CUY-2-1441

PHYSICAL CONDITION REPORT
ROUTINE INSPECTION OF MAIN AVENUE BRIDGE
OVER THE CUYAHOGA RIVER
SFN: 1800035

Inspection Date:
July 9 - 12, 2018
Routine Inspection Report

Submitted to:

Ohio Department of Transportation
District 12
5500 Transportation Boulevard
Garfield Heights, OH 44125
United States of America

STATE OF OHIO
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1/31/2019

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INFRASTRUCTURE ENGINEERS
a CONSOR company

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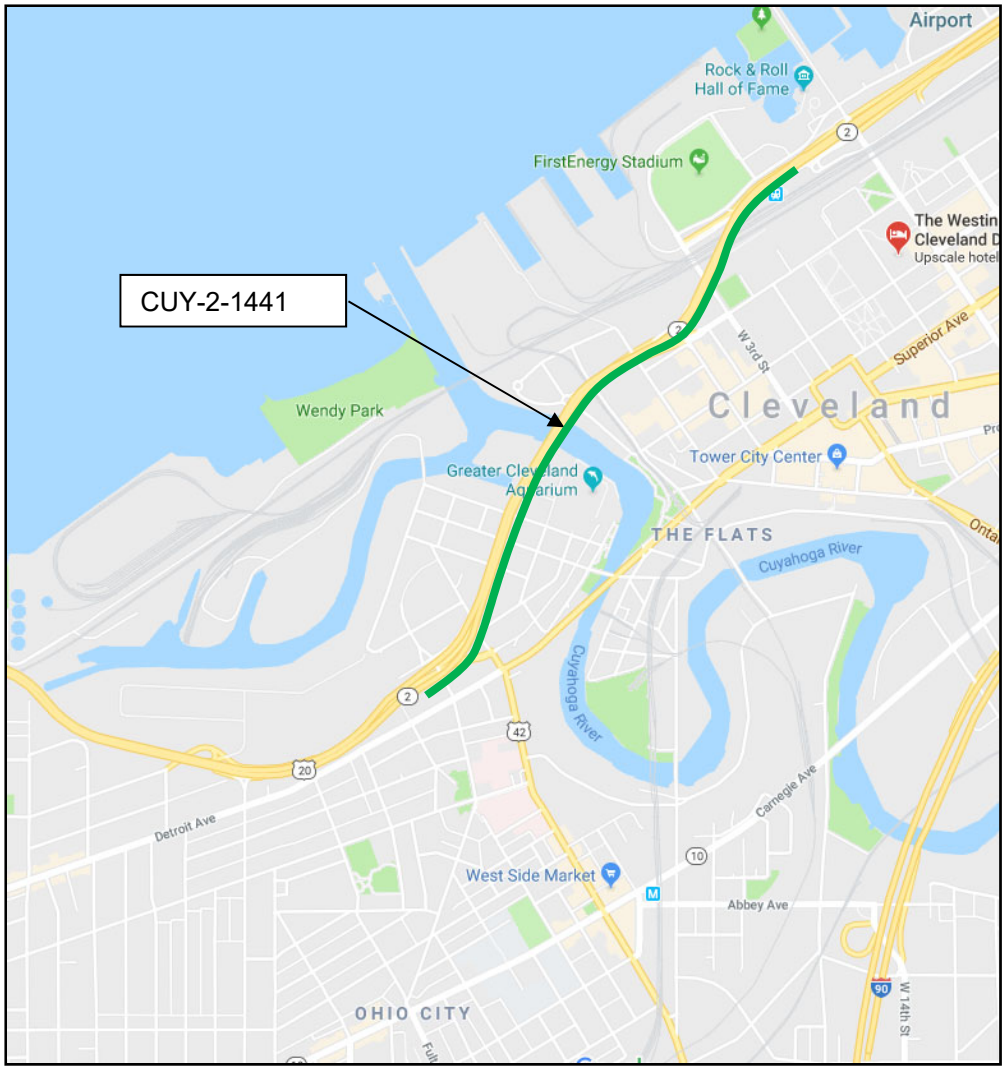
LOCATION MAP



Structure: CUY-2-1441
Main Avenue over Cuyahoga River
Cleveland, Ohio

GENERAL DESCRIPTION

The Main Avenue Bridge (CUY-2-1441, SFN 1800035) carries four to six lanes of State Route 2 traffic through downtown Cleveland. The bridge is 6,580 feet long and crosses over numerous local streets, RTA railroad tracks, Norfolk Southern/CSX railroad tracks and the Cuyahoga River. The bridge was constructed from 1938 to 1940.

The West Approach, Main Truss Spans, and East Approach-Forward sections were opened to traffic on October 6, 1939; and the Lakefront Trestle and Lakefront Ramp were opened to traffic in 1940. The bridge was closed for a major rehabilitation project from April 13, 1991 to October 6, 1992. Work included replacing and widening the deck, updating safety features, improving the drainage system, installing new floor system members, and strengthening or replacing deteriorated sections.

The Main Avenue Bridge consists of five (5) units of varying structure types within each section (Photos I-X).

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

Plan views of the Main Avenue Bridge with the units and sections identified are shown in sketches A-1 through A-5.

The structure's alignment varies over the length of the bridge. Nomenclature of this bridge follows the 1990 rehabilitation plans previous inspection reports. All compass directions will be based upon this relative assignment.

Unit I – West Approach

The West Approach section consists of separate east and west bound structures. Each structure carries three lanes of traffic from 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')
- Steel floorbeam/stringer system (Section N).
  - The steel floorbeam/stringer system consists of continuous stringers bearing on top of floorbeams, which 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

The Main Truss Spans start east of West 25th street and carry six (6) lanes of traffic over the Cuyahoga River Valley and the Cuyahoga River. The Main Truss Spans end near West 10th Street.

The Main Truss Spans consists of:

- Ten (10) cantilevered Pratt deck trusses.
  - The upper and lower chords are composed of riveted built-up box sections and the truss diagonal and verticals are a combination of rolled wide flange section and riveted box sections. The floor system is composed of rolled steel beam stringers set on top of riveted and welded floorbeams. The floorbeams frame into the truss at the upper chord panel point connections.

Unit III – East Approach – Forward Section

The Forward Section starts at West 10th Street, along the base of the Flats and carries the six lanes of traffic from the Cuyahoga River Valley up to West 9th Street.

The Forward Section consists of:

- Steel truss bents supported by 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. 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

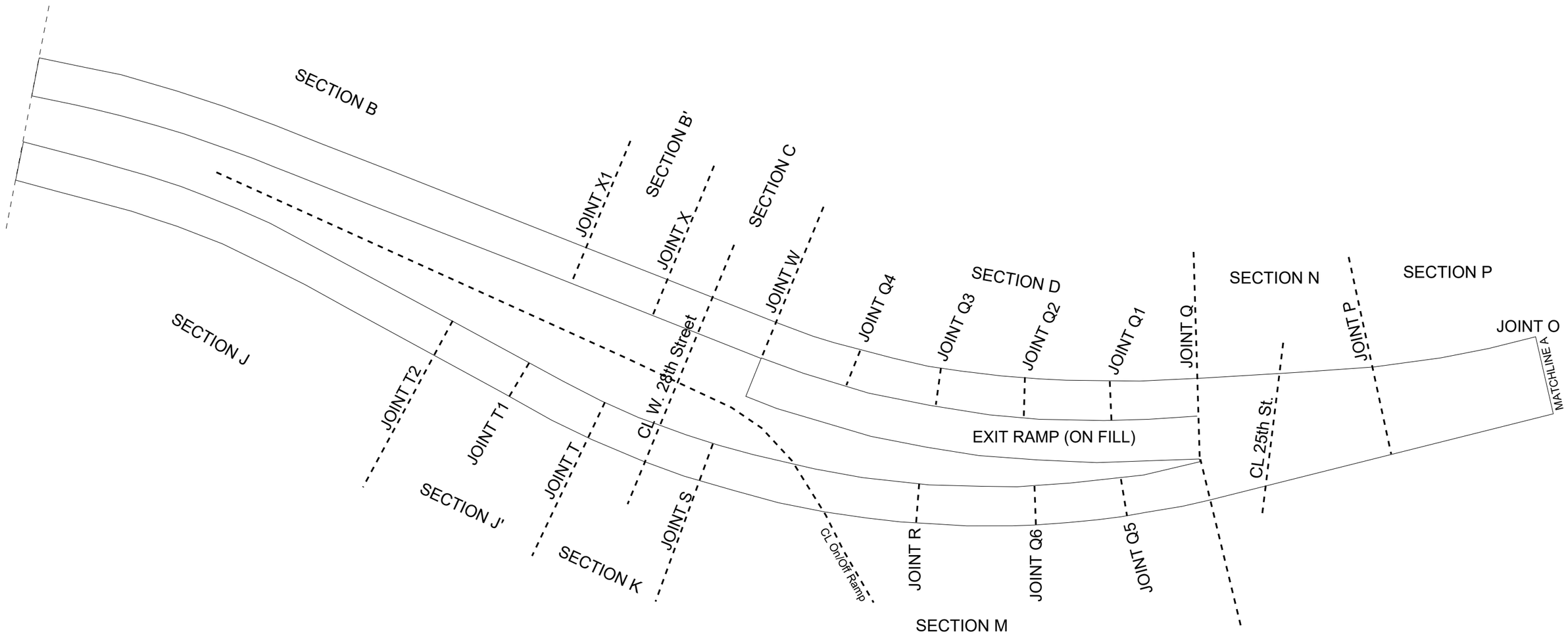
The Lakefront Trestle starts at West 9th Street and continues to West 3rd Street carrying four (4) lanes of traffic.

- The Lakefront Trestle superstructure is supported by two lines of longitudinal rigid steel frames composed of riveted built-up beams and columns. Transverse floorbeams frame into the longitudinal frames and support rolled stringers.

Unit V – East Approach – Lakefront Ramp

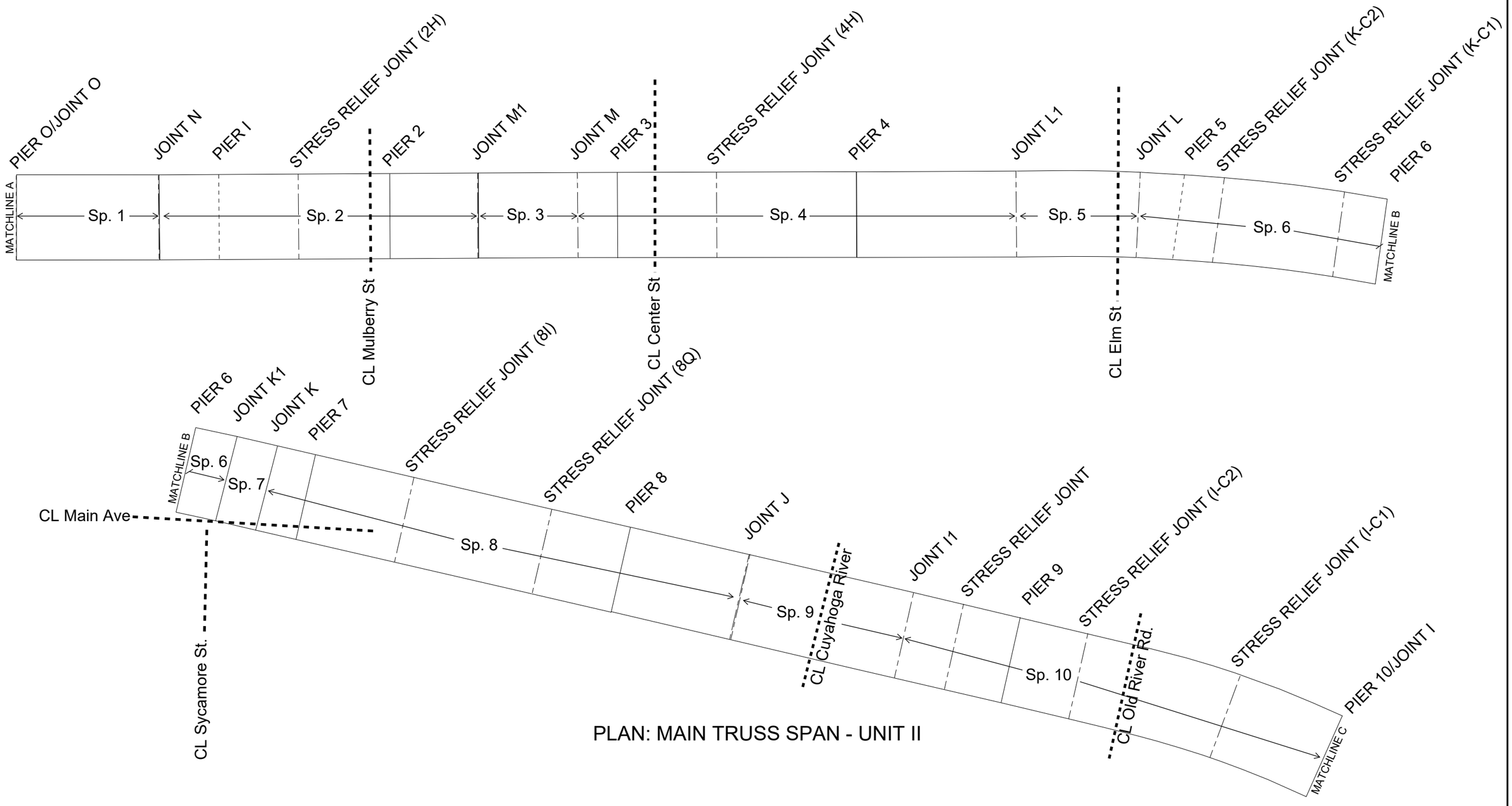
The Lakefront Ramp carries four (4) lanes of traffic, beginning at West 3rd Street, continuing over the RTA and the Norfolk Southern/CSX railroad tracks, and terminating near First Energy Stadium.

- The superstructure consists of three riveted, built-up plate girders with rolled floorbeams and stringers.



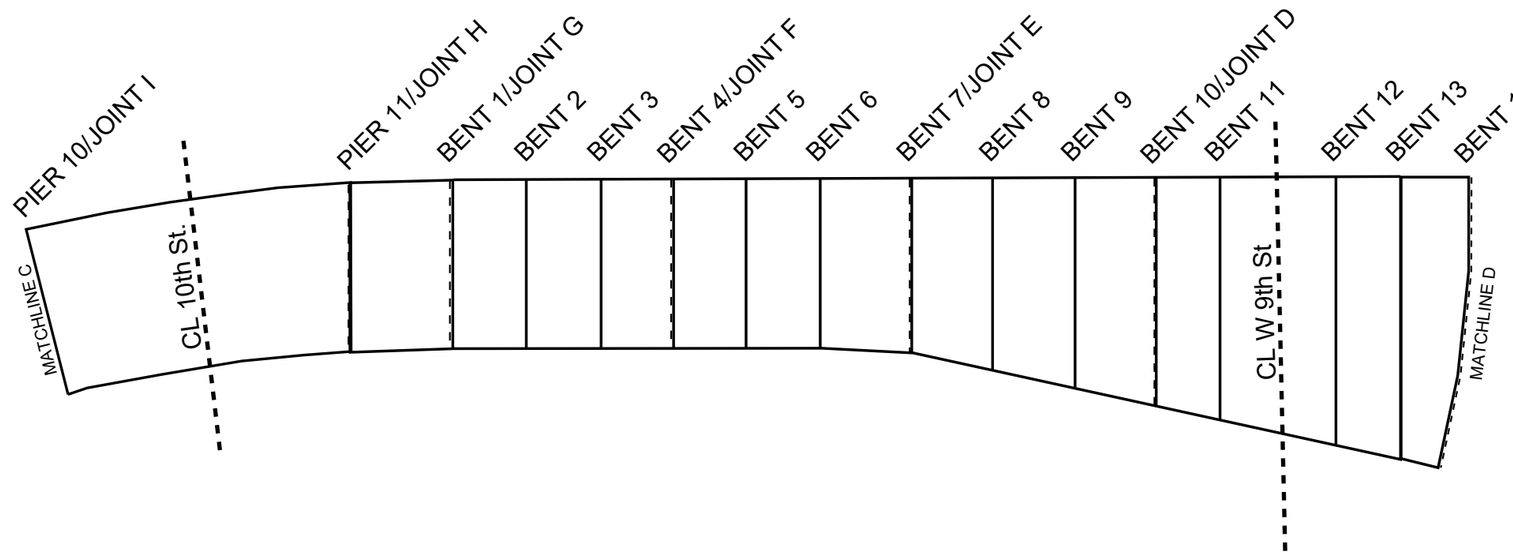
PLAN: WEST APPROACH - UNIT I

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 WEST APPROACH - UNIT I PAGE A-1



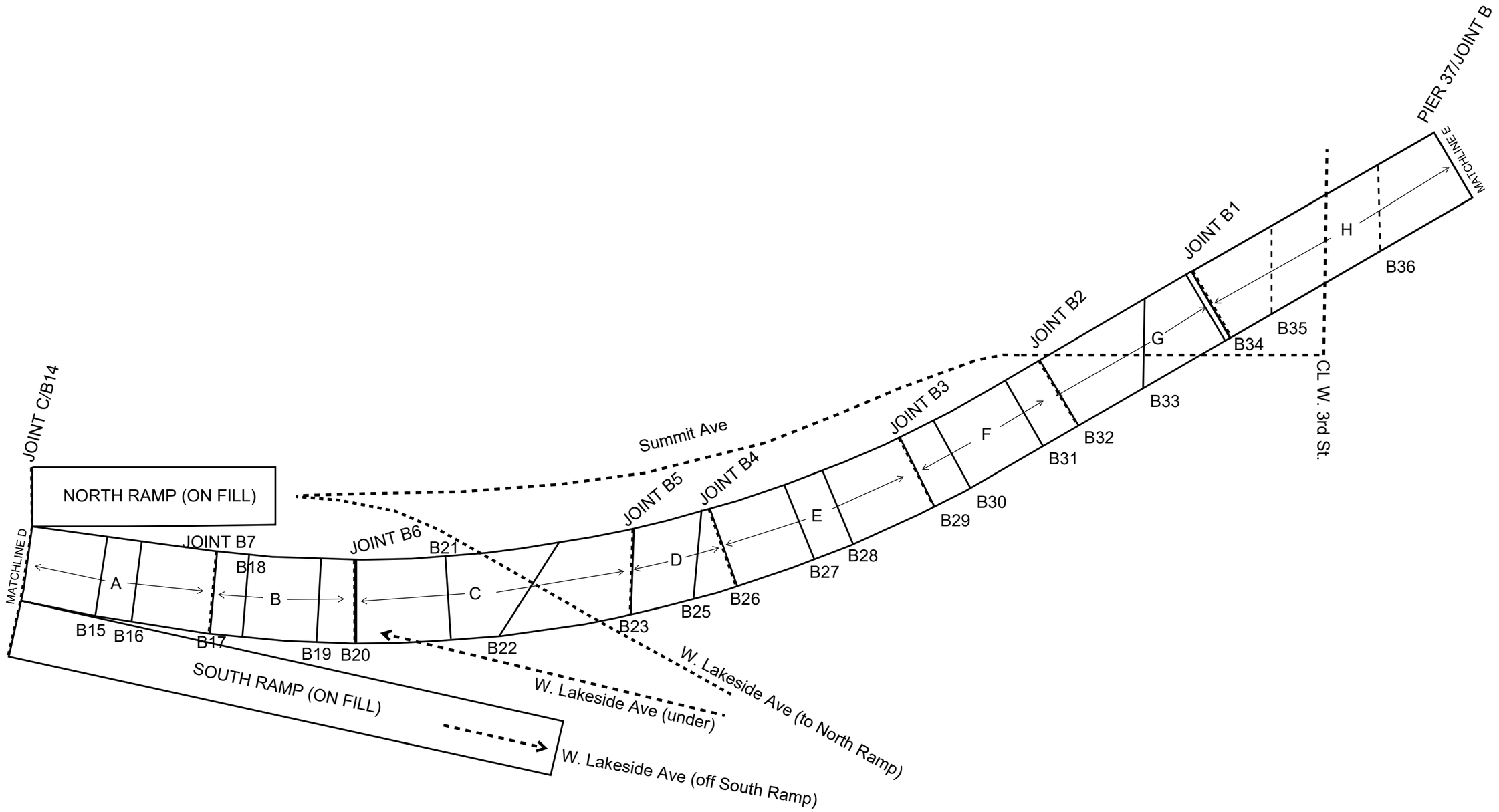
PLAN: MAIN TRUSS SPAN - UNIT II

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 MAIN TRUSS SPAN - UNIT II PAGE A-2



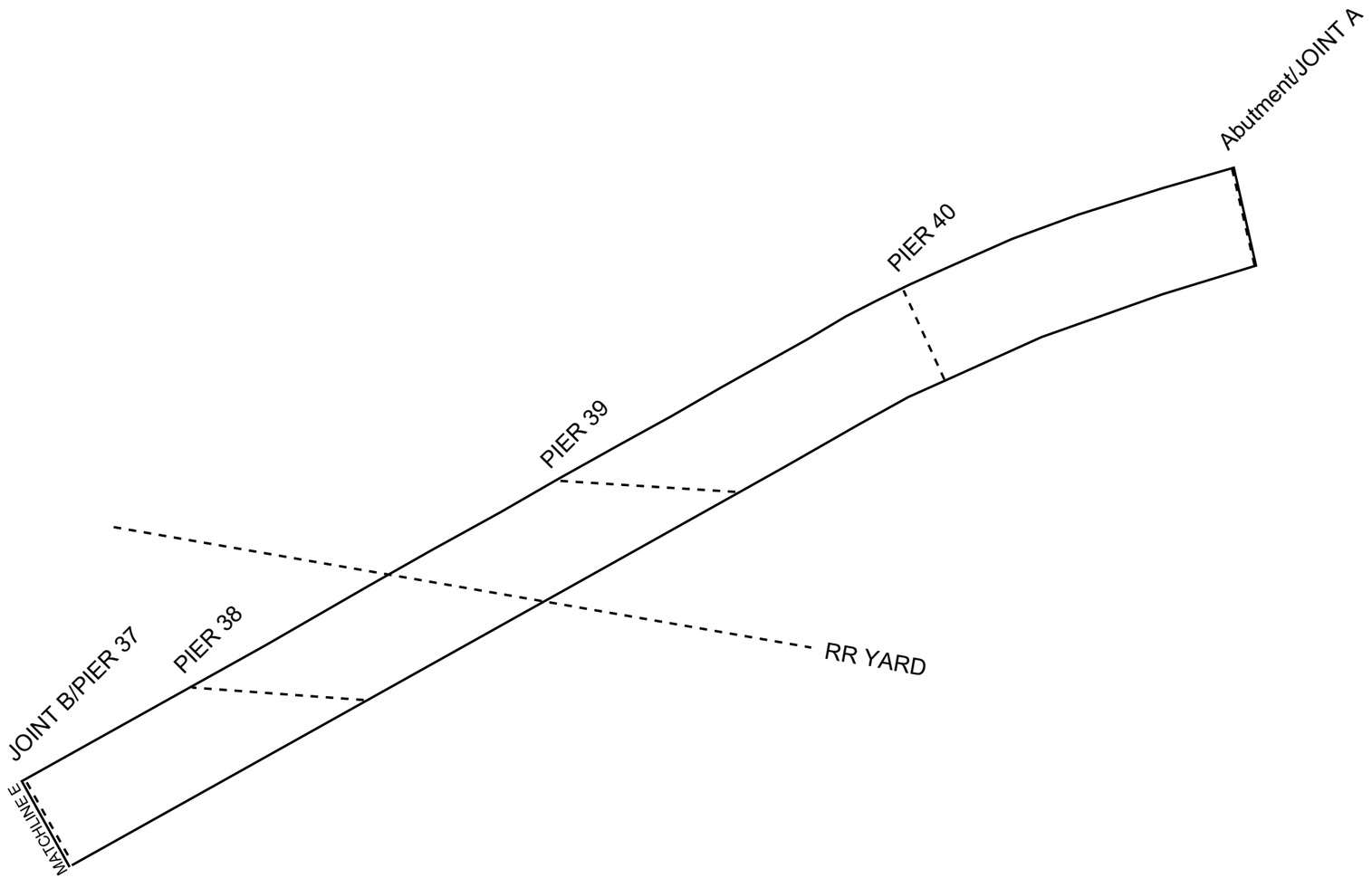
PLAN: FRAMED & BRACED COLUMN - UNIT III

GRAPHIC SCALE MEASURED IN FEET	DATE	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441
NOT TO SCALE	JUL, 2018	INFRASTRUCTURE ENGINEERS, LLC	FRAMED AND BRACED COLUMN - UNIT III / PAGE A-3



PLAN: EAST APPROACH - UNIT IV

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, LLC	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	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441
NOT TO SCALE	JUL, 2018	INFRASTRUCTURE ENGINEERS, LLC	LAKE FRONT RAMP - UNIT IV / PAGE A-5

Photo I: Unit I: Section C, Superstructure cleaned and painted

Photo II: Unit I: Section K, South elevation; tarped for painting

Photo III: Unit I: Section M, North elevation; tarped for painting

Photo IV: Unit I: Section N, North elevation

Photo V: Unit I: Section P, Superstructure

Photo VI: Unit II: Main Truss Spans, South elevation

Photo VII: Unit II: Main Span Truss, Typical pier; Ongoing rehab work

Photo VIII: Unit III: East Approach, Forward Section; Ongoing painting

Photo IX: Unit IV: East Approach, Lakefront Trestle; North elevation

Photo X: Unit V: East Approach, Lakefront Ramp Section; Ongoing painting

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 and Main Avenue Bridge was 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-November1985: 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 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 Present: 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-Present: Concrete repairs to the vaults within Unit I. Ongoing painting contract, Unit IV competed at time of 2017 inspection, with painting and structural repairs beginning on Unit III and Unit V.

INSPECTION PROCEDURE

Infrastructure Engineers, LLC conducted a routine inspection using existing lane closures and technical access techniques. A routine inspection was completed on all accessible structural elements. The inspection was performed by a crew of four (4) members recording inspection notes and verifying any new or previously reported areas of deterioration or structural distress.

Access along the top of the deck was gained via the existing lane closures for the ongoing joint replacement and parapet repair. In Unit III, Bents 1 through 11 of the frame and braced column section were not inspected due to being enclosed for rehabilitation and painting. The same situation was noted in Unit V: East Approach (Lakefront Ramp Section).

Condition and Element Rating Guidelines

The table below contains the bridge inspection rating matrix established by the Federal Highway Administration (FHWA), using a 0-Failure through 9-Excellent scale, and used by the Ohio Department of Transportation (ODOT). In this report, component conditions will generally be discussed based on the ODOT rating guidelines for individual components, 1-Good through 4-Critical.

The General Appraisal, the Deck, Superstructure, Substructure, Channel and Approach Summaries, and the Protective Coating System rating will follow the NBIS/ODOT 0 through 9 rating guidelines.

Individual Items (ODOT)	Summary Items (NBIS)	Condition	Defect
1 GOOD	9	Excellent	Excellent condition.
	8	Very Good	No problems noted.
	7	Good	Some minor problems
2 FAIR	6	Satisfactory	Structural elements show some minor deterioration.
	5	Fair	All primary structural elements are sound but may have minor section loss, cracking, spalling, or scour.
3 POOR	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.
4 CRITICAL	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
Bridge Inspector's Reference Manual, Federal Highway Administration (FHWA), 2015
Manual for Condition Evaluation of Bridges, 2nd Edition, AASHTO, 2010 (rev 2011)
National Bridge Inspection Standards, U.S. Department of Transportation, 2004
Inspection of Fracture Critical Bridge Members, U.S. Department of Transportation, 1986
Manual for Inspecting Bridges for Fatigue Damage Conditions, Commonwealth of Pennsylvania Department of Transportation, 1990

Inspection Findings:

Item N58 – Deck (7, Good Condition)

The deck is in overall ***Good*** condition, a rating of a 7 on the NBIS condition rating guidelines.

Lighting
The deck lighting is in Fair condition. The deck lighting consists of metal poles with cobra head fixtures. At the pole bases, several pull boxes have either missing or loose covers with exposed wiring. One light post at Joint B2, East parapet, is severely damaged from vehicular impact and should be replaced (Photo 1).

The deck findings and summary of deck conditions for each of the deck items can be found in Tables 1 through 4, located at the end of this section.

Item 7.1 – Floor (1, Good Condition)
The deck floor is in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
56,2590 SF	49,8749 SF	63,841 SF			1.16

The replacement deck, opened to traffic in 1992, consists of epoxy coated reinforcement with stay-in-place metal galvanized steel forms. The haunches in the deck above the stringers exhibit areas of minor spalling. Previously noted areas of deteriorated stay-in-place forms are in the process of being replaced throughout.

Cracking with efflorescence is noted throughout Unit I, Section P (Photo 2).

The auxiliary deck on the Lakefront Trestle section was removed prior to the 2015 inspection.

Item 7.2 – Edge of Floor (1, Good Condition)
The edge of floor is in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
13,160 SF	11,902 SF	1,258 SF			1.14

Isolated spalls were noted adjacent to the expansion joint armor and areas of isolated spalling is noted along the gutterline on the eastbound main truss spans.

Item 8– Wearing Surface (1, Good Condition)
The concrete wearing surface is in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
539,560 SF	525,705 SF	13,855 SF			1.04

Distressed areas include isolated surface scaling with minor hairline cracking.

Item 10 and Item 11 – Median and Railing (1, Good Condition)
The concrete median and railings are in ***Satisfactory*** condition.

Component	Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
Median	6,580 LF	6,380 LF	100 LF	100 LF		1.26
Railing	13,160 LF	12,560 LF	400 LF	200 LF		1.28

The median and railings constructed during the 1991-1992 rehabilitation were placed using slip form construction. Following the reopening of the bridge, cracks and local spalls were observed along the top section of the parapet and repairs were completed.

Numerous large spalls are noted along the top half, along the exterior reveal, and adjacent the deck joint locations (Photo 3). The existing spalls have increased in size and exposed additional reinforcing bars since prior inspections. There are also isolated locations that exhibit delaminations and pose a potential hazard to the public below. Some locations have loose concrete previously removed and the surface has been sealed but these locations currently exhibit corrosion staining implying that water penetration through the sealant is occurring.

The median has isolated spalls with exposed reinforcing bars similar to the bridge railings. Existing spalls have increased in size and exposed additional reinforcing bars since the previous inspection. The impact attenuators on the Lakeside Avenue and West 28th Street exit ramps have had various levels of collision damage.

Item 12 – Drainage (1, Good Condition)
The deck drainage is in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
268 EA	250 EA	14 EA	4 EA		1.30

The drainage troughs and hoppers within the Main Truss Spans typically exhibit advanced section loss with areas of holes causing water to drain onto the superstructure components below. Torn rubber splices between drain pipe sections were also observed. Some gutterline scuppers and catch basins were also partially clogged with debris. All above scuppers of the Forward Approach (Bent 0 to Bent 10) are clogged. Ongoing repair and replacement of the drainage system were noted throughout the entire structure.

Item 13 – Expansion Joints (7, Good Condition)
The expansion joints are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
3,548 LF	0 LF	3,209 LF	237 LF	102 LF	2.66

All expansion joints and headers throughout the structure have either been replaced or, are in the process of being replaced at the time of the inspection (Photos 4 and 5).

Deck deficiencies and specific locations are noted in Tables 1-4 below:

Table 1: Unit II Deck Deficiencies

Travel Direction	Span	Joint	Note	Photo
East	4/5	L1	The deck inlet is 3/4 full of debris.	
East	5	L	South parapet light junction cover taped in place, 20' West of Joint L.	
East	7/8	K	6' L x Full Width x 18" H spall with exposed rebar and adjacent delaminations on South parapet.	
East	8/9	J	Missing junction cover at base of light 15' West of Joint J.	

Table 2: Unit III Deck Deficiencies

Travel Direction	Span	Joint	Note	Photo
West	11	H	1/4" vertical offset between joint edges, East is higher.	
East			South parapet at 30+50; 15' L x 15" H x up to 4" D spall with exposed rebar.	

Table 3: Unit IV Deck Deficiencies

Travel Direction	Span	Bent/ Pier	Joint	Note	Photo
West	A	14	C	West lakeside exit ramp: At Joint C, the west wall for filled ramp has a 1/16” W x Full Height vertical crack at centerline.	
West	B	18/19		6” W x 3” L corrosion hole in deck pan above diaphragm above floorbeam cantilever South of North exterior girder.	
West	E			5' L x 1' H x 5" D spall with exposed rebar and utility chase on the North parapet.	

Table 3: Unit IV Deck Deficiencies					
Travel Direction	**Span**	**Bent/ Pier**	**Joint**	**Note**	**Photo**
West	F		Drain	1' W x 4" L x 2" D spall at south end of 3' L crack emanating from curb inlet.	
West	H		B1	Loose light base cover, North parapet, 25' east of joint.	
West	H			South lane; 8' L x 8' W area of 1" D spalling with staining.	
West	H			6' L x Full Width x 6" D spall with exposed rebar. Outboard faces have been sealed (over 3rd Street).	
West		37	B	North parapet, West of joint, 25' L patch.	

Table 4: Unit V Deck Deficiencies				
Travel Direction	**Span**	**Joint**	**Deficiency**	**Photo**
West	37/38	B	South parapet armor, laminating corrosion, but functioning. Joint/deck armor is fair with areas of 1/8" D pitting on the sides.	
West	37/38	B	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.	
West	38		North curb, inlet grate filled with debris except directly over the vertical scupper (Same condition at South curb).	
West	39/40		Inlets are full along North curb near Pier 39, but clear directly over the vertical downspout.	
West	40		Wearing surface; minor wear in wheel paths.	
West	41		Typical wearing surface with minor wear in wheel paths.	
West	41		20' east of Pier 40, 5' L x 16" H area of delaminations with small spalls along south parapet.	
West	41		5' L x Full Width x 4" D spall in top of parapet.	
West	41		North curb, light debris accumulation.	
West	Approach	East	Asphaltic plug joint between east approach roadway and slab. 2" W gaps between the east and west edges of the joint.	
West	Approach	East	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.	
West	Approach	East	Map cracking covers full length of interior north face of south parapet (concrete median). Small delaminations with no actual spalls. Minor vegetation sporadically along curb line.	
West	Approach	East	Spall with exposed and corroded rebar on north parapet, south face 3' L x Full Width x up to 2" D.	
West	Approach	East	North curb height varies 1-2" above the roadway.	

Item N59 – Superstructure (5, Fair Condition)

The superstructure is overall ***Fair*** condition, or 5 on the NBIS condition rating guidelines.

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

Item 14 – Alignment of Members (1, Good Condition)
The alignment of the primary superstructure members is ***Good***.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
40 EA	40 EA				1.00

In Unit III, between Bent 11 and Bent 12, the southern fascia beam is misaligned due to numerous hits from vehicles travelling northbound on West 9th Street (Photo 10). Beam FSS was previously heat straightened and nearly returned to its original alignment. Measured minimum clearance at this beam is 13.60 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 had not been braced nor straightened.

Item 15.1 Beams/Girders (2, Satisfactory Condition)
The beams and girders are in overall ***Good***. Isolated areas of reactivated pack rust with minor section loss and distortion due to pack rust are noted in isolated areas.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
9,374 LF	4,742 LF	2,642 LF			1.47

The West Approach, Unit I superstructure consists of rolled beams, welded plate girders, and riveted built-up plate girders. These members exhibited areas of minor corrosion and broken rivets. The South girder in Section M at the South column of Frame 3 has one sheared rivet at the south connection angle. See *Table 5*, *Table 8* and *Table 9* for additional deficiencies and locations.

The East Approach, Unit IV Lakefront Trestle consists of riveted built-up girders. These girders have isolated deep pockets of pack rust along the bottom flange. Recent painting has cleaned and sealed these girders.

The East Approach, Unit V Lakefront Ramp superstructure consists of three riveted built-up plate girders. This section was rigged for painting, inhibiting inspection access.

Item 16 – Diaphragms or Cross Frames (1, Good Condition)
The diaphragms and cross frames are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
1,203 EA	1,003 EA	200 EA			1.23

Item 17 – Stringers (1, Good Condition)
The stringers are in ***Good*** condition with little to no section loss and areas of isolated freckled corrosion. All stringers were replaced during the 1991-1992 rehabilitation project.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
71,947 LF	64,171 LF	7,776 LF			1.15

The East Approach, Unit V Lakefront Ramp was rigged for painting and portions were not accessible during the inspection.

Item 18 – Floorbeams and Floorbeam Connections (1, Good Condition)
The floorbeams and floorbeam connections are in Good condition with areas of reactivated pack rust, painted over pitting, and section loss.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
27,168 LF	18,564 LF	8,604 LF			1.41

Areas of painted over section loss and pitting ranging from 1/16” to 1/4” deep are noted throughout the floorbeams. Reactivated areas of pack rust and surface corrosion are noted on the floor beams, especially in the form of freckled corrosion. Additional active corrosion and staining is most likely due to leaking joints above which are currently under construction. There are also weld remnants and attachments on the floorbeams from previous drainage assemblies. In the main truss spans, areas of painted over pitting are noted along the bottom of top flange tension tie plates connecting the center floor beam section and the floor beam cantilever brackets. See *Table 6.0* and *Table 7.0* for additional deficiencies and locations.

Item 19 – Truss Vertical (1, Good Condition)
The truss verticals are in ***Good*** condition with isolated areas of pack rust and pitting.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
272 EA	240 EA	32 EA			1.17

The truss verticals exhibit areas of minor section loss with pitting and reactivated pack rust. Section loss is present on the truss verticals in the form of pack rust between the gusset plates, fill plates and vertical flanges. See *Table 6.1* and *Table 7.0* for additional deficiencies and locations.

Span 11 was rigged for painting during the inspection.

Item 20 – Truss Diagonals (2, Satisfactory Condition)
The truss diagonals are in ***Good*** condition with isolated areas of pack rust and pitting.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
268 EA	227 EA	30 EA	9 EA	2 EA	1.81

The truss diagonals exhibit areas of section loss with pitting on the top face of the web plates and pack rust along the flanges and connection fill plates. See *Table 6.2* and *Table 7.0* for additional deficiencies and locations.

Span 11 was rigged for painting during the inspection.

Item 21 – Truss Upper Chord (2, Satisfactory Condition)
The truss upper chords are in ***Good*** condition with isolated areas of pack rust and pitting.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
268 EA	238 EA	30 EA			2.78

The truss upper chord exhibits areas of section loss, pitting, and reactivated pack rust. See *Table 6.3* for additional deficiencies and locations.

Span 11 was rigged for painting during the inspection.

Item 22 – Truss Lower Chord (2, Fair Condition)
The truss lower chords are in ***Fair*** condition with isolated areas of pack rust and pitting.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
268 EA	169 EA	30 EA	59 EA	10 EA	2.78

Various deficiencies are noted throughout the lower chord. Areas of section loss are affecting up to 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.

Various degrees of pack rust, both sealed and reactivated, located between the flange angles and the web plates are prevalent throughout the exterior lower chords. Isolated perforations are also noted along the top plates. See *Table 6.4* and *Table 7.0*for additional deficiencies and locations.

Item 23 – Truss Gusset Plates (1, Good Condition)
The truss gusset plates are in ***Good*** condition with isolated areas of pack rust and pitting.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
1,1,088 EA	965 EA	72 EA	51 EA		1.67

Corrosion is present in the form of pack rust and pitting. Some gusset plates with corrosion holes have been painted as evidenced at the north truss, unit 4, lower panel point 8. See *Table 6.5* and *Table 7.0* for additional deficiencies and locations. 12 gusset plates have been retrofitted as part of the 2012 project that was completed in 2015.

Item 24 – Lateral Bracing (1, Good Condition)
The lateral bracing is in ***Good*** condition with isolated areas of pack rust and pitting.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
370 EA	370 EA				1.00

Item 25 – Sway Bracing (1, Good Condition)
The sway bracing is in ***Good*** condition with isolated areas of pack rust and pitting.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
364 EA	364 EA				1.00

Item 26 – Bearing Devices (1, Good Condition)
The bearings are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
364 EA	349 EA	15 EA			1.06

Standing water was noted in a number of bearings at the truss member connections due to blocked drain holes within the bearing assembly (Photo 6). Unit II exhibit moderate surface corrosion and laminated edge corrosion along the vertical steel box sides and edges located at the bottoms of some bearings (Photo 7).

In Unit III (Forward Section), the anchor bolts at the base of the pier bents from Bent 1 through 10 exhibit moderate section loss due to pack rust and debris accumulation between the bearing stiffeners and bent columns.

Item 30 – Protective Coating System (1, Very Good Condition)

During the inspection the following locations were rigged for painting:

- Unit I: West Approach; steel portions K and M
- Unit III: East Approach; Frame and Braced Section, Bents 1-11
- Unit IV: Lake Front Ramp

The protective coating system (PCS) is in ***Satisfactory*** condition. The PCS of the Main Truss Spans was applied in 2007. Portions of the PCS for the West Approach, Forward Section and the Lakefront Ramp date back to 1984. The PCS within the Forward Section and the Lakefront Ramp were under a paint containment system and not fully accessible. The Lakefront Trestle was painted prior to the inspection.

Due to the varying age of the overall PCS, the PCS condition states are listed for each section. PCS quantities include lengths of the following steel components: stringers, beams, floorbeams, girders, truss lines (per ODOT Manual of Bridge Inspection, Revised 2014 (v. 8)), and the estimated length of steel pier bents.

Section	Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
West Approach	24,857 LF	13,357 LF	11,500 LF			1.56
Main Span Truss	51,003 LF	50,153 LF	800 LF	50 LF		1.02
Forward Section	15,937 LF		15,937 LF			2.00
Lakefront Trestle	16,832 LF	16,832 LF				1.00
Lakefront Ramp	13,611 LF		13,611 LF			2.00
Total	122,240 LF	80,342 LF	41,848 LF	50 LF		1.44

Item 31 – Pins, Hangers and Hinges (7, Good Condition)

The pins, hangers and hinges are in ***Good*** condition. Some rivet heads interfere with several hangers in the Lakefront Trestle. Due to recent painting, evidence of movement of the pin and hanger was noted due to cracked paint between the hangers and the beam webs.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
14 EA	11 EA	3 EA			1.29

Item 32 – Fatigue Prone Details (7, Good Condition)
The fatigue prone details are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
122,240 LF	122,240 LF				1.00

Unit II, 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.

Superstructure deficiencies and specific locations for Units 1, 3, 4 and 5 are noted in the Tables 6-9:

Table 5: Unit I Superstructure Deficiencies

Unit	Section	Frame	Floorbeam	Girder	Note	Photo
1	K				6” Long horizontal cracked weld in Floorbeam 2 south cantilever knee brace along east side, caused by pack rust.	
1	K/M				1/8” D pitting on girder ends at frame 1 below Joint S.	
1	M		2		4” L vertical crack in south exterior stringer to floorbeam cantilever west connection angles at top.	
1	M	2 South	3		1/2” T pack rust between column and floorbeam cantilever bottom flange.	
1	M	3 South	5		Sheared rivet head on south girder connection (North side) to west face of Column 3.	
1	M				Peeling paint and surface corrosion on north girder outside of north curtain wall for west vault area.	
1	N			North	Not fully engaged bolt between girder web and top flange connection angle, also to north face cantilever connection angle.	
1	N	5		Center	Sheared bolt at end of top flange due to pack rust.	
1	N	6/7		North	1/2" T pack rust between top flange of floorbeam cantilever plate and top flange of floorbeam.	

Table 5: Unit I Superstructure Deficiencies						
Unit	**Section**	**Frame**	**Floorbeam**	**Girder**	**Note**	**Photo**
1	N		7	Center	Peeling paint and surface corrosion on bearing components.	
1	N		7		Drain pipe welded connections to west face of Floorbeam 7.	
1	N		8	North	1/16” D painted over pitting on east end of girder near bearing.	
1	N		8	North	South guide bar welds on north side previously noted as broken have been painted and are disconnected.	8
1	P	1	2	South	Full Height x Full Width x up to 2” D spall with exposed rebar along overhang.	9

- (Unit III was rigged for painting between Span 11 and Bent 11, the 2017 deficiencies were inaccessible during the 2018 inspection).

Table 6.0: Unit II Floor Beam Deficiencies				
Span	**FB**	**CS 3**	**CS 4**	**Photo**
2	6	1/4" section loss to top flange.		
4	0	2 of 3 bolts are loose on the inboard sliding plate for the north truss at U0. Movement noted.		
6	0	Typical stringer bearings on east face of Floorbeam 0, evidence of movement		
8	8	Significant painted over section loss up to 1/4" that is beginning to reactivate		
8	16	Significant painted over section loss up to 1/4" that is beginning to reactivate		
10	7	Section Loss, 1/8" D pitting in both flanges.		
10	10	Section Loss, 1/8" D pitting in bottom flange.		

Table 6.1: Unit II Main Truss Vertical Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
2	N	L11U11	4” W x 2” H corrosion hole in inboard fill plate above main inboard L11 gusset plate.		
2	N	L15U15	8” W x 4-1/2” H corrosion hole in inboard fill plate above main inboard L15 gusset plate. 3/4" T reactivating pack rust and scalloping of edges of outboard flange plate.		
2	S	L2U3	Up to 3/4" distortion to the outboard cover/fill plate connection at L2.		
2	S	L6U6	Downspout is broken allowing water to drain directly onto lower chord.		

Table 6.1: Unit II Main Truss Vertical Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
2	S	L10	Lower lateral bracing top horizontal gusset at L10 south truss has two sheared rivets, pitting up to 3/16" D and pack rust up to 1" T with an adjacent fill plate. Fill plate has a 1/2" L and 2-1/2" W corrosion hole.		
2	S	L15U14	Isolated areas of up to 8" diameter x up to 3/16" D pitting on the top face of the web near L15.		
5	S	L1U1	At L1; Painted over pack rust up to 1-5/8" T on inboard and outboard fill plate. Inboard fill plate has a 3-1/2" crack/split due to pack rust.		15
5	S	L1U1	Pack rust causing 7/8" inward bow in flange.		
5	N	L1U1	Up to 1/8" D pitting near L1. 1/2" T pack rust between fill plates and vert		
5	N	L5U5	1/2" T pack rust between fill plates and vertical.		
6	S	L5U5	Caulked and painted over pack rust up to 1” T along both the interior and exterior stiffening plates resulting in scalloped edges along full height.		
6	S	L10U10	Caulked and painted over pack rust with a 6” H x 2” W corrosion hole along the top edge of the fill plate.		
6	N	L0U0	Painted over 1/4" section loss along top flange.		
6	N	L0U0	Pack rust and failing caulking repair at inboard gusset and vertical.		
6	S	L17U17	3/8” pack rust between the gusset plate and vertical flange at L0		16
7	S	L6U6	1-1/2” Diameter corrosion hole and 1/8” deep pitting in the web plate.		
8	N	L8U8	Painted over and reactivating pack rust between built up members with pitting up to 1/8" D along flanges.		
8	N	L12U12	Painted over and reactivated pack rust up to 3/4" T between cover plates. Pack rust up to 3/4" T between fill plates with complete section loss in outboard fill plate at L12. Pitting up to 3/16" D along flange and web interface, full length of member.		
8	N	L13U13	Painted over pitting up to 1/4" T between cover plates. Up to 1/8" deep pitting in both fill plates.		

Table 6.1: Unit II Main Truss Vertical Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
8	S	L9U9	Painted over and reactivated pack rust between built up members. Pack rust up to 3/4" T between fill plates with complete section loss in outboard fill plate at L9.		
8	S	L19U19	At L19 there is an open electrical box with exposed wired.		
8	S	L21 U21	Rough cut holes in inboard web near L21.		
8	S	L25U25	Vertical has reactivating corrosion along the flanges and at all connection points to the bracing members.		
9	S	L8U8	Up to 1/16” D painted over pitting on outboard flange plate above lower vertical member pin and gusset plate connection. Reactivating 1" T pack rust behind outboard pin plate for lower vertical member pin at gusset plate connection.		
9	N	L8U8	At L8: up to 1/8” D painted over pitting on outboard flange plate above lower vertical member pin and gusset plate connection. 1” T pack rust between outboard pin plate and vertical.		17

Table 6.2: Unit II Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
1	S	L5U6	Up to 1/8" D painted over pitting in top face of web.		
1	N	L2U1	1/2" T pack rust between L1U0 and inboard fill plate at L1.		
2	S	L0U1	Up to 1/8" D painted over pitting in top face of web.		
2	S	U4L5	Up to 3/16" D painted over pitting near L5 on the top face of the web.		
2	S	L10U11	Up to 3/16" D pitting in the top face of the web near L10.		

Table 6.2: Unit II Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
2	S	L15U15	Vertical fill plates between vertical and gusset at L15 on the inboard and the outboard have pack rust and scalloping due to pack rust up to 1" T and an 8" L x 3" H area of 100% section loss. Riveted plate attached to the flanges of the verticals has up to 7/8" T pack rust and scalloping, heaviest near L15, extending the full height.		
2	N	L5U4	Up to 1/8” D painted over pitting on web near L5.		
2	N	L6U5	Up to 1/8” D painted over pitting on web.		
2	N	L10U11	Up to 1/8” D painted over pitting on web near L10.		
2	N	L11U12	Up to 1/8” D painted over pitting on web near L11. 12” W x 5” L area of 1/8” D painted over pitting on inboard flange near L11 gusset plate.		
2	N	L12U13	Reactivating pack rust, up to 3/16” T scalloping top edge of outboard flange plate.		
2	N	L15U14	Up to 1/16” D painted over pitting on web near L15.		
4	S	U1L0	Both flanges exhibit isolated areas of up to 1/4" D pitting along with the bottom half of the member. The bottom half of the top face of the web has widespread pitting and is retrofitted with a new plate bolted onto the bottom face.		
4	S	L5U4	Fill plates at L5 have severe distortion and 100% painted over section loss.		
4	S	L9U10	Outboard fill plate at L9 is distorted with painted over section loss.		
4	S	L10U11	The top of the web has up to 1/8" D painted over pitting.		
4	N	L3U2	Painted over pack rust up to 1/4" T between inboard and outboard fill plates and diagonal at L4.		

Table 6.2: Unit II Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
4	N	U4L5	Severe pack rust has been removed from fill plate between inboard and outboard fill plates and diagonal at L5. Painted over pitting up to 1/8" D throughout lower half of diagonal.		
4	N	U9L8	Up to 1/4" D pitting in web of diagonal near L8.		
4	N	U10L9	1/2" T x 20" W retrofit has been bolted to the lower half of U10L9. Inboard and outboard fill plates at L9 and outboard fill plate at U10 have pack rust up to 1/2" T with areas of complete section loss and/or removed sections.		
4	N	U11L10	1/8" D pitting in web of diagonal near L10.		
4	N	U12L11	1/16" D pitting in web of diagonal near L11.		
4	N	U13L14	1/2" T x 20" W retro fit has been bolted to the lower half of U13L14. Section loss up to 7/16" D pitting along web near L13.		
5	S	L1U0	Up to 1/8" D painted over pitting on top of web.		
5	N	U0L1	Section loss up to 1/4" D pitting along web near L1.		
5	N	U1L2	Section Loss, 1/16" D pitting throughout.		
5	N	U6L5	Section Loss, 1/16" D pitting throughout.		
6	S	L0U1	Up to 1/4" D painted over section loss to top of web. A strengthening plate has been bolted to the web.		
6	S	U4L5	Up to 3/16” D pitting along the lower 5’ of the web (strengthening plate along underside) with up to 1” T of caulked and painted over pack rust between the inboard and outboard fill plates and diagonal flanges. The outboard caulking is cracked and deteriorated.		18
6	S	L10U11	3/4” T painted over and caulked pack rust along the north and south edges. Both plates exhibit scalloping of the plate edge.		

Table 6.2: Unit II Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
6	N	L0U1	1/2" T x 20" W retro fit has been bolted to the lower half of L0U1. Up to 7/16" D painted over pitting along web near L0. Inboard fill plate has up to 3/16" D pitting at L0.		19
6	N	L5U4	Up to 3/16” D painted over pitting on web for bottom half of member. Strengthening plate added to bottom side of web. Painted over pack rust 1-1/2” T and corrosion holes in fill plate extension for inboard L5 gusset plate. Painted over pack rust 1” T and corrosion holes in fill plate extension for outboard L5 gusset plate.		
6	N	L9U10		Four corrosion holes in bottom of web at L9; One 3-1/2” L x 2-1/2” W and three 1/4"-1/2” Diameter holes. Varying depths of painted over pitting on lower 1/3 of web.	20
6	N	L10U11	Up to 5/16” D painted over pitting on web for bottom half of member. Strengthening plate added to bottom side of web.		
6	N	L11U12	Two areas of 100% section loss 6” L x 2” W and 6” W x 2” L, on fill plate extension for outboard gusset plate L11.		
6	N	U16L17	Section Loss, 1/8" D pitting throughout.		
8	S	L9U8	Up to 3/16" D painted over pitting on the top of the web near L9.		
8	S	L11U12	The inboard and outboard fill plates at L11 are distorted up to 1/2" due to painted over pack rust.		
8	S	L13U14	Up to 1/8" D painted over pitting in the top of the web near L13.		

Table 6.2: Unit II Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
8	S	L14U15	Inboard fill plates near L14 with painted over corrosion holes		21
8	S	L16U17	Up to 1/8" D painted over section loss near L16.		
8	N	U5L6	Section loss, 1/8" D pitting in web of diagonal near L6.		
8	N	U6L7	Section loss, 1/16" D pitting in web of diagonal near L7. Painted over pack rust up to 1/8" T between outboard fill plates and diagonal at L7.		
8	N	U7L8	Section loss, up to 3/8" D pitting in web and flanges of diagonal in lower half. Painted over Pack rust up to 1" T between both cover plates along full length.		
8	N	U8L9	Up to 1/4" D pitting in web and flanges of diagonal in lower half. Pack rust up to 1/2" T between fill plates and diagonal at L9.		
8	N	L11U10	Section loss, 1/8" D pitting in web of diagonal near L11.		
8	N	L11U12	Section loss, 1/8" D pitting in web of diagonal near L11. Pack rust up to 3/4" T between both inboard outboard fill plates and diagonal at both U12 and L11 connections.		
8	N	L12U13	Section loss, 1/8" D pitting in web of diagonal near L12. 1/4" T pack rust between outboard fill plate and diagonal at U13.		
8	N	L13U14	Section loss, 1/8" D pitting in web of diagonal in lower half. 3/16" T pack rust between fill plates and diagonal at U14.		

Table 6.2: Unit II Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
8	N	L14U15	Section loss, 1/8" D pitting in web of diagonal near L14. Pack rust up to 3/4" T between inboard and outboard fill plates and diagonal at both U15 and L14, 100% section loss noted on outboard face.		
8	N	L15U16	Section loss, 1/16" D pitting in web of diagonal near L15. Pack rust up to 3/4" T with areas removed between both inboard and outboard fill plates and diagonal at both U16 and L15 connections.		
8	N	L16U17	Section loss, 1/8" D pitting in web of diagonal in lower half.		
8	N	L25U24	Panted over pack rust up to 1/2" T between flange cover plates and diagonals.		
9		L2U1	Up to 1/4" scalloping between the flange cover plates and flanges.		
9	N	L6U7	Reactivating pack rust 1/2” T scalloping top edge of both built-up flanges.		
9	N	L2U1	Painted over pack rust up to 1/4" T between inboard and outboard cover plates and diagonal flange.		
10	S	L10U9	Up to 1/2” T painted over and caulked pack rust along the edges of both the interior and exterior fill plates at L10.		
10	S	L14U13	There is up to 1/2” T painted over and caulked packed rust between the fill plate and both the interior and exterior flanges of the diagonal. Both the interior and exterior fill plates exhibit 100% section loss around and between the rivet heads. The average hole size is 4” x 3”.		
10	S	L15 U16	Up to 1/4" D painted over pitting in the flanges of the diagonal.		
10	S	L19U20	Up to 7/8" T scalloping between the web cover plates and webs. Retrofit installed along the bottom half of the web.		
10	N	L11U10	1/8" D pitting along web.		
10	N	L12U11	Damage, 3/4" D gouge in web plate.		

Table 6.2: Unit II Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
10	N	L15U16	Up to 1/16” D painted over pitting on bottom 5’ of web near inboard flange.		

Table 6.3: Unit II Main Truss Upper Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS4**	**Photo**
1	S	U5U6	1/8" D pitting in bottom flange plate.		
2	N	U10U11	1/8" D painted over pitting on underside of bottom flange plate.		
6	S	U4U5	1/8" D pitting in web plates.		
6	N	U0U1	1/4" D pitting in both web plates.		
6	N	U4U5	1/8" D pitting in web plate.		
6	N	U14U15	1/8" D pitting in top flange plate.		
7	S	U1U2	1/8" D pitting in both web plates.		
7	N	U0U1	1/8" D pitting in top flange and both web plates, 1/8" T remaining section of bottom flange.		
7	N	U1U2	1/8" D pitting in top flange plate.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
1	S	L2L3	Section Loss, 1” T pack rust distorting top flange plate and web plates.		
1	S	L3L4	Section Loss, 1/2" T pack rust distorting top flange plate.		
1	S	L5L6	Section Loss up to 1/8" D to top cover plate at L5.		
1	S	L6L7	1/8" D painted over pitting with a small area of perforations at L7. The top cover plate and side plates are distorted up to 1/2" due to painted over pack rust.		
1	S	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. Similar to north truss at this location		22

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
1	N	L0L1	Section Loss, 1/8" T pack rust between outboard web plate and top flange plate at L0. Section loss, 1/8" T pack rust beneath paint on top flange adjacent to inboard gusset plate at L0.		
1	N	L1L2	Section loss, 1/4" T pack rust between outboard web and top flange near centerline of L1L2.		
1	N	L2L3	Section Loss, 1/2" T pack rust distorting top flange plate and both inboard and outboard webs.		
1	N	L3L4	Section Loss, 1/4" T painted over pack rust distorting top flange plate and both inboard and outboard webs.		
1	N	L5L6	Section loss, wide spread painted over pitting up to 1/8" D on top flange at L5. Section loss, painted over laminar corrosion and pack rust up to 1/2" T between top flange and splice plate at L6.		
1	N	L6L7	Section loss, heavy painted over pack rust and heavily deformed outboard web in the interior of built up bottom chord member at the pin at L7. 1" T pack rust between inboard web and gusset plate at L7.		
2	S	L0L1	Up to 3/4" T distortion in the top flange plate and web plates due to pack rust.		
2	S	L1	Lower later bracing connection angle to the truss is missing two rivets.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
2	S	L1L2		Scalloping due to pack rust up to 2" thick between the inboard and outboard edges of the top cover plate due to reactivated pack rust.	23
2	S	L2L3	Section Loss, 1/2" T pack rust distorting both edges of top flange plate.		
2	S	L3L4	1-1/8" T pack rust between gusset and the inboard pin plate at L3.		
2	S	L4L5	Pitting up 1/8" D around top flange inboard rivets with scalloping and pack rust up to 1/2" T along inboard edge of top flange and web.		
2	S	L10	Lower lateral bracing connection plate has multiple corrosion holes and heavy pitting.		24
2	S	L10L11	Painted over scalloping of inboard and outboard edges of top flange due to 3/4" to 1" T pack rust Isolated areas of reactivating corrosion around outboard top flange rivets.		
2	S	L11L12	Scalloping: 1-1/2" T pack rust distorting bottom edge of both web plates.		
2	S	L12L13	1” T pack rust distorting top edge of both web plates, maximum noted at L13, up to 1-1/2".		
2	S	L13L14	1” T pack rust distorting both edges of top flange plate. Isolated areas of painted over pitting up to 8" Diameter by up to 3/16" D and 1" T pack rust with scalloping along both top flanges.		
2	N	L0L1	Section Loss, 1/8" D painted over pitting in both web plates and in top flange.	Deep pitting with 1/4" diameter perforation in bottom flange at L0.	25

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
2	N	L1L2	Section Loss, 1-1/2" T pack rust distorting top flange plate. 1/2" T pack rust is reactivating at L2.		
2	N	L3L4	Reactivating pack rust 1/4” T with scalloping edges of top plate. L3 bearing is full of water.		
2	N	L4L5	Reactivating pack rust 1/4” T with scalloping edges of top plate. Up to 1/8” D painted over pitting on top plate.		
2	N	L5L6	Reactivating pack rust 1/4” T with scalloping edges of top plate. Up to 1/4” D painted over pitting on top plate.		
2	N	L9L10	Reactivating pack rust 1/4” T with scalloping edges of top plate. Up to 1/8” D painted over pitting on top plate near L10.	`	
2	N	L10L11	1/2" T pack rust distorting top flange plate.		
2	N	L11L12	Reactivating pack rust 1” T with scalloping edges of top plate. Up to 3/16” D painted over pitting on top plate.		
2	N	L12L13	Reactivating pack rust 1” T with scalloping edges of top plate. Up to 1/8” D painted over pitting on top plate.		
2	N	L13L14	Reactivating pack rust 1” T with scalloping edges of top plate. Up to 1/4” D painted over pitting on top plate. 1” Diameter corrosion hole in top plate along inboard edge at midpoint of member.		26

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
2	N	L14L15	Reactivating pack rust 1/2” T with scalloping edges of top plate. Up to 3/16” D painted over pitting on top plate. 3” L x 1” W corrosion hole in top plate along outboard edge at midpoint near drain pipe tubular support.		
2	N	L15L16	Reactivating pack rust 1/2” T with scalloping edges of top plate. Up to 3/16” D painted over pitting on top plate.		
3	S	L4L5	Top flange of the member has painted over pitting up to 1/4" D along 50% of the top face, worst case noted at L5.		
3	S	L0	Caulked over pack rust between gusset plates, lower chord, and vertical. 1/8" D pitting around pin nut with 1/2" T reactivated pack rust between the bottom of the pin plate and inboard and outboard gusset plates.		27
3	N	L0L1	Up to 1/8” D painted over section loss along the top plate. Areas of previously caulked pack rust along the top flanges are beginning to reactivate with minor surface corrosion noted. There are three painted over corrosion holes, up to 1” Diameter in the top plate at L0. 1” T reactivated pack rust with deteriorated caulking repair between the lower chord and the interior gusset at L0.		28

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
3	N	L4L5	Painted over pitting up to 3/16” D along top plate	The end 16” of the top plate at L5 exhibits painted over section loss with maximum 1/8” T remaining section and a 1/2” Diameter corrosion hole.	
4	N	L0L1	Painted over pitting up to 3/16” D along top plate. 3/8" T pack rust with failing caulking is distorting the top flange plate. Two caulked and painted 2” Diameter corrosion holes along inboard edge near middle.	The end 16” L of the top plate at L0 exhibits painted over deep pitting with a 16” L x up to 12” W painted over corrosion hole.	29
4	N	L1L2	Painted over pitting and pack rust typical and areas of reactivated pack rust and surface corrosion along the north edge. L2 bearing is full of water.		
4	N	L4L5	Section loss, 1/4" T pack rust between outboard web plate and top flange.		
4	N	L5L6	Section loss, 1/2" T pack rust between outboard web plate and top flange. Areas of 1/16" D pitting adjacent to rivet heads.		
4	N	L7L8	Section Loss, 1/8" D pitting in north web plate.		
4	N	L8L9	Section loss and heavy pack rust with deformation up to 1-1/2" in both inboard and outboard webs and top flange.		
4	N	L9L10	Section Loss, 1/8" D pitting in top flange plate.		
4	N	L10L11	Section Loss, 1/8" D pitting in top flange plate.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
4	N	L12L13	Section Loss, 1/8" D pitting in top flange plate. Pack rust up to 1/8" T with minor distortion of outboard and inboard webs.		
4	N	L13L14	Section Loss, 1/4" D pitting in top flange plate, 1/2" T pack rust distorting top flange plate.		
4	S	L0L1	1” T caulked over pack rust along both edges of the top plate.	Two corrosion holes up to 1-1/2" Diameter and three pinholes under L0 in bottom plate. 1/4" D section loss throughout all plates with minor reactivating pack rust. Two corrosion holes in the lower lateral bracing gusset plate with surrounding heavy pitting and section loss below the scupper. 1" L x 1/2" H painted over corrosion hole in inboard web near L1. 1/8” D section loss is typical along top 12” H.	30, 31 32 33
4	S	L1L2	1/2” T caulked over pack rust along both edges of the top plate. L2 bearing is full of water.	Section Loss, 1/4" D pitting in top flange plate. Painted over 1" Diameter and 3-1/2" L x 4" W area of corrosion holes at the end of the member at L2 in the top plate.	34
4	S	L4L5	Section Loss, 1/8" D pitting in top flange plate.		
4	S	L5L6	Section Loss, 1/4" bow/distortion in top cover plate from pack rust.		
4	S	L8L9	Fill plate at L8 has reactivating corrosion and distortion due to pack rust.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
4	S	L10L11	Up to 1/8" D painted over pitting in the top cover plate.		
4	S	L13L14	Section Loss, 1/4” L perforation in bottom flange plate.		
5	S	L0L1	Section Loss, 1/8" D pitting in top flange plate and along the tops of the web plates.		
5	S	L4L5	1/4" scalloping from pack rust in exterior web plate.		
5	S	L5L6	1/4" scalloping from pack rust in exterior web plate.		
5	N	L0L1	Section Loss, 1/4" D pitting in top flange plate.		
5	N	L1L2	Section Loss, 1/16" D pitting in top flange plate. Pack rust up to 1/4" T and deformation between inboard and outboard web plates.		
5	N	L3L4	Section Loss, 1/8" D pitting in top flange plate at L4 with pack rust up to 1/8" T between splice plate and top flange.		
5	N	L4L5	Section loss, moderate pack rust with deformation up to 1/2" in both inboard and outboard webs and top flange.		
5	N	L5L6	Section loss, moderate pack rust with deformation up to 1/2" in both inboard and outboard webs and top flange. Minor outboard deformation up to 3/4" of inboard web at L6.		
6	S	L0L1	Section Loss, up to 1/4" D pitting on top and inboard face of member 1/4" scalloping from pack rust in exterior web plates.		
6	S	L1L2	Section Loss, 1/8" D pitting in each face of bottom flange plate.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
6	S	L2L3	Up to 1” T reactivated pack rust distorting north and south web plate. 4” L x Full Width area of up to 3/16” D pitting at L3.		
6	S	L3L4	Up to 1” T reactivated pack rust distorting north and south web plate.		
6	S	L4L5	Caulked and painted pack rust up to 1/2” T creating scalloping of the plates along both the upper and lower edges of the inboard and outboard web plates.		
6	S	L5L6	Caulked and painted pack rust up to 1” T creating scalloping of the plates along both the upper and lower edges of the inboard and outboard web plates.		
6	S	L6L7	Minor section Loss, up to 1/2" caulked and painted pack rust distorting north web plate	The top plate has only 1/8” T remaining section for an 8” L x Full Width area with a 2” Diameter hole at L7	35
6	S	L7L8	Minor section Loss, up to 1/2" T caulked and painted pack rust distorting inboard web plate.		
6	S	L9L10	Up to 1” T caulked and painted over pack rust distorting north and south web plate. Areas of reactivated pack rust and cracked caulking noted along the top edge.		
6	S	L10L11	Up to 1” T caulked and painted over pack rust distorting north and south web plate. Areas of reactivated pack rust noted along the top edge.		
6	S	L11L12	Up to 1” T caulked and painted over pack rust distorting north and south web plate. Areas of reactivated pack rust and cracked caulking noted along the top edge.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
6	S	L12L13	Up to 1” T caulked and painted over pack rust distorting north and south web plate. Areas of reactivated pack rust and cracked caulking noted along the top edge.		
6	S	L13L14	Up to 1” T caulked and painted over pack rust distorting north and south web plate. Areas of reactivated pack rust and cracked caulking noted along the top edge.		
6	S	L14L15	Up to 1” T caulked and painted over pack rust distorting north and south web plate. Areas of reactivated pack rust and cracked caulking noted along the top edge. Sheared rivet head at L14.		
6	S	L16L17	Up to 1” T caulked and painted over pack rust distorting north and south web plate. Areas of reactivated pack rust and cracked caulking noted along the top edge.		
6	N	L0L1	Moderate pack rust and distortion up to 1/2" along inboard and outboard web and top flange.	At L2, 8” L x 1-1/2” W corrosion hole in bottom right side of bottom flange, adjacent 2” diameter area of pinholes	36
6	N	L1L2		5” Diameter corrosion hole on Left side and 1/4" D pitting in bottom flange plate under L1. 10” L x 4” W area of section loss and two corrosion holes	37 38
6	N	L3L4	Up to 1/4” reactivated pack rust distorting outboard web plate.		
6	N	L4L5		Painted over section loss, 1/8" T section remaining in 5” Diameter area on top flange of L4	
6	N	L5L6	Missing rivet head on top plate along outboard edge 5’ from L6.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
6	N	L8L9	Reactivating pack rust with 1” scalloping edges of top plate near panel points. Up to 1/8” D painted over pitting on top plate.		
6	N	L10L11	Reactivating pack rust 3/4” T with scalloping edges of both web plates. Up to 1/4” D localized painted over pitting on top plate.		
6	N	L11L12	1/4" D painted over pitting and 1/4" Diameter corrosion hole in top flange plate at L11. Reactivating pack rust 3/4” T with scalloping both edges of both web plates.		
6	N	L12L13	Reactivating pack rust 3/4” T with scalloping both edges of both web plates.		
6	N	L13L14	Sheared rivet head at bottom inboard rivet line at L14 Bearing assembly is filled with water at L14. 50% section loss to anchor bolts. Reactivating pack rust 3/4” T with scalloping both edges of both web plates.		
6	N	L16L17	5" x 2” corrosion hole in vertical end plate at L17		39
7	S	L3L4	1/8” T pack rust along the top edge of the outboard plate at L3.		
7	S	L5L6	Area of up to 3/16” D painted over pitting adjacent to L6. Reactivated pack rust adjacent the inboard and outboard gusset plate at L6.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
8	S	L4L5	Up to 1/8" D painted over pitting in top flange plate. Up to 1/2" scalloping between the top plate and side web plates		
8	S	L5L6	3/4" distortion of the top and side cover plates due to pack rust		
8	S	L8L9	Up to 1/4" D painted over pitting throughout the top cover plate with 3/4" scalloping along the edges.		
8	S	L13L14	Up to 3/16" D painted over pitting with minor scalloping along the edges of the top cover plate.		
8	S	L14L15	Inboard and outboard fill plates at L14 are severely distorted due to painted over pack rust.		
8	S	L15L16	Inboard and outboard fill plates at L15 are severely distorted due to painted over pack rust.		
8	S	L24L25	Lower chord retrofit: steel channels added parallel to the lower chord webs with bolted steel channels crossing perpendicular to the chord		40
8	N	L2L3	Panel point L3 is full of water		
8	N	L3L4	Reactivated pack rust and deformation of bottom flange up to 3/4" at inboard and outboard connections.		
8	N	L4L5	Reactivated pack rust deforming both inboard and outboard web plates and the top flange plate up to 3/4"		
8	N	L5L6	Reactivated pack rust deforming both inboard and outboard web plates and the top flange plate up to 3/4"		
8	N	L6L7	Reactivated pack rust deforming both inboard and outboard web plates and the top flange plate up to 3/4"		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
8	N	L8L9	Section loss, up to 3/16" D throughout. Reactivated pack rust and deformation of interior and exterior webs and top flange up to 3/4"		
8	N	L9L10	Section loss, up to 1/8" D pitting near L10. Pack rust and deformation of interior and exterior webs and top flange up to 3/4"		
8	N	L11L12	Section loss, up to 1/8" D pitting throughout.		
8	N	L12L13	Section loss, up to 3/16" D throughout. Painted over and reactivated pack rust and deformation of interior and exterior webs and top flange up to 3/4".		
8	N	L14L15	Section loss, up to 1/8" D pitting throughout.		
8	N	L15L16	Section loss, up to 1/8" D pitting throughout.		
8	N	L16L17	Section loss, up to 1/8" D pitting in top flange and inboard web near L17		
8	N	L17L18	Section loss, up to 1/8" D pitting with 3" Diameter area of bubbling and blistering paint near L18.		
8	N	L22L23	Reactivated laminating corrosion up to 1/2" T at L22. Laminar corrosion along the outboard edge of the top flange near L22.		
8	N	L23L24	Painted over pitting up to 1/16" D in the top flange at the splice plate at L23 and in inboard web near L24.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
8	N	L24L25	Bolted retrofit steel channels added parallel to the lower chord webs with bolted steel channels crossing perpendicular to the chord. Isolated areas of blistering paint and surface corrosion.		
9	S	L0L1	Inboard oval pin plate has rotated counterclockwise	Painted over heavy section loss, 1/4" D pitting along top flange plate with 1/2" Diameter corrosion holes.	41 42
9	S	L7L8	The inboard oval pin plate is bowed outward at ends up to 1 1/2” due to pack rust between L8 gusset plate and oval pin plate. 1/4” T pack rust between outboard gusset plate and oval pin plate is separating the caulk at top and bottom edges.		
9	N	L0L1	Section Loss, 1/4" D pitting in top flange plate. Inboard oval pin plate has rotated clockwise at L0.		43
9	N	L1L2	Up to 1/16” D painted over pitting on top plate at L1.		
9	N	L2L3	Up to 1/16” D painted over pitting on top plate at L2.		
9	N	L3L4	Up to 1/16” D painted over pitting on top plate at L3.		
9	N	L4L5	Up to 1/16” D painted over pitting on top plate at L4.		
9	N	L5L6	Localized 3” Diameter area of 5/16” D painted over pitting along outboard rivet line at midpoint. Up to 1/16” D painted over pitting on top plate at L5.		
9	N	L6L7	Up to 1/16” D painted over pitting on top plate at L6 and L7.		
9	N	L7L8	Oval pin plates have rotated at L8. Up to 1/8” deep painted over pitting on top plate at L7.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
10	S	L0L1	Areas of painted over pitting along top plate. 1” T reactivating pack rust causing scalloping along north and south web plate.		
10	S	L1L2	There is up to 1/4” T reactivated pack rust between the top chord fill plate and the top plate at L2. The fill plate exhibits corrosion holes around 4 rivet heads.		
10	S	L6	The bearing assembly anchor bolts nuts exhibit up to 50% section loss.		
10	S	L8	6” Diameter hole in the vertical cross bracing member web at the south truss		
10	S	L10L11	Areas of 1/8” D painted over pitting at the ends of the chord with isolated areas of 3/16” D pitting.		
10	S	L11L12	Areas of 1/8” D painted over pitting at the ends of the chord with isolated areas of 3/16” D pitting.		
10	S	L12L13	Areas of 1/8” D painted over pitting at the ends of the chord with isolated areas of 3/16” D pitting.		
10	S	L15L16	Up to 1/4" D painted over pitting along the inboard web plate and top plate.		
10	S	L20L21	Section Loss, 2” to 4” Diameter corrosion holes in the bottom flange plate.		
10	S	L21L22	Section Loss, 2” to 4” Diameter corrosion holes and 1/8" D pitting in bottom flange plate.		
10	N	L0L1	Section Loss, 1/4" bow/distortion from pack rust in top flange plate.		
10	N	L6L7	Section Loss, 1/8" D pitting along top flange plate.		
10	N	L11L12	Section Loss, 1/8" D pitting along top flange plate.		
10	N	L14L15	Up to 1/18” D painted over pitting on top plate at L14.		

Table 6.4: Unit II Main Truss Lower Chord Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
10	N	L16L17	Section Loss, 1/8" D pitting along top flange plate.		
10	N	L17L18	Pack rust up to 1/2" T and removed section of fill plates with pitting in L17L18 up to 1/8" D at L17 in top flange. Pitting up to 1/8" D along the top flange.		
10	N	L18L19	Section Loss, 1/8" D pitting on top flange plate at L19.		
10	N	L19L20	Pack rust up to 1/2" T and removed section of fill plates with pitting in L19L20 up to 1/8" D at L19 in top flange.		
10	N	L21L22	Pack rust up to 1/2" T and removed section of inboard and outboard fill plates with pitting in L21L22 up to 1/8" D at L22. Pitting up to 1/8" D along top flange.		

Table 6.5: Unit II Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
1	S	L2	1	Pack rust, 1/2” T at connection with L1L2.	
1/2	S	L7 / L0		Up to 3/8” W 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” D painted over pitting on the interior faces. The inboard and outboard gusset plate, exterior face has up to 1/16” D pitting throughout and up to 1/8” D around the pin.	44
2	S	L0	2	There is up to 3/8” T pack rust between the outboard gusset plate and lower chord at L0 Span 2. Section Loss, 1/8” D pitting on both plates.	
2	S	L2	2	Section Loss, 1/8” D pitting on both plates.	
2	S	L3	2	Section Loss, 1/8” D pitting on both plates.	

Table 6.5: Unit II Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
2	N	L0	2	Section loss, up to 3/16” D pitting on both faces of both outboard and inboard gusset plates primarily around pins.	
2	N	U11	1	1/4” D painted over pitting on exterior face of exterior plate.	
2	N	L14	2	1/8” D painted over pitting on interior faces of both gusset plates just above the lower chord.	
3	N	L0	1	Section loss, 1/4” D pitting on exterior face of exterior plate. Up to 1/8” T active pack rust between the pin strengthening plate and both the interior and exterior gusset plates	
4	N	L8	1	Section Loss, 2” Diameter corrosion hole in outboard gusset plate under L8U8. 1-1/4” T fill plate retrofit at inboard gusset plate.	45
4	N	L14	1	1/4” T pack rust between L14U14 and inboard gusset plate with failed caulk and active corrosion, gusset is bowed 1/4".	
5	S	L1	1	Up to 3/4” T painted over pack rust between outboard gusset plate and L0L1 at L1.	
5	S	L2	1	Up to 3/4” T painted over pack rust between outboard gusset plate and L1L2 at L2.	
5	S	L6	2	Inboard faces of both gusset plates have up to 1/4” D painted over pitting. Inboard gusset plate is bowed to the north. Outboard gusset plate is bowed to the north 1/2”.	
6	S	L0	1	Inboard faces of both gusset plates have up to 1/4” D painted over pitting. Inboard gusset plate is bowed to the north. Outboard gusset plate is bowed to the north 1/2”.	
6	S	L1	2	Up to 1/8” D painted over pitting on both gusset plates	
6	S	L2	2	Up to 1/8” D painted over pitting on both gusset plates	

Table 6.5: Unit II Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
6	S	L4	2	U to 1/8” T pack rust along the top edge of the outboard gusset plate between the vertical. 1/16” D pitting along the inboard faces of both gussets above the lower chord.	
6	S	L5	2	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. Pack rust is caulked and painted over. 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 There is up to 1/8” D painted over section loss on the inboard gusset plate by the strut connection.	46
6	S	L6	1	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” T pack rust.	
6	S	L10	1	Up to 3/16” D 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” T with a 6” L x 3” H corrosion hole along the top edge of the interior plate and a 4” L x 2” W and 2” L x 1” W corrosion hole along the fill plate on the inboard face of the diagonal.	47
6	S	L11	2	1/8” D painted over pitting on both plates.	
6	S	L12	1	1/8” D painted over pitting on both plates.	
6	S	L17	2	Up to 1/2” T pack rust between the inboard and outboard gusset plates and the vertical.	
6	S	U17	1	3/16” bowing of inboard and outboard plate due to pack rust.	
6	N	L0	2	Section Loss, 1/4” D pitting on both plates. Bowing outboard (north) at both inboard and outboard gussets.	
6	N	U0	2	Section Loss, 1/4” D pitting on both plates. Section loss and bowing approximately 1-1/2” D at outboard gusset and 3/4” D at inboard. Both bowed to the outboard (north).	
6	N	U2	1	Broken rivet in exterior plate on U2L3 connection.	

Table 6.5: Unit II Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
6	N	L4	1	Section Loss, 1/8” T pack rust in top joint on exterior plate.	
6	N	U6	1	Section Loss, 5/16” D pitting on exterior plate.	
6	N	L7	1	1/8” D painted over pitting on interior face of outboard gusset plate.	
6	N	L8	2	3/16” D painted over pitting on interior faces of both gusset plates just above the lower chord.	
6	N	L9	1	Section Loss, 1/8” D pitting on exterior plate.	
6	N	L10	2	3/16” D painted over pitting on interior faces both gusset plates.	
7		L3	1	Section Loss, 1/8” D pitting on exterior plate.	
7	N	L0	1	Section Loss, 3/8” T reactivated pack rust is distorting the inboard and outboard plates.	
7	N	U1	1	Section Loss, 1/2” T pack rust is distorting the exterior plate.	
8	S	L4-L6	3	Outboard gusset plate has up to 1/2” T painted over pack rust between it and the lower chord.	
8	S	L8, L9	2	Inboard gusset plates have up to 1/8” D painted over section loss.	
8	S	U16	1	Outboard gusset plate exterior face has up to 3/16” D painted over pitting.	
8	S	L16	1	Inboard gusset plate has up to 1/8” D painted over pitting along the inside face at the lower chord interface.	
8	S	L25	2	At L25, there is reactivating pack rust between the vertical and the inboard and outboard gusset plate up to 1-1/4” T. Heavy debris accumulation within the panel point.	
8	N	L8	2	Section Loss, 1/8” T pack rust in top joint on both plates.	
8	N	U10	1	Manufacturing defect in outboard gusset near L11U10 connection.	
8	N	L13	2	Section Loss, 1/8” D pitting in both plates.	
8	N	L16	2	Section Loss, 1/8” D pitting in both plates.	
8	N	L25	2	Pitting up to 1/8” D in both plates and adjacent to pin. Reactivated pack rust between L25U25 and inboard and outboard gusset plates.	

Table 6.5: Unit II Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
9	N	L2	2	1/16” D painted over pitting on interior faces of both gusset plates just above the lower chord.	
9	N	L3	2	1/8” D painted over pitting on interior faces of both gusset plates just above the lower chord.	
9	N	L4	2	1/8” D painted over pitting on interior faces of both gusset plates just above the lower chord.	
9	N	L5	2	Up to 1/8” D painted over pitting on interior faces of both gusset plates just above the lower chord.	
9	N	L6	1	1/8” D painted over pitting on interior face of outboard gusset plate.	
10	S	L0	2	The exterior pin nut spacer plate exhibits 1” T painted and caulked pack rust at the corners. Reactivated pack rust is noted at all corners. Up to 1/4” T pack rust between gusset plates and vertical connection with painted over 1/8” D pitting to the inboard faces.	
10	S	L1	1	Up to 1/8” T painted and caulked pack rust between outboard gusset and lower chord L1L2.	
10	S	U15	1	Section Loss, 1/4” D pitting in both plates.	
10	S	L22	2	Both gusset plates have up to 1/4” D painted over pitting	
10	N	L0, U0	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L8-L19	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L9	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L10	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L11	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L12	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L13	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L14	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	

Table 6.5: Unit II Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
10	N	L15	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	U15	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L16	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L17	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	U17	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L18	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L19	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	
10	N	L19	2	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	

Table 7: Unit III Superstructure Deficiencies				
Span	**Bent/ Truss**	**Column/ Member**	**Note**	**Photo**
11		South	Debris on horizontal strut at level 1 over Pier 11.	
11		North	The cross bracing connection to the column exhibits typical pack rust up to 1/4” T with a 4” hole in the web of the brace at the connection.	
11		North/South	Significant construction debris along the top of the built-up strut below the temporary painting rigging.	
11	S	L1U0	Inboard and outboard flanges have up to 3/16" D painted over pitting at L1 where the old fill plate was located.	
11	S	L2U2	The inboard web of each of these members has a left in place flame cut bracket.	
11	S	L3U2	The inboard web of each of these members has a left in place flame cut bracket.	
11	S	L3U3	The inboard web of each of these members has a left in place flame cut bracket.	
11	S	L6	Gusset plates - inboard gusset plate has up to 1/4" D painted over pitting on the inboard face. Outboard gusset plate has up to 1/8" D painted over pitting on the outboard face.	
11	S	L7L8	The inboard flange at L8 has reactivating surface corrosion and reactivating pack rust between it and the fill plate.	
11	S	L8U8	The vertical has up to 1/4" D painted over pitting on the web and inboard flange.	

Table 7: Unit III Superstructure Deficiencies				
Span	**Bent/ Truss**	**Column/ Member**	**Note**	**Photo**
11	N	L1U0	Painted over pack rust up to 1/2" T between diagonal and outboard fill plate at U0.	
11	N	L1	Painted over Pitting up to 1/8" D on interior faces of both inboard and outboard gusset plates (along bottom above lower chord interface).	
11	N	L1L2	Painted over pitting up to 1/4" D in web.	
11	N	Typical	Painted over pitting up to 1/16" D on interior faces of both inboard and outboard gusset plates (along bottom above lower chord interface).	
11	N	L2	Lower chord web splice plates and rivets at L2 have heavy painted over pitting up to 100% section loss. Lower chord outboard flange splice plate has pack rust up to 1/2" T.	
11	N	L2U1	Painted over pack rust up to 1/2" T between diagonal and outboard and inboard fill plates at U1.	
11	N	Typical	Painted over pitting up to 3/16" D in webs.	
11	N	L4	Painted over pack rust up to 1/2" T between gusset plate and exterior lower chord splice plate and inboard and outboard gusset plates.	
11	N	L4	Moderate painted over pitting up to 1/4" D on interior faces of inboard and outboard flange splice plates.	
11	N	L6	Moderate painted over pitting up to 3/16" D on interior faces of inboard and outboard flange splice plates.	
11	N	L7U7	1/4" T pack rust around rivet heads and removed sections of inboard and outboard fill plates at L7. Painted over pitting up to 1/8" D where fill plates have been removed.	
11	N	L7U8	Painted over pack rust up to 3/8" T with removed sections on inboard and outboard fill plates at U8.	
Frame and Braced Column	0	Center	Center column from level 1 extending up to level 3 has small areas of surface corrosion and isolated areas of painted over pitting up to 1/8" D near the bottom of the member.	
Frame and Braced Column	0	Floorbeams between lines	Floorbeams between trusses on level 2 exhibit peeling paint and laminar corrosion on the top face of the bottom flange and lower 5" of the web along the full length. The top face of the top flanges exhibit painted over pitting up to 3/16" D with water ponding on the pitting.	
Frame and Braced Column	0	Truss strut below level 2	Heavy debris buildup on top chord of with ponding water, moderate debris buildup on the lower chord that is retaining moisture. The truss strut exhibits peeling paint, laminar corrosion and pitting throughout.	

Table 7: Unit III Superstructure Deficiencies				
Span	**Bent/ Truss**	**Column/ Member**	**Note**	**Photo**
Frame and Braced Column	1	North	Minor to moderate surface corrosion with areas of painted over pitting up to 1/8” D at the bracing connections. Pack rust typical up to 1/8” T at all bracing connections.	
Frame and Braced Column	1	South	Debris on top of truss strut between south and center columns for Bent 1.	
Frame and Braced Column	1	Floorbeam between lines	Laminar corrosion on the bottom flanges and lower 2" of web, the top flange with painted over pitting up to 1/4" D. Surface corrosion located sporadically throughout the web.	
Frame and Braced Column	1	Strut above roadway	The struts at level 1 above the roadway are in good condition with laminar and surface corrosion beginning to form on nuts and bolts and debris buildup on the top face of horizontal members. Light surface corrosion is beginning to form along flanges.	
Frame and Braced Column	2	Floorbeam	Level 3 floorbeam with peeling paint and surface corrosion on the bottom and top flange.	
Frame and Braced Column	2/3	Middle	Diagonal bracing exhibits surface corrosion and areas of laminar corrosion throughout. Horizontal bracing has collected heavy debris and exhibits heavy laminar corrosion throughout. The center bracing gusset has up to 1-3/4" T pack rust.	
Frame and Braced Column	2/3	North/ South	Typical minor surface corrosion on all bracing and columns with isolated areas of blistering laminated corrosion.	
Frame and Braced Column	2	Struts	Struts at level 1 exhibit sporadic locations of surface corrosion and has light debris buildup on the web of the top beam. The top beam between the center and the north lines has two corrosion holes in the web measuring 2" L x 6" W and 2" W x 1" L.	
Frame and Braced Column	3	Strut	Struts exhibit light to moderate surface corrosion and light debris buildup on the top and bottom horizontal members. Peeling paint on the south strut top horizontal is more significant. Two up to 2" Diameter corrosion holes noted in the north strut.	

Table 7: Unit III Superstructure Deficiencies				
Span	**Bent/ Truss**	**Column/ Member**	**Note**	**Photo**
Frame and Braced Column	3	Floorbeam	Level 3 floorbeam with peeling paint and surface corrosion on the bottom and top flange.	
Frame and Braced Column	3	North/South	The built-up strut between the North and South trusses exhibits section loss with 1" to 2” Diameter corrosion holes throughout the horizontal members.	
Frame and Braced Column	4	Floorbeam	Level 2 floorbeam between center and south lines with 1/16" to 5/16" D pitting on the top flange, up to 1/4" D pitting with surface corrosion on the bottom flange and sporadic areas of surface corrosion located on the web throughout. Level 3 floorbeam with isolated areas of surface corrosion and pitting up to 3/16" D on the lower 5" of the web.	
Frame and Braced Column	4	Strut	Struts with areas of light surface corrosion, light buildup of debris on the top member and pack rust up to 1/2" T at random gusset plate connections.	
Frame and Braced Column	4	North	Level 2 rolled I beam strut with surface corrosion along flanges and pitting along the web. There is a 5-1/2" W x 1/2" H corrosion hole above the North column bearing plate and the member is buckling in the web.	
Frame and Braced Column	4	South	At level 2 the inboard C-channel flange has three pinholes above the floorbeam on the west side and a 3/4" Diameter corrosion hole on the east side.	
Frame and Braced Column	5/6	Center	The North mid gusset plate connecting the bracing between Bents 5 and 6 is lightly bowed to the North along the top edge.	
Frame and Braced Column	5/6	North	Misaligned bolt hole for catwalk splice at U14, span 6N. The misaligned hole is the bottom east bolt hole for each splice.	
Frame and Braced Column	8/9	South	The diagonal from Bent 8 to Bent 9 is bent upward and to the south due to collision damage.	

Table 7: Unit III Superstructure Deficiencies				
Span	**Bent/ Truss**	**Column/ Member**	**Note**	**Photo**
Frame and Braced Column	9	North	3/4" L crack in gusset coping from upper cross bracing to column.	
Frame and Braced Column	11/12		Chipped paint on the bottom flange of Stringer 1 between Bent 11 and 12 over North 9th street lane indicates vehicular impact	10

Table 8: 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	17	Pin & Hanger	Recently painted. Painted over pack rust between built up flange components. Up to 1/8” D pitting on bottom flange angle.	
B	17/18		Abandoned welded attachments to south face of North girder between Bents 17 and 18.	
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; recently painted. Painted over pack rust between built up flange components. Up to 1/8” D pitting on bottom flange angle.	
C	20	North Floorbeam cantilever	Sheared bolt head at North stringer connection angle to East face of floorbeam cantilever.	
C/D	23		Typical pin-hanger East of bent, North girder. Edges have been caulked but new movement is evident.	
E/F	29		Typical stringer bearing at east face of Bent 29. Typical movement noted.	

Table 9: Unit V Superstructure Deficiencies				
Span	**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 typically on the top half of the girder but can extend down to 3/4 of the girder height.	
All Spans	All	All	All floorbeams have painted over pitting up to 1/16" D.	

Table 9: Unit V Superstructure Deficiencies				
Span	**Girder**	**Face**	**Note**	**Photo**
38	South	North	3" H x 1" L corrosion hole approximately 2' above the bottom flange.	
38/39	South		65" L x Up to 1-1/4" T pack rust between bottom flange plates before and after pier 1.	
37/38	South	North	Pitting between the bottom flange cover plates over the pier.	
38/39	Center	Bottom	Up to 1/4" T pack rust between bottom flange built up plates near the pier.	
39	Middle	Bottom	Pack rust beginning to form in the bottom flange cover plates through the span.	
39	Middle	South	3/16" D painted over pitting between Floorbeam 62 and 63.	
39	South	North	Painted over pitting up to 1/4" D in web from Floorbeams 75 and 77 and in vertical stiffener to Floorbeam 76.	
39/40	Center	Bottom	Up to 1/4" T pack rust between bottom flange built up plates near Pier 39.	
39	Center		Rocker bearing at Pier 39 has typical 3/16" D painted over pitting.	
40	North/Center		Typical 1/8" D painted over pitting along bearing.	
40	North/Center		1-1/2" L x 1/2" H area of corrosion holes between girders near North girder support. 100% section loss in the knee brace at this location.	
40/41	Center		Up to 1/4" T pack rust between bottom flange built up plates near Pier 40.	
41	South	North	Flame cut hole in South girder web past Pier 40.	
41	North/Center		Large pile of trash on catwalk between North and center girder.	

Item N60 – Substructure (6, Satisfactory Condition)

The substructure is in overall **Satisfactory** condition, or 6 on the NBIS condition rating guidelines.

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

Item 33 – Abutment Walls (7, Good Condition)
The abutment walls are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
263 LF	263 LF				1.00

Item 36 – Pier Walls (7, Good Condition)
The Pier walls are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
55 LF	55 LF				1.00

Item 37 – Pier Caps (1, Good Condition)
The Pier caps are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
6,698 LF	6,636 LF	60 LF	2 LF		1.02

Multiple pier caps have spalls and delaminations throughout. Other areas without spalls and delaminations are also marked for rehabilitation.

Item 38 – Pier Columns/Bents (5, Good Condition)
The pier columns are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
374 EA	341 EA	31 EA	2 EA		1.20

The steel bents exhibit isolated cleaned and painted over areas of pitting. The steel piers in the Lakefront Ramp Section were either being painted or still rigged from recent painting operations.

Item 39 – Backwalls (7, Good Condition)
The backwalls are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
263 LF	66 LF	197 LF			1.28

A portion of the east abutment of the Lakefront ramp was covered due to ongoing painting at the time of the inspection. Minor vertical cracking and delaminated concrete at the East Abutment.

Item 40 – Wingwalls (7, Good Condition)
The wingwalls are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
12 LF	12 LF				1.00

Mask Walls
Non-structural mask walls exist beneath the superstructure along West 28th Street, West 25th Street and West 9th Street. Ongoing rehabilitation was noted during the inspection.

Item 42 – Scour (7, Good Condition)
The scour is in ***Good*** condition. Sea walls are present along both river banks, providing protection for Pier 8 and 9. No underwater inspection is required for this structure

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
2	2				1.00

Item 43 – Slope Protection (7, Good Condition)
The concrete slope protection is in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
40	40				1.00

Substructure deficiencies and specific locations are listed in Tables 10-13 below:

Table 10: Unit I Substructure Deficiencies

Section	Pier/ Frame	Note	Photo
D	37	North column has a 1'-10" H x 1' W x 3" D spall.	11
M	12	Cap with 2' L x 6" W x 3" D spall with exposed rebar.	12
N		Ongoing repairs for concrete curtain walls.	
P	2	The base of the column is delaminated around the north and east faces below the original ground level and is marked for repair.	13
P	O	Bottom face of cap has three 4' Diameter delaminations near the middle of the cap with surrounding vertical cracks.	
P	O	Inboard faces are delaminated in multiple areas with marks for repair.	

Table 11: Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
11	-	South	22” W x 6” H x 4” D spall on West face of concrete base above drain pipe catch basin connection. Drain holes at base on West face of South column are filled with debris. Laminating corrosion and pack rust on North and South anchor bolt assemblies at base. Drain holes at base on east face are filled with debris. 4” W x 3” H x 1” D spall with vertical hairline crack extending downward on East face of concrete base. The cells in top of the steel base on the North side are filled with water. The cells in top of steel base on the South side are filled with debris. Laminating corrosion on the East and West faces of the pier.	
11	-	North	The bottom of the column base is clogged with debris. The drain holes located on the East and West face do not drain and significant debris is noted in the base of the columns. The anchor bolts exhibit up to 10% section loss at the base.	
11	-	North	The interior faces of the column plates exhibit up to 1/8” D section loss along the lower 12” due to debris build up within the column base. The exterior surface of the column exhibits moderate surface corrosion full height with pack rust up to 1/4” T noted at most connections.	
Frame and Braced Column	1	North	Column base exhibits minor surface corrosion with areas of pitting up to 1/16” 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.	

Table 11: Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
Frame and Braced Column	1	South	Initiation of peel paint on column with corrosion staining. Debris and laminating corrosion on bent at level 2 floor beam south end near stringer connection at bent. Peeling paint and laminating corrosion on masonry plate, anchor bolt assemblies, and bottom of column. Debris between web and stay plates at base of column.	
Frame and Braced Column	1	Center	Center column exhibits peeling paint and laminar corrosion throughout. Flanges exhibit painted over pitting typically at 1/16" D but in isolated areas, up to 1/8" D. The anchor bolt nuts exhibit paint failure and laminar corrosion. A drainage pipe is attached to the east face of the member. The lower stiffening plate above the bearing plate exhibits multiple corrosion holes up to 8" H x 2" W however this is not a structural piece of the bent. The bearing pedestal typically exhibits 2-3 full height 1/16" W cracks and one full width horizontal crack. The top half of the column from level 1 to level 2 is in better condition with light surface corrosion random locations and painted over 1/16" D pitting on the flanges.	
Frame and Braced Column	1	Middle	The base of the column exhibits moderate surface corrosion, pitting of the base plate up to 1/16” D and moderate debris build up between the stay plate and vertical web plate. Both the east and west stay plates exhibit holes up to 8” H x 6” W also on the lower 8” H. The anchor bolts also exhibit up to 10% section loss between the vertical and the base plate with up to 25% section loss of the anchor bolt nuts.	
Frame and Braced Column	1	Middle	The vertical web plate at the base of the column has a 3” L x 2” H corrosion hole at the South end above the base plate. The east side of the vertical web also exhibits up to 50% section loss along the lower 4" - 6” H.	
Frame and Braced Column	2	North	The base of the column typical exhibits minor surface corrosion with areas of pitting up to 1/16” 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. The anchor bolt nuts also exhibit up to 10% section loss.	

Table 11: Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
Frame and Braced Column	2	North	There is a Full Height x 1/16” W vertical crack at the southwest and southeast corners of the concrete pedestal.	
Frame and Braced Column	2	Middle	Column from the base to level 2 has moderate surface corrosion throughout. Column from level 2 to level 3 has light surface corrosion along the ends of the flanges and web.	
Frame and Braced Column	2	Middle	The base of the column exhibits moderate surface corrosion, pitting of the base plate up to 1/16” D and minor debris build up between the stay plate and vertical web plate. The lower 2” H of the vertical web plates exhibits severe laminated corrosion with areas of up to 50% section loss.	
Frame and Braced Column	3	North	The base of the column typical exhibits minor surface corrosion with areas of pitting up to 1/16” 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 and Braced Column	3	Middle	The base of the column exhibits moderate surface corrosion, pitting of the base plate up to 1/16” D and minor debris build up between the stay plate and vertical web plate.	
Frame and Braced Column	3	Middle	Column from level 0 to level 2 exhibits light surface corrosion located sporadically through the member. From level 2 to 3 the column is in good condition with little surface corrosion in isolated areas.	

Table 11: Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
Frame and Braced Column	3	South	Peeling paint with surface corrosion and light debris on bottom flange and peeling paint with surface corrosion on top flange connection for level 2 floor beam to south column. Peeling paint with laminating corrosion and debris on truss strut between south and center column at level 1. Peeling paint and laminating corrosion on column at level 1 North-South and East-West strut connection areas. Peeling paint and laminating corrosion on column bolts for both built-up flanges between the base and level 1. Peeling paint and laminating corrosion on masonry plate, anchor bolt assemblies, and bottom of column. Debris between web and stay plates at base of column.	
Frame and Braced Column	4	North	The base of the vertical exhibits pitting up to 1/16” D. The east and west stay plate has 100% section loss up to 6” H along the lower edge. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate.	
Frame and Braced Column	4	North	Column from level 0 to level 2 with moderate surface corrosion and up to 1/8" D painted over pitting on the inboard flange C-channel flanges at level 2 on the east inboard flange C-channel there is a 1-1/2" 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.	
Frame and Braced Column	4	Middle	The base of the vertical exhibits pitting up to 1/16” D. The west stay plate has 100% section loss Full Width x up to 6” L along the lower edge. The anchor bolts also exhibit up to 10% section loss between the vertical collar and the base plate.	
Frame and Braced Column	4	Middle	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 undermining of the base plate.	

Table 11: Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
Frame and Braced Column	4	Middle	Column level 0 to level 3 with light to moderate surface corrosion on flanges and webs with 1/16" to 1/8" D pitting 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 and Braced Column	4	South	Peeling paint and laminating corrosion on masonry plate, anchor bolt assemblies, and bottom of column. Peeling paint and laminating corrosion on column between the base and level 1.	
Frame and Braced Column	5	North/ Middle	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 and Braced Column	5	South	Peeling paint and laminating corrosion on masonry plate, anchor bolt assemblies, and bottom of column. Peeling paint and surface corrosion on column between the base and level 1. Peeling paint and laminating corrosion on level 1 truss strut between south and center columns. Peeling paint and surface corrosion on column between level 2 and 3. Peeling paint and surface corrosion on both flanges of level 2 floor beam at column connection.	
Frame and Braced Column	6	North	North column has 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 and Braced Column	6	South	Peeling paint and surface corrosion on masonry plate, anchor bolt assemblies, and bottom of column Peeling paint and laminating corrosion on column at east-west and north-south level 2 strut connections.	
Frame and Braced Column	6-7		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 corrode with 100% section loss exposing electrical wires.	

Table 11: Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
Frame and Braced Column	6-9	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 and Braced Column	10		Active painting during inspection. No significant deficiencies noted.	
Frame and Braced Column	11		Active painting during inspection. No significant deficiencies noted.	
Frame and Braced Column	12		Active painting during inspection. No significant deficiencies noted.	
Frame and Braced Column	13		Active painting during inspection. No significant deficiencies noted.	
Frame and Braced Column			West Lakeside non-structural mask wall are being rehabilitated.	

Table 12: Unit IV Substructure Deficiencies		
Bent	**Note**	**Photo**
14	West lakeside exit ramp: South wall, south face; spalling with exposed reinforcement and delaminations up to Full Height x 3' W on each side of Joint C	
14	West lakeside exit ramp: South face of south wall, west end of panel 1; large spalls and delaminations along top half of south wall.	
14	West lakeside exit ramp: South wall, south face between panels 1 and 2; Full Height x 1’ W spalling with exposed rebar on each side of joint.	
14	West lakeside exit ramp: South wall, south face of panel 2; Large spalls and delaminations along top half of wall up to Full Height x 1/16” W	
14	West lakeside exit ramp: South wall, south face, panel 4; Hairline to 1/16” W vertical cracks throughout.	
14	West lakeside exit ramp: South wall, south face of panel 5; 3 hairline vertical cracks.	
	Lake 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.	
30	3’ Diameter x 3’ D sink hole near North column. *The district was contacted regarding this sink hole during the inspection.	14

Table 13: Unit V Substructure Deficiencies

Span	Pier	Face	Note:	Photo
38/39	38	Top	Top of pier cap exhibits painted pitting up to 3/16" D. Up to 1/4" T pack rust between top plate and web plates.	
39/40	39	Top	Top of pier cap between the north and center girders has painted over pitting up to 3/16" D and up to 1/4" T pack rust between top plate and web plates.	

- (Unit V was rigged for painting and not fully accessible during the inspection)

Item N61 – Channel (8, Very Good Condition)

The channel is in ***Very Good*** condition, or an 8 on the NBIS condition rating guidelines.

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

Item 51 – Alignment (1, Very Good Condition)
The alignment is in ***Very Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
200 LF	200 LF				1.00

Item 52 – Protection (1, Very Good Condition)
The channel protection is in ***Very Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
200 LF	200 LF				1.00

Item 53 – Hydraulic Opening (1, Very Good Condition)
The hydraulic opening is in ***Very Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
2	2				1.00

Item 54 – Navigation Lights (1, Very Good Condition)
The navigation lights are in ***Very Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
5	5				1.00

Item 6 – Approaches Summary (6, Satisfactory Condition)

The approaches are in ***Satisfactory*** condition, or a 6 on the NBIS condition rating guidelines.

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

Item 1 – Approach Wearing Surface (2, Fair Condition)
The approach wearing surfaces are in ***Fair*** condition due to minor cracking and spalling noted throughout.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
6		6			2.00

Item 2 – Approach Slabs (1, Good Condition)
The approach slabs are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
6,788 SF	6,788 SF				1.00

Item 3 – Relief Joints (1, Good Condition)
The relief joints are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
272 LF	272 LF				1.00

Item 4 – Embankment (1, Good Condition)
The approach embankments are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
1	1				1.00

Item 5 –Guardrail (1, Good Condition)
The approach guardrails are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
13	13				1.00

Security
There are several locations where the structure and structure right of way can be accessed by non-bridge personnel. It appears most of these areas may be restricted following the ongoing rehabilitation.

Recommendations

The General Appraisal and Operating Status for the Main Avenue Bridge over the Cuyahoga River is 5A, Fair condition. The lower chord is the element governing this condition rating.

Two maintenance/rehabilitation projects are currently active and taking place.

The following items are recommendations by Infrastructure Engineers, LLC:

- Restore bridge lighting for Westbound Roadway & W. 28 Street Ramps.
- Install minimum overhead clearance signs as required by ODOT & City of Cleveland policy.
- Repair all missing/damaged joint material throughout the structure.
- Continue ongoing painting of the bridge superstructure in Units III and V.
- Continue ongoing concrete repairs and cleaning out vaults throughout Unit I.
- Spot paint areas of activated corrosion within Unit II
- Lakefront Ramp – Remove piled debris from catwalks.
- East Abutment – Secure area in front of East Abutment.
- Lateral Bracing – Blow off construction debris.
- Remove & replace edge and lane lines.
- Install utility box covers on bridge light poles where needed.
- Remove all obsolete welded attachments.
- Section K: At floor beam cantilever brackets, remove pack rust and repair areas of section loss at the connection
- Clean debris from ground level drainage collectors and clear underground storm sewer pipe.
- Forward Approach – Clean, repair and paint the areas between bearing anchor bolts and stiffeners at the bent columns.
- Remove all construction debris once painting is completed.
- Remove obstructions from drain holes and chambers on bearing castings.
- Main Truss Spans: Remove expansion bearing guide plates, remove debris and paint roller nest.

Photos

Photo 1 – Joint B2, East parapet; damaged light post

Photo 2 – Unit I, Section P; Transverse cracking with efflorescence

Photo 3 – Unit IV, Section E; Spalling along full height of median, South face

Photo 4 – Section IV, Joint C; Joint being replaced

Photo 5 - Section IV, Joint C; Joint being replaced

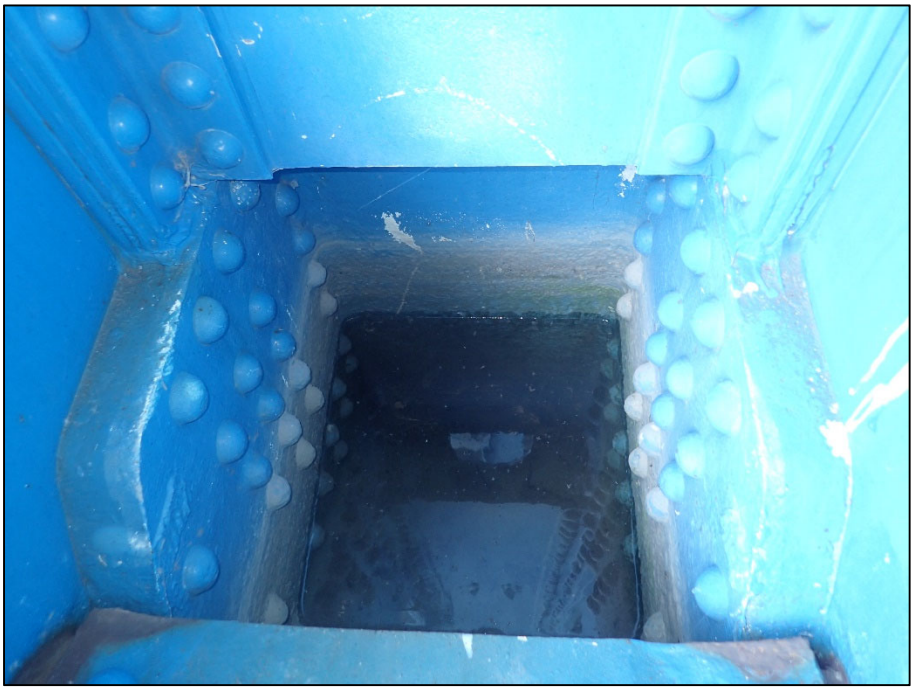


Photo 6 – Unit II, Span 4, L2 bearing; full of water

Photo 7 – Unit II, Pier 5, South bearing; moderate surface corrosion along vertical steel box sides

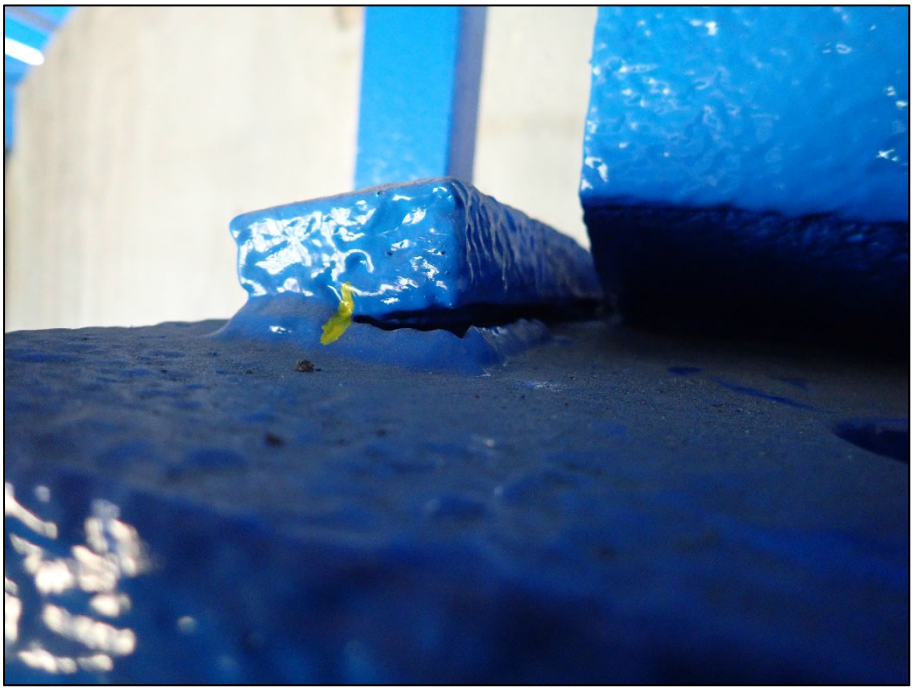


Photo 8 – Unit I, Section N, Floorbeam 8; south guide bar of north bearing is cracked

Photo 9 – Unit I, Section P, Frame 1, Floorbeam 2; Full Height x Full Width x 2” D spall with exposed rebar along south end

Photo 10 – Unit III, Bent 11/12; Stringer 1 with chipped paint on bottom flange over 9th Street

Photo 11 – Unit I, Section D, Frame 37; North column with 1'-10" H x 1' W x 3" D spall

Photo 12 – Unit I, Section M, Frame 12; 2' L x 6" W x 3" D spall

Photo 13 – Unit I, Section P, Pier 2; base of column marked for repair

Photo 14 – Unit IV, Bent 30; 3’ Diameter x 3’ D sink hole near North column

Photo 15 – Unit II, Span 5, South truss at L1; 1-5/8” T painted over pack rust on inboard fill plate

Photo 16 – Unit II, Span 6, South truss at L17; 3/8” T pack rust between outboard gusset and vertical

Photo 17 – Unit II, Span 9, North truss at L8; 1” T pack rust between outboard pin plate and vertical

Photo 18 – Unit II, Span 6, South truss at L5; deteriorated caulk along outboard face

Photo 19 – Unit II, Span 6, North truss at L0U1; 7/16” D painted over pitting along web

Photo 20 – Unit II, Span 6, North truss at L9; 3-1/2” L x 2-1/2” W corrosion hole with adjacent 1/2" Diameter holes

Photo 21 – Unit II, Span 8, South truss near L14; inboard fill plates with painted over corrosion holes

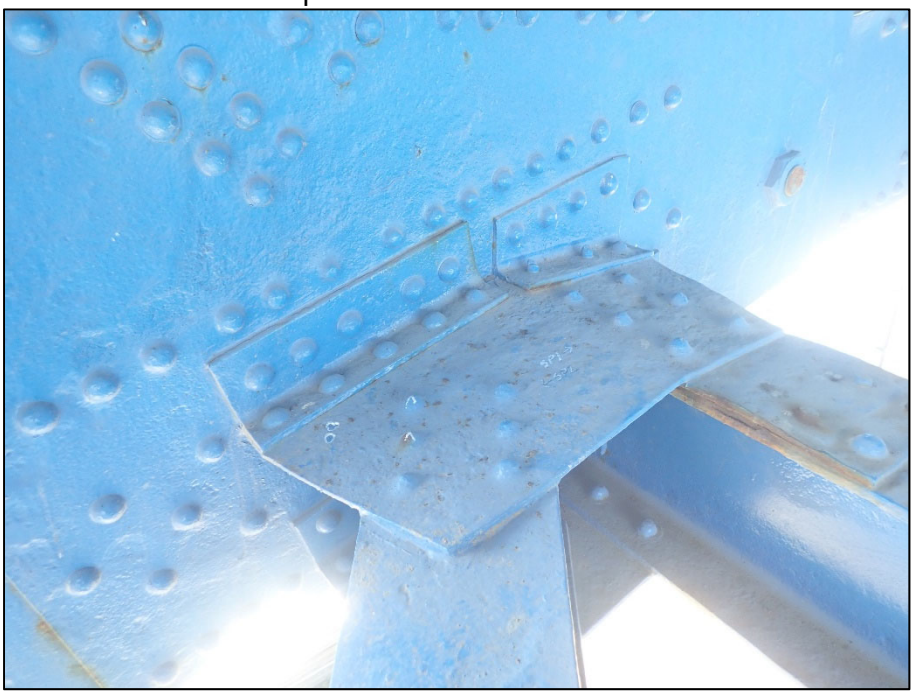


Photo 22 – Unit II, Span 1 South truss at L7; Up to 100% section loss to lower lateral bracing gusset plates

Photo 23 – Unit II, Span 2, South truss, L1L2; up to 2" distortion along inboard and outboard edges of top plate due to reactivated pack rust

Photo 24 – Unit II, Span 2, South truss, L10; Multiple corrosion holes in lower lateral bracing

Photo 25 – Unit II, Span 2, North truss at L0; 1/4” diameter perforation in bottom flange

Photo 26 – Unit II, Span 2, North truss, L13L14; 1” Diameter corrosion hole in top plate

Photo 27 – Unit II, Span 3, South truss at L0; 1/2" T reactivated pack rust between bottom of pin plate and inboard gusset plate

Photo 28 – Unit II, Span 3, North truss at L0; 1” T pack rust between lower chord and interior gusset plate

Photo 29 – Unit II, Span 4, North truss at L0; end 16” L with sever painted over dee pitting and 12” W x 16” L corrosion hole

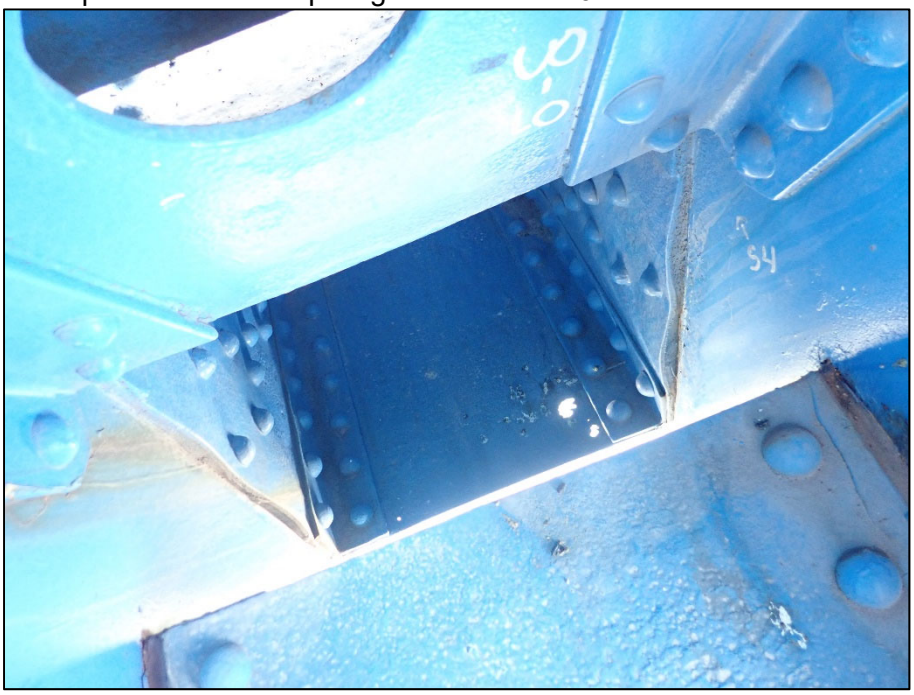


Photo 30 – Unit II, Span 4, South truss at L0; two (2) 1-1/2” Dia corrosion holes in bottom plate

Photo 31 – Unit II, Span 4, South truss at L0L1; 1” T caulked over pack rust along outboard edge of top plate

Photo 32 – Unit II, Span 4, South truss; Corrosion holes in lower lateral bracing gusset plate

Photo 33 – Unit II, Span 4, South truss near L1; 1” L x 1/2" H painted over corrosion hole in inboard web

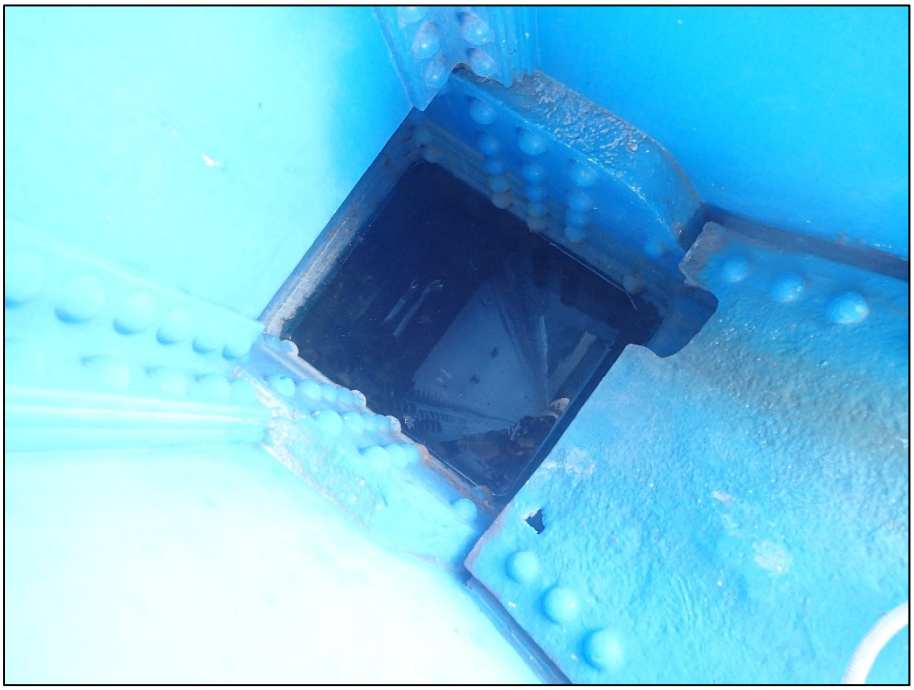


Photo 34 – Unit II, Span 4, South truss at L2; Bearing full of water, 3-1/2” L x 4” W corrosion hole in top plate

Photo 35 – Unit II, Span 6, South truss at L7; 1/8” T remaining section within 8” L x Full Width with 2” Diameter corrosion hole

Photo 36 - Unit II, Span 6, North truss at L2; 8” L x 1-1/2” W corrosion hole in bottom flange

Photo 37 – Unit II, Span 6, North truss under L1; 5” Diameter corrosion hole with 1/4" D pitting

Photo 38 - Unit II, Span 6, North truss at L1; 10” L x 4” W corrosion hole

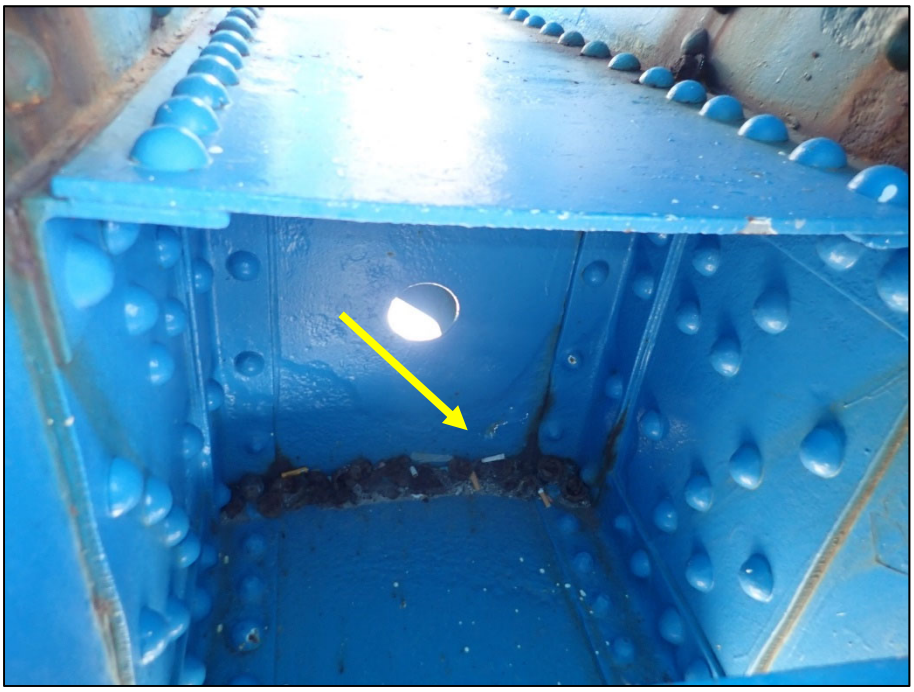


Photo 39 - Unit II, Span 6, North truss at L17; 5” W x 2” H corrosion hole in end plate

Photo 40 - Unit II, Span 8, South truss, L24L25; lower chord steel channel retrofit

Photo 41 – Unit II, Span 9, South truss at L0; inboard oval pin plate has rotated counterclockwise

Photo 42 – Unit II, Span 9, South truss along L0L1; Painted over heavy section loss, up to 1/4" D pitting with 1/2" Diameter corrosion holes

Photo 43 – Unit II, Span 9, North truss at L0; inboard oval pin plate has rotated clockwise

Photo 44 – Unit II, Span 1, South truss at L7; 3/16” D painted over pitting inboard gusset plate

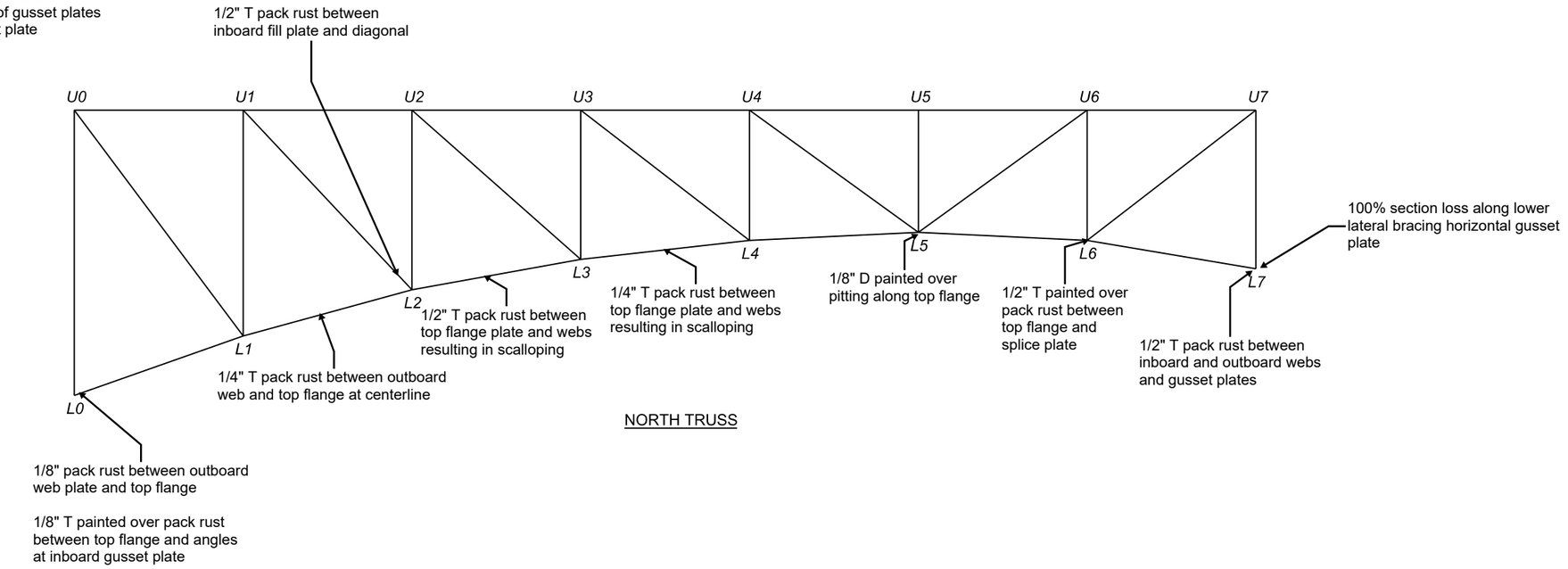
Photo 45 – Unit II, Span 4, North truss at L8; 2” Diameter corrosion hole in outboard gusset plate

Photo 46 – Unit II, Span 6, South truss at L5; 3” L x 1” H area of section loss with 1 1/8” bow in fill plate

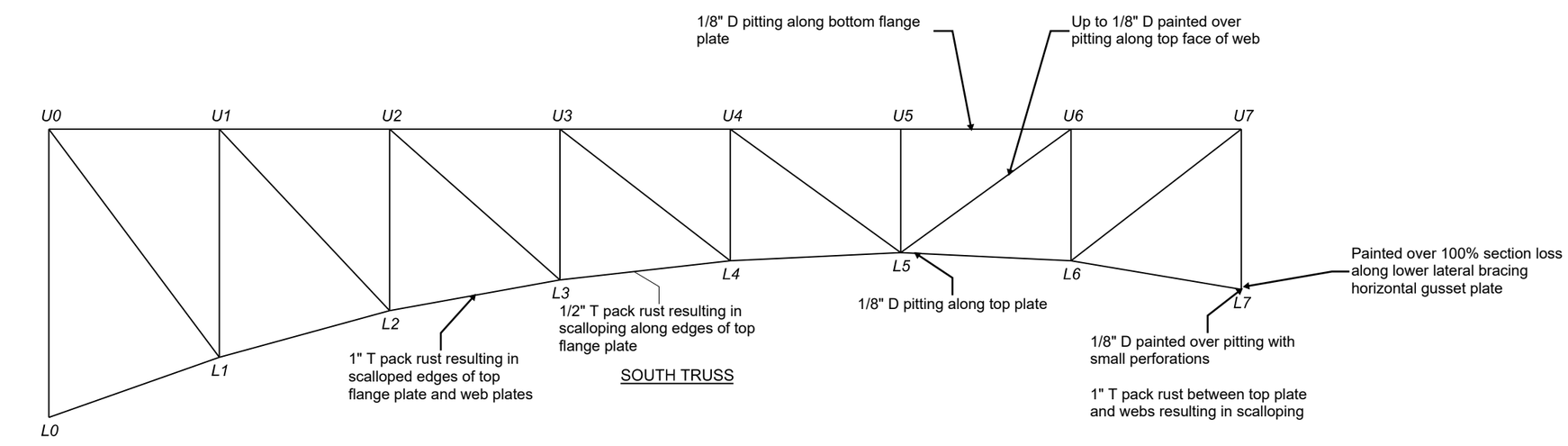
Photo 47 – Unit II, Span 6, South truss at L10; interior fill plate with painted over section loss and corrosion holes in fill plates

Unit II Main Truss Span Deficiency Drawings

Gusset Plates:
L2, South; 1/2" T pack rust
L7 South; 3/8" pack rust between outboard gusset and lower chord
3/16" D painted over pitting along interior faces of gusset plates
1/16" D pitting on exterior face of inboard gusset plate
3/8" T pack rust between outboard gusset plate

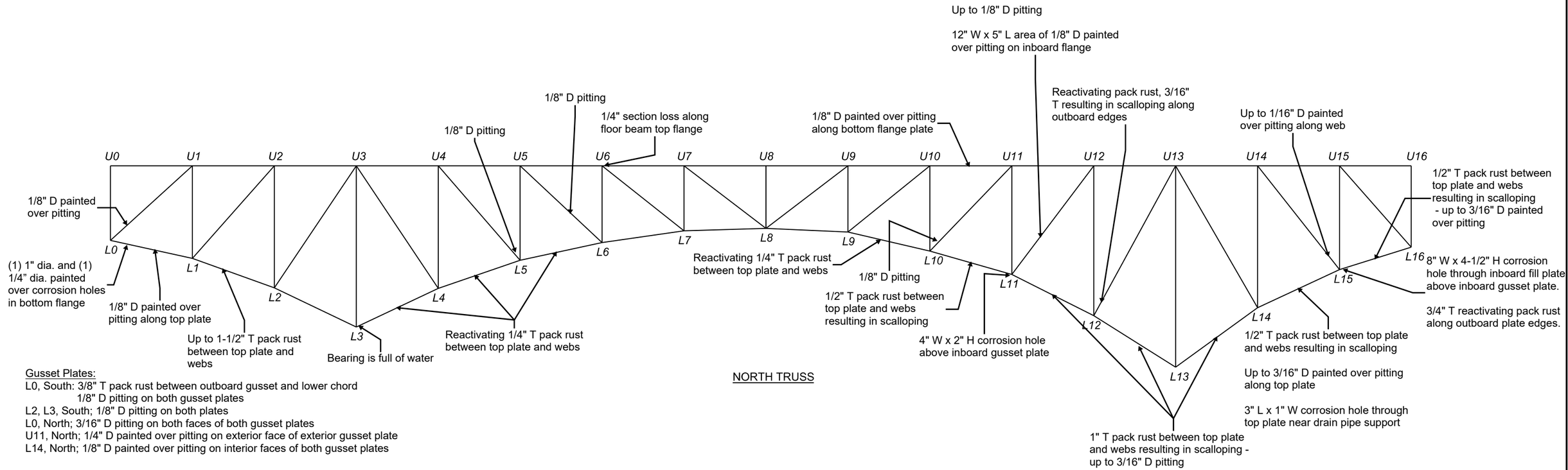


NORTH TRUSS



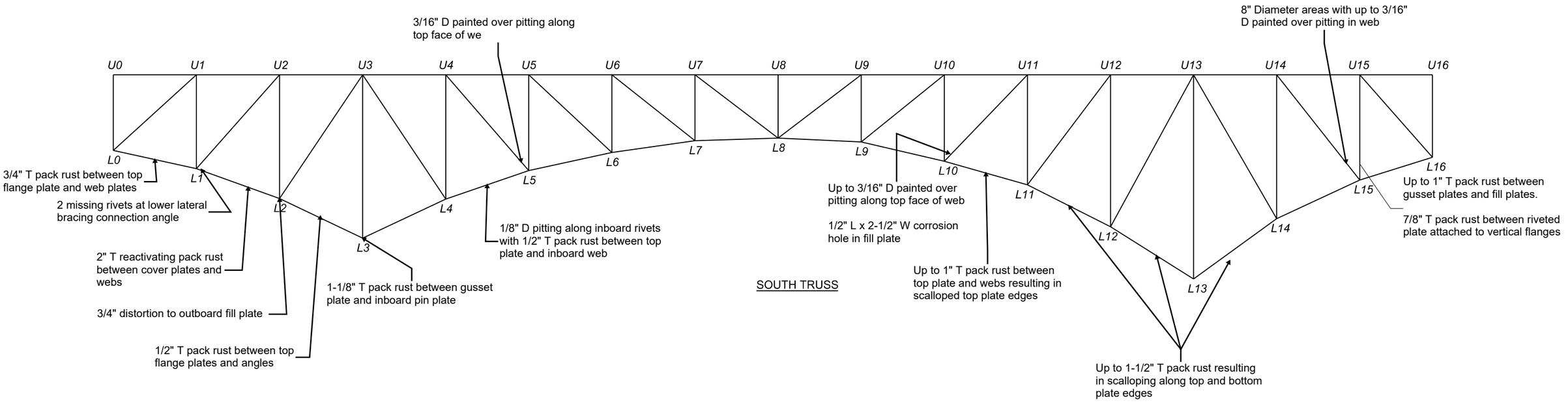
SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441	
NOT TO SCALE	JUL, 2018	INFRASTRUCTURE ENGINEERS, LLC	TRUSS ELEVATION - SPAN 1	PAGE B-1



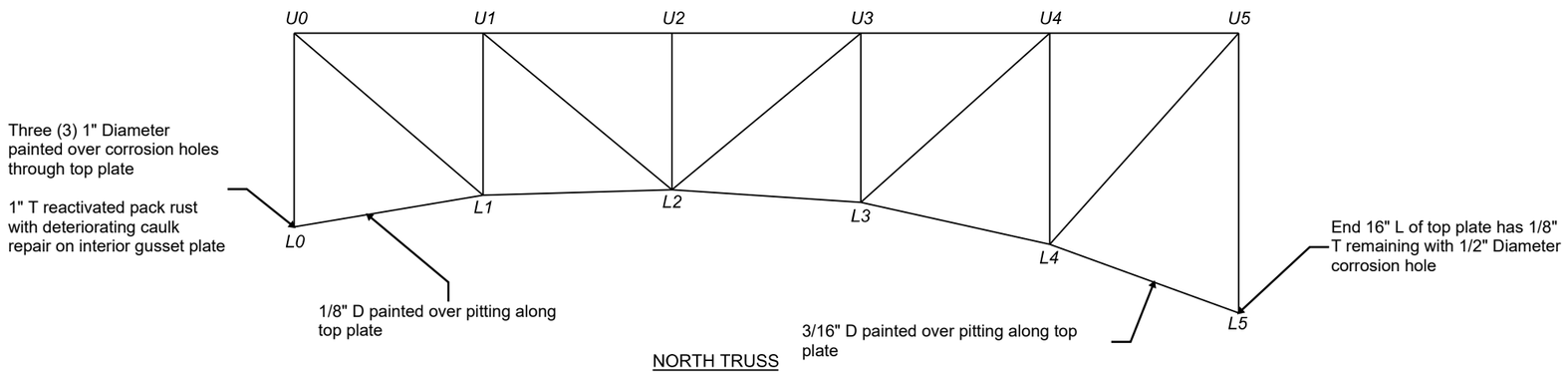
Gusset Plates:
L0, South: 3/8" T pack rust between outboard gusset and lower chord
1/8" D pitting on both gusset plates
L2, L3, South; 1/8" D pitting on both plates
L0, North; 3/16" D pitting on both faces of both gusset plates
U11, North; 1/4" D painted over pitting on exterior face of exterior gusset plate
L14, North; 1/8" D painted over pitting on interior faces of both gusset plates

NORTH TRUSS



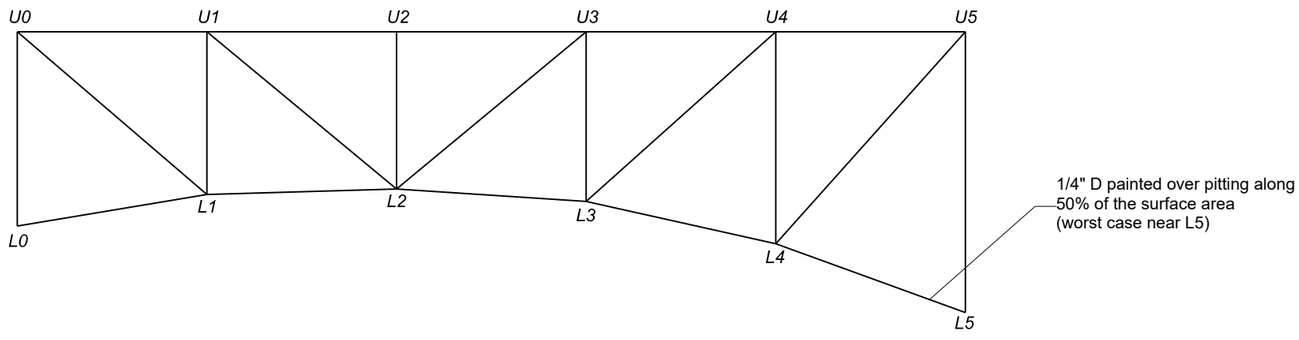
SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 2 — PAGE B-2



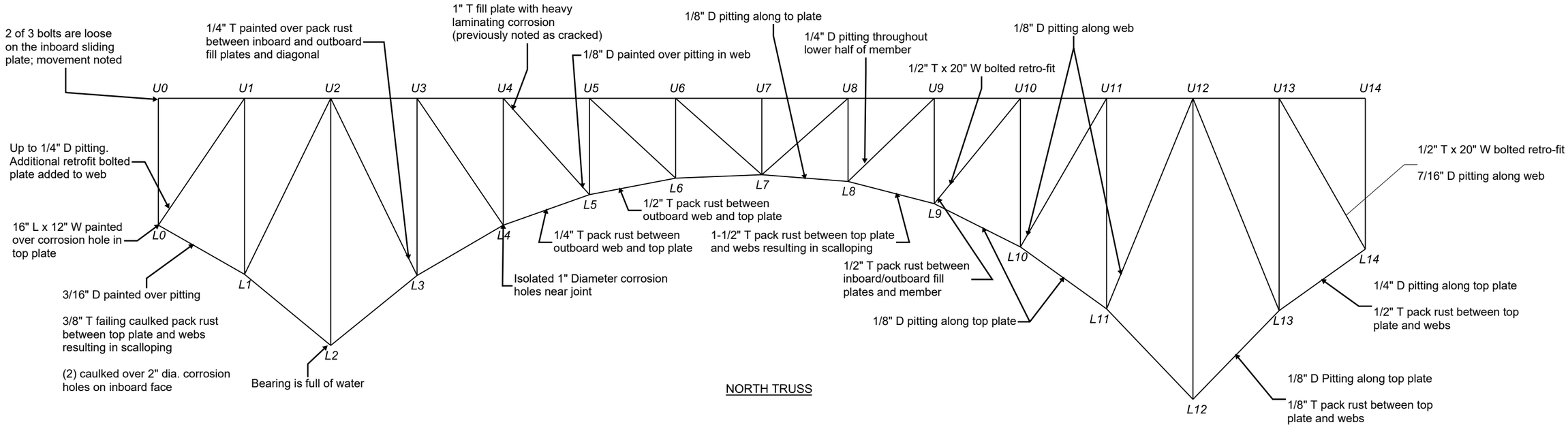
NORTH TRUSS

Gusset Plates:
L0, North; 1/4" D pitting on exterior face of exterior plate

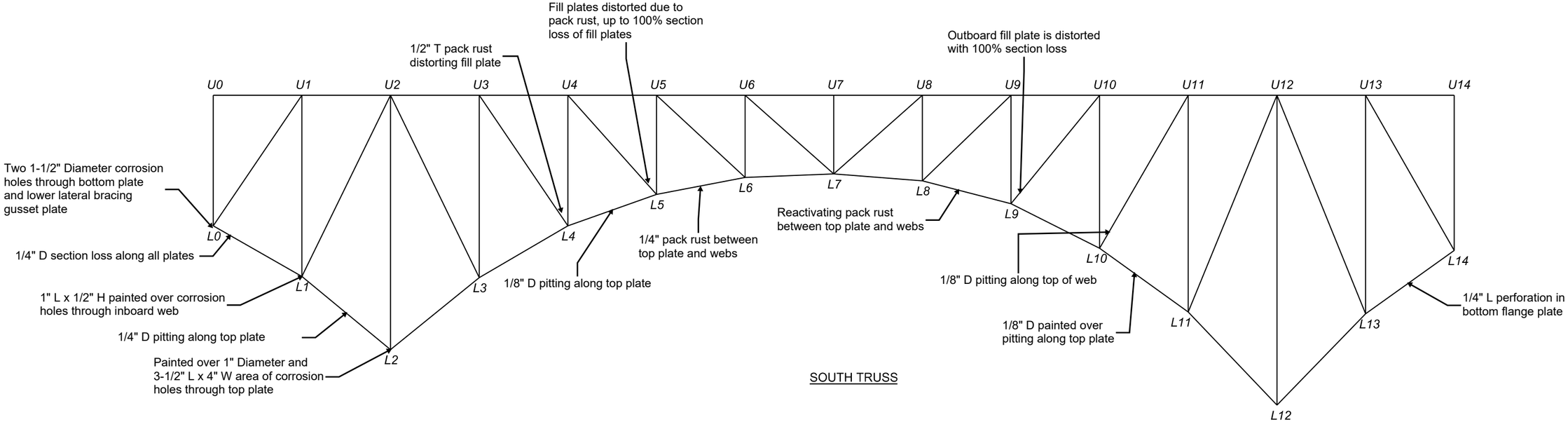


SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 3 — PAGE B-3



NORTH TRUSS

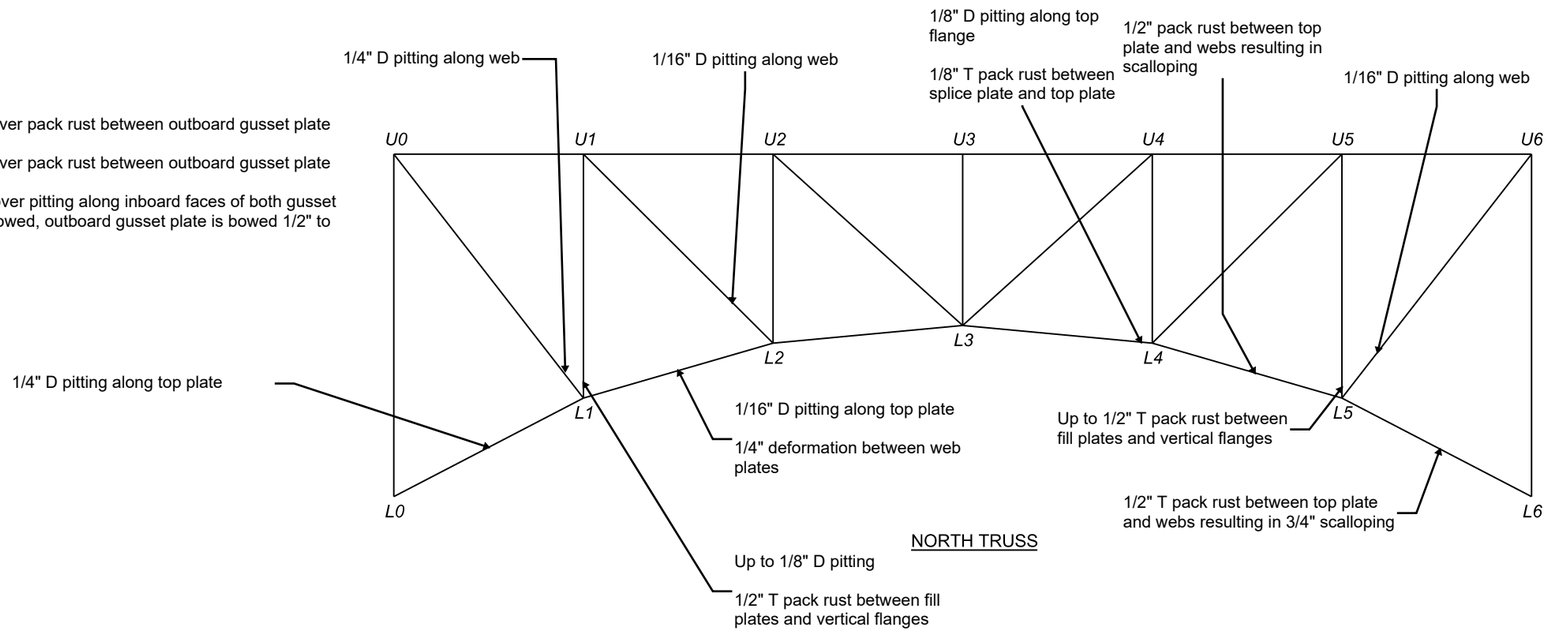


SOUTH TRUSS

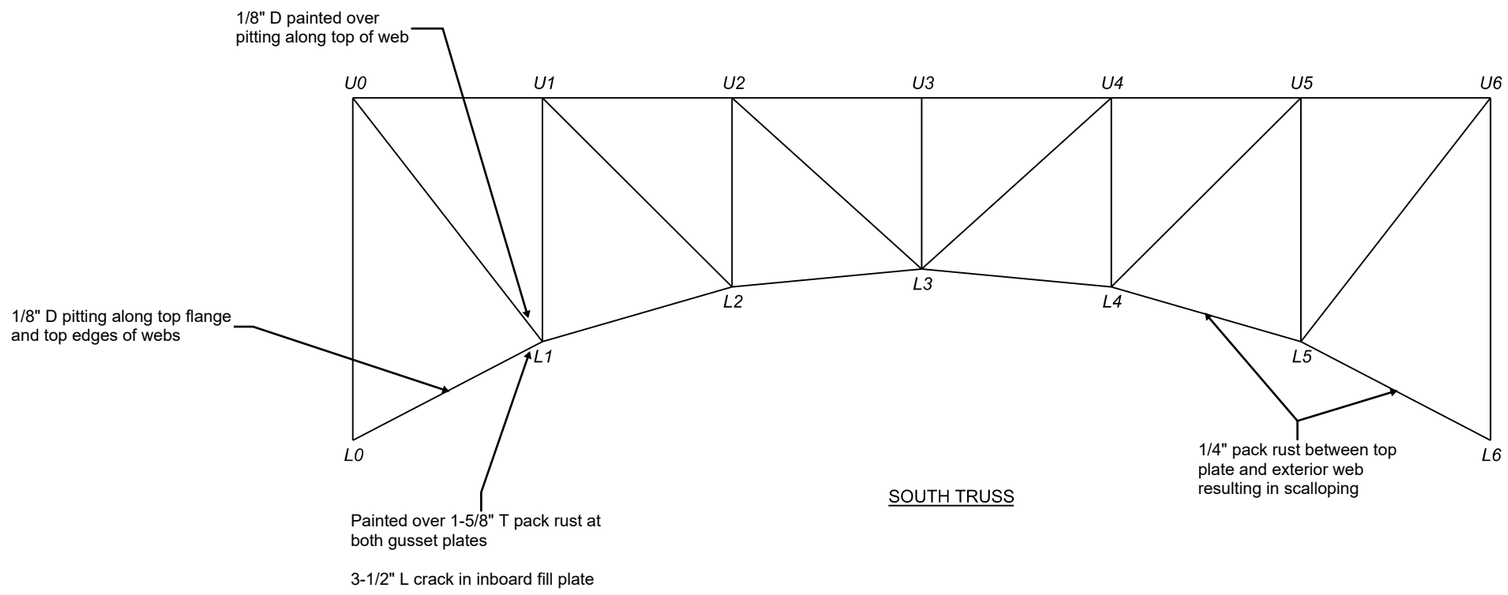
Gusset Plates:
L8, North; 2" Diameter corrosion hole in exterior gusset plate
L14, North; 1/4" T pack rust between inboard gusset plate and vertical, 1/4" bow in inboard gusset

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 4 — PAGE B-4

Gusset Plates:
L1, South; 3/4" T painted over pack rust between outboard gusset plate and lower chord
L2, South; 3/4" T painted over pack rust between outboard gusset plate and lower chord
L6, South; 1/4" D painted over pitting along inboard faces of both gusset plates, inboard gusset is bowed, outboard gusset plate is bowed 1/2" to the north

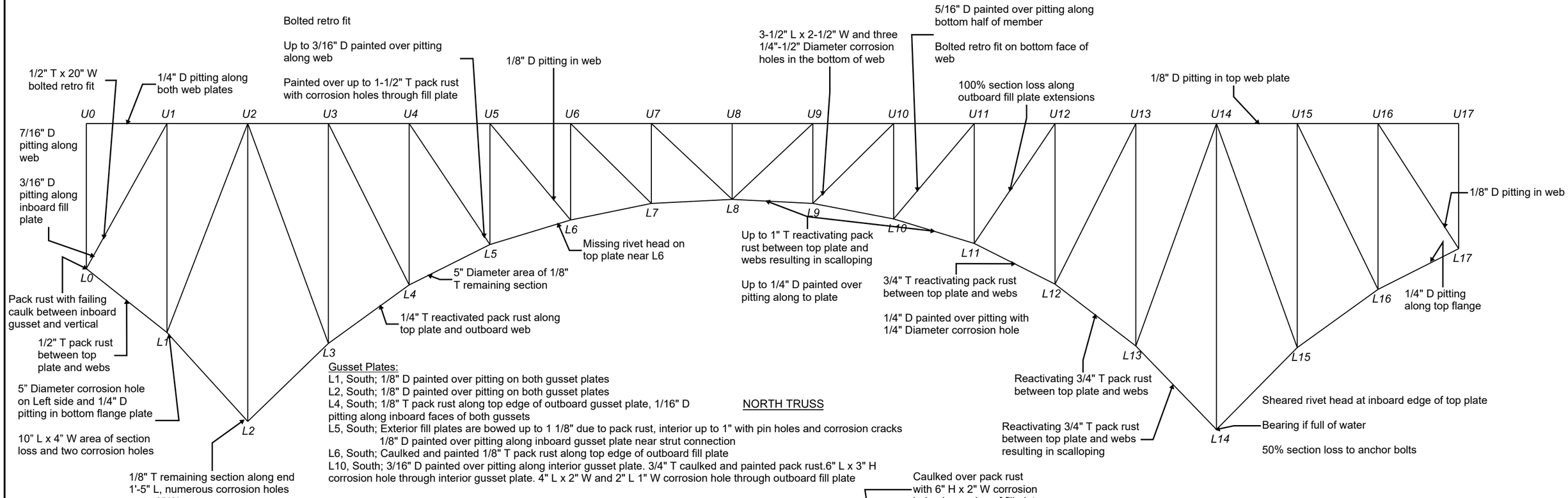


NORTH TRUSS

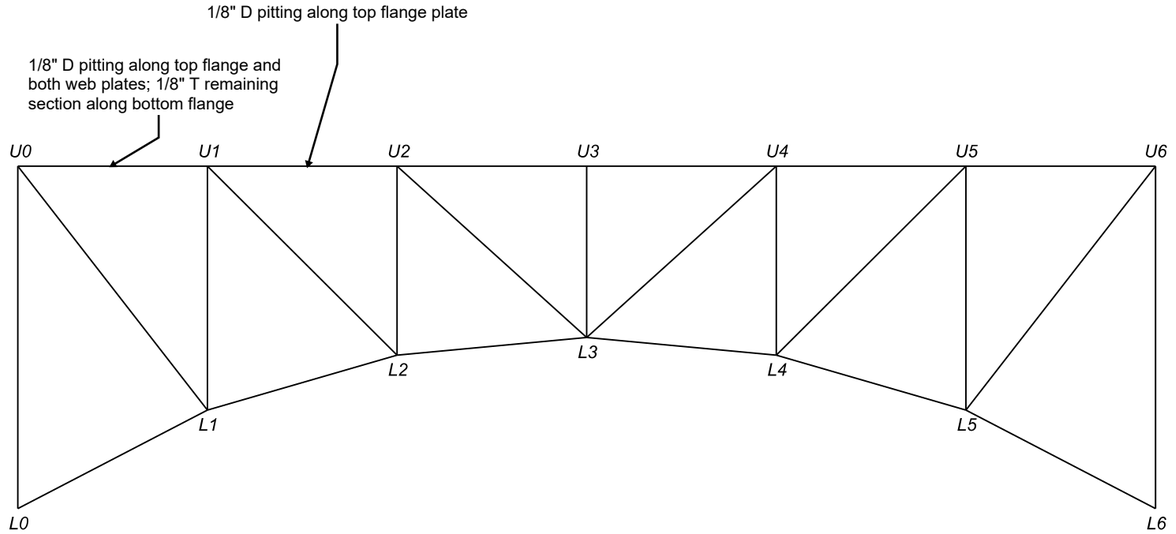


SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 5

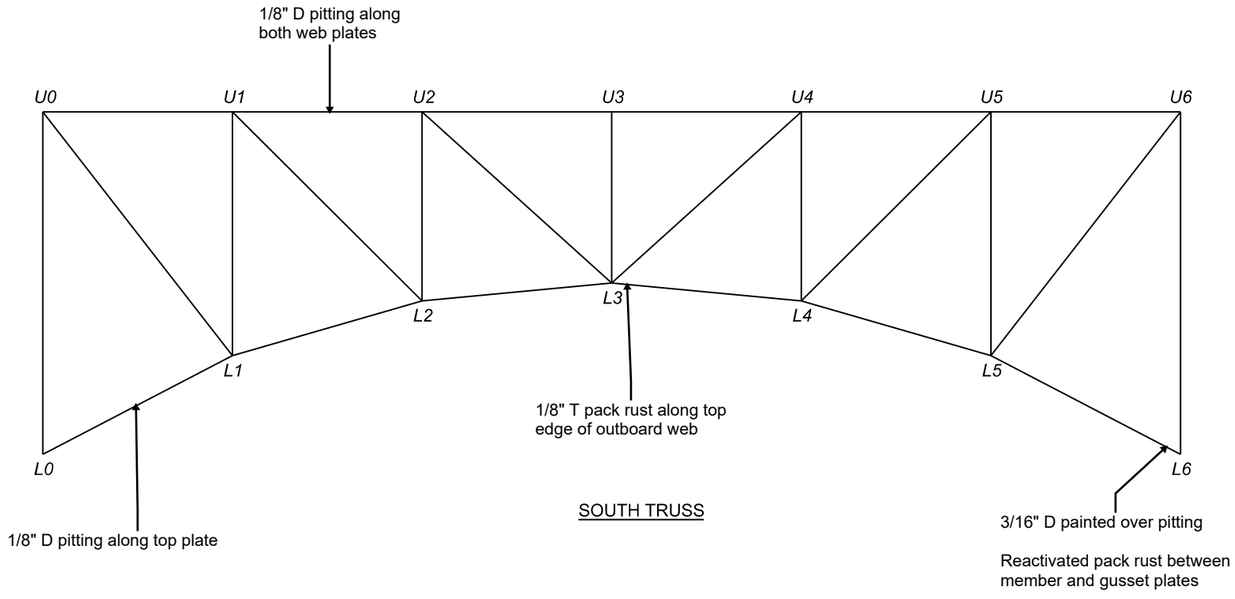


GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 6 PAGE B-6



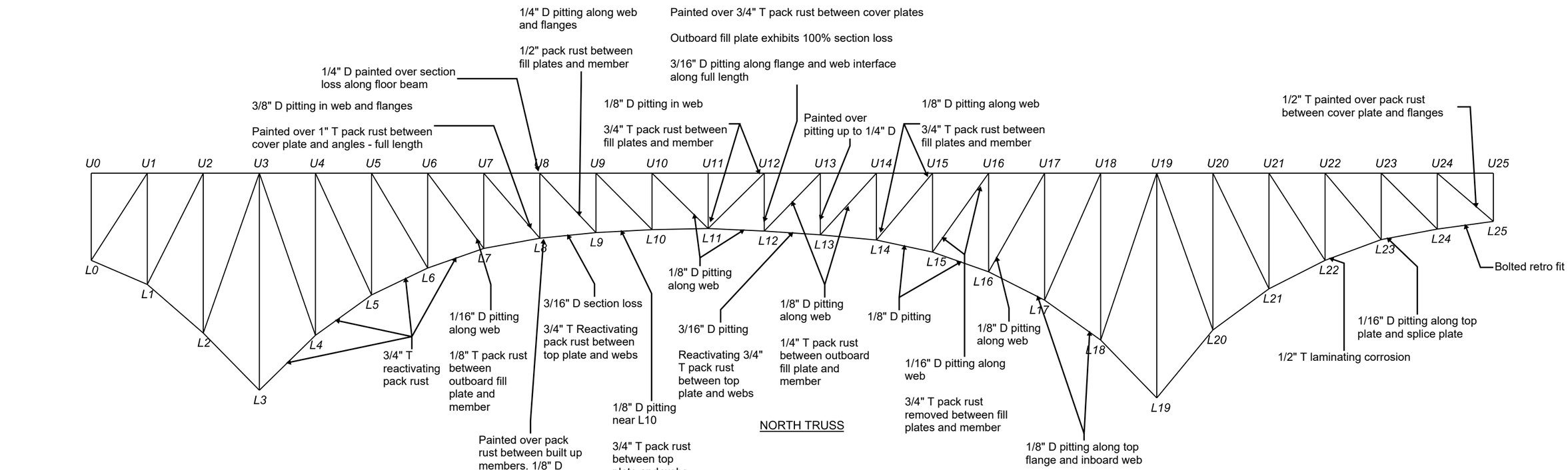
NORTH TRUSS

Gusset Plates:
L3, South; 1/8" D pitting along outboard plate
L0, North; 3/8" T reactivated pack rust distorting both gusset plates
U1, North; 1/2" T pack rust distorting outboard gusset plate



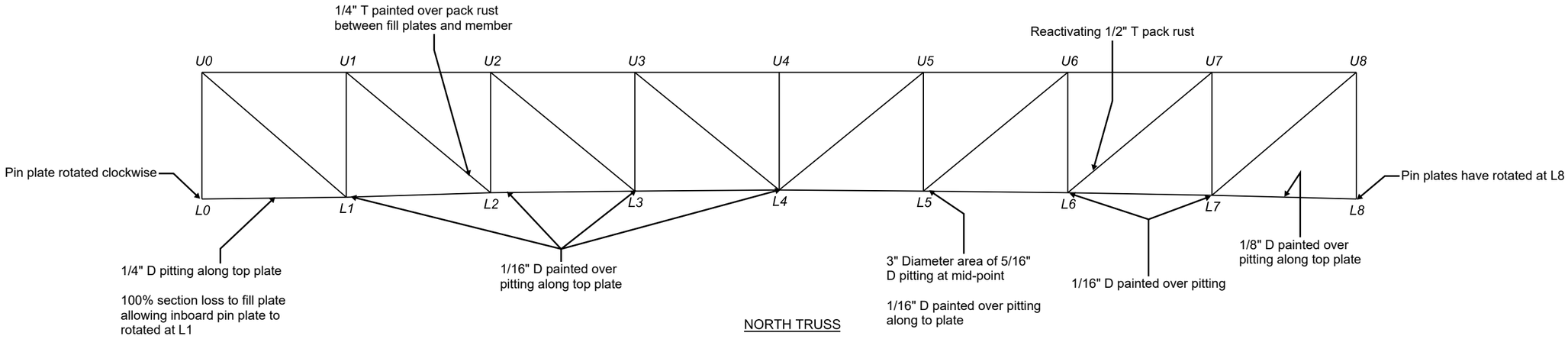
SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 7 PAGE B-7



Gusset Plates:
L4, L5, L6, South; 1/2" T pack rust between outboard gusset and lower chord
L8, L9, South; 1/8" D painted over pitting on inboard gusset plate
U16, South; 3/16" D painted over pitting on outboard gusset plate
L16, South; 1/8" D painted over pitting on inboard gusset plate, inboard face
L25, South; 1-1/4" T reactivated pack rust between gusset plates and vertical
L8, North; 1/8" T pack rust along top of gusset plates
U10, North; Rolling defect on outboard gusset plate
L13, North; 1/8" D pitting in both gusset plates
L16, North; 1/8" D pitting in both gusset plates
L25, North; 1/8" D pitting in both gusset plates

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 8 PAGE B-8



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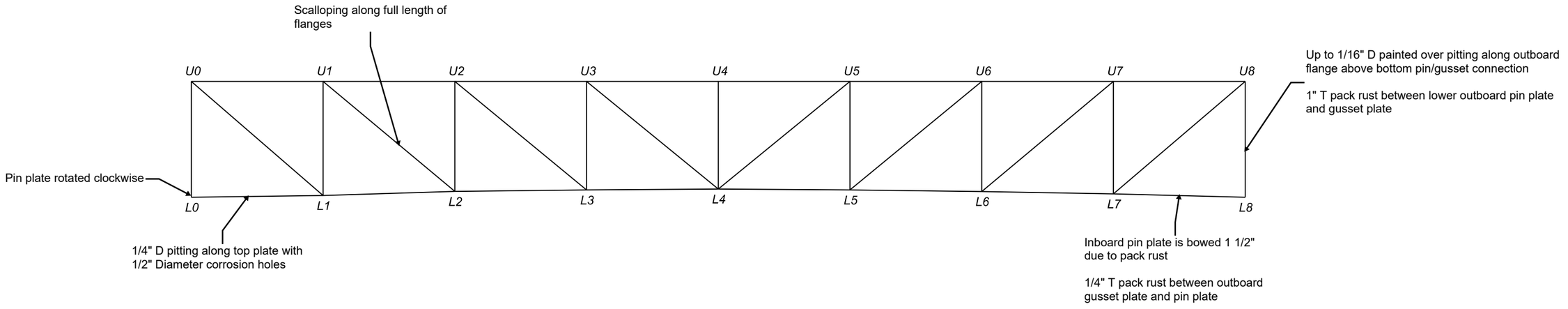
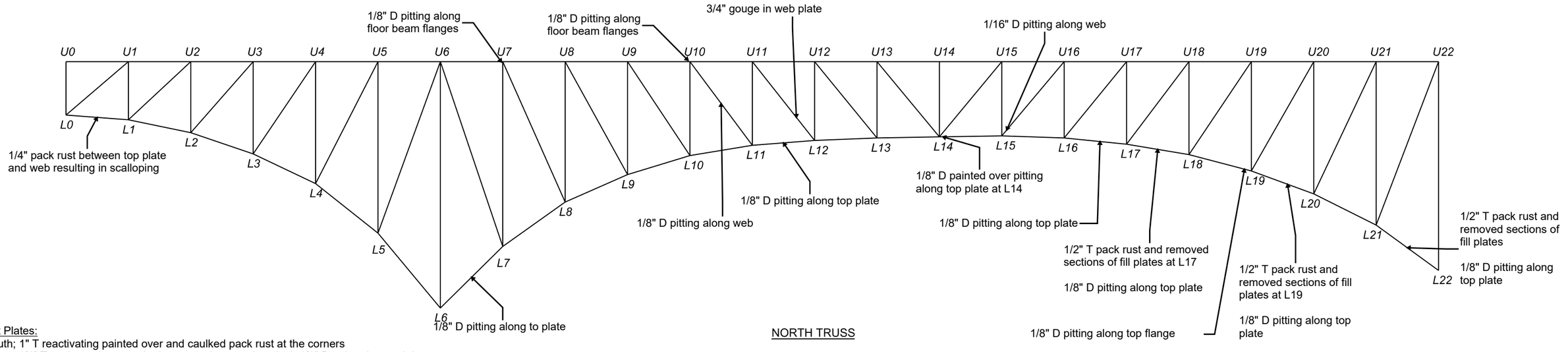


SOUTH TRUSS

Gusset Plates:
L2, North; 1/16" D painted over pitting along interior faces of both gusset plates
L3, North; 1/8" D painted over pitting on interior faces of both gusset plates
L4, North; 1/8" D painted over pitting on interior faces of both gusset plates
L5, North; 1/8" D painted over pitting on interior faces of both gusset plates
L6, North; 1/8" D pitting on inboard face of outboard gusset plate

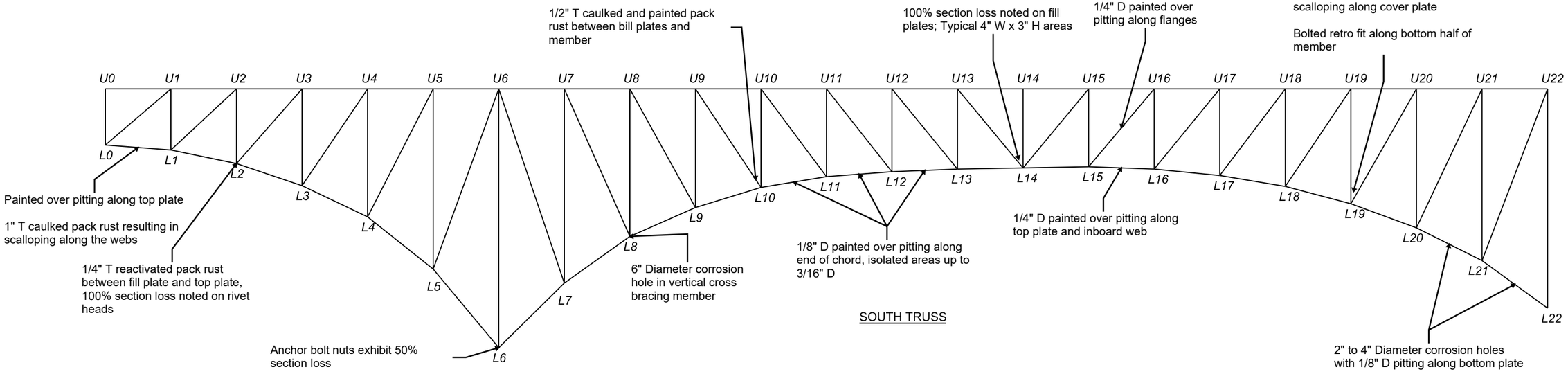
GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 9 — PAGE B-9



NORTH TRUSS

Gusset Plates:
L0, South; 1" T reactivating painted over and caulked pack rust at the corners
1/4" T pack rust between both gusset plates and vertical, 1/8" D painted over pitting
L1, South; 1/8" T painted and caulked pack rust between outboard gusset plate and lower chord
U15, South; 1/4" D pitting in both gusset plates
L22, South; 1/4" D painted over pitting on both gusset plates

L0, North; 1/8"-1/4" D pitting and pack rust on both gusset plates
L8-19, North; 1/8"-1/4" D pitting and pack rust on both gusset plates
U0, U10, U15, U17, North; 1/8"-1/4" D pitting and pack rust on both gusset plates

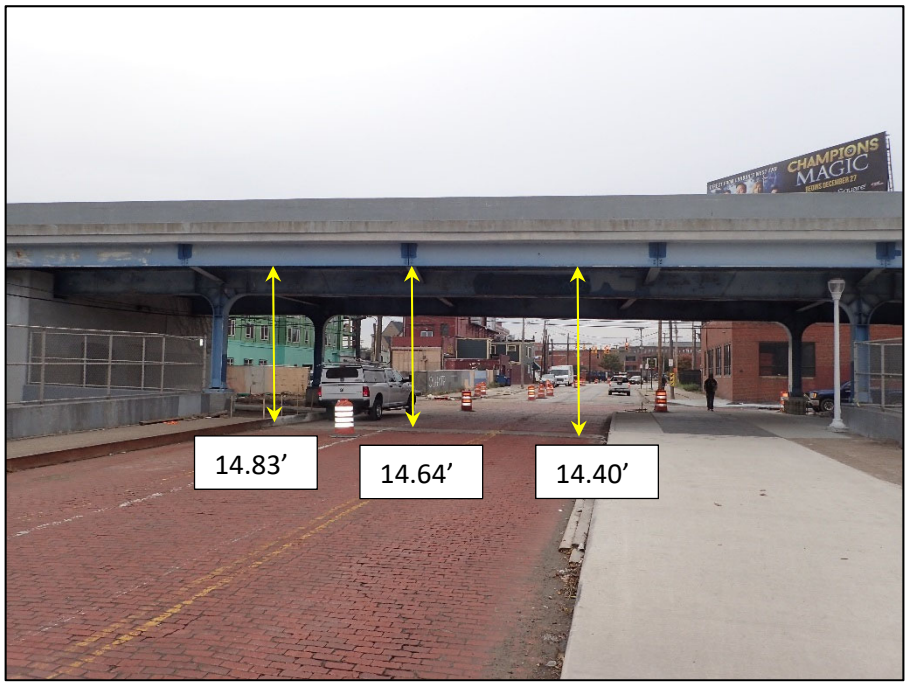


SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE JUL, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH: 614-599-5000 INFRASTRUCTURE ENGINEERS, LLC	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 10 PAGE B-1

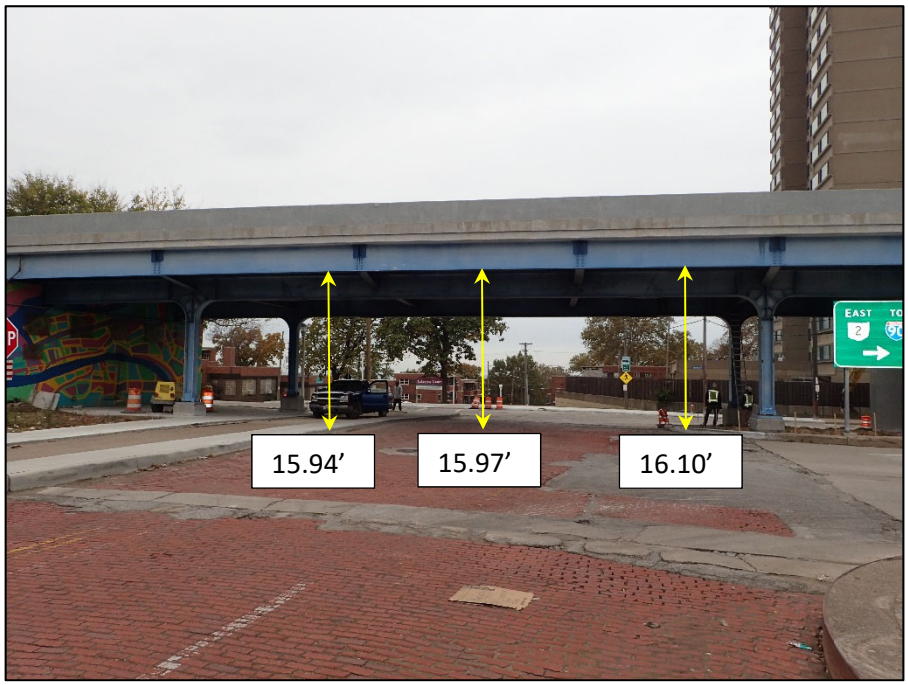
2017 Underclearance Measurements

*Measurements were not verified in 2018 due to ongoing rehabilitation



Unit I, Section K; West 28th St., Eastbound lanes, Looking South

Unit I, Section K; West 28th St. Eastbound lanes, Looking North



Unit I, Section C; West 28th Street Westbound lanes, Looking North

Unit I, Section C; West 28th Street, Westbound lanes, Looking South

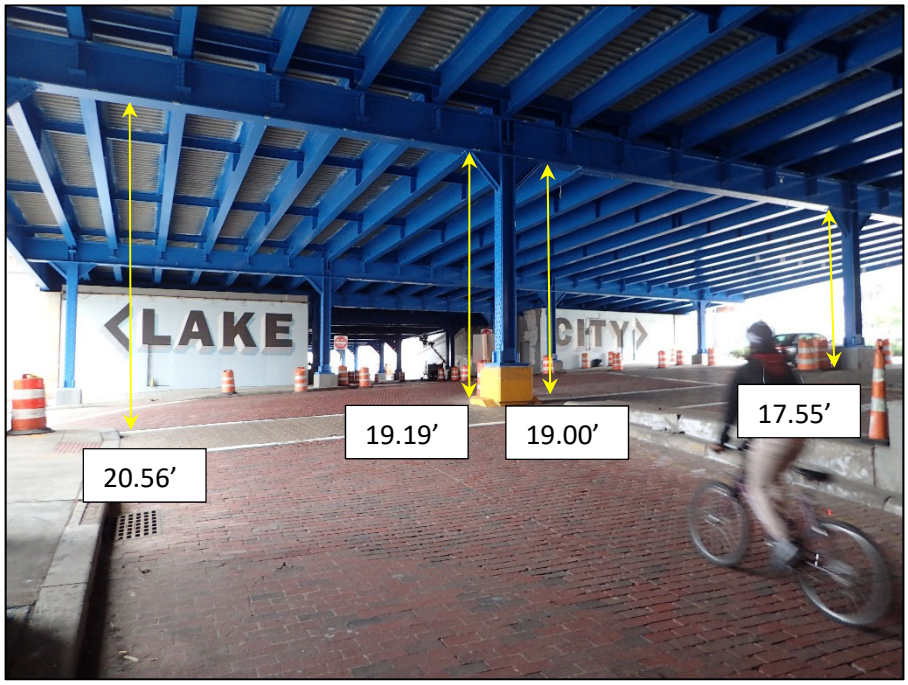
Unit I, Section N; West 25th Street, North fascia, Looking South

Unit I, Section N; West 25th Street, Center Girder, Looking South

Unit I, Section N; West 25th Street, South fascia, Looking North

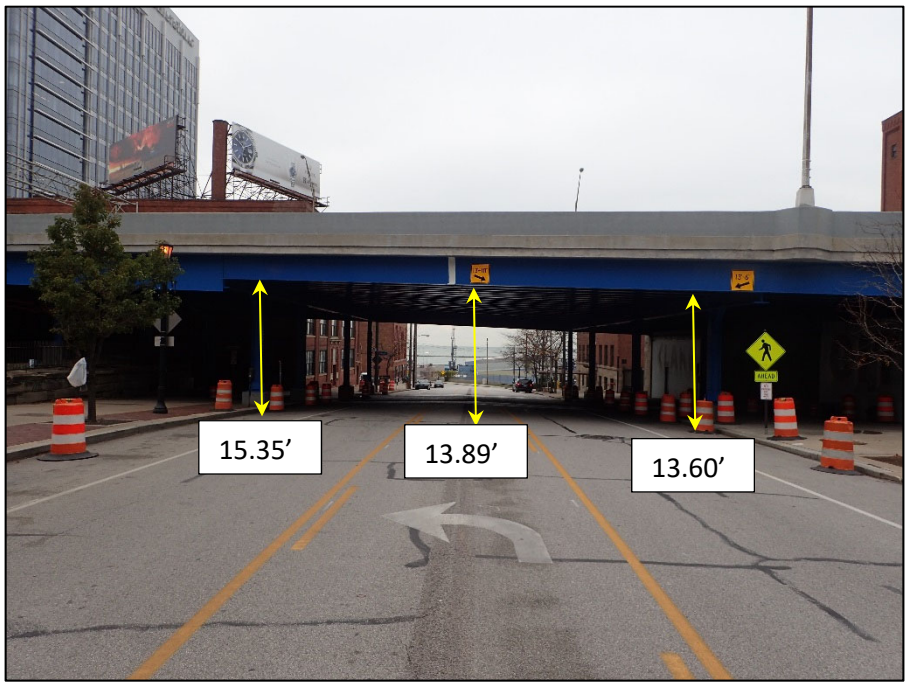
Unit III, Frame & Braced Column Section; Main Avenue, Looking East below Trestle

Unit III; Main Avenue, Bent 9, Looking West



Unit III; Main Avenue at 9th Street intersection, Looking East

Unit III; West 9th Street, North fascia, Looking South

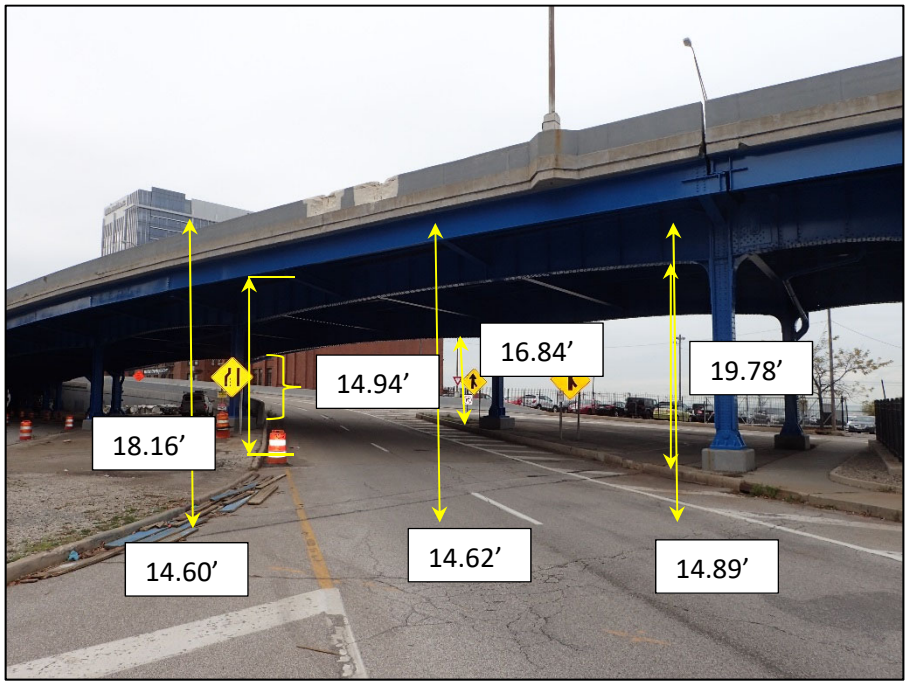


Unit III; West 9th Street, South fascia, Looking North

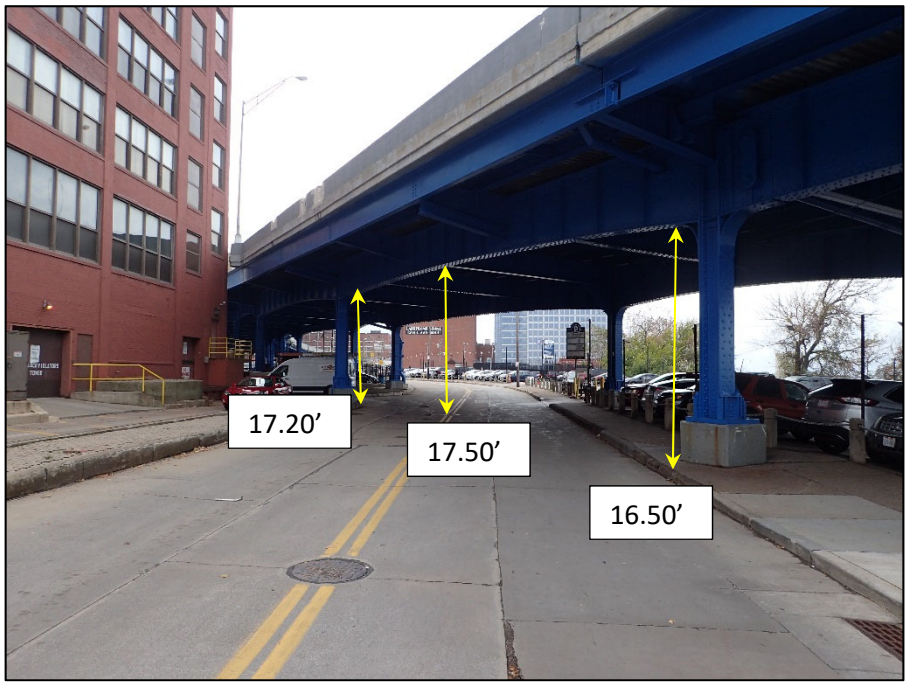
Unit III; Lakeside Avenue, Bent 14, Looking East

Unit III; Lakeside Avenue Between Bents 14 – 15, Looking West

Unit IV; Lakeside Avenue, Westbound, Looking North

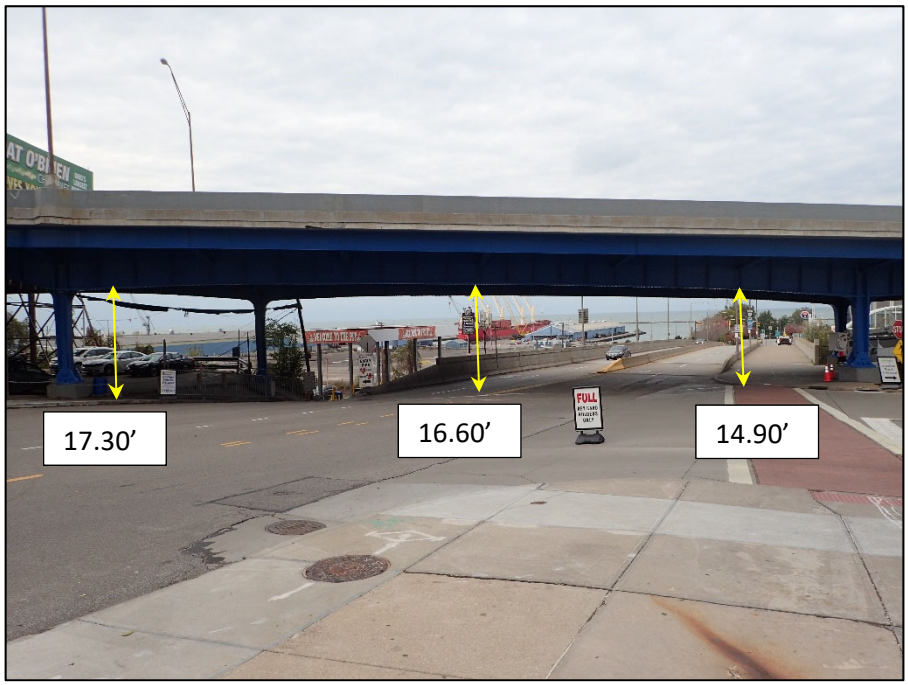


Unit IV: West Lakeside Avenue Ramp to SR 2, Looking North

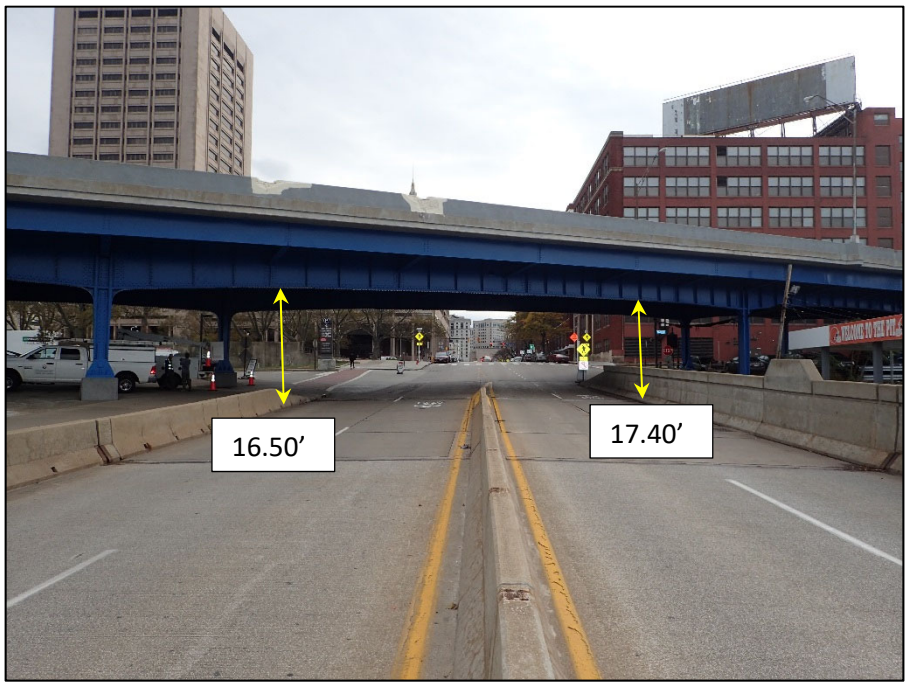


Unit IV: Summit Avenue, Looking West

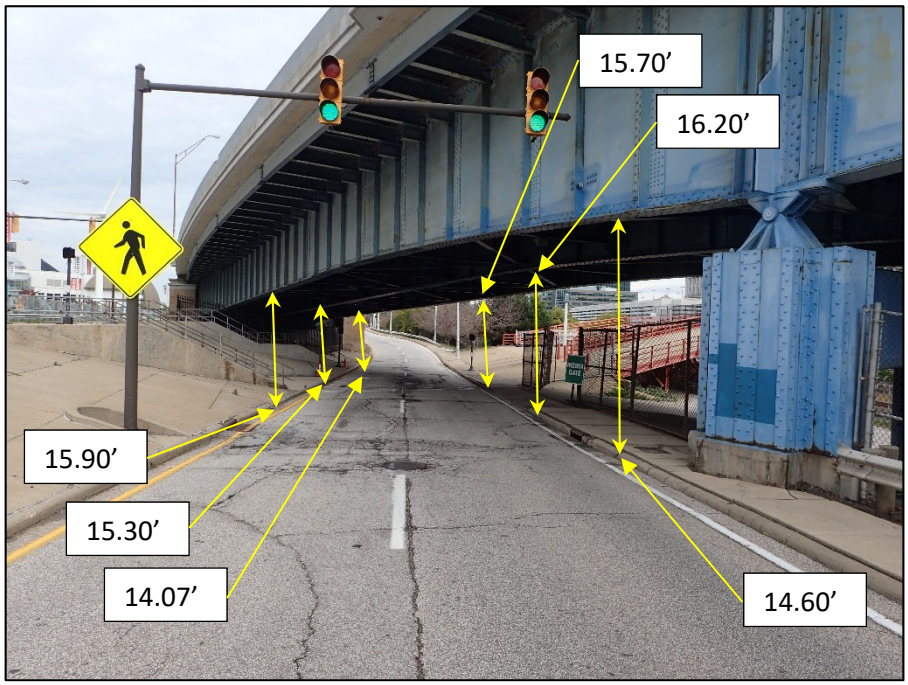
Unit IV: Summit Avenue, Looking East



Unit IV, West 3rd Street, Looking North



Unit IV: West 3rd Street, Looking South



Unit V: West 3rd Street/Port Authority Ramp to SR 2 Eastbound, Looking East