

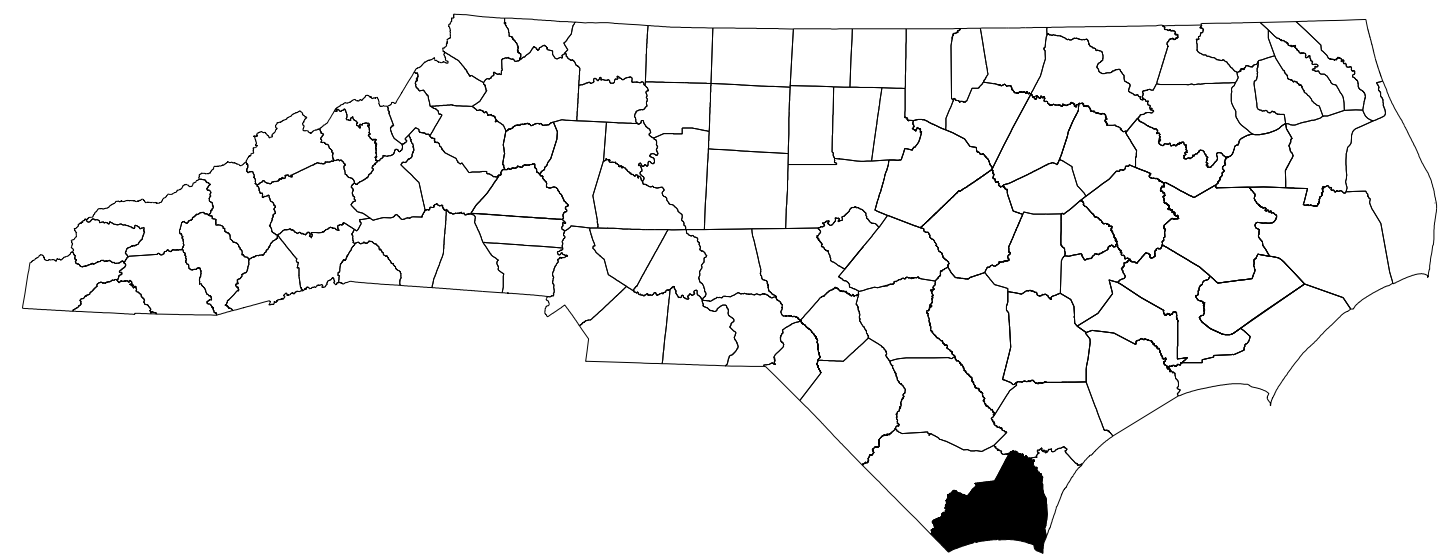
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PROJECT NUMBER: 15BPR.24

CONTRACT: C204300



STATE OF NORTH CAROLINA

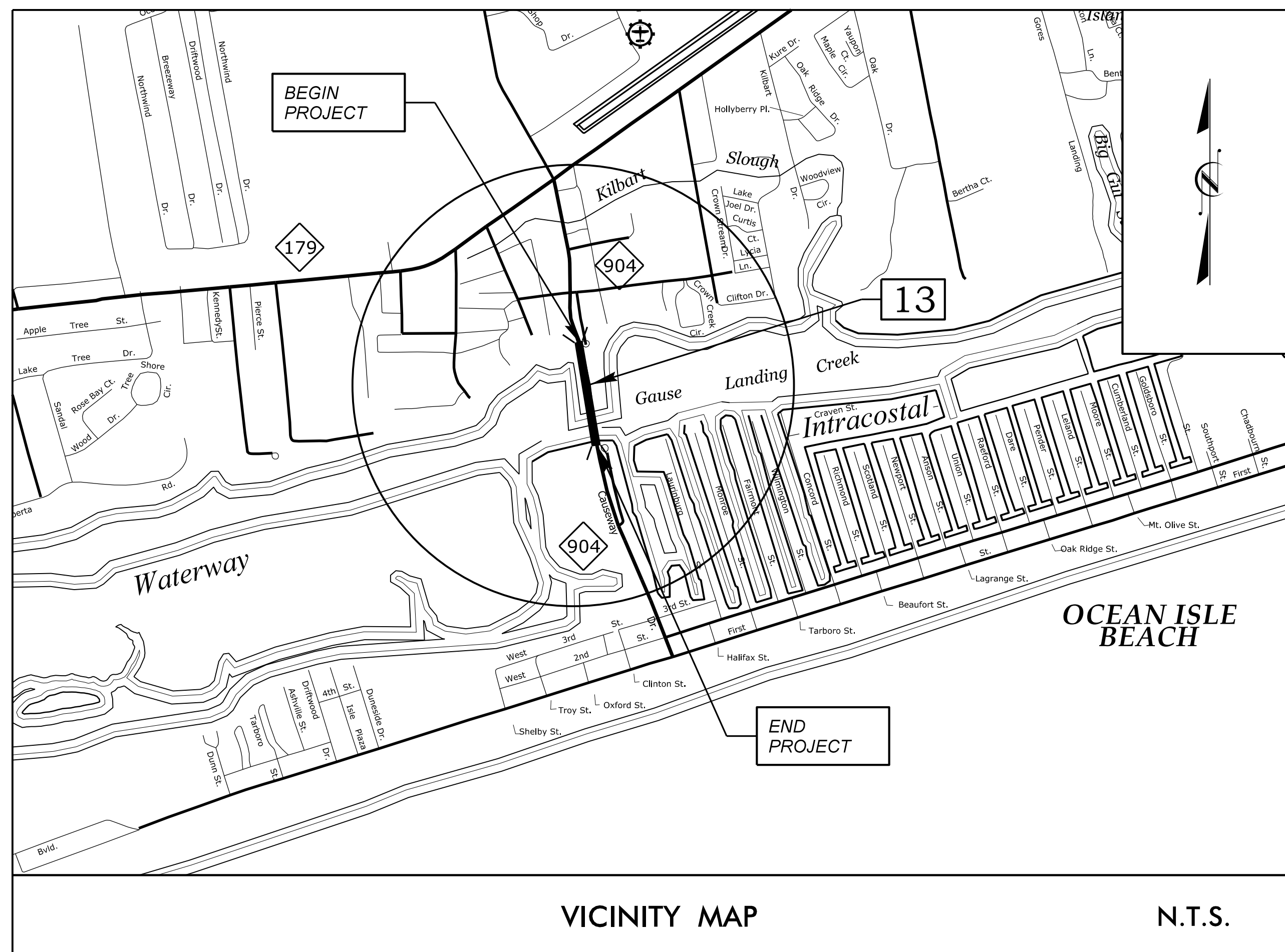
DIVISION OF HIGHWAYS

BRUNSWICK COUNTY

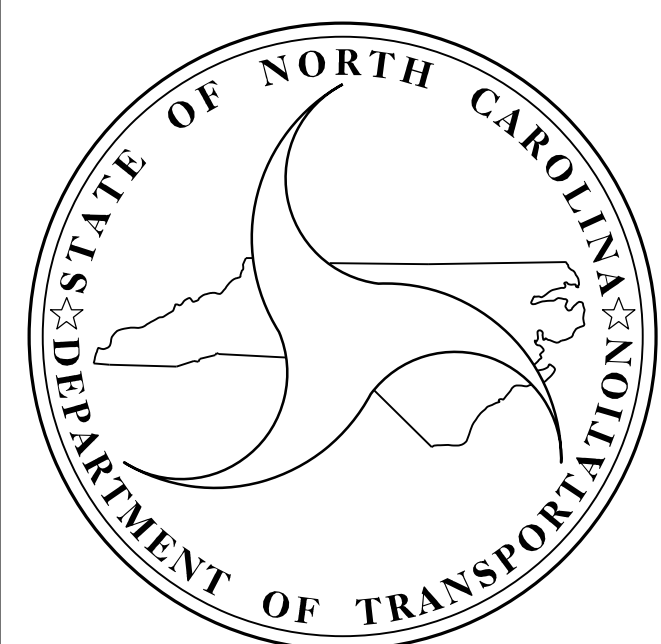
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	15BPR.24	1	45
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
15BPR.24	-	P.E.	
15BPR.24	-	CONST.	

LOCATION: BRUNSWICK COUNTY
BRIDGE #090013 ON NC 904 OVER THE INTRACOASTAL WATERWAY

TYPE OF WORK: BRIDGE PRESERVATION – POLYESTER POLYMER CONCRETE DECK OVERLAY, SILANE DECK TREATMENT, JOINT REPAIR, SUPERSTRUCTURE REPAIR, BEARING REPLACEMENT, SUBSTRUCTURE REPAIR, CATHODIC PROTECTION, AND INTEGRAL PILE JACKETS



STRUCTURES



DESIGN DATA

BRUNSWICK COUNTY
 #13 ADT 2014 = 11,000

PROJECT LENGTH

BRUNSWICK COUNTY
 #13 = 0.36 MILE

2018 STANDARD SPECIFICATIONS

LETTING DATE :
 MAY 21, 2019

Prepared for the Office of:
DIVISION OF HIGHWAYS
 STRUCTURES MANAGEMENT UNIT
 1000 BIRCH RIDGE DR.
 RALEIGH, N.C. 27610

KCA 301 FAYETTEVILLE ST., SUITE 1500
 RALEIGH, NC 27601 (919) 882-7839
 LICENSE #: C-1506

DocuSigned by:
Jacob H. Duke
3/28/2019

JACOB H. DUKE
 PROJECT ENGINEER

DIEGO A. AGUIRRE
 PROJECT DESIGN ENGINEER

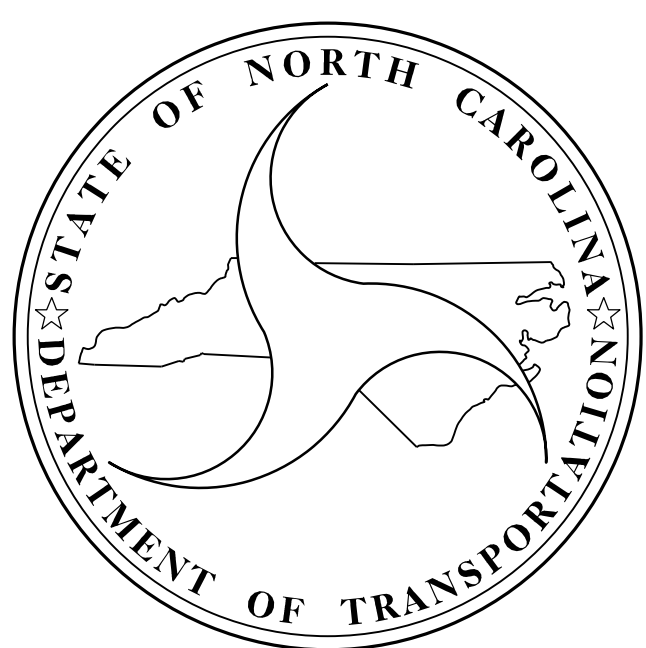
TIP PROJECT: 15BPR.24

CONTRACT: C204300

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	15BPR.24	1A	45
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15BPR.24	-	P.E.	
15BPR.24	-	CONST.	



KCA
KISINGER CAMPO
& ASSOCIATES
301 FAYETTEVILLE ST., SUITE 1500
RALEIGH, NC 27601 (919) 882-7839
LICENSE #: C-1506

SUMMARY OF QUANTITIES

TOTAL BILL OF MATERIAL

	INCIDENTAL MILLING	ASPHALT CONCRETE SURFACE COURSE TYPE, S9.5C	ASPHALT BINDER FOR PLANT MIX	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE II (4")	REMOVAL OF PAVEMENT MARKING LINES (4")	PER,AMEMT RAISED PAVEMENT MARKING	GROOVING BRIDGE FLOORS	CLASS II, SURFACE PREPARATION	ELASTOMERIC BEARINGS	CONCRETE REPAIRS	SHOTCRETE REPAIRS	EPOXY RESIN INJECTION	INTEGRAL PILE JACKETING	FOAM JOINT SEALS FOR PRESERVATION	WATER LINE REMOVAL
	SO. YD.	TON	TON	LIN. FT.	LIN. FT.	EA.	SQ. FT.	SO. YD.	LUMP SUM	CU. FT.	CU. FT.	LIN. FT.	LF.	LIN. FT.	LUMP SUM
TOTAL	305	26	2	8069	5565	49	14417	2	LUMP SUM	45	321	750	5	720	LUMP SUM

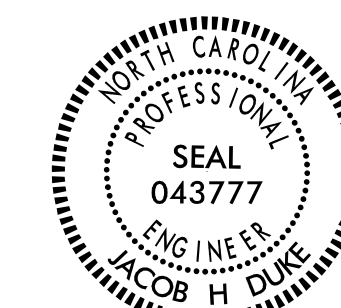
TOTAL BILL OF MATERIAL - CONT.

	RAIL RETROFIT	POLYESTER POLYMER CONCRETE MATERIALS	ELASTOMERIC CONCRETE FOR PRESERVATION	REPAIRS TO PRESTRESSED CONCRETE GIRDERS	BRIDGE JOINT DEMOLITION	EPOXY COATING	SCARIFYING BRIDGE DECK	SHOTBLASTING BRIDGE DECK	PLACING AND FINISHING POLYESTER POLYMER CONCRETE OVERLAY	SILANE DECK TREATMENT	CONCRETE DECK REPAIR FOR POLYESTER POLYMER CONCRETE OVERLAY	TYPE I BRIDGE JACKING BRIDGE NO. 13	CATHODIC PROTECTION SYSTEM-SUBMERGED ZINC BULK ANODE
	LIN. FT.	CU. YD.	CU. FT.	CU. FT.	SO. FT.	SO. FT.	SO. YD.	SO. YD.	SO. YD.	SO. YD.	SO. YD.	EA.	EA.
TOTAL	3795	103	14	141	65	5627	1789	6330	1789	4632	1.2	6	50

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



DocuSigned by:
 Jacob H. Duke
 4/1/2019

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWINGS AND DIMENSIONS:

- DO NOT SCALE DRAWINGS FOR DIMENSIONS NOT GIVEN.
- VERIFY ALL EXISTING FIELD CONDITIONS AND DIMENSIONS (INCLUDING MINIMUM VERTICAL CLEARANCE) PRIOR TO COMMENCING REPAIRS OR ORDERING ANY MATERIAL. NOTIFY ENGINEER OF ANY DISCREPANCIES FOUND.
- ALL DIMENSIONS ARE IN FEET AND INCHES.

DESIGN SPECIFICATIONS:

- LRFD BRIDGE DESIGN SPECIFICATIONS (8TH EDITION, 2017)
- 2018 NCDOT STANDARD SPECIFICATIONS AND PROJECT SPECIAL PROVISIONS.

PROJECT SCOPE:

- POLYESTER POLYMER CONCRETE (PPC) OVERLAY
- SILANE DECK TREATMENT
- SUPERSTRUCTURE CONCRETE REPAIRS
- SUBSTRUCTURE CONCRETE REPAIRS
- EXPANSION JOINT REPLACEMENT/INSTALLATION
- BEARING REPLACEMENT
- INTEGRAL PILE JACKETING
- GALVANIC CATHODIC PROTECTION - BULK ANODE
- RAIL RETROFIT (TYP.)
- APPROACH ROADWAY MILLING AND RESURFACING
- EPOXY COATING BEAM ENDS.
- WATER LINE REMOVAL

GENERAL NOTES:

- IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL STATE AND FEDERAL REQUIREMENTS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR CONTROL OF TRAFFIC AND LIMITS ON PHASING CONSTRUCTION, SEE TRANSPORTATION MANAGEMENT PLAN.
- FOR SURFACE PREPARATION FOR PPC OVERLAY, SEE SPECIAL PROVISIONS.
- FOR POLYESTER POLYMER CONCRETE (PPC), SEE SPECIAL PROVISIONS.
- FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.
- FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.
- FOR CONCRETE REPAIRS, SEE PLAN DETAILS AND SPECIAL PROVISIONS.
- FOR CONCRETE DECK REPAIR FOR PPC OVERLAY, SEE SPECIAL PROVISIONS.
- FOR ADHESIVELY ANCHORED RODS AND DOWELS, SEE ARTICLE 420-13 OF THE STANDARD SPECIFICATIONS.
- ALL PROPOSED EXPANSION JOINT DIMENSIONS, OPENINGS AND BLOCKOUTS ARE SHOWN AT 65°F. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTALLATION GUIDELINES AND MAKE ANY NECESSARY ADJUSTMENTS.
- WORK ON BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL SUBMIT PLANS FOR CONSTRUCTION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL, A COMPLETE SEQUENCE OF TASKS FOR EACH OPERATION AFFECTING THE BRIDGE SURFACE AND/OR VEHICLE/MARINE TRAFFIC.
- ANY DAMAGE TO EXISTING REINFORCING STEEL, DURING CONTRACTOR'S OPERATIONS, SHALL BE REPAIRED AS DIRECTED BY THE ENGINEER AND PERFORMED AT NO ADDITIONAL COST TO THE DEPARTMENT.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR MAINTENANCE OF WATER TRAFFIC, SEE SPECIAL PROVISIONS.
- FOR WORK IN, OVER OR ADJANCE TO NAVIGABLE WATERS, SEE SPECIAL PROVISIONS.
- FOR INTEGRAL PILE JACKETING, SEE SPECIAL PROVISIONS.
- FOR SECURING OF VESSELS, SEE SPECIAL PROVISIONS.
- FOR COORDINATION WITH THE U.S. COAST GUARD, SEE SPECIAL PROVISIONS.
- EXISTING JOINTS AND DRAINS SHALL BE SEALED PRIOR TO BEGINNING REPAIRS OF BRIDGE DECK.
- FOR PAVEMENT MARKINGS AND MARKERS, SEE TRASPORTATION MANAGEMENT PLANS.

PROJECT COORDINATES:

NC 904/OCEAN ISLE BEACH ROAD SW IS AN EAST/WEST ROUTE AND THE BRIDGE BEGINS ON THE MAINLAND SIDE AND ENDS ON THE BEACH SIDE. ALTHOUGH THE BRIDGE IS ORIENTED IN THE NORTH/SOUTH CARDINAL DIRECTION, REFERENCE IN THESE PLANS, BRIDGE INSPECTION REPORTS, AND OTHER DATA IS BASED ON END BENT 1 BEING LOCATED AT THE MAINLAND SIDE AND END BENT 2 BEING LOCATED AT THE BEACH SIDE. IN AN ATTEMPT TO BE CONSISTENT WITH THE CURRENT BRIDGE INSPECTION REPORT, END BENT 1 WILL BE LABELED THE "WEST" END, AND END BENT 2 WILL BE LABELED THE "EAST" END OF THE BRIDGE. THE ACTUAL BRIDGE COORDINATES GIVEN IN THE BRIDGE INSPECTION REPORT ARE LATITUDE: 33° 53' 45.9" AND LONGITUDE: 78° 26' 23.4"

DATUM:

ALL ELEVATIONS REFER TO NGVD '29 UNLESS NOTED OTHERWISE.

ENVIRONMENT:

SUPERSTRUCTURE: EXTREMELY AGGRESSIVE - COASTAL
 SUBSTRUCTURE: EXTREMELY AGGRESSIVE - COASTAL

SITE CONDITIONS:

HABITAT BEYOND THE LIMITS OF CONSTRUCTION SHALL NOT BE DISTURBED.

CONCRETE CLASS:

SEE PROJECT SPECIAL PROVISIONS FOR CONCRETE REPAIR MATERIALS.

CONCRETE COVER:

- CONCRETE COVER SHOWN IN THE PLANS DOES NOT INCLUDE PLACEMENT OR FABRICATION TOLERANCES UNLESS SHOWN AS "MINIMUM COVER." SEE NCDOT SPECIFICATIONS FOR ALLOWABLE REINFORCEMENT PLACEMENT TOLERANCES.
- CONSTRUCTION JOINTS ARE PERMITTED ONLY AT LOCATIONS SPECIFIED IN THE PLANS. ADDITIONAL CONSTRUCTION JOINTS OR ALTERATIONS TO THOSE SHOWN REQUIRE THE ENGINEER'S APPROVAL.

CONCRETE FINISHES:

FINISH IN ACCORDANCE WITH THE LATEST NCDOT SPECIFICATIONS. MATCH EXISTING FINISH ON ALL EXPOSED EDGES UNLESS OTHERWISE NOTED. A CLASS 5 FINISH COATING SHALL BE APPLIED TO THE BEAM ENDS WHERE CONCRETE REPAIRS HAVE BEEN PERFORMED, MATCHING THE COLOR OF SURROUNDING CONCRETE.

KCA 301 FAYETTEVILLE ST., SUITE 1500
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 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : DIEGO A. AGUIRRE DATE : 10/2018
 CHECKED BY : JACOB H. DUKE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

ADJACENT EDGE CONCRETE REPAIRS:

WHEN PROPOSED CONCRETE REPAIRS (OR DETERMINED LOCATIONS) ARE ADJACENT TO A CORNER, REPAIR ON THE ADJACENT EDGE SHOULD BE ANTICIPATED IN ADDITION TO THE AREA SHOWN ON SUBSTRUCTURE CONCRETE REPAIR SHEETS. CONTRACTOR IS RESPONSIBLE FOR THIS REPAIR AT ALL LOCATIONS REGARDLESS OF CALL-OUT ON RESPECTIVE SHEET(S).

REINFORCING STEEL:

- ALL REINFORCING STEEL SHALL BE ASTM A615-96, GRADE 60.
- ALL DIMENSIONS PERTAINING TO LOCATION OF REINFORCEMENT ARE TO CENTERLINE OF BARS EXCEPT WHERE THE CLEAR DIMENSION IS SHOWN TO FACE OF CONCRETE.
- REINFORCEMENT DETAIL DIMENSIONS ARE OUT-TO-OUT OF BARS.

LIMIT OF REPAIRS:

- LIMITS OF REPAIRS PROVIDED IN THESE PLANS ARE BASED ON PREVIOUS NBIS ELEMENT INSPECTIONS AND LIMITED FIELD WORK. THE EXTENT OF THE REPAIRS IS EXPECTED TO VARY DURING CONSTRUCTION.
- DUE TO TIME SINCE INSPECTION, DEFICIENCIES MAY HAVE DETERIORATED OR INCREASED IN NUMBER. NOTIFY THE ENGINEER OF SIGNIFICANT CHANGES.

FORMS CONSTRUCTION:

FORMS MUST BE SUPPORTED BY THE EXISTING STRUCTURE. FULL DEPTH COFFERDAMS WILL NOT BE ACCEPTED. THE CONTRACTOR SHALL SUBMIT DETAILED PLANS FOR FORMS AND FALSEWORK TO BE USED FOR CONSTRUCTION OF THE PIER AND CONCRETE REPAIR.

CONSTRUCTION SURVEYING:

ALL SURVEYING AND STAKING NECESSARY TO COMPLETE THE PROPOSED WORK IS INCIDENTAL TO ALL OTHER PAY ITEMS FOR THIS PROJECT.

ENVIRONMENTAL NOTES:

STANDARD CONSTRUCTION CONDITIONS SHALL BE IMPLEMENTED FOR THE FOLLOWING PROTECTED/ENDANGERED SPECIES AS APPLICABLE AND INCLUDED IN CONTRACT DOCUMENTS.

- ATLANTIC RIDLEY SEA TURTLE
- LEATHERBACK SEA TURTLE
- RED-COCKADED WOODPECKER
- WEST INDIAN MANATEE
- COOLEY'S MEADOWRUE
- ROUGH-LEAVED LOOSESTRIPE

POLLUTION CONTROL:

- THE CONTRACTOR SHALL SUBMIT A POLLUTION CONTROL PLAN TO THE ENGINEER IN ACCORDANCE THE NCDOT STANDARD SPECIFICATIONS, PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITIES.
- THE CONTRACTOR SHALL NOT ALLOW, AT ANY TIME, ANY DISCHARGE OR MATERIALS TO FALL INTO THE WATERWAY.
- THE CONTRACTORS SHALL SUBMIT TO THE ENGINEER AN EROSION CONTROL PLAN AS REQUIRED BY THE NCDOT STANDARD SPECIFICATIONS AND BEST MANAGEMENT PRACTICES.
- NO OFFSITE IMPACTS SHALL BE PERMITTED.
- A CONTAINMENT PLAN IS REQUIRED FOR CONCRETE REPAIRS.

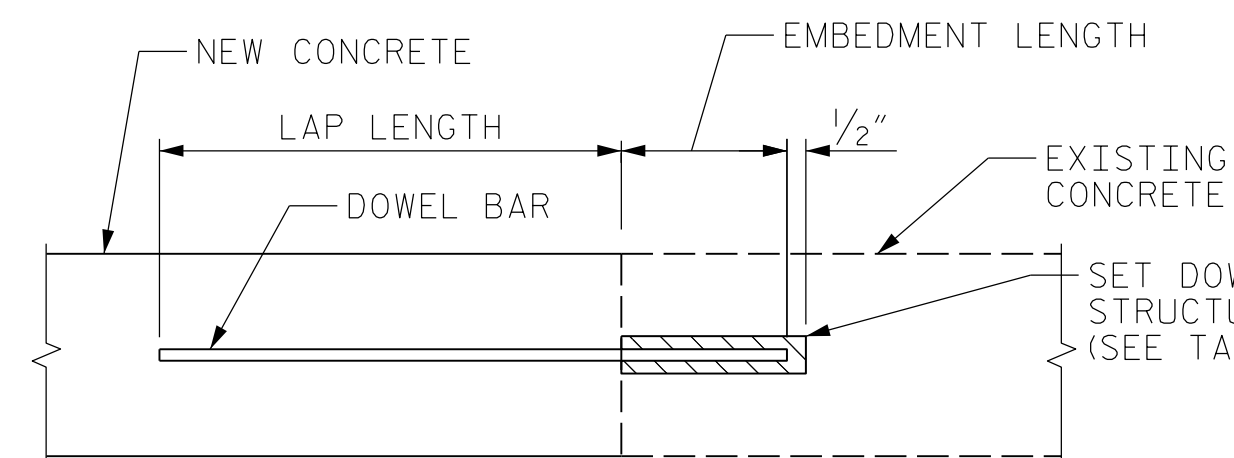
MISCELLANEOUS NOTES:

- THE CONTRACTOR IS RESPONSIBLE TO SUBMIT A JACKING PLAN FOR EACH OPERATION TO THE ENGINEER FOR APPROVAL PRIOR TO BRIDGE JACKING.
- PAYMENT FOR INCIDENTAL ITEMS NOT SPECIFICALLY COVERED IN THE INDIVIDUAL BID ITEMS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR THE BID ITEMS CONTAINED IN THE CONTRACT.
- FOR ICT, SEE CONTRACT DOCUMENTS AND TRANSPORTATION MANAGEMENT PLANS.

DOWEL DETAIL:

- ANY REQUIRED DOWEL HOLES SHALL BE DRILLED INTO EXISTING CONCRETE ACCORDING TO THE DETAIL AND NCDOT SPECIFICATIONS.
- NOTIFY THE ENGINEER OF ANY BROKEN BARS OR BARS WHICH ARE DETERMINED TO HAVE A SECTION LOSS OF 25% OR GREATER.
- INSTALL DOWELS IN ACCORDANCE WITH NCDOT SPECIFICATIONS.

DOWEL DIMENSIONS (UNLESS OTHERWISE NOTED)			
DOWEL SIZE	HOLE DIAMETER	EMBEDMENT LENGTH	MIN LAP LENGTH
4	5/8"	8"	1'-9"
5	3/4"	9"	2'-2"
6	7/8"	11"	2'-7"
8	1 1/8"	1'-4"	4'-6"



Seal of North Carolina Professional Engineer Jacob H. Duke, Seal 043777. Signed by Jacob H. Duke, 3/28/2019.

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

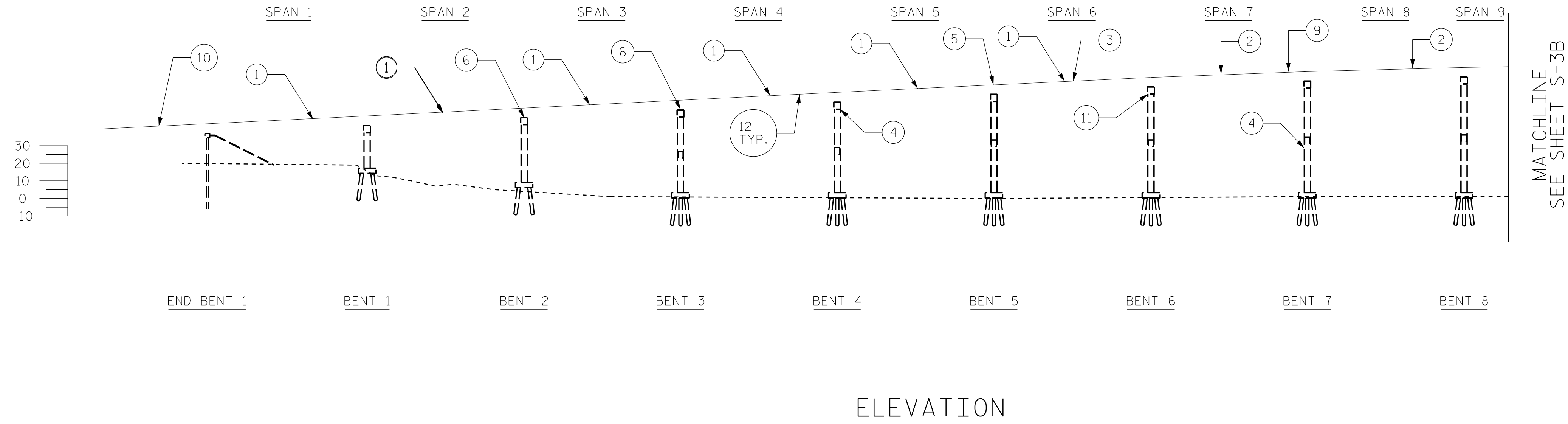
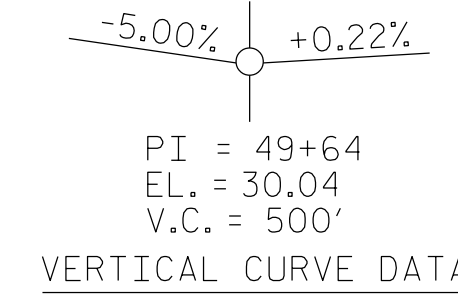
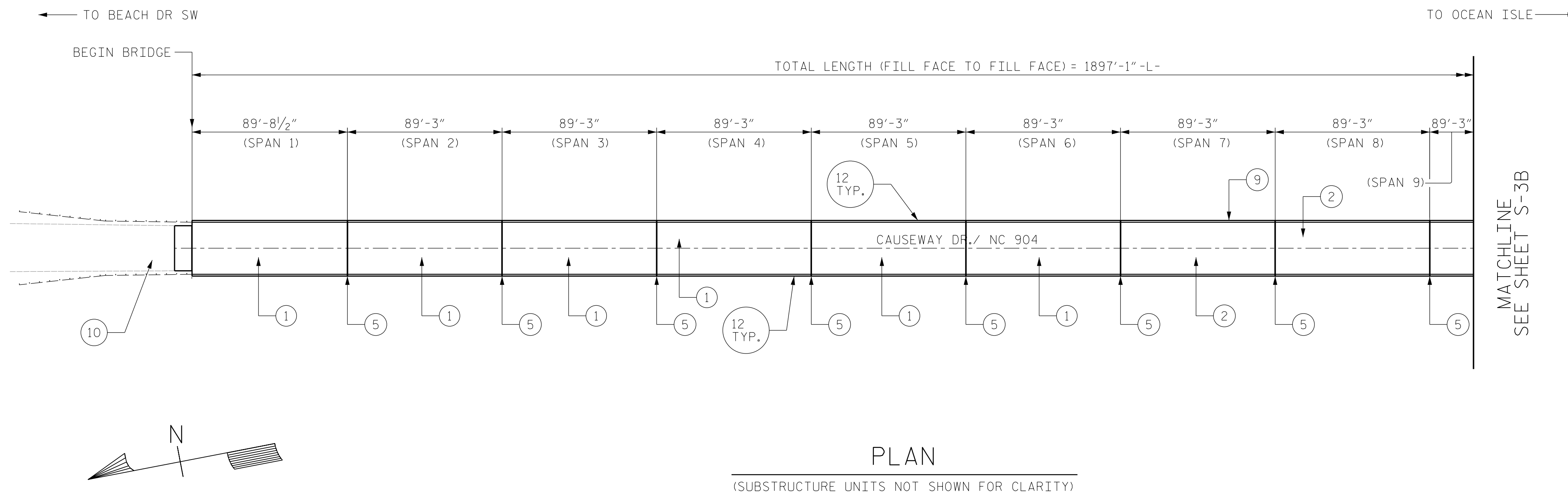
SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL NOTES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2A
1			3			TOTAL SHEETS
2			4			45

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HYDRAULIC DATA FROM INITIAL DESIGN:

DESIGN HIGH WATER ELEVATION: 16.4 FT. (HURRICANE HAZEL)

FREQUENCY OF FLOOD: 500 YR.

NOTES:

CURVE AND HYDRAULIC DESIGN DATA BASED ON INITIAL DESIGN. STATIONING BASED ON EXISTING PLANS.

SPAN AND BENT NUMBERS BASED ON CURRENT BRIDGE INSPECTION REPORT.

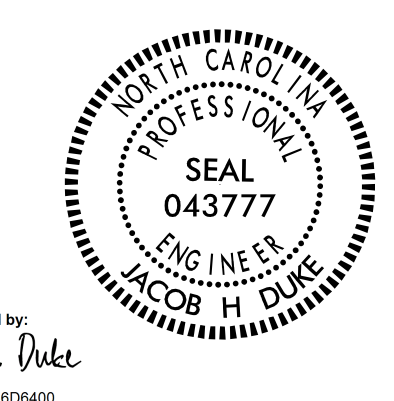
- ① PPC OVERLAY
- ② SILANE DECK TREATMENT
- ③ SUPERSTRUCTURE CONCRETE REPAIRS (TYP)
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- ⑨ RAIL RETROFIT (TYP.)
- ⑩ APPROACH ROADWAY MILLING AND RESURFACING
- ⑪ EPOXY COATING BEAM ENDS
- ⑫ WATER LINE REMOVAL

PROJECT NO. 15BPR.24

BRUNSWICK COUNTY

BRIDGE NO. 090013

SHEET 1 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER THE
INTRACOASTAL WATERWAY
BETWEEN BEACH DR. SW
AND E. 1ST ST.

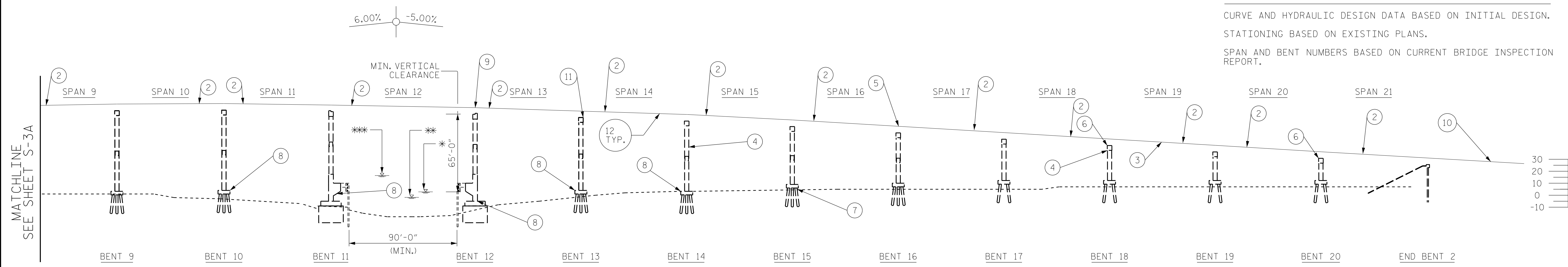
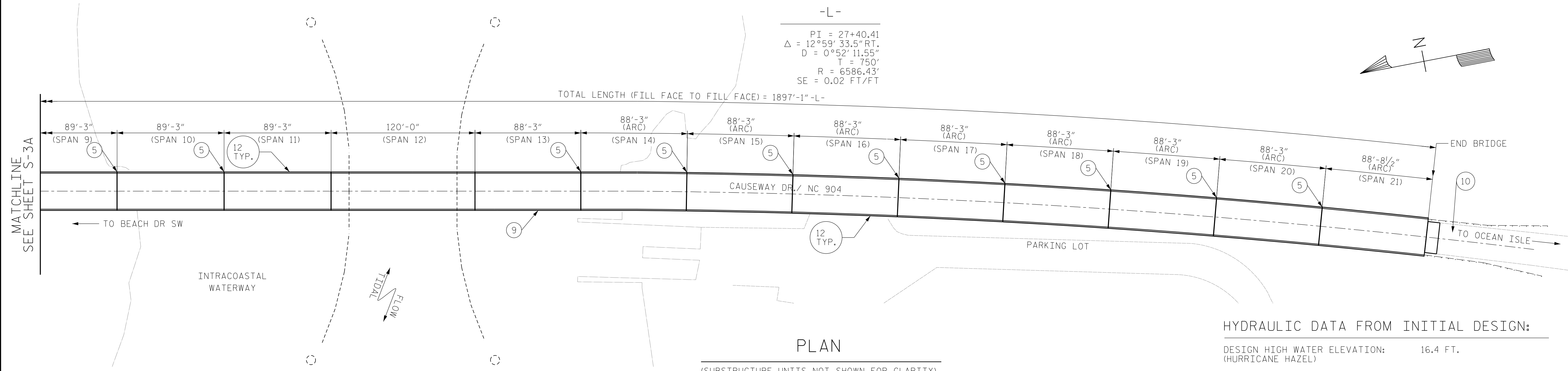
BENT #	STATION	BENT #	STATION	BENT #	STATION	BENT #	STATION	BENT #	STATION
END BENT 1	47+16.79	BENT 5	42+70.00	BENT 10	38+23.75	BENT 15	33+49.75	BENT 20	29+08.50
BENT 1	46+27.00	BENT 6	41+80.75	BENT 11	37+34.50	BENT 16	32+61.50	END BENT 2	28+18.17
BENT 2	45+37.75	BENT 7	40+91.50	BENT 12	36+14.50	BENT 17	31+73.25		
BENT 3	44+48.50	BENT 8	40.02.25	BENT 13	35+26.25	BENT 18	30+85.00		
BENT 4	43+59.25	BENT 9	39+13.00	BENT 14	34+38.00	BENT 19	29+96.75		

KCA 301 FAYETTEVILLE ST., SUITE 1500
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DRAWN BY : JACOB H. DUKE DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3A	
1			3			TOTAL SHEETS	45
2			4				

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SCOPE LEGEND:

- ① PPC OVERLAY
- ② SILANE DECK TREATMENT
- ③ SUPERSTRUCTURE CONCRETE REPAIRS (TYP.)
- ④ SUBSTRUCTURE CONCRETE REPAIRS (TYP.)
- ⑤ EXPANSION JOINT REPLACEMENT/INSTALLATION (TYP.)
- ⑥ BEARING REPLACEMENT
- ⑦ INTEGRAL PILE JACKETING
- ⑧ GALVANIC CATHODIC PROTECTION - BULK ANODE
- ⑨ RAIL RETROFIT (TYP.)
- ⑩ APPROACH ROADWAY MILLING AND RESURFACING
- ⑪ EPOXY COATING BEAM ENDS
- ⑫ WATER LINE REMOVAL

- * MEAN HIGH TIDE EL. 2.80
- ** MEAN LOW TIDE EL. -1.80
- *** HURRICANE HAZEL (1954) EL. 16.40

ELEVATION

BENT #	STATION	BENT #	STATION	BENT #	STATION	BENT #	STATION	BENT #	STATION
END BENT 1	47+16.79	BENT 5	42+70.00	BENT 10	38+23.75	BENT 15	33+49.75	BENT 20	29+08.50
BENT 1	46+27.00	BENT 6	41+80.75	BENT 11	37+34.50	BENT 16	32+61.50	END BENT 2	28+18.17
BENT 2	45+37.75	BENT 7	40+91.50	BENT 12	36+14.50	BENT 17	31+73.25		
BENT 3	44+48.50	BENT 8	40.02.25	BENT 13	35+26.25	BENT 18	30+85.00		
BENT 4	43+59.25	BENT 9	39+13.00	BENT 14	34+38.00	BENT 19	29+96.75		

HYDRAULIC DATA FROM INITIAL DESIGN:

DESIGN HIGH WATER ELEVATION: 16.4 FT. (HURRICANE HAZEL)
 FREQUENCY OF FLOOD: 500 YR.

NOTES:

CURVE AND HYDRAULIC DESIGN DATA BASED ON INITIAL DESIGN.
 STATIONING BASED ON EXISTING PLANS.
 SPAN AND BENT NUMBERS BASED ON CURRENT BRIDGE INSPECTION REPORT.

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839 LICENSE #: C-1506

DRAWN BY : JACOB H. DUKE DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



PROJECT NO. 15BPR.24
 BRUNSWICK COUNTY
 BRIDGE NO. 090013

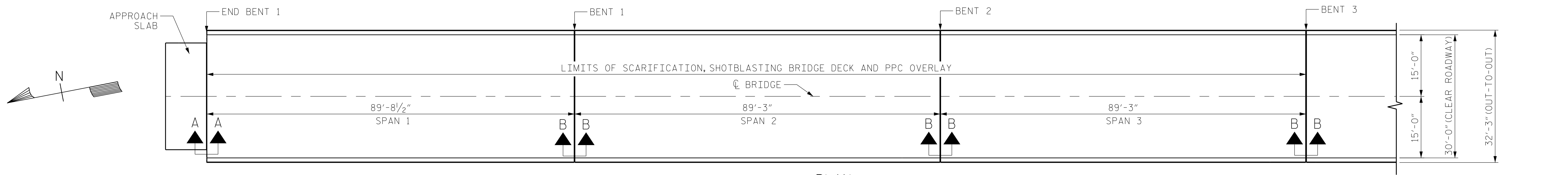
SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

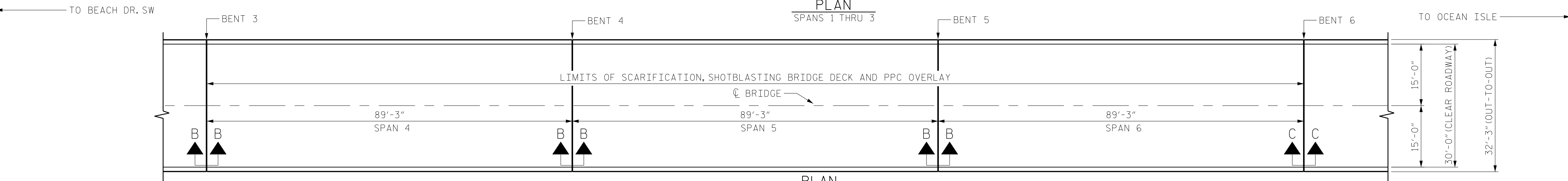
GENERAL DRAWING
 FOR BRIDGE OVER THE
 INTRACOASTAL WATERWAY
 BETWEEN BEACH DR. SW
 AND E. 1ST ST.

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3B
1			3			TOTAL SHEETS 45
2			4			

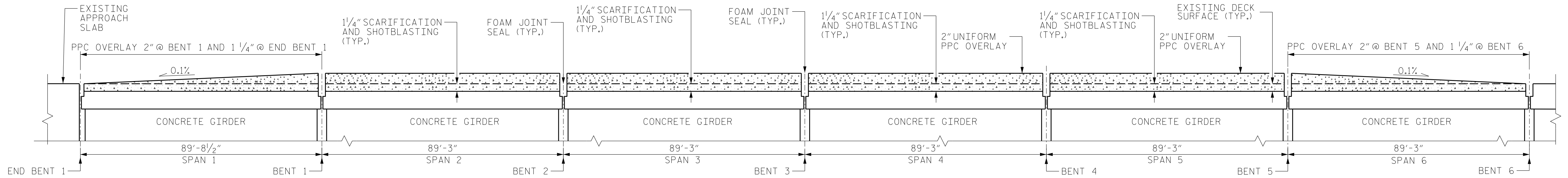
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PLAN SPANS 1 THRU 3



PLAN SPANS 4 THRU 6



PPC OVERLAY THICKNESS DETAIL SPANS 1 THRU 6 (NOT TO SCALE)

AS-BUILT REPAIR QUANTITY TABLE						
TOP OF DECK REPAIRS						
	SPAN 1		SPAN 2 THRU 5		SPAN 6	
	ESTIMATE	ACTUAL	ESTIMATE	ACTUAL	ESTIMATE	ACTUAL
SCARIFYING BRIDGE DECK	299 SY		298 SY		298 SY	
CLASS II SURFACE PREPARATION	0.2 SY		0.2 SY		0.2 SY	
CONCRETE DECK REPAIR FOR PPC OVERLAY	0.2 SY		0.2 SY		0.2 SY	
SHOTBLASTING BRIDGE DECK	299 SY		298 SY		298 SY	
PPC MATERIALS	14.9 CY		18.3 CY		14.9 CY	
PLACING & FINISHING PPC OVERLAY	299 SY		298 SY		298 SY	
GROOVING BRIDGE FLOORS	2413 SF		2401 SF		2401 SF	

BENT #	JOINT DETAIL DESIGNATION
END BENT 1	A - A
1	B - B
2	B - B
3	B - B
4	B - B
5	B - B
6	C - C

NOTES:

- WHERE MULTIPLE SPANS ARE LISTED, ESTIMATED QUANTITIES ARE BASED ON THE ANTICIPATED VALUES FOR A SINGLE SPAN OF THAT CONFIGURATION.
- REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITY TABLE.
- CONCRETE COVER FOR TOP BARS IN THE DECK SLAB IS 2 1/2" PER THE EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.
- CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 1 1/2" TO 2" BASED ON VISUAL INSPECTION EXCEPT FOR SPAN 3, WHERE THE CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 0" TO 1/2".
- MINOR QUANTITIES OF CLASS II AREAS ARE ANTICIPATED, PARTICULARLY NEAR JOINTS. HOWEVER, DUE TO THEIR SMALL SIZE, THE CLASS II LOCATIONS HAVE NOT BEEN DELINEATED ON THESE PLANS. THE CLASS II QUANTITIES INDICATED ARE ANTICIPATED TO BE SUFFICIENT FOR THE ACTUAL QUANTITIES ENCOUNTERED.
- FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".
- BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATIONS.
- BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).
- FOR BRIDGE DECK RIDEABILITY AND GROOVING, SEE SPECIAL PROVISIONS.

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

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 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



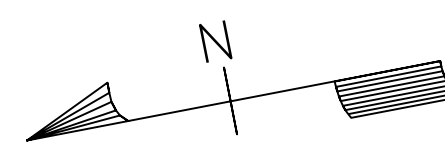
3/28/2019

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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PLAN OF SPAN SPANS 1 THRU 6

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-4
2			4			TOTAL SHEETS 45



AS-BUILT REPAIR QUANTITY TABLE

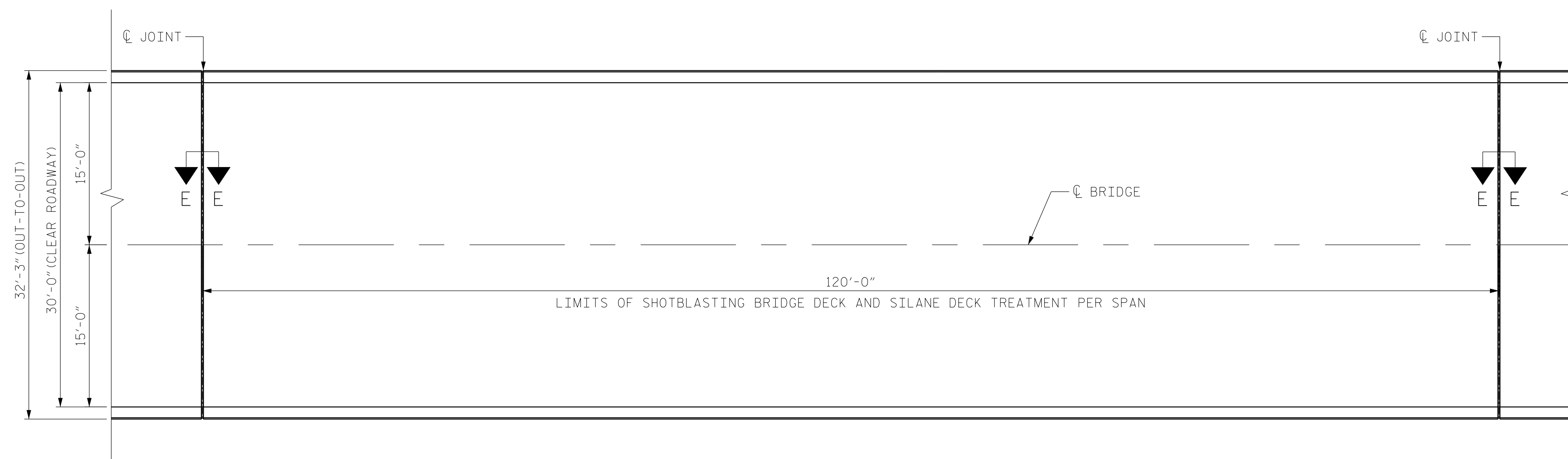
TOP OF DECK REPAIRS

SPAN 12

	ESTIMATE	ACTUAL
SHOTBLASTING BRIDGE DECK	400 SY	
SILANE DECK TREATMENT	400 SY	

← TO BEACH DR. SW

TO OCEAN ISLE →



PLAN

NOTES:

WHERE MULTIPLE SPANS ARE LISTED, ESTIMATED QUANTITIES ARE BASED ON THE ANTICIPATED VALUES FOR A SINGLE SPAN OF THAT CONFIGURATION.

REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CONCRETE COVER FOR TOP BARS IN THE DECK SLAB IS 2 1/2" PER THE EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 1 1/2" TO 2" BASED ON VISUAL INSPECTION.

MINOR QUANTITIES OF CLASS II AREAS ARE ANTICIPATED, PARTICULARLY NEAR JOINTS. HOWEVER, DUE TO THEIR SMALL SIZE, THE CLASS II LOCATIONS HAVE NOT BEEN DELINEATED ON THESE PLANS. THE CLASS II QUANTITIES INDICATED ARE ANTICIPATED TO BE SUFFICIENT FOR THE ACTUAL QUANTITIES ENCOUNTERED.

FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".

BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATION.

BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).

FOR SILANE DECK TREATMENT, SEE SPECIAL PROVISIONS.

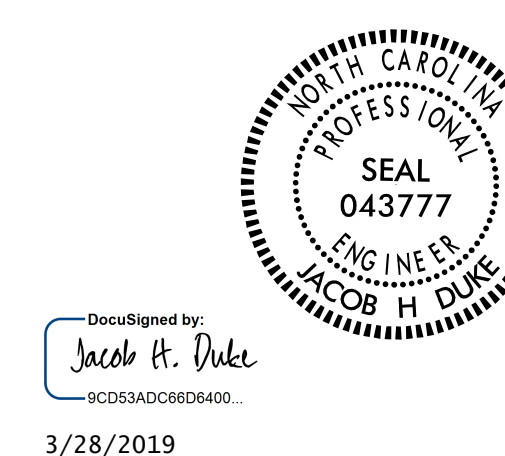
BENT #	JOINT DETAIL DESIGNATION
11	E - E
12	E - E

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
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 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

3/28/2019
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 User:jduke



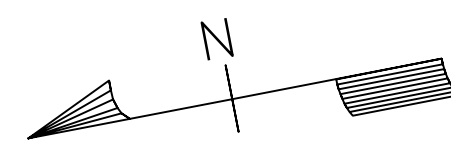
3/28/2019

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PLAN OF SPAN
 SPAN 12

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-6
2			4			TOTAL SHEETS 45

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 FINAL UNLESS ALL
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AS-BUILT REPAIR QUANTITY TABLE

TOP OF DECK REPAIRS

	SPANS 13 THRU 20	
	ESTIMATE	ACTUAL
SHOTBLASTING BRIDGE DECK	294 SY	
SILANE DECK TREATMENT	294 SY	

NOTES:

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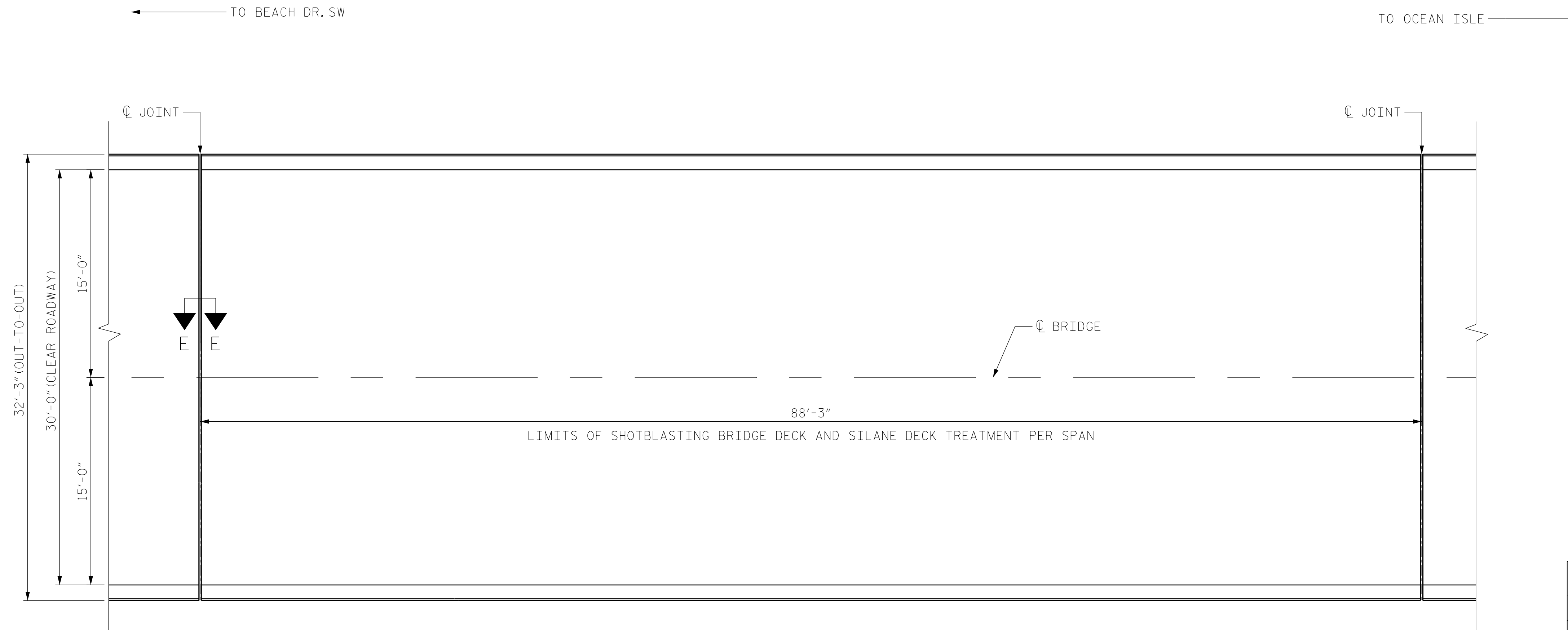
CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 1 1/2" TO 2" BASED ON VISUAL INSPECTION.

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FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".

BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATION.

BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).



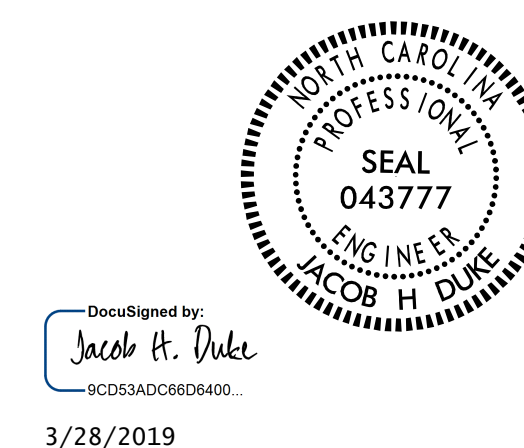
PLAN

BENT #	JOINT DETAIL DESIGNATION
13	E - E
14	E - E
15	E - E
16	D - D
17	E - E
18	E - E
19	E - E
20	E - E

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
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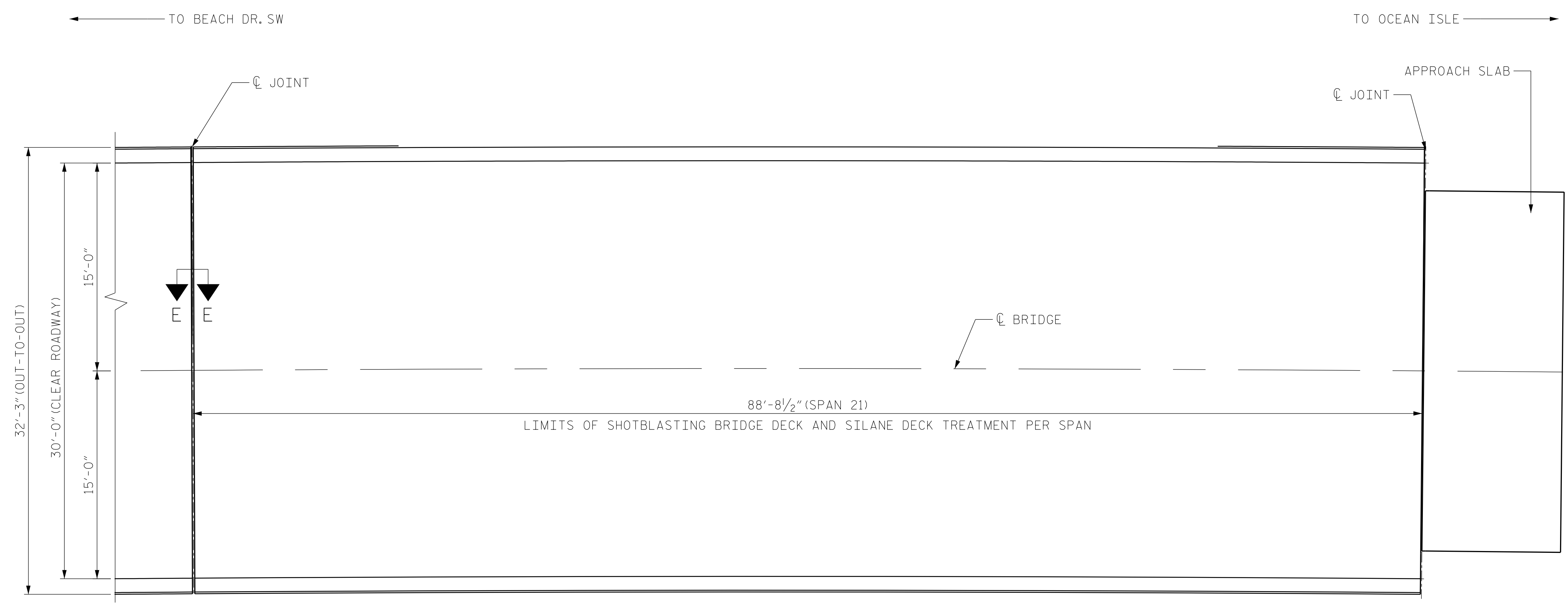
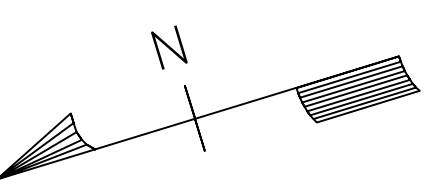


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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PLAN OF SPAN SPANS 13 THRU 20

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-7
2			4			TOTAL SHEETS 45

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PLAN

AS-BUILT REPAIR QUANTITY TABLE		
TOP OF DECK REPAIRS		
SPAN 21		
	ESTIMATE	ACTUAL
SHOTBLASTING BRIDGE DECK	299 SY	
SILANE DECK TREATMENT	299 SY	

NOTES:

WHERE MULTIPLE SPANS ARE LISTED, ESTIMATED QUANTITIES ARE BASED ON THE ANTICIPATED VALUES FOR A SINGLE SPAN OF THAT CONFIGURATION.

REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CONCRETE COVER FOR TOP BARS IN THE DECK SLAB IS 2 1/2" PER THE EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

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FOR CLASS II SURFACE PREPARATION LOCATIONS AT BRIDGE JOINTS, SEE "JOINT DETAILS SHEETS".

BRIDGE DECK GROOVING QUANTITY BASED ON LIMITS REQUIRED IN SECTION 420-14(B) OF STANDARD SPECIFICATION.

BRIDGE DECK SCARIFICATION LIMITS ARE THE FULL CLEAR ROADWAY WIDTH (INSIDE FACE OF EACH BRIDGE RAIL).

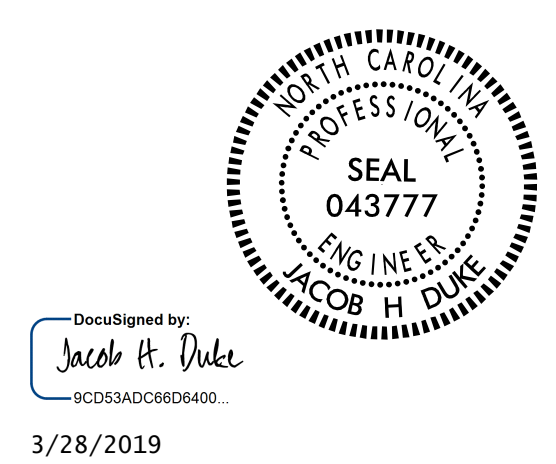
FOR SILANE DECK TREATMENT, SEE SPECIAL PROVISIONS.

BENT #	JOINT SECTION
20	E - E

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

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DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
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 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



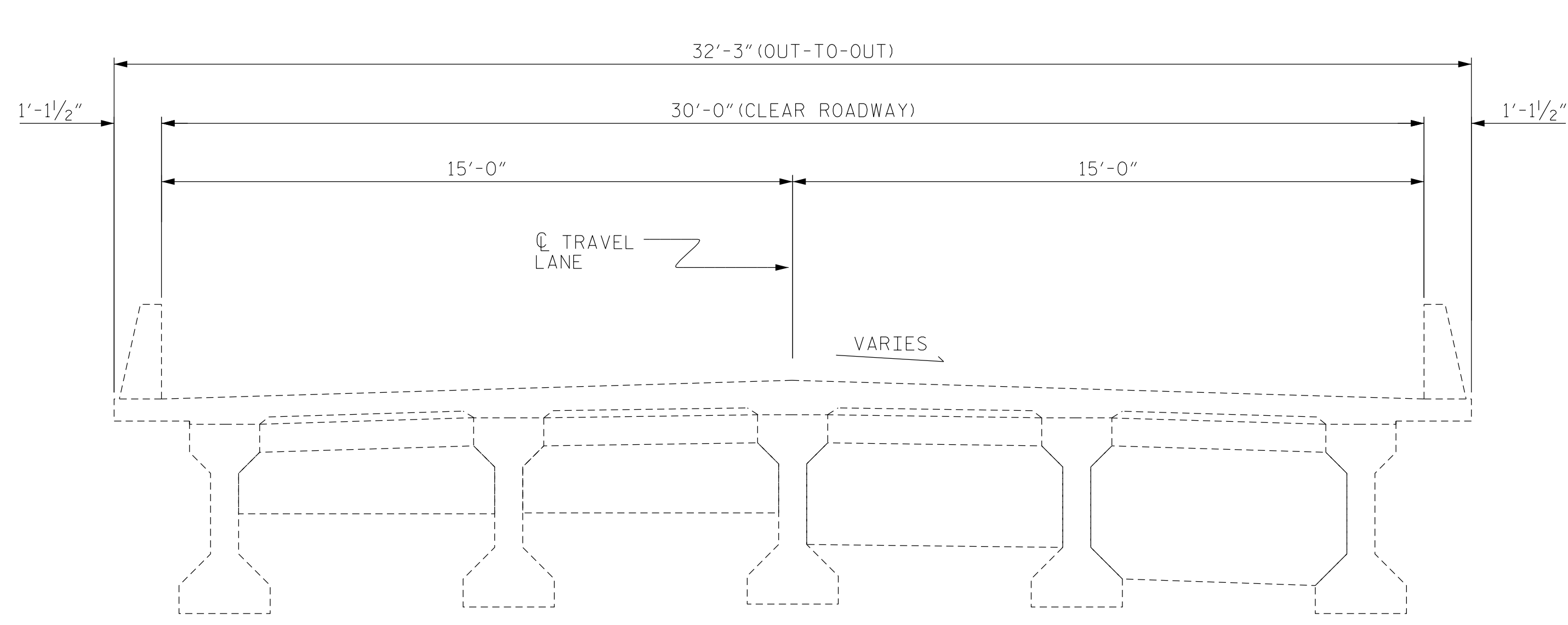
3/28/2019
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 User: jduke

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

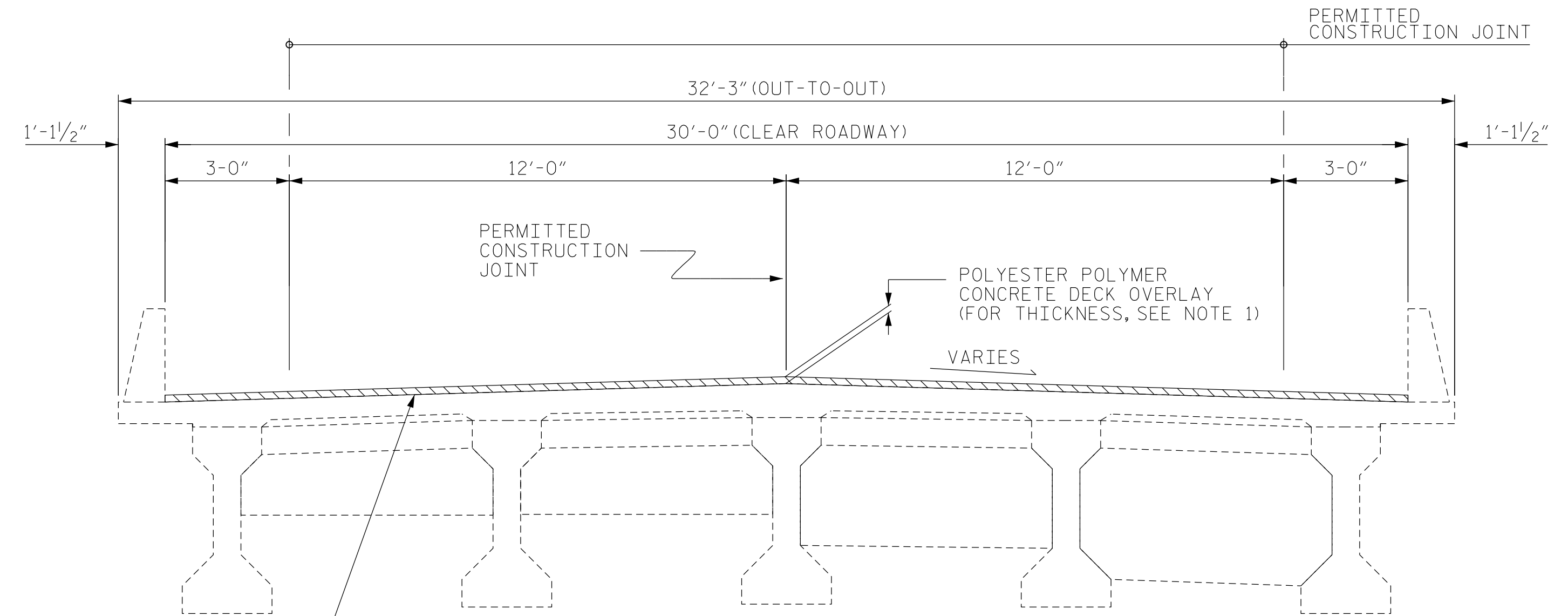
PLAN OF SPAN
 SPAN 21

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-8
2			4			TOTAL SHEETS 45

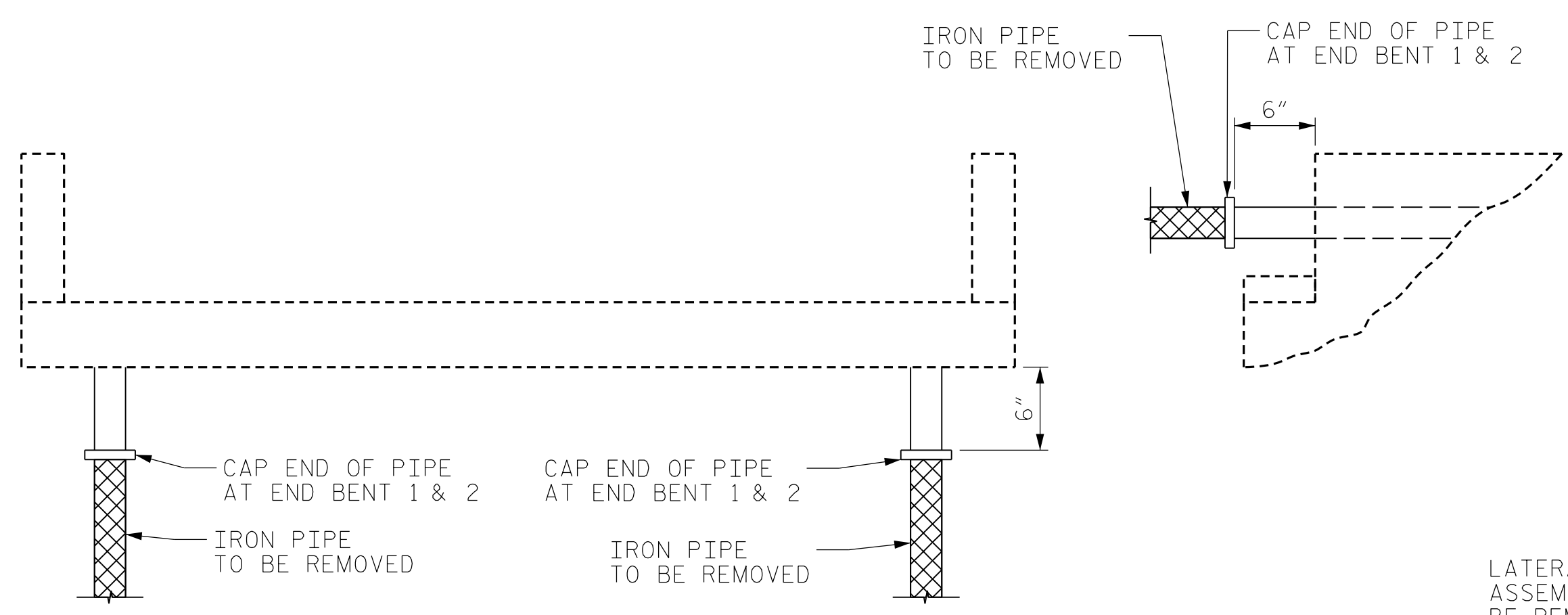
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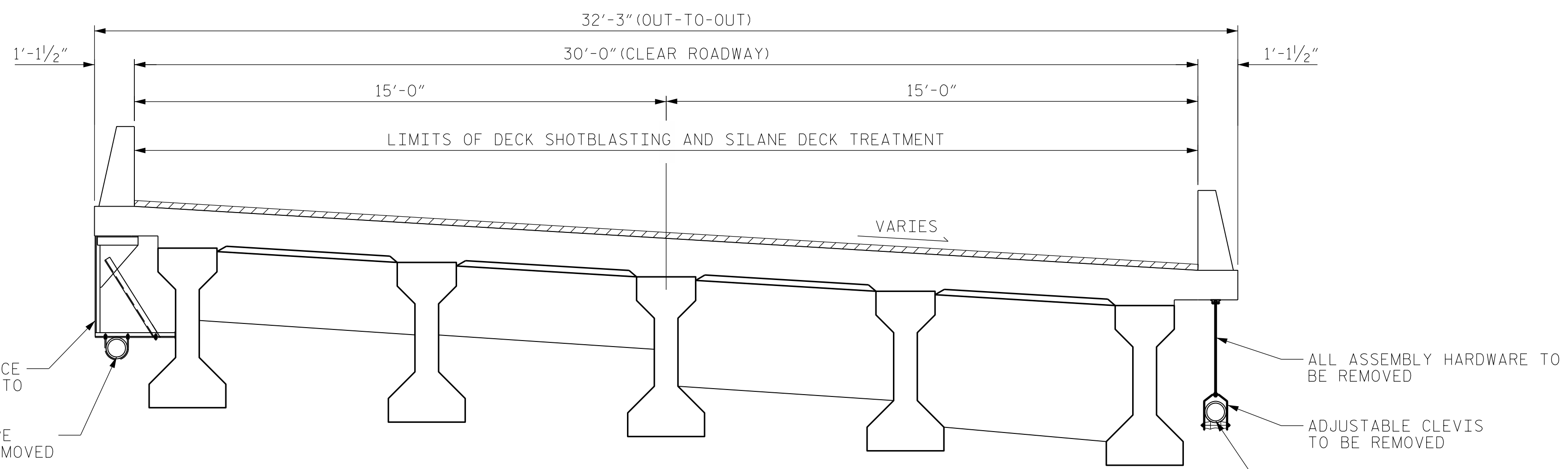
TYPICAL SECTION
(EXISTING SPANS 1 THRU 6)
(PROPOSED RAIL RETROFIT NOT SHOWN)



TYPICAL SECTION
(PROPOSED SPANS 1 THRU 6)
(PROPOSED RAIL RETROFIT NOT SHOWN)

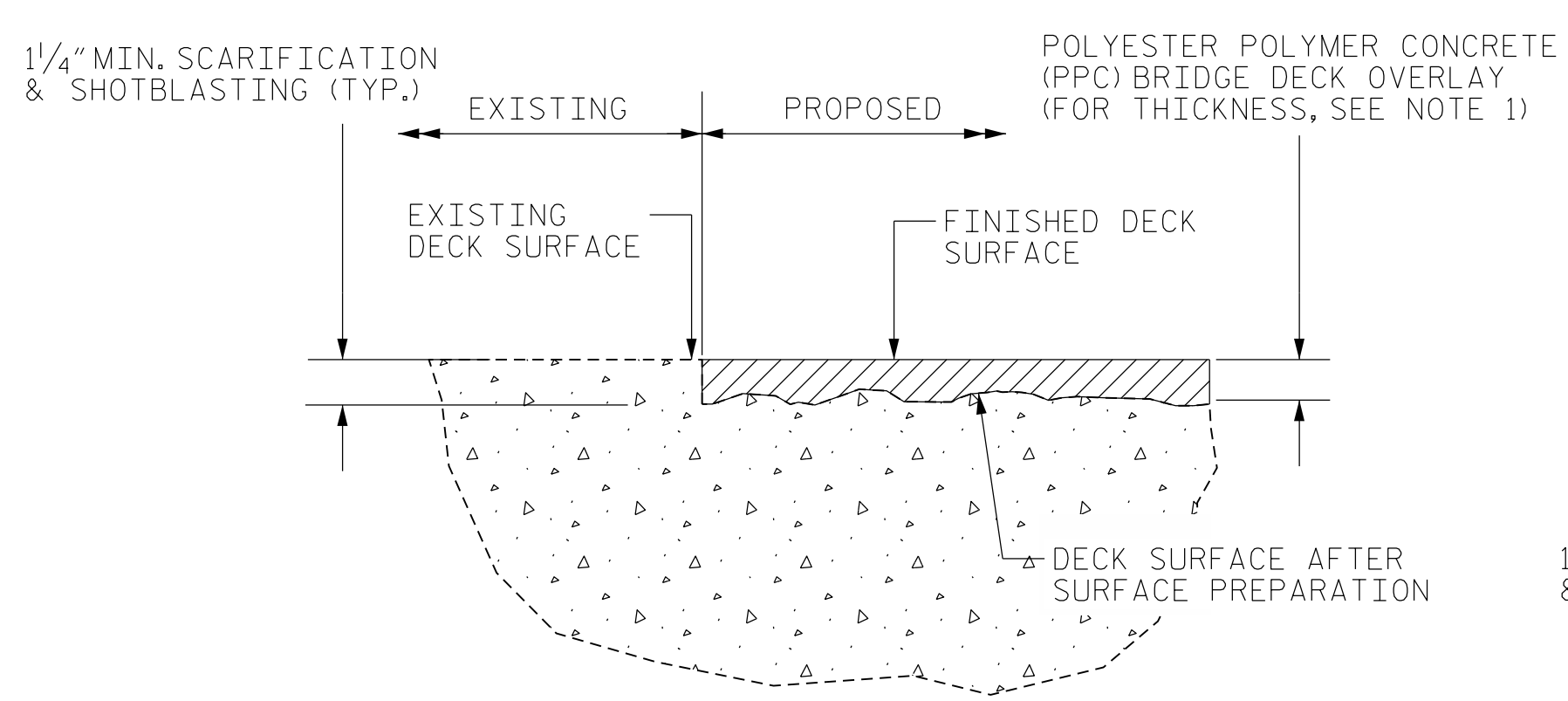


WATER LINE REMOVAL DETAILS
AT END BENT 1 & 2

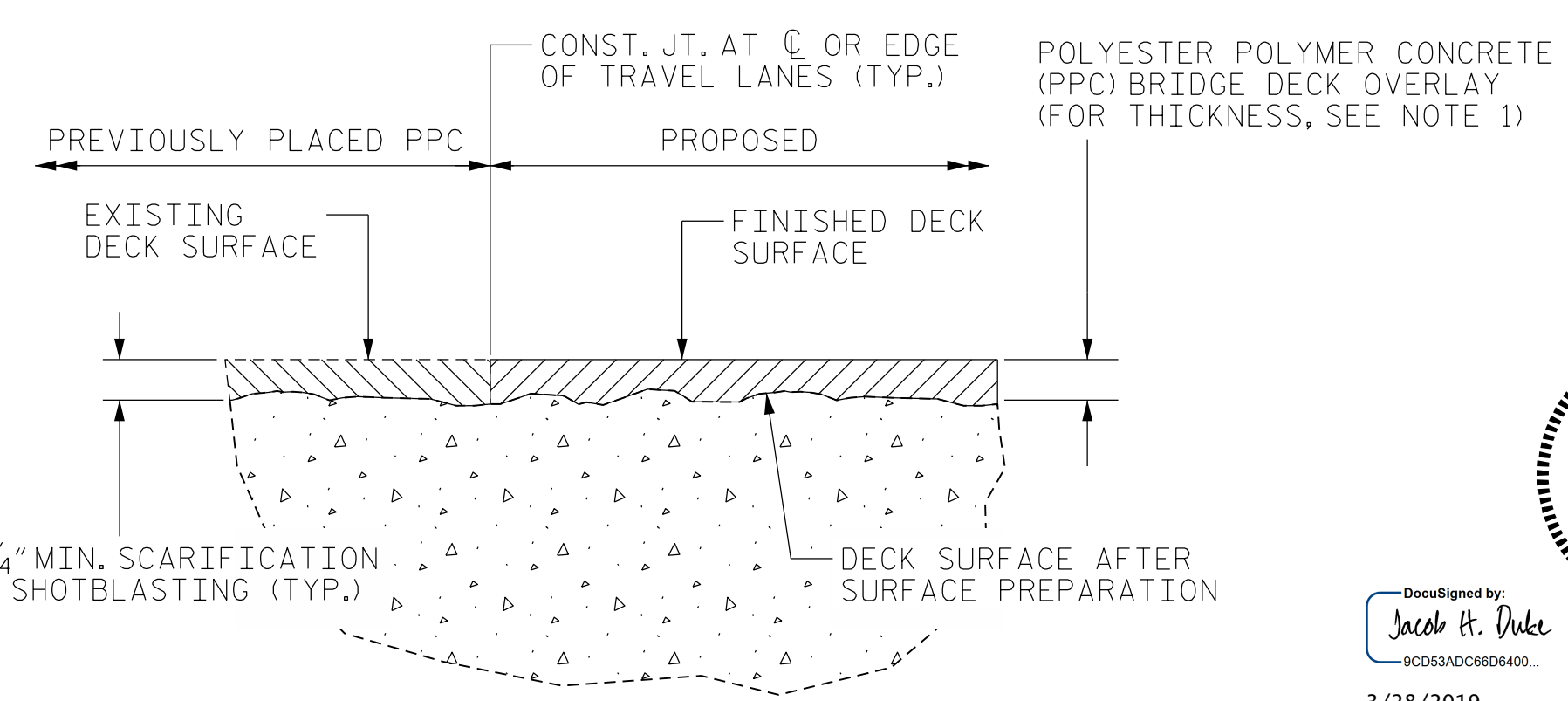


TYPICAL SECTION
(LIMITS OF SILANE DECK TREATMENT SPANS 7-21)
(WATER LINE REMOVAL DETAILS)

- NOTES:**
- PPC BRIDGE DECK OVERLAY IS TO BE APPLIED ON SPANS 1 THRU 6 ONLY. SPAN 2 THROUGH 5 HAVE A 2" UNIFORM THICKNESS, WHILE THE THICKNESS ON SPANS 1 AND 6 TRANSITIONS FROM 1 1/4" TO 2". FOR FURTHER DETAILS SEE "PLAN OF SPAN - SPANS 1 THRU 6" SHEET.
 - LONGITUDINAL CONSTRUCTION JOINTS OF OVERLAYS SHALL BE LOCATED ALONG THE CENTERLINE OR EDGE OF TRAVEL LANES.
 - SEE TRAFFIC MANAGEMENT PLANS FOR LANE WIDTHS, SEQUENCING, AND OTHER TRAFFIC CONTROL MEASURES FOR STAGING OF POLYESTER POLYMER CONCRETE (PPC) SYSTEM AND SURFACE PREPARATION.
 - FOR PROPOSED RAIL RETROFIT DETAILS, SEE "RAIL RETROFIT" SHEETS.
 - WATER LINE HANGER ASSEMBLIES VARY BY LOCATION AT BOTH BRIDGE OVERHANGS. THE ASSEMBLIES SHOWN ARE FOR REPRESENTATIVE PURPOSES. FULLY REMOVE THE WATER LINE HANGER ASSEMBLIES.
 - FOR WATER LINE REMOVAL, SEE SPECIAL PROVISIONS.



DETAIL FOR PPC OVERLAY



DETAIL FOR STAGED PPC OVERLAY



3/28/2019

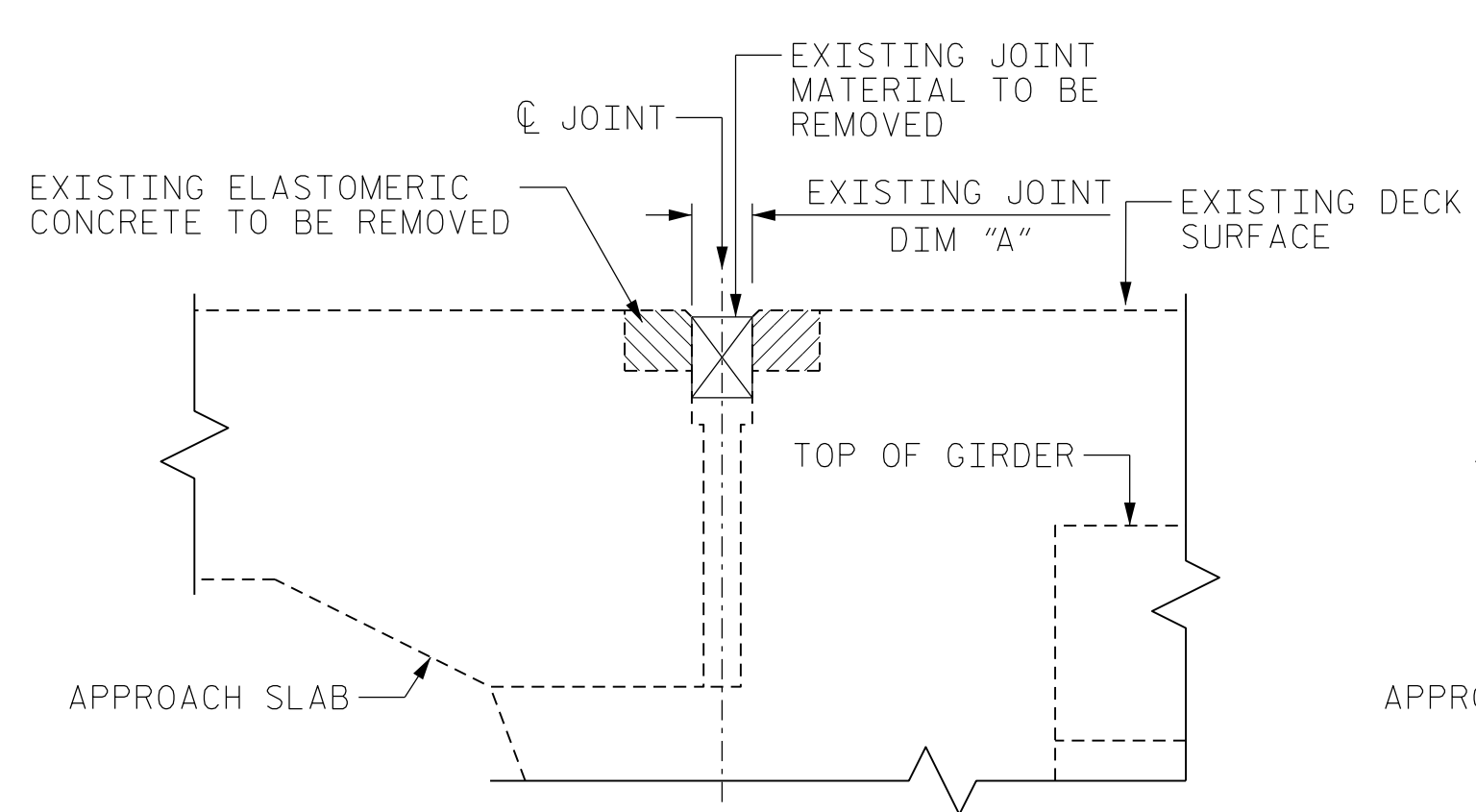
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

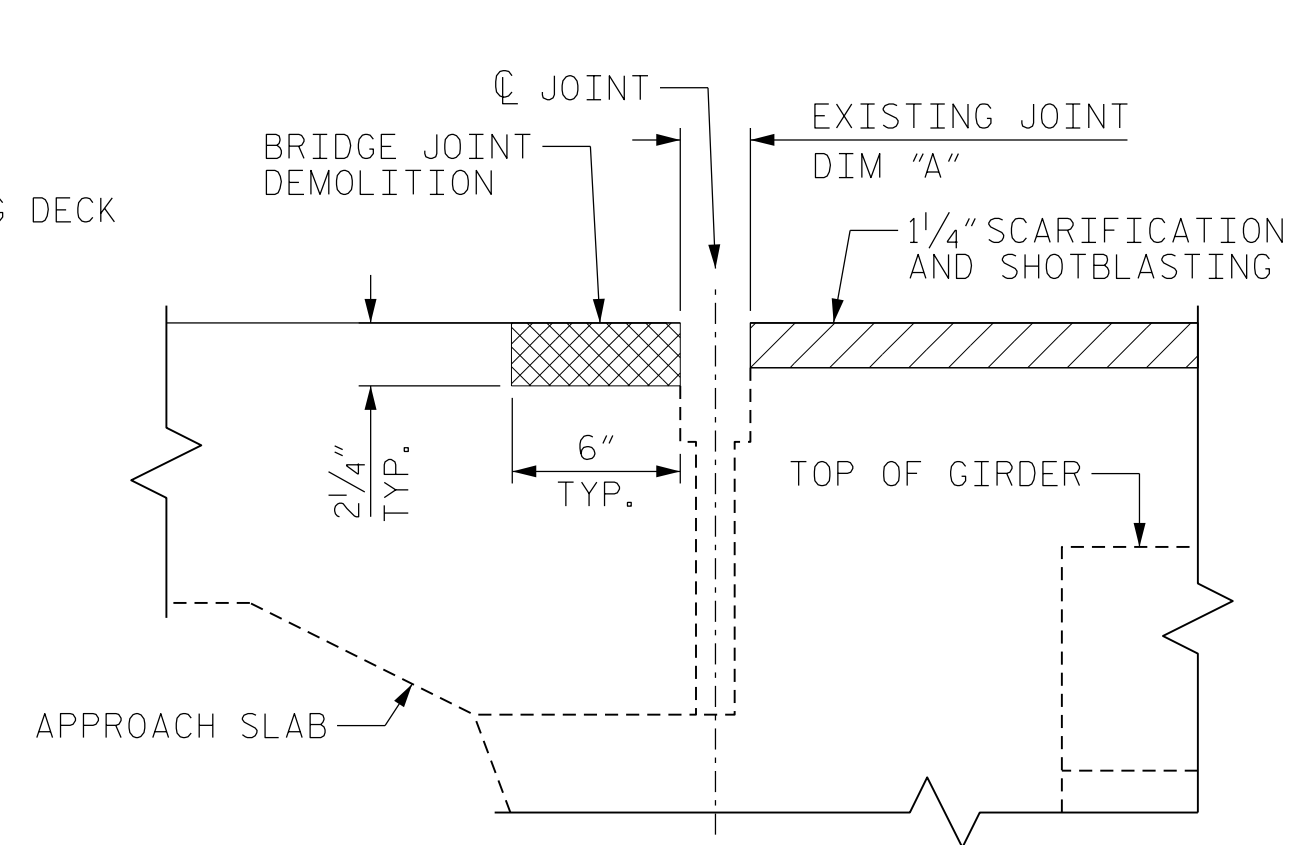
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
TYPICAL SECTIONS PPC OVERLAY & WATER LINE REMOVAL					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-9
					TOTAL SHEETS 45

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KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
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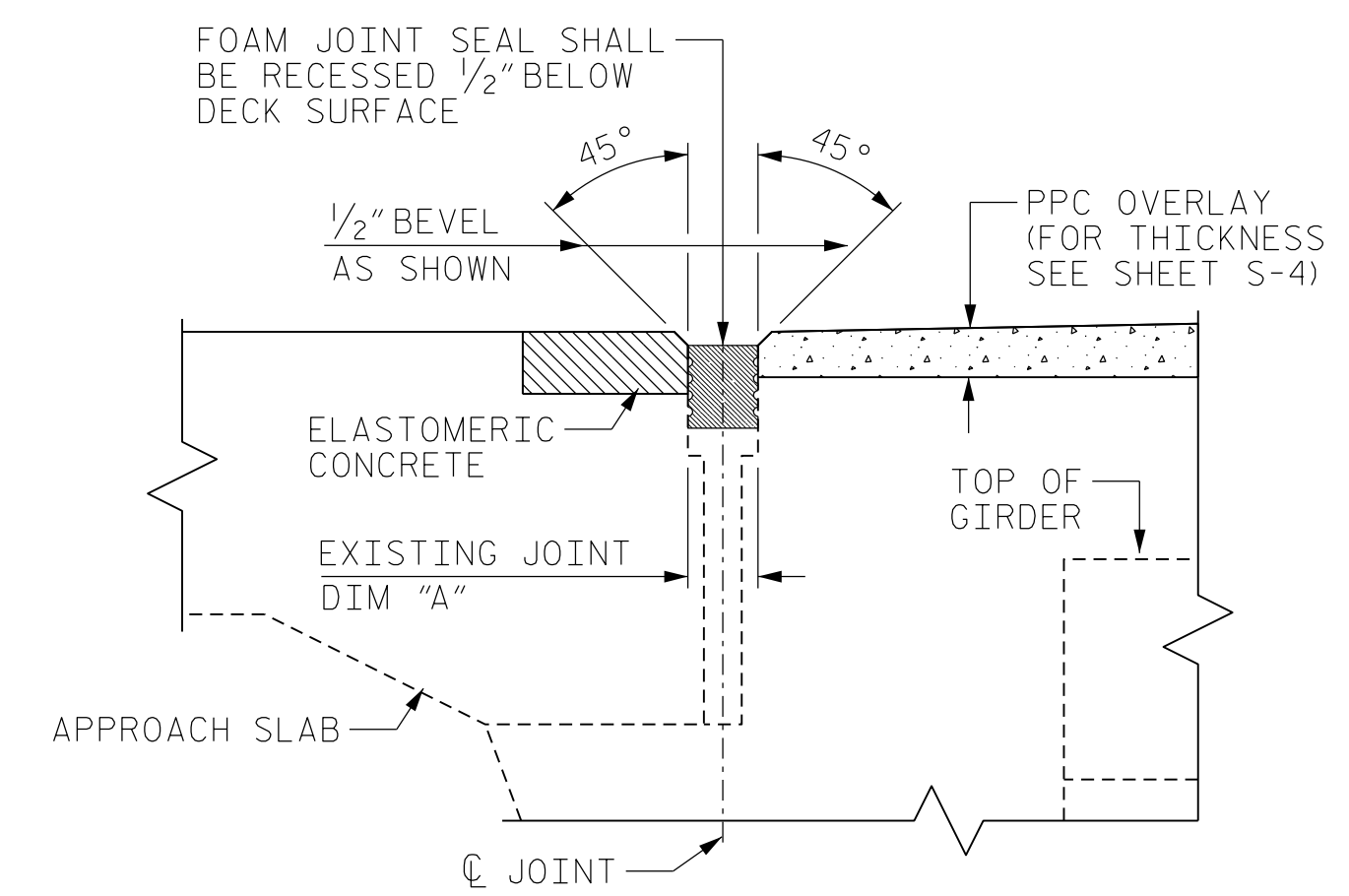
DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
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DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



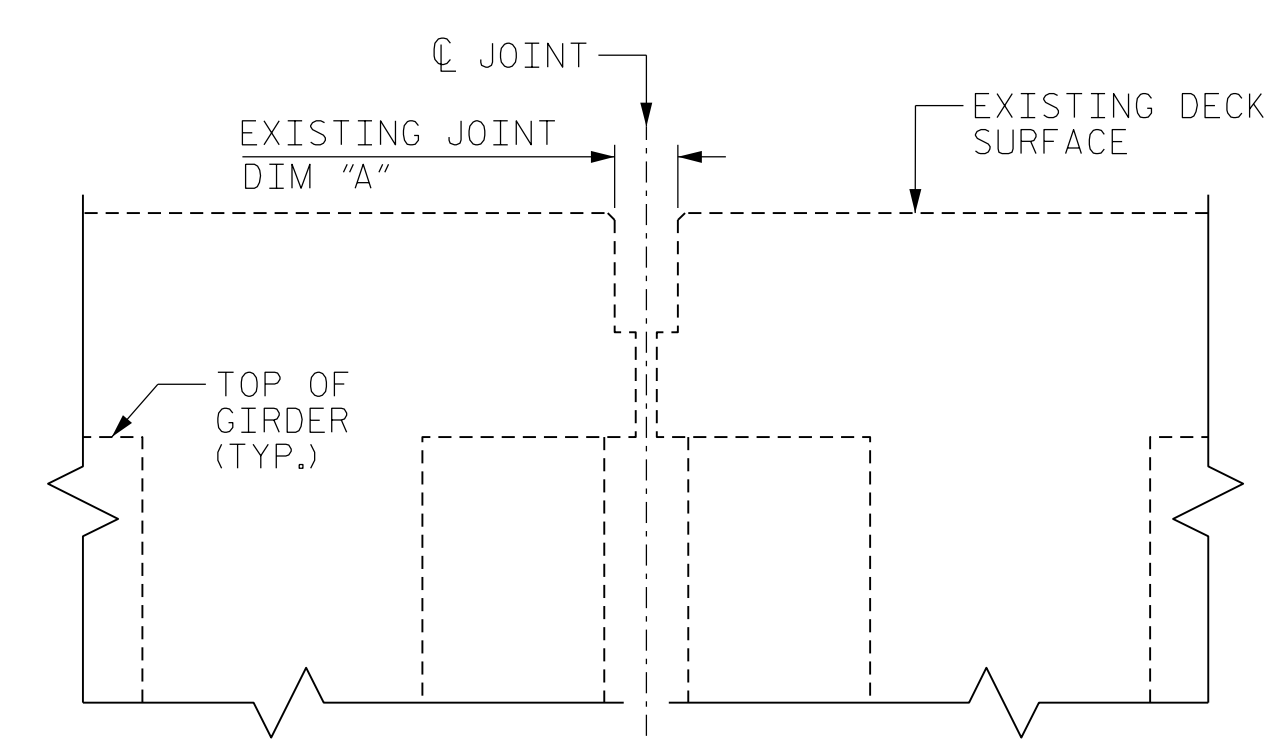
SECTION A-A
(EXISTING JOINT)



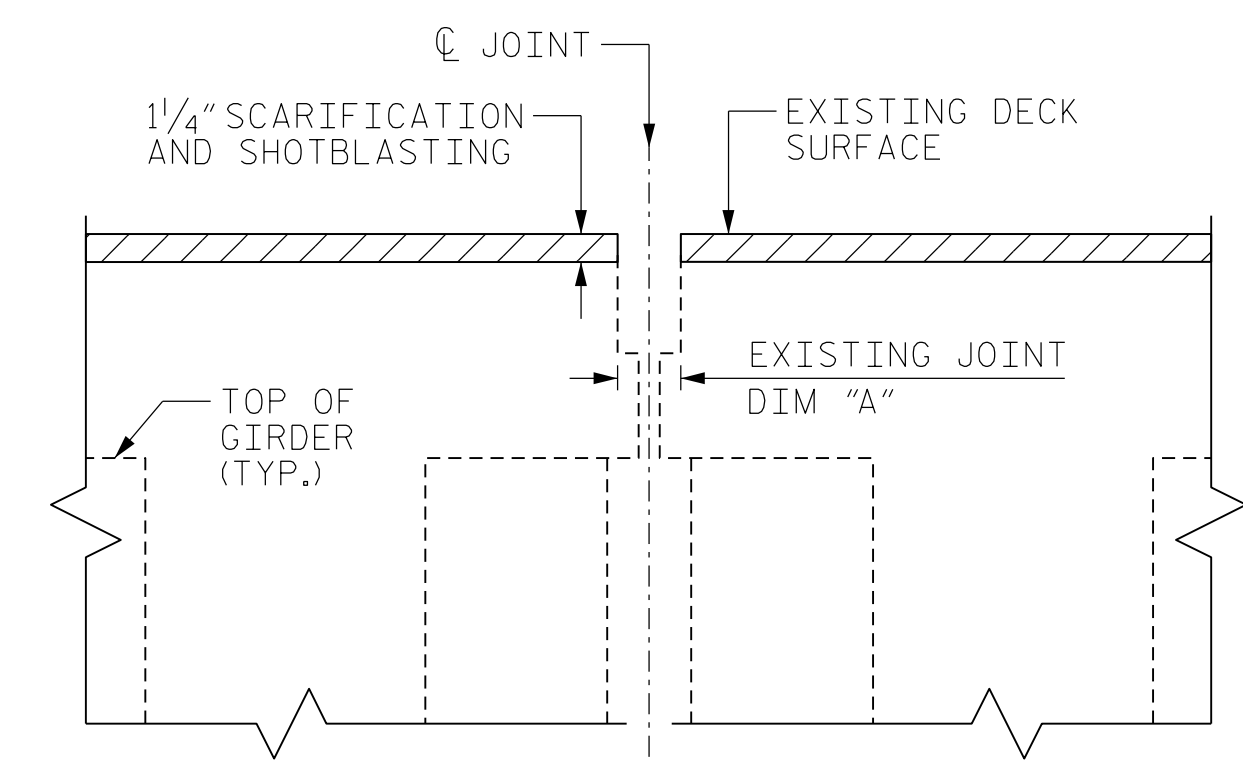
SECTION A-A
(MIN. EXISTING JOINT DEMOLITION)



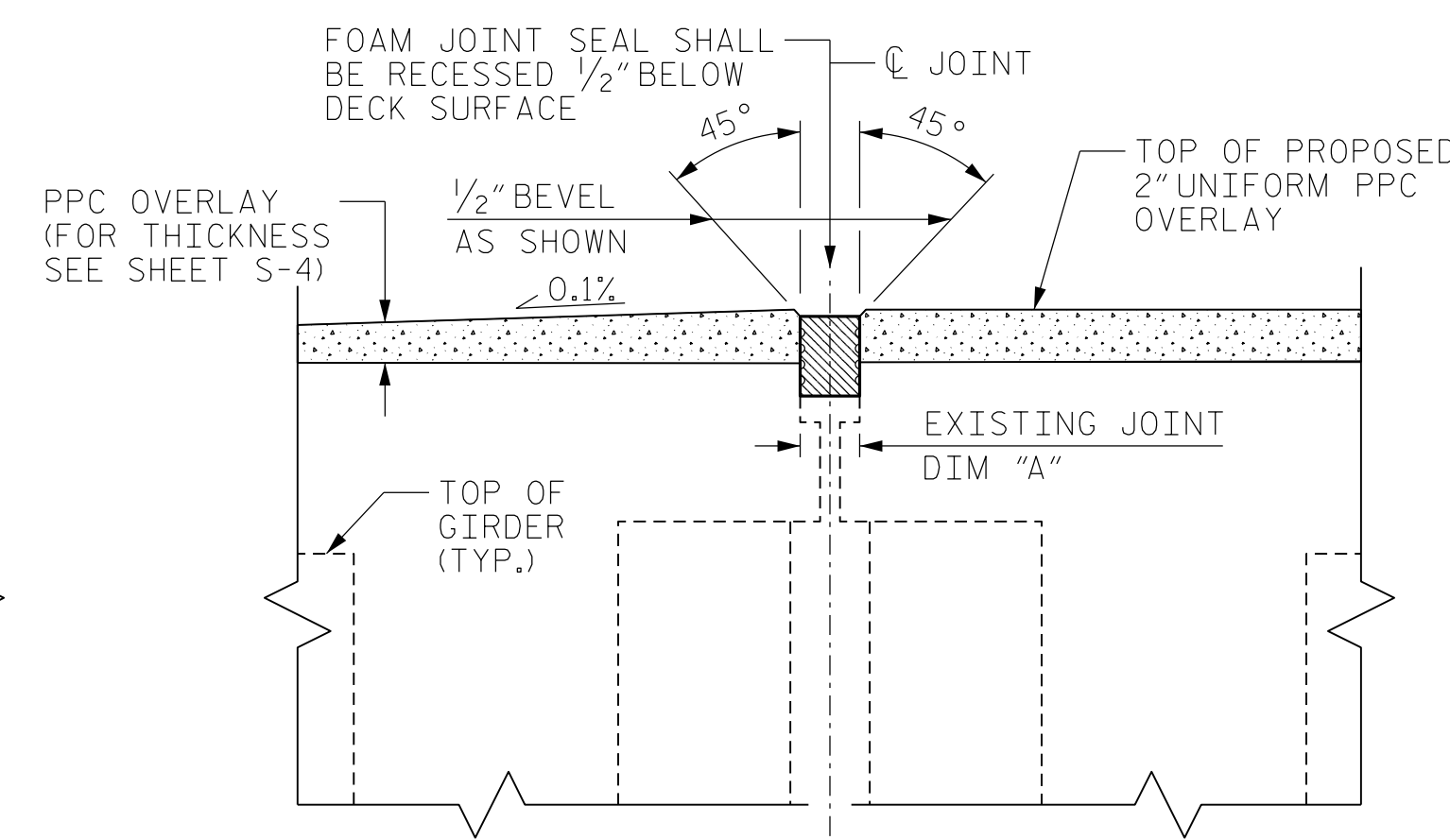
SECTION A-A
(PROPOSED JOINT SEAL)



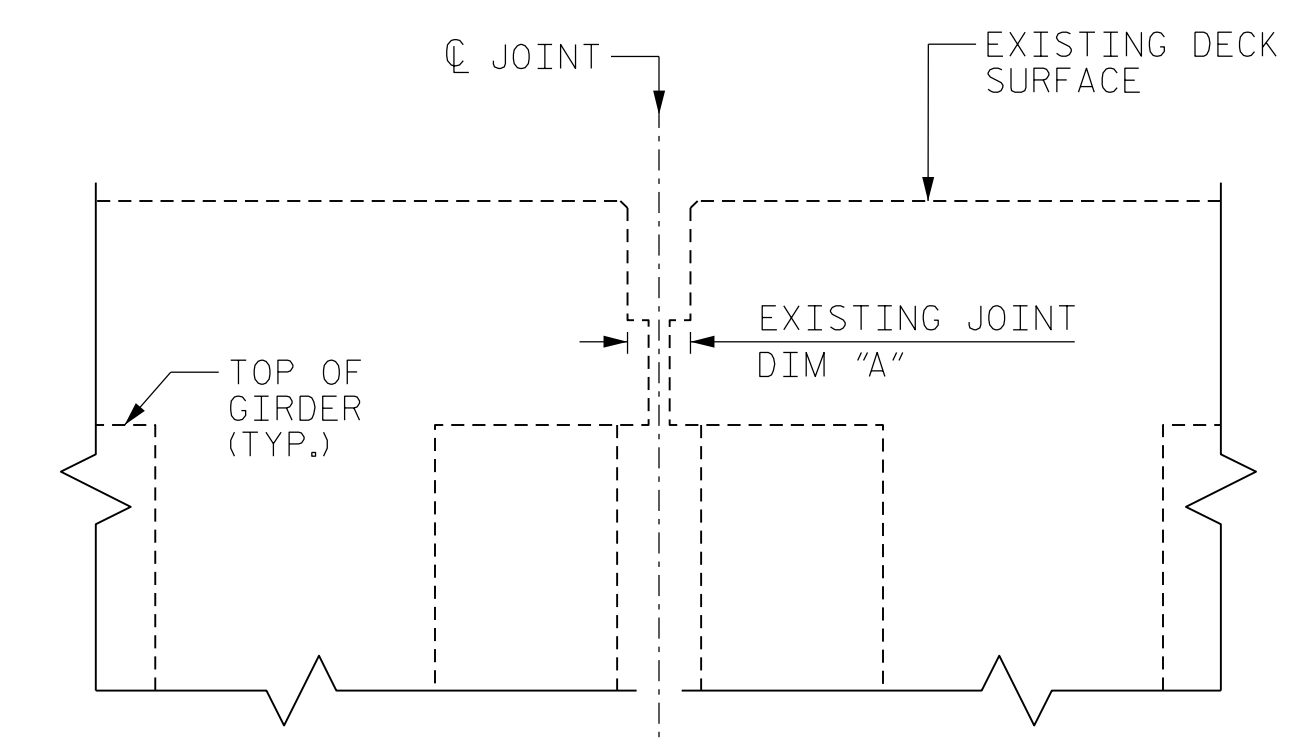
SECTION B-B
(EXISTING JOINT PRIOR TO PPC OVERLAY)



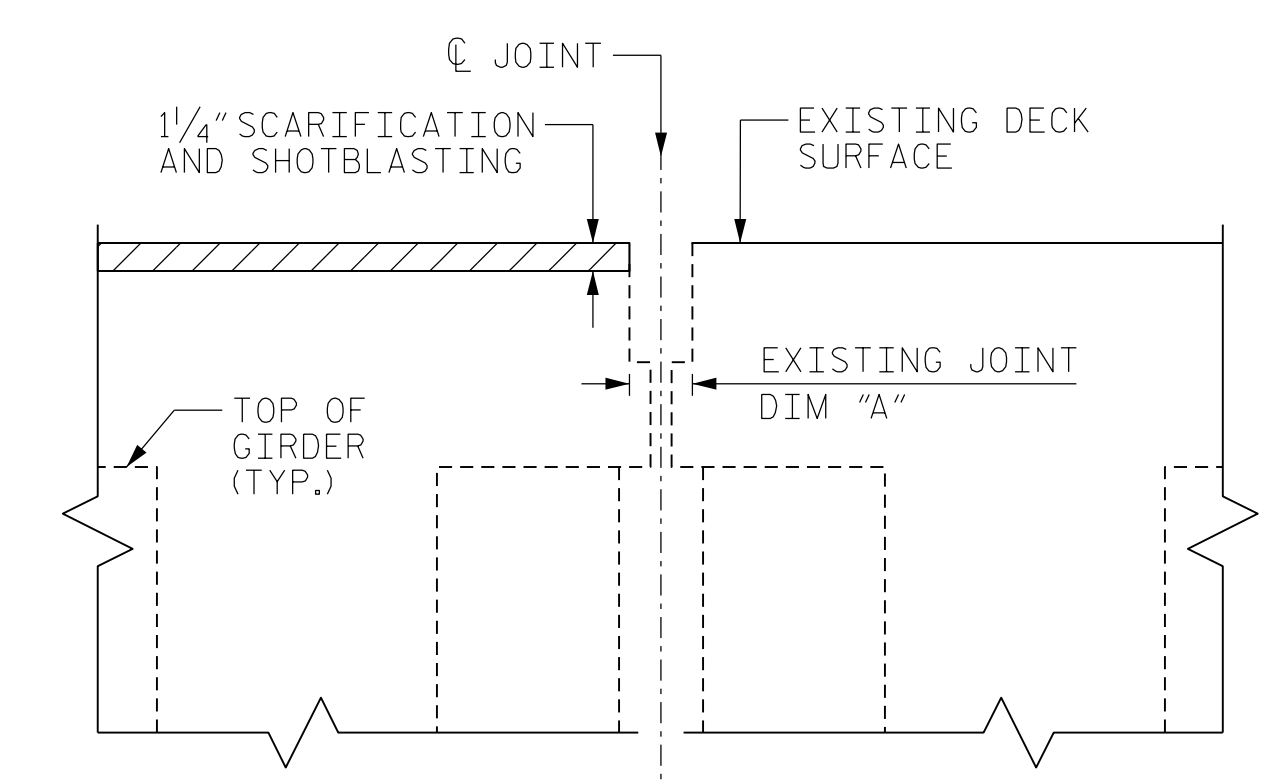
SECTION B-B
(SCARIFICATION AND SHOTBLASTING)



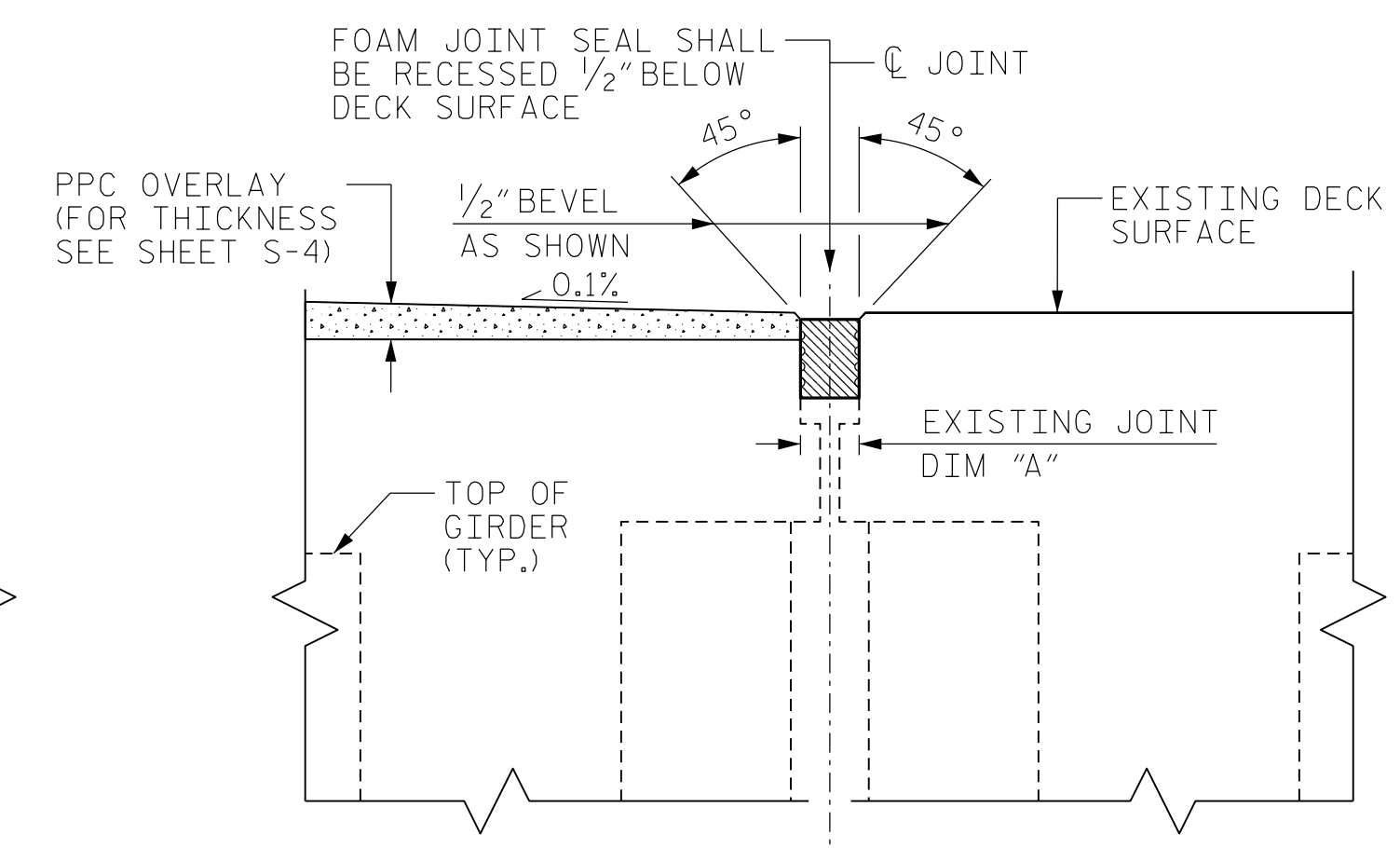
SECTION B-B
(PROPOSED FOAM JOINT SEAL)



SECTION C-C
(EXISTING JOINT PRIOR TO PPC OVERLAY)



SECTION C-C
(SCARIFICATION AND SHOTBLASTING)



SECTION C-C
(PROPOSED FOAM JOINT SEAL)

NOTES:

THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING JOINT OPENING PRIOR TO ORDERING JOINT SEAL MATERIAL. IF THE ACTUAL OPENING VARIES FROM THE OPENING INDICATED IN THE DETAIL BY MORE THAN 1/4", NOTIFY THE ENGINEER. REVISION OF THE JOINT SEAL SIZE MIGHT BE NECESSARY.

THE MANUFACTURER IS TO PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL FOR THE SIZE OF THE OPENING ON THE PLANS AND ACCOMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.

FOAM JOINTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S RECOMMENDATIONS.

THE CONTRACTOR SHALL TAKE CARE DURING JOINT REHAB OPERATIONS NOT TO DROP ANY MATERIAL THAT FALLS BELOW THE BRIDGE, WITHOUT PROTECTIVE DEVICES BELOW TO CATCH THE MATERIAL. ANY MATERIAL THAT FALLS BELOW THE BRIDGE SHALL BE CONTAINED, REMOVED AND DISPOSED OF BY THE CONTRACTOR AT NO EXTRA COST TO THE DEPARTMENT. IF THE ENGINEER DETERMINES THAT THE PROTECTIVE DEVICES ARE NOT ADEQUATE OR NOT BEING EMPLOYED, THE WORK SHALL BE SUSPENDED UNTIL ADEQUATE PROTECTION IS PROVIDED.

THE CONTRACTOR WILL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINT.

THE INSTALLED FOAM JOINT SHALL BE WATER TIGHT.

QUANTITIES SHOWN IN THE ELASTOMERIC CONCRETE FOR PRESERVATION TABLE BASED ON THE MINIMUM JOINT DEMOLITION SHOWN.

FOR EXCAVATION BELOW THE BOTTOM OF THE PLANNED JOINT DECK DEMOLITION, CONCRETE FOR DECK REPAIRS SHALL BE PLACED IN THE EXCAVATED AREA TO THE ELEVATION AT BOTTOM OF THE PROPOSED ELASTOMERIC CONCRETE FOR PRESERVATION HEADERS SHOWN.

FOR BRIDGE JOINT DEMOLITION, SEE SPECIAL PROVISIONS.

FOR FOAM JOINT SEALS FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR CONCRETE FOR DECK REPAIR, SEE SPECIAL REVISION.

FOR DIM "A", SEE TABLE 1 ON SHEET S-11

FOR JOINT QUANTITIES, SEE SHEET S-11.

FOR JOINT AT END BENT 2, REMOVE EXISTING JOINT MATERIAL AND INSTALL FOAM JOINT SEALS (SIMILAR TO SECTION E-E, PROPOSED JOINT SEAL).

BRIDGE JOINT DEMOLITION



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Jacob H. Duke
3/28/2019

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

JOINT DETAILS

KCA 301 FAYETTEVILLE ST., SUITE 1500
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			45

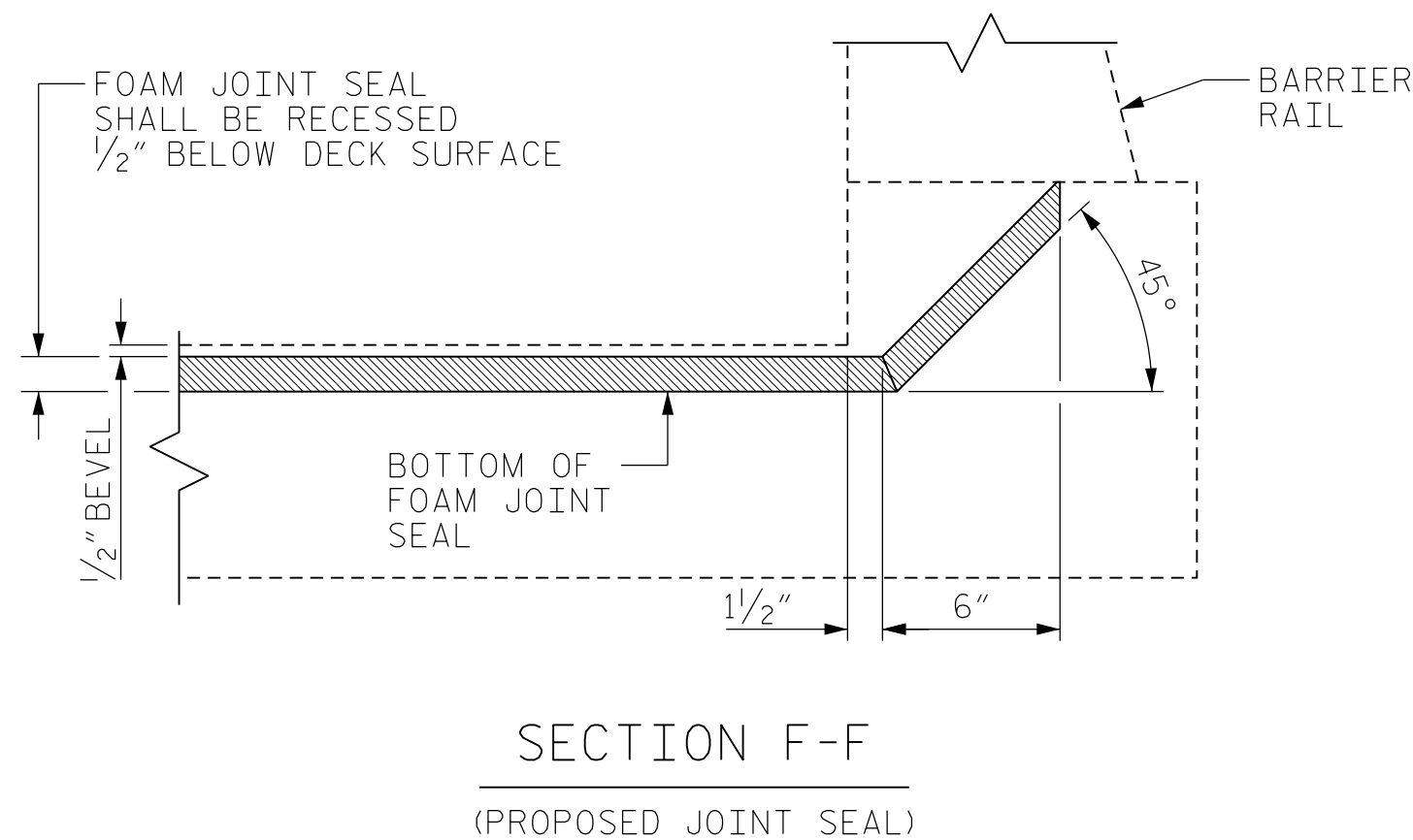
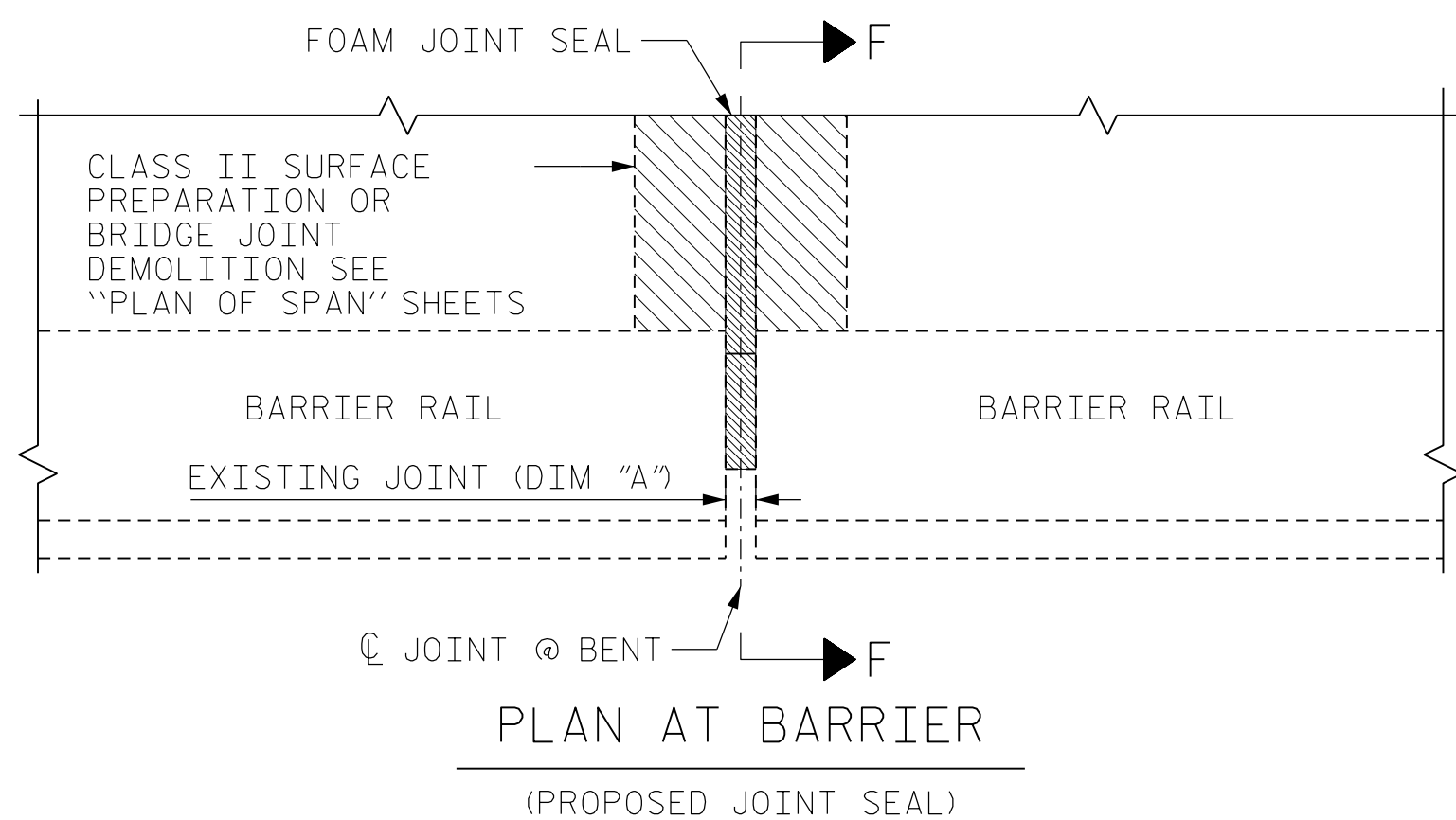
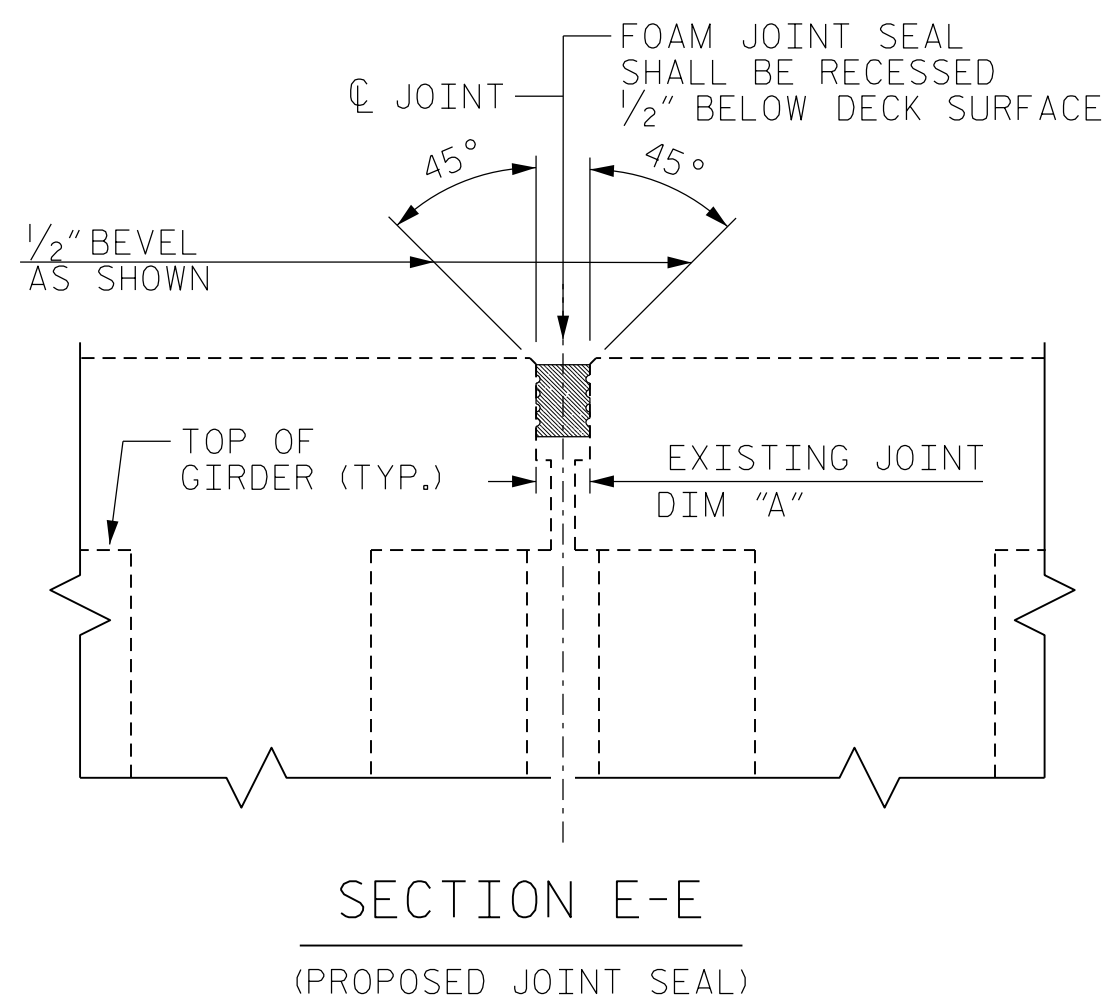
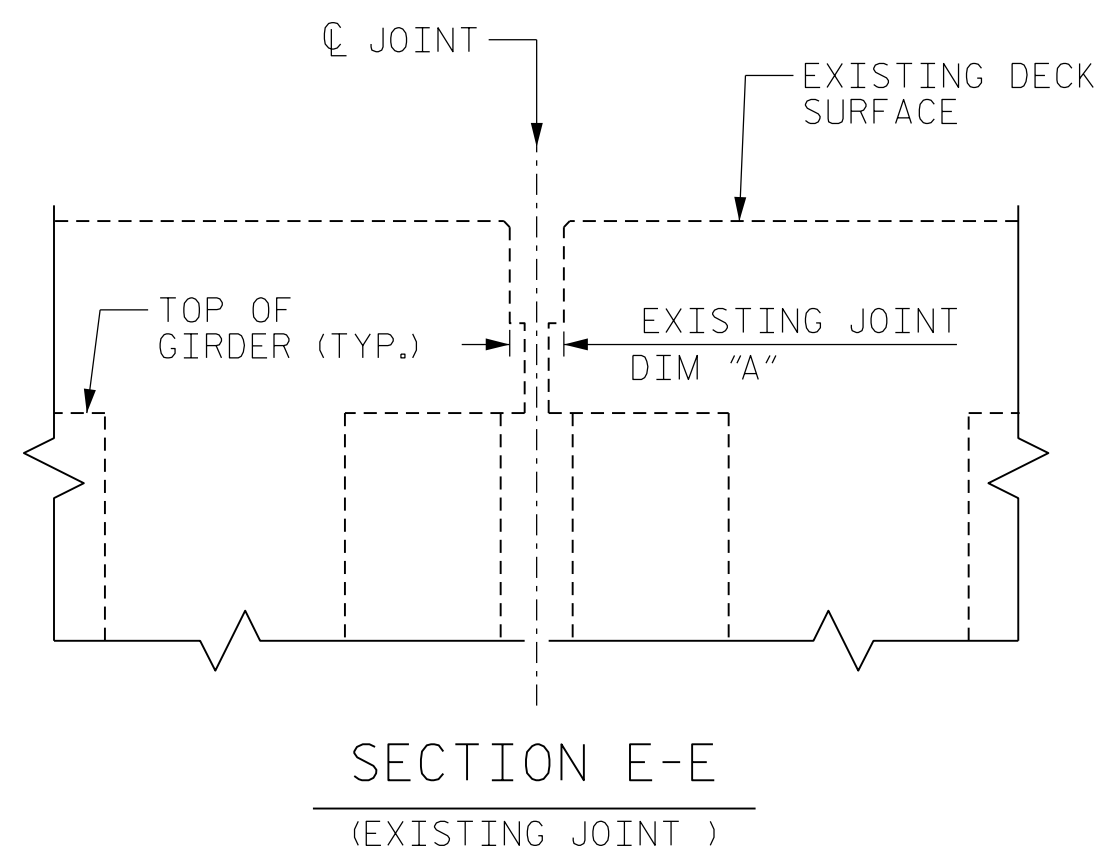
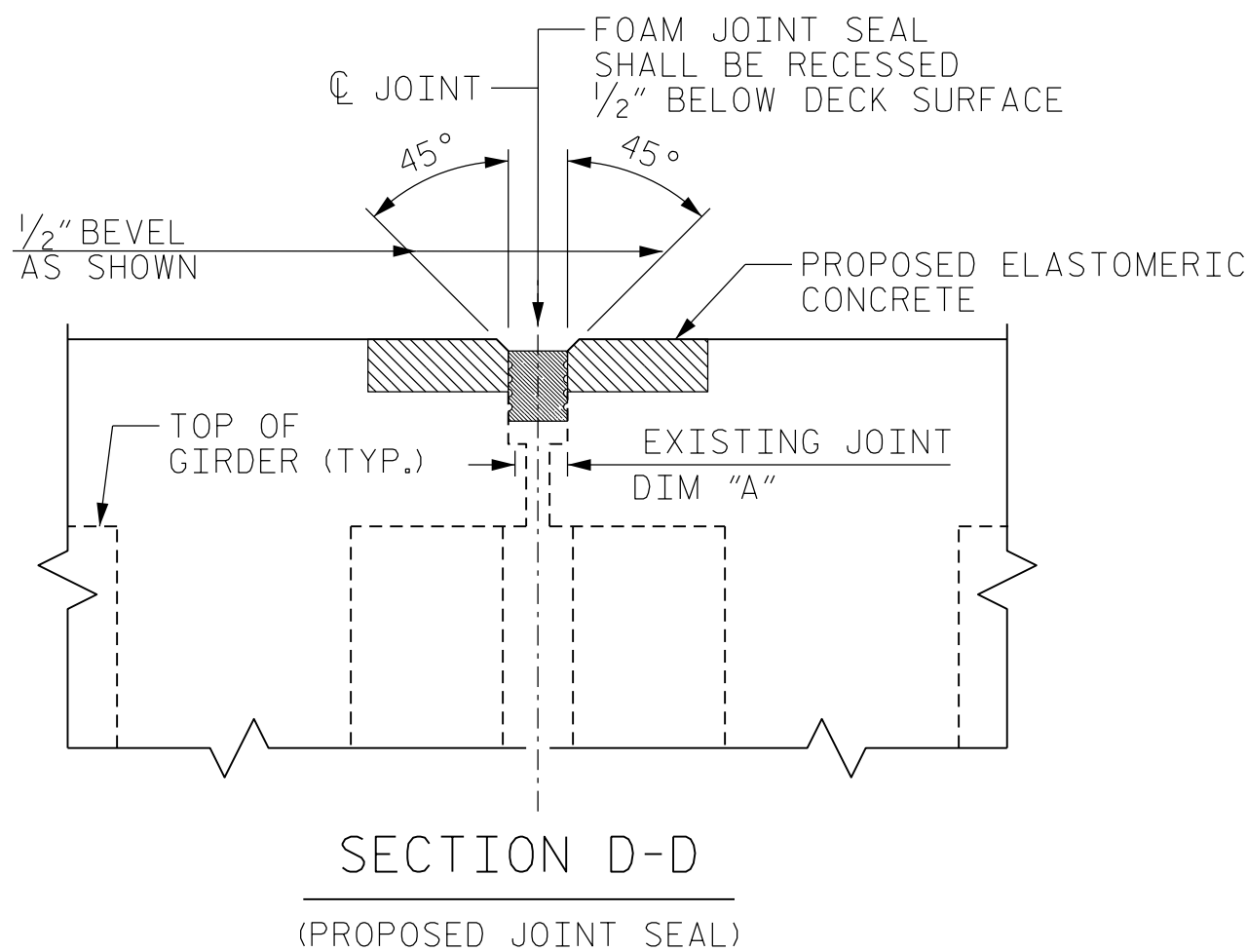
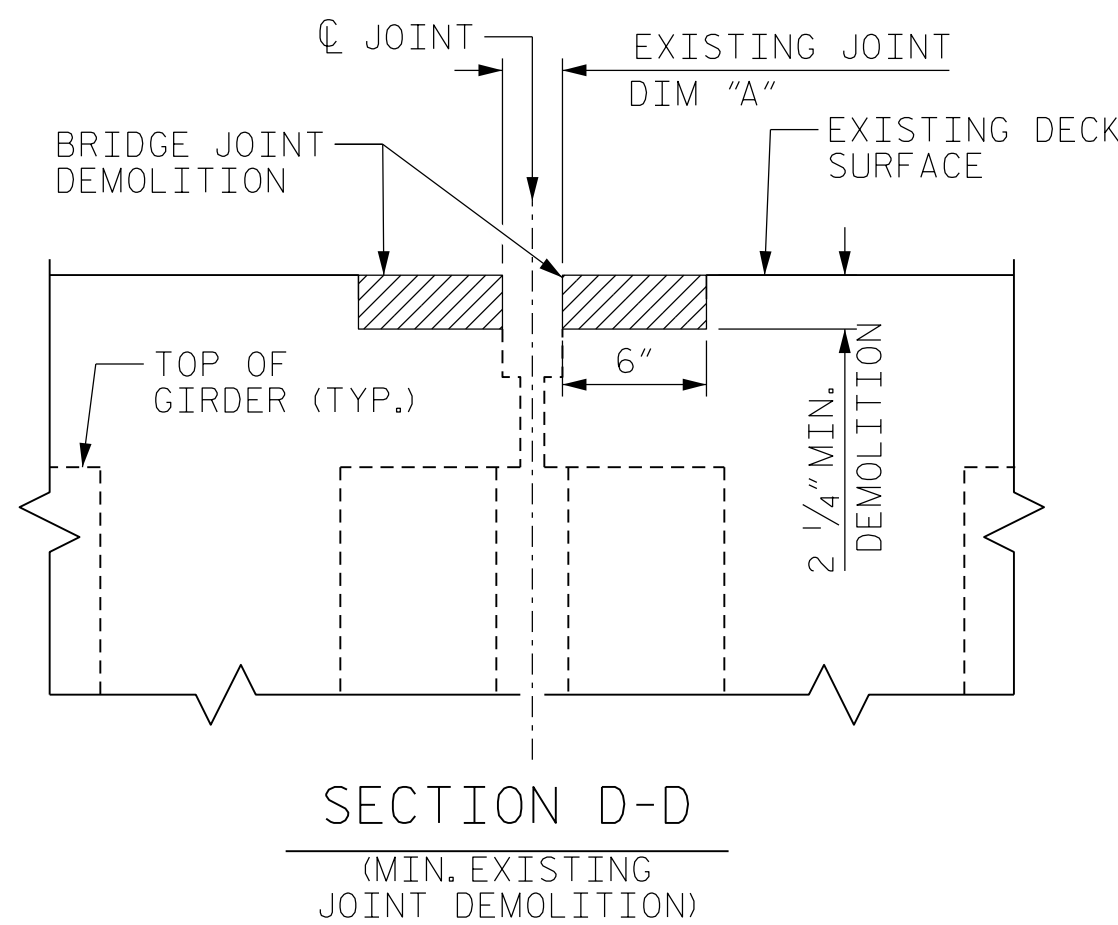
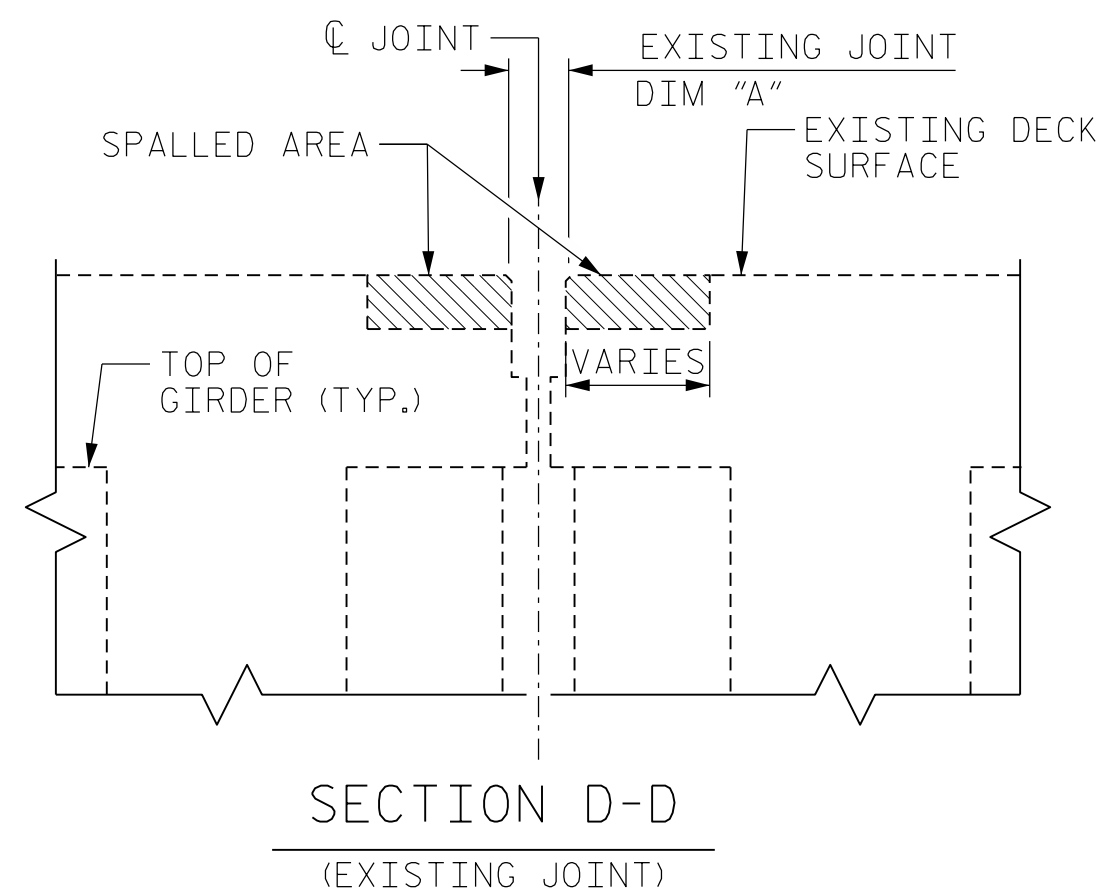


TABLE 1	
Table Date 10-2018	
BENT/ JOINTS	DIM "A" @ 65°F
END BENT 1	2.00"
1	1.75"
2	1.50"
3	2.00"
4	1.75"
5	1.50"
6	1.50"
7	2.00"
8	1.75"
9	1.50"
10	1.50"
11	3.00"
12	3.00"
13	2.00"
14	2.00"
15	1.50"
16	1.50"
17	1.50"
18	1.50"
19	1.50"
20	2.00"
END BENT 2	2.00"

ELASTOMERIC CONCRETE FOR PRESERVATION

LOCATION	ESTIMATED (CU.FT.)	ACTUAL (CU.FT.)
END BENT 1	3.05	
BENT 7	6.1	
BENT 16	3.05	

BRIDGE JOINT DEMOLITION

LOCATION	ESTIMATED (SQ.FT.)	ACTUAL (SQ.FT.)
END BENT 1	16.2	
BENT 7	32.5	
BENT 16	16.2	

JOINT REPAIR QUANTITY

	ESTIMATED (LIN.FT.)	ACTUAL (LIN.FT.)
FOAM JOINT SEALS FOR PRESERVATION	720 LF	

NOTES:

THE CONTRACTOR SHALL FIELD VERIFY THE EXISTING JOINT OPENING PRIOR TO ORDERING JOINT SEAL MATERIAL. IF THE ACTUAL OPENING VARIES FROM THE OPENING INDICATED IN THE DETAIL BY MORE THAN 1/4", NOTIFY THE ENGINEER. REVISION OF THE JOINT SEAL SIZE MIGHT BE NECESSARY.

THE MANUFACTURER IS TO PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL FOR THE SIZE OF THE OPENING ON THE PLANS AND ACCOMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.

FOAM JOINTS SHALL BE INSTALLED AS PER THE MANUFACTURER'S RECOMMENDATIONS.

THE CONTRACTOR SHALL TAKE CARE DURING JOINT REHAB OPERATIONS NOT TO DROP ANY MATERIAL THAT FALLS BELOW THE BRIDGE, WITHOUT PROTECTIVE DEVICES BELOW TO CATCH THE MATERIAL. ANY MATERIAL THAT FALLS BELOW THE BRIDGE SHALL BE CONTAINED, REMOVED AND DISPOSED OF BY THE CONTRACTOR AT NO EXTRA COST TO THE DEPARTMENT. IF THE ENGINEER DETERMINES THAT THE PROTECTIVE DEVICES ARE NOT ADEQUATE OR NOT BEING EMPLOYED, THE WORK SHALL BE SUSPENDED UNTIL ADEQUATE PROTECTION IS PROVIDED.

THE CONTRACTOR WILL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINT.

THE INSTALLED FOAM JOINT SHALL BE WATER TIGHT.

QUANTITIES SHOWN IN THE ELASTOMERIC CONCRETE FOR PRESERVATION TABLE BASED ON THE MINIMUM JOINT DEMOLITION SHOWN.

FOR EXCAVATION BELOW THE BOTTOM OF THE PLANNED JOINT DECK DEMOLITION, CONCRETE FOR DECK REPAIRS SHALL BE PLACED IN THE EXCAVATED AREA TO THE ELEVATION AT BOTTOM OF THE PROPOSED ELASTOMERIC CONCRETE FOR PRESERVATION HEADERS SHOWN.

FOR BRIDGE JOINT DEMOLITION, SEE SPECIAL PROVISIONS.

FOR FOAM JOINT SEALS FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR ELASTOMERIC CONCRETE FOR PRESERVATION, SEE SPECIAL PROVISIONS.

FOR CONCRETE FOR DECK REPAIR, SEE SPECIAL REVISION.

FOR DIM "A", SEE TABLE 1 ON SHEET S-11

FOR JOINT QUANTITIES, SEE SHEET S-11.

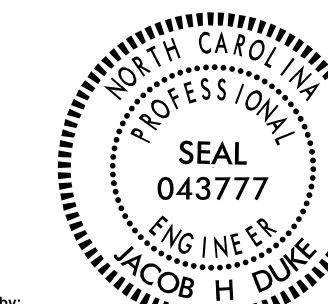
FOR JOINT AT END BENT 2, REMOVE EXISTING JOINT MATERIAL AND INSTALL FOAM JOINT SEALS (SIMILAR TO SECTION E-E, PROPOSED JOINT SEAL).

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

JOINT DETAILS



Designed by:
 Jacob H. Duke
 SC093AD0606400

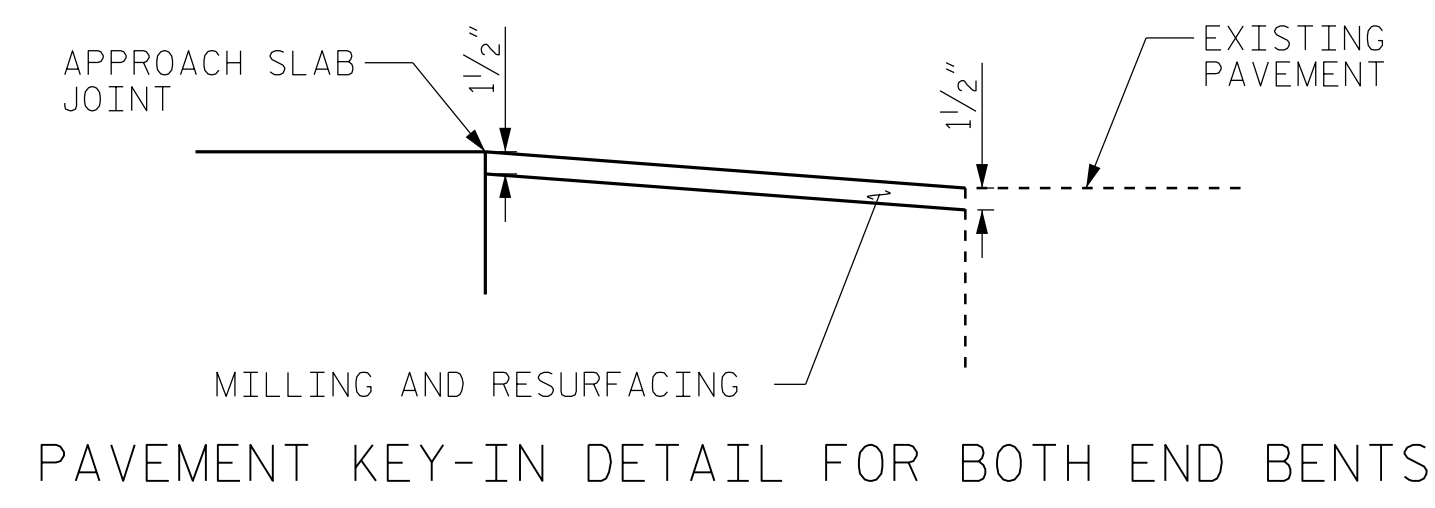
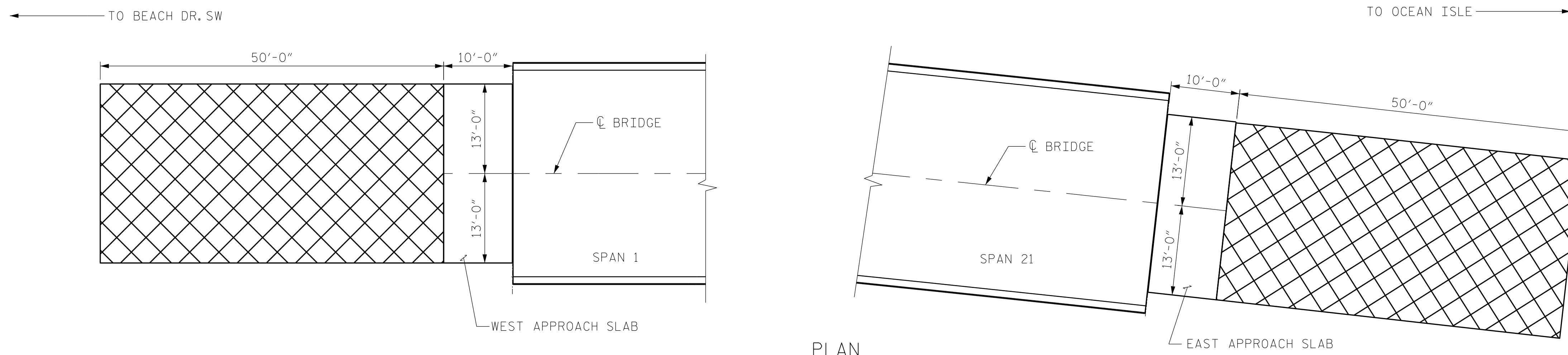
3/28/2019

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2			4			45

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KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

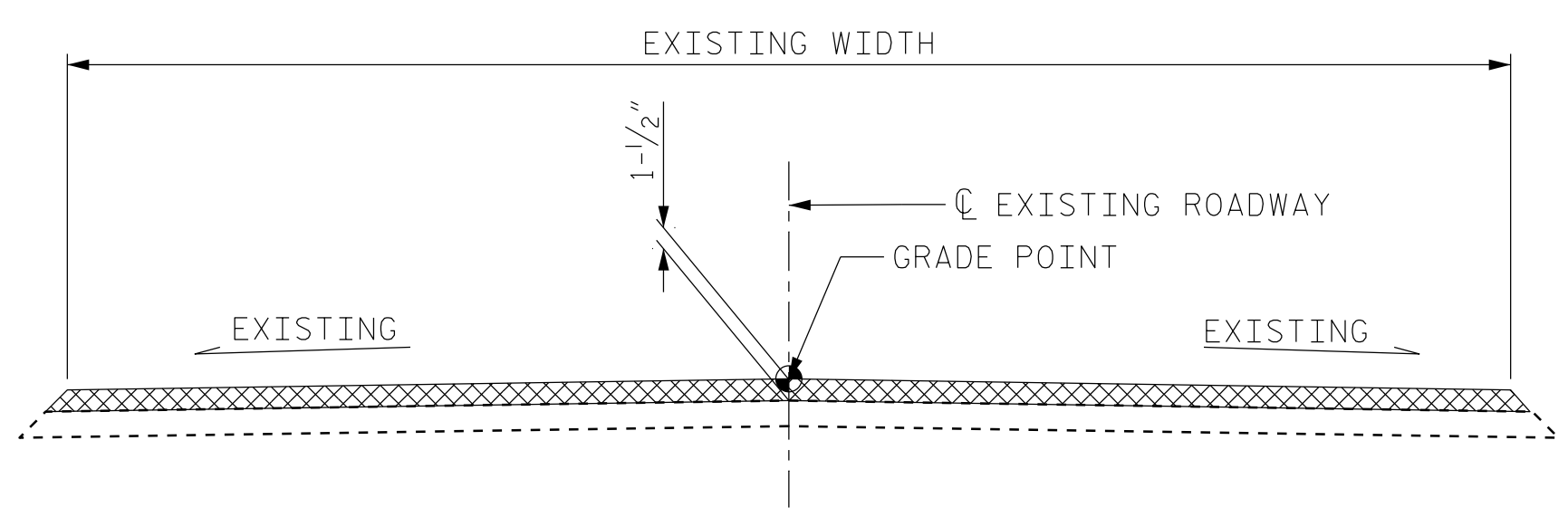


AS-BUILT QUANTITY TABLE

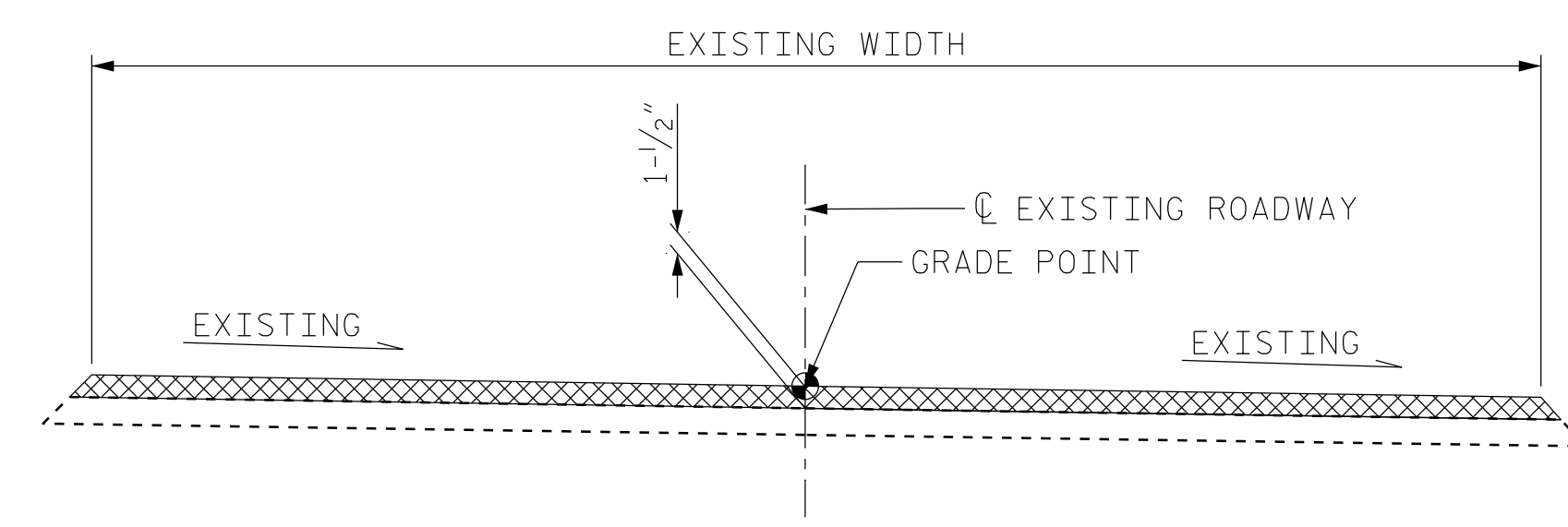
	ESTIMATE	ACTUAL
INCIDENTAL MILLING	290 SY	
ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C	24.5 TONS	
ASPHALT BINDER FOR PLAN MIXER	1.5 TONS	

NOTES:

- INCIDENTAL MILLING - EXISTING APPROACH ASPHALT PAVEMENT TO BE MILLED AS NECESSARY TO ATTAIN MINIMUM 1 1/2" DEPTH OF NEW ASPHALT PAVEMENT. NEW ASPHALT PAVEMENT SHALL BE OF THICKNESS NECESSARY TO PROVIDE A SMOOTH TRANSITION BETWEEN THE ROADWAY AND THE BRIDGE DECK. THE NEW ASPHALT PAVEMENT THICKNESS MAY EXCEED 1 1/2" DUE TO SETTLEMENT OF THE EXISTING APPROACH.
- FOR NEW ASPHALT PLACEMENT, SEE STANDARD SPECIFICATIONS.
- GRADE MAY BE ADJUSTED BY THE ENGINEER TO ENSURE PROPER TIE-IN AT THE END BENT 1 APPROACH ROADWAY.



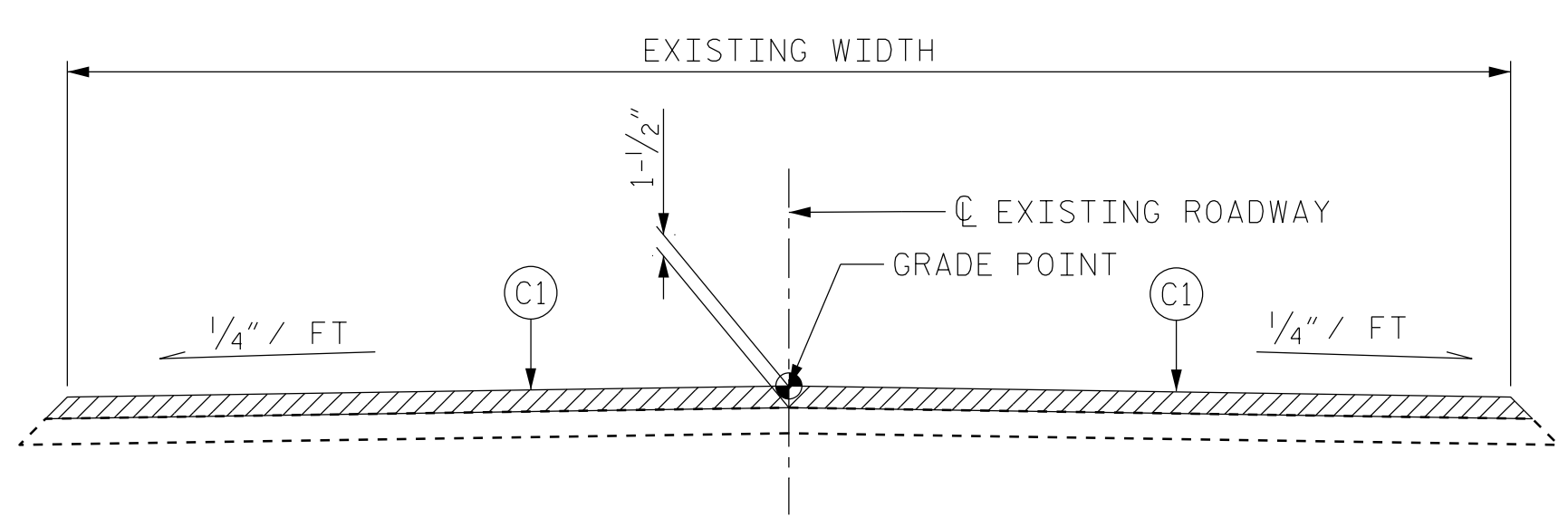
EXISTING SECTION
BEGIN BRIDGE



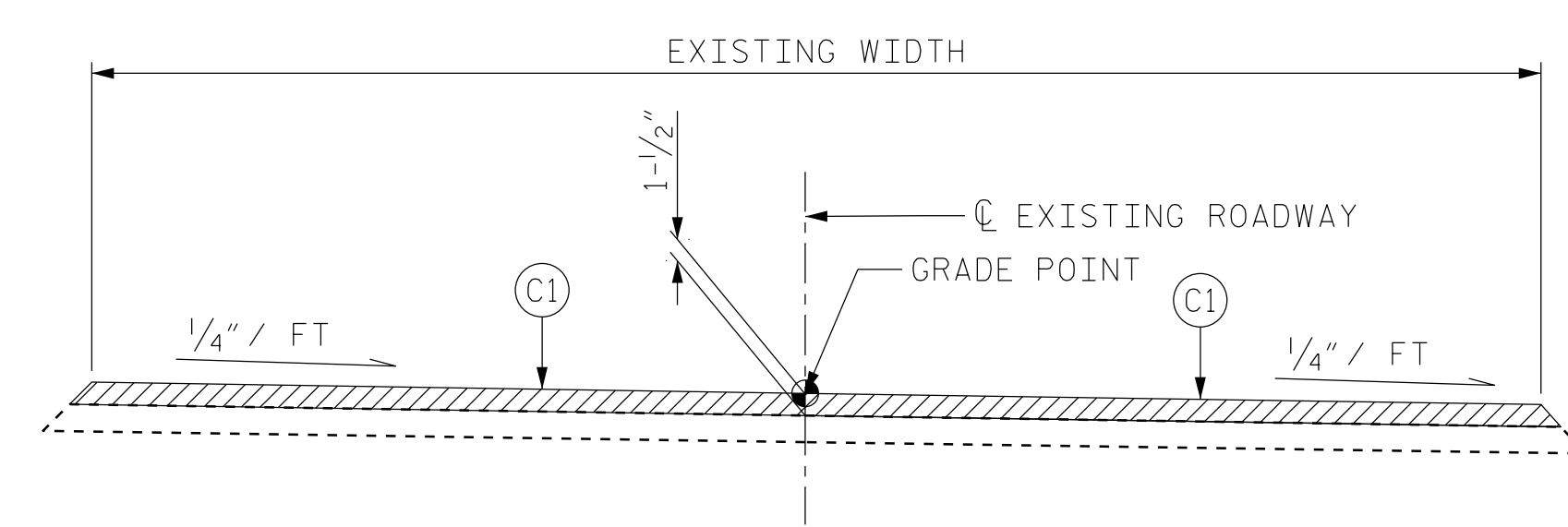
EXISTING SECTION
END BRIDGE

- INCIDENTAL MILLING
- ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C
- PPC OVERLAY

C1 PROPOSED VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1" OR GREATER THAN 2" IN DEPTH.



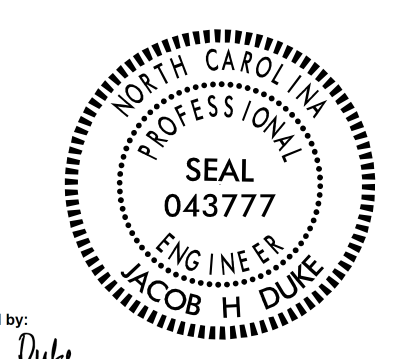
PROPOSED SECTION
BEGIN BRIDGE



PROPOSED SECTION
END BRIDGE

TYPICAL ROADWAY SECTION

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013



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Jacob H. Duke
SC053AD0606400

3/28/2019

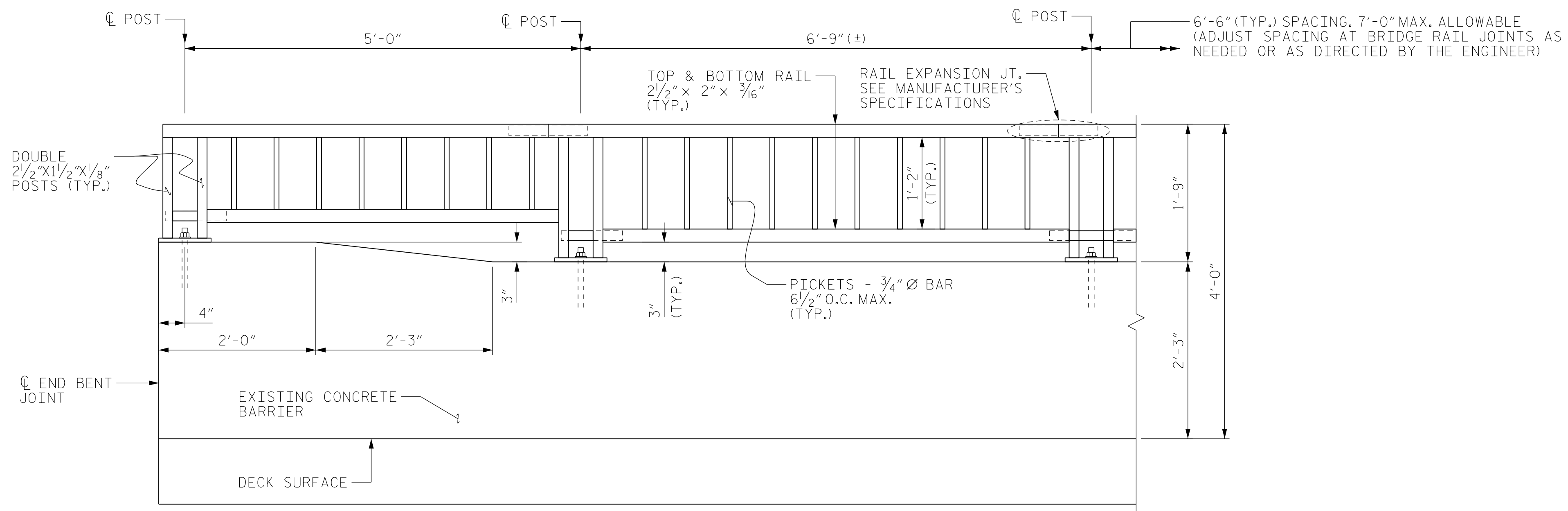
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**APPROACH ROADWAY
 MILLING AND RESURFACING**

KCA 301 FAYETTEVILLE ST., SUITE 1500
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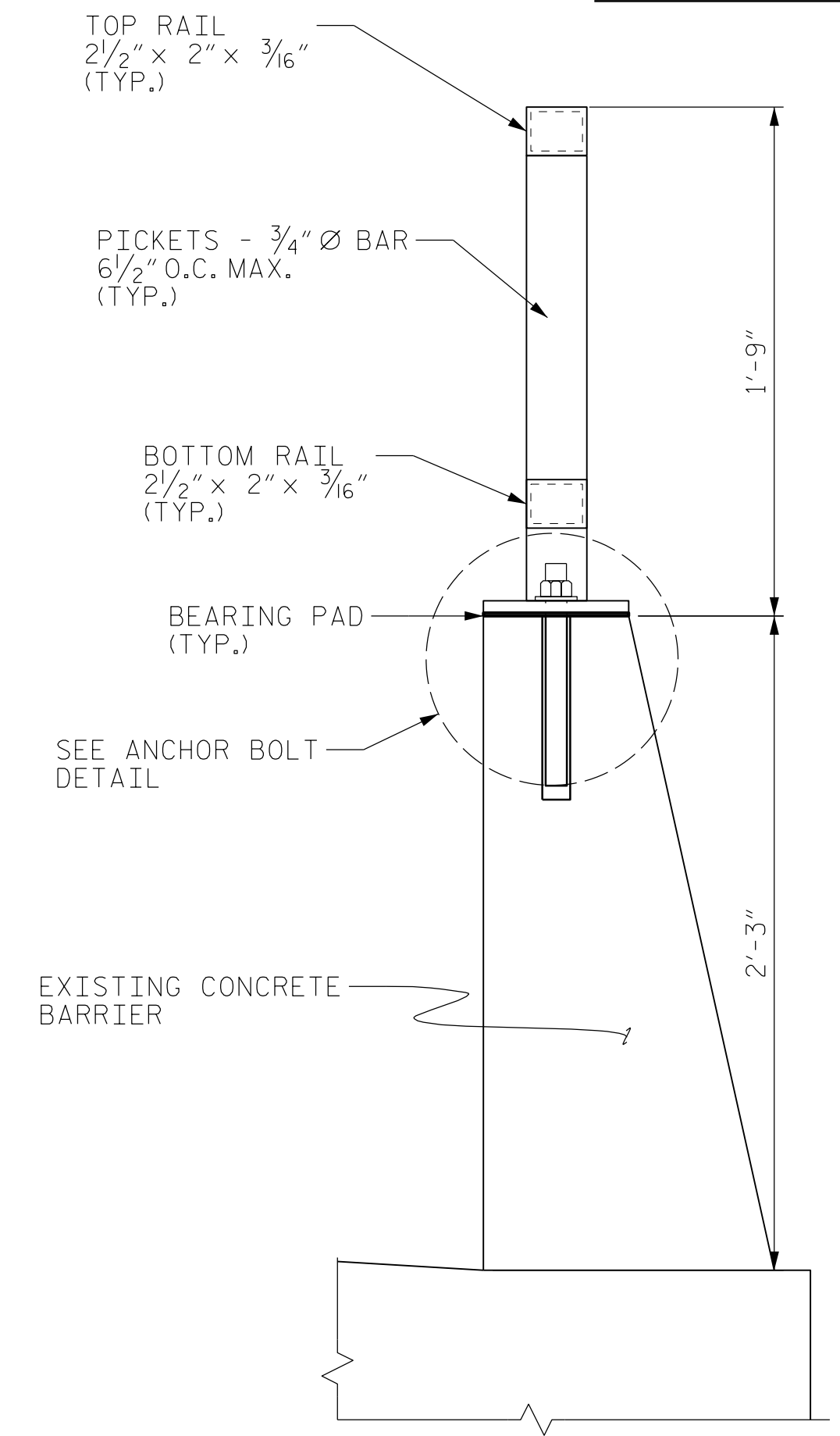
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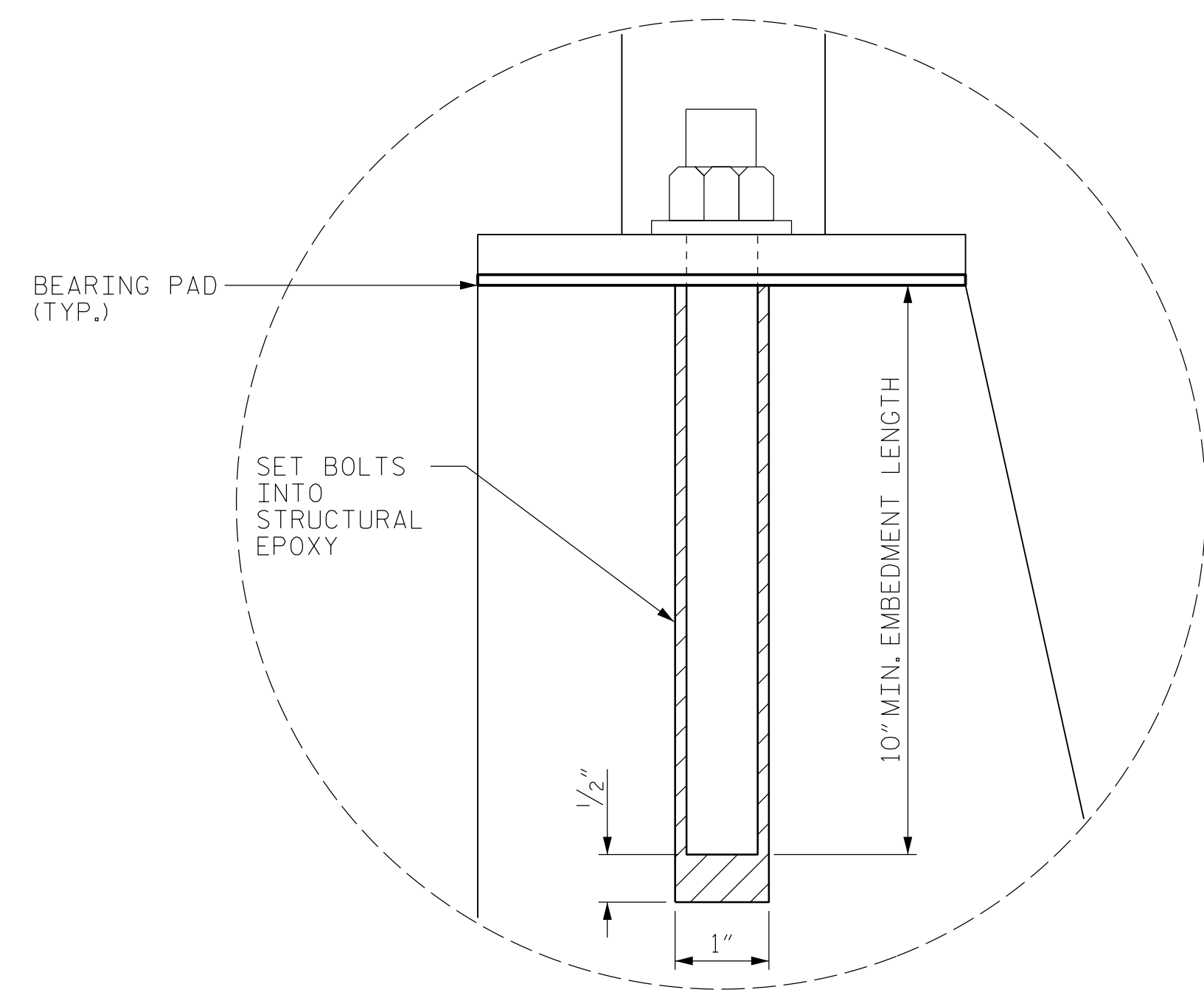
RAIL END ELEVATION

RAIL RETROFIT NOTES:

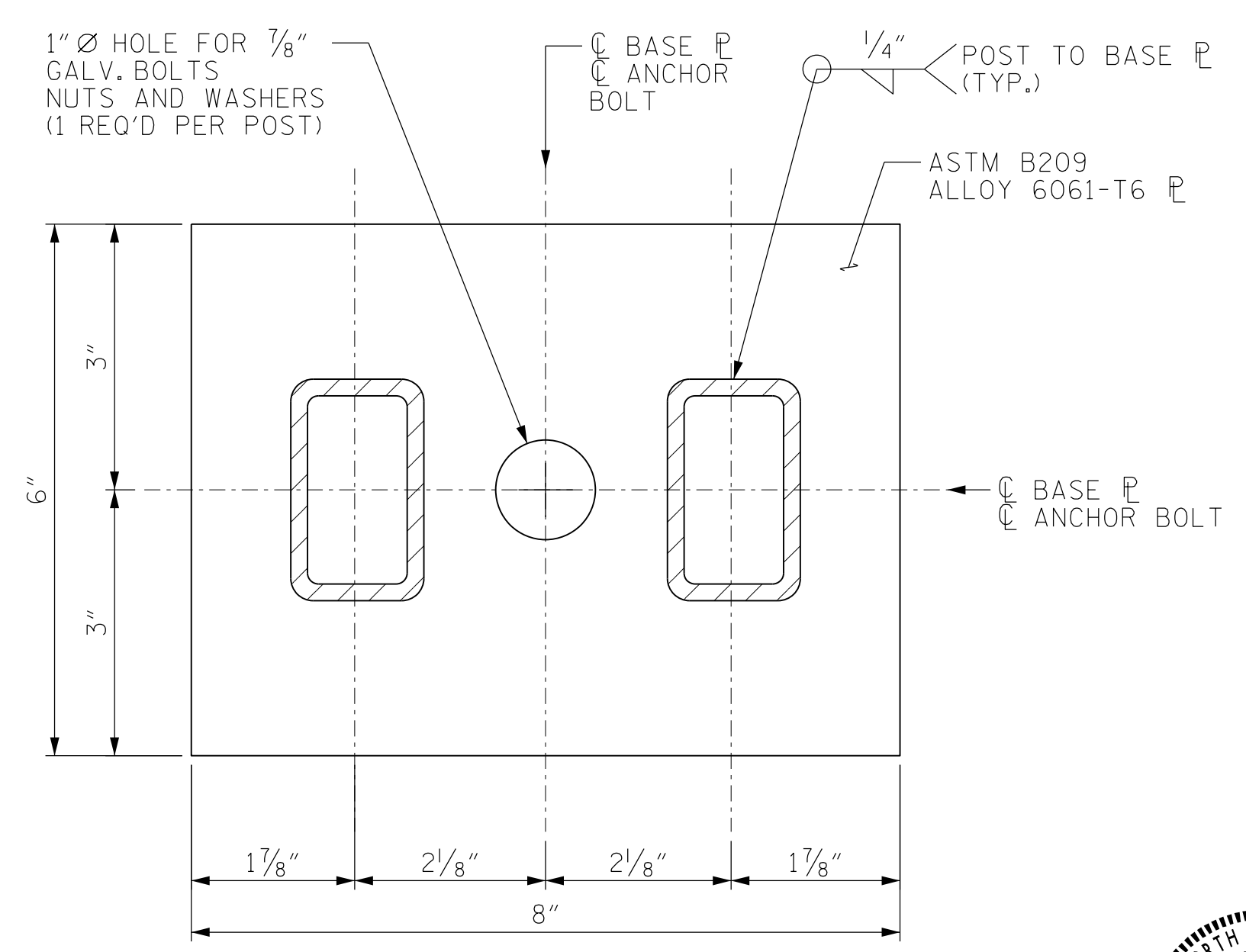
1. PROVIDE AN ALUMINUM RAIL RAIL SYSTEM IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. FOR RAIL RETROFIT, SEE SPECIAL PROVISIONS.
3. FOR RAIL POST LOCATIONS, SEE SHEET S-14.
4. ALL BARRIER RAIL POSTS ARE TO BE VERTICALLY PLUMB. PROVIDE SHORTER POSTS AT THE FOUR END LOCATIONS TO MAINTAIN LEVEL HORIZONTAL RAILS AS SHOWN IN THIS SHEET.
5. POSTS, BASES AND RAILS SHALL BE ASTM B-221 ALLOY-T6. THE CONTRACTOR SHALL USE SUITABLE HARDWARE. WELDING SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 1074 OF THE STANDARD SPECIFICATIONS.
6. THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE, SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.
7. FOR ADHESIVELY ANCHORED BOLTS, SEE STANDARD SPECIFICATIONS SECTION 420-13. ANCHOR BOLTS SHALL BE ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH.
8. NUTS SHALL MEET REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844.
9. FOR ADHESIVELY ANCHORED BOLTS, LEVEL ONE FIELD TESTING IS REQUIRED. THE REQUIRED PULLOUT STRENGTH IS 5 KIPS FOR THE SPECIFIED EMBEDMENT LENGTH.
10. BEARING PADS SHALL BE 1/8" THICK, PLAIN, FABRIC REINFORCED OR FABRIC LAMINATED BEARING PADS. FOR FURTHER DETAILS, SEE SPECIAL PROVISIONS FOR RAIL RETROFIT.



SECTION THROUGH RAIL



ANCHOR BOLT DETAIL



BASE PLATE DETAILS



DocuSigned by:
Jacob H. Duke
SC053AD0606400

3/28/2019

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

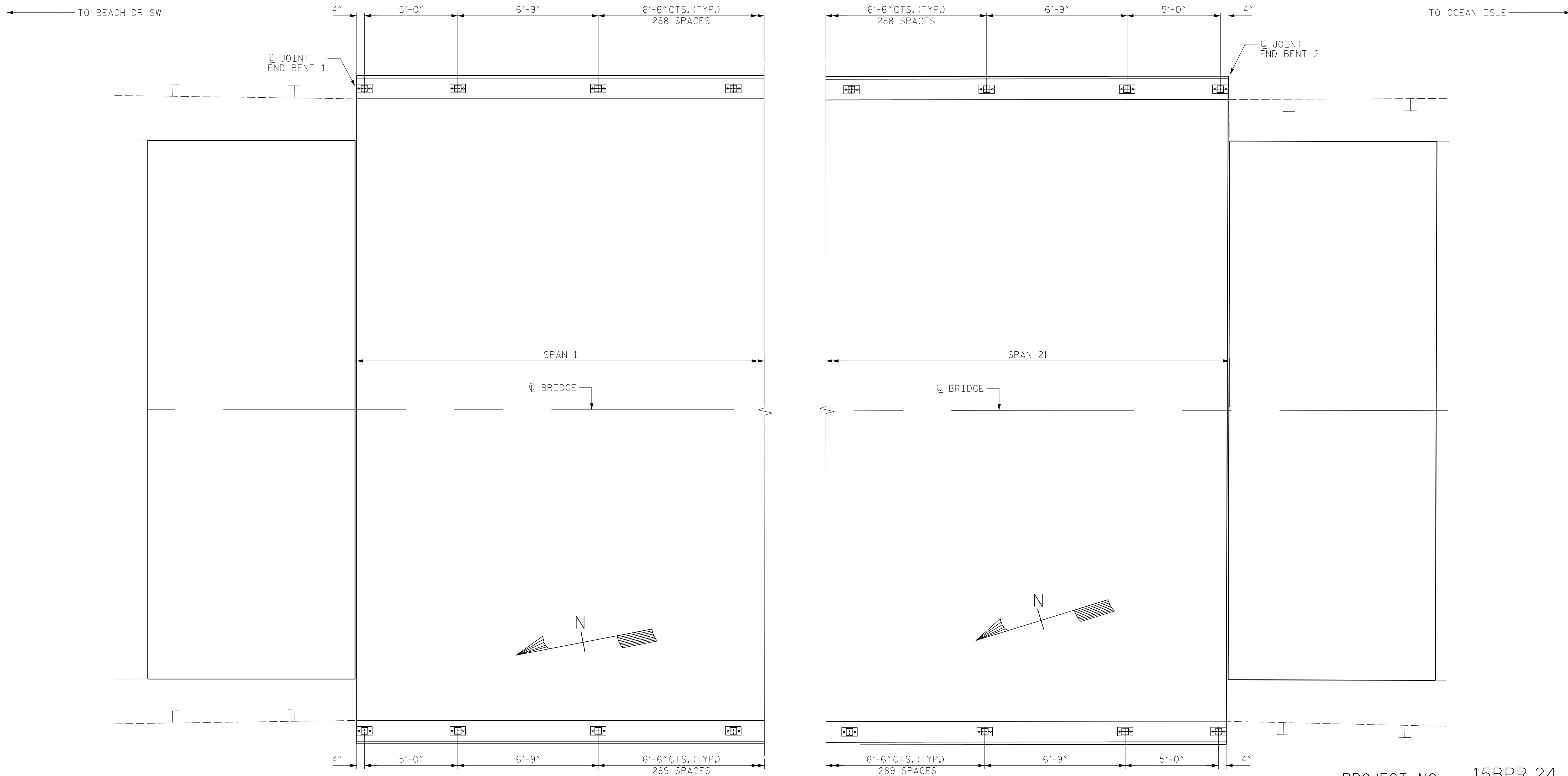
RAIL
 RETROFIT

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : JACOB H. DUKE DATE : 10/2018
 CHECKED BY : SAMUEL L. CULLUM DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			45



NOTES:

1. DO NOT PLACE ANY POST BASEPLATE OVER A BENT JOINT.
2. FIELD ADJUST POST LOCATIONS AT LOCATIONS WHERE POST BASEPLATE FALLS OVER A BRIDGE JOINT.
3. TYPICAL POST SPACING: 6'-6", MAX. ALLOWED POST SPACING: 7'-0"
4. COORDINATE THIS SHEET WITH "RAIL RETROFIT" SHEET 1 OF 2.

RAIL POST SPACING

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

SHEET 2 OF 2

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
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DRAWN BY : JACOB H. DUKE DATE : 10/2018
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 Jacob H. Duke
 SC093AD0606400
 3/28/2019

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**RAIL
 RETROFIT**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
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Brunswick #13								As-Built Quantities		Brunswick #13								As-Built Quantities	
Span #	Component	Location (ft. from nearest bent, etc)	Bent #	Defect Description	Length (ft.)	Width (ft.)	Assumed Depth (ft.)	Actual (C.F.)	Actual Depth (ft.)	Span #	Component	Location (ft. from nearest bent, etc)	Bent #	Defect Description	Length(ft.)	Width(ft.)	Depth(ft.)	Actual (C.F.)	Actual Depth (ft.)
1	Deck	at random throughout		(x7) Spall	7	1.5	0.5			5	Girder 4	At end of Girder at bent 4	4	Exposed Rebar	2	2.5	0.5		
1	Girder 1	at end of beam, at Bent 1	1	Spall	1.5	1	0.5			5	Girder 4	At end of Girder at bent 4	4	Cracking (PSC)	6				
1	Girder 2	at end of beam, at Bent 1	1	Spall	2	1.5	0.5			5	Girder 4	At end of Girder at bent 5	5	Cracking (PSC)	6				
1	Girder 3	at end of girder, at bent 1	1	Spall	1	1	0.5			5	Girder 5	At end of Girder at bent 4	4	Spall	1.5	1.5	0.5		
2	Girder 1	at end of girder, at bent 1	1	Spall	2	1	0.5			5	Girder 5	At end of Girder at bent 5	5	Spall	1	1.5	0.5		
2	Girder 1	at bottom flange, at end of girder, at bent 2	2	Spall	1.5	1.5	0.5			6	Girder 1	East corner, at end girder at bent 6	6	Spall	2	1	0.5		
2	Girder 2	at end of girder, at bent 1	1	Spall	1.5	1.5	0.5			6	Girder 1	At end of girder at bent 5	5	Cracking (PSC)	6				
2	Girder 2	at end of girder, at bent 2	2	Cracking (PSC)	6					6	Girder 2	Bottom of beam at bent 5	5	Spall	1	1.5	0.5		
2	Girder 3	at end of girder, at bent 1	1	Cracking (PSC)	6					6	Girder 2	End of girder, at bent 5	5	Spall	2.5	2.5	0.5		
2	Girder 4	at end of girder, at bent 1	1	Exposed Rebar	1.5	1.5	0.5			6	Girder 2	At end of girder, at bent 6	6	Cracking (PSC)	6				
2	Girder 4	at end of girder, at bent 1	1	Spall	1.5	1.5	0.5			6	Girder 3	At beam end, at bent 6	6	Spall	1.5	1.5	0.5		
2	Girder 5	at end of girder, at bent 1	1	Cracking (PSC)	6					6	Girder 3	Top of flange, at end of girder, at bent 6	6	Spall	2.5	2.5	0.5		
2	Girder 5	at end of girder, at bent 2	2	Cracking (PSC)	6					6	Girder 3	At end of girder at bent 5	5	Cracking (PSC)	6				
3	Girder 1	at end of girder, at bent 3	3	(x2) Spalls/Exposed bar	6	3	0.5			6	Girder 4	Bottom of beam, at bent 5	5	(x2) Spalls	2	1	0.5		
3	Girder 1	bottom flange, at end of girder, at bent 2	2	Spall	1.5	1.5	0.5			6	Girder 4	At end of girder, at bent 5	5	Cracking (PSC)	6				
3	Girder 1	at end of girder, at bent 3	3	Cracking (PSC)	6					6	Girder 4	At end of girder, at bent 6	6	Cracking (PSC)	6				
3	Girder 1	at end of girder, at bent 2	2	Cracking (PSC)	6					6	Girder 5	At end of girder, at bent 5	5	Cracking (PSC)	6				
3	Girder 2	bottom flange, at end of girder, at bent 2	2	Spall	1.5	1	0.5			6	Girder 5	At end of girder, at bent 6	6	Spall	2.5	2.5	0.5		
3	Girder 2	at end of girder, at bent 2	2	Cracking (PSC)	6					7	Deck	Top of deck, 10' from left bridge rail	7	Spall	2	1	0.5		
3	Girder 2	at end of girder, at bent 3	3	Cracking (PSC)	6					7	Girder 1	North face, at bent 6	6	Spall	1	1	0.5		
3	Girder 3	bottom flange, at end of girder, at bent 2	2	Exposed Rebar	3	3	0.5			7	Girder 1	End of girder, at bent 6	6	Cracking (PSC)	6				
3	Girder 3	at end of girder, at bent 3	3	Cracking (PSC)	6					7	Girder 1	End of girder, at bent 7	7	Spall	1	1.5	0.5		
3	Girder 3	at end of girder, at bent 2	2	Cracking (PSC)	6					7	Girder 2	At end of girder at bent 6	6	Cracking (PSC)	6				
3	Girder 3	at end of girder, at bent 2	2	Exposed Rebar	3	3	0.5			7	Girder 2	End of girder, at bent 7	7	Cracking (PSC)	6				
3	Girder 4	at end of girder, at bent 2	2	Cracking (PSC)	6					7	Girder 3	South Face, at bent 6	6	Spall	1	1	0.5		
3	Girder 4	at end of girder, at bent 2	2	Cracking (PSC)	6					7	Girder 3	End of girder, at bent 7	7	Cracking (PSC)	6				
3	Girder 5	bottom flange, at end of girder, at bent 2	2	Exposed Rebar	3	3	0.5			7	Girder 4	Diagonal crack, South face at bent 6	6	Cracking (PSC)	1				
3	Girder 5	Top flange, at end of girder, at bent 3	3	Spall	2.5	2.5	0.5			7	Girder 4	End of girder, at bent 6	6	Cracking (PSC)	6				
3	Girder 5	at end of girder, at bent 2	2	Cracking (PSC)	6					7	Girder 4	End of girder, at bent 7	7	Cracking (PSC)	6				
4	Girder 1	bottom flange, at end of girder, at bent 3	3	Exposed Rebar	2	2.75	0.5			7	Girder 5	End of girder, at bent 6	6	Cracking (PSC)	6				
4	Girder 1	at end of girder, at bent 3	3	Cracking (PSC)	6					7	Girder 5	End of girder, at bent 7	7	Cracking (PSC)	6				
4	Girder 1	at end of girder, at bent 4	4	Cracking (PSC)	6					8	Deck	Top of deck, 10' from left bridge rail	7	Spall	3.5	1	0.5		
4	Girder 2	bottom flange, at end of girder, at bent 3	3	Exposed Rebar	1.5	0.75	0.5			8	Girder 1	End of girder, at bent 8	8	Cracking (PSC)	6				
4	Girder 2	at end of girder, at bent 3	3	Cracking (PSC)	6					8	Girder 1	End of girder, at bent 7	7	Cracking (PSC)	6				
4	Girder 2	at end of girder, at bent 4	4	Cracking (PSC)	6					8	Girder 2	South face, at bent 7	7	Spall	2	1	0.5		
4	Girder 3	at end of girder, at bent 4	4	Exposed Rebar	3	2.75	0.5			8	Girder 2	North face, at bent 7	7	Spall	1	1	0.5		
4	Girder 3	at end of girder, at bent 3	3	Cracking (PSC)	6					8	Girder 2	End of girder, at bent 8	8	Cracking (PSC)	6				
4	Girder 4	North face, at bent 3	3	Spall	0.75	0.75	0.5			8	Girder 2	End of girder, at bent 7	7	Cracking (PSC)	6				
4	Girder 4	Bottom flange at bent 3	3	(x2) Exposed Rebar	4	1	0.5			8	Girder 3	End of girder, at bent 7	7	Cracking (PSC)	6				
4	Girder 4	at end of girder, at bent 4	4	Exposed Rebar	2	1	0.5			8	Girder 3	End of girder, at bent 8	8	Cracking (PSC)	6				
4	Girder 4	at end of girder, at bent 3	3	Cracking (PSC)	6					8	Girder 4	North face, bottom flange at beam end	7	Cracking (PSC)	2.25				
4	Girder 4	at end of girder, at bent 4	4	Cracking (PSC)	6					8	Girder 4	North face at bent 7	7	(x2) Spall	3.5	1	0.5		
4	Girder 5	at end of girder, at bent 3	3	Spall	1.5	1	0.5			8	Girder 4	North face at bent 8	8	Spall	1.25	1	0.5		
4	Girder 5	at end of girder, at bent 4	4	Spall	1.5	1.5	0.5			8	Girder 4	South face at bent 8	8	Spall	1	1	0.5		
5	Girder 1	Top flange, at end of girder, at bent 4	4	Spall	2.5	2.5	0.5			8	Girder 4	End of girder, at bent 7	7	Cracking (PSC)	6				
5	Girder 1	at end of girder, at bent 5	5	Cracking (PSC)	6					8	Girder 4	End of girder, at bent 8	8	Cracking (PSC)	6				
5	Girder 2	Bottom flange, end of girder, at bent 4	4	Exposed Rebar	1.5	1.75	0.5			8	Girder 5	End of girder, at bent 8	8	Spall	1	1	0.5		
5	Girder 2	at end of girder, at bent 5	5	Cracking (PSC)	6					8	Girder 5	End of girder, at bent 7	7	Cracking (PSC)	6				
5	Girder 2	at end of girder, at bent 5	5	Cracking (PSC)	6					9	Deck	35' from bent 9, 1' from right bridge rail	9	Unsound Patched Area	1.5	1.5	0.5		
5	Girder 3	at end of girder, at bent 4	4	Cracking (PSC)	6					9	Girder 1	South face, at beam end, at Bent 8	8	Spall	1.5	1	0.75		
5	Girder 3	At end of Girder at bent 4	4	Cracking (PSC)	6					9	Girder 1	Southwest corner at end of girder at bent 8	8	Spall	1	1.5	0.75		
5	Girder 3	At end of Girder at bent 5	5	Cracking (PSC)	6					9	Girder 2	End of girder at bent 8	8	Cracking (PSC)	6				

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013
SHEET 1 OF 2

NOTES:

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- COORDINATE THIS SHEET WITH "CONCRETE RESTORATION DETAILS" AND "SUPERSTRUCTURE CONCRETE REPAIRS" SHEETS.
- IF ADDITIONAL REPAIRS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE CORRESPONDING SHEET THE APPROXIMATE LOCATIONS AND THE DESCRIPTION OF THE REPAIRS, AND WILL ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITIES TABLE.
- FOR REPAIRS TO PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS

KCA 301 FAYETTEVILLE ST., SUITE 1500
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



3/28/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE REPAIRS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Brunswick #13									As-Built Quantities		Brunswick #13									As-Built Quantities	
Span #	Component	Location (ft. from nearest bent, etc)	Bent #	Defect Description	Length(ft.)	Width(ft.)	Depth(ft.)	Actual (C.F.)	Actual Depth (ft.)	Span #	Component	Location (ft. from nearest bent, etc)	Bent #	Defect Description	Length(ft.)	Width(ft.)	Depth(ft.)	Actual (C.F.)	Actual Depth (ft.)		
9	Girder 3	End of girder at bent 8	8	Cracking (PSC)	6					16	Girder 2	End of girder at bent 16	16	Cracking	6						
9	Girder 3	End of girder at bent 9	9	Cracking (PSC)	6					16	Girder 3	1' from end of beam at bent 16	16	(x2) Spalls	3	1	0.5				
9	Girder 4	End of girder at bent 9	9	Cracking (PSC)	6					16	Girder 3	End of girder at bent 15	15	Cracking	6						
9	Girder 5	South face over bent 8	8	(x2) Spall	3	1	0.5			16	Girder 3	End of girder at bent 16	16	Cracking	6						
9	Girder 5	North face at bent 8	8	Spall	1	1	0.5			16	Girder 4	End of girder at bent 15	15	Cracking	6						
9	Girder 5	End of girder at bent 8	8	Cracking (PSC)	6					16	Girder 4	End of girder at bent 16	16	Cracking	6						
9	Girder 5	End of girder at bent 9	9	Spall	1	1	0.5			16	Girder 5	End of beam, over bent 16	16	Spall	3.5	1.5	0.25				
10	Girder 1	2" from South face, at bent 10	10	Cracking (PSC)	2.5					16	Girder 5	Bottom of beam over bent 15	15	Spall	1	0.75	0.5				
10	Girder 1	South face, at bent 10	10	Spall	1.5	1.5	0.5			16	Girder 5	South face, 1' from bent 16	16	Exposed Rebar	1	0.75	0.5				
10	Girder 1	At end of girder, at bent 10	10	Cracking (PSC)	6					16	Girder 5	End of girder at bent 15	15	Cracking	6						
10	Girder 2	End of girder at bent 9	9	Cracking (PSC)	6					17	Deck	11' from left bridge rail	16	Spall	2	1.5	0.75				
10	Girder 3	End of girder at bent 9	9	Cracking (PSC)	6					17	Girder 1	South face, over bent 17	17	(x3) spall	4.5	1	0.5				
10	Girder 4	At end of girder, at bent 10	10	Cracking (PSC)	6					17	Girder 1	End of girder at bent 16	16	Cracking	6						
10	Girder 4	End of girder at bent 9	9	Spall	1.5	1	0.5			17	Girder 2	South face, over bent 16	16	(x2) Spalls	3	0.75	0.5				
10	Girder 5	North face, at bent 9	9	Spall	1.5	1	0.5			17	Girder 2	End of girder at bent 17	17	Cracking	6						
10	Girder 5	End of beam over bent 10	10	Cracking (PSC)	6					17	Girder 2	End of girder at bent 16	16	Cracking	6						
10	Girder 5	End of girder at bent 9	9	Cracking (PSC)	6					17	Girder 3	At beam end, at bent 16	16	Spall	1.5	1.5	0.5				
11	Girder 1	End of beam over bent 10	10	Cracking (PSC)	6					17	Girder 3	End of girder at bent 17	17	Cracking	6						
11	Girder 2	End of beam over bent 10	10	Cracking (PSC)	6					17	Girder 3	End of girder at bent 16	16	Cracking	6						
11	Girder 3	End of beam over bent 10	10	Spall	2.75	2.5	0.5			17	Girder 4	At end of beam over bent 17	17	Spall	1	0.75	0.5				
11	Girder 4	End of beam over bent 10	10	Cracking (PSC)	6					17	Girder 4	End of girder at bent 16	16	Cracking	6						
11	Girder 5	End of beam over bent 11	11	Spall	1.5	1	0.5			17	Girder 4	End of girder at bent 17	17	Cracking	6						
11	Girder 5	End of beam over bent 10	10	Spall	1.25	1	0.5			17	Girder 5	End of girder at bent 17	17	Cracking	6						
12	Deck	8' from left bridge rail, at bent 12	12	Unsound Patched Area	6.5	1				17	Girder 5	End of girder at bent 16	16	Cracking	6						
12	Girder 1	North and bottom face 20' from bent 12	12	Spall	1	0.75	0.75			18	Girder 1	End of girder at bent 17	17	Cracking	6						
12	Girder 3	South face at bent 11	11	Spall	3	1.5	1.5			18	Girder 1	End of girder at bent 18	18	Cracking	6						
12	Girder 1	At end of girder, at bent 13	13	Cracking (PSC)	6					18	Girder 2	At beam end, at bent 17	17	Spall	1	0.75	0.5				
13	Girder 2	Bottom of beam over bent 12	12	(x2) Spall	2	1	0.5			18	Girder 2	End of girder at bent 18	18	Cracking	6						
13	Girder 4	End of girder at bent 13	13	Cracking (PSC)	6					18	Girder 3	South face, at bent 17	17	(x2) Spalls	3	1	0.5				
13	Girder 5	North face, 3' from end of girder at bent 13	13	Spall	1.5	0.75	0.5			18	Girder 3	At beam end, at bent 17	17	Spall	1	0.75	0.5				
14	Girder 1	End of girder at bent 13	13	Spall	1.5	1	0.5			18	Girder 3	At end of girder, at bent 18	18	Cracking	6						
14	Girder 1	End of girder at bent 14	14	Spall	2	1.5	0.5			18	Girder 4	South face of beam, 1' from bent 18	18	Spall	1	1	0.5				
14	Girder 2	End of girder at bent 13	13	Cracking (PSC)	6					18	Girder 4	End of beam at bent 17	17	Spall	1	1	0.5				
14	Girder 2	End of girder at bent 14	14	Cracking (PSC)	6					18	Girder 4	End of beam at bent 18	18	Spall	1	1	0.5				
14	Girder 3	End of girder at bent 14	14	Cracking (PSC)	6					18	Girder 4	End of beam at bent 18	18	Cracking	6						
14	Girder 4	End of girder at bent 14	14	Cracking (PSC)	6					18	Girder 4	End of beam at bent 17	17	Cracking	6						
14	Girder 4	End of girder at bent 13	13	Cracking (PSC)	6					18	Girder 5	South face, near bent 18	18	(x3) spall	3	1	0.5				
14	Girder 5	End of girder at bent 13	13	Cracking (PSC)	6					18	Girder 5	End of beam at bent 18	18	Cracking	6						
14	Girder 5	End of girder at bent 14	14	Cracking (PSC)	6					19	Girder 1	At end of girder, at bent 19	19	Cracking	6						
15	Girder 1	End of girder at bent 15	15	Cracking	6					19	Girder 2	Bottom of beam at bent 19	19	Spall	1	1	0.5				
15	Girder 1	End of girder at bent 14	14	Cracking	6					19	Girder 3	South face, 1' from end of beam 3 at bent 18	18	Spall	1.5	1	0.5				
15	Girder 2	End of girder at bent 15	15	Cracking	6					19	Girder 4	Bottom of beam, 1' from bent 18	18	Spall	1	1	0.5				
15	Girder 3	End of girder at bent 14	14	Cracking	6					19	Girder 4	At end of girder at bent 19	19	Cracking	6						
15	Girder 3	End of girder at bent 15	15	Cracking	6					19	Girder 4	At end of girder at bent 18	18	Cracking	6						
15	Girder 4	South face at bent 14	14	Spall	1	1	0.5			19	Girder 5	At end of girder at bent 19	19	Cracking	6						
15	Girder 5	North face, at bent 14	14	(x2) Spall	3	1	0.5			20	Deck	East face of deck, 8' from left bridge rail		Spall	1.5	1.5	0.75				
15	Girder 4	End of girder at bent 14	14	Cracking	6					20	Girder 1	Bottom of beam, near bent 19	19	Spall	2	1	0.5				
15	Girder 4	End of girder at bent 14	14	Cracking	6					20	Girder 1	At end of girder at bent 19	19	Cracking	6						
15	Girder 4	End of girder at bent 15	15	Cracking	6					20	Girder 1	At end of girder at bent 20	20	Cracking	6						
16	Deck	11' from left bridge rail	16	Unsound Patched Area	3	1	0.5			21	Girder 3	Bottom face at bent 20	20	Exposed Rebar	1.5	1	0.5				
16	Girder 1	End of girder at bent 15	15	Cracking	6					21	Girder 4	South corner, end of beam at bent 20	20	Unsound Patched Area	1.5	1	1				
16	Girder 1	End of girder at bent 16	16	Cracking	6					21	Girder 5	Southwest corner at bent 20	20	Spall	1.5	0.75	0.75				
16	Girder 2	End of girder at bent 15	15	Cracking	6					21	Girder 5	South face at bent 20	20	Spall	1.5	0.75	0.5				

PROJECT NO. 15BPR.24
 BRUNSWICK COUNTY
 BRIDGE NO. 090013

SHEET 2 OF 2

NOTES:

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KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

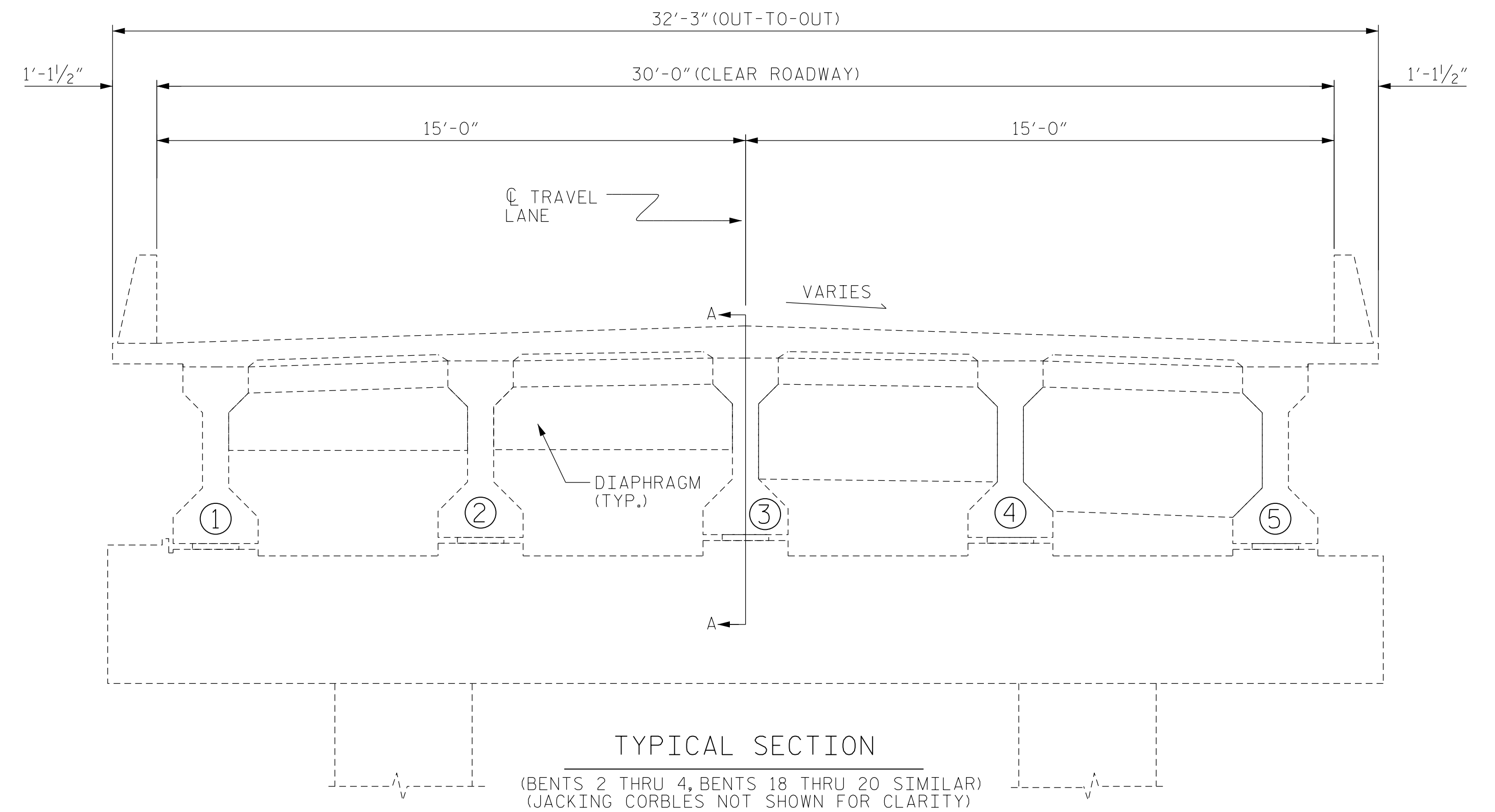
SUPERSTRUCTURE REPAIRS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			45

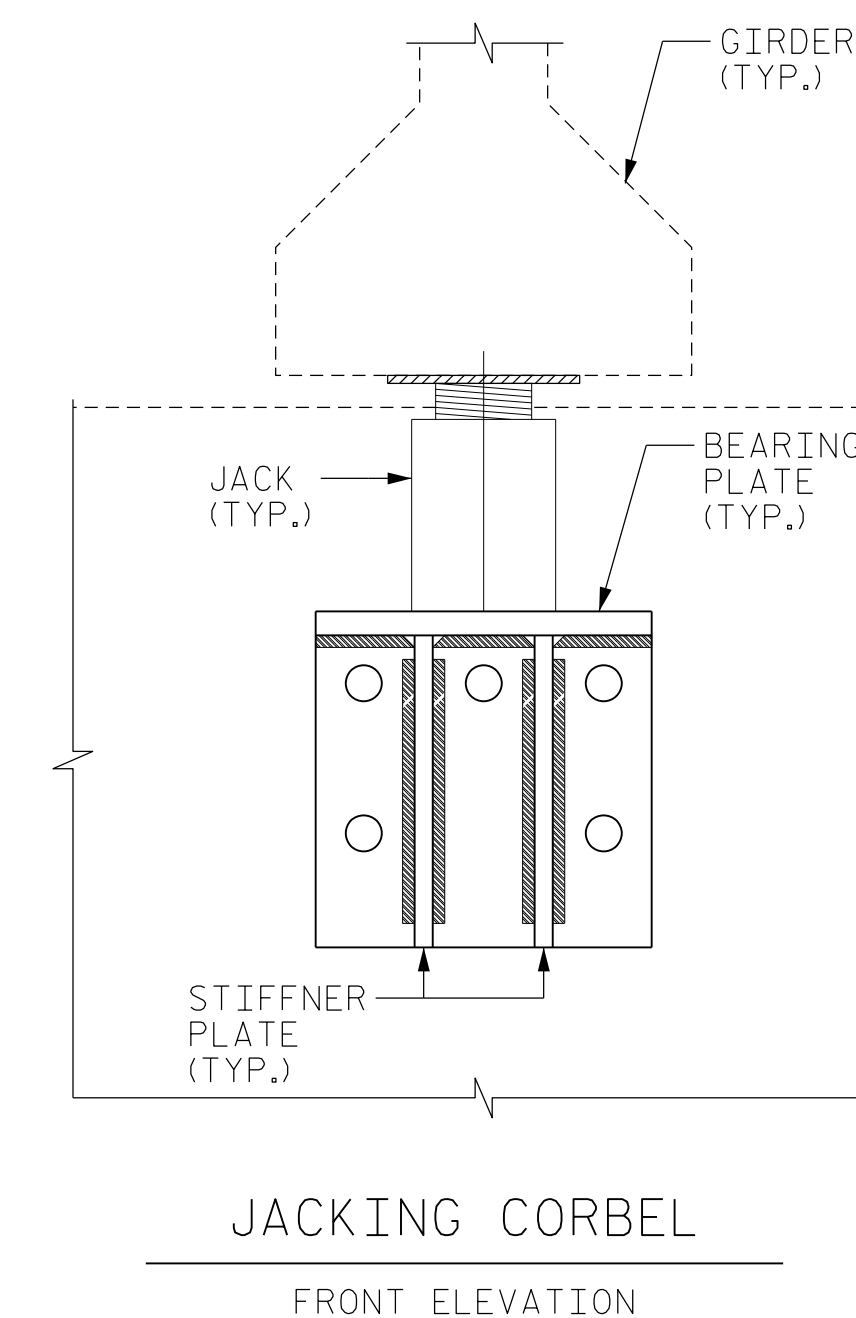
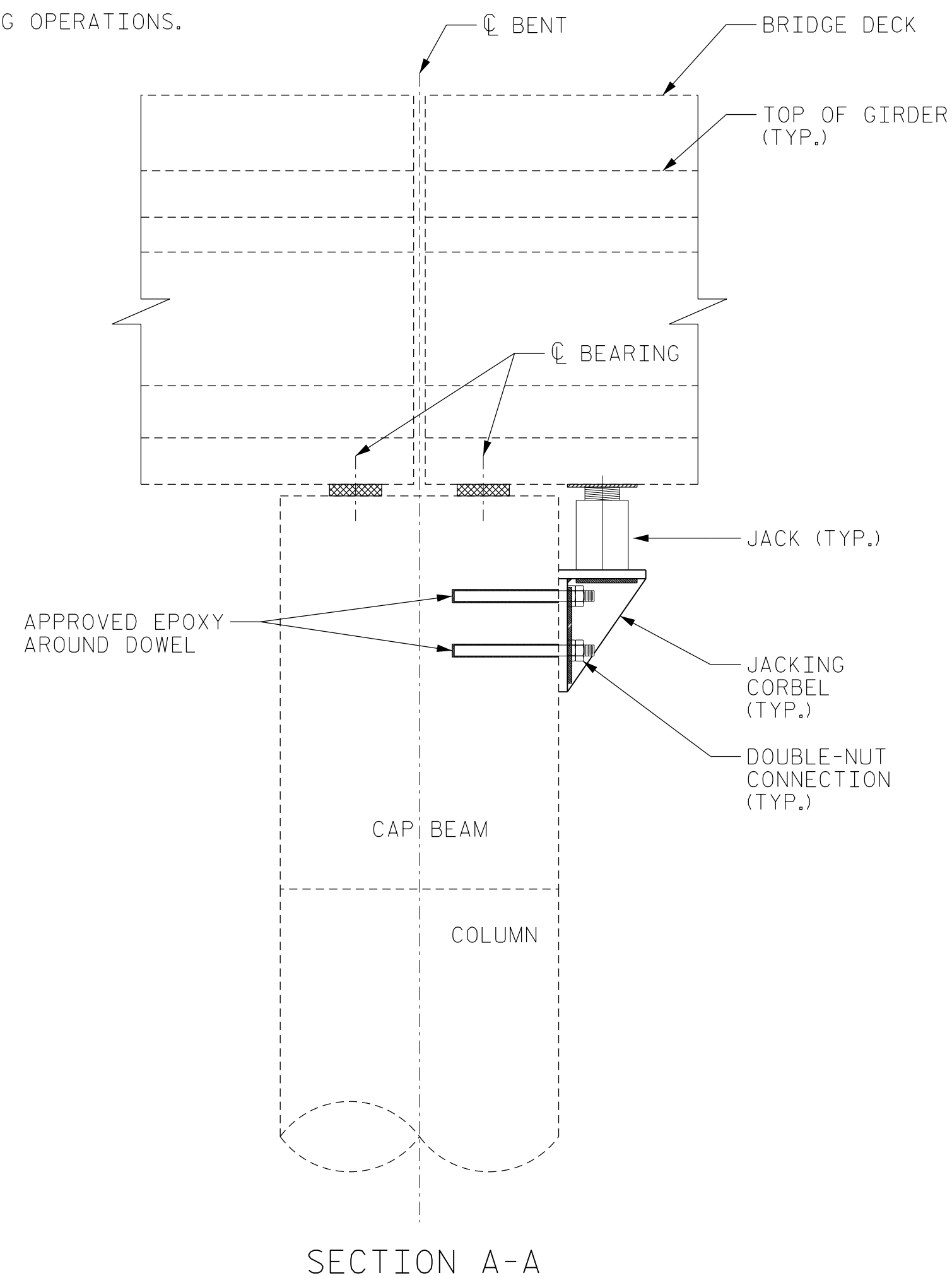
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

JACKING NOTES:

- THIS DETAIL IS A GENERIC EXAMPLE OF A JACKING SCHEME AND DOES NOT NECESSARILY REPRESENT SPECIFIC CONDITIONS AT A PARTICULAR BRIDGE. ACTUAL BRIDGE GEOMETRIES, DIMENSIONS AND CONDITIONS MAY DIFFER FROM THIS DETAIL. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL INVESTIGATE THE BRIDGE AND DEVELOP A PROPER STRENGTH JACKING SCHEME TO BE SUBMITTED FOR REVIEW.
- PRIOR TO BRIDGE JACKING OPERATIONS, THE ENGINEER AND CONTRACTOR SHALL INSPECT THE STRUCTURE FOR ANY NOTABLE DEFECTS TO THE PRIMARY AND SECONDARY STRUCTURAL MEMBERS. ALL NOTABLE DEFECTS SHALL BE DOCUMENTED AND REPORTED TO THE AREA BRIDGE MAINTENANCE ENGINEER PRIOR TO THE COMMENCEMENT OF BRIDGE JACKING. THE CONTRACTOR SHALL PROVIDE SAFE AND SUFFICIENT ACCESS TO ALL STRUCTURAL MEMBERS FOR THE ENGINEER TO ESTABLISH PROPER DOCUMENTATION.
- PRIOR TO JACKING, THE CONTRACTOR SHALL ENSURE THERE ARE NO OBSTACLES PREVENTING THE BEAM FROM BEING LIFTED.
- THE BEAMS SHALL BE LIFTED ENOUGH THAT THE BEAM CLEARS THE BEARINGS AND ALL LOAD IS SUPPORTED BY THE JACKS. AFTER JACKING IS COMPLETE, THE CONTRACTOR SHALL PROVIDE FOR A METHOD TO REMOVE THE JACKS AND SUPPORT THE BEAM FOR DEAD AND LIVE LOAD DURING THE REPAIR OPERATIONS. IF THE JACKS REMAIN IN PLACE DURING THE ENTIRE JACKING AND REPAIR OPERATION, THEY SHALL HAVE MECHANICAL LOCK OFF CAPABILITIES.
- IF, DURING THE JACKING PROCESS, OR WHILE THE BEAM IS BEING SUPPORTED, THE BEAM SHIFTS FROM ITS ORIGINAL POSITION, ALL WORK SHALL CEASE AND THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
- BEARINGS ADJACENT TO THE BEAM BEING JACKED MAY BE LOOSENED TO DECREASE THE RESISTANCE OF THE DECK SLAB DURING JACKING. ALL BEARINGS LOOSENED SHALL BE TIGHTENED BACK AFTER REPAIR OPERATIONS ARE COMPLETED AND THE JACKS AND BLOCKING HAVE BEEN REMOVED.
- THE MAXIMUM DIFFERENTIAL BETWEEN ADJACENT BEAMS THAT ARE BEING JACKED IS $\frac{1}{8}$ ".
- LOADS PROVIDED IN THE "BRIDGE JACKING TABLE" ARE SHOWN FOR INFORMATION PURPOSES ONLY. THE CONTRACTOR'S ENGINEER SHALL DETERMINE THE EXPECTED LOADS TO BE LIFTED DURING THE BRIDGE JACKING OPERATIONS.
- THE CONTRACTOR SHALL SUBMIT WORKING DRAWINGS AND CALCULATIONS OF THE JACKING PROCEDURE(S) SEALED BY A PROFESSIONAL ENGINEER IN THE STATE OF NORTH CAROLINA TO THE ENGINEER FOR APPROVAL PRIOR TO BRIDGE JACKING OPERATIONS.
- FOR TYPE I OR TYPE II BRIDGE JACKING, SEE SPECIAL PROVISIONS.
- FOR WORKING DRAWING SUBMITTALS, SEE SPECIAL PROVISIONS.
- TYPE II BRIDGE JACKING SHALL BE DONE WITH A HYDRAULIC JACKING SYSTEM THAT LIFTS EACH BEAM ALONG ENTIRE SPAN END WITH EQUAL FORCE AND AT AN EQUAL RATE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE CAUSED TO THE EXISTING STRUCTURE BY BRIDGE JACKING OPERATIONS AT NO ADDITIONAL COST TO THE DEPARTMENT.
- PRIOR TO JACKING, LOOSEN ANY ATTACHMENTS TO ALLOW MOVEMENT AND COMPLETE ALL JOINT AND BARRIER SAWCUTS.
- JACKS SHALL BE IN FULL COMPLIANCE WITH ANSI B30.1.
- A PRE-JACKING MEETING SHALL BE REQUIRED BETWEEN THE CONTRACTOR, THE UTILITY REPRESENTATIVE, AND THE ENGINEER PRIOR TO ANY JACKING OPERATIONS.
- THE CONTRACTOR SHALL BE AWARE OF UTILITY CONDUITS THROUGHOUT BRIDGE AND SHALL MAKE ARRANGEMENTS FOR JACKING OPERATIONS. A UTILITY REPRESENTATIVE SHALL BE ON SITE DURING JACKING OPERATIONS.



PRELIMINARY JACKING LOADS				
SPAN 2 & 3	BEAM	FACTORED DEAD LOAD (KIPS)	FACTORED LIVE LOAD NO IMPACT (KIPS)	MIN. JACK CAPACITY LIVE & DEAD LOAD (TONS)
	EXTERIOR	110	120	120
	INTERIOR	110	160	140
SPAN 18 & 20	BEAM	FACTORED DEAD LOAD (KIPS)	FACTORED LIVE LOAD NO IMPACT (KIPS)	MIN. JACK CAPACITY LIVE & DEAD LOAD (TONS)
	EXTERIOR	110	120	120
	INTERIOR	110	160	140
NOTES: DL FACTOR: 1.25 LL FACTOR: 1.75				



PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013



DocuSigned by:
Jacob H. Duke
3/28/2019

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
JACKING DETAILS					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					TOTAL SHEETS 45

KCA 301 FAYETTEVILLE ST., SUITE 1500
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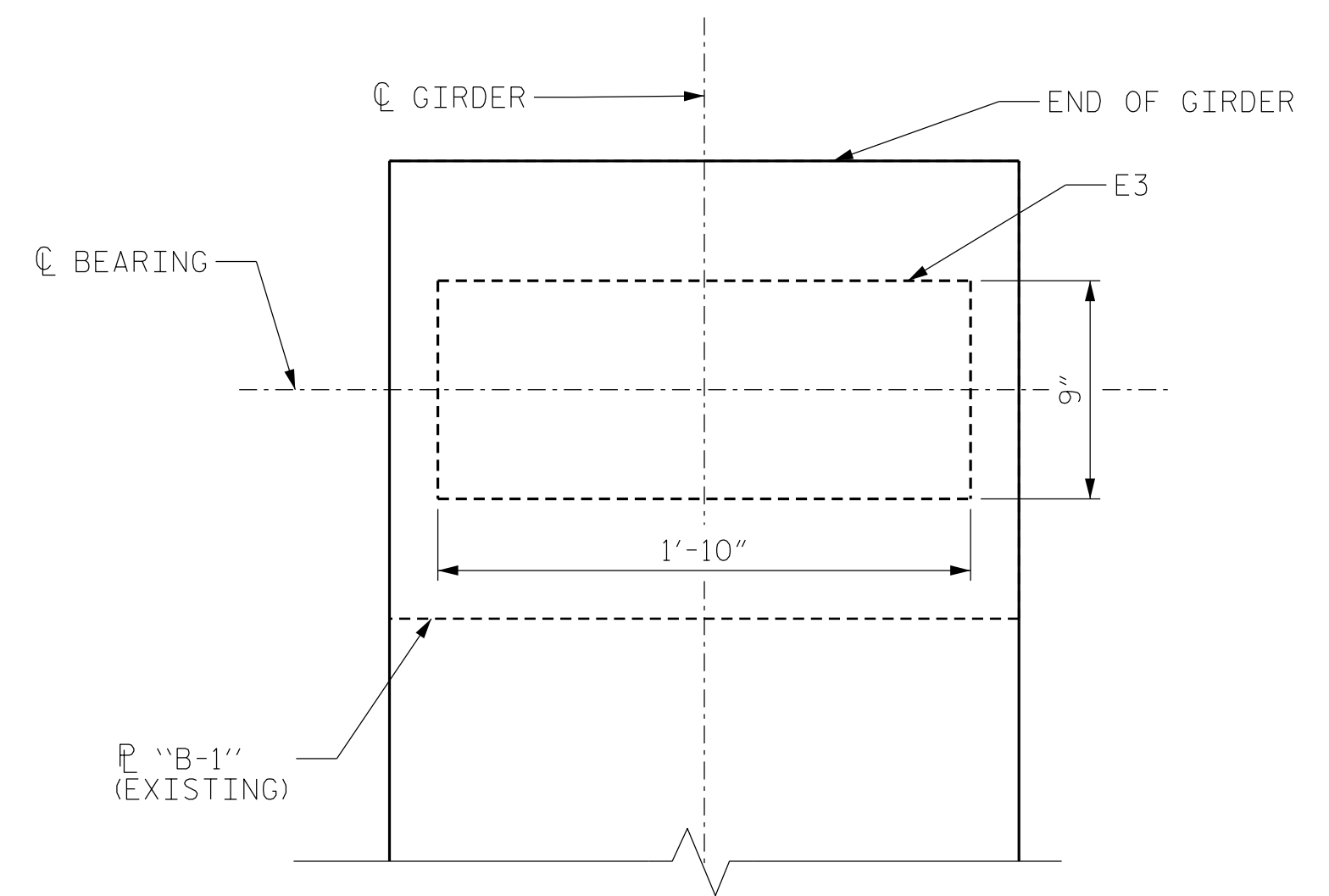
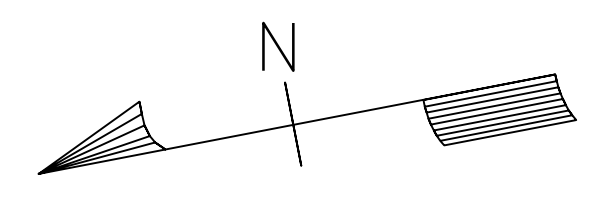
DRAWN BY : DIEGO A. AGUIRRE DATE : 10/2018
 CHECKED BY : JACOB H. DUKE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k

NOTES:

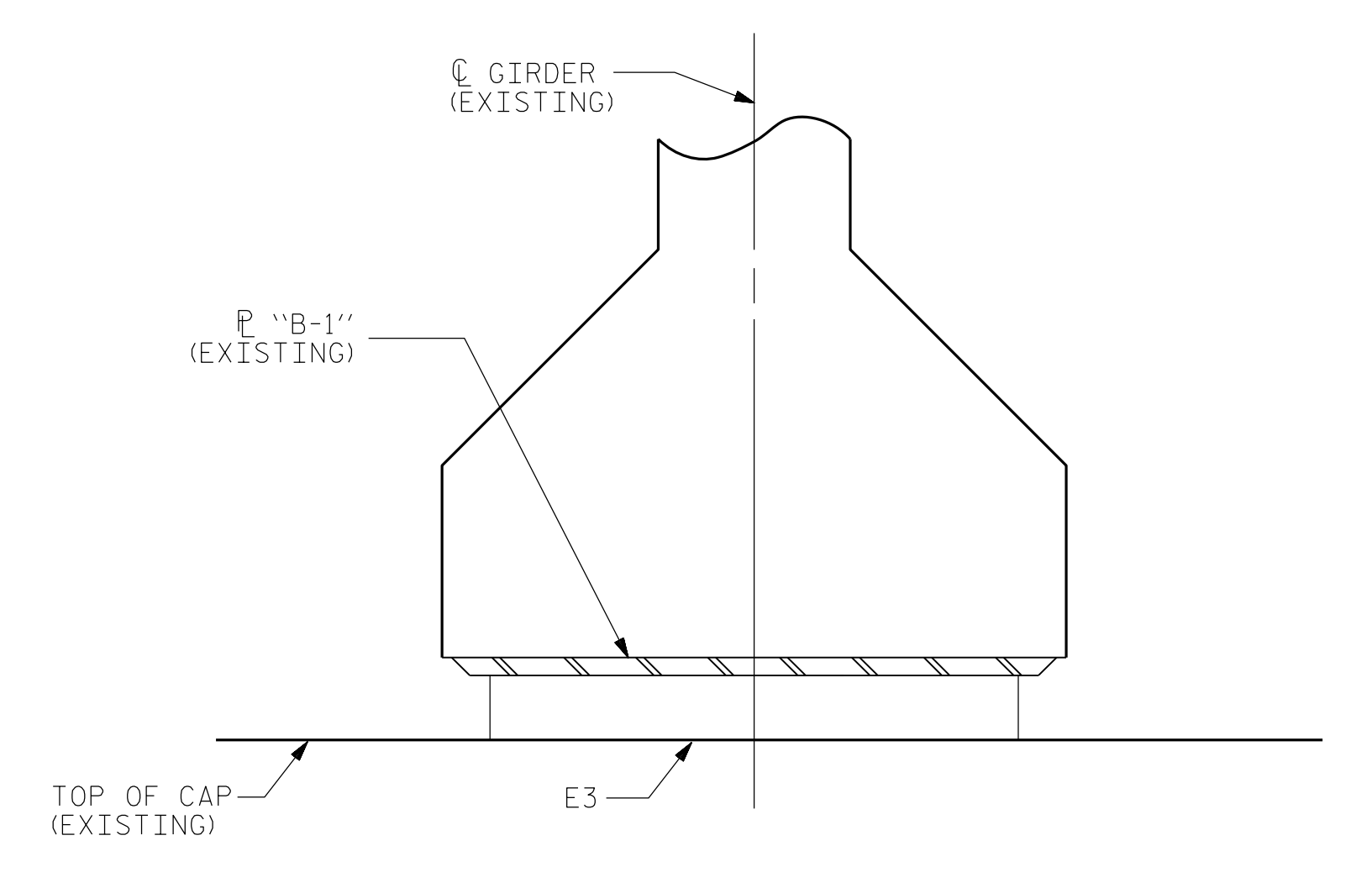
1. THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.
2. FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE STANDARD SPECIFICATIONS AND PROJECT SPECIAL PROVISIONS.
3. FOR BRIDGE JACKING, SEE JACKING DETAILS SHEET.

BEARING REPLACEMENT TABLE					
SPAN	BENT	BEARING	TYPE	"T"	ELASTOMER VOLUME (CU. IN.)
2	2	1	E3	2 ⁵ / ₁₆ "	458
2	2	5	E3	2 ⁵ / ₁₆ "	458
3	3	2	E3	2 ⁵ / ₁₆ "	458
18	18	1	E3	2 ⁵ / ₁₆ "	458
20	20	4	E3	2 ⁵ / ₁₆ "	458
20	20	5	E3	2 ⁵ / ₁₆ "	458

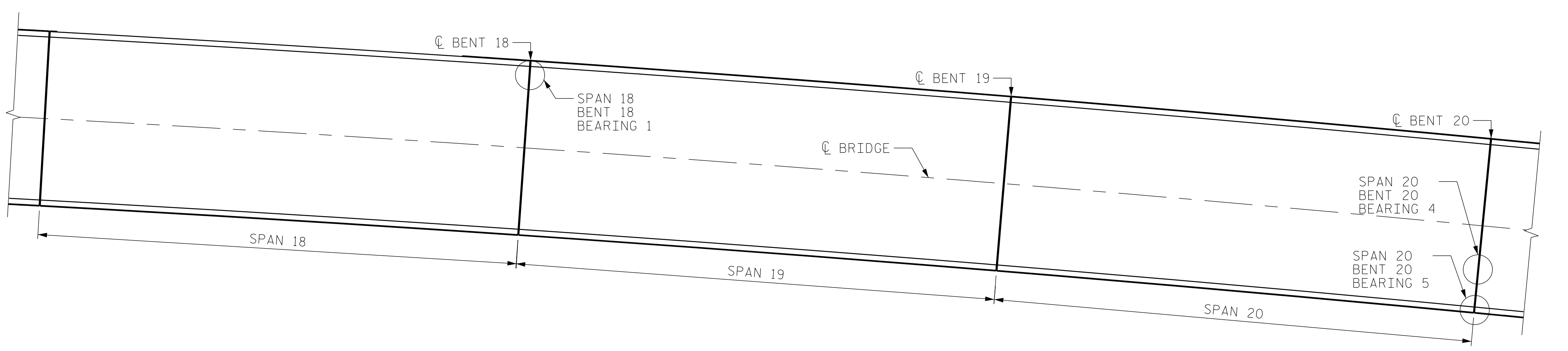
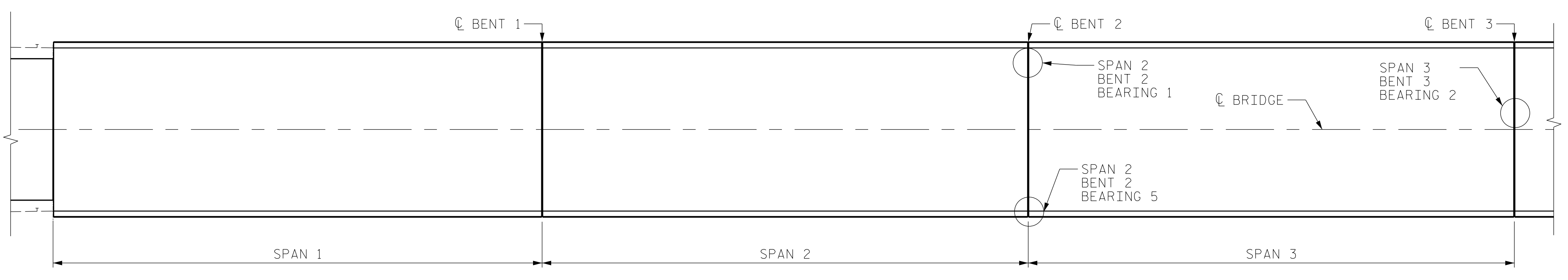


TYPICAL PLAN VIEW OF ELASTOMERIC BEARING

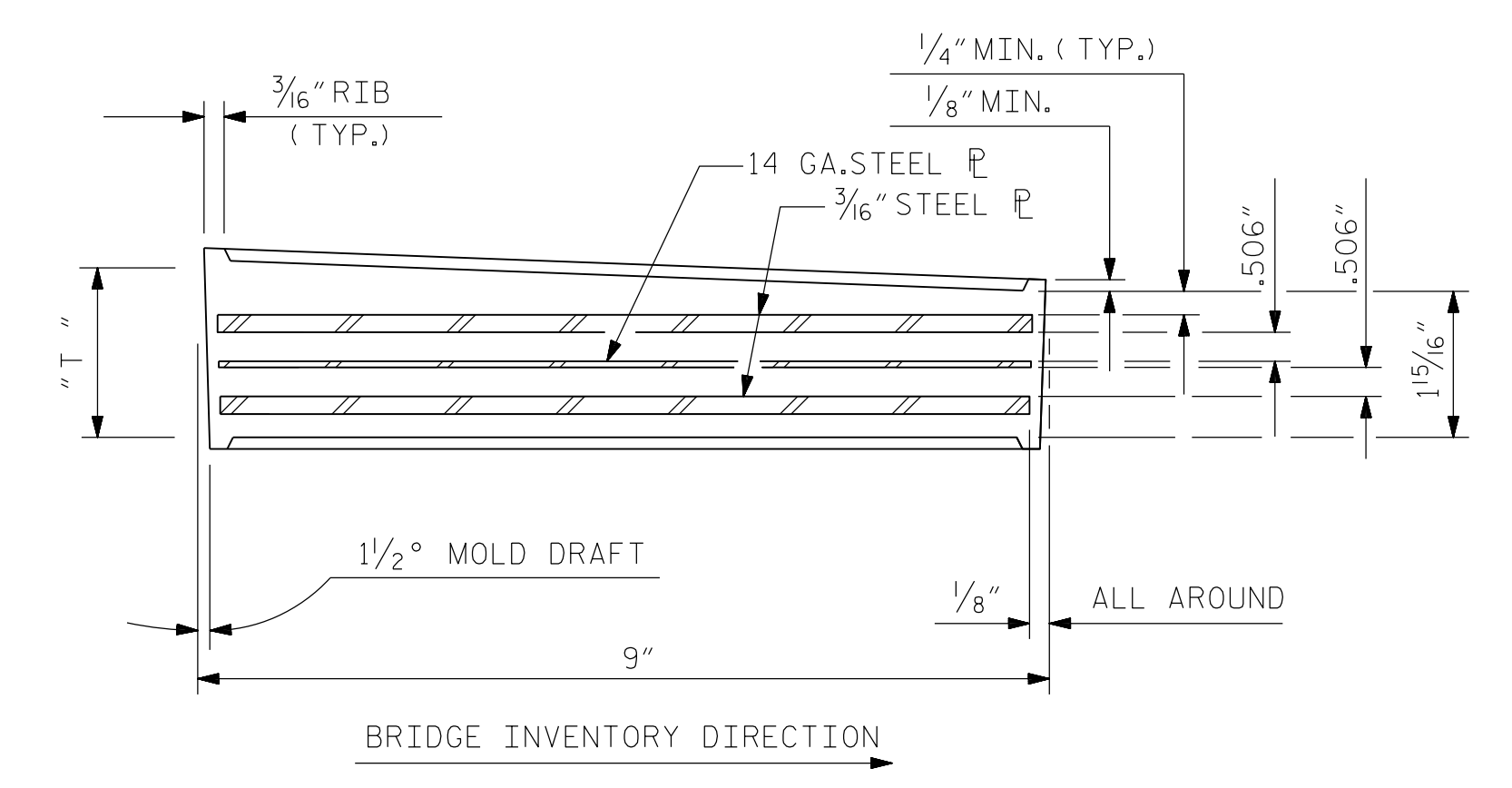
(CAP NOT SHOWN)
 SPAN 2, BENT 2, BRG. 1 (1 REQ'D)
 SPAN 2, BENT 2, BRG. 5 (1 REQ'D)
 SPAN 3, BENT 3, BRG. 2 (1 REQ'D)
 SPAN 18, BENT 18, BRG. 1 (1 REQ'D)
 SPAN 20, BENT 20, BRG. 4 (1 REQ'D)
 SPAN 20, BENT 20, BRG. 5 (1 REQ'D)



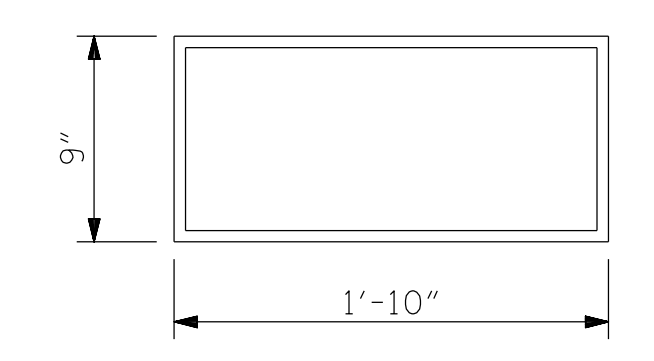
EXPANSION BEARINGS



REPLACEMENT BEARING LOCATIONS
 (PLAN OF SPANS 1 THRU 3 AND 18 THRU 20)

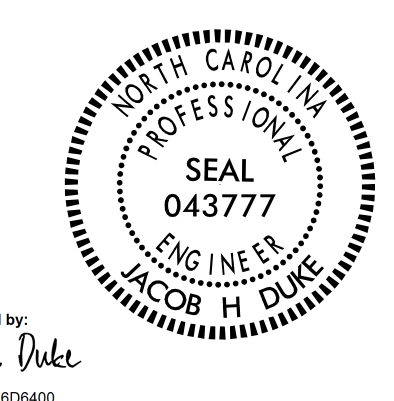


TYPICAL SECTION OF ELASTOMERIC BEARINGS



E3 (6 REQ'D)
 PLAN VIEW OF ELASTOMERIC BEARING
 TYPE IV (EXPANSION BEARING)

PROJECT NO. 15BPR.24
 BRUNSWICK COUNTY
 BRIDGE NO. 090013



Designed by:
 Jacob H. Duke
 3/28/2019

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

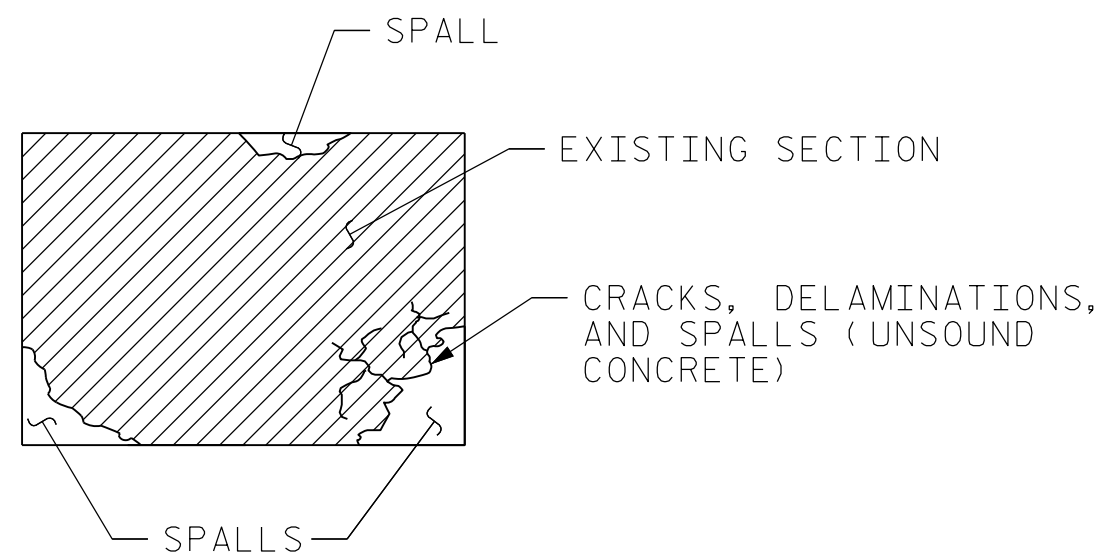
**BEARING REPLACEMENT
 DETAILS**

KCA 301 FAYETTEVILLE ST., SUITE 1500
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 (919) 882-7839
 LICENSE #: C-1506

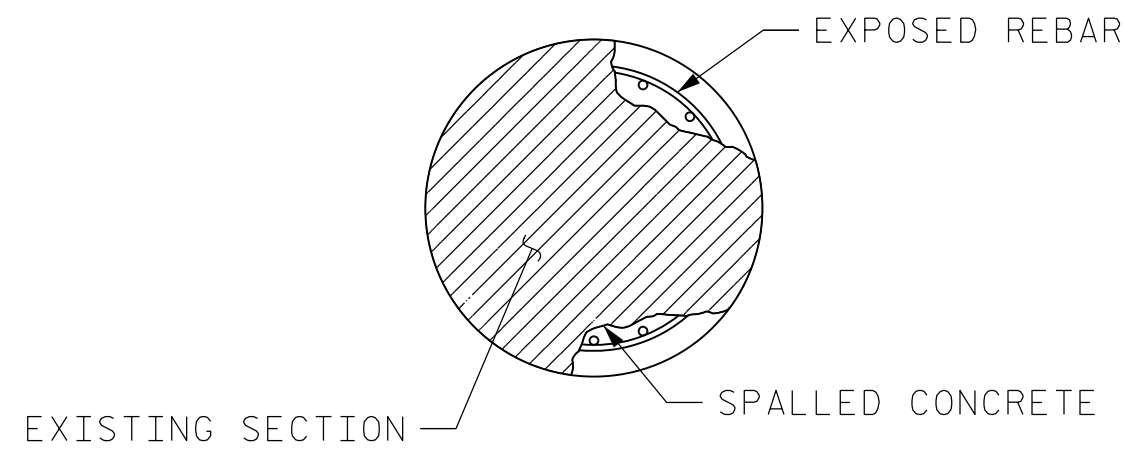
DRAWN BY : DIEGO A. AGUIRRE DATE : 10/2018
 CHECKED BY : JACOB H. DUKE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-18
2			4			TOTAL SHEETS 45

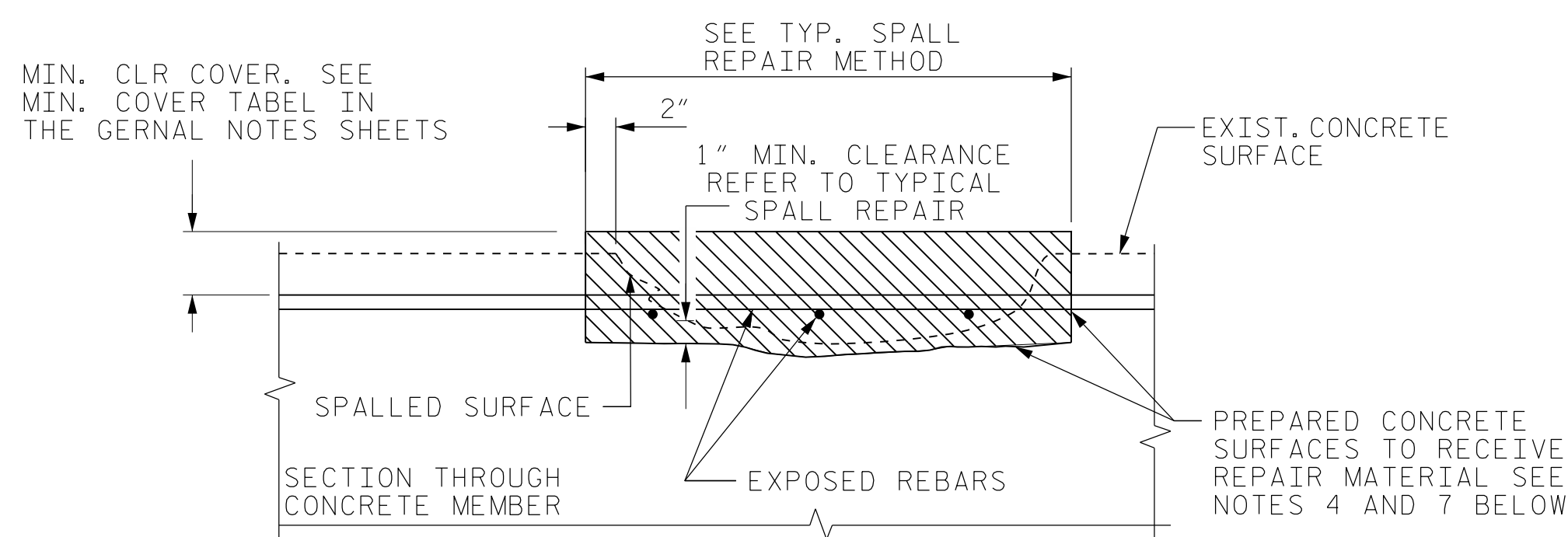
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TYPICAL DELAMINATIONS AND SPALLS

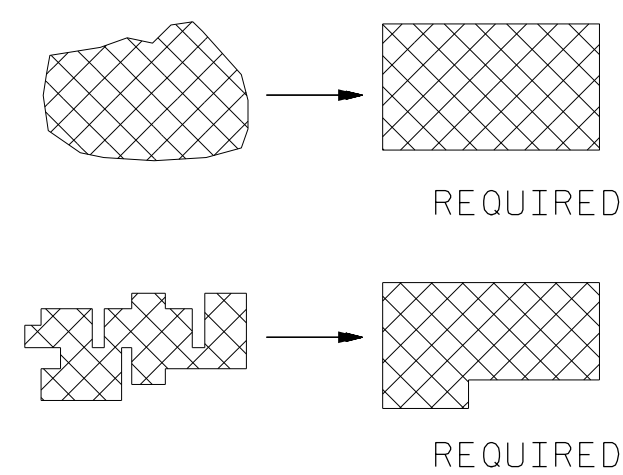


TYPICAL SPALL WITH EXPOSED REBAR



EXPOSING AND UNDERCUTTING REINFORCING STEEL

APPLICABLE TO HORIZONTAL, VERTICAL, AND OVERHEAD LOCATIONS



SIMPLE PATCH CONFIGURATION

AT CORNER LOCATIONS PROVIDE RIGHT ANGLE CUTS. PATCH CONFIGURATION SHALL BE KEPT AS SIMPLE AS POSSIBLE. INDIVIDUAL REPAIR AREAS WITHIN 2 FEET SHALL BE JOINED AT THE DIRECTION OF THE ENGINEER.

TYPICAL SPALL REPAIR

- FOR CONCRETE RESTORATION, REMOVE AND REPAIR UNSOUND CONCRETE FROM AREAS TO BE REPAIRED IN ACCORDANCE WITH THIS SHEET AND THE PROJECT SPECIAL PROVISIONS. AREAS WELL ADHERED TO EXISTING STRAND OR REINFORCEMENT SHALL REMAIN.
- ALL UNSOUND CONCRETE MUST BE REMOVED. HOWEVER, PRESTRESSED STRANDS SHOULD NOT BE DISTURBED UNLESS ABSOLUTELY NECESSARY. USE EXTREME CARE TO NOT DAMAGE STRANDS.
- ALL REPAIRS SHALL BE MARKED FOR APPROVAL OF APPROXIMATE PERIMETER PRIOR TO INITIATION OF WORK.
- THE CONTRACTOR SHALL SUBMIT A PLAN FOR CONTROL AND DISPOSAL OF DEBRIS TO THE ENGINEER FOR APPROVAL.
- ANY REINFORCEMENT WHICH IS LOOSE SHALL BE SECURED IN PLACE BY TYING TO OTHER SECURED BARS OR BY OTHER APPROVED METHODS. LAP SPLICES SHALL BE INSTALLED IN ACCORDANCE WITH THE TABLE BELOW. REFER TO GENERAL NOTES FOR DOWEL DETAIL (IF NECESSARY).
- CLEAN EXPOSED REBARS AND ANY LOOSE CONCRETE OR ABRASIVES BY SANDBLASTING OR APPROVED ALTERNATE. CLEANED STEEL SHALL NOT BE LEFT EXPOSED FOR MORE THAN 72 HOURS PRIOR TO ENCAPSULATION OF CONCRETE.
- AN APPROVED CEMENTITIOUS BASED BONDING AGENT SHALL BE USED ON ALL EXPOSED CONCRETE SURFACES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS BEFORE THE REPAIR MATERIAL IS APPLIED.
- FILL VOIDS WITH REPAIR MATERIAL IN ACCORDANCE WITH THE PROJECT SPECIAL PROVISIONS AND NCDOT SPECIFICATIONS. NOTE THAT ANY REPAIR MATERIAL APPLIED TO OVERHEAD LOCATIONS SHALL BE SPECIFICALLY DESIGNATED FOR OVERHEAD USE BY THE MANUFACTURER'S SPECIFICATIONS.

TYPICAL CRACK REPAIR

- OBTAIN ENGINEER'S APPROVAL TO CARRY OUT CRACK REPAIR (IN LIEU OF SPALL REPAIR) FOR CASES WHERE ADJACENT CONCRETE IS OTHERWISE SOUND AND CRACKING IS NOT A RESULT OF CORRODING REINFORCEMENT.
- ADDRESS CRACKS IN NEW CONSTRUCTION IN ACCORDANCE WITH PROJECT SPECIAL PROVISIONS. ADDRESS EXISTING CRACKS IN ACCORDANCE WITH THIS SHEET AND PROJECT SPECIAL PROVISIONS.
- REMOVE UNSOUND CONCRETE FROM CRACK AREA.
- THE CONTRACTOR SHALL SUBMIT A PLAN FOR CONTROL AND DISPOSAL OF DEBRIS TO THE ENGINEER FOR APPROVAL.
- FOR CRACKS UP TO 1/8" USE AN EPOXY RESIN WITH MINIMUMS OF VISCOSITY OF 325 CPS, 28 DAY COMPRESSIVE STRENGTH OF 13000 PSI. FOR CRACKS 1/8" TO 1/4", USE AN INJECTION GEL OR EQUAL NON-SAG PASTE WITH 28 DAY COMPRESSIVE STRENGTH OF 10000 PSI.
- TO SEAL CRACK SURFACES PRIOR TO CRACK INJECTION, USE INJECTION GEL WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 12000 PSI.
- ENGINEER TO APPROVE CRACK AND CAP SEAL MATERIAL PRIOR TO BEGINNING OF CONSTRUCTION.
- APPLY CLASS II FINISH AT COMPLETION OF CRACK REPAIR TO REMOVE FINS OR KNOBS.

RC GIRDER REPAIR

- SOUND CONCRETE TO DETERMINE EXTENTS OF REPAIR LOCATION.
- IF AFTER UNSOUND CONCRETE REMOVAL ON GIRDERS, MORE THAN 50% SECTION LOSS IS NOTED ON THE REBAR, OR IF SEVERED REBAR IS ENCOUNTERED, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONCRETE REPAIR.
- REMOVE SURFACE CONCRETE TO VERIFY THAT SAW CUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL. SAW CUT AROUND REPAIR AREA TO A NOMINAL DEPTH OF 1/2".
- REMOVE CONCRETE WITHIN SAW CUT AREA TO A MINIMUM 1/2" DEPTH. IF CONCRETE IS DAMAGED BEYOND THE ORIGINAL SAW CUT, A NEW SAW CUT IS REQUIRED.
- IF MORE THAN HALF THE CIRCUMFERENCE OF A REINFORCING BAR IS EXPOSED DURING THIS PROCESS, REMOVE ADDITIONAL CONCRETE TO 1" BEHIND THE BAR.
- CLEAN ALL EXPOSED REINFORCING BARS. FOR BARS WITH MORE THAN 10% SECTION LOSS, SPLICE AND SECURELY TIE SUPPLEMENTAL REINFORCING BARS AS NEEDED.
- REMOVE ALL LOOSE OR WEAKENED MATERIAL THEN CLEAN THE REPAIR AREA OF DIRT, GREASE, OIL, AND FOREIGN MATTER.
- PREPARE SURFACE AND PLACE APPROVED PREPACKAGED MATERIAL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. MAXIMUM AGGREGATE SIZE FOR REPAIR MATERIAL SHALL NOT EXCEED 2/3 THE MINIMUM REPAIR DEPTH.
- FOR GIRDER REPAIRS, SEE SPECIAL PROVISION FOR CONCRETE REPAIRS AND SEE "SUPERSTRUCTURE REPAIRS" SHEETS.

CONCRETE REPAIR NOTES

- PERFORM A SOUNDING SURVEY IN THE PRESENCE OF THE ENGINEER TO IDENTIFY ALL LOCATIONS IN NEED OF CONCRETE REPAIR.
- GAIN CONCURRENCE ON ALL REPAIR AREAS AT EACH LOCATION PRIOR TO COMMENCING WORK AT THE BENT.
- THE DETERIORATED AREAS SHOWN ON OTHER PAGES ARE BASED ON BRIDGE INSPECTION REPORT, AND PARTIAL FIELD REVIEWS OF THE STRUCTURE. AS SUCH, THEY ARE FOR INFORMATIONAL PURPOSES AND SUBJECT TO CHANGE BASED ON CONTINUING DETERIORATION.
- GENERALLY EXTEND REPAIR AREAS 2"-3" INTO SOUND CONCRETE BEYOND EDGE OF SPALLS AND SQUARE OFF AREAS IN ACCORDANCE WITH DETAILS ON THIS SHEET.
- THE METHOD USED TO DELINEATE THE AREAS OF UNSOUND CONCRETE TO BE REPAIRED SHALL NOT PERMANENTLY MARK THE CONCRETE, LEAVE ANY RESIDUE AFTER REMOVAL, OR REQUIRE HARSH CHEMICALS TO REMOVE.
- THE CONTRACTOR SHALL REMOVE THE DETERIORATED CONCRETE IN ACCORDANCE WITH THE GUIDELINES SET IN THESE NOTES, IN THE PROJECT SPECIAL PROVISIONS, AND THE STANDARD SPECIFICATIONS.
- REMOVE UNSOUND CONCRETE TO THE EXTENT NECESSARY. MINIMUM OF 1" BEHIND REBAR AND MINIMUM OF 2" CLEARANCE TO SAWCUT.
- REINFORCING STEEL, WHICH IS DETERMINED BY THE ENGINEER TO BE REPLACED, SHALL BE REMOVED TO A POINT WHERE IT IS SOUND. THE PATCH SHALL EXTEND A SUFFICIENT DISTANCE BEYOND THIS POINT TO DEVELOP A SPLICE LENGTH SPECIFIED IN THE TABLE ON THIS SHEET.
- FOR REPAIRS OVER TRAFFIC AND SHALLOW REPAIRS THAT DO NOT ENGAGE REINFORCEMENT, ANCHOR PATCH MATERIAL USING 1/4" GALVANIZED BOLTS, EPOXY ANCHORED WITH 2" EMBEDMENT. PLACE BOLTS IN A 6" GRID. USE A LATEX OR EPOXY PATCH MATERIAL FOR IMPROVED BOND.
- FOR ADHESIVELY ANCHORED DOWELS OR ANCHOR BOLTS, SEE STANDARD SPECIFICATIONS.
- FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.
- FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.
- FOR EPOXY RESIN INJECTION (ERI), SEE SPECIAL PROVISIONS.
- FOR SUPERSTRUCTURE REPAIRS SEE "SUPERSTRUCTURE REPAIRS" SHEETS.
- FOR SUBSTRUCTURE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3 AND "SUBSTRUCTURE CONCRETE REPAIRS" SHEETS.

CONCRETE REPAIR SCHEDULE	
REPAIR AREA	APPROVED MATERIAL
BEAMS	CONCRETE REPAIRS (RC GIRDERS)
SUBSTRUCTURE	"FORM AND POUR" CONCRETE REPAIR, SHOTCRETE, OR CONTRACTOR OPTION

LAP SPLICE TABLE	
REBAR SIZE	LAP SPLICE LENGTH
4	1'-9"
5	2'-2"
6	2'-7"
7	3'-6"
8	4'-6"
9	5'-10"
10	7'-4"

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

SHEET 1 OF 3



DocuSigned by:
Jacob H. Duke
SC093AD0606400

3/28/2019

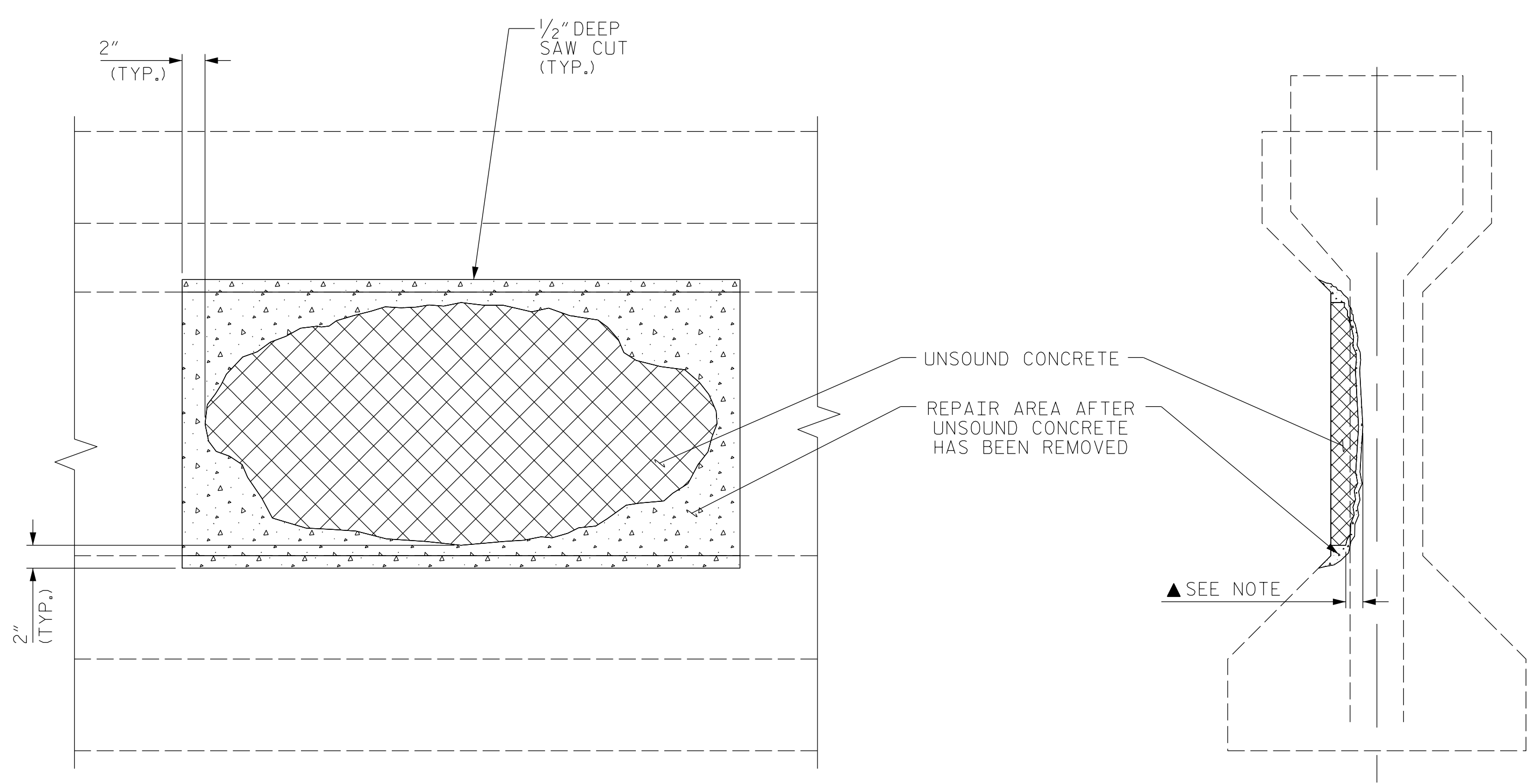
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**CONCRETE RESTORATION
 DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			45

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KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : JACOB H. DUKE DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



ELEVATION

SECTION

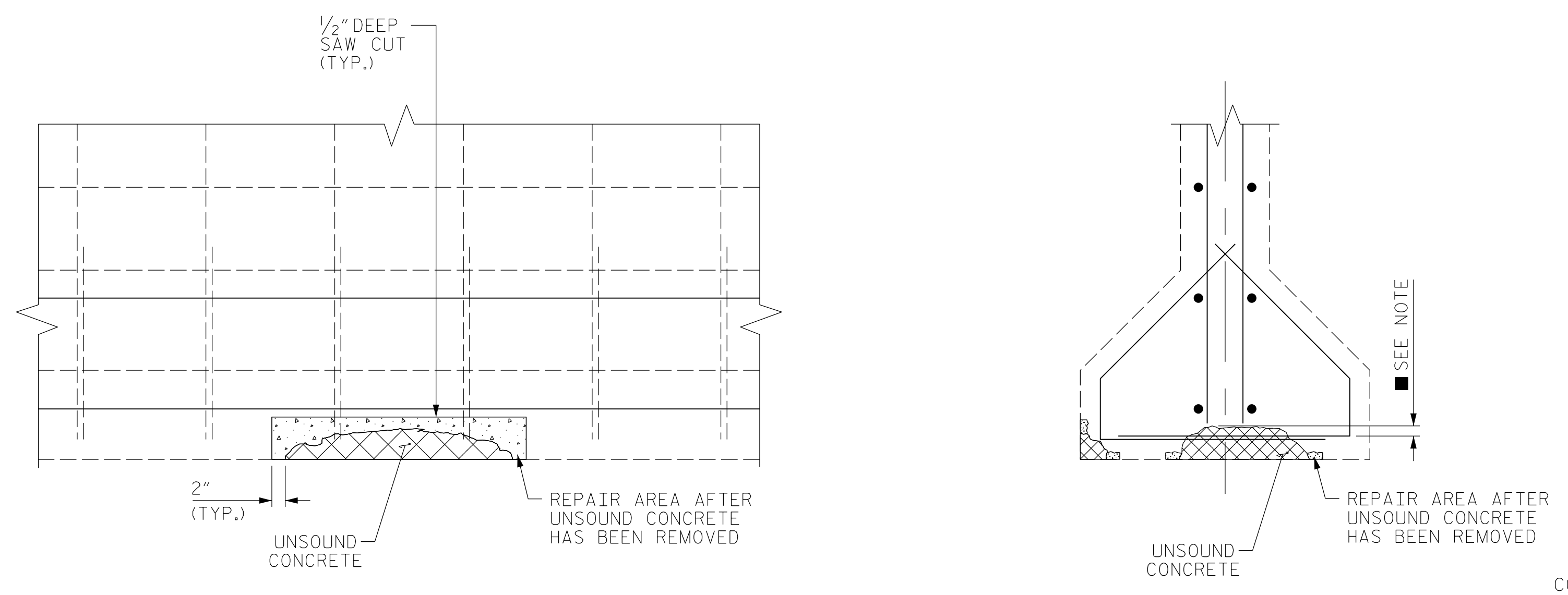
GIRDER WEB REPAIR

PRESTRESSED GIRDER REPAIR SEQUENCE:

1. SOUND CONCRETE TO DETERMINE EXTENTS OF REPAIR LOCATION (PHOTO REQUIRED).
2. REMOVE SURFACE CONCRETE TO VERIFY THAT SAW CUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL. SAW CUT AROUND REPAIR AREA TO A NOMINAL DEPTH OF 1/2".
3. REMOVE CONCRETE WITHIN SAW CUT AREA TO MINIMUM DEPTH 1/2" DEPTH. IF CONCRETE IS DAMAGED BEYOND THE ORIGINAL SAW CUT, A NEW SAW CUT IS REQUIRED.
4. ▲ IF MORE THAN HALF THE CIRCUMFERENCE OF A REINFORCING BAR IS EXPOSED DURING THIS PROCESS, REMOVE ADDITIONAL CONCRETE TO 1" BEHIND THE BAR. THIS DOES NOT APPLY TO PRESTRESS STRANDS.
5. ■ ALL UNSOUND CONCRETE MUST BE REMOVED. HOWEVER, PRESTRESSED STRAND SHOULD NOT BE DISTURBED UNLESS ABSOLUTELY NECESSARY. USE EXTREME CARE TO NOT DAMAGE STRANDS.
6. CLEAN ALL EXPOSED REINFORCING BARS AND PRESTRESSED STRANDS. FOR BAR WITH MORE THAN 10% SECTION LOSS, SPLICE AND SECURELY TIE SUPPLEMENTAL REINFORCING BARS AS NEEDED. NOTE AND PROVIDE DETAILED DOCUMENTATION, INCLUDING LOCATION AND SEVERITY OF ALL DAMAGE TO PRESTRESSED STRANDS THAT EXCEEDS 10% SECTION LOSS. IF FIVE OR MORE STRANDS ARE DAMAGED, NOTIFY THE ENGINEER PRIOR TO PLACEMENT OF REPAIR MATERIAL.
7. REMOVE ALL LOOSE OR WEAKENED MATERIAL THEN CLEAN THE REPAIR AREA OF DIRT, GREASE, OIL, AND FOREIGN MATTER.
8. PREPARE SURFACE AND PLACE APPROVED MATERIAL ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. MAXIMUM AGGREGATE SIZE FOR REPAIR MATERIAL SHALL NOT EXCEED 2/3 THE MINIMUM REPAIR DEPTH.
9. FOR GIRDER REPAIRS, SEE PROJECT SPECIAL PROVISION FOR REPAIRS TO PRESTRESSED CONCRETE GIRDERS AND SEE "SUPERSTRUCTURE DEFICIENCIES" SHEETS.

NOTES:

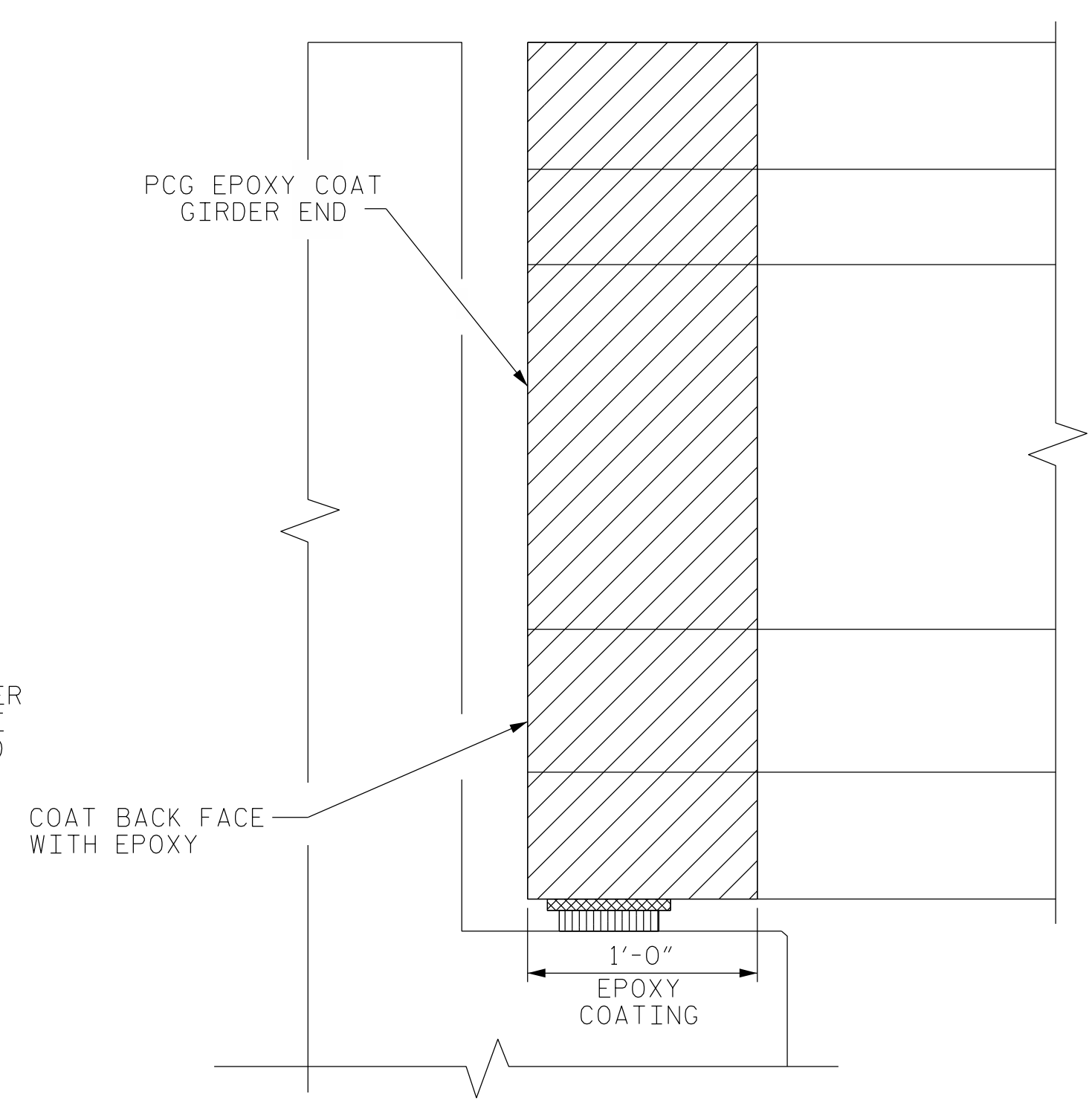
PREPACKAGED MATERIAL IS REQUIRED.
 FOR REPAIRS OVER TRAFFIC AND SHALLOW REPAIRS THAT DO NOT ENGAGE REINFORCEMENT, ANCHOR PATCH MATERIAL USING 1/4" GALVANIZED BOLTS, EPOXY ANCHORED WITH 2" EMBEDMENT. PLACE BOLTS IN A 6" GRID. USE A LATEX OR EPOXY PATH MATERIAL FOR IMPROVED BOND. USE EXTREME CARE TO NOT DAMAGE STRANDS.



ELEVATION

SECTION

GIRDER FLANGE REPAIR



LIMITS OF PCG EPOXY COATING GIRDER ELEVATION

PROJECT NO. 15BPR.24
 BRUNSWICK COUNTY
 BRIDGE NO. 090013

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 CONCRETE RESTORATION
 DETAILS



DocuSigned by:
 Jacob H. Duke
 3/28/2019

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : JACOB H. DUKE DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

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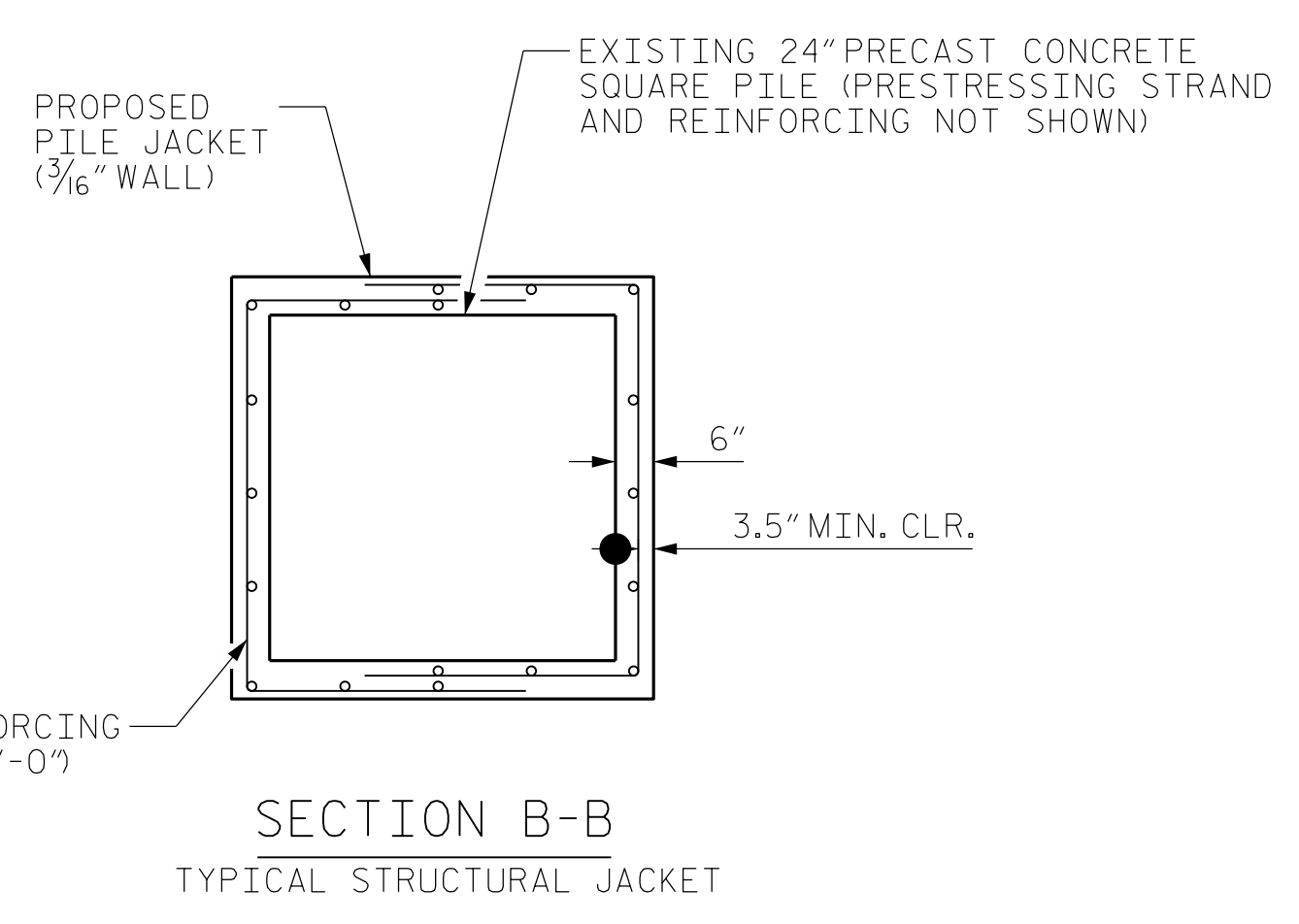
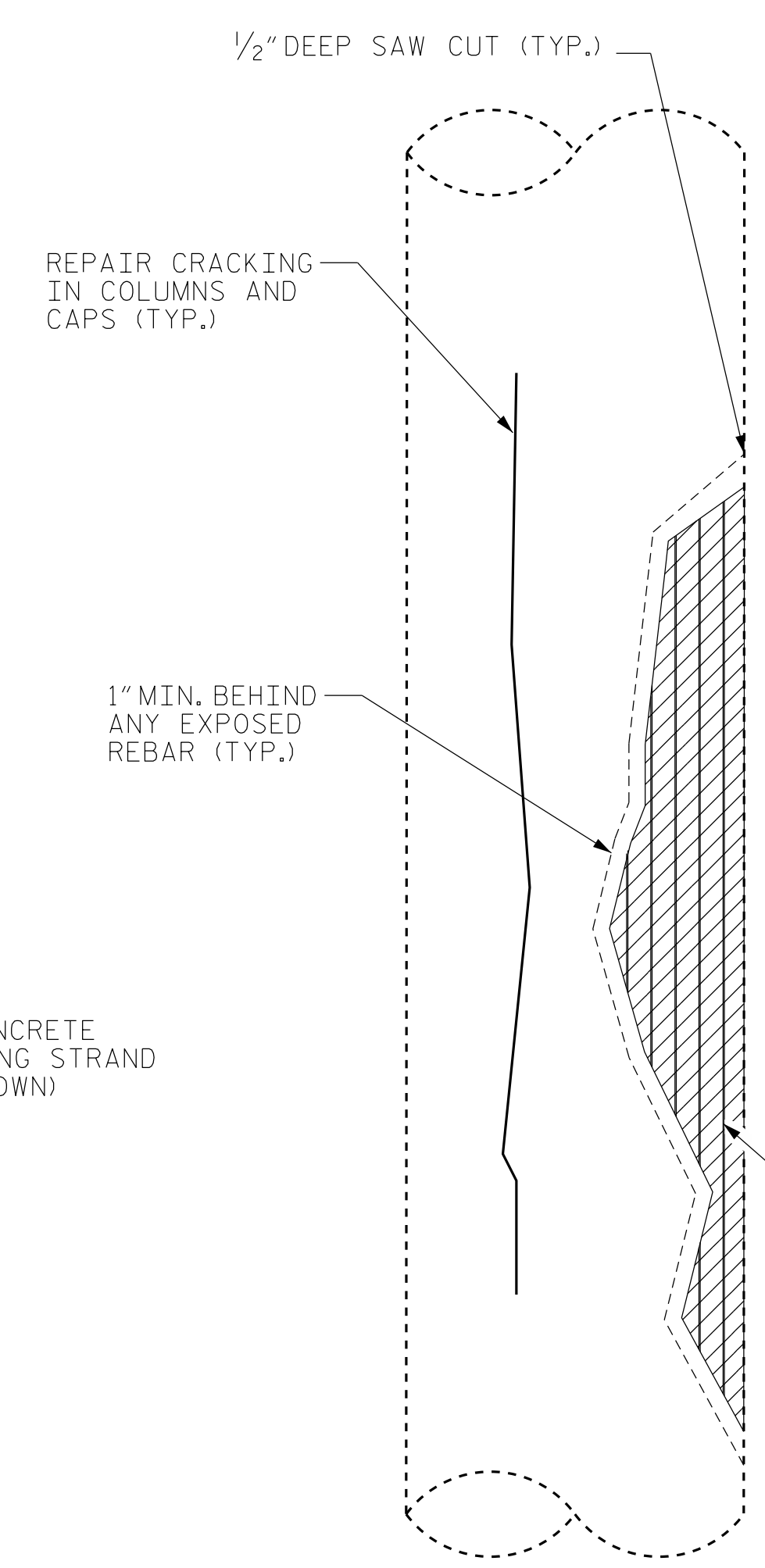
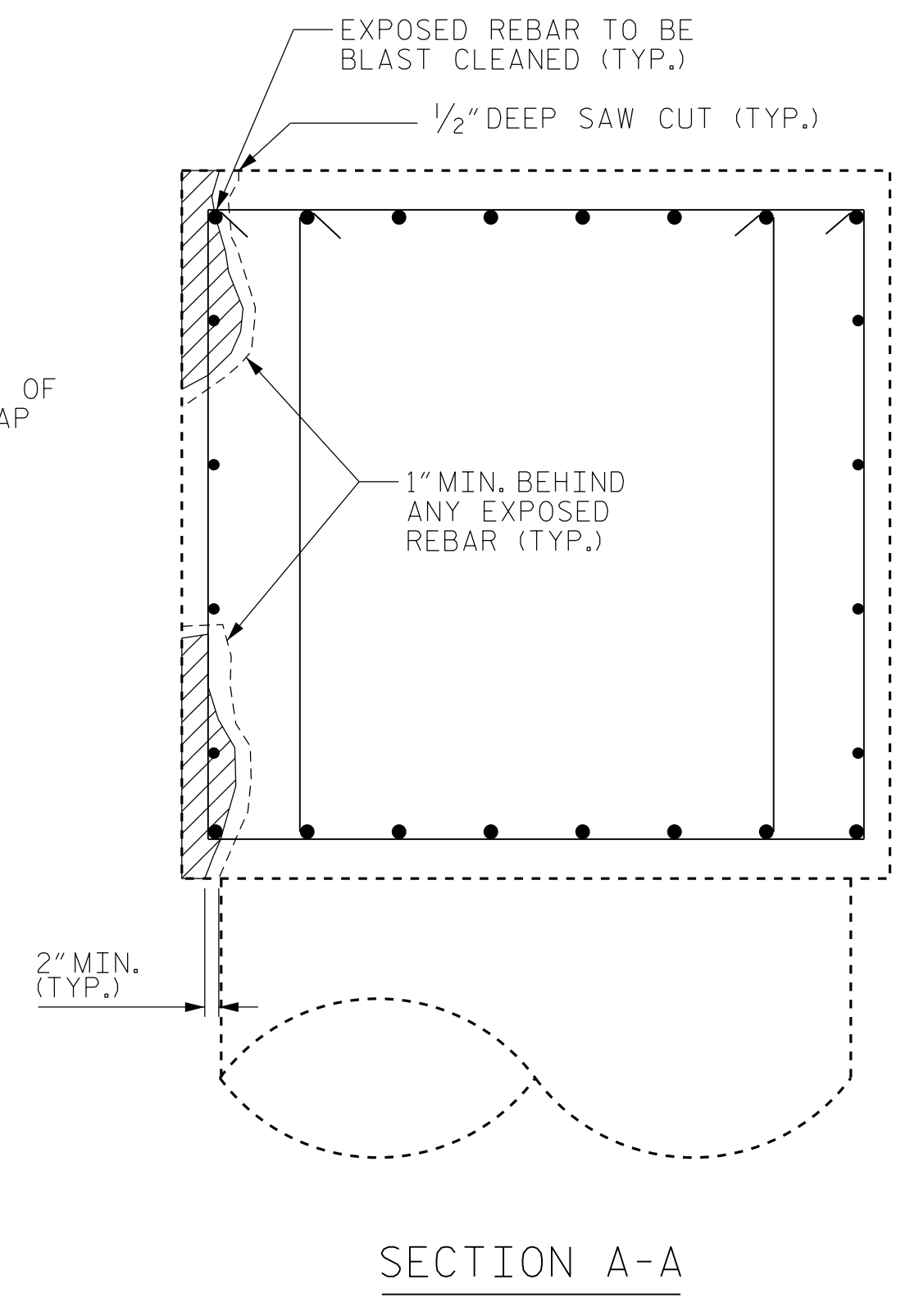
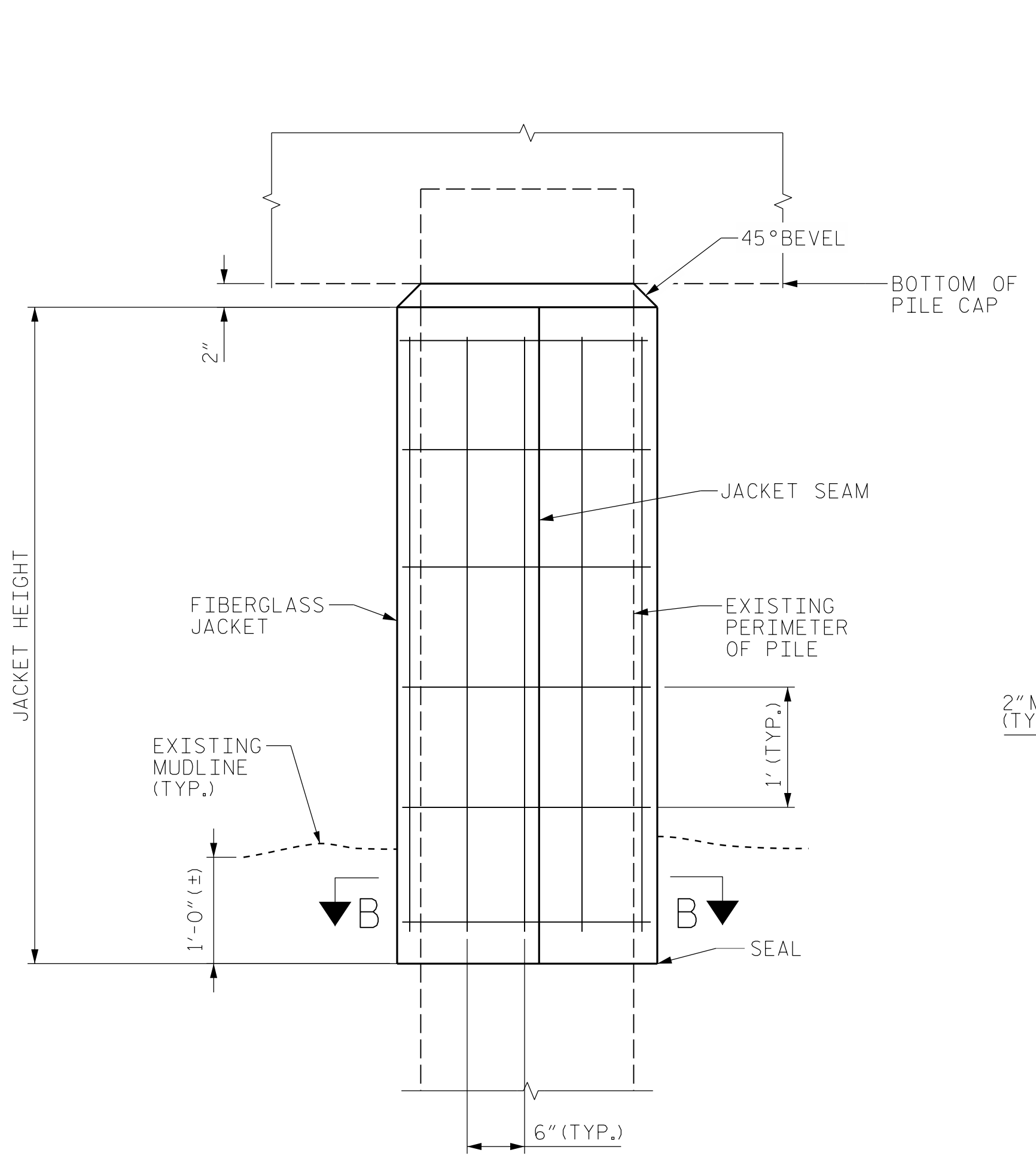
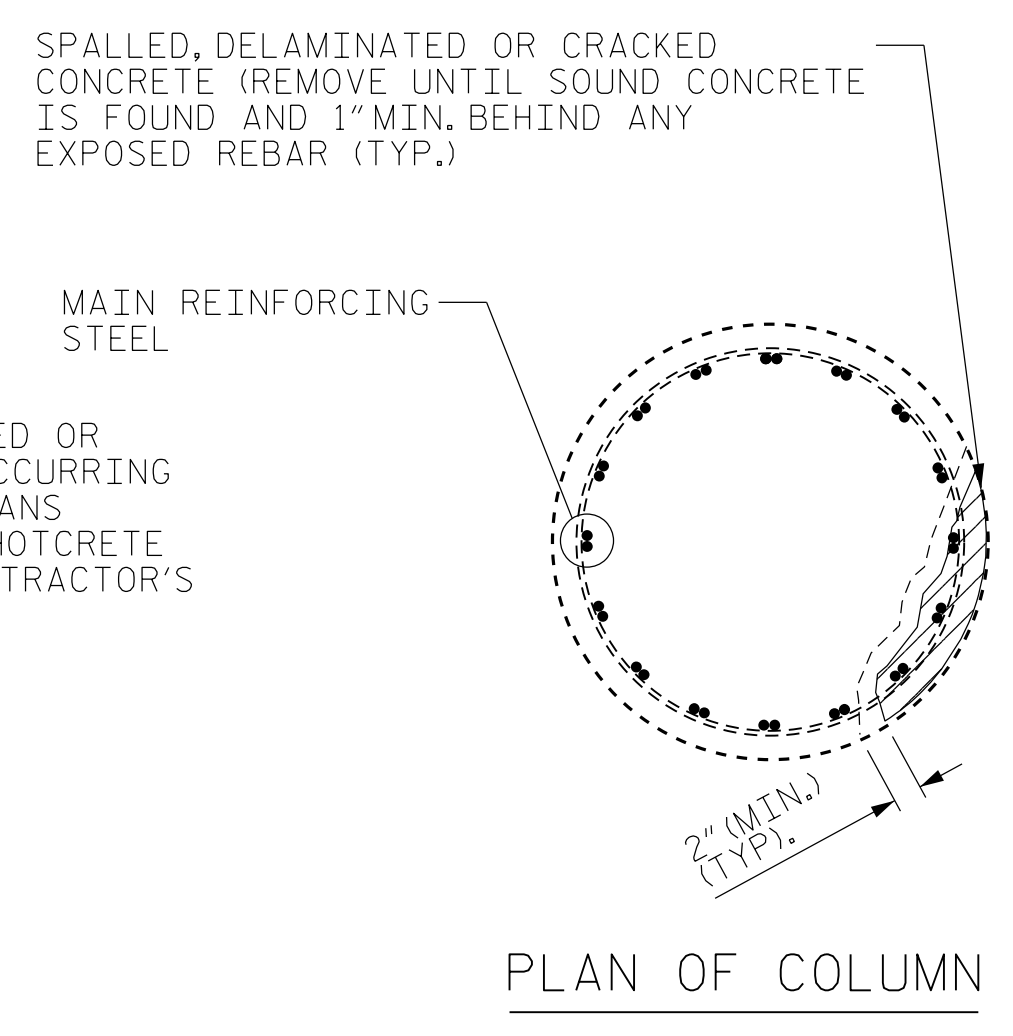
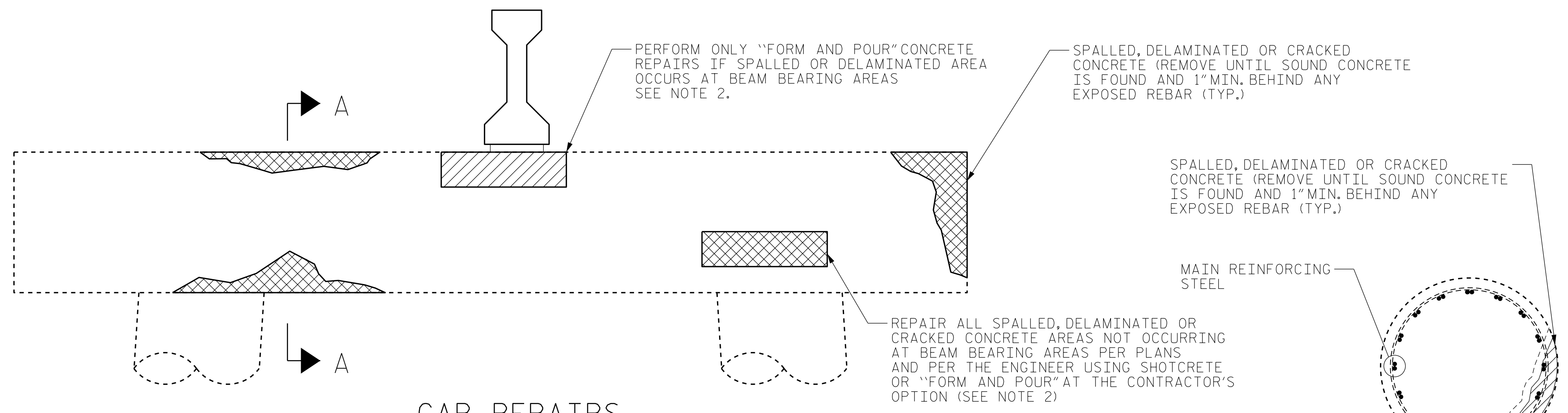
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			45

CONSTRUCTION SEQUENCE FOR PILE JACKETS:

1. PREPARE SPALL AREAS WITHIN THE LIMITS OF THE PILE JACKETS IN ACCORDANCE WITH THIS SHEET PRIOR TO INSTALLING STRUCTURAL PILE JACKETS.
2. POSITION JACKET FORMS AND STEEL AROUND THE ENTIRE PILE PERIMETER FOR THE LENGTH OF THE JACKET IN PREPARATION FOR POUR.
3. POUR CONCRETE JACKET AS INDICATED ON THIS SHEET.
4. REMOVE FORMS. NO FORMS SHALL BE LEFT IN PLACE.
5. EXTEND JACKETS 1 FT. INTO THE MUDLINE AND FILL BACK AS APPROPRIATE.
6. REPAIR SPALLS ABOVE THE LIMITS OF THE APPROVED JACKETS LENGTHS IN ACCORDANCE WITH THIS SHEET.
7. PATCH AND FILL ANY REMAINING EXCAVATIONS WITH APPROVED MATERIAL.

NOTES:

1. WORK THIS SHEET WITH REPAIR METHODS AND CONCRETE REPAIR NOTES IN "CONCRETE RESTORATION DETAILS" SHEET 1 OF 3.
2. TYPICAL BENT CAP REPAIRS ARE SHOWN IN THIS SHEET. REPAIR DETAILS SIMILAR FOR END BENT CAPS.
3. THE METHOD USED TO DELINEATE THE AREAS OF UNSOUND CONCRETE TO BE REPAIRED SHALL NOT PERMANENTLY MARK THE CONCRETE, LEAVE ANY RESIDUE AFTER REMOVAL, OR REQUIRE HARS CHEMICALS TO REMOVE.
4. THE CONTRACTOR SHALL REMOVE THE DETERIORATED CONCRETE IN ACCORDANCE WITH THE GUIDELINES SET IN THESE NOTES, IN THE SPECIAL PROVISIONS, AND THE STANDARD SPECIFICATIONS.
5. REMOVE UNSOUND CONCRETE TO THE EXTENT NECESSARY, ENSURING A MINIMUM OF 1" BEHIND REBAR, AND A MINIMUM CLEARANCE OF 2" TO SAWCUT.
6. REINFORCING STEEL WHICH IS DETERMINED BY THE ENGINEER TO BE REPLACED, SHALL BE REMOVED TO A POINT WHERE IT IS SOUND. THE PATCH SHALL EXTEND A SUFFICIENT DISTANCE BEYOND THIS POINT TO DEVELOP A SPLICE LENGTH SPECIFIED IN THE TABLE IN THE "GENERAL NOTES" SHEET 1 OF 2.
7. IF ANY AREA IS DETERMINED TO BE UNSTABLE DURING THE REPAIR PROCESS AS DETERMINED BY THE ENGINEER, STOP THE CURRENT REPAIR PROCEDURE, SHORE THE AREA AND PERFORM A "FORM AND POUR" CONCRETE REPAIR.
8. NO MORE THAN 30% OF THE CAP OR PILE CROSS SECTIONAL AREA SHALL BE REMOVED AT ONE TIME. SHOULD IT BECOME NECESSARY TO REMOVE MORE THAN 30% OF THE CROSS SECTIONAL AREA, NOTIFY THE ENGINEER PRIOR TO PROCEEDING.
9. SIMULTANEOUS REMOVAL OF UNSOUND CONCRETE MAY BE PERMITTED ON MORE THAN ONE FACE OF A CAP AND/OR PILE, IF THE AREAS OF REMOVAL ARE NOT ADJACENT TO OR DIRECTLY OPPOSITE ONE ANOTHER. IF REMOVAL EXTENDS MORE THAN 1/2" BEHIND THE MAIN REINFORCING BARS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING.
10. COAT ALL THE SURFACE AREA ON THE TOP OF CAPS, INCLUDING CHAMFERS, WITH EPOXY PROTECTIVE COATING. DO NOT COAT AREA UNDER BEARINGS.
11. FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.
12. FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.
13. FOR EPOXY RESIN INJECTION (ERI), SEE SPECIAL PROVISIONS.
14. FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.
15. FOR SUBSTRUCTURE REPAIRS, SEE "SUBSTRUCTURE REPAIRS" SHEETS.
16. FOR INTEGRAL PILE JACKETS, SEE SPECIAL PROVISIONS.



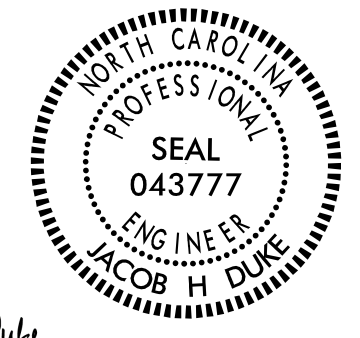
BENT CAP REPAIRS

COLUMN REPAIRS

* REPAIR LENGTH SHALL NOT EXCEED 10 VERTICAL FEET AT ONCE OR 1/2 COLUMN DIAMETER.

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

SHEET 3 OF 3



DocuSigned by:
 Jacob H. Duke
 3/28/2019

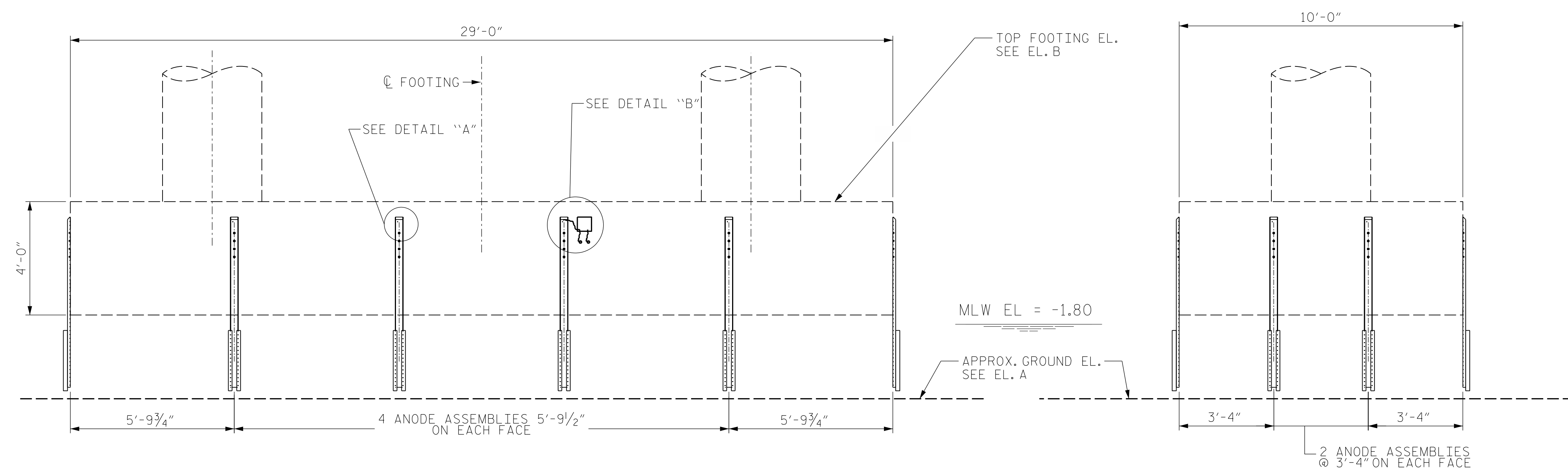
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**CONCRETE RESTORATION
 DETAILS**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			45

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KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY :	JACOB H. DUKE	DATE :	10/2018
CHECKED BY :	DIEGO A. AGUIRRE	DATE :	10/2018
DESIGN ENGINEER OF RECORD :	JACOB H. DUKE	DATE :	10/2018

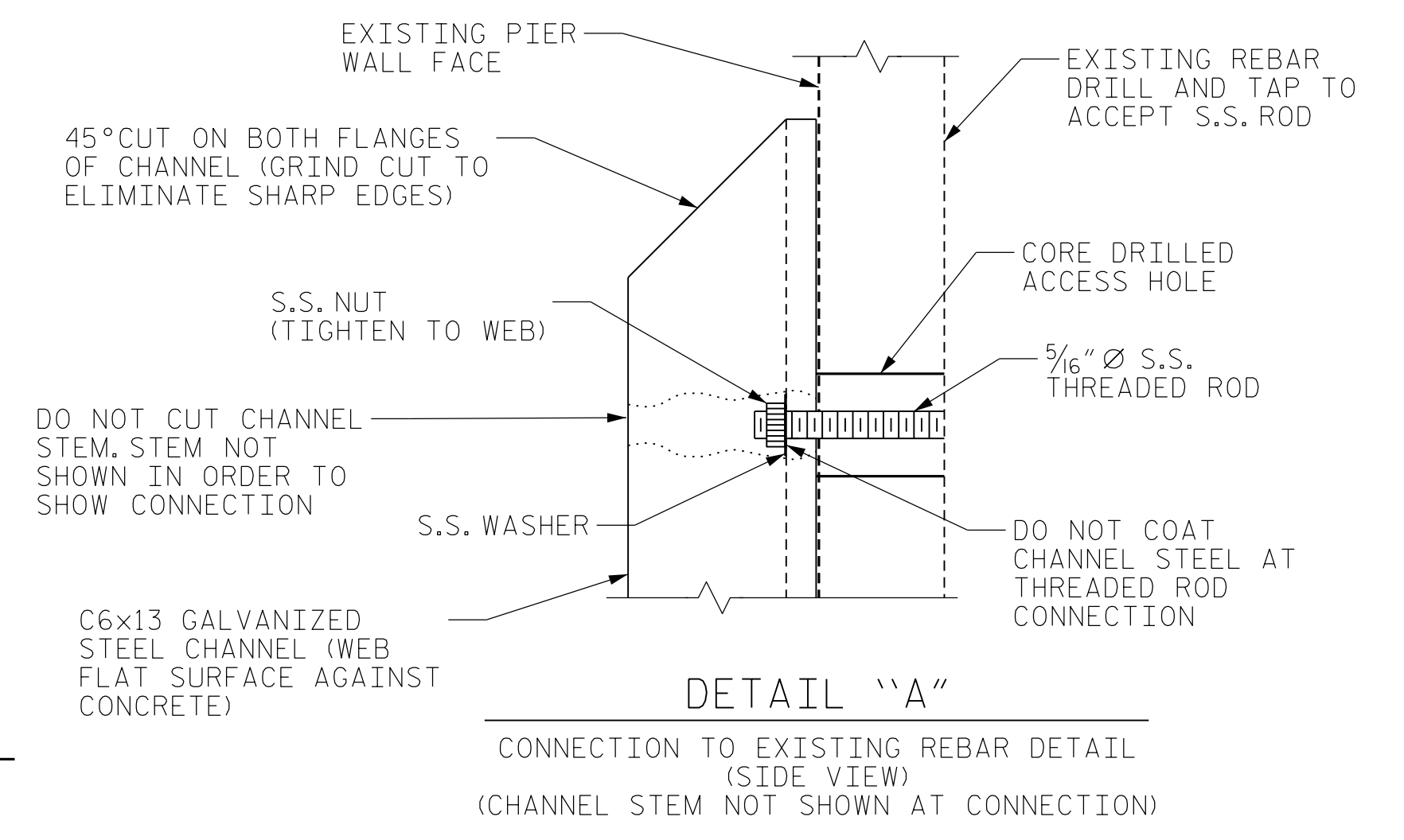


ELEVATION
WEST OR EAST FACE
PILES NOT SHOWN FOR CLARITY

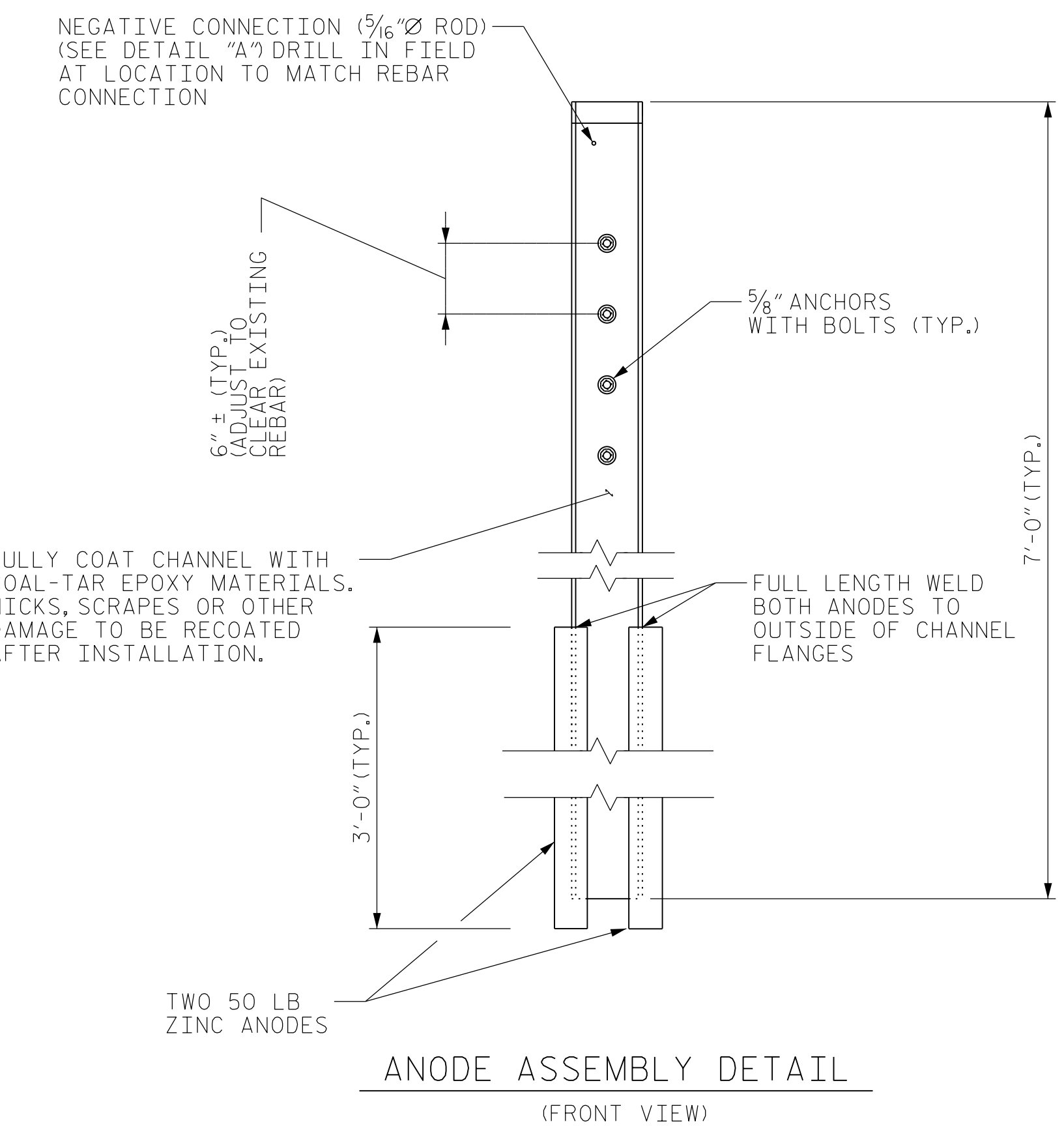
ELEVATIONS		
BENT NO.	EL. A	EL. B
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13	-1.00	4.00

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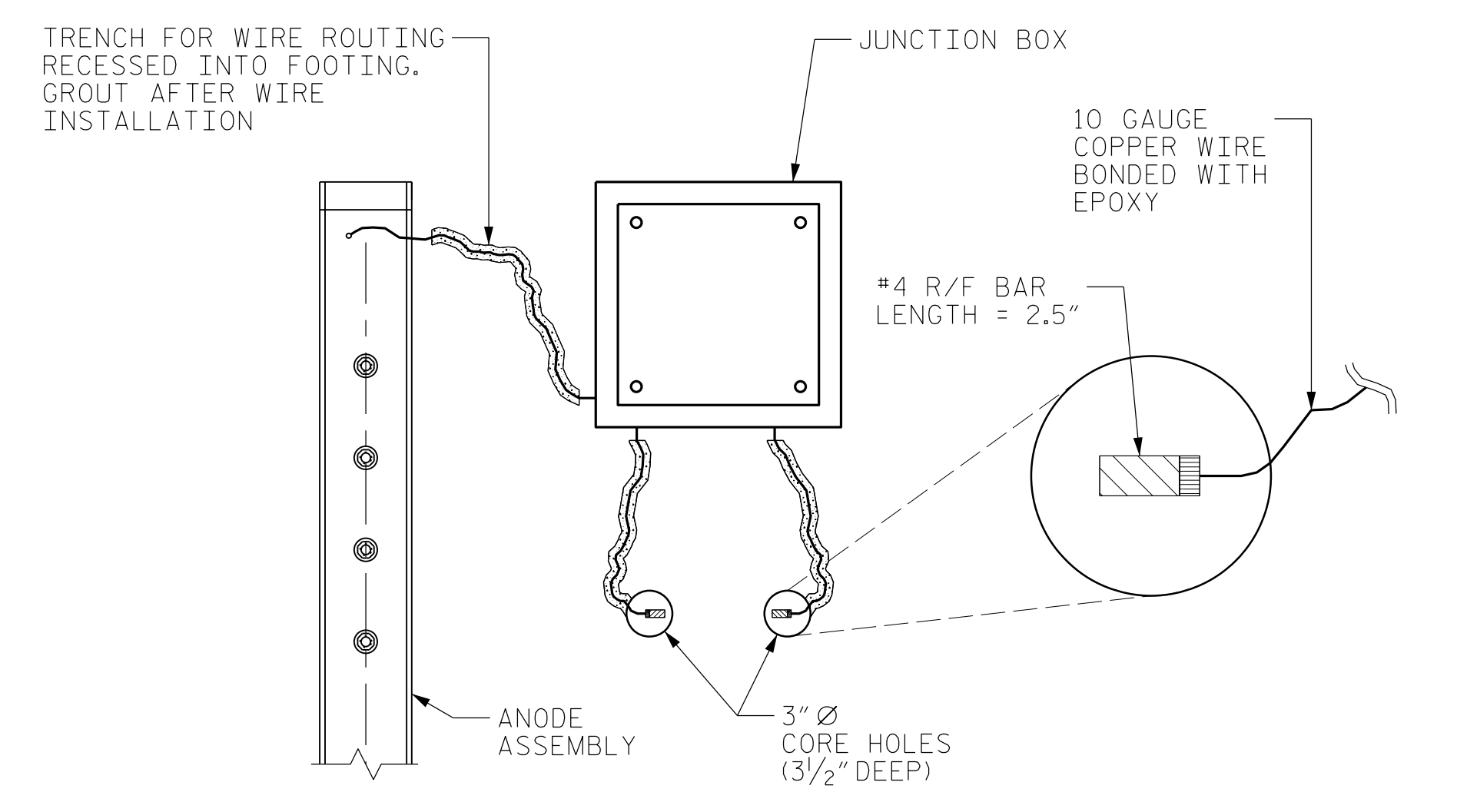
1. THOROUGHLY CLEAN THE FOOTINGS OF MARINE GROWTH AND DEBRIS BEFORE PERFORMING ANY WORK ASSOCIATED WITH THE INSTALLATION OF THE PROPOSED BULK ANODES.
2. ANODES SHALL BE ASTM B418-01 TYPE I.
3. EXCEPT FOR ANODE WELDING, ALL CHANNEL MANUFACTURING SHALL BE PERFORMED PRIOR TO GALVANIZING.
4. ANCHORS TO BE DROP-IN TYPE 5/8" x 2 1/32" GALVANIZED HILTI HDI 243262 OR APPROVED EQUAL.
5. SEAL ACCESS HOLE WITH APPROVED EPOXY GROUT MATERIAL AFTER S.S. ROD INSTALLATION.
6. ANODE ASSEMBLIES SHALL BE PLACED SUCH THAT THE ANODE BE SUBMERGED A MINIMUM OF 1'-0" BELOW MEAN LOW WATER ELEVATION AT ALL TIMES. SPACING AND ELEVATION ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER.
7. WELDING OF S.S. ROD TO THE REBAR IN LIEU OF DRILL AND TAP MAY BE APPROVED AT THE DISCRETION OF THE ENGINEER.
8. ELECTRICAL CONTINUITY OF REINFORCING STEEL BETWEEN AT LEAST TWO OTHER CONNECTIONS SHALL BE PERFORMED PER CONNECTION PRIOR TO AND AFTER ANODE ASSEMBLY INSTALLATION.
9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE REINFORCING STEEL AND PATCH ALL CORES WITH APPROVED CONCRETE REPAIR MATERIAL.
10. DIMENSIONS AND ELEVATIONS SHOWN ON THIS SHEET ARE BASED ON LIMITED AVAILABLE DATA. DIFFERENT DIMENSIONS AND TYPES OF ANODE SYSTEM MAY BE USED BASED ON ACTUAL FIELD CONDITIONS.
11. PAYMENT FOR ALL WORK AND HARDWARE DESCRIBED ASSOCIATED WITH FURNISHING AND INSTALLING OF THE ZINC ANODES SHALL BE INCIDENTAL TO THE PAY ITEM FOR "CATHODIC PROTECTION SYSTEM - SUBMERGED ZINC BULK ANODES".
12. SEE PROJECT SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS AND ACCEPTANCE CRITERIA. (PSP: CATHODIC PROTECTION SYSTEM - SUBMERGED ZINC BULK ANODE)



DETAIL "A"
CONNECTION TO EXISTING REBAR DETAIL
(SIDE VIEW)
(CHANNEL STEM NOT SHOWN AT CONNECTION)

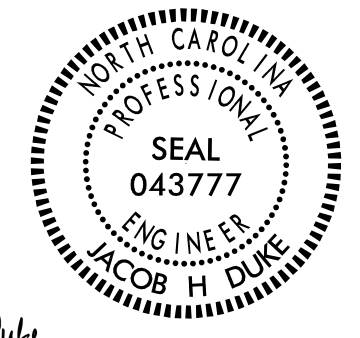


ANODE ASSEMBLY DETAIL
(FRONT VIEW)



DETAIL "B"
MONITORING JUNCTION BOX DETAIL
(FRONT VIEW)

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013



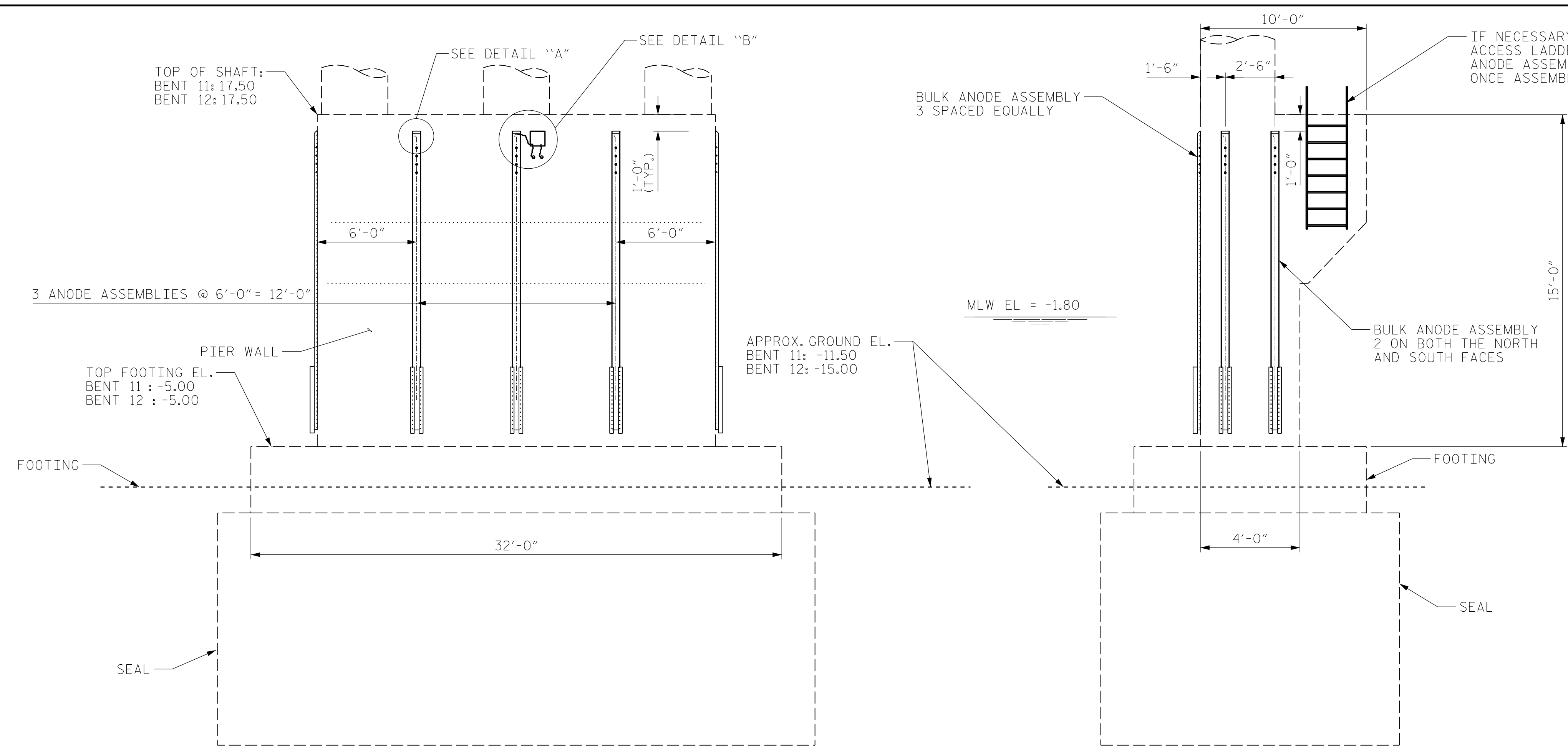
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
**CHANNEL BENT
FOOTING RESTORATION**
BULK ANODE DETAILS
BENTS 10 & 13

KCA 301 FAYETTEVILLE ST., SUITE 1500
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

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1			3			TOTAL SHEETS
2			4			45

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ELEVATION
(WEST FACE OF BENT 11)
(EAST FACE OF BENT 12)

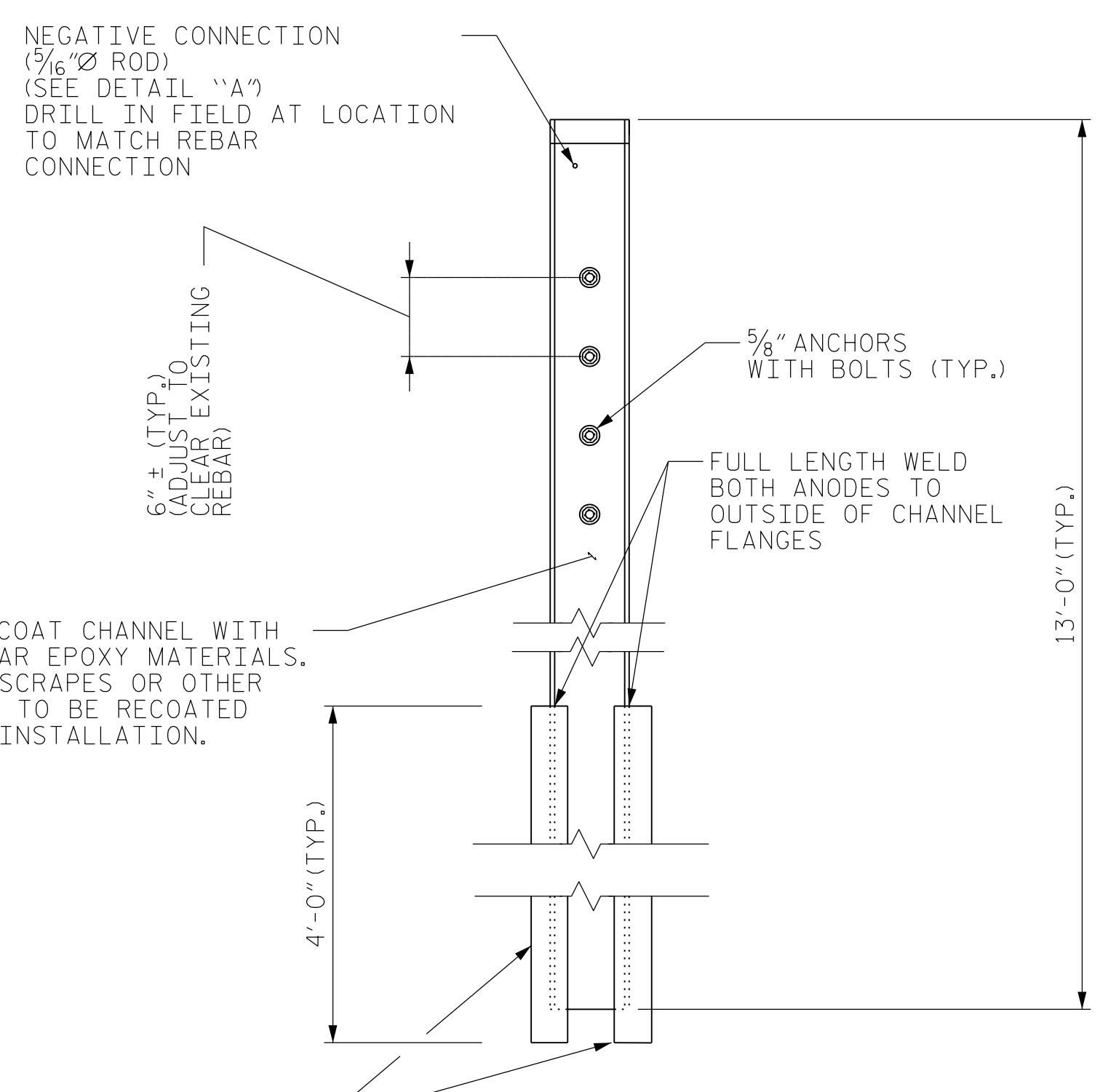
ELEVATION
(SOUTH FACE OF BENT 11)
(NORTH FACE OF BENT 12)
(ACCESS LADDER ON SOUTH FACES OF FOOTINGS ONLY)

ANODE PLACEMENT

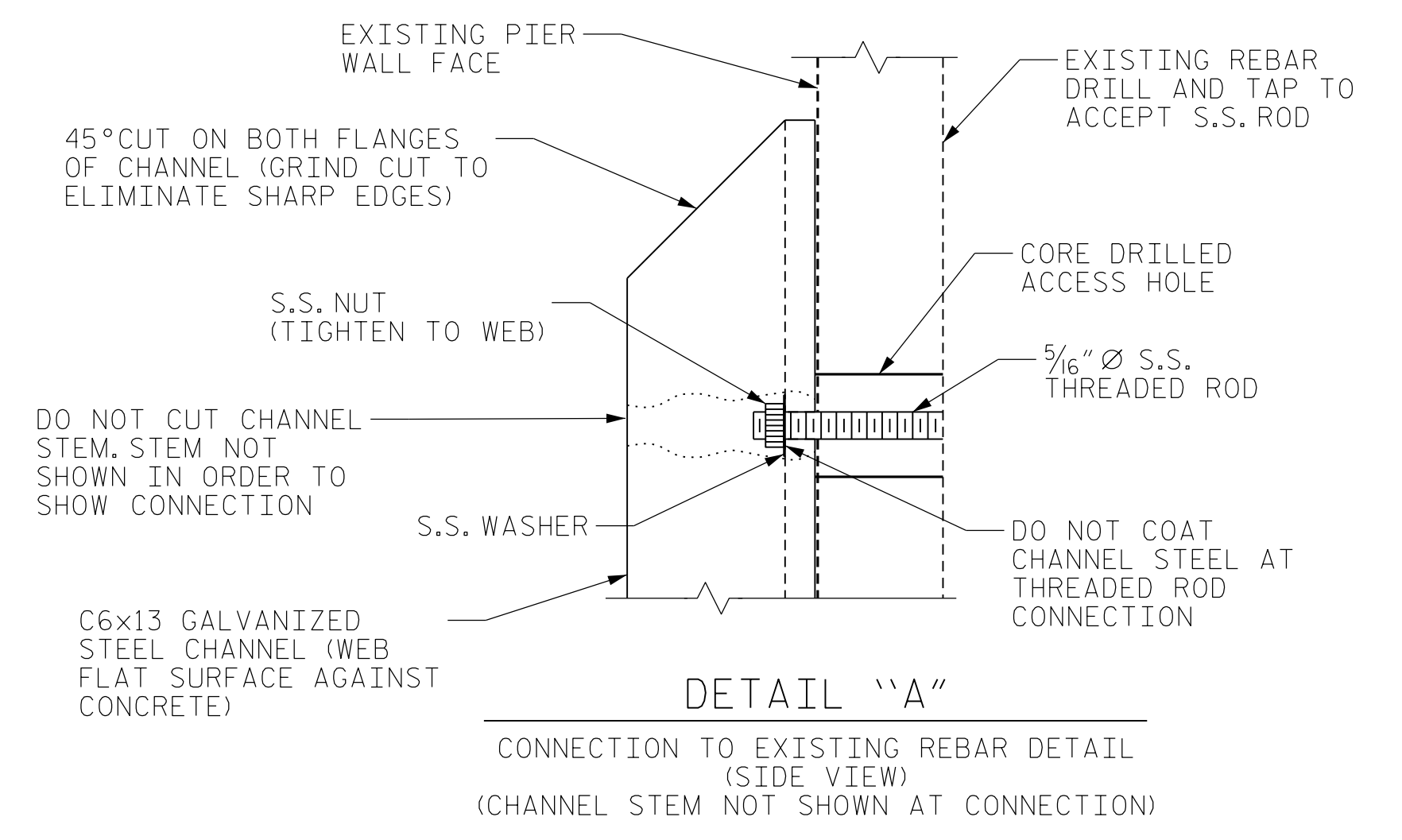
SEE DETAIL "A" FOR CONNECTION TO EXISTING REBAR
SEE DETAIL "B" FOR MONITORING JUNCTION BOX

NOTES:

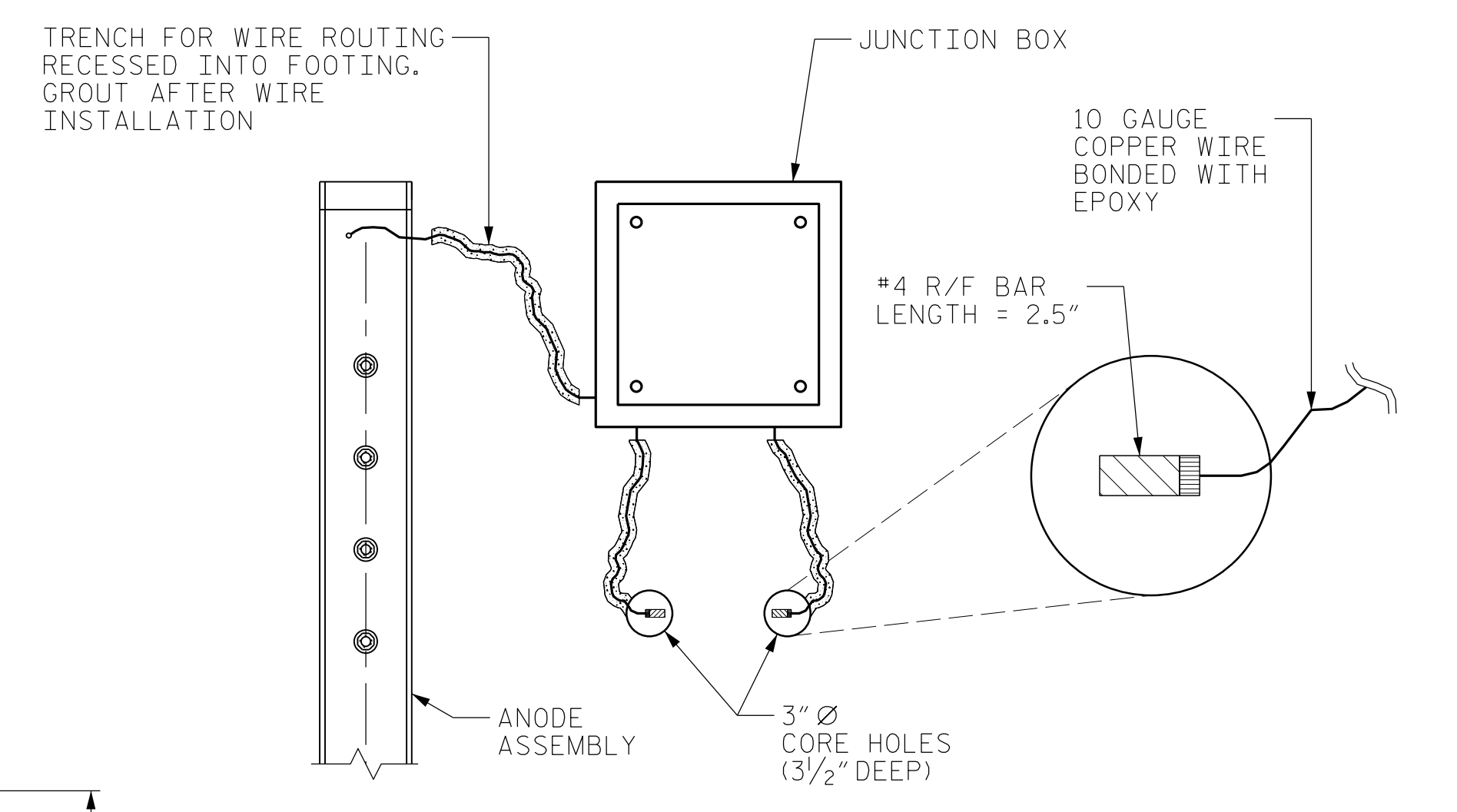
1. THOROUGHLY CLEAN THE FOOTINGS OF MARINE GROWTH AND DEBRIS BEFORE PERFORMING ANY WORK ASSOCIATED WITH THE INSTALLATION OF THE PROPOSED BULK ANODES.
2. ANODES SHALL BE ASTM B418-01 TYPE I.
3. EXCEPT FOR ANODE WELDING, ALL CHANNEL MANUFACTURING SHALL BE PERFORMED PRIOR TO GALVANIZING.
4. ANCHORS TO BE DROP-IN TYPE 5/8" x 2 7/32" GALVANIZED HILTI HDI 243262 OR APPROVED EQUAL.
5. SEAL ACCESS HOLE WITH APPROVED EPOXY GROUT MATERIAL AFTER S.S. ROD INSTALLATION.
6. ANODE ASSEMBLIES SHALL BE PLACED SUCH THAT THE ANODE BE SUBMERGED A MINIMUM OF 3'-0" BELOW MEAN LOW WATER ELEVATION AT ALL TIMES. SPACING AND ELEVATION ADJUSTMENTS SHALL BE APPROVED BY THE ENGINEER.
7. PER EXISTING PLANS, TYPICAL CONCRETE COVER ON EXISTING PIER WALL IS 4".
8. WELDING OF S.S. ROD TO THE REBAR IN LIEU OF DRILL AND TAP MAY BE APPROVED AT THE DISCRETION OF THE ENGINEER.
9. ELECTRICAL CONTINUITY OF REINFORCING STEEL BETWEEN AT LEAST TWO OTHER CONNECTIONS SHALL BE PERFORMED PER CONNECTION PRIOR TO AND AFTER ANODE ASSEMBLY INSTALLATION.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE REINFORCING STEEL AND PATCH ALL CORES WITH APPROVED CONCRETE REPAIR MATERIAL.
11. PAYMENT FOR ALL WORK AND HARDWARE DESCRIBED ASSOCIATED WITH FURNISHING AND INSTALLING OF THE ZINC ANODES SHALL BE INCIDENTAL TO THE PAY ITEM FOR "CP SYSTEM (ZINC BULK ANODES)".
12. SEE PROJECT SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS AND ACCEPTANCE CRITERIA. (PSP: CATHODIC PROTECTION SYSTEM - SUBMERGED ZINC BULK ANODE)



ANODE ASSEMBLY DETAIL
(FRONT VIEW)



DETAIL "A"
CONNECTION TO EXISTING REBAR DETAIL
(SIDE VIEW)
(CHANNEL STEM NOT SHOWN AT CONNECTION)



DETAIL "B"
MONITORING JUNCTION BOX DETAIL
(FRONT VIEW)

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
BRIDGE NO. 090013



DocuSigned by:
Jacob H. Duke
30293AD0606400

3/28/2019

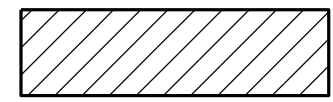
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.	
CHANNEL BENT FOOTING RESTORATION						S-23	
BULK ANODE DETAILS BENT 11 & 12						TOTAL SHEETS 45	
REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				
2			4				

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

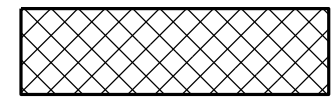
KCA 301 FAYETTEVILLE ST., SUITE 1500
KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
(919) 882-7839
LICENSE #: C-1506

DRAWN BY :	OMAR M. KHALAFALLA	DATE :	10/2018
CHECKED BY :	DIEGO A. AGUIRRE	DATE :	10/2018
DESIGN ENGINEER OF RECORD :	JACOB H. DUKE	DATE :	10/2018

LEGEND:



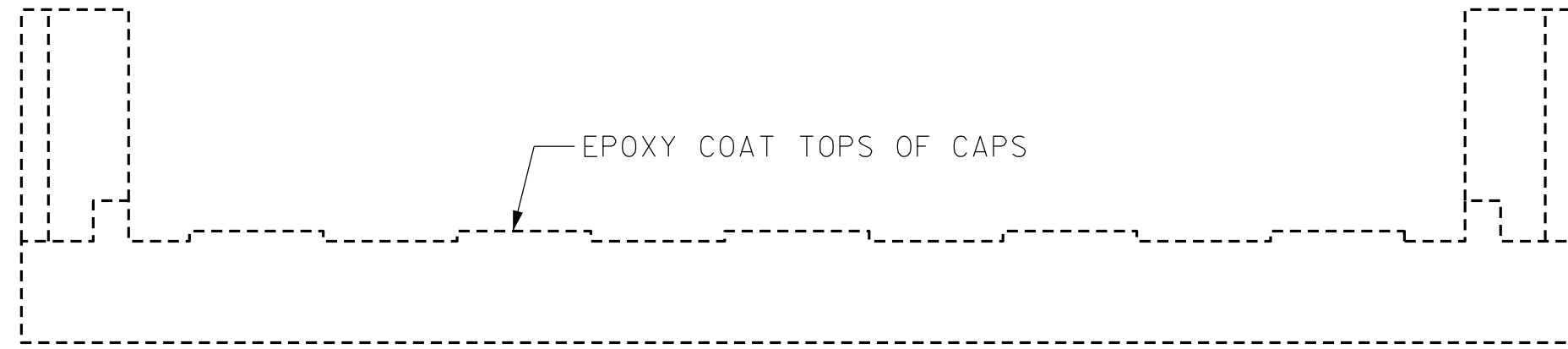
CONCRETE REPAIR AREA



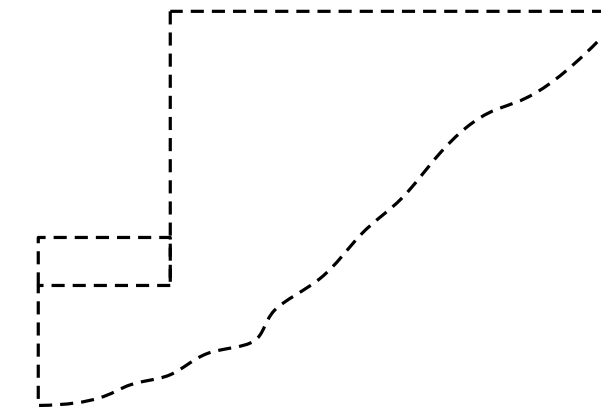
SHOTCRETE REPAIR AREA



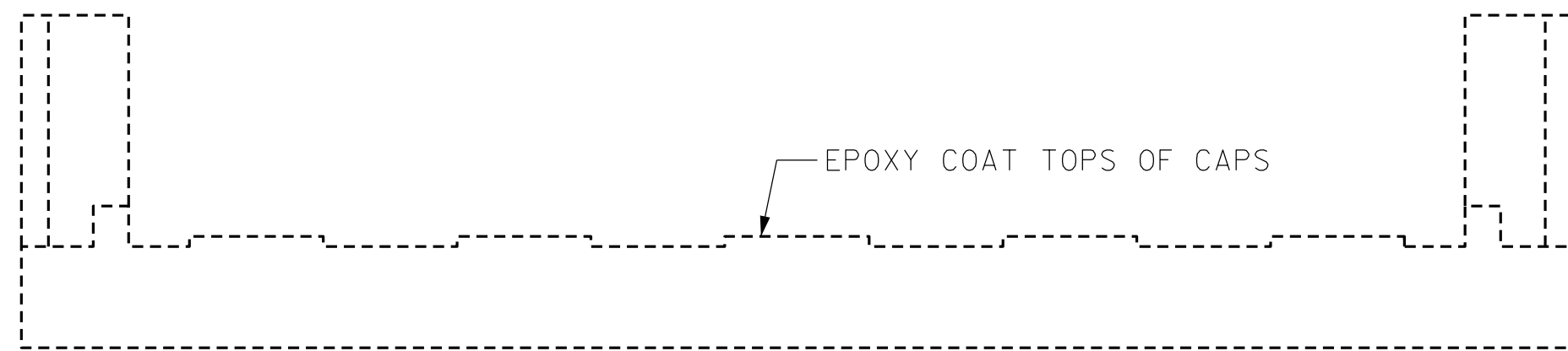
EPOXY RESIN INJECTION (ERI)



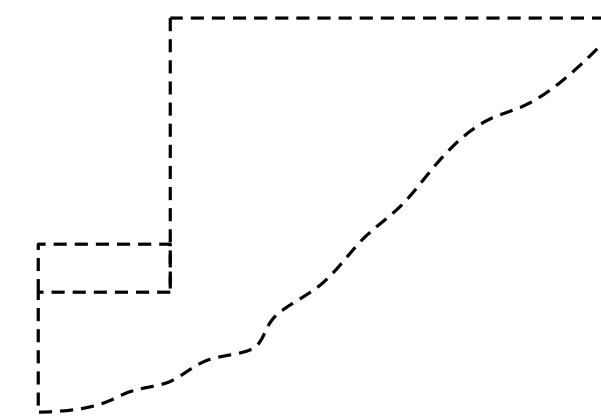
END BENT 1



ELEVATION



END BENT 2



ELEVATION

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	-	-		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	-	-		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING		AREA SQ. FT.		AREA SQ. FT.
CAP		152.6		

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

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FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

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SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRIDGE JACKING, SEE SPECIAL PROVISIONS.

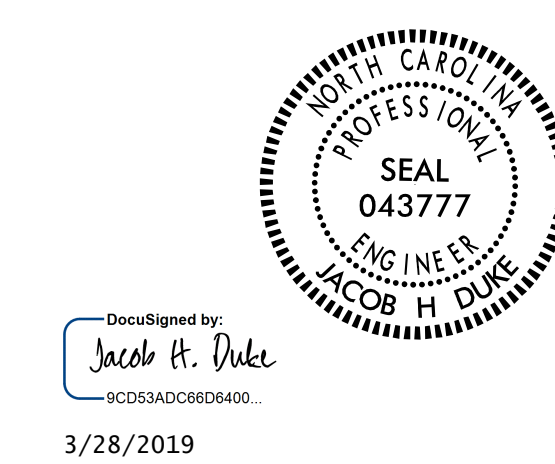
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
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 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



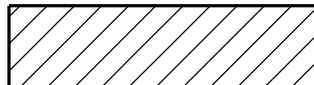


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

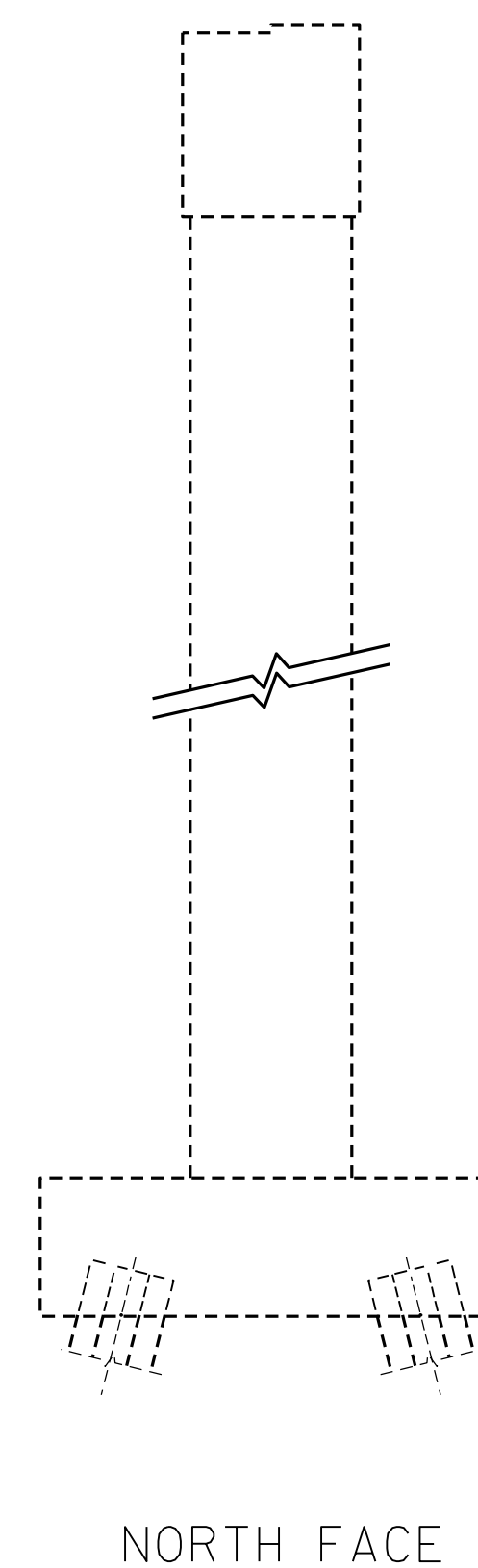
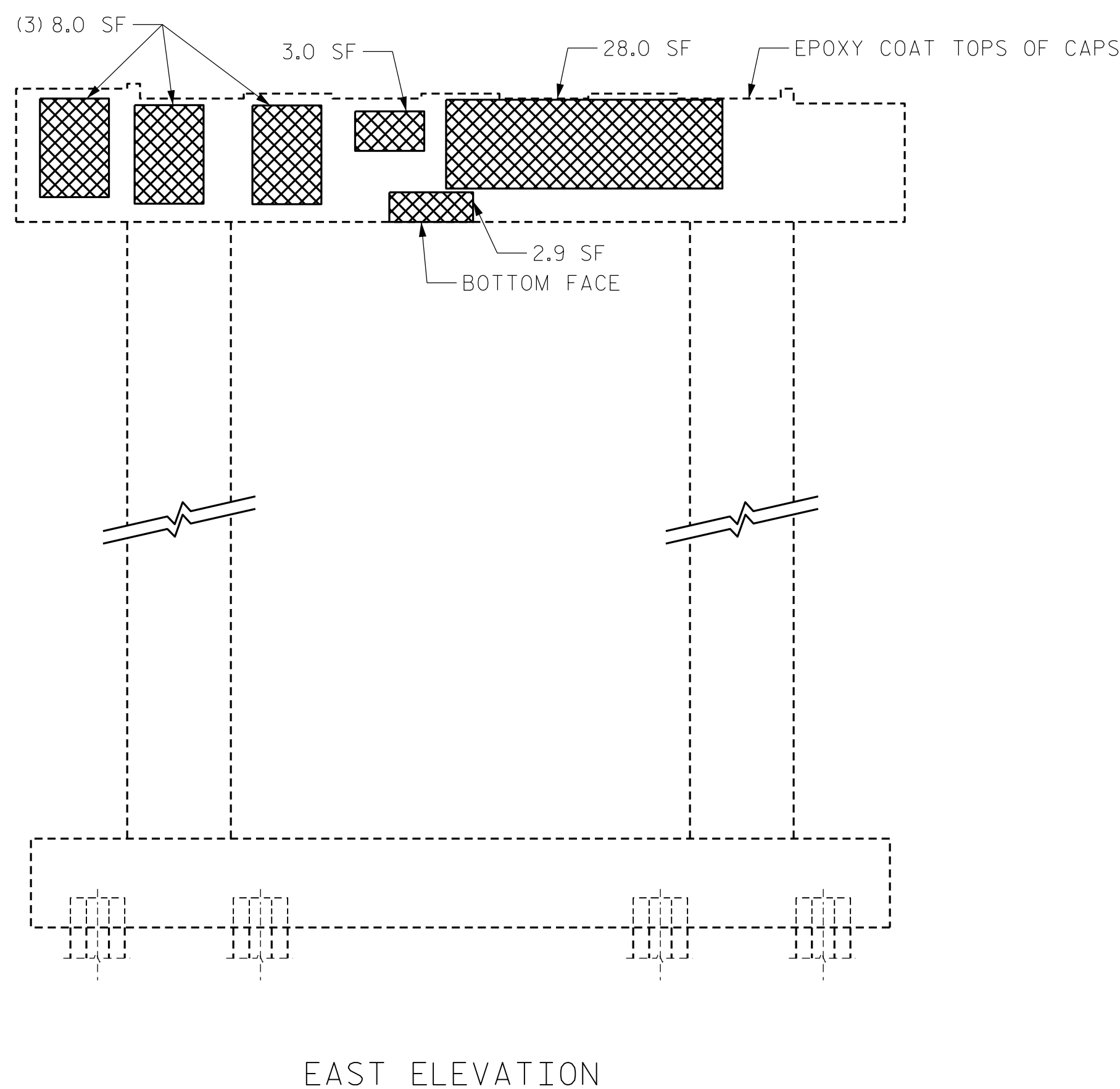
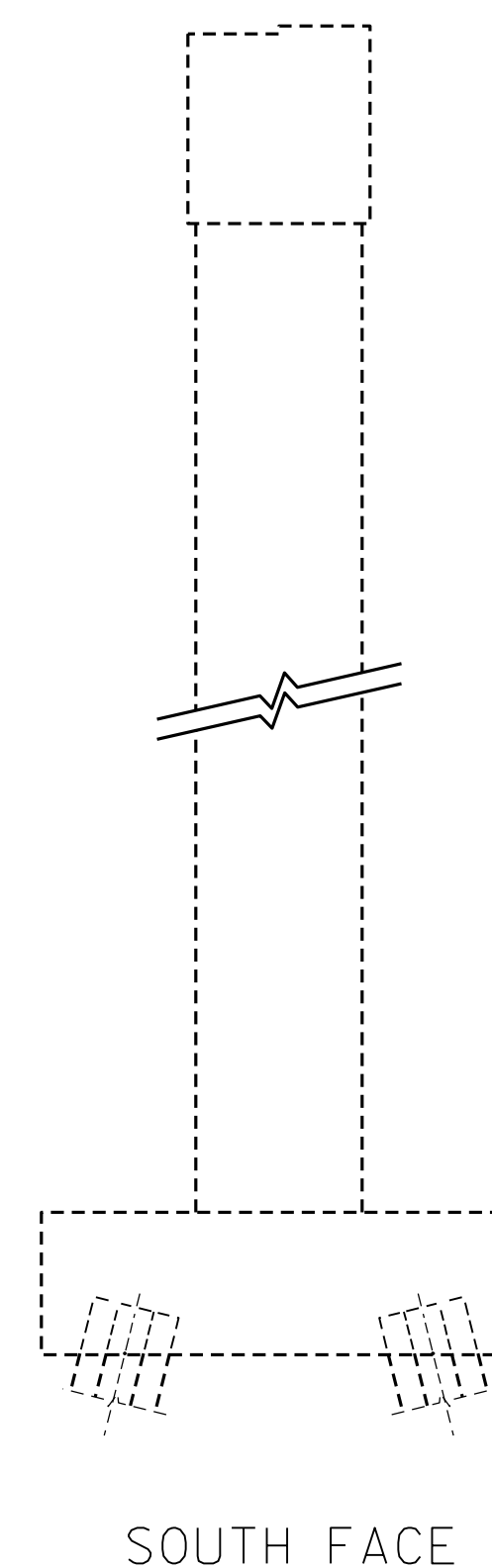
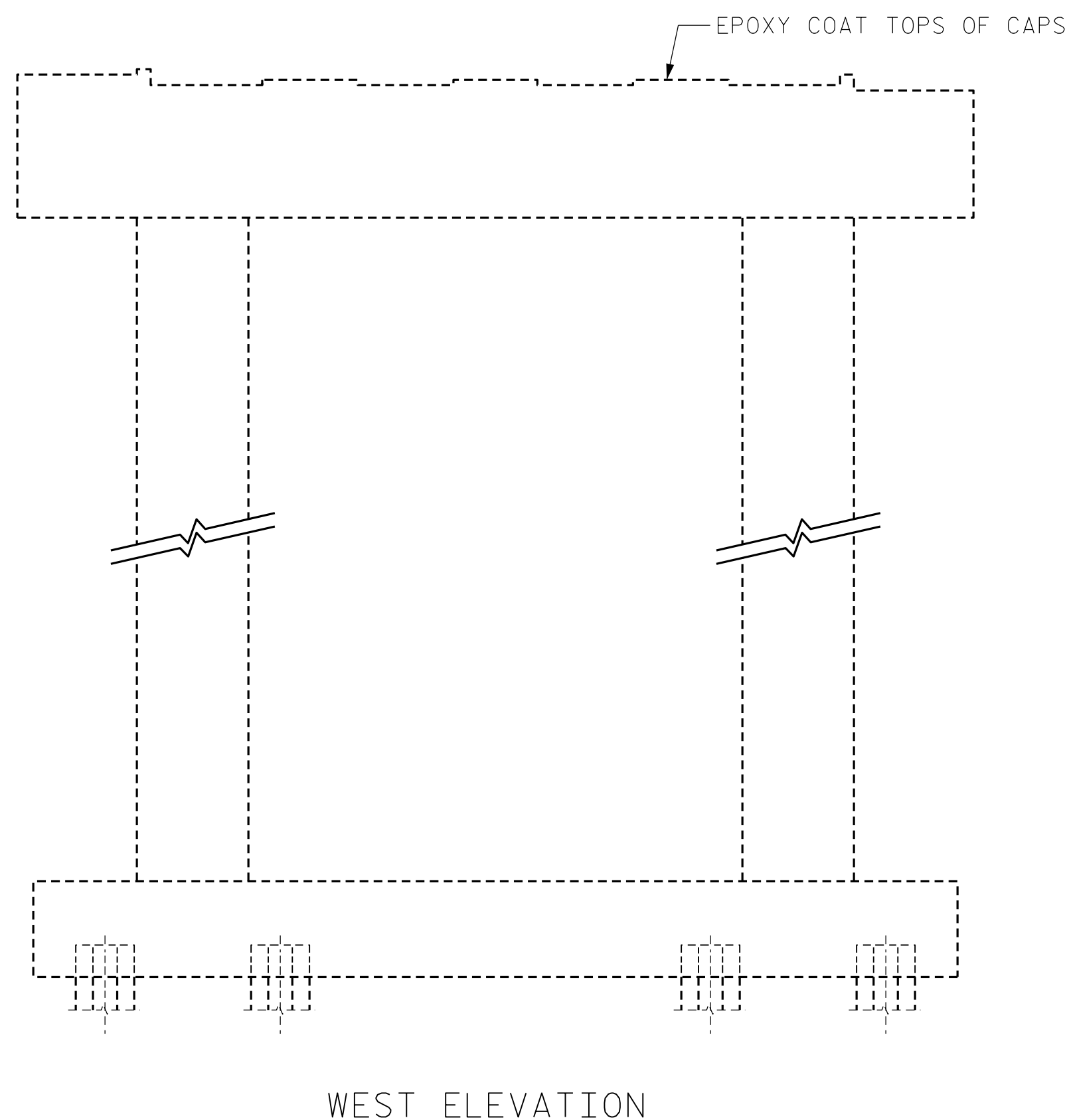
SUBSTRUCTURE
 CONCRETE REPAIRS
 END BENTS 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LEGEND:

-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	57.9	29		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	5.8	2.9		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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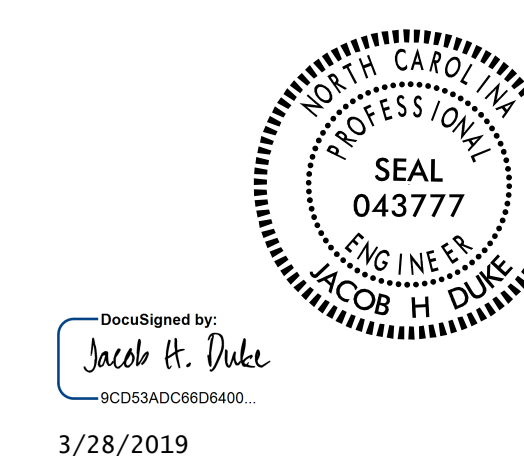
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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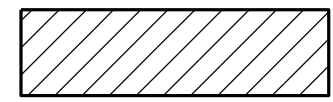


3/28/2019

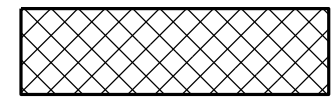
DOCUMENT NOT CONSIDERED
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 1						S-25
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:



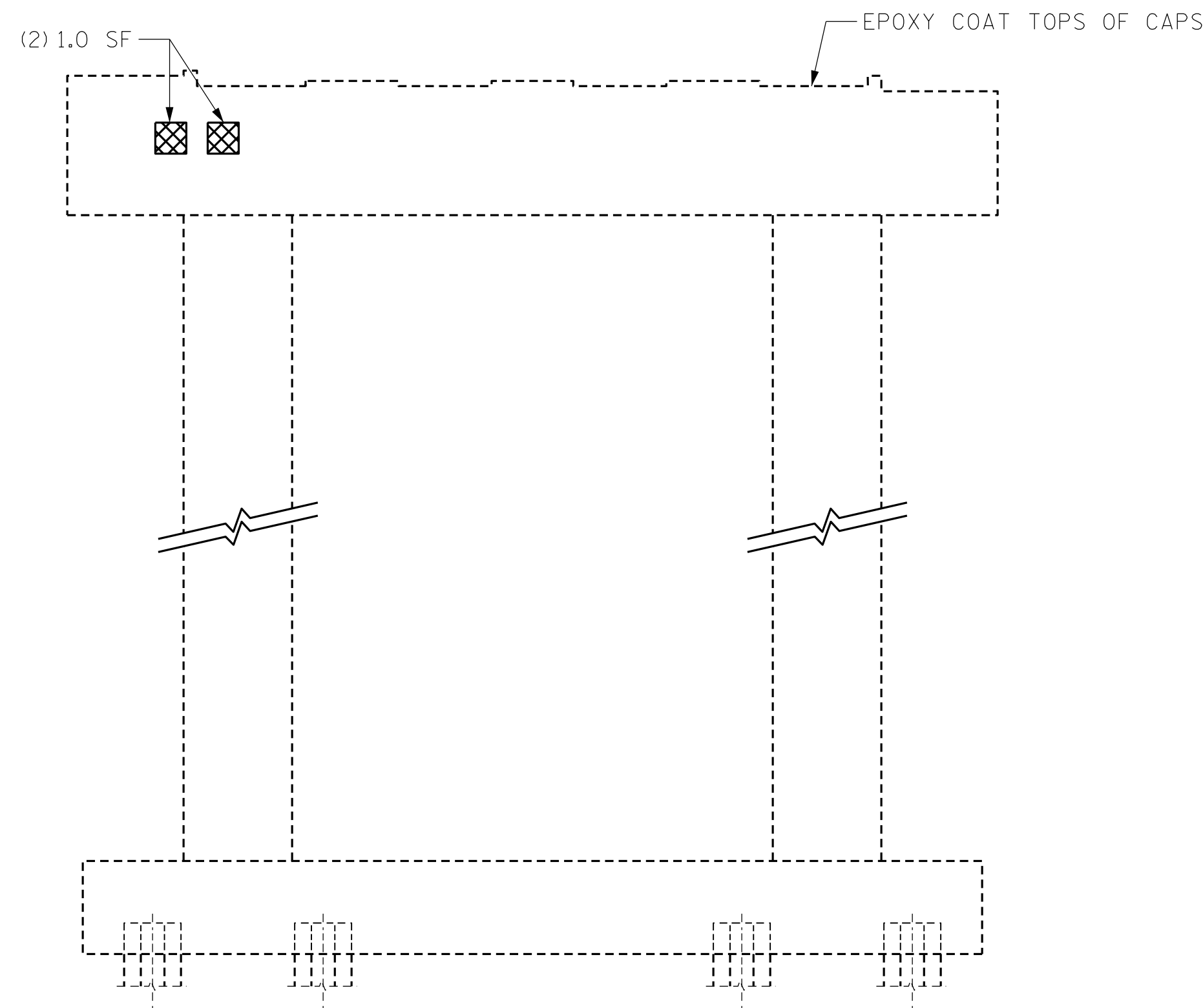
CONCRETE REPAIR AREA



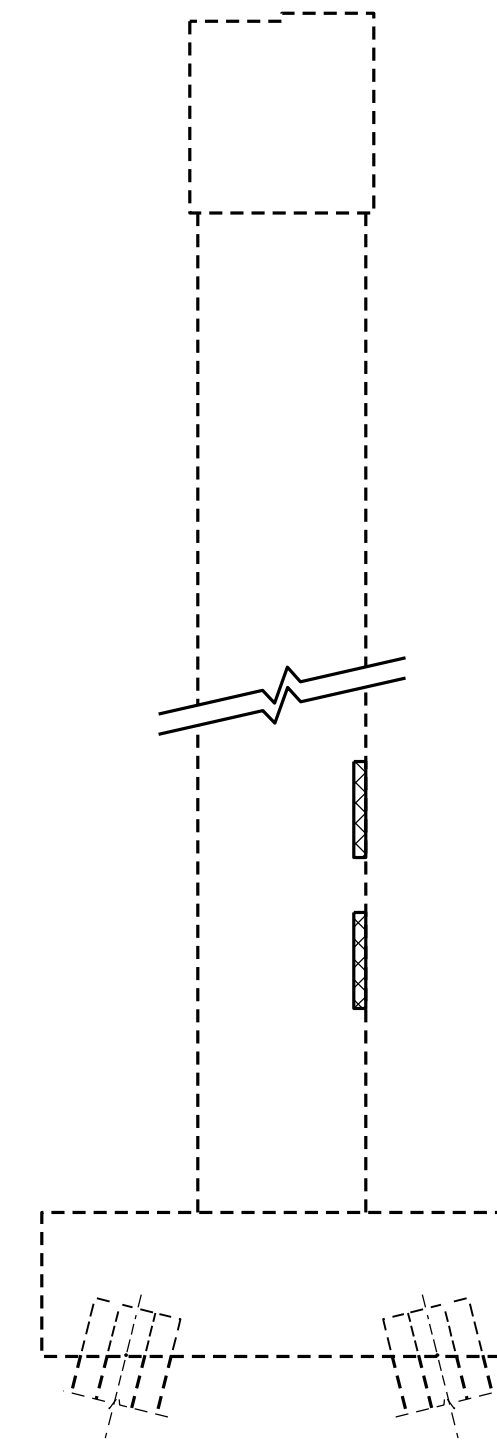
SHOTCRETE REPAIR AREA



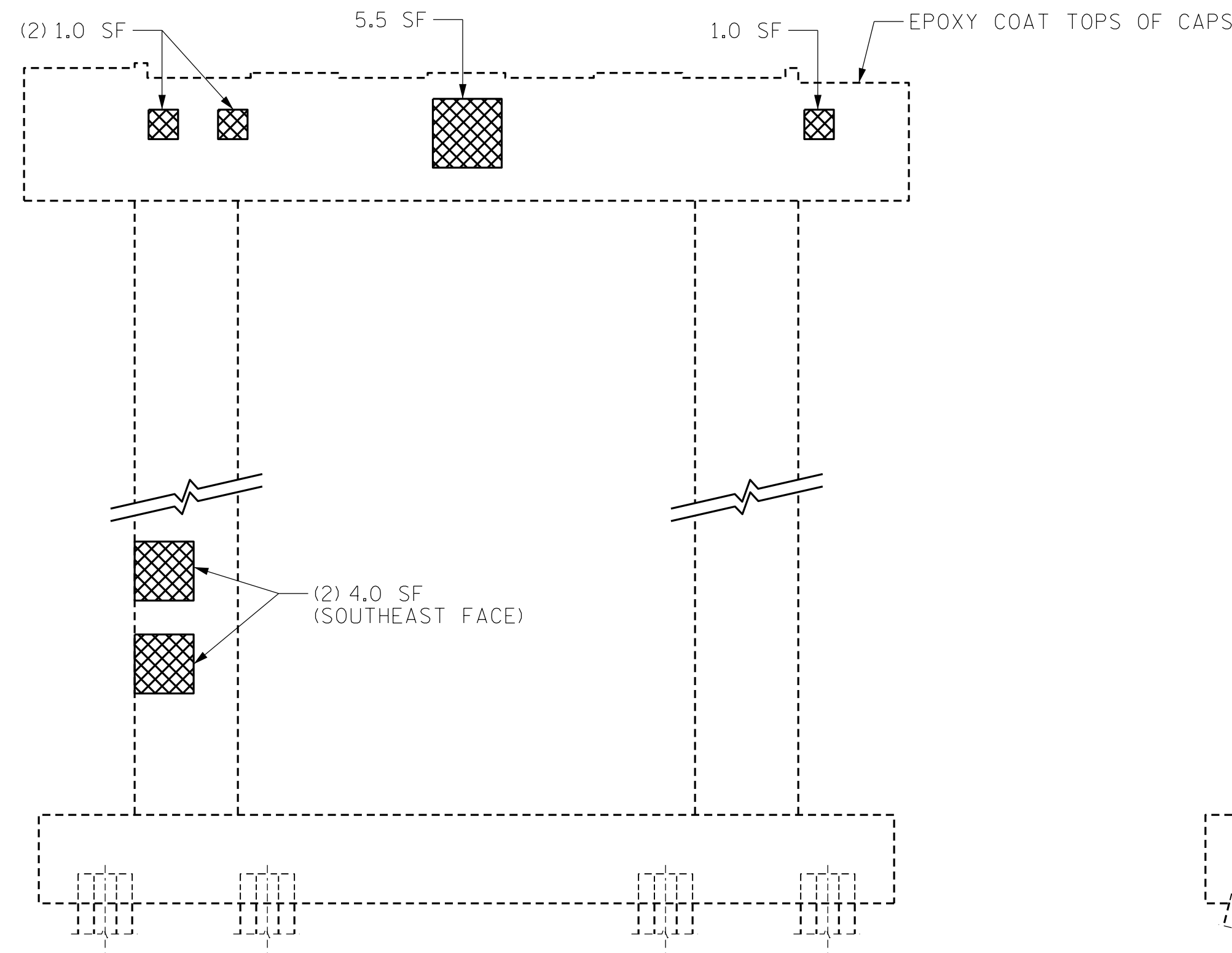
EPOXY RESIN INJECTION (ERI)



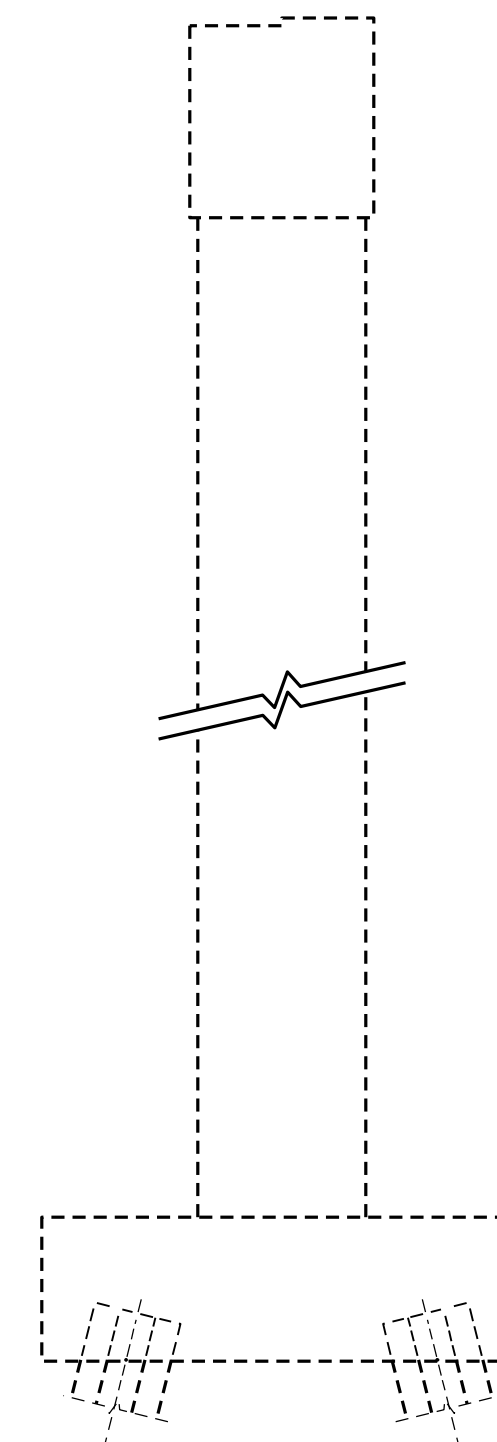
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	18.5	9.25		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.9	1.0		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

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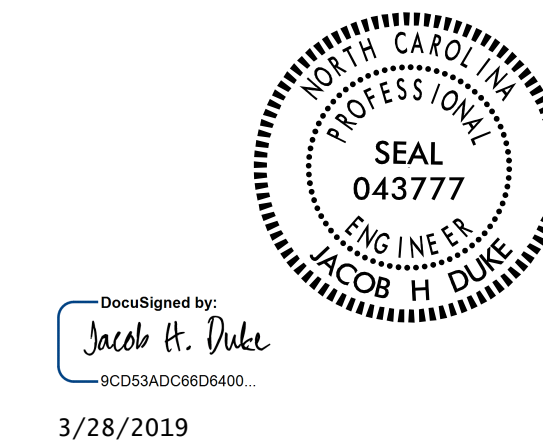
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

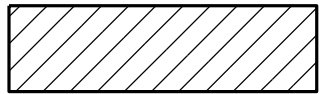
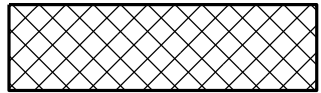



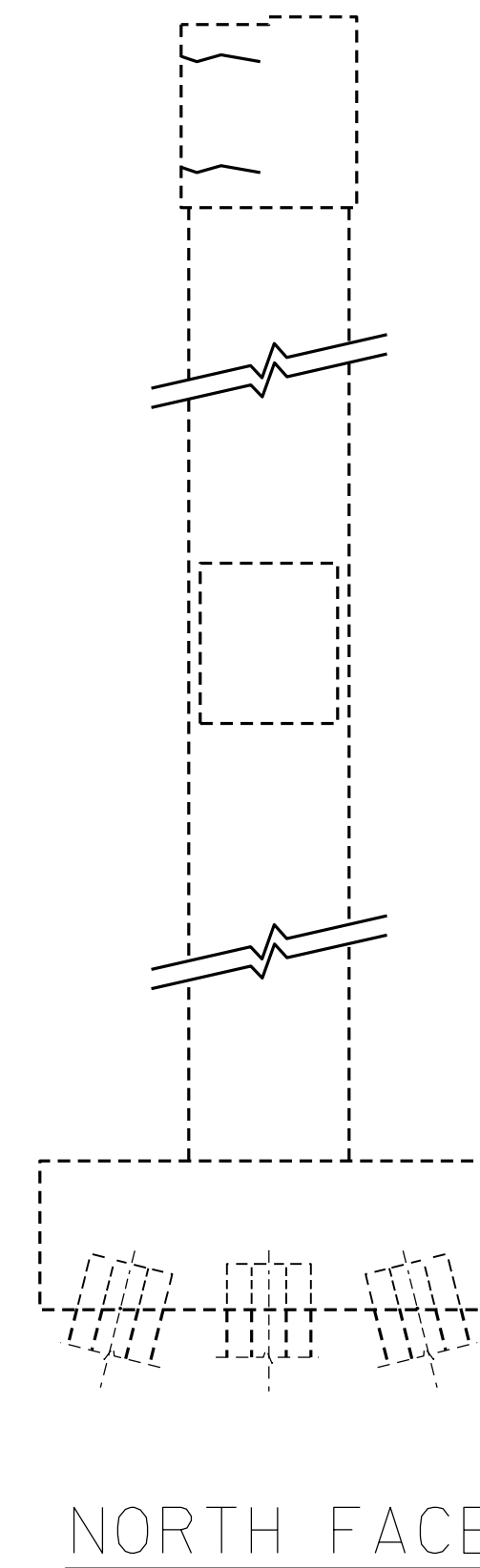
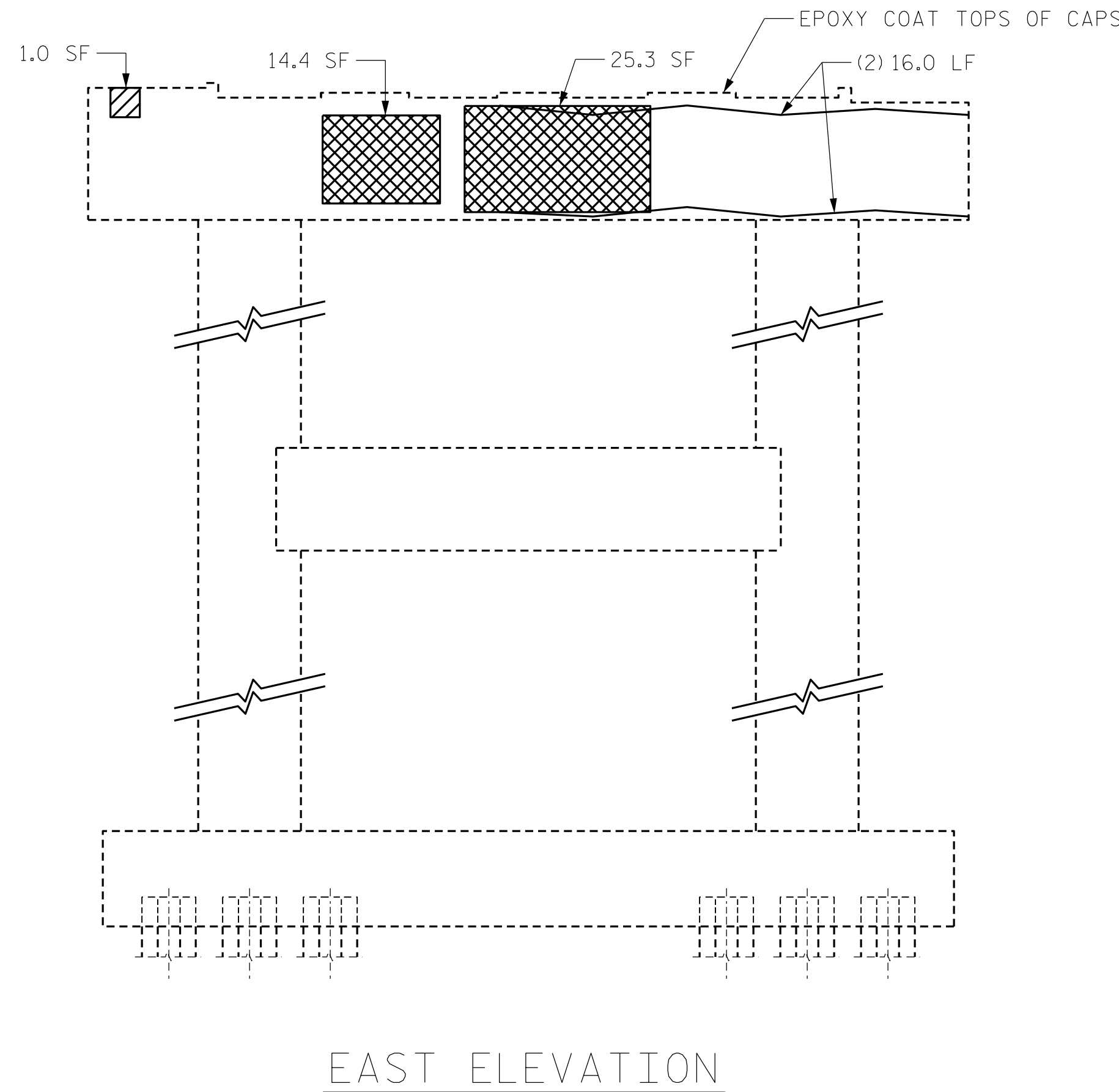
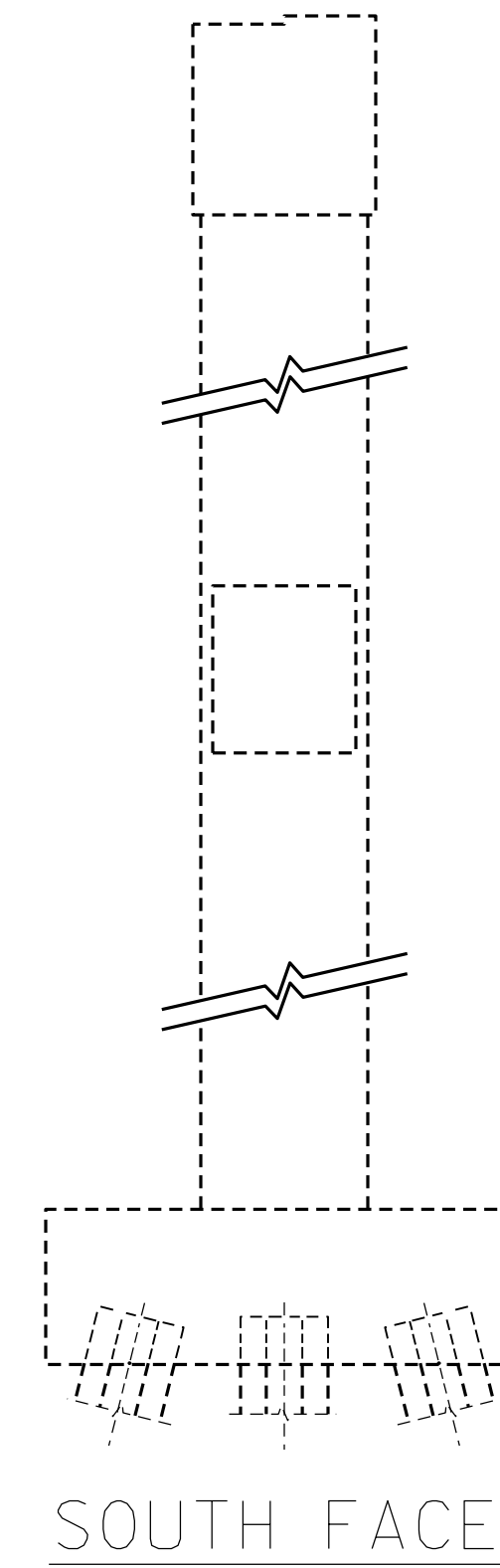
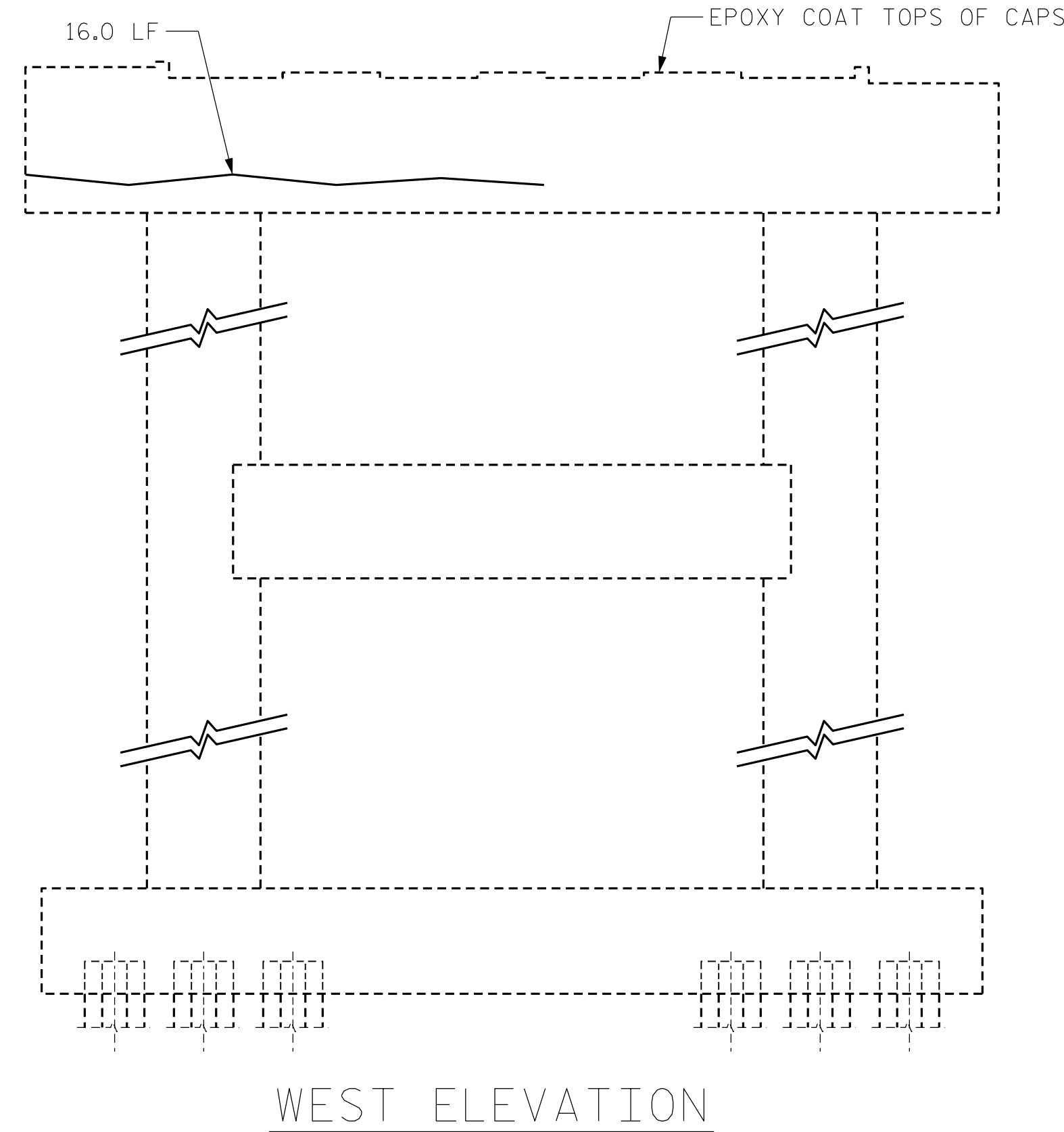
3/28/2019

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE CONCRETE REPAIRS BENT 2					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-26
					TOTAL SHEETS 45

LEGEND:

-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	39.7	19.9		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.0	0.5		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	39.0			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

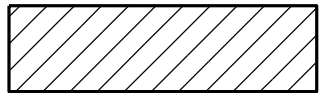
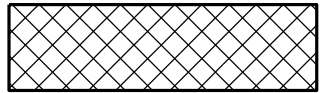



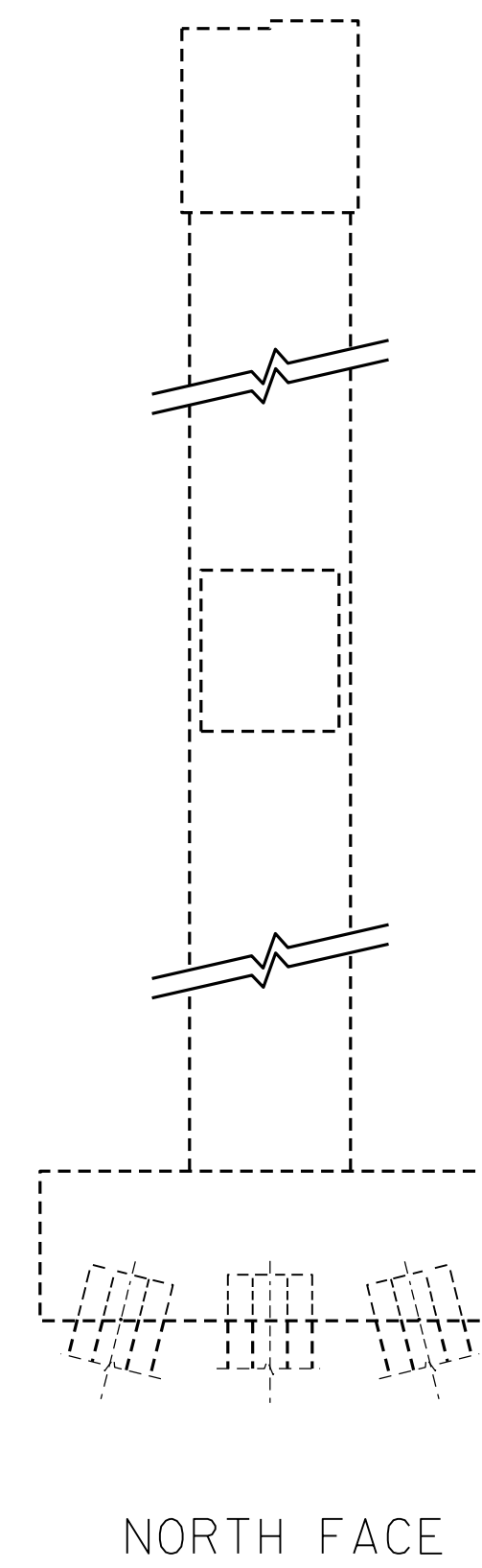
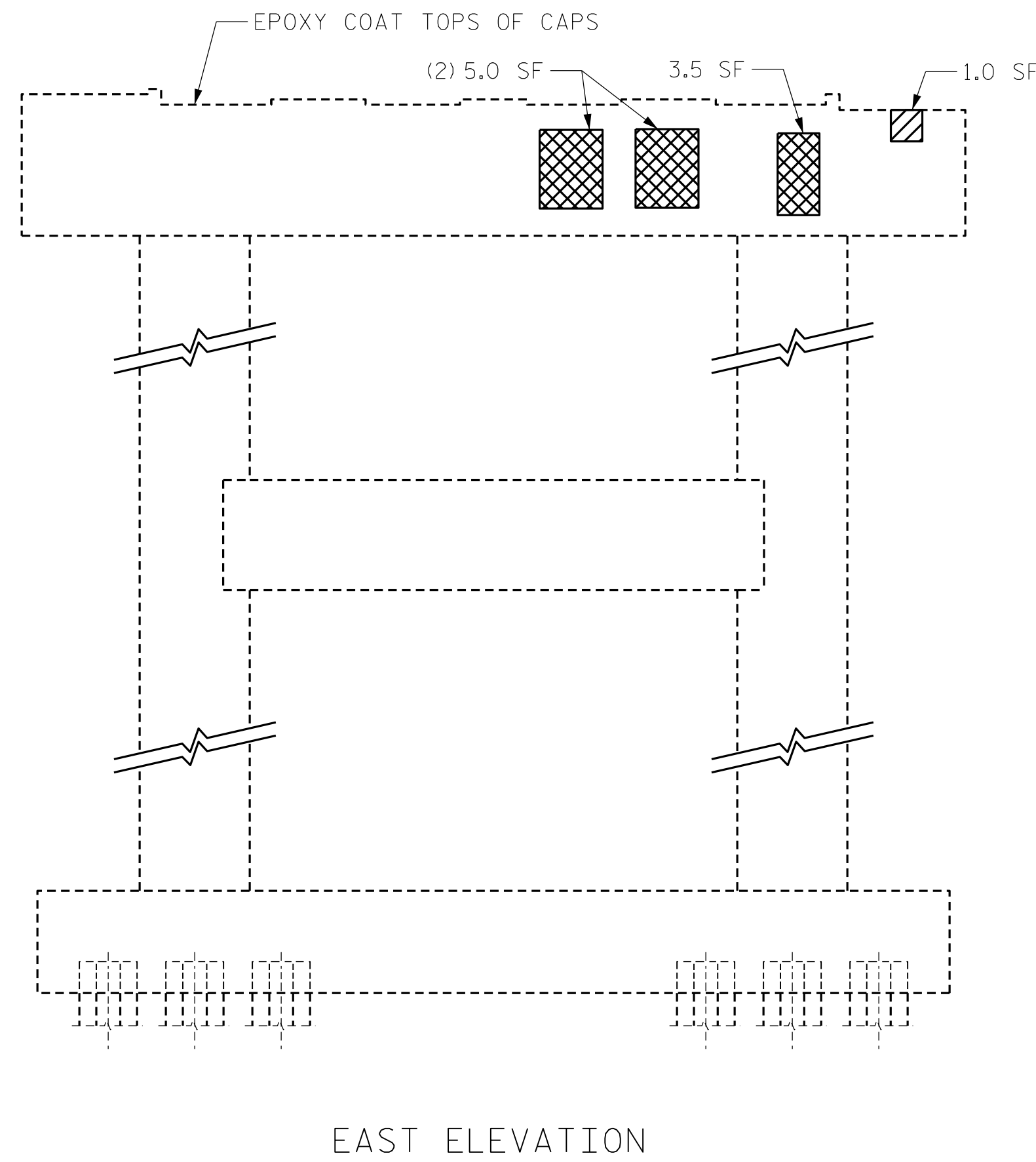
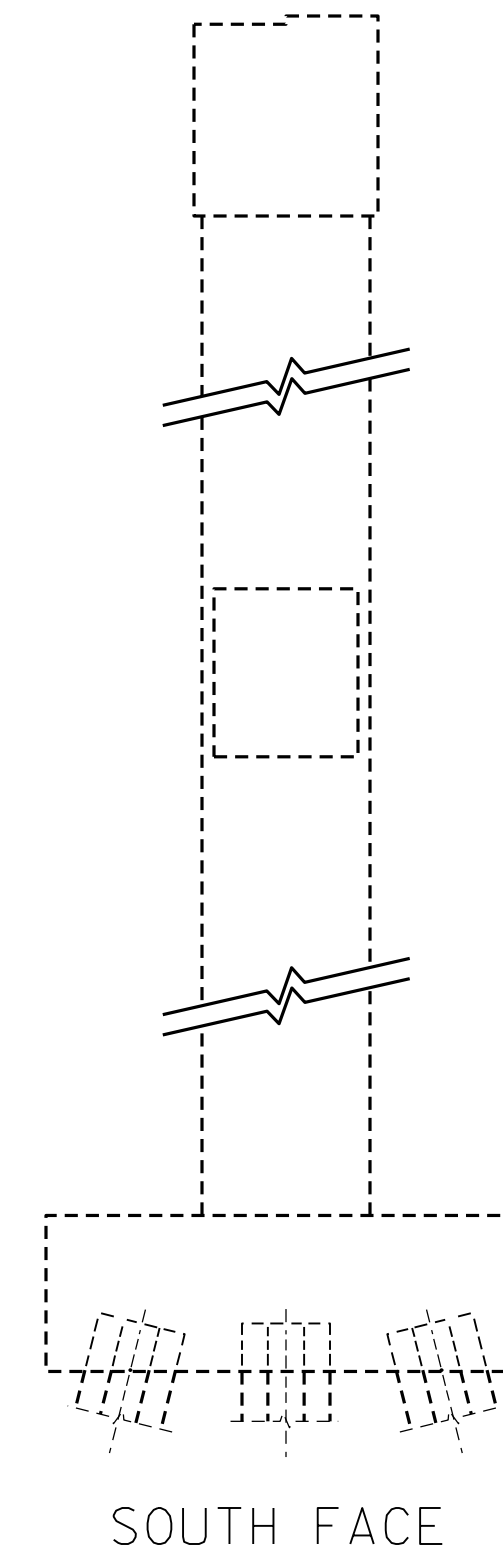
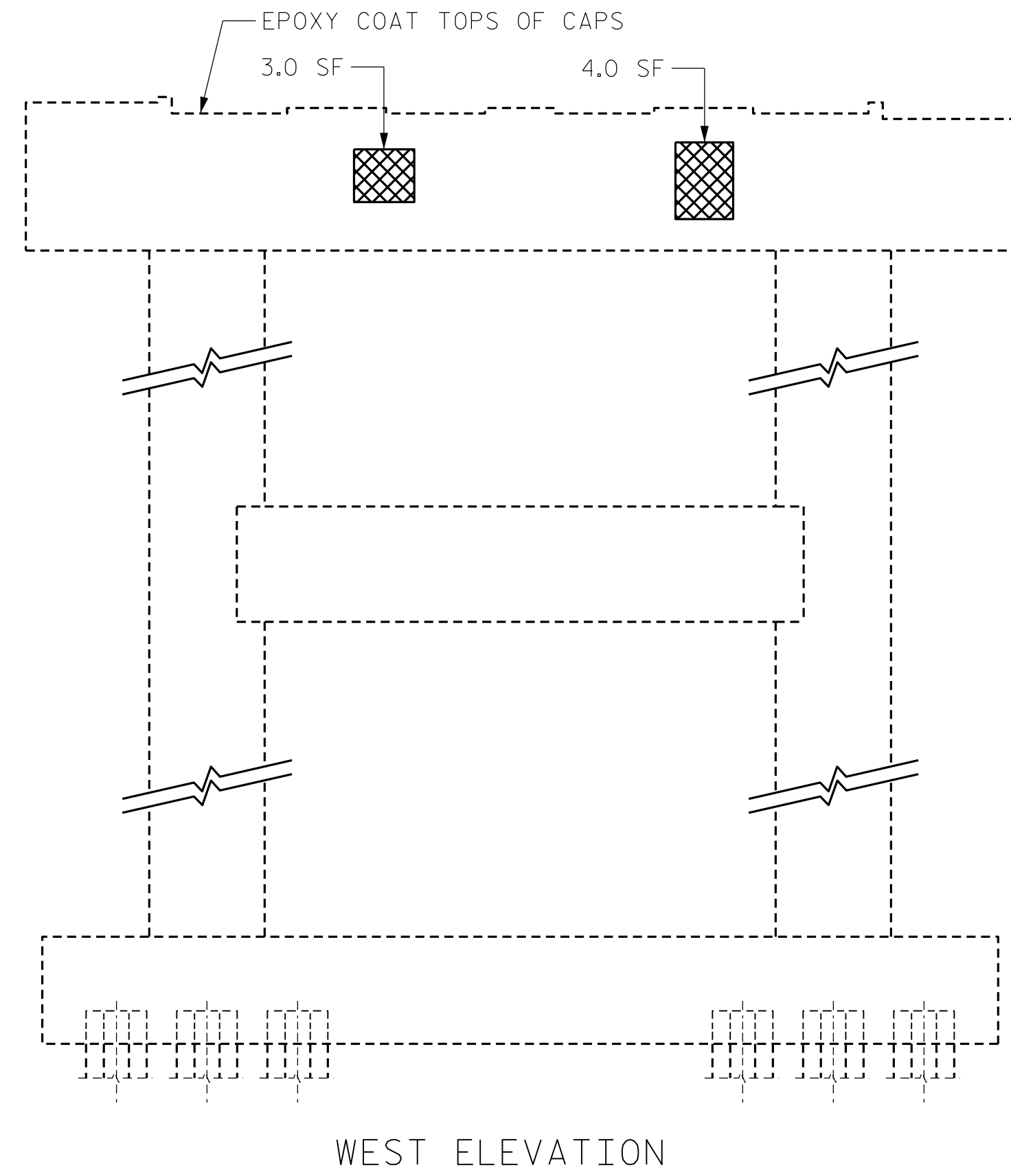
3/28/2019

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE CONCRETE REPAIRS BENT 3					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					TOTAL SHEETS 45

LEGEND:

-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	20.5	10.25		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.0	0.5		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1/2" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRIDGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

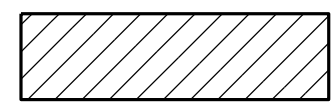


3/28/2019

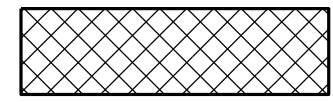
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 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 4						S-28
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:



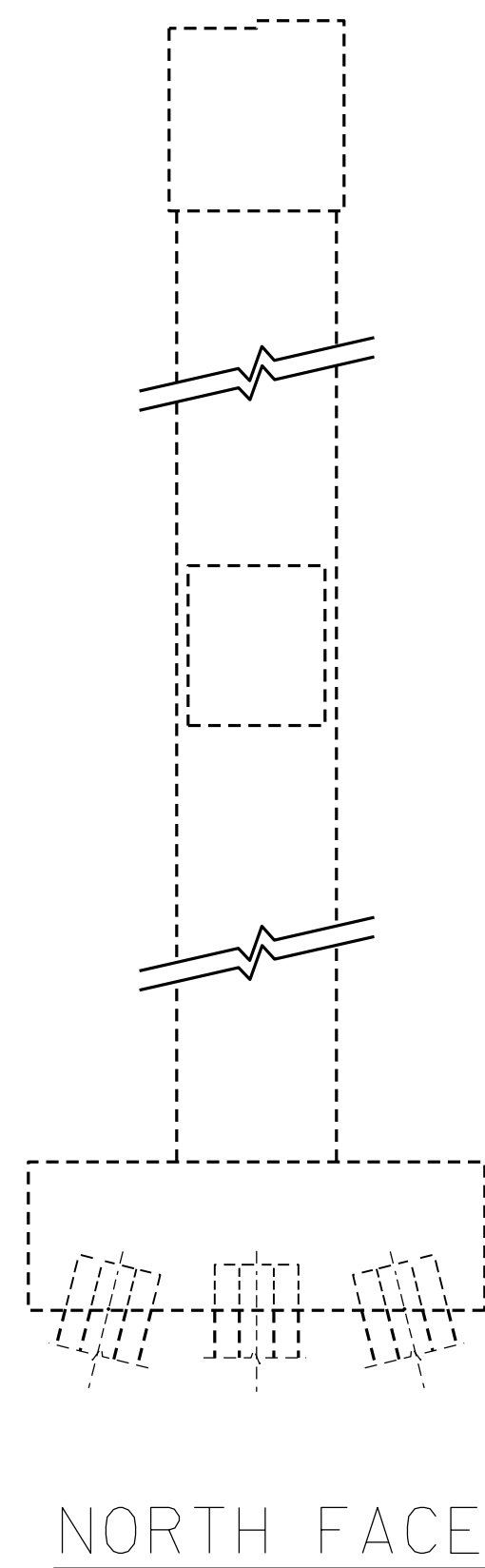
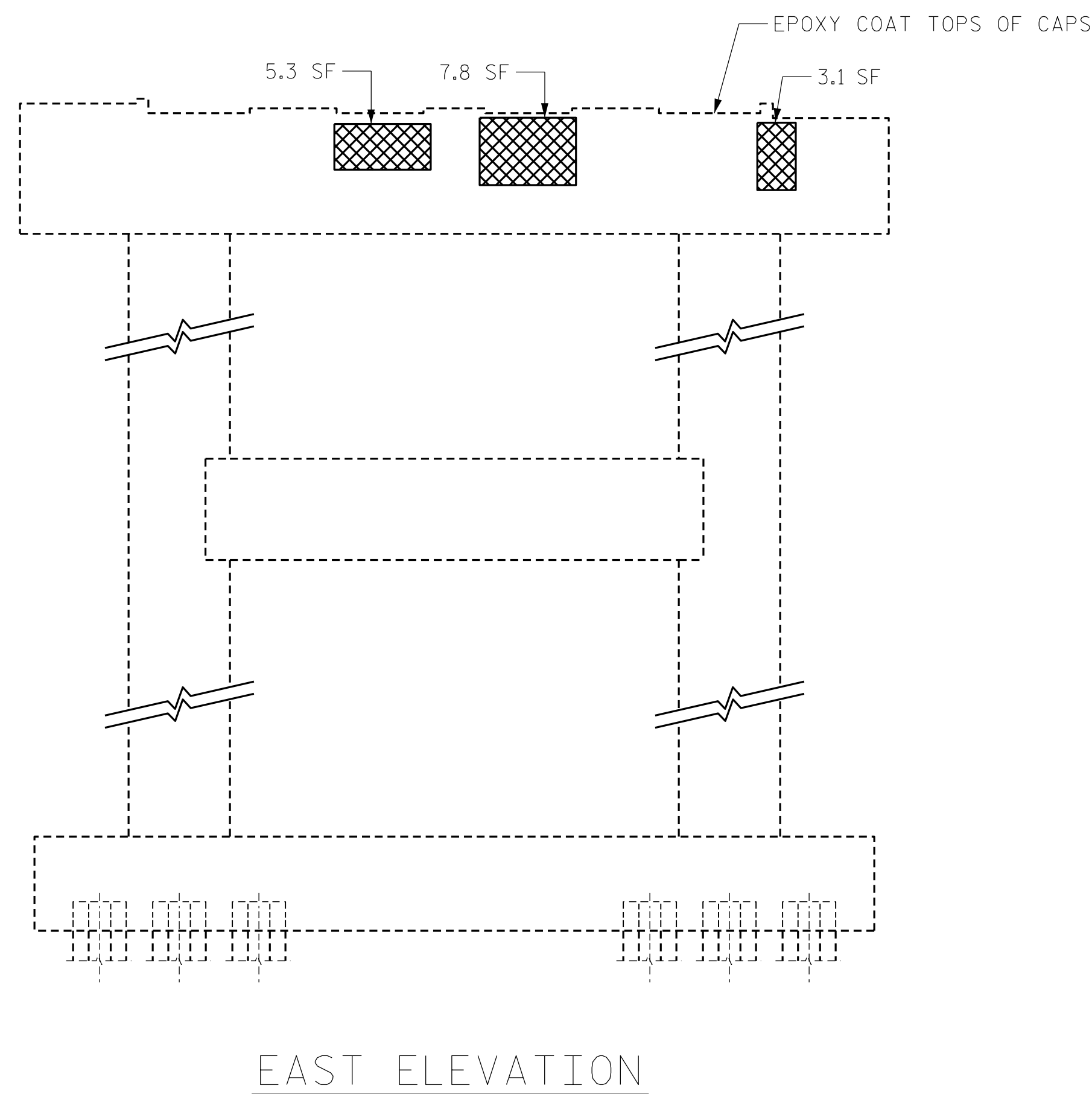
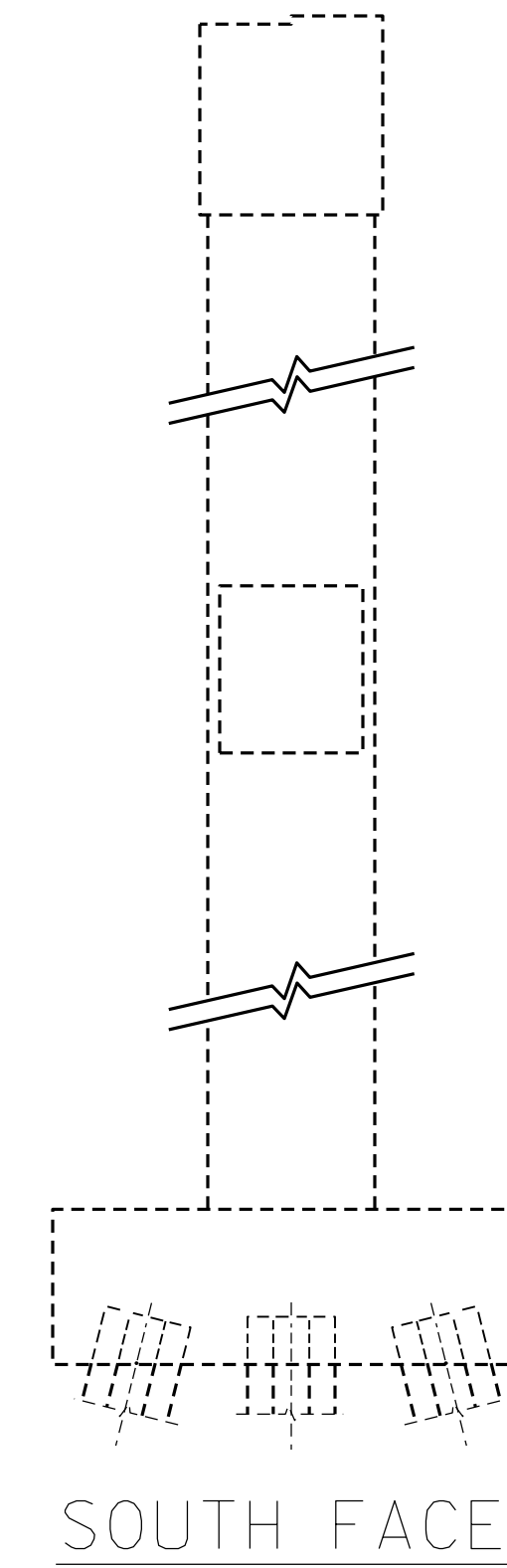
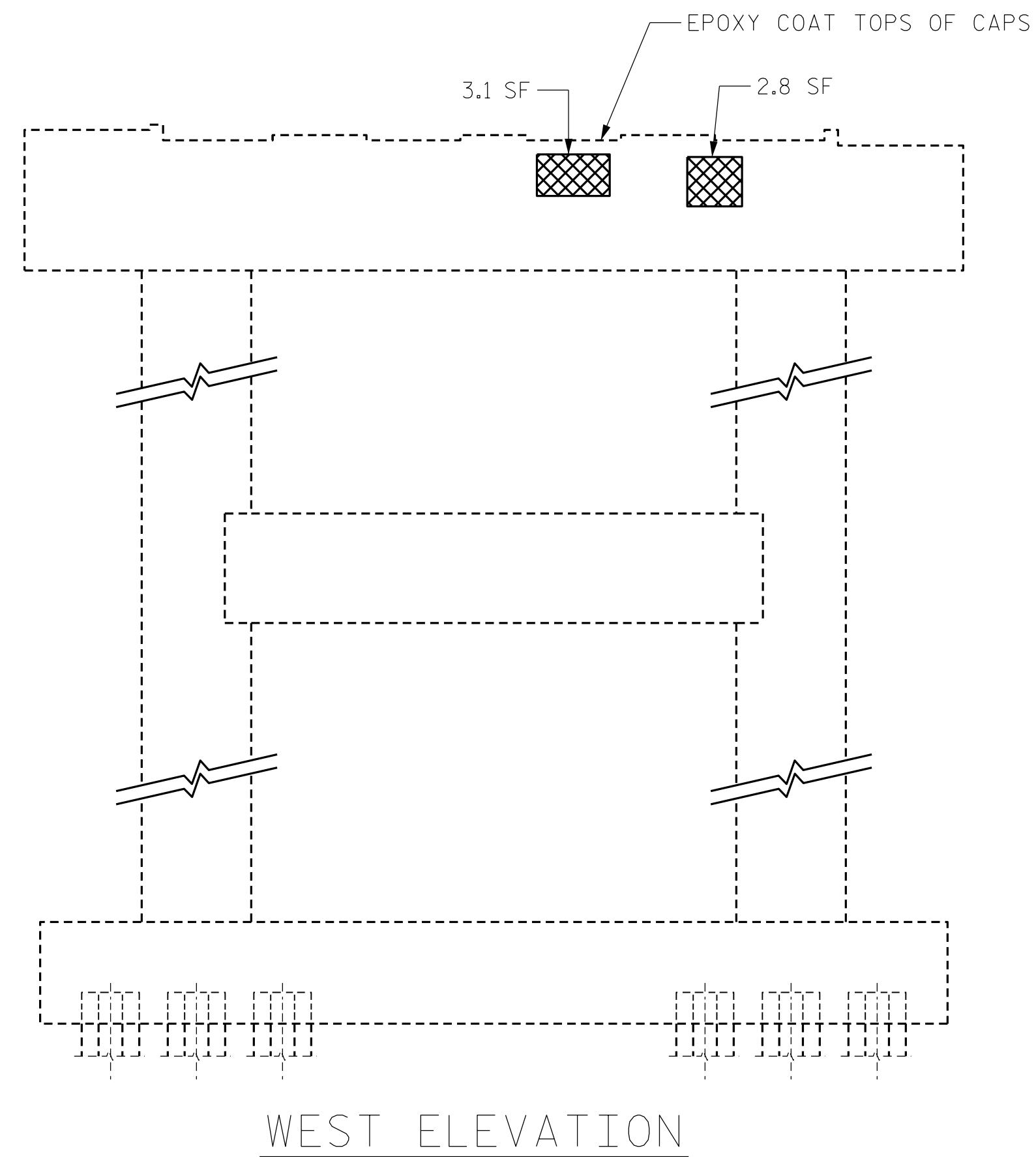
CONCRETE REPAIR AREA



SHOTCRETE REPAIR AREA



EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	22.1	11.1		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	2.2	1.1		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

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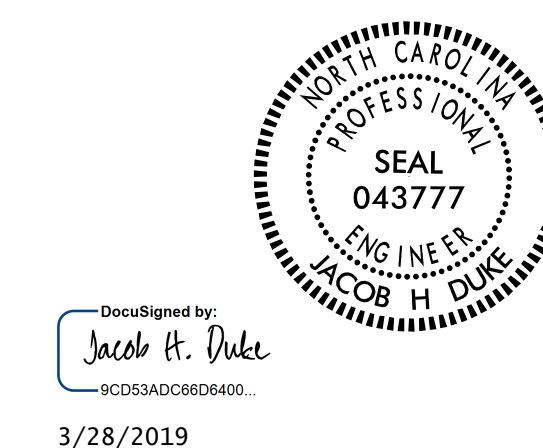
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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 BRIDGE NO. 090013

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 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

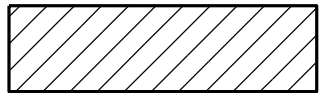
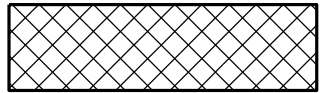



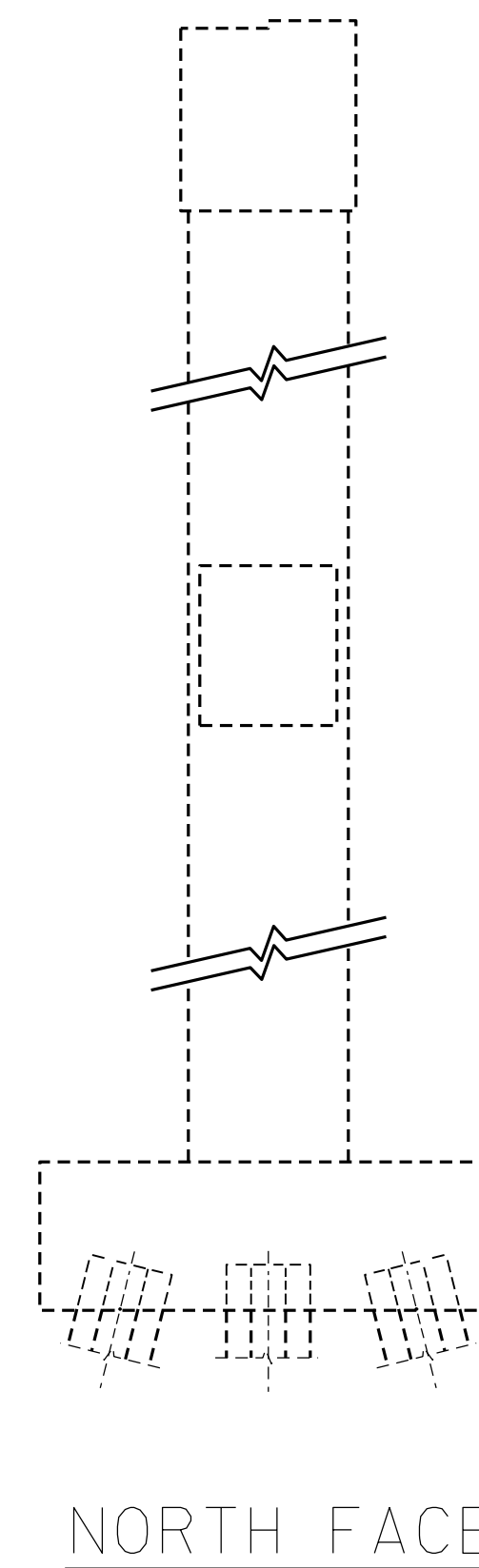
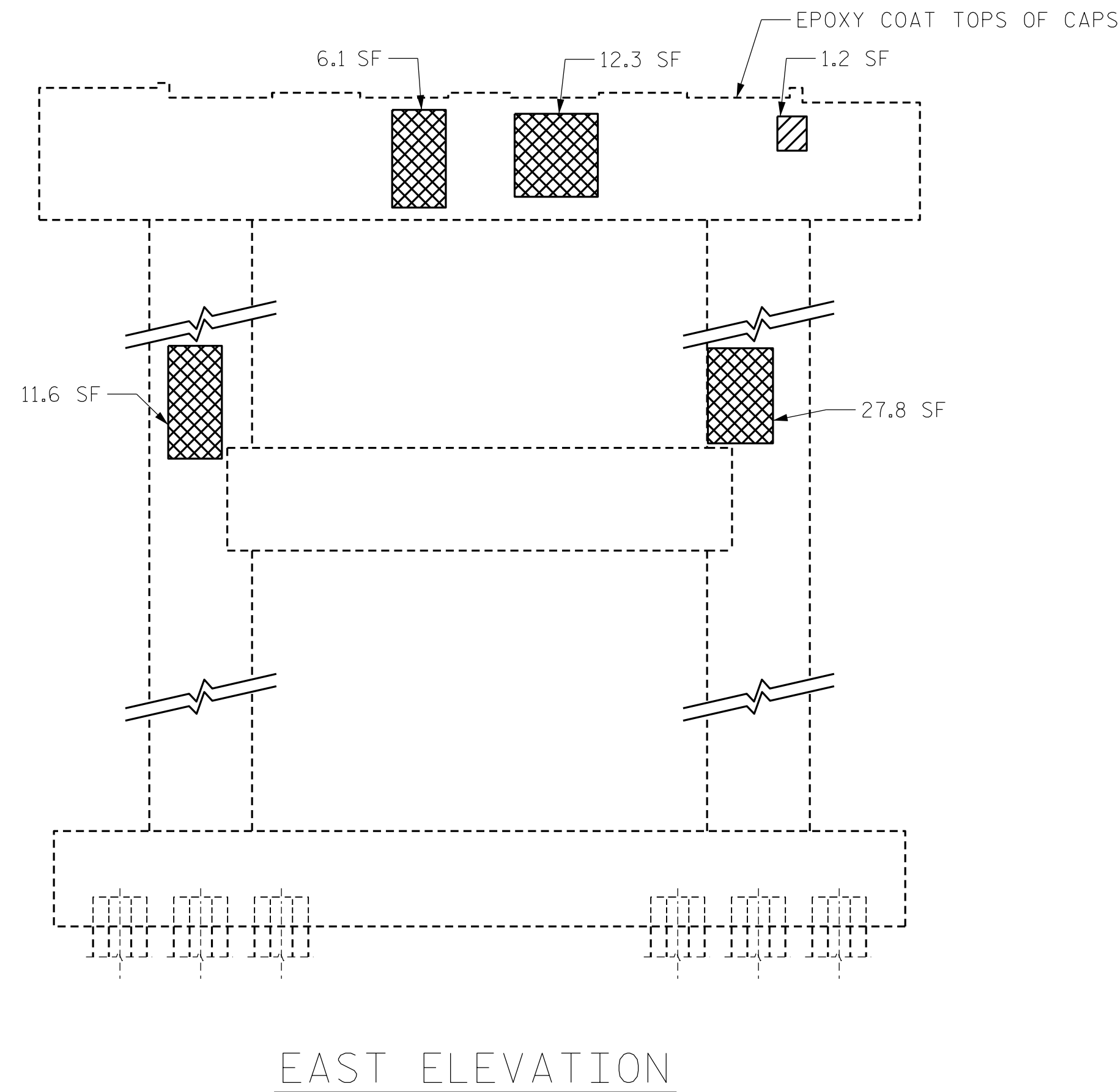
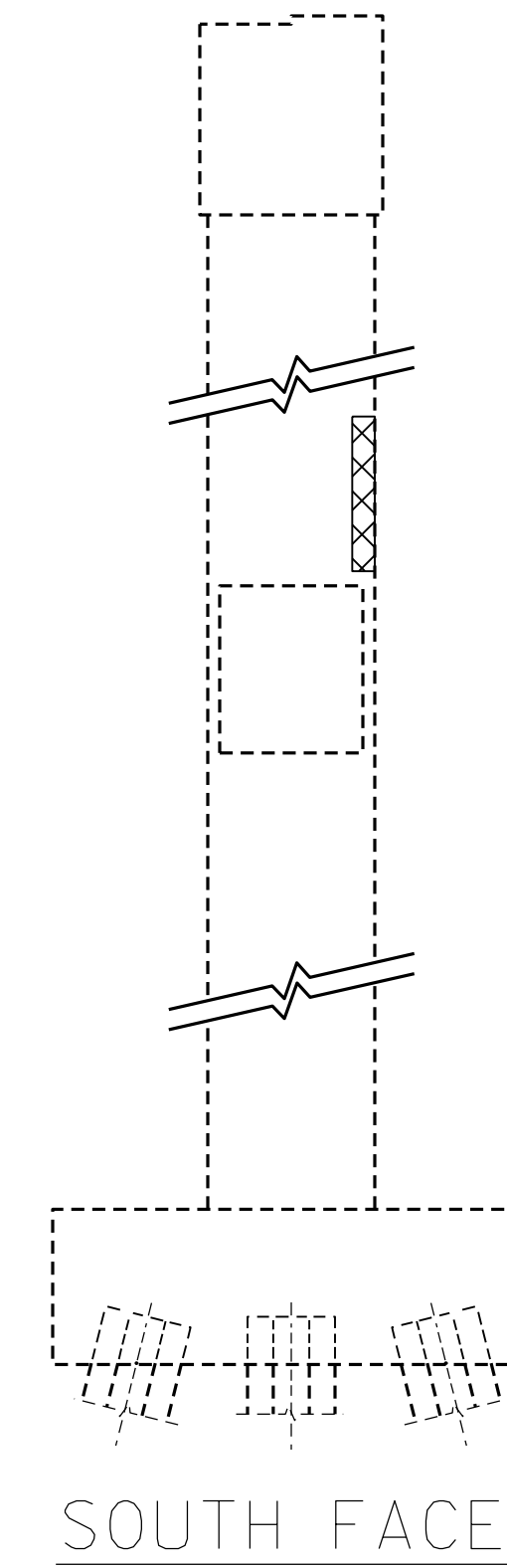
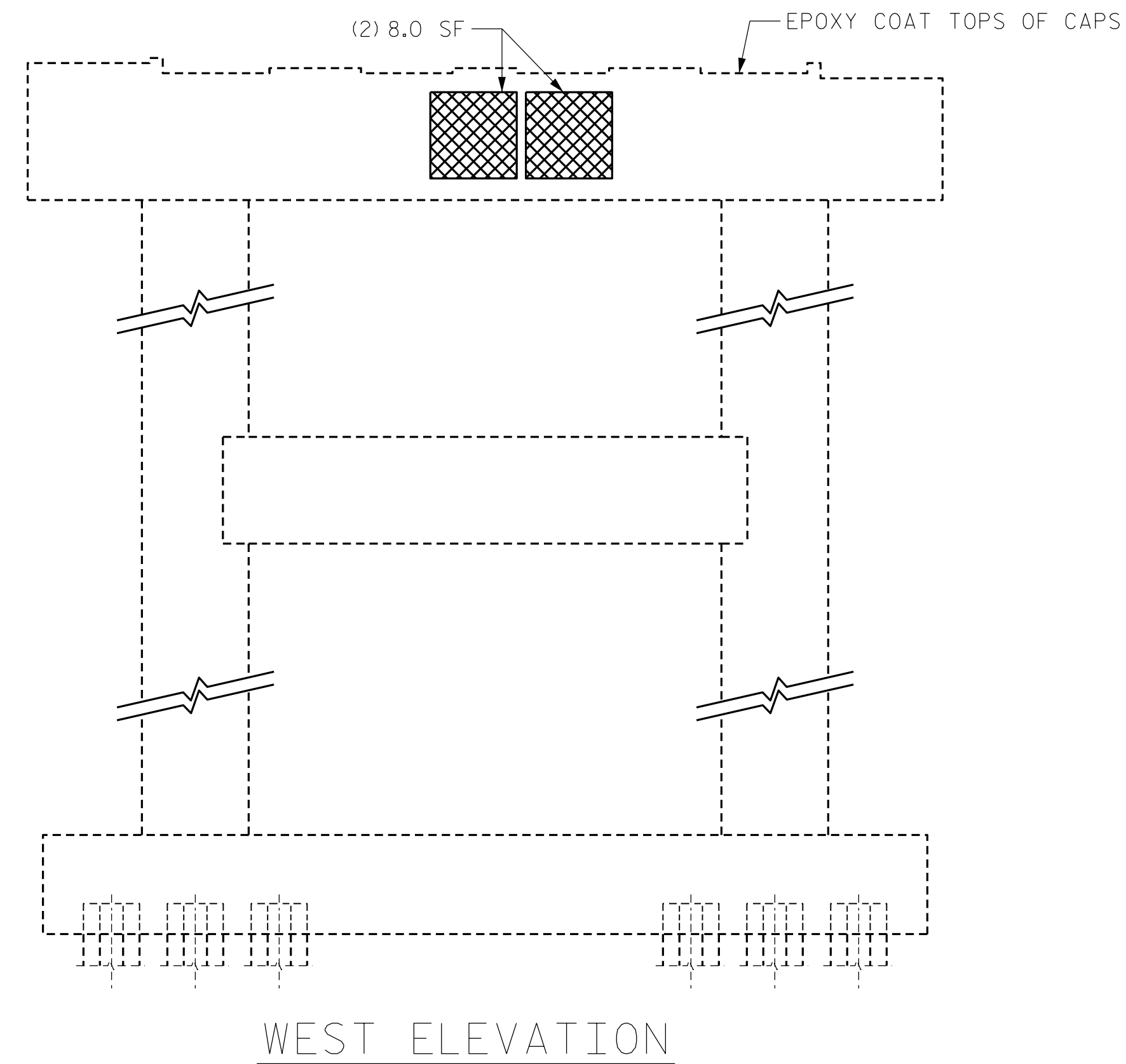
3/28/2019

DOCUMENT NOT CONSIDERED
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE CONCRETE REPAIRS BENT 5					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-29
					TOTAL SHEETS 45

LEGEND:

-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	34.4	17.2		
COLUMN/PILE	39.4	19.7		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.2	0.6		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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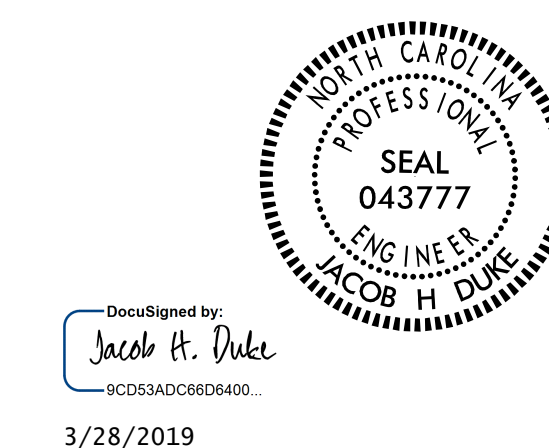
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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BRUNSWICK COUNTY
 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
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 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

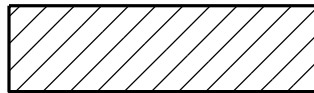




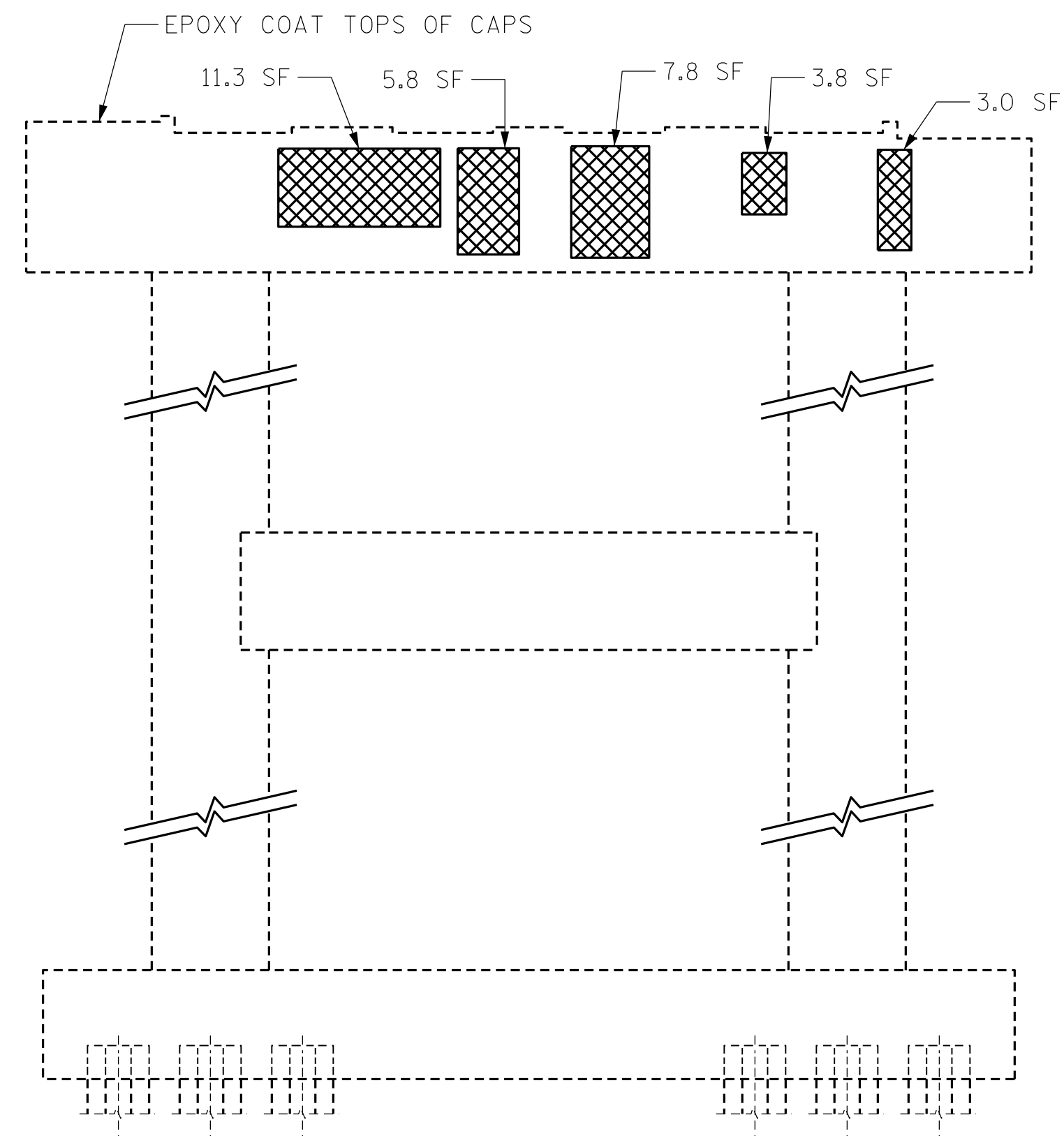
3/28/2019

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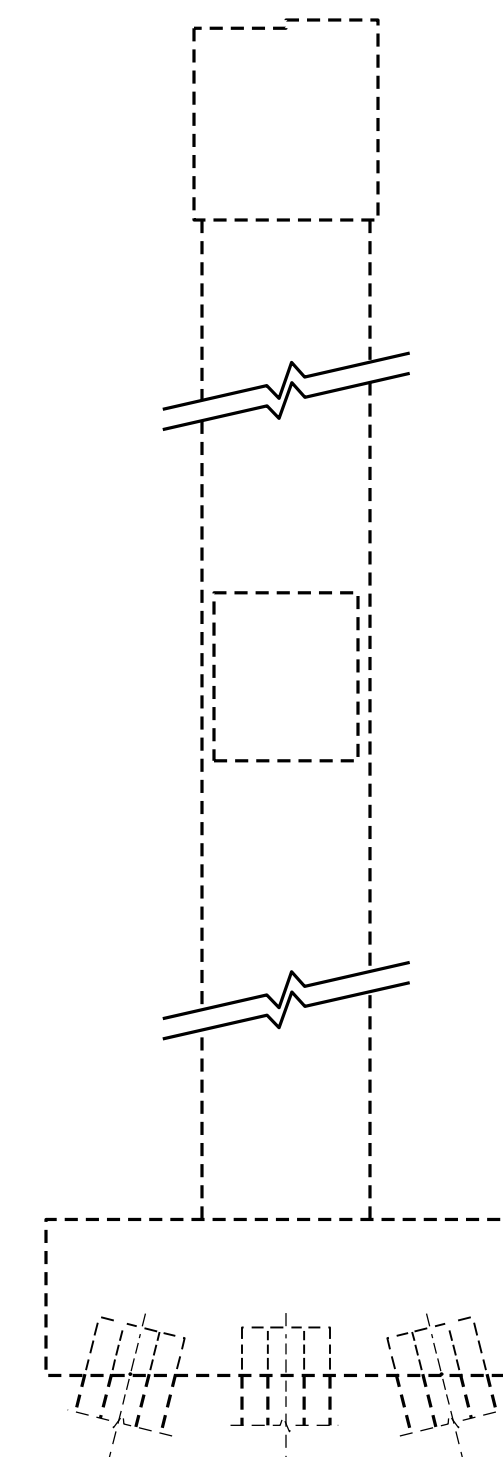
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE CONCRETE REPAIRS BENT 6					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-30
					TOTAL SHEETS 45

LEGEND:

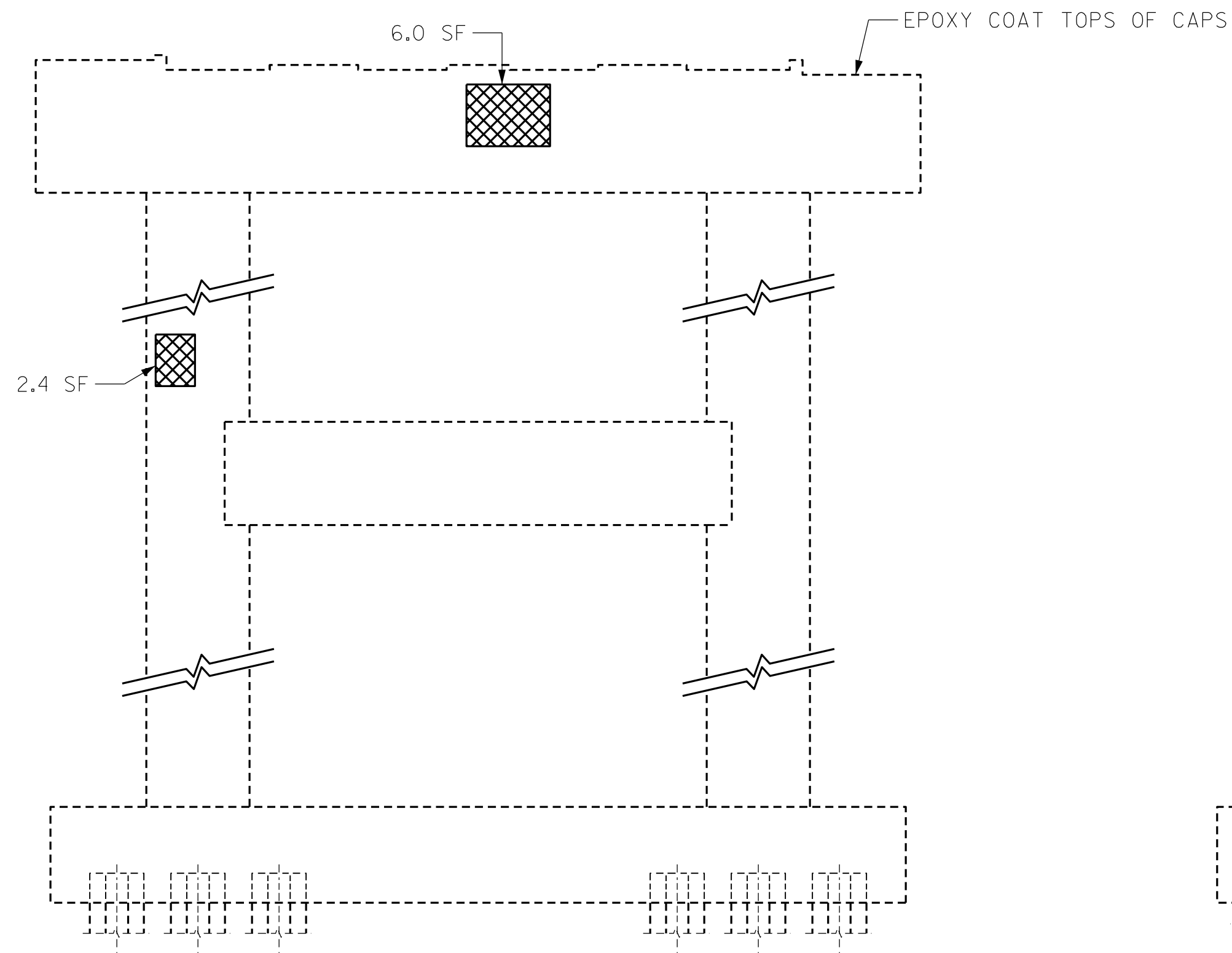
-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



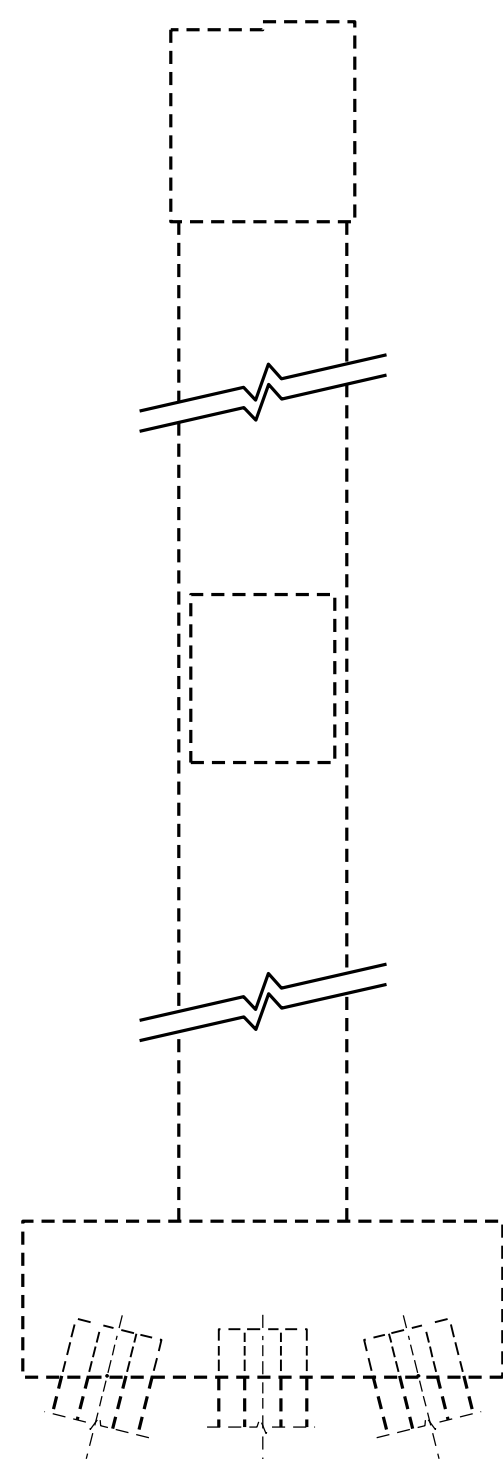
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	37.7	18.9		
COLUMN/PILE	2.4	1.2		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	3.8	1.9		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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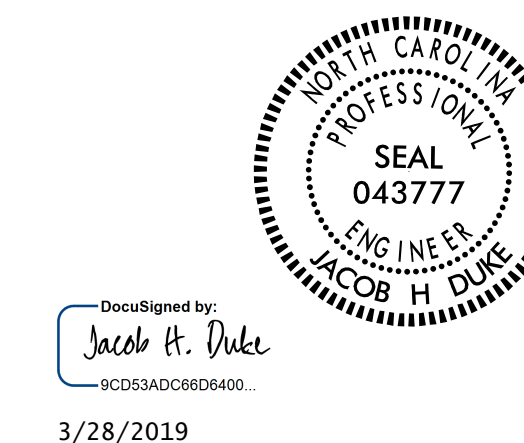
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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BRUNSWICK COUNTY
 BRIDGE NO. 090013

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 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

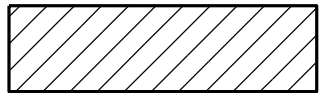
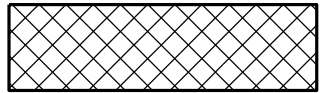



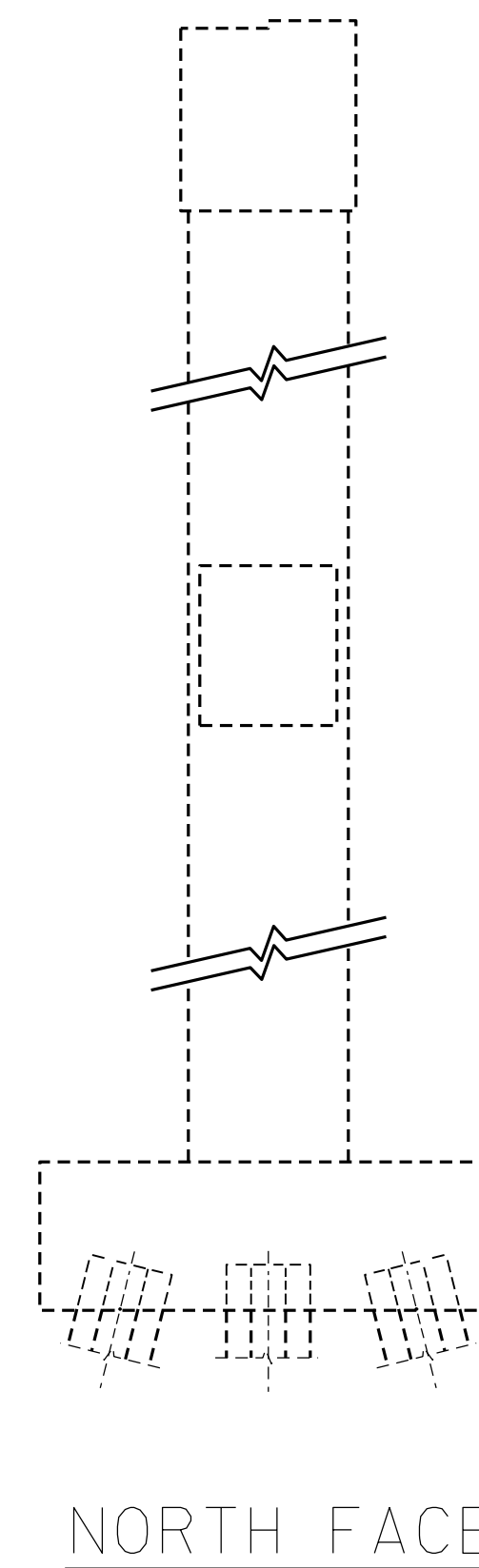
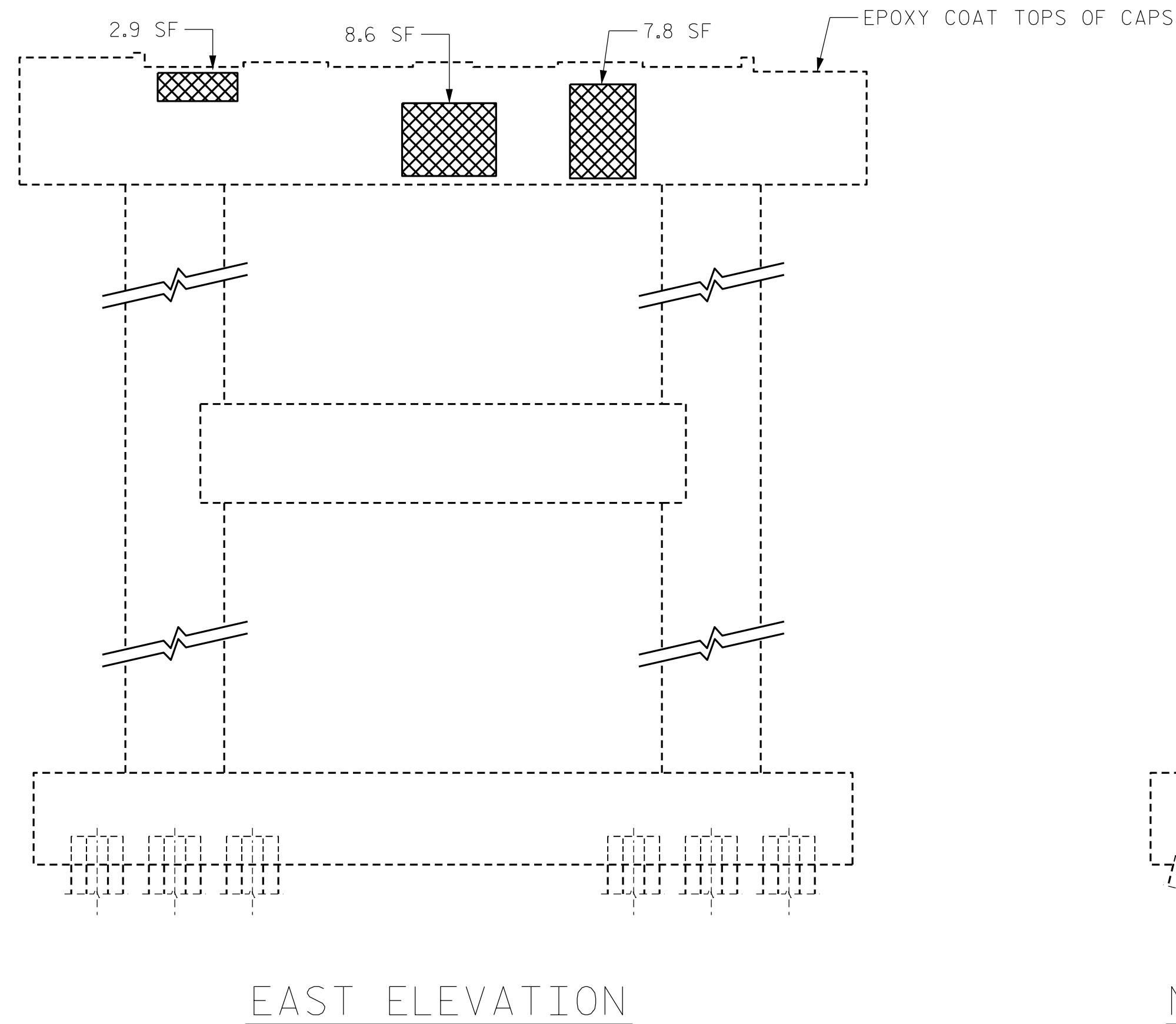
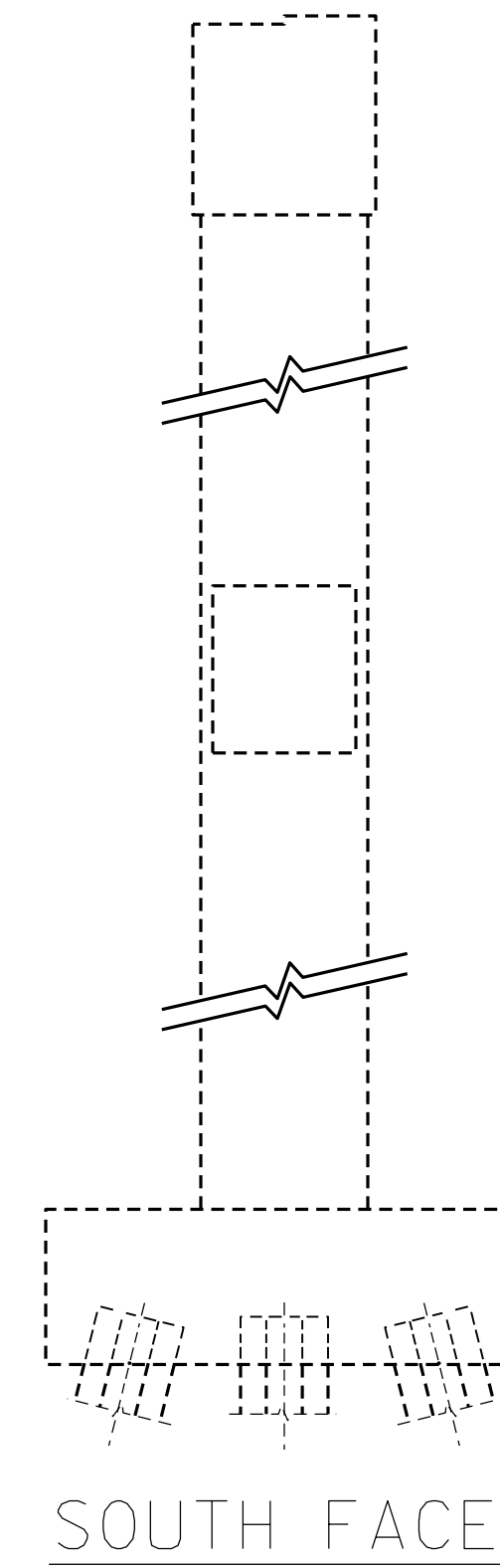
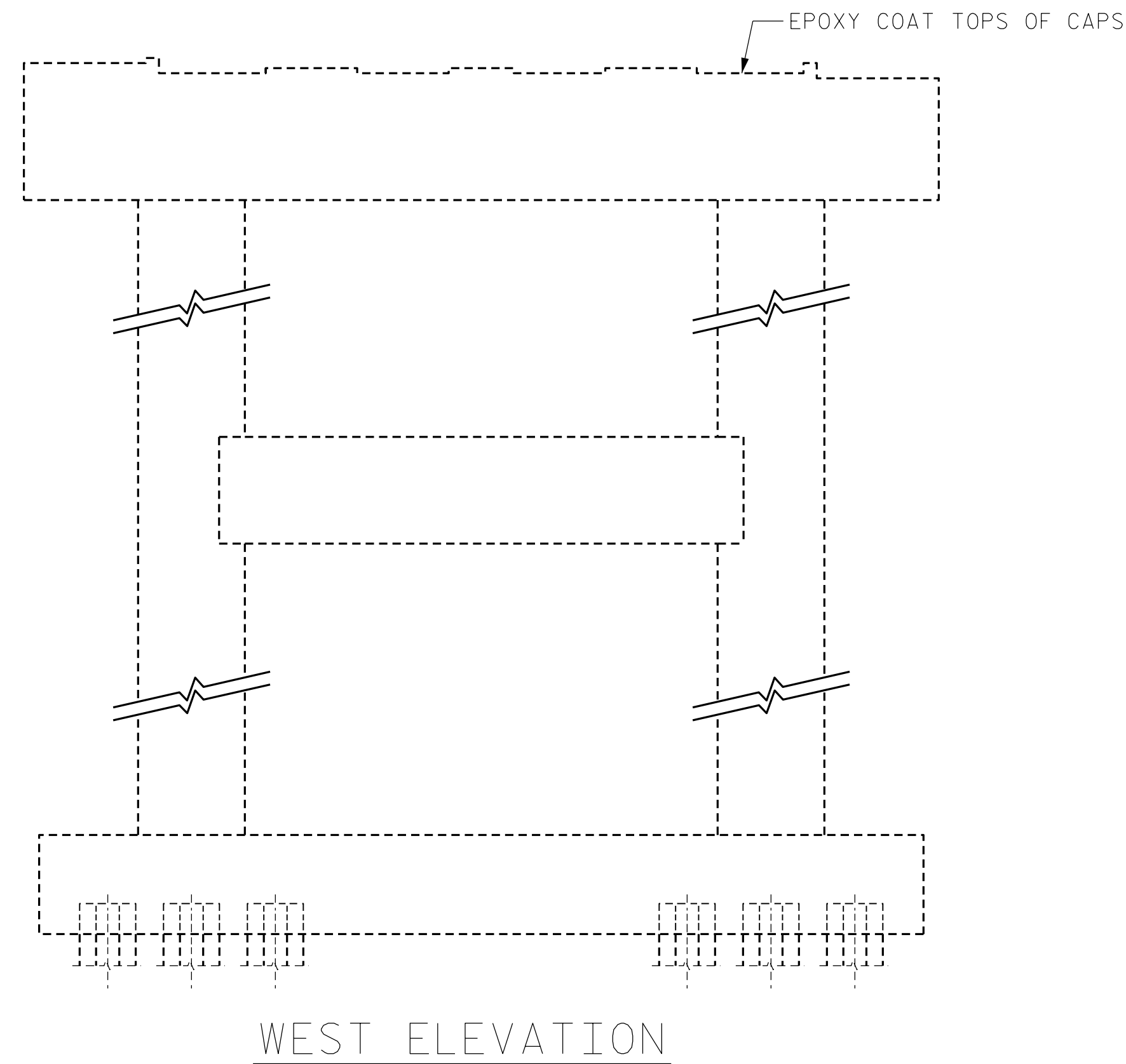
3/28/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 7						S-31
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:

-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	19.3	9.7		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.9	1.0		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

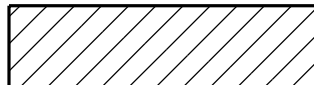




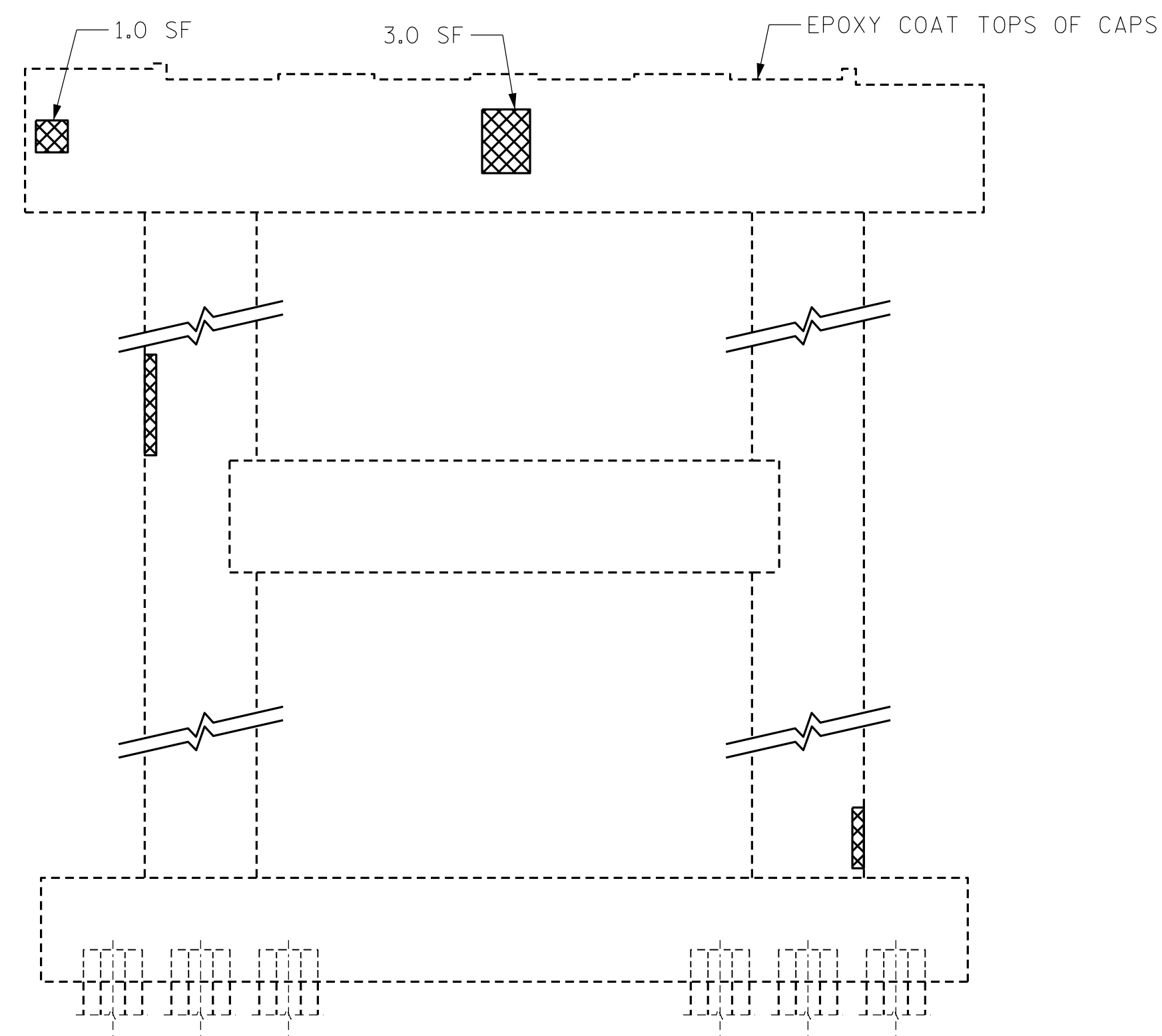
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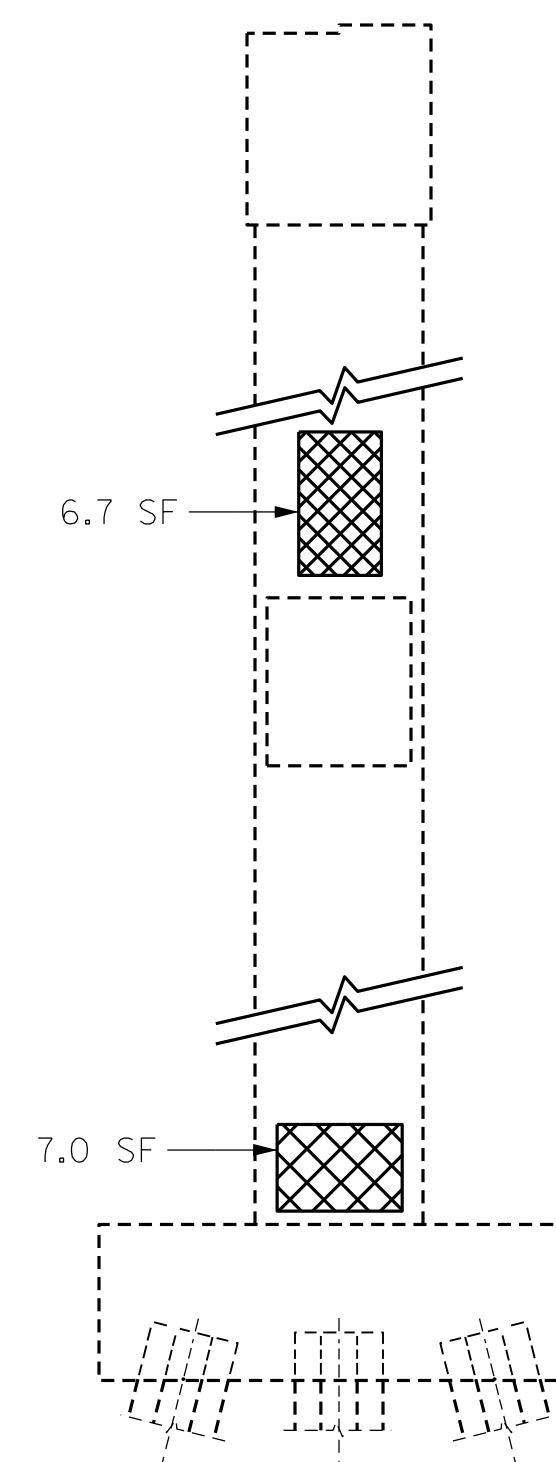
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 8						S-32
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
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2			4			

LEGEND:

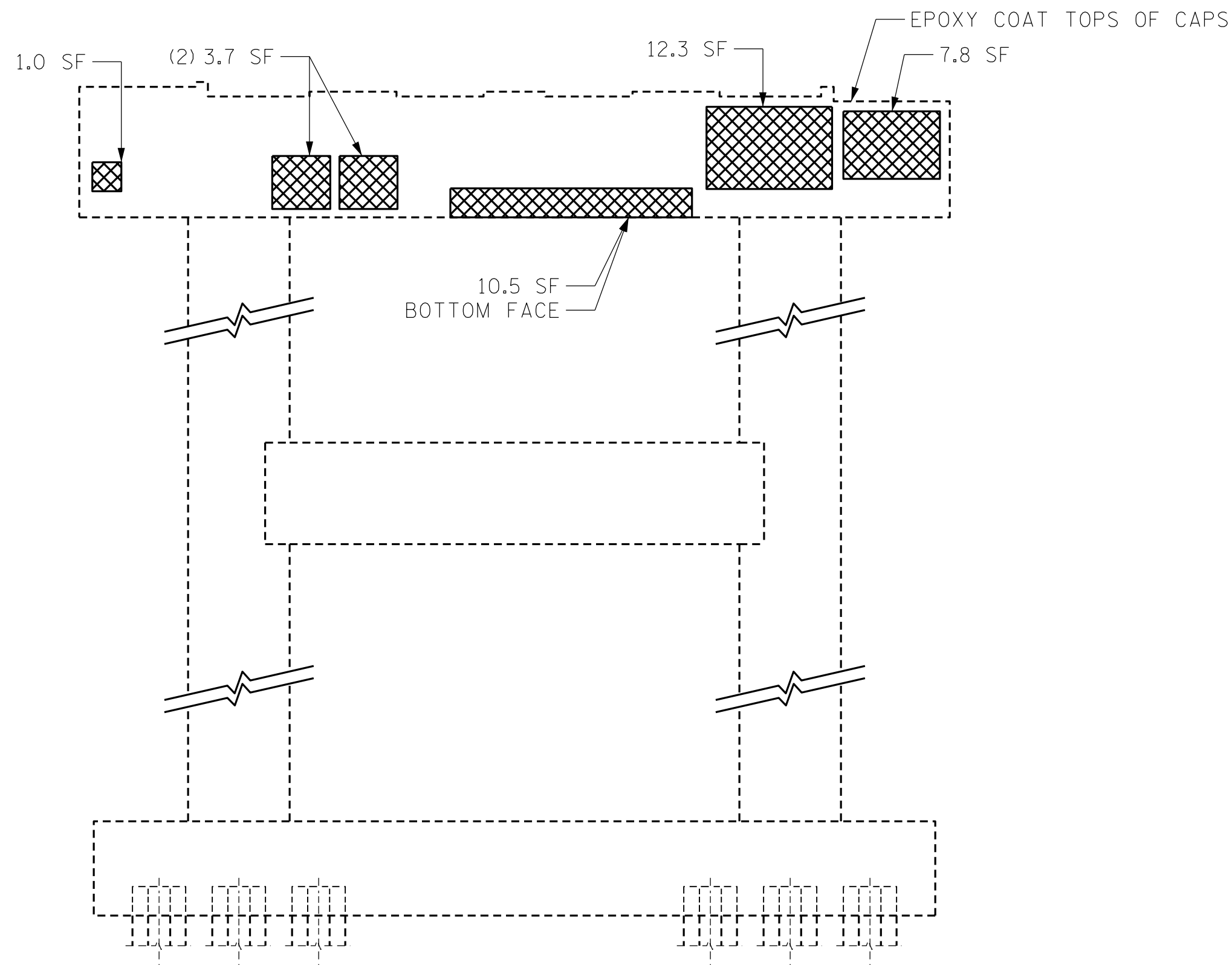
-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



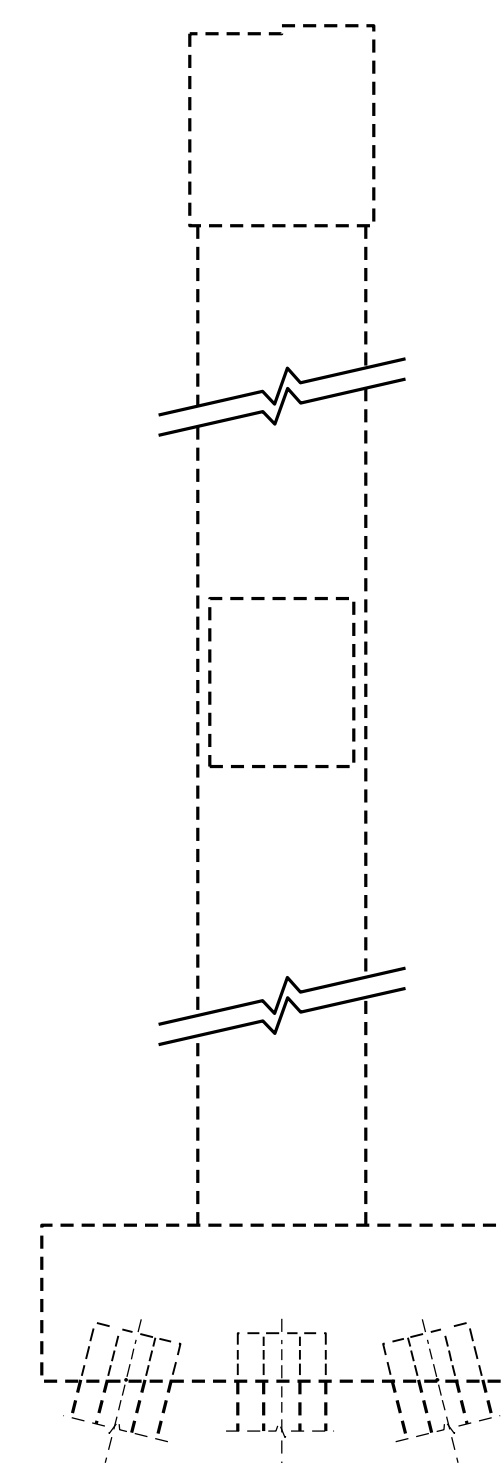
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	43	21.5		
COLUMN/PILE	13.7	6.9		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	4.3	2.2		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING		AREA SQ. FT.		AREA SQ. FT.
CAP		120		

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



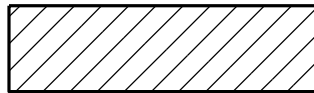


3/28/2019

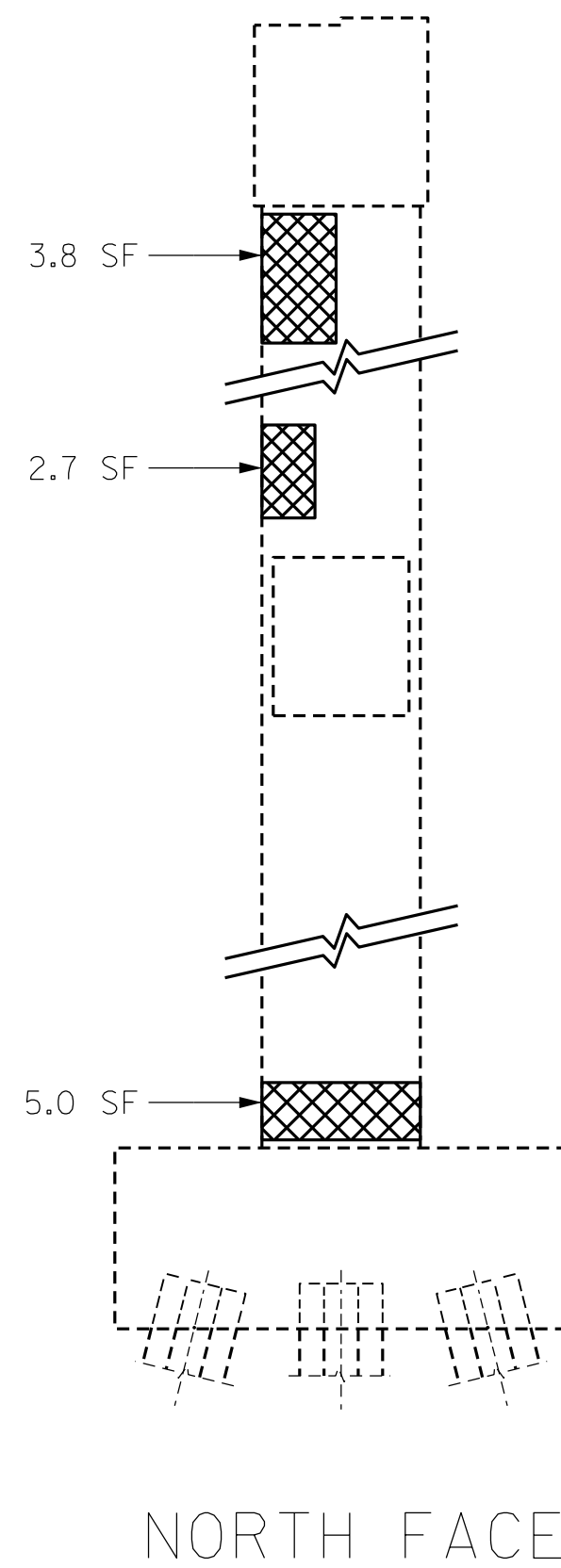
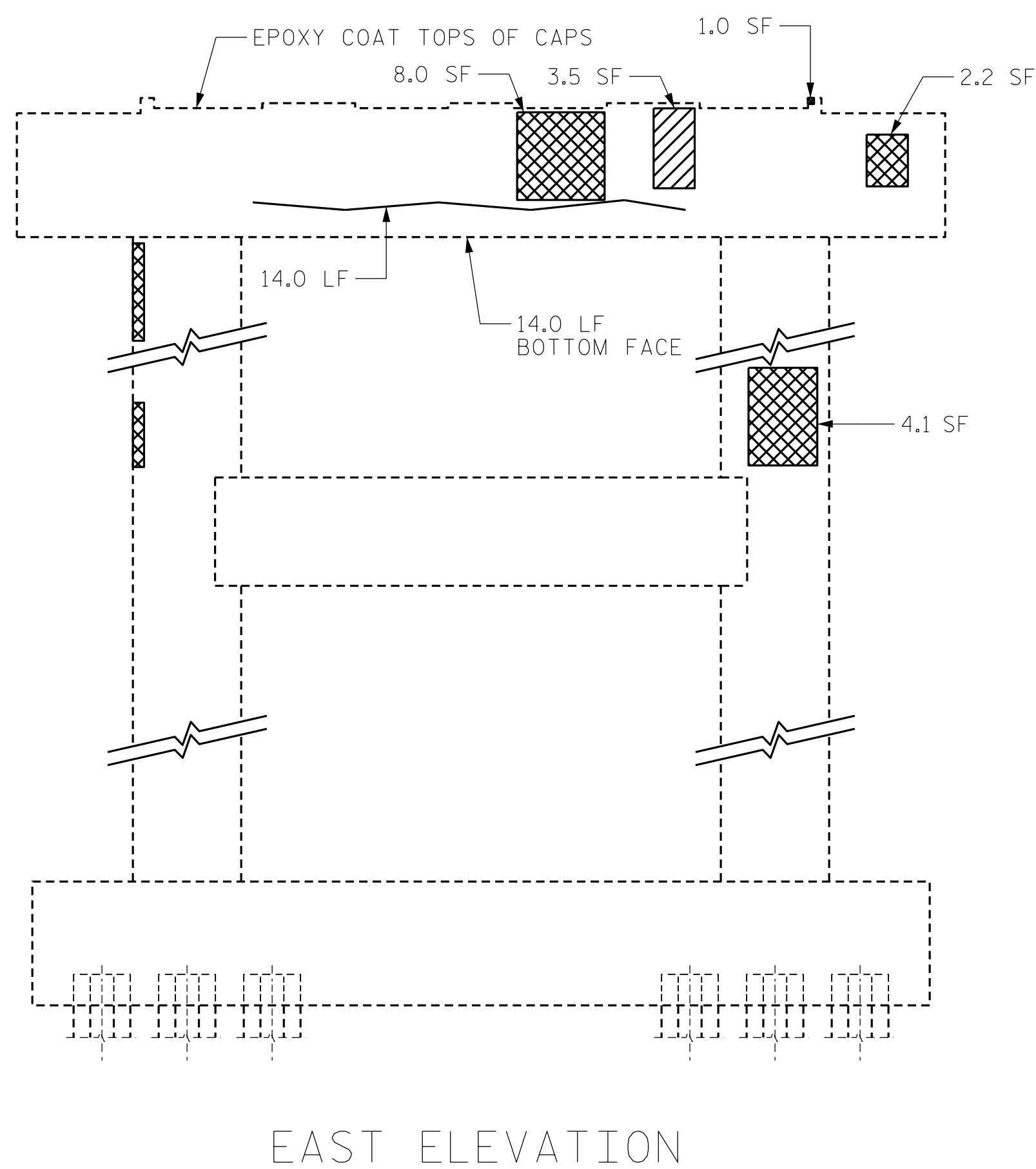
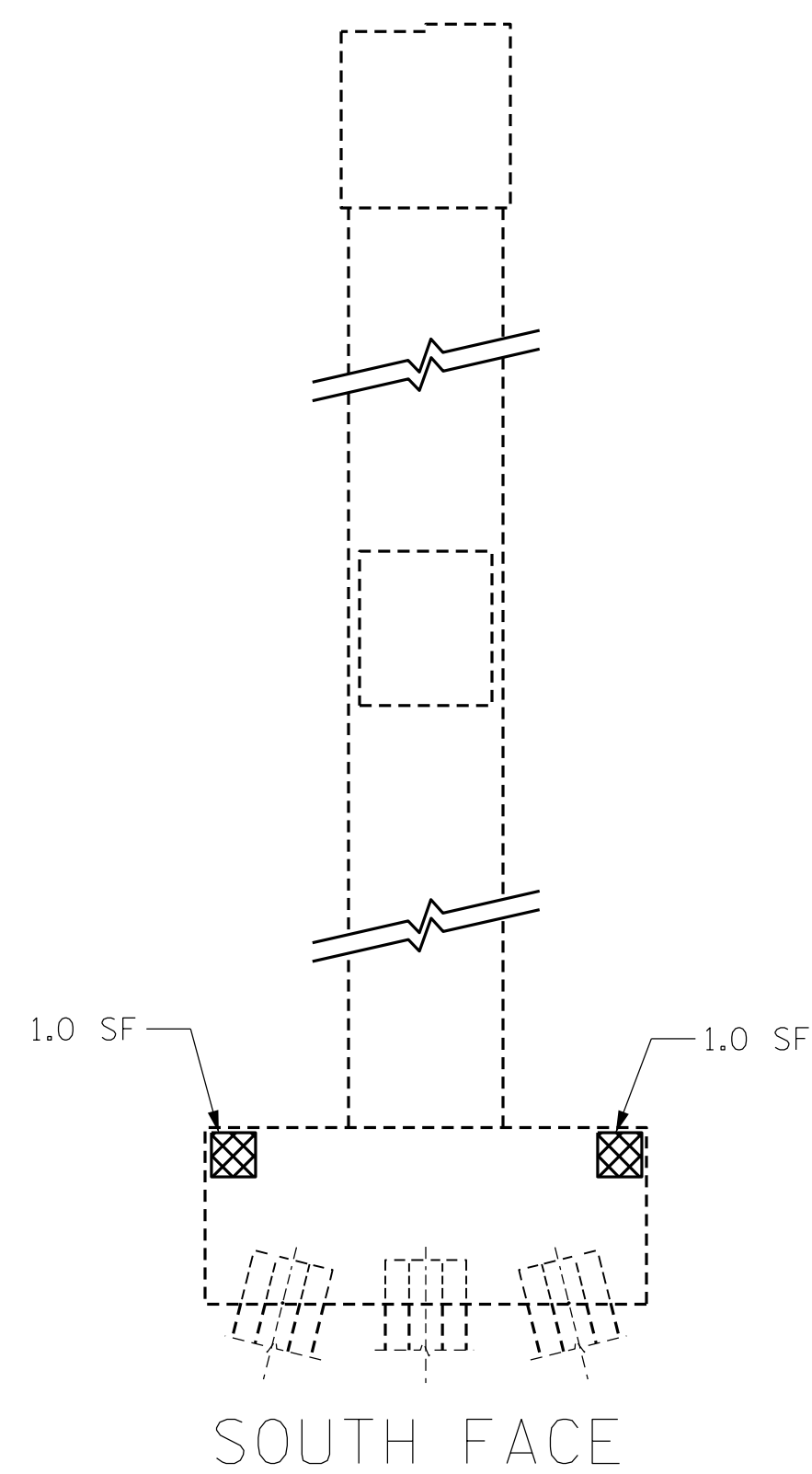
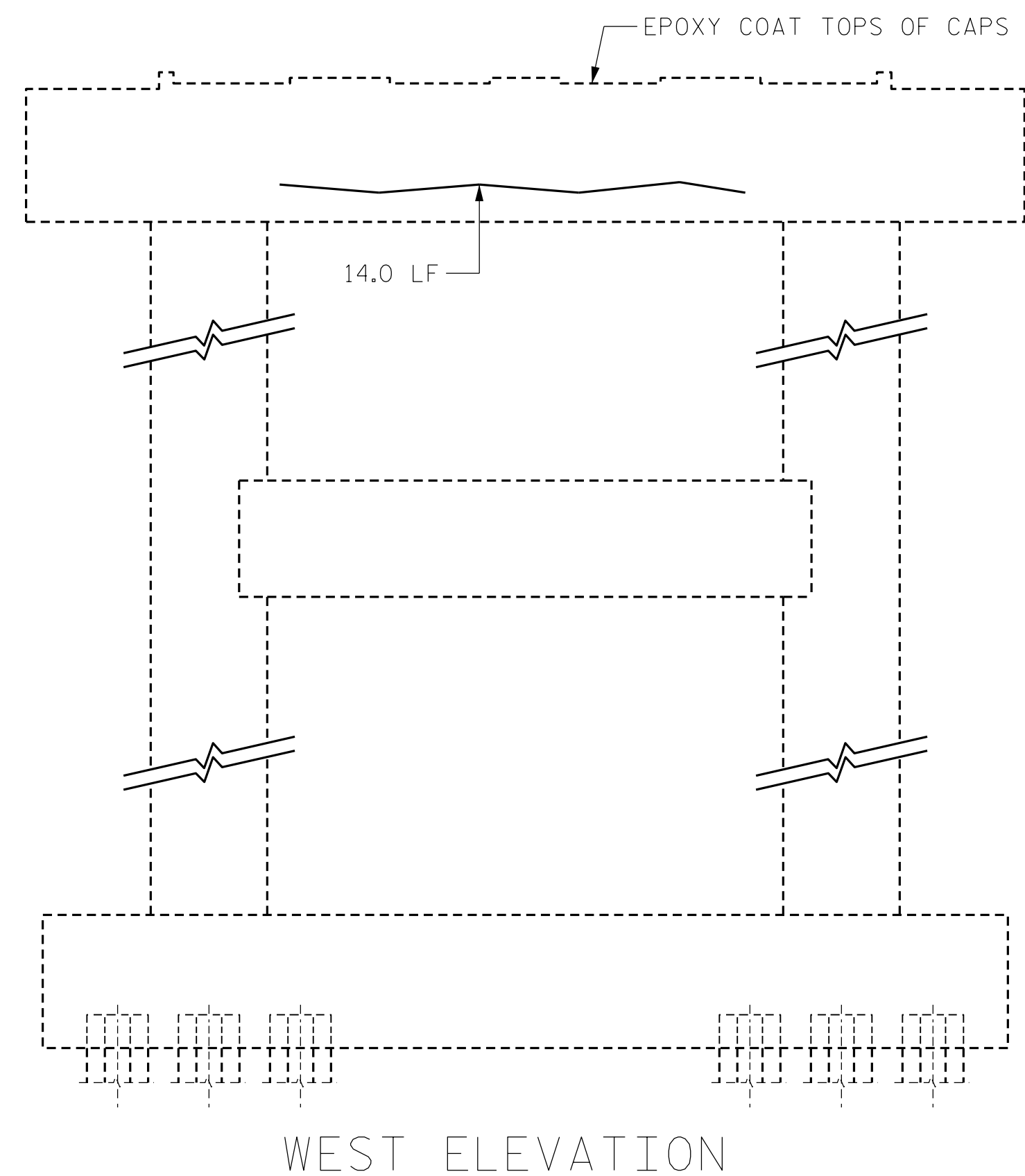
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 CONCRETE REPAIRS
 BENT 9

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			45

LEGEND:

-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	13.2	6.6		
COLUMN/PILE	15.6	7.8		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	3.5	1.8		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	42.0			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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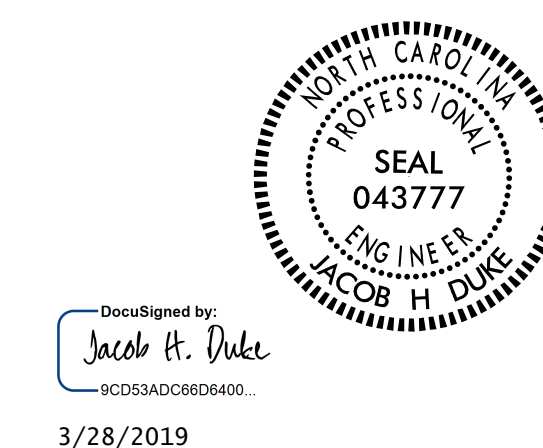
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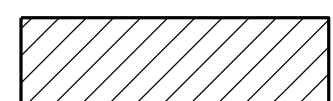


3/28/2019

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 10						S-34
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:



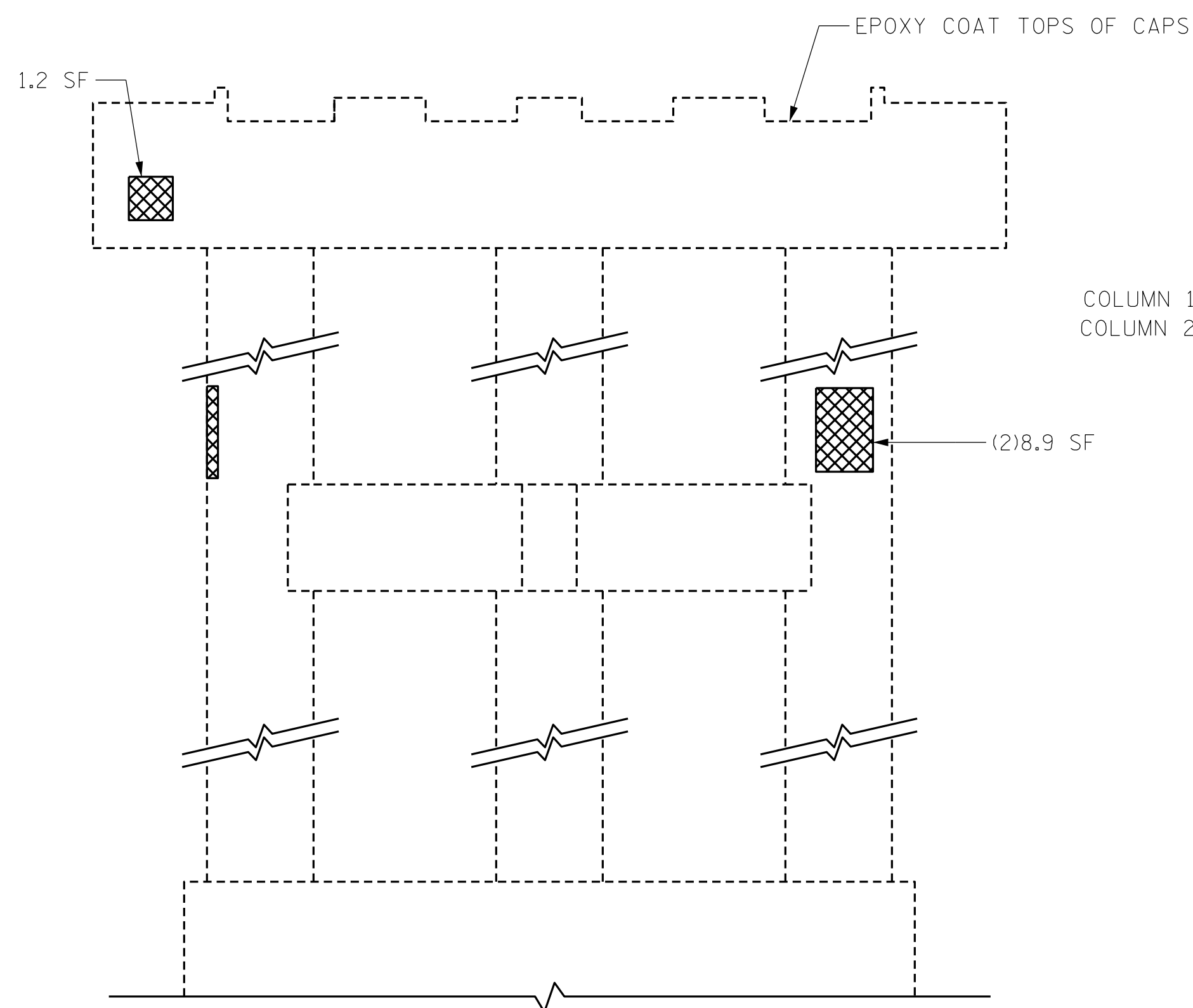
CONCRETE REPAIR AREA



SHOTCRETE REPAIR AREA



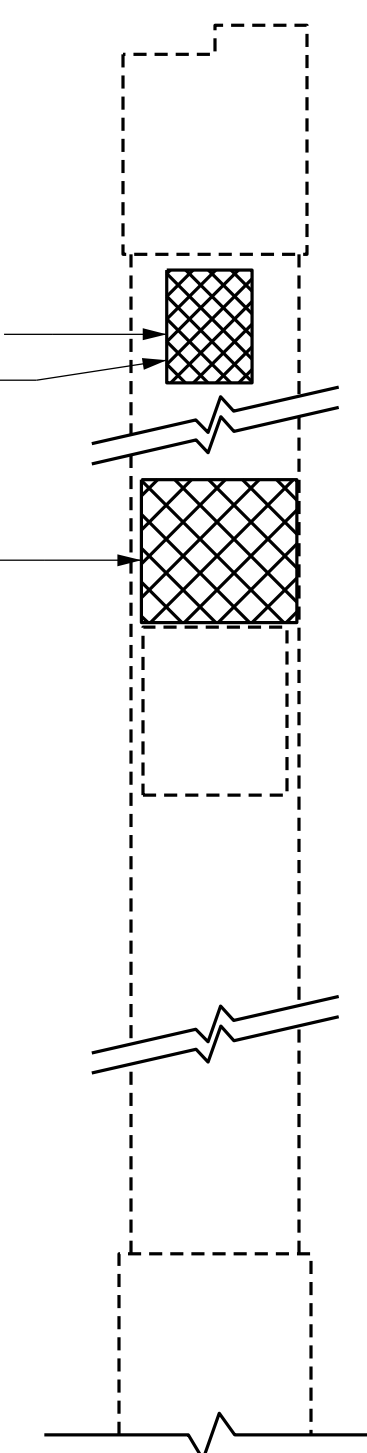
EPOXY RESIN INJECTION (ERI)



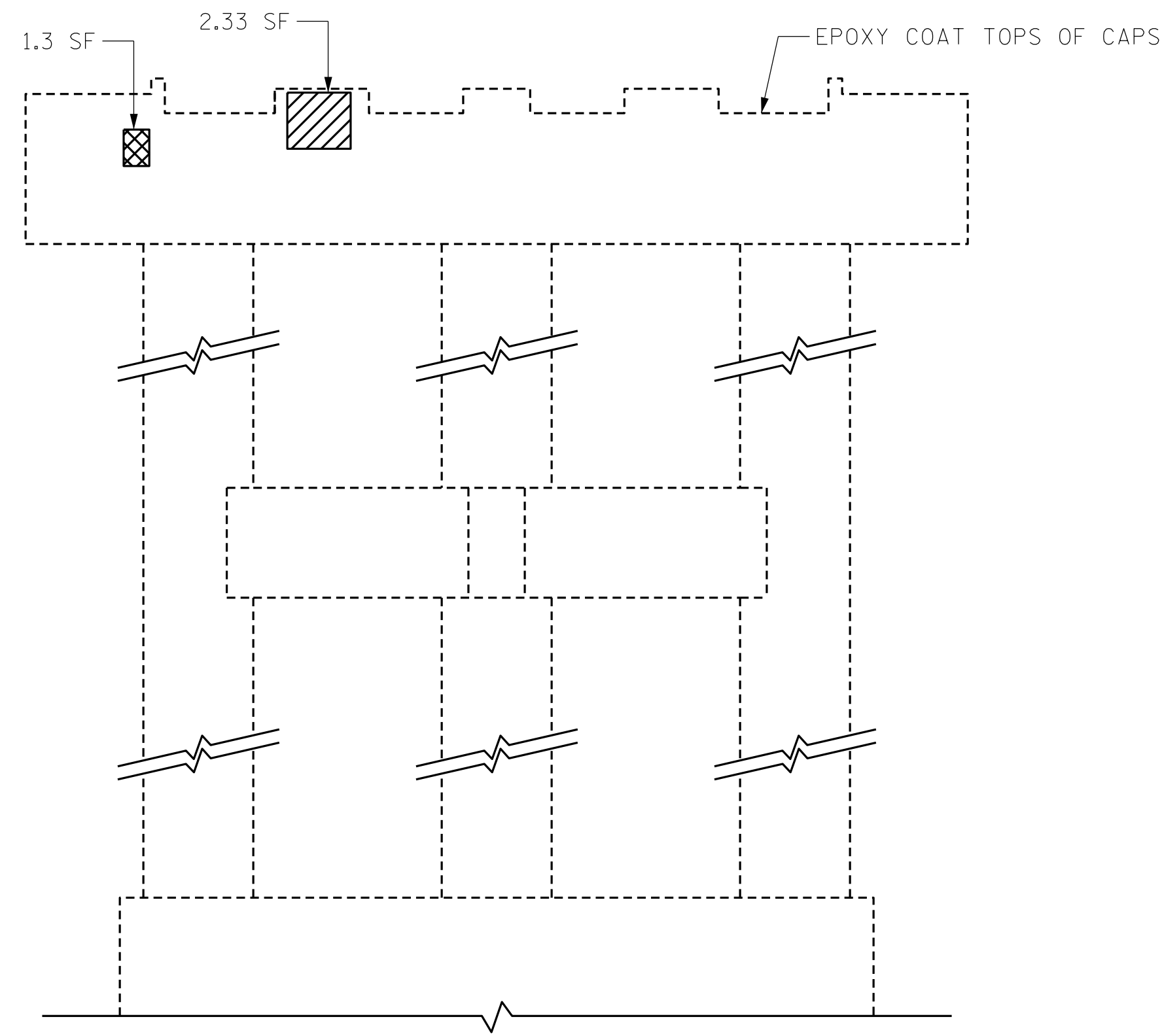
WEST ELEVATION

COLUMN 1: (2)14.4 SF
COLUMN 2: (2)7.8 SF

27.4 SF



SOUTH FACE



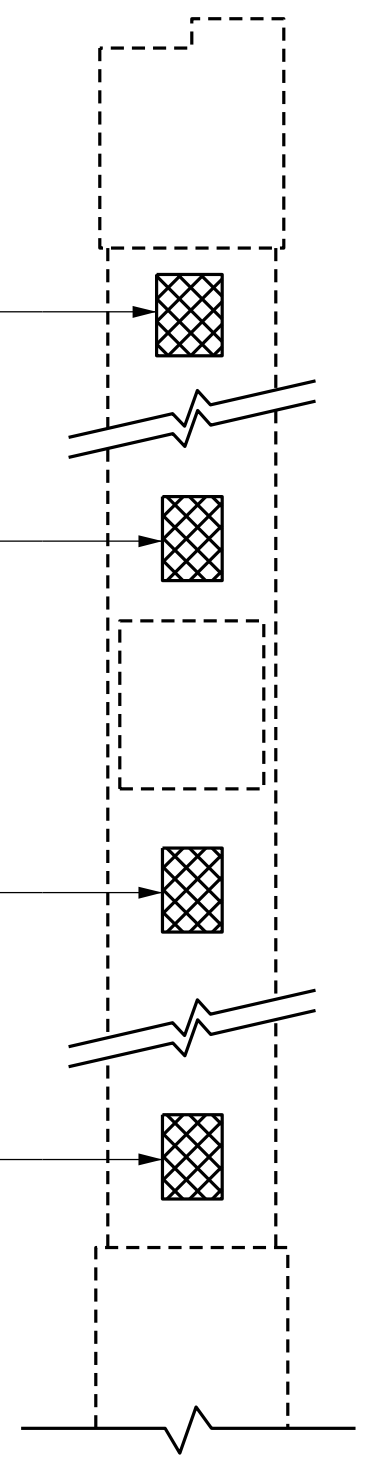
EAST ELEVATION

3.7 SF

2.7 SF

2.0 SF

2.0 SF



NORTH FACE

AS-BUILT REPAIR QUANTITY TABLE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	2.5	1.3		
COLUMN/PILE	100.0	50.0		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	2.3	1.2		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	143			

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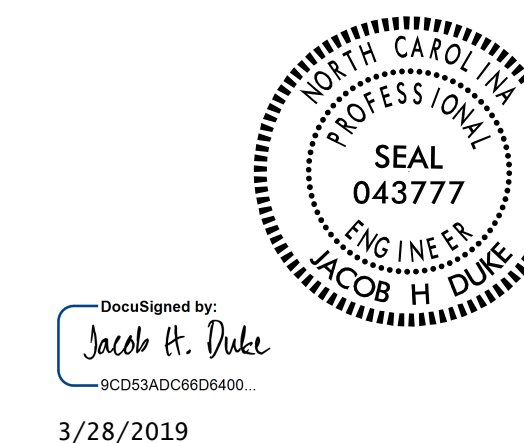
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 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018



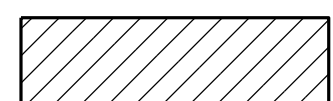
3/28/2019

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 CONCRETE REPAIRS
 BENT 11

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			45

LEGEND:



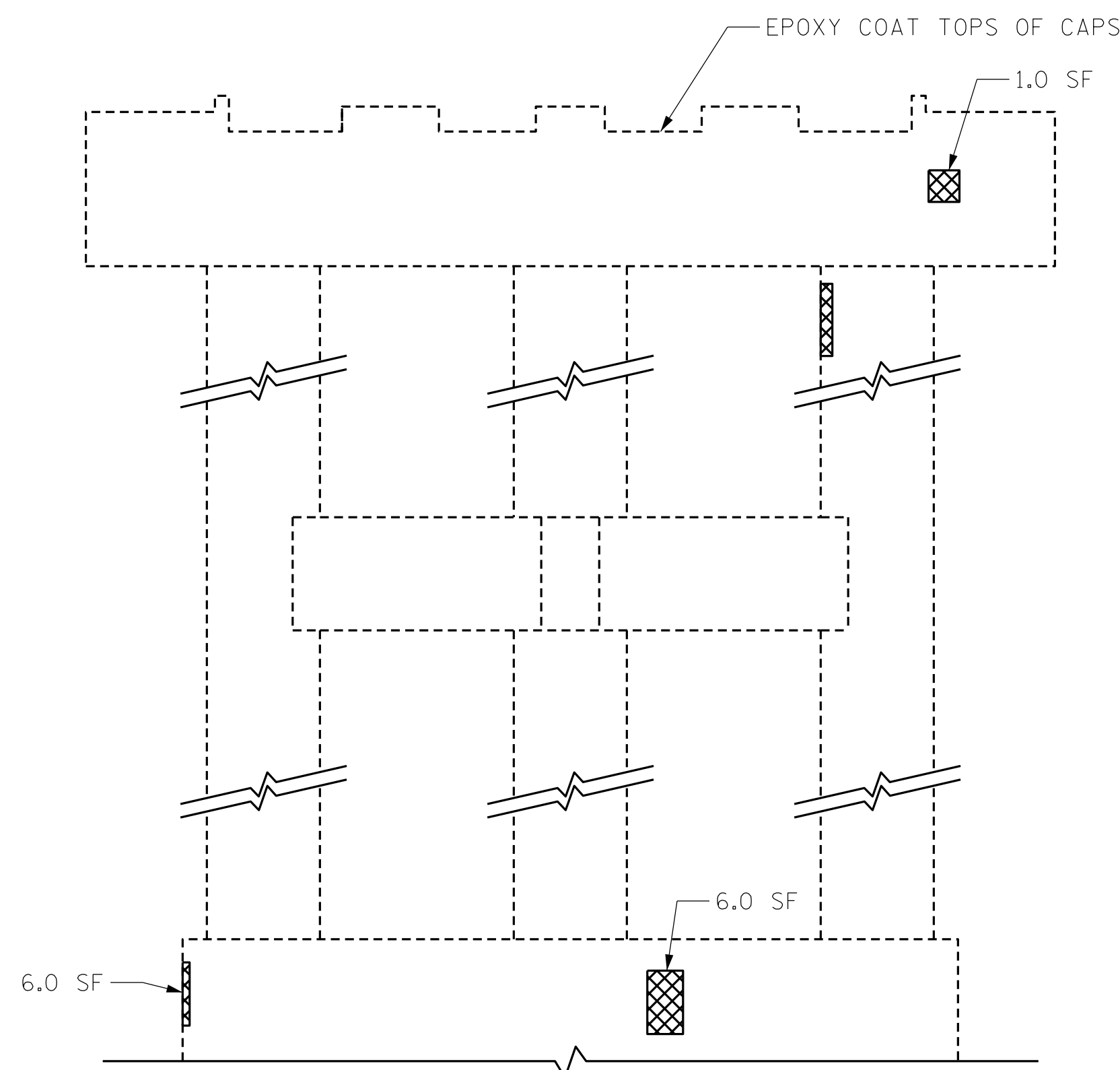
CONCRETE REPAIR AREA



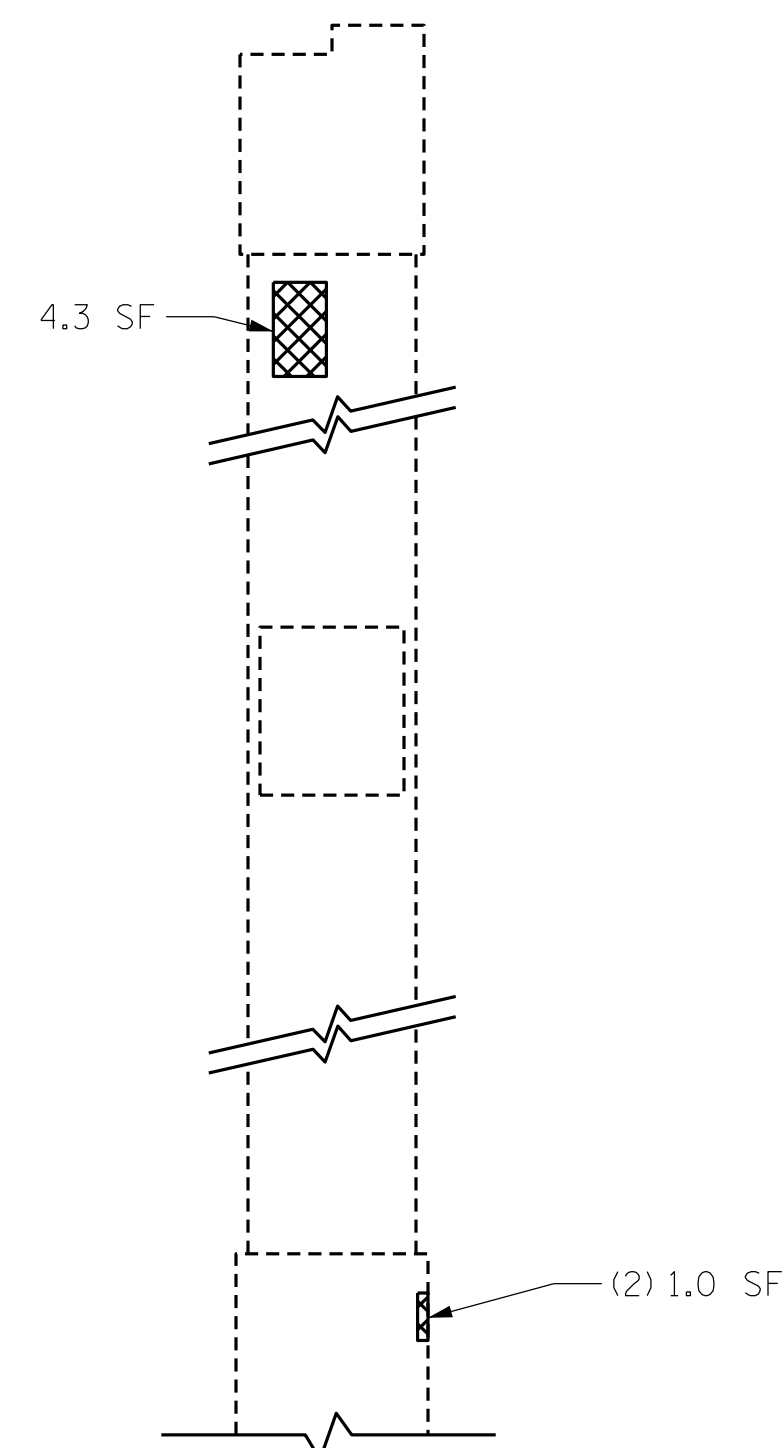
SHOTCRETE REPAIR AREA



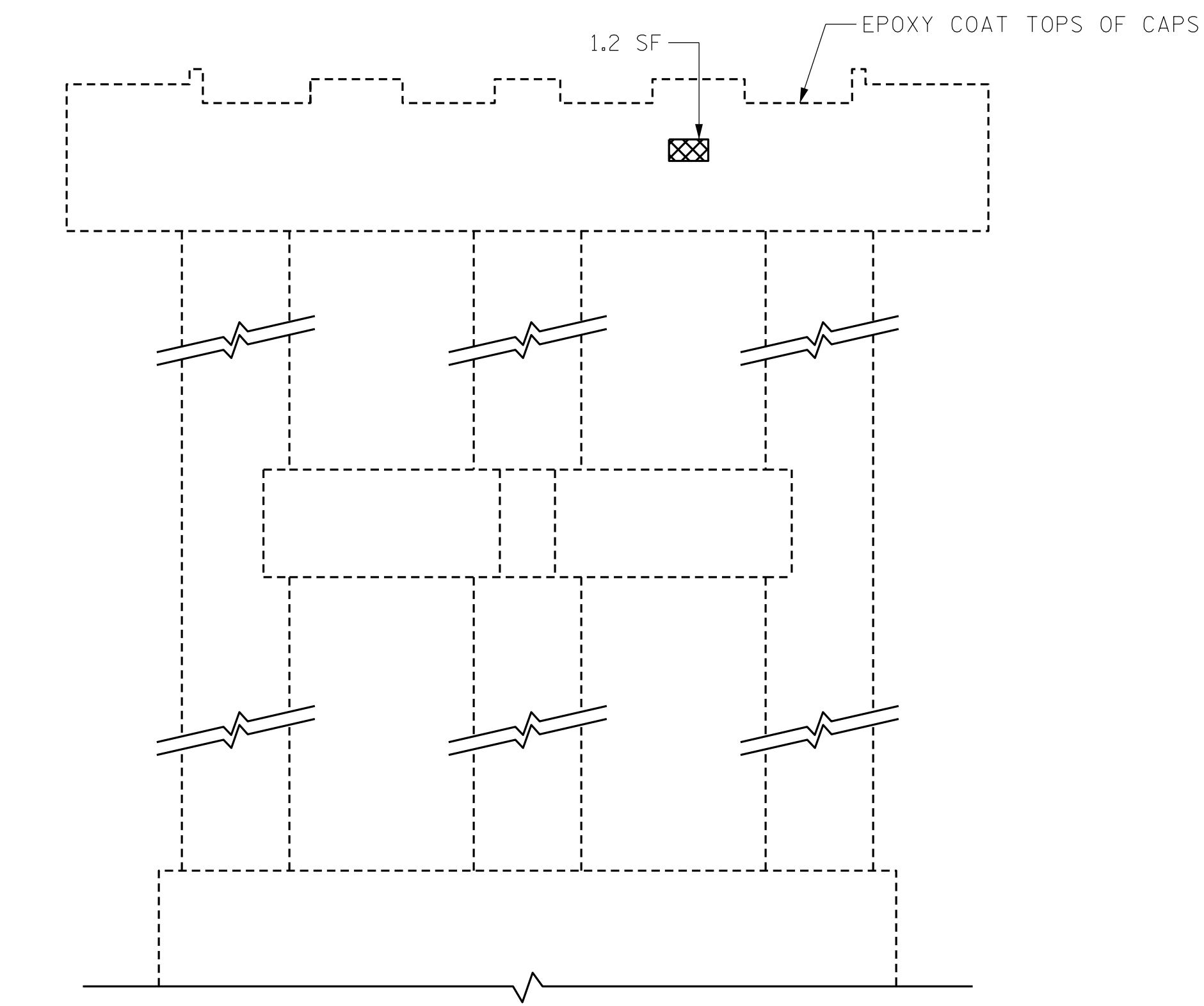
EPOXY RESIN INJECTION (ERI)



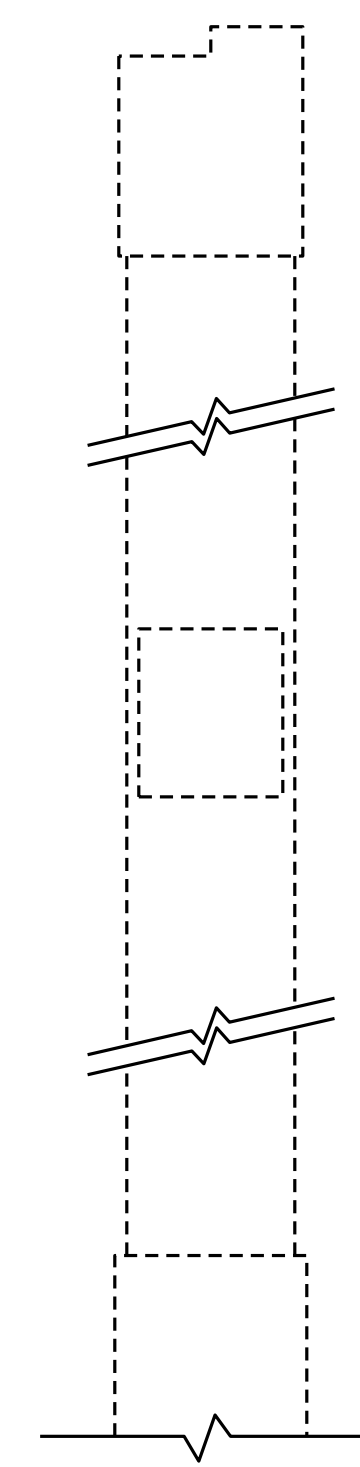
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	16.2	8.1		
COLUMN/PILE	4.3	2.2		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	-	-		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	143			

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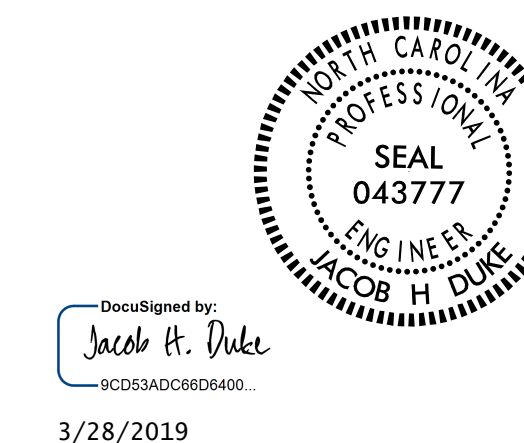
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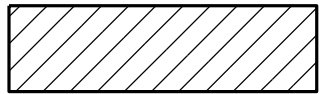
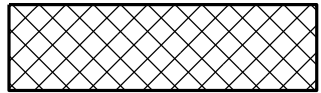



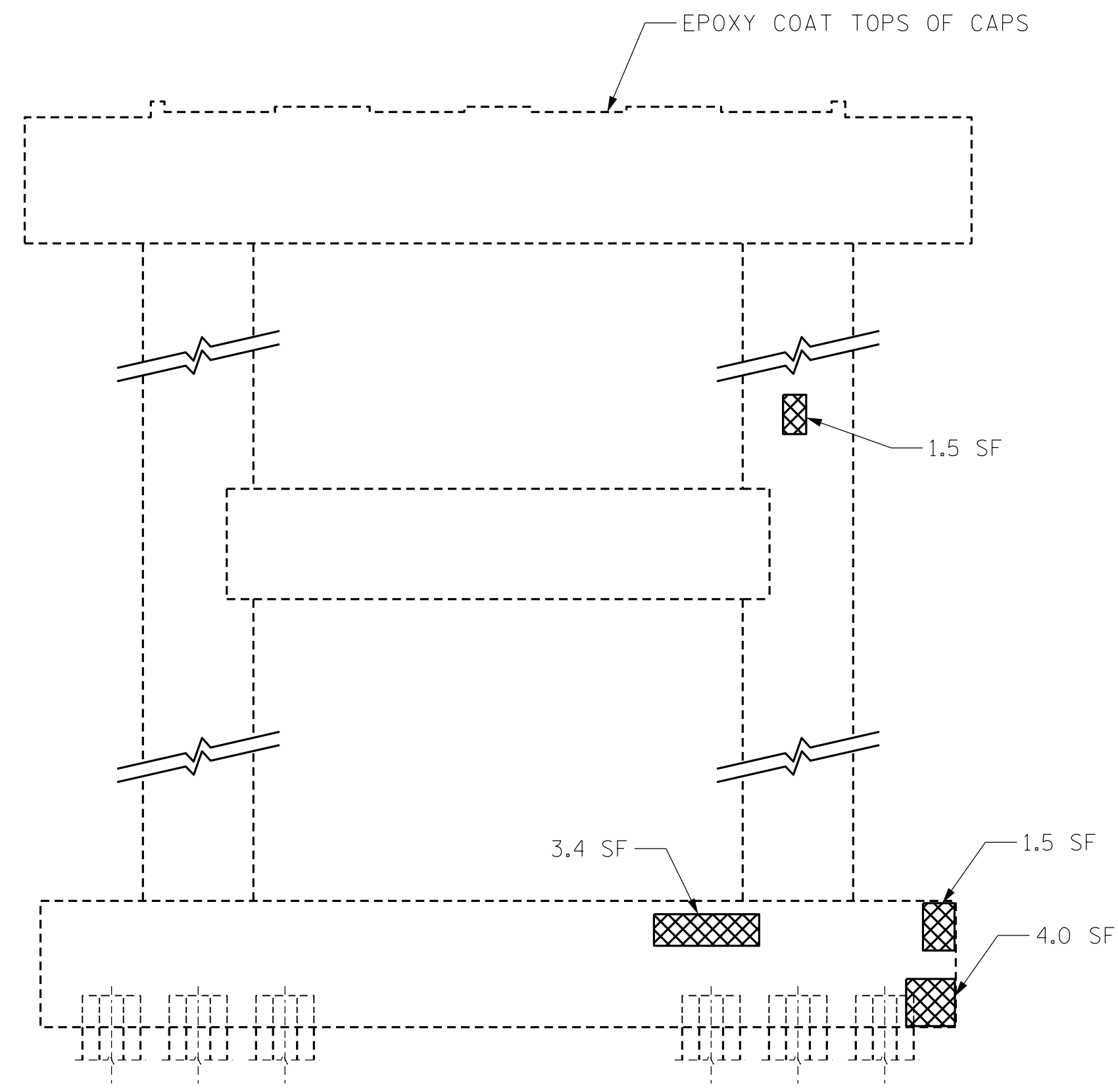
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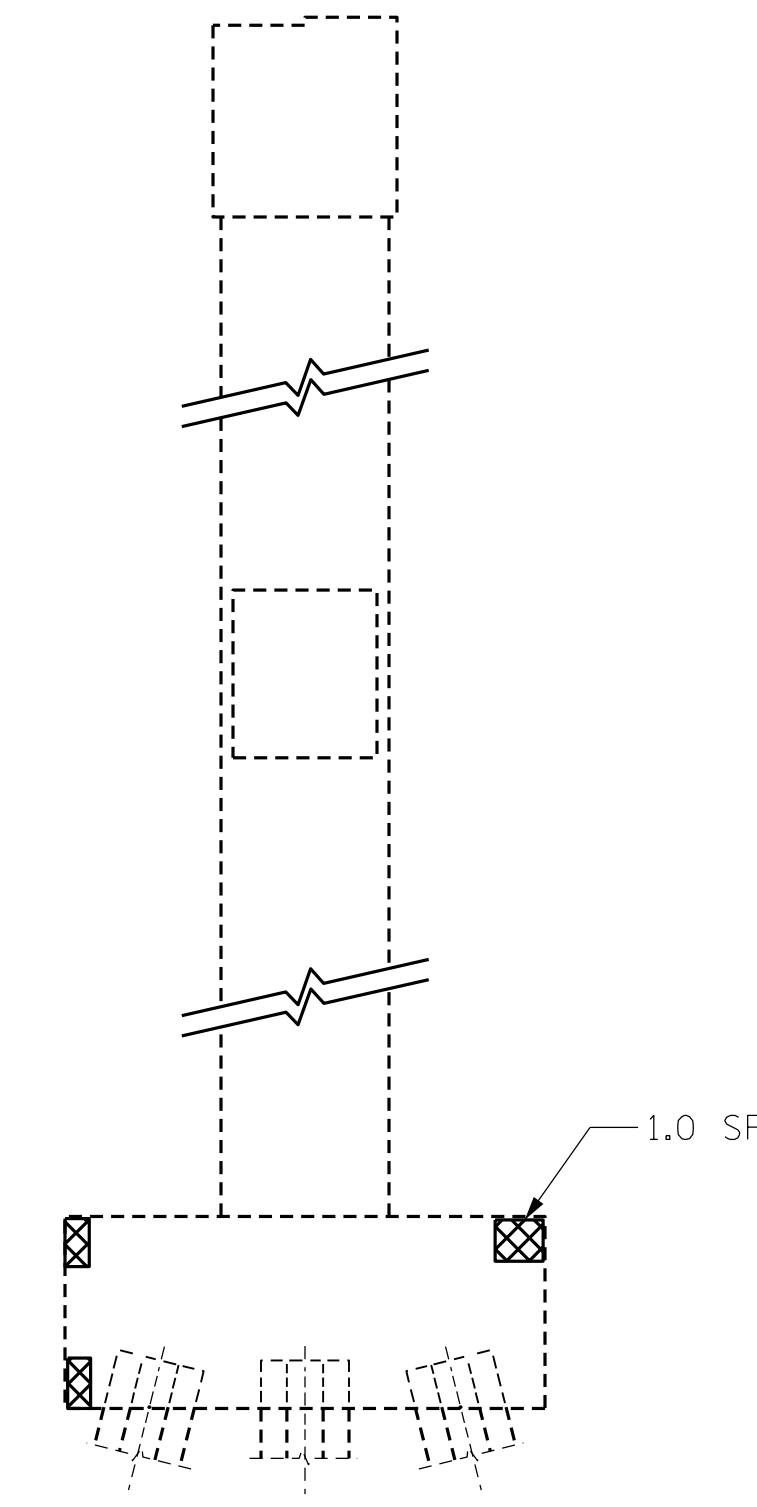
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 12						S-36
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:

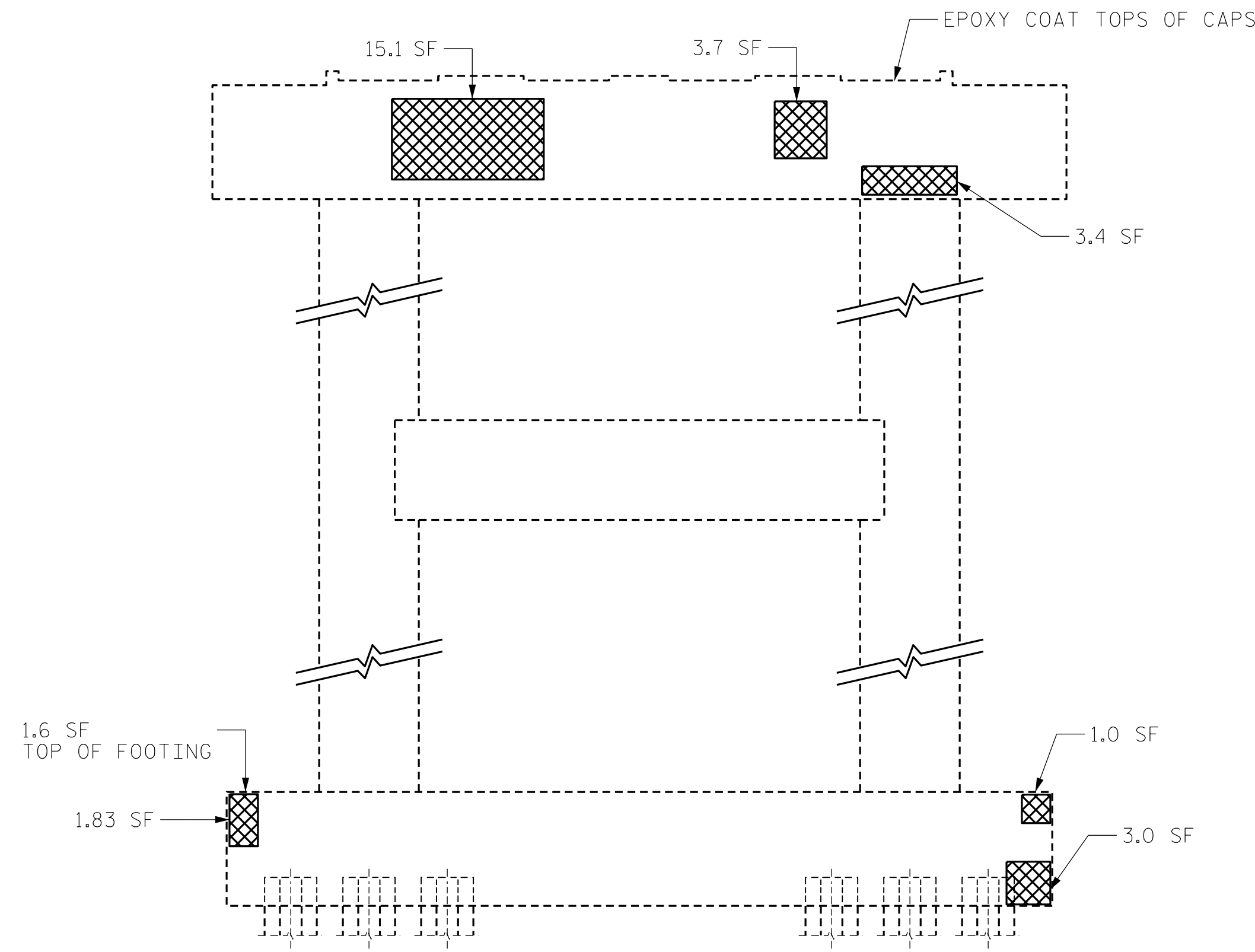
-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



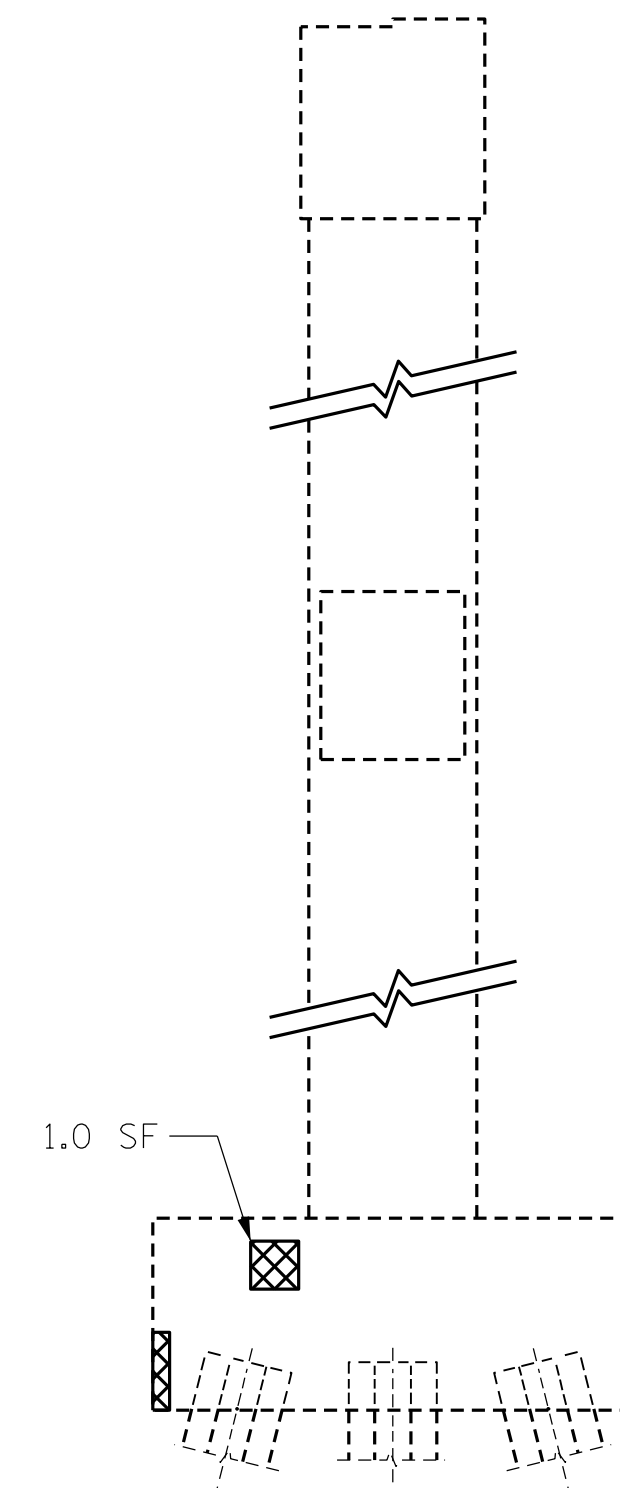
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	40.5	20.3		
COLUMN/PILE	1.5	0.8		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	3.2	1.6		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING		AREA SQ. FT.		AREA SQ. FT.
CAP		120		

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1/2" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRIDGE JACKING, SEE SPECIAL PROVISIONS.

FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

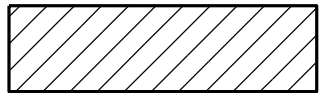
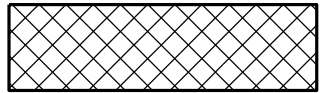



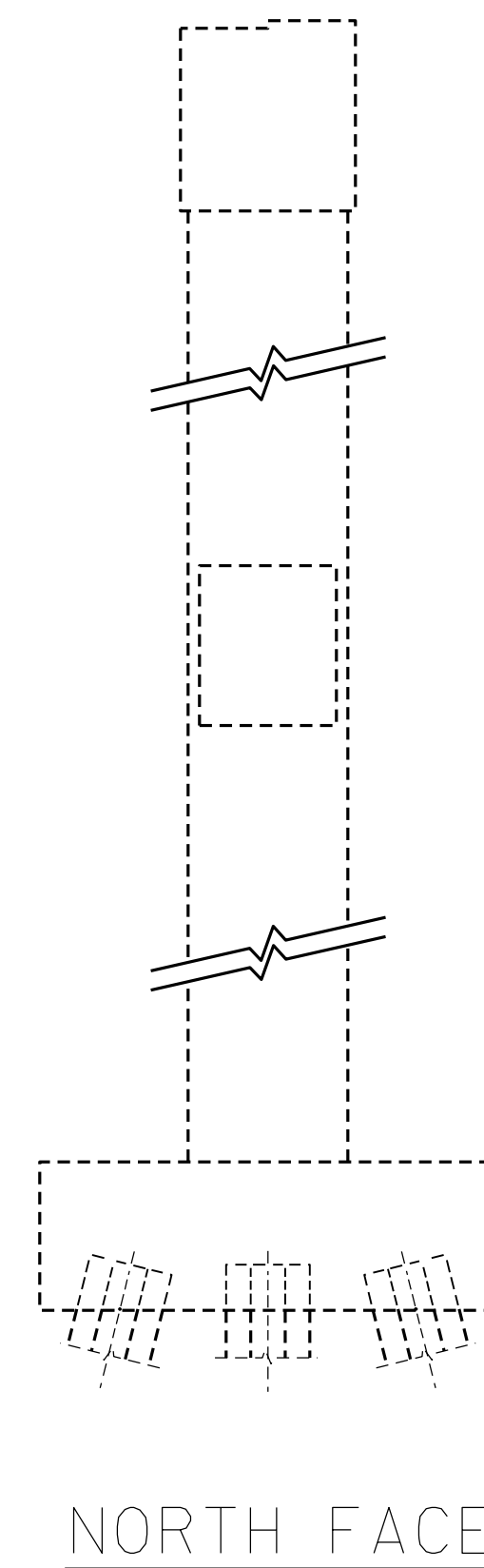
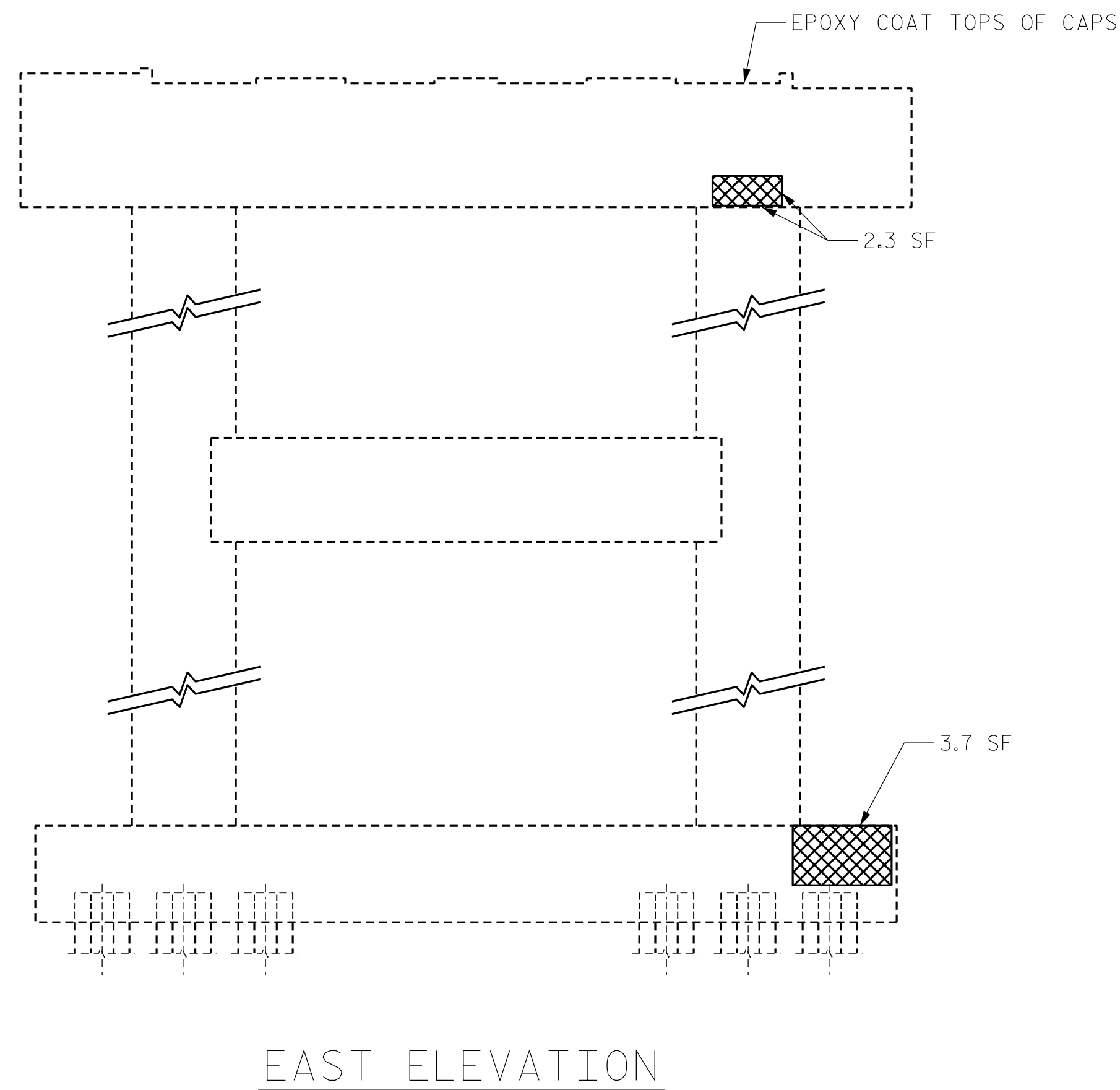
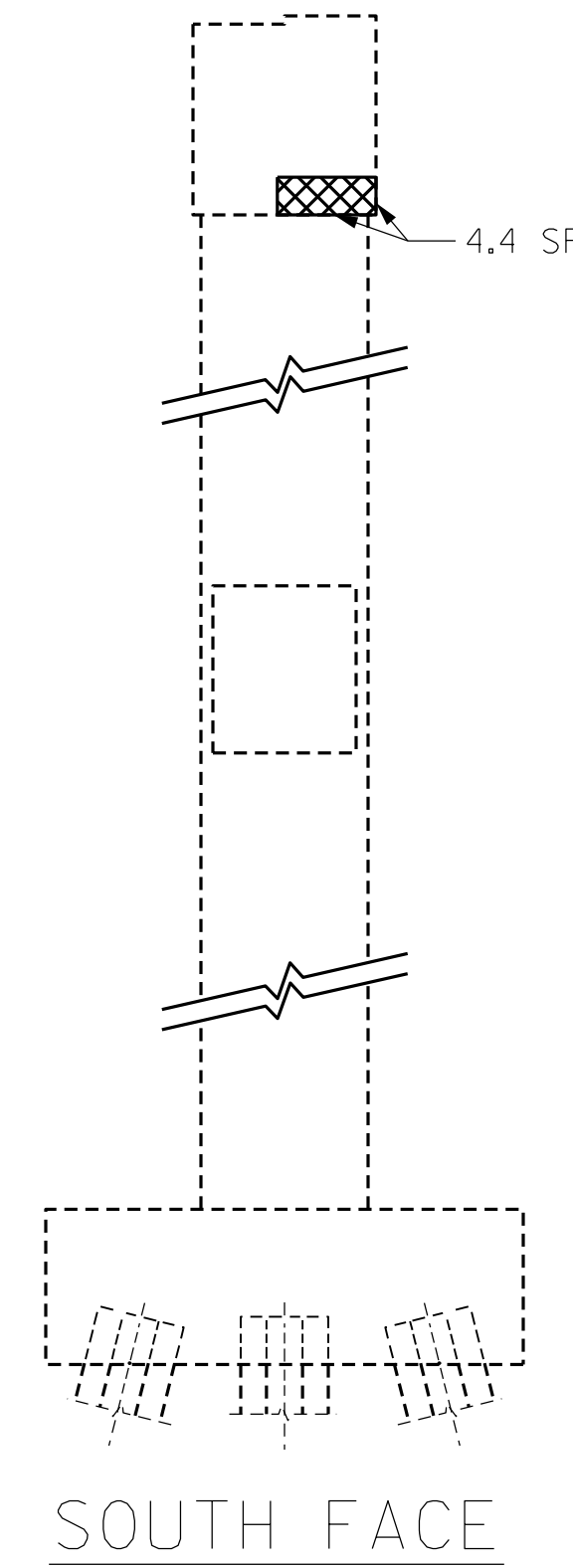
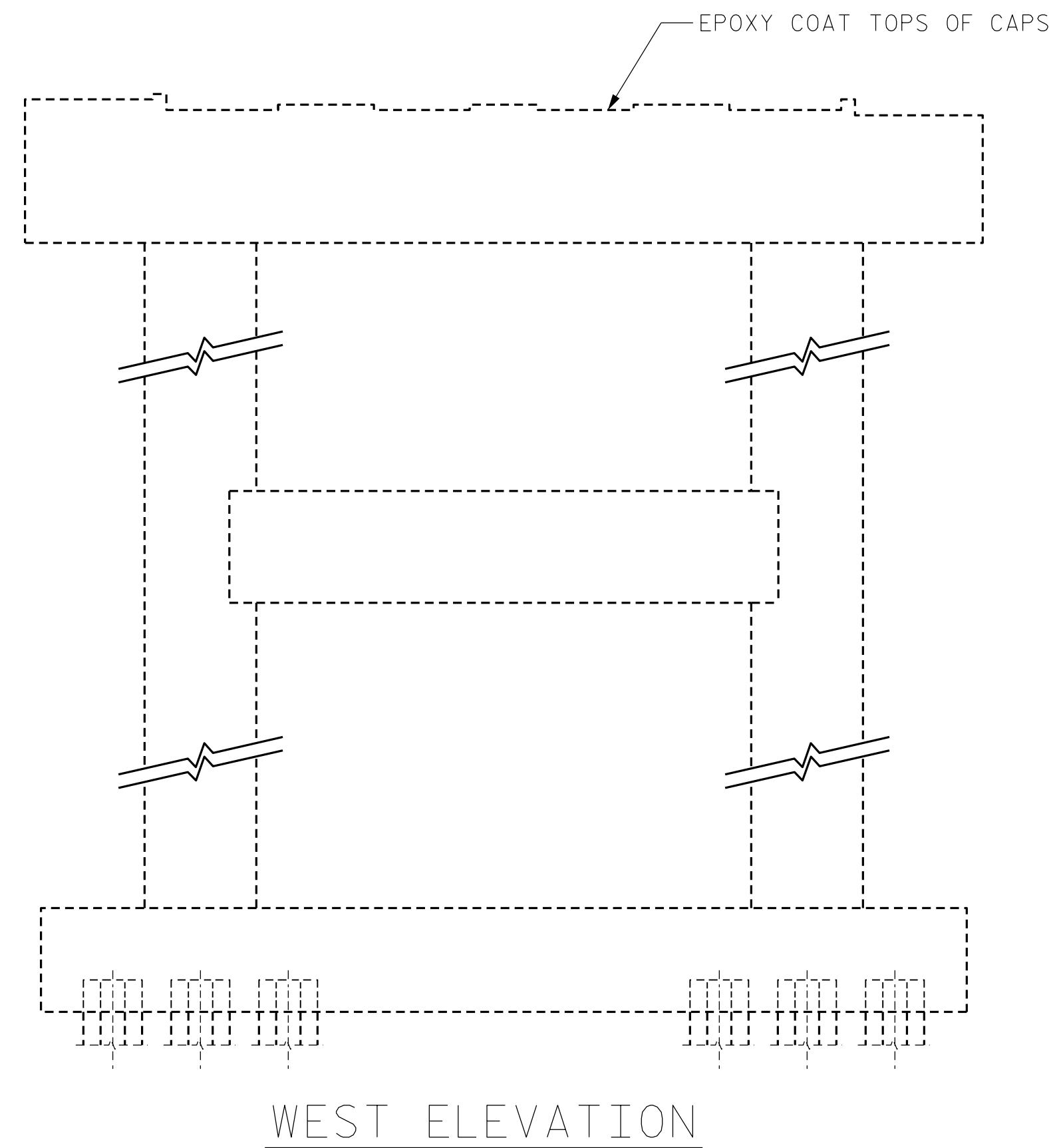
3/28/2019

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 13						S-37
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:

-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	10.4	5.2		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	1.0	0.5		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

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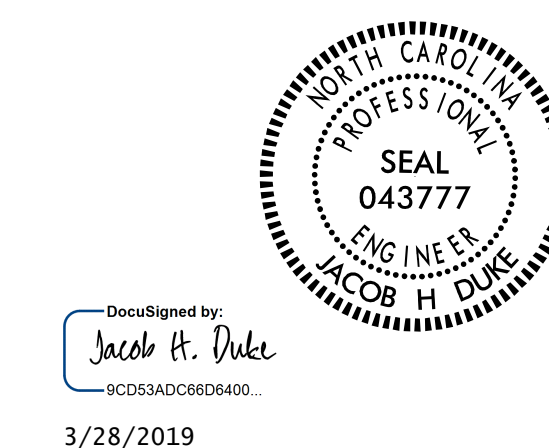
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
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 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

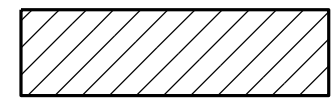


3/28/2019

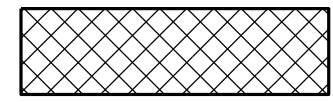
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 14						S-38
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:



CONCRETE REPAIR AREA



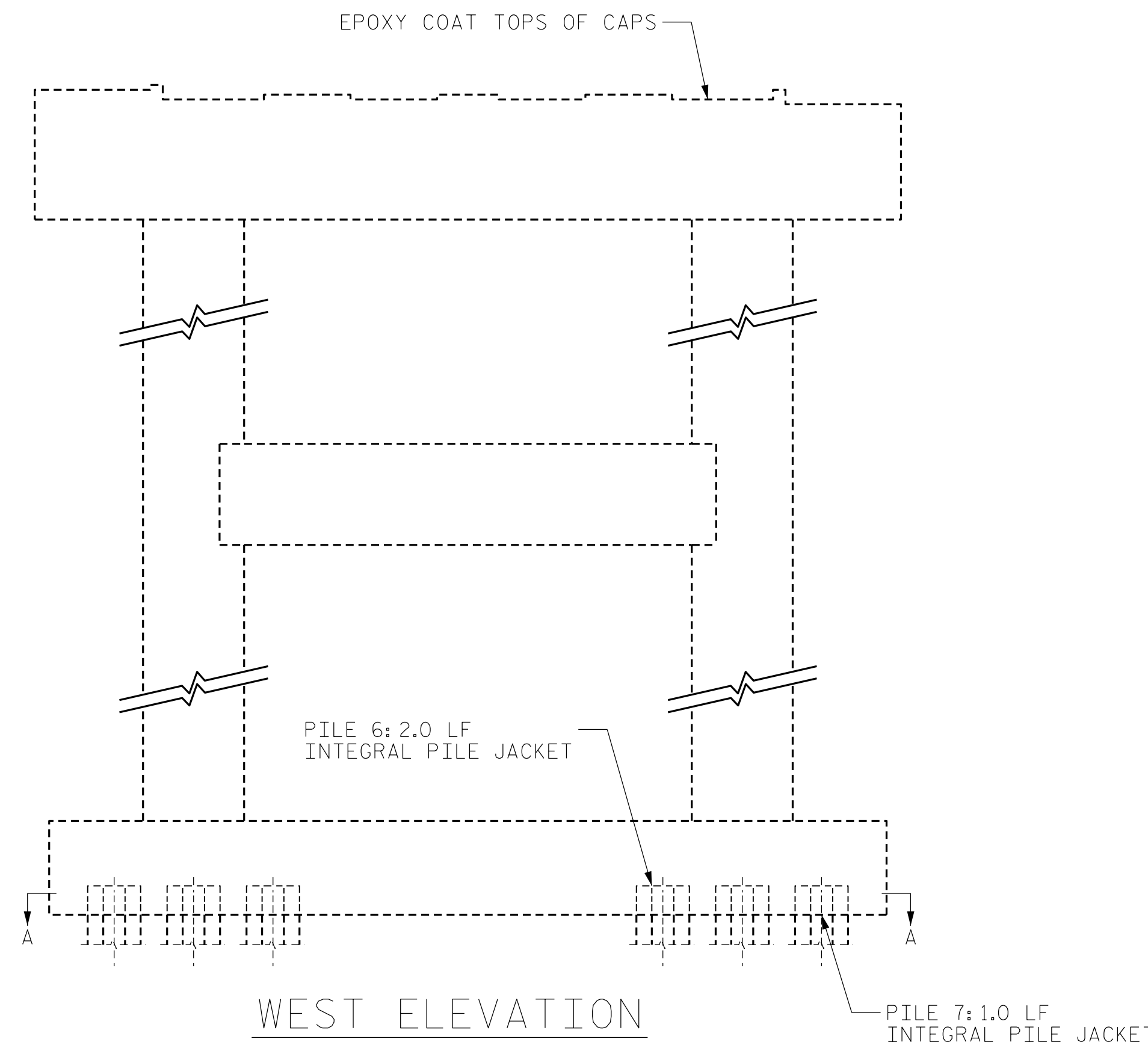
SHOTCRETE REPAIR AREA



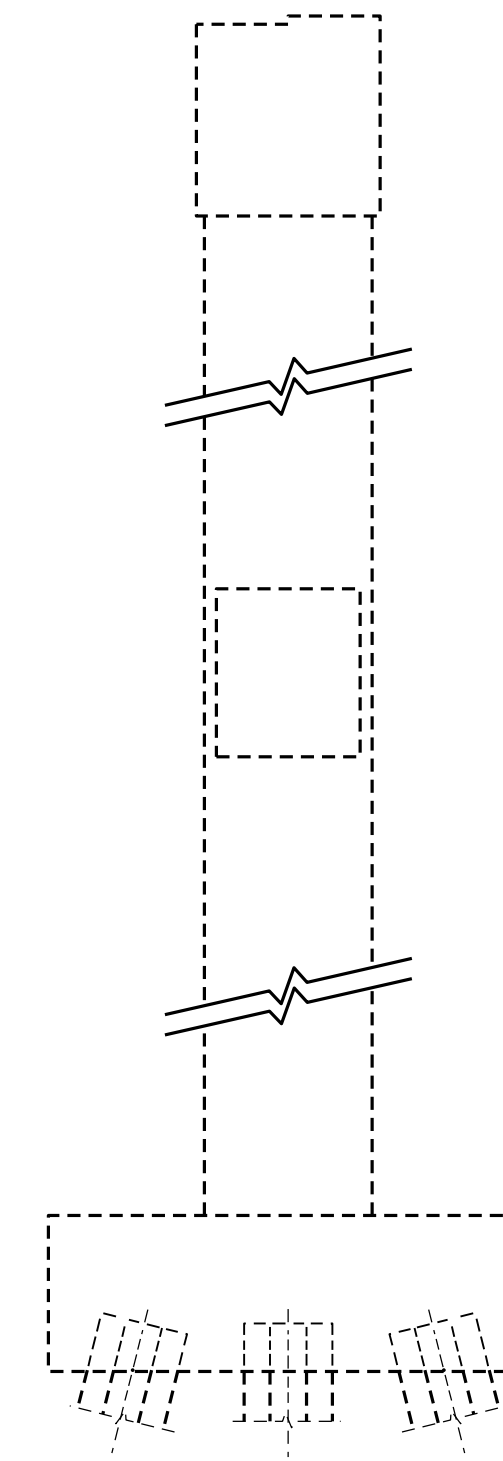
EPOXY RESIN INJECTION (ERI)



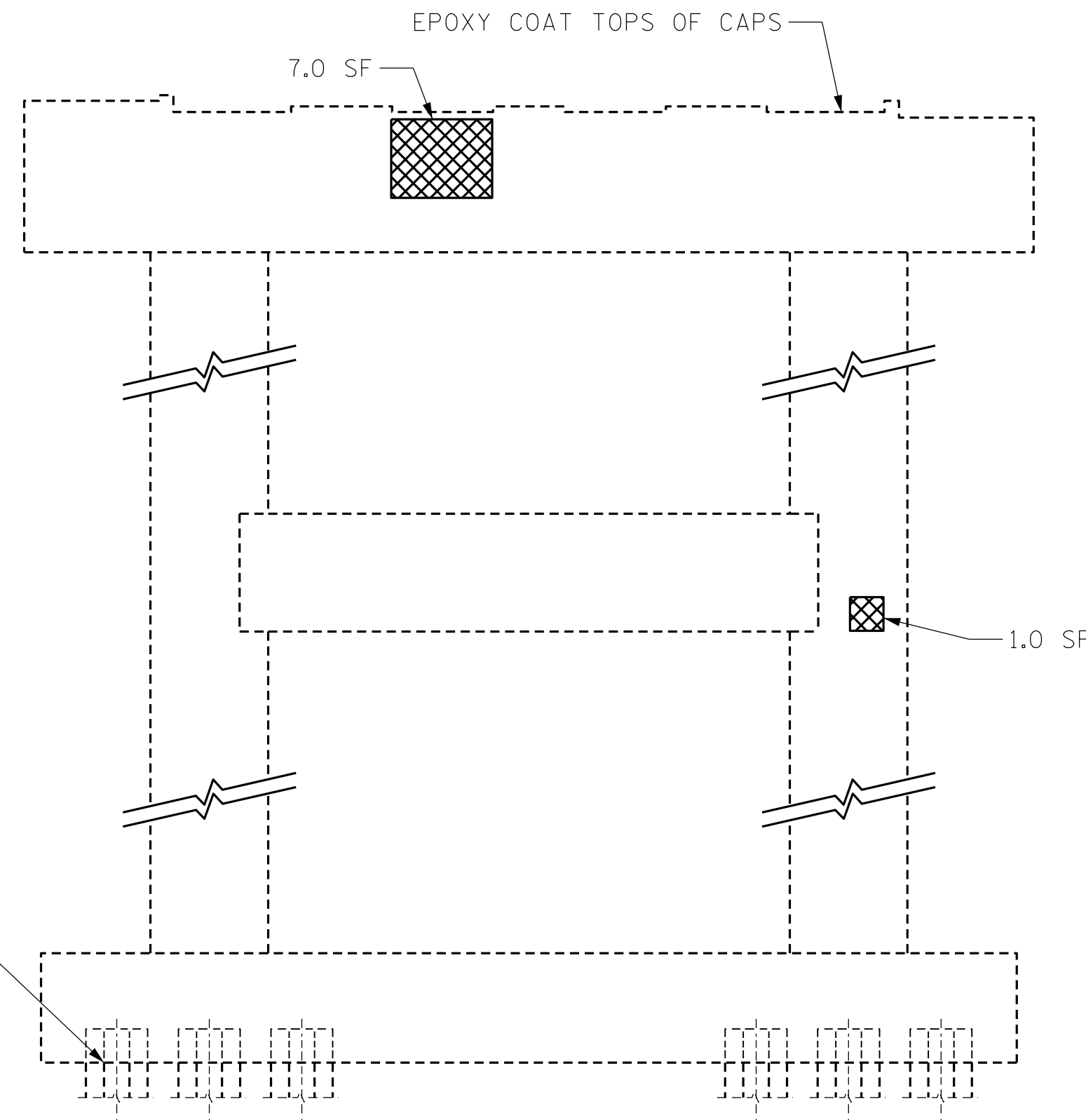
SEC A-A
(NUMBERING OF PILES)



WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	7.0	3.5		
COLUMN/PILE	1.0	0.5		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	-	-		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	5.0			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

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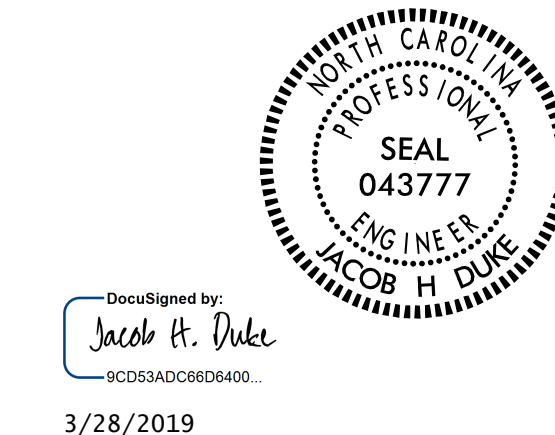
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

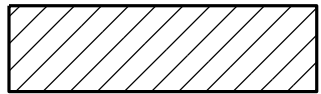
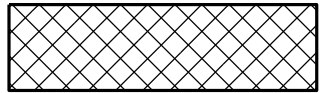



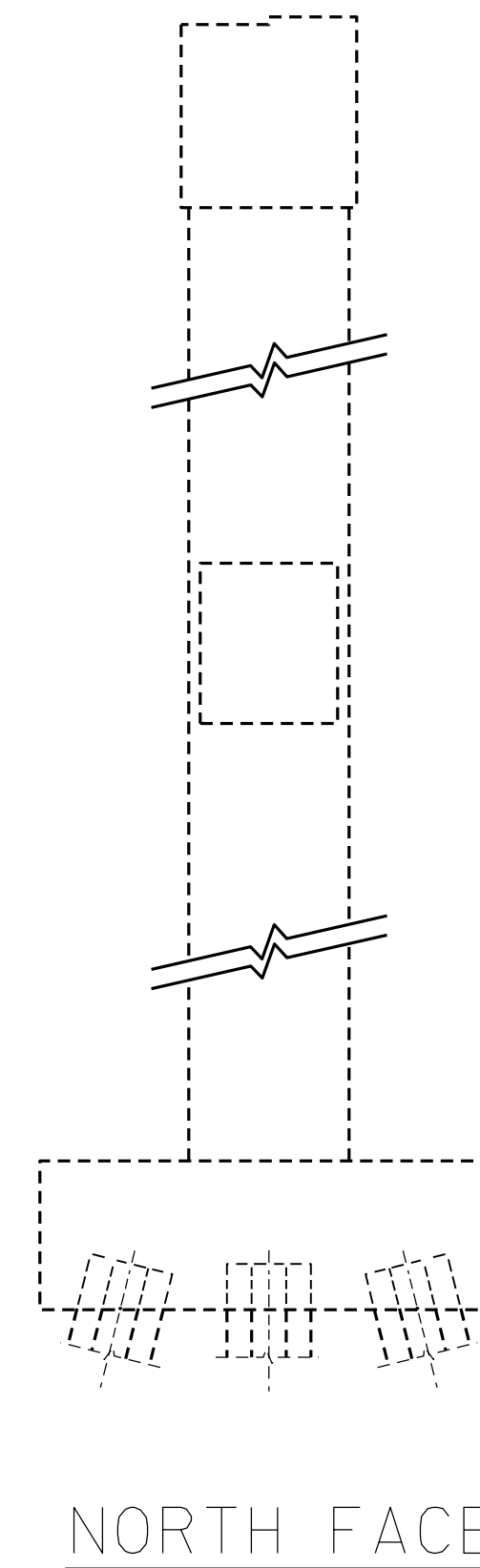
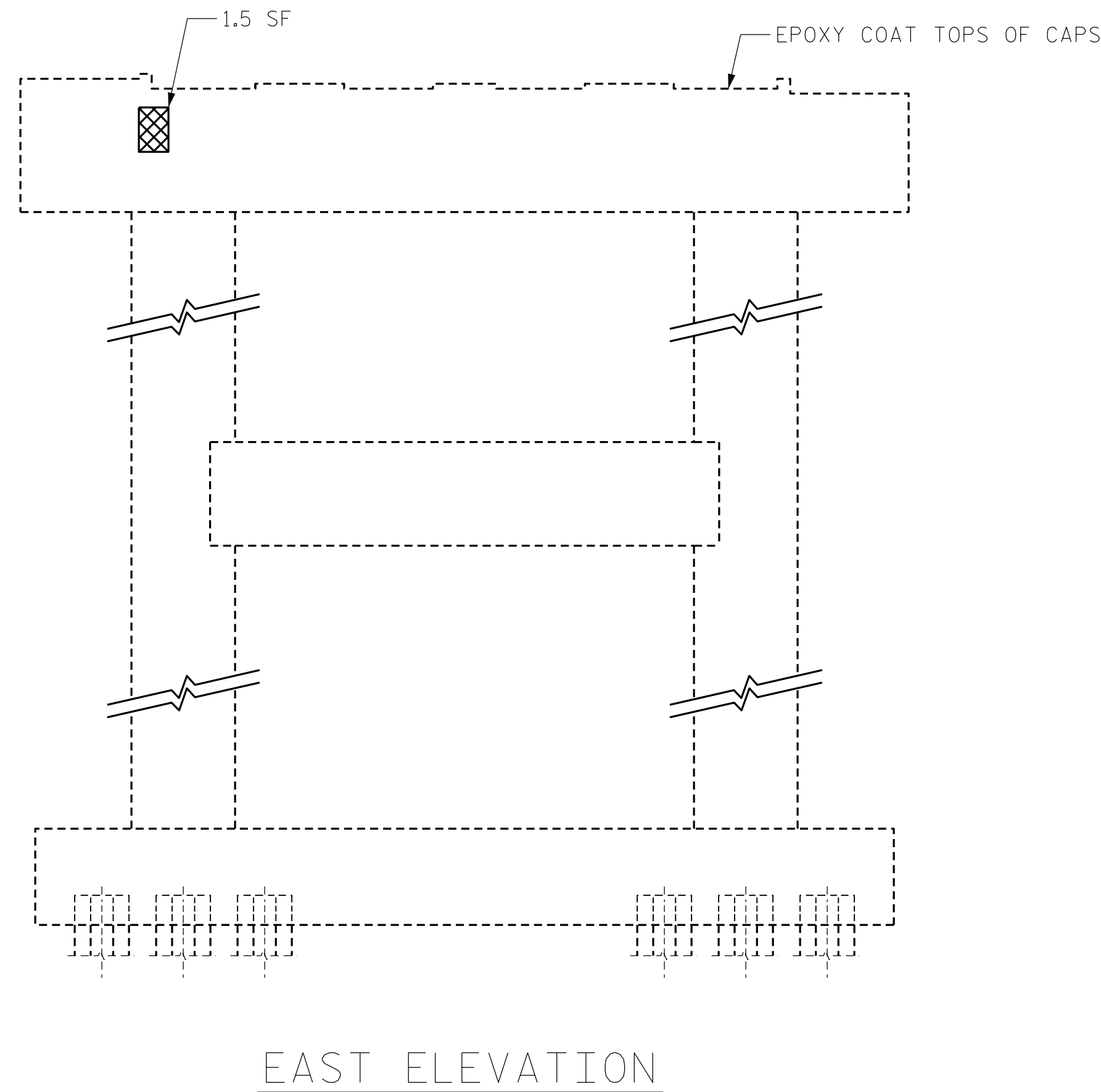
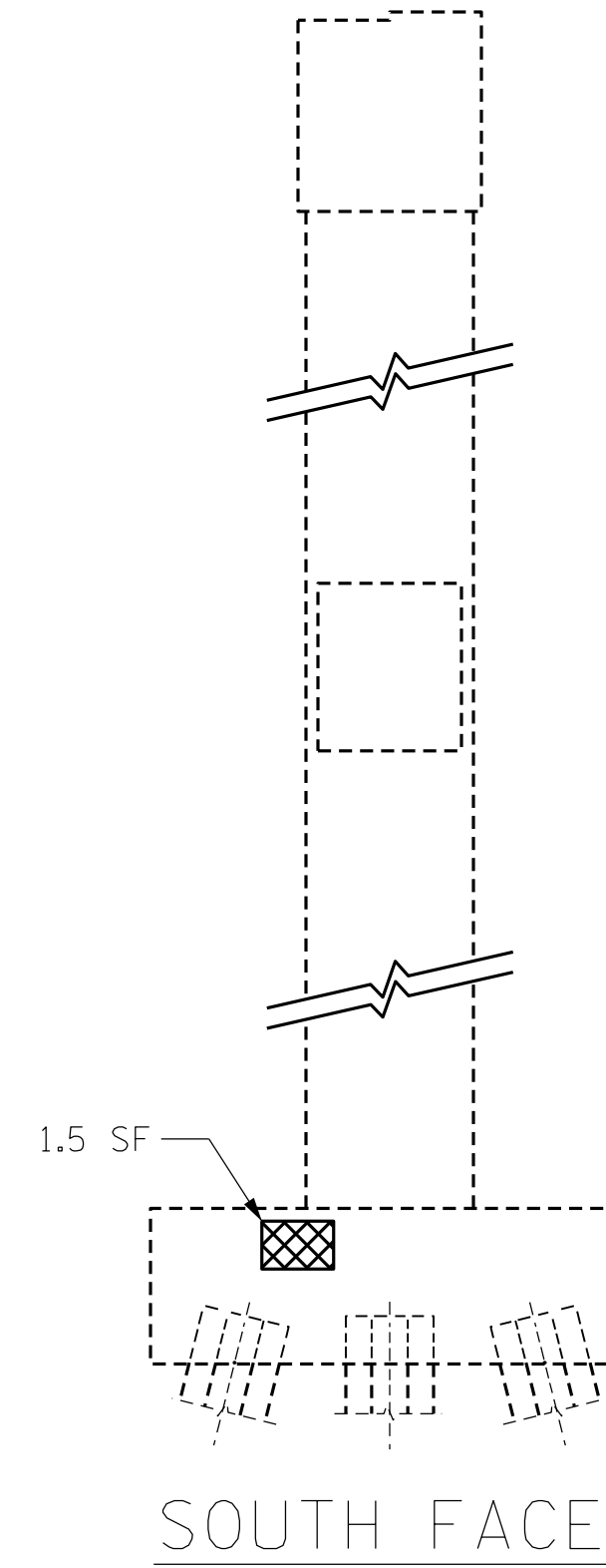
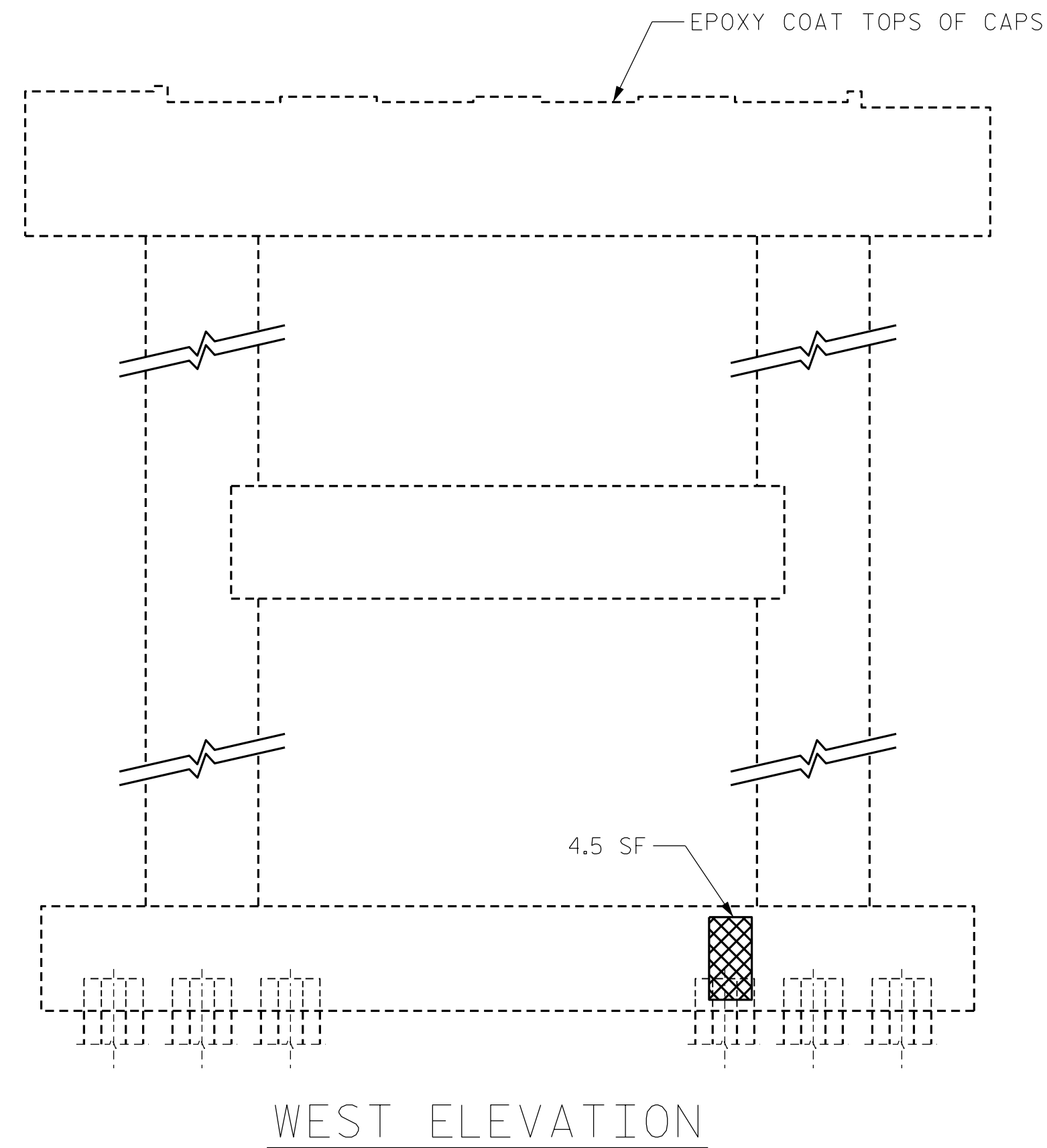
3/28/2019

DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 15						S-39
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:

-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	7.5	3.8		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	0.75	0.4		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRIDGE JACKING, SEE SPECIAL PROVISIONS.

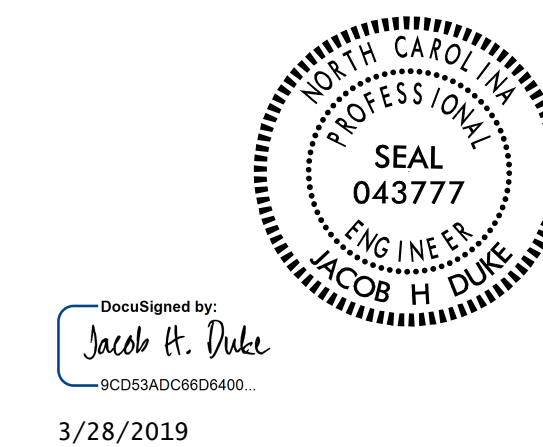
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
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 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

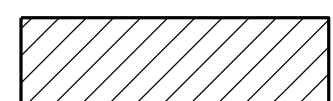


3/28/2019

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 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 16						S-40
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:



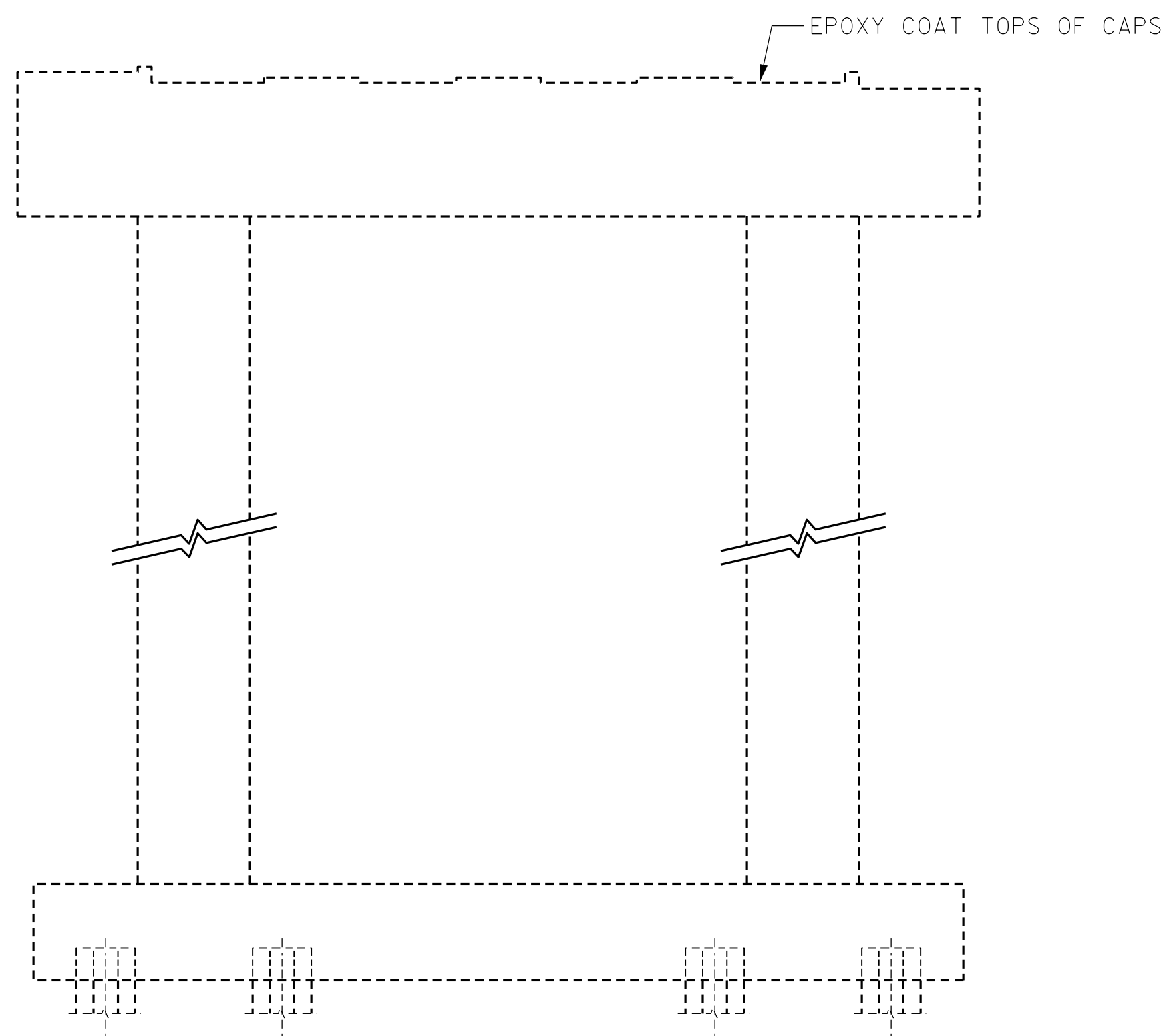
CONCRETE REPAIR AREA



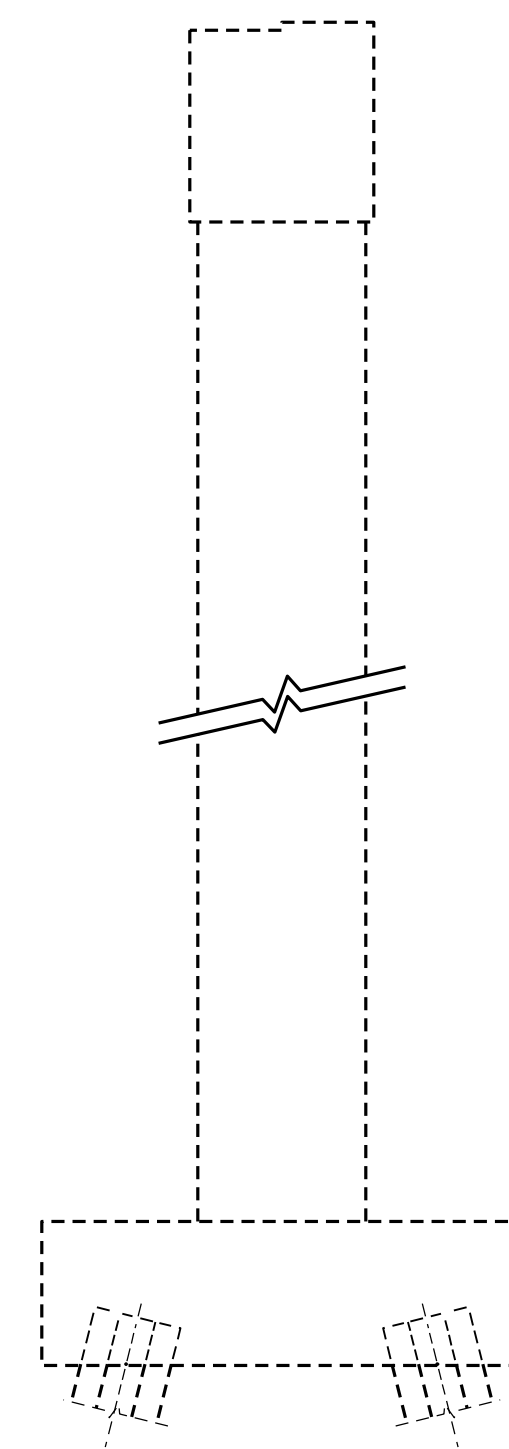
SHOTCRETE REPAIR AREA



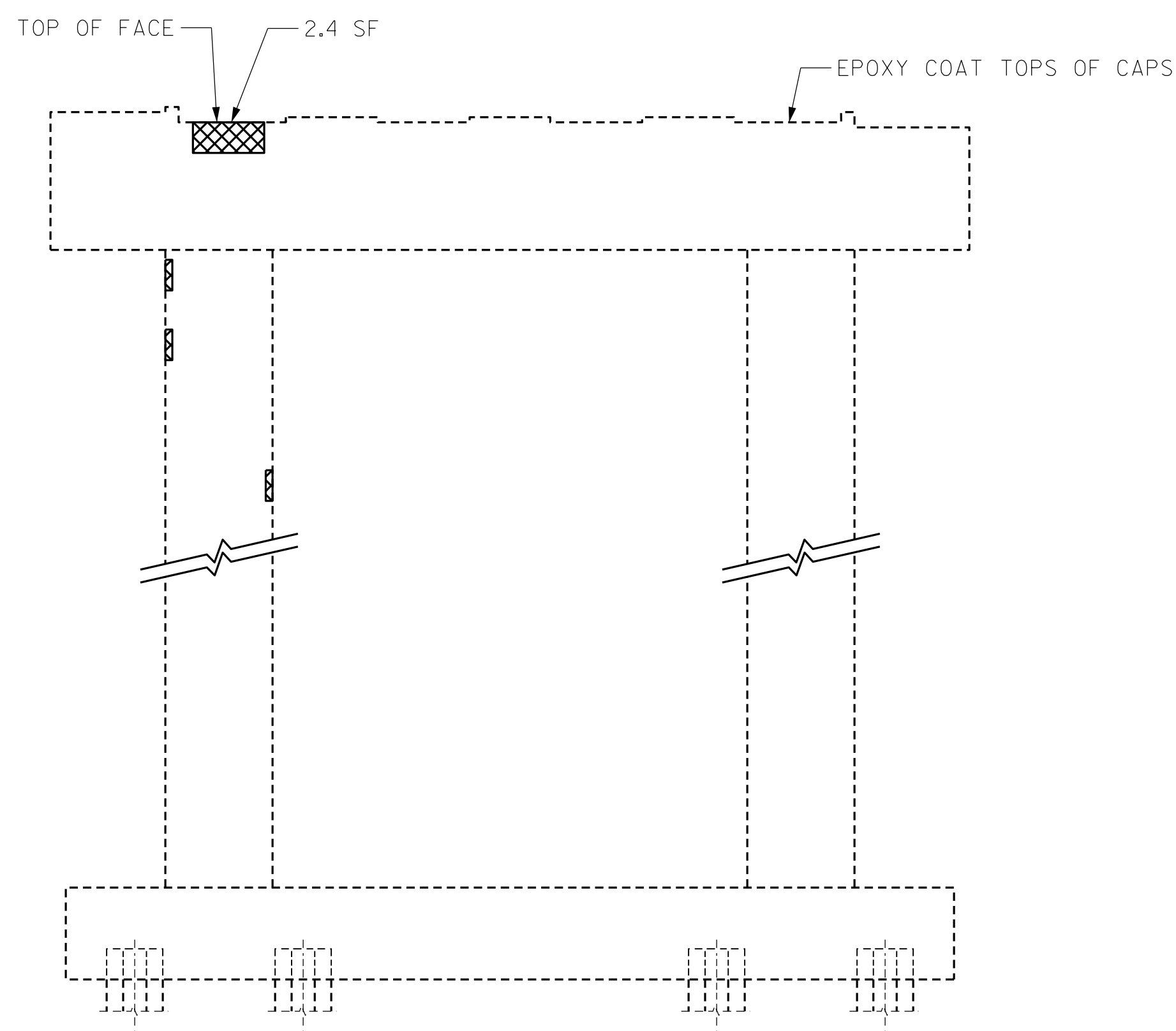
EPOXY RESIN INJECTION (ERI)



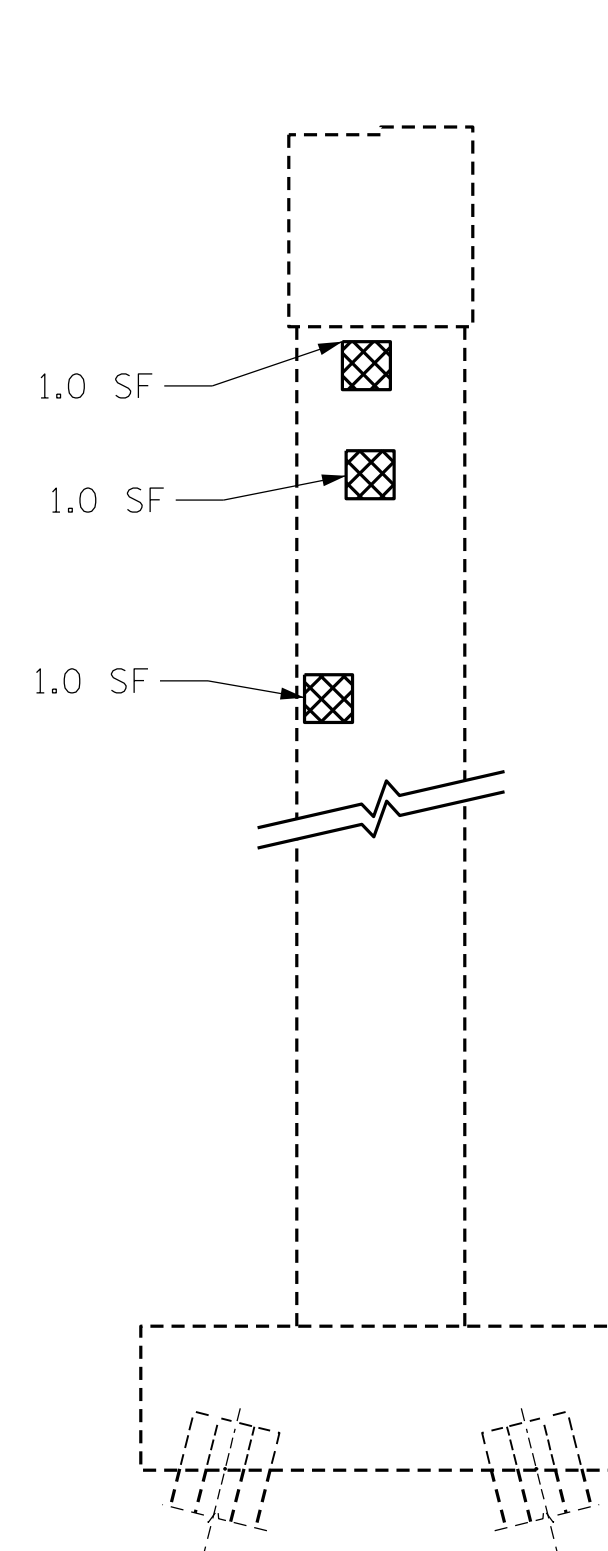
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	2.4	1.2		
COLUMN/PILE	3.0	1.5		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	0.24	0.12		
EPOXY RESIN INJECTION		LIN. FT.		LIN. FT.
CAP		-		
COLUMN/PILE		-		
PILE REPAIR JACKET		LIN. FT.		LIN. FT.
INTEGRAL PILE JACKET		-		
EPOXY COATING		AREA SQ. FT.		AREA SQ. FT.
CAP		120		

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

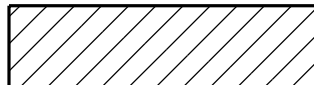




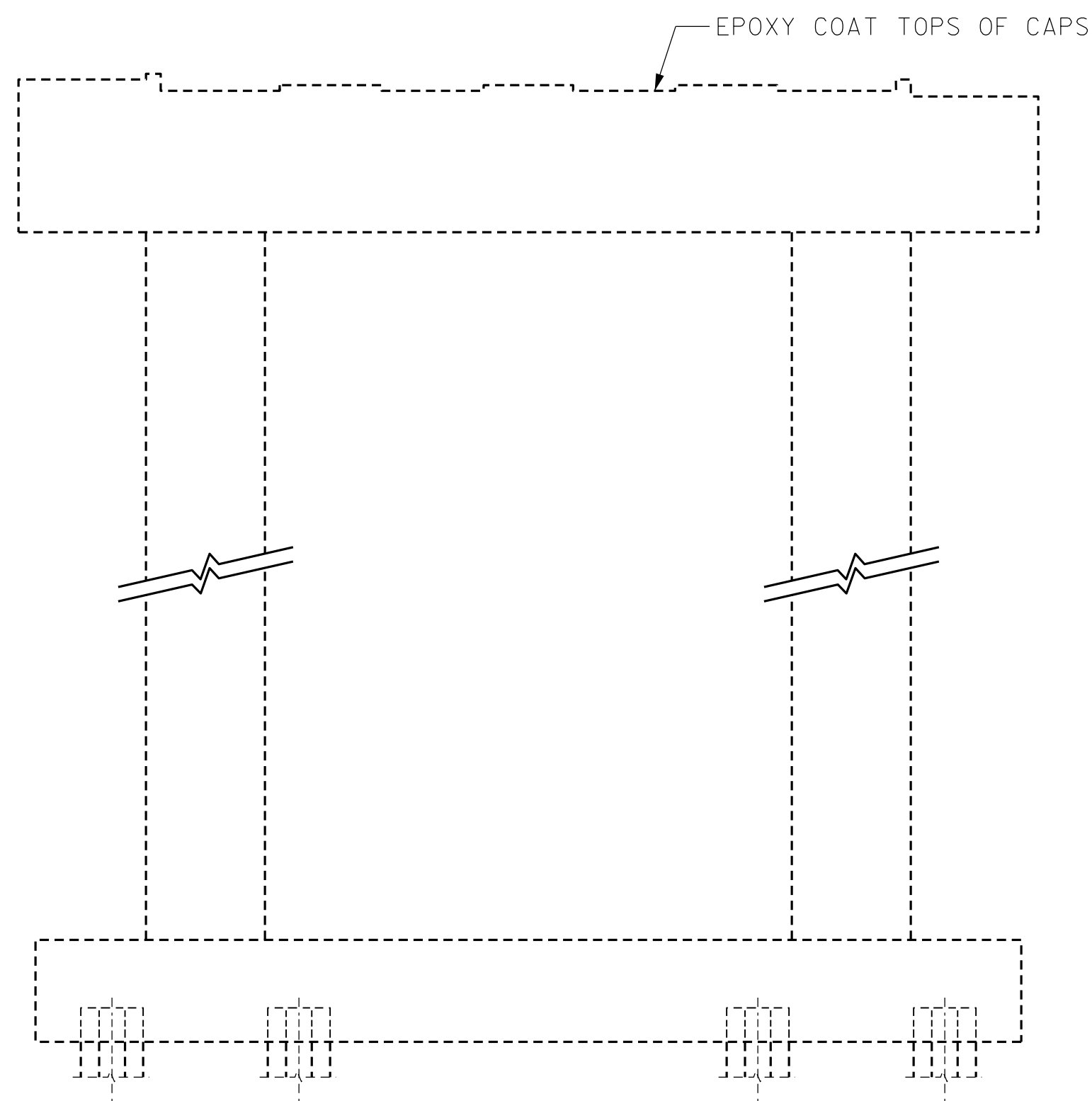
3/28/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

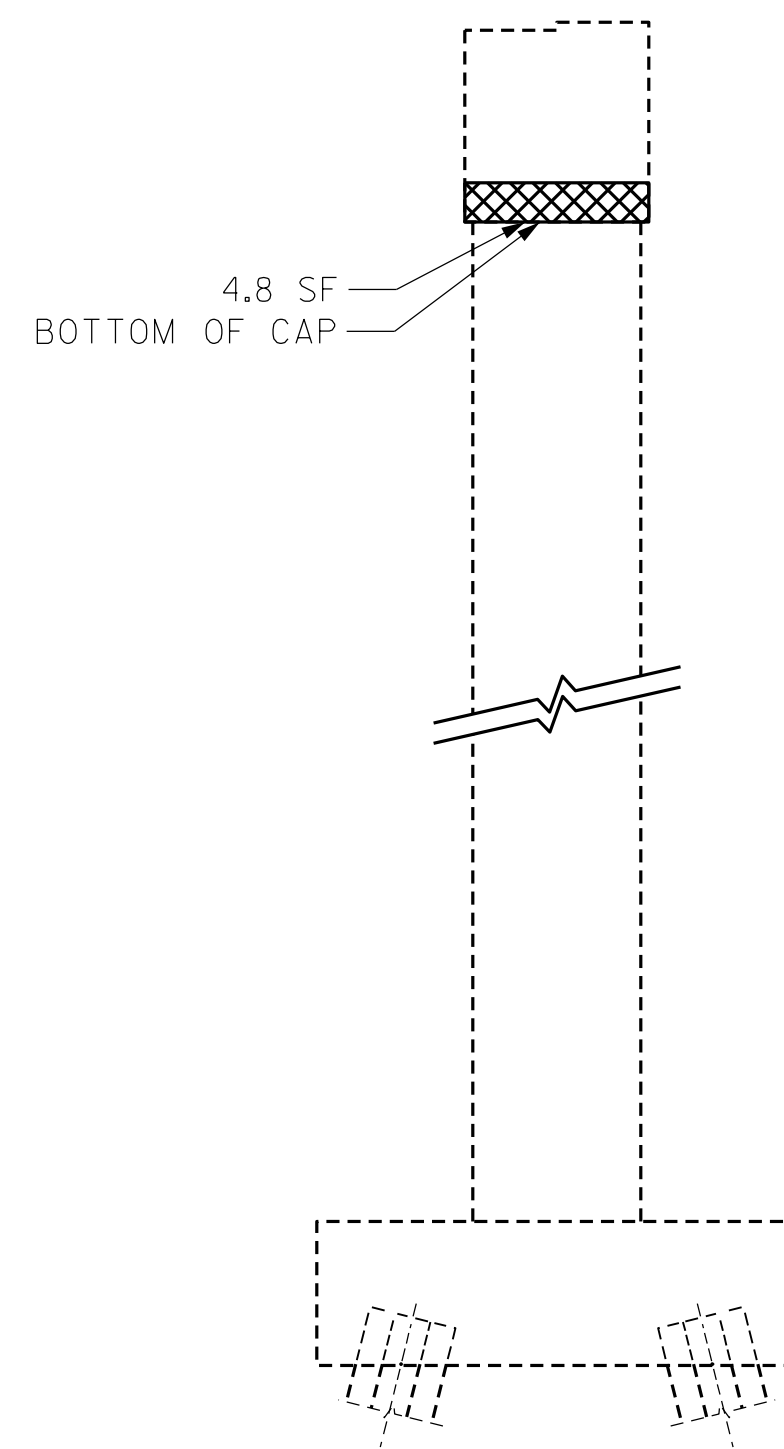
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 17						S-41
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:

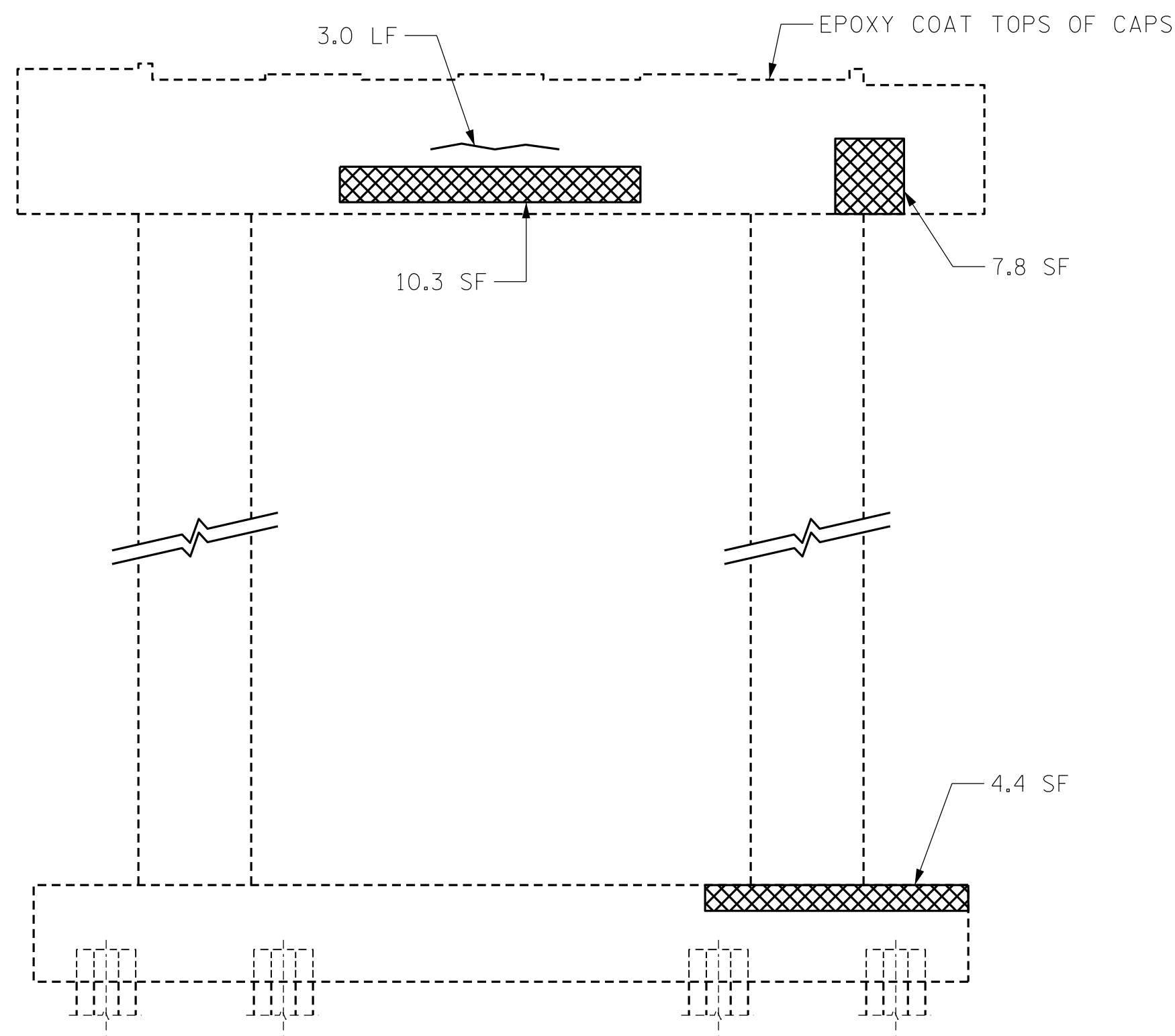
-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



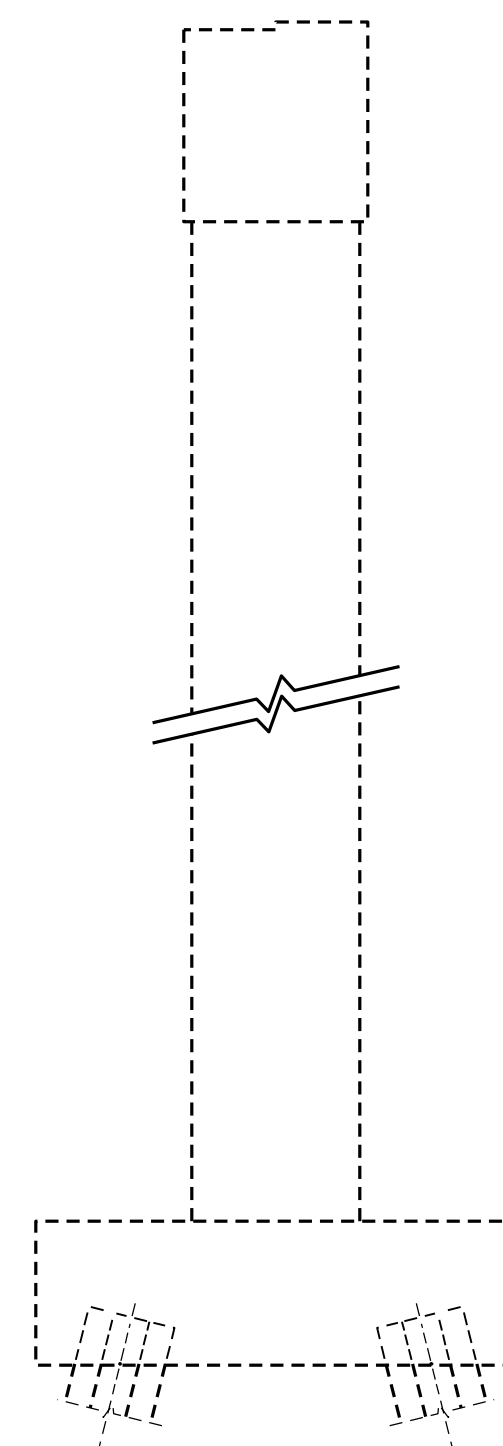
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	27.3	13.7		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	2.7	1.4		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	3.0			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

NOTES:

REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN ON THE DRAWINGS ARE DEEMED NECESSARY BY THE ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CONCRETE COVER FOR EXTERIOR BARS IN THE CAP IS 3" ON THE BOTTOM FACE, 2" ELSEWHERE, AND 2" ON THE COLUMNS PER EXISTING BRIDGE PLANS. ACTUAL CONCRETE COVER SHALL BE DETERMINED BY THE CONTRACTOR AND PRESENTED TO THE ENGINEER PRIOR TO BEGINNING SCARIFICATION.

CURRENT AVERAGE COVER IS EXPECTED TO BE FROM 2" TO 3" ON THE CAP AND FROM 1 1/2" TO 2" ON THE COLUMNS BASED ON VISUAL INSPECTION.

FOR CONCRETE AND SHOTCRETE REPAIRS, SEE "CONCRETE RESTORATION DETAILS" SHEET 3 OF 3.

ALL DEFECT QUANTITIES ON STRUTS AND COLUMN FOOTINGS ARE LISTED WITH THE QUANTITIES FOR THE CAP.

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

SHOTCRETE REPAIRS TO THE BENT CAP MAY REQUIRE BRIDGE JACKING. FOR BRIDGE JACKING, SEE SPECIAL PROVISIONS.

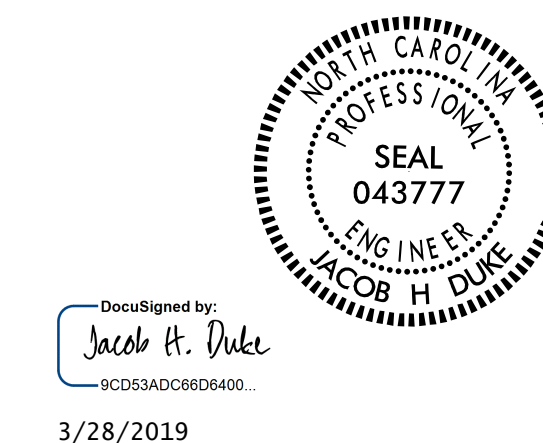
FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

* QUANTITIES OF CONCRETE REPAIR AREAS ARE ANTICIPATED UNDER BEARING AREAS. DUE TO LACK OF INFORMATION, ALL AREAS ARE NOT KNOWN. QUANTITY INCLUDES CONTINGENCIES AND ARE ANTICIPATED TO BE SUFFICIENT FOR ACTUAL QUANTITIES ENCOUNTERED. FOR CONCRETE REPAIRS SEE "CONCRETE RESTORATION DETAILS" SHEETS.

PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

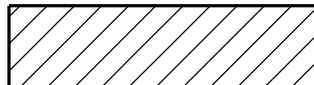




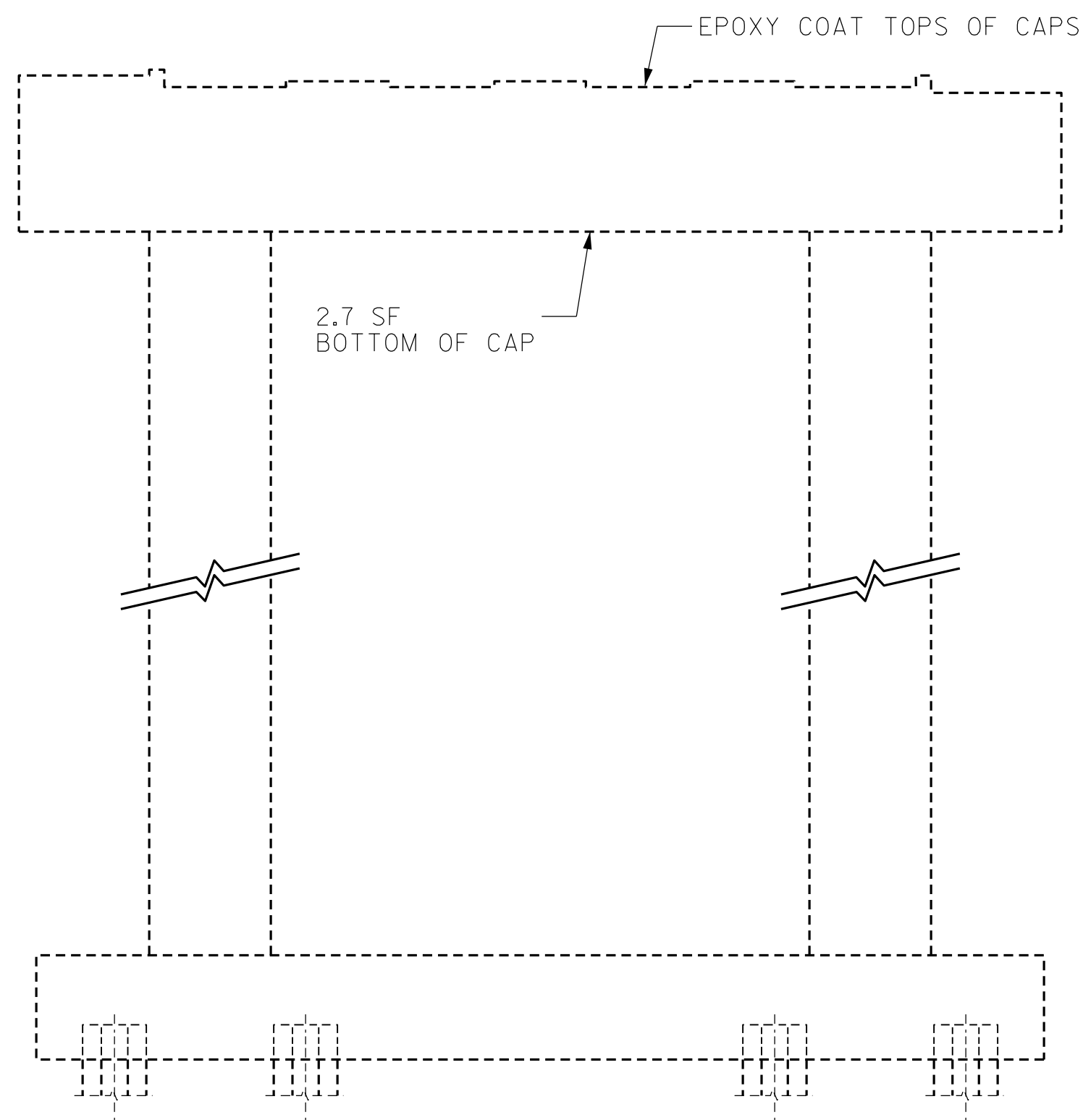
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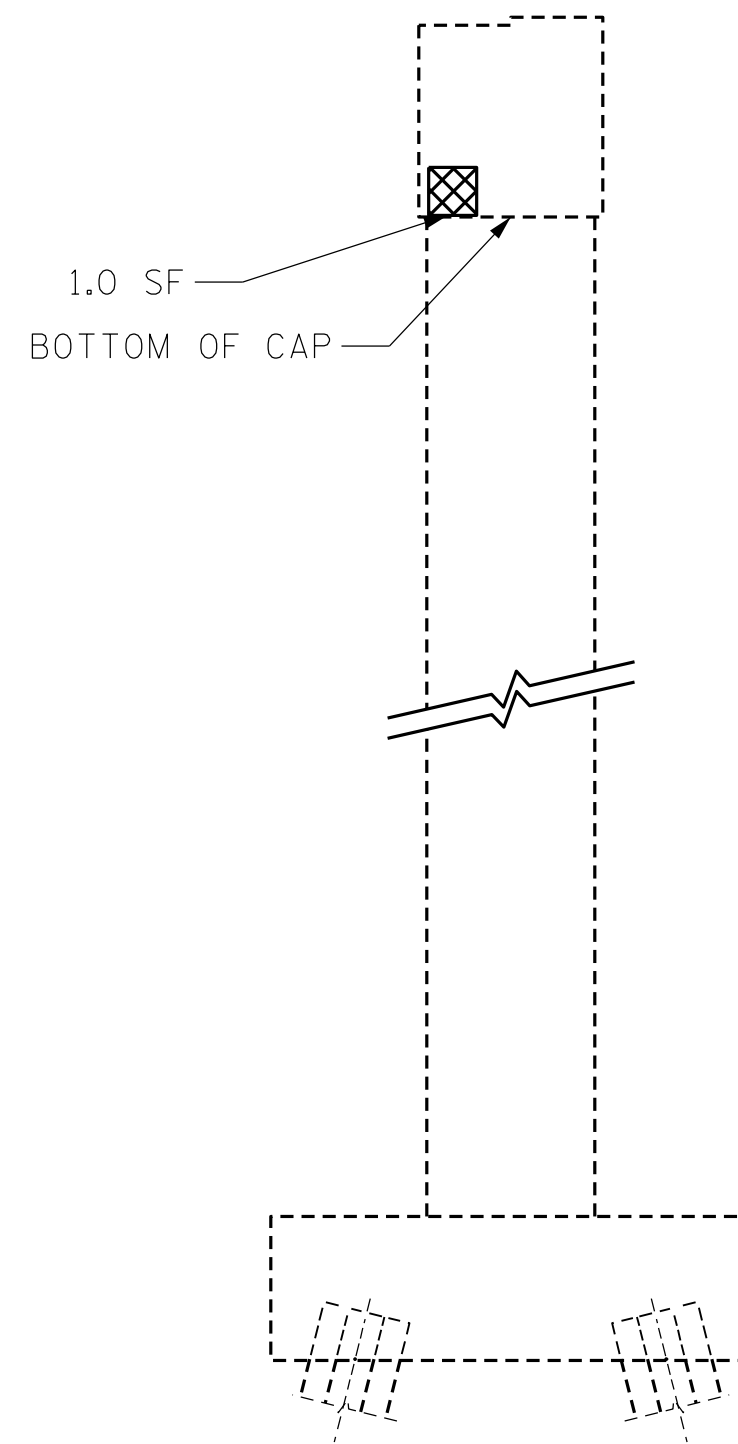
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE CONCRETE REPAIRS BENT 18					
REVISIONS					SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					S-42
					TOTAL SHEETS 45

LEGEND:

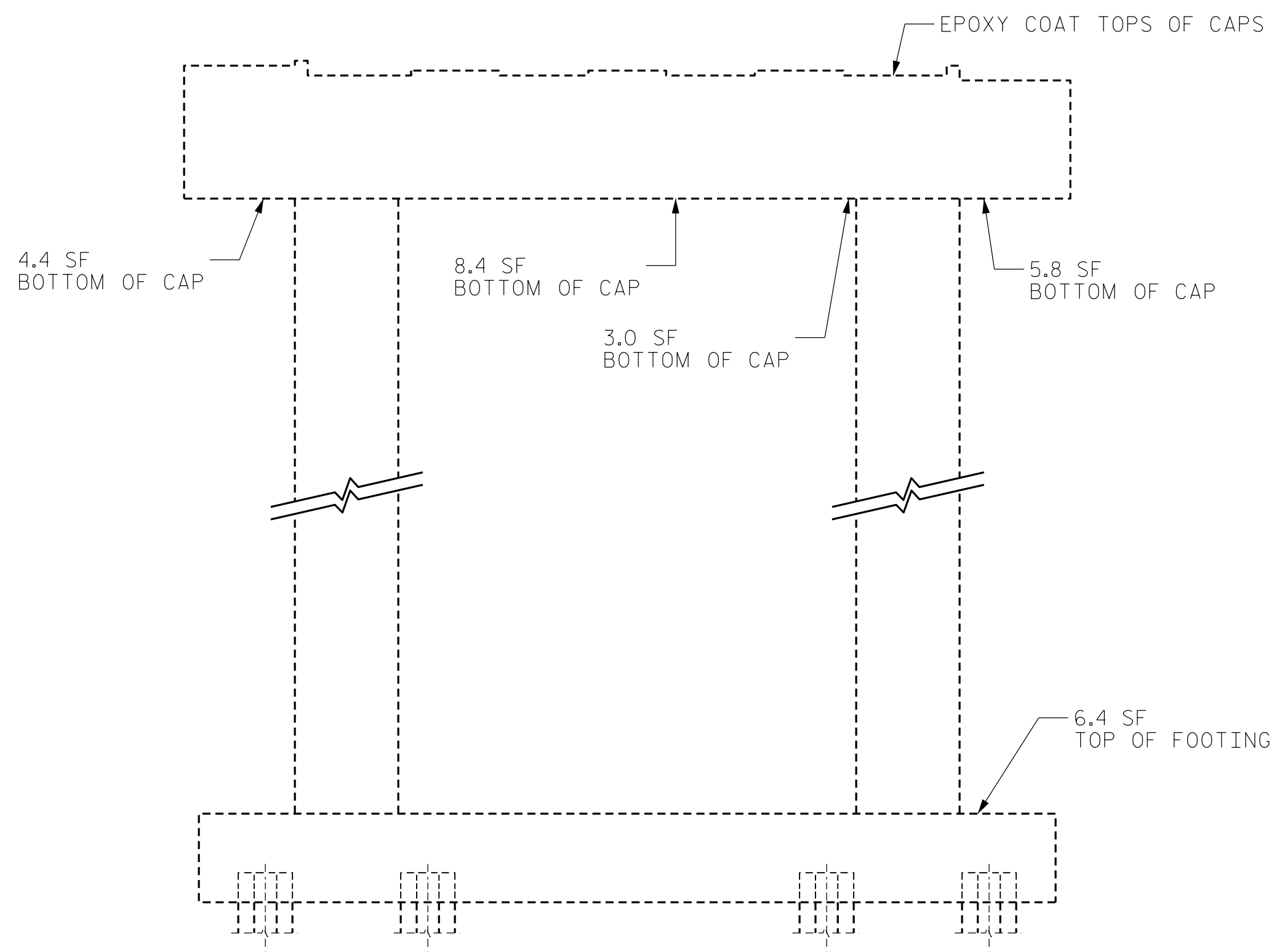
-  CONCRETE REPAIR AREA
-  SHOTCRETE REPAIR AREA
-  EPOXY RESIN INJECTION (ERI)



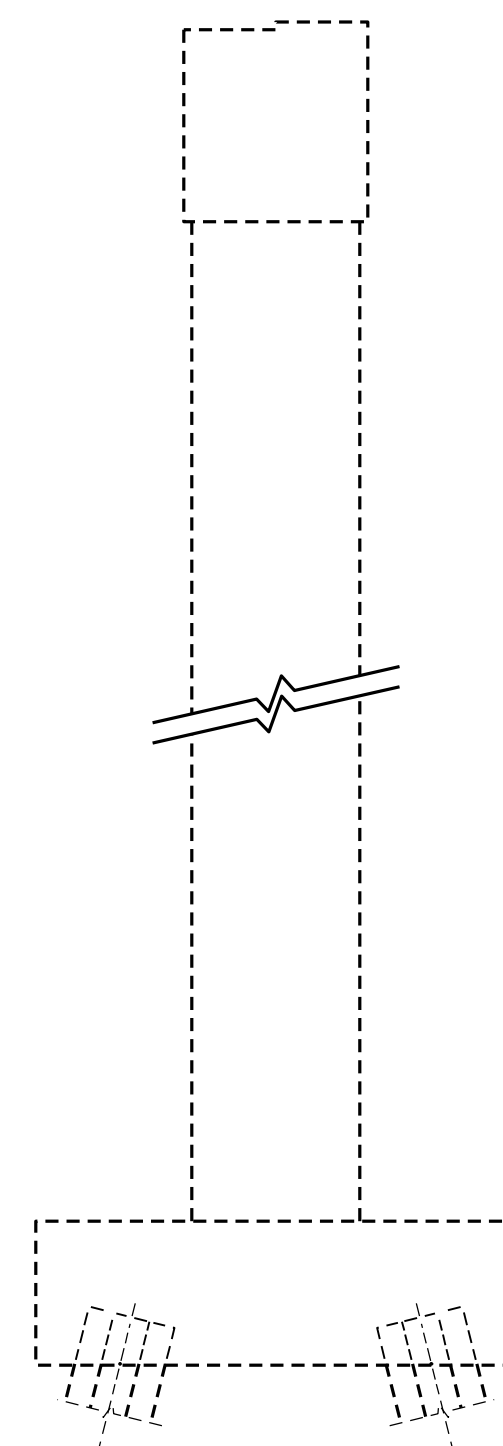
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	31.7	15.9		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	3.2	1.6		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

3/28/2019
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 User: jduke



3/28/2019

DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
SUBSTRUCTURE CONCRETE REPAIRS BENT 19						S-43
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	45
1			3			
2			4			

LEGEND:



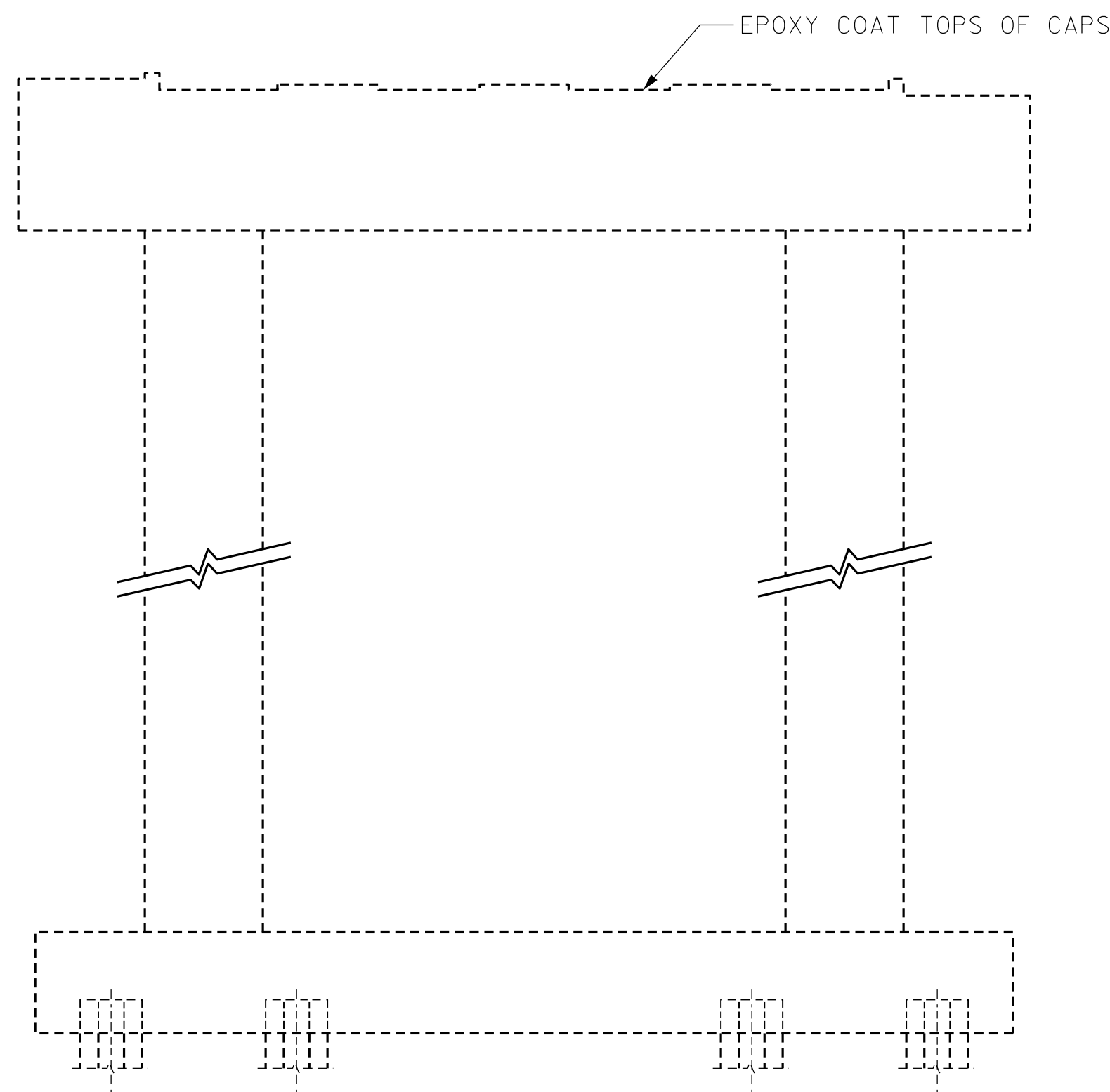
CONCRETE REPAIR AREA



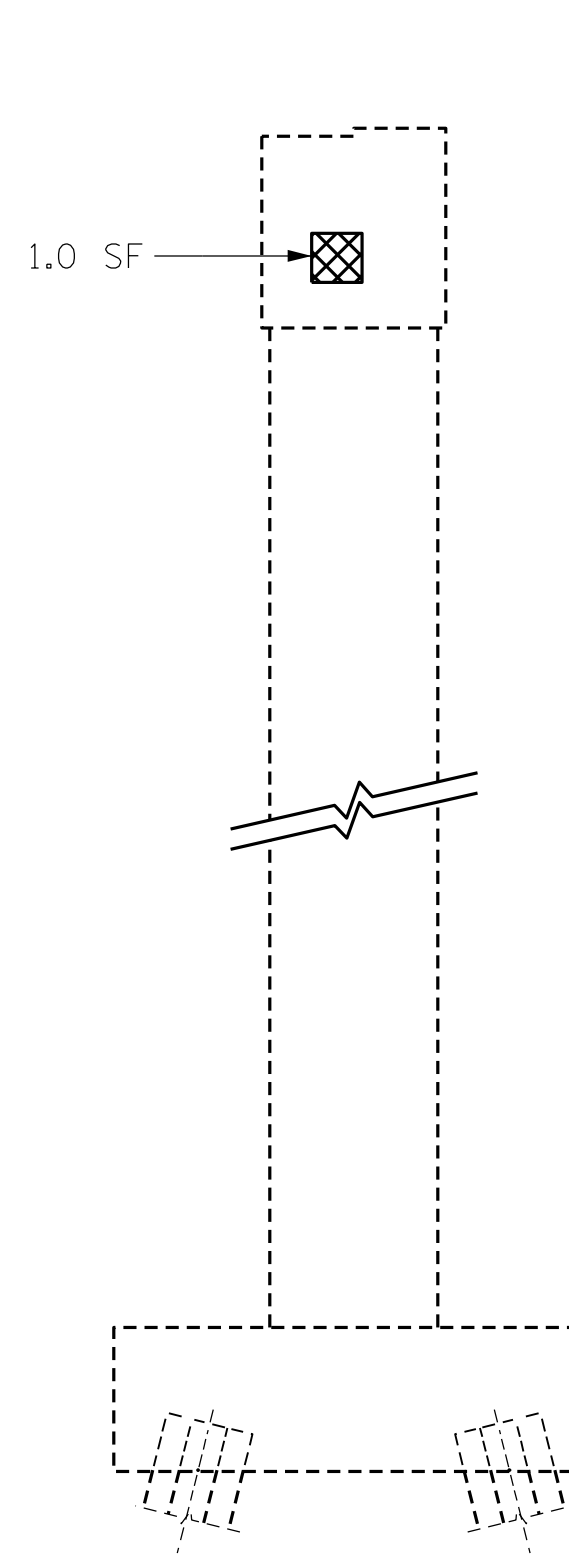
SHOTCRETE REPAIR AREA



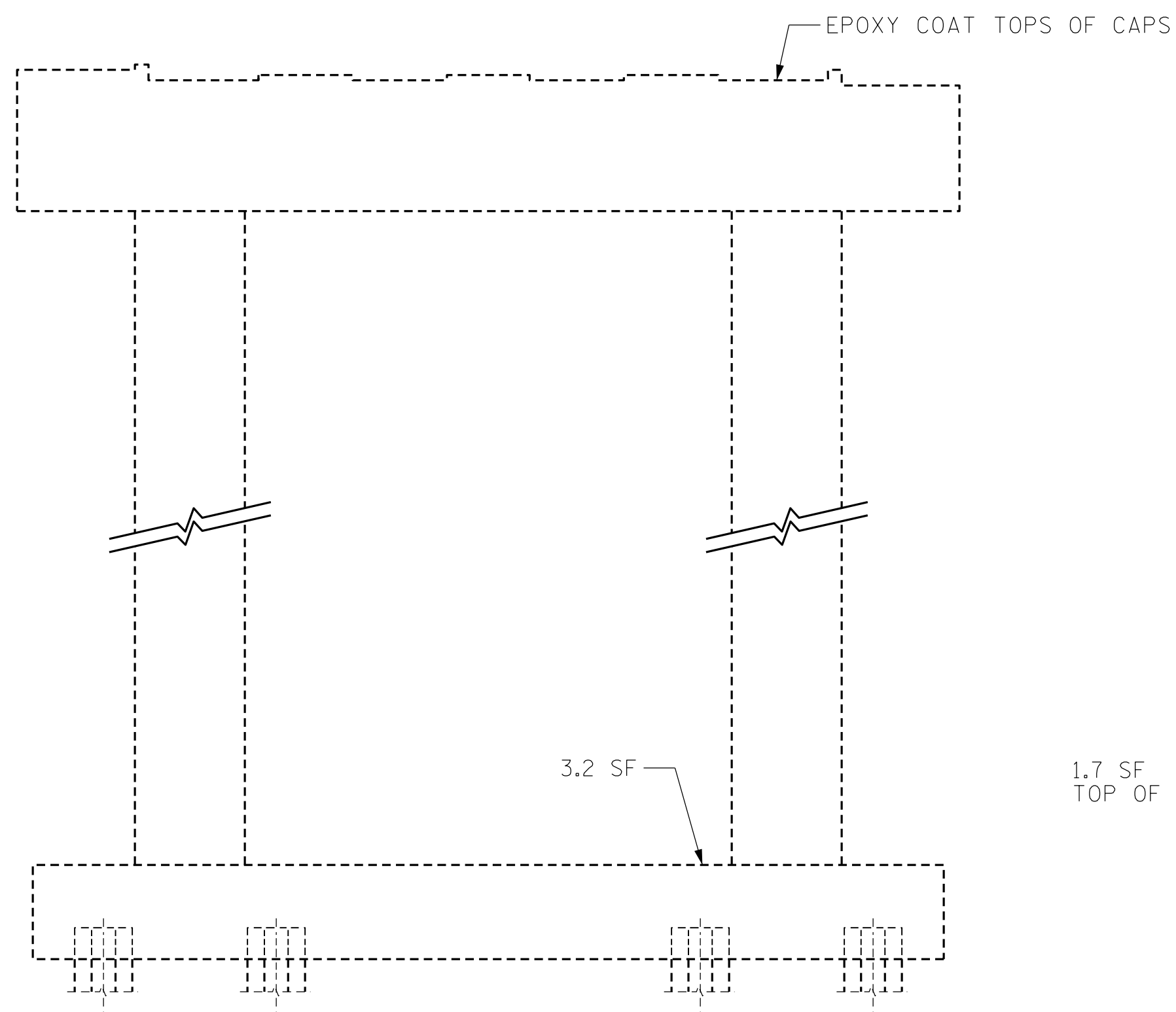
EPOXY RESIN INJECTION (ERI)



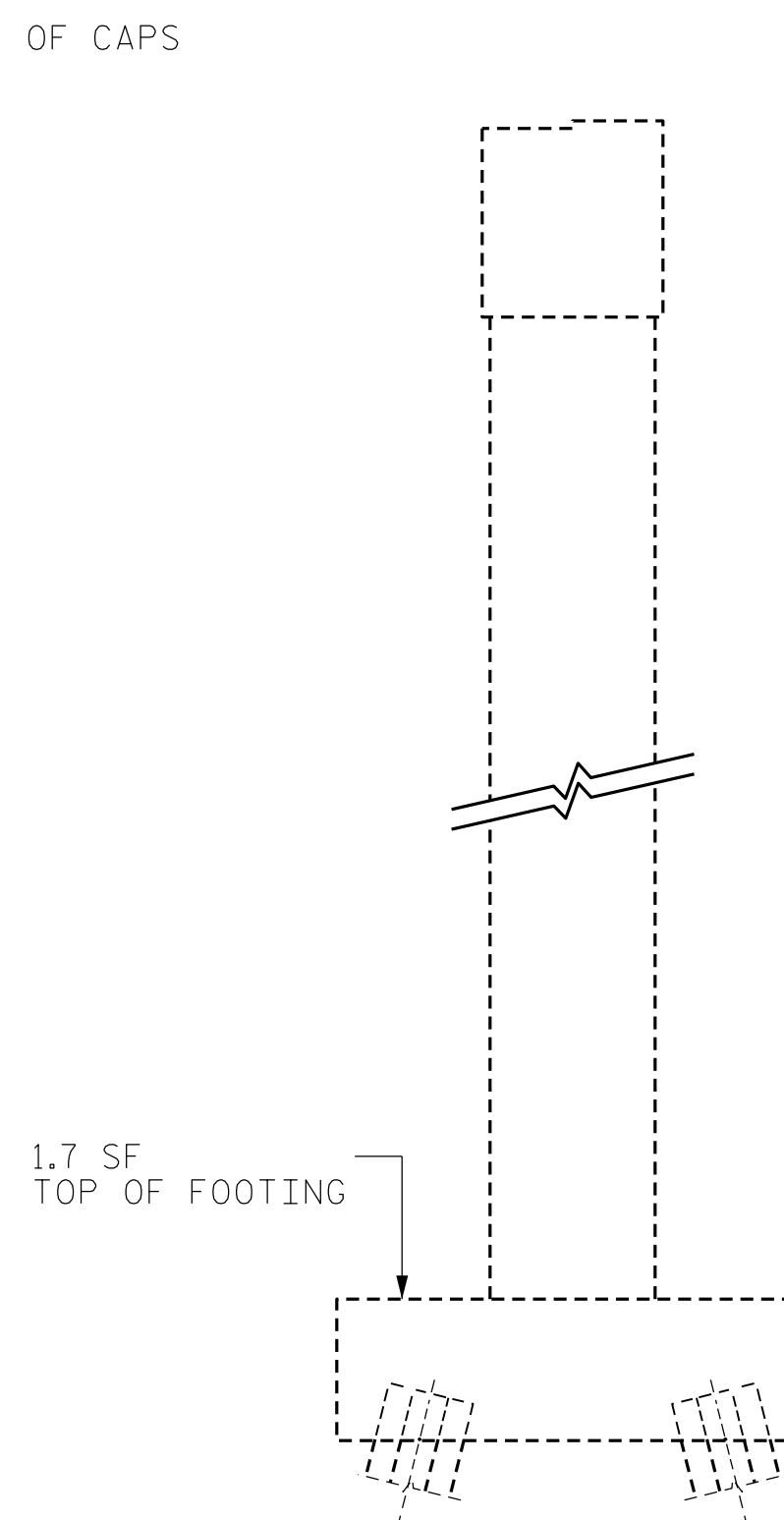
WEST ELEVATION



SOUTH FACE



EAST ELEVATION



NORTH FACE

	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
CAP/FOOTING	5.9	3.0		
COLUMN/PILE	-	-		
CONCRETE REPAIRS	AREA SQ. FT.	VOLUME CU. FT.	AREA SQ. FT.	VOLUME CU. FT.
* CAP	0.6	0.3		
EPOXY RESIN INJECTION	LIN. FT.		LIN. FT.	
CAP	-			
COLUMN/PILE	-			
PILE REPAIR JACKET	LIN. FT.		LIN. FT.	
INTEGRAL PILE JACKET	-			
EPOXY COATING	AREA SQ. FT.		AREA SQ. FT.	
CAP	120			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MINIMUM OF 1" BEHIND REBAR AND MINIMUM 2" CLEARANCE TO SAWCUT. FOR REPAIR DETAILS, SEE "CONCRETE RESTORATION DETAILS - SUBSTRUCTURE" SHEET.

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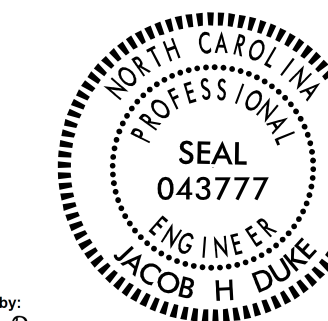
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FOR EPOXY PROTECTIVE COATING, SEE SPECIAL PROVISIONS.

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PROJECT NO. 15BPR.24
BRUNSWICK COUNTY
 BRIDGE NO. 090013



DocuSigned by:
Jacob H. Duke

3/28/2019

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S-44
SUBSTRUCTURE CONCRETE REPAIRS BENT 20						TOTAL SHEETS 45
REVISIONS						NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			1
2			4			2

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

KCA 301 FAYETTEVILLE ST., SUITE 1500
 KISINGER CAMPO & ASSOCIATES RALEIGH, NC 27601
 (919) 882-7839
 LICENSE #: C-1506

DRAWN BY : OMAR M. KHALAFALLA DATE : 10/2018
 CHECKED BY : DIEGO A. AGUIRRE DATE : 10/2018
 DESIGN ENGINEER OF RECORD : JACOB H. DUKE DATE : 10/2018

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	- - - - -	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	- - - - -	SEE PLANS
IMPACT ALLOWANCE	- - - - -	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	- -	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	- -	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	- -	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	- - -	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	- - - - -	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	- - - - -	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	- - -	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	- - - - -	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	- - - - -	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2018 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED $\frac{3}{4}$ " WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO $1\frac{1}{2}$ " RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$ " FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A $\frac{1}{4}$ " RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE $\frac{7}{8}$ " \emptyset SHEAR STUDS FOR THE $\frac{3}{4}$ " \emptyset STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$ " \emptyset STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$ " \emptyset STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$ " \emptyset STUDS FOR 4 - $\frac{3}{4}$ " \emptyset STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{3}{16}$ " IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY $\frac{1}{16}$ " INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN