CUY-2-1441

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

Inspection Date:
October 24 - 26, 2017 November 1 - 3, 2017
Routine & Fracture Critical Inspection Report

Submitted to:

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

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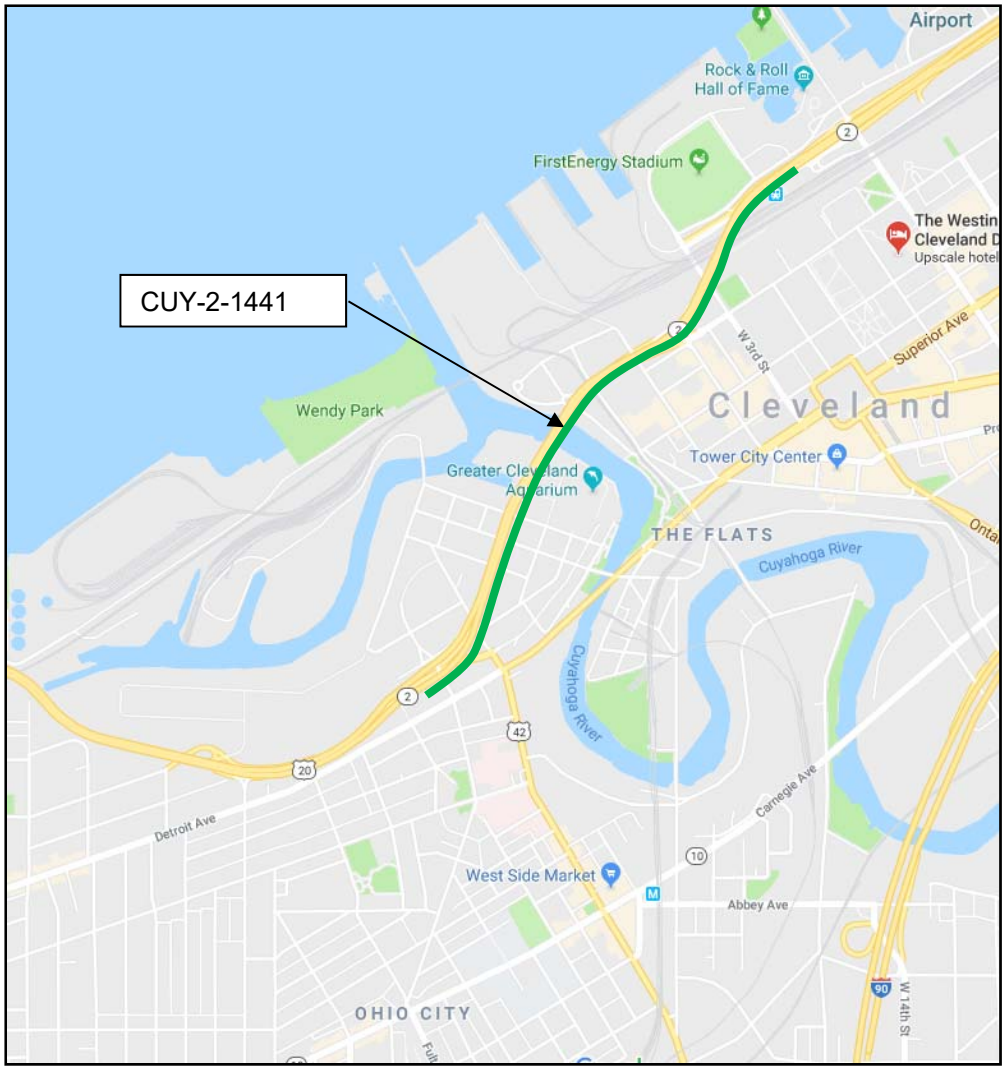


Structure: CUY-2-1441
Main Avenue over Cuyahoga River
Cleveland, Ohio

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.

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 Figures 1 and 2.

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 is present, however it has been removed as part of a previous rehabilitation project. 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.

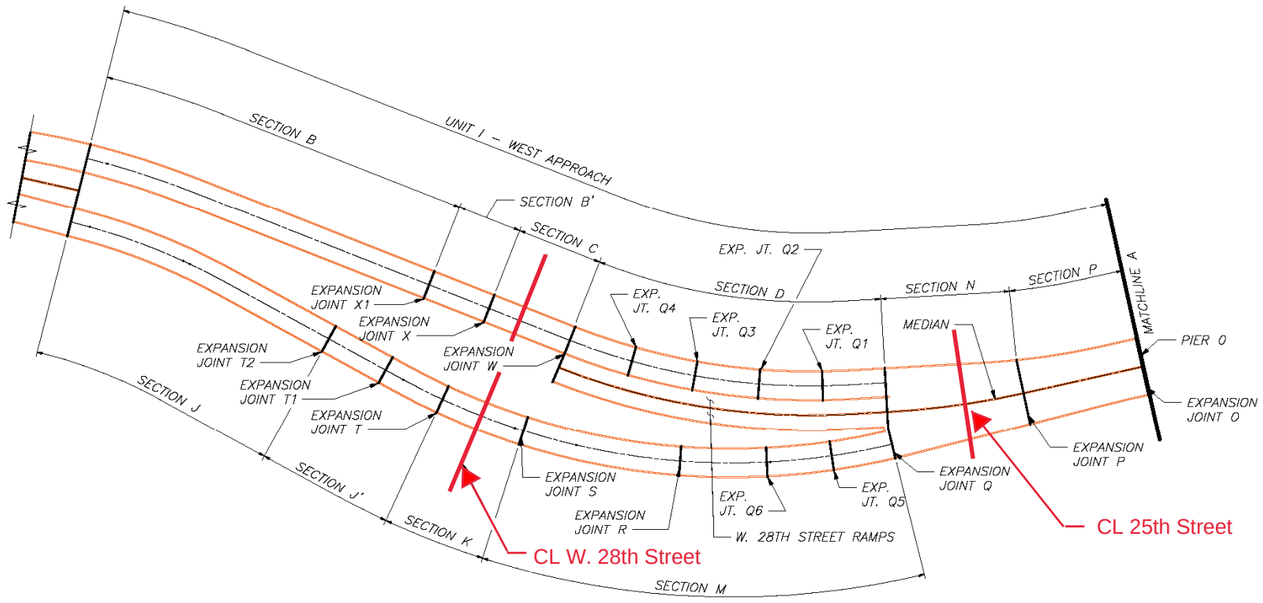
The Lakefront Trestle superstructure is supported by two lines of longitudinal rigid steel frames composed of riveted built-up beams and columns. Transverse floorbeams frame into the longitudinal frames and support rolled stringers.

Unit V – East Approach – Lakefront Ramp

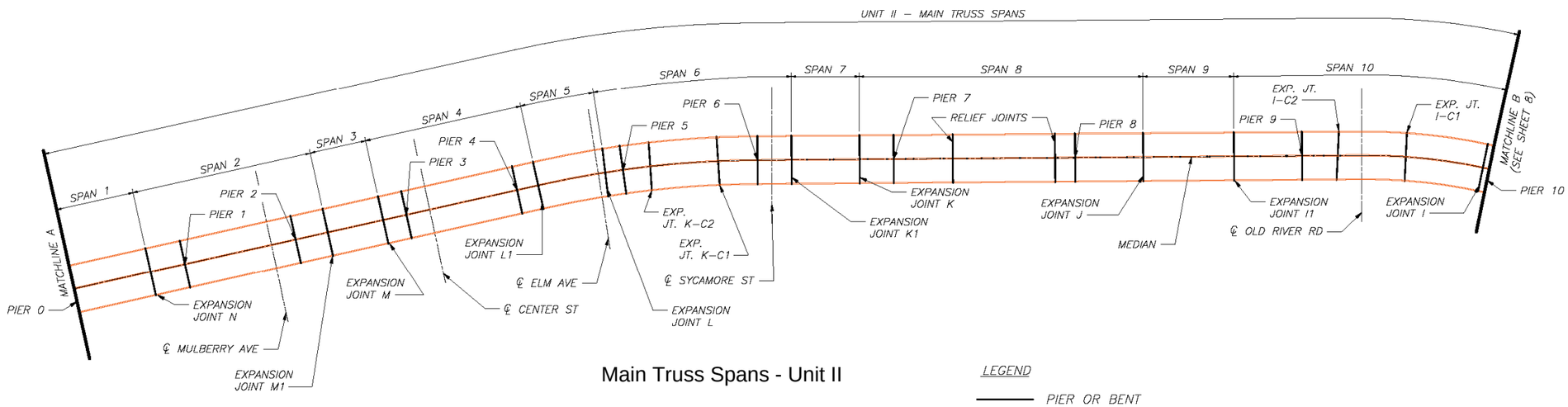
The Lakefront Ramp carries four (4) lanes of traffic, beginning at West 3rd Street, continuing over the RTA and the Norfolk Southern/CSX railroad tracks, and terminating near First Energy Stadium.

The superstructure consists of:

Three riveted, built-up plate girders with rolled floorbeams and stringers.



West Approach - Unit I



Main Truss Spans - Unit II

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Main Avenue Bridge over Cuyahoga River 2017
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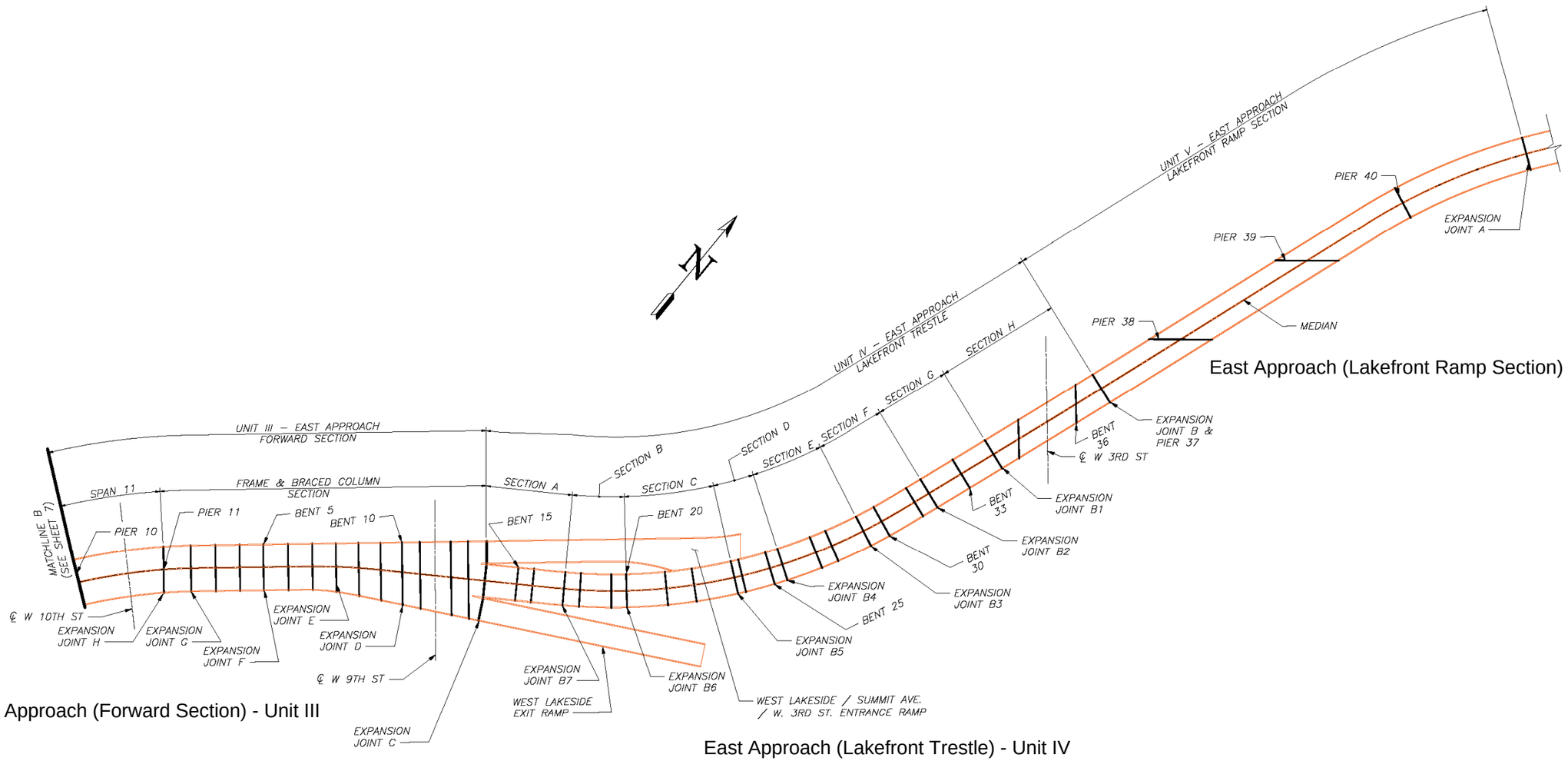

East Approach (Lakefront Ramp Section) - Unit V

East Approach (Forward Section) - Unit III

East Approach (Lakefront Trestle) - Unit IV

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Unit I: Section C, North elevation

Unit I: Section C, South elevation

Unit I: Section K, South elevation

Unit I: Section M, North elevation

Unit I: Section M, Typical vault

Unit I: Section N, North elevation

Unit II: Main Truss Spans, South elevation

Unit II: Main Span Truss, Typical pier

Unit III: East Approach, Forward Section, North elevation

Unit IV: East Approach, Lakefront Trestle; North elevation

Unit V: East Approach, Lakefront Ramp Section; North elevation

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: Ongoing concrete repairs to the vaults within Unit I. Ongoing painting contract, Unit IV competed at time of 2017 inspection, work beginning on Unit III and Unit V.

INSPECTION PROCEDURE

Infrastructure Engineers, Inc. conducted a fracture critical and routine inspection using a combination of equipment and technical access techniques. A hands-on inspection was performed of all fracture critical members within Units I through V and a routine inspection was completed on the remaining structural elements. The inspection was performed by a crew of six (6) members recording inspection notes and verifying any new or previously reported areas of deterioration or structural distress.

All Access Rigging Co. provided traffic control and access equipment. An Aspen Aerial A-62 was utilized to access portions of the Main Truss Spans (Unit II) and a bucket truck was used to access portions of the Lakefront Trestle and Ramp sections (Units III and IV). A single Lane traffic restriction was utilized along the Main Truss Spans to access both sides of the structure.

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.

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

Item 7.1 – Floor (7, Good Condition)
The deck floor is in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
562,590 SF	562,590 SF				1.00

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 and the stay-in-place forms exhibit moderate corrosion below the expansion joints within the Main Truss Spans.

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

Item 7.2 – Edge of Floor (7, 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	13,160 SF				1.00

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

Item 8– Wearing Surface (7, 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	539,560 SF				1.00

Distressed areas include isolated surface scaling with minor hairline cracking.

Item 10 and Item 11 – Median and Railing (7, Good Condition)
The concrete median and railings are in ***Good*** 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 were noted along the top half, along the exterior reveal, and adjacent the deck joint locations. 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 had loose concrete removed and the surface has been sealed but 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 (7, Good Condition)
The deck drainage is in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
268	250	14	4		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 ground collectors of the Forward Approach (Bent 0 to Bent 10) were clogged. Portions of the drainage system had been repaired while others were temporarily removed as part of the ongoing painting and concrete rehabilitation at the time of inspection.

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	3,328 LF	120 LF	100 LF		1.45

The metal expansion joints armor was noted to be corroded with paint failure at multiple locations. The modular expansion joints have corrosion and section loss and the joint armor exhibits minor gouges and section loss. Various expansion joints throughout exhibit areas of failed joint seals, leaking runoff onto the superstructure components below. A few isolated joints also exhibited minor vertical misalignment resulting in plow catch point and damage to joint armor.

Deck deficiencies and specific locations are noted in the following tables:

Unit I Deck Deficiencies					
Travel Direction	**Section**	**Column**	**Joint**	**Note**	**Photo**
East	D	10/11		Joint between 10 and 11 is leaking and has spalls/delaminations in the walls up to full height adjacent to the joint.	
East	D	40/41		Joint is actively leaking	
East	J/J'		T1	Soffit, corrosion staining and efflorescence on joint header	1
East	M	13/14		Edge spalling along the joint	
East	M	23/24		Leaking joint.	

Unit II Deck Deficiencies				
Travel Direction	**Span**	**Joint**	**Note**	**Photo**
East	4/5	L1	The deck inlet is 3/4 full of debris	2
East	5	L	South parapet light junction cover taped in place, 20' West of Joint L	
East	5/6	L	Failed joint seal.	3
East	7/8	K	6' L x Full Width x 18" H spall with exposed rebar and adjacent delaminations on South parapet	4
East	8/9	J	Missing junction cover at base of light 15' West of Joint J.	

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 with exposed rebar	5
East	11	H	Joint seal has failed.	

Unit IV Deck Deficiencies					
Travel Direction	**Section/ Span**	**Bent/ Pier**	**Joint**	**Note**	**Photo**
West	A	14	C	Large areas of missing joint seal along Joint C.	
West	A	14	C	West lakeside exit ramp: Joint C seal is deteriorated and leaking, west wall for filled ramp has 1/16” W x Full Height vertical cracks.	
West	A	14	C	West lakeside exit ramp: At Joint C, the west wall for filled ramp has a 1/16” W x FH 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			C	Deck at north edge (south side of parapet) 4' east of Joint C; 5' L x 11" W x 5-1/2" D pothole in should is full of sand.	
West			C	Half of joint is good with seal in place - level transition.	
West			C	Entrance ramp: Failed joint with material depressed through the joint.	6
West	E			5' L x 1' H x 5" D spall with exposed reinforcement and utility chase on the North parapet.	
West	E			Missing light base cover on North parapet.	7
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.	8
West	H			6' L x Full Width x 6" D spall with exposed rebar. Outboard faces have been sealed (over 3rd Street)	9
West		37	B	North parapet, West of joint, 25' L patch.	

Unit V Deck Deficiencies				
Direction	**Span**	**Joint**	**Deficiency**	**Photo**
West	37/38	B	South parapet armor, laminating corrosion, but functioning. Joint/deck armor is fair with seas 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 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	

Unit V Deck Deficiencies				
Direction	**Span**	**Joint**	**Deficiency**	**Photo**
West	EAB	A	Joint A: There is a 2-3' L gap between the strip seal that allow water to drain to the superstructure below. Moderate surface corrosion on girder diaphragm bracing between North and Middle girders.	
West	EAB	A	Joint A, centerline of roadway, middle 4' L of joint has failed. Remainder sets 1/2" below armor and is covered with roadway debris/gravel/sand.	10
West	EAB	A	Joint A, North parapet, 3" gap in parapet joint.	
West		East approach	Asphaltic plug joint between east approach roadway and slab. 2" W gaps between the east and west edges of the joint	
West		East approach slab	Good condition: one 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		East approach parapet	Map cracking covers full length of interior north face of south parapet (concrete median). Small delaminations with no actual spells. Minor vegetation sporadically along curb line.	
West		East approach parapet	Spall with exposed and corroded reinforcement on north parapet, south face 3' L x Full Width x up to 2" D	
West		East approach roadway	North curb height varies 1-2" above the roadway.	11
West		East approach roadway	Typical patched joint	

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	40				1.00

In Unit III, between Bent 11 and Bent 12, the southern fascia beam was misaligned due to numerous hits from vehicles travelling northbound on West 9th Street. 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, Fair 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 were noted in isolated areas.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
7,394 LF	7,205 LF	189 LF			1.04

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 from the south connection angle.

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. These members have isolated areas of minor section loss and reactivated corrosion. There is existing painted over surface pitting from past deck leaks and pack rust along the bottom flange. A few corrosion holes were also noted in the webs at random locations.

Item 16 – Diaphragms or Cross Frames (7, 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	1,203				1.00

Item 17 – Stringers (7, 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	71,939 LF	8 LF			1.00

Item 18 – Floorbeams and Floorbeam Connections (7, 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	25,691 LF	1,231 LF	246 LF		1.21

Areas of painted over section loss and pitting ranging from 1/16” to 1/8” D were noted throughout the floorbeams. Reactivated areas of pack rust and surface corrosion was 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. There are also unnecessary welds and attachments on the floorbeams from previous drainage assemblies. In the main truss spans, areas of painted over pitting was noted along the bottom of top flange tension tie plates connecting the center floor beam section and the floor beam cantilever brackets.

Item 19 – Truss Vertical (7, 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	265	4	3		1.15

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.

Item 20 – Truss Diagonals (7, Good 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	253	4	10	1	1.74

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.

Item 21 – Truss Upper Chord (7, Good 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	252	7	9		1.50

The truss upper chord exhibits areas of section loss, pitting and reactivated pack rust.

Item 22 – Truss Lower Chord (5, 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	176	23	59	10	2.78

Various deficiencies were noted throughout the lower chord. Areas of section loss are estimated to as high as 25%. 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 were also noted along the top plates.

Item 23 – Truss Gusset Plates (7, 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
1088	1019	18	51		1.63

The truss gusset plates have isolated areas of pack rust and pitting with section loss, but no misalignment observed

Item 24 – Lateral Bracing (7, 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	370				1.00

Item 25 – Sway Bracing (7, 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	364				1.00

Item 26 – Bearing Devices (2, Fair Condition)
The bearings are in ***Good*** condition.

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

Standing water was noted in a number of bearings above the truss connections due to blocked drain holes within the bearing assembly.

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 (5, Fair Condition)
The protective coating system (PCS) is in ***Fair*** 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 for Span 11 within the Forward Section and the Lakefront Trestle were 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	10,000 LF	1,500 LF		2.00
Main Span Truss	51,003 LF	50,153 LF	800 LF	50 LF		1.04
Forward Section	15,937 LF	11,497 LF	3,740 LF	700 LF		1.78
Lakefront Trestle	16,832 LF	16,832 LF				2.31
Lakefront Ramp	13,611 LF	5,211 LF	6,400 LF	2,000 LF		2.39
Total	122,240 LF	97,050 LF	20,940 LF	4,250 LF		1.84

The West Approach, portions of the Forward Section and the Lakefront Ramp have prevalent areas of PCS failure. Corrosion and active pack rust were noted throughout the components of these Units. Among the girders of the West Approach and Lakefront Trestle, worn paint with light corrosion patches are present on the web surfaces.

Item 31 – Pins, Hangers and Hinges (7, Good Condition)
The pins, hangers and hinges are in ***Good*** condition. Rivet head interference is present among several hangers in the Lakefront Trestle. Due to recent painting, evidence of proper 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	11	3			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 following tables:

- (See *Unit II Main Span Truss Deficiencies, Photos & Drawings* for Unit II deficiencies and specific locations)

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.	12
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. No crack in east angle, only chipped paint.	13
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 tightened but not loose bolt between girder web and top flange connection angle, also to north face cantilever connection angle.	
1	N	5		Center	Popped bolt at end of top flange, due to pack rust.	14

Unit I Superstructure Deficiencies						
Unit	**Section**	**Frame**	**Floorbeam**	**Girder**	**Note**	**Photo**
1	N	6/7		North	1/2" T pack rust between top flange of floorbeam cantilever plate and top flange of floorbeam.	15
1	N		7	Center	Peeling paint and surface corrosion on bearing components	16
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 are broken due to pack rust formation between guide bar and masonry plate	17

Unit III Superstructure Deficiencies				
Span	**Bent/ Truss**	**Column/ Member**	**Note**	**Photo**
11		South	Debris at 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.	18
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.	
11	S	L2U2, L3U2, 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.	
11	N	L1U0	Painted over Pack rust up to 1/2" thick 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" deep 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.	19

Unit III Superstructure Deficiencies				
Span	**Bent/ Truss**	**Column/ Member**	**Note**	**Photo**
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 1/8" - 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.	20
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.	
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.	

Unit III Superstructure Deficiencies				
Span	**Bent/ Truss**	**Column/ Member**	**Note**	**Photo**
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.	
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.	21
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.	22
Frame and Braced Column	9	North	3/4" L crack in gusset coping from upper cross bracing to column.	23
Frame and Braced Column	11/12		Previous and new over height vehicle collision damage to bottom flange of Stringer 1 between Bent 11 and 12 over 9th street Northbound lane.	24

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.	

Unit V Superstructure Deficiencies				
Span	**Girder**	**Face**	**Note**	**Photo**
All Spans	All	All	Girder webs have up to 1/16" D painted over pitting.	25
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.	
38	South	North	3" H x 1" L corrosion hole approximately 2' above the bottom flange.	26
38/39	South		65" L x Up to 1-1/4" T pack rust between bottom flange plates before and after pier 1.	27
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.	28

Unit V Superstructure Deficiencies				
Span	**Girder**	**Face**	**Note**	**Photo**
40	North/ Center		1-1/2" L x 1/2" H area of corrosion holes between girders near North girder support. Diameter area of 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 web past Pier 40 South girder.	
41	North/Center		Large pile of trash on catwalk between North and center girder.	29

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
90 LF	90 LF				1.00

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
197		197			2.00

The steel bents exhibit isolated cleaned and painted over areas of pitting. The steel piers in the Lakefront Ramp Section exhibit active corrosion with debris noted along the bottom of the pier bents.

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	263 LF				1.00

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	12				1.00

Mask Walls
Non-structural mask walls are noted beneath the superstructure along West 28th Street, West 25th Street and West 9th Street. A rehabilitation project was ongoing during the current 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 for Units 1, 3, 4 and 5 are noted in the following tables:

- (See the attachments for Unit 2 substructure deficiencies and specific locations)

Unit I Substructure Deficiencies			
Section	**Pier/ Frame**	**Note**	**Photo**
N		Southeast wall: Interior face of curtain wall is mapped out with paint for areas of delaminations and spalls to be repaired.	37
N		West curtain wall, east side of 25th St.; Spalls, delaminations and vertical cracks on east face of curtain wall.	
N	7	Rehab in progress for concrete base of south column	
N	8	Rehab in progress for concrete base of south column	38

Unit I Substructure Deficiencies			
Section	**Pier/ Frame**	**Note**	**Photo**
P	2	The base of the column is delaminated around the north and east faces below the original ground level. It has been marked for rehab.	
P	3&5	Downspout outlets onto Columns 1 and 3.	
P	O	Bottom face of cap has two 3' Diameter delaminations near the middle of the cap.	
P	O	Inboard faces are delaminated in multiple areas with marks for rehab	

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.	39
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.	40
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.	

Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
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.	
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 cooler and the base plate with up to 25% section loss of the anchor bolt nuts.	41
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.	

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.	42
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.	
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.	43

Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
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. From level 2 to level 3 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 spall Full Length x 3” H x up to 1” D with up to 1/2” D undermining of the base plate.	44
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.	

Unit III Substructure Deficiencies				
Span/Pier	**Bent**	**Column**	**Note**	**Photo**
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.	
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 entrance ramp: South curtain wall has spalls with exposed rebar that follow the rebar layout on north face.	
Frame and Braced Column			West Lakeside entrance ramp: Spalls with exposed rebar at east end of north face of the south curtain wall of the northeast vault.	
Frame and Braced Column			West face of West Lakeside entrance ramp: Large spalls marked for rehab on north face of the north curtain wall of the southeast vault	45

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	46
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	47

Unit V Substructure Deficiencies					
Span	**Pier**	**Girder**	**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.	

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 (8, 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 (8, 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 (8, 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 (8, 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 (5, Fair Condition)
The approach wearing surfaces are in ***Fair*** condition.

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

Item 2 – Approach Slabs (7, 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 (7, 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 (7, 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 (7, 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. The lock is missing from the gate at the East Abutment of the Lakefront Ramp, and nearby Pier 37 can be easily accessed with a ladder. Large debris piles are present on the Lakefront Ramp's catwalk due to vagrants.

Recommendations

The Main Avenue Bridge over the Cuyahoga River is in overall Fair condition, or 5 on the NBIS rating guideline. The lower chord is the element governing this condition rating.

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

	Repair/Maintenance Task	2018	2019	2020	2021	2022
1	Restore bridge lighting for Westbound Roadway & W. 28 Street Ramps.	X				
2	Install minimum overhead clearance signs as required by ODOT & City of Cleveland policy.	X				
3	Repair all missing/damaged joint material throughout the structure.	X				
4	Continue ongoing painting of the bridge superstructure in Units III and V.	X				
5	Continue ongoing concrete repairs and cleaning out vaults throughout Unit I.	X				
6	Spot paint areas of activated corrosion within Unit II			X		
7	Lakefront Ramp – Remove piled debris from catwalks.	X				
8	East Abutment – Secure area in front of East Abutment.	X				
9	Lateral Bracing – Blow off construction debris.	X				
10	Remove & replace edge and lane lines.	X				
11	Install utility box covers on bridge light poles where needed.	X				
12	Remove all obsolete welded attachments.		X			
13	Section K: At floor beam cantilever brackets, remove pack rust and repair areas of section loss at the connection		X			
14	Clean debris from ground level drainage collectors and clear underground storm sewer pipe.		X			
15	Forward Approach – Clean, repair and paint the areas between bearing anchor bolts and stiffeners at the bent columns.		X			
16	Remove all construction debris once painting is completed.	X				
17	Remove obstructions from drain holes and chambers on bearing castings.	X				
18	Main Truss Spans: Remove expansion bearing guide plates, remove debris and paint roller nest.		X			

Deck Photos

Photo 1 – Unit I, Joint T1; Leaking joint resulting in corrosion staining and efflorescence

Photo 2 – Unit II, Joint L1; 3/4 blocked curb drain

Photo 3 – Unit II, Joint L; Failed joint seal

Photo 4 – Unit II, Joint K, bridge parapet; 6' L x Full Width x 18" H spall

Photo 5 – Unit III, South parapet at 30+50; 15' L x 15" H x up to 4" D with exposed rebar

Photo 6 – Unit IV; Entrance Ramp, Westbound lanes; Failed joint

Photo 7 – Unit IV, Section E, North parapet; Missing light base cover

Photo 8 – Unit IV; Westbound lanes, South Lane; 8' L x 8' W area of 1" D spalling with staining

Photo 9 – Unit IV, Section H, Westbound lane; 6’ L x Full Width x 6” D spall with exposed reinforcement

Photo 10 – Unit IV, Joint A; 4’ L section of joint has failed along middle

Photo 11 – Unit V, Westbound lanes; East Approach roadway;
North "curb" height varies 1-2" above the roadway

Superstructure Photos
Units I, III-V

Photo 12 – Unit I, Section K, Floorbeam 2; 6” Long horizontal crack

Photo 13 – Unit I, Section M, Floorbeam 2; 4” L vertical crack in south exterior stringer to floorbeam cantilever connection angle

Photo 14 – Unit I, Section N; Popped rivet at end of top flange due to pack rust

Photo 15 – Unit I, Section N Girder 5; 1/2” T pack rust between girder top flange and cantilever support tie plate

Photo 16 – Unit I, Section N, Floorbeam 7, center bearing; Typical bearing paint condition

Photo 17 – Unit I, Section N at Floorbeam 8, North girder; South guide bar welds are cracked

Photo 18 – Unit III, Span 11, North column; 1/4” T pack rust at connection and 4” Diameter corrosion hole through web of brace

Photo 19 – Unit III, Span 11, Panel Point L2, north truss; Painted over section loss with up to 1/2” T pack rust

Photo 20 – Unit III, Bent 0 floorbeam; Typical 3/16” D painted over pitting with ponding water along top flanges

Photo 21 – Unit III, Bent 4, North column; 5-1/2" W x 1/2" H corrosion hole above bearing plate

Photo 22 – Unit III, Bent 8-9, South column; Diagonal from Bent 8 to Bent 9 is bent upward and to the South due to collision damage

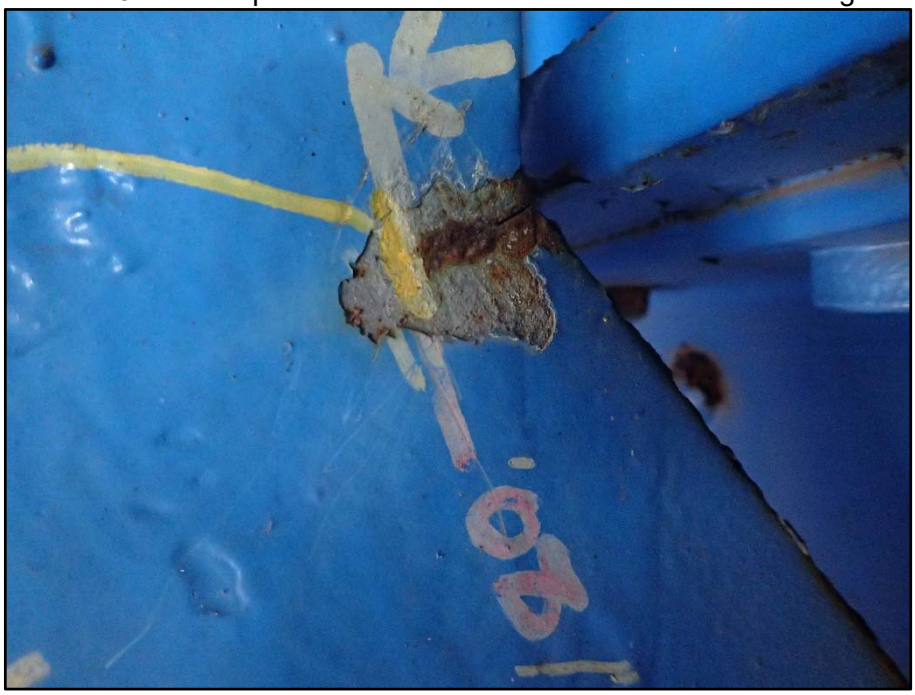


Photo 23 – Unit III, Bent 9, North column; 3/4" L crack in gusset coping from upper cross bracing to column

Photo 24 – Unit III, Bent 11 – 12; Over height vehicle collision damage to bottom flange of Stringer 1

Photo 25 – Unit V, Typical girder; Up to 1/16" D painted over pitting

Photo 26 – Unit V, Span 38, South girder, north face; 3” H x 1” L corrosion hole 2’ above bottom flange

Photo 27 – Unit V, Spans 38 – 39, South Girder; Up to 1-1/4" T pack rust between bottom flange plates

Photo 28 – Unit V, Span 40, center bearing; 1/8” D painted over pitting

Photo 29 – Unit V, Span 41; Debris and trash on the catwalk

Unit II Main Span Truss
Deficiencies, Photos & Drawings

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.		30
6	0	Typical stringer bearings on east face of Floorbeam 0, evidence of movement		
8	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.		

Photo 30 – Span 4, Floorbeam 0; Loose bolts on the inboard sliding plate for the north truss at U0

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.		31
2	S	L2U3	Up to 3/4" distortion to the outboard cover/fill plate connection at L2.		
2	S	U4I5	Up to 3/16" D painted over pitting near L5 on the top face of the web.		
2	S	L6U6	Downspout is broken allowing drainage directly onto lower chord.		
2	S	L10U11	Up to 3/16" D pitting in the top face of the web near L10.		
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.		
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 3/4"-1" T pack rust 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		
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		

Main Truss Vertical Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
5	S	L1U1	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.		
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 vert		
6	S	L5U5	Caulked and painted 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.		
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. Section loss, 1/8" deep pitting in both fill plates.		

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	L0U0	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 5/8" T pack rust behind outboard pin plate for lower vertical member pin at gusset pate connection.		
9	N	L8U8	Up to 1/8” D painted over pitting on outboard flange plate above lower vertical member pin and gusset plate connection. Reactivating pack rust 1” T behind outboard pin plate for lower vertical member pin at gusset pate connection.		

Photo 31 – Span 2, North Truss, L15U15; 3/4" T reactivating pack rust and scalloping of edges

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	L10	Lower lateral bracing top horizontal gusset at L10 south truss has two sheared rivets, pitting up to 3/16" D, 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	N	L0U1	Section Loss, 1/8" D pitting.		
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, 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	U3L4	Pack Rust distorting fill plate at L4 up to 1/2" T.		
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		

Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
4	N	U4L5	1” T in fill plate at U4 exhibits heavy laminar corrosion that is flaking off. Previous report noted this as a crack.	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	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	Section loss, 1/4" D pitting in web of diagonal near L8.		
4	N	U10L9	1/2" T x 20" W retro fit 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.		
5	N	U6L5	Section Loss, 1/16" D pitting.		
6	S	L0U1	Up to 1/4" D painted over section loss to top of web. An addition plate has been bolted to the web to reinforce it.		

Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
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. The outboard caulking is cracked and deteriorated.		
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.		
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 pitting along web near L0. Inboard fill plate has up to 3/16" D pitting at L0.		
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 1-1/2” W and three 1/2” Diameter holes. Varying depths of painted over pitting on lower 1/3 of web.	
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.		

Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
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.		
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.		
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.		

Main Truss Diagonal Deficiencies					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
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.		
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.		

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

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.		

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.		32
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 and has up to 100% painted over section loss. Similar to north truss at this location		
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.		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
1	N	L6L7	Section loss, heavy pack rust and heavily deformed outboard web in the interior of built up bottom chord member at the pin at L7. 1/2" 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.		
2	S	L1L2		Up to 1-1/2" distortion to the top cover plate due to pack rust.	
2	S	L2L3	Section Loss, 1/2" T pack rust distorting both edges of top flange plate. Panel point L3 is full of water.		33
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	L8	Lower lateral bracing connection plate has multiple corrosion hole and heavy pitting.		
2	S	L10L11	Section Loss, 1/2" T pack rust distorting top flange plate, 4” Diameter corrosion hole in angle. 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".		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
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 pitting in both web plates and in top flange.	Deep pitting with perforations (100% section loss) in bottom flange at L0.	
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.		
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.		

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 pack rust between the bottom of the pin plate and gusset plates		
3	N	L0L1	Up to 1/8” D painted over section loss along the top plate. Areas of previously caulked pack rust are beginning to reactivate with minor surface corrosion noted. There are three 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.		
3	N	L4L5	Painted over Section Loss 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.	

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
4	N	L0L1	Painted over Section Loss up to 3/16" D along top plate. 3/8" T partially caulked pack rust distorting top flange plate.	The bottom plate below the pin also exhibits 100% section loss along the end 8". The end 16" L of the top plate at L0 exhibits painted over section loss with a 16" L x up to 12" W corrosion hole.	
4	N	L1L2	Painted over pitting and pack rust typical and areas of reactivated pack rust and surface corrosion along the north edge.		
4	N	L3L4		Section Loss, 1/8" T remaining along bottom flange plate. Isolated 1" Diameter through holes near joint L4.	
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.		
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.		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
4	S	L0L1		Two corrosion holes up to 1-1/2" Diameter and three pinholes under L0U0. 1/4" D section loss throughout all plates. Two corrosion holes in the lower lateral bracing gusset plate with surrounding heavy pitting and section loss. 1" L x 1/2" H painted over corrosion hole in inboard web near L1.	
4	S	L1L2		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.	
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.		
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.		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
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.		
5N	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.		
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	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	

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
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.		
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. Popped rivet head at L14.		34
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.	

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
6	N	L1L2		Section Loss, 5” Diameter corrosion hole and 1/4" D pitting in bottom flange plate under L1	
6	N	L1L2		The lower 2’ of the bottom plate exhibits only 1/8” T remaining section with numerous corrosion holes throughout up to 8” Diameter at L2	
6	N	L3L4	Up to 1/4” reactivated pack rust distorting outboard web plate.		
6	N	L4L5		Section Loss, 1/8" T section remaining in 5’ Diameter area.	
6	N	L5L6	Missing rivet head on top plate along outboard edge 5’ from L6.		
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.		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
6 N	N	L13L14	Sheared rivet head at bottom inboard rivet line at L14 Bottom of member filled with water at L14. Reactivating pack rust 3/4” T with scalloping both edges of both web plates.		
7	S	L0L1	Section Loss, 1/8” D pitting in top flange plate.		
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.		
7	N	L0L1	Section Loss, 1/4” D pitting along top flange plate, 5" x 2” corrosion hole in bottom flange plate.		
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 scalloping		
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.		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
8	S	L24L25	Lower chord retrofit: steel channels added parallel to the lower chord webs with bolted steel channels crossing perpendicular to the chord		35
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"		
8	N	L8L9	Section loss, up to 3/16" D. 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.		
8	N	L12L13	Section loss, up to 3/16" D. 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.		
8	N	L15L16	Section loss, up to 1/8" D pitting.		
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 pain near L18.		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
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.		
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		Section Loss, 1/4" D pitting along top flange plate with 1/2" Diameter corrosion holes.	
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. Pin plate has rotated clockwise		
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.		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
9	N	L6L7	Up to 1/16” D painted over pitting on top plate at L6 and L7.		
9	N	L7L8	Pin plates have rotated at L8. Up to 1/8” deep painted over pitting on top plate at L7.		
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 100% section loss around 4 rivet heads		
10	S	L6	The bearing assembly anchor bolts nuts exhibit up to 50% section loss.		36
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.		

Main Truss Lower Chord Deficiencies.					
Span	**Truss**	**Member**	**CS 3**	**CS 4**	**Photo**
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.		
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.		

Photo 32 – Span 1, South truss, L2L3; 1” T pack rust distorting top flange plate and web plates

Photo 33 – Span 2, South truss, L2L3; Panel point L3 is full of water

Photo 34 – Span 6, South truss, L14L15; Popped rivet head at L14

Photo 35 – Span 8, South truss, L24L25; Lower chord retrofit

Photo 36 – Span 10, South Truss, L6 bearing; Anchor bolts nuts exhibit up to 50% section loss

Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
1		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 gusset plate, exterior face has up to 1/16” D pitting throughout and up to 1/8” D around the pin.	
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.	
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 exterior plate under L8U8. 1-1/4” T fill plate retrofit at inboard gusset plate.	
4	N	L14	1	1/4” T pack rust between L14U14 and inboard gusset plate with failed caulk and active corrosion. 1/4” bow in inboard gusset plate	
5	S	L1	1	Up to 3/4” T painted over pack rust between outboard gusset plate and L0L1 at L1.	

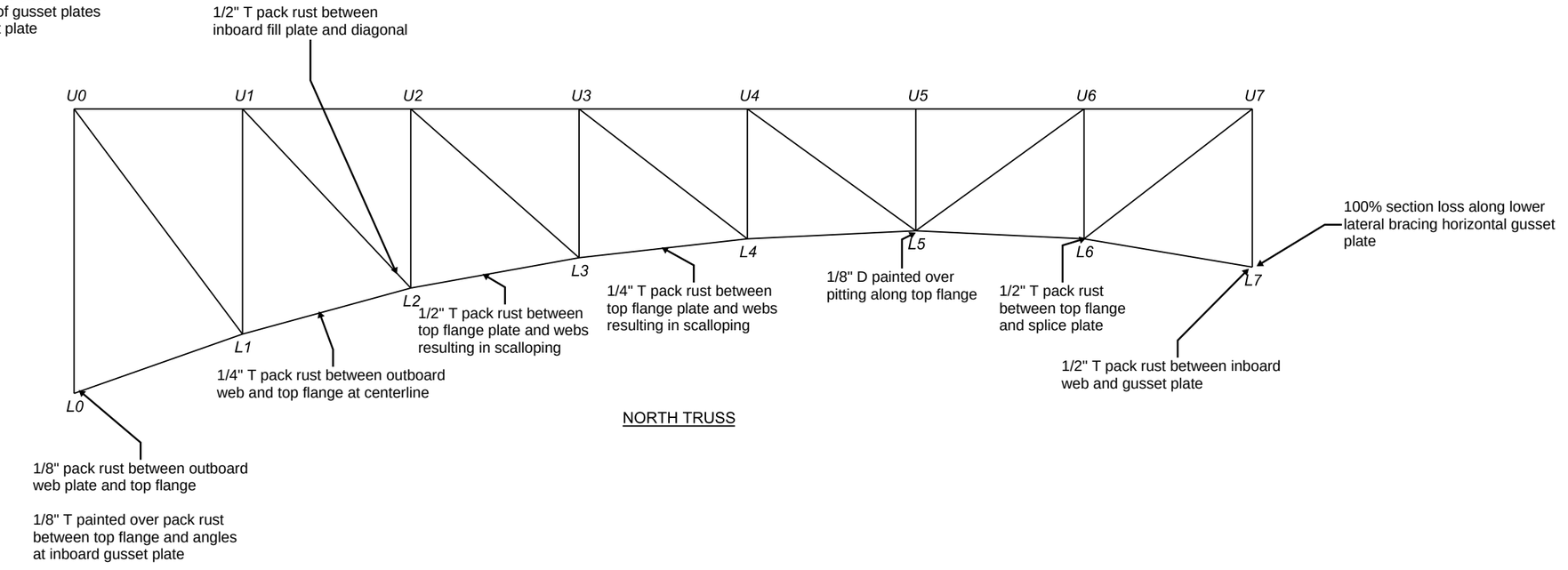
Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
5	S	L2	1	Up to 3/4” T painted over pack rust between outboard gusset plate and L1L2 at L2.	
5	S	L6	2	Inboard faces of both gusset plates have up to 1/4” D painted over pitting. Inboard gusset plate is bowed to the north, unable to measure. 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, unable to measure. 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	
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. There is up to 1/8” D painted over section loss on the inboard gusset plate by the strut connection.	
6	S	L6	1	Caulked and painted 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.	

Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
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 outboard fill plate.	
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 outboard plate from 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.	
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 pack rust is distorting the outboard plate.	
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.	

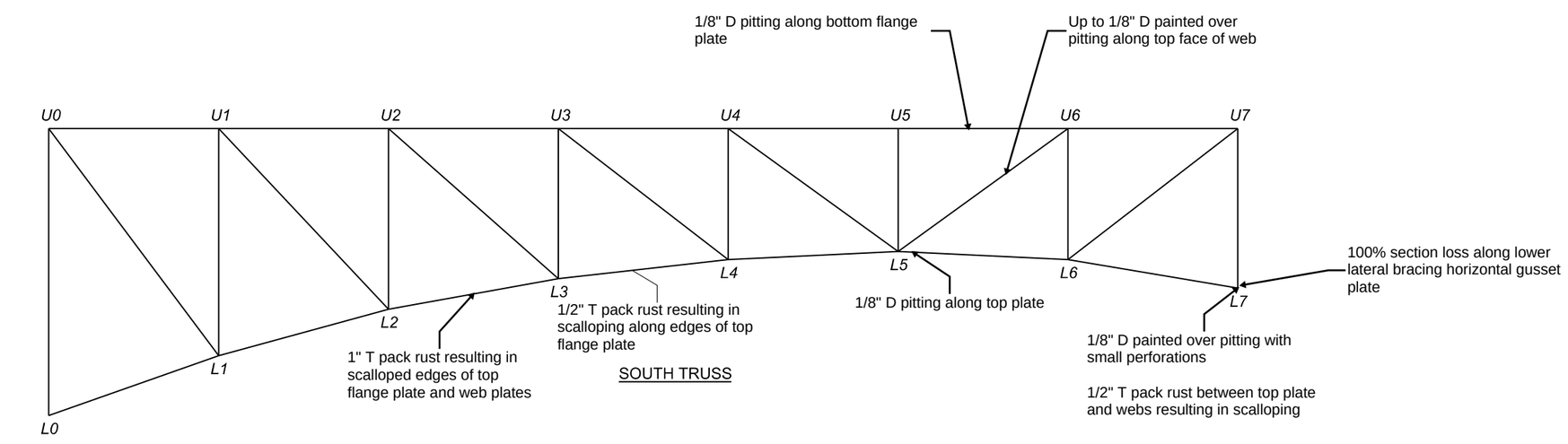
Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
8	S	L16	1	Inboard gusset plate has up to 1/8” D painted over pitting along the inside face at the lower chord interface	
8	S	L25	2	At L25, there is reactivating pack rust between the vertical and the inboard 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	
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.	

Main Truss Gusset Plate Deficiencies					
Span	**Truss**	**Member**	**Quantity**	**CS 3**	**Photo**
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, L8-L19, U0, U10, U15, U17	18	1/8” – 1/4” D pitting and pack rust on both interior and exterior plates.	

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

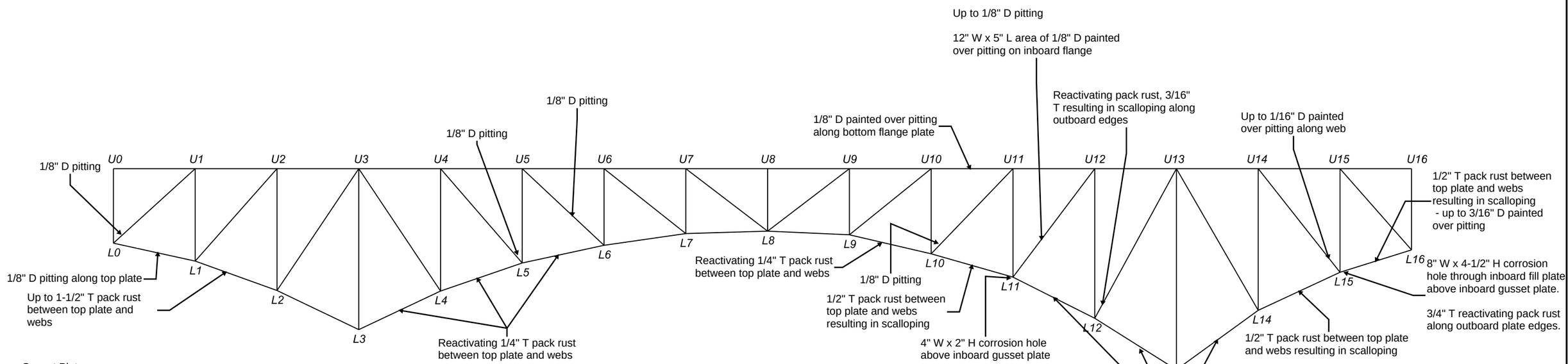


NORTH TRUSS

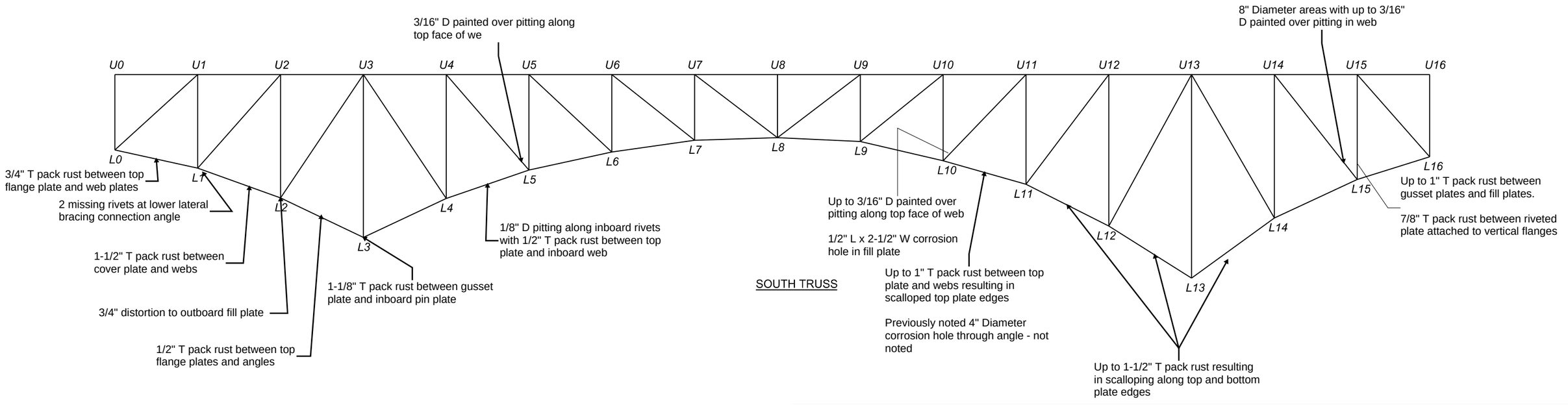


SOUTH TRUSS

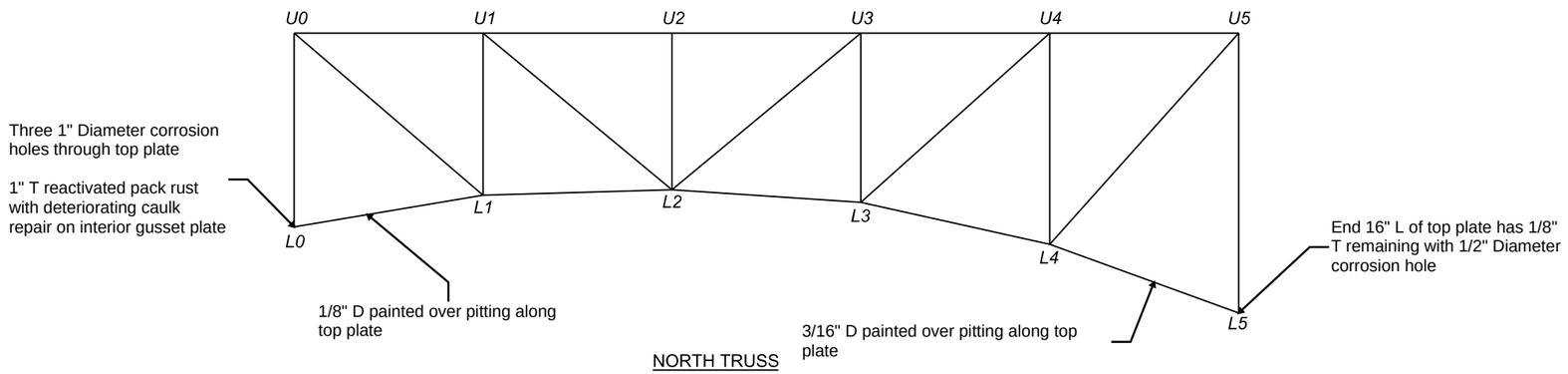
GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE DEC, 2017	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, INC.	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 1
			PAGE A-1



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

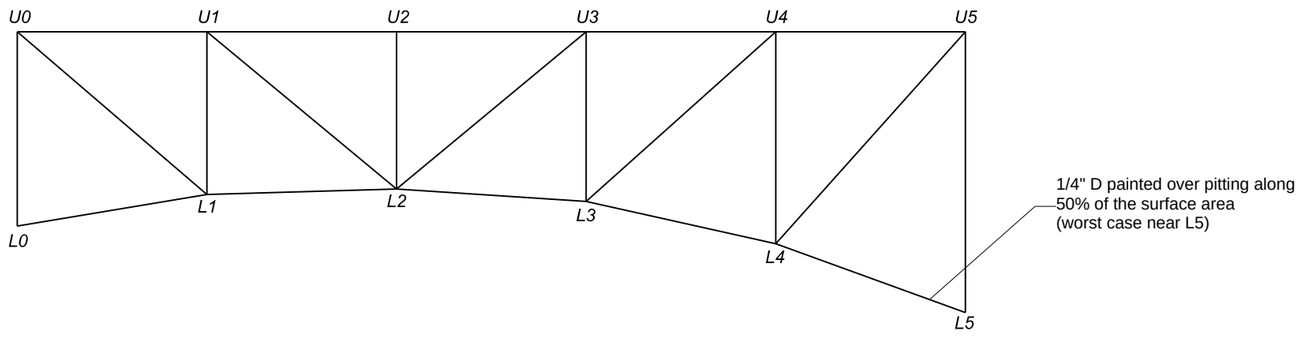


GRAPHIC SCALE MEASURED IN FEET	DATE	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441
NOT TO SCALE	DEC, 2017	INFRASTRUCTURE ENGINEERS, INC.	TRUSS ELEVATION - SPAN 2 / PAGE A-3



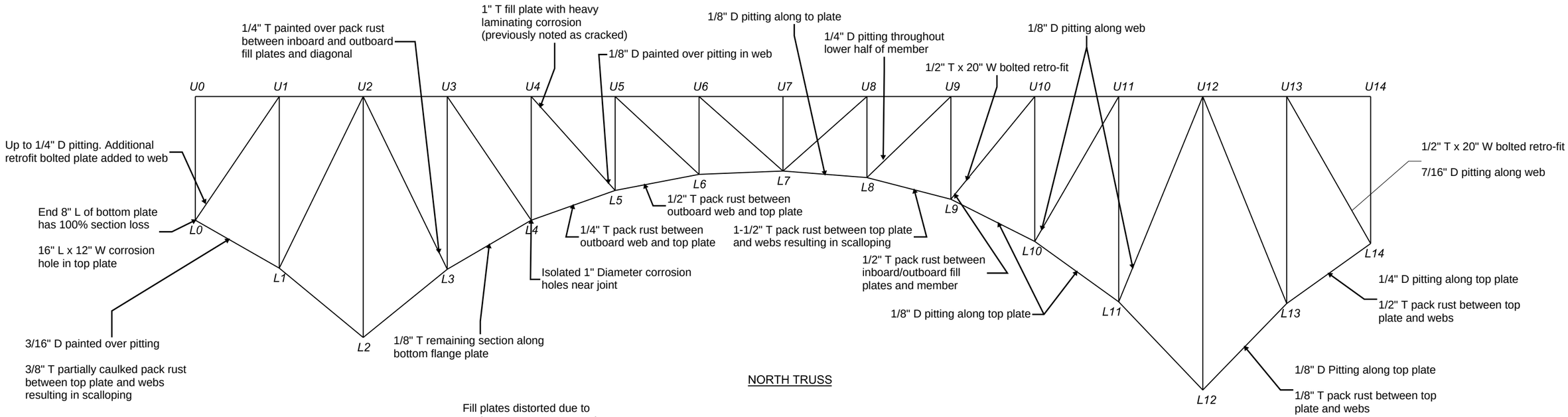
Gusset Plates:
L0, North; 1/4" D pitting on exterior face of exterior plate

NORTH TRUSS

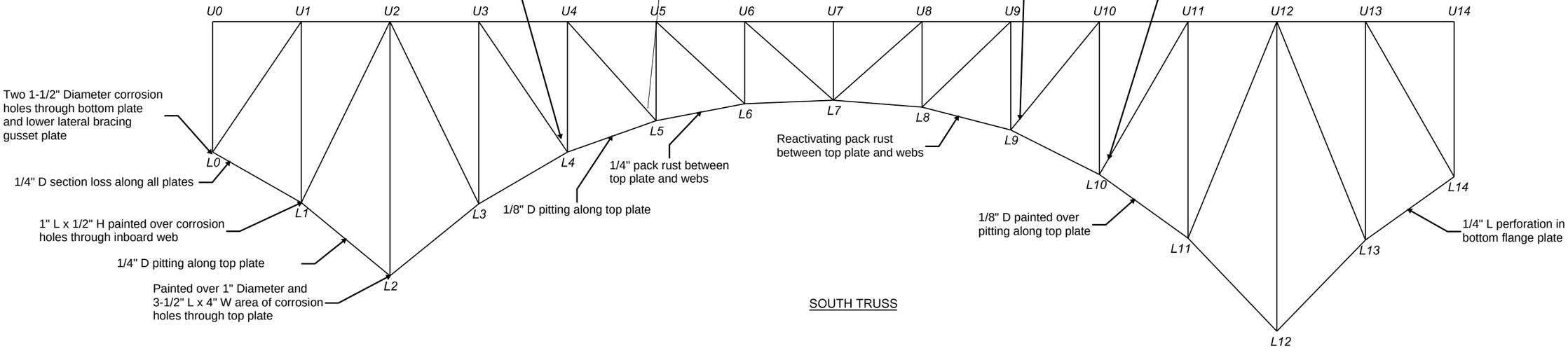


SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE DEC, 2017	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, INC.	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 3 PAGE A-4



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

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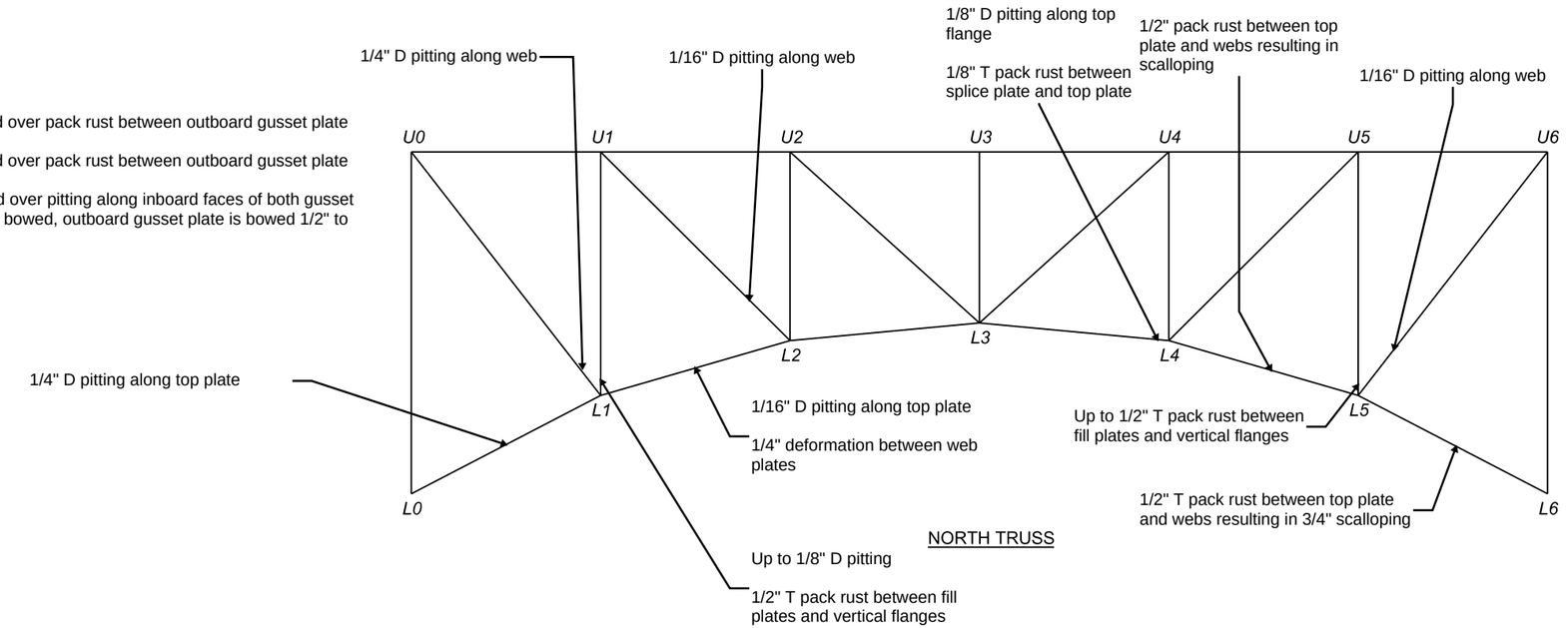
			PAGE A-5

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



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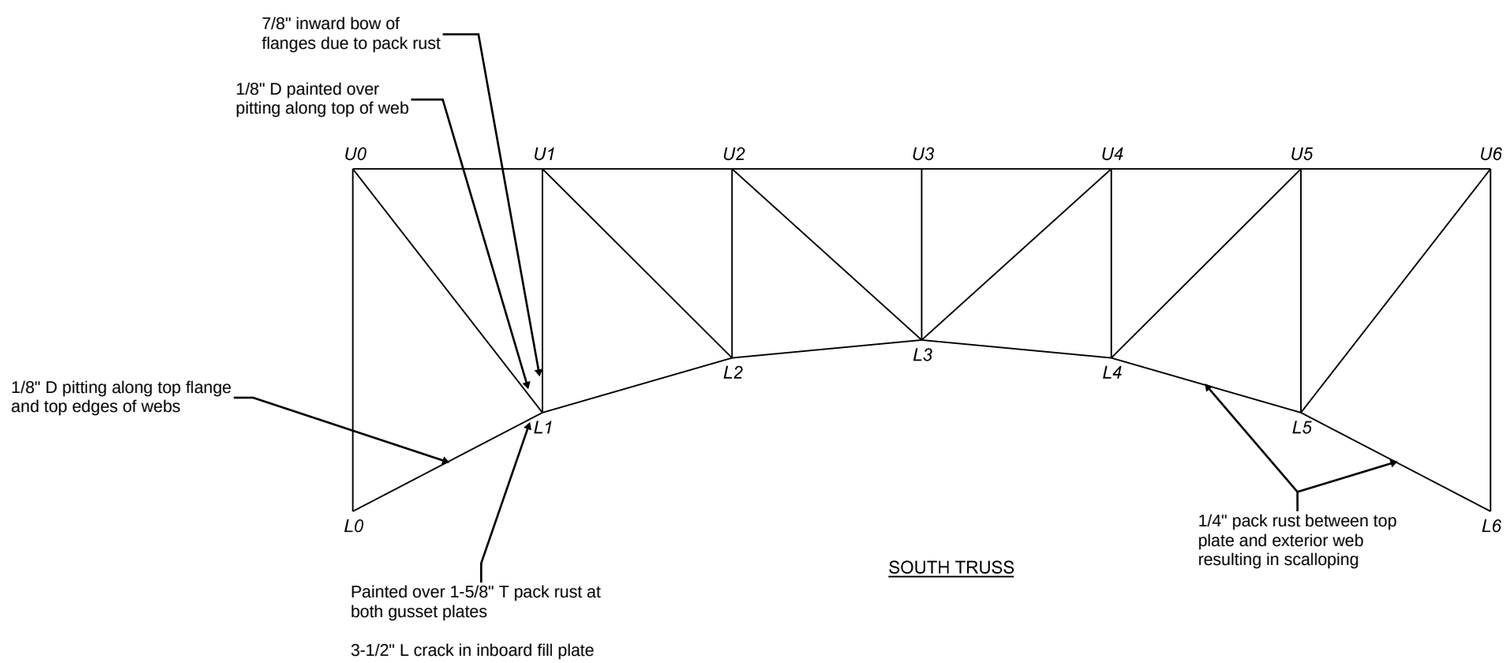
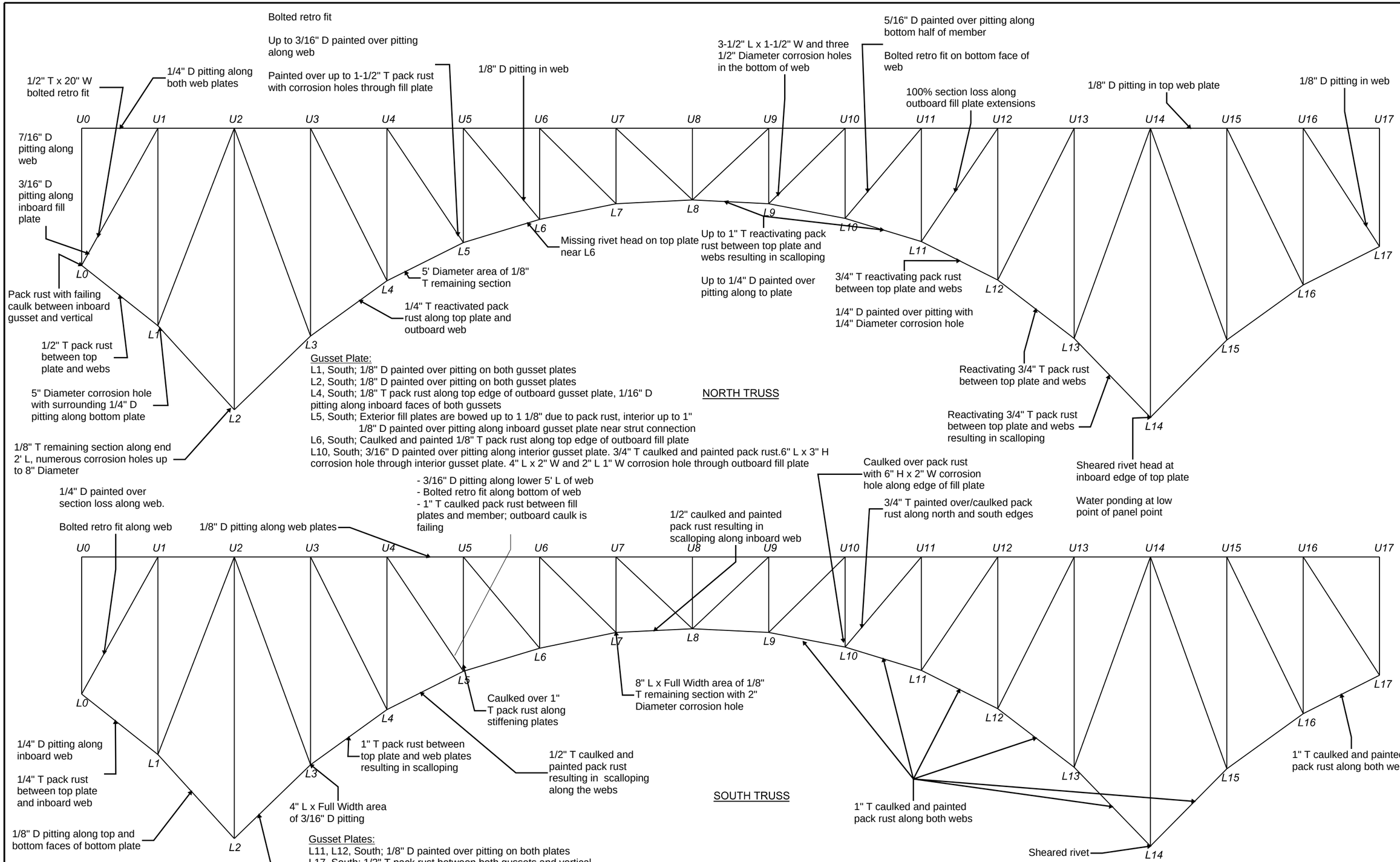
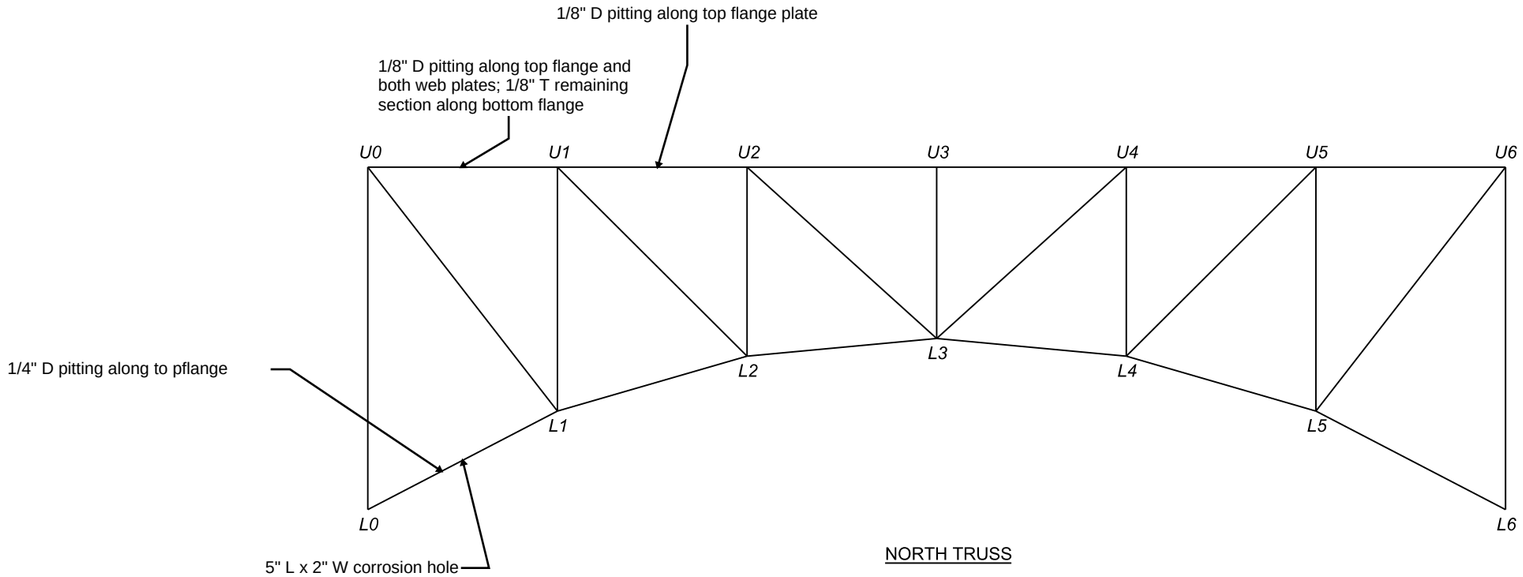


SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE DEC, 2017	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, INC.	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 5
			PAGE A-6

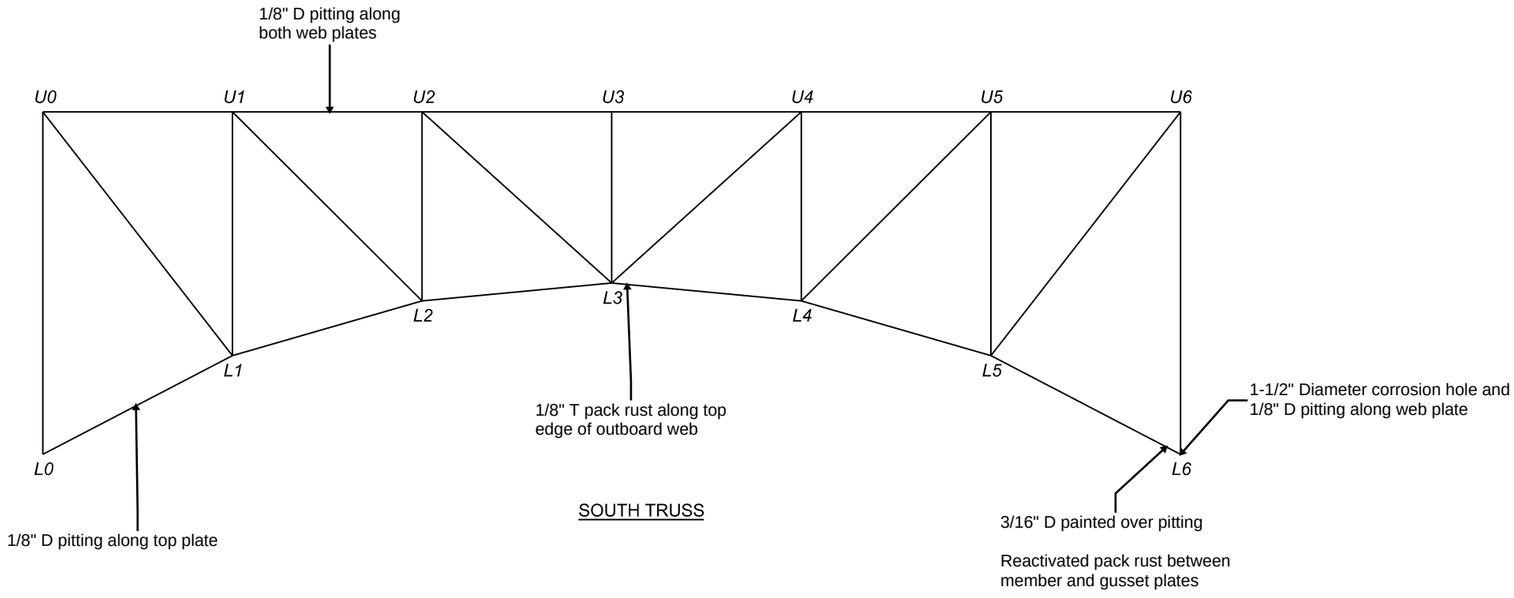


GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE DEC, 2017	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, INC.	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 6 PAGE A-7



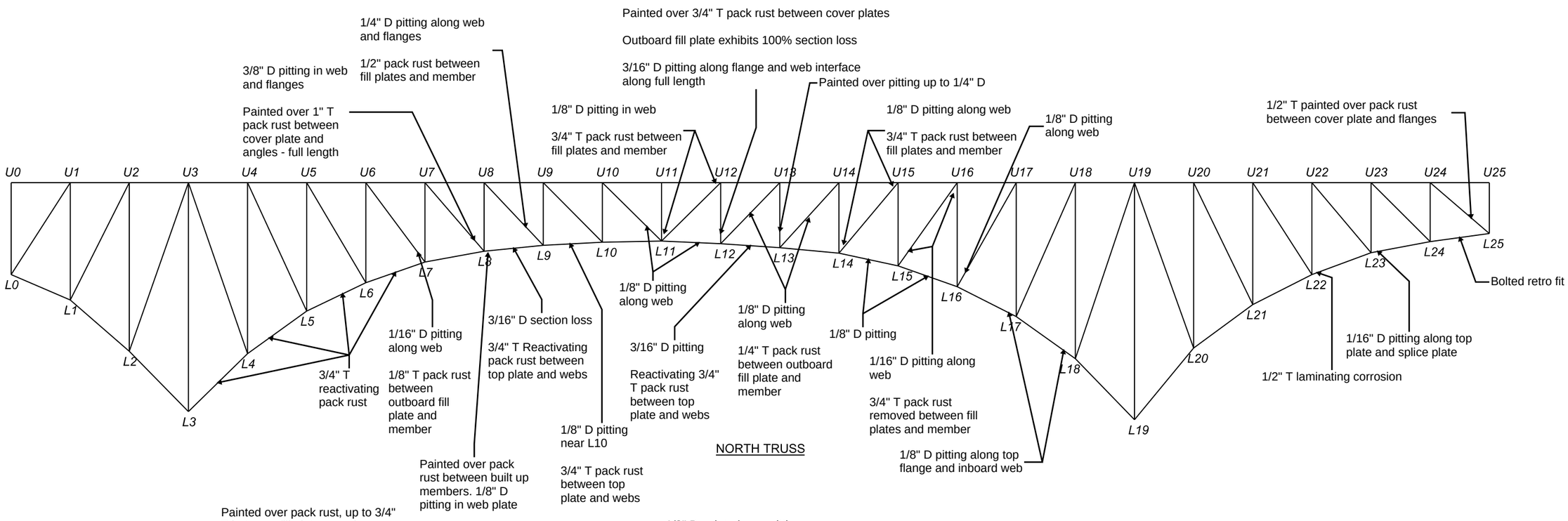
NORTH TRUSS

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



SOUTH TRUSS

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE DEC, 2017	200 East Campus View Blvd. Suite 200 Columbus, OH 43235 PH.: 614.310.3048 INFRASTRUCTURE ENGINEERS, INC.	MAIN AVENUE OVER CUYAHOGA RIVER BRIDGE NO. CUY-2-1441 TRUSS ELEVATION - SPAN 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

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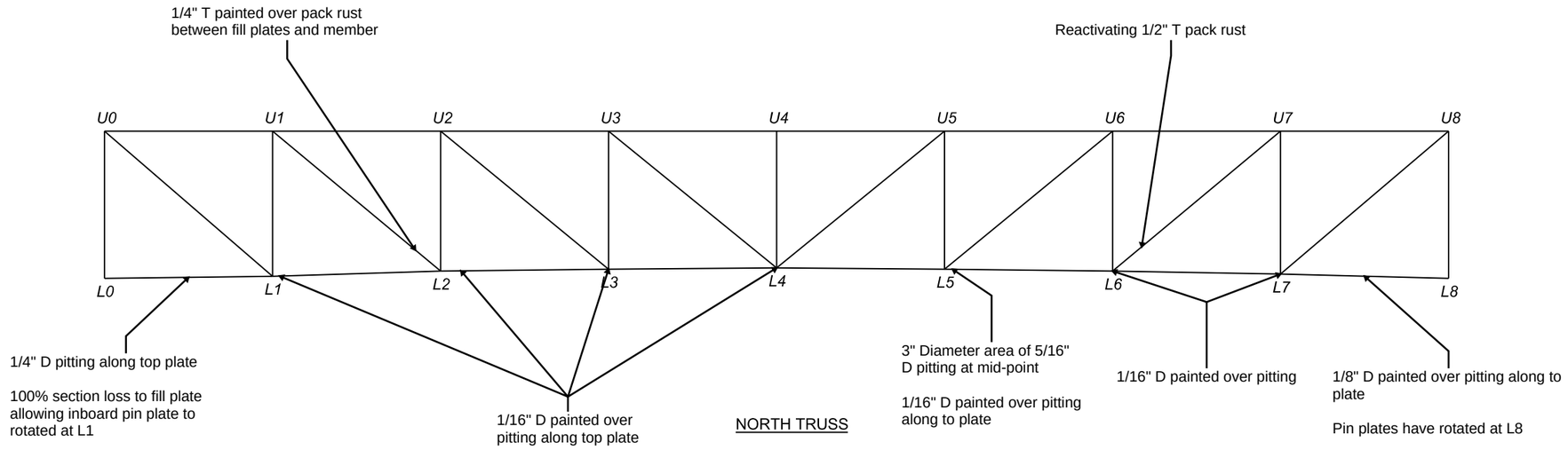

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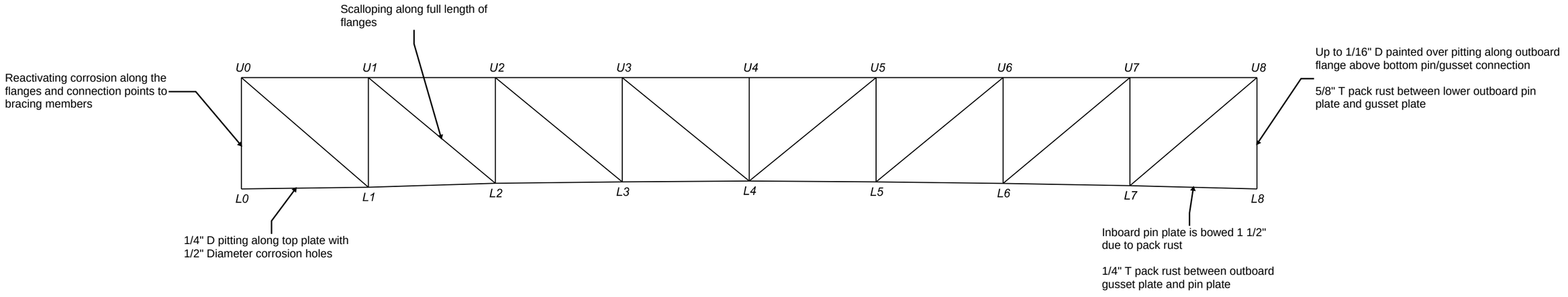

SOUTH TRUSS

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

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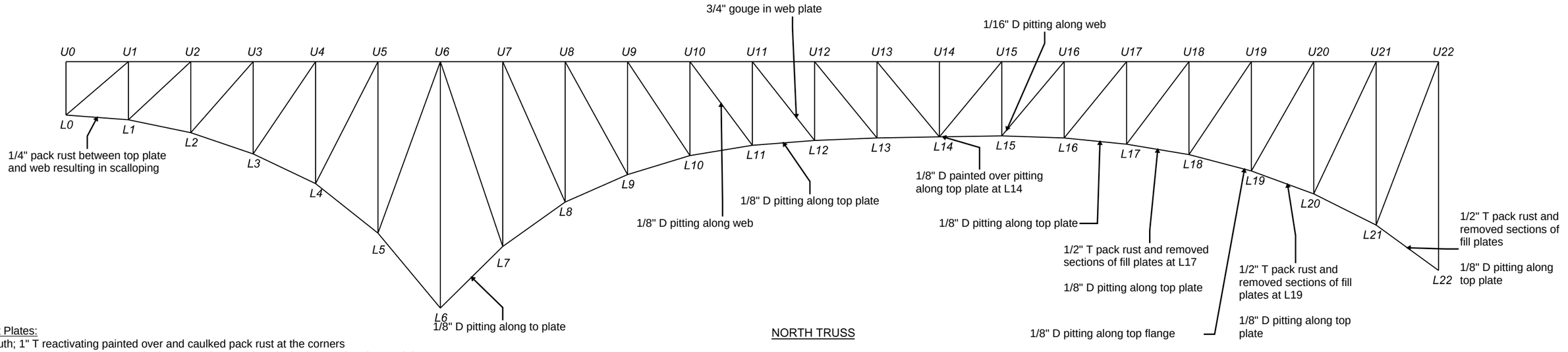
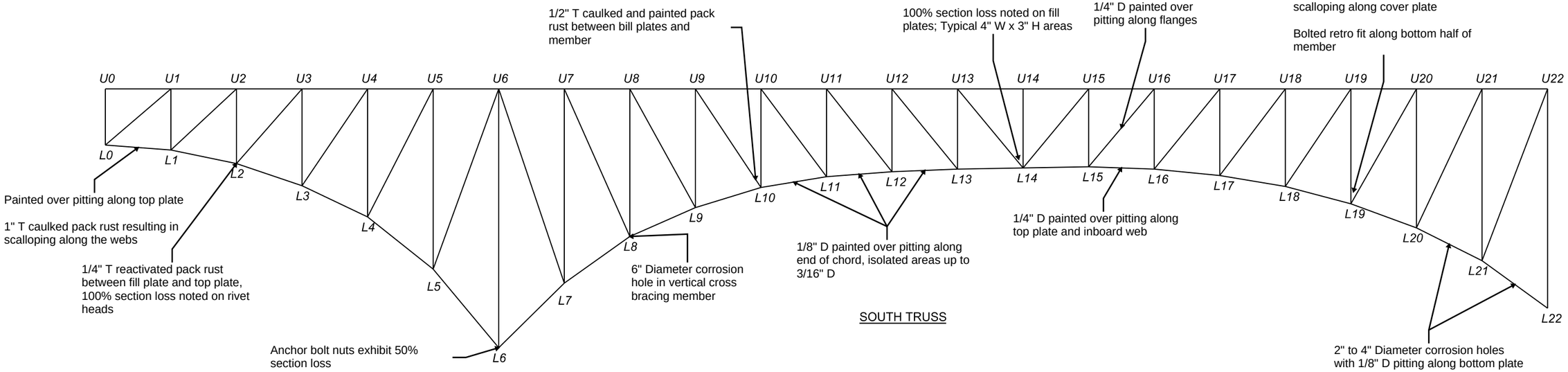


NORTH TRUSS

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

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Substructure Photos
Unit I-V

Photo 37 – Unit I, Section N; Southeast curtainwall is mapped out with areas of delaminations and spall to be repaired

Photo 38 – Unit I, Section N, Frame 8; Active rehabilitation of frame base

Photo 39 – Unit III, Bent 11, South column; Base of column is holding water

Photo 40 – Unit III, Bent 11, North column; Plugged drain holes and up to 10% section loss along anchor bolts

Photo 41 – Unit III, Framed and Braced Column; Bent 1, middle column; 8” H x 6” W corrosion hole in the stay plates

Photo 42 – Unit III, Framed and Braced Column; Bent 2, north column; Full Height x 1/16” W vertical crack on the southwest corner

Photo 43 – Unit III, Framed and Braced column; North column exhibits 1/16” D pitting along the base

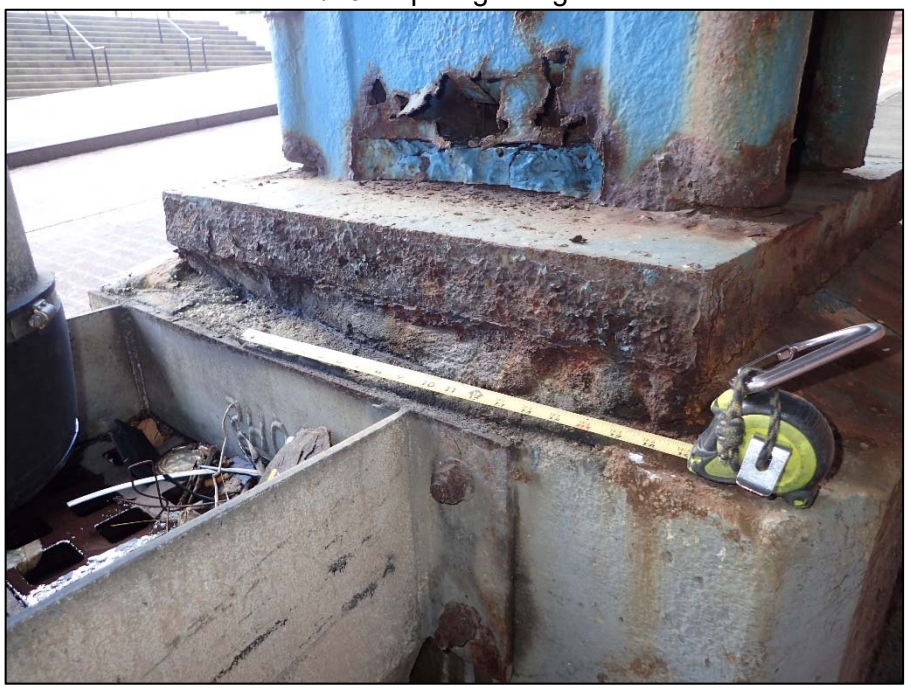


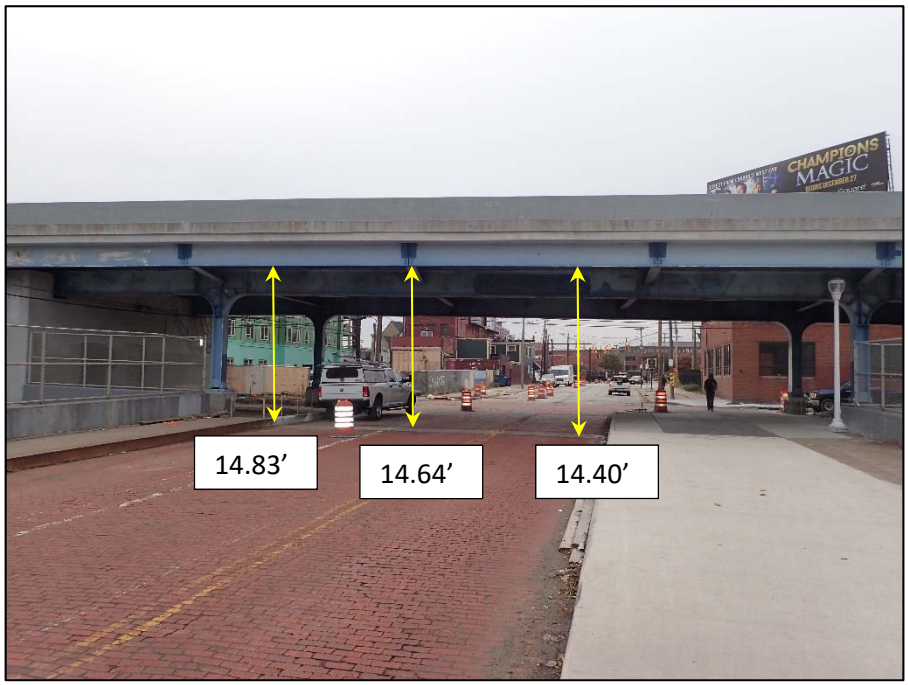
Photo 44 – Unit III, Frame and Braced Column, Bent 4; North column has a Full Length x 3” H x up to 1” D spall with 1/2” D undermining

Photo 45 – Unit IV; West Lakeside entrance ramp; West face of south wall exhibits multiple spalls with exposed reinforcement

Photo 46 – Unit IV, West Lakeside exit ramp; South wall exhibits spalling with exposed reinforcement and delaminations

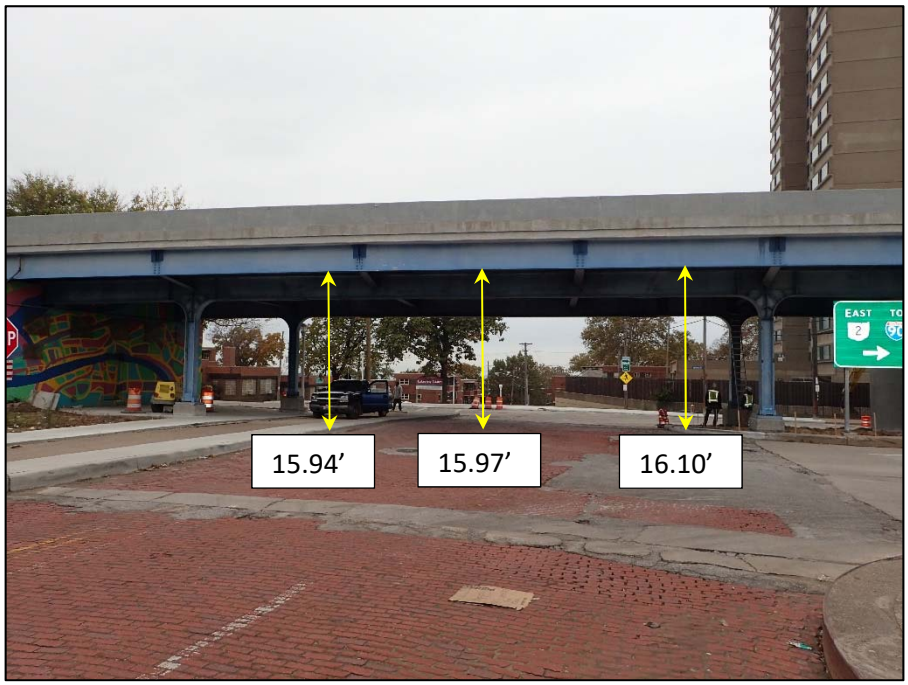
Photo 47 – Unit V, East abutment, South wingwall; Full Height vertical cracking with moisture staining and efflorescence spaced 10’-15’ apart

Underclearance Measurements



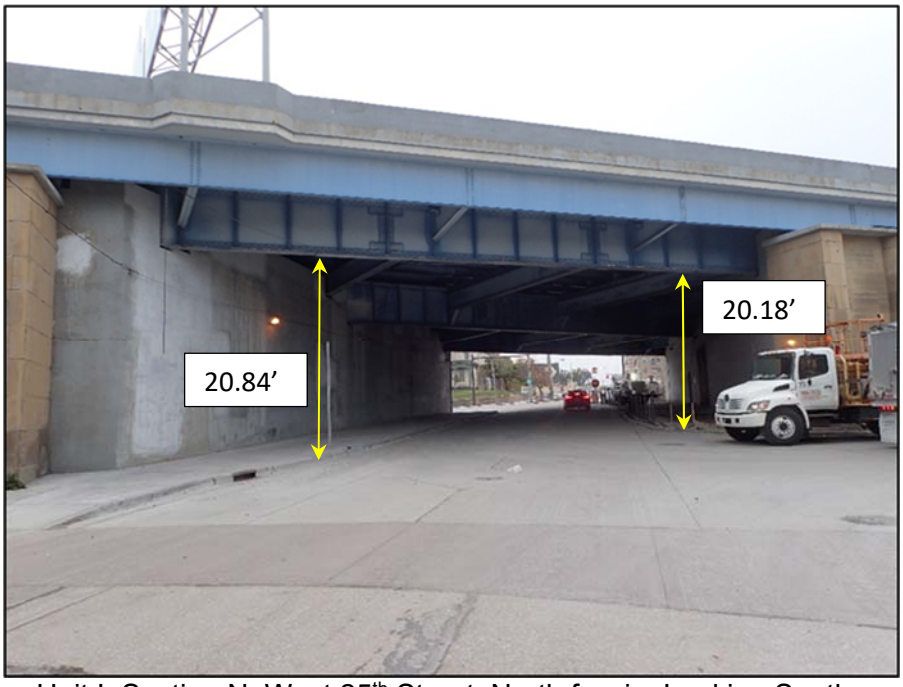
Unit I, Section K; West 28th St., Eastbound lanes, Looking South

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

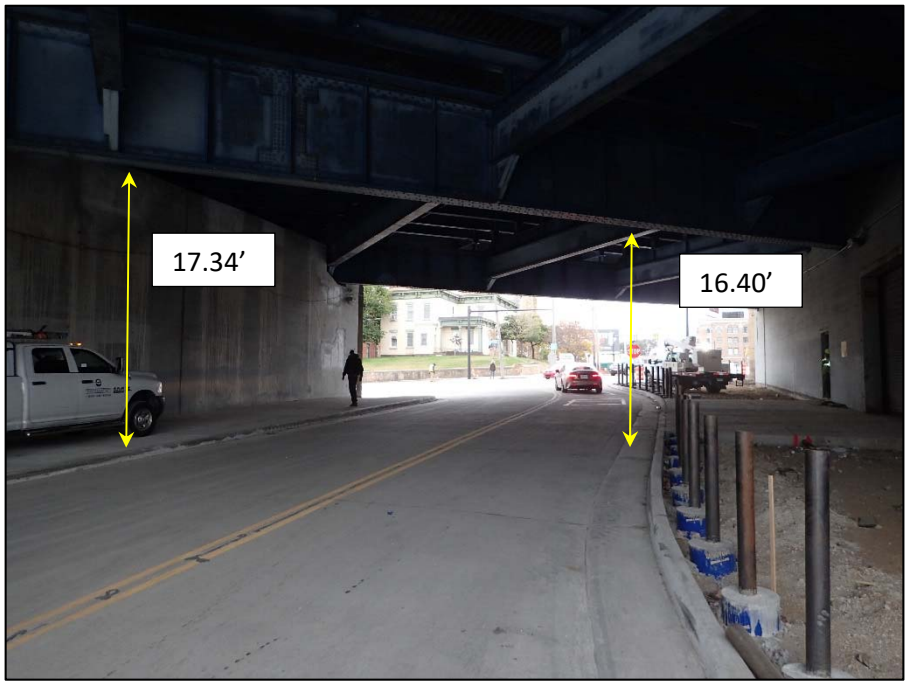


Unit I, Section C; West 28th Street Westbound lanes, Looking North

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



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

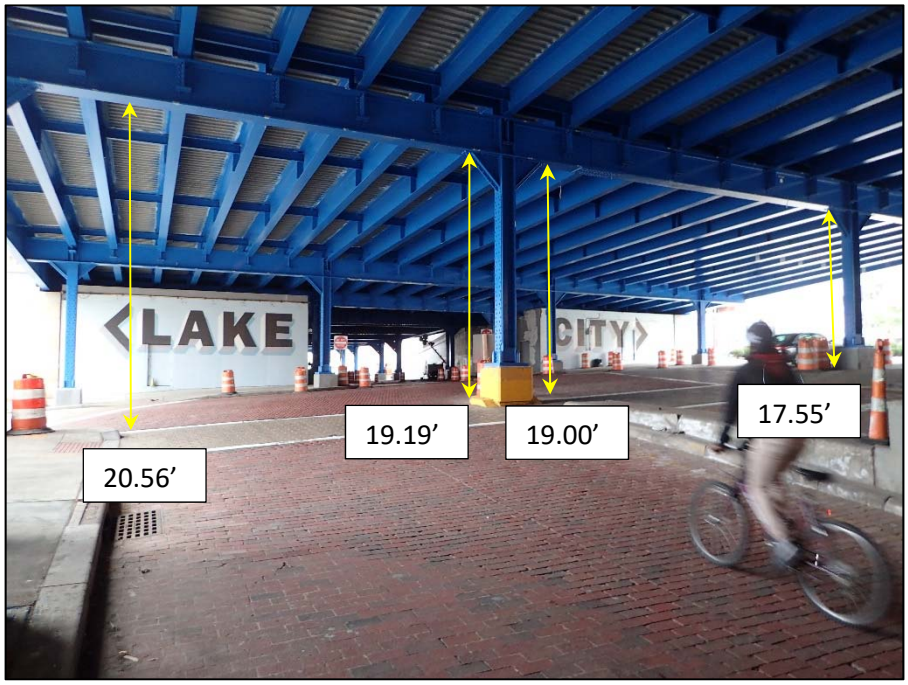


Unit I, Section N; West 25th Street, Center Girder, Looking South

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

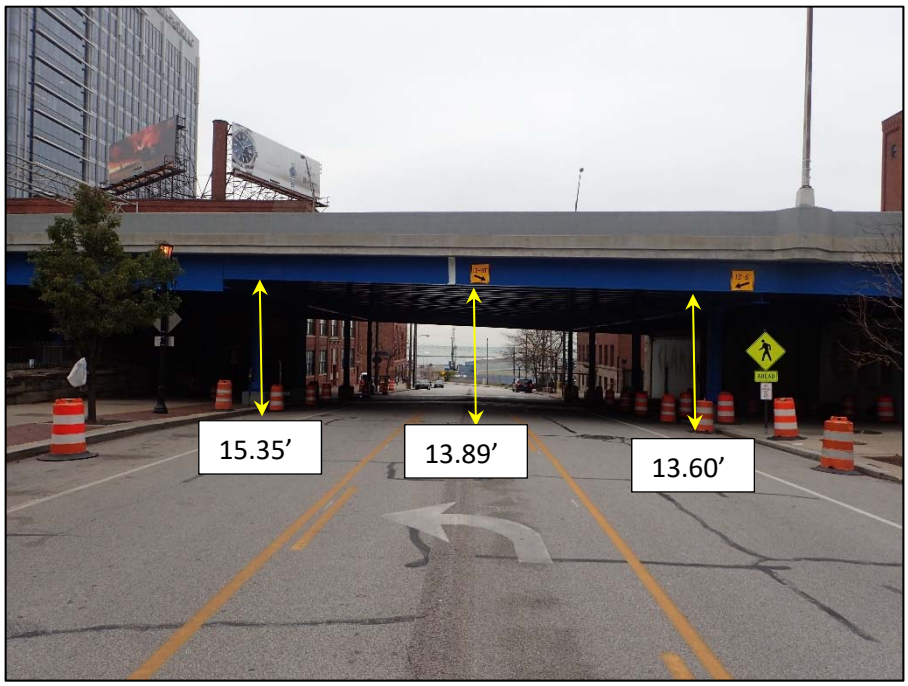
Unit III, Frame & Braced Column Section; Main Avenue, Looking East below Trestle

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

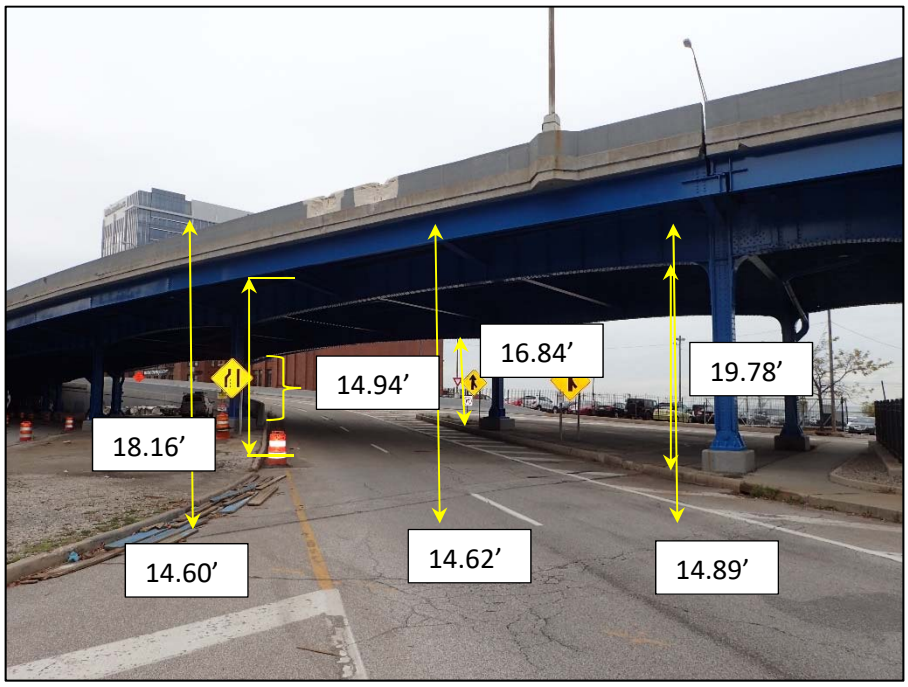


Unit III; West 9th Street, South fascia, Looking North

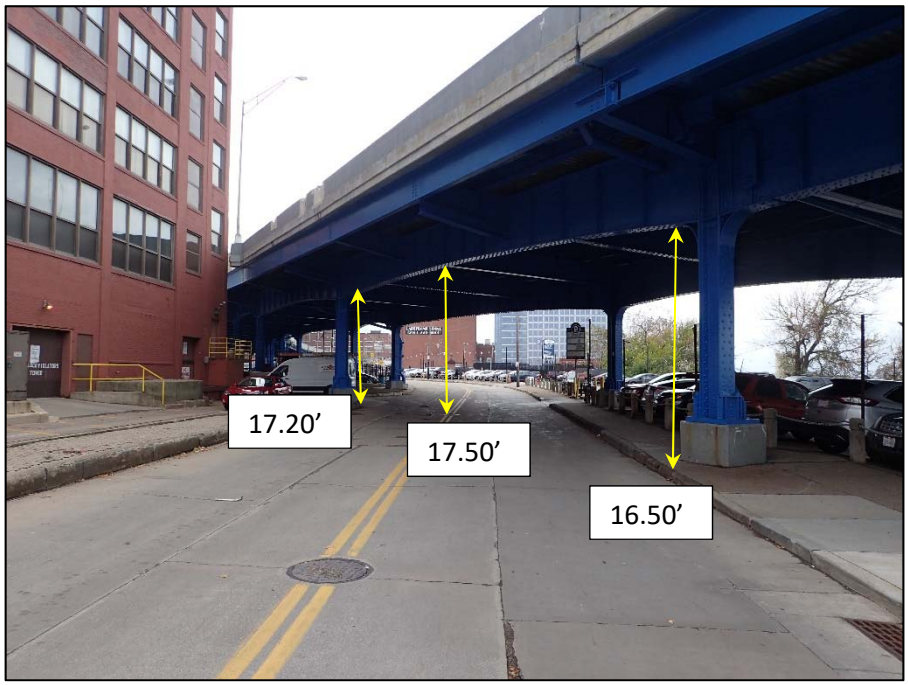
Unit III; Lakeside Avenue, Bent 14, Looking East

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

Unit IV; Lakeside Avenue, Westbound, Looking North

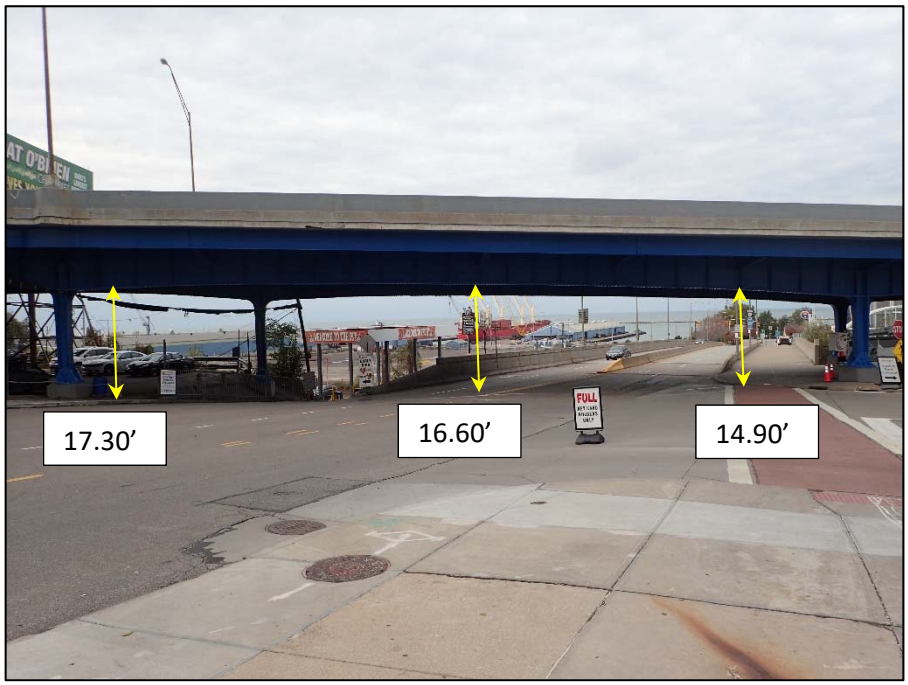


Unit IV: West Lakeside Avenue Ramp to SR 2, Looking North

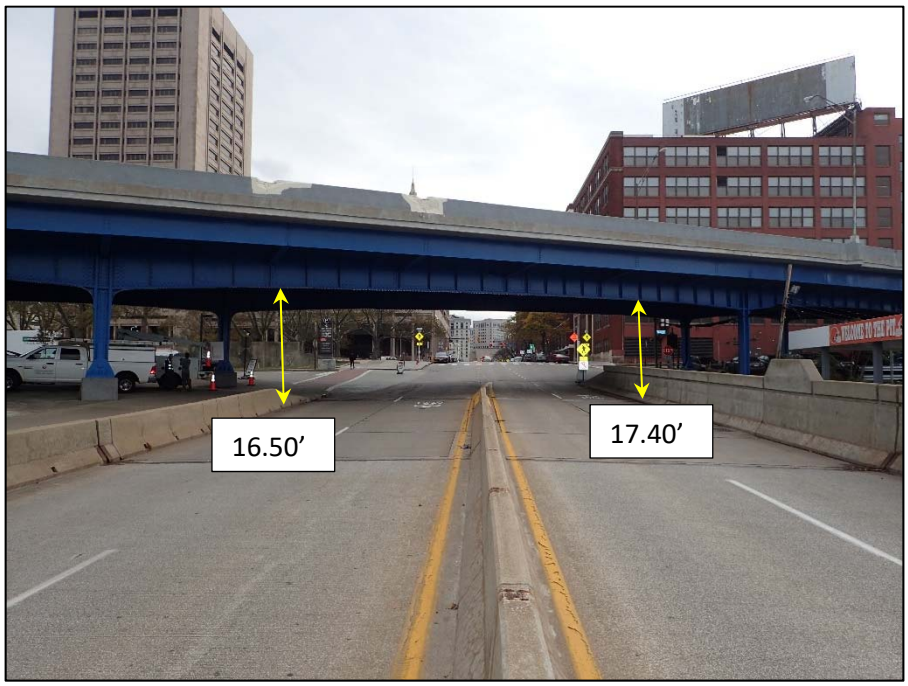


Unit IV: Summit Avenue, Looking West

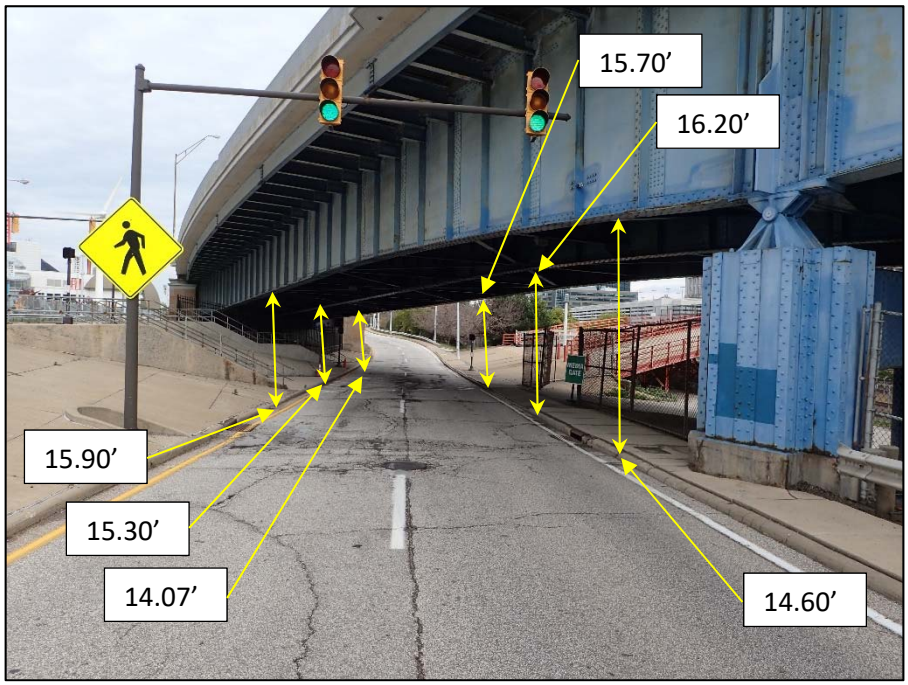
Unit IV: Summit Avenue, Looking East



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