

STRUCTURE S-258
INSPECTION DATE: 4/1/2020



Location:	USJRB North
	Levee L-74E
Latitude:	27.8253 N
Longitude:	80.7115 W
Type:	Gated Culvert
No. Barrels:	Four
Inspection	
Start Date:	4/1/2020
End Date:	4/1/2020

TEAM MEMBERS	
Lead Engineer	Jeffrey O'Connor, P.E.
Dive Supervisor	Jordan Klingler
Diver	Natasha Daniel
Diver – Standby	Aaron Willard
Dive Tender	Ben Harpel
Dive Tender	
Animal Control	TJ McDonagh
SJRWMD Agent	

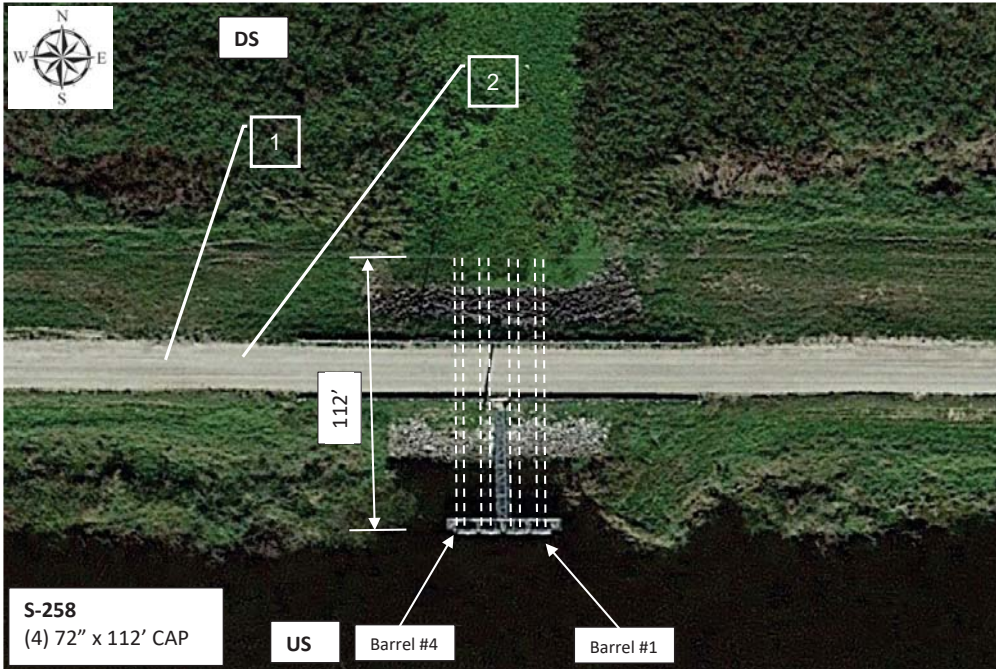
Respectfully Submitted,
UNDERWATER ENGINEERING SERVICES, INC.
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Jeffrey O'Connor, P.E. (FL 50914)
Vice President
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Digitally signed by
Jeffrey H O'Connor
Date: 2020.06.25
11:14:35 -04'00'

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Aerial View of Structure



No.	Item No.	Inspection Item	Rating	Deficiency
1	US151	Structure Gate	C-3	Gate 1 is not fully closed.
2	US155	Operator/Actuator Components	C-3	Gate 1 stem block connection missing one bolt.
3	US104	Headwall	C-2	Headwall has minor scaling.
4	US151	Structure Gates	C-2	Gates have minor pitting.
5	DS58	Debris	C-2	Crew removed a rock on Gate 1 bottom seal.
6	DS115	Culverts	C-2	Culvert barrels have minor corrosion throughout and higher concentration closer to gates.
7	DS153	Gate Seals	C-2	All gates have missing or damaged bottom seals from 04:00 to 07:00.

Structure Description and Method of Underwater Inspection

Structure S-258 is a gated culvert comprised of four barrels, extending south (gated end) to north (open end) under Levee L-74E. The barrels are CAP, 72 inches diameter by 112 feet long. The south end has a platform supported by the concrete headwall.

The underwater inspection was performed by a 5-person dive team on April 1, 2020. The dive team worked from a dive trailer, using surface-supplied air, and accessed the structure areas from the bank.

The scope of services included the underwater inspection of the submerged structure components. The area extended 20 feet beyond the structure edges. There were no boat barriers.

The air temperature was 72 degrees F. and the weather was mostly clear. The underwater visibility ranged from 0 to 2 feet. The culverts were flooded. There were no staff gauges present.

Rating System

- C-1: No action needed
- C-2: Monitor condition at next dive inspection (5 years)
- C-3: Schedule repair/replacement (for routine items)
- C-4: Schedule repair/replacement (for safety or operational items)
- C-5: Repair/replace immediately (for structural items)
- C-6: Critical - Repair/replace immediately (for operational items)

Summary of Observations

Items Rated C-5 and Above

There were no items rated C-5 and above.

Items Rated C-4

There were no items rated C-4.

Items Rated C-3

- Item US151: Gate 1 had a rock removed along the bottom seal, but could not get the gate to fully close.
 - Recommended Action: Perform adjustments on gate to fully close.
- Item US155: The Gate 1 stem connection block is missing one of two bolts.
 - Recommended Action: Install a new bolt for the Gate 1 stem at the block connection to the gate.

Items Rated C-2

- Item US104: The headwall has minor scaling with pitting up to 1/8" deep from top to bottom.
 - Recommended Action: Monitor headwall for advanced scaling.

- Item US151: The gate plates and stiffener members in the upper 1' of the gates have minor pitting corrosion up to 1/64" deep covering less than 5% of the area.
 - Recommended Action: Monitor the gate plate and top stiffener angles for advanced corrosion and/or section loss.
- Item DS58: Barrel #1 had rock debris at the gate keeping gate from closing. The crew raised the gate, the diver removed the rock and other gravel debris, and the crew closed the gate.
 - Recommended Action: Monitor rock and other debris along the gate.
- Item DS115: (1) All four barrels have minor pitting corrosion up to 1/64" deep covering less than 5% throughout their length. (2) Barrels #2, #3 & #4 has higher concentration of corrosion within the last 10' of the gates. The pitting depth is still 1/64", but the coverage gets as high as 50%. The material is aluminum. (3) All four barrels have sediment deposits at the invert ranging from 1' to 1.5' in depth.
 - Recommended Action: Monitor the culvert barrels for advanced corrosion and higher sediment depth.
- Item DS153: All four gates have missing or damaged seal along the bottom, typically from 04:00 to 07:00 across the invert. None of the seals have noticeable leaks, but the water levels may have been equal.
 - Recommended Action: Monitor the seal and replace it if the gates begin to leak.

PHOTOGRAPHS

Item No.: US151 Structure Gates	Rating: C-3	Photo Description: Gate 1 is not closed
Deficiency: Gate 1 had a rock removed along the bottom seal, but could not get the gate to fully close.		
Probable Cause: Rock debris prevented the gate from closing. It was removed, but the crew could not close it fully for unknown reason.		
Recommendation: Perform adjustments on gate to fully close.		
Black water conditions at culvert invert, no photo available.		

Item No.: US155 Operator/Actuator Components	Rating: C-3	Photo Description: Gate 1 stem block missing one bolt.
Deficiency: The Gate 1 stem connection block is missing one of two bolts.		
Probable Cause: The missing bolt was left out during construction.		
Recommendation: Install a new bolt for the Gate 1 stem at the block connection to the gate.		



APPENDIX

CHECKLISTS

Structure No. S-258

UPSTREAM EROSION CONTROL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US1	Slope/Banks of Channel	1	No deficiencies noted		
US2	Rip Rap	1	No deficiencies noted		
US3	Exposed erosion-Control Fabric	1	No deficiencies noted		
US4	Evidence of stone displacement (bedding stone)	1	No deficiencies noted		
US5	Channel Stabilization and erosion control	1	No deficiencies noted		

UPSTREAM GENERAL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US50	Structural - General Concrete Condition	2	Refer to US104		
US51	Structural - General Metal Condition	3	Refer to US155		
US52	Structural - General Timber Condition	NA	Item not present		
US53	Construction Joints (Bolts, Welds)	NA	Item not present		
US54	Channels for Stoplogs or Flashboards	NA	Item not present		
US55	Settlement	1	No deficiencies noted		
US56	Shoaling/Scour	1	No deficiencies noted		
US57	Fouling/Marine Growth	1	No deficiencies noted		
US58	Debris	3	Refer to DS58		
US59	Stilling Wells	NA	Item not present		
US60	Underwater Controls/Instruments	1	No deficiencies noted in PVC tube.		
US61	Fenders	NA	Item not present		

UPSTREAM STRUCTURE

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
US100	Wingwalls	NA	Item not present		
US101	Buttresses (support arms for wall)	NA	Item not present		
US102	Abutments	NA	Item not present		
US103	Retention Walls	NA	Item not present		
US104	Headwall	2	The headwall has minor scaling with pitting up to 1/8" deep from top to bottom.	Monitor headwall for advanced scaling.	The concrete scaling is due to chemical attack from the water.
US105	Expansion/Construction Joints	NA	Item not present		
US106	Sheetpiles and Bulkheads	NA	Item not present		
US107	Wales/Tiebacks	NA	Item not present		
US108	Intake Bays	NA	Item not present		
US109	Piers	NA	Item not present		
US110	Foundation	NA	Item not present		
US111	Weir/Weir crest	NA	Item not present		
US112	Baffles	NA	Item not present		
US113	Underwater Apron Slabs	NA	Item not present		
US114	Structural Support, Bracing or Frames	NA	Item not present		
US115	Culverts	NA	Item not present		
US116	Risers	NA	Item not present		

UPSTREAM GATES

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
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Structure No. S-258

			(1) C-3: Gate 1 had a rock removed along the bottom seal, but could not get the gate to fully close [12:34]. (2) C-2: The gate plates and stiffener members in the upper 1' of the gates have minor pitting corrosion up to 1/64" deep covering less than 5% of the area [12:38, 12:42, 12:54, 13:03].		Rock debris prevented the gate from closing. It was removed, but the crew could not close it fully for unknown reason. The corrosion was due to chemical attack from the water and possible galvanic corrosion from contact of dissimilar metals.
US151	Structure Gate(s)	3		Perform adjustments on gate to fully close. Monitor the gate plate and top stiffener angles for advanced corrosion and/or section loss.	
US152	Gate Guides and Gate Control	1	No deficiencies noted.		
US153	Gate Seals & Mating Surface	NA	Item not present		
US154	Cathodic Protection (entire structure)	NA	Item not present		
			(1) C-3: The Gate #1 stem connection block is missing one of two bolts [12:44]. (2) C-2: Gate #1, #2 and #4 stem stop block bolts have minor corrosion on the bolts [12:44, 12:52, 13:05].		The missing bolt was left out during construction. The corrosion was due to chemical attack from the water and possible galvanic corrosion from contact of dissimilar metals.
US155	Operator/Actuator Components	3		Install a new bolt for the Gate #1 stem at the block connection to the gate. Monitor the bolts for the stem stop blocks for advanced corrosion.	
US156	Emergency Closure Gates	NA	Item not present		
US306	Navigation Lock Miter Gates	NA	Item not present		

Structure Name/No.: S-258

DOWNSTREAM EROSION CONTROL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS1	Slope/Banks of Channel	1	No deficiencies noted		
DS2	Rip Rap	1	No deficiencies noted		
DS3	Exposed erosion-Control Fabric	1	No deficiencies noted		
DS4	Evidence of stone displacement (bedding stone)	1	No deficiencies noted		
DS5	Channel Stabilization and erosion control	1	No deficiencies noted		

DOWNSTREAM GENERAL

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS50	Structural - General Concrete Condition	NA	Item not present		
DS51	Structural - General Metal Condition	2	Refer to DS115		
DS52	Structural - General Timber Condition	NA	Item not present		
DS53	Construction Joints (Bolts, Welds)	NA	Item not present		
DS54	Channels for Stoplogs or Flashboards	NA	Item not present		
DS55	Settlement	1	No deficiencies noted		
DS56	Shoaling/Scour	1	No deficiencies noted		
DS57	Fouling/Marine Growth	1	No deficiencies noted		
DS58	Debris	2	Barrel #1 had rock debris at the gate keeping gate from closing [10:14]. The crew raised the gate, the diver removed the rock and other gravel debris, and the crew closed the gate.	Monitor rock and other debris along the gate.	Rock debris most likely due to sand/rock deposits built up at invert on upstream side of gate.
DS59	Stilling Wells	NA	Item not present		
DS60	Underwater Controls/Instruments	NA	Item not present		
DS61	Fenders	NA	Item not present		

DOWNSTREAM STRUCTURE

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS100	Wingwalls	NA	Item not present		
DS101	Buttresses (support arms for wall)	NA	Item not present		
DS102	Abutments	NA	Item not present		
DS103	Retention Walls	NA	Item not present		
DS104	Headwall	NA	Item not present		
DS105	Expansion/Construction Joints	NA	Item not present		
DS106	Sheetpiles and Bulkheads	NA	Item not present		
DS107	Wales/Tiebacks	NA	Item not present		
DS108	Intake Bays	NA	Item not present		
DS109	Piers	NA	Item not present		
DS110	Foundation	NA	Item not present		
DS111	Weir/Weir crest	NA	Item not present		
DS112	Baffles	NA	Item not present		
DS113	Underwater Apron Slabs	NA	Item not present		
DS114	Structural Support, Bracing or Frames	NA	Item not present		

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DS115	Culverts	2	(1) All four barrels have minor pitting corrosion up to 1/64" deep covering less than 5% throughout their length [10:00 to 12:00]. (2) Barrels #2, #3 & #4 has higher concentration of corrosion within the last 10' of the gate. The pitting depth is still 1/64", but the coverage gets as high as 50%. The material is aluminum [10:56, 11:17 & 11:49]. (3) All four barrels have sediment deposits at the invert ranging from 1' to 1.5' in depth [10:00 to 12:00].	Monitor the culvert barrels for advanced corrosion and higher sediment depth.	The corrosion was due to chemical attack from the water and possible other magnetic fields near the gate (causing the higher concentration of corrosion). The sediment deposit is natural with a low flow condition.
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DOWNSTREAM GATES

Finding #	Inspection Item	Rating	Comments	Recommended action	Probable cause
DS151	Structure Gate(s)	1	No deficiencies noted.		
DS152	Gate Guides and Gate Control	1	No deficiencies noted.		
DS153	Gate Seals & Mating Surface	2	All four gates have missing or damaged seal along the bottom, typically from 04:00 to 07:00 across the invert. None of the seals have noticeable leaks, but the water levels may have been equal [10:17, 10:49, 11:25, 11:59].	Monitor the seal and replace it if the gates begin to leak.	Damage to seal most likely due to rock or other debris present during operation.
DS154	Cathodic Protection (entire structure)	NA	Item not present		
DS155	Operator/Actuator Components	NA	Item not present		
DS156	Emergency Closure Gates	NA	Item not present		
DS157	Navigation Lock Miter Gates	NA	Item not present		
DS1000	Additional Items and Comments	NA	Item not present		