

AS-BUILT REPAIR QUANTITY TABLE				
BENT 2 SPAN C FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	4.0	1.0		
COLUMN	11.0	3.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	1.0			
COLUMN	0.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

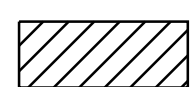


SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

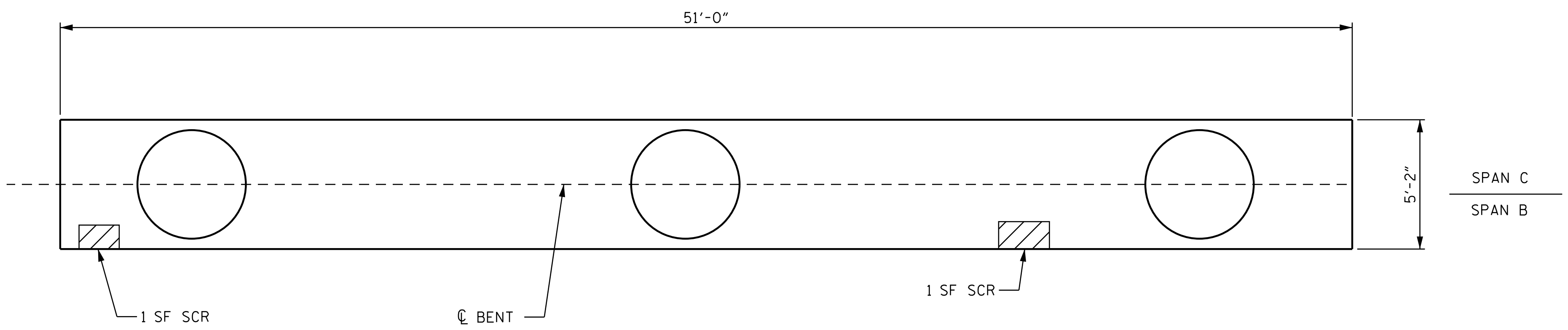
FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

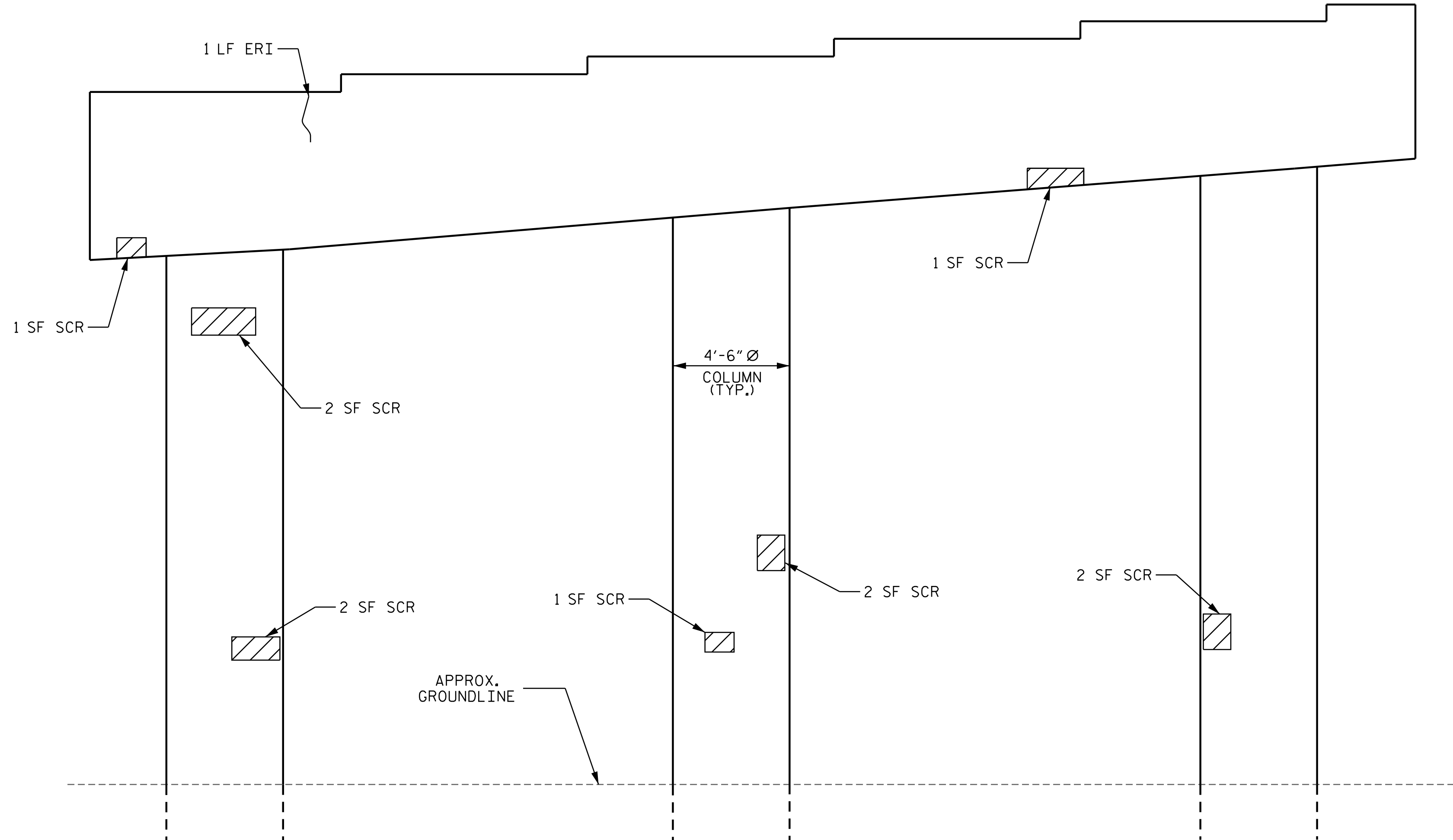
FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

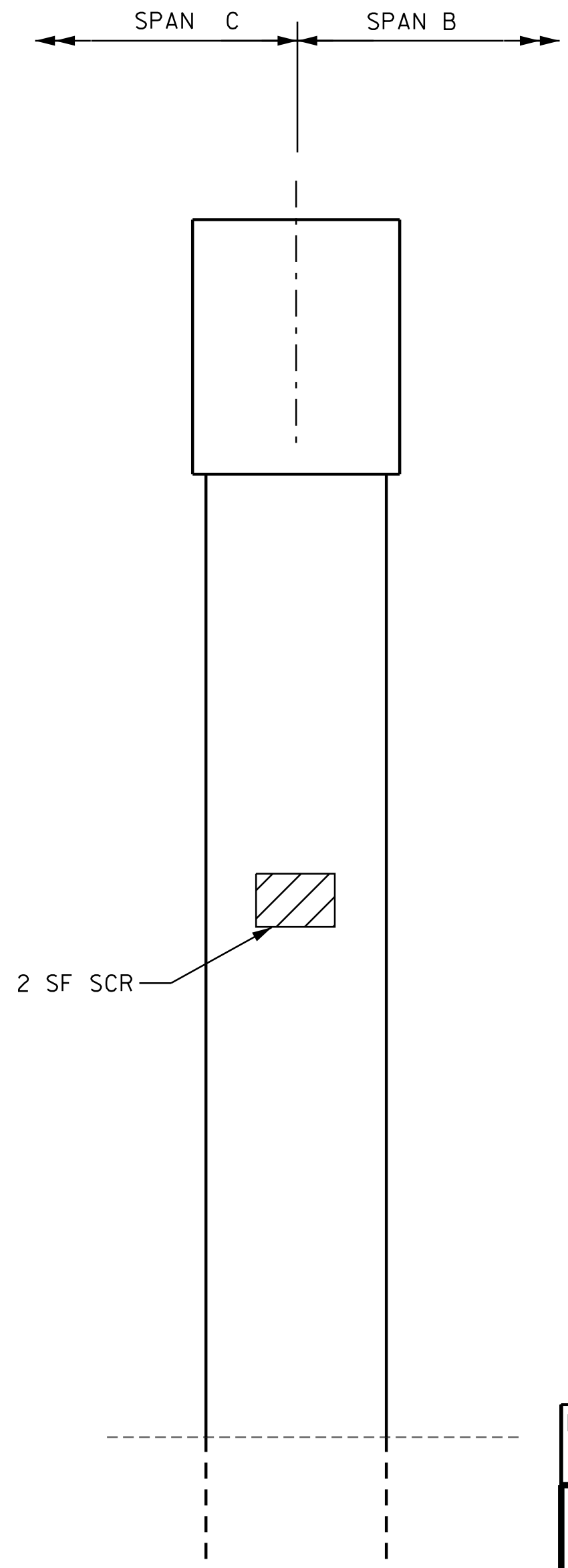
-  SHOTCRETE REPAIR (SCR)
-  CONCRETE REPAIR (CR)
-  EPOXY RESIN INJECTION (ERI)



BOTTOM OF CAP

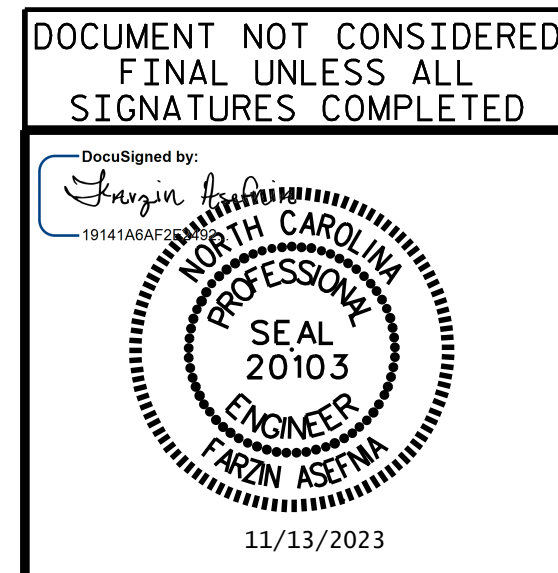


ELEVATION



END VIEW

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310135
 SHEET 5 OF 8

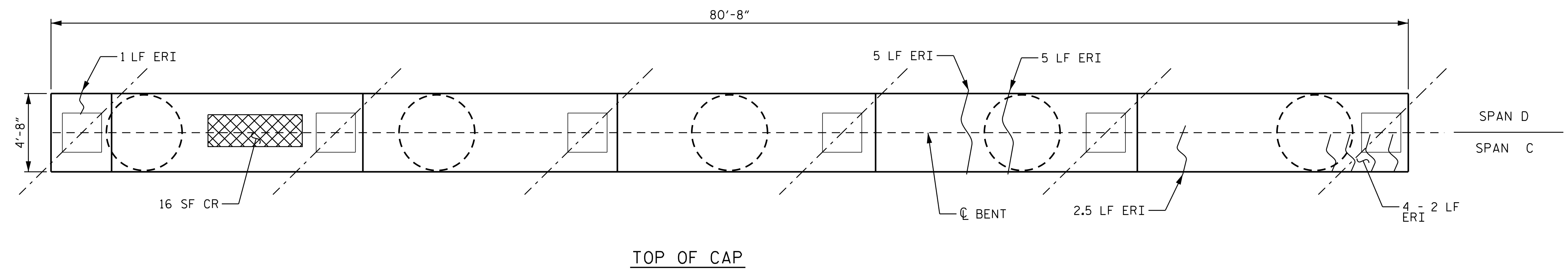


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE REPAIR
 BENT 2 SPAN C FACE

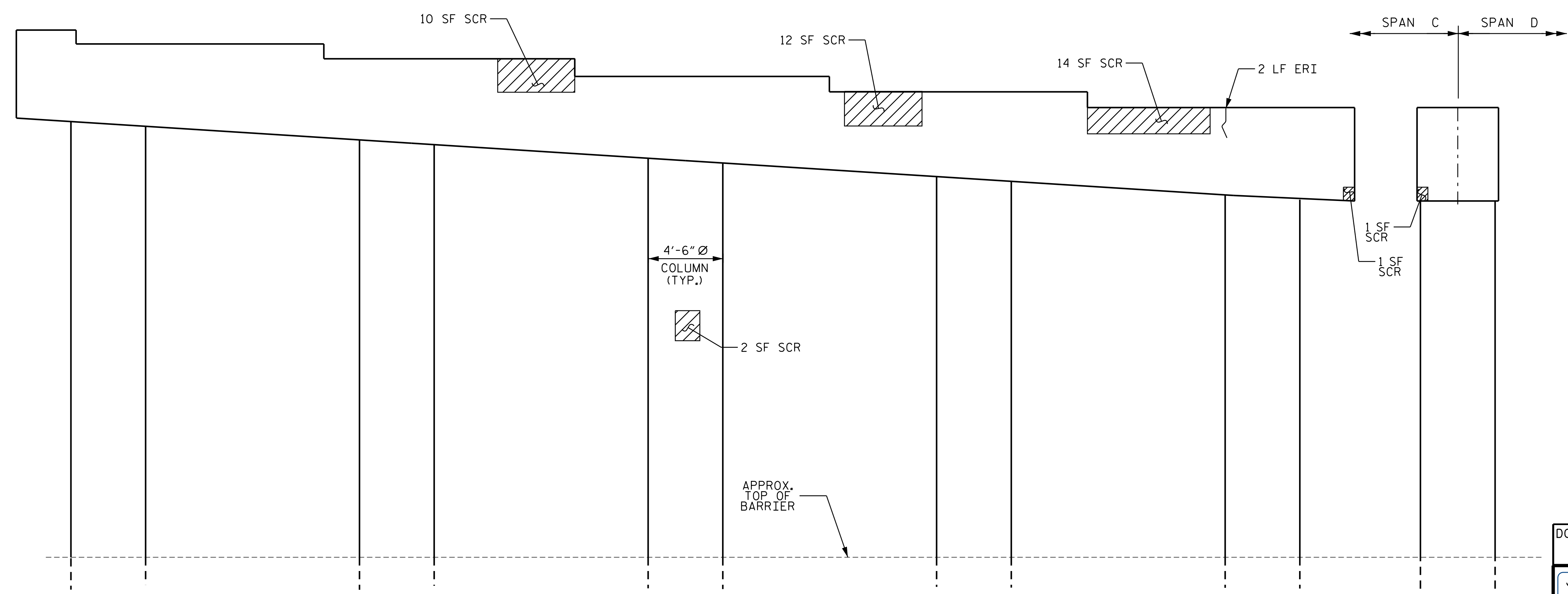
DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

BENT NO. 2
 SPAN C FACE

REVISIONS						SHEET NO. S3-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 18
2			4			



TOP OF CAP



ELEVATION

END VIEW

BENT NO. 3
SPAN C FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 3 SPAN C FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	38.0	9.5		
COLUMN	2.0	0.5		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	16.0	4.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	23.5			
COLUMN	0.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF BENT CAP	365.0			

NOTES:

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CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941

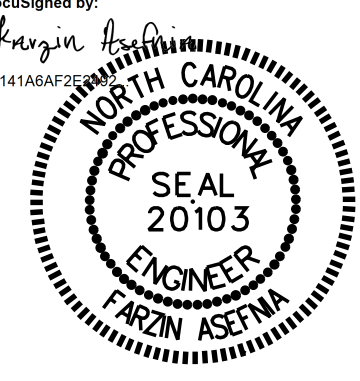
DURHAM COUNTY

BRIDGE NO. 310135

SHEET 6 OF 8

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
Farzin Asefnia
101418AB2



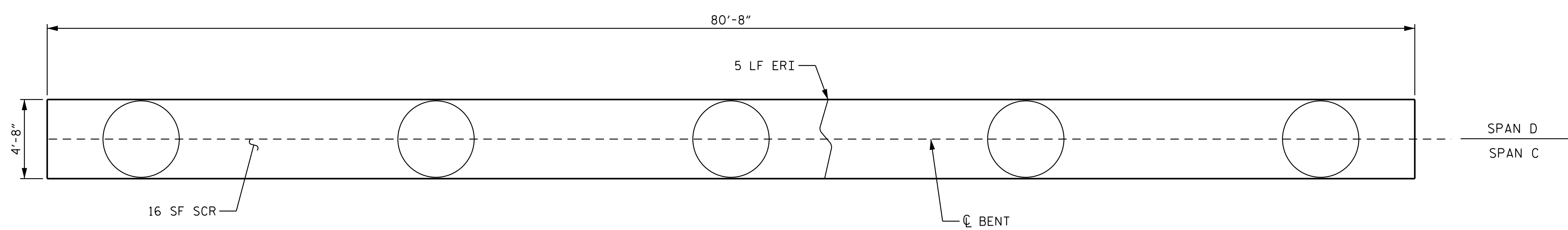
11/13/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

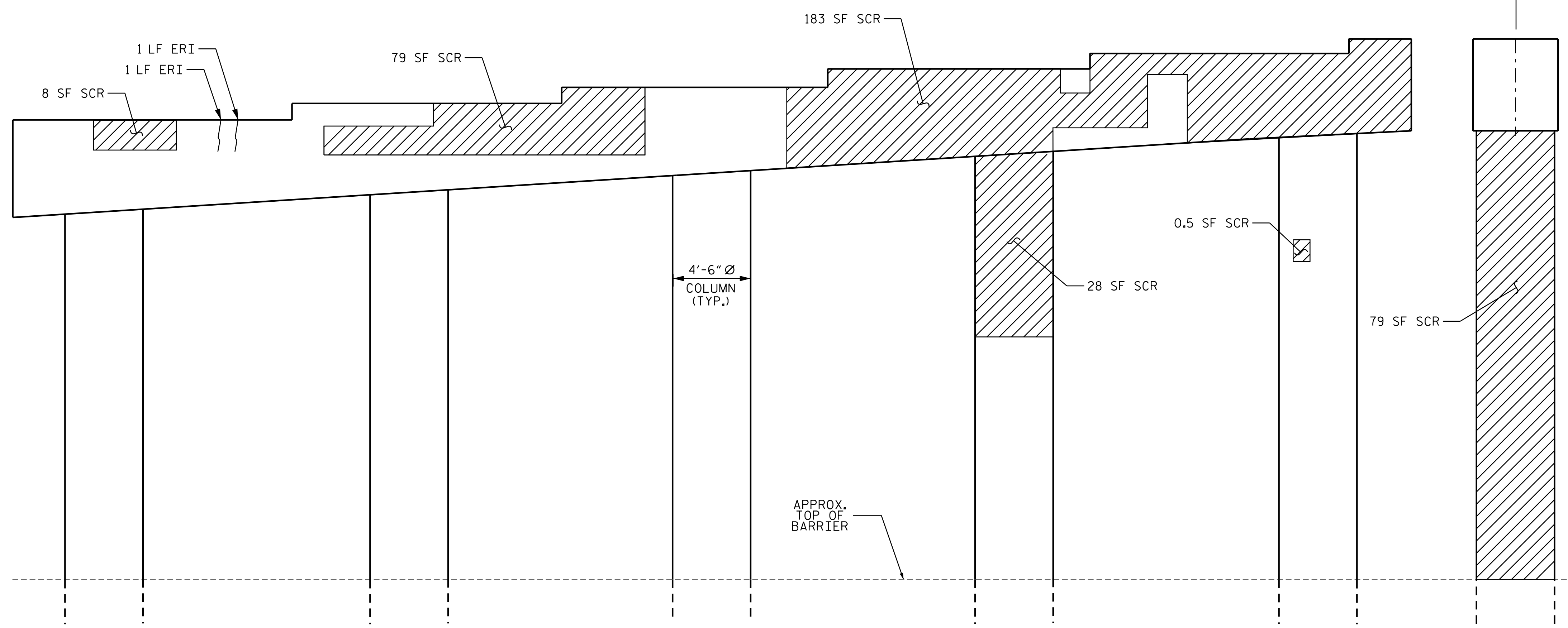
SUBSTRUCTURE REPAIR
BENT 3 SPAN C FACE

DRAWN BY :	M. HOGAN	DATE :	3/2023
CHECKED BY :	JIA XU	DATE :	7/2023
DESIGN ENGINEER OF RECORD:	F. ASEFNIA	DATE :	11/2023

REVISIONS						SHEET NO. S3-16
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 18
2			4			



BOTTOM OF CAP



ELEVATION

END VIEW

BENT NO. 3
SPAN D FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 3 SPAN D FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	270.0	68.0		
COLUMN	107.5	27.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	7.0			
COLUMN	0.0			

NOTES:

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CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

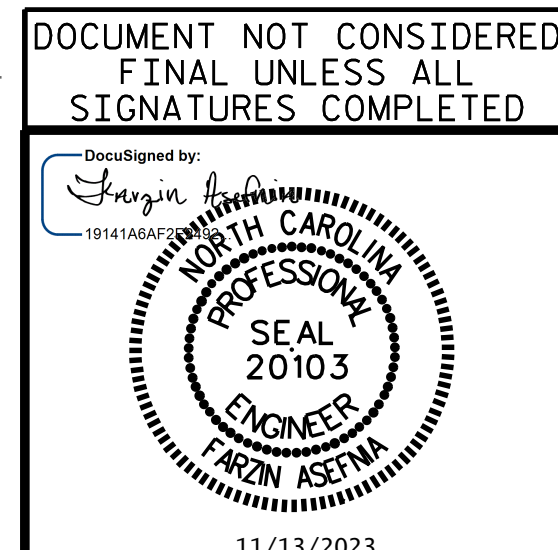
FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
BRIDGE NO. 310135
SHEET 7 OF 8



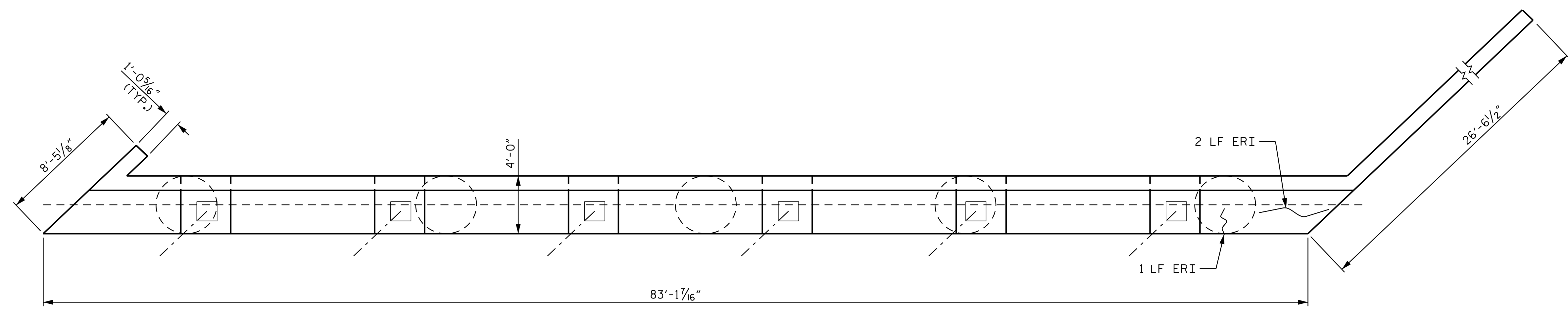
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE REPAIR
BENT 3 SPAN D FACE

DRAWN BY : M. HOGAN DATE : 3/2023
CHECKED BY : JIA XU DATE : 7/2023
DESIGN ENGINEER OF RECORD : F. ASEFNIA DATE : 11/2023

REVISIONS						SHEET NO. S3-17
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 18
2			4			



AS-BUILT REPAIR QUANTITY TABLE				
END BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
CURTAIN & WING WALL	0.5	0.2		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION		LN. FT.		LN. FT.
CAP		3.0		
CURTAIN WALL		62.0		
EPOXY COATING		SO. FT.		SO. FT.
TOP OF CAP		225.0		



PLAN

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

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

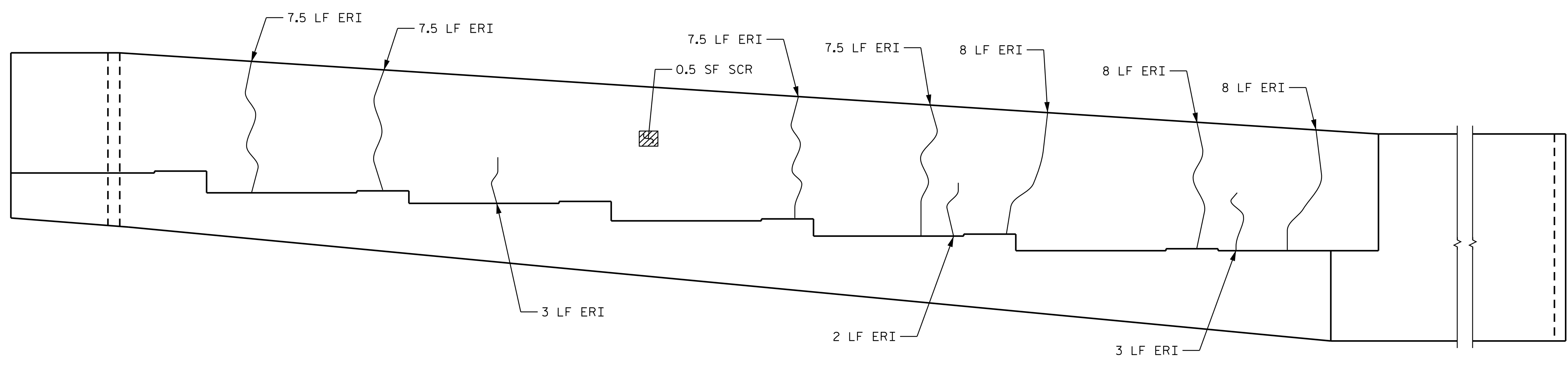
FOR CAP REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)



ELEVATION

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310135
 SHEET 8 OF 8

END BENT NO. 2

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD : F. ASEFNIA DATE : 11/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Designed by:

NORTH CAROLINA
 PROFESSIONAL
 SEAL
 20103
 ENGINEER
 FARZIN ASEFNIA

11/13/2023

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

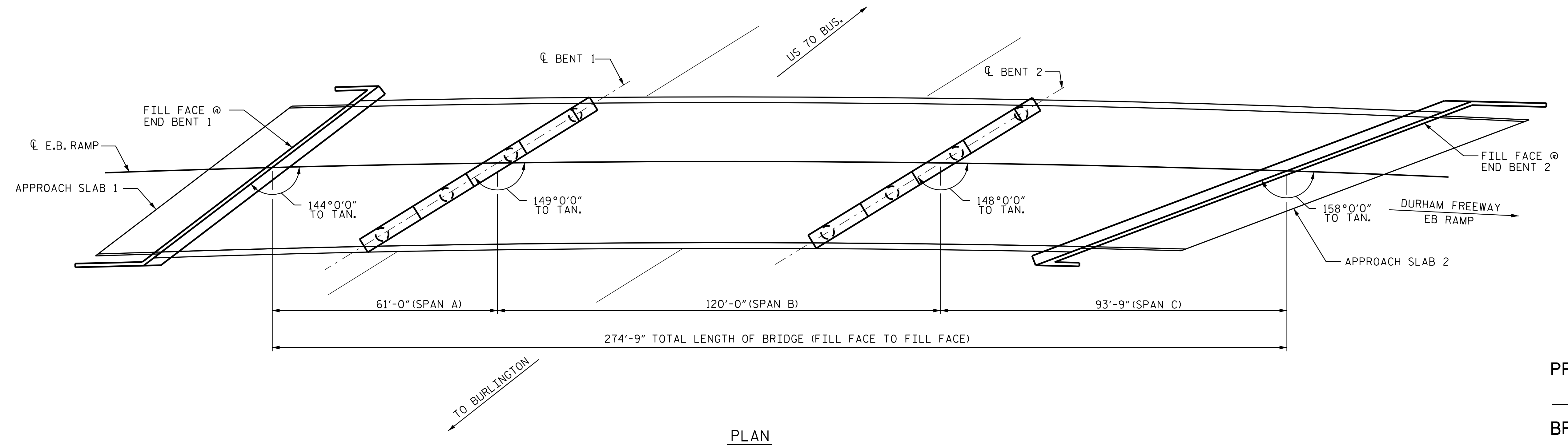
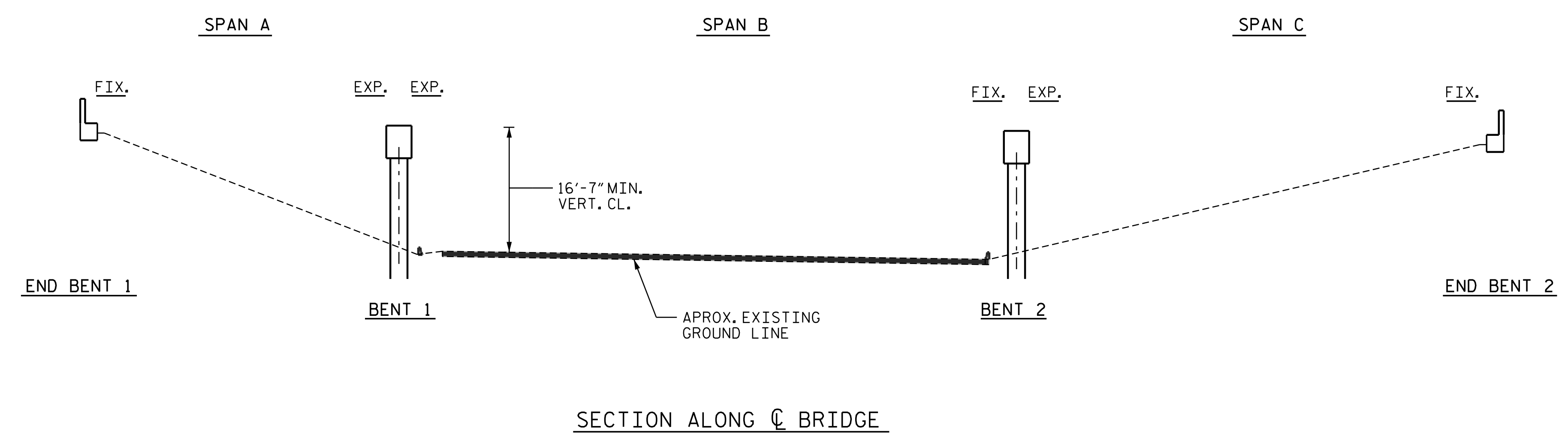
SUBSTRUCTURE REPAIR

END BENT 2

REVISIONS						SHEET NO. S3-18
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 18
2			4			

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NOTES:
 GENERAL DRAWING INFORMATION IS TAKEN FROM THE ORIGINAL PLANS AND THE ROUTINE INSPECTION REPORT DATED 11/28/2022.
 BRIDGE ORIENTATION CONFORMS TO THE ORIGINAL BRIDGE PLANS/ROUTINE INSPECTION.
SCOPE OF WORK
 PARTIALLY REMOVE TOP OF BRIDGE DECK CONCRETE BY SCARIFICATION AND SHOTBLASTING METHODS.
 PREPARE THE CONCRETE BARRIER RAIL FRONT AND TOP SURFACES BY SHOTBLASTING FOR SILANE TREATMENT.
 PREPARE AND REPAIR CLASS II AREAS OF BRIDGE DECK.
 APPLY SILANE SEALER TO THE FRONT AND TOP SURFACES OF THE CONCRETE BARRIER SECTIONS.
 OVERLAY PREPARED TOP OF BRIDGE DECK WITH POLYMER CONCRETE (PC).
 REMOVE EXISTING JOINT MATERIAL AND INSTALL FOAM JOINT SEALS FOR PRESERVATION.
 GROOVE PC BRIDGE DECK.
 REMOVE DEBRIS FROM TOP OF EXISTING END BENT AND BENT CAPS AND APPLY EPOXY COATING.
 EPOXY RESIN INJECTION OF CONCRETE CRACKS.
 REMOVE UNSOUND CONCRETE AND PROPERLY PREPARE EXISTING END BENT AND BENT AREAS FOR SHOTCRETE AND CONCRETE REPAIRS.
 PROPERLY PREPARE SPALLED AREAS IN EXISTING END BENT AND BENTS AND PERFORM SHOTCRETE AND CONCRETE REPAIRS.
 CLEAN AND PAINT EXISTING WEATHERING STEEL BEAM ENDS.



PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

SHEET 1 OF 2

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 Farzin Asefnia
 1914168292

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

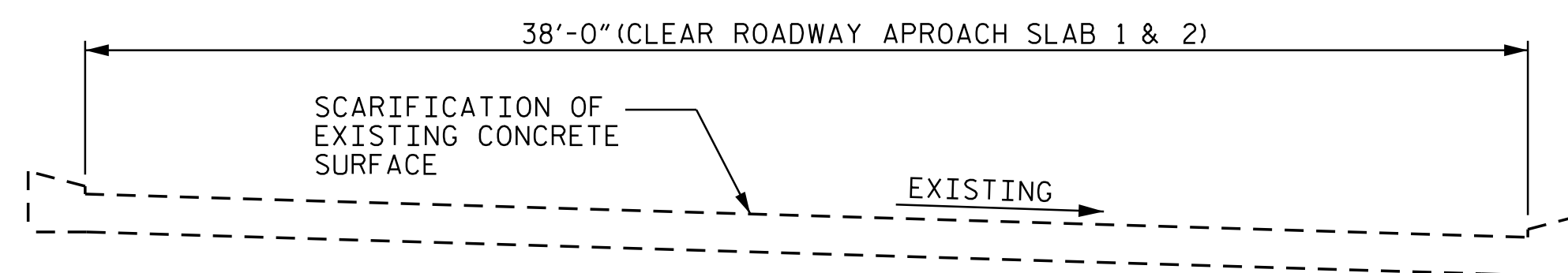
GENERAL DRAWING

FOR BRIDGE ON NC 147
 SOUTHBOUND RAMP
 OVER US 70 BUSINESS

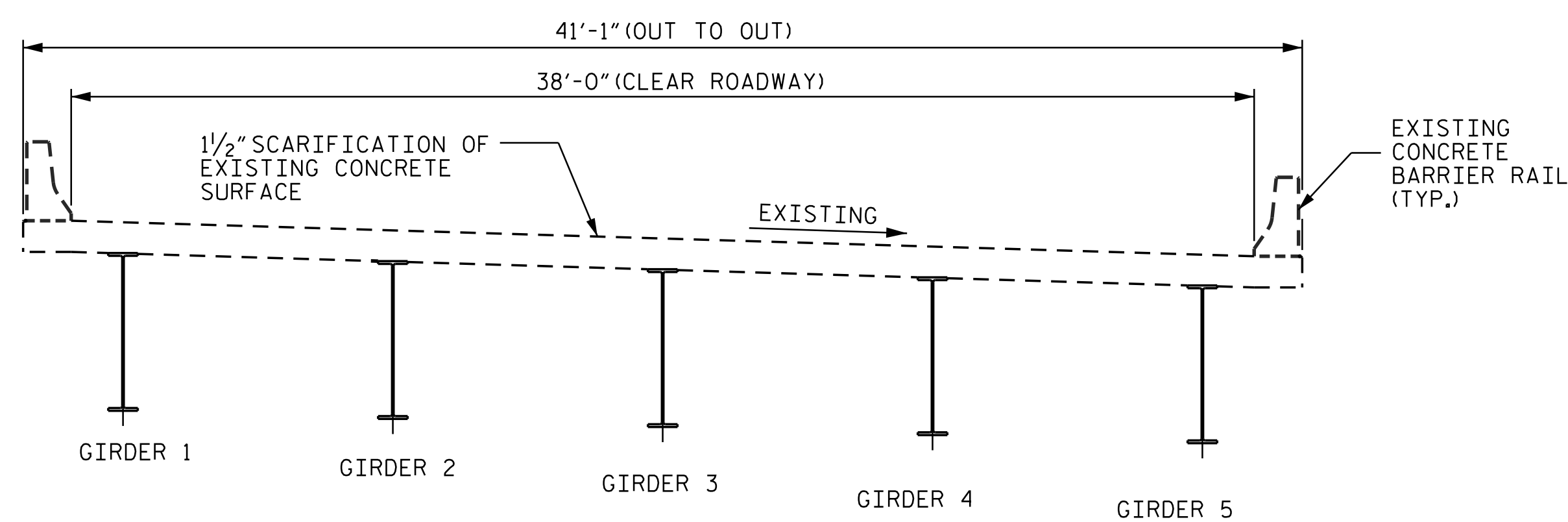
DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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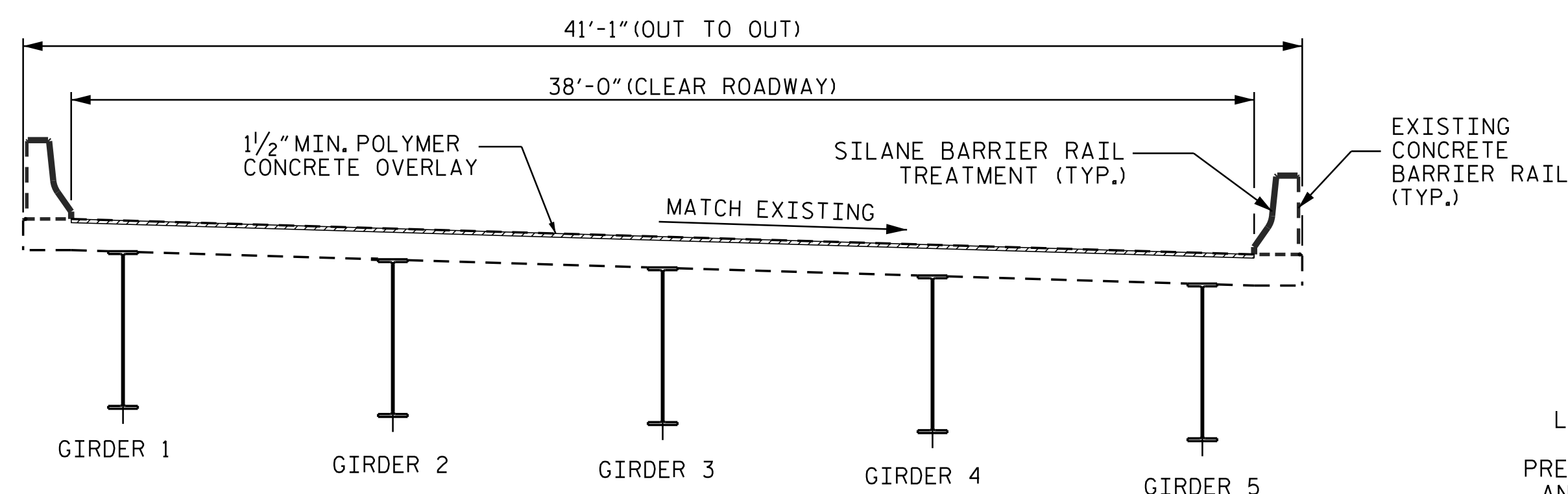
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NO.	BY:	DATE:	NO.	BY:	DATE:	S4-1
1			3			TOTAL SHEETS
2			4			14



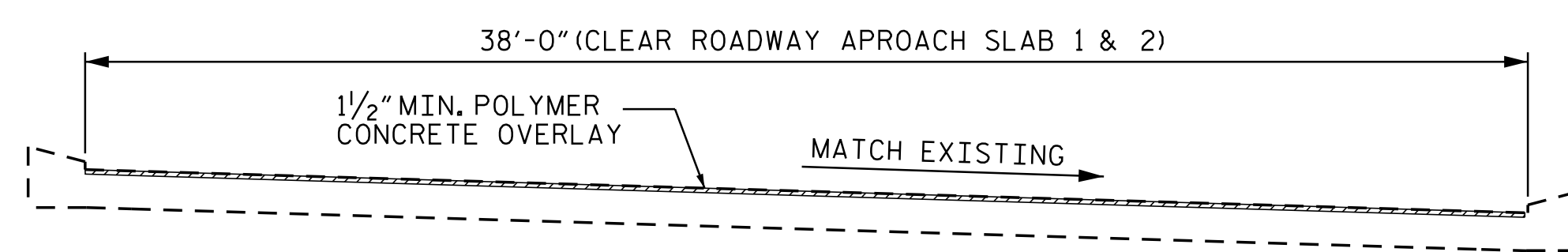
TYPICAL SECTION - APPROACH SLAB
(EXISTING)



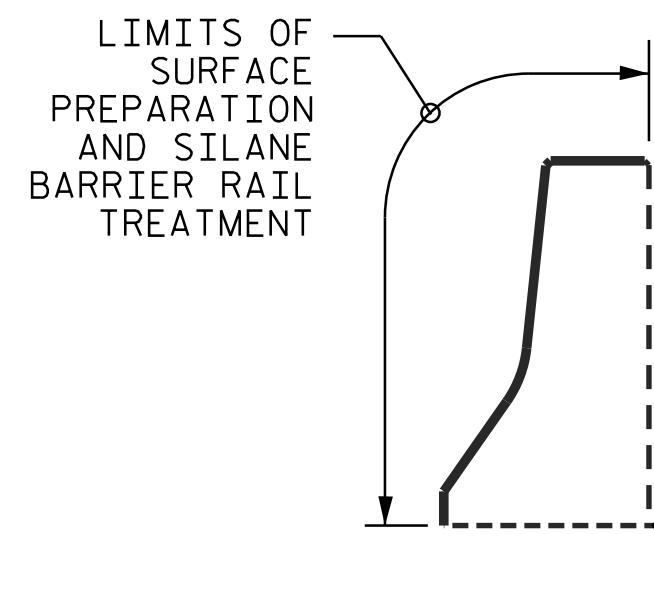
TYPICAL SECTION
(EXISTING)



TYPICAL SECTION
(PROPOSED)

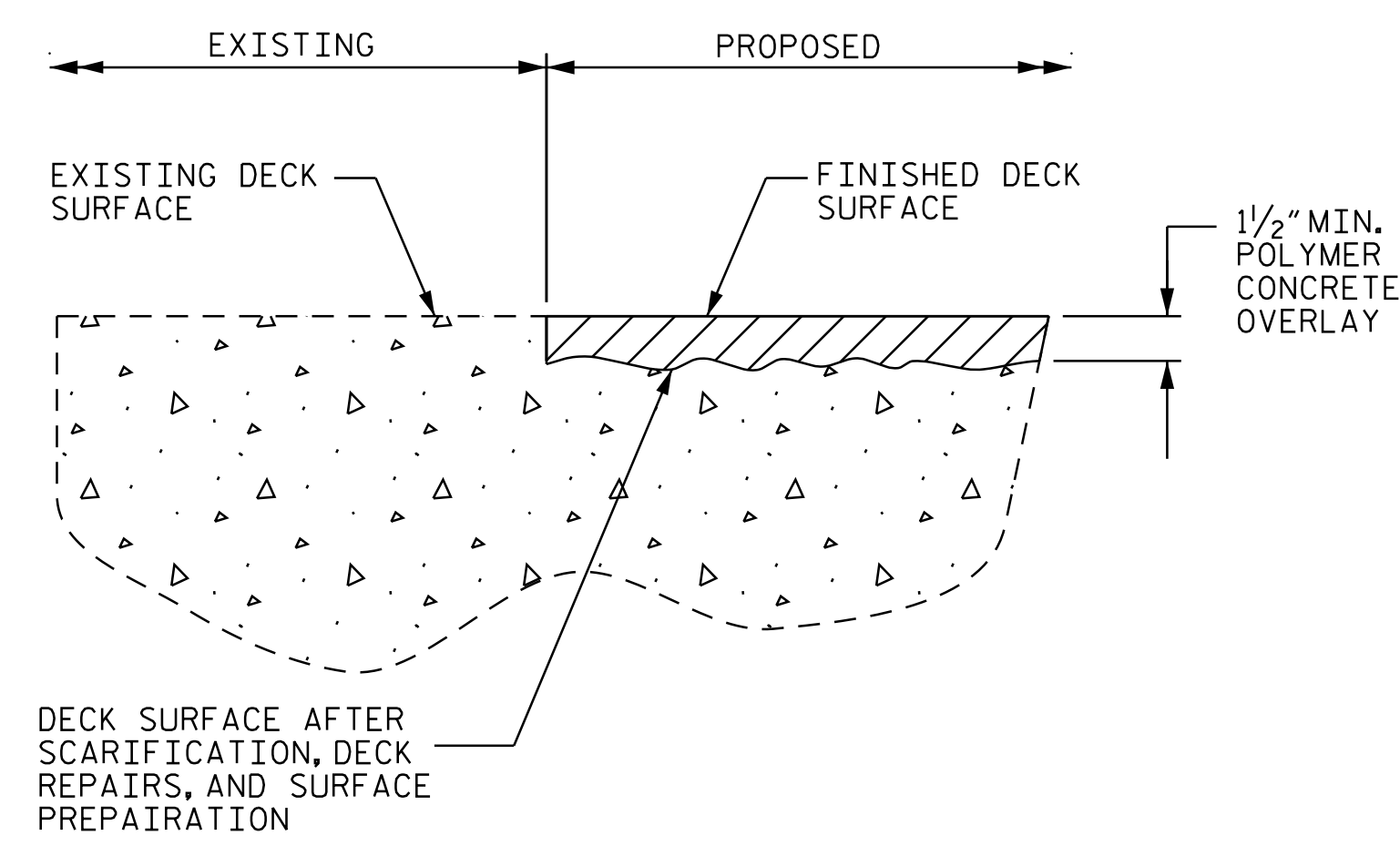


TYPICAL SECTION - APPROACH SLAB
(PROPOSED)

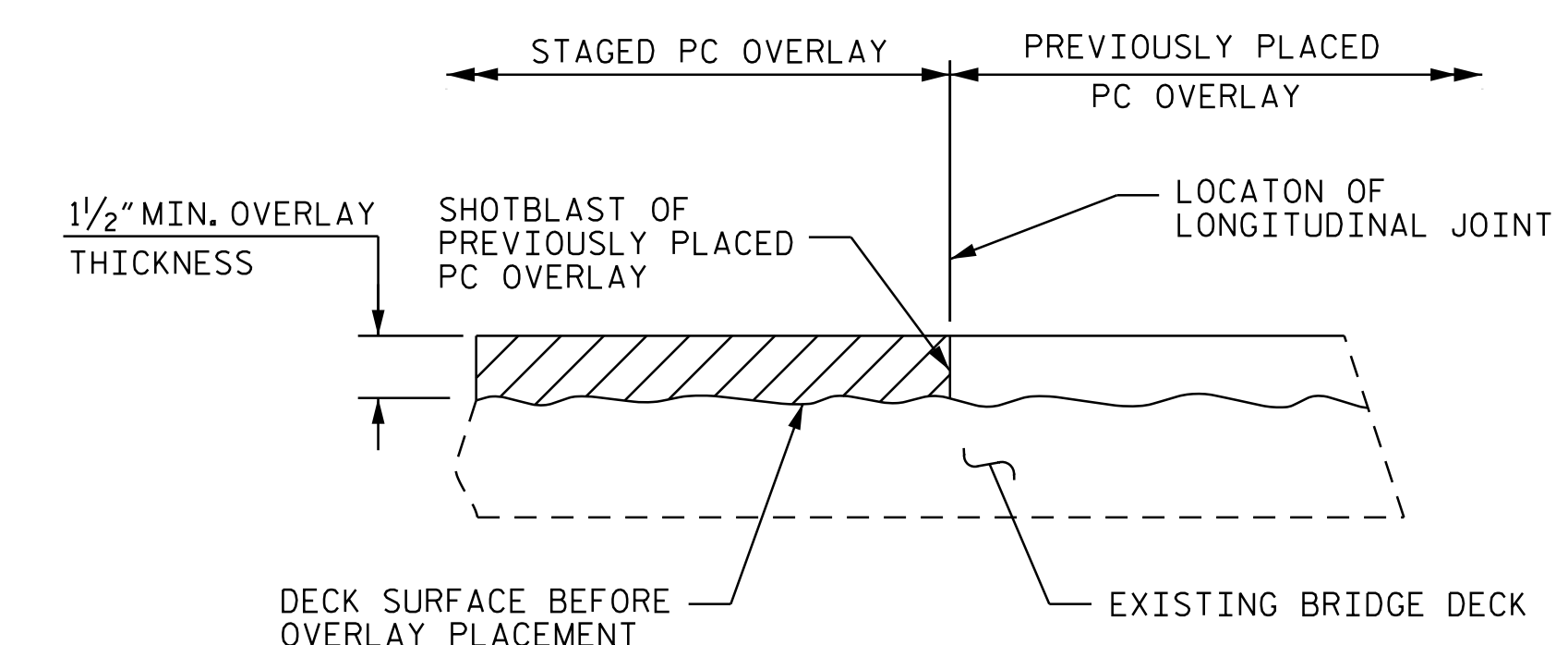


DETAIL FOR SILANE BARRIER RAIL TREATMENT

NOTES:
SEE TRAFFIC MANAGEMENT PLANS FOR LANE WIDTHS, SEQUENCING, AND OTHER TRAFFIC CONTROL MEASURES FOR STAGING OF POLYMER CONCRETE (PC) OVERLAY SYSTEM AND SURFACE PREPARATION.



DETAILS FOR POLYMER CONCRETE OVERLAY
FINISHED SURFACE ELEVATION SHALL MATCH EXISTING CONCRETE SURFACE ELEVATIONS. ACTUAL THICKNESS OF PC OVERLAY MAY VARY.



STAGED PC OVERLAY JOINT

PROJECT NO. I-5941
DURHAM COUNTY
BRIDGE NO. 310355

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Drawn/signed by: *Farzin Asefnia*

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA



11/13/2023

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION & PC OVERLAY DETAILS

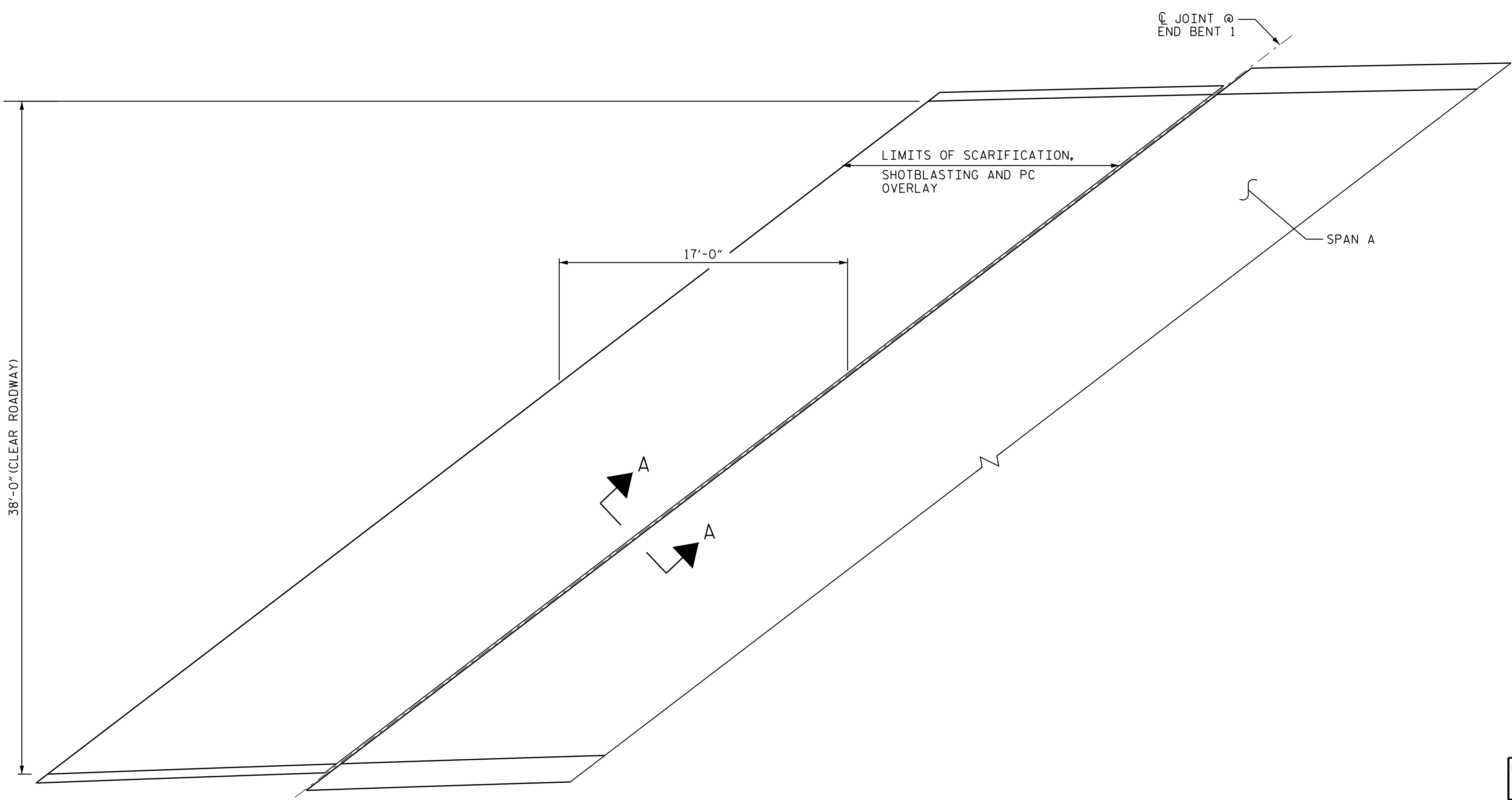
DRAWN BY :	M. HOGAN	DATE :	3/2023
CHECKED BY :	JIA XU	DATE :	7/2023
DESIGN ENGINEER OF RECORD:	F. ASEFNIA	DATE :	11/2023

REVISIONS						SHEET NO.
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1			3			S4-3
2			4			TOTAL SHEETS 14

 CLASS II SURFACE PREPARATION
 CONCRETE REPAIR (CR)

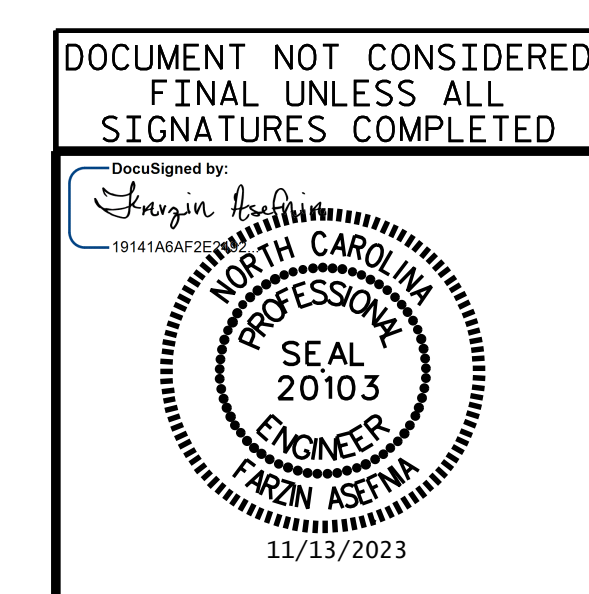
NOTES:
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 FOR SECTION A-A, SEE "JOINT DETAILS" SHEETS.
 FOR SCARIFYING BRIDGE DECK, SHOTBLASTING BRIDGE AND CLASS II SURFACE PREPARATION, SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.
 TOP OF DECK REPAIR QUANTITIES REPRESENT ESTIMATED VALUES OF CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY AFTER REMOVAL OF UNSOUND CONCRETE (MIN. 2" CLEAR TO SAWCUT). SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.
 FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.
 FOR CONCRETE DECK REPAIR FOR PC OVERLAY, PC MATERIALS AND PLACING AND FINISHING PC OVERLAY, SEE POLYMER CONCRETE BRIDGE DECK OVERLAY SPECIAL PROVISIONS.

AS-BUILT REPAIR QUANTITY TABLE				
APPROACH SLAB 1				
	ESTIMATE		ACTUAL	
SCARIFYING BRIDGE DECK	72.0	SY		
CLASS II SURFACE PREPARATION	0.0	SY		
CONCRETE DECK REPAIR FOR PC OVERLAY	0.0	SY		
SHOTBLASTING BRIDGE DECK	72.0	SY		
POLYMER CONCRETE MATERIALS	3.5	CY		
PLACING AND FINISHING PC OVERLAY	72.0	SY		
GROOVING BRIDGE FLOORS	571.0	SF		
CONCRETE REPAIRS	ESTIMATE		ACTUAL	
	AREA SF.	VOLUME CF	AREA SF.	VOLUME CF
CONCRETE CURB AND RAIL	0.0	0.0		



APPROACH SLAB 1

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355
 SHEET 1 OF 3

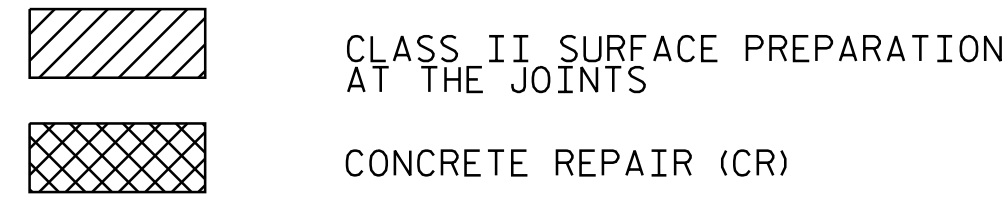


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DECK SURFACE REPAIR
 APPROACH SLAB 1

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-4
1			3			TOTAL SHEETS
2			4			14

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FOR SECTION A-A AND B-B, SEE "JOINT DETAILS" SHEETS.

FOR SCARIFYING BRIDGE DECK, SHOTBLASTING BRIDGE AND CLASS II SURFACE PREPARATION, SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.

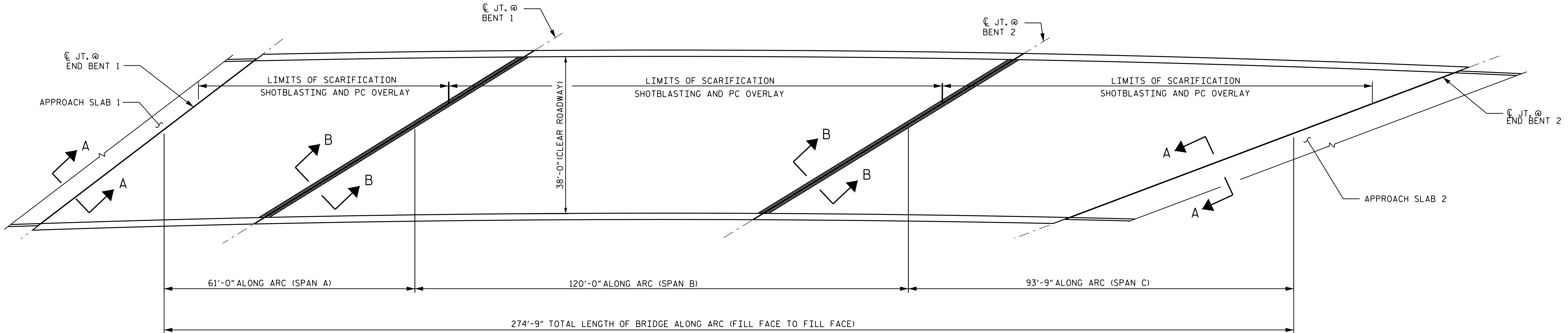
TOP OF DECK REPAIR QUANTITIES REPRESENT ESTIMATED VALUES OF CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY AFTER REMOVAL OF UNSOUND CONCRETE (MIN. 2" CLEAR TO SAWCUT). SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE DECK REPAIR FOR PC OVERLAY, PC MATERIALS AND PLACING AND FINISHING PC OVERLAY, SEE POLYMER CONCRETE BRIDGE DECK OVERLAY SPECIAL PROVISIONS.

THE EXISTING COVER PLATES SHALL BE REMOVED DURING THE JOINT REPLACEMENT PROCESS, CLEANED AND PUT BACK IN PLACE AFTER COMPLETION OF WORK. PAYMENT FOR SUCH WORK SHALL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

AS-BUILT REPAIR QUANTITY TABLE				
TOP OF DECK REPAIRS				
	ESTIMATE		ACTUAL	
SCARIFYING BRIDGE DECK	1,128.0	SY		
CLASS II SURFACE PREPARATION	22.0	SY		
CONCRETE DECK REPAIR FOR PC OVERLAY	22.0	SY		
SHOTBLASTING BRIDGE DECK	1,128.0	SY		
POLYMER CONCRETE MATERIALS	55.0	CY		
PLACING AND FINISHING PC OVERLAY	1,128.0	SY		
GROOVING BRIDGE FLOORS	9,315.0	SF		
SILANE PREP. FOR CONCRETE BARRIER	1,776.0	SF		
SILANE BARRIER RAIL TREATMENT	1,776.0	SF		
CONCRETE REPAIRS	ESTIMATE		ACTUAL	
	AREA SF.	VOLUME CF	AREA SF.	VOLUME CF
CONCRETE CURB AND RAIL	0.0	0.0		



BRIDGE DECK

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

SHEET 2 OF 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:

 191418A070C

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20103
 FARZIN ASEFNIA
 11/13/2023

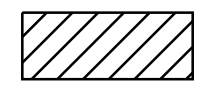
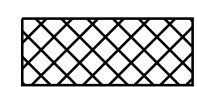
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DECK SURFACE REPAIR
SPAN A, B & C

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD : F. ASEFNIA DATE : 11/2023

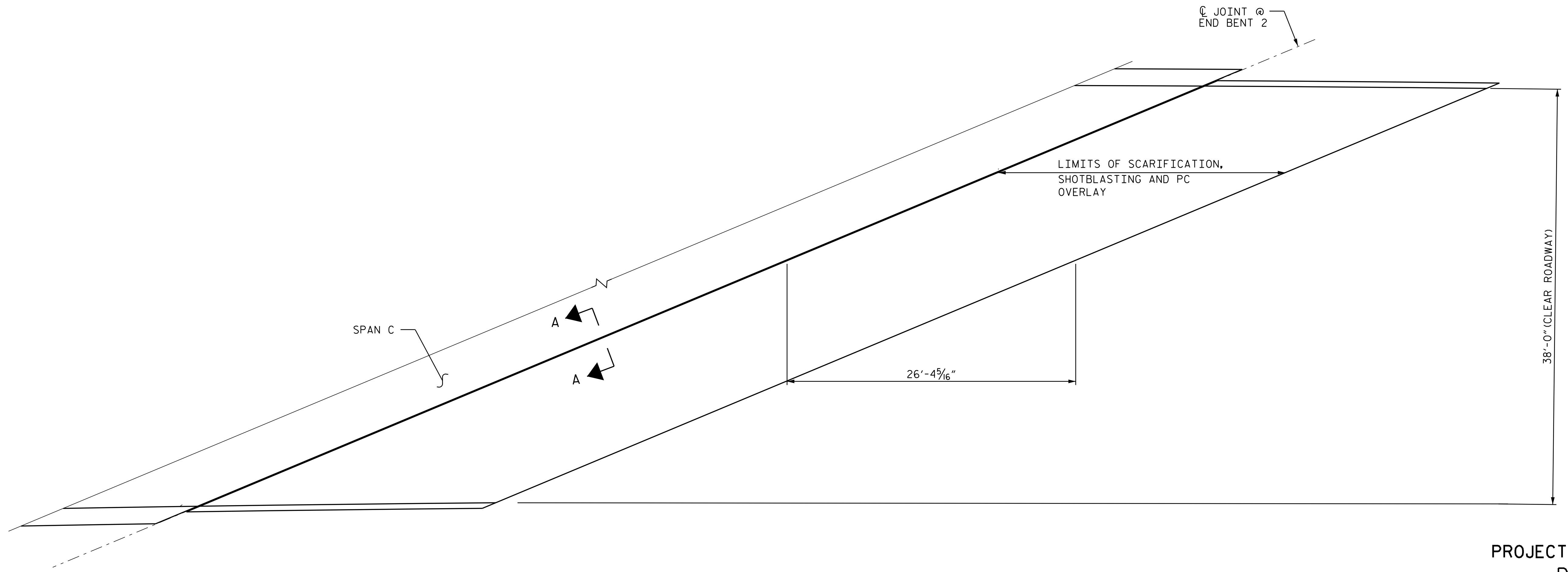
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S4-5
2			4			TOTAL SHEETS 14

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 efr@elrobinsonengineering.com
 License: C-22 9

 CLASS II SURFACE PREPARATON
 CONCRETE REPAIR (CR)

NOTES:
 REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.
 FOR SECTION A-A, SEE "JOINT DETAILS" SHEETS.
 FOR SCARIFYING BRIDGE DECK, SHOTBLASTING BRIDGE AND CLASS II SURFACE PREPARATION, SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.
 TOP OF DECK REPAIR QUANTITIES REPRESENT ESTIMATED VALUES OF CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY AFTER REMOVAL OF UNSOUND CONCRETE (MIN. 2" CLEAR TO SAWCUT), SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.
 FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.
 FOR CONCRETE DECK REPAIR FOR PC OVERLAY, PC MATERIALS AND PLACING AND FINISHING PC OVERLAY, SEE POLYMER CONCRETE BRIDGE DECK OVERLAY SPECIAL PROVISIONS.

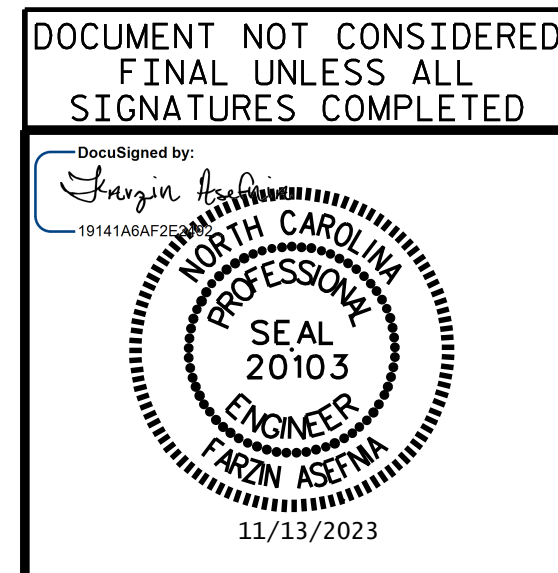
AS-BUILT REPAIR QUANTITY TABLE				
APPROACH SLAB 2				
	ESTIMATE		ACTUAL	
SCARIFYING BRIDGE DECK	104.0	SY		
CLASS II SURFACE PREPARATION	0.0	SY		
CONCRETE DECK REPAIR FOR PC OVERLAY	0.0	SY		
SHOTBLASTING BRIDGE DECK	104.0	SY		
POLYMER CONCRETE MATERIALS	5.0	CY		
PLACING AND FINISHING PC OVERLAY	104.0	SY		
GROOVING BRIDGE FLOORS	830.0	SF		
CONCRETE REPAIRS	ESTIMATE		ACTUAL	
	AREA SF.	VOLUME CF	AREA SF.	VOLUME CF
CONCRETE CURB AND RAIL	0.0	0.0		



APPROACH SLAB 2

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355
 SHEET 3 OF 3

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DECK SURFACE REPAIR
 APPROACH SLAB 2

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			14

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JOINT REPAIR QUANTITY TABLE		
FOAM JOINT SEALS FOR PRESERVATION	ESTIMATED LIN. FT.	ACTUAL LIN. FT.
BENT 1	75.0	
BENT 2	75.0	
TOTAL	150.0	

POURABLE SILICONE JOINT SEALANT		
FOAM JOINT SEALS FOR PRESERVATION	ESTIMATED LIN. FT.	ACTUAL LIN. FT.
END BENT 1	65.0	
END BENT 2	104.0	
TOTAL	169.0	

NOTES:

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

FINAL JOINT SEALS SHALL NOT BE INSTALLED UNTIL THE OVERLAY IS COMPLETE.

THE CONTRACTOR SHALL TAKE CARE DURING JOINT REHAB OPERATIONS NOT TO DROP ANY MATERIAL BELOW THE BRIDGE WITHOUT PROTECTIVE DEVICES BELOW TO CATCH THE MATERIAL. ANY MATERIAL THAT FALLS BELOW THE BRIDGE SHALL BE CONTAINED, REMOVE AND DISPOSED OF BY THE CONTRACTOR AT NO EXTRA COST TO THE DEPARTMENT. IF THE ENGINEER DETERMINES THAT THE PROTECTIVE DEVICES ARE NOT ADEQUATE OF 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.

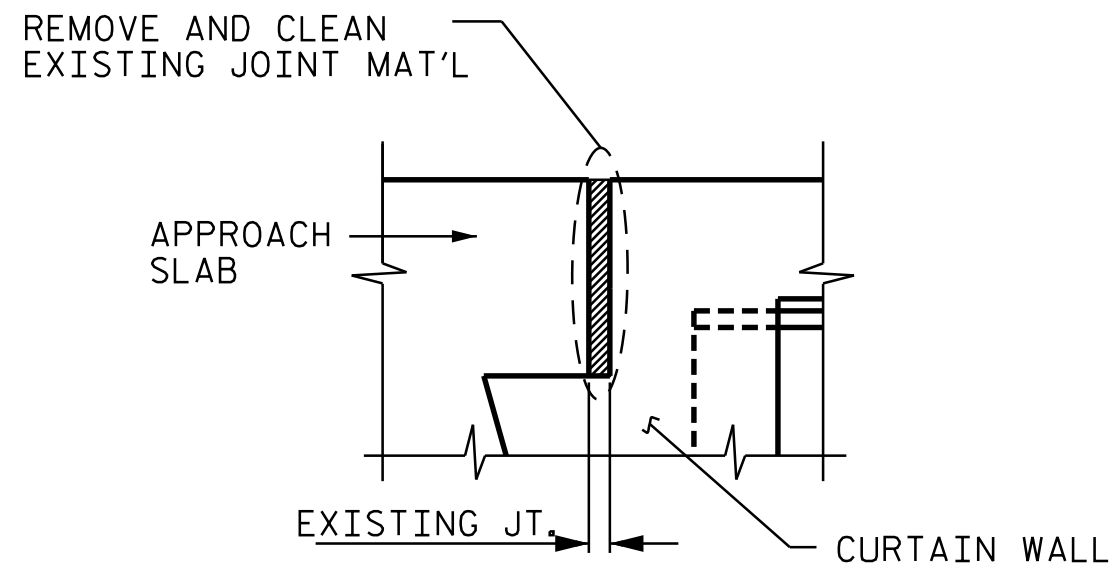
DURING THE JOINT INSTALLATION PROCEDURE, THE JOINT AND SURROUNDING AREA SHALL BE KEPT CLEAN AND FREE OF DEBRIS.

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

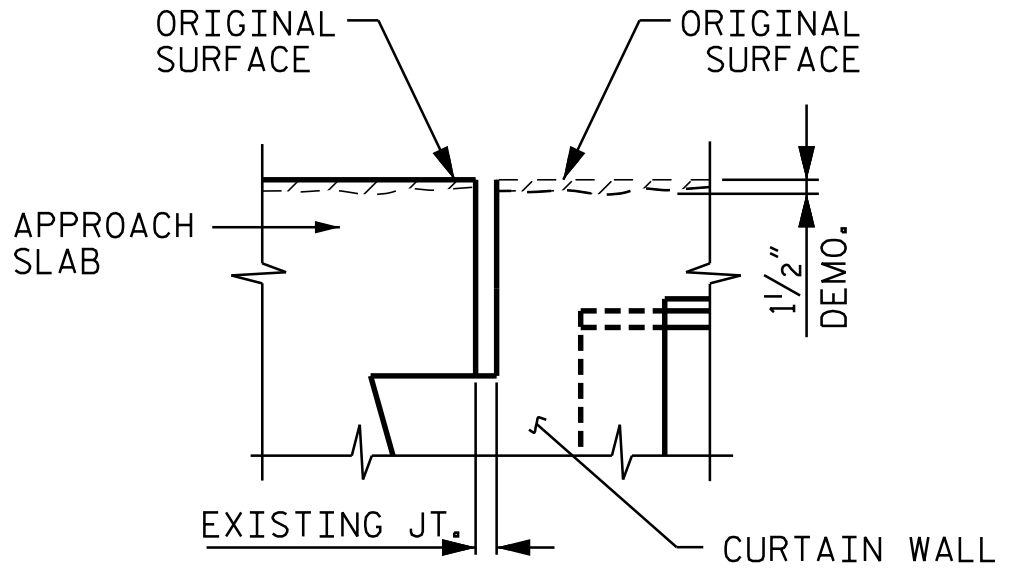
FINAL SURFACE OF THE JOINT DEMOLITION AREA PRIOR TO PLACEMENT OF CONCRETE REPAIR MATERIAL SHOULD BE REASONABLY FLAT AND LEVEL. ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF THE SURFACE PRIOR TO PLACEMENT OF REPAIR CONCRETE.

THE INSTALLATION OF THE JOINT SEAL SHALL BE WATERTIGHT.

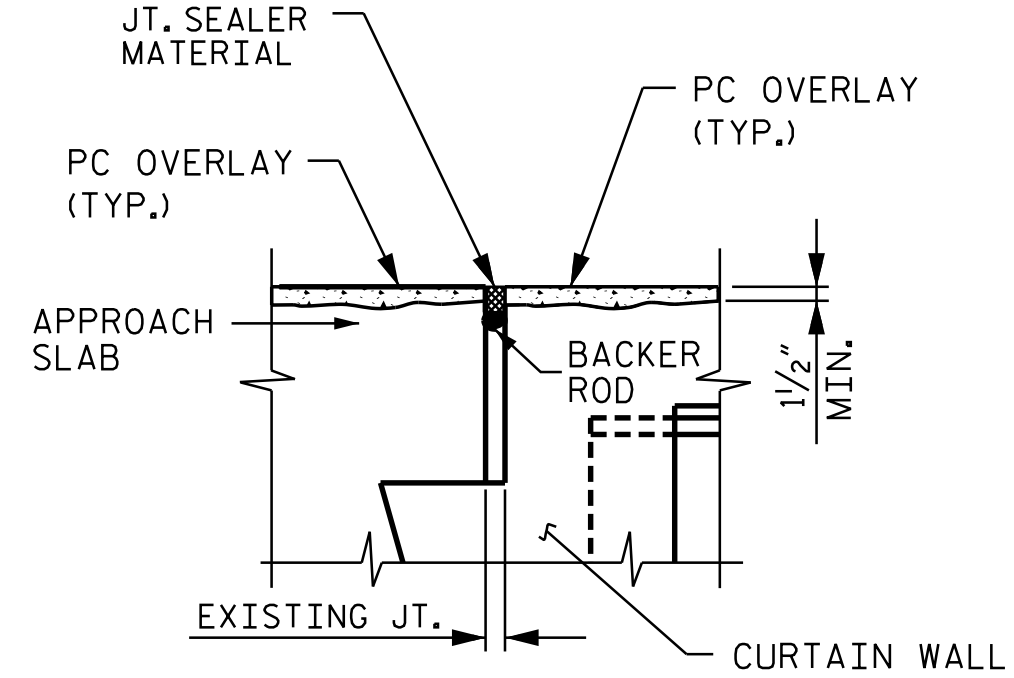
A MANUFACTURER'S CERTIFIED TRAINED REPRESENTATIVE SHALL BE PRESENT DURING THE INSTALLATION OF THE FIRST JOINT OF THE PROJECT, OR UNTIL THE ENGINEER IS SATISFIED WITH THE INSTALLATION PROCESS.



EXISTING JOINT

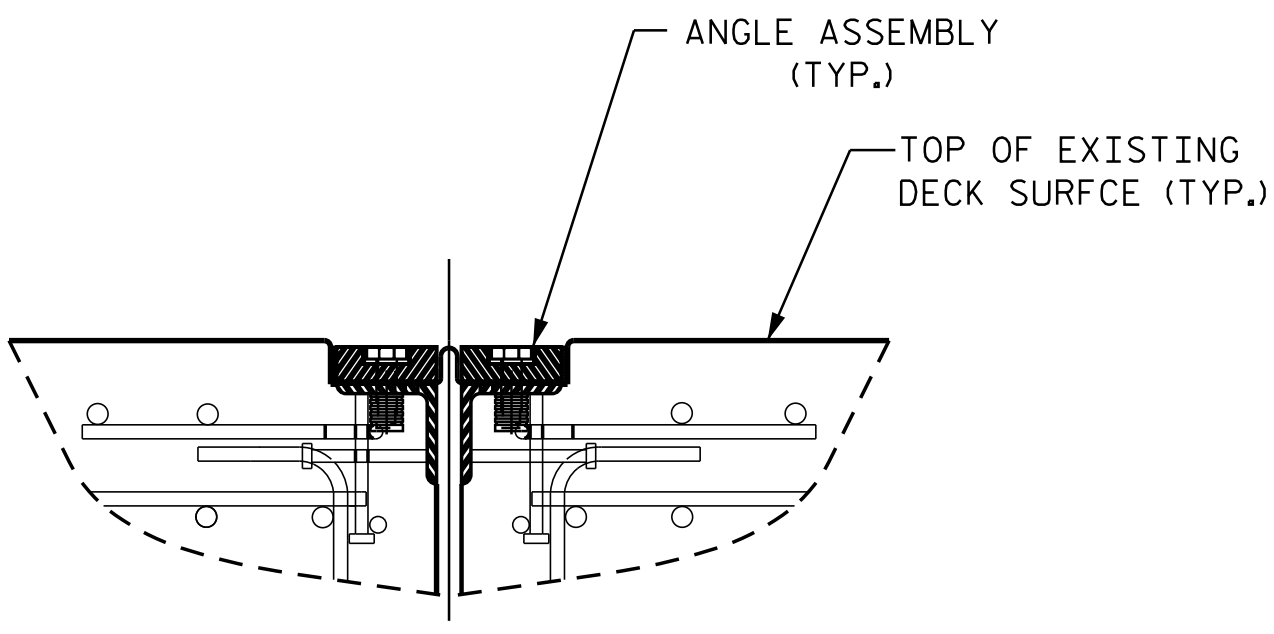


MINIMUM EXISTING JOINT DEMOLITION

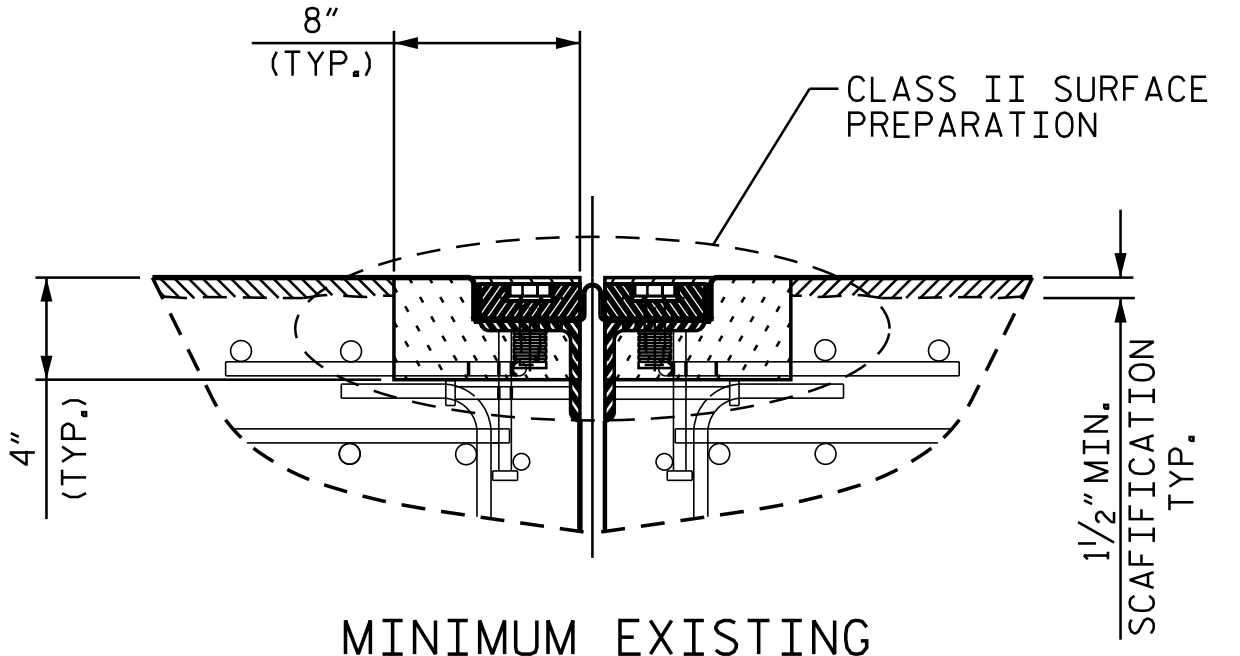


PROPOSED JOINT

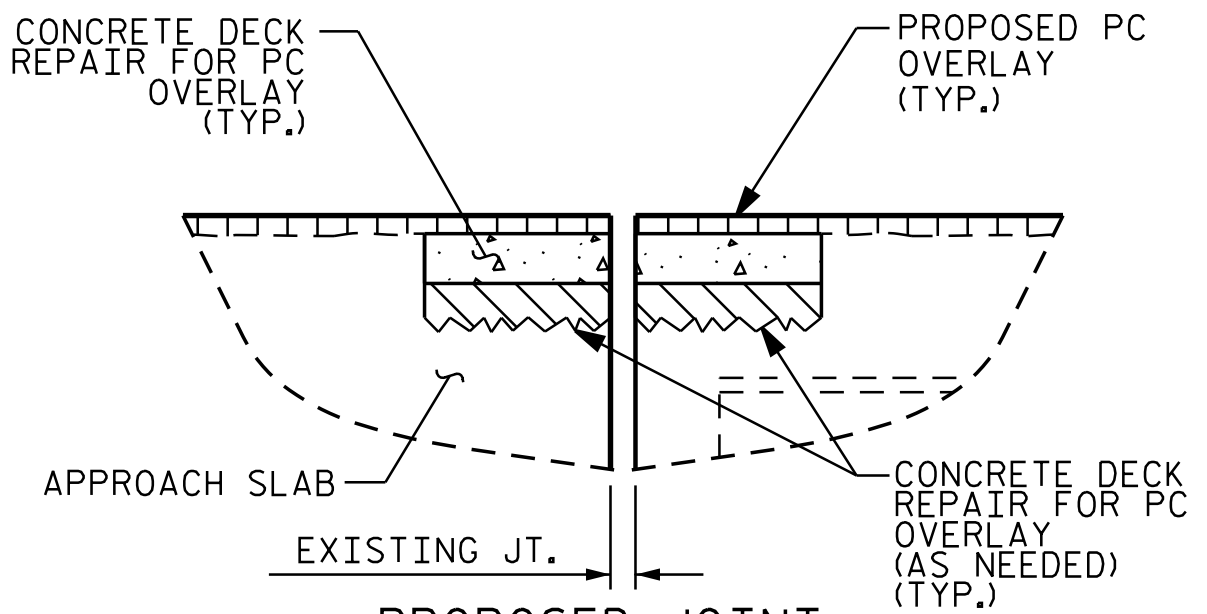
JOINT INSTALLATION SEQUENCE AT END BENTS
SECTION A-A



EXISTING JOINT

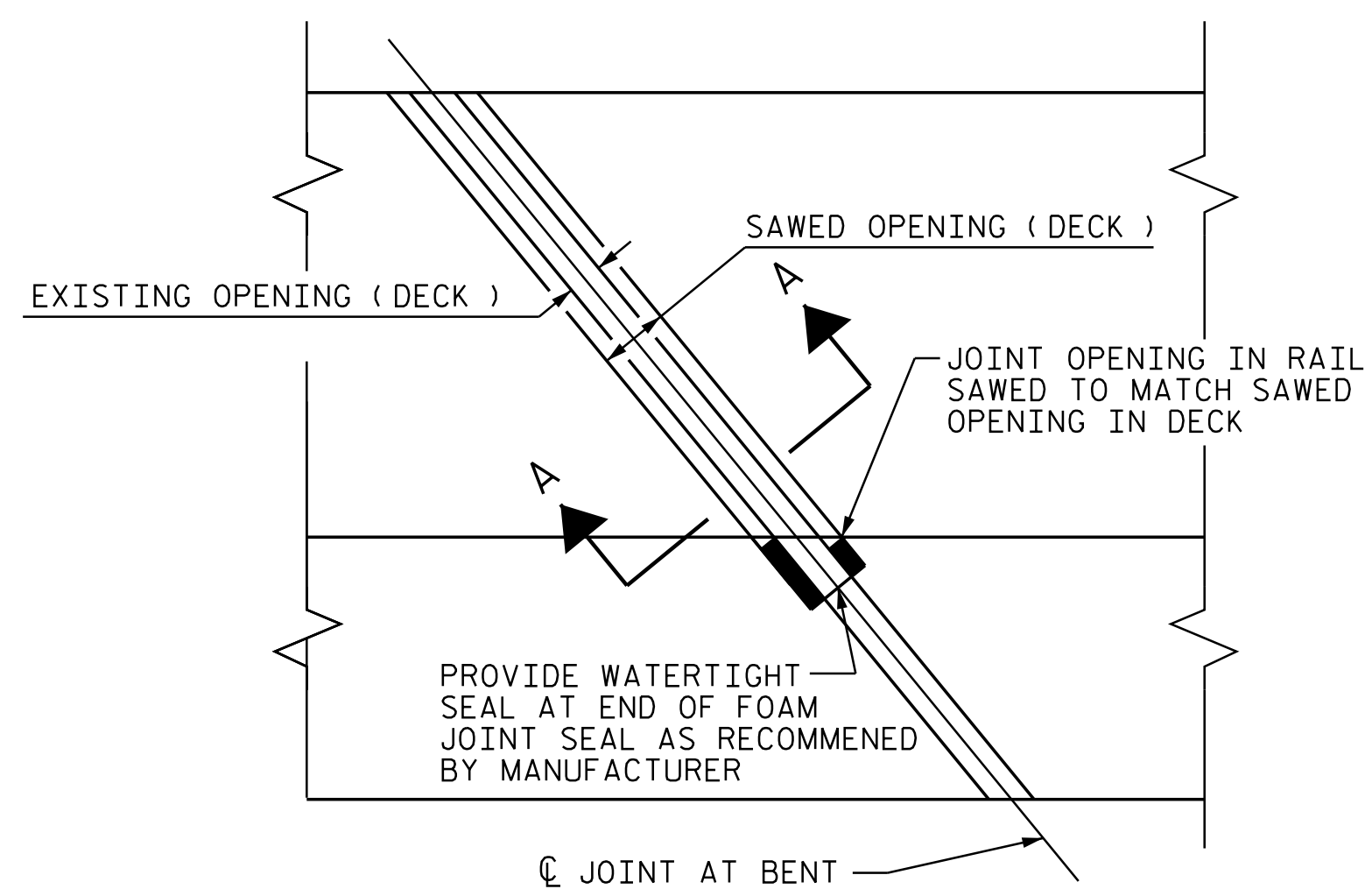


MINIMUM EXISTING JOINT DEMOLITION

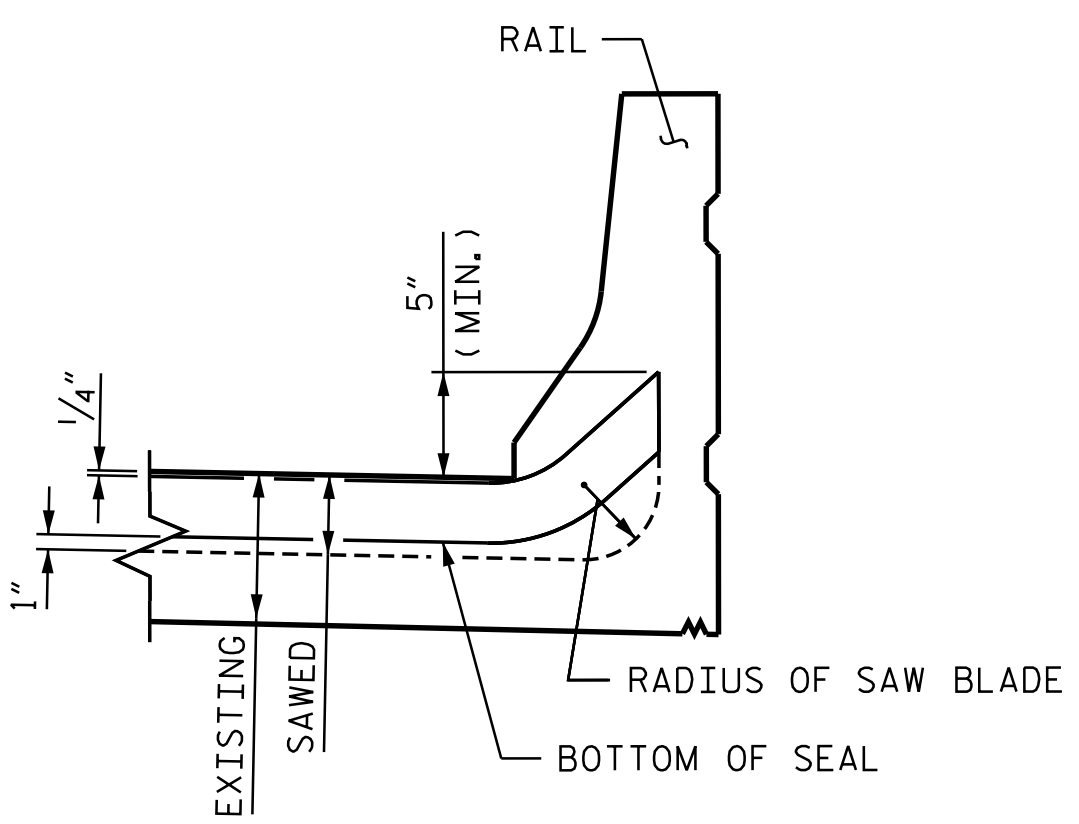


PROPOSED JOINT PRIOR TO SAWING

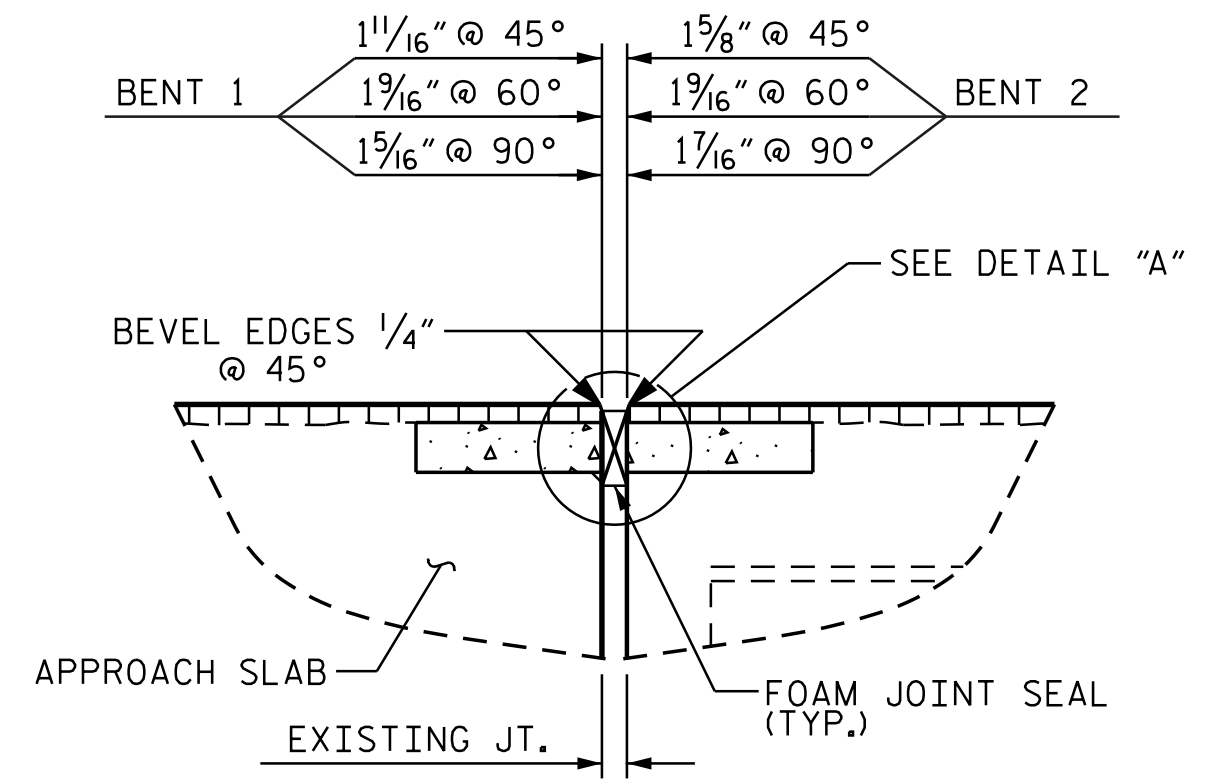
JOINT INSTALLATION SEQUENCE AT BENTS
SECTION B-B



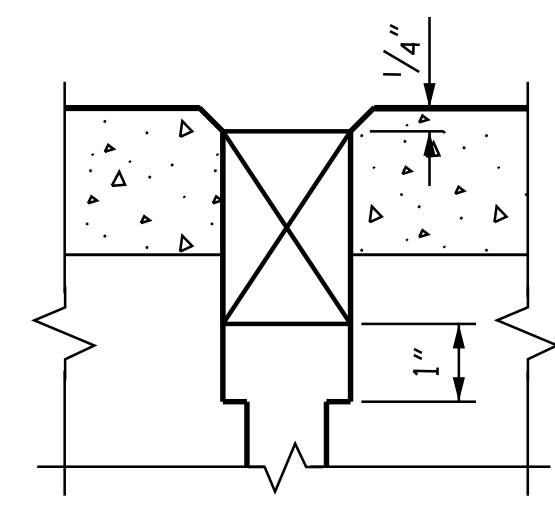
PLAN



EXPANSION JOINT FOAM AT BARRIER



PROPOSED FOAM JOINT SEAL



DETAIL "A"

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

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Designed by: *Farzin Asefnia*

19141ABAP

NORTH CAROLINA PROFESSIONAL SEAL 20103 ENGINEER FARZIN ASEFNIA

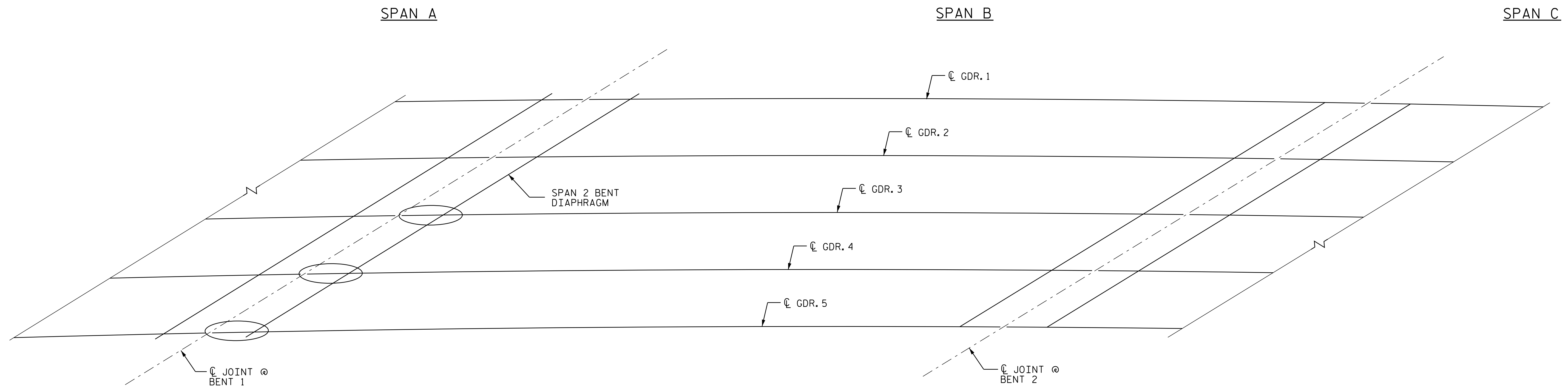
11/13/2023

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE JOINT DETAILS

DRAWN BY :	M. HOGAN	DATE :	3/2023
CHECKED BY :	JIA XU	DATE :	7/2023
DESIGN ENGINEER OF RECORD:	F. ASEFNIA	DATE :	11/2023

REVISIONS						SHEET NO.
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1			3			S4-7
2			4			TOTAL SHEETS 14



FRAMING PLAN

○ GIRDER, CONNECTION PLATE AND END DIAPHRAGM REPAIR.

NOTES:

FOR BEAM REPAIR DETAILS, SEE "BEAM PLATING REPAIR DETAIL" SHEET.

ALL WELDING SHALL BE IN ACCORDANCE WITH CURRENT AWS SPECIFICATIONS. WELD MATERIAL SHALL BE E70XX.

PLATE SIZES ARE BASED ON BEST INFORMATION AVAILABLE. ENGINEER SHALL VERIFY EXTENTS OF REPAIR AND PLATE SIZES PRIOR TO PLATE FABRICATION.

CONTRACTOR SHALL CLEAN EXISTING STEEL SURFACES IN REPAIR AREA BEFORE PERFORMING REPAIRS.

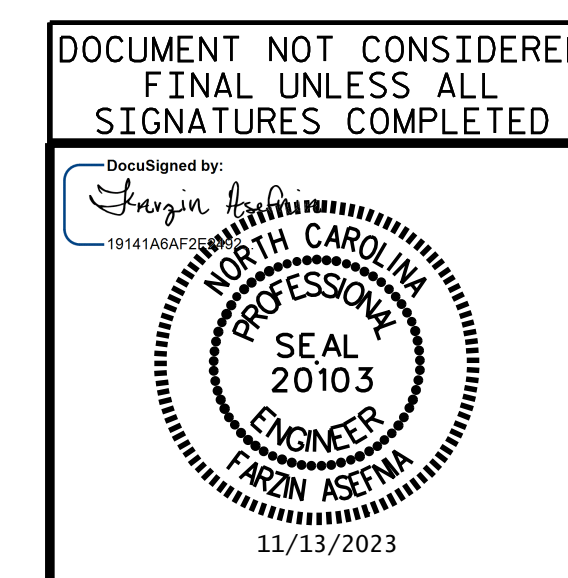
ANTICIPATED BEAM REPAIR LOCATIONS

SPAN	BEAM	LOCATION	DIM. "A"	DIM. "B"
B	3	BENT 1- BAY 2	52"	11"
B	3	BENT 1- BAY 3	52"	12"
B	4	BENT 1- BAY 3	52"	11"
B	4	BENT 1- BAY 4	52"	12"
B	5	BENT 1- BAY 4	52"	11"
B	5	BENT 1- EXT	52"	12"

BEAM REPAIR QUANTITY TABLE

BEAM END REPAIR	
LBS.	
ESTIMATE	ACTUAL
306	-

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355



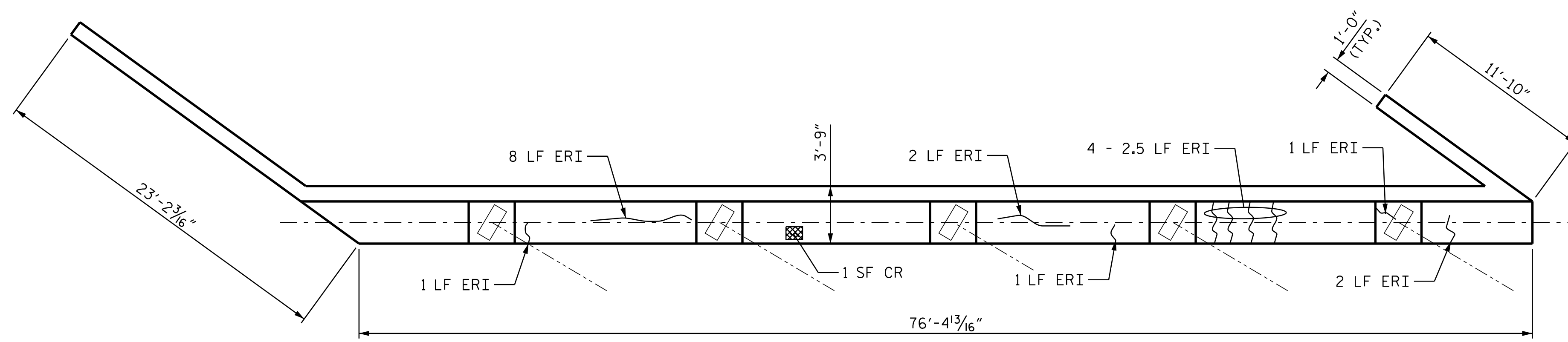
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GIRDER ENDS REPAIR LOCATION

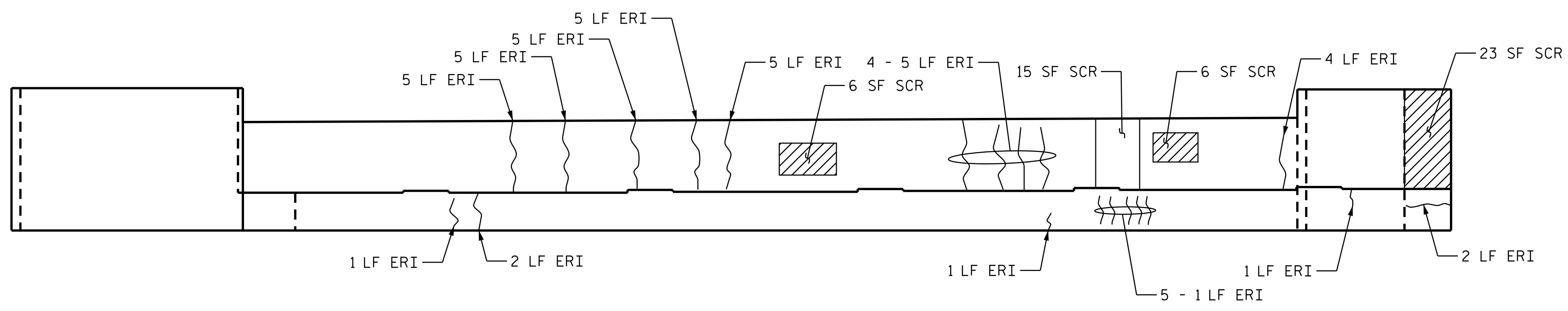
DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD : F. ASEFNIA DATE : 11/2023

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2			4			TOTAL SHEETS 14

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PLAN



ELEVATION

END BENT 1

AS-BUILT REPAIR QUANTITY TABLE				
END BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
CURTAIN & WING WALL	50.0	13.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	1.0	0.3		
EPOXY RESIN INJECTION		LN. FT.		LN. FT.
CAP		37.0		
CURTAIN WALL		49.0		
EPOXY COATING		SQ. FT.		SQ. FT.
TOP OF CAP		206.0		

NOTES:
 REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING, EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

SHEET 1 OF 6

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 191416A625C

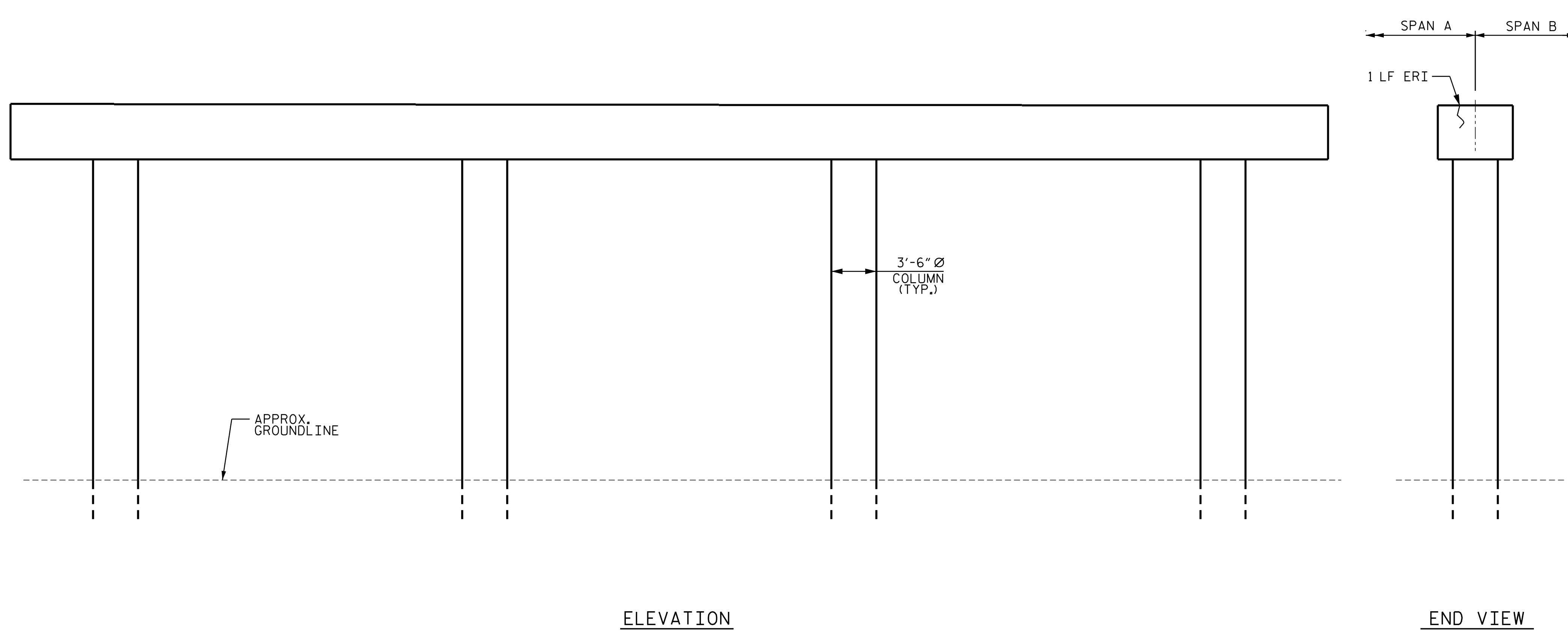
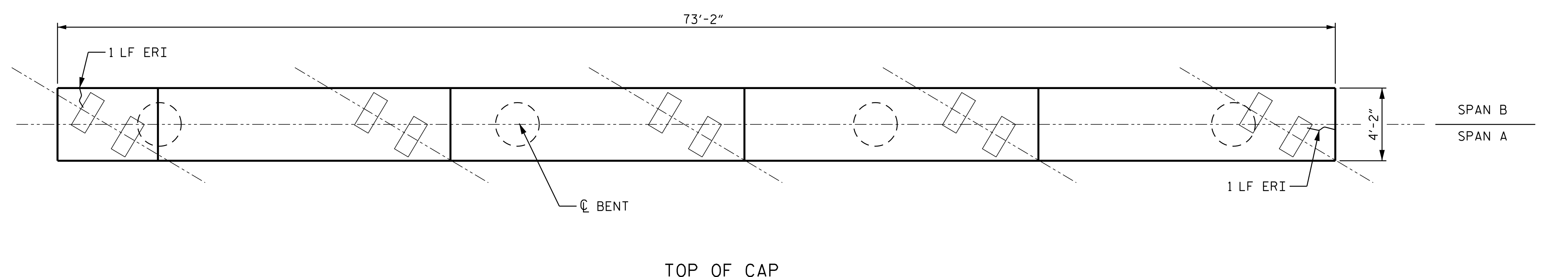
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE REPAIR
 END BENT 1

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

REVISIONS						SHEET NO. S4-9
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 14
2			4			

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BENT NO. 1
SPAN A FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 1 SPAN A FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
COLUMN	0.0	0.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	3.0			
COLUMN	0.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF BENT CAP	295.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

SHEET 2 OF 6

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	REVISIONS				SHEET NO. S4-10 TOTAL SHEETS 14	
E.L. ROBINSON 3362 Six Forks Rd. Raleigh, N.C. 27609 Tel: 984.980.2810 efarzin@erobinson.com License: C-22 9	NO. 1	BY: M.HOGAN	DATE: 3/2023	NO. 2	BY: JIA XU	DATE: 7/2023
	NO. 3	BY: F.ASEFNIA	DATE: 11/2023	NO. 4	BY:	DATE:

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

AS-BUILT REPAIR QUANTITY TABLE				
BENT 1 SPAN B FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	80.0	20.0		
COLUMN	0.0	0.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	2.0			
COLUMN	0.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

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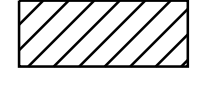


SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

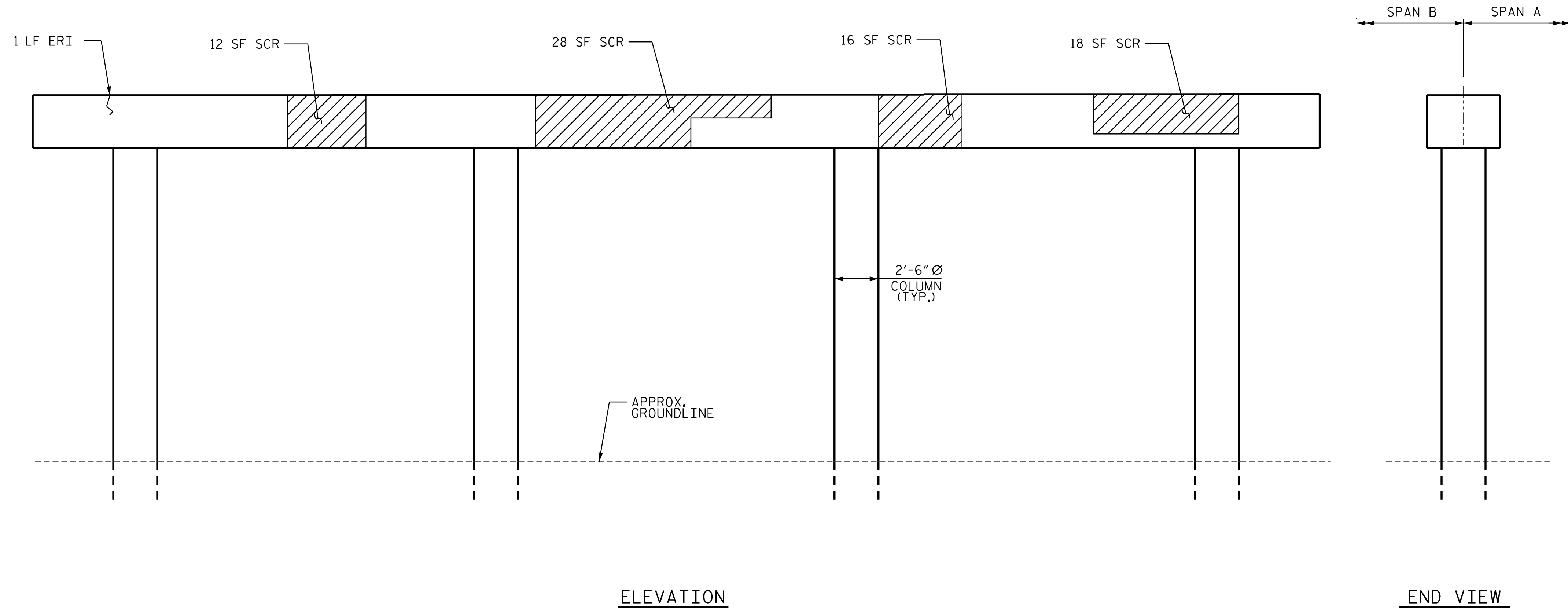
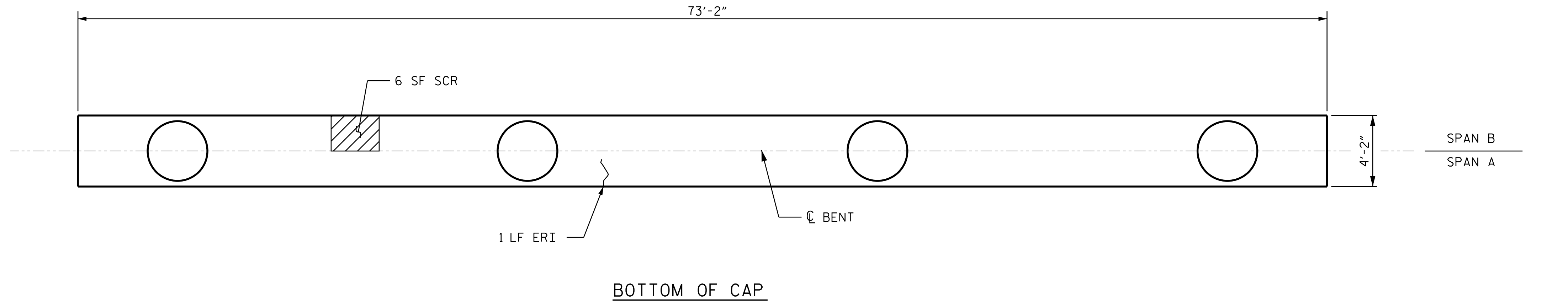
FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

-  SHOTCRETE REPAIR (SCR)
-  CONCRETE REPAIR (CR)
-  EPOXY RESIN INJECTION (ERI)



ELEVATION

END VIEW


BENT NO. 1
SPAN B FACE

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

SHEET 3 OF 6

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Designed by: *Farzin Asefnia*

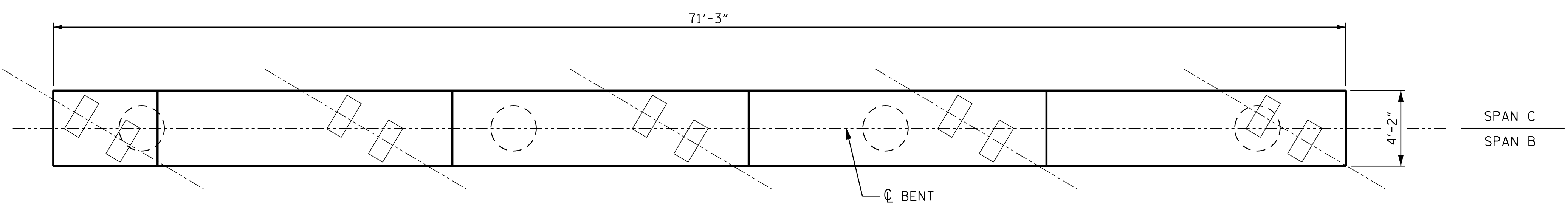


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

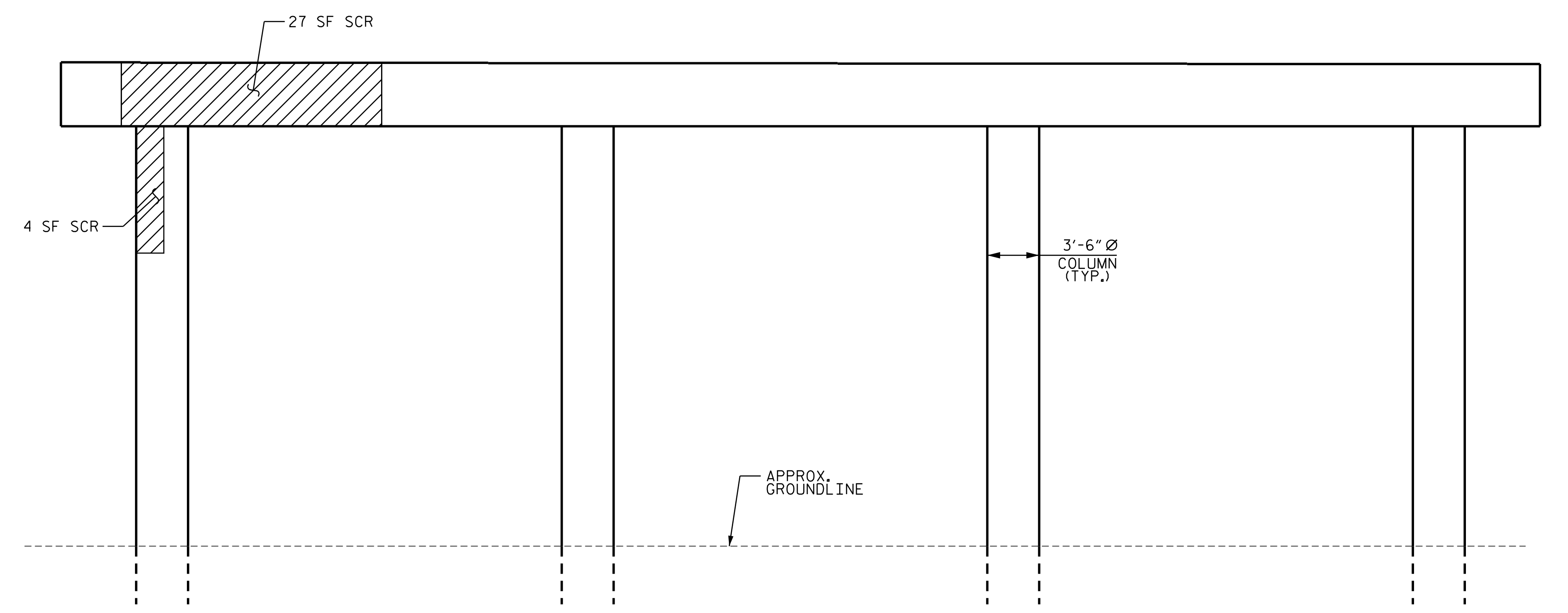
SUBSTRUCTURE REPAIR
BENT 1 SPAN B FACE

DRAWN BY :	M. HOGAN	DATE :	3/2023
CHECKED BY :	JIA XU	DATE :	7/2023
DESIGN ENGINEER OF RECORD:	F. ASEFNIA	DATE :	11/2023

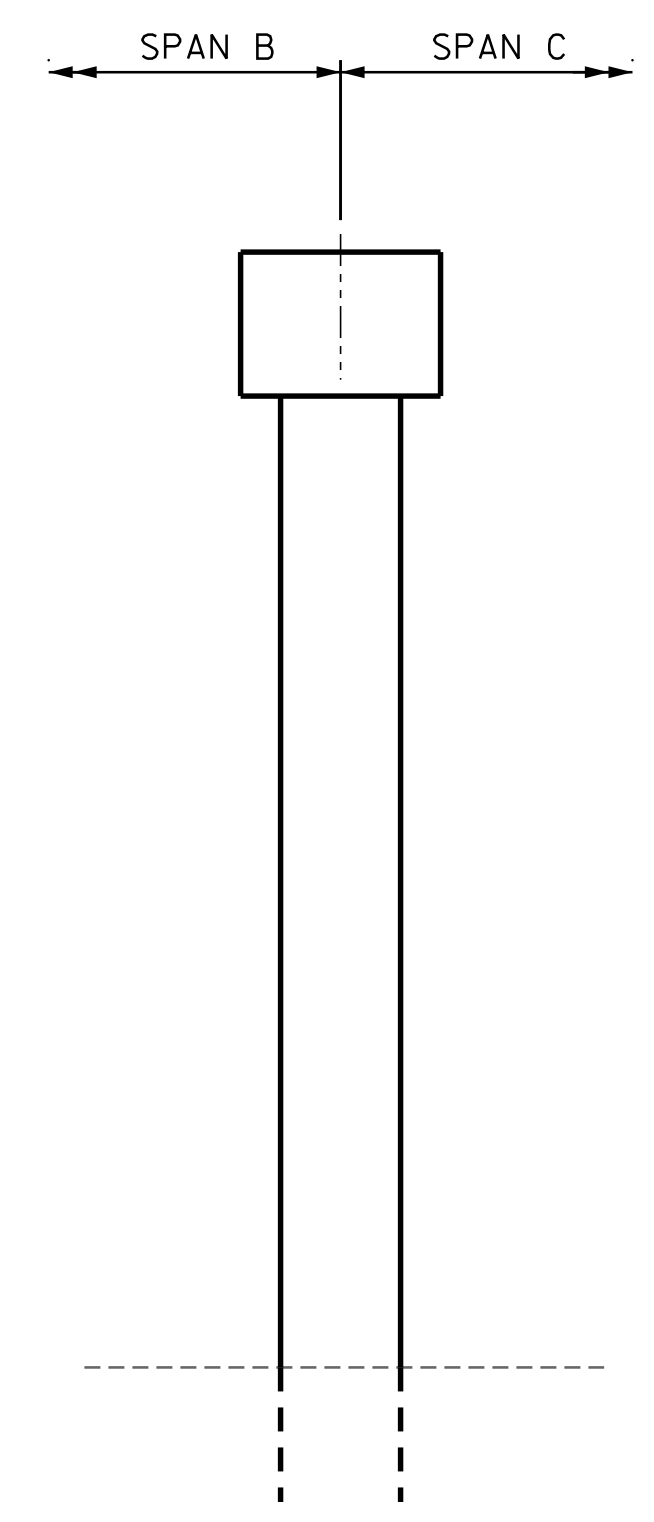
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1			3			TOTAL SHEETS 14
2			4			



TOP OF CAP



ELEVATION



END VIEW

BENT NO. 2
SPAN B FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 2 SPAN B FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	27.0	7.0		
COLUMN	4.0	1.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	0.0			
COLUMN	0.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF BENT CAP	296.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

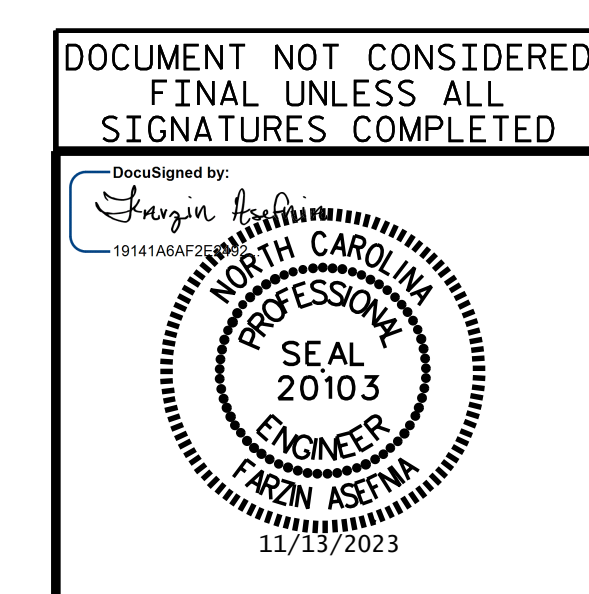
FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

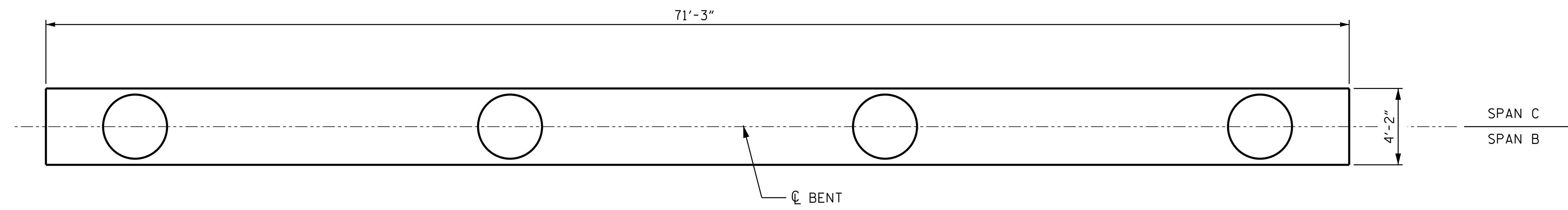
SHEET 4 OF 6



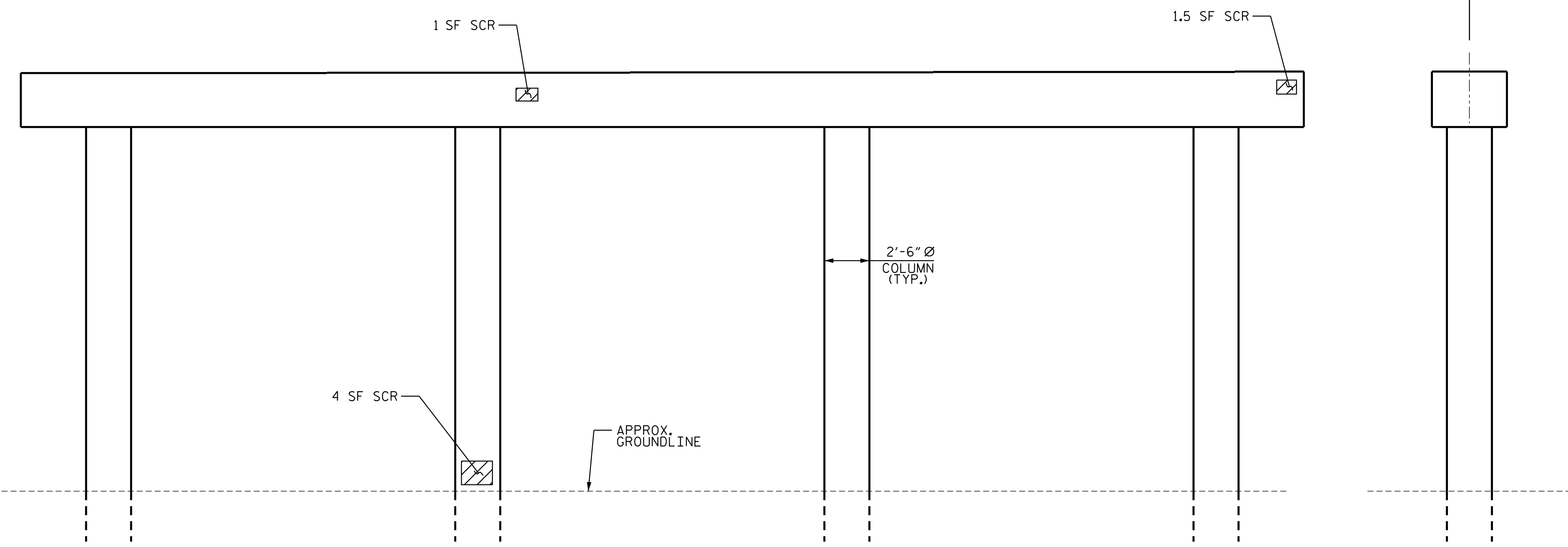
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE REPAIR
 BENT 2 SPAN B FACE

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD : F. ASEFNIA DATE : 11/2023

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S4-12 TOTAL SHEETS 14
2			4			



BOTTOM OF CAP



ELEVATION

END VIEW

BENT NO. 2
SPAN C FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 2 SPAN C FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	2.5	0.6		
COLUMN	4.0	1.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	0.0			
COLUMN	0.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

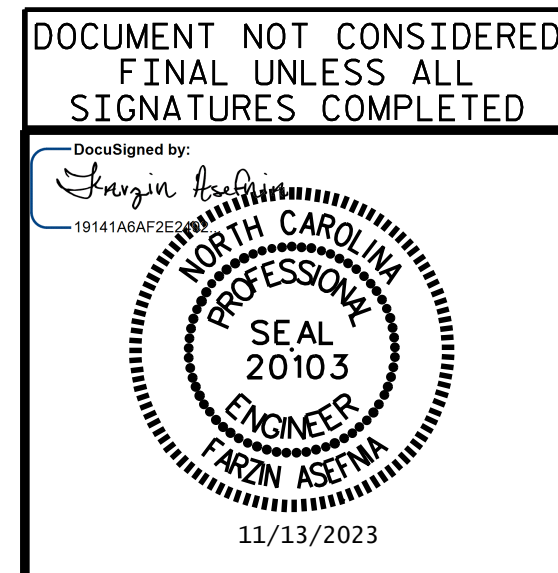
FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
BRIDGE NO. 310355

SHEET 5 OF 6



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE REPAIR
BENT 2 SPAN C FACE



REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-13
1			3			TOTAL SHEETS
2			4			14

DRAWN BY : M. HOGAN DATE : 3/2023
CHECKED BY : JIA XU DATE : 7/2023
DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

NOTES:

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FOR CAP REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

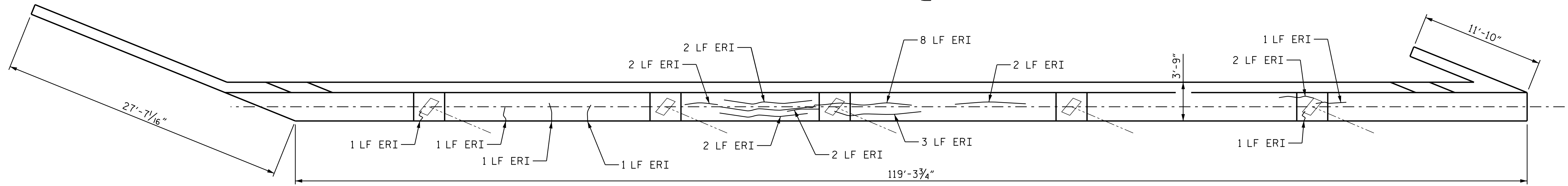
FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

 SHOTCRETE REPAIR (SCR)

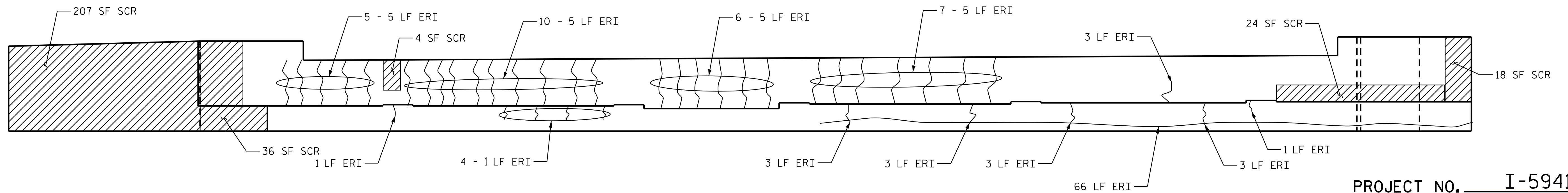
 CONCRETE REPAIR (CR)

 EPOXY RESIN INJECTION (ERI)

AS-BUILT REPAIR QUANTITY TABLE				
END BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	36.0	9.0		
CURTAIN & WING WALL	253.0	63.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	113.0			
CURTAIN WALL	143.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF CAP	328.0			



PLAN



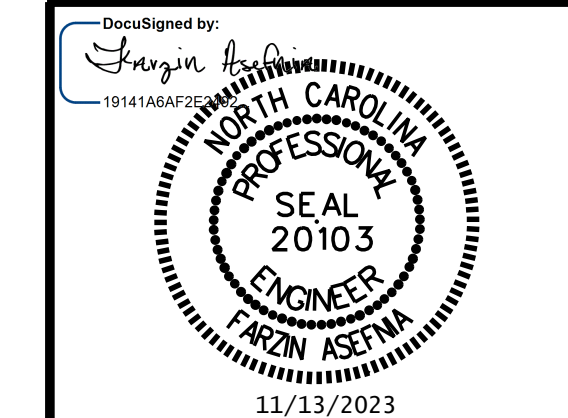
ELEVATION

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

SHEET 6 OF 6

END BENT 2

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE REPAIR

END BENT 2

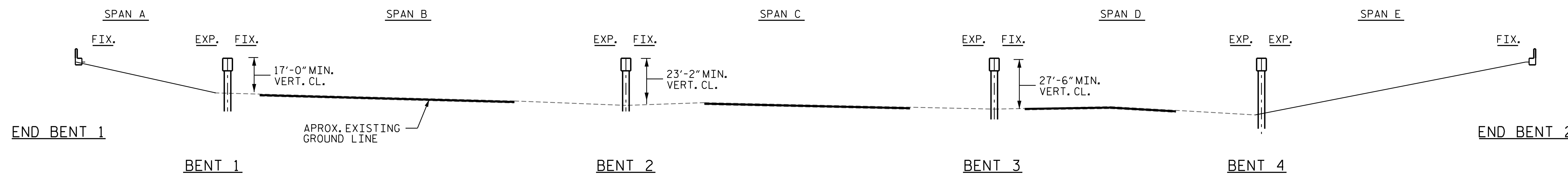
REVISIONS

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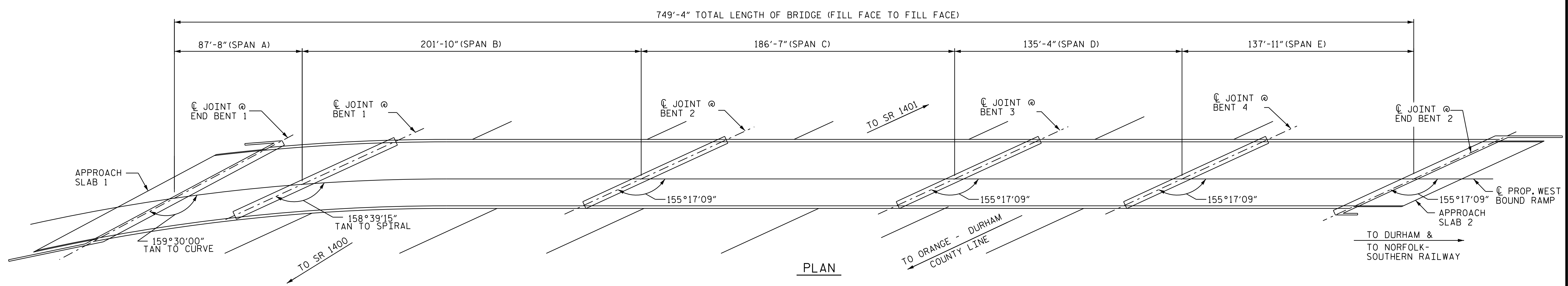
SHEET NO.
 S4-14
 TOTAL SHEETS
 14

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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 e:rl@elrobinsonengineering.com
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SECTION ALONG C BRIDGE



PLAN

NOTES:

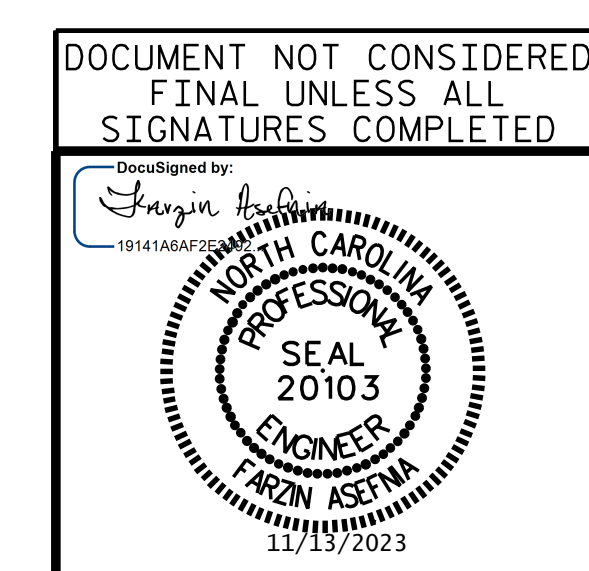
GENERAL DRAWING INFORMATION IS TAKEN FROM THE ORIGINAL PLANS AND THE ROUTINE INSPECTION REPORT DATED 11/28/2022.
BRIDGE ORIENTATION CONFORMS TO THE ORIGINAL BRIDGE PLANS/ROUTINE INSPECTION.

SCOPE OF WORK

- PARTIALLY REMOVE TOP OF BRIDGE DECK CONCRETE BY SCARIFICATION AND SHOTBLASTING METHODS.
- PROPERLY PREPARE SPALLED AREAS IN EXISTING END BENT AND BENTS AND PERFORM SHOTCRETE AND CONCRETE REPAIRS.
- CLEAN AND PAINT EXISTING WEATHERING STEEL BEAM ENDS.
- PREPARE THE CONCRETE BARRIER RAIL FRONT AND TOP SURFACES BY SHOTBLASTING FOR SILANE TREATMENT.
- CLEAN AND PAINT EXISTING WEATHERING STEEL BEAM ENDS.
- PREPARE AND REPAIR CLASS II AREAS OF BRIDGE DECK.
- APPLY SILANE SEALER TO THE FRONT AND TOP SURFACES OF THE CONCRETE BARRIER SECTIONS.
- OVERLAY PREPARED TOP OF BRIDGE DECK WITH POLYMER CONCRETE (PC).
- REMOVE EXISTING JOINT MATERIAL AND INSTALL FOAM JOINT SEALS FOR PRESERVATION.
- GROOVE PC BRIDGE DECK.
- REMOVE DEBRIS FROM TOP OF EXISTING END BENT AND BENT CAPS AND APPLY EPOXY COATING.
- EPOXY RESIN INJECTION OF CONCRETE CRACKS.
- REMOVE UNSOUND CONCRETE AND PROPERLY PREPARE EXISTING END BENT AND BENT AREAS FOR SHOTCRETE AND CONCRETE REPAIRS.

PROJECT NO. I-5941
DURHAM COUNTY
BRIDGE NO. 310429

SHEET 1 OF 2

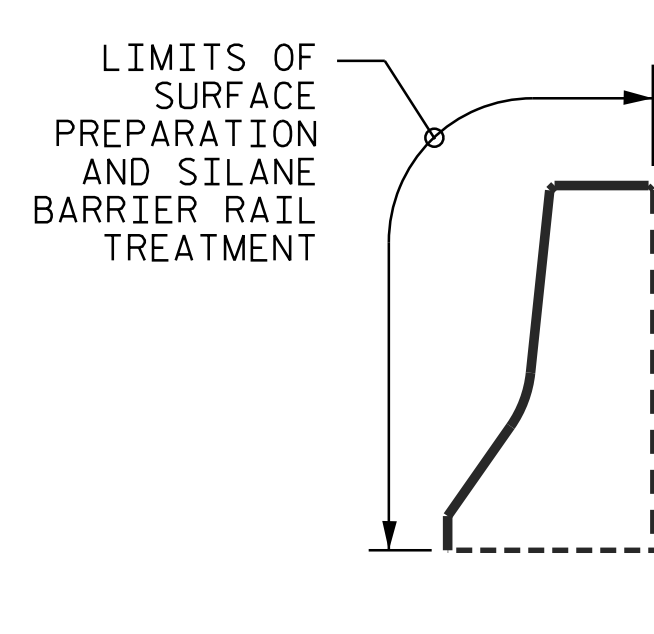
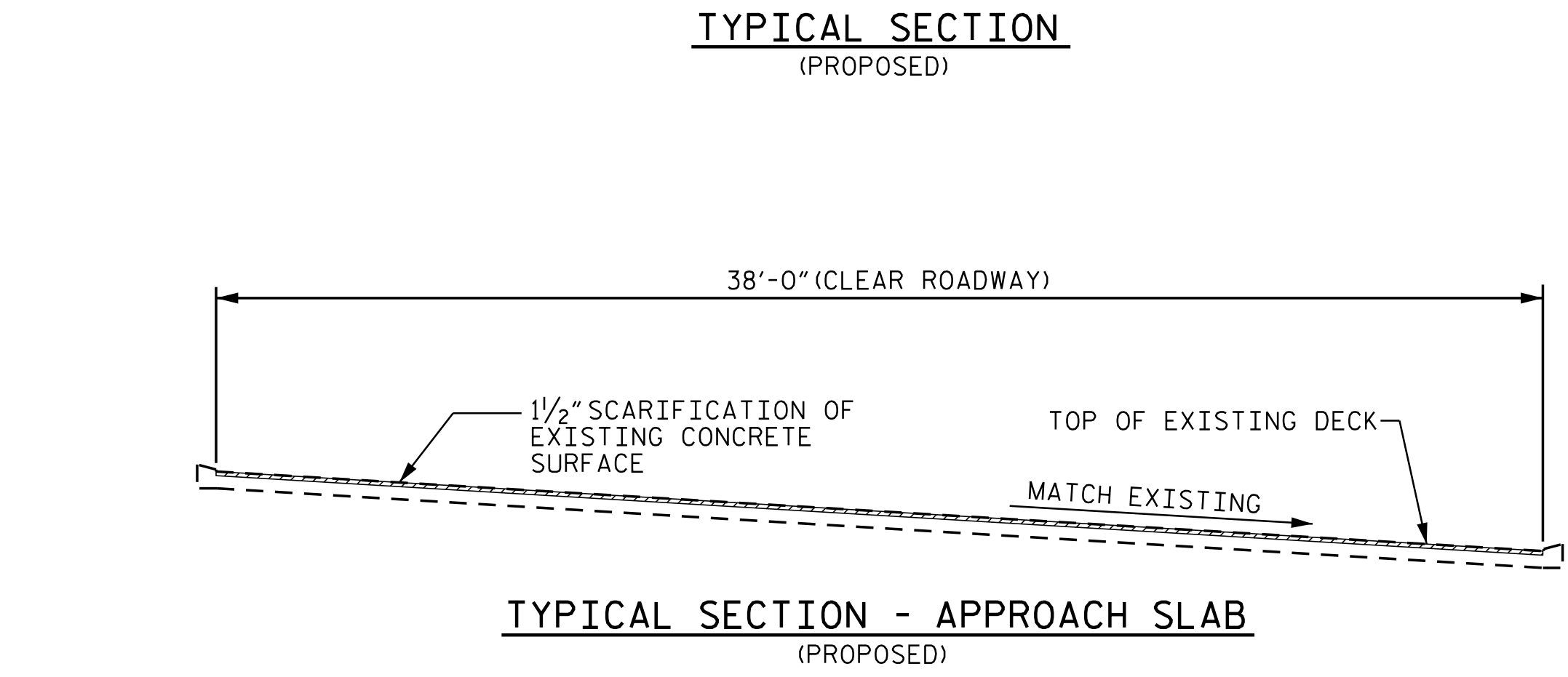
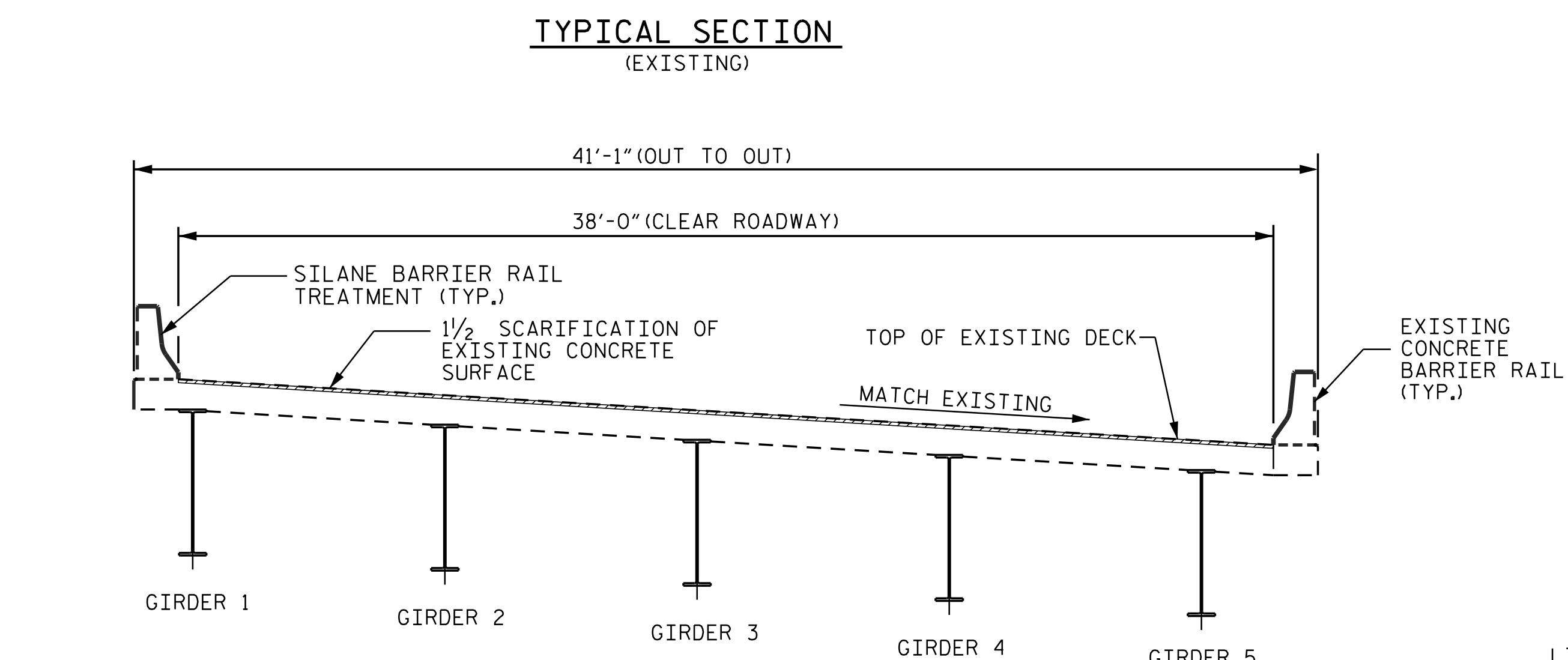
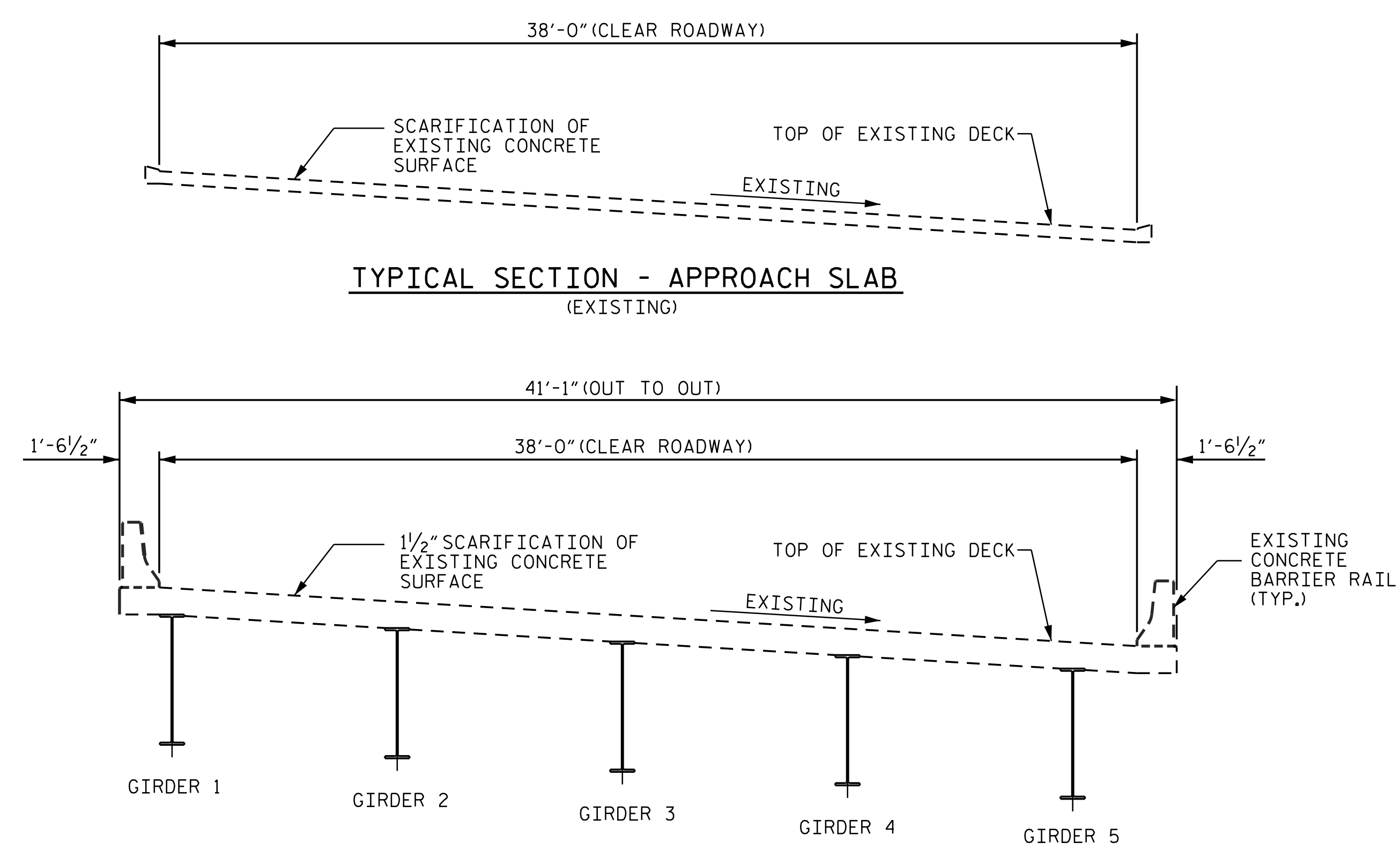


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
FOR BRIDGE ON NC 147
NORTHBOUND RAMP OVER
I-85 & US 70 BUSINESS

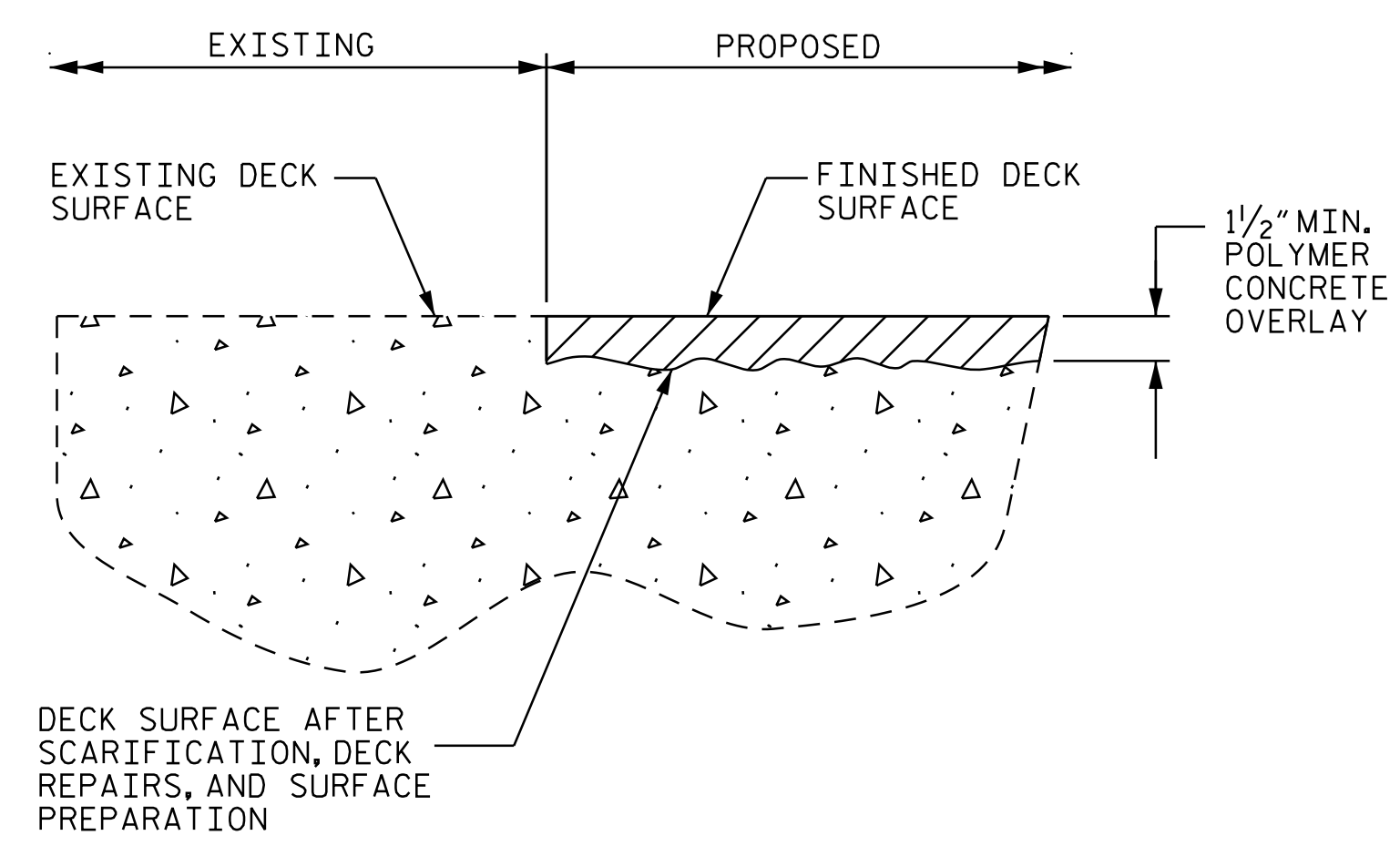
DRAWN BY : M. HOGAN DATE : 3/2023
CHECKED BY : JIA XU DATE : 7/2023
DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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3362 Old Fork Rd.
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ef@elrobinsongroup.com
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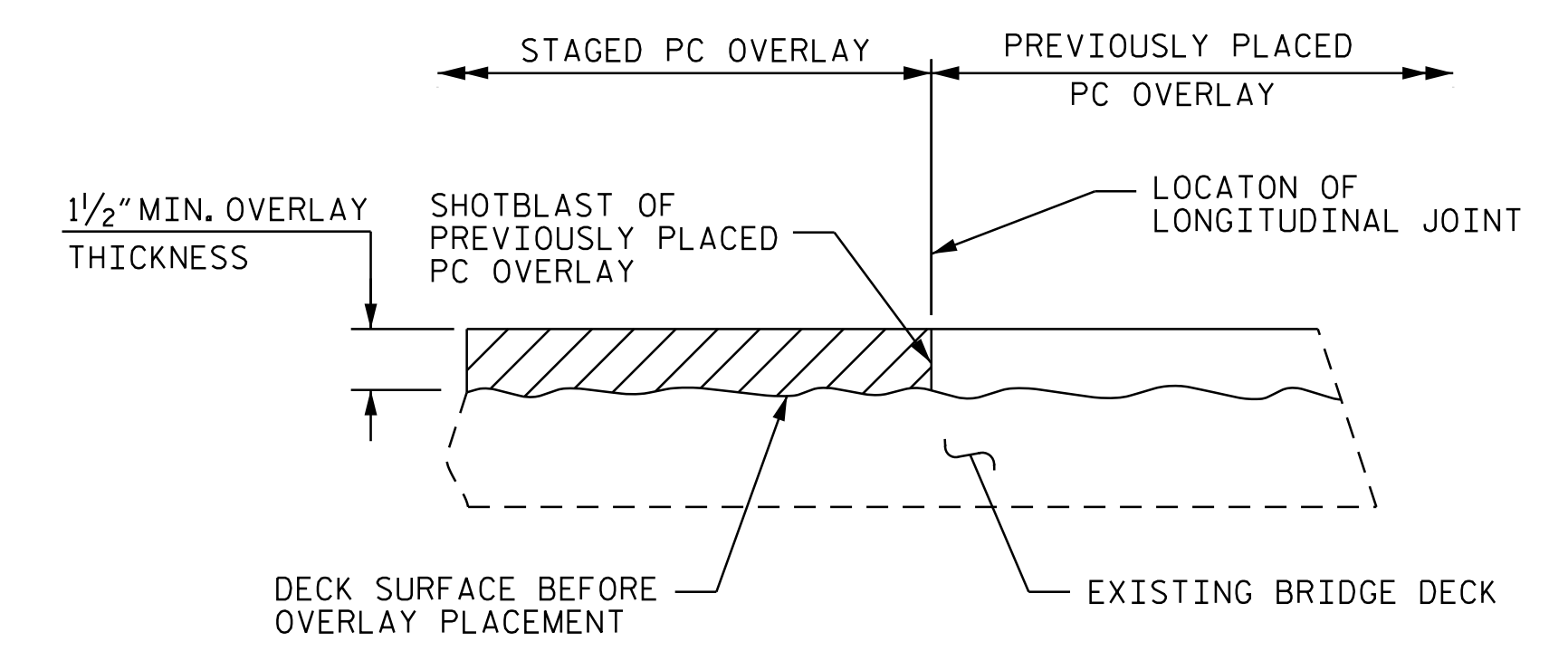
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-1
1			3			TOTAL SHEETS
2			4			17



NOTES:
 SEE TRAFFIC MANAGEMENT PLANS FOR LANE WIDTHS, SEQUENCING, AND OTHER TRAFFIC CONTROL MEASURES FOR STAGING OF POLYMER CONCRETE (PC) OVERLAY SYSTEM AND SURFACE PREPARATION.



DETAILS FOR POLYMER CONCRETE OVERLAY
 FINISHED SURFACE ELEVATION SHALL MATCH EXISTING CONCRETE SURFACE ELEVATIONS. ACTUAL THICKNESS OF PC OVERLAY MAY VARY.



PROJECT NO. I-5941
 DURHAM COUNTY
 BRIDGE NO. 310429

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Drawn/Designed by: *Farzin Asefnia*

PROFESSIONAL ENGINEER SEAL 20103
 FARZIN ASEFNIA
 11/13/2023

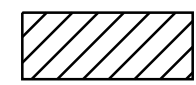
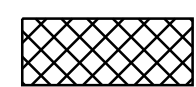
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

TYPICAL SECTION & PC OVERLAY DETAILS

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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1			3			S5-3
2			4			TOTAL SHEETS 17

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 efarzin@e-robinson.com
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-  CLASS II SURFACE PREPARATION
-  CONCRETE REPAIR (CR)

NOTES:
 REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

FOR SECTION A-A, SEE "JOINT DETAILS" SHEETS.

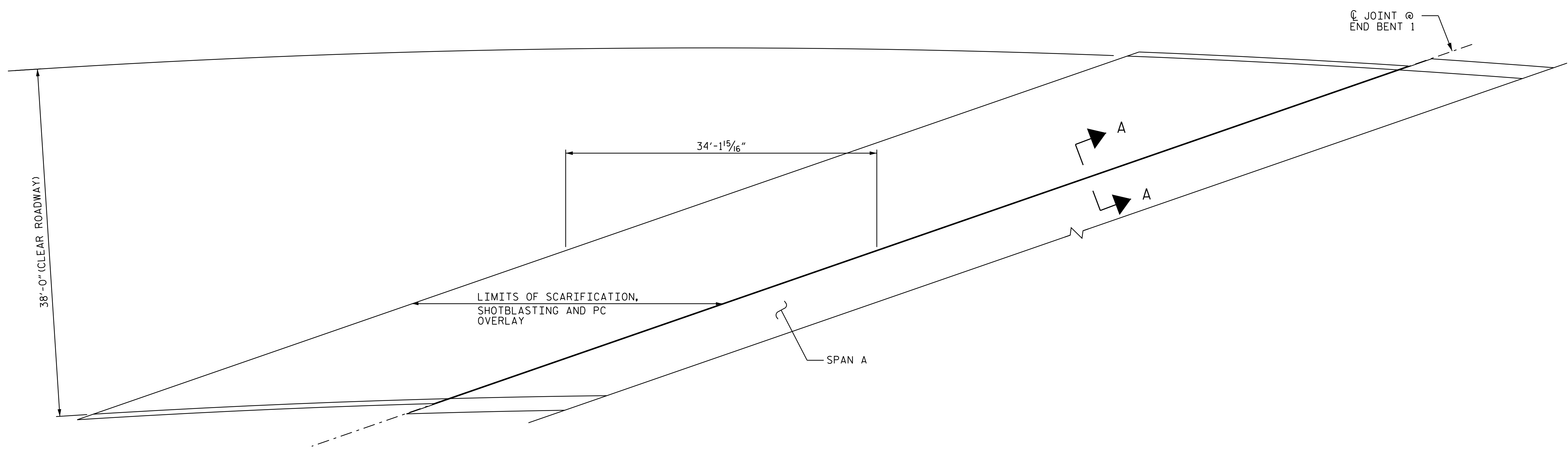
FOR SCARIFYING BRIDGE DECK, SHOTBLASTING BRIDGE AND CLASS II SURFACE PREPARATION, SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.

TOP OF DECK REPAIR QUANTITIES REPRESENT ESTIMATED VALUES OF CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY AFTER REMOVAL OF UNSOUND CONCRETE (MIN. 2" CLEAR TO SAWCUT). SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

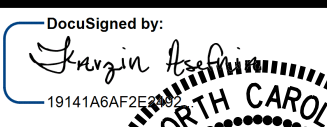

FOR CONCRETE DECK REPAIR FOR PC OVERLAY, PC MATERIALS AND PLACING AND FINISHING PC OVERLAY, SEE POLYMER CONCRETE BRIDGE DECK OVERLAY SPECIAL PROVISIONS.

AS-BUILT REPAIR QUANTITY TABLE				
APPROACH SLAB 1				
	ESTIMATE		ACTUAL	
SCARIFYING BRIDGE DECK	143.0	SY		
CLASS II SURFACE PREPARATION	0.0	SY		
CONCRETE DECK REPAIR FOR PC OVERLAY	0.0	SY		
SHOTBLASTING BRIDGE DECK	143.0	SY		
POLYMER CONCRETE MATERIALS	7.0	CY		
PLACING AND FINISHING PC OVERLAY	143.0	SY		
GROOVING BRIDGE FLOORS	1,163.0	SF		
CONCRETE REPAIRS	ESTIMATE		ACTUAL	
	AREA SF.	VOLUME CF	AREA SF.	VOLUME CF
CONCRETE CURB AND RAIL	0.0	0.0		


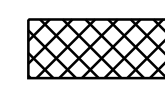


APPROACH SLAB 1

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429
 SHEET 1 OF 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED DocuSigned by:  10141AB47  11/13/2023	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		DECK SURFACE REPAIR APPROACH SLAB 1
	REVISIONS		
E.L. ROBINSON 3362 Old Forks Rd. Raleigh, N.C. 27609 Tel: 984.980.2810 efarzina@robinsoneng.com License: C-22 9	NO. 1 BY: [] DATE: []	NO. 2 BY: [] DATE: []	NO. 3 BY: [] DATE: []

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

 CLASS II SURFACE PREPARATION
 CONCRETE REPAIR AREA

NOTES:
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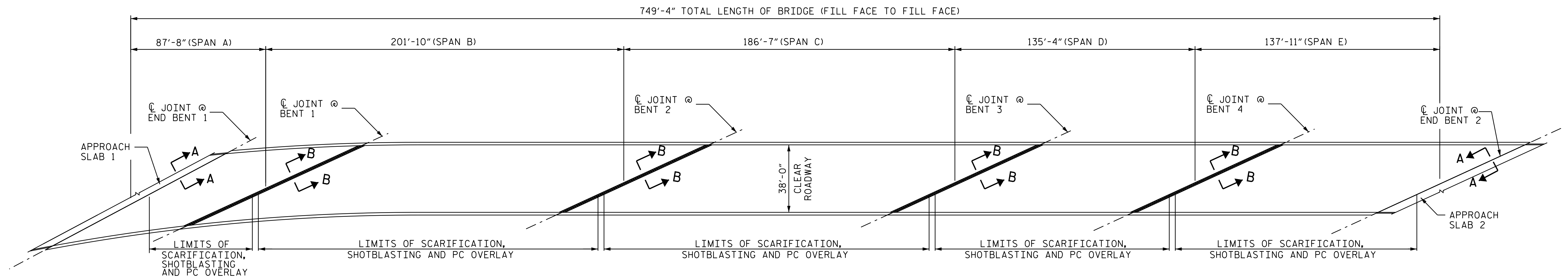
FOR SECTION A-A AND B-B, SEE "JOINT DETAILS" SHEETS.
 FOR SCARIFYING BRIDGE DECK, SHOTBLASTING BRIDGE AND CLASS II SURFACE PREPARATION, SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.

TOP OF DECK REPAIR QUANTITIES REPRESENT ESTIMATED VALUES OF CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY AFTER REMOVAL OF UNSOUND CONCRETE (MIN. 2" CLEAR TO SAWCUT). SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE DECK REPAIR FOR PC OVERLAY, PC MATERIALS AND PLACING AND FINISHING PC OVERLAY, SEE POLYMER CONCRETE BRIDGE DECK OVERLAY SPECIAL PROVISIONS.

AS-BUILT REPAIR QUANTITY TABLE				
TOP OF DECK REPAIRS				
	ESTIMATE		ACTUAL	
SCARIFYING BRIDGE DECK	3,109.0	SY		
CLASS II SURFACE PREPARATION	58.0	SY		
CONCRETE DECK REPAIR FOR PC OVERLAY	58.0	SY		
SHOTBLASTING BRIDGE DECK	3,109.0	SY		
POLYMER CONCRETE MATERIALS	151.0	CY		
PLACING AND FINISHING PC OVERLAY	3,109.0	SY		
GROOVING BRIDGE FLOORS	25,241.0	SF		
SILANE PREP. FOR CONCRETE BARRIER	4,980.0	SF		
SILANE BARRIER RAIL TREATMENT	4,980.0	SF		
CONCRETE REPAIRS	ESTIMATE		ACTUAL	
	AREA SF.	VOLUME CF	AREA SF.	VOLUME CF
CONCRETE CURB AND RAIL	0.0	0.0		



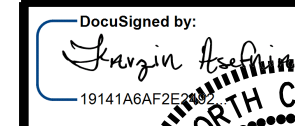
BRIDGE DECK


PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429

SHEET 2 OF 3

DRAWN BY : M. HOGAN DATE : 3/2023
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 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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 101418A8702



11/13/2023

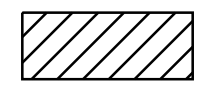
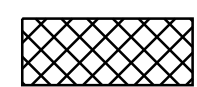
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DECK SURFACE RAPAIR

REVISIONS						SHEET NO.
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1			3			S5-5
2			4			TOTAL SHEETS 17

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-  CLASS II SURFACE PREPARATION
-  CONCRETE REPAIR

NOTES:
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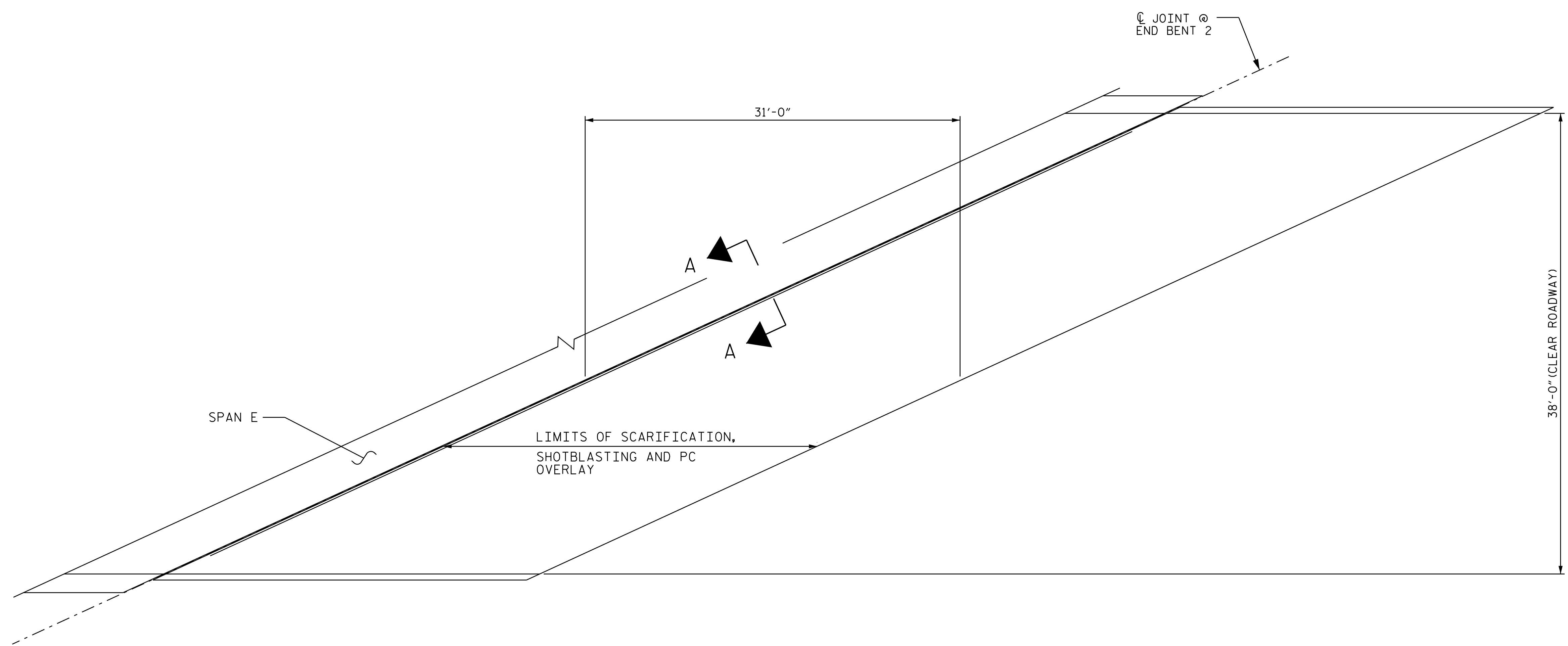
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TOP OF DECK REPAIR QUANTITIES REPRESENT ESTIMATED VALUES OF CLASS II SURFACE PREPARATION AND CONCRETE DECK REPAIR FOR PC OVERLAY AFTER REMOVAL OF UNSOUND CONCRETE (MIN. 2" CLEAR TO SAWCUT), SEE OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE DECK REPAIR FOR PC OVERLAY, PC MATERIALS AND PLACING AND FINISHING PC OVERLAY, SEE POLYMER CONCRETE BRIDGE DECK OVERLAY SPECIAL PROVISIONS.

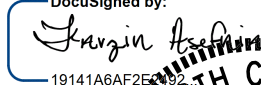
AS-BUILT REPAIR QUANTITY TABLE				
APPROACH SLAB 2				
	ESTIMATE	ACTUAL		
SCARIFYING BRIDGE DECK	131.0 SY			
CLASS II SURFACE PREPARATION	0.0 SY			
CONCRETE DECK REPAIR FOR PC OVERLAY	0.0 SY			
SHOTBLASTING BRIDGE DECK	131.0 SY			
POLYMER CONCRETE MATERIALS	7.0 CY			
PLACING AND FINISHING PC OVERLAY	131.0 SY			
GROOVING BRIDGE FLOORS	1,057.0 SF			
CONCRETE REPAIRS	ESTIMATE		ACTUAL	
	AREA SF.	VOLUME CF	AREA SF.	VOLUME CF
CONCRETE CURB AND RAIL	0.0	0.0		




APPROACH SLAB 2

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429
 SHEET 3 OF 3

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11/13/2023

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DECK SURFACE REPAIR
 APPROACH SLAB 2

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S5-6
2			4			TOTAL SHEETS 17

 E.L. ROBINSON

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JOINT REPAIR QUANTITY TABLE		
FOAM JOINT SEALS FOR PRESERVATION	ESTIMATED LIN. FT.	ACTUAL LIN. FT.
BENT 1	107.0	
BENT 2	93.0	
BENT 3	93.0	
BENT 4	93.0	
TOTAL	386.0	

POURABLE SILICONE JOINT SEALANT		
FOAM JOINT SEALS FOR PRESERVATION	ESTIMATED LIN. FT.	ACTUAL LIN. FT.
END BENT 1	109.0	
END BENT 2	91.0	
TOTAL	200.0	

NOTES:

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

FINAL JOINT SEALS SHALL NOT BE INSTALLED UNTIL THE OVERLAY IS COMPLETE.

THE CONTRACTOR SHALL TAKE CARE DURING JOINT REHAB OPERATIONS NOT TO DROP ANY MATERIAL BELOW THE BRIDGE WITHOUT PROTECTIVE DEVICES BELOW TO CATCH THE MATERIAL. ANY MATERIAL THAT FALLS BELOW THE BRIDGE SHALL BE CONTAINED, REMOVE AND DISPOSED OF BY THE CONTRACTOR AT NO EXTRA COST TO THE DEPARTMENT. IF THE ENGINEER DETERMINES THAT THE PROTECTIVE DEVICES ARE NOT ADEQUATE OF 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.

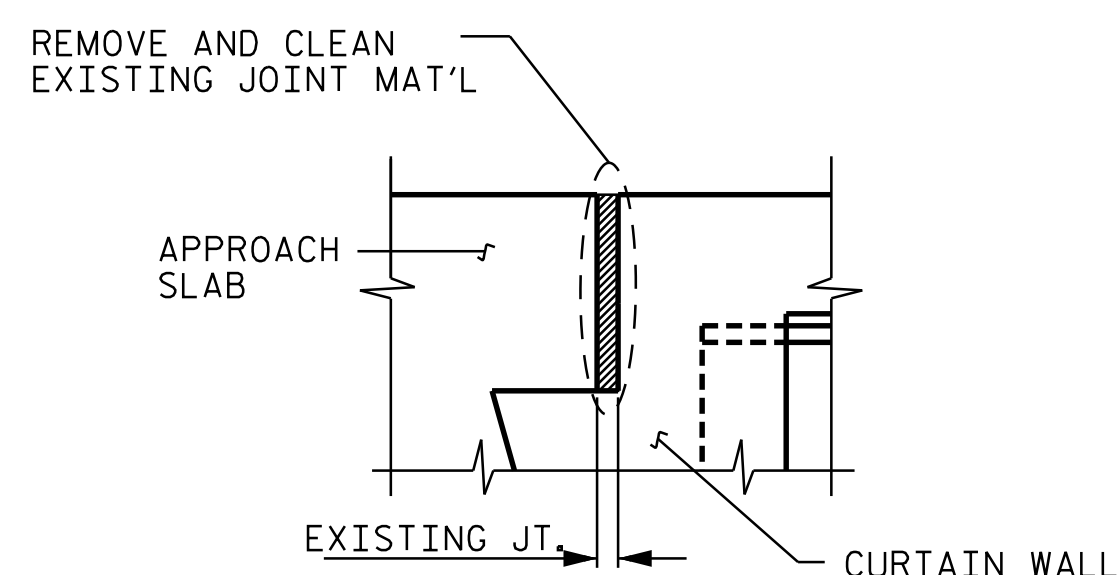
DURING THE JOINT INSTALLATION PROCEDURE, THE JOINT AND SURROUNDING AREA SHALL BE KEPT CLEAN AND FREE OF DEBRIS.

FINAL SURFACE OF THE JOINT DEMOLITION AREA PRIOR TO PLACEMENT OF CONCRETE REPAIR MATERIAL SHOULD BE REASONABLY FLAT AND LEVEL. ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF THE SURFACE PRIOR TO PLACEMENT OF REPAIR CONCRETE.

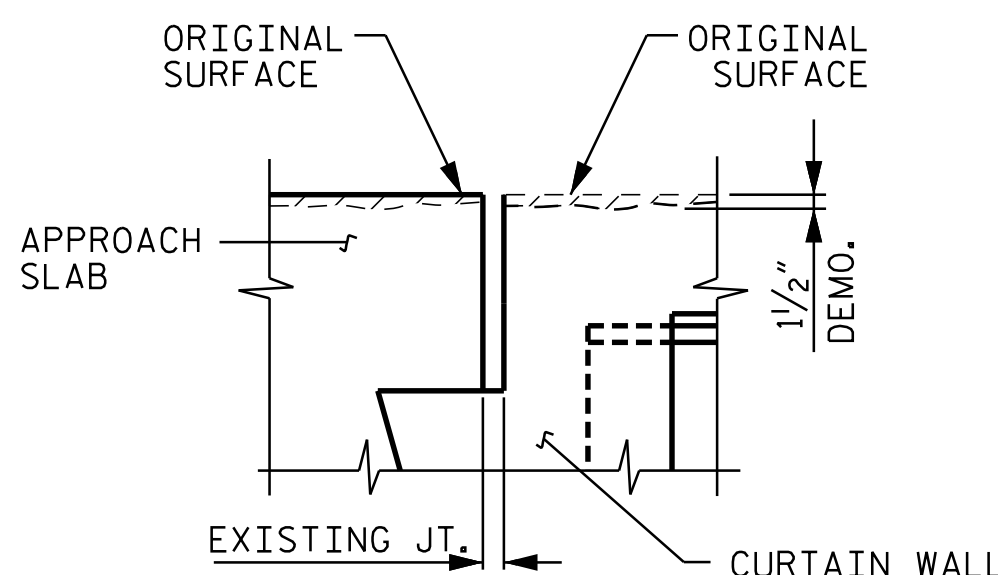
THE INSTALLATION OF THE JOINT SEAL SHALL BE WATERTIGHT.

A MANUFACTURER'S CERTIFIED TRAINED REPRESENTATIVE SHALL BE PRESENT DURING THE INSTALLATION OF THE FIRST JOINT OF THE PROJECT, OR UNTIL THE ENGINEER IS SATISFIED WITH THE INSTALLATION PROCESS.

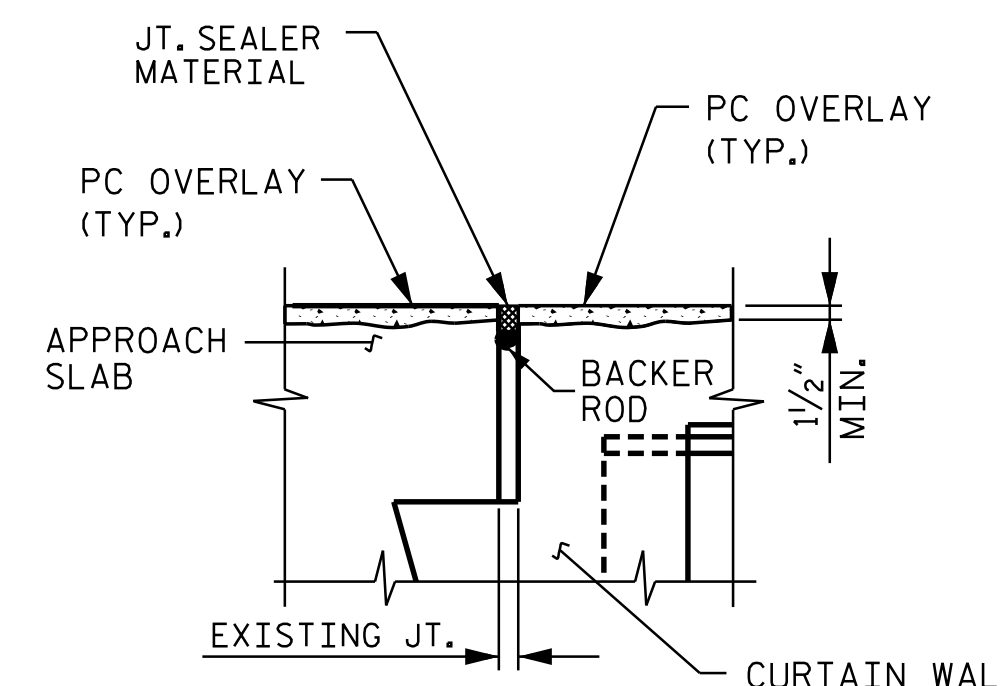
THE MANUFACTURER IS TO DETERMINE AND PROVIDE THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL FOR THE SIZE OF THE OPENING ON THE PLANS AND TO ACCOMMODATE THE MINIMUM EXPANSION SHOWN ON THE PLANS.



EXISTING JOINT

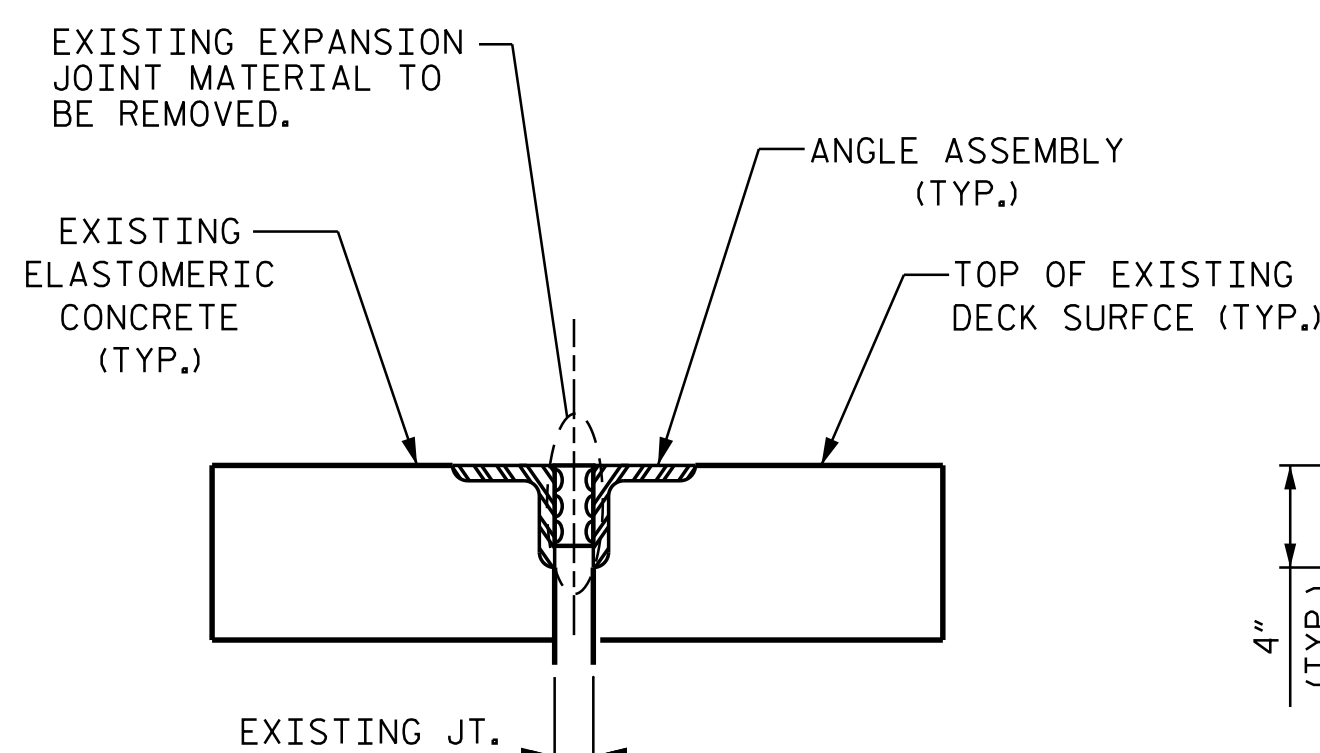


MINIMUM EXISTING JOINT DEMOLITION

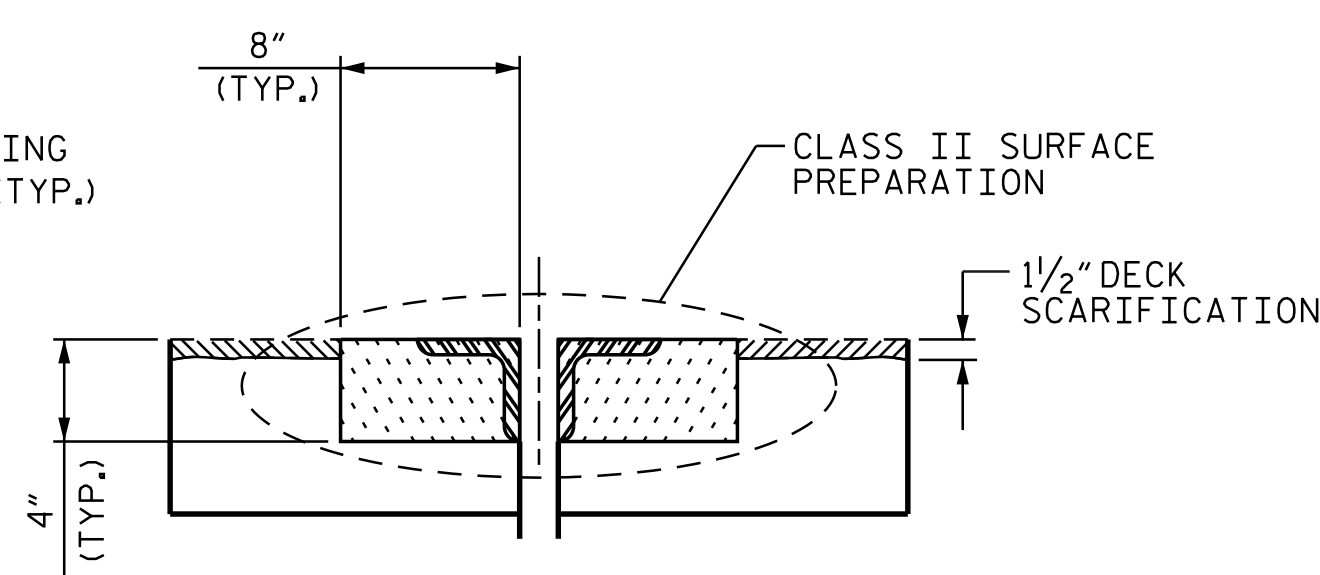


PROPOSED JOINT

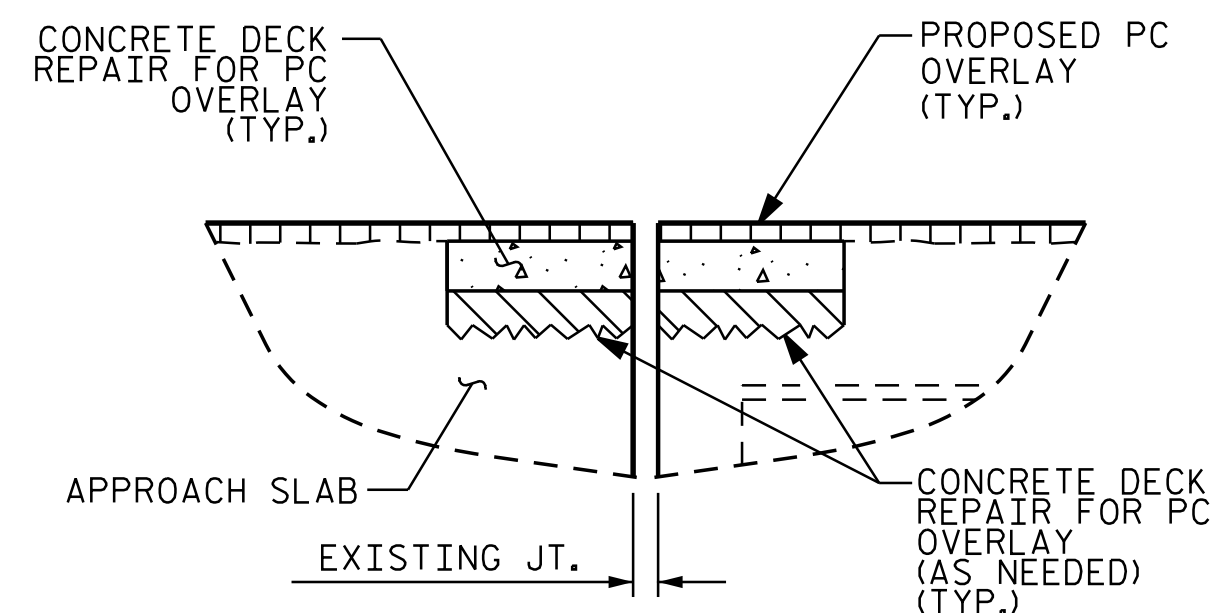
JOINT INSTALLATION SEQUENCE AT END BENTS
SECTION A-A



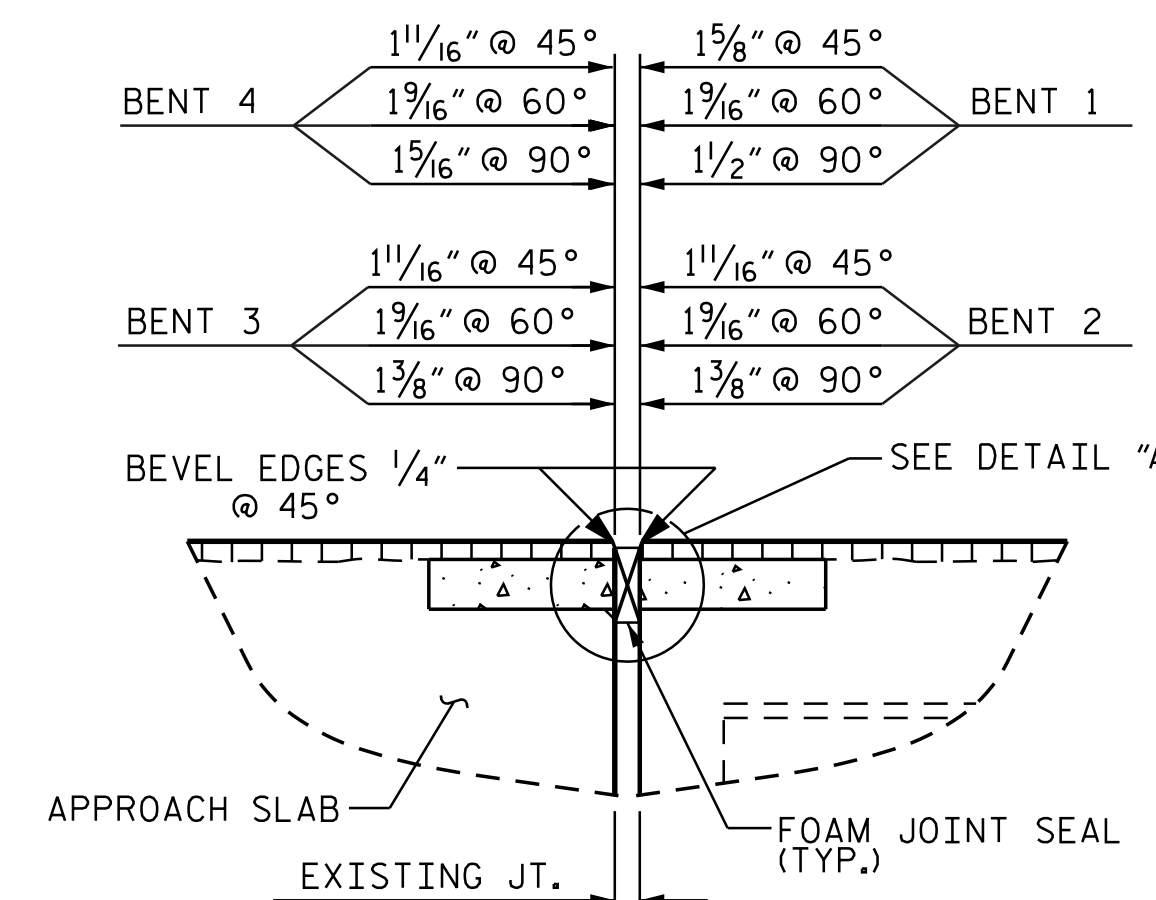
EXISTING JOINT



MINIMUM EXISTING JOINT DEMOLITION

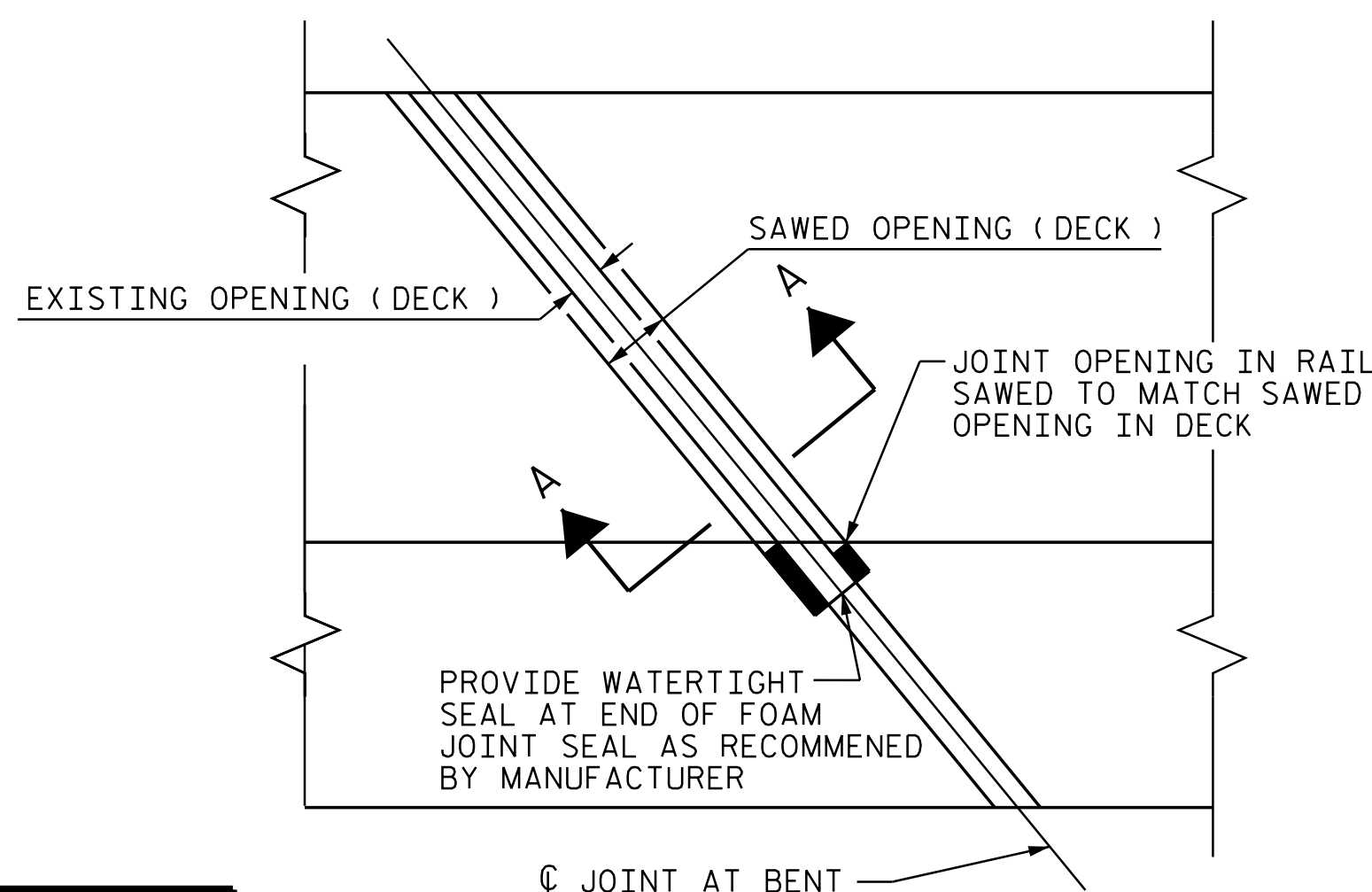


PROPOSED JOINT PRIOR TO SAWING

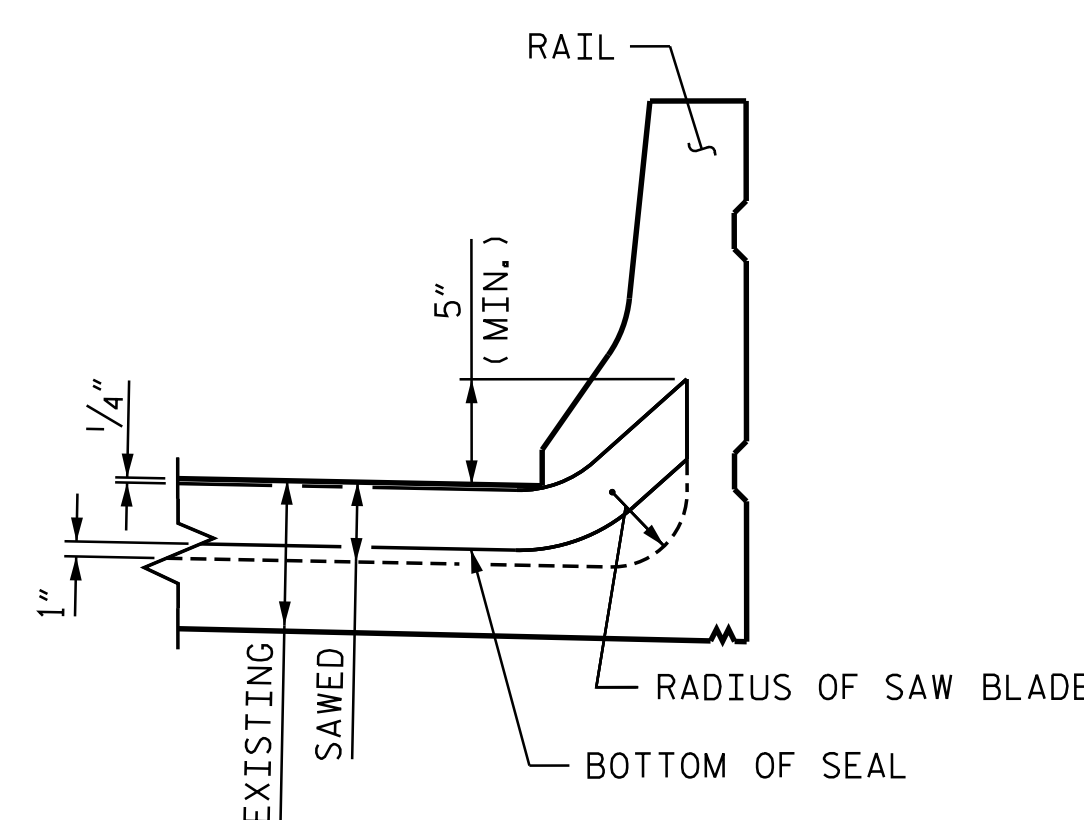


PROPOSED FOAM JOINT SEAL

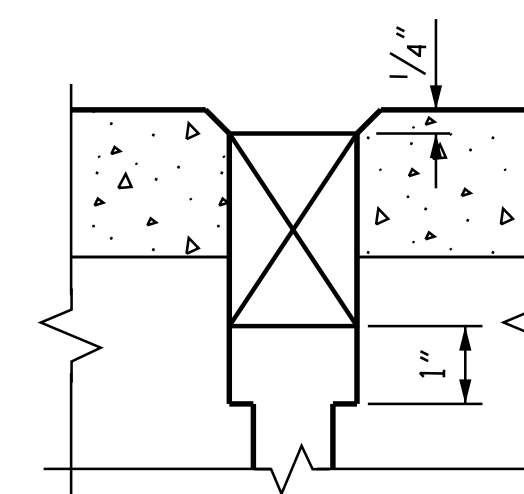
JOINT INSTALLATION SEQUENCE AT BENTS
SECTION B-B



PLAN



EXPANSION JOINT FOAM AT BARRIER



DETAIL "A"

PROJECT NO. I-5941
 DURHAM COUNTY
 BRIDGE NO. 310429

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

101418A07052

11/13/2023

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 JOINT DETAILS

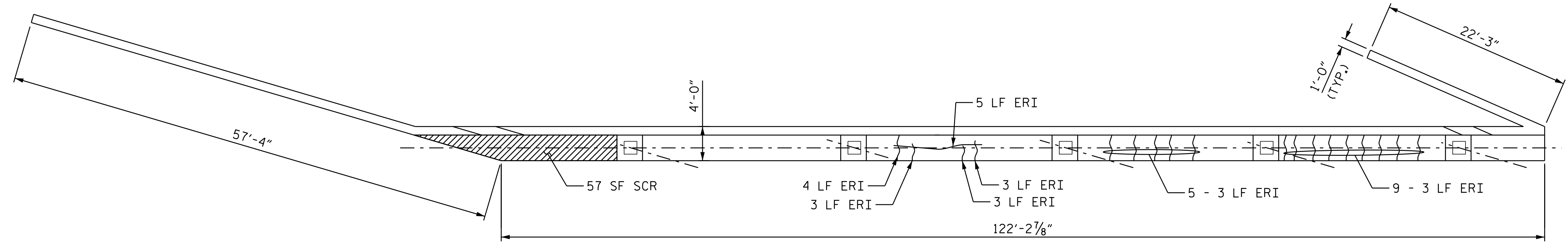
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S5-7
 TOTAL SHEETS 17

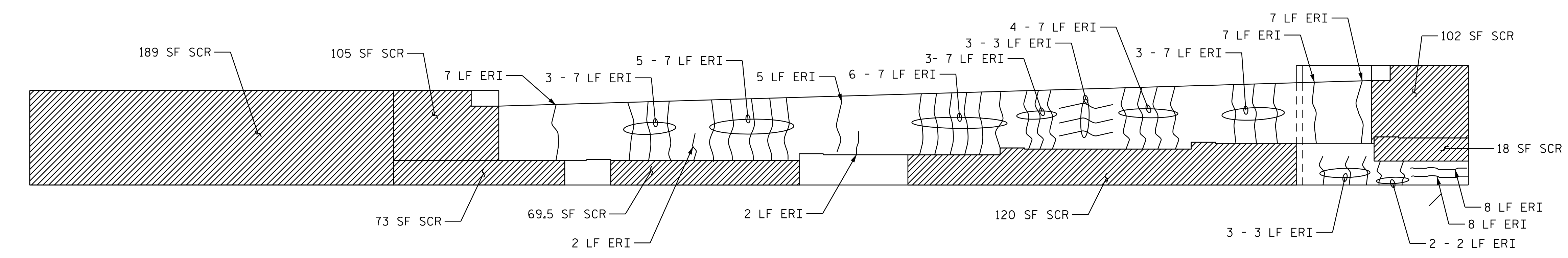
DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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 efarzin@easengr.com
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AS-BUILT REPAIR QUANTITY TABLE				
END BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	350.0	88.0		
CURTAIN & WING WALL	396.0	99.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	89.0			
CURTAIN WALL	207.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF CAP	372.0			



PLAN



ELEVATION

END BENT 1

NOTES:
 REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429

SHEET 1 OF 10

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:

 19141ADK555

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20103
 FARZIN ASEFNIA
 11/13/2023

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

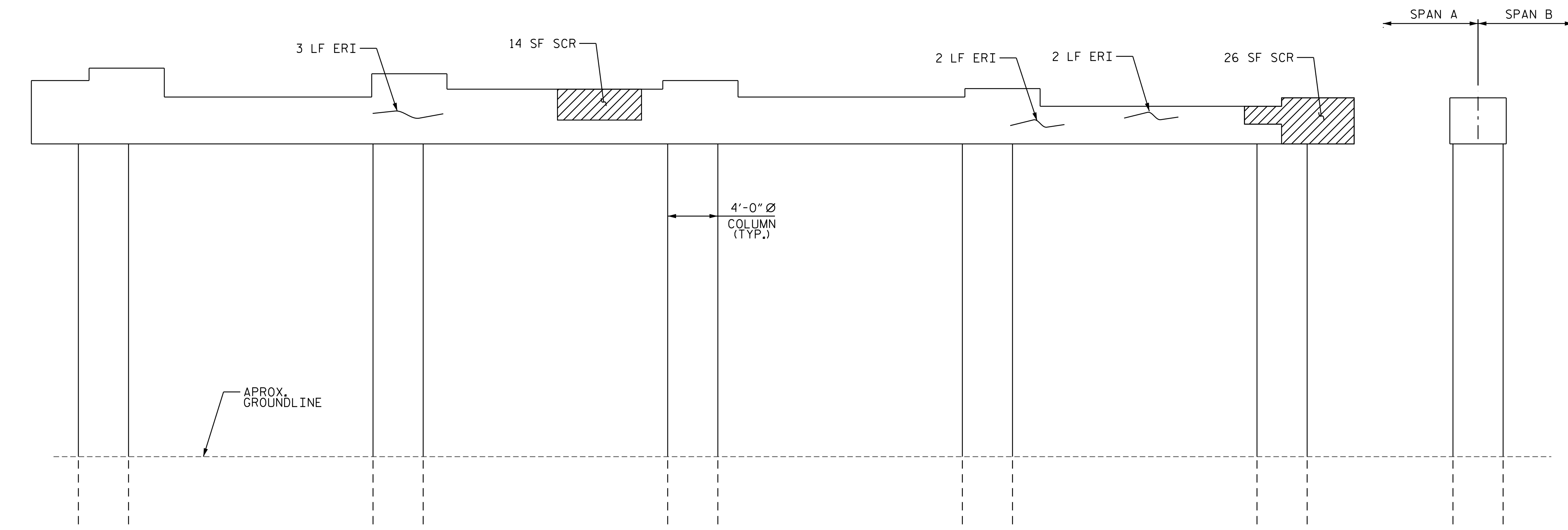
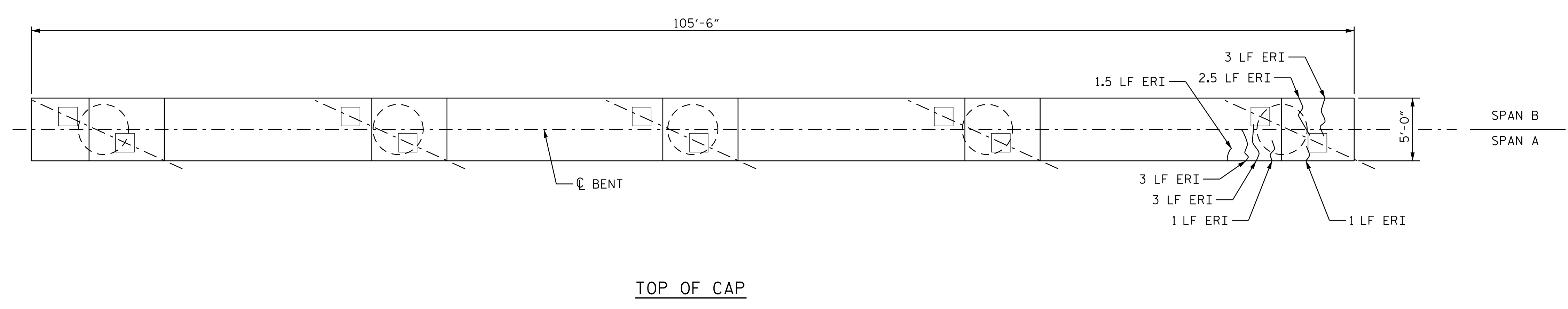
SUBSTRUCTURE REPAIR

END BENT 1

REVISIONS						SHEET NO. S5-8
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 17
2			4			

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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ELEVATION
BENT NO. 1
SPAN A FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 1 SPAN A FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	40.0	10.0		
COLUMN	0.0	0.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	22.0			
COLUMN	0.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF BENT CAP	518.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

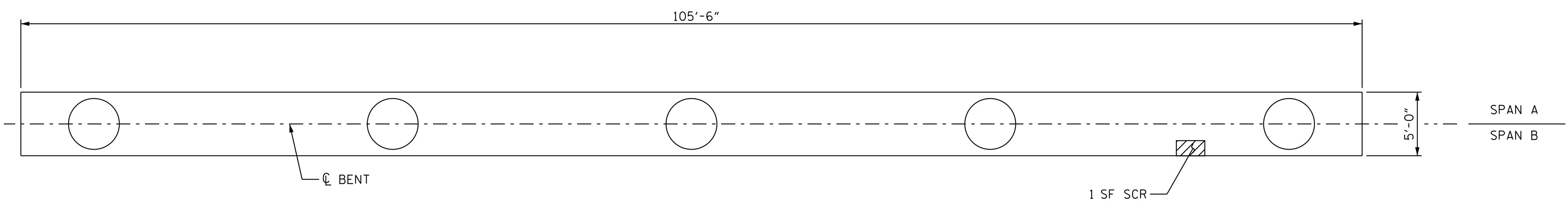
FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

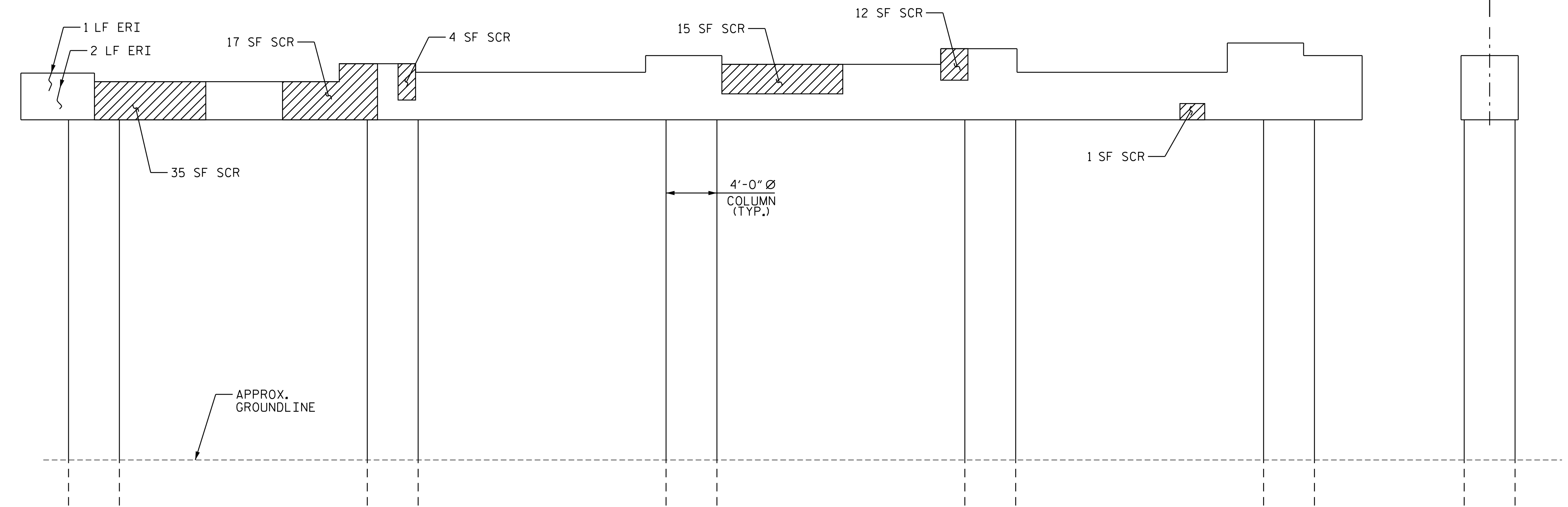
PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429
 SHEET 2 OF 10

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED Drawn/Sealed by: 11/13/2023	STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE REPAIR BENT 1 SPAN A FACE	
	REVISIONS	
3362 Old Park Rd. Raleigh, N.C. 27609 Tel: 984.980.2810 efl@elrobinsonengineering.com License: C-22 9	NO. 1 BY: [Signature] DATE: [Blank]	NO. 2 BY: [Signature] DATE: [Blank]
SHEET NO. S5-9 TOTAL SHEETS 17		

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023



BOTTOM OF CAP



ELEVATION

END VIEW

BENT NO. 1
SPAN B FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 1 SPAN B FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	85.0	21.0		
COLUMN	0.0	0.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	3.0			
COLUMN	0.0			

NOTES:

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CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

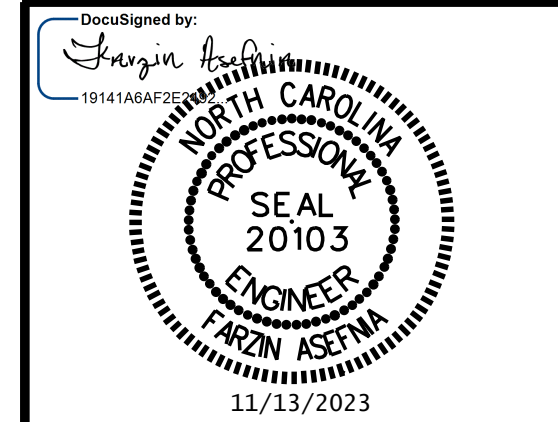
FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
BRIDGE NO. 310429

SHEET 3 OF 10

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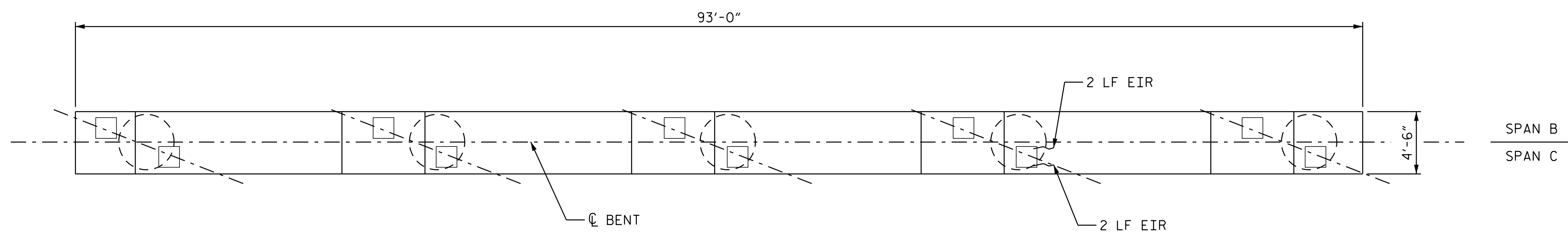


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE REPAIR
BENT 1 SPAN B FACE

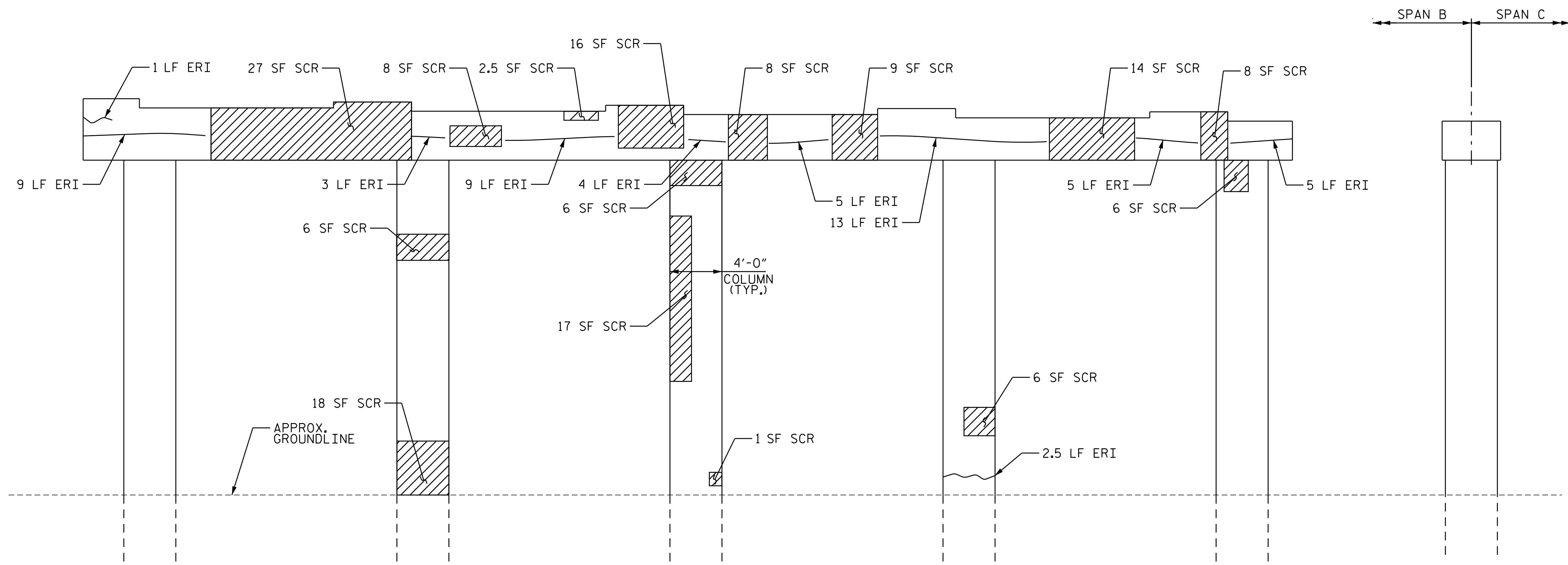
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1			3			TOTAL SHEETS
2			4			17

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TOP OF CAP



ELEVATION

END VIEW

BENT NO. 2
SPAN B FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 2 SPAN B FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	92.5	23.0		
COLUMN	60.0	15.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	58.0			
COLUMN	2.5			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF BENT CAP	409.0			

NOTES:

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CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

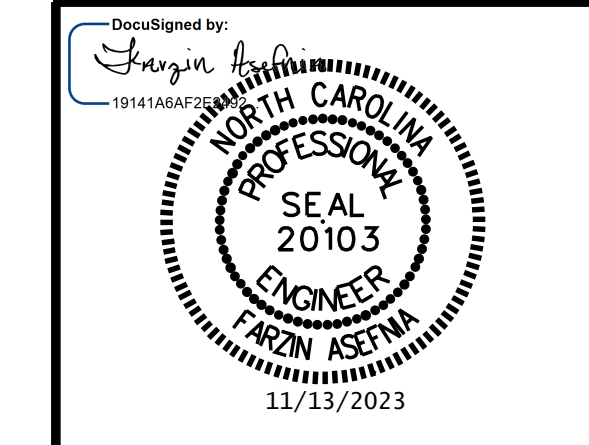
FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429

SHEET 4 OF 10

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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE REPAIR
BENT 2 SPAN B FACE

REVISIONS						SHEET NO. S5-11
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 17
2			4			

DRAWN BY : M. HOGAN DATE : 3/2023
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 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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AS-BUILT REPAIR QUANTITY TABLE				
BENT 2 SPAN C FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	216.0	54.0		
COLUMN	228.0	57.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	30.5			
COLUMN	0.0			

NOTES:

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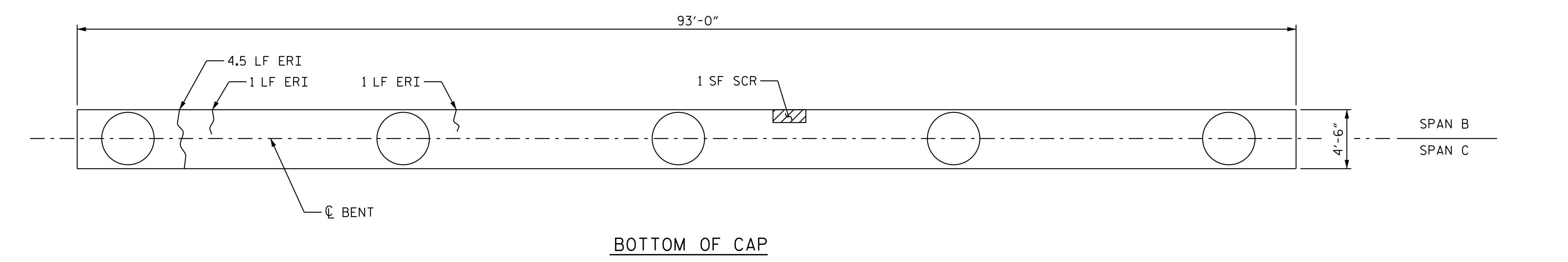
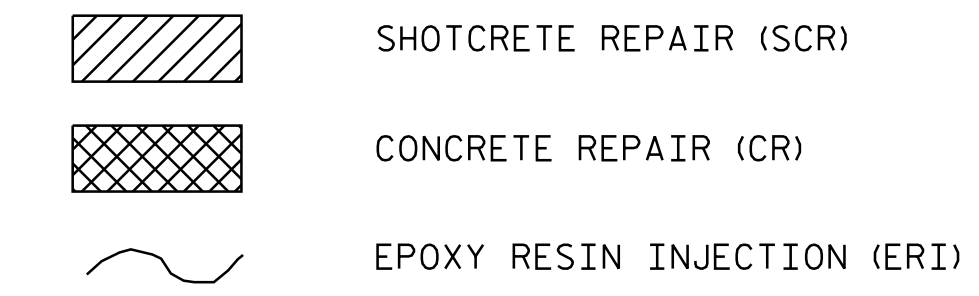
SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

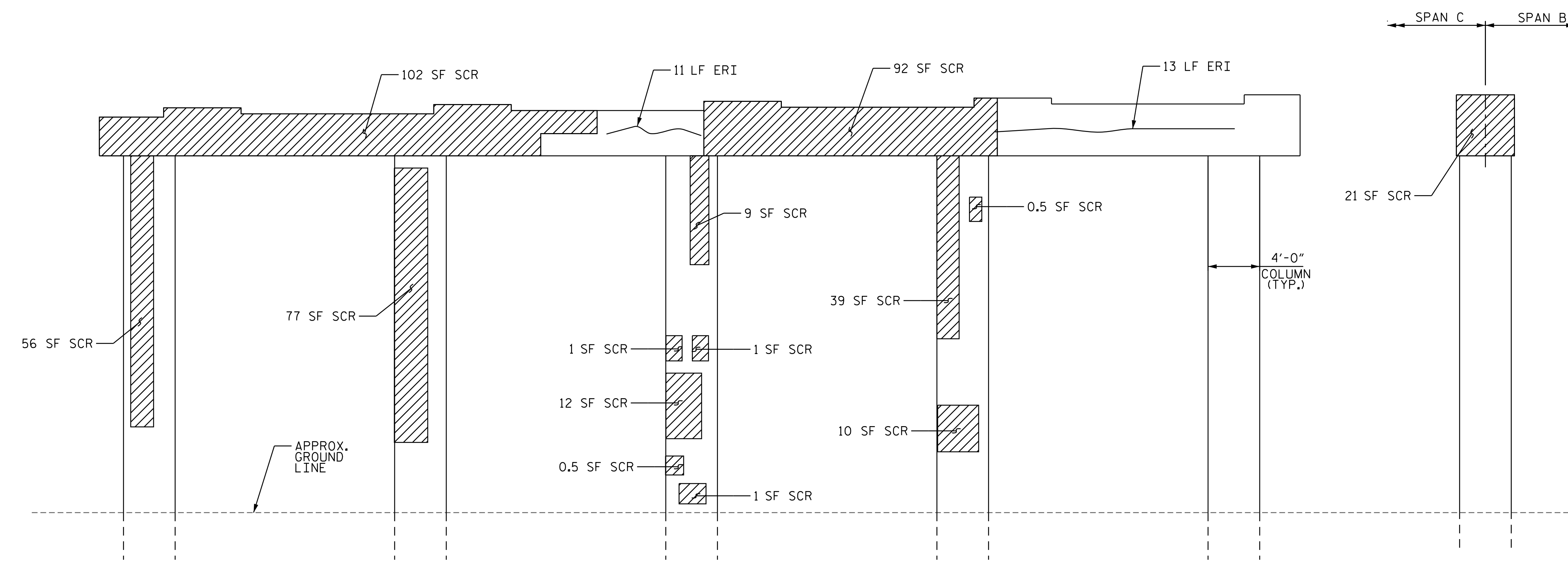
FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

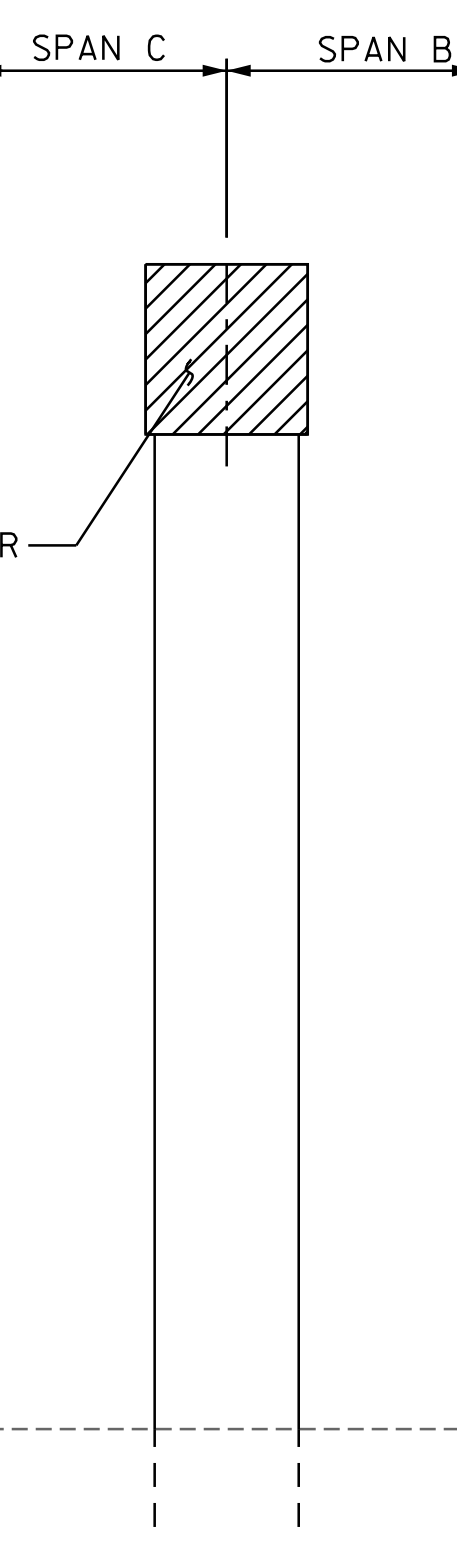
FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.



BOTTOM OF CAP



ELEVATION



END VIEW

BENT NO. 2
SPAN C FACE

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429

SHEET 5 OF 10

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD : F. ASEFNIA DATE : 11/2023

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DocuSigned by:

 191418A8F2FC

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20103
 FARZIN ASEFNIA
 11/13/2023

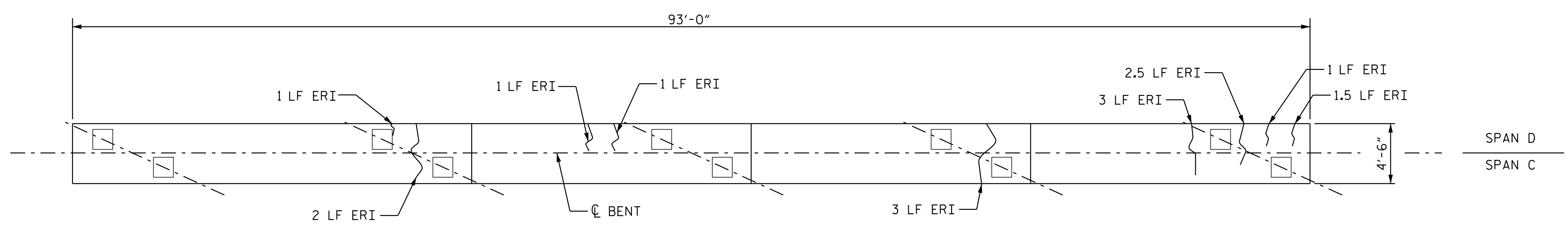
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE REPAIR
BENT 2 SPAN C FACE

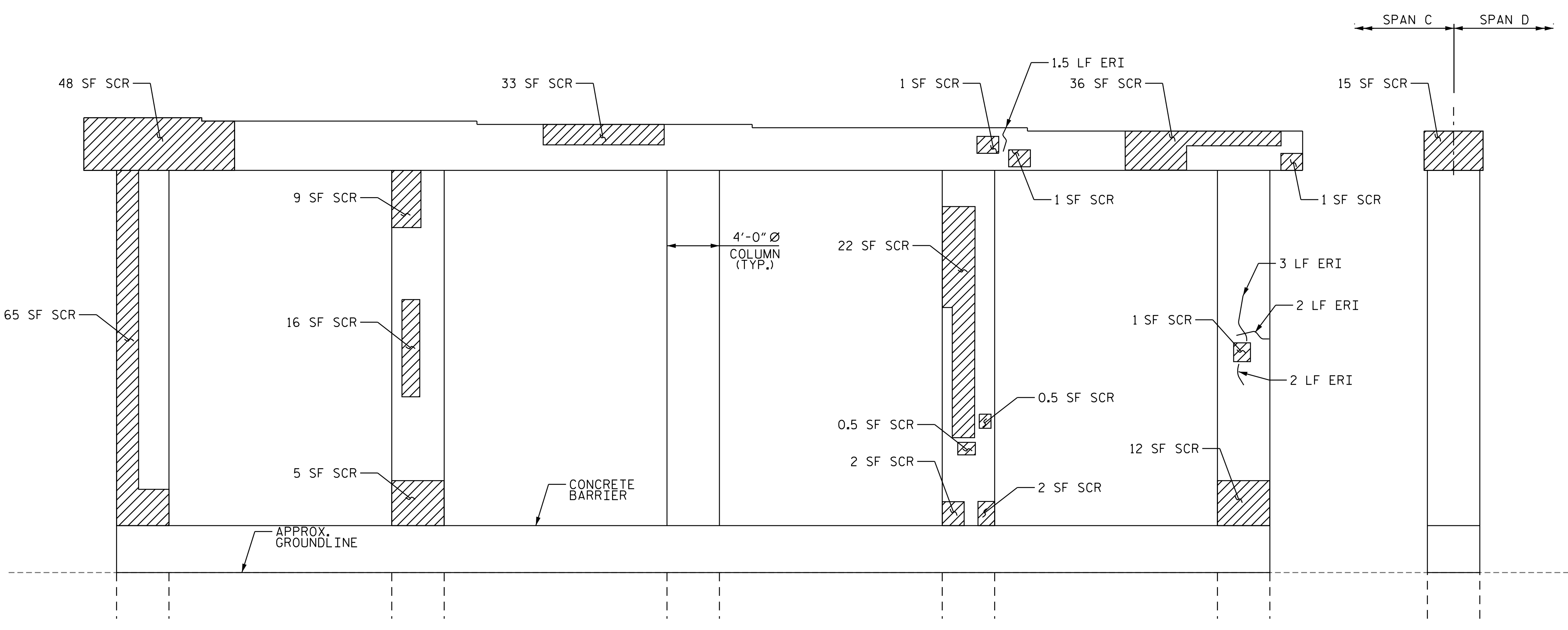
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S5-12
2			4			

TOTAL SHEETS: 17

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TOP OF CAP



ELEVATION

END VIEW

BENT NO. 3
SPAN C FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 3 SPAN C FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	135.0	34.0		
COLUMN	135.0	34.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	16.0			
COLUMN	7.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF BENT CAP	409.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

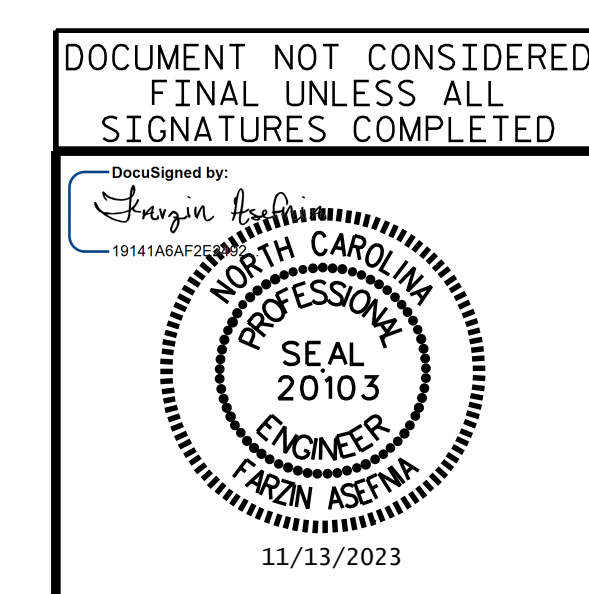
FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429

SHEET 6 OF 10



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE REPAIR
BENT 3 SPAN C FACE

REVISIONS						SHEET NO. S5-13
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 17
2			4			

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023



AS-BUILT REPAIR QUANTITY TABLE				
BENT 3 SPAN D FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	181.0	45.3		
COLUMN	123.0	31.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	10.5			
COLUMN	0.0			

NOTES:

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FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

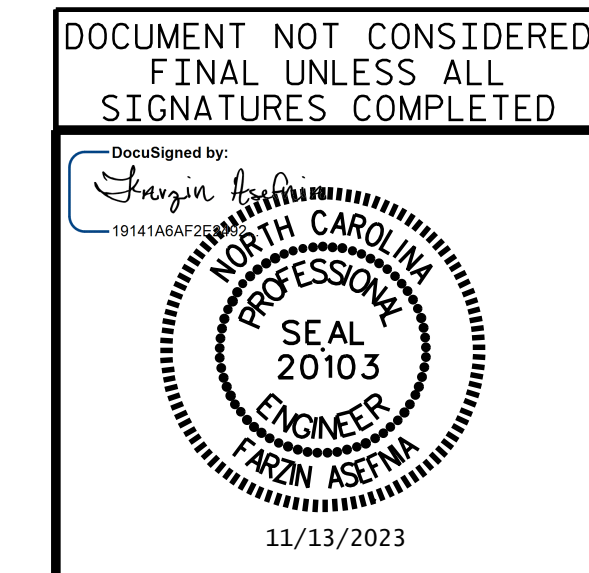
FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

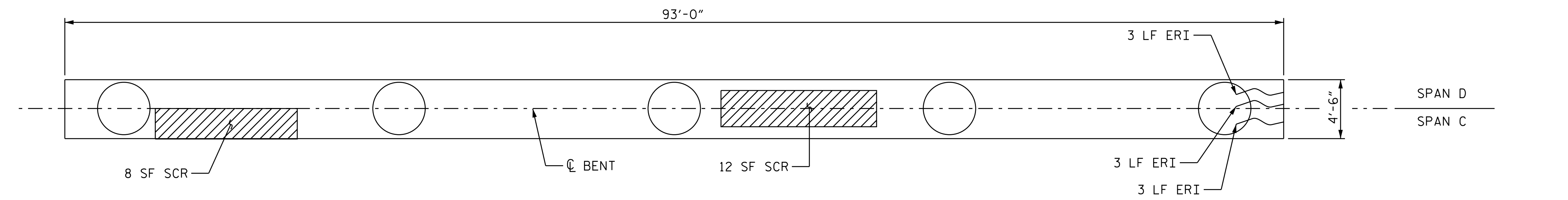
-  SHOTCRETE REPAIR (SCR)
-  CONCRETE REPAIR (CR)
-  EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
 DURHAM COUNTY
 BRIDGE NO. 310429
 SHEET 7 OF 10

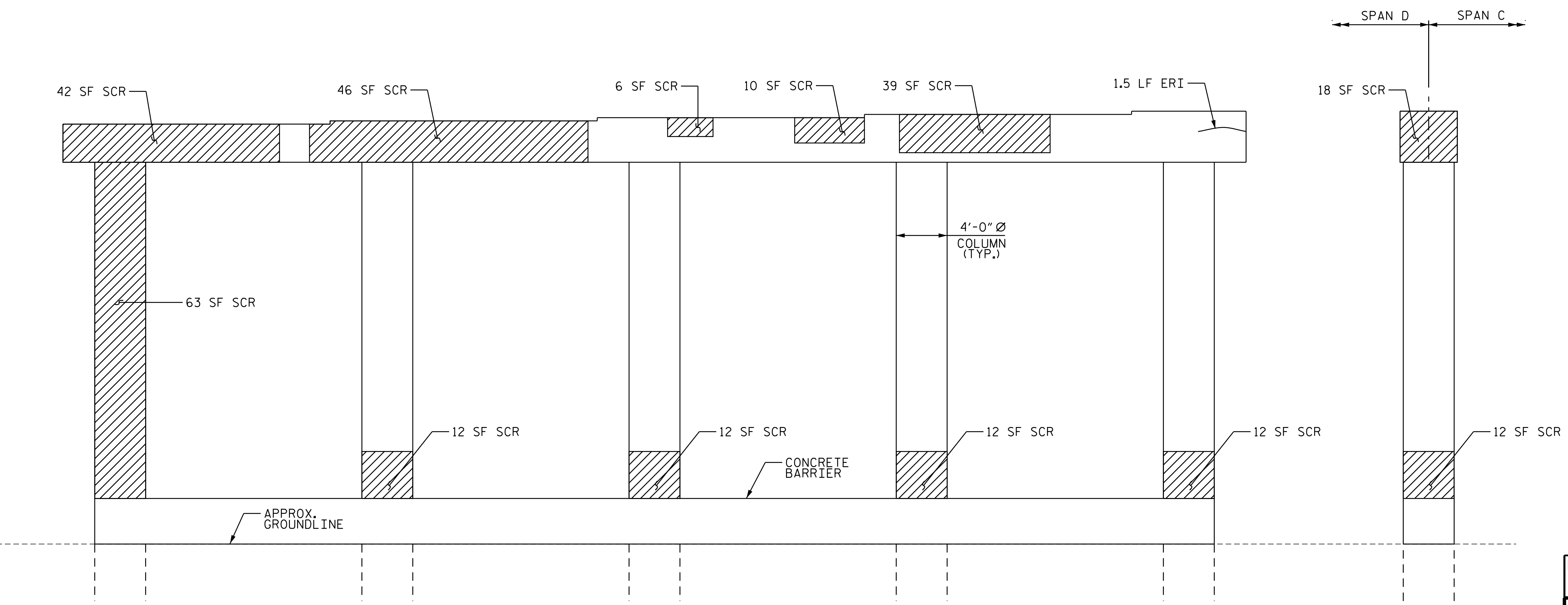


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE REPAIR
BENT 3 SPAN D FACE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-14
1			3			TOTAL SHEETS
2			4			17



BOTTOM OF CAP



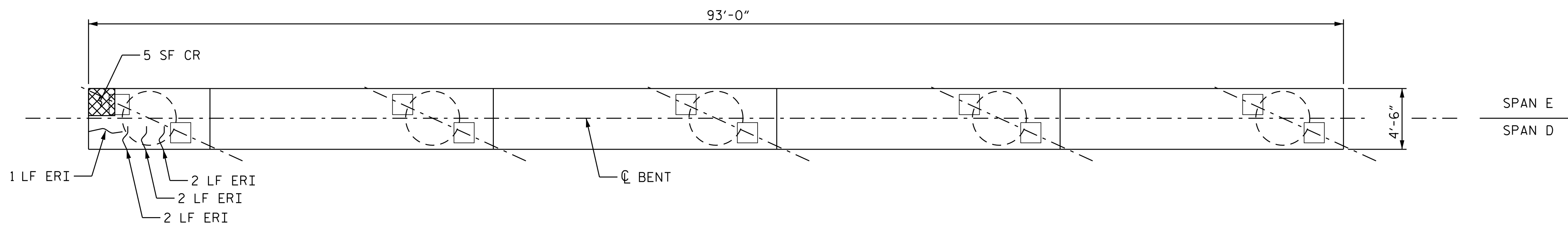
ELEVATION

END VIEW

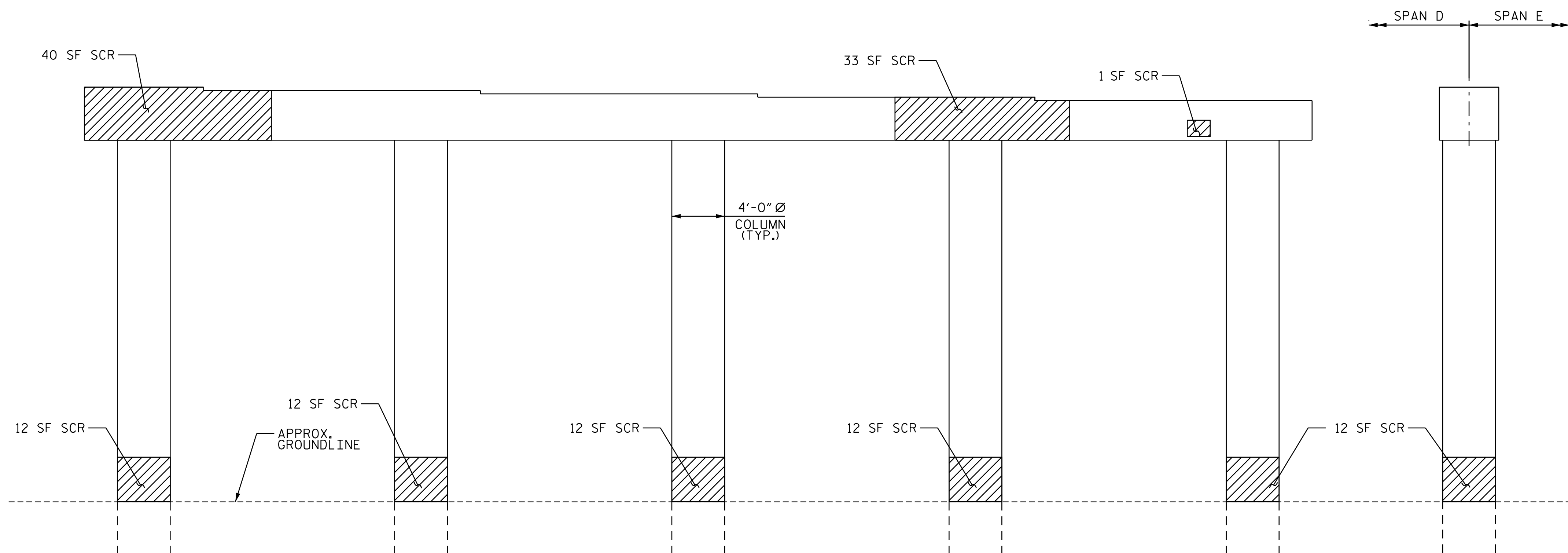
BENT NO. 3
SPAN D FACE

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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 e:rlr@elrobinsonengineering.com
 License: C-22 9



TOP OF CAP



ELEVATION

END VIEW

BENT NO. 4
SPAN D FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 4 SPAN D FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	74.0	19.0		
COLUMN	72.0	18.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	5.0	1.3		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	7.0			
COLUMN	0.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF BENT CAP	409.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

CLEAN AND REMOVE DEBRIS FROM THE TOP OF THE CAP AND APPLY EPOXY PROTECTIVE COATING. EPOXY COATING SHALL BE APPLIED TO THE TOP SURFACE OF THE CAP. THE CONTRACTOR SHALL NOT COAT THE AREA OF THE CAP BENEATH THE MASONRY PLATES. FOR EPOXY COATING, SEE SPECIAL PROVISIONS.




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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

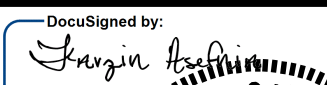
-  SHOTCRETE REPAIR (SCR)
-  CONCRETE REPAIR (CR)
-  EPOXY RESIN INJECTION (ERI)


PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429

SHEET 8 OF 10

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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DocuSigned by:

 101418A80000

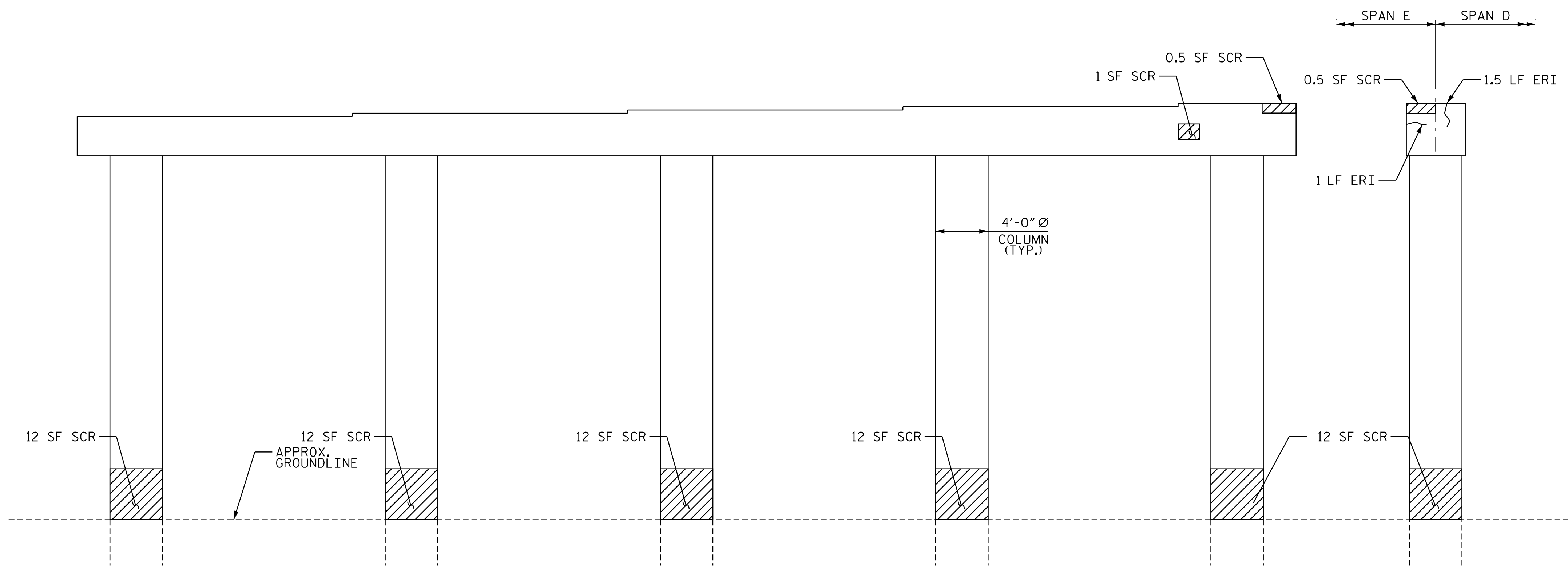
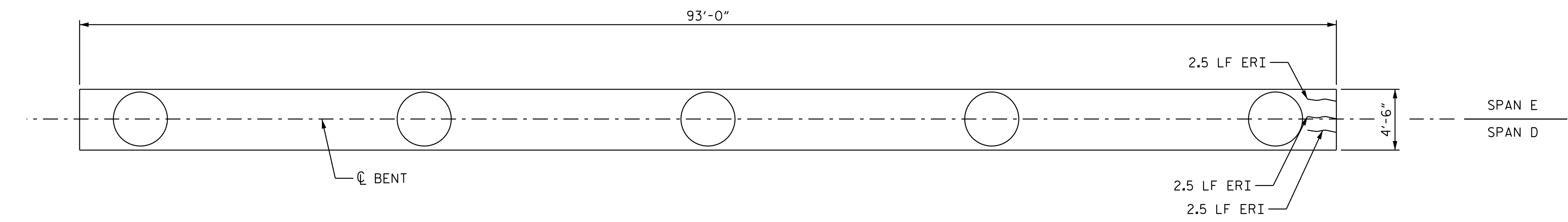


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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE REPAIR
 BENT 4 SPAN D FACE

REVISIONS						SHEET NO. S5-15
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 17
2			4			



BOTTOM OF CAP

ELEVATION

END VIEW

BENT NO. 4
SPAN E FACE

AS-BUILT REPAIR QUANTITY TABLE				
BENT 4 SPAN E FACE	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	2.0	0.5		
COLUMN	72.0	18.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	10.0			
COLUMN	0.0			

NOTES:

REPAIR LOCATIONS AND ESTIMATE OF QUANTITIES ARE BASED ON 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 ENTER THE ACTUAL QUANTITIES INTO THE AS-BUILT REPAIR QUANTITY TABLE.

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

FOR CAP AND COLUMN REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

- SHOTCRETE REPAIR (SCR)
- CONCRETE REPAIR (CR)
- EPOXY RESIN INJECTION (ERI)

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429

SHEET 9 OF 10

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:

 19141A6A72

NORTH CAROLINA
 PROFESSIONAL
 SEAL
 20103
 ENGINEER
 FARZIN ASEFNIA
 11/13/2023

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE REPAIR
BENT 4 SPAN E FACE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S5-16 TOTAL SHEETS 17
2			4			

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

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 efl@elrobinsongroup.com
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AS-BUILT REPAIR QUANTITY TABLE				
END BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	365.0	92.0		
CURTAIN WALL	0.0	0.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT.		LN. FT.	
CAP	28.0			
CURTAIN WALL	62.0			
EPOXY COATING	SQ. FT.		SQ. FT.	
TOP OF CAP	317.0			

NOTES:
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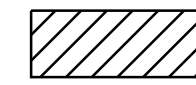
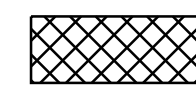

SHOTCRETE REPAIRS MAY BE REPLACED WITH CONCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

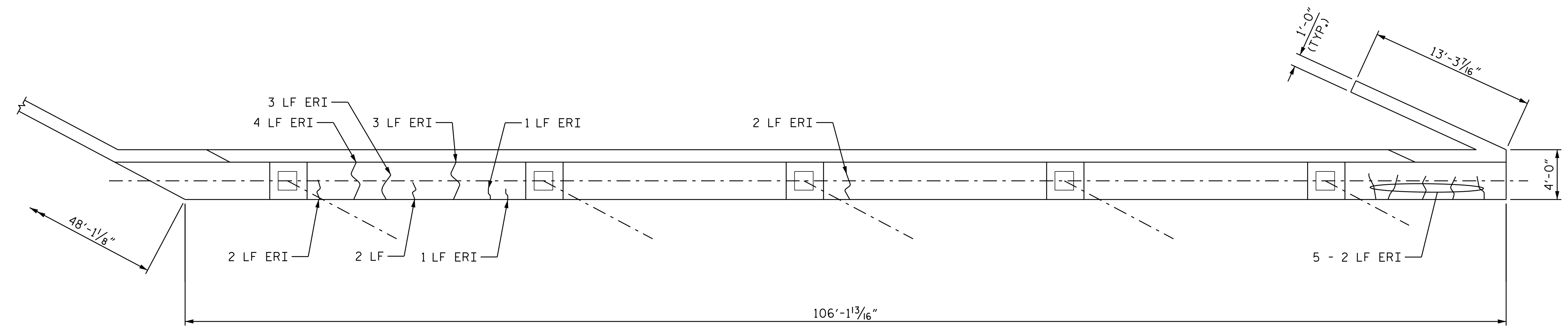
FOR CAP REPAIRS, SEE "TYPICAL CAP AND COLUMN REPAIR DETAILS", SHEET.

FOR SHOTCRETE REPAIR, SEE SPECIAL PROVISIONS.

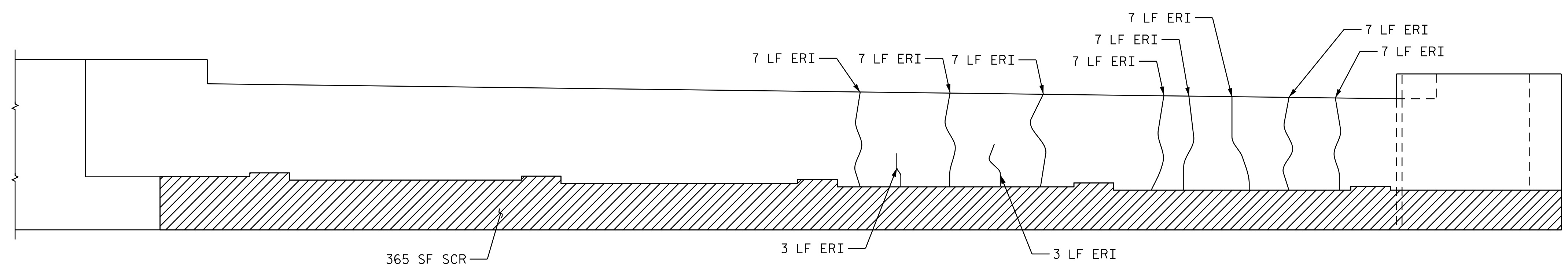
FOR CONCRETE REPAIR, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

-  SHOTCRETE REPAIR (SCR)
-  CONCRETE REPAIR (CR)
-  EPOXY RESIN INJECTION (ERI)



PLAN

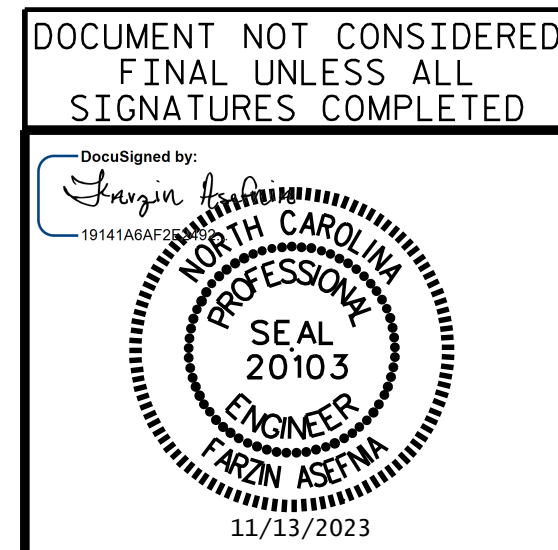


ELEVATION

END BENT 2

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310429

SHEET 10 OF 10

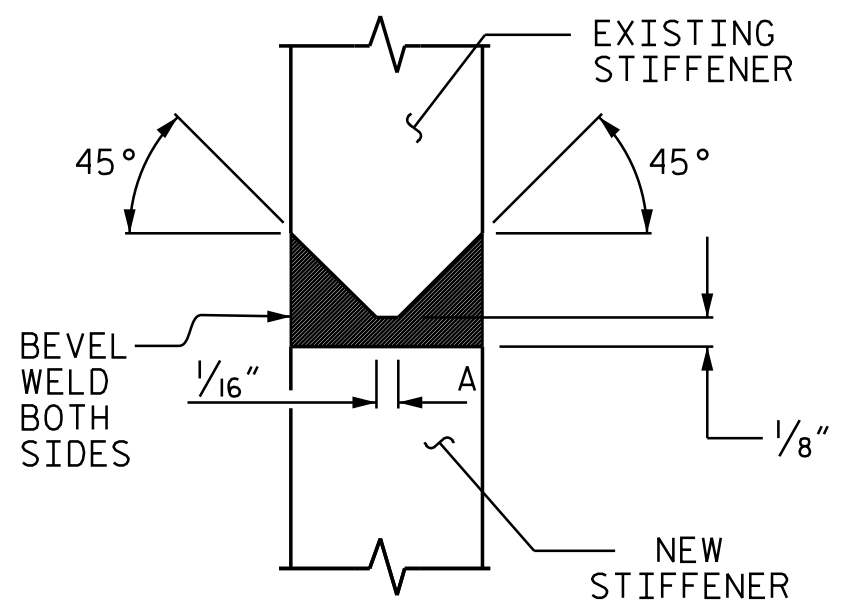


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUBSTRUCTURE REPAIR
END BENT 2

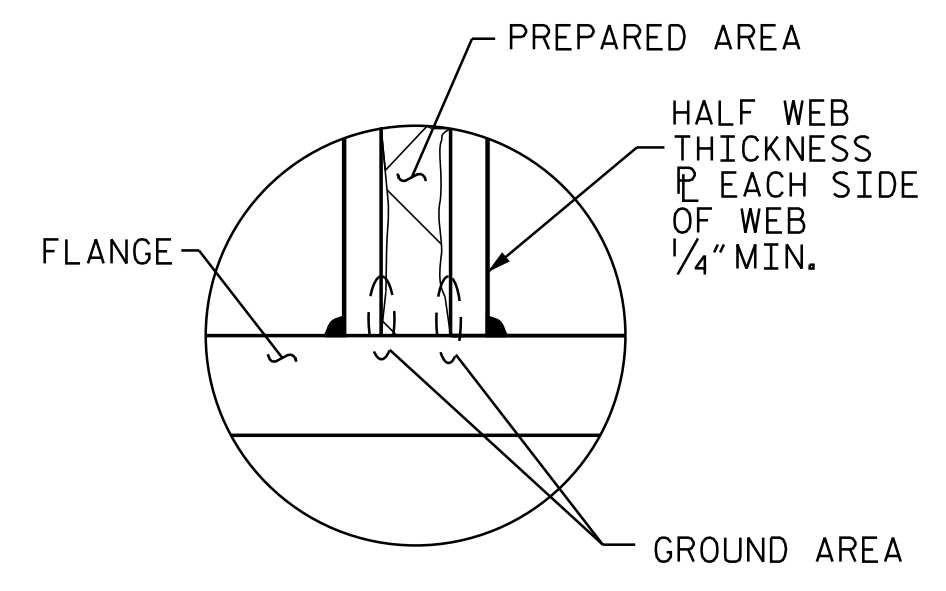
REVISIONS						SHEET NO. S5-17
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 17
2			4			

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

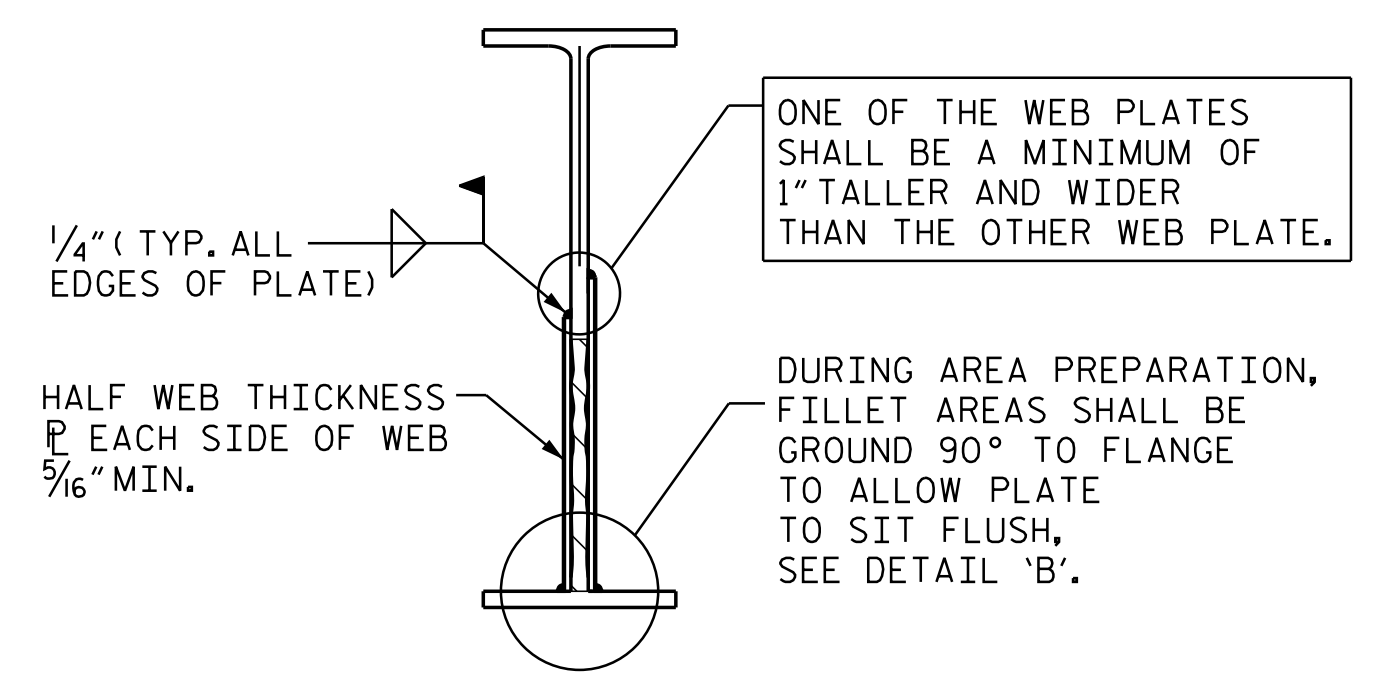




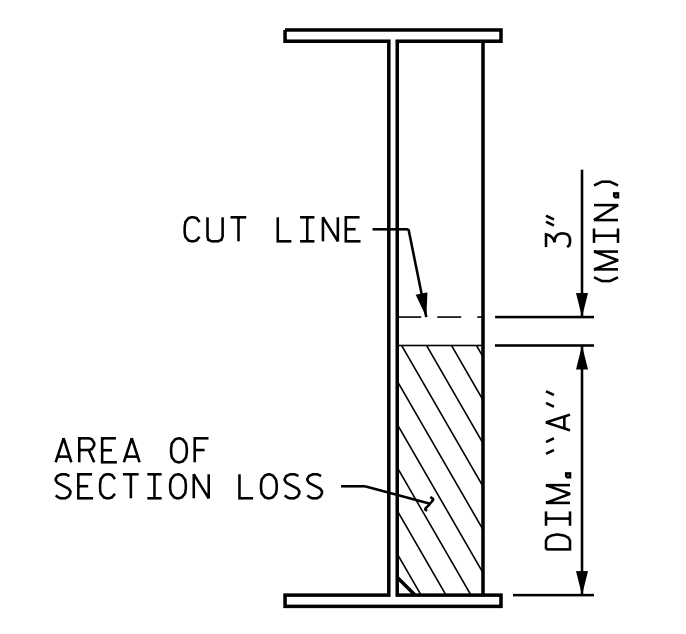
DETAIL "A"



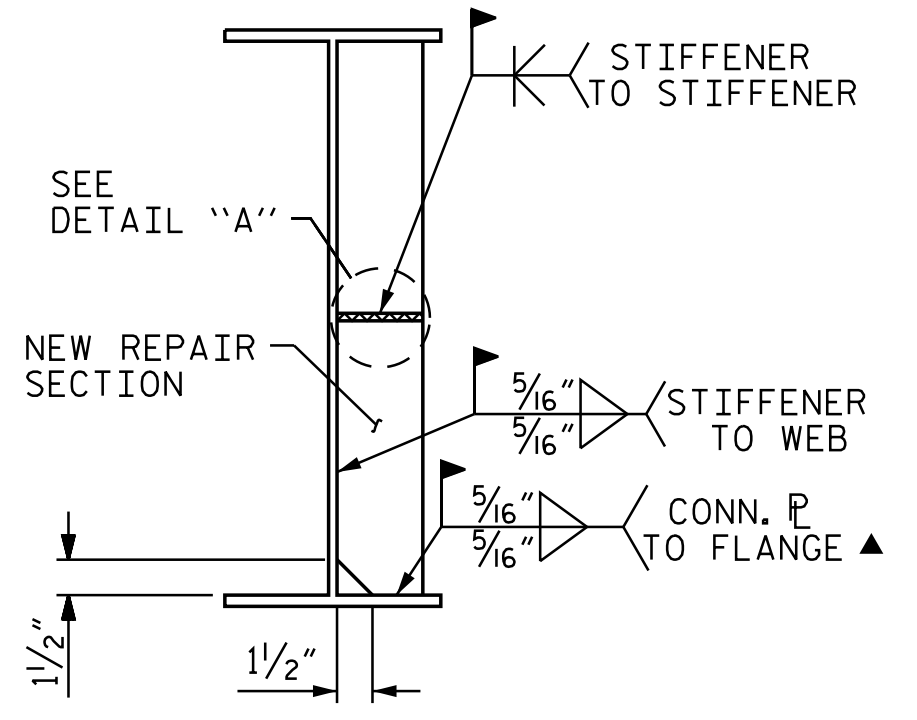
DETAIL "B"



SECTION I-I



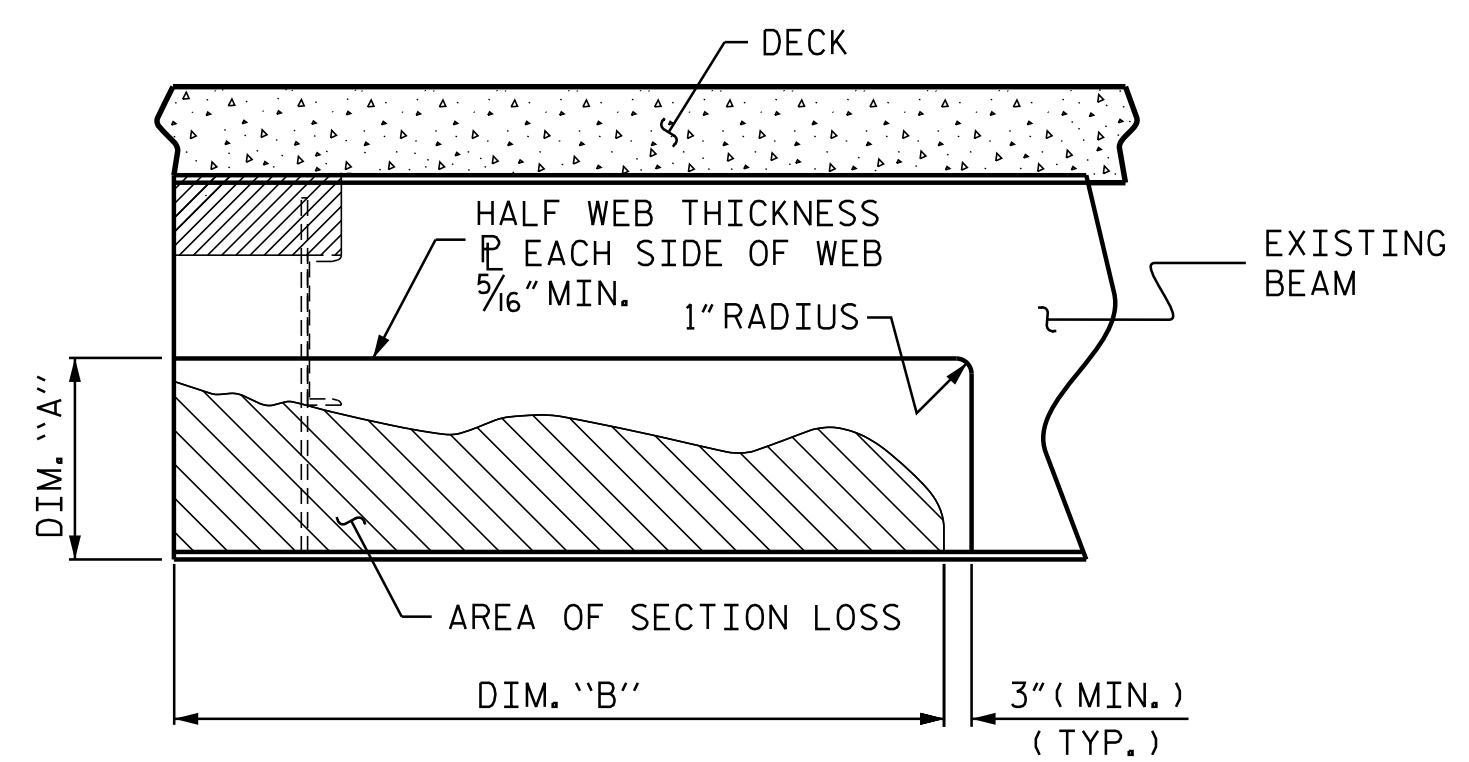
STIFFENER/CONN. PLATE SECTION LOSS



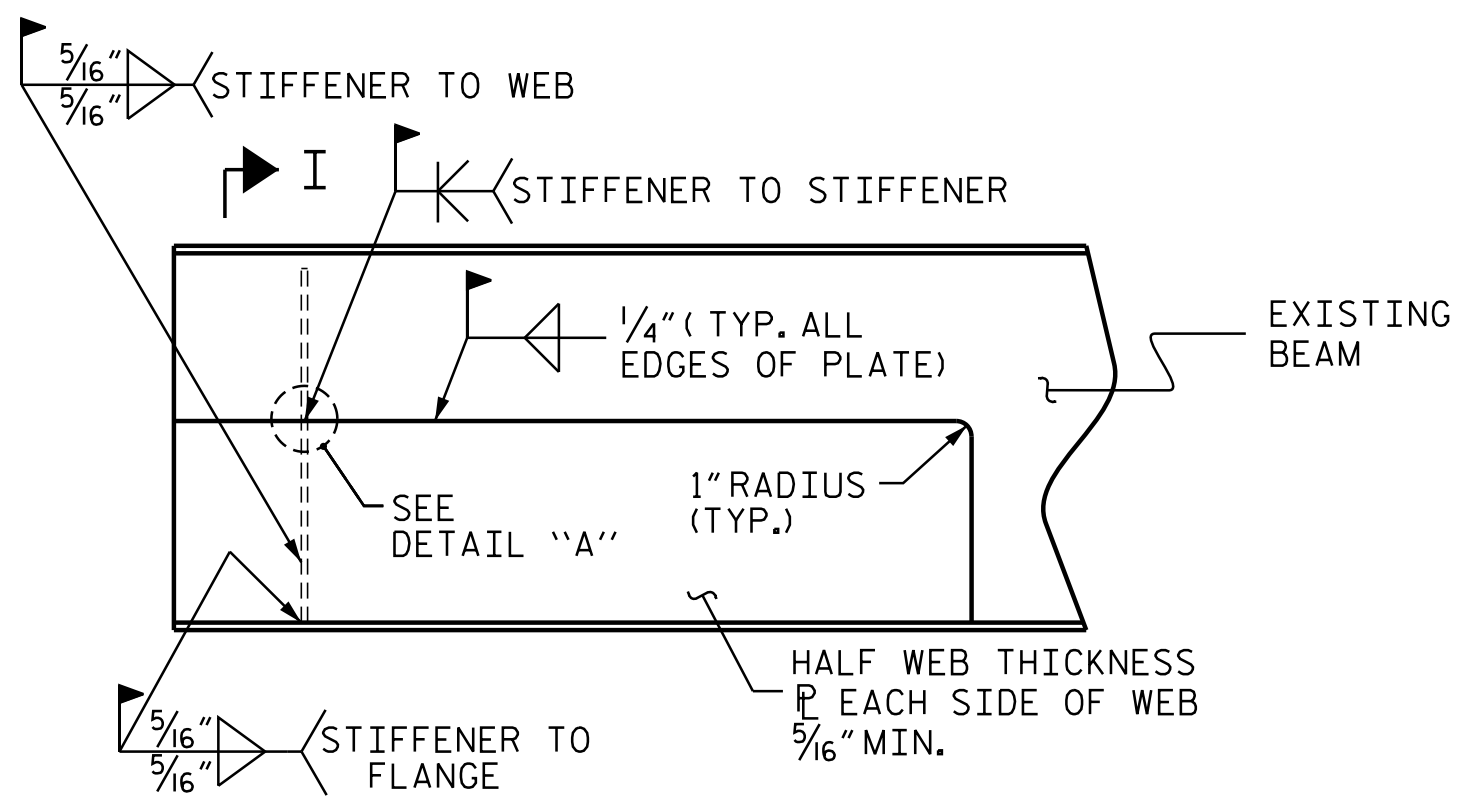
STIFFENER/CONN. PLATE SECTION REPAIR

▲ FOR STIFFENERS, MILL TO BEAR AND DO NOT WELD

STIFFENER/CONNECTOR PLATE REPAIR

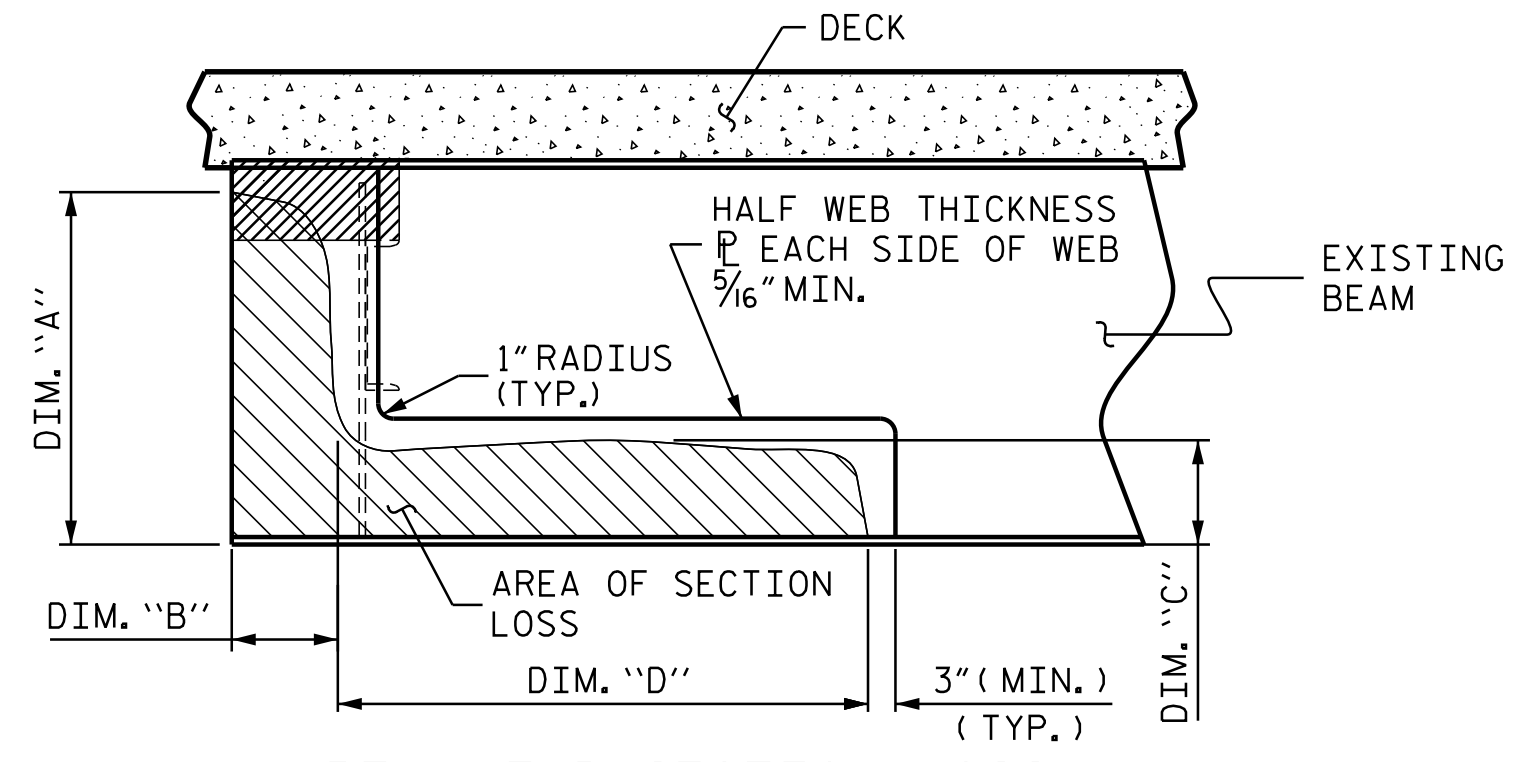


BEAM END SECTION LOSS AND PLATING REPAIR

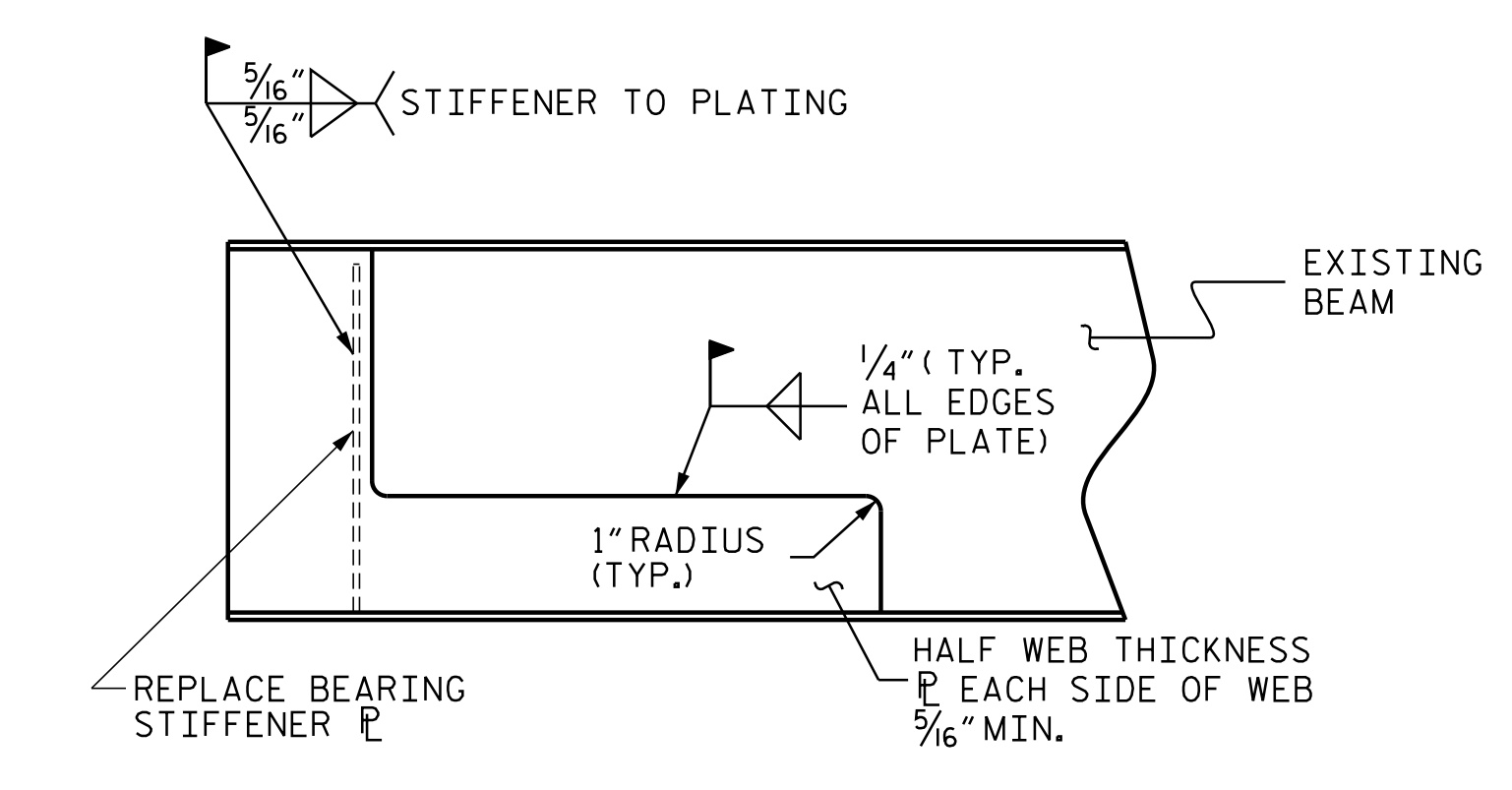


BEAM END PLATING REPAIR

BEAM END PLATING REPAIR

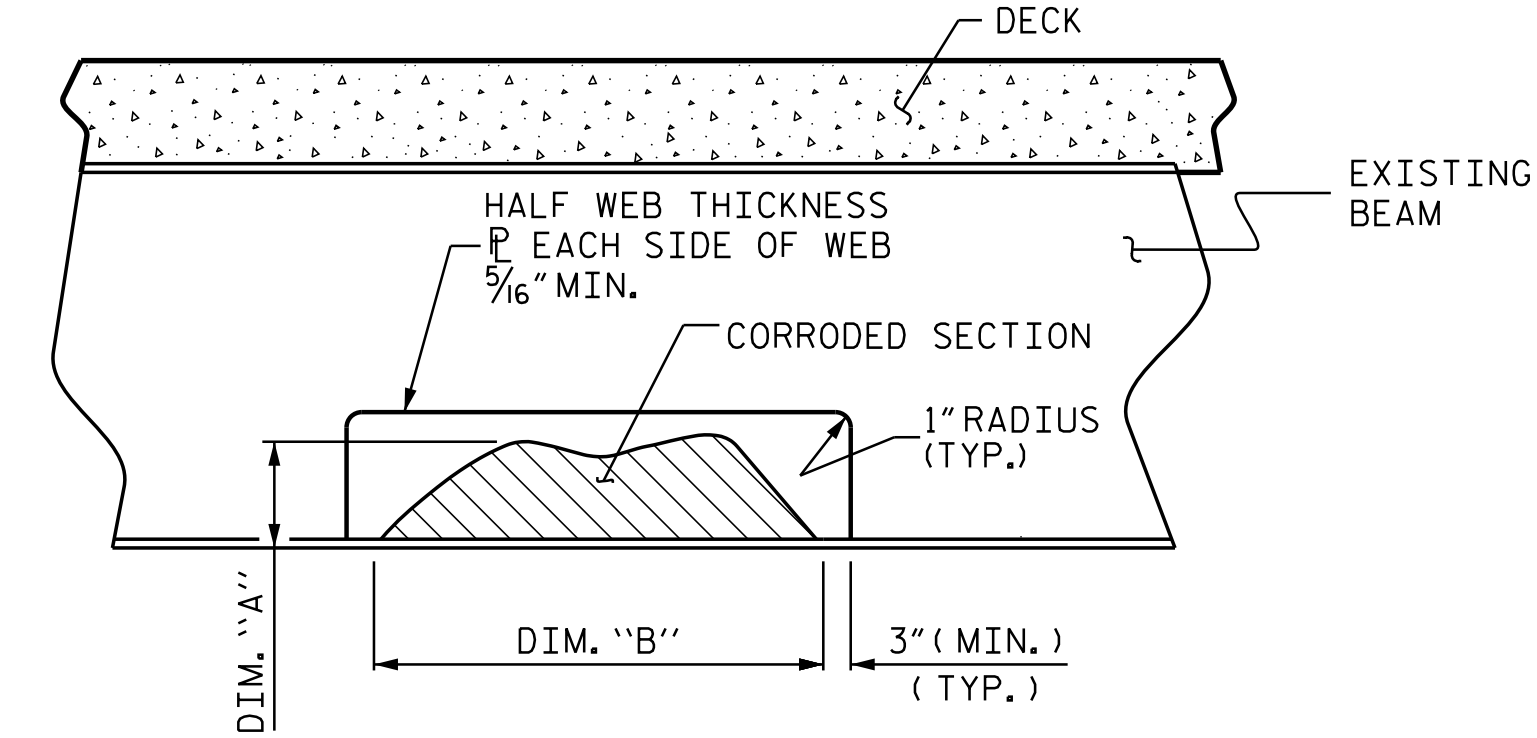


BEAM END SECTION LOSS AND PLATING REPAIR

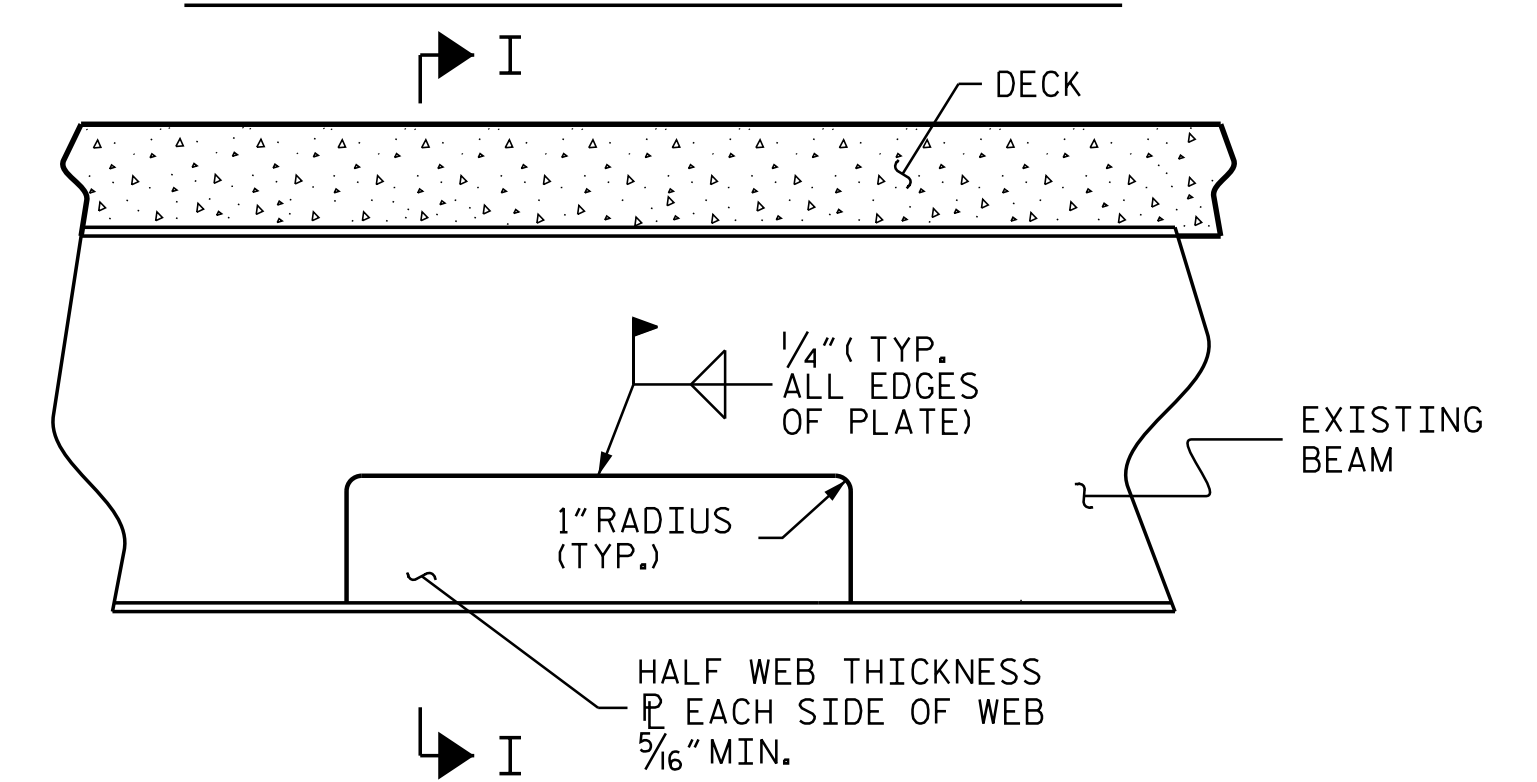


BEAM END PLATING REPAIR

BEAM END PLATING REPAIR



INTERMEDIATE SECTION LOSS BEAM PLATING REPAIR



INTERMEDIATE SECTION LOSS BEAM PLATING REPAIR

INTERMEDIATE BEAM PLATING REPAIR

BEAM PLATING REPAIR NOTES

ALL CONDITIONS AND DIMENSIONS SHALL BE FIELD VERIFIED PRIOR TO FABRICATION OR INSTALLATION OF ANY COMPONENTS.

REPAIR PLATES SHALL BE ASTM A588, GRADE 50 KSI STEEL.

REPAIR SEQUENCE:

COORDINATE WITH MATERIALS AND TEST UNIT AT LEAST 4 DAYS PRIOR TO ANTICIPATED WORK.

REMOVE LIVE LOAD FROM REPAIR AREA BY EITHER CLOSING BRIDGE TO TRAFFIC OR SHIFTING TRAFFIC AWAY FROM REPAIR AREA.

IF NECESSARY, REMOVE EXISTING STIFFENER TO INSTALL WELDED PLATE REPAIR. REPLACE WITH A NEW STIFFENER PLATE OF SIMILAR SIZE.

IF BEAM DETERIORATION EXTENDS INTO THE CONCRETE DIAPHRAGM THEN CHIP AWAY CONCRETE TO DETERMINE THE EXTENT OF THE DAMAGE.

MECHANICALLY CLEAN RUST, SCALE, AND EXISTING PAINT TO AT LEAST 3" BEYOND REPAIR AREA.

PRIME ENTIRE REPAIR AREA AND REPAIR PLATES WITH AN ORGANIC ZINC PRIMER PRIOR TO WELDING NEW PLATES. REMOVE PRIMER IN WELD AREA.

ONE PLATE SHALL BE PLACED, AS INDICATED, ON EACH SIDE OF THE BEAM WEB. ONE OF THE WEB PLATES SHALL BE A MINIMUM OF 1" TALLER AND WIDER THAN THE OTHER WEB PLATE TO OFFSET THE WEB PLATE WELDING LOCATIONS ON THE EXISTING BEAM WEB.

EACH PLATE SHALL BE APPROXIMATELY ONE-HALF THE ORIGINAL THICKNESS OF THE BEAM WEB, WITH A MINIMUM THICKNESS OF 5/16".

FULLY WELD ALONG TOP AND SIDES OF THE PLATES AS SHOWN.

ALL WELDING SHALL BE IN ACCORDANCE WITH CURRENT APPLICABLE AWS AND NCDOT STANDARD SPECIFICATIONS.

ALL WELDS SHALL BE INSPECTED AND TESTED BY THE NCDOT MATERIALS AND TEST UNIT IN ACCORDANCE WITH THE CURRENT AWS BRIDGE WELDING CODE AND STANDARD SPECIFICATIONS.

IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, AFTER REPAIR, GRIND ALL WELDS FLUSH, AND THOROUGHLY CLEAN AREA TO REMOVE DEBRIS AND OILS FROM THE REPAIR PROCESS.

CLEANING AND PAINTING OF REPAIRED STRUCTURAL STEEL SHALL BE PERFORMED AS PART OF THE OVERALL CLEANING AND PAINTING CONTRACT.

FOR CLEANING AND PAINTING, SEE PAINTING EXISTING WEATHERING STEEL STRUCTURE SPECIAL PROVISIONS.

AFTER BEAMS ARE REPAIRED AND PAINTED, ANY CONCRETE REMOVED FROM THE BENT DIAPHRAGMS SHALL BE RECAST. ANY REINFORCING STEEL CUT DURING THE REMOVAL PROCESS SHALL BE SPLICED WITH A SIMILAR SIZE BAR WITH AT LEAST A ONE FOOT SPLICE TO THE EXISTING STEEL. NO SEPARATE PAYMENT SHALL BE MADE FOR CONCRETE AND REINFORCING STEEL AS THIS IS CONSIDERED INCIDENTAL TO THE PAY ITEM "BEAM REPAIR". FOR BEAM REPAIR, SEE SPECIAL PROVISIONS.

REMOVE ALL TRAFFIC CONTROL DEVICES.

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 310355

SHEET 1 OF 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DocuSigned by:
 Farzin Asefnia
 10141ABAD

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BEAM PLATING REPAIR DETAILS

REVISIONS						SHEET NO. S-73
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 74
2			4			

DRAWN BY :	M. HOGAN	DATE :	3/2023
CHECKED BY :	JIA XU	DATE :	7/2023
DESIGN ENGINEER OF RECORD:	F. ASEFNIA	DATE :	11/2023

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 Tel: 984.980.2810
 efarzin@elrob.com
 License: C-22 9

NOTE

CONTRACTOR SHALL SAW CUT TO A NOMINAL DEPTH OF 1/2" BUT REINFORCING STEEL SHALL NOT BE DAMAGED.

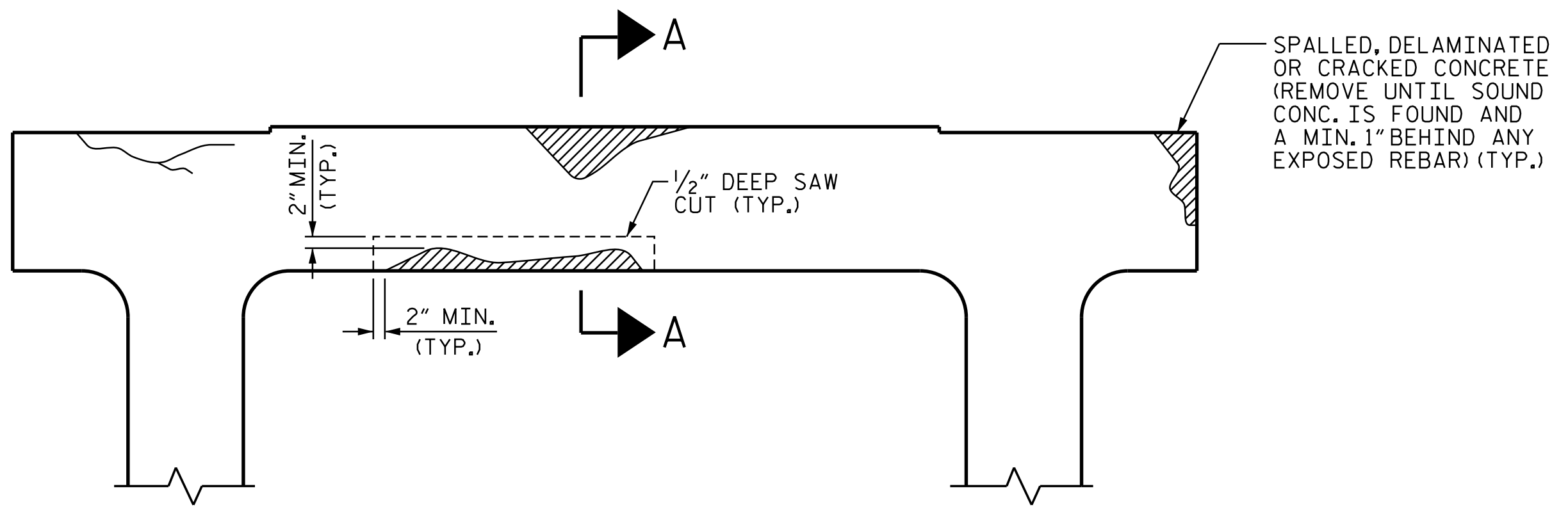
CONTRACTOR SHALL REMOVE SURFACE CONCRETE TO VERIFY THAT SAWCUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL.

CONTRACTOR SHALL SAW CUT THE REPAIR AREAS SO THAT THE CORNERS ARE SQUARE AS INDICATED ON THE DETAILS.

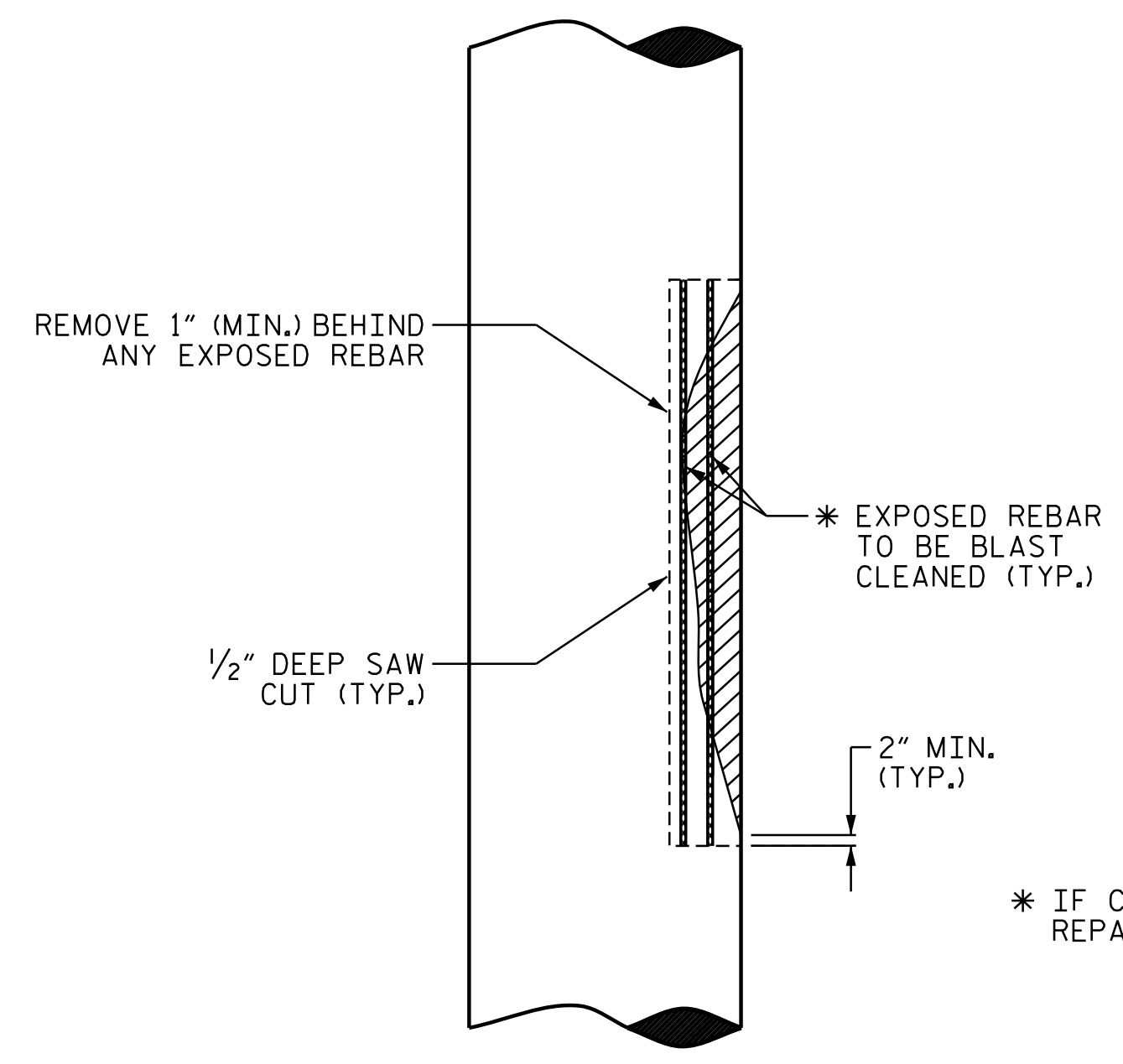
CONCRETE REPAIRS MAY BE SUBSTITUTED IN LIEU OF SHOTCRETE REPAIRS WITH THE APPROVAL OF THE ENGINEER.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

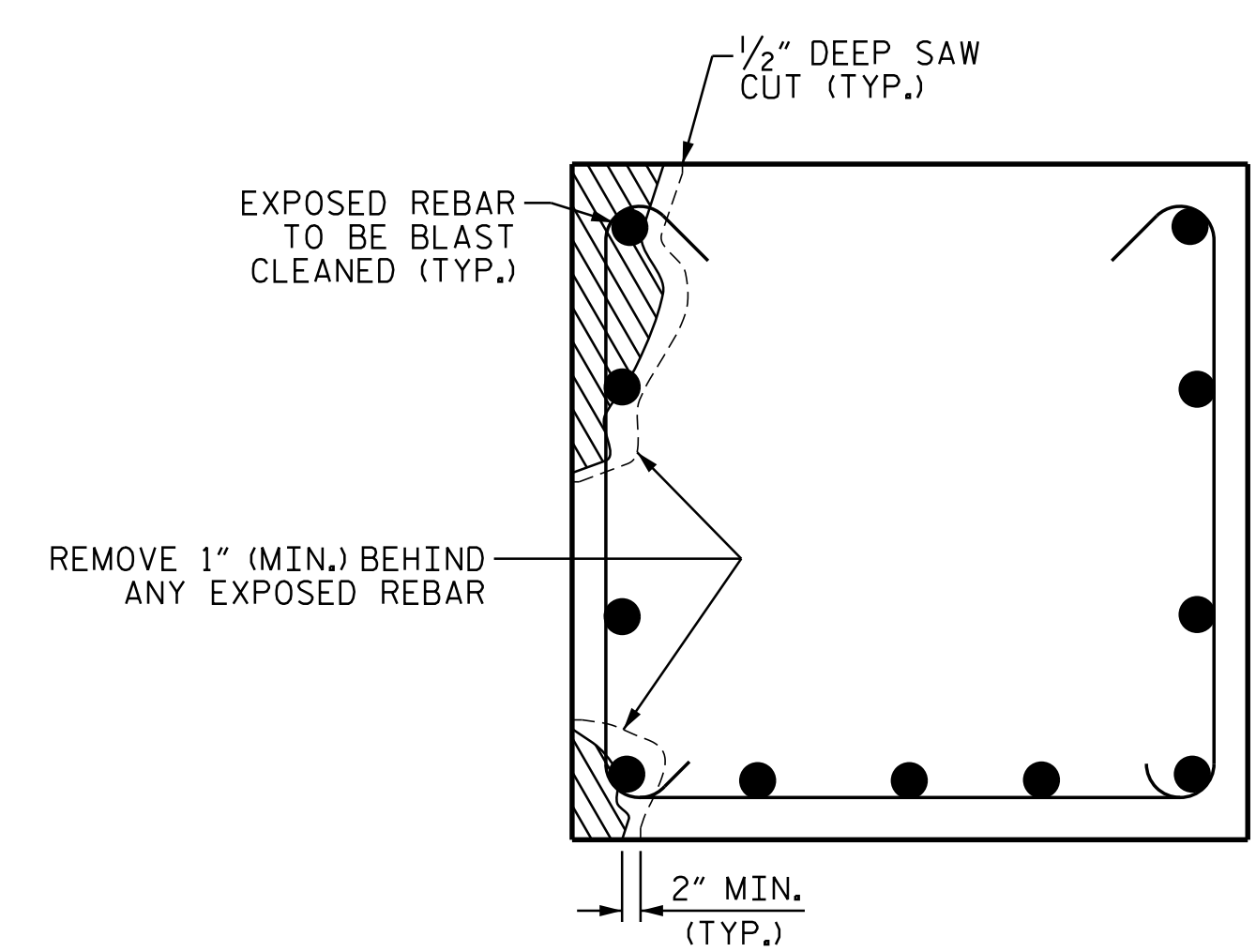
FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.



BENT CAP REPAIRS

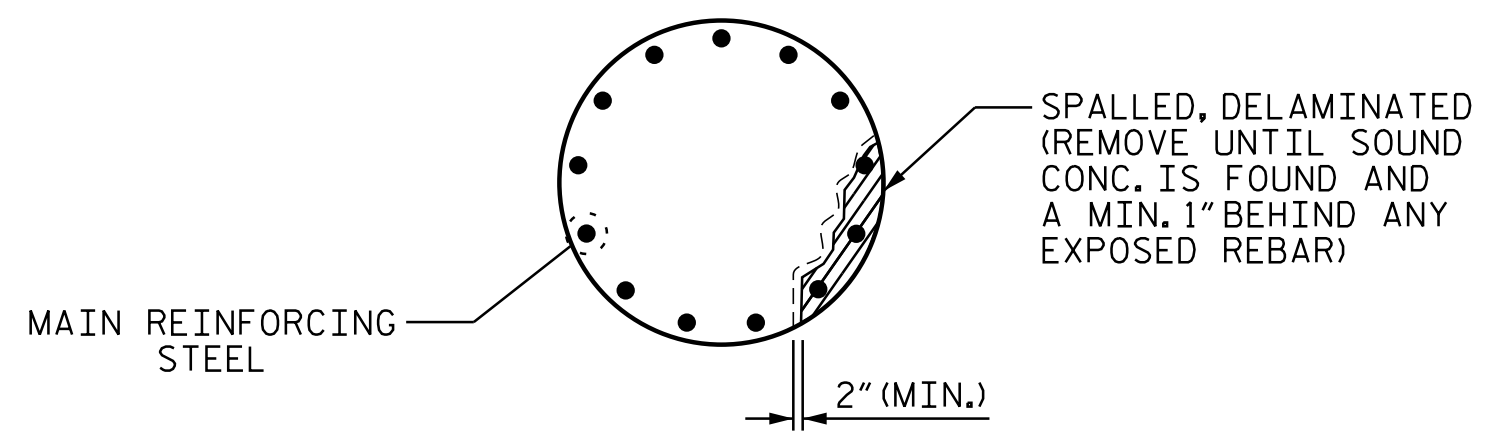


ELEVATION OF CAP



SECTION THRU CAP
(EXAMPLE ONLY, ACTUAL REBAR SIZES & LOCATIONS MAY VARY)

CAP REPAIR



PLAN OF COLUMN

COLUMN REPAIR

PROJECT NO. I-5941
DURHAM COUNTY
 BRIDGE NO. 108, 112, 135,
355 & 429

SHEET 2 OF 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED 11/13/2023 E.L. ROBINSON 3362 Old Forks Rd. Raleigh, N.C. 27609 Tel: 984.980.2810 ehl@elrobinsonengineering.com License: C-22 9		STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUBSTRUCTURE TYPICAL CAP AND COLUMN REPAIR DETAILS	
REVISIONS NO. BY: DATE: NO. BY: DATE:		SHEET NO. S-74 TOTAL SHEETS 74	
1		3	
2		4	

DRAWN BY : M. HOGAN DATE : 3/2023
 CHECKED BY : JIA XU DATE : 7/2023
 DESIGN ENGINEER OF RECORD: F. ASEFNIA DATE : 11/2023

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE.....	SEE AASHTO
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 AASHTO
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 2024 "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 $\frac{1}{2}$ " 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 $\frac{5}{16}$ " 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 $\frac{1}{16}$ " 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. FINIS 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.