

BRIDGE INSPECTION REPORT

2800152
Structure File NumberBRIDGE NUMBER **GEA 00044 0135**YEAR BUILT **1960**DIST **12**Bridge Type **112**TYPE SERVICE **5 5****LA DUE RES. 1.23 MIS 422**

DECK	out/out 43.8 Deck Area 4,650 sqft		3 LATEX MODIFIED CONCRETE OVERLAY	
1. FLOOR	1 REINF CONCRT (PRESTRSD, PRECAST)	3	2. WEARING SURFACE	Thk 1.2 3
3. CURBS, SIDEWALKS AND WALKWAYS	Left N NONE / Right N NONE		4. MEDIAN	Lanes on 2
5. RAILING	7 STL GUARDRL ON STL, CONCR. OR T	1	6. DRAINAGE	1 OVER THE SIDE (W/O DRIP STRIP) 1
7. EXPANSION JOINTS	3 COMPRESSION SEAL	2	8. SUMMARY	4
SUPERSTRUCTURE			3 OTHER (CONCRETE RIGID FRAME)	
9. ALIGNMENT	Max Spans 40	1	10. BEAMS/GIRDERS/SLAB	3
11. DIAPHRAGMS or CROSSFRAMES			12. JOISTS/STRINGERS	
13. FLOOR BEAMS			14. FLOOR BEAM CONNECTIONS	
15. VERTICALS			16. DIAGONALS	
17. END POSTS			18. TOP CHORD	
19. LOWER CHORD			20. LOWER LATERAL BRACING	
21. TOP LATERAL BRACING			22. SWAY BRACING	
23. PORTALS			24. BEARING DEVICES	0 OTHER 1
25. ARCH			26. ARCH COLUMNS or HANGERS	
27. SPANDREL WALLS			28. PROTECTIVE COATING SYSTEM	Paint Date 1/10/1967 U UNKNOWN 6
29. PINS/HANGERS/HINGES			30. FATIGUE PRONE CONNECTIONS	
31. LIVE LOAD RESPONSE		S	32. SUMMARY	4
SUBSTRUCTURE			3 SOLID WALL	
33. ABUTMENTS	3 SOLID WALL	2	34. ABUTMENT SEATS	Abutment: ON PILING 2
35. PIERS		2	36. PIER SEATS	4 OPEN COLUMN Piers: ON PILING 1
37. BACKWALLS		2	38. WINGWALLS	2
39. FENDERS and DOLPHINS	Piers = 02 NN NN Spans = 3		40. SCOUR	3 3
41. SLOPE PROTECTION	N NONE-NATURAL PROTECTION(GRA)	4	42. SUMMARY	Dive Date 12/30/1899 4
CULVERTS				
43. GENERAL	N NONE/NOT APPLICABLE		44. ALIGNMENT	
45. SHAPE			46. SEAMS	
47. HEADWALLS or ENDWALLS	Culvert Length 0		48. SCOUR	Culvert Fill Depth 0
49.			50. SUMMARY	
CHANNEL				
51. ALIGNMENT		1	52. PROTECTION	5 RIP RAP (DUMPED ROCK OR ROCK) 3
53. WATERWAY ADEQUACY	8 SLIGHT CHANCE OVERTOPPING	1	54. SUMMARY	4
APPROACHES				
55. PAVEMENT	2 BITUMINOUS	2	56. APPROACH SLABS	1
57. GUARDRAIL	1 STEEL BEAM	1	58. RELIEF JOINTS	
59. EMBANKMENT		3	60. SUMMARY	Percent Legal = 150 4
GENERAL				
61. NAVIGATION LIGHTS			62. WARNING SIGNS	Maint Resp 1 OHIO TRAN DEPT
63. SIGN SUPPORTS	Signs on = N MVC on = 9999.9 Under C = 0		64. UTILITIES	
65. VERTICAL CLEARANCE	Under NC = 0	N	66. GENERAL APPRAISAL & OPERATIONAL STATUS	4 A
67. INSPECTED BY			68. REVIEWED BY	

SIGNED

PE Number

KJB
INITIALS

SIGNED

72336 MWB
PE Number INITIALS

DATE 11/3/2009

1 1 1 1 1 N N N
SURVEY

DATE 3/10/2010

DECK

FL: SEE ITEM #10 (SLAB). FLOOR IS 25-30% DETERIORATED.
WS: CRACKS SOME AS WIDE AS 1/8". 175 SF OF ASPHALT PATCHES.
10% DELAMINATED. 10 SF BREAKING UP. 2 SF SPALLED. WS IS
15-20% DETERIORATED.
RAILING: VERTICAL CRACKS.
EXJTS: ASPHALT PATCHES AT BOTH EXPANSION JOINTS.

SUPERSTRUCTURE

SLAB: 400 SF OF FLOOR SPALLS AND 40 SF OF DELAMS ALONG
CONSTRUCTION JOINT AT CENTERLINE OF USR 44 REVEAL 125' OF
360 DEGREE EXPOSURE OF LONGITUDINAL REBARS; SEE ATTACHED
PHOTOS 1 - 3 DATED 11/3/09. 375 SF OF FLOOR SPALLS ALONG
LEFT EDGE OF SLAB REVEAL 210' OF 360 DEGREE EXPOSED REBAR.
370 SF OF FLOOR SPALLS ALONG RIGHT EDGE OF SLAB REVEAL
130' OF 360 DEGREE REBAR EXPOSURE. SOME MISSING
LONGITUDINAL REBAR. THE MAJORITY OF THE FLOOR SPALLS ALONG
BOTH SLAB EDGES ARE OUTSIDE THE INSIDE RAILINGS.

SUBSTRUCTURE

ABUTMENTS: SPALLS.
ABUTMENT SEATS: 4 SF OF SEAT LOSS AT ENDS OF ABUTMENTS.
PIERS: MINOR DELAMINATIONS AND SPALLS OF CAPS. RUSTING
SECTION LOSS OF STEEL PIER COLUMNS NEAR WATERLINE.
SCOUR: SOME EROSION IS HAPPENING BEHIND START ABUTMENT NEAR
CENTERLINE OF BRIDGE; SEE ATTACHED PHOTOS 6 & 7 DATED
11/3/09.
BACKWALLS: SPALLS. SOME DETERIORATED AREAS; SEE ATTACHED
PHOTOS 4 & 5 DATED 11/3/09.
WINGWALLS: CRACKS. SPALLS. DETERIORATING CONCRETE.
SLOPE PROTECT: UNDERMINING OF BOTH ABUTMENTS EXPOSE SOME
PILES AT FINISH ABUT AND ALL PILES AT START ABUT TO AIR

AND WATER WHEN LAKE IS HIGH; SEE ATTACHED PHOTOS 4 - 7
DATED 11/3/09.

CHANNEL

PROTECTION: MOST OF THE STONE HAS WASHED AWAY FROM BOTH
ABUTMENTS.

APPROACHES

PAVEMENT: CRACKS. ASPHALT PATCHES ALONG TOPS OF BOTH
BACKWALLS.

EMBANKMENT: EROSION AT ALL FOUR CORNERS. EROSION ALONG
NORTHWEST CAUSEWAY EMBANKMENT WITH SEVERAL WASHOUTS THAT

EXTEND TO GUARDRAIL POSTS.

GENERAL

AP WAS WITH DIVE INSPECTION OF PIERS ON 10/28/09.

GEA-44-0135
SFN 2800152



P1: SPAN #1 UNDER CENTERLINE OF BRIDGE.



P3: SPAN #3 UNDER CENTERLINE.



P2: SPAN #2 (MID) UNDER CENTERLINE.

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P4: FINISH (N) ABUTMENT. NOTE MOST OF DECK EDGE SPALLS ARE UNDER OLD RAILING. NEW RAIL WAS ADDED TO THE INSIDE OF OLD.



P5: DETERIORATED FINISH-LEFT (NW) ABUTMENT. NOTE REBAR HANGING WAS REMOVED ON 11/6/09.



P6: START (S) ABUTMENT. NOTE PILE EXPOSURE. ARROW IS NEAR CENTERLINE OF BRIDGE.



P7: CLOSE-UP OF ARROW IN P6. EROSION IS STARTING TO GET BEHIND ABUTMENT.

Underwater Inspection Report for:

State Route 44 over La Due Reservoir Geauga County, Ohio
(Three Span, Continuous Reinforced Concrete Slab Bridge)

KCI Personnel on site during inspection:

1. Mr. Travis M. Clower, P.E. (Primary Diver / Lead Inspector)
2. Mr. Mark A. Suchan, (Backup Diver / Inspector)
3. Mr. John L. Clower (Supervisor / Inspector)

ODOT Personnel on site during inspection:

1. Mrs. Andrea Persani



East Elevation View



Location Map

Prepared for:

ODOT District 12
5500 Transportation Blvd
Garfield Heights, Ohio 44125



Prepared by:

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Travis M. Clower
12-10-09



DESCRIPTION

Bridge GEA-44-0135 (SFN 2800152) carries two lanes of State Route 44 over the south end of La Due Reservoir. The bridge has an overall length of approximately 105 feet and was built in 1960. The structure consists of a three span continuous reinforced concrete slab bridge carried by two pile supported piers and two pile supported abutments. Although the water level at the time of inspection was more than five feet below the concrete abutments, the abutments were still inspected and included in this report. For consistency, the numbering convention will follow that previously established by ODOT with the south pier noted as Pier 1.

INSPECTION OPERATIONS

KCI's three-person dive team performed an underwater inspection on October 28, 2009. A visual inspection was performed from 1-foot above the waterline (splash zone) to the mud line. Several additional defects above this area are noted in the report. Where the diver's visibility was limited, tactile methods were used. Soundings were taken along all substructure units and up to 30 feet upstream and downstream of the bridge using a survey story pole.

The 2003 Underwater Inspection Report and established Hydrographic Reference Location were not available. Hence, the west end underside of Pier 2's cap was chosen as the 2009 reference location. From the 1959 Pier Detail Plans, the elevation at this point is 1129.76. The water surface was measured to be 9.39 feet below that at an elevation of 1120.37.

Hazards Encountered: *N/A*

Inspection Mode: *Diving from shore.*

Flow Direction / Velocity: *N/A*

Direction of Diver / Inspector: *Soundings were gathered first. Then the Piers were inspected in order.*

Bottom Composition: *Slope protection Riprap (see Photos 1 – 6) around the piles. Flat mud bottom at the midspan.*

Scour Checked By: *Soundings, probing and tactile methods.*

Equipment Used: *SCUBA*

Elements Cleaned: *No significant cleaning required.*

Hydrographic Reference: *West end of Pier 2 underneath the Cap.*



OBSERVATIONS

GENERAL

- Underwater visibility was less than 1-foot with no current.

CHANNEL

- The bottom composition surrounding the steel piles is the slope protection riprap stone shown in Photos 1 – 6. The slope of the stone is steep around the piles and gives way with any contact.
- The bottom composition at the midspan was flat mud. The soundings at the midspan are relatively constant.

DEFECTS & DEFICIENCIES

PIER 1 (SOUTH PIER)

- All 9 of the steel piles for this pier have up to a 1/8-inch layer of rust on the surface. Each of these piles was sounded with a hammer from the waterline to the bottom and no through holes were found. Photo 7 of Pier 2 shows this typical rust layer. The condition of the piles remains constant from the waterline to the riprap stone.
- All of the steel piles are surrounded with slope protection riprap stone. This stone slopes downward steeply toward the midspan.
- Although Pier 1's Cap is beyond the scope of this Underwater Inspection Report, it is worth noting the 1-foot diameter x 3-inch deep spalls located on the bottom edges at both the east and west ends. Photo 2 shows the east end spall.

PIER 2 (NORTH PIER)

- All 9 of the steel piles for this pier have up to a 1/8-inch layer of rust on the surface. Each of these piles was sounded with a hammer from the waterline to the bottom and no through holes were found. Photo 7 shows this typical rust layer. The condition of the piles remains constant from the waterline to the riprap stone.
- All of the steel piles are surrounded with slope protection riprap stone. This stone slopes downward steeply toward the midspan.
- Although Pier 2's Cap is beyond the scope of this Underwater Inspection Report, it is worth noting the spalls located on the bottom edges at both the east and west ends. Photo 8 shows the missing and damaged concrete around the west end pile cap. The area of missing concrete is 1 foot high x 2 feet wide x 6 inches deep.



DEFECTS & DEFICIENCIES CONTINUED**NORTH ABUTMENT**

- The abutment concrete has less than ¼-inch scaling and is partially painted with an epoxy coating. The epoxy paint stops at the level of where the previous slope protection riprap stone was.
- Using this epoxy paint edge, we can see that the previous slope protection was up to three feet higher in some locations.
- Photo 6 of the abutment east end shows an area of spalled concrete 6 feet high x 4 feet wide x 7 inches deep with exposed reinforcing steel.
- There is 22 feet of concrete undermining at the west end of this abutment with exposed supporting piles. The worst undermining occurred ten feet from the west end and has dimensions of 4 inches high x 33 inches deep.

SOUTH ABUTMENT

- The abutment concrete has less than ¼-inch scaling and is partially painted with an epoxy coating. The epoxy paint stops at the level of where the previous slope protection riprap stone was.
- Using this epoxy paint edge, we can see that the previous slope protection was up to three feet higher in some locations.
- Photo 5 of the abutment east end shows a corner area of spalled concrete 2 feet high x 6 feet wide x 8 inches deep with exposed reinforcing steel. The west end of this abutment also has a corner spall 13 inches in diameter x 5 inches deep with exposed reinforcing steel.
- The South Abutment is undermined across the entire width (44 feet) exposing the supporting piles. The worst undermining occurred ten feet from the west end and has dimensions of 12 inches high x 43 inches deep.



COMPARISION TO PREVIOUS REPORTING AND SUMMARY

Unfortunately the previous Underwater Inspection Report with soundings was not available. Therefore comparisons of the bottom topography and movement of slope protection from 2003 to 2009 are also unavailable. From the epoxy paint line on both abutments, it is safe to say that several feet of slope protection stone has washed away.

The 11/13/2008 ODOT Topside Inspection Report with photos and dimensions of the South Abutment undermining was provided. The South Abutment undermining dimensions taken during the 2008 inspection were almost identical to those taken during this inspection. The 2008 report mentions the North Abutment undermining also but does not give dimensions. Subsequent inspections can compare the North Abutment undermining dimensions to those provided in this report.

Without ultrasonically checking the remaining thickness of the steel piles, it is impossible to give an estimate of the section loss in the steel. Hence we are recommending this be done during the next underwater inspection.

RECOMMENDATIONS

As stated above, several feet of slope protection stone has washed away from the abutments undermining them and exposing their supporting piles. Now that both abutment faces are exposed, the epoxy painting should be completed and larger slope protection riprap be installed. This will prevent further undermining of the abutments.

The ultrasonic thickness check of the steel piles mentioned above will establish a baseline for future underwater inspections and show the extent of section loss within the piles. KCI's Diving Division owns this equipment and their divers are able to perform this non-destructive test both above and below the water.





Photo by T. Clower, 10/28/09

Photo 1 – Facing Northeast. West Elevation of the Bridge.



Photo by J. Clower, 10/28/09

Photo 2 – Facing Northwest. East Elevation of the Bridge.



Photo by T. Clower, 10/28/09

Photo 3 – Facing West. View from Bridge also showing North Shore sloping Riprap.



Photo by T. Clower, 10/28/09

Photo 4 – Facing East. View from Bridge also showing North Shore sloping Riprap.



Photo by J. Clower, 10/28/09

Photo 5 – Facing West. South Abutment with full width Undermining and Exposed Piles.



Photo by T. Clower, 10/28/09

Photo 6 – Facing Northwest. North Abutment with West Corner Undermining.

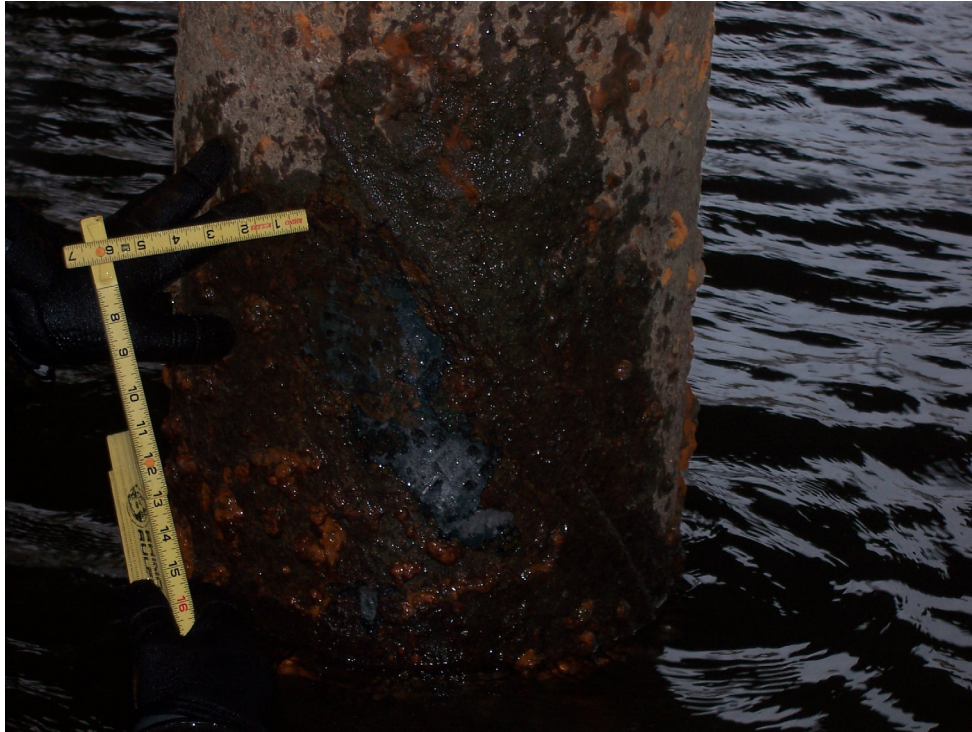


Photo by J. Clower, 10/28/09

Photo 7 – Facing South. Pier 2 (North Pier), 4th Steel Pile from the East. Typical 1/8-inch thick corrosion of the Steel with section loss. No through holes.



Photo by T. Clower, 10/28/09

Photo 8 – Facing Southeast. West end of Pier 2 (North Pier) pile cap with Corner Spall.

