UNDERWATER BRIDGE INSPECTION REPORT

SFN:	**3101924**	**c36 Pier Walls:**	**1**	**Bridge Number:**	**HAM-27-1848R**
Substructure:	**7**	**c42 Scour:**	**1**	**Inspection Date:**	**08/06/2019**
Channel:	**6**	**c51 Alignment:**	**1**	**Division:**	**District 8**
		c53 Hydraulic Opening:	**1**	**River:**	**Great Miami River**

Program Manager:	**Steve Mary, P.E.**	Weather:	**Sunny**
Project Manager:	**Jason Sander, P.E.**	Air Temperature:	**81° (F)**
Team Leader:	**Brad Walden**	Water Temperature:	**79° (F)**
Team Members:	**Jason Hickey (Diver), Cassie Brendel (Tender)**		

Route:	**US 27**
Inventory Direction:	**South to North**
County:	**Hamilton**
Location:	**N 39°18'43.75"**
	W 84°37'52.07"
Bridge Length:	**643'**
Superstructure Type:	**Steel Girder**
Substructure Type:	**CIP Concrete Pier Walls**
Foundation Type:	**Concrete Piles**
Total Substructure Units:	**6**
Substructure Units in Water:	**2**
Water Depth:	**13'**
Water Velocity:	**< 2.5 FPS**
Underwater Visibility:	**8"**

Summary of Scour and Channel Conditions:

Local scour was noted on the upstream nose of pier 2R. The scour pocket noted measured approximately 20' in diameter and approximately 4' in depth. The scour pocket was located upstream of the large debris build-up. Extremely heavy debris was noted on the north side of pier 2R.

Summary of Substructure Conditions:

No significant changes since the last inspection in 2014. The concrete at and below the waterline was found in good condition with no significant distress.

Repair Recommendation:

Remove debris from pier 2R.

Bathymetric Survey performed using, Make: Leica Model: CS10 Net Rover GIS S/N 2521330, interfaced with Make: Seafloor Systems Inc. Model: Sonarmite Precision fathometer SN: SMIL240518. Depth Accuracy of 1cm/0.1 percent of depth.

Terracon
Consulting Engineers & Scientists

Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**
County: **Hamilton** State: **Ohio**
Description: **South Abutment (Abutment #1)**

1. Not inspected, out of water.

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Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 1R**

1. Pier 1R was primarily of the water with only a small portion on the north side in the water, with water depths less than 2'.
2. Light marine growth (algae). Approximately 10% of the substructure unit was cleaned below the water line.
2. Visibility less than 1'.
3. No foundation or footing exposure.
4. The bottom substrate around the base of pier 1L consisted of cobbles and boulders.
5. Hammer soundings of the concrete were performed along the entire length of the pier; no areas of unsound concrete (delaminations, voids, etc.) were noted.
6. Three large spall/damage areas believed to be from impact were noted on the north face approximately 3' to 5' downstream of the upstream nose. The damaged area was less than 12" in diameter and less than ½" in depth.
6. No significant defects were observed below the waterline.

See attached drawings, sketches and photographs of the areas to better visualize the conditions at the time of the assessment.

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Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 2R**

1. Extremely heavy tree debris was noted on the upstream nose and along both the north and south face. The debris was very dense and prevented inspection.
2. Local scour was noted on the upstream nose of pier 2R. The scour pocket noted measured approximately 20' in diameter and approximately 4' in depth.

See attached drawings, sketches and photographs of the areas to better visualize the conditions at the time of the assessment.

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Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 3R**

1. Not inspected, out of water.

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Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 4R**

1. Not inspected, out of water.

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Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**
County: **Hamilton** State: **Ohio**
Description: **North Abutment (Abutment #2)**

1. Not inspected, out of water**.**

Terracon
Consulting Engineers & Scientists

Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Bridge Structure, Looking Downstream**

Photos
TERRACON

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Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Bridge Structure, Looking Upstream**

Photos
TERRACON

Terracon
Consulting Engineers & Scientists

Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 1R**

Photos
TERRACON

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Consulting Engineers & Scientists

Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 2R South Face**

Photos
TERRACON

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Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 3R**

Photos
TERRACON

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Consulting Engineers & Scientists

Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Typical Concrete Condition At Waterline**

Photos
TERRACON

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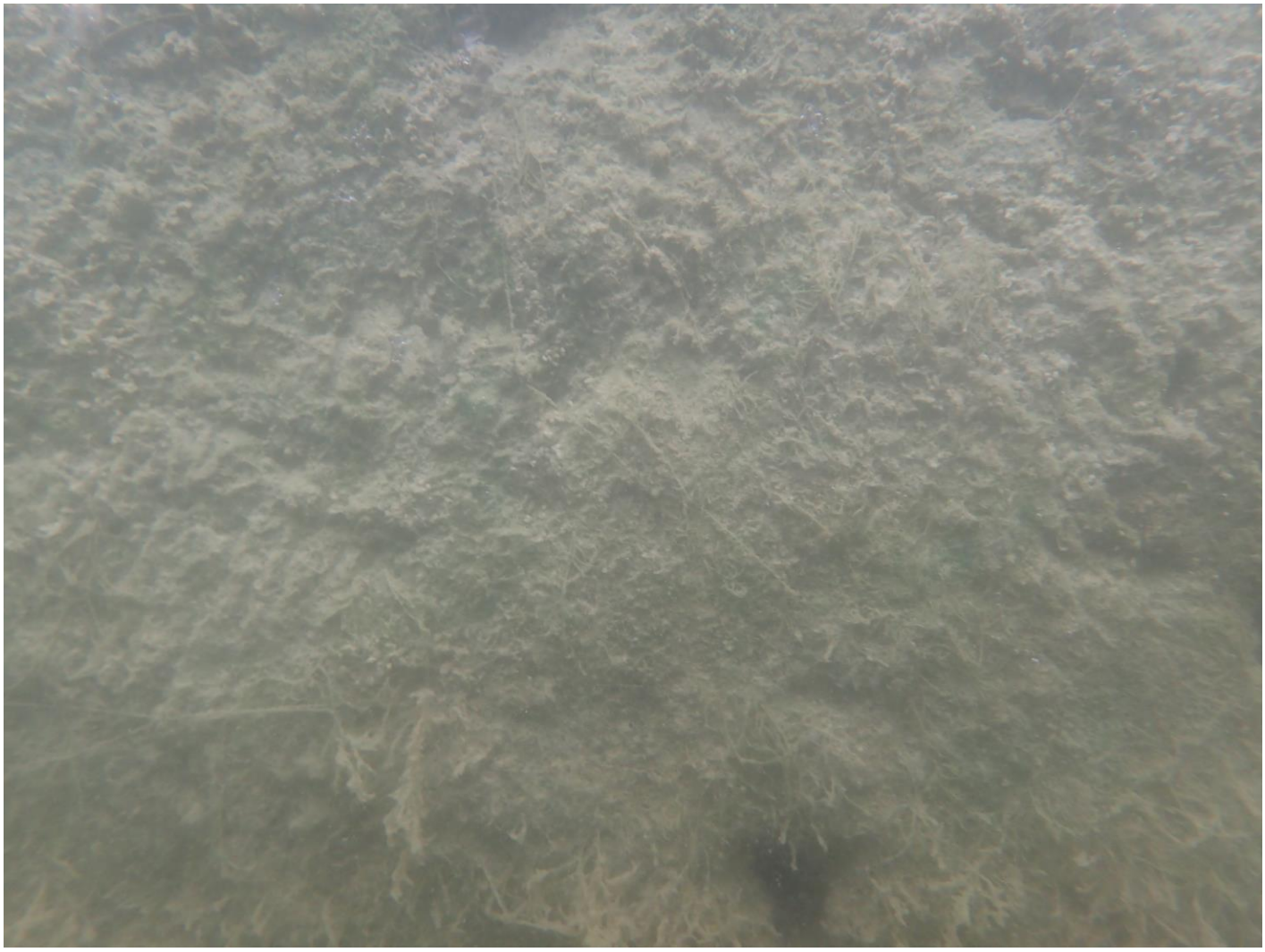
Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Typical Concrete Condition Below Water**



Photos
TERRACON

Terracon
Consulting Engineers & Scientists

Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 2R, Heavy Debris Upstream Face and both North and South Faces**

Photos
TERRACON

Terracon
Consulting Engineers & Scientists

Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 1R, Spall/Damage 1**

Photos
TERRACON

Terracon
Consulting Engineers & Scientists

Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 1R, Spall/Damage 2**

Photos
TERRACON

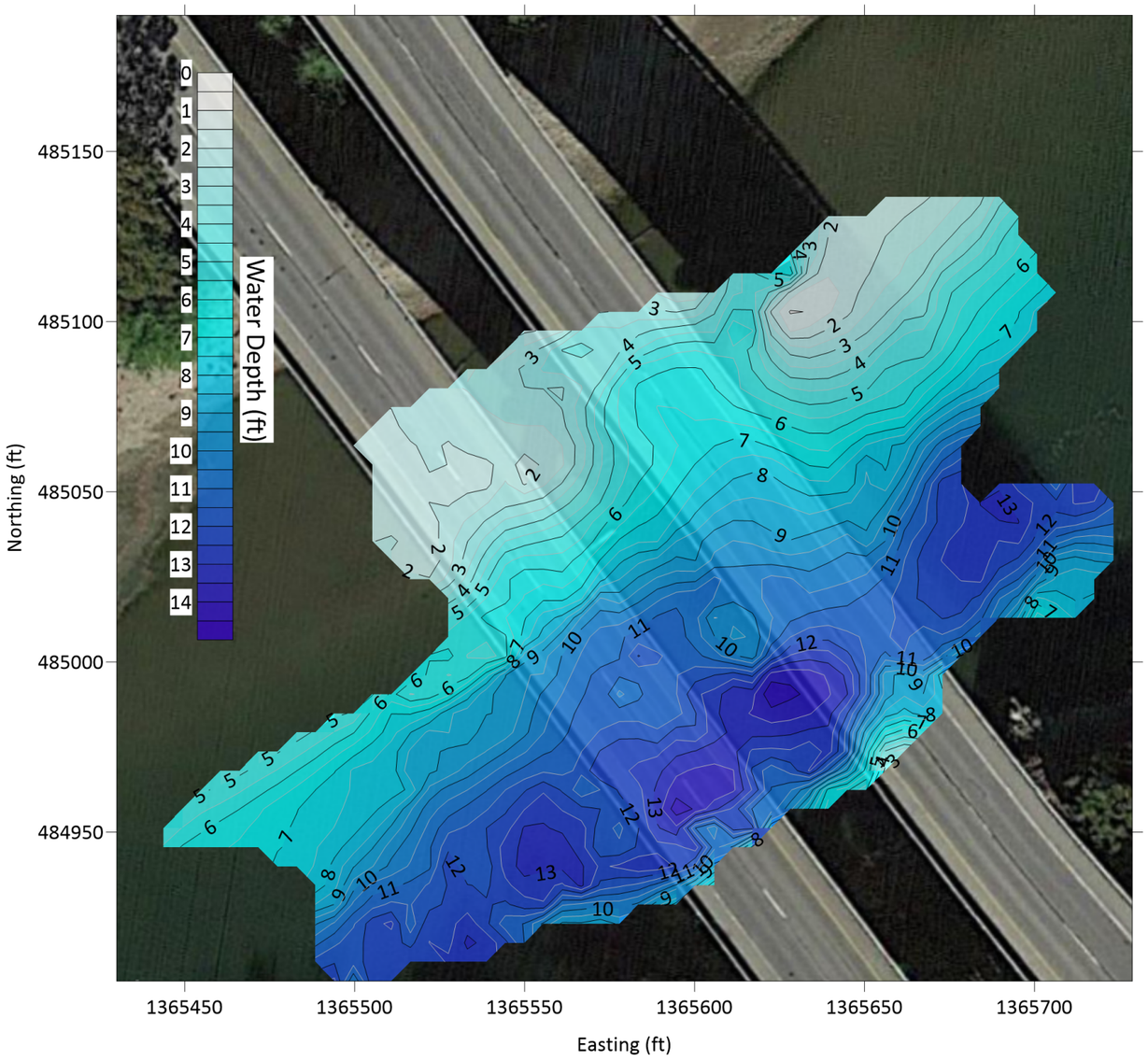
Terracon
Consulting Engineers & Scientists

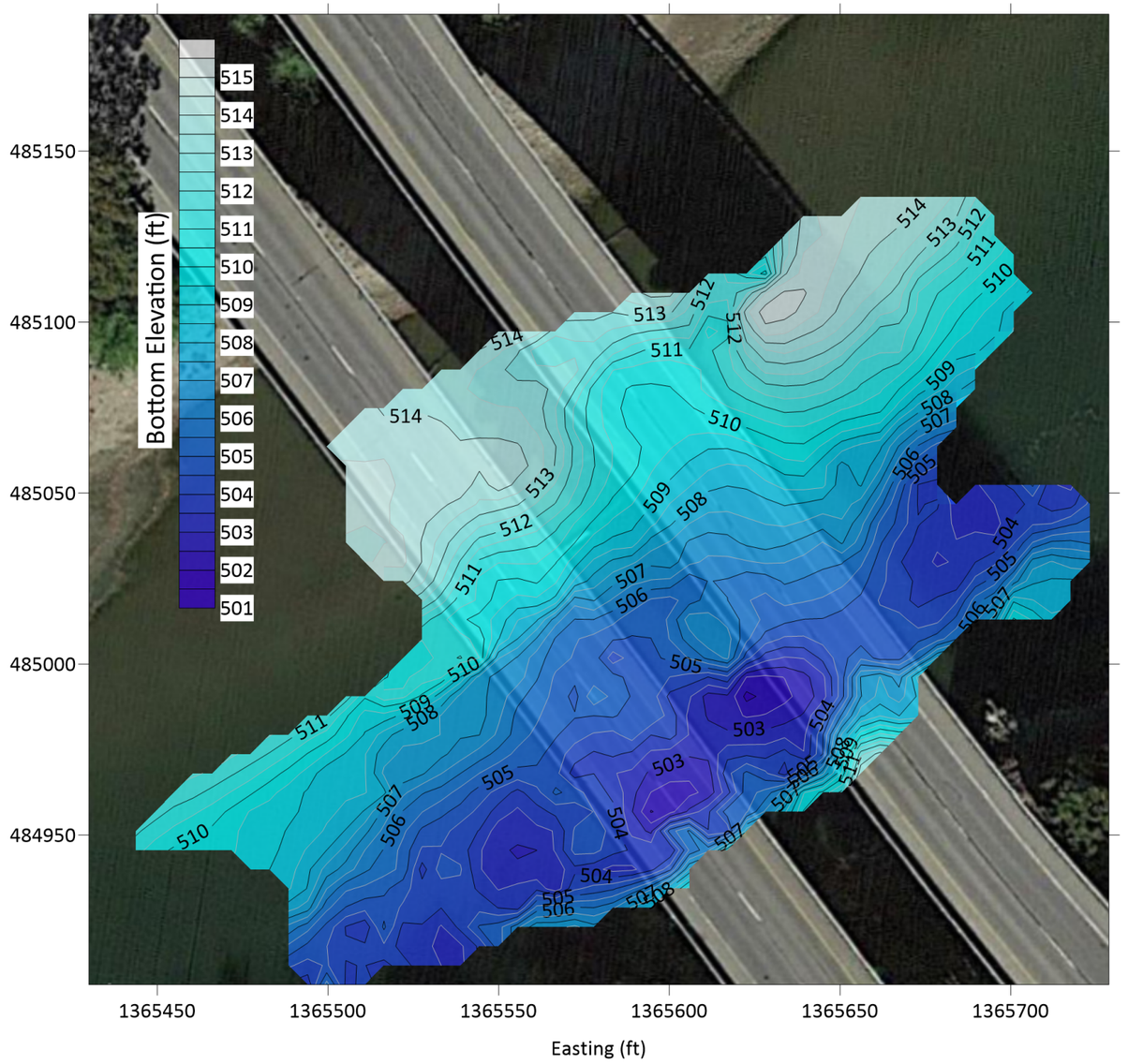
Structure ID #: **HAM-27-1848R, US 27 over Great Miami River** Date: **08/06/2019**

County: **Hamilton** State: **Ohio**

Description: **Pier 1R, Spall/Damage 3**

Photos
TERRACON





N

Diagram is for general location only, and is not intended for construction purposes. The contoured elevations are approximate interpolations between the survey transects.

Coordinate System: State Plane 1983 - Ohio South (feet)
Based on depth below water surface
Approximate Water Elevation at time of survey: 516.3 feet
Average GPS Accuracy: 1.6 feet

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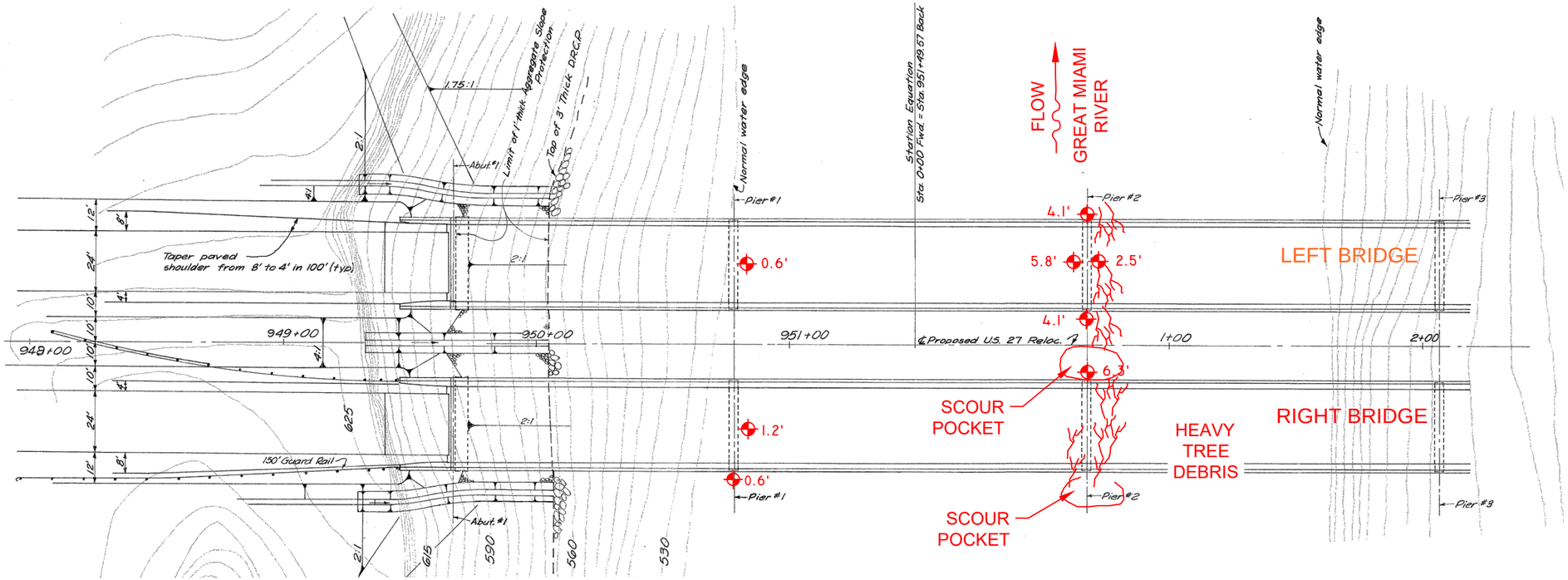
611 LUNKEN PARK DRIVE CINCINNATI, OHIO 45226

BATHYMETRIC MAP
BRIDGE NO. HAM-27-1848
OHIO DEPARTMENT OF TRANSPORTATION-DISTRICT 8
US 27 OVER GREAT MIAMI RIVER
HAMILTON COUNTY, OHIO

EXHIBIT 1

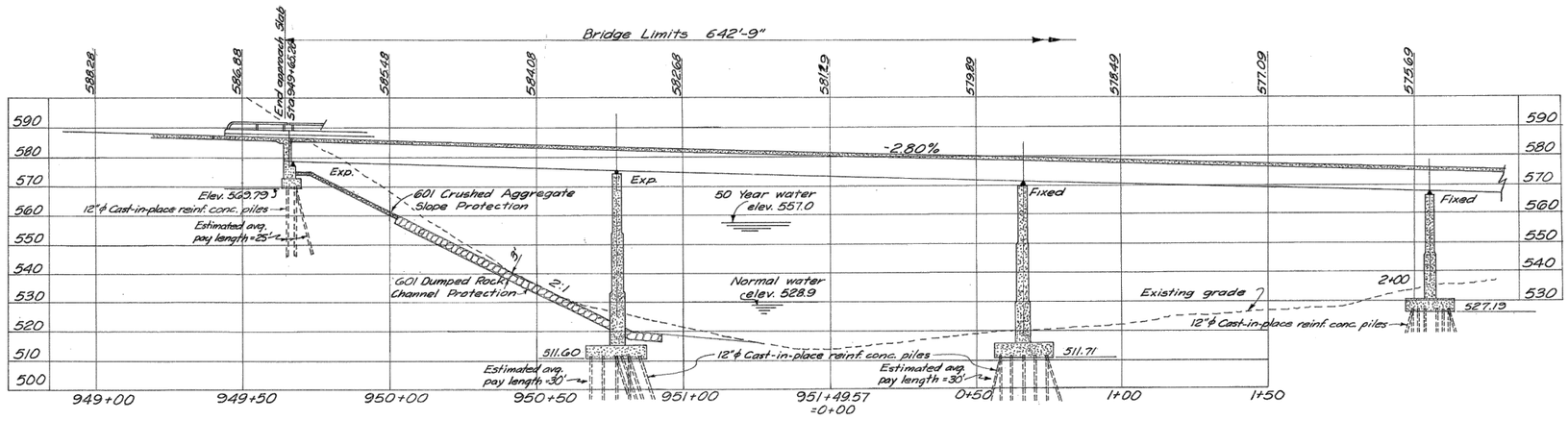
DESIGNED BY:	KJS
DRAWN BY:	KJS
APPVD. BY:	JAS
SCALE:	As Shown
DATE:	9/19/2019
JOB NO.	N1191158
DATE OF INSPECTION	7/30/2019



LEGEND:

6.3' INDICATES WATER DEPTH IN FEET AT THE TIME OF INSPECTION

PARTIAL SOUNDING PLAN
NOT TO SCALE



BRIDGE PROFILE
NOT TO SCALE

Date: 8/10/2019 12:15 PM File Path: C:\DRAWINGS\1191158\BR INS.DWG

REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
611 LUNKEN PARK DRIVE CINCINNATI, OHIO 45226
PH. (513) 321-5816 FAX. (513) 321-4540

CROSS-SECTIONAL DEPTH PLAN (PARTIAL)

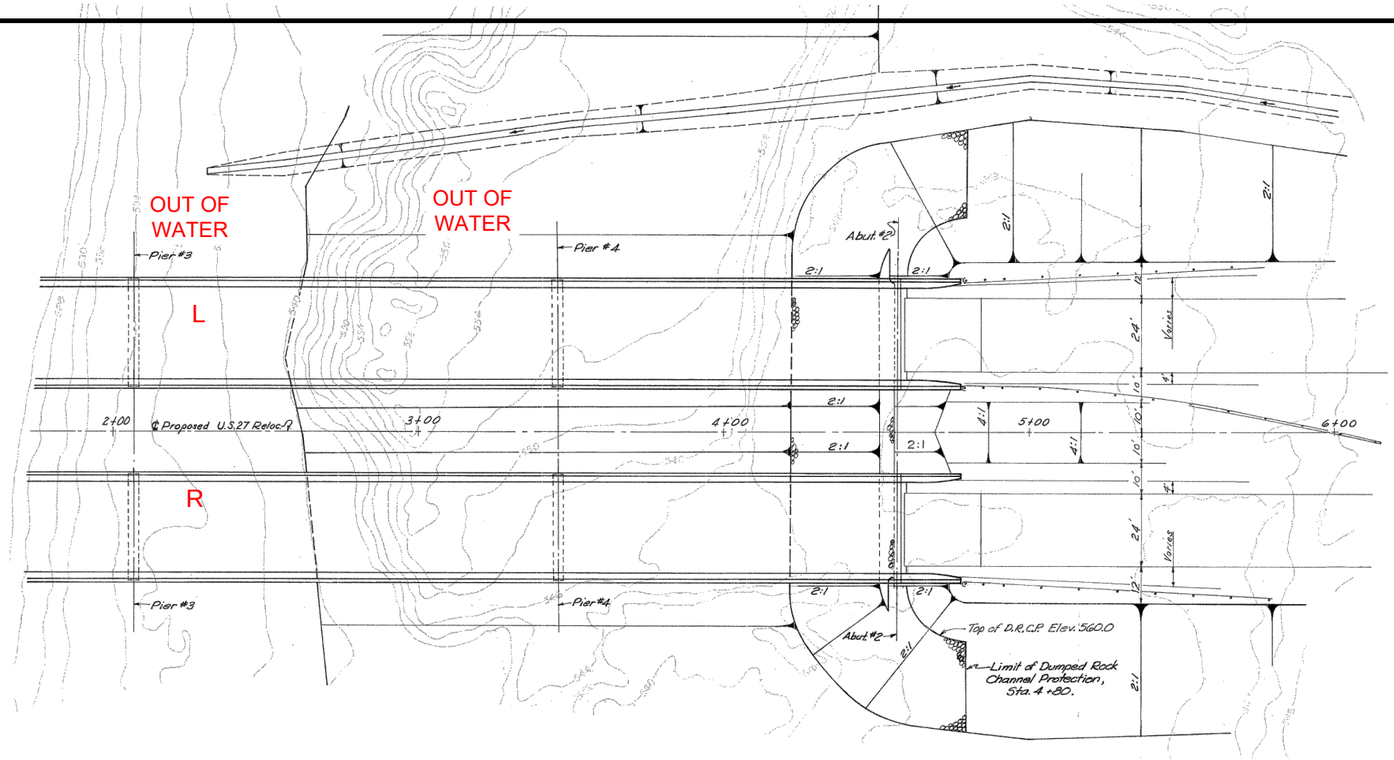
BRIDGE NO. HAM-27-1848

OHIO DEPARTMENT OF TRANSPORTATION-DISTRICT 8

US 27 OVER GREAT MIAMI RIVER
HAMILTON COUNTY, OHIO

EXHIBIT 2

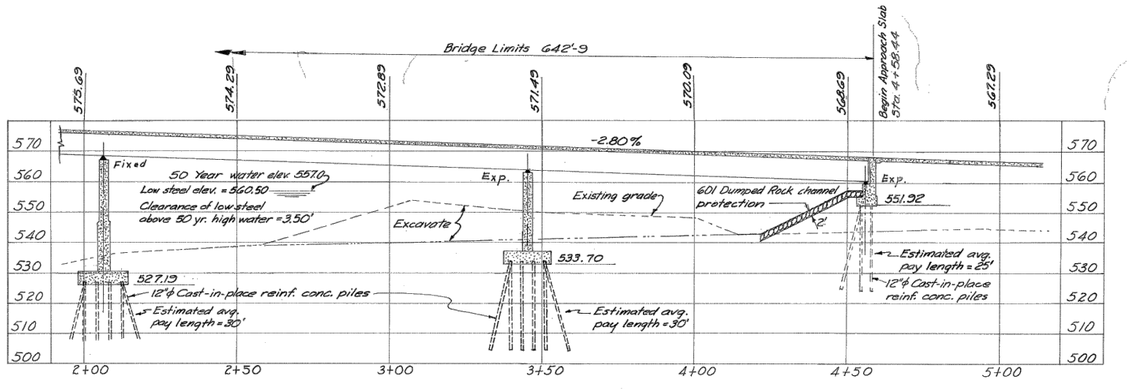
DESIGNED BY:	BTW
DRAWN BY:	KM
APPVD. BY:	JS
SCALE:	NOT TO SCALE
DATE:	07/22/2019
JOB NO.	N1191158
ACAD NO.	BR INS.DWG
SHEET NO.:	2



LEGEND:

6.3' INDICATES WATER DEPTH IN FEET AT THE TIME OF INSPECTION

PARTIAL SOUNDING PLAN
NOT TO SCALE



BRIDGE PROFILE
NOT TO SCALE

Date: 8/10/2019 12:15 PM File Path: C:\DRAWINGS\1191158\BR INS.DWG

REV	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
611 LUNKEN PARK DRIVE CINCINNATI, OHIO 45226
PH. (513) 321-5816 FAX. (513) 321-4540

CROSS-SECTIONAL DEPTH PLAN (PARTIAL)

BRIDGE NO. HAM-27-1848
OHIO DEPARTMENT OF TRANSPORTATION-DISTRICT 8
US 27 OVER GREAT MIAMI RIVER
HAMILTON COUNTY, OHIO

EXHIBIT 2

DESIGNED BY:	BTW
DRAWN BY:	KM
APPVD. BY:	JS
SCALE:	NOT TO SCALE
DATE:	07/22/2019
JOB NO.	N1191158
ACAD NO.	BR INS.DWG
SHEET NO.:	2

ODOT MANUAL OF BRIDGE INSPECTION APPENDIX F - Underwater Inspection Procedure Checklist

Acceptable written procedures communicate to the next field inspection team leader what is necessary to ensure a safe and successful inspection. Each bridge requiring underwater diving techniques must have written inspection procedures specific to each bridge which address items unique to that bridge. The prior inspection report condition ratings and inspection comments, by themselves, do not suffi ce for the required procedures. It is valuable to review these items but they do not serve the same purpose as the inspection procedures. The inspection report records what an inspector actually did, what was looked at, and what was found. Procedures lay out what should be done, looked at, etc. Often consultant underwater reports will include a paragraph or section in the written report that communicates the underwater inspection procedures. This will often suffice as adequate inspection procedures and fulfill the intent of the FHWA requirement. This checklist is a framework and should be completed for all underwater diving inspections when inspection procedures do not exist.

I. Bridge Identification

a. Agency with Inspection Responsibility: **Terracon Consultants, Inc.**

Dive Frequency: **60** months

SFN: **3101924** Bridge Number (County-Route-SLM-SD): **HAM-27-1848R**

Superstructure Type Main Span Type: **STEEL GIRDER**

Substructure Type Abutment Type: **REINFORCED CONCRETE**

Pier Type: **REINFORCED CONCRETE**

Total Pier Count: **4**

Total Pier Count in water: **2**

Foundations: **CONCRETE PILES**

Feature Intersected: **GREAT MIAMI RIVER**

b. **Photographs – Photographs are shown in the underwater inspection report for this structure.**

End view

Elevation

Underside

II. Office and Field Assessment

Prior to the inspection, obtain and review copies of the previous underwater inspection reports, routine inspection reports and design plans in preparation of the inspection. Divers should pay particular attention given to any observed areas of deterioration, the channel conditions and factors that may accelerate material deterioration. Changes shall be noted in the inspection procedure. Site conditions should be reviewed prior to diving.

a. Channel Conditions

Waterway features

YES	Rapid stream flows,
NO	Significant debris accumulation
NO	Constricted waterway openings
NO	Soft or unstable streambeds
NO	Meandering channels
YES	Other (which may promote scour and undermining of substructure elements) - **DEBRIS**
NO	Navigable Waterway
NO	Flow Controls

b. Anticipated Water conditions which may affect the inspection

NO	Cold Water (Approx. Temp___)
NO	Black water - limited
YES	Rapid stream flows
NA	Near military facility
NA	Tribal fishing
OK	Water quality
YES	History of Log jams

c. Identify factors that may accelerate the deterioration of the bridge elements:

NO	Highly corrosive water
NO	Unprotected steel members
NO	Other

Risk Factor Narrative:

Refer to report.

III. **Contacts Prior to Work**

(TO BE COMPLETED BY THE BRIDGE OWNER)

Point of contact for immediate action such as closing the bridge due to findings)

Contact Bridge Owner ___ (number) days before the proposed underwater inspection.

Special contracting and scheduling procedures prior to inspection, include recommended lead time

Entity	Contact Name and Title	Contact Phone	Lead Time
Coast Guard	NA	NA	NA
Property Owner	NA	NA	NA
Access Equipment	BOAT	TERRACON OWNED	NA
Lake or River draw-down	NA	NA	NA
Canal dry time	NA	NA	NA
Tree removal	NA	NA	NA
Other:			
Other:			

IV. **Dive Team Shall Include the Following:**

Dive Team Narrative:

Refer to report.

Example: The Bridge shall be investigated using a three-member dive team: one supervisor to monitor rack box and take notes, one diver, and one tender/standby diver. There shall be one NBIS Team Leader onsite at all times.

V. **Site Information**

Navigable waterway:	**NO**	Anticipated current	**1.5 ft**
If Yes, (waterway river point)	**NA**	Scour Critical (item 113):	**NO**
Anticipated water visibility depth	**1 ft**	POA in place:	**NO**
Anticipated Dive depth	**<10 ft**	Scour Monitoring devices present:	**NO**

Verify the Scope of Services when work is contracted for the procedure for underwater elements that are not in water during an inspection. **NA**
Site Information Narrative: **NA**

Refer to report.

The underwater inspection consists of a visual and tactile examination of the accessible surfaces of the substructure items in water. Additional items should reference the scope of services in the contract. For reference the following items are in water: (FILL in number only if in water…IF NONE, put 0)

Item	Number of Units	Level of Inspection (1, 2 or 3) with Commentary
Piers and Number of Columns	2	Refer to report, as applicable
Abutment	0	Refer to report, as applicable
Culvert	0	Refer to report, as applicable
Scour Countermeasures	0	Refer to report, as applicable
Fenders or Dolphins	0	Refer to report, as applicable

Photographs should be taken, if water clarity permits, for typical conditions, conditions that have changed since last inspection and significant or noteworthy deficiencies. The type of channel bottom material, the presence or extent of scour, the presence or extent of riprap, the presence or extent of drift and debris, and the location of any foundation exposure or undermining shall be quantified. Include depth, length, height and location of deficiencies.

VI. **Equipment and Field Logistics**

a. The inspection should be conducted using:

NA Chest waders

NA Hip waders

YES Diving equipment

NA SCUBA (Note that ADCI Consensus Standards require communication systems be employed for both SCUBA and Surface-Supplied (whether air or mixed-gas) dive modes)

YES SCUBA with communication

NA Surface Supplied with communication

b. The channel bottom should be sounded utilizing

X Digital fathometer

X Telescoping survey rod

X acoustic imaging

c. During the inspection, the divers should work from

X Boat

____ Shore

____ Either

The note taker should work alongside the dive team.

d. Access to the waterway should be obtained from the shore (north bank, southwest quadrant, driveway 30 yards north etc.)

HAND CARRIED BOAT TO WATER

e. The maximum depth of the channel is typically measured_____feet from

_____

_____

Reference Datum_____

Soundings should be dictated by the scope of work. When not detailed in the scope they should be repeated from the previous soundings. If neither exist, then they need to be taken in a grid pattern between substructure units 100' upstream and 100' downstream.

VII. Other Narrative Not Included In Previous Sections

Refer to report.

STATE OF OHIO
BRIDGE INSPECTION FIELD REPORT

SFN 3101924 | Bridge Number HAM-27-1848R | Year Built 1970
DIST 08 | Feature Intersect GREAT MIAMI RIVER | Municipality

APPROACH ITEMS

		Qty.	condition state 1	2	3	4	cr TR
c1.	Wearing Surface (EA)						
c2.	Slab (SF)						
c3.	Relief Joint (LF)						
c4.	Embankment (EA) ded						
c5.	Guardrail (EA)						
N36.	Safety Features: Tr, Gr, Tm						
c6.	Approach Summary						

DECK ITEMS

		Qty.	condition state 1	2	3	4	cr TR
c7.1	Floor/Slab (SF)						
c7.2	Edge of Floor/Slab (LF)						
c8.	Wearing Surface (SF)						
c9.	Curbs/Sidewalk (LF)						
c10.	Median (LF)						
c11.	Railing (LF)						
N36.	Safety Features: Rail						
c12.	Drainage (EA) ded						
c13.	Expansion Joint (LF) ded						
N58.	Deck Summary						

SUPERSTRUCTURE ITEMS

		Qty.	condition state 1	2	3	4	cr TR
c14.	Alignment (EA) ded						
c15.1	Beams/Girders (LF)						
c15.2	Slab (SF)						
c16.	Diaphragm/X-Frames (EA)						
c17.	Stringers (LF)						
c18.	Floorbeams (LF)						
c19.	Truss Verticals (EA)						
c20.	Truss Diagonals (EA)						
c21.	Truss Upper Chord (EA)						
c22.	Truss Lower Chord (EA)						
c23.	Truss Gusset Plate (EA) ded						
c24.	Lateral Bracing (EA)						
c25.	Sway Bracing (EA)						
c26.	Bearing Devices (EA) ded						
c27.	Arch (LF)						
c28.	Arch Column/Hanger (EA)						
c29.	Arch Spandrel Walls (LF)						
c30.	Prot. Coating System (LF) ded						
c31.	Pins/Hangers/Hinges (EA) ded						
c32.	Fatigue (LF) ded						
N59.	Superstructure Summary						

SUBSTRUCTURE ITEMS

		Qty.	condition state 1	2	3	4	cr TR
c33.	Abutment Walls (LF)	72	72				1
c34.	Abutment Caps (LF)						
c35.	Abut. Colmns/Bents (EA)						
c36.	Pier Walls (LF)	63	63				1
c37.	Pier Caps (LF)						
c38.	Pier Columns/Bents (EA)						
c39.	Backwalls (LF)						
c40.	Wingwalls (EA)	4	4				1
c42.	Scour (EA) ded	1	1				1
c43.	Slope Protection (EA) ded	1	1				1
N60.	Substructure Summary						7

CULVERT ITEMS

		Qty.	condition state 1	2	3	4	cr TR
c44.	General (LF)						
c45.	Alignment (LF) ded						
c46.	Shape (LF) ded						
c47.	Seams (EA) ded						
c48.	Headwall/Endwall (EA)						
c49.	Scour (EA) ded						
c50.	Abutments (LF)						
N62.	Culvert Summary						

CHANNEL ITEMS

		Qty.	condition state 1	2	3	4	cr TR
c51.	Alignment (LF) ded	200	200				1
c52.	Protection (LF) ded	200	200				1
c53.	HydraulicOpening (EA) ded	5	5				1
c54.	Navigation Lights (EA) ded						
N61.	Channel Summary						6

SIGN/UTILITY ITEMS

		Qty.	condition state 1	2	3	4	cr TR
c55.	Signs (EA) ded						
c56.	Sign Supports (EA) ded						
c57.	Utilities (LF) ded						
N59, 60 or 62	General Appraisal						
N41.	Operating Status						

Inspector Name Jason Hickey
Inspection Date/Type 08/06/19
Reviewer Name JASON SANDER P.E.
Review Date 08/06/19
PE Number (Insp or Rev) E69719