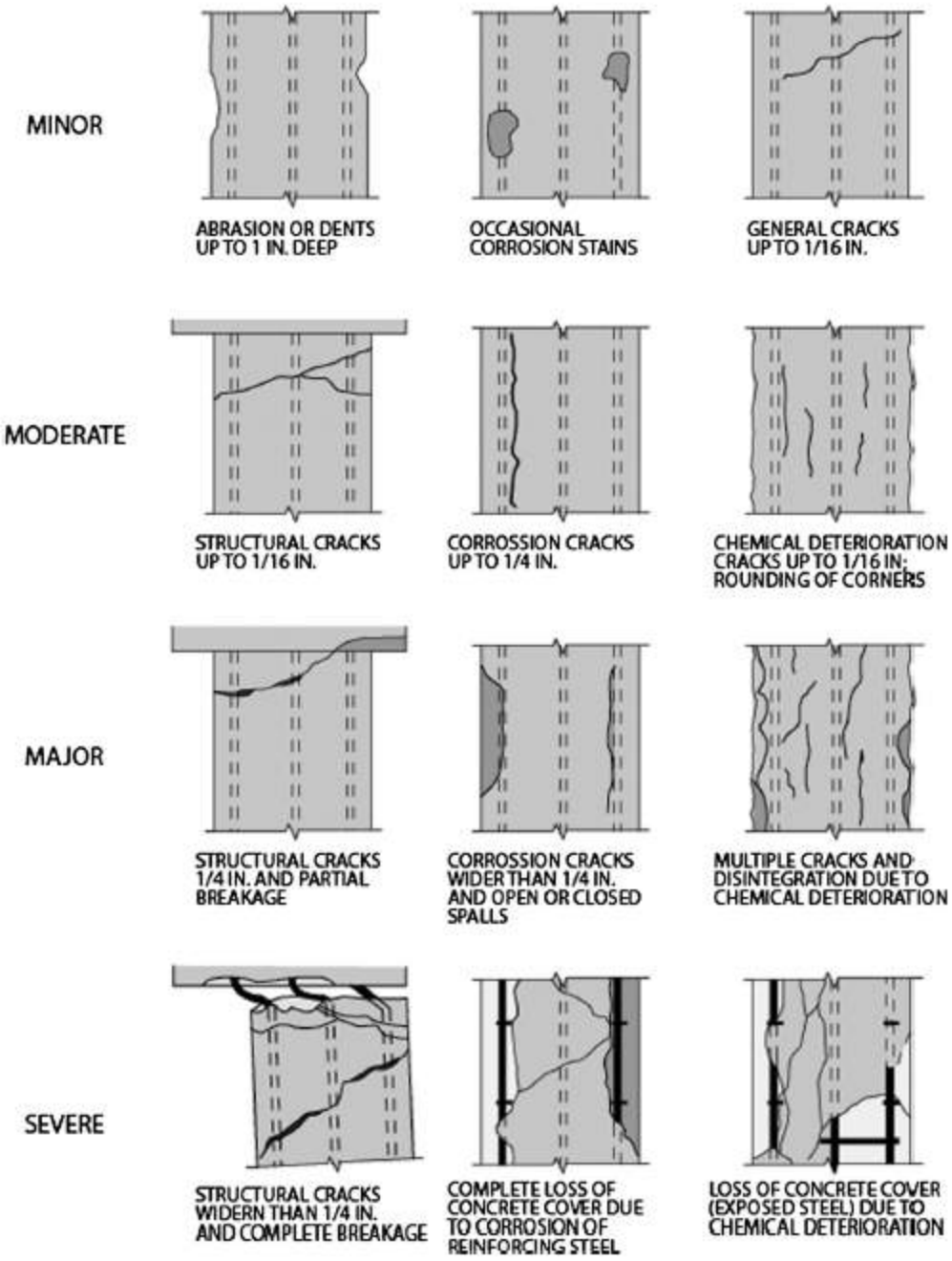

Fig. 2-4. Damage ratings for reinforced concrete elements
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