

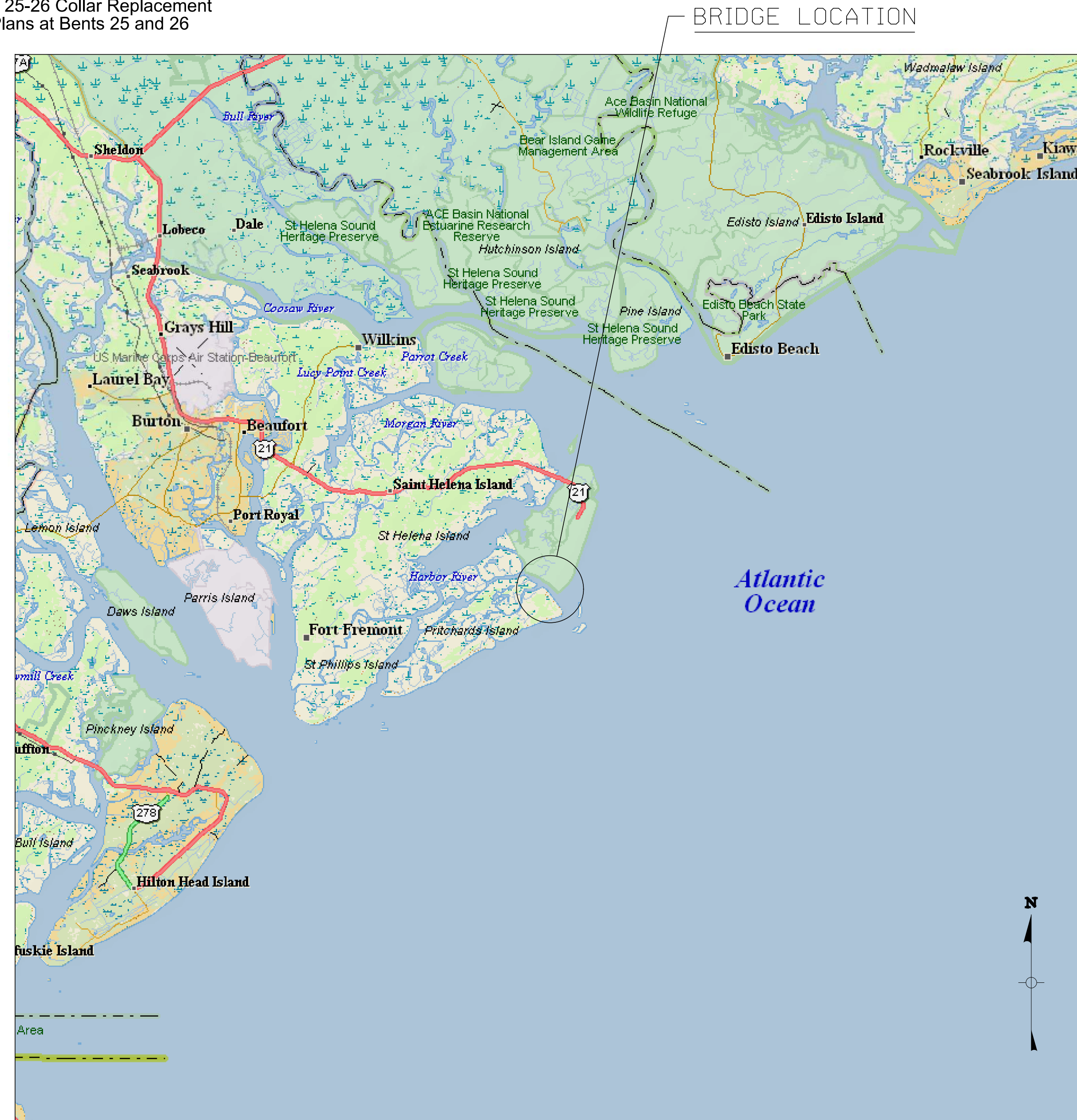
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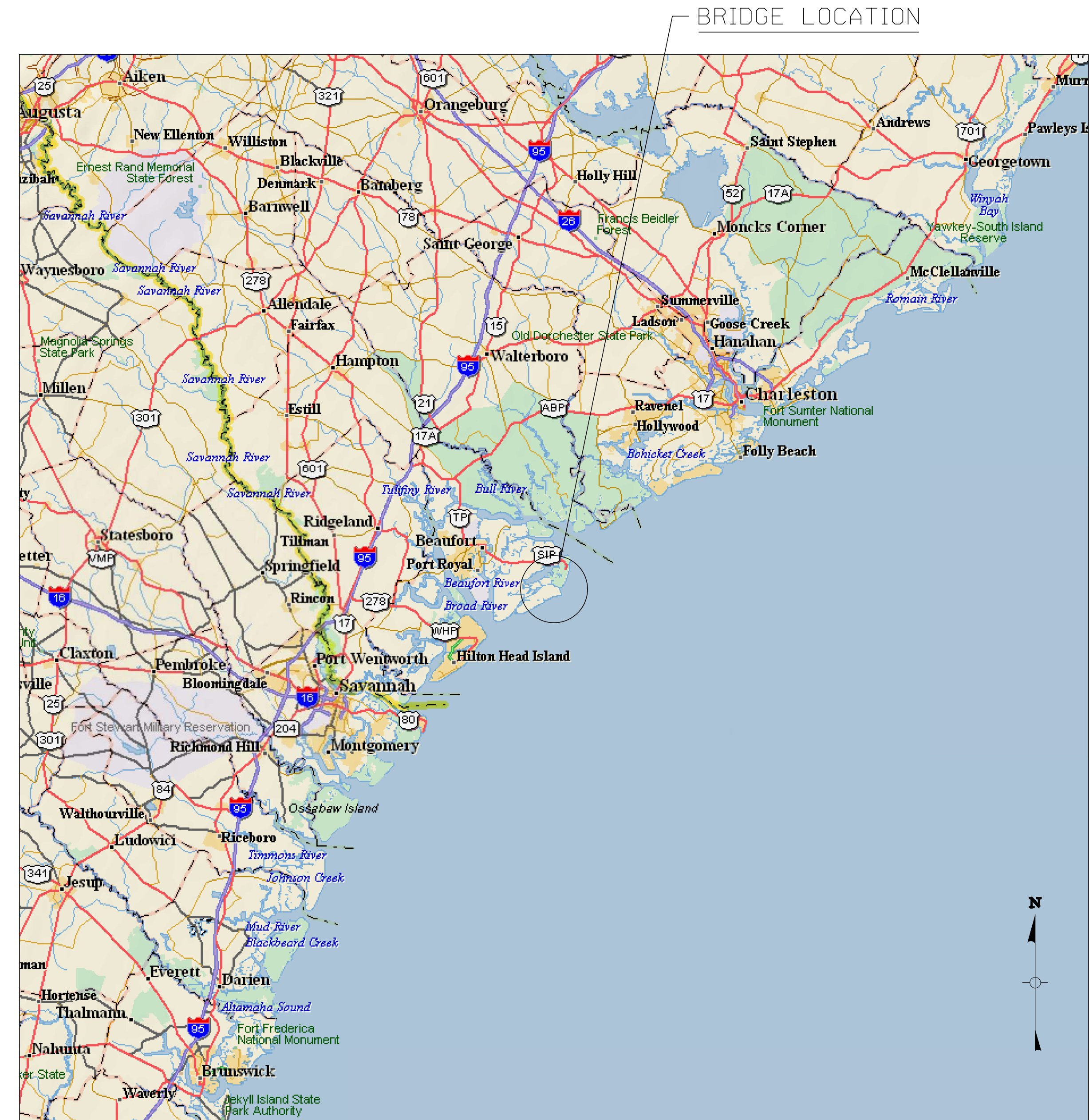
# FRIPP ISLAND INLET BRIDGE REPAIRS

## FRIPP ISLAND, SOUTH CAROLINA

### JANUARY 2025



LOCATION

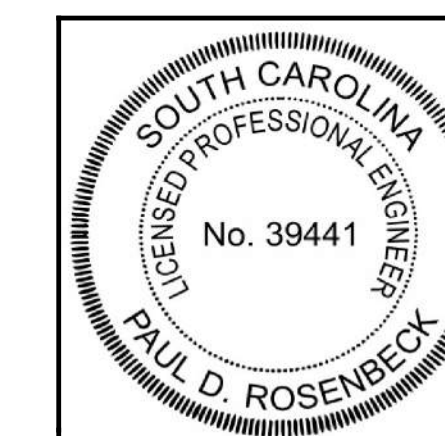


VICINITY

Approximate Location of Bridge is

Latitude 32°-20'-14"

Longitude 80°-27'-55"



LOCATION AND VICINITY	
DRAWN BY: AMV	DATE: 1/6/2025
CHECKED BY: PDR	SCALE: NTS
PROJECT: 13-1394-017	SHEET NO. 1

235 MAGRATH DARBY BLVD.  
 SUITE 275  
 MT. PLEASANT, SC 29464  
 (843) 556-2624



**General Notes:**

1. Notes below are not intended to replace Specifications. See Specifications for requirements in addition to General Notes. Contractor shall use the SCDOT 2007 Standard Specifications for Highway Construction.
2. The Contractor shall verify all dimensions and existing conditions before starting work. Notify the Owner in writing of any discrepancies. The Contractor shall not begin construction in any such affected area until the discrepancy has been resolved by the Owner.
3. All Federal, State, and Local Safety Regulations are to be strictly followed. Methods of Construction and Installation of Materials is the Contractor's responsibility.
4. All elevations referenced on these Contract Plans are based on Mean Sea Level (MSL) Elevation of 0.0. All elevations shall be verified in the field by the Contractor. All existing elevations are based on the Design Drawings dated 1961, 1980, 1996, and 1999 and from the Hydrographic Survey completed on February 6, 2022 by GEL Engineering, LLC.
5. All work shall conform to the requirements of the Contract Documents.
6. The Contractor shall exercise caution during construction operations to prevent any damage to adjacent structures and structural components not within the scope of these outlined repairs. Structures and structural components not within the scope of this project that are damaged during the repair operations shall be repaired or replaced at the expense of the Contractor to the satisfaction of the Owner.
7. All Utilities shall be temporarily supported or removed and re-attached comparable to existing conditions to the satisfaction of the Owner. This work shall be considered incidental to the specified repair work. Any Utilities damaged in the process of the Contractor's Operations shall be repaired or replaced at the expense of the Contractor to the satisfaction of the Owner.
8. All work under this Contract shall comply with "The Safety And Health Regulations For Construction" (OSHA 29 CFR 1926), the State of South Carolina, and all other applicable codes and regulations of agencies having jurisdiction.
9. For all Repair Items requiring the removal of Existing Structural Materials, Marine Growth, and other Deleterious Substances, the Contractor shall capture all materials and substances removed and not allow their discharge into the surrounding land, water, or air. All debris created during the execution of the specified work shall be removed from the project site. No oil or other hazardous substances shall be discharged into the water around the project site. All products of removal operations, debris, and hazardous substances shall be properly disposed of according to the Contract Documents and regulations of all governing agencies, and shall be the sole responsibility of the Contractor.
10. Plan dimensions and details shown on these Contract Documents are based primarily on the Design Documents dated 1961, 1980, 1996, 1999 and field measurements and are subject to nominal construction variations.
11. The Contractor shall furnish all labor, equipment, and materials for successful completion of the project.
12. The Contractor shall make no deviation from the Contract Documents without written approval from the Owner.
13. The Contractor shall notify the Owner of any discrepancies between the Contract Documents and Existing Conditions for resolution prior to proceeding with the work.
14. The locations of underground and overhead lines and structures that may be shown on the plans are for reference only and the accuracy and locations are not guaranteed. The Contractor shall be responsible for verifying and locating all aboveground and underground utility lines and structures before digging. Other utilities or structures may be in place and the Contractor shall accept risk of other underground utilities. The Contractor shall make every effort to locate other possible unknown utility lines by use of an Electronic Pipe Finder, or other means he may prefer, and shall excavate and expose all existing underground lines in advance of any trenching or digging operations. The Contractor will be held responsible for the workmanlike repair of any damage done to any utilities during work under this contract. The Contractor shall familiarize himself with the Existing Conditions and be prepared to adequately care for and safeguard himself and the Owner from damage.
15. Jetting of piles shall not be permitted. Pile installation shall be accomplished with appropriate pile driving equipment. During the pile driving operations the contractor shall continuously monitor the elevation of the bridge deck at both gutter lines. Should any change in elevation exceeding 1/4" be detected, the pile driving shall be ceased immediately. Details of the movement shall be reported to the engineer for further instructions.

**Water Elevations:**

The water elevations shown in the Plans are for information only, and the actual water elevation during construction may vary depending on weather conditions and seasonal fluctuations.

**Reinforcing Steel:**

Fabricate reinforcing bars in accordance with the current C.R.S.I Manual of Standard Practice except for ties and stirrups. Provide all ties and stirrups with 135° hooks that have extensions no less than the larger of ten bar diameters or six inches.

**Channel Bottom Notes:**

Channel Bottom Elevations were obtained from fascia soundings completed on February 6, 2022.

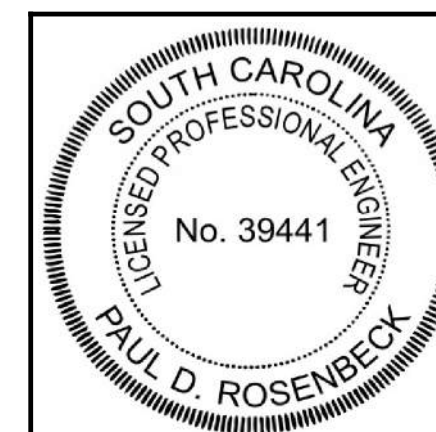
Summary of Estimated Quantities		
Repair Item	Unit	Quantity
Mobilization	EA	1
Traffic Control	EA	1
Repair Type 1: Square Pile Jacket	LF	54
Repair Type 2: Octagonal Pile Jacket	LF	31
Repair Type 3: Beam Spall Repair	CF	5.63
Repair Type 4: Concrete Spall Repair	CF	103.88
Repair Type 5: Bent Retrofit (Quantities for a Total of 2 Bent Retrofits)	—	—
Reinforcing Steel for Structures (Bridges)	LB	4,982
Concrete for Structures - Class 4000	CY	54.6
Prestressed Concrete Piling (20" Square)	LF	742
Prestressed Concrete Index Piling (20" Square)	LF	106
Dynamic Pile Analyzer Test Set-Up	EA	1
Pile Driving Set-Up	EA	8
Repair Type 6: Concrete Collar Demolition and Replacement (Bents 25 and 26)	EA	2

**Specifications:**

AASHTO 2017 LRFD Bridge Design Specifications, 8th Edition, With Interim Revisions through 2017.

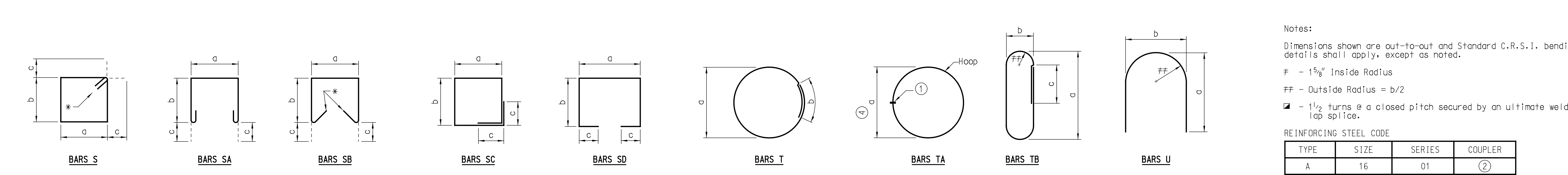
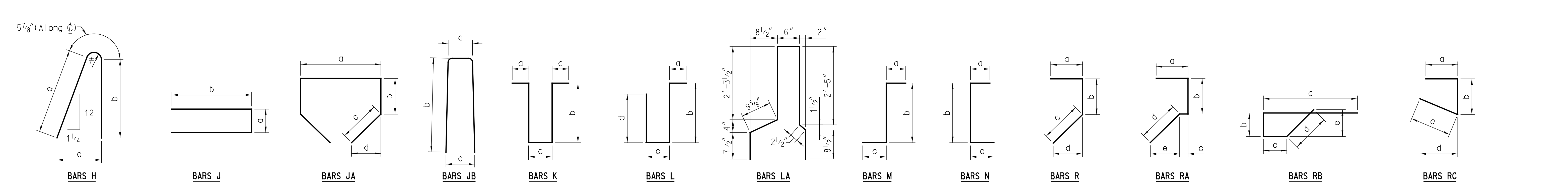
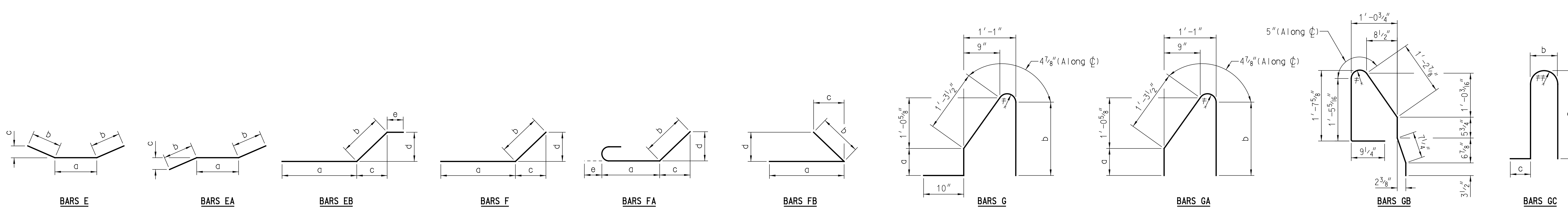
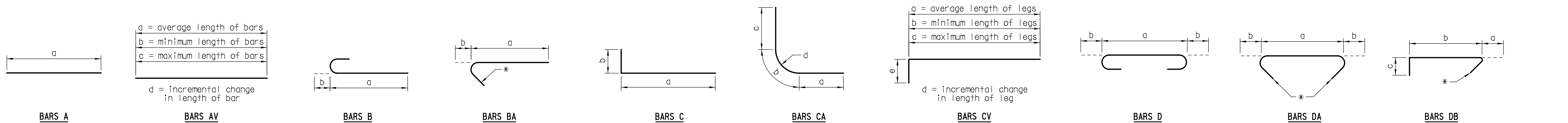
**Design Data:**

Load and Resistance Factored Design (LRFD) Method.  
Live Load: HS 15-44



**GENERAL NOTES**

<b>DRAWN BY:</b> AMV		235 MAGRATH DARBY BLVD., SUITE 275 MT. PLEASANT, SC 29464 (843) 556-2624	<b>DATE:</b> 1/6/2025
<b>CHECKED BY:</b> PDR			<b>SCALE:</b> NTS
<b>PROJECT:</b> 13-1394-017			<b>SHEET NO.:</b> 2

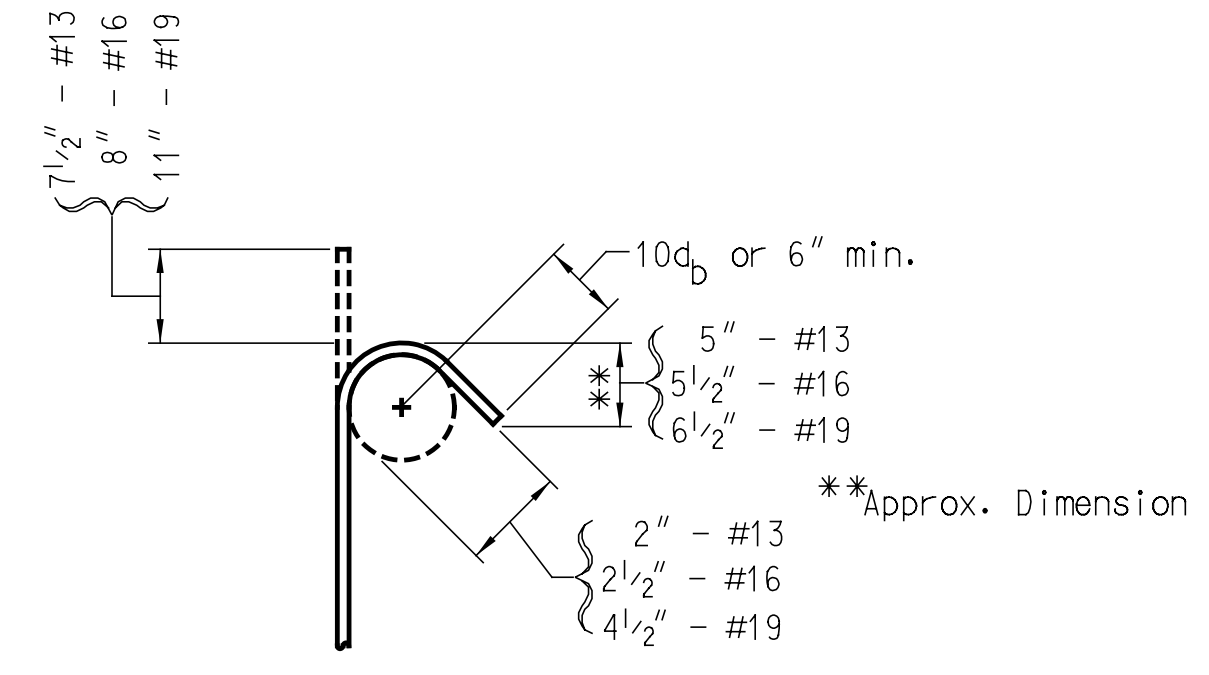


Notes:  
 Dimensions shown are out-to-out and Standard C.R.S.I. bending details shall apply, except as noted.  
 # - 1 5/8" Inside Radius  
 ## - Outside Radius = b/2  
 \* - 1 1/2 turns @ a closed pitch secured by an ultimate welded lap splice.

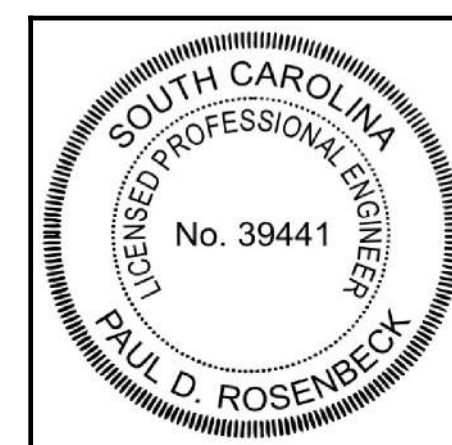
REINFORCING STEEL CODE

TYPE	SIZE	SERIES	COUPLER
A	16	01	(2)

- Ultimate Butt-Welded Splice - Use complete joint penetration butt weld conforming to the requirements of AWS D1.4/D1.4M Structural Welding Code - Reinforcing Steel (Latest Edition) and the Standard Specifications.
- If a mechanical coupler is required, the reinforcing steel code includes a designation of "S" for a standard coupler and a designation of "U" for an Ultimate Coupler. Unless noted otherwise, bar lengths shown in the Reinforcing Steel Schedules are to the center of the coupler. If necessary, adjust the length of the bars to maintain the required concrete cover.
- Splice WS and WP bars with either ultimate welded lap splices or ultimate mechanical couplers. Use over and under lap splices, not side by side, to maintain bar clearances.
- The fabrication tolerance for welded hoop diameter is ± 1/2 inch.



\*STANDARD 135° SEISMIC HOOK



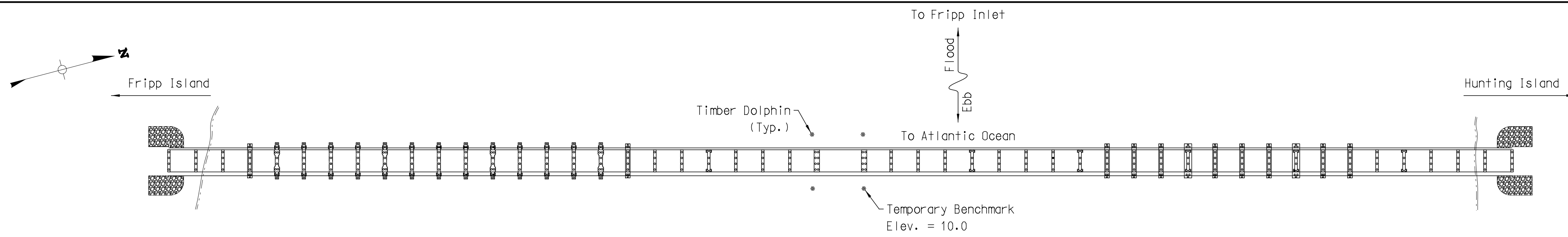
REINFORCING BENDING DETAILS

DRAWN BY: AMV	DATE: 1/6/2025
CHECKED BY: PDR	SCALE: NTS
PROJECT: 13-1394-017	SHEET NO. 3



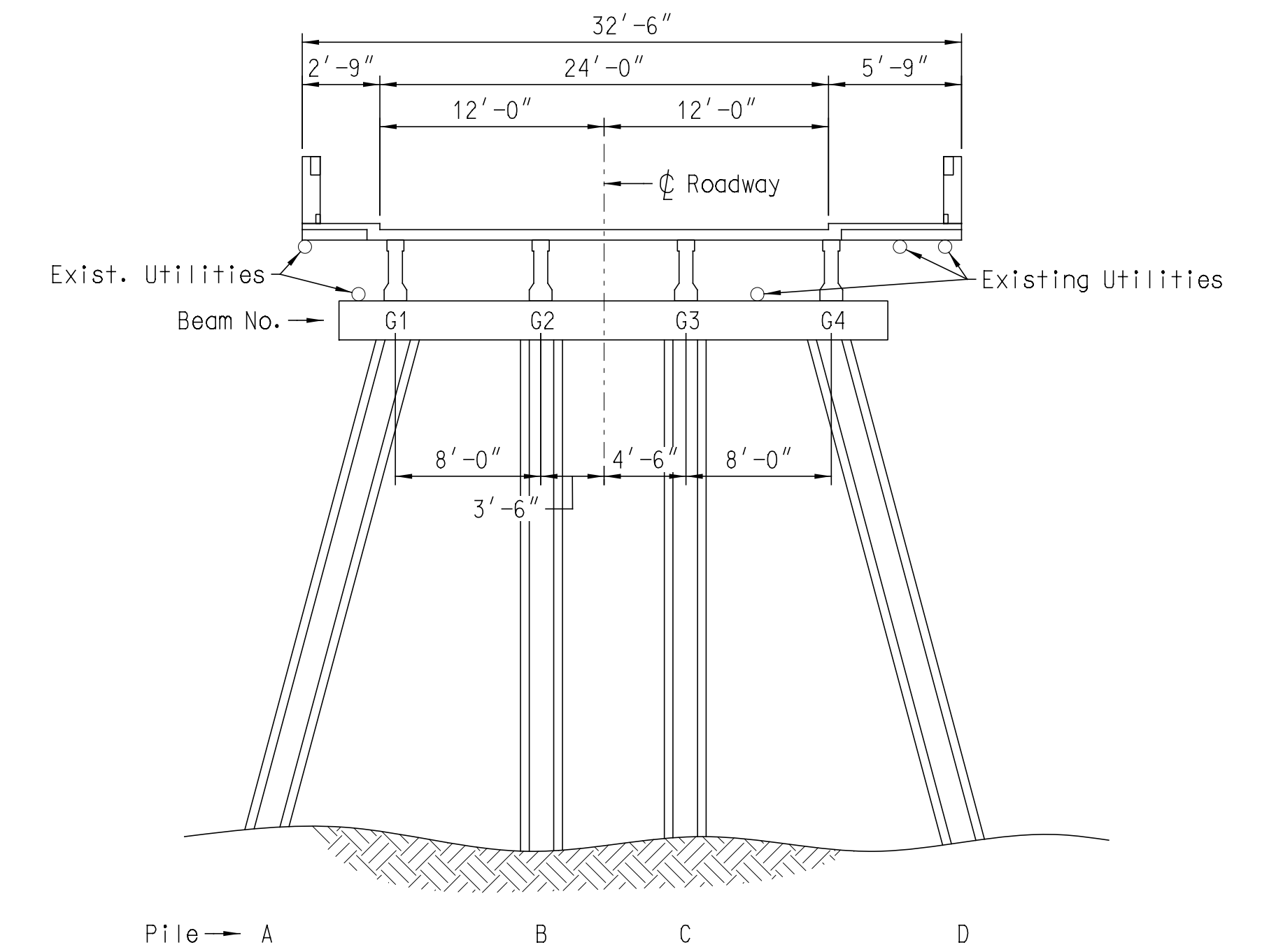
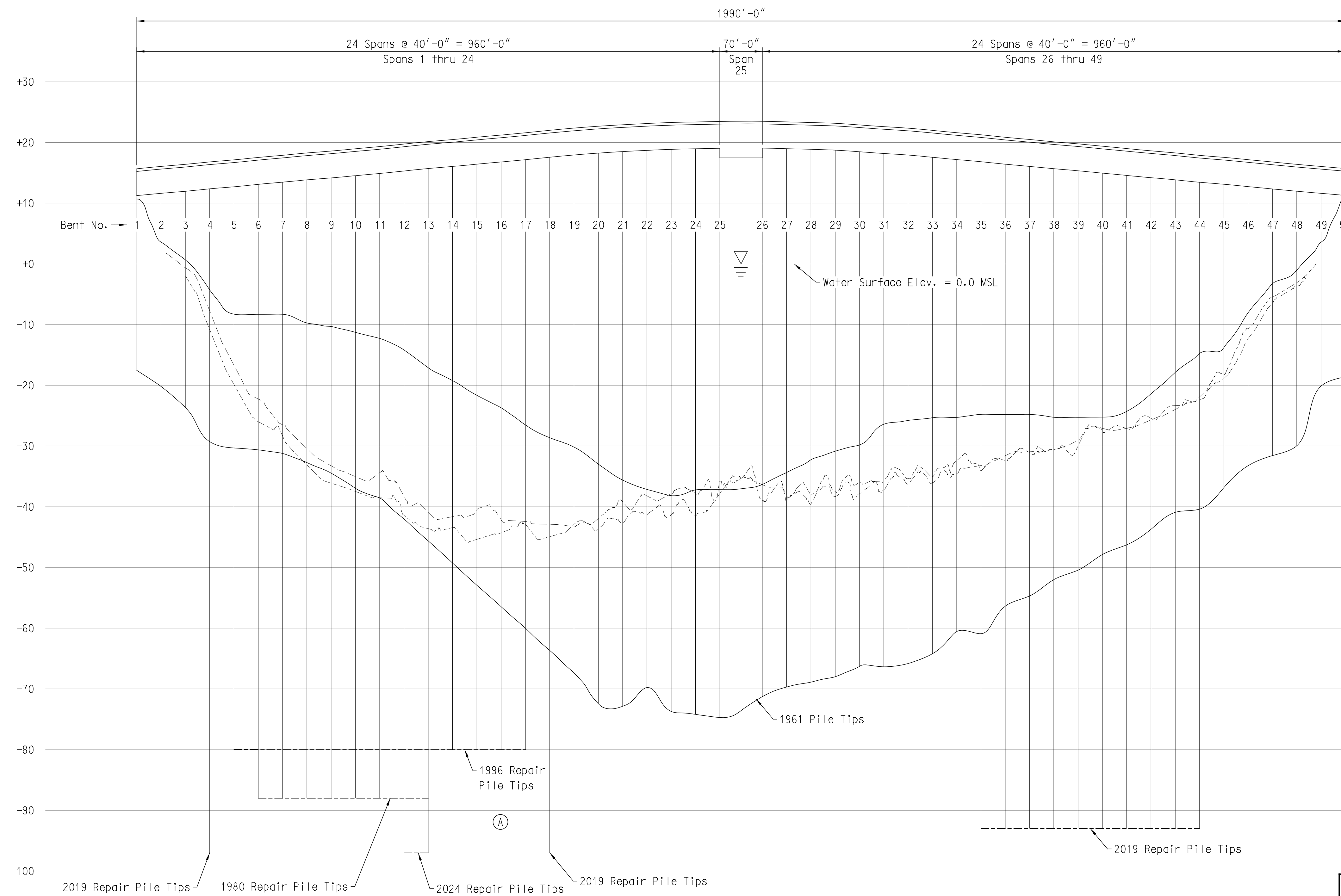
235 MAGRATH DARBY BLVD.  
 SUITE 275  
 MT. PLEASANT, SC 29464  
 (843) 556-2624





General Notes:

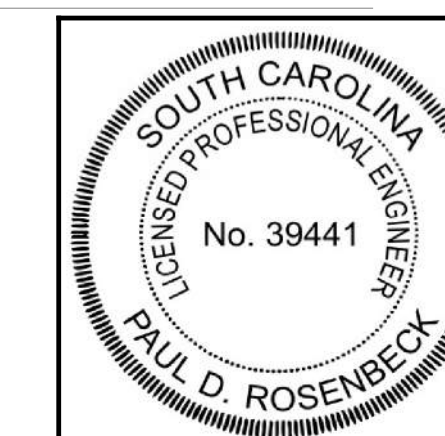
1. 1961 channel bottom profile was developed from construction documents dated 1961.
2. 2022 channel bottom profile was developed from the hydrographic survey completed on February 6, 2022 by GEL Engineering, LLC.
3. This figure was developed from field notes, sketches, and existing construction documents dated 1961, 1980, 1996, and 1999 provided by Fripp Island Public Service District.



Legend:

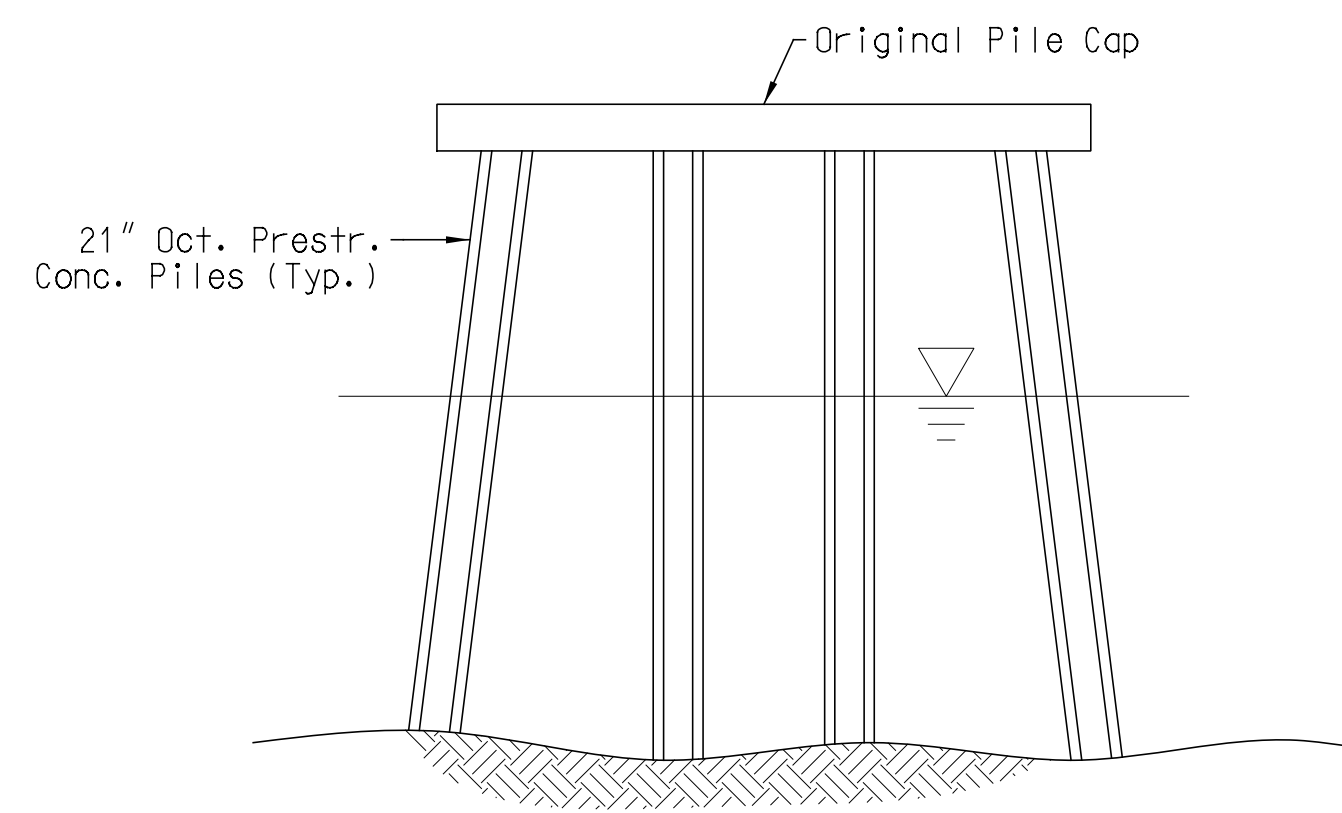
- 1961 Channel Bottom
- 2022 Upstream Channel Bottom (By GEL) (B)
- 2022 Downstream Channel Bottom (By GEL) (B)

- (A) 1980 Repair Plans specify that pile tips to be determined by test piles. Test Pile data is not available, pile tips are based on 1996 construction documents.
- (B) 2022 GEL Hydrographic Survey used as baseline survey.



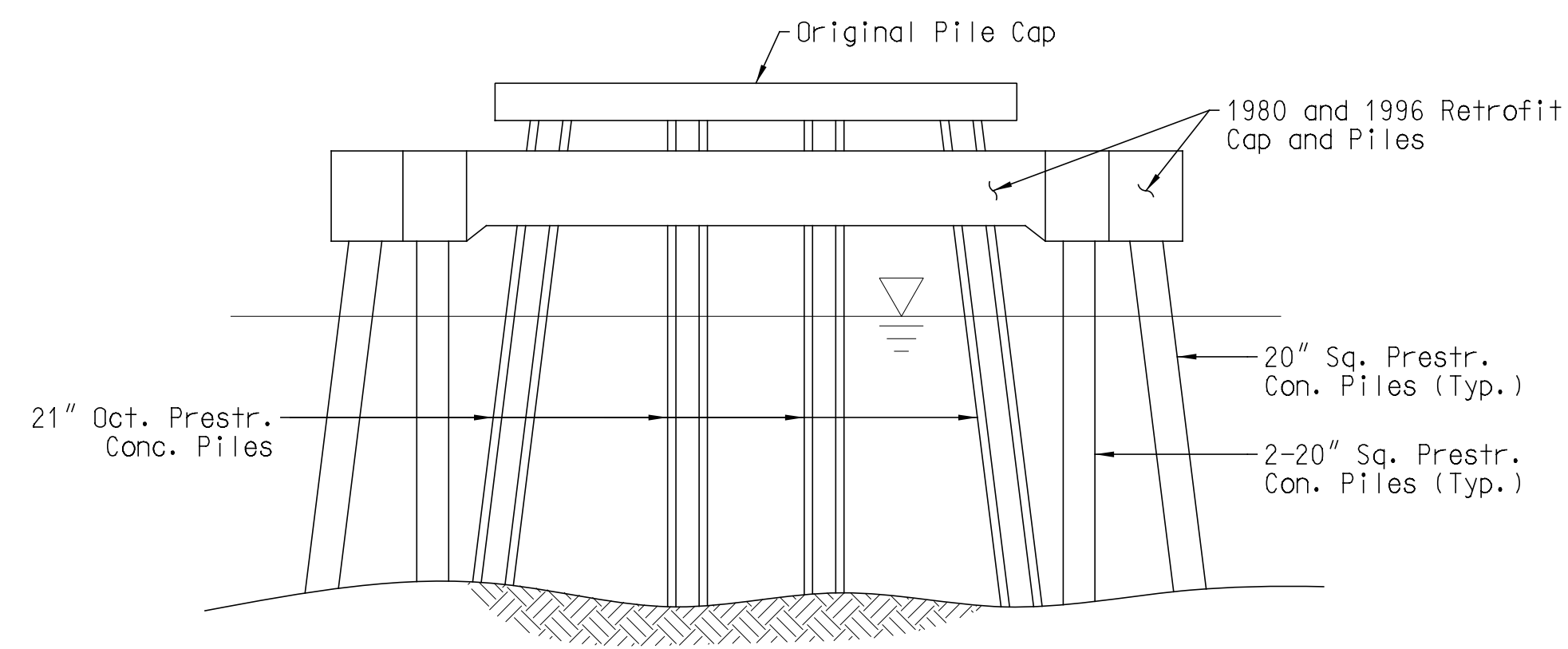
PLAN AND PROFILE

DRAWN BY: AMV		235 MAGRATH DARBY BLVD., SUITE 275 MT. PLEASANT, SC 29464 (843) 556-2624	DATE: 1/6/2025
CHECKED BY: PDR			SCALE: AS SHOWN
PROJECT: 13-1394-017			SHEET NO. 4



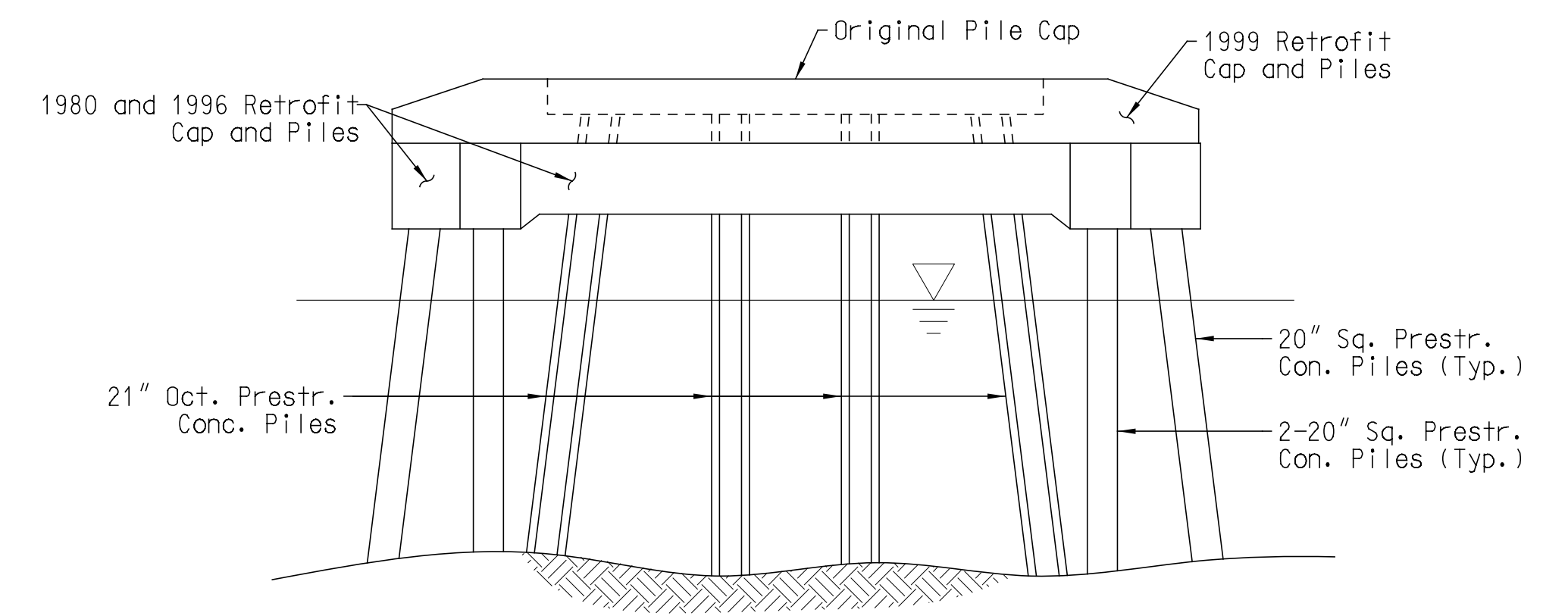
**TYPE I BENT ELEVATION**

(Typical of Bents 1-3, 19-20, 22-24, 27-29, 31-33, 45, and 47-50)



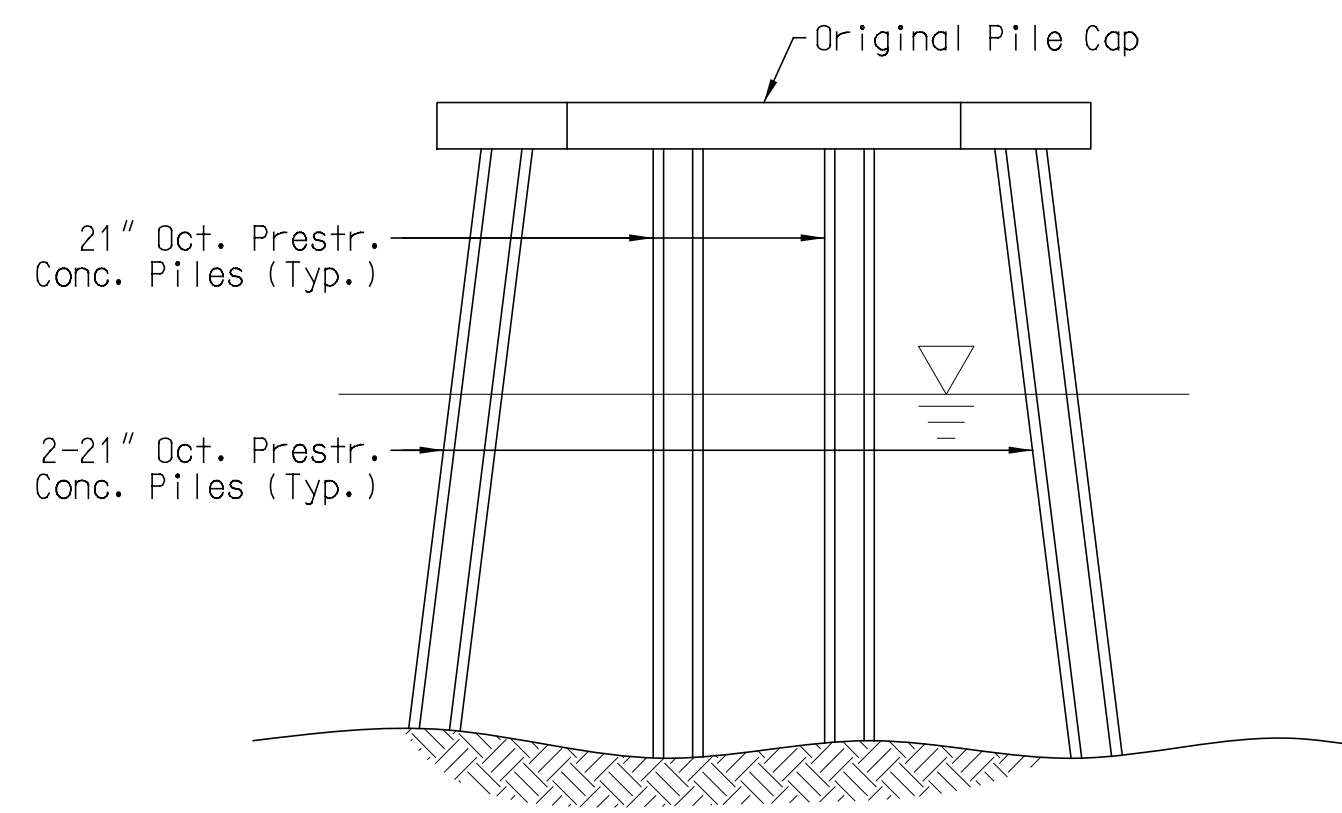
**RETROFIT I BENT ELEVATION 1**

(Typical of Bents 14, 15, and 16)



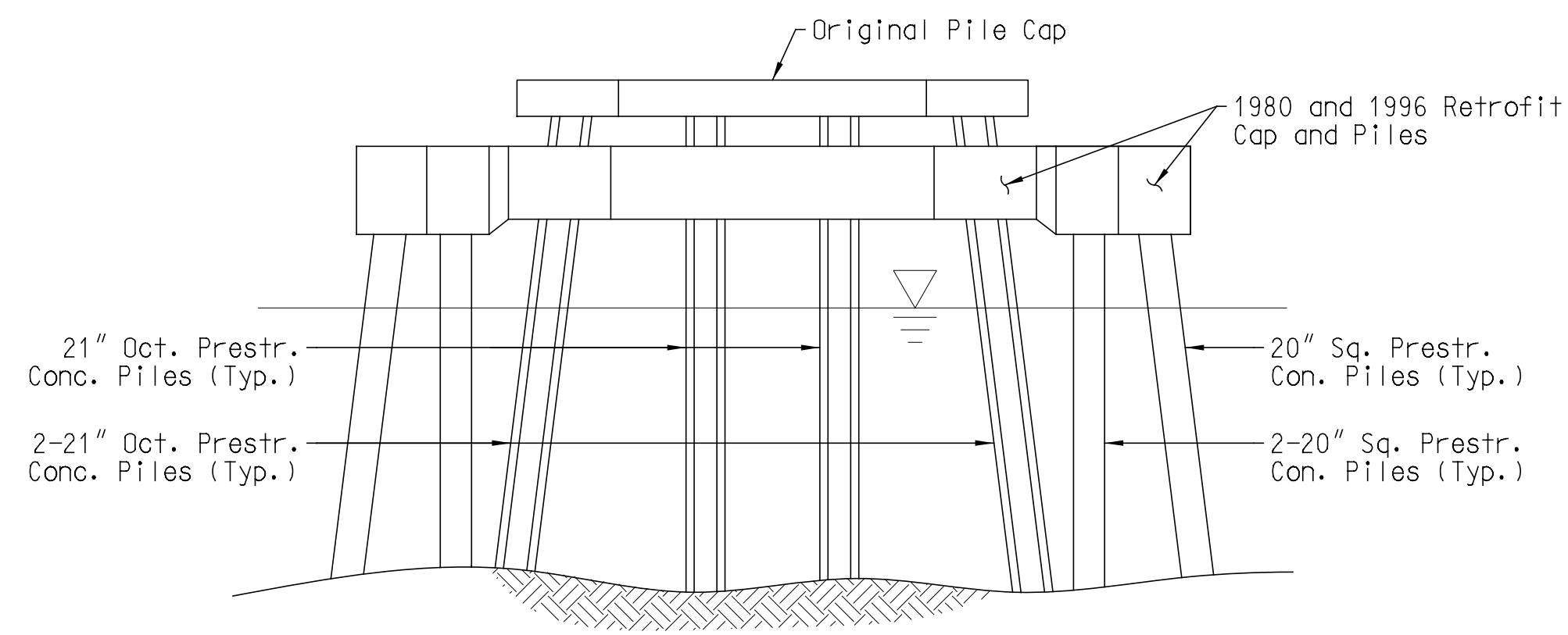
**RETROFIT I BENT ELEVATION 2**

(Typical of Bents 6-8, and 10-12)



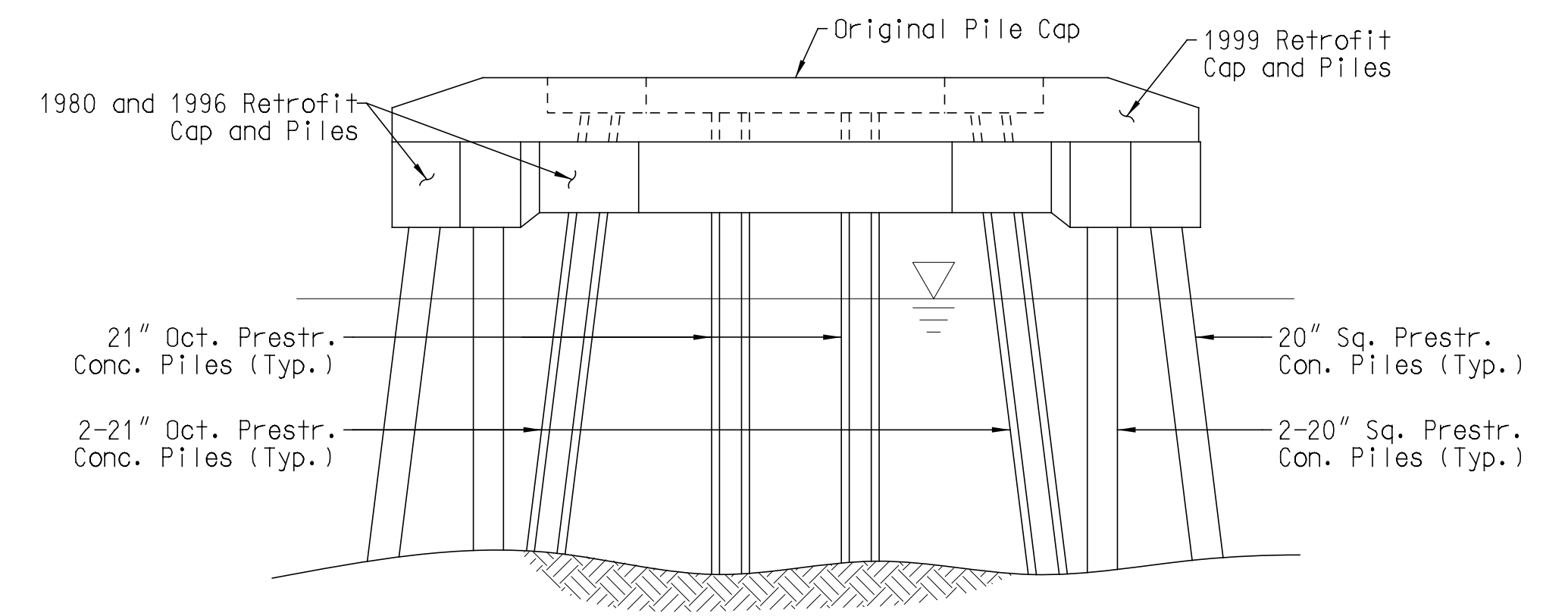
**TYPE II BENT ELEVATION**

(Typical of Bents 21, 30, 34, and 46)



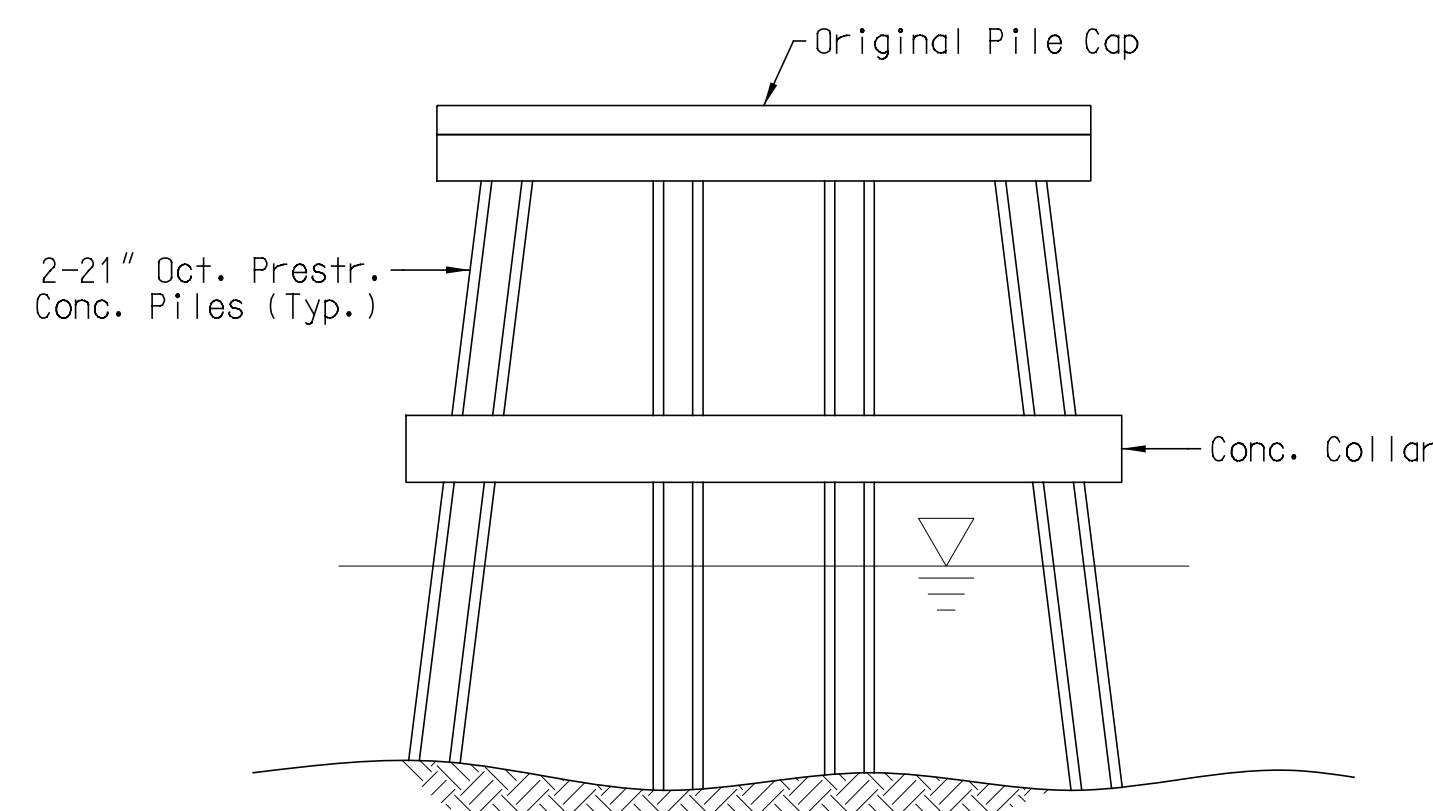
**RETROFIT II BENT ELEVATION 1**

(Typical of Bents 5 and 17)



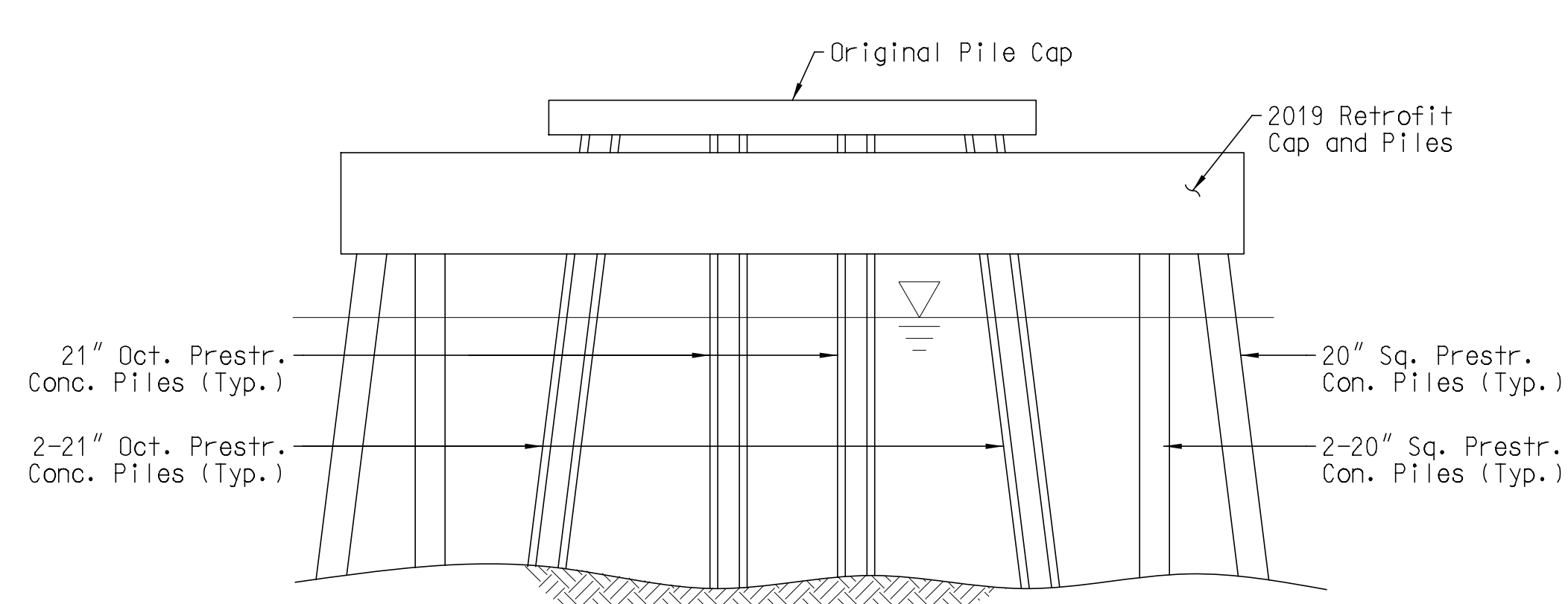
**RETROFIT II BENT ELEVATION 2**

(Typical of Bents 9 and 13)



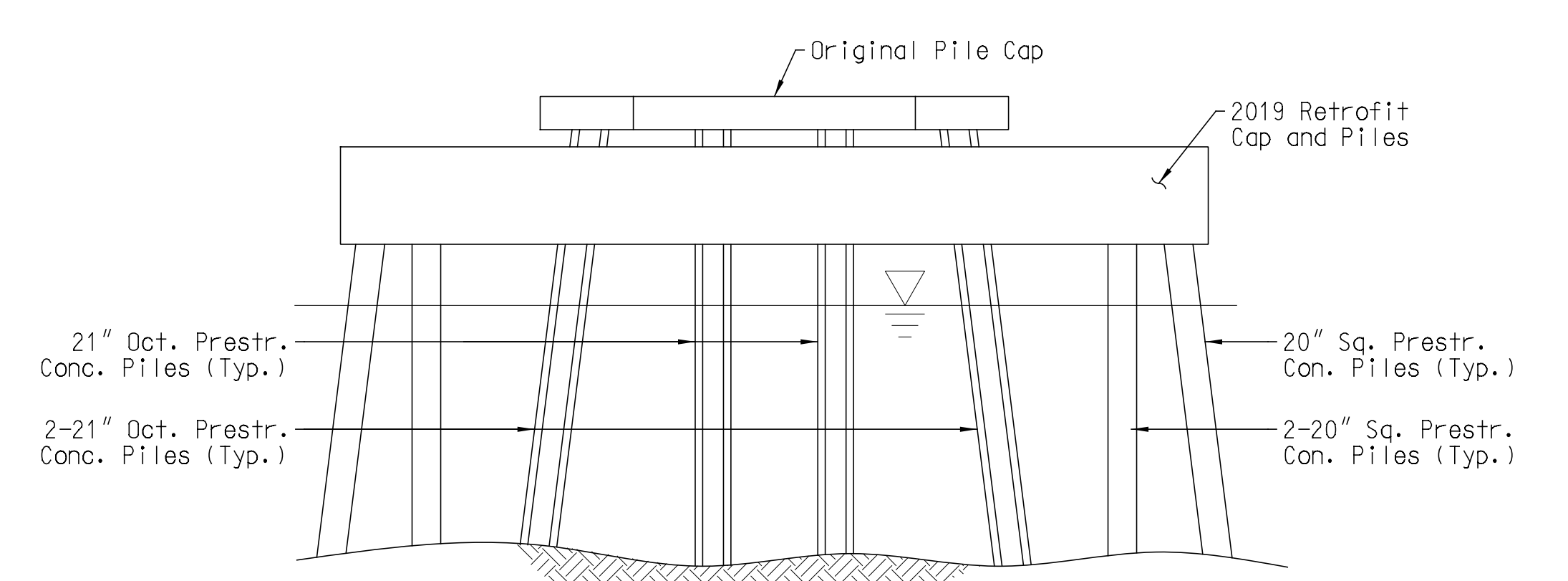
**TYPE III BENT ELEVATION**

(Typical of Bents 25 and 26)



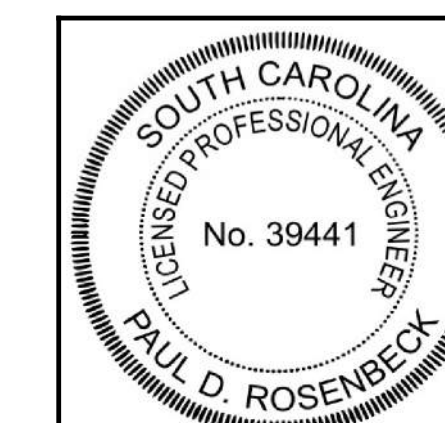
**RETROFIT III BENT ELEVATION**

(Typical of Bents 4, 18, 35-37, 39-41, and 43-44)



**RETROFIT IV BENT ELEVATION**

(Typical of Bents 38 and 42)



**TYPICAL BENT ELEVATIONS**

<b>DRAWN BY:</b> AMV		235 MAGRATH DARBY BLVD., SUITE 275 MT. PLEASANT, SC 29464 (843) 556-2624	<b>DATE:</b> 1/6/2025
<b>CHECKED BY:</b> PDR			<b>SCALE:</b> 1"=8'-0"
<b>PROJECT:</b> 13-1394-017			<b>SHEET NO.</b> 5



REPAIR NOTES			
Item Number	Repair Type	Estimated Quantity of Repair, CF	Deterioration Notes
1	4	13.96 CF	Span 2, 4' north of bent 2 between beams 1 and 2, and beams 2 and 3, impending spall 5' dia.
2	3	0.71 CF	Span 2, Beam 3, west face of bottom flange, crack up to 1/8" wide by 2' length, from north end of beam.
3	4	0.79 CF	Span 3, underside of deck, between beams 3 and 4, spall 2' by 2' by 1" penetration, rust staining present.
4	4	8.18 CF	Span 3, underside of deck, between beams 3 and 4, 3 impending spalls, 3' dia. rust staining present.
5	4	0.97 CF	Span 4, underside of deck, between Beams 3 and 4, spall 1 1/2' wide by 1' long by 4" penetration with 3 exposed reinforcement. Minor section loss.
6	4	2.43 CF	Span 4, underside of deck, between beams 3 and 4, 3' by 2' area impending spall.
7	4	2.22 CF	Bent 5, pile cap west fascia, horizontal cracks typ 1/8" and up to 1/4" with efflorescence, rust staining.
8	4	5.35 CF	Bent 5, pile cap east fascia, horizontal crack 1/8" by full width. Wrapped around north face (1'-6" length) and south face (6' length).
9	3	0.23 CF	Span 5 beam 2, impending spall 1' dia. on underside of beam 5' from bent 6.
10	4	0.24 CF	Bent 2, pile cap, horizontal crack 1/16" x 18" between piles C and D - on north face.
11	4	0.20 CF	Span 6 underside of deck between beams 1 and 2, spall 1' dia. by 1" penetration with 1 exposed reinforcement and 20% section loss.
12	3	0.20 CF	Span 6, west face of beam 4, 3' north of bent 6, shallow popout spall 18" vertical x 4" horizontal, with 1 exposed reinforcement bar, up to 10% section loss.
13	2	6.0 FT	Bent 49, Pile A, 1/16" horizontal crack located at top of pile and extending around the entire perimeter.
14	3	0.71 CF	Span 7 beam 2 at 4' north of bent 7, spall in bottom flange 2' dia. by 2" penetration with 3 exposed strands and 20% section loss.
15	4	0.35 CF	Span 7, east fascia of deck, spall 1' length by 4" vertical by 4" horizontal by 2" penetration.
16	3	1.99 CF	Span 7 beam 3 at bent 8, spall in bottom flange 4' long by full width by 3" penetration with 4 exposed strands and up to 100% section loss.
17	4	1.34 CF	Span 8 between beam 1 and 2 at bent 8, impending spall 2' dia. in bottom of deck.
18	4	0.97 CF	Span 8, underside of deck, between Beams 1 and 2, spall 1' by 2'.
19	1	6.0 FT	Bent 9, Pile B South, 1/16" vertical crack by 20" length located at top of pile at south west corner.
20	1	6.0 FT	Bent 9, Pile B North, north west corner, vertical crack 1/16" wide 1' long with adjacent rust stains.
21	1	6.0 FT	Bent 9, Pile G North, north east corner, vertical crack 1/8" wide 1' long.
22	1	6.0 FT	Bent 11, Pile B South, south west and north west corners, vertical crack 1/8" wide by 1 1/2' long. South west corner exhibits rust staining.
23	1	6.0 FT	Bent 11, Pile G North, north east corner, vertical crack 1/4" wide by 2' long, 30" by 8" area of delamination.
24	4	0.49 CF	Span 11, bottom of deck, between beams 2 and 3, 12" by 10" area of delamination.
25	1	6.0 FT	Bent 12, Pile G South, west face, impending spall from the cap down 4' with rust staining.
26	4	4.00 CF	Bent 12 Cap at Pile G, impending spall 4' by 1' on north and south face.
27	1	6.0 FT	Bent 13, Pile B South, northwest and southeast corner, crack 1/16" wide with rust staining 2'-6" long.
28	1	6.0 FT	Bent 13, Pile G South, crack 1/16" wide with rust staining from the cap down 3'.
29	4	0.12 CF	Span 13, east fascia, north end of span, 6" by 8" by 1" penetration spall.
30	3	0.26 CF	Span 14, Beam 3, east face, spall 1 1/2' long by 6" vertical by 1/2" penetration on bottom flange.

REPAIR NOTES			
Item Number	Repair Type	Estimated Quantity of Repair, CF	Deterioration Notes
31	4	0.35 CF	Bent 15, pile cap, horizontal crack 1/16" by 3' long at pile B south.
32	4	0.30 CF	Bent 15, pile cap, 1/8" wide horizontal crack 2 1/2' long at Pile B north.
33	3	0.33 CF	Span 15 beam 2 at 10' south of bent 16, spall 18" long by 9" wide by 1" penetration and no exposed reinforcement.
34	4	0.46 CF	Bent 16, pile cap, south face, at pile B - South, spall 18" long by 9" wide by 2" penetration.
35	4	35.14 CF	Bent 16, pile cap, horizontal crack 18" below top of retrofit cap, starting at pile f (south face) wrapping around east face, and extending to pile f (north face).
36	2	6.0 FT	Bent 16, Pile F, east face, hairline vertical crack with rust staining approximately 4' below cap.
37	1	6.0 FT	Bent 16, Pile G South, north face, hairline vertical crack from cap down 1'-3".
38	4	0.27 CF	Span 16, spall 18" by 8" by 1" penetration on underside of west rail located 8' south of Bent 17.
39	3	0.41 CF	Span 16, beam 3, at Bent 17, spall, full width of bottom flange at bearing line. 12" long x 1/2" penetration with no exposed strands.
40	2	6.0 FT	Bent 21, Pile D-South, north west face near pile cap, 1/16" by 2' long crack with associated 12" x 12" area of delamination.
41	4	11.49 CF	Bent 49, pile cap, on the south face a horizontal crack 1/16" wide extending the full length of the cap face.
42	2	6.0 FT	Bent 23, Pile D, west face, hairline horizontal crack, 17" length located 18" from top of pile.
43	2	7.0 FT	Bent 25, Pile C North, north face of pile, 18" below cap, 1/16" wide horizontal crack by 54" long. Wraps around south west face to east face.
44	4	0.71 CF	Span 25, bottom of deck, spall 2' long by 1' by 2" penetration with 3 exposed reinforcement and 10% section loss.
45	3	0.48 CF	Span 29, Beam 4, underside, shallow spall 4' long by 4" wide by 1/4" penetration with one exposed reinforcement.
46	4	0.15 CF	Bent 30, underside of pile cap, spall at Pile D North 8" dia. by 1 1/2" penetration.
47	4	0.26 CF	Bent 46, pile cap, spall 12" dia. by 1 1/2" penetration with exposed reinforcement 50% loss of section located at Pile D North.
48	4	1.05 CF	Bent 49, pile cap, 14" wide by 9" vertical by 7" penetration spall located on west face bottom corner.
49	4	11.49 CF	Bent 49, pile cap, hairline to 1/8" wide horizontal crack along the full length of the north face.
50	4	0.31 CF	Bent 49, pile cap, spall 12" by 8" by 2" penetration located southeast of Pile D on corner of pile cap.
51	3	0.13 CF	Span 25, Beam 3, underside, spall 18" long by 6" wide by 1" penetration with three exposed strands.
52	4	0.28 CF	West Rail, South Face at End Bent 1, Spall 8" wide by 10 1/2" Long by 2" penetration with exposed reinforcing.
53	4	0.02 CF	Span 37, Southbound lane near midspan, reinforcing protruding from deck, 1/4" high by 2" wide.
54	3	0.18 CF	Span 6, Beam 2, underside, spall 15" long by 12" wide by 1" penetration with two exposed strands.
55	6	2-EA	Demolition and replacement in kind of existing pile collars at bents 25 and 26

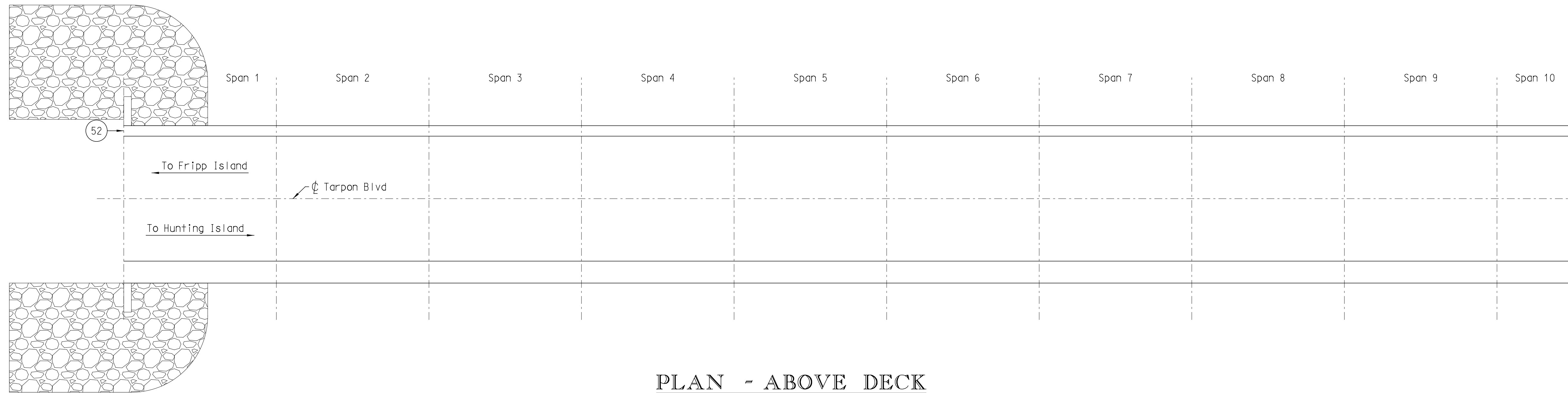
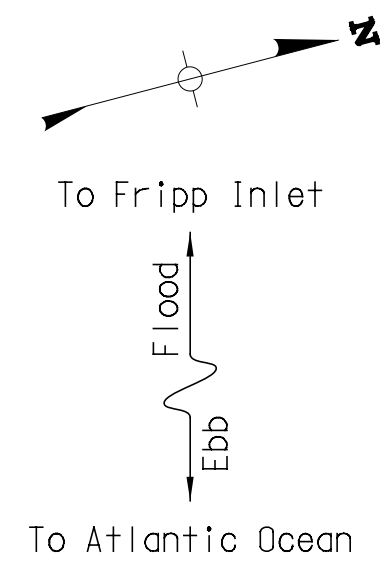


### REPAIR ITEM LIST

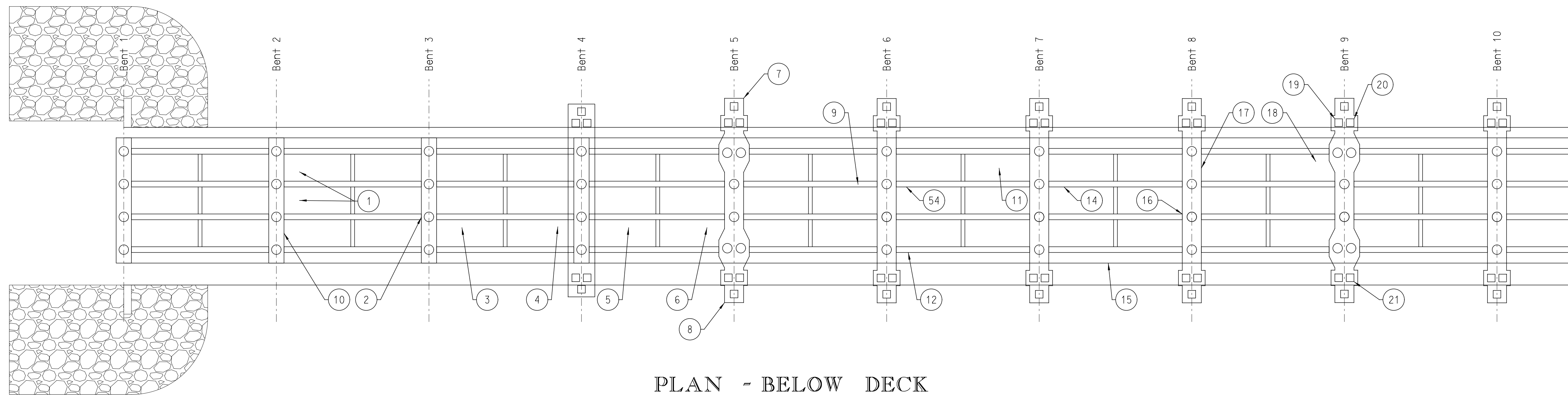
<b>DRAWN BY:</b> AMV	<b>DATE:</b> 1/6/2025
<b>CHECKED BY:</b> PDR	<b>SCALE:</b> NTS
<b>PROJECT:</b> 13-1394-017	<b>SHEET NO.</b> 6



235 MAGRATH DARBY BLVD.  
SUITE 275  
MT. PLEASANT, SC 29464  
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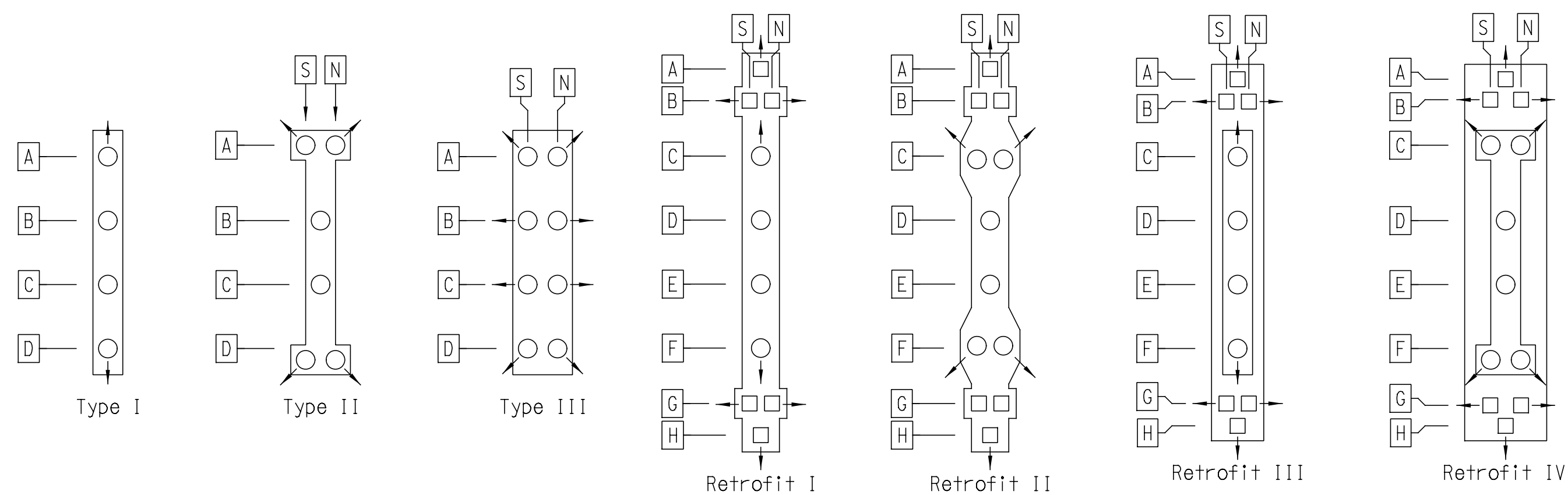


PLAN - ABOVE DECK



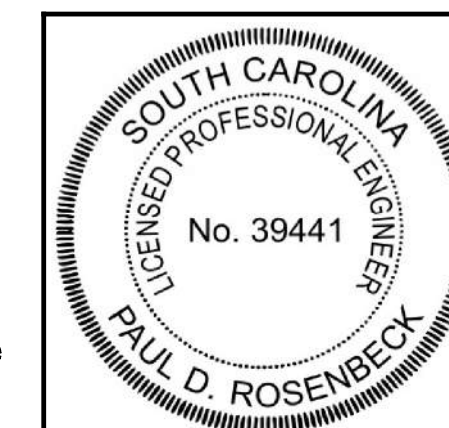
PLAN - BELOW DECK

MATCHLINE A-A (SEE REPAIR LOCATION PLAN II)



Legend:

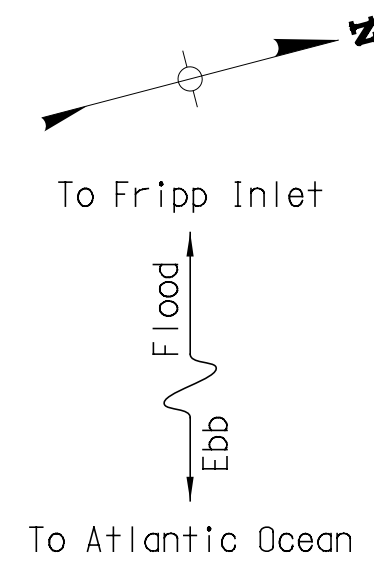
- Rip-Rap
- Repair Item
- 20 in. Sq. Conc. Pile
- 20 in. Sq. Conc. Jacketed Pile
- 21 in. Octagonal Concrete Pile
- 21 in. Oct. Conc. Jacketed Pile



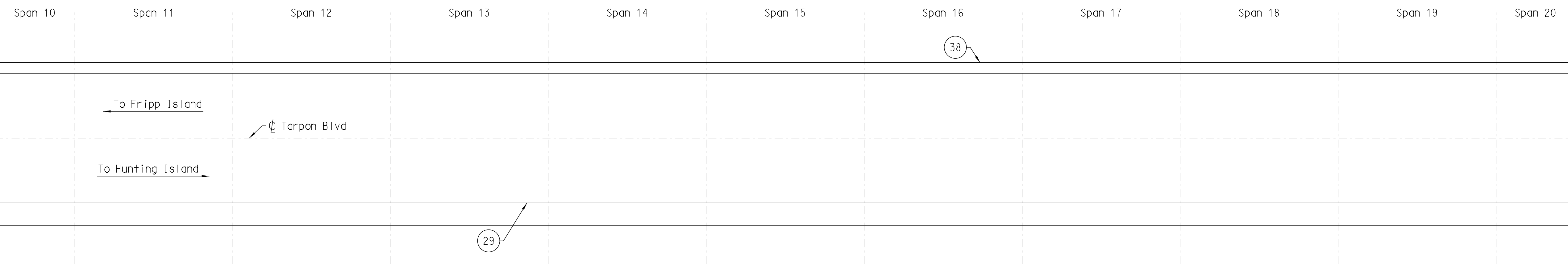
<b>REPAIR LOCATION PLAN I</b>	
<b>DRAWN BY:</b> AMV	<b>DATE:</b> 1/6/2025
<b>CHECKED BY:</b> PDR	<b>SCALE:</b> 1"=15'-0"
<b>PROJECT:</b> 13-1394-017	<b>SHEET NO.:</b> 7

235 MAGRATH DARBY BLVD.  
SUITE 275  
MT. PLEASANT, SC 29464  
(843) 556-2624

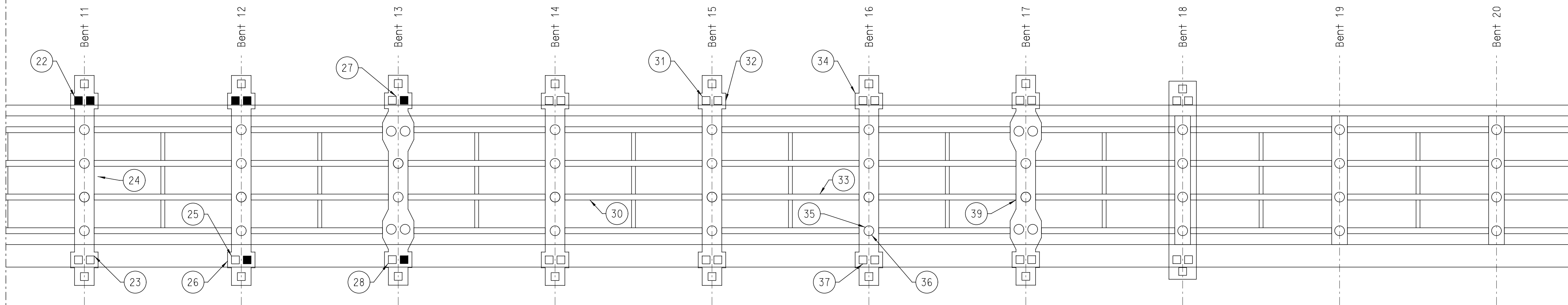




MATCHLINE A-A (SEE REPAIR LOCATION PLAN I)

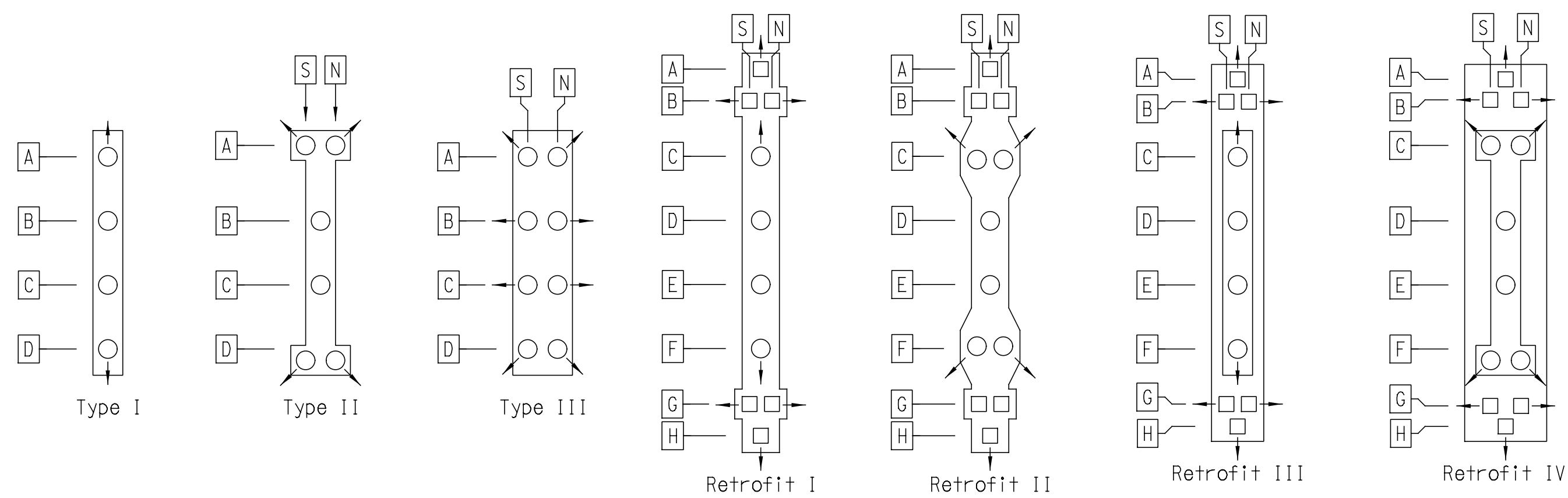


**PLAN - ABOVE DECK**



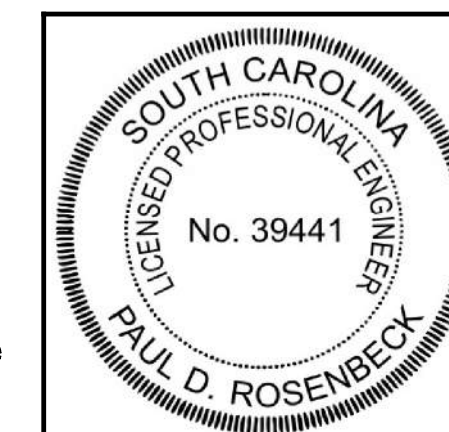
**PLAN - BELOW DECK**

MATCHLINE B-B (SEE REPAIR LOCATION PLAN III)



Legend:

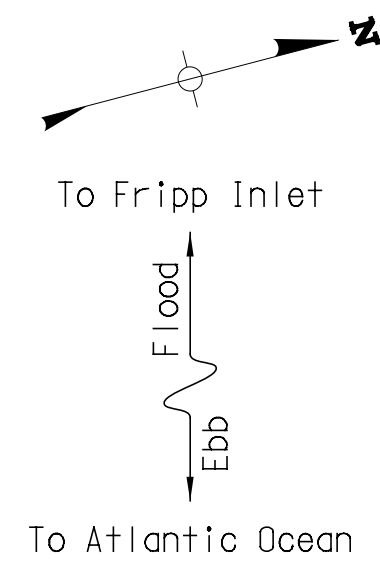
- Rip-Rap
- Repair Item
- 20 in. Sq. Conc. Pile
- 20 in. Sq. Conc. Jacketed Pile
- 21 in. Octagonal Concrete Pile
- 21 in. Oct. Conc. Jacketed Pile



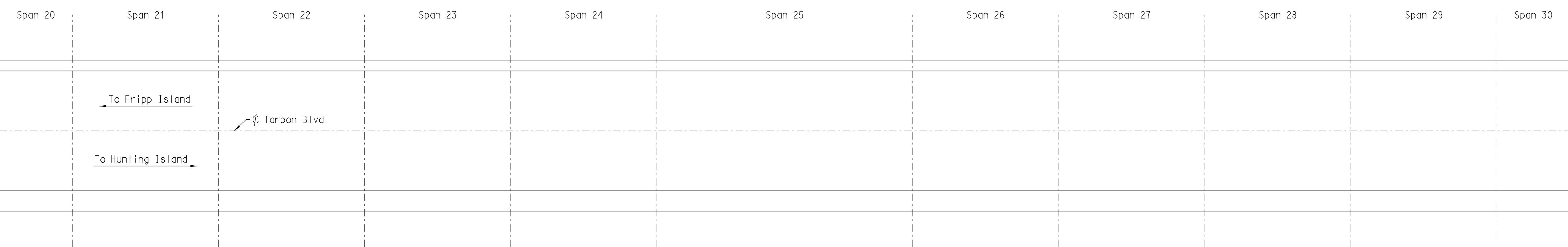
<b>REPAIR LOCATION PLAN II</b>	
<b>DRAWN BY:</b> AMV	<b>DATE:</b> 1/6/2025
<b>CHECKED BY:</b> PDR	<b>SCALE:</b> 1"=15'-0"
<b>PROJECT:</b> 13-1394-017	<b>SHEET NO.:</b> 8

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SUITE 275  
MT. PLEASANT, SC 29464  
(843) 556-2624

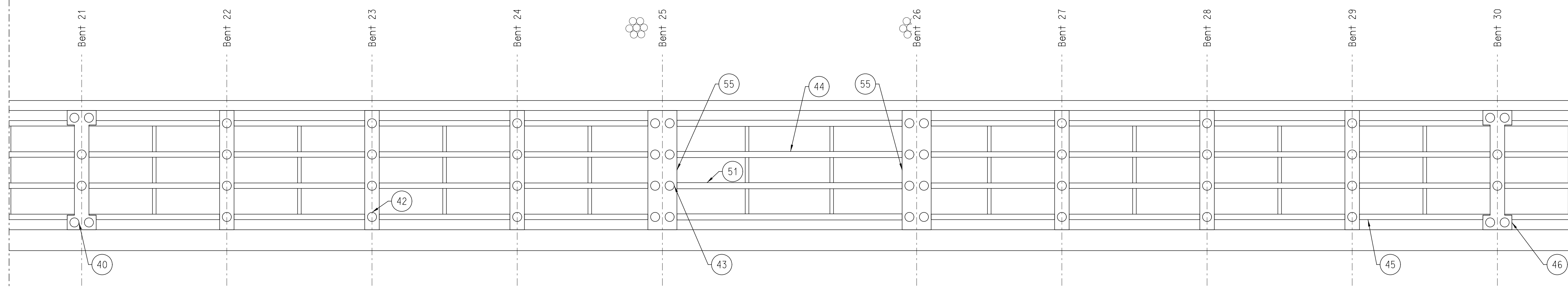




MATCHLINE B-B (SEE REPAIR LOCATION PLAN II)

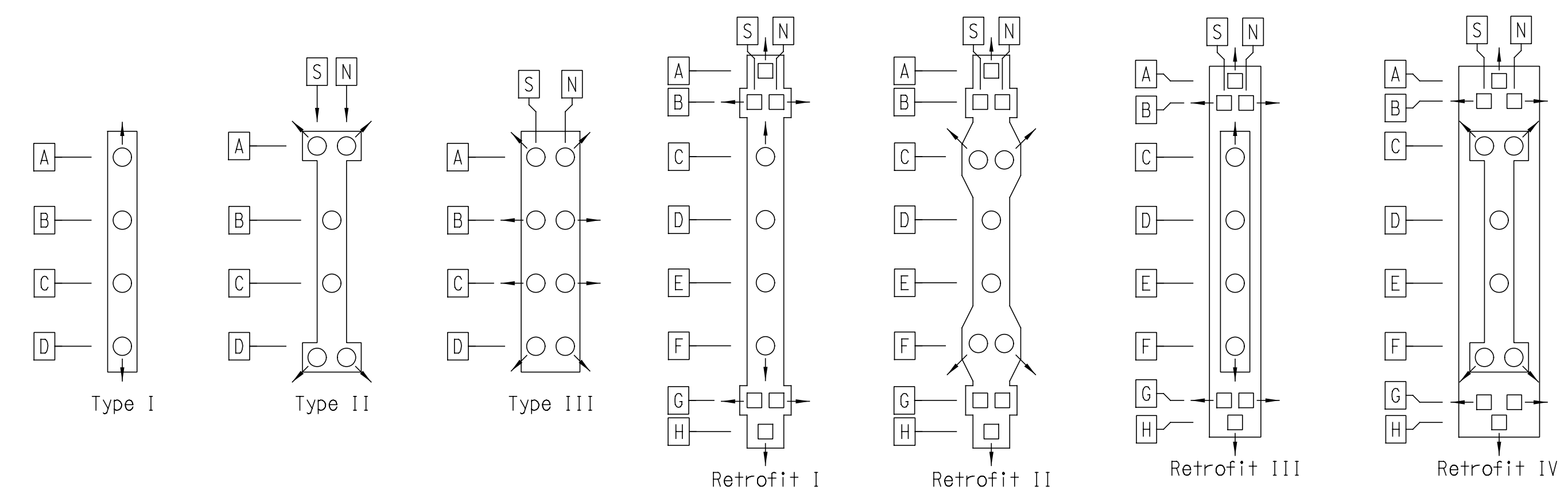


PLAN - ABOVE DECK



PLAN - BELOW DECK

MATCHLINE C-C (SEE REPAIR LOCATION PLAN IV)



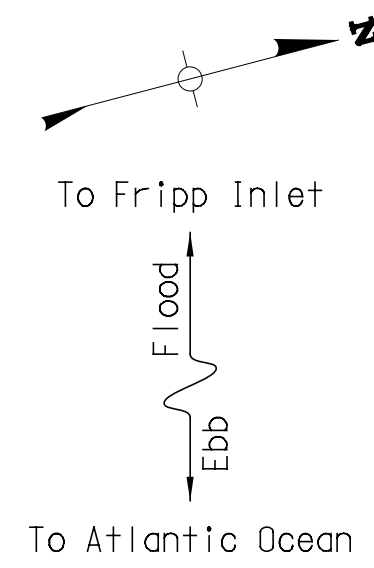
- Legend:
- Rip-Rap
  - Repair Item
  - 20 in. Sq. Conc. Pile
  - 21 in. Octagonal Concrete Pile
  - 21 in. Oct. Conc. Jacketed Pile



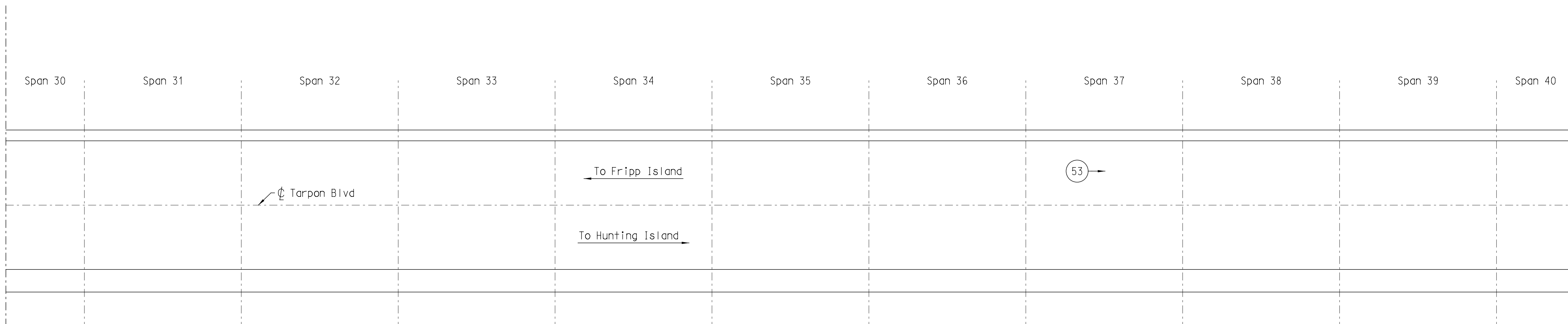
<b>REPAIR LOCATION PLAN III</b>	
<b>DRAWN BY:</b> AMV	<b>DATE:</b> 1/6/2025
<b>CHECKED BY:</b> PDR	<b>SCALE:</b> 1"=15'-0"
<b>PROJECT:</b> 13-1394-017	<b>SHEET NO.:</b> 9

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SUITE 275  
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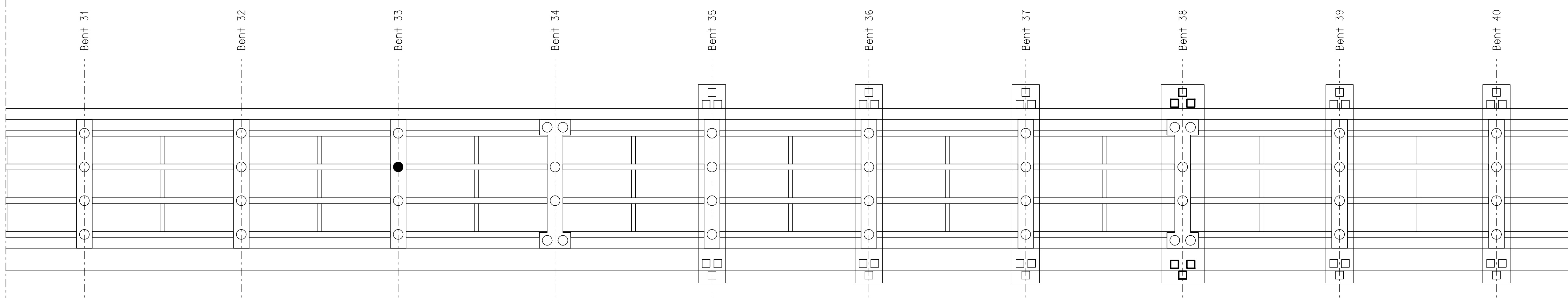




MATCHLINE C-C (SEE REPAIR LOCATION PLAN III)

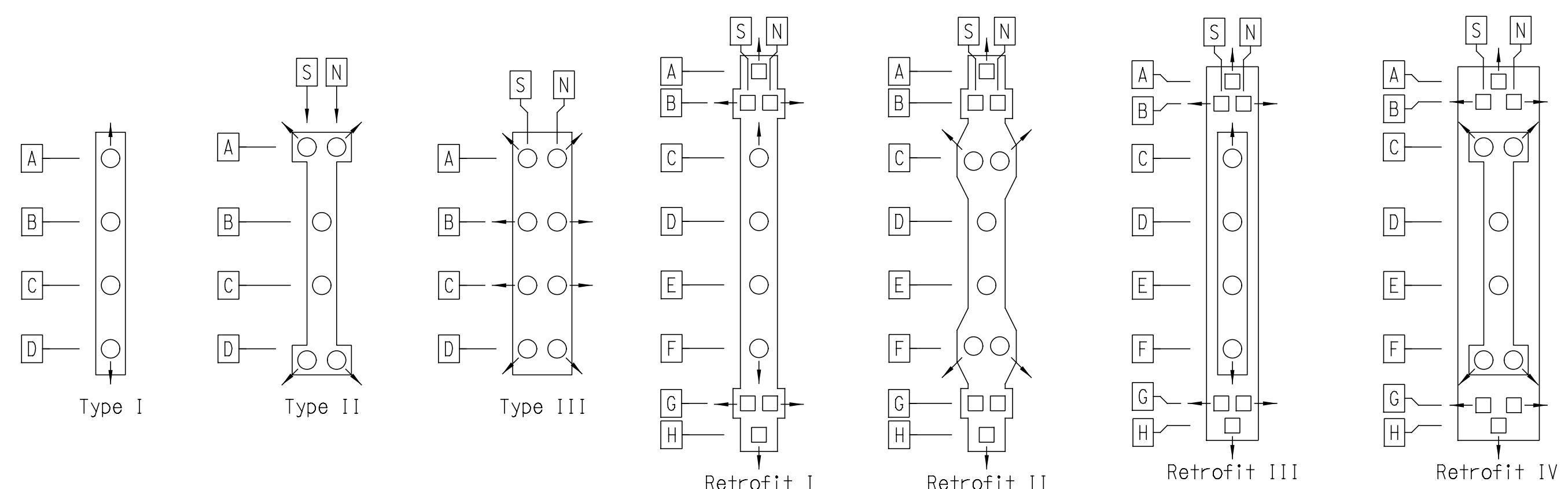


**PLAN - ABOVE DECK**

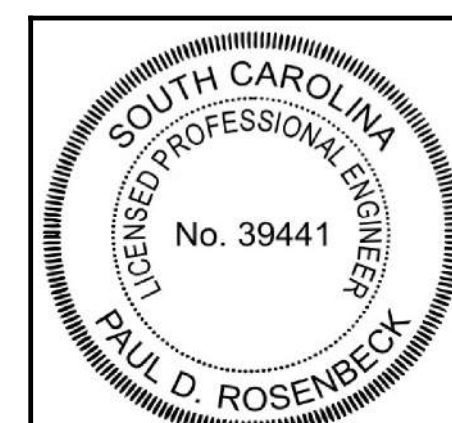


**PLAN - BELOW DECK**

MATCHLINE D-D (SEE REPAIR LOCATION PLAN V)



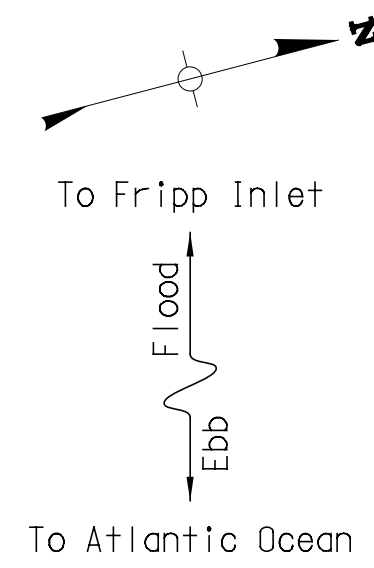
- Legend:**
- Rip-Rap
  - Repair Item
  - 20 in. Sq. Conc. Pile
  - 20 in. Sq. Conc. Jacketed Pile
  - 21 in. Octagonal Concrete Pile
  - 21 in. Oct. Conc. Jacketed Pile



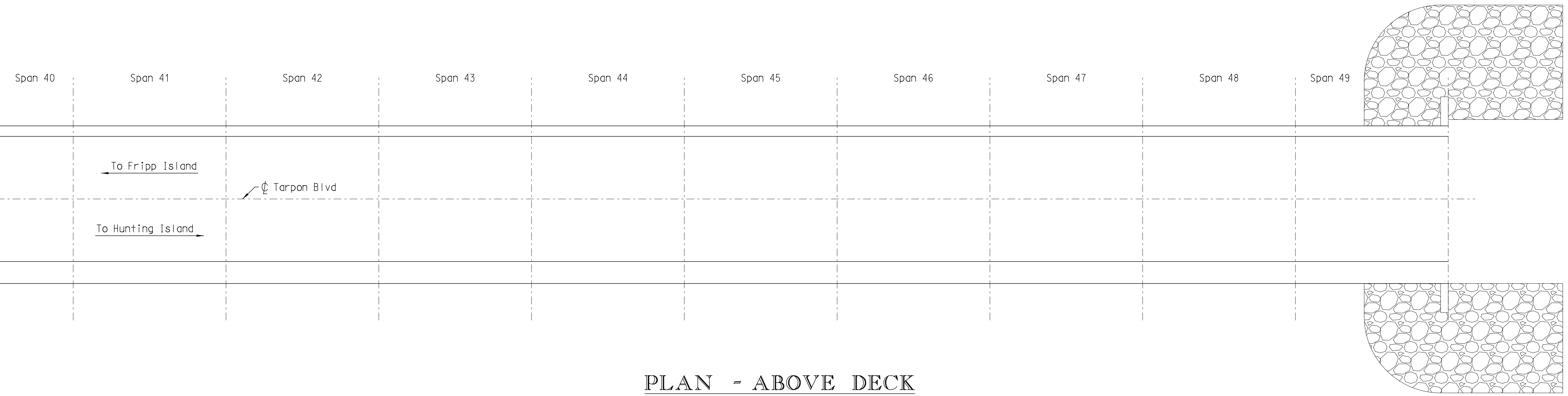
<b>REPAIR LOCATION PLAN IV</b>	
<b>DRAWN BY:</b> AMV	<b>DATE:</b> 1/6/2025
<b>CHECKED BY:</b> PDR	<b>SCALE:</b> 1"=15'-0"
<b>PROJECT:</b> 13-1394-017	<b>SHEET NO.:</b> 10

235 MAGRATH DARBY BLVD.  
SUITE 275  
MT. PLEASANT, SC 29464  
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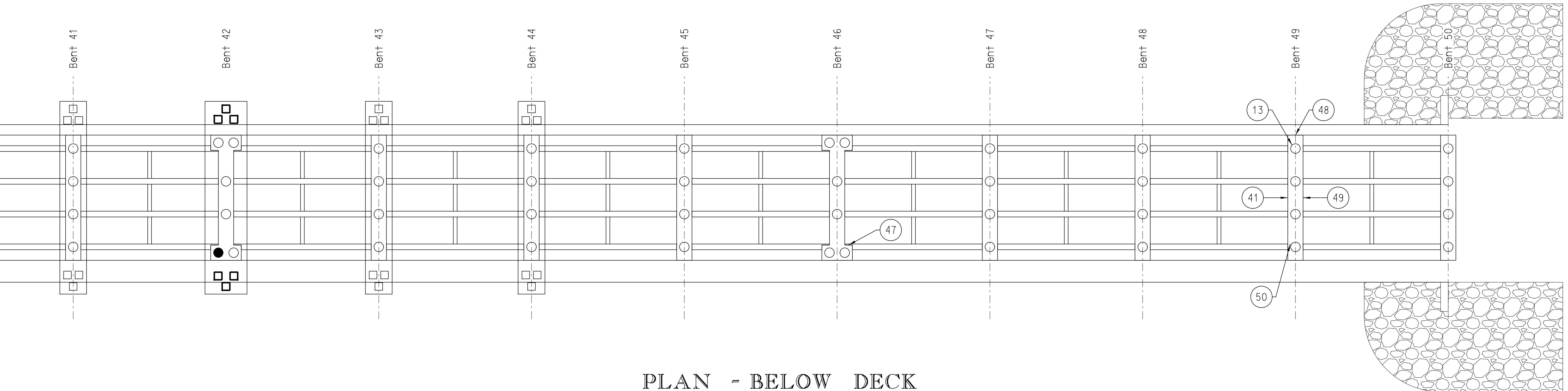




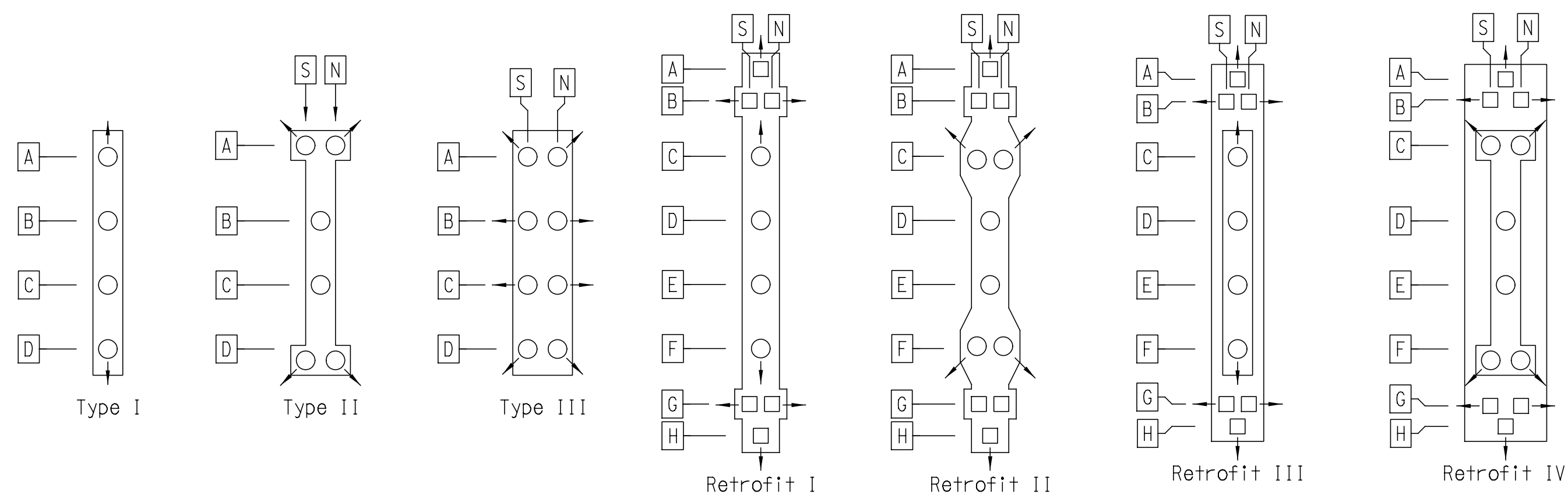
MATCHLINE D-D (SEE REPAIR LOCATION PLAN IV)



PLAN - ABOVE DECK

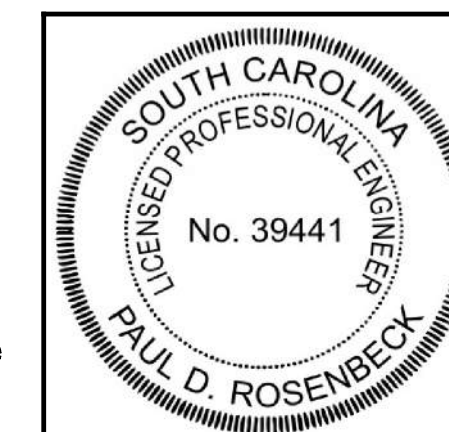


PLAN - BELOW DECK



Legend:

- Rip-Rap
- Repair Item
- 20 in. Sq. Conc. Pile
- 20 in. Sq. Conc. Jacketed Pile
- 21 in. Octagonal Concrete Pile
- 21 in. Oct. Conc. Jacketed Pile



REPAIR LOCATION PLAN V

DRAWN BY: AMV  
 CHECKED BY: PDR  
 PROJECT: 13-1394-017



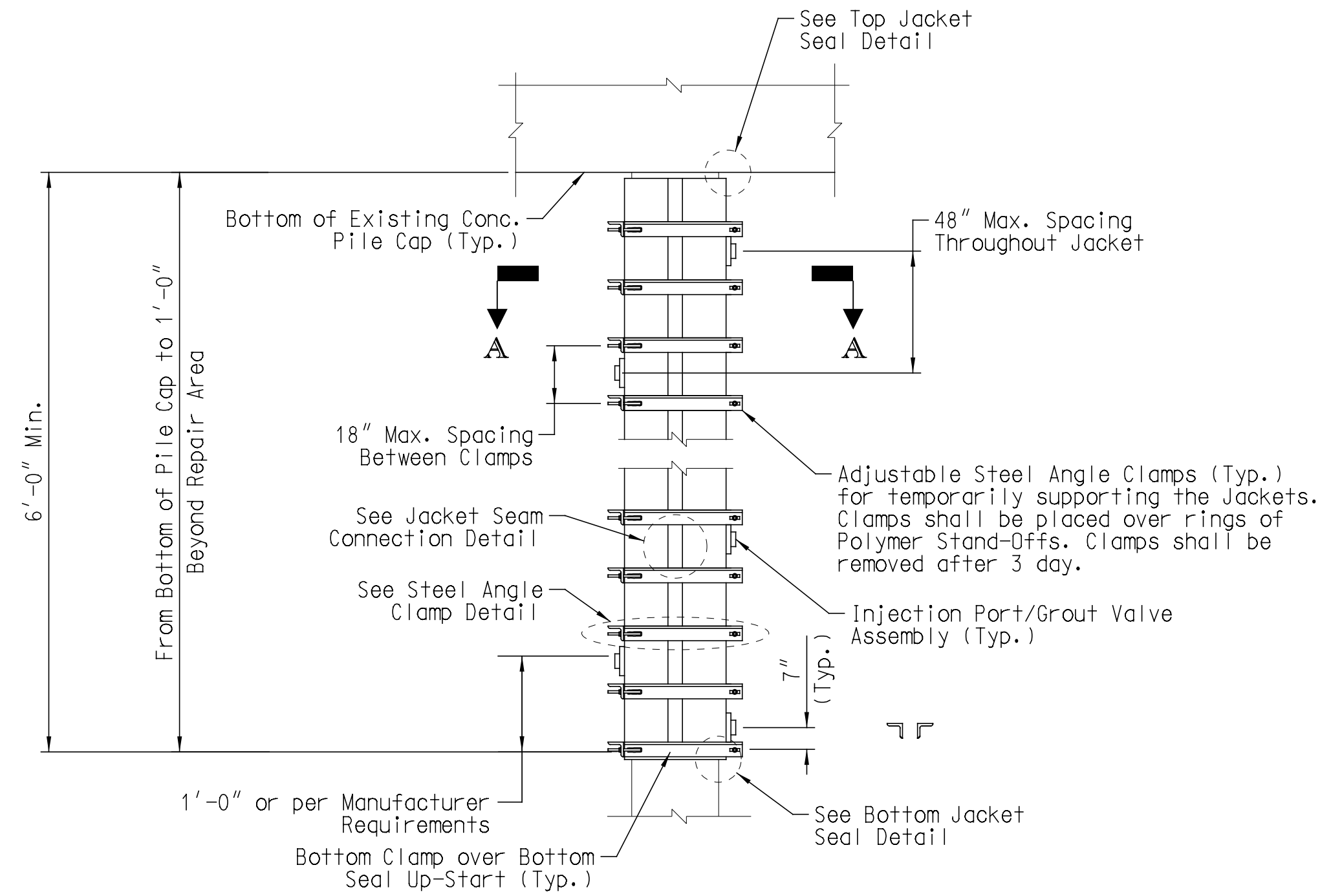
235 MAGRATH DARBY BLVD.  
 SUITE 275  
 MT. PLEASANT, SC 29464  
 (843) 556-2624

DATE: 1/6/2025  
 SCALE: 1"=15'-0"  
 SHEET NO. 11

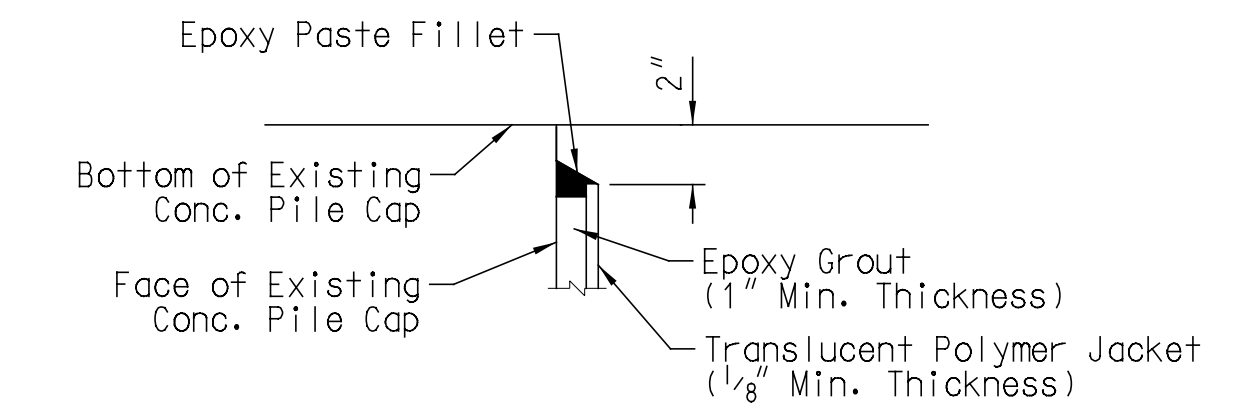


Repair Type 1: Square Pile Jacket Encapsulation Notes:

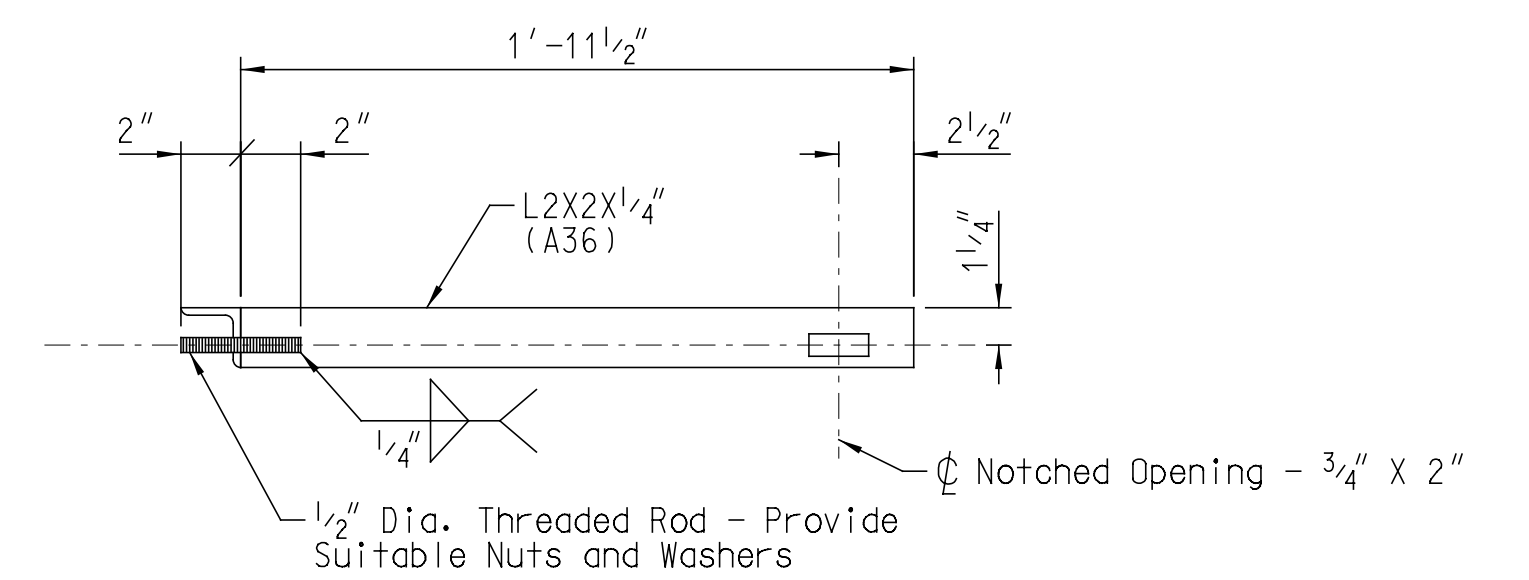
- Repair Type 1 is reserved for 20"x20" P/S Conc. Piles.
- Encapsulate vertical precast concrete piles with translucent polymer jackets and fill with epoxy grout, as detailed on this sheet and as per the contract documents.
- Patterns of stand-offs detailed shall be duplicated at intervals not to exceed 18 inches along the entire length of each jacket.
- Adjustable steel angle column clamps shall be placed over each ring of stand-offs.
- Injection ports/grout valves shall be placed on alternately opposite halves of each jacket, with bottom ports and spacing as shown in encapsulation elevation.
- The translucent polymer jacket installation procedure is as follows:
  - Step 1: The contractor shall clean the existing pile by abrasive blasting or high pressure water (3000 psi to 10,000 psi) to remove marine growth or deteriorated pile material.
  - Step 2: The owner shall have the opportunity to verify and photo document the level of deterioration of each pile prior to the jacket installation.
  - Step 3: Establish proper encapsulation limits for each pile scheduled for jacketing. Install encapsulation jacket around the pile, verify proper fit, and seal longitudinal seams. Contractor shall be responsible for securing the jacket in the proper location during grout installation. Any damage caused to secure the jacket in place shall be repaired to the satisfaction of the owner.
  - Step 4: Install bottom seal gasket and secure with epoxy paste. Allow bottom seal to cure as detailed in the contract documents.
  - Step 5: Attach the grout umbilical to the bottommost injection port/grout valve and pump epoxy grout for 30 seconds. Stop pumping grout and check jacket for leaks. Plug all upper injection ports/grout valves and resume pumping the epoxy grout until it reaches the top of jacket. The upper injection ports/grout valves shall only be used if pumping from the lower ports becomes difficult, as directed by the owner.



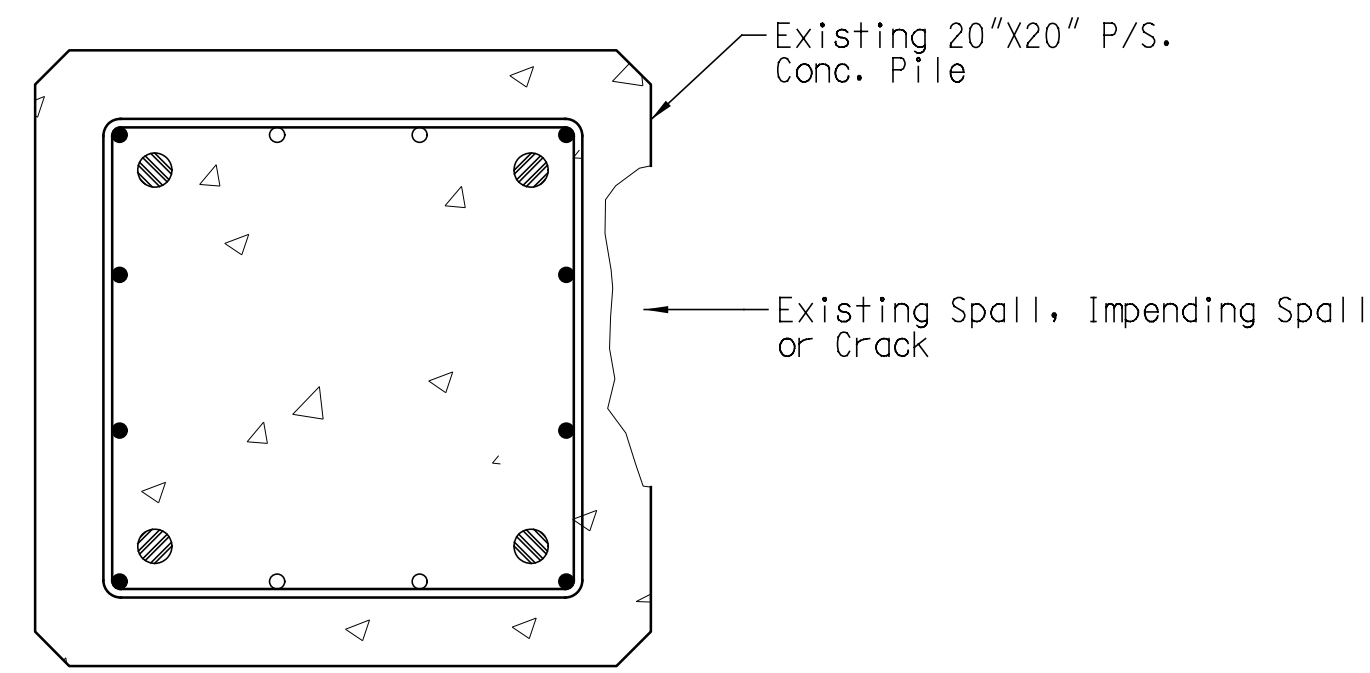
SQUARE PILE JACKET ENCAPSULATION



TOP JACKET SEAL DETAIL

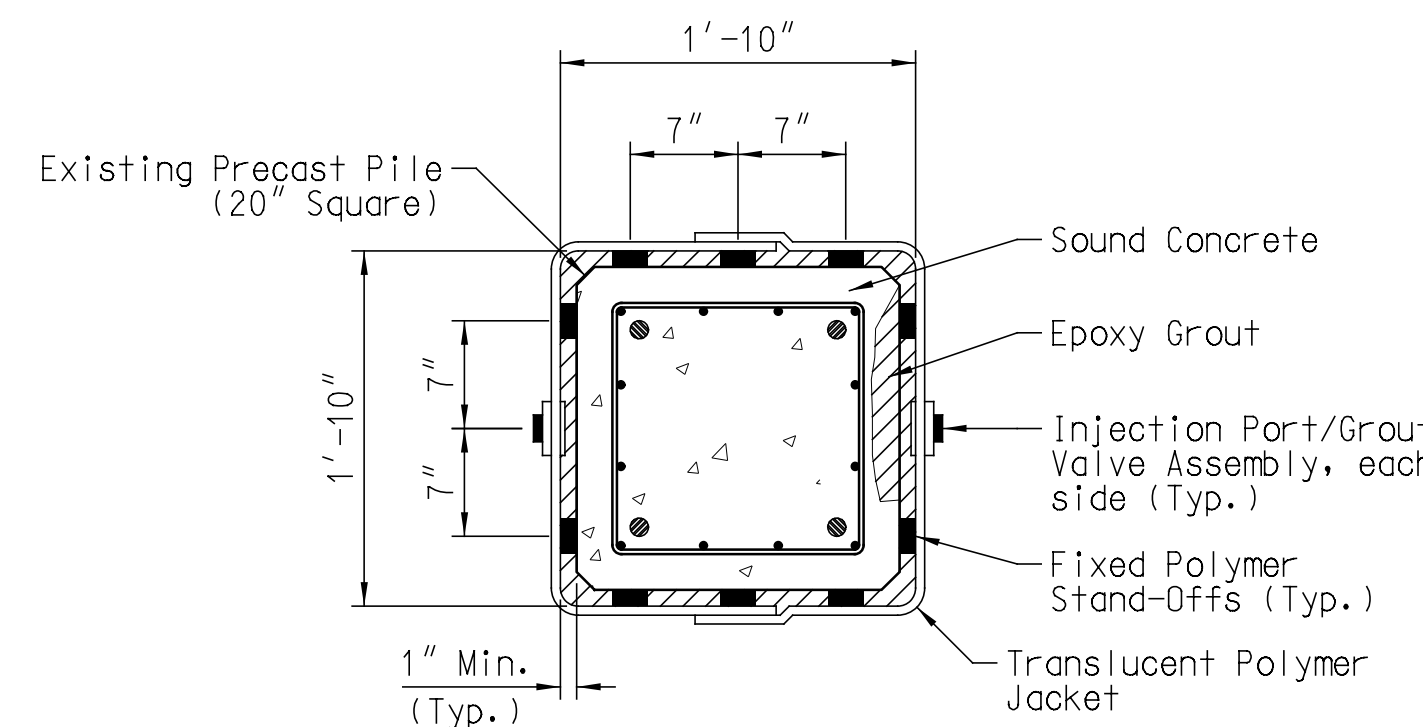


STEEL ANGLE CLAMP DETAIL

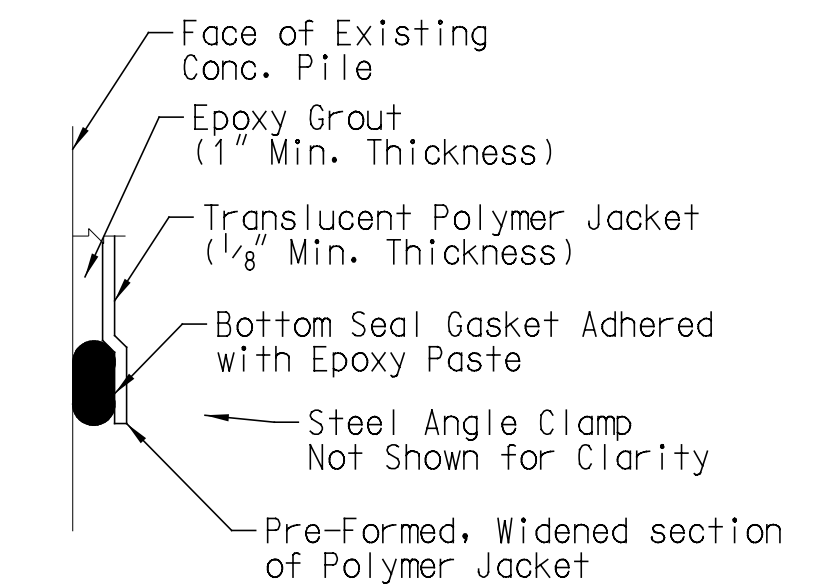


TYPICAL CONDITION FOR REPAIR TYPE 1: SQUARE PILE JACKET ENCAPSULATION

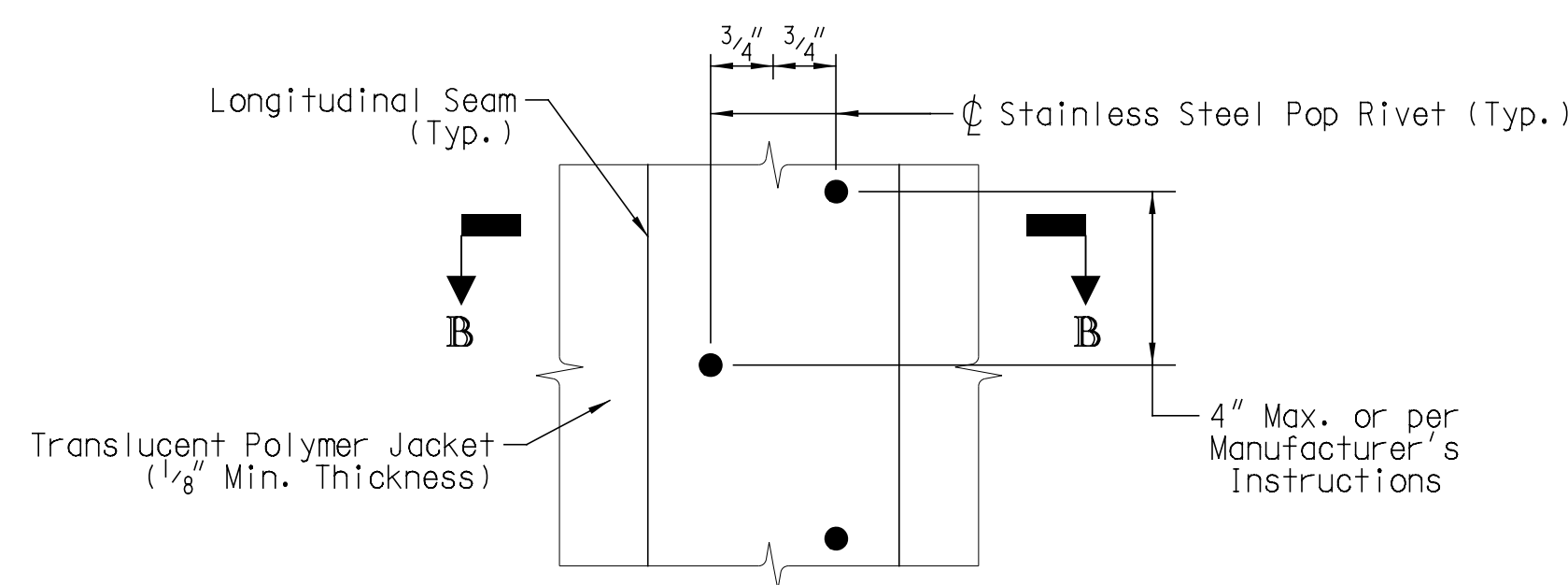
(Defect shown in one face only for clarity. Defect may be on multiple faces)



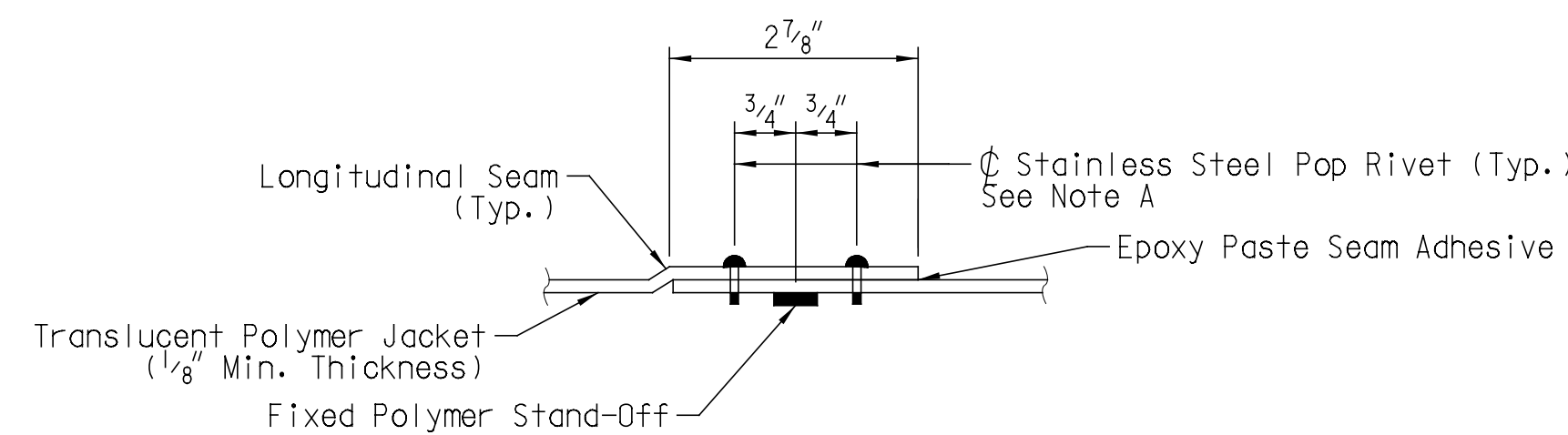
SECTION A-A



BOTTOM JACKET SEAL DETAIL



JACKET SEAM CONNECTION DETAIL

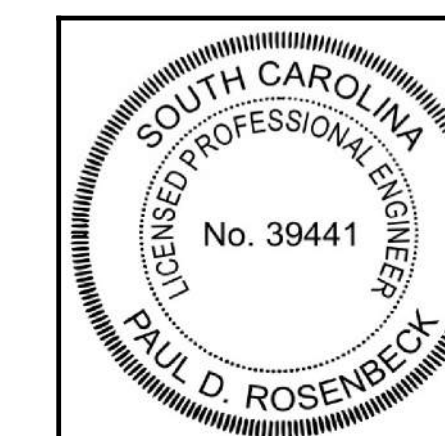


SECTION B-B

Note A:  
Rivets staggered right and left of seam centerline. Rivet spacing shall not exceed 4" along length of seams or per Manufacturer's Instructions. (Typ.)

General notes:

- See sheet titled "Repair Item List" for table with corresponding item numbers and repair types. See sheets titled "Repair Location Plan 1" through "Repair Location Plan V" for item number locations.
- The owner shall have the opportunity to verify and photo document the level of deterioration of each pile after cleaning the existing pile and prior to jacket installation.



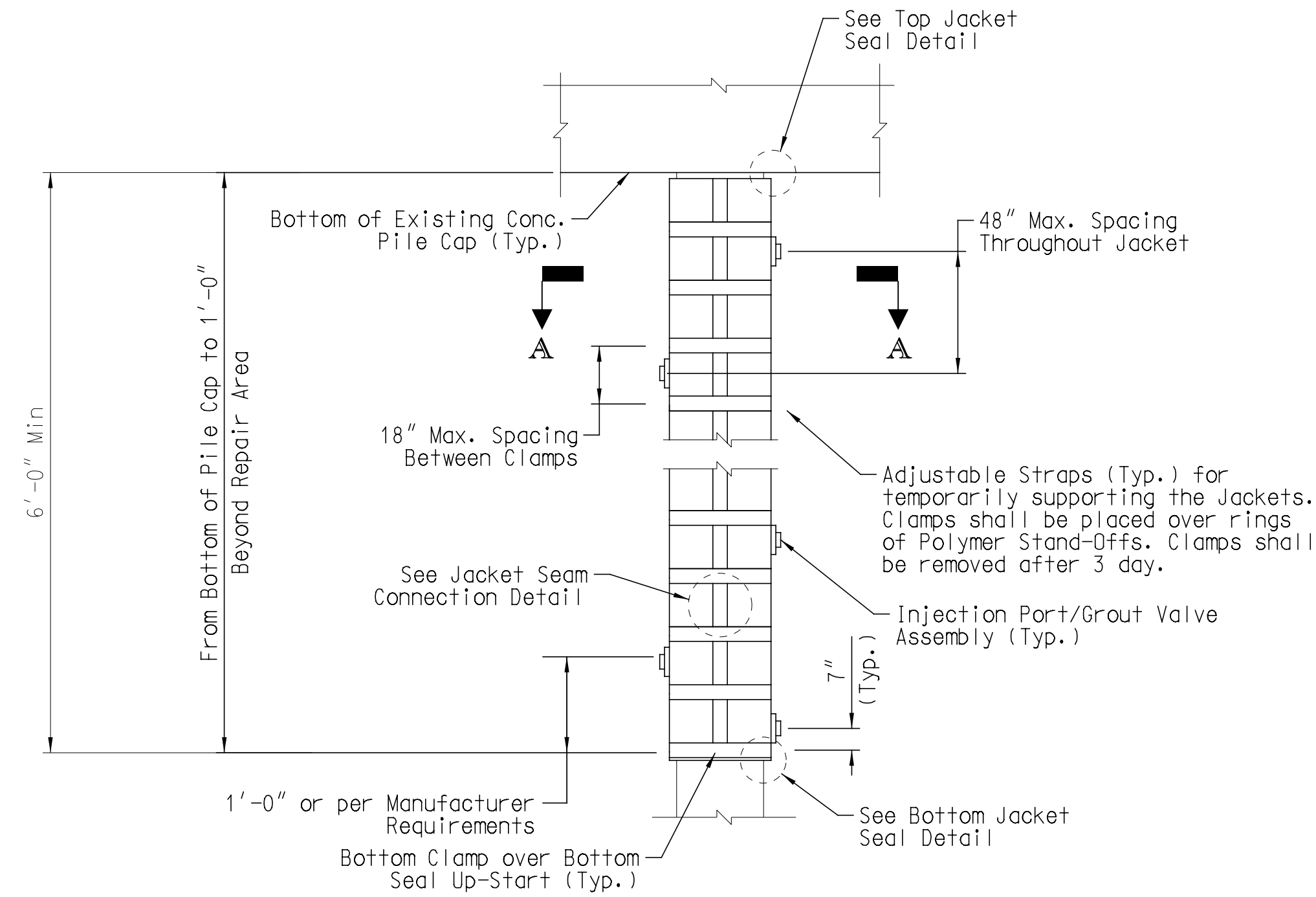
REPAIR TYPE 1: SQUARE PILE JACKET ENCAPSULATION

DRAWN BY: AMV		235 MAGRATH DARBY BLVD., SUITE 275 MT. PLEASANT, SC 29464 (843) 556-2624	DATE: 1/6/2025
CHECKED BY: PDR		SCALE: NTS	
PROJECT: 13-1394-017		SHEET NO. 12	

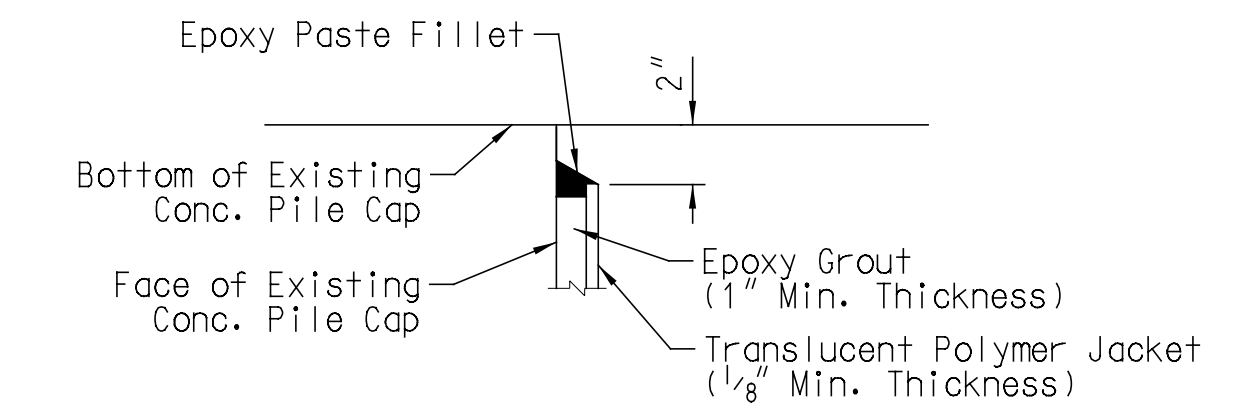


Repair Type 2: Octagonal Pile Jacket Encapsulation Notes

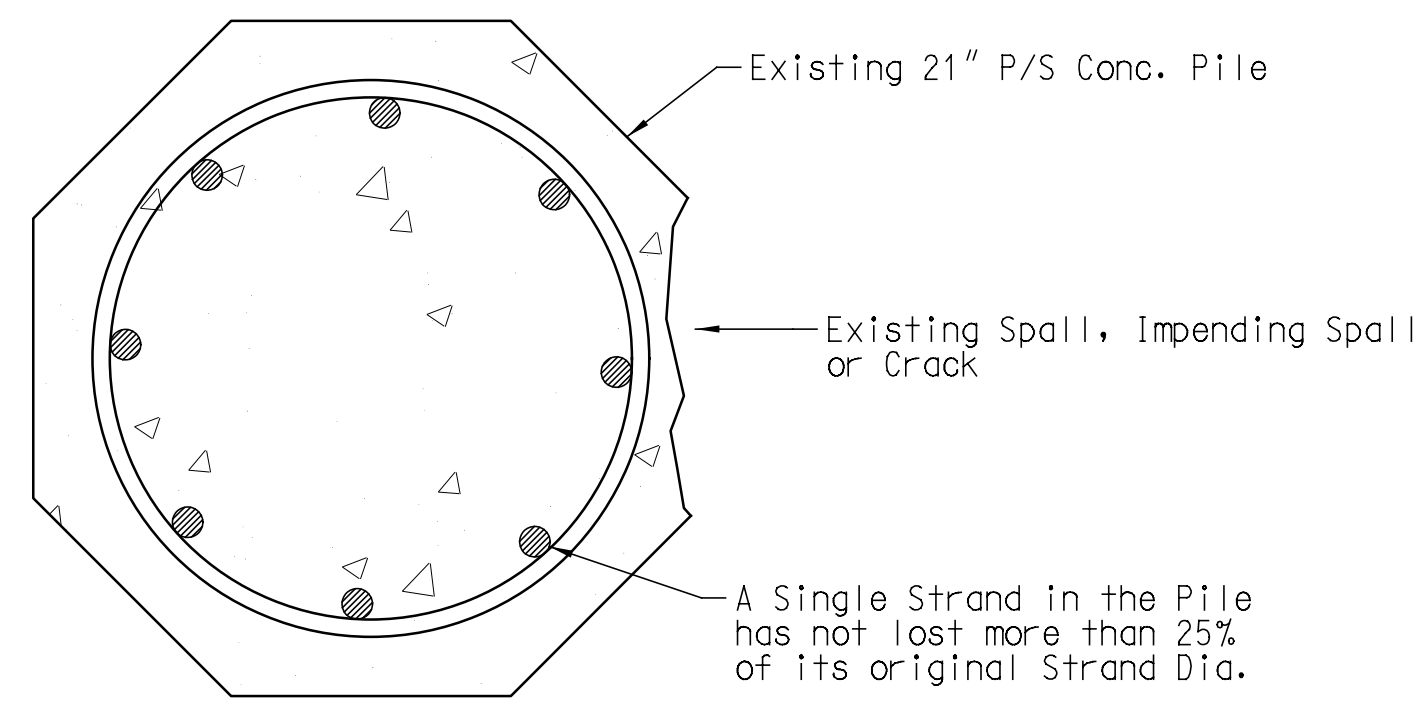
- Repair Type 2 is reserved for 21" P/S Conc. Piles.
- Encapsulate vertical precast concrete piles with translucent polymer jackets and fill with epoxy grout, as detailed on this sheet and as per the contract documents.
- Patterns of stand-offs detailed shall be duplicated at intervals not to exceed 18 inches along the entire length of each jacket.
- Adjustable straps shall be placed over each ring of stand-offs.
- Injection ports/grout valves shall be placed on alternately opposite halves of each jacket, with bottom ports and spacing as shown in encapsulation elevation.
- The translucent polymer jacket installation procedure is as follows:
  - The contractor shall clean the existing pile by abrasive blasting or high pressure water (3000 psi to 10,000 psi) to remove marine growth or deteriorated pile material.
  - The owner shall have the opportunity to verify and photo document the level of deterioration of each pile prior to the jacket installation.
  - Establish proper encapsulation limits for each pile scheduled for jacketing. Install encapsulation jacket around the pile, verify proper fit, and seal longitudinal seams. Contractor shall be responsible for securing the jacket in the proper location during grout installation. Any damage caused to secure the jacket in place shall be repaired to the satisfaction of the owner.
  - Install bottom seal gasket and secure with epoxy paste. Allow bottom seal to cure as detailed in the contract documents.
  - Attach the grout umbilical to the bottommost injection port/grout valve and pump epoxy grout for 30 seconds. Stop pumping grout and check jacket for leaks. Plug all upper injection ports/grout valves and resume pumping the epoxy grout until it reaches the top of jacket. The upper injection ports/grout valves shall only be used if pumping from the lower ports becomes difficult, as directed by the owner.



**OCTAGONAL PILE JACKET ENCAPSULATION**

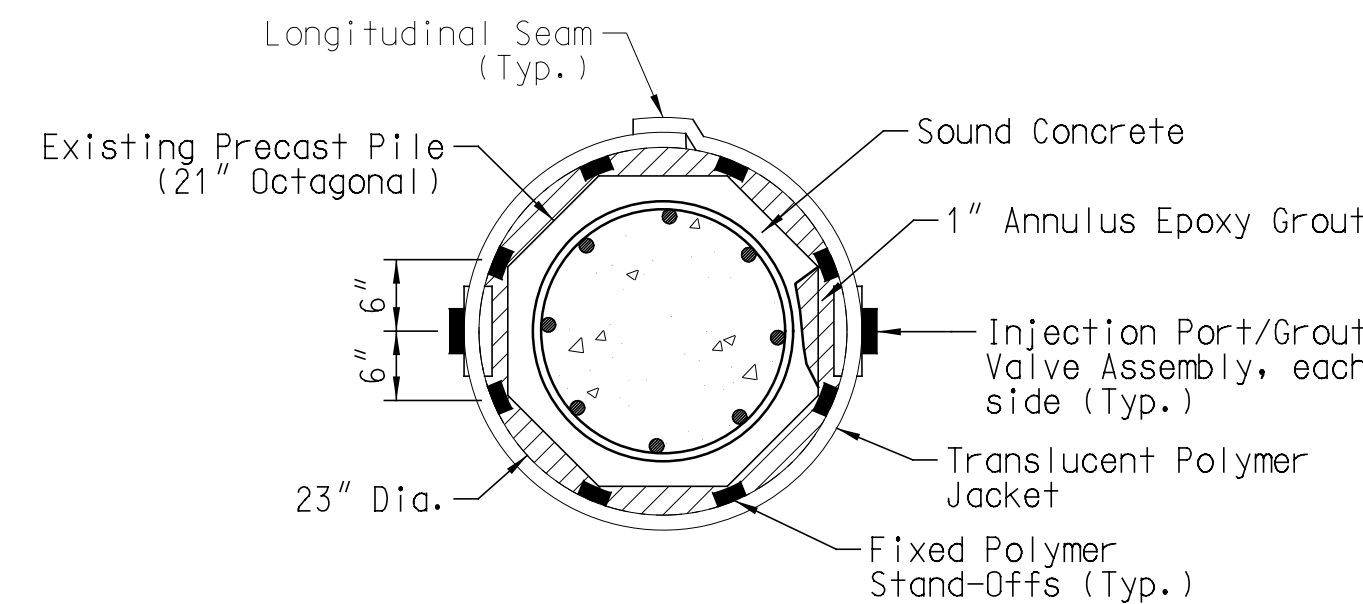


**TOP JACKET SEAL DETAIL**

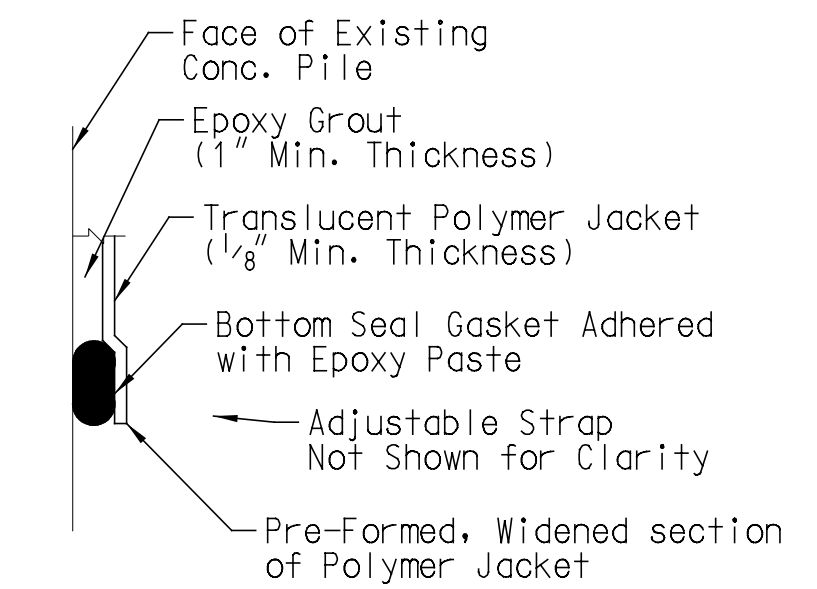


**TYPICAL CONDITION FOR REPAIR TYPE 2: OCTAGONAL PILE JACKET ENCAPSULATION**

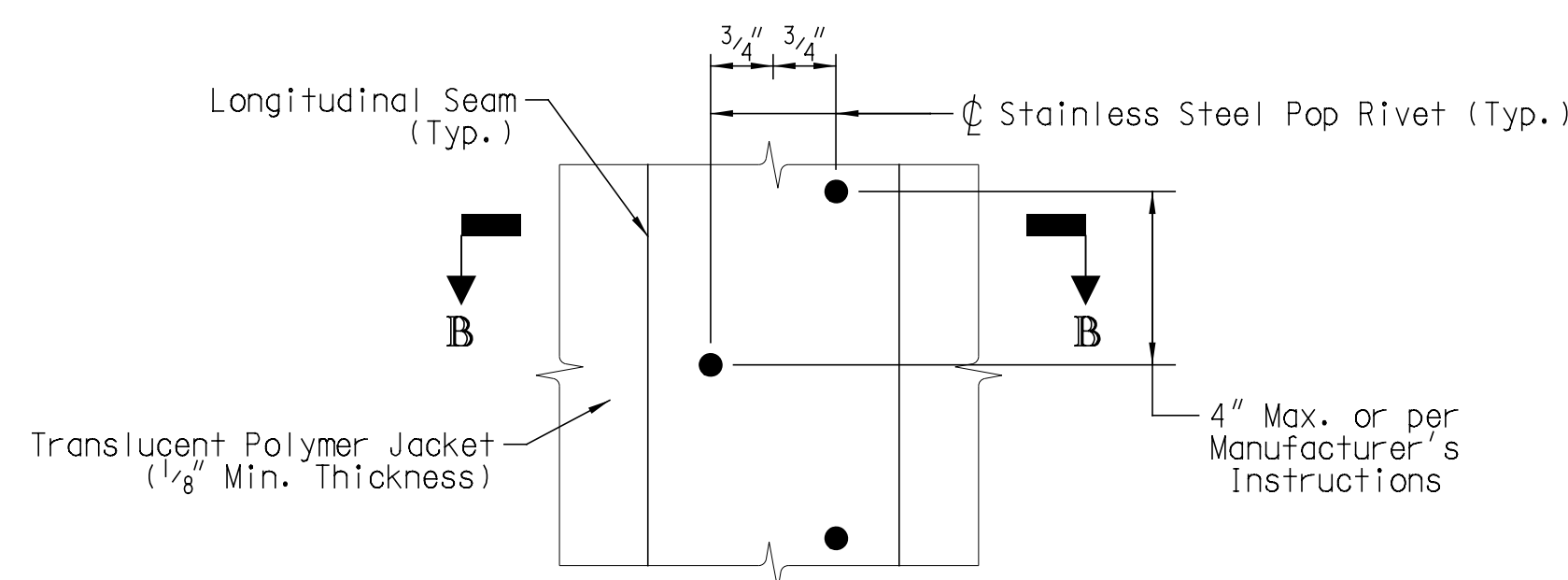
(Defect shown in one face only for clarity. Defect may be on multiple faces)



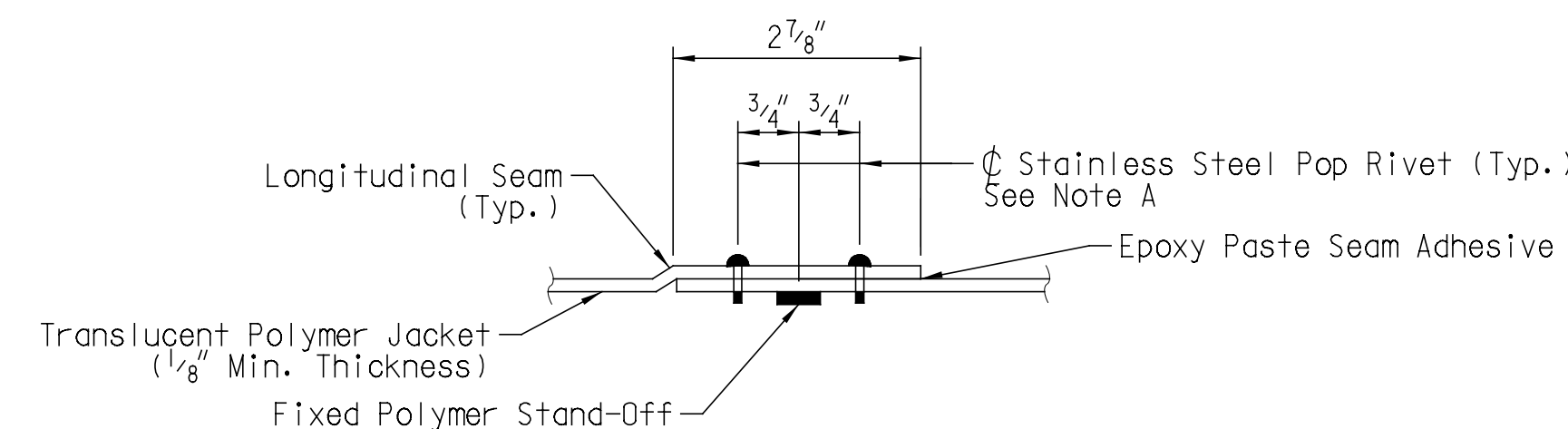
**SECTION A-A**



**BOTTOM JACKET SEAL DETAIL**



**JACKET SEAM CONNECTION DETAIL**

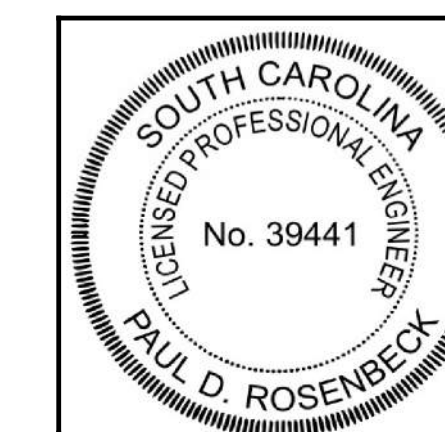


**SECTION B-B**

Note A:  
Rivets staggered right and left of seam centerline. Rivet spacing shall not exceed 4" along length of seams or per Manufacturer's Instructions. (Typ.)

General notes:

- See sheet titled "Repair Item List" for table with corresponding item numbers and repair types. See sheets titled "Repair Location Plan 1" through "Repair Location Plan V" for item number locations.
- The owner shall have the opportunity to verify and photo document the level of deterioration of each pile after cleaning the existing pile and prior to jacket installation.



**REPAIR TYPE 2: OCTAGONAL PILE JACKET ENCAPSULATION**

DRAWN BY: AMV		235 MAGRATH DARBY BLVD., SUITE 275 MT. PLEASANT, SC 29464 (843) 556-2624	DATE: 1/6/2025
CHECKED BY: PDR		SCALE: NTS	
PROJECT: 13-1394-017		SHEET NO. 13	



**General Notes:**

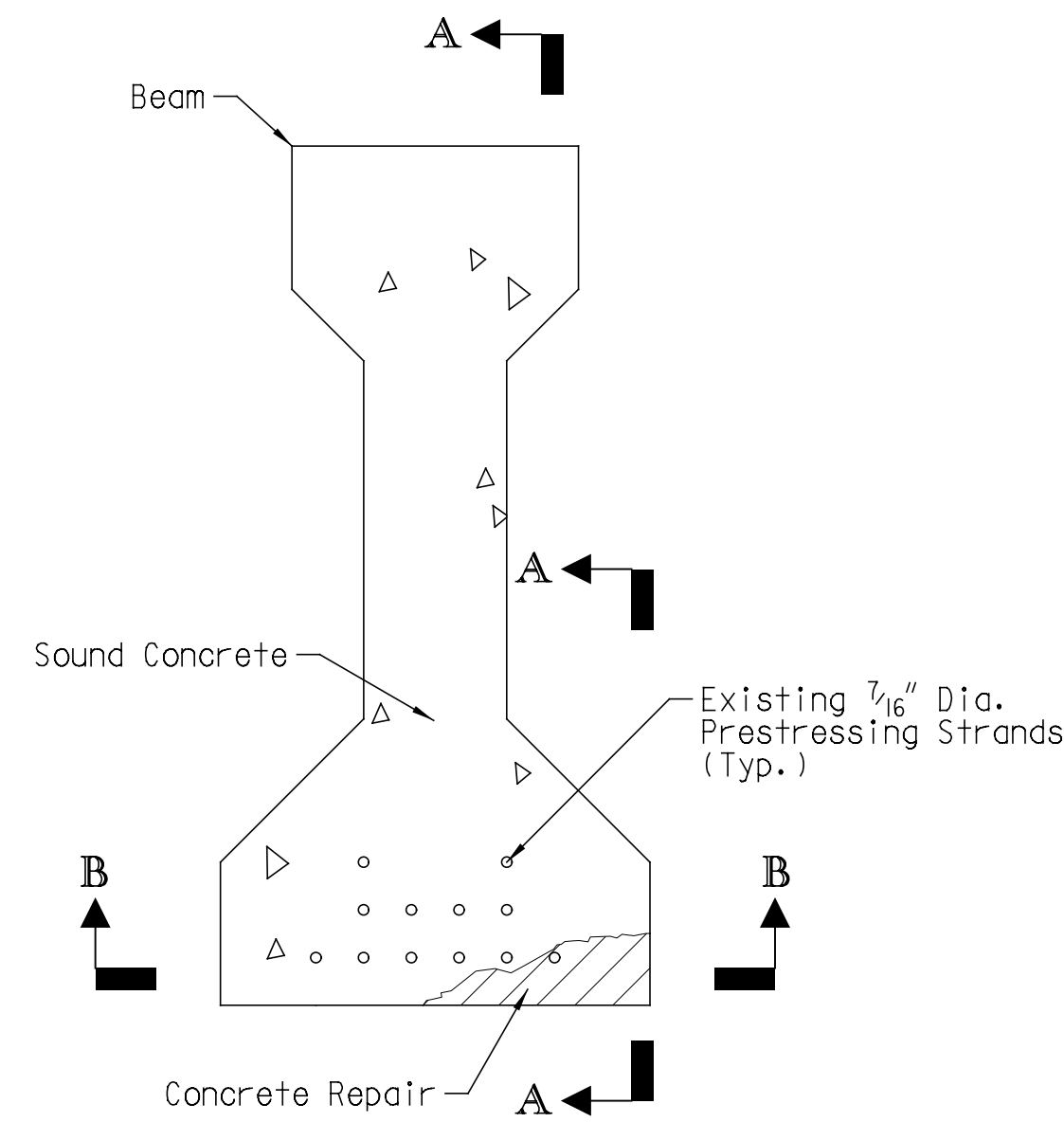
- Notes below are not intended to replace specifications. See project specifications for requirements in addition to general notes.
- The Contractor shall verify all dimensions and existing conditions before starting work. Notify the Owner in writing of any discrepancies. The Contractor shall not begin construction in any such affected area until the discrepancy has been resolved by the Owner. Plan dimensions and details shown on these contract documents are based primarily on field measurements and are subject to nominal construction variations.
- The Contractor shall exercise caution during construction operations to prevent any damage to adjacent structures and structural components not within the scope of these outlined repairs. Structures and structural components not within the scope of this project that are damaged during the repair operations shall be paired or replaced at the expense of the Contractor to the satisfaction of the Owner.
- See sheet titled "Repair Item List" for table with corresponding item numbers, repair types and locations.
- The Contractor shall submit all required product specifications, proposed formwork and concrete placement procedures for approval by the Owner prior to beginning of work.

**Maintenance of Traffic & Repair Staging:**

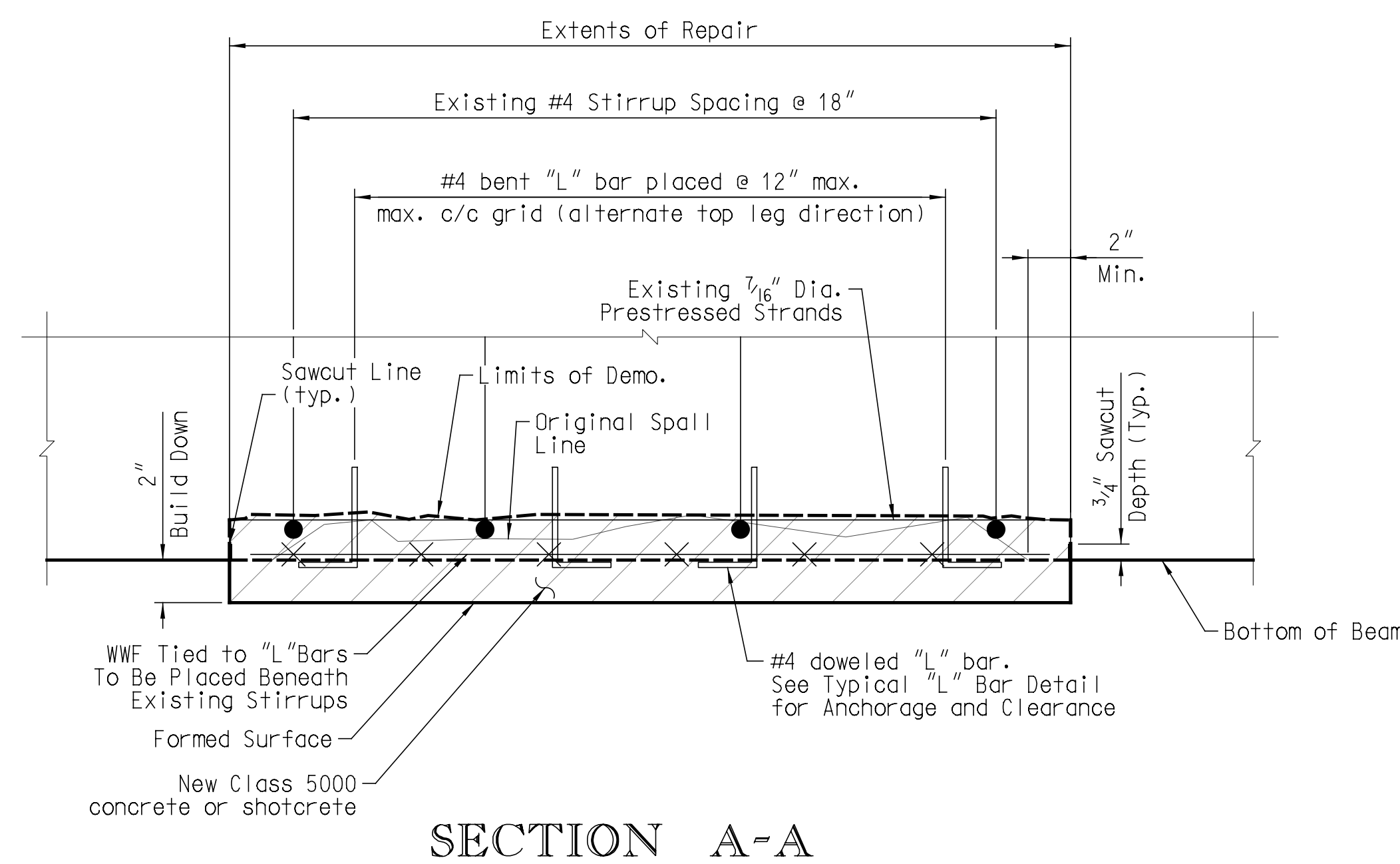
- No spall repair work shall be conducted underneath direct live traffic. Traffic shall be maintained during repair operations with all repairs in a phase being completed before shifting traffic to the next phase. Contractor shall submit a written traffic control plan and schedule of construction activities with phasing information to Owner prior to commencement of work.

**Repair Type 3 - Beam Spall Repair:**

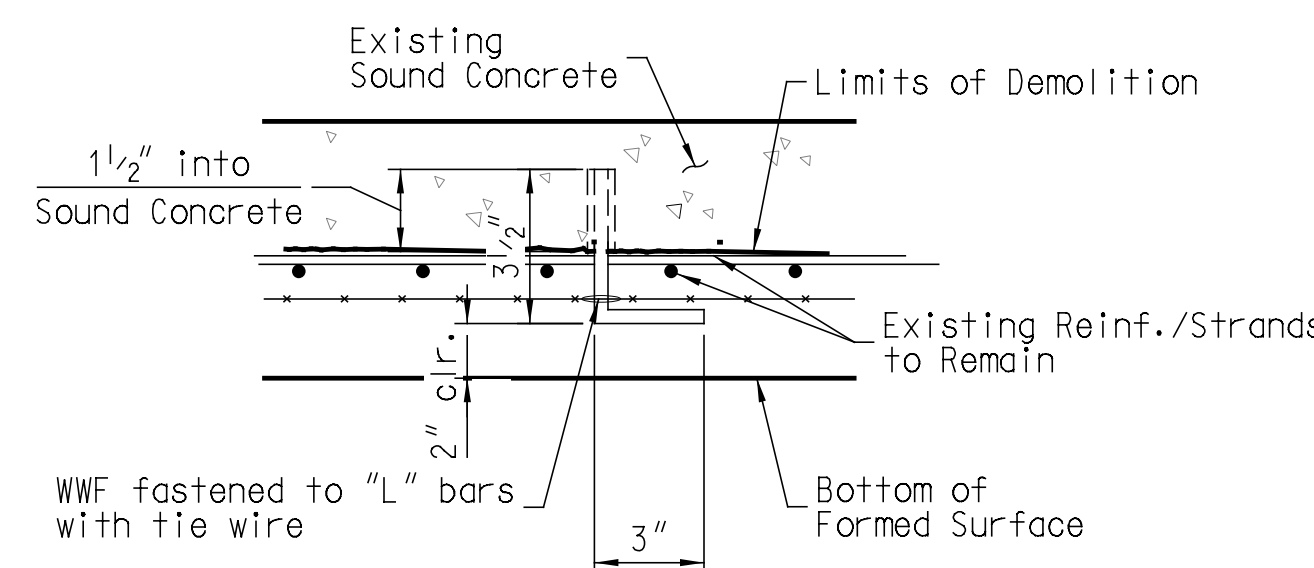
- Containment/Catchment Devices**
  - The contractor shall use containment/catchment devices to prevent concrete chips, debris, etc. from falling into the surrounding water during the preparation/repair work.
  - Containment/Catchment devices shall be approved by the owner prior to beginning work.
- Saw Cuts**
  - The repair perimeter shall be saw cut to a depth of 3/4 in. Where necessary to avoid cutting the reinforcement, the depth may be less than 3/4 in.
  - The saw cuts shall be made a distance of 2 in. outside the farthest edge of the spall, impending spall or crack, around the entire perimeter. The saw cut surfaces shall be roughened.
  - Any cut reinforcement shall be repaired or replaced at the expense of the contractor.
  - If the concrete is broken or removed beyond the limits of the initial saw cut, the new repair perimeter shall be re-cut.
- Concrete removal**
  - The areas to be repaired shall have all loose, unsound concrete removed completely by the use of chipping hammers or hydrodemolition equipment.
  - The concrete removal shall extend along the existing reinforcement until the reinforcement is free of bond inhibiting corrosion.
  - The removal of unsound concrete is not intended to go behind exposed prestressing strands. If prestressing strands are encountered, contractor is to use extreme caution when removing unsound concrete to not damage the prestressing strand. If damage occurs, concrete removal operations shall stop and Owner/EOR shall be notified immediately.
- Reinforcement**
  - Place #4 Bent "L" reinforcement bars in a 12" max. center-to-center maximum spaced grid. Anchor into sound concrete with epoxy anchoring system.
  - Attach Welded Wire Fabric (WWF) to the Bent "L" reinforcement bars with wire at a maximum spacing of 1'-0" in each direction. WWF shall be ASTM A1064 3X3 or 4X4 WWF made of 8, 10, or 11 Gauge Wire.
  - Contractor to submit proposed epoxy anchoring system for approval. Demolition shall not begin prior to approval.
- Surface Preparation**
  - Exposed reinforcing shall be cleaned of all rust, scale, oil, and dirt by abrasive techniques or high pressure water (3,000 PSI to 10,000 PSI). Care shall be taken not to damage or destroy exposed prestressing during cleaning/corrosion removal. If prestressing strands are damaged beyond their existing conditions, work operations shall stop and the owner/EOR shall be notified immediately.
  - Concrete surfaces to be patched shall be thoroughly cleaned by removing any loose particles and dust. The surfaces shall be saturated for approximately four hours subsequent to cleaning. Just prior to concrete placement, the repair area shall be in a saturated, surface dry condition (thoroughly wet with no standing water).
  - An anti-corrosion agent or equal corrosion converter shall be applied to the reinforcing. Additionally, A Galvanode XP or equal embedded sacrificial anode shall be installed per manufacturers instructions.
  - A bonding agent shall be applied to the cleaned surface of the concrete and reinforcing steel before placing concrete. Any further surface preparations, time frame, and/or manner of patch placement specified by the bonding agent manufacturer's instructions shall also be strictly adhered to.
- Concrete Patch**
  - Repair concrete, grout, and mortar compressive strength:  $f'c = 5,000$  PSI minimum at 28 days. Mix shall be as detailed in the specifications. Contractor shall have the option to implement Repair Type 1 with either shotcrete, formed concrete, or patch mortar.
  - All concrete work shall conform to ACI 318-11 and the specifications.
  - All exposed concrete corners shall have a 3/4 in. chamfer.
  - Anti washout admixture, such as Master Builders Rheomac or approved equal shall be used with all concrete placed underwater or placed within the tidal zone. Methods and equipment in placing concrete underwater or within the tidal zone shall prevent the segregation or washing of the concrete before it has hardened.
- Documentation**
  - The owner shall have the opportunity to verify and photo document the surface preparation of each concrete repair prior to placing any concrete repair material.



**REPAIR TYPE 3: BEAM SPALL REPAIR**



**SECTION A-A**



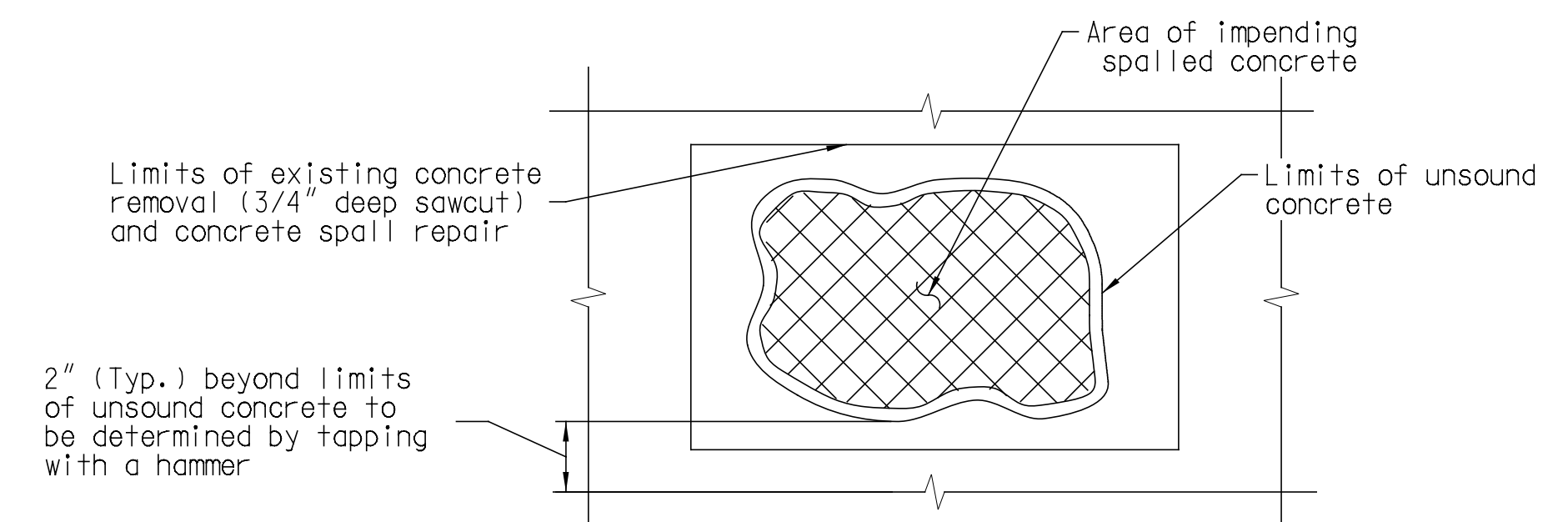
**TYPICAL "L" BAR DETAIL**



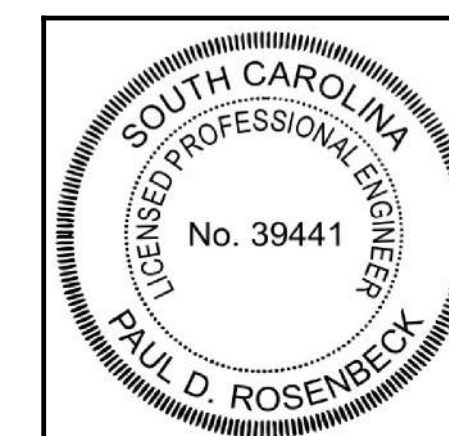
**PHOTO 1: TYPICAL SPALL REPAIR ITEM**



**PHOTO 2: TYPICAL SPALL REPAIR ITEM**



**SECTION B-B**



**REPAIR TYPE 3: BEAM SPALL REPAIR DETAILS**

<b>DRAWN BY:</b> AMV		235 MAGRATH DARBY BLVD. SUITE 275 MT. PLEASANT, SC 29464 (843) 556-2624	<b>DATE:</b> 1/6/2025
<b>CHECKED BY:</b> PDR			<b>SCALE:</b> NTS
<b>PROJECT:</b> 13-1394-017			<b>SHEET NO.</b> 14



**General Notes:**

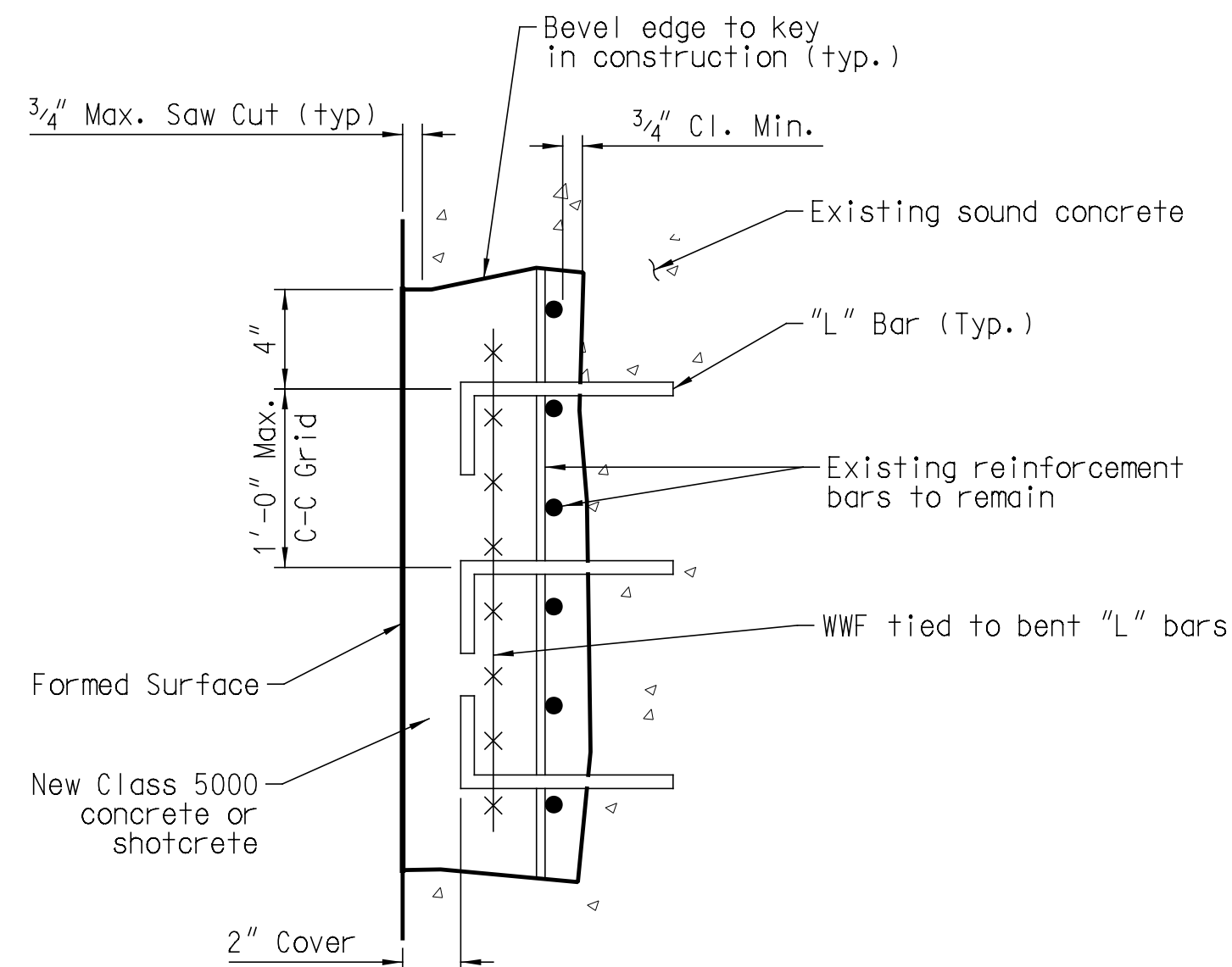
- Notes below are not intended to replace specifications. See project specifications for requirements in addition to general notes.
- The Contractor shall verify all dimensions and existing conditions before starting work. Notify the Owner in writing of any discrepancies. The Contractor shall not begin construction in any such affected area until the discrepancy has been resolved by the Owner. Plan dimensions and details shown on these contract documents are based primarily on field measurements and are subject to nominal construction variations.
- The Contractor shall exercise caution during construction operations to prevent any damage to adjacent structures and structural components not within the scope of these outlined repairs. Structures and structural components not within the scope of this project that are damaged during the repair operations shall be paired or replaced at the expense of the Contractor to the satisfaction of the Owner.
- See sheet titled "Repair Item List" for table with corresponding item numbers, repair types and locations.
- The Contractor shall submit all required product specifications, proposed formwork and concrete placement procedures for approval by the Owner prior to beginning of work.

**Maintenance of Traffic & Repair Staging:**

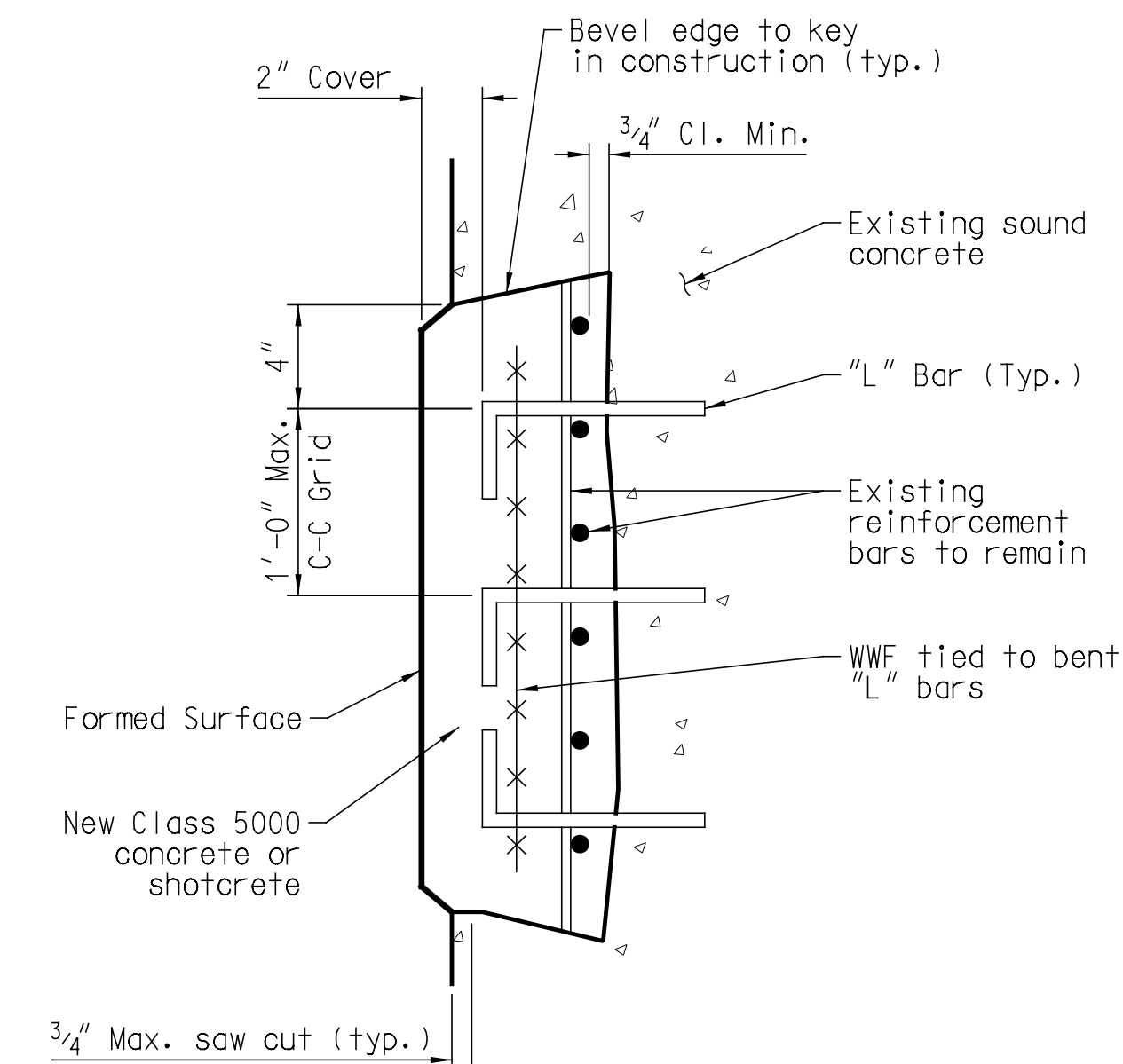
- No spall repair work shall be conducted underneath direct live traffic. Traffic shall be maintained during repair operations with all repairs in a phase being completed before shifting traffic to the next phase. Contractor shall submit a written traffic control plan and schedule of construction activities with phasing information to Owner prior to commencement of work.

**Repair Type 4 - Spall Repair:**

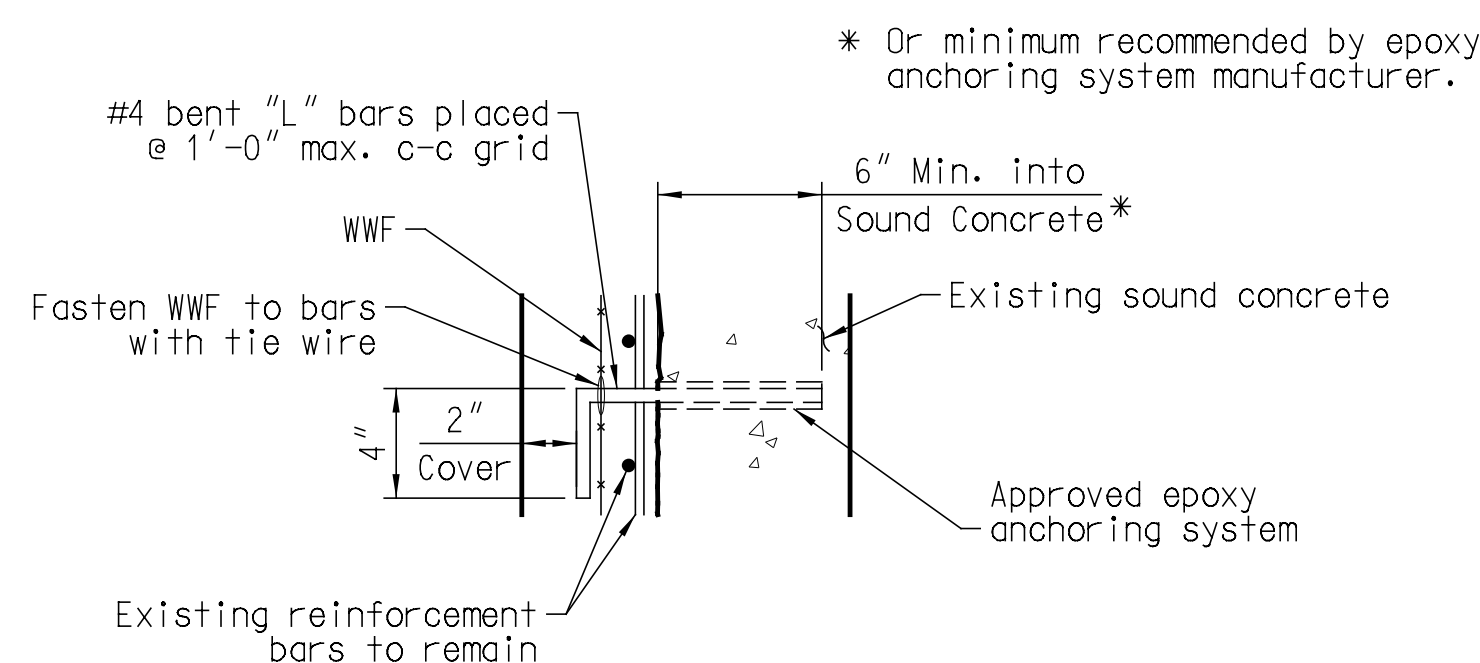
- Containment/Catchment Devices**
  - The contractor shall use containment/catchment devices to prevent concrete chips, debris, etc. from falling into the surrounding water during the preparation/repair work.
  - Containment/Catchment devices shall be approved by the owner prior to beginning work.
- Saw Cuts**
  - The repair perimeter shall be saw cut to a depth of 3/4 in. Where necessary to avoid cutting the reinforcement, the depth may be less than 3/4 in.
  - The saw cuts shall be made a distance of 2 in. outside the farthest edge of the spall, impending spall or crack, around the entire perimeter. The saw cut surfaces shall be roughened.
  - Any cut reinforcement shall be repaired or replaced at the expense of the contractor.
  - If the concrete is broken or removed beyond the limits of the initial saw cut, the new repair perimeter shall be re-cut.
- Concrete removal**
  - The areas to be repaired shall have all loose, unsound concrete removed completely by the use of chipping hammers or hydrodemolition equipment.
  - The concrete removal shall extend along the reinforcement bar(s) until the reinforcement is free of bond inhibiting corrosion.
  - The concrete removal shall extend a minimum of 3/4 in. clearance all around.
  - The outermost layer of exposed reinforcement bar(s) shall be cleaned of all rust, scale, oil, and dirt by abrasive techniques or high pressure water (3,000 PSI to 10,000 PSI).
- Reinforcement**
  - Place #4 Bent "L" reinforcement bars in a 12" max. center-to-center maximum spaced grid. Anchor into sound concrete with epoxy anchoring system.
  - Attach Welded Wire Fabric (WWF) to the Bent "L" reinforcement bars with wire at a maximum spacing of 1'-0" in each direction. WWF shall be ASTM A1064 3X3 or 4X4 WWF made of 8, 10, or 11 Gauge Wire.
  - Contractor to submit proposed epoxy anchoring system for approval. Demolition shall not begin prior to approval.
- Surface Preparation**
  - Exposed reinforcing shall be cleaned of all rust, scale, oil, and dirt by abrasive techniques or high pressure water (3,000 PSI to 10,000 PSI). Care shall be taken not to damage or destroy exposed prestressing during cleaning/corrosion removal. If prestressing strands are damaged beyond their existing conditions, work operations shall stop and the owner/EOR shall be notified immediately.
  - Concrete surfaces to be patched shall be thoroughly cleaned by removing any loose particles and dust. The surfaces shall be saturated for approximately four hours subsequent to cleaning. Just prior to concrete placement, the repair area shall be in a saturated, surface dry condition (thoroughly wet with no standing water).
  - An anti-corrosion agent or equal corrosion converter shall be applied to the reinforcing. Additionally, A Galvanode XP or equal embedded sacrificial anode shall be installed per manufacturers instructions.
  - A bonding agent shall be applied to the cleaned surface of the concrete and reinforcing steel before placing concrete. Any further surface preparations, time frame, and/or manner of patch placement specified by the bonding agent manufacturer's instructions shall also be strictly adhered to.
- Concrete Patch**
  - Repair concrete, grout, and mortar compressive strength:  $f'c = 5,000$  PSI minimum at 28 days. Mix shall be as detailed in the specifications. Contractor shall have the option to implement Repair Type 1 with either shotcrete, formed concrete, or patch mortar.
  - All concrete work shall conform to ACI 318-11 and the specifications.
  - All exposed concrete corners shall have a 3/4 in. chamfer.
  - Anti washout admixture, such as Master Builders Rheomac or approved equal shall be used with all concrete placed underwater or placed within the tidal zone. Methods and equipment in placing concrete underwater or within the tidal zone shall prevent the segregation or washing of the concrete before it has hardened.
- Documentation**
  - The owner shall have the opportunity to verify and photo document the surface preparation of each concrete repair prior to placing any concrete repair material.



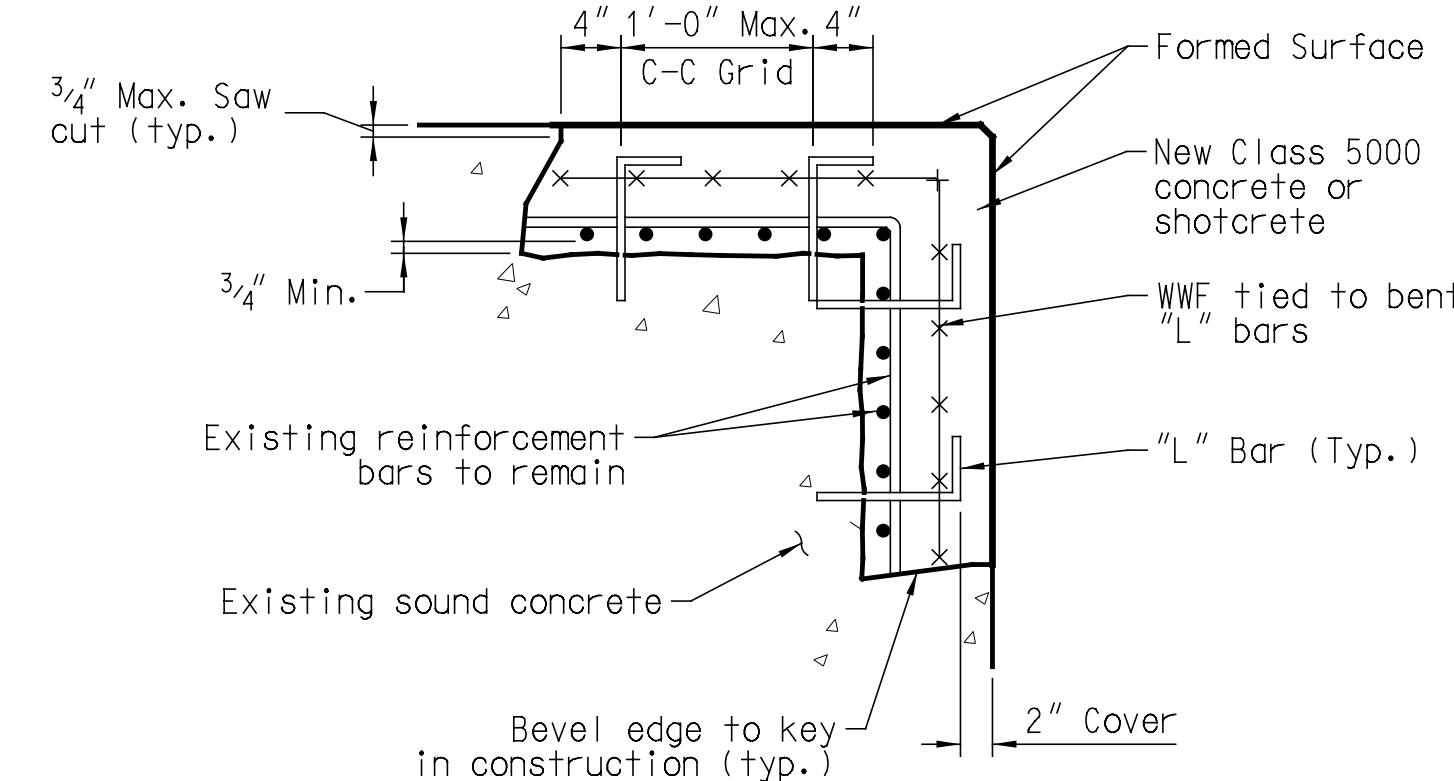
**REPAIR TYPE 4:  
SPALL REPAIR**



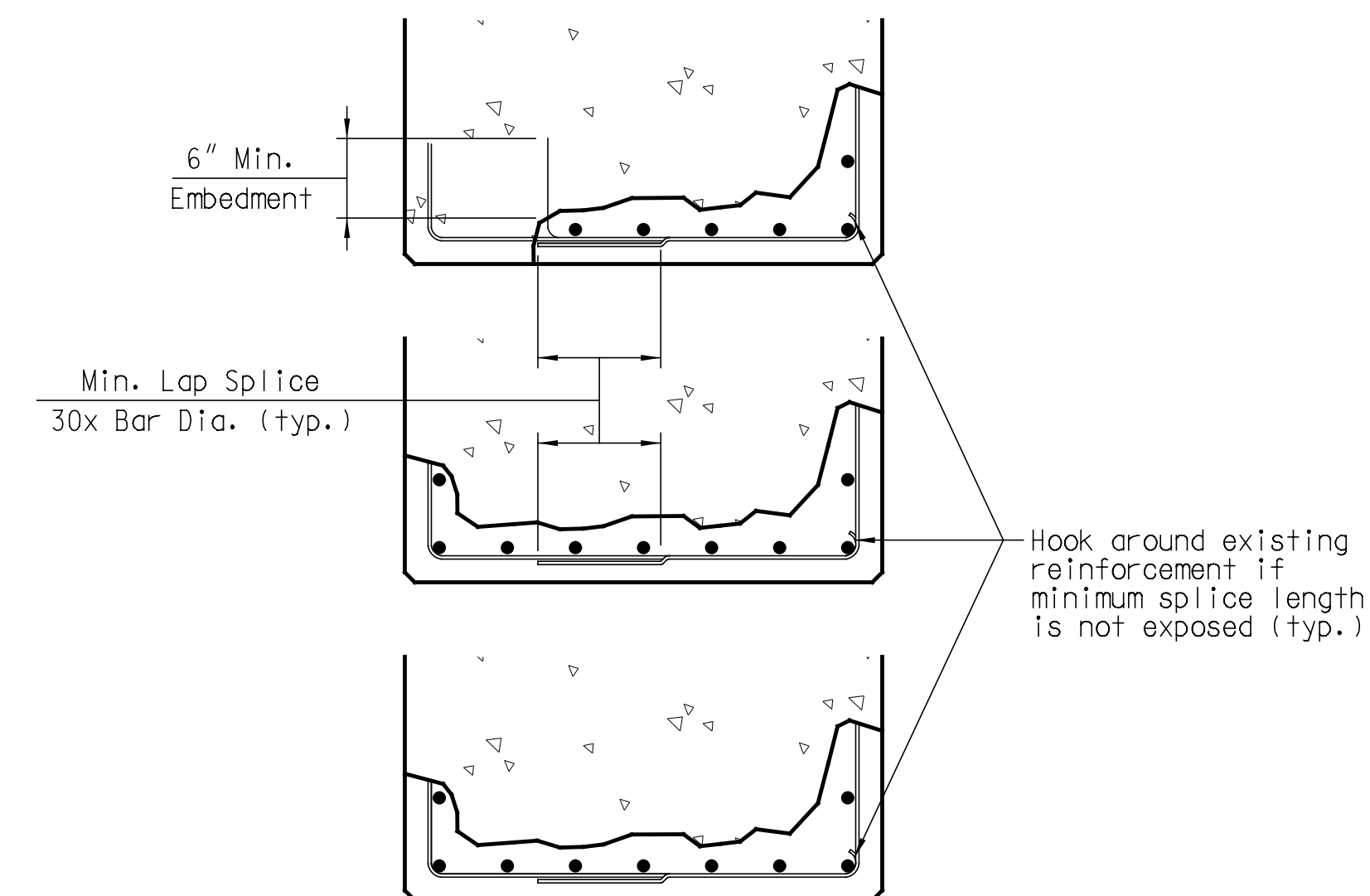
**REPAIR TYPE 4 FOR  
LESS THAN 2" COVER**



**TYPICAL "L" BAR DETAIL**



**TYPICAL CORNER  
REPAIR DETAIL**



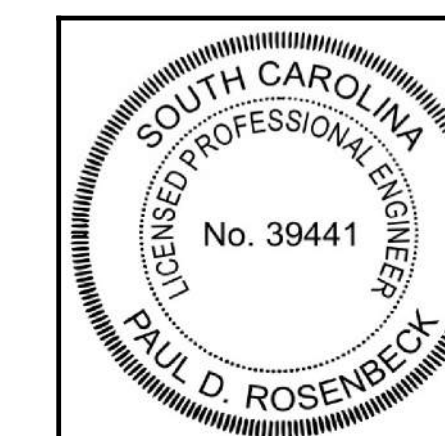
**SPLICE DETAILS FOR CONCRETE CAP  
STRIRRUPS WITH ≥ 50% SECTION LOSS**



**PHOTO 1: TYPICAL  
SPALL REPAIR ITEM**



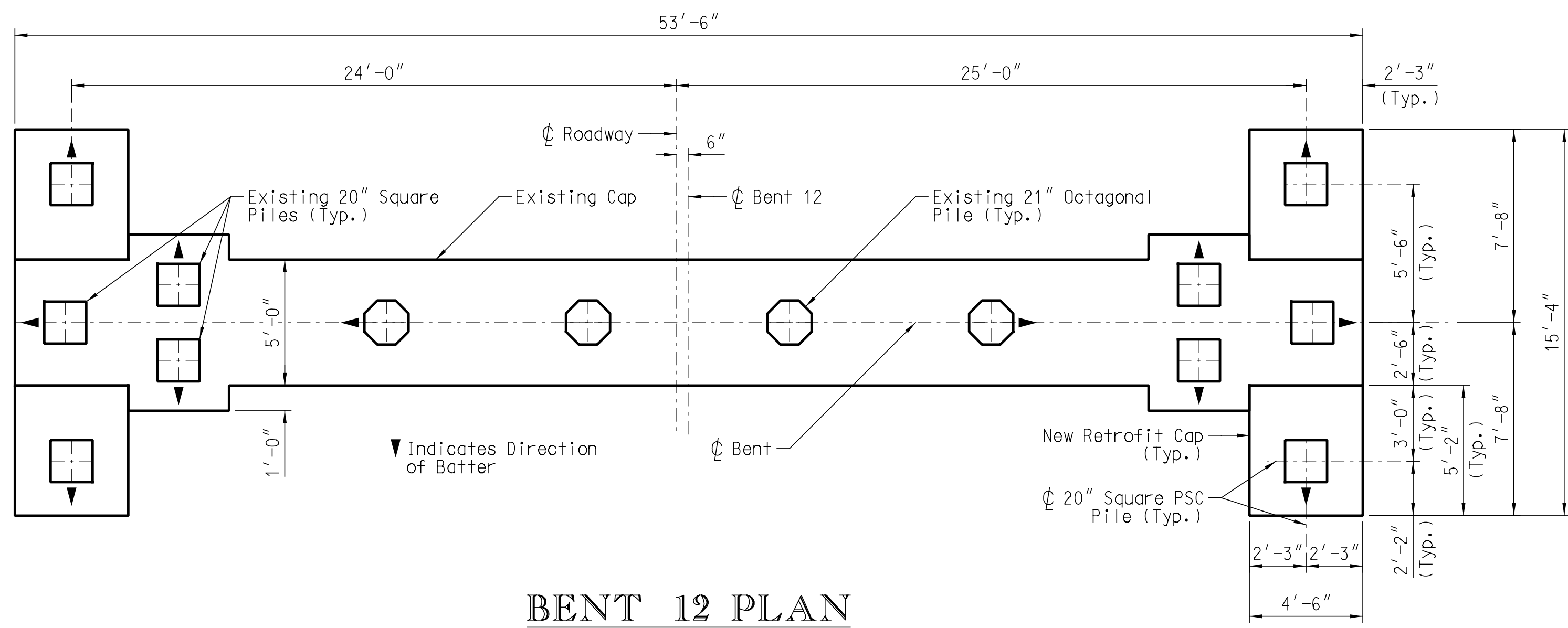
**PHOTO 2: TYPICAL  
SPALL REPAIR ITEM**



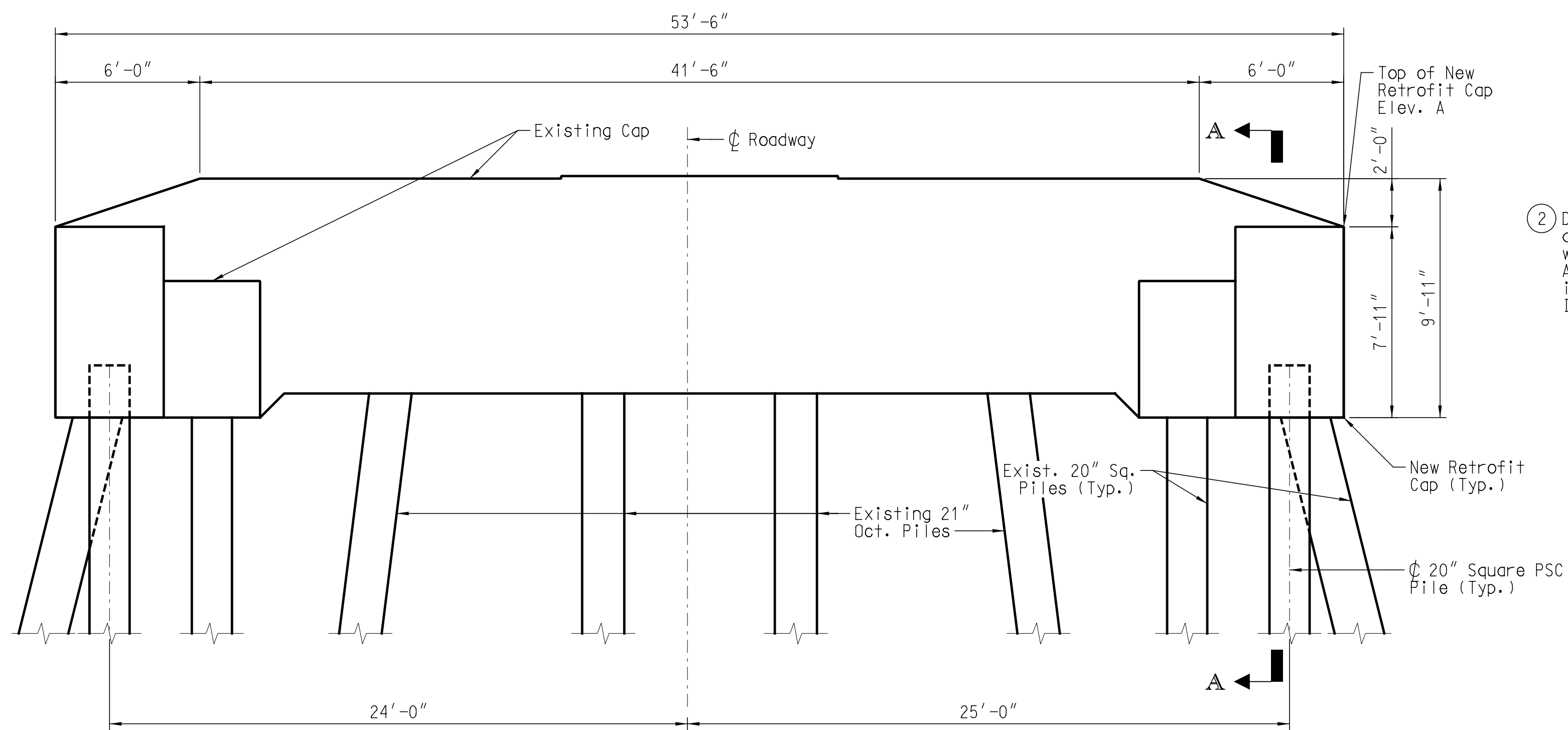
**REPAIR TYPE 4:  
SPALL REPAIR DETAILS**

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<b>PROJECT:</b> 13-1394-017			<b>SHEET NO.:</b> 15

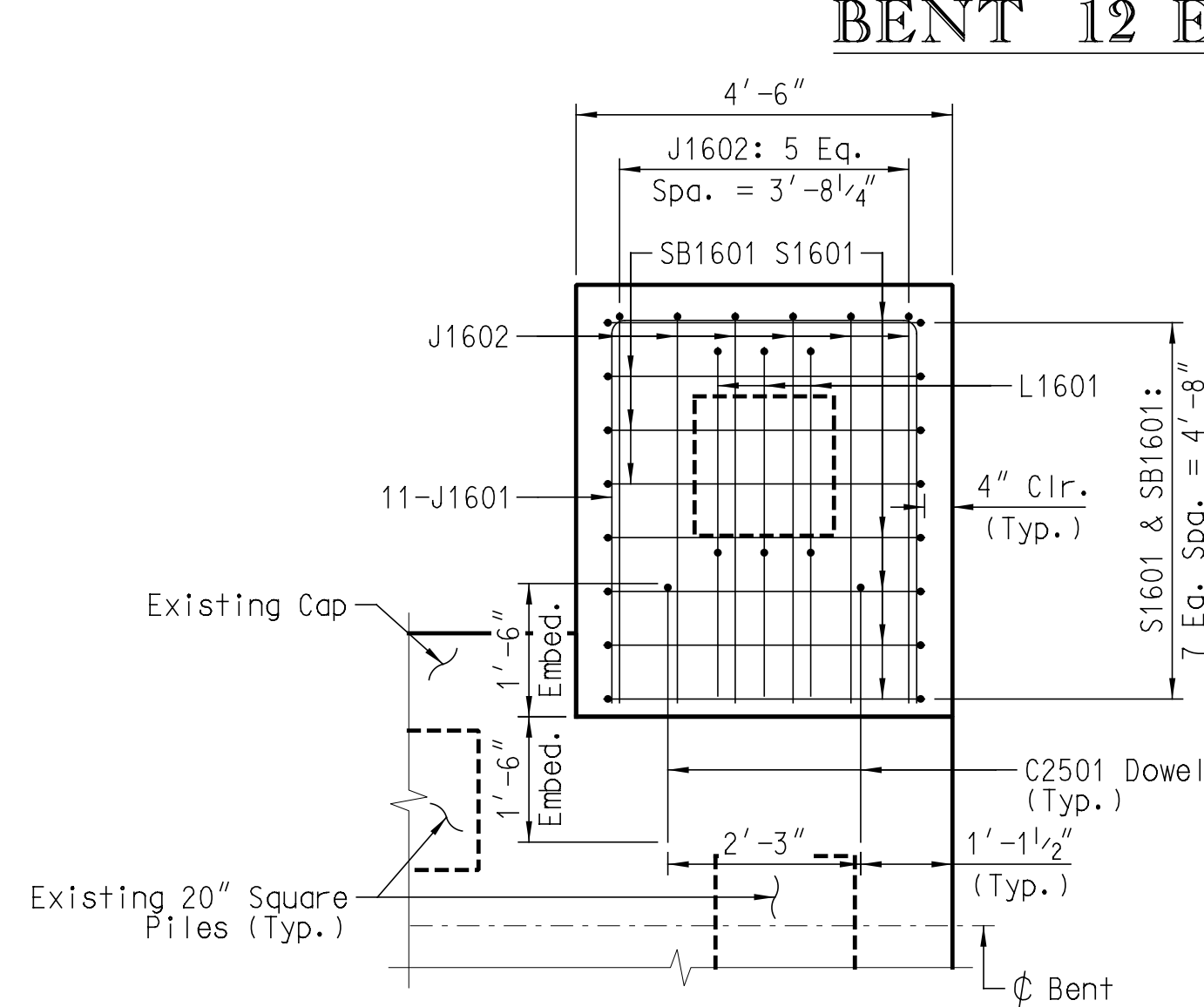




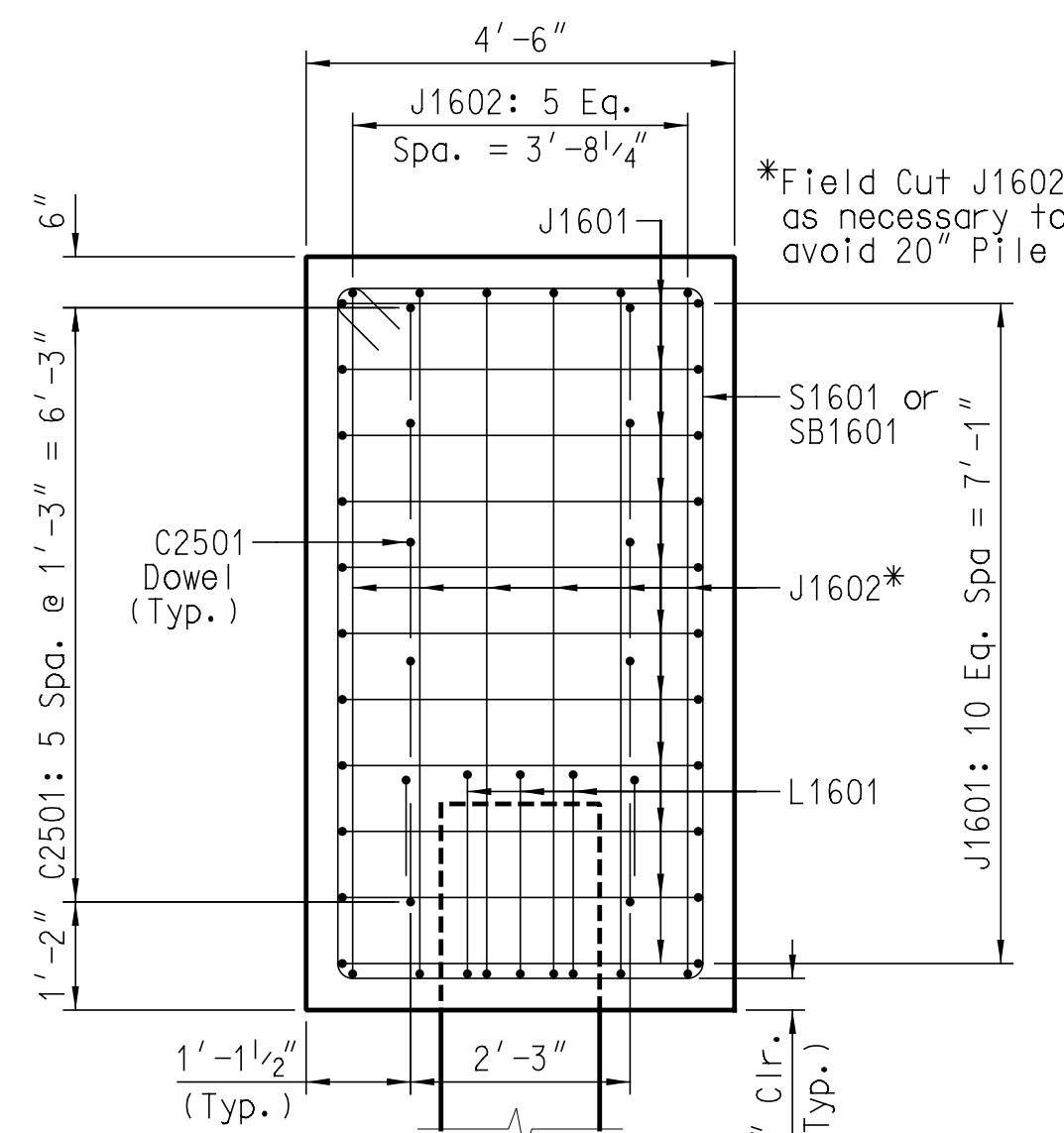
**BENT 12 PLAN**



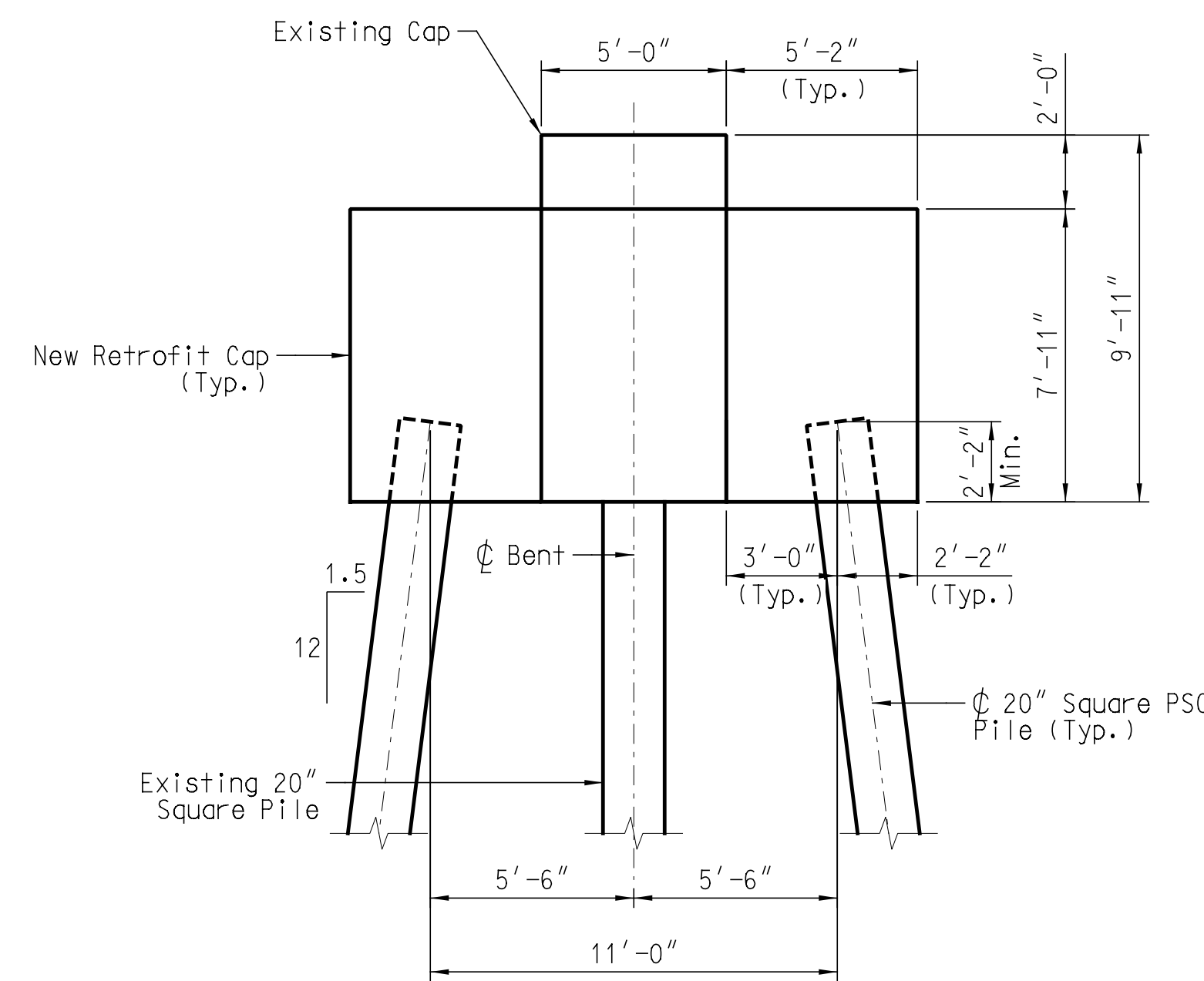
**BENT 12 ELEVATION**



**SECTION B-B**



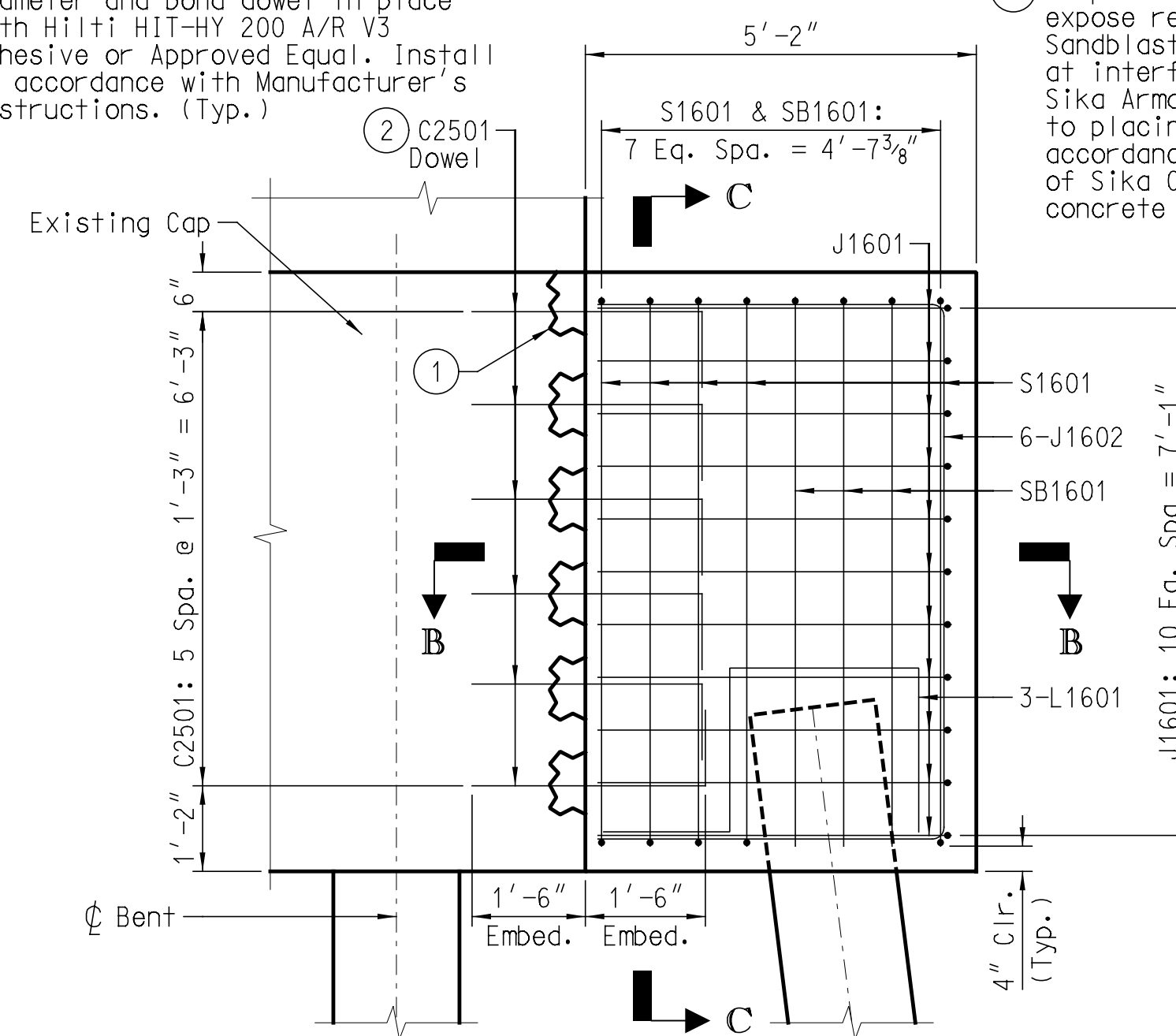
**SECTION C-C**



**SECTION A-A**

② Drill hole  $\frac{1}{8}$ " larger than bar diameter and bond dowel in place with Hilti HIT-HY 200 A/R V3 Adhesive or Approved Equal. Install in accordance with Manufacturer's Instructions. (Typ.)

① Chip out existing concrete to expose reinforcing before drilling. Sandblast clean existing concrete at interface with new and apply Sika Armatex 110 EPO-CEM just prior to placing new concrete in accordance with application procedures of Sika Corp. for bonding old concrete to new concrete. (Typ.)



**REINFORCING ELEVATION**

**BENT 12 REINF. STEEL SCHED.**

MARK	NO. REQ'D	DIMENSION				LENGTH
		"a"	"b"	"c"	"d"	
C2501	48	3'-2"	1'-6"	—	—	4'-8"
J1601	44	3'-8 3/4"	4'-8"	—	—	13'-0 3/4"
J1602	24	7'-1 3/4"	4'-8"	—	—	16'-5 3/4"
L1601	12	1'-9"	2'-2 1/4"	2'-5 1/4"	2'-2 1/4"	8'-6 3/4"
S1601	20	4'-0"	7'-5"	0'-11"	—	24'-8"
SB1601	12	4'-0"	7'-5"	0'-11"	—	20'-8"
SB	4" Ht.		As Necessary			

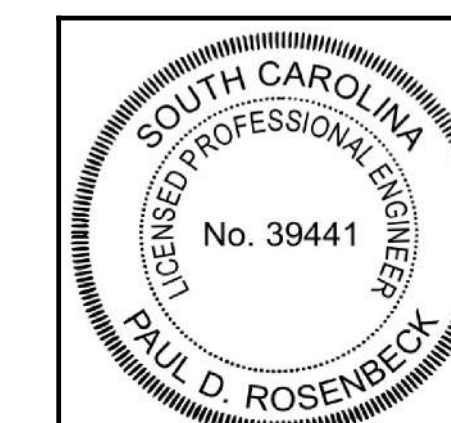
**QUANTITIES**

ITEM	UNIT	QUANTITY
Concrete, Class 4000	CY	27.3
Reinforcing Steel	LB	2,491
Dynamic Pile Analyzer Test Set-up	EA	1
Pile Driving Set-up	EA	4
Prest. Conc. Piling (20" Sq.)	LF	424

Notes:

1. For Drivability Analysis Parameters and Pile Bearing details, see sheet titled "Repair Type 5: Bent 13 Retrofit Details".

Elev. A	Minimum Conc. Pile Tip Elev.	Estimated Conc. Pile Tip Elev.
13.909	-80	-97



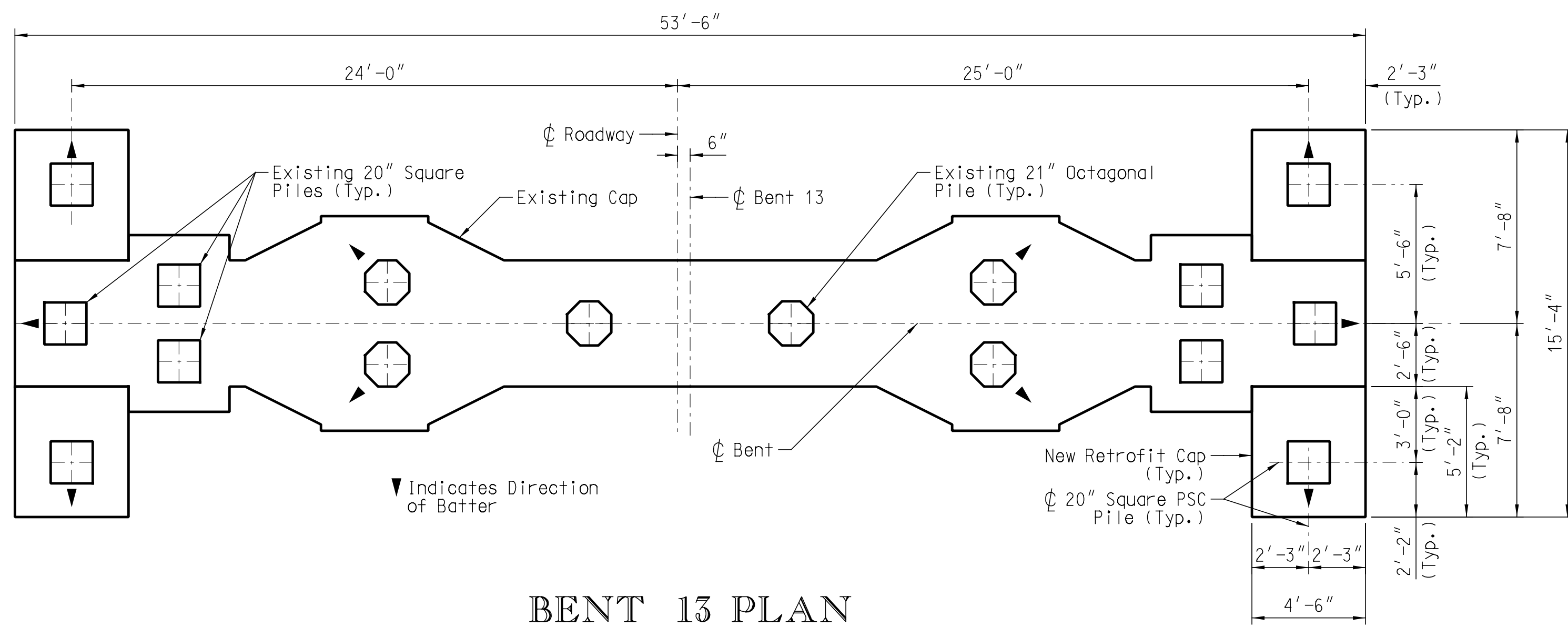
**REPAIR TYPE 5: BENT 12  
RETROFIT DETAILS**

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CHECKED BY: PDR  
PROJECT: 13-1394-017

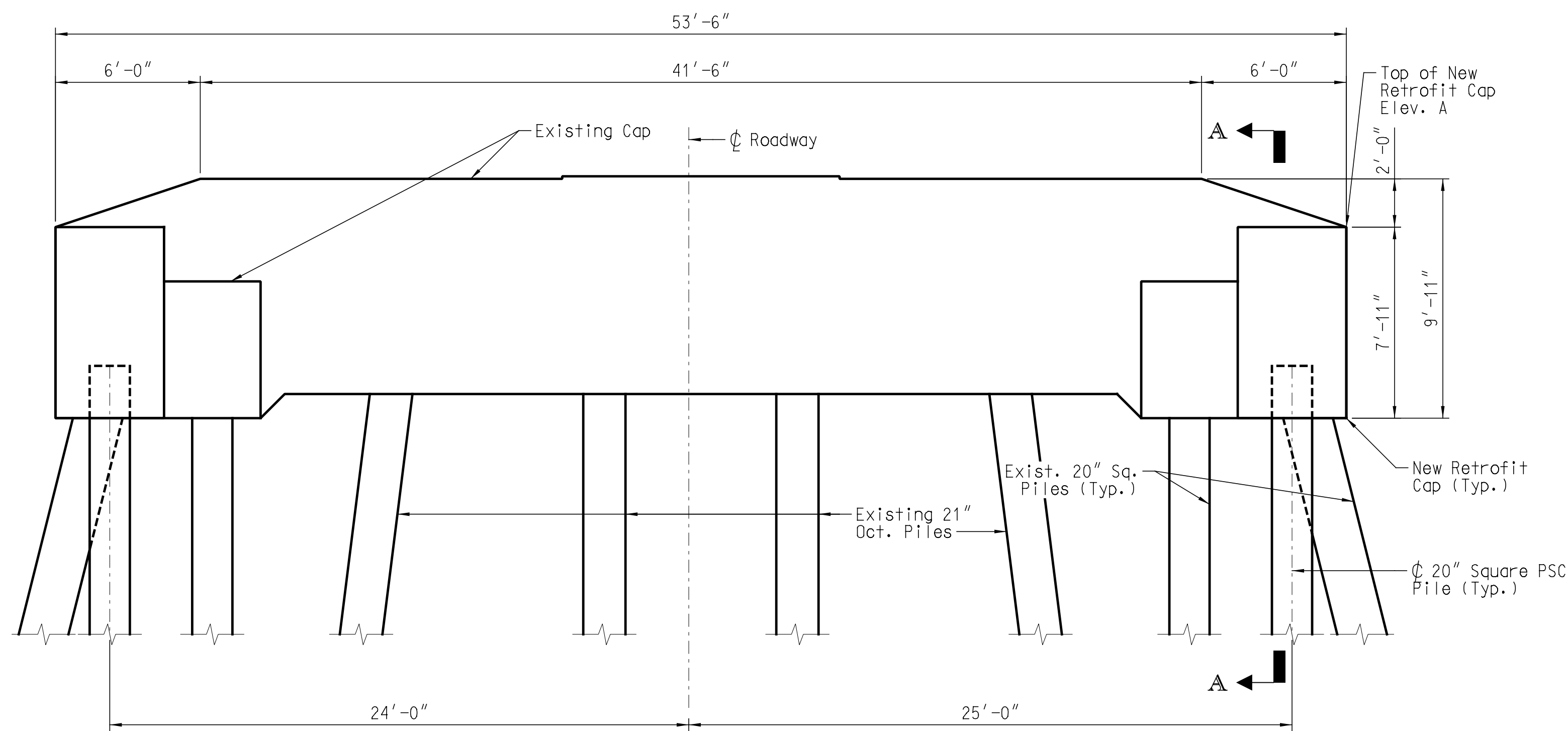


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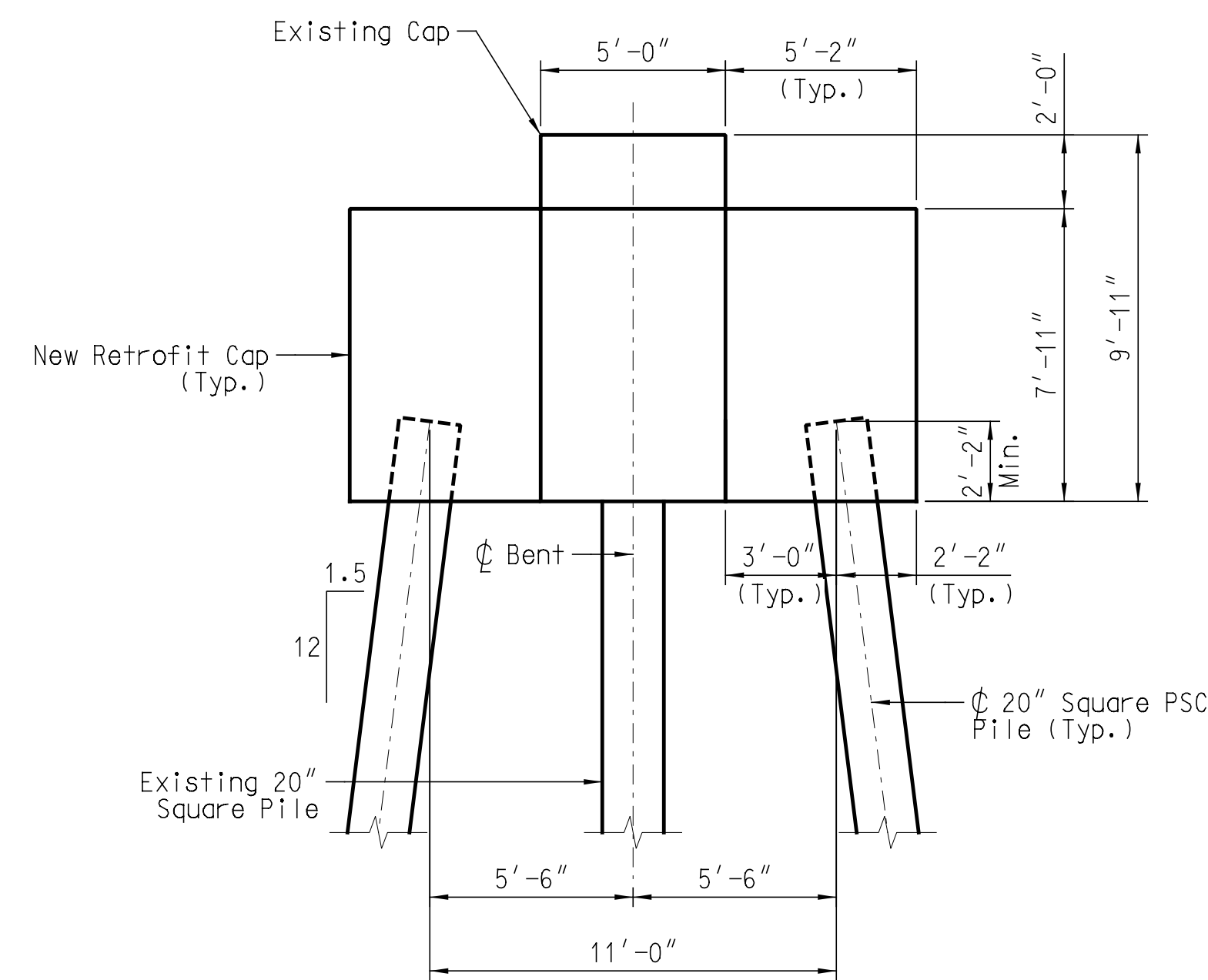
DATE: 1/6/2025  
SCALE: NTS  
SHEET NO. 16



**BENT 13 PLAN**



**BENT 13 ELEVATION**



**SECTION A-A**

PILE BEARING (ONE PILE)	
Parameter	Bent 12 & 13
Factored Design Load	270 Kips
Geotechnical Resistance Factor	0.6
Nominal Resistance	450 Kips
Loss Due to Scour	50 Kips
Required Driving Resistance	500 Kips

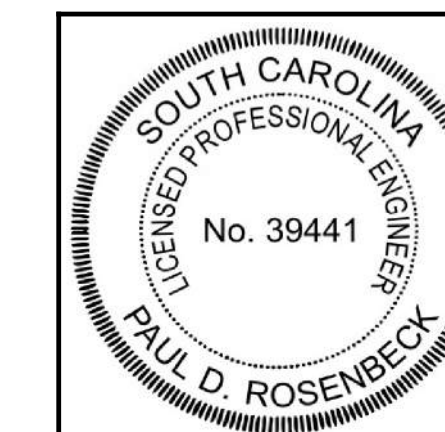
Resistance shall be verified by high-strain dynamic testing with a pile driving analyzer (PDA) and signal matching (CAPWAP) analysis of test piles.

Perform at least one high-strain dynamic test with a pile driving analyzer (PDA). A test should be performed during the installation of the first production pile in Bent 13. PDA gages are attached a minimum of 1.5D below the pile top and cannot function below grade or in water. Therefore, accommodations for this must be made. With respect to driving resistance, the required resistance of the piles at this site may not be reflected in the dynamic measurements during initial installation, but rather at some time following installation as the pile "sets up". However, even if the required driving resistance is not measured during initial pile installation, dynamic testing should be performed during a restrike test to confirm the required driving resistance if it is not measured during initial installation. In general, a longer idle period after installation will result in a higher driving resistance and a minimum of 7 days may be required to measure the required driving resistance.

If piles are not installed in one continuous operation, they may "set up" and require additional effort to continue installation. Include details of any anticipated temporary driving discontinuances including anticipated time intervals in the pile installation plan.

Jetting of piles shall not be permitted. Pile installation shall be accomplished with appropriate pile driving equipment. During the pile driving operations the contractor shall continuously monitor the elevation of the bridge deck at both gutter lines. Should any change in elevation exceeding 1/4" be detected, pile driving shall be ceased immediately. Details of the movement shall be reported to the engineer for further instructions.

TABLE OF ELEVATIONS		
Elev. A	Minimum Conc. Pile Tip Elev.	Estimated Conc. Pile Tip Elev.
14.289	-80	-97



**BENT 13 REINF. STEEL SCHED.**

MARK	NO. REQ'D	DIMENSION				LENGTH
		"a"	"b"	"c"	"d"	
C2501	48	3'-2"	1'-6"	---	---	4'-8"
J1601	44	3'-8 3/4"	4'-8"	---	---	13'-0 3/4"
J1602	24	7'-1 3/4"	4'-8"	---	---	16'-5 3/4"
L1601	12	1'-9"	2'-2 1/4"	2'-5 1/4"	2'-2 1/4"	8'-6 3/4"
S1601	20	4'-0"	7'-5"	0'-11"	---	24'-8"
SB1601	12	4'-0"	7'-5"	0'-11"	---	20'-8"
SB	4" Ht.		As Necessary			

**QUANTITIES**

ITEM	UNIT	QUANTITY
Concrete, Class 4000	CY	27.3
Reinforcing Steel	LB	2,491
Dynamic Pile Analyzer Test Set-up	EA	1
Pile Driving Set-up	EA	4
Prest. Conc. Piling (20" Sq.)	LF	318
Prest. Index Piling (20" Sq.)	LF	106

**DRIVEABILITY ANALYSIS PARAMETERS**

PARAMETER	BENT 12 & 13
SKIN QUAKE (IN.)	0.10
TOE QUAKE (IN.)	0.20
SKIN DAMPING (S/FT.)	0.20
TOE DAMPING (S/FT.)	0.15
% SKIN FRICTION	80%
% END BEARING	20%
DISTRIBUTION SHAPE NO.	VARIABLE*
BEARING GRAPH	PROPORTIONAL
PILE PENETRATION	55%
END BEARING FRACTION (TOE NO. 2)	0.90
HAMMER ENERGY RANGE	70 TO 100 FT-KIPS

- A. Uniform at 0.5 between 52 and 58 ft, linearly increasing from 0.3 to 0.5 from 58 to 68 ft, uniform at 0.7 from 68 to 77 ft, and uniform at 1.7 from 77 to 120 ft.
- B. The hammer selection shall be based on a wave equation analysis.

A properly operating pile hammer having the maximum rated energy between 70 ft-kips and 100 ft-kips is considered suitable for driven pile installation. However, final hammer approval shall be based on a wave equation analysis that accurately reflects the contractor's proposed driving system.

Notes:

- 1. For reinforcing details, see sheet titled "Repair Type 5: Bent 12 Retrofit Details".



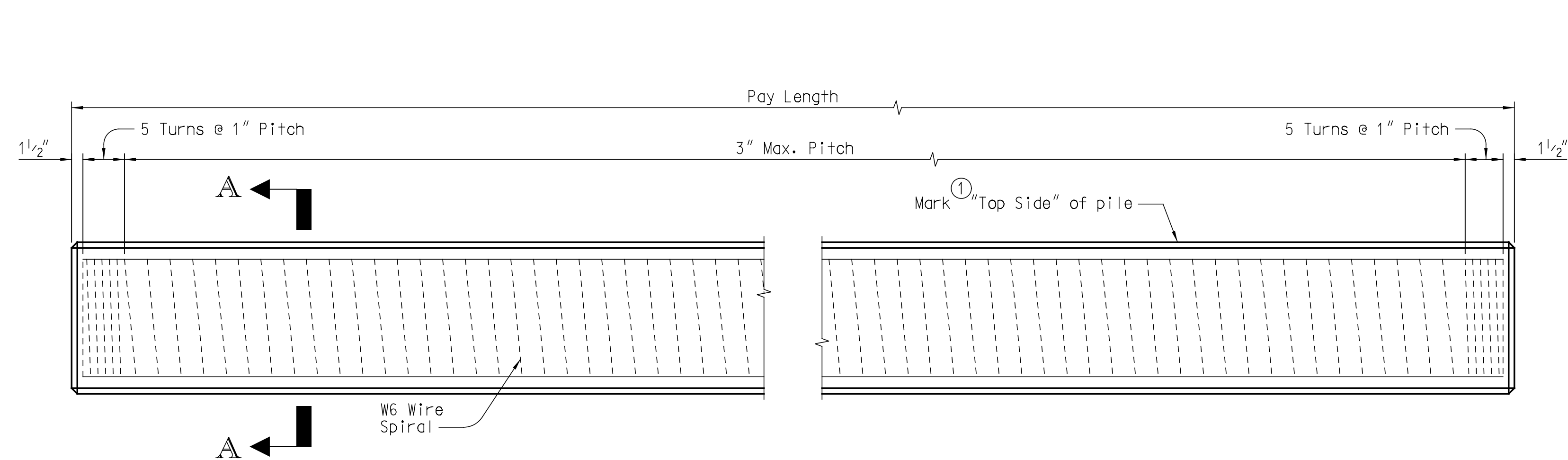
**REPAIR TYPE 5: BENT 13 RETROFIT DETAILS**

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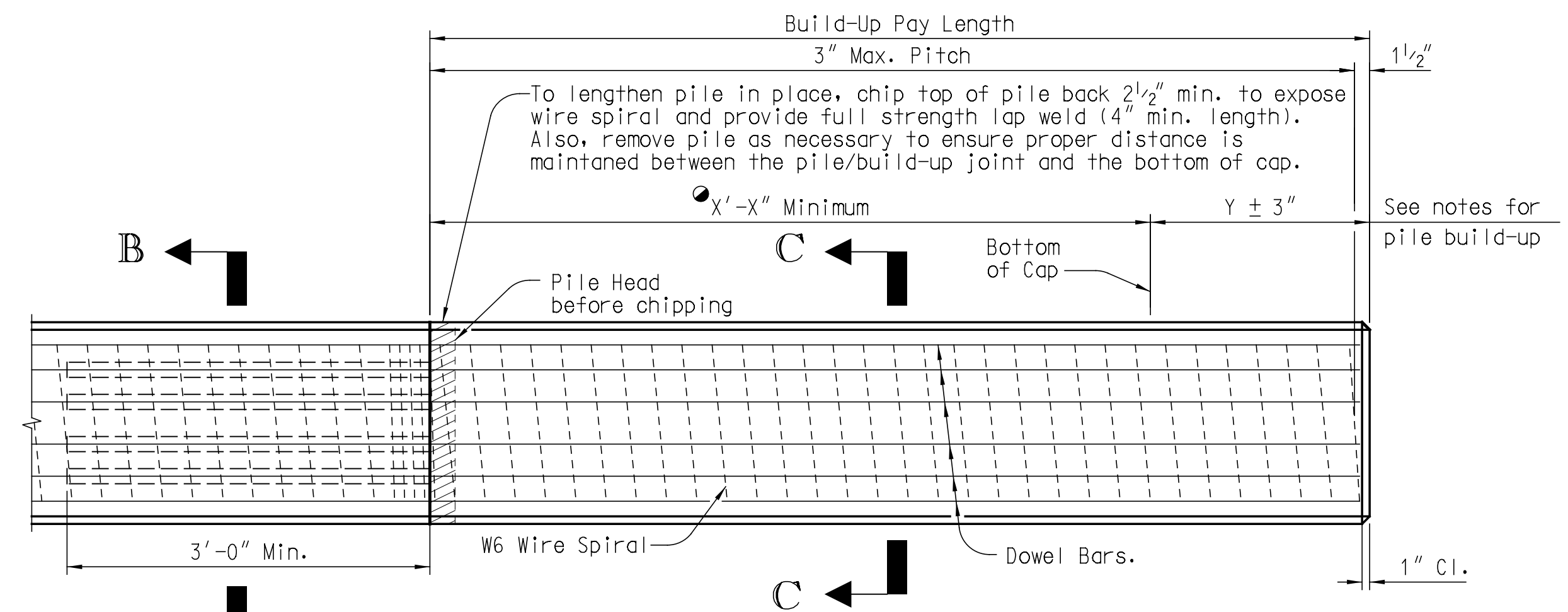


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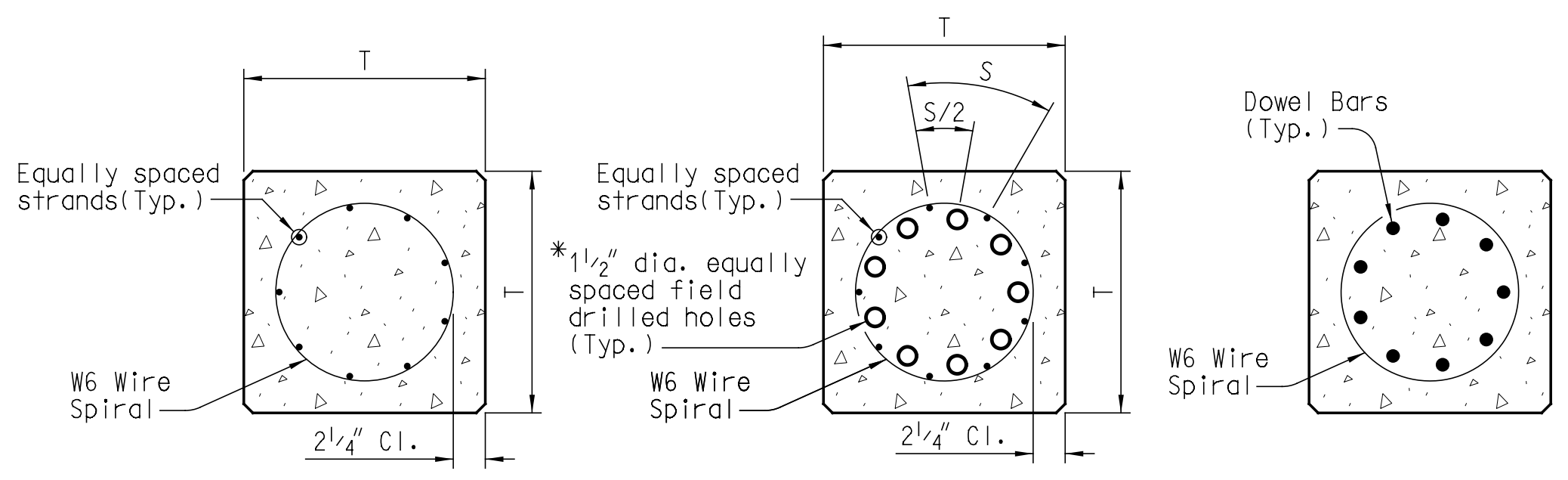


TYPICAL PILE ELEVATION



BUILD-UP

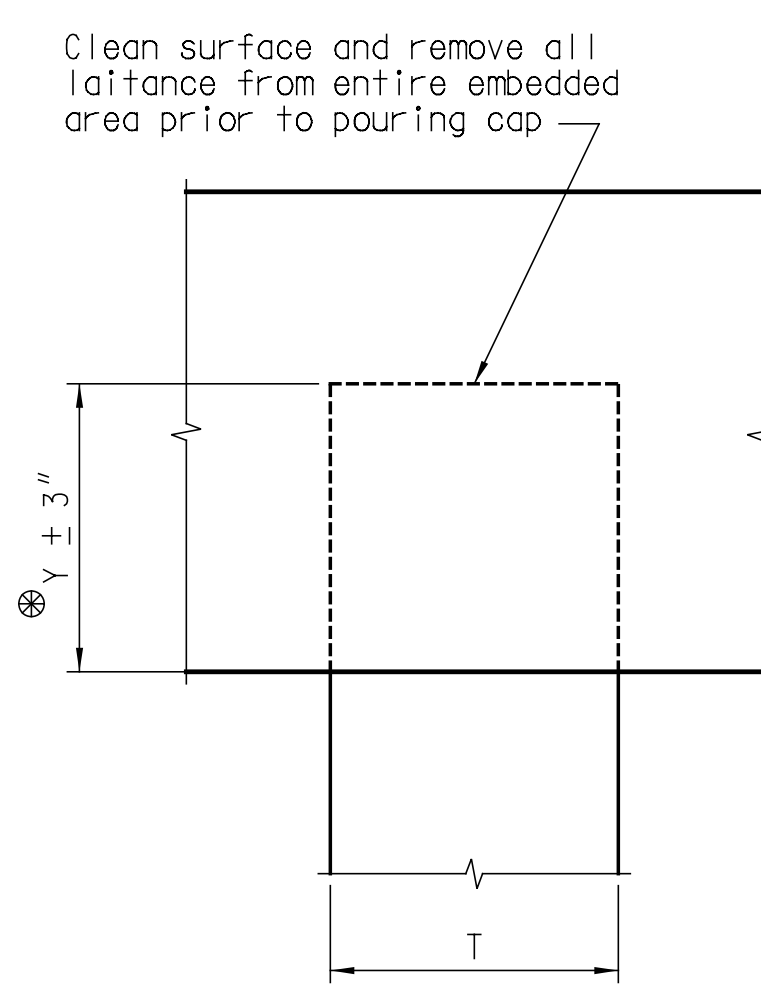
**NOTES FOR BUILD-UP**  
 Chip back top of piles and field drill holes as shown. Grout dowel bars in the holes using an approved non-shrink grout with  $f'c = 5$ ksi. Terminate dowel bars 1" clear from the top of pile. Submit dowel bar lengths to the RCE for approval. Include all costs associated with preparation of the pile for build-up in the unit price bid for Pile Build-up Preparation.



SECTION A-A SECTION B-B SECTION C-C

\*Field drill dowel holes. Locate dowel holes to provide 1/2" cl. to wire spiral.

PILE DATA <sup>2</sup>							
PILE SIZE " x "	PILE EMBEDMENT " x "	STRANDS	STRESS (ksi)	DOWEL BARS	MAXIMUM L		
					1 PICK-UP POINT	2 PICK-UP POINTS	3 PICK-UP POINTS
20"	26"	12 - 1/2"	0.785	12 # 25	64'	91'	131'

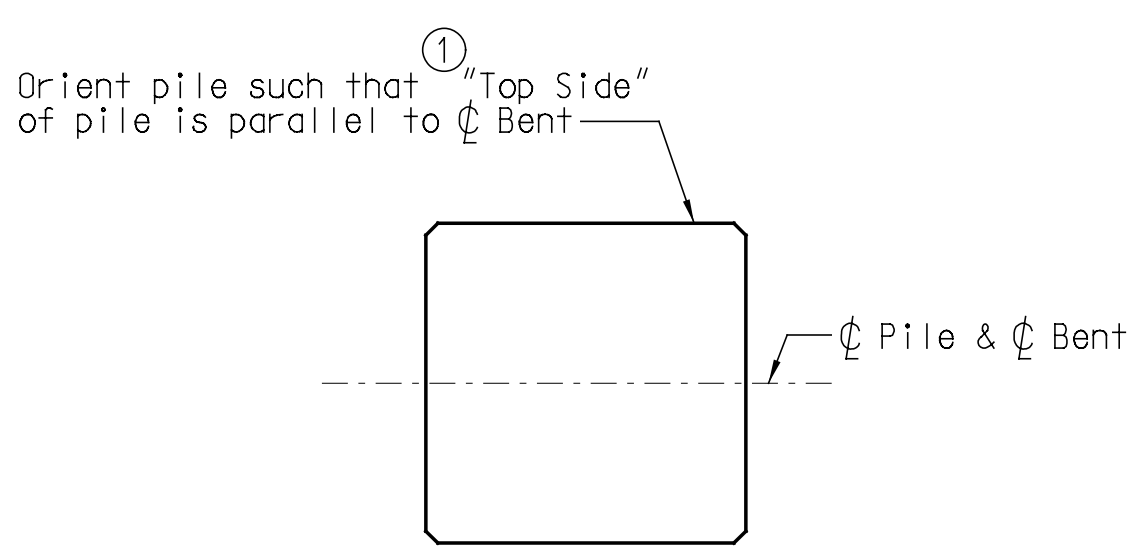


Build up all piles that have an embedment length less than the minimum shown in the plans. Use the build-up details shown on this sheet. The option is available to cast build-ups with bent caps provided rebar and wire spiral are continued a distance equal to "Y" into the cap and the cap is cast with Class 5000 concrete. Pay for cap concrete as Class 4000 concrete regardless of the actual class used. Include an embedment length of "Y" in the pile build-up length measured for payment. Pay for the pile build-up, including all costs for dowel bars, wire spirals, and build-up concrete, as an additional length of prestressed concrete piling equal to the build-up pay length shown in the build-up detail.

**GENERAL NOTES**  
 Splice wire spiral using full strength lap welds.  
 Submit dowel bar lengths to the RCE for approval.  
 Chamfer all exposed edges 3/4" unless noted otherwise.  
 All dimensions relative to reinforcing steel are to centers of bars (except as noted).  
 Release alternate strands simultaneously at opposite ends without shock.

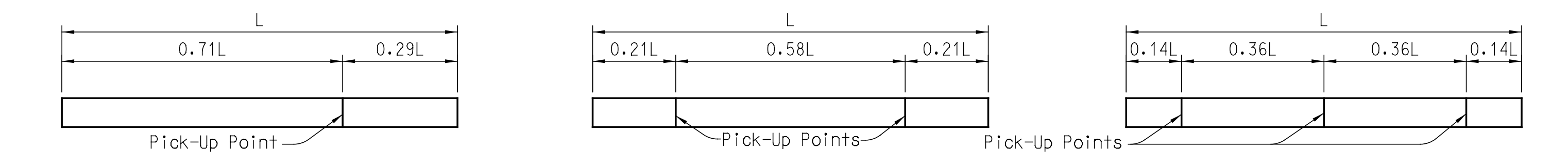
PILE ANCHORAGE DETAILS

\*If this dimension is less than Y - 3", build up the pile as detailed above.



PILE ORIENTATION DETAIL

<sup>1</sup>"Top Side" is the top surface of the pile when it was poured in the casting bed.

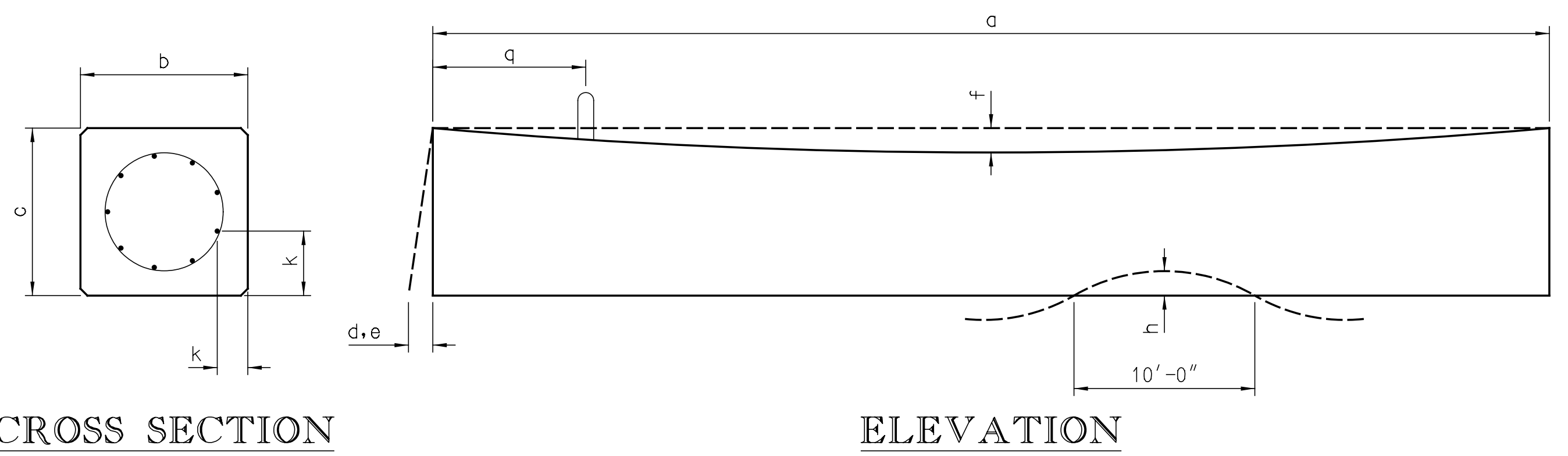


SINGLE POINT PICK-UP DOUBLE POINT PICK-UP TRIPLE POINT PICK-UP

**MATERIALS**  
 Prestressing Strand - Grade 270, Low Relaxation AASHTO M 203  
 Wire Spiral - AASHTO M 32, M 225  
 Reinforcing Steel - Grade 60 AASHTO M 31, Type W  
 Concrete - Class 5000 Standard Spec. Sect. 701

**TOLERANCES**

- a. Length ----- ± 1"
- b. Width or Diameter ----- ± 3/8", + 1/2" (including form draft)
- c. Depth ----- ± 3/8"
- d. Variation from Specified Plan End  
 Squareness or Skew ----- ± 1/4" per 12", ± 1/2" maximum
- e. Variation from Specified Elevation  
 End Squareness or Skew ----- ± 1/4" per 12", ± 1/2" maximum
- f. Sweep (Variation from straight line parallel to centerline of member) (considered to be a form tolerance) ----- ± 1/8" per 10'
- h. Local Smoothness of Any Surface ----- 1/4" in 10'
- k. Location of Strand ----- ± 1/4"
- q. Location of Handling Device ----- ± 6"
- Longitudinal Spacing of Stirrups or Spiral Reinforcement ----- ± 3/4"



CROSS SECTION

ELEVATION

DESIGN DATA	
Low Relaxation Strands	
Tensile Strength (fpu) = 270 ksi	
Initial Prestress (0.75 fpu) = 202.5 ksi	
Class 5000 Concrete	
f'c = 5 ksi	
f'ci = 3.5 ksi	



PRESTRESSED CONCRETE PILES

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PROJECT: 13-1394-017	SHEET NO. 18



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Collar Replacement Notes:

- Existing collars at Bents 25 and 26 shall be demolished and replaced in kind according to the original 1961 plan details. See sheet 20 of this set for original collar details, elevations and reinforcing schedule.
- Conduct all work in accordance with the SCDOT 2007 Standard Specifications for Highway Construction
- Reinforcing Steel: ASTM-A615, Gr. 60
- Concrete: Class 4000 (f'c=4000psi min. 28 day strength)
- See sheets titled "Repair Item List" and "Repair Location Plan" for corresponding item numbers and locations of collar replacement.
- The Contractor shall submit all required product specifications, proposed formwork and concrete placement procedures for approval by the Engineer prior to the beginning of work.
- Methods and equipment in placing concrete underwater or within the tidal zone shall prevent the segregation or washing of the concrete before it has hardened.

Repair Type 6 - Construction Notes

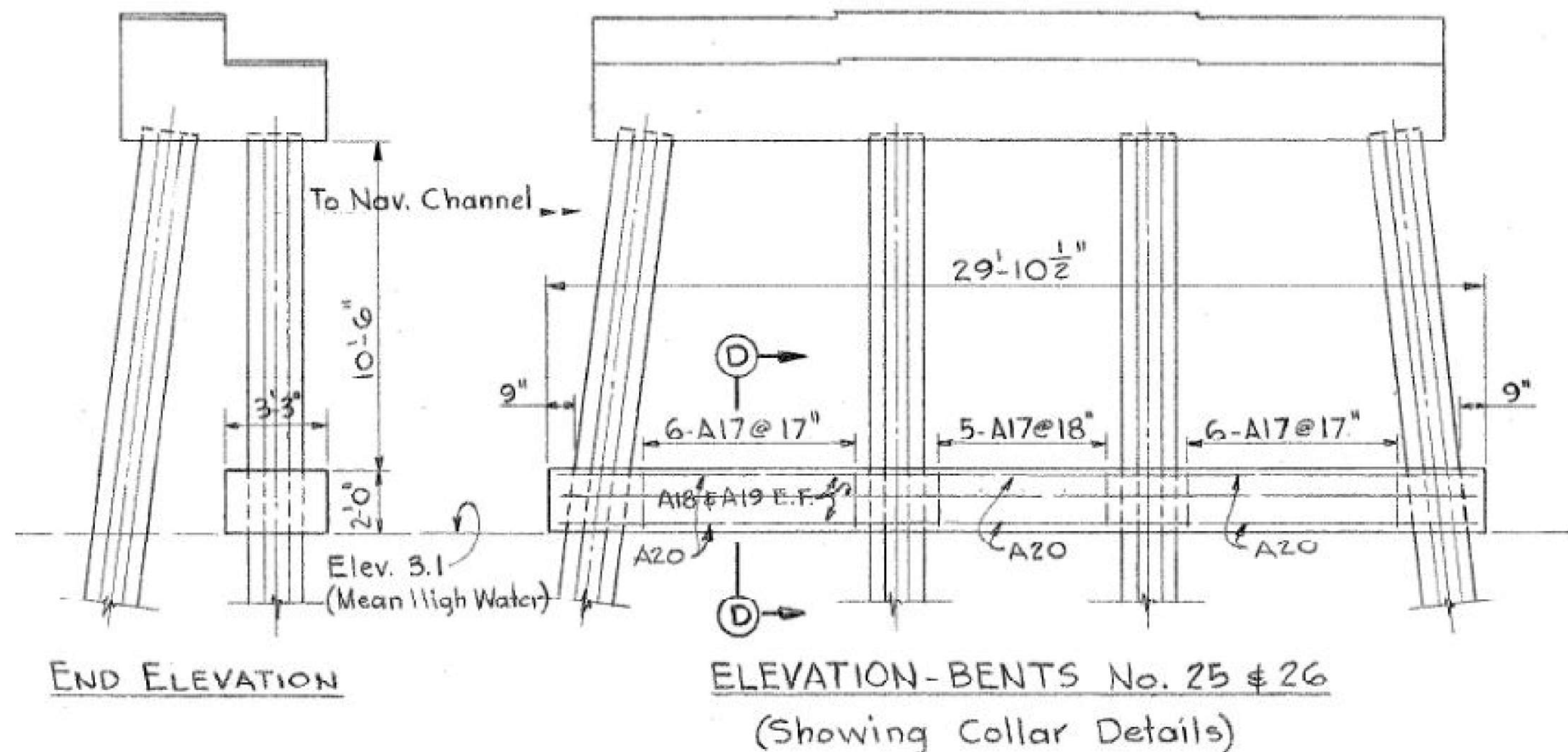
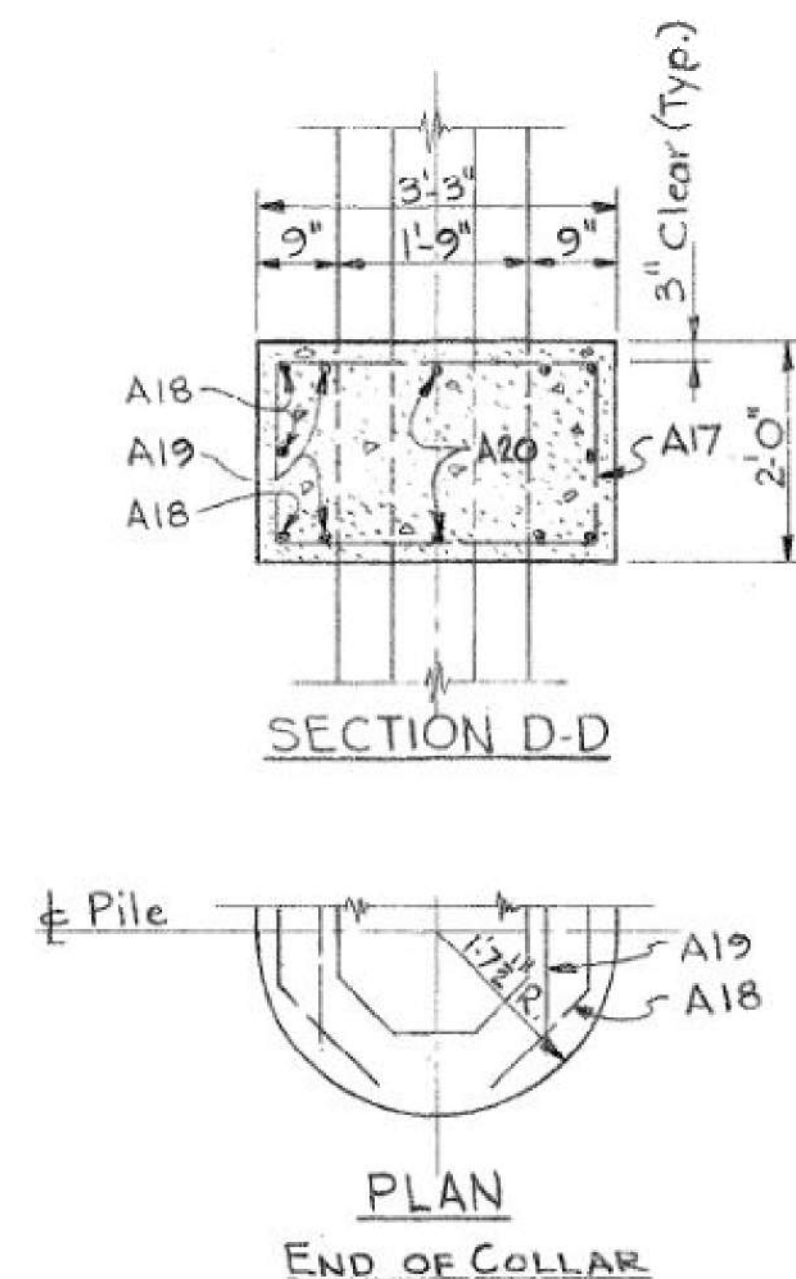
- Containment/Catchment Devices
  - The contractor shall use containment/catchment devices to prevent concrete chips, debris, etc. from falling into the surrounding water during the preparation/repair work.
  - Containment/Catchment devices shall be approved by the owner prior to beginning work.
- Concrete Removal and Surface Prep
  - All collar concrete and existing reinforcing steel shall be removed and disposed of. Laitant collar concrete shall be sufficiently debonded and removed from the existing pile prior to placing of new concrete.
  - The exposed pile shall be cleaned of all rust, scale, oil, and dirt by abrasive techniques or high pressure water (3,000 PSI to 10,000 PSI) prior to placing of new concrete. Pile surface shall be thoroughly cleaned by removing any loose particles and dust. The surfaces shall be saturated for approximately four hours subsequent to cleaning. Just prior to concrete placement, the repair area shall be in a saturated, surface dry condition (thoroughly wet with no standing water).
  - The Contractor shall exercise caution during demolition and construction operations to prevent any damage to existing piles, adjacent structures and structural components not within the scope of these outlined repairs. Structures and structural components not within the scope of this project that are damaged during the repair operations shall be repaired or replaced at the expense of the Contractor to the satisfaction of the Owner
- Concrete Work
  - All concrete work shall conform to ACI 318-11 and the specifications.
- Documentation
  - The owner shall have the opportunity to verify and photo document the surface preparation of each concrete repair prior to placing any concrete repair material.



PHOTO 1: TYPICAL COLLAR ELEVATION



PHOTO 2: TYPICAL COLLAR ELEVATION



FENDER DETAILS:  
(FROM EXISTING PLAN SHEETS)

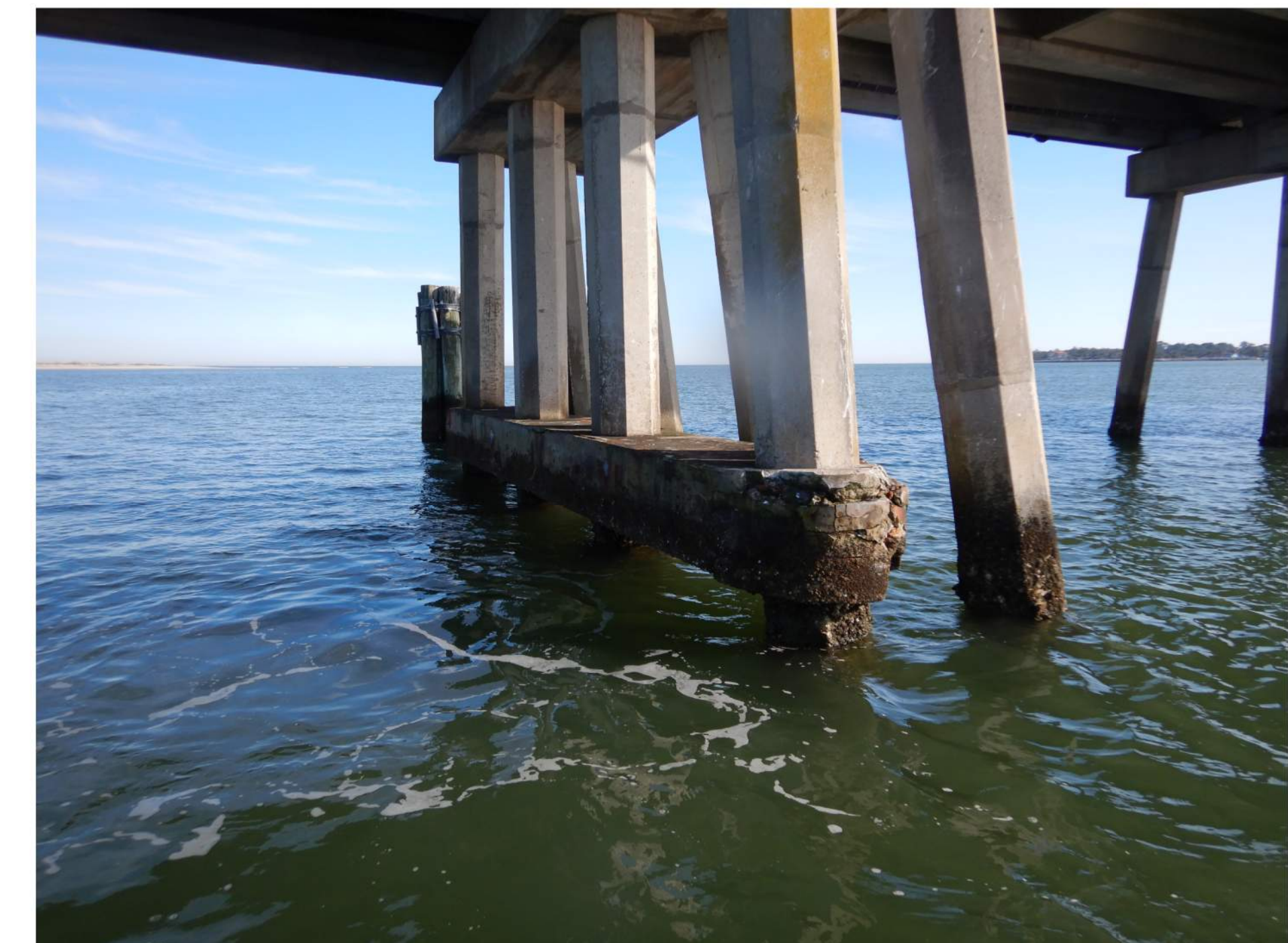
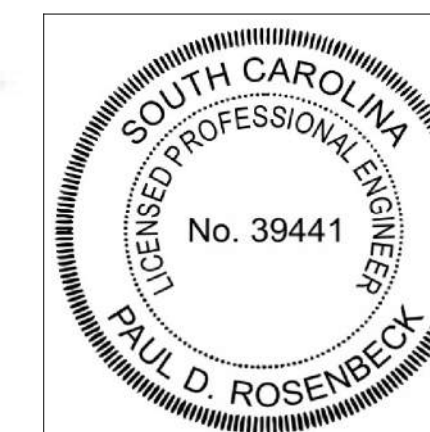


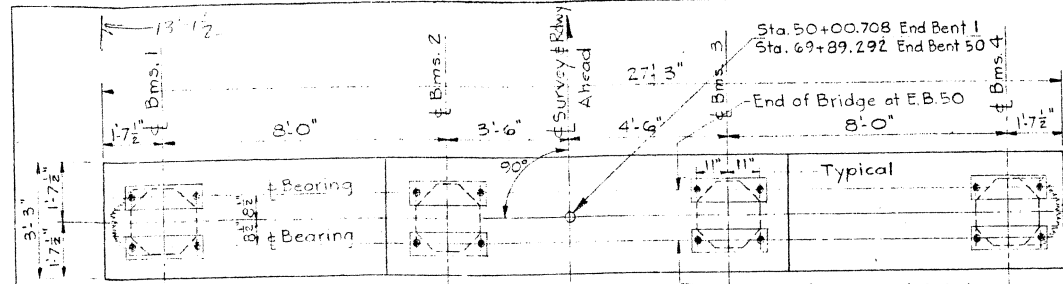
PHOTO 3: TYPICAL COLLAR ELEVATION



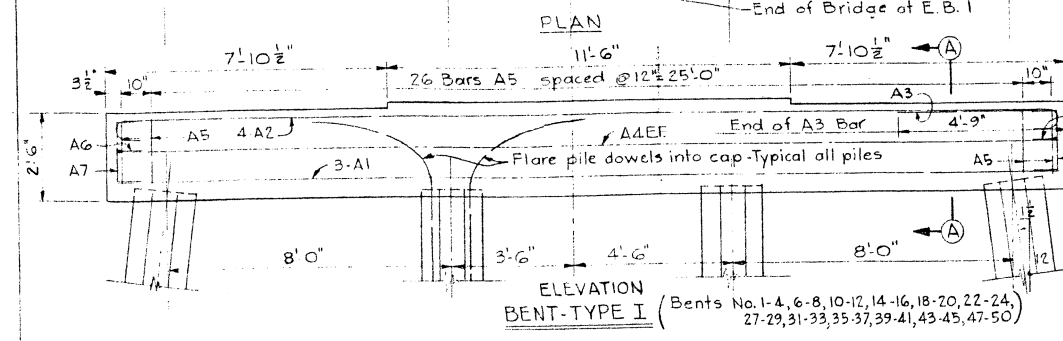
REPAIR TYPE 6:  
BENT 25-26 COLLAR REPLACEMENT

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PROJECT: 13-1394-017			SHEET NO. 19

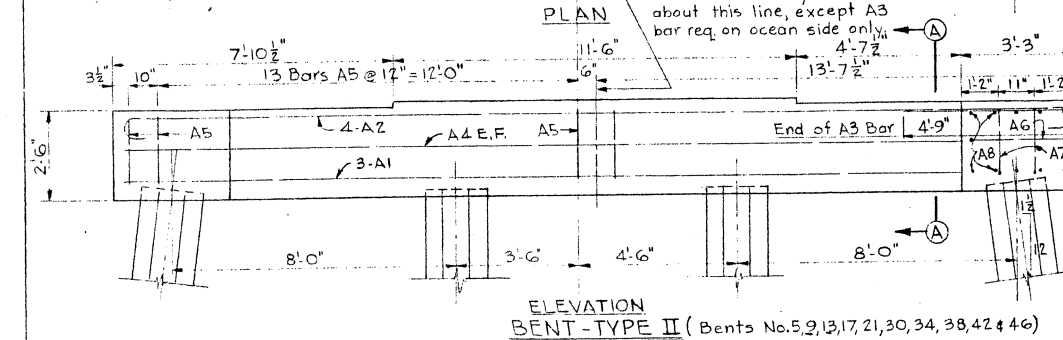
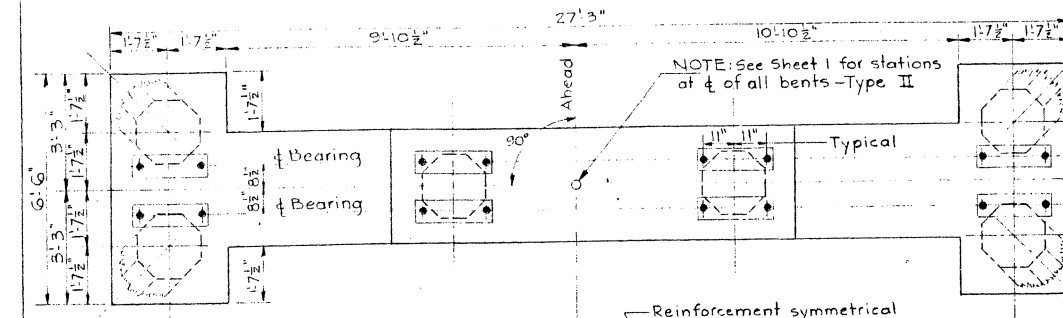
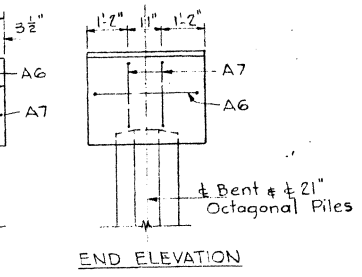




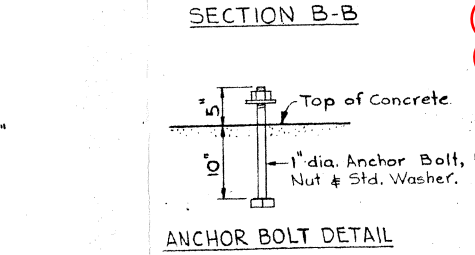
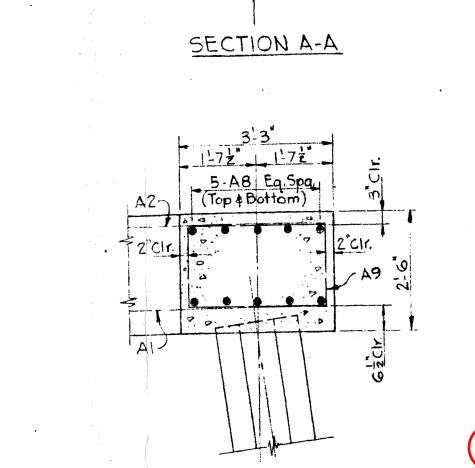
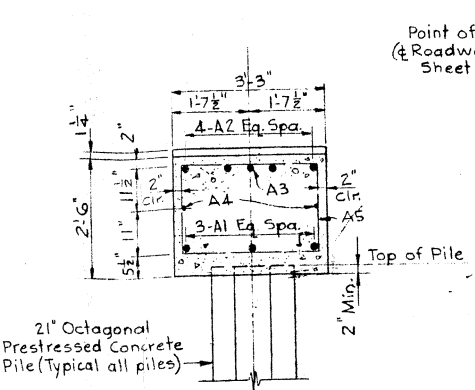
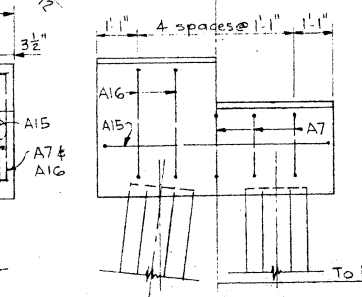
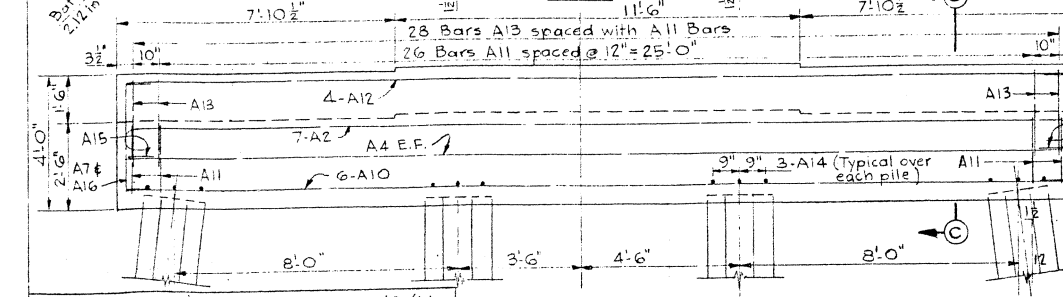
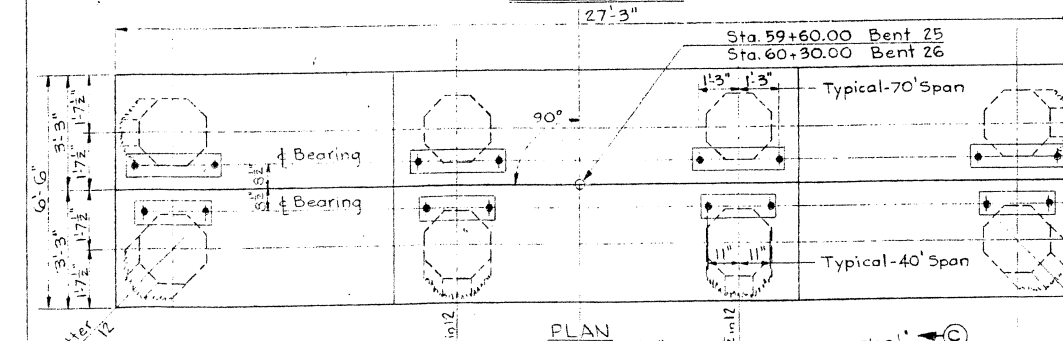
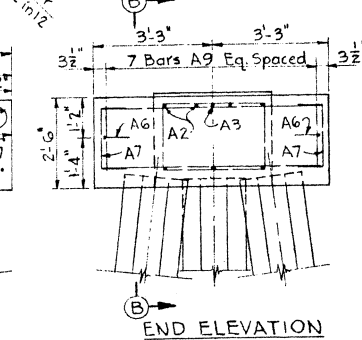
NOTE: See Sheet 1 for stations at  $\frac{1}{4}$  of all other bents-Type I



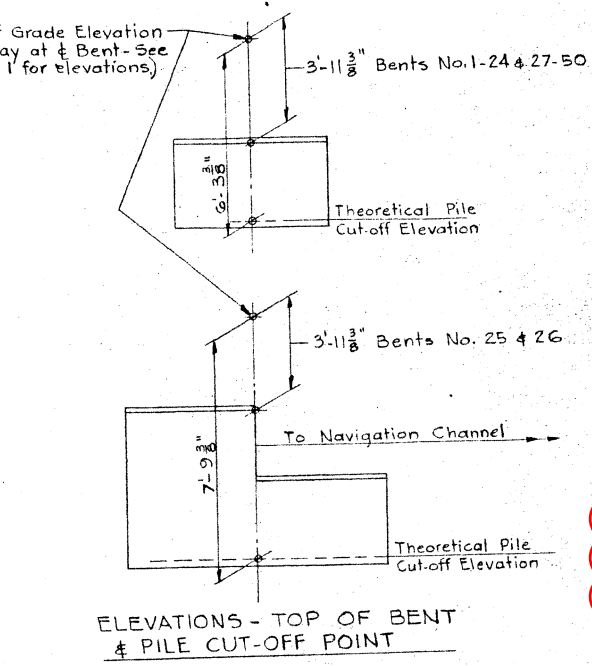
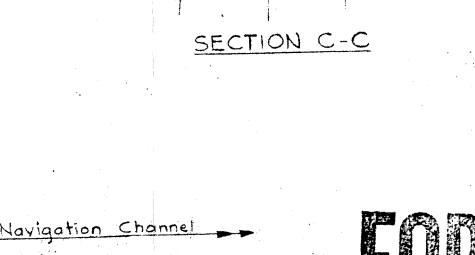
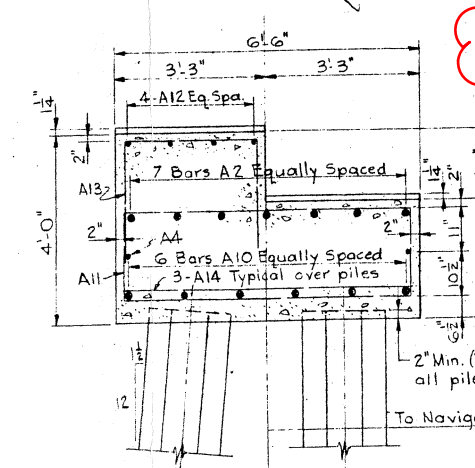
All Bents Type I & Bearing at End Bents only



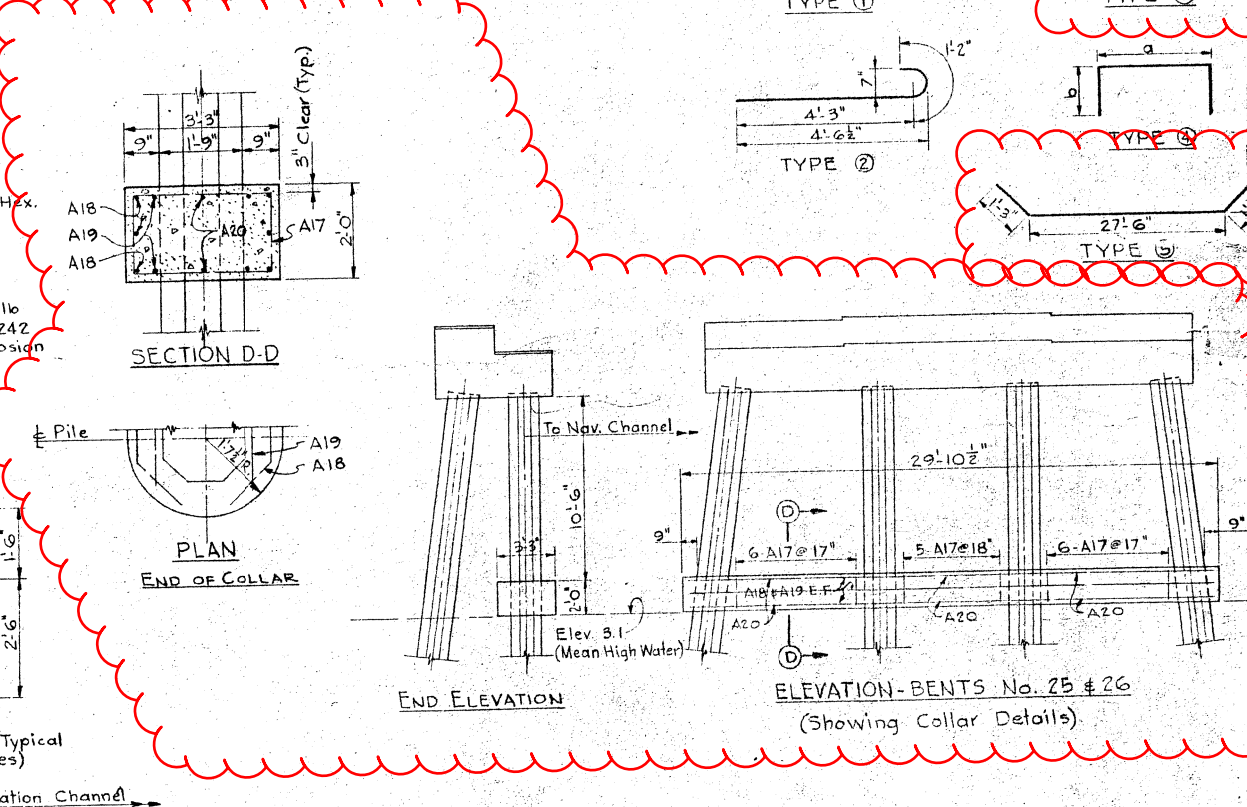
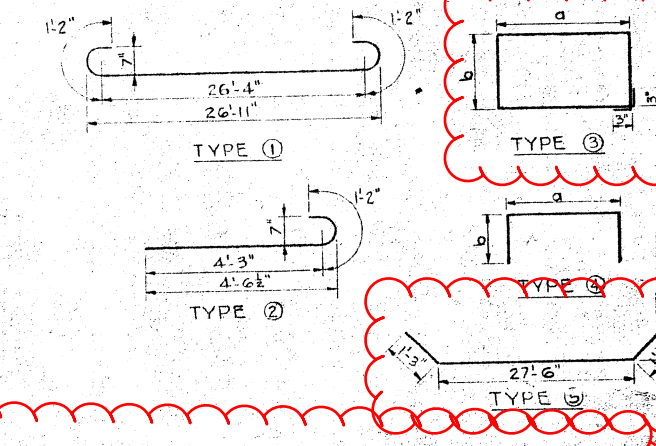
All Bents Type II



Weight of Anchor Bolt, Nut & Washer 4.2 lb  
Bolts, nuts and washers to be ASTM 242 Steel possessing 4 to 6 times the corrosion resistance of ASTM A7 Steel.



BAR	TYPE	SIZE	NUMBER			LENGTH		a	b	c	d
			BT I	BT II	BT III	FT.	IN.				
A1	St.	7	3	3	-	26	11				
A2	①	7	4	4	7	28	8				
A3	②	7	1	1	-	5	5				
A4	St.	4	2	2	2	26	11				
A5	③	4	28	28	-	10	1	2'-11"	1'-10 1/2"		
A6	④	4	2	-	-	4	10	2'-10"	1'-0"		
A7	④	4	4	8	6	3	10	1'-9 1/2"	1'-0"		
A8	St.	7	-	20	-	6	2				
A9	③	4	-	14	-	9	9	2'-11"	1'-8 1/2"		
A10	St.	7	-	-	6	26	11				
A11	⑤	4	-	-	28	16	5	6'-2"	1'-9 1/2"		
A12	St.	7	-	-	4	26	11				
A13	④	4	-	-	28	8	1	2'-11"	2'-7"		
A14	St.	7	-	-	12	6	2				
A15	④	4	-	-	2	8	1	6'-1"	1'-0"		
A16	④	4	-	-	4	5	2	3'-2"	1'-0"		
A17	③	4	-	-	17	9	0	2'-9"	1'-6"		
A18	⑤	7	-	-	6	30	0				
A19	St.	7	-	-	4	28	8				
A20	St.	7	-	-	6	6	0				



BENTS:	TYPE I	TYPE II	TYPE III
Concrete, Class A (c.y.)	8.8	10.3	27.8
*Reinforcing Steel (lb.)	652	999	2423
21" Oct. Prestr. Concrete Piles (Number)	4	6	8
*Wt of Anchor Bolt Assemblies not included.			
Total Number - 21" Octagonal Prestressed Concrete Piles:	228		
Total Estimated Length of Piles:	14,000 linear feet.		

FRIPP ISLAND TOLL BRIDGE  
FRIPP INLET - BEAUFORT COUNTY

BENTS

SH. 4  
SCHEM

DESIGNED BY J.E.C. DATE 10/61  
DRAWN BY E.H.E. DATE 10/61  
TRACED BY DATE  
CHECKED BY W.B. DATE 10/61

ELEVATION  
BENT-TYPE III (Bents No. 25 & 26)

FOR INFORMATION ONLY