CUY-6-1456

PHYSICAL CONDITION REPORT
ROUTINE FRACTURE CRITICAL INSPECTION
VETERANS MEMORIAL/DETROIT-SUPERIOR BRIDGE
OVER THE CUYAHOGA RIVER
SFN: 1800930

Inspection Date:
October 22-26, 2018
Routine and Fracture Critical Inspection

Submitted to:

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

STATE OF OHIO
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2/8/2019

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INFRASTRUCTURE ENGINEERS
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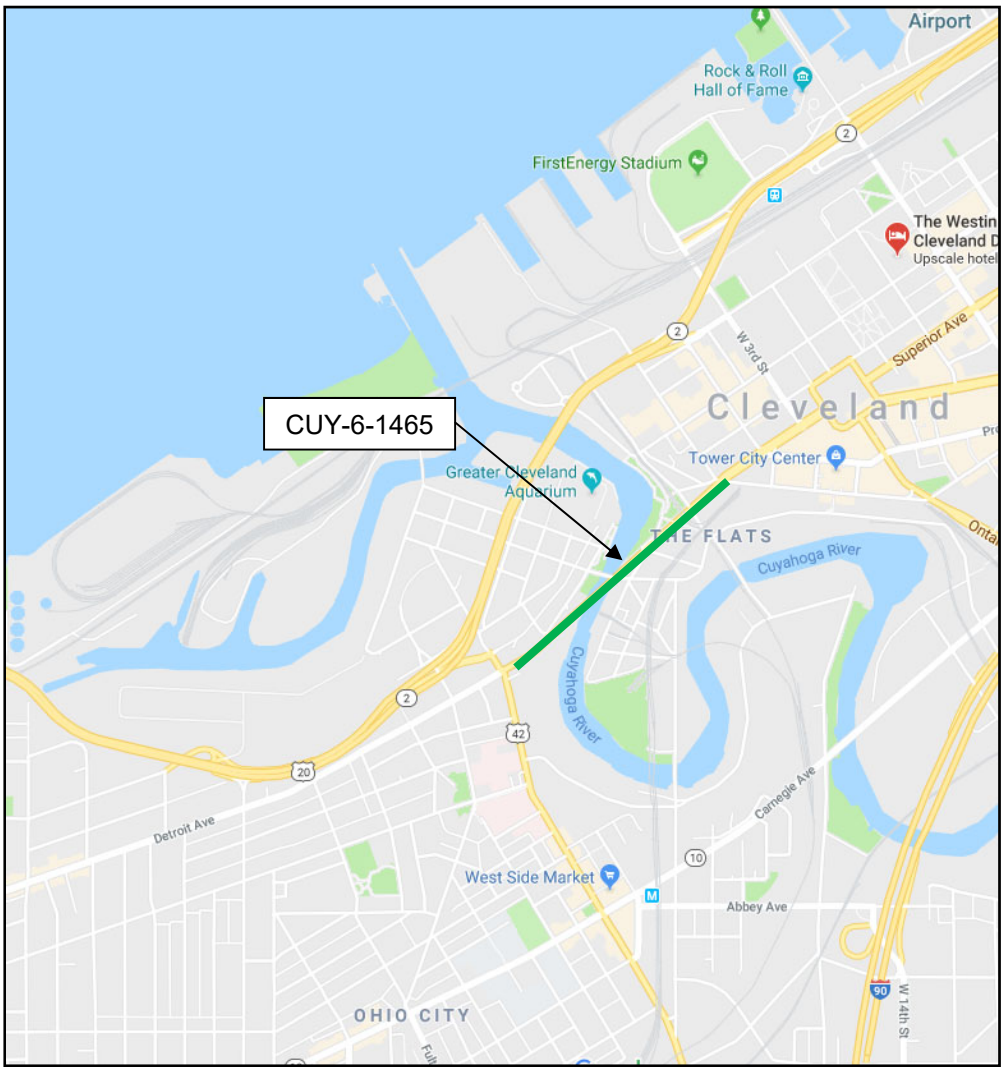
LOCATION MAP



Structure: CUY-6-1456
Veterans Memorial/Detroit-Superior over Cuyahoga River
Cleveland, Ohio

GENERAL DESCRIPTION

The Veterans Memorial/Detroit-Superior Bridge (CUY-6-1456, SFN 1800930) carries three lanes of traffic and one lane of bike traffic over the Cuyahoga River Valley, local streets, and RTA railroad tracks. The bridge is approximately 2,880 feet long, including 1,673 feet of subway tunnel that is linked by the lower deck. The bridge was constructed from 1914 to 1917.

The upper deck was opened to vehicular traffic in November 1917 and currently carries three lanes of traffic over the Cuyahoga River Valley. The lower deck was designed for four streetcar lines with room for an additional two lines that were active from January 1918 to 1953. On January 18, 1974 the bridge was added to the National Register of Historic Places. On Veterans Day November 11, 1989 the bridge was renamed the Veterans Memorial Bridge.

The bridge has undergone two major rehabilitation projects from 1967 to 1970 and 1995 to 1997. 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 Detroit-Superior Bridge consists of three (3) units of varying structure types within each section.

Unit I - West Approach
Unit II - Main Unit Spans
Unit III - East Station

Plan views of the Veterans Memorial/Detroit-Superior Bridge with the units and sections identified are shown in Drawings 1 through 3 (pages 11-13).

Unit I – West Approach

The West Approach section consists of the West Station area spanning a total of 350 feet west of Tower A and two abandoned subway tunnels: the Detroit Avenue Tunnel (660 feet long) and the West 25th Street Tunnel (480 feet long). There are several utilities that pass through the west station and tunnels. The West Station has been open to the public for tours and festivals since the 1980s.

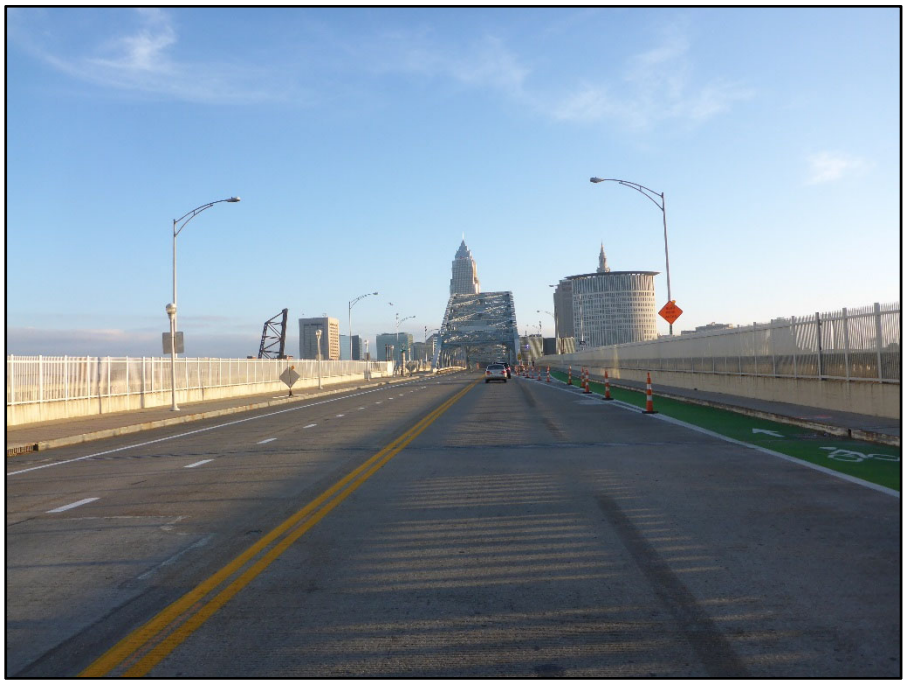
Unit II – Main Unit Spans

The Main Unit is comprised of Spans 1A, 1B, and Spans 1 through 13. Spans 1A and 1B are transition structures from the underground West Station to the approach and main spans. These two concrete cellular spans total 220 feet long and have an enclosed cellular construction below the lower deck referred to as the catecombs. Spans 1 through 13 are the main spans of the bridge with a double deck design. Spans 1 through 3, 5 through 11, and 13 are concrete open spandrel arches. Span 12 is a concrete encased steel half through arch. Span 4 is a 591 foot, three-hinged steel half through arch truss in a Pratt configuration. The upper deck is used for vehicular and pedestrian traffic and the lower deck is used for utilities and maintenance access. Occasional tours and festivals take place on the lower deck.

Unit III – East Station

The East Station is a concrete cellular span that extends 165 feet past the East Abutment. A three panel long, cellular construction is present under the East Station lower deck immediately behind the East Abutment.

East end view looking west



West end view looking east

South elevation

North elevation

Construction and Maintenance History

The following is a summary of significant events in the history of the Detroit-Superior Bridge:

- 1914-1917: Construction of the Detroit Superior High Line Bridge
- November 1917: Bridge opened up to vehicular and pedestrian traffic.
- January 1918: Bridge opened up to streetcar traffic.
- 1953: Streetcar lines abandoned.
- 1967-70 Major Rehabilitation
    - Removal of the original upper deck consisting of four vehicular lanes and two 15-foot wide sidewalks.
    - Strengthening or replacement of all upper deck concrete floorbeams.
    - Span 4: Erection of new steel floorbeam cantilevers.
    - Construction of the new upper deck with six vehicular lanes and two 5-foot wide sidewalks.
- January 18, 1974: Bridge was added to the National Register of Historic Places
- November 11, 1989: Bridge was renamed the Veterans Memorial Bridge.
- 1995-97 Major Rehabilitation
    - Replacement of the upper and lower deck floors.
    - Replacement of select upper and lower concrete floorbeams, columns, jack arches and pier shafts.
    - Application of epoxy-urethane or non-epoxy sealer to most exposed concrete surfaces.
    - Span 4: Replacement of all steel hangers, Panel Points 6 through 6'.
    - Span 4: Replacement of upper deck and lower deck Floorbeams 5 through 5' and the corresponding stringers.
    - Painting of all steel superstructure components.
    - Installation of new drainage system.
    - Installation of architectural lighting.
- 2003 North Sidewalk Linear Park Conversion.
    - Conversion of vehicular traffic to two westbound and one eastbound lane between the steel trusses and on eastbound lane on the Span 4 south cantilever.
    - Widening of the north sidewalk with longitudinal trench drainage.
    - Installation of public art and benches along the modified north sidewalk.
- 2014-Present
    - Span 1A through Span 13: Patching deficient upper deck wearing surface areas.
    - Patch deficient concrete super and substructure components in West Station, Detroit Avenue Tunnel, West 25th Street Tunnel and Spans 1-3 and 5-13. (Note: In Spans 1-3 and 5-13, the patching below the lower deck was later restricted to areas adjacent to and over public areas.)
    - Span 4: Zone painting of primary and secondary truss members between upper and lower decks.
    - Install hanger caps at hanger opening in upper deck, Panel Points 6 through 6'.
    - Repaired spalled wearing surface in Span 9.
    - Pipe cleanout for pedestrian tunnels in the west and east station. (This task was performed but not successful.)
    - South vehicular eastbound lane converted into bike lane.

INSPECTION PROCEDURE

Infrastructure Engineers, LLC. conducted a Routine/Fracture Critical inspection on the structural elements of Units I, II, and III using a combination of equipment and industrial rope access techniques. The inspection was performed by a crew of five (5) members recording inspection notes and verifying any new or previously reported areas of deterioration or structural distress.

From the 1995-97 bridge rehabilitation up until the 2015 Routine inspection, a different bridge nomenclature system had been used. With the original construction and rehabilitation drawings included as a significant element of the bridge record, and past FHWA policy of recommending that original member identification system be followed, this inspection therefore followed the structure's original member identification. This practice ensures that this inspection will at a minimum, conform with the original shop drawings and documentation for the prior bridge rehabilitation.

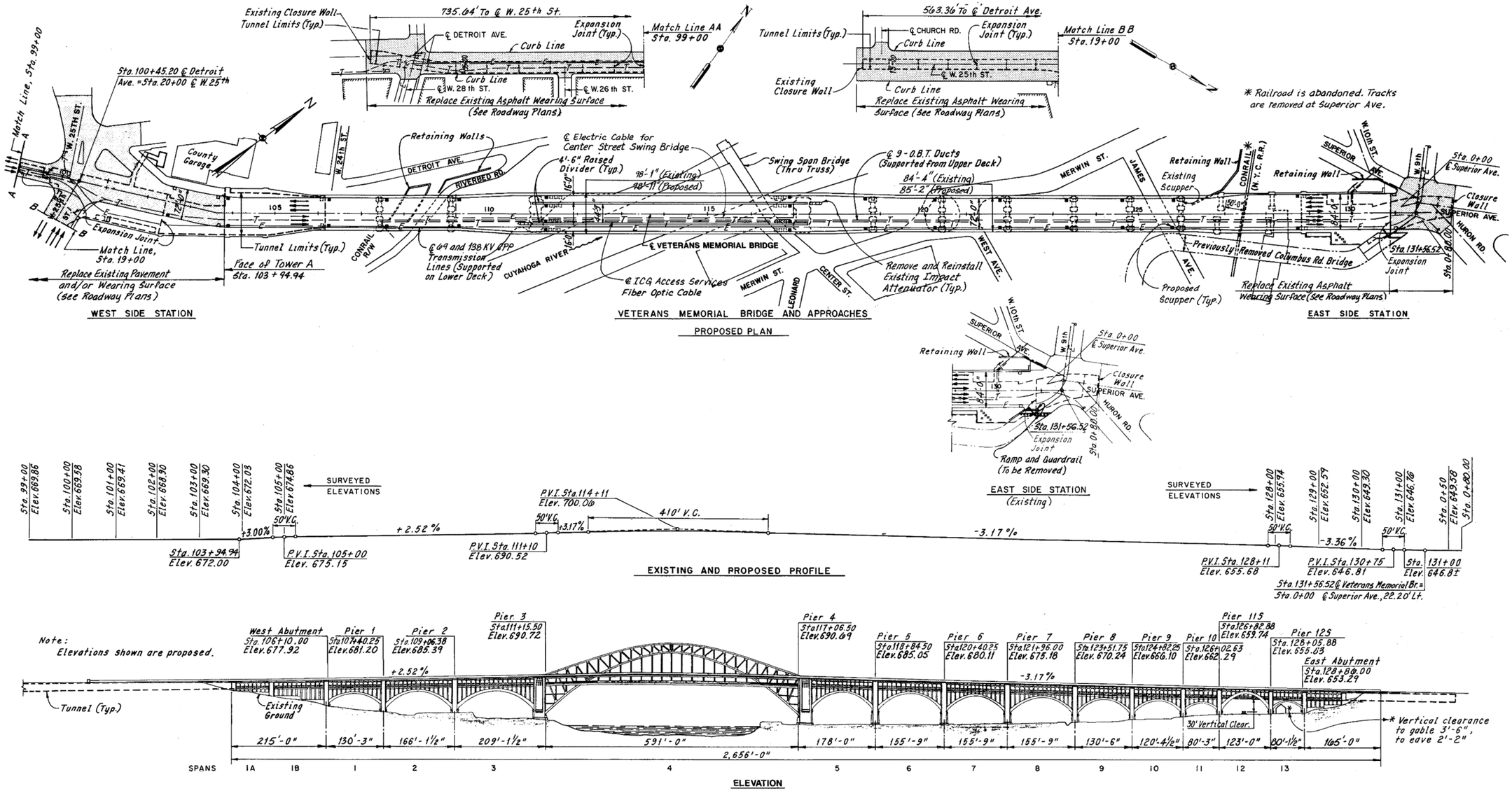
Condition and Element Rating Guidelines

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



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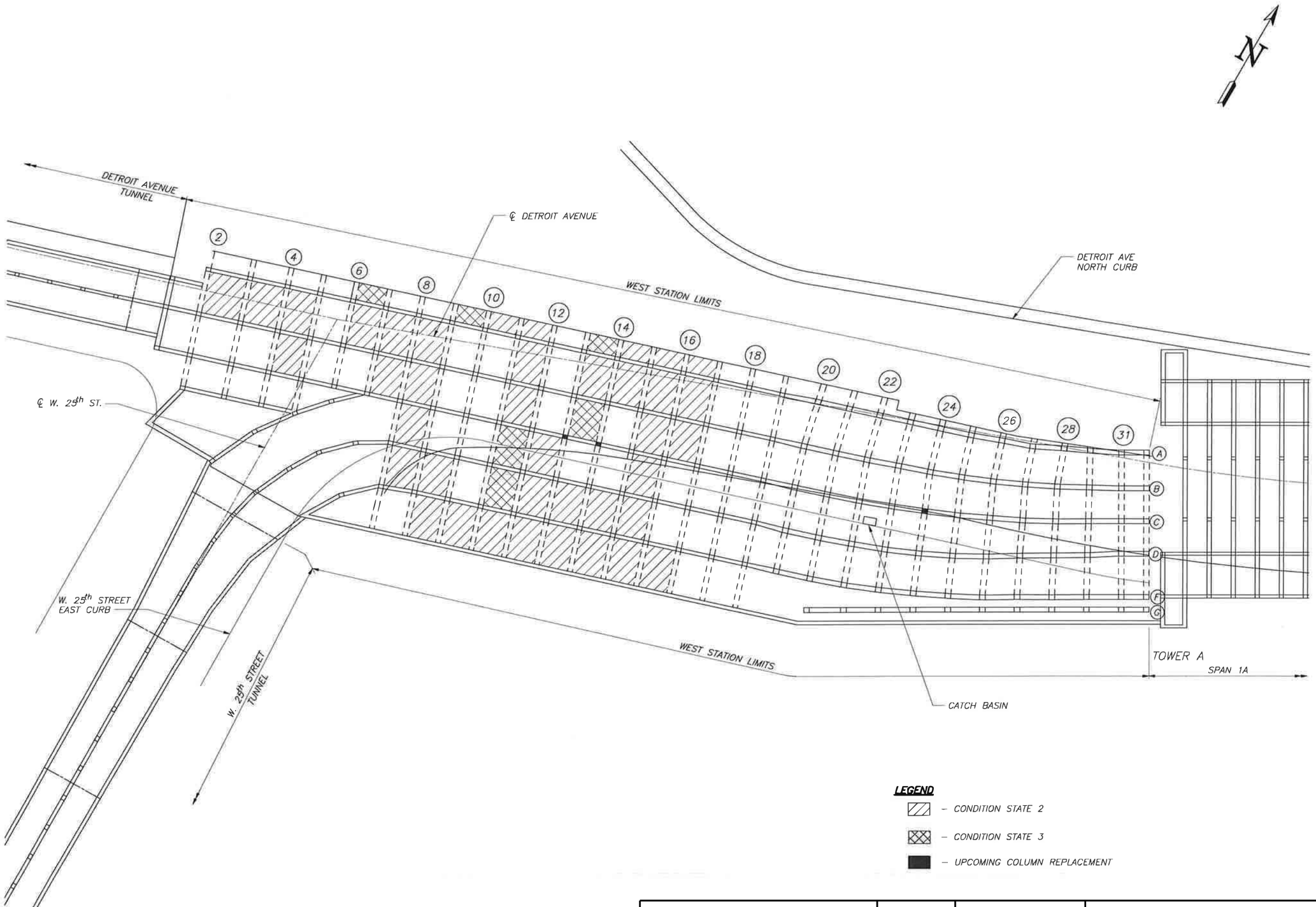
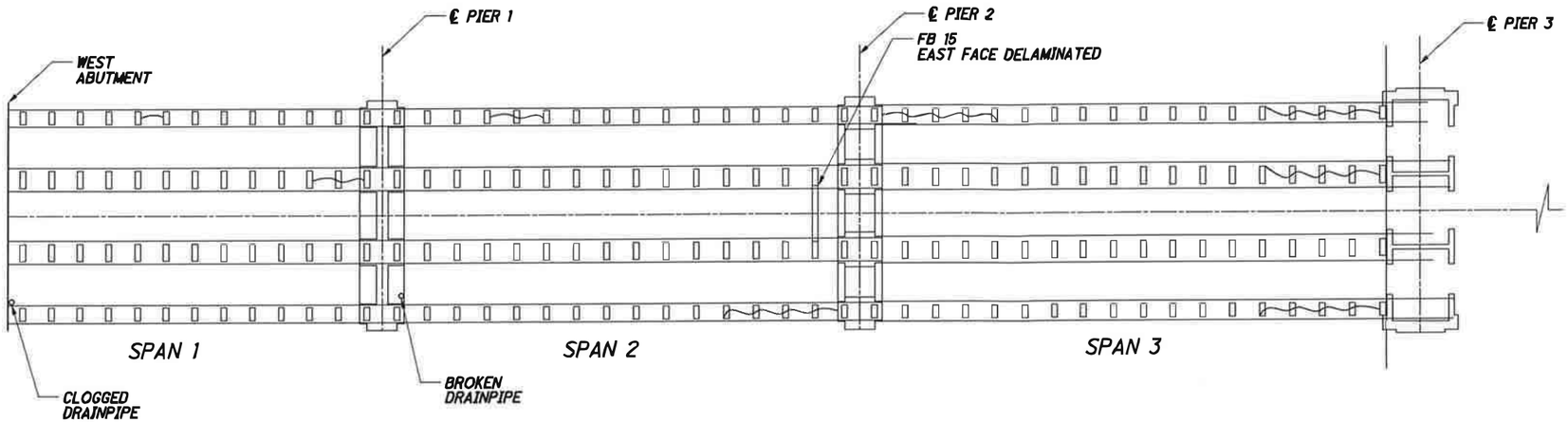
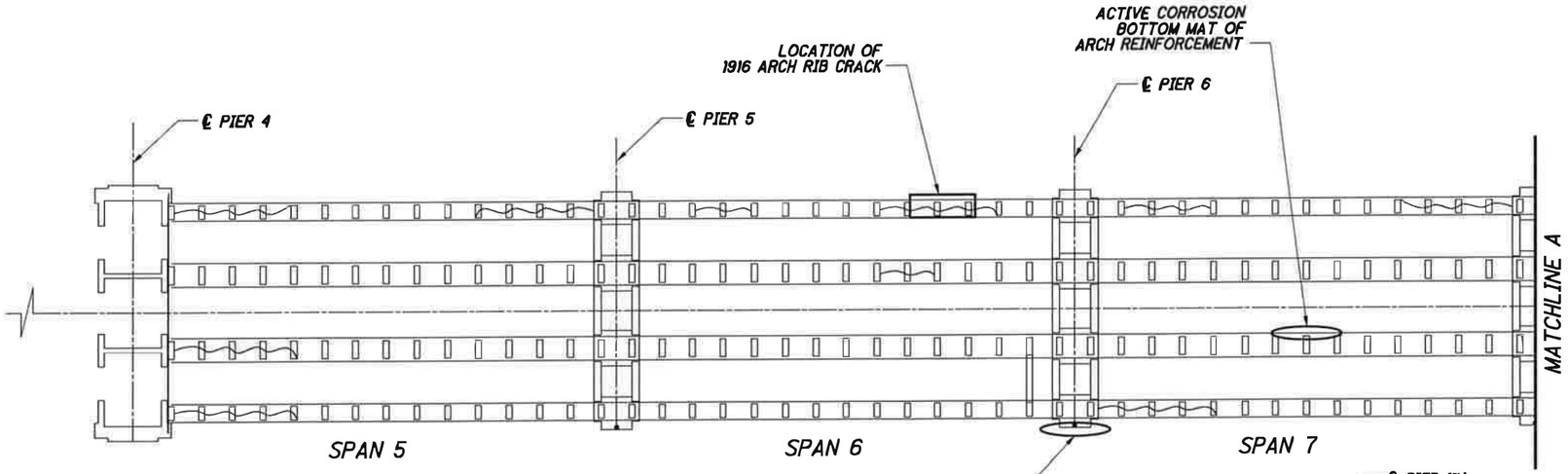
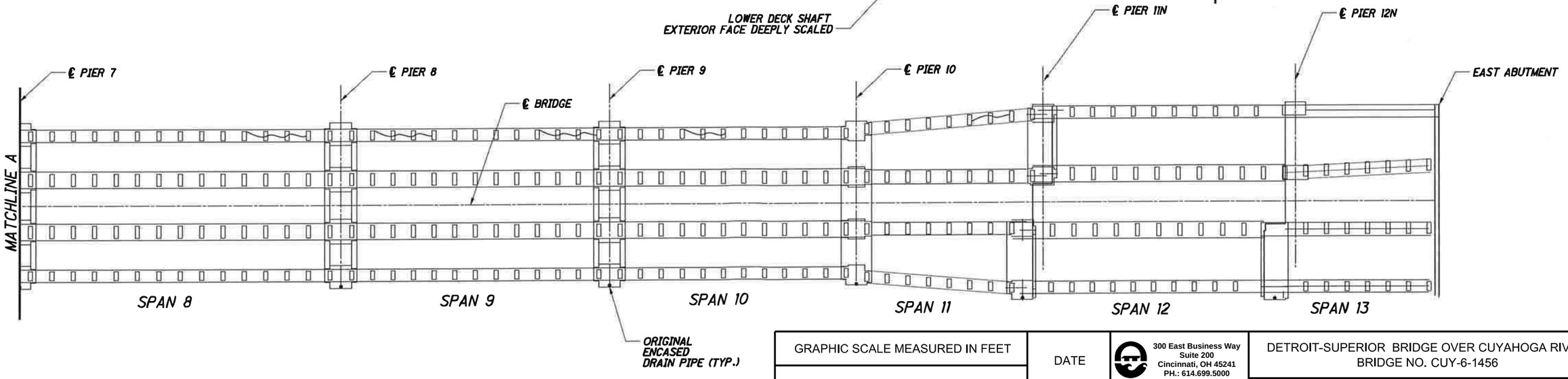
Veterans Memorial/Detroit-Superior Bridge over Cuyahoga River
2019 Routine/fracure Critical Report
Ohio Department of Transportation, District 12



GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2017	300 East Business Way Suite 200 Cincinnati, OH 45241 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1456 WEST STATION PLAN PAGE D-2







LEGEND

VERTICAL ARCH CRACK

GRAPHIC SCALE MEASURED IN FEET	DATE	300 East Business Way Suite 200 Cincinnati, OH 45241 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1456	
NOT TO SCALE	NOV, 2017	INFRASTRUCTURE ENGINEERS, INC.	SUPERSTRUCTURE PLAN	PAGE D-3

Inspection Findings:

Item N58 – Deck (6, Satisfactory Condition)

The deck is in overall ***Satisfactory*** condition, a rating of a 6 on the NBIS condition rating guidelines.

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

Item 7.1 – Floor - Upper Deck (2, Fair Condition)
The upper deck floor is in ***Fair*** condition.

Section	Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
Detroit Ave. Tunnel	17,950 SF	9,950 SF	8000			1.55
West 25th St. Tunnel	13,750 SF	12,650 SF	1000 SF	100 SF		1.22
West Station	37,800 SF	26,600 SF	10,350 SF	850 SF		1.62
Spans 1A, 1B, 1-13	232,250 SF	220,638 SF	11,612 SF			1.07
East Station	31,150 SF	31,150 SF				1.00
Total Structure	332,900 SF	300,988 SF	30,962 SF	950 SF		1.18

Detroit Avenue Tunnel: The Detroit Avenue tunnel slab was retrofitted during the 1995-1997 rehabilitation; a new reinforced concrete slab was placed on top of the original slab. The new slab was designed for HS20 live load with the original slab offering no structural support. The top and bottom surfaces for the new slab is not visible and assumed to be in good condition despite the poor and critical conditions of the original tunnel slab beneath.

West 25th Street Tunnel: The West 25th Street tunnel floor is in good condition and exhibits isolated delaminated areas and shallow spalling.

West Station: The West Station Floor is in fair condition and exhibits areas of spalling, cracking and efflorescence, active water infiltration, and exposed reinforcing steel. The most significant areas of deterioration are adjacent to the restored floor joints and in Bays A and B.

Spans 1A, 1B, and 1 through 13: The upper deck floor in the main spans is in fair condition with isolated cracks with and without efflorescence. There are numerous sound and unsound patches and spalls, some with exposed reinforcing. During the inspection, cold patches were performed, however, in a very poor

manner which will likely not be sufficient.

East Station: The East Station floor is in good condition with no significant deficiencies.

Lower Deck: Not considered in this quantity was the lower deck floor. The lower deck is in good condition. The lower deck is reinforced concrete with stay in place (SIP) forms in Spans 1 through 3, and Spans 5 through 13. In Span 4 the lower deck is a combination of an interior vehicular steel grid deck and exterior pedestrian fiberglass grating. In the center bay of Panel 15 in Span 2 the SIP forms exhibit severe corrosion that is staining the west face of Pier 2. The South Bay in Span 1B has spalling up to 4-inches deep that exposed the top mat of reinforcing in the 12-inch thick slab.

Item 7.2 – Edge of Floor – Upper Deck (2, Fair Condition)
The edge of floor is in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
5,312 LF	5,312 LF				1.00

Item 8 – Wearing Surface (2, Fair Condition)
The concrete wearing surface is in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
191,232 SF	186,717 SF	2,785 SF	1,730 SF		1.17

The asphalt wearing surface above the West Station exhibits heavy cracking and patching throughout. The deterioration above the West Station is more prominent in the eastbound lanes. The concrete wearing surface exhibits delaminations, large asphalt patches, and deteriorating asphalt patches. The bike lane along the south side of the bridge in Span 4 has multiple asphalt and concrete patches throughout with wide spread map cracking. Not considered in this quantity was the lower deck wearing surface.

Item 9 – Curb and Sidewalk (2, Fair Condition)
The curb and sidewalks are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
5,312 LF	3,872 LF	1,062 LF	378		1.95

The curbs and sidewalks exhibit random cracking, isolated spalls, and delaminations.

Item 10 and Item 11 – Median and Railing (1, 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	674 LF	635 LF	39 LF			1.08
Railing	5,312 LF	5,308 LF	4 LF			1.00

The median exhibits shallow spalls. The southwest impact attenuator in Span 3 exhibits minor impact damage. In Span 5 the south railing aluminum fence has a 2-foot long damaged section. The south railing at Tower A is misaligned 7/8-inch vertically. The south railing at Tower B is vertically misaligned 1/4-inch vertically.

The entire length of concrete railing on the bridge was considered in this item. There was also Type 5 railing on the north side of Span 4 protecting the bridge truss and hangers. All concrete railing was in good condition with minor cracking, staining, and isolated distress. In Span 5 the south railing aluminum fence has a 2-foot long damaged section.

Item 12 – Drainage (2, Fair Condition)
The deck drainage is in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
28 EA	22 EA	1 EA	1 EA	4 EA	3.25

The West Abutment, south downspout is completely clogged at the base of the catch basin. At Pier 1 there is a 15-foot section of PVC pipe missing from the south drain on the east face of the pier. The north catch basin at Pier 1 is missing the catch basin grate. At Piers 8 and 9, the south catch basin is clogged. The Pier 9 south catch basin concrete frame has shifted to the west. The north sidewalk longitudinal trench drains are filled with debris and not functioning.

Item 13 – Expansion Joints (2, Fair Condition)
The expansion joints are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
2579 LF		2538 LF	40 LF		2.09

The Tower B expansion joint in the westbound lane exhibits broken fillet welds attaching the joint extrusion to the joint armor due to the formation of pack rust between the components. Snow plow damage is also present on the Tower B expansion joint in the westbound lane due to the west armor sitting 1/2-inch higher than the east armor. Joints are typically filled with debris and have edge spalls along the joint armor.

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

Deck Notes				
Unit	**Span**	**Drawing Note**	**Note**	**Photo**
Sidewalk	1A		South sidewalk has a 4’ L x 4” W x 1” D spall.	
Railing	Tower A		South top railing; vertically misaligned 7/8" at railing joint.	7
Upper Deck	West tunnels		Heavy efflorescence, cracking, delaminations, and spalls with corroded reinforcing throughout the underside of the deck.	8
Wearing Surface	West Station		Heavy cracking and patching throughout asphalt wearing surface. This is more prominent in the eastbound lanes.	9
Expansion Joints	Tower B		Left westbound lane; pack rust has broken fillet welds. Snow plow damage is present.	10
Railing	Tower B		South top railing; vertically misaligned 1/4" at railing joint.	
Railing	1A		South parapet has an open electrical box.	
Lower Deck	1B		South Bay; exposed top mat of reinforcement.	
Drainage	West Abut.		South downspout is completely clogged at the bottom.	
Lighting	1		The light pole base on the north sidewalk in Span 1 is broken.	
Wearing Surface	1	5	8’ L x 3’ W x 1” D spalling patch.	
Wearing Surface	1	6	6’ Diameter spalling patch.	
Wearing Surface	1	7	6' L x 3’ W x 1” D spalling patch.	
Drainage	Pier 1		South drain pipe is missing a 15' long section of PVC.	11
Drainage	Pier 1		The north drain pipe catch basin grate is missing.	
Lower Deck	2		Panel 15, Center Bay; SIP forms have severe corrosion that is staining the west face of Pier 2.	12
Median	3		Southwest attenuator has minor impact damage.	13
Wearing Surface	3	10	1’ Diameter x 2” D spall with exposed reinforcing.	
Wearing Surface	3	12	12’ L x 2’ W patch with minor spalls along the edge of the joint armor.	
Wearing Surface	4	14	4’ Diameter deteriorating patch.	
Sidewalk	4	15	5-1/2’ L x 8” W x 2” D spall in sidewalk.	
Curb	4	18	3’ L x 7” W x 2” D spall in top edge of curb.	
Curb	4	19	1-1/2’ L x 8” W x 2” D spall in top edge of curb.	
Curb	4	20	3’ L x 6” W x 2” D spall in top edge of curb.	

Deck Notes				
Unit	**Span**	**Drawing Note**	**Note**	**Photo**
Curb	4	21	2’ L x 7” W x 2” D spall in top edge of curb.	
Sidewalk	4	23	2’ L x 1’-7” W x 2” D spall in sidewalk.	
Curb	4	24	Three (3) 2’ L x 6” W up to 1” D spalls in top of curb.	
Wearing Surface	4	25	12’ L x 18’ W x 1” D spalling patch.	14
Curb	4	26	2’ L x 1’ W x 1” D spall in top edge of curb.	
Wearing surface	4	27	Pier 4 west joint has intermittent spalling along the west armor plate up to 1” D.	
Concrete Railing	4	29	North and south Concrete railing has a 1’-10” H x 8” W x 3” D spall.	
Joint	4		The 10 bolts that secure the joint cover over the Pier 4 west joint on the south sidewalk have sheared heads.	
Wearing Surface	4	31	Pier 4 east joint has intermittent spalling along the west armor plate up to 1” D.	
Sidewalk	4	F1	North sidewalk has a 1’ L x 3’ W x up to 2” D spall/delamination.	
Sidewalk	4	F2	North sidewalk has intermittent spalling over a 100’ L x 18” W x up to 1-1/2” D.	
Wearing Surface	4	F3	Intermittent spalling along either side of joint at Panel Point 5’ in the travel lanes and north sidewalk up to 1/2” D.	
Sidewalk	4	F4	Intermittent spalling along either side of joint at Panel Point 5 in the travel lanes and north sidewalk up to 1/2” D.	
Sidewalk	4	F5	North sidewalk has intermittent spalling over a 50’ L x 18” W x up to 1-1/2” D.	
Sidewalk	4	F6	Pier 3 east joint at the north sidewalk has a 15’ L x 3’ W x 2” D spalling.	
Wearing Surface	5		Panel 2; large delamination.	
Railing	5	1	South railing fence has a 2' L damaged section.	
Lighting	5		Base of light pole on the north sidewalk over Pier 5 is broken.	
Wearing Surface	5	2	2’ L x 3’ W spalling patch.	
Wearing Surface	5	3	Two (2) 1’ Diameter spalling patches.	
Wearing Surface	5	4	Intermittent spalling along either side of joint over Pier 5 for full width of bridge up to 1/2” D.	
Wearing Surface	5	5	3’ Diameter spalling patch.	
Wearing Surface	5	8	Intermittent spalling along either side of joint over west side of Pier 6 joint in the travel lanes up to 1/2” D.	

Deck Notes				
Unit	**Span**	**Drawing Note**	**Note**	**Photo**
Upper Deck	7		Panel 4, Center Bay; local area of efflorescence on deck underside.	15
Wearing Surface	7	10	15’ L x 8’ W deteriorating patch.	
Curb	7	11	2’ L x 8” W x 2” D spall in top edge of curb.	
Railing	7	12	South metal railing has damage over a 1’ Length.	
Wearing Surface	7	13	4’ x 4’ x 1” D spalling patch.	
Wearing Surface	8	14	5’ W x 4’ L x up to 2” D spalling patch.	
Wearing Surface	8	15	3’ L x 2’ W deteriorating patch.	
Wearing Surface	8	16	12’ L x 10’ W x 1” D spalling patch.	
Wearing Surface	8	17	8’ L x 4’ W x 1” D spalling patch.	
Wearing Surface	8	18	25’ L x 7’ x 3” D spalling patch with exposed reinforcing.	16
Wearing Surface	8	19	15’ L x 24’ W x up to 4” D spalling patch with exposed reinforcing.	
Wearing Surface	8	20	6’ W x 57’ L delaminated patch.	
Drainage	Pier 8		The South drain pipe catch basin is clogged.	
Wearing Surface	9	21	15’ L x 7’ W x up to 1” D spalling patch.	
Wearing Surface	9	23	5’ Diameter x up to 2” D spalling patch.	
Drainage	Pier 9		The South drain pipe catch basin is completely clogged and concrete frame is shifted to the west. North drain pipe catch basin is partially clogged.	
Wearing Surface		22	Intermittent spalling along either side of joint over west side of Pier 9 joint in the travel lanes up to 1/2” D.	
Wearing Surface		24	10’ L x 5’ W x up to 1” D spalling patch.	
Wearing Surface		25	2’ L x 3’ W x up to 1” D spalling patch.	
Wearing Surface	10	26	8’ L x 6” W spalling patch.	
Wearing Surface	11	27	Intermittent spalling along either side of joint over west side of Pier 10 joint in the travel lanes up to 1/2” D.	

Deck Notes				
Unit	**Span**	**Drawing Note**	**Note**	**Photo**
Lighting	11		The light pole base on the north sidewalk in Span 11 is broken	17
Wearing Surface	12	28	6’ x 6’ x 1” D spalling patch.	
Wearing Surface	12	29	3’ L x 6’ W x 1” D spalling patch.	
Wearing Surface	12	30	1’ L x 2’ W deteriorating patch.	
Sidewalk	12	31	2’ L x 7” W x 2” D spall in top edge of sidewalk.	
Wearing Surface	13	32	Intermittent spalling along either side of joint over Pier 12 joint in the travel lanes up to 1/2” D.	
Wearing Surface	13	33	Intermittent spalling along either side of joint over east abutment in the travel lanes up to 1/2” D.	
Upper Deck	18		South Bay, Panel 3; 2’ Diameter area of map cracking and efflorescence	

Item N59 – Superstructure (5, Fair Condition)

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

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

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

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

Concrete Superstructure

Item 27 – Concrete Arch (2, Fair Condition)
The concrete arches are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
8,040 LF	6,540 LF	1,475 LF	25 LF		1.30

The concrete arches typically exhibit cracking, spalls with and without exposed reinforcing, and

delaminations throughout. Some of the previous spalling has been repaired particularly over public areas and parking lots. The repairs appear to be sound. See the "Open Spandrel Arch and Truss Spans CADD Drawings and Deficiencies" section showing all concrete arch deficiencies (Photos 18- through 20).

Item 28 – Concrete Arch Columns/Hanger (2, Fair Condition)
The concrete arch columns are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
747 EA	672 EA	50 EA	25 EA		1.54

The concrete arch columns exhibit up to full height corner cracking and up to full height shallow spalls with exposed reinforcing steel. Previously patched columns exhibit delaminated areas adjacent to the patched concrete. Concrete arches connecting the columns just below the upper deck exhibit spalls with exposed reinforcing steel, cracks, and delaminated areas. See the "Open Spandrel Arch and Truss Spans CADD Drawings and Deficiencies" section showing all the concrete arch column deficiencies (Photos 21 and 22).

Item 15.1 Beams - Concrete (3, Poor Condition)
The beams are in overall ***Poor*** condition. This element consists of the longitudinal beams in the Detroit Tunnel, West 25th Street Tunnel, and West Station.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
7,394 LF	3,698 LF	1,848 LF	1,848 LF		2.56

The concrete beams in the West Station, Detroit Tunnel, and West 25th Street Tunnel are in poor condition due to extensive spalling with and without exposed reinforcing, delaminations, and efflorescence. The previous report mentioned these spalls were to be repaired at the conclusion of the current rehabilitation in Spring 2016, however these spalls still exist. See the attached drawings showing all the concrete beam deficiencies.

Item 18 – Floorbeams - Concrete (2, Fair Condition)
The floorbeams are in overall ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
33,543 LF	10,000 LF	16,543 LF	7,000 LF		2.48

The concrete floorbeams in Spans 1A, 1B, 1 through 3, and Spans 5 through 13 are in ***Satisfactory*** condition. The floorbeams exhibit isolated spalls with exposed reinforcing, cracking, and delaminations. See the "Open Spandrel Arch and Truss Spans CADD Drawings and Deficiencies" section for the concrete floorbeam deficiencies (Photos 23 through 25).

The lower deck floorbeams in the East Station have the bottom mat of reinforcing steel exposed. This deterioration has changed little since the 1980's and with no live load carried by these floorbeams, no repairs are recommended.

The lower deck corbels appear to be architectural elements however they are actually cantilevered ends to the floor beams, directly supporting the exterior upper deck column loads above. Many of the corbels were patched or replaced in the 1995 and 2014 rehabilitations. Additional cracks, delaminations, and spalls are present on multiple lower deck corbels due to the corrosion of the compressive diagonal reinforcing steel in the corbel.

Steel Superstructure (Span 4)

The load bearing components (web plates and flange angles) of the primary truss members and gusset plates are composed of nickel steel, an early high strength steel also known for its corrosion resistant properties (Photos 26 and 27). The original hangers, composed of nickel steel, were replaced with 50 ksi steel. All lacing member components of the primary truss members, upper and lower deck floorbeams, lateral and longitudinal bracing and sway bracing are composed of 30 ksi carbon steel.

Item 17 – Stringers (1, Good Condition)
The stringers are in ***Good*** condition. All of the upper deck stringers have shear studs welded to the top flange providing composite action with the deck. The upper and lower deck stringers in Panels 4, 5, 5', and 4' were replaced in 1995.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
10,638 LF	10,615 LF	1 LF	2 LF	20 LF	1.10

The upper deck stringers are in good condition. The original curb stringers of Lines 5 and 14 exhibit light pitting on the bottom flanges. The stringers supporting the outer pedestrian fiber glass grid deck are also in good condition.

The lower deck stringers supporting the steel grid deck are in good condition. Lower deck stringers supporting only their own dead weight often exhibit advanced corrosion at the saddle bearings.

Item 18 – Floorbeams - Steel (1, Good Condition)
The steel floorbeams in Span 4 are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
3,925 LF	3,871 LF	2 LF	10 LF	42 LF	1.52

Random upper deck floorbeams have painted over perforations at the ends, some of which have repair plates welded in place. See attached deficiencies table and drawings for specific locations.

The lower deck floorbeams exhibit light active corrosion below the truss lines. Knife edging on lower deck Floorbeams 5 and 5' was cleaned and painted during the 1995 rehabilitation.

Item 19 – Truss Verticals (1, Good Condition)
The truss verticals are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
50 EA	38 EA	12 EA			1.32

Local perforations are present on diaphragm plates located between the upper and lower decks and minor corrosion of the lacing bars below the lower deck.

Item 20 – Truss Diagonals (1, 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 EA	253 EA	4 EA	11 EA		1.57

The truss diagonal stay plates below the lower deck exhibit minor pitting. Random lacing bars above the upper deck exhibit painted over corrosion holes.

Item 21 – Truss Upper Chord (1, 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
48 EA	47 EA			1 EA	1.83

The truss upper chord members exhibit isolated rust staining with negligible section loss. North U12U11' exhibits pack rust between the hinge cover plate and the truss top flange resulting in a 1/8-inch Diameter corrosion hole in the cover plate.

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

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
48 EA	36 EA	12 EA			1.33

Item 23 – Truss Gusset Plates (2, Fair Condition)
The truss gusset plates are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
104 EA	75 EA	25 EA	4 EA		1.74

The lower chord gusset plates exhibit minor corrosion above the top of the lower chord members. The south face of the south gusset plate at North L2 and both gusset plates at L3 exhibit pitting up to 1/4-inch deep with reactivating corrosion along the interior face of the gusset plates above the lower chord. The rest of the gusset plates below the lower deck exhibit areas of surface corrosion on the interior faces of the gusset plates.

Item 24 – Lateral Bracing (1, Good Condition)
The lateral bracing is in ***Good*** condition with isolated areas of minor surface corrosion and pack rust below the lower deck.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
36 EA	30 EA		6 EA		2.29

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

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
28 EA	21 EA	2 EA	5 EA		2.35

Isolated perforations were noted at the connections to the truss vertical members below the lower deck.

Item 26 – Bearing Devices (2, Fair Condition)
The bearings are in ***Fair*** condition with surface corrosion noted on the interior faces of all four bearing castings.

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

The non-structural bearing pin cover plates exhibit cracks up to 7-inches long at L0 and L0' on both trusses. The north pin cover at L0 on the north truss has fallen off. Steel shot blasting material from the 1997 painting operation has accumulated within the casting chambers.

Item 30 – Protective Coating System (2, Fair Condition)

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

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
14,469 LF	12,869 LF	1,200 LF	400 LF		1.49

Areas of corrosion and failed paint are present on the main truss members below the lower deck. The structural steel between the upper and lower decks was repainted in 2014-2015 and is in very good condition. Blast material not contained during the 2014-2015 painting operation has accumulated on bracing and gusset connections. The top coat of the protective coating system above the upper deck has oxidized with minor rust staining.

Item 31 – Pins, Hangers and Hinges (1, Good Condition)
The pins, hangers and hinges are in ***Good*** condition with no significant deficiencies noted. Minor painted over pitting was noted on random eye-bars below the upper deck.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
30 EA	28 EA	2 EA			1.10

Item 32 – Fatigue Prone Details (1, Good Condition)
The fatigue prone details are in ***Good*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
14,469 LF	14,469 LF				1.00

Steel superstructure deficiencies and specific locations are in the following tables and attached drawings.

Span 4, North Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
	Lower Chord		L0-L5		L0-L5 uphill transverse angles have water and debris accumulation causing pitting and perforations of the diaphragm plates and transverse angles.	
1	Vertical		L0-U0	U0	Stiffener plate between the north and south gusset plates at U0 has a 1” Diameter painted corrosion hole with surrounding 3/16” D painted over pitting.	

Span 4, North Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
1	Floorbeam	UD	FB0		Painted over section loss to the north knee brace for the upper deck floorbeam.	
2	Floorbeam	LD	FB1		Painted over 10% section loss to the top and bottom east flanges of the lower deck floorbeam.	
3	Vertical		L0-U0		Full height of vertical has peeling paint and flowering rivets due to leaking joint.	
4	Bearings			L0	North decorative pin plate cover is not present.	
5	Diagonal		U0-L1		Reactivating corrosion along lacing bars/channel webs due to leaking joint.	
6	Vertical		L1-U1		Reactivated laminar corrosion along full height of vertical at lacing bar connections, lower deck and lower strut connections.	
7	Lowe Chord		L0-L1	L1	The strut at L1 bottom west angle leg has a 1" L x 4" H corrosion hole at the gusset plate connection to the truss.	
8	Gusset Plate			L2	North gusset plate exhibits 2' L x 3" H x up to 1/8" D reactivating pitting at the lower chord interface on the south face and 2' L x up to 3" H x up to 1/4" D pitting on the north face. The south gusset plate exhibits 30" L x up to 4" H x up to 3/8" D pitting on the south face with reactivating corrosion and 2' L x up to 3" H x up to 1/4" D pitting on the north face. Original plate 3/4" T.	28
9	Diagonal		U1-L2	L2	The lower batten plate has a 12" H x Full Width area of 100% section loss.	29
10	Floorbeam	LD	FB2		100% painted over corrosion hole to bottom batten plates at floorbeam connection to vertical.	
10	Gusset Plate		L2-L3	L3	South face of the south gusset plate has up to 1' H x 2" W x up to 3/16" D painted over pitting along the west edge of floorbeam connection angle. There is active laminar corrosion and pitting up to 3/16" D x 8" H along the lower chord interface of L2-L3. The north face of the	30

Span 4, North Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
					south gusset plate has a 6' L x up to 6" H area of active laminar corrosion.	
10	Floorbeam	LD		FB3	End 3’ L on both sides have up to 1/4” D painted over pitting on the webs and bottom flanges.	
11	Sway Bracing		L3-U3		Upper lateral bracing connections to vertical have reactivating corrosion and pack rust.	
12	Eyebar	LD		LD4	Bottom head of east eye bar has up to 3/16” D painted over pitting around the pin. Stiffening plates on floorbeam web exhibit up to 100% painted over corrosion holes, but the floorbeam web appears sound.	
13	Diagonal		U5-L6	L6	The south gusset plate at L6 has four bolts welded to the south face.	
13	Lower Chord		L5-L6	L6	The south top flange of the lower chord at L6 has reactivating corrosion.	
14	Upper chord		U8-U9	U8	Missing rivet in the top hip plate at U8.	
15	Floorbeam	UD		FB10	There is a 4” W x 1-1/8” H hole in the floorbeam web north of the first interior stringer from the panel point.	
16	Floorbeam	LD		FB10	3-3/4” L crack along the weld of stiffening plate welded to floorbeam top flange, east face of floorbeam.	
17	Upper Chord		U12-U11'	U12	Up to 5/8” T pack rust between hinge cover plate and truss top flange resulted in a 1/8" Diameter corrosion hole in the cover plate.	
18	Lower chord		L11-L12	L12	The north pin plate has a 1-5/8” gap between it and the north face of L11L12 lower chord. The south pin plate has a 1-7/8” gap between it and the south face of L11L12 lower chord.	
19	Floorbeam	UD		FB12	There is a 7-1/4” W x 4” H corrosion hole in the floorbeam web north of the first interior stringer from the panel point.	
20	Stringer	LD		FB12	The north connection angle for the second stringer from the south, on the	

Span 4, North Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
					west side of FB12 has a 4-1/2” H x 3-1/2” W area of 3/8” D pitting.	
21	Lower chord		L12-L11'	L11'	The west pin nut appears to be new with surface corrosion and no paint.	
22	Floorbeam	UD		FB11'	There is a 3-1/2” W x 2-1/2” H hole in the floorbeam web north of the first interior stringer from the panel point.	
23	Floorbeam	LD		FB11'	2-7/8” crack along weld of stiffening plate welded to floorbeam top flange, east face of floorbeam.	
24	Floorbeam	UD		FB10'	There is a 7” W x 2-1/4” H and a 4-1/4” Diameter corrosion hole in the floorbeam web north of the first interior stringer from the panel point.	31
25	Floorbeam	LD		LD10'	3-5/16” L crack along weld of stiffening plate welded to floorbeam top flange, west face of floorbeam.	
26	Floorbeam	UD		FB8'	There is a 5-1/2” W x 11-1/2” H corrosion hole in the floorbeam web north of the first interior stringer from the panel point.	32
27	Vertical		L7'-U7'	L7'	Moderate painted over pitting on both faces of vertical L7’-U7’ and along the top flange of the floorbeam. Reinforcement plates have been added, but also exhibit painted over losses.	
27	Floorbeam	LD		FB7'	2’ H X 2’ W area of average 1/4” D painted pitting with two corrosion holes in the web of the floorbeam between the strut and stringer, west face.	
28	Diagonal		L6’-U5’	L6'	The south gusset plate at L6’ has four bolts welded to the south face.	
29	Floorbeam	UD		FB6'	Up to 1/8” D pitting on the eyebar face around the lower portion of the pin. There is a 6-1/2” L x 1-1/2” H corrosion hole in the floorbeam web north of the first interior stringer from the panel point.	
30	Floorbeam	LD		FB6'	Cracked perimeter along weld of stiffening plate welded to floorbeam top flange, west face of floorbeam.	
	Lower Chord		L5'-L0'		L5'-L0' uphill transverse angles have water and debris accumulation causing	

Span 4, North Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
					pitting and corrosion holes of the diaphragm plates and transverse angles.	
31	Gusset Plate	UD		UD5'	The vertical gusset plates at the lower chord to lower vertical connection has four plug welds on each plate.	
32	Diagonal		L5'-U4'	L5'	The baton plate on the underside of L5'U4' at L5' has a 1" Diameter painted over corrosion hole.	
33	Lower Chord		L5'-L4'	L4'	Areas of reactivated surface corrosion on the truss lower chord components.	
33	Floorbeam	UD		FB4'	Corrosion holes in the web below the upper deck lateral bracing gusset plate.	
33	Diagonal		L4'-U3'	L4'	Typical areas of painted over pitting and isolated corrosion holes throughout the lower 2' of the diagonal and lower baton plates.	
34	Vertical		L4'-U4'	LD4'	Typical areas of painted over pitting within the vertical web plates at the eyebar connection.	
35	Floorbeam	LD		FB4'	There are numerous painted over corrosion holes within the bottom flange of the floorbeam adjacent the sway bracing connection. Areas of reactivated surface corrosion were noted throughout the top and bottom flanges. The sway bracing on the east side also exhibits reactivated surface corrosion in the end 6'.	
36	Stringer	LD		LD3'	The stringer to floorbeam bearing on the west side of the floorbeam exhibits painted over pack rust, missing anchor bolt and corrosion holes. Typical on both stringers on each side of the vertical connection. This note is typical at the south truss. The north stringer to the south truss vibrates under live load due to 100% section loss of the bottom flange. There is no connection of the stringer to the bearing assembly.	
36	Sway Bracing	LD		LD3'	The majority of the original steel components at the lower deck	

Span 4, North Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
					connection above L3' exhibit areas of painted over pitting with corrosion holes and knife edging.	
36	Diagonal		U4'-L3'	L3'	Typical areas of painted over pitting and isolated corrosion holes along lower 2' of the diagonal and lower baton plates.	
36	Floorbeam	LD		FB3'	The floorbeam cantilever exhibits an area of painted over pitting and a 1/2" Diameter hole adjacent the vertical connection.	
37	Lower Chord		L3'-L2'		The diaphragm plate in the middle of the lower chord has a 6" diameter corrosion hole and moderate surface corrosion full height.	33
38	Vertical		L2'-U2'	U2'	Northeast flange at U2'; missing two rivets.	
39	Diagonal		L2'-U1'	L2'	Two lacing bars are missing and/or broken due to section loss.	
40	Diagonal		L1'-U0'		One lacing bar has 100% section loss with two others having 1-2" Diameter corrosion holes at the flange connections. Lower batten plates for the diagonal exhibits up to 100% section loss along the lower 12'. Baton plate below the deck upper strut exhibits two 12" L x up to 3" W corrosion holes.	
41	Floorbeam	LD		FB0'	The lower deck floorbeam also exhibits typical painted over pitting up to 1/8" D with 100% section loss to the west bottom flange of the cantilevered portion.	
42	Bearings		L0'		Cracks up to 7" L on the non-structural bearing pin cover plates at L0' on both trusses.	

Span 4, South Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
	Lower Chord		L0-L5		L0-L5 uphill transverse angles have water and debris accumulation causing pitting and perforations of the diaphragm plates and transverse angles.	
1	Floorbeam	UD		U0	Exterior and interior west knee brace has an 18” L x up to 4” W area of painted over corrosion holes. The west web plates also have up to 18” H x 12” W L-shaped painted over corrosion holes in the upper corners.	
1	Vertical	UD	L0-U0	U0	Top two lacing bars have up to 100% painted over section loss and are completely severed.	
1	Diagonal	UD	U0-L1	U0	Full length flaking paint with laminar corrosion throughout. The top face top batten plate has a 14” L x 3” W corrosion hole.	
2	Floorbeam	LD	FB0		End 3’ of the web has painted over corrosion holes.	
3	Bearings			L0	L0 inboard pin plate has a 5-3/4” L crack with a 4-3/4” L crack that propagates off of the other crack that extends to the end of the plate. The outboard pin plate has a vertical 7” L crack extending upward from the nut and a 1-1/2” L vertical crack that extending downward from the nut.	34
4	Lower Chord		L0-L1		The second top transverse lacing channel from L0 has a 5” H x 3/4” W and a 1/2” Diameter corrosion hole. The fourth lacing channel from L0 has a 6” L x 2” W corrosion hole.	
4	Lower Chord		L0-L1		Sheared bolt on top lacing channel connection along the top flange. There is also a fractured bolt in the end of the batten plate.	35
5	Gusset Plate	LD	L1-U1	L1	Gusset plate - exterior and interior gusset plates below the horizontal member have painted over pitting with corrosion holes.	
6	Lower Chord		L0-L1	L1	Four corrosion holes in diaphragm for L0-L1 south truss near L1.	
6	Gusset		L1-L3	L1, L2,	Gusset plate - East face fill plate between	

Span 4, South Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
	Plate			L3	gusset plates has corrosion holes, some of which are painted over.	
	Lower Chord		L0-L5		Uphill transverse angles have water and debris causing pitting and perforations of the diaphragm plates and transverse angles.	
7	Lower Chord		L1-L2		Bottom face channel lacing have 100% section loss to the vertical legs adjacent to the lower chord web plates.	
8	Gusset Plate			L2	Gusset Plate - L2 north gusset plate above L2-L3 exhibits 2' L x 2” H x up to 1/8" D pitting on the south face and 1’ L x up to 2" H x up to 1/8” D pitting on the north face with reactivating laminar corrosion. L2 south gusset plate above L2-L3 exhibits 30" L x up to 3” H x up to 1/4” D pitting on the south face with reactivating corrosion and 2' L x up to 2” H x up to 1/8" D pitting on the north face. Original plate is 3/4" T.	
8	Floorbeam			L2	The south diagonal floorbeam support has a 7” H x 7” W area of holes in the web near the L2 connection.	
9	Stringer	LD		FB3	Second stringer from the south, east face of LDFB3 has a 12” L x 3” H area of painted over pitting with a 6” L x 3” H corrosion hole in the bottom of the web. The north bottom flange has a 10” L x 4” W corrosion hole at the end.	
9	Floorbeam	LD		FB3	The east face bottom flange at the L3 connection has a 10” L x 4” W hole.	
10	Eyebar	LD		LD4	UD4-LD4 east eyebar has up to 1/4” D painted over pitting along the south half of the pin nut for 2” W.	
11	Vertical	LD	LD9-UD9	LD9	LD9 has painted over corrosion holes above the floorbeam top flange.	
12	Lower Chord		L9-U9	L9	The south and north fill plate at L9 has a full height x 10" L area of 100% painted over section loss.	
13	Stringer	LD		LD10	Second stringer from the south, west and east face of FB10 has a 12” L x 2” W	

Span 4, South Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
					painted over hole at the end of both south and north top flanges.	
14	Stringer	LD		LD11	Second stringer from the south, west face of FB11 has a 12” L x 3” W painted over corrosion hole at the end of both south and north top flanges.	
15	Upper Chord		U11-U12	U12	The top plate at U12 has up to 3/4" T pack rust between it and the upper chord. The plate on the south face of the upper chord at U12 is bent outward up to 3-7/8" with the bottom angle having 50% section loss. The inside of the south web at U12 has 12" L x 4" H x 1/8" D pitting.	
16	Lower Chord		L11-L12	L12	The south pin plate at L12 is bent outward 2" due to pack rust. The north pin plate at L12 is bent 3/4" outward due to pack rust.	
17	Vertical	LD	LD12-UD12	LD12	LD12 has painted over corrosion holes above the floorbeam top flange.	
17	Stringer	LD		LD12	Second stringer from the south, west and east face of FB12 has a 12” L x 1” W painted over corrosion hole at the end of both south and north top flanges.	
18	Stringer	LD		LD11'	Third stringer from the south, east face of FB11'; 12” L x 2” W painted over corrosion hole at the end of the south and north top flanges.	
18	Stringer	LD		LS11'	Second stringer from the south, west face of FB11' has a 12” L x 3” W painted over corrosion hole at the end of both south and north top flanges.	
18	Stringer	LD		LD11'	The south stringer, east face of FB11' has a 12” L x 2” H area of pitting with a 2” Diameter corrosion hole.	
19	Stringer	LD		LD10'	Second stringer from the south at FB10' has a 12” L x 2” W painted over corrosion hole at the end of both south and north top flanges.	
20	Stringer	LD		FB8'	Second stringer from the south, west face of FB8’ has a 6” L x 3” W painted over corrosion hole on the south top flange.	

Span 4, South Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
					The east face of FB8' has a 3” L x 1” W painted over corrosion hole on the north top flange.	
20	Stringer	LD		FB8'	2’ from east face of FB8’ south top flange has a 2” L x 1” W painted over corrosion hole	
21	Upper Chord		U9'-U8'	U8'	There is a missing rivet at U8' on the north lower angle.	
22	Stringer	LD		FB7'	Second stringer from the south, west and east face of FB7' has a 10” L x 1” W painted over corrosion hole on both north and south top flanges. Third stringer from the south, east face of FB7' has a 12” L x 1” W painted over corrosion hole on the north and south top flange.	
23	Upper Chord		U6'-U5'	U5'	The bracing gusset plate at U5' us bent upward and has a 1" L tear.	
	Lower Chord		L5'-L0'		L5'-L0' uphill transverse angles have water and debris accumulation causing pitting and perforations of the diaphragm plates and transverse angles.	
24	Eyebar	UD		UD5'	The eyebar heads exhibits painted over pitting around the full perimeter of the pin nut.	
25	Stringer	LD		LD3'	The stringer to floorbeam bearing on the west side of the floorbeam exhibits painted over pack rust, missing anchor bolt and corrosion holes. Typical condition to both stringers on each side of the vertical connection. This note is typical at the south truss. The north stringer to the south truss vibrates under live load due to 100% section loss of the bottom flange. There is no connection of the stringer to the bearing assembly.	
25	Bracing	LD		LD3'	Typical corrosion holes along the bottom 6” portions of vertical bracing connections to floorbeam flanges at the vertical connection	
25	Bracing	LD		LD3'	The lower deck bracing connection to the arch strut at LD3’ has up to 4” of pack	

Span 4, South Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
					rust to the upper connection.	
25	Sway Bracing	LD		LD3'	The majority of the original steel components at the lower deck connection above L3' exhibit areas of painted over pitting with corrosion holes and knife edging.	
26	Diagonal		L3'-U2'		Moderate surface corrosion at the upper deck opening.	
27	Lower Chord		L3'-L2'		3" Diameter hole in the channel lacing bar of the lower chord.	
28	Vertical		L2'-U2'	L2'	Moderate surface corrosion to components below the lower deck with minor pack rust typical between lacing bars. There are a number of replaced lacing bars at the Lower deck connection to the vertical. Areas throughout the lower floorbeam connection have painted over pitting and missing batten plates and/or holes.	
28	Diagonal		L2'-U1'	L2'	The lower batten plate for the diagonal exhibits up to 100% section loss along the lower 12". The upper batten plate is almost 100% gone and there are four lacing bars with holes up to 2" Diameter.	
29	Vertical		L2'-U2'		Moderate pack rust and surface corrosion on the lacing bars with up to 20% section loss on the lacing bars. Isolated areas of up to 1/4" T pack rust typical at the bracing gusset connections to the vertical.	
30	Lower Chord		L2'-L1'		Typical minor surface corrosion with isolated corrosion holes noted throughout the lower chord diaphragm plates	
31	Diagonal		L1'-U0'	L1'	Lower batten plate for the diagonal exhibits up to 100% section loss along the lower 12'. The lower two lacing bars exhibit up to 75% section loss at the connections to the flanges and one has a 2" Diameter hole.	
32	Lower Chord		L1'-L0'		Typical minor surface corrosion with isolated corrosion holes noted throughout	

Span 4, South Truss Deficiencies						
Drawing Note	**Member Type**	**Upper/ Lower Deck**	**Member**	**Location**	**Deficiency**	**Photo**
					the lower chord diaphragm plates	
33	Vertical		L0'-U0'		Moderate surface corrosion with minor pack rust typical between lacing bars.	
34	Bearings		L0'		Cracks up to 7" L on the non-structural bearing pin cover plates at L0' on both trusses.	

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 (2, Fair Condition)
The abutment walls are in ***Satisfactory*** condition. The abutment walls consist of the West and East Abutments and the walls of the Detroit Avenue and West 25th Street Tunnels (Photos 36 through 39).

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
3459 LF	1689 LF	1600 LF	170 LF		1.97

The abutments exhibit map cracking throughout with minor moisture staining. Some staining appears to be superficial due to leaking deck joints above.

At the east end, the tunnel continues to the east and is flooded with water. The pedestrian stairwell along the south wall is visible, but holds water up to the second step from the top.

The West Abutment walls typically exhibit deep spalling and delaminations throughout with a 1/4” W vertical crack below the south exterior arch.

Item 36 – Pier Walls (2, Fair Condition)
The pier walls at Piers 1, 3 and 4 are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
200 LF	100 LF	50 LF	50 LF		2.56

The west face of Pier 1 is primarily covered by fill. The exposed portions of the pier walls exhibit map cracking with minor corrosion staining as well as graffiti.

The east face of Pier 3 is covered with painted murals which hides surface flaws. The areas around the murals exhibit map cracking with corrosion staining. The west face of Pier 3 also exhibits map cracking and corrosion staining throughout.

The west face of Pier 4 is on the edge of the Cuyahoga River with sloped fill along the north end. The bottom quarter of the pier exhibits map cracking. Near the water surface, the edge of the sealant was visible. An underwater inspection was not performed during this inspection. The west face of the pier wall is against higher fill while the exposed portion exhibits minor map cracking.

Item 38 – Pier Columns/Bents (2, Fair Condition)
The pier columns are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
40 EA	25 EA	5 EA	10 EA		2.53

The reinforced concrete pier columns exhibit map cracking with moisture staining throughout. Below leaking joints or faulty downspouts, superficial staining it common on the surfaces as well. See “Open Spandrel Arch and Truss Spans CADD Drawings and Deficiencies” section showing all substructure deficiencies (Photos 38 and 40 through 45).

Deep spalling, up to 10” D with exposed reinforcement was noted throughout. Some of these instances exist over areas that are accessible to the public. The west station columns and arches have heavy deterioration with exposed reinforcing and efflorescence.

The South wall at Tower B, 5, 6, and 7 are all rotated to the south. Towers 5, 6, and 7 were measure from the inside face of the south exterior tower wall to the vertical concrete edge of the adjacent span on both the east and west side of the towers. Tower B was measured from the inside face of the south exterior tower wall to the south face of the tower core wall. The “Tower Wall Rotation Measurements” table below shows the measurements for each tower.

Tower Wall Rotation Measurements			
Tower	**East Measurement**	**West Measurement**	**Photo**
B	6”	5-2/16”	
5	14-11/16”	15-2/16”	44
6	16”	16”	
7	15”	14-13/16”	

Item 39 – Backwalls (1, 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

The abutment backwalls do not exist at the West and East Abutments due to the continuation of the tunnels. At the east tunnel, the backwall acts as a closure panel.

Item 40 – Wingwalls (3 Poor Condition)
The wingwalls are in ***Poor*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
12 EA			12 EA		3.00

The wingwalls along Spans 1A and 1B and the East Station exhibit cracking and spalling with exposed reinforcement throughout.

The south wall at Tower B continues to exhibit movement spanning over the past 10 years. The tower currently resides with an outward measurement of 4-3/4" at the lower deck level. On the interior, the top of the tower is spalled and cracked due to contact with the soffit of the upper level sidewalk.

Item 42 – Scour (1, 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 EA	2 EA				1.00

Item 43 – Slope Protection (1, Good Condition)
The concrete slope protection is in ***Good*** condition.

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

Substructure deficiencies and specific locations are noted in the following table:

Substructure Deficiencies				
Main Unit	**Secondary Unit**	**Item**	**Deficiency**	**Photo**
Substructure	Piers	All piers	The up-lighting brackets attached to the north and south faces of the piers are corroding.	41
Substructure	Abutment Walls	Tunnel Walls	Spalls with exposed reinforcing.	
Substructure	West Abutment	West Abutment	West Abutment below the southeast arch; there is a 1/4" W vertical crack. The southeast corner of the abutment is delaminated and breaking off.	39

Substructure Deficiencies				
Main Unit	**Secondary Unit**	**Item**	**Deficiency**	**Photo**
Substructure	Pier Columns/Bents	West Station	Numerous columns and arches far into the west stationing tunnel are in need of repair, most of the heavily deteriorated sections are marked.	38
Safety	Fencing	Safety	Fence that keeps area enclosed below Spans 1A, 1B, and 1 has an open gate allowing access at Pier 1.	
Approaches	Embankment	3	Sloped banks below Span 3.	
Substructure	Navigation Lights	4	Navigation lights are nonfunctional.	
Substructure	Per Column	Pier 5	North exterior column, southwest corner; 10' H x 6" D corner spall with exposed rebar.	43
Substructure	Pier Column	Pier 5	South exterior column, east face; 6' H x 4' W x 8" D spall with exposed rebar under bottom deck overhang.	
Substructure	Pier Column	Pier 6	South exterior column, south face; widespread spalling and delaminations throughout middle 1/3.	
Substructure	Pier Columns/Bents	Pier 6	South exterior lower deck shaft - deep scaling over the surface, fractured concrete at the interface with the lower deck corbels.	
Substructure	Pier Column	Pier 8	South exterior column, east face; 6' H x 3' W delamination above parked cars.	
Substructure	Pier Column	Pier 8	South exterior column, west face; 4' x 4' x 10" D under bottom deck overhang.	45
Substructure	Pier Column	Pier 10	South exterior column, west Face; 4' H x 2' W x 4" D spall with exposed rebar under bottom deck overhang.	
Substructure	South Tower	Tower B	Interior section at Tower B, south, is fractured at the interface with the upper deck.	42
Approaches	Embankment	Tower A/Span 1A	Heavy erosion up to 2' H around manhole basin with missing manhole cover at south side of Tower A and along south side of Span 1A.	

Channel (7, Good Condition)

The channel is in ***Good*** condition, or a 7 on the NBIS condition rating guidelines.

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

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

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

Item 52 – Protection (2, Fair Condition)
The channel protection is in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
200 LF		200 LF			2.00

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

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

Item 54 – Navigation Lights (2, Fair Condition)
The six (5) navigation lights are in ***Fair*** condition and were not functioning at the time of the inspection.

Item 6 – Approaches Summary (6, Satisfactory Condition)

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

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

Item 1 – Approach Wearing Surface (2, Fair Condition)
The approach wearing surfaces are in ***Fair*** condition.

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

The east and west approaches exhibit moderate map cracking throughout and the west approach exhibits isolated spalls.

Item 4 – Embankment (2, Fair Condition)
The approach embankments are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
4 EA	3 EA		1 EA		2.50

The embankment under Span 3 exhibits several slope depressions. This embankment was primarily loose soil placed over demolition debris. Beneath this fill is a concrete strut between piers 2 and 3 used as a means of structure stability during construction. This strut is preventing portions of the fill from sliding into the Cuyahoga River. This embankment is being monitored with slope inclinometers. Tower B is also being monitored due to its rotation to the south which is being monitored via crack gauges.

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

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
4 EA	3 EA	1 EA			1.33

There are minor scrapes and gouges due to impact along the concrete approach railings.

Utility Items

Item 56 – Utilities (2 Fair Condition)
The utilities are in ***Fair*** condition.

Total Quantity	CS 1	CS 2	CS 3	CS 4	Transition Rating
4,553 LF		4,553 LF			2.00

The lower deck telephone junction chamber in Spans 2 and 13 are severely corroded and lacking security due to salt water infiltration through the manhole above.

The lighting on the bridge is in fair condition. The upper deck architectural light pole bases on the north sidewalk in Spans 1 and 11 have cracked and are broken. All of the exterior pier shaft light brackets exhibit paint failure and corrosion with minor section loss present.

Architectural lighting was installed throughout the bridge in 1996 for the City of Cleveland.

Security Items

There are locations where the structure and structure right of way can be accessed by non-bridge personnel. Security fencing installed around Piers 2 and 3 can easily be surpassed by vagrants. The fence running from Tower A South to Pier 1 which encloses the land between Span 1 and along Spans 1A and 1B is accessible due to an unlocked gate on the southeast end of Pier 1. Due to the unlocked gate there are multiple homeless camps set up beneath the spans. Preventative access steel mesh installed outside Span 1A near Tower A to prevent access appears formidable, however, plastic steps located adjacent to this area indicate opportunities have been taken to gain access.

A chain link enclosure for the Center Street bridge operator's vehicle on the west side of Pier 4 allows vandals to climb the fencing cover to access the sway bracing. From here the vandals have vandalized Pier 4 and have access to the truss lower chord and lower deck.

West and East Abutment Chambers

The chambers below the west and east approach were inspected, however, are not included in any of the quantities within this report. Crack gauges are in place in a number of cells within the west chambers to monitor shifting. There are large spalls with exposed and corroded reinforcing on the walls and ceilings of most of the cells. Horizontal, vertical, diagonal and map cracking with efflorescence and moisture staining are also present throughout all cells. The floors are typically covered in dirt and construction debris. The "Open Spandrel Arch and Truss Spans CADD Drawings and Deficiencies" section shows all the deficiencies within the chambers (Photos 46 through 49).

The east abutment chambers typically have large spalls with exposed and corroded reinforcing and exposed reinforcing ties protruding from chamber walls. The floors are typically covered in dirt and construction debris. The "Open Spandrel Arch and Truss Spans CADD Drawings and Deficiencies" section shows all the deficiencies within the chambers (Photos 50 and 51).

Recommendations

The Veterans Memorial/Detroit-Superior Bridge over the Cuyahoga River is in overall Fair condition, or 5 on the NBIS rating guideline.

High:

- Pier 8 South exterior column; Remove loose concrete and repair spalled area

Immediate:

- Repair and clean areas of the deteriorated concrete deck
- Clean and Repair the drainage catch basins
- Repair areas of the deteriorated and leaking joints with dislodged joint materials
- Repair and clean areas of the deteriorated concrete arch superstructure
- Repair and clean areas of the deteriorated concrete stringer superstructure
- Repair and clean areas of the deteriorated concrete floor beam superstructure
- Repair and clean areas of the deteriorated steel superstructure
- Spot paint areas of the deteriorated steel components
- Repair and clean areas of the deteriorated substructure concrete
- Repair and/or replace the navigation lights
- Repair areas of the deteriorated approach wearing surfaces
- Repair the embankment in Span 3
- Secure all access points to the structure
- Drain water from the East Tunnels and stop the source of water infiltration so a full inspection can be completed

Deck Photos

Photo 1 – Typical lower deck soffit West Approach

Photo 2 – Typical upper deck soffit Span 2

Photo 3 – Typical upper deck soffit Span 4

Photo 4 – Typical upper deck wearing surface condition

Photo 5 – Typical bridge rail condition

Photo 6 – Typical expansion joint condition

Photo 7 – South top railing at Tower A; vertically misaligned 7/8” at railing joint

Photo 8 – West tunnels upper deck with heavy efflorescence, cracking, delaminations, and spalls with corroded reinforcing steel

Photo 9 – West Station wearing surface; heavy map cracking and patching throughout

Photo 10 – Tower B expansion joint, left westbound lane; pack rust has broken fillet welds. Snow plow damage is present.

Photo 11 – Pier 1 south downspout; missing 15’ section of PVC pipe

Photo 12 – Span 2, Panel 15 center bay; SIP forms exhibit severe corrosion that is staining the west face of Pier 2

Photo 13 – Span 3 south attenuator; minor impact damage

Photo 14 – East end of Span 4; deteriorating 12’ L x 18’ W x 1” D patch

Photo 15 – Upper Deck, Span 7, Panel 4 center bay; local area of efflorescence

Photo 16 – Span 8 eastbound lane; 25’ L x 7’ W x up to 3” D spalling patch with exposed reinforcing

Photo 17 – Span 11, north sidewalk; broken light pole base

Superstructure Photos

Photo 18 – Span 5 North Exterior Arch Rib, Panel 14; longitudinal through crack that has propagated into several spandrel columns

Photo 19 – Span 7 South Interior Arch Rib; lower north corner near apex has an unrepaired spall with exposed reinforcing

Photo 20 – Span 11 North Exterior Arch, south face; crack extending from Pier 11 up 1/4 length of the arch

Photo 21 – Span 2 North Exterior lower columns 3 and 4; south faces have up to full height spalling with corroded reinforcing

Photo 22 – Span 8 North Interior Upper Column 2; 4’ H x 4” D corner spall on the northeast corner of the column with exposed reinforcing

Photo 23 – Span 5 Upper Deck Floorbeam 11 west face between interior arches; Full Height x 3’ W x 4” D spall with exposed rebar

Photo 24 – Span 12, lower deck floorbeams; multiple floorbeams have spalled concrete with exposed, painted over reinforcing

Photo 25 – Span 3 North Interior Arch between upper deck Columns 10 & 11; arch is cracked and delaminated with efflorescence

Photo 26 – Typical superstructure condition

Photo 27 – Typical truss condition

Photo 28 – Span 4 North Truss L2 South Gusset, North Face; 2' L x up to 3" H x up to 1/4" D pitting with reactivating laminar corrosion

Photo 29 – Span 4 North Truss L2 lower batten plate; 20" L x Full Width corrosion hole

Photo 30 – Span 4 North Truss L3 south gusset above L2L3; Active laminar corrosion and pitting up to 3/16” D

Photo 31 – Span 4 Upper Deck Floorbeam 10’; web corrosion hole north of the first interior stringer from the panel point

Photo 32 – Span 4 Upper Deck Floorbeam 8'; corrosion hole below the upper deck lateral bracing gusset plate on the north arch

Photo 33 – Span 4 North Truss L3'L2' diaphragm; corrosion hole

Photo 34 – Span 4 South Truss L0 Inboard Pin Cover Plate; non-structural plate with two cracks

Photo 35 – Span 4 South Truss L0L1 near L0; fractured bolt on top lacing channel connection along top flange

Substructure Photos

Photo 36 – East Abutment typical condition

Photo 37 – West Abutment typical condition

Photo 38 – West 25th Street Columns and Arches; heavily deteriorated with exposed reinforcing and efflorescence

Photo 39 – West Abutment Below South Exterior Arch; 1/4" W vertical crack

Photo 40 – Pier, typical condition

Photo 41 –Typical architectural lighting brackets on pier are corroding

Photo 42 – Tower B South side; rotated outwards and fractured at the interface with the upper deck

Photo 43 – Pier 5 North Exterior Column; 10’ H x 6” D corner spall with exposed reinforcing

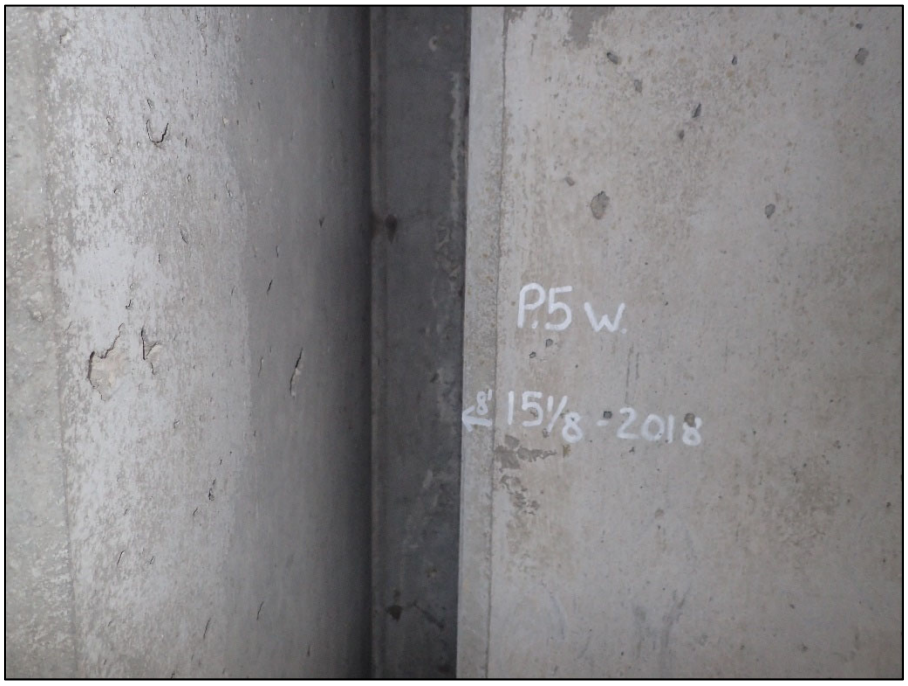


Photo 44 – Pier 5, west side of south wall; 15-2/16" measurement of tower rotation

Photo 45 – Pier 8 South Exterior Column, west Face; 4' H x 4' W x 10" D spall

West and East Abutment Chamber Photos

Photo 46 – West Abutment, Chamber 9S, south wall; 1-1/2" rotation towards the south

Photo 47 – West Abutment, Chamber 6S, west wall; crack gauge

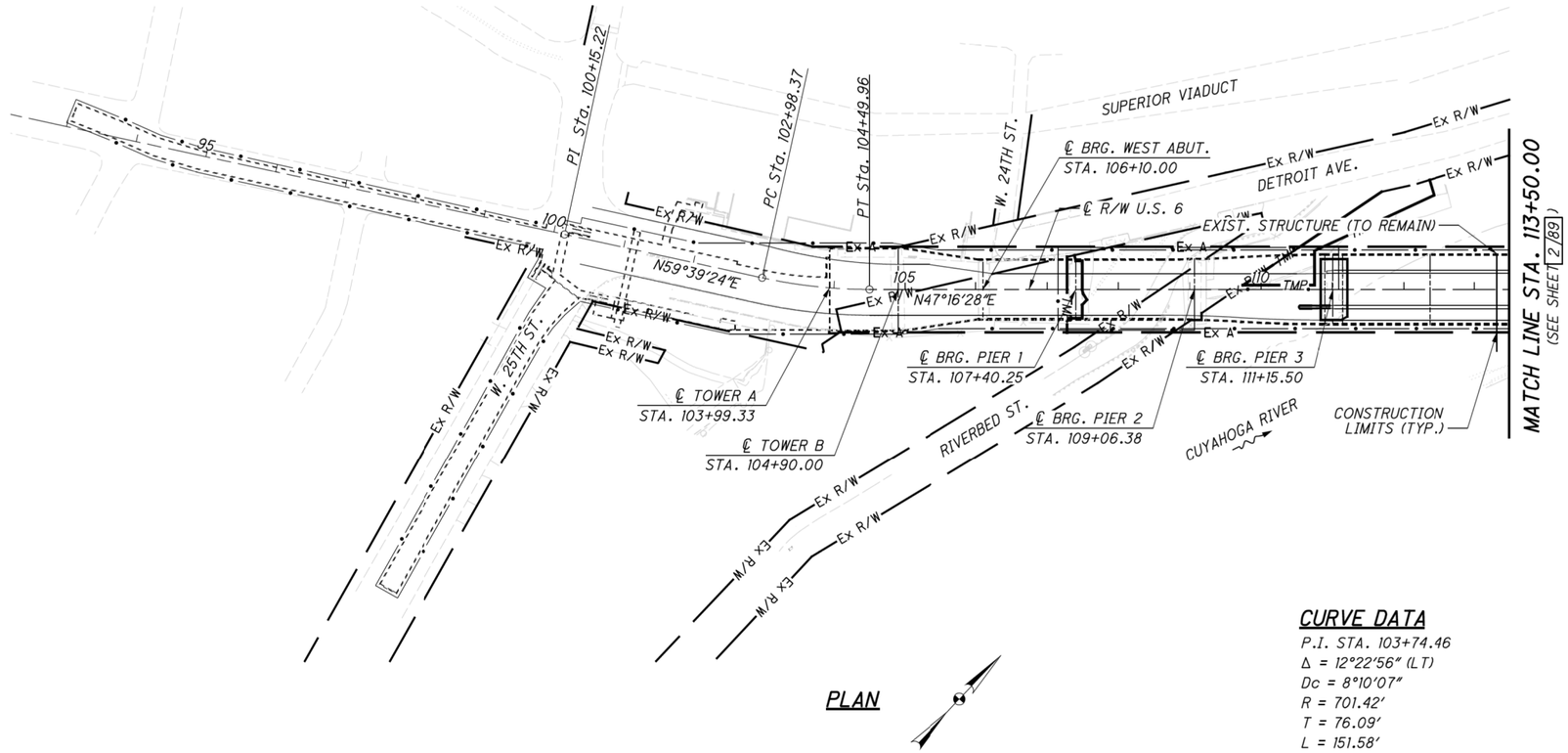
Photo 48 – West Abutment, Chamber 1S, ceiling; typical cracks with efflorescence and moisture

Photo 49 – West Abutment, Chamber 7, west wall; 4’ L x 20” H x 1” D spall with exposed reinforcing

Photo 50 – East Abutment, North Chamber ceiling; bottom of floor beam spalled full length with exposed reinforcing

Photo 51 – East Abutment, South Chamber, west wall; vertical spalls with exposed reinforcing

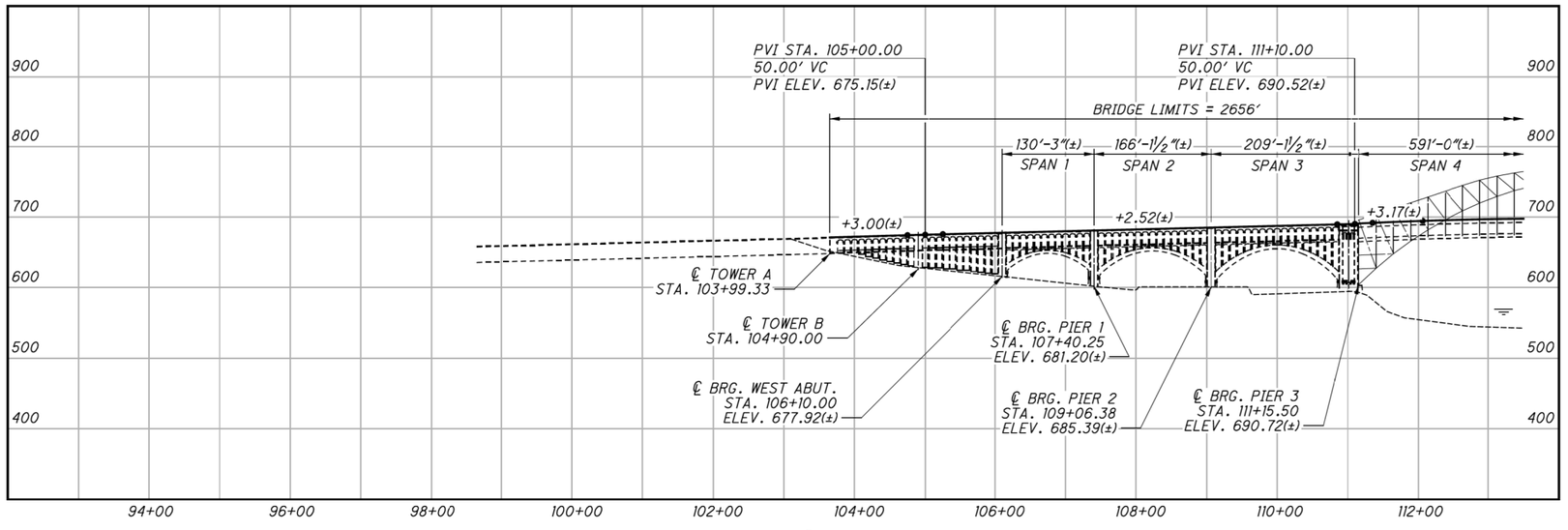
OPEN SPANDREL ARCH SPANS, TRUSS SPAN, AND DECK CADD DRAWINGS AND DEFICIENCIES



PLAN

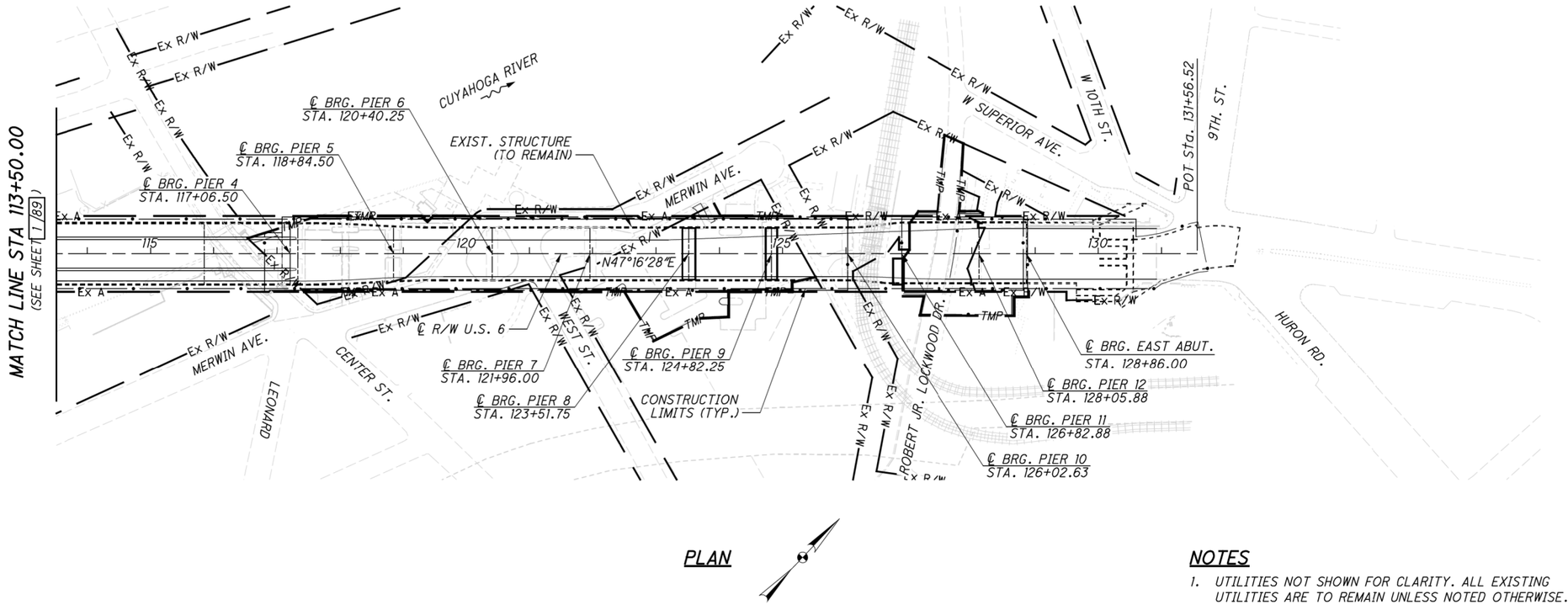
CURVE DATA

P.I. STA. 103+74.46
Δ = 12°22'56" (LT)
Dc = 8°10'07"
R = 701.42'
T = 76.09'
L = 151.58'
E = 4.11'
C = 151.29'
C.B. = N 53°27'56" E



PROFILE ALONG ℄ R/W U.S. 6

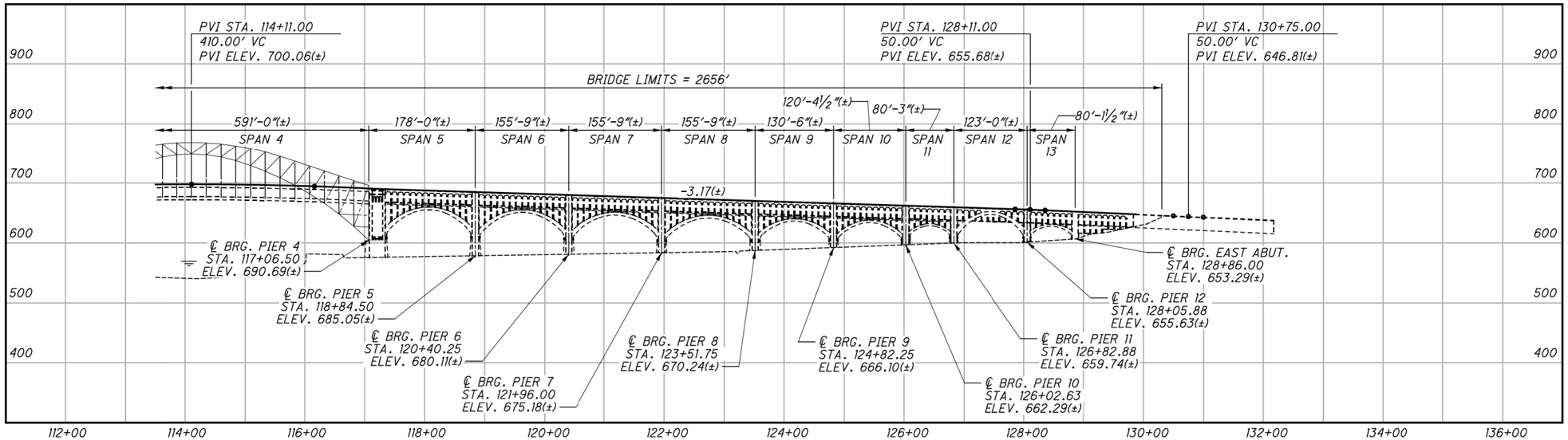
GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 GENERAL PLAN & ELEVATION PAGE A-1



PLAN

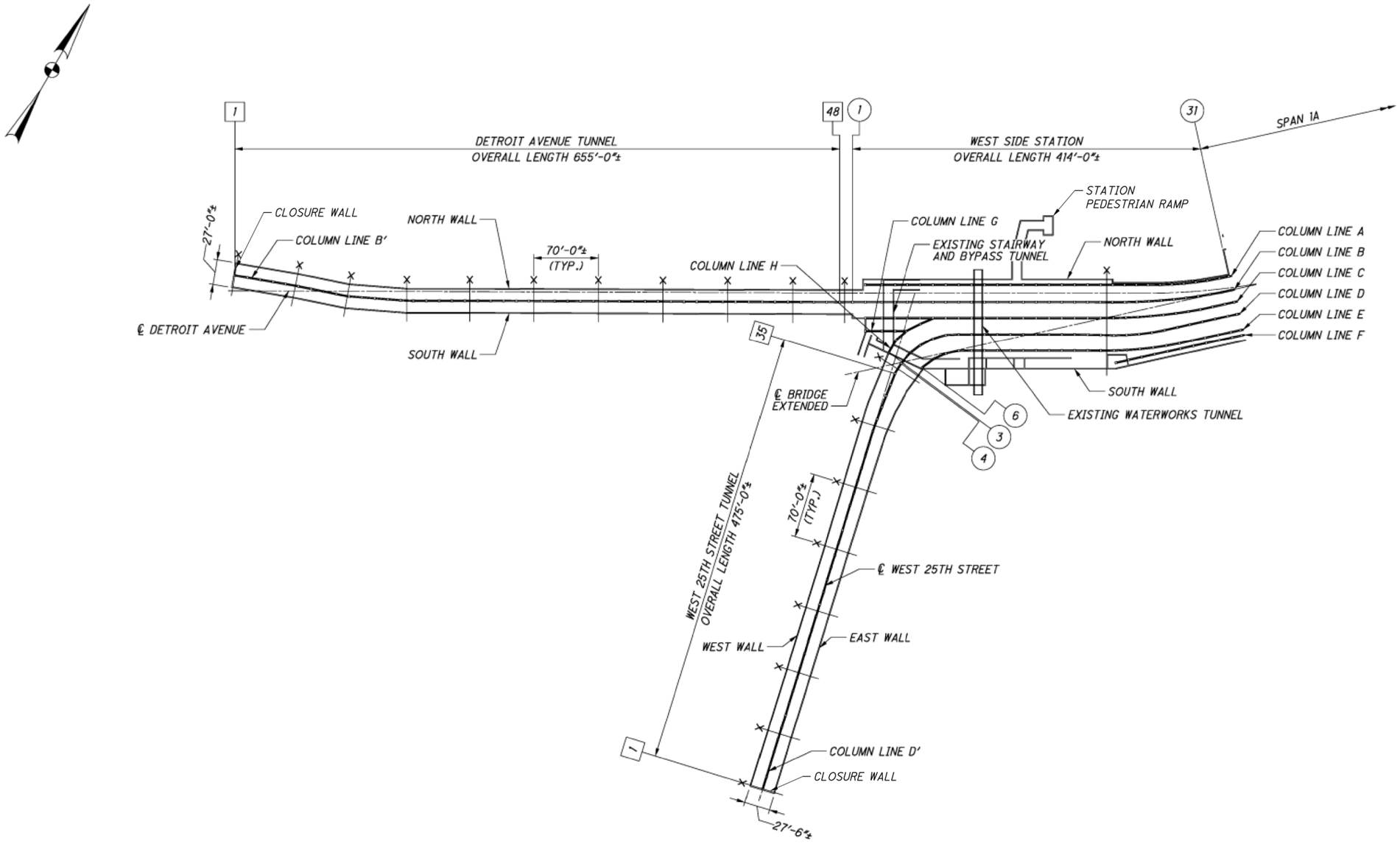
NOTES

1. UTILITIES NOT SHOWN FOR CLARITY. ALL EXISTING UTILITIES ARE TO REMAIN UNLESS NOTED OTHERWISE.



PROFILE ALONG ℄ R/W U.S. 6

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 GENERAL PLAN & ELEVATION PAGE A-2



PLAN

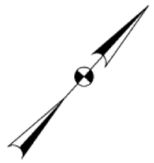
LEGEND:

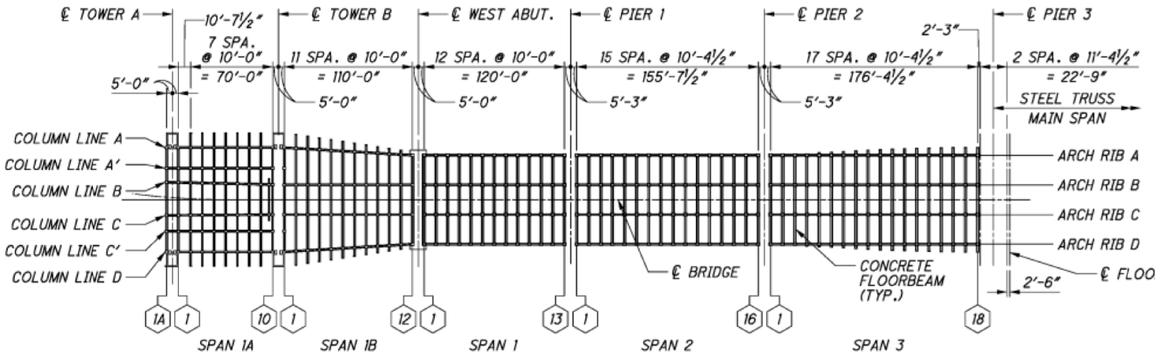
- [#] TUNNEL COLUMN NUMBER
- (#) WEST STATION COLUMN NUMBER
- CONSTRUCTION JOINT

NOTES:

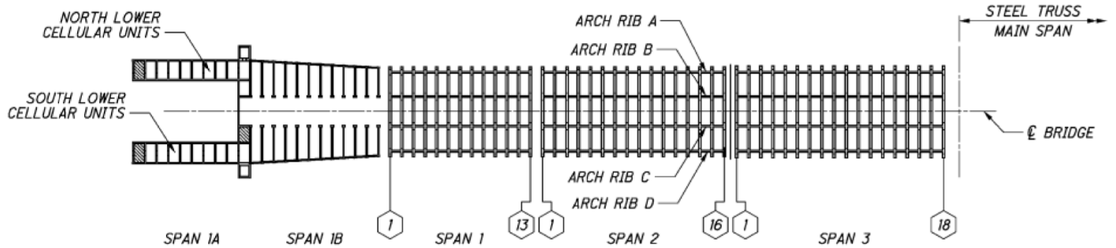
1. NO PROPOSED WORK SHOWN ON THIS SHEET.
2. FOR STRUCTURE GENERAL NOTES, SEE SHEETS [5/89] TO [9/89]
3. ALL DIMENSIONS ARE HORIZONTAL.

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	MEMBER IDENTIFICATION PLAN — PAGE A-3





UPPER DECK - WEST APPROACH



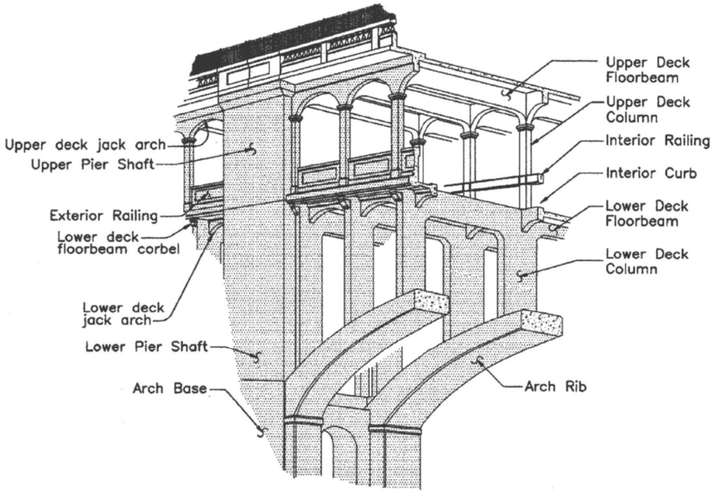
LOWER DECK - WEST APPROACH

LEGEND:

(#) FLOORBEAM LINE NUMBER & COLUMN LINE NUMBER

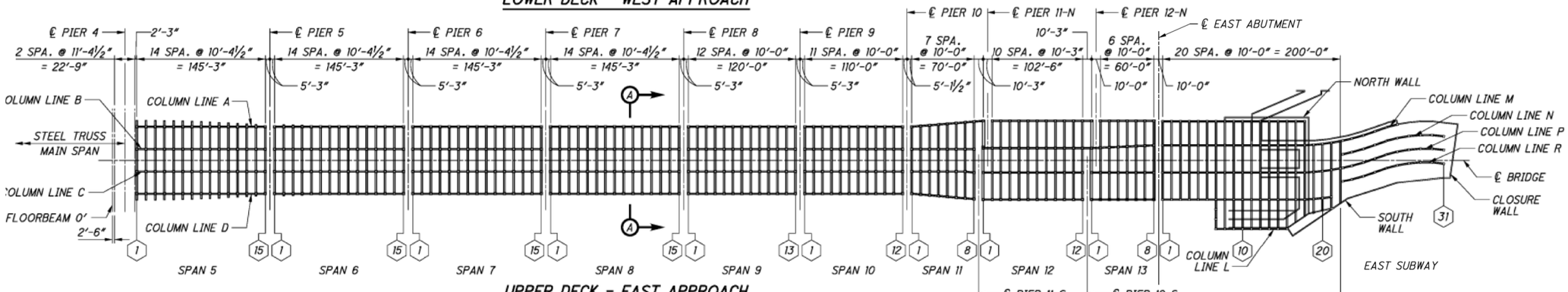
NOTES:

1. NO PROPOSED WORK SHOWN ON THIS SHEET.
2. FOR STRUCTURE GENERAL NOTES, SEE SHEETS 5/89 TO 9/89
3. ALL DIMENSIONS ARE HORIZONTAL AND (±).

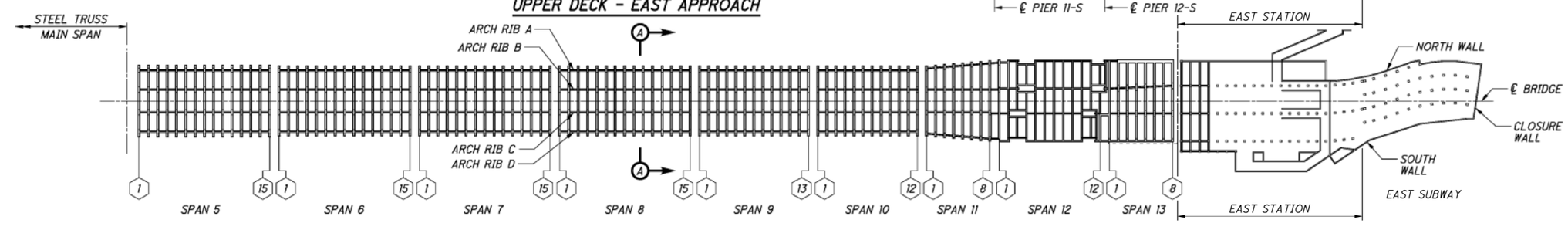


SECTION A-A

SHOWING UPPER & LOWER DECK ELEMENT NOMENCLATURE



UPPER DECK - EAST APPROACH



LOWER DECK - EAST APPROACH

PLAN

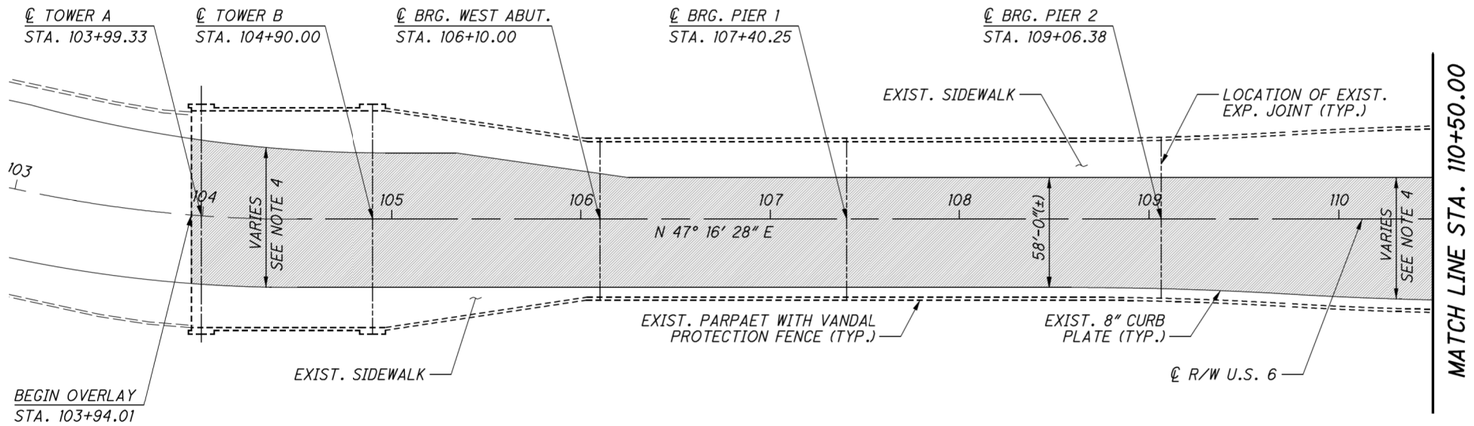
GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	MEMBER IDENTIFICATION PLAN — PAGE A-4

NOTES

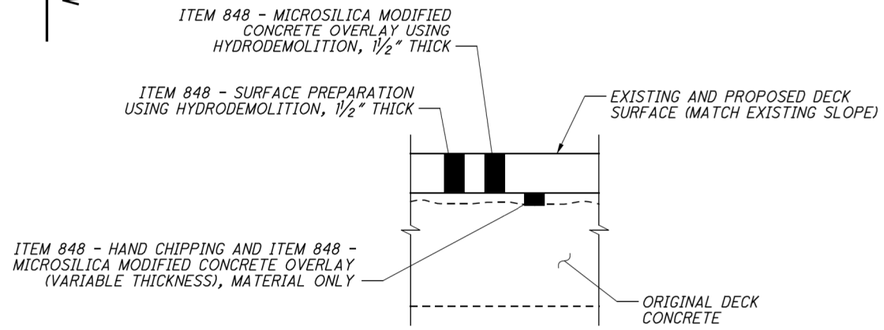
1. FINISHED TOP OF DECK ELEVATIONS SHALL MATCH EXISTING TOP OF DECK ELEVATIONS.
2. FOR ADDITIONAL DETAILS NOT SHOWN, SEE ODOT SUPPLEMENTAL SPECIFICATION 848.
3. FOR VARYING ROADWAY WIDTHS AND STATIONING, SEE TYPICAL SECTIONS ON SHEET 3 / 128 .

LEGEND

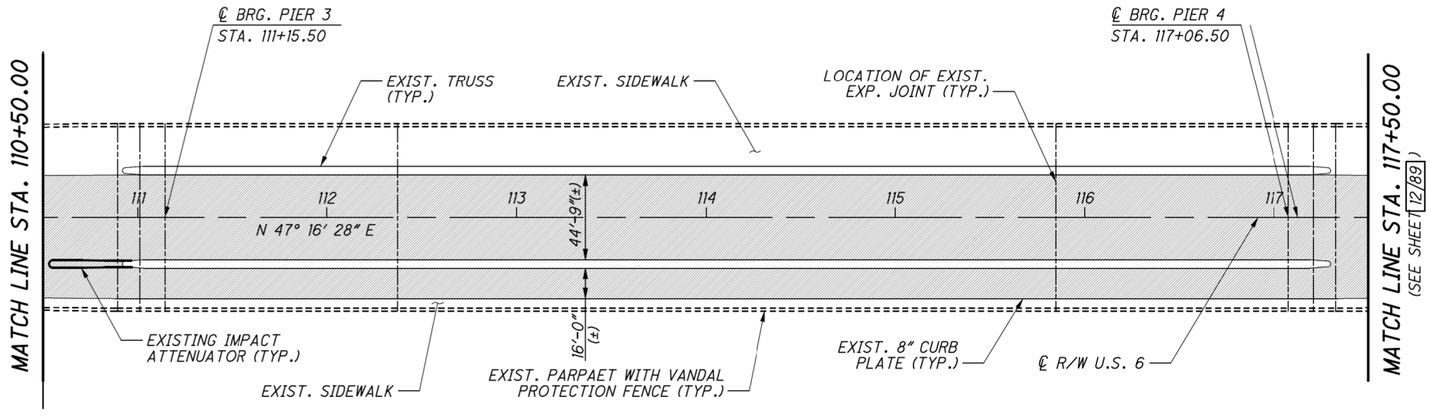
AREAS OF THE DECK TO HAVE EXISTING OVERLAY REMOVED AND REPLACED. FOR OVERLAY REMOVAL SEE NOTE 2. FOR MICRO SILICA MODIFIED CONCRETE OVERLAY SEE NOTE 3.



PLAN

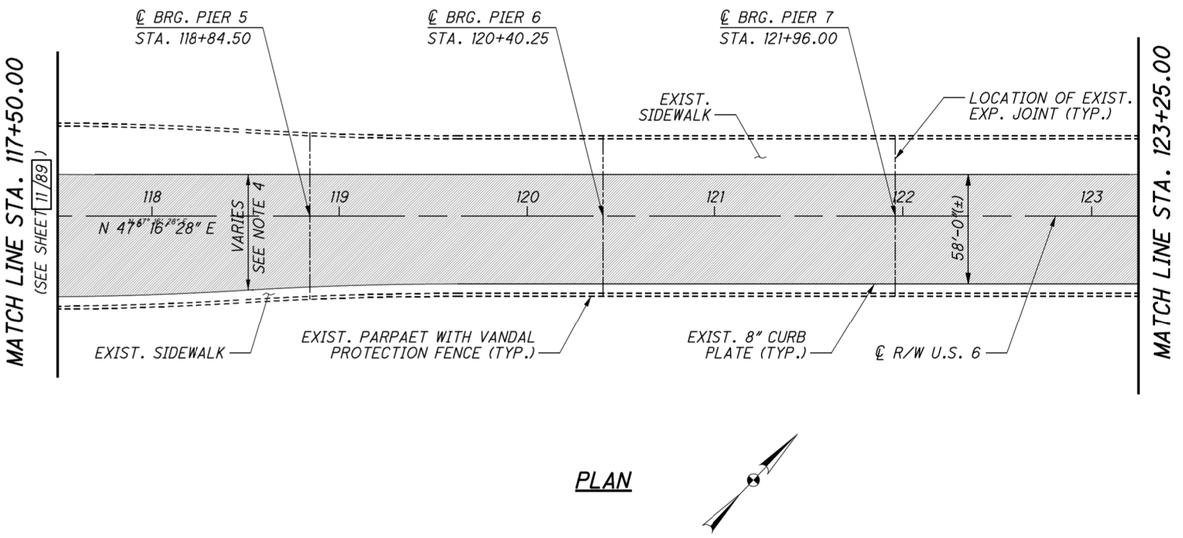


BRIDGE DECK WEARING SURFACE REPLACEMENT DETAIL



PLAN

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 UPPER DECK PLAN - 1 PAGE A-5



PLAN

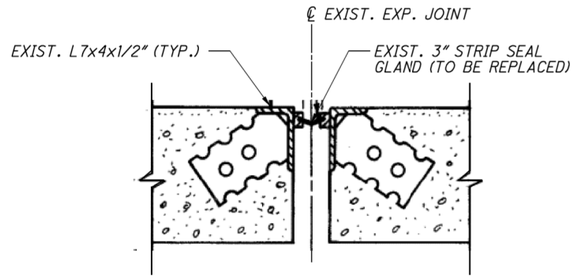
NOTES

1. FINISHED TOP OF DECK ELEVATIONS SHALL MATCH EXISTING TOP OF DECK ELEVATIONS.
2. FOR ADDITIONAL DETAILS NOT SHOWN, SEE ODOT SUPPLEMENTAL SPECIFICATION 848.
3. FOR VARYING ROADWAY WIDTHS AND STATIONING, SEE TYPICAL SECTIONS ON SHEET 3/128 .
4. FOR BRIDGE DECK WEARING SURFACE REPLACEMENT DETAIL, SEE SHEET 11/89 .
5. FOR ADDITIONAL STRIP SEAL EXPANSION JOINT DETAILS, SEE STANDARD DRAWING EXJ-4-87.

LEGEND

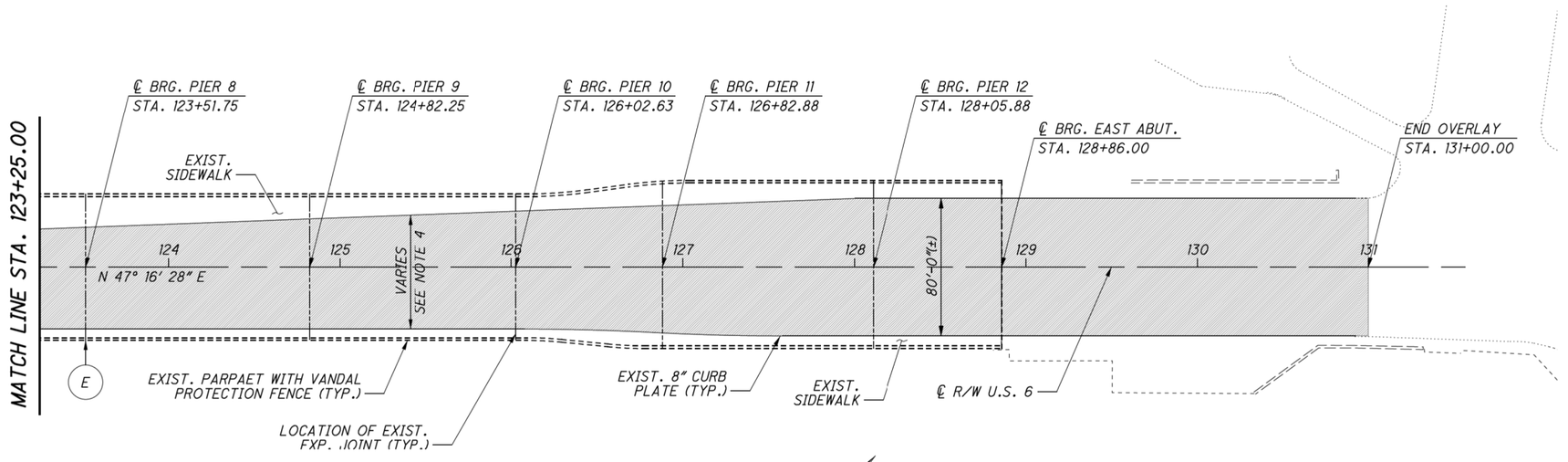
AREAS OF THE DECK TO HAVE EXISTING OVERLAY REMOVED AND REPLACED. FOR OVERLAY REMOVAL SEE NOTE 2. FOR MICRO SILICA MODIFIED CONCRETE OVERLAY SEE NOTE 3.

(E) REPLACE STRIP SEAL GLAND IN EXPANSION JOINT, SEE DETAIL ON THIS SHEET



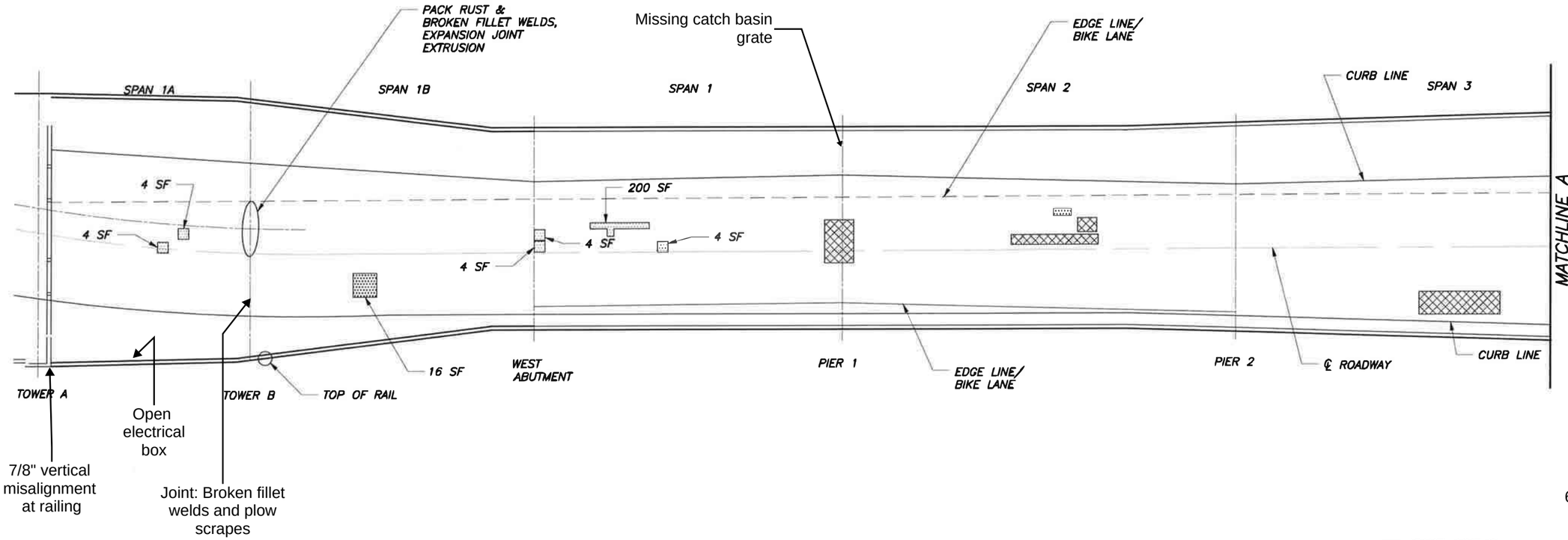
EXPANSION JOINT DETAIL

SEE NOTE 5
(NOT TO SCALE)



PLAN

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 UPPER DECK PLAN - 2
			PAGE A-6



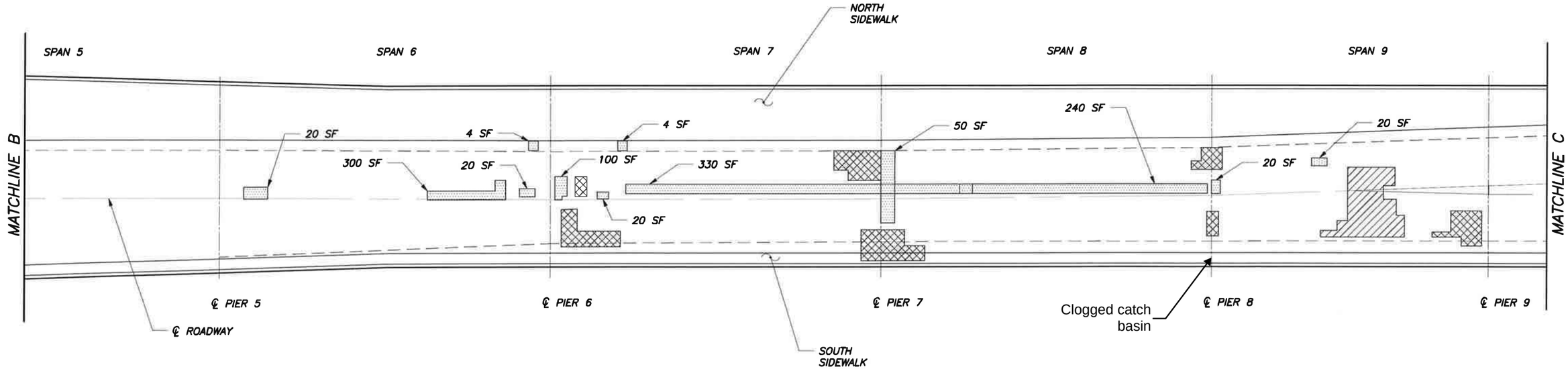
General Notes:

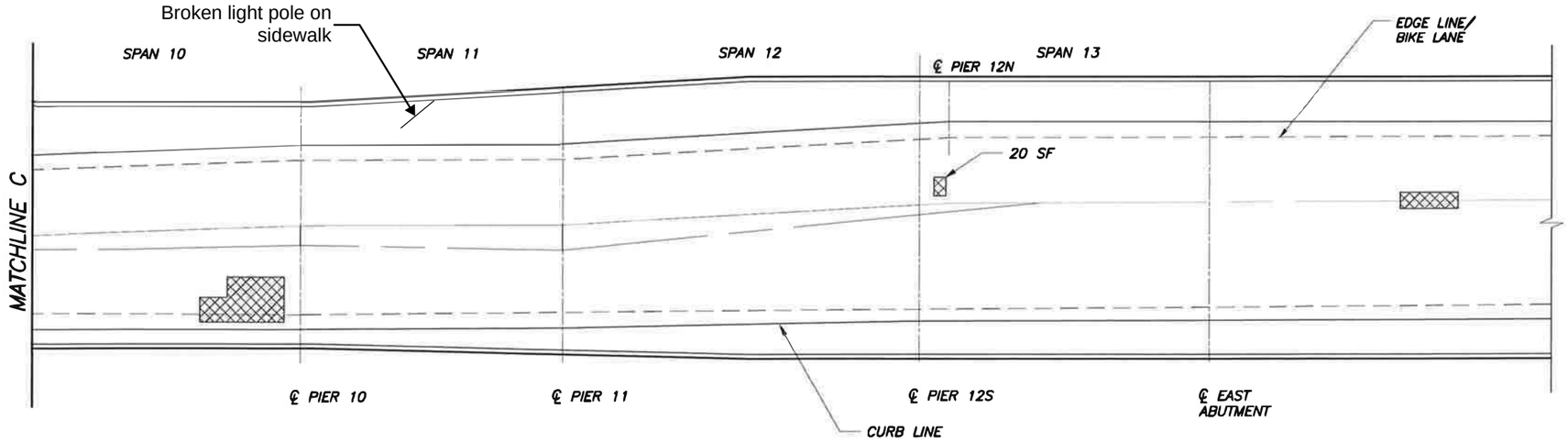
- Map cracking throughout wearing surface.
- Heavy cracking and patching throughout wearing surface. This is more prominent in the eastbound lanes.
- Joints are typically filled with debris and have edge spalls along the joint armor.
- Heavy efflorescence, cracking, delaminations, and spalls with corroded reinforcing throughout all members and underside of deck.

LEGEND

- DELAMINATED CONCRETE WEARING SURFACE WITH ESTIMATED AREA
- PATCHED WEARING SURFACE NOVEMBER 2015
- PREVIOUS WEARING SURFACE REPAIR

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2017	300 East Business Way Suite 200 Cincinnati, OH 45241 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1456 DECK PLAN - SPAN 1A TO SPAN 5 PAGE A-7





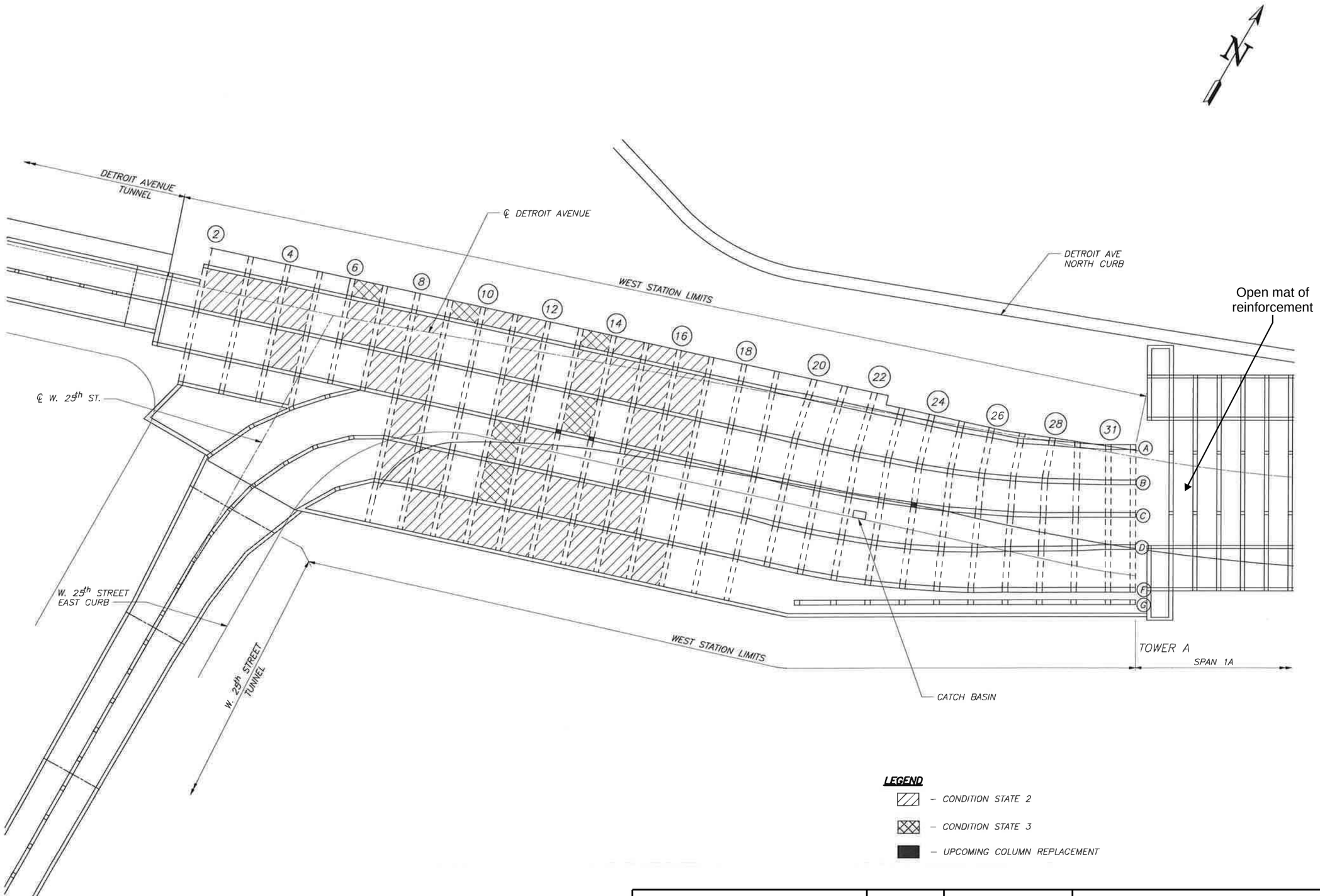
LEGEND

- DELAMINATED CONCRETE WEARING SURFACE
- WEARING SURFACE PATCH 2015
- PREVIOUSLY PATCH WORN

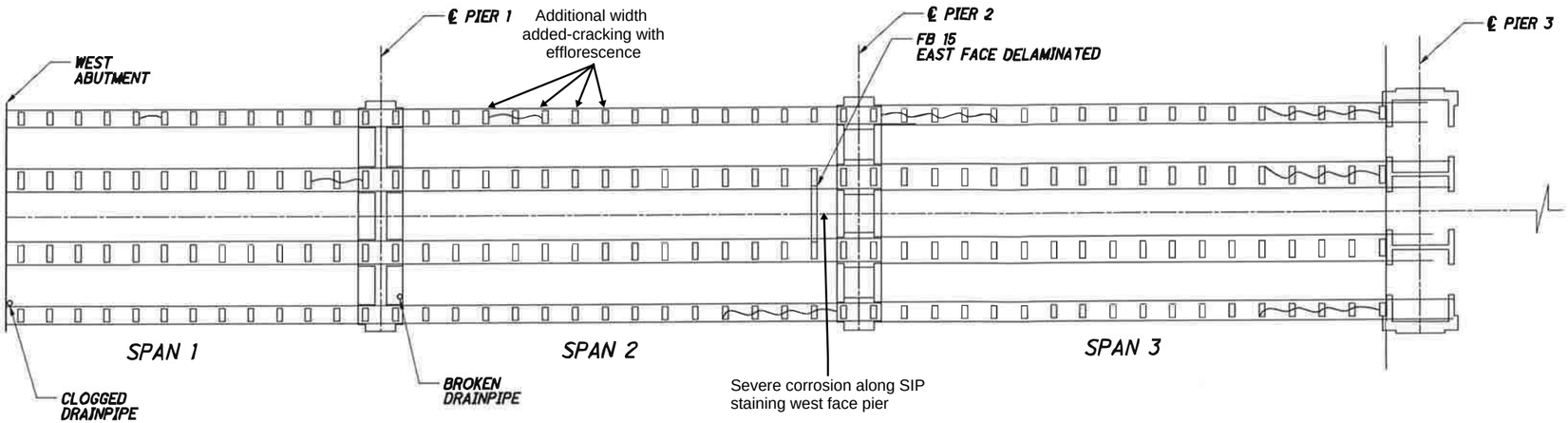
General Notes:

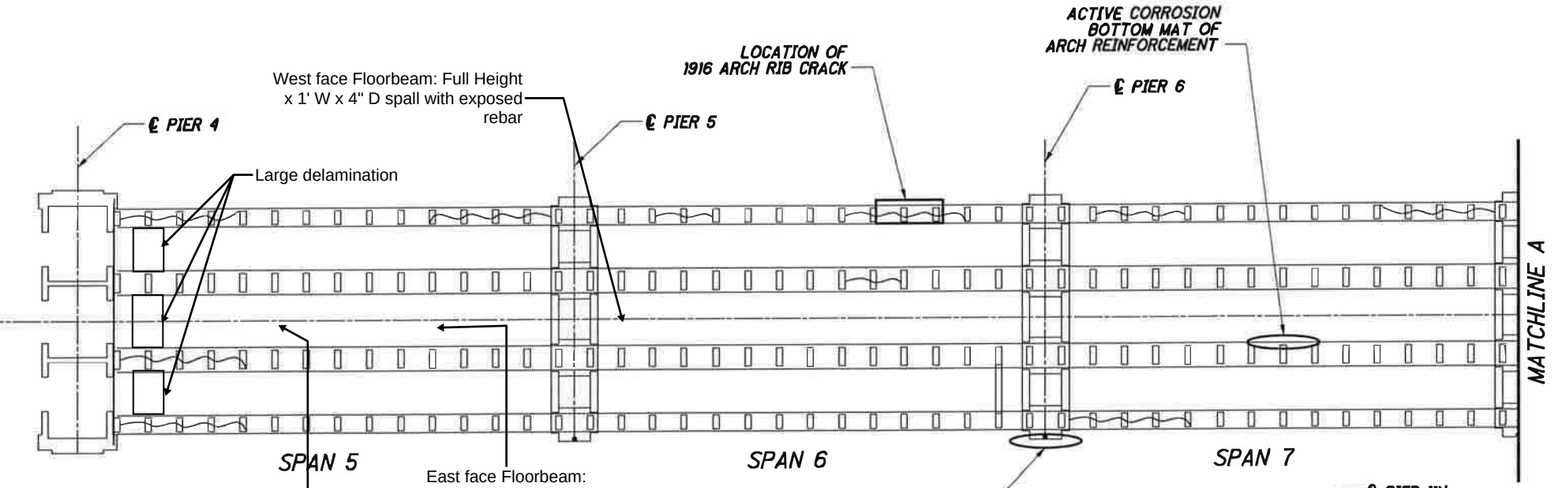
- Map cracking throughout wearing surface.
- Heavy cracking and patching throughout wearing surface. This is more prominent in the eastbound lanes.
- Joints are typically filled with debris and have edge spalls along the joint armor.
- Heavy efflorescence, cracking, delaminations, and spalls with corroded reinforcing throughout all members and underside of deck.

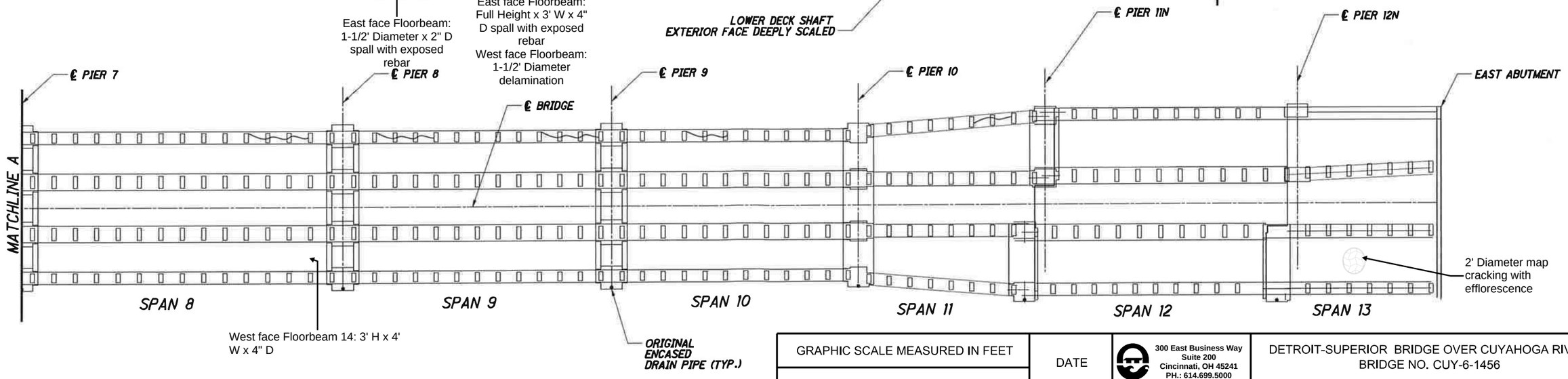
GRAPHIC SCALE MEASURED IN FEET	DATE	300 East Business Way Suite 200 Cincinnati, OH 45241 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1456
NOT TO SCALE	NOV, 2017	INFRASTRUCTURE ENGINEERS, INC.	DECK PLAN - SPAN 5 TO EAST APPROACH — PAGE A-8



GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2017	300 East Business Way Suite 200 Cincinnati, OH 45241 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1456 WEST STATION PLAN PAGE A-9



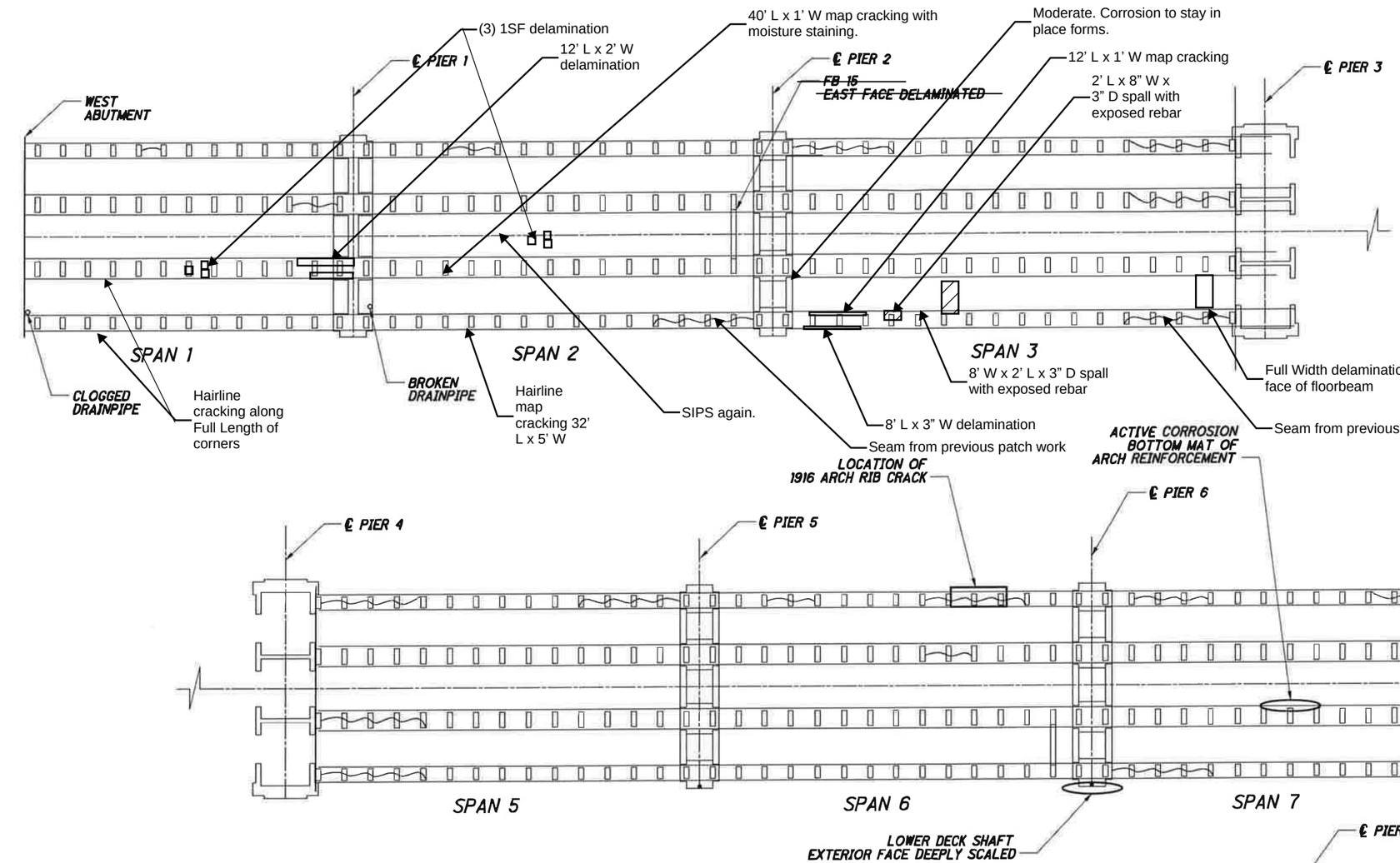




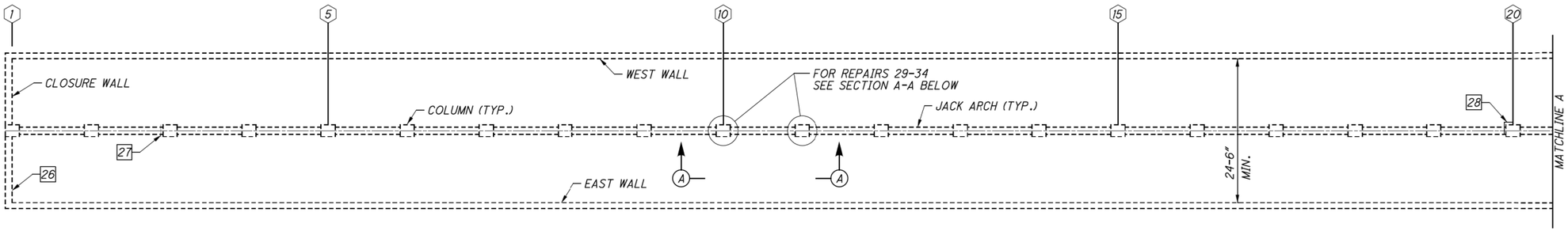
LEGEND

VERTICAL ARCH CRACK

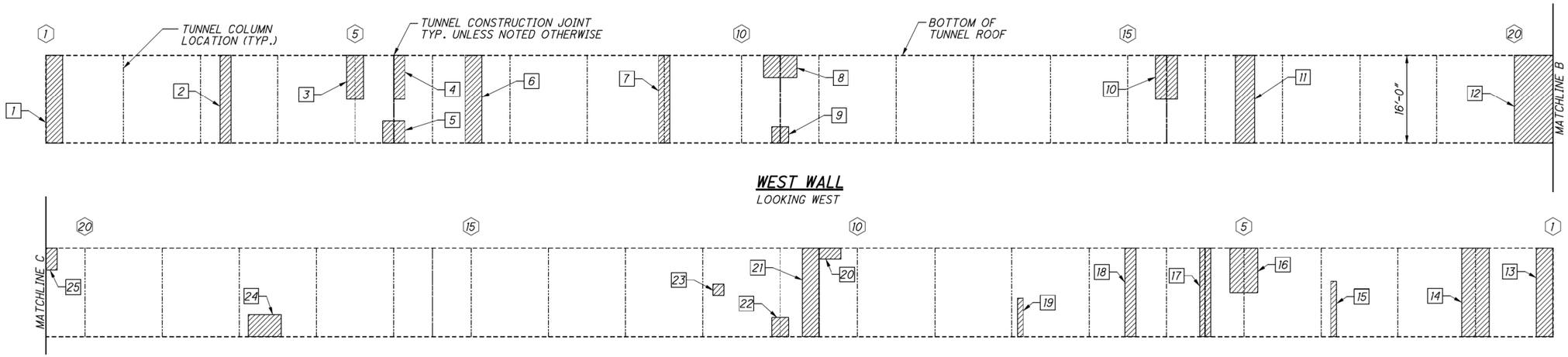
GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2017	300 East Business Way Suite 200 Cincinnati, OH 45241 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1456 UNDERSIDE OF UPPER DECK - PLAN	PAGE A-10



GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1456 UNDERSIDE OF LOWER DECK - PLAN PAGE A-11



WEST 25TH STREET TUNNEL - PLAN



WEST WALL
LOOKING WEST

EAST WALL
LOOKING EAST

ESTIMATED PATCHING QUANTITIES

REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	48	24
2	TYPE 1	32	12
3	TYPE 1	24	12
4	TYPE 1	16	6
5	TYPE 1	16	8
6	TYPE 1	48	24
7	TYPE 1	32	12
8	TYPE 1	24	10
9	TYPE 1	9	4
10	TYPE 1	32	14
11	TYPE 1	56	24
12	TYPE 1	144	34
13	TYPE 1	48	24
14	TYPE 1	80	28
15	TYPE 1	10	7
16	TYPE 1	40	16
17	TYPE 1	32	12
18	TYPE 1	32	12
19	TYPE 1	7	5
20	TYPE 1	8	3
21	TYPE 1	48	24
22	TYPE 1	11	4

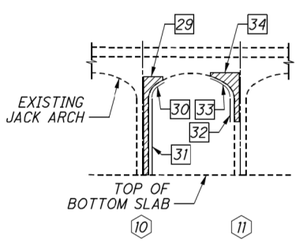
ESTIMATED PATCHING QUANTITIES

REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
23	TYPE 1	4	-
24	TYPE 1	24	10
25	TYPE 1	16	8
26	TYPE 1	100	24
27	TYPE 1	4	4
28	TYPE 1	6	6
29	TYPE 1	13	12
30	TYPE 2	5	3
31	TYPE 1	21	18
32	TYPE 1	6	6
33	TYPE 2	7	4
34	TYPE 1	10	8
MEASURED QUANTITY*		1013	-
PLAN QUANTITY*		1520	422

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	1502
TYPE 2 REPAIR	SF	18



SECTION A-A
LOOKING WEST

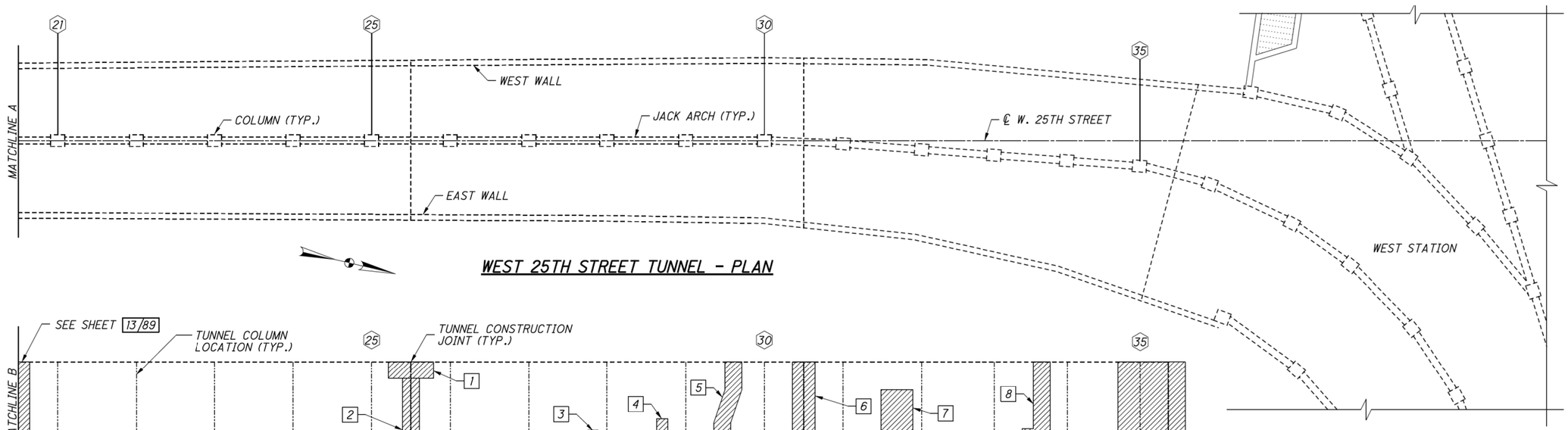
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.
6. DETERIORATED CONCRETE SURFACES WITHIN THREE FEET OF THE TUNNEL FLOOR SHALL NOT BE REPAIRED UNLESS ASSOCIATED WITH A REPAIR ABOVE THIS HEIGHT OR AS NOTED ON THIS SHEET.

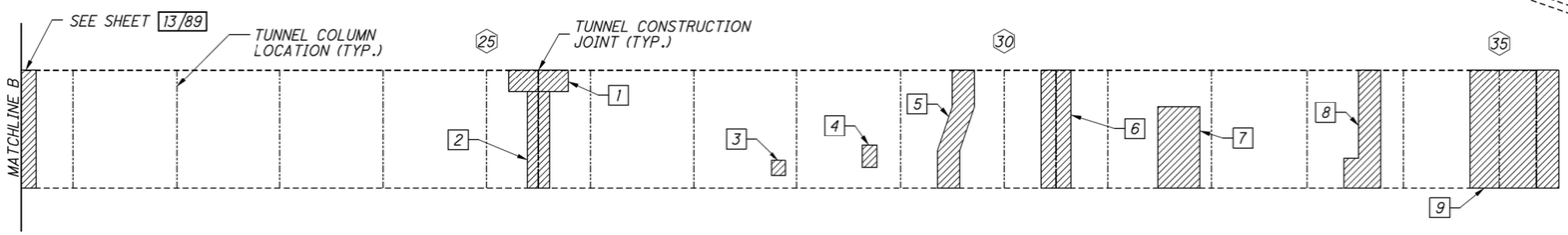
LEGEND:

- (#) TUNNEL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE ! REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	WEST 25TH ST TUNNEL CONC. REPAIR DETAILS — PAGE A-12

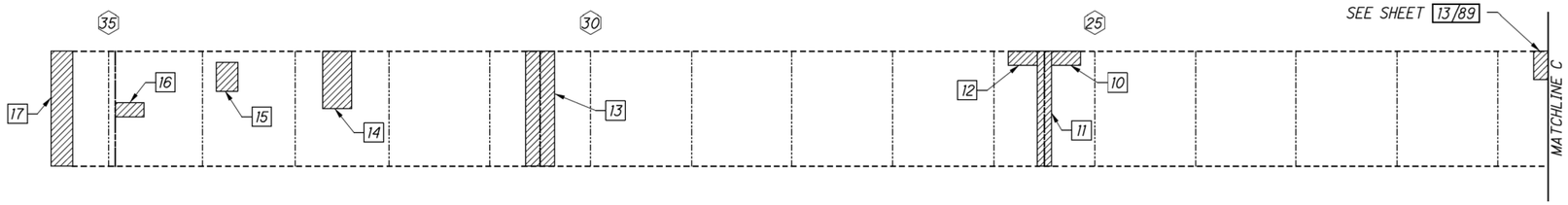


WEST 25TH STREET TUNNEL - PLAN



WEST WALL

LOOKING WEST



EAST WALL

LOOKING EAST

ESTIMATED PATCHING QUANTITIES

REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	25	12
2	TYPE 1	40	20
3	TYPE 1	4	-
4	TYPE 1	6	2
5	TYPE 1	48	24
6	TYPE 1	64	26
7	TYPE 1	63	20
8	TYPE 1	80	28
9	TYPE 1	272	44
10	TYPE 1	8	3
11	TYPE 1	32	12
12	TYPE 1	8	3
13	TYPE 1	64	26
14	TYPE 1	32	14
15	TYPE 1	12	6

ESTIMATED PATCHING QUANTITIES

REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
16	TYPE 1	8	3
17	TYPE 1	48	24
MEASURED QUANTITY*		814	-
PLAN QUANTITY*		1221	267

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	1221
TYPE 2 REPAIR	SF	-

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.
6. DETERIORATED CONCRETE SURFACES WITHIN THREE FEET OF THE TUNNEL FLOOR SHALL NOT BE REPAIRED UNLESS ASSOCIATED WITH A REPAIR ABOVE THIS HEIGHT OR AS NOTED ON THIS SHEET.

LEGEND:

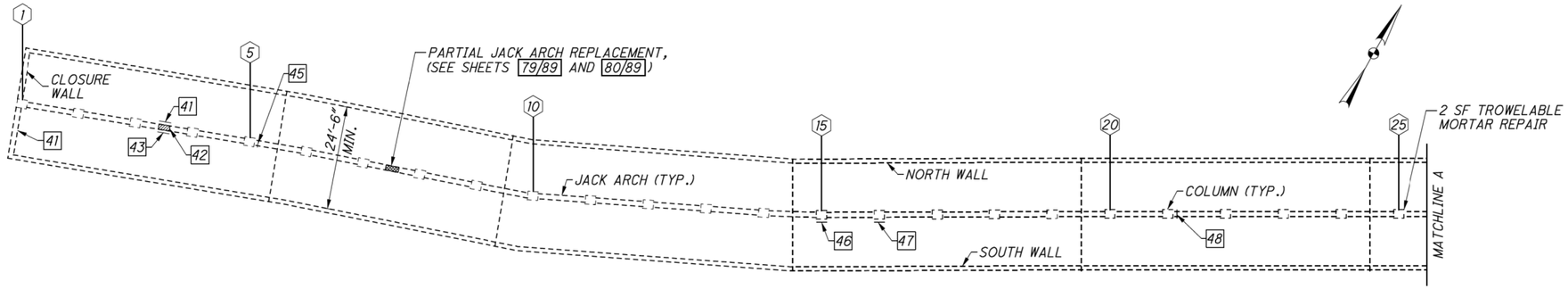
(#) TUNNEL COLUMN NUMBER

[#] REPAIR NUMBER

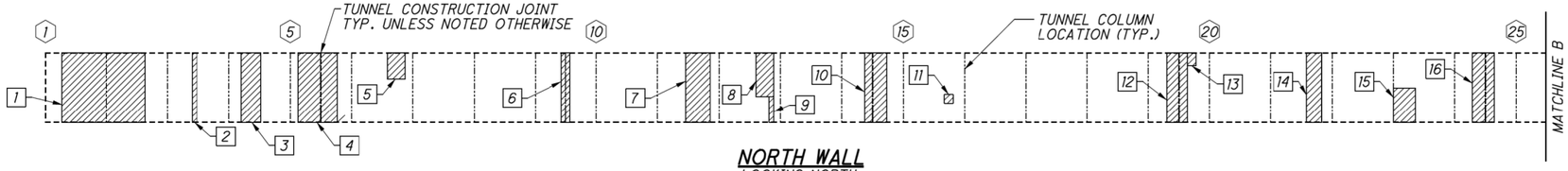
LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

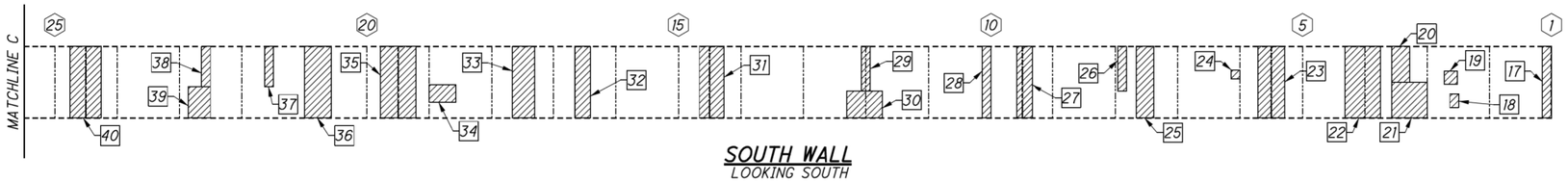
GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	WEST 25TH ST TUNNEL CONC. REPAIR DETIALS — PAGE A-13



DETROIT AVENUE TUNNEL - PLAN



NORTH WALL
LOOKING NORTH



SOUTH WALL
LOOKING SOUTH

ESTIMATED PATCHING QUANTITIES			
REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	304	48
2	TYPE 1	16	12
3	TYPE 1	72	26
4	TYPE 1	144	34
5	TYPE 1	24	10
6	TYPE 1	32	12
7	TYPE 1	88	28
8	TYPE 1	45	18
9	TYPE 1	6	4
10	TYPE 1	80	28
11	TYPE 1	4	-
12	TYPE 1	76	26
13	TYPE 1	12	2
14	TYPE 1	56	24
15	TYPE 1	40	16
16	TYPE 1	84	28
17	TYPE 1	32	12
18	TYPE 1	6	2
19	TYPE 1	9	4

ESTIMATED PATCHING QUANTITIES			
REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
20	TYPE 1	32	14
21	TYPE 1	64	20
22	TYPE 1	128	32
23	TYPE 1	96	28
24	TYPE 1	4	-
25	TYPE 1	64	26
26	TYPE 1	21	7
27	TYPE 1	56	24
28	TYPE 1	32	12
29	TYPE 1	20	7
30	TYPE 1	48	16
31	TYPE 1	88	28
32	TYPE 1	56	24
33	TYPE 1	80	28
34	TYPE 1	24	10
35	TYPE 1	128	32
36	TYPE 1	96	28
37	TYPE 1	18	7
38	TYPE 1	18	7

ESTIMATED PATCHING QUANTITIES			
REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
39	TYPE 1	35	14
40	TYPE 1	112	30
41	TYPE 1	36	12
42	TYPE 1	7	6
43	TYPE 2	7	6
44	TYPE 1	7	6
45	TYPE 1	13	12
46	TYPE 1	4	4
47	TYPE 1	6	6
48	TYPE 1	5	4
MEASURED QUANTITY*		2435	-
PLAN QUANTITY*		3653	788

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	3642
TYPE 2 REPAIR	SF	11

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.
6. DETERIORATED CONCRETE SURFACES WITHIN THREE FEET OF THE TUNNEL FLOOR SHALL NOT BE REPAIRED UNLESS ASSOCIATED WITH A REPAIR ABOVE THIS HEIGHT OR AS NOTED ON THIS SHEET.
7. A NEW TUNNEL ROOF WAS PREVIOUSLY CONSTRUCTED ON TOP OF THE ORIGINAL DETROIT AVENUE TUNNEL ROOF. THE CONTRACTOR SHALL REMOVE LOOSE ORIGINAL ROOF CONCRETE FROM THE BOTTOM OF THE ORIGINAL DETROIT AVENUE ROOF AS DIRECTED BY THE ENGINEER. PAYMENT SHALL BE INCLUDED AS PART OF ITEM 202 - PORTIONS OF STRUCTURE REMOVED, OVER 20-FOOT SPAN, AS PER PLAN.

LEGEND:

- (#) TUNNEL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET

NOT TO SCALE

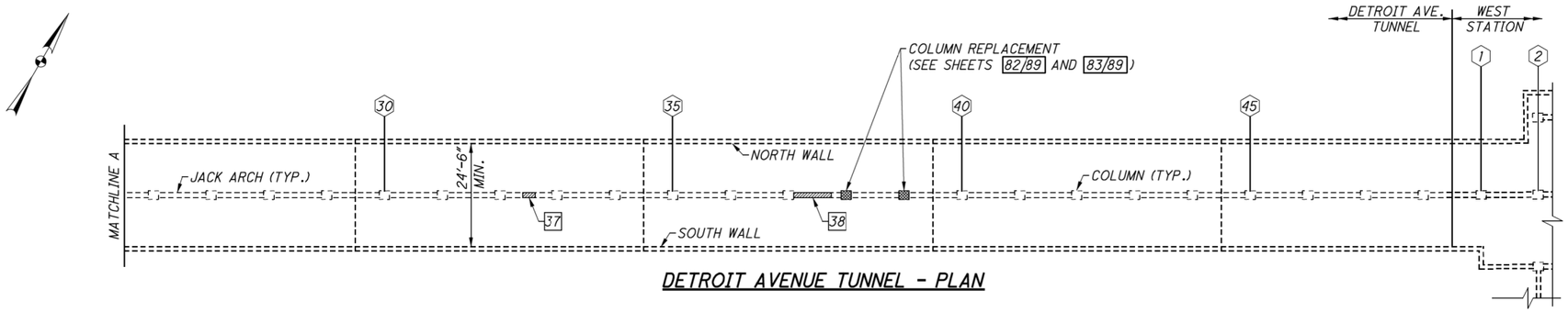
DATE

NOV, 2018

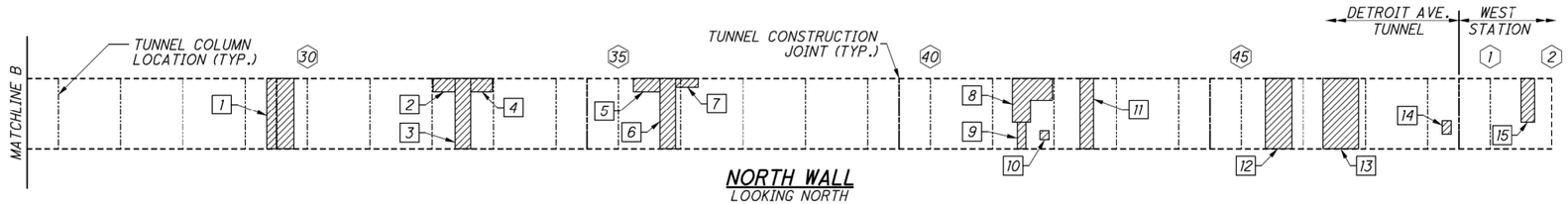
9902 Carver Road
Suite 201
Cincinnati, OH 45242
PH.: 614.699.5000
INFRASTRUCTURE ENGINEERS, INC.

DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER
BRIDGE NO. CUY-6-1465

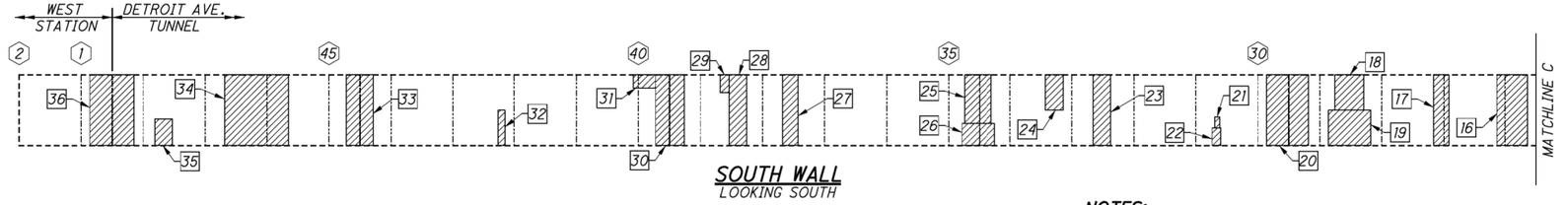
DETRIOT AVE TUNNEL CONC. REPAIR DETAIL



DETROIT AVENUE TUNNEL - PLAN



NORTH WALL
LOOKING NORTH



SOUTH WALL
LOOKING SOUTH

ESTIMATED PATCHING QUANTITIES			
REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	100	28
2	TYPE 1	15	8
3	TYPE 1	56	24
4	TYPE 1	15	8
5	TYPE 1	18	8
6	TYPE 1	56	24
7	TYPE 1	10	4
8	TYPE 1	70	16
9	TYPE 1	12	4
10	TYPE 1	4	-
11	TYPE 1	48	24
12	TYPE 1	116	30
13	TYPE 1	128	32
14	TYPE 1	6	2
15	TYPE 1	30	14

ESTIMATED PATCHING QUANTITIES			
REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
16	TYPE 1	112	30
17	TYPE 1	56	24
18	TYPE 1	52	18
19	TYPE 1	76	22
20	TYPE 1	152	34
21	TYPE 1	3	-
22	TYPE 1	8	3
23	TYPE 1	64	26
24	TYPE 1	32	14
25	TYPE 1	66	20
26	TYPE 1	38	14
27	TYPE 1	56	24
28	TYPE 1	64	26
29	TYPE 1	8	3
30	TYPE 1	104	30

ESTIMATED PATCHING QUANTITIES			
REPAIR No.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
31	TYPE 1	15	8
32	TYPE 1	12	6
33	TYPE 1	112	30
34	TYPE 1	232	42
35	TYPE 1	24	10
36	TYPE 1	160	34
37	TYPE 2	6	6
38	TYPE 2	20	18
MEASURED QUANTITY*		2126	-
PLAN QUANTITY*		3189	668

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	3150
TYPE 2 REPAIR	SF	39

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.
6. DETERIORATED CONCRETE SURFACES WITHIN THREE FEET OF THE TUNNEL FLOOR SHALL NOT BE REPAIRED UNLESS ASSOCIATED WITH A REPAIR ABOVE THIS HEIGHT OR AS NOTED ON THIS SHEET.
7. A NEW TUNNEL ROOF WAS PREVIOUSLY CONSTRUCTED ON TOP OF THE ORIGINAL DETROIT AVENUE TUNNEL ROOF. THE CONTRACTOR SHALL REMOVE LOOSE ORIGINAL ROOF CONCRETE FROM THE BOTTOM OF THE ORIGINAL DETROIT AVENUE ROOF AS DIRECTED BY THE ENGINEER. PAYMENT SHALL BE INCLUDED AS PART OF ITEM 202 - PORTIONS OF STRUCTURE REMOVED, OVER 20-FOOT SPAN, AS PER PLAN.

LEGEND:

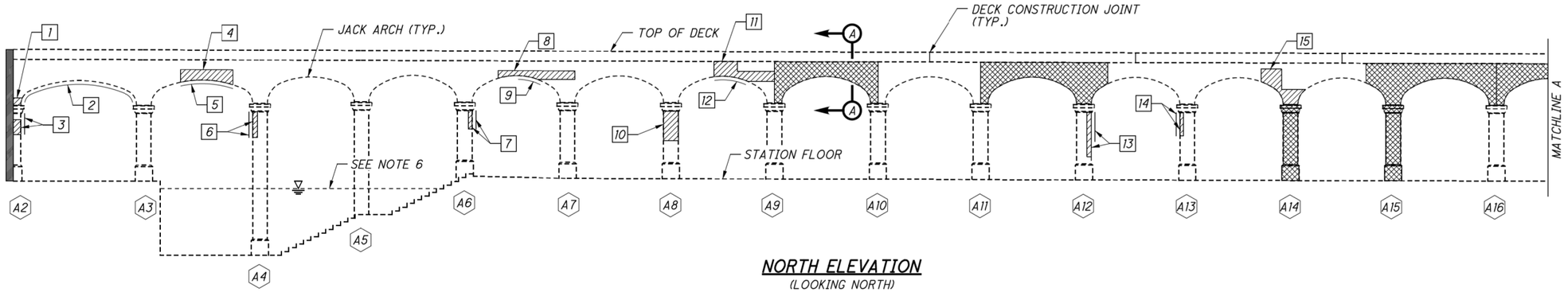
(#) TUNNEL COLUMN NUMBER

[#] REPAIR NUMBER

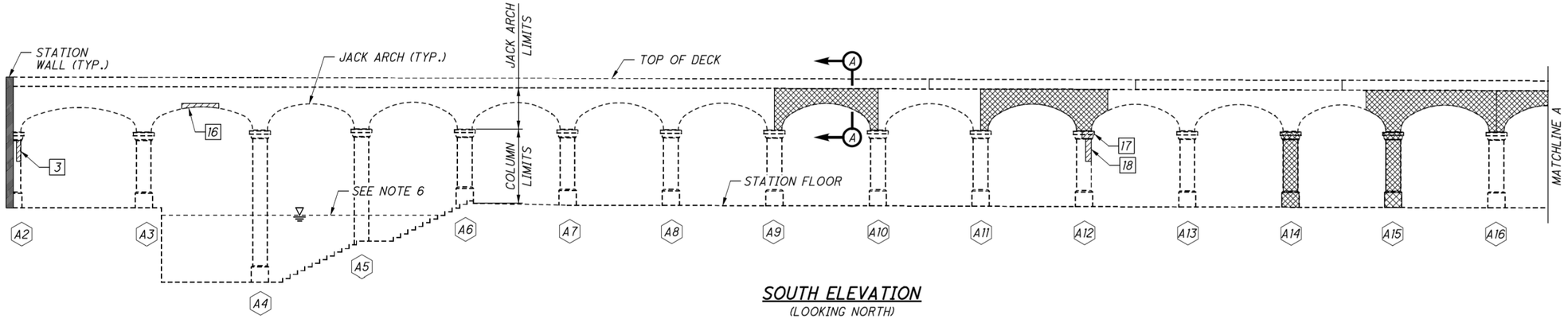
LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	DETROIT AVE TUNNEL CONC. REPAIR DETAIL — PAGE A-15



NORTH ELEVATION
(LOOKING NORTH)



SOUTH ELEVATION
(LOOKING NORTH)

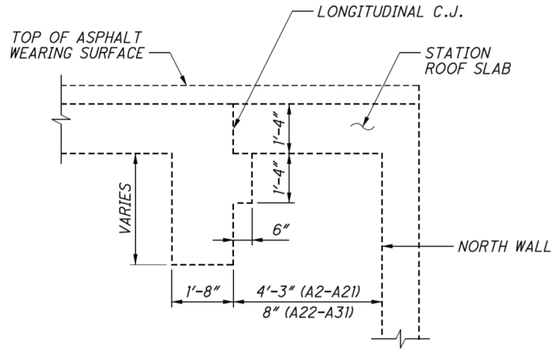
ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	2	-
2	TYPE 2	9	15
3	TYPE 1	10	4
4	TYPE 1	11	6
5	TYPE 2	4	-
6	TYPE 1	6	2
7	TYPE 1	3	-
8	TYPE 1	14	9
9	TYPE 2	2	-
10	TYPE 1	8	3
11	TYPE 1	14	7
12	TYPE 2	4	-
13	TYPE 1	12	8
14	TYPE 1	4	-
15	TYPE 1	12	8
16	TYPE 1	4	-
17	TYPE 1	2	-
18	TYPE 1	3	-
MEASURED QUANTITY*		124	-
PLAN QUANTITY*		186	62

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	158
TYPE 2 REPAIR	SF	28



SECTION A-A

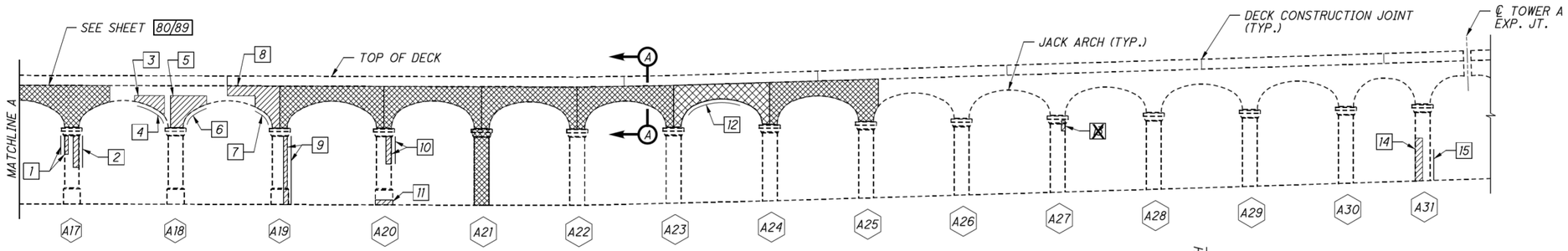
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.
6. THE UNDERSIDE OF THE CEILING EXHIBITS TYPICAL AREAS OF SPALLING WITH EXPOSED AND CORRODED REINFORCEMENT BETWEEN ALL COLUMN LINES. APPORXIMATELY 15% OF THE UNDERSIDE IS SPALLED WITH CRACKING, MOISTURE LEAKAGE AND EFFLORESCENCE STAINING.

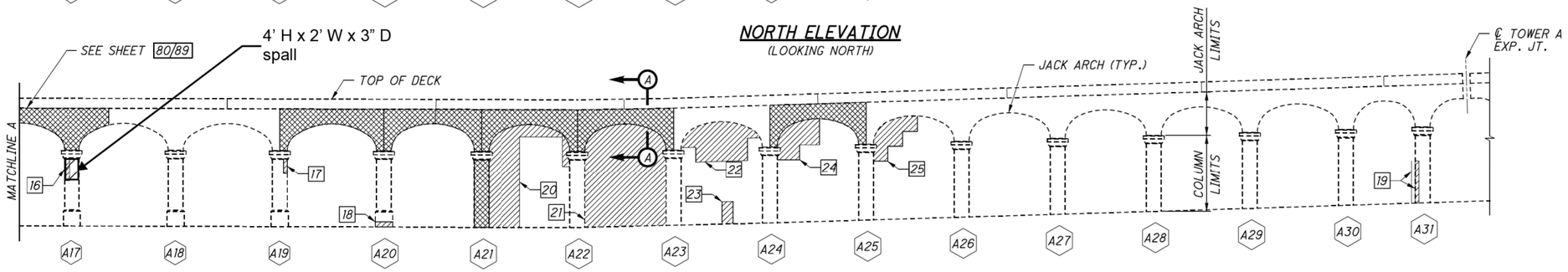
LEGEND:

- (#) STATION COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED. FOR REPLACEMENT DETAILS, SEE SHEETS 79/89 THRU 83/89

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	WEST STATION CONC REPAIR DETAILS — PAGE A-16



NORTH ELEVATION
(LOOKING NORTH)



SOUTH ELEVATION
(LOOKING NORTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	4	-
2	TYPE 1	7	3
3	TYPE 1	6	3
4	TYPE 2	3	-
5	TYPE 1	14	6
6	TYPE 2	5	2
7	TYPE 2	3	-
8	TYPE 1	18	10
9	TYPE 1	10	7
10	TYPE 1	6	2
11	TYPE 1	2	-
12	TYPE 2	12	5
~~13~~	~~TYPE 1~~	~~1~~	~~-~~
14	TYPE 1	6	4
15	TYPE 1	4	-
16	TYPE 1	3	-
17	TYPE 1	1	-
18	TYPE 1	2	-
19	TYPE 1	13	8
20	TYPE 1	65	20

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
21	TYPE 1	143	30
22	TYPE 1	41	14
23	TYPE 1	5	2
24	TYPE 1	22	12
25	TYPE 1	20	10
MEASURED QUANTITY*		416	-
PLAN QUANTITY*		624	138

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	590
TYPE 2 REPAIR	SF	34

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89 .
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.
6. FOR SECTION A-A, SEE SHEET 17/89 .

LEGEND:

(#) STATION COLUMN NUMBER

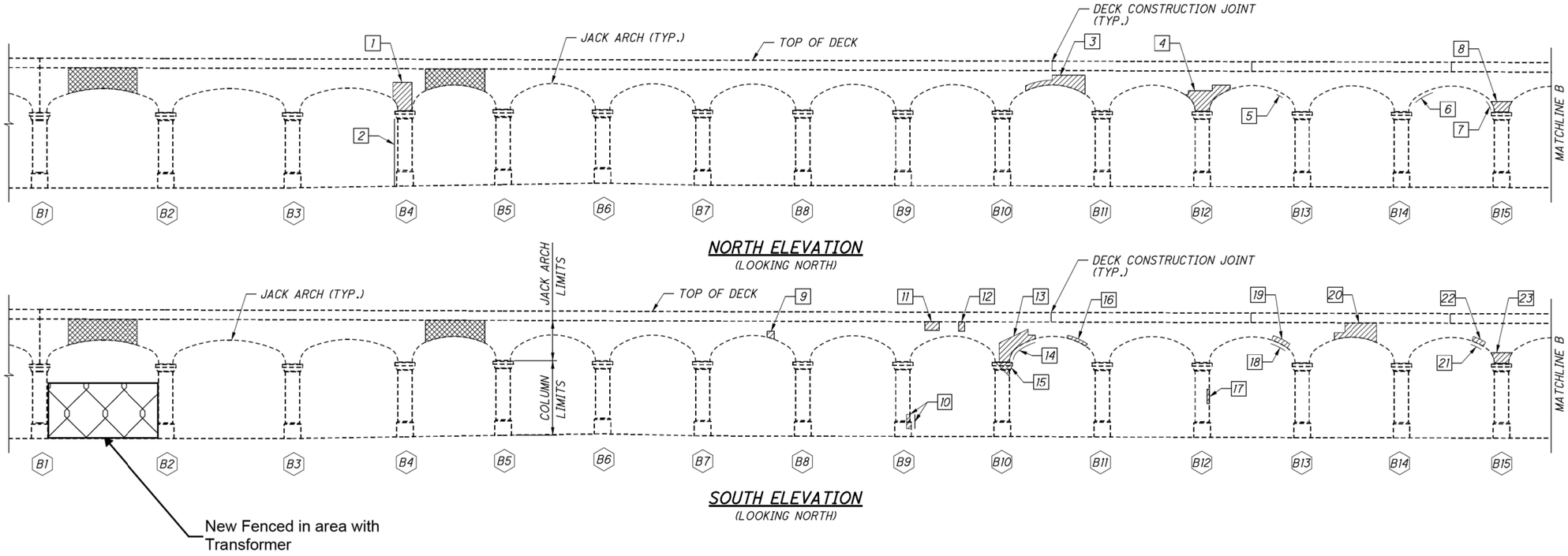
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED. FOR REPLACEMENT DETAILS, SEE SHEETS 79/89 THRU 83/89

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018		WEST STATION CONC. REPAIR DETAILS — PAGE A-17



ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	10	6
2	TYPE 1	18	7
3	TYPE 1	11	7
4	TYPE 1	12	8
5	TYPE 2	1	-
6	TYPE 2	5	3
7	TYPE 2	3	-
8	TYPE 1	4	-
9	TYPE 1	1	-
10	TYPE 1	4	-
11	TYPE 1	3	-
12	TYPE 1	2	-
13	TYPE 1	10	8
14	TYPE 2	3	-
15	TYPE 1	3	-
16	TYPE 1	2	-
17	TYPE 1	1	-
18	TYPE 2	3	-
19	TYPE 1	2	-
20	TYPE 1	12	10

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
21	TYPE 2	1	-
22	TYPE 1	2	-
23	TYPE 1	4	-
MEASURED QUANTITY*		117	-
PLAN QUANTITY*		176	49

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	152
TYPE 2 REPAIR	SF	24

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

LEGEND:

(#) STATION COLUMN NUMBER

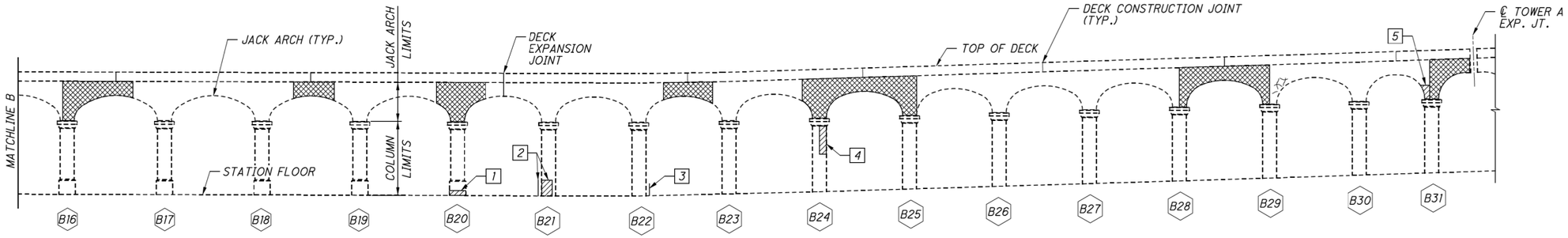
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

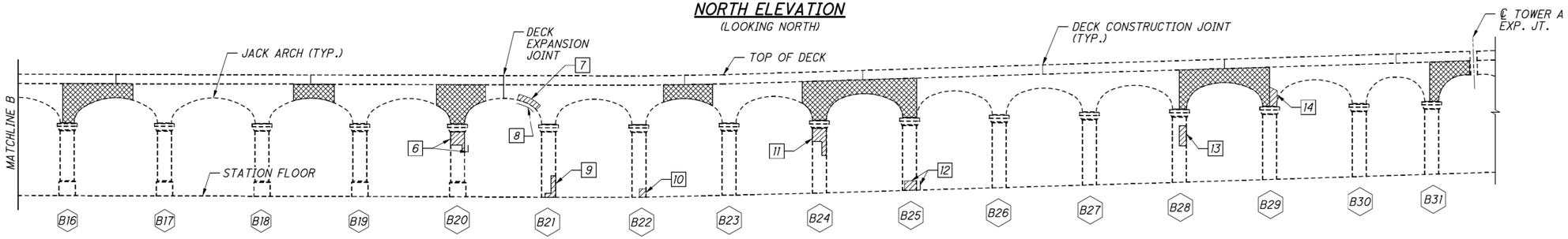
LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED. FOR REPLACEMENT DETAILS, SEE SHEETS 79/89 THRU 83/89

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 WEST STATION CONC. REPAIR DETAILS PAGE A-18



NORTH ELEVATION
(LOOKING NORTH)



SOUTH ELEVATION
(LOOKING NORTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	2	-
2	TYPE 1	6	4
3	TYPE 1	3	-
4	TYPE 1	4	-
5	TYPE 1	3	-
6	TYPE 1	6	4
7	TYPE 1	3	-
8	TYPE 2	3	-
9	TYPE 1	2	-
10	TYPE 1	2	-
11	TYPE 1	6	3
12	TYPE 1	4	-
13	TYPE 1	3	-
14	TYPE 1	3	-
MEASURED QUANTITY*		50	-
PLAN QUANTITY*		75	11

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	70
TYPE 2 REPAIR	SF	5

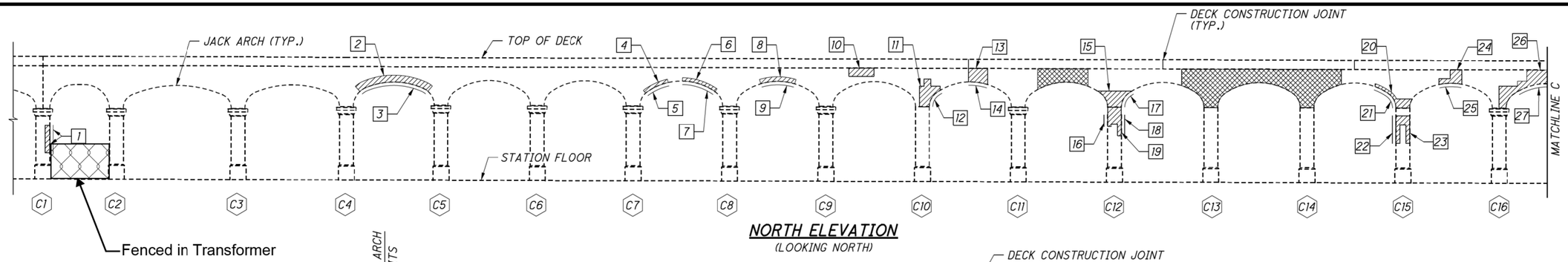
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89 .
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

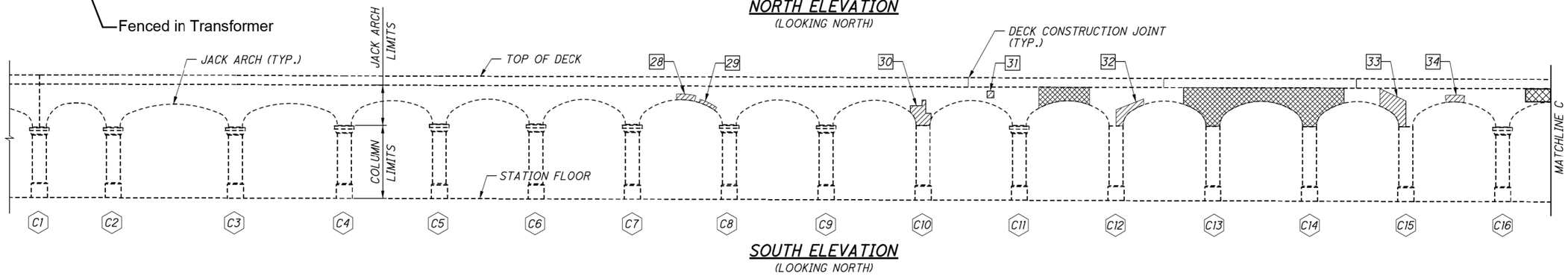
LEGEND:

- (#) STATION COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED. FOR REPLACEMENT DETAILS, SEE SHEETS 79/89 THRU 83/89

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	WEST STATION CONC. REPAIR DETAILS — PAGE A-19



NORTH ELEVATION
(LOOKING NORTH)



SOUTH ELEVATION
(LOOKING NORTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	10	6
2	TYPE 1	11	10
3	TYPE 2	6	10
4	TYPE 1	2	-
5	TYPE 2	2	-
6	TYPE 1	3	-
7	TYPE 2	3	-
8	TYPE 1	4	-
9	TYPE 2	3	-
10	TYPE 1	5	-
11	TYPE 1	8	6
12	TYPE 2	4	-
13	TYPE 1	6	4
14	TYPE 2	2	-
15	TYPE 1	8	4
16	TYPE 1	1	-
17	TYPE 2	4	-
18	TYPE 1	3	-
19	TYPE 1	6	2
20	TYPE 1	5	-
21	TYPE 2	7	3
22	TYPE 1	7	3
23	TYPE 1	6	2

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
24	TYPE 1	5	-
25	TYPE 2	2	-
26	TYPE 1	12	6
27	TYPE 2	10	8
28	TYPE 1	3	-
29	TYPE 1	2	-
30	TYPE 1	8	6
31	TYPE 1	1	-
32	TYPE 1	6	3
33	TYPE 1	12	8
34	TYPE 1	3	-
MEASURED QUANTITY*		180	-
PLAN QUANTITY*		270	81

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	206
TYPE 2 REPAIR	SF	64

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

LEGEND:

(#) STATION COLUMN NUMBER

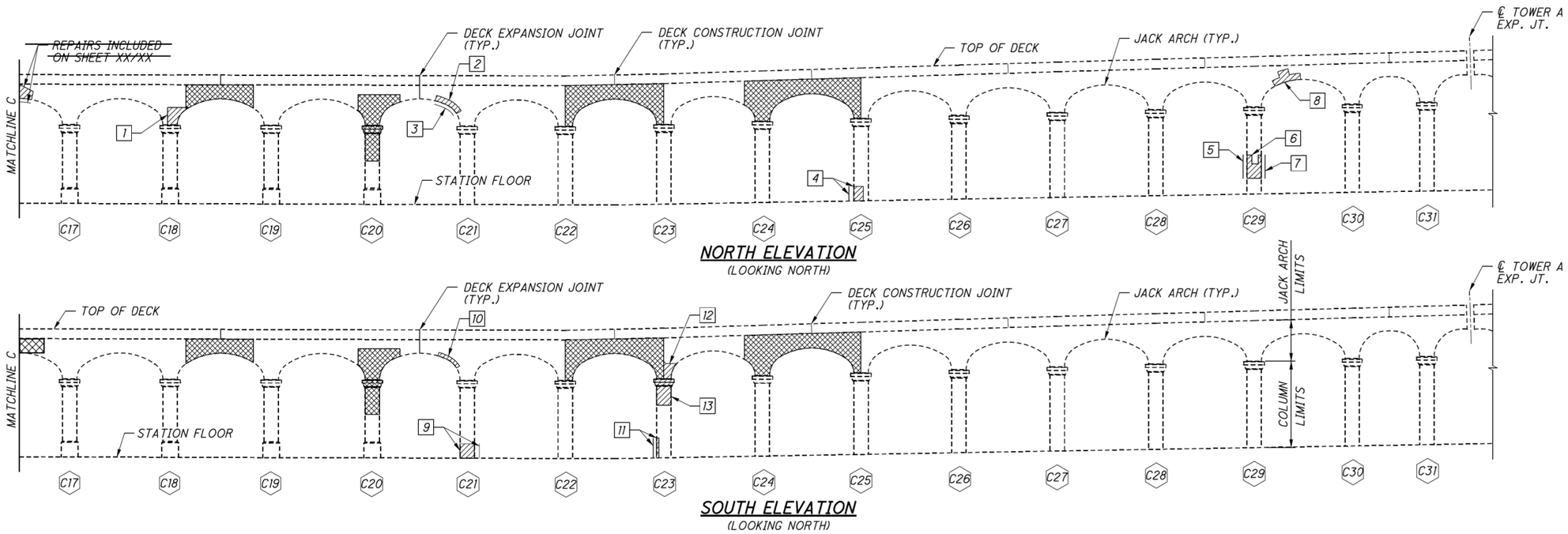
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED. FOR REPLACEMENT DETAILS, SEE SHEETS 79/89 THRU 83/89

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	WEST STATION CONC. REPAIR DETAILS — PAGE A-20



NORTH ELEVATION
(LOOKING NORTH)

SOUTH ELEVATION
(LOOKING NORTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	5	-
2	TYPE 1	3	-
3	TYPE 2	7	4
4	TYPE 1	7	2
5	TYPE 1	2	-
6	TYPE 1	7	2
7	TYPE 1	2	-
8	TYPE 1	6	3
9	TYPE 1	8	3
10	TYPE 1	2	-
11	TYPE 1	6	2
12	TYPE 1	3	-
13	TYPE 1	6	2
MEASURED QUANTITY*		64	-
PLAN QUANTITY*		96	18

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	86
TYPE 2 REPAIR	SF	10

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89 .
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

LEGEND:

(#) STATION COLUMN NUMBER

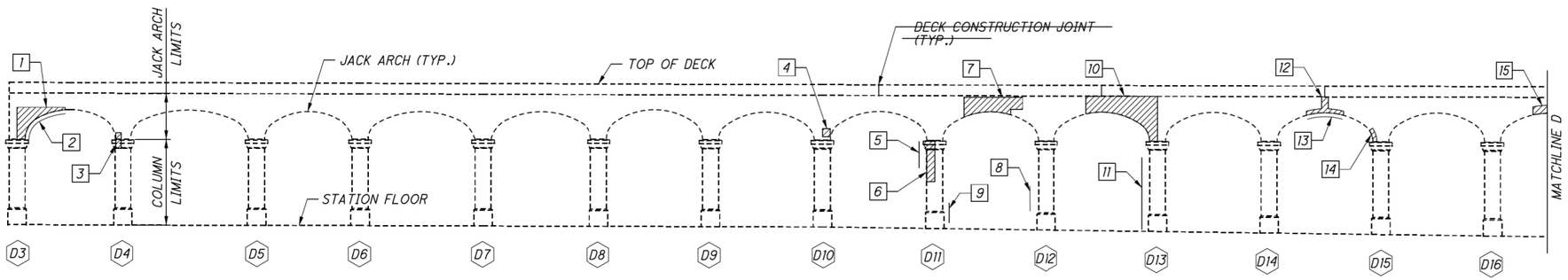
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

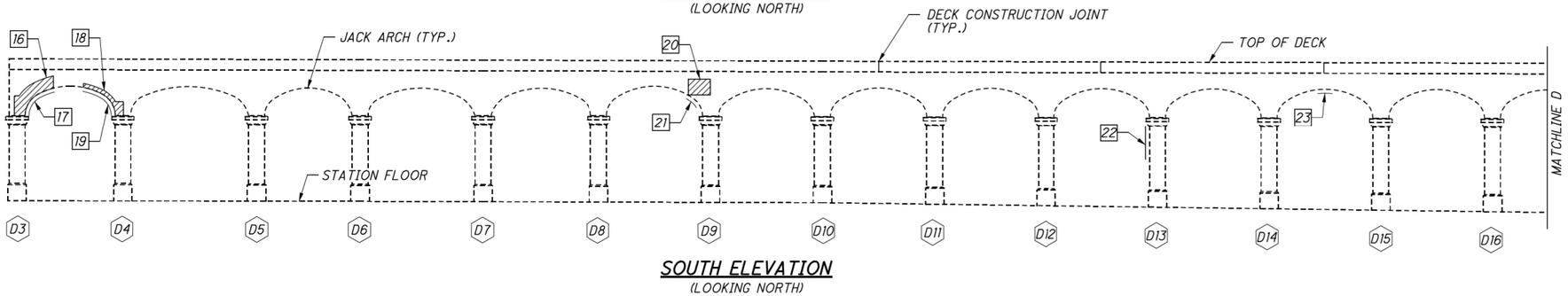
LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED.
FOR REPLACEMENT DETAILS, SEE SHEETS 79/89 THRU 83/89

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	WEST STATION CONC. REPAIR DETAILS — PAGE A-21



NORTH ELEVATION
(LOOKING NORTH)



SOUTH ELEVATION
(LOOKING NORTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	10	5
2	TYPE 2	4	-
3	TYPE 1	2	-
4	TYPE 1	1	-
5	TYPE 1	4	-
6	TYPE 1	6	4
7	TYPE 1	14	6
8	TYPE 1	7	2
9	TYPE 1	5	-
10	TYPE 1	27	18
11	TYPE 1	9	7
12	TYPE 1	4	-
13	TYPE 2	3	-
14	TYPE 1	1	-
15	TYPE 1	3	-
16	TYPE 1	10	8
17	TYPE 2	3	-
18	TYPE 1	5	-
19	TYPE 2	3	-
20	TYPE 1	7	4

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
21	TYPE 2	2	-
22	TYPE 1	4	-
23	TYPE 2	2	-
MEASURED QUANTITY*		136	-
PLAN QUANTITY*		204	54

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	178
TYPE 2 REPAIR	SF	26

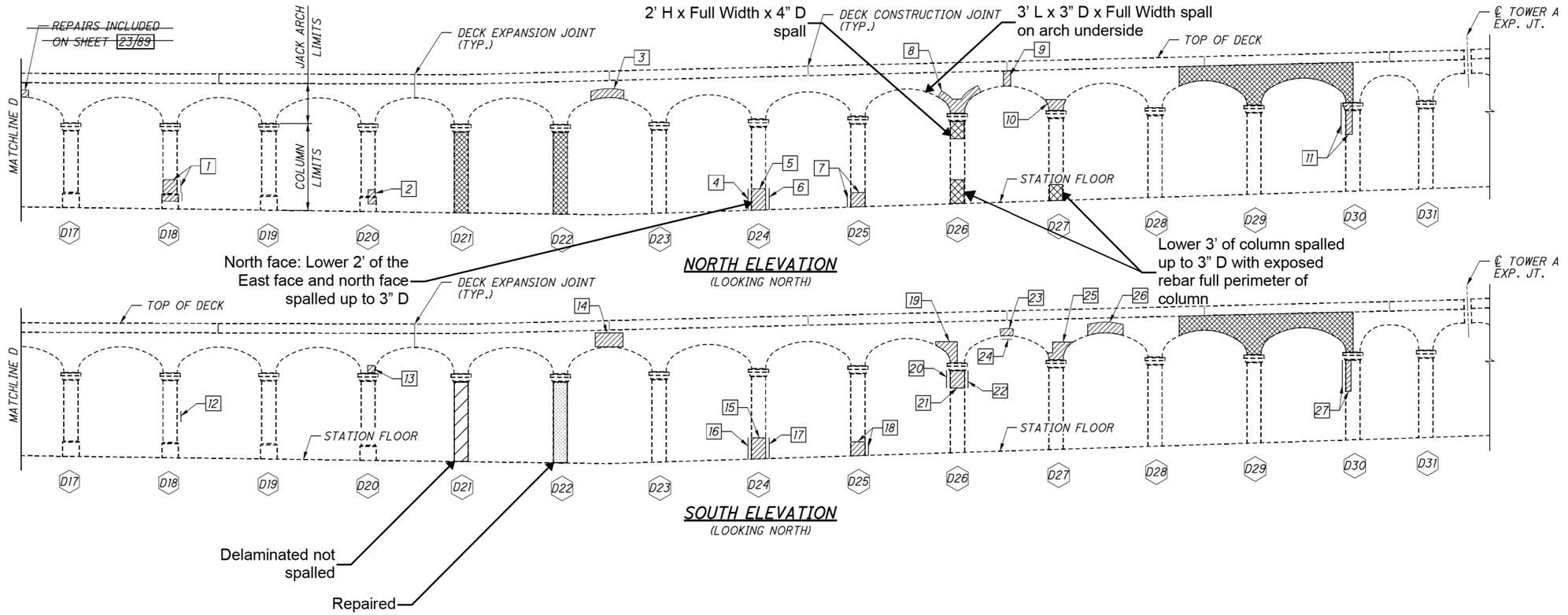
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89 .
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

LEGEND:

- (#) STATION COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED. FOR REPLACEMENT DETAILS, SEE SHEETS 79/89 THRU 83/89

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	WEST STATION CONC. REPAIR DETAILS — PAGE A-22



ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	12	6
2	TYPE 1	2	-
3	TYPE 1	6	4
4	TYPE 1	6	2
5	TYPE 1	6	2
6	TYPE 1	6	2
7	TYPE 1	8	3
8	TYPE 1	9	5
9	TYPE 1	2	-
10	TYPE 1	4	-
11	TYPE 1	9	3
12	TYPE 1	3	-
13	TYPE 1	1	-
14	TYPE 1	8	6
15	TYPE 1	6	2
16	TYPE 1	6	2
17	TYPE 1	6	2
18	TYPE 1	8	3
19	TYPE 1	5	-
20	TYPE 1	2	-

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
21	TYPE 1	5	-
22	TYPE 1	2	-
23	TYPE 1	2	-
24	TYPE 2	2	-
25	TYPE 1	7	6
26	TYPE 1	8	4
27	TYPE 1	13	6
MEASURED QUANTITY*		154	-
PLAN QUANTITY*		231	58

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	228
TYPE 2 REPAIR	SF	3

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89 .
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

LEGEND:

(#) STATION COLUMN NUMBER

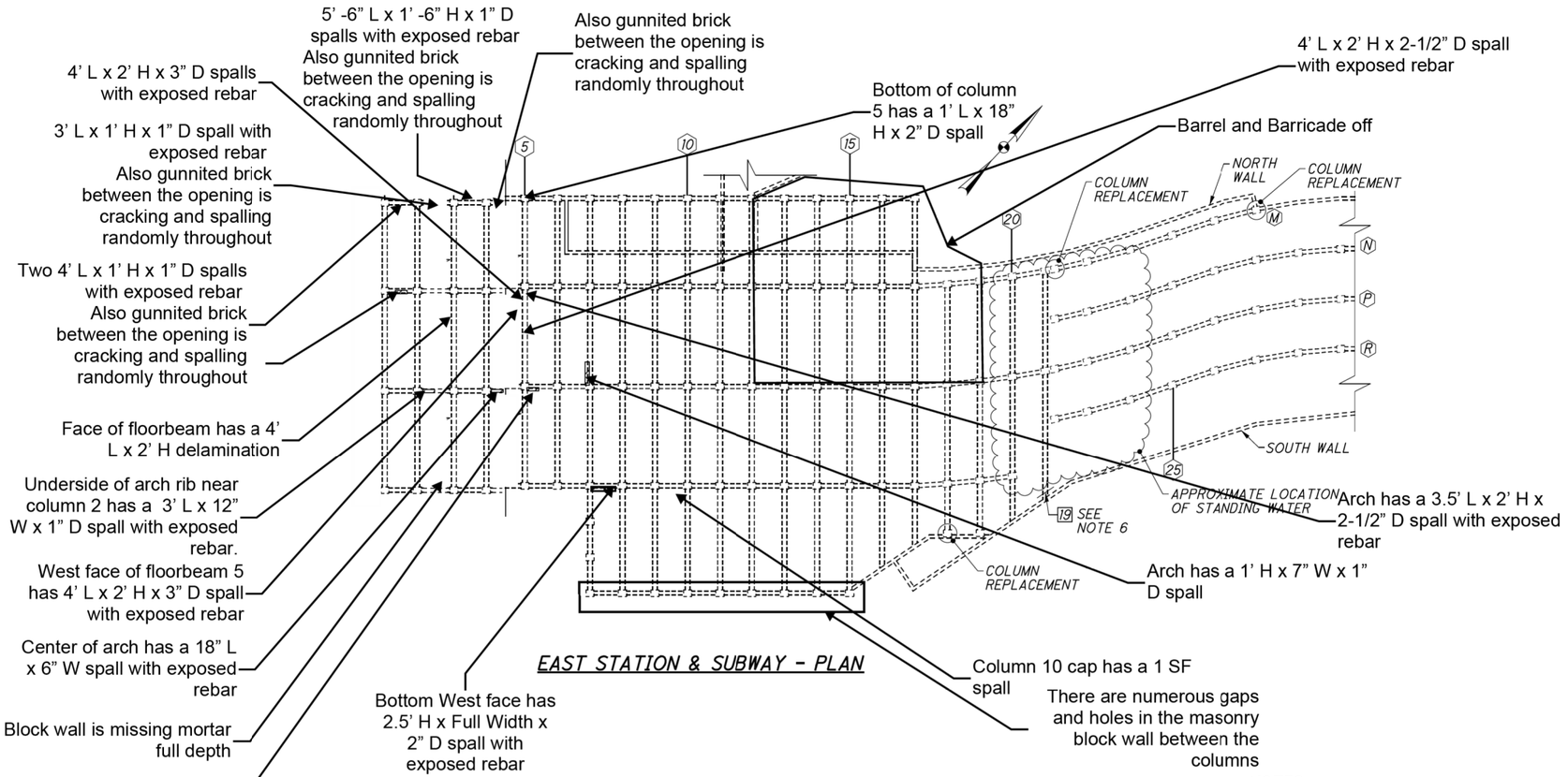
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

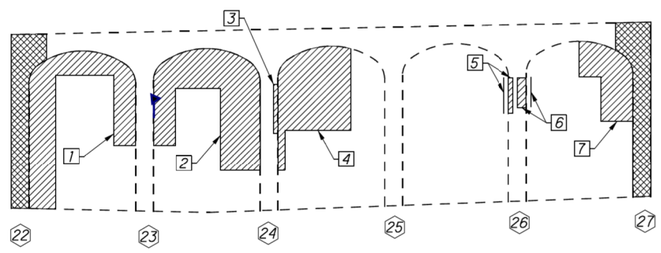
LOCATION OF DEFICIENT CONCRETE ON PERPINDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED. FOR REPLACEMENT DETAILS, SEE SHEETS 79/89 THRU 83/89

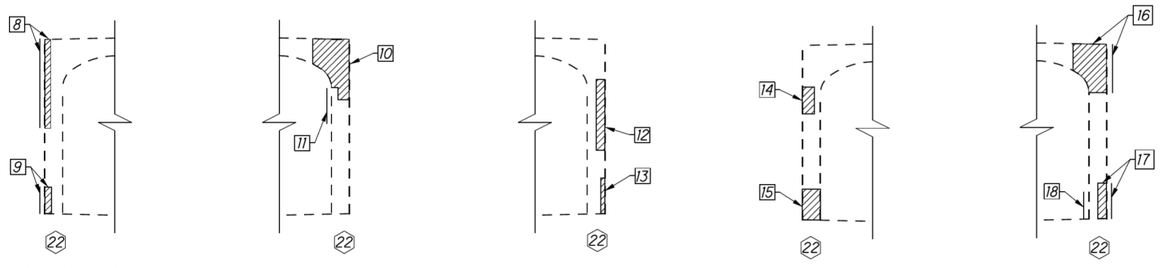
GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 WEST STATION CONC. REPAIR DETAILS PAGE A-23



EAST STATION & SUBWAY - PLAN



COLUMN LINE M & SUBWAY NORTH WALL - SOUTH FACE



SOUTH FACE — NORTH FACE — COLUMN N22

NORTH FACE — COLUMN P22

SOUTH FACE — NORTH FACE — COLUMN R22

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1 ‡	TYPE 1	183	42
2	TYPE 1	120	28
3	TYPE 1	3	-
4	TYPE 1	80	20
5	TYPE 1	4	-
6	TYPE 1	11	-
7 ‡	TYPE 1	111	30
8	TYPE 1	27	27
9	TYPE 1	6	-
10	TYPE 1	21	12
11	TYPE 1	4	-
12	TYPE 1	10	6
13	TYPE 1	2	-
14	TYPE 1	4	-
15	TYPE 1	7	2
16	TYPE 1	18	14
17	TYPE 1	13	6
18	TYPE 1	6	2
19	TYPE 1	70	34
MEASURED QUANTITY*		700	-
PLAN QUANTITY*		1050	223

* SEE NOTES 1 & 2 ‡ SEE NOTE 8
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	1050
TYPE 2 REPAIR	SF	-

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES IN THE EAST STATION AND EAST SUBWAY.
6. THE CONTRACTOR SHALL REMOVE DEBRIS THAT OBSTRUCTS THE PATCHING OF THE SOUTH WALL. PAYMENT SHALL BE INCLUDED AS PART OF ITEM 202 - PORTIONS OF STRUCTURE REMOVED OVER 20 FOOT SPAN, AS PER PLAN.
7. FOR DETAILS OF COLUMNS AND JACK ARCH REPLACEMENT, SEE SHEETS 79/89 THRU 83/89.
8. WALL REPAIR EXTENDS BEHIND COLUMN TO BE REPLACED.

LEGEND:

(#) STATION COLUMN NUMBER

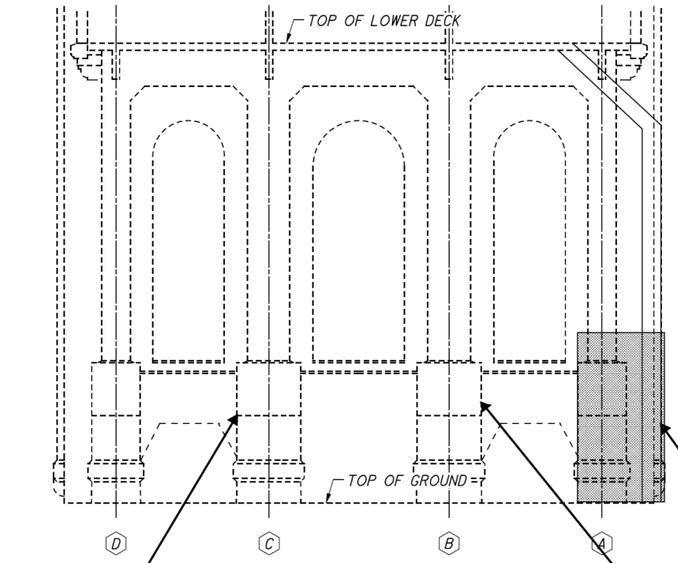
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURES, TYPE 1 REPAIR

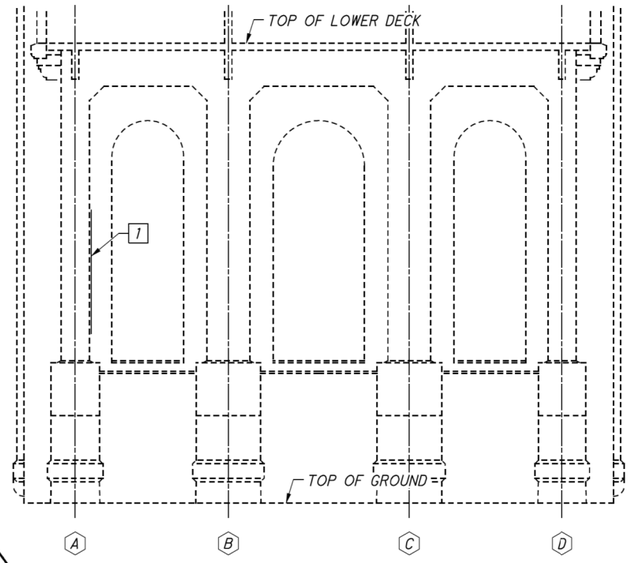
LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL PATCHING CONCRETE STRUCTURES, TYPE 1 REPAIR

LOCATION OF DEFICIENT COLUMN OR JACK ARCH TO BE REPLACED.

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 EAST STATION & SUBWAY REPAIR DETAILS



PIER 3 - EAST ELEVATION



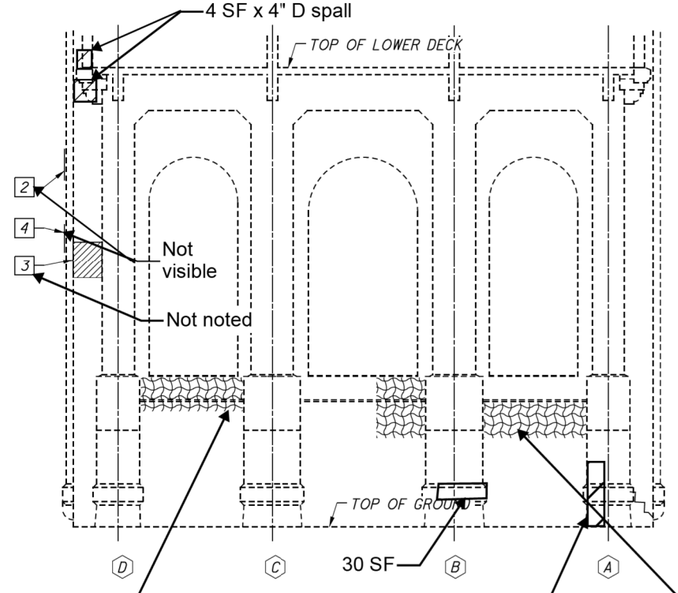
PIER 3 - WEST ELEVATION

Debris accumulations along bearings and bearing seats.

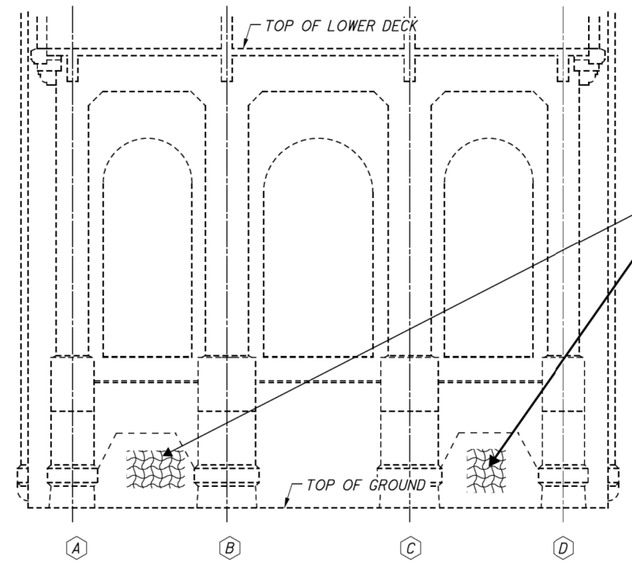
Debris accumulations along bearings and bearing seats.

Vine growth covering concrete.

4 SF x 4" D spall



PIER 4 - EAST ELEVATION



PIER 4 - WEST ELEVATION

12' H x 12' W map cracking

7' W x 4' W map cracking.

Full Height x Full Width x 1' D

30 SF map cracking

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	14	6
2	TYPE 1	6	2
3	TYPE 1	36	12
4	TYPE 1	2	1
MEASURED QUANTITY*		58	-
PLAN QUANTITY*		87	21

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	87
TYPE 2 REPAIR	SF	-

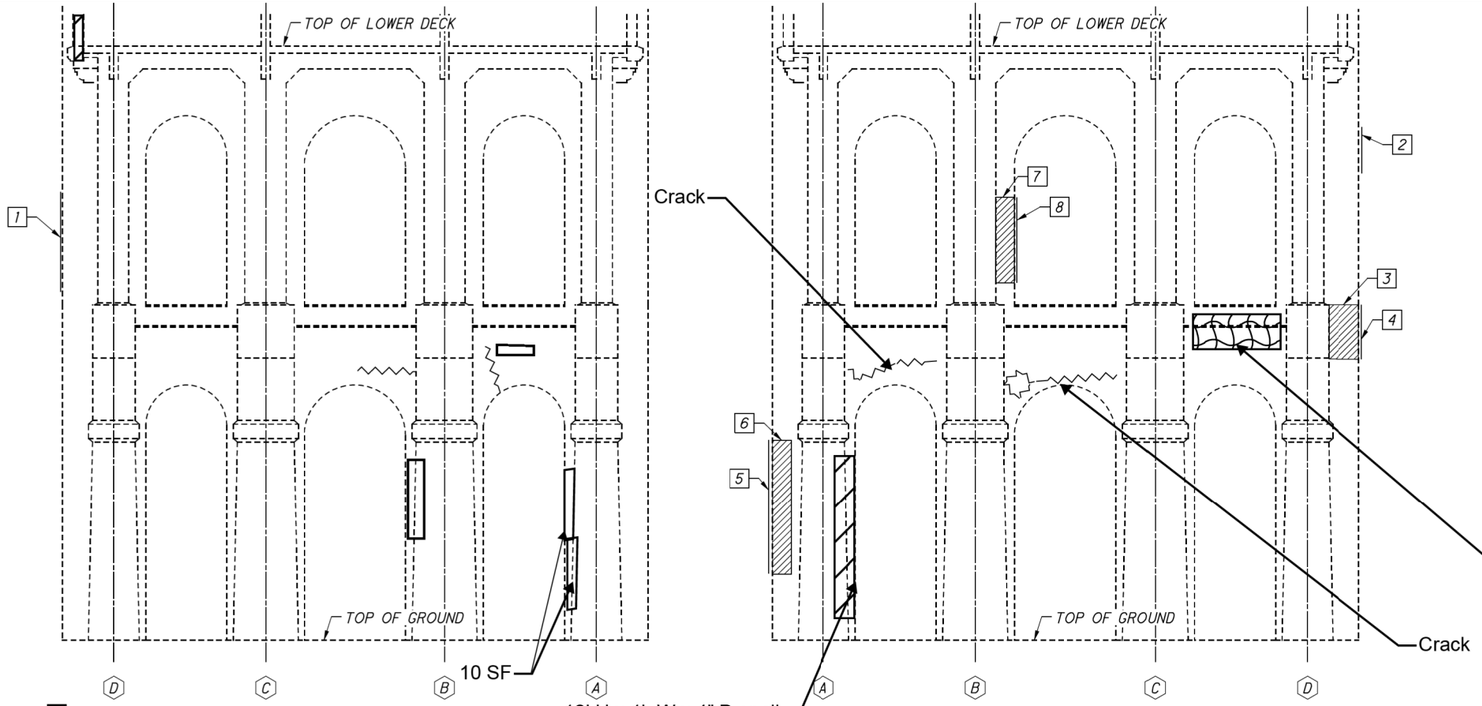
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.

LEGEND:

- (X) ARCH RIB LINE
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	PIER CONCRETE REPAIR DETAILS — PAGE A-25



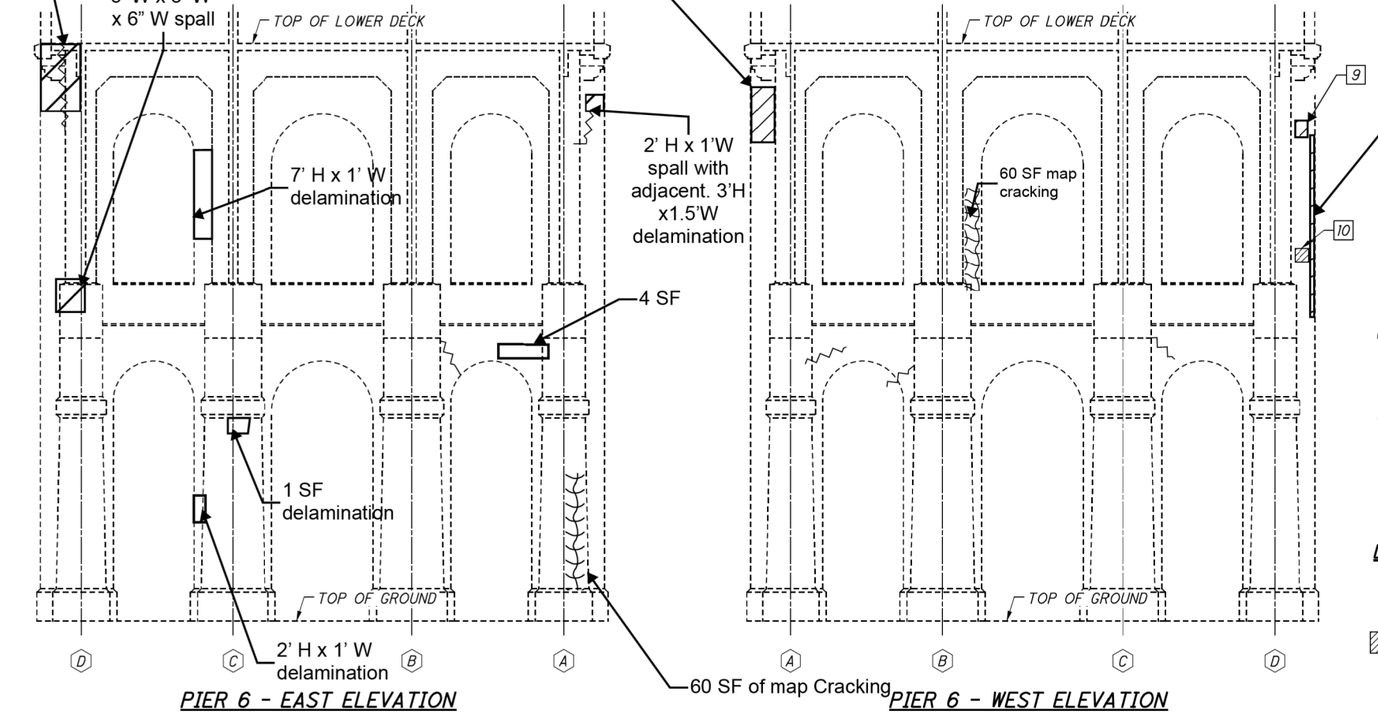
PIER 5 - EAST ELEVATION

PIER 5 - WEST ELEVATION

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	28	9
2	TYPE 1	4	1
3	TYPE 1	16	5
4	TYPE 1	5	2
5	TYPE 1	12	7
6	TYPE 1	24	7
7	TYPE 1	3	3
8	TYPE 1	3	3
9	TYPE 1	1	1
10	TYPE 1	4	1
MEASURED QUANTITY*		100	-
PLAN QUANTITY*		150	39

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	150
TYPE 2 REPAIR	SF	-



PIER 6 - EAST ELEVATION

PIER 6 - WEST ELEVATION

DEFECT NOTE:
A: TOP 15' H X 7' W APPEARS TO BE FALLING/ROTATING AWAY FROM THE ARCH RIBS. APPEARS THERE IS A 2'-3" GAP NEAR THE TOP AND NO GAP AT LOWER DECK LEVEL. CRACK ALONG SOUTH FACE ALMOST FULL WIDTH OF THE SECTION IN QUESTION.

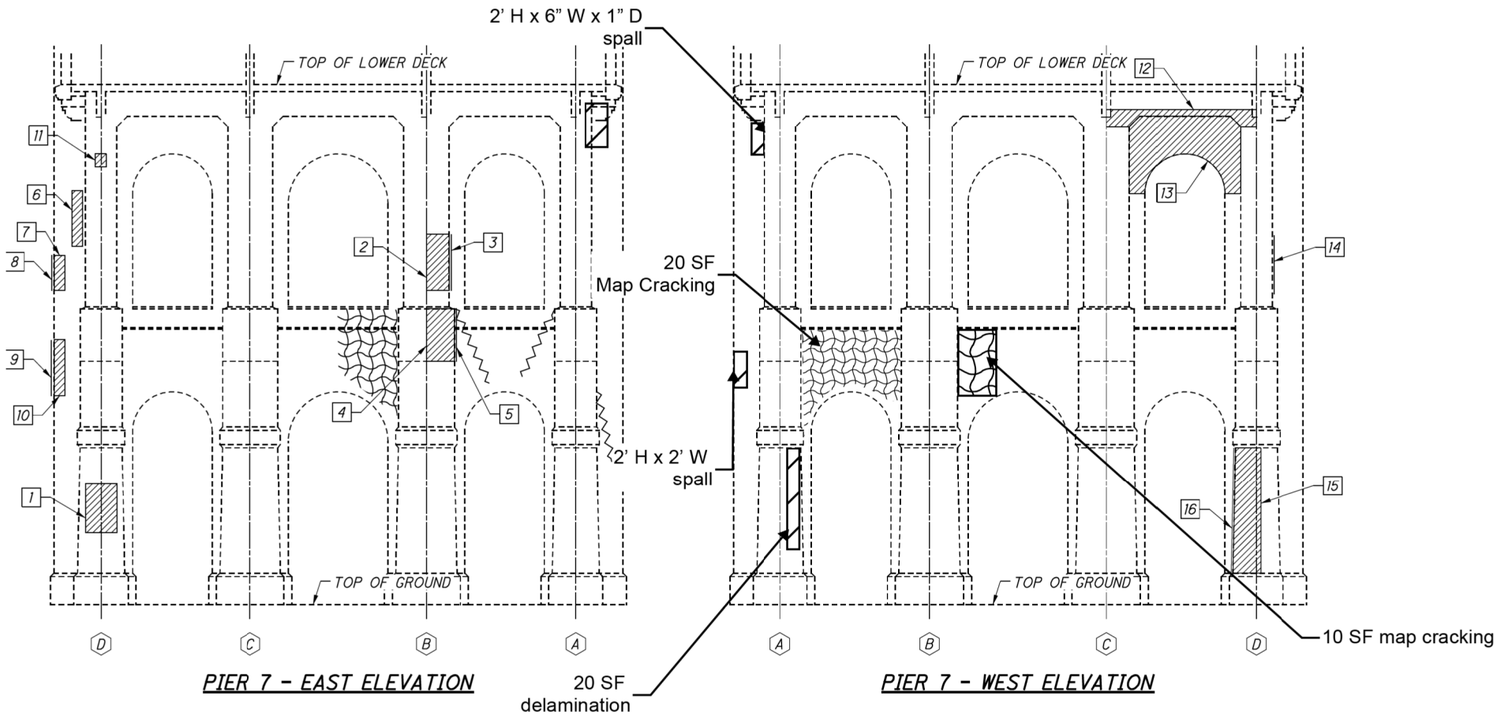
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.

LEGEND:

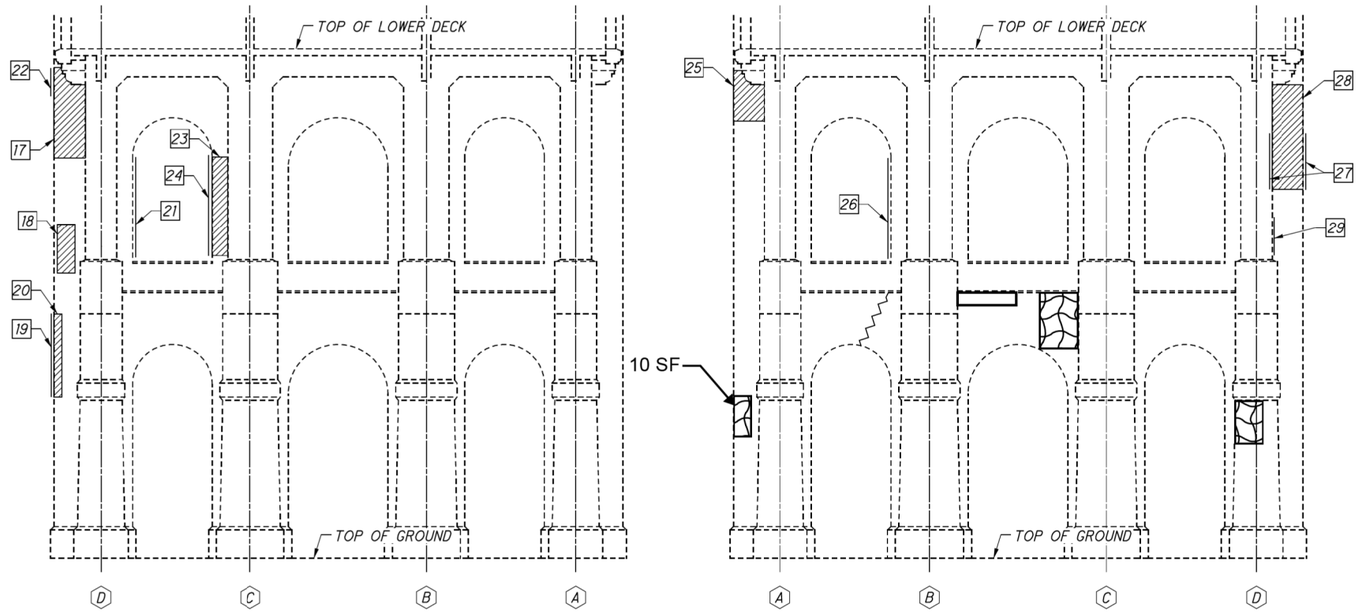
- (X) ARCH RIB LINE
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 PIER CONCRETE REPIAR DETAILS PAGE A-26



PIER 7 - EAST ELEVATION

PIER 7 - WEST ELEVATION



PIER 8 - EAST ELEVATION

PIER 8 - WEST ELEVATION

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	9	4
2	TYPE 1	12	3
3	TYPE 1	3	3
4	TYPE 1	8	5
5	TYPE 1	6	5
6	TYPE 1	7	3
7	TYPE 1	6	7
8	TYPE 1	6	7
9	TYPE 1	4	1
10	TYPE 1	4	1
11	TYPE 1	1	1
12	TYPE 1	152	30
13	TYPE 1	71	26
14	TYPE 1	18	5
15	TYPE 1	67	20
16	TYPE 1	34	10
17	TYPE 1	83	24
18	TYPE 1	21	8
19	TYPE 1	5	2
20	TYPE 1	15	9
21	TYPE 1	15	9
22	TYPE 1	8	5
23	TYPE 1	45	18
24	TYPE 1	15	9
25	TYPE 1	32	10
26	TYPE 1	150	26
27	TYPE 1	9	4
28	TYPE 1	68	20
29	TYPE 1	17	6
MEASURED QUANTITY*		891	-
PLAN QUANTITY*		1337	281

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	1337
TYPE 2 REPAIR	SF	-

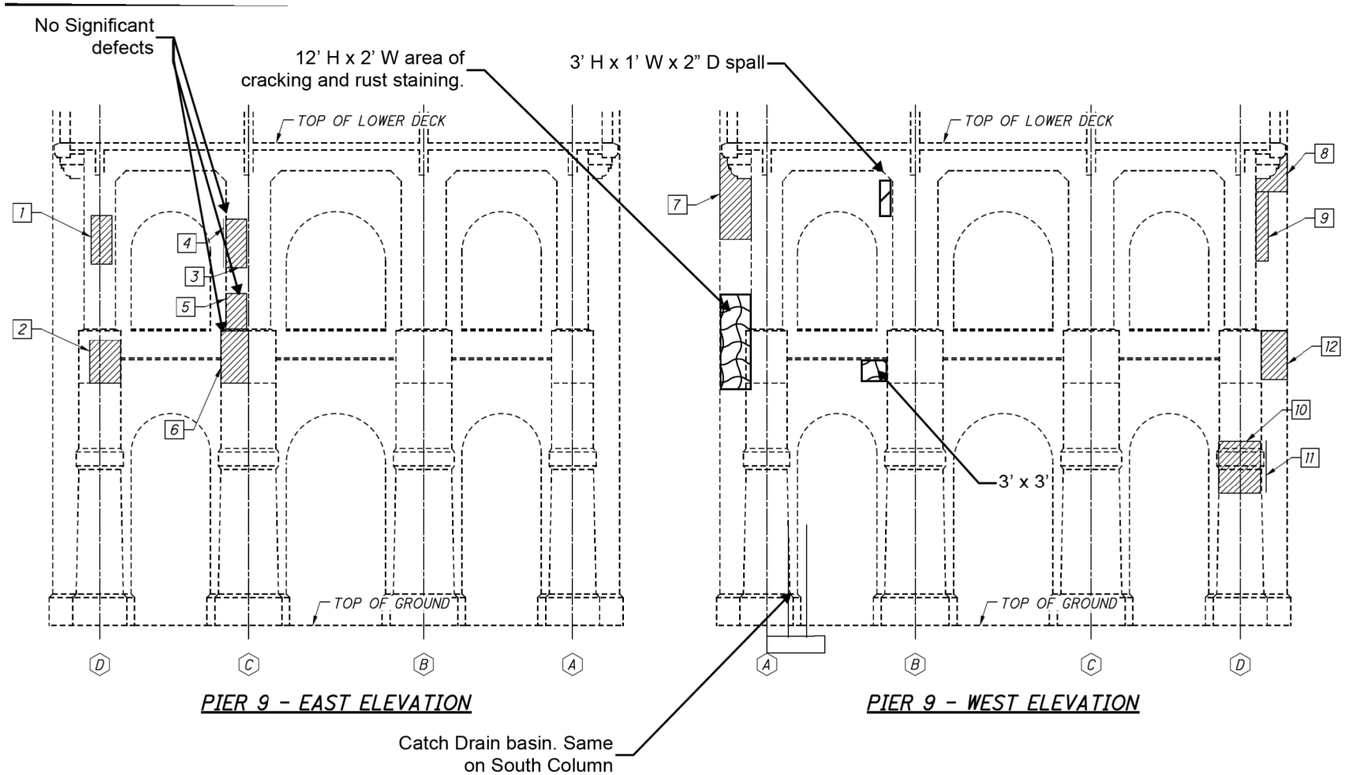
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.

LEGEND:

- (X) ARCH RIB LINE
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 PIER CONCRETE REPIAR DETAILS PAGE A-27



PIER 9 - EAST ELEVATION

PIER 9 - WEST ELEVATION

Catch Drain basin. Same on South Column

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	21	8
2	TYPE 1	11	5
3	TYPE 1	16	4
4	TYPE 1	4	4
5	TYPE 1	27	10
6	TYPE 1	4	4
7	TYPE 1	34	12
8	TYPE 1	20	6
9	TYPE 1	18	6
10	TYPE 1	9	4
11	TYPE 1	6	2
12	TYPE 1	25	8
MEASURED QUANTITY*		195	-
PLAN QUANTITY*		293	75

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	293
TYPE 2 REPAIR	SF	-

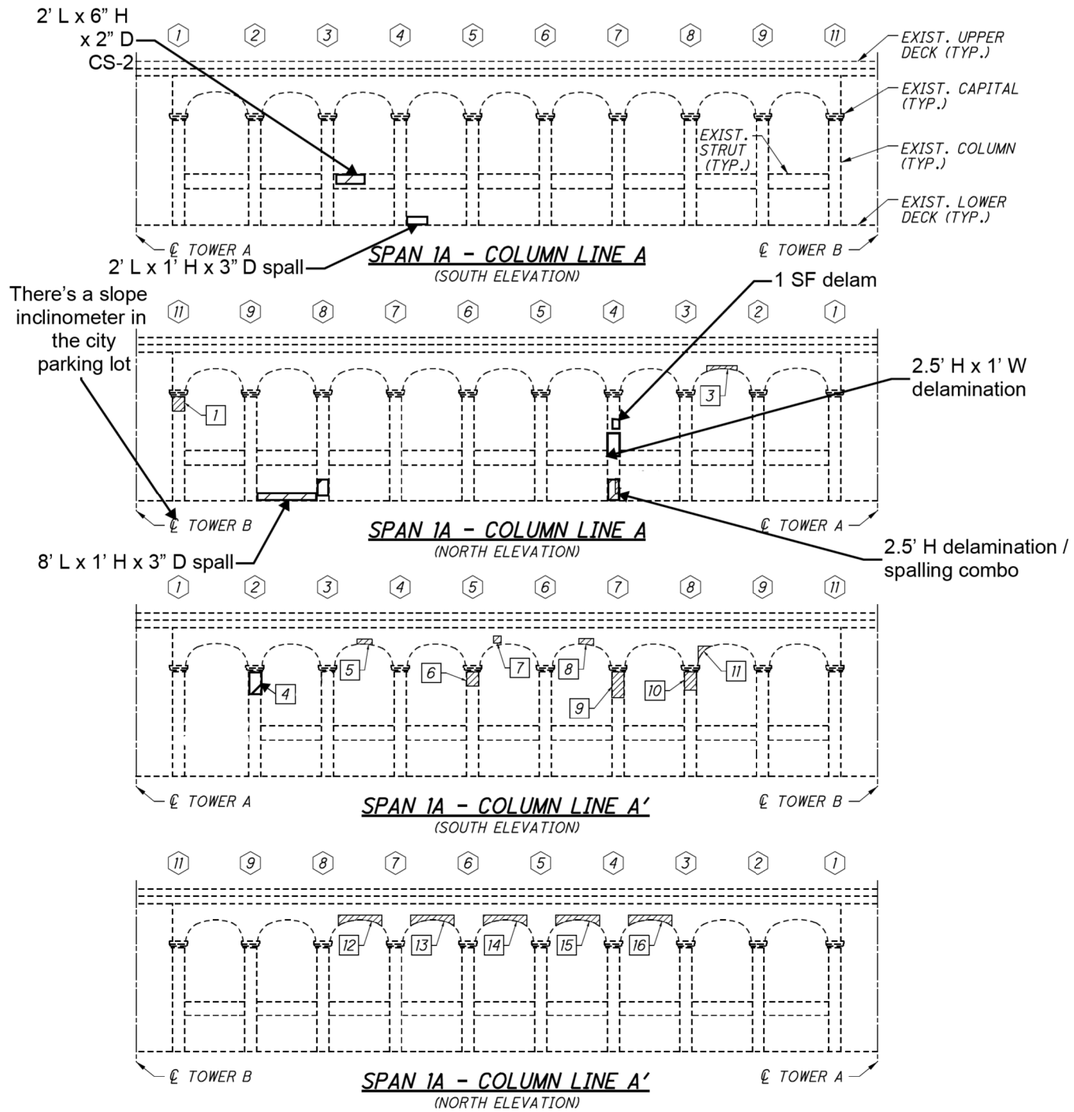
NOTES:

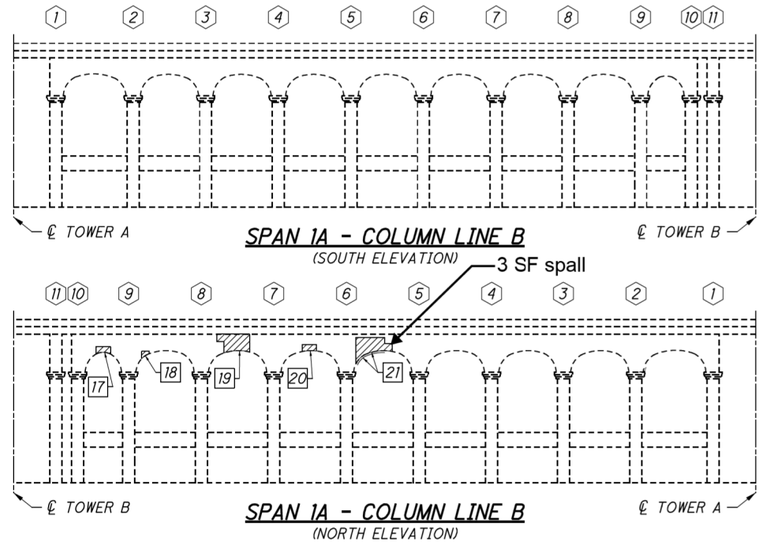
1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN SEPTEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.

LEGEND:

- (X) ARCH RIB LINE
- (#) REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 PIER CONCRETE REPIAR DETAILS PAGE A-28





ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	2	-
2	TYPE 1	1	-
3	TYPE 1	1	-
4	TYPE 1	3	-
5	TYPE 1	2	-
6	TYPE 1	3	-
7	TYPE 1	1	-
8	TYPE 1	4	-
9	TYPE 1	6	3
10	TYPE 1	5	2
11	TYPE 1	4	-
12	TYPE 1	6	5
13	TYPE 1	6	5
14	TYPE 1	6	5
15	TYPE 1	6	5
16	TYPE 1	6	5
17	TYPE 1	2	-
18	TYPE 1	1	-
19	TYPE 1	8	6
20	TYPE 1	1	-

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
21	TYPE 2	21	12
22	TYPE 1	2	-
MEASURED QUANTITY*		97	-
PLAN QUANTITY*		146	48

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	114
TYPE 2 REPAIR	SF	32

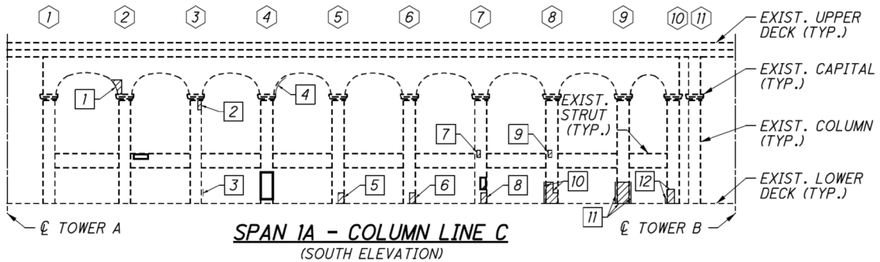
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

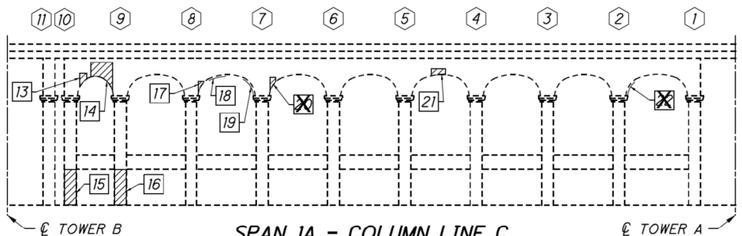
LEGEND:

- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

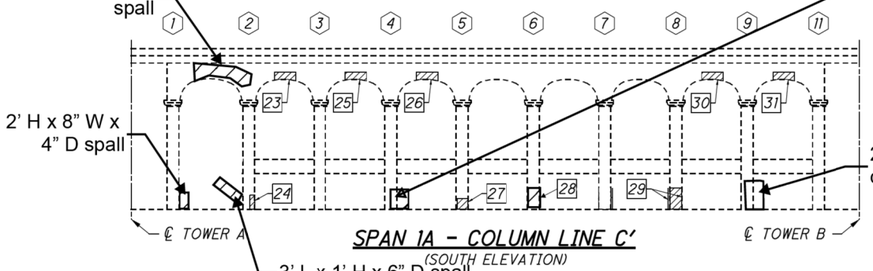
GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 SPAN 1A CONCRETE REPAIR DETAILS PAGE A-29



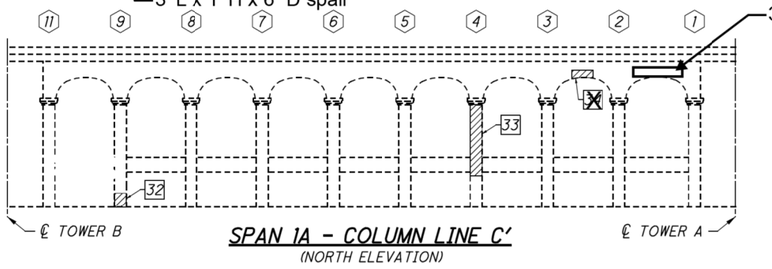
SPAN 1A - COLUMN LINE C
(SOUTH ELEVATION)



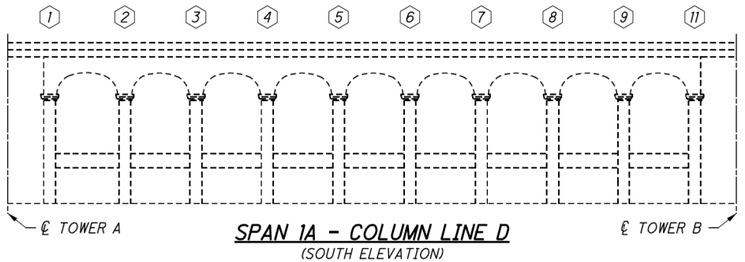
SPAN 1A - COLUMN LINE C
(NORTH ELEVATION)



SPAN 1A - COLUMN LINE C'
(SOUTH ELEVATION)

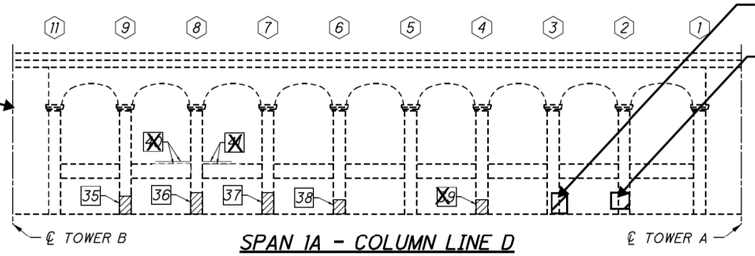


SPAN 1A - COLUMN LINE C'
(NORTH ELEVATION)



SPAN 1A - COLUMN LINE D
(SOUTH ELEVATION)

Tower B is rotating to the south West side measures 5-1/8" East side 6"



SPAN 1A - COLUMN LINE D
(NORTH ELEVATION)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	2	-
2	TYPE 1	1	-
3	TYPE 1	1	-
4	TYPE 2	3	-
5	TYPE 1	2	-
6	TYPE 1	2	-
7	TYPE 1	1	-
8	TYPE 1	2	-
9	TYPE 1	1	-
10	TYPE 1	8	4
11	TYPE 1	15	8
12	TYPE 1	4	-
13	TYPE 1	2	2
14	TYPE 1	12	8
15	TYPE 1	5	2
16	TYPE 1	5	2
17	TYPE 1	2	-
18	TYPE 2	3	-
19	TYPE 2	4	-
~~20~~	~~TYPE 1~~	~~2~~	~~-~~
21	TYPE 1	3	-
~~22~~	~~TYPE 2~~	~~5~~	~~4~~

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
23	TYPE 1	3	-
24	TYPE 1	2	-
25	TYPE 1	3	-
26	TYPE 1	3	-
27	TYPE 1	3	-
28	TYPE 1	9	4
29	TYPE 1	8	6
30	TYPE 1	3	-
31	TYPE 1	3	-
32	TYPE 1	4	-
33	TYPE 1	17	7
~~34~~	~~TYPE 1~~	~~3~~	~~-~~
35	TYPE 1	7	3
36	TYPE 1	6	2
37	TYPE 1	6	2
38	TYPE 1	4	-
~~39~~	~~TYPE 1~~	~~4~~	~~-~~
~~40~~	~~TYPE 1~~	~~6~~	~~1~~
~~41~~	~~TYPE 1~~	~~2~~	~~-~~
MEASURED QUANTITY*		181	-
PLAN QUANTITY*		272	55

* SEE NOTES 1 & 2
** SEE NOTE 3

Notes:
Floorbeams between C' and D exhibit shallow rebar and popouts throughout. 50 SF of patch work to be done.

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	249
TYPE 2 REPAIR	SF	23

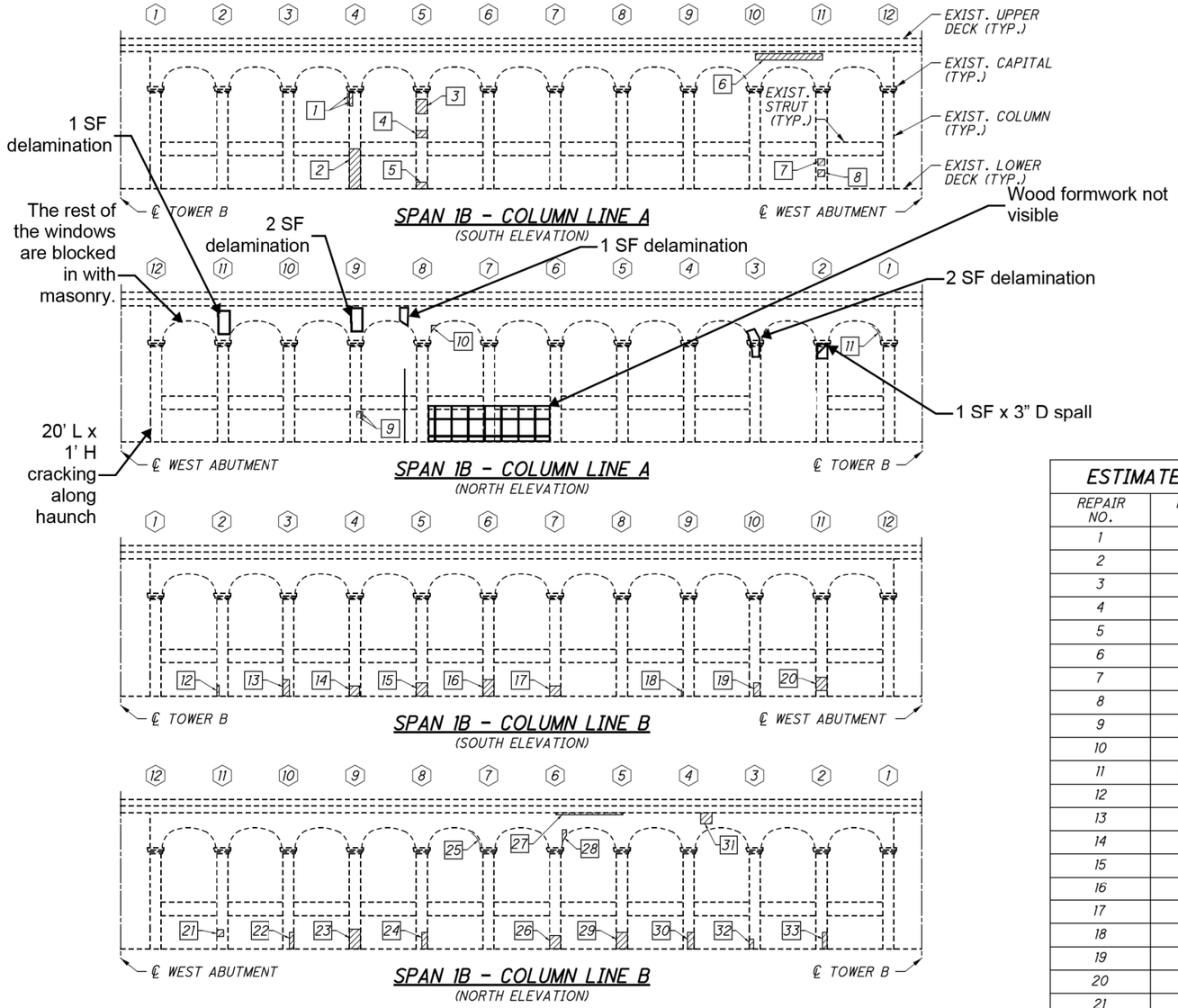
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89 .
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

LEGEND:

- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 1A CONCRETE REPAIR DETAILS — PAGE A-30



ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	2	-
2	TYPE 1	7	3
3	TYPE 1	4	-
4	TYPE 1	2	-
5	TYPE 1	2	-
6	TYPE 1	10	9
7	TYPE 1	1	-
8	TYPE 1	1	-
9	TYPE 1	2	-
10	TYPE 1	1	-
11	TYPE 2	6	6
12	TYPE 1	1	-
13	TYPE 1	3	-
14	TYPE 1	3	-
15	TYPE 1	4	-
16	TYPE 1	5	2
17	TYPE 1	3	-
18	TYPE 1	1	-
19	TYPE 1	2	-
20	TYPE 1	4	-
21	TYPE 1	1	-
22	TYPE 1	2	-

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
23	TYPE 1	5	1
24	TYPE 1	3	-
25	TYPE 2	3	-
26	TYPE 1	4	-
27	TYPE 1	4	-
28	TYPE 1	2	-
29	TYPE 1	5	7
30	TYPE 1	3	-
31	TYPE 1	3	-
32	TYPE 1	1	-
33	TYPE 1	2	-
MEASURED QUANTITY*		102	-
PLAN QUANTITY*		153	28

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	139
TYPE 2 REPAIR	SF	14

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

LEGEND:

(#) SPANDREL COLUMN NUMBER

[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET

NOT TO SCALE

DATE

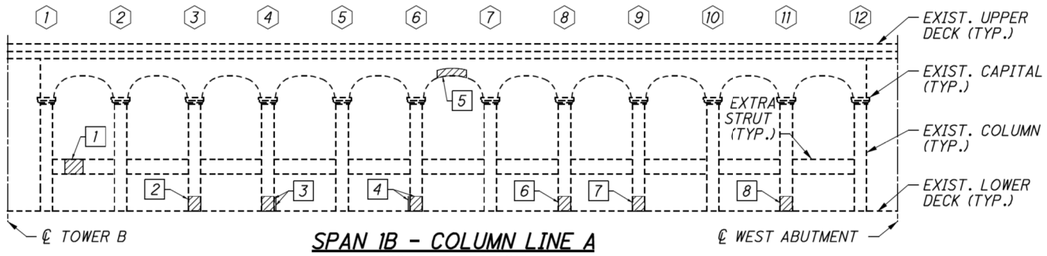
NOV, 2018

9902 Carver Road
Suite 201
Cincinnati, OH 45242
PH.: 614.699.5000
INFRASTRUCTURE ENGINEERS, INC.

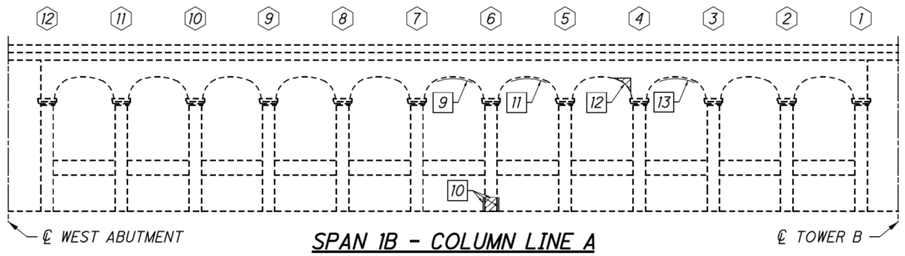
DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER
BRIDGE NO. CUY-6-1465

SPAN 1B CONCRETE REPAIR DETAILS

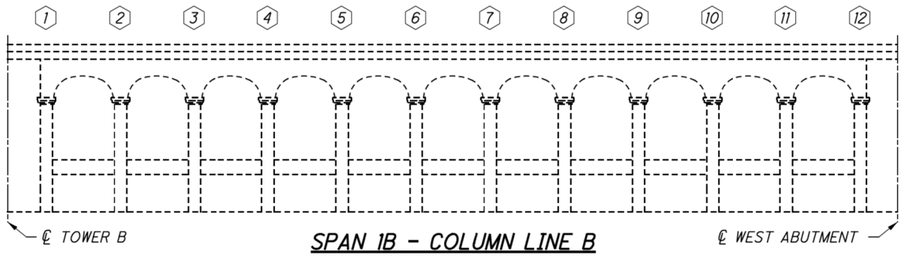
PAGE A-31



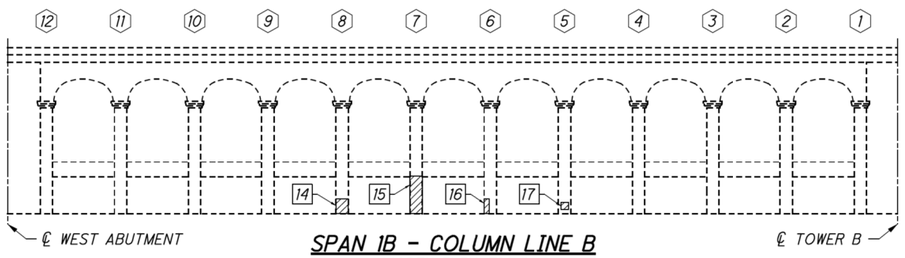
SPAN 1B - COLUMN LINE A
(SOUTH ELEVATION)



SPAN 1B - COLUMN LINE A
(NORTH ELEVATION)



SPAN 1B - COLUMN LINE B
(SOUTH ELEVATION)



SPAN 1B - COLUMN LINE B
(NORTH ELEVATION)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	5	4
2	TYPE 1	4	-
3	TYPE 1	8	4
4	TYPE 1	8	4
5	TYPE 1	4	-
6	TYPE 1	4	-
7	TYPE 1	4	-
8	TYPE 1	4	-
9	TYPE 2	6	4
10	TYPE 1	12	8
11	TYPE 2	5	4
12	TYPE 1	2	-
13	TYPE 2	4	-
14	TYPE 1	4	-
15	TYPE 1	10	4
16	TYPE 1	2	-
17	TYPE 1	1	-
MEASURED QUANTITY*		87	-
PLAN QUANTITY*		131	32

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	108
TYPE 2 REPAIR	SF	23

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR THE EMBEDDED GALVANIC ANODES, SEE SHEET [84/89].
5. EPOXY-URETHANE SEALER SHALL NOT BE APPLIED TO PATCHED OR REPLACED CONCRETE SURFACES.

LEGEND:

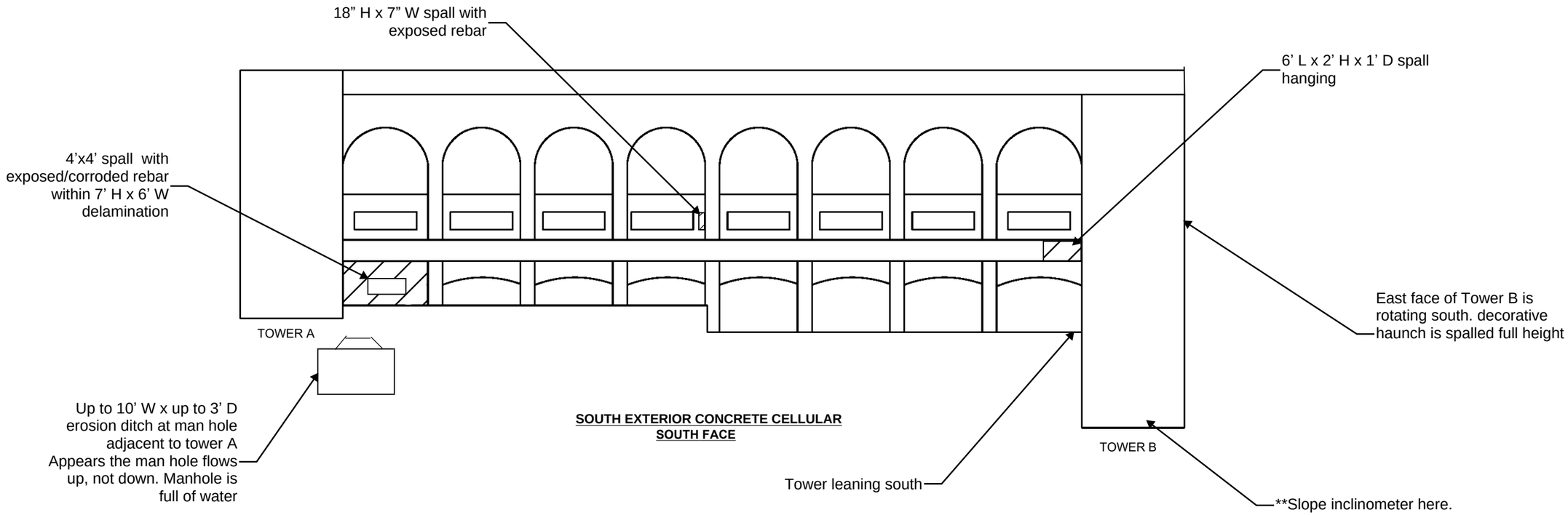
(#) SPANDREL COLUMN NUMBER

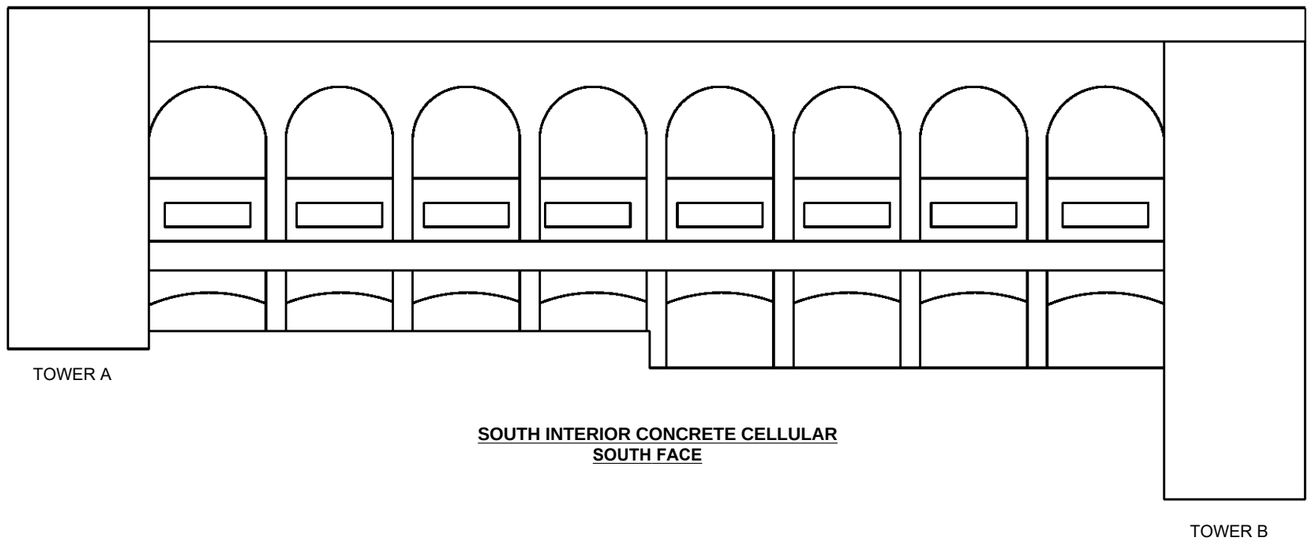
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 SPAN 1B CONCRETE REPAIR DETAILS PAGE A-32

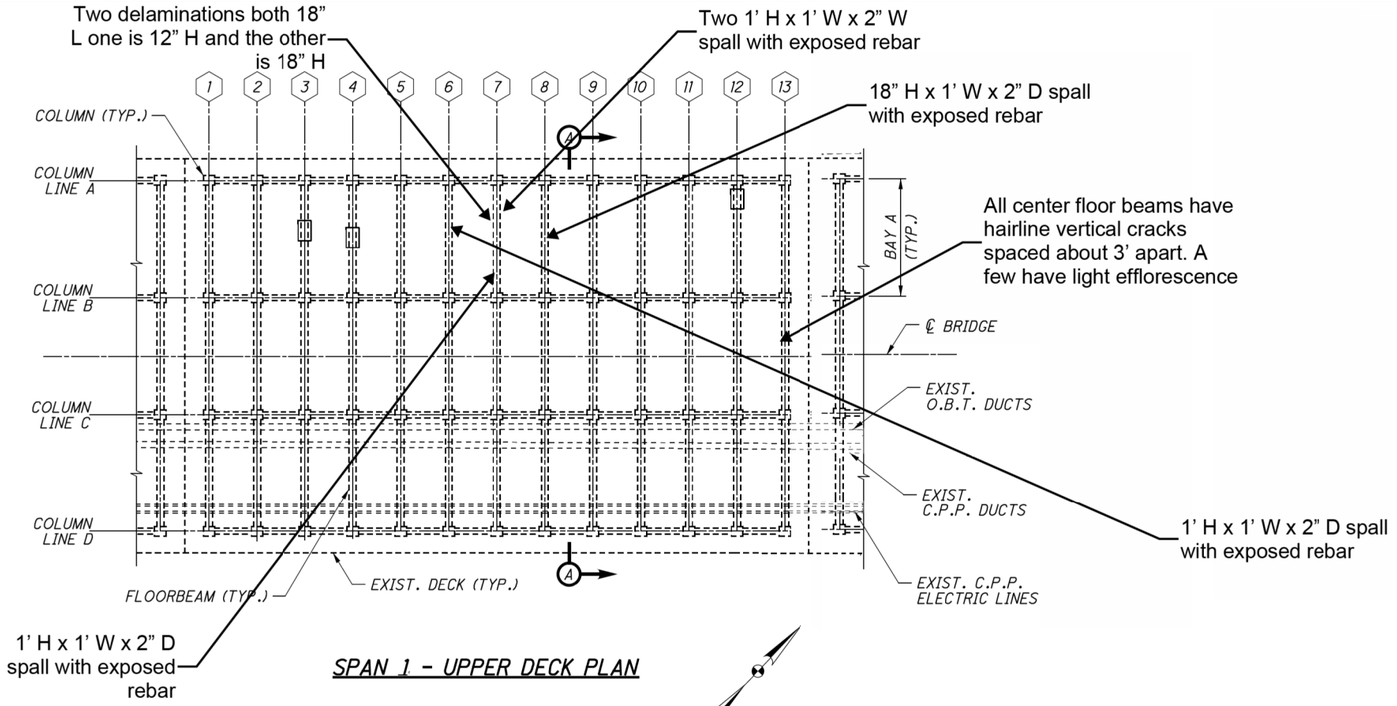




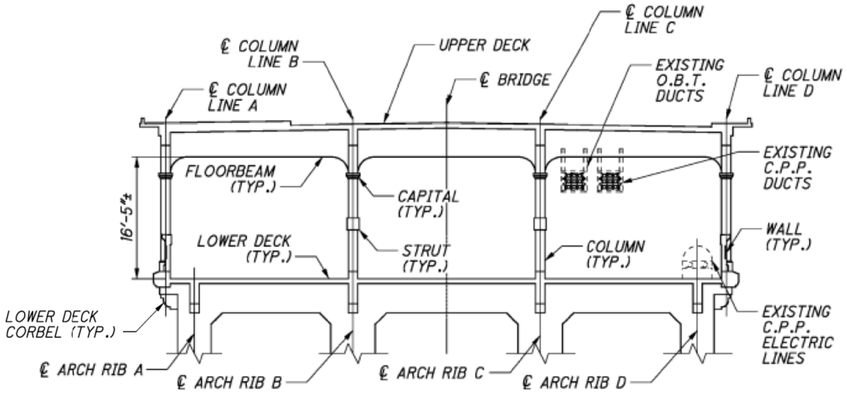
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

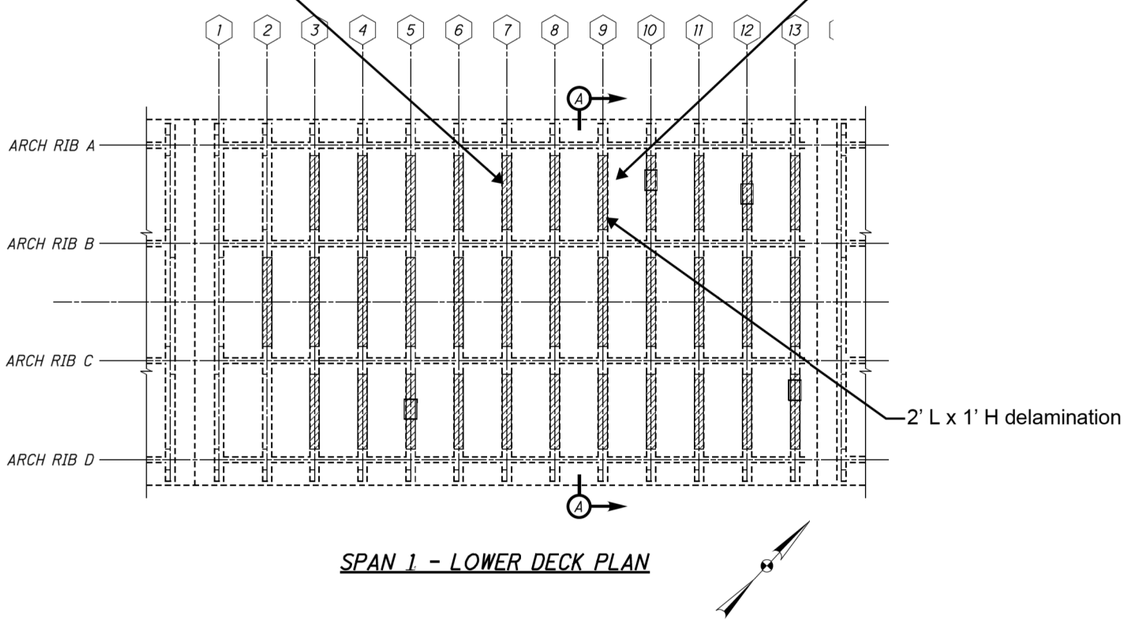
GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 STRUCTURE ELEVATION - SPAN 1A PAGE A-33



SPAN 1 - UPPER DECK PLAN



SECTION A-A



SPAN 1 - LOWER DECK PLAN

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN OCTOBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

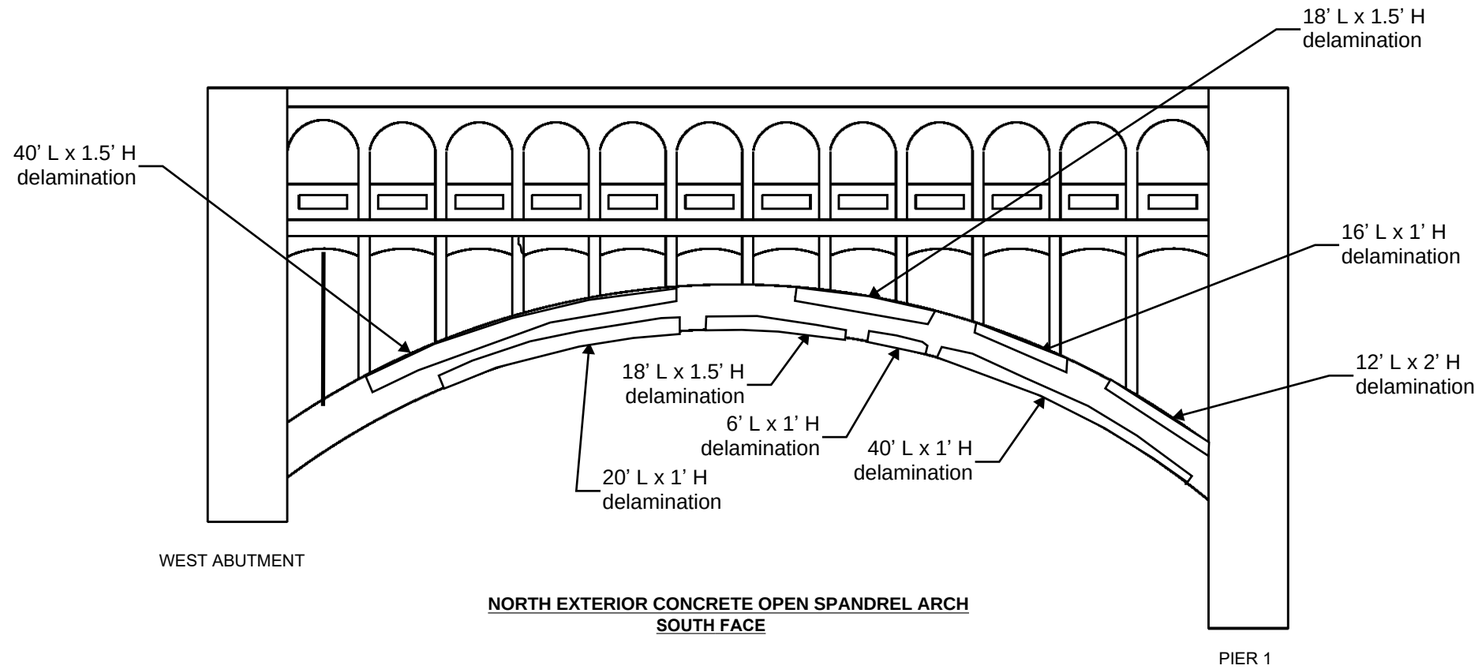
LEGEND:

(#) FLOORBEAM LINE NUMBER

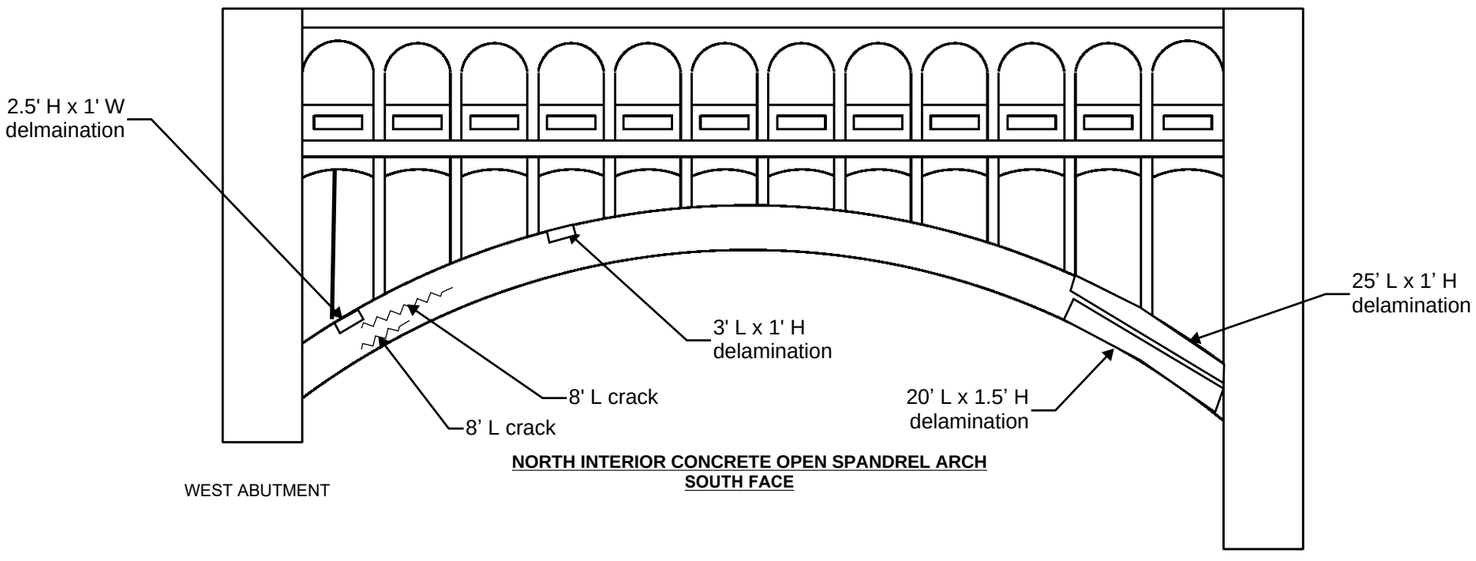
[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 1 CONCRETE REPAIR DETAILS — PAGE A-34



NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

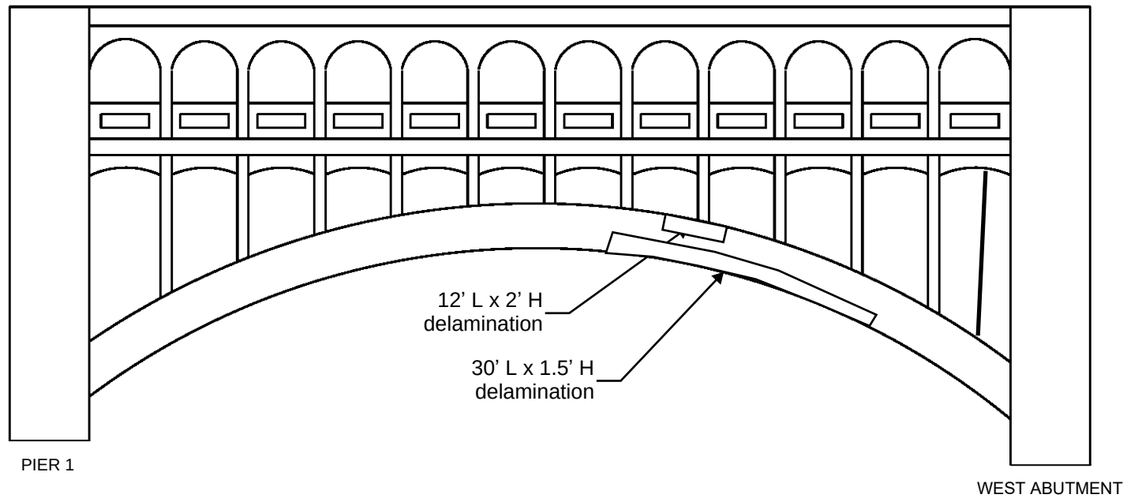


NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

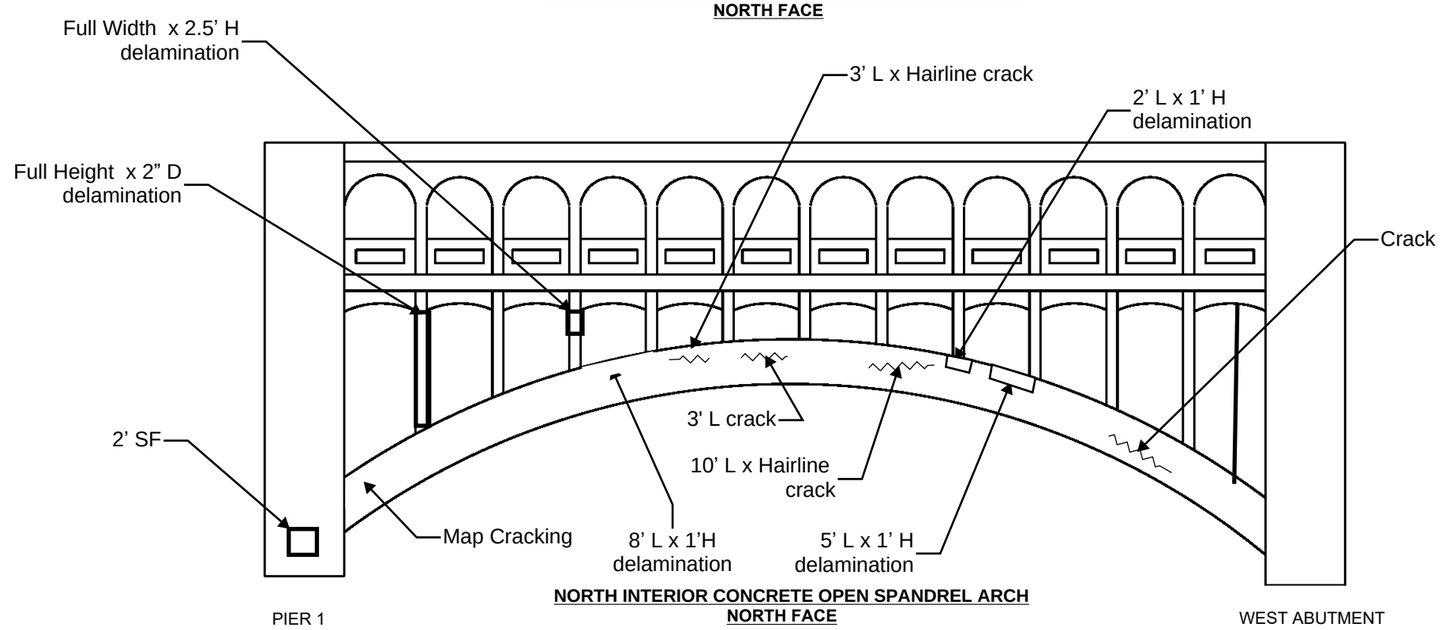
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 1 — PAGE A-35



NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

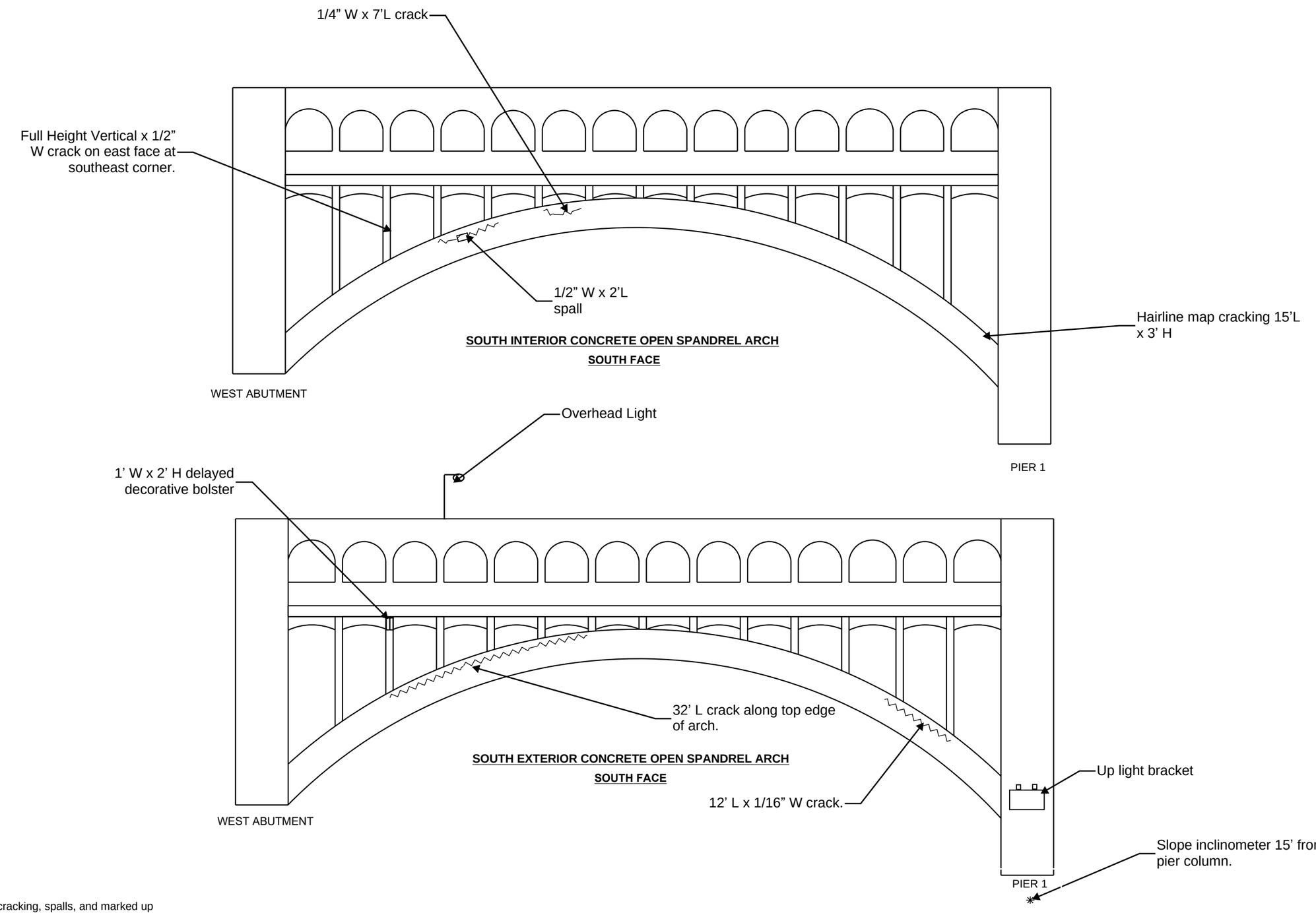


NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

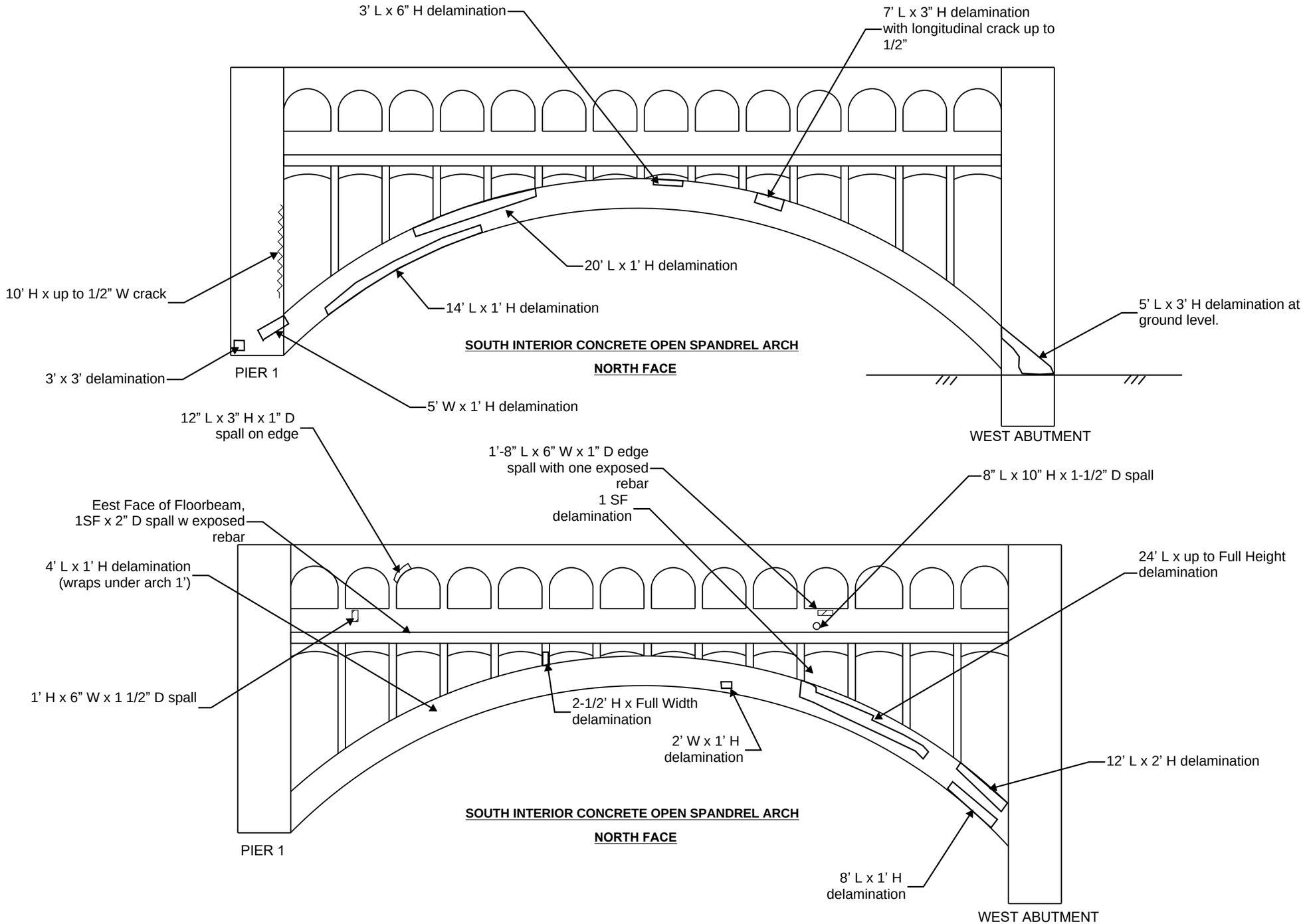
GRAPHIC SCALE MEASURED IN FEET	**DATE**	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465**
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 1 — **PAGE** A-36



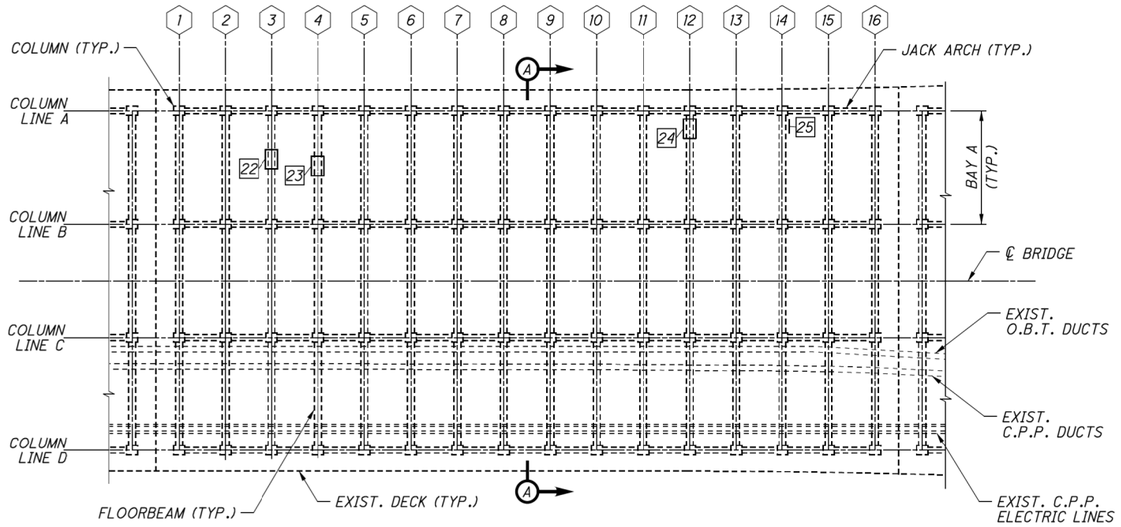
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

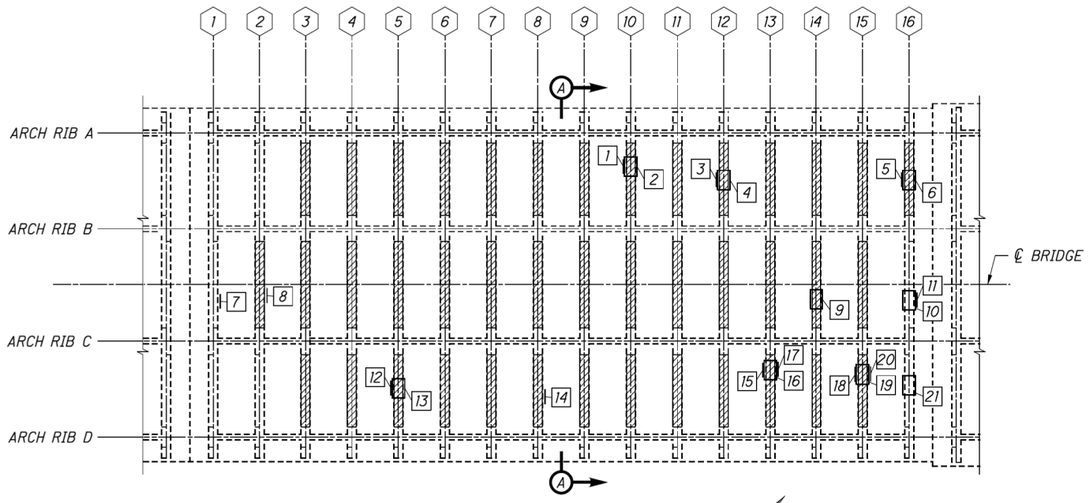
GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 1	PAGE A-37



GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018		STRUCTURAL ELEVATION - SPAN 1	PAGE A-38



SPAN 2 - UPPER DECK PLAN



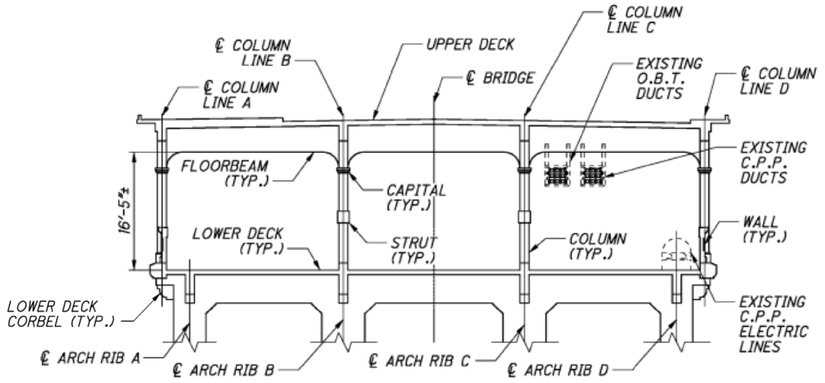
SPAN 2 - LOWER DECK PLAN

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	5	3
2	TYPE 2	10	4
3	TYPE 1	10	5
4	TYPE 2	10	8
5	TYPE 1	5	3
6	TYPE 2	10	4
7	TYPE 1	4	1
8	TYPE 1	3	2
9	TYPE 2	10	8
10	TYPE 2	12	10
11	TYPE 1	20	5
12	TYPE 1	10	3
13	TYPE 2	10	8
14	TYPE 1	8	2
15	TYPE 1	10	3
16	TYPE 2	10	4
17	TYPE 1	5	3

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
18	TYPE 1	10	5
19	TYPE 2	10	4
20	TYPE 1	20	5
21	TYPE 2	33	13
22	TYPE 2	2	1
23	TYPE 2	3	2
24	TYPE 2	1	1
25	TYPE 1	12	3
MEASURED QUANTITY*		243	-
PLAN QUANTITY*		365	110

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	183
TYPE 2 REPAIR	SF	182
FRP WRAP	SF	3524



SECTION A-A

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN OCTOBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

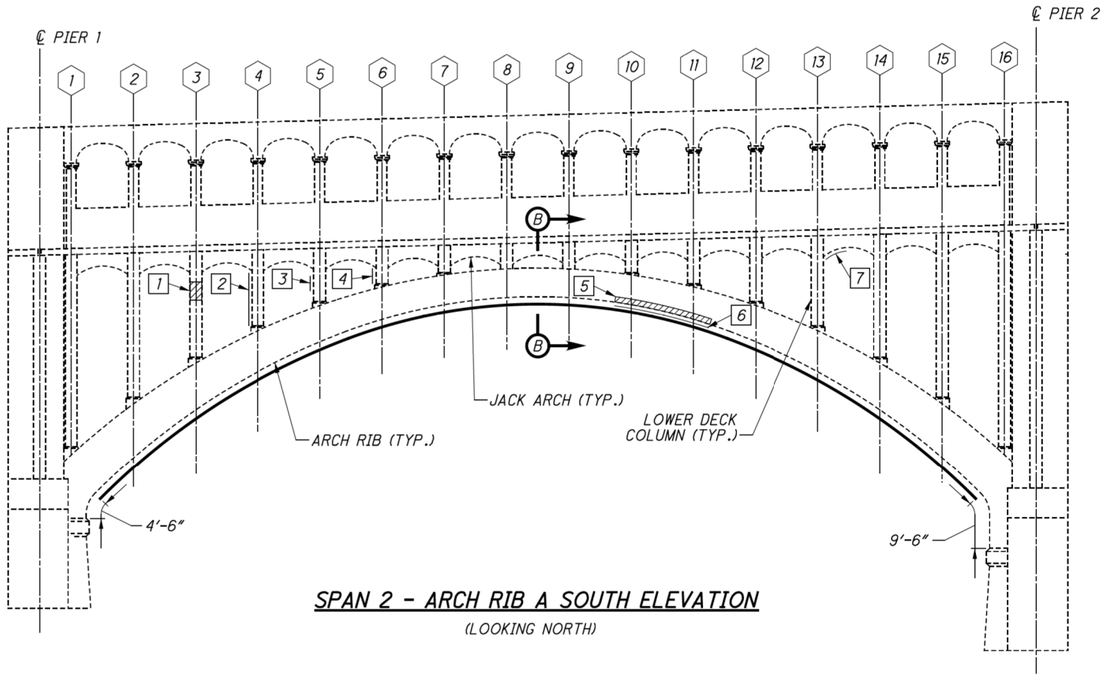
LEGEND:

(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

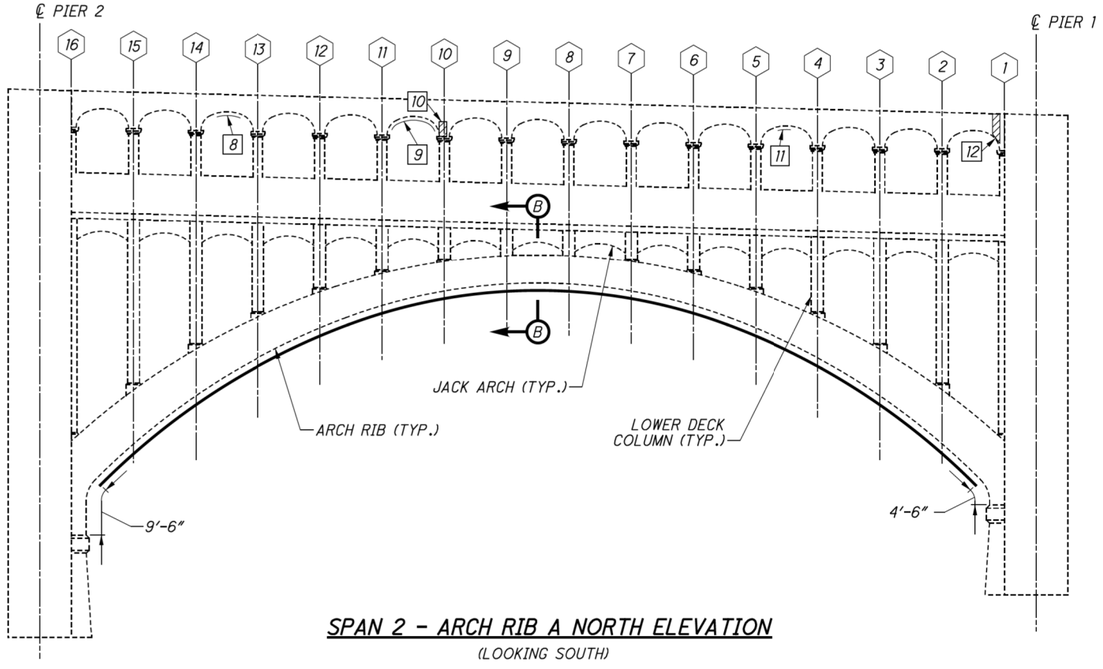
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 2 CONCRETE REPAIR DETAILS — PAGE A-39



SPAN 2 - ARCH RIB A SOUTH ELEVATION

(LOOKING NORTH)



SPAN 2 - ARCH RIB A NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	6	2
2	TYPE 1	14	4
3	TYPE 1	2	1
4	TYPE 1	6	2
5	TYPE 1	14	-
6	TYPE 2	14	10
7	TYPE 2	3	2
8	TYPE 2	5	2
9	TYPE 2	8	6
10	TYPE 1	2	1
11	TYPE 2	2	1
12	TYPE 1	4	2
MEASURED QUANTITY*		80	-
PLAN QUANTITY*		120	33

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	72
TYPE 2 REPAIR	SF	48
FRP WRAP	SF	1949

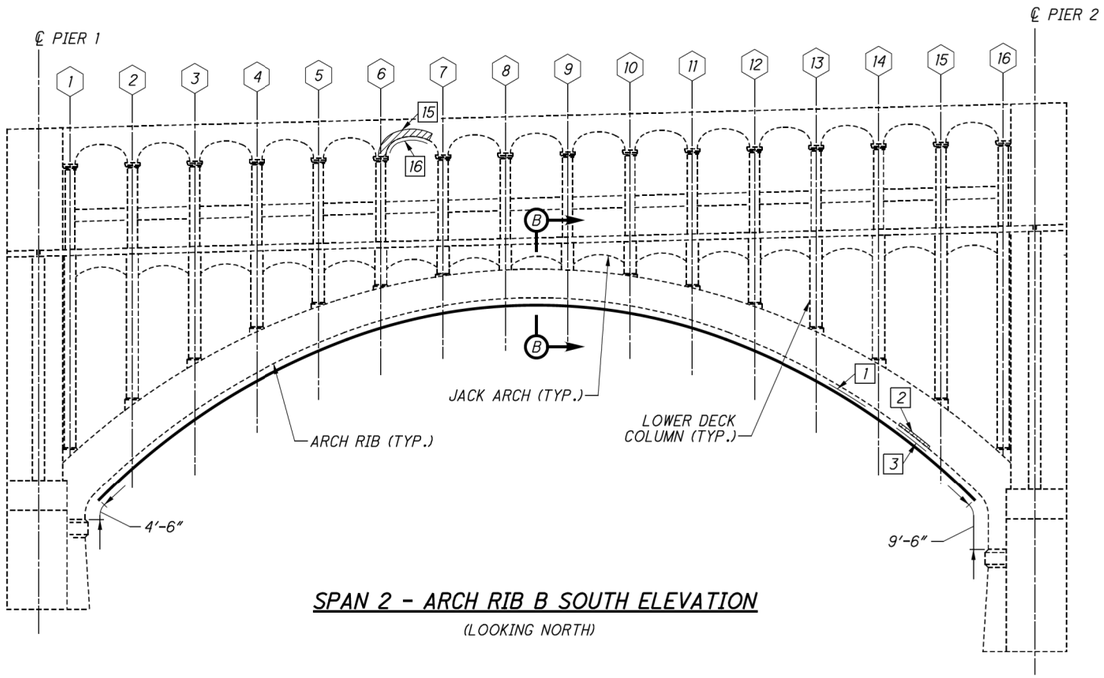
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN NOVEMBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

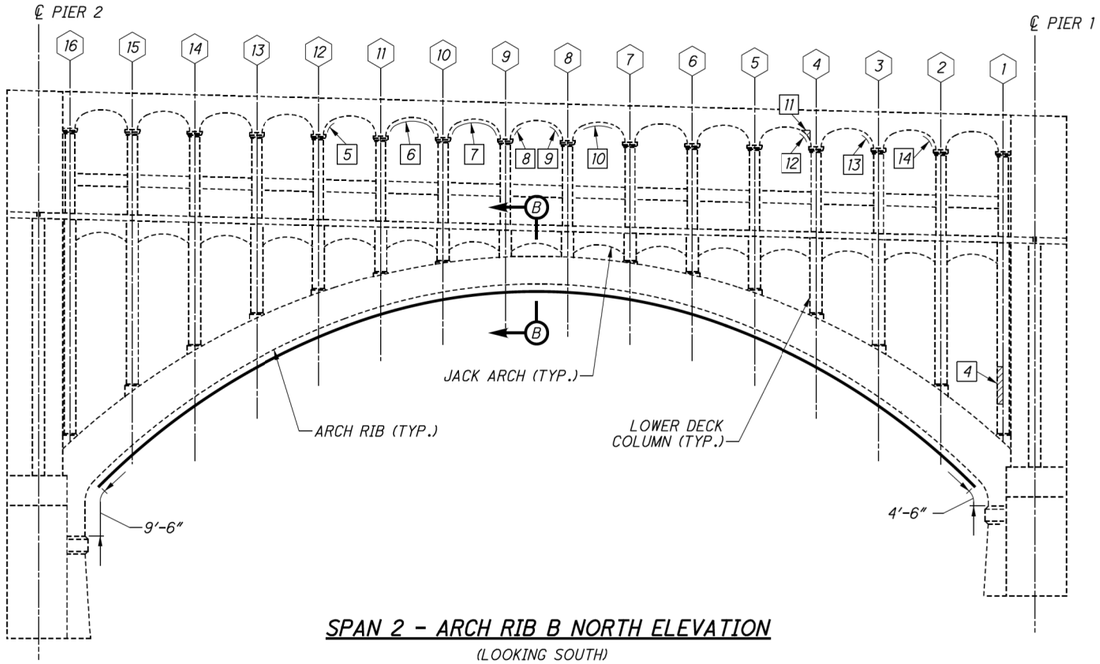
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 1 CONCRETE REPAIR DETAILS	PAGE A-40



SPAN 2 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)



SPAN 2 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 2	6	4
2	TYPE 1	1	-
3	TYPE 2	5	4
4	TYPE 1	6	3
5	TYPE 2	2	1
6	TYPE 2	18	8
7	TYPE 2	18	8
8	TYPE 2	6	2
9	TYPE 2	6	2
10	TYPE 2	9	4
11	TYPE 1	1	1
12	TYPE 2	1	1
13	TYPE 2	2	1
14	TYPE 2	4	2
15	TYPE 1	10	5
16	TYPE 2	12	6
MEASURED QUANTITY*		107	-
PLAN QUANTITY*		161	52

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	27
TYPE 2 REPAIR	SF	134
FRP WRAP	SF	2322

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN NOVEMBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

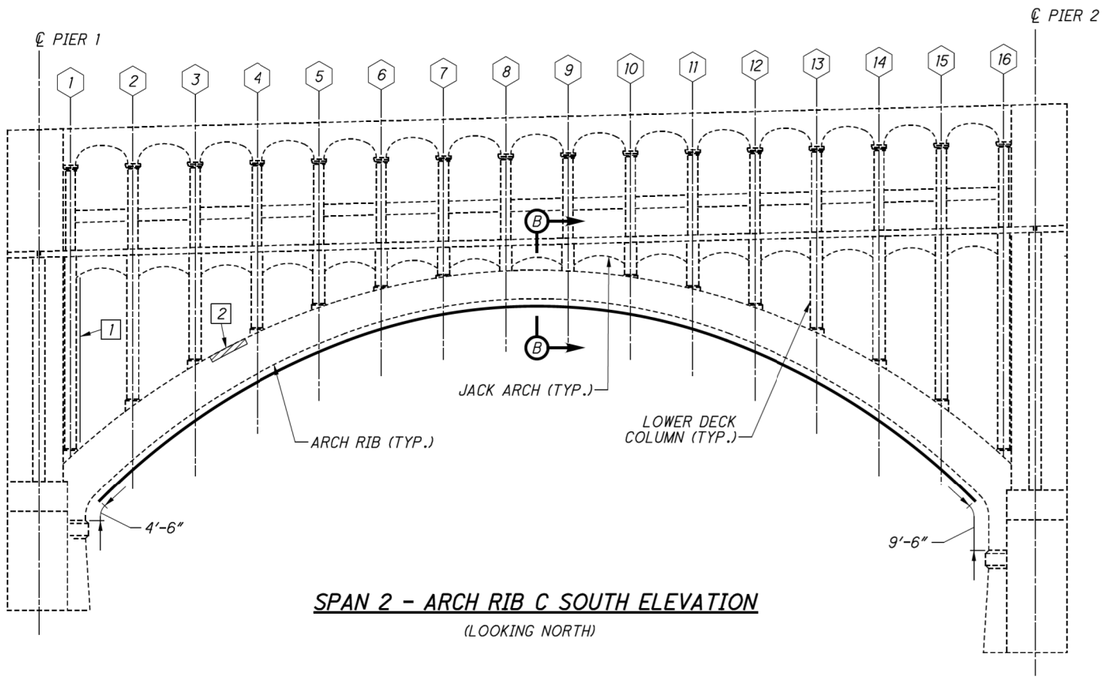
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

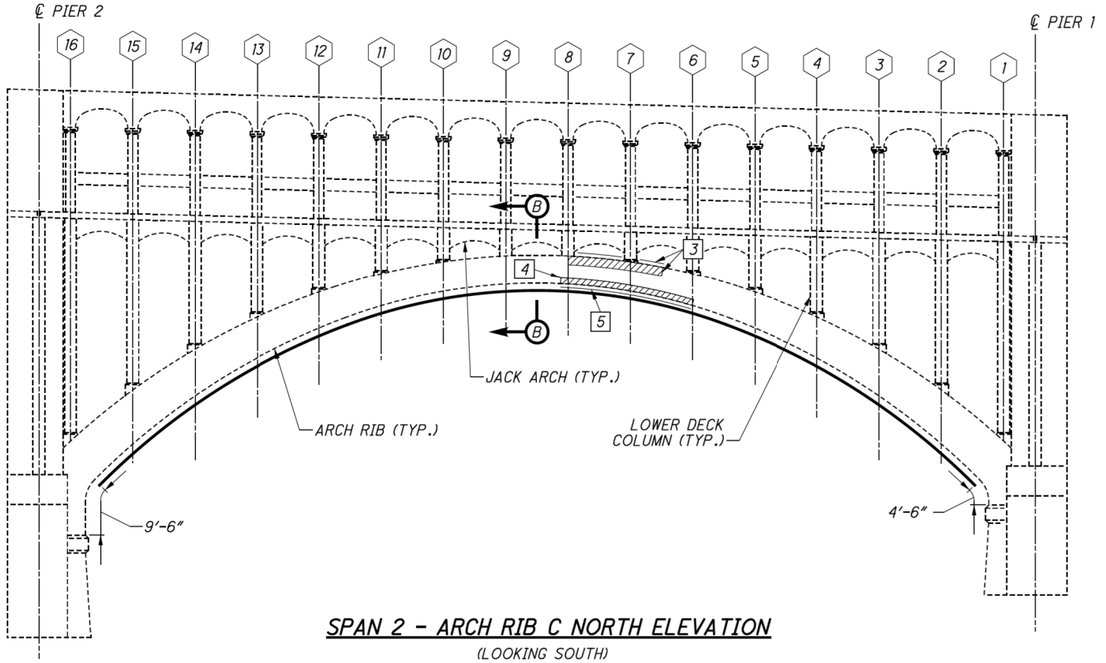
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 SPAN 2 CONCRETE REPAIR DETAILS PAGE A-41



SPAN 2 - ARCH RIB C SOUTH ELEVATION

(LOOKING NORTH)



SPAN 2 - ARCH RIB C NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	56	14
2	TYPE 1	6	-
3	TYPE 1	40	12
4	TYPE 1	23	-
5	TYPE 2	23	17
MEASURED QUANTITY*		148	-
PLAN QUANTITY*		222	43

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	188
TYPE 2 REPAIR	SF	34
FRP WRAP	SF	2322

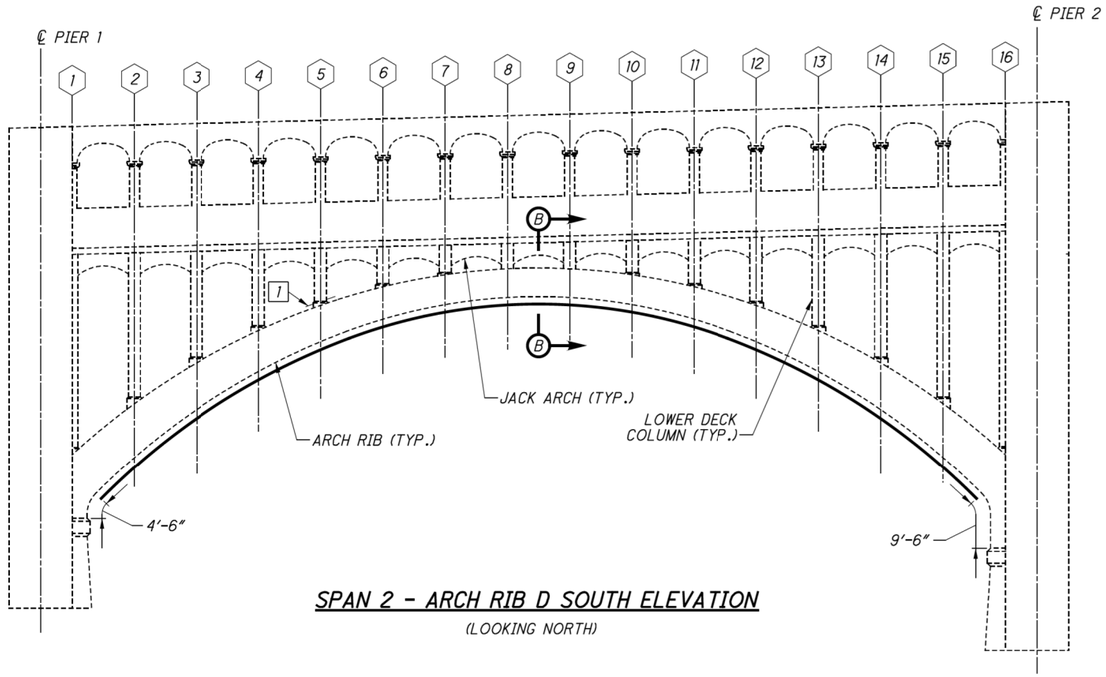
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN NOVEMBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

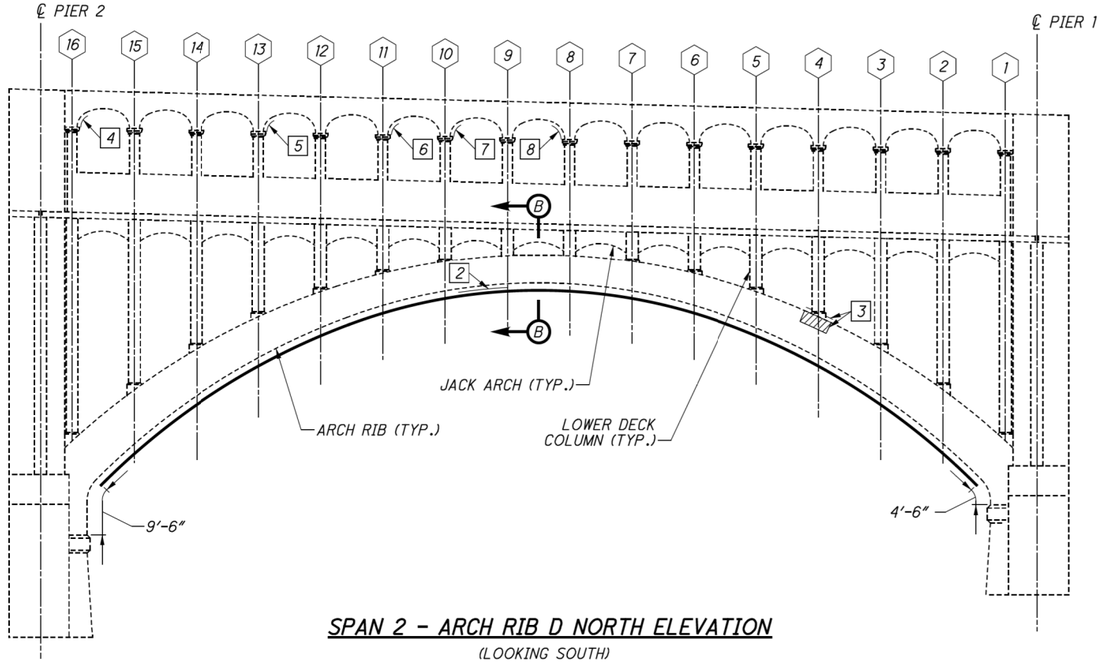
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 2 CONCRETE REPAIR DETIALS — PAGE A-42



SPAN 2 - ARCH RIB D SOUTH ELEVATION

(LOOKING NORTH)



SPAN 2 - ARCH RIB D NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	5	4
2	TYPE 2	24	12
3	TYPE 1	12	3
4	TYPE 2	3	1
5	TYPE 2	3	1
6	TYPE 2	4	2
7	TYPE 2	8	3
8	TYPE 2	8	3
MEASURED QUANTITY*		67	-
PLAN QUANTITY*		101	29

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	26
TYPE 2 REPAIR	SF	75
FRP WRAP	SF	1949

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN NOVEMBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

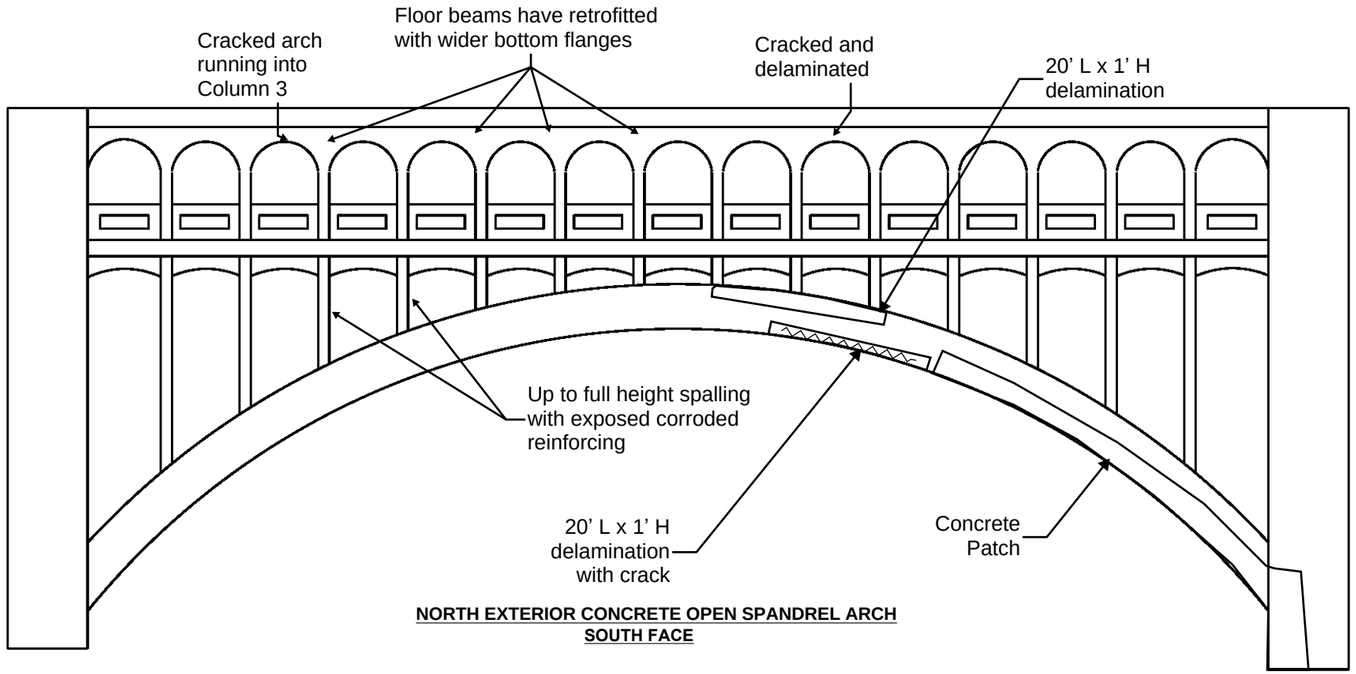
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

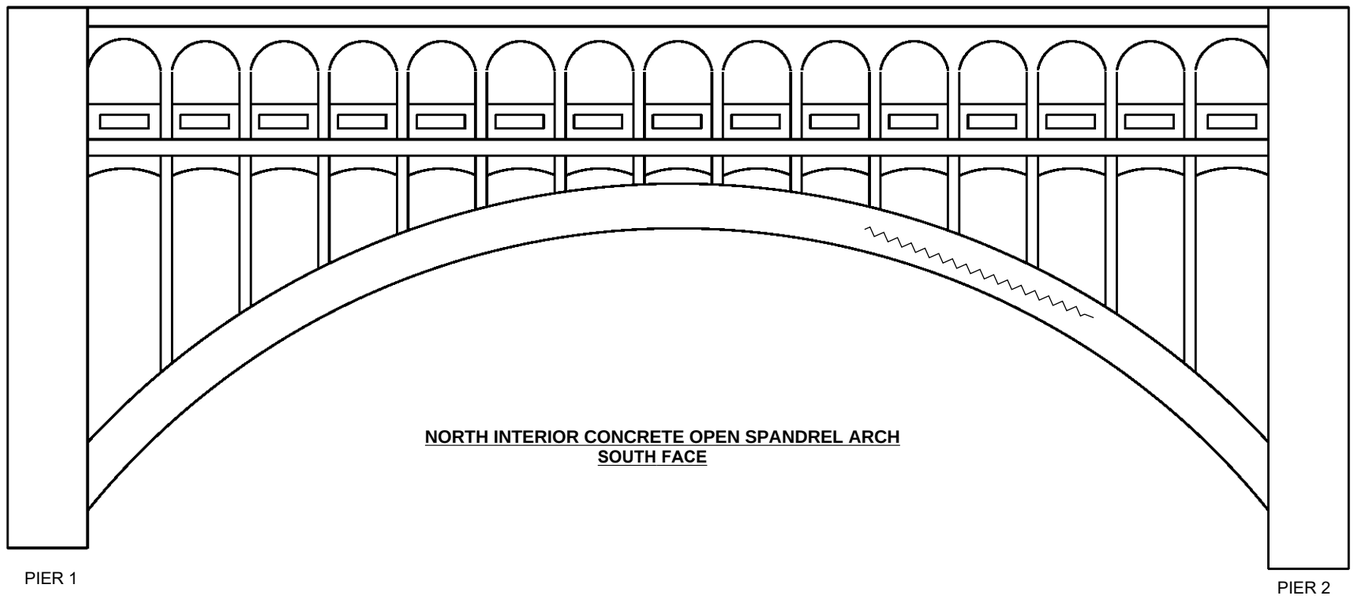
LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 2 CONCRETE REPAIR DETAILS	PAGE A-43



NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

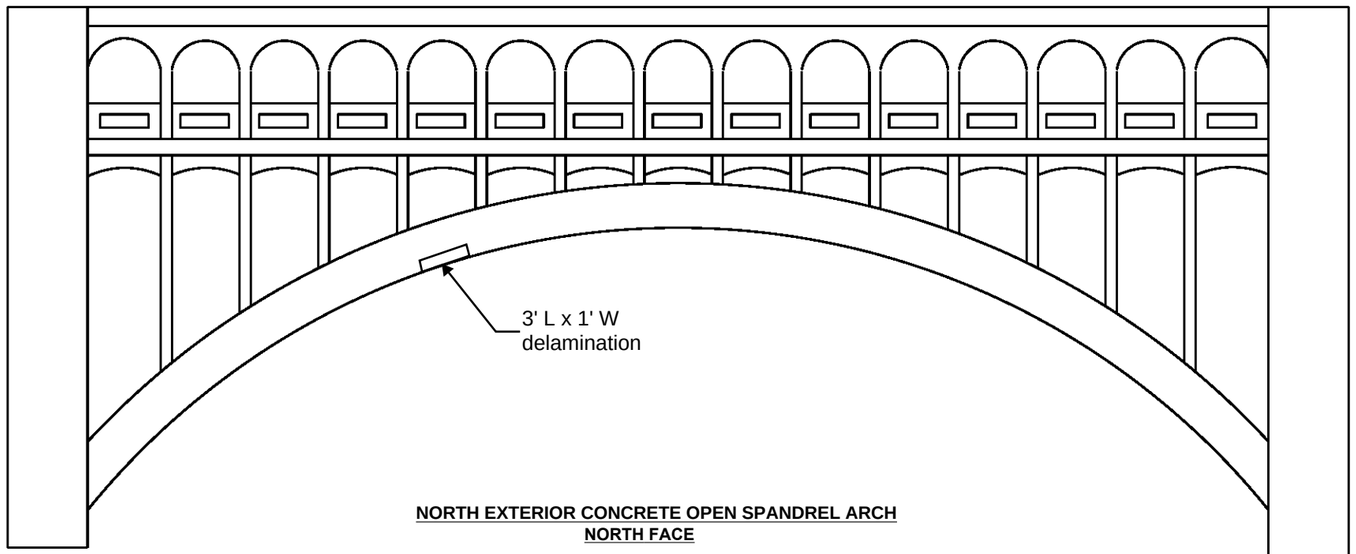


NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

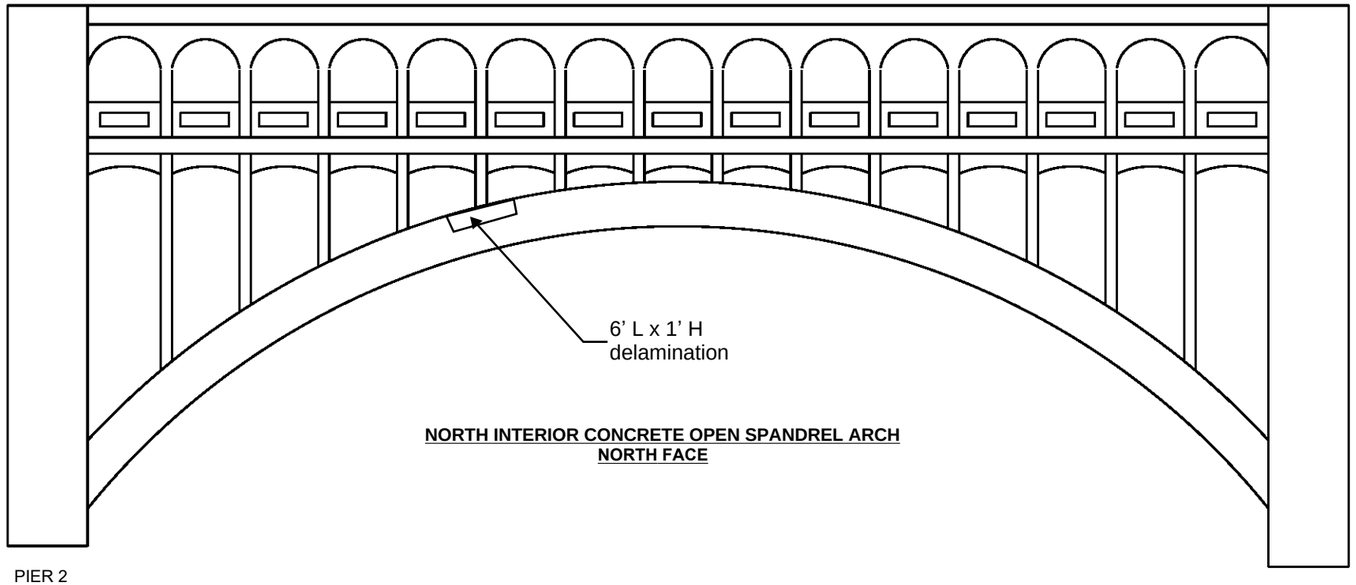
GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 STRUCTURE ELEVATION - SPAN 2 — PAGE A-44



NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

PIER 2

PIER 1



NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

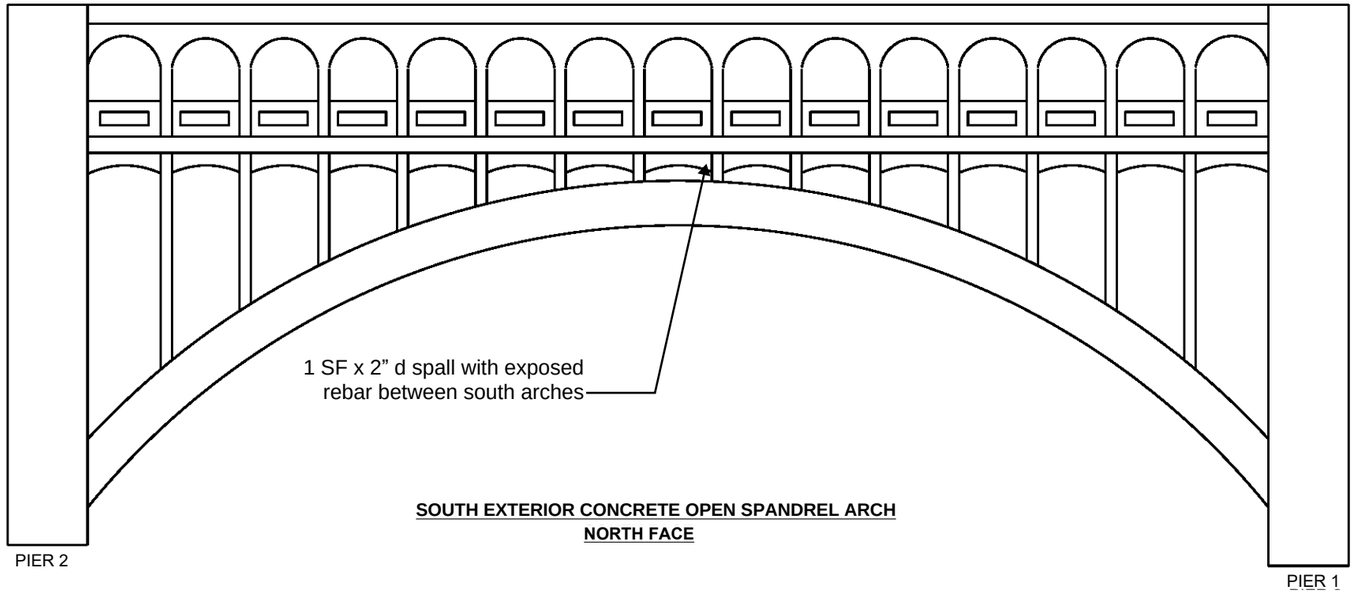
PIER 2

PIER 1

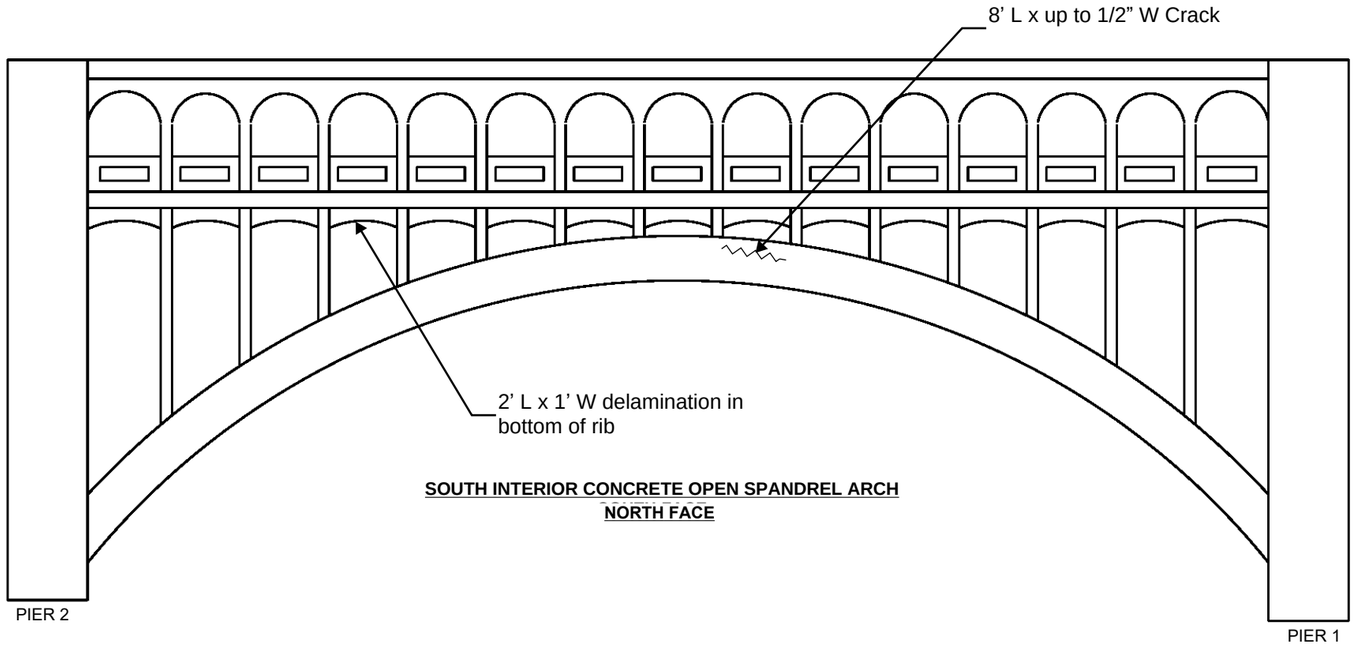
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 2	PAGE A-45



SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

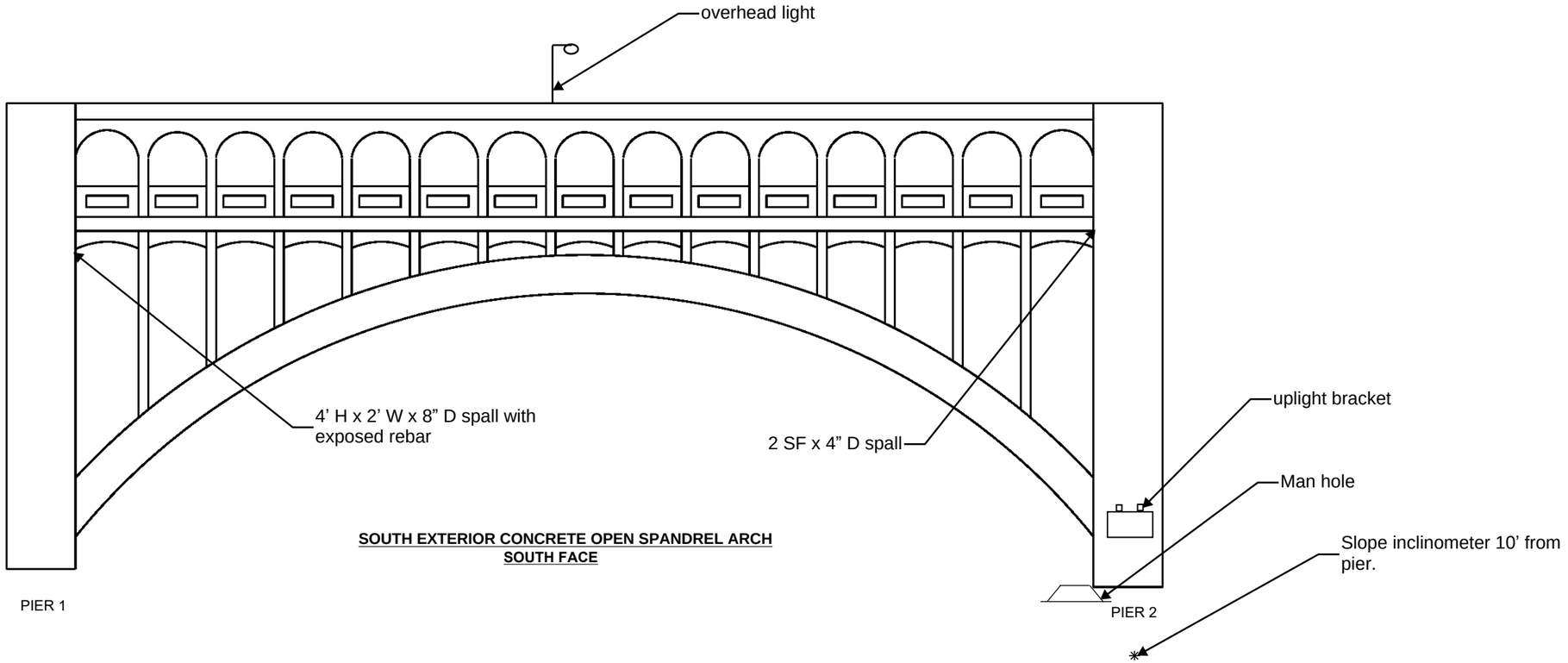


SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

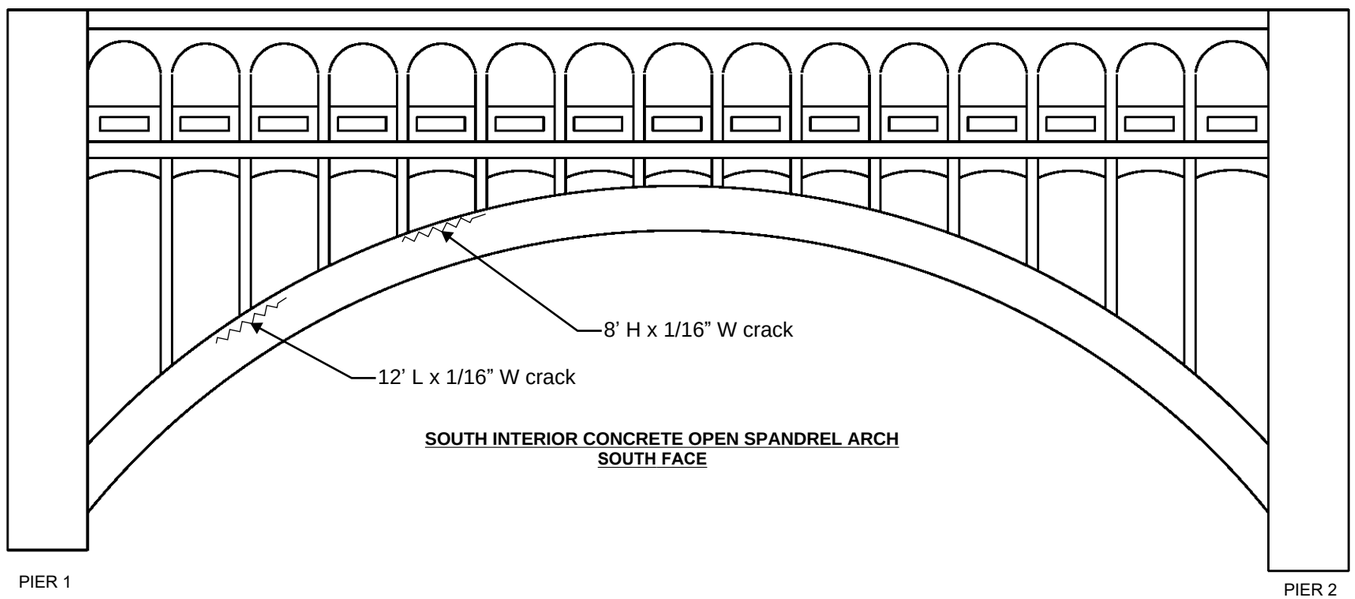
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 2	PAGE A-46



SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

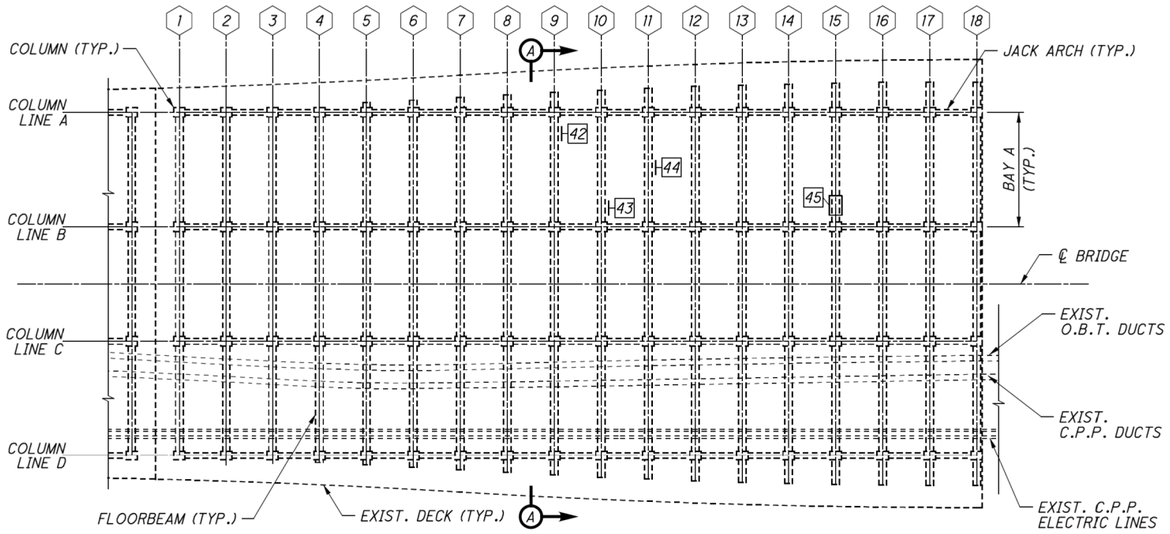


SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

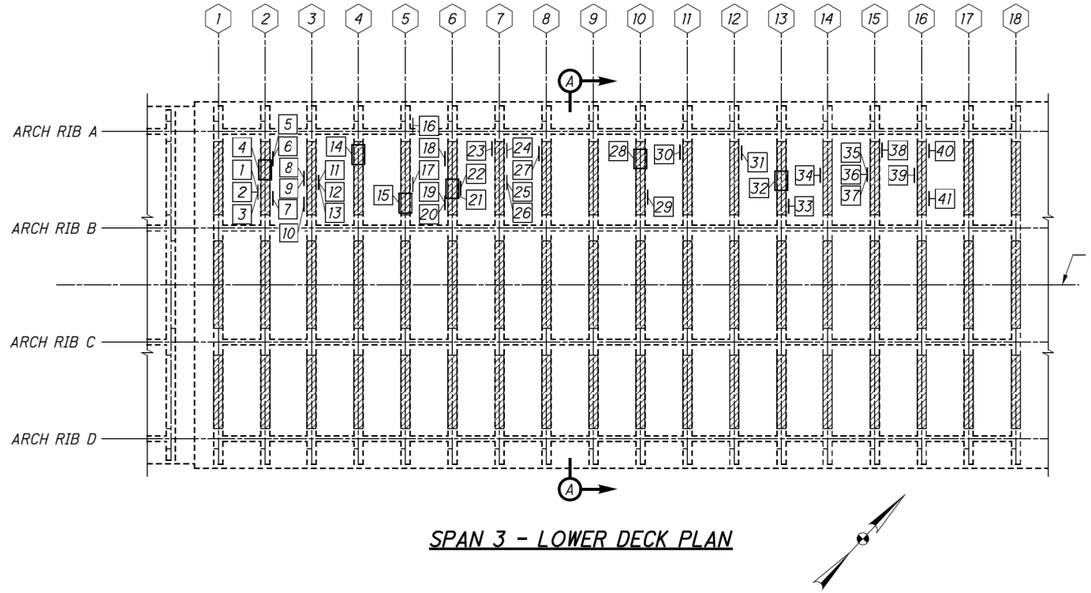
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018		STRUCTURE ELEVATION - SPAN 2	PAGE A-47



SPAN 3 - UPPER DECK PLAN



SPAN 3 - LOWER DECK PLAN

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	7	2
2	TYPE 1	2	1
3	TYPE 1	5	2
4	TYPE 2	13	5
5	TYPE 1	2	1
6	TYPE 1	2	1
7	TYPE 1	2	1
8	TYPE 1	3	1
9	TYPE 1	3	1
10	TYPE 1	3	1
11	TYPE 1	2	1
12	TYPE 1	2	1
13	TYPE 1	3	1
14	TYPE 2	7	3
15	TYPE 2	4	2
16	TYPE 1	10	2
17	TYPE 1	1	1
18	TYPE 1	3	1
19	TYPE 1	2	1
20	TYPE 1	2	1

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
21	TYPE 2	9	7
22	TYPE 1	5	4
23	TYPE 1	2	1
24	TYPE 1	3	2
25	TYPE 1	2	1
26	TYPE 1	3	1
27	TYPE 1	1	1
28	TYPE 2	4	1
29	TYPE 1	2	1
30	TYPE 1	3	1
31	TYPE 1	3	1
32	TYPE 2	7	3
33	TYPE 1	2	1
34	TYPE 1	6	2
35	TYPE 1	5	2
36	TYPE 1	3	1
37	TYPE 1	2	1
38	TYPE 1	1	1
39	TYPE 1	6	1
40	TYPE 1	2	1
41	TYPE 1	8	2
42	TYPE 1	4	2
43	TYPE 1	9	2
44	TYPE 1	5	3
45	TYPE 2	1	1
MEASURED QUANTITY*		176	-
PLAN QUANTITY*		264	74

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	197
TYPE 2 REPAIR	SF	67
FRP WRAP	SF	4635

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR SECTION A-A, SEE SHEET 34/89.
6. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

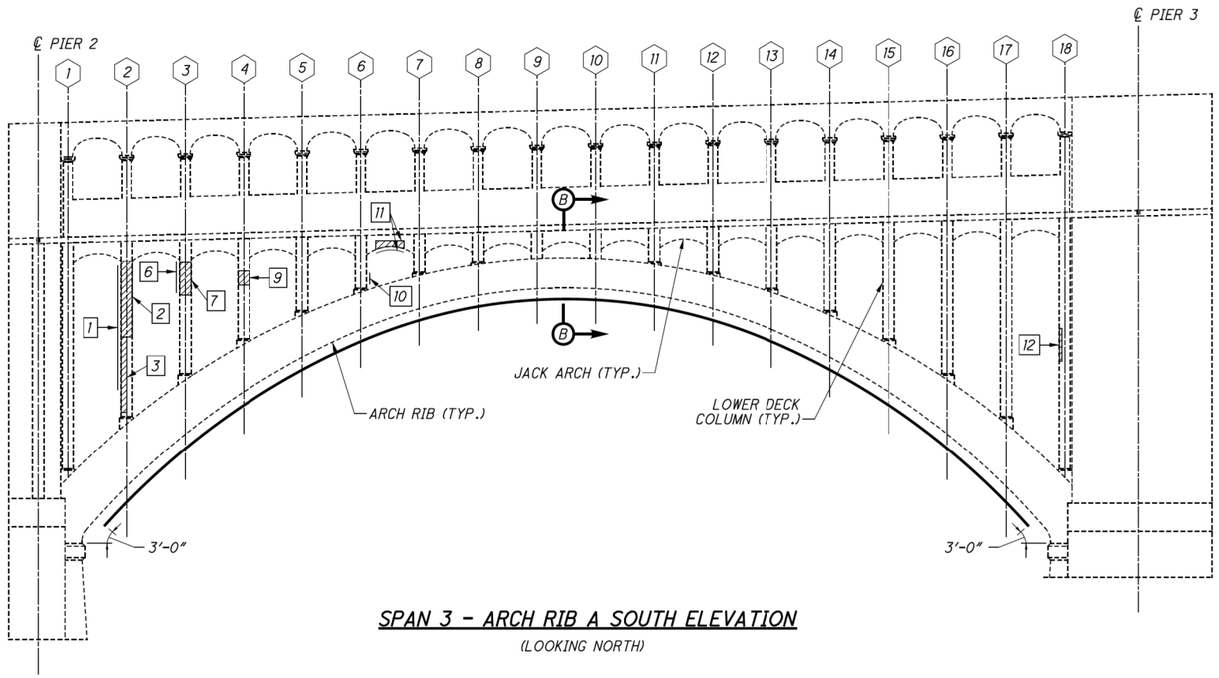
LEGEND:

(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

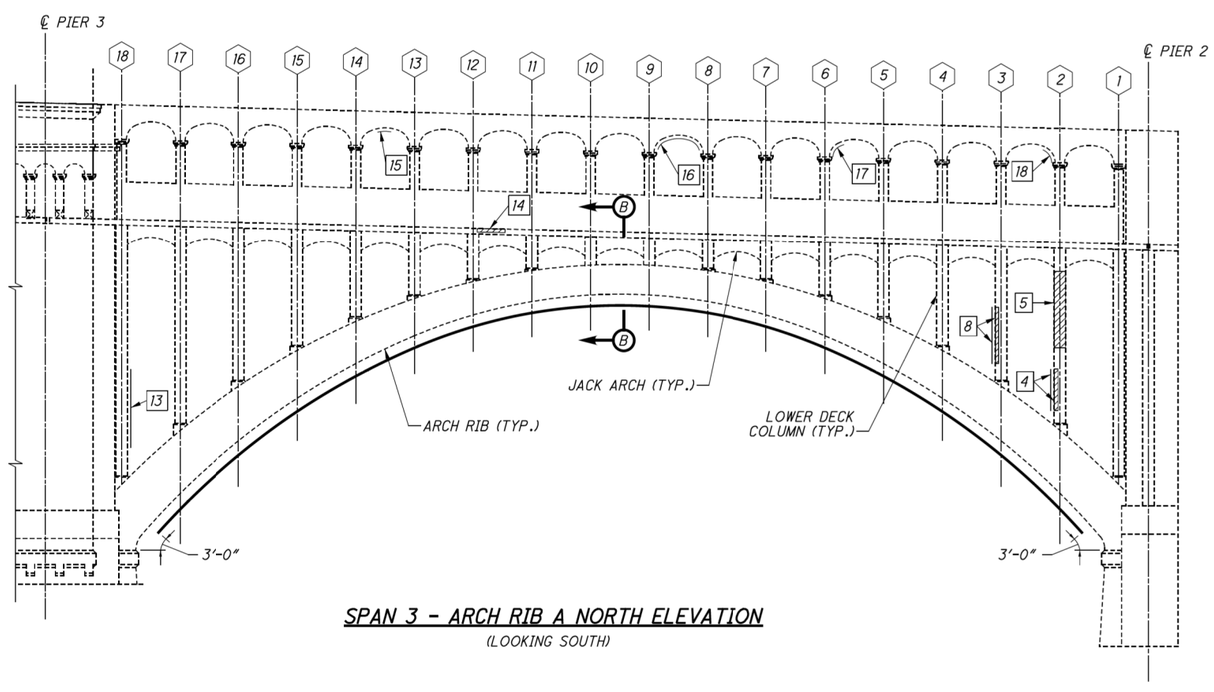
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 3 CONCRETE REPAIR DETAILS — PAGE A-48



SPAN 3 - ARCH RIB A SOUTH ELEVATION

(LOOKING NORTH)



SPAN 3 - ARCH RIB A NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	96	22
2	TYPE 1	27	7
3	TYPE 1	14	7
4	TYPE 1	10	4
5	TYPE 1	27	7
6	TYPE 1	19	6
7	TYPE 1	12	3
8	TYPE 1	10	5
9	TYPE 1	5	1
10	TYPE 1	2	1
11	TYPE 1	8	4
12	TYPE 1	5	2
13	TYPE 1	7	3
14	TYPE 1	2	3
15	TYPE 2	2	1
16	TYPE 2	13	7
17	TYPE 2	4	2
18	TYPE 2	1	1
MEASURED QUANTITY*		264	-
PLAN QUANTITY*		396	86

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	366
TYPE 2 REPAIR	SF	30
FRP WRAP	SF	2300

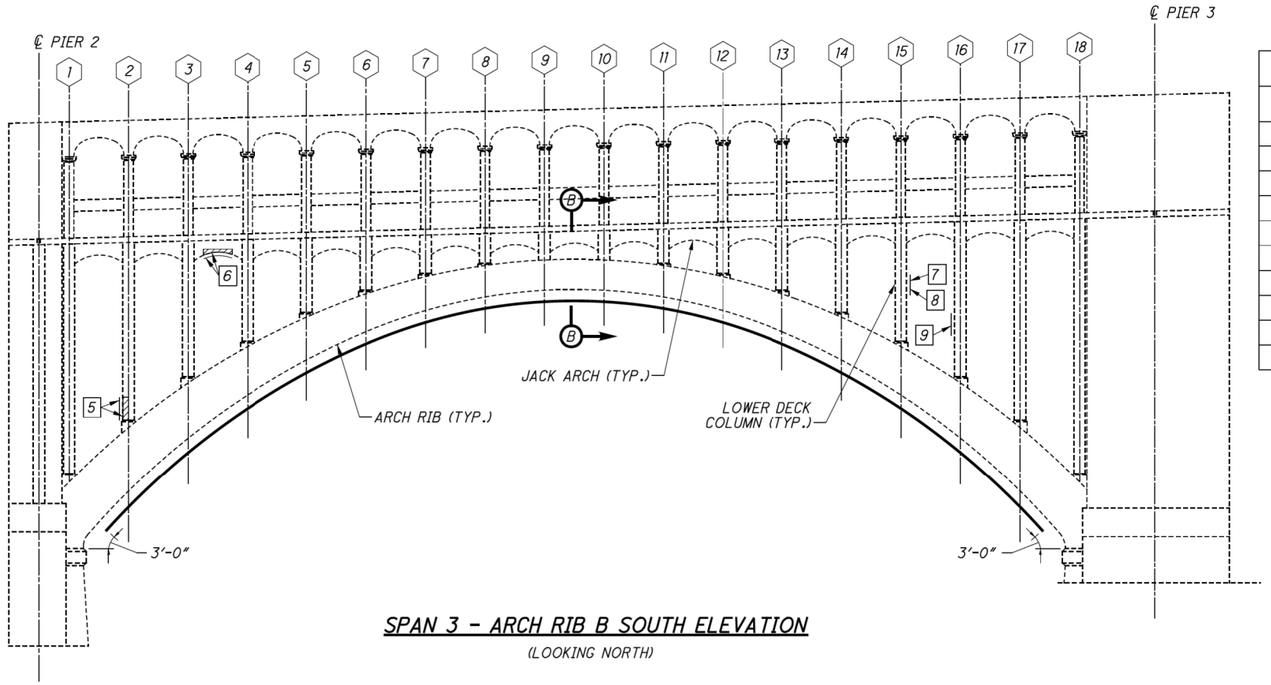
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 3 REPAIR DETAILS, SEE SHEET 26/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

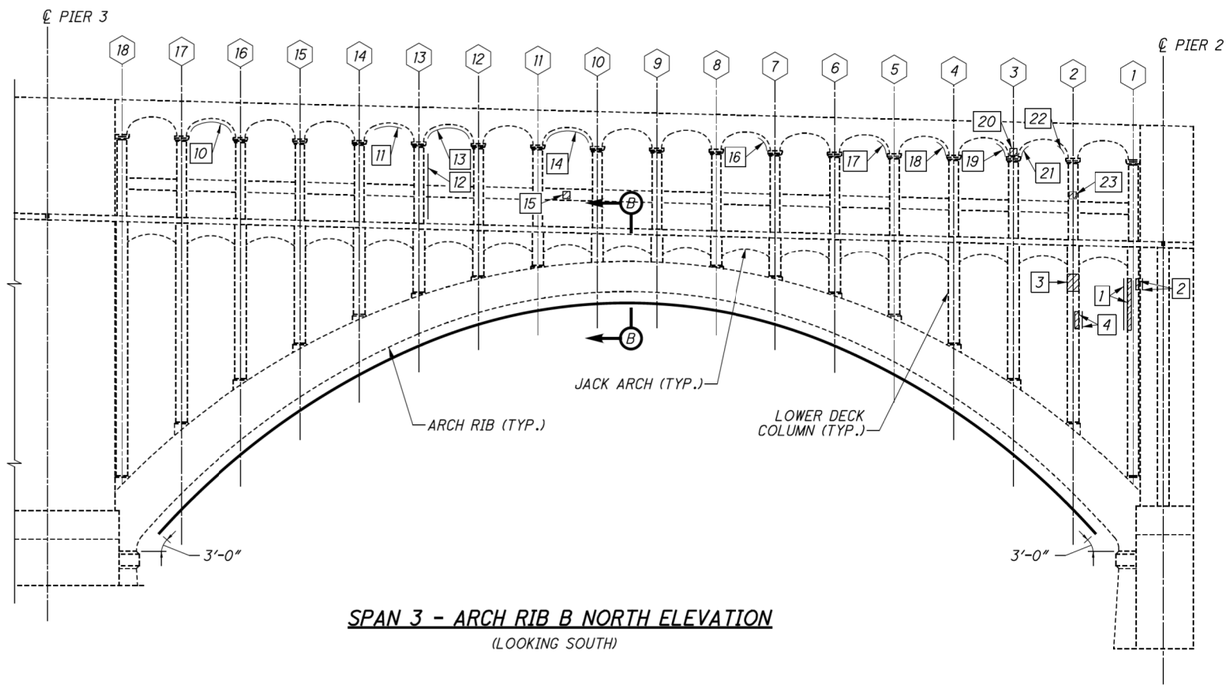
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR.
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 3 CONCRETE REPAIR DETAILS	PAGE A-49



SPAN 3 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)



SPAN 3 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	13	5
2	TYPE 1	4	2
3	TYPE 1	2	1
4	TYPE 1	4	2
5	TYPE 1	8	2
6	TYPE 2	15	10
7	TYPE 1	2	1
8	TYPE 1	2	1
9	TYPE 1	3	1
10	TYPE 2	13	7

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
11	TYPE 2	9	5
12	TYPE 1	14	7
13	TYPE 2	13	7
14	TYPE 2	13	7
15	TYPE 1	1	1
16	TYPE 2	1	1
17	TYPE 2	1	1
18	TYPE 2	1	1
19	TYPE 2	6	4
20	TYPE 1	1	1
21	TYPE 2	6	4
22	TYPE 2	1	1
23	TYPE 1	1	1
MEASURED QUANTITY*		134	-
PLAN QUANTITY*		201	73

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	82
TYPE 2 REPAIR	SF	119
FRP WRAP	SF	2741

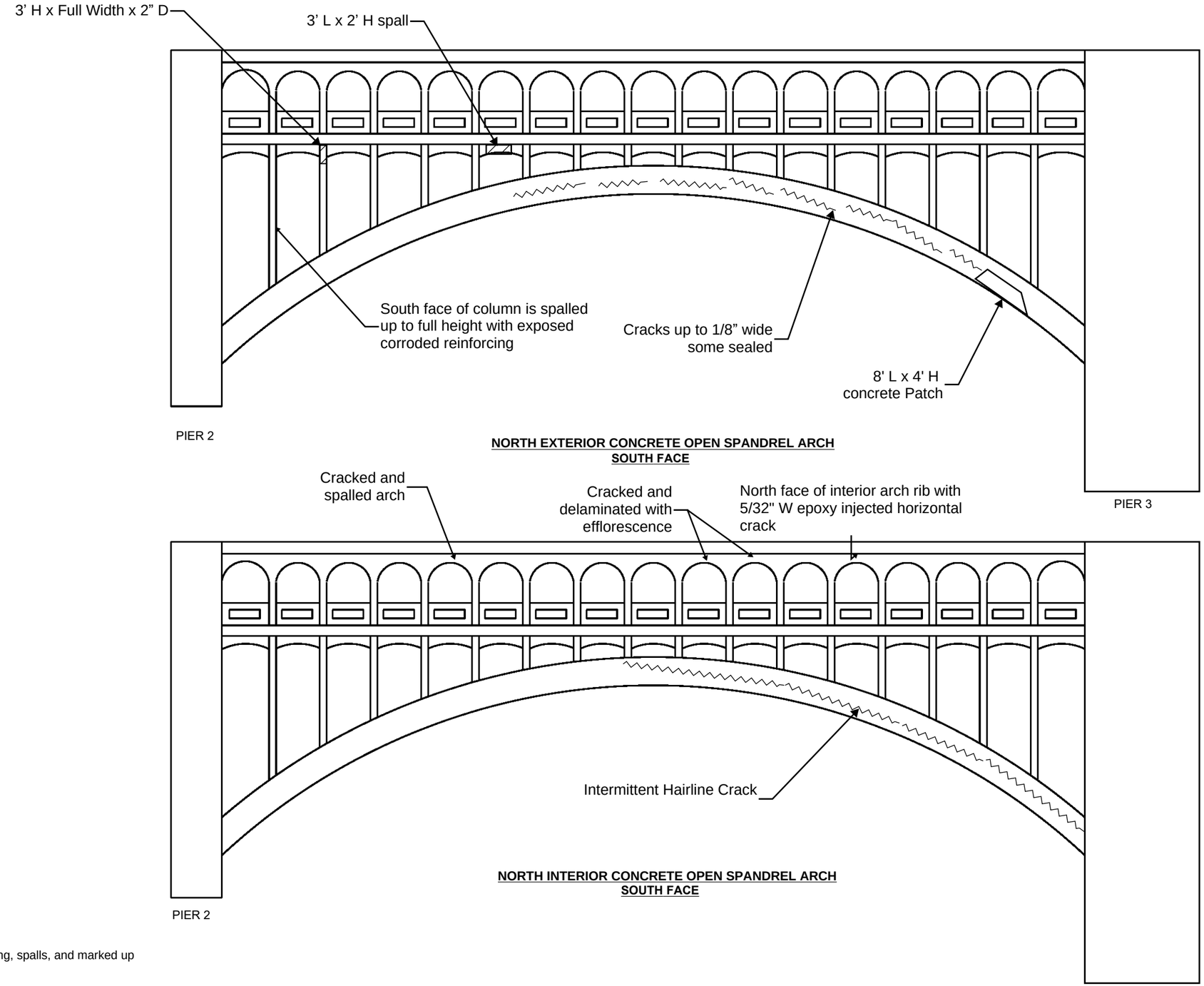
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 3 REPAIR DETAILS, SEE SHEET 26/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR.
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 3 CONCRETE REPAIR DETAILS — PAGE A-50



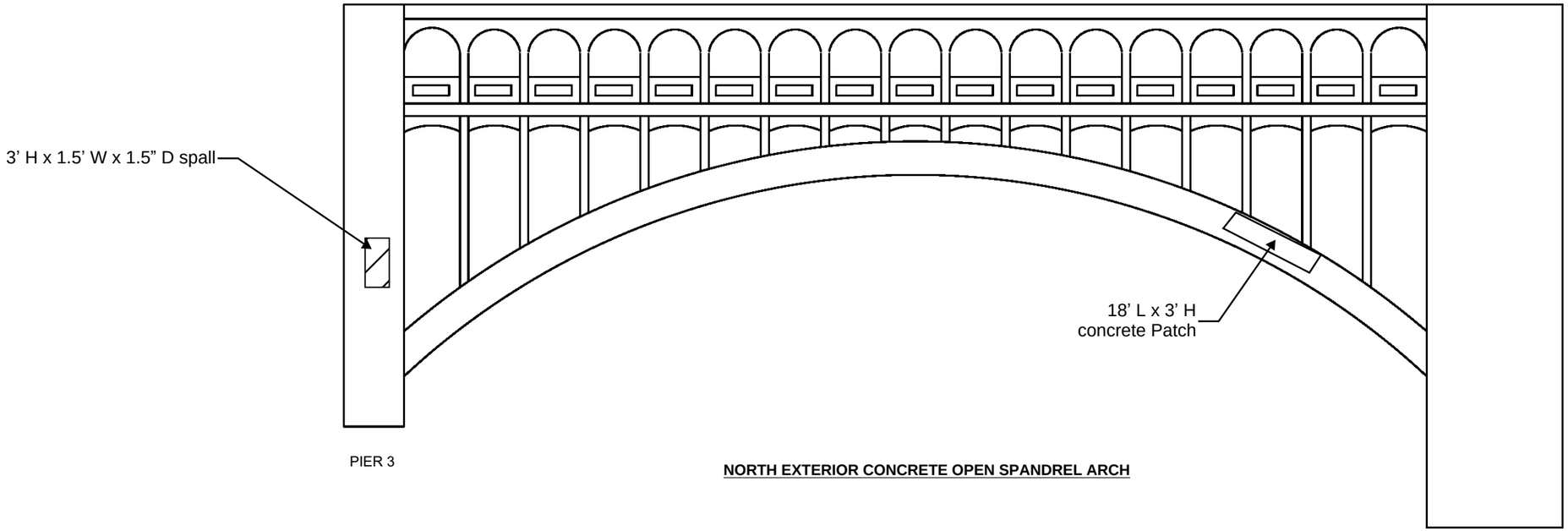
NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

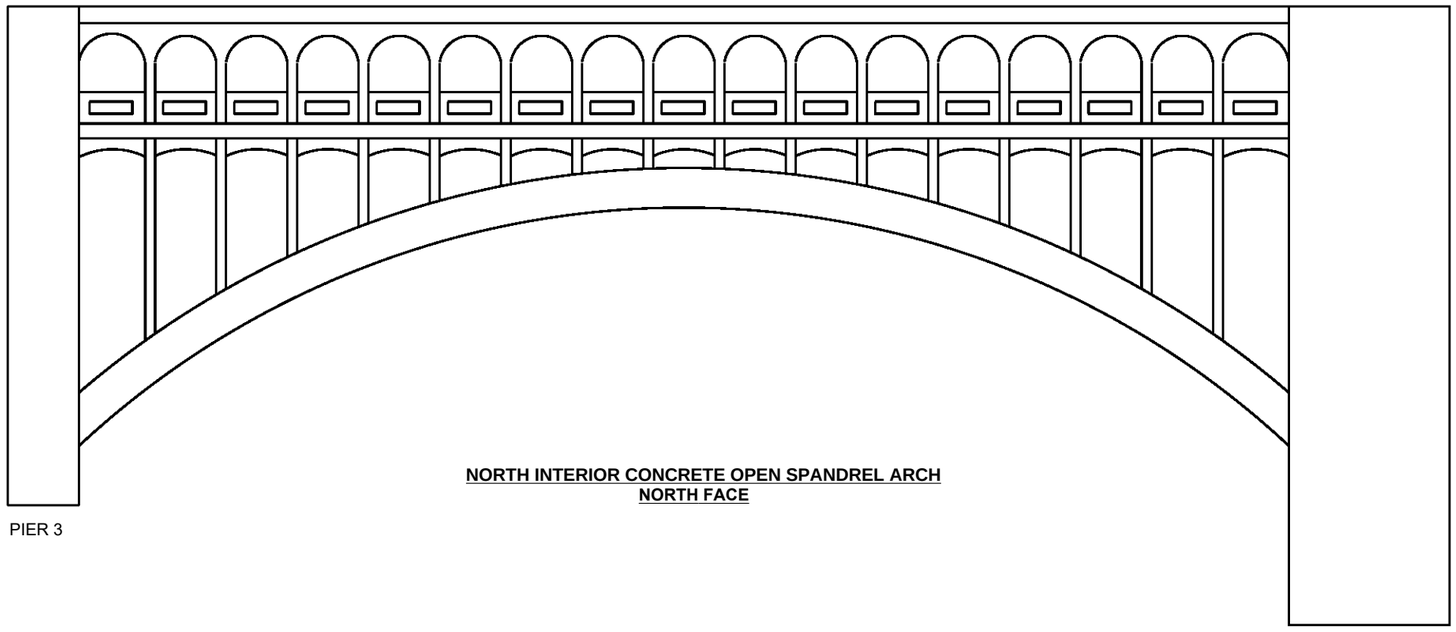
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 STRUCTURE ELEVATION - SPAN 3 PAGE A-51



NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

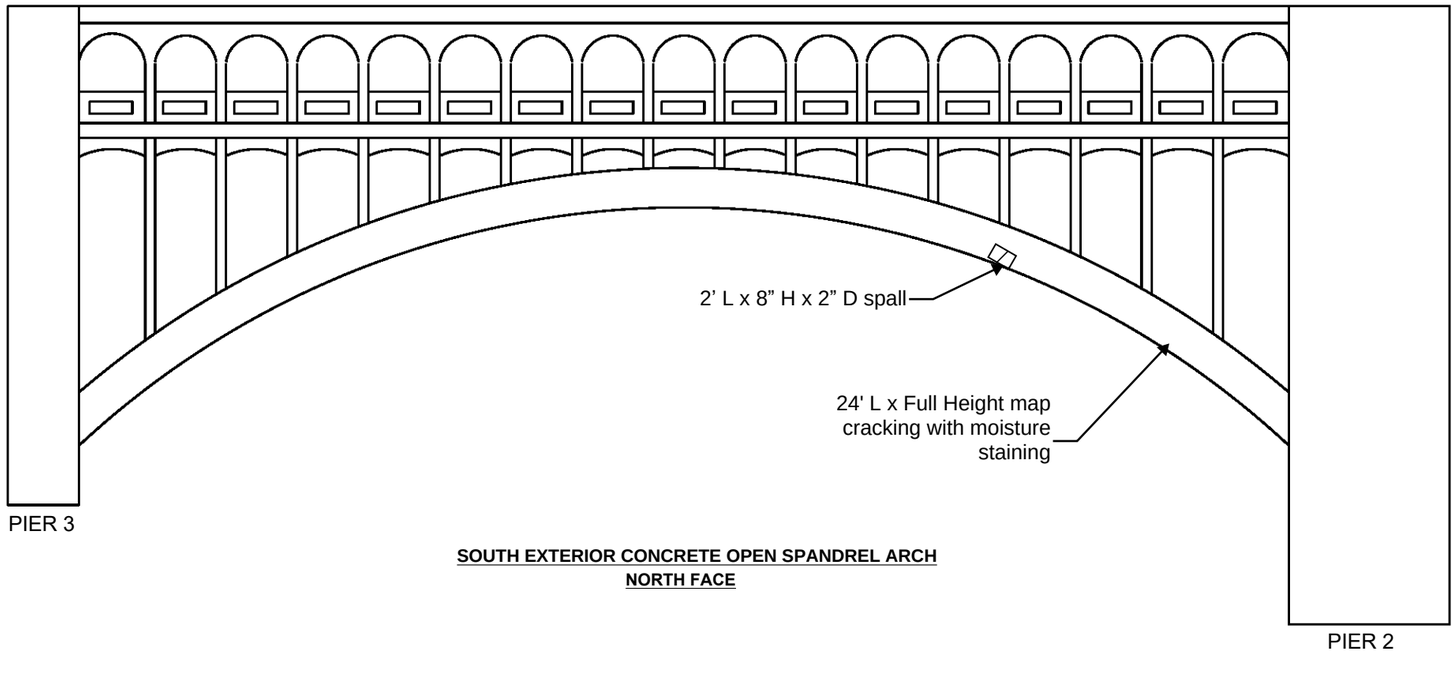


NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

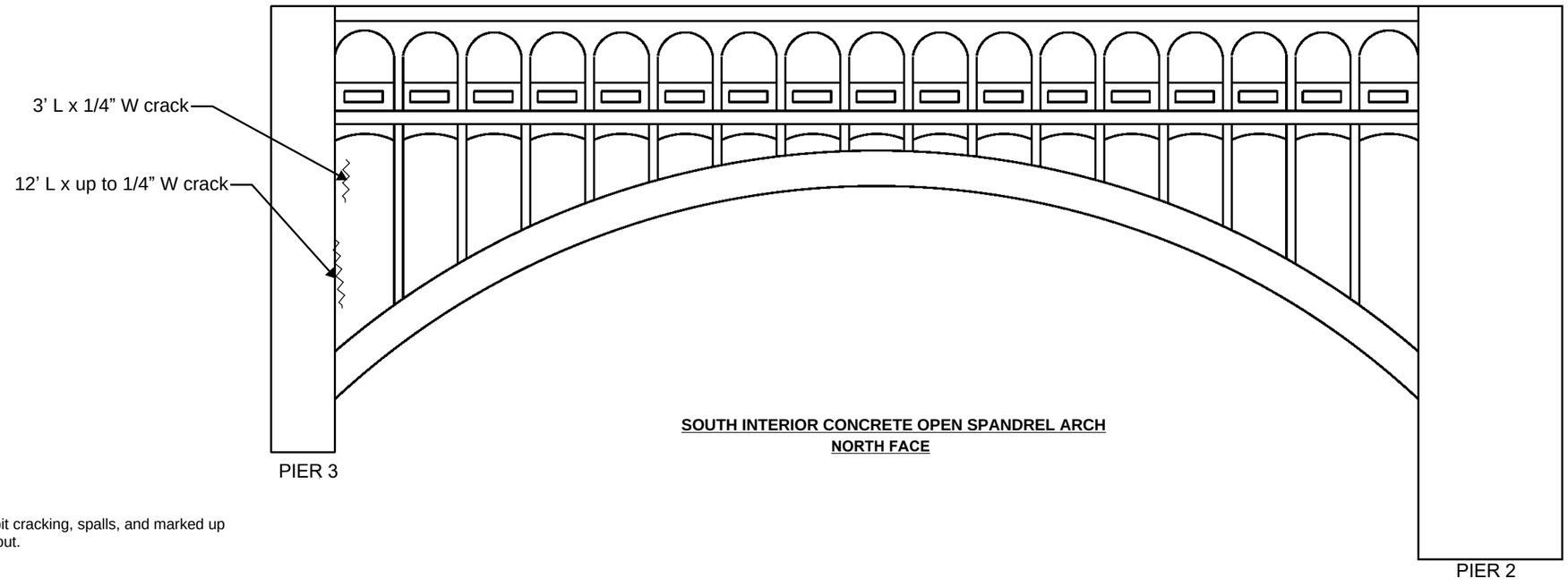
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 STRUCTURE ELEVATION - SPAN 3



SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

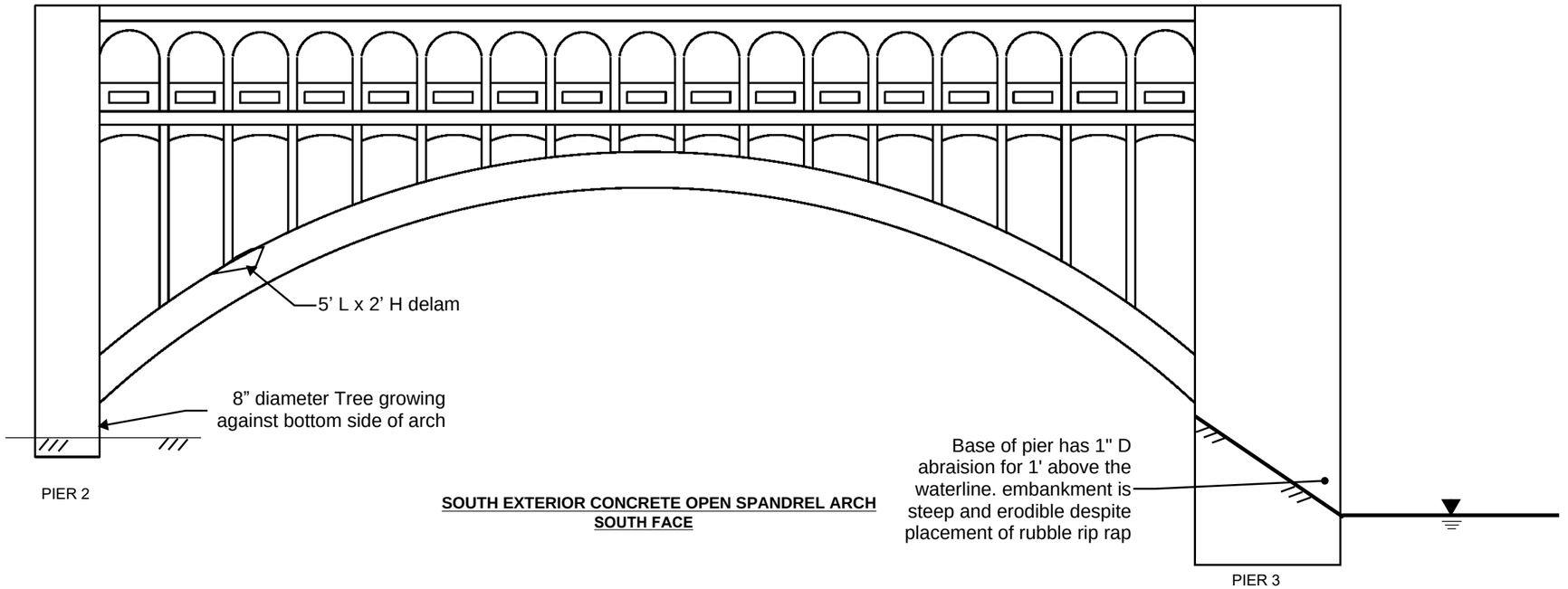


SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

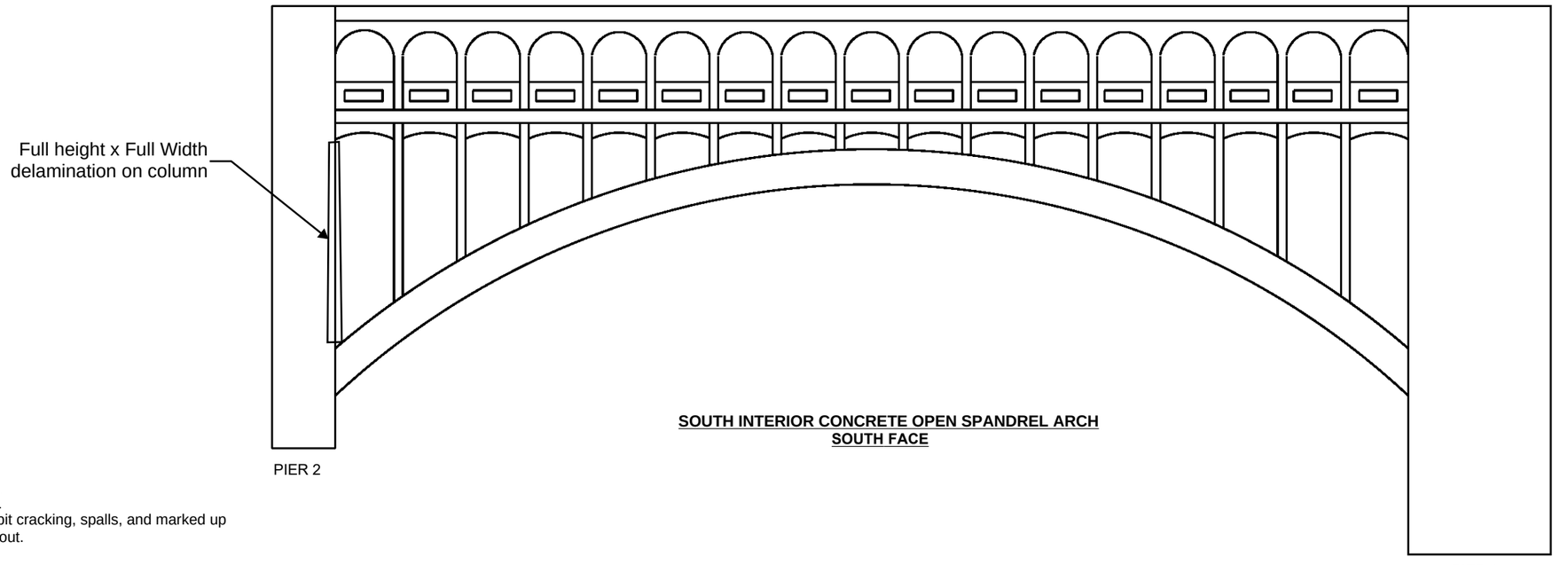
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 3	PAGE A-53



SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

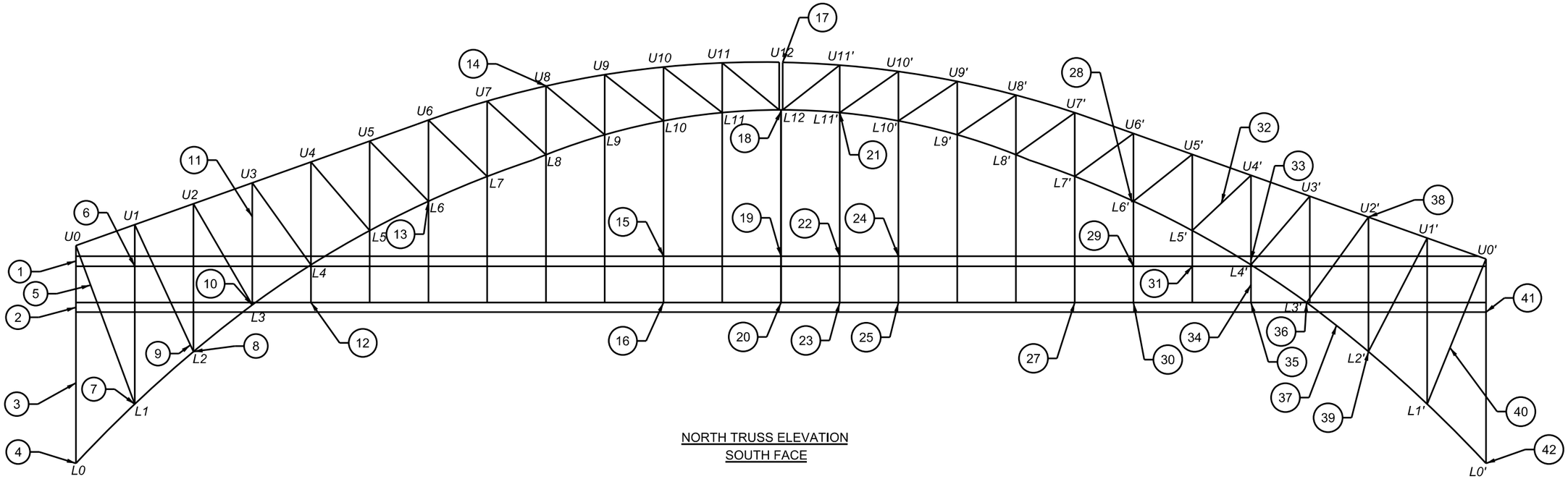


SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

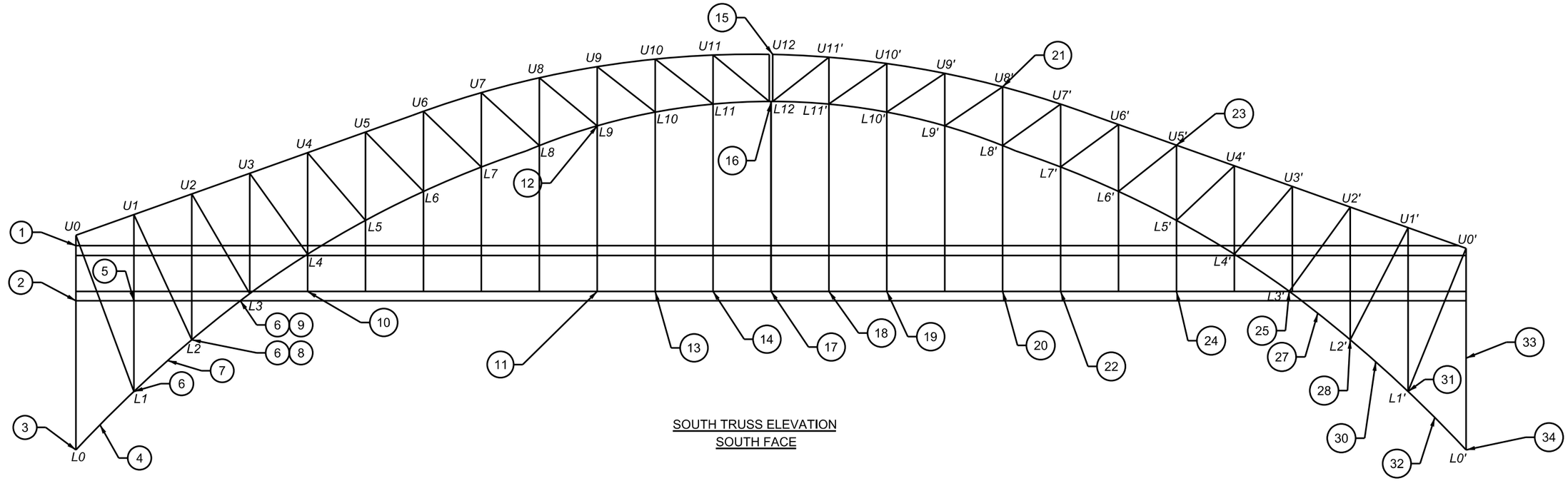
General Notes:

- Arches typically exhibit cracking, spalls, and marked up delaminations throughout.

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 STRUCTURE ELEVATION - SPAN 3

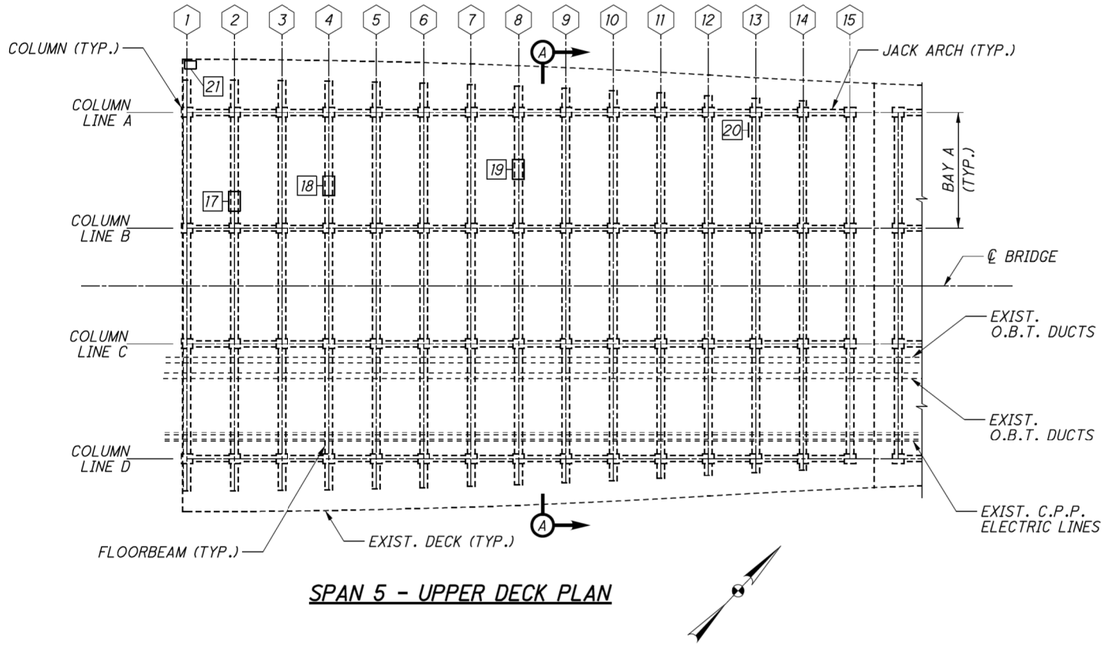


NORTH TRUSS ELEVATION
SOUTH FACE

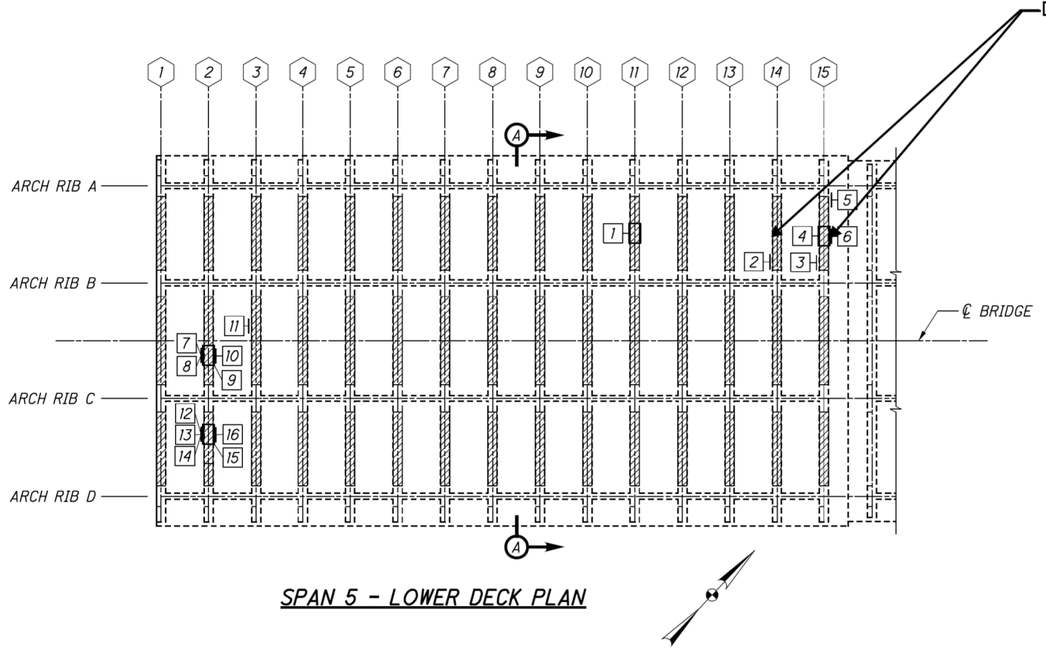


SOUTH TRUSS ELEVATION
SOUTH FACE

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cinncinati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	TRUSS ELEVATION - SPAN 4
			PAGE A-55



SPAN 5 - UPPER DECK PLAN



SPAN 5 - LOWER DECK PLAN

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 2	11	4
2	TYPE 1	2	1
3	TYPE 1	5	1
4	TYPE 2	4	3
5	TYPE 1	2	1
6	TYPE 1	15	4
7	TYPE 1	17	8
8	TYPE 1	10	3
9	TYPE 2	33	13
10	TYPE 1	41	8
11	TYPE 1	12	2
12	TYPE 1	4	1
13	TYPE 1	11	2
14	TYPE 1	4	1
15	TYPE 2	14	6
16	TYPE 1	8	2
17	TYPE 2	3	2
18	TYPE 2	2	2
19	TYPE 2	1	1
20	TYPE 1	9	4
21	TYPE 2	1	1
MEASURED QUANTITY*		209	-
PLAN QUANTITY*		314	70

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	210
TYPE 2 REPAIR	SF	104
FRP WRAP	SF	3863

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
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3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR SECTION A-A, SEE SHEET 34/89.
6. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

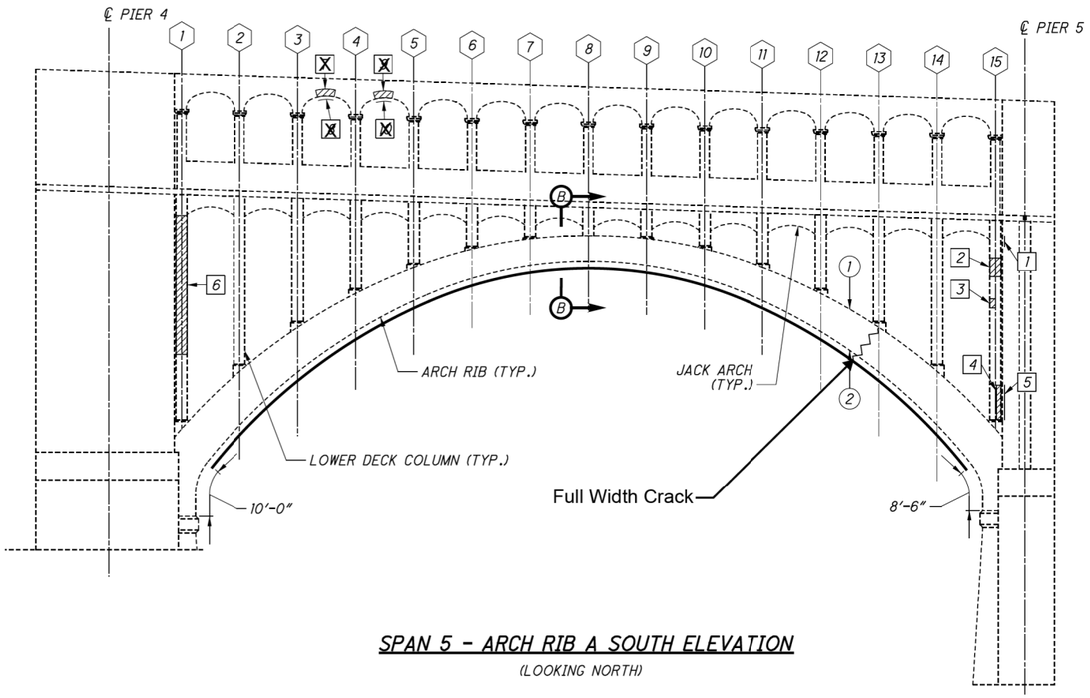
LEGEND:

(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

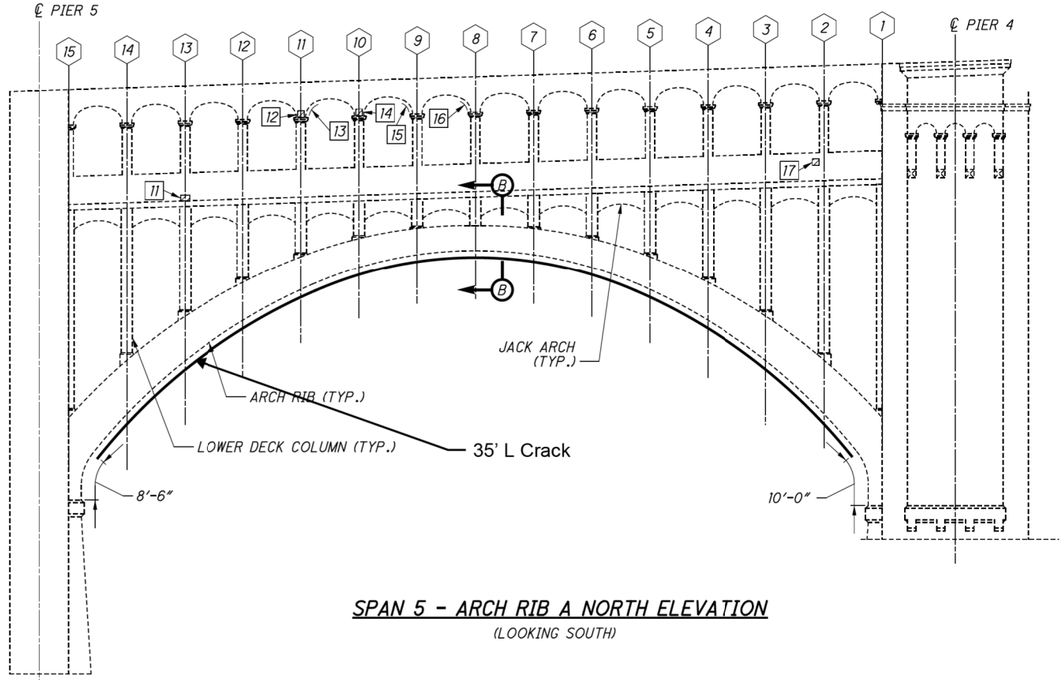
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 5 CONCRETE DETAILS — PAGE A-56



SPAN 5 - ARCH RIB A SOUTH ELEVATION

(LOOKING NORTH)



SPAN 5 - ARCH RIB A NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	3	1
2	TYPE 1	6	1
3	TYPE 1	2	1
4	TYPE 1	4	3
5	TYPE 1	4	2
6	TYPE 1	40	10
~~7~~	~~TYPE 1~~	~~3~~	~~1~~
~~8~~	~~TYPE 2~~	~~3~~	~~2~~
~~9~~	~~TYPE 1~~	~~4~~	~~1~~
~~10~~	~~TYPE 2~~	~~3~~	~~1~~
11	TYPE 1	2	1
12	TYPE 1	1	1
13	TYPE 2	3	2
14	TYPE 1	1	1
15	TYPE 2	4	2
16	TYPE 2	3	2
17	TYPE 1	1	1
MEASURED QUANTITY*		87	-
PLAN QUANTITY*		131	33

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

CRACK REPAIRS

REPAIR NO.	LENGTH (FT)
1	~~50~~ 15
2	50
TOTAL	100

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	107
TYPE 2 REPAIR	SF	24
EPOXY INJECTION	FT	100
FRP WRAP	SF	1755

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
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4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 4 REPAIR DETAILS, SEE SHEET 26/89. FOR PIER 5 REPAIR DETAILS, SEE SHEET 27/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

[#] REPAIR NUMBER

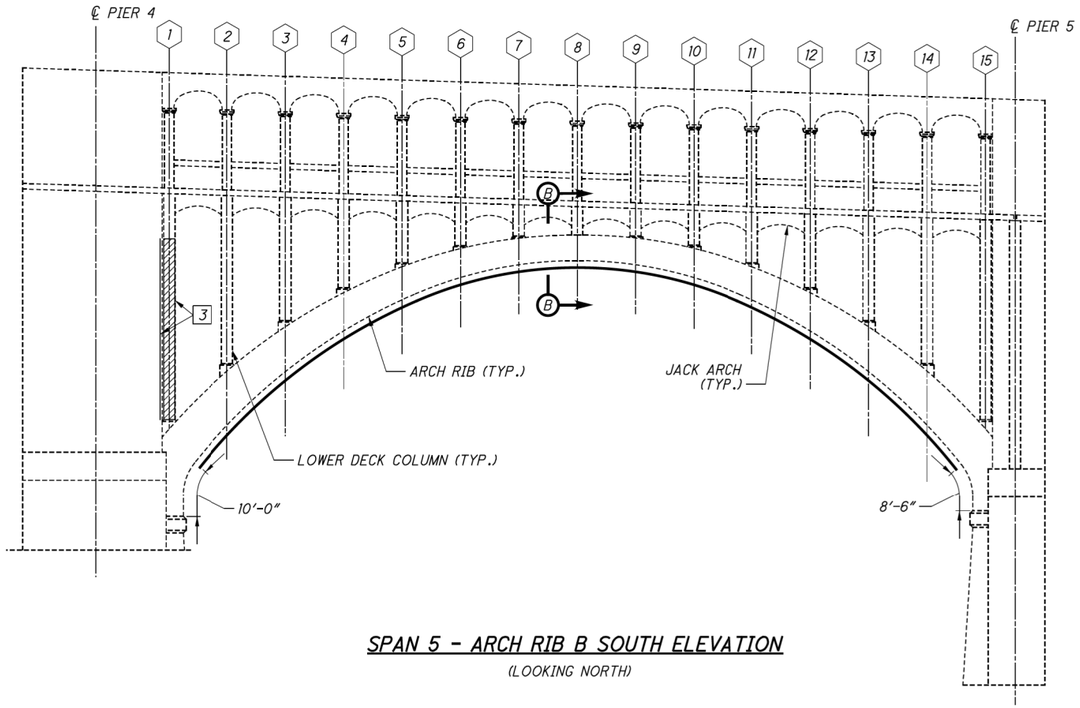
LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

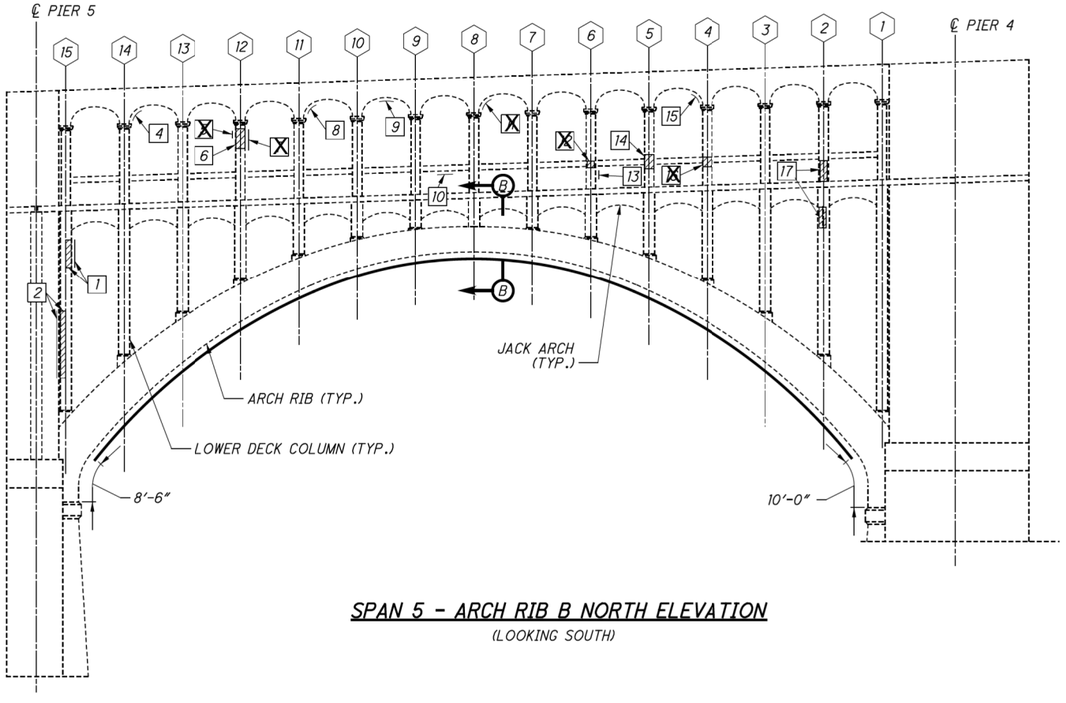
(#) LOCATION OF CRACK TO BE REPAIRED IN ACCORDANCE WITH ITEM 512 - CONCRETE REPAIR BY EPOXY INJECTION

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 SPAN 5 CONCRETE DETAILS PAGE A-57



SPAN 5 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)



SPAN 5 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	7	2
2	TYPE 1	26	5
3	TYPE 1	96	24
4	TYPE 2	3	2
~~5~~	~~TYPE 1~~	~~1~~	~~1~~
6	TYPE 1	4	2
~~7~~	~~TYPE 1~~	~~3~~	~~2~~
8	TYPE 2	2	1
9	TYPE 2	2	1
10	TYPE 2	4	3
~~11~~	~~TYPE 2~~	~~3~~	~~2~~
~~12~~	~~TYPE 1~~	~~1~~	~~1~~
13	TYPE 1	1	1
14	TYPE 1	3	1
15	TYPE 2	3	2
~~16~~	~~TYPE 1~~	~~2~~	~~1~~
17	TYPE 1	3	2
MEASURED QUANTITY*		164	-
PLAN QUANTITY*		246	53

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	220
TYPE 2 REPAIR	SF	26
FRP WRAP	SF	2074

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
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5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 4 REPAIR DETAILS, SEE SHEET 26/89. FOR PIER 5 REPAIR DETAILS, SEE SHEET 27/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

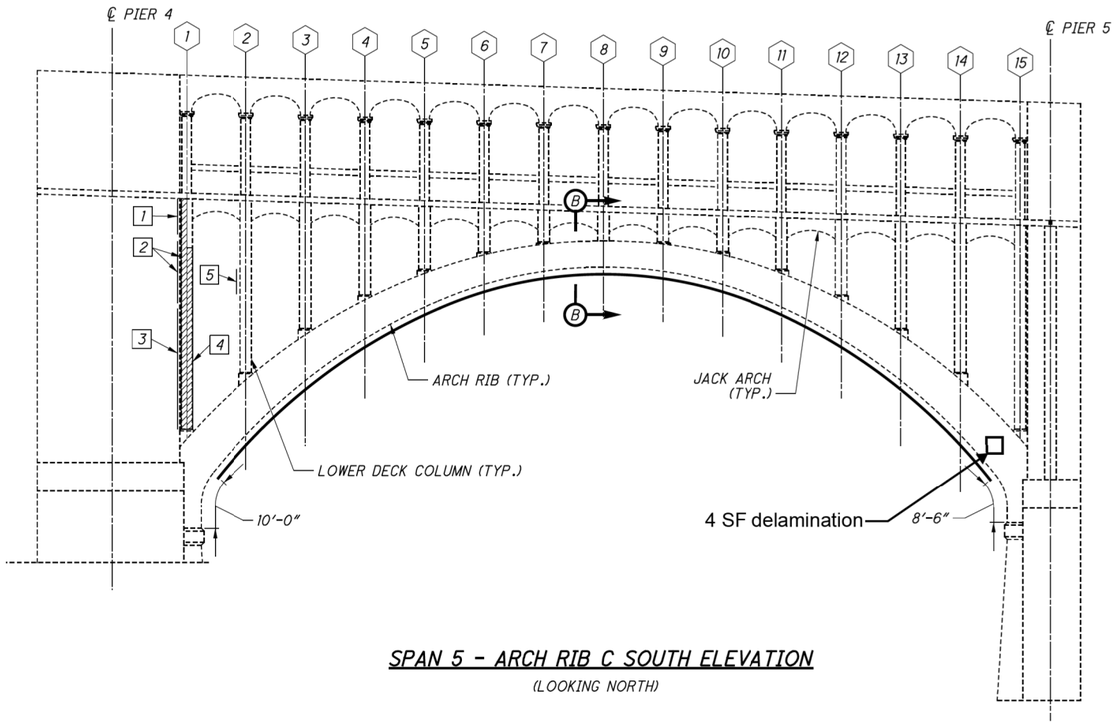
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

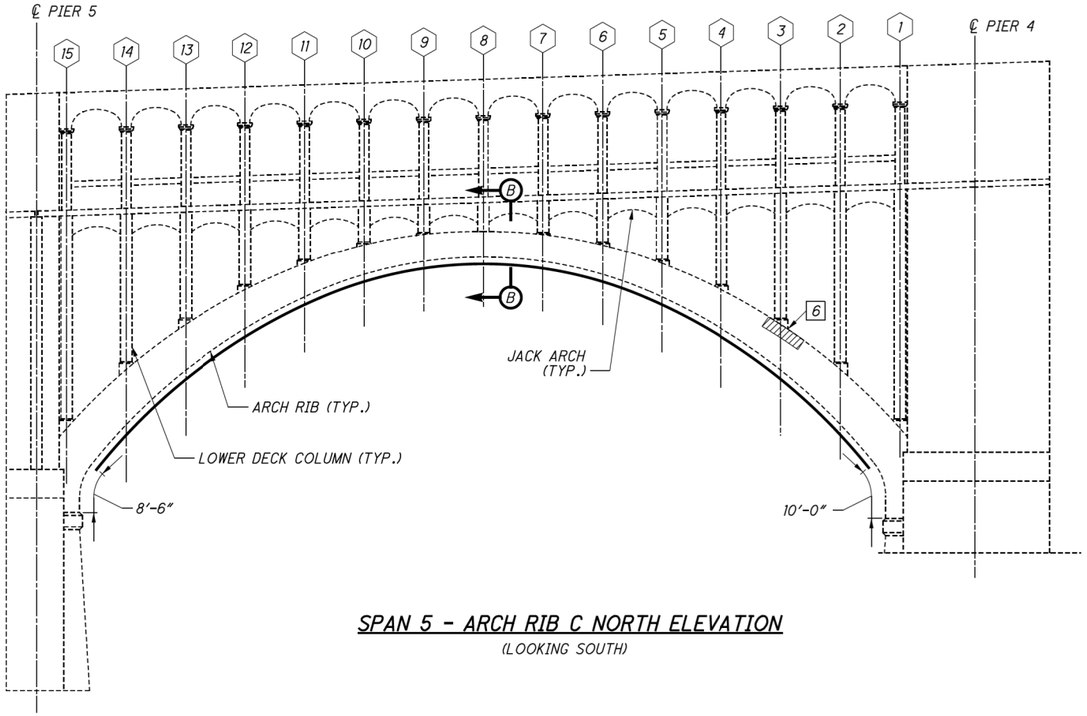
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	SPAN 5 CONCRETE REPAIR DETAILS	PAGE A-58



SPAN 5 - ARCH RIB C SOUTH ELEVATION

(LOOKING NORTH)



SPAN 5 - ARCH RIB C NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	23	6
2	TYPE 1	70	14
3	TYPE 1	60	16
4	TYPE 1	44	11
5	TYPE 1	7	2
6	TYPE 1	10	-
MEASURED QUANTITY*		214	-
PLAN QUANTITY*		321	49

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	321
TYPE 2 REPAIR	SF	-
FRP WRAP	SF	2074

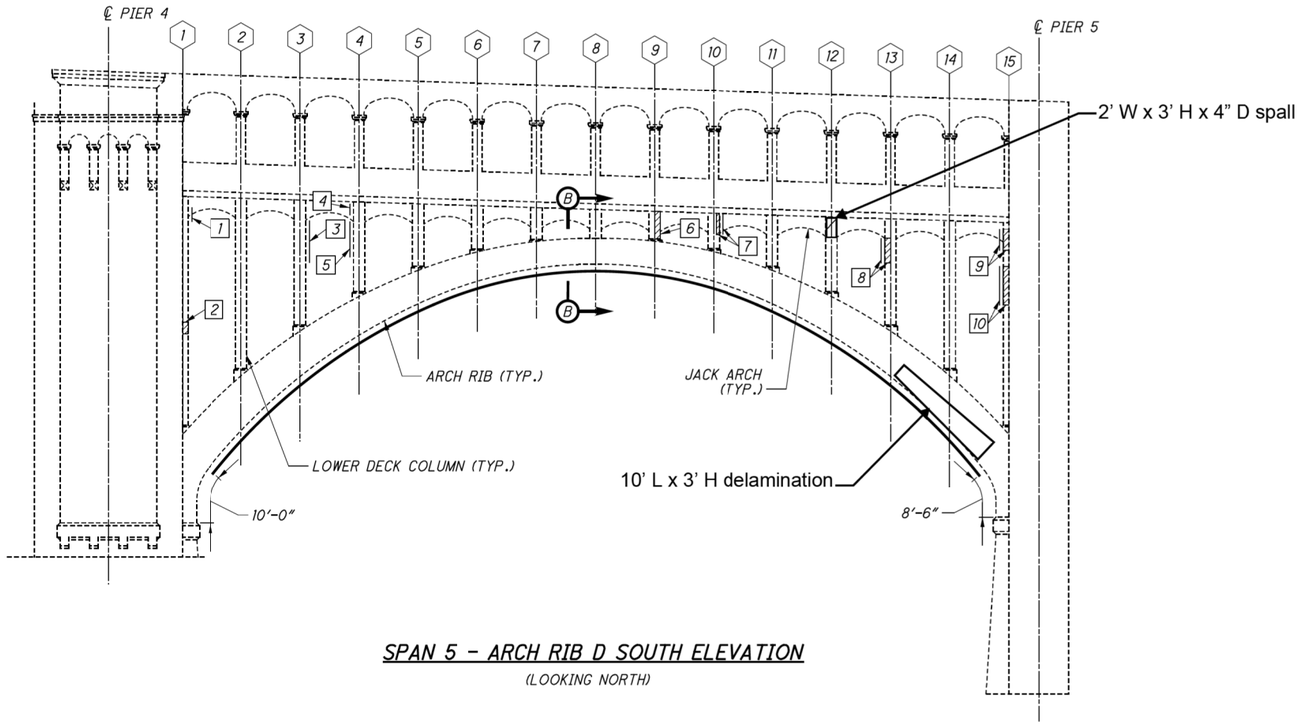
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 4 REPAIR DETAILS, SEE SHEET 26/89. FOR PIER 5 REPAIR DETAILS, SEE SHEET 27/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

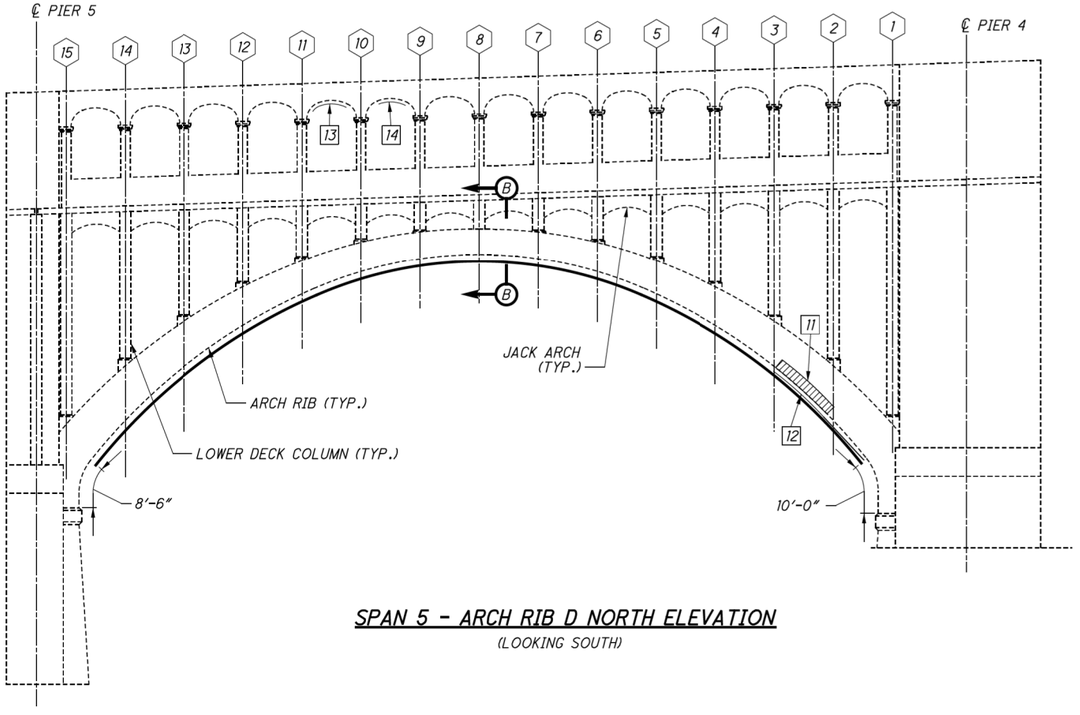
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 5 CONCRETE REPAIR DETAILS	PAGE A-59



SPAN 5 - ARCH RIB D SOUTH ELEVATION

(LOOKING NORTH)



SPAN 5 - ARCH RIB D NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	5	1
2	TYPE 1	4	1
3	TYPE 1	12	3
4	TYPE 1	4	1
5	TYPE 1	15	6
6	TYPE 1	4	2
7	TYPE 1	3	2
8	TYPE 1	7	2
9	TYPE 1	9	2
10	TYPE 1	16	3
11	TYPE 1	15	-
12	TYPE 1	15	7
13	TYPE 2	6	4
14	TYPE 2	5	4
MEASURED QUANTITY*		120	-
PLAN QUANTITY*		180	38

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	164
TYPE 2 REPAIR	SF	16
FRP WRAP	SF	1755

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 4 REPAIR DETAILS, SEE SHEET 26/89. FOR PIER 5 REPAIR DETAILS, SEE SHEET 27/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

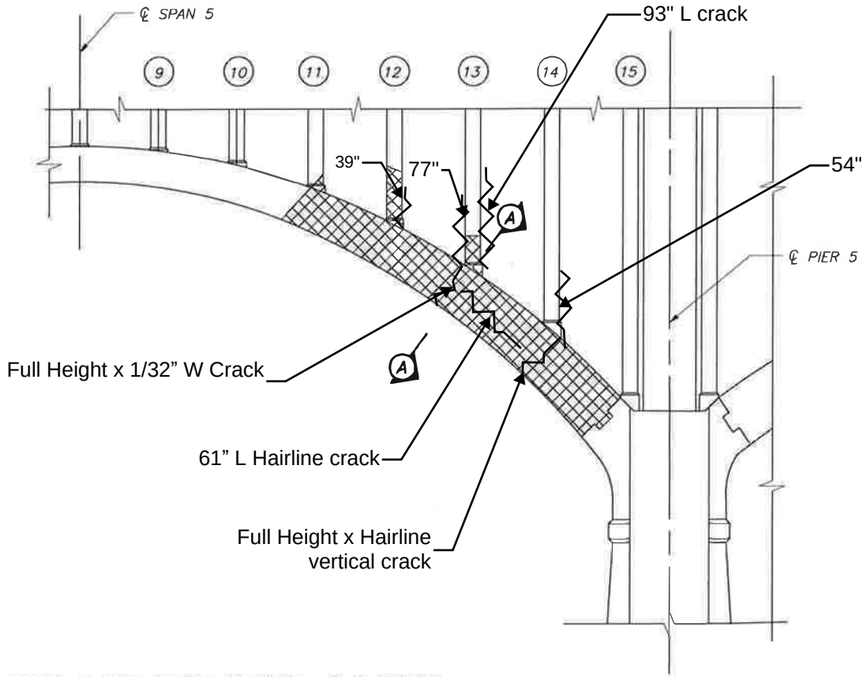
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

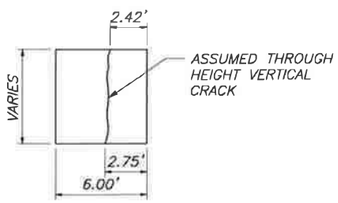
GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 5 CONCRETE REPAIR DETAILS — PAGE A-60



SPAN 5 NE ARCH PARTIAL ELEVATION

LOOKING NORTH

CRACK MEASUREMENTS				
PANEL	INTRADOS		EXTRADOS	
	MEASURED CRACK WIDTH	DIST. FROM SOUTH FACE	MEASURED CRACK WIDTH	DIST. FROM SOUTH FACE
11–12	**43"**	**43"**	-	-
12–13	**3/16"**	**32.5"**	**3/32"**	**47.25"**
13–14	**3/16"**	**39"**	**3/16"**	**35"**
14–15	**0.002"**	**22.5**	**1/32"**	**33"**

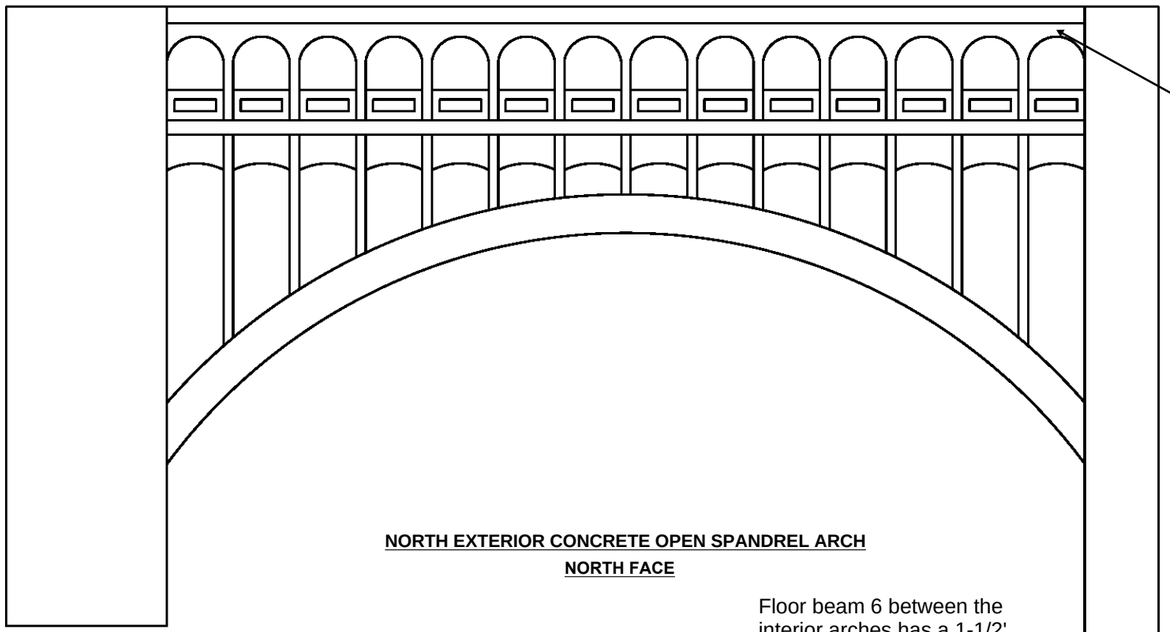


SECTION A–A

LEGEND

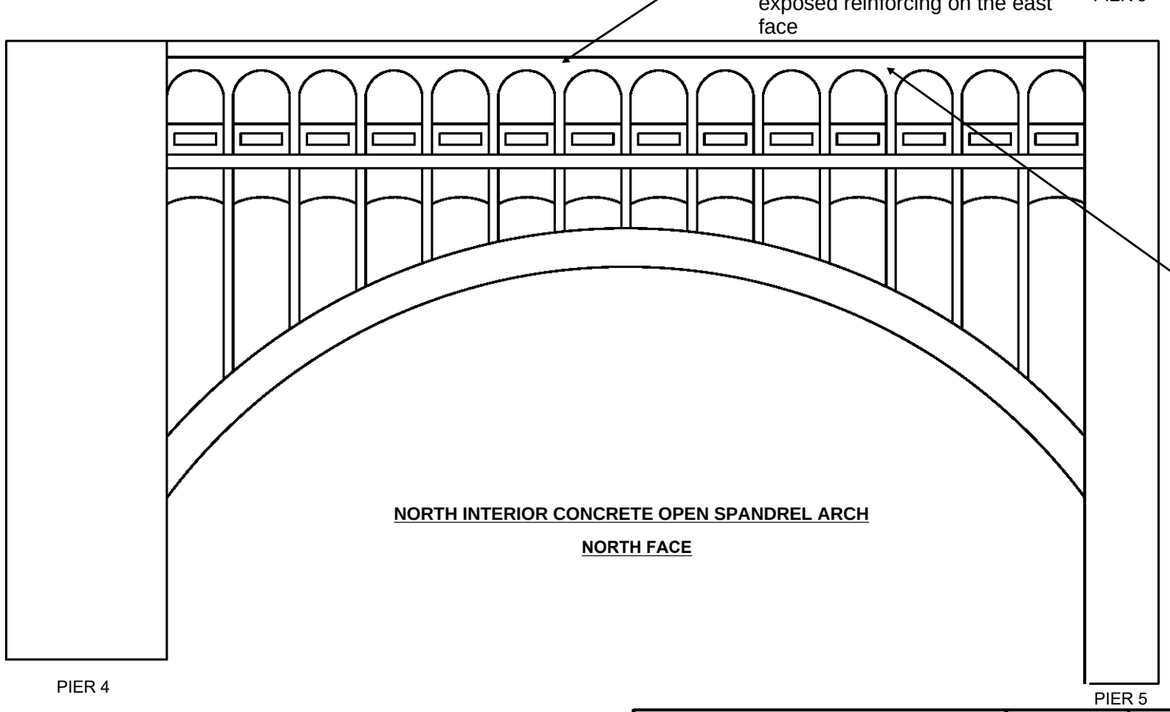
–VERTICAL CRACK LOCATION

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1456 OPEN SPANDREL ARCH, SPAN 5



NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

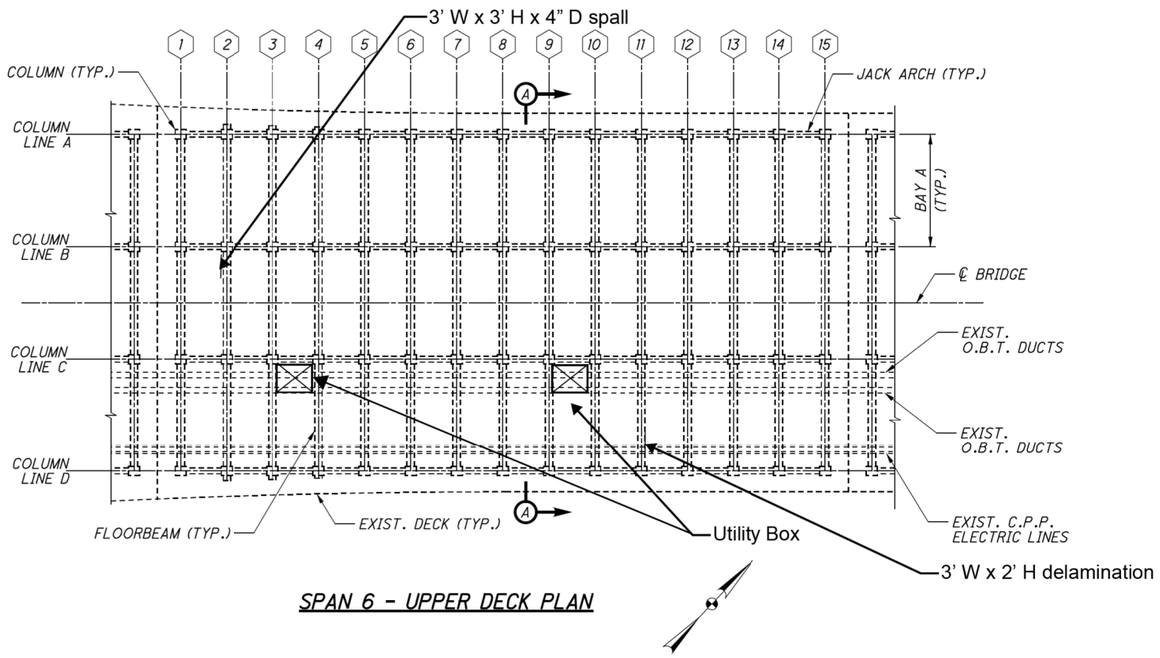
NORTH FACE



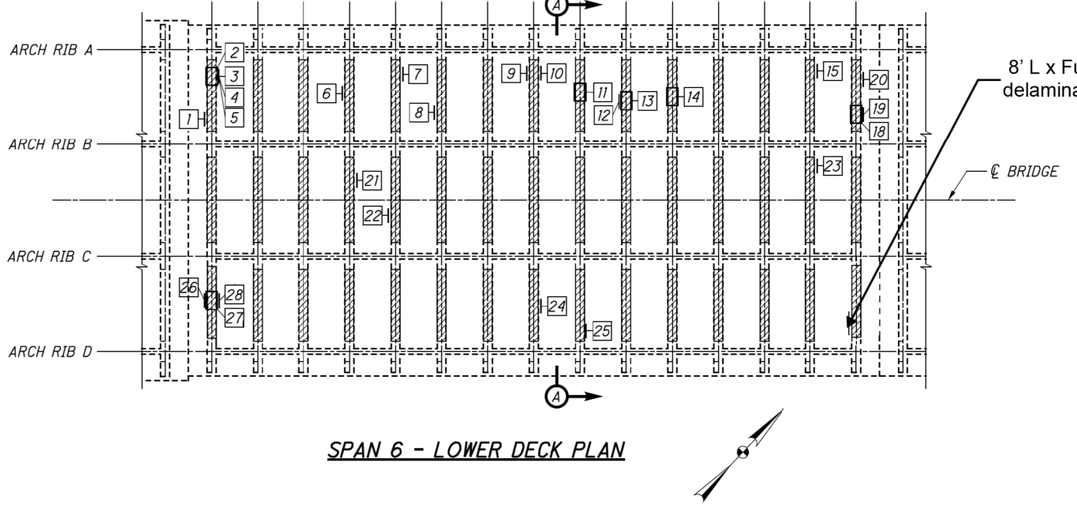
NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH

NORTH FACE

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 5	PAGE A-62



SPAN 6 - UPPER DECK PLAN



SPAN 6 - LOWER DECK PLAN

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	10	3
2	TYPE 2	11	4
3	TYPE 1	6	1
4	TYPE 1	3	1
5	TYPE 1	3	1
6	TYPE 1	7	2
7	TYPE 1	2	1
8	TYPE 1	1	1
9	TYPE 1	2	1
10	TYPE 1	8	2
11	TYPE 2	7	3
12	TYPE 1	6	2
13	TYPE 2	51	20
14	TYPE 2	7	4
15	TYPE 1	4	1
16	TYPE 1	6	5
17	TYPE 1	21	5
18	TYPE 2	6	8
19	TYPE 1	13	4
20	TYPE 1	12	4
21	TYPE 1	6	3
22	TYPE 1	5	1
23	TYPE 1	6	1
24	TYPE 1	6	1
25	TYPE 1	51	12
26	TYPE 1	26	12
27	TYPE 2	51	20
28	TYPE 1	26	12
MEASURED QUANTITY*		363	-
PLAN QUANTITY*		545	135

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	345
TYPE 2 REPAIR	SF	200
FRP WRAP	SF	3863

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR SECTION A-A, SEE SHEET 34/89.
6. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

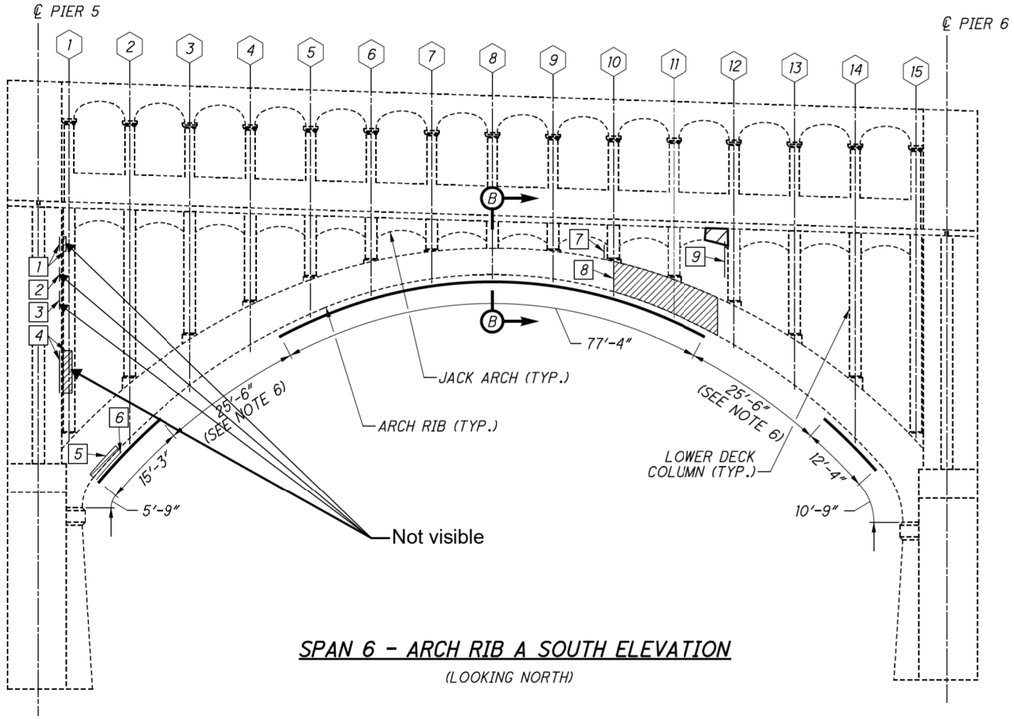
LEGEND:

(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

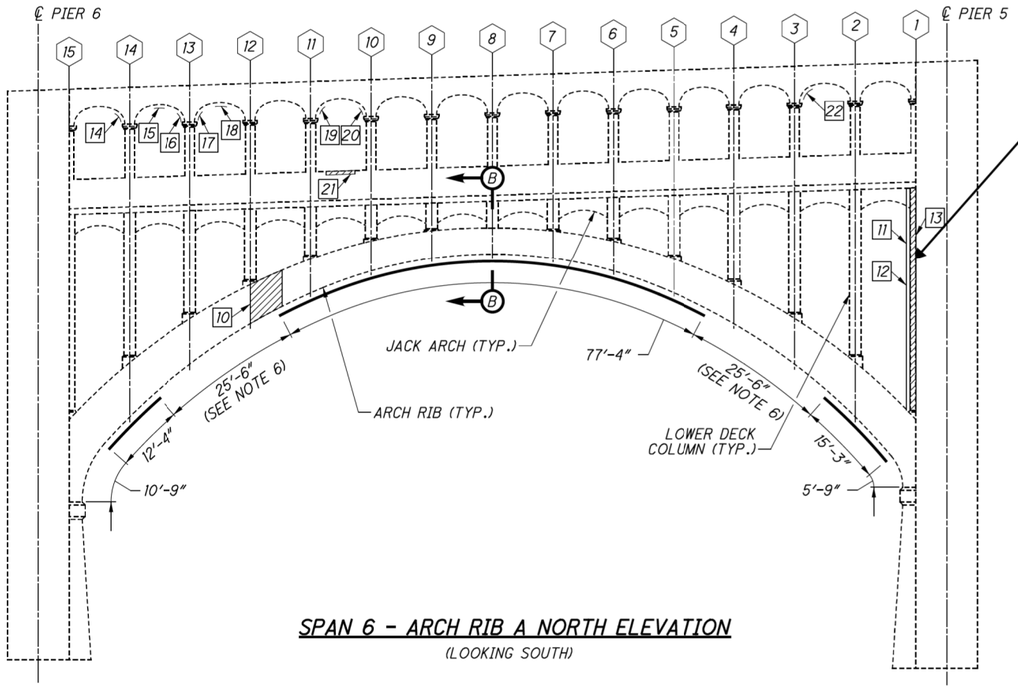
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 6 CONCRETE REPAIR DETAILS — PAGE A-63



SPAN 6 - ARCH RIB A SOUTH ELEVATION

(LOOKING NORTH)



SPAN 6 - ARCH RIB A NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	2	1
2	TYPE 1	2	1
3	TYPE 1	4	1
4	TYPE 1	13	3
5	TYPE 1	4	-
6	TYPE 2	4	3
7	TYPE 1	4	1
8	TYPE 1	68	-
9	TYPE 1	15	6
10	TYPE 1	20	-
11	TYPE 1	104	30
12	TYPE 1	8	2
13	TYPE 1	26	15

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
14	TYPE 2	2	1
15	TYPE 2	1	1
16	TYPE 2	1	1
17	TYPE 2	1	1
18	TYPE 2	1	1
19	TYPE 2	1	1
20	TYPE 2	1	1
21	TYPE 1	2	3
22	TYPE 2	2	1
MEASURED QUANTITY*		286	-
PLAN QUANTITY*		429	74

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	408
TYPE 2 REPAIR	SF	21
FRP WRAP	SF	1154

Defect not Found, does not appear to be spalled

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
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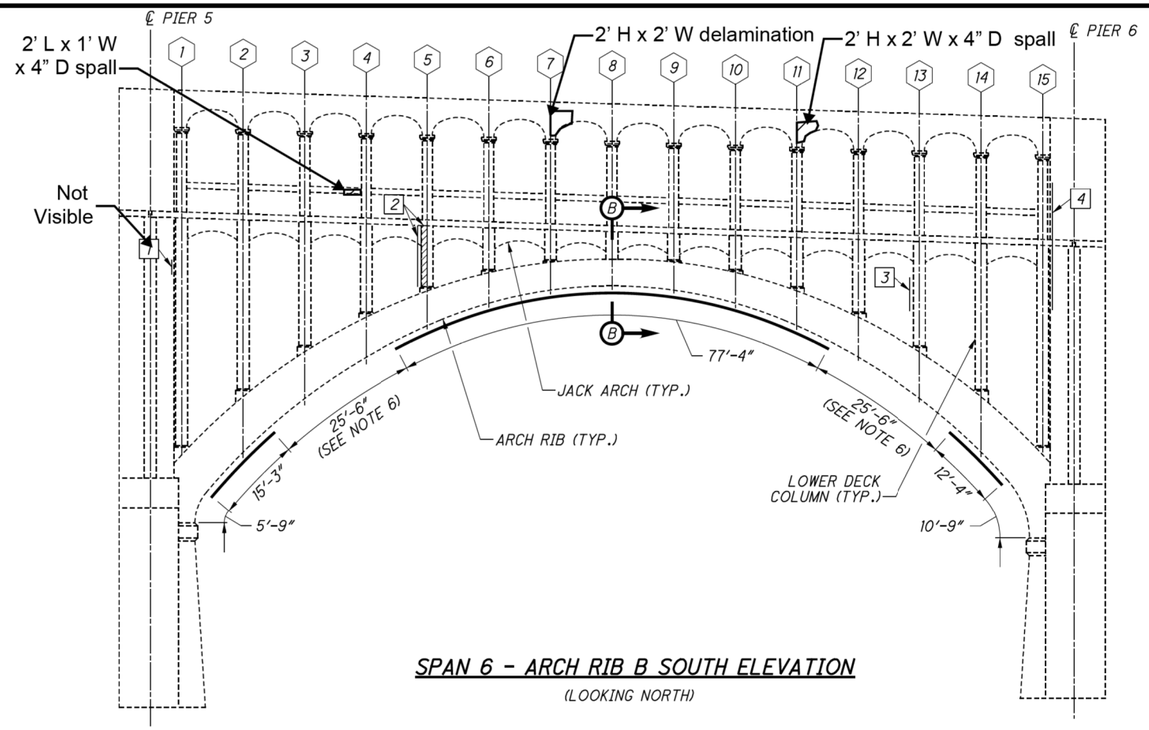
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FRP WRAP WILL NOT BE USED FOR WRAPPING THE UNREINFORCED SECTIONS OF THE CONCRETE ARCH RIBS.
7. FOR PIER 5 AND PIER 6 REPAIR DETAILS, SEE SHEET 27/89.
8. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

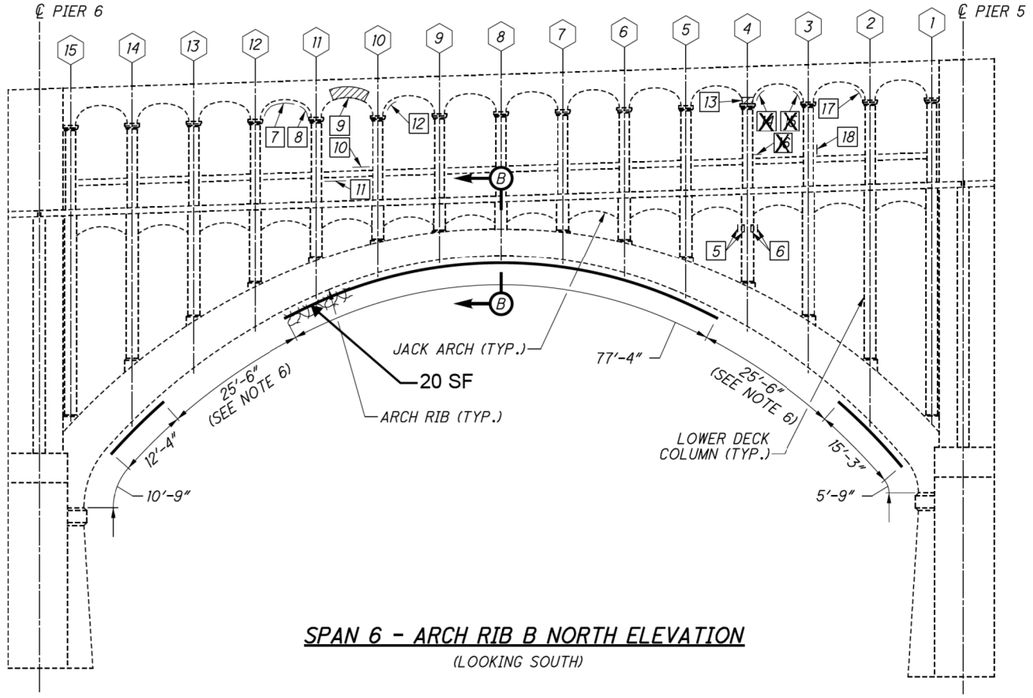
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 6 CONCRETE REPAIR DETAILS	PAGE A-64



SPAN 6 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)



SPAN 6 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	2	1
2	TYPE 1	17	5
3	TYPE 1	16	4
4	TYPE 1	35	9
5	TYPE 1	1	1
6	TYPE 1	1	1
7	TYPE 2	16	6
8	TYPE 2	8	3
9	TYPE 1	6	2
10	TYPE 1	3	2

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
11	TYPE 2	3	2
12	TYPE 2	1	1
13	TYPE 1	2	1
~~14~~	~~TYPE 2~~	~~3~~	~~2~~
~~15~~	~~TYPE 2~~	~~2~~	~~1~~
~~16~~	~~TYPE 1~~	~~1~~	~~1~~
17	TYPE 2	3	2
18	TYPE 1	1	1
MEASURED QUANTITY*		121	-
PLAN QUANTITY*		182	45

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	128
TYPE 2 REPAIR	SF	54
FRP WRAP	SF	1364

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
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3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FRP WRAP WILL NOT BE USED FOR WRAPPING THE UNREINFORCED SECTIONS OF THE CONCRETE ARCH RIBS.
7. FOR PIER 5 AND PIER 6 REPAIR DETAILS, SEE SHEET 27/89.
8. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

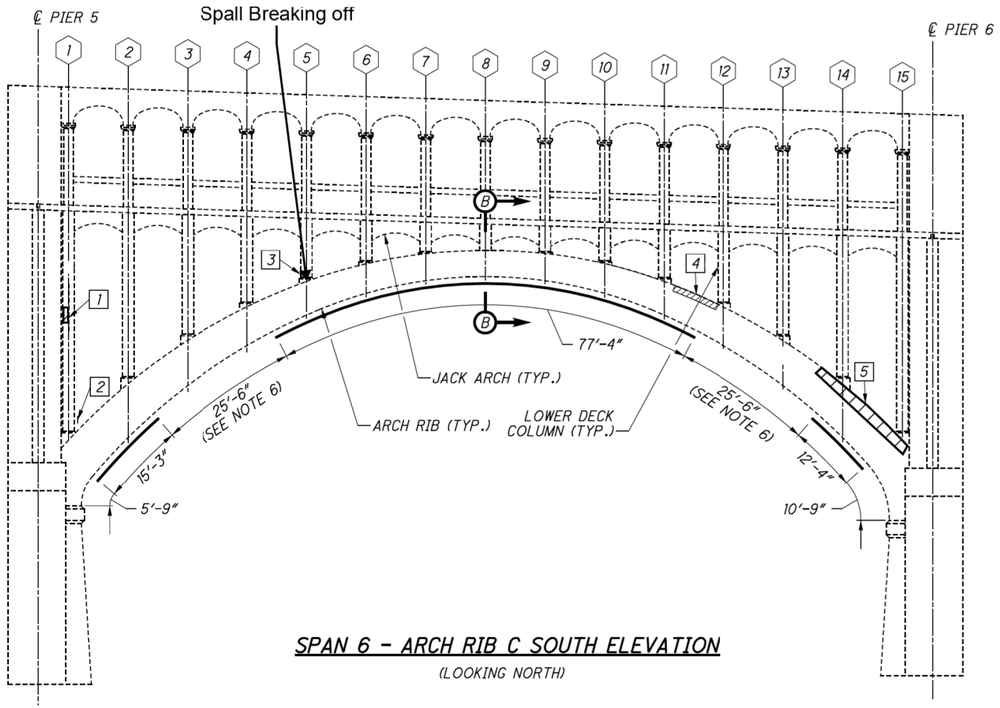
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

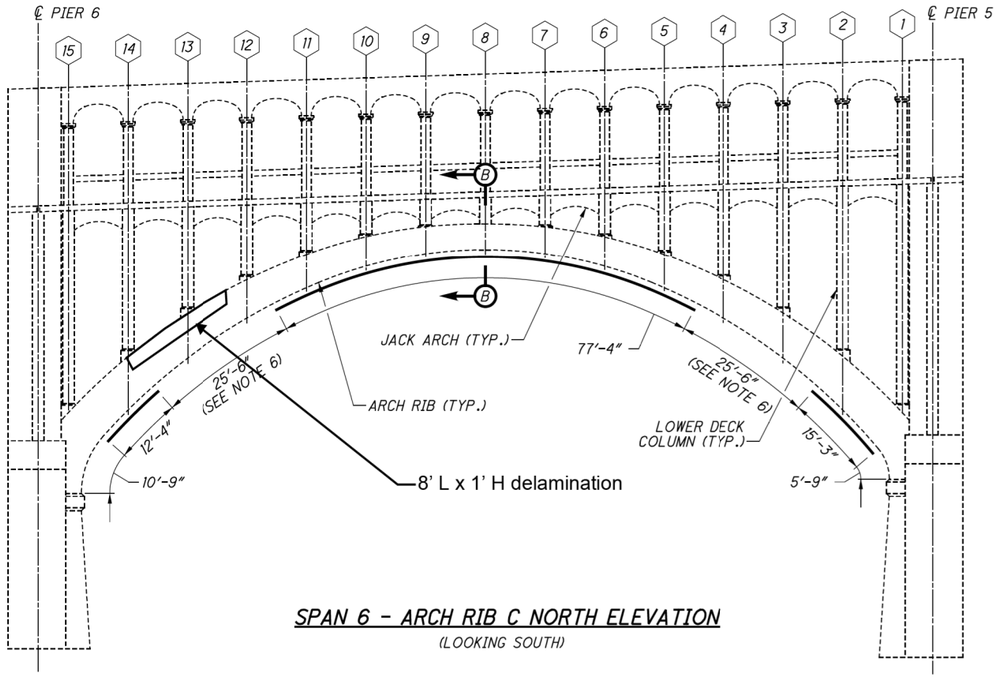
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 6 CONCRETE REPAIR DETAILS — PAGE A-65



SPAN 6 - ARCH RIB C SOUTH ELEVATION

(LOOKING NORTH)



SPAN 6 - ARCH RIB C NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	1	1
2	TYPE 1	1	1
3	TYPE 1	1	1
4	TYPE 1	5	-
5	TYPE 1	10	-
MEASURED QUANTITY*		18	-
PLAN QUANTITY*		27	3

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	27
TYPE 2 REPAIR	SF	-
FRP WRAP	SF	1364

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
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3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FRP WRAP WILL NOT BE USED FOR WRAPPING THE UNREINFORCED SECTIONS OF THE CONCRETE ARCH RIBS.
7. FOR PIER 5 AND PIER 6 REPAIR DETAILS, SEE SHEET 27/89.
8. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

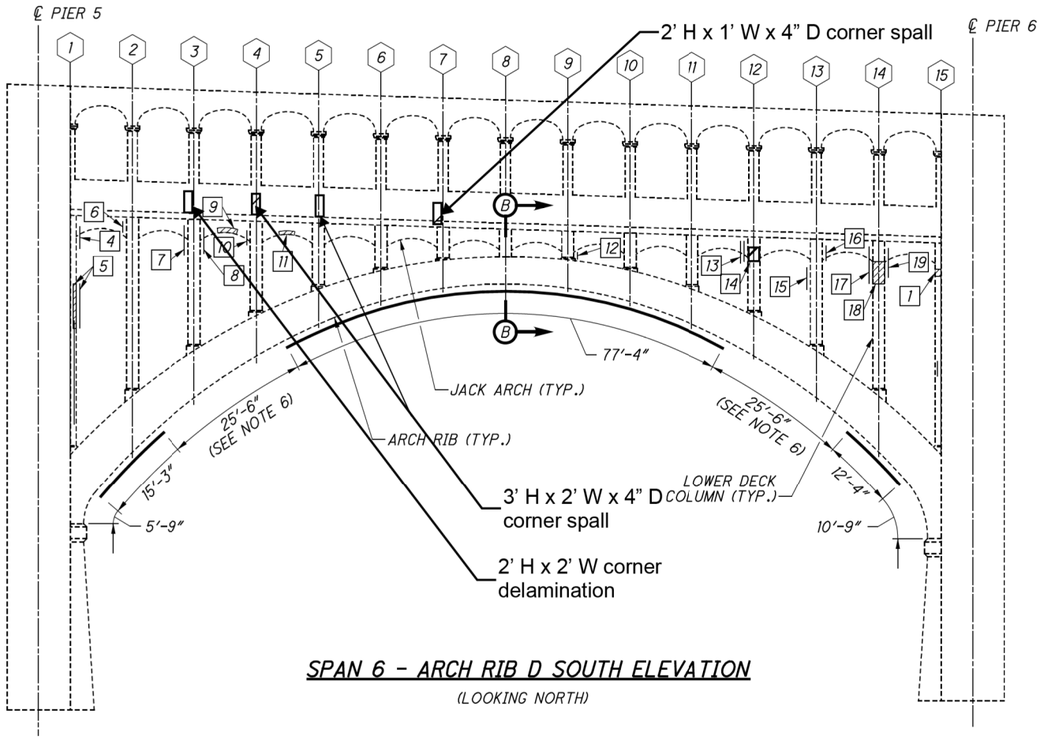
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

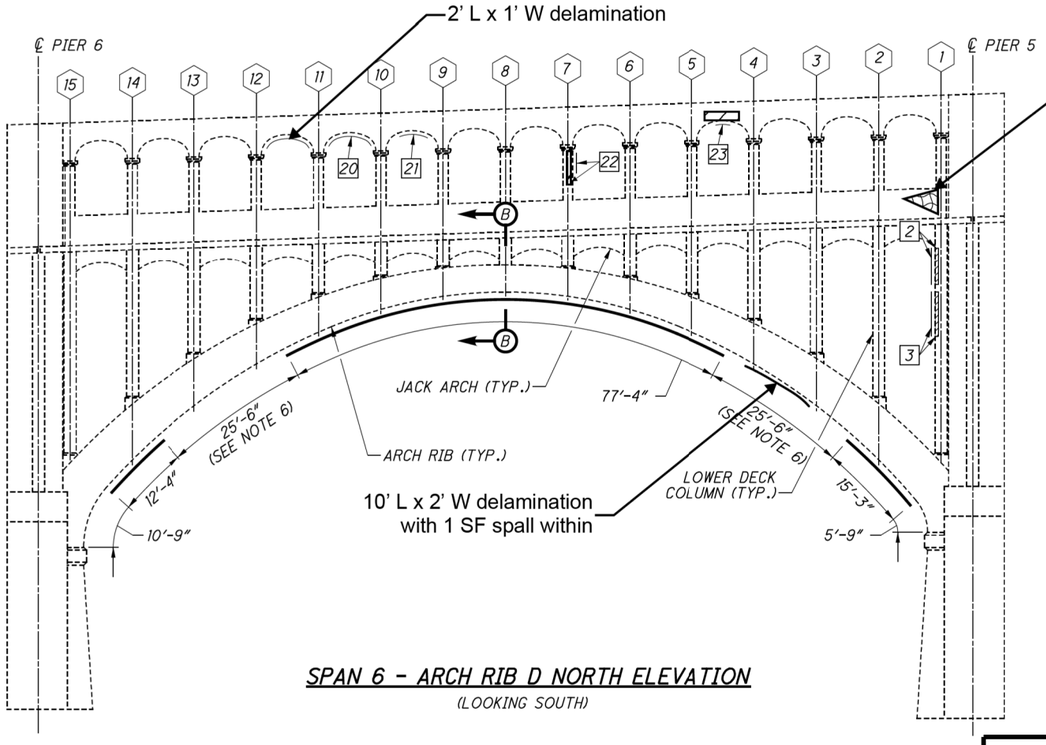
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 6 CONCRETE REPAIR DETAILS — PAGE A-66



SPAN 6 - ARCH RIB D SOUTH ELEVATION

(LOOKING NORTH)



SPAN 6 - ARCH RIB D NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	1	2
2	TYPE 1	6	3
3	TYPE 1	6	1
4	TYPE 1	3	4
5	TYPE 1	14	4
6	TYPE 1	14	2
7	TYPE 1	2	1
8	TYPE 1	4	2
9	TYPE 1	1	1
10	TYPE 1	1	4
11	TYPE 1	9	2
12	TYPE 1	8	2

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
13	TYPE 1	4	1
14	TYPE 1	10	3
15	TYPE 1	6	2
16	TYPE 1	8	2
17	TYPE 1	1	1
18	TYPE 1	5	3
19	TYPE 1	6	3
20	TYPE 2	10	7
21	TYPE 2	4	3
22	TYPE 1	5	4
23	TYPE 2	2	1
MEASURED QUANTITY*		132	-
PLAN QUANTITY*		198	58

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	174
TYPE 2 REPAIR	SF	24
FRP WRAP	SF	1154

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
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3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
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5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FRP WRAP WILL NOT BE USED FOR WRAPPING THE UNREINFORCED SECTIONS OF THE CONCRETE ARCH RIBS.
7. FOR PIER 5 AND PIER 6 REPAIR DETAILS, SEE SHEET 27/89.
8. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

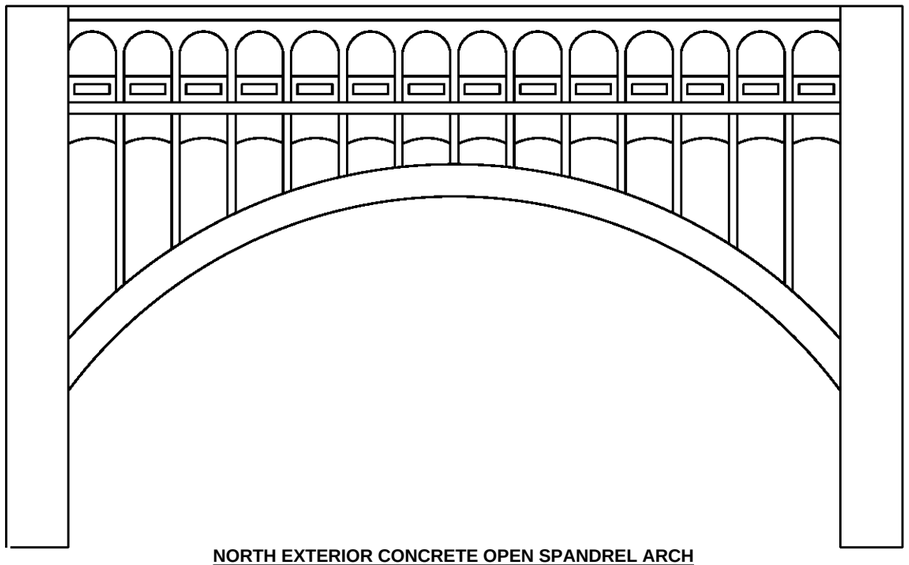
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 6 CONCRETE REPAIR DETAILS	PAGE A-67

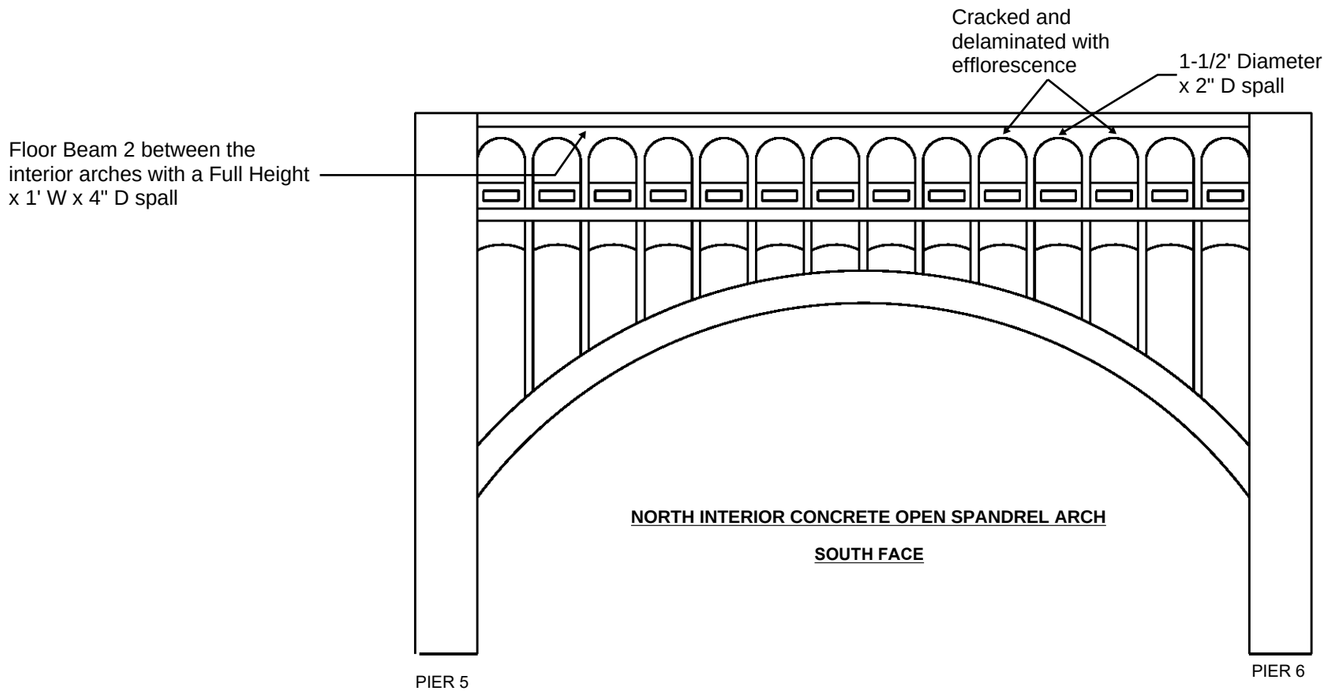


NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

SOUTH FACE

PIER 5

PIER 6



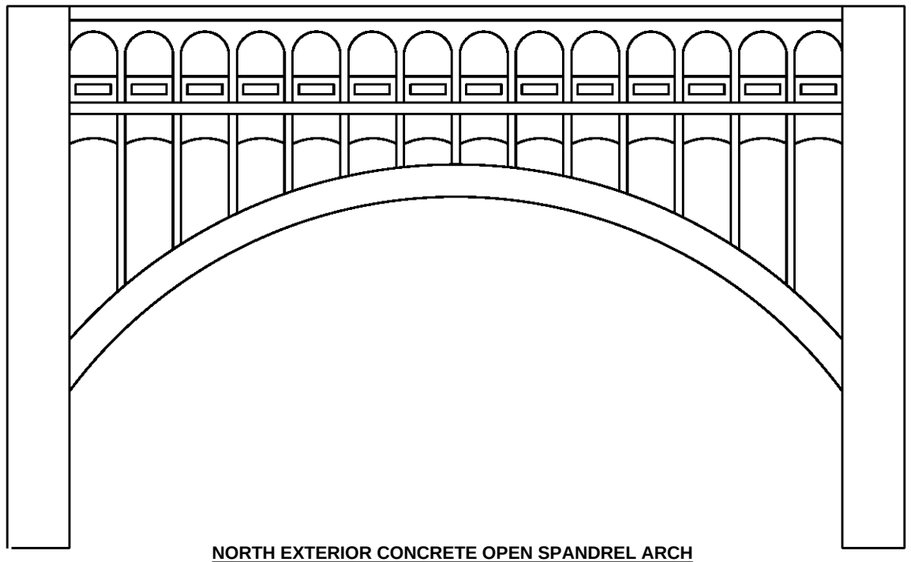
NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH

SOUTH FACE

PIER 5

PIER 6

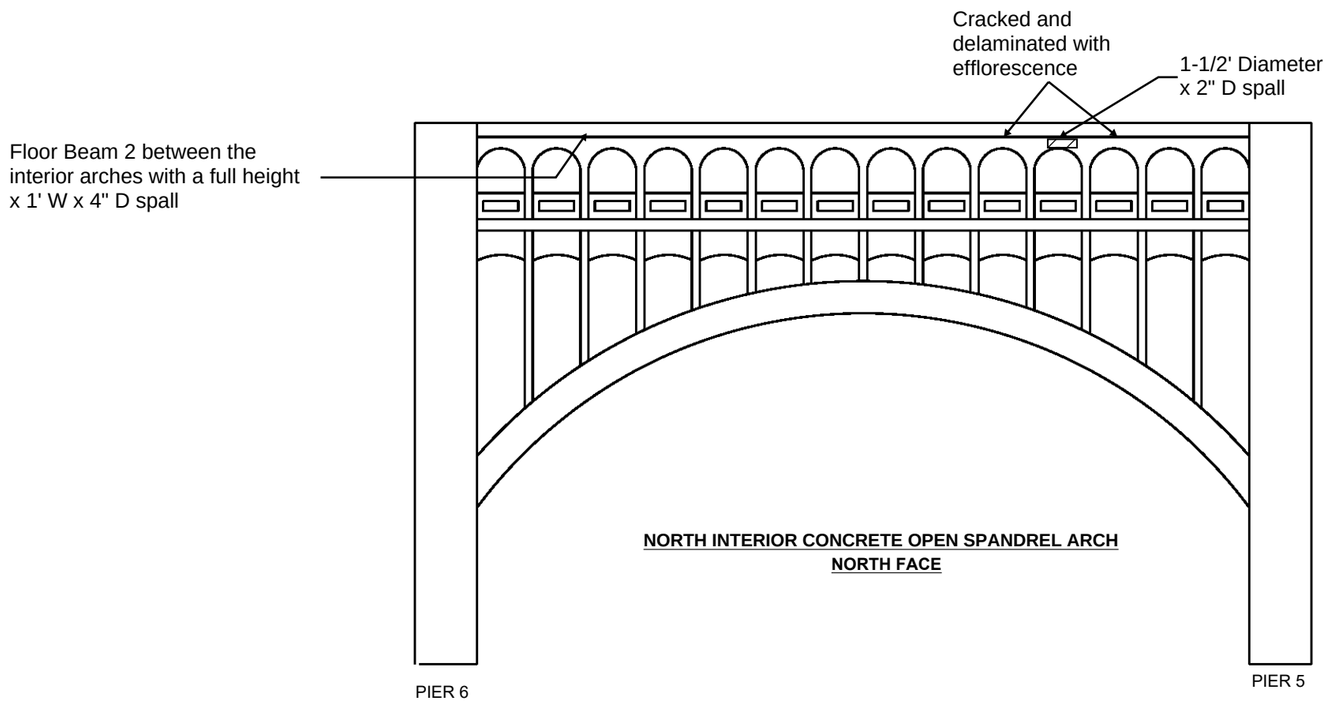
GRAPHIC SCALE MEASURED IN FEET **NOT TO SCALE**	**DATE** NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465** STRUCTURE ELEVATION - SPAN 6



PIER 6

NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

PIER 5

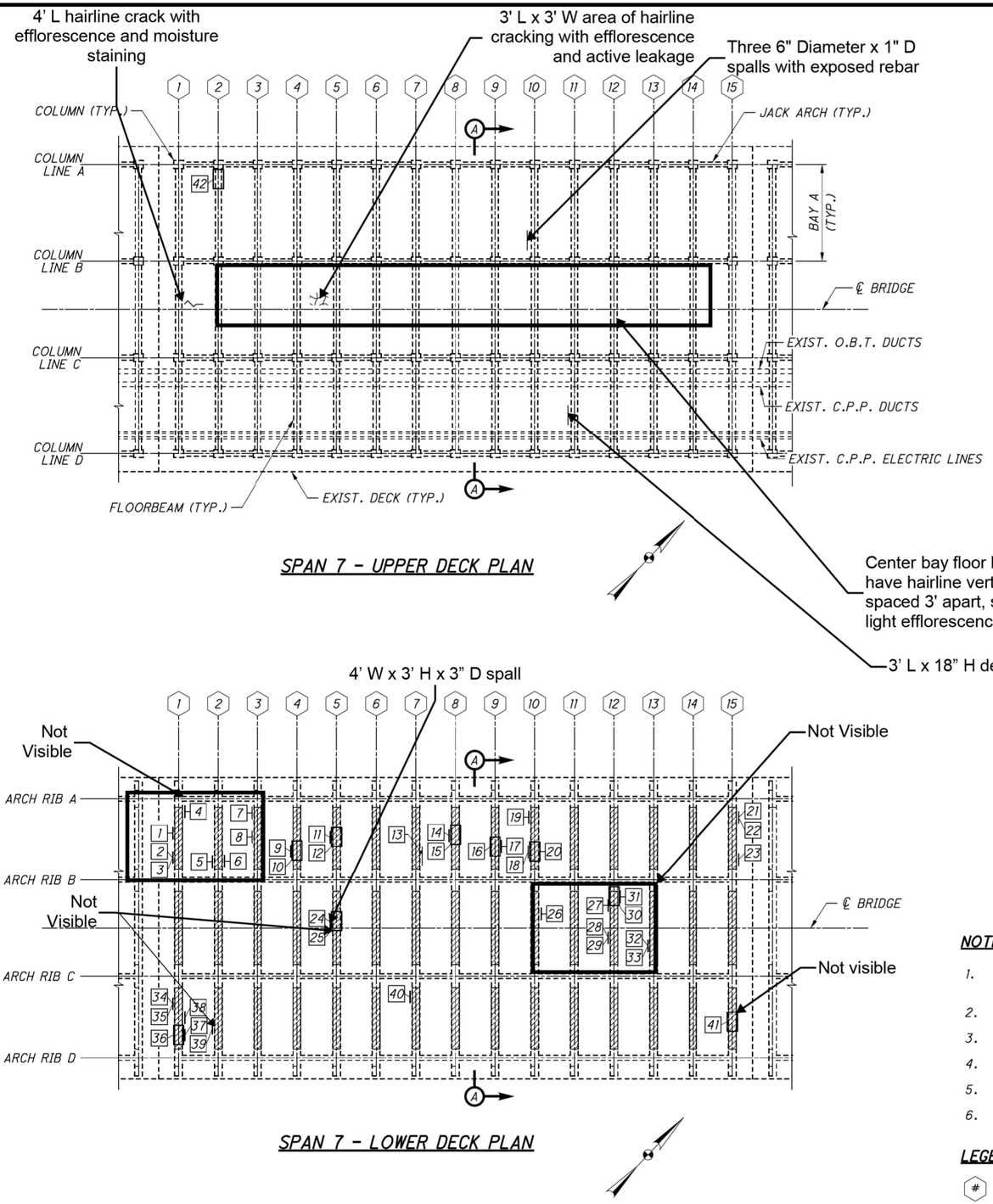


PIER 6

NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

PIER 5

GRAPHIC SCALE MEASURED IN FEET **NOT TO SCALE**	**DATE** NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465** STRUCTURE ELEVATION - SPAN 6 **PAGE** A-69



SPAN 7 - UPPER DECK PLAN

SPAN 7 - LOWER DECK PLAN

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	8	2
2	TYPE 1	20	4
3	TYPE 1	5	1
4	TYPE 1	4	1
5	TYPE 1	2	1
6	TYPE 1	2	1
7	TYPE 1	8	2
8	TYPE 1	21	6
9	TYPE 1	25	4
10	TYPE 2	22	9
11	TYPE 1	6	3
12	TYPE 2	1	1
13	TYPE 1	16	4
14	TYPE 1	6	3
15	TYPE 2	30	12
16	TYPE 2	5	2
17	TYPE 1	4	1
18	TYPE 1	6	2
19	TYPE 1	3	2
20	TYPE 2	3	3
21	TYPE 1	20	6

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
22	TYPE 1	5	1
23	TYPE 1	19	6
24	TYPE 1	12	4
25	TYPE 2	4	3
26	TYPE 1	6	2
27	TYPE 1	4	1
28	TYPE 1	17	3
29	TYPE 1	13	2
30	TYPE 2	2	2
31	TYPE 1	3	1
32	TYPE 1	2	1
33	TYPE 1	2	1
34	TYPE 1	16	6
35	TYPE 1	6	2
36	TYPE 2	3	3
37	TYPE 1	3	2
38	TYPE 1	10	2
39	TYPE 1	33	12
40	TYPE 1	21	4
41	TYPE 2	13	8
42	TYPE 2	1	1
MEASURED QUANTITY*		412	-
PLAN QUANTITY*		618	137

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	492
TYPE 2 REPAIR	SF	126
FRP WRAP	SF	3863

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2018. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR SECTION A-A, SEE SHEET 34/89.
6. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

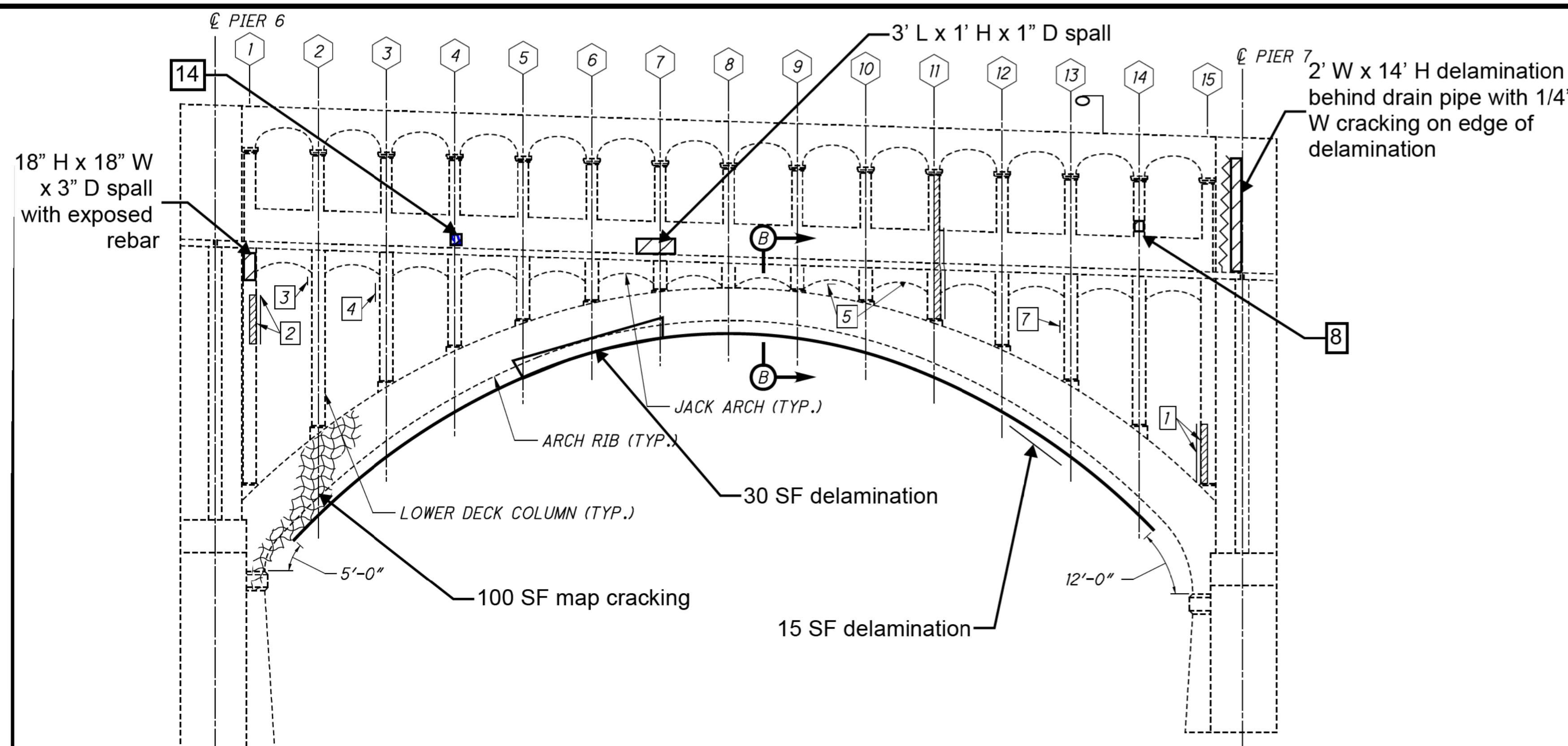
LEGEND:

(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

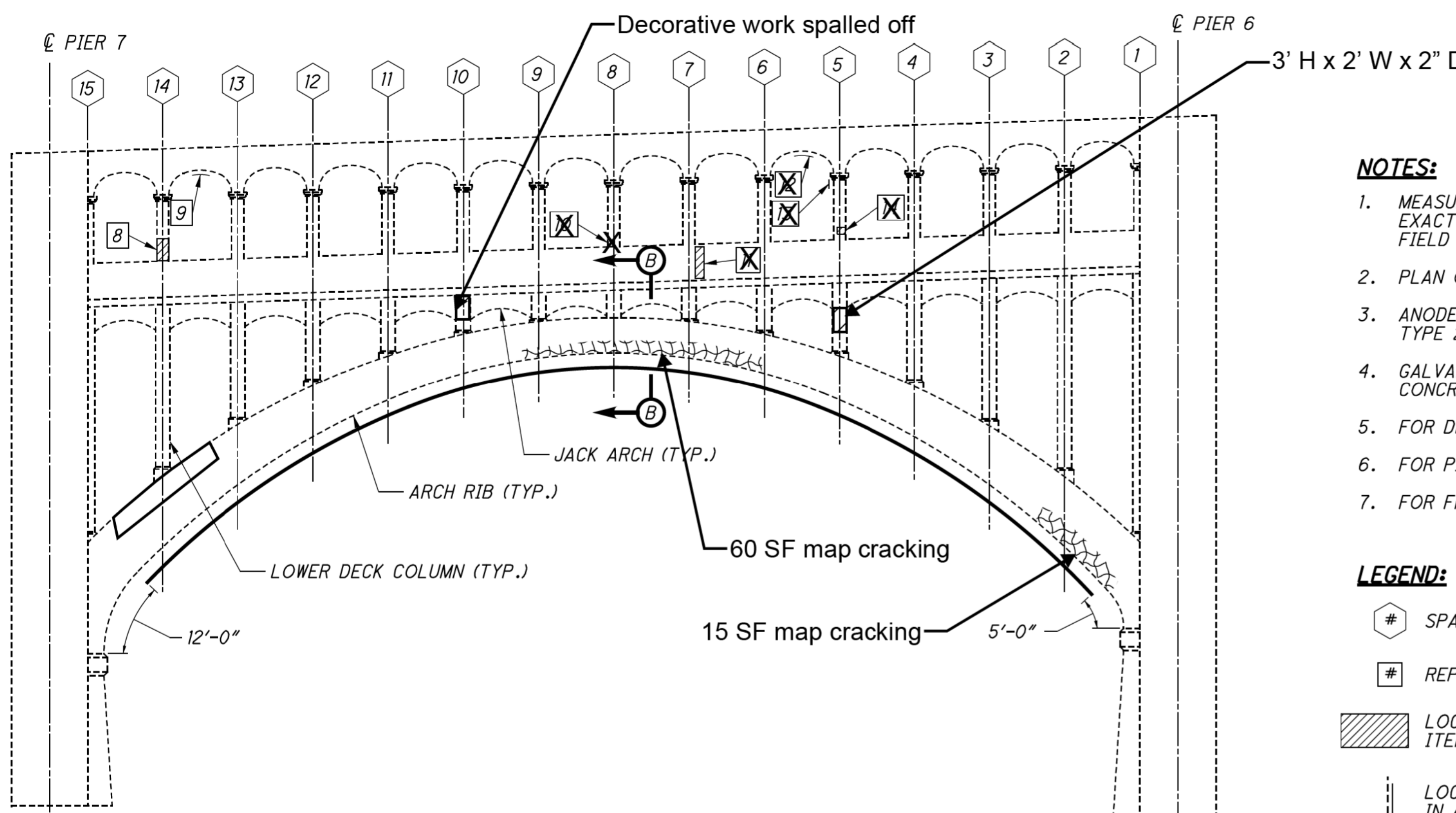
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 7 CONCRETE REPAIR DETIALS / PAGE A-70



SPAN 7 - ARCH RIB A SOUTH ELEVATION

(LOOKING NORTH)



SPAN 7 - ARCH RIB A NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	21	5
2	TYPE 1	20	6
3	TYPE 1	1	1
4	TYPE 1	7	2
5	TYPE 2	2	2
6	TYPE 1	32	12
7	TYPE 1	3	1
8	TYPE 1	5	2
9	TYPE 2	4	1
~~10~~	~~TYPE 1~~	~~1~~	~~1~~
~~11~~	~~TYPE 1~~	~~4~~	~~2~~
~~12~~	~~TYPE 2~~	~~2~~	~~1~~
~~13~~	~~TYPE 1~~	~~1~~	~~1~~
~~14~~	~~TYPE 1~~	~~1~~	~~1~~
MEASURED QUANTITY*		104	-
PLAN QUANTITY*		156	38

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	144
TYPE 2 REPAIR	SF	12
FRP WRAP	SF	1681

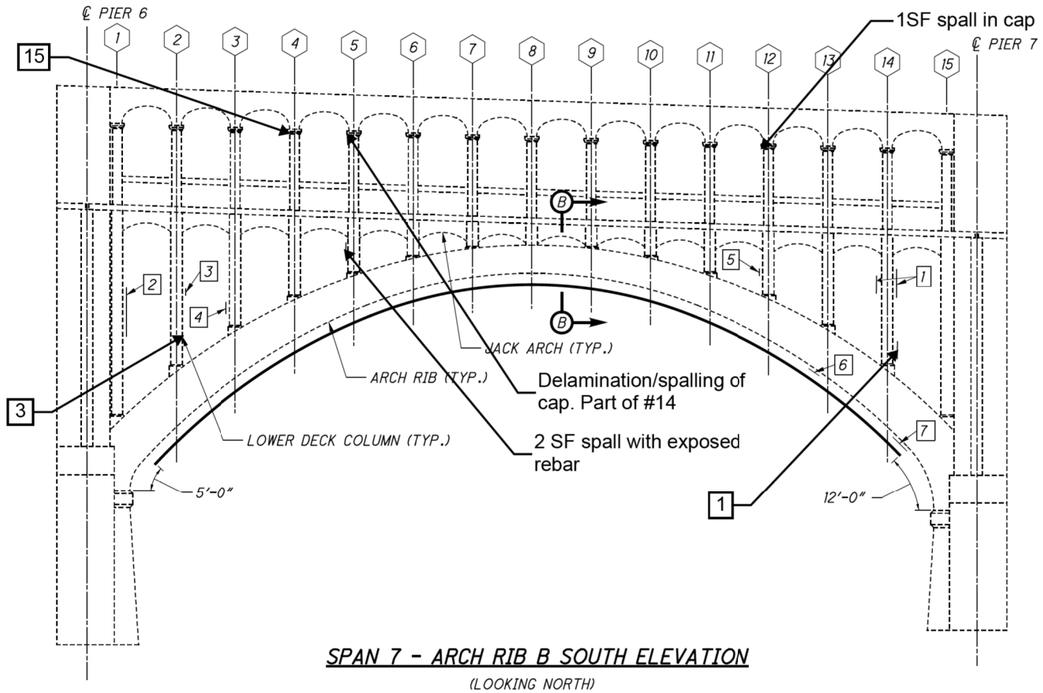
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 6 REPAIR DETAILS, SEE SHEET 27/89. FOR PIER 7 REPAIR DETAILS, SEE SHEET 28/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

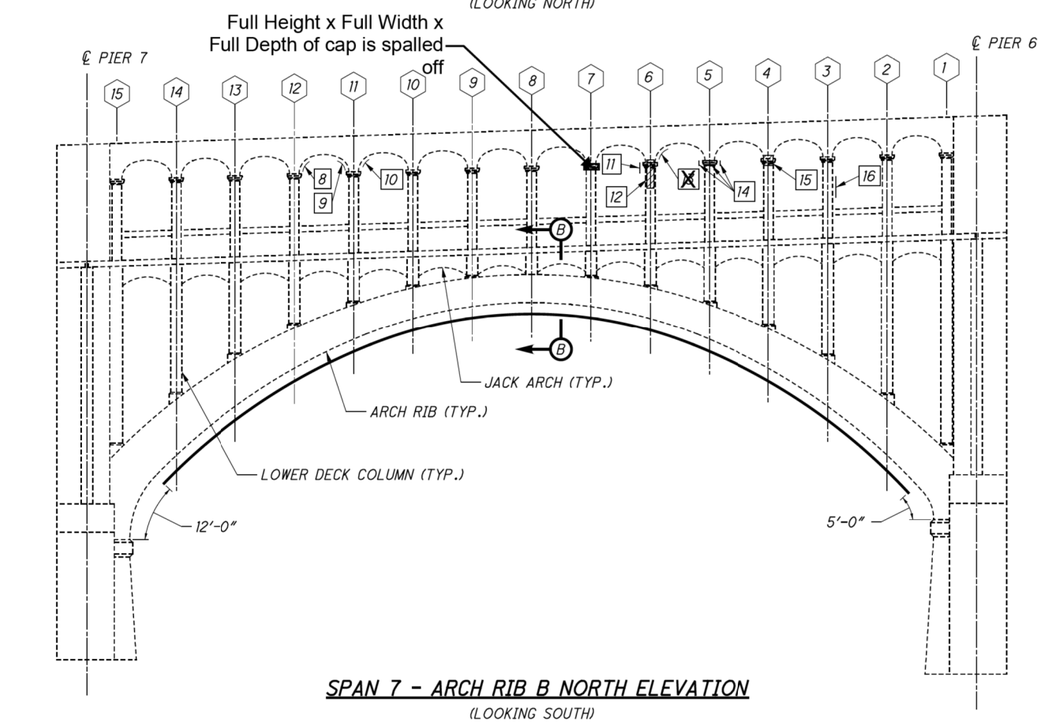
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- (hatched) LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- (dashed) LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- (dashed/solid line) AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	INFRASTRUCTURE ENGINEERS, INC. 9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018		SPAN 7 CONCRETE REPAIR DETAILS	PAGE A-71



SPAN 7 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)



SPAN 7 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	10	2
2	TYPE 1	28	8
3	TYPE 1	2	1
4	TYPE 1	5	1
5	TYPE 1	1	1
6	TYPE 2	3	1
7	TYPE 2	21	8
8	TYPE 2	3	2
9	TYPE 2	3	2
10	TYPE 2	1	1
11	TYPE 1	4	1
12	TYPE 1	5	4
~~13~~	~~TYPE 2~~	~~4~~	~~3~~
14	TYPE 1	5	4
15	TYPE 1	4	1
16	TYPE 1	5	4
MEASURED QUANTITY*		104	-
PLAN QUANTITY*		156	44

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	103
TYPE 2 REPAIR	SF	53
FRP WRAP	SF	1987

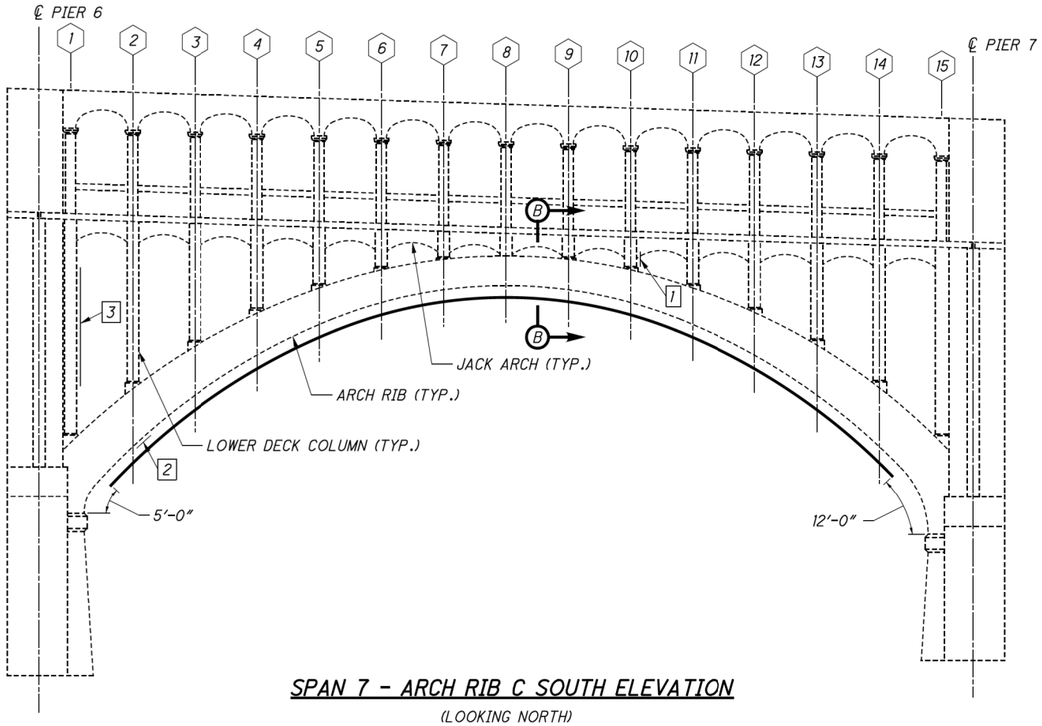
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 6 REPAIR DETAILS, SEE SHEET 27/89. FOR PIER 7 REPAIR DETAILS, SEE SHEET 28/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

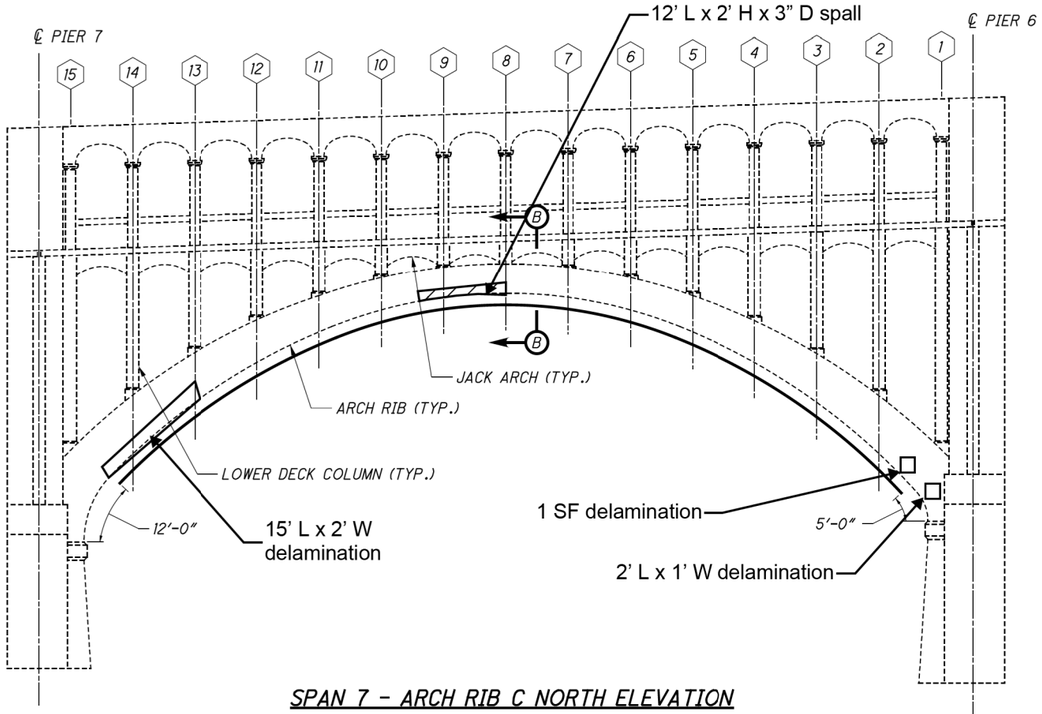
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cinncinati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 7 CONCRETE REPAIR DETAILS — PAGE A-72



SPAN 7 - ARCH RIB C SOUTH ELEVATION

(LOOKING NORTH)



SPAN 7 - ARCH RIB C NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	2	1
2	TYPE 2	15	5
3	TYPE 1	32	8
MEASURED QUANTITY*		49	-
PLAN QUANTITY*		74	14

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	51
TYPE 2 REPAIR	SF	23
FRP WRAP	SF	1987

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 6 REPAIR DETAILS, SEE SHEET 27/89. FOR PIER 7 REPAIR DETAILS, SEE SHEET 28/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

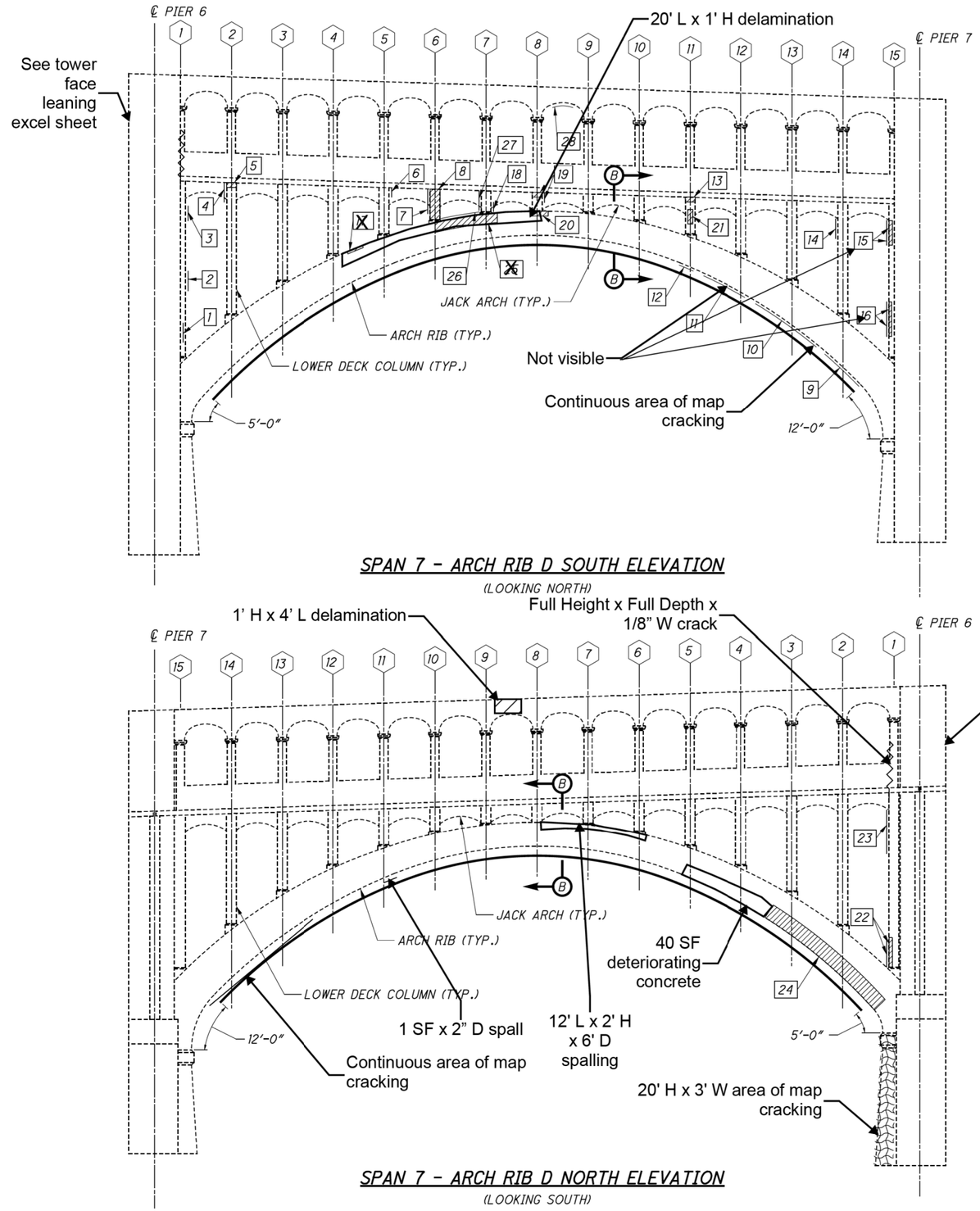
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 7 CONCRETE REPAIR DETAILS — PAGE A-73



SPAN 7 - ARCH RIB D SOUTH ELEVATION

(LOOKING NORTH)

SPAN 7 - ARCH RIB D NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	4	2
2	TYPE 1	4	2
3	TYPE 1	3	2
4	TYPE 1	8	2
5	TYPE 1	2	1
6	TYPE 1	3	2
7	TYPE 1	20	6
8	TYPE 1	12	3
9	TYPE 2	16	6
10	TYPE 2	25	12
11	TYPE 2	18	10
12	TYPE 2	5	2
13	TYPE 1	2	1
14	TYPE 1	6	2
15	TYPE 1	18	6

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
16	TYPE 1	10	4
~~17~~	~~TYPE 1~~	~~17~~	~~10~~
18	TYPE 1	4	1
19	TYPE 1	6	2
20	TYPE 1	3	-
21	TYPE 1	3	2
22	TYPE 1	8	3
23	TYPE 1	12	5
24	TYPE 1	90	-
~~25~~	~~TYPE 1~~	~~24~~	~~-~~
26	TYPE 1	72	22
27	TYPE 1	8	2
28	TYPE 2	4	3
MEASURED QUANTITY*		407	-
PLAN QUANTITY*		611	113

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	509
TYPE 2 REPAIR	SF	102
FRP WRAP	SF	1681

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 6 REPAIR DETAILS, SEE SHEET 27/89. FOR PIER 7 REPAIR DETAILS, SEE SHEET 28/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

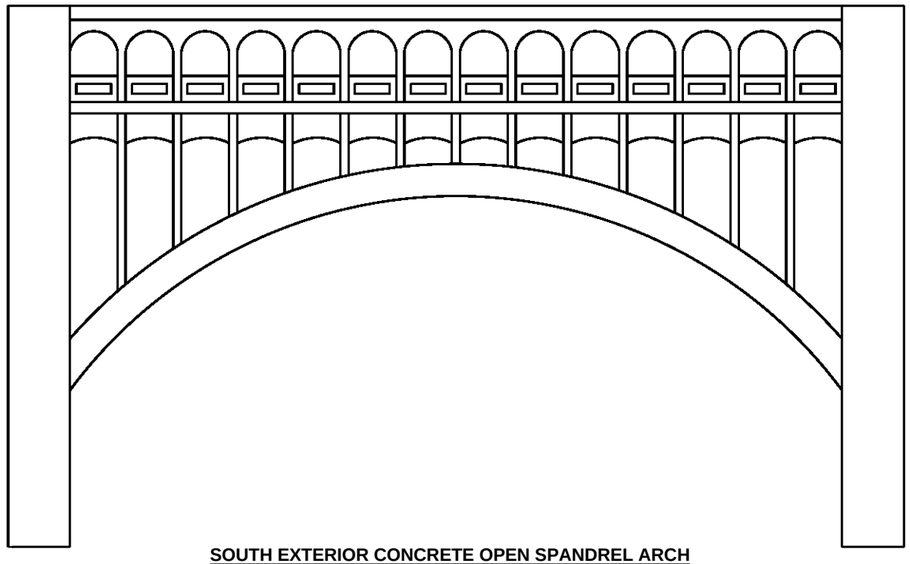
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 7 CONCRETE REPAIR DETAILS — PAGE A-74

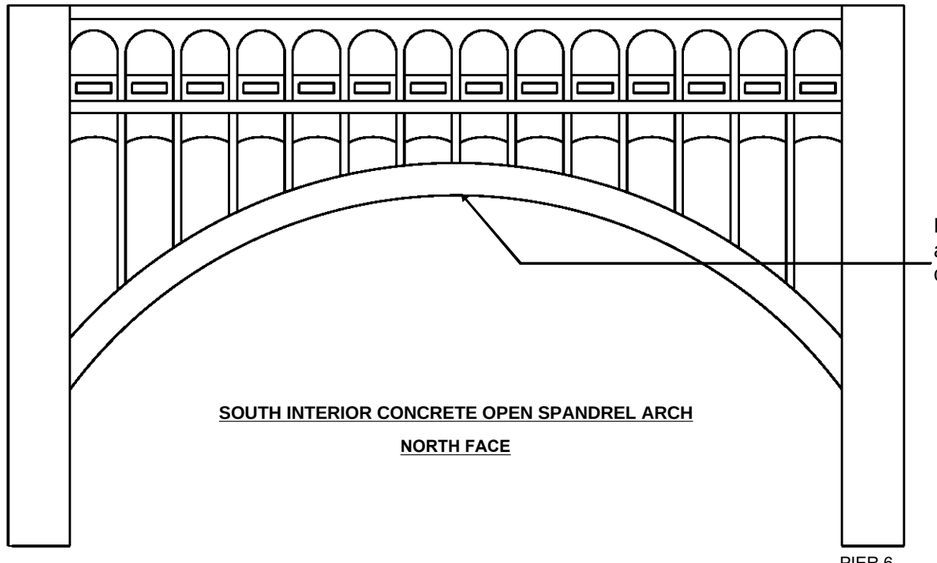


PIER 7

PIER 6

SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

NORTH FACE



Bottom north edge of arch rib has a spall with corroded reinforcing

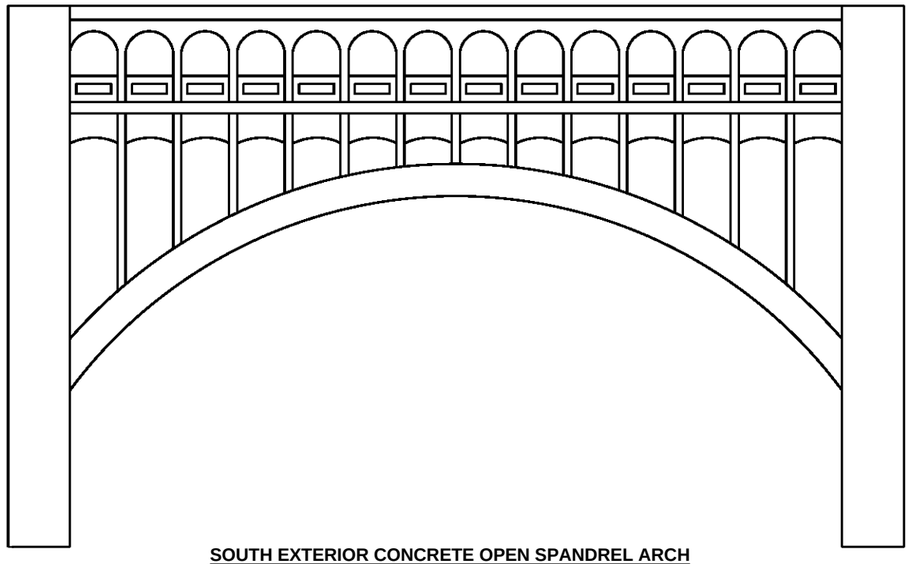
PIER 7

PIER 6

SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH

NORTH FACE

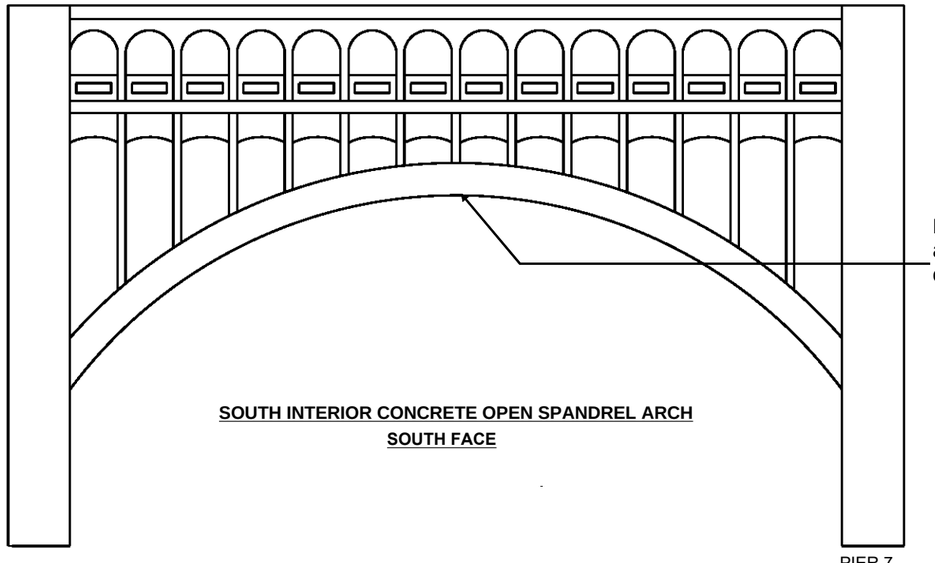
GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 7	PAGE A-75



PIER 6

SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

PIER 7



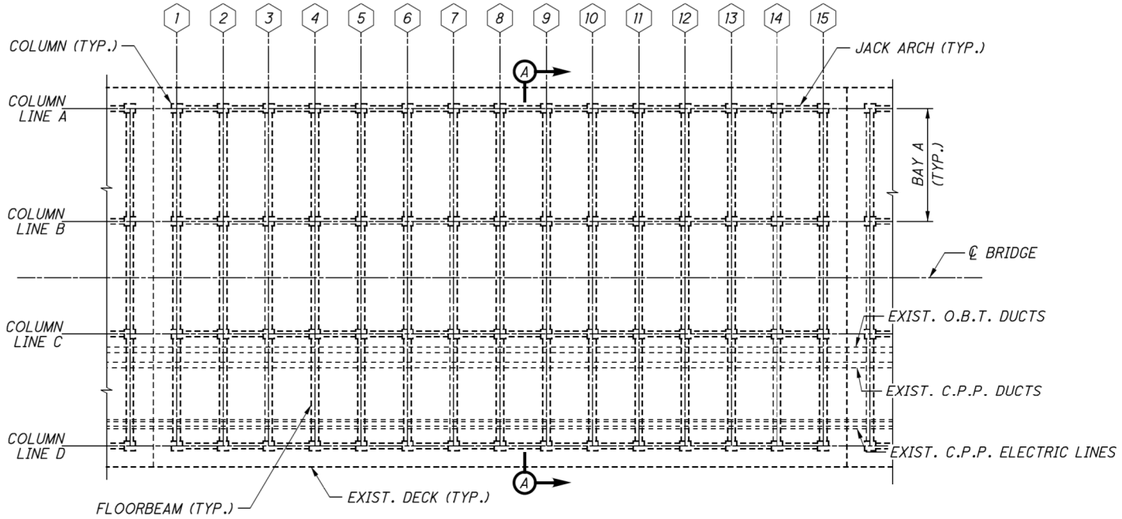
Bottom north edge of arch rib has a spall with corroded reinforcing

PIER 6

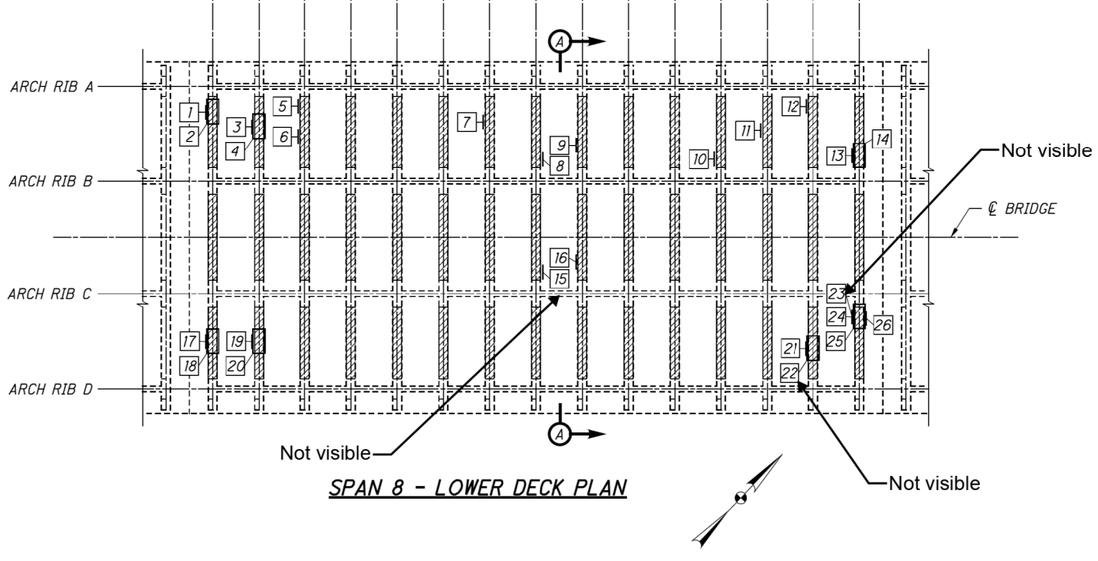
SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

PIER 7

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 7	PAGE A-76



SPAN 8 - UPPER DECK PLAN



SPAN 8 - LOWER DECK PLAN

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	4	4
2	TYPE 2	4	6
3	TYPE 1	3	2
4	TYPE 2	6	3
5	TYPE 1	4	2
6	TYPE 1	14	4
7	TYPE 1	3	1
8	TYPE 1	8	2
9	TYPE 1	39	10
10	TYPE 1	1	1
11	TYPE 1	8	2
12	TYPE 1	10	4
13	TYPE 1	1	1
14	TYPE 2	2	2
15	TYPE 1	2	1
16	TYPE 1	8	2
17	TYPE 1	4	4
18	TYPE 2	7	6
19	TYPE 1	20	6
20	TYPE 2	5	4
21	TYPE 1	17	4
22	TYPE 2	3	2
23	TYPE 1	23	6
24	TYPE 1	5	1
25	TYPE 2	5	2
26	TYPE 1	8	2
MEASURED QUANTITY*		214	
PLAN QUANTITY*		321	84

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	273
TYPE 2 REPAIR	SF	48
FRP WRAP	SF	3863

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR SECTION A-A, SEE SHEET 34/89.
6. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

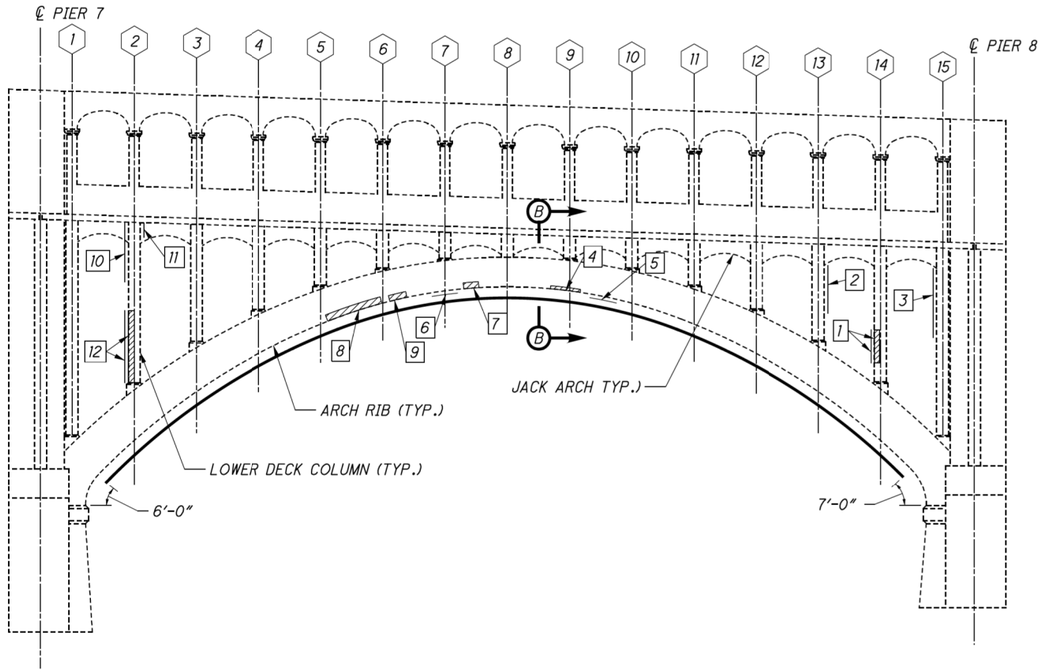
LEGEND:

(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

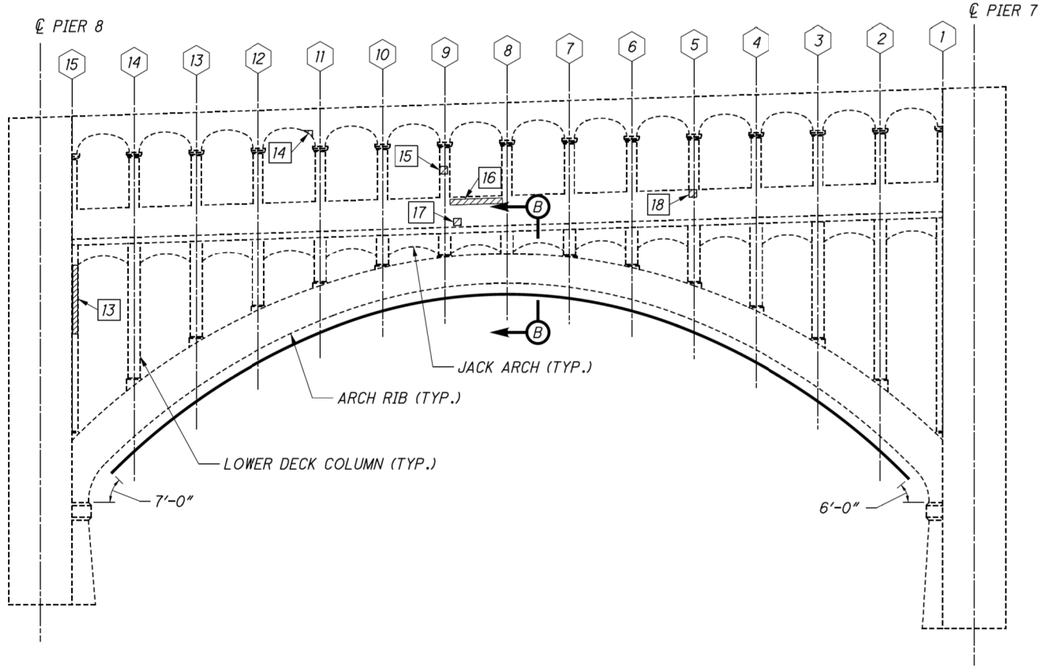
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 8 CONCRETE REPAIR DETAILS — PAGE A-77



SPAN 8 - ARCH RIB A SOUTH ELEVATION

(LOOKING NORTH)



SPAN 8 - ARCH RIB A NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	15	3
2	TYPE 1	26	8
3	TYPE 1	18	6
4	TYPE 1	3	-
5	TYPE 2	11	6
6	TYPE 2	7	4
7	TYPE 1	2	-
8	TYPE 1	12	-
9	TYPE 1	2	-
10	TYPE 1	12	5
11	TYPE 1	32	6
12	TYPE 1	1	1
13	TYPE 1	6	4
14	TYPE 1	1	1
15	TYPE 1	1	1
16	TYPE 1	9	5
17	TYPE 1	1	1
18	TYPE 1	1	1
MEASURED QUANTITY*		160	-
PLAN QUANTITY*		240	52

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	213
TYPE 2 REPAIR	SF	27
FRP WRAP	SF	1680

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 7 AND PIER 8 REPAIR DETAILS, SEE SHEET 28/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

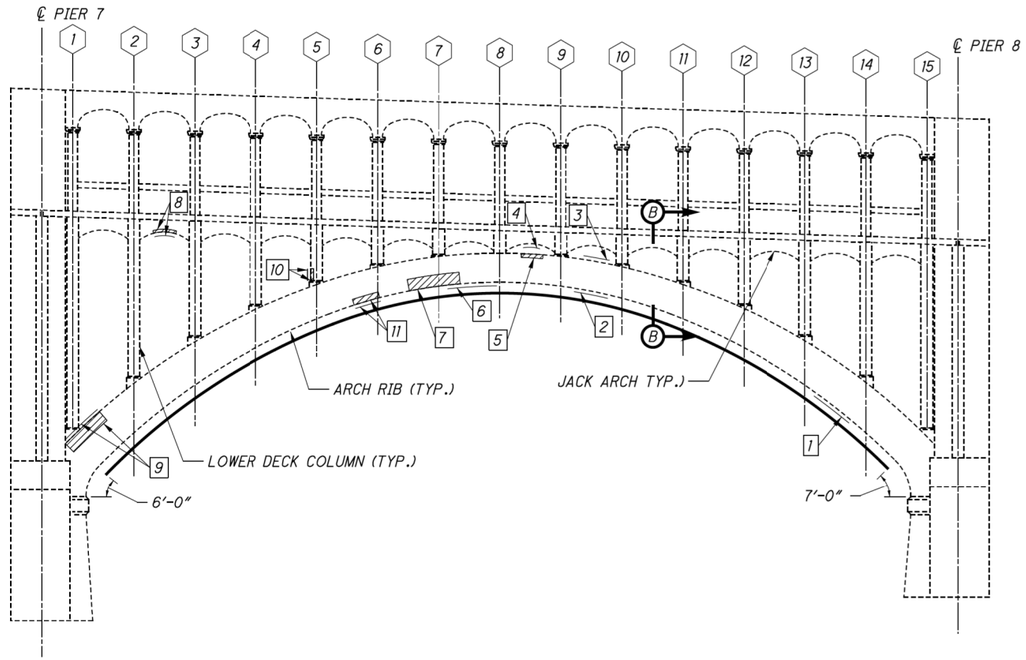
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

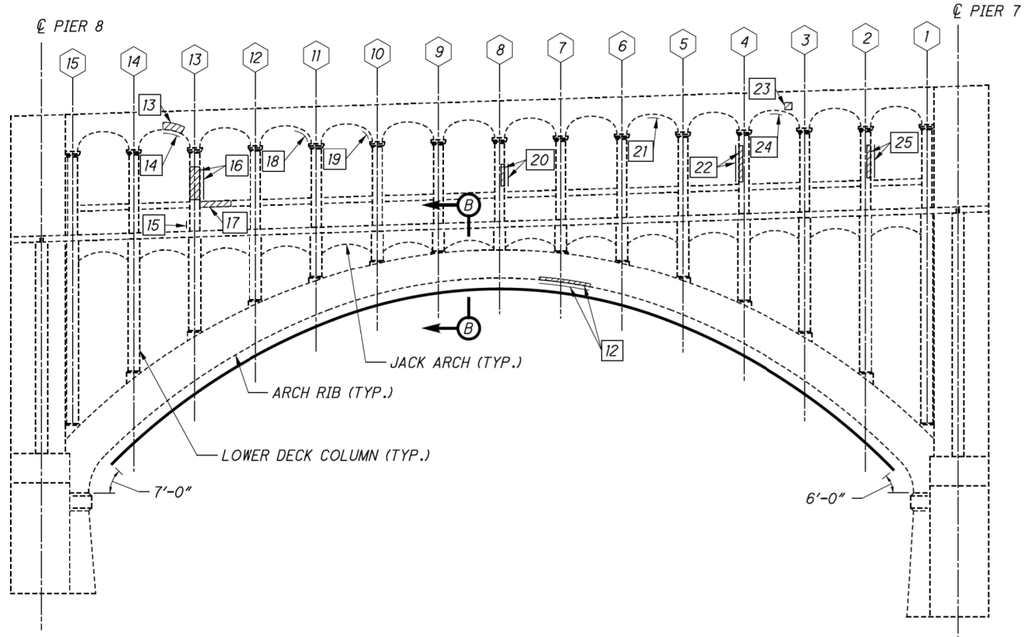
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 8 CONCRETE REPAIR DETAILS — PAGE A-78



SPAN 8 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)



SPAN 8 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 2	9	5
2	TYPE 2	32	12
3	TYPE 1	5	3
4	TYPE 2	3	3
5	TYPE 1	4	-
6	TYPE 2	11	4
7	TYPE 1	23	-
8	TYPE 2	2	2
9	TYPE 1	11	-
10	TYPE 1	2	1
11	TYPE 2	6	2
12	TYPE 2	13	8
13	TYPE 1	2	1
14	TYPE 2	2	1
15	TYPE 1	1	1

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
16	TYPE 1	12	6
17	TYPE 1	5	3
18	TYPE 2	6	3
19	TYPE 2	1	1
20	TYPE 1	3	2
21	TYPE 2	1	1
22	TYPE 1	5	4
23	TYPE 1	1	1
24	TYPE 2	1	1
25	TYPE 1	5	3
MEASURED QUANTITY*		166	-
PLAN QUANTITY*		249	68

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	119
TYPE 2 REPAIR	SF	130
FRP WRAP	SF	1985

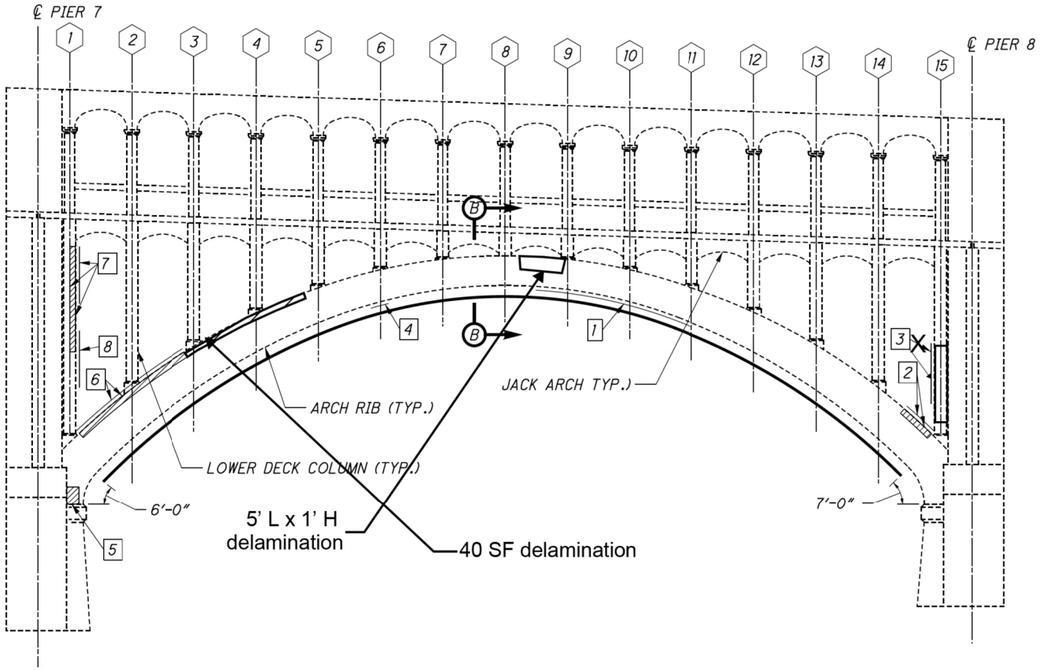
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 7 AND PIER 8 REPAIR DETAILS, SEE SHEET 28/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

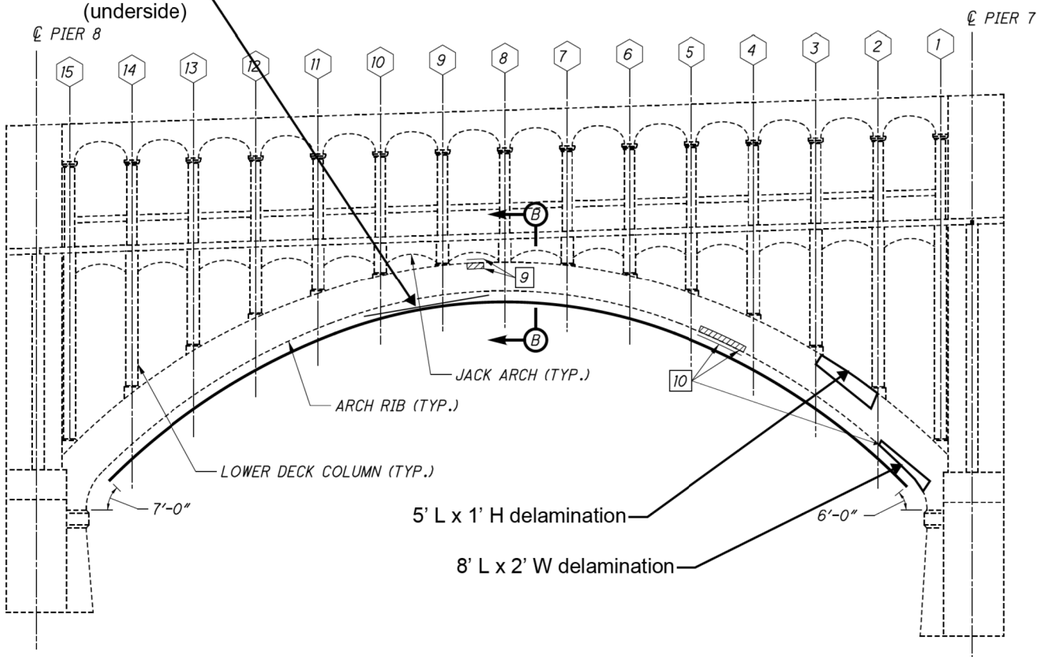
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 SPAN 8 CONCRETE REPAIR DETAILS PAGE A-79



SPAN 8 - ARCH RIB C SOUTH ELEVATION

(LOOKING NORTH)



SPAN 8 - ARCH RIB C NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 2	192	44
2	TYPE 1	26	12
3	TYPE 1	35	10
4	TYPE 2	4	1
5	TYPE 1	6	2
6	TYPE 1	40	15
7	TYPE 1	175	36
8	TYPE 1	10	5
9	TYPE 1	3	2
10	TYPE 2	21	10
MEASURED QUANTITY*		512	-
PLAN QUANTITY*		768	137

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	442
TYPE 2 REPAIR	SF	326
FRP WRAP	SF	1985

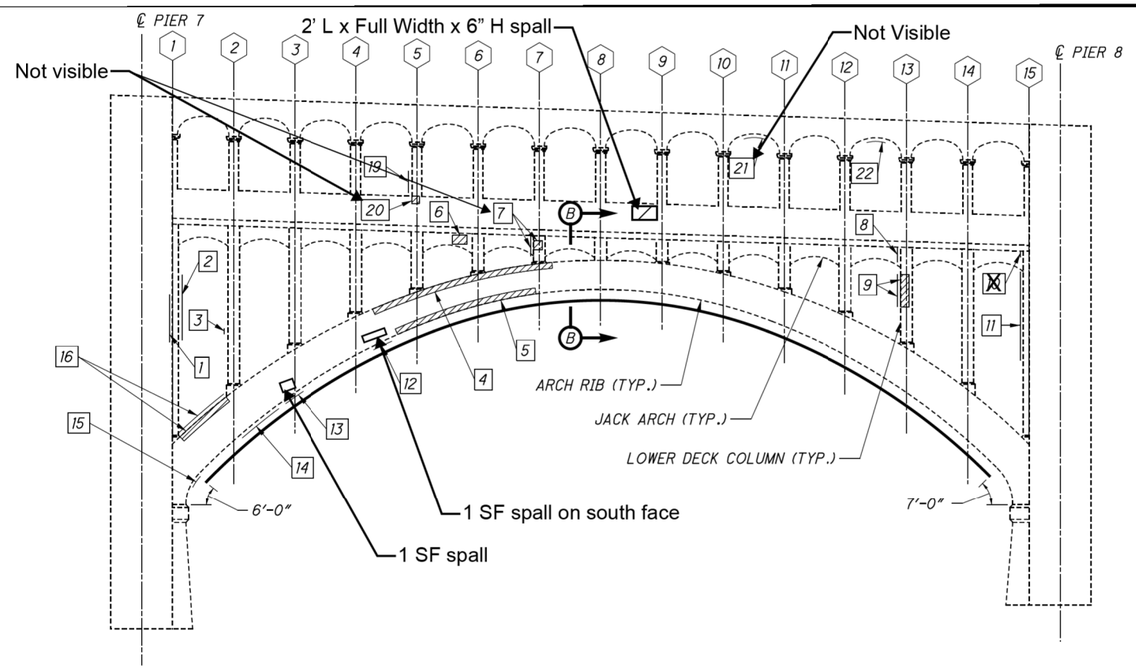
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 7 AND PIER 8 REPAIR DETAILS, SEE SHEET 28/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

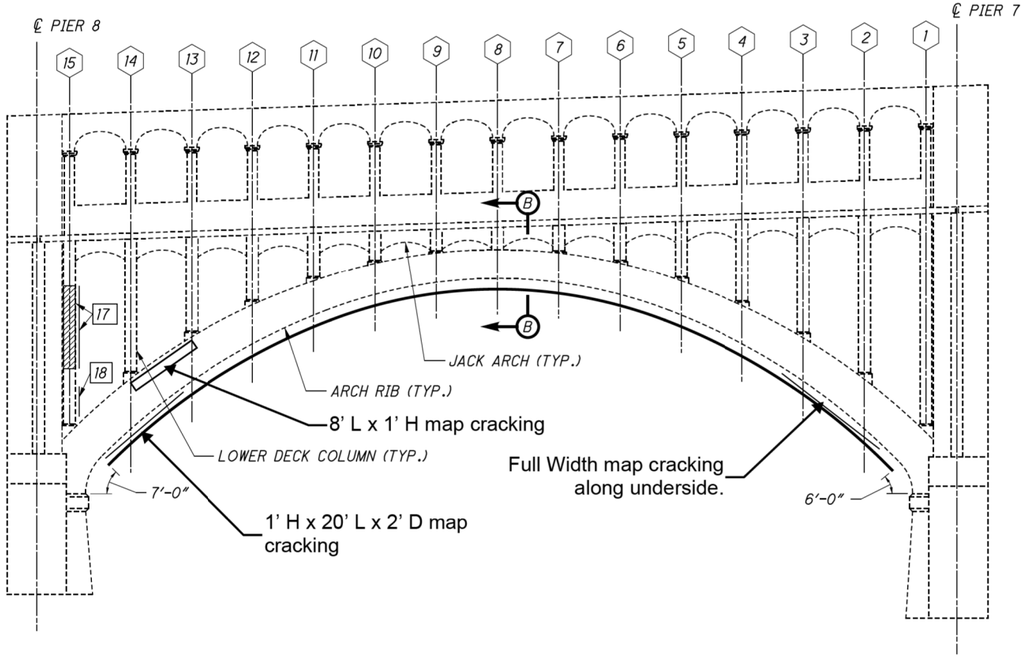
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 8 CONCRETE REPAIR DETAILS	PAGE A-80



SPAN 8 - ARCH RIB D SOUTH ELEVATION

(LOOKING NORTH)



SPAN 8 - ARCH RIB D NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	12	4
2	TYPE 1	11	5
3	TYPE 1	1	1
4	TYPE 1	65	-
5	TYPE 1	30	-
6	TYPE 1	4	2
7	TYPE 1	12	8
8	TYPE 1	5	1
9	TYPE 1	16	3
~~10~~	~~TYPE 1~~	~~1~~	~~1~~
11	TYPE 1	23	7
12	TYPE 2	8	3
13	TYPE 2	4	2
14	TYPE 2	15	6
15	TYPE 2	5	2

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
16	TYPE 1	27	12
17	TYPE 1	56	22
18	TYPE 1	5	4
19	TYPE 1	5	2
20	TYPE 1	1	1
21	TYPE 2	4	3
22	TYPE 2	3	2
MEASURED QUANTITY*		313	-
PLAN QUANTITY*		470	91

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	411
TYPE 2 REPAIR	SF	59
FRP WRAP	SF	1680

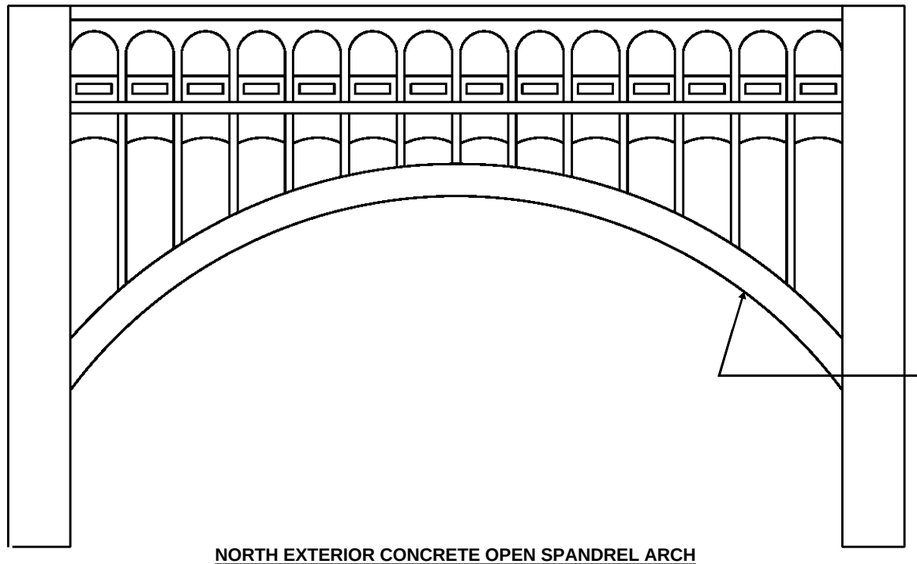
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 7 AND PIER 8 REPAIR DETAILS, SEE SHEET 28/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 8 CONCRETE REPAIR DETAILS	PAGE A-81

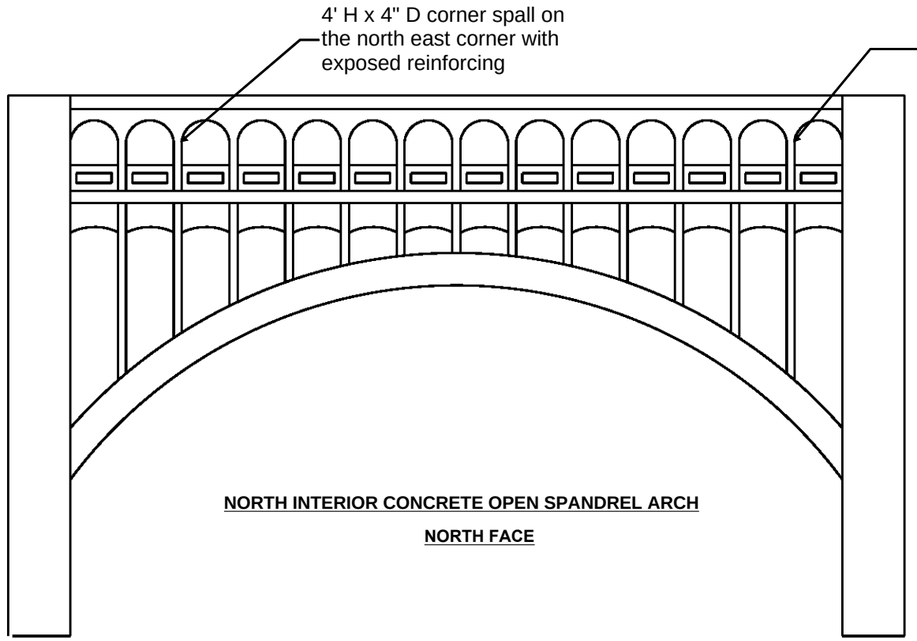


PIER 8

NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

NORTH FACE

PIER 7



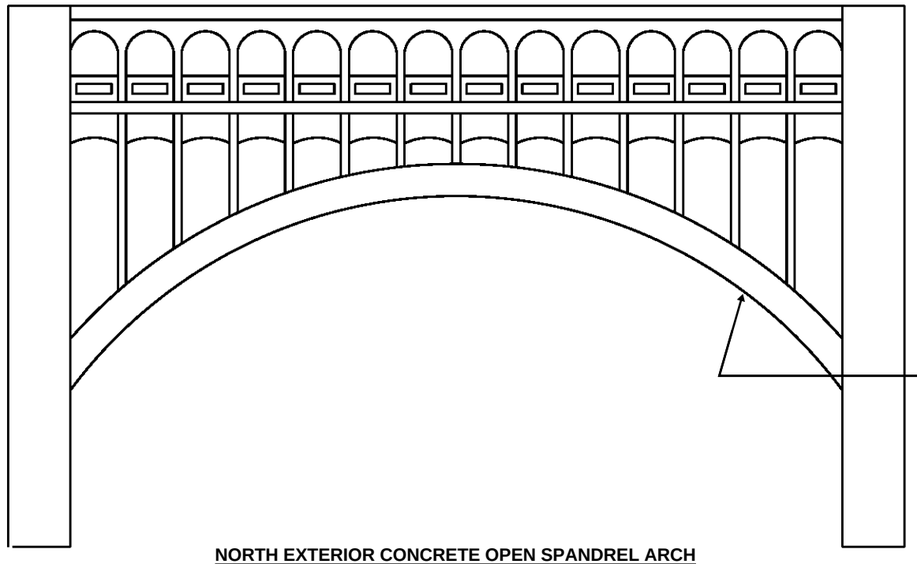
PIER 8

NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH

NORTH FACE

PIER 7

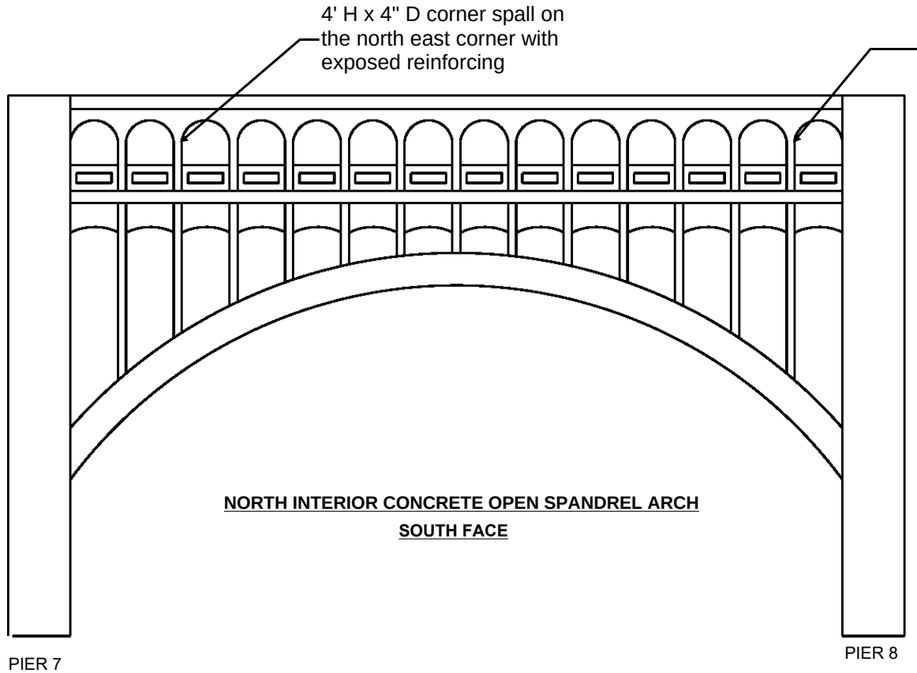
GRAPHIC SCALE MEASURED IN FEET	**DATE**	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465**
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 8
			PAGE A-82



PIER 7

NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

PIER 8



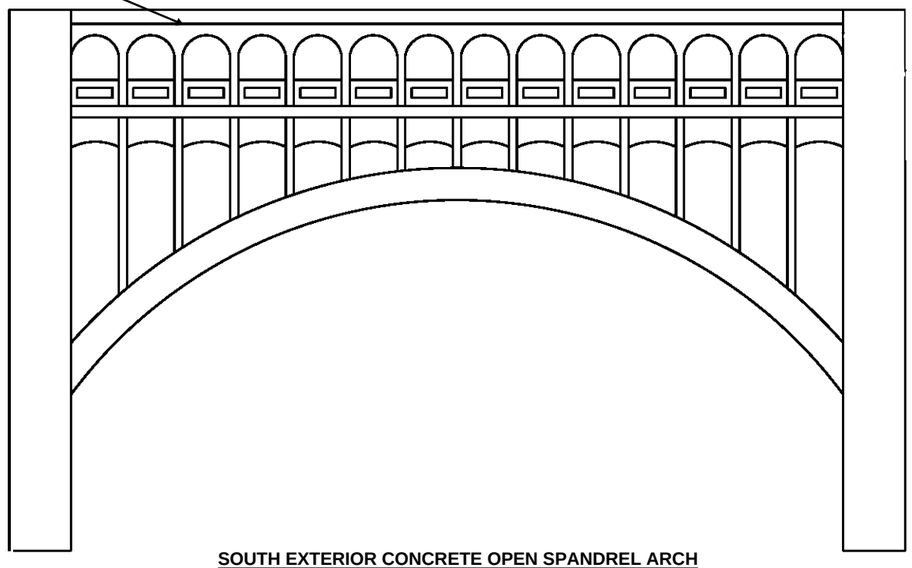
PIER 7

NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

PIER 8

GRAPHIC SCALE MEASURED IN FEET	**DATE**	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465**
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 8 — **PAGE** A-83

Floor beam 14 between the interior and exterior arches with 3' H x 4' W x 4" D with exposed reinforcing on the west face

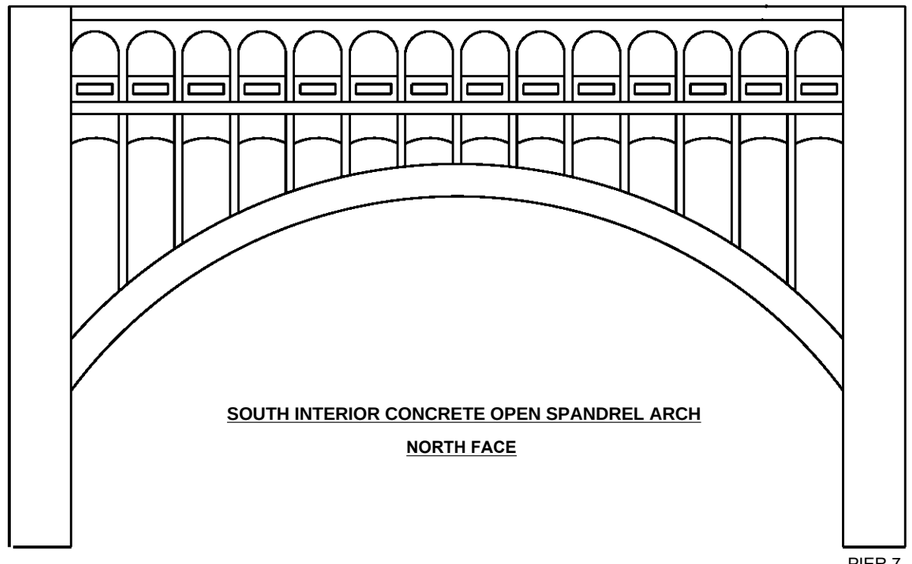


PIER 8

PIER 7

SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

NORTH FACE



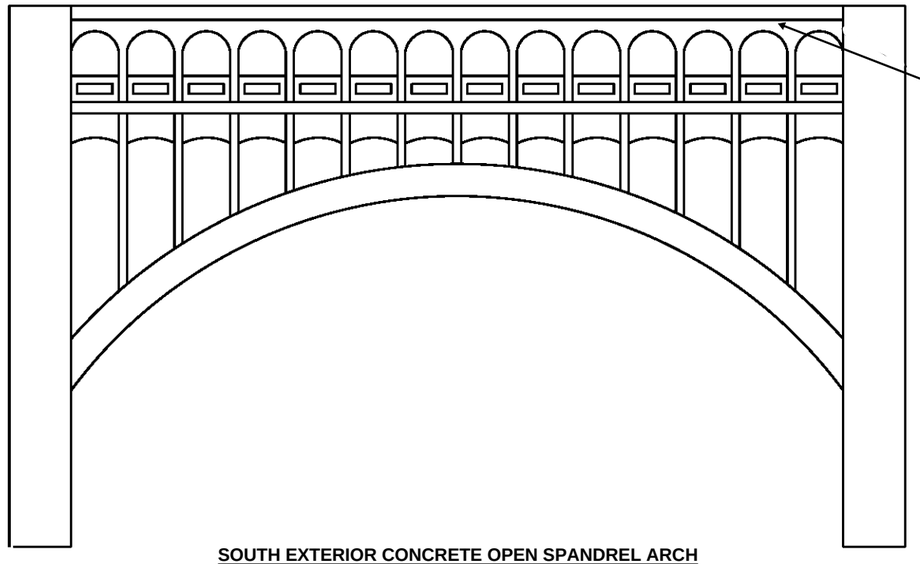
PIER 8

PIER 7

SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH

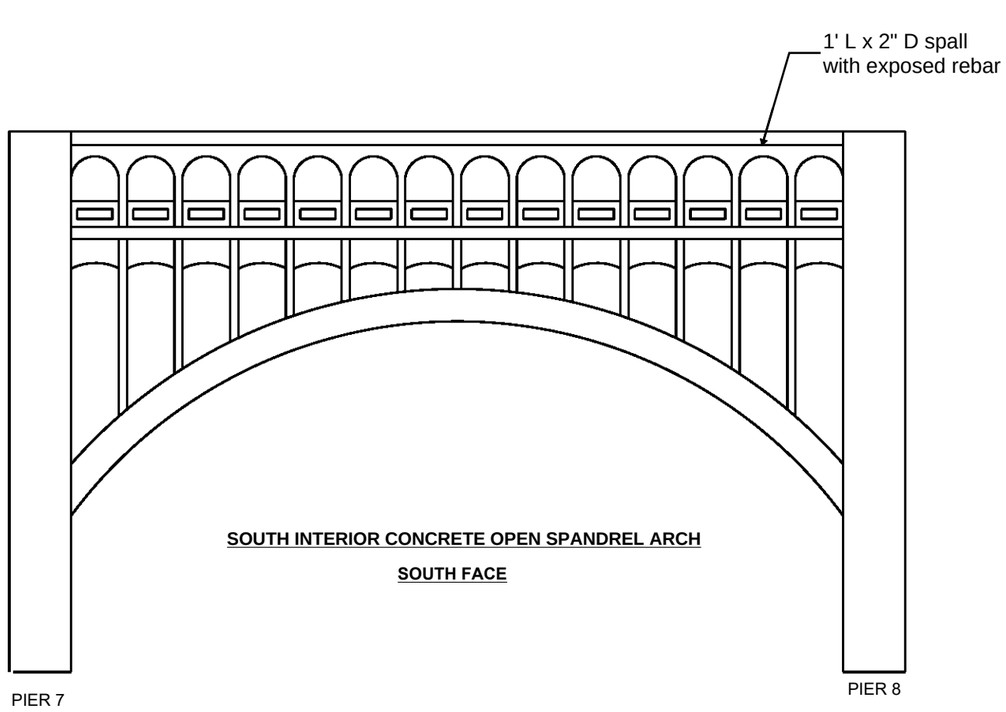
NORTH FACE

GRAPHIC SCALE MEASURED IN FEET **NOT TO SCALE**	**DATE** NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465** STRUCTURE ELEVATION - SPAN 8 **PAGE** A-84



SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

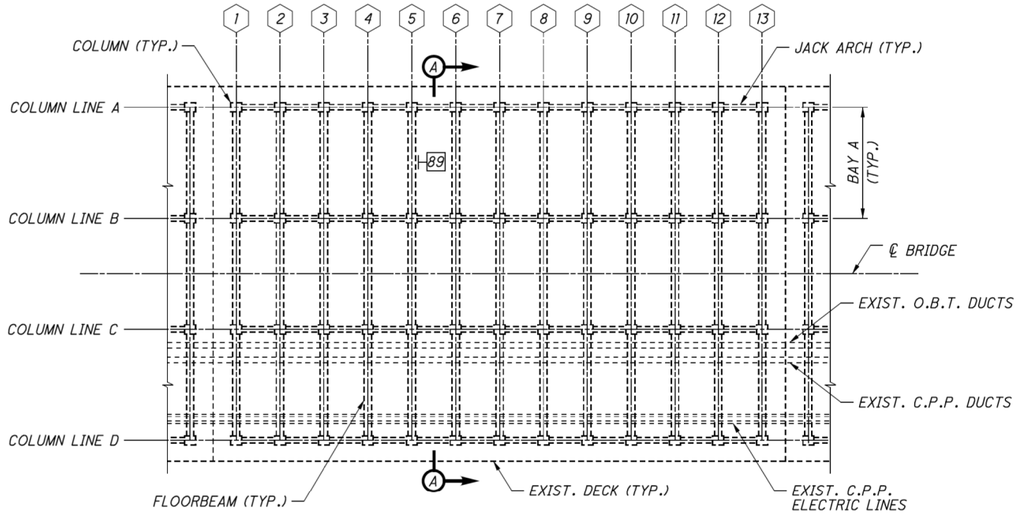
SOUTH FACE



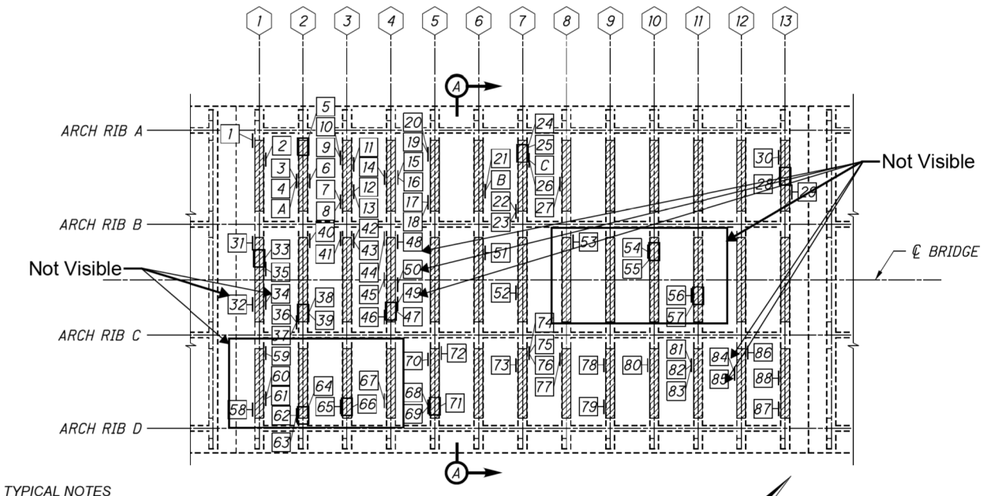
SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH

SOUTH FACE

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 8	PAGE A-85



SPAN 9 - UPPER DECK PLAN



SPAN 9 - LOWER DECK PLAN

TYPICAL NOTES
NUMEROUS EPOXY INJECTED VERTICAL CRACKS THROUGHOUT THE FLOORBEAMS. VARIOUS ENDS OF THE FLOORBEAMS THROUGHOUT ALL SPANS HAVE BEEN REHABBED.

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	4	1
2	TYPE 1	5	1
3	TYPE 1	1	1
4	TYPE 1	3	1
5	TYPE 2	9	5
6	TYPE 1	1	1
7	TYPE 1	3	1
8	TYPE 1	4	1
9	TYPE 1	4	1
10	TYPE 1	2	1
11	TYPE 1	4	1
12	TYPE 1	4	1
13	TYPE 1	2	1
14	TYPE 1	24	6
15	TYPE 1	3	1
16	TYPE 1	2	1
17	TYPE 1	3	1
18	TYPE 1	2	1
19	TYPE 1	6	2
20	TYPE 1	3	1
21	TYPE 1	2	1
22	TYPE 1	2	1
23	TYPE 1	1	1
24	TYPE 2	7	6
25	TYPE 2	1	1
26	TYPE 1	3	1
27	TYPE 1	21	6
28	TYPE 2	28	11
29	TYPE 1	18	6
30	TYPE 1	46	12
31	TYPE 1	29	8
32	TYPE 1	19	6
33	TYPE 2	6	5
34	TYPE 1	8	2
35	TYPE 1	3	3
36	TYPE 1	1	1
37	TYPE 1	1	1
38	TYPE 2	2	1
39	TYPE 2	1	1
40	TYPE 1	2	1
41	TYPE 1	2	1
42	TYPE 1	4	1
43	TYPE 1	1	1
44	TYPE 1	2	1
45	TYPE 1	23	6
46	TYPE 1	3	1

* SEE NOTES 1 & 2
** SEE NOTE 3

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
47	TYPE 2	3	4
48	TYPE 1	2	1
49	TYPE 1	3	3
50	TYPE 1	3	1
51	TYPE 1	2	1
52	TYPE 1	2	1
53	TYPE 1	2	1
54	TYPE 1	5	5
55	TYPE 2	7	7
56	TYPE 1	4	4
57	TYPE 2	7	6
58	TYPE 1	19	6
59	TYPE 1	5	1
60	TYPE 1	18	4
61	TYPE 1	3	1
62	TYPE 1	6	1
63	TYPE 1	2	1
64	TYPE 2	2	1
65	TYPE 1	2	2
66	TYPE 2	3	3
67	TYPE 1	5	2
68	TYPE 1	4	3
69	TYPE 1	4	1
70	TYPE 1	2	1
71	TYPE 2	4	5
72	TYPE 1	2	1
73	TYPE 1	1	1
74	TYPE 1	1	1
75	TYPE 1	2	1
76	TYPE 1	3	2
77	TYPE 1	4	1
78	TYPE 1	2	1
79	TYPE 1	2	1
80	TYPE 1	6	2
81	TYPE 1	4	2
82	TYPE 1	3	1
83	TYPE 1	7	2
84	TYPE 1	4	1
85	TYPE 1	2	1
86	TYPE 1	24	6
87	TYPE 1	14	4
88	TYPE 1	1	1
89	TYPE 1		
MEASURED QUANTITY*		528	-
PLAN QUANTITY*		792	212

A	SS843	15	-
B	SS843	2	-
C	SS843	1	-
MEASURED QUANTITY*		18	-

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	672
TYPE 2 REPAIR	SF	120
FRP WRAP	SF	3348

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR SECTION A-A, SEE SHEET 34/89.
6. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

LEGEND:

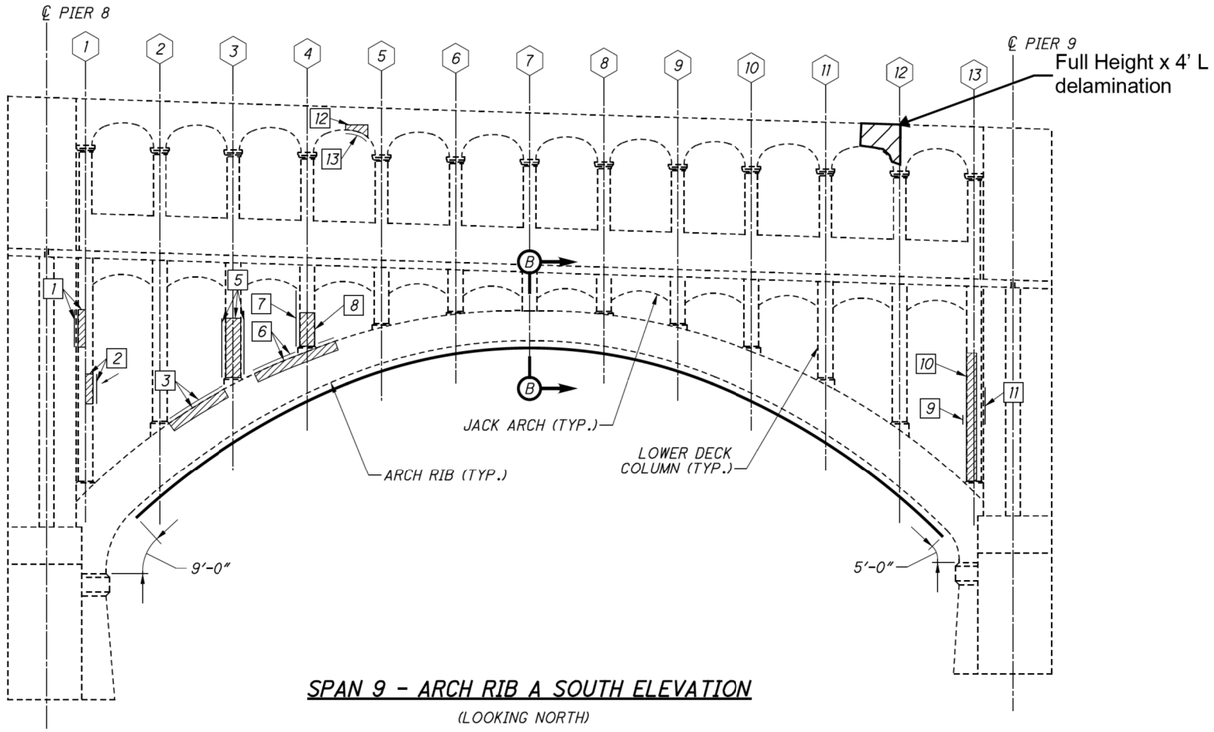
(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

[A] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 843

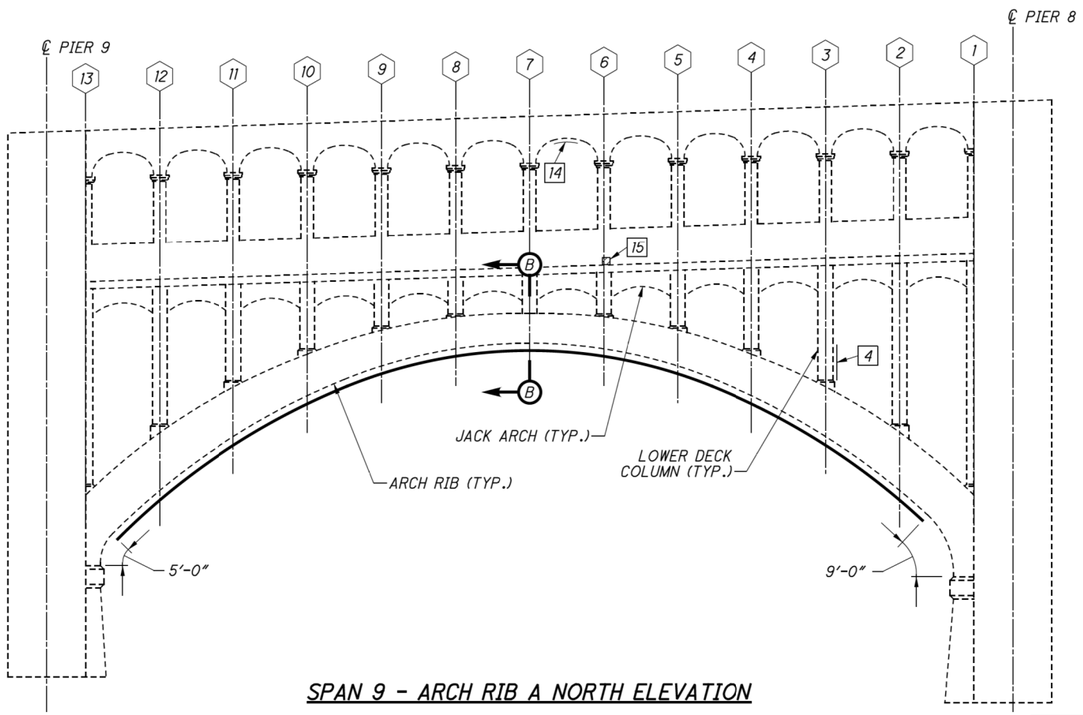
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 9 CONCRETE REPAIR DETAILS — PAGE A-86



SPAN 9 - ARCH RIB A SOUTH ELEVATION

(LOOKING NORTH)



SPAN 9 - ARCH RIB A NORTH ELEVATION

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	10	3
2	TYPE 1	7	2
3	TYPE 1	25	6
4	TYPE 1	18	4
5	TYPE 1	30	8
6	TYPE 1	26	7
7	TYPE 1	32	8
8	TYPE 1	9	2
9	TYPE 1	2	1
10	TYPE 1	24	9
11	TYPE 1	5	3
12	TYPE 1	6	2
13	TYPE 2	3	2
14	TYPE 2	4	3
15	TYPE 1	1	1
MEASURED QUANTITY*		202	-
PLAN QUANTITY*		303	61

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	292
TYPE 2 REPAIR	SF	11
FRP WRAP	SF	1358

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE VERTICAL SIDES OF THE UNREINFORCED CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET [84/89].
6. FOR PIER 8 REPAIR DETAILS, SEE SHEET [28/89]. FOR PIER 9 REPAIR DETAILS, SEE SHEET [29/89].
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET [85/89].

LEGEND:

(#) SPANDREL COLUMN NUMBER

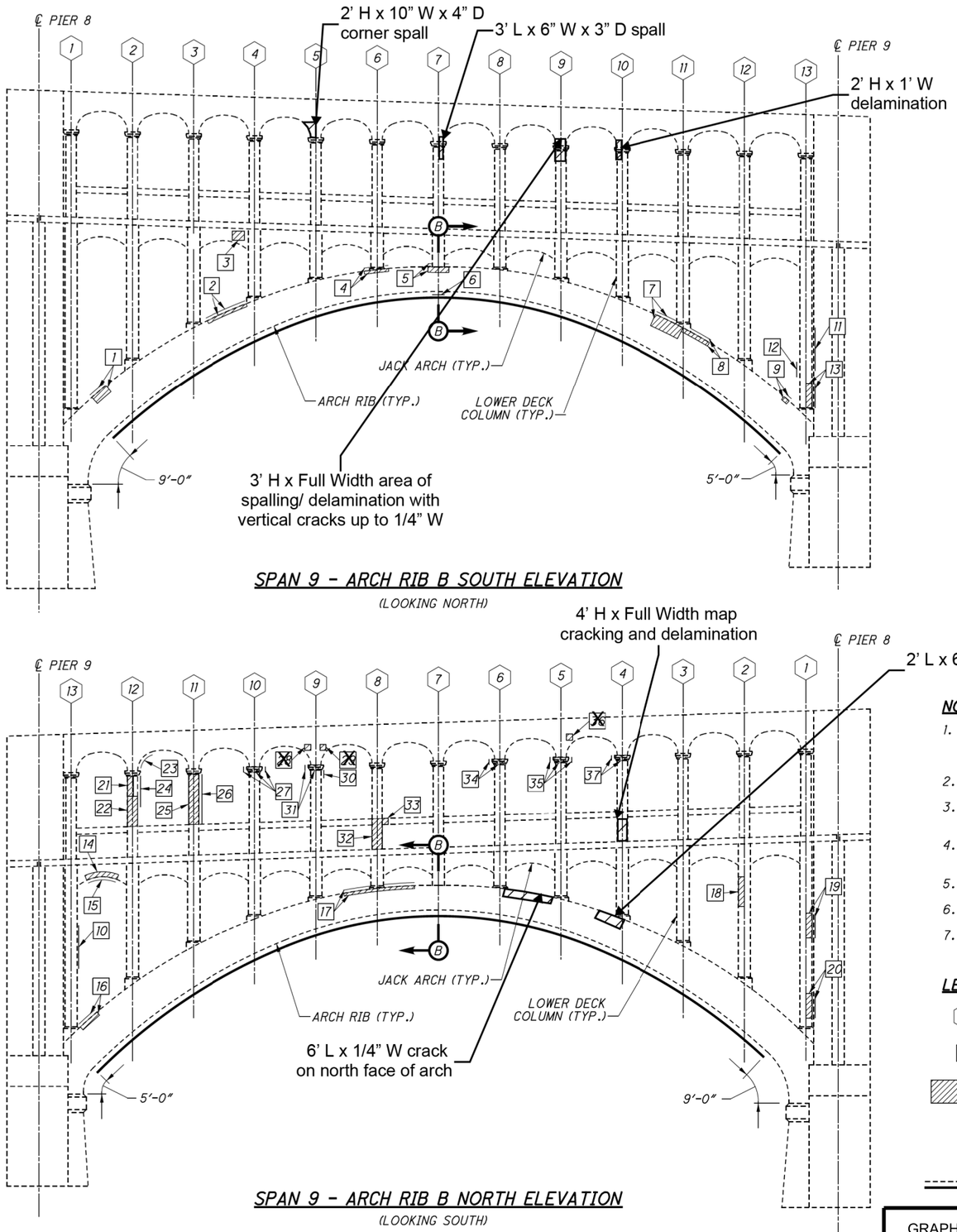
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 9 CONCRETE REPAIR DETAILS — PAGE A-87



SPAN 9 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)

SPAN 9 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	7	2
2	TYPE 1	9	5
3	TYPE 1	3	2
4	TYPE 1	5	3
5	TYPE 1	6	2
6	TYPE 2	2	1
7	TYPE 1	14	4
8	TYPE 1	10	3
9	TYPE 1	2	1
10	TYPE 1	18	6
11	TYPE 1	11	4
12	TYPE 1	4	1
13	TYPE 1	10	2
14	TYPE 1	5	5
15	TYPE 2	5	5
16	TYPE 1	5	2
17	TYPE 1	19	9
18	TYPE 1	5	2
19	TYPE 1	6	2
20	TYPE 1	12	2

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
21	TYPE 1	3	2
22	TYPE 1	9	4
23	TYPE 2	3	2
24	TYPE 1	5	4
25	TYPE 1	14	6
26	TYPE 1	4	6
27	TYPE 1	4	3
~~28~~	~~TYPE 1~~	~~1~~	~~1~~
~~29~~	~~TYPE 1~~	~~1~~	~~1~~
30	TYPE 1	2	1
31	TYPE 1	3	2
32	TYPE 1	9	4
33	TYPE 1	1	1
34	TYPE 1	4	3
35	TYPE 1	4	3
~~36~~	~~TYPE 1~~	~~1~~	~~1~~
37	TYPE 1	3	2
MEASURED QUANTITY*		229	-
PLAN QUANTITY*		344	109

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	329
TYPE 2 REPAIR	SF	15
FRP WRAP	SF	1605

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE VERTICAL SIDES OF THE UNREINFORCED CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 8 REPAIR DETAILS, SEE SHEET 28/89. FOR PIER 9 REPAIR DETAILS, SEE SHEET 29/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

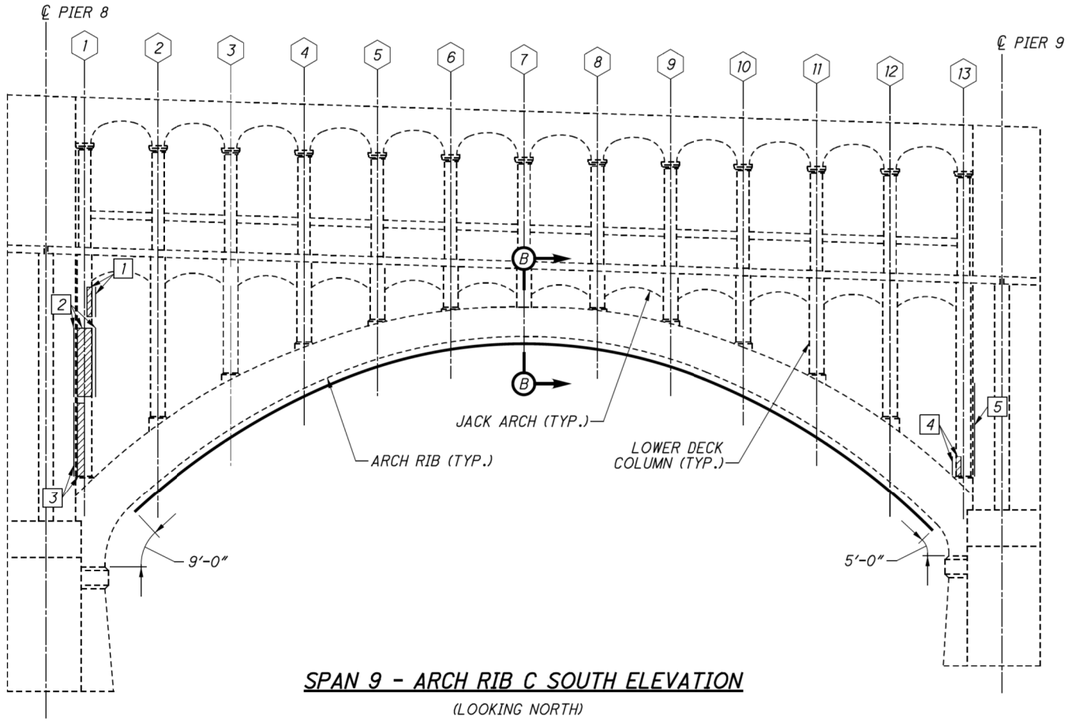
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

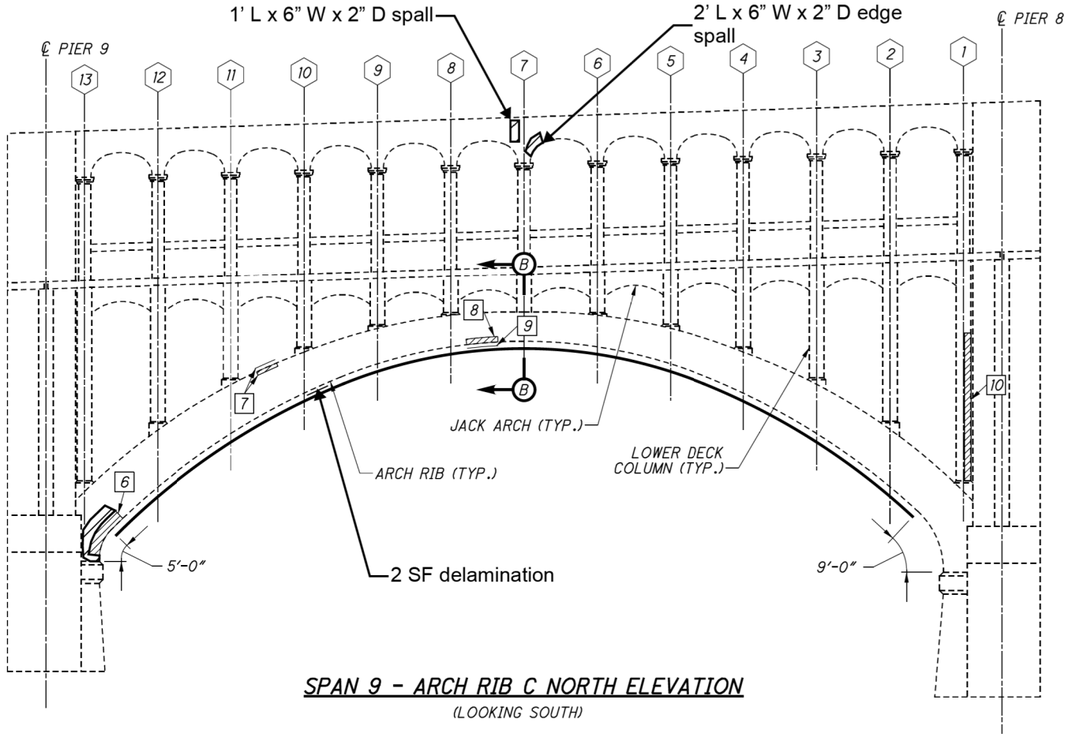
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 9 CONCRETE REPAIR DETAILS — PAGE A-88



SPAN 9 - ARCH RIB C SOUTH ELEVATION

(LOOKING NORTH)



SPAN 9 - ARCH RIB C NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	5	2
2	TYPE 1	54	12
3	TYPE 1	43	12
4	TYPE 1	4	1
5	TYPE 1	26	6
6	TYPE 1	10	-
7	TYPE 1	9	4
8	TYPE 1	4	-
9	TYPE 2	9	3
10	TYPE 1	17	10
MEASURED QUANTITY*		181	-
PLAN QUANTITY*		272	50

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	259
TYPE 2 REPAIR	SF	13
FRP WRAP	SF	1605

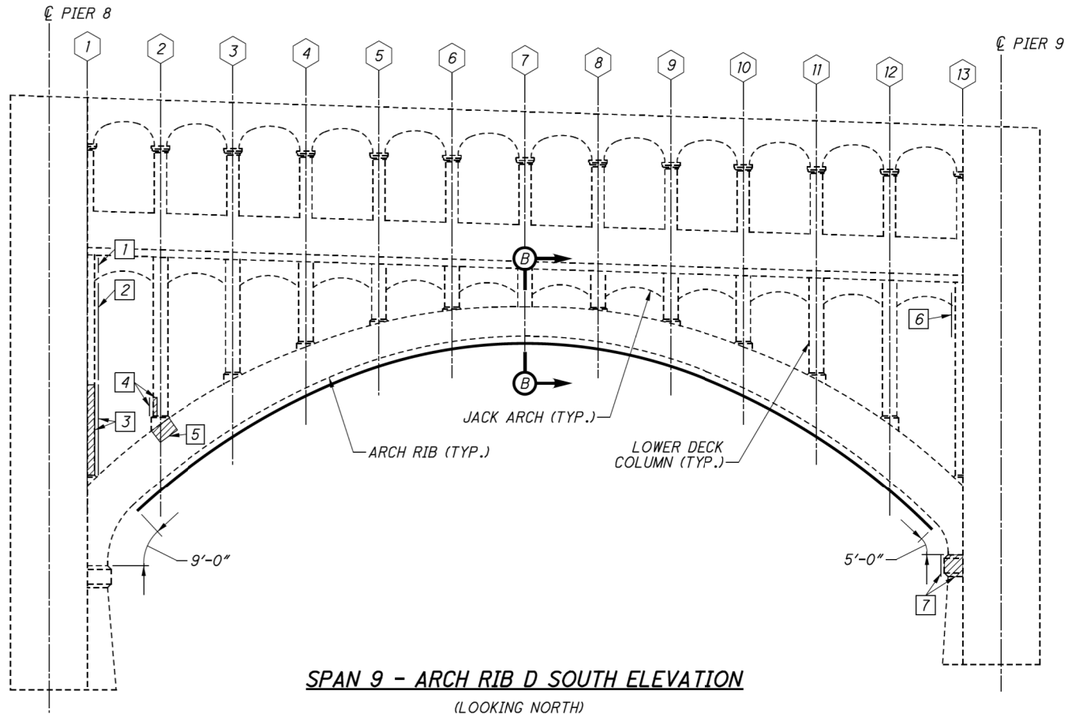
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE VERTICAL SIDES OF THE UNREINFORCED CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 8 REPAIR DETAILS, SEE SHEET 28/89. FOR PIER 9 REPAIR DETAILS, SEE SHEET 29/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

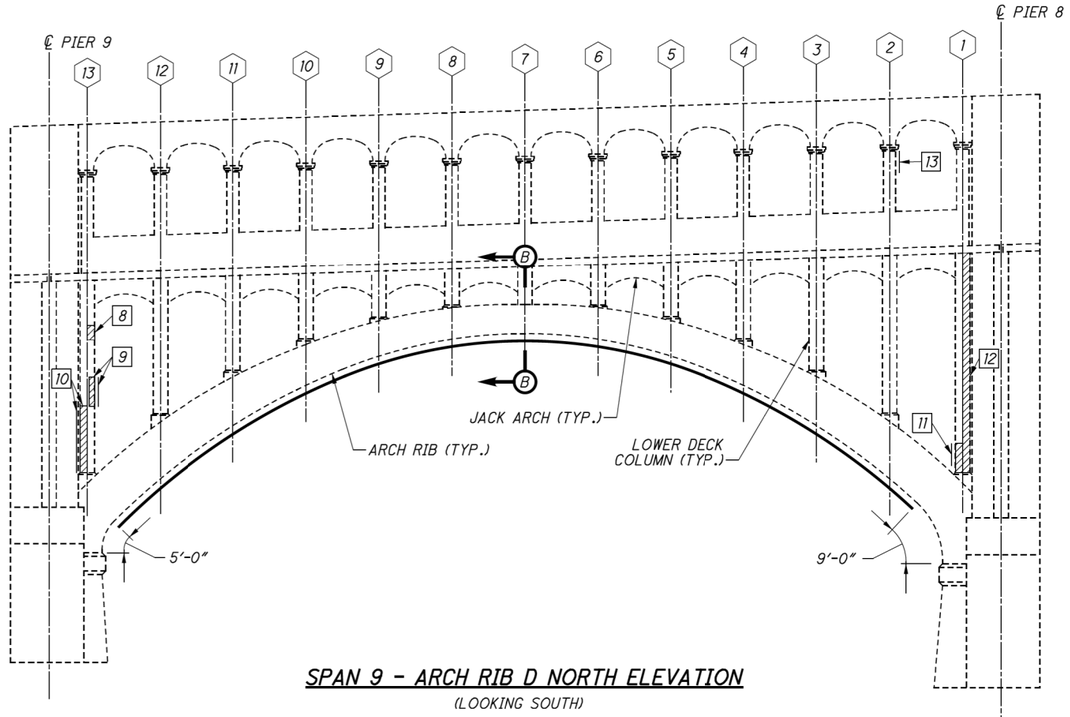
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 SPAN 9 CONCRETE REPAIR DETAILS PAGE A-89



SPAN 9 - ARCH RIB D SOUTH ELEVATION

(LOOKING NORTH)



SPAN 9 - ARCH RIB D NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	4	1
2	TYPE 1	62	18
3	TYPE 1	28	6
4	TYPE 1	3	1
5	TYPE 1	6	-
6	TYPE 1	18	6
7	TYPE 1	15	8
8	TYPE 1	2	1
9	TYPE 1	6	2
10	TYPE 1	23	5
11	TYPE 1	4	2
12	TYPE 1	34	17
13	TYPE 1	3	2
MEASURED QUANTITY*		208	-
PLAN QUANTITY*		312	69

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	312
TYPE 2 REPAIR	SF	-
FRP WRAP	SF	1358

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE VERTICAL SIDES OF THE UNREINFORCED CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET [84/89].
6. FOR PIER 8 REPAIR DETAILS, SEE SHEET [28/89]. FOR PIER 9 REPAIR DETAILS, SEE SHEET [29/89].
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET [85/89].

LEGEND:

(#) SPANDREL COLUMN NUMBER

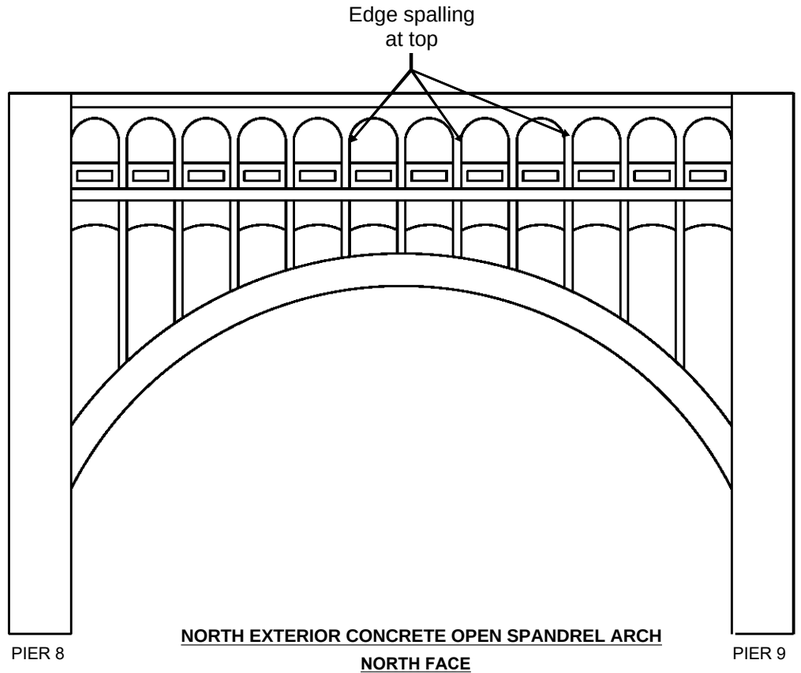
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

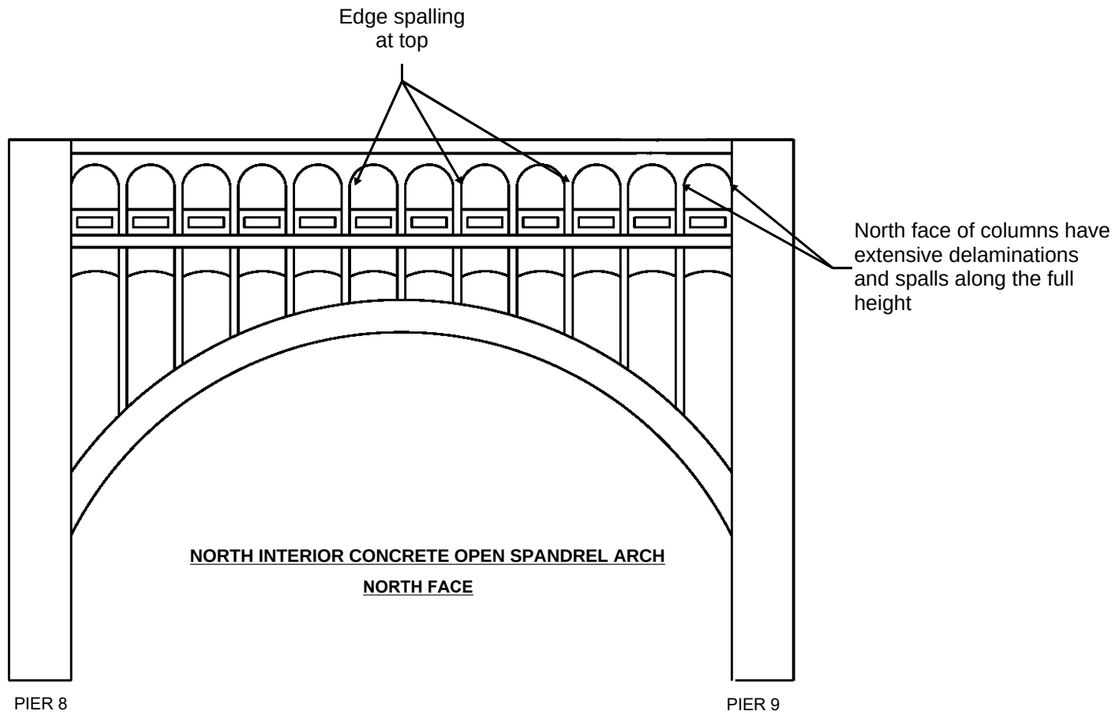
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 9 CONCRETE REPAIR DETAILS	PAGE A-90



NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

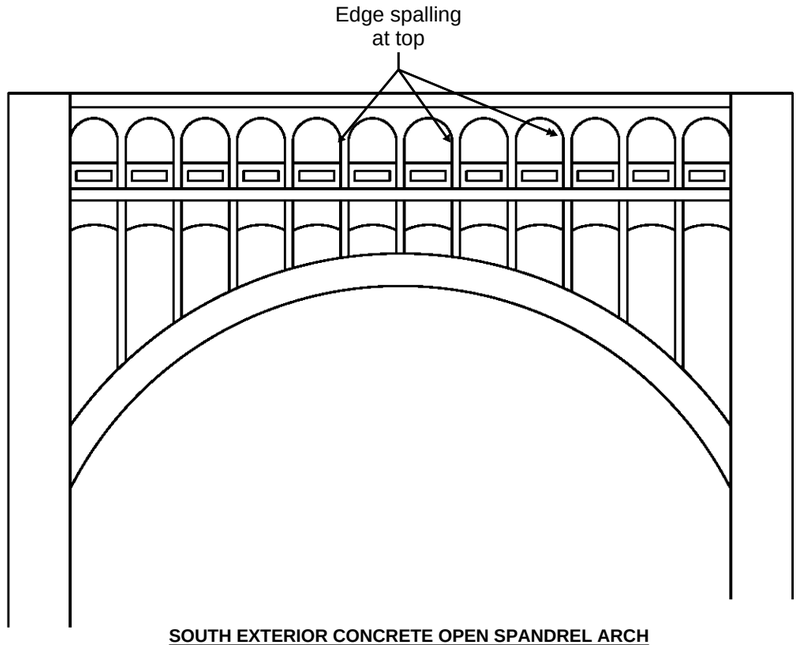
NORTH FACE



NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH

NORTH FACE

GRAPHIC SCALE MEASURED IN FEET	**DATE**	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465**
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 9
			PAGE A-91

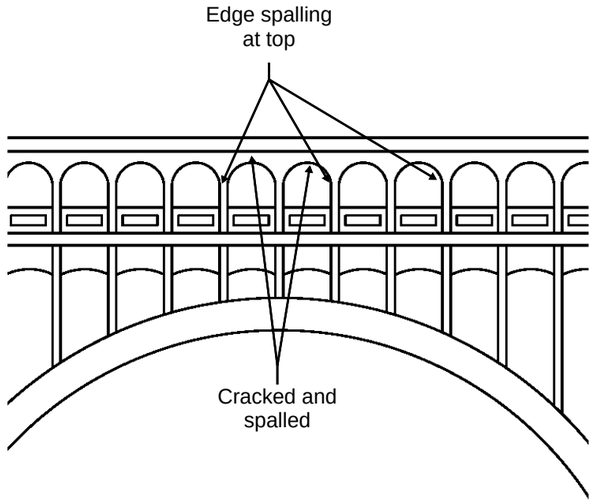


PIER 9

SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

NORTH FACE

PIER 8



SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH

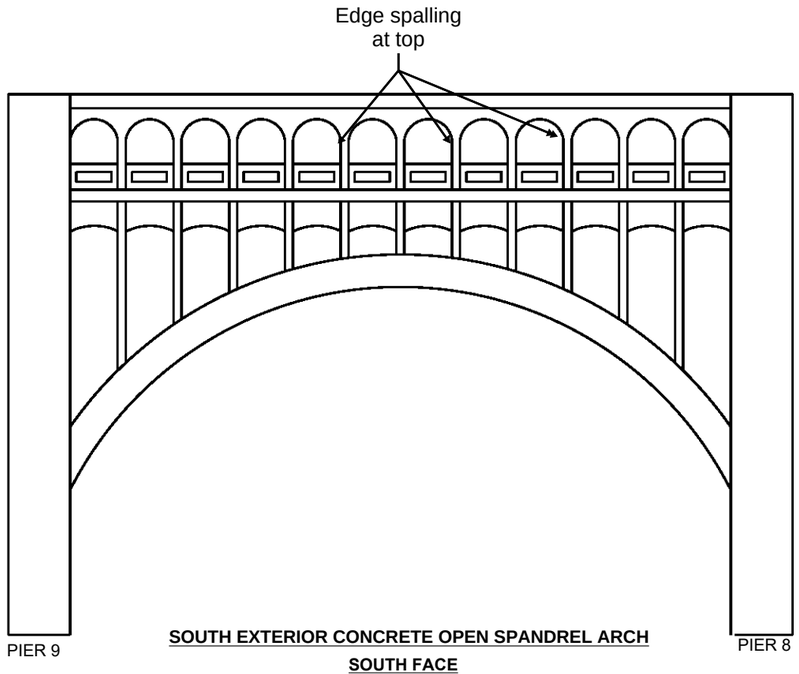
NORTH FACE

PIER 9

PIER 8

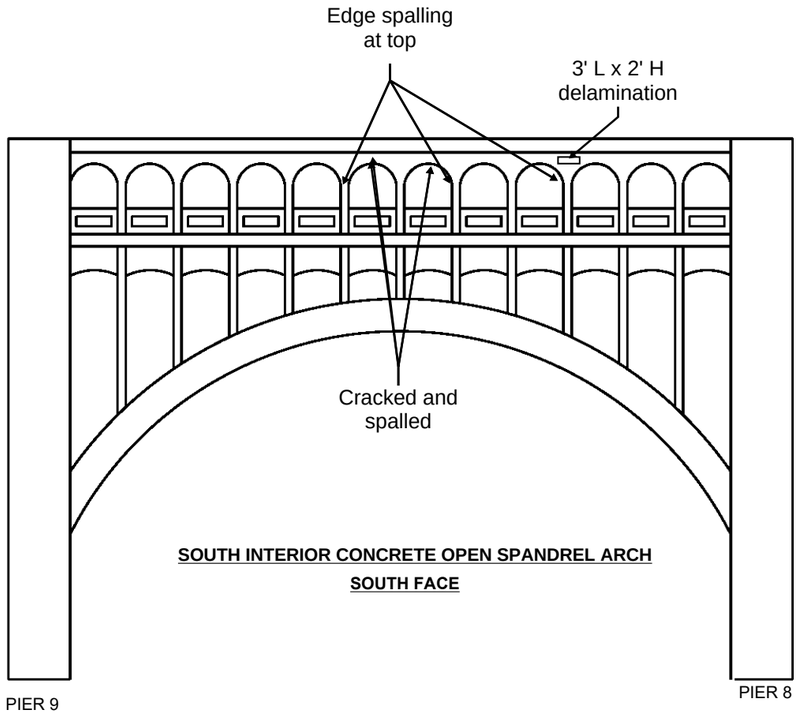
GRAPHIC SCALE MEASURED IN FEET	**DATE**	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465**
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 9

PAGE
A-92



SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH

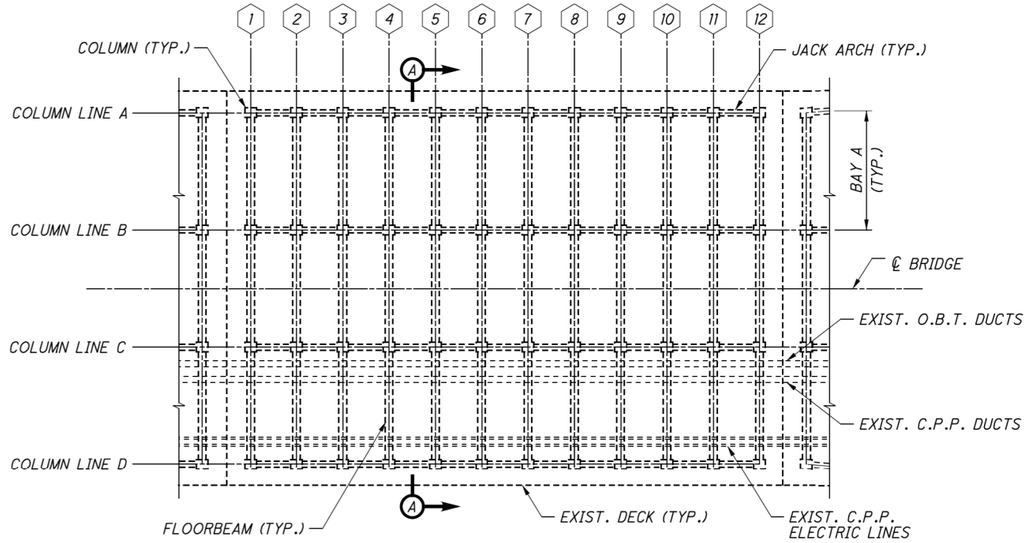
SOUTH FACE



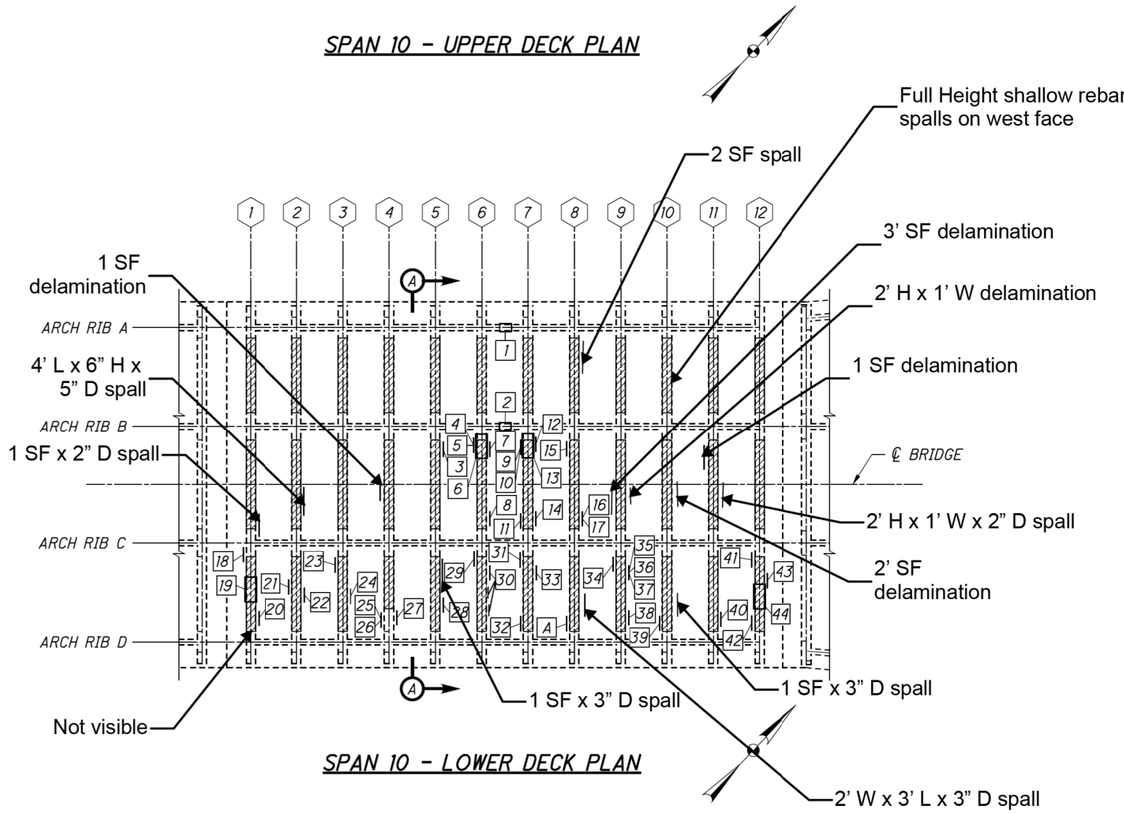
SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH

SOUTH FACE

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 9	PAGE A-93



SPAN 10 - UPPER DECK PLAN



SPAN 10 - LOWER DECK PLAN

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 2	1	1
2	TYPE 2	1	1
3	TYPE 1	4	1
4	TYPE 1	5	1
5	TYPE 1	4	2
6	TYPE 2	9	3
7	TYPE 1	13	2
8	TYPE 1	2	1
9	TYPE 1	4	2
10	TYPE 1	4	1
11	TYPE 1	15	6
12	TYPE 1	26	8
13	TYPE 2	14	5
14	TYPE 1	8	1
15	TYPE 1	4	1
16	TYPE 1	4	1
17	TYPE 1	4	1
18	TYPE 1	9	4
19	TYPE 2	17	7
20	TYPE 1	21	6
21	TYPE 1	3	1
22	TYPE 1	5	2
23	TYPE 1	2	1
24	TYPE 1	2	1

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
25	TYPE 1	16	4
26	TYPE 2	4	3
27	TYPE 1	2	1
28	TYPE 1	6	2
29	TYPE 1	10	2
30	TYPE 1	19	6
31	TYPE 1	37	10
32	TYPE 1	10	2
33	TYPE 1	12	4
34	TYPE 1	30	8
35	TYPE 1	2	1
36	TYPE 1	4	1
37	TYPE 1	16	4
38	TYPE 1	27	8
39	TYPE 1	34	8
40	TYPE 1	3	1
41	TYPE 1	21	8
42	TYPE 1	11	4
43	TYPE 1	2	1
44	TYPE 2	9	3
MEASURED QUANTITY*		456	-
PLAN QUANTITY*		684	141

A	SS843	8	-
MEASURED QUANTITY*		8	-

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	602
TYPE 2 REPAIR	SF	82
FRP WRAP	SF	3090

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR SECTION A-A, SEE SHEET 34/89.
6. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

LEGEND:

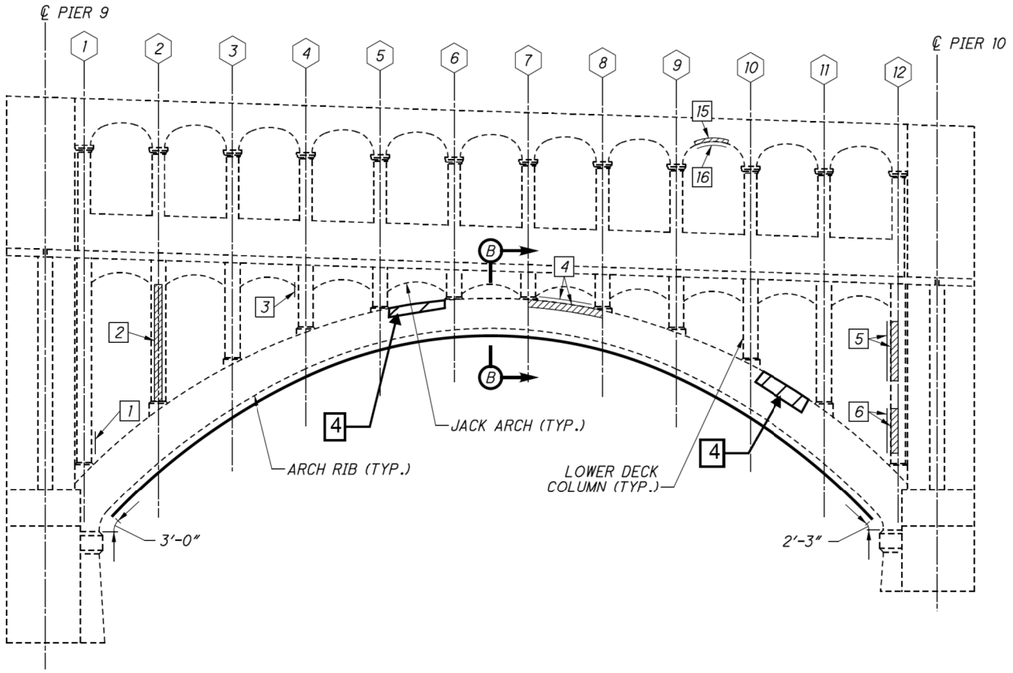
(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

[A] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH SUPPLEMENTAL SPECIFICATION 843.

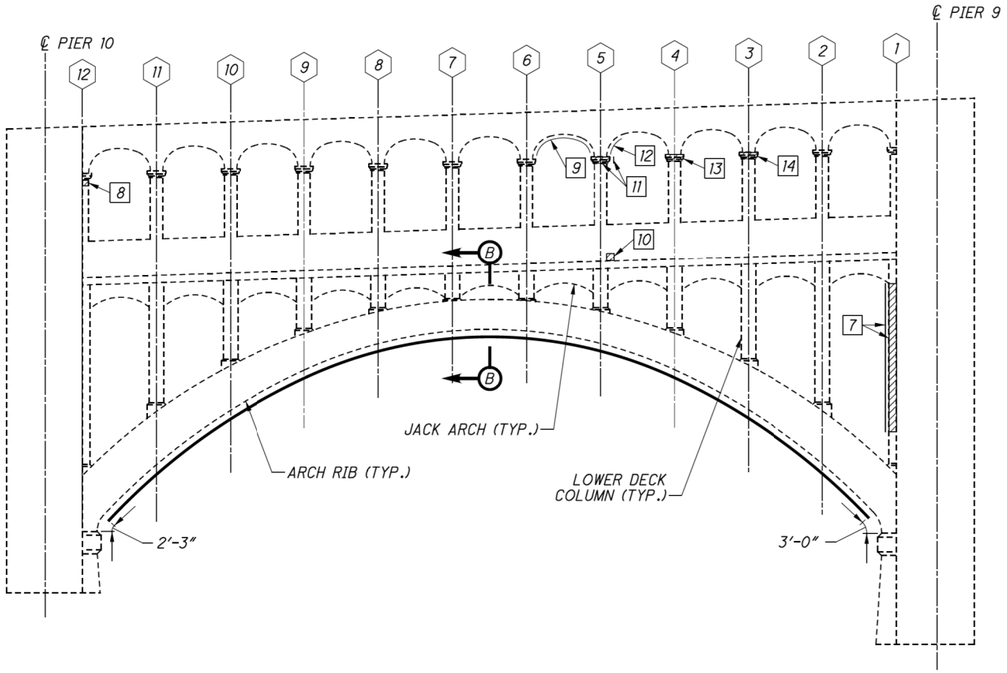
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 10 CONCRETE REPAIR DETAILS — PAGE A-94



SPAN 10 - ARCH RIB A SOUTH ELEVATION

(LOOKING NORTH)



SPAN 10 - ARCH RIB A NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	3	2
2	TYPE 1	16	8
3	TYPE 1	2	1
4	TYPE 1	20	7
5	TYPE 1	16	4
6	TYPE 1	12	3
7	TYPE 1	40	10
8	TYPE 1	1	1
9	TYPE 2	10	7
10	TYPE 1	1	1
11	TYPE 1	3	2
12	TYPE 2	2	1
13	TYPE 1	2	1
14	TYPE 1	2	1
15	TYPE 1	2	2
16	TYPE 2	2	3
MEASURED QUANTITY*		134	-
PLAN QUANTITY*		201	54

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	180
TYPE 2 REPAIR	SF	21
FRP WRAP	SF	1304

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN NOVEMBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 9 REPAIR DETAILS, SEE SHEET 29/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

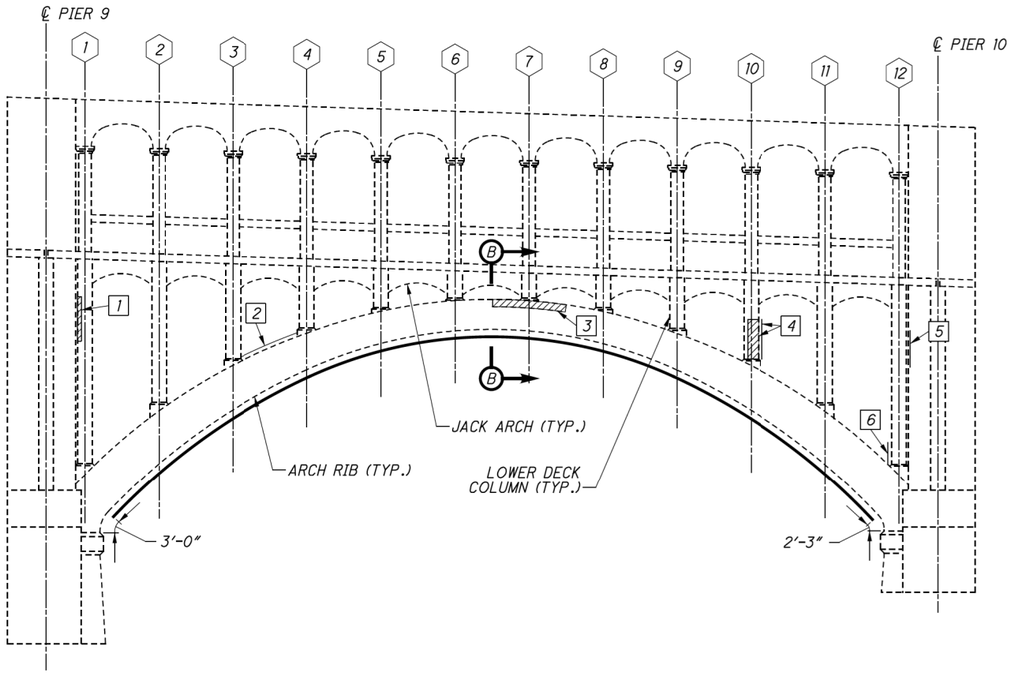
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

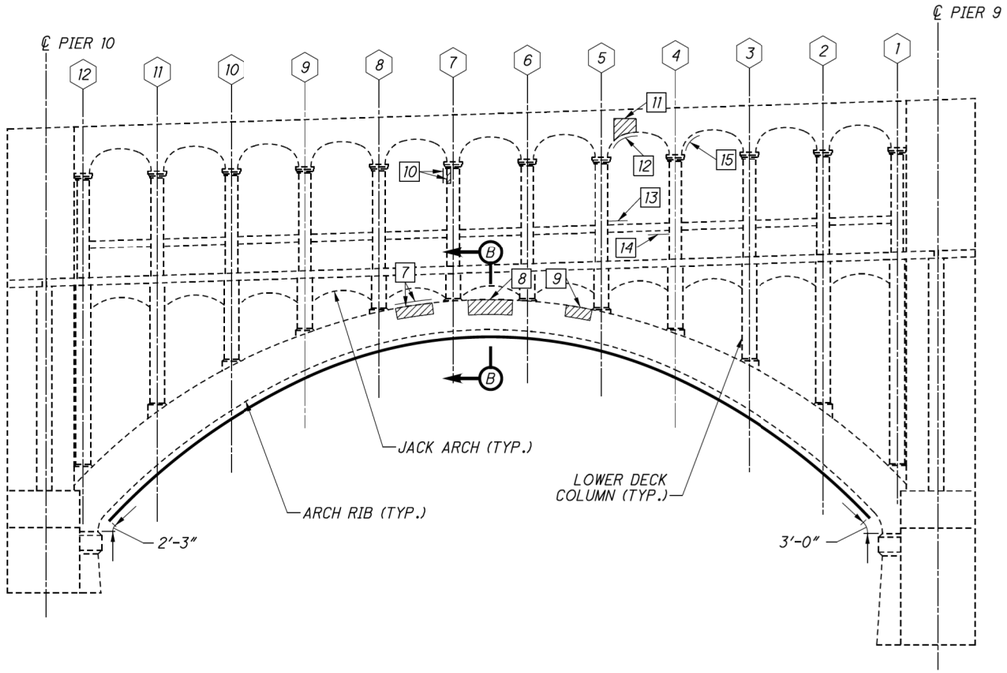
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 10 CONCRETE REPAIR DETAILS — PAGE A-95



SPAN 10 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)



SPAN 10 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	3	3
2	TYPE 1	80	22
3	TYPE 1	10	-
4	TYPE 1	16	6
5	TYPE 1	5	3
6	TYPE 1	6	2
7	TYPE 1	48	16
8	TYPE 1	12	-
9	TYPE 1	5	-
10	TYPE 1	1	1
11	TYPE 1	6	2
12	TYPE 2	3	2
13	TYPE 1	3	2
14	TYPE 2	3	2
15	TYPE 2	3	2
MEASURED QUANTITY*		204	-
PLAN QUANTITY*		306	63

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	293
TYPE 2 REPAIR	SF	13
FRP WRAP	SF	1541

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN NOVEMBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 9 REPAIR DETAILS, SEE SHEET 29/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

(#) SPANDREL COLUMN NUMBER

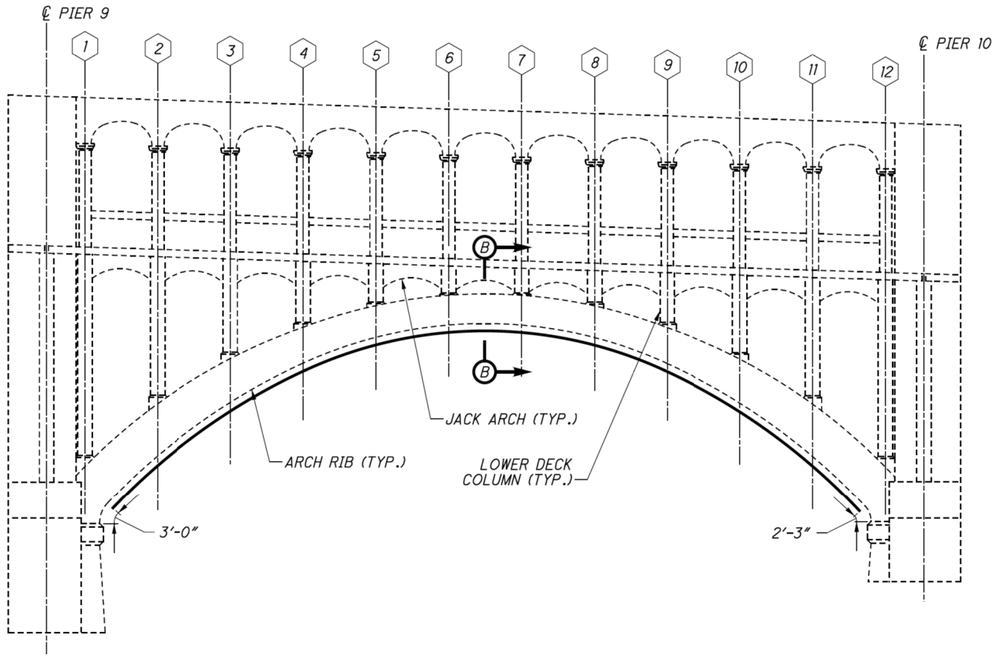
[#] REPAIR NUMBER

LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR

LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR

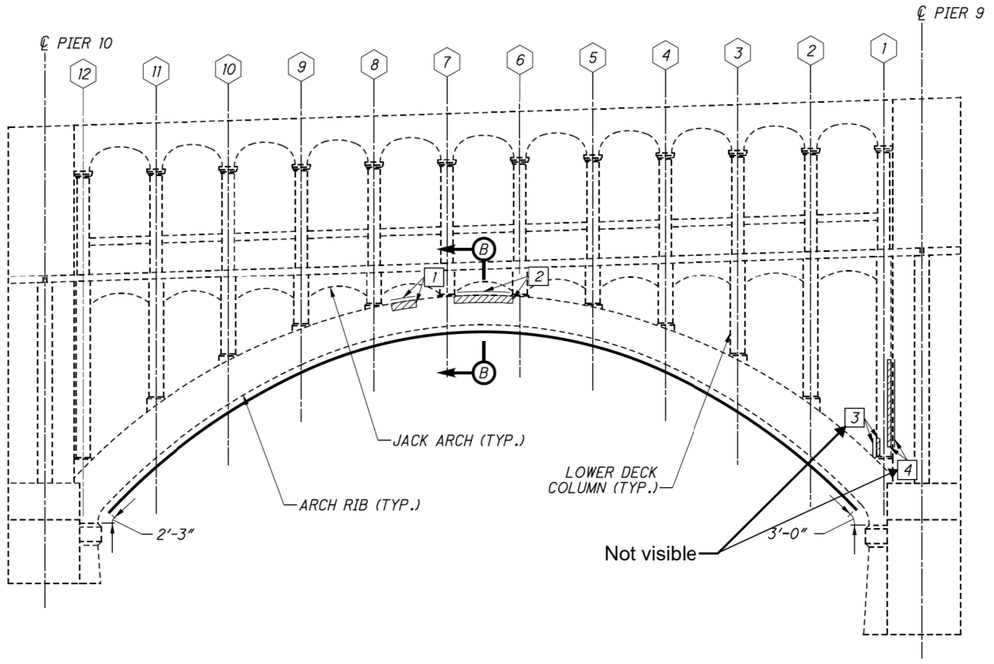
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 10 CONCRETE REPAIR DETAILS — PAGE A-96



SPAN 10 - ARCH RIB C SOUTH ELEVATION

(LOOKING NORTH)



SPAN 10 - ARCH RIB C NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	7	2
2	TYPE 1	32	12
3	TYPE 1	3	1
4	TYPE 1	34	6
MEASURED QUANTITY*		76	-
PLAN QUANTITY*		114	21

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	114
TYPE 2 REPAIR	SF	-
FRP WRAP	SF	1541

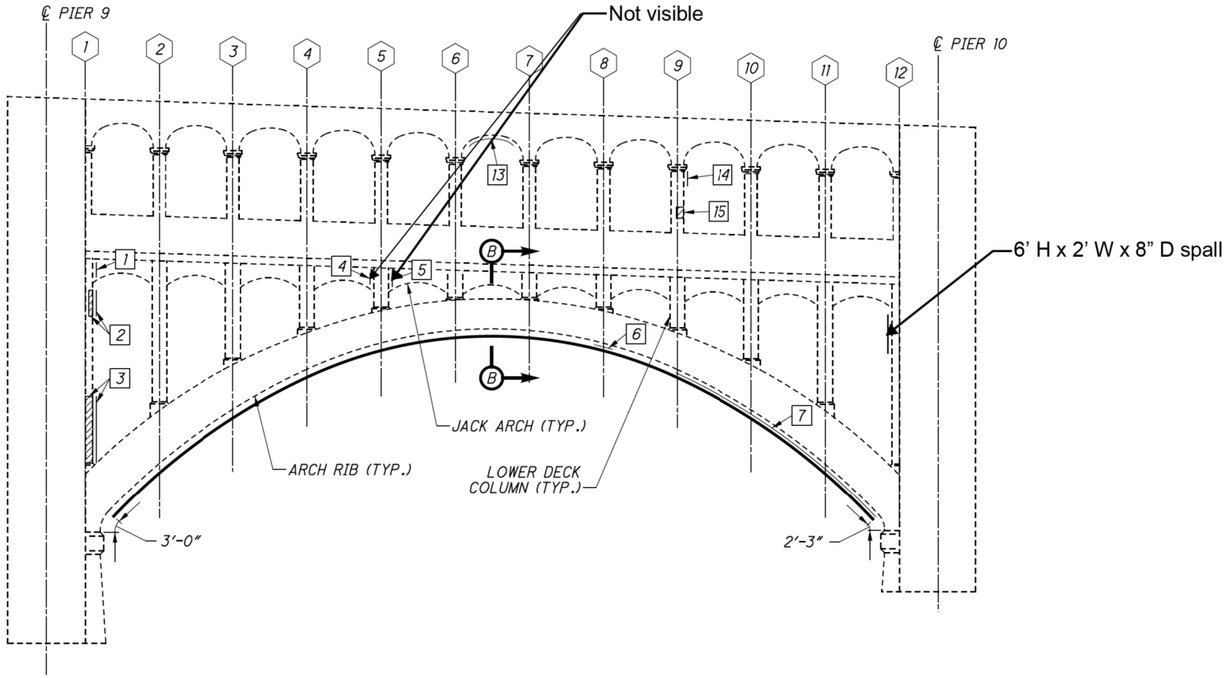
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR PIER 9 REPAIR DETAILS, SEE SHEET 29/89.
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

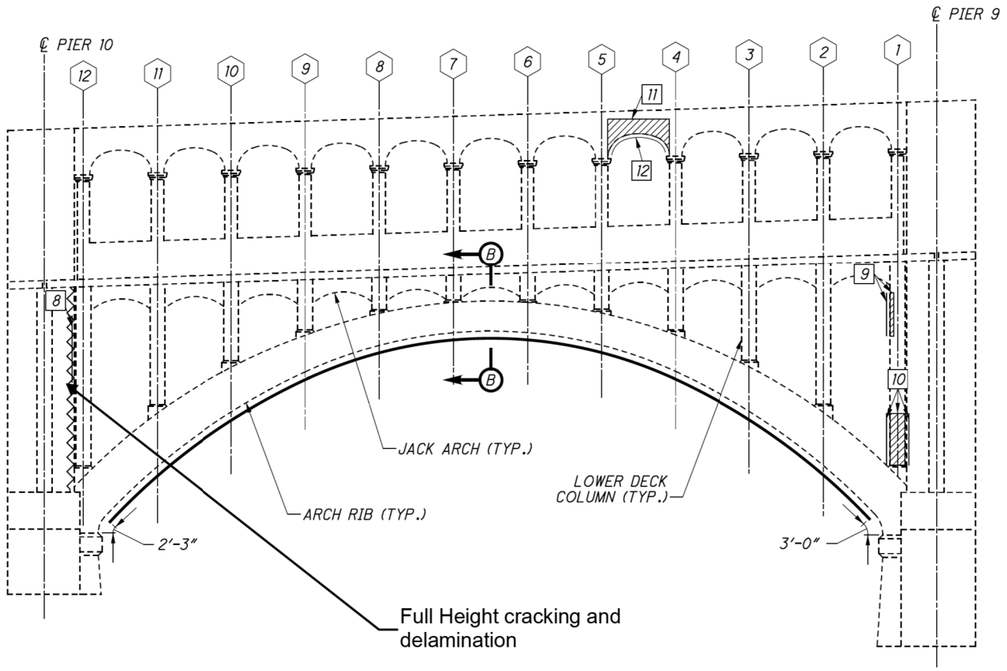
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cincinnati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 10 CONCRETE REPAIR DETAILS — PAGE A-97



SPAN 10 - ARCH RIB D SOUTH ELEVATION

(LOOKING NORTH)



SPAN 10 - ARCH RIB D NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	4	1
2	TYPE 1	8	3
3	TYPE 1	21	5
4	TYPE 1	1	1
5	TYPE 1	2	1
6	TYPE 2	4	1
7	TYPE 2	138	52
8	TYPE 1	18	5
9	TYPE 1	6	2
10	TYPE 1	24	8
11	TYPE 1	24	8
12	TYPE 2	18	9
13	TYPE 2	7	5
14	TYPE 1	2	1
15	TYPE 1	2	1
MEASURED QUANTITY*		279	-
PLAN QUANTITY*		419	103

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	168
TYPE 2 REPAIR	SF	251
FRP WRAP	SF	1304

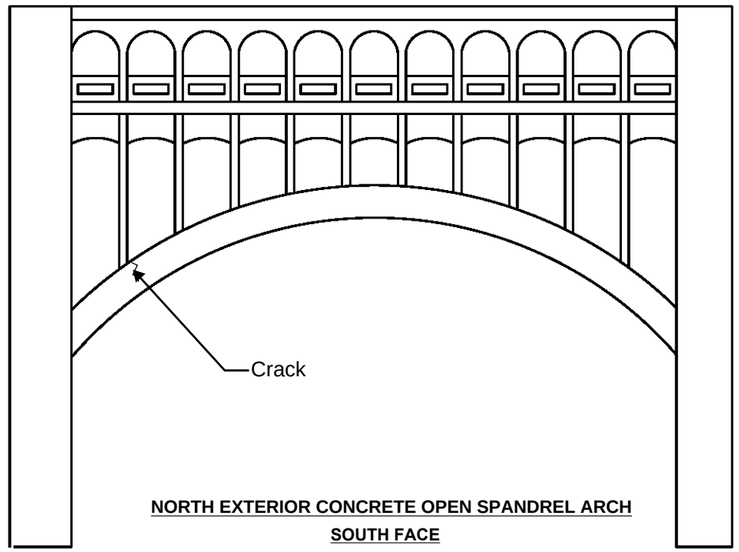
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN DECEMBER 2016. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET [84/89].
6. FOR PIER 9 REPAIR DETAILS, SEE SHEET [29/89].
7. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET [85/89].

LEGEND:

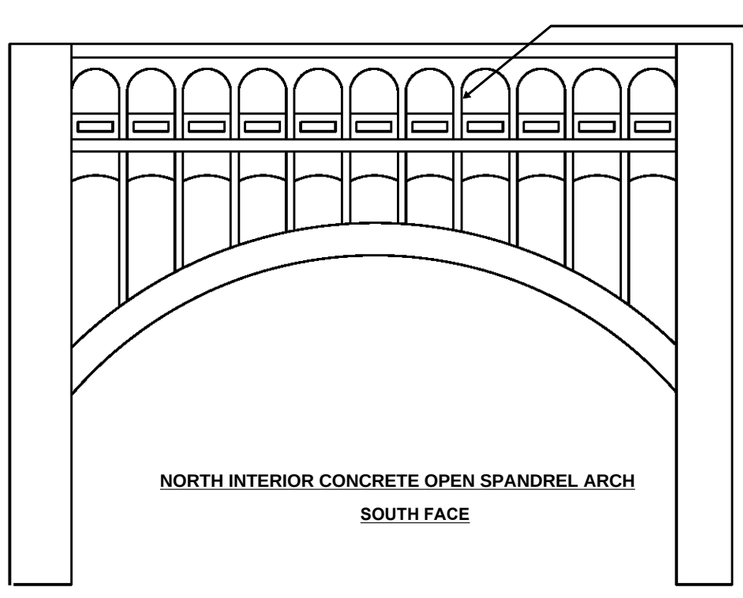
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 10 CONCRETE REPAIR DETAILS	PAGE A-98



NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

PIER 9 PIER 10



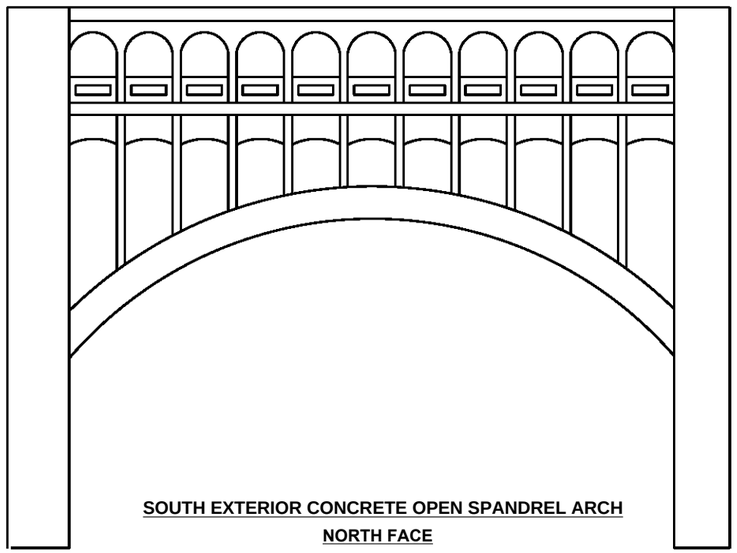
NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

PIER 9 PIER 10

General Notes:

- Floor beams typically have random spalls with exposed corroded reinforcing

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 10	PAGE A-99

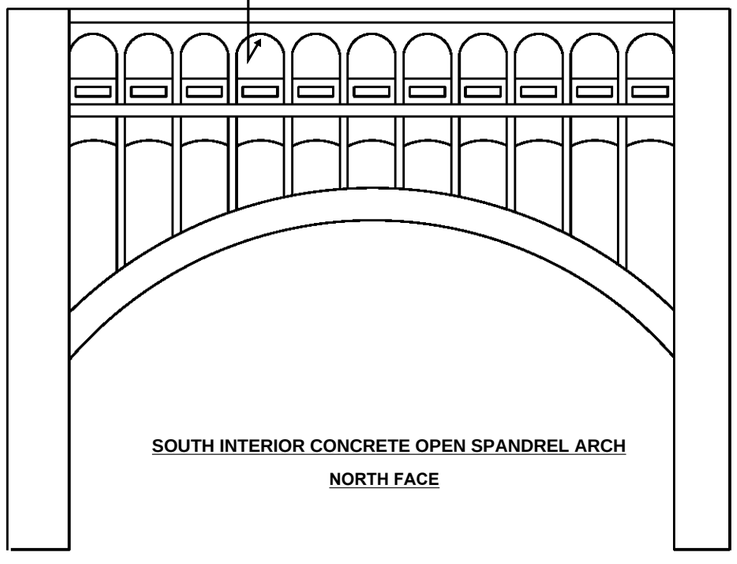


SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

PIER 10

PIER 9

Bottom face: Cracked
and delaminated

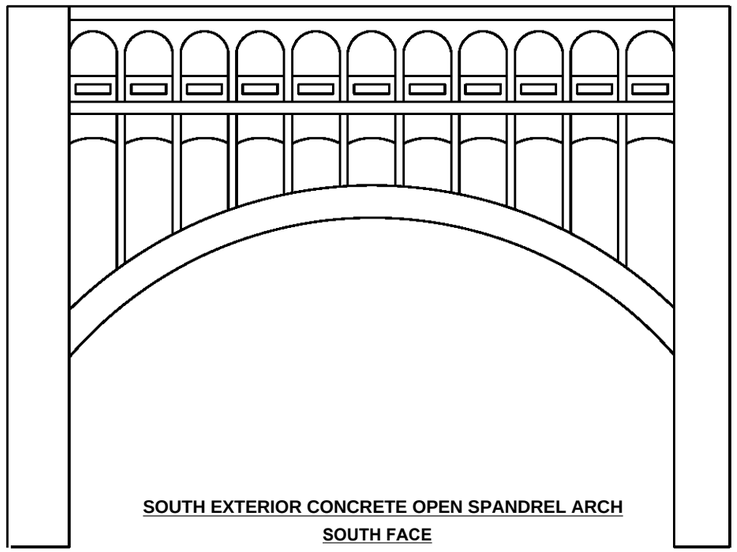


SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

PIER 10

PIER 9

GRAPHIC SCALE MEASURED IN FEET **NOT TO SCALE**	**DATE** NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465** STRUCTURE ELEVATION - SPAN 10

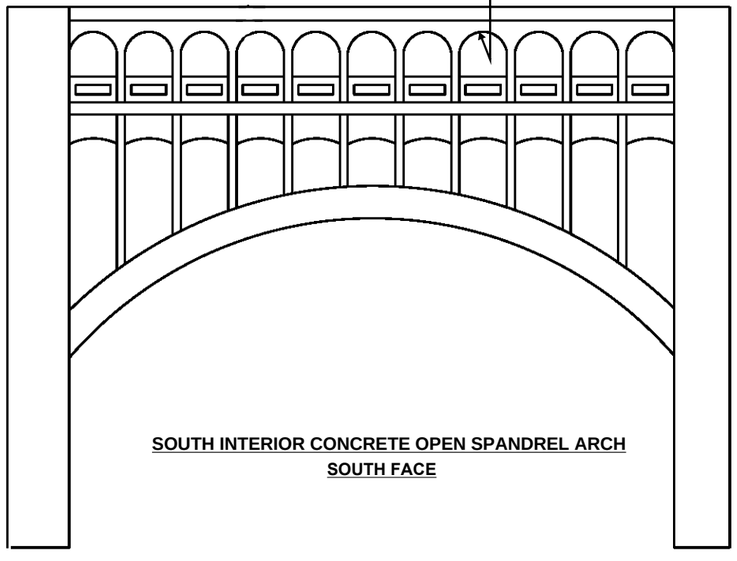


SOUTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

PIER 9

PIER 10

Bottom face: Cracked
and delaminated

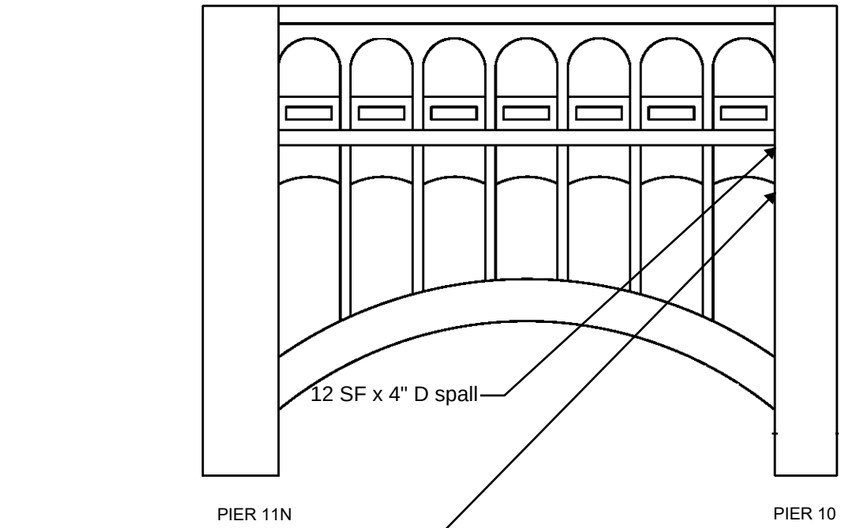


SOUTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

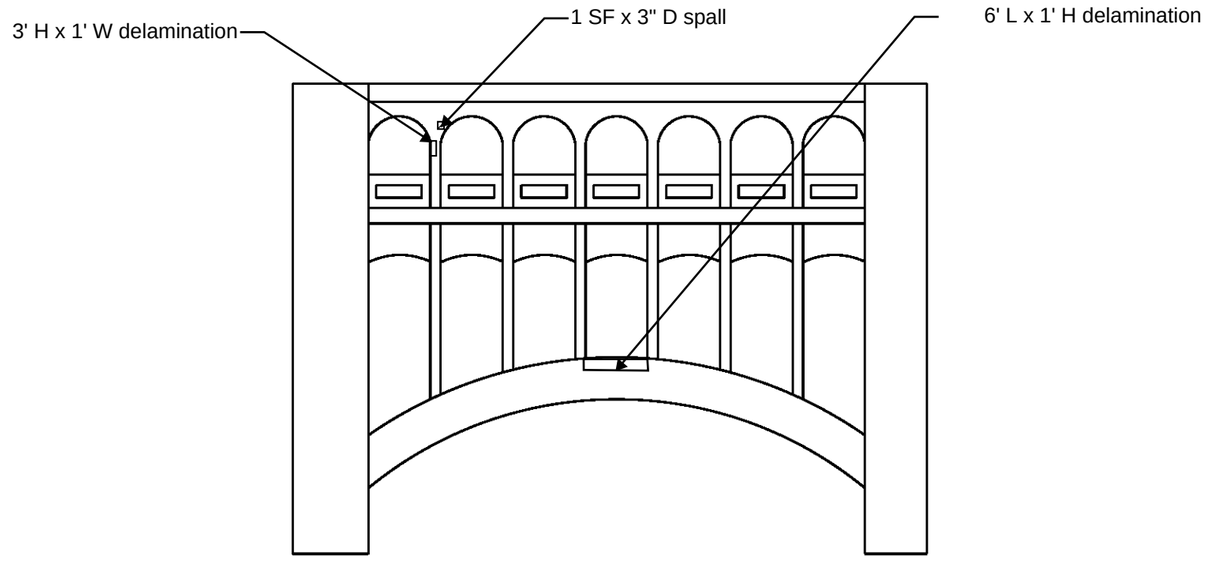
PIER 9

PIER 10

GRAPHIC SCALE MEASURED IN FEET	**DATE**	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	**DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER** **BRIDGE NO. CUY-6-1465**
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 10
			PAGE A-101

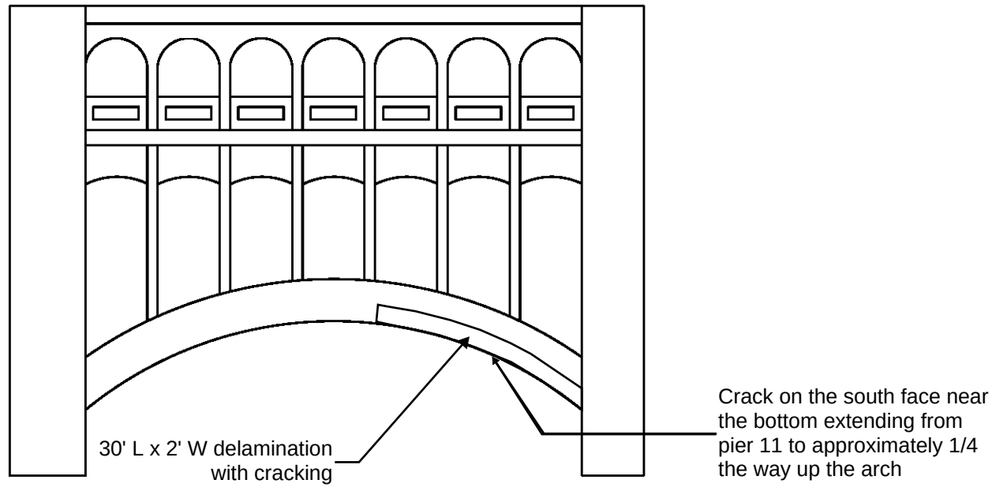


NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

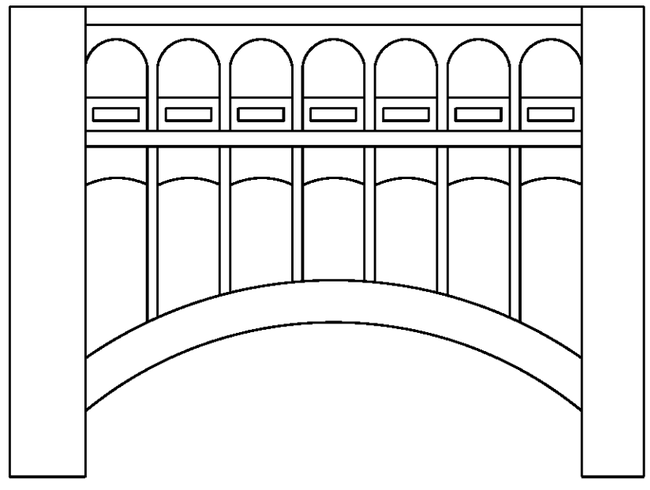


NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
NORTH FACE

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 11	PAGE A-102

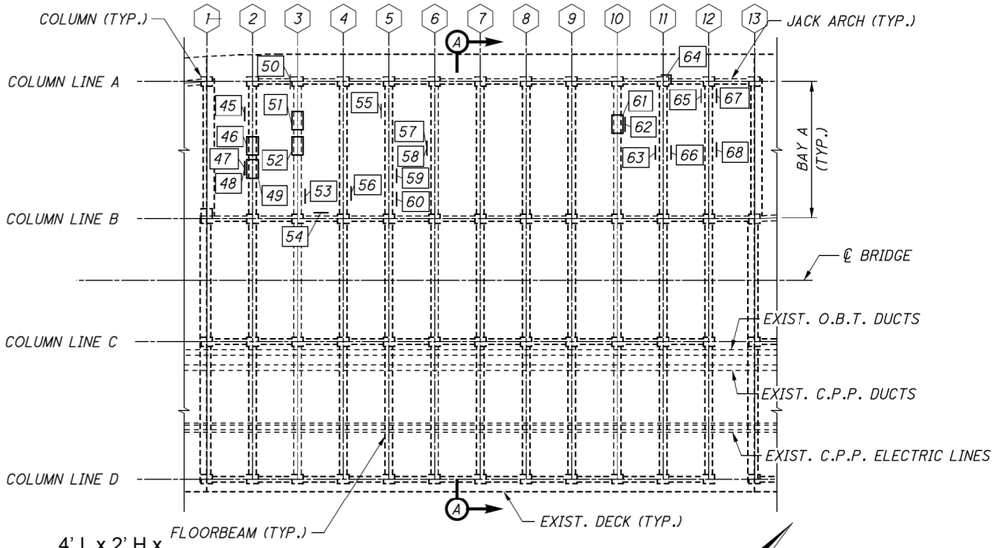


NORTH EXTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

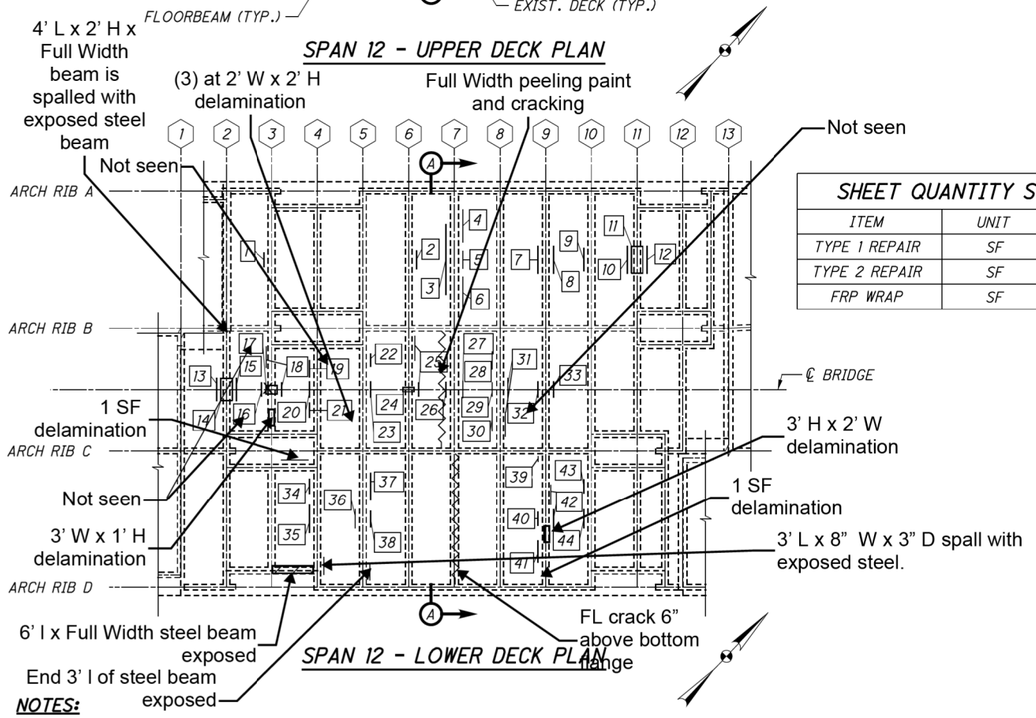


NORTH INTERIOR CONCRETE OPEN SPANDREL ARCH
SOUTH FACE

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road, Suite 201, Cinncinati, OH 45242, PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 11	PAGE A-103



SPAN 12 - UPPER DECK PLAN



SPAN 12 - LOWER DECK PLAN

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	531
TYPE 2 REPAIR	SF	44
FRP WRAP	SF	65

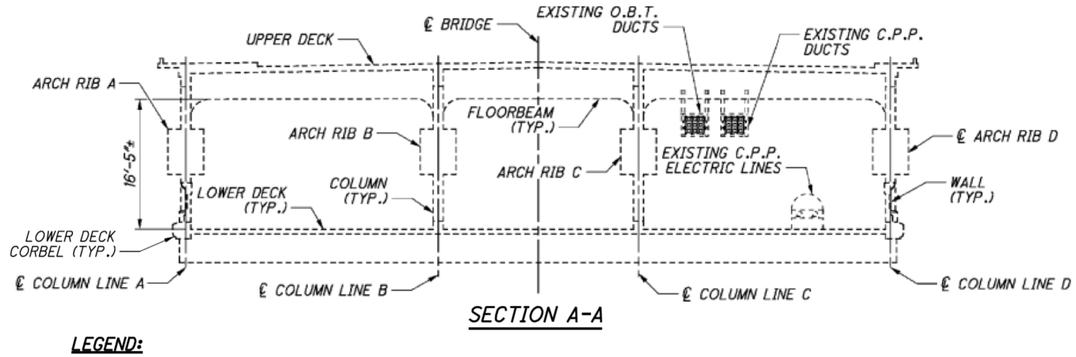
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE INSPECTION PERFORMED IN JANUARY 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. THE LOWER DECK FLOORBEAMS ARE CONCRETE ENCASED STEEL GIRDERS AND CONTAIN MINIMAL TEMPERATURE/SHRINKAGE STEEL REINFORCEMENT. PATCH THE VERTICAL SIDES OF THESE MEMBERS IN ACCORDANCE WITH THE STANDARD TYPE 1 REPAIR DETAILS. PATCH THE HORIZONTAL BOTTOM SURFACES IN ACCORDANCE WITH THE DETAILS SHOWN ON SHEET 84/89. CONNECTION OF THE EMBEDDED GALVANIC ANODES SHALL CONFORM TO THE MANUFACTURER'S RECOMMENDATIONS.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 1	1	1
2	TYPE 1	6	1
3	TYPE 1	16	8
4	TYPE 1	19	4
5	TYPE 1	5	1
6	TYPE 1	15	3
7	TYPE 1	4	1
8	TYPE 1	4	1
9	TYPE 1	1	1
10	TYPE 1	20	6
11	TYPE 2	6	4
12	TYPE 1	20	6
13	TYPE 1	17	6
14	TYPE 2	5	4
15	TYPE 1	17	6
16	TYPE 1	4	2
17	TYPE 2	2	2
18	TYPE 1	4	2
19	TYPE 1	5	1
20	TYPE 1	2	1
21	TYPE 1	3	1
22	TYPE 1	2	1
23	TYPE 1	3	1
24	TYPE 2	1	2
25	TYPE 1	2	1
26	TYPE 1	2	1
27	TYPE 1	5	1
28	TYPE 1	5	1
29	TYPE 1	2	1
30	TYPE 1	11	4
31	TYPE 1	10	4
32	TYPE 1	3	1
33	TYPE 1	3	1
34	TYPE 1	3	1
35	TYPE 1	14	3
36	TYPE 1	6	2
37	TYPE 1	5	3

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
38	TYPE 1	4	1
39	TYPE 1	3	2
40	TYPE 1	1	1
41	TYPE 1	10	2
42	TYPE 1	8	2
43	TYPE 1	1	1
44	TYPE 1	2	1
45	TYPE 1	3	2
46	TYPE 2	4	3
47	TYPE 1	1	1
48	TYPE 1	1	1
49	TYPE 2	1	1
50	TYPE 1	2	1
51	TYPE 2	4	4
52	TYPE 2	3	3
53	TYPE 1	2	1
54	TYPE 1	3	2
55	TYPE 1	3	2
56	TYPE 1	1	1
57	TYPE 1	4	2
58	TYPE 1	23	5
59	TYPE 1	6	2
60	TYPE 1	6	2
61	TYPE 2	3	3
62	TYPE 1	10	3
63	TYPE 1	6	2
64	TYPE 1	3	2
65	TYPE 1	1	1
66	TYPE 1	1	1
67	TYPE 1	6	2
68	TYPE 1	4	1
MEASURED QUANTITY*		383	-
PLAN QUANTITY*		575	148

* SEE NOTES 1 & 2
** SEE NOTE 3



SECTION A-A

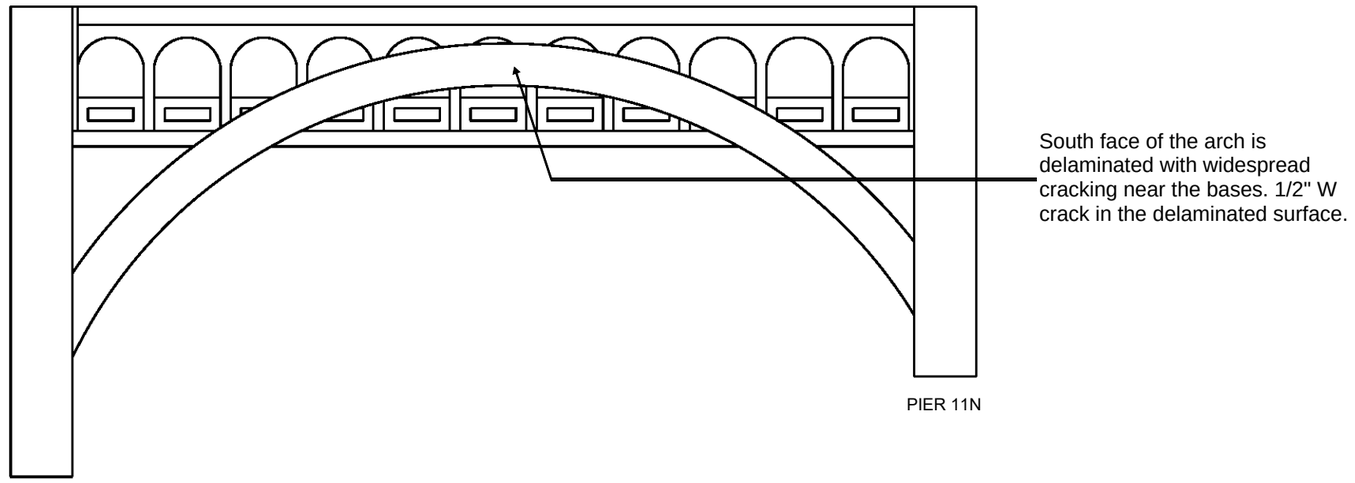
LEGEND:

(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

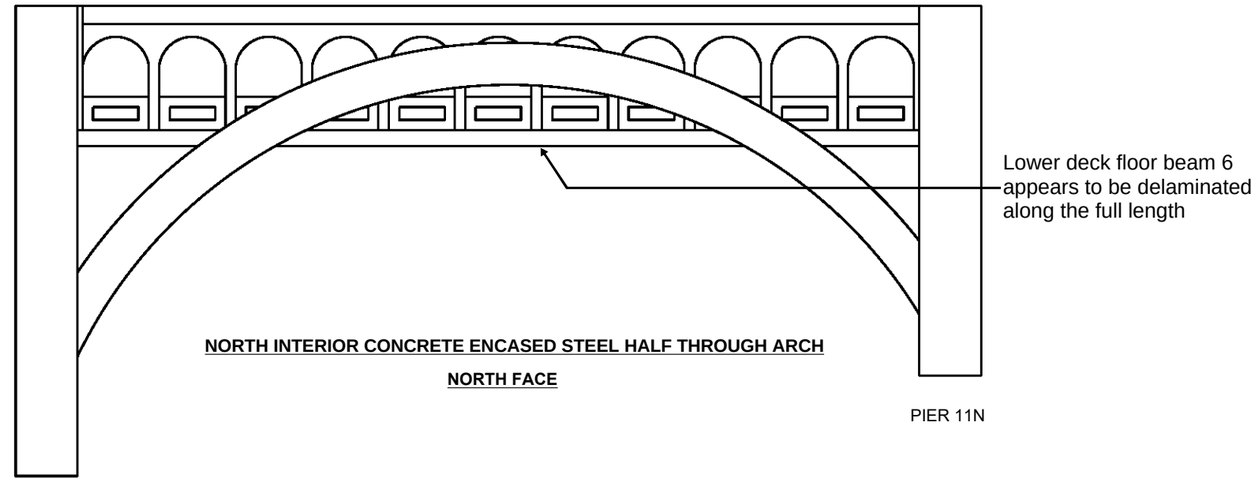
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 SPAN 12 CONCRETE REPAIR DETAILS PAGE A-104



NORTH EXTERIOR CONCRETE ENCASED STEEL HALF THROUGH ARCH

NORTH FACE



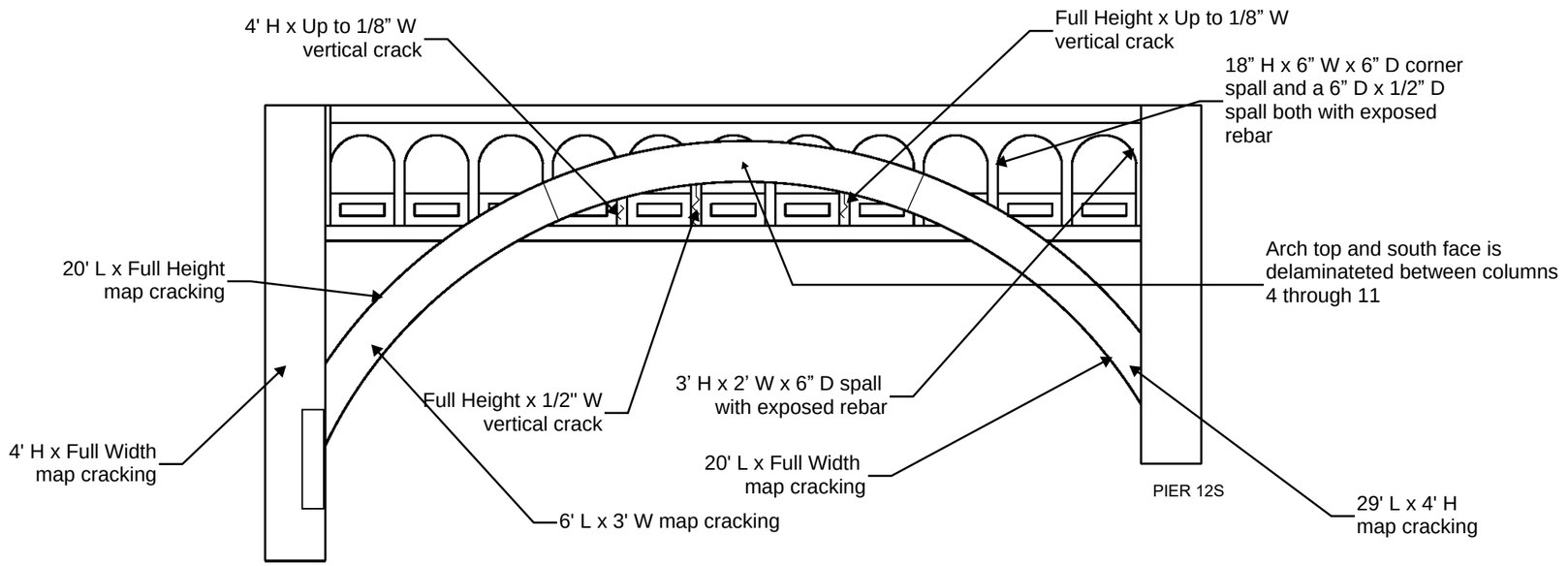
NORTH INTERIOR CONCRETE ENCASED STEEL HALF THROUGH ARCH

NORTH FACE

General Notes:

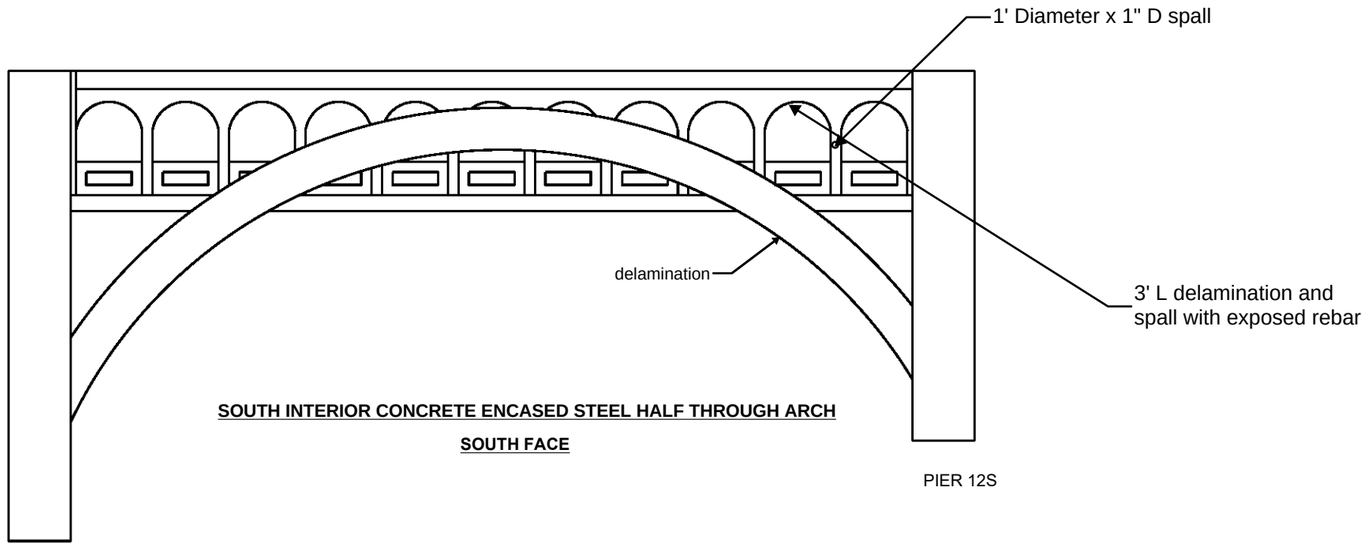
- Lower deck floorbeams have numerous areas that have been chipped off and painted. Numerous areas are cracked and marked but have not been chipped away.

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 12	PAGE A-105



SOUTH EXTERIOR CONCRETE ENCASED STEEL HALF THROUGH ARCH

SOUTH FACE



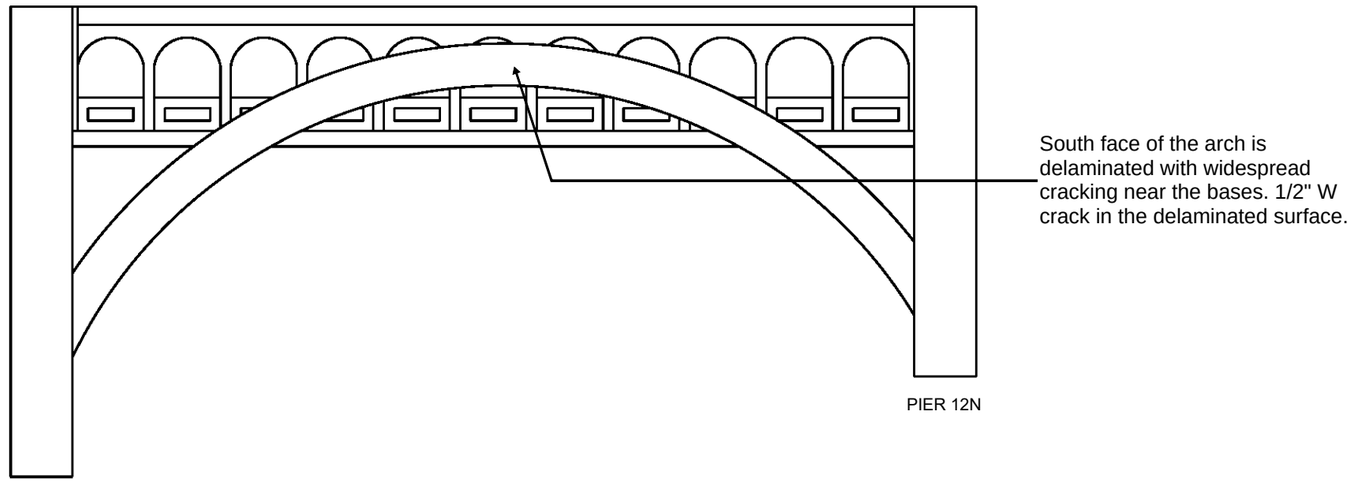
SOUTH INTERIOR CONCRETE ENCASED STEEL HALF THROUGH ARCH

SOUTH FACE

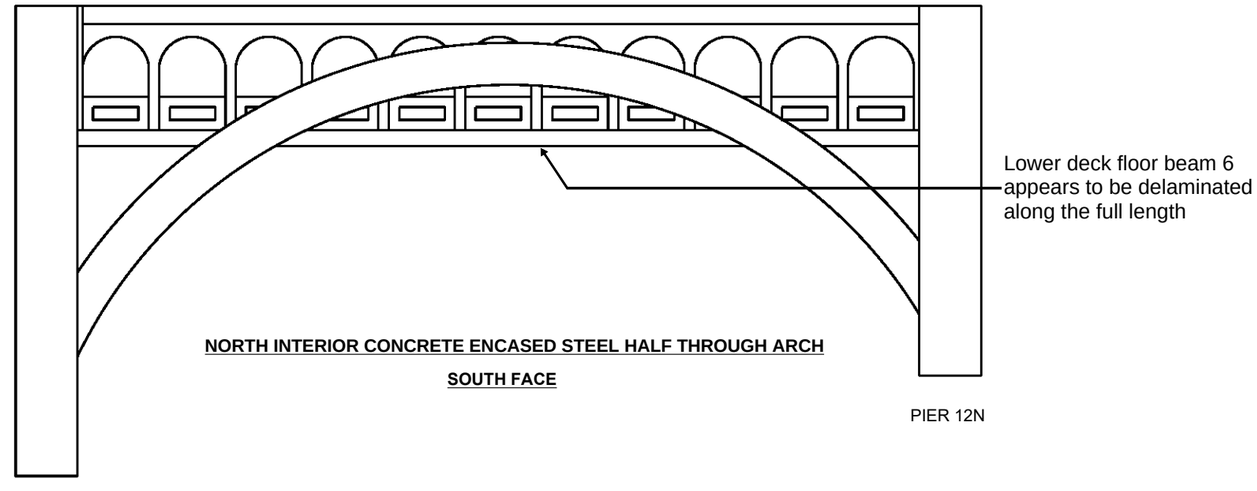
General Notes:

- Lower deck floorbeams have numerous areas that have been chipped off and painted. Numerous areas are cracked and marked but have not been chipped away.

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 12	PAGE A-106



NORTH EXTERIOR CONCRETE ENCASED STEEL HALF THROUGH ARCH
SOUTH FACE

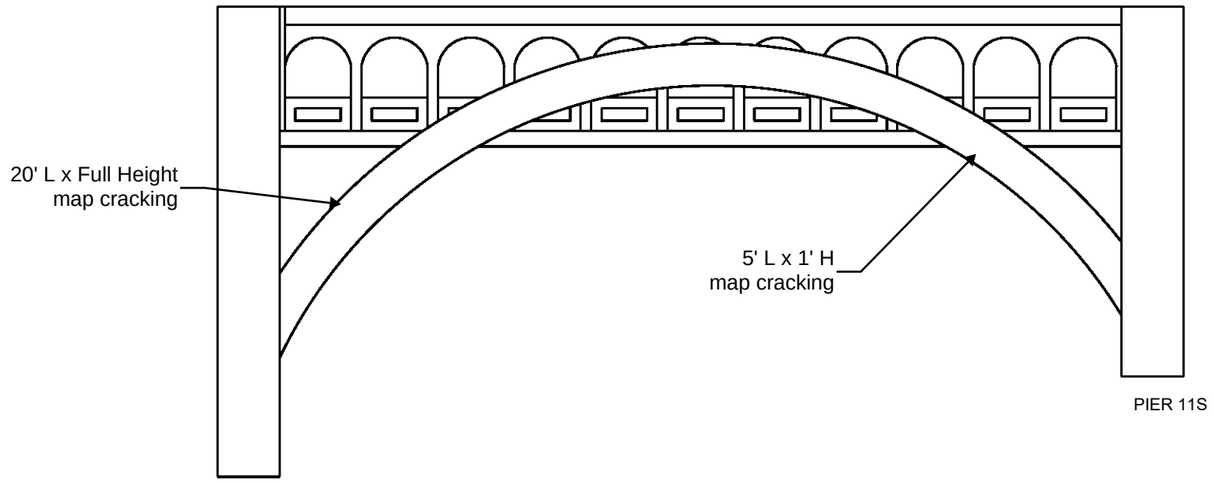


NORTH INTERIOR CONCRETE ENCASED STEEL HALF THROUGH ARCH
SOUTH FACE

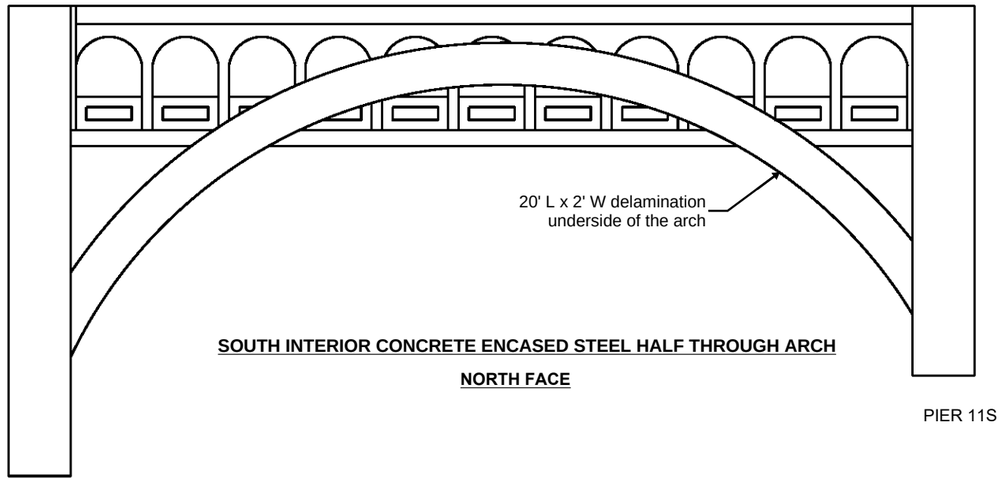
General Notes:

- Lower deck floorbeams have numerous areas that have been chipped off and painted. Numerous areas are cracked and marked but have not been chipped away.

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 12	PAGE A-107



SOUTH EXTERIOR CONCRETE ENCASED STEEL HALF THROUGH ARCH
NORTH FACE

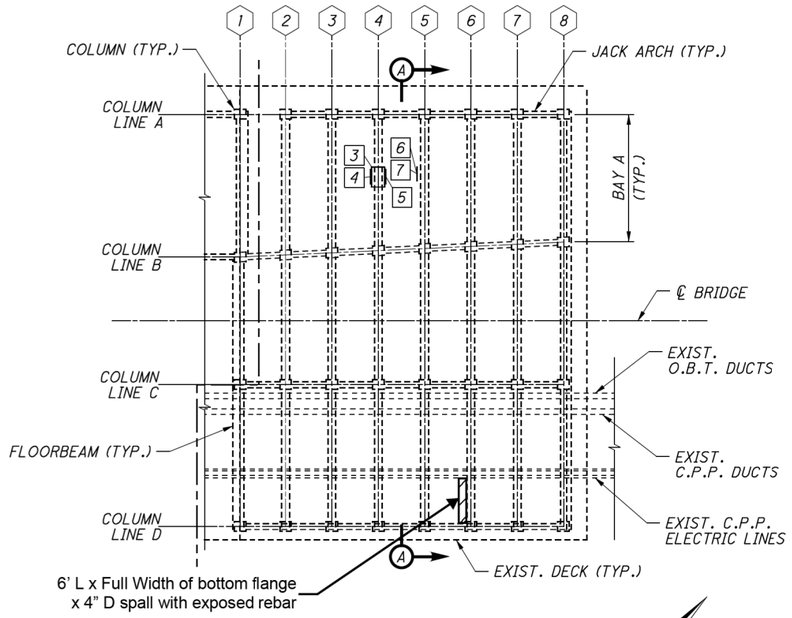


SOUTH INTERIOR CONCRETE ENCASED STEEL HALF THROUGH ARCH
NORTH FACE

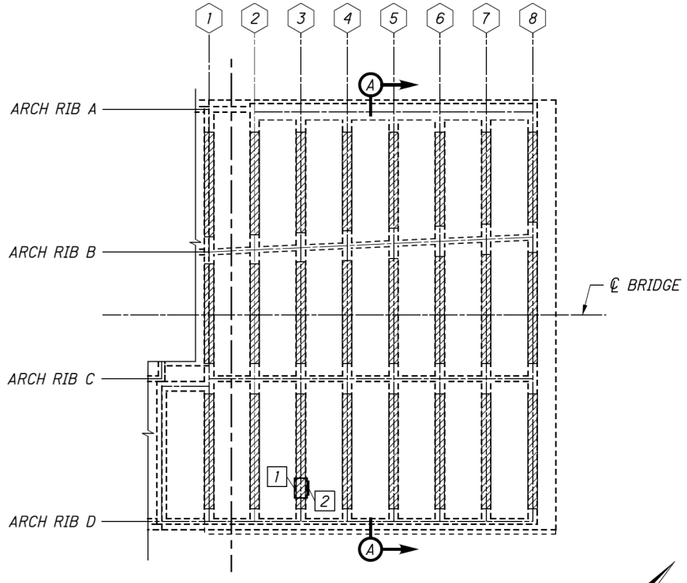
General Notes:

- Lower deck floorbeams have numerous areas that have been chipped off and painted. Numerous areas are cracked and marked but have not been chipped away.

GRAPHIC SCALE MEASURED IN FEET	DATE		DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465	
NOT TO SCALE	NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	STRUCTURE ELEVATION - SPAN 12	PAGE A-108



SPAN 13 - UPPER DECK PLAN



SPAN 13 - LOWER DECK PLAN

ESTIMATED PATCHING QUANTITIES			
REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 2	10	6
2	TYPE 1	6	3
3	TYPE 2	4	4
4	TYPE 1	4	1
5	TYPE 1	2	1
6	TYPE 1	4	1
7	TYPE 1	10	3
MEASURED QUANTITY*		40	-
PLAN QUANTITY*		60	19

* SEE NOTES 1 & 2
** SEE NOTE 3

SHEET QUANTITY SUMMARY		
ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	39
TYPE 2 REPAIR	SF	21
FRP WRAP	SF	2738

NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN NOVEMBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
5. FOR SECTION A-A, SEE SHEET 34/89.
6. FOR FRP WRAP DETAILS, SEE SHEET 85/89.

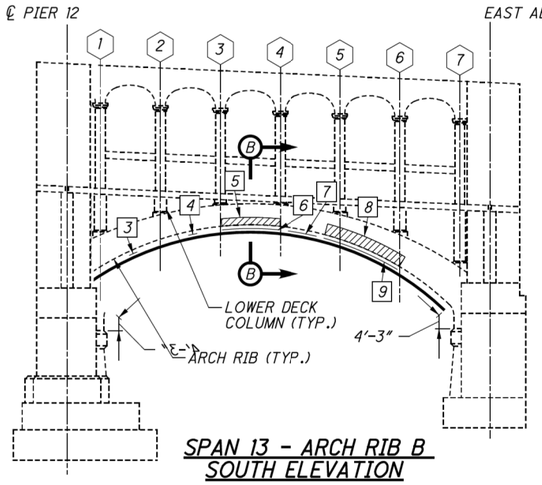
LEGEND:

(#) FLOORBEAM LINE NUMBER

[#] REPAIR NO. OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.

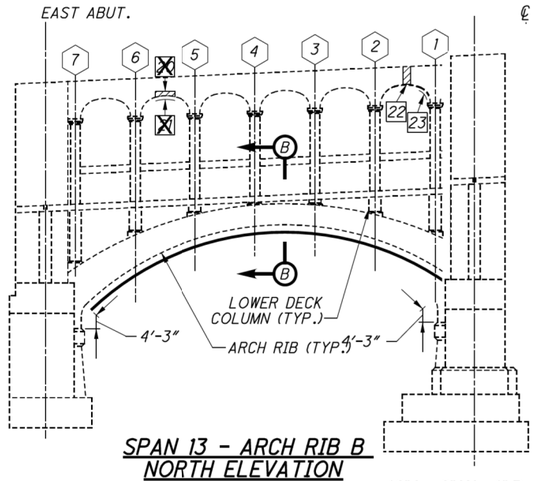
AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET NOT TO SCALE	DATE NOV, 2018	9902 Carver Road Suite 201 Cinncinati, OH 45242 PH.: 614.699.5000 INFRASTRUCTURE ENGINEERS, INC.	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465 SPAN 13 CONCRETE DETAILS PAGE A-109



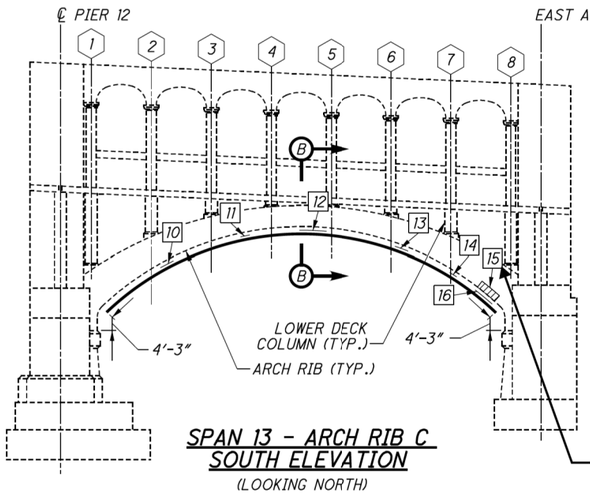
SPAN 13 - ARCH RIB B SOUTH ELEVATION

(LOOKING NORTH)



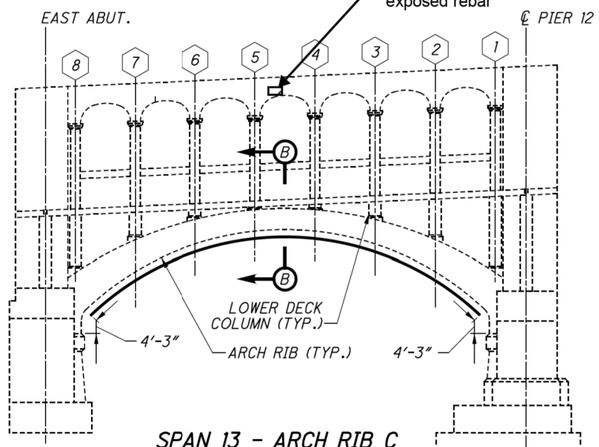
SPAN 13 - ARCH RIB B NORTH ELEVATION

(LOOKING SOUTH)



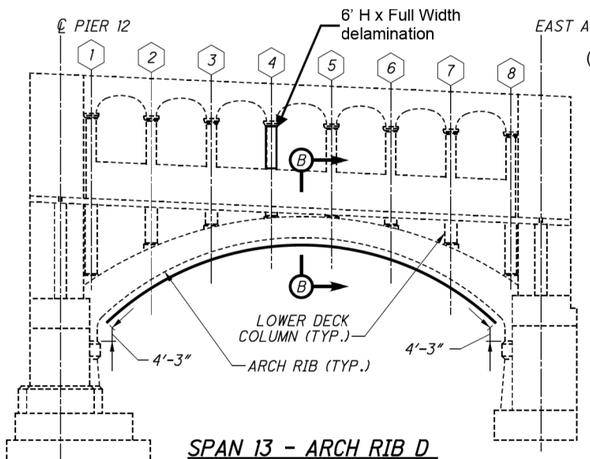
SPAN 13 - ARCH RIB C SOUTH ELEVATION

(LOOKING NORTH)



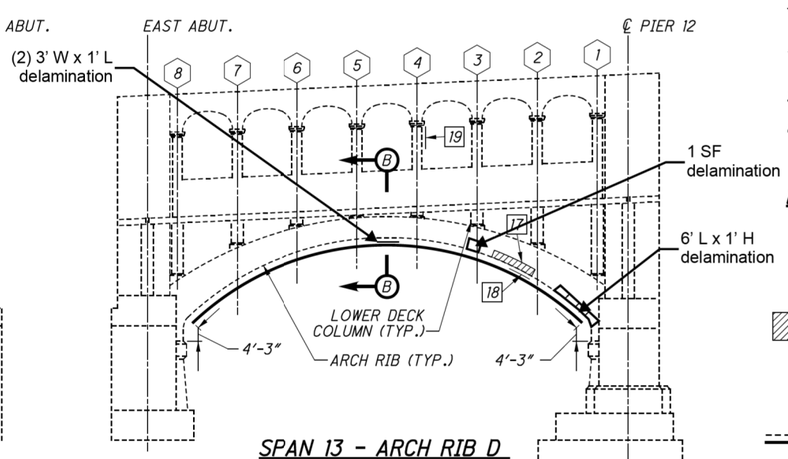
SPAN 13 - ARCH RIB C NORTH ELEVATION

(LOOKING SOUTH)



SPAN 13 - ARCH RIB D SOUTH ELEVATION

(LOOKING NORTH)



SPAN 13 - ARCH RIB D NORTH ELEVATION

(LOOKING SOUTH)

ESTIMATED PATCHING QUANTITIES

REPAIR NO.	REPAIR TYPE	AREA (SF)	ANODE QUANTITY**
1	TYPE 2	1	1
2	TYPE 2	1	1
3	TYPE 2	1	1
4	TYPE 2	1	1
5	TYPE 1	10	-
6	TYPE 2	40	16
7	TYPE 2	15	8
8	TYPE 1	23	-
9	TYPE 2	75	26
10	TYPE 2	4	1
11	TYPE 2	1	1
12	TYPE 2	24	10
13	TYPE 2	2	1
14	TYPE 2	1	1
15	TYPE 1	3	-
16	TYPE 2	3	2
17	TYPE 1	6	-
18	TYPE 2	5	2
19	TYPE 1	3	2
~~20~~	~~TYPE 1~~	~~3~~	~~2~~
~~21~~	~~TYPE 2~~	~~4~~	~~3~~
22	TYPE 1	4	2
23	TYPE 2	1	1
MEASURED QUANTITY*		231	-
PLAN QUANTITY*		347	82

* SEE NOTES 1 & 2
** SEE NOTES 3 & 4

SHEET QUANTITY SUMMARY

ITEM	UNIT	QUANTITY
TYPE 1 REPAIR	SF	78
TYPE 2 REPAIR	SF	269
FRP WRAP	SF	2491

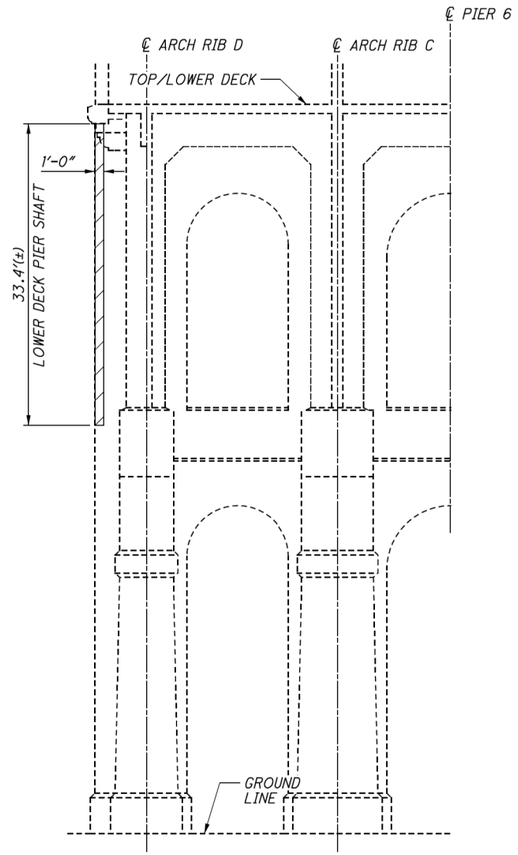
NOTES:

1. MEASURED QUANTITIES ARE BASED ON THE VISUAL INSPECTION PERFORMED IN NOVEMBER 2017. THE EXACT DIMENSIONS AND LOCATIONS OF PATCHES SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD FOR FINAL PAY QUANTITY.
2. PLAN QUANTITIES INCLUDE 50% CONTINGENCY ADDED TO MEASURED QUANTITIES.
3. ANODES ARE INCLUDED FOR PAYMENT WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR.
4. GALVANIC ANODES WILL NOT BE USED FOR PATCHING THE UNREINFORCED VERTICAL SIDES OF THE CONCRETE ARCH RIBS.
5. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.
6. FOR FRP WRAP DETAILS AND SECTION B-B, SEE SHEET 85/89.

LEGEND:

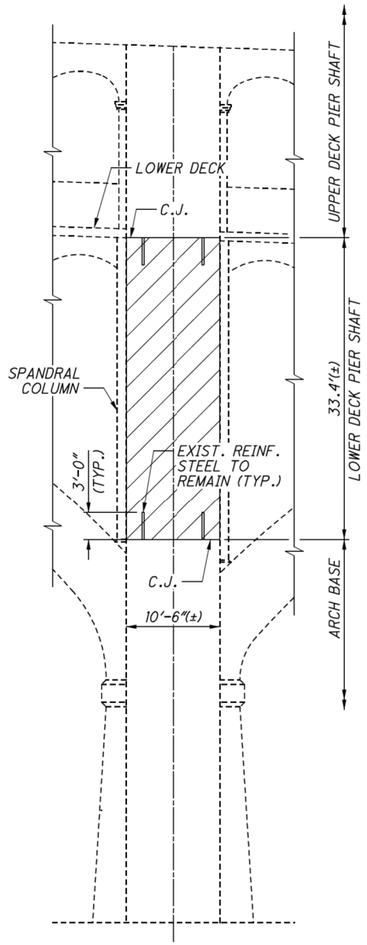
- (#) SPANDREL COLUMN NUMBER
- [#] REPAIR NUMBER
- LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 REPAIR
- LOCATION OF DEFICIENT CONCRETE ON PERPENDICULAR FACE (NOT VISIBLE IN ELEVATION VIEW) TO BE REPAIRED IN ACCORDANCE WITH ITEM SPECIAL - PATCHING CONCRETE STRUCTURE, TYPE 1 OR TYPE 2 REPAIR
- AREA TO BE TREATED WITH FRP WRAP PER ITEM SPECIAL - COMPOSITE FIBER WRAP SYSTEM

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	SPAN 13 CONCTRETE REPAIR DETAILS — PAGE A-110



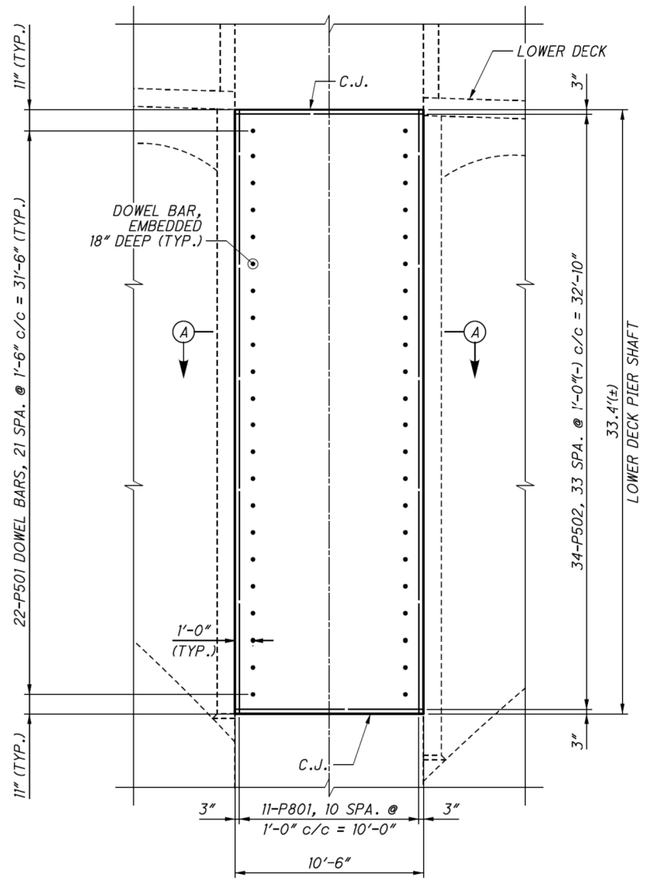
PIER 6 - EAST ELEVATION

SHOWING LIMITS OF REMOVAL



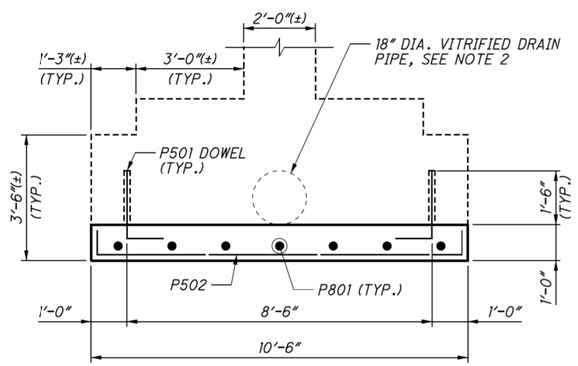
PIER 6 - SOUTH ELEVATION

SHOWING LIMITS OF REMOVAL



PARTIAL REPLACEMENT

LOWER DECK SHAFT ELEVATION



SECTION A-A

LEGEND:

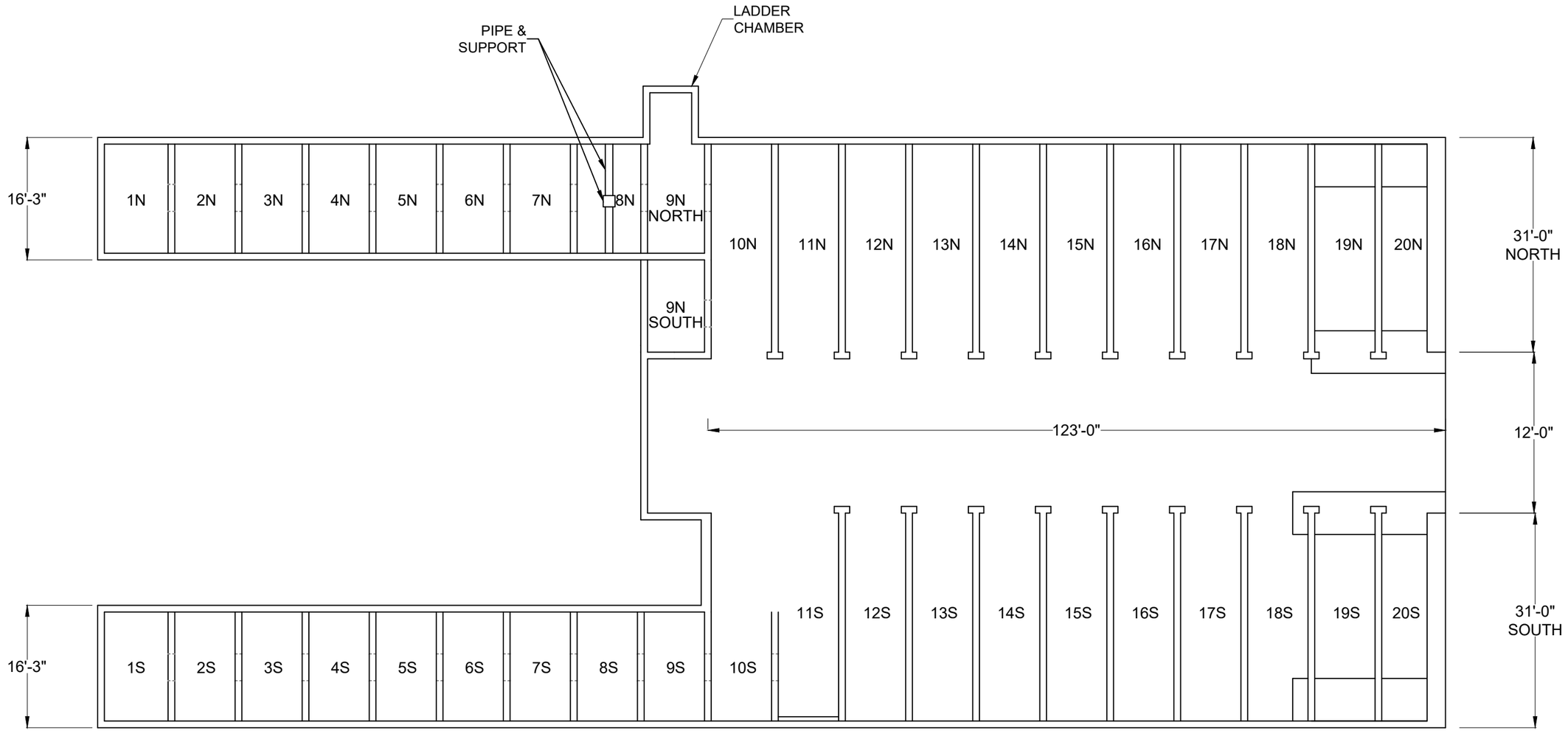
LOCATION OF DEFICIENT CONCRETE TO BE REPAIRED IN ACCORDANCE WITH ITEM 511 - CONCRETE, MISC.: PIER 6 LOWER DECK SHAFT REPAIR

NOTES:

1. THE DEPTH OF CONCRETE REMOVAL SHALL NOT BE GREATER THAN 12 INCHES.
2. THE ASSUMED POSITION OF THE ORIGINAL ENCASED 18" DIAMETER DRAIN PIPE IS SHOWN. IF THE DRAIN PIPE IS EXPOSED DURING REMOVAL OF DETERIORATED CONCRETE, THE EXISTING PIPE SHALL BE REMOVED. ANY DETERIORATED CONCRETE SURROUNDING THE PIPE BEYOND THE 12" REMOVAL SHALL REMAIN IN PLACE.
3. EMBEDDED GALVANIC ANODES ARE NOT SHOWN FOR CLARITY. FOR DETAILS AND MAXIMUM GRID SPACING FOR EMBEDDED GALVANIC ANODES, SEE SHEET 84/89.

GRAPHIC SCALE MEASURED IN FEET	DATE	9902 Carver Road Suite 201 Cincinnati, OH 45242 PH.: 614.699.5000	DETROIT-SUPERIOR BRIDGE OVER CUYAHOGA RIVER BRIDGE NO. CUY-6-1465
NOT TO SCALE	NOV, 2018	INFRASTRUCTURE ENGINEERS, INC.	PIER 6 LOWER DECK SHAFT REPAIRS — PAGE A-111

WEST AND EAST ABUTMENT CHAMBER CADD DRAWINGS AND DEFICIENCIES

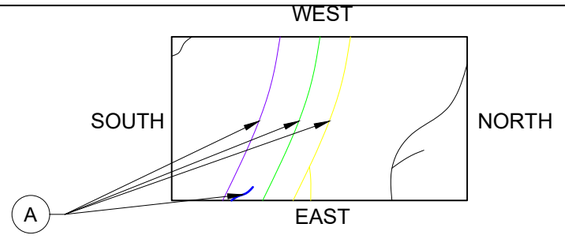


WEST ABUTMENT PLAN

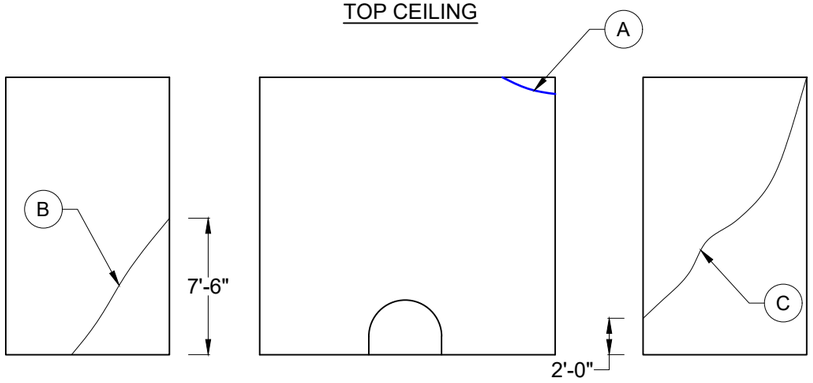
Notes:

1. *All Dimensions are Field Measurements.*
2. *Waterline Reference for soundings is the Top of Angled Nose on the Upstream side of Pier 5 (Top of Nose to Waterline = 11.2')*
3. *Stream slope is < 1%.*

SCALE:	DATE:		Detroit-Superior Bridge Structure No. CUY-6-1456	
N.T.S	OCT, 2018	INFRASTRUCTURE ENGINEERS, INC.	West Abutment Plan	PAGE: A-1

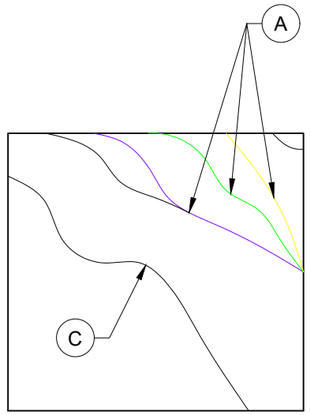


TOP CEILING



NORTH WALL

EAST WALL, WEST FACE



SOUTH WALL

WEST WALL, EAST FACE

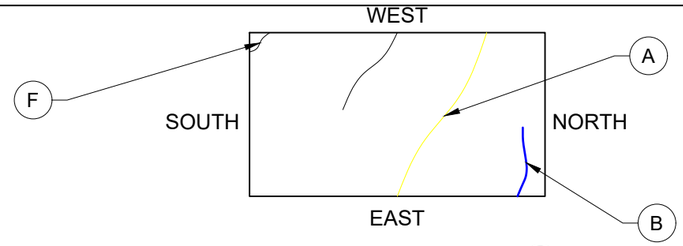
CHAMBER 1S

CHAMBER 1S

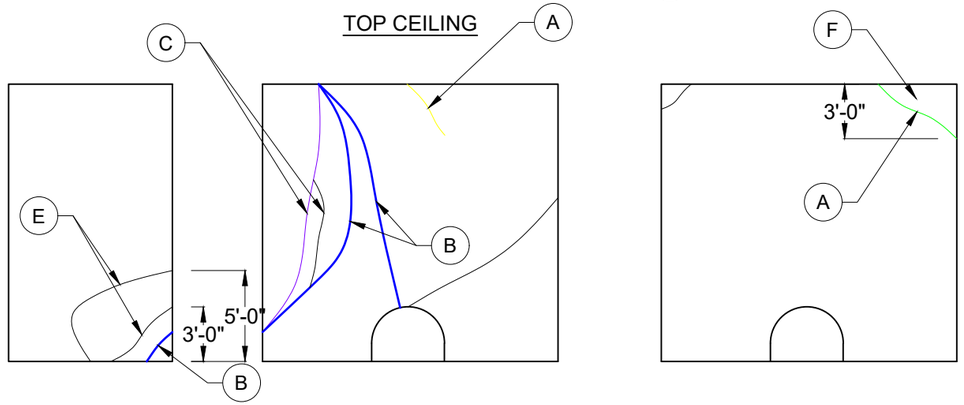
CHAMBER 1S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	Cracks with heav effloresence and moisture staining extending to the East and West walls.	DWN084 to DWN 86
B	Hairline crack	
C	1/32" W Crack	

Notes:

1. *All Dimensions are Field Measurements.*
2. *Waterline Reference for soundings is the Top of Angled Nose on the Upstream side of Pier 5 (Top of Nose to Waterline = 11.2')*
3. *Stream slope is < 1%.*



TOP CEILING



NORTH WALL

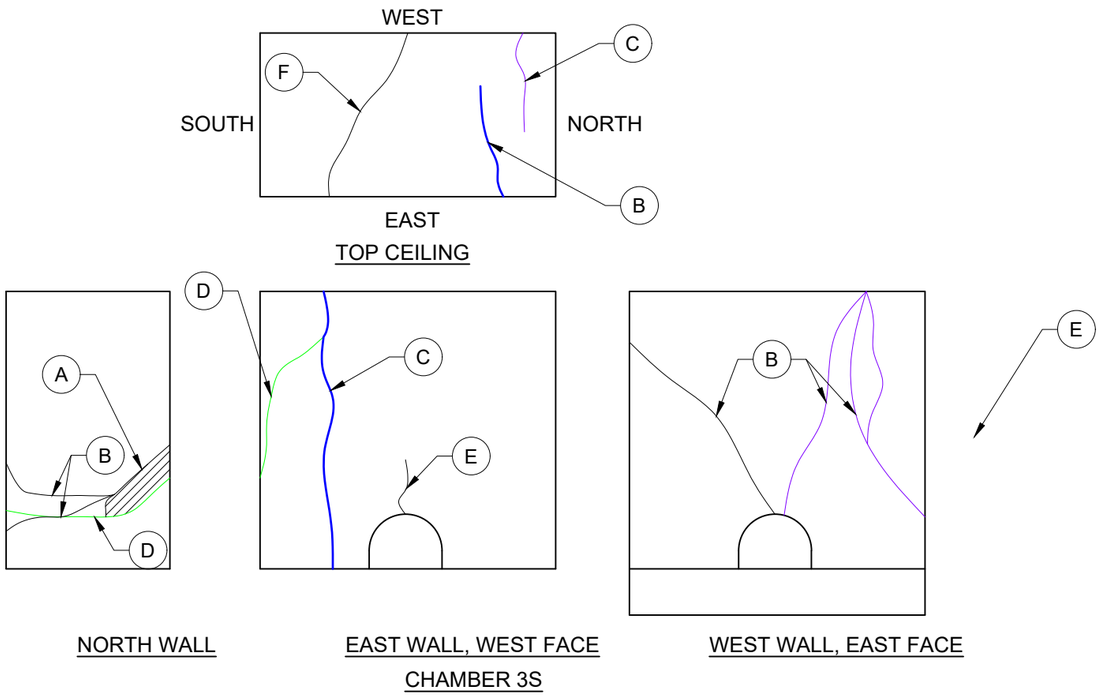
EAST WALL, WEST FACE

WEST WALL, EAST FACE

CHAMBER 2S

CHAMBER 2S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1/16" crack with heavy effloresence from ceiling into the East Wall and ceiling into West Wall 3'-0" from the top.	DWN084 to DWN 86
B	1/8" crack from ceiling to West wall extending down to 2'-0" above the floor, extending into the North wall. Crack also branches off from the top of the West wall extending into the entrance hole.	DWN077 to 748
C	1/16" W crack extending down from the Top of West wall connecting to the crack guage. Crack splits off to a 3/8" W crack and reconnects at the crack guage.	DWN077 to 748
D	1/8" W Crack from entrance hole extending to the south corner of the East wall.	
E	Two 1/32" W cracks starting 3'-0" to 5'-0" from the at the East corner of the North wall.	DWN081
F	1/16" W crack at the southwest corner of ceiling extending down into the top left cornor of the West wall.	DWN082

SCALE:	DATE:		Detroit-Superior Bridge Structure No. CUY-6-1456	
N.T.S	OCT, 2018	INFRASTRUCTURE ENGINEERS, INC.	South Chamber Details - S1 & S2	PAGE: A-2

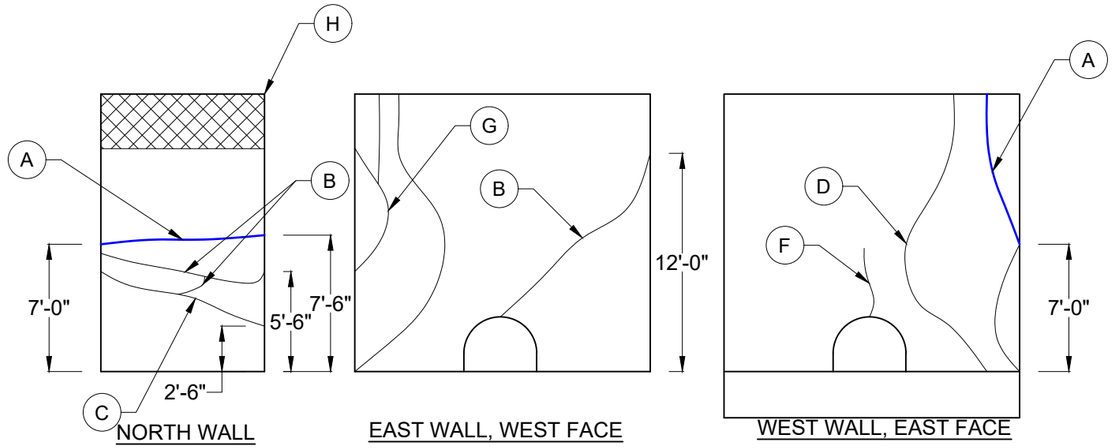


CHAMBER 3S

CHAMBER 3S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	2'-2" H x 2'-0" W x 3-3/4" D spall	DWN071 & 073
B	1/8" W Crack	
C	1/16" W crack at 4'-0" from the ground up, 2'-0" away from entrance.	DWN070
D	1/2" W crack extending up into the ceiling and extends across the full length of the north wall.	
E	1/16" crack 3'-0" from the top of the entrance.	DWN070
F	Crack on ceiling with minor effloresence.	

Notes:

1. *All Dimensions are Field Measurements.*
2. *Waterline Reference for soundings is the Top of Angled Nose on the Upstream side of Pier 5 (Top of Nose to Waterline = 11.2')*
3. *Stream slope is < 1%.*



CHAMBER 4S

CHAMBER 4S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1/16" W crack extends full width of the North wall and connects to the West wall and becomes 1/2" to 1" W crack and extends to the top of the wall.	DWN066/067
B	1/16" W crack	
C	1/8" w full width of the North wall.	
D	1/8" W crack full height of the West wall.	
E	1/32" W crack extends 7' from the bottom of the floor.	
F	1/16" W crack at the top of entrance on the west wall extends up 3'-6" up.	DWN069
G	3/4" W crack starting 5'-6" from the bottom of the wall and extend back into the the side of the east wall and to the top of the East wall.	
H	3' H x Full width x 3" D spall.	DWN 68
I	1/16" W crack full height of the east wall.	

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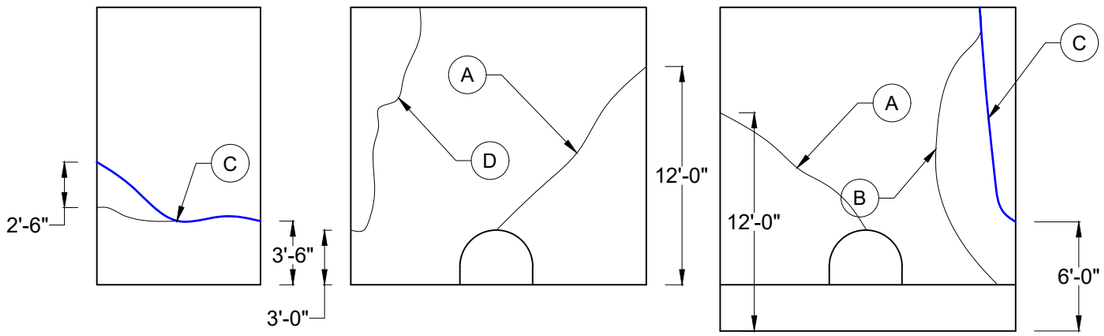
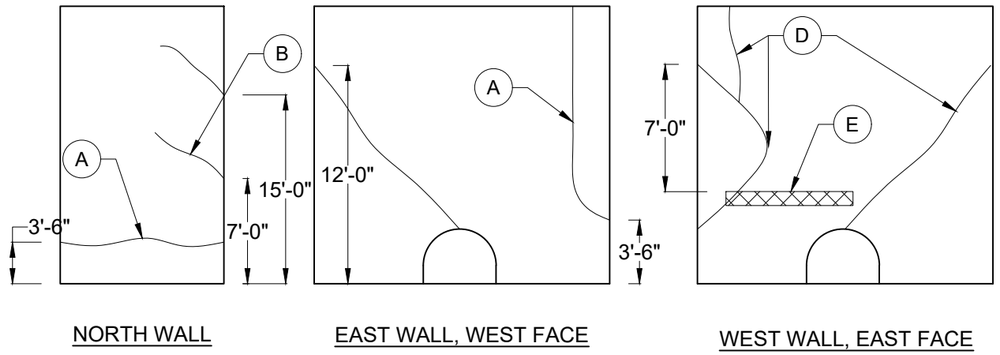


NORTH WALL | EAST WALL, WEST FACE | WEST WALL, EAST FACE

CHAMBER 5S

CHAMBER 5S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1/16" W crack from the top of entrance at the West wall extending over to the North of the West wall.	DWN0658
B	1/8" W crack full height of the West wall.	DWN061-62
C	1/8" W crack full width of the North wall, becomes a 1/2" W crack at the West Wall extending all the way to the top of the wall.	DWN061-62
D	3/4" W crack at 7'-6".	DWN059-60



NORTH WALL | EAST WALL, WEST FACE | WEST WALL, EAST FACE

CHAMBER 6S

CHAMBER 6S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1/32" W crack along the cold joint connects to the West wall and extends to the top widing to 5/16" W with crack guage.	DWN053/54
B	1/32" W crack	DWN061-62
C	1/16" W crack	DWN061-62
D	1/8" W crack	DWN059-60
E	7' W x 8" H honeycombing with exposed rebar.	

Notes:

1. *All Dimensions are Field Measurements.*
2. *Waterline Reference for soundings is the Top of Angled Nose on the Upstream side of Pier 5 (Top of Nose to Waterline = 11.2')*
3. *Stream slope is < 1%.*

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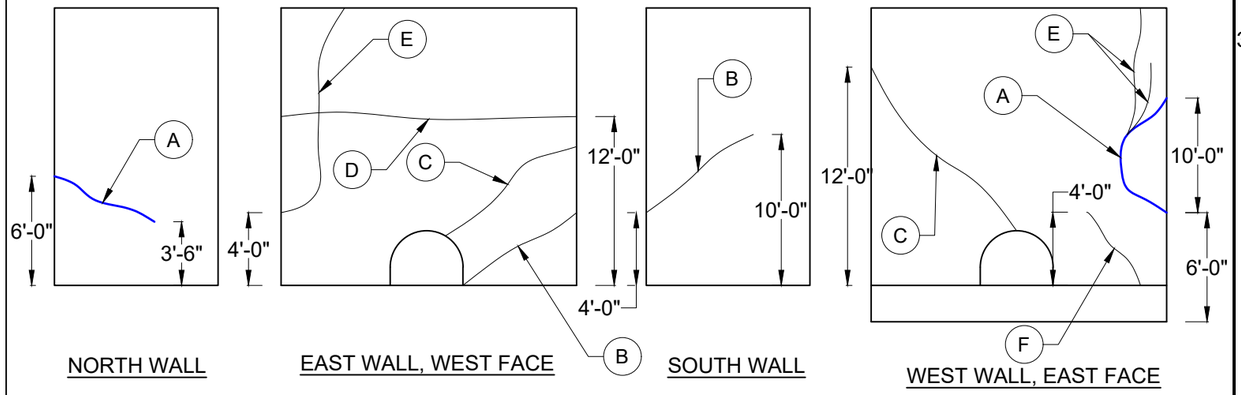
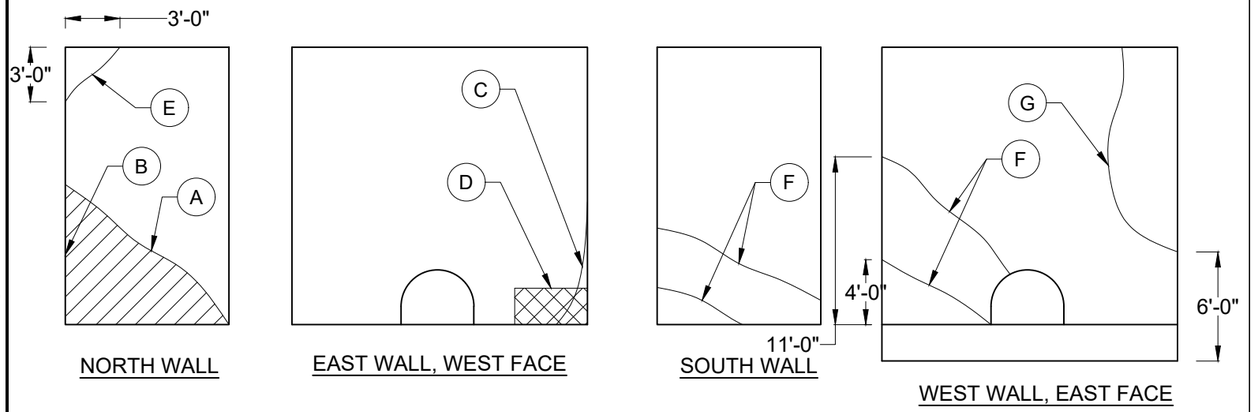


CHAMBER 7S

CHAMBER 7S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1/32" W diagonal crack 3'-6" from the floor and 3'-6" from the east side of the north wall extending into the west wall widening to a 1/4" W vertical crack.	
B	1/32" W diagonal crack extending from the east wall to the South wall widening to a 1/16" W diagonal crack.	
C	1/16" W diagonal crack	DWN051
D	1/8" W horizontal crack	DWN052
E	1/8" W vertical crack	DWN050
F	1/32" W diagonal crack	



CHAMBER 8S

CHAMBER 8S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	Full depth seperation of wall rotation outward.	DWN046
B	1/8" W seperation at 4'-0"	DWN048
C	5/8" W sepaeration	DWN051
D	2' H x 4' W x 4" D spall	DWN049
E	1/8" W diagonal crack with efloresence.	DWN050
F	1/32" W diagonal crack with minor effloresence.	
G	1/8" W vertical crack.	DWN042-043

Notes:

1. *All Dimensions are Field Measurements.*
2. *Waterline Reference for soundings is the Top of Angled Nose on the Upstream side of Pier 5 (Top of Nose to Waterline = 11.2')*
3. *Stream slope is < 1%.*

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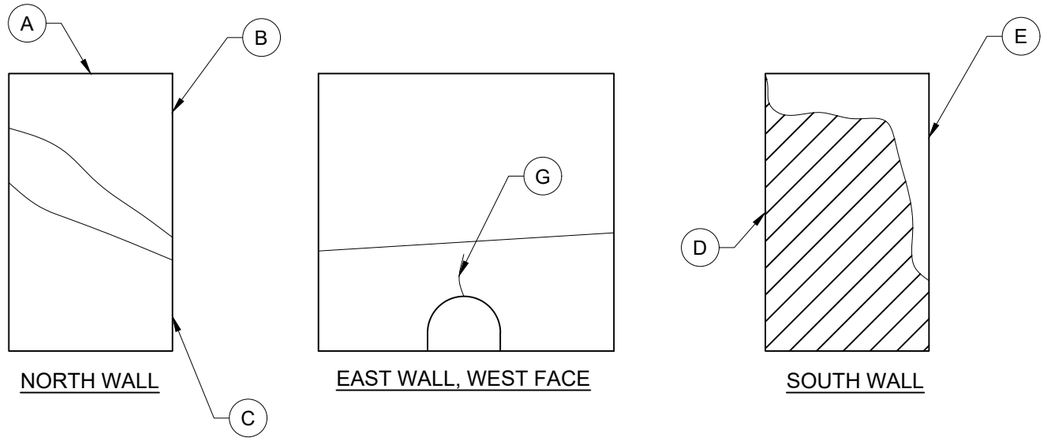
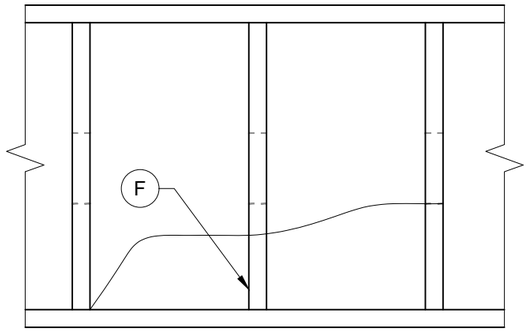
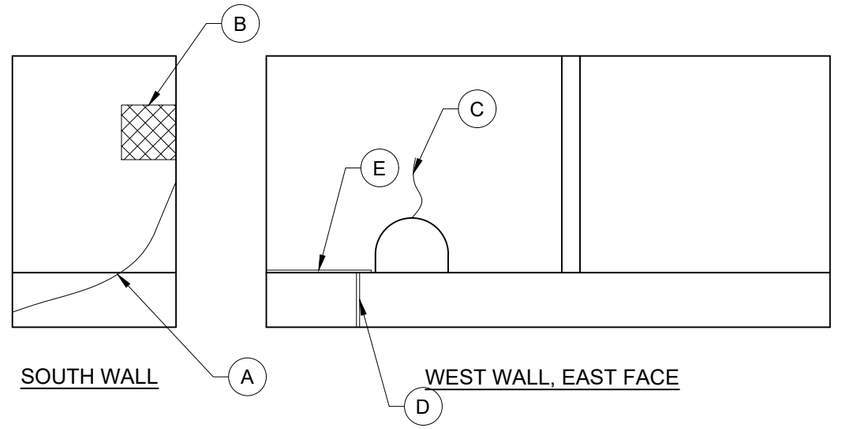


CHAMBER 9S



FLOOR
CHAMBERS 9 & 8

CHAMBER 9S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	Seperation at the top of the wall	DWN027/ 28
B	Full height seperation of the North wall from the east wall. Seperation increases from bottom to top of wall.	FJN632 to 34
C	7/16" W crack 42" H from base.	
D	The east edge of the wall has seperated from the wast wall and has rotated towards the south at 48" H 1-1/2" seperation.	FJN629
E	South wall is roatated S, 1-1/4" at 48" H 7.7' H wall is split Full Depth with edge spalling up to 6" D. The lower portion of the wall has seperated and day light is visible through the seperation.	DWN31-3 7
F	1/2" W crack all the Floor full length of chamber 8S and chamber 9S.	
G	22" G x 1/32" W vertical crack.	



CHAMBER 10S

CHAMBER 10S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1/32" Crack	FJN628
B	6' H x 5' W delam / spall	FJN627
C	1'-10" H x 1/16" W crack	
D	Crack guage on top of step	FJN629
E	Crack guage located at base of wall	FJN630

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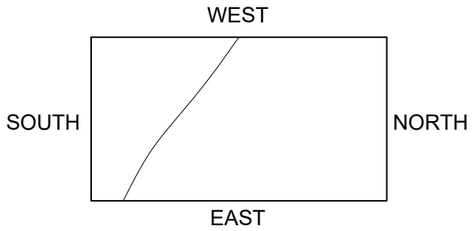
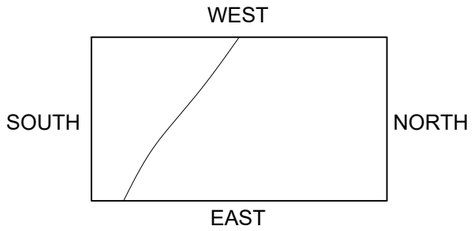
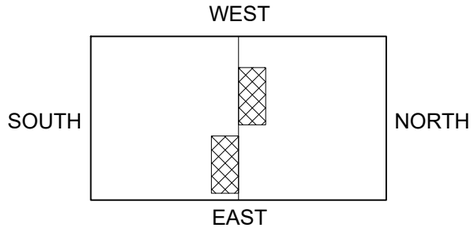


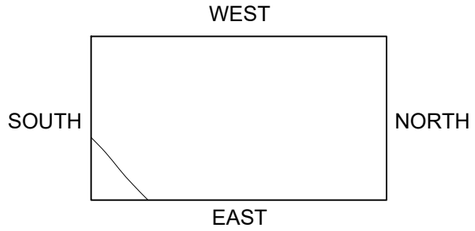
CHAMBER 11S



CHAMBER 14S

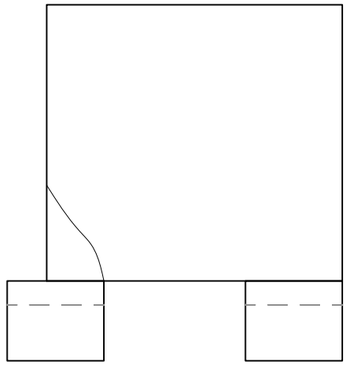


CHAMBERS 13S & 17S

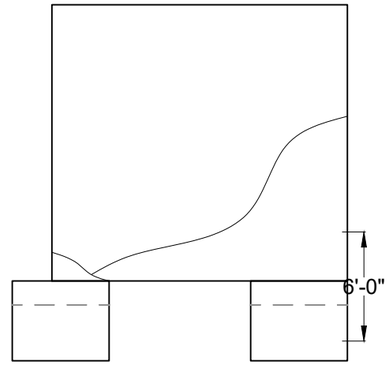


CHAMBER 15S

CHAMBERS 11, 13, 14 &15S DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	Effloresence and rust staining	DNW087, 090-092,
B	Full width joint in ceiling with typical spalling up to 3'-0" W with exposed reinforcement.	DWN088-089



CHAMBER 18S
EAST WALL, WEST FACE



CHAMBER 19S
EAST WALL, WEST FACE

CHAMBER 10S

CHAMBERS 18 & 19s DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	8'-0" L x 1/16" W cracks	
B	1/8" W crack is reflective on the east face of wall	DWN096, 098, 099

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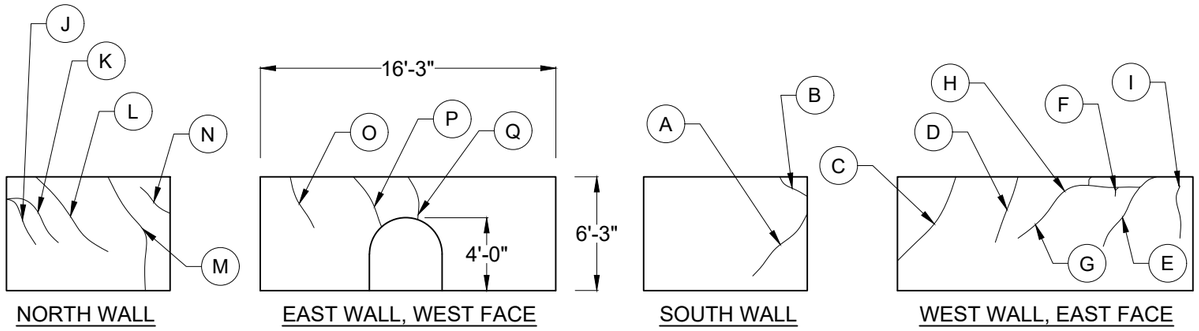
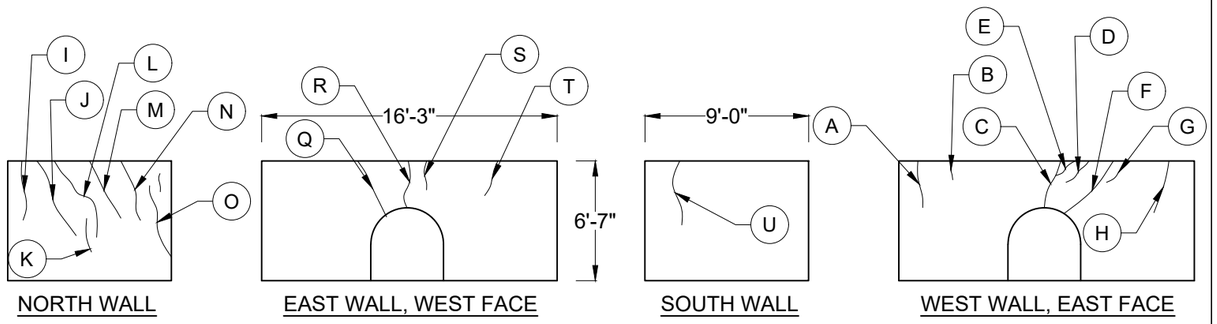


CHAMBER 1N

CHAMBER 1N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	4'-9" L diagonal hairline crack with light effloresence.	RSF1673
B	1'-0" diagonal 1/32 W crack.	RSF1674
C	5'-2" L diagonal hairline crack with light effloresence.	RSF1680
D	4'-9"L diagonal 1/32" W crack with light effloresence.	RSF1679
E	4'-7" L diagonal / vertical 1/32" W crack with light effloresence and moisture staining.	RSF1676
F	3'-1" L horizontal hairline crack with light effloresence and moisture.	RSF1677
G	3'0" L diagonal hairline crack with light effloresece.	RSF1678
H	6" L diagonal hairline crack with effloresence.	RSF1677
I	8" L diagonal hairline crack with moisture.	RSF1677
J	4'-0" L vertical hairline crack with light effloresence.	RSF1675
k	1'-9" diagonal hairline crack with moderate effloresence.	RSF1685
L	4'-2" L hairline hairline crack with heavy effloresence and rust stain.	RSF1685
M	6'-9" L x upto 1/32" W crack with heavy effloresence and rust stain.	RSF1684/83
N	Full height x up to 1/32" W crack with moderate effloresence and rust stain.	RSF1682
O	2'-1" L hairline crack with light effloresence.	RSF1681
P	3'-9" L hairline crack with light effloresence.	RSF1686
Q	3'-0" L x 1/16" W crack with light effloresence. Crack is failing full depth of wall.	RSF1687
R	2'-5" L x 1/16" W crack with light effloresence full depthe of wall	RSF1688



CHAMBER 2N

CHAMBER 2N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	2'-10" Hairline crack	RSF1664
B	1'-7" L Hairline crack with light effloresence.	RSF1690
C	2'-5" L x 1/16" W crack with light effloresence full depthe of wall	RSF1691
D	1'-7" L Hairline crack with light effloresence.	
E	9" L fine crack with light effloresence.	
F	3'-0" L x 1/16" W crack with light effloresence. Crack is failing full depth of wall.	RSF1692
G	1'-5" L hairline crack with light effloresence	RSF1693
H	3'-5" L hairline crack with light effloresence.	RSF1694
I	2'-10" L hairline crack with light effloresence.	RSF1695
J	5'-0" L hairline crack with light effloresence and rust stain.	RSF1696
k	1' L hairline crack with effloresence.	RSF1697
L	5'-1" L hariline crack with light effloresence.	RSF1697
M	3'-5"L hairline crack with light effloresence.	RSF1684/83
N	4'-2"L hairline crack with light effloresence.	
O	3'-8" l hairline crack with heavy effloresence.	RSF1698
P	9" L hariline crack;	RSF1686
Q	3'-4" L x 1/32" W crack with light effloresence goes full depth of wall	RSF1699
R	2'-7" L x 1/16" W crack goes full depth of wall.	RSF1700
S	1'-9" L hairline crack with light effloresence	RSF1701
T	2'-4" L hairline crack	RSF1702
U	3'-6" L x 1/32" W crack with moisture stain.	RSF1703

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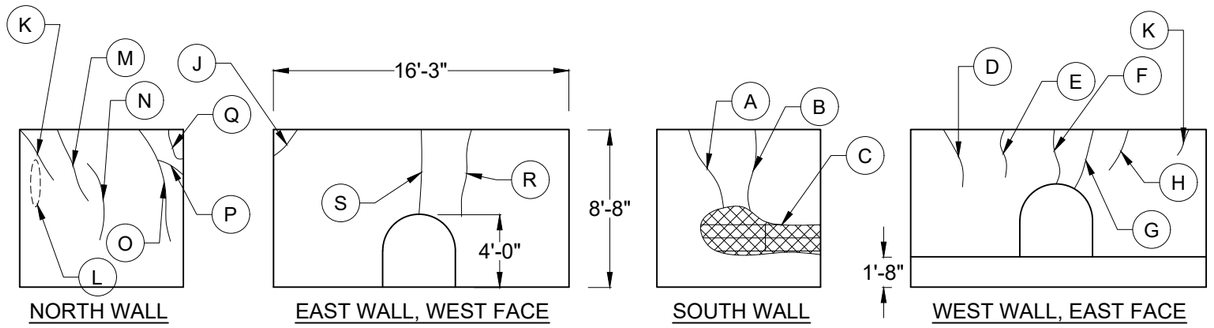
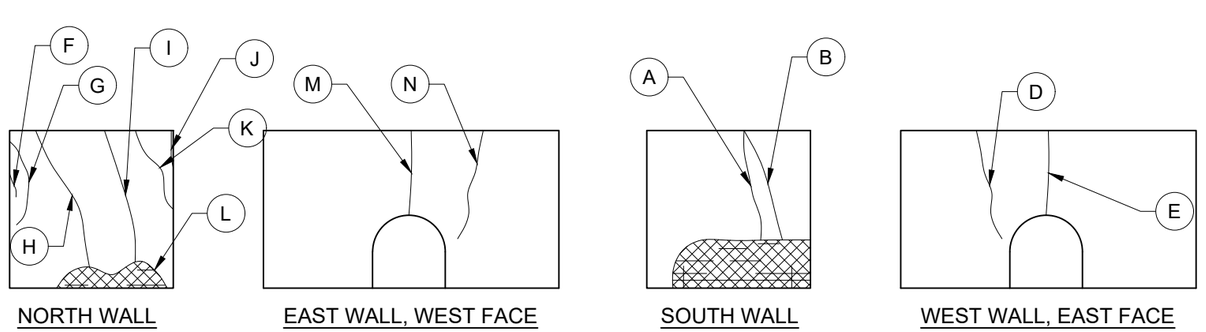


CHAMBER 3N

CHAMBER 3N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	5'-6" L Hairline crack	RSF1704
B	5'-2" L Hairline crack	RSF1706-07
C	2'-4" H x 6'-7" L x 2" D poor cosolidation / spalling with 3 longitudinal and 1 transverse rebar exposed	RSF1706-07
D	3'-7" L hairline crack with light effloresence.	RSF1708
E	2'-5" L hairline crack with minor effloresence.	RSF1709
F	2'-7" L x 1/16" W crack goes full depth of wall.	RSF1710
G	3'-4" L x 1/32" W crack with light effloresence goes full depth of wall	RSF1711
H	2'-2" L hairline crack with light effloresence.	RSF1712
I	1'-8" L hairline horizontal crack with light effloresence.	RSF1713
J	4'-7" L hairline crack with effloresence and rust stain.	RSF1714
k	Area of heavy effloresence.	
L	5' L hairline crack with heavy effloresence and light rust.	RSF1715
M	4'-2" L hairline crack with moderate effloresence.	RSF1715
N	6'-11" L hairline crack with heavy effloresence and rust stain.	RSF1716
O	2'-6" L hairline crack with light effloresence.	RSF1716
P	2'-2" lL hariline crack with light effloresence and moisture.	RSF1716
Q	1' L hairline crack with effloresence.	RSF1717
R	4'-8" L x 1/8 W crack. Crack is full depth of wall.	RSF1718
S	5'-2" L x 1/32" W crack with light effloresence.	RSF1719



CHAMBER 4N

CHAMBER 4N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	5'-9" L hairline crack.	RSF1704
B	5'-10" L x 1/32" W crack with light effloresence.	RSF1706-07
C	7'-6" W x 3' H poor consolidated concrecte kup to 1-1/2" D with 5 longitudinal and 2 vertical exposed rebar.	RSF1706-07
D	5'-7" L x 1/32" W crack with light effloresence. Crack maybe full depth of wall.	RSF1708
E	2'-6" L hairline crack with light effloresence.	RSF1709
F	1' L fine crackwith light effloresence.	RSF1710
G	5'-3" L hairline crack with light effloresence.	RSF1711
H	7'-9" L hairline crack with moderate effloresence.	RSF1712
I	7'-10" L hairline crack with heavy effloresence.	RSF1713
J	6'-5" L hairline crack with light effloresence.	RSF1714
k	2'-6" L hairline crackwith heavy effloresence.	
L	5'-8" L x 1'-0" H x 1" D poor consolidation poor consolidation with 2 longitudinal rebar exposed.	RSF1715
M	4'-8" L x 1/8 W crack with 1/2" spalling along the bottom.	RSF1715
N	5'-8" L x up to 1/32" /w crack with light effloresence.	RSF1716

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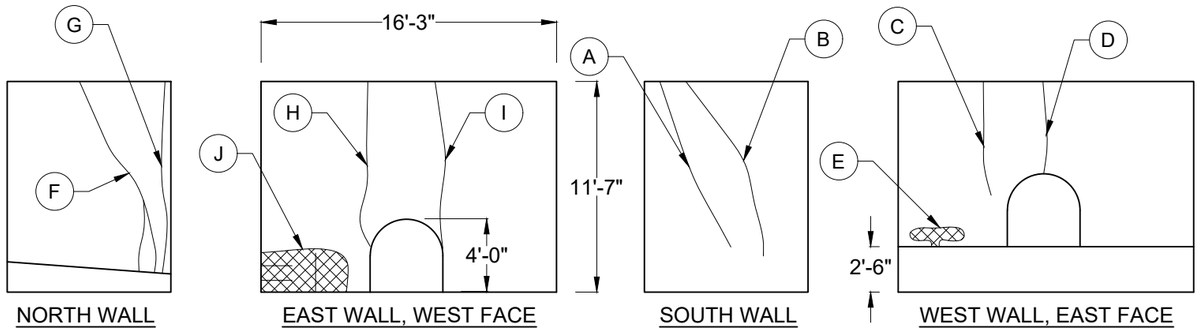
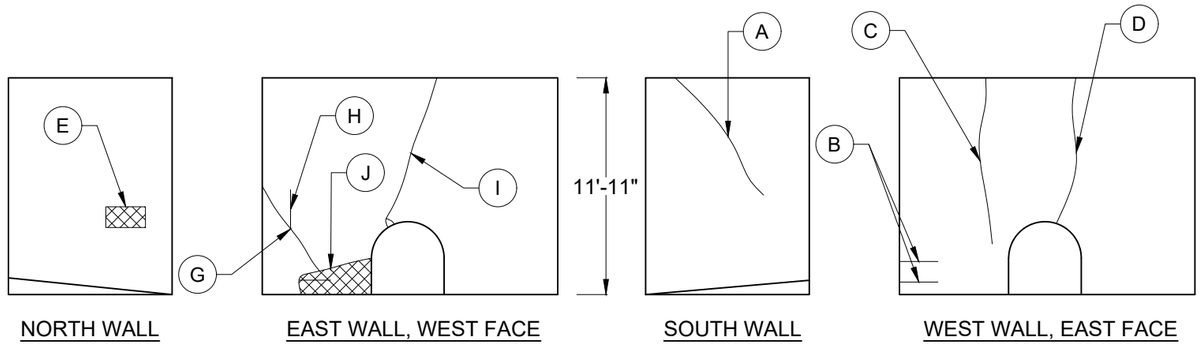


CHAMBER 5N

CHAMBER 5N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	10'-9" L hairline crack	RSF1704
B	9'-9" L hairline crack with light effloresence.	RSF1706-07
C	6'-3" L x 1/32" W crack, might line up with 4 N.	RSF1706-07
D	4'-8" L x 1/8 W crack with 1/2" spalling along the bottom.	RSF1708
E	4' L x 1' H x 2" D poor consolidation with one longitudinal rebar exposed.	RSF1709
F	11'-2" L hairline crack splits into 2 cracks at bottom 3'-0" with moderate effloresence.	RSF1710
G	10'-7" L hairline crack with light effloresence.	RSF1711
H	8'-3" L x 1/16" W crack full depth.	RSF1712
I	7'-10" L x 1/32" W crack with light effloresence.	RSF1713
J	4'-6" L x 1'-10" H x 1-1/2" D poor consoidation with 2 longitudinal and 1 vertical rebar exposed.	RSF1714



CHAMBER 6N

CHAMBER 6N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	10'-8" L hairline crack with ligth effloresence.	RSF1704
B	(2) 2' L rebar exposed.	RSF1706-07
C	8'-3" L x 1/32" W crack with light effloresence may line up with 5N.	RSF1706-07
D	8'-3" L x 1/16" W crack full depth.	RSF1708
E	2' L x 1' H poor consolidation with moderate effloresence and rust.	RSF1709
F	4' L piece of rebar exsposed.	RSF1710
G	6'-7" L hairline crack.	RSF1711
H	1'-7" L hairline crack.	RSF1712
I	8'3" L x 1/8" W crack. Crack is full depth of wall.	RSF1713
J	4' L 2' H x 1" D spall with one exposed long rebar.	RSF1714

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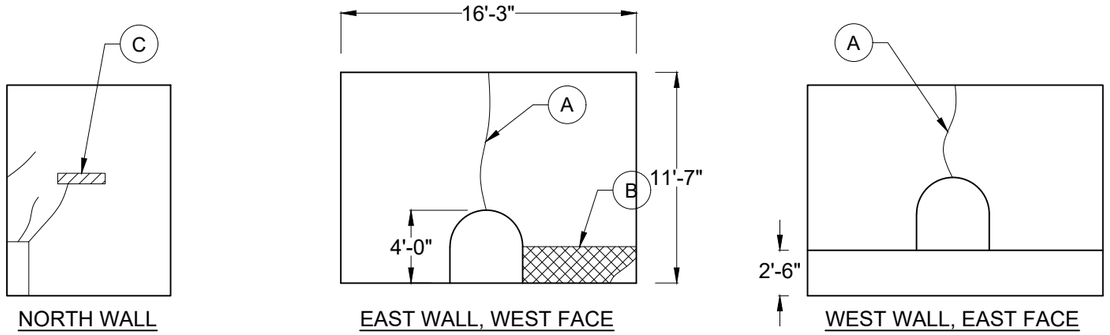
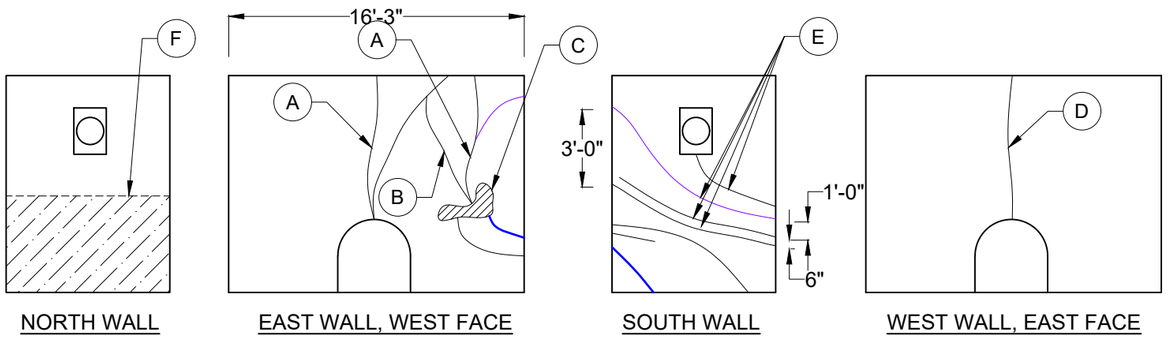


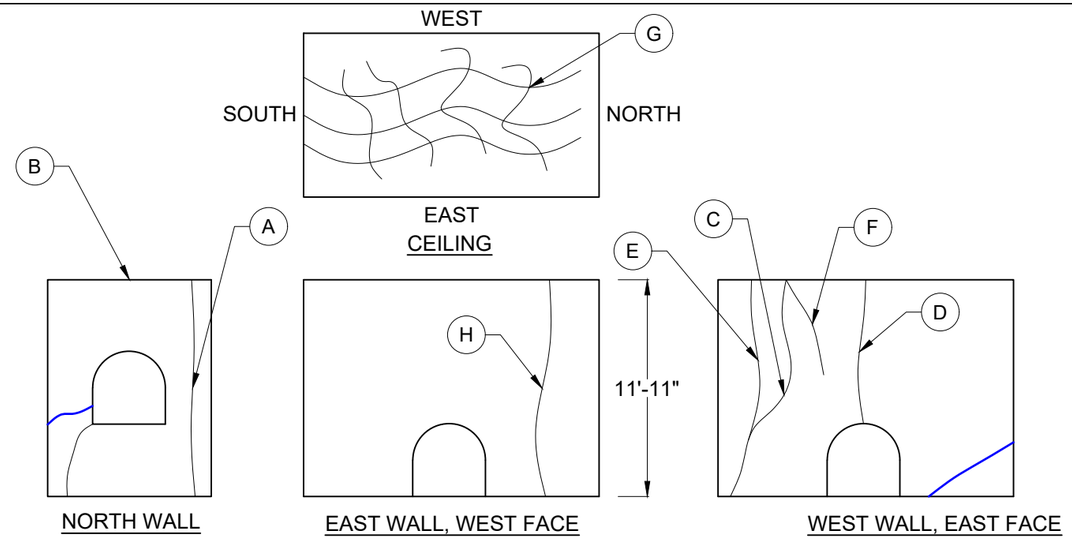
CHAMBER 7N

CHAMBER 7N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	Full Height x 1/8" W crack	DWN133
B	4' L x 1'-8" H spall.	DWN132
C	1'-6" L x 2'-0" delamination with heavy effloresence and moisture.	DWN134



CHAMBER 8N

CHAMBER 8N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1/4" W crack	DWN127-28
B	1/16" W crack	
C	spall with cracks extending from it.	
D	1/8" W crack from the top of entrance to the ceiling.	DWN130
E	Multiple hailine cracks about full width of South wall.	DWN129
F	Lower half of north wall, heavy effloresence and rust staining.	DWN131



CHAMBER 9N (NORTH)

CHAMBER 9N (NORTH) DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	Full Height x +/- 1/8" W crack/joint	DWN125
B	1" W gap	
C	1/8" W crack full height of wall	DWN123-124
D	1/8" W crack from the top of entrance to the ceiling.	DWN123-124
E	1/4" W crack branching from crack in note C.	DWN123-124
F	Hairline crack branching crack in note C.	DWN123-124
G	Hairline map cracking with effloresence	DWN126
H	Full Height x 1/16" W crack	

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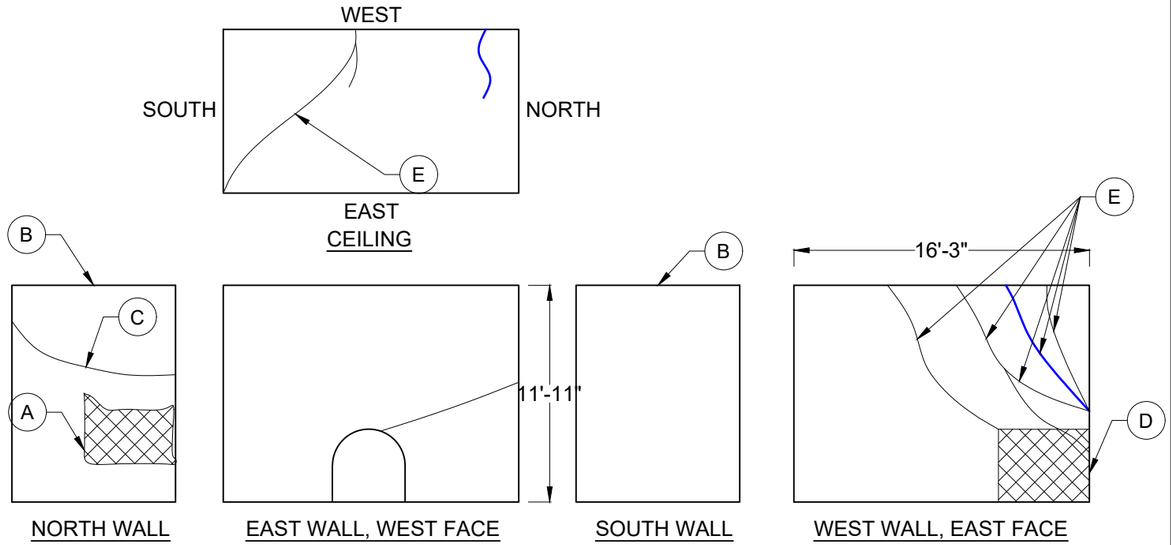
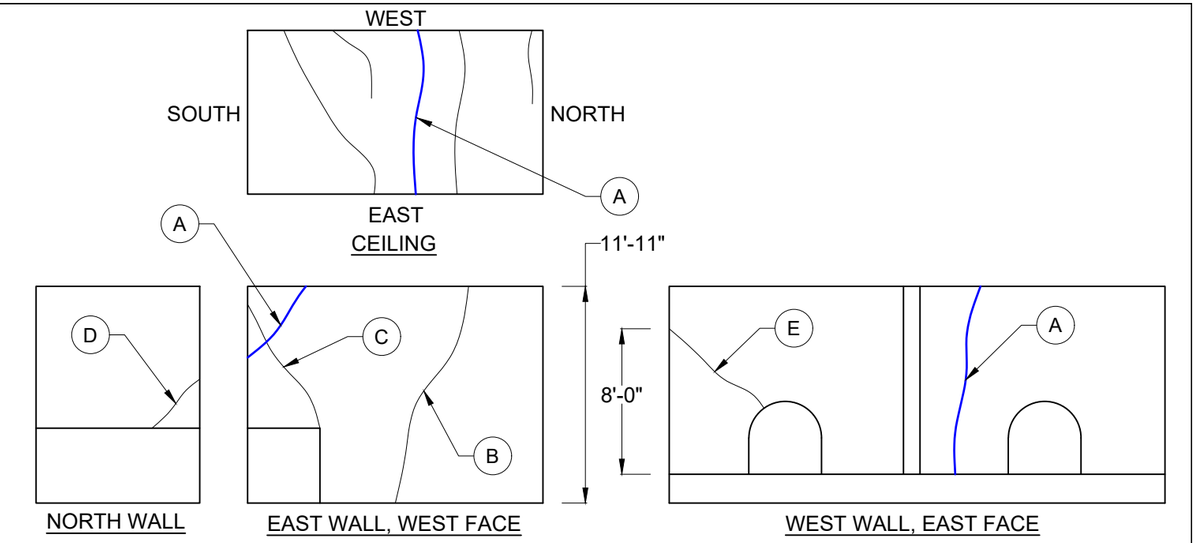


CHAMBER 9N (SOUTH)

CHAMBER 9N (SOUTH) DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	3' H x 5' W area of honeycombing	DWN125
B	1" W gap	
C	1/32" W crack full width of the north wall	DWN123-124
D	5' L x 4' H delam / Spall.	DWN123-124
E	Hairline to 1/8" W cracks	DWN123-124
F	1/16" W crack	DWN123-124



CHAMBER 10N

CHAMBER 10N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1/32" W crack full height of west connects to ceiling goes full width of ceiling connects to the east wall.	DWN117-118
B	Full height hairline on the East wall	
C	Diagonal hairline crack from cold joint to the south side.	
D	3' L x Hairline on the North wall.	
E	1/8" W from the top of south entrance to the south end 8'-0" from the bottom.	DWN117
F	1/16" W crack	

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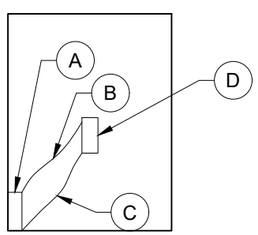
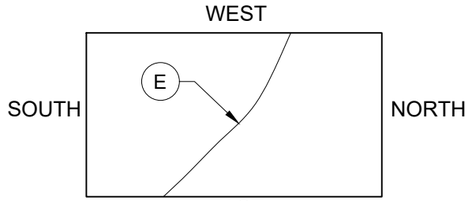
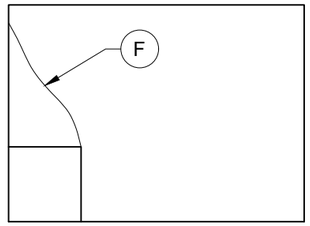


NORTH WALL

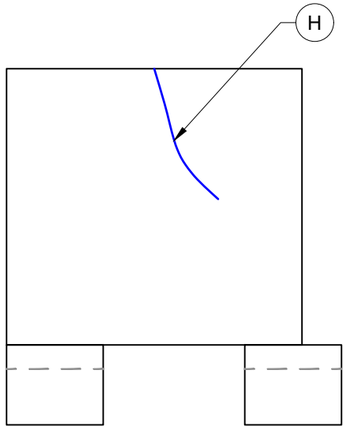


CEILING



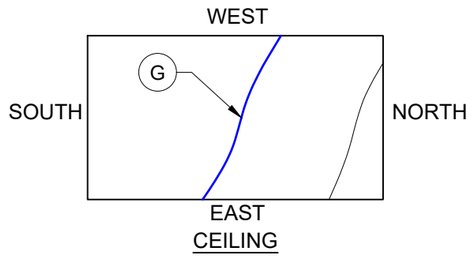
CHAMBER 12N

CHAMBER 11N



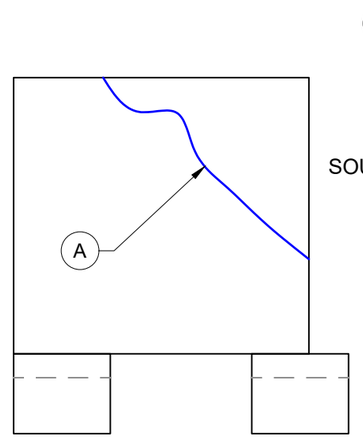
EAST WALL, WEST FACE

CHAMBER 18N

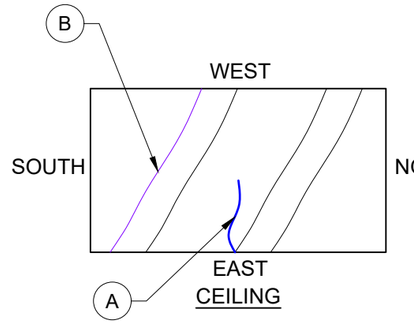


CEILING

CHAMBER 11N, 12N & 18N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	Delamination	DWN103
B	1/16" W crack from delam to steel plate	DWN103
C	1/8" W crack from delam to steel plate.	DWN103
D	Steel plate	
E	Diagonal crack full width of ceiling with minor effloresence	
F	Hairline crack reflective on the East face. Same crack and joints on Chamber 13N, West and East face of wall. (Wall between 13N-14N).	DWN104
G	Crack with heavy effloresence and moisture full width of the ceiling connects to the east wall extending halfway down the east wall.	DWN105
H	diagonal crack with heavy effloresence and moisture.	DWN106



EAST WALL, WEST FACE



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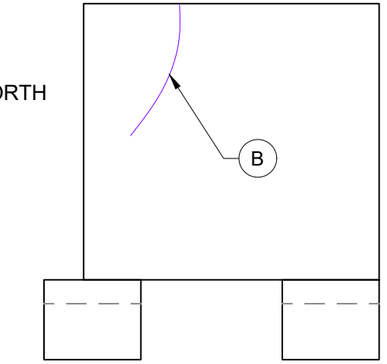

WEST WALL, EAST FACE

CHAMBER 19N

CHAMBER 19N DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	Crack with effloresence, rust and moisture connects to the east wall and extends diagonally downward to the north edge of the east wall.	DWN108-109
B	Diagonal crack full width of ceiling with effloresence, rust and moisture connecting to the west wal and extends halfway down the west wall.	DWN106-108
C	Diagonal cracks full width of ceiling with effloresence, rust and moisture.	DWN108

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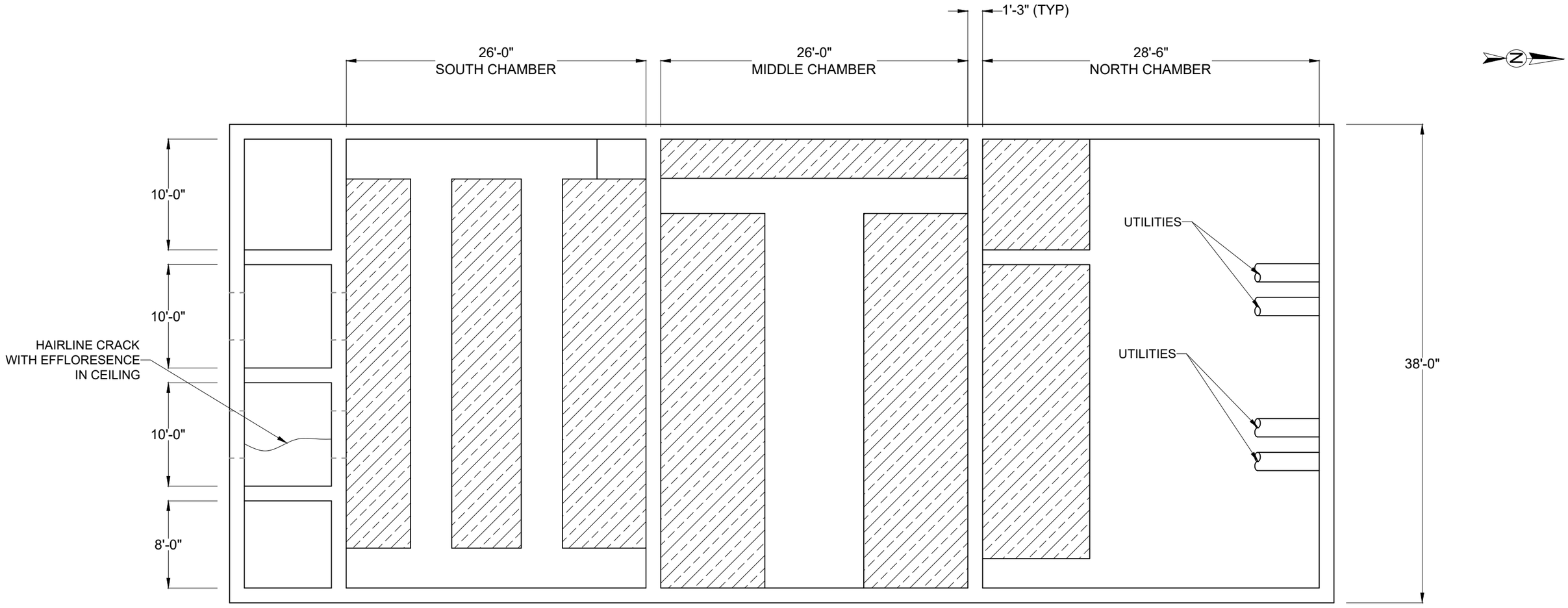

EAST ABUTMENT PLAN

LEGEND

DEBRIS, CONCRETE AND DIRT

Typical Notes:

1. *Exposed rebar and shallow spalls throughout.*
2. *Exposed rebar ties typically 2'-0" L throughout, sticking out of wall / FBS.*
3. *If no detail sketch no significant defects were found.*
4. *Floors are covered with debris, concrete and dirt throughout.*

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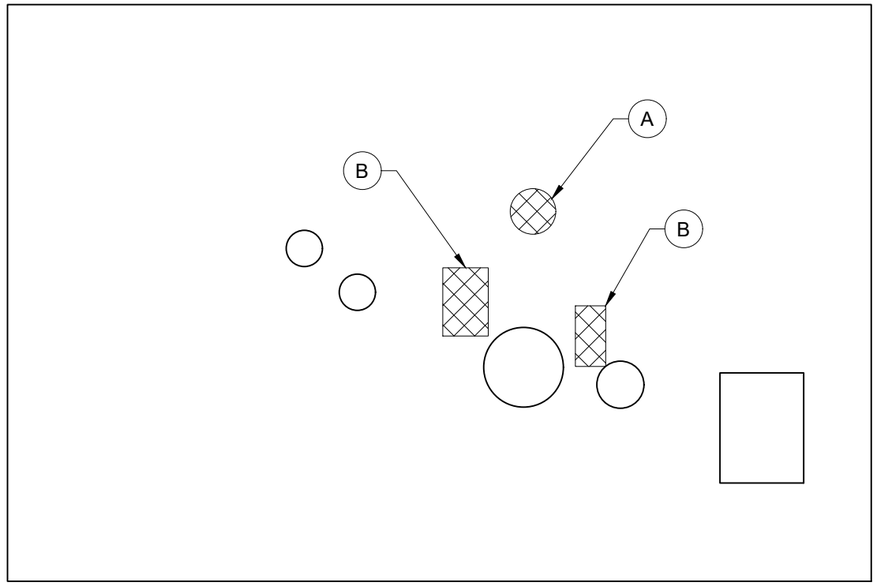
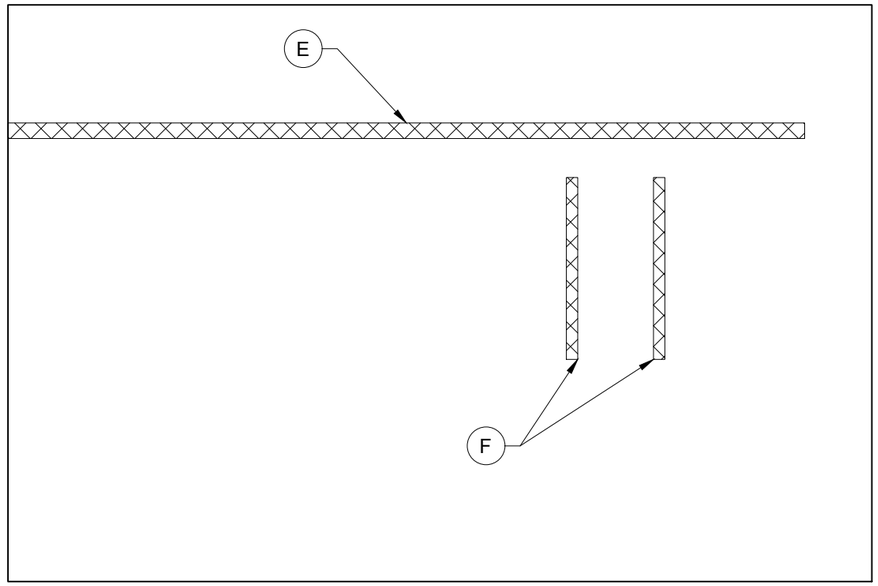
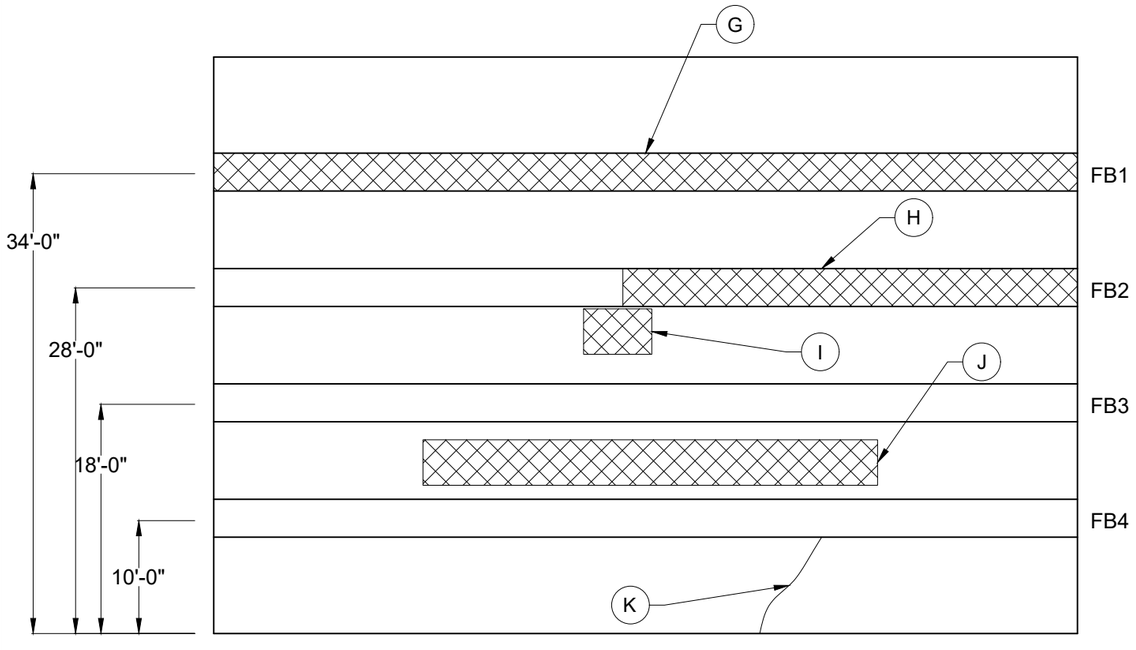


NORTH WALL



WEST WALL



CEILING

NORTH CHAMBER DEFECT TABLE

CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	1'-0" Diameter x 1" D spall.	
B	3'-0" H x 2'-0" W x 2" D spall.	
C	2'-9" H x 1'-4" W x 2-1/2" D spall.	
D	(4) abandoned breaker boxes.	
E	8" H x Full width x 4" D spall.	
F	(2) 8'-0" H x 6" W x 1" D spall with exposed rebar.	
G	Bottom of floorbeam, full length x 8" D spall with exposed rusted rebar.	ADZ638
H	Bottom of floorbeam, 20' L x full width x 4" D with exposed rusted rebar.	ADZ637
I	2'-0" L x 3'-0" W x 1-1/2" D spall.	
J	20'-0" L x 2-0" W x 1-1/2" D spall with exposed rebar.	
K	Full with crack with effloresence.	

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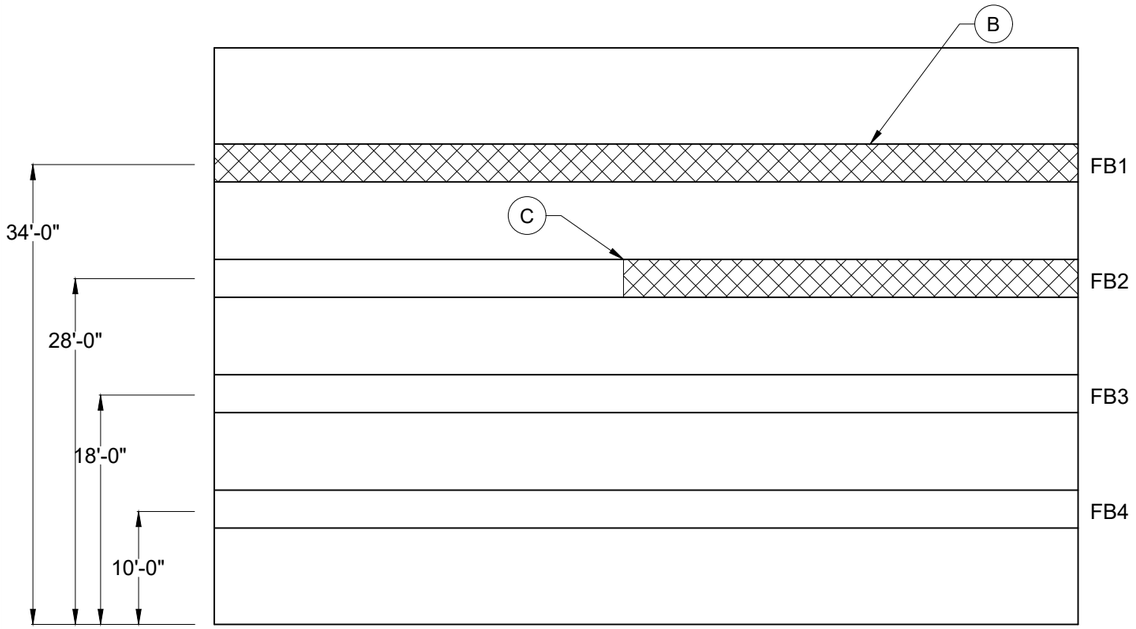
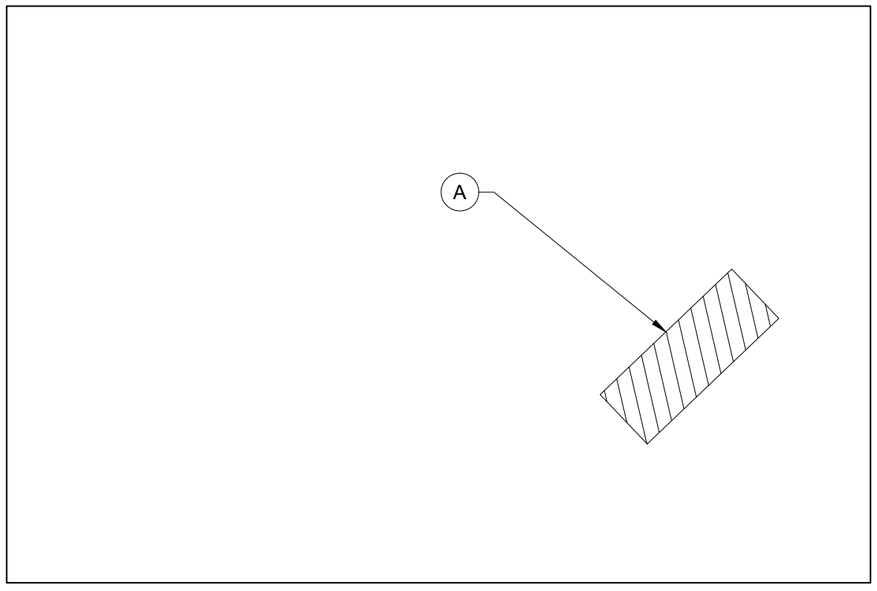


CEILING

MIDDLE CHAMBER DEFECT TABLE		
CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	8'-0" L X up to 3'-0" H delamination	
B	2'-0" L x 3'-0" W x 1-1/2" D spall.	
C	20'-0" L x 2-0" W x 1-1/2" D spall with exposed rebar.	



NORTH WALL

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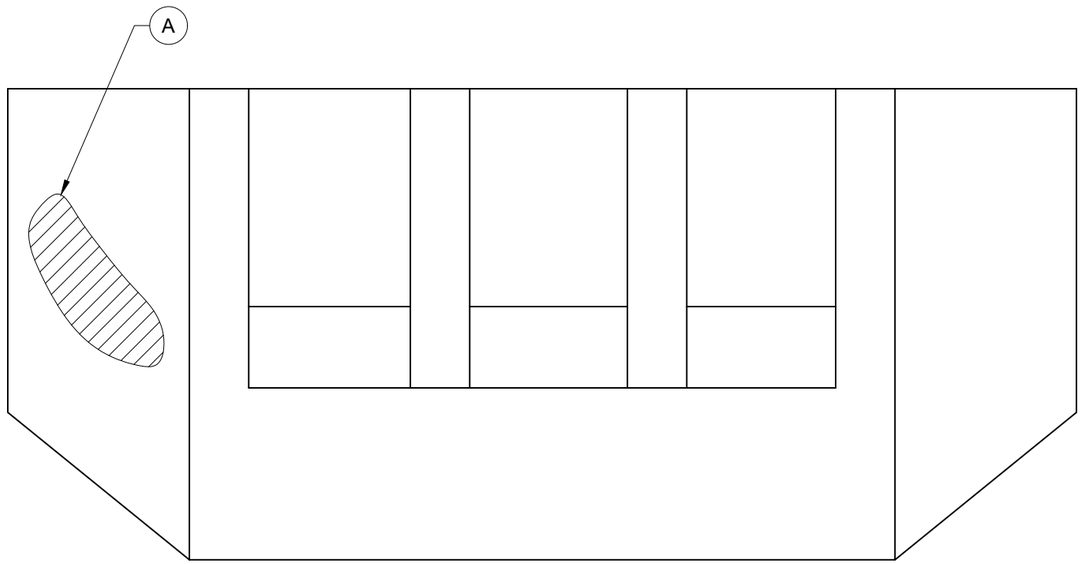
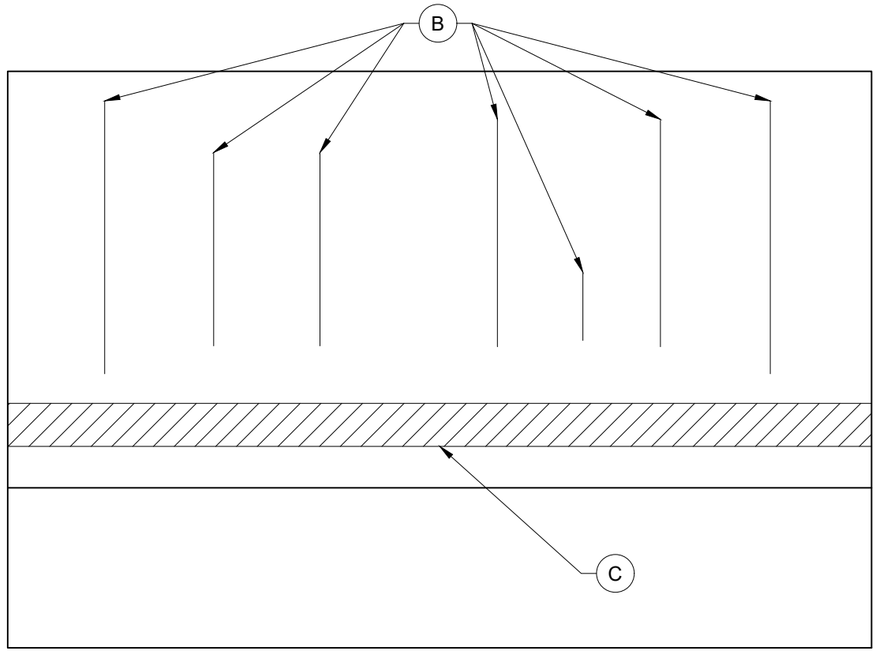
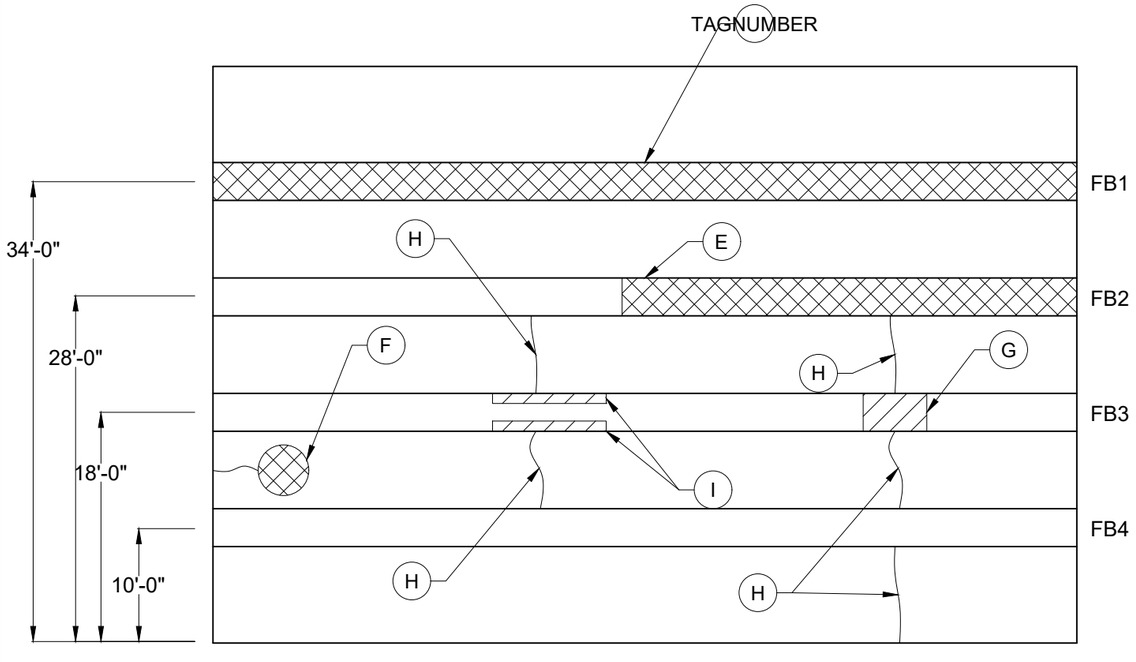


NORTH WALL



WEST WALL



CEILING

SOUTH CHAMBER DEFECT TABLE

CALL OUT #	DEFECT DESCRIPTION	PHOTO #
A	20'-0" L x up to 2'-0" H delamination.	ADZ644
B	3'-0" up to 12'-0" H exposed rebar.	ADZ641-642
C	Full Length x 2'-0" H delamination.	ADZ641-642
D	Bottom of floorbeam, full length x 8" D spall with exposed rusted rebar.	
E	Bottom of floorbeam, 20' L x full width x 4" D with exposed rusted rebar.	
F	18" Diameter x 1-1/2" D spall.	
G	3'-0" L x Full Width delamination.	
H	Full width hairline cracks with effloresence	
I	5'-0" L x up to 3'-0" H delamination.	

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