

**Physical Condition Report for
CUY-002-1441
SFN 1800035
Main Avenue Bridge over the Cuyahoga River
2021 Routine and Fracture Critical Inspection**



Prepared for:

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Transportation

District 12

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Inspection Dates and Procedure

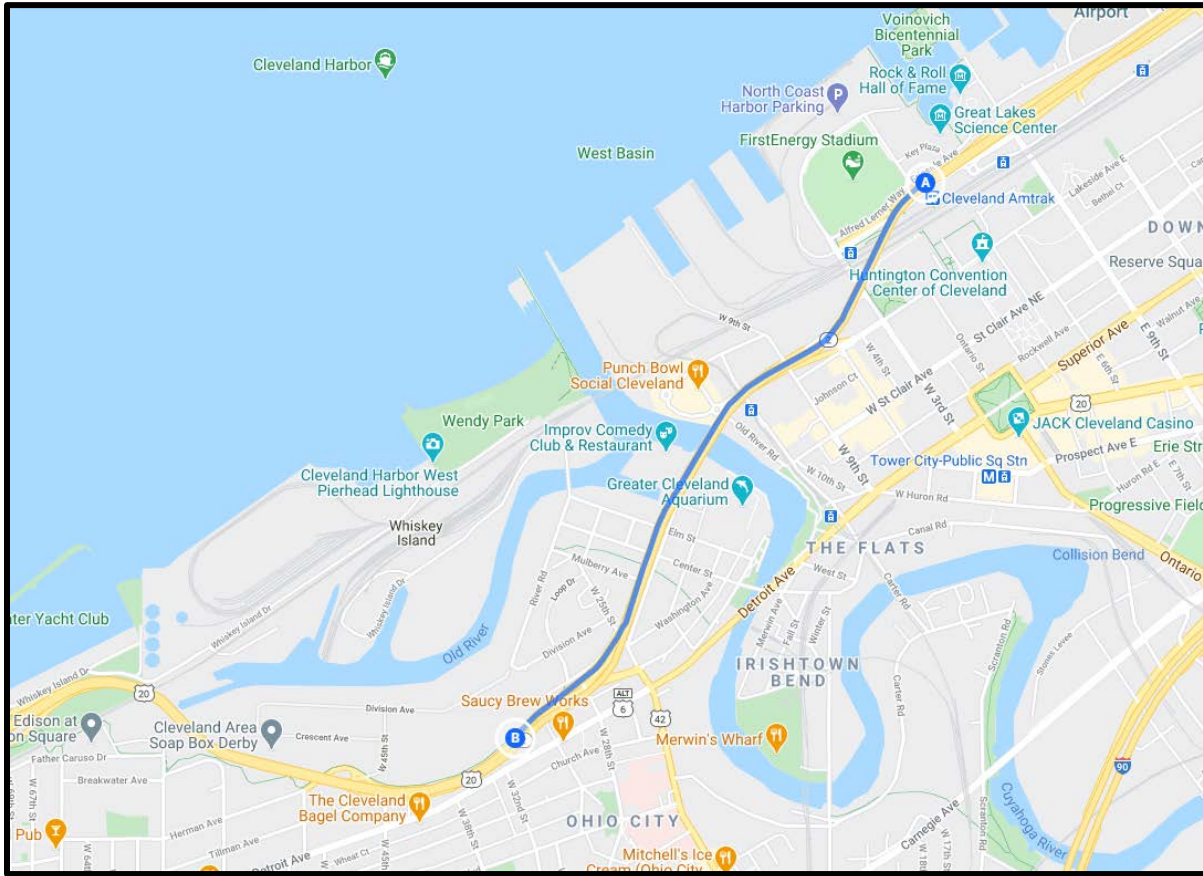
NBI Inspection Completion Date: 07/22/2021

Palmer Engineering with the assistance of Patrick Engineering and Srinteg conducted a routine and fracture critical inspection of the bridge between the dates of June 22, 2021 and July 16, 2021. The bridge was accessed using two Aspen A-62 Under Bridge Inspection Vehicles (Snoopers), a 40-ft aerial work platform, ladders, the existing inspection catwalk under the structure, and modified climbing techniques. The snoopers were used in Unit II, Unit III and Unit V. The 40' aerial work platform was used in Unit I, Unit II, Unit III and Unit IV. A ladder was used in Unit I, Unit III and Unit IV in areas that could not be accessed by the aerial work platform. The existing catwalk and climbing techniques were used in Unit V to access areas that could not be accessed with the snoopers. Traffic control was provided by Sofis Company, Inc.

The following personnel were involved in the bridge inspection:

- Justin Rufener, PE, Team Leader (Palmer)
- Vince Dragich (Palmer)
- Adam Lenemier (Palmer)
- Pete Anamasi, PE, Team Leader (Patrick)
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Location Map



**Structure: CUY-2-1441
Main Avenue Bridge over Cuyahoga River
Cleveland, OH**

General Bridge Description

The Main Avenue Bridge (CUY-2-1441, SFN 1800035) carries between four to six lanes of vehicular traffic over the Cuyahoga River, several city streets, the GCRTA Waterfront Line tracks, and Norfolk Southern/CSX railroad tracks. The bridge was constructed between 1938 and 1940 and the bridge is approximately 6,580 feet long. On October 6, 1939, the West Approach, Main Truss Spans, and East Approach-Forward Sections were opened to traffic. The Lakefront Trestle and Lakefront Ramp were opened to traffic in 1940. The bridge was closed to traffic for a major rehabilitation project between April 13, 1991 and October 6, 1992. Rehabilitation work included replacing and widening the deck, updating safety features, improving the drainage system, installing new floor system members, and strengthening or replacing deteriorated portions of the bridge.

The Main Avenue Bridge is comprised of five distinct units of varying structure types within each section.

Unit I – West Approach

Unit II – Main Truss Spans

Unit III – East Approach - Forward Section

Unit IV – East Approach – Lakefront Trestle Section

Unit V – East Approach – Lakefront Ramp Section

For plan views of the bridge with the units and sections identified refer to Figures 1 to 5 in Appendix A.

The alignment of the bridge varies throughout the length of the structure. The nomenclature of the bridge will follow the 1990 rehabilitation plans and previous inspection reports. All compass directions will be based upon this relative assignment.

Unit I – West Approach

The West Approach section consists of east and west bound structures separated by the ramps at W. 28th Street. Each portion of the structure carries three lanes of traffic from near West 29th Street to 250 feet east of West 25th Street. These separate structures then merge into one structure near West 25th Street.

The West Approach section consists of four main structure types: Transverse rigid concrete frames supporting a concrete deck slab (Sections B', D, J' and M), concrete stringers and diaphragms (Section P), longitudinal rigid steel frames supporting floorbeams and stringers (Sections C, K and L'), and a steel floorbeam/stringer system (Section N). The steel floorbeam/stringer system consists of continuous stringers bearing on top of floorbeams that are supported by steel columns. The various steel sections consist of rolled beams, welded plate girders, and riveted built-up plate girders.

Unit II – Main Truss Spans

Beginning at the termination of Section I (West Approach) east of W. 25th Street, the Main Truss Spans carry six lanes of traffic over several city streets and the Cuyahoga River ending near West 10th Street.

The Main Truss Spans section consists of ten (10) cantilevered Pratt deck trusses. The upper and lower truss chord members are composed of riveted built-up box sections. The truss diagonals and verticals are a combination of rolled wide flange sections and riveted box sections. The floor system is comprised of rolled steel beam stringers supported on riveted and welded floorbeams. The floorbeams frame into the truss at the upper chord panel point connections.

Unit III – East Approach – Forward Section

Beginning at the end of Unit II (Main Truss Spans), the Forward Section starts just west of West 10th Street at the base of the Flats and carries the six lanes of traffic from the Cuyahoga River Valley over the western portion of the GCRTA Waterfront Line tracks and up to West 9th Street. The Forward Section consists of steel truss bents that support rolled steel floorbeams with rolled steel stringers bearing on top. The steel truss bent members consist of rolled steel sections connected by riveted gusset plates. Below the eastbound lanes, a lower utility/parking deck was removed, however, portions of the steel support structure remain in place. The Pratt deck truss members consist of rolled wide flange sections with a similar deck framing system to the main truss spans of Unit II.

Unit IV – East Approach – Lakefront Trestle

Beginning at the end of Unit III (Forward Section), the Lakefront Trestle starts just west of West 9th Street and continues to West 3rd Street carrying four lanes of traffic over parking lots and city streets. Two ramp structures tie into the main structure in this area as well. The Lakefront Trestle superstructure is supported by two lines of steel longitudinal rigid frames comprised of riveted built-up beams and columns. Transverse floorbeams frame into the steel longitudinal rigid frames and support rolled stringers.

Unit V – East Approach – Lakefront Ramp

Beginning at the end of Unit IV (Lakefront Trestle), the Lakefront Ramp starts just east of West 3rd Street and carries four lanes of traffic continuing over the eastern end of the GCRTA Waterfront Line and the Norfolk Southern/CSX railroad tracks and terminating near First Energy Stadium. The superstructure consists of three riveted, built-up plate girders with rolled floorbeams and stringers.

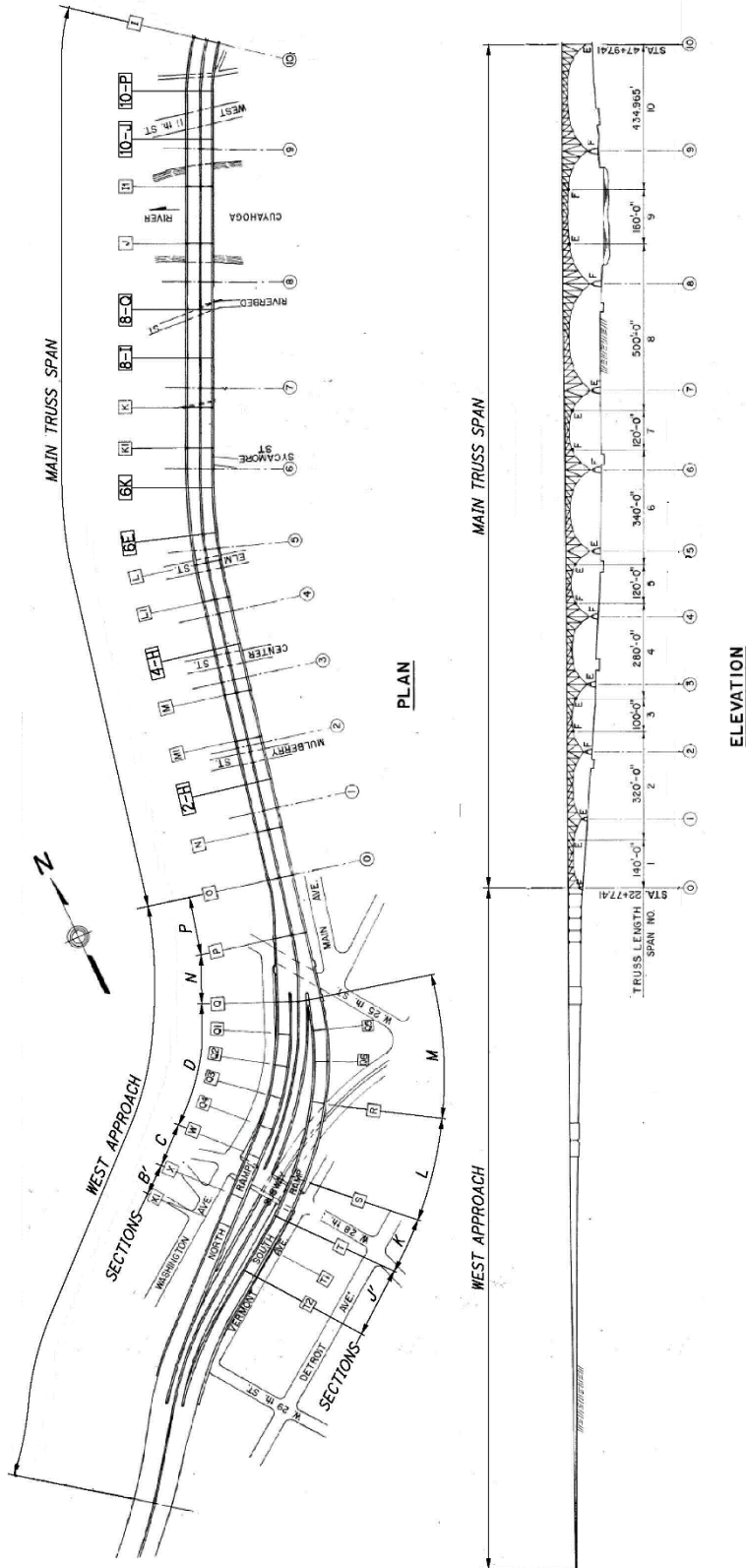


Figure 1a: Units I and II - Bridge Plan and Elevation V

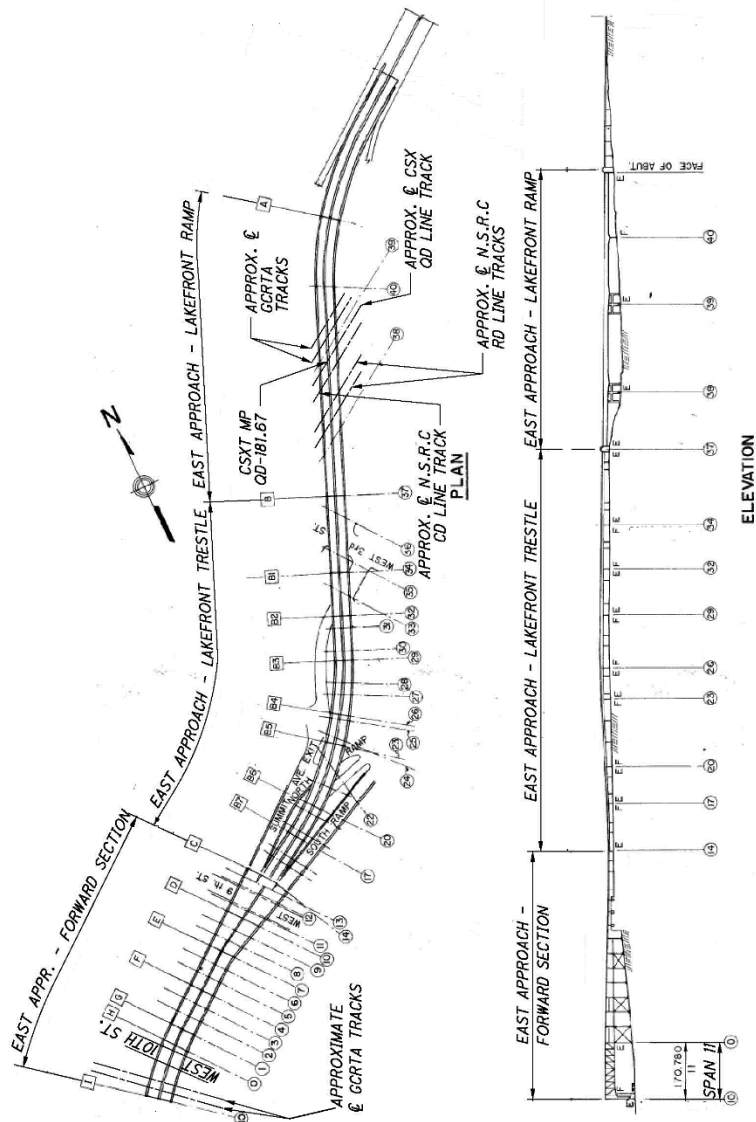


Figure 1b: Units III, IV & V - Bridge Plan and Elevation V

Construction and Maintenance History

The following is a summary of significant events in the history of the Main Avenue Bridge:

- 1930-37: Planning and design for the Main Avenue Bridge was performed following the Cuyahoga County Engineer's Office decision to build the Lorain-Carnegie Bridge first as a means to relieve congestion on the Detroit-Superior Bridge. The structure was designed by Fred L. Plummer, Chief Design Engineer of the Cuyahoga County Engineer's Office. Consulting engineer was Wilbur Watson & Associates.
- 1937-40: The West Approach, Main Truss Spans, East Approach-Forward Section, and East Approach-Lakefront Trestle were constructed in 17 months. The bridge project was one of the initial projects funded by the Federal Emergency for Public Works.
- October 6, 1939: Main Avenue Bridge was dedicated and opened to traffic the following morning.
- 1954-55: Bridge superstructure was repainted.
- April 1984-November 1985: Complete removal of the existing paint and application of a Zinc-Vinyl-Vinyl (ZVV) paint system on the steel superstructure was performed.
- 1986: Bridge was rededicated as the Harold Burton Memorial Bridge.
- April 13, 1991 to October 6, 1992: The Main Avenue Bridge was closed to traffic for an 18-month major rehabilitation. Repair work consists of the following activities:
 - Removal of the existing concrete filled steel grid deck, sidewalks, and stringers.
 - Placement of new stringers on top of existing floor beams.
 - Replacement of approximately 40% of the main truss spans floor beam cantilevers with welded floor beam brackets.
 - Removal of the existing drainage system, including drain troughs along interior portions of the lower chord.
 - Local painting of new steel elements with an OZEU protective coating system.
 - Application of pack rust caulk sealant along open structural steel seams.
- 2007: Main Truss Spans – Complete painting of the steel superstructure.
- 2007: Emergency retrofits were performed on L24L25, North and South Trusses, Span 8.
- 2014 to 2016: A series of minor rehabilitation projects have been conducted: Construction tasks include:
 - Gusset plate retrofits.
 - Truss member repairs and strengthening.
 - Replacement of select lower lateral bracing members.
 - Drainage replacement, Main Truss Spans.
 - Removal of sheared rivets due to vehicular impact and installation of high-strength bolts, Lakefront Ramp.

- Concrete railing and median repairs (2016).
- Combination of expansion joint membrane replacement and expansion joint membrane replacement (2016).
- 2017-2019: A major paint project was completed on the east and west approaches. In addition, patching concrete substructure units, patching both median and exterior parapets, superstructure steel repairs, replacement of deck joint armor and joint glands, drainage replacement, and drainage repairs were completed as part of the rehabilitation project.

Structure Typical Photos



West 28th Street Overpass Looking West



Section C Over W. 28th Street Looking North



Section N at W. 25th Street Looking North



Section N Typical Superstructure Over W. 25th Street Looking East



Section P Looking Northeast



Unit II – Main Truss Span 1 Looking Northeast



Unit II Span 9 Over the Cuyahoga River Looking South



Unit II Span 10 Typical Superstructure Looking West



Unit III Span 11 Over West 10th Street Looking North



Unit III Bent 0 at West 10th Street Looking East



Unit III – Frame and Brace Typical Structure View Looking East



Unit IV North Elevation Over Summit Avenue Looking Southeast



Unit IV Over West Lakeside Avenue Looking West



Unit V Lakefront Ramp Over CSX and NS Railroad Tracks Looking East

Condition and Element Rating Guidelines

The table below contains the bridge inspection rating matrix established by the Federal Highway Administration (FHWA), and employed by ODOT, using a 0-Failed through 9-Excellent scale. The General Appraisal, Deck, Wearing Surface, Expansion Joint, Superstructure, Protective Coating System, Substructure, Channel and Scour rating will follow these 0 through 9 rating guidelines.

Summary Items (NBIS)	Condition	Defect
9	Excellent	Excellent condition.
8	Very Good	No problems noted.
7	Good	Some minor problems.
6	Satisfactory	Structural elements show minor deterioration.
5	Fair	All primary structural elements are sound but may have minor section loss, crackling, spalling or scour.
4	Poor	Advanced section loss, deterioration, spalling or scour.
3	Serious	Loss of section, deterioration, spalling or scour has 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 report. 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 be put it back in light service.
0	Failed	Out of service – beyond corrective action.

Manual of Bridge Inspection, Ohio Department of Transportation (ODOT), 2014 (with 2017 & 2021 Addendums)

Bridge Inspector's Reference Manual, Federal Highway Administration (FHWA), 2015

Manual for Bridge Element Inspection, 2nd Edition, AASHTO, 2019

National Bridge Inspection Standards, U.S. Department of Transportation, 2004

Inspection of Fracture Critical Bridge Members, U.S. Department of Transportation, 1986

Inspection Findings

Inspection findings are presented below. Findings shown in **RED** text indicate new findings during the 2021 inspection.

NBI Item N58 – Deck (7, Good Condition)

The deck is in overall **Good** condition, a rating of 7 on the NBIS condition rating guidelines. There are two NBI sub-items under the deck condition:

NBI Item N58.01 – Wearing Surface (7, Good Condition)

NBI Item N58.02 – Expansion Joint (6, Satisfactory Condition)

The wearing surface is overall in **Good** condition. The expansion joints are overall in **Satisfactory** condition.

The deck findings and summary of deck conditions for individual deck elements are as follows:

Element 12 – Reinforced Concrete Deck

The reinforced concrete deck is in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
502,787 SF	487,593 SF	15,094 SF	100 SF	

The replacement deck, opened to traffic in 1992, consists of epoxy coated reinforcement with stay-in-place metal galvanized steel forms. In Unit 1, there are several sections that do not have stay-in-place forms, and the underside of the deck is visible. The haunches in the deck above the stringers in these sections have areas of minor spalling (*Photo 12-1*). In Unit 1, Section P, the underside of the deck has cracking with efflorescence throughout. Isolated edge delamination and spalls were noted, often adjacent to the expansion joint armor (*Photo 12-2*). At some locations these edge spalls have been sealed. Areas of isolated spalling were noted along the gutter line on the eastbound roadway in Unit II, Main Truss spans. The underside of deck exhibits spalling at several joint locations in Unit II.

Refer to Tables 1 through 5 in *Appendix C* for specific deck deficiencies.

Element 300 – Strip Seal Expansion Joint

The strip seal expansion joints are in **Satisfactory** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
1750 LF	651 LF	869 LF	230 LF	

At Joint O on the westbound side of the bridge, the west joint armor in the left lane near the W. 28th Street exit ramp is loose and banging under vehicular impact (*Photo 300-1*). The west joint header exhibits spalls on the top of deck at the area of loose joint armor. Throughout the structure, joints have significant debris impaction and corrosion with section loss typically 3/16” deep on the joint plates (*Photo 300-2*). Some joints are depressed up to 1” deep. Isolated joints exhibit evidence of leakage.

Refer to Tables 1 through 5 in *Appendix C* for specific joint deficiencies.

Element 302 – Compression Joint Seal

The compression joints are in **Satisfactory** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
1055 LF	392 LF	524 LF	139 LF	10 LF

At Joint X, there is a 10 foot section of broken compression seal retainer in westbound lane 3, allowing drainage directly through the joint (*Photo 302-1*). Throughout the structure, joints have significant debris impaction and corrosion with section loss typically 3/16” deep on the joint plates. Some joints are depressed, up to 1” deep (*Photo 302-x*). Isolated joints exhibit evidence of leakage.

Refer to Tables 1 through 5 in *Appendix C* for specific joint deficiencies.

Element 303 – Assembly Joint with Seal

The modular joints are in **Satisfactory** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
595 LF	222 LF	295 LF	78 LF	

At Joint L between Spans 5 and 6, the joint header on the east side of the joint is delaminated and spalling with loose concrete falling onto the catwalk below (*Photo 303-1*). This joint is located over Elm Street in Unit II. There are scattered areas of minor tearing and leaking in the seals (*Photo 303-2*).

Refer to Table 2 in *Appendix C* for specific joint deficiencies.

Element 331 – Reinforced Concrete Bridge Railing

The concrete railings are in **Fair** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
20,150 LF	17,645 LF	2,368 LF	137 LF	

The median and railing constructed during the 1991-1992 rehabilitation were poured using slip form construction. Both the median and the parapets were repaired in the last rehabilitation project between 2017 and 2018. Vertical, horizontal, and map cracking are common throughout the bridge railings (*Photo 331-1*). Many of the large spalls facing traffic were patched, however, isolated patches are spalled again. Several spalls exhibit exposed reinforcing steel. Many of the spalls previously noted on the exterior faces of the parapets have been sealed; however, surface corrosion is reactivating on the exposed reinforcing bars that were sealed, and some of the sealed concrete is delaminating. There are scattered areas with new spalls and delamination of the exterior of the parapets (*Photo 331-2*). Spalls exist in the bridge railing at or near the deck joints (*Photo 331-3*). There are isolated spalls up to 3” deep in the median.

Refer to Tables 1 through 5 in *Appendix C* for specific railing deficiencies.

Element 510 – Wearing Surface

The concrete wearing surface is in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
464,586 SF	430,483 SF	33,873 SF	230 SF	

The wearing surface consists of a 1.2” layer of latex modified concrete on top of the reinforced concrete deck. Typical deterioration includes minor wear in the wheel path and isolated minor hairline cracking. There are isolated areas of surface scaling or spalling up to 1” deep (*Photo 510-1*). Some of the scaled/spalled areas are patched with bituminous material. There is spalling up to ½” deep along the joints and areas of vegetation are growing along the curb line. In Unit II, **Span 6, there is an area of spalling in the wearing surface in Lane 3 Westbound that appears to be due to a vehicle fire** (*Photo 510-2*).

Refer to Tables 1 through 5 in *Appendix C* for specific wearing surface deficiencies.

Element 815 – Drainage

The deck drainage is in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
268 EA	171 EA	54 EA	27 EA	16 EA

Many of the scuppers and catch basins along the edge of roadway are partially or fully clogged with debris that is visible from the top of deck (*Photo 815-1*). Many of the scupper catch basins, including those inside vaulted areas are fully clogged with dirt, debris and water. In Unit IV, near Bent 15, the scupper catch basing is heavily spalled and the grate has fallen out of place (*Photo 815-2*). In Unit II, Span 2, the downspout at the South Truss panel point L6U6 is broken which is allowing water to drain directly onto the superstructure. At the Pier 5 South Column, the bottom angle scupper piece is broken. In Unit II Span 9, the north scupper downspout is disconnected and a portion of the downspout could fall into the river below (*Photo 815-3*).

Refer to Table 6 in *Appendix C* for specific drainage deficiencies.

NBI Item N59 – Superstructure (5, Fair Condition)

The superstructure is in **Fair** condition. There is an NBI sub-item under the substructure condition:

NBI Item N59.01 – Protective Coating System (7, Good Condition)

The protective coating system is in **Good** condition.

The superstructure findings and summary of conditions for individual items are as follows:

Element 107 – Steel Open Girder/Beam

The steel beams and girders are in overall **Fair** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
8,898 LF	7,346 LF	1,510 LF	42 LF	

The West Approach, Unit I, Section K / C and N superstructure consists of rolled beams, welded plate girders, and riveted built-up plate girders. Typical conditions found include areas of minor corrosion and broken rivets.

In Unit III over West 9th Street, the south fascia beam is misaligned slightly to the north due to vehicular impact. There are also impact scrapes visible on the recently painted bottom flange (*Photo 107-1*). Beam FSS was previously heat straightened and nearly returned to its original alignment. Measured minimum clearance at this beam is 13'-6" (posting) feet along the right curb.

The East Approach, Unit IV Lakefront Trestle consists of riveted built-up girders with isolated areas of painted over pitting up to 1/8” deep and pack rust along the bottom flange up to 1” thick (*Photo 107-2*). There are cutouts in the girder webs up to 11.5” L x 10” H in various locations throughout Unit IV. These cutouts are present for drainage troughs that were removed in 1991.

The East Approach, Unit V Lakefront Ramp superstructure consists of three riveted built-up plate girders with painted over pitting up to 1/16” deep typical on the girder webs with isolated locations of up to ¼” deep (*Photo 107-3*). At several locations the bottom flange plates are distorted due to sealed pack rust.

Refer to Tables 7 through 10 in *Appendix C* for specific steel beam deficiencies.

Element 113 – Steel Stringer

The stringers are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
62,103 LF	61,648 LF	455 LF		

The steel stringers across the structure were replaced in the 1991-1992 deck replacement project. The stringers on the approaches were all repainted in the recent rehabilitation project. Typical conditions found are isolated freckled corrosion across the structure.

Refer to Tables 7 and 9 and Figures 1 through 18 in *Appendix C* for specific steel stringer deficiencies.

Element 116 – Reinforced Concrete Stringer

The reinforced concrete stringers are in **Satisfactory** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
3,611 LF	3,503 LF	72 LF	36 LF	

The reinforced concrete stringers in West Approach Sections D, M, J’, P, and B’ are in overall Satisfactory condition. There are hairline cracks with and without efflorescence throughout the concrete stringers. There are isolated patches throughout the stringers with some areas of unconsolidated concrete and delaminations. The stringers in Section P are in fair to poor condition. There are spalls and delaminated areas up to 12’ long x 4’ high and isolated spalls up to 3” deep in stringers in Section P (*Photo 116-1*).

Refer to Table 7 in *Appendix C* for specific concrete stringer deficiencies.

Element 120 - Steel Truss

The truss is in **Fair** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
5,360 LF	1,978 LF	2,150 LF	1,178 LF	54 LF

Overall, the truss members are in Fair condition with typical areas of painted over minor section loss, pitting, reactivated pack rust, distortion due to pack rust, and surface corrosion throughout all truss members. A summary of defects on each truss member type is listed below. Refer to the Deficiency Figures for further details.

The truss verticals exhibit varying section loss due to pack rust between the gusset plates, fill plates, cover plates, and vertical flanges (*Photo 120-1*).

The truss diagonals exhibit section loss with pitting typical in the top face of the web plates of the rolled sections and pack rust induced distortion along the flanges and connection fill plates (*Photo 120-2 & 120-3*). There are locations where section loss in the web was repaired with bolted repair plates (*Photo 120-4*).

The truss upper chord exhibits areas of painted over section loss, pitting, and pack rust induced distortion (*Photo 120-5*). There are isolated areas of reactivating corrosion near the joints.

The lower chord exhibits more numerous deficiencies across the structure. Section loss is affecting up to approximate 25% of the total calculated length of the lower chord members (*Photo 120-6*). These areas include section loss due to previously noted and reactivated areas of pack rust and pitting. There are previously caulked areas of pack rust at the lower chord to gusset plate interfaces that are cracked and no longer effective. There are numerous locations noted of pack rust, both sealed and reactivated, located between the flange angles and the web plates that are distorting the web plates up to 2" high (*Photo 120-7*). Isolated perforations are also noted along the top and bottom flange plates. The Unit II lower chord (Span 8, L2425) at the South Truss, has a full length retrofit around the original steel member. There is minor surface corrosion on the retrofit bolt heads at this location.

The lower lateral bracing and sway exhibits areas of pack rust and pitting, with areas of painted over corrosion holes (*Photo 120-8*). Isolated locations exhibit missing rivets and broken and painted over section loss on the rivet heads. The connection plates have areas of significant section loss with isolated corrosion holes typical.

Refer to Figures 1 through 18 in *Appendix C* for specific truss member deficiencies.

Element 152 – Steel Floor Beam

The floorbeams are in overall **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
23,487 LF	18,141 LF	5,111 LF	235 LF	

The floorbeams were recently repainted in Unit I, Unit III, Unit IV, and Unit V. Typical conditions found in those areas include areas of painted over pitting up to 1/4” deep and reactivated areas of pack rust and freckled surface corrosion (*Photos 152-1 to 152-2*). Behind some of the removed stringer connections, there are painted over corrosion holes in the webs (*Photo 152-3*). Weld remnants and random attachments remain on the floorbeams from previous drainage assemblies. In the Unit II main truss spans, areas of painted over pitting were found along the bottom of top flange tension tie plates connecting the center floor beam section and the floor beam cantilever brackets. In Unit II, there are cracks present in the floorbeam webs at the top flange cope, adjacent to the truss lines. **There are several new crack locations that were not previously noted, and several of the previously noted cracks have grown since the 2020 inspection (*Photos 152-4 to 152-5*).** Refer to Table 12 in *Appendix C* for specific Unit II floorbeam crack locations and descriptions.

Refer to Tables 7 through 10 and 12, and Figures 1 through 18 in *Appendix C* for specific floorbeam deficiencies.

Element 155 – Reinforced Concrete Floor Beam

The floorbeams are in overall **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
5,407 LF	5,353 LF	54 LF		

There are reinforced concrete floorbeams in the West Approach, Unit I, Section J’, B’, M, D and P. In Section P, there are isolated hairline cracks and areas of delamination throughout the floorbeams, and several locations of spalling with exposed reinforcing.

Refer to Table 7 in *Appendix C* for specific deficiencies.

Element 161 – Steel Pin and Pin & Hanger Assembly

The pins, hangers, and hinges are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
14 EA	11 EA	3 EA		

In Unit II, the pins exhibit painted over pitting with some active corrosion due to deck joint leakage (*Photo 161-1*). In Span 9, South Truss at LOL1 the inboard and outboard oval pin plates have rotated (*Photo 161-2*). The pin plates are rotated to the point where they are in contact with gusset stiffening channels on both the inboard and outboard gusset. The channel flange/rivets are beginning to push the edge of the pin plate outward.

In the Unit IV, there are pin and hanger locations where rivet heads on the girders interfere with hangers (*Photos 161-3*). Evidence of movement of the pin and hanger was noted due to cracked paint between the hangers and the beam webs. Isolated pins exhibit painted over pitting less than 1/8" D.

Refer to Table 9 and Figures 1 through 15 in *Appendix C* for specific deficiencies.

Element 162 – Steel Gusset Plate

The truss gusset plates are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
548 EA	293 EA	140 EA	112 EA	

The truss gusset plates typically exhibit painted over pitting up to 1/4" deep (*Photo 162-1 to 162-2*). There are several locations of reactivating pitting throughout the Main Truss spans. There is pack rust between various truss members and gusset plates at both the upper and lower chords. Fill plates across the structure typically exhibit painted over section loss with up to 100% section loss in isolated locations outside of the gusset plates (*Photo 162-3*).

Refer to Figures 1 through 18 in *Appendix C* for specific gusset plate deficiencies.

Element 311 Moveable Bearing

The moveable bearings are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
103 EA	83 EA	14 EA	6 EA	

The moveable bearings in Unit II exhibit moderate surface corrosion throughout the bearing components. Several bearings in Unit II have standing water and debris accumulation in the bearing assembly (*Photo 311-1*). Refer to Table 11 in *Appendix C* for specific locations of standing water and debris accumulation. The moveable bearings in Unit III were cleaned and in the latest rehabilitation project. Typical conditions found are painted over section loss up to 3/16" deep throughout the lower portion of the columns and cleaned and caulked areas of pack rust. The anchor bolts at

the base of Bents 1 through 10 exhibit moderate painted over section loss. Masonry plates typically exhibit painted over pitting up to 3/16” deep. In Unit V the moveable bearings have widespread painted over pitting (*Photo 311-2*)

Refer to Tables 7 through 11 and Figures 1 through 18 in *Appendix C* for specific moveable bearing deficiencies.

Element 313 Fixed Bearing

The fixed bearings are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
100 EA	80 EA	14 EA	6 EA	

The fixed bearings in Unit II exhibit moderate corrosion and section loss throughout the bearing components (*Photo 313-1*). Several bearings in Unit II have standing water and debris accumulation in the bearing assembly.

Refer to Tables 7 through 11 and Figures 1 through 18 in *Appendix C* for specific fixed bearing deficiencies.

Element 515 – Steel Protective Coating

The protective coating system (PCS) is in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
889,000 SF	862,510 SF	26,340 SF	150 SF	

The PCS in the Main Truss Spans was applied in 2007. The PCS in the West Approach, Forward Section, Lakefront Trestle, and Lakefront Ramp was applied in 2017 and 2018 and in is very good condition. The paint system in Unit II typically exhibits fading and reactivating corrosion throughout with isolated locations of moderate active corrosion.

Alignment

In Unit II, there are several pin locations along the upper chord and lower chord where the trusses are not aligned along a linear plane. This is due to an intentional change in alignment of the structure. These locations should continue to be monitored.

In Unit III, between Bent 8 and 9, the south diagonal is bent upward and to the South due to vehicular impact. The member has not been braced or straightened.

In Unit IV, Section E at Bent 26, the north girder bottom flange on the north side is bent at Joint B4 and the pin nuts show evidence of movement. Continue to monitor this location.

Fatigue Prone Details

The fatigue prone details are in **Good** condition. In the Lakefront Trestle, Unit IV, Bents 14 and 15, Section A, there is an obsolete utility bracket welded to the south twin girder. The top flange weld on the field splice of Girder GF2 exhibits a deep crevice between adjacent weld passes. These types of welded connections represent stress risers and potential fatigue prone details that should be monitored in future inspections

NBI Item N60 – Substructure (6, Satisfactory Condition)

The superstructure is in **Satisfactory** condition.

The substructure findings and summary of conditions for individual items are as follows:

Element 202 – Steel Column

The steel pier columns are in **Fair** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
151 EA	120 EA	31 EA		

The steel bents in Unit I, Unit III and Unit IV exhibit areas of painted over pitting up to 3/16” D and isolated painted over corrosion holes (*Photo 202-1*). There are areas of painted over pack rust up to 1/4” thick between plates. The anchor bolts nuts exhibit up to 40% painted over section loss. Anchor bolts have painted over section loss up to 75% (*Photo 202-2*). The reinforced concrete bases exhibit isolated spalls up to 4” deep.

Refer to Tables 7 through 10 and Figures 16 through 18 in *Appendix C* for specific steel column deficiencies.

Element 205 – Reinforced Concrete Column

The reinforced concrete pier columns are in **Fair** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
268 EA	213 EA	53 EA	2 EA	

In Unit I, Section M and D, the reinforced concrete columns are generally in good condition with one isolated column with significant spalling. In Unit I, Section P, several of the columns have areas of delamination (*Photo 205-1*). The columns in Unit II typically have areas of cracking with rust staining and some areas of delamination (*Photo 205-2*).

Refer to Tables 13 through 17 in *Appendix C* for specific deficiencies.

Element 210 – Reinforced Concrete Pier Wall

The pier walls are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
55 LF	30 LF	25 LF	10 LF	

Pier 37 between Units IV and V has several areas of delamination, spalling and cracking, especially on the bearing pedestals (*Photos 210-1 & 210-2*).

Refer to Table 17 in *Appendix C* for specific pier wall deficiencies.

Element 215 – Reinforced Concrete Abutment

The abutment walls are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
110 LF	59 LF	51 LF		

There are isolated areas of hairline vertical cracking with isolated areas of efflorescence and water staining. In Unit V, the East Abutment exhibits areas of patched concrete.

Refer to Table 13 and 17 in *Appendix C* for specific abutment wall deficiencies.

Element 231 – Steel Pier Cap

The pier caps are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
5,655 LF	5,425 LF	209 LF	20 LF	

The steel pier caps at Pier 38, 39 & 40 in Unit V exhibit painted over pitting and pack rust up to 1” thick.

Refer to Table 13 and 17 in *Appendix C* for specific steel pier cap deficiencies.

Element 234 – Reinforced Concrete Pier Caps

The pier caps are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
212 LF	203 LF	9 LF		

In Unit I, there are areas of delaminations in the underside of Pier O in Section P near the middle of the cap. The Pier 12 cap in Section M exhibits a spall with exposed reinforcing steel. In Unit II, Pier 10 Cap exhibits a patched and fiber wrapped area on the underside of the cap.

Refer to Table 13 in *Appendix C* for specific concrete pier cap deficiencies.

Element 830 – Abutment Backwalls

The backwalls are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
110 LF	50 LF	60 LF		

Minor vertical cracking and staining are present on the East Abutment backwall.

Refer to Table 17 in *Appendix C* for specific backwall deficiencies.

Wingwalls

The wingwalls are in **Good** condition.

Mask Walls

In Unit I, there are mask walls in each section except for B and J where the roadway is built on fill. The mask walls have significant areas of spalling, delaminations, and cracking on the inside and outside faces of the walls (*Photo MW-1*). Several spalls exhibit exposed reinforcing steel with significant section loss. In Section C & K, some of the delaminations are above pedestrian walkways.

In Unit III, there are mask walls at the north and south chambers east of West 9th Street. The inside faces of the walls have significant areas of spalling, delaminations and cracking. Several spalls have exposed rebar with up to 100% section loss.

Refer to Tables 13 and 15 in *Appendix C* for specific mask wall deficiencies.

NBI Item N61 –Channel (7, Good Condition)

The Channel is in **Good** condition. There is an NBI sub-item under the Channel condition:

NBI Item N61.01.01 – Scour (7, Good Condition)

The bridge scour is in **Good** condition.

The channel findings and summary of conditions are as follows:

Alignment

The alignment is in **Good** condition.

Protection

The channel protection is in **Good** condition.

Hydraulic Openings

The hydraulic opening is in **Good** condition. The hydraulic opening is sufficient.

Navigation Lights

The navigation lights are in **Good** condition.

Approaches

The approaches are in **Satisfactory** condition. The approach findings and summary of conditions for individual items are as follows:

Element 321 – Approach Slab

The approach slabs are in **Good** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4
6,788 SF	6,788 SF			

The asphalt joints at the ends of the west approach slabs have areas of cracking, patching and heaving (*Photo 321-1*).

Approach Wearing Surface

The approach wearing surfaces are in **Fair** condition. The West Approach wearing surface exhibits numerous potholes and asphalt patches, especially in the eastbound lanes. Several patched areas exist on the West Approach. There are potholes and asphalt patches in the East Approach wearing surface (*Photo AWS-1*).

Embankment

The approach embankments are in **Good** condition. **There is an 8’ long x 4’ wide x 2’ deep sinkhole near the North column of Bent 30 in Unit IV. The sink hole has grown in size since the 2020 inspection and there are still traffic cones delineating the hole (*Photo APR-1*).**

Guardrail

The approach guardrails are in **Satisfactory** condition. There are areas of cracking and spalling in the approach concrete barrier. **At the westbound exit to W 28th St, the impact attenuator is heavily damaged (*Photo APR-2*).**

Security Items

The fenced in area under Unit V is accessible due to an open gate on the southeast end of Pier 37 (*Photo APR-3*). Due to this opening, there is evidence of a homeless encampments within the fenced in area.

Signs & Utilities

Signs

The signs on the structure are in **Good** condition. In Unit V, there is a missing sign curve warning sign in the Eastbound lanes (*Photo SIG-1*)

Lighting

The deck lighting is in **Fair** condition. The deck lighting consists of metal poles with cobra head fixtures. Several pull boxes at the base of the light poles across the structure have either missing or loose covers with exposed wiring (*Photo LI-1*).

Recommendations

The General Appraisal and Operating Status for the Main Avenue Bridge over the Cuyahoga River is 5 (Fair Condition). The Superstructure components, particularly the Unit II - Main Truss lower chord members, are the governing element for this condition rating. The following items are recommendations by Palmer Engineering:

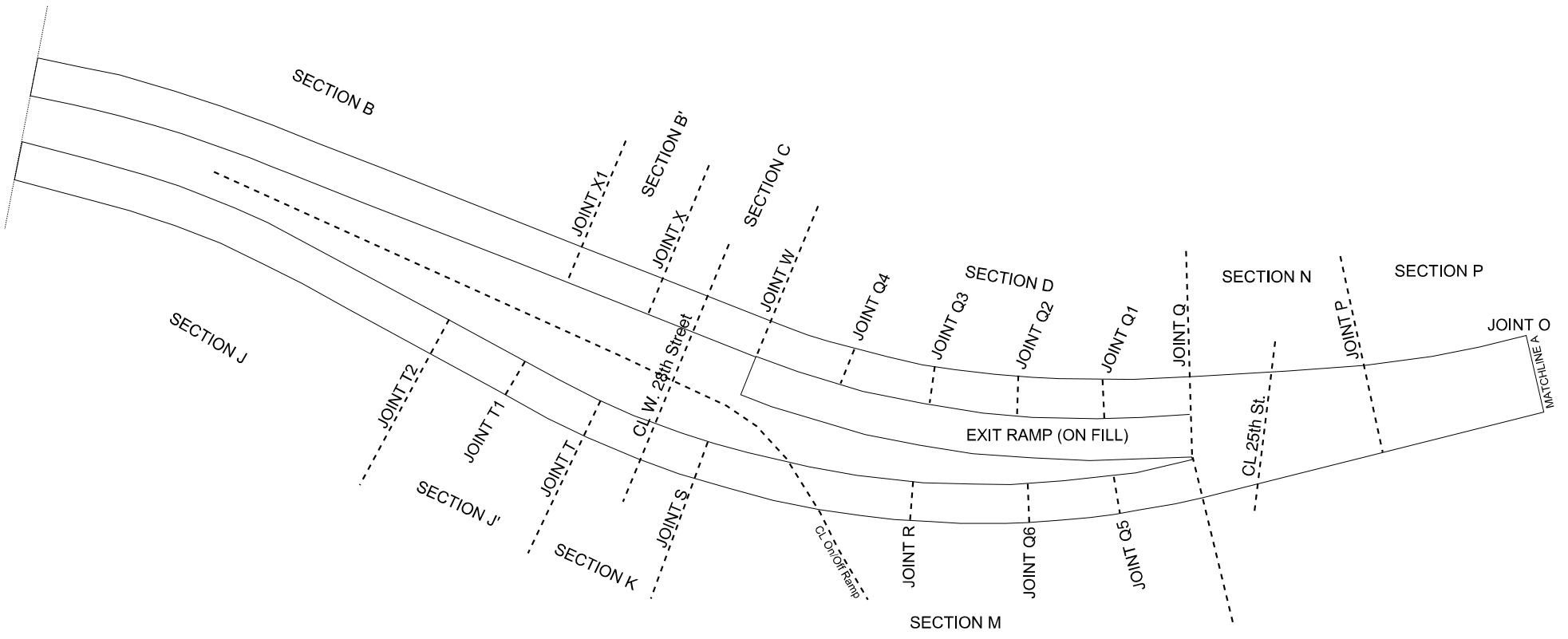
Immediate:

- Remove delaminated concrete from Joint L concrete header above Elm Street in Span 5/6.
- **Repair the Joint X broken compression seal retainer over Westbound Lane 3 in Unit 1.**
- **Drill crack arrest holes in the areas of fatigue cracking in the Unit II Floorbeam Top Flange Copes.**
- Secure loose joint armor at Joint O in Westbound Lane 1 in Unit II.
- **Repair the disconnected downspout over the Cuyahoga River in Unit II, Span 9.**
- **Repair the heavily damaged impact attenuator at the westbound exit to W 28th St.**

Routine:

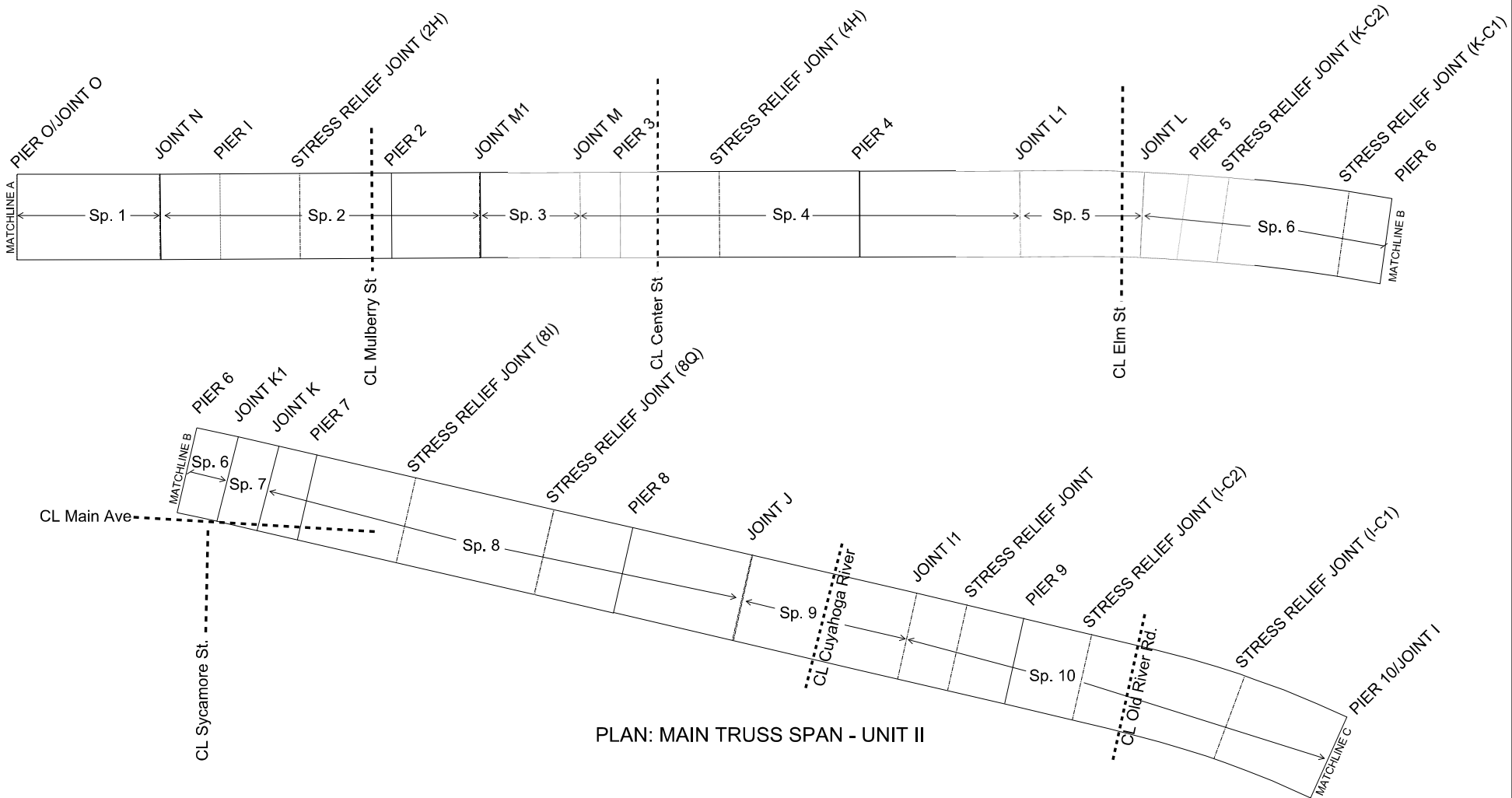
- Monitor areas of fatigue cracking and fatigue crack repairs during future inspections.
- Clean out debris from all joints.
- Continue to monitor the areas of reactivating pack rust and corrosion throughout the structural members. Spot paint areas of corrosion in Unit II.
- Install minimum overhead clearance signs as required by ODOT & City of Cleveland policy.
- **Clean out all scuppers at deck level and under structure.**
- Replace the broken downspout bottom angle piece at Unit II, Span 2, South Truss, L6U6.
- Install utility access covers on bridge light poles as needed.
- Remove obsolete and random welded attachments.
- Clean out drain holes to drain water from bearings. Drill drain holes in bearings where needed to avoid water collecting in casting.
- Reset expansion bearings at Pier 3 and Pier 11.
- Clean out debris and secure gate at Unit V, Pier 37.
- Main Truss Spans: Remove expansion bearing guide plates, remove debris and paint roller nest.
- Repair sink hole in Unit IV at Bent 3

APPENDIX A – BRIDGE LAYOUT DRAWINGS



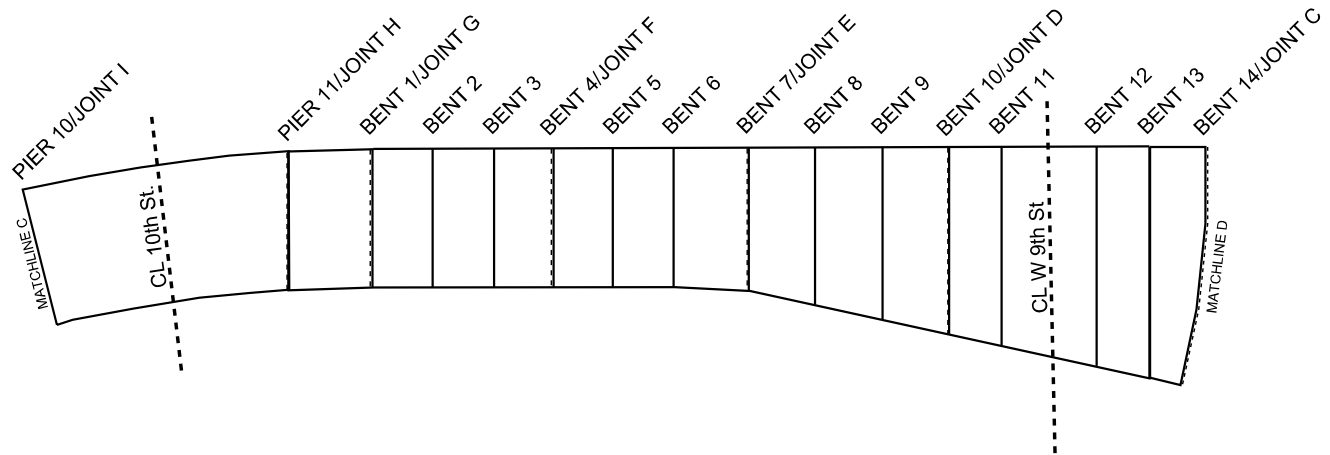
PLAN: WEST APPROACH - UNIT I

GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441
NOT TO SCALE	July, 2021		WEST APPROACH - UNIT I



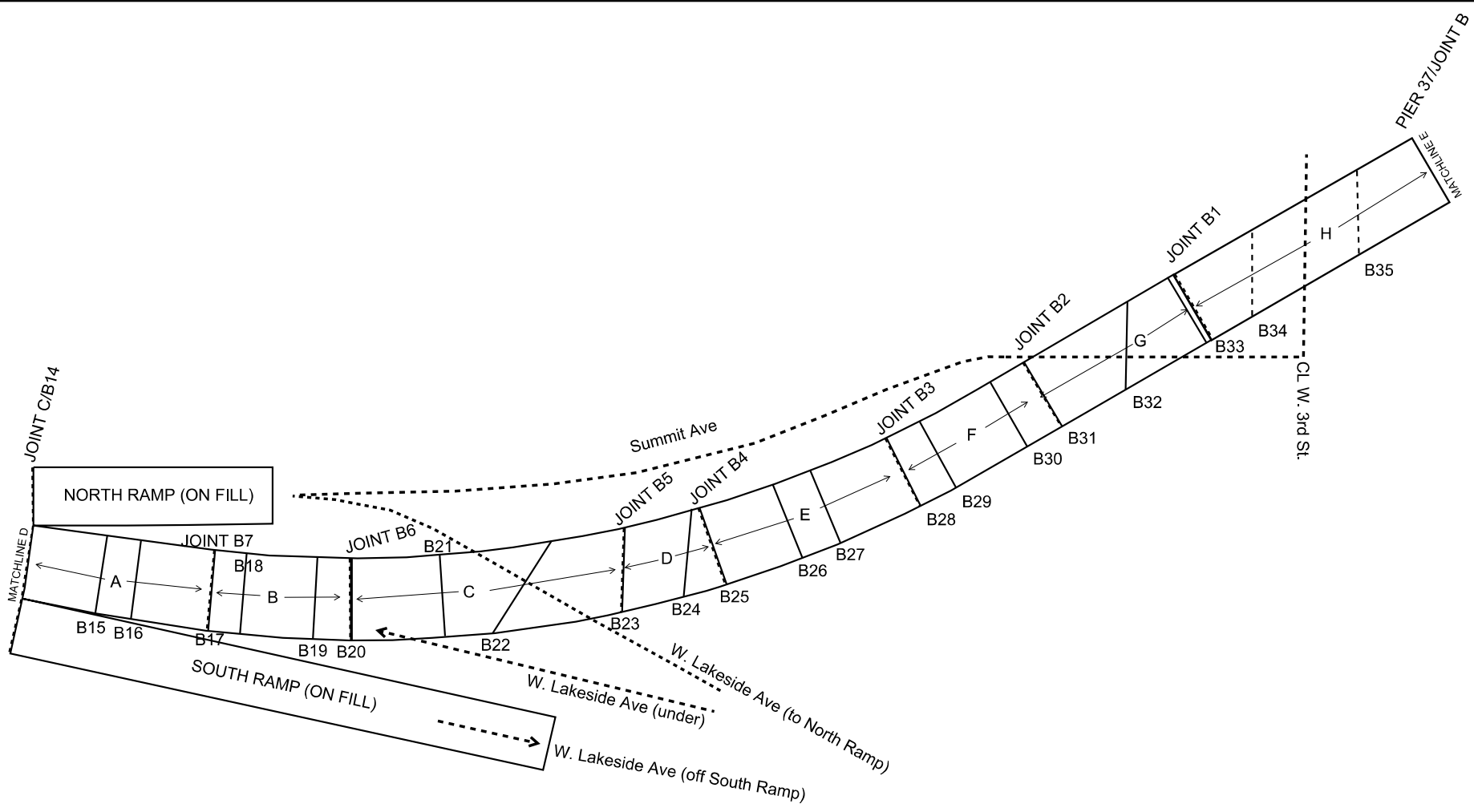
PLAN: MAIN TRUSS SPAN - UNIT II

GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441
NOT TO SCALE	July, 2021		MAIN TRUSS SPAN - UNIT II



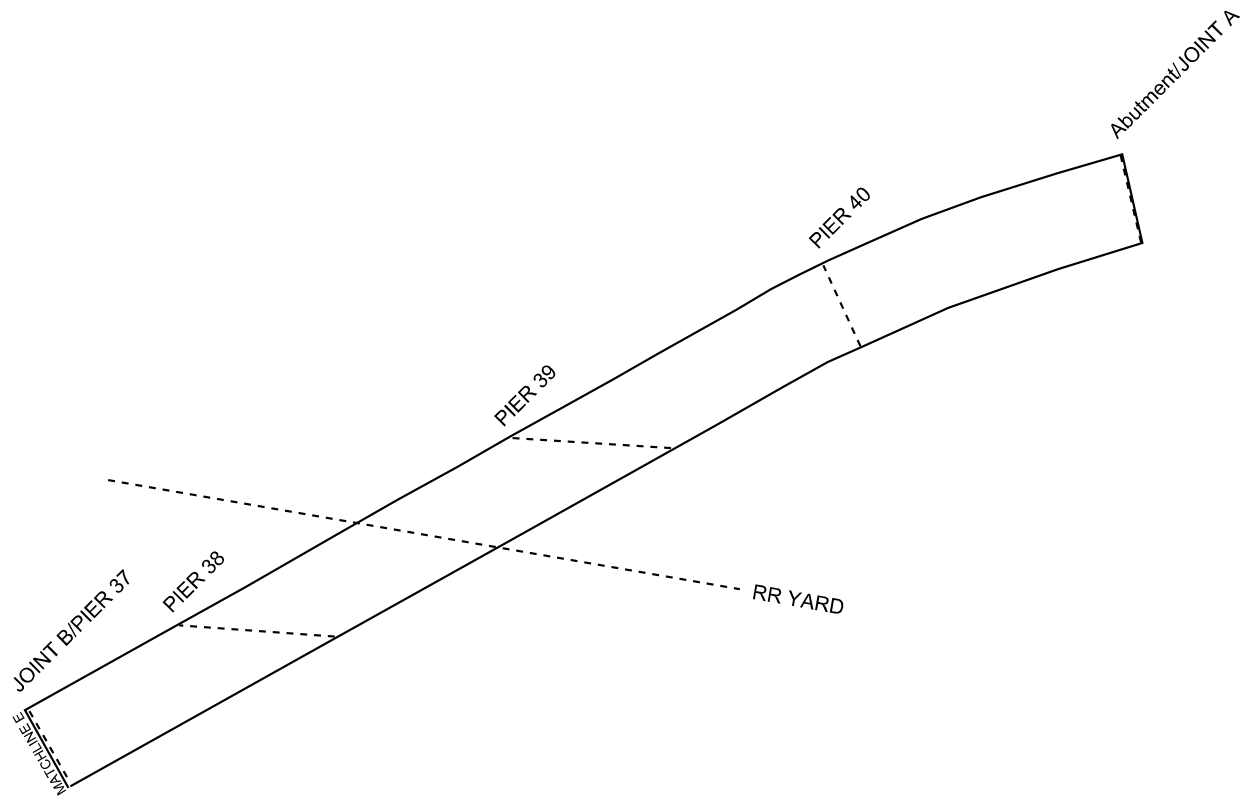
PLAN: FRAMED & BRACED COLUMN - UNIT III

GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441	PAGE
NOT TO SCALE	July, 2021		FRAMED AND BRACED COLUMN - UNIT III	A-3



PLAN: EAST APPROACH - UNIT IV

GRAPHIC SCALE MEASURED IN FEET	DATE July, 2021		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441	
			EAST APPROACH - UNIT IV	PAGE A-4



PLAN: LAKEFRONT RAMP - UNIT V

GRAPHIC SCALE MEASURED IN FEET	DATE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441
NOT TO SCALE	July, 2021		LAKE FRONT RAMP - UNIT IV
			PAGE A-5

APPENDIX B – INSPECTION PHOTOS

DECK PHOTOS



Photo 12-1 – Scattered Haunch Spalling in Unit I



Photo 12-2 – Deck Edge Spalling and Delamination in Unit II



Photo 300-1 – Joint O Loose Joint Armor and Spalled Header



Photo 300-2 – Unit II, Span 4/5 Joint L1, Typical Rusting and Debris Impaction in Joint



Photo 302-1 – Unit I, Joint X, 10-ft Section of Broken Retainer in Westbound Lane 3



Photo 302-2 – Unit IV, Joint B4, Section of Compression Joint Seal Dislodged from Retainer, Eastbound Lane 1

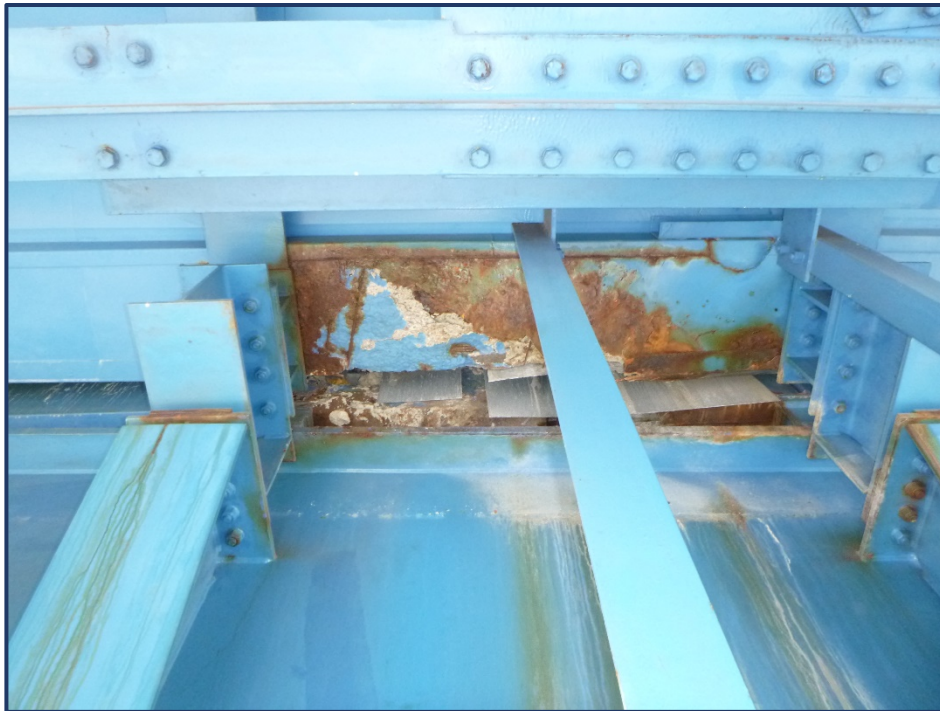


Photo 303-1 – Unit II, Joint L Header Spalled and Delaminated Concrete



Photo 303-2 – Unit V, Joint B, Areas of Minor Seal Tearing



Photo 331-1 – Typical Area of Cracking, Parapet Interior Face



Photo 331-2 – Typical Area of Delamination & Spalling, Parapet Exterior Face



Photo 331-1 – Area of Parapet Spalling at Deck Joint.



Photo 510-1 – Scattered Shell Spalling with Asphalt Patching in Wearing Surface



Photo 510-2 – Unit II, Span 6, Area of Shallow Spalling and Burn Marks in Westbound Lane 3



Photo 815-1 – Typical Clogged Scupper Inlets



Photo 815-2 – Unit IV, Bent 15 Catch Basin, Heavy Spalling of Frame and Shifting Grate



Photo 815-3 – Unit II, Span 9, North Side Scupper Downspout Disconnected

SUPERSTRUCTURE PHOTOS



Photo 107-1 – Unit III, Bent 11-12, South Fascia Stringer, Vehicular Impact



Photo 107-2 – Unit IV Girders, Typical Bottom Flange Pack Rust up to 1”



Photo 107-3 – Unit V, South Girder, ¼" Painted over Section Loss on Web



Photo 116-3 – Span 13, Active Corrosion on Maintenance Deck Stringers



Photo 120-1 – Span 5, South Truss, Section Loss and Distortion due to Pack Rust at L1-U1 Fill Plate



Photo 120-2 – Span 6, North Truss, Painted over Pitting and Corrosion Holes in Web of L9-U10 at L9



Photo 120-3 – Typical Distortion of Diagonal Flange Plates due to Sealed Pack Rust



Photo 120-4 – Area of Painted over Section Loss on Diagonal with Retrofit Plate on Back Side



Photo 120-5 – Span 6, South Truss, U4-U5, Painted over Pitting and Web Plate Distortion



Photo 120-6 – Span 9, South Truss, L0-L1, Reactivating Section Loss



Photo 120-7 – Span 1, South Truss, L8-L9, Distortion of Top Flange Plate due to Pack Rust



Photo 120-8 – Typical Painted over Section Loss with Perforations in Sway Bracing



Photo 152-1 – Unit V, Painted of Section Loss of Floorbeam Cantilever at Abandoned Drainage Downspout Location



Photo 152-2 – Unit II, Span 2, FB 16, Active Surface Corrosion due to Deck Drainage

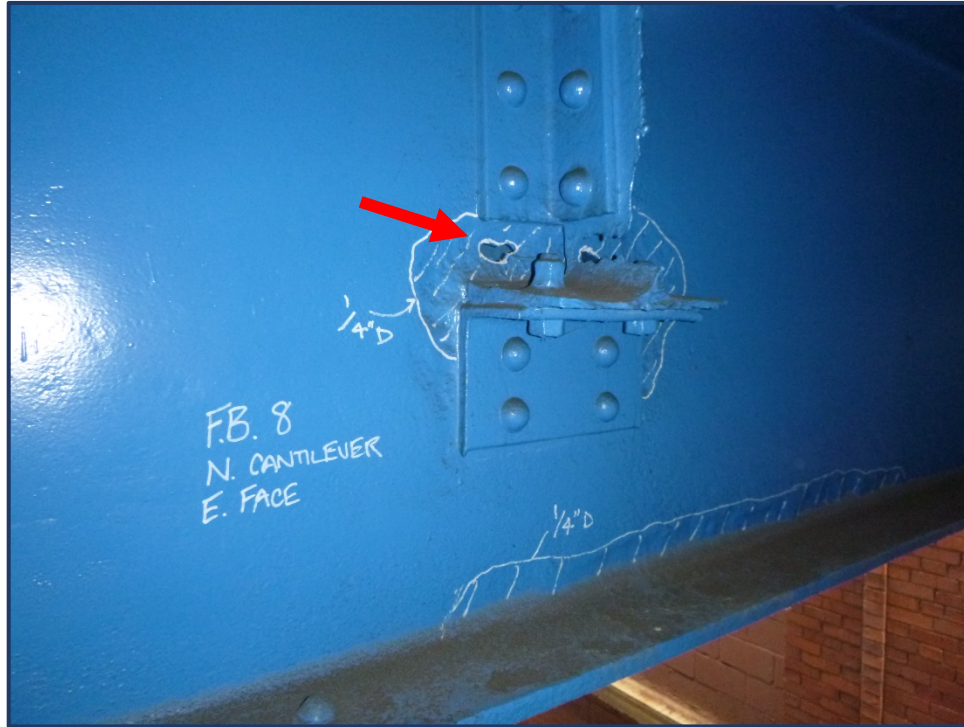


Photo 152-3 – Unit III, FB 8, Areas of Painted over Section Loss and Corrosion Holes at Abandoned Stringer Connection



Photo 152-4 – Unit II, Span 4, FB 14 at North Truss, New Crack in Top Flange Cope



Photo 152-5 – Unit II, Span 1, FB 7 at South Truss, Crack in Top Flange Cope Exhibiting Slow Growth



Photo 161-1 – Unit II, Span 9, North Truss, Painted over Pitting on Pin with Rust Staining



Photo 161-2 – Unit II, Span 9, South Truss, Rotated Pin Plate at L0



Photo 161-3 – Unit IV, Span E, Hanger Assembly Near Joint B4



Photo 162-1 – Unit II, Span 1, South Truss, Painted Over Pitting on L7 Gusset Plate



Photo 162-2 – Unit II, Span 8, North Truss, Painted over Section Loss on L23 Gusset Plate along Lower Chord



Photo 162-3 – Unit II, Span 8, South Truss, Corrosion Complete Section Loss In Fill Plate



Photo 311-1 – Unit II, Pier 1, South Truss Bearing, Layered Corrosion



Photo 311-1 – Unit V, Pier 39, North Bearing, Painted Over Pitting



Photo 311-1 – Unit II, Pier 0, South Truss Bearing, Section Loss of Bearing and Anchor Bolt Nuts

SUBSTRUCTURE PHOTOS

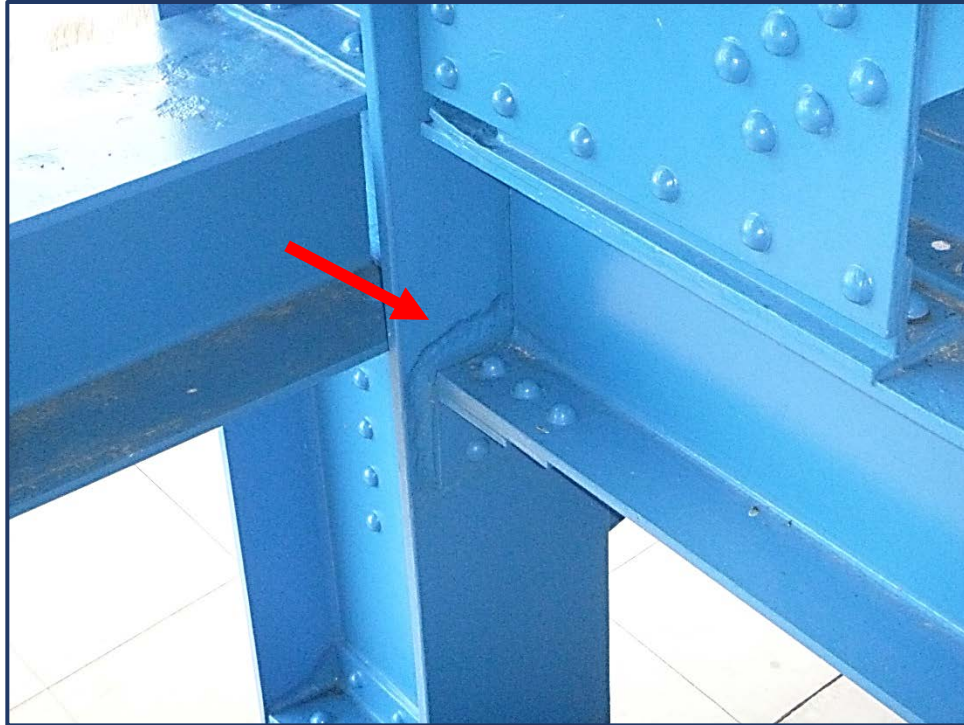


Photo 202-1 – Unit III, Bent 5 North Column, Painted Over Section Loss at Bracing Connection



Photo 202-1 – Unit III, Bent 8 Center Column, Painted Over Section Pitting and 75% Loss of Anchor Bolts



Photo 205-1 – Unit I, Unit P, East Pier, Delamination of North Column



Photo 205-2 –Unit II, Pier 7 North, Patching and Rust Staining



Photo 210-1 – Pier 37, East Face, Delamination and Spalling of Pier Wall



Photo 210-2 – Pier 37, Span 38 South Bearing Pedestal Spalling with Exposed Reinforcing



Photo MW-1 – Pier 37, Unit I, Section N, Spalling of Mask Wall at South Fascia

APPROACH PHOTOS



Photo 321-1 – West Approach Slab, Westbound, Areas of Patching and Heaving of Asphalt Joint



Photo AWS-1 – East Approach Pavement, Westbound Lanes, Areas of Asphalt Patching



Photo APR-1 – Unit IV, Bent 30, Sinkhole in Parking Lot



Photo APR-2 – Westbound Exist to W. 28th St., Heavily Damaged Impact Attenuator



Photo APR-3 – Unit V, South Side of Pier 37, Open Vandal Fence Gate

UTILITY PHOTOS



Photo SIG-1 – Unit V, Eastbound, Missing Sign on Right Parapet



Photo LI-1 – Typical missing utility cover at light pole, Span 5 over Elm Street

APPENDIX C – DEFICIENCY TABLES AND FIGURES

Table 1: Unit 1 Deck Deficiencies					
Travel Direction	Span	Joint	Component	Note	Photo
Typical	All		Railing	Throughout all parapets all units all spans have sound patching (5-10%).	
West	All		Railing	Along length of parapet, horizontal, map cracks and vertical cracks up to FH x 1/32" W (15%).	
West	All	All	Joints	Throughout all joints, debris impaction (40%).	
West	APP		Wearing Surface	Throughout west approach westbound lanes have multiple spalls/potholes and patches up to FW x 3' with vegetation growth at both shoulders.	
West	APP		Guardrails	Throughout approach guardrails multiple spalls/delaminations up to 2.5' x 18" x up to 5" D.	
West	J'		Wearing Surface	Throughout west approach, asphalt patches.	
East	J'	T2	Joints	Joint filled with water, debris impaction (12LF), spot/freckled rust (5LF).	
East	J'	T1	Joints	Debris impaction (8LF), spot/freckled rust (5LF).	
East	J'	T	Joint	Debris impaction (15LF), spot/freckled rust (5LF).	
East	J'		Wearing Surface	Typical vegetation growth along south shoulder, eastbound lane.	
East	J'		Wearing Surface	Along length of deck adjacent to joints, edge spalling up to 3' L x 4" W x 1/2" D (30 SF).	
East	J'		Railing	Throughout parapets, multiple vertical cracks up to FH x up to 1/32" W (15%).	
West	B		Deck	On the south fascia, located two sections west of Joint X1, the underside edge of deck at bridge rail joint has a 1' H x 1'-6" W x 5" D spall.	
West	B		Railing	Two sections west of Joint X1, Bridge rail has 1' H x 6" W delamination.	
West	B'	X	Joints	8 LF of compression seal retainer has broken away from deck, allowing drainage directly though the joint. Corrosion with section loss up to 3/16" D (4LF), joint is depressed up to 1" H x FL, edge spalling adjacent wearing surface FL x up to 2" W x 1/4" D.	
East	K		Deck	1' L haunch spall above Stringer 1 by Floorbeam 3.	
East	K		Railing	Throughout parapets, multiple vertical cracks up to FH x up to 1/32" W (15%).	
East	K	S	Joints	Debris impaction (13LF), spot/freckled rust (4LF).	
West	D		Wearing Surface	10' west from Joint Q2 at north parapet, wearing surface has a spall 5' L x up to 7" W x up to 1" D.	
West	D	Q5	Joints	Debris impaction (FL).	
West	D	Q4	Joints	Debris impaction (8 LF), Corrosion with section loss up to 3/16" D (6LF), joint is depressed up to 1" H x FL, edge spalling adjacent wearing surface FL x up to 2" W x 1/4" D.	
West	D	Q3	Wearing Surface	24" diameter x 1-1/4" D spall with poor patching in center lane westbound.	
West	D	Q3	Joints	Corrosion with section loss up to 3/16" D (9LF), joint is depressed up to 1" H x FL, edge spalling adjacent wearing surface FL x up to 2" W x 1/4" D.	
West	D	Q2	Joints	Debris impaction (6 LF), Corrosion with section loss up to 3/16" D (8LF), joint is depressed up to 1" H x FL.	
West	D	Q1	Joints	Debris impaction (8 LF).	

Table 1: Unit 1 Deck Deficiencies					
Travel Direction	Span	Joint	Component	Note	Photo
West	D	Q	Joints	Debris impaction (10 LF), Corrosion with section loss up to 3/16" D (15LF).	
West	D		Railing	At Joint Q, 42" H x 12" W x 1" D spall to N face of the median parapet. The south face of the north parapet has spall on each side of the joint. West side: 12" H x 12" W x 1/4" D. East side: 12" H x 1" W x 2" D.	
East	M	Q5	Deck	Along length of adjacent deck, edge spalling up to 10' L x 2" W x 1/2" D (35 SF).	
East	M		Wearing Surface	Entrance/exit ramp approximately 23' from Joint Q, asphalt patch FW x 3' raised higher than roadway up to 5".	
East	M	Q5	Railing	On the south railing, the outside face has a 5' W x 6" H spall with exposed reinforcing.	
East	M	Q6	Railing	Spall with exposed reinforcing 4' L x 6" H x 3" D, one exposed bar.	
East	M	R	Joint	Debris impaction (18LF).	
East	M		Railing	Parapets at Joint S, spalls up to 11" H x 3-1/2" W x 2-3/4" D (1LF per rail).	
East	M		Railing	Left parapet along top edge between Joint R and Q6, spalling up to 5' L x 1" H x 1/2" D (20 LF), at Joint Q6, spall 18" H x FW x 5" D with 5 exposed rebar which has been painted.	
East	M		Railing	Throughout entrance/exit ramp, multiple asphalt patches with adjacent broken up concrete.	
Typical	M		Railing	Through parapets at entrance/exit ramp multiple vertical cracks up to FH x 1/32" W (50%).	
West	M	Q	Railing	Both parapets westbound lane at Joint Q spalls up to FH x 12" H x 4" D.	
East	M	Q	Median	At concrete median sound patch 15' L x 5' H.	
East	M	Q6	Joints	Debris impaction (15LF), spot/freckled rust (5LF).	
East	M	Q5	Joints	Debris impaction (8LF), spot/freckled rust (4LF), near center line of roadway joint is depressed up to 1" (8LF).	
East	M	Q	Joints	Debris impaction (26LF), spot/freckled rust (5LF).	
East	M		Railing	Throughout parapets Section M, vertical and horizontal cracks up to FH x up to 1/32" W (15%).	
East	N	P	Joints	Debris impaction (22 LF), corrosion with section loss up to 1/16"D (6 LF).	
West	N	P	Joints	Debris impaction (8 LF), corrosion with section loss up to 3/16" D (11 LF), joint is depressed up to 1" H x FL.	
East	N		Median	Median near Joint Q, multiple spalls up to 12" L x 12" H x 3" D with one with exposed rebar.	
East	N	P	Railing	Both parapets at Joint P, spalling up to 12" L x 15" H x up to 6" D (1LF each rail).	
East	N		Railing	Multiple vertical cracks around the utility pole.	
East	N		Railing	Right parapet near Joint Q, multiple spalls up to 12" L x 12" H x 3" D with one with exposed rebar.	
West	N		Railing	The guardrail impact attenuator for the W 28th St exit ramp has sustained heavy vehicular impact damage.	
West	N		Railing	3' H x 16" W x 1" D spall to the north face of the median parapet. The south face of the north parapet has spalls on each side of Joint P. West side of P: 18" W x 12" H x 1/4" D. East side of P: 6" W x 12" H x 1/4" D.	
East	P	O	Joint	Debris impaction (FL).	

Table 2: Unit 2 Deck Deficiencies					
Travel Direction	Span	Joint	Component	Note	Photo
Center	5	L	Deck	Underside of deck at Joint L, corrosion of stay in place form up to 100% with multiple spalls up to 5' L x 2' W x up to 3" D with exposed rebar and section loss up to 15%.	
Center	8		Deck	Underside of deck at Floorbeam 0, corrosion of stay in place form up to 100% with multiple spalls up to 2' L x 1' W x 11" D with exposed rebar and section loss up to 15%.	
Center	9		Deck	Underside of deck at Floorbeam 0, corrosion of stay in place form up to 100% with multiple spalls up to 2' L x 2' D x up to 1" D with exposed rebar and section loss up to 15%.	
East	4		Wearing Surface	Spall in the South lanes near parapet up to 16" W x 15' L x up to 1" D on outside shoulder.	
East	6		Wearing Surface	Just east of Relief Joint K-C1, there is a 12' L x up to 4" W x up to 1/2" D area of spalling to the south outside shoulder against the parapet.	
West	4		Wearing Surface	Between Joints M and 4H, 28" L x 14" W x 3/4" D spall to north outside shoulder.	
West	6		Wearing Surface	16' L x 10' W x 1/4" D area of spalling to the WB lane 3 wearing surface due to vehicle damage (160 SF).	
East	1		Railing	Parapets have horizontal and vertical cracks up to full height x up to 1/32" W (10%).	
East	2		Railing	Parapets have vertical cracks up to full height x up to 1/32" W (10%).	
East	2		Railing	Spall in the South railing with map cracking 9" W x 6" L x 1-1/2" D.	
East	2		Railing	Median and right parapet at Joint M1, spalls/delaminations up to 12" x 12" x up to 1" D (1LF each rail).	
East	2		Railing	Spall with exposed reinforcing in the south fascia rail between Joints 2H and M1, east of the sign post, measuring 6' L x 1' H x 2" D.	
East	3		Railing	Parapets have vertical and horizontal cracks up to full height x up to 1/32" W with adjacent map cracking (10%).	
East	3		Railing	Between Joints M1 and M, there is a 14" L x 2" W x up to 1" D spall on the north face of the south parapet.	
East	3		Railing	South fascia has a spall with exposed reinforcing just west of Joint M measuring 9' L x 2' H x 2-1/2" D with one exposed bar.	
East	4		Railing	Parapets have vertical and horizontal cracks up to 1/16" W x up to full height (10%).	
East	4		Railing	South fascia spall 5' W x 1-1/2' H x 3" D with one exposed rebar. Spall is just west of center street.	
East	4		Railing	South fascia spall 6' W x 2' H x 4" D between floorbeams 9-10.	
East	4		Railing	South fascia spall 3' W x 1' H x 2" D exposed corroded rebar at FB10 between Joints 4H and M.	
East	5		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" W (10%).	
East	6		Railing	South fascia between Joints KC1 and KC2, spall with exposed corroding rebar 15' L x 2' H x up to 3" D.	

Table 2: Unit 2 Deck Deficiencies					
Travel Direction	Span	Joint	Component	Note	Photo
East	6		Railing	South fascia east of Joint KC1, spall 15' W x 1-1/2' H with 3 longitudinal and 7 vertical rebar exposed. One of the longitudinal rebar is broken.	
East	6		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" W (10%), (8LF) efflorescence.	
East	6		Railing	Cracking and spalling on top of the South rail 2' L x 1" W x 3/8" D.	
East	7		Railing	Two south fascia spalls: 15" W x 7" H x 2" D and 1' W x 6" H x 2" D at FB 6.	
East	7		Railing	South parapet top face at end of first rail segment spall / delamination 18" x FW x up to 1-1/2" D.	
East	7		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x hairline (10%), (8LF efflorescence).	
East	7		Railing	Right parapet at Joint K, spall 6" x 9" x 1" D.	
East	8		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" (10%).	
East	8		Railing	Median rail at Joint J, spall 12" diameter x 3/4" D.	
East	8	J	Railing	1" diameter delamination located 3' West of Joint J.	
East	8-9	J	Railing	Missing junction cover at base of light 15' East of Joint J. Junction opening is covered with tape.	
East	9		Railing	Median rail at Joint J, spall 14" x up to 5" x 3/4" D.	
East	9		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" (10%).	
East	10		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" (10%).	
West	All		Railing	Along length of parapet, multiple vertical cracks up to FH x 1/32" W (10%).	
West	1		Railing	9' west of Joint N at top outside edge of north parapet spall/delamination 8" L x 4" H x up to 1" D with one exposed rebar on outside face.	
West	2	Btw. FB 13-14	Railing	12' L x 2' H x 3" D spall with exposed and corroded rebar.	
West	2		Railing	4' west of Joint 2H on north face of median parapet spall 8" L x 5" H x 1" D.	
West	2/3		Railing	At Joint M1, there is a 2' H x 5" W x up to 5" D spall on the north face of the median parapet, with adjacent map cracking.	
West	4		Railing	16" H x 9" W x 1-1/2" D spall to the exterior face of the north parapet, over Center St.	
West	4		Railing	15' west of Joint 4H on north parapet spall 8" L x 12" H x 2" D.	
West	6		Railing	8' west of Joint K-C2, 6" W x 6" H x 1" D spall near the top of the north exterior face of north parapet.	
West	6		Railing	4' west of Joint KC1 on north parapet, interior face, spall 17" L x 10" H x 1" D.	
West	6		Railing	12' west of Joint K1 on the north parapet, interior face, several areas of shallow spalling (10 LF) due to vehicle damage.	

Table 2: Unit 2 Deck Deficiencies					
Travel Direction	Span	Joint	Component	Note	Photo
West	6/7		Railing	2 small spalls at Joint K1, one on each side of the header. West side: 5" W x 5" H. East side: 6" W x 6" H.	
West	7	FB 1	Railing	12' L x 1' H x 3" D spall/delamination with exposed and corroded rebar.	
West	8	FB 4	Railing	15' L x 2' H x 4" D spall with two longitudinal and 14 vertical exposed and corroded rebar.	
East	1	O	Joints	Debris impaction (FL).	
East	1	N	Joints	Debris impaction full length, corrosion with section loss up to 3/16" D (6 LF).	
East	2	2H	Joints	Debris impaction (20 LF), corrosion with section loss up to 1/8" D (8 LF).	
East	3	M1	Joints	Debris impaction full length, corrosion with section loss up to 3/16" D (12 LF).	
East	4	M	Joints	Debris impaction (FL), corrosion with section loss up to 3/16" D (10 LF).	
East	4	4H	Joints	Debris impaction (FL), corrosion with section loss up to 3/16" (17 LF).	
East	5	L1	Joints	Debris impaction (36 LF), corrosion with section loss up to 3/16" (20 LF), depressed up to 1" (18 LF).	
East	6	K-C2	Joints	Debris impaction x FL, corrosion with section loss up to 1/8" (13 LF).	
East	6	K-C1	Joints	Debris impaction x FL, corrosion with section loss up to 3/16" (6 LF).	
East	7	K1	Joints	Debris impaction (15 LF), corrosion with section loss up to 3/16" (17 LF).	
East	8	K	Joints	Debris impaction x FL, corrosion with section loss up to 3/16" (9 LF).	
East	8	8I	Joints	Debris impaction x FL, corrosion with section loss up to 3/16" (6 LF), depressed up to 1" (5 LF).	
East	8	8Q	Joints	Debris impaction x FL, corrosion with section loss up to 3/16" (10 LF), depressed up to 1" (18 LF).	
East	9	J	Joints	Debris impaction (30 LF) corrosion with section loss up to 3/16" (9 LF). Joint plate under FB 25 has corrosion with up to 100% section loss.	
East	10	I1	Joints	Debris impaction full length, corrosion with section loss up to 3/16" D. Bottom joint plate at FB 8 has up to 100% section loss.	
East	10	I-C2	Joints	Debris impaction (12 LF), corrosion with section loss up to 3/16" D.	
East	10	I-C1	Joints	Debris impaction (12 LF), corrosion with section loss up to 3/16" D.	
West	1	O	Joints	Debris impaction (8 LF).	
West	2	N	Joints	Debris impaction (FL), Corrosion with section loss up to 3/16" D (13 LF).	
West	3	M1	Joints	Corrosion with section loss up to 3/16" D (17 LF).	
West	4	M	Joints	Corrosion with section loss up to 3/16" D (11 LF).	
West	7	K1	Joints	Debris impaction (6 LF), Corrosion with section loss up to 3/16" D (14 LF).	
West	8	K	Joints	Debris impaction (3 LF), corrosion with section loss up to 3/16" D (6 LF).	

Table 2: Unit 2 Deck Deficiencies					
Travel Direction	Span	Joint	Component	Note	Photo
West	8	8I	Joints	Debris impaction (FL), corrosion with section loss up to 3/16" D (6 LF), bottom joint plate at U8 has 100% section loss.	
West	8	8Q	Joints	Corrosion with section loss up to 1/8" D (5 LF).	
West	9	J	Joints	Debris impaction (6 LF), corrosion with section loss up to 3/16" D (7 LF).	
West	10	I1	Joints	Debris impaction (25 LF), corrosion with section loss up to 3/16" D (4 LF).	
West	10	IC-2	Joints	Debris impaction (14 LF), corrosion with section loss up to 3/16" D (8 LF).	
West	10	IC-1	Joints	Debris impaction (18 LF), corrosion with section loss up to 3/16" D (8 LF).	
West	10	I	Joints	Corrosion with section loss up to 3/16" D (8 LF).	
East	2		Lighting	On one light pole in span 2, cover plate is missing. Light pole cover is taped on to base on another light pole in span 2.	
East	5		Lighting	Pole on south parapet over Elm St. is missing its cover and its inside is heavily corroded.	
West	1		Lighting	Between Joint O and N, light pole is missing its cover plate; inside is heavily corroded and has exposed wires.	
West	7		Lighting	Pole on north parapet is missing its southeast anchor bolt cover.	

Table 3: Unit 3 Deck Deficiencies					
Travel Direction	Span	Joint	Component	Note	Photo
East		D/E	Railing	Top of south rail has a spall with delamination 18" W x Full Height x 2"D.	
East		F/E	Railing	Parapets between Joints F and E have vertical and horizontal cracking with adjacent mc up to full height x up to 1/32" W (10%).	
East		F/E	Railing	Median rail with 8 LF of rust staining.	
East		H/I	Railing	Spall 5' L x 1' H on south side of south rail over railroad.	
East	11		Railing	Parapets have vertical and horizontal cracking with adjacent map cracking up to full height x up to 1/32" W (10%).	
West	All		Railing	Throughout parapet, multiple vertical cracks up to full height x 1/32" W (10%). Horizontal cracking at the top of the parapets typical (10% South, 5% North).	
West		H	Railing	16" H x 6" W x up to 1" D spall on north parapet.	
West		E/F	Railing	Between Joints E and F, there is a 3.5' L x up to FW x up to 1-1/2" D spall on top of the north parapet.	
East	All	All	Joints	Throughout joints: debris impaction (50%), corrosion with section loss (15%).	
East	11	I	Joints	Debris impaction (10LF), corrosion with section loss up to 3/16" (7LF).	
East		H	Joints	Debris impaction (18 LF).	
East		G	Joints	Debris impaction (22 LF).	
East		F	Joints	Debris impaction (24 LF), corrosion with section loss up to 1/8" D (21LF).	
East		E	Joints	Debris impaction (13 LF), corrosion with section loss up to 3/16" D (15 LF), depressed up to 1" H x FL.	
East		D	Joints	Debris impaction (17 LF).	
East		C	Joints	Debris impaction (FL).	
West	All	All	Joints	Throughout joints: debris impaction (50%), corrosion with section loss (15%).	
West	11	I	Joints	Debris impaction (20 LF), corrosion with section loss up to 3/16" D (7 LF).	
West		H	Joints	Debris impaction (15 LF), corrosion with section loss up to 1/8" D (18 LF). 1/4" vertical offset between joint edges, East is higher.	
West		G	Joints	Debris impaction (FL).	
West		F	Joints	Debris impaction (36 LF), corrosion with section loss up to 1/8" D (12 LF). Joint is depressed up to 1" H (24 LF).	
West		E	Joints	Debris impaction (18 LF).	
West		D	Joints	Debris impaction (FL).	
West		E/F	Lighting	Attached lighting between Joints E and F, missing conduit cover.	
East		E	Deck	2 small spalls are developing between Bent 7/Joint E and Bent 9, south exterior	

Table 4: Unit 4 Deck Deficiencies					
Travel Direction	Span	Bent / Joint	Component	Note	Photo
East	All		Railing	Throughout parapets, multiple horizontal, vertical and map cracking to FH x 1/32" W (10%). Parapets have many sound areas of patching.	
West	All	C to B	Joints	Throughout joints from Joint C to Joint B, debris impaction (50%), corrosion with section loss up to 1/8" D (15%).	
East	All	C to B	Joints	Throughout joints from Joint C to Joint B, debris impaction (60%), corrosion with section loss up to 1/8" D (20%).	
West	North Ramp		Railing	Spalling 1' L x 3' W x up to 3" D, patched with bituminous material.	
West	A	14	Joints	West Lakeside Avenue exit ramp: At Joint C, the west wall for filled ramp has a 1/16" W x Full Height vertical crack at centerline.	
East	A		Railing	North Parapet of South ramp 40' from Joint C, spall/delamination 4' x FW x up to 5" D.	
West	B	18/19	Deck	6" W x 3" L corrosion hole in deck pan above diaphragm above floorbeam cantilever South of North exterior girder.	
West	C	B6	Joints	Debris impaction (7 LF), corrosion with section loss (5 LF).	
West	C	B5	Joints	Debris impaction (12 LF).	
West	C		Railing	8" W x 11" H x 3/4" D spall near Joint B6 on north parapet.	
East	C		Deck	2' L x 6" H x 2" D spall with adjacent delam, south exterior face.	
West	D	B4	Joints	Debris impaction (FL), corrosion with section loss (6 LF).	
West	D		Deck	8' L x 2' H x 2" D sealed spall with exposed reinforcing, north exterior face.	
East	D		Deck	3' L x 1' H x 2" D spall, south exterior face.	
West	E		Railing	6' L x 2' H x 5" D spall with exposed rebar and utility chase on the North parapet, exterior face.	
East	E/F		Deck	Numerous deck edge spalls removed by ODOT 3-21, south exterior face.	
West	E		Railing	1.5' W x 6" L x 2" D spall at south end of 3' L crack emanating from curb inlet.	
West	E		Lighting	Light pole is missing cover plate.	
West	F	B3	Joints	Debris impaction (16 LF).	
West	G	B2	Joints	Debris impaction (FL), corrosion with section loss (8 LF).	
West	G		Railing	Near Joint B2, north parapet light pole is missing its SE anchor bolt cover.	
West	H		Wearing Surface	South lane; 8' L x 8' W area of 1" D spalling with staining.	
West	H	B1	Joints	Debris impaction (FL), corrosion with section loss (6 LF).	
West	H		Lighting	Light pole is missing its SE anchor bolt cover.	
East	H		Deck	1.5' x 1.5' x 6" D spall on the underside of the south overhang.	

Table 5: Unit 5 Deck Deficiencies					
Travel Direction	Pier / Section	Joint	Component	Note	Photo
East	Approach	East	Wearing Surface	Throughout approach, multiple spalls, potholes and patched areas up to 5' L x 3' W x 1" D.	
West	40		Wearing Surface	Minor wear in wheel paths.	
West	41		Wearing Surface	Minor wear in wheel paths.	
West	Approach	East	Wearing Surface	24" W x 4" L bituminous patch in the centerline of the south lane at the asphalt plug joint on the east end of the slab. Throughout approach, multiple spalls, potholes and patched areas.	
Both	All		Railing	Throughout parapets, multiple horizontal, vertical and map cracking to full height x 1/32" D (10%).	
East	Approach	East	Railing	Along length of the South parapet, multiple spalls up to 8" x FW x 6" D.	
East	39		Railing	4' L x 2' H x 2" D spall/delamination on the south parapet, exterior face.	
East	40/41		Railing	8' L x 2' H x 2" D spall/delamination on the south parapet, exterior face.	
East	40/41		Railing	8' L x 2' H x 3" D spall with exposed rebar on the south parapet, exterior face.	
West	38/39		Railing	On top of North parapet, FW x 1' L x 2" D spall.	
West	40/41		Railing	20' east of Pier 40, 5' L x 16" H area of delaminations with small spalls along south parapet.	
West	Approach	East	Railing	Map cracking covers full length of interior north face of south parapet with some small delaminations/spalls. North curb height varies 1-2" above the roadway. Minor vegetation sporadically along curb line.	
East	All	All	Joints	Joint B and Joint A, debris impaction (65%), corrosion with section loss up to 1/8" D (40%)	
West	All	All	Joints	Joint B and Joint A, debris impaction (60%), corrosion with section loss up to 1/8" D (40%)	
East	Abutment	A	Joints	Debris impaction (10 LF), corrosion with section loss (8 LF).	
East	37	B	Joints	Debris impaction (FL), corrosion with section loss (14 LF).	
West	Approach	East	Joints	Asphaltic plug joint between east approach roadway and slab. 2" W gaps between the east and west edges of the joint.	
West	Abutment	A	Joints	Debris impaction (FL), corrosion with section loss (10 LF).	
West	37	B	Joints	South parapet armor, laminating corrosion, but functioning. Joint/deck armor is fair with areas of 1/8" D pitting on the sides. North end of parapet, armor has laminating corrosion. The top plate appears to be bent upward possibly during cold/contracted conditions. Minor roadway debris within joint but appears to move freely. 12 LF of corrosion with section loss up to 1/8" D.	
East	38		Lighting	East of Pier 38, light pole has a taped on cover plate.	
East	40/A		Lighting	Light pole base is missing NW anchor bolt cover.	

TABLE 6: DRAINAGE DEFICIENCIES					
Unit	Span	Travel Direction	Component	Comment	Photo
Entire Bridge - Both Directions			Deck	Throughout all deck drains, partially filled with debris and sediment.	
1	B'	N/A	Catch Basin	All catch basins in this section are fully clogged with debris.	
1	J'	N/A	Catch Basin	All catch basins in this section are fully clogged with debris.	
1	M	N/A	Catch Basin	Basin near column 13 is fully clogged.	
1	P	West	Deck	Both outside shoulder scuppers are completely clogged with debris.	
2	1	N/A	Catch Basin	Pier 0, the north catch basin drain is fully clogged and buried. The south drain is fully clogged.	
2	2	West	Deck	West of Relief Joint 2H, both scuppers are completely clogged with debris.	
2	2	East	Deck	Just west of Relief Joint 2H, both scuppers are completely clogged with debris and grass.	
2	2	N/A	Downspout	PP6 downspout is clogged/disconnected near U6, allowing drainage directly on to the bottom chord.	
2	2	N/A	Catch Basin	Pier 1, the south catch basin drain is fully clogged and buried.	
2	6	East	Deck	Near Joint L, both scuppers are completely clogged with debris.	
2	6	N/A	Downspout	The bottom angle piece of the scupper is missing.	
2	9	N/A	Downspout	Drainage downspout on north overhang is disconnected over the Cuyahoga River.	
2	10	N/A	Catch Basin	The Pier 10 south basin drain is fully clogged.	
3	11	N/A	Catch Basin	South column, basin clogged and filled with water.	
3	Near Jt. C	East	Deck	Deck drains at right parapet near Joint C, 2/3 of the drains are 100% clogged.	
3	North Chamber	N/A	Catch Basin	Basin along north wall is blocked, causing drainage and debris to backup and flow through vault.	
3	South Chamber	N/A	Catch Basin	Drainage pipe along south wall is exposed. Catch basin is partially blocked and heavily spalled.	
4	A	N/A	Catch Basin	Fully clogged with debris, concrete edges of basin are heavily spalling and displaced.	
4	A/B	N/A	Catch Basin	Fully clogged with spalling with exposed reinforcing.	
4	B/C	N/A	Catch Basin	Clogged with debris.	
4	C	N/A	Catch Basin	Clogged with debris.	

TABLE 6: DRAINAGE DEFICIENCIES

Unit	Span	Travel Direction	Component	Comment	Photo
4	C	West	Deck	East of joint B6, both north shoulder scuppers are fully clogged with dirt and debris.	
4	C/D	N/A	Catch Basin	Fully clogged with debris, with spalling.	
4	E	N/A	Catch Basin	Partially clogged with debris	
4	E/F	N/A	Catch Basin	Partially clogged with debris	
4	G	N/A	Catch Basin	Partially clogged with debris	
4	H	N/A	Catch Basin	Partially clogged with debris	
5	37	N/A	Downspout / Catch Basin	2 of 2 downspouts are clogged (also catch basins).	
5	39	N/A	Downspout	Between FB 31-32, typical signs of leakage between sections of pipe at the gaskets. Typical for all downspouts.	
5	39/40	West	Deck	Both inlets are fully clogged with debris along North curb near Pier 39.	

Table 7: Unit I Superstructure Deficiencies

Section	Frame	Floorbeam	Girder	Note	Photo
D				Joint Q is leaking for full length.	
D				Joint Q1 is leaking for 8 LF.	
J'		17		At Floorbeam 17, North End, there is exposed rebar due to poor consolidation with surface corrosion and no section loss.	
K		0		1/4" painted over pitting on the bottom flange and bottom half of the web.	
K		at FB0	South	1/8" painted over pitting on the bottom flange and lower 6" of the web. There is a 2" W x 1" H corrosion hole in the SW bearing stiffener.	
K/M				1/8" D pitting on girder ends at Frame 1 below Joint S.	
L'		Jt R		There is 1/8" D painted over pitting on the end of the girders and columns.	
M				Steel components in Span M have been cleaned and painted. Overall good condition with isolated areas of pitting up to 1/16" D at stringer to floorbeam connections and at the base of the support columns.	
M		1	North	Opening in wall for girder pass thru is rough cut with exposed rebar and stirrups along all edges.	
M		2		The previously noted 4" L vertical crack in south exterior stringer to floorbeam cantilever west connection angles at top was not found.	
M		3		32" L x 12" H area of advanced section loss at the south end of Floorbeam 3, west face. Nominal thickness is 13/16" T, thinnest remaining section is 0.40" T.	
M			North	Typical painted over 1/8" T pack rust between girder top flange cover plates at the transverse ends.	
M		2	North	1/8" pack rust between girder top flange and tie plate for floorbeam.	
M		3	North	1/2" T painted over pack rust between girder top flange and floorbeam tie plate.	
M		4	North	1/8" pack rust between girder top flange and tie plate for floorbeam.	
M		7	North	3/16" T pack rust between girder top flange and tie plate for floorbeam.	
N			North	Not fully engaged bolt between girder web and top flange connection angle, also to north face cantilever connection angle.	
N	5		Center	Sheared bolt at end of top flange due to pack rust.	
N		All	North	Knee braces have a 12" L x 3" W cutouts.	
N		1	North and Center	Between the north and center girders, there is up to 1/8" D painted over section loss on the web and flanges in a 9' L section.	
N		4	Center	West of the center girder, there are 2 bent areas in the knee brace flange.	
N		8	North	1/16" D painted over pitting on east end of girder near bearing.	
N		5	South	East bearing all anchor bolt nuts are missing.	

Table 7: Unit I Superstructure Deficiencies

Section	Frame	Floorbeam	Girder	Note	Photo
N		5	South	Pack rust between girder top flange and floorbeam to cantilever tie plate up to 3/4" thick.	
P		West of 1	14	3' x 4' delamination, south face	
P		West of 1	15	3' x 6' delamination	
P		1 to 2	14	Girder; South face of girder 14 at floorbeam 2 has 3' L x 2' H delamination with cracks (3LF).	
P		1 to 2	4	At Floorbeam 2, there is an area of delamination 2' L x 1.5' W.	
P		1 to 2	2	Girder; South face of girder at FB 2 has a 3' diameter delamination (2LF).	
P		2		Floorbeam; West face of floorbeam 2 in middle section has numerous hairline cracks and an isolated 2' x 2' delamination between girder 11 and 12 (2LF).	
P		3	13-14	West face, delamination 12" H x 3" W	

Table 8: Unit III Superstructure Deficiencies

Span	Bent/ Truss	Column/ Member	Note	Photo
Frame and Braced Column	11/12		Chipped paint on the bottom flange of Stringer 1 between Bent 11 and 12 over West 9th Street lane indicates vehicular impact. There are slight bends from impacts and heat straightening.	
Frame and Braced Column	14	South Center Column	Up to 1/8" D painted over section loss in webs and flanges, knife edging, and a small perforation on the East side of the transverse stiffeners.	

Table 9: Unit IV Superstructure Deficiencies

Section	Bent	Item	Note	Photo
A	14		North girder; Painted over 1/2" Diameter corrosion hole and adjacent pitting in web of column at masonry plate.	
B		Girder	North girder; 11.5" L x 10" H cutout 15" west of column 15.	
B	17	Pin & Hanger	Painted over pack rust between built up flange components. Up to 1/8" D pitting on bottom flange angle.	
B	17	Stringer	2nd stringer from south has abrasion dust.	
B	Joint B7	Girder	North girder; 11.5" L x 10" H cutout 30" east of Joint B7.	
B	18/19	Floorbeam	Typical 1/16" D painted over pitting on bottom of web and bottom flange.	
B	19/20		Abandoned welded attachments to south face of North girder between Bents 19 & 20.	
B	20	Pin & Hanger	North girder: Painted over pack rust between built up flange components. Up to 1/8" D pitting on bottom flange angle.	
C		Girder	North girder over Lakeside Ramp, there is 1" T painted over pack rust between the bottom flange plates.	
C	20	North Floorbeam cantilever	Sheared bolt head at North stringer connection angle to East face of floorbeam cantilever.	
C/D	23	Pin & Hanger	Typical pin-hanger East of bent, North girder. Edges have been caulked, but new movement is evident.	
D	23	Stringer	1st interior stringer from the south has abrasion dust.	
E	26	Girder	North girder; bottom flange angle on north side is bent at the Joint B4. Pin nuts show evidence of movement.	
F	29	Floorbeam	1/16" painted over pitting on bottom flange and lower 6" of the web.	
F	32	Floorbeam	1/8" painted over section loss on the bottom flange and lower 6" of the web (most of length).	
G	35	North Cantilever	East bottom flange is bent 12" L x 1" H.	
G	36	South Cantilever	Cantilever west bottom flange is bent 18" L x 1" H.	

Table 10: Unit V Superstructure Deficiencies

Section	Girder	Face	Note	Photo
All Spans	All	All	Girder webs have up to 1/16" D painted over pitting.	
All Spans	All	All	Typical up to 1/16" D pitting on all girders that extends up to the full height of the web.	
All Spans	All	All	All floorbeams have painted over pitting up to 1/16" D.	
All Spans	All	All	Lateral bracing: Up to 1" T pack rust between the vertical legs, worst near the piers.	
38	North / Center		Abandoned catwalk at FB20 with up to 100% section loss and holes that are cleaned and painted.	
38	South	North	Between FBs 26-33, up to 1/2" T painted over pack rust between bottom flange cover plates.	
38	South	North	Previously noted corrosion hole in the web has been repaired with a steel plate retrofit between FBs 28/29.	
38	Center	North	Painted over pitting up to 1/4" D x 24" H in web and 1/4" D x FW in top of the bottom flange above bearing at Pier 38, FB30. 4 rivet heads have popped off and been painted over on bottom flange and 4 web rivet heads and 2 bottom flange rivet heads have up to 90% section loss and are painted over. Several rivets have been replaced with high strength bolts. At this location, bottom secondary connection plate has 18" L x 6" W area of 100% section loss.	
38	Center		Abrasion rust along the middle bearing.	
38	North	Both	Between 1/8" to 3/16" D painted over pitting to the Pier 38 bearing.	
38	Center / South		The lower lateral bracing gusset plate has advanced painted over section loss, up to 3/4", including knife-edging, perforations and 30% rivet head loss. The lateral brace from Center Girder to South Girder has advanced 5/16" D painted over section loss in the web and bottom flange with up to 1/2" perforations.	
39	North / Center		Between FB 31-32, typical signs of leakage between sections of pipe at the gaskets. Typical for all downspouts.	
39	Center / South	South	Typical cleaned and painted section loss with up to 100% section loss at abandoned catwalk channel at connection to south face of the center girder	
39	Center	Both	3/16" D painted over pitting between Floorbeams 40 and 41, and also between Floorbeams 62 and 63. Transverse catwalk extension at these locations removed due to excessive section loss in supports. Longitudinal catwalk is in good condition. Abandoned catwalk supports have widespread 1/8" D pitting with knife edging and isolated sections of 100% section loss to angle legs.	
39	Center	North	Between FB 51-61, up to 1/2" T painted over pack rust between the two bottom flange cover plates.	

Table 10: Unit V Superstructure Deficiencies

Section	Girder	Face	Note	Photo
39	Center	North	At FB 63, typical 1/16" D pitting with isolated areas up to 3/16".	
39	Center	North	Painted over pitting up to 1/4" D by 30* N in the bottom of the web and vertical leg of bottom flange from floorbeams and in vertical stiffener to floorbeam.	
39	Center	Both	Rocker bearing at Pier 39 has typical 3/16" D, up to 3/8" D painted over pitting.	
39	Center		Between FBs 73-80, up to 1/2" T painted over pitting between bottom flange cover plates.	
39	North / Center		One plug weld in FB 76 bottom flange over catwalk.	
40	North / Center		Typical 1/8" D painted over pitting along bearing.	
40	North / Center		Three corrosion holes (up to 1-1/2" L x 1/2" H) in lower strut between girders near north girder support. The lower lateral brace east of Pier 39 has up to 3/16" D section loss in the web and rivet heads near the top flange. Lower strut impact dent (3/4" up over 6" L) in bottom flange near midspan.	
40	North	South	At the second portal brace east of Pier 39, there is up to 3/16" D painted over web loss and rivet head loss in the lateral bracing connection angle near the top flange at the lower lateral brace.	
40	North	South	25% section loss in 4 rivet heads in south bottom flange at FB 77.	
40	North	South	1/8" D undercutting in south face of the web at the plate base weld.	
40	North		Two plug welds in stiffener outstanding leg below FB83.	
40	Center		12-1/2" W x 10" H rectangular hole and two open holes in web between FB 83-84 with isolated 1/16" painted over pitting around. (South girder similar).	
40	North		Errant weld material in south web below the Floorbeam 92 connection (similar at FB 87 and 88).	
40	Center		12-1/2" W x 10" H rectangular hole and two open holes in web between FB 101-102 with isolated 1/16" painted over pitting around. (South girder similar). Two plug welds in bottom flange of FB101.	
40/41	South		Arrested pack rust up to 1-5/8" T at the bottom flange plate (worst on east side of pier 40).	
40/41	Center	North	Up to 1/4" T pack rust between bottom flange built up plates near Pier 40. This has been cleaned and sealed. Painted over section loss (1/8" D) at the floorbeam connection to the Center girder.	
41	Center		Flame cut hole for scupper downspout in South girder web past Pier 40.	
41	Center	North	Isolated 1/8" painted over pitting on north face of web around FB 115.	

Table 10: Unit V Superstructure Deficiencies

Section	Girder	Face	Note	Photo
41	South	North	Isolated painted over pitting 1/8" between FB 115-116.	
41	Center		12-1/2" W x 10" H rectangular hole and two open holes in web between FB 118-119 with isolated 1/16" painted over pitting around. (South girder similar).	
41	South		Replaced rivets with bolts in south girder bottom flange over eastbound on ramp. Minor gouges in edges and underside of bottom flange with no significant distress noted.	
41	North	North	Up to 1" Painted over pack rust between the bottom flange plates east of Pier 40.	
41	All Bearings		All rocker bearings at the East Abutment are at or near full expansion. North 4.0 degrees, Mid 7.7 degrees, South 7.4 degrees. All rotated east. (2021 Measurement conditions: 79 *F and sunny)	

Table 11: Unit II Main Truss Bearing Deficiencies				
Span	Pier	Truss	Comment	Photo
1	0	North	No Significant Deficiencies.	
1	0	South	No Significant Deficiencies.	
2	1	North	Bearing is full of water. Active corrosion with section loss up to 1/4" on steel plates surrounding bearing.	
2	1	South	Laminating corrosion of steel side plates for bearing.	
2	2	North	No Significant Deficiencies.	
2	2	South	No Significant Deficiencies.	
4	3	North	There are signs of water accumulation. There is heavy laminar corrosion and pack rust between the bearing edge plates separating the edge plates up to 1.5".	
4	3	South	Bearing area full of water.	
4	4	North	L12 fixed bearing exhibits painted over pitting up to 1/4" D on the masonry plate and 1/8" D on other bearing components. Bleeding rust is dripping down below pinned connections. Anchor bolt nuts have laminar corrosion and up to 20% section loss.	
4	4	South	The bearing assembly anchor bolts nuts exhibit up to 25% section loss.	
6	5	North	No Significant Deficiencies.	
6	5	South	The bearing assembly has moderate surface corrosion along the rocker containment plates. It also appears to be full of debris.	
6	6	North	Bearing is full of water. 50% section loss to anchor bolts.	
6	6	South	No Significant Deficiencies.	
8	7	North	There is heavy laminar corrosion / pack rust between the bearing edge plates separating the edge plates up to 1.25". North side of the bearing is ponding water between the stiffeners. SW anchor bolt has up to 100% section loss.	
8	7	South	No Significant Deficiencies.	
8	8	South	Anchor bolts exhibit up to 50% section loss.	
10	9	North	Anchor bolt nuts exhibit up to 25% painted over section loss with some active corrosion.	
10	9	South	Anchor bolt nuts exhibit 50% section loss with some active corrosion.	
10	10	North	1/8" painted over section loss on the bearing and pin. Reactivating in some areas.	
10	10	South	1/8" painted over section loss on the bearing and pin. Reactivating in some areas.	
10			Typical stringer bearings (sliding plate) on east face of Floorbeam 0, evidence of movement. Surface corrosion is present.	
11	10	North	2 of 3 bolts are loose on the inboard sliding plate for the north truss at U0. Movement noted.	

Table 12: Unit II Floorbeam Cracks

Span	Truss Line	Floorbeam	Location	Comment	Crack Length	
					2020	2021
1	North	FB 0	OB West Face	Horizontal Crack in Web at Top Flange		3 1/4"
1	South	FB 6	OB East Face	Horizontal Crack in Web at Top Flange		3 1/8"
1	South	FB 7	OB West Face	Horizontal Crack in Web at Top Flange	2 7/8"	3 3/8"
			OB East Face	Horizontal Crack in Web at Top Flange	4 1/2"	4 7/8"
2	North	FB 0	OB East Face	Horizontal Crack in Web at Top Flange		3"
4	North	FB 14	OB West Face	Horizontal Crack in Web at Top Flange		1-1/4"
6	North	FB0	IB East Face	Horizontal Crack in Web at Top Flange	2"	1 1/2"
			OB East Face	Horizontal Crack in Web at Top Flange	2 1/8"	2 3/4"
6	North	FB 17	OB West Face	Horizontal Crack in Web at Top Flange		2-3/8"
6	South	FB 0	OB West Face	Horizontal Crack in Web at Top Flange	2 5/16"	2 5/16"
			OB East Face	Horizontal Crack in Web at Top Flange	4 1/2"	4 1/2"
			IB West Face	Horizontal Crack in Web at Top Flange	2"	2"
			IB East Face	Horizontal Crack in Web at Top Flange	2 1/4"	2 1/4"
8	North	FB 0	OB East Face	Horizontal Crack in Web at Top Flange		3 1/4"
			IB West Face	Horizontal Crack in Web at Top Flange		1 5/8"
			IB East Face	Horizontal Crack in Web at Top Flange		2 1/8"
8	North	FB 25	North Cantilever	6 crack arrest holes and multiple arrested cracks present at the Stringer 6 bracket.		
10	South	FB 22	OB West Face	Horizontal Crack in Web at Top Flange	3 1/4"	3 3/4"
			OB East Face	Horizontal Crack in Web at Top Flange	6"	7 1/4"
			IB West Face	Horizontal Crack in Web at Top Flange	4"	4"
			IB East Face	Horizontal Crack in Web at Top Flange	6 1/2"	7"

Table 13: Unit I Substructure Deficiencies					
Section	Inside / Outside	Face	Location	Note	Photo
SECTION B AND B'					
B	Inside	North		6' H x 6" W edge spall.	
B	Inside	South		6' H x 2' W spall with exposed reinforcing.	
B'	Inside	South	West of Column 0	Top has a 2' diameter delamination.	
B'	Inside			All drains in section are fully clogged.	
B'	Inside	Both	Between Columns 7 & 8	Full height x 1/16" W crack on N & S walls.	
B & B'	Outside	North		Multiple vertical cracks typically full height x 1/16" W but up to 1/8" W (30 LF).	
B	Outside	North	4 Sections W of Jt X, west end of section	12" x 6" x 1" D spall.	
B	Outside	North	5 Sections W of Joint X	12" x 8" x 1.5" D spall.	
B	Outside	South	At Joint X1	2' H x 6" W x 1' D spall with exposed and corroded rebar at the top of the joint.	
B	Outside	South	Joint between Sections 5 & 6 W of Jt X	2' H x 4" W incipient spall at top right section of wall. At mid height, 2' H x 3" W spall.	
B	Outside	South	Joint between Sections 6 & 7 W of Jt X	2' H x 4" W x 2-1/2" D spall at top of wall. 4' H x 6" W x 5" D spall at mid height.	
B	Outside	South	Joint b/w Sections 8 & 9 W of Jt X	2.5' H x 2" W x 4" D spall with exposed reinforcing.	
B'	Outside	North	at Joint X1	5' H x 8" W delamination.	
B'	Outside	North	W end of Section 2 W of Jt X	6' H x 1.5' W delamination.	
SECTION J AND J'					
J	Outside	North		Full height vertical cracks up to 1/16" W with efflorescence and some rust staining spaced 10' apart on average, with isolated diagonal cracks as well.	
J	Outside	North	Mask Wall	Concrete around second joint from Joint T2 is spalling out 1' W x 12' H.	
J	Outside	North	Mask Wall	At Joint T2 the west wall panel is leaning to the north approximately 2.5" more than the east panel (approximated at the top).	
J	Outside	South	Between Section 2 and 4	Full Height vertical cracks.	
J'	Outside	North	Mask Wall	At the first panel east of Joint T2, delamination at top of Wall 15 SF.	
J'	Outside	North	Mask Wall	First panel west of Joint T1 has 15 SF of delaminations.	
J'	Outside	North	Panel East of Joint T1	20 SF delamination near top.	
J'	Outside	North	Near Joint T	Spall on outside of Wall beneath bearing 1.5' L x 1.5' H with exposed rebar with minor section loss.	

Table 13: Unit I Substructure Deficiencies					
Section	Inside / Outside	Face	Location	Note	Photo
J'	Outside	South	Section 5	10 SF of spalls, some with exposed rebar with 30% section loss. 20 SF of delaminations. Full height hairline cracks.	
J'	Outside	South	Section 6	4 SF of spalls, some with exposed rebar. 26 SF delamination. Full height hairline cracks.	
J'	Outside	South	Section 7	5 SF of spalls, some with exposed rebar with 30% section loss. 20 SF of delaminations. Full height hairline cracks.	
J'	Outside	South	Section 8	10 SF of delaminations. Full height hairline cracks.	
J'	Inside		Catch Basins	Catch basins are typically clogged.	
J'	Inside	South	At Joint T2	Full height x 3' W x 4" D spall with exposed rebar.	
J'	Inside	Both	At Joint T2	Cracking with efflorescence of header. At north wall, edge spalling and minor delaminations.	
J'	Inside	East	Near Joint T2	Spall / Delamination in Wall 4' H x 2' W x 5" D.	
J'	Inside	Both	Near Joint T1	On south wall, 2' W x 11' H delamination centered at joint. On north wall, 2' W x 12' H delam/spall with exposed reinforcing. Signs of leakage and rusting through joint.	
J'	Inside		6 columns W of Jt T	6' H x 1' W delamination.	
J'	Inside	South	At Joint T	Full height x 3' W delamination.	
SECTION C					
C	Inside	West	West Wall	5' H x 2' W delamination. South end of west wall has a 2' x 2' delamination.	
C	Outside	North	Joint X	5' H x 16" W x up to 2" D spall / delamination with one vertical and four horizontal exposed rebar with up to 80% section loss.	
C	Outside	North	West Wall, Near Joint X	3' H x 16" W spall with exposed reinforcing.	
C			Columns 2 and 3 north and south	The anchor bolts have been cleaned and painted with 20% section loss with minor necking of the bolt between the column sleeve and base plate. This is typical of all 4 anchor bolts. The bottom base plate has up to 1/8" D painted over pitting throughout	
C	Inside	North	West Wall	4' W x 5' H delamination.	
C	Outside	South	East Wall	2' H x 1" W delamination.	
C	Outside	South		2' x 6" W delamination.	
SECTION K					
K	Outside	East	West Wall	Top of wall has a 4' diameter delamination at North and South ends.	
K	Both	Both	West Wall	West face and east face of west concrete wall have a full height x up to 6' W delamination below Girder 2.	
K	Outside	North	Top of West Wall under steel	2' diameter x 3" D spall with exposed rebar.	
K	Outside	West	East Concrete Wall along W 28th St.	Below Girder 2, there is an 8' H x 3" W delamination.	
SECTION M					
M	Inside		Pier Cap 12	3' x 1' spall with exposed reinforcing.	

Table 13: Unit I Substructure Deficiencies					
Section	Inside / Outside	Face	Location	Note	Photo
M	Inside		Column 13	Catch basin is clogged.	
M	Inside	South	Between Columns 18 and 19	3' H x 2' W spall with exposed reinforcing.	
M	Inside		South Wall, Between Columns 28 and 29	3' H x 2' W spall with exposed reinforcing.	
M	Outside		North Column by FB5 (Ramp Median)	1/8" painted over pitting on the base plate and stiffening angles. 25% section loss to the anchor bolts.	
M	Outside		2nd Panel West of Joint Q	5' H x 2' W delamination.	
M	Outside		3rd Panel West of Joint Q	3' H x 4' W delamination.	
M	Outside		4th Panel West of Joint Q	7' H x 2' W delamination. 3.5' H x 18" W x 4" D spall with exposed reinforcing.	
M	Outside		5th Panel West of Joint Q	3 SF small delaminations.	
M	Outside		6th Panel West of Joint Q	Three delaminations 6' H x 2' W, 4' H x 4' W, and 1' H x 6" W.	
M	Outside	South	South Wall	Typical up to 1/16" W cracks (20 LF total).	
M				The bottom base plate has up to 3/16" D painted over pitting. The west flange just above the vertical gusset plate has up to 3/16" D painted over pitting for 2" H.	
M	Inside	North	Between Joint S and R	Interior of concrete wall has full height x 8" H x 2" D spalling with exposed rebar. The stabilizing column at this location also has full height x 8" W x 8" D spalling with exposed rebar.	
M	Inside	North	West of Joint R	Spall 1.5' diameter x 1.5" D with exposed rebar and minor section loss.	
M	Inside	South	Joint Q6	2 spalls in the wall up to 4' H x 2' W x up to 4" D with exposed rebar.	
M	Inside	North	Joint Q6	Spall in wall 4' H x 6" W x 2" D, exposed rebar with minor section loss.	
M	Outside	South	2nd Panel East of Joint S	1' H x 1' W delamination near top.	
M	Outside	North	West of Joint R	4' W x 2' H delamination at top of wall.	
M	Outside	West	East Wall	2 spalls with exposed reinforcing at corner, 6' W x 6' H and 3' W x 2' H.	
SECTION D					
D	Both	North	Joint W	15" x 8" spall at top of the joint.	
D	Inside	East	West Wall, At Joint W	Scaling with secure aggregate over 25% of surface area.	

Table 13: Unit I Substructure Deficiencies					
Section	Inside / Outside	Face	Location	Note	Photo
D	Inside	East	West Wall, N Corner	6' H x up to 3' W x up to 2" D spall with exposed rebar with minor section loss.	
D	Inside	North	Between Columns 5 & 6	10' H x 4' W x up to 2" D spall with exposed rebar with minor section loss.	
D	Inside	South	Between Columns 18 & 19	6' H x 1' W x up to 2" D spall with exposed rebar with minor section loss. Also, a Full height x 1/16" W vertical crack.	
D	Inside		Typical	There are isolated instances of hairline cracking in the walls up to 1/32" W, some with minor moisture/rust staining.	
D	Inside		Typical	Some of the columns have spalling in the corners up to 1' diameter from machine impact.	
D	Inside		Typical	Concrete beams have isolated instances of scaling and minor spalls less than 6" diameter.	
D	Inside	South	Between Column 5 & 6	Up to 10' H x 4' W spall with exposed rebar in north. Southside, 4' H x 2' W delamination.	
D	Inside	Both	Joint Q4	At the south face, 4' H x Full Height delamination. At the North face, 14' H x 1' W spall with exposed reinforcing with minor section loss of rebar.	
D	Inside	South	Between Columns 15 and 16	8' H L x 2' W delamination with 4 SF spall with exposed reinforcing.	
D	Inside	Both	Q3	At the south face, 2' H x 2' W spall with exposed reinforcing. At the north face, 4' H x 2' W spall.	
D	Inside	North	Between Columns 25 and 26	4' H x 6" W x 6" D spall with exposed reinforcing.	
D	Inside	North	Q2	3' H x 2' W spall with exposed reinforcing.	
D	Inside	North	Between Columns 35 and 36	10' H x 1.5' W delamination.	
D	Inside	Both	Between Columns 45 and 46	At south face, 3' H x 6" W x 4" D spall. At north face, 2' H x 1' W spall with exposed reinforcing.	
D	Outside	North	Between Joints Q to Q4	Numerous full height vertical cracks up to 1/16" W. Numerous areas of delam measuring 6' x 4'/ Several spalls with exposed reinforcing.	
D	Outside	South	Section 1 (Starting from West 28th St.)	10 SF of delaminations.	
D	Outside	South	Section 2	10 SF of delaminations.	
D	Outside	South	Section 3	30 SF of delaminations. 2 SF spall 2" D.	
D	Outside	South	Section 4	10 SF of delaminations. 1 SF shallow spall.	
D	Outside	South	Section 5	15 SF of delaminations.	
D				North column has a 1'-10" H x 1' W x 3" D spall.	
SECTION N					
N	Inside		Wall West of 25th St	Spalling around garage door.	
N	Outside		South Wall	6' x 3' spall with exposed reinforcing on top of wall.	

Table 13: Unit I Substructure Deficiencies					
Section	Inside / Outside	Face	Location	Note	Photo
N	Inside	North	East of Joint Q	3' H x 10" W x up to 5" D spall with exposed rebar with minor section loss.	
N	Inside	North	East of Joint Q	4' H x 1.5' W x up to 4" D spall with exposed rebar with minor section loss. Adjacent to this spall is an area of delamination 8' W x 3.5' H.	
N	Both	North	East of Joint Q	Full height x 1/4" W vertical through crack.	
N	Inside	North	East of Joint Q	4' H x 1' W x 3" D spall with exposed reinforcement. Below this spall is an area of delamination 4' H x 1' W. (Between 2nd and 3rd columns)	
N	Inside	North	North girder at East end	Rocker bearing with no anchor bolts in masonry plate.	
N	Inside	South Wall North Face	Wall East of 25th St	1000 SF delaminations.	
N	Inside	East	Wall East of 25th St	100 SF delaminations. Numerous 1/16" vertical cracks.	
N	Outside	North	East Vault	3' H x 2' W delamination.	
N	Outside	North	East of Joint Q	1/8" W X FH vertical crack 20' east of Joint Q.	
N	Outside		Panel adjacent to Joint P	Multiple delaminations - 4' H x 4' W, 2'W x 1' H, and 1/8" W x Full Height crack with 2' W delaminations.	
N	Outside		2nd Panel West of Joint P	Multiple delaminations - 3' W x 6' H, 4' W x 1.5' H, 4' W x 2' H, 6' W x 2' H, 4' W x 6' H, 3' W x 2' H, 2' W x 2' H.	
SECTION P					
P		Under side	East End Pier Cap	Bottom face of cap has two delaminations, 5' x 3' and 4' x 2', near the middle of the cap with surrounding vertical cracks.	
P	Inside	North	S Wall, W end	Curtain walls at both north and south ends, multiple spalls and delaminations up to 6' L x up to 4' H x 5" D with exposed rebar with 10% section loss; several areas on curtain walls marked for repair.	
P	Inside		East Pier, South End	4' L delamination with rust staining.	
P	Inside		East Pier, North Column	8' H x 1' W delamination, 6 SF spall with exposed reinforcing.	
P	Inside	Both	East Curtain Walls	North wall, 40 SF delaminations and 5 SF spall with exposed reinforcing. South wall, 60 SF delaminations.	
P		East	3rd column from S, 2nd row of columns from W	The base of the column is delaminated around the north and east faces below the original ground level and is marked for repair.	

Table 14: Unit II Substructure Deficiencies

Span / Pier	Column	Face	Note	Photo
Typical Note			All columns have typical concrete patching with some map cracking and minor rust staining.	
Pier 0	North	SE	2' L x 4" H delamination/spall.	
Pier 0	South	North	2.5' L x 6" H delamination.	
Pier 2	South	West	2' x 2' delamination	
Pier 7	North	NE corner	6' W x 5' H x 1" D spall	

Table 15: Unit III Substructure Deficiencies

Span / Pier	Bent	Column	Note	Photo
Typical			Typical areas of painted over section loss up to 3/16" D were noted throughout the lower portions of the columns and along the lower bracing members. Areas of pack rust have been cleaned and caulked throughout.	
11		South	22" W x 6" H x 4" D spall on West face of concrete base above drain pipe catch basin connection. 4" W x 3" H x 1" D spall with vertical hairline cracks extending downward on East face of concrete base. Anchor bolt nuts with 20-40% section loss. Corrosion holes in the 2nd and 3rd north web plates up to 2" diameter.	
11		North	The interior faces of the column plates exhibit up to 1/8" D section loss along the lower 2.5'. The anchor bolts exhibit up to 25% section loss at the base. The exterior surface of the column has painted over section loss up to 1/8" D x full height.	
Frame & Braced Connection	1	North	The column has been cleaned and painted with typical painted over pitting up to 1/8" D. The anchor bolts exhibit up to 10% section loss with minor necking of the bolt between the column sleeve and base plate. This is typical of all 4 anchor bolts.	
Frame & Braced Connection	1	Center	Typical painted over pitting up to 1/8" D on all faces from Level 2 to the base. Isolated areas up to 3/16" D section loss noted at the bracing connections. The web stiffening angles located at the Level 1 bolted connection for the transverse strut truss exhibit up to 75% section loss with the upper angle having FL x FW section loss up to 100%. The bearing pedestal typically exhibits 2-3 full height 1/16" W cracks and one full width horizontal crack. The anchor bolts have up to 10% section loss between the vertical and the base plate with up to 25% section loss of the anchor bolt nuts.	

Table 15: Unit III Substructure Deficiencies

Span / Pier	Bent	Column	Note	Photo
Frame & Braced Connection	2	North	The bottom 3" H of the column and the base plate have typical painted over pitting up to 1/8" D. The anchor bolts have been cleaned and painted with 50% section loss with minor necking of the bolt between the column sleeve and base plate. This is typical of all 4 anchor bolts. The anchor bolt nuts on the north side have up to 20% painted over section loss. There is a Full Height x 1/16" W vertical crack at the southwest and southeast corners of the concrete pedestal. The east bottom batten plate of the column has a 1/2" diameter hole. The northeast corner of the pedestal has a 1'-9" H x 5" W x 1" D spall/delamination. The southeast corner at the bottom has a 6" H x 10" W x 2" D spall. The southwest corner has a 3" H x 5" W x 1" D spall at the top edge and a 3" H x 2" W x 1/2" D spall at the bottom.	
Frame & Braced Connection	2	Center	The base of the column exhibits painted over pitting of the base plate up to 1/8" D. There is a 2" H x 1" W corrosion hole in the west batten plate. The lower 4" of the web exhibits painted over pitting 1/8" with a corrosion hole 3" x 1"	
Frame & Braced Connection	3	North	The bottom 3" H of the column and the base plate have typical painted over pitting up to 1/8" D. The anchor bolts have been cleaned and painted with 35% section loss with minor necking of the bolt between the column sleeve and base plate. This is typical of all 4 anchor bolts. The anchor bolt nuts have up to 20% painted over section loss. The west bottom batten plate of the column has a 1/2" diameter hole.	
Frame & Braced Connection	3	Center	The base of the column has painted pitting of the base plate up to 1/8" D and painted over pitting on lower web at base full width x up to 3" H x up to 3/16" D pitting. The anchor bolts exhibit 10% section loss.	
Frame & Braced Connection	3	South	1/8" pitting on the masonry plate and lower column. The anchor bolts exhibit 10% section loss. There are two pinhole perforations on the east batten plate.	
Frame & Braced Connection	4	North	The base of the vertical has pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate. The lower web has a 3" x 3" corrosion hole. Column from Level 0 to Level 2 have painted over pitting up to 1/8" D on the inboard flange C-channel flanges. At Level 2 on the east inboard flange C-channel there is a 11/2" H x 1/2" L corrosion hole. Level 2 to Level 3 are in similar conditions. At Level 3 the inboard C-channel flange has a 6" H x 3/4" L corrosion hole.	

Table 15: Unit III Substructure Deficiencies

Span / Pier	Bent	Column	Note	Photo
Frame & Braced Connection	4	Center	The base of the vertical has painted pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate. The west edge of the concrete pedestal is spalled Full Length x 3" H x up to 1" D with up to 1/2" D void underneath the base plate. Column Level 0 to Level 3 has painted over pitting up to 1/16" to 1/8" D in isolated locations on the exterior webs. Exterior web channels on the north end of the member just above Level 2 has two corrosion holes 3/4" H x 3/8" L.	
Frame & Braced Connection	4	South	Painted over pitting from 1/16" D to 1/8" D on anchor bolt assemblies, and bottom of column. Up to 10% section loss to anchor bolts. Masonry plates with up to 1/4" D painted over pitting. South flanges exhibit knife edging with up to 1" diameter areas of 100% section loss above the masonry plate.	
Frame & Braced Connection	5	North	The base of the column exhibits pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate.	
Frame & Braced Connection	5	Center	The base of the column exhibits pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate.	
Frame & Braced Connection	6	North	7/16" D pitting in outboard flange at horizontal connection for longitudinal bracing to Bent 5 at Level 2. Original thickness 7/8". Up to 50% section loss.	
Frame & Braced Connection	6 to 7		Diagonal cross bracing between Bent 5 and 6. Utility pipe at cross bracing from Level 2, Bent 6 to Level 1 cross bracing is completely corroded with 100% section loss exposing electrical wires.	
Frame & Braced Connection	6 to 9	All	The base of the vertical exhibits pitting up to 1/16" D. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate.	
Frame & Braced Connection	7	North	The anchor bolts exhibit section loss, 25% on the two northernmost columns.	
Frame & Braced Connection	8 to 10	South	The base of the southernmost columns for towers 8 - 10 in the parking lot have a rocker bearing at the base that sits in a metal pan/base plate. Minor debris accumulation typical in pan with typical painted over pitting up to 1/16".	
Frame & Braced Connection	10	North Outside	4" H x 1" W corrosion hole in the stiffener.	
Frame & Braced Connection	10	South	2' x 4" x 4" delamination on north face with efflorescence.	

Table 15: Unit III Substructure Deficiencies				
Span / Pier	Bent	Column	Note	Photo
Frame & Braced Connection	10		The base of the column exhibits painted over pitting up to 1/8" D. The anchor bolts also exhibit painted over up to 10% section loss between the vertical collar and the base plate.	
Frame & Braced Connection	11		The base of the column exhibits painted over pitting up to 1/8" D. The anchor bolts also exhibit painted over up to 10% section loss between the vertical collar and the base plate.	
Frame & Braced Connection	12		The base of the column exhibits painted over pitting up to 1/8" D. The anchor bolts also exhibit painted over up to 10% section loss between the vertical collar and the base plate.	
Frame & Braced Connection	13	North	Spall with exposed reinforcing in NE corner of concrete column base 18" L x 7" W x 1" D.	
Frame & Braced Connection	South Chamber		South wall, north face has a full height x 3' W spall with exposed rebar. South wall, north face west side has a 6' H x 8' W spall with exposed rebar and a 30" H x 8" W x 5" D spall with exposed rebar. West wall, east face has a 10' H x 4' W spall with exposed rebar and a 5' W x 2' H delamination at the top.	
Frame & Braced Connection	South Chamber		North wall, south face is spalled over 10' W x full height area with exposed rebar with section loss.	
Frame & Braced Connection	North Chamber		South wall, north face, in the southeast corner of the North Ramp vault under Joint C has a Full Height x 44" W spall with exposed rebar and adjacent delaminations. Does not impact load bearing members.	
Frame & Braced Connection	13	4 Outside Columns	The base of the column exhibits painted over pitting up to 1/8" D. The anchor bolts also exhibit painted over up to 10% section loss between the vertical collar and the base plate.	
Frame & Braced Connection	14	inside columns	The base of the column exhibits painted over pitting up to 1/8" D. The anchor bolts also exhibit painted over up to 10% section loss between the vertical collar and the base plate.	
Frame & Braced Connection	North Chamber		North wall, inside face has a 2' diameter spall with exposed reinforcement, minor section loss. Adjacent delamination 2' x 8'.	
Frame & Braced Connection	North Chamber		Large area of spalling and delaminations 8' x 10' x up to 3" D.	
Frame & Braced Connection	13		Two 6' H x 2' W delaminations on north wall inside face.	
Frame & Braced Connection	North Chamber		18" x 18" spall with exposed reinforcing on south wall interior.	

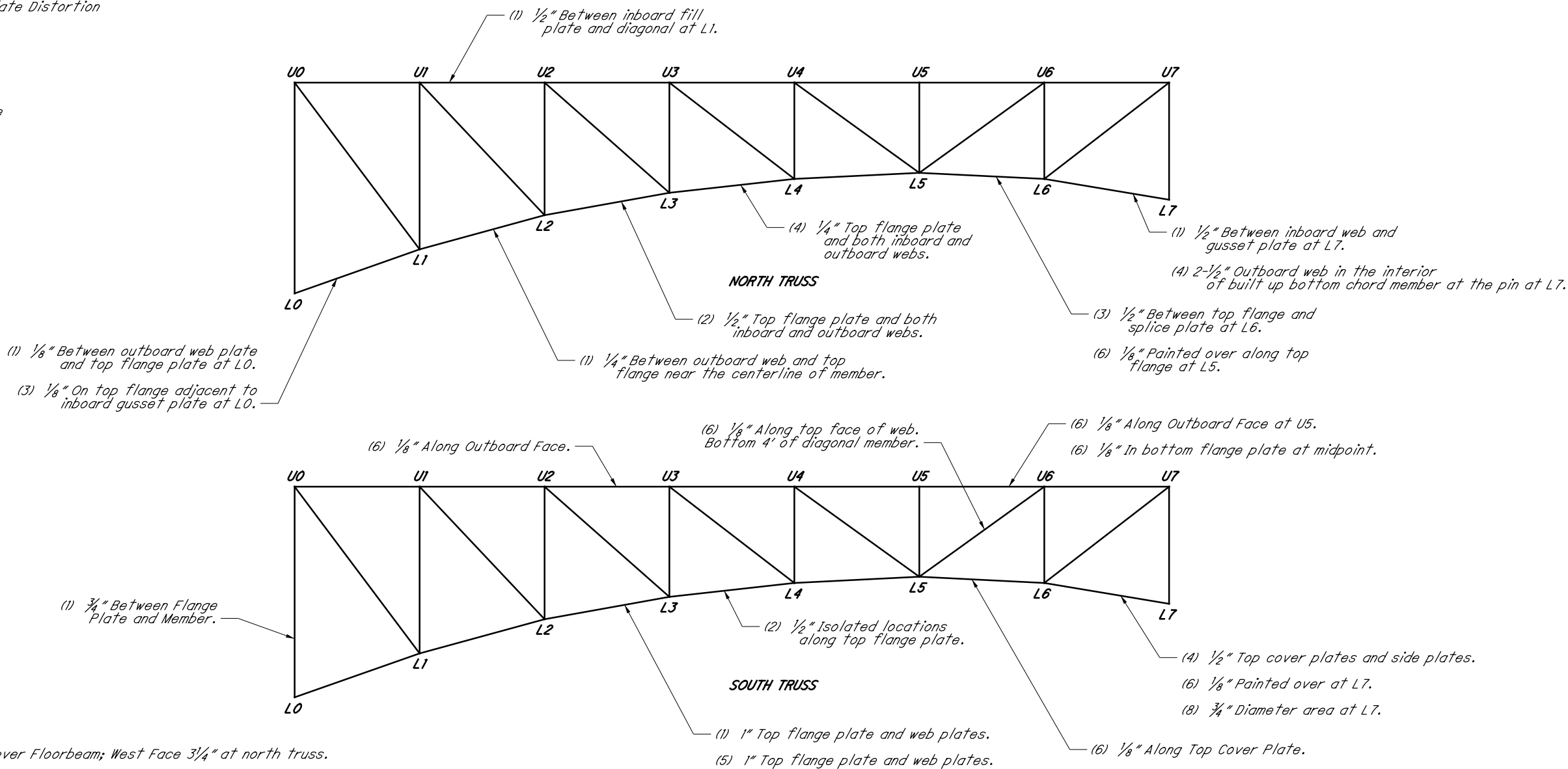
Table 16: Unit IV Substructure Deficiencies

Bent	Note	Photo
14	West Lakeside Ave. entrance ramp (North ramp): North wall has spall and delamination along joint.	
15	West Lakeside Ave entrance ramp, north face: Panel 1 at east end has a 2' H x 6" W x 6" D spall.	
15	West Lakeside Ave. exit ramp: North face of Panel 1/2 has a 1.5" H x 6" W spall.	
15	West Lakeside Ave. entrance ramp, south face: Panel 2 has a 1.5" L x 6" H spall with exposed reinforcements.	
16	West Lakeside Avenue entrance ramp: The east end at the top has two 1' diameter delaminations. The north face of the entrance ramp at panel 2/3 has a minor spall, delamination and rust staining.	
16	West Lakeside Ave. exit ramp, north face: Panel 3 has a 1' H x 6" W spall with exposed reinforcing.	
17	North column at base of web, painted over pitting up to 1/8" D with 2 pin hole perforations.	
17	West Lakeside Avenue entrance ramp: South wall, south face of Panel 3; the east end at the top has 8" L x 6' H x 1" D spall/delamination with one exposed corroded rebar.	
18	North column at base of web, painted over pitting up to 1/8" D with corrosion hole 2" x 1" with adjacent pin holes.	
	Lakefront entrance ramp South wingwall; delaminations and spalls with exposed reinforcement. Some patched areas, multiple areas of covered graffiti.	
	East Abutment/entrance ramp North wingwall; vertical cracking isolated to joint areas.	
	East Abutment/entrance ramp South wingwall. Vertical full height cracking with moisture leakage and efflorescence, spaced 10'-15' apart.	
24	The north column anchor bolts are short 3/8".	
25	South column anchor bolts are short 3/8," north column bolts short 1/2".	
26	South concrete has Full Height hairline cracking with rust stains extending from SE and SW anchor bolt.	
27	The north column has 1/8" pitting on the webs, with a 7" L x 1" H corrosion hole.	
28	Both column's anchor bolts are short 1/4".	
30	There is a 8' L x 4' W x 2' D sink hole near North column. The south column north face anchor bolts are short 1/2."	
31	The north column anchor bolts are short 3/4".	
32	The north column has a 3" L x 1" H corrosion hole, and 1/4" pitting on the north web. Pitting on the lower portion of the south column's web, up to 1/8" D.	
32	South column north face has bent anchor bolt stiffeners and the anchor bolts are short 1/4".	
34	North column anchor bolts have section loss up to 25% at the NW bolt. The south web of the north column has a Full W x 2" H corrosion hole, and the north web has two pinhole perforations.	

Table 17: Unit V Substructure Deficiencies			
Pier	Face	Note	Photo
37	E	Spalling and delamination with exposed rebar 32" W x 5' H x up to 5" D (typ. 1-3/4" D) along east face of bearing pedestal, South Girder.	
37	E	East face of the east backwall, south end, has 6' H x 18" W x 3" D spall with exposed reinforcing.	
37	E	East face of the pier wall has a 9' W x 8' H x 2-1/2" D spall/delamination with exposed corroded rebar between North and Middle Girders.	
37		Center girder pedestal, south face, has 54" L x 30" H x 3-1/2" D spall with exposed corroded rebar; north face has a 30" H x 24" W x 2-1/2" D delamination/spall with exposed rebar.	
37	W	3' L x 1/4" W crack along South edge of West Face of Pier wall (Non-structural)	
37	W	West face north end, cracking in patched and non-patched areas.	
37		North face middle bearing pedestal has 24" W x 30" H x 1.5" D delamination. South face middle bearing pedestal has 60" W x 30" H x 3" D delamination with spall.	
38	Btm.	Pitting and up to 1" diameter corrosion holes in the underside of the strut between the north and center columns at the center column.	
38	Top	Top of pier strut exhibits painted pitting up to 3/16" D. Up to 1/4" T pack rust between top plate and web plates.	
38		Center bearing and surrounding area has 1/4" D painted over pitting on the bearing with areas of 3/16" remaining.	
38	Btm.	Inside face of bottom flange plate has a 9" L x 4" W corrosion hole inside the member at the connection to the north column.	
39	Top	Top of pier strut between the north and center girders has painted over pitting up to 3/16" D near the old downspout connection and typical up to 1/4" T pack rust between top plate and web plates. Up to 1" T x 12" L painted over pack rust is present between the top plate and web plate at the north column. The top of the strut between the north and center girders has up to 1/4" T painted over pack rust between the web plate and channel.	
40	Top	Pier strut face plates and top face plates have up to 1-1/8" T pack rust with scalloping. Isolated active corrosion along connections to the pier strut.	
40		North pedestal has several 3/8" W vertical cracks and isolated spalls/delaminations throughout (up to 8" H x 6" W x 3" D). Two vertical cracks on the east face extend into the sidewalk, and a portion of the sidewalk has settled approx. 3/8" at this location.	
41	Back wall	31 LF of patches on the East Abutment stem (all patches are sound). Minor vertical cracking and staining. 30" H x 20" W x 2" D spall with exposed and corroded reinforcing.	

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate



Floorbeam Deficiencies:

- FB0, Crack in top of web of cantilever Floorbeam; West Face $3\frac{1}{4}$ " at north truss.
- FB6, Crack in top of web of cantilever Floorbeam; East Face $3\frac{1}{8}$ " at south truss.
- FB7, Crack in top of web of cantilever Floorbeam; West Face $3\frac{3}{8}$ " & East face $4\frac{1}{8}$ " at south truss.

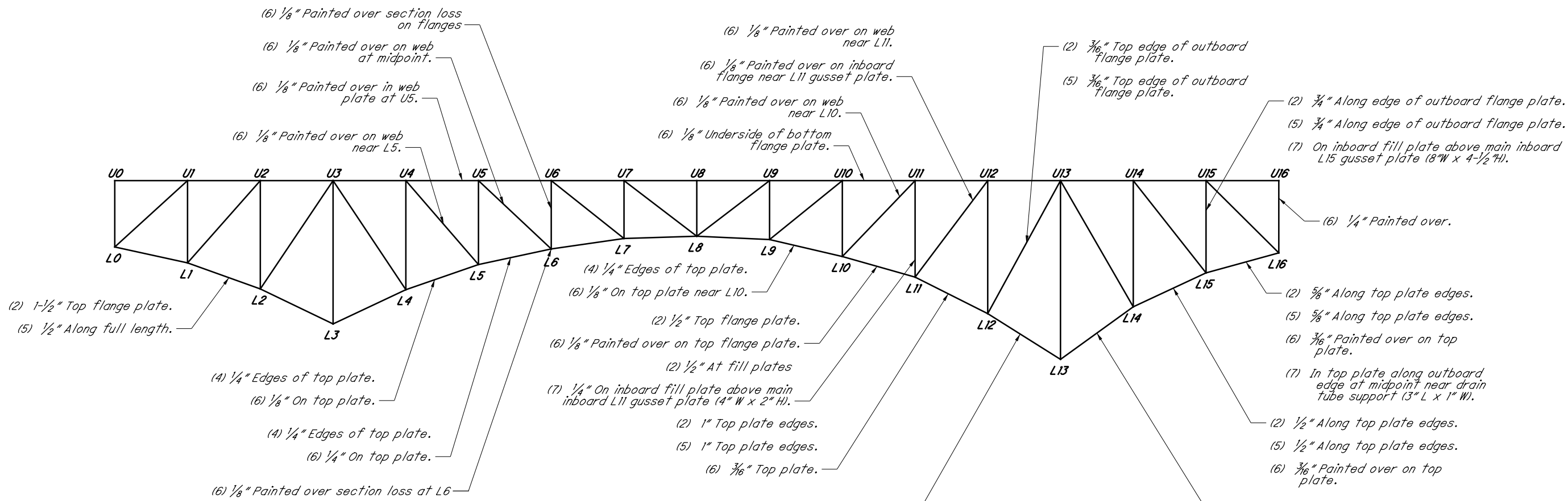
South Truss Gusset Plate Deficiencies:

- L0, Up to $\frac{3}{8}$ " gap due to pack rust between outboard gusset plate and lower chord at L7.
Inboard and outboard gusset plate at L7 has up to $\frac{3}{16}$ " painted over pitting on the interior faces.
The inboard and outboard gusset plate, exterior face has up to $\frac{1}{16}$ " pitting throughout and up to $\frac{1}{8}$ " around the pin.
- L2, Pack rust, $\frac{1}{2}$ " T at connection with L1L2 south web plate.
- L7, Lower lateral bracing horizontal gusset plate connection is heavily distorted along the edges due to pack rust and small areas of up to 100% painted over section loss.
Two broken bolts at angle connection to vertical gusset plate.
Up to $\frac{3}{8}$ " wide gap due to pack rust between outboard gusset plate and lower chord at L7.
Inboard and outboard gusset plate at L7 has up to $\frac{3}{16}$ " painted over pitting on the interior faces.
The inboard and outboard gusset plate, exterior face has up to $\frac{1}{16}$ " pitting throughout and up to $\frac{1}{8}$ " around the pin.
Pack rust, $\frac{1}{2}$ " between vertical gusset plates and web plates of L6L7.
Section Loss, $\frac{1}{8}$ " pitting on north face of north vertical plate, more noticeable at pin for vertical.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 1	FIG. II-1

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LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate

Floorbeam Deficiencies:

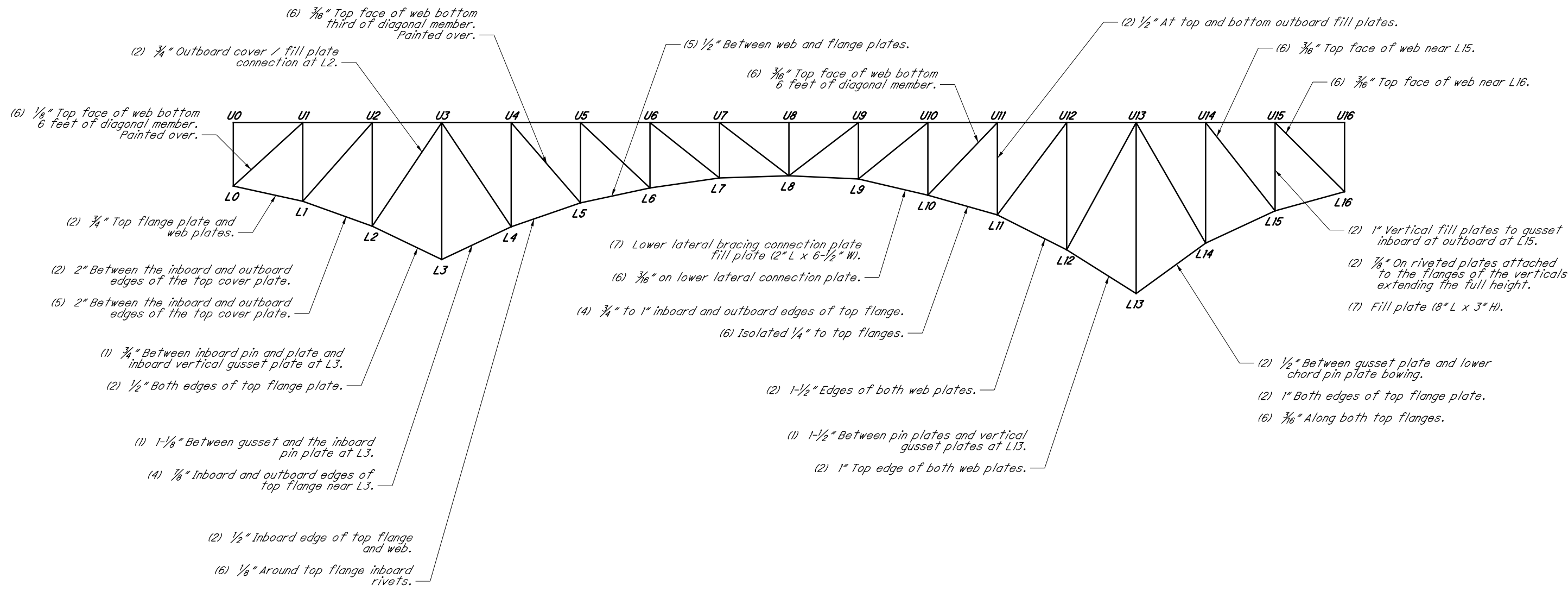
- FB0, Crack in top of web of cantilever Floorbeam; East Face 3" at north truss.
- FB6, 1/4" section loss to top and bottom flanges at midspan.

North Truss Gusset Plate Deficiencies:

- L0, Section loss, up to 3/16" pitting on both faces of both outboard and inboard gusset plates primarily around pins.
- L5, Up to 1/8" pitting painted over in south face of north gusset at L5.
- L6, Outboard gusset plate, 1/8" thick reactivated pack rust between gusset plate and fill plate on east side of L6 connection. 1/8" painted over section loss along lower chord both plates.
- L14, 1/8" painted over pitting on interior faces of both gusset plates just above the lower chord.
- U11, 1/4" painted over pitting on exterior face of exterior plate. Interior gusset has 3/16" painted over pitting.
- U13, 1/4" pitting north face north gusset inactive.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 2 NORTH	FIG. II-2N

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Drainage Deficiencies:

Panel Point 6, Downspout is clogged/disconnected, allowing drainage directly onto bottom chord.

Floorbeam Deficiencies:

FB6, 1/4" section loss to top and bottom flanges at midspan.

South Truss Gusset Plate Deficiencies:

- L0, Up to 3/8" gap due to pack rust between outboard gusset plate and lower chord at L7.
- Inboard and outboard gusset plate at L7 has up to 3/16" painted over pitting on the interior faces.
- The inboard and outboard gusset plate, exterior face has up to 1/16" pitting throughout and up to 1/8" around the pin.
- 3/8" pack rust between the outboard gusset plate and lower chord at L0 Span 2 and 1/8" pitting on both plates.
- L2, Section Loss, 1/8" pitting on both plates.
- L3, Section Loss, 1/8" pitting on both plates.
- L5, North gusset plate, south face 1/8" pitting throughout on east side of L5 connection.
- L14, North gusset, south face, up to 1/8" pitting typical at lower chord of south gusset, north face of north gusset.

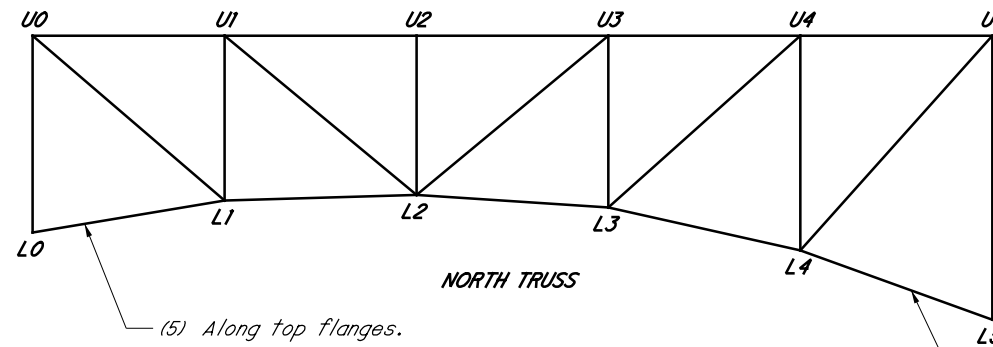
LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 2 SOUTH	FIG. II-2S

LEGEND

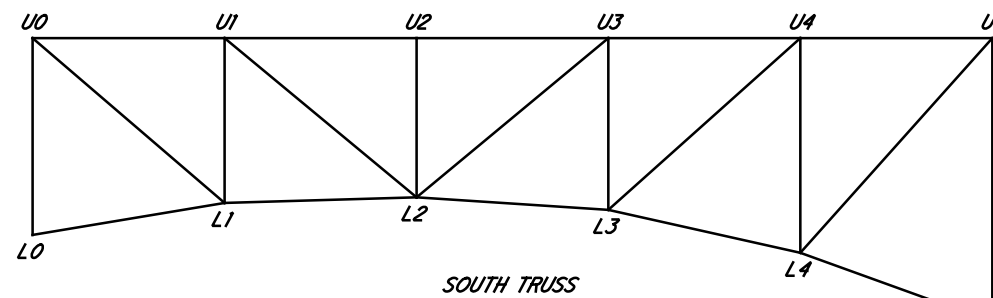
- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate



(5) Along top flanges.

(5) 1" Between the lower chord and the interior gusset at L0.

(6) 3/16" Along Top Plate. Painted Over.



(6) 1/4" Painted over along 50% of the top flange.

South Truss Gusset Plate Deficiencies:

- L0, Caulked over pack rust between gusset plates, lower chord, and vertical.
- 1/8" D pitting around pin nut with 1/2" reactivated pack rust between the bottom of the pin plate and inboard and outboard gusset plates.
- Inboard gusset plate has active corrosion and 1/2" pack rust between vertical member connection plate and gusset plate.

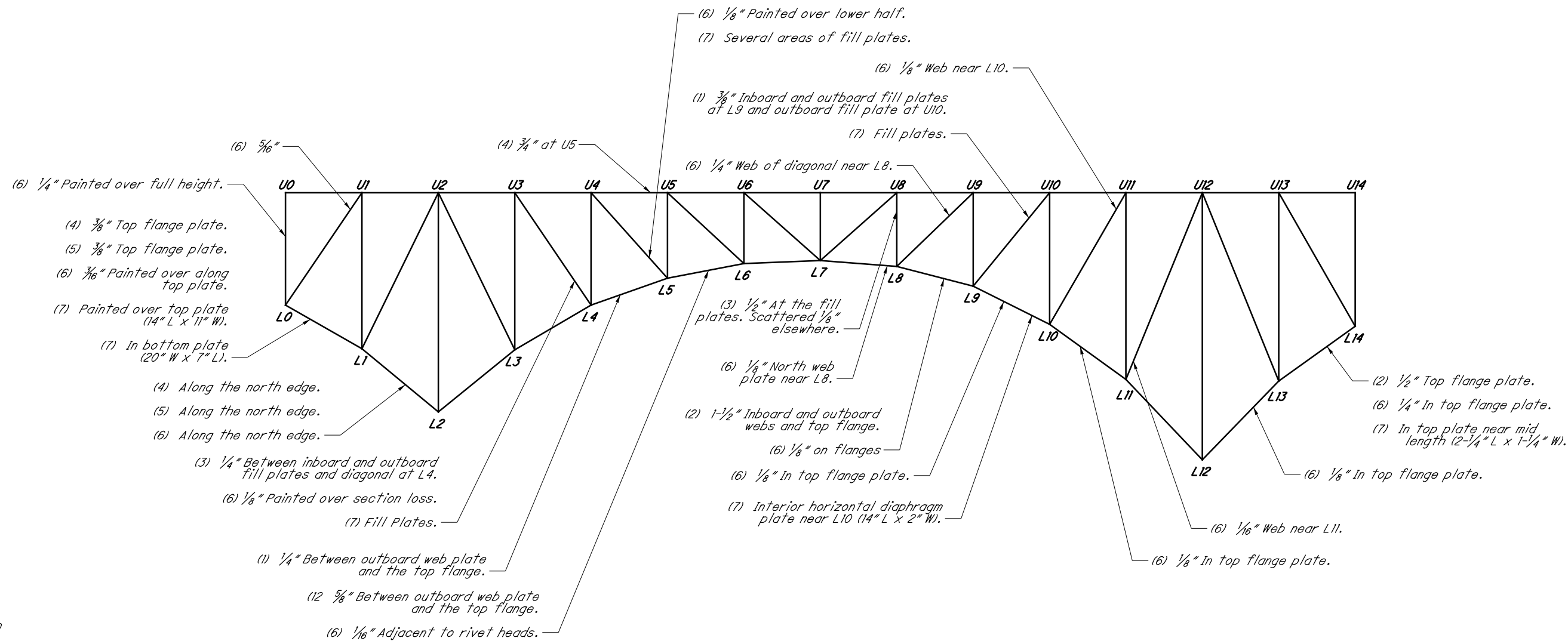
North Truss Gusset Plate Deficiencies:

- L0, Section loss, 1/4" pitting on exterior face of exterior plate and both faces of interior gusset plate.
- Up to 1/8" active pack rust between the pin strengthening plate and both the interior and exterior gusset plates.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 3	FIG. II-3

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LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate

Floorbeam Deficiencies:

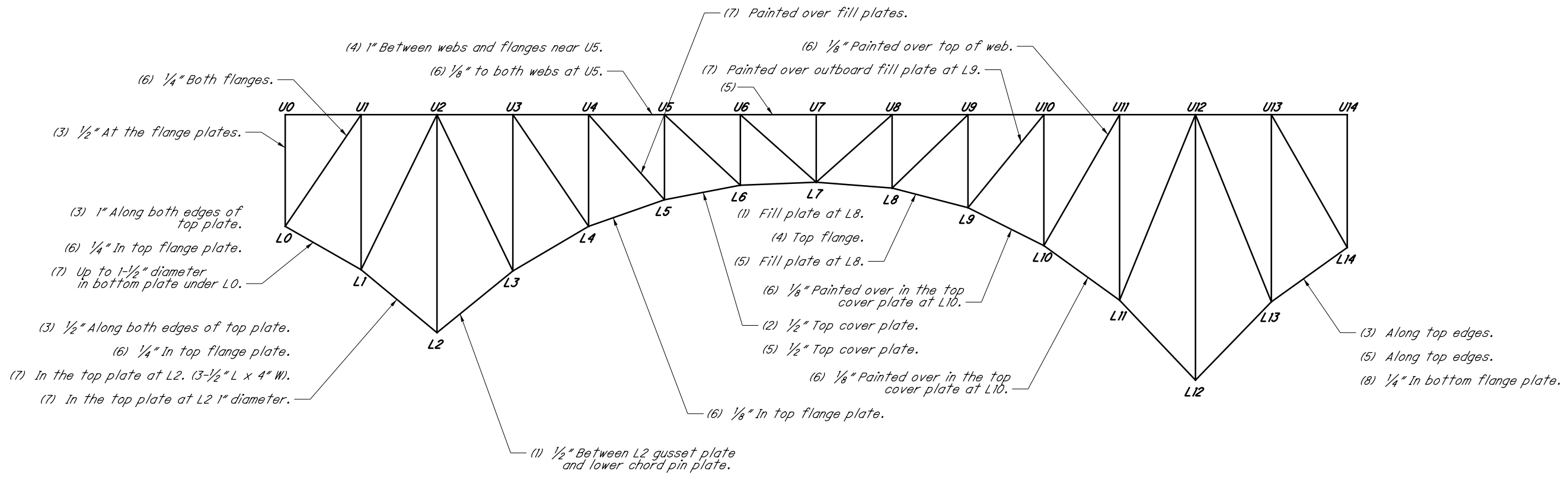
- FBO, 2 of 3 bolts are loose on the inboard sliding plate for the north truss at U0.
- FB14, 1/8" Painted over section loss on the web and flanges at midspan.
Crack in top of web of cantilever Floorbeam; West Face 1/4" at north truss.

North Truss Gusset Plate Deficiencies:

- L0, Inboard gusset, inside face has painted over pitting up to 1/8" deep x 8" diameter.
- L2, 2" x 3/16" deep painted over pitting on inboard and outboard gusset plates around L2L3 pin plates.
- L8, 1/8" Section Loss, 2" Diameter corrosion hole in outboard gusset plate under L8U8.
1-1/4" fill plate retrofit at inboard gusset plate.
- L14, 1/2" pack rust between L14U14 and both gusset plates with failed caulk and active corrosion, gusset is bowed 1/4".
- U0, Up to 1/8" painted over pitting to both interior and exterior plates.
- U8, Up to 1/8" painted over pitting and rivet head loss to both plates.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 4 NORTH	FIG. II-4N

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LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate

Floorbeam Deficiencies:

FB14, Painted over section loss up to 1/8" on the web and flanges at midspan.

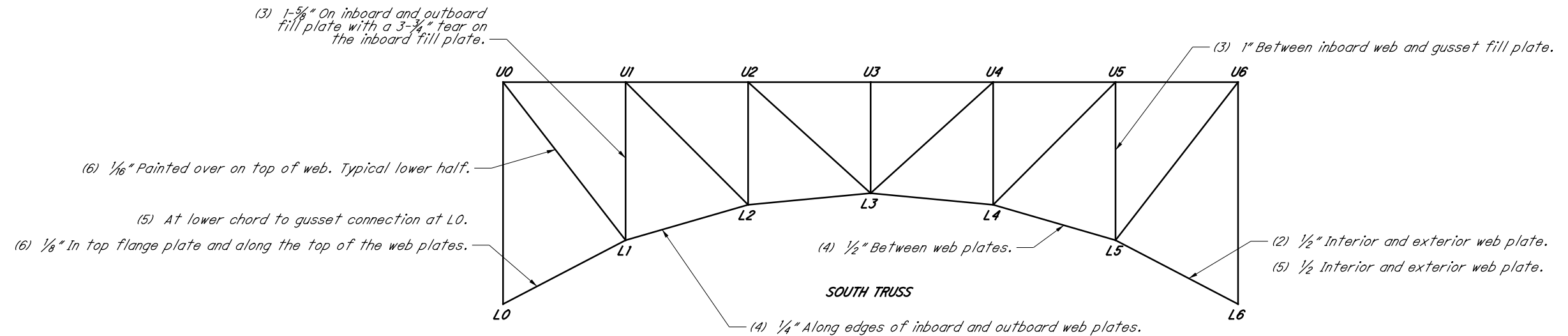
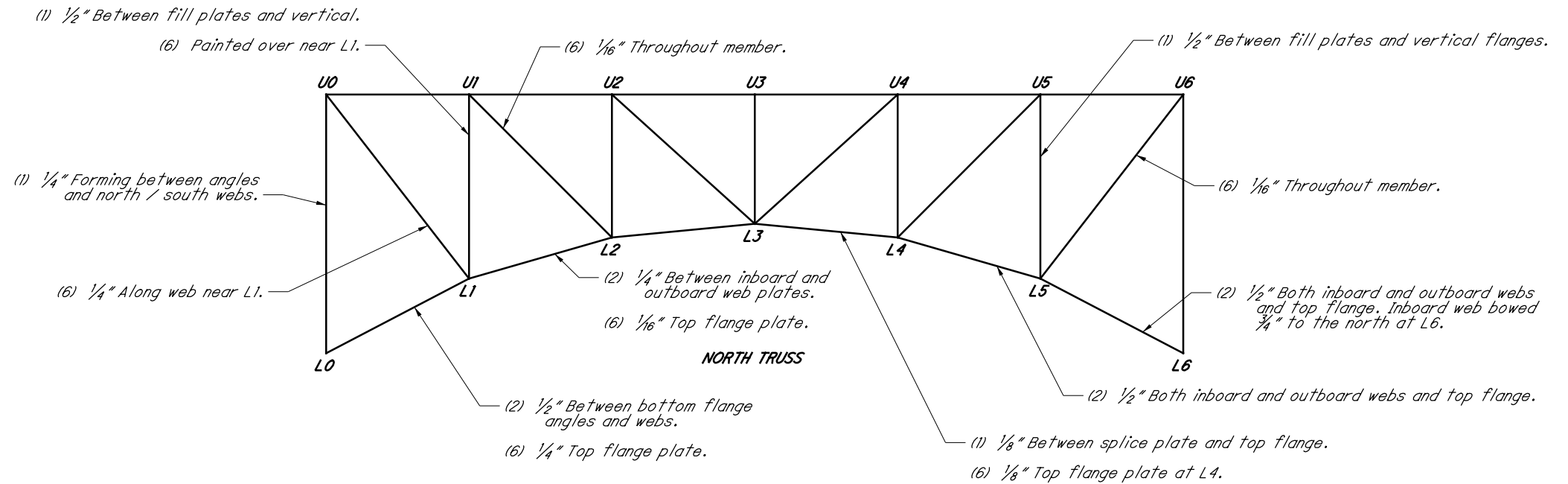
South Truss Gusset Plate Deficiencies:

- L0, Inboard gusset, inside face has painted over pitting up to 1/8" deep x 8" diameter.
- L2, 2" x 3/16" deep painted over pitting on inboard and outboard gusset plates around L2L3 pin plates.
- L10, 1/16" Painted over section loss, inboard face of inboard plate along lower chord.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 4 SOUTH	FIG. II-4S

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate



South Truss Gusset Plate Deficiencies:

- L0, Inboard gusset has typical painted over section loss up to 1/8 inch along the lower chord L1L3L14 bolted connection.
- L1, Up to 3/4 inch painted over pack rust between outboard gusset plate and L0L1 at L1.
- L2, Up to 3/4 inch painted over pack rust between outboard gusset plate and L1L2 at L2.
- L6, Inboard faces of both gusset plates have up to 1/4 inch painted over pitting typical with corrosion staining noted along the edges of the truss members.
Inboard gusset plate is bowed to the north, this is due to the truss alignment. The truss alignment changes in a slight SE direction at this pin location.
Outboard gusset plate is bowed to the north 1/2 inch, this is due to the truss alignment. The truss alignment changes in a slight SE direction at this pin location.

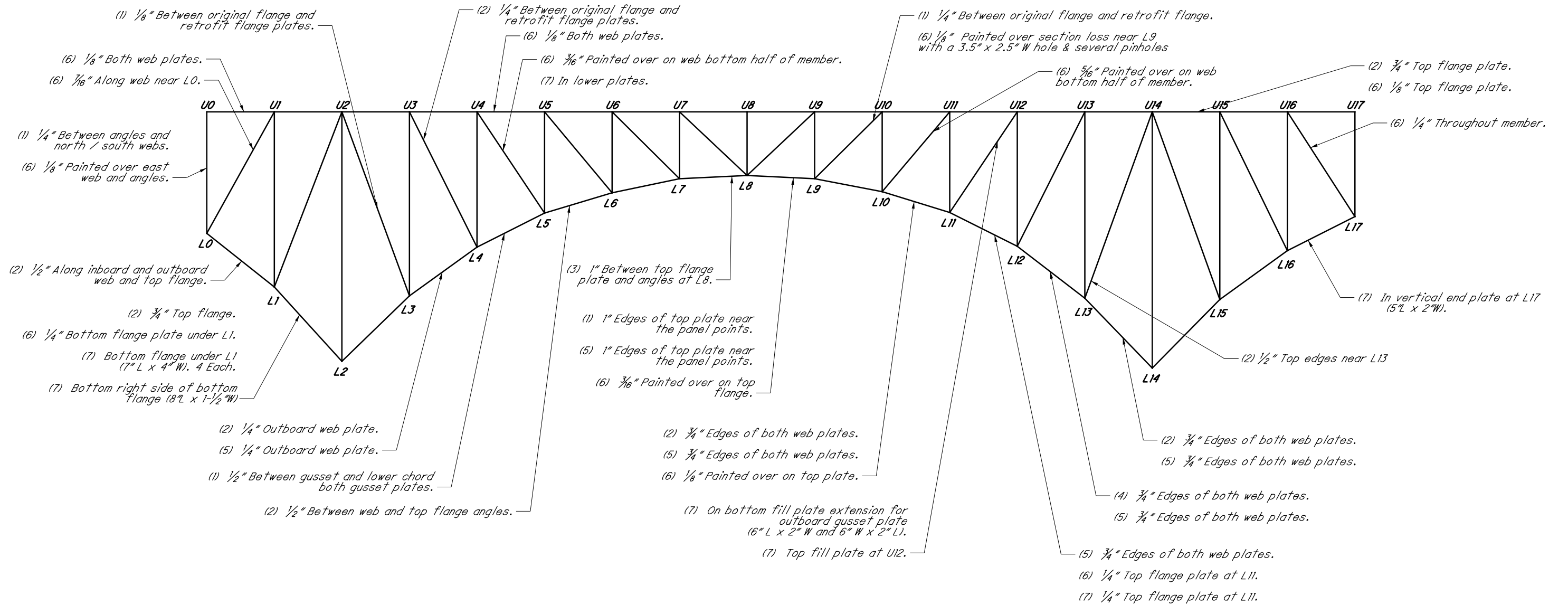
North Truss Gusset Plate Deficiencies:

- L0, 1/8 inch pack rust beginning to form along connection with L0L1.
- L4, Up to 1/8 inch painted over section loss along the lower chord, both plates.
- U6, 1/8 inch to 1/4 inch painted over section loss of both plates and 3/4 inch pack rust at the verticals.

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 5	FIG. II-5

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Floorbeam Deficiencies:

- FB0, Typical stringer bearings (sliding plate) on east face of Floorbeam 0, evidence of movement at Panel 0.
- FB0, Two cracks found in east face of the floorbeam. Inboard 1/2" long crack at top cope, outboard 2 1/4" long crack at top cope.
- FB6, 1/8" painted over pitting on the web and flanges at midspan. 7" L x 1/2" H corrosion hole behind old stringer bearings at midspan.
- FB9, 1/8" painted over section loss at center of floorbeam. 1/8" painted over pitting on the web and flanges at midspan.
- FB17, Crack in top of web of cantilever Floorbeam; West Face 2 3/8" at north truss.

North Truss Gusset Plate Deficiencies:

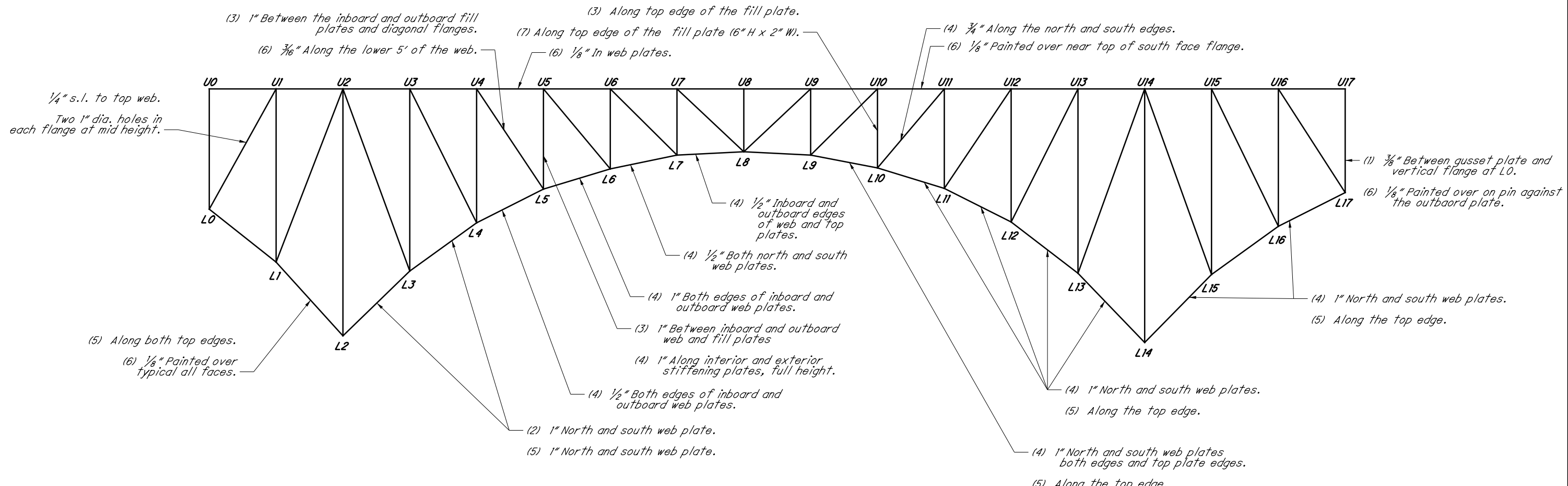
- L0, Section Loss, 1/4" pitting on both plates. Bowing outboard (north) at both inboard and outboard gussets.
- L4, Section Loss, 1/8" pack rust in top joint on exterior plate.
- L7, 1/8" painted over pitting on interior face of outboard gusset plate.
Broken rivet on inboard gusset plate for member L6L7
- L8, 3/16" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L9, Section Loss, 1/8" pitting on both plates.
- L10, 3/16" painted over pitting on interior faces both gusset plates.
- U0, Section Loss, 1/4" pitting on both plates.
Section loss and bowing approximately 1-1/2" at outboard gusset and 3/4" at inboard.
- U2, Broken rivet in exterior plate on U2L3 connection.
- U6, Section Loss, 5/16" pitting on exterior plate.

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 6 NORTH	FIG. II-6N

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South Truss Gusset Plate Deficiencies:

- L0, Inboard faces of both gusset plates have up to 1/4" painted over pitting typical
Inboard gusset plate has various areas of section loss up to 3/16" along the exterior face above the lower chord and scupper connections.
- L1, Up to 1/8" painted over pitting on both gusset plates.
- L2, Up to 1/8" painted over pitting on both gusset plates, especially around the lower chord pin connection plates.
Painted over pitting 1/8" on east pin of L2 bearing connection
- L4, U to 1/8" pack rust along the top edge of the outboard gusset plate between the vertical.
1/16" pitting along the inboard faces of both gussets above the lower chord.
- L5, 3'L x 1'H area of section loss with up to 1-1/8" bowing of exterior vertical filler plate due to pack rust.
A 2-3/16" long crack was noted in the fill plate in the paint/caulk.
The interior plate exhibits up to 1" distortion due to pack rust along top of fill plate.
The pack rust is beginning to reactivate along the top edge and has caused pin holes and corrosion cracks in caulk.
There is up to 1/8" painted over section loss on inboard gusset plate above lower chord and strut connection.
- L6, Caulked and painted over pack rust along top edge of outboard fill plate.
The vertical edges of the fill plate to vertical connection exhibit up to 1/8" pack rust.
- L10, Up to 3/16" painted over pitting typical along the interior gusset plate
The interior and exterior fill plates exhibit painted and caulked pack rust up to 3/4"
6'L x 3'H corrosion hole along the top edge of the interior plate
4'L x 2"W and 2'L x 1"W corrosion hole along the fill plate on the outboard face of the diagonal.
- L11, 1/8" painted over pitting on both plates.
Typical painted over pack rust up to 1/2" between all gusset fill plates and the vertical and diagonal.
- L13, Isolated 1/8" painted over pitting on both plates.
- L15, 1/8" painted over pitting on inside of both plates.
- L17, Up to 1/2" pack rust between the inboard and outboard gusset plates and the vertical.
1/8" pack rust in/out between gusset and lower chord
- U17, 3/16" bowing of inboard and outboard plate due to pack rust.

Floorbeam Deficiencies:

- FB0, Typical stringer bearings (sliding plate) on east face of Floorbeam 0, evidence of movement at Panel 0.
- FB0, Four cracks found in top of web in floorbeam at south truss; OB West Face 25/16", OB East Face 4/2", IB West Face 2", IB East Face 2/4"
- FB6, 1/8" painted over pitting on the web and flanges at midspan. 7" L x 1/2" H corrosion hole behind old stringer bearings at midspan.
- FB9, 1/8" painted over section loss at center of floorbeam. 1/8" painted over pitting on the web and flanges at midspan.

LEGEND

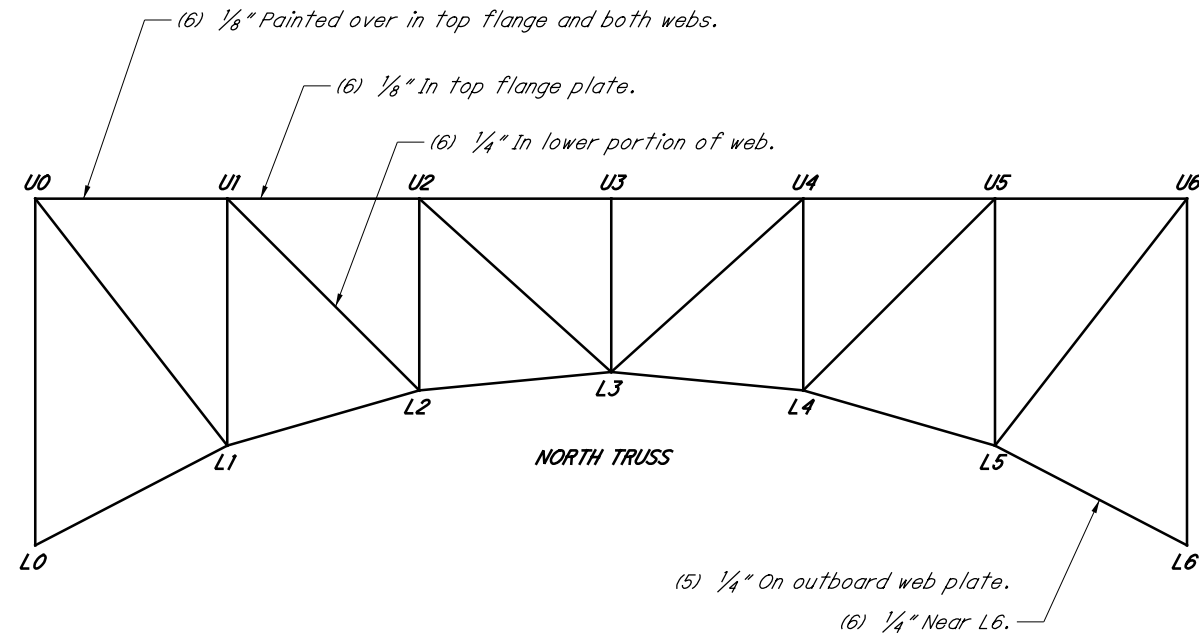
- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE: JULY 2021		TRUSS ELEVATION - SPAN 6 SOUTH	FIG. II-6S

J:\ODOT\109534_VAR-D12 Inspections\Inspection\CUY-2-14-41_Main Ave_1800035\2021\Inspection\CAD\CUY_2-14-41_Truss_Span_Configurations.dgn_Span 7 II/30/2021 10:21:42 AM Justin-r

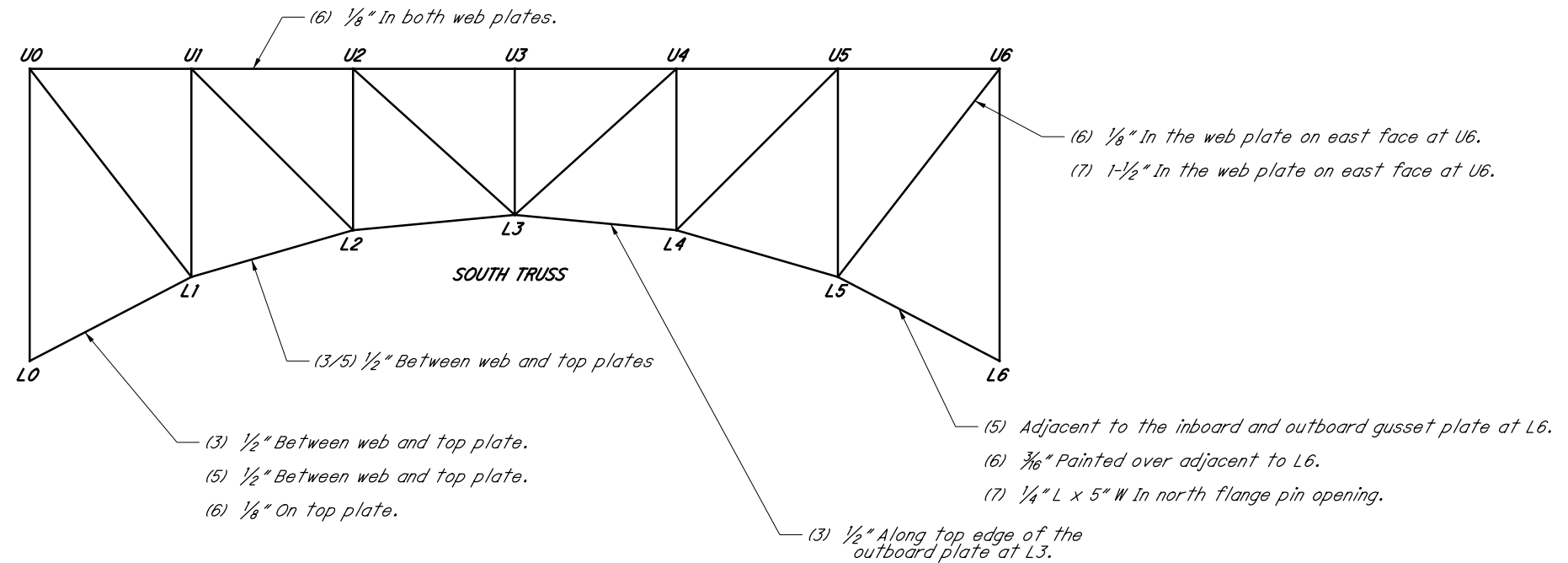
LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate



North Truss Gusset Plate Deficiencies:

- L0, Section Loss, $\frac{3}{8}$ " reactivated pack rust is distorting the inboard and outboard plates.
- L3, Section Loss, $\frac{1}{8}$ " pitting on exterior plate.
- U1, Section Loss, distorting the exterior plate from previous pack rust.



Floorbeam Deficiencies:

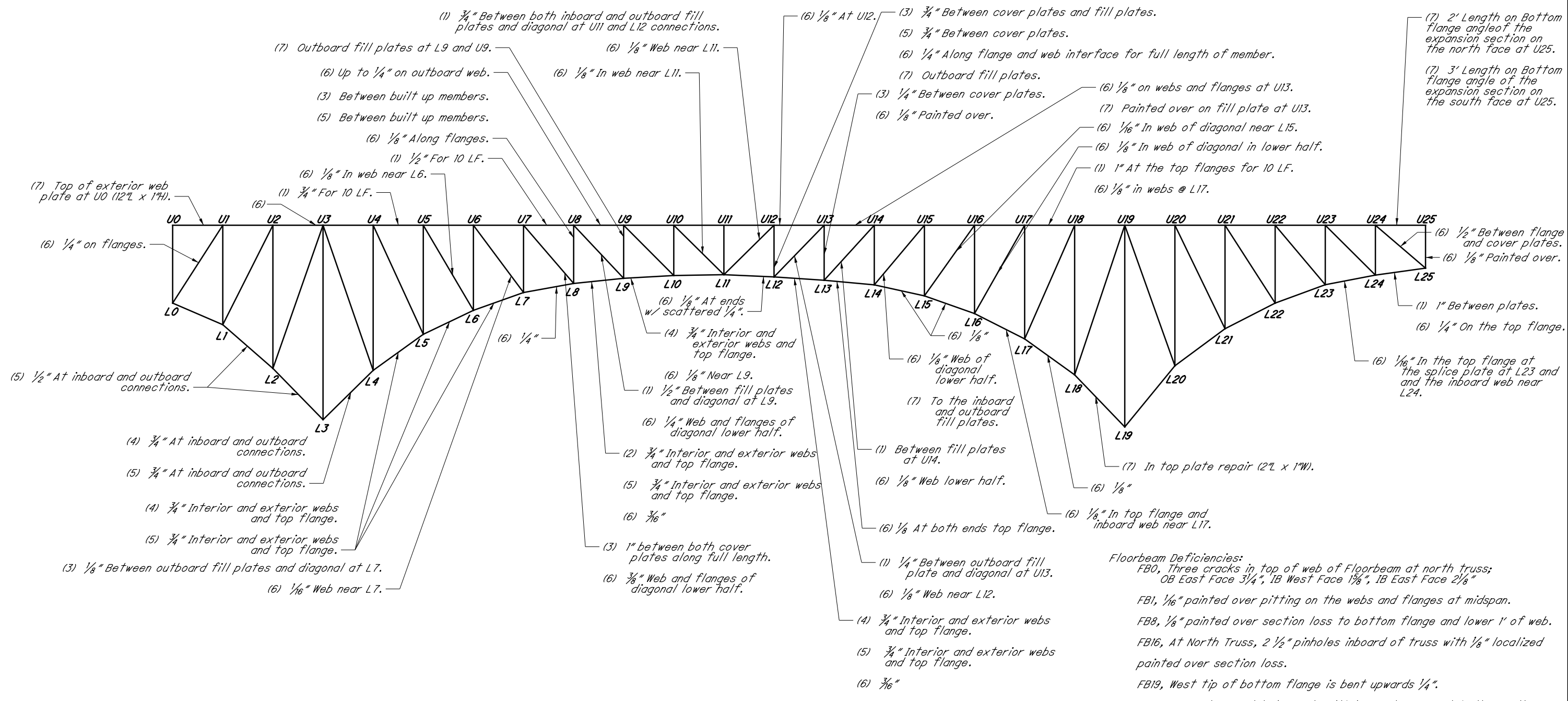
- FBO, $\frac{1}{8}$ " Painted over section loss on the web and flanges extending from the north truss to midspan.

South Truss Gusset Plate Deficiencies:

- L1, $\frac{1}{8}$ " deep painted over pitting along top of lower chord with isolated location on inboard gusset plate 3" diameter x $\frac{3}{16}$ " deep.
- L2, Painted over pitting along top of lower chord on inside of both gusset plates typ. 2" x up to $\frac{3}{16}$ " deep

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE: JULY 2021		TRUSS ELEVATION - SPAN 7	FIG. II-7

J:\ODOT\109534-VAR-D12 Inspections\Inspection\CUY-2-14-41 Main Ave_1800035\2021 Inspection\CAD\CUY_2-14-41_Truss_Span_8 - North 11/30/2021 10:21:12 AM Justin-r



Floorbeam Deficiencies:
 FB0, Three cracks in top of web of Floorbeam at north truss; OB East Face 3/4", IB West Face 1/8", IB East Face 2/8"
 FB1, 1/16" painted over pitting on the webs and flanges at midspan.
 FB8, 1/8" painted over section loss to bottom flange and lower 1' of web.
 FB16, At North Truss, 2 1/2" pinholes inboard of truss with 1/8" localized painted over section loss.
 FB19, West tip of bottom flange is bent upwards 1/4".
 FB25, 6 crack arrest holes and multiple cracks present in the North cantilever at the Stringer 6 bracket.

North Truss Gusset Plate Deficiencies:

- L0, Pack rust up to 1/2" thick on both gusset plates inside connection.
- L3, Pitting and section loss in south gusset north face.
- L8, Section Loss, 1/8" pack rust in top joint on both plates.
- L9, 1/8" scattered painted over section loss, interior faces both plates.
- L11, 1/8" painted over section loss, inside face of both plates.
- L12, 1/8" painted over section loss, inside face of both plates.
- L13, Both interior and exterior gusset plates have painted over section loss up to 1/4" on the east half.
- L16, Section Loss, 1/8" pitting in both plates.
- L21, 1/8" - 1/4" painted over section loss on both plates.
- L23, South gusset, north face 3/16" pitting
- L24, 3" x up to 1/8" painted over pitting along the interior face of both gussets above the lower chord.
Isolated 1/2" diameter areas of 1/4" pitting
- L25, Up to 1/8" painted over section loss on the gusset plates.
Up to 1" pack rust between the gusset plates and the vertical.

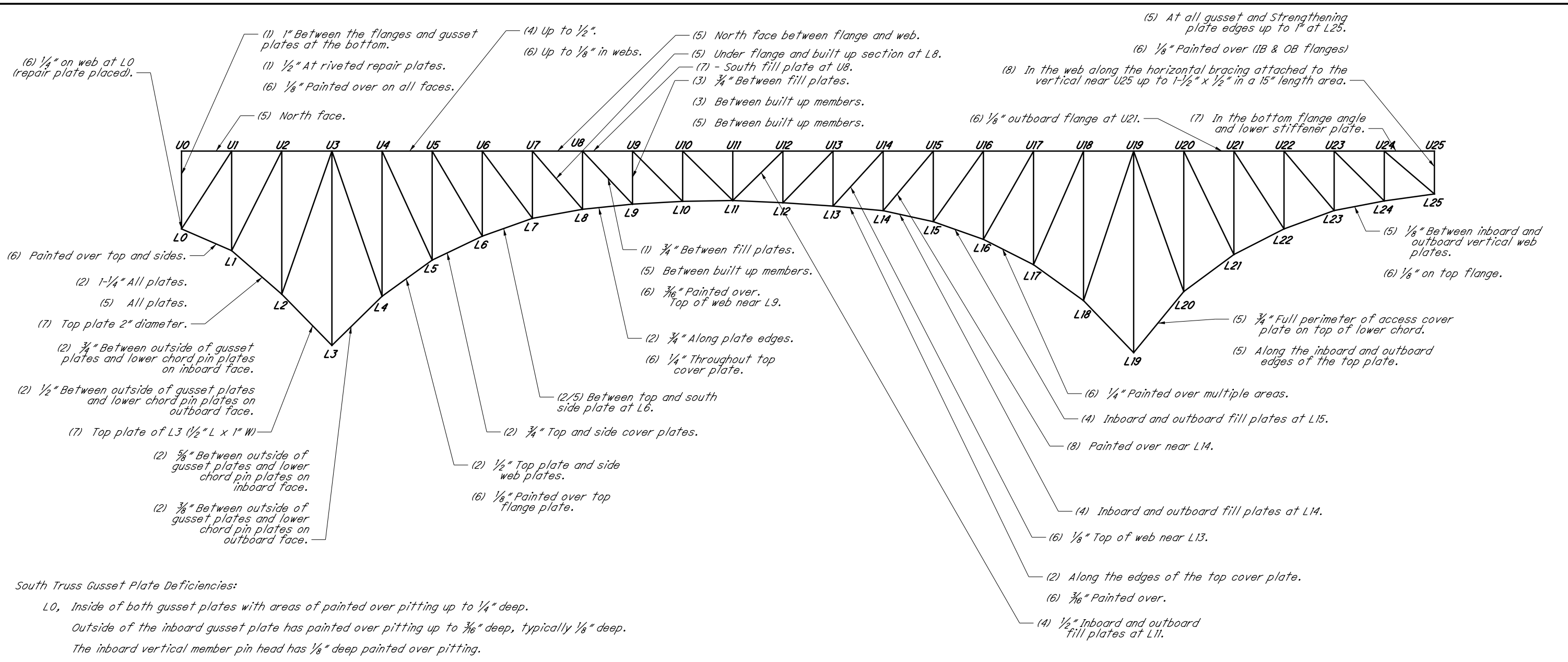
- U0, 1/2" diameter hole in inboard gusset plate.
- U8, Exterior and interior gusset plate has up to 1/4" painted over pitting throughout.
- U10, Manufacturing defect in outboard gusset near L11U10 connection.
- U12, Pitting up to 1/4" on outboard face of outboard and inboard gusset plate.
- U13, Reactivating 1/4" pack rust between gusset plate and member.
Up to 1#8" painted over section loss.
- U16, Exterior gusset plate has up to 1/4" painted over pitting throughout.
- U21, Both interior and exterior gusset plates have painted over section loss up to 1/4" on the west half.

LEGEND

1 - Pack Rust
2 - Pack Rust With Plate Distortion
3 - Painted Over Pack Rust
4 - Painted Over Pack Rust With Plate Distortion
5 - Reactivating Pack Rust
6 - Pitting
7 - 100% Section Loss
8 - Perforations In The Steel Plate

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE: JULY 2021		TRUSS ELEVATION - SPAN 8 NORTH	FIG. II-8N

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South Truss Gusset Plate Deficiencies:

- L0, Inside of both gusset plates with areas of painted over pitting up to 1/4" deep. Outside of the inboard gusset plate has painted over pitting up to 3/16" deep, typically 1/8" deep. The inboard vertical member pin head has 1/8" deep painted over pitting.
- L1, 1/16" painted over section loss to both plates along the lower chord.
- L4, Outboard gusset plate has up to 1/2" painted over pack rust between it and the lower chord.
- L5, Outboard gusset plate has up to 1/2" painted over pack rust between it and the lower chord.
- L6, Outboard gusset plate has up to 1/2" painted over pack rust between it and the lower chord.
- L8, Both gusset plates have up to 1/8" painted over section loss.
- L9, Both gusset plates have up to 1/8" painted over section loss.
- L13, Added 1/2" gusset plate to inboard plate.
- L16, Inboard gusset plate has up to 1/8" painted over pitting along the inside face at the lower chord interface.
- L21, Both gusset plates have up to 1/8" painted over section loss.
- L22, Both gusset plates have up to 1/8" painted over section loss.
- L23, Both gusset plates have up to 1/8" painted over section loss.
- U0, Both gusset plates have up to 1/8" painted over section loss.
- U7, Both gusset plates have up to 1/8" painted over section loss.
- U16, Outboard gusset plate exterior face has up to 3#16" painted over pitting.
- U25, There is reactivating pack rust between the vertical and the inboard and outboard gusset plate up to 1-1#4". Typical painted section loss up to 1/4" around the vertical pin and adjacent the strut and bracing connections, inboard plate.
- L25, there is reactivating pack rust between the vertical and the inboard and outboard gusset plate up to 1-1/4". Heavy debris accumulation within the panel point.

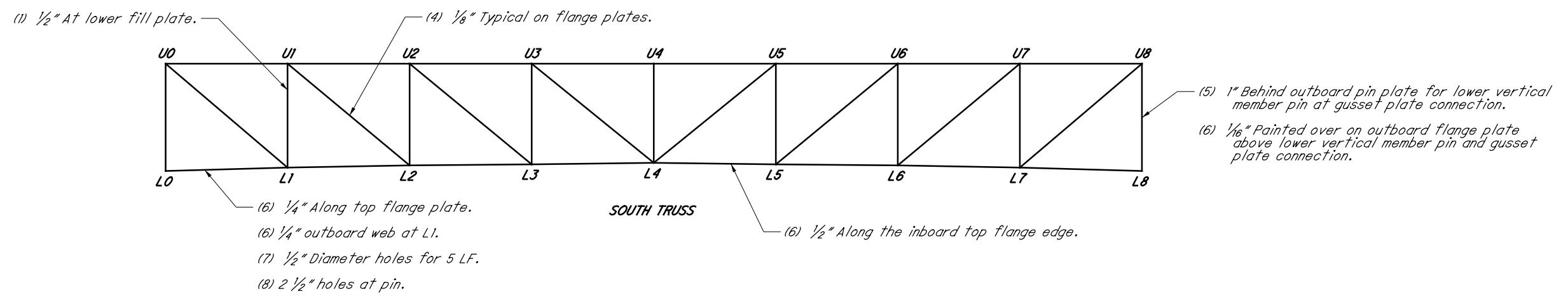
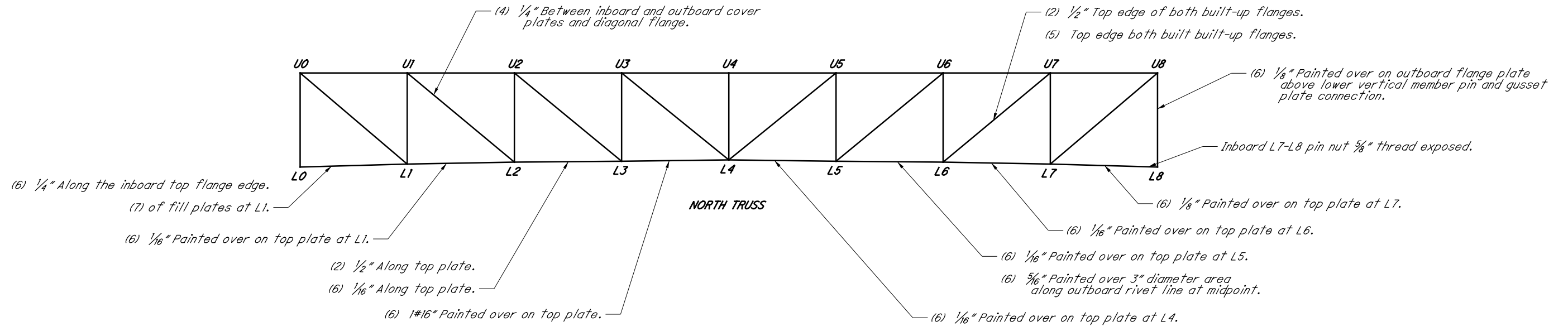
Floorbeam Deficiencies:

- FB0, 3-1/2" crack, outboard side, east face at top cope.
- FB1, 1/16" painted over pitting on the webs and flanges at midspan.
- FB8, 1/8" painted over section loss to bottom flange and lower 1' of web.
- FB16, At North Truss, 2 1/2" pinholes inboard of truss with 1/8" localized painted over section loss.
- FB19, West tip of bottom flange is bent upwards 1/4".
- FB25, 6 crack arrest holes and multiple cracks present in the North cantilever at the Stringer 6 bracket.

- LEGEND**
- 1 - Pack Rust
 - 2 - Pack Rust With Plate Distortion
 - 3 - Painted Over Pack Rust
 - 4 - Painted Over Pack Rust With Plate Distortion
 - 5 - Reactivating Pack Rust
 - 6 - Pitting
 - 7 - 100% Section Loss
 - 8 - Perforations In The Steel Plate

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 8 SOUTH	FIG. II-8S

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North Truss Gusset Plate Deficiencies:

- L1, Up to 1/16" painted over section loss on both plates.
- L2, 1/16" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L3, 1/8" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L4, 1/8" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L5, Up to 1/8" painted over pitting on interior faces of both gusset plates just above the lower chord.
- L6, 1/8" painted over pitting on interior face of both gusset plates.
- L7, Up to 1/8" painted over pitting along the lower chord.
- U8, 1/8" painted over section loss to outside faces.

South Truss Gusset Plate Deficiencies:

- L1, 1/8" painted over section loss along the lower chord.
- L4, 1/8" painted over section loss along the lower chord.
- L3, 1/8" painted over section loss along the lower chord.
- L4, 1/8" painted over section loss along the lower chord.
- L5, 1/8" painted over section loss along the lower chord.
- L7, Typical areas of painted over section loss up to 1/4" around diagonal connection and lower chord rivet heads.
- U2, Outboard, Missing rivet due to misspunched member.

Floorbeam and Drainage Deficiencies:

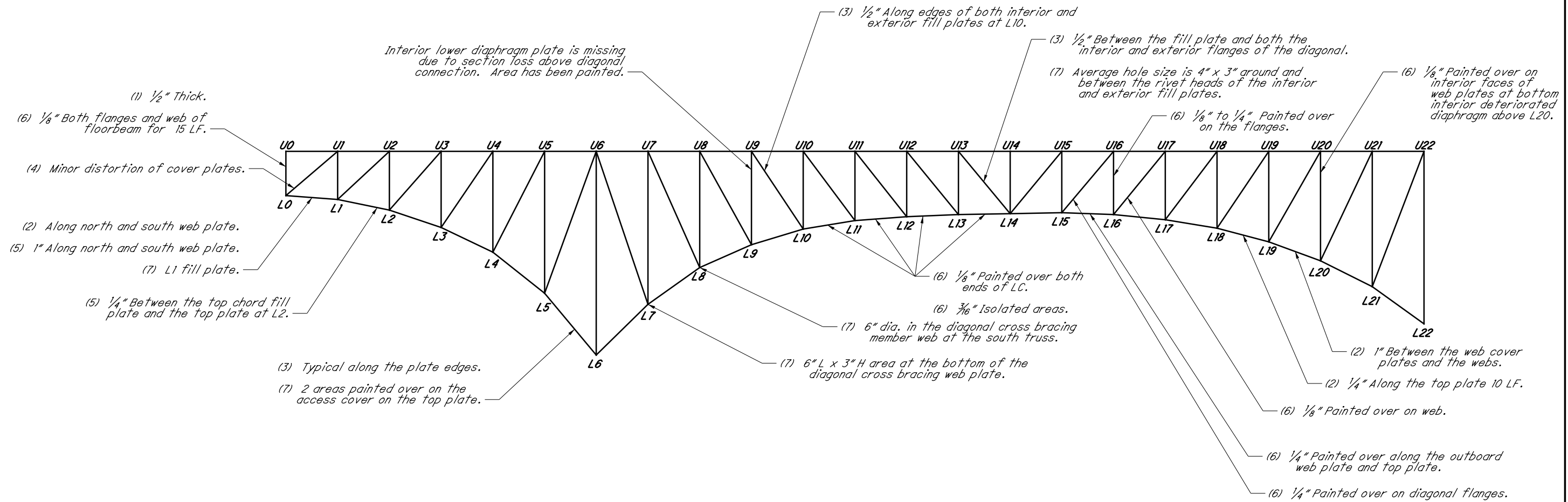
- Drainage downspout on north overhang is disconnected at Panel 7.
- FB8, 1/8" - 1/4" Painted over section loss beginning to reactivate due to joint leakage.

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 9	FIG. II-9

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Floorbeam Deficiencies:

- FB7, Pitting $\frac{1}{8}$ " Both flanges and web.
- FB9, Section Loss $\frac{1}{8}$ " painted over on web and flanges at midspan.
- FB10, Pitting $\frac{1}{8}$ " both flanges and web.
- FB15, Painted over section loss $\frac{1}{8}$ " between S truss and catwalk.
- FB17, Painted over section loss $\frac{1}{8}$ " on web and flanges at midspan.
- FB18, Painted over section loss $\frac{1}{8}$ " on web and flanges at midspan.
- FB22, Four cracks found at south truss at the top flange cope; IB east face 7", IB West Face 4", OB East $7\frac{1}{4}$ ", OB West $3\frac{3}{4}$ "

South Truss Gusset Plate Deficiencies:

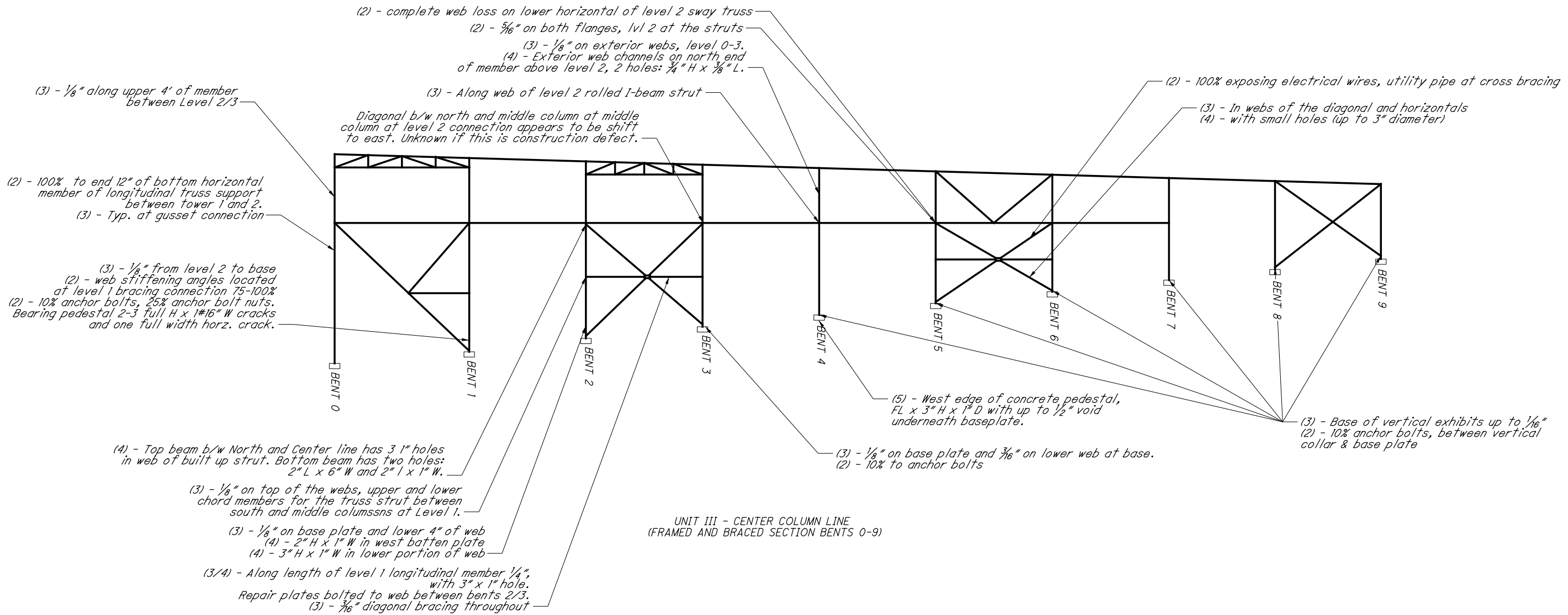
- L0, The exterior pin nut spacer plate exhibits 1" painted and caulked pack rust at the corners. Reactivated pack rust is noted at all corners.
Up to $\frac{1}{4}$ " pack rust between gusset plates and vertical connections.
Painted over $\frac{1}{8}$ " pitting to the inboard faces of the inboard gusset.
- L1, Up to $\frac{1}{8}$ " T painted and caulked pack rust between outboard gusset and lower chord L1L2.
Up to $\frac{1}{8}$ " painted over section loss along the lower chord.
- L12, Isolated areas of $\frac{1}{8}$ " painted over section loss along inside face of both gussets.
- L16, Painted over pitting up to $\frac{1}{8}$ " on interior face of both gusset plates.
- L22, Both gusset plates have up to $\frac{1}{4}$ " painted over pitting.
Painted over pitting up to $\frac{1}{8}$ " on interior face of outboard gusset plate.
- U15, Section Loss, $\frac{1}{4}$ " pitting in both plates.

LEGEND

- 1 - Pack Rust
- 2 - Pack Rust With Plate Distortion
- 3 - Painted Over Pack Rust
- 4 - Painted Over Pack Rust With Plate Distortion
- 5 - Reactivating Pack Rust
- 6 - Pitting
- 7 - 100% Section Loss
- 8 - Perforations In The Steel Plate

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		TRUSS ELEVATION - SPAN 10 SOUTH	FIG. II-10S

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UNIT III - CENTER COLUMN LINE
(FRAMED AND BRACED SECTION BENTS 0-9)

Frame & Braced Column Sections - Floorbeam & Stringer Deficiencies

FB0, Top flange with 3/16" painted over pitting and wavy areas.
There are isolated locations of painted over pitting up to 1/4". The rivet heads have 10% section loss. The rivet heads at the bottom flange connection to the south column have 60-80% section loss.

Stringers between Bent 0-1 - Level 2, 1/8" painted over pitting throughout, especially along the lower 5' of the web, full length. The top flange has isolated areas of 3/16".

FB1, Painted over pitting on top and bottom flanges and lower 1' of the web up to 1/4" for level 3 floorbeam. Level 2, floorbeam between trusses on level 2 has painted over pitting on flanges typically 1/8".

FB2, Painted over 3/16" pitting on top of both flanges and locations on web at level 3.

FB3, Painted over 1/8" pitting on top of both flanges and locations on web at level 3.

FB4, Painted over 1/4" pitting on lower 8" of web and flanges, west face, level 3. Level 2 floorbeam between center and south lines with 5/16" pitting with surface corrosion on the web throughout.

FB5, 1/16" painted over pitting on bottom flange and lower portion of web, level 3.

FB6, 1/16" painted over pitting on bottom flange and lower portion of web, level 3.

FB7, 1/16" painted over pitting on bottom flange and lower portion of web, level 3. Steel repair plate on lower portion of web over catwalk measuring 10" H x 16" W. 3/16" painted over pitting at north end.

FB8, 1/8" pitting on bottom flange and lower 6" of the web along the southern overhang.

Framed and Braced Column Section - Gusset Plate Deficiencies

Bent 2 - Level 1, Ends of gussets between N and Mid. columns bowed outward 1-1#4" due to previous pack rust

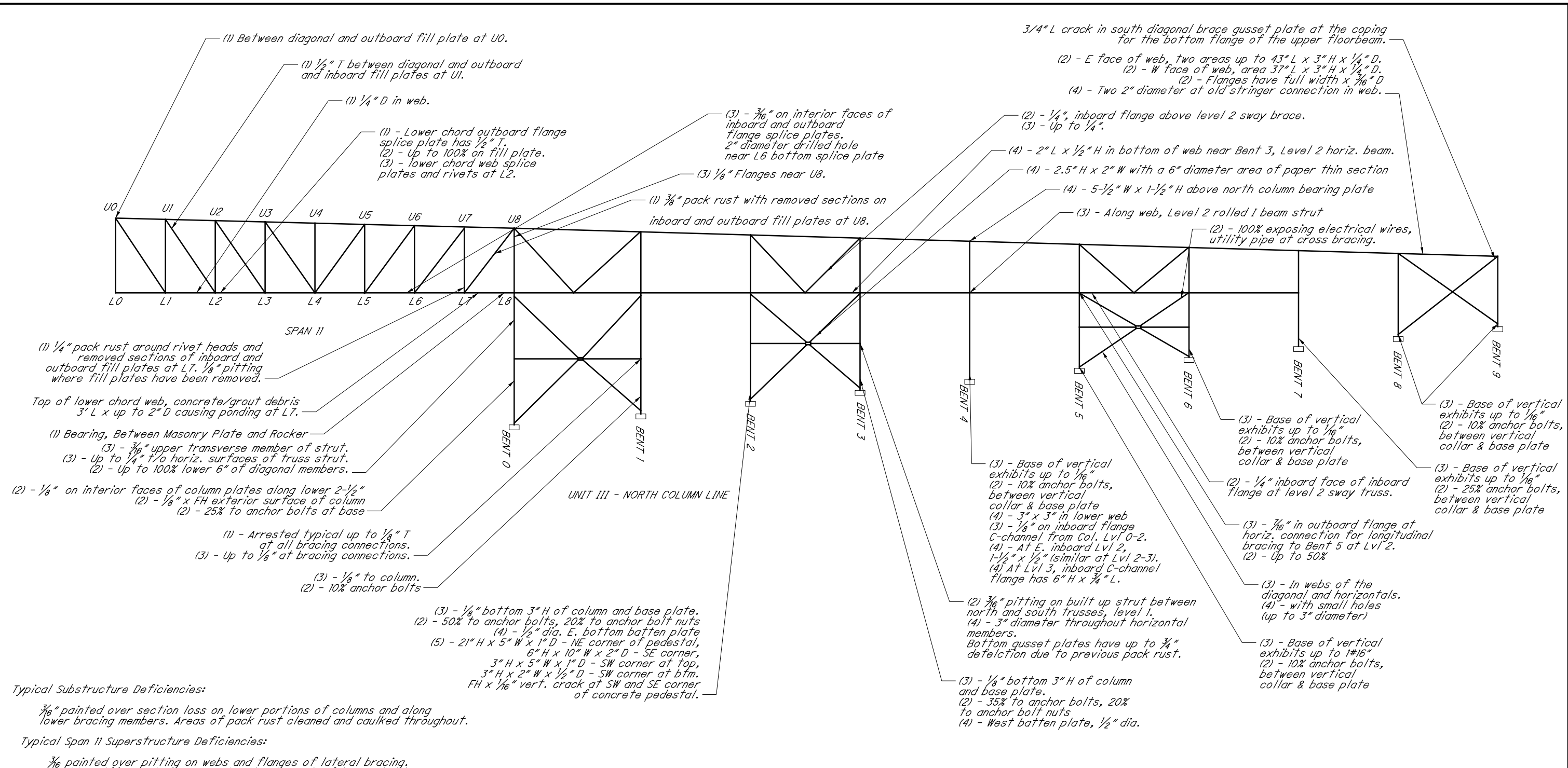
Bent 2, center bracing gusset has 1-3/4" deflection where pack rust was removed and 1/4" pitting.

Bent 5, north mid-gusset plate connecting the bracing between bents 5-6 is lightly bowed to the north along the top edge. The south plate is bowed to the south due to pack rust up to 1" T. The south plate has corrosion holes measuring 2" x 1/2".

- LEGEND**
- 1 - Painted Over Pack Rust
 - 2 - Painted Over Section Loss
 - 3 - Painted Over Pitting
 - 4 - Corrosion Hole(s)
 - 5 - Spalling

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		UNIT 3 ELEVATION (CENTER COLUMN LINE - BENTS 0-9)	FIG. III-C

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(1) Between diagonal and outboard fill plate at U0.

(1) $\frac{1}{2}$ " T between diagonal and outboard and inboard fill plates at U1.

(1) $\frac{1}{4}$ " D in web.

(1) - Lower chord outboard flange splice plate has $\frac{1}{2}$ " T.

(2) - Up to 100% on fill plate.

(3) - lower chord web splice plates and rivets at L2.

(3) - $\frac{3}{16}$ " on interior faces of inboard and outboard flange splice plates.

2" diameter drilled hole near L6 bottom splice plate

(3) $\frac{1}{8}$ " Flanges near U8.

(1) $\frac{3}{8}$ " pack rust with removed sections on inboard and outboard fill plates at U8.

(1) $\frac{1}{4}$ " pack rust around rivet heads and removed sections of inboard and outboard fill plates at L7. $\frac{1}{8}$ " pitting where fill plates have been removed.

Top of lower chord web, concrete/grout debris 3' L x up to 2" D causing ponding at L7.

(1) Bearing, Between Masonry Plate and Rocker

(3) - $\frac{3}{16}$ " upper transverse member of strut.

(3) - Up to $\frac{1}{4}$ " T/o horiz. surfaces of truss strut.

(2) - Up to 100% lower 6" of diagonal members.

(2) - $\frac{1}{8}$ " on interior faces of column plates along lower 2-1/2"

(2) - $\frac{1}{8}$ " x FH exterior surface of column

(2) - 25% to anchor bolts at base

(1) - Arrested typical up to $\frac{1}{8}$ " T at all bracing connections.

(3) - Up to $\frac{1}{8}$ " at bracing connections.

(3) - $\frac{1}{8}$ " to column.

(2) - 10% anchor bolts

(3) - $\frac{1}{8}$ " bottom 3" H of column and base plate.

(2) - 50% to anchor bolts, 20% to anchor bolt nuts

(4) - $\frac{1}{2}$ " dia. E. bottom batten plate

(5) - 21" H x 5" W x 1" D - NE corner of pedestal, 6" H x 10" W x 2" D - SE corner, 3" H x 5" W x 1" D - SW corner at top, 3" H x 2" W x $\frac{1}{2}$ " D - SW corner at btm. FH x $\frac{1}{16}$ " vert. crack at SW and SE corner of concrete pedestal.

(1) $\frac{3}{4}$ " L crack in south diagonal brace gusset plate at the coping for the bottom flange of the upper floorbeam.

(2) - E face of web, two areas up to 43" L x 3" H x $\frac{1}{4}$ " D.

(2) - W face of web, area 37" L x 3" H x $\frac{1}{4}$ " D.

(2) - Flanges have full width x $\frac{3}{16}$ " D

(4) - Two 2" diameter at old stringer connection in web.

(2) - $\frac{1}{4}$ ", inboard flange above level 2 sway brace.

(3) - Up to $\frac{1}{4}$ ".

(4) - 2" L x $\frac{1}{2}$ " H in bottom of web near Bent 3, Level 2 horiz. beam.

(4) - 2.5" H x 2" W with a 6" diameter area of paper thin section

(4) - 5-1/2" W x 1-1/2" H above north column bearing plate

(3) - Along web, Level 2 rolled I beam strut

(2) - 100% exposing electrical wires, utility pipe at cross bracing.

(3) - Base of vertical exhibits up to $\frac{1}{16}$ "

(2) - 10% anchor bolts, between vertical collar & base plate

(3) - Base of vertical exhibits up to $\frac{1}{16}$ "

(2) - 25% anchor bolts, between vertical collar & base plate

(3) - Base of vertical exhibits up to $\frac{1}{16}$ "

(2) - 10% anchor bolts, between vertical collar & base plate

(2) - $\frac{1}{4}$ " inboard face of inboard flange at level 2 sway truss.

(3) - $\frac{3}{16}$ " in outboard flange at horiz. connection for longitudinal bracing to Bent 5 at Lvl 2.

(2) - Up to 50%

(3) - In webs of the diagonal and horizontals.

(4) - with small holes (up to 3" diameter)

(3) - Base of vertical exhibits up to 1#16"

(2) - 10% anchor bolts, between vertical collar & base plate

(3) - Base of vertical exhibits up to $\frac{1}{16}$ "

(2) - 10% anchor bolts, 20% to anchor bolt nuts

(4) - West batten plate, $\frac{1}{2}$ " dia.

(2) $\frac{3}{16}$ " pitting on built up strut between north and south trusses, level 1.

(4) - 3" diameter throughout horizontal members. Bottom gusset plates have up to $\frac{3}{4}$ " deflection due to previous pack rust.

(3) - $\frac{1}{8}$ " bottom 3" H of column and base plate.

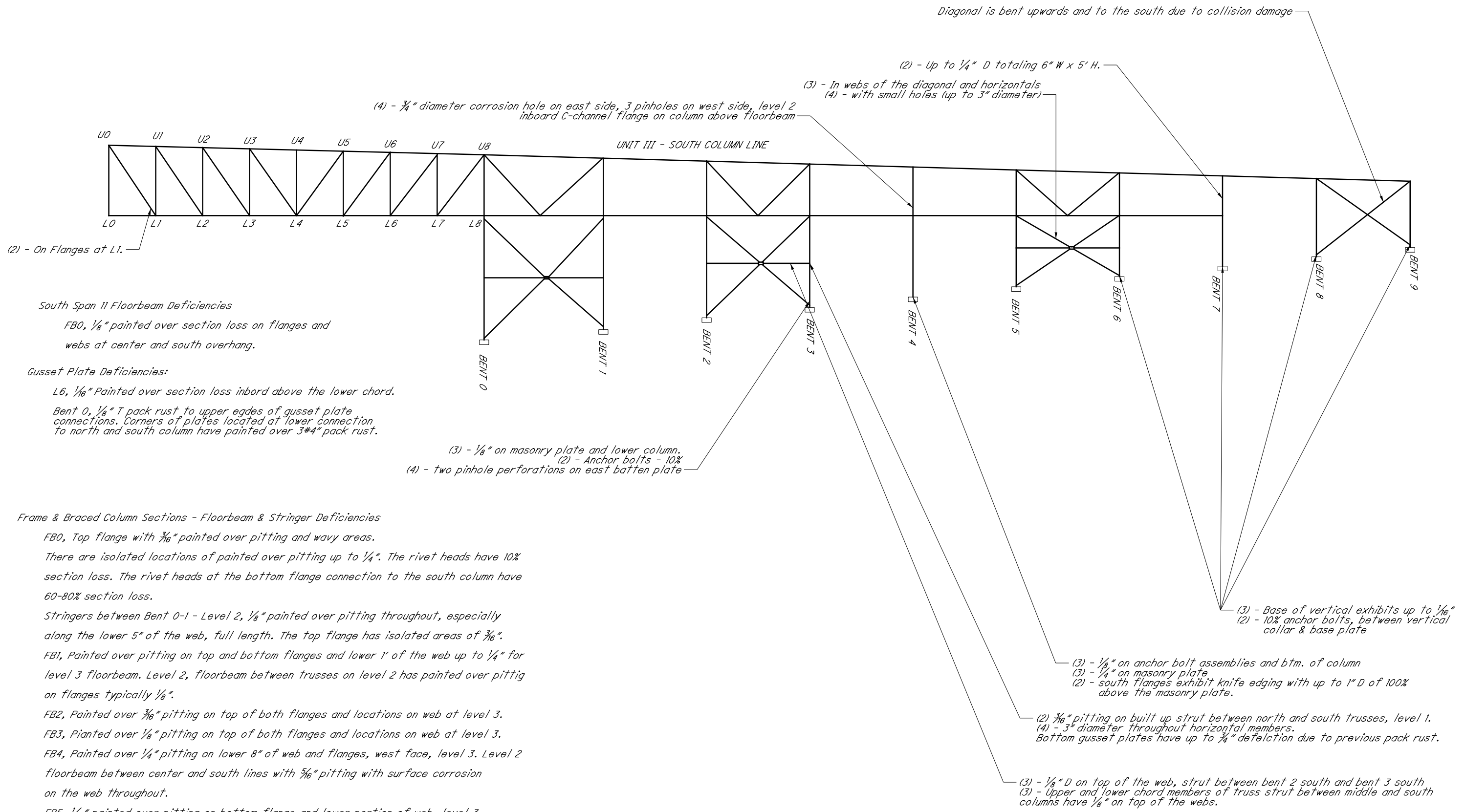
(2) - 35% to anchor bolts, $\frac{1}{2}$ " dia.

LEGEND

- 1 - Painted Over Pack Rust
- 2 - Painted Over Section Loss
- 3 - Painted Over Pitting
- 4 - Corrosion Hole(s)
- 5 - Spalling

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		UNIT 3 ELEVATION - NORTH (SPAN 11 & BENTS 0-9)	FIG. III-N

J:\000T\09534_VAR-D12 Inspections\Inspection\CUY-2-14-41_Main Ave_1800035\2021\Inspection\CAD\CUY_2-14-41_Truss_Span_Configurations.dgn Unit 3 South Columns 11/30/2021 10:21:17 AM justin-r



- LEGEND**
- 1 - Painted Over Pack Rust
 - 2 - Painted Over Section Loss
 - 3 - Painted Over Pitting
 - 4 - Corrosion Hole(s)

NOT TO SCALE		MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-14.41	
DATE JULY 2021		UNIT 3 ELEVATION (SOUTH COLUMN LINE)	FIG. III-S

APPENDIX D – VERTICAL UNDERCLEARANCE TABLES

Table 1 - Main Avenue Bridge Minimum Vehicular Underclearance		
Roadway Below	Vertical Clearance	Comments
W 28th Street - North	NB: 16.10'	At east curb
	SB: 15.94'	At west curb
W 28th Street - South	NB: 14.07'	At centerline roadway
	SB: 14.40'	At west curb
W 25th Street Ramps (Subway)	WB Entrance: 18.1'	W 28th street overpass poses restrictive clearance
	EB Exit: >25.0'	W 28th street overpass poses restrictive clearance
W 25th Street	NB: 15.00'	At east curb
	SB: 16.51'	At west curb
Main Avenue (East)	EB: 14.20'	At knee brace in bent
	WB: 14.79'	At knee brace in bent
W 9th Street	NB: 13.60'	At east curb
	SB: 13.89'	At centerline of center turn lane
W Lakeside WB	14.58'	At Floorbeam between Bents 14 & 15 at centerline roadway
W Lakeside Avenue Ramp to SR 2	Superstructure: 14.62'	Most restrictive clearance along west curb at drain pipe
	Drain Pipe: 13.58'	
Summit Avenue	EB: 16.50'	At south girder at north curb
	WB: 16.50'	At north girder at north curb
W 3rd Street	NB: 14.90'	At east curb
	SB: 16.50'	At centerline of NB right lane
W 3rd Street/Port Authority Ramp to SR 2 EB	14.07'	Along north curb

APPENDIX E – ASSETWISE BRIDGE INSPECTION FIELD REPORT

Ohio Bridge Inspection Summary Report

CUY-00002-1441 (1800035)

2: District 16000 - CLEVELAND (CUY county)
 12

5A: Inventory Route 1 00002

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 2
 6: Feature Ints CUY RIVER,RTA,FLATS
 9: Location MAIN AVE. BRIDGE
 Lat, Lon 41.490256 ,-81.711967

Condition	Structure Type
-----------	----------------

58: Deck **7 - Good Condition**
 58.01 Wearing Surface 7 - Good (1% distress)
 58.02 Joint 6- Satisfactory (isolated leaking)
59: Superstructure **5 - Fair Condition**
 59.01 Paint & PCS 7 - Good (1-5% corr.)
60: Substructure **6 - Satisfactory Condition**
61: Channel **8**
 61.01 Scour **7 - Good**
62: Culverts **N - Not Applicable**
67.01 GA **5**

43: Bridge Type 3 - Steel
 09 - Truss - Deck
 N- Not Applicable
 45: Spans Main / Approach 10 / 30
 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 40.2 SD/FO 2 - FO
 36: Rail, Tr, Gd, Term Std 1 1 1 1
 72: Approach Alignment 6 - Equal to present minimum criteria
 113: Scour Critical 8 - Stable for scour conditions
 71: Waterway Adequacy 9 - Bridge Above Flood Water Elevations

422: WS Date 01/01/1992
 423: WS Thick (in) 1.2
 482: Protective Coating 8 - Paint System A with
 intermediate tie coat
 483: PCS Date 01/01/1984
 453: Bearing Type 1 0 - Other
 455: Bearing Type 2 N - None
 528: Foundn: Abut Fwd 4 - Spread Footing (on soil)
 533: Foundn: Abut Rear 4 - Spread Footing (on Soil)
 536: Foundn: Pier 1 2 - Cast-in-Place Reinforced
 Concrete Piles (Other diameter)
 539: Foundn: Pier 2 N - None (Such as most Culverts)

Geometric	422: WS Date
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48: Max Span Length (ft) 400.0
 49: Structure Length (ft) 6580.0
 52: Deck Width, Out-To-Out (ft) 85.5
 424: Deck Area (sf) 562590
 32: Appr Roadway Width (ft) 70.0
 51: Road Width, Curb-Curb (ft) 82.0
 50A: Curb/SW Width: Left (ft) 0
 50A: Curb/SW Width: Right (ft) 0
 34: Skew (deg) 99
 33: Bridge Median 3 - Closed median with non-
 mountable barriers
 54B: Min Vert Underclearance (ft) 14.08
 336A: Min Vert Clrnce IR Cardinal (ft) 99
 336B: Min V Clr IR Non-Cardinal (ft) 0
 578: Culvert Length (ft) 0

Age and Service	422: WS Date
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27: Year Built/ 106 Rehab 1939 / 1992
 42A: Service On 5 - Highway-pedestrian
 42B: Service Under 8 - Highway - waterway -
 railroad
 28A: Lanes on 06
 28B: Lanes Under 04
 19: Bypass Length 2
 29: ADT 37139
 109: % Trucks (%) 3

Load Posting	422: WS Date
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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 (%) 110
 704: Analysis Date 07/01/2012
 63: Analysis Method 6 - Load Factor (LF) rating reported by
 rating factor (RF) method using MS18
 loading.

Inspections	422: WS Date
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		<i>Months</i>	
90: Routine Insp.		12	07/21/2021
92A: FCM Insp.	Y	24	07/25/2019
92B: Dive Insp.	N	0	
92C: Special Insp.	N	0	
92D: UBIT Insp.	Y	12	08/14/2020
92E: Drone Insp.			

Inspector Rufener,Justin

Inspector: Justin Rufener
 Inspection Date: 07/21/2021

Structure Number: 1800035
 Facility Carried: SR 2

Bridge Inspection Report

Element Inspection

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
12 - Reinforced Concrete Deck	3 - Mod.	502787	sq. ft.	487593	15094	100	0
	<p>CS2: In Unit 1 the haunches in the deck above the stringers in these sections have areas of minor spalling. In Unit 1, Section P, the underside of the deck has cracking with efflorescence throughout. Isolated edge delaminations throughout.</p> <p>CS3: The underside of deck exhibits spalling at several joint locations in Unit II. Isolated edge spalls throughout.</p>						
510 - Wearing Surfaces		464586	sq. ft.	430483	33873	230	0
	<p>CS2: Minor abrasion in the wheel path and isolated hairline map cracking. Areas of bituminous patching</p> <p>CS3: Isolated areas of surface abrasion and spalling up to 1" deep. In Unit II, Span 6, there is an area of spalling in the wearing surface in Lane 3 Westbound that appears to be due to a vehicle fire</p>						
107 - Steel Open Girder/Beam	3 - Mod.	8898	ft.	7346	1510	42	0
	<p>CS2: Surface corrosion & minor painted over pitting.</p> <p>CS3: In Unit III over West 9th Street, the south fascia beam is misaligned slightly to the north due to vehicular impact. The East Approach, Unit IV Lakefront Trestle consists of riveted built-up girders with isolated areas of painted over pitting up to 1/8" deep and pack rust along the bottom flange up to 1" thick. The East Approach, Unit V Lakefront Ramp superstructure consists of three riveted built-up plate girders with painted over pitting up to 1/16" deep typical on the girder webs with isolated locations of up to 1/4" deep.</p>						
515 - Steel Protective Coating		58000	sq. ft.	57420	580	0	0
	CS2: Areas of surface dulling						
113 - Steel Stringer	3 - Mod.	62103	ft.	61648	455	0	0
	CS2: Surface corrosion.						
515 - Steel Protective Coating		350000	sq. ft.	349300	700	0	0
	CS2: Areas of surface dulling						
116 - Reinforced Concrete Stringer	3 - Mod.	3611	ft.	3503	72	36	0
	<p>CS2: Hairline cracks with and without efflorescence. Isolated patches and delaminations.</p> <p>CS3: Heavy spalls in Unit Unit I, Section P.</p>						

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Bridge Inspection Report

Element Inspection

120 - Steel Truss	3 - Mod.	5360	ft.	1978	2150	1178	54
<p>CS2: Surface corrosion & painted over minor pitting.</p> <p>CS3: Minor to moderate section loss, isolated small perforations, pack rust between plates with up to 2" of distortion.</p> <p>CS4: Advanced section loss & corrosion holes at several locations on lower chord.</p>							
515 - Steel Protective Coating		225000	sq. ft.	202400	22500	100	0
<p>CS2: Areas of surface dulling and surface corrosion (substantially effective).</p> <p>CS2: Areas with limited effectiveness.</p>							
152 - Steel Floor Beam	3 - Mod.	23487	ft.	18141	5111	235	0
<p>CS2: Surface Corrosion</p> <p>CS3: Areas of minor to moderate section loss, painted over pitting up to 1/4" deep, reactivated pack rust. Unarrested cracks in top flange copes at truss connections.</p>							
515 - Steel Protective Coating		230000	sq. ft.	227650	2300	50	0
<p>CS2: Areas of surface dulling and surface corrosion (substantially effective).</p> <p>CS2: Areas with limited effectiveness.</p>							
155 - Reinforced Concrete Floor Beam	3 - Mod.	5407	ft.	5353	54	0	0
<p>CS2: Isolated hairline cracks and areas of delamination</p>							
161 - Steel Pin and Pin & Hanger Assembly or both	3 - Mod.	14	each	11	3	0	0
<p>CS2: Minor painted over pitting on pins and adjacent plates. Minor misalignments of plates.</p>							
162 - Steel Gusset Plate	3 - Mod.	548	each	296	140	112	0
<p>CS2: Areas of surface corrosion</p> <p>CS3: Painted over & reactivated pitting up to 1/4" deep. Pack rust along lower chord members.</p>							
202 - Steel Column	3 - Mod.	151	each	120	31	0	0
<p>CS2: Areas of minor section loss</p>							
515 - Steel Protective Coating		26000	sq. ft.	25740	260	0	0
<p>CS2: Areas of surface dulling and surface corrosion (substantially effective).</p>							
205 - Reinforced Concrete Column	3 - Mod.	268	each	213	53	2	0
<p>CS2: Areas of map cracking, patching and delamination</p> <p>CS3: Few locations of spalling and rust staining</p>							

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Bridge Inspection Report

Element Inspection

210 - Reinforced Concrete Pier Wall	3 - Mod.	55	ft.	20	25	10	0
	CS2: Areas of moderate cracking and delamination						
	CS3: Areas of spalling						
215 - Reinforced Concrete Abutment	3 - Mod.	110	ft.	59	51	0	0
	CS2: Minor vertical cracks with efflorescence and staining.						
231 - Steel Pier Cap	3 - Mod.	5426	ft.	5197	209	20	0
	CS2: Minor painted over pitting in Unit V						
	CS3: Moderate painted over pitting and pack rust up to 1" thick in Unit V						
234 - Reinforced Concrete Pier Cap	3 - Mod.	212	ft.	203	9	0	0
	CS2: Areas of delamination						
300 - Strip Seal Expansion Joint	3 - Mod.	1750	ft.	651	869	230	0
	CS2: Isolated areas of leakage. Minor Debris Impaction. Minor section loss to plates.						
	CS3: Areas of significant debris impaction. Seals depressed up to 1". At Joint O on the westbound side of the bridge, the west joint armor in the left lane near the W. 28th Street exit ramp is loose and banging under vehicular impact						
302 - Compression Joint Seal	3 - Mod.	1055	ft.	382	524	139	10
	CS2: Isolated areas of leakage. Minor Debris Impaction. Minor section loss to plates.						
	CS3: Areas of significant debris impaction. Seals depressed up to 1".						
	CS4: At Joint X, there is a 10 foot section of broken compression seal retainer in westbound lane 3, allowing drainage directly through the joint						
303 - Assembly Joint with Seal	3 - Mod.	595	ft.	222	295	78	0
	CS2: Isolated areas of leakage						
	CS3: Areas of tearing seals.						
311 - Movable Bearing	3 - Mod.	103	each	83	14	6	0
	CS2: Surface Corrosion						
	CS3: Painted over pitting up to 3/16" deep and moderate anchor bolt section loss.						
313 - Fixed Bearing	3 - Mod.	100	each	80	14	6	0
	CS2: Surface Corrosion						
	CS3: Minor to moderate section loss.						
321 - Reinforced Concrete Approach Slab	3 - Mod.	6788	sq. ft.	6788	0	0	0

Inspector: Justin Rufener
 Inspection Date: 07/21/2021

Structure Number: 1800035
 Facility Carried: SR 2

Bridge Inspection Report

Element Inspection

331 - Reinforced Concrete Bridge Railing	3 - Mod.	20150	ft.	17645	2368	137	0
	CS2: Moderate vertical and horizontal cracking, map cracking, poor & failing patches. CS3: Areas of spalling, some with exposed reinforcing.						
815 - Drainage	3 - Mod.	268	each	171	54	27	16
	CS2: Numerous partially clogged scuppers CS3: Numerous mostly clogged scuppers. Some disconnected or clogged downspouts. CS4: Several fully clogged scuppers						
830 - Abutment Backwall	3 - Mod.	110	ft.	50	60	0	0
	CS2: Minor vertical cracking with staining.						

ODOT District: District 12

CUY-00002-1441_(1800035)

Date Built: 07/01/1939

Major Maint: 01 - State Highway Agency

Facility Carried: SR 2

Traffic On: 5 - Highway-pedestrian

Rehab Date: 07/15/1992

Routine Maint: 04 - City or Municipal Highway Agency

Feature Inters: CUY RIVER,RTA,FLATS

Traffic Under: 8 - Highway - waterway - railroad

Insp. Resp A: 01 - State Highway Agency

FIPS Code: 16000 - CLEVELAND (CUY county)

Location: DISTRICT 12

MAIN AVE. BRIDGE

Insp

Resp B:

Inspector

Rufener,Justin

Inspection Date 07/21/2021

Reviewer Rufener,Justin

Inspector Comments - Deck and Approach

Deck

Element 12 - Reinforced Concrete Deck (SF)

The replacement deck, opened to traffic in 1992, consists of epoxy coated reinforcement with stay-in-place metal galvanized steel forms. In Unit 1, there are several sections that do not have stay-in-place forms, and the underside of the deck is visible. The haunches in the deck above the stringers in these sections have areas of minor spalling. In Unit 1, Section P, the underside of the deck has cracking with efflorescence throughout. Isolated edge delamination and spalls were noted, often adjacent to the expansion joint armor. At some locations these edge spalls have been sealed. Areas of isolated spalling were noted along the gutter line on the eastbound roadway in Unit II, Main Truss spans. The underside of deck exhibits spalling at several joint locations in Unit II. See the inspection report for additional details.

Element 300 - Strip Seal Expansion Joint (LF)

At Joint O on the westbound side of the bridge, the west joint armor in the left lane near the W. 28th Street exit ramp is loose and banging under vehicular impact. The west joint header exhibits spalls on the top of deck at the area of loose joint armor. Throughout the structure, joints have significant debris impaction and corrosion with section loss typically 3/16" deep on the joint plates. Some joints are depressed up to 1" deep. Isolated joints exhibit evidence of leakage. See the inspection report for additional details.

Element 302 - Compression Joint Seal (LF)

At Joint X, there is a 10 foot section of broken compression seal retainer in westbound lane 3, allowing drainage directly through the joint. Throughout the structure, joints have significant debris impaction and corrosion with section loss typically 3/16" deep on the joint plates. Some joints are depressed, up to 1" deep. Isolated joints exhibit evidence of leakage. See the inspection report for additional details.

Element 303 - Assembly Joint with Seal (LF)

At Joint L

between Spans 5 and 6, the joint header on the east side of the joint is delaminated and spalling with loose concrete falling onto the catwalk below. This joint is located over Elm Street in Unit II. There are scattered areas of minor tearing and leaking in the seals. See the inspection report for additional details.

Element 331 - Reinforced Concrete Bridge Railing (LF)

The median and railing constructed during the 1991-1992 rehabilitation were poured using slip form construction. Both the median and the parapets were repaired in the last rehabilitation project between 2017 and 2018. Vertical, horizontal, and map cracking are common throughout the bridge railings. Many of the large spalls facing traffic were patched, however, isolated patches are spalled again. Several spalls exhibit exposed reinforcing steel. Many of the spalls previously

noted on the exterior faces of the parapets have been sealed; however, surface corrosion is reactivating on the exposed reinforcing bars that were sealed, and some of the sealed concrete is delaminating. There are scattered areas with new spalls and delamination of the exterior of the parapets. Spalls exist in the bridge railing at or near the deck joints. There are isolated spalls up to 3" deep in the median. See the inspection report for additional details.

Element 510 - Wearing Surface (SF)

The wearing surface consists of a 1.2" layer of latex modified concrete on top of the reinforced concrete deck. Typical deterioration includes minor wear in the wheel path and isolated minor hairline cracking. There are isolated areas of surface scaling or spalling up to 1" deep (*Photo 510-1*). Some of the scaled/spalled areas are patched with bituminous material. There is spalling up to ½" deep along the joints and areas of vegetation are growing along the curb line. In Unit II, Span 6, there is an area of spalling in the wearing surface in Lane 3 Westbound that appears to be due to a vehicle fire. See the inspection report for additional details.

Element 815 - Drainage (EA)

The scuppers and catch basins along the edge of roadway are partially or fully clogged with debris that is visible from the top of deck. Many of the scupper catch basins, including those inside vaulted areas are fully clogged with dirt, debris and water. In Unit IV, near Bent 15, the scupper catch basing is heavily spalled and the grate has fallen out of place. In Unit II, Span 2, the downspout at the South Truss panel point L6U6 is broken which is allowing water to drain directly onto the superstructure. At the Pier 5 South Column, the bottom angle scupper piece is broken. In Unit II Span 9, the north scupper downspout is disconnected and a portion of the downspout could fall into the river below. See the inspection report for additional details.

Lighting

The deck lighting consists of metal poles with cobra head fixtures. Several pull boxes at the base of the light poles across the structure have either missing or loose covers with exposed wiring. See the inspection report for additional details.

Approach

Element 321 - Approach Slab (SF)

The approach slabs are in Good condition. The asphalt joints at the ends of the west approach slabs have areas of cracking, patching and heaving. See report for detailed locations and descriptions of deficiencies.

Approach Wearing Surface

The approach wearing surfaces are in Fair condition. The West Approach wearing surface exhibits numerous potholes and asphalt patches, especially in the eastbound lanes. Several patched areas exist on the West Approach. There are potholes and asphalt patches in the East Approach wearing surface. See report for detailed locations and descriptions of deficiencies.

Embankment

The approach embankments are in Good condition. There is an 8' long x 4' wide x 2' deep sinkhole near the North column of Bent 30 in Unit IV. The sink hole has grown in size since the 2020 inspection and there are still traffic cones delineating the hole. See report for detailed locations and descriptions of deficiencies.

Guardrail

The approach guardrails are in Satisfactory condition. There are areas of cracking and spalling in the approach concrete barrier. At the westbound exit to W 28th St, the impact attenuator is heavily damaged.

Security Items

The fenced in area under Unit V is accessible due to an open gate on the southeast end of Pier 37. Due to this opening, there is evidence of a homeless encampments within the fenced in area.

Signs

The signs on the structure are in Good condition. In Unit V, there is a missing sign curve warning sign in the Eastbound lanes

Inspector Comments - General Appraisal

Superstructure

Element 107 - Steel Open Girder/Beam

The West Approach, Unit I, Section K / C and N superstructure consists of rolled beams, welded plate girders, and riveted built-up plate girders. Typical conditions found include areas of minor corrosion and broken rivets.

In Unit III over West 9th Street, the south fascia beam is misaligned slightly to the north due to vehicular impact. There are also impact scrapes visible on the recently painted bottom flange. Beam FSS was previously heat straightened and nearly returned to its original alignment. Measured minimum clearance at this beam is 13'-6" (posting) feet along the right curb.

The East Approach, Unit IV Lakefront Trestle consists of riveted built-up girders with isolated areas of painted over pitting up to 1/8" deep and pack rust along the bottom flange up to 1" thick. There are cutouts in the girder webs up to 11.5" L x 10" H in various locations throughout Unit IV. These cutouts are present for drainage troughs that were removed in 1991.

The East Approach, Unit V Lakefront Ramp superstructure consists of three riveted built-up plate girders with painted over pitting up to 1/16" deep typical on the girder webs with isolated locations of up to 1/4" deep. At several locations the bottom flange plates are distorted due to sealed pack rust.

See the inspection report for additional details.

Element 113 - Steel Stringers (LF)

The steel stringers across the structure were replaced in the 1991-1992 deck replacement project. The stringers on the approaches were all repainted in the recent rehabilitation project. Typical conditions found are isolated freckled corrosion across the structure. See the inspection report for additional details.

Element 116 - Reinforced Concrete Stringers (LF)

The reinforced concrete stringers in West Approach Sections D, M, J', P, and B' are in overall Satisfactory condition. There are hairline cracks with and without efflorescence throughout the concrete stringers. There are isolated patches throughout the stringers with some areas of unconsolidated concrete and delaminations. The stringers in Section P are in fair to poor condition. There are spalls and delaminated areas up to 12' long x 4' high and isolated spalls up to 3" deep in stringers in Section P. See the inspection report for additional details.

Element 120 - Steel Truss (LF)

Overall, the truss members are in Fair condition with typical areas of painted over minor section loss, pitting, reactivated pack rust, distortion due to pack rust, and surface corrosion throughout all truss members. A summary of defects on each truss member type is listed below.

The truss verticals exhibit varying section loss due to pack rust between the gusset

plates, fill plates, cover plates, and vertical flanges.

The truss

diagonals exhibit section loss with pitting typical in the top face of the web plates of the rolled sections and pack rust induced distortion along the flanges and connection fill plates. There are locations where section loss in the web was repaired with bolted repair plates.

The truss

upper chord exhibits areas of painted over section loss, pitting, and pack rust induced distortion.

There are isolated areas of reactivating corrosion near the joints.

The lower

chord exhibits more numerous deficiencies across the structure. Section loss is affecting up to approximate 25% of the total calculated length of the lower chord members. These

areas include section loss due to previously noted and reactivated areas of pack rust and pitting. There are previously caulked areas of pack rust at the lower chord to gusset plate interfaces that are cracked and no longer effective. There are numerous locations noted of pack rust, both sealed and reactivated, located between the flange angles and the web plates that are distorting the web plates up to 2" high. Isolated perforations are also noted along the top and bottom flange plates. The Unit II lower chord (Span 8, L2425) at the South Truss, has a full length retrofit around the original steel member. There is minor surface corrosion on the retrofit bolt heads at this location.

The lower

lateral bracing and sway exhibits areas of pack rust and pitting, with areas of painted over corrosion holes.

Isolated locations exhibit missing rivets and broken and painted over section loss on the rivet heads. The connection plates have areas of significant section loss with isolated corrosion holes typical.

See the inspection report for additional details.

Element 152 - Steel Floorbeam (LF)

The

floorbeams were recently repainted in Unit I, Unit III, Unit IV, and Unit V. Typical conditions found in those areas include areas of painted over pitting up to 1/4" deep and reactivated areas of pack rust and freckled surface corrosion. Behind some of the removed stringer connections, there are painted over corrosion holes in the webs. Weld remnants and

random attachments remain on the floorbeams from previous drainage assemblies.

In the Unit II main truss spans, areas of painted over pitting were found along the bottom of top flange tension tie plates connecting the center floor beam section and the floor beam cantilever brackets. In Unit II, there are cracks present in the floorbeam webs at the top flange cope, adjacent to the truss lines. There are several new crack locations that were not previously noted, and several of the previously noted cracks have grown since the 2020 inspection. See the inspection report for additional details.

Element 155 - Reinforced Concrete Floorbeam (LF)

There are reinforced concrete floorbeams in the West Approach, Unit I, Section J, B', M, D and P. In Section P, there are isolated hairline cracks and areas of delamination throughout the floorbeams, and several locations of spalling with exposed reinforcing. See the inspection report for additional details.

Element 161 - Steel Pin and Pin & Hanger Assembly (EA)

The pins, hangers, and hinges are in **Good condition**. In Unit II, the pins exhibit painted over pitting with some active corrosion due to deck joint leakage. In Span 9, South Truss at L0L1 the inboard and outboard oval pin plates have rotated. The pin plates are rotated to the point where they are in contact with gusset stiffening channels on both the inboard and outboard gusset. The channel flange/rivets are beginning to push the edge of the pin plate outward.

In the Unit IV, there are pin and hanger locations where rivet heads on the girders interfere with hangers. Evidence of movement of the pin and hanger was noted due to cracked paint between the hangers and the beam webs. Isolated pins exhibit painted over pitting less than 1/8" D.

See the inspection report for additional details.

Element 162 - Steel Gusset Plate (EA)

The truss gusset plates typically exhibit painted over pitting up to 1/4" deep. There are several locations of reactivating pitting throughout the Main Truss spans. There is pack rust between various truss members and gusset plates at both the upper and lower chords. Fill plates across the structure typically exhibit painted over section loss with up to 100% section loss in isolated locations outside of the gusset plates. See report for detailed locations and descriptions of deficiencies.

Element 311 - Moveable Bearings (EA)

The moveable bearings in Unit II exhibit moderate surface corrosion throughout the bearing components. Several bearings in Unit II have standing water and debris accumulation in the bearing assembly. The moveable bearings in Unit III were cleaned and in the latest rehabilitation project. Typical conditions found are painted over section loss up to 3/16" deep throughout the lower portion of the columns and cleaned and caulked areas of pack rust. The anchor bolts at the base of Bents 1 through 10 exhibit moderate painted over section loss. Masonry plates typically exhibit painted over pitting up to 3/16" deep. In Unit V the moveable bearings have widespread painted over pitting. See report for detailed locations and descriptions of deficiencies.

Element 315 - Fixed Bearings (EA)

The fixed bearings in Unit II exhibit moderate corrosion and section loss throughout the bearing components. Several bearings in Unit

II have standing water and debris accumulation in the bearing assembly. See report for detailed locations and descriptions of deficiencies.

Element 515 - Steel Protective Coating System (SF)

The PCS in the Main Truss Spans was applied in 2007. The PCS in the West Approach, Forward Section, Lakefront Trestle, and Lakefront Ramp was applied in 2017 and 2018 and is in very good condition. The paint system in Unit II typically exhibits fading and reactivating corrosion throughout with isolated locations of moderate active corrosion. See report for detailed locations and descriptions of deficiencies.

Superstructure Alignment

In Unit II, there are several pin locations along the upper chord and lower chord where the trusses are not aligned along a linear plane. This is due to an intentional change in alignment of the structure. These locations should continue to be monitored. In Unit III, between Bent 11 and Bent 12, the southern fascia beam over West 9th Street is misaligned due to numerous hits from vehicles travelling northbound. Beam FSS was previously heat straightened and nearly returned to its original alignment. Measured minimum clearance at this beam is 13'-6" (posting) feet along the right curb. In Unit III, between Bent 8 and 9, the south diagonal is bent upward and to the South due to vehicular impact. The member has not been braced or straightened. In Unit IV, Section E at Bent 26, the north girder bottom flange on the north side is bent at Joint B4 and the pin nuts shown evidence of movement. Continue to monitor this location. Historic remarks: Isolated stringer sliding bearings exhibit minor vertical misalignment at the bearing interface in the East Approach Trestle Section.

Fatigue Prone Details

No fatigue distress was noted at locations of tack welds and welded cover plates in the West Approach and Trestle Sections. Previous cracks (not necessarily fatigue related) have been drilled and do not exhibit additional growth. Unit IV, Lakefront Trestle, Bents 14 and 15, Section A, an obsolete utility bracket is welded to the south twin girder. The top flange weld on the field splice of Girder GF2 has a deep crevice between adjacent weld passes. Both of these welded connections represent stress risers and potential fatigue prone details. See report for detailed locations and descriptions of deficiencies.

Substructure

Element 202 - Steel Column (EA)

The steel bents in Unit I, Unit III and Unit IV exhibit areas of painted over pitting up to 3/16" D and isolated painted over corrosion holes. There are areas of painted over pack rust up to 1/4" thick between plates. The anchor bolts nuts exhibit up to 40% painted over section loss. Anchor bolts have painted over section loss up to 75%. The reinforced concrete bases exhibit isolated spalls up to 4" deep. See report for detailed locations and descriptions of deficiencies.

Element 205 - Reinforced Concrete Columns (EA)

In Unit I, Section M and D, the reinforced concrete columns are generally in good condition with one isolated column with significant spalling. In Unit I, Section P, several of the columns have areas of delamination. The columns in Unit II typically have areas of cracking with rust staining and some areas of delamination. See report for detailed locations and descriptions of deficiencies.

Element 510 - Reinforced Concrete Pier Wall (LF)

The reinforced concrete pier walls are in Good condition. Pier 37 between Units IV and V has several areas of delamination, spalling and cracking, especially on the bearing pedestals. See report for detailed locations and descriptions of deficiencies.

Element 215 - Reinforced Concrete Abutment (LF)

The abutments are in Good condition. There are isolated areas of hairline vertical cracking with isolated areas of efflorescence and water staining. In Unit V, the East Abutment exhibits areas of patched concrete. See report for detailed locations and descriptions of deficiencies.

Element 231 - Steel Pier Caps (LF)

The pier caps are in Good condition. The steel pier caps at Pier 38, 39 & 40 in Unit V exhibit painted over pitting and pack rust up to 1" thick. See report for detailed locations and descriptions of deficiencies.

Element 234 - Reinforced Concrete Pier Caps (LF)

The Pier caps are in Good condition. In Unit I, there are areas of delaminations in the underside of Pier O in Section P near the middle of the cap. The Pier 12 cap in Section M exhibits a spall with exposed reinforcing steel. In Unit II, Pier 10 Cap exhibits a patched and fiber wrapped area on the underside of the cap. See report for detailed locations and descriptions of deficiencies.

Element 830 - Abutment Backwalls (LF)

The backwalls are in Good condition. Minor vertical cracking and staining are present on the East Abutment backwall. See report for detailed locations and descriptions of deficiencies.

Wingwalls

The wingwalls are in Good condition.

Mask Walls

In Unit I, there are mask walls in each section except for B and J where the roadway is built on fill. The mask walls have significant areas of spalling, delaminations, and cracking on the inside and outside faces of the walls. Several spalls exhibit exposed reinforcing steel with significant section loss. In Section C & K, some of the delaminations are above pedestrian walkways.

In Unit III, there are mask walls at the north and south chambers east of West 9th Street. The inside faces of the walls have significant areas of spalling, delaminations and cracking. Several spalls have exposed rebar with up to 100% section loss.

See report for detailed locations and descriptions of deficiencies.

Substructure Scour

Sea walls are present along both riverbanks, providing protection for Pier 8 and 9.

Culvert

Inspector Comments - Waterway

Waterway Adequacy

Channel

Channel Allignment

The alignment is in Good condition.

Channel Protection

The channel protection is in Good condition. Historic Remark: Isolated erosion holes exist in the area between Pier 9 and the river wall.

Channel Hydraulic Opening

The hydraulic opening is in Good condition. The hydraulic opening is sufficient.

Channel Navigation Lights

The navigation lights are in Good condition.

Scour Critical

APPENDIX F – FRACTURE CRITICAL MEMBER PLAN

Ohio Department of Transportation



Fracture Critical Member and Fatigue Prone Connection Identification Plan

Reference: ODOT Manual of Bridge Inspection Chapter 4 and Appendix E

District: 12
County-Route-SLM: CUY-002-1441
Structural File Number: 1800035

Fatigue Life Study: Year of Study N/A Remaining Fatigue Life N/A

Load Path Redundant: No, structure is fracture critical, inspect FCM's every 24 months

Structurally Redundant: No, acts as simple spans

Internally Redundant: Yes/No, some built up riveted members present

System Redundant: Analysis has not been performed to determine

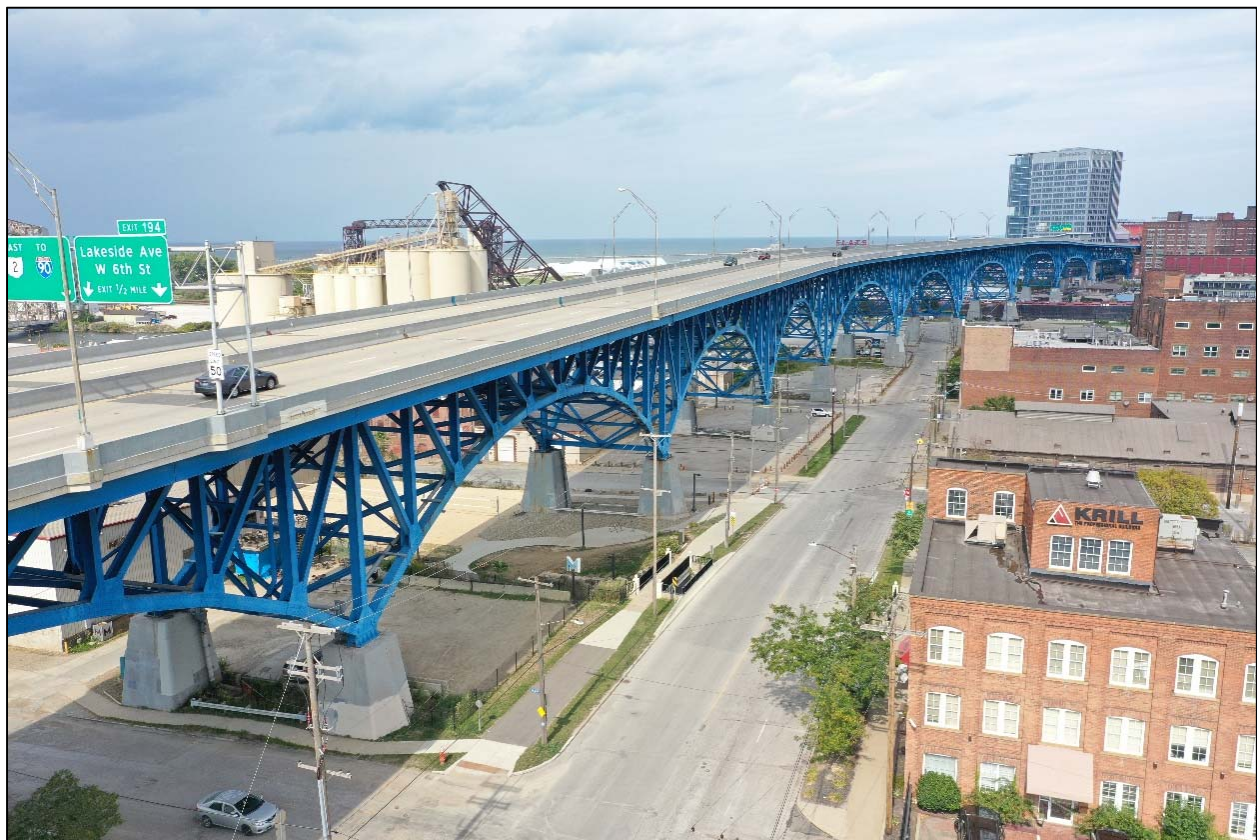


Figure 1: CUY-10-1613 over the Cuyahoga River

Location: CUY-2-1441 (SFN 1800035), commonly known as the Main Avenue Bridge, carries four to six lanes of vehicular traffic over the Cuyahoga River Valley, local streets, parking lots, GCRTA Waterfront Line tracks and Norfolk Southern Railroad Tracks.

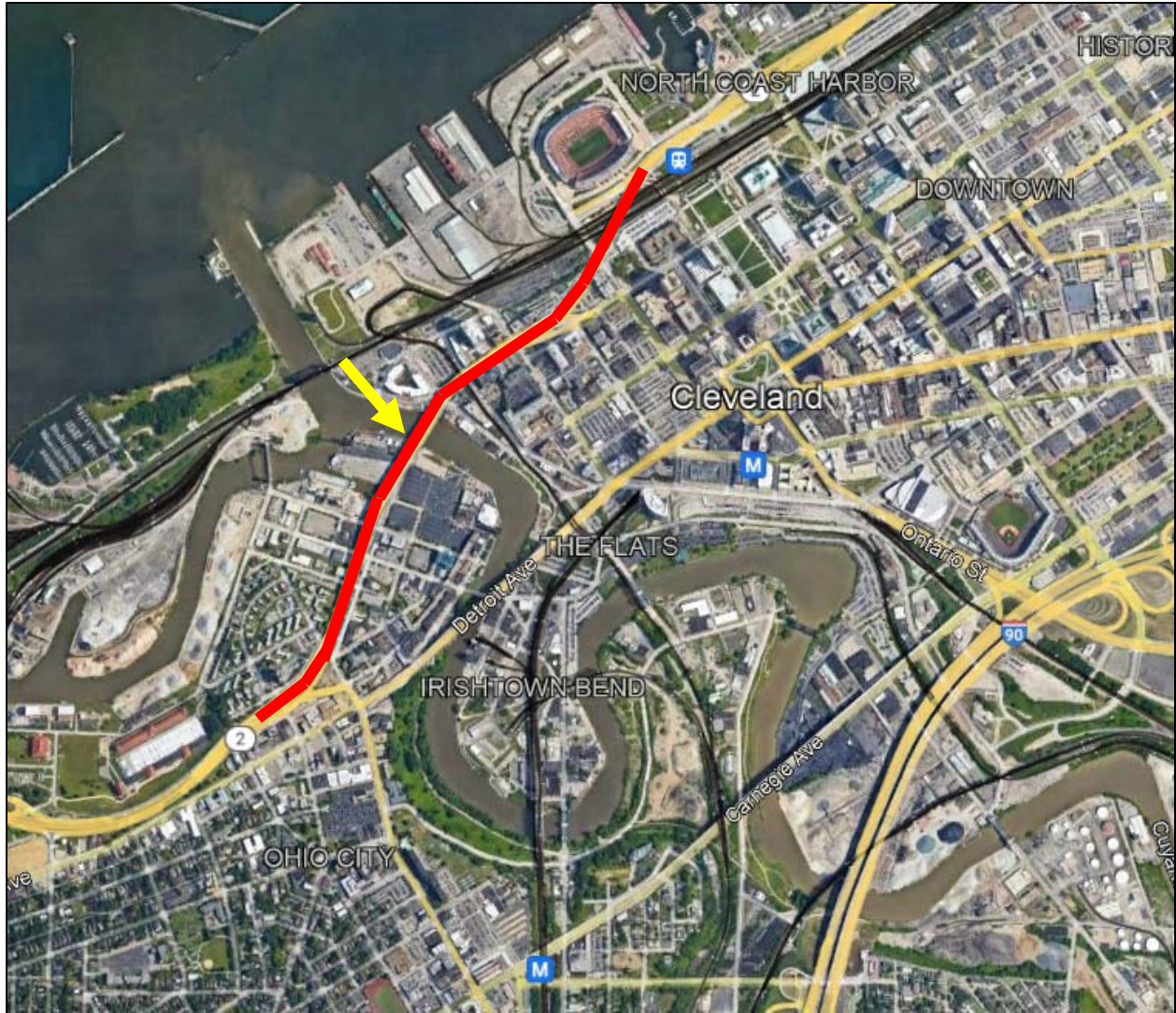


Figure 2: CUY-2-1441 in Cleveland over the Cuyahoga River

Description: The bridge is approximately 6,580 feet long. The bridge is comprised of five sections referred to as the West Approach, Main Truss Spans, East Approach – Forward Section, East Approach - Lakefront Trestle Section, and East Approach - Lakefront Ramp Section:

Unit I - West Approach: The West Approach section consists of east and west bound structures separated by the ramps at W. 28th Street. Each portion of the structure carries three lanes of traffic from near West 29th Street to 250 feet east of West 25th Street. These separate structures then merge into one structure near West 25th Street. There are eight individual units, with varying structure types. The four main structure types are: Transverse rigid concrete frames supporting a concrete deck slab (Sections B', D, J' and M), concrete stringers and diaphragms (Section P), longitudinal rigid steel frames supporting floorbeams and stringers (Sections C, K and L'), and a steel floorbeam/stringer system (Section N).

Fracture critical members: Steel floorbeams and longitudinal frames in Sections C, K and N.

Unit II - Main Truss Spans: Ten (10) spans of two (2) lines of cantilever Pratt deck style trusses. Truss spans vary from 200' to 400'.

Fracture critical members: All floorbeams and select truss chords, diagonals, pins and gusset plates. See *Figure 3* for locations of fracture critical truss chords and diagonals.

Unit III - East Approach – Forward Section: The unit consists of a single span Pratt deck style truss (Span 11), and fourteen (14) spans of steel truss bents that support rolled steel floorbeams with rolled steel stringers bearing on top. Below the eastbound lanes there is lower set of floorbeams which used to support a utility deck.

Fracture critical members: All upper deck floorbeams; Select truss chords, diagonals and gusset plates in Span 11. See *Figure 4* for locations of fracture critical truss chords and diagonals in Span 11.

Unit IV - East Approach – East Approach – Lakefront Trestle Section: The units consists of two lines of steel longitudinal rigid frames comprised of riveted built-up beams and columns. Transverse floorbeams frame into the steel longitudinal rigid frames and support rolled stringers.

Fracture critical members: All longitudinal frames and floorbeams.

Unit V - East Approach – Lakefront Trestle Section: The unit consists of three riveted, built-up plate girders with rolled floorbeams and stringers. The floorbeams are spaced at

Fracture critical members: All girders.

FCM Access: A combination of climbing techniques, underbridge inspection vehicles, aerial work platforms, bucket trucks, and ladders were used in previous inspections to achieve arms' length inspection. Alternate techniques to those described below may be employed at the discretion of the inspection team.

Unit I: The fracture critical girders in this unit are mainly accessed using aerial work platforms or bucket trucks, assisted by ladders.

Unit II: The fracture critical truss members and floorbeams in this unit are mainly accessed using underbridge inspection units and aerial work platforms or bucket trucks.

Unit III: The fracture critical truss members and floorbeams in this unit are mainly accessed using underbridge inspection units, aerial work platforms or bucket trucks, and ladders.

Unit IV: The Fracture Critical girders in this unit are mainly accessed using aerial work platforms or bucket trucks, assisted by ladders.

Unit III: The Fracture Critical truss members and floorbeams in this unit are mainly accessed using underbridge inspection units and climbing techniques.

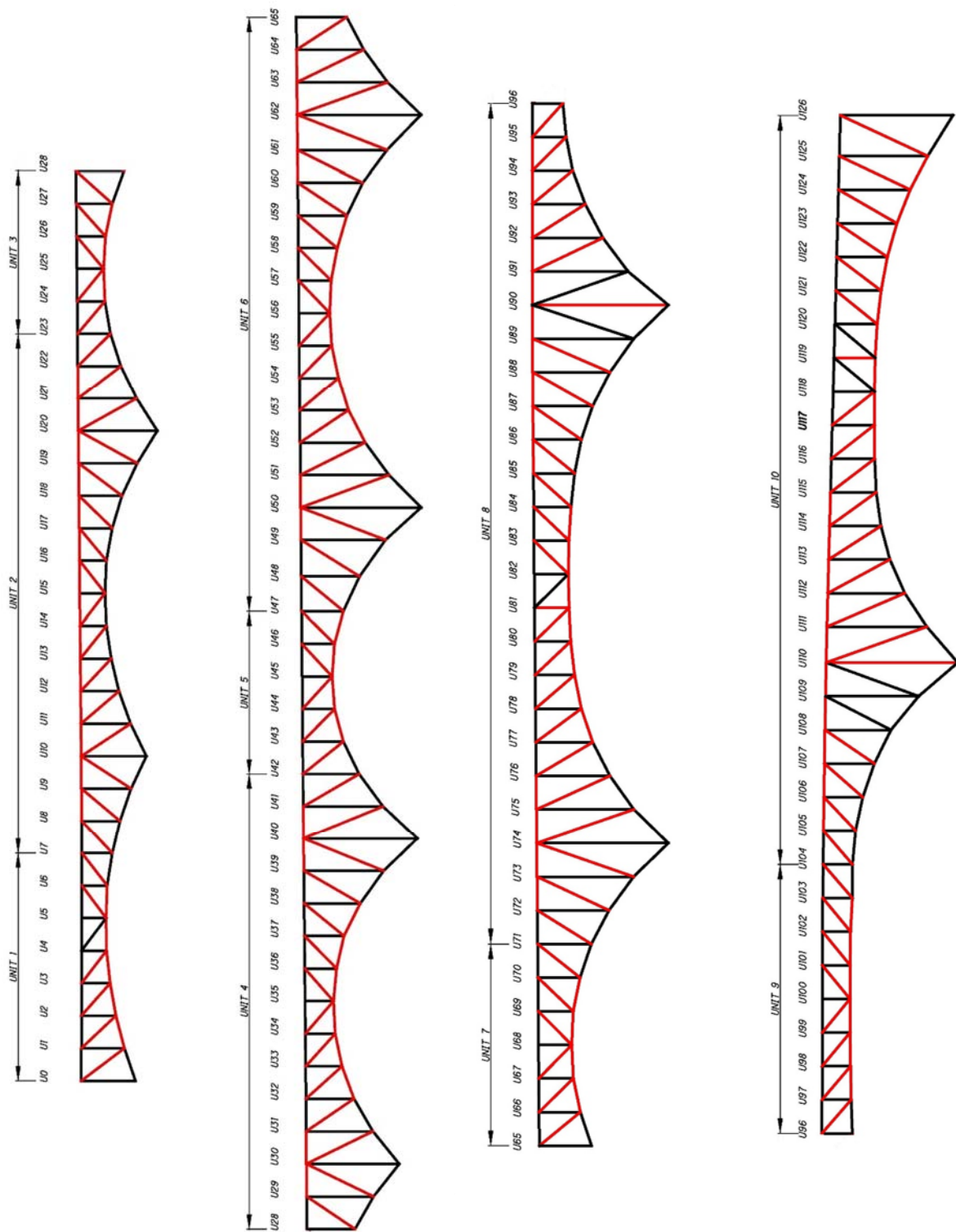


Figure 3: Main Truss Spans Fracture Critical Member Locations (Highlighted Red)

U127 *U128* *U129* *U130* *U131* *U132* *U133* *U134* *U135*

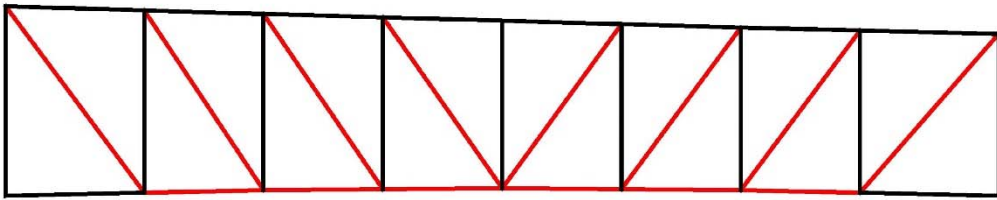


Figure 4: Span 11 Fracture Critical Member Locations (Highlighted Red)

Known Structural Risk Factors & Fatigue Prone Details

Category reference: AASHTO LRFD Bridge Design Specs, 9th Ed. Table 6.6.1.2.3-1

Photo Reference	Label / Fatigue Category	Where?	Description
1	Welded Flange Plates, Fatigue Category E'	Unit I Sections C & K Girders	Ends of field splice plates welded to top and bottom flanges (four girders total with two splice locations on each girder)
2	Abandoned Utility Brackets, Fatigue Category E'	Unit IV Section A Girder Webs	Abandoned utility brackets welded to webs of girders. Some are E/E' depending on length and location.
3	Cracks in Floorbeam Webs	Unit II Floorbeams at truss upper chords	Cracks in coped corners of floorbeam webs adjacent to truss lines in Unit II (Span 1 FBs 0, 6 & 7; Span 2 FB 0; Span
4	Crack in Diagonal Bracing Gusset Plate	Unit III Frame and Braced Column Floorbeam 9	3/4" crack in south diagonal brace gusset plate at the coping for the bottom flange of the upper floorbeam.

*Blank cells are for inspectors to add FPD's, retrofits or fatigue crack locations in future inspections

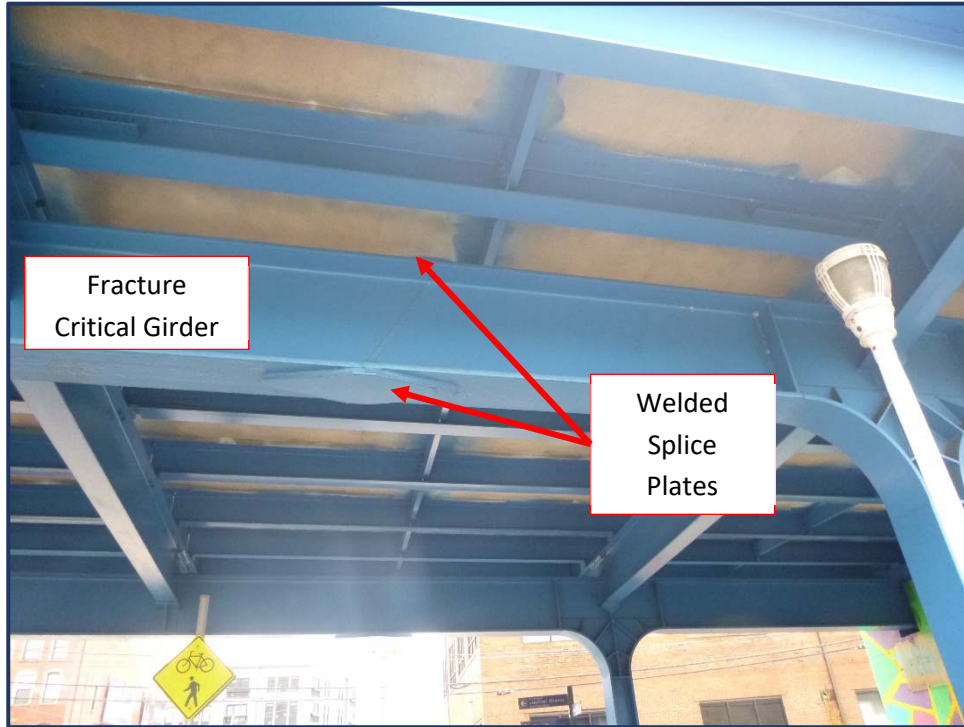


Photo 1 – Welded Cover Plates at Girders in Unit I

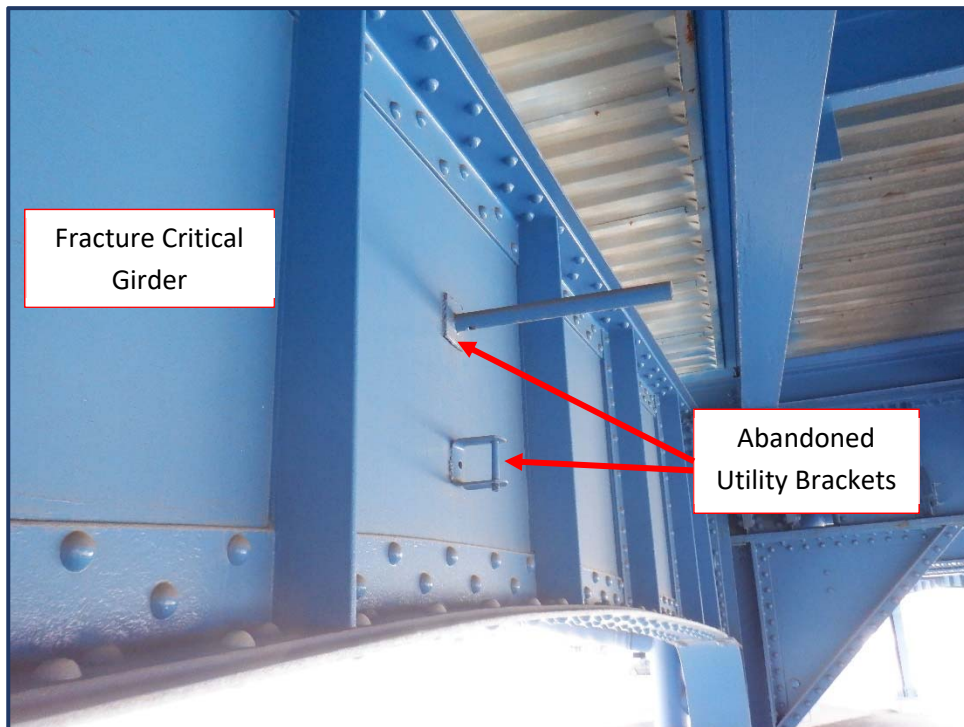


Photo 2 – Abandoned Utility Brackets on Unit IV Girder Webs

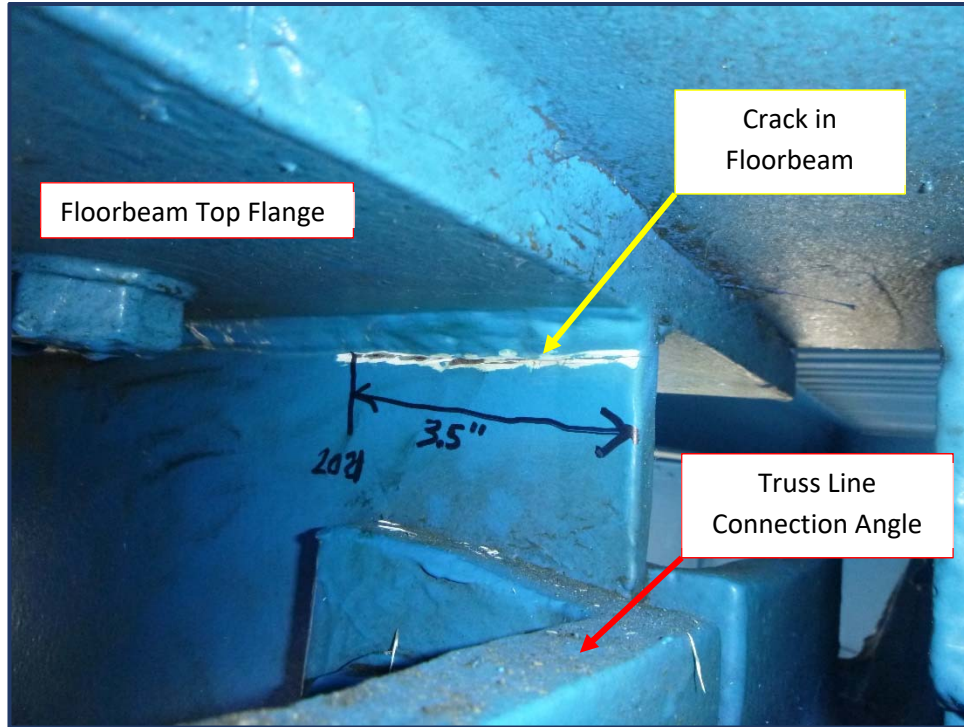


Photo 3 – Cracks in Unit II Floorbeam Web at Top Flange, at Truss Lines

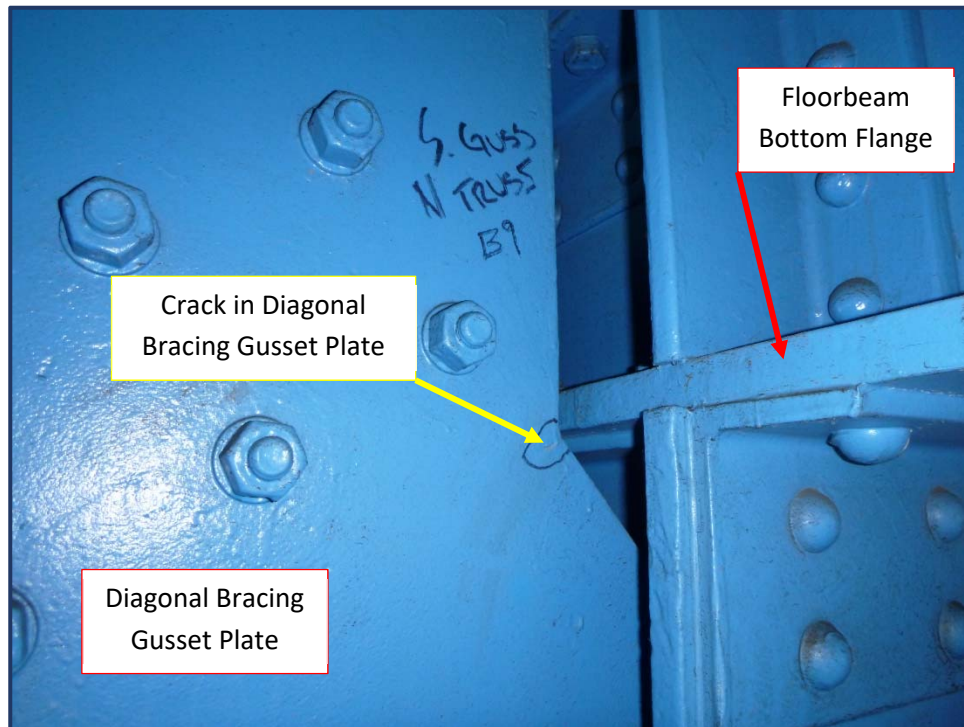


Photo 4 – Crack in Diagonal Bracing Gusset Plate, Unit III, Floorbeam 9, North Column