

Underwater Inspection Report



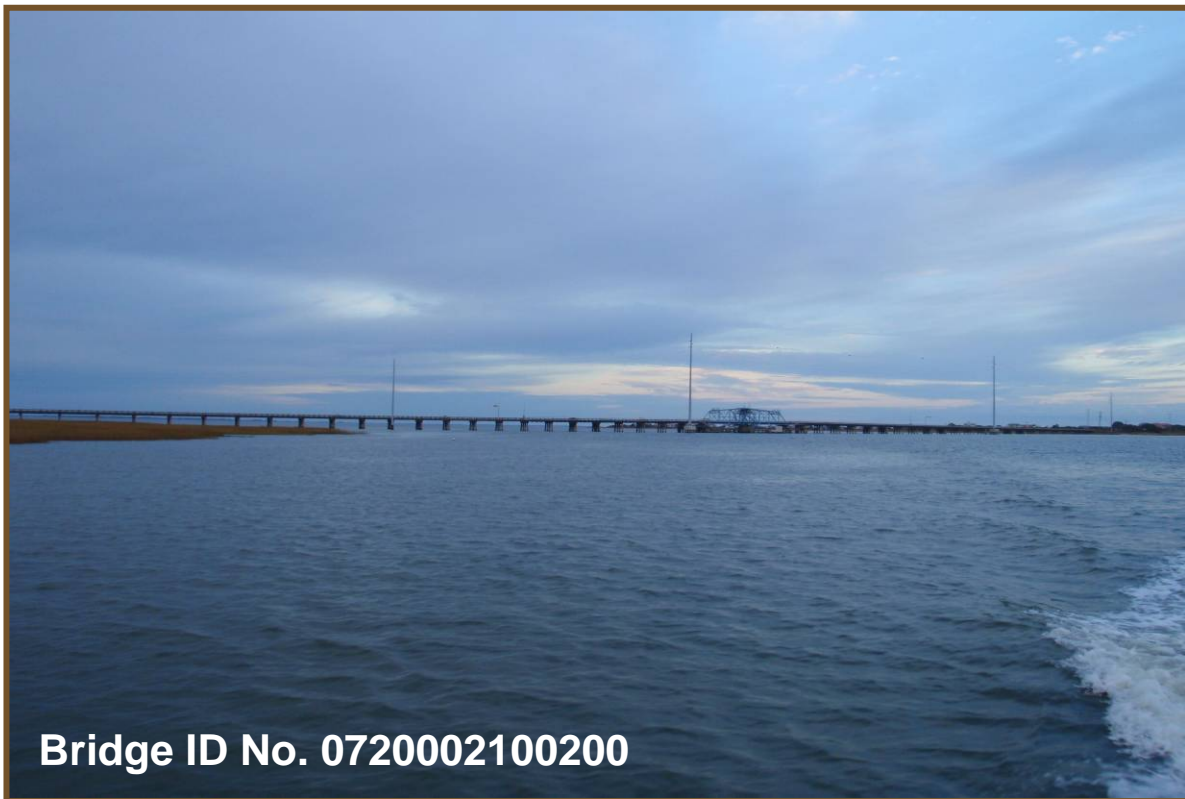
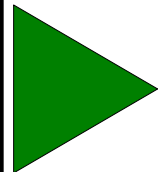
South Carolina Department of Transportation

US 21

Over

Harbor River

No Significant
Action Required



Developed by:

Beaufort County, South Carolina
November 16, 2010



**INFRASTRUCTURE
ENGINEERS, INC.**

consulting engineers | commercial divers

Job No. 08007SC00.01 - 5

This Underwater Inspection Report was Developed for:

Bridge No. 0720002100200

which carries

US 21 over Harbor River

in

Beaufort County, South Carolina

Infrastructure Engineers: 1460 John B White Sr. Blvd, Suite 1C. Spartanburg, SC 29306

2010 UNDERWATER INSPECTION REPORT EXECUTIVE SUMMARY

Inspection Date: November 16, 2010

NBIS Rating:

- The submerged components of the bridge are in **satisfactory** and **fair** condition.

Significant Conditions Observed:

- Up to 1 in. wide by 6 ft long vertical crack on the northeast corner of Pile 2 at Bent 45.
- Up to 1/2-in. wide vertical cracks on piles at Bents 30, 31, 33 through 35, 40, 43 through 45, 47 through 49, 51 through 58, 60 through 62, and Piers B and E.
- Spalling up to 1 ft high by 5 ft long with up to 6 in. of penetration in the caps at Bents 56 and 63.

Repair Recommendations:

- Clean and seal all cracks.
- Clean spalls and voids down to sound concrete and patch with grout suitable for a marine environment.

1.0 INTRODUCTION

1.1 Purpose and Scope

SCDOT Bridge No. 0720002100200 carries US 21 over the Harbor River in Beaufort County. On November 16, 2010, Infrastructure Engineers, Inc. performed a routine underwater investigation at the bridge to evaluate the condition of all substructure units (SSUs) located in the water. This report includes a general description of the structure and the method of investigation, as well as a detailed description of the conditions noted. In addition, this report contains a condition assessment of the bridge components evaluated and presents recommendations for structural repairs.

The scope of the investigation included a visual inspection of all accessible substructure units located in the water from the high-water mark to the channel bottom. Depth soundings were also taken along the upstream and downstream fascias of the bridge to assist in the identification and documentation of scour conditions.

1.2 General Description of the Structure

The photograph on the cover of this report shows an overall view of the upstream fascia of the bridge, and Photograph 1 in Appendix B shows a view of the downstream fascia.

The bridge consists of seventy simply supported steel girder spans and a two span continuous steel thru truss swing span. The superstructure is supported by sixty-six intermediate bents, four piers, and a pivot pier. Bents 30 through 32, 35 through 39, 42 through 44, 45 through 47, 50 through 52, 55 through 58, and 61 through 63 each consist of four square prestressed concrete piles and a reinforced concrete cap. Bents 33, 34, 40, 41, 48, 49, 53, 54, 59, and 60 each consist of seven square prestressed concrete piles and a reinforced concrete cap. Piers A and E each consist of two rows of

four prestressed concrete piles and a reinforced concrete cap. Piers B and D each consist of two rows of six prestressed concrete piles and a reinforced concrete cap. Pier C consists of a reinforced concrete column and a reinforced concrete footing founded on submerged piles. Refer to Photographs 2 through 4 in Appendix B for a view of typical bents and piers.

SCDOT design drawings were not available at the time of inspection. The bents are labeled numerically from west to east. The piles are labeled numerically from north to south. Rows of piles are designated as west and east. Refer to Figures 1 through 3 in Appendix A for a plan and elevation sketch of the bridge.

1.3 Method of Investigation

A dive team led by a South Carolina-registered professional engineer-diver conducted the underwater inspection. Access to the bridge site was obtained by boat. The boat was launched from a boat ramp on Butchs Road.

The underwater investigation generally consisted of a Level I “swim-by” visual inspection over 100 percent of the accessible SSU surfaces from the high water mark to the channel bottom. A Level II visual/tactile inspection was performed on at least 25 percent of the SSUs, which included cleaning marine growth at the waterline, mid-depth, and channel bottom to facilitate an evaluation of the underlying surfaces. Particular attention was given to any observed areas of excessive deterioration or apparent distress, and the condition of any repairs was noted.

An assessment of the waterway and streambed conditions in the vicinity of the bridge was also made. The type of channel bottom material was noted, as well as the location and extent of any observed scour, riprap, or debris.

The location of the waterline with respect to a fixed reference on the bridge was noted at the time of the inspection. Depth soundings were taken along the bridge fascias and around each SSU using a continuously recording fathometer.

2.0 INSPECTION FINDINGS

At the time of inspection, the waterline was located 15.7 ft below the top of the deck at Bent 30. SCDOT design drawings were not available at the time of inspection; therefore, the top of the deck was assigned a reference elevation of 100.0 at Bent 30. This translates to a waterline elevation of 84.3. The Harbor River is tidally influenced and flowed with a velocity of up to 1 fps during the inspection. Bridge soundings indicate that the maximum water depth was 38.7 ft at the downstream fascia at the midpoint between Bent 44 and Pier A. Refer to Table 1 in Appendix A for a listing of the sounding measurements relative to the bridge deck.

The banks along the Harbor River in the vicinity of the bridge are in stable condition. Embankment protection in the form of riprap and vegetation is present on the west and east banks. There is no sign of active erosion. Refer to Photographs 7 and 8 in Appendix B for a view of the west and east embankments, respectively. The channel bottom primarily consists of sand and shells.

The substructure units located in water at the time of inspection included Bents 30 through 63 and Piers A through E. All inspected substructure units have moderate to heavy marine growth in the form of oysters from the high water mark to the channel bottom. Piles at Bents 33, 45, 56, 57, 61, and 62 and Pier B have up to 1/4-in. wide by 3 ft long vertical cracks with rust stains. Piles at Bents 30, 34, 36, 40, 44, 48, 52 through 55, and 58 have up to 1/8-in. wide by up to 4 ft long vertical cracks with rust stains. Piles at Bents 31, 43, 49, 51, and 60 and Pier E have up to 1/16-in. wide by 3 ft long vertical cracks with rust stains. Refer to Photograph 11 in Appendix B for a view of a typical crack in a pile.

Pile 5E at Pier B has a 1/2-in. wide by 2 ft long vertical crack with rust stains is the north face at the waterline. Pile 2 at Bent 45 has an up to 1 in. wide by 6 ft long vertical crack on the northeast corner of Pile 2 at Bent 45 at the waterline. Pile 1 at

Bent 61 has a 1/2-in. wide by 4 ft long vertical crack with rust stains on the south face at the waterline. Refer to Photograph 12 in Appendix B for a view of this crack.

There is a void measuring 1 ft long by 1 1/2 in. high by 4 in. deep on the east face of the column at the first step-out at Pier C 3 ft below the waterline. There is a spall measuring 2 ft long by 1 ft high with 4 in. of penetration with exposed reinforcing on the east face of the cap at Bent 56. There is a spall measuring 5 ft long by 1 ft high with 6 in. of penetration with exposed reinforcing at the bottom of the west face of the cap at Bent 63. Refer to Photograph 13 in Appendix B for a view of this spall. Refer to Figures 1 through 3 in Appendix A for detailed inspection notes and a plan view showing the existing conditions at each of the inspected bents.

3.0 EVALUATION AND ASSESSMENT

Overall, the submerged components of the bridge substructure units are in **satisfactory** and **fair** condition. The cracking in the piles, rust stains, voiding, and spalls in the caps do not affect the structural capacity of the bridge. The inspected substructure units are rated as **satisfactory**, **Code 6**, and **fair**, **Code 5**, in accordance with the FHWA National Bridge Inspection Standards (NBIS) Coding information. Condition rating forms in both NBIS and Bridge Management System (BMS) formats for this bridge are presented in Appendix C.

4.0 RECOMMENDATIONS

It is recommended that all cracks be cleaned and sealed. Spalls and voids should be cleaned down to sound concrete and patched with grout suitable for a marine environment. In accordance with NBIS recommendations, the next routine underwater inspection for this bridge should be conducted on an interval not to exceed 60 months. In addition, bridge soundings should be taken as part of biennial above-water inspections, as well as following significant flooding events.

Respectfully submitted,
INFRASTRUCTURE ENGINEERS, INC.

Jeffrey B. Rowe, P.E.

Table 1
Bridge Soundings

Bent/Pier	Upstream Fascia			Downstream Fascia		
	Waterline To Channel Bottom (ft)	Top of Deck To Waterline (ft)	Top of Deck To Channel Bottom (ft)	Waterline To Channel Bottom (ft)	Top of Deck To Waterline (ft)	Top of Deck To Channel Bottom (ft)
30	3.0	15.7	18.7	3.0	15.7	18.7
1/2	3.0	15.8	18.8	3.0	15.8	18.8
31	3.0	15.9	18.9	3.0	15.9	18.9
1/2	3.0	16.0	19.0	3.2	16.0	19.2
32	4.0	16.1	20.1	3.5	16.1	19.6
1/2	5.0	16.2	21.2	4.0	16.2	20.2
33	6.0	16.3	22.3	5.8	16.3	22.1
1/2	9.0	16.4	25.4	8.0	16.4	24.4
34	15.0	16.5	31.5	13.0	16.5	29.5
1/2	18.0	16.6	34.6	16.0	16.6	32.6
35	24.0	16.6	40.6	21.5	16.6	38.1
1/2	26.0	16.7	42.7	24.0	16.7	40.7
36	28.0	16.8	44.8	28.0	16.8	44.8
1/2	30.0	16.9	46.9	30.0	16.9	46.9
37	32.0	17.0	49.0	30.2	17.0	47.2
1/2	33.0	17.1	50.1	31.5	17.1	48.6
38	33.0	17.2	50.2	32.0	17.2	49.2
1/2	34.0	17.3	51.3	33.8	17.3	51.1
39	34.0	17.4	51.4	33.8	17.4	51.2
1/2	34.0	17.5	51.5	33.8	17.5	51.3
40	34.0	17.6	51.6	32.5	17.6	50.1
1/2	34.0	17.7	51.7	33.7	17.7	51.4
41	34.0	17.8	51.8	33.7	17.8	51.5
1/2	33.5	17.9	51.4	33.9	17.9	51.8
42	35.0	18.0	53.0	33.9	18.0	51.9
1/2	36.0	18.1	54.1	35.0	18.1	53.1
43	35.5	18.2	53.7	35.8	18.2	54.0
1/2	35.8	18.3	54.1	36.1	18.3	54.4
44	36.0	18.3	54.3	38.0	18.3	56.3

1/2	37.0	18.4	55.4	38.7	18.4	57.1
A	37.0	18.5	55.5	37.0	18.5	55.5
1/2	34.8	18.6	53.4	37.0	18.6	55.6
B	32.9	18.7	51.6	36.0	18.7	54.7
1/4	34.0	18.8	52.8	34.0	18.8	52.8
1/2	35.0	18.9	53.9	34.5	18.9	53.4
1/4	25.0	19.0	44.0	34.0	19.0	53.0
C	25.0	19.1	44.1	31.0	19.1	50.1
1/4	33.0	19.0	52.0	30.0	19.0	49.0
1/2	34.5	18.9	53.4	35.0	18.9	53.9
1/4	32.0	18.8	50.8	35.8	18.8	54.6
D	31.5	18.7	50.2	32.0	18.7	50.7
1/2	35.0	18.6	53.6	34.0	18.6	52.6
E	36.0	18.5	54.5	34.5	18.5	53.0
1/2	36.0	18.4	54.4	35.0	18.4	53.4
45	36.0	18.3	54.3	34.7	18.3	53.0
1/2	33.0	18.3	51.3	33.6	18.3	51.9
46	32.8	18.2	51.0	32.0	18.2	50.2
1/2	31.5	18.1	49.6	32.0	18.1	50.1
47	31.5	18.0	49.5	31.7	18.0	49.7
1/2	31.0	17.9	48.9	32.0	17.9	49.9
48	31.0	17.8	48.8	30.0	17.8	47.8
1/2	30.0	17.7	47.7	30.0	17.7	47.7
49	29.0	17.6	46.6	30.0	17.6	47.6
1/2	30.0	17.5	47.5	30.0	17.5	47.5
50	30.0	17.4	47.4	30.5	17.4	47.9
1/2	30.0	17.3	47.3	30.6	17.3	47.9
51	29.8	17.2	47.0	29.5	17.2	46.7
1/2	28.5	17.1	45.6	29.0	17.1	46.1
52	26.0	17.0	43.0	26.0	17.0	43.0
1/2	24.0	16.9	40.9	25.5	16.9	42.4
53	22.0	16.8	38.8	23.8	16.8	40.6
1/2	21.0	16.7	37.7	22.0	16.7	38.7
54	19.2	16.6	35.8	19.8	16.6	36.4
1/2	17.0	16.6	33.6	18.1	16.6	34.7
55	13.0	16.5	29.5	15.0	16.5	31.5
1/2	11.0	16.4	27.4	13.0	16.4	29.4

56	9.0	16.3	25.3	10.0	16.3	26.3
1/2	6.0	16.2	22.2	8.0	16.2	24.2
57	6.0	16.1	22.1	8.0	16.1	24.1
1/2	5.0	16.0	21.0	6.0	16.0	22.0
58	5.0	15.9	20.9	6.2	15.9	22.1
1/2	5.0	15.8	20.8	5.0	15.8	20.8
59	5.0	15.7	20.7	5.1	15.7	20.8
1/2	Dry	Dry	Dry	4.3	15.6	19.9

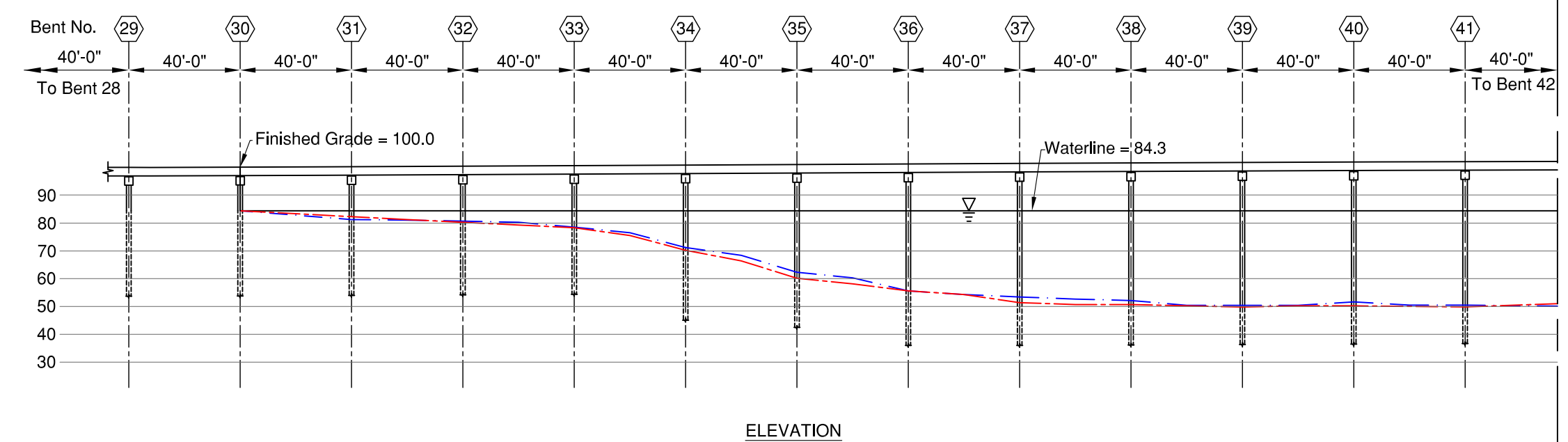
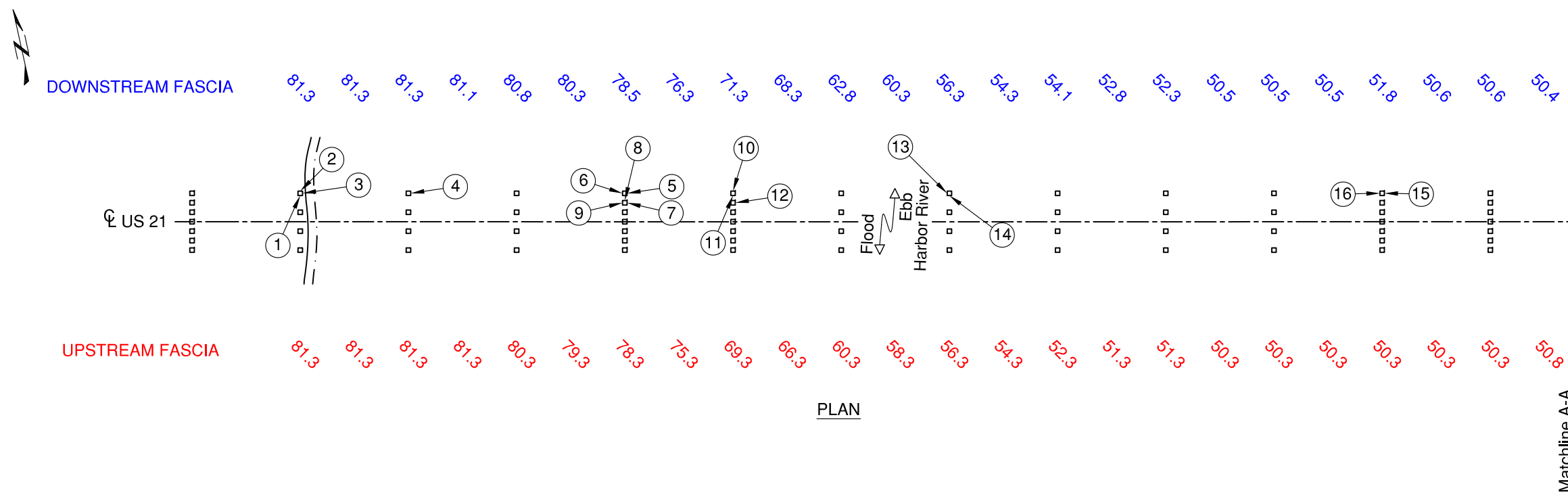
NOTE: The numbers listed in this table represent distances and not elevations. Since SCDOT design drawings were not available at the time of inspection, a reference elevation of 100.0 was assigned to the top of deck at Bent 30.

Table 2

Vertical Footing/Seal Exposures

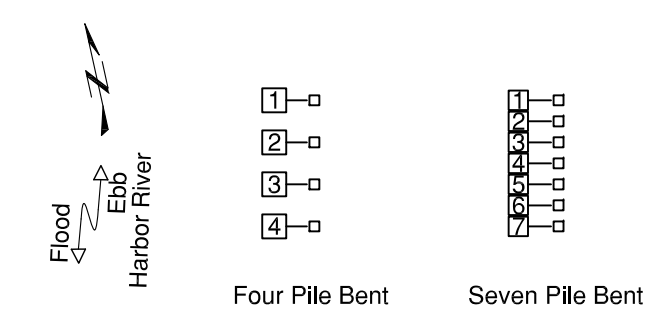
Pier	Northeast Corner (ft)	Northwest Corner (ft)	Southeast Corner (ft)	Southwest Corner (ft)
A1	6.0*	6.0*	6.0*	6.0*
A2	6.0*	6.0*	6.0*	6.0*
B	2.0 [†]	2.0 [†]	2.0*	2.0*
C	4.0*	5.0*	4.0*	5.0*

NOTE: Footing exposure measurements are taken from the top of the footing down to the channel bottom. An * indicates complete footing exposure and partial seal exposure, with measurements taken from the top of the seal to the channel bottom. A [†] indicates complete seal exposure resulting in undermining, with measurements taken from the bottom of the seal to the channel bottom.



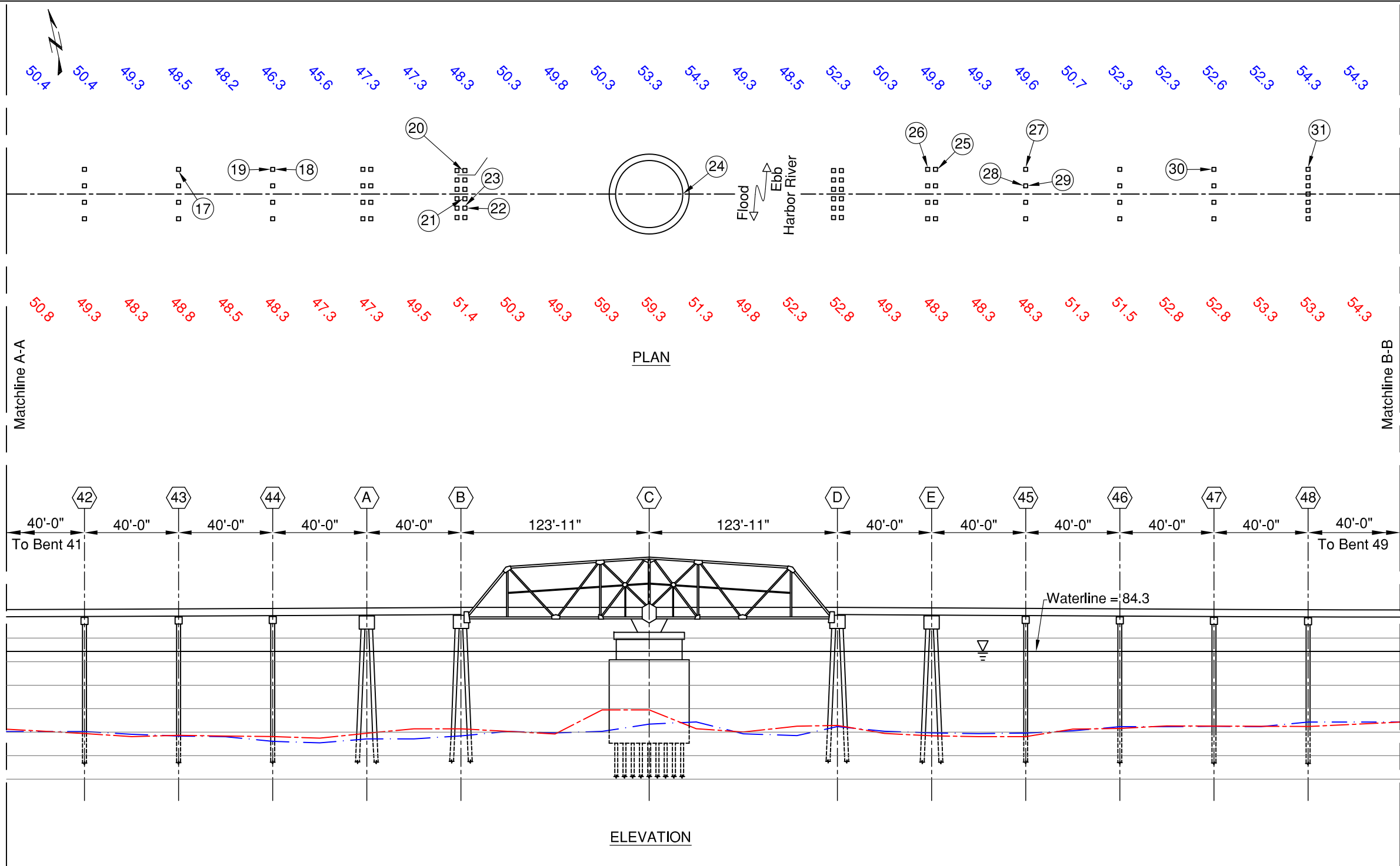
- Legend**
- GN General Note
 - 3 Inspection Note
 - 2010 Channel Bottom Elevation
 - Original Channel Bottom Profile
 - Upstream Fascia
 - Downstream Fascia
 - Timber Debris
 - Rip Rap

- Figure Notes:**
- At the time of inspection on November 16, 2010, the waterline was approximately 15.7 ft below the top of deck at Bent 30. Plans were not available at the time of inspection; therefore, a reference elevation of 100.0 was assigned to the top of deck at Bent 30. This translates to a waterline elevation of 84.3.
 - Soundings across the channel were taken parallel to the bridge at the bents and piers, and are referenced channel bottom elevations in feet determined on November 16, 2010.
 - This figure was developed from field notes, sketches, and measurements taken in the field.
 - See Figure 5 for inspection notes.



GRAPHIC SCALE 0 48' 96'		DATE November 2010	 1460 John B. White Sr. Blvd., Ste. 1C Spartanburg, SC 29306 PH: 864.596.8030 FAX: 864.596.8034 INFRASTRUCTURE ENGINEERS, INC. consulting engineers commercial divers	 SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION Bridge ID: 0720002100200	US 21 over Harbor River Plan and Elevation	FIG NO. 1
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DWG. SC-5

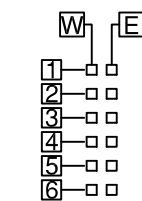
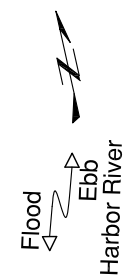


Legend

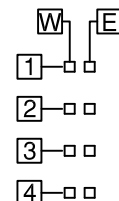
- (GN) General Note
- (3) Inspection Note
- 2010 Channel Bottom Elevation
- Original Channel Bottom Profile
- Upstream Fascia
- Downstream Fascia
- Timber Debris
- Rip Rap

Figure Notes:

1. At the time of inspection on November 16, 2010, the waterline was approximately 15.7 ft below the top of deck at Bent 30. Plans were not available at the time of inspection; therefore, a reference elevation of 100.0 was assigned to the top of deck at Bent 30. This translates to a waterline elevation of 84.3.
2. Soundings across the channel were taken parallel to the bridge at the bents and piers, and are referenced channel bottom elevations in feet determined on November 16, 2010.
3. This figure was developed from field notes, sketches, and measurements taken in the field.
4. See Figure 5 for inspection notes.



Piers A and E



Piers B and D

GRAPHIC SCALE

0 48' 96'

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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Bridge ID: 0720002100200

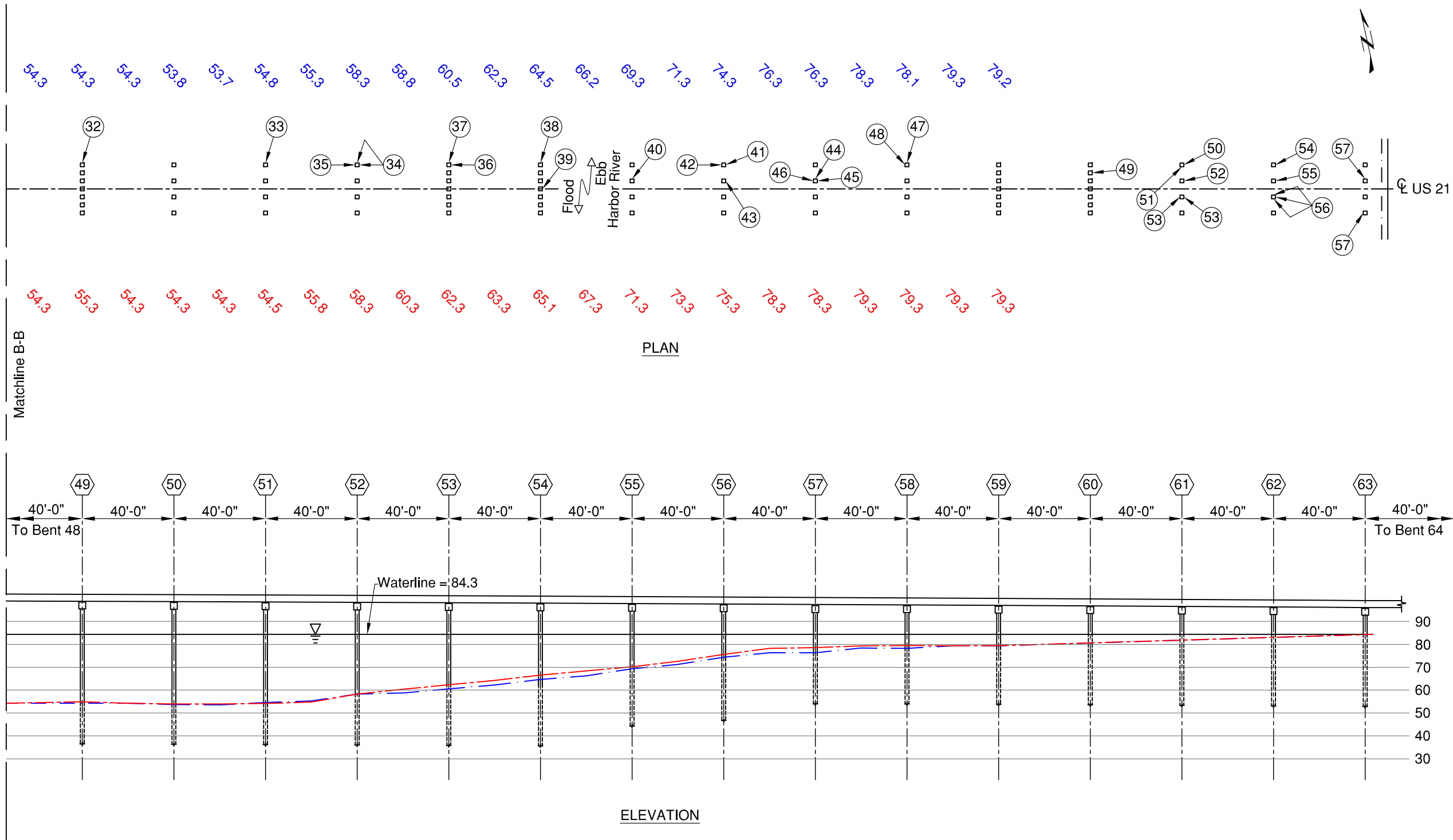
US 21
over Harbor River

Plan and Elevation

FIG NO.

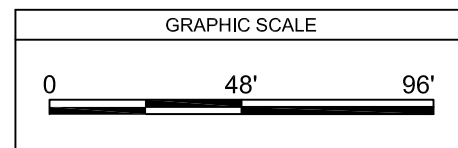
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DWG. SC-5



- Legend
- GN General Note
 - 3 Inspection Note
 - 2010 Channel Bottom Elevation
 - Original Channel Bottom Profile
 - Upstream Fascia
 - Downstream Fascia
 - Timber Debris
 - Rip Rap

- Figure Notes:
- At the time of inspection on November 16, 2010, the waterline was approximately 15.7 ft below the top of deck at Bent 30. Plans were not available at the time of inspection; therefore, a reference elevation of 100.0 was assigned to the top of deck at Bent 30. This translates to a waterline elevation of 84.3.
 - Soundings across the channel were taken parallel to the bridge at the bents and piers, and are referenced channel bottom elevations in feet determined on November 16, 2010.
 - This figure was developed from field notes, sketches, and measurements taken in the field.
 - See Figure 5 for inspection notes.



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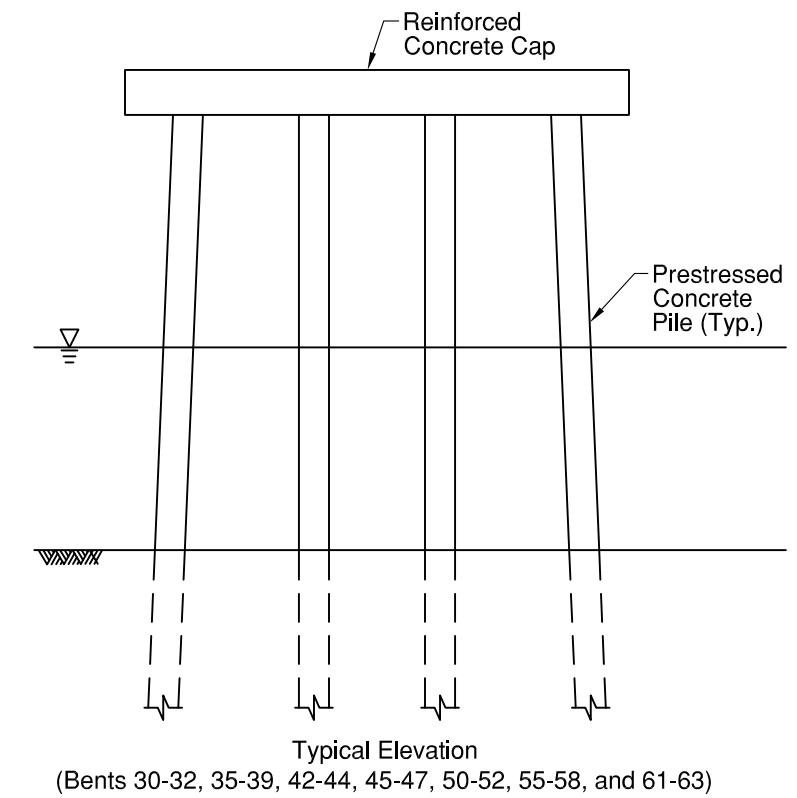
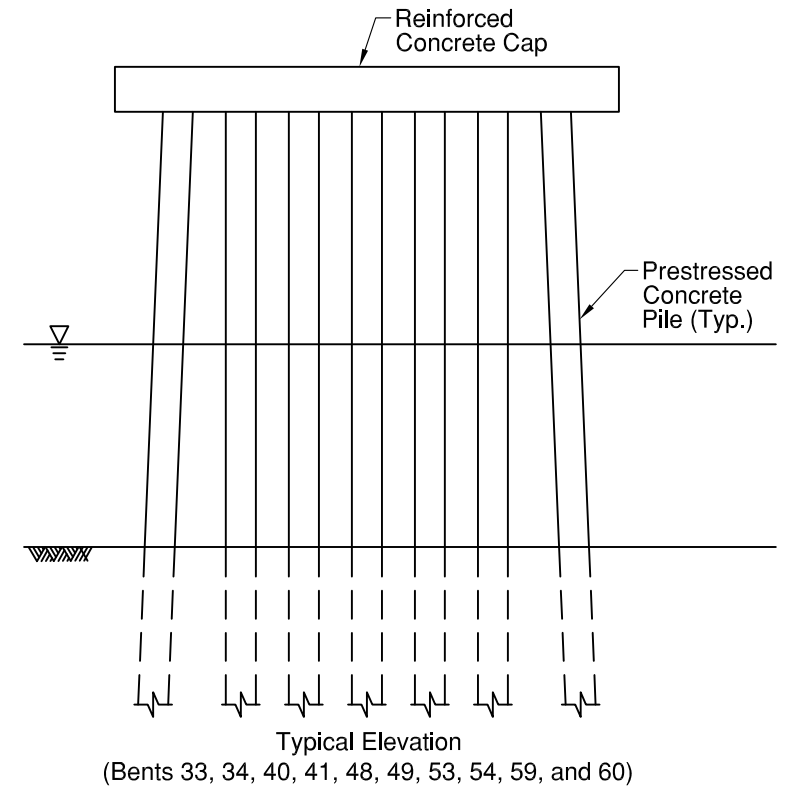
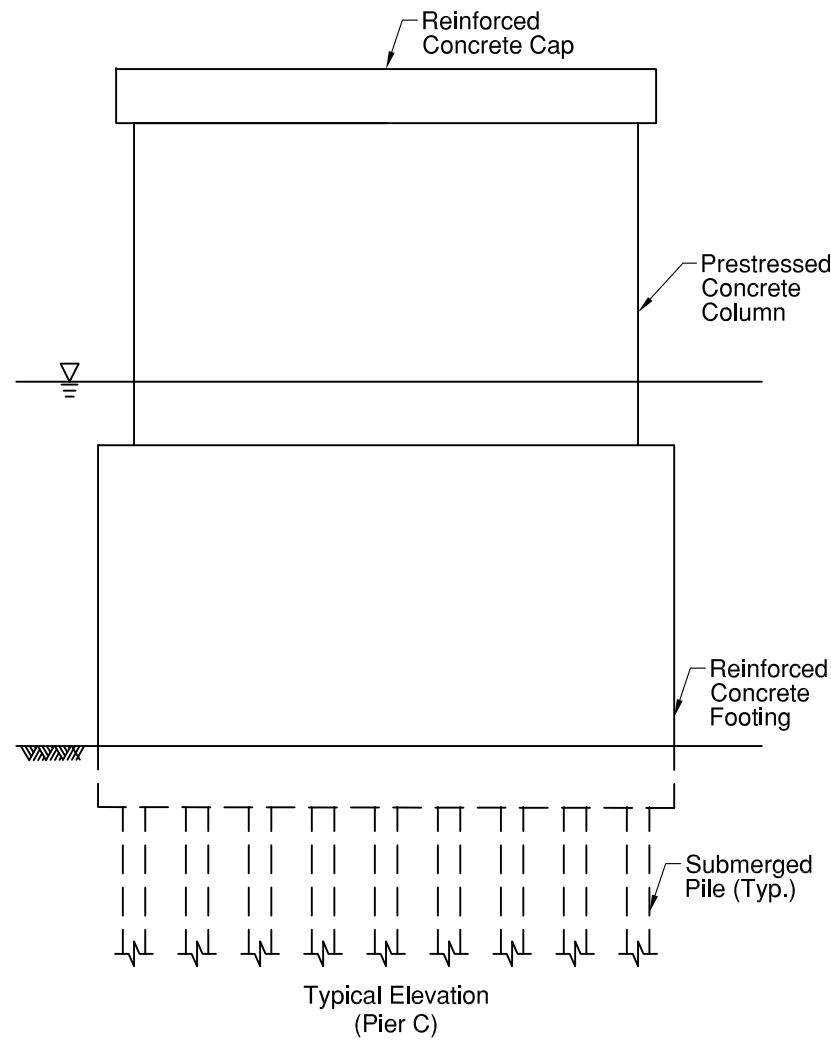
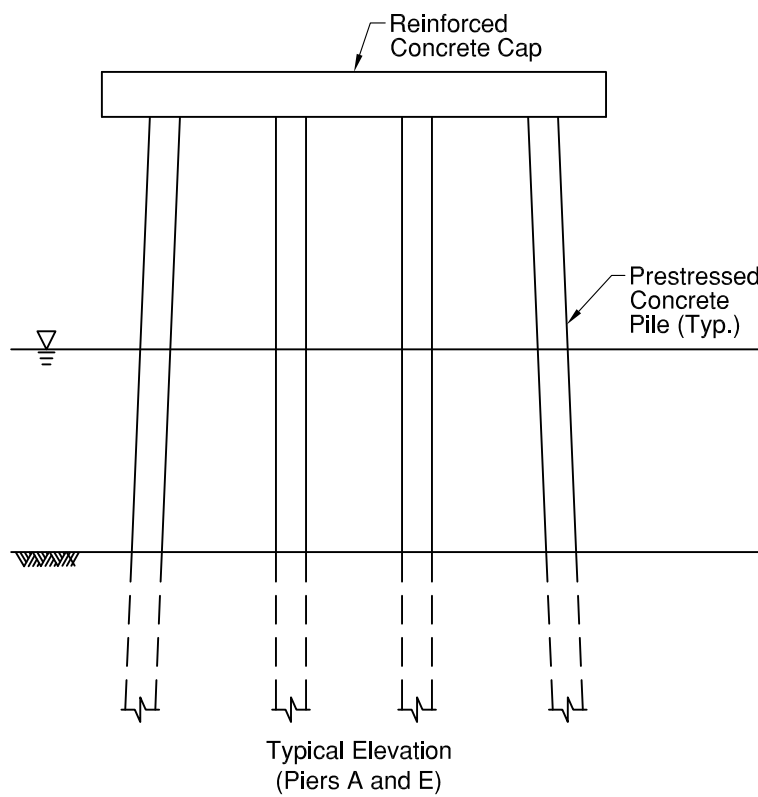
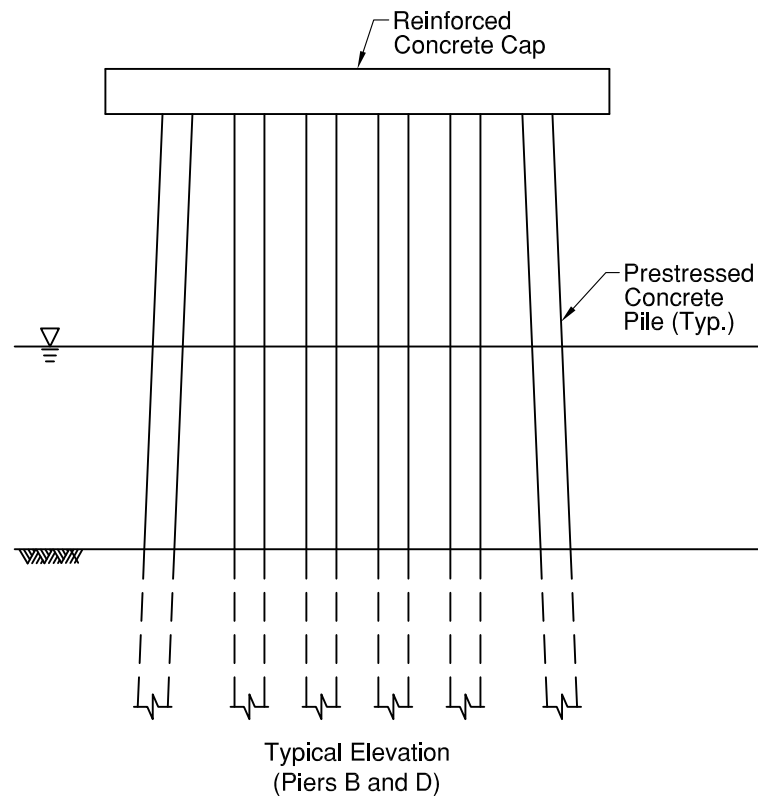
Bridge ID: 0720002100200

US 21
over Harbor River

Plan and Elevation

FIG NO.
3

DWG. SC-5



DWG. SC-5

GRAPHIC SCALE	DATE	 1460 John B. White Sr. Blvd., Ste. 1C Spartanburg, SC 29306 PH: 864.595.8030 FAX: 864.595.8034	 SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION Bridge ID: 0720002100200	US 21 over Harbor River	
				Typical Bent/Pier Elevations	FIG NO. 4

Not to Scale

November
2010

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Inspection Notes:

- ① 1/16-in. wide by 3 ft long vertical crack with rust stains on the south face at the waterline.
- ② 1/8-in. wide by 3 ft long vertical crack with rust stains on the north face at the waterline.
- ③ 1/32-in. wide by 3 ft long vertical crack on the east face at the waterline.
- ④ 1/16-in. wide by 3 ft long vertical crack with rust stains on the east face at the waterline.
- ⑤ 1/4-in. wide by 3 ft long vertical crack on the east face at the waterline.
- ⑥ 1/16-in. wide by 3 ft long vertical crack with rust stains on the west face at the waterline.
- ⑦ 1/8-in. wide by 2 1/2 ft long vertical crack with rust stains on the east face at the waterline.
- ⑧ 1/16-in. wide by 1 ft long vertical crack on the north face at the waterline.
- ⑨ 1/16-in. wide by 2 ft long vertical crack with rust stains on the west face at the waterline.
- ⑩ 1/8-in. wide by 2 ft long vertical crack with rust stains and a 1/32-in. wide by 1 ft long vertical crack with rust stains on the north face at the waterline.
- ⑪ 1/8-in. wide by 2 ft long vertical crack with rust stains on the south face at the waterline.
- ⑫ 1/16-in. wide by 1 ft long vertical crack on the east face at the waterline.
- ⑬ 1/8-in. wide by 1 1/2 ft long vertical crack on the west face at the waterline.
- ⑭ 1/32-in. wide by 1 ft long vertical crack with rust stains on the south face at the waterline.
- ⑮ 1/8-in. wide by 3 ft long vertical crack on the east face at the waterline.
- ⑯ 1/16-in. wide by 3 ft long vertical crack with rust stains on the west face at the waterline.
- ⑰ 1/16-in. wide by 2 ft long vertical crack with rust stains on the south face at the waterline.
- ⑱ 1/8-in. wide by 2 ft long vertical crack on the east face at the waterline.
- ⑲ Two 1/16-in. wide by 2 ft long vertical cracks with rust stains on the west face at the waterline.
- ⑳ 1/4-in. wide by 2 ft long vertical crack with rust stains on the west face at the waterline.
- ㉑ 1/32-in. wide by 2 ft long vertical crack with rust stains on the west face at the waterline.
- ㉒ 1/16-in. wide by 2 ft long vertical crack with rust stains on the east face at the waterline.
- ㉓ Up to 1/2-in. wide by 2 ft long vertical crack with rust stains on the north face at the waterline.
- ㉔ 1 ft long by 1 1/2-in. wide void with 4 in. of penetration in the column on the east face at the column/footing interface.

- ㉕ 1/16-in. wide by 1 1/2 ft long vertical crack with rust stains on the east face at the waterline.
- ㉖ 1/16-in. wide by 2 ft long vertical crack with rust stains on the north and west faces at the waterline.
- ㉗ 1/4-in. wide by 3 ft long vertical crack on the north face at the waterline.
- ㉘ 1/4-in. wide by 2 ft long vertical crack on the west face at the waterline.
- ㉙ Up to 1 in. wide by 6 ft long vertical crack on the northeast corner at the waterline.
- ㉚ Two hairline by 1 ft long vertical cracks with rust stains on the west face at the waterline.
- ㉛ 1/8-in. wide by 3 ft long vertical crack and a 1/16-in. wide by 2 1/2 ft long vertical crack with rust stains on the north face at the waterline.
- ㉜ 1/16-in. wide by 1 1/2 ft long vertical crack with rust stains on the north face at the waterline.
- ㉝ 1/16-in. wide by 3 ft long vertical crack on the north face at the waterline.
- ㉞ 1/16-in. wide by 2 ft long vertical crack with rust stains on the north and east faces.
- ㉟ 1/8-in. wide by 1 1/2 ft long vertical crack on the west face at the waterline.
- ㊱ 1/16-in. wide by 2 ft long vertical crack on the east face at the waterline.
- ㊲ 1/8-in. wide by 3 ft long vertical crack on the north face at the waterline.
- ㊳ 1/8-in. wide by 3 ft long vertical crack and a 1/16-in. wide by 3 ft long vertical crack on the north face at the waterline.
- ㊴ Three 1/8-in. wide by 1 ft long vertical cracks on the east face at the waterline.
- ㊵ 1/8-in. wide by 2 ft long vertical crack on the north face at the waterline.
- ㊶ 1/8-in. wide by 3 ft long vertical crack on the northeast corner at the waterline.
- ㊷ 1/4-in. wide by 2 ft long vertical crack on the west face at the waterline.
- ㊸ 2 ft long by 1 ft high spall with 4 in. of penetration and exposed reinforcing on the east face of the cap.
- ㊹ 1/8-in. wide by 3 ft long vertical crack on the north face at the waterline.
- ㊺ 1/2-in. wide by 5 ft long vertical crack with rust stains on the east face at the waterline.
- ㊻ 1/4-in. wide by 3 ft long vertical crack with rust stains on the west face at the waterline.
- ㊼ 1/8-in. wide by 2 ft long vertical crack with rust stains on the north face at the waterline.
- ㊽ 1/32-in. wide by 1 ft long vertical crack with rust stains on the west face at the waterline.
- ㊾ 1/16-in. wide by 28 in. long vertical crack with rust stains on the east face at the waterline.

- ㊿ 1/4-in. wide by 14 in. long vertical crack with rust stains on the east face at the waterline.
- ① 1/2-in. wide by 4 ft long vertical crack with rust stains on the south face at the waterline.
- ② 1/8-in. wide by 3 ft long vertical crack with rust stains on the east face at the waterline.
- ③ 1/32-in. wide by 1 ft long vertical crack with rust stains on the east and west faces at the waterline.
- ④ Two up to 1/4-in. wide vertical cracks from the marine growth to the cap on each face.
- ⑤ 1/8-in. wide by 3 ft long vertical crack with rust stains on the east face at the waterline.
- ⑥ Up to 1/4-in. wide by 3 ft long vertical cracks on the north, east, and south faces at the waterline.
- ⑦ 5 ft long by 1 ft high spall with 6 in. of penetration and exposed reinforcing on the west face of the cap.

DWG. SC-5

GRAPHIC SCALE	DATE November 2010	 <div>1480 John B. White Sr. Blvd., Ste. 1C Spartanburg, SC 29306 PH: 864.595.8030 FAX: 864.595.8034</div>		US 21 over Harbor River	
Not to Scale				SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION Bridge ID: 0720002100200	FIG NO. 5



Photograph 1. Downstream Fascia.



Photograph 2. View of Pier A, Typical of Piers A and E.



Photograph 3. View of Pier B, Typical of Piers B and D.



Photograph 4. View of Pier C.



Photograph 5. View of Bent 29, Typical of Bents 30 through 32, 35 through 39, 42 through 44, 45 through 47, 50 through 52, 55 through 58, and 61 through 63.



Photograph 6. View of Bent 33, Typical of Bents 33, 34, 40, 41, 48, 49, 53, 54, 59 and 60.



Photograph 7. West Embankment.



Photograph 8. East Embankment.



Photograph 9. View Upstream from Under Bridge.



Photograph 10. View Downstream from Under Bridge.



Photograph 11. View of a Typical Vertical Crack in a Pile.



Photograph 12. View of Crack in Pile 1 at Bent 61. Typical of larger cracks.



Photograph 13. Spall in west face of Bent 63 cap.

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. **0720002100200**
 WATERWAY: **Harbor River**
 INSPECTORS: **INFRASTRUCTURE ENGINEERS, INC.**
 INSPECTION DATE: **November 16, 2010**

NOTE: Condition ratings are assigned in accordance with the National Bridge Inspection Standards (NBIS) Coding Information, as presented in Federal Highway Administration Report No. FHWA-PD-96-001 "Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges," dated December 1995 (revised April 27, 2001).

CONDITION RATING

Unit	Substructure Code (Item 60)	Channel and Channel Protection Code (Item 61)	Underwater Inspection Code (Item 92B)	Scour Critical Bridge Code (Item 113)
Bent 30	5	8	Y60	6
Bent 31	5	8	Y60	6
Bent 32	6	8	Y60	6
Bent 33	5	8	Y60	6
Bent 34	5	8	Y60	6
Bent 35	6	8	Y60	6
Bent 36	5	8	Y60	6
Bent 37	6	8	Y60	6
Bent 38	6	8	Y60	6
Bent 39	6	8	Y60	6
Bent 40	5	8	Y60	6
Bent 41	6	8	Y60	6
Bent 42	6	8	Y60	6
Bent 43	5	8	Y60	6
Bent 44	5	8	Y60	6
Pier A	6	8	Y60	6
Pier B	5	8	Y60	6
Pier C	6	8	Y60	6
Pier D	6	8	Y60	6

Pier E	5	8	Y60	6
Bent 45	5	8	Y60	6
Bent 46	6	8	Y60	6
Bent 47	6	8	Y60	6
Bent 48	5	8	Y60	6
Bent 49	5	8	Y60	6
Bent 50	6	8	Y60	6
Bent 51	5	8	Y60	6
Bent 52	5	8	Y60	6
Bent 53	5	8	Y60	6
Bent 54	5	8	Y60	6
Bent 55	5	8	Y60	6
Bent 56	5	8	Y60	6
Bent 57	5	8	Y60	6
Bent 58	5	8	Y60	6
Bent 59	6	8	Y60	6
Bent 60	5	8	Y60	6
Bent 61	5	8	Y60	6
Bent 62	5	8	Y60	6
Bent 63	5	8	Y60	6

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site: _____ Yes _____ ☒ No

(Note: Bridges may also be scour critical if abutment or pier foundations are rated as unstable due to scour potential as determined by a scour evaluation study)

REMARKS: As the result of an underwater inspection, for Item 113, a structure may only be rated as 0, 1, 2, 4, or 6. Other ratings may be assigned only as the result of a scour analysis.

Whenever a rating factor of 2 or below is determined for Item 113 - Scour, the rating factor for Item 60 – Substructure may need to be revised to reflect the severity of actual scour and resultant damage to the bridge.

UNDERWATER INSPECTION BRIDGE MANAGEMENT SYSTEM CONDITION REPORT FORM

BRIDGE NO. **0720002100200**
 WATERWAY: **Harbor River**
 INSPECTORS: **INFRASTRUCTURE ENGINEERS, INC.**
 INSPECTION DATE: **November 16, 2010**

NOTE: Element Condition ratings are assigned in accordance with the AASHTO "Guide for Commonly Recognized (CoRe) Structural Elements", dated December 1997.

BMS CONDITION REPORT

Element	Total Quantity	Unit	Quantities in Condition State				
			1	2	3	4	5
CoRe Elements (Deck/Super/Sub)							
204 P/S Column or Pile Extension	206	EA	170	36			
205 R/C Concrete Column or Pile Extension	1	EA	1				
220 Submerged Pile Cap/Footing	1	EA	1				
Smart Flags							