



FRACTURE CRITICAL PIER CAP INSPECTION REPORT

SFN3106780 (HAM-71-0248L)
IR-71 SB OVER EDEN PARK DRIVE AND
READING ROAD (US-42)
HAMILTON COUNTY, OH
DISTRICT 8

June 2023

Prepared for:



9/19/2023

Prepared by:

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

1.0 INTRODUCTION 1

 1.1 Purpose and Scope 1

 1.2 General Description of the Structure 1

 1.3 Method of Investigation 3

 1.4 Condition Ratings 4

2.0 EXISTING CONDITIONS 5

 2.1 Pier Cap Conditions 5

 2.1.1 Pier Cap 1 5

 2.1.1.1 Pier Cap 1 Interior 6

 2.1.1.2 Pier Cap 1 Exterior 8

 2.1.1.3 Pier Cap 1 Fatigue Prone Details 9

 2.1.2 Pier Cap 2 10

 2.1.2.1 Pier Cap 2 Interior 10

 2.1.2.2 Pier Cap 2 Exterior 12

 2.1.2.3 Pier Cap 2 Fatigue Prone Details 13

 2.1.3 Pier Cap 3 14

 2.1.3.1 Pier Cap 3 Interior 14

 2.1.3.2 Pier Cap 3 Exterior 15

 2.1.3.3 Pier Cap 3 Fatigue Prone Details 17

3.0 EVALUATION AND RECOMMENDATIONS 19

EXHIBIT 1 – EXISTING PLANS 20

EXHIBIT 2 – REHABILITATION PLANS 23

EXHIBIT 3 – ODOT ASSETWISE FIELD REPORT 30



EXECUTIVE SUMMARY

- Project:** VAR-District 8 Bridge Inspections No. 2023-4. (PID No. 105476)
- Purpose of Project:** To perform a routine and fracture critical inspection of fracture critical steel pier caps on bridges for the Ohio Department of Transportation, District 8.
- Inspection Team:** Team Leader – Michael Seal, P.E. – Collins Engineers, Inc.
Team Member – Trent Graham – Collins Engineers, Inc.
Team Member – Rob Parker – Gannett Fleming, Inc.
Team Member – Matthew McFadden E.I.T. – Gannett Fleming, Inc.
- Inspection Date(s):** June 24, 2023 (Routine completed 8/4/2023)

Summary of Findings:

- **Pier 1:**
 - The nuts were missing from all the anchor bolts on the pot bearings. This is an old condition, and the bearings continue to function as designed.
 - Isolated areas of surface corrosion with no section loss are present on the top flange plate, at the top of the web plates, and at the bottom flange between the diaphragm and end caps. This is an old condition.
 - The west face of Diaphragm D connection to the south web plate exhibited minor section loss in the lower corner. This is not currently problematic.
 - There was no change noted to the discontinuous fillet weld observed at the stiffener east of the Girder B diaphragm, and the several ground tack welds inside the cap exhibited no change since the previous inspection.
 - There was no change observed to the 1-1/8 in. long tack weld west of the stiffener between the Girder C and D diaphragms on the north web plate.
 - The gouges caused by tack weld removal between the diaphragms and the 9 in. minor grinding scrape on Girder D exhibited no change since the previous inspection.
 - The extents of the minor gap above Girder E and the top flange of steel pier cap have not changed since the previous inspection.
 - The fillet weld porosity at Girder F did not change.
 - There was a tree growing on the south side of the east column. It was encroaching into the roadway and should be trimmed or removed to improve roadway sight distance.
- **Pier 2:**
 - The fillet welds at multiple tension zone locations intersect the fillet welds between the web plates and vertical web plate stiffeners/diaphragms. The cope near this intersection is ineffective for the intersecting welds. This is an old condition and was observed to be more common on stiffeners than on diaphragms.
 - The 1/4 in. and 1/2 in. diameter weld spots on the bottom flange of the east side Girder C diaphragm exhibited no change.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



- The reactivated corrosion along the lower flange plate was observed to be continuing with no major changes since the last inspection.
- No change was observed to the 1/2 in. long shallow gouge in the north web west of the east bearing diaphragm.
- The nuts were missing from the anchor bolts at all bearings, and the bearings appeared to function as designed. No uplift was observed at this location, and therefore this situation is not problematic.
- Multiple weld passes over single welds were observed in isolated locations throughout the pier cap between the vertical web plate stiffeners and the web plates. This is an old condition and was typically observed on the fillet welds connecting a stiffener to a web plate.
- The ground tack welds on the interior and exterior of the cap exhibited no change since the last inspection.
- Both hatches were missing several nuts and bolts. These are old conditions, and no changes were observed.
- A bolted connection of the lower lateral bracing on the north web had been retrofitted at Girder B. This is an old condition and has not changed.
- Paint cracks were present along the edges of the clip angles connecting the girders to the cap webs. These paint cracks extended over the stitch welds present along the clip angle/cap web bit and no weld cracks were observed.
- **Pier 3:**
 - The bearing anchor bolts were missing nuts.
 - The previously noted fillet welds between the Girder A diaphragm and the bottom flange tie plate and south web plate intersecting the fillet weld of the tie plate and web has not changed since the previous inspection. The intersecting fillet welds under the girder tie plates, girder webs, and the diaphragms have previously been drilled, coped in the lower corners, and painted. This is an old condition, and no changes were observed during this inspection.
 - The east access hatch cover was still missing both middle bolts, and the bolt holes were caulked over to seal the hatch. The west hatch door gasket seal was missing.
 - The top flange plate exhibited painted over pitting with no corrosion. Corrosion was developing between the top plate and the concrete deck.
 - The painted over laminating corrosion at both ends of the interior of the pier cap has reactivated.
 - The welded connection for the drainpipe support bracket on the north web plate was replaced with a bolted connection. The connection was observed to operate as intended and exhibited no corrosion or section loss.
 - The welded lateral bracing connections were removed from the pier cap web plates and replaced with bolted connections and clip angles.
 - During a previous rehabilitation, the web plates were retrofit with drilled stress relief holes connected by vertical saw cuts adjacent to the welded connections of the girder bottom flange tie plates. No change was observed, and the retrofits appear to function as designed.
 - No change was observed to the previously noted 2 in. long painted and ground tack weld on the north web plate exterior below Girder B.
 - Tack welds were typical along the bolted clip angles connecting the girder web to the pier cap. This occurred on the clip angle on only one side of the girder.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)

Hamilton County, OH • June 2023



- No change was observed to the surface corrosion on the pot bearings and along the lower edge of the masonry plate. The ponding of water on the concrete around the plate edge contributes to the corrosion.

Summary of Recommendations:

- Consider retrofits of Category E details of intersecting welds at Piers 1, 2, and 3. A simple drilled and ground retrofit at the intersection is recommended.
- Replace the detached anchor nut at the west access hatch and ensure that the hatch cover plate can be removed at Pier 2.
- Replace the missing cover plate anchor bolts and rubber gasket seal on the west access hatch at Pier 3.
- Clean and paint the areas of active laminating corrosion on the bottom flange inside the ends of the pier cap at Pier 3.
- Trim or remove the tree encroaching the roadway at Pier 1 to improve roadway sight distance.

NBI Ratings:

Item ID	Description	Condition Rating	Summary
B.C.01	Deck Condition Rating	6-Satisfactory	A few cracks and efflorescence present. Localized haunch spalls.
B.C.02	Super. Condition Rating	6-Satisfactory	A couple small, localized corrosion holes. Painted over pitting to 1/8 in.
B.C.03	Substr. Condition Rating	7-Good	A few small spalls, some minor cracks.
B.C.05	Railing Condition Rating	6-Satisfactory	Vertical cracks. Impact scrapes and gouges.
B.C.06	Rail Trans. Condition Rating	7-Good	Good, rail extends past bridge.
B.C.07	Bearings Condition Rating	6-Satisfactory	Freckling corrosion, one in contraction when it should be in expansion.
B.C.08	Joints Condition Rating	6-Satisfactory	Debris, evidence of leaking.
B.C.14	NSTM	7-Good	Corrosion reactivating, retrofits perform as designed. No major defects.

AASHTO National Bridge Element (NBE) Ratings:

Element #	Description	Units	Total	Condition State			
				1	2	3	4
152	Steel Floor Beam	LF	160	130	30	0	0

Note: Ratings were developed using the FHWA Specifications for the National Bridge Inventory and AASHTO Manual for Bridge Element Inspection, 2nd Edition.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



1.0 INTRODUCTION

1.1 Purpose and Scope

This report consists of the results of a detailed inspection of non-redundant steel tension members (fracture critical) performed at the IR-71 SB Bridge over Eden Park Drive and Reading Road (US-42) in Hamilton County, OH. Collins Engineers, Inc. (Collins) conducted the fracture critical and NBI routine inspection for the Ohio Department of Transportation (ODOT), District 8 on June 24, 2023 and August 3, 2023.

1.2 General Description of the Structure

Bridge HAM-71-0248L is a seven span bridge constructed in 1970 that carries IR-71 southbound over Eden Park Drive and Reading Road (US-42). The superstructure is comprised of welded steel plate girders. The overall bridge length is 755 ft, and the deck width is 54 ft.

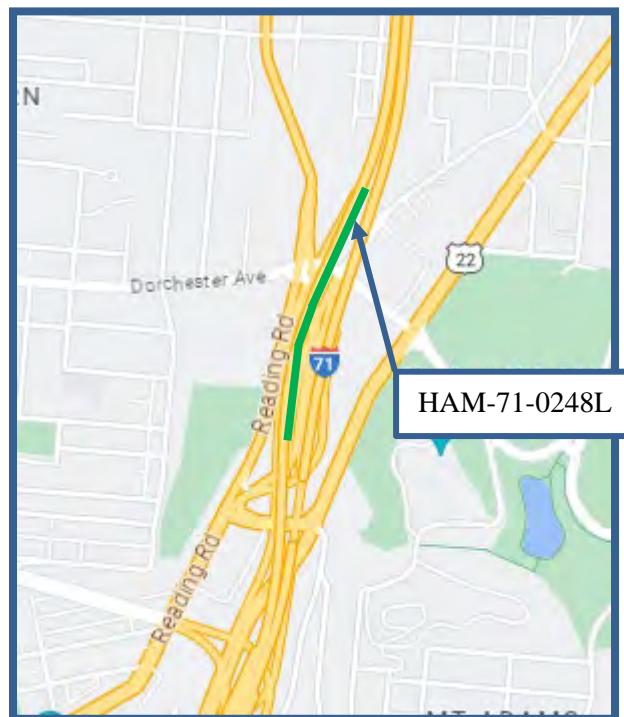


Figure 1: Bridge Location Map

Three fracture critical pier caps are supported by concrete columns at Piers 1, 2, and 3. The caps are simply supported welded box members with cantilever ends up to 10.5 ft in length. Six welded plate girders frame into the box sections. The girder webs are bolted by vertical double angles to the cap webs. At Piers 1, 2, and 3, the top flange splice plates are bolted to the top flanges of the pier caps and to the girders on each side

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



of the cap. At Piers 1 and 2, the bottom flange splice plates are bolted to the bottom flanges of the pier caps and to the girders on each side of the cap. At Pier 3, the bottom flange splice plates pass through the web plates of the pier cap and are bolted to the bottom flanges of the girders on each side of the cap. Refer to Exhibit 1 for existing pier cap plans and Exhibit 2 for the rehabilitation project plans.

A previous rehabilitation project performed the following repairs on this structure:

- Cleaning and painting portions of the interiors of all the caps
- Removal of interior diaphragm knee braces on the caps at Piers 1 and 2
- Bolted retrofit of welded drainage bracket and lateral bracing gusset connections to the web plates of all pier caps
- Grinding of intersecting fillet welds on the web stiffeners and the cap flanges at Piers 1 and 2
- Grinding of miscellaneous tack welds on the caps at Piers 1 and 2
- Drilling and saw-cutting of pressure relief holes in the web plates of the cap at Pier 3

A 2017 rehabilitation project performed the following repairs on this structure:

- Removed and replaced wearing surface with Super plasticized Dense Concrete (SDC)
- Replaced torn expansion joint seal at rear expansion joint and intermediate expansion joint
- Cleaned existing drainage system to the first manhole both on structure and below the ground
- Repaired fatigue cracks in Steel Pier Cap 3 details

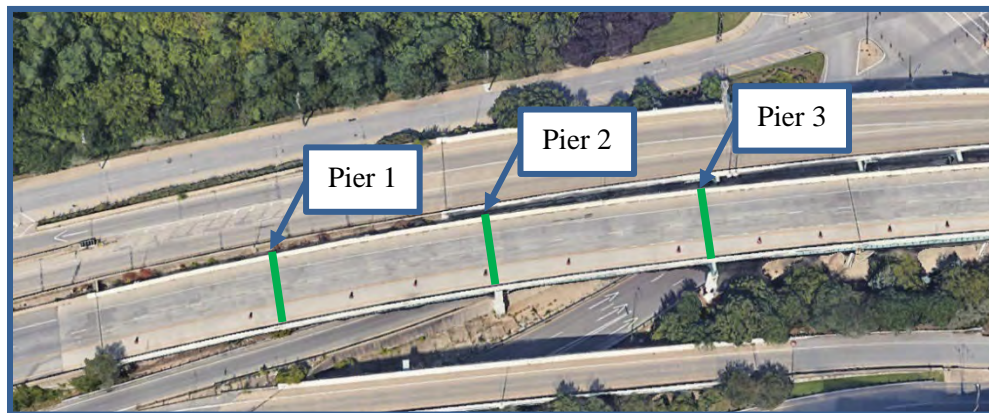


Figure 2: Fracture Critical Pier Cap Locations

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



This bridge is inventoried in a south to north direction, and superstructure units are labeled from left to right looking north. Substructure units are labeled as Rear and Forward Abutments (Abutments 1 and 2) and Piers 1 through 3. Refer to Photographs 1 and 2 below for overall views of the bridge superstructure.



Photograph 1: Bridge Elevation, Looking North.



Photograph 2: Bridge Endview, Looking North.

1.3 Method of Investigation

On June 22 to 24, and August 2 and 3, 2023, a two- to three-person team consisting of a professional engineer and NBI team leader (Michael A. Seal, P.E.) and technicians Trent Graham (Collins) and Rob Parker (Gannett Fleming), or Matthew McFadden (Gannett Fleming) performed an NBI routine and fracture critical inspection of Bridge HAM-71-0248L. A 46 ft. bucket truck was used to access the fracture critical pier cap interiors (Pier 1, Pier 2, Pier 3), perform the “arms-length” inspection of the exteriors, and to complete routine inspections for the remaining structural elements. Traffic control provided by A&A Safety was used to gain access to the box cap exteriors and consisted of single lane closures as follows:

- SB IR-71 Ramp – One shoulder of this one lane ramp was closed between the hours of 8:00 AM and 3:30 PM to inspect the caps at Piers 2 and 3.
- NB Reading Road (US-42) – Single lane closures between the hours of 8:00 AM to 3:30 PM were necessary on NB Reading Road to inspect the cap at Pier 3.
- Eden Park Drive – Single lane closures between the hours of 8:00AM to 3:30PM were necessary to inspect Pier 5.

OSHA confined space entry procedures were followed while inspectors were working inside the pier caps. Entry was performed in accordance with complete permit-required confined space entry procedures per

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)

Hamilton County, OH • June 2023



GF SOP #10 and 29 CFR 1910.146. This included the use of an entry permit system, pre-entry air monitoring, continuous air monitoring, the designation of qualified entrants, attendants, and supervisor(s), and available emergency response. OSHA compliant safety harnesses and lanyards were worn by inspectors when working in the lift bucket and when implementing bridge climbing techniques. The bolts securing the pier cap hatches were removed and reinstalled with an impact wrench and the hatches were sealed with exterior-grade caulking once the interior inspection was complete. Various socket sizes from 1/2 in. to 15/16 in. were required to remove the hatch bolts.

Field measurements were taken using tape measures, calipers, and an ultrasonic thickness gauge to verify structural component dimensions. Observed deficiencies were recorded on member-specific field inspection forms. Digital photographs were taken of the fatigue prone details and other areas of interest or concern to further document the physical condition of the pier caps.

1.4 Condition Ratings

State and federal guidelines for evaluating the condition of bridges have been developed to promote uniformity in the inspections performed by different teams at different times. Condition ratings are used to describe the existing, in-place bridge as compared to the as-built condition. The following table was used as a guide in evaluating the condition of the various members of the pier cap.

CODE	CONDITION	DESCRIPTION
N	NOT APPLICABLE	Component does not exist.
9	EXCELLENT	Isolated inherent defects.
8	VERY GOOD	Some inherent defects.
7	GOOD	Some minor defects.
6	SATISFACTORY	Widespread minor or isolated moderate defects.
5	FAIR	Some moderate defects; strength and performance of the component are not affected.
4	POOR	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
3	SERIOUS	Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



2	CRITICAL	Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open.
1	IMMINENT FAILURE	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	FAILED	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.

The inspection of this bridge was performed in accordance with the following documents:

1. Manual of Bridge Inspection, Ohio Department of Transportation (ODOT), 2014.
2. Manual for Bridge Element Inspection, AASHTO, 2019.
3. Bridge Inspector's Reference Manual, U.S. Department of Transportation, 2002 (rev 2012).
4. Inspection of Fracture Critical Bridge Members, U.S. Department of Transportation, 1986.
5. Specifications for the National Bridge Inventory, U.S. Department of Transportation, 2022.

2.0 EXISTING CONDITIONS

2.1 Pier Cap Conditions

2.1.1 *Pier Cap 1*

Pier Cap 1 was in overall GOOD condition [7]. There were isolated areas of surface corrosion on the interior surfaces of the cap that have not changed since the previous inspection. At the time of inspection, the pier cap interior was dry.



Photograph 3: General Elevation of Pier Cap 1, Looking South.



2.1.1.1 Pier Cap 1 Interior

The interior paint and pier cap was overall in GOOD condition [7]. Specific items on the interior to note include:

- The interior exhibited isolated areas of surface corrosion with no section loss on the top flange plate, along the top of the web plates, and at the bottom flange between the diaphragm and end caps (Photographs 4 and 5).
- A minor gap was observed above Girder E and the top flange of steel pier cap; this is an old comment that has not changed.
- There was no change noted to the discontinuous fillet weld observed on the web plate stiffener east of the Girder B diaphragm.
- The knee braces at the Girder C and D diaphragms had previously been removed with the fillet welds ground from the bottom flange plate. This is an old condition and has not changed (Photograph 6).
- There was no change observed to the 1-1/8 in. long tack weld west of the stiffener between the Girder C and D diaphragms on the north web plate (Photograph 7). The ground tack welds on both web plates (three are not completely removed) exhibited no change since the previous inspection.
- There were six total gouges caused by tack weld removal between the Girder D and E diaphragms with three on each web plate (Photograph 8).
- Between Girder E and F diaphragms, there was one moderate gouge and 3 minor gouges from tack weld removal along the south web, and one on the north web plate. This has not changed since the prior inspection.
- The previously noted 9 in. long minor grinding scrape on the north web plate east of Girder D exhibited no change since the last inspection (Photograph 9).
- Weld porosity was still observed in the fillet weld between the north web plate and the top flange plate just west of Girder F (Photograph 10). This was also observed between the west face of Diaphragm D and the south web plate in the lower corner (Photograph 11).
- The west face of Diaphragm D connection to the south web plate exhibited minor section loss in the lower corner of 1/16 in. max. This is not currently problematic.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



Photograph 4: Typical Example of Corrosion on Web Plates, North Web Between Diaphragms C and D Shown, Looking North.



Photograph 5: Typical Steel Pitting at End of Cap, East End Shown.



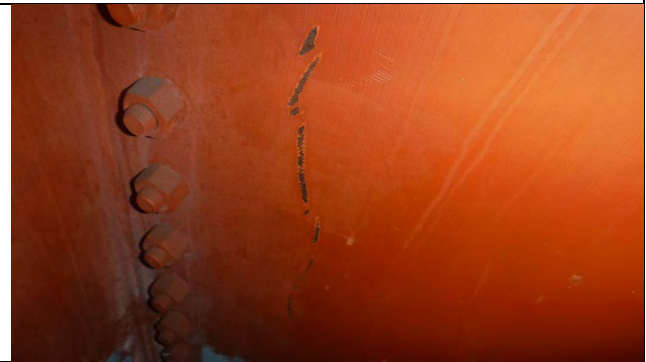
Photograph 6: View of the West Face at Diaphragm A. Typical Example of Removed Knee Braces on Diaphragms, Looking West.



Photograph 7: View of Tack Weld in the North Web Between Diaphragms C and D.



Photograph 8: Typical Gouge in the South Web Between Diaphragms D and E, Looking South.



Photograph 9: Minor Grinding Scrape East of Girder D on the North Web.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



Photograph 10: Weld Porosity Between the Top Flange and the North Web West of Girder F.



Photograph 11: Location of Weld Porosity at the West Face of Diaphragm D.

2.1.1.2 Pier Cap 1 Exterior

The exterior of the pier cap was in GOOD [7] Condition. Tack welds were removed during previous rehabilitations from the underside of the bottom flange plate and the edges of the girder fill plates.

- The welded lateral bracing connections were removed from the web plates and replaced with bolted connections. This is an old condition and has not changed since the previous inspection (Photograph 12).
- The nuts were missing from all the anchor bolts on both pot bearings (Photograph 13). This is an old condition, and the bearings continue to function as designed. Specific items on the interior to note include:



Photograph 12: Bolted connection of Web Plates to Girder A, Looking Southwest.



Photograph 13: Typical Example of Missing Nuts at Pier 1, West Bearing, Looking Northeast.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



Photograph 14 (left): View of the East End Hatch, Looking West.

2.1.1.3 Pier Cap 1 Fatigue Prone Details

Fatigue Prone Detail 1

Fillet welds between diaphragms or stiffeners and web plates.

Category: C'

Location: All girder diaphragms and web stiffeners.

Fatigue Prone Detail 3

Tack welds, less than 2 in., on web and flange

Category: C

Location:

- One tack weld on the interior of the north web plate between Girder C and D; One tack weld on interior of the north web plate between Girder D and E; One tack weld on the interior of the south web plate between Girder E and F (3 total-all previously ground, but not completely removed).
- One tack weld along each edge of the bottom flange plate and the fill plates of Girder C and D (4 total).

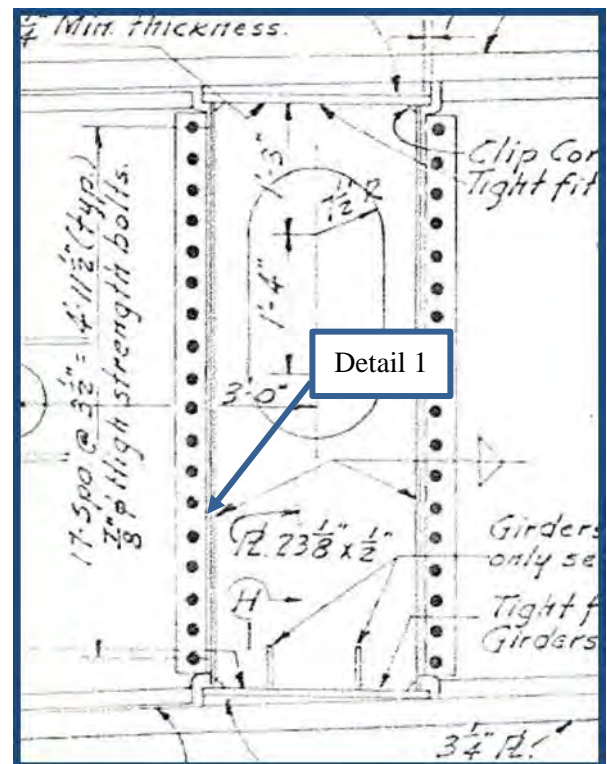


Figure 3: Section of Pier Cap 1

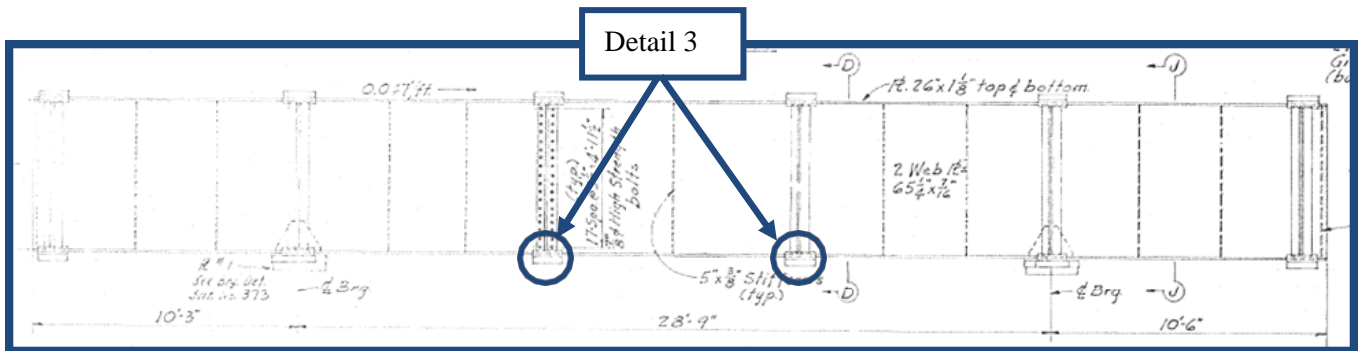


Figure 4: Elevation of Pier Cap 1

2.1.2 Pier Cap 2

Pier Cap 2 was overall in GOOD Condition [7] (Photograph 15). At the time of inspection, the pier cap interior was dry.



Photograph 15: General Elevation of Pier Cap 2, Looking North.

2.1.2.1 Pier Cap 2 Interior

The interior pier cap and paint was in GOOD Condition [7]. The lower flange plates and portions of the web plates at the end caps were painted during a previous rehab. However, the reactivated corrosion along the lower flange plate continues with no major changes since the last inspection (Photograph 16). Specific items to note include:

- Knee braces had been removed from the diaphragms at the interior girders. This is an old comment and continues to work as intended.
- In various tension zones the fillet welds between the web and flange plates intersected the fillet welds between the web plates and vertical web stiffeners/diaphragms. The cope was ineffective to accommodate intersecting welds where the flange and web plates connect with the diaphragms and web plate stiffeners. This is an old condition that has not changed for this inspection; this is more common on the web plate stiffeners than on the diaphragms. (Photograph 17).

NBI FRACTURE CRITICAL INSPECTION

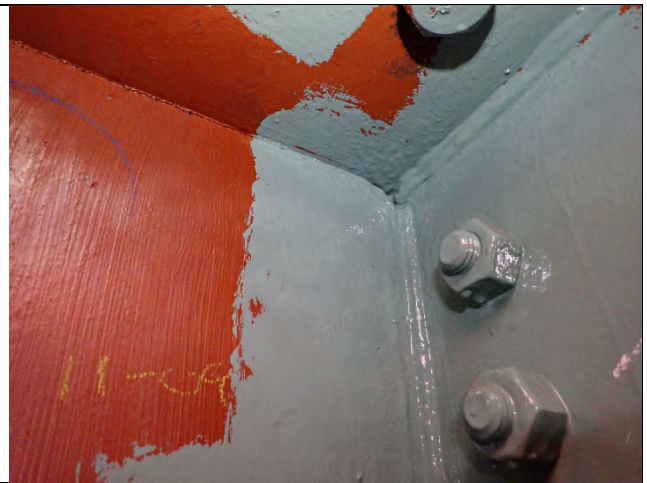
IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



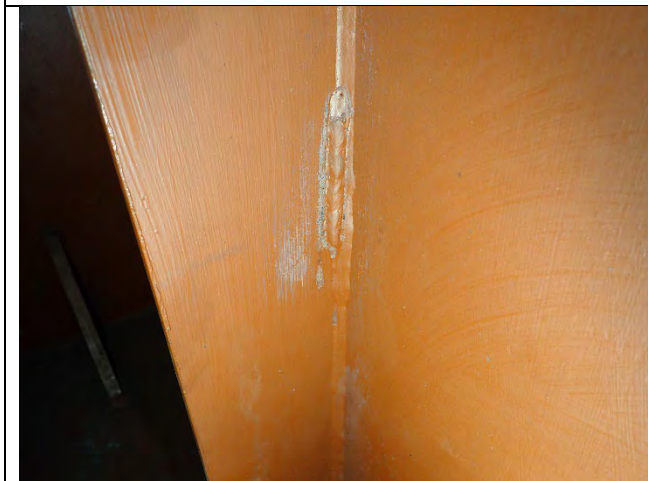
- Multiple weld passes are present at isolated locations throughout the pier cap between the vertical web plate stiffeners and the web (Photograph 18). These usually occur on the fillet welds connecting a stiffener to a web plate.
- No changes were observed at the 1/4 in. and a 1/2 in. diameter weld spots observed on the bottom flange of the east side Girder C diaphragm.
- The two ground (but not completely removed) tack welds up to 3/4 in. long on the north web plate between the west bearing and the Girder B diaphragm exhibited no change since the last inspection.
- The previously noted 1/2 in. long shallow gouge in the north web plate west of the east bearing diaphragm has not changed since the last inspection (Photograph 19).



Photograph 16: Example of Corrosion Reactivating on the Bottom Flange Plate, West End Shown.



Photograph 17: Typical Example of Tight Cope at Intersecting Welds for Web Plates, Flange Plates, and Diaphragms, Looking East.



Photograph 18: Typical Example of Additional Fillet Weld Pass. No Change from Prior Inspection.



Photograph 19: Gouge at the North Web West of the East Bearing Stiffener, Looking North.



2.1.2.2 Pier Cap 2 Exterior

The exterior of the pier cap was in GOOD Condition [7]. No change was observed to the tack welds previously removed during rehabilitation from the underside of the pier cap bottom flange plate and the edges of the girder fill plates. The exterior paint is in Good Condition [7]. There is typical cracking in the paint along the lower portions of the web stiffener and the bottom flange. Paint cracks were present along the edges of the clip angles connecting the girders to the cap webs. These paint cracks extended over the stitch welds present along the clip angle/cap web and are not weld cracks. Specific items on the exterior to note include:

- The west access hatch was missing the south middle bolt and the north lower bolt. The nuts were only present on the north middle, south top, and south bottom bolts. The anchor nut for one of the bolts that secure the cover plate on the west access hatch was detached from the end plate, and the east access hatch was missing two out of six bolts. These are old conditions, and no changes were observed.
- No change was observed to the stitch welds between the girder web and the clip angles on one side of the girders (Photograph 20)
- Tack welds remained along the edges of the pier cap bottom flange and the girder fill plates; no cracks were noted for this inspection.
- Two tack welds were present on the west face of Girder B and the north web plate between the bottom of the clip angle and the girder web. These welds were previously ground but not all weld material was removed, allowing a localized stress riser. No cracks were observed during this inspection (Photograph 21).
- A bolted connection of the lower lateral bracing on the north web had been retrofitted at Girder B. This is an old condition and has not changed.
- The nuts were missing from the anchor bolts at all bearings. This is an old condition, and the bearings function as designed (Photograph 22).



Photograph 20: View of Typical Stitch Welds on Girder to Cap Web Clip Angles., Looking South.



Photograph 21: Two Tack Welds Present Along the Base of the Clip Angle Between the Clip Angle and Girder, Looking West.



Photograph 22 (left): View of the Typical Missing Nut at the Bearing.

2.1.2.3 Pier Cap 2 Fatigue Prone Details

Fatigue Prone Detail 1

Fillet welds between diaphragms or stiffeners and web or flange plates.

Category: C'

Location: All girder diaphragms and web stiffeners.

Fatigue Prone Detail 3

Tack welds, less than 2 in., on web and flange

Category: C

Location:

- Two tack welds on the interior of the north web plate between the west bearing and Girder B (previously ground, but not completely removed).
- Two tack welds along each edge of the bottom flange plate and the fill plates of the interior girders (16 total).
- Two weld spots on the bottom flange on the east side of Girder C

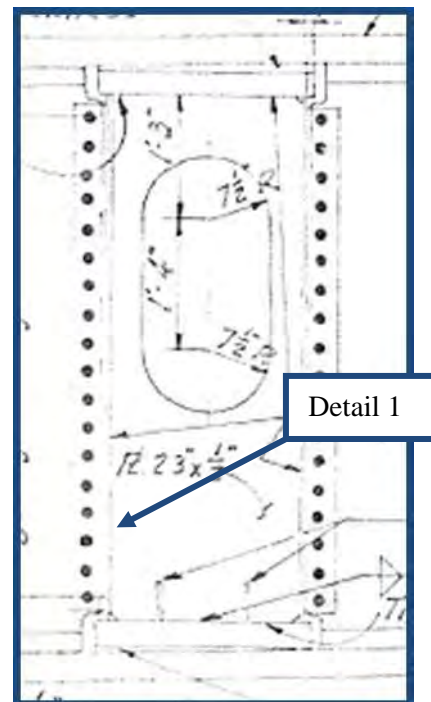


Figure 5: Section of Pier Cap 2

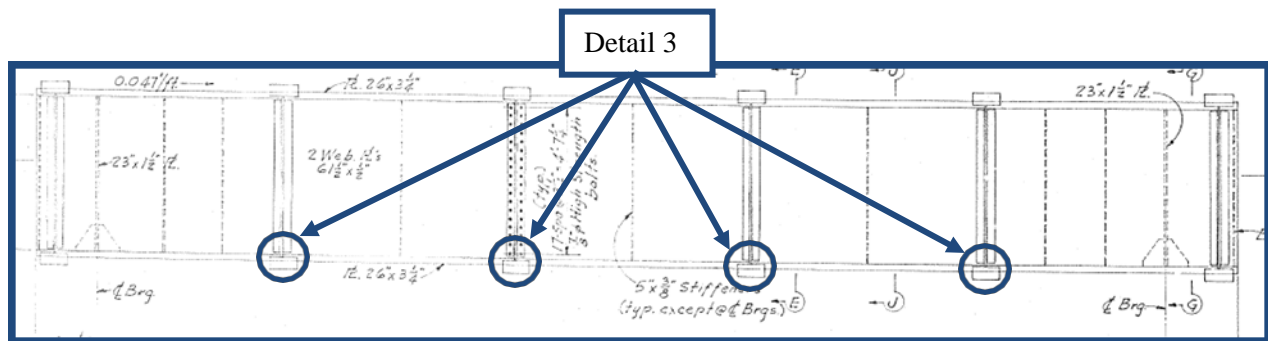


Figure 6: Elevation of Pier Cap 2

2.1.3 Pier Cap 3

Pier Cap 3 was overall in GOOD condition [7] with isolated areas of laminating corrosion and intersecting welds. At the time of inspection, the interior of the cap was dry.



Photograph 23: General Elevation of Pier Cap 3, Looking North.

2.1.3.1 Pier Cap 3 Interior

The interior of the cap was observed to be in GOOD [7] condition. The painted over laminating corrosion at both ends of the interior of the pier cap on the bottom flange adjacent the access hatches was observed to be reactivated (Photograph 24). The previously noted intersecting fillet welds between the Girder A diaphragm, the bottom flange tie plate, and the south web plate has not changed since the previous inspection. Intersecting fillet welds under the girder tie plates, girder webs, and the diaphragms have previously been drilled in the lower corners to allow a cope, and were painted (Photograph 25). This is an old condition, and no changes were observed during this inspection.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



Photograph 24: Laminating Corrosion at the Ends of the Interior of the Pier Cap Has Reactivated.



Photograph 25: Typical View of the Coped and Painted Drilled Hole Retrofits at Lower Corners of Diaphragms and Bottom Flange Plate.

2.1.3.2 Pier Cap 3 Exterior

The exterior of the pier cap and paint were in Good [7] Condition. The welded lateral bracing connections were removed from the pier cap web plates and replaced with bolted connections and clip angles. This introduces a local loading eccentricity, but no crack or deficiencies were observed. The welded connection for the drainpipe support bracket on the north web was replaced with a bolted connection. The connection was observed to operate as intended and exhibited no corrosion or section loss. The specific items on the exterior include:

- The east access hatch cover was still missing both middle bolts, and the bolt holes were caulked over to seal the hatch. The west hatch door gasket seal was still missing.
- The web plates were retrofit during a previous rehabilitation with drilled stress relief holes connected by vertical saw cuts adjacent to the welded connections of the girder bottom flange tie plates. No change was observed during this inspection, and the retrofits appear to function as designed (Photograph 26).
- The top flange plate exhibited painted over pitting up to 1/16 in. deep. Corrosion was developing between the top plate and the concrete deck.
- No change was observed to the previously noted 2 in. long ground tack weld on the north web below Girder B (Photograph 27).
- Tack welds were typical along clip angles bolted to the girder web to the pier cap. This occurred on the clip angle on only one side of the girder (Photograph 28). No cracks were noted and this has not changed since the prior inspection.

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



- The bearing anchor bolts were missing nuts.
- No change was observed to the isolated surface corrosion on the pot bearings and along the lower edge of the masonry plate. Water ponds on the concrete around the plate edge contributes to the corrosion (Photograph 29).



Photograph 26: View of the Typical Drilled Hole Retrofit, North Web Face at Girder B Shown, Looking South.



Photograph 27: View of the Ground Off and Painted Tack Weld at the North Web Plate Under Girder B, Looking South.



Photograph 28: View of the Typical Tack/Stitch Welds Along the Girder Clip Angle Connection, Looking Southeast.



Photograph 29: View of the Typical Bearing Conditions, Looking West.

2.1.3.3 Pier Cap 3 Fatigue Prone Details

Fatigue Prone Detail 1

Fillet welds between diaphragms or stiffeners and web plates.

Category: C'

Location: All girder diaphragms and web stiffeners.

Fatigue Prone Detail 2

Full Penetration groove weld of flange splice.

Category: B

Location: Two bottom flange splices.

Fatigue Prone Detail 4

Tack welds, greater than or equal to 2 in. and less than or equal to 4 in.,
on the flange plates.

Category: D

Location: One tack weld on the exterior of the north web plate below
Girder B.

Fatigue Prone Detail 8

Intersection of fillet welds.

Category: E

Location:

- Fillet welds of the web plates and the Girder A and C bottom flange tie plates, intersecting the fillet welds between the girder diaphragms and the tie plates and web plates.

Fatigue Prone Detail 9

Drilled hole stress relief retrofit in web plates.

Category: B

Location: Both web plates on each side of all interior girder connections

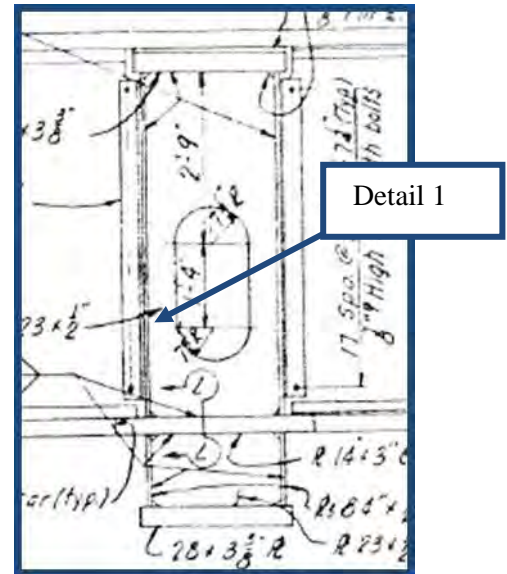


Figure 7: Section of Pier
Cap 3

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023

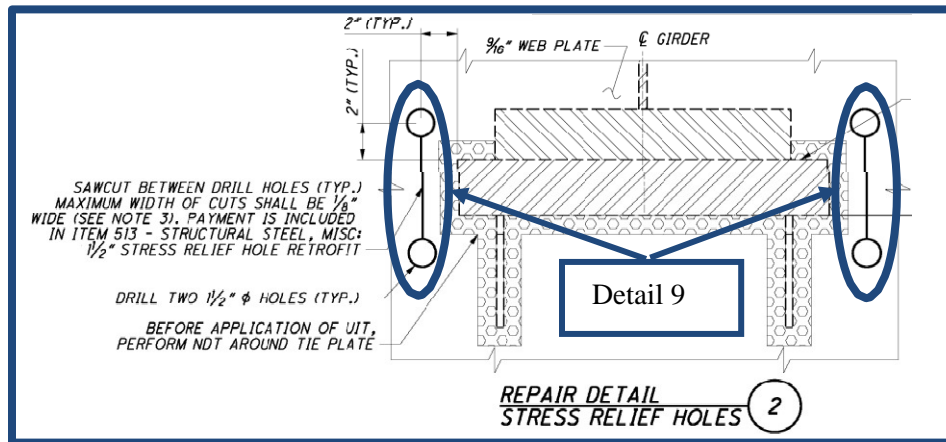


Figure 8: Web Plate Retrofit on Pier Cap 3

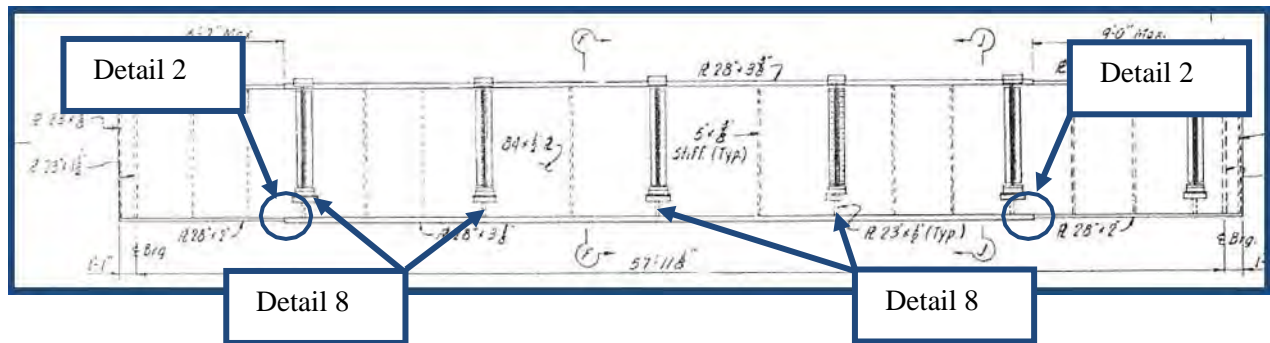


Figure 9: Elevation of Pier Cap 3



3.0 EVALUATION AND RECOMMENDATIONS

Based on this inspection, the pier caps for the piers were rated GOOD. The overall rating for the NSTM (B.C.14) has not changed from GOOD (7). Previously noted locations of tack welds, weld remnants, gouges, and similar items were still present; these have not changed since the prior inspection. Anchor bolts were still missing anchor nuts, but this is currently not problematic since no uplift was observed. Corrosion has reactivated on the interior of the caps, mostly on the bottom flange plates at the ends of the cap. Overall, locations of painted over pitting has not changed since the prior inspection.

Collins appreciates the opportunity to work with the Ohio Department of Transportation on this project and looks forward to working together in the future. We would be happy to discuss any aspect of the report with you in person or via phone or email.

Respectfully Submitted,
COLLINS ENGINEERS, INC.

A handwritten signature in blue ink that reads "Michael Seal".

Michael Seal, P.E.
Project Manager

A handwritten signature in black ink that reads "Olivia Farmer".

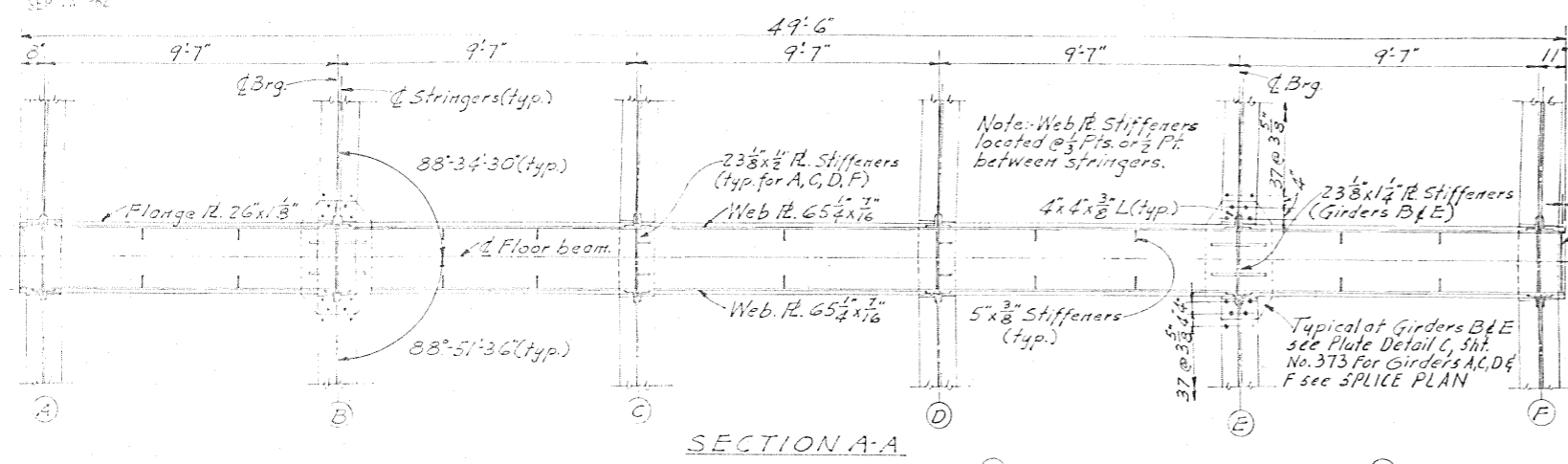
Originated by:
Olivia Farmer, E.I.T.

NBI FRACTURE CRITICAL INSPECTION

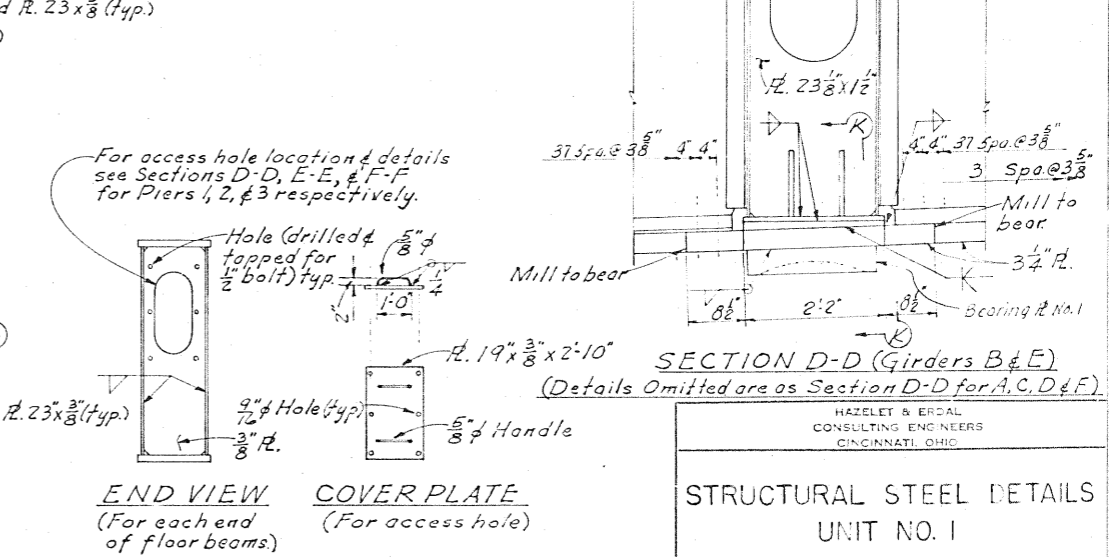
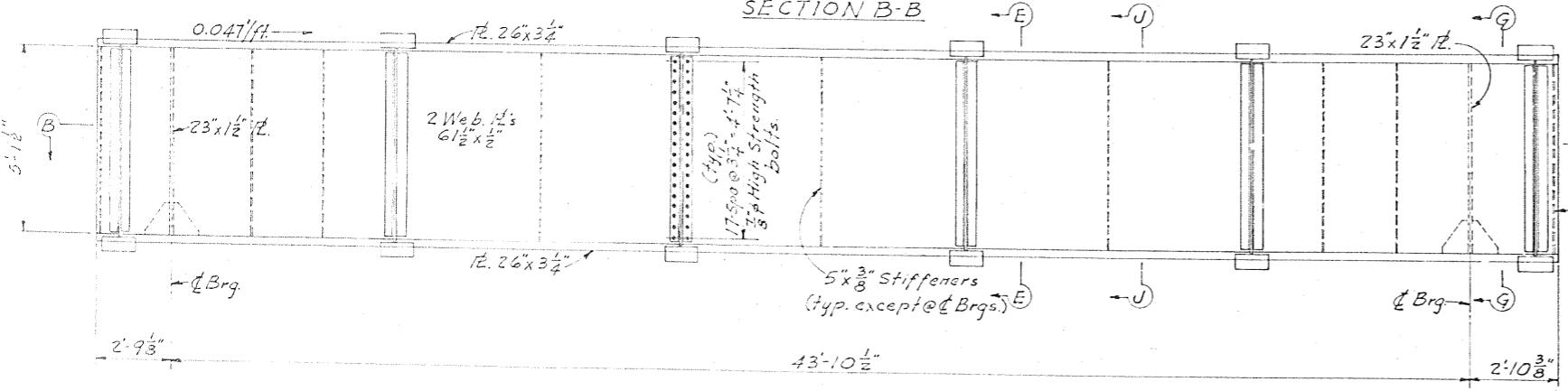
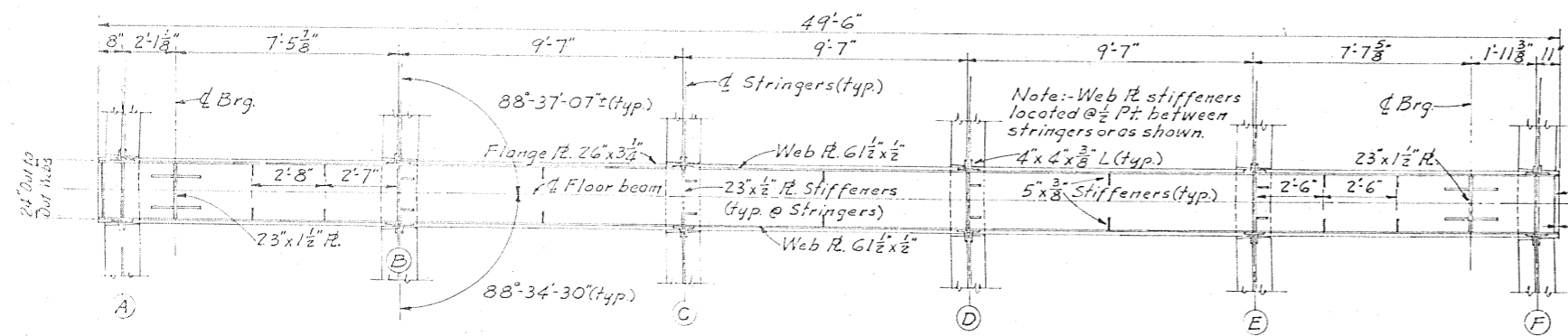
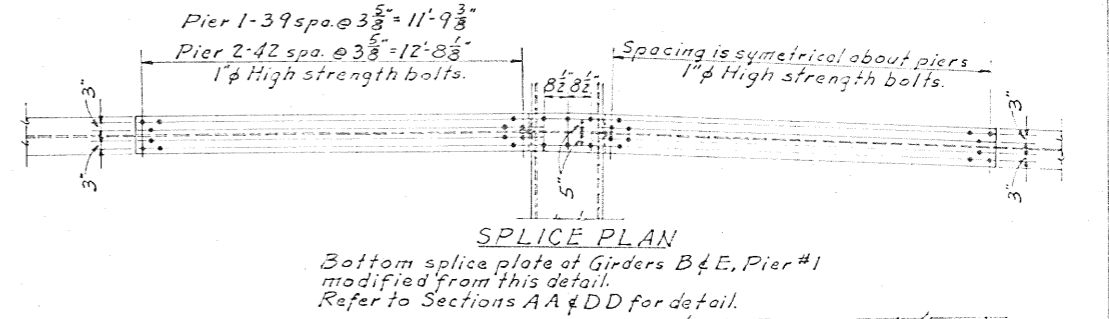
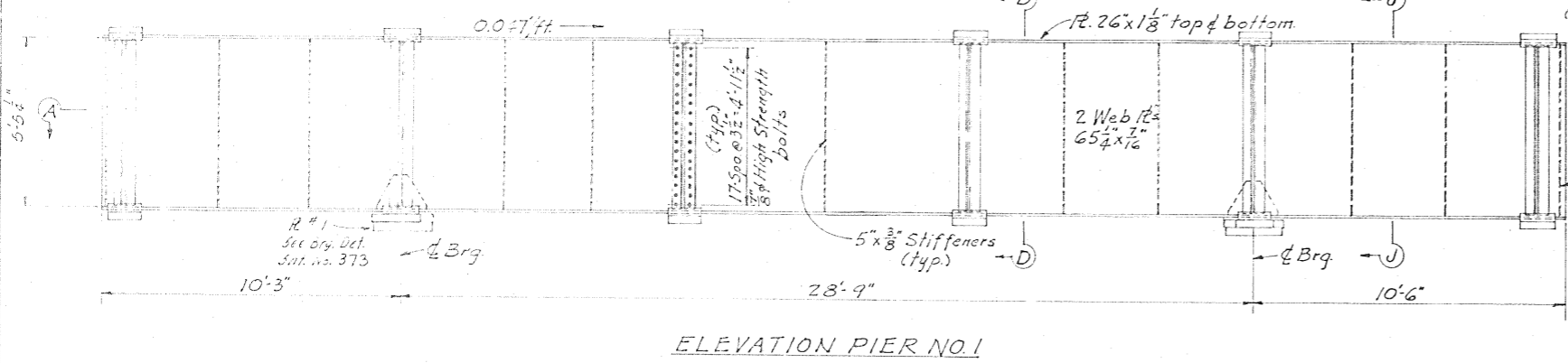
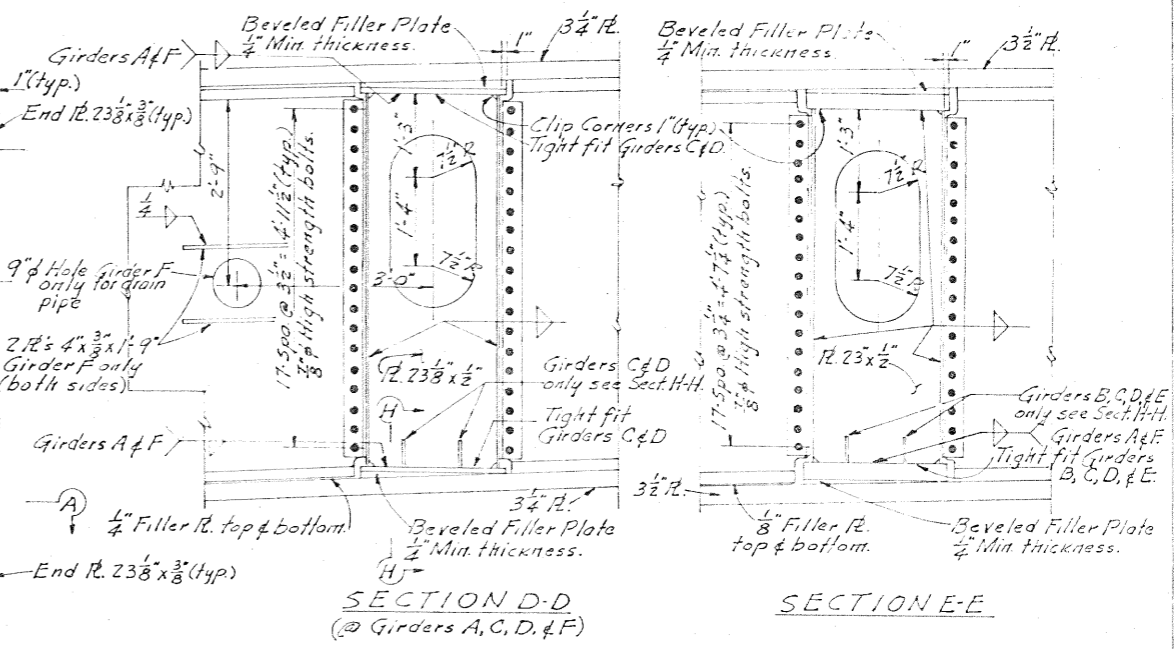
IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



EXHIBIT 1 – EXISTING PLANS



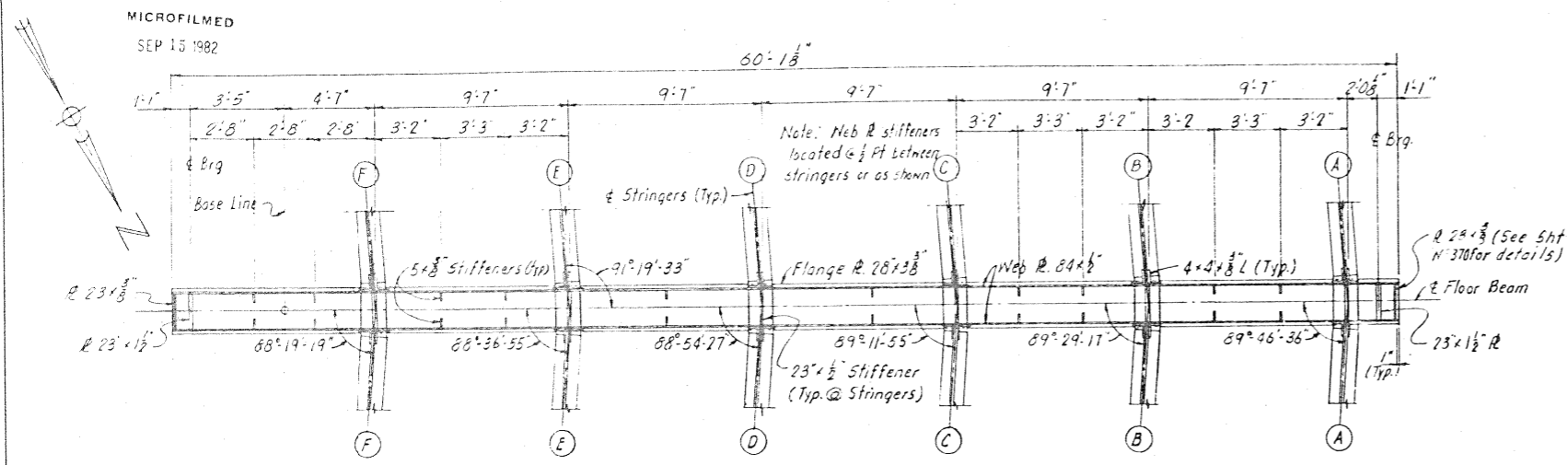
TYPICAL STIFFENER LOCATION-ALL STRINGERS



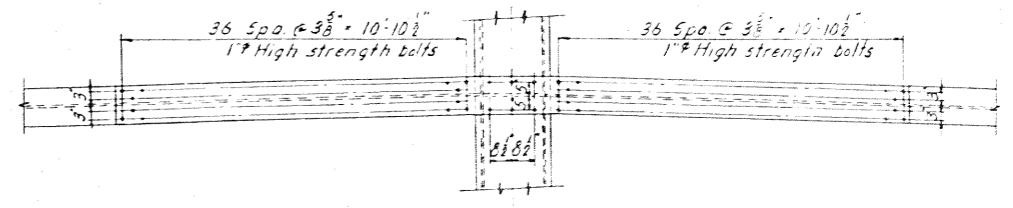
STRUCTURAL STEEL DETAILS					
UNIT NO. 1					
BRIDGE No. HAM-71-0226					
H&E BRIDGE No. 17					
DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED DATE	REV. NO.
CRK	RBS	LMH	ELW	JHO	

SFN 3106780

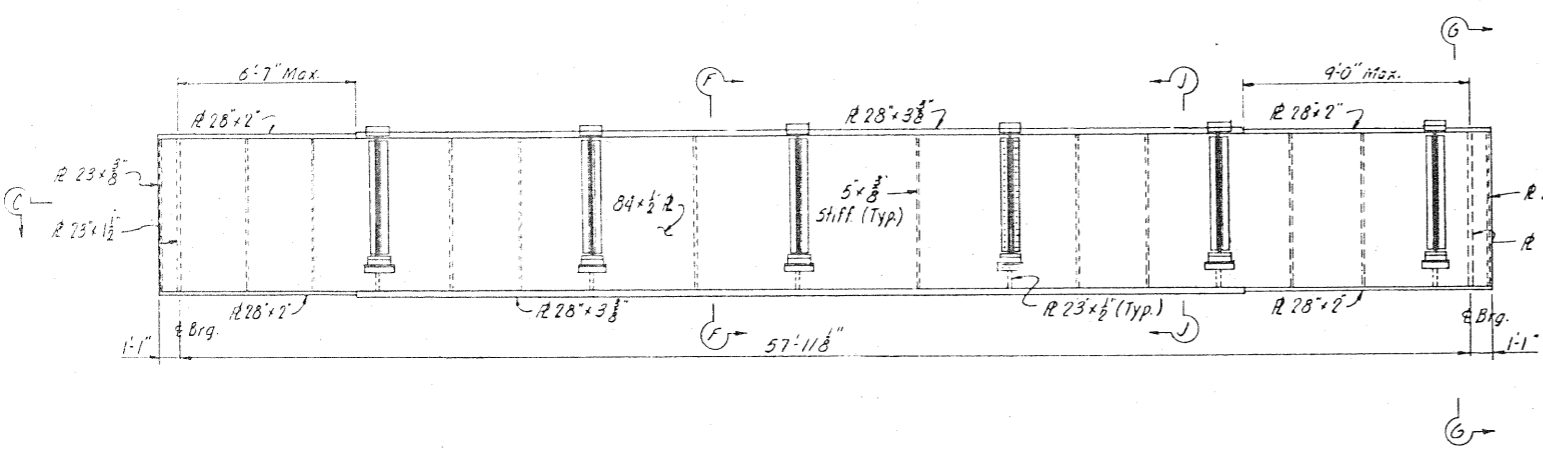
For Sections G-G, H-H, J-J, & K-K. See Sheet No. 371
For Fillet Weld Sizes See "Table of Fillet Weld Sizes," Sheet No. 427



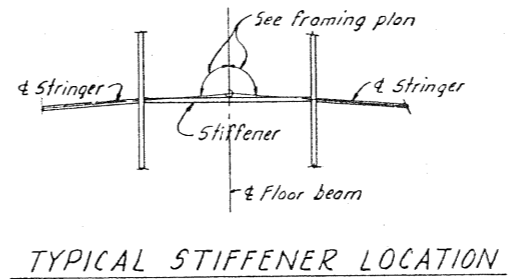
SECTION C-C-PIER N° 3



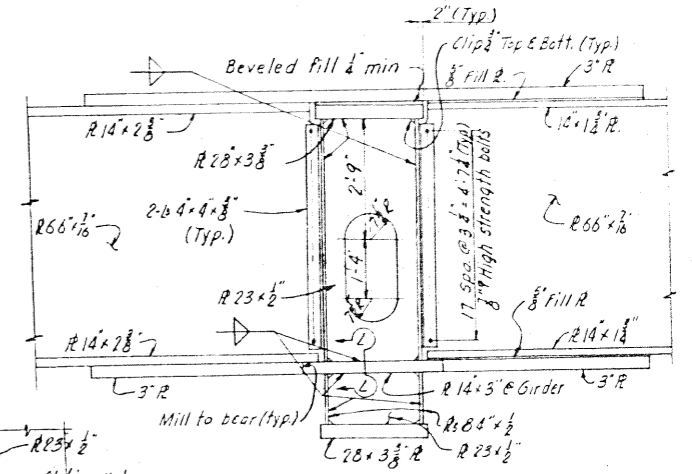
TOP SPLICE PLAN-PIER-3



ELEVATION

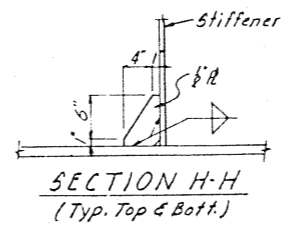


TYPICAL STIFFENER LOCATION

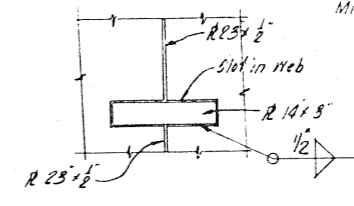


SECTION F-F

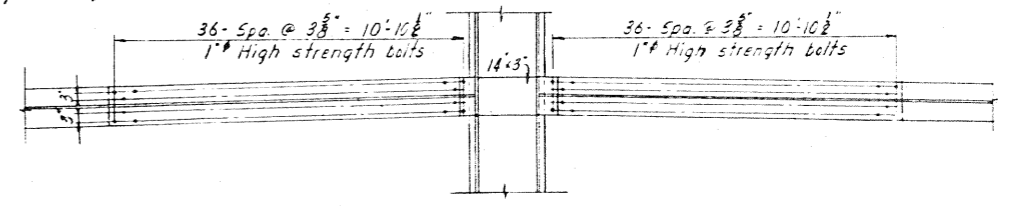
Note: Milled ends of compression splice on bottom flanges of girders shall be brought to full bearing against milled ends of pier girder brackets before bolts are tightened



SECTION H-H (Typ. Top & Bott.)



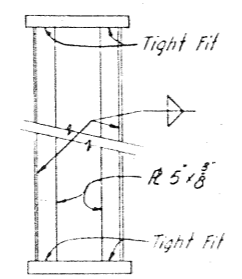
SECTION L-L



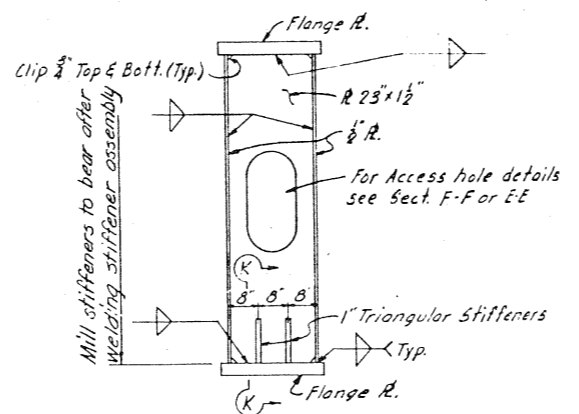
BOTTOM SPLICE PLAN-PIER 3

notes:
Convexity includes variations due to vertical curvature, superelevation and horizontal curvature.
Girder web plates shall be cut to a parabolic crown.
Pier N° 1 has no meaningful deflections.

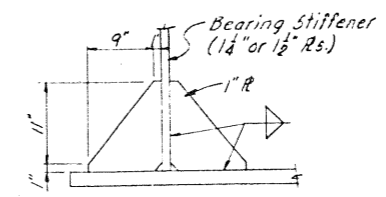
DEFLECTION and CAMBER for UNIT N° 1												
Beam	Span 1		Span 2		Span 3		Span 4		Pier 2		Pier 3	
	1/4	1/2	1/4	1/2	1/4	1/2	1/4	1/2	B	C	D	E
Deflection due to weight of steel	1/2	1/6	1/2	1/6	1/2	1/6	1/2	1/6	1/2	1/6	1/2	1/6
Deflection due to remaining dead load	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6
Convexity required for vertical curve	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/6
Sum of deflections & convexity	2/6	2/6	2/6	2/6	2/6	2/6	2/6	2/6	2/6	2/6	2/6	2/6
Required Camber	2/6	3/6	2/6	3/6	2/6	3/6	2/6	3/6	-	-	-	-



SECTION J-J (Typ. all intermediate stiffeners)



SECTION G-G (Showing Bearing Stiffener)



SECTION K-K

For end view of floor beam see Sht. N° 370
For fillet weld sizes see TABLE OF FILLET WELD SIZE Sht. N° 427

HAZELET & ERDAL
CONSULTING ENGINEERS
CINCINNATI, OHIO

STRUCTURAL STEEL DETAILS
UNIT NO. 1
BRIDGE No. HAM-71-0226
H&E BRIDGE No. 17

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED DATE	REVISED
CRK	RL MIF		ELW	JH 6 8/11/65	

SFN 3106780

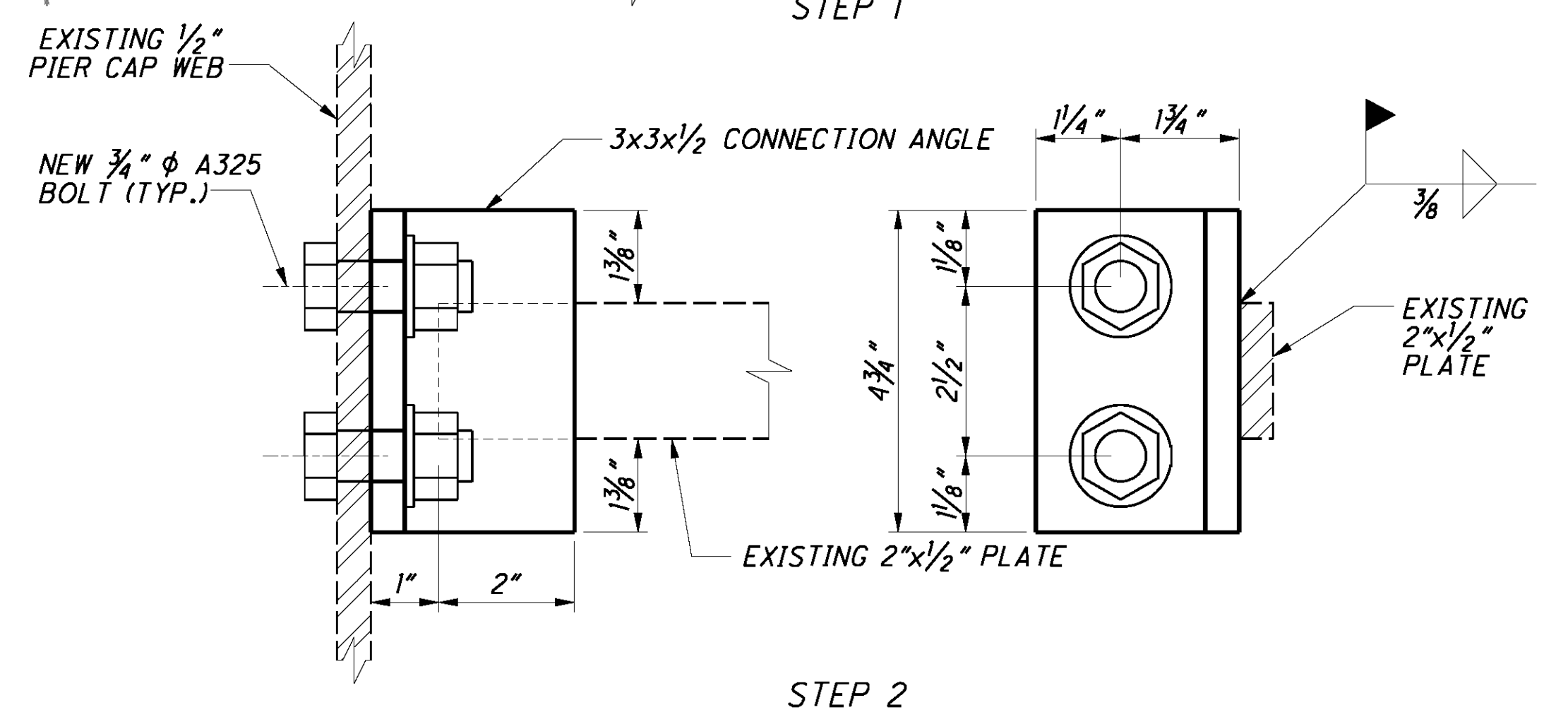
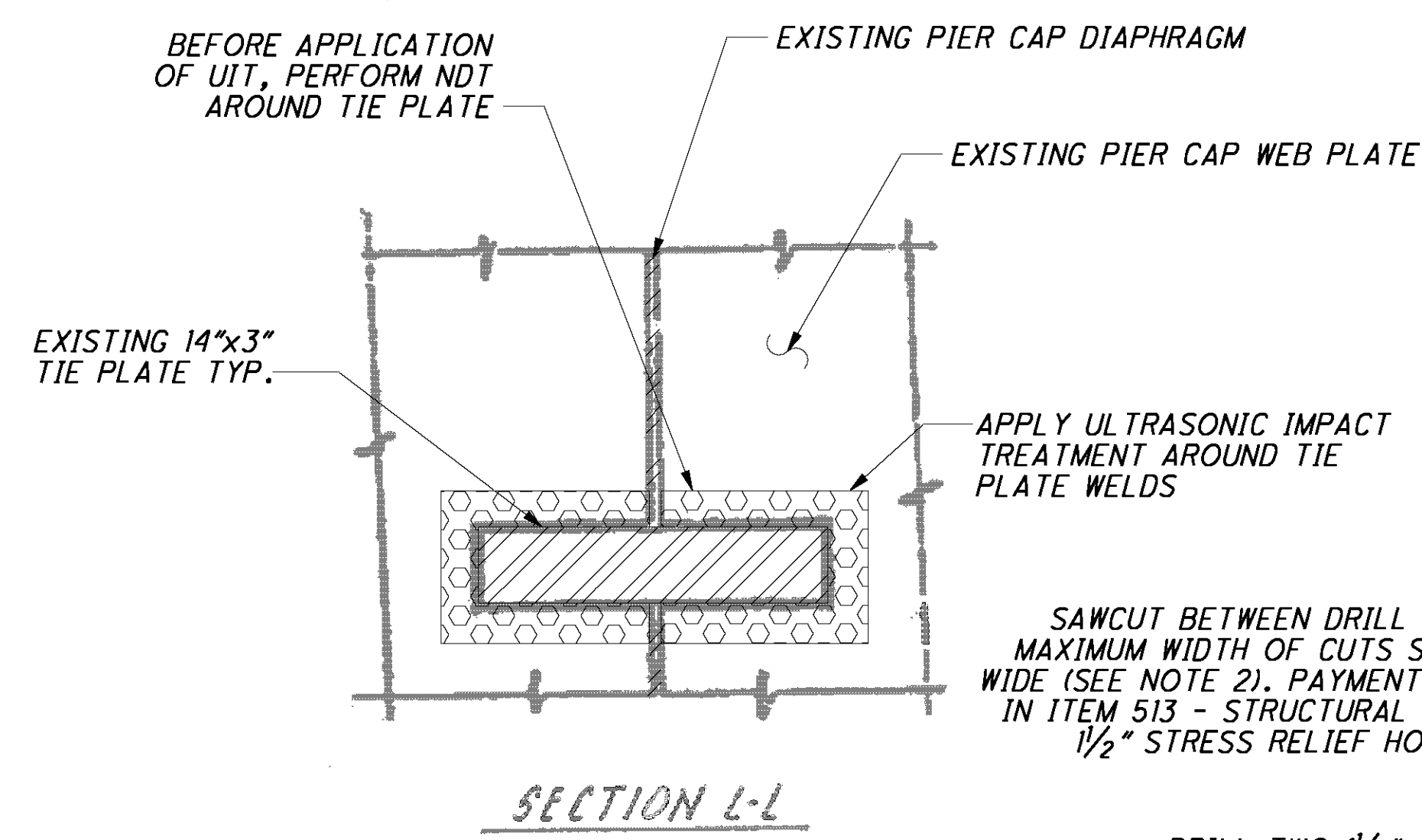
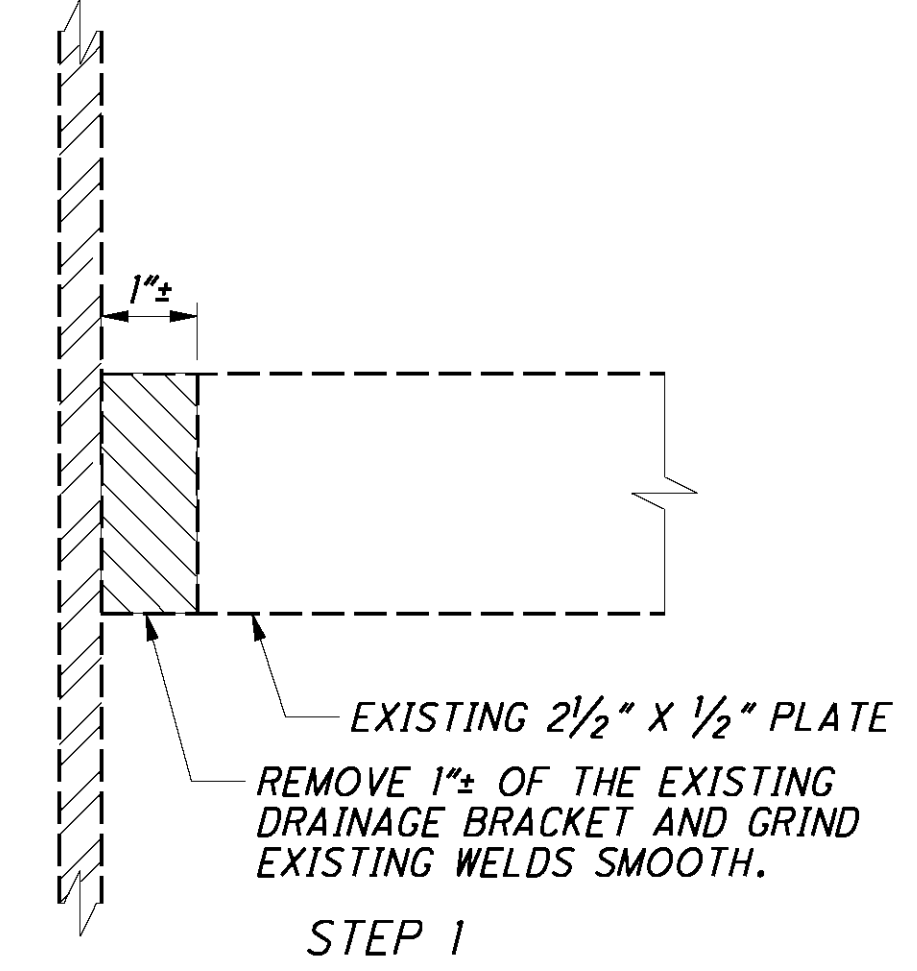
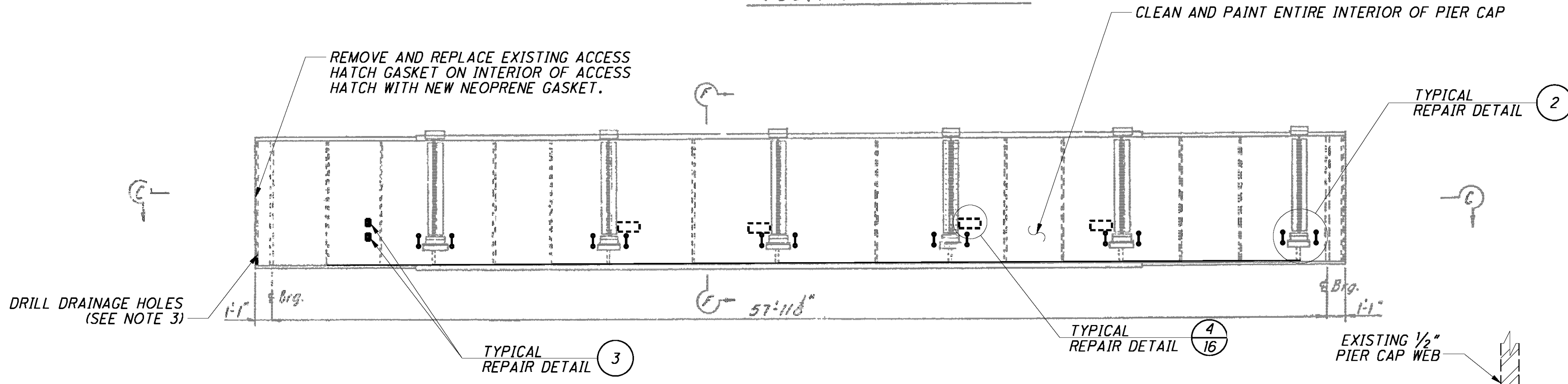
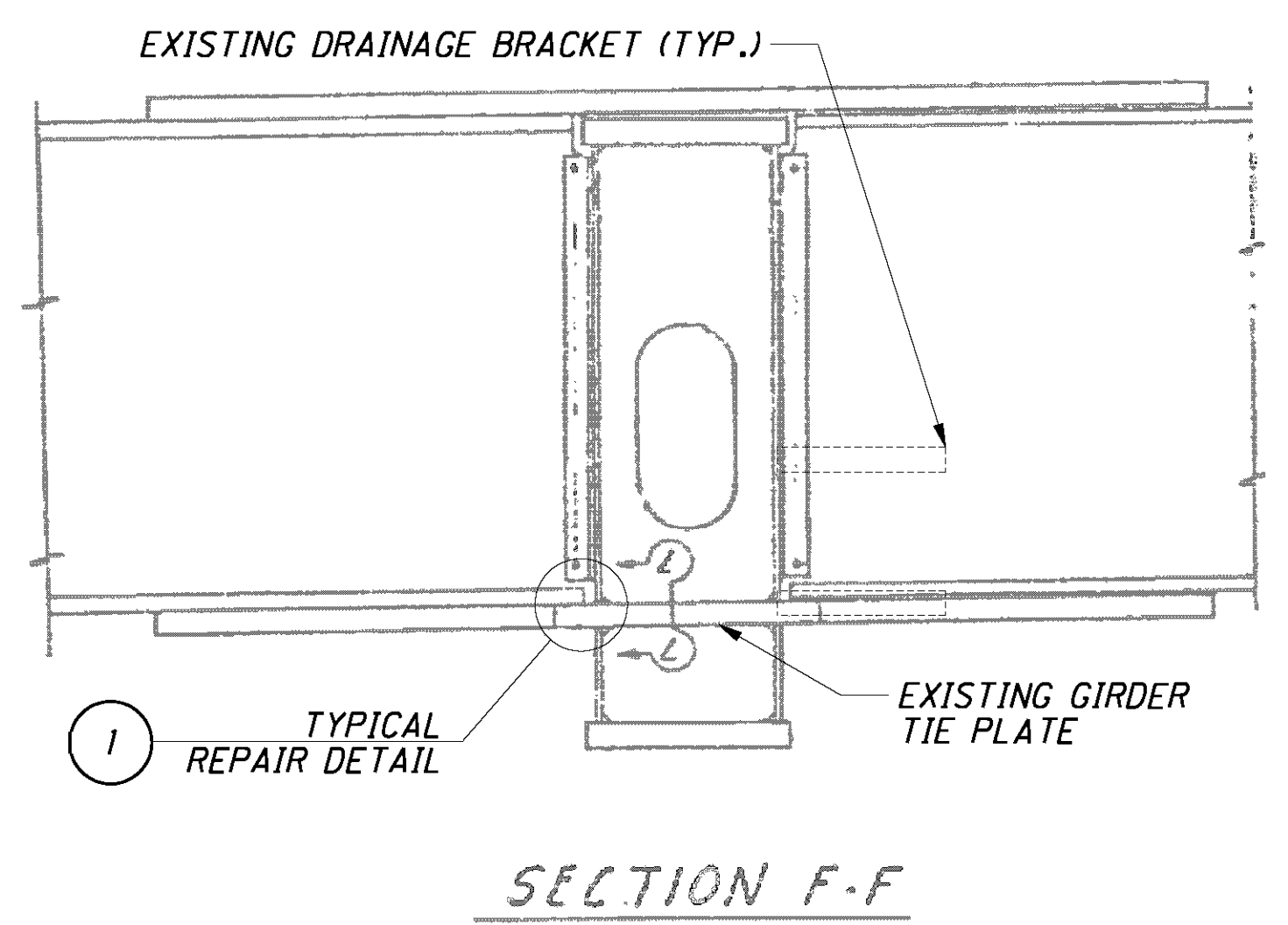
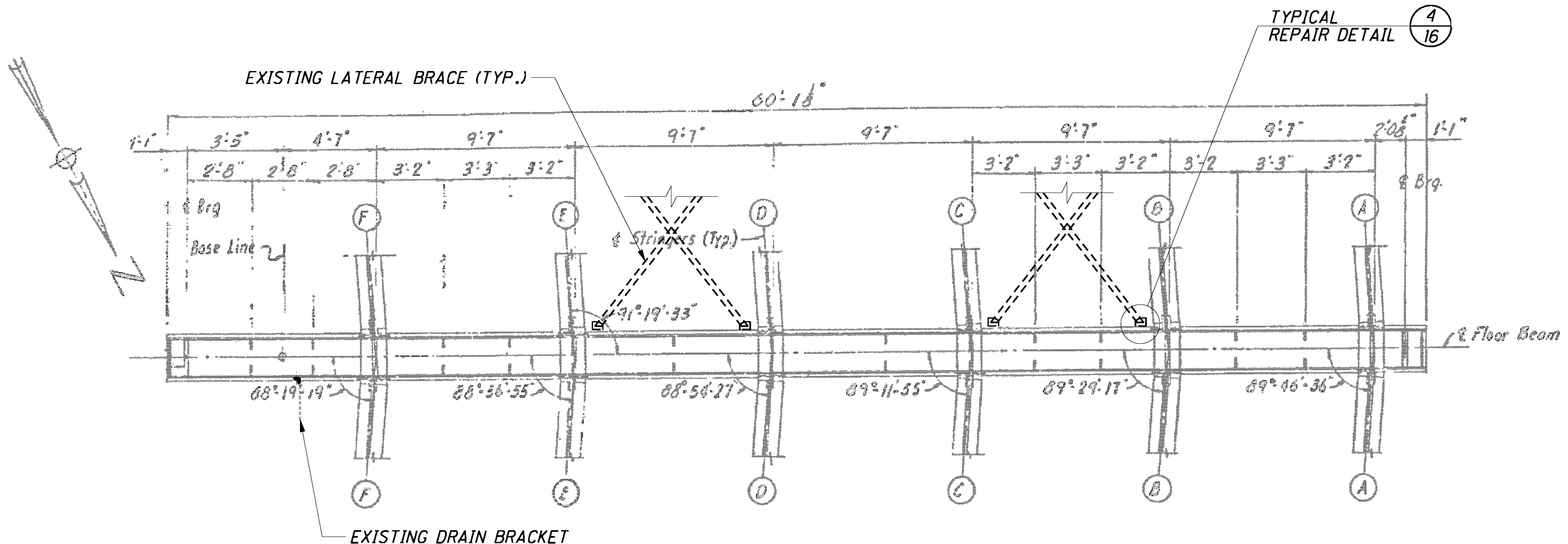
NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



EXHIBIT 2 – REHABILITATION PLANS

4/17/2008
 P:\2426.03-ODOT 8 Pier Cap\2007 PID25374 DRAWINGS\(#5) HAM-71-0248L\HAM-71-0248L_P3.dwg



REPAIR DETAIL 1
 INTERIOR TIE PLATE TREATMENT

REPAIR DETAIL 2
 STRESS RELIEF HOLES

REPAIR DETAIL 3
 DRAIN BRACKET RETROFIT

- LIMITS OF 1/2" WIDE ULTRASONIC IMPACT TREATMENT (UIT)

(FOR GIRDERS A THROUGH F AT NORTH AND SOUTH WEB PLATES)

- NOTES:**
1. PIER ELEVATION AND SECTIONS C-C, F-F, AND L-L ARE TAKEN FROM THE ORIGINAL PLANS.
 2. CARE SHALL BE TAKEN NOT TO OVERCUT SAWCUT BEYOND DRILLED HOLES. FLAME CUTTING IS NOT PERMITTED.
 3. DRILL TWO 1/2" φ HOLES THROUGH THE EAST END PLATE. THE BOTTOM OF THE HOLES SHALL BE FLUSH WITH THE PIER CAP BOTTOM FLANGE. HOLES SHALL NOT PENETRATE OR GOUGE PIER CAP WEB PLATES OR FLANGE PLATE.

DESIGNED	NBR	CHECKED	BKC
DRAWN	NBR	REVISED	
REVIEWED	WRW	STRUCTURE FILE NUMBER	3106780
DATE	12-04-07		

DESIGN AGENCY: **Trail Systems**
 65 PUBLIC SQUARE, SUITE 1800
 CLEVELAND, OHIO 44113

PIER 3 CAP RETROFIT DETAILS
 BRIDGE NO. HAM-71-0248L
 SOUTHBOUND I-71 OVER US 42 AND EDEN PARK DRIVE

HAM-BH-VAR
 PID No. 25374

32
38

RFI – 005 --- Box Girder Pier Cap Issues – HAM-71-0248R, etc.

To: ODOT District 8
From: HAM-71-1.97 Design Team
RE: Notes concerning Field Visit on 7/27/17
Date: July 28, 2017

On Thursday, July 27th members of the consultant design staff met with District and Contractor personnel on the project site to discuss clarification of plan details for work being done to steel pier caps on bridges HAM-71-0248R, HAM-71-0248L, and HAM-71-0264R. Notes from the meeting follow. This memo, once reviewed and confirmed by all parties, will help guide the remaining work.

HAM-71-0248R

PIER CAPS 9, 10, and 12:

1. ITEM 513 – MISC. 2” STRESS RELIEF HOLE RETROFITS – some locations cannot be completed using a mag drill due to lack of clearance. Any specified holes in these three caps that cannot be accessed using a mag drill will be completed using a torch with the resulting holes ground smooth. Any specified hole locations that are inaccessible by torch will receive UIT. Any hole locations that are also inaccessible to UIT will be non-performed.
2. All weld material and remnants of knee braces removed in previous rehabilitations will be removed completely as specified in ITEM 513 – STRUCTURAL STEEL MISC: GRINDING PER FOOT, AS PER PLAN. However, the plan note should be revised to include removal of remains of knee braces and welds on the (vertical) web plate. ONLY knee braces removed previously are subject to this item. Any existing, intact knee braces are not included.
3. The Fillet Weld Crack Retrofit specified to repair two cracks in Pier Cap 9 will be non-performed as it was determined that these were not cracks in the weld.

PIER CAP 11:

1. All work on this cap has been completed according to the plans except for UIT.

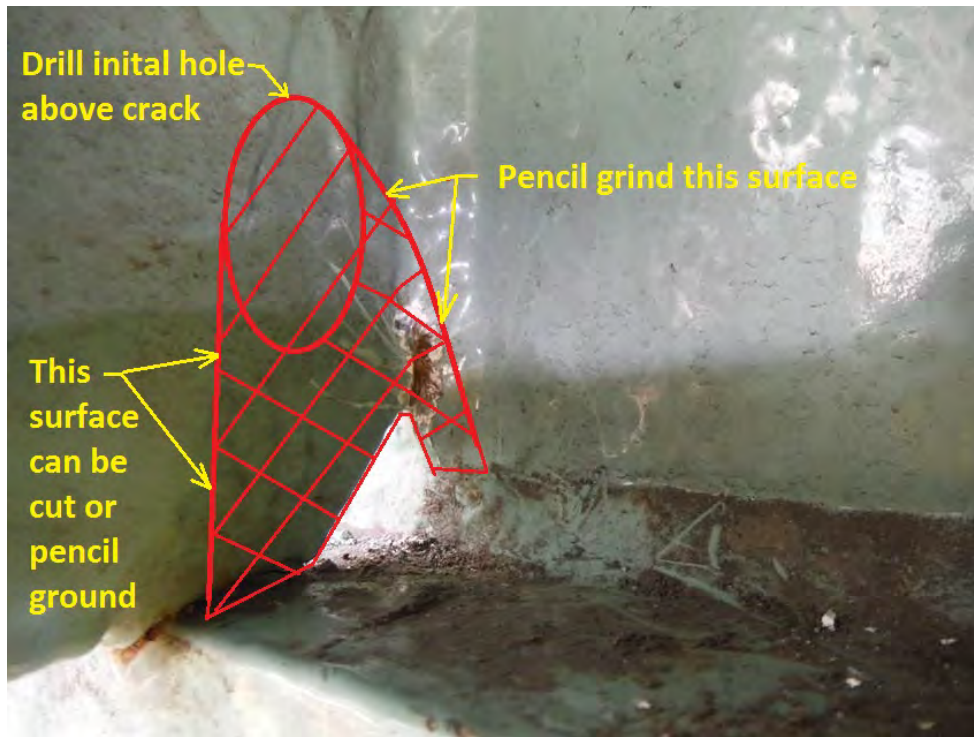
HAM-71-0248L

NO concerns or issues with the work being done on this bridge.

HAM-71-0264R

PIER CAPS 2, 3, AND 4

1. ITEM 513 – MISC. 2" STRESS RELIEF HOLE RETROFITS will be non-performed at all three caps since the plates that would be drilled are discontinuous and only welded on the vertical leg.
2. The location of the cracked fillet weld in Pier Cap 2 is shown correctly on sheet 275. A more desirable method of repair is depicted below:

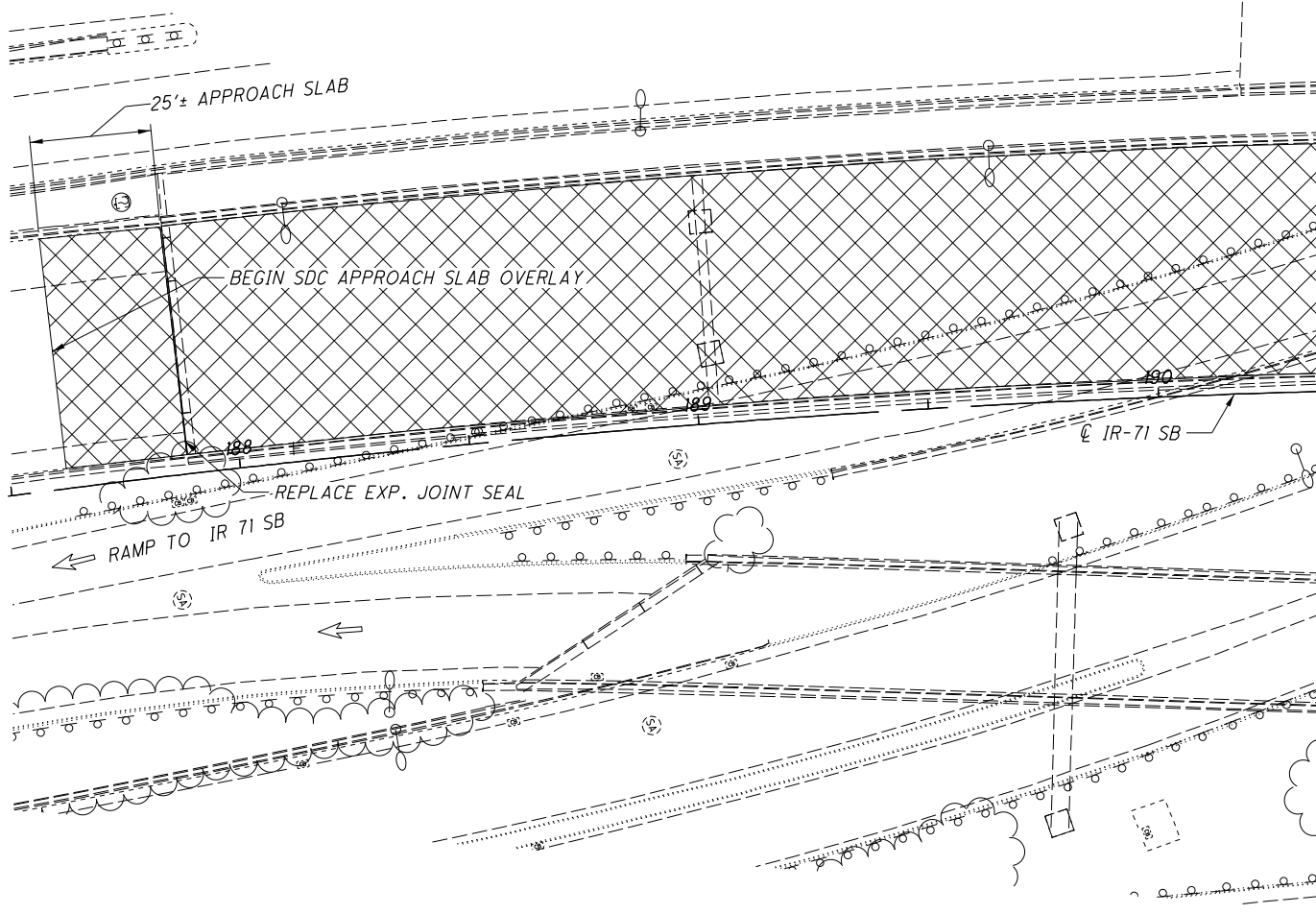
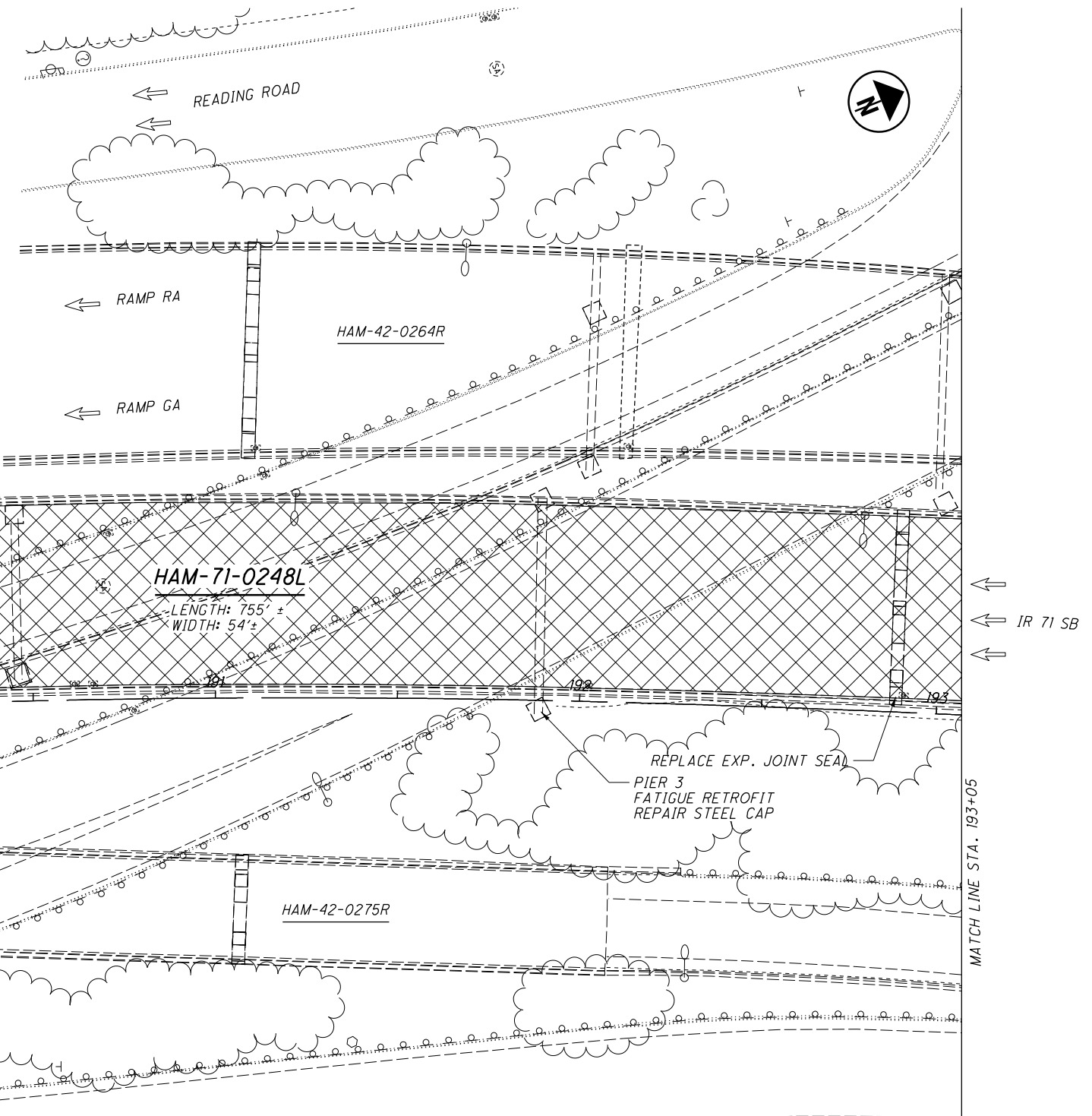


EXISTING STRUCTURE

TYPE: CONTINUOUS WELDED PLATE GIRDER WITH REINFORCED CONCRETE DECK AND SUBSTRUCTURE
 SPANS: 114'-0"±, 2 @ 142'-6"±, 98'-0"±, 90'-6"±, 94'-6"±, 68'-6"±
 ROADWAY: 50'-0"± F/F CURBS
 LOADING: C.F. = 2000 (57)
 SKEW: 90° (TANG. TO CURVE)
 APPROACH SLABS: AS-1-54 (25'-0" LONG)
 ALIGNMENT: VARIES
 SUPERELEVATION: VARIES
 STRUCTURAL FILE NUMBER: 3106780
 DATE BUILT: 1970

PROPOSED STRUCTURE

TYPE: CONTINUOUS WELDED PLATE GIRDER WITH REINFORCED CONCRETE DECK AND SUBSTRUCTURE
 SPANS: 114'-0"±, 2 @ 142'-6"±, 98'-0"±, 90'-6"±, 94'-6"±, 68'-6"±
 ROADWAY: 50'-0"± F/F CURBS
 LOADING: C.F. = 2000 (57)
 SKEW: 90° (TANG. TO CURVE)
 APPROACH SLABS: AS-1-54 (25'-0" LONG)
 ALIGNMENT: VARIES
 SUPERELEVATION: VARIES
 COORDINATES: LATITUDE 39°6'59" N
 LONGITUDE 84°30'2" W



PLAN

LEGEND

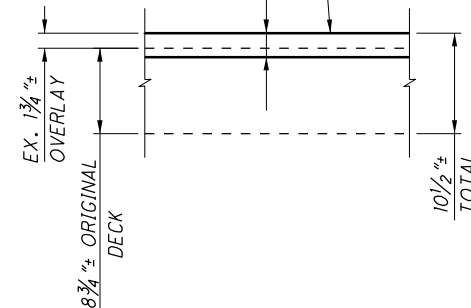
SUPERPLASTICIZED DENSE CONCRETE (SDC) OVERLAY

PROPOSED WORK:

1. REMOVE EXISTING 1 3/4" LATEX MODIFIED CONCRETE (LMC) WEARING SURFACE AND 1" OF THE ORIGINAL DECK USING HYDRODEMOLITION AND REPLACE WITH 2 3/4" THICK SUPERPLASTICIZED DENSE CONCRETE (SDC).
2. REMOVE 1 3/4" OF THE ORIGINAL APPROACH SLAB AND TOP OF BACKWALL USING HYDRODEMOLITION AND REPLACE WITH 1 3/4" OF SUPERPLASTICIZED DENSE CONCRETE (SDC).
3. REPLACE THE TORN EXPANSION JOINT SEAL AT THE REAR EXPANSION JOINT AND THE INTERMEDIATE EXPANSION JOINT. JOINT SEAL = D.S. BROWN #SE-400 OR APPROVED EQUAL.
4. CLEAN EXISTING DRAINAGE SYSTEM TO THE FIRST MANHOLE, BOTH ON THE STRUCTURE AND BELOW THE GROUND.
5. PRESSURE WASH BEAM SEATS, BACKWALLS, AND STRUCTURAL STEEL WITHIN 10 FEET OF ABUTMENT EXPANSION JOINTS.
6. REPAIR FATIGUE CRACKS IN PIER 3 STEEL PIER CAP.
7. ALL WORK WILL BE PERFORMED IN ACCORDANCE WITH MAINTENANCE OF TRAFFIC PLANS AND NOTES.

TOP OF OVERLAY TO MATCH TOP OF EXISTING BRIDGE DECK OVERLAY

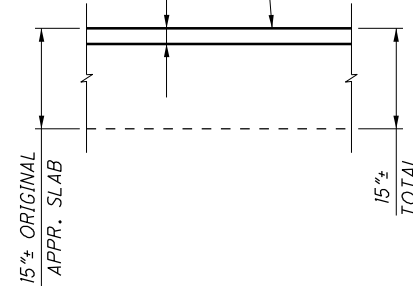
OVERLAY BRIDGE DECK PER NOTE 1 IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 848



DECK SLAB OVERLAY DETAIL

TOP OF OVERLAY TO MATCH TOP OF EXISTING APPROACH SLAB

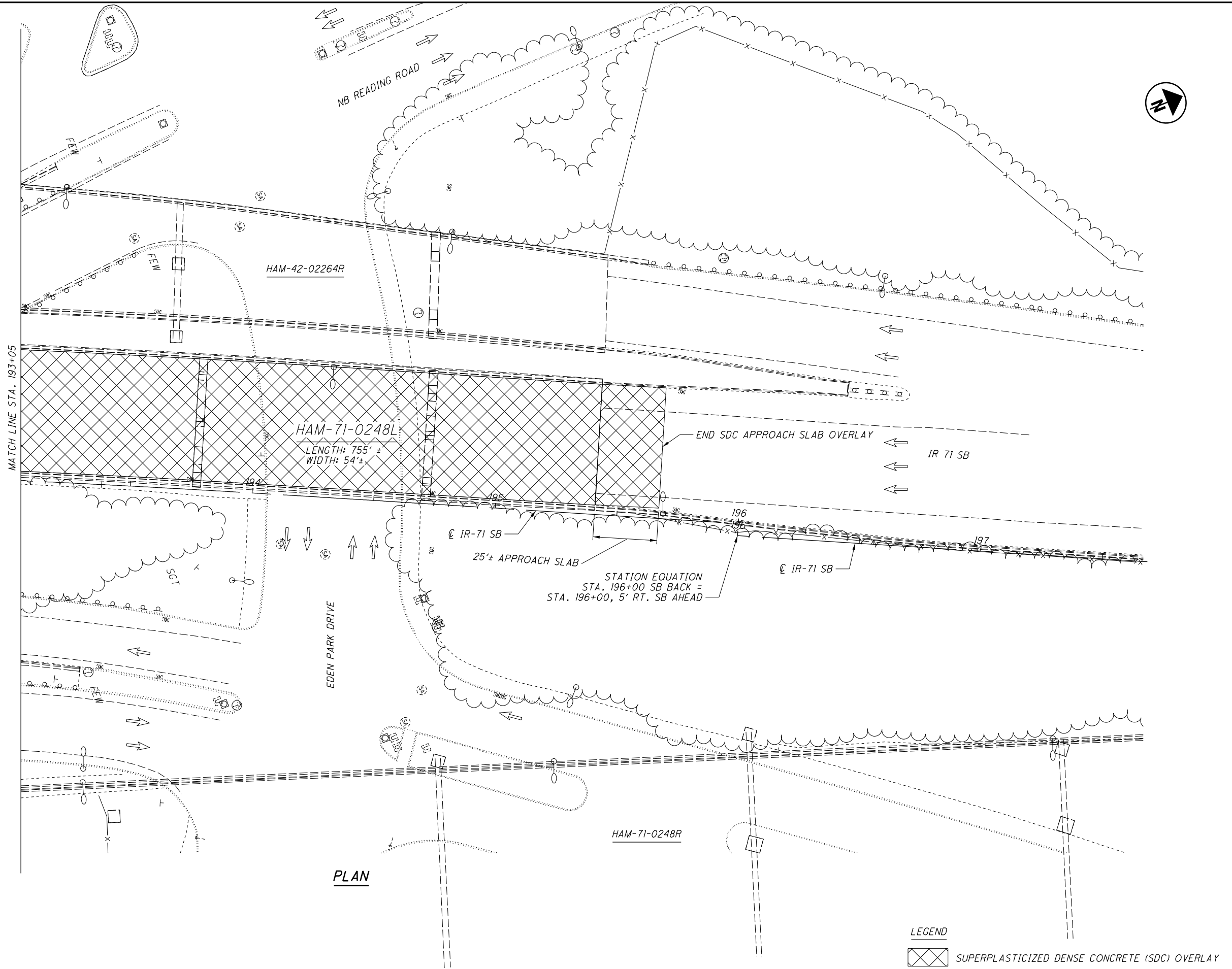
OVERLAY APPROACH SLAB PER NOTE 2 IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 848



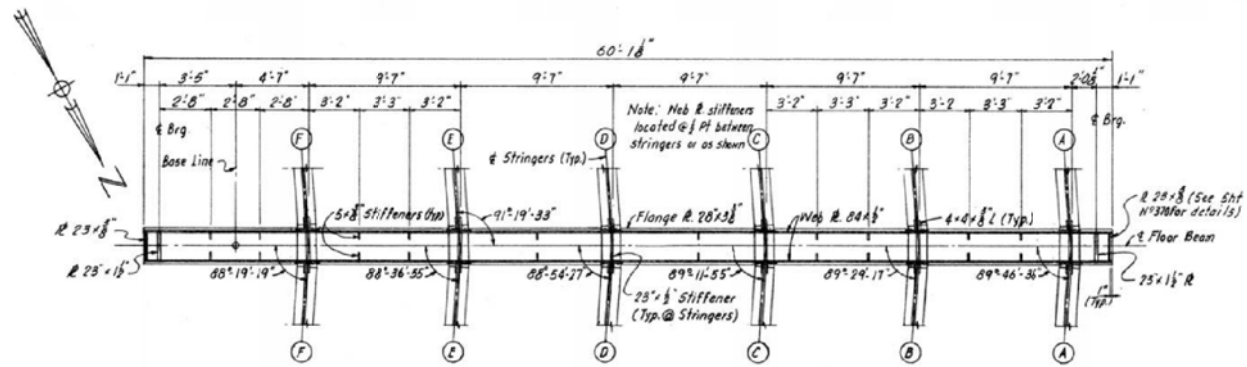
APPROACH SLAB OVERLAY DETAIL

P:\PR54860\HAM\82975\Design\Structures\HAM071_0248L\Sheets\071_0248L_SC001.dgn Sheet 9/8/2016 10:10:07 AM onslin

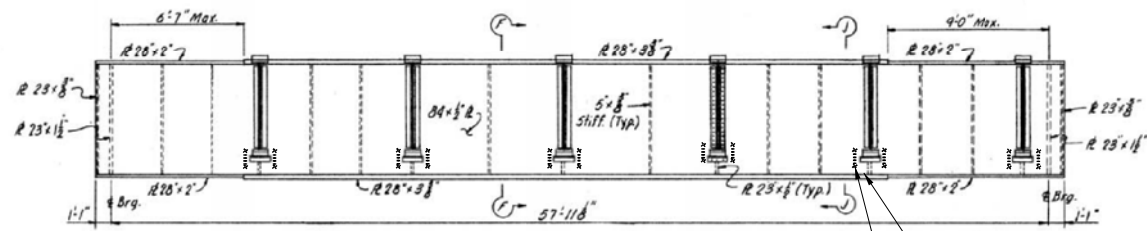
DESIGN AGENCY BURGESS & NIPLE 312 PLUM ST. CINCINNATI OH	
REVIEWED JSB	DATE 8/31/2016
DRAWN SJA	STRUCTURE FILE NUMBER 3106780
DESIGNED SJA	CHECKED XAC
GENERAL PLAN -1 HAM-71-0248L I-71 SB OVER NB US 42 AND EDEN PARK DRIVE	
HAM-71-1.97 PID No. 82975	
1 / 3	
267 292	



HAM-71-1.97 PID No. 82975	GENERAL PLAN -2 HAM-71-0248L I-71 SB OVER NB US 42 AND EDEN PARK DRIVE		DESIGNED SJA	DRAWN SJA	REVIEWED JSB	DATE 8/31/2016	DESIGN AGENCY BURGESS & NIPLÉ 312 PLUM ST. CINCINNATI OH
	2 / 3	CHECKED XAC	REVISED XXX	STRUCTURE FILE NUMBER 3106780	NORTH ARROW	268 292	



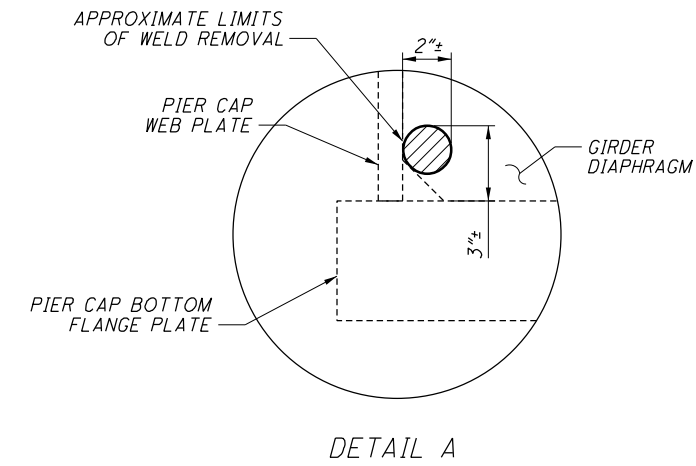
SECTION C-C-PIER N°3



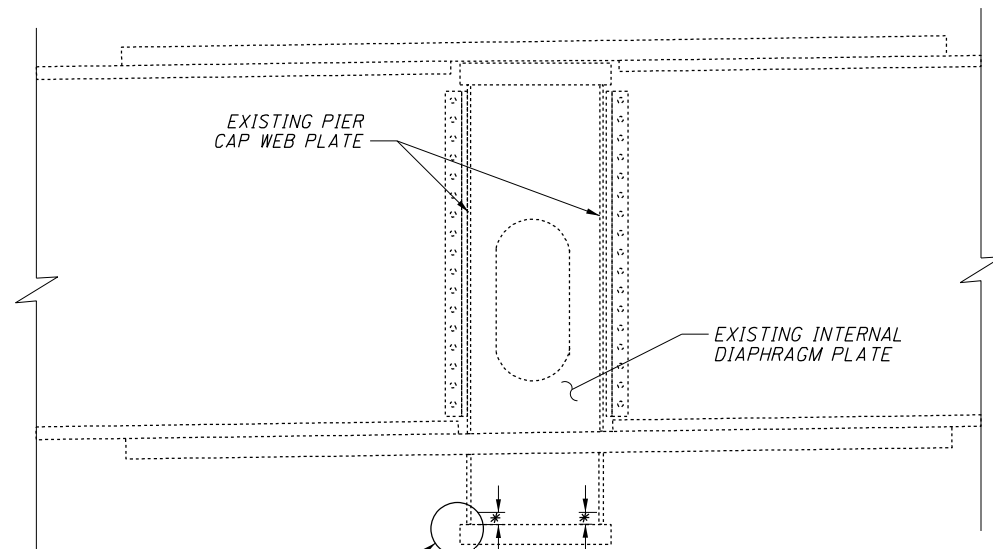
PIER CAP ELEVATION
PIER 3

ITEM 513-STRUCTURAL STEEL, MISC.: 2" STRESS RELIEF HOLE RETROFIT TYPICAL AT ALL EXISTING STRESS RELIEF RETROFIT LOCATIONS (DOG-BONE REPAIRS) DONE PREVIOUSLY.

EXISTING STRESS RELIEF RETROFIT LOCATIONS (DOG-BONE REPAIRS) DONE PREVIOUSLY.



DETAIL A



DETAIL A

SECTION A-A

* APPROXIMATE LIMITS OF WEB PLATE WELD REMOVAL. PAYMENT INCLUDED UNDER ITEM 513-STRUCTURAL STEEL, MISC.: 2" STRESS RELIEF HOLE RETROFIT.

ITEM 513-STRUCTURAL STEEL, MISC.: 2" STRESS RELIEF HOLE RETROFIT

PERFORM THE REPAIRS DESCRIBED BELOW AT 12 LOCATIONS AT PIERS 3.

REPAIR PROCEDURE:

1) DRILL A 2" DIA. HOLE THROUGH THE GIRDER DIAPHRAGM TO REMOVE THE WELD BETWEEN THE PIER CAP WEB PLATE AND THE GIRDER DIAPHRAGM AT ALL EXISTING STRESS RELIEF RETROFIT LOCATIONS. ELONGATE THE HOLE VERTICALLY DOWN TO THE BOTTOM OF THE WELD. GRIND THE WEB SURFACE SMOOTH TO REMOVE WELD MATERIAL. DO NOT DISTURB THE WELD BETWEEN THE CAP BOTTOM FLANGE AND THE WEB PLATE.

2) TREAT THE REMAINING DIAPHRAGM WELD BETWEEN THE DRILLED HOLE AND THE GIRDER BOTTOM FLANGE TIE PLATE AT ALL LOCATIONS WITH ULTRASONIC IMPACT TREATMENT (UIT). SEE GENERAL NOTES FOR ULTRASONIC IMPACT TREATMENT FOR REQUIREMENTS OF THE PROCEDURE. THE COST OF THE LABOR AND EQUIPMENT ASSOCIATED WITH THIS WORK IS INCIDENTAL TO ITEM 513-STRUCTURAL STEEL, MISC.: 2" STRESS RELIEF HOLE RETROFIT.

3) PAINT ALL RETROFITTED/UIT TREATED AREAS PER ITEM 514 - FIELD PAINTING OF DAMAGED STRUCTURAL STEEL, AS PER PLAN

DESIGN AGENCY BURGESS & NIPLE 312 PLUM ST. CINCINNATI OH	
DATE 8/31/2016	DESIGNED SJA
REVIEWED JSB	CHECKED XAC
STRUCTURE FILE NUMBER 3106780	DRAWN SJA
	REVISER XXX
PIER CAP RETROFIT DETAILS HAM-42-0248L I-71 SB OVER NB US 42 AND EDEN PARK DRIVE	
HAM-71-1.97 PID No. 82975	
3 / 3	
269 292	

NBI FRACTURE CRITICAL INSPECTION

IR-71 SB over Eden Park Drive and Reading Road (US 42) • SFN3106780 (HAM-71-0248L)
Hamilton County, OH • June 2023



EXHIBIT 3 – ODOT ASSETWISE FIELD REPORT

Inspector: Seal,Michael

Inspection Date: 08/03/2023

Structure Number: 3106780

Facility Carried: SB IR 71

Ohio Bridge Inspection Summary Report

HAM-00071-0248L (3106780)

2: District 15000 - CINCINNATI (HAM county)
District 08

5A: Inventory Route 1 00071

21: Major Maint A/B 01 - State Highway Agency /
225 Routine Main A/B 01 - State Highway Agency /
221 Inspection A/B 01 - State Highway Agency /
220: Inv. Location DISTRICT 08

7: Facility On SB IR 71
6: Feature Ints US42*N&RMP;EDEN PARK ENT
9: Location .2 MI N OF US 42
Lat, Lon 39.116511 ,-84.500497

Condition	Structure Type
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58: Deck **6 - Satisfactory Condition**
58.01 Wearing Surface 6 - Satisfactory (1-10% distress)
58.02 Joint 6- Satisfactory (isolated leaking)
59: Superstructure **6 - Satisfactory Condition**
59.01 Paint & PCS 7 - Good (1-5% corr.)
60: Substructure **7 - Good Condition**
61: Channel **N**
61.01 Scour **N - Not Applicable**
62: Culverts **N - Not Applicable**

43: Bridge Type 3 - Steel
03 - Girder and Floorbeam System
N- Not Applicable
45: Spans Main / Approach 7 / 0
107: Deck Type 1 - Concrete Cast-in-Place
408: Composite Deck U - Unknown
414A Joint Type 1 8 - Elastomeric Strip Seal
414B: Joint Type 2 N - None
108A: Wearing Surface 2 - Integral Concrete (separate non-modified layer of concrete added to structural deck)
1- Super Plasticized

67.01 GA 6

Appraisal

Sufficiency Rating 59.8 SD/FO 2 - FO
36: Rail, Tr, Gd, Term Std 1 1 1 1
72: Approach Alignment 9 - Superior to present desirable criteria
113: Scour Critical N - Not over waterway
71: Waterway Adequacy N - Not Applicable

422: WS Date 01/01/2018
423: WS Thick (in) 1.7
482: Protective Coating 5 - Paint System OZEU
483: PCS Date 07/01/2010
453: Bearing Type 1 3 - Sliding (Bronze)
455: Bearing Type 2 N - None
528: Foundn: Abut Fwd 1 - Steel H Piles (Other size)
533: Foundn: Abut Rear 1 - Steel H Piles (Other Size)
536: Foundn: Pier 1 1 - Steel H Piles (Other size)
539: Foundn: Pier 2 N - None (Such as most Culverts)

Geometric

48: Max Span Length (ft) 142.0
49: Structure Length (ft) 755.0
52: Deck Width, Out-To-Out (ft) 54.3
424: Deck Area (sf) 40996.5
32: Appr Roadway Width (ft) 48.0
51: Road Width, Curb-Curb (ft) 50.0
50A: Curb/SW Width: Left (ft) 0
50A: Curb/SW Width: Right (ft) 0
34: Skew (deg) 30
33: Bridge Median 0 - No median
54B: Min Vert Underclearance (ft) 33.08
336A: Min Vert Clrnce IR Cardinal (ft) 99
336B: Min V Clr IR Non-Cardinal (ft) 0
578: Culvert Length (ft) 0

Age and Service

27: Year Built/ 106 Rehab 1970 / 0000
42A: Service On 1 - Highway
42B: Service Under 1 - Highway, with or w/out pedestrian
28A: Lanes on 04
28B: Lanes Under 07
19: Bypass Length 0
29: ADT 49038
109: % Trucks (%) 14

Load Posting

41: Op/Post/Closed A - Open
70: Posting 5 - Equal to or above legal loads
70.01: Date
70.02: Sign Type
734: Percent Legal (%) 140
704: Analysis Date 11/01/2019
63: Analysis Method 8 - Load and Resistance Factor Rating (LRFR) rating report by rating factor (RF) method using HL-93 loadings.

Inspections

	Months	
90: Routine Insp.	12	08/03/2023
92A: FCM Insp.	Y 12	06/09/2021
92B: Dive Insp.	N 0	
92C: Special Insp.	N 0	
92D: UBIT Insp.	N 0	
92E: Drone Insp.	N 0	

Inspector Seal,Michael

Inspector: Seal, Michael
 Inspection Date: 08/03/2023

Structure Number: 3106780
 Facility Carried: SB IR 71

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
12-Reinforced Concrete Deck	3 - Mod.	41021	sq. ft.	20921	19588	512	0
<p>CS2: Several areas of minor cracks with efflorescence is present on the deck underside on the bridge in Span 5, plus one area in Span 3. There are random and minor areas of delaminations on the underside. Haunch spalls are present along the girder top flanges, the worst case of spalls is along the east side of Girder E near Pier 4. Overall no major changes. (20,050 SF)</p> <p>CS3: Several areas of haunch spalling along the top flange of the beams, particularly near supports (100 SF) Some areas of saturation are present in Span 2, bay 3 and Span 5, bays 1-3, (415sf).</p>							
510-Wearing Surfaces		39260	sq. ft.	35873	3362	25	0
<p>CS2: Widespread cracking is typical in the wearing surface (3398 SF)</p> <p>CS3: Medium to wide cracks are present at isolated locations and minor potholes are present in the lanes (25 SF).</p>							
107-Steel Open Girder/Beam	3 - Mod.	4530	ft.	4487	40	3	0
<p>Tack welds are present in between the bottom flange and the bottom flange splice plate for Girder A in Span 2. There is a poor quality tack weld at the bottom of the west connection angle for Girder B at the north side of Pier 2 cap in Span 3. There are steel angles welded to the webs of Girder B and Girder C in Span 4 near Pier 3. Overall no major changes.</p> <p>CS2: Some isolated areas of painted over pitting/section loss, mostly near supports (40'). This was up to 1/8" deep at isolated pits with 1/16" typical at these areas. No changes overall. The upper bolted connection at the West side of Girder B, just south of Pier 5 is not completely tight. Overall no major changes.</p> <p>CS3: Small corrosion holes previously noted on the Girder C and F webs at Pier 4 (3'). These have not grown.</p>							
515-Steel Protective Coating		99509	sq. ft.	98469	0	1040	0
<p>CS3: Isolated areas of reactivating corrosion continue at isolated connections on the beams, approx 1% (1040 SF).</p>							
152-Steel Floor Beam	3 - Mod.	160	ft.	130	30	0	0
<p>The pier caps have been retrofit with stress relief drilled holes connected by vertical saw-cuts adjacent to the welded connections of the girder bottom flange tie plates at all girders, 2017. Retrofits were installed at Pier 3 to remove fatigue prone detail and known cracks, 2019. Floor beams overall are in good condition. See the 2023 fracture critical report for specifics.</p> <p>CS2: Typical minor to moderate areas of corrosion are present on the interior and exterior of the steel caps. Minor gouges, weld defects, and isolated scrapes and impact damage are present (30').</p>							
515-Steel Protective Coating		3356	sq. ft.	3311	35	10	0
<p>CS2: Pier 1: Isolated areas of light rust spots on the top flange and at the top of the web plates, at the bottom flange between diaphragm and end caps. Pier 2: Some cracking of exterior paint.</p> <p>CS3: Pier 2: The lower flange and portions of web at the end caps were painted during a previous rehab, however corrosion is reactivating along the lower flange. Pier 3: Painted over laminating corrosion at both ends of the pier cap on the bottom flange adjacent the access hatches are beginning to reactivate. No major changes overall.</p>							
205-Reinforced Concrete Column	3 - Mod.	15	each	13	2	0	0
<p>The bridge identification placard is located on the west face of the east column of Pier 3.</p> <p>CS2: Two piers have hairline cracks sealed over (2).</p>							

Inspector: Seal, Michael
 Inspection Date: 08/03/2023

Structure Number: 3106780
 Facility Carried: SB IR 71

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
215-Reinforced Concrete Abutment	3 - Mod.	126	ft.	109	15	2	0
<p>CS2: Abutment 1 - Several cracks along the stem of Abutment 1 with associated delaminations (8'), and ponding water on the east side of bearing seat is causing corrosion stains on the stem below (2'). Abutment 2 - Minor ponding water on beam seat in bay 2 (3') and scaling on beam seat near girder E (2'). No major changes overall. CS3: Abutment 1 - corner delamination/spall in top of stem in bay 5 (2'). Only slight change from prior inspection.</p>							
234-Reinforced Concrete Pier Cap	3 - Mod.	160	ft.	160	0	0	0
<p>Staining is present on the east face of Pier 5 and both faces of Pier 6. No change.</p>							
300-Strip Seal Expansion Joint	3 - Mod.	162	ft.	136	14	12	0
<p>CS2: Forward joint has soil and debris in the joint and along the shoulder area. CS3: Rear header has a small area breaking out and settled near the joint seal. Some leakage is present in the forward joint and evidence of prior leakage on the left area of the Pier 4 joint. This continues for this inspection.</p>							
311-Movable Bearing	3 - Mod.	42	each	29	12	1	0
<p>CS2: Several bearings throughout have minor freckled corrosion (12). The Girder F bearing at Abutment 2 is in contraction in June; all other bearings are in expansion (1). Several pot bearings missing nuts on the anchor bolts. These are old comments that have not changed.</p>							
321-Reinforced Concrete Approach Slab	3 - Mod.	1950	sq. ft.	1932	10	8	0
<p>CS2: Cracking along edge of forward slab (10 SF). No change from the prior inspection. CS3: At the edge of the forward slab for the asphalt to slab transition joint, there is a failing patch with an 8' spall/pothole (8SF). A spall is present in the rear slab at the pavement to slab joint (1SF). This continues for this inspection.</p>							
331-Reinforced Concrete Bridge Railing	3 - Mod.	1510	ft.	775	735	0	0
<p>CS2: The parapet exhibits minor cracking, frequently at the joints. A few collision scrapes are present, and impact gouges are present on the left railing, and right rear section of rail is deteriorating (735').</p>							
815-Drainage	3 - Mod.	7	each	0	0	7	0
<p>CS2: Minor to moderate corrosion at some downspouts, some with minor perforations (2 total). CS3: All the grates were clogged (increase from prior inspection).</p>							
830-Abutment Backwall	3 - Mod.	126	ft.	115	10	1	0
<p>CS2: Abutment 1 backwall - typical minor cracks throughout (3'). Abutment 2 backwall - several minor spalls along the deck joint armoring throughout, mostly on the forward joint. Other typical minor cracking in each bay (7'). No changes overall. CS3: Spall behind Girder F in the forward backwall (1'). No changes overall.</p>							

Inspector: Seal,Michael

Structure Number: 3106780

Inspection Date: 08/03/2023

Facility Carried: SB IR 71

ODOT District: District 08

HAM-00071-0248L_(3106780)

Date Built: 07/01/1970

Major Maint: 01 - State Highway Agency

Facility Carried: SB IR 71

Traffic On: 1 - Highway

Rehab Date:

Routine Maint: 01 - State Highway Agency

Feature Inters: US42*N&RMP;EDEN PARK
ENT

Traffic Under: 1 - Highway, with or w/out
pedestrian

Insp. 01 - State Highway Agency

FIPS Code: 15000 - CINCINNATI (HAM county)

Location: DISTRICT 08

.2 MI N OF US 42

Insp
Resp A:

Inspector

Seal,Michael

Inspection Date 08/03/2023

Reviewer Not Approved

Insp
Resp B:

Inspector Comments - Deck and Approach

Deck

Floor/Deck

The deck is in fair condition. There are cracks with efflorescence on the underside in Span 5 and one small area in Span 3. Haunch spalls are present along the top flange of girders near supports. Some areas of saturation in span 2 and 5. Overall no major changes.

Wearing Surface

The wearing surface is in fair condition with widespread cracking typical throughout. A few cracks are of a larger width. A few potholes are present in the travel lanes.

Railing

Concrete railing is in fair condition with vertical cracking along the length, heavier near the rail joints. Honeycombing, impact gouges, and minor deterioration are present along both sides.

Drainage

Some corrosion and perforations on a couple downspouts. All the grates were clogged.

Expansion Joints

Soil and debris are present in the joints. The rear slab header is breaking up and settled. Leakage is present in isolated areas along the left forward joint and evidence of prior leakage at Pier 4; the Pier 4 joint was replaced in 2017. The deck joint armor of the forward joint is missing a section of concrete at the top east corner of the header with a timber plank in its place. These are old comments that have not changed.

Approach

Approach Roadway

Approach roadway in good condition, only minor defects noted.

Approach Slab

Approach slab visible and in fair condition. Cracks are present along the edge of the

Inspector: Seal, Michael

Structure Number: 3106780

Inspection Date: 08/03/2023

Facility Carried: SB IR 71

forward slab. At the edge of the forward slab for the asphalt to slab transition joint, there is a failing patch with an 8' spall/pothole. A spall is present in the rear slab at the pavement to slab joint. Minor cracks throughout.

Approach Guardrail

Approach guardrail is in good condition, no defects noted.

Inspector Comments - General Appraisal

Superstructure

Beams/Girders

Superstructure is in fair condition. Minor active corrosion with isolated painted over pitting (section loss) present on the webs, normally over near the joints where prior leakage allowed the deterioration.

There are two areas with small corrosion holes (Girder C and F webs at Pier 4).

Diaphragms/X-Frames

Bearings

Bearings are in fair condition with minor corrosion throughout. The bearing for Girder F at Abutment 2 bearing is in contraction at 80F, opposite direction of rest of bearings (contraction in June, others in expansion).

This is an old condition that continues.

Steel Floor Beams

The pier caps have been retrofit with stress relief drilled holes connected by vertical saw-cuts adjacent to the welded connections of the girder bottom flange tie plates at all girders, 2017. Retrofits were installed at Pier 3 to remove fatigue prone detail and known cracks, 2019. Floor beams overall are in good condition. See the 2023 fracture critical report for specifics.

Protective Coating System

Isolated areas of reactivating corrosion exist at isolated connections and random areas on beams, 1% (1000 SF). No major changes for this inspection.

Substructure

Substructure is in good condition, with minor cracking to some pier columns and cracks, delaminations, and one corner delamination/spall with rust staining at the abutments.

Abutments

Inspector: Seal, Michael
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Abutments are in fair condition. There are cracks along the stem of Abutment 1, with small delaminations along these cracks.

Corrosion staining is present on the east side of the Abutment 1 bearing seat on the stem. There is a corner spall on the top of the stem in Bay 5.

Water is ponding on the Abutment 2 beam seat in Bay 2, which has caused scaling on the beam seat near Girder E. There

is vegetation growth along the southeast wingwall for Abutment 1 and both wingwalls for Abutment 2.

Pier Columns

Piers are in good condition with hairline cracks to a couple columns.

Concrete Pier Caps

No issues.

Backwalls

Vertical cracks in both walls. Shallow spalling under forward joint armor. Spall in forward backwall behind Girder F.

Slope protection

Light vegetation growth is present near Abutment 1 between the joints along the fascia of the bridge. There is an accumulation of debris and tree trimmings south of Pier 1 along the entrance ramp. There are cracks and a broken slope protection near the Pier 5 column.

Vegetation growth is present along the full height of the joints on the west side of the slope protection near Abutment 2. There is 1" of slope wall settlement along the Abutment 2 stem.

Culvert

Inspector Comments - Waterway

Waterway Adequacy

Channel

Scour Critical

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 1

Description Endview looking south.



PHOTO 2

Description Endview looking north.

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 3

Description Span 3 underview looking north.



PHOTO 4

Description Span 4 underview looking north.

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 5

Description Span 5 underview looking north.

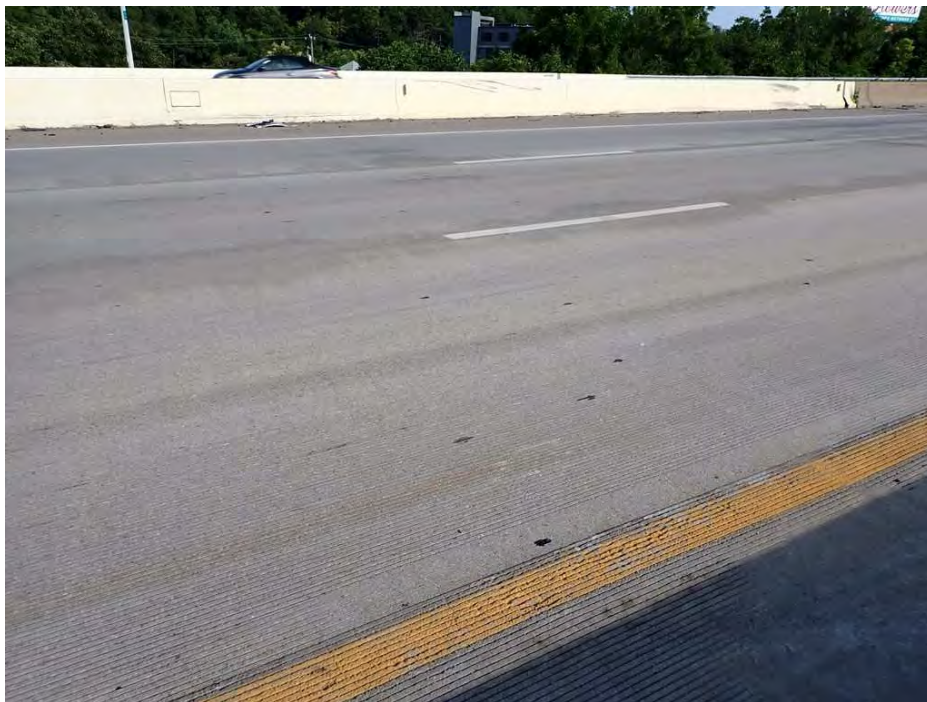


PHOTO 6

Description Typical deck wearing surface condition.

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 7

Description View of typical efflorescence on soffit. Span 3 area shown.



PHOTO 8

Description View of typical efflorescence on soffit. Span 5 area shown.

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 9

Description View of north joint. Note debris impaction in the joint.



PHOTO 10

Description Overall view of Pier 4 joint.

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 11

Description View of south joint. Note debris impactation in the joint.



PHOTO 12

Description Typical bridge rail condition and configuration.

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 13

Description View of Span 4, east web of Girder F near Pier 4. Note the painted over 3" diameter corrosion hole in the bottom of the cross-frame bracing angle.



PHOTO 14

Description Typical example of missing nuts on bearing anchor bolts.

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 15

Description Overall view of north approach slab.



PHOTO 16

Description View of south approach slab. Note pothole in the roadway pavement at the end of the slab.

Inspector: Michael Seal
Inspection Date: 08/03/2023

Structure Number: 3106780
Facility Carried: SB IR 71

Bridge Inspection Report

Pictures



PHOTO 17

Description General example of clogged scupper on the bridge deck. All scuppers were clogged with vegetation growing in the scupper.