STATE OF OHIO DEPARTMENT OF TRANSPORTATION

BRIDGE INSPECTION REPORT

1806564 Structure File Number | BRIDGE NUMBER **CUY 00077 1318** | YEAR BUILT **1914**

DIST **12** | Bridge Type **095** | TYPE SERVICE **1 5** | **MORGANA RUN**

DECK out/out 0 Deck Area 1,324 sqft 1. FLOOR N NONE		N NOT APPLICABLE (CULVERT UNDER FILL ETC) 2. WEARING SURFACE Thk 0	
Left N NONE / Right N NONE 3. CURBS, SIDEWALKS AND WALKWAYS		4. MEDIAN Lanes on 6	
5. RAILING N NONE		6. DRAINAGE N NONE	
7. EXPANSION JOINTS N NONE		8. SUMMARY	
SUPERSTRUCTURE 9. ALIGNMENT Max Spans 11		1 N/A (CULVERTS, TRUSSES, ETC.) 10. BEAMS/GIRDERS/SLAB	
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 N NONE	
25. ARCH		26. ARCH COLUMNS or HANGERS	
27. SPANDREL WALLS		Paint Date 1/1/2005 28. PROTECTIVE COATING SYSTEM 9 PAINT SYSTEM IZEU	
29. PINS/HANGERS/HINGES		30. FATIGUE PRONE CONNECTIONS	
31. LIVE LOAD RESPONSE		32. SUMMARY	

SUBSTRUCTURE 33. ABUTMENTS N NONE		N NONE 34. ABUTMENT SEATS Abutment: NOT ON PILING	
35. PIERS		N NONE 36. PIER SEATS Piers: NOT ON PILING	
37. BACKWALLS		38. WINGWALLS	
Piers = NN NN NN 39. FENDERS and DOLPHINS Spans = 1		40. SCOUR	
41. SLOPE PROTECTION N NONE-NATURAL PROTECTION(GRA		Dive Date 10/27/2009 42. SUMMARY	
CULVERTS 43. GENERAL 6 PIPE-ELLIPTICAL	2	44. ALIGNMENT	1
45. SHAPE		46. SEAMS	
Culvert Length 375 47. HEADWALLS or ENDWALLS		Culvert Fill Depth 70 48. SCOUR	1
49.		50. SUMMARY	6
CHANNEL 51. ALIGNMENT	1	52. PROTECTION N NONE	
5 (SEE CODING GUIDE) 53. WATERWAY ADEQUACY	1	54. SUMMARY	8
APPROACHES 55. PAVEMENT 2 BITUMINOUS	2	56. APPROACH SLABS	
57. GUARDRAIL 7 CONC DFLCT PARAPET	1	58. RELIEF JOINTS	
59. EMBANKMENT	1	Percent Legal = 150 60. SUMMARY	6
GENERAL 61. NAVIGATION LIGHTS		Maint Resp 1 OHIO TRAN DEPT 62. WARNING SIGNS	
Signs on = N 63. SIGN SUPPORTS MVC on = 9999.9		64. UTILITIES	
Under C = 0 65. VERTICAL CLEARANCE Under NC = 0	N	66. GENERAL APPRAISAL & OPERATIONAL STATUS	6 A

67. INSPECTED BY

SIGNED | PE Number | INITIALS

ACP

DATE 11/1/2010

68. REVIEWED BY

SIGNED | PE Number | INITIALS

59487 YSS

DATE 3/1/2011

N N N N N N N N

SURVEY

CULVERTS

GENERAL: CRACKS IN MOTAR WITH AREAS OF HEAVY EFFLORESCENCE.
LOCALIZED AREAS OF MISSING BRICK. SEE ATTACHED DIVER REPORT
DATED 11/1/10.

APPROACHES

PAVEMENT: CRACKS. MINOR ASPHALT PATCHES.

GENERAL

DEPTH OF FILL OVER STRUCTURE >50'(UNDER I-77).
CONFINED SPACE ENTRY BY DIVER

Inspection Report for:

Morgana Run Culvert under Interstate Route 77 below Cleveland, Ohio
(Three layer Brick and Reinforced Concrete Culvert)

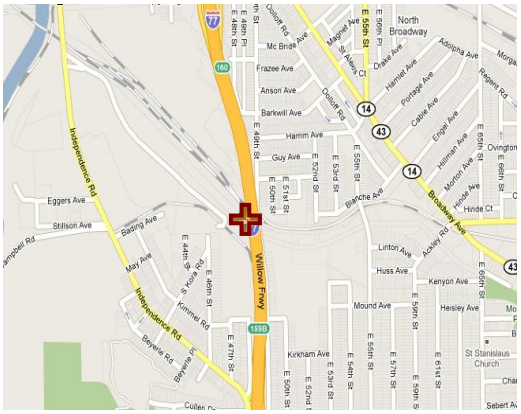
KCI Personnel on site during inspection:

1. Capt. Travis M. Clower, MBA, P.E. (Entrant/ Inspector)
2. Mr. Christopher J. Luciani, (Attendant)
3. Mr. William Becka (Supervisor)

ODOT Personnel on site during inspection:

1. Andrea Persanyi

General View of Brick Culvert



Location Map

Prepared for:

ODOT District 12
5500 Transportation Blvd
Garfield Heights, Ohio 44125

Prepared by:

KCI Associates of Ohio, P. A.
388 S. Main Street, Suite 401
Akron, Ohio 44311
Phone: (330) 564-9100

DESCRIPTION

The Morgana Run Culvert, CUY-77-1318 (SFN 1806564) is located under Interstate 77 below Cleveland, Ohio. The teardrop-shaped, three layer brick culvert was constructed in 1914 and is connected on the west end to a reinforced concrete box culvert with tile floor. The culvert was inspected from a manhole at East 49th Street (on the east side of Interstate 77) to a manhole located on the Arcelor Mittal Steel property on the west side of Interstate 77.

INSPECTION OPERATIONS

KCI's three-person, OSHA certified, confined space team performed the culvert inspection on 11/01/10. This was a permit required confined space entry. A tripod, winch and harness were used for entry into the Arcelor Mittal Steel manhole on the west side of Interstate 77. Although the atmosphere contained 21.0% oxygen, the entrant carried his breathable air with him and wore a Superlite 27 helmet for precautionary reasons inside the confined space. The previous inspection report dated 10/27/09 was available for comparison. A visual inspection was performed on the entire internal structure between the two manholes mentioned above. The entrant entered the Arcelor Mittal Steel property manhole on the west side of Interstate 77. From there, he traveled east until reaching the 49th Street Manhole. At this point the inspector turned to report findings and take photos on the return trip.

Hazards Encountered:	*Difficult entrance, Permit Required Confined Space.*
Inspection Mode:	*Visual*
Flow Direction / Velocity:	*N/A*
Direction of Diver / Inspector:	*Reported findings starting at the 49th Street Manhole on the return trip to the Arcelor Mittal Steel property manhole.*
Culvert Bottom:	*Brick and Tile*
Scour Checked By:	*N/A*
Equipment Used:	*Superlite 27 helmet with hard wire communication to the surface, tripod, winch, gas monitor, harness, lights*
Elements Cleaned:	*None*
Hydrographic Reference:	*N/A*

OBSERVATIONS STARTING AT THE 49th STREET MANHOLE

GENERAL

- At 385 feet from the Arcelor Mittal Steel entry manhole is the 49th Street manhole. This six-sided concrete structure has ladder rungs mounted on one side and is located on the south wall of the culvert (see Photo 2).
- The culvert is a teardrop shape created with three layers of red brick. This shape is shown in Photos 5 and 8.
- A concrete diversion weir with dimensions 24 inches high and 19 inches thick is located directly below the 49th Street manhole.
- The 12-inch deep water on the east side of the weir wall makes a 90-degree bend and flows under the north wall. This is shown in Photos 3 and 4. There were only sporadic puddles on the west side.
- At 370 feet from the entry point, is a horizontal six inch beam located eight feet above the floor. Photos 5, 6 and 7 show the beam and the brick surrounding it. A similar beam is located 15 feet east of the weir wall at the same elevation.
- Facing west at 215 feet from the entry point, the brick culvert makes approximately a 35-degree bend northward (to the right).
- There is a 4-foot diameter brick incoming pipe on the south wall 290 feet from the entry point. Photo 9 shows this incoming pipe with a small amount of flow.
- There is a 4-inch diameter clay tile incoming pipe on the north wall at 160 feet from the Arcelor Mittal Steel entry manhole. It is located approximately 6 feet above the floor and is partially blocked with sludge and debris (see Photo 10).
- The culvert transitions from the red brick teardrop shape to a rectangle concrete and tile floor culvert section 45 feet from the entry point. This is shown in Photos 12, 13 and 15.

DEFECTS & DEFICIENCIES STARTING AT THE 49th STREET MANHOLE

- The concrete around the 49th Street manhole had up to ½-inch deep scaling.
- The ladder rungs at both manholes were intact but heavily corroded. Photo 2 shows the 49th Street ladder rungs and Photos 14 and 16 show the Arcelor Mittal Steel manhole ladder rungs.
- The diversion weir has a 1/16-inch wide through crack at the center. This is shown in Photo 3.
- The horizontal beam shown in Photos 5, 6 and 7 has heavy corrosion and is deflected approximately 2 inches in the center. The area where the beam penetrates the walls is patched with concrete. Both the beam condition and the surrounding concrete patchwork are similar to the conditions found during the 2009 inspection. There is minor debris on the beam (see Photos 5-7). The similar beam to the east of the weir wall does not appear to have the deflection.
- Photo 11 shows a 2-inch wide x 3-inch high hole in the first layer of brick located 5 feet off of the floor on the north wall at 150 feet east of the entry point.
- Photos 5, 8, 12 and 13 show a ¼ to ½-inch horizontal crack on both sides of the culvert with water infiltration and heavy efflorescence. This crack jumps mortar joints staying between 7 and 9 feet above the floor. The cracking is mostly on the south wall. The crack is not continuous around the culvert's 35-degree bend. There is very little infiltration in this area also.
- There is water infiltration in numerous places at the peak for the first 100 feet of the teardrop shaped culvert. Photo 12 shows this well.
- The transition between the two culvert types is not smooth at the west end. This is shown in Photo 13.
- The concrete culvert below the entry point had up to ¼-inch scaling with heavy efflorescence near the ladder rungs (Photos 14 – 16).
- The entry / exit manhole ladder rungs are offset, corroded and slippery. A tripod, winch and harness are necessary for safe extraction.
- No loose bricks or concrete debris was found on the floor.
- Photo 17 shows a 60' long x 3' wide area of 4" deep standing water approximately 50' from the East 49th Street manhole.

COMPARISION TO PREVIOUS REPORTING AND SUMMARY

The culvert's condition has changed very little in the past year. This inspector had the opportunity to do the October 2006, October 2009 and November 2010 inspections. The deficiencies noted above, such as the weir wall crack, beam deflection, horizontal mortar joint cracks and ladder rung corrosion remain consistent with the previous reports. Standing water is now present 50' from the East 49th Street manhole.

Aerial Photo by Google Maps

Photo 1 – Facing Down. Aerial view showing approximate location of Culvert.

Photo by T. Clower, 11/01/10

Photo 2 – Facing Upward. 49th Street Manhole access.

Photo by T. Clower, 11/01/10

Photo 3 – Facing East. Weir Wall with 1/16-inch through crack.

Photo by T. Clower, 11/01/10

Photo 4 – Facing Northeast. Diversion Channel at the Weir Wall with water exiting beneath North Wall.

Photo by T. Clower, 11/01/10

Photo 5 – Facing West at 370 feet from the Arcelor Mittal Steel entry point. Steel Beam with approximate 2-inch deflection and debris.

Photo by T. Clower, 11/01/10

Photo 6 – Facing South. Area where the Steel Beam penetrates the brick wall.

Photo by T. Clower, 11/01/10

Photo 7 – Facing North. Area where the Steel Beam penetrates the brick wall.

Photo by T. Clower, 11/01/10

Photo 8 – Facing West at 365 feet from the Arcelor Mittal Steel entry point. Horizontal Mortar Joint Cracks with infiltration and efflorescence.

Photo by T. Clower, 11/01/10

Photo 9 – Facing South 290 feet from the entry manhole.
48-inch diameter brick incoming pipe.

Photo by T. Clower, 11/01/10

Photo 10 – Facing North at 160 feet from the Arcelor Mittal Steel entry point.
4-inch diameter incoming clay tile pipe.

Photo by T. Clower, 11/01/10

Photo 11 – Facing North at 150 feet from the Arcelor Mittal Steel entry point. 2-inch wide x 3-inch high hole in first layer of brick.

Photo by T. Clower, 11/01/10

Photo 12 – Facing West. Looking out the west end of the Brick Culvert.

Photo by T. Clower, 11/01/10

Photo 13 – Facing East. Transition from Concrete to Brick Culvert.

Photo by T. Clower, 11/01/10

Photo 14 – Facing Northwest. Arcelor Mittal Steel manhole (entry point) ladder rungs.

Photo by T. Clower, 11/01/10

Photo 15 – Facing West. Concrete and Tile Culvert.

Photo by T. Clower, 11/01/10

Photo 16 – Facing up at entry point. Note the offset in the ladder rungs.

Photo by T. Clower, 11/01/10

Photo 17 – Facing West. Standing water along the floor of the culvert at approximately 335 feet from the entry manhole.

CONFINED SPACE ENTRY PERMIT

Date and Time Issued: *11/1/10 10:00 hrs*

Date and Time Expires: *11/1/10 13:00 hrs*

Job Site/ Space I.D.: *MORGANNA RUN* Supervisor: *Bill Becka*

Equipment to be worked on: *N/A* Work Performed: *Inspection*

Checklist:

- Personnel trained in Confined Space Entry, CPR, and First Aid *(yes)*
- Communications: *Line tended entrant with hard wire communications*
- Method of Egress: *Tripod, winch and harness*
- Natural Ventilation: *(yes)* and/or Forced Ventilation (____)
- Is Lock Out/Tag Out and/or Weather an Important Issue? *(must have no rain)*
- Is SCBA or Surface Supplied Air being used? *(SCUBA tank with dive helmet)*
- Monitor Atmosphere (Top, Middle, Bottom) every 20 minutes
  - Oxygen *(~~19.4% 100 low~~ 21%)* must be between 19.5 and 23.5% to breath
  - Explosive % *(0%)* must be < 10% LEL
  - Toxic PPM *(0%)* must be < 10 PPM H(2)S
  - Times Checked *(continuous)*

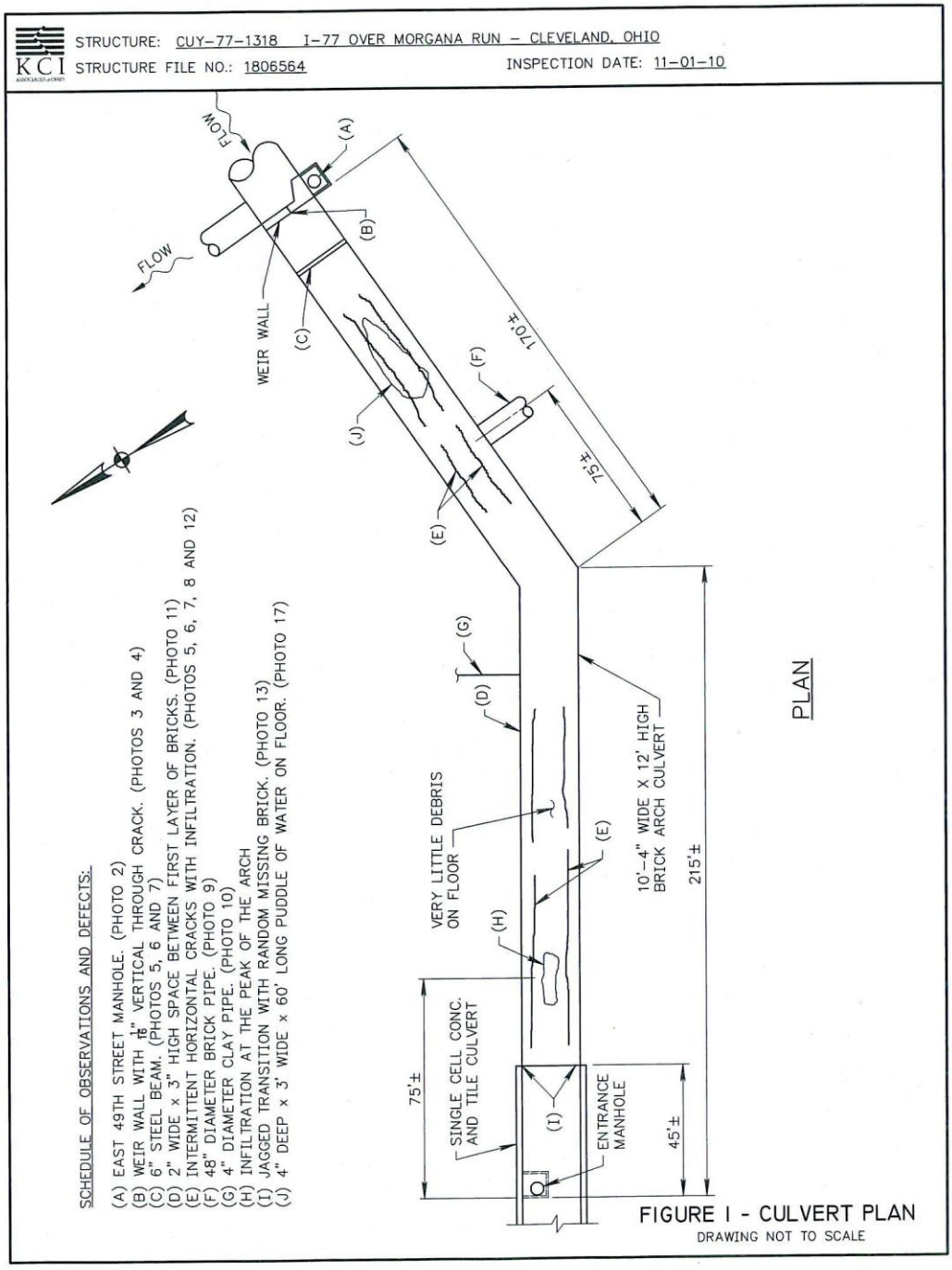
We have reviewed the work authorized by this permit and the information contained here-in. Instructions, safety and rescue procedures have been reviewed and understood.

Entrant(s) Signature: Travis M. Clower, P.E.

Attendant(s) Signature: Chris Luciani

Supervisor Signature: Bill Becka

Bill Becka


STRUCTURE: CUY-77-1318 I-77 OVER MORGANA RUN – CLEVELAND, OHIO
STRUCTURE FILE NO.: 1806564
INSPECTION DATE: 11-01-10
FLOW
FLOW
WEIR WALL
(A)
(B)
(C)
(D)
(E)
(F)
(G)
(H)
(I)
(J)
170'±
75'±
215'±
45'±
75'±
VERY LITTLE DEBRIS ON FLOOR
10'-4" WIDE X 12' HIGH BRICK ARCH CULVERT
SINGLE CELL CONC. AND TILE CULVERT
ENTRANCE MANHOLE
PLAN
SCHEDULE OF OBSERVATIONS AND DEFECTS:
(A) EAST 49TH STREET MANHOLE. (PHOTO 2)
(B) WEIR WALL WITH ⅝" VERTICAL THROUGH CRACK. (PHOTOS 3 AND 4)
(C) 6" STEEL BEAM. (PHOTOS 5, 6 AND 7)
(D) 2" WIDE x 3" HIGH SPACE BETWEEN FIRST LAYER OF BRICKS. (PHOTO 11)
(E) INTERMITTENT HORIZONTAL CRACKS WITH INFILTRATION. (PHOTOS 5, 6, 7, 8 AND 12)
(F) 48" DIAMETER BRICK PIPE. (PHOTO 9)
(G) 4" DIAMETER CLAY PIPE. (PHOTO 10)
(H) INFILTRATION AT THE PEAK OF THE ARCH
(I) JAGGED TRANSITION WITH RANDOM MISSING BRICK. (PHOTO 13)
(J) 4" DEEP x 3' WIDE x 60' LONG PUDDLE OF WATER ON FLOOR. (PHOTO 17)
FIGURE 1 - CULVERT PLAN
DRAWING NOT TO SCALE