

**PHYSICAL CONDITION REPORT  
FOR THE 2022 ROUTINE ELEMENT LEVEL INSPECTION**

**LORAIN ROAD OVER ROCKY RIVER  
BRIDGE NO. CUY-10-0869  
SFN: 1801325**

**OHIO DEPARTMENT OF TRANSPORTATION  
DISTRICT 12  
PID #115405**



**Inspected: August 29 – September 2 and September 7, 2022**

**Report: November, 2022**



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**2022 ROUTINE ELEMENT LEVEL  
PHYSICAL CONDITION REPORT**

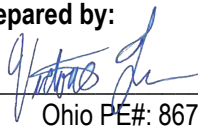
of the

**LORAIN ROAD BRIDGE OVER ROCKY RIVER  
BRIDGE NO. CUY-10-0869  
SFN: 1801325**

**CUYAHOGA COUNTY, OHIO**


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Inspected on:  
August 29 – September 2 and September 7, 2022

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**OHIO DEPARTMENT OF TRANSPORTATION  
DISTRICT 12**

PID No. 115405

Report Submitted November, 2022

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## BRIDGE DESCRIPTION

The CUY-10-0869 Bridge (Lorain Road Bridge over the Rocky River) carries four lanes of State Route 10 over Valley Parkway and the Rocky River connecting the cities of Cleveland and Fairview Park in Cuyahoga County, Ohio.

The bridge was built in 1935, with a major rehabilitation in 1987, and is composed of nine spans with an overall length of 1,229'-10" (see Figure 1). The superstructure is divided into four west approach spans, four arch spans, and one east approach span. There is a slab that spans the cellular Forward Abutment, and this slab span is included in the element quantities but does not alter the total span count of nine (see Figure 2). The west and east approach spans are made up of nine lines of rolled steel beams, two lines of built-up sidewalk girders, and two lines of rolled steel sidewalk fascia beams with a reinforced concrete deck. The arch spans are composed of two arch lines of built-up steel arches with built-up spandrel columns and built-up steel jack arches supporting built-up steel floorbeams, seven lines of rolled steel stringers, and two lines of rolled steel sidewalk fascia stringers with a reinforced concrete deck. The superstructure is supported by two reinforced concrete cellular abutments, built-up steel pier caps and steel columns at Piers 1 through 3, and built-up steel tower caps and columns with reinforced concrete pier walls at Piers 4 through 8. The built-up steel floorbeams and pier caps are considered nonredundant steel tension members due to spacing exceeding 14' (see Figure 3).

In 1987, the 40' wide reinforced concrete deck with 5' sidewalks was replaced and widened to 54' with a 1 1/4" thick latex modified concrete wearing surface and 5' sidewalks. The floorbeam and tower pier cap cantilevers were removed and replaced with welded and bolted steel members, and select structural steel repairs were performed. The drainage system was removed and replaced, and erosion control gabion baskets were installed from the Rear Abutment to midspan of Span 3. A new vandal protective fence was installed behind the tubular steel railing in 2019, and spalls in the deck soffit exterior face were patched in isolated locations and sealed throughout. In 2022, a minor rehabilitation was performed to replace deteriorated portions of the metal railings and paint all of the structural steel.

All structure component nomenclature follows previous inspection reports for consistency and in accordance with current ODOT standards. Therefore, in this report, "left" is north, "right" is south, "rear" is west, and "forward" is east. Substructure units and spans are labeled from west to east, and beams and stringers are labeled 1 through 13 from north to south. Jack arches are considered part of the arch element but are labelled with the beams to remain consistent with previous inspection reports. The interior bays of the arch ribs are numbered from west to east. Note that in the original plans and rehabilitation plans, the spans are labeled from east to west.



Location Map

Forward Abut. Slab

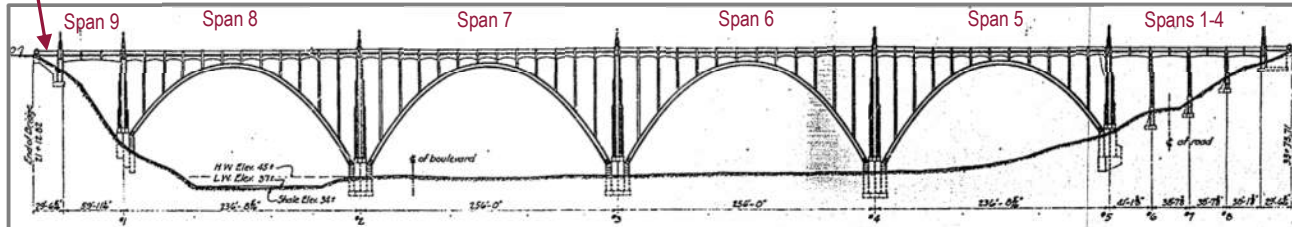


Figure 1 – CUY-10-0869 Bridge North Elevation (taken from the original plans).

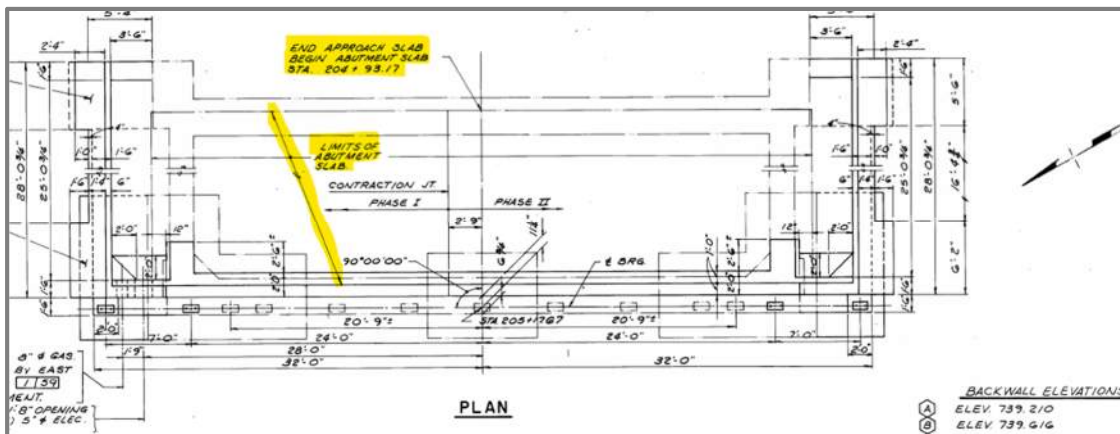


Figure 2 – Forward Abutment Slab Span plan view (taken from the major rehabilitation drawings).

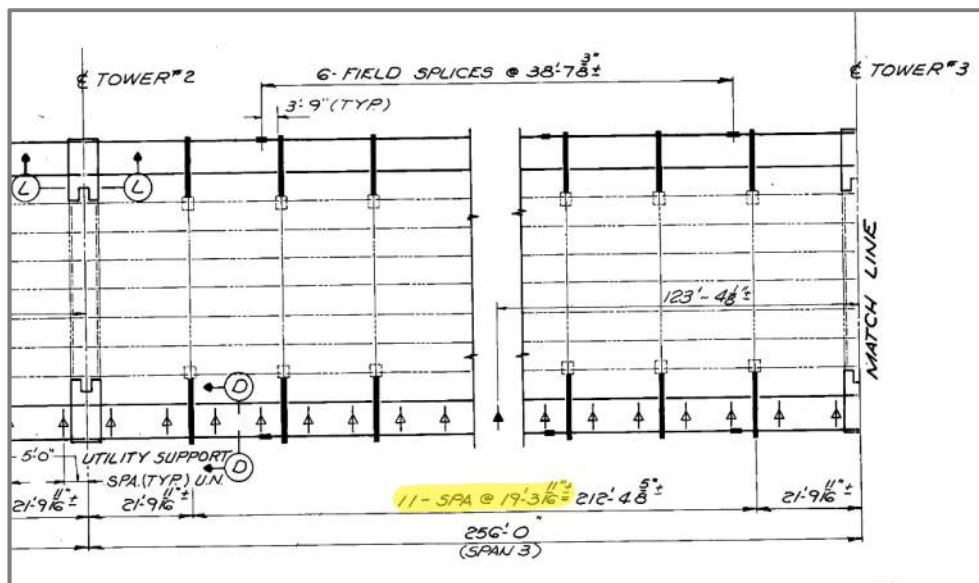


Figure 3 – Span 7 Arch plan view showing the typical floorbeam spacing (taken from the major rehabilitation drawings). Note that the original span numbering was east to west, so Span 7 was formerly Span 3.



## INSPECTION SCOPE AND PROCEDURE

Personnel from TranSystems Corporation performed a routine element level inspection of the bridge during the days of August 29 – September 2 and September 7, 2022. Final painting operations were ongoing during the inspection. Access to the structure was gained through use of an Aspen Aerials A-62 under bridge inspection unit (snooper) and an 85' manlift. The superstructure and substructure at the ends of the bridge were accessed from the ground. The interior of the steel arches, pier columns, and pier caps were accessed through padlocked hatches with the aid of the manlift and a key from District 12. Several of the pier tower caps were accessed through hatches in the right sidewalk with the aid of crowbars since wood blocking and foam blocked the top of the column interiors. The Pier 5 cap was accessed from the right sidewalk hatch, but the Pier 5 column interiors could not be accessed due to wood blocking and foam at the top of the columns and recent painting operations preventing the column base hatches from opening. The hatches at the base of the columns of Piers 1 through 3 were opened using an impact wrench with a 3/4" socket. Non-permit confined space procedures were followed including the use of multi-gas meters.

The inspection findings were recorded on bridge specific field inspection forms, and field sketches were created to document specific conditions. Inspection equipment utilized during the inspection included but was not limited to: chipping hammers, wire brushes, measuring tapes, 6 foot carpenter rules, crowbars, an impact wrench, and flashlights. Color digital photographs were taken of areas of deterioration, condition changes, typical details, and any immediate maintenance needs, if necessary.

Traffic control was necessary to perform a routine inspection and consisted of a single right lane closure of S.R. 10 westbound. The painting contractor's single right lane closure of S.R. 10 eastbound was utilized.

## INSPECTION TEAM

The inspection team members are as follows:

- Carolyn Guion, PE - TranSystems
- Victoria Feudo, PE - TranSystems
- Steven Hammerschmidt, PE – TranSystems
- Jacob Adamrovich, EIT – TranSystems

## CONDITION RATING

State and federal guidelines for evaluating the condition of bridges have been developed to promote uniformity in the inspections performed by different teams and 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 bridge.

SUMMARY ITEMS (NBIS)	CONDITION	DEFECTS
9	Excellent	Excellent condition.
8	Very Good	No problems noted.
7	Good	Some minor problems.
6	Satisfactory	Structural elements show some minor deterioration.
5	Fair	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
4	Poor	Advanced section loss, deterioration, spalling or scour.
3	Serious	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	Critical	Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	"Imminent" Failure	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put it back in light service.
0	Failed	Out of service - beyond corrective action.

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, 2<sup>nd</sup> Edition*, AASHTO, 2019
3. *Manual for Condition Evaluation of Bridges, 2<sup>nd</sup> Edition*, AASHTO, 2011 (rev 2016).
4. *Bridge Inspector's Reference Manual*, U. S. Department of Transportation, 2002 (rev 2012).
5. *Inspection of Fracture Critical Bridge Members*, U.S. Department of Transportation, 1986.
6. *National Bridge Inspection Standards*, U.S. Department of Transportation, 2004.
7. *Manual for Bridge Evaluation*, AASHTO, 2018 (3<sup>rd</sup> edition).
8. *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*, Federal Highway Administration, 1995 with Latest Revisions.
9. *Ohio Manual of Uniform Traffic Control Devices (OMUTCD)*, ODOT, 2012 (rev 2011).

## EXECUTIVE SUMMARY

The CUY-10-0869 Bridge is in FAIR CONDITION [5-NBIS] overall. Significant findings include:

- Minor section loss in the beams and stringers, particularly at the expansion joints
- Isolated section loss on the arch rib exteriors
- Advanced section loss in the diaphragms and bracing within the pier tower columns
- Isolated spalls with exposed reinforcement in the deck underside
- Moderate erosion channel at the forward slope

The overall item ratings can be summarized as follows in **Table 1**:

Bridge Condition Summary Ratings		
ITEM	RATING	TYPICAL NOTES
DECK	6	Transverse hairline cracks with efflorescence, isolated spalls with exposed reinforcement
SUPERSTRUCTURE	6	Minor to moderate pitting throughout the arch exteriors and stringers which has been <b>arrested by paint</b>
SUBSTRUCTURE	5	Areas of up to 100% section loss <b>typically arrested by paint</b> in the steel pier tower columns and caps, <b>sealed</b> vertical cracks in reinforced concrete

Table 1 - Bridge Condition Summary Ratings

## INSPECTION FINDINGS

### ITEM 58 – DECK SUMMARY

The deck is in SATISFACTORY CONDITION [6-NBIS] overall with some scattered spalls in the underside of the deck (see **Photo 1**) and hairline transverse cracks. The wearing surface exhibits minor transverse cracks and a few minor spalls. The metal bridge railing has sealed spalls throughout the concrete portion, and there is painted over section loss in the metal railing and posts. The drainage system consists of clogged trench drain scuppers and typically clear downspouts with locations of 100% section loss in most of the approach span downspouts. The elastomeric strip seal expansion joints mostly exhibit several areas of warped and extruded strip seals and moderate debris accumulation. The joint armor has minor surface corrosion and some gouges, and there are minor vertical misalignments up to 1/2" high.



Photo 1 – Isolated spall with exposed reinforcement and adjacent typical hairline transverse cracks in the deck underside (looking up and east at the right forward end of Span 8).

### ELEMENT 12 – REINFORCED CONCRETE DECK

The reinforced concrete deck is in satisfactory condition with hairline cracking and isolated minor spalls. **The deck element includes the width of the roadway plus the 1' wide extensions below the sidewalks** (see **Appendix D** for the transverse section). The underside exhibits transverse hairline cracks throughout with



Photo 2 – Spall in the deck underside at the right forward end of Span 7 (looking up and south between Floorbeams 11 and 12).



Photo 3 – Isolated 1/16" wide transverse crack in the deck underside (looking up and north between Floorbeams 8 and 9 in Span 7).



Photo 4 – 1 1/2" deep spall in the wearing surface with water ponding at a failing asphalt patch (looking south at the forward end of Span 9).

isolated areas of hairline map cracking and minor efflorescence. The deck underside typically has delaminations between Stringers 6 and 7 in the arch spans above the utilities.

The forward portion of Span 8 has several spalls in the underside up to 3" deep. A minor 1" deep spall in the deck underside is present in Span 7 between Floorbeams 11 and 12 on the left side of the right jack arch (see Photo 2). There is a 1/16" wide crack with minor efflorescence in the deck underside in Span 7 between Stringers 7 to 9 and Floorbeams 8 and 9 (see Photo 3). The deck underside below the sidewalk construction joints typically has transverse hairline cracks with minor efflorescence spaced at 3'. Water staining and shallow spalls are present in the underside adjacent to the right sidewalk Pier 5 hatch, and a corner spall with exposed reinforcement is in the deck underside at the right sidewalk Pier 8 hatch. The edge of the deck exhibits minor to moderate efflorescence at the sidewalk construction joint in Span 1. For notes about the reinforced concrete slab at the Forward Abutment, see the Superstructure section.

#### ELEMENT 510 – WEARING SURFACE

The wearing surface is in satisfactory condition overall with minor transverse cracks and isolated spalls. Transverse cracks are typically 0.02" wide and spaced at approximately 3' to 4' with isolated transverse cracks up to 0.06" wide. There are several minor spalls up to 1 1/2" deep located near the centerline of the wearing surface, at deteriorating patches (see Photo 4), and around scuppers. There is a failing asphalt patch at the left forward side of the Forward Abutment slab (see Photo 5), and the forward edge of the slab has several spalls with deteriorating asphalt patches. At the time of the inspection, there was water ponding up to 1" deep at the left side of the Forward Abutment slab.

#### SIDEWALKS (no associated element)

The sidewalks are typically in fair condition due to widespread delaminations in the top surface, spalls





Photo 5 – Overall view of the Forward Abutment slab wearing surface with a 2' diameter spall at a failing asphalt patch (looking south).

and water ponding behind the curb plates, and transverse cracks with minor to moderate efflorescence throughout the underside. Spalls with exposed reinforcement are present in the top face of the sidewalks at the curb plates, and while these spalls are typically 2" deep by 3" wide, there are several spalls up to 5" deep by 6" wide (see Photo 6). The remaining width of the sidewalk is typically delaminated. Below the pier cap access hatches in the right sidewalk, there are typically spalls, delaminations, and rust staining in the sidewalk underside. In the exterior face of the sidewalk below the metal railing posts, there are sealed spalls throughout with isolated areas of reactivating corrosion at exposed and recently sealed railing post anchor bolts.



Photo 6 – Spalls with exposed reinforcement in the right sidewalk with water ponding (looking south near midspan of Span 8).

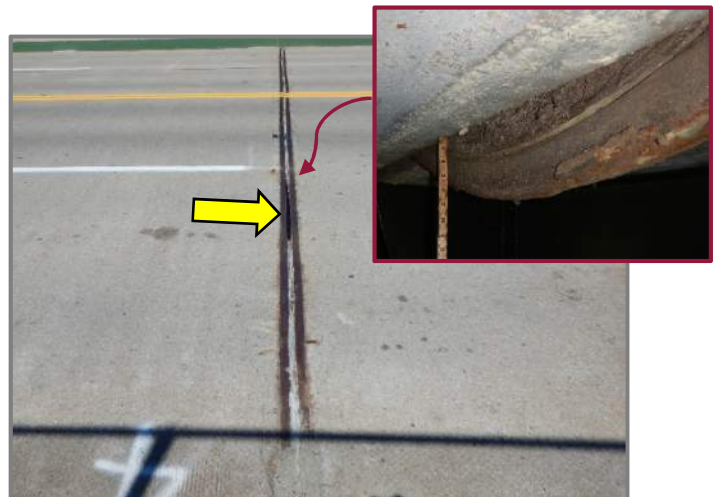


Photo 7 – Elastomeric strip seal failure at the Pier 4 expansion joint (looking north). Inset: Looking southwest at the joint underside from within the Pier 4 cap.

### ELEMENT 300 – STRIP SEAL EXPANSION JOINT

The expansion joints are in **poor** condition overall due to vertical misalignments between joint armor retainers, minor surface corrosion, failed seal glands, and debris accumulation. There are gouges in the joint armor up to 2" wide. The elastomeric strip seal is typically dislodged from the armor and exhibits failure in the following locations of the right eastbound lane:

- Pier 4 Expansion Joint - 6' long section sagging up to 13" (see Photo 7)
- Pier 5 Expansion Joint - 3' and 4' long sections sagging up to 9"
- Pier 6 Expansion Joint - 3' long section sagging 2"
- Pier 7 Expansion Joint - 4' long section sagging up to 9"

The joint headers at the abutments have longitudinal and transverse cracks up to 1/8" wide (see Photo 8), and the joint headers at the piers have isolated minor delaminations and shallow spalls. The expansion joint armor is vertically misaligned with the rear side 1/2" higher at Pier 7, forward side 1/2" higher at Pier 8, and

the rear side 1/4" higher at the Forward Abutment. The longitudinal joint measurements are listed below (see Table 2).

Location	2022 Left End Measurement (70°F)
Rear Abutment	1"
Pier 4	1 7/8"
Pier 5	1 1/8"
Pier 6	1"
Pier 7	1 1/8"
Pier 8	1 1/4"
Forward Abutment	1 1/2"

Table 2 - Expansion Joint Longitudinal Measurements.

### ELEMENT 330 – METAL BRIDGE RAILING

The metal bridge railing is in fair condition with areas of **painted over** section loss in the metal posts and rails and exposed anchor bolts at spalls in the concrete portion of the railing. **Isolated locations of 100% loss in the tubular rails and the top of the railing posts are present and have been arrested by paint.** **Minor corrosion was noted between some of the decorative railing components.** The railing post anchor bolts are exposed at sealed spalls up to full height by 36" long throughout the left and right faces of the concrete portion of the railing (see **Photo 9**), and there are locations of **minor rust staining despite the spalls having been recently sealed.** There is an isolated spall in the top face of the right railing concrete portion which is 30" long by 6" wide by 4" deep at the right forward end of Span 7.

At the request of District 12, the fascia beams, stringers, and their bearings are included with this railing element. They support the railing and the sidewalk. There are several locations of 100% section loss in the fascia stringer webs below the expansion joints:

- Beam 13 above the Pier 4 cap has three holes up to 3" in diameter in the upper portion of the web (see **Photo 10**)
- Stringer 1 above the Pier 5 cap has a 1" diameter hole at the bottom of the web

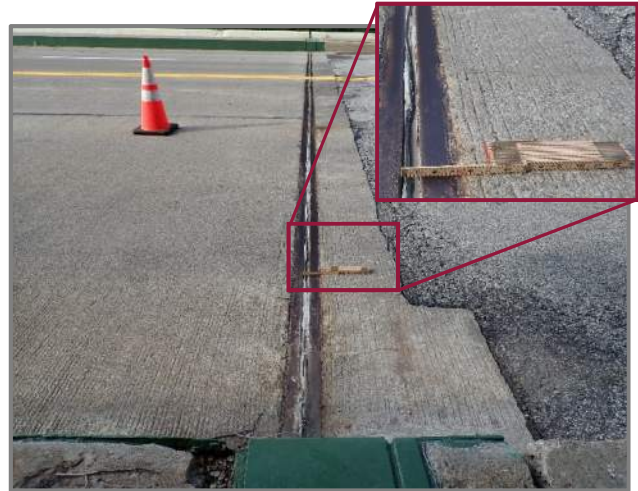


Photo 8 – Rear Abutment expansion joint with failing strip seal, longitudinal cracks in the joint header, and surface corrosion on the joint armor (looking south).



Photo 9 – Typical spall in the concrete portion of the railings with exposed railing post anchor bolts (looking south near midspan of Span 7).



Photo 10 – 100% section loss in the right railing fascia stringer web (looking southeast at Stringer 11 at Pier 4).



- Stringer 11 at Pier 6 has 2" diameter holes at the top of the web

The Beam 13 bearing at the Rear Abutment has moderate section loss in the right anchor bolt and nut with a 3/4" gap between the nut and the masonry plate. The Beam 13 Forward Abutment bearing has a 1 1/4" high gap between the left anchor bolt nut and the masonry plate.

### ELEMENT 815 – DRAINAGE

The drainage system is in poor condition overall with the scuppers typically full of debris (see **Photo 11**) and 100% section loss to several downspouts. The scuppers are trench drains in the shoulders of the wearing surface, and while most of the scuppers are clogged, the downspouts are typically clear. **There is a scupper grate at the left rear corner of Span 4 where five of the transverse bars are cracked through**, and a mesh covering over a portion of the scupper at the left forward corner of Span 7 has failed.

The downspouts at Piers 1 through 3 and near Pier 8 typically have 100% section loss up to 3' high at the bends near the interior face of the columns (see **Photo 12**). **100% section loss in the downspout at the left end of Floorbeam 12 in Span 7 was taped over and painted**. There is a leaky downspout at the left rear side of the Pier 4 cap where there was an active drip flowing along the bottom flange of the pier cap at the time of the inspection. The downspout at the left rear end of Floorbeam 1 in Span 6 is leaking with minor efflorescence on the exterior top 3' at the deck underside. **The rear end of the downspout cleanout at the Span 6 left arch near Column 8 has only two of eight bolts in place**. **The drainage pipes at the base of the pier tower columns are clogged with debris, and there is water ponding up to 2" deep on top of the concrete floor at the base of the pier columns in Piers 4, 5, and 8 (see Photo 13)**. The base of the downspouts near the reinforced concrete pier walls exhibit moderate laminate corrosion and section loss where they were not painted.



Photo 11 – Scuppers at the right rear end of Span 1 full of debris (looking southwest).



Photo 12 – 100% section loss in the downspout at the right side of Pier 3 (looking west).

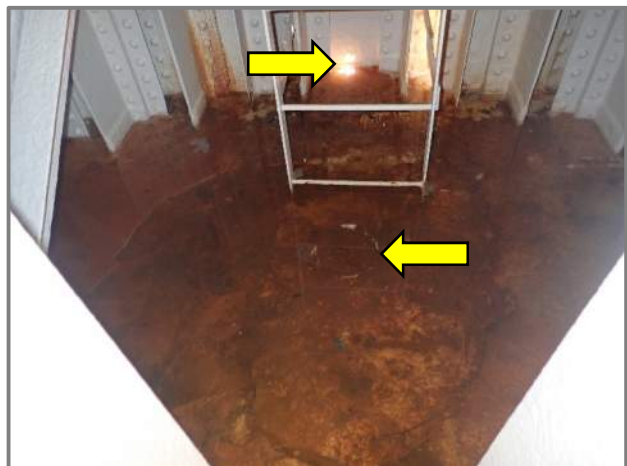


Photo 13 – Clogged drain pipe and water ponding at the base of the left Pier 5 column (looking south). Note the daylight visible through the area of 100% section loss in the column.

## ITEM 59 – SUPERSTRUCTURE SUMMARY

The superstructure is in SATISFACTORY CONDITION [6-NBIS] overall with most locations having no notable deficiencies but some areas of advanced section loss in the beams at the abutments, minor to moderate section loss in the jack arches and arch exteriors, isolated construction damage in the floorbeams, a cracked tack weld, and spalls with exposed reinforcement in the Forward Abutment slab underside. The structure was recently painted as part of a minor rehabilitation project, and minor to moderate section loss in the beams, stringers, arches, and bearings has been arrested by paint.



Photo 14 – Forward Abutment slab underside with full length longitudinal cracks and a spall with exposed reinforcement at the left rear end (looking north).

### ELEMENT 38 – REINFORCED CONCRETE SLAB

There is a reinforced concrete slab at the cellular Forward Abutment which is visible due to arched openings in the rear wall of the abutment. The slab is in fair condition overall with several full length longitudinal cracks up to 1/8" wide with efflorescence and rust staining in the underside. There is a 5' long by up to 5' wide spall with exposed reinforcement at the left rear end of the underside (see Photo 14).



Photo 15 – Beam 11 at the Rear Abutment with 100% section loss in the transverse stiffener and painted over pitting throughout the web and flanges (looking south).

### ELEMENT 107 – STEEL OPEN GIRDER/BEAM

The rolled steel beams and built-up sidewalk beams in Spans 1 through 4 and Span 9 are in satisfactory condition due to minor to moderate section loss at the expansion joints and painted over pitting. Note that Beams 1 and 13 support the sidewalk and the railing and are not included with this element. See Element 330 – Metal Bridge Railing for deficiencies in Beams 1 and 13.

The end 2' of the beams in Span 1 typically exhibit 1/8" deep painted over pitting at the Rear Abutment. Beam 11 is dapped at the Rear Abutment and has 100% section loss in the bottom 24" of the transverse stiffeners with up to 3/16" deep pitting in the web and flanges (see Photo 15). The web of Beam 8 has a 3" long by 1" high area



Photo 16 – Beam 10 floating at the Rear Abutment due to a missing shim plate (looking west).



of 100% section loss below the Rear Abutment end diaphragm. The end 2' of the Beam 10 bottom flange and bottom portion of the web was removed and replaced with a portion of a new rolled steel beam welded in place. There is a missing shim plate below the new Beam 10 bottom flange, and the beam is floating 1/2" above the Rear Abutment masonry plate (see Photo 16). The end 5' of the beams at the Forward Abutment has painted over 1/16" deep pitting throughout.

Beams 3 and 11 in Spans 2 through 4 exhibit 1/16" deep pitting in the bottom portion of the web and throughout the bottom flange with isolated 1/8" deep pits in the web near midspan. At midspan of Span 4, the Beam 3 transverse stiffeners have up to 100% section loss at the bottom 3" (see Photo 17). Beams 7 and 8 in Span 9 typically have two misdrilled holes in the web at the utility bracket bolted connections.

### ELEMENT 113 – STEEL STRINGER

The steel stringers are in satisfactory condition with localized painted over pitting 1/16" deep. There are isolated areas with advanced section loss, particularly near the utility housing at midspan of the centerline of Span 6 (see Photo 18). There is moderate pitting in Stringers 6 and 7 adjacent to the access hole in the deck at the utility housing. Stringers 2 and 10 typically have painted over pitting 1/16" deep near the interface between the downspouts and the deck underside. The web of Stringer 6 above the rear bearing on Pier 6 has poor quality plug welds and fillet welds at the right diaphragm connection angle. The Stringer 7 bearing in Span 8 at Pier 7 is only bearing on a 2" width at the left edge (see Photo 19); there is a stay plate welded to the pier cap top flange on the right side of the bearing where the forward face weld has broken leaving a 1" high gap.



Photo 17 – Beam 3 transverse stiffener with 100% section loss at the bottom 3" (looking southeast at midspan of Span 4).

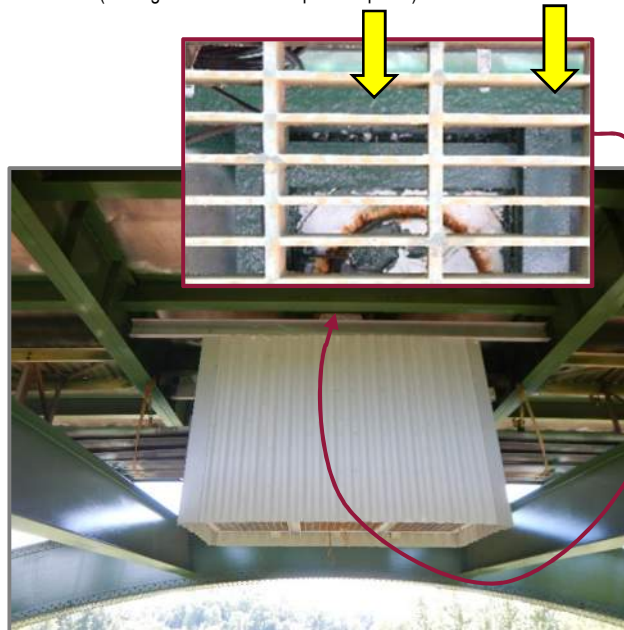


Photo 18 – Section loss in Stringer 7 below the deck access hole at midspan of Span 6 (looking south). Inset: Looking up and north at the bottom flange through the utility housing grate.

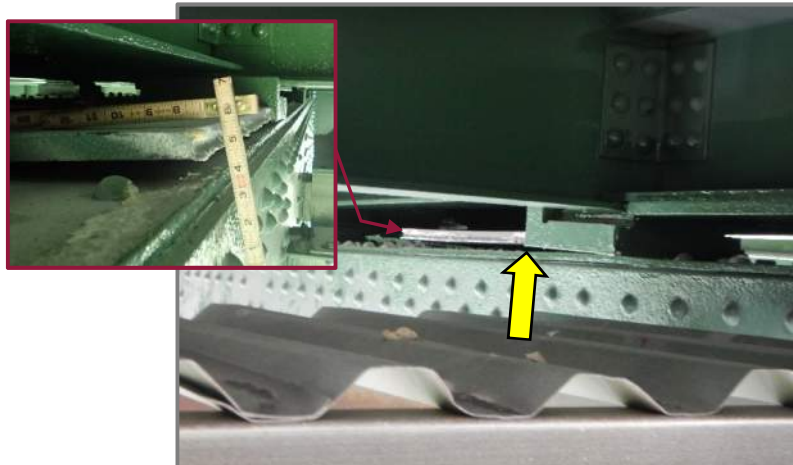


Photo 19 – Stringer 7 at the forward side of Pier 7 not fully bearing on the pier cap (looking southwest). Inset: Looking north along the east edge.

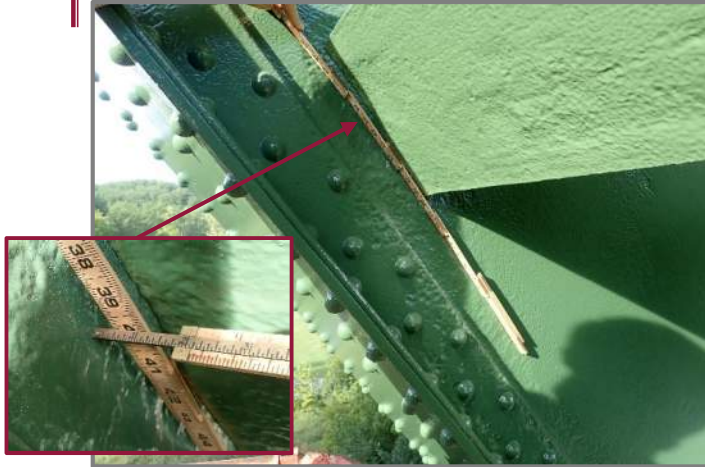


Photo 20 – Painted over pitting in the exterior face of the arch web and bottom flange angles near the pier (looking south at the north face of the right arch in Span 7 below the Column 2 strut).

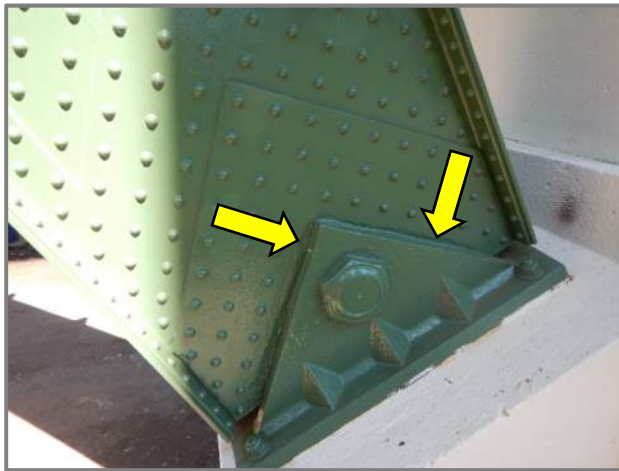


Photo 21 – Up to 1/4" deep pitting in the pin plate surrounding the bearing casting (looking north at the Span 6 left arch Pier 6 bearing)



Photo 22 – Corrosion hole in the Span 8 left arch top flange plate at Column 2 (looking west at the interior).

## ELEMENT 141 – STEEL ARCH

The steel arches are in **satisfactory** condition overall with areas of minor to moderate **painted over** section loss throughout the exterior of the arches, spandrel columns, and built-up jack arches. Isolated locations of **up to 3/16" deep pitting in the exterior of the arch ribs** is typically localized at the uphill side of the top flange at spandrel columns, uphill side of the flanges at splices, and in the web plates and bottom flange angles near the piers. **An isolated area of 3/8" deep pitting was noted in the bottom 5" of the Span 7 right arch north web below the Column 2 strut (see Photo 20).** The arch struts typically exhibit **painted over** pitting up to 3/16" deep on the downhill side of the top face of the webs and flanges and near the connections to the arch. The struts also have minor painted over section loss in the underside at drain holes.

The arch interiors at the bottom are newly painted between the bay above the bearings and the access hatch bay. The interior of the arches outside of the newly painted locations typically has protective coating failure with minor surface corrosion throughout. The bottom of the arches near the bearings has laminate corrosion throughout the web plates, flange plates, and stiffeners. **The pin plates exhibit 1/8" deep pitting up to 6" high surrounding the bearing castings, and rivet heads at these locations have up to 75% section loss.** At the Span 6 left arch bearing at Pier 6, the pin plate has 3/16" deep, with isolated 1/4" deep, pitting around the perimeter of the bearing casting **(see Photo 21).** There are corrosion holes up to 1" in diameter in the left arch top flange plate in Span 7 at Column 12 and Span 8 at Column 2 **(see Photo 22).** Blasting debris is typical within the end five bays of the arches, and animal droppings are present on the interior diaphragms throughout. There are locations of **3/4" thick pack rust** between intermediate hatch doors and hatch angles at the interior of the arch. There are isolated misdrilled holes in the arch interior stiffeners at column connections. **The arch access hatch doors do not close fully, leaving gaps up to 1 1/2" wide** where water can infiltrate the arch interior.





Photo 23 – 100% section loss in the top flange angle of the Span 7 right jack arch (looking east near Pier 7).

The jack arches have 1/16" deep painted over pitting throughout. There are localized areas with moderate to advanced section loss in the jack arches. **Knife edging and waviness are present in the top flange of the right jack arch in Span 6 between Floorbeams 6 and 7, and the right jack arch in Span 7 at Pier 7 is similar but has several corrosion holes in the top flange (see Photo 23).** The left jack arch in Span 7 has a distortion in the bottom flange where it is bent up 1/4" over a 6" length between Pier 6 and Floorbeam 1, and the right jack arch in Span 8 has a minor distortion with the left top flange angle bent down 1/4" over a 9" length between Floorbeams 10 and 11.



Photo 24 – Typical poor quality welds between the spandrel column web plates and the arch top flange and 100% section loss in the column web plate (looking west at the forward web plate of Column 11 at the top flange of the right arch in Span 5).

The spandrel columns typically have minor painted over pitting 1/16" deep in the web plates, particularly near the downspouts. Column 11 of the right arch in Span 5 has **painted over** pitting up to 1/4" deep over the full height of the forward face. There are poor quality welds between the column web plates and the top flange of the arch ribs where the welds lack penetration with 100% section loss at the base of the column web plates (**see Photo 24**). There is typically cleaned and painted pack rust up to 3/4" thick between the flange angles and web plates. Column 1 of the left arch in Span 5 has four open holes in the south angles at a previous attachment near the top of the column. **Column 3 of the Span 7 left arch is missing two of four bolts at a downspout connection bracket in the forward face.**

## ELEMENT 152 – STEEL FLOORBEAM



Photo 25 – Cracked tack weld at Floorbeam 4 at the Stringer 6 connection angle fill plate in Span 6 (looking southeast).

The steel floorbeams are considered nonredundant steel tension members (fracture critical). They are in **satisfactory** condition overall with minor **painted over** section loss, isolated areas of construction damage, and **one cracked tack weld**. There are several poor quality welds between the floorbeam bottom flange and the spandrel columns with uneven toes, porosity, spatter, and minor undercutting.

**There is a 3/4" long crack in a poor quality tack weld between the Floorbeam 4 rear face and the left Stringer 6 connection angle fill plate in Span 6 (see Photo 25).** To the left of this deficiency,



Photo 26 – Construction damage in the web of Floorbeam 3 in Span 6 (looking east at the rear face between Stringers 7 and 8).

Floorbeam 4 also has a transverse stiffener on the rear face which is bent 1 1/2" over a 12" height between Stringers 5 and 6. Floorbeam 3 in Span 6 has a location of construction damage in the rear face between Stringers 7 and 8 with the top of the web bent in 1/4" near a transverse stiffener which is bent 2" to the left over a 12" height (see Photo 26). The floorbeams typically have 1/16" deep painted over pitting in the lower portion of the web and bottom flange surrounding the utility attachments near the centerline of the bridge.

### ELEMENT 311 – MOVABLE BEARING ELEMENT 313 – FIXED BEARING

The bearing devices are in satisfactory condition as the bearings typically exhibit minor to moderate painted over section loss. The bearings throughout the bridge are moveable with the exception of the fixed bearings at the Forward Abutment.

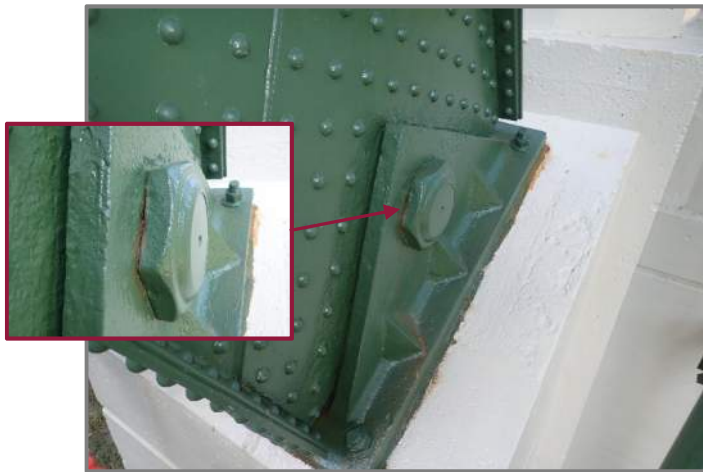


Photo 27 – Active pack rust at the Span 8 right arch pin nut (looking southwest at the Pier 7 bearing). Note the typical pitting in the exterior face of the pin plate and bearing casting.

The Beam 10 bearing at the Rear Abutment is missing a shim plate between the bottom flange and the sole plate resulting in a 1/2" high gap (see Photo 16). The right anchor bolt of the Stringer 5 bearing in Span 6 at Pier 6 is missing. The Stringer 7 bearing in Span 8 at Pier 8 has minor abrasion dust between the masonry plate and the side plates. The left jack arch bearing in Span 7 at Pier 7 has minor painted over section loss, and the right anchor bolt nut has moderate section loss which has been painted. The Stringer 7 bearing in Span 7 at Pier 7 has a stay plate on the right side with a broken weld at the pier cap top flange (see Photo 19)



Photo 28 – Moderate laminate corrosion on the web plates and stiffeners at the Span 5 left arch bearing (looking east at the Pier 5 bearing). Note the anchor bolt nut with up to 100% loss on the uphill side.

The arch bearings are in satisfactory condition overall with an isolated location of active pack rust and moderate laminate corrosion on the stiffeners below the pins. There is 1/4" thick active pack rust between the Span 8 right arch Pier 7 bearing casting and the north pin nut (see Photo 27). The southwest anchor bolt at the Span 5 left arch Pier 4 bearing is bent which appears to be due to construction damage. The



arch bearing anchor bolts and nuts have **50% to 100% section loss (see Photo 28)**, and there is standing water at the uphill side of the bearings. 6" of water was noted at the Span 8 right arch Pier 8 bearing.

The Forward Abutment fixed bearings typically have 1/16" deep painted over pitting, and there are **gaps up to 3/8" high** between the right edge of the shim plates due to cleaned and painted pack rust (see Photo 29).

### ELEMENT 515 – STEEL PROTECTIVE COATING (SUPERSTRUCTURE)

The protective coating system is in good condition due to the recent completion of painting operations throughout the structure. The exterior surfaces of the superstructure have been **painted**. The interior of the arches was only **painted in the short length from the bay above the bearings to the lowest hatch bay**, and there is typically laminate corrosion at the arch ends and minor to moderate corrosion throughout the arch interior. **There is a minor vertical scrape at the left forward corner of the left arch Column 8 in Span 5.** The plywood painting containment within both Span 7 arches had not been removed from the rear hatch locations at the time of the inspection.

### DIAPHRAGMS (no associated element)

The diaphragms are in **satisfactory** condition with isolated areas of moderate to advanced section loss. They are located at the abutments and at midspan of the approach spans. The diaphragm between Beams 8 and 9 in Span 1 exhibits **construction damage with the top flange bent up 1/2" in two 9" long areas**. Similarly, the diaphragm between Beams 6 and 7 at Pier 8 has damage to the **top flange with it bent down 1/2" over a 6" length**. The diaphragm between Beams 10 and 11 at midspan of Span 4 has areas of **100% section loss in the left 6" of the bottom flange (see Photo 30)**. At midspan of Span 6, there are two diaphragms with advanced section loss between Stringers 6 and 7 below an access hole in the centerline of the deck. The rear diaphragm at the access hole in Span 6 has **100% section loss up to 4" wide over a 3' length**.



Photo 29 – Gaps up to 3/8" high between the right edge of the shim plates at the Forward Abutment fixed bearings (looking east at the Beam 8 Forward Abutment bearing).



Photo 30 – 100% section loss in the bottom flange of the diaphragm between Beams 10 and 11 at midspan of Span 4 (looking west). Inset: Looking up and south at the forward bottom flange angle.

**FATIGUE (no associated element)**

The fatigue details of the bridge are in good condition overall. A summary of all fatigue details can be found in **Table 3**. The floorbeams and pier caps are considered nonredundant steel tension members due to their spacing exceeding 14'.

CUY-10-0869 Fatigue Details			
Fatigue Category*	Member	Description	Photo
E	Floorbeam/Pier Cap Cantilevers	Base metal of the web at the termination of longitudinal stiffener-to-web welds with the stiffener attached by fillet welds with no transition radius ( $t < 1.0"$ )	Photo 31
E	Floorbeam/Pier Cap Cantilevers	Base metal of the flange at the termination of vertical stiffener plate-to-flange welds with the stiffener attached by fillet welds with no transition radius ( $t < 1.0"$ )	Photo 32
E'	Pier Cap Top Flange	Base metal of the top flange at a detail with a length $L$ in the direction of primary stress and a thickness $t$ attached by fillet welds parallel to the direction of primary stress where the detail incorporates no transition radius ( $L > 12t$ or 4 in., $t \geq 1.0$ in.)	Photo 33
E'	Stringers	Base metal of the stringer flange at the termination of partial length welded cover plates than are wider than the flange and without welds across the ends	Photo 34

Table 3— CUY-10-0869 listing of fatigue details (nonredundant steel tension members/fracture critical members are indicated in red)

\*Fatigue prone detail categories are in accordance with AASHTO LRFD specifications Table 6.6.1.2.3-1

There are isolated overcuts in the floorbeam and pier cap webs at the beam/stringer cover plate openings. The partial length welded cover plates on the stringers are in good condition with no significant deficiencies noted. Although not defined as a fatigue category by AASHTO, tack welds are considered problematic details. They are present throughout the structure, particularly at transverse stiffener angles. **A partially cracked tack weld was noted at the rear face of Floorbeam 4 in Span 6 (see Element 152 – Steel Floorbeam). The Stringer 7 bearing in Span 8 at the Pier 7 top flange has a broken stay plate weld at the stay plate on the right side of the bearing (see Photo 19).**

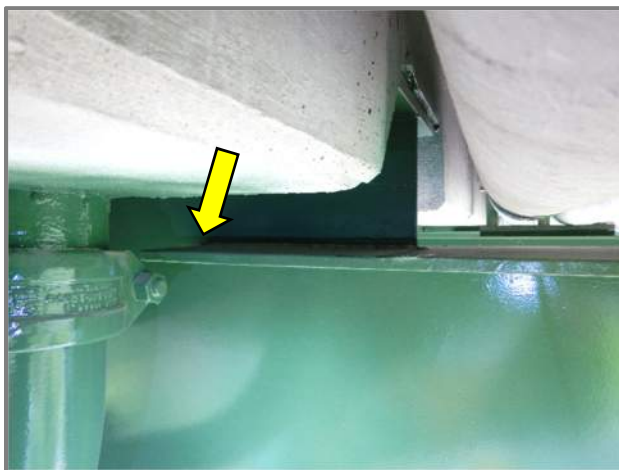


Photo 31 – Longitudinal stiffener to web weld termination with no transition radius (looking west at the Span 7 Floorbeam 12 left cantilever).

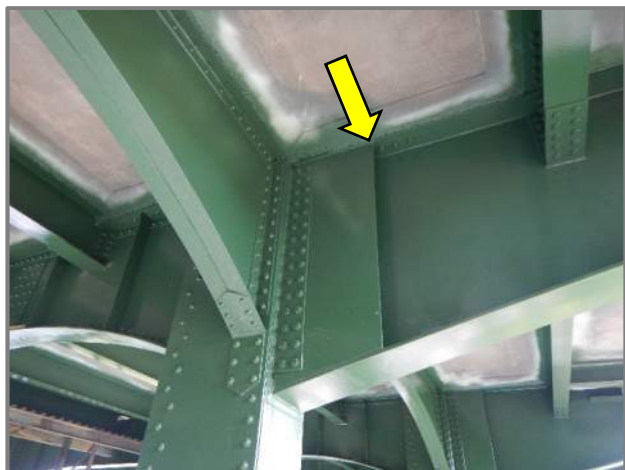


Photo 32 – Termination of stiffener to flange welds with no transition radius (looking west in Span 8 at the Floorbeam 10 left cantilever).

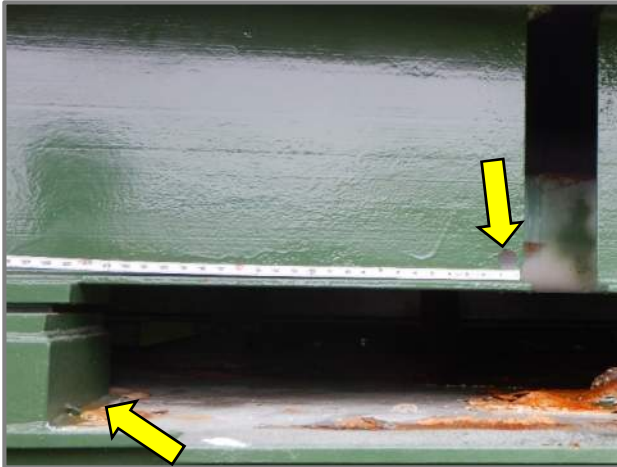


Photo 33 – Typical fillet weld with no transition radius between the pier cap top flange and stringer bearing plate (looking south at the Stringer 1 north face and bearing plate at the Pier 6 cap top flange). Note the 100% section loss in the stringer web.



Photo 34 – Typical partial length welded moment cover plate at the beam/stringer flange at the floorbeams (looking southwest in Span 4 at the Beam 6 bottom flange near Pier 3).

## ITEM 60 – SUBSTRUCTURE SUMMARY

The substructure is in FAIR CONDITION [5-NBIS] with many of the steel pier caps and columns only exhibiting minor **painted over** section loss and several areas of advanced to 100% section loss within the columns. Hairline **sealed** cracks and **epoxy-injected vertical** cracks are present in the reinforced concrete substructure elements.

### ELEMENT 202 – STEEL COLUMN

The steel pier columns are in **fair** condition overall with areas of minor painted over section loss on the exterior faces and moderate to advanced section loss and pack rust throughout the interiors of the pier tower columns **which has been painted in most areas**.

The column exteriors have minor to moderate **painted over** pitting throughout with corrosion holes up to 8" high by 3" wide in the web plates, especially near the base of the columns and at locations of interior diaphragms. There is typically **minor rust staining** on the exterior face of the columns below corrosion holes. There is pack rust typically 1" thick but up to 2" thick at the exterior face of the columns between web plates. Several locations throughout the pier columns were missing fasteners at the exterior face of the web plates. The Pier 5 right column is missing six fasteners at the rear edge of



Photo 35 – Missing fasteners at the left rear corner of the Pier 5 right column (looking up and southeast).



Photo 36 – Pier 6 right column exterior with 3/8" deep pitting in the rear web plate (looking northeast).



the left face with cleaned and painted pack rust between the plates (see Photo 35). The Pier 6 right column has a repair plate in the right face opposite the strut which has 14 of 42 holes which are oversized. There is an isolated location of 3/8" deep by 10" wide by 14" high pitting in the rear face of the Pier 6 right column approximately 20' above the base (see Photo 36).

The Pier 4 through 8 column interiors typically have moderate to advanced section loss with 100% section loss to stiffeners and diagonal bracing members throughout (see Photo 37). The column interiors have been painted except for the columns at Piers 1 through 3 and the Pier 7 left column. The access hatch doors at the base of the columns are difficult to open and some cannot be fully closed due to the recent painting operation. Locations of pack rust up to 3/4" thick within the columns have been cleaned and painted with isolated locations of minor reactivating corrosion. Rivet heads throughout the interior exhibit up to 90% section loss, and stiffeners and diagonal bracing members have knife edging along the outstanding legs and are bowed several inches along their full length. The interior of the Pier 5 columns could not be accessed since wood blocking and foam sealed the entrances from the Pier 5 cap, and the column base doors could only be opened approximately 7". The lateral bracing angles in the lower levels of the Pier 7 left column exhibit 100% section loss in the outstanding legs, particularly in the north side of the column. The ladder safety cable in both columns of Pier 7 are broken halfway between the strut and the pier cap. The base of the Pier 7 left column is full of up to 2' deep rust and debris, and the Pier 7 left column lock is missing. The Pier 8 right column hatch door was not reinstalled after painting was finished and is resting on struts behind the ladder. The left column of Pier 2 does not have a lock on the access hatch door at the rear face, and the left column of Pier 3 has 5/32" deep by 2" high pitting in the interior face of the forward web plate. The concrete-encased bottom of the pier columns are included with this element, and they have up to 2" of standing water due to blocked drainage pipes (see Photo 13).

## ELEMENT 210 – REINFORCED CONCRETE PIER WALL

The pier walls are in satisfactory condition with sealed vertical cracks and isolated unsealed spalls. There is typically minor rust staining at the drainage holes below the columns. Vertical cracks in the center portion of the walls have been sealed (see Photo 38), and a full height vertical crack at the forward face of the Pier 5 wall has been epoxy-injected. The top right corner of the Pier 8 wall has a 5' long by 6" high by 6" wide spall which has not



Photo 37 – Pier 7 left column interior with only up to 10 1/2" high remaining section (41 1/2" nominal height) at a diagonal bracing connection plate (looking south in the upper half of the column).



Photo 38 – Pier 4 reinforced concrete pier wall with a typical sealed vertical crack and minor rust staining below the column drainage holes (looking west).



been sealed. Pier 4 has a **14" high by 8" wide by 2" deep spall** at the right end of the forward face at ground level.

### ELEMENT 215 – REINFORCED CONCRETE ABUTMENT

The abutments are in **satisfactory** condition overall. The Rear Abutment was recently **sealed** and has minor honeycombing in the left half and **minor water staining** below the utility conduit. The forward wall of the cellular Forward Abutment is visible due to arched openings in the rear wall. The Forward Abutment has several vertical hairline cracks throughout the forward wall, and there is moderate rust staining present in line with rust staining in the slab underside (see **Photo 39**). The lower portion of the Forward Abutment forward wall is composed of the original masonry abutment which has been doweled into and connected to the newer concrete portion, and there is typically **cracked and missing grout** throughout the masonry blocks.



Photo 39 – Vertical hairline cracks and rust staining on the reinforced concrete portion of the forward wall at the Forward Abutment (looking east).

### ELEMENT 231 – STEEL PIER CAP

The steel pier caps are in **satisfactory** condition overall due to areas of minor **painted over** section loss at the exterior and locations of **active corrosion at debris and water ponding at the interior**. The interior of the Pier 5, 6, and 7 caps is in **poor condition due to heavy debris and locations of standing water**. The exterior of the pier caps have been **painted**. The underside of the caps between the columns typically exhibit 1/16" deep painted over pitting. Diaphragms, lateral bracing, and stiffeners within the pier caps have moderate section loss with several areas of 100% section loss in the outstanding legs.



Photo 40 – 1/4" long overcut in the rear face of the Pier 3 web at the Beam 6 bottom flange (looking east).

The Pier 3 cap web has a minor **1/4" long by 1/4" deep overcut** in the rear face at the Beam 6 bottom flange opening (see **Photo 40**). The Pier 5, 6 and 7 cap interiors have **debris up to 6" deep throughout the bottom including sand, water, and trash where the containment plywood has not been removed (see Photo 41)**, and the Pier 5 right column **ladder safety cable support bracket is bowed downwards**. There is moderate active rust staining and corrosion on the underside of the Pier 6 cap at the drain holes. The rust staining extends along the left Pier 6 column and onto the horizontal strut below. The Pier 7 cap has a 2' long location of 1" thick cleaned and painted pack rust at the right end of the rear face underside. The Pier 6 cap has an anchor bolt nut **painted** to the top flange on the right side of the left rear jack arch bearing.

**ELEMENT 515 – STEEL PROTECTIVE COATING (SUBSTRUCTURE)**

The steel protective coating is typically in **satisfactory** condition due to the recent completion of painting operations throughout the bridge. **There were several locations throughout the pier tower columns where wood blocking and foam from the painting containment was not removed at the time of the inspection:**

- Top of both Pier 5 columns
- Top of both Pier 6 columns
- Pier 7 left column opening to horizontal strut
- Top of both Pier 7 columns

The exterior of all of the structural steel was painted, but the **interior of the Pier 5, 6, and 7 caps did not appear to have been painted** and had heavy debris buildup and water ponding along the bottom flange (**see Photo 41**). **The interior of the Pier 7 left column was not painted** due to extensive advanced section loss (**see Photo 37**), and approximately **15' of the Pier 7 right column interior at midheight did not receive the finish coat of paint**. The top lateral bracing, the top face of the pier caps at the right sidewalk access hatches, the interior of the Pier 5 through Pier 7 caps, and the tops of the columns below the wood blocking and foam have minor to moderate corrosion throughout at areas of debris accumulation and water ponding (**see Photo 42**). The exterior of the pier columns have isolated areas of 100% section loss with minor reactivating corrosion below corrosion holes in the web plates.

**ELEMENT 830 – ABUTMENT BACKWALL**

The Rear Abutment backwall is in good condition with only two vertical hairline cracks noted at the right end.



Photo 41 – Debris and water ponding in the south side of the Pier 6 cap with access to the column blocked by painting containment plywood (looking north). Inset: Looking east at blasting debris in the north half of the cap and 100% section loss in the bottom flange longitudinal stiffener.



Photo 42 – Laminated corrosion at the top of the Pier 6 right column below the painting containment (looking up and south).

### SLOPE PROTECTION (no associated element)

The slope protection is in good condition at the Rear Abutment with no significant deficiencies noted at the time of the inspection. The slope at the Forward Abutment is in poor condition and has an erosion channel below the centerline of the bridge which is up to 5' deep and extends to the Pier 8 wall (see Photo 43). The erosion channel at the Forward Abutment does not appear to have changed significantly since the previous inspection.

### ITEM 61 – CHANNEL SUMMARY

The channel is in GOOD CONDITION [7-NBIS] overall with no major deficiencies noted at the time of the inspection.

#### ITEM 61.01 – SCOUR

The scour is in GOOD CONDITION [7-NBIS] with no deficiencies or undermining of the substructure units noted.

### CHANNEL ALIGNMENT (no associated element)

The alignment is in **satisfactory** condition overall due to the slight curve at the location of the bridge.

### CHANNEL PROTECTION (no associated element)

The protection is in **satisfactory** condition overall. The forward bank is steep and exhibits minor erosion near Pier 8 (see Photo 44). The rear bank is typically well vegetated.

### HYDRAULIC OPENING (no associated element)

The hydraulic opening is in good condition with a vertical clearance over 100' which is significantly greater than several other structures on the river. No obstructions were noted during the inspection.



Photo 43 – Erosion channel at the Forward Abutment (looking east).



Photo 44 – View of the channel below Span 8 (looking northeast).



## APPROACH SUMMARY

The approaches are in **satisfactory** condition overall with minor cracks in the asphalt wearing surface, small failing asphalt patches, and minor spalls. The approach wearing surface and embankments are in satisfactory condition overall.

### ELEMENT 321 – REINFORCED CONCRETE APPROACH SLAB

The approach slabs are covered by an asphalt wearing surface and are rated based on the condition of the wearing surface. The approach slabs are in **satisfactory** condition overall. The forward approach wearing surface is typically in good condition with several sealed longitudinal cracks and transverse map cracking along the forward edge (**see Photo 45**). The rear approach slab wearing surface has map cracking throughout the forward end 2' with several deteriorating asphalt patches and a full length longitudinal crack at the crown of the roadway (**see Photo 46**).

### APPROACH WEARING SURFACE (no associated element)

The wearing surface past the approach slabs is typically in **satisfactory** condition overall. There are several full width transverse cracks in the asphalt. The **rear approach relief joint is heaved upwards 1"** with map cracking in the adjacent wearing surface (**see Photo 47**). The sidewalks at the rear approach are vertically misaligned up to 2" high at the bridge. **The right rear approach curb has several full height cracks and spalls.**

### EMBANKMENT (no associated element)

The embankment is in good condition with no significant deficiencies noted.

### GUARDRAIL (no associated element)

The guardrail is in fair condition with moderate impact damage to the right rear guardrail and a missing blockout at the left forward guardrail. The



Photo 45 – Forward approach slab with transverse map cracking along the forward edge (looking west).



Photo 46 – Full length longitudinal cracks and deteriorating asphalt patches in the rear approach wearing surface (looking west).



Photo 47 – Overall view of the rear approach relief joint which is heaved upwards (looking south).

impact damage to the right rear guardrail includes a broken and missing end post and one rotated blockout (see Photo 48). The decorative railing obelisks at the approaches have several corrosion holes up to 6" high by 7" long near the base which have been painted.

### SIGN/UTILITY ITEMS SUMMARY

The signs and utilities on the bridge are typically in fair condition with several locations of 100% section loss noted in the conduit and typically minor corrosion of the utility hangers at the centerline of the bridge.



Photo 48 – Impact damage to the left rear guardrail; note the broken and missing end post (looking east).

### SIGNS AND SUPPORTS (no associated element)

Signs are not present on the bridge. There are commemorative plaques at the right rear approach obelisks which are in good condition.

### UTILITIES (no associated element)

There are utilities situated below the left sidewalk and to the right of the bridge centerline over the full length of the bridge. The utilities near the bridge centerline are supported by channels bolted to the floorbeam transverse stiffeners and beam/stringer webs with hanger systems below, and the utility supports exhibit isolated areas of minor to moderate surface corrosion. There is a utility housing at midspan of Span 6 below an access hole in the deck. At couplings, there are areas of minor corrosion and misalignments.



Photo 49 – The conduit at the Rear Abutment with 100% section loss in the underside of the conduit and minor water staining on the abutment wall below (looking west).

The underside of all of the conduit at the Rear Abutment at the centerline of the bridge exhibits 100% section loss with minor water staining on the abutment wall below (see Photo 49). One of the utility conduits between Beams 7 and 8 in Span 2 has a 3" diameter hole in the south face below Pier 1. The lower right conduit between the left sidewalk and the Floorbeam 12 top flange in Span 7 has a 1" diameter hole in the right face. The light standards on the bridge are in good condition with no major deficiencies noted at the time of the inspection.

### ITEM 41 – OPERATIONAL STATUS

The bridge remains OPEN WITH NO RESTRICTIONS [A-NBIS].

## CONCLUSIONS AND RECOMMENDATIONS

Based upon the results of the 2022 routine element level inspection, the CUY-10-0869 Bridge (SFN 1801325) is in FAIR CONDITION [5-NBIS] overall. There is typically hairline transverse cracking in the wearing surface with isolated spalls, and the expansion joints exhibit minor surface corrosion, vertical misalignments of the joint armor, and **several locations of gland failure in the right eastbound lane**. The bridge railings exhibit areas of **painted over** section loss in the steel railings and posts, and there are **sealed** spalls with exposed reinforcement throughout the concrete portion of the railings, exposing railing post anchor bolts. The deck underside has hairline transverse cracks with minor efflorescence and isolated minor spalls with exposed reinforcement. The trench drain scuppers are clogged with debris, and the downspouts have several areas of 100% loss at the bends and moderate laminate corrosion at the interface with the ground. The beams and stringers typically exhibit areas of minor **painted over** pitting below the expansion joints and the deck access hole at midspan of Span 6. **There is a cracked tack weld between a floorbeam web and a stringer connection fill plate in Span 6**. The steel pier caps and columns are in **fair** condition with areas of debris accumulation in the caps and advanced section loss at the column interior. The pier tower column concrete encasement typically exhibits shallow spalls in the top face at the base of the pier columns, and the reinforced concrete abutments and pier walls have several **sealed** vertical cracks and areas of minor honeycombing.

The four categories of recommendations for the CUY-10-0869 Bridge (S.R. 10 Bridge over Rocky River) are as follows:

- **Priority Work:**  
(Within 1 Year Period) Work which should be performed as soon as possible to address deficiencies which affect the capacity of the structure or public safety.
- **Rehabilitation/Evaluation:**  
(Within 5 Year Period) Recommendations for large-scale deficiencies which are extensive in nature and require engineering analysis.
- **Maintenance:**  
(As Scheduled) Recommendations that are minor in nature and can be easily repaired.
- **Monitoring:**  
(As Recommended) Regular field observation of defects which are not currently in need of repair but will require corrective action if deterioration continues.

**Priority Work:** None.

**Rehabilitation/Evaluation:** Deck

1. Replace the expansion joint seals.
2. Repair areas of 100% section loss and leaking downspouts.
3. Design a new drainage system for the joints above Piers 4 through 8 to prevent water from entering the caps and columns.

Superstructure

4. Replace the missing shim plate at the Rear Abutment Beam 10 bearing.
5. Repair the Pier 7 Stringer 7 bearing which is only bearing on the left 2".
6. Replace the missing anchor bolt at the Stringer 5 bearing on Pier 6.
7. Remove and replace anchor bolts and nuts with 50% or more section loss at the arch bearings.
8. Design and install new access hatches at the arches which fully close and prevent water infiltration.
9. Grind out the cracked tack weld at the rear face of Floorbeam 4 in Span 6 at the Stringer 6 connection angle fill plate.

Substructure

10. Evaluate and rehabilitate the structural steel with advanced to 100% section loss at Piers 4 through 8.
11. Design and install new access hatches at the pier tower caps and columns which fully close and prevent water infiltration.

**Maintenance:** Deck

12. Patch spalls and failing patches in the wearing surface.
13. Seal the unsealed cracks in the wearing surface.
14. Clean all drainage scuppers and downspouts that are fully or partially clogged with dirt and debris.
15. Repair damaged scupper grates.

Superstructure

16. Clean and paint the arch bearings, stiffeners, and location of active pack rust between the Span 8 right arch and the pin nut at Pier 7.

Substructure

17. Clean the pier caps of debris and water and remove the painting containment plywood which blocks access to the column interiors.
18. Apply the final coat of protective coating in the Pier 7 right column.
19. Clean and paint the interior of the Pier 7 left column and the Pier 5, 6, and 7 caps.
20. Clean out the reinforced concrete pier wall drainage pipes of debris and seal the spalls in the top face at the base of the pier columns.
21. Remove and replace deteriorated safety cables in the pier tower columns.
22. Repair the erosion channel at the Forward Abutment.

**Monitoring:**Superstructure

23. Monitor the cracked tack weld at the rear face of Floorbeam 4 in Span 6 at the Stringer 6 connection angle fill plate.
-



## Appendix A

### Framing Plan with Deficiencies

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Missing shim plate with a 1/4" gap between the sole plate and the masonry plate (looking west).



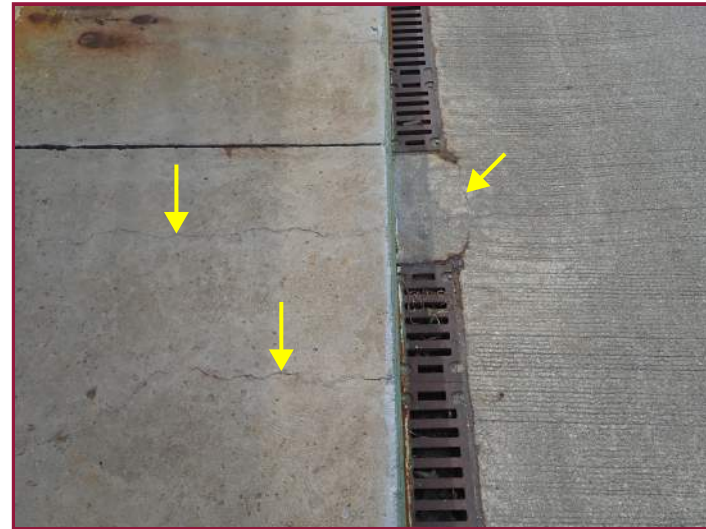
2" vertical misalignment between the left rear approach sidewalk and the bridge (looking northwest).



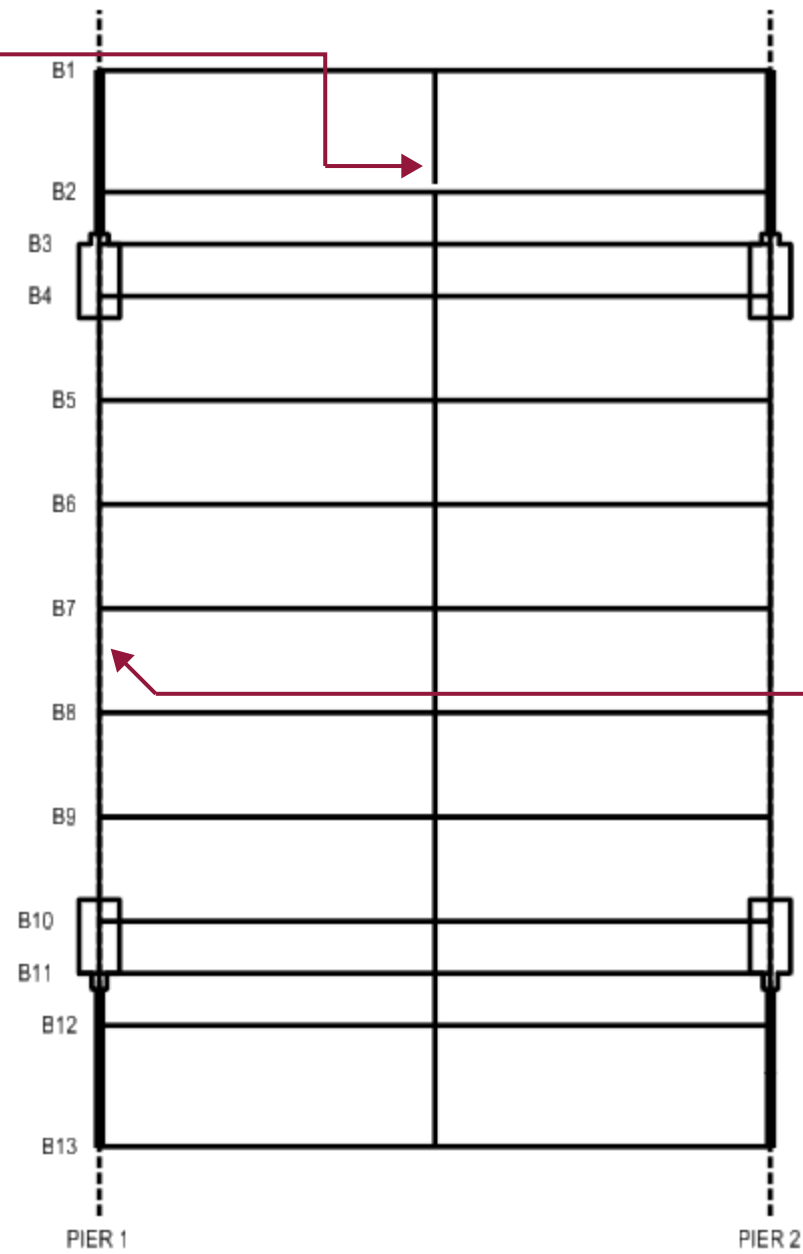
Hairline transverse cracks with efflorescence in the sidewalk underside and efflorescence at the joint with the deck (looking northwest).



Diaphragm top flange bent up 1/2" over 9" in two locations (looking east).



Transverse cracks in the sidewalk and a longitudinal crack in the wearing surface between scuppers (looking east).



3" diameter hole in the utility conduit below Pier 1 (looking northwest).

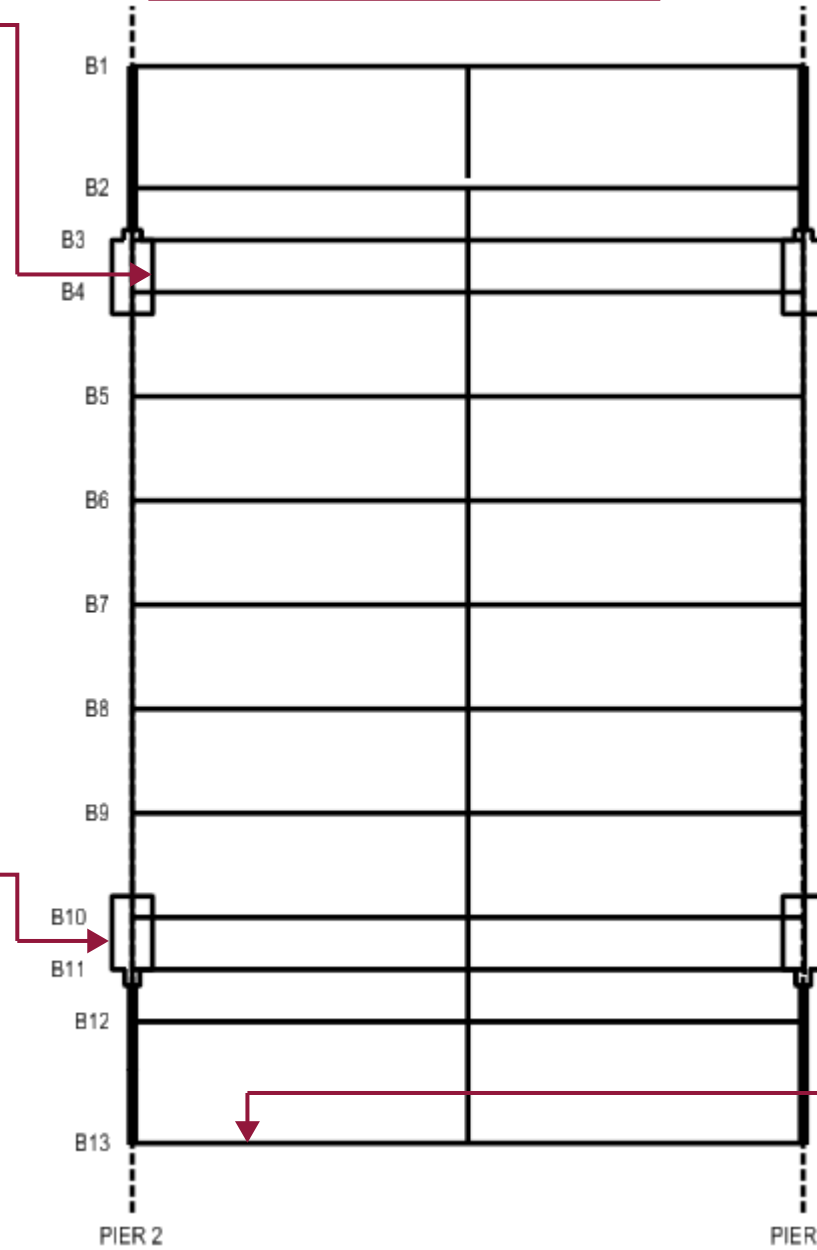




Pitting up to 5/32" deep in the interior face of the Pier 3 left column forward web at the concrete interface (looking east).



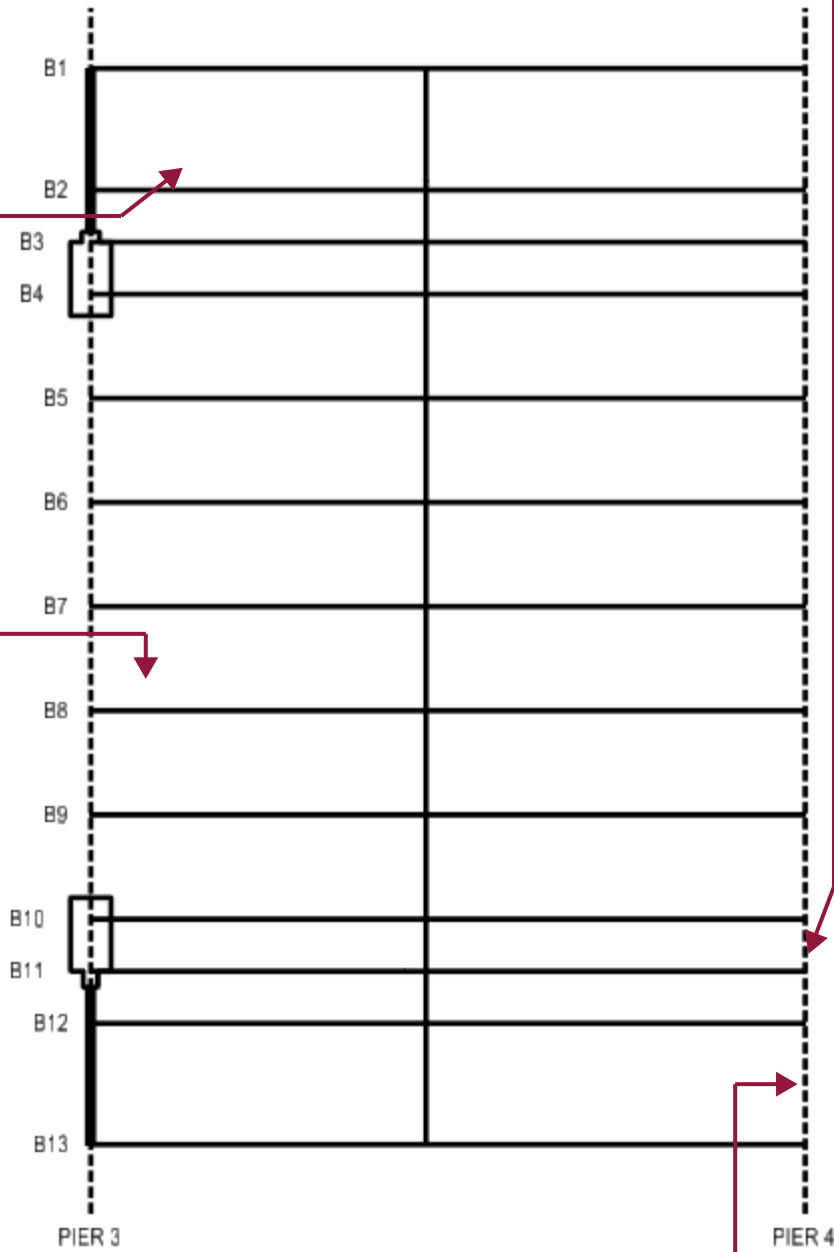
Pitting up to 1/8" deep in the rear face of the Pier 2 column (looking southeast).



Typical sealed spall in the concrete portion of the railing with an exposed metal railing anchor bolt (looking south).



Scupper grate with full depth cracks in five of the bars (looking east near the left curb).



Painted over 100% section loss in the column interior diaphragms (looking down and south near the base). Note the water ponding at the bottom of the column due to the clogged drainage pipe.



Corrosion at the bottom of the utility hanger (looking southwest).



Delaminations and minor water staining in the underside of the sidewalk at the pier cap access hatch (looking east).

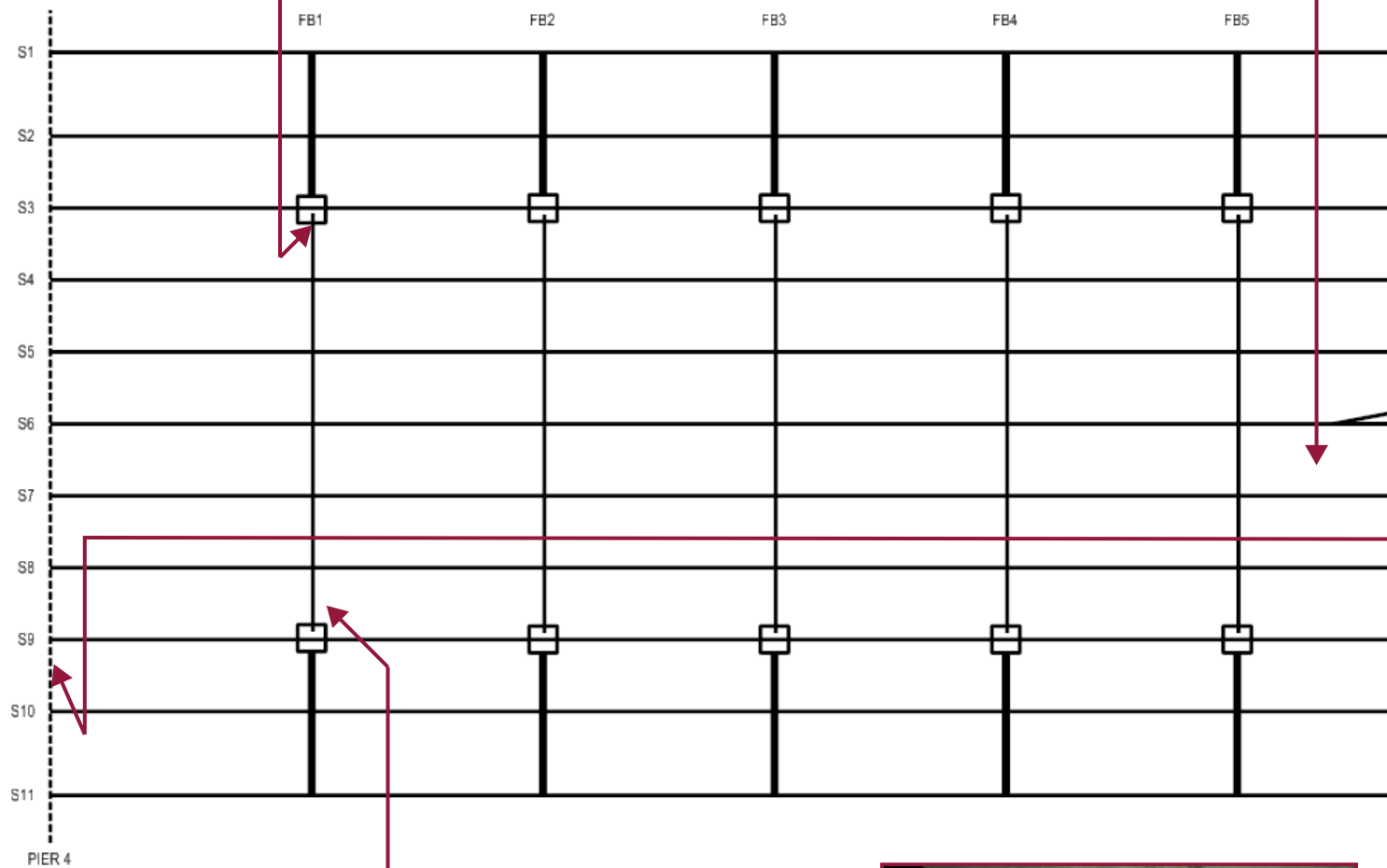




Four open holes in the south column angles of Column 1 (looking northeast).



Hairline diagonal and transverse cracks in the wearing surface (looking northwest).



Minor delaminations and water staining in the deck underside above the utilities (looking up and south). Note the corrosion on the utility supports.



Painted over 100% section loss in the pier cap interior stiffener angles (looking northeast near the south end of the pier cap).

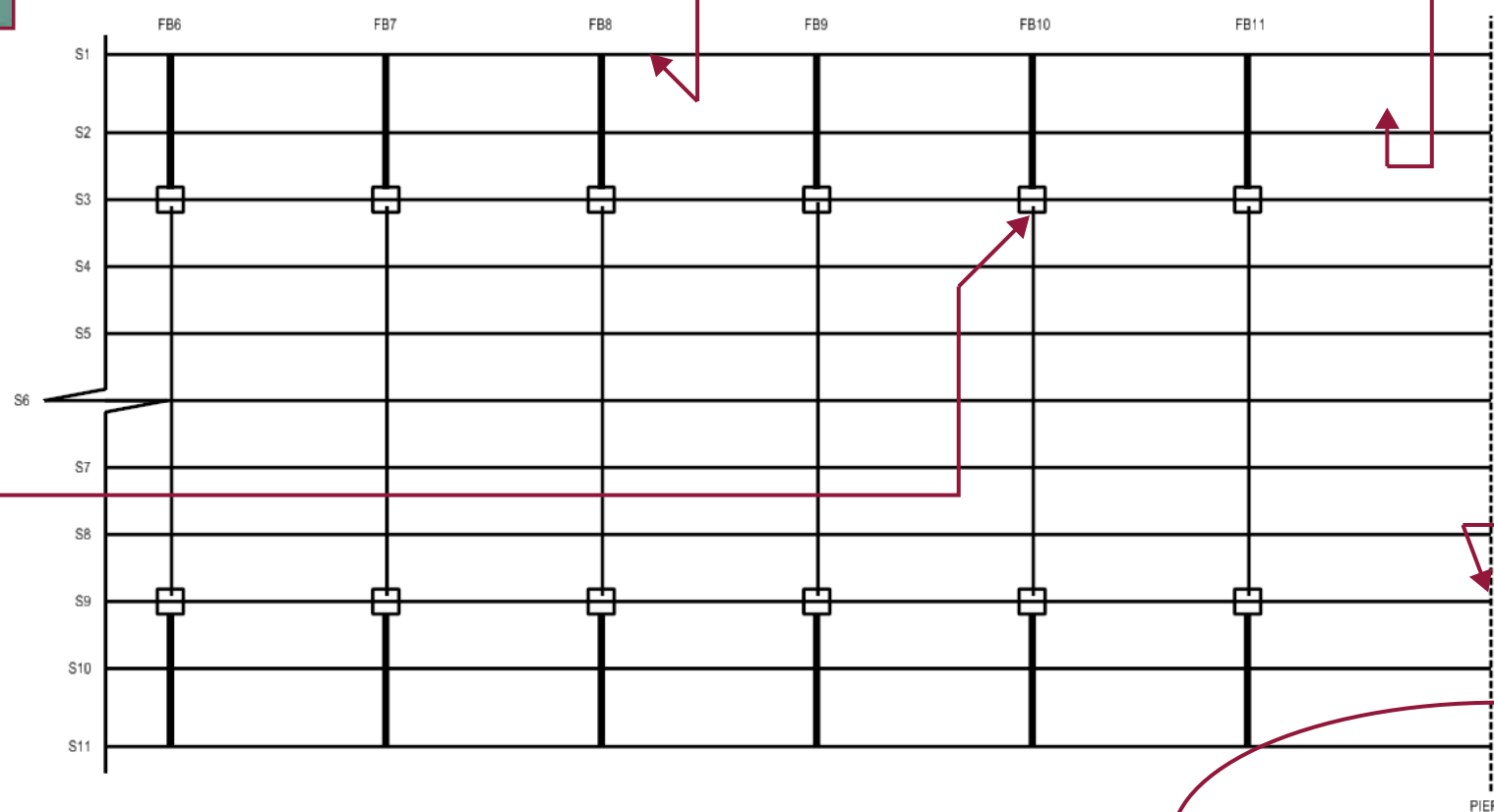




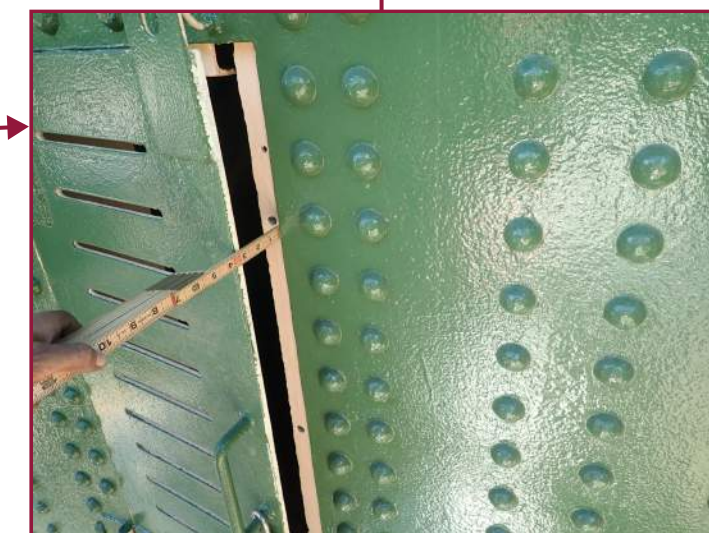
Missing railing post cap plate with minor section loss in the top of the post (looking west).



Hairline transverse cracks with minor efflorescence in the edge of the deck underside (looking north). Note the misalignment and sag of the utilities.



Poor quality weld between the floorbeam bottom flange and the spandrel column (looking north).



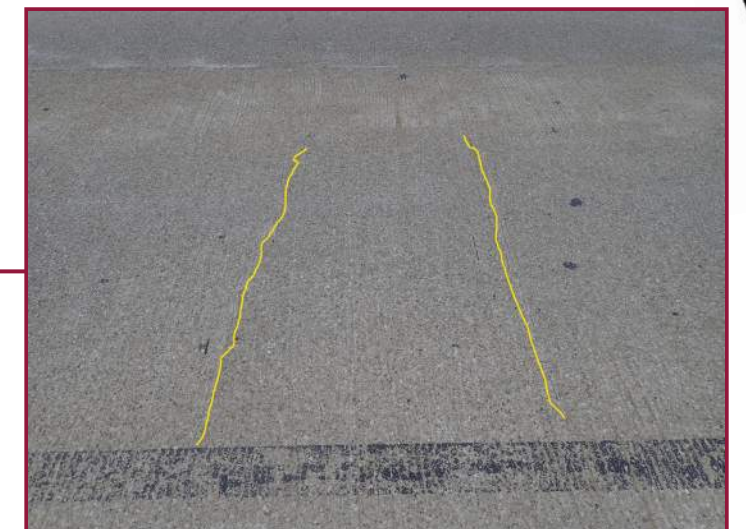
Typical Pier 5 column hatch door which is not able to be opened (7" maximum) or closed (3" minimum) with heavy paint at the hinges (looking southeast).



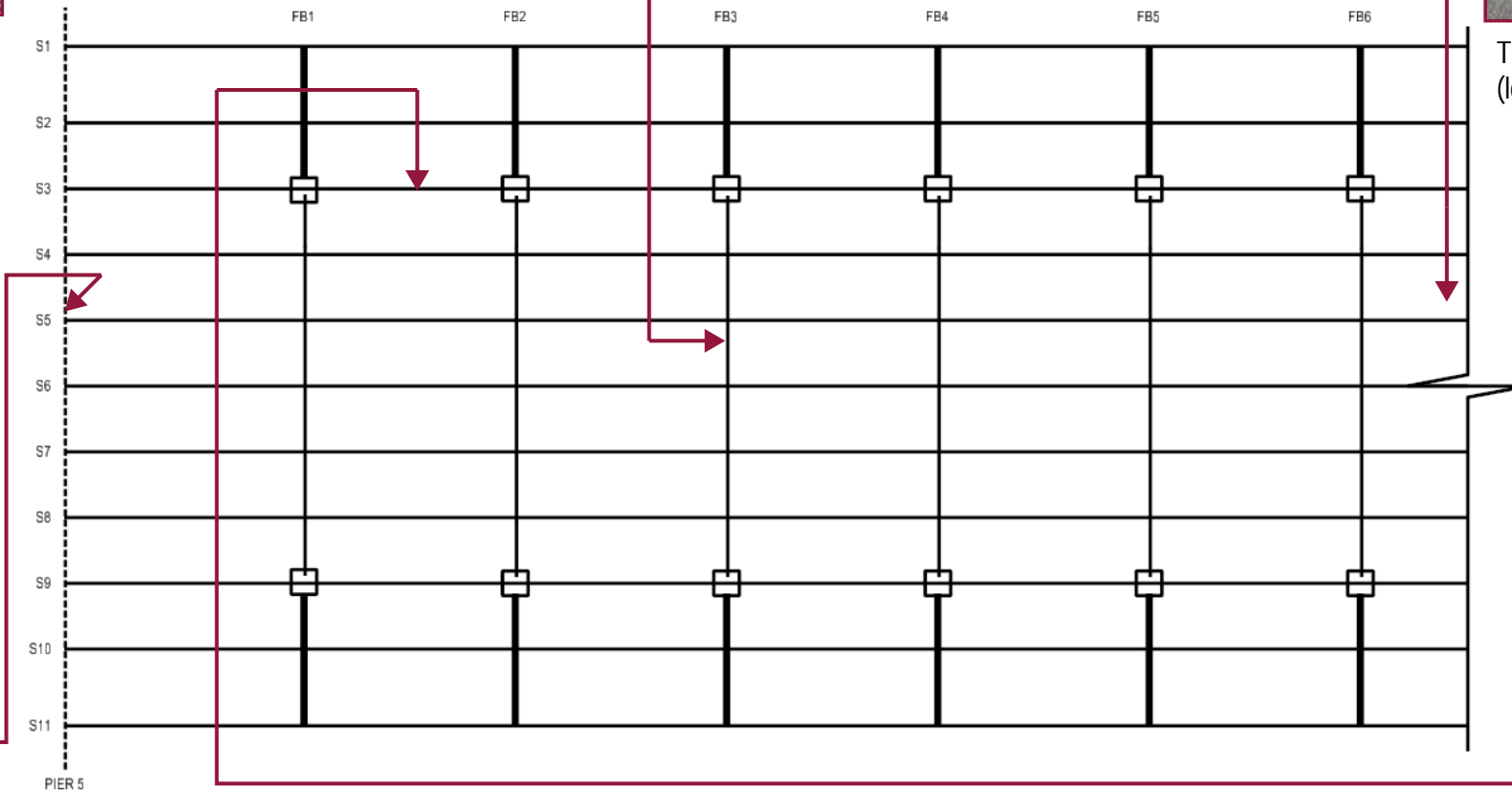




Floorbeam transverse stiffener bent 1 1/2" to the right over a 12" height (looking east).



Transverse hairline cracks in the wearing surface (looking south). Cracks outlined in yellow.



1/16" deep pitting throughout the underside of the pier cap (looking south).

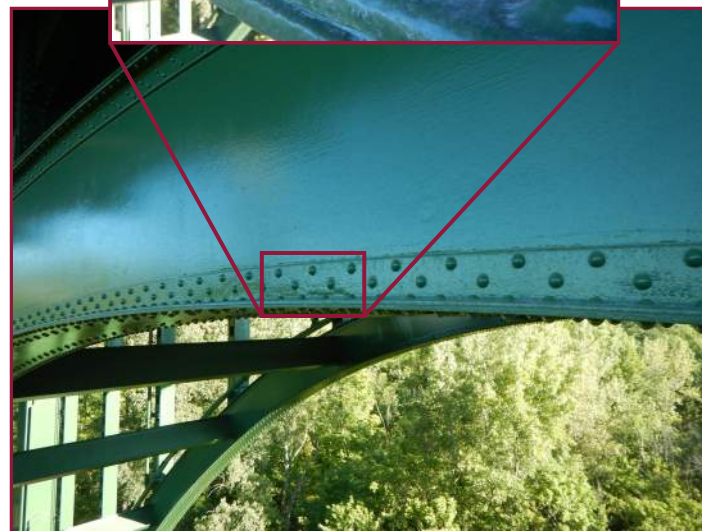


Up to 3/4" thick pack rust between the south web and the intermediate hatch door (looking southeast in Bay 12 of the arch interior).

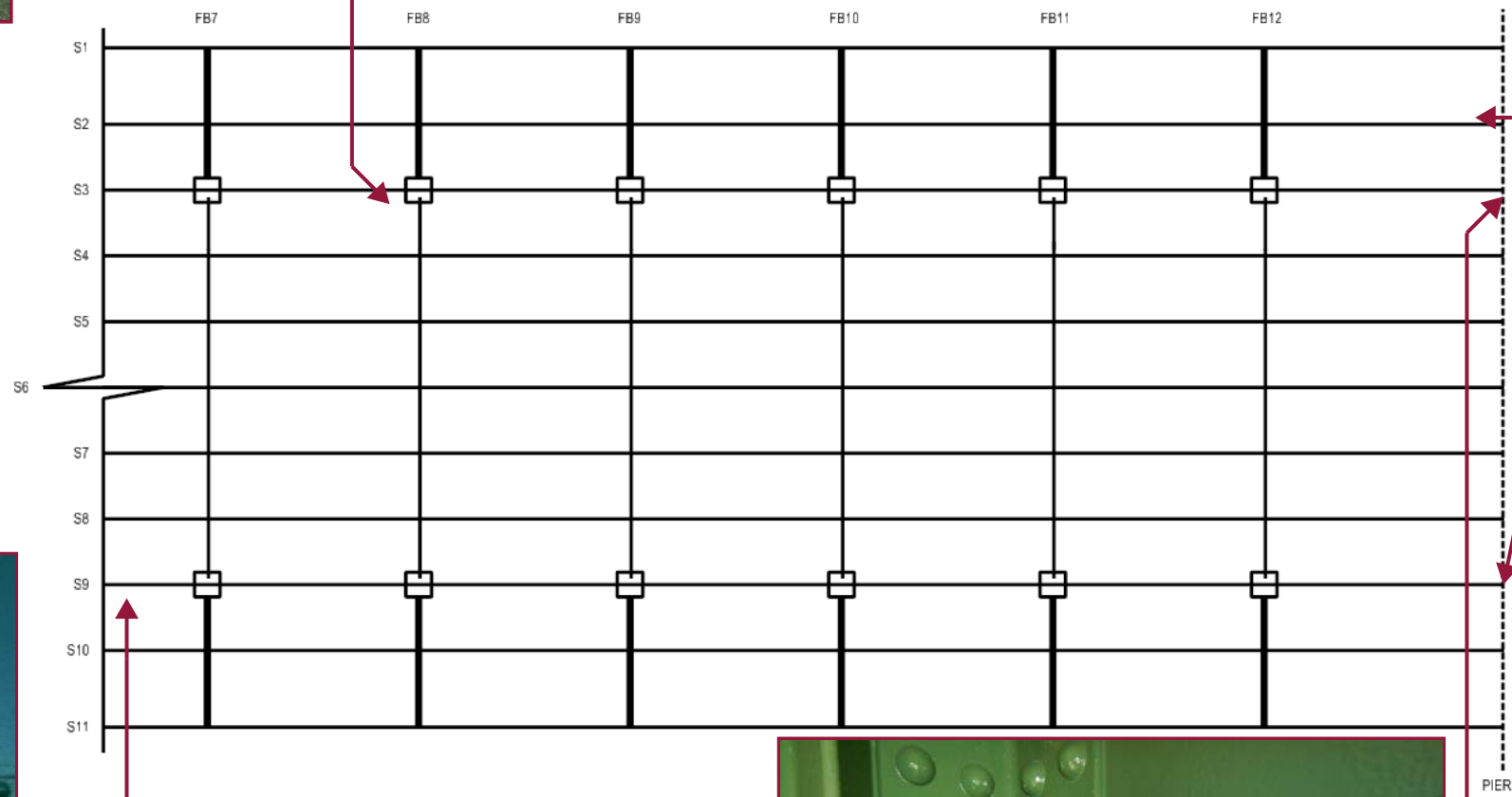




Only 2 of 8 bolts in place at the drainage cover plate (looking southeast).



1/16" deep pitting in the exterior face of the arch bottom flange (looking northwest).



Section of scupper 100% packed with debris (looking west near the Pier 6 expansion joint).



100% section loss in the top flange of the pier cap strut (looking south near Stringer 9). Note the typical corrosion in the pier cap.



Nut painted to the top flange of the pier cap (looking northeast).

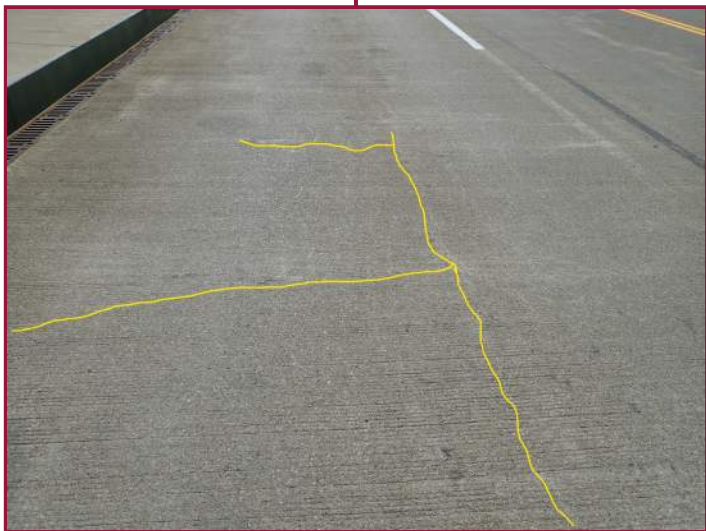
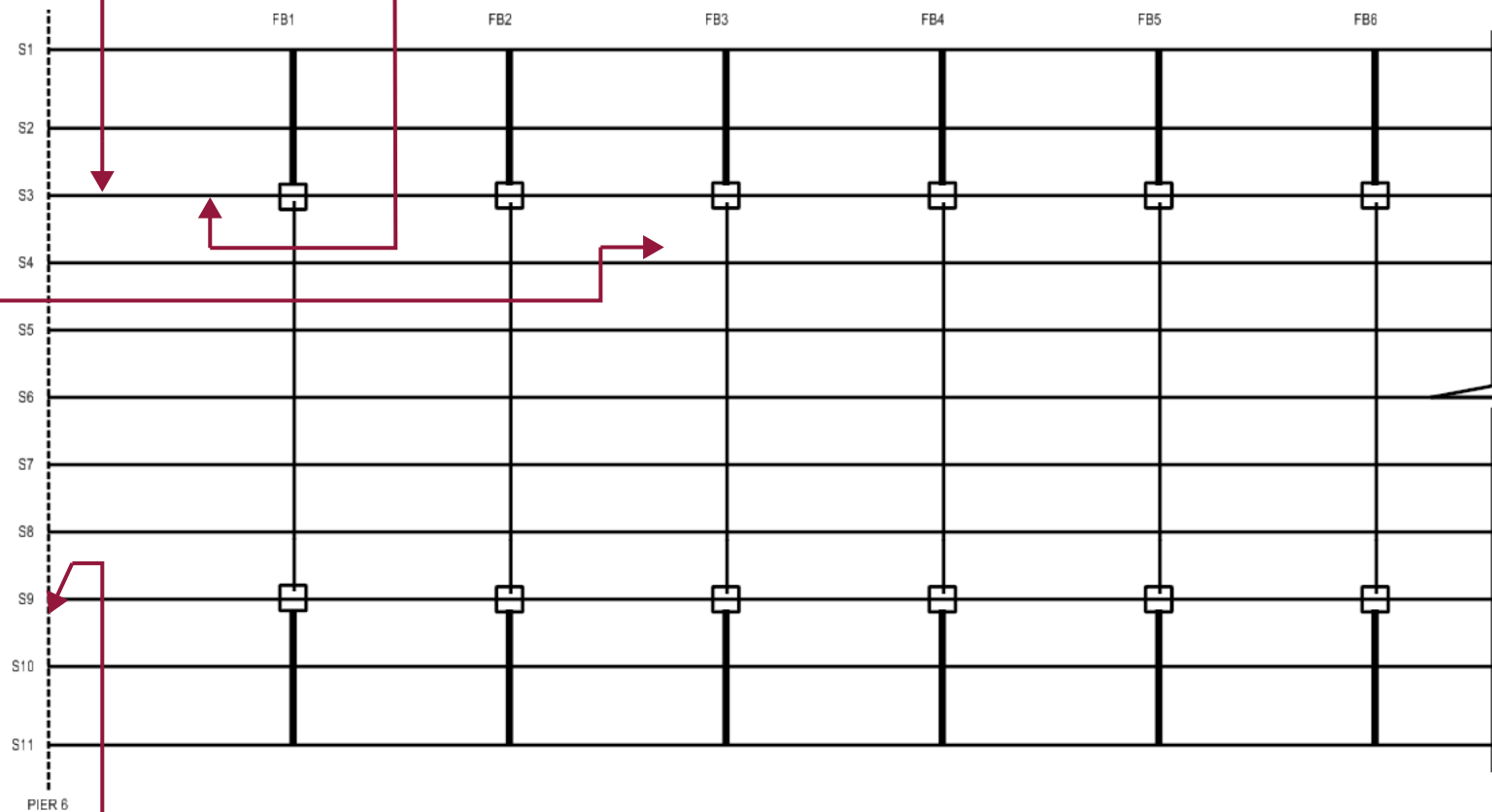




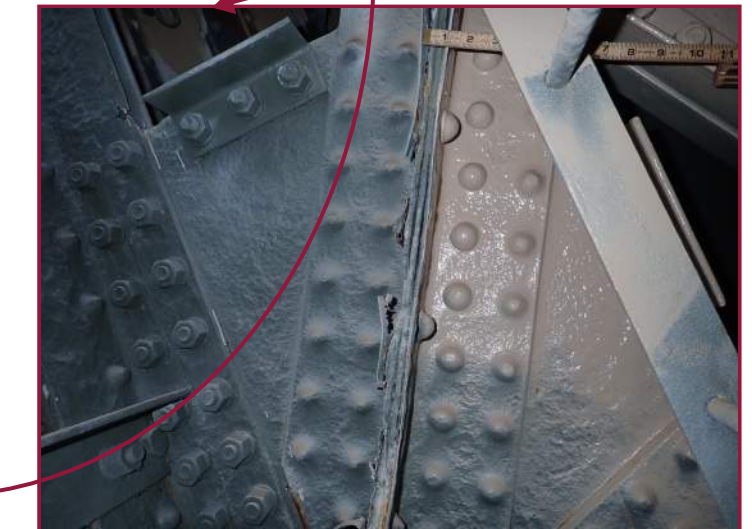
Minor distortion in the jack arch bottom flange with the left angle outstanding leg bent up 1/4" over 6" (looking south).



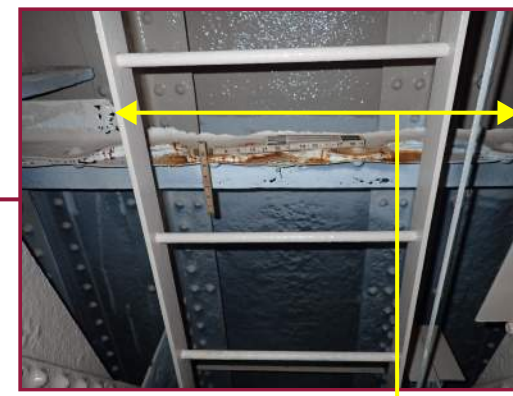
Arch access hatch door does not close fully, leaving a 1 1/2" wide gap (looking northeast).



Longitudinal and transverse cracks up to 0.06" wide in the wearing surface (looking east).

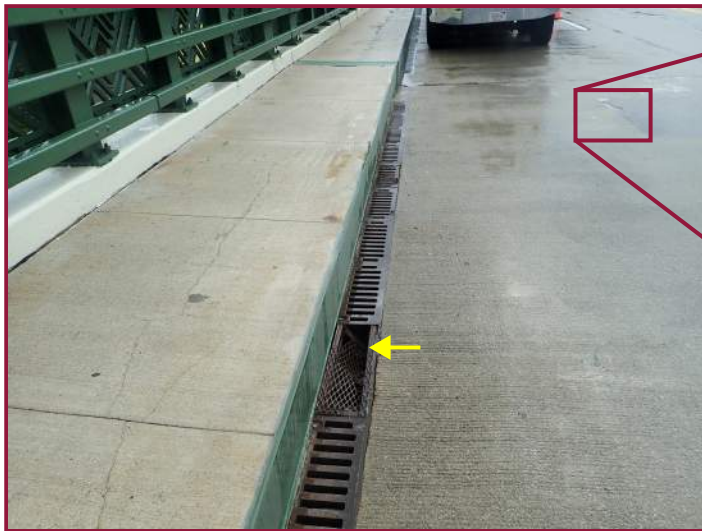


South column diagonal bracing and connection plate with advanced section loss and painted pack rust 1" thick (looking west across from the pier strut). Inset: Looking south at the horizontal bracing with 100% section loss in the vertical leg between the south column wall and the ladder.



100% section loss in the vertical leg of the angle

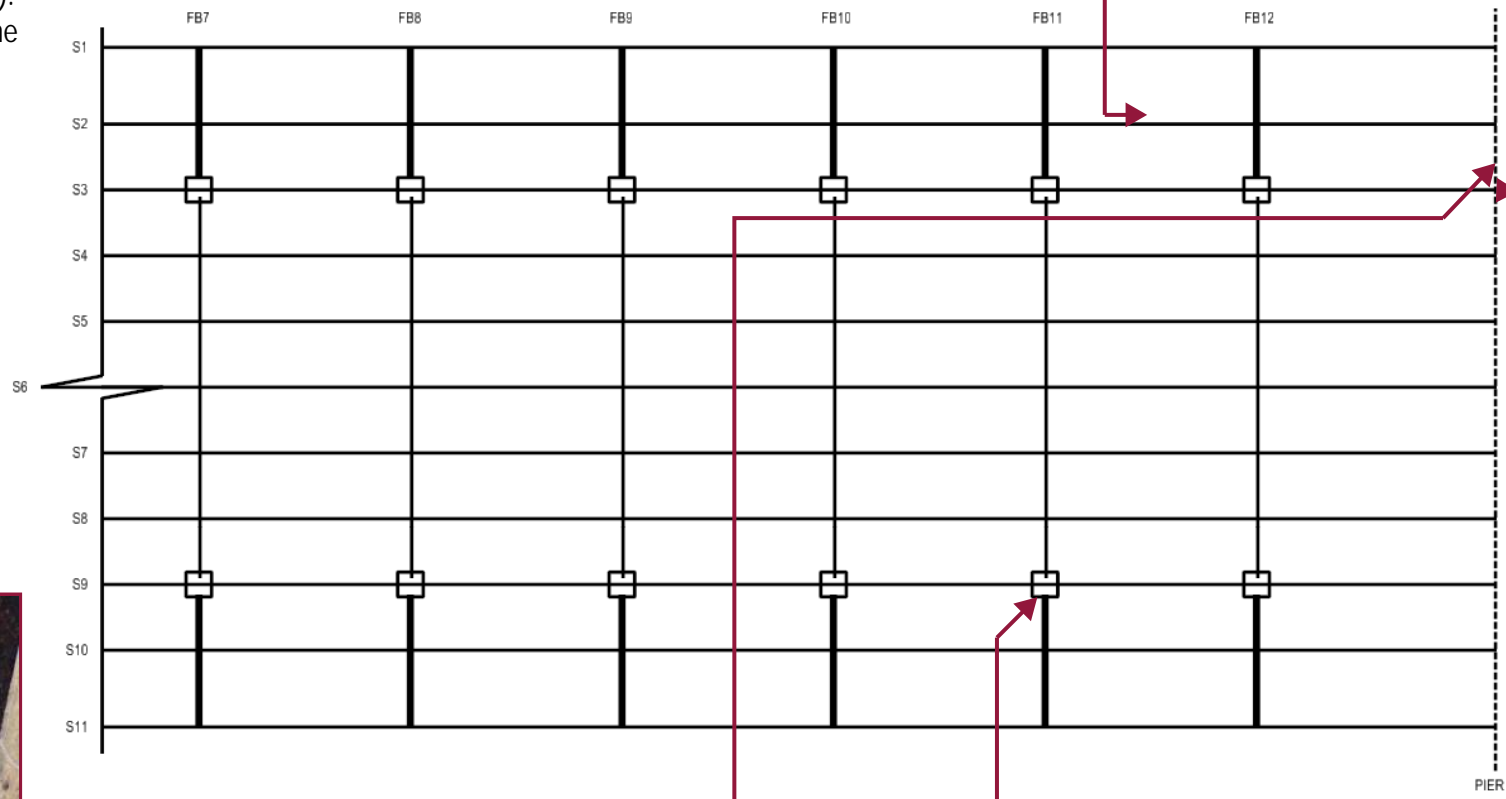




Scupper wire grate failed (looking east near the left curb). Note the wearing surface patch which is spalled along the left side.



2' high rust and debris at the base of the Pier 7 left column (looking southwest).



Corrosion hole in the north web plate and 2" thick pack rust between outstanding stiffener angle legs (looking north in the lower half of the Pier 7 left column).



Typical 1/16" to 1/8" deep painted over pitting in a spandrel column (looking northeast).



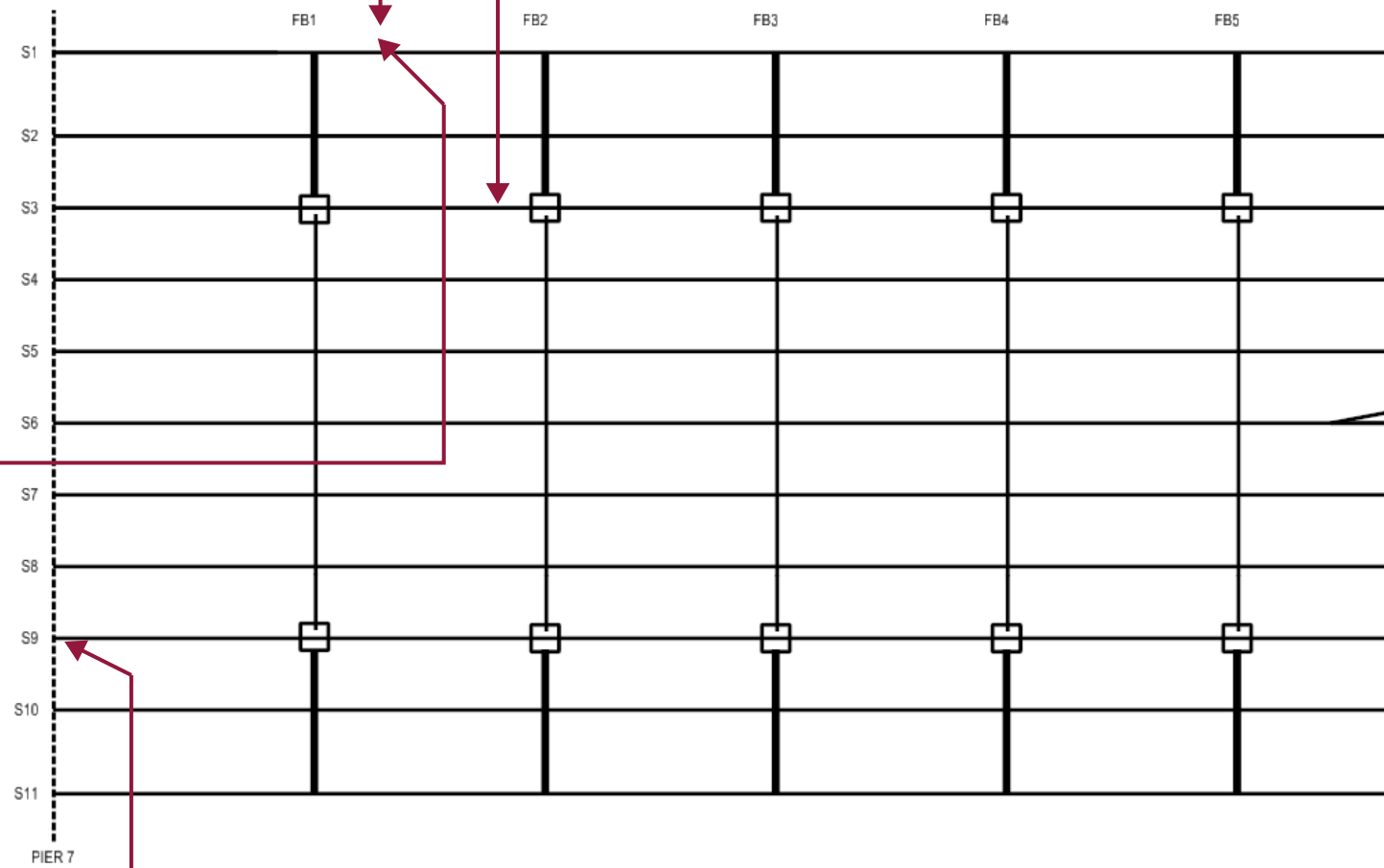




Spall with exposed railing post anchor bolts with minor rust staining in the concrete portion of the left railing (looking south).



Spalls with exposed railing post anchor bolts in the concrete portion of the left railing (looking northwest).



Pack rust at the interior of the arch between an access hatch and the south web (looking southeast).



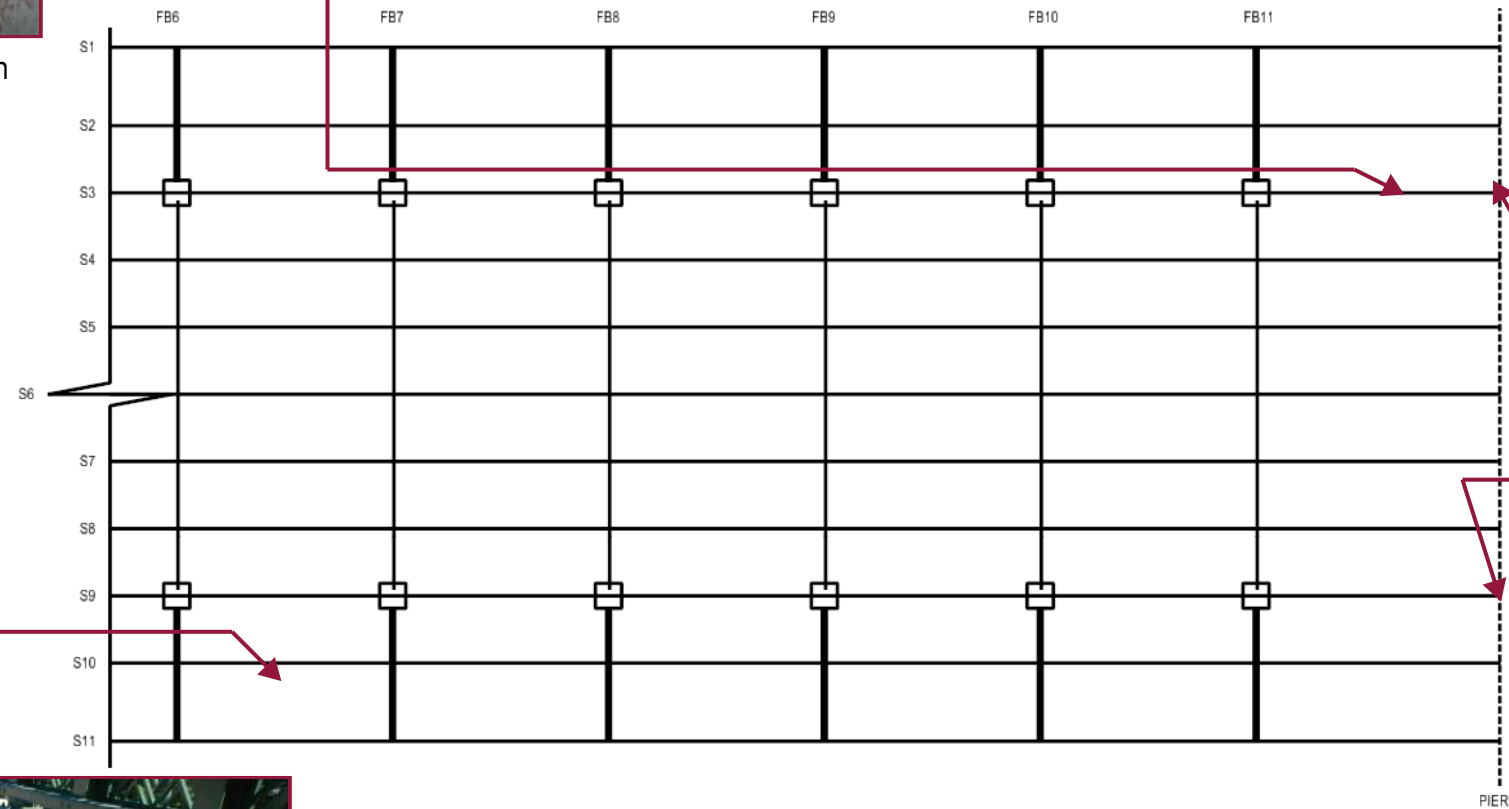
Typical laminate corrosion and bearing anchor bolt and nut section loss at the arch pins (looking west).



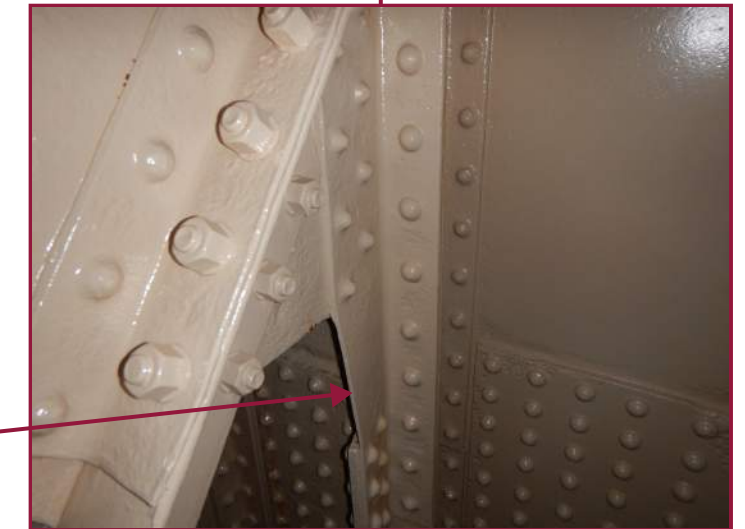
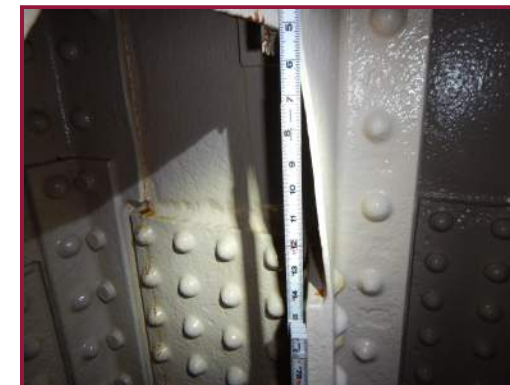
Typical minor surface corrosion at the interior of the arch (looking east).



Clogged drainage pipe at the bottom of the column and 100% section loss at the bottom 4" of a north web stiffener angle (looking down and north). Inset: Looking northwest.



Spalls with exposed reinforcement and water ponding in the right sidewalk (looking east).

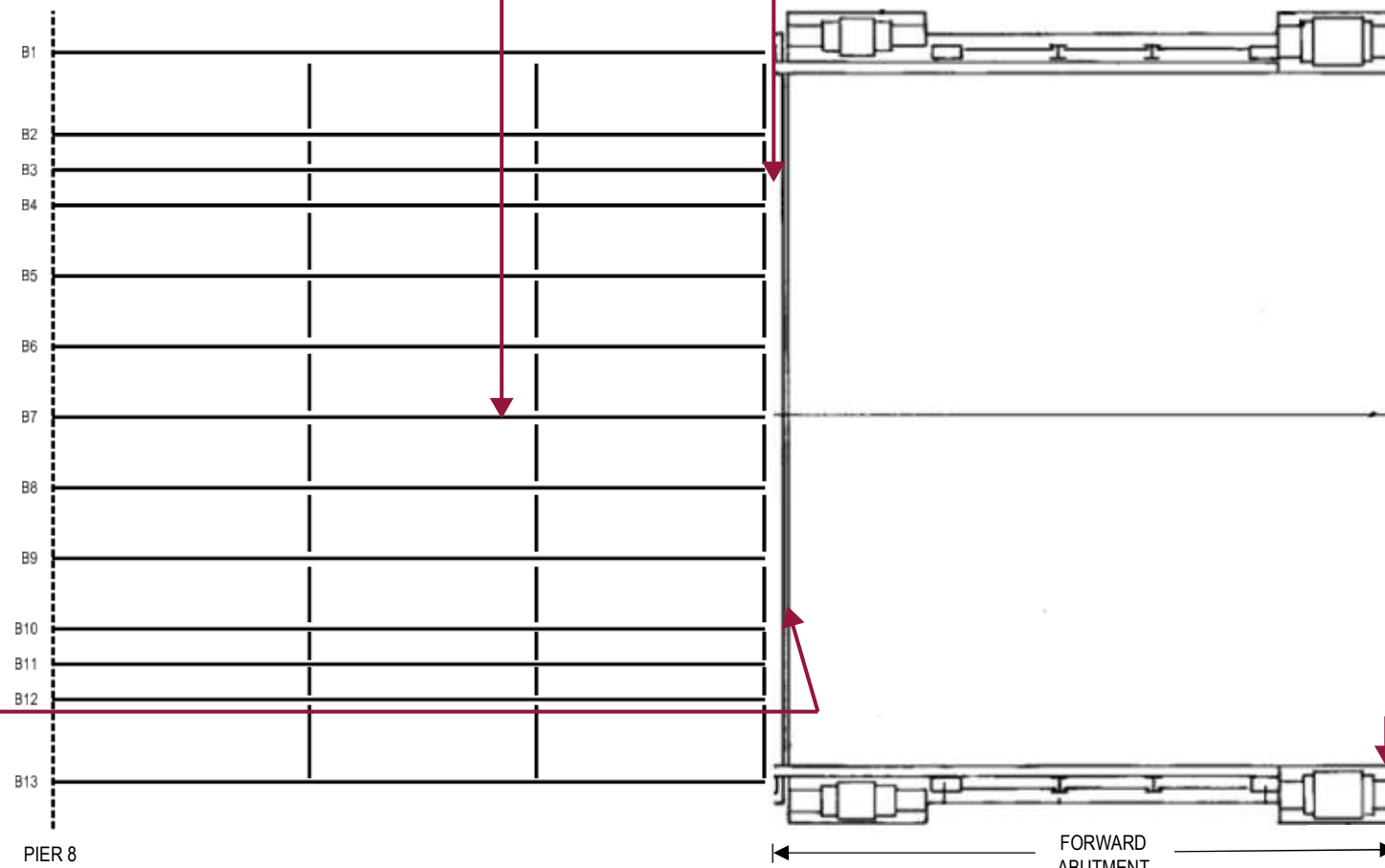


Column stiffener outstanding leg bowed up to 2" to the west (looking southeast in the bay below the pier cap).





Typical misdrilled holes in Beams 7 and 8 at the utility bracket connections (looking south).



2" wide gouge in the joint armor (looking south in the westbound lanes).



Spalls and transverse cracks in the joint header (looking north).



100% section loss near the base of the decorative railing obelisk (looking south).

## Appendix B

### Element Level Data



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<b>Approach Slab Summary</b>	2022 Ratings				
	Condition State				
	QTY.	1	2	3	4
321 - Reinforced Concrete Approach Slab (SF)	2659	2333	252	74	0

<b>Rear Approach Slab</b>	Condition State				
	QTY.	1	2	3	4
	321 - Reinforced Concrete Approach Slab (SF)	1350	1094	202	54

<b>Forward Approach Slab</b>	Condition State				
	QTY.	1	2	3	4
	321 - Reinforced Concrete Approach Slab (SF)	1309	1239	50	20

Deck Summary	2022 Ratings				
	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	64997	46182	18740	75	0
38 - Reinforced Concrete Slab (SF)	1516	1420	31	65	0
510 - Wearing Surface (SF)	64048	46950	16967	131	0
300 - Strip Seal Expansion Joint (LF)	390	0	70	303	17
330 - Metal Bridge Railing (LF)	2469	2182	24	263	0
815 - Drainage (EA)	58	0	49	9	0

Deck - Beam Span 1	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	2089	1489	600	0	0
510 - Wearing Surface (SF)	2012	1482	530	0	0
300 - Strip Seal Expansion Joint (LF) [Rear Abut.]	65	0	64	1	0
330 - Metal Bridge Railing (LF)	78	74	4	0	0
815 - Drainage (EA) [Rear Abut.]	2	0	0	2	0

Deck - Beam Span 2	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	2086	1487	599	0	0
510 - Wearing Surface (SF)	2008	1463	545	0	0
330 - Metal Bridge Railing (LF)	78	69	0	9	0
815 - Drainage (EA) [Pier 1]	2	0	0	2	0

Deck - Beam Span 3	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	2086	1487	599	0	0
510 - Wearing Surface (SF)	2008	1459	549	0	0
330 - Metal Bridge Railing (LF)	78	68	0	10	0
815 - Drainage (EA) [Pier 2]	2	0	0	2	0

Deck - Beam Span 4	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	2221	1584	637	0	0
510 - Wearing Surface (SF)	2138	1575	564	0	0
330 - Metal Bridge Railing (LF)	83	73	0	10	0
815 - Drainage (EA) [Piers 3 and 4]	4	0	2	2	0

Deck - Arch Span 5	2022 Ratings				
	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	12782	9026	3753	3	0
510 - Wearing Surface (SF)	12309	8204	4103	2	0
300 - Strip Seal Expansion Joint (LF) [Pier 4]	65	0	0	59	6
330 - Metal Bridge Railing (LF)	474	430	2	42	0
815 - Drainage (EA)	10	0	10	0	0

Deck - Arch Span 6	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	13824	9851	3968	5	0
510 - Wearing Surface (SF)	13312	9953	3328	31	0
300 - Strip Seal Expansion Joint (LF) [Pier 5]	65	0	0	58	7
330 - Metal Bridge Railing (LF)	512	473	0	39	0
815 - Drainage (EA)	12	0	11	1	0

Deck - Arch Span 7	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	13824	9841	3968	15	0
510 - Wearing Surface (SF)	13312	9968	3328	16	0
300 - Strip Seal Expansion Joint (LF) [Pier 6]	65	0	6	59	0
330 - Metal Bridge Railing (LF)	512	428	0	84	0
815 - Drainage (EA)	12	0	12	0	0

Deck - Arch Span 8	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	12782	9063	3669	50	0
510 - Wearing Surface (SF)	12309	9228	3077	4	0
300 - Strip Seal Expansion Joint (LF) [Pier 7]	65	0	0	61	4
330 - Metal Bridge Railing (LF)	474	418	2	54	0
815 - Drainage (EA)	10	0	10	0	0

Deck - Beam Span 9	Condition State				
	QTY.	1	2	3	4
12 - Reinforced Concrete Deck (SF)	3303	2353	948	2	0
510 - Wearing Surface (SF)	3180	2382	797	1	0
300 - Strip Seal Expansion Joint (LF) [Pier 8]	65	0	0	65	0
330 - Metal Bridge Railing (LF)	123	101	10	12	0
815 - Drainage (EA)	4	0	4	0	0

Deck - Forward Abutment Slab Span	Condition State				
	QTY.	1	2	3	4
38 - Reinforced Concrete Slab (SF)	1516	1420	31	65	0
510 - Wearing Surface (SF)	1460	1237	146	77	0
300 - Strip Seal Expansion Joint (LF) [Forward Abut.]	65	0	51	14	0
330 - Metal Bridge Railing (LF)	57	48	6	4	0



Superstructure Summary	2022 Ratings				
	Condition State				
	QTY.	1	2	3	4
38 - Reinforced Concrete Slab (SF) *see Deck	1516	1420	31	65	0
107 - Steel Open Girder/Beam (LF)	2409	2078	329	2	0
515 - Steel Protective Coating (SF)	18152	18152	0	0	0
113 - Steel Stringer (LF)	6898	6671	180	47	0
515 - Steel Protective Coating (SF)	33096	33096	0	0	0
141 - Steel Arch (LF) [Jack Arches, Columns, Main Arches]	1972	1183	591	197	0
515 - Steel Protective Coating (SF)	138116	48199	69060	20717	140
152 - Steel Floorbeam (LF)	2898	2604	293	1	0
515 - Steel Protective Coating (SF)	32667	32667	0	0	0
311 - Movable Bearing (EA)	121	21	97	3	0
313 - Fixed Bearing (EA)	11	0	11	0	0

Beam Span 1	Condition State				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (LF)	433	336	95	2	0
515 - Steel Protective Coating (SF)	3226	3226	0	0	0
311 - Movable Bearing (EA) [Rear Abutment]	11	10	0	1	0

Beam Span 2	Condition State				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (LF)	425	386	39	0	0
515 - Steel Protective Coating (SF)	3106	3106	0	0	0

Beam Span 3	Condition State				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (LF)	425	386	39	0	0
515 - Steel Protective Coating (SF)	3106	3106	0	0	0

Beam Span 4	Condition State				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (LF)	453	351	102	0	0
515 - Steel Protective Coating (SF)	3336	3336	0	0	0
311 - Movable Bearing (EA) [Pier 4 Rear]	11	11	0	0	0

Arch Span 5	2022 Ratings				
	Condition State				
	QTY.	1	2	3	4
113 - Steel Stringer (LF)	1657	1583	74	0	0
515 - Steel Protective Coating (SF)	7950	7950	0	0	0
141 - Steel Arch (LF)	474	287	140	47	0
515 - Steel Protective Coating (SF)	33383	11647	16694	5008	35
152 - Steel Floorbeam (LF)	693	624	69	0	0
515 - Steel Protective Coating (SF)	7812	7812	0	0	0
311 - Movable Bearing (EA) [Pier 4 Forward & Pier 5 Rear]	22	0	22	0	0

Arch Span 6	Condition State				
	Condition State				
	QTY.	1	2	3	4
113 - Steel Stringer (LF)	1792	1705	47	40	0
515 - Steel Protective Coating (SF)	8598	8598	0	0	0
141 - Steel Arch (LF)	512	296	164	51	0
515 - Steel Protective Coating (SF)	36805	12847	18402	5521	35
152 - Steel Floorbeam (LF)	756	676	79	1	0
515 - Steel Protective Coating (SF)	8522	8522	0	0	0
311 - Movable Bearing (EA) [Pier 5 Forward & Pier 6 Rear]	22	0	22	0	0

Arch Span 7	Condition State				
	Condition State				
	QTY.	1	2	3	4
113 - Steel Stringer (LF)	1792	1747	39	6	0
515 - Steel Protective Coating (SF)	8598	8598	0	0	0
141 - Steel Arch (LF)	512	308	152	51	0
515 - Steel Protective Coating (SF)	36805	12847	18402	5521	35
152 - Steel Floorbeam (LF)	756	680	76	0	0
515 - Steel Protective Coating (SF)	8522	8522	0	0	0
311 - Movable Bearing (EA) [Pier 6 Forward & Pier 7 Rear]	22	0	21	1	0

Arch Span 8	Condition State				
	Condition State				
	QTY.	1	2	3	4
113 - Steel Stringer (LF)	1657	1636	20	1	0
515 - Steel Protective Coating (SF)	7950	7950	0	0	0
141 - Steel Arch (LF)	474	292	135	47	0
515 - Steel Protective Coating (SF)	31123	10858	15562	4669	35
152 - Steel Floorbeam (LF)	693	624	69	0	0
515 - Steel Protective Coating (SF)	7812	7812	0	0	0
311 - Movable Bearing (EA) [Pier 7 Forward & Pier 8 Rear]	22	0	21	1	0

Beam Span 9	Condition State				
	Condition State				
	QTY.	1	2	3	4
107 - Steel Open Girder/Beam (LF)	673	618	55	0	0
515 - Steel Protective Coating (SF)	5378	5378	0	0	0
311 - Movable Bearing (EA) [Pier 8 Forward]	11	0	11	0	0
313 - Fixed Bearing (EA) [Forward Abutment]	11	0	11	0	0

Substructure Summary	2022 Ratings				
	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	16	0	13	3	0
515 - Steel Protective Coating (SF)	72134	60476	7825	2834	999
210 - Reinforced Concrete Pier Wall (LF)	250	131	33	86	0
215 - Reinforced Concrete Abutment (LF)	382	330	52	0	0
231 - Steel Pier Cap (LF)	509	284	170	55	0
515 - Steel Protective Coating (SF)	13617	11610	920	733	355
830 - Abutment Backwall (LF)	64	62	2	0	0

Rear Abutment	Condition State				
	QTY.	1	2	3	4
215 - Reinforced Concrete Abutment (LF)	191	176	15	0	0
830 - Abutment Backwall (LF)	64	62	2	0	0

Pier 1	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	2	0	2	0	0
515 - Steel Protective Coating (SF)	1379	910	276	124	69
231 - Steel Pier Cap (LF)	63	57	6	0	0
515 - Steel Protective Coating (SF)	710	710	0	0	0

Pier 2	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	2	0	2	0	0
515 - Steel Protective Coating (SF)	2838	1873	568	255	142
231 - Steel Pier Cap (LF)	63	57	6	0	0
515 - Steel Protective Coating (SF)	710	710	0	0	0

Pier 3	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	2	0	2	0	0
515 - Steel Protective Coating (SF)	3567	2354	713	321	178
231 - Steel Pier Cap (LF)	63	56	7	0	0
515 - Steel Protective Coating (SF)	710	710	0	0	0

Pier 4	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	2	0	1	1	0
515 - Steel Protective Coating (SF)	9313	9311	2	0	0
210 - Reinforced Concrete Pier Wall (LF)	50	28	1	21	0
231 - Steel Pier Cap (LF)	64	14	30	20	0
515 - Steel Protective Coating (SF)	2197	2021	176	0	0

Pier 5	2022 Ratings				
	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	2	0	2	0	0
515 - Steel Protective Coating (SF)	15241	14174	762	305	0
210 - Reinforced Concrete Pier Wall (LF)	50	22	8	20	0
231 - Steel Pier Cap (LF)	64	19	30	15	0
515 - Steel Protective Coating (SF)	2364	1823	236	189	116

Pier 6	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	2	0	2	0	0
515 - Steel Protective Coating (SF)	15241	14174	762	305	0
210 - Reinforced Concrete Pier Wall (LF)	50	24	6	20	0
231 - Steel Pier Cap (LF)	64	14	30	20	0
515 - Steel Protective Coating (SF)	2364	1821	236	189	118

Pier 7	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	2	0	1	1	0
515 - Steel Protective Coating (SF)	15241	9297	3810	1524	610
210 - Reinforced Concrete Pier Wall (LF)	50	22	8	20	0
231 - Steel Pier Cap (LF)	64	34	30	0	0
515 - Steel Protective Coating (SF)	2364	1653	236	355	121

Pier 8	Condition State				
	QTY.	1	2	3	4
202 - Steel Column (EA)	2	0	1	1	0
515 - Steel Protective Coating (SF)	9313	8382	931	0	0
210 - Reinforced Concrete Pier Wall (LF)	50	35	10	5	0
231 - Steel Pier Cap (LF)	64	34	30	0	0
515 - Steel Protective Coating (SF)	2197	2162	35	0	0

Forward Abutment	Condition State				
	QTY.	1	2	3	4
215 - Reinforced Concrete Abutment (LF)	191	154	37	0	0



## Appendix C

### AssetWise Report

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Inspector: Feudo,Victoria  
 Inspection Date: 09/07/2022

Structure Number: 1801325  
 Facility Carried: SR 10

Bridge Inspection Report

**Ohio Bridge Inspection Summary Report**

**CUY-00010-0869 (1801325)**

2: District 26446 - FAIRVIEW PARK (CUY county)  
 District 12

5A: Inventory Route 1 00010

21: Major Maint A/B 01 - State Highway Agency /  
 225 Routine Main A/B 04 - City or Municipal Highway /  
 Agency  
 221 Inspection A/B 01 - State Highway Agency /  
 220: Inv. Location DISTRICT 12

7: Facility On SR 10  
 6: Feature Ints VALLEY PKWY/ROCKY RIVER  
 9: Location APPROX 200FT W STORYRD  
 Lat, Lon 41.451275 ,-81.824214

Condition	Structure Type
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**58: Deck** **6 - Satisfactory Condition**  
 58.01 Wearing Surface 6 - Satisfactory (1-10% distress)  
 58.02 Joint 4- Poor (heavy leaking, offset)  
**59: Superstructure** **6 - Satisfactory Condition**  
 59.01 Paint & PCS 7 - Good (1-5% corr.)  
**60: Substructure** **5 - Fair Condition**  
**61: Channel** **7**  
 61.01 Scour **7 - Good**  
**62: Culverts** **N - Not Applicable**  
**67.01 GA** **5**

43: Bridge Type 3 - Steel  
 11 - Arch - Deck  
 N- Not Applicable  
 45: Spans Main / Approach 4 / 5  
 107: Deck Type 1 - Concrete Cast-in-Place  
 408: Composite Deck N - Non-composite Construction  
 414A Joint Type 1 8 - Elastomeric Strip Seal  
 414B: Joint Type 2 N - None  
 108A: Wearing Surface 3 - Latex Concrete or similar  
 additive  
 N- Not Applicable

Appraisal	422: WS Date
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Sufficiency Rating 77.6 SD/FO 0 - ND  
 36: Rail, Tr, Gd, Term Std 1 1 0 1  
 72: Approach Alignment 8 - Equal to present desirable criteria  
 113: Scour Critical 9 - Foundations above flood waters  
 71: Waterway Adequacy 8 - Bridge Above Approaches

422: WS Date 01/01/1986  
 423: WS Thick (in) 1.2  
 482: Protective Coating 5 - Paint System OZEU  
 483: PCS Date 10/15/1991  
 453: Bearing Type 1 A - Sliding (Other)  
 455: Bearing Type 2 8 - Fixed Arch-Rib  
 528: Foundn: Abut Fwd 6 - Rock (including Spread Footing  
 on Rock)  
 533: Foundn: Abut Rear 6 - Rock (Including Spread Footing  
 on Rock)  
 536: Foundn: Pier 1 6 - Rock (including Spread Footing  
 on Rock)  
 539: Foundn: Pier 2 0 - Other

Geometric	Age and Service
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48: Max Span Length (ft) 256.0  
 49: Structure Length (ft) 1230.0  
 52: Deck Width, Out-To-Out (ft) 64.7  
 424: Deck Area (sf) 79581  
 32: Appr Roadway Width (ft) 52.0  
 51: Road Width, Curb-Curb (ft) 52.0  
 50A: Curb/SW Width: Left (ft) 5  
 50A: Curb/SW Width: Right (ft) 5  
 34: Skew (deg) 0  
 33: Bridge Median 0 - No median  
 54B: Min Vert Underclearance (ft) 95  
 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	Inspections
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27: Year Built/ 106 Rehab 1935 / 1990  
 42A: Service On 5 - Highway-pedestrian  
 42B: Service Under 6 - Highway - waterway  
 28A: Lanes on 04  
 28B: Lanes Under 02  
 19: Bypass Length 5  
 29: ADT 11449  
 109: % Trucks (%) 7

Load Posting	Inspections
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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 (%) 150

		Months	
90: Routine Insp.		12	09/07/2022
92A: FCM Insp.	Y	24	09/07/2021
92B: Dive Insp.	N	0	
92C: Special Insp.	N	0	
92D: UBIT Insp.	Y	12	09/02/2022
92E: Drone Insp.	N	0	



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704: Analysis Date 07/01/1995 Inspector Feudo,Victoria  
63: Analysis Method 0 - Field evaluation and documented engineering judgment

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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
<b>12-Reinforced Concrete Deck</b>	3 - Mod.	64997	sq. ft.	46182	18740	75	0
<p>2022:  This element includes the width of the deck from curb to curb and the 1' wide extensions below the sidewalks - 54' total.</p> <p>CS2 - Deck underside with transverse hairline cracks with minor efflorescence and delaminations above the utilities near the centerline of the bridge.  CS3 - Isolated spalls in the deck underside with exposed reinforcement.</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>510-Wearing Surfaces</b>		64048	sq. ft.	46950	16967	131	0
<p>2022:  CS2 - Transverse cracks typically 0.02" wide spaced at 3' to 4' throughout the wearing surface.  CS3 - Spalls at deteriorating patches, expansion joints, and scuppers.</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>38-Reinforced Concrete Slab</b>	3 - Mod.	1516	sq. ft.	1420	31	65	0
<p>2022:  This element includes the reinforced concrete slab at the cellular Forward Abutment which is visible due to arched openings in the rear wall of the abutment.</p> <p>CS2 - Underside with longitudinal hairline cracks with efflorescence, delaminations  CS3 - Underside with wide longitudinal cracks with rust staining and spalls with exposed reinforcement</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>107-Steel Open Girder/Beam</b>	3 - Mod.	2409	ft.	2078	329	2	0
<p>2022:  This element includes the steel beams in the west and east approach spans excluding the fascia beams which support the sidewalk and railing. Comments regarding the fascia stringers are included with Element 330 - Metal Bridge Railing.</p> <p>CS2 - Typical minor painted over pitting in localized areas of the approach spans  CS3 - Moderate to advanced section loss located near expansion joints</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>515-Steel Protective Coating</b>		18152	sq. ft.	18152	0	0	0
<p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							

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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
<b>113-Steel Stringer</b>	3 - Mod.	6898	ft.	6671	180	47	0
<p>2022:  This element includes the steel stringers in arch Spans 5 through 8. The jack arches which were previously included with the stringer element have been moved to Element 141 - Steel Arch. The fascia stringers below the sidewalks have been moved to Element 330 - Metal Bridge Railing.</p> <p>CS2 - Typical minor painted over pitting in localized areas  CS3 - Moderate to advanced section loss located near expansion joints and below the access hole at midspan of Span 6</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>515-Steel Protective Coating</b>		33096	sq. ft.	33096	0	0	0
<p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>141-Steel Arch</b>	3 - Mod.	1972	ft.	1184	591	197	0
<p>2022:  This element includes the jack arches, spandrel columns, and main arches.</p> <p>CS2 - Typical minor painted over pitting in the arches near spandrel columns and at the ends of the arches near the piers. Minor section loss in jack arches and columns especially near downspouts  CS3 - Moderate to advanced section loss in jack arches, columns, and in isolated areas of the the top flange of the arches at spandrel columns</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>515-Steel Protective Coating</b>		138116	sq. ft.	48199	69060	20717	140
<p>2022:  CS2 - Minor scrape of the top coat at a spandrel column exterior. Minor surface corrosion throughout the interior of the arch ribs at deteriorating protective coating.  CS3 - Moderate surface corrosion at the interior of the arch ribs at areas of failing protective coating.  CS4 - Laminate corrosion and section loss at the ends of the arches at the bearings at locations of failed protective coating.</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>152-Steel Floor Beam</b>	3 - Mod.	2898	ft.	2604	293	1	0
<p>2022:  CS2 - Typical minor painted over pitting throughout  CS3 - 3/4" long crack in a tack weld at the rear face of Floorbeam 4 in Span 6 at the Stringer 6 connection angle fill plate</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>515-Steel Protective Coating</b>		32667	sq. ft.	32667	0	0	0
<p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>202-Steel Column</b>	3 - Mod.	16	each	0	13	3	0



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<p>2022:  This element includes the steel columns and the concrete encasing the bottom of the pier columns.</p> <p>CS2 - Minor painted over pitting in the exterior face of the columns  CS3 - Moderate to advanced section loss in the column web plates, interior diagonal bracing, and diaphragms, most notably the Pier 7 left column which has not been cleaned and painted. Spalls in the top face at the base of column encasement where the drainage pipes are clogged with debris</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
515-Steel Protective Coating	72134	sq. ft.	60476	7825	2834	999	
<p>2022:  CS2 - Minor corrosion on the exterior faces at corrosion holes in the web plates, areas of minor surface corrosion at the column interiors  CS3 - Moderate to advanced section loss at flaked and deteriorating protective coating at the column interiors  CS4 - Areas of advanced section loss at failed protective coating at the column interiors, most notably the Pier 7 left column which has not been cleaned and painted</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
210-Reinforced Concrete Pier Wall	3 - Mod.	250	ft.	131	33	86	0
<p>2022:  CS2 - Sealed vertical cracks  CS3 - Isolated corner and ground level spalls</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
215-Reinforced Concrete Abutment	3 - Mod.	382	ft.	330	52	0	0
<p>2022:  This element includes all four walls of both cellular abutments. The original masonry abutment at the Forward Abutment was doweled into in order to connect it to the reinforced concrete above; comments about the masonry are included here.</p> <p>CS2 - Minor honeycombing, water staining, and sealed vertical cracks. Cracked or missing grout in the masonry</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
231-Steel Pier Cap	3 - Mod.	509	ft.	284	170	55	0
<p>2022:  CS2 - Minor painted over section loss in the underside of the caps and at the interiors  CS3 - Moderate section loss in the pier cap interiors and areas of advanced section loss in stiffeners, lateral bracing, and diaphragms</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
515-Steel Protective Coating	13617	sq. ft.	11609	920	733	355	

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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
	2022:  CS2 - Minor corrosion at the underside of the caps near drain holes and within the pier caps at areas of dirt and debris accumulation CS3 - Moderate corrosion in the pier cap interiors near accumulated construction debris, dirt, and water ponding CS4 - Failed protective coating at locations of advanced section loss in stiffeners, diaphragms, and lateral bracing at the pier cap interiors and water ponding within the pier caps  For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.						
<b>300-Strip Seal Expansion Joint</b>	3 - Mod.	390	ft.	0	70	303	17
	2022:  CS2 - Longitudinal hairline cracks in the joint headers and minor surface corrosion of the joint armor. CS3 - Strip seal failure (particularly in the right eastbound lane), wide cracks in the joint headers, gouges in the joint armor.  For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.						
<b>311-Movable Bearing</b>	3 - Mod.	121	each	21	97	3	0
	2022: This element includes the movable bearings from the Rear Abutment to Pier 8 including the arch bearings. The fascia stringer bearings are not included here, and comments regarding the fascia stringer bearings can be found with Element 330 - Metal Bridge Railing.  CS2 - Typical minor painted over section loss in the bearings. Typical minor laminate corrosion at the pin stiffeners, minor section loss in the pin plates CS3 - Missing shim plate at Rear Abutment Beam 10 bearing, Stringer 7 bearing at Pier 7 only bearing at left 2" width. Moderate to advanced section loss in the pin plates and 1/4" thick active pack rust at the Span 8 right arch pin nut at Pier 7  For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.						
<b>313-Fixed Bearing</b>	3 - Mod.	11	each	0	11	0	0
	2022:  CS2 - Minor section loss and 3/8" high gaps due to cleaned and painted pack rust between shim plates at the Forward Abutment  For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.						

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<b>321-Reinforced Concrete Approach Slab</b>	3 - Mod.	2659	sq. ft.	2333	252	74	0
<p>2022:  This element is rated based on the asphalt wearing surface which overlays the approach slabs.</p> <p>CS2 - Longitudinal and transverse cracks and deteriorating patches in the asphalt wearing surface.  CS3 - Heavy pattern map cracking and spalls in the asphalt wearing surface.</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>330-Metal Bridge Railing</b>	3 - Mod.	2469	ft.	2182	24	263	0
<p>2022:  The bridge railings are primarily composed of metal rails and posts anchored in concrete.</p> <p>CS2 - Minor section loss in the railing posts and rails  CS3 - Spalls with exposed railing post anchor bolts throughout the concrete portion of the railing, 100% section loss in fascia stringer webs at the expansion joints</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>815-Drainage</b>	3 - Mod.	58	each	0	49	9	0
<p>2022:  CS2 - Leaking downspouts, areas of small corrosion holes in downspouts  CS3 - Advanced section loss in 2' long or more sections of the downspouts, damaged scupper grates, clogged scuppers preventing water drainage</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							
<b>830-Abutment Backwall</b>	3 - Mod.	64	ft.	62	2	0	0
<p>2022:  This element includes the reinforced concrete backwall at the Rear Abutment.</p> <p>CS2 - Vertical hairline cracks at the right end of the Rear Abutment backwall</p> <p>For additional information regarding condition states and a table of condition states broken down by span, refer to the 2022 Routine Element Level Inspection Report, attached in AssetWise.</p>							

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### Bridge Inspection Report

## CUY-00010-0869\_(1801325)

ODOT District: District 12

Major Maint: 01 - State Highway Agency

Routine Maint: 04 - City or Municipal Highway Agency

FIPS Code: 26446 - FAIRVIEW PARK (CUY county)

Facility Carried: SR 10

Feature Inters: VALLEY PKWY/ROCKY RIVER

Location: DISTRICT 12

Inspector

Feudo,Victoria

Inspection Date

09/07/2022

Traffic On: 5 - Highway-pedestrian

Traffic Under: 6 - Highway - waterway

APPROX 200FT W STORYRD

Reviewer Not Approved

Date Built: 07/01/1935

Rehab Date: 01/01/1990

Insp. Resp A: 01 - State Highway Agency

Insp

Resp B:

## Inspector Comments - Deck and Approach

### Deck

2022: The deck is in satisfactory overall with some minor spalls in the underside of the deck and hairline transverse cracks. The wearing surface exhibits minor transverse cracks and a few minor spalls. The metal bridge railing has sealed spalls throughout the concrete portion, and there is painted over section loss in the metal railing and posts. The drainage system consists of clogged trench drain scuppers and typically clear downspouts with locations of 100% section loss in most of the approach span downspouts. The strip seal expansion joints mostly exhibit several areas of adhesion failure and moderate debris accumulation. The joint armor has minor surface corrosion and some gouges, and there are minor vertical misalignments up to 1/2" high between the rear and forward plates.

Additional comments for each element are included under the Element Inspection Tab.

### Reinforced Concrete Deck

This element includes the width of the deck from curb to curb and the 1' wide extensions below the sidewalks - 54' total. The reinforced concrete deck is in satisfactory condition with hairline cracking and isolated minor spalls. The forward portion of Span 8 has several spalls in the underside up to 3" deep with exposed reinforcement. The deck underside below the sidewalk construction joints typically has transverse hairline cracks with minor efflorescence spaced at 3'.

### Sidewalk

The sidewalks do not correspond to an element, but their condition is summarized here. The sidewalks are typically in fair condition due to widespread delaminations in the top surface, spalls and water ponding behind the curb plates, and transverse cracks with minor to moderate efflorescence throughout the underside. Spalls with exposed reinforcement are present in the top face of the sidewalks at the curb plates, and while these spalls are typically 2" deep by 3" wide, there are several spalls up to 5" deep.

### Reinforced Concrete Slab

There is a reinforced concrete slab at the cellular Forward Abutment which is visible due to arched openings in the rear wall of the abutment. The slab is in fair condition overall with several full length longitudinal cracks with efflorescence and rust staining in the underside. There is a 5' long by up to 5' wide spall with exposed reinforcement at the left rear end of the underside.

### Wearing Surface

This element includes the wearing surface of Element 38 - Reinforced Concrete Slab which is present at the Forward Abutment. The wearing surface is in satisfactory condition overall with minor transverse cracks and isolated spalls. Transverse cracks are typically 0.02" wide and spaced at approximately 3' to 4', and there are isolated transverse cracks up to 0.06" wide. There are



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several minor spalls up to 1 1/2" deep located near the centerline of the wearing surface, at deteriorating patches.

#### Metal Bridge Railing

This element includes the railing from the Rear Abutment strip seal to the forward end of the Forward Abutment. Comments about the fascia stringers are included here, and their deficiencies influence the condition state quantities. The metal bridge railing is in fair condition with areas of **painted over** section loss in the metal posts and rails and exposed anchor bolts at spalls in the concrete portion of the railing. **Isolated locations of 100% loss in the tubular rails and the top of the railing posts are present and have been arrested by paint. Minor corrosion was noted between some of the decorative railing components.** The railing post anchor bolts are exposed at **sealed** spalls up to full height by 36" long throughout the left and right faces of the concrete portion of the railing. **There are several locations of 100% section loss in the fascia stringer webs below the expansion joints:**

- Beam 13 above the Pier 4 cap has three holes up to 3" in diameter in the upper portion of the web
- Stringer 1 above the Pier 5 cap has a 1" diameter hole at the bottom of the web
- Stringer 11 at Pier 6 has 2" diameter holes at the top of the web

#### Drainage

The drainage system is in poor condition overall with the scuppers typically full of debris and 100% section loss to several downspouts. The scuppers are trench drains in the shoulders of the wearing surface, and while most of the scuppers are clogged, the downspouts are typically clear. **There is a scupper grate at the left rear corner of Span 4 with five of the transverse bars cracked through, and a mesh covering over a portion of the scupper at the left forward corner of Span 7 has failed.**

#### Strip Seal Expansion Joint

The expansion joints are in **poor** condition overall due to vertical misalignments between joint armor plates, minor surface corrosion, failed seal material, and debris accumulation. There are minor gouges in the joint armor up to 2" wide. **The strip seal material is typically pulling away from the armor and exhibits failure in the following locations of the right eastbound lane:**

- Pier 4 Expansion Joint - 6' long section sagging up to 13"
- Pier 5 Expansion Joint - 3' and 4' long sections sagging up to 9"
- Pier 6 Expansion Joint - 3' long section sagging 2"
- Pier 7 Expansion Joint - 4' long section sagging up to 9"

#### Approach

2022: The approaches are in **satisfactory** condition overall.

#### Approach Wearing Surface

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The approach roadway wearing surface beyond the approach slabs is typically in **satisfactory** condition. There are several full width transverse cracks in the asphalt. **The rear approach relief joint is heaved upwards 1"** with map cracking in the adjacent wearing surface.

#### Approach Slab

The approach slabs are in **satisfactory** condition overall, and both slabs are rated based on the asphalt wearing surface which overlays it. There are several sealed longitudinal cracks and areas of transverse map cracking and deteriorating asphalt patches in both approach slab wearing surfaces.

#### Approach Guardrail

The guardrail is in fair condition with moderate impact damage to the right rear guardrail and a missing blockout at the left forward guardrail.

#### Signs and Supports

The commemorative plaques at the left rear approach railing obelisks are in good condition.

#### Utilities

There are utilities situated below the left sidewalk and to the right of the bridge centerline over the full length of the bridge. The underside of all of the conduit at the centerline of the bridge exhibits **100% section loss at the Rear Abutment** with minor water staining on the abutment wall below. The light standards on the bridge are in good condition with no major deficiencies noted at the time of the inspection.

### Inspector Comments - General Appraisal

#### Superstructure

2022: The superstructure is in satisfactory condition overall with most locations having no notable deficiencies but some areas of advanced section loss in the beams at the expansion joints, minor to moderate section loss in the arches and spandrel columns, and **a cracked tack weld at a floorbeam web.**

Additional comments for each element are included under the Element Inspection Tab.

#### Superstructure Alignment

The arches and floorbeams are in good alignment overall.

#### Reinforced Concrete Slab

\*see Deck section

#### Steel Open Girder/Beam

This element includes the steel beams in the west and east approach spans, **excluding the fascia beams which support the sidewalk and railing.** Comments regarding the fascia stringers are included under Element 330 - Metal Bridge Railing. The rolled steel beams and built-up sidewalk beams in Spans 1 through 4 and Span 9 are in satisfactory condition due to minor to moderate section loss at the expansion joints and painted over pitting. The end 2' to 5' of the beams at the abutments typically have minor to moderate painted over pitting 1/8" deep. Beams 3 and 11 in Spans 2 through 4 have 1/16" deep pitting throughout the underside and lower portion of the webs.

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Beam 10 at the Rear Abutment is floating 1/2" due to a missing shim plate.

#### Steel Arch

The arch quantity includes the jack arches, spandrel columns, and main arch ribs. The steel arches are in satisfactory condition overall with areas of minor to moderate painted over section loss throughout the exterior of the arches, spandrel columns, and built-up jack arches. Isolated locations of up to 3/16" deep pitting in the exterior of the arch ribs is typically localized at the uphill side of the top flange at spandrel columns, uphill side of the flanges at splices, and in the web plates and bottom flange angles near the piers. The interior of the arches typically has protective coating failure with minor surface corrosion throughout. There are corrosion holes up to 1" in diameter in the left arch top flange plate in Span 7 at Column 12 and Span 8 at Column 2. The jack arches have 1/16" deep painted over pitting throughout. There are localized areas with moderate to advanced section loss in the jack arches. Knife edging and waviness are present in the top flange of the right jack arch in Span 6 between Floorbeams 6 and 7, and the right jack arch in Span 7 at Pier 7 is similar but has several corrosion holes in the top flange.

#### Steel Stringer

This element includes the steel stringers in the arch Spans 5 through 8. The fascia stringers below the sidewalks are not included with the Steel Stringer quantity, and comments regarding the fascia stringers are included under Element 330 - Metal Bridge Railing. The steel stringers are in satisfactory condition with localized painted over pitting 1/16" deep. There are isolated areas with advanced section loss, particularly near the utility housing at midspan of the centerline of Span 6. Stringer 7 in Span 8 at the Pier 7 top flange is bearing on only the left 2" width with a full length cracked weld along the east edge of the stay plate.

#### Steel Floorbeams

This element includes the full width of the floorbeams throughout the bridge. The steel floorbeams are considered nonredundant steel tension members (fracture critical). They are in satisfactory condition overall with minor painted over section loss, isolated areas of construction damage, and one cracked tack weld. There are several poor quality welds between the floorbeam bottom flange and the spandrel columns with uneven toes, porosity, spatter, and minor undercutting. There is a 3/4" long crack in a poor quality tack weld between the Floorbeam 4 rear face and the left Stringer 6 connection angle fill plate in Span 6.

#### Movable Bearing

This element includes the movable bearings from the Rear Abutment to Pier 8 excluding the fascia stringer bearings. Notes about the fascia stringer bearings can be found with Element 330 - Metal Bridge Railing. The bearing devices are in satisfactory condition as the bearings typically exhibit minor to moderate painted over section loss. The bearings throughout the bridge are moveable with the exception of the fixed bearings at the Forward Abutment.

The arch bearings are in satisfactory condition overall with an isolated location of active pack rust, moderate laminate corrosion on the bottom of the stiffeners, and section loss in the anchor rod bolts and nuts. There is typically 50% to 100% section loss in the anchor rod bolts and nuts of the arch bearings. There is 1/4" thick active pack rust between the Span 8 right arch Pier 7 bearing casting and the north pin nut.

#### Fixed Bearing

This element includes the fixed bearings at the Forward Abutment excluding the fascia stringer bearings. Notes about the fascia stringer bearings can be found with Element 330 - Metal Bridge Railing. The Forward

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Abutment fixed bearings are in **satisfactory** condition and typically have 1/16" deep painted over pitting. There are **gaps up to 3/8" high** between the right edge of the shim plates due to cleaned and painted pack rust

#### Steel Protective Coating (Superstructure)

The protective coating system is typically in **good** condition due to the recent completion of painting operations throughout the bridge. **There is a minor vertical scrape at the left forward corner of the left arch Column 8 in Span 5. The plywood painting containment within both Span 7 arches had not been removed from the rear hatch locations at the time of the inspection.**

#### Diaphragms

The diaphragms are typically in **satisfactory** condition with isolated areas of moderate to advanced section loss. They are located at the abutments and at midspan of the approach spans. The diaphragm between Beams 8 and 9 in Span 1 exhibits construction damage with the **top flange bent up 1/2" in two 9" long areas**. At midspan of Span 6, there are two diaphragms with **advanced section loss** between Stringers 6 and 7 below an access hole in the centerline of the deck. The rear diaphragm at the access hole in Span 6 has **100% section loss up to 4" wide over a 3' length**.

#### Fatigue

The fatigue details are in good condition overall. For a list of the Category E and E' fatigue details, see the 2022 Routine Element Level Inspection Report, attached in AssetWise.

### Substructure

2022: The substructure is in satisfactory condition overall with the majority of the steel pier caps and columns only exhibiting minor painted over section loss. **Hairline sealed cracks and epoxy-injected vertical cracks** are present in the reinforced concrete substructure elements.

Additional comments for each element are included under the Element Inspection Tab.

#### Steel Columns

This element includes the steel pier columns, and comments about the concrete encasing the bottom of the pier columns can be found here.

The steel pier columns are in **fair** condition overall with areas of minor section loss on the exterior faces and moderate to advanced **painted over** section loss throughout the interiors of the pier tower columns. The column exteriors have minor to moderate painted over pitting throughout with corrosion holes up to 8" high by 3" wide in the web plates, especially near the base of the columns and at locations of interior diaphragms. The Pier 4 through 8 column interiors typically have moderate to advanced section loss with 100% section loss to stiffeners and diagonal bracing members throughout. **The column interiors have been painted except for the columns at Piers 1 through 3 and the Pier 7 left column.** The lateral bracing angles in the lower levels of the Pier 7 left column exhibit 100% section loss in the outstanding legs, particularly in the north side of the column. The **ladder safety cable in both columns of Pier 7 is broken** halfway between the strut and the pier cap. The base of the Pier 7 left column is **full of**



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up to 2' deep rust and debris.

#### Reinforced Concrete Pier Walls

This element includes the reinforced concrete pier walls at Piers 4-8. The pier walls are in satisfactory condition with **sealed** vertical cracks and isolated unsealed spalls. There is typically minor rust staining at the drainage holes below the columns. Vertical cracks in the center portion of the walls have been **sealed** and isolated full height vertical cracks have been **epoxy-injected**.

#### Reinforced Concrete Abutment

This element includes **all four walls** of the cellular abutments. Note that the original masonry abutment at the Forward Abutment was doweled into to connect it with the reinforced concrete wall above, and its defects are included here.

The abutments are in **satisfactory** condition overall. The Rear Abutment was recently **sealed** and has minor honeycombing in the left half and **minor water staining** below the utility conduit. The Forward Abutment forward wall has several vertical hairline cracks throughout with moderate rust staining present in line with rust staining in the slab underside. There is typically **cracked and missing grout** throughout the masonry portion of the abutment.

#### Steel Pier Cap

The steel pier caps are in **satisfactory** condition overall due to areas of minor **painted over** section loss and locations of **active corrosion at debris and water ponding at the interior**. The underside of the caps between the columns typically exhibit 1/16" deep painted over pitting. Diaphragms, lateral bracing, and stiffeners within the pier caps have moderate section loss with several areas of 100% section loss in the outstanding legs. **The Pier 5, 6 and 7 cap interiors have debris up to 6" deep throughout the bottom including sand, water, and trash where the containment plywood was not removed.**

#### Abutment Backwall

This element includes the reinforced concrete backwall at the Rear Abutment.

The Rear Abutment backwall is in good condition with only two vertical hairline cracks noted at the right end.

#### Substructure Scour/Embankment/Slope Protection

The slope protection gabion baskets at the Rear Abutment are in good condition. The slope at the Forward Abutment has an erosion channel below the centerline of the bridge which is up to 5' deep and extends to the Pier 8 wall. The Forward Abutment erosion channel does not appear to have changed significantly since the previous inspection. The embankments are in good condition with no significant deficiencies noted at the time of the inspection.

#### Culvert

### Inspector Comments - Waterway

#### Waterway Adequacy

Inspector: Feudo,Victoria  
Inspection Date: 09/07/2022

Structure Number: 1801325  
Facility Carried: SR 10

Bridge Inspection Report

Channel

2022: The channel is in good condition overall with only minor erosion at the forward bank.

Scour

The scour is in good condition with no deficiencies or undermining of the substructure units noted at the time of the inspection.

Channel Alignment

The channel alignment is in **satisfactory** condition overall due to the slight curve at the location of the bridge.

Channel Protection

The protection is in **satisfactory** condition overall with minor erosion in the forward bank near Pier 8.

Hydraulic Opening

The hydraulic opening is in good condition with a vertical clearance over 100' and no obstructions noted at the time of the inspection.

Scour Critical

## **Appendix D**

### Select Plan Sheets from the Rehabilitation Plans

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11-1

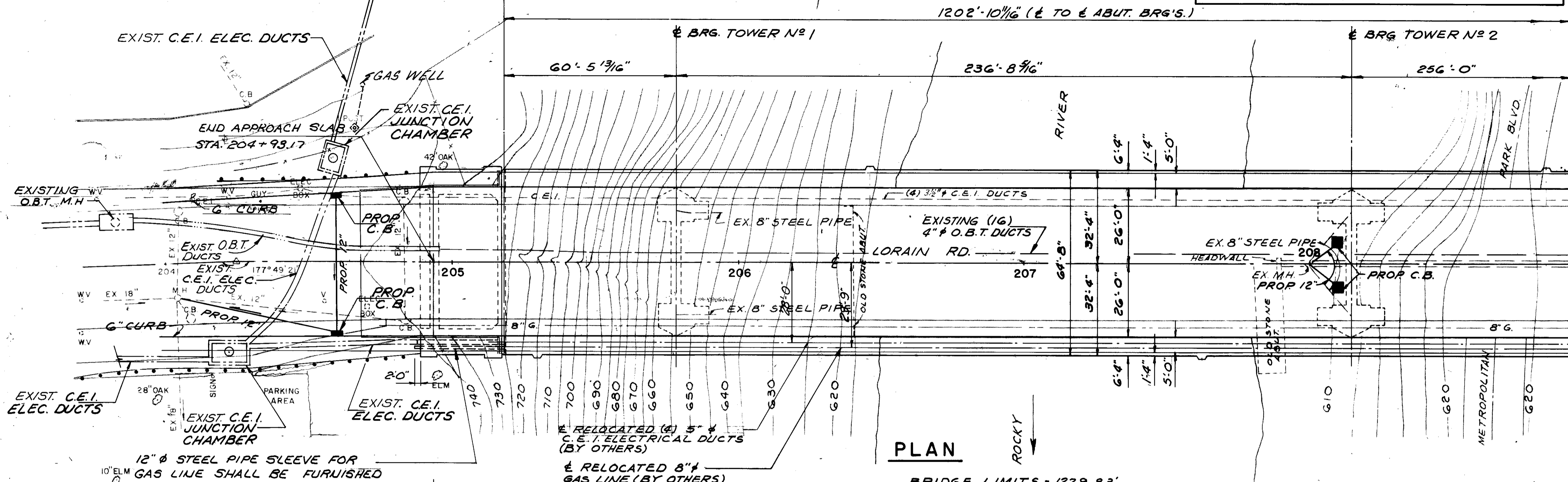
NOTE: FOR VERTICAL LOCATIONS OF THE EXISTING UTILITIES AND STORM SEWERS SHOWN ON THIS SHEET, SEE SHEETS 16, 18, 23, 24 & 25. BRG. EAST ABUTMENT

NOTE: THE SPAN LENGTHS AND THE LONGITUDINAL FRAMING DIMENSIONS SHOWN ON THESE PLANS ARE AS DETAILED ON THE EXISTING STRUCTURE PLANS. THE ACTUAL DIMENSIONS MAY VARY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL DIMENSIONS IN THE FIELD BEFORE USING THEM.

F.H.W.A. REG.	STATE	PROJECT
5	OHIO	F-BRF-69(42)

39  
113

CUYAHOGA COUNTY  
CUY-10-08.69



**EXISTING STRUCTURE**

TYPE - OPEN SPANDREL STEEL ARCH BRIDGE WITH REINFORCE CONCRETE DECK SLAB.

EAST APPROACH SPAN 60'-5 7/16"  
MAIN ARCH SPANS 236'-8 7/16", 256'-0", 256'-0" & 236'-8 7/16"  
WEST APPROACH SPANS 41'-18", 38'-7 7/8", 38'-7 7/8" & 438'-8 5/8"

SKIEW = 0° 00' 00"  
ROADWAY = 40' F/F CURBS WITH 2'-5" SIDEWALKS

LOADING = H20-33  
WEARING SURFACE = ASPHALT  
ALIGNMENT = TANGENT  
GRADE = 0%  
SLOPE PROTECTION = NONE

**PROPOSED STRUCTURE**

TYPE, SPAN, SKIEW, ALIGNMENT & GRADE - SAME AS EXISTING STRUCTURE

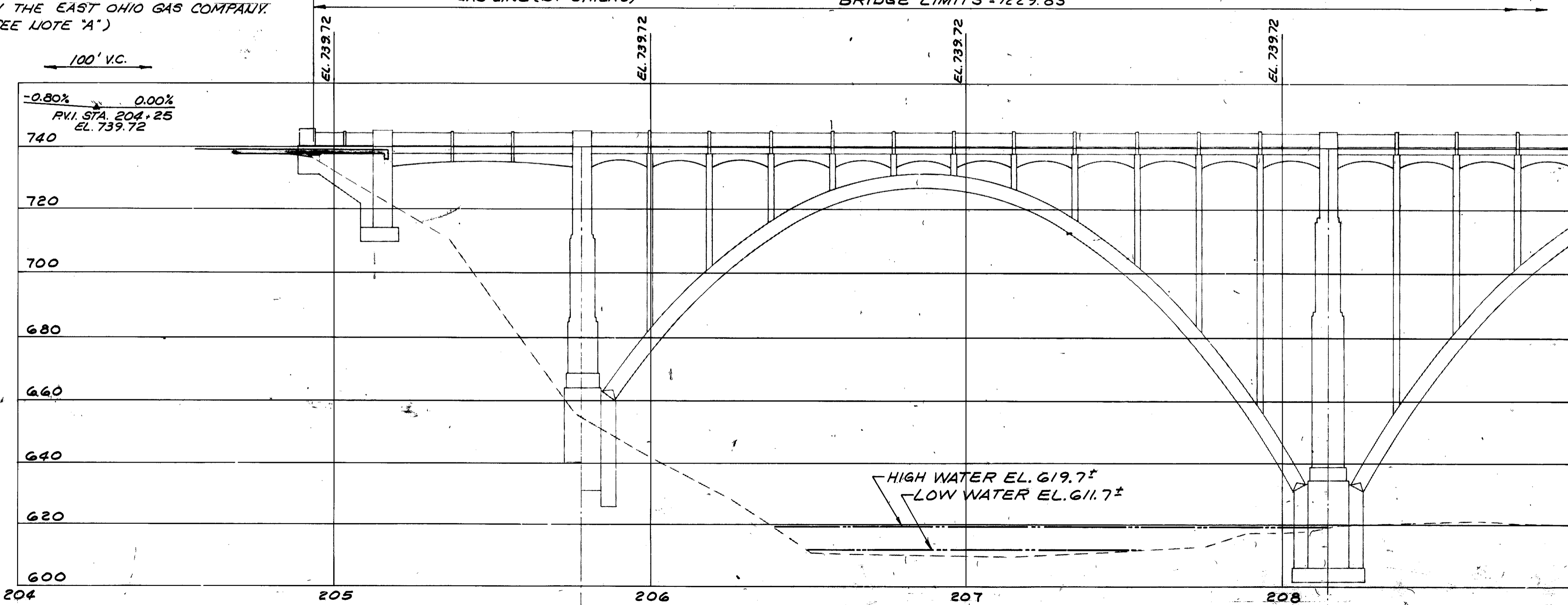
ROADWAY = 52'-0" F/F CURBS WITH 2'-5" SIDEWALKS

LOADING = HS20-44  
WEARING SURFACE = 1 1/2" LATE MODIFIED CONCRETE

APPROACH SLABS = 25'-0" @ ABUTMENTS AS-1

SLOPE PROTECTION = 9" THICK GABION MATS WEST ABUTMENT SIDE ONLY

- NOTE:
- 1 SEE SHEET 2-59 FOR DESCRIPTION OF PROPOSED NORMAL
  - 2 SEE SHEET 3-59 FOR INDEX OF STRUCTURAL DETAIL PLANS



(NOTE "A")  
NO EXTRA PAYMENT WILL BE MADE FOR INSTALLING THE PIPE SLEEVE IN PLACE BUT THE COST THEREOF SHALL BE INCLUDED IN THE COST OF ITEM 202, "EXIST. GAS LINE AND SUPPORTS REMOVED", FOR PAYMENT.

**SITE PLAN**

LORAIN ROAD VIADUCT  
OVER ROCKY RIVER  
BRIDGE NO. CUY-10-0869  
STA. 204+93.17 TO STA. 217+23.00  
CUYAHOGA COUNTY

REPORT NO. 7092	NO. 72	CHECKED BY: BKL, F.F.	DATE: 4/24	REVIEWED BY: JFP	DATE: 7/25
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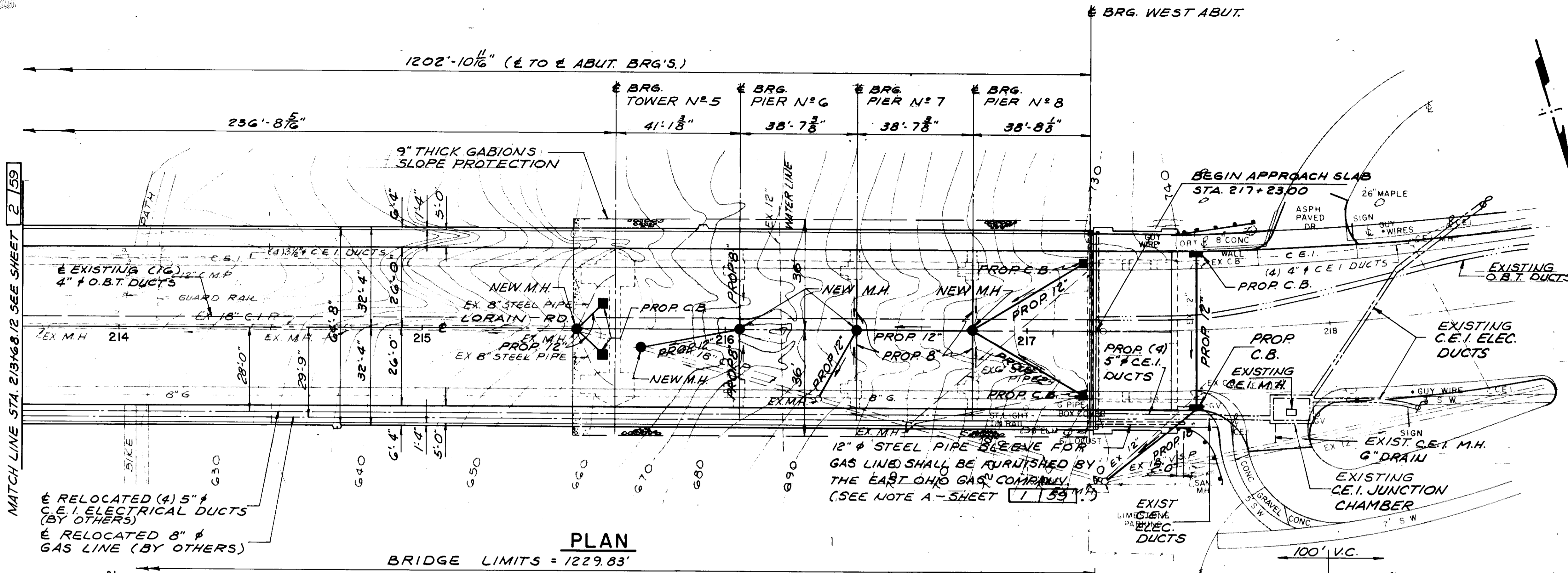




**INDEX OF  
STRUCTURAL DETAIL PLANS**

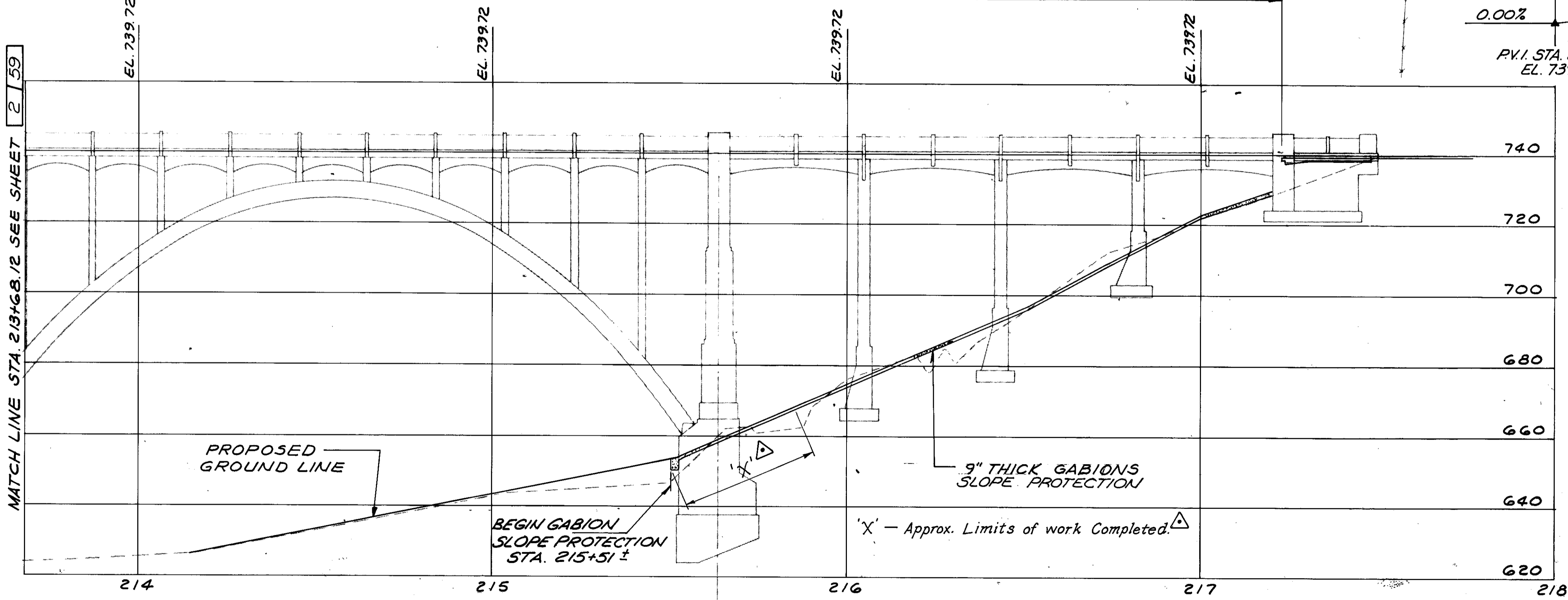
BRIDGE SHEET N <sup>o</sup>	DESCRIPTION
1-3	SITE PLAN
4-8	STRUCTURAL GENERAL NOTES
9	STR. GEN. NOTES & EST. QUANT.
10-12	GENERAL PLAN & ELEVATION
13	DEMOLITION & PHASING DETAILS
14	EAST ABUT. DEMOLITION DETAILS
15-18	EAST ABUTMENT DETAILS
19	WEST ABUT. DEMOLITION DETAILS
20-22	WEST ABUTMENT DETAILS
23	FRAMING PLAN
24	FRAMING DETAILS
25	END DIAPHRAGM DETAILS
26-28	FRAMING DETAILS
29	TOWERS 1&5 DEMOLITION DETAILS
30	TOWERS 1&5 CANTILEVER DETAILS
31	TOWERS 2,3&4 DEMOLITION DETAILS
32	TOWERS 2,3&4 CANTILEVER DETAILS
33	TOWERS 1-5 CANTILEVER DETAILS
34	SPALLS 2,3&4 PORT. FRAME GANT.
35	PIERS 6,7&8 CANTILEVER DETAILS
36-37	STRUCTURAL STEEL REPAIR DETAILS
38	LADDER DETAIL
39	DEFLECTION & CAMBER
40	SLAB PLAN
41	TRANSVERSE SECTIONS
42-44	SUPERSTRUCTURE DETAILS
45	FORMING ELEVATIONS
46-47	EXPANSION JOINT DETAILS
48	RAILING PLAN
49-50	RAILING DETAILS
51-56	DRAINAGE DETAILS
57,57A,58,58A	REINFORCING SCHEDULE
59	APPROACH SLAB DETAILS

NOTE: FOR VERTICAL LOCATIONS OF EXISTING UTILITIES, SANITARY AND STORM SEWERS SEE SHEETS 18, 28 THRU 33.



**PLAN**

BRIDGE LIMITS = 1229.83'



**ELEVATION**

DALTON DALTON NEWELL  
CLEVELAND OHIO ARRON OHIO

**SITE PLAN** 3/22

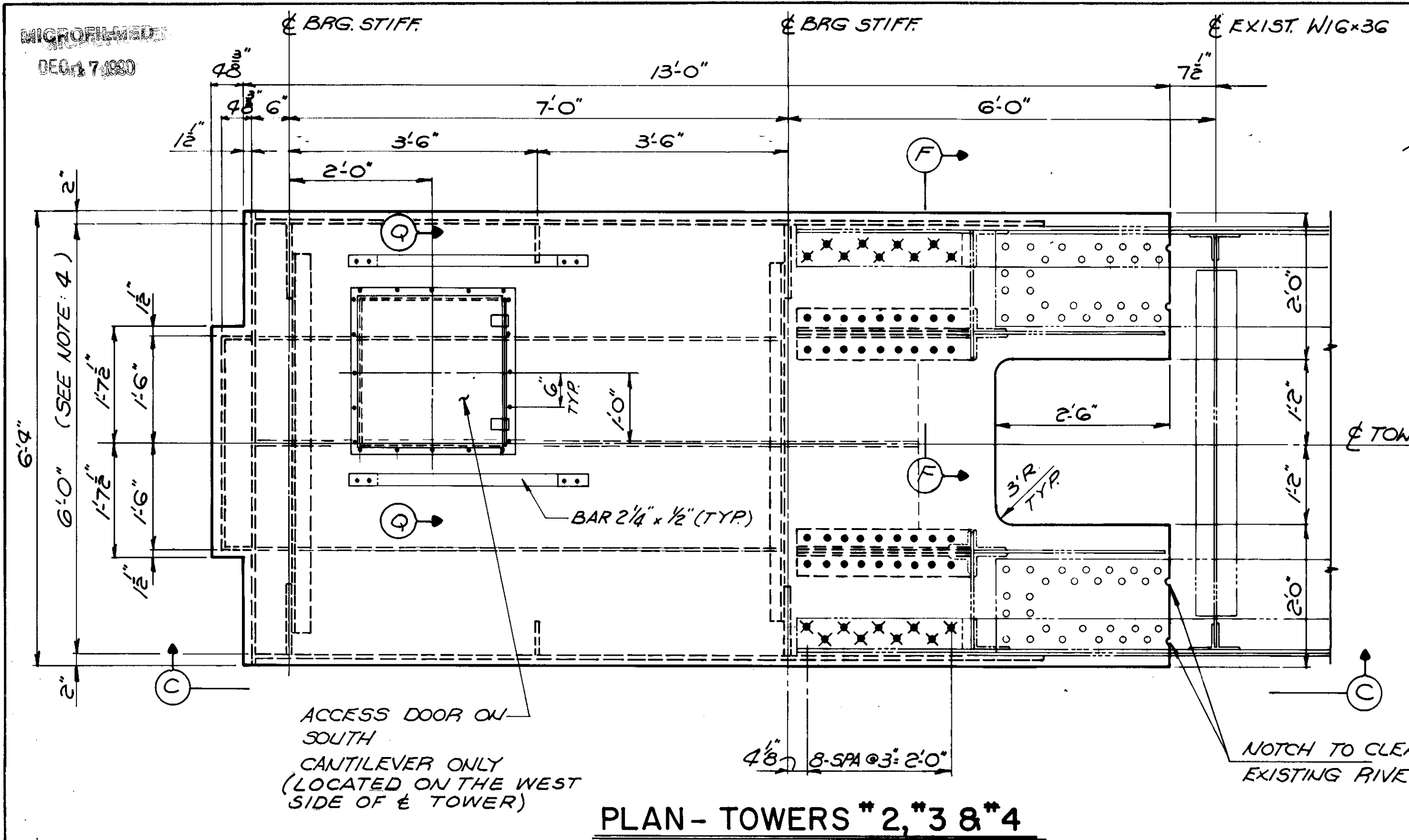
LORAIN ROAD VIADUCT  
OVER ROCKY RIVER  
BRIDGE N° CUY-10-0869  
STA. 204+93.17 TO STA 217+25.00  
CUYAHOGA COUNTY



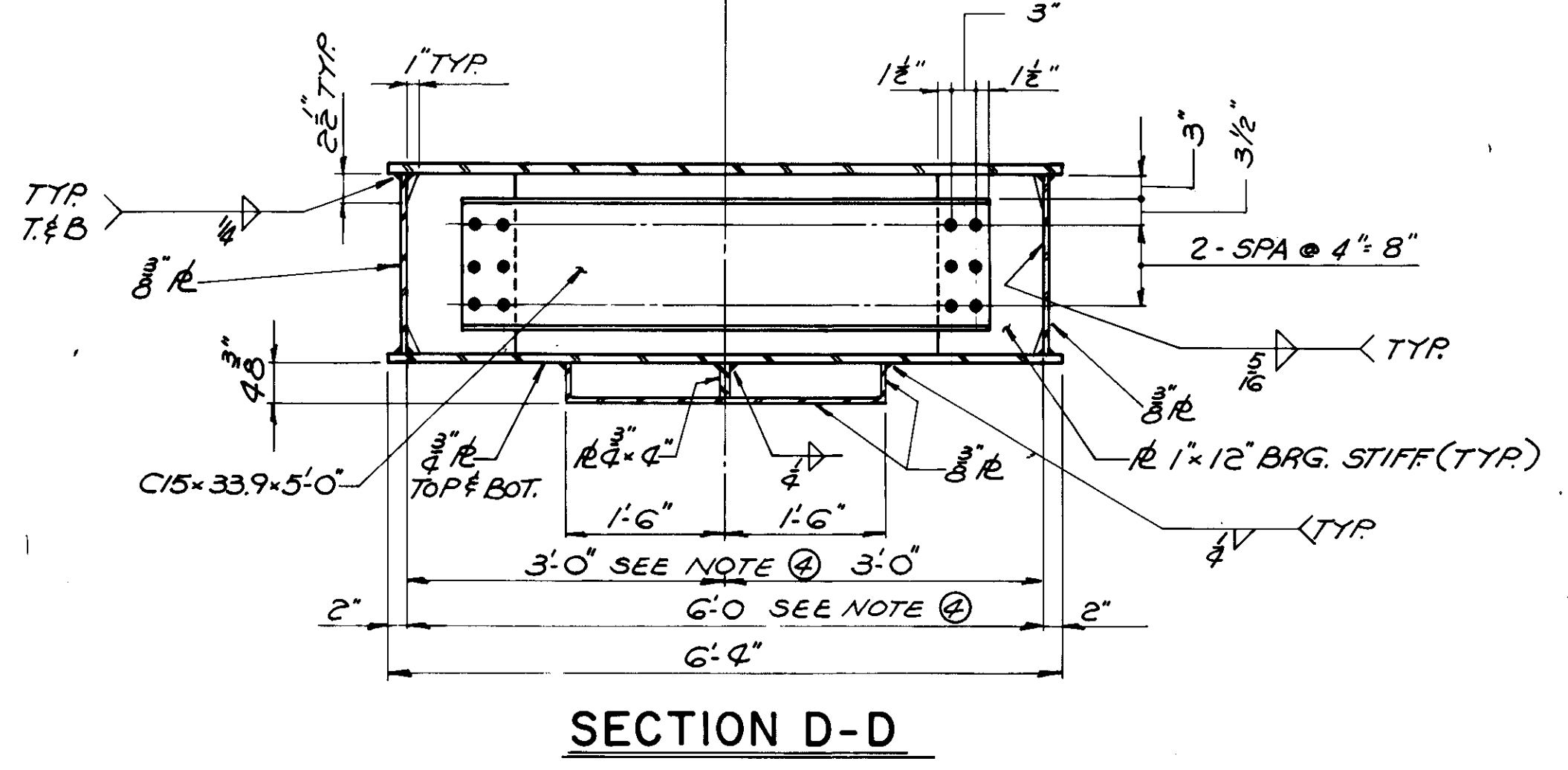




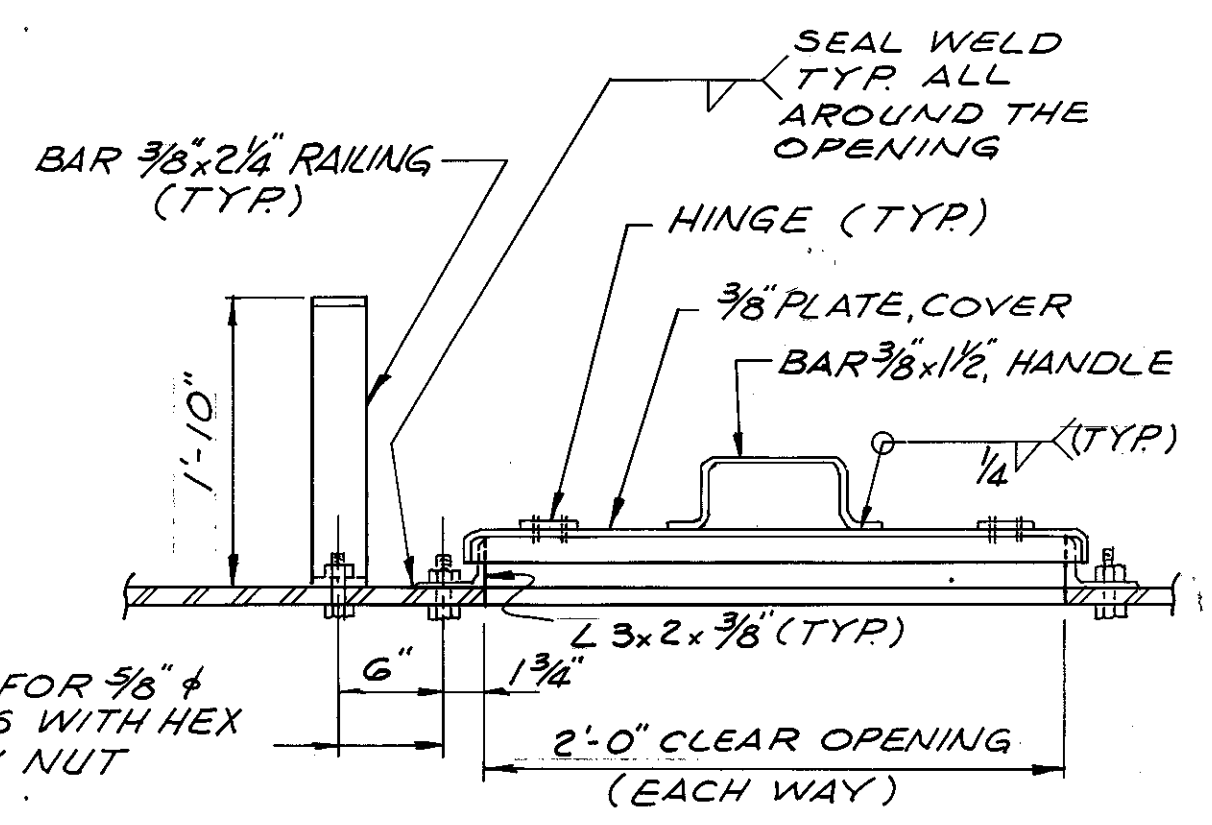




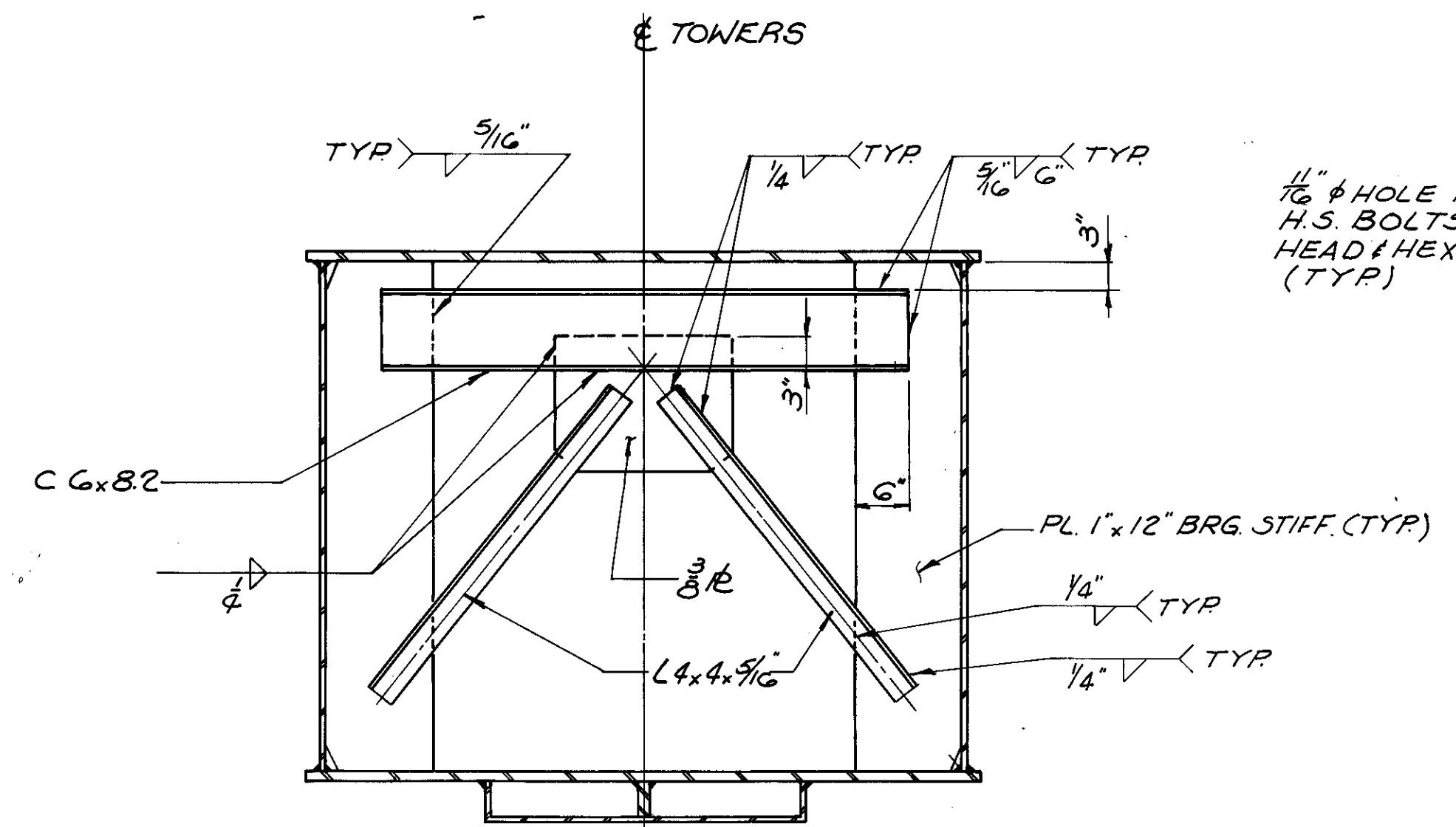
PLAN - TOWERS #2, #3 & #4



SECTION D-D

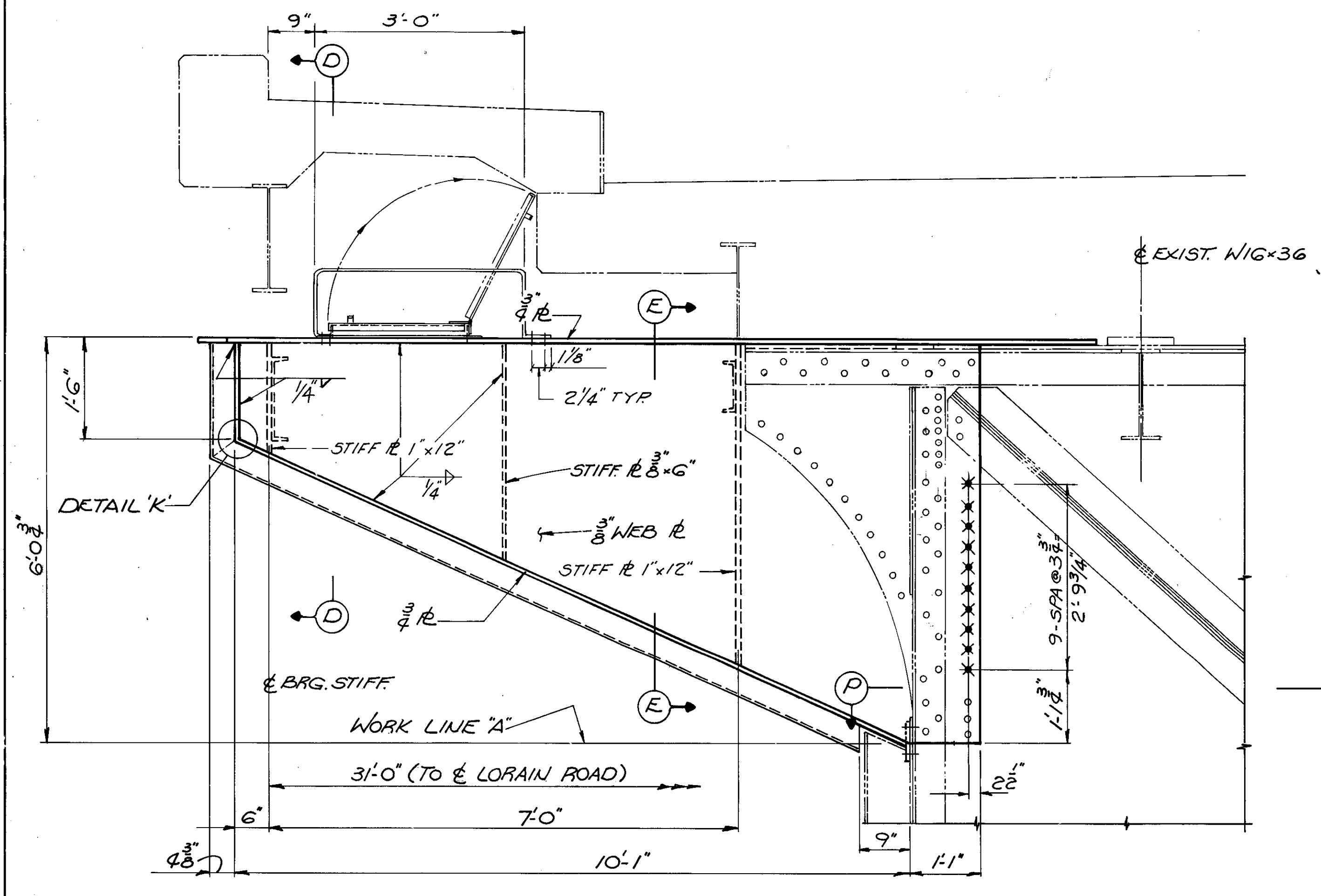


SECTION Q-Q

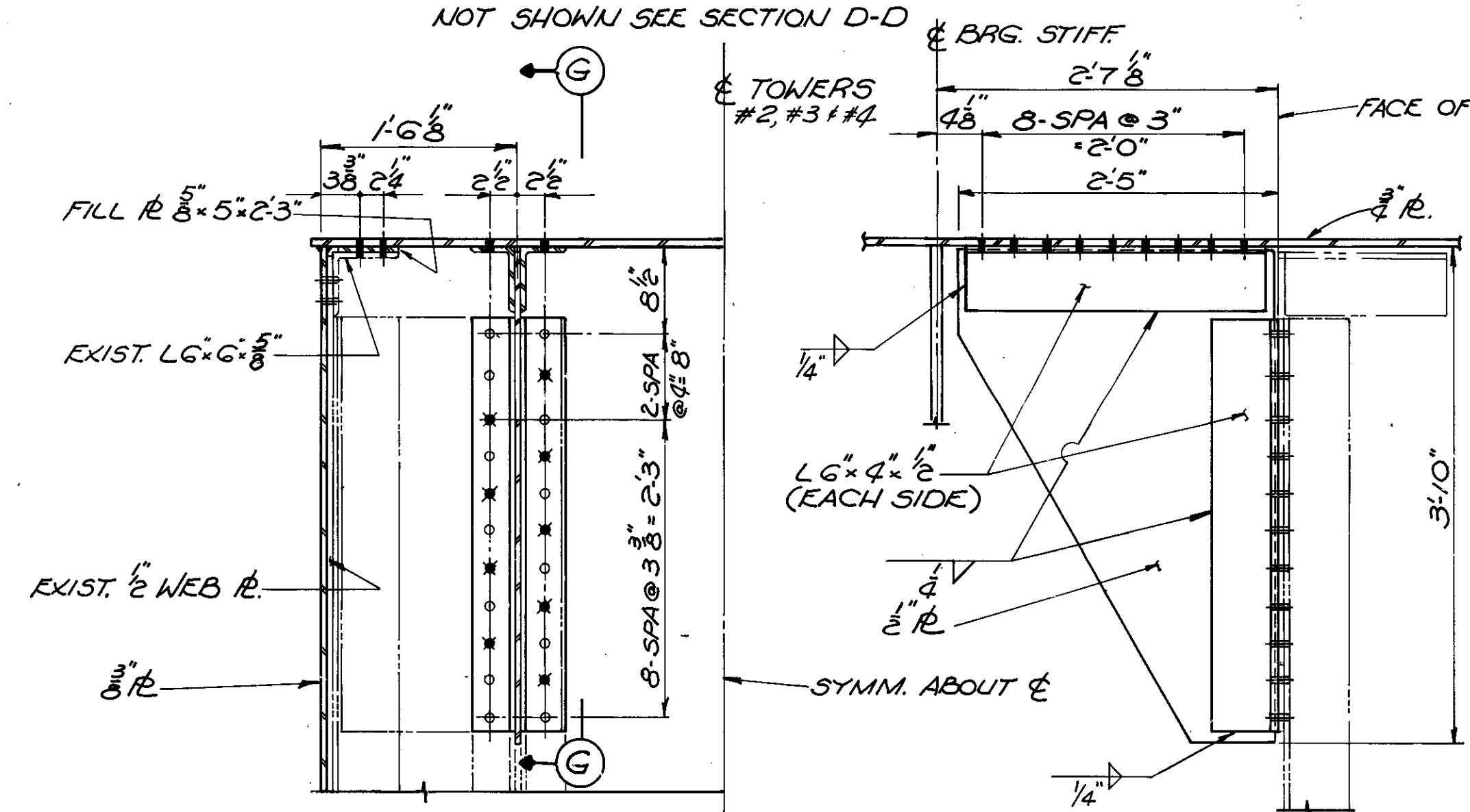


SECTION E-E

FOR DIMENSIONS & DETAILS NOT SHOWN SEE SECTION D-D



VIEW C-C



SECTION F-F

SECTION G-G

- NOTES**
- FOR DETAILS "K" SEE SHEET 30/59
  - FOR SECTION "P-P" SEE SHEET 33/59
  - FOR LOCATION OF SECTIONS "Q-Q", "D-D" & "E-E" FOR TOWERS 1&5 CANTILEVERS, SEE SHEET 30/59.
  - SEE NOTE 2 SHEET 34/59.
  - FOR EXPLANATION OF BOLTS CONNECTION SYMBOLS SEE NOTES 2, 3 & 4 SHEET 30/59.

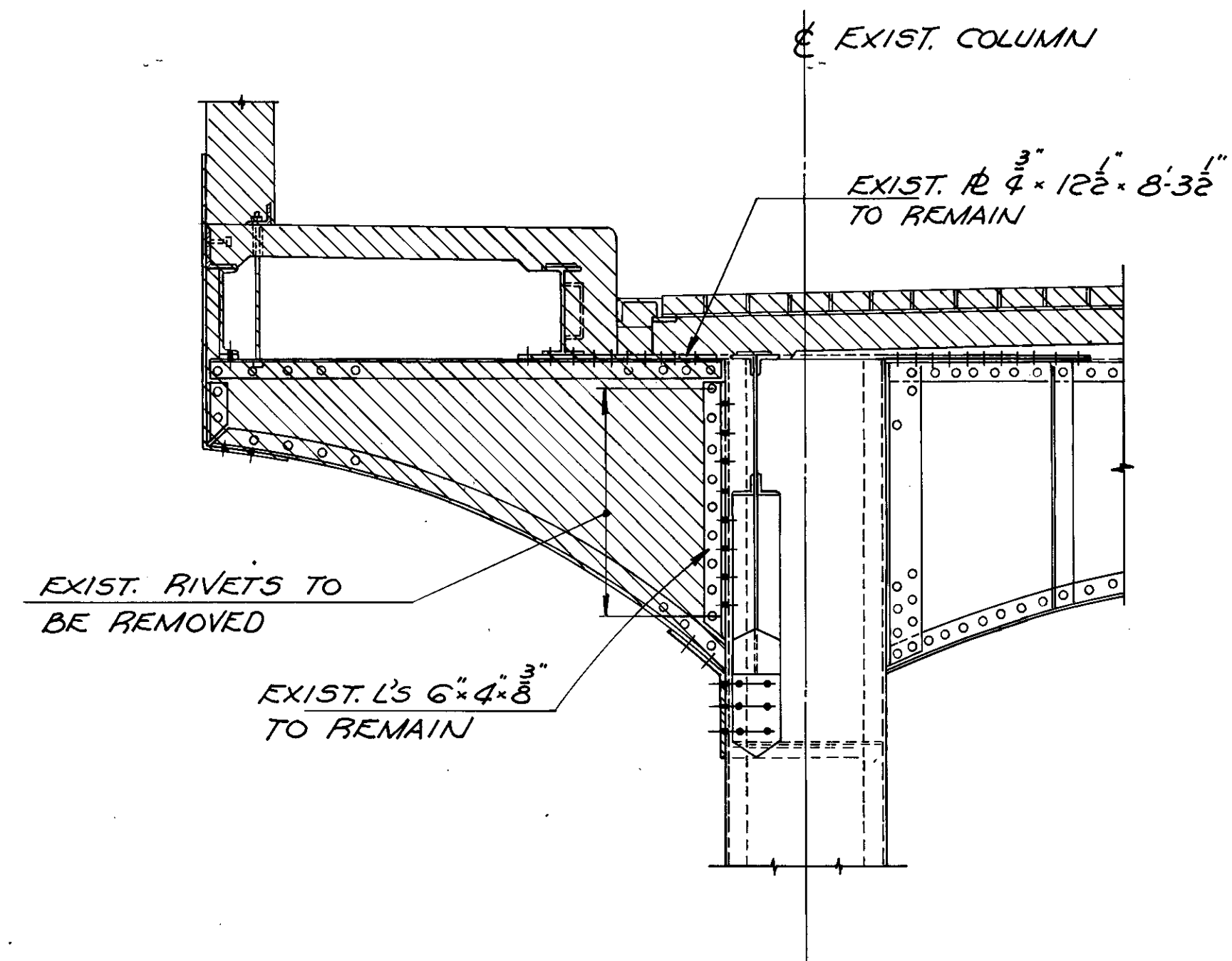
DALTON · DALTON · NEWPORT  
CLEVELAND, OHIO AKRON, OHIO

**TOWERS 2, 3 & 4** 32/59  
**CANTILEVER DETAILS**  
LORAIN ROAD VIADUCT  
OVER ROCKY RIVER  
BRIDGE # CUY-10-0869  
STA 204+93.17 TO STA 217+23.00  
CUYAHOGA COUNTY OHIO

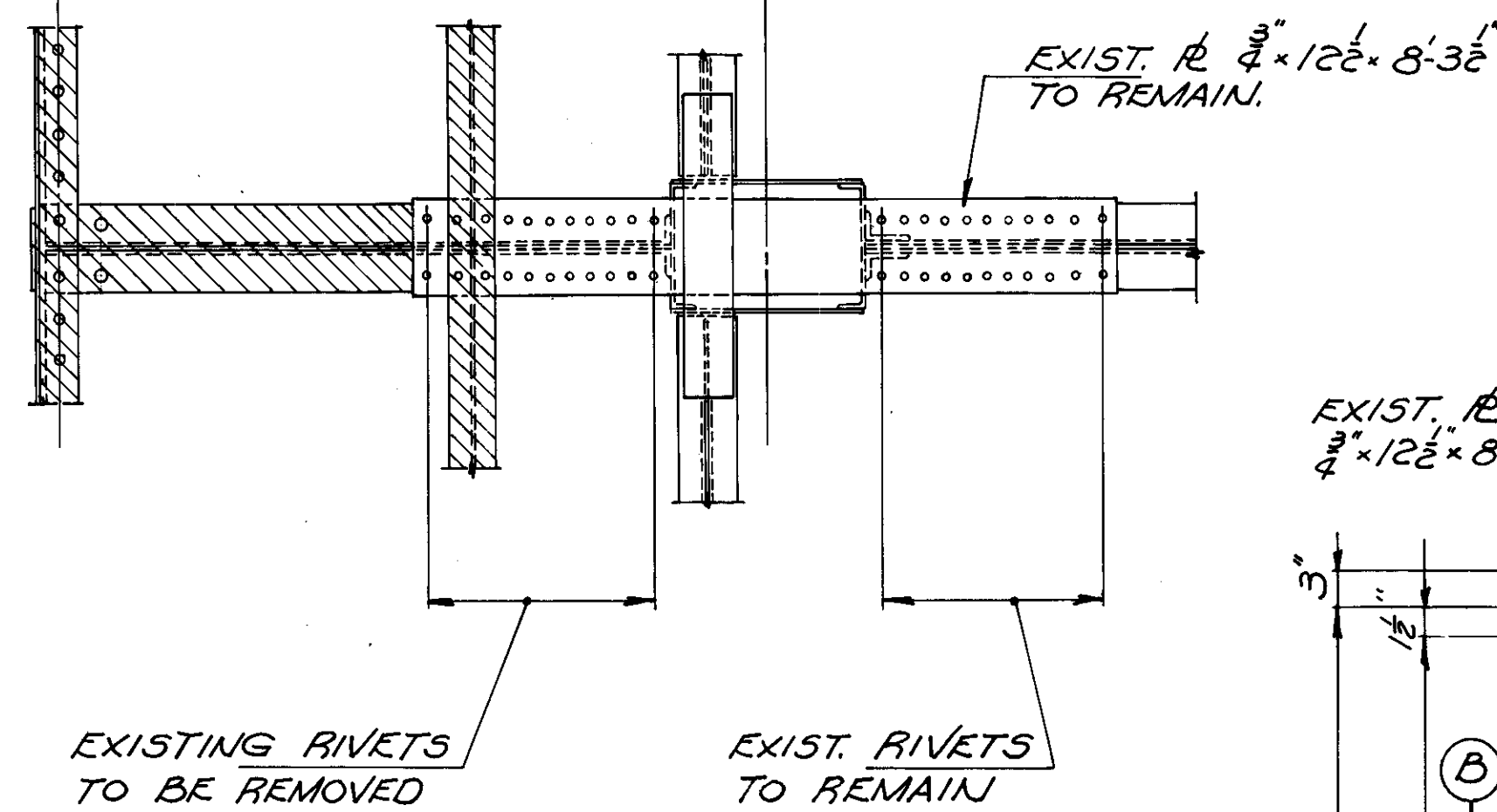
REPORT # 7092  
# B - 79

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISION
BKL	LWN		RER	JFP	7-30-82	

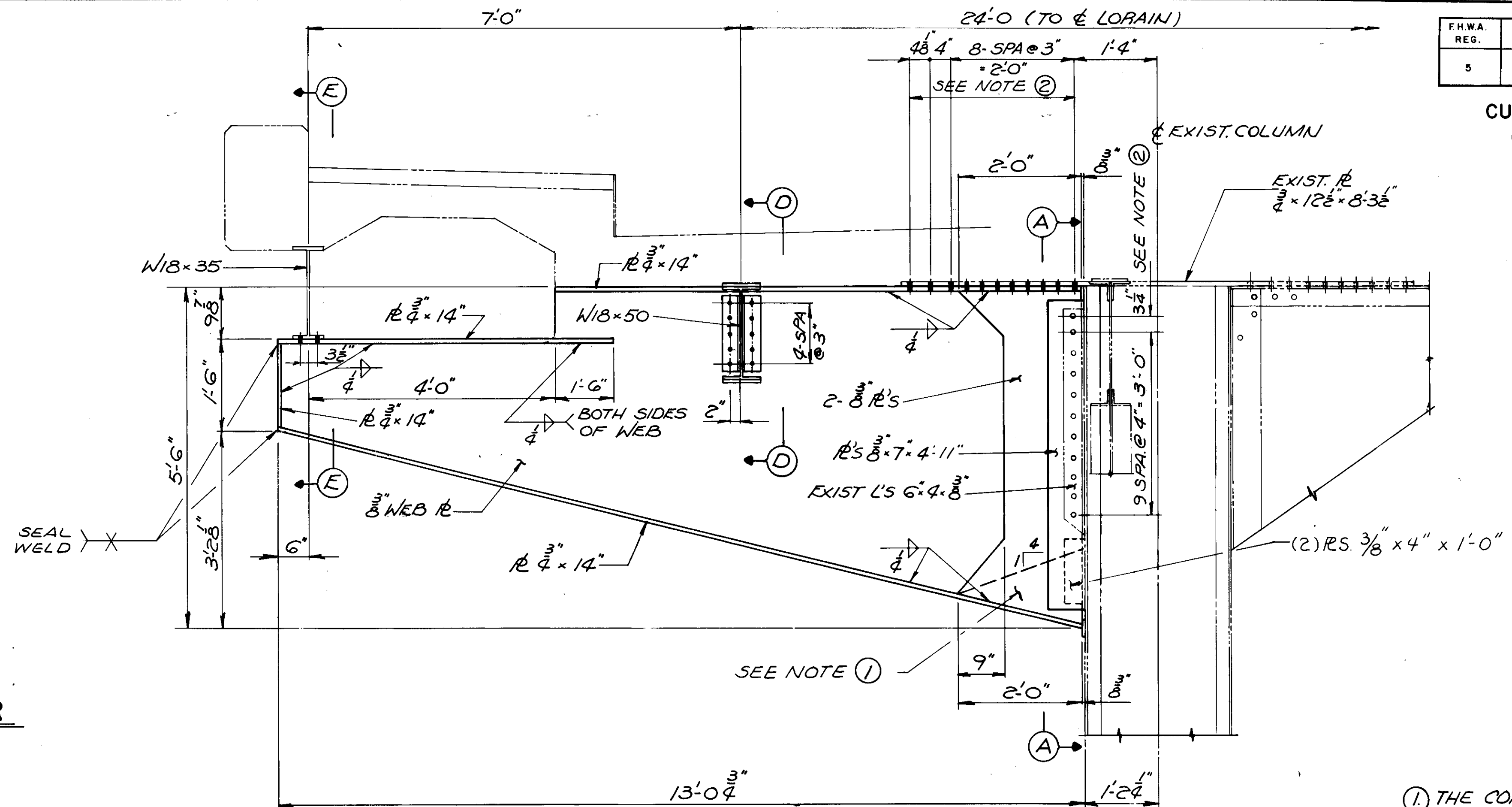
LORAIN ROAD BRIDGE # 42



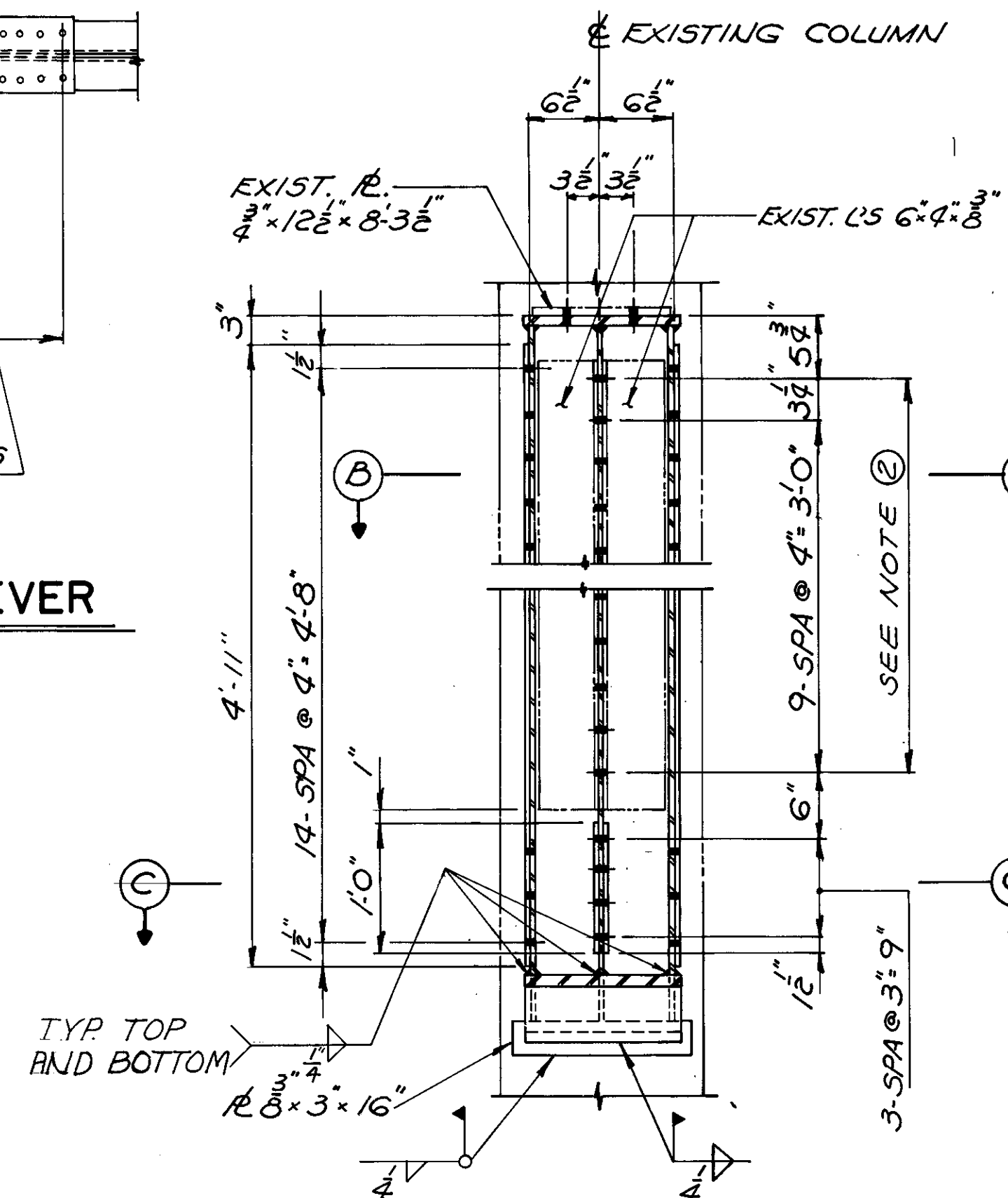
ELEVATION- EXISTING CANTILEVER



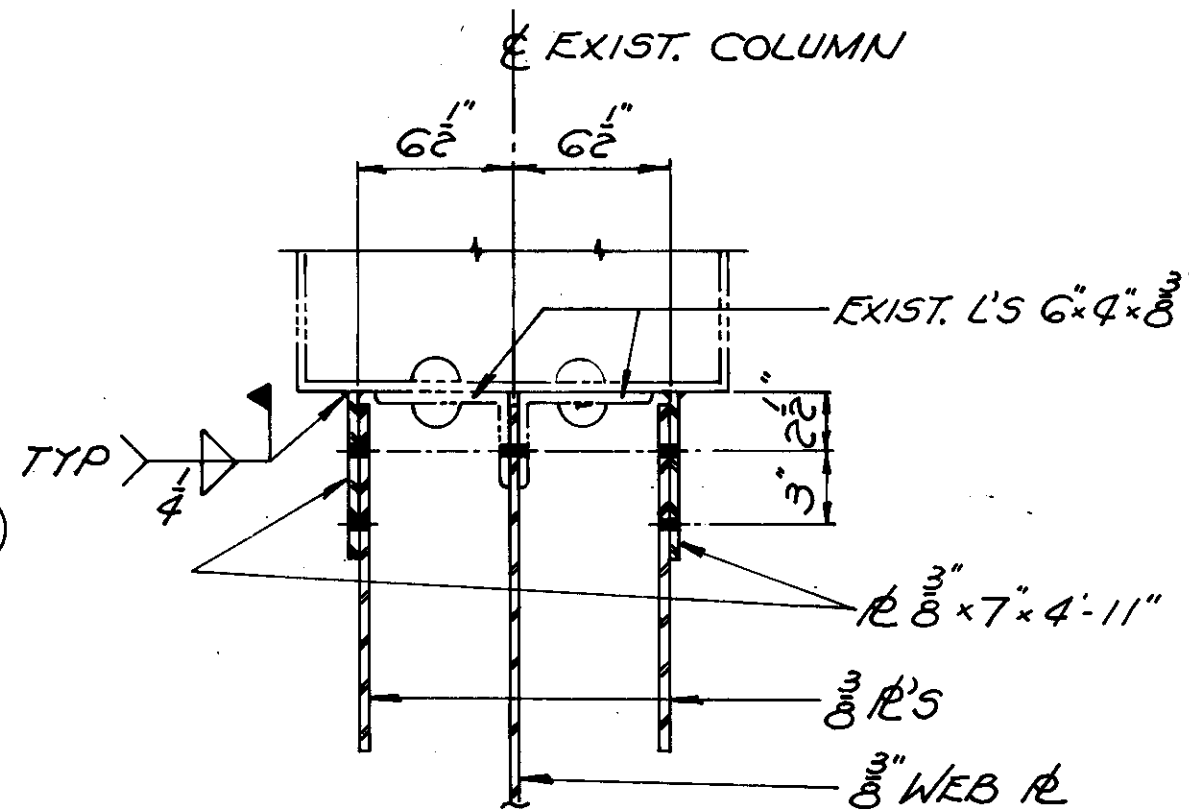
PLAN-EXISTING CANTILEVER



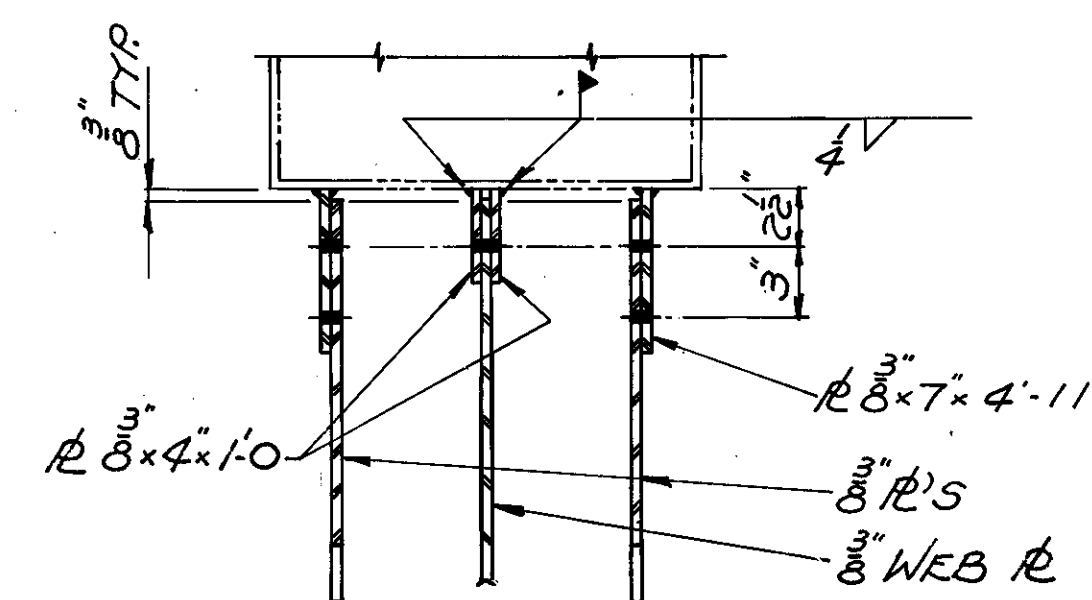
ELEVATION- PROPOSED CANTILEVER  
(92-REQUIRED)



SECTION A-A



SECTION B-B



SECTION C-C

- NOTES**
- THE CONTRACTOR SHALL FILL THE AREA BETWEEN THE FLANGES AND WEBS BELOW DASHED LINE AS SHOWN WITH CLASS "5" CONCRETE AFTER ALL THE STRUCTURAL STEEL WORK FOR THE CANTILEVER HAS BEEN FINISHED AND INSPECTED BY THE ENGINEER. THE QUANTITY OF CONCRETE FOR THE FILL SHALL BE INCLUDED WITH QUANTITY FOR ITEM 511 CLASS "5" CONCRETE, SUPERSTRUCTURE.
  - THESE DIMENSIONS HAVE BEEN OBTAINED FROM THE EXISTING STRUCTURAL STEEL SHOP DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THESE DIMENSIONS IN THE FIELD BEFORE FABRICATION OF ANY STRUCTURAL STEEL.
  - FOR SECTIONS 'D-D' & 'E-E' SEE SHEET [24/59].
  - FOR EXPLANATION OF BOLT CONNECTION SYMBOLS SEE NOTES 2,3 & 4 SHEET [30/59].
  - SEE NOTE ①, SHEET [26/59].

DALTON · DALTON · NEWPORT  
CLEVELAND, OHIO · AKRON, OHIO

SPANS 2, 3, 4 & 5  
PORTAL FRAME CANTILEVER  
LORAIN ROAD VIADUCT  
OVER ROCKY RIVER  
BRIDGE N° CUY-10-0869  
STA 204+93.17 TO STA 217+23.00  
CUYAHOGA COUNTY OHIO

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
BKL	llw		RER	JFP	7-30-82	

REPORT N° 7092  
N° B -79

LORAIN ROAD BRIDGE N° 42



MICROFILMED

DEC 17 1980

MICROFILMED

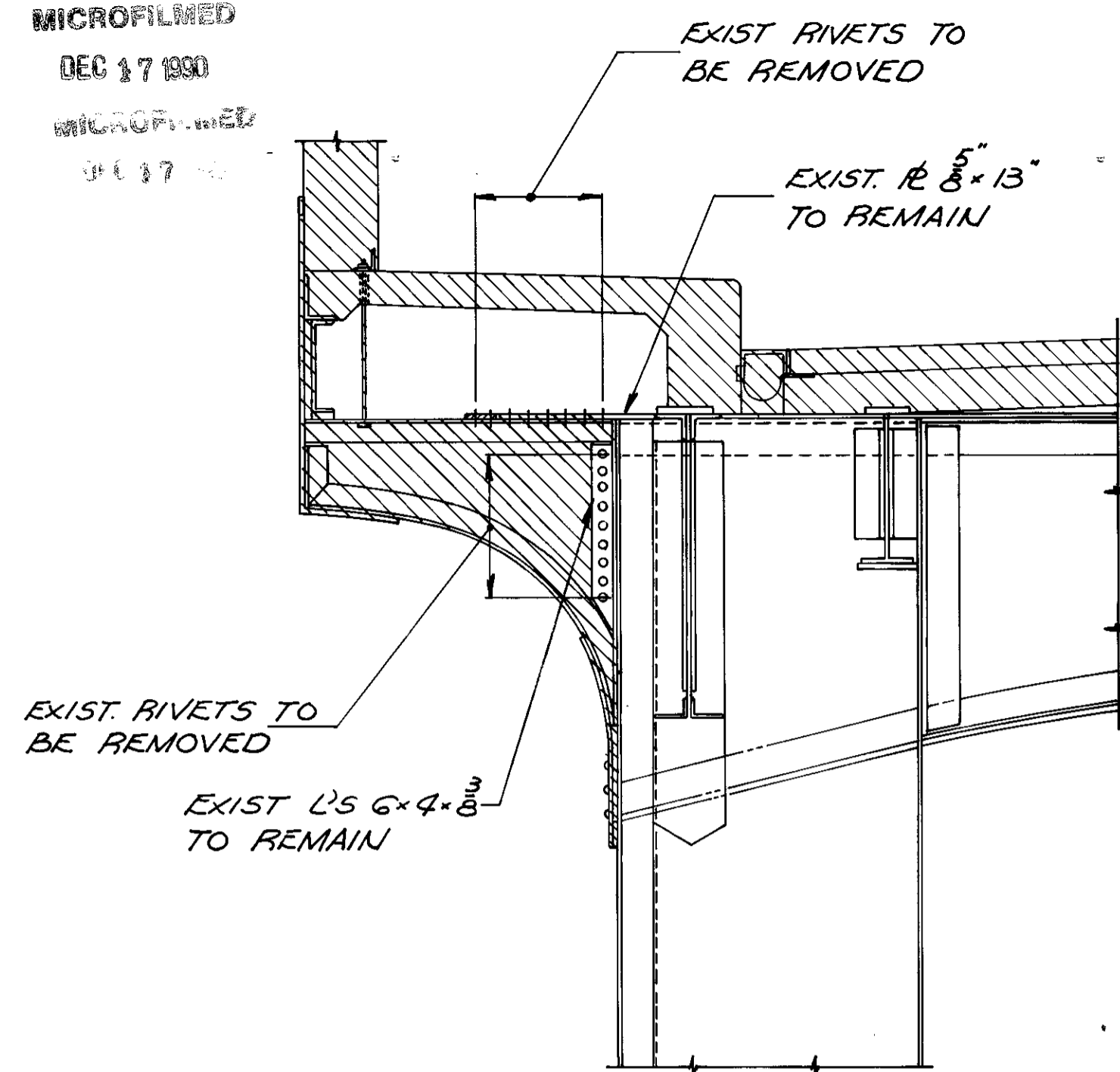
F.H.W.A. REG.	STATE	PROJECT
5	OHIO	F-BRF-69 (42)

73  
113

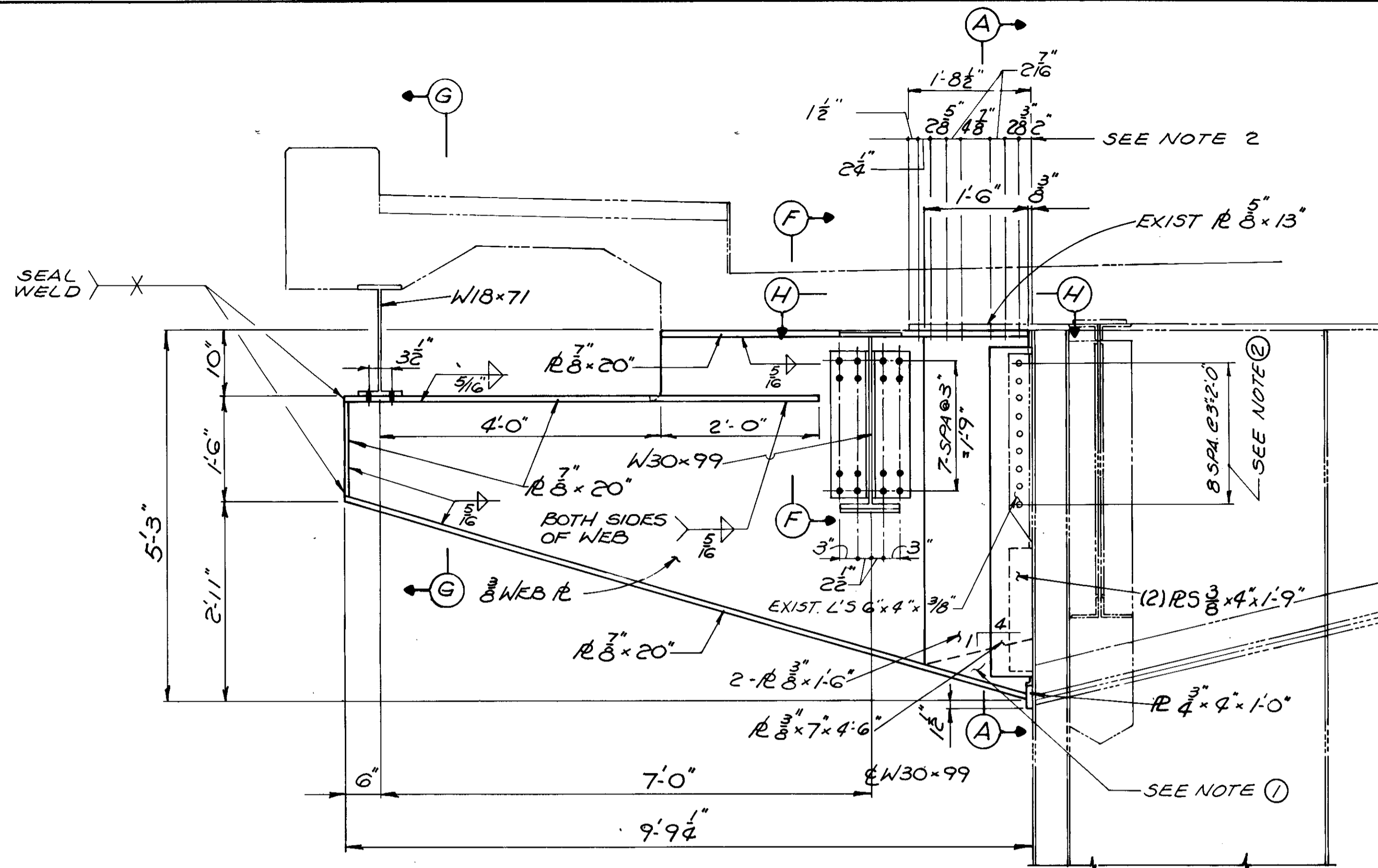
CUYAHOGA COUNTY  
CUY-10-08.69

NOTES

- ① SEE NOTE ① SHEET 34/59.
- ② THESE DIMENSIONS HAVE BEEN OBTAINED FROM THE EXISTING STRUCTURAL STEEL SHOP DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THESE DIMENSIONS IN THE FIELD BEFORE FABRICATION OF ANY STRUCTURAL STEEL.
- ③ FOR SECTIONS F-F & G-G SEE SHEET 24/59.
- ④ FOR EXPLANATION OF BOLT CONNECTION SYMBOLS SEE NOTES 2, 3 & 4 SHEET 30/59.
- ⑤ SEE NOTE ① SHEET 26/59.

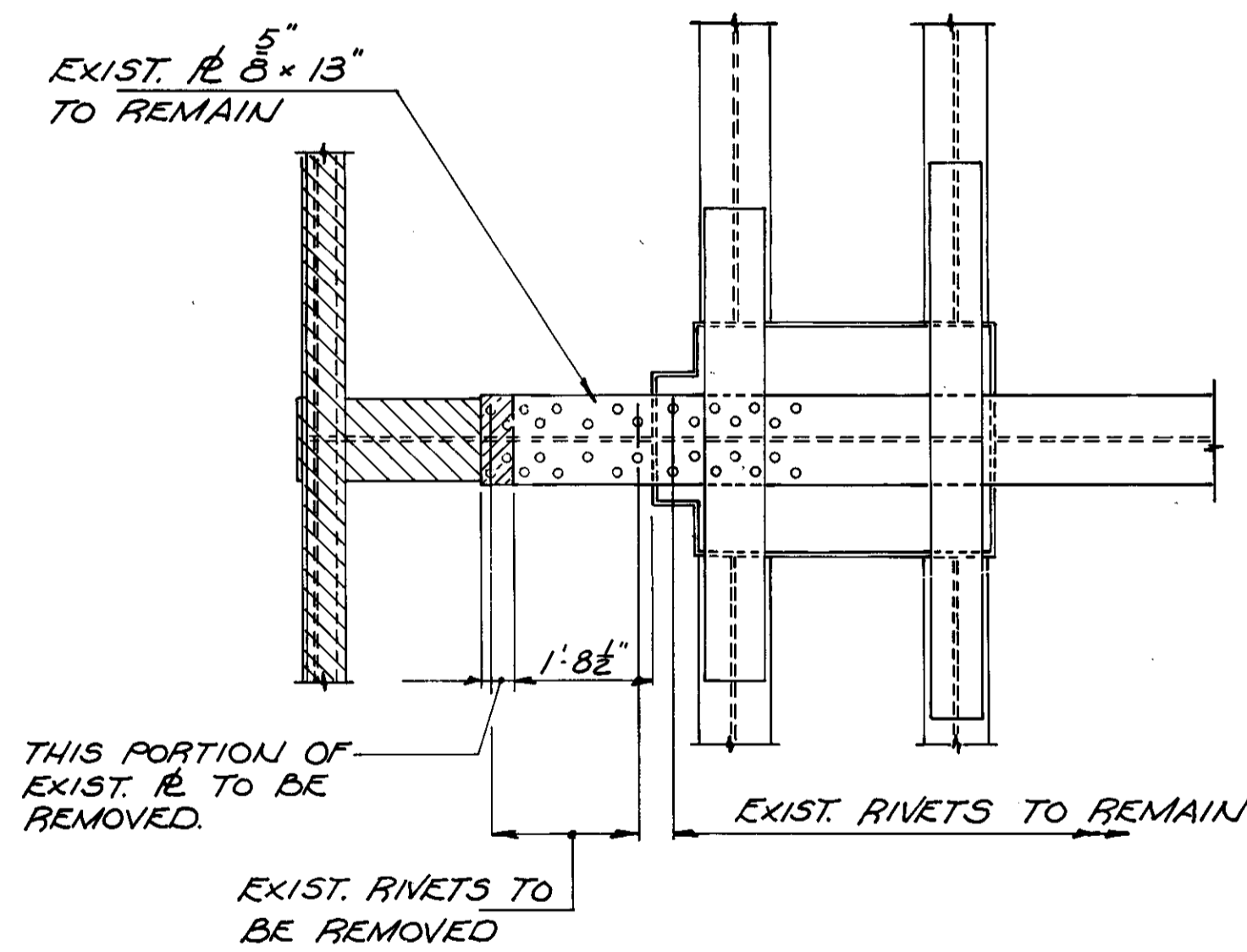


ELEVATION-EXISTING CANTILEVER

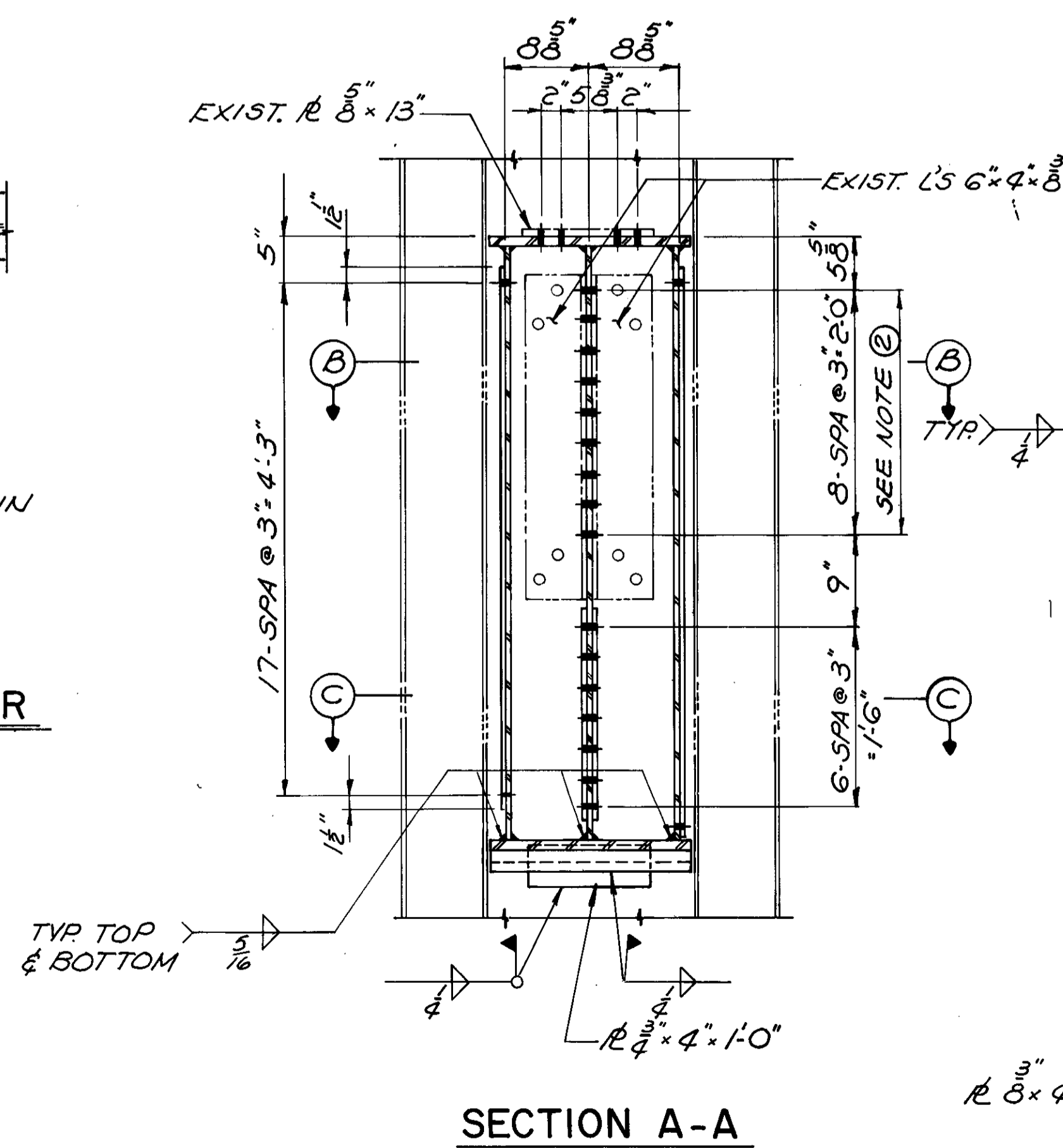


ELEVATION - PROPOSED CANTILEVER

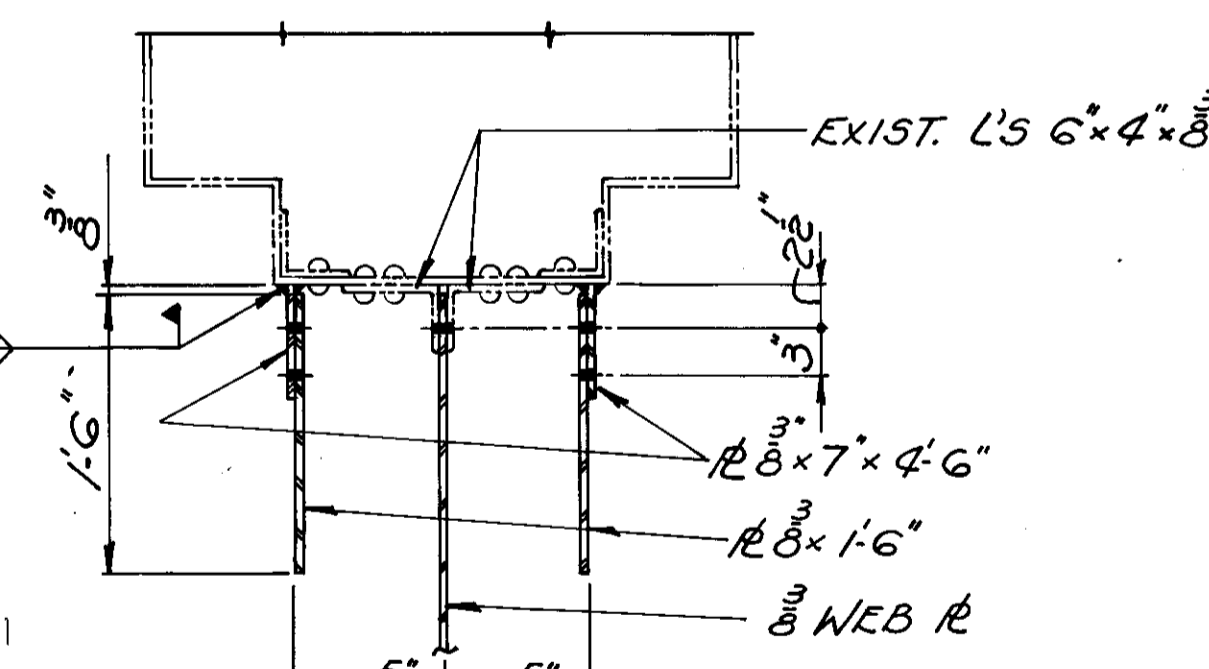
(G - REQUIRED)



PLAN - EXISTING CANTILEVER

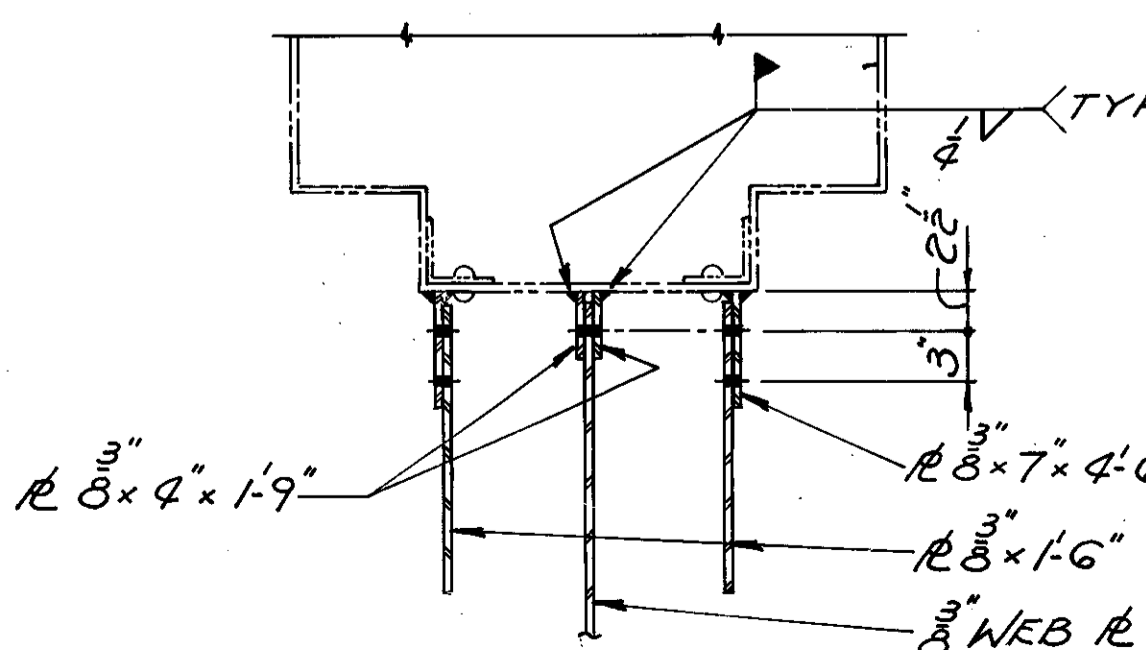


SECTION A-A

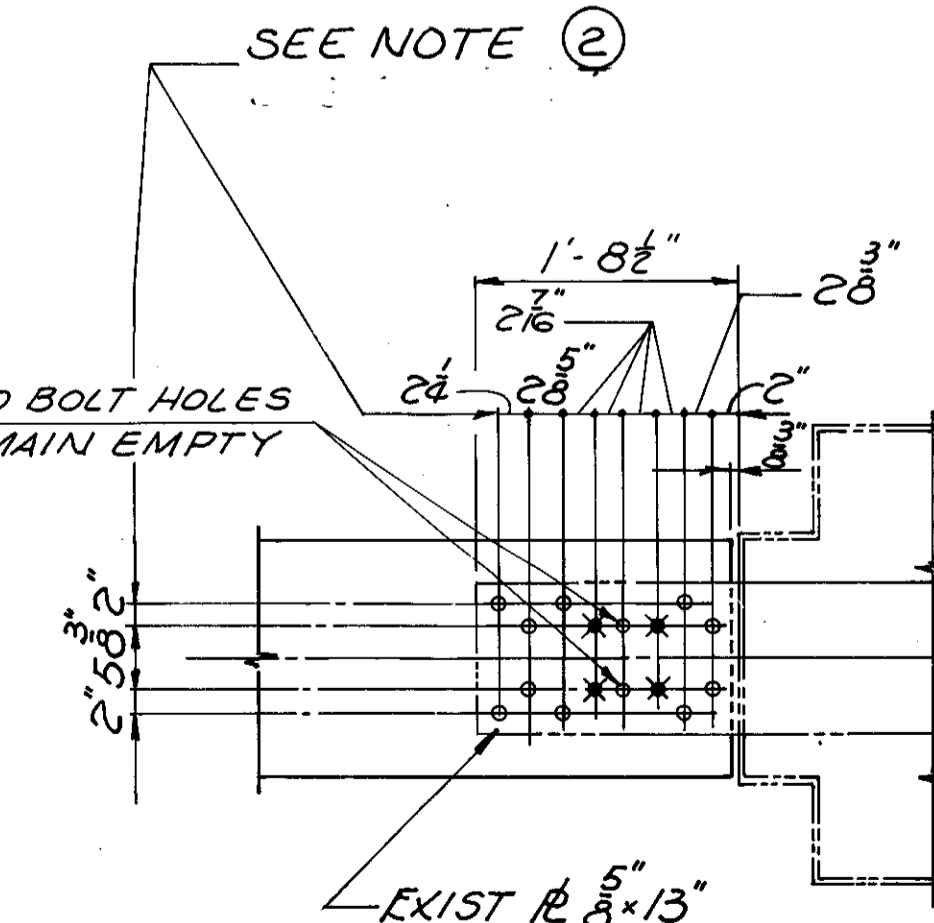


SECTION B-B

THESE TWO BOLT HOLES ARE TO REMAIN EMPTY



SECTION C-C



SECTION H-H

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CLEVELAND, OHIO AKRON, OHIO

PIERS 6,7 & 8  
CANTILEVER DETAILS

LORAIN ROAD VIADUCT  
OVER ROCKY RIVER  
BRIDGE No CUY-10-0869

STA 204+93.17 TO STA 217+23.00

CUYAHOGA COUNTY OHIO

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
	BKL	JWW	RER	JFP	7-30-82	

REPORT No 7092  
No B-79

LORAIN ROAD BRIDGE No 42

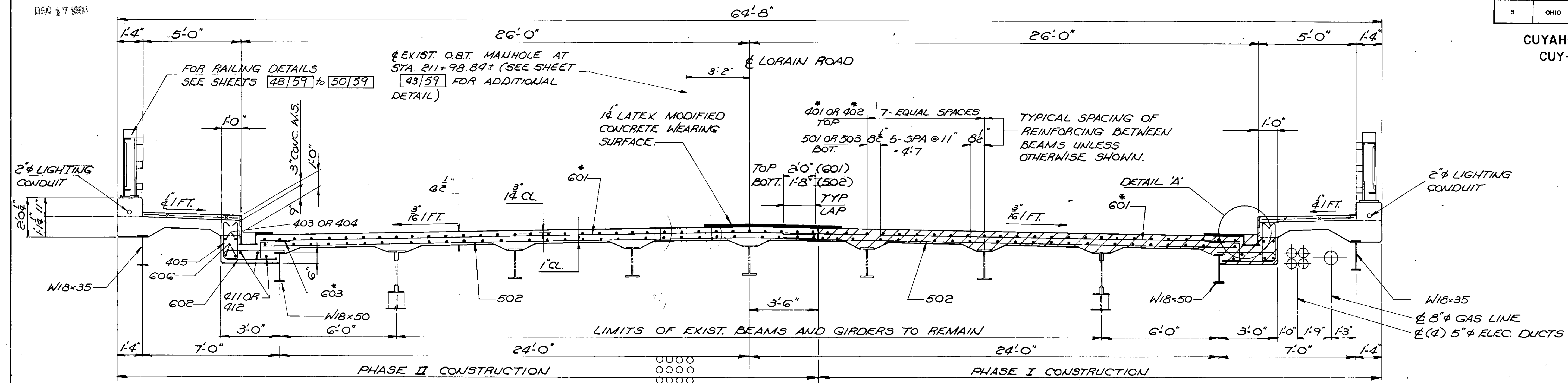


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F.H.W.A. REG.	STATE	PROJECT
5	OHIO	F-BRF-69(42)

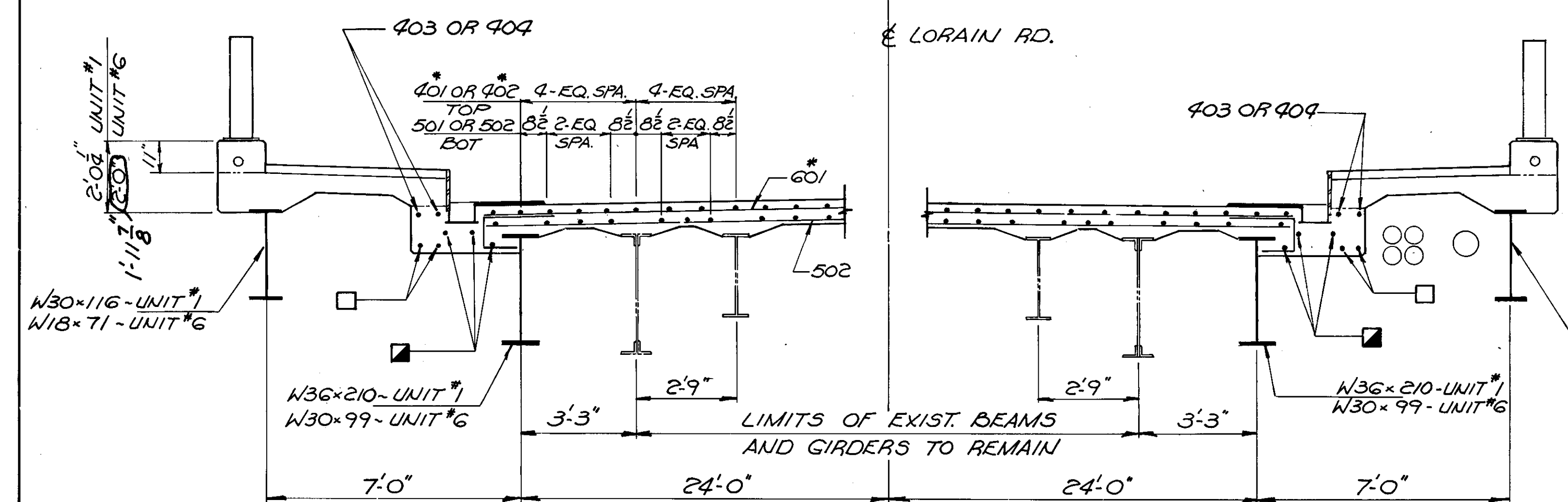
79  
113

CUYAHOGA COUNTY  
CUY-10-08.69



NOTE  
FOR SIDEWALK AND PARAPET  
REINFORCING SEE DETAIL 'C'

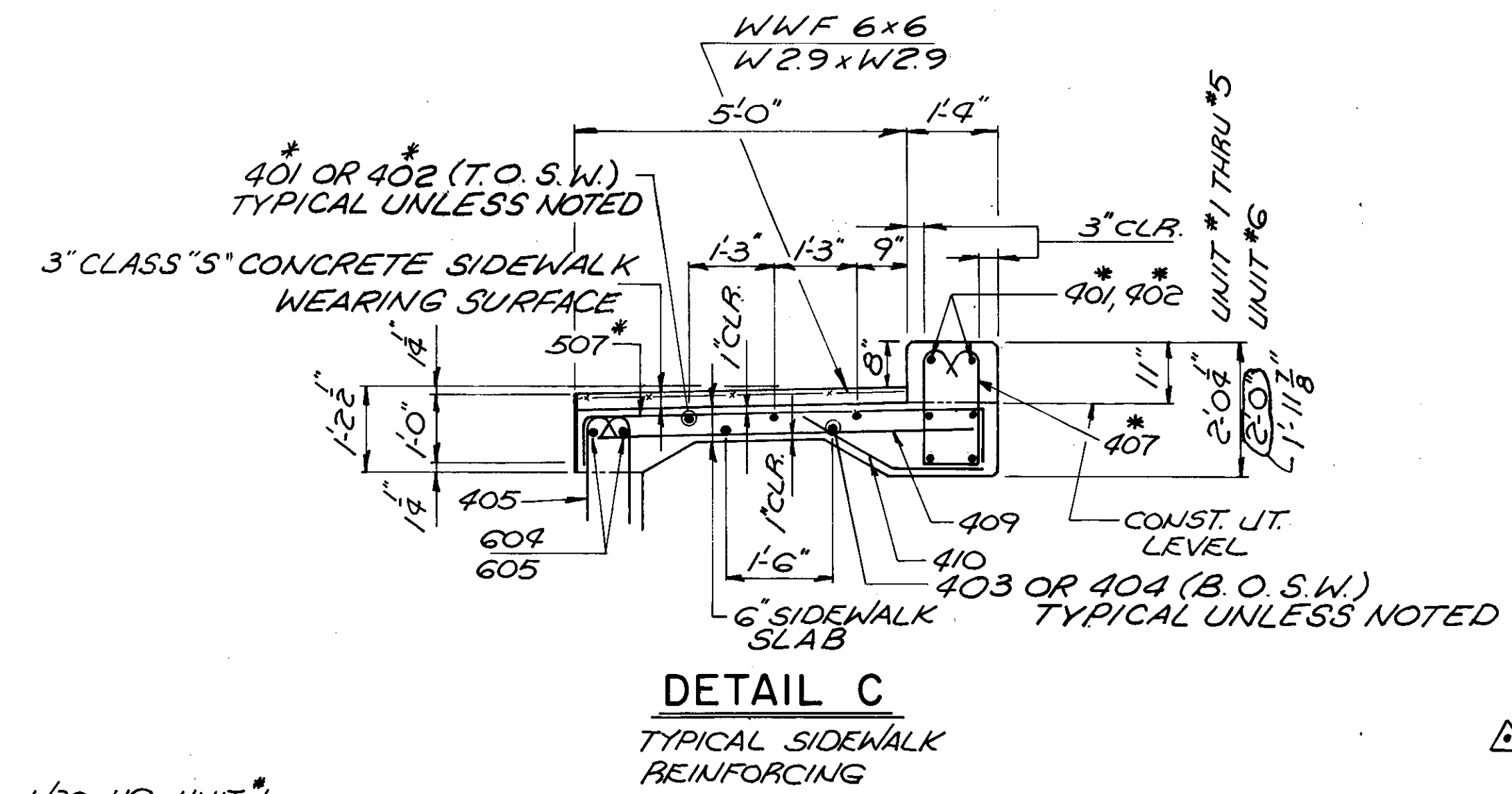
**SECTION A-A**  
FOR UNITS #2,3,4 & 5



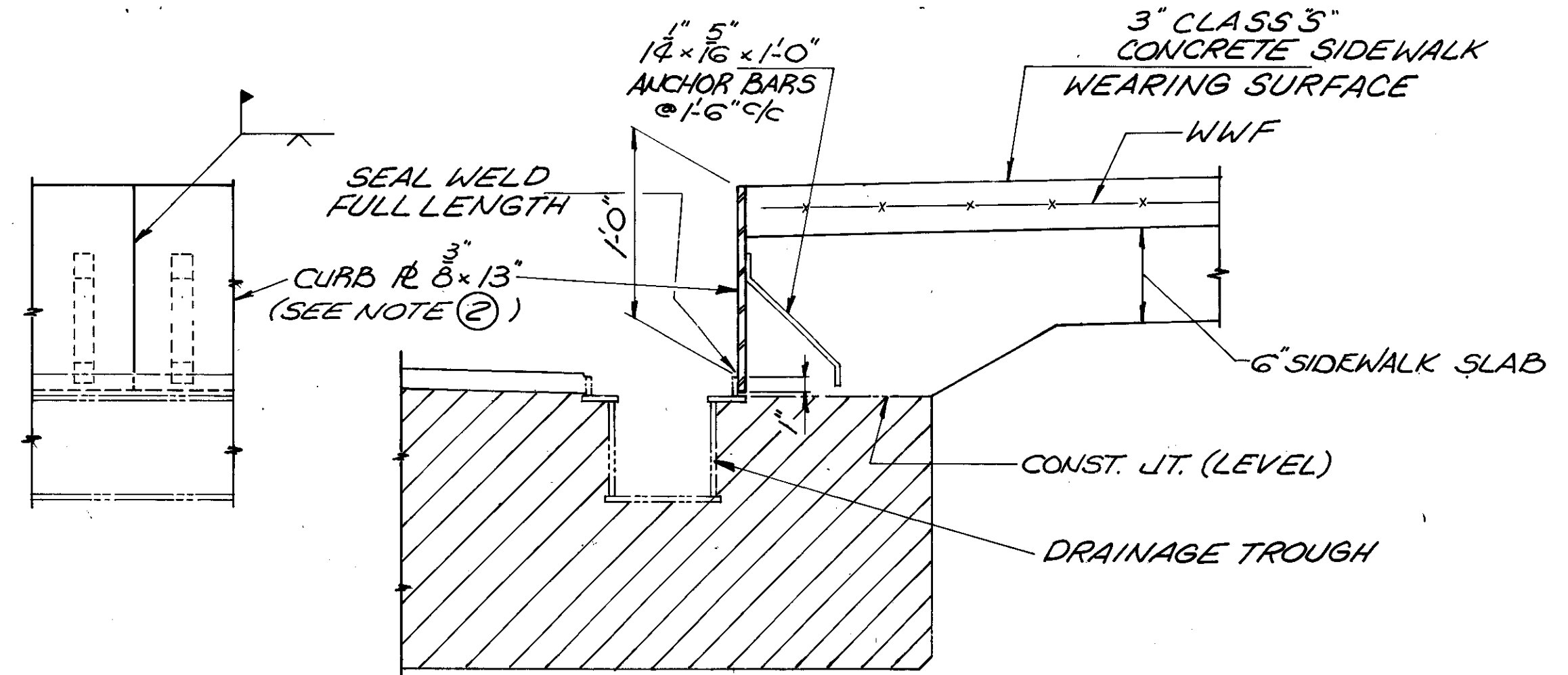
**SECTION B-B**  
FOR UNITS #1 & #6  
FOR DIMENSIONS, DETAILS &  
REINFORCING NOT SHOWN  
SEE SECTION A-A

**LEGEND**

- 604 - UNIT #1
- 606, 607 OR 609 - UNIT #6
- 403 - UNIT #1
- 411, 412 OR 413 - UNIT #6



**DETAIL C**  
TYPICAL SIDEWALK  
REINFORCING



**DETAIL A**

**NOTES**

- ① SEE SHEET 40/59 FOR NOTES AND LOCATION OF SECTIONS A-A & B-B.
- ② THE FURNISHING AND INSTALLATION OF CURB PLATES AS SHOWN ON THE PLANS SHALL BE INCLUDED WITH ITEM 513 STRUCTURAL STEEL (A36) FOR PAYMENT EXCEPT IN THE VICINITY OF EXPANSION JOINTS AS SHOWN ON SHEET 46/59.
- ③ LONGITUDINAL & TRANSVERSE REINFORCING SHALL BE CUT IN FIELD 2" CLEAR OF EXISTING O.B.T. MANHOLE (PHASE II-UNIT #4) COST TO BE INCLUDED WITH ITEM 509 - REINFORCING STEEL - GRADE 60 FOR PAYMENT.

Concrete in place.  
NOTE: No Latex placed to date

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4/59

**TRANSVERSE SECTIONS**  
LORAIN ROAD VIADUCT  
OVER ROCKY RIVER  
BRIDGE # CUY-10-0869  
STA 204+93.17 TO STA 217+23.00  
CUYAHOGA COUNTY OHIO

DESIGNED	DRAWN	TRACED	CHECKED	REVIEWED	DATE	REVISED
BRL	UWW		A.L.H.	JFP	7-30-82	5/15/84

REPORT # 7092  
# B - 79

LORAIN ROAD BRIDGE # 42

## Appendix E

### Fracture Critical Plan

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## Nonredundant Steel Tension Member (NSTM)/Fracture Critical Member (FCM) Inspection Procedure

Reference: ODOT Manual of Bridge Inspection, Chapter 4

Inspection Responsibility: ODOT District 12

County-Route-SLM: CUY-10-0869

Structural File Number: 1801325

Inspection Frequency: 24 Months

Fatigue Life Study: Year of Study: Not Calculated Remaining Fatigue Life: Not Calculated

Load Path Redundant: No

Structurally Redundant: No

Internally Redundant: No

System Redundant: No rigorous analysis performed (i.e. finite element, 3-D modeling)

**Location:** The CUY-10-0869 Bridge (S.R. 10 Bridge over Rocky River) carries two lanes of Interstate 10 westbound and two lanes of Interstate 10 eastbound traffic over the Rocky River in the city of Cleveland in Cuyahoga County, Ohio (see Figure 1).



Figure 1 – CUY-10-0869 (SFN 1801325) overall location map.



**Structure Description:** The bridge was built in 1935, with a major rehabilitation in 1987, and is composed of nine spans with an overall length of 1,229'-10". The superstructure is divided into four west approach spans, four arch spans, and one east approach span. **There is a slab that spans the cellular Forward Abutment, and this slab span is included in the element quantities but does not alter the total span count of nine.** The west and east approach spans are made up of nine lines of rolled steel beams, two lines of built-up sidewalk girders, and two lines of rolled steel sidewalk fascia beams with a reinforced concrete deck. The arch spans are composed of two arch lines of built-up steel arches with built-up spandrel columns and built-up steel jack arches supporting built-up steel floorbeams, seven lines of rolled steel stringers, and two lines of rolled steel sidewalk fascia stringers with a reinforced concrete deck. The superstructure is supported by two reinforced concrete cellular abutments, built-up steel pier caps and steel columns at Piers 1 through 3, and built-up steel tower caps and columns with reinforced concrete pier walls at Piers 4 through 8. The built-up steel floorbeams and built-up steel pier caps are considered nonredundant steel tension members (fracture critical) (see Figure 2) due to spacing exceeding 14' (see Figure 3).



Figure 2 – CUY-10-0869 (SFN 1801325) overall view of Spans 6 through 9 looking east.

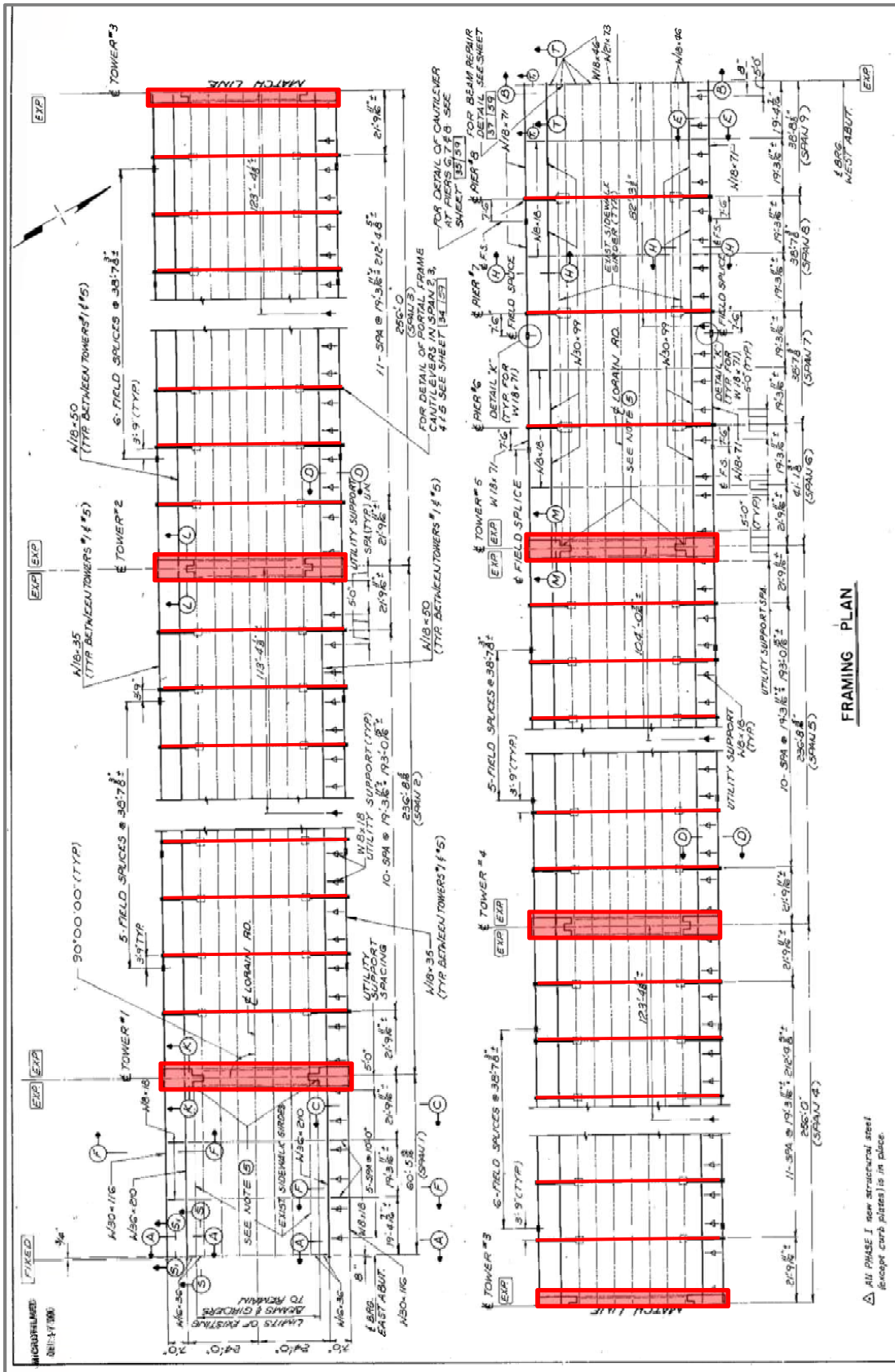


Figure 3 – CUY-10-0869 (SFN 1801325) framing plan (taken from the major rehabilitation drawings). The built-up steel floorbeams and built-up steel pier caps are considered nonredundant steel tension members and are highlighted red. Note that in this original framing plan, the spans were labeled from east to west, but the current nomenclature is from west to east.

The built-up steel tower pier caps at Piers 4 through 8 are 63'-9" long, are riveted and bolted to the tower pier columns, and have 10'-6" long cantilevers at both ends. The original pier caps between the tower pier columns are comprised of 72" wide by 1/2" thick flange plates and 1/2" thick web plates (see Figure 4). The cantilevers installed during the major rehabilitation are composed of 76" wide by 3/4" thick flange plates and 3/8" thick web plates (see Figure 5). There are riveted and bolted internal diaphragms and top lateral bracing, and the arch span stringers and jack arches bear on the pier caps with welded bearing plate connections.

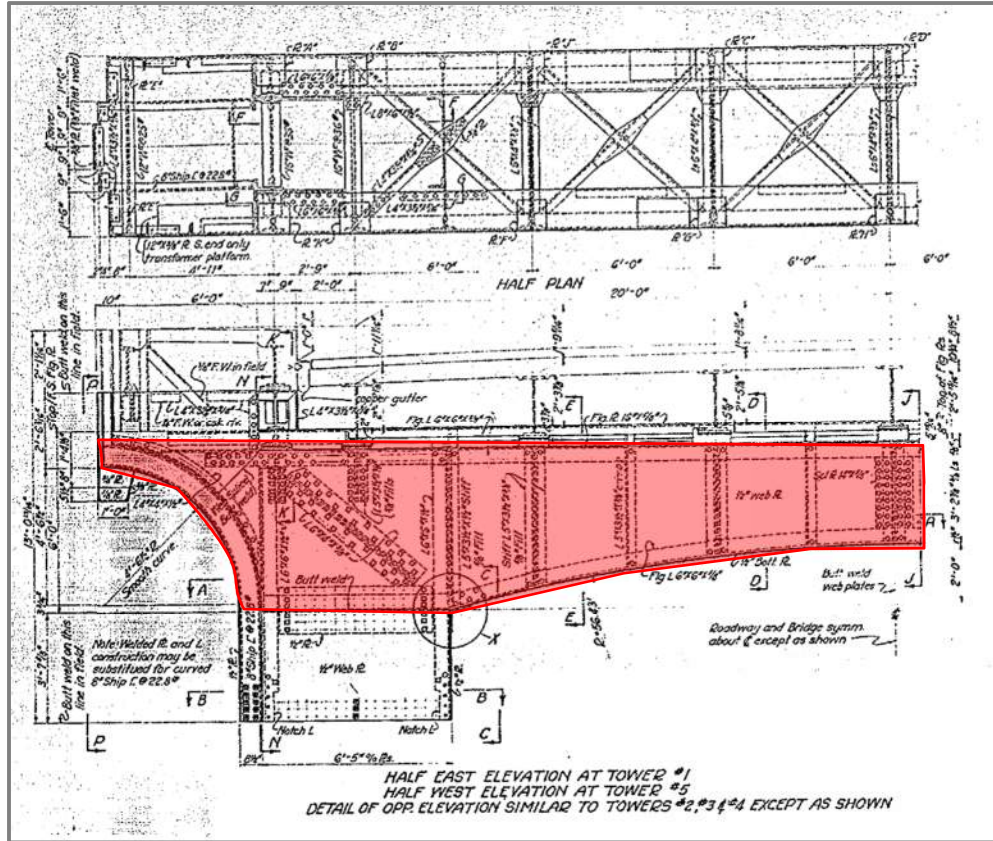


Figure 4 – Built-up steel tower pier caps at Piers 4 through 8 half elevation (taken from the original design drawings). **The nonredundant steel tension member is highlighted red.**

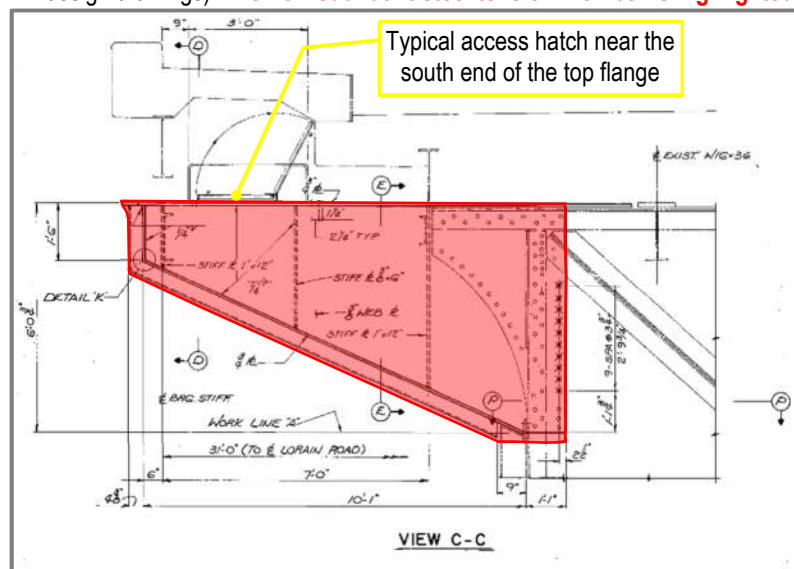


Figure 5 – Built-up steel tower pier cap cantilever elevation (taken from the major rehabilitation drawings). **The nonredundant steel tension member is highlighted red.**



The built-up, riveted and welded, steel floorbeams throughout Spans 4 through 8 and the pier caps at Piers 1 through 3 are 63'-0" long and are riveted, bolted, and welded to the arch spandrel columns and Pier 1 through 3 pier columns, respectively. The original steel floorbeams and pier caps between the columns are comprised of 6" by 4" by 3/8" thick flange angles and a 3/8" thick web plate (see Figure 6). They have 13'-3/4" long cantilevers on each side which were replaced during the major rehabilitation (see Figure 7). There are riveted transverse stiffeners, and the stringers/beams frame through the floorbeams and pier caps with welded connections.

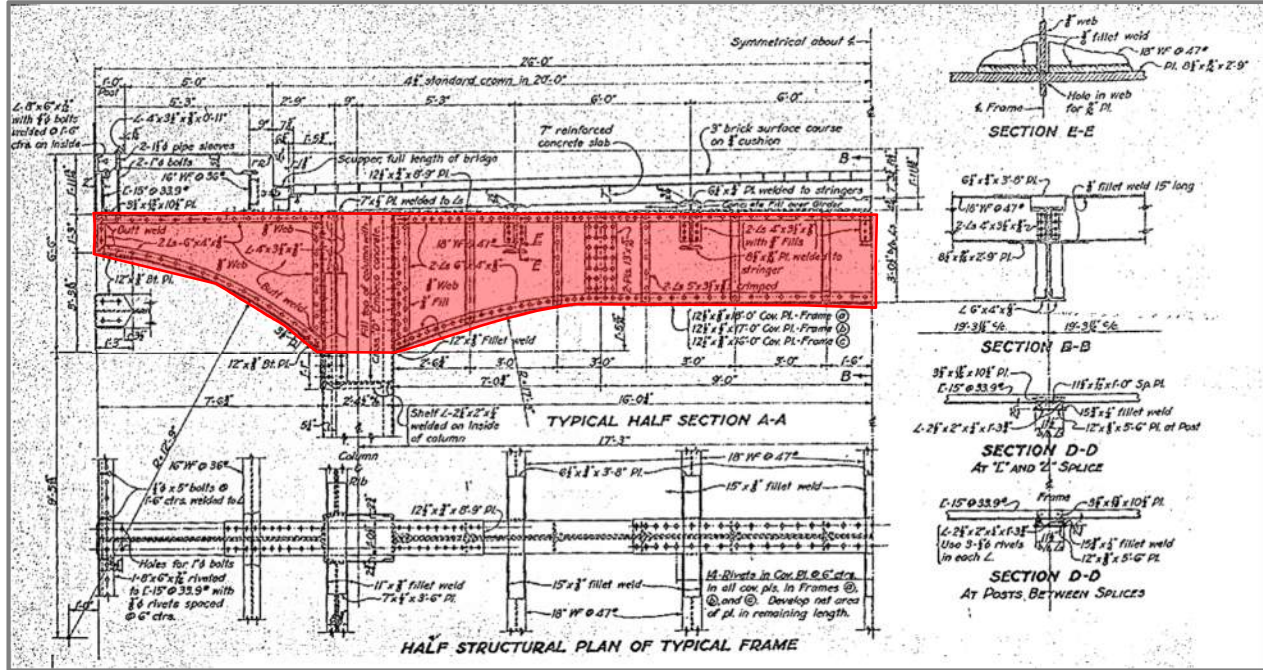


Figure 6 – Built-up steel pier caps at Piers 1 through 3 and built-up steel arch span floorbeams half elevation (taken from the original design drawings). **The nonredundant steel tension member is highlighted red.**

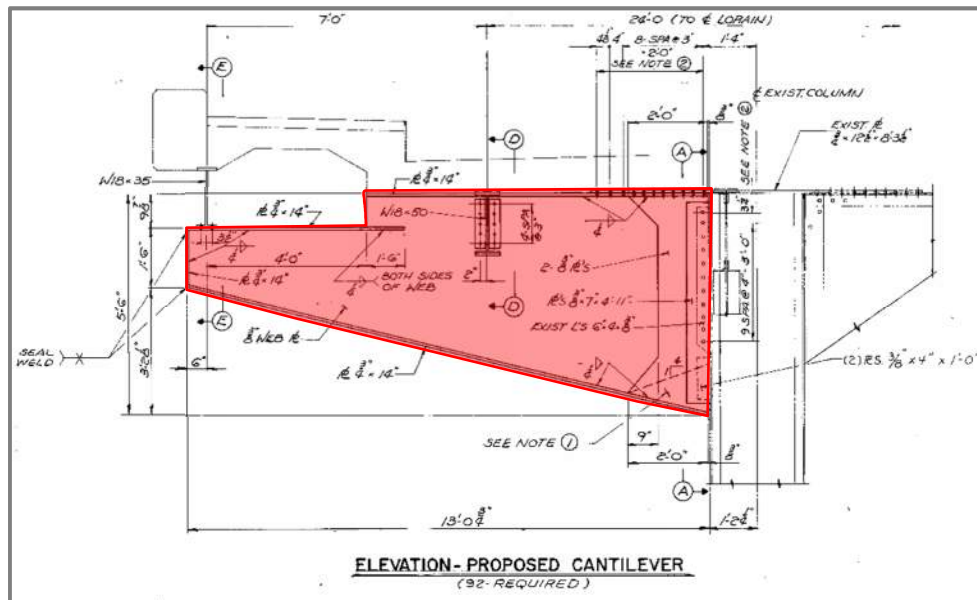


Figure 7 – Built-up steel cantilevers at Piers 1 through 3 and the arch span floorbeams elevation (taken from the major rehabilitation drawings). **The nonredundant steel tension member is highlighted red.**



## Inspection Procedure and Inspector Access Risk Factors

**Inspection Procedure:** An under bridge inspection unit (UBIU) and a bucket truck or self-propelled lift can be utilized to access all of the fracture critical members. The interior of the steel tower pier caps at Piers 4 through 8 can be accessed through hatches near the south end of the top flange and from the ladders in the tower pier columns.

- Inspection Locations
  - Tower pier caps at Piers 4 through 8: Inspect the exterior faces of the bottom flange and bottom half of the web in the positive moment region, the top flange and top half of the web in the negative moment regions at both ends, and the web in primary shear regions for cracks and distress at fatigue prone details. Enter into the interior to inspect these same locations on the inside.
  - Floorbeams throughout Spans 4 through 8 and the Piers 1 through 3 caps: Inspect the bottom flange and bottom half of the web in the positive moment region, the top flange and top half of the web in the negative moment regions, and the web in primary shear regions for cracks and distress at fatigue prone details
- Access
  - Tower pier caps at Piers 4 through 8: An UBIU with 60' or more of horizontal reach can be used to access the exterior faces of the pier caps and the access hatch for the interior. Alternatively, there are hatches in the south sidewalk above the pier caps which can be opened utilizing crowbars. There are access hatches on the top flange at the south end that can be opened by lifting the hinged lids. There are two railings on the top of the top flange that inspection personnel can tie off to when accessing the interior. Fixed ladders allow access into the pier caps from the tower pier columns. Non-permit confined space procedures, such as using a calibrated multi-gas air meter, should be followed when entering the pier caps.
  - Floorbeams throughout Spans 4 through 8 and the Piers 1 through 3 caps: A UBIU with at least 60' of horizontal reach can be used to access each of the floorbeams/pier caps. A single right lane closure of S.R. 10 westbound and a single right lane closure of S.R. 10 eastbound should be utilized.
- Maintenance of Traffic
  - Single right lane closures of S.R. 10 westbound and eastbound are necessary when utilizing an UBIU to achieve hands-on access to all critical areas of the Piers 1 through 8 caps and the floorbeams throughout Spans 4 through 8.

### Inspector Access Risk Factors

- Inspector risks
  - Traffic on the bridge
  - Work at heights
  - Cold/Hot extreme temperatures
  - Areas of raccoon debris and histoplasmosis
  - Non-permit confined space

<b>Structural Risk Factors</b>			
<b>Risk Factor</b>	<b>Location</b>	<b>Description</b>	<b>Photo</b> (photos on following pages)
Nonredundant steel tension/fracture critical elements	Superstructure – floorbeams in Spans 4 through 8 and the Piers 1 through 3 caps  Substructure – tower pier caps at Piers 4 through 8	Floorbeam/pier cap failure would be catastrophic.	-
Fatigue Prone Detail – E'	Piers 4 through 8 pier cap top flange at welded stringer bearing plates	Base metal of the tower pier cap top flange at the stringer bearings with a length $L$ in the direction of primary stress and a thickness $t$ attached by fillet welds where the detail incorporates no transition radius ( $L > 12t$ or 4 in. & $t \geq 1.0$ ") (Category E')*.	1
Fatigue Prone Details – E	Cantilevers at the Piers 1 through 3 caps and floorbeams in Spans 4 through 8	Base metal in the cantilever web at the termination of longitudinal stiffener-to-web welds with the stiffener attached by fillet welds with no transition radius ( $t < 1.0$ ") (Category E)*.	2
Fatigue Prone Details – E	Cantilevers at the Piers 1 through 3 caps and floorbeams in Spans 4 through 8	Base metal of the flange at the termination of vertical stiffener plate-to-flange welds with the stiffener attached by fillet welds with no transition radius ( $t < 1.0$ ") (Category E)*.	3
Problematic Detail – Tack Welds	Piers 1 through 3 caps, floorbeams in Spans 4 through 8, tower pier caps at Piers 4 through 8	Miscellaneous tack welds on pier cap and floorbeam webs throughout.	4
High ADTT	All steel pier caps and floorbeams	Average daily truck traffic is 801	---

\*Fatigue prone detail categories are in accordance with AASHTO LRFD specifications Table 6.6.1.2.3-1



Photo 1 – Tower pier cap top flange at the stringer bearing plate attached by fillet welds with no transition radius (**Category E'**). The north end of the pier cap top flange at the Stringer 1 bearing is shown (looking south).

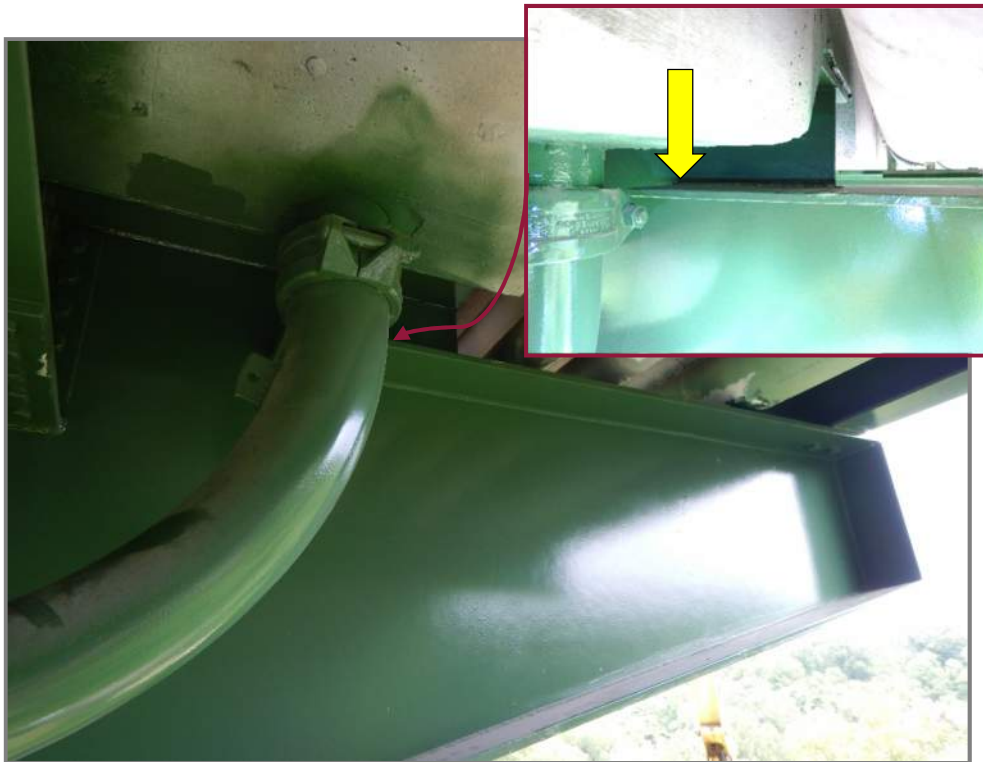


Photo 2 – Base metal of the cantilever web at the termination of longitudinal stiffener-to-web welds with the stiffener attached by fillet welds with no transition radius (**Category E**) (looking west at the east face of the Floorbeam 12 north cantilever in Span 7).

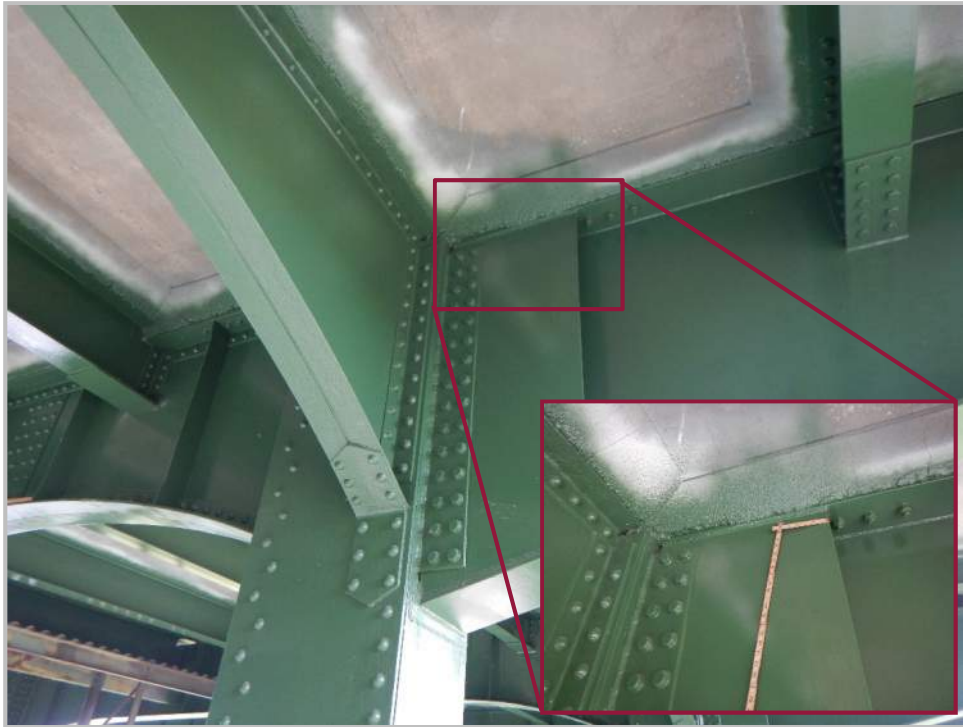


Photo 3 – Base metal of the flange at the termination of vertical stiffener plate-to-flange welds with the stiffener attached by fillet welds with no transition radius (**Category E**) (looking west at the east face of the Floorbeam 10 north cantilever in Span 8).

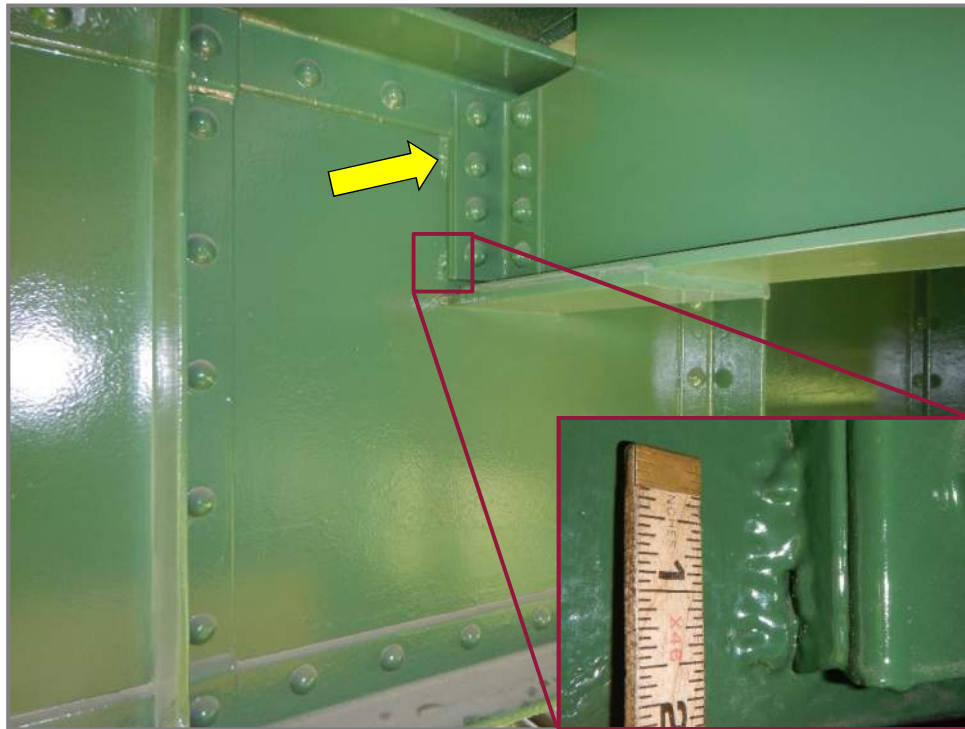


Photo 4 – Base metal of the floorbeams and pier caps at tack welds (**Problematic Detail**) (looking southeast at the north face of Floorbeam 4 in Span 6 at the Stringer 6 connection angle fill plate tack weld with a 3/4" long crack).