TIP PROJECT: U-6020

CONTRACT: C204944

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRANVILLE COUNTY

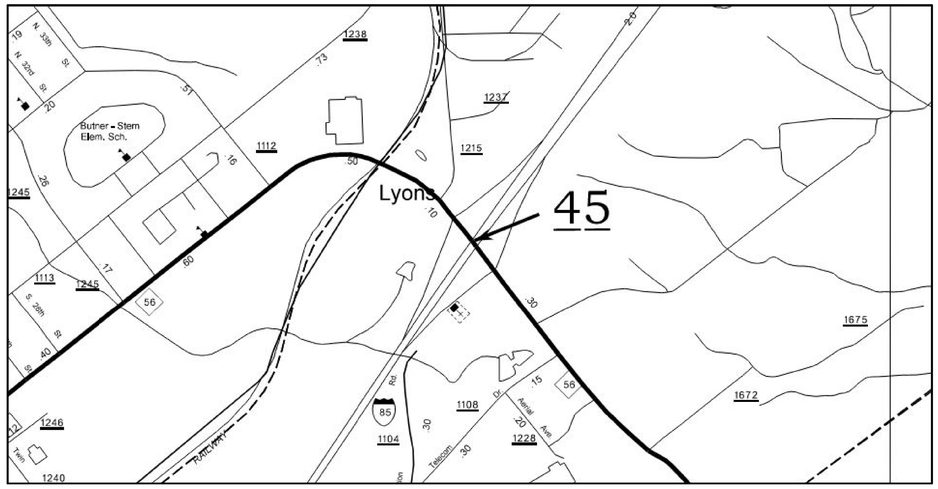
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6020	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
47165.1.1	–	P.E.
47165.3.1	–	CONSTRUCTION

LOCATION – GRANVILLE COUNTY :

BRIDGE #45 ON NC 56 OVER I–85

TYPE OF WORK: BRIDGE PRESERVATION – SUBSTRUCTURE REPAIRS, BEAM REPAIRS, AND CLEANING AND PAINTING OF EXISTING STEEL BRIDGE STRUCTURE.



VICINITY MAP – GRANVILLE COUNTY

DESIGN DATA

GRANVILLE COUNTY

#45 ADT 2013 = 15,000

PROJECT LENGTH

GRANVILLE COUNTY

– #45 = 0.1 MILES

WSP USA Inc.
128 TALJERT RD.
SUITE A
MOORESVILLE, NC 28117
TEL: 1.704.662.0100

LICENSE NO. F–0165

MICHAEL W. CRAIG
PROJECT ENGINEER

2024 STANDARD SPECIFICATIONS

LETTING DATE: NOVEMBER 19, 2024

NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

9/18/2024

MICHAEL W. CRAIG

9/18/2024 1:35:46 PM L:\Structures\2024\U6020 Updates - NCDOT Bridge Preservation\DGN\400_001_U-6020_SMU_TSH.dgn
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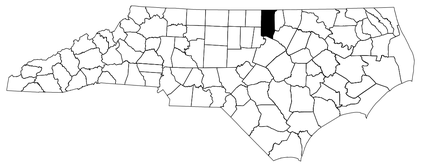
TIP PROJECT: U–6020

CONTRACT: C204944



STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

GRANVILLE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-6020	1A	

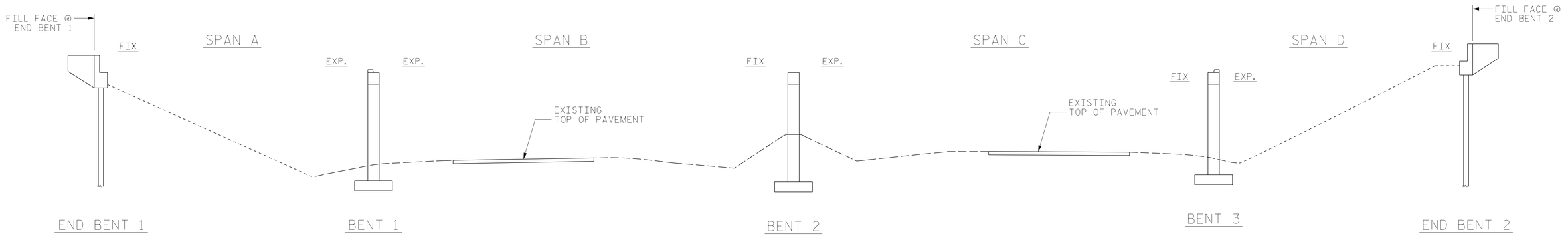
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
47165.1.1	–	P.E.
47165.3.1	–	CONSTRUCTION

LOCATION – GRANVILLE COUNTY :

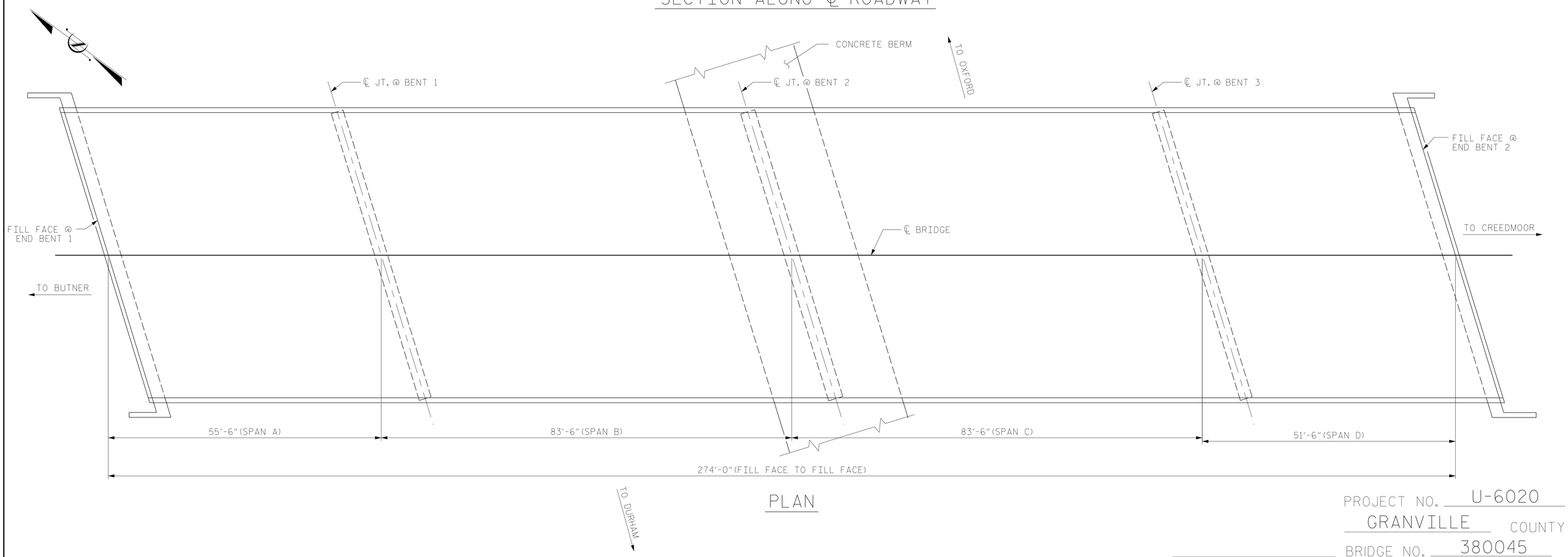
BRIDGE #45 ON NC 56 OVER I–85

TYPE OF WORK: BRIDGE PRESERVATION – SUBSTRUCTURE REPAIRS, BEAM REPAIRS, AND CLEANING AND PAINTING OF EXISTING STEEL BRIDGE STRUCTURE.

INDEX OF SHEETS



SECTION ALONG ℄ ROADWAY



PLAN

NOTES:

PROFILE INFORMATION IS TAKEN FROM THE ORIGINAL PLANS AND THE ROUTINE INSPECTION REPORT DATED 7/27/2018.

BRIDGE ORIENTATION CONFORMS TO EXISTING BRIDGE PLANS.

SCOPE OF WORK

REPAIR STEEL BEAMS AND BEARINGS.

CLEANING AND PAINTING OF STEEL BEAMS.

REMOVE DEBRIS FROM TOP OF END BENT AND BENT CAPS.

EPOXY INJECTION OF CONCRETE CRACKS.

CLEAN AND REPAIR REBAR IN CONCRETE REPAIR AREAS.

PERFORM SHOTCRETE AND CONCRETE REPAIRS IN PREPARED AREAS.

APPLY EPOXY COATING TO TOP OF BENT CAPS.

I hereby cerify that this structure was rehabilitated according to these plans or as noted herein.

Resident Engineer Date

DRAWN BY : J.MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

DocuSigned by: Michael Craig C49E9154585644D...

5/3/2024

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TEL: 1.704.662.0100
LICENSE NO. F-0165

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

SHEET NO. S-1
TOTAL SHEETS 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 56
BETWEEN BUTNER AND
CREEDMOOR OVER I-85

PROJECT NO. U-6020
GRANVILLE COUNTY
BRIDGE NO. 380045

LOCATION SKETCH

INFORMATION INDICATED ON THE LOCATION SKETCH SHALL BE CONSIDERED GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL CONFIRM, THROUGH OTHER SOURCES, SPECIFIC INFORMATION REGARDING BRIDGES, ROADWAYS, UTILITIES, THE SURROUNDING AREA, AND ANY OTHER ASPECT THAT MAY BE NECESSARY TO PERFORM AND COMPLETE THE PROJECT.

TOTAL BILL OF MATERIAL

BRIDGE NO.	CONCRETE REPAIRS	SHOTCRETE REPAIRS	EPOXY RESIN INJECTION	CLEANING AND REPAINTING OF BRIDGE #45	PAINTING CONTAINMENT FOR BRIDGE #45	POLLUTION CONTROL	BEAM REPAIR	BEAM PLATING REPAIR	EPOXY COATING	STEEL BEARING REPLACEMENT	TYPE I BRIDGE JACKING BRIDGE #45
	CU. FT.	CU. FT.	LIN. FT.	LUMP SUM	LUMP SUM	LUMP SUM	LBS.	LBS.	SQ. FT.	EA.	EA.
380045	8.3	90.0	68.5	LUMP SUM	LUMP SUM	LUMP SUM	2,370	330	459	10	19

NOTES:

EXISTING DIMENSIONS AND BRIDGE CONDITION ARE FROM THE BEST INFORMATION AVAILABLE. THE CONTRACTOR SHALL FIELD VERIFY THE INFORMATION SHOWN ON THE PLANS AND NOTIFY THE ENGINEER IF ACTUAL DIMENSIONS AND CONDITIONS DIFFER.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL STATE AND FEDERAL SAFETY REQUIREMENTS.

FOR CONTROL OF TRAFFIC AND LIMITS ON PHASING OF CONSTRUCTION, SEE TRANSPORTATION MANAGEMENT PLAN SHEETS.

FOR BEAM REPAIR, SEE SPECIAL PROVISIONS.

FOR BEAM PLATING REPAIR, SEE SPECIAL PROVISIONS.

FOR STEEL BEARING REPLACEMENT, SEE SPECIAL PROVISIONS.

FOR CLEANING AND REPAINTING OF BRIDGE, SEE PAINTING EXISTING STRUCTURE SPECIAL PROVISION.

FOR PAINTING CONTAINMENT, SEE PAINTING EXISTING STRUCTURE SPECIAL PROVISION.

FOR POLLUTION CONTROL, SEE PAINTING EXISTING STRUCTURE SPECIAL PRVISION.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

FOR TYPE I AND TYPE II BRIDGE JACKING, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSE WORK AND FORM WORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

BRIDGE COORDINATES	
LATITUDE	LONGITUDE
36°08'50.96"	78°43'29.32"

PROJECT NO. U-6020

GRANVILLE COUNTY

BRIDGE NO. 380045

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

DocuSigned by: Michael W. Craig C49E9154685B442...

5/3/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON NC 56 BETWEEN BUTNER AND CREEDMOOR OVER I-85

DRAWN BY : J. MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024

WSP USA Inc.
128 TALBERT RD.
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LICENSE NO. F-0165

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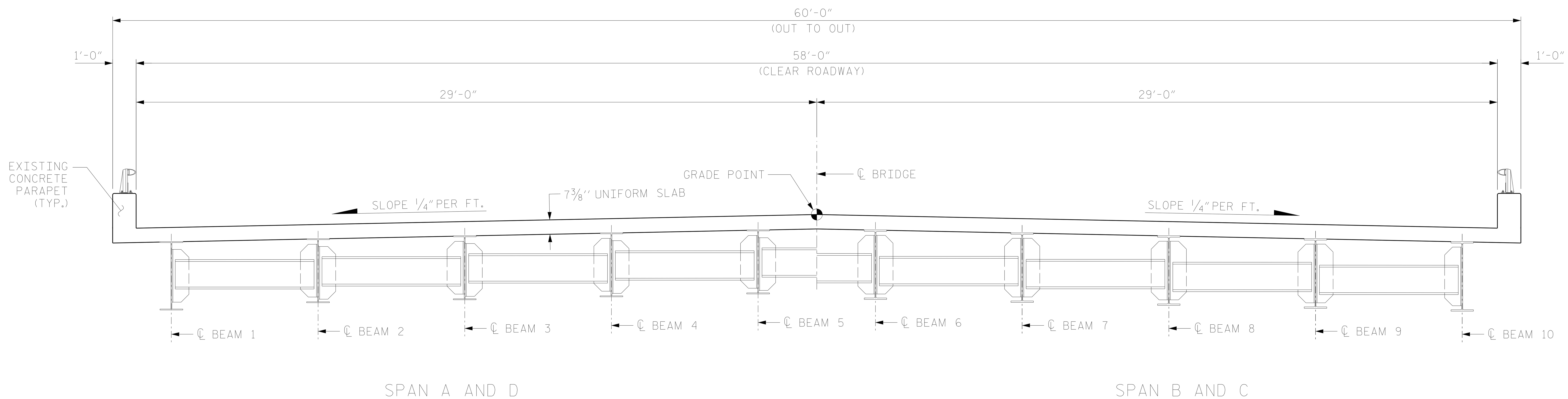
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-2

TOTAL SHEETS 16



TYPICAL SECTION

(EXISTING)

PROJECT NO. U-6020

GRANVILLE COUNTY

BRIDGE NO. 380045

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027320 MICHAEL W. CRAIG

DocuSigned by: Michael Craig
C49E91546B85440

5/3/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION

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LICENSE NO. F-0165

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

SHEET NO. S-3

TOTAL SHEETS 16

DRAWN BY :	J. MYA	DATE :	3/2019
CHECKED BY :	J.YANNACCONE	DATE :	3/2019
DESIGN ENGINEER OF RECORD :	MICHAEL W. CRAIG	DATE :	4/2024

NOTES

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

ALL BEAM ENDS AT BENTS 1, 2 AND 3 SHALL BE CLEANED AND PAINTED. FOR ZONE PAINTING, SEE PAINTING EXISTING STRUCTURE SPECIAL PROVISION.

HORIZONTAL LIMITS OF ZONE PAINTING SHALL EXTEND 6'' BEYOND THE MAXIMUM HORIZONTAL EXTENT OF ANY BEAM REPAIRS OR 3 FEET FROM THE BEAM END, WHICHEVER IS GREATER.

VERTICAL LIMITS OF ZONE PAINTING SHALL EXTEND FOR THE FULL DEPTH OF THE BEAMS.

FOR BEAM REPAIRS, SEE ''BEAM REPAIR DETAILS'' SHEET.

FOR BEAM PLATING REPAIRS, SEE ''BEAM PLATING REPAIRS DETAILS SHEET''.

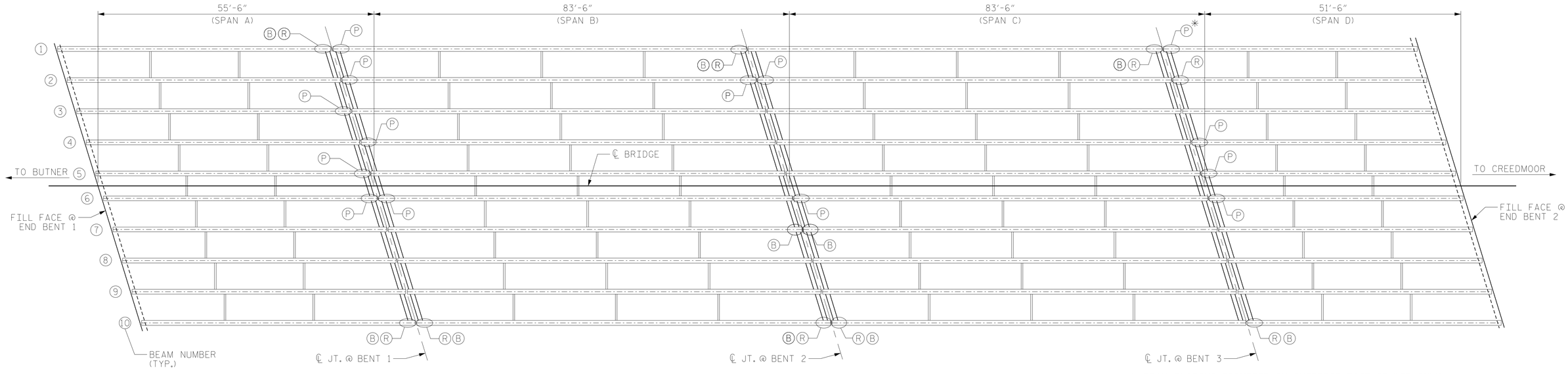
FOR STEEL BEARING REPLACEMENT, SEE ''BEARING DETAILS'' SHEET.

(R) BEAM REPAIR
(P) BEAM PLATING REPAIR
(B) STEEL BEARING REPLACEMENT

REPAIR QUANTITY TABLE

SUPERSTRUCTURE REPAIR

	ESTIMATE	ACTUAL
BEAM REPAIR	2,370 LBS.	
BEAM PLATING REPAIR	330 LBS.	
STEEL BEARING REPLACEMENT	10 EA.	



* BEAM PLATING REQUIRED ON INTERIOR FACE OF WEB ONLY. MATCH PLATE THICKNESS WITH EXISTING PLATE ON EXTERIOR FACE OF WEB.

SUPERSTRUCTURE REPAIR LOCATIONS

(OTHER LOCATIONS MAY EXIST, SEE NOTES)

ANTICIPATED REPAIR LOCATIONS

SPAN	BEAM	LOCATION	DIM ''A''	DIM ''B''	DIM ''C''	DIM ''D''	DIM ''E''	DIM ''F''
A	1	BENT 1	28''	16''	6''	44''	---	---
A	1	BENT 1	STEEL BEARING REPLACEMENT (EXPANSION)					
A	3	BENT 1	8''	10''	---	---	0''	---
A	5	BENT 1	6''	10''	---	---	---	---
A	6	BENT 1	4''	10''	---	---	---	---
A	10	BENT 1	28''	16''	9''	49''	---	---
A	10	BENT 1	STEEL BEARING REPLACEMENT (EXPANSION)					
B	1	BENT 1	16''	10''	---	---	12''	---
B	2	BENT 1	8''	10''	---	---	0''	---
B	4	BENT 1	8''	10''	---	---	0''	---
B	6	BENT 1	6''	10''	---	---	0''	---
B	10	BENT 1	28''	14''	12''	34''	6''	43''
B	10	BENT 1	STEEL BEARING REPLACEMENT (EXPANSION)					
B	1	BENT 2	4''	30''	---	---	---	---
B	1	BENT 2	STEEL BEARING REPLACEMENT (FIXED)					
B	2	BENT 2	14''	10''	---	---	0''	---
B	7	BENT 2	STEEL BEARING REPLACEMENT (FIXED)					
B	10	BENT 2	28''	15''	6''	15''	---	---
B	10	BENT 2	STEEL BEARING REPLACEMENT (FIXED)					

ANTICIPATED REPAIR LOCATIONS

SPAN	BEAM	LOCATION	DIM ''A''	DIM ''B''	DIM ''C''	DIM ''D''	DIM ''E''	DIM ''F''
C	2	BENT 2	16''	10''	---	---	12''	---
C	6	BENT 2	14''	10''	---	---	0''	---
C	7	BENT 2	STEEL BEARING REPLACEMENT (EXPANSION)					
C	10	BENT 2	28''	14''	6''	31''	---	---
C	10	BENT 2	STEEL BEARING REPLACEMENT (EXPANSION)					
C	1	BENT 3	5''	27''	---	---	---	---
D	1	BENT 3	17''	10''	---	---	12''	---
D	1	BENT 3	STEEL BEARING REPLACEMENT (FIXED)					
D	2	BENT 3	6''	24''	---	---	---	---
D	4	BENT 3	22''	10''	---	---	0''	---
D	5	BENT 3	22''	10''	---	---	0''	---
D	6	BENT 3	2''	10''	---	---	26''	---
D	10	BENT 3	4''	50''	---	---	---	---
D	10	BENT 3	STEEL BEARING REPLACEMENT (EXPANSION)					

PROJECT NO. U-6020
GRANVILLE COUNTY
BRIDGE NO. 380045

DRAWN BY : J. MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG
DocuSigned by: Michael Craig C49E91546B5440...
5/3/2024

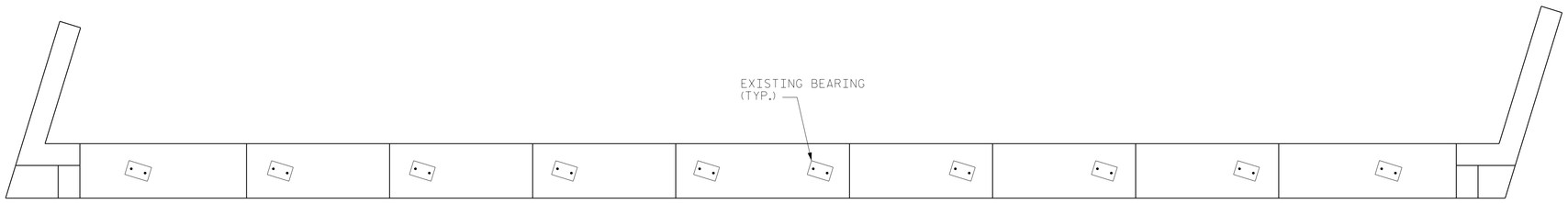
WSP USA Inc.
128 TALBERT RD.
SUITE A
MOORESVILLE, NC 28117
TEL: 1.704.662.0100
LICENSE NO. F-0165

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

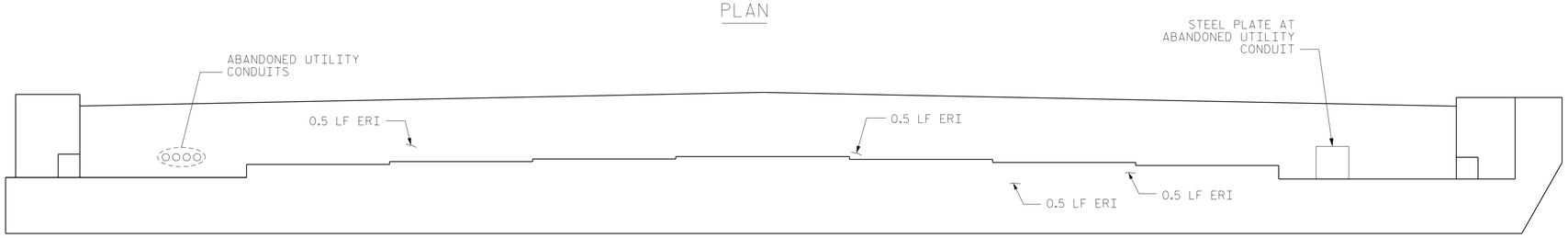
SUPERSTRUCTURE REPAIR LOCATIONS

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

SHEET NO. S-4
TOTAL SHEETS 16

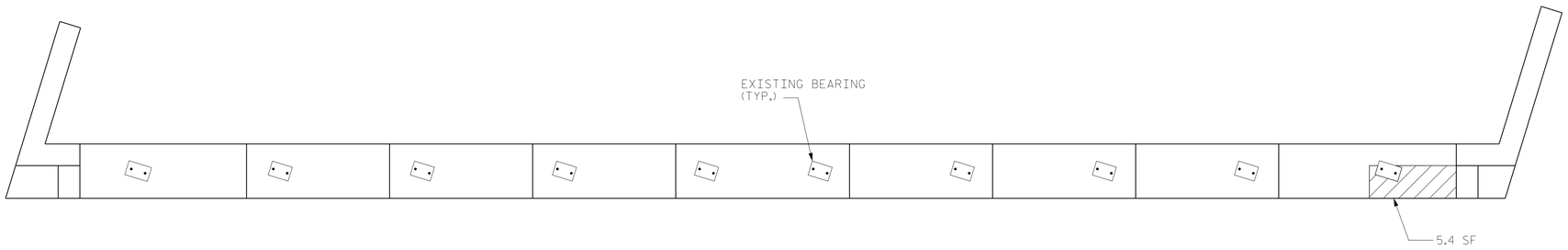


PLAN



ELEVATION

END BENT 1



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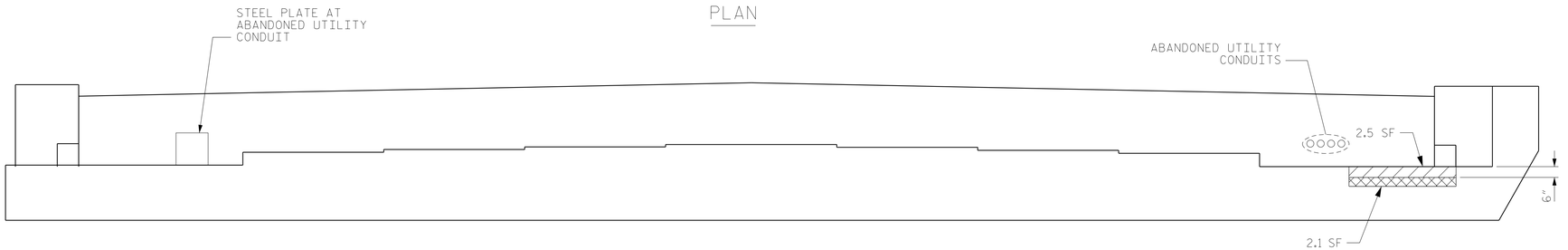

ELEVATION

END BENT 2

SHOTCRETE REPAIR

CONCRETE REPAIR

EPOXY RESIN INJECTION (ERI)

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 WALL	0.0	0.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
CURTAIN WALL	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT		LN. FT	
CAP	1.0			
CURTAIN WALL	1.0			
EPOXY COATING	AREA SF		AREA SF	
TOP OF END BENT CAP	0.0			

END BENT 2	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	2.1	1.0		
CURTAIN WALL	0.0	0.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	7.9	3.2		
CURTAIN WALL	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT		LN. FT	
CAP	0.0			
CURTAIN WALL	0.0			
EPOXY COATING	AREA SF		AREA SF	
TOP OF END BENT CAP	0.0			

VALUES IN CHARTS REPRESENT ESTIMATED REPAIRS TOTALS AFTER REMOVAL OF SOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 2" CLEAR TO SAW CUT. SEE REPAIR DETAILS.

NOTES

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

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

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

PROJECT NO. U-6020

GRANVILLE COUNTY

BRIDGE NO. 380045

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NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

DocuSigned by: Michael Craig C49E9154665440...

5/3/2024

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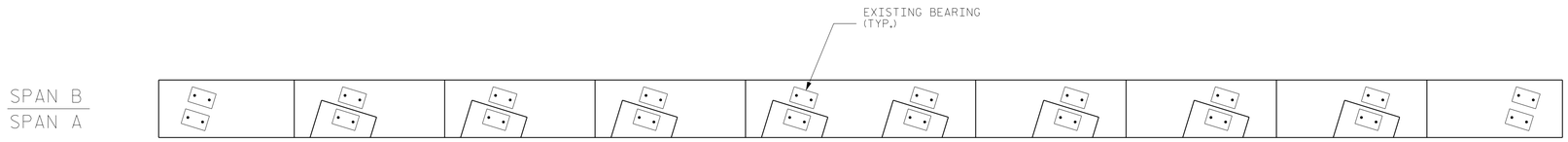
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

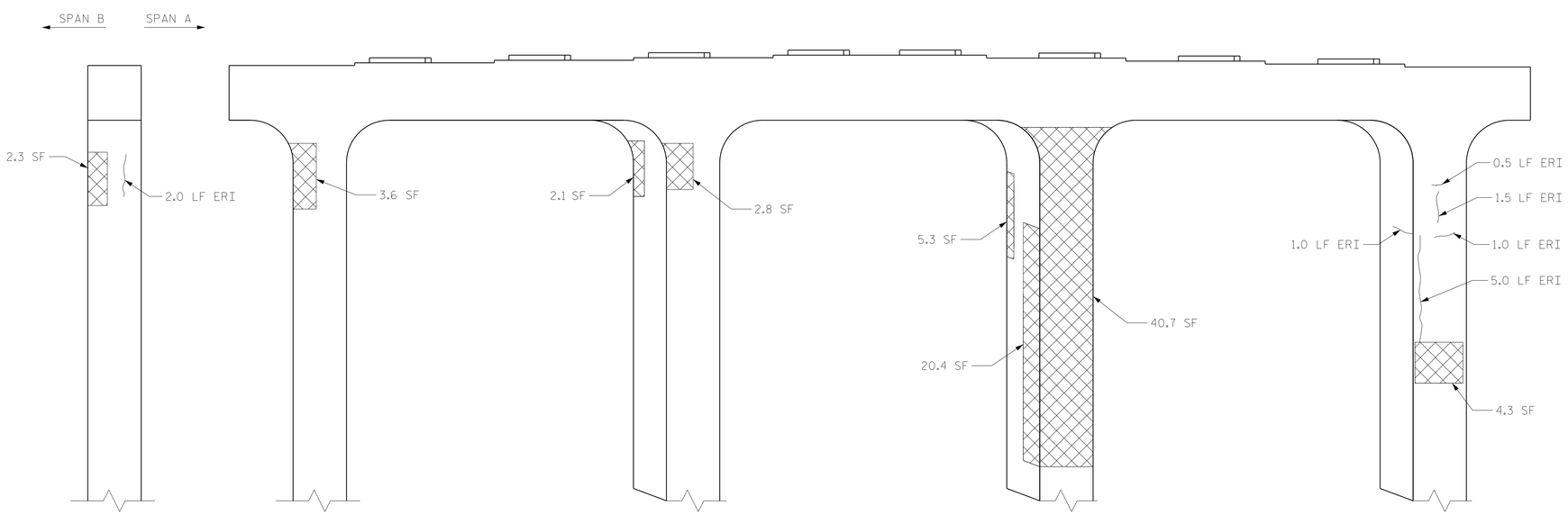
END BENT 1 & 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			16

DRAWN BY : J.MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024



TOP OF CAP



END VIEW

ELEVATION

REPAIR QUANTITY TABLE

REPAIRS BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	18.5	7.3		
COLUMN	116.7	47.4		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	0.0	0.0		
COLUMN	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT		LN. FT	
CAP	1.0			
COLUMN	18.5			
EPOXY COATING	AREA SF		AREA SF	
TOP OF BENT CAP	153 SF			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 2" CL TO SAWCUT. SEE REPAIR DETAILS.

NOTES

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

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

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

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

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

SHOTCRETE REPAIR

CONCRETE REPAIR

EPOXY RESIN INJECTION (ERI)

PROJECT NO. U-6020

GRANVILLE COUNTY

BRIDGE NO. 380045

DRAWN BY : J.MYA DATE : 3/2019

CHECKED BY : J.YANNACCONE DATE : 3/2019

DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024

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NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

DocuSigned by: Michael Craig C49E915468B5440...

5/3/2024

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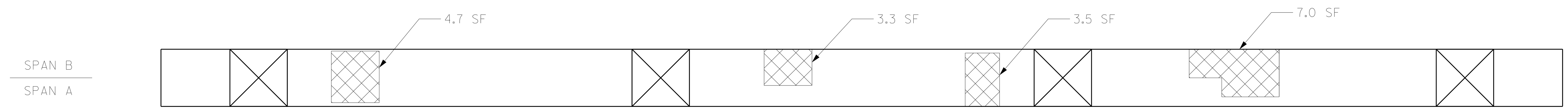
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 1 SPAN A FACE

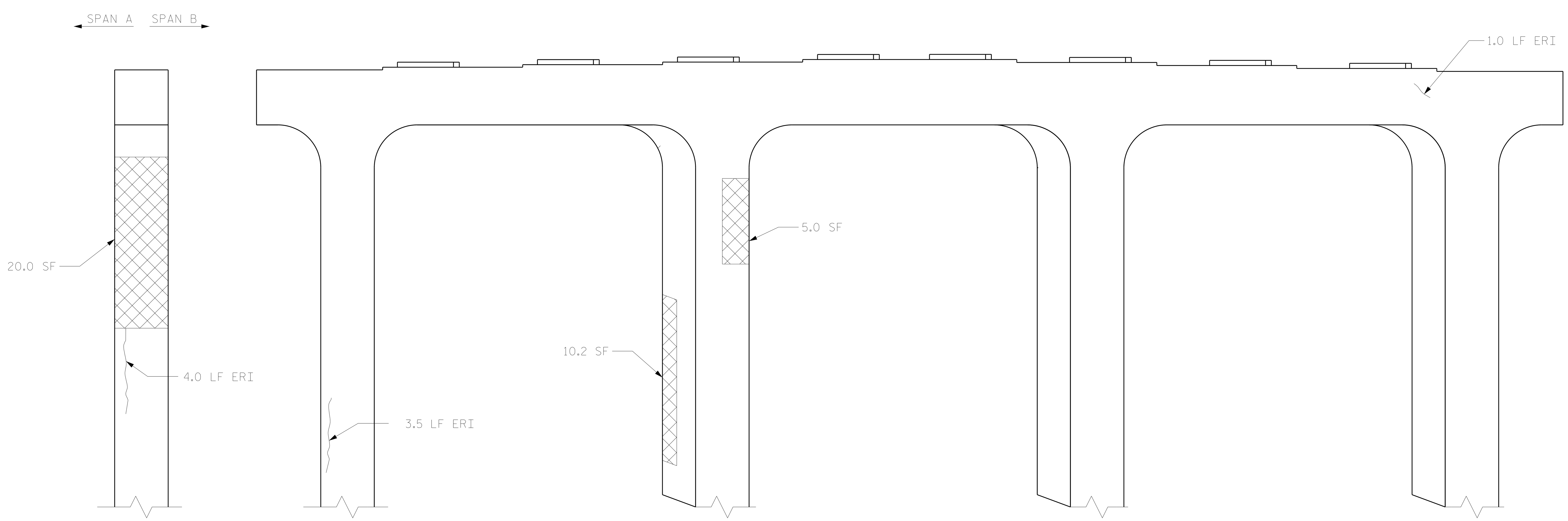
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-6

TOTAL SHEETS 16



BOTTOM OF CAP



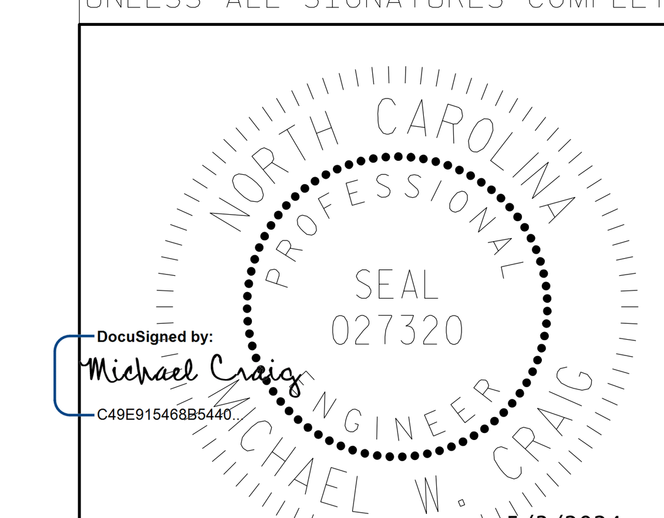
END VIEW

ELEVATION

SHOTCRETE REPAIR
CONCRETE REPAIR
EPOXY RESIN INJECTION (ERI)

PROJECT NO. U-6020
GRANVILLE COUNTY
BRIDGE NO. 380045

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



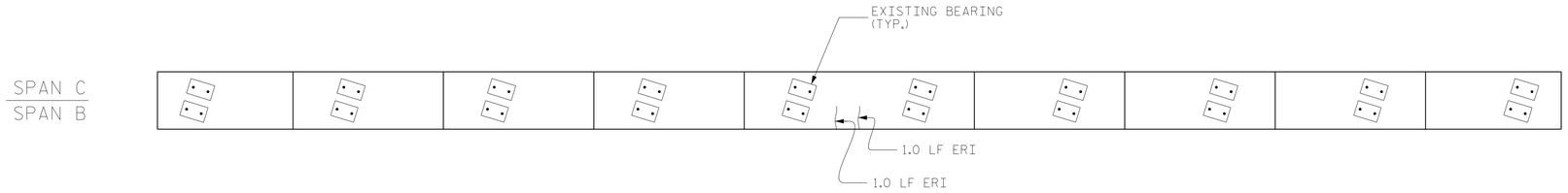
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1
SPAN B FACE

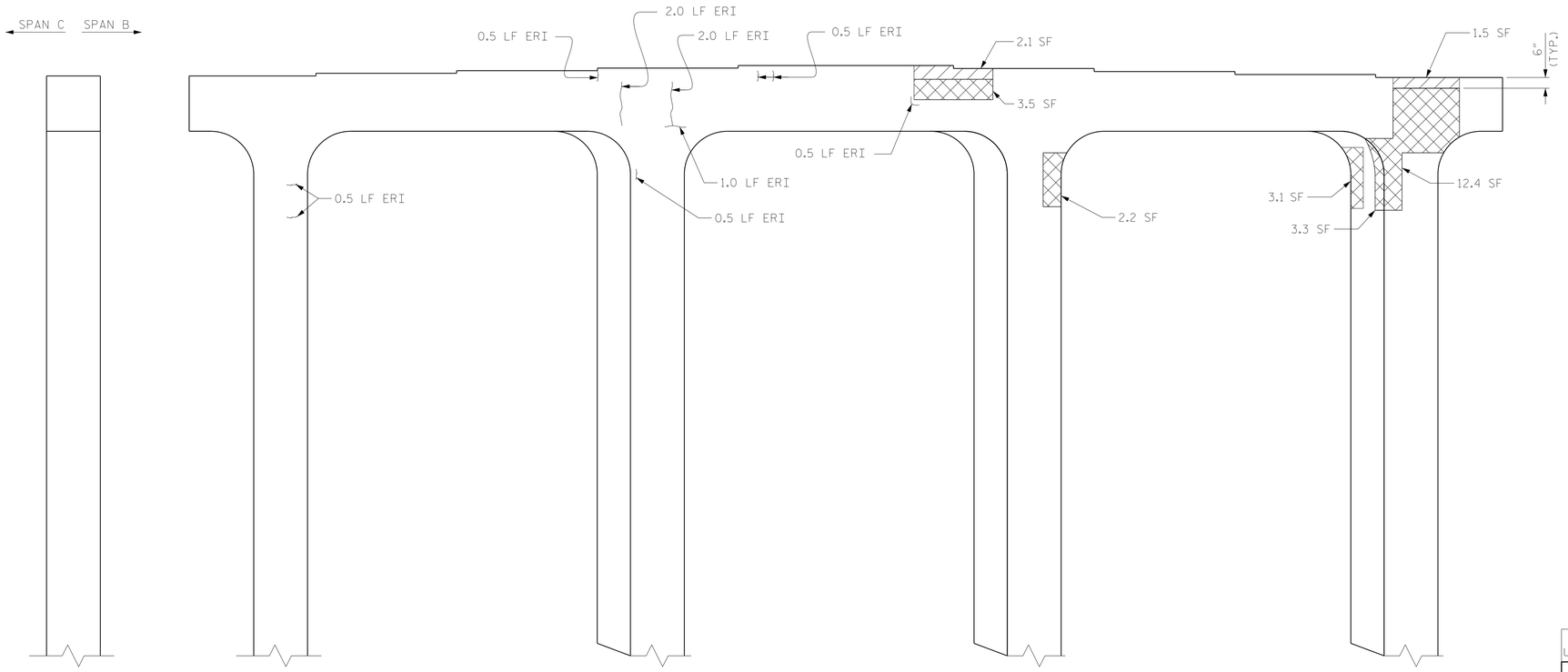
WSP USA Inc.
125 TALBERT RD.
SUITE A
MOORESVILLE, NC 28117
TEL: 1.704.662.0100
LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			16

DRAWN BY : J.MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024



TOP OF CAP



END VIEW

ELEVATION

REPAIR QUANTITY TABLE				
REPAIRS BENT 1	QUANTITIES			
	ESTIMATE		ACTUAL	
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	45.3	17.9		
COLUMN	17.9	7.3		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	4.8	1.9		
COLUMN	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT		LN. FT	
CAP	37.0			
COLUMN	7.5			
EPOXY COATING	AREA SF		AREA SF	
TOP OF BENT CAP	153 SF			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE. MIN. OF 1" BEHIND REBAR AND MIN. 2" CL TO SAWCUT. SEE REPAIR DETAILS.

NOTES

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

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

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

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

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

SHOTCRETE REPAIR

CONCRETE REPAIR

EPOXY RESIN INJECTION (ERI)

PROJECT NO. U-6020

GRANVILLE COUNTY

BRIDGE NO. 380045

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

DocuSigned by: Michael Craig C49E9154688544D...

5/3/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 2 SPAN B FACE

WSP USA Inc.
128 TALBERT RD.
SUITE A
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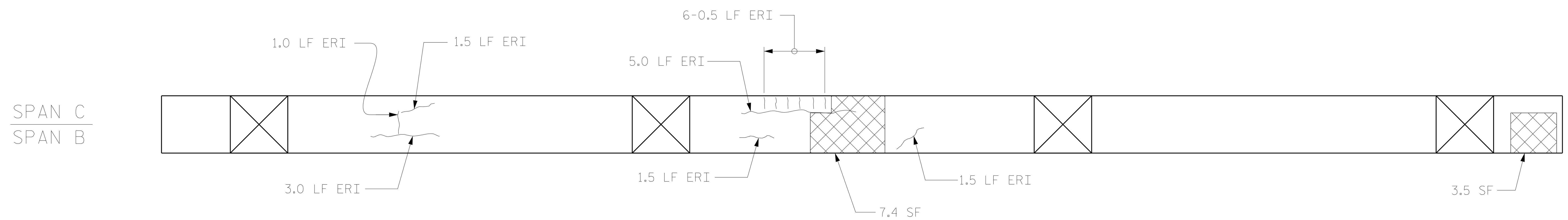
LICENSE NO. F-0165

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

SHEET NO. S-8

TOTAL SHEETS 16

DRAWN BY : J.MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024



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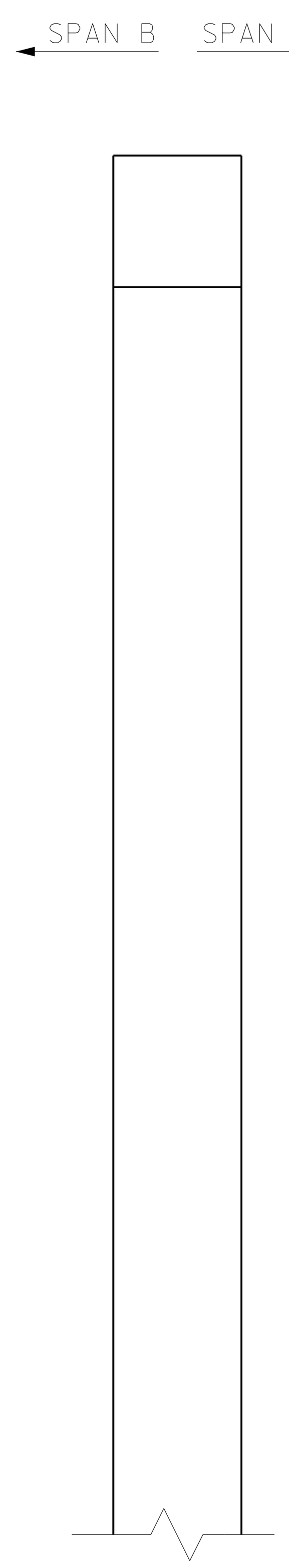

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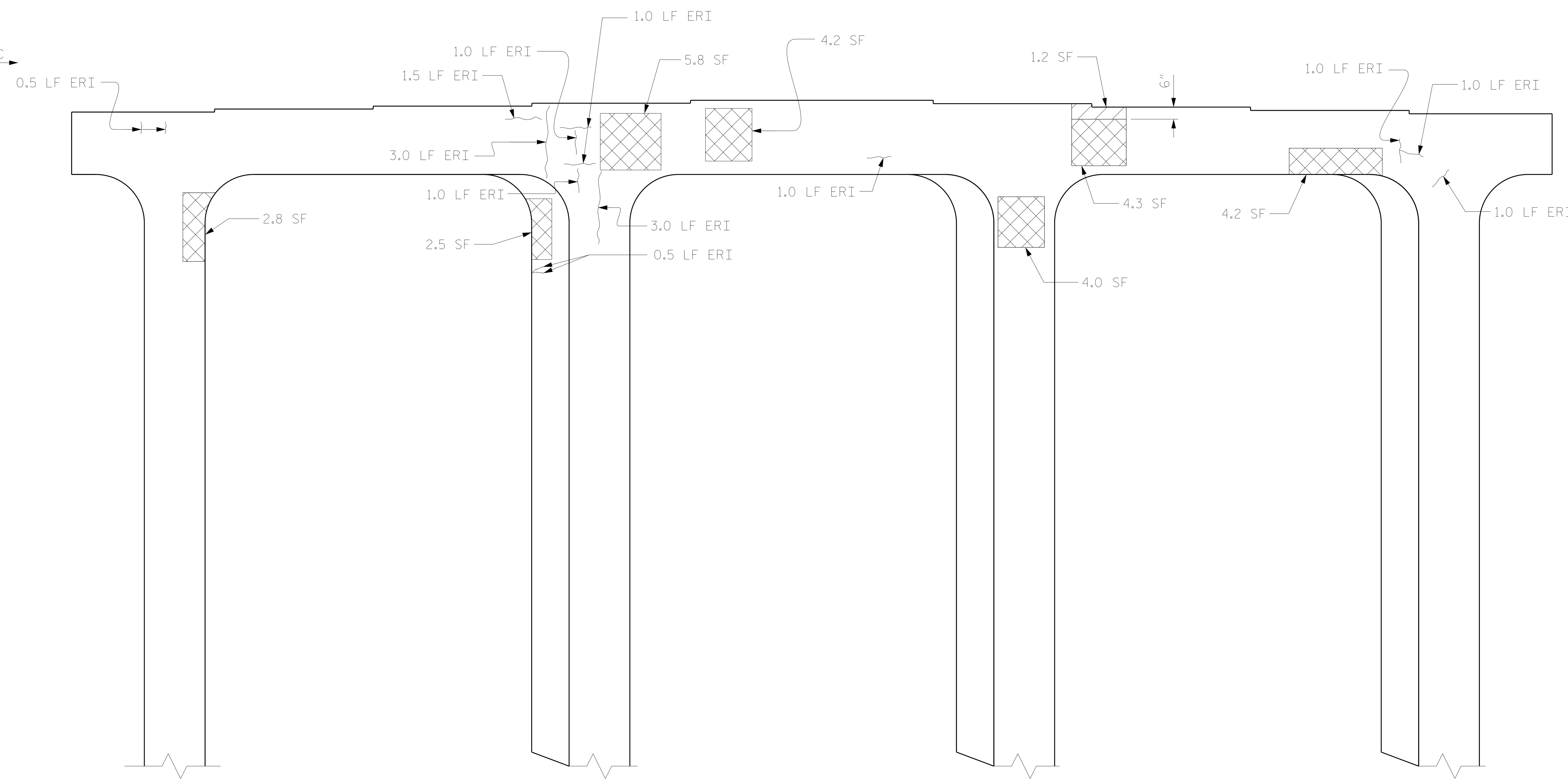

ELEVATION

SHOTCRETE REPAIR
CONCRETE REPAIR
EPOXY RESIN INJECTION (ERI)

PROJECT NO. U-6020
GRANVILLE COUNTY
BRIDGE NO. 380045

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NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG
DocuSigned by: Michael Craig
C49E91546B8D440...
5/3/2024

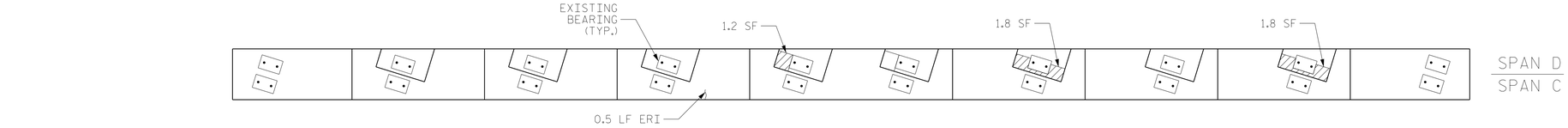
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2
SPAN C FACE

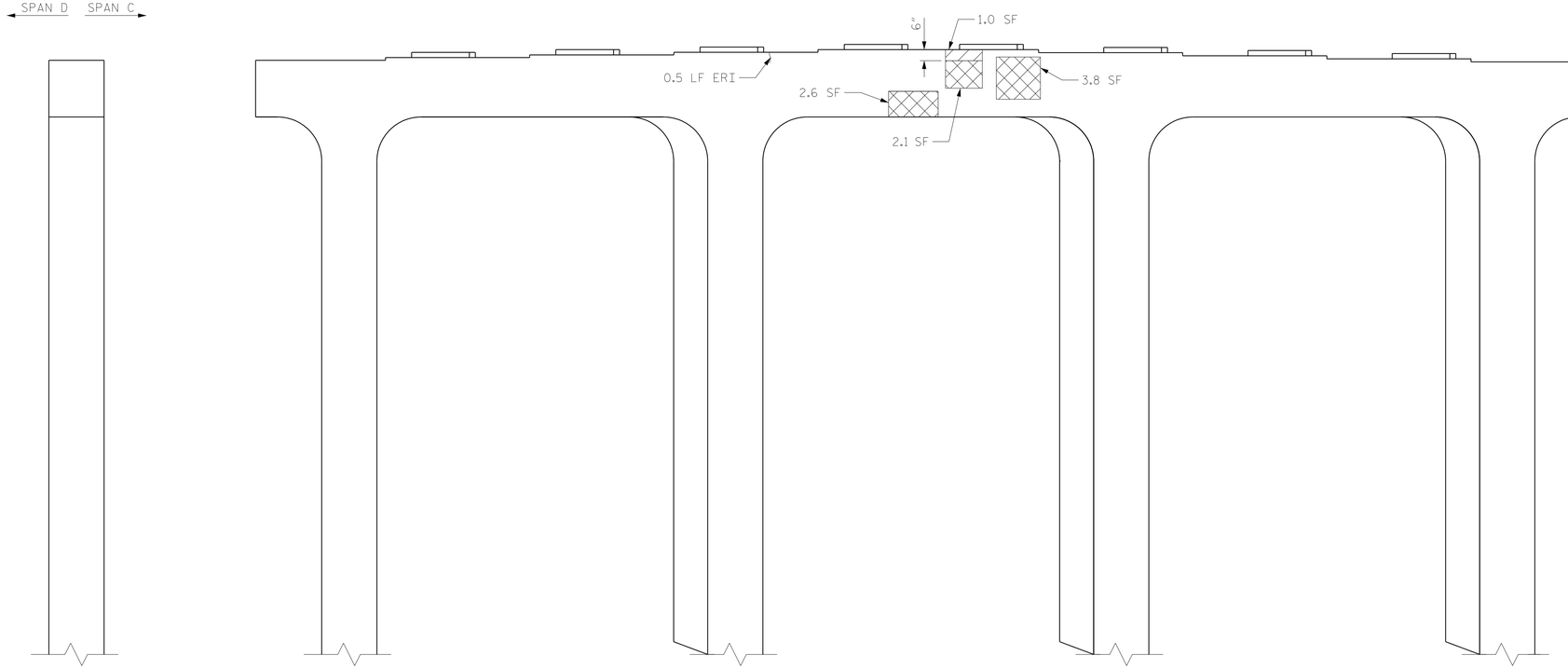
wsp
WSP USA Inc.
128 TALBERT RD.
SUITE A
MOORESVILLE, NC 28117
TEL: 1.704.662.0100
LICENSE NO. F-0165

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-9
1			3					TOTAL SHEETS
2			4					16

DRAWN BY :	J.MYA	DATE :	3/2019
CHECKED BY :	J.YANNACCONE	DATE :	3/2019
DESIGN ENGINEER OF RECORD :	MICHAEL W. CRAIG	DATE :	4/2024



TOP OF CAP



END VIEW

ELEVATION

REPAIR QUANTITY TABLE

REPAIRS BENT 3	QUANTITIES ESTIMATE AREA SF	ESTIMATE VOLUME CF	ACTUAL AREA SF	ACTUAL VOLUME CF
SHOTCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	15.4	6.1		
COLUMN	7.2	3.0		
CONCRETE REPAIRS	AREA SF	VOLUME CF	AREA SF	VOLUME CF
CAP	6.8	3.2		
COLUMN	0.0	0.0		
EPOXY RESIN INJECTION	LN. FT		LN. FT	
CAP	2.5			
COLUMN	0.0			
EPOXY COATING	AREA SF		AREA SF	
TOP OF BENT CAP	153 SF			

VALUES IN CHART REPRESENT ESTIMATED REPAIR TOTALS AFTER REMOVAL OF UNSOUND CONCRETE, MIN. OF 1" BEHIND REBAR AND MIN. 2" CL TO SAWCUT. SEE REPAIR DETAILS.

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FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

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SHOTCRETE REPAIR

CONCRETE REPAIR

EPOXY RESIN INJECTION (ERI)

PROJECT NO. U-6020

GRANVILLE COUNTY

BRIDGE NO. 380045

DRAWN BY : J.MYA DATE : 3/2019

CHECKED BY : J.YANNACCONE DATE : 3/2019

DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

DocuSigned by: Michael Craig C49E9154685540...

5/3/2024

WSP USA Inc.
128 TALBERT RD.
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MOORESVILLE, NC 28117
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

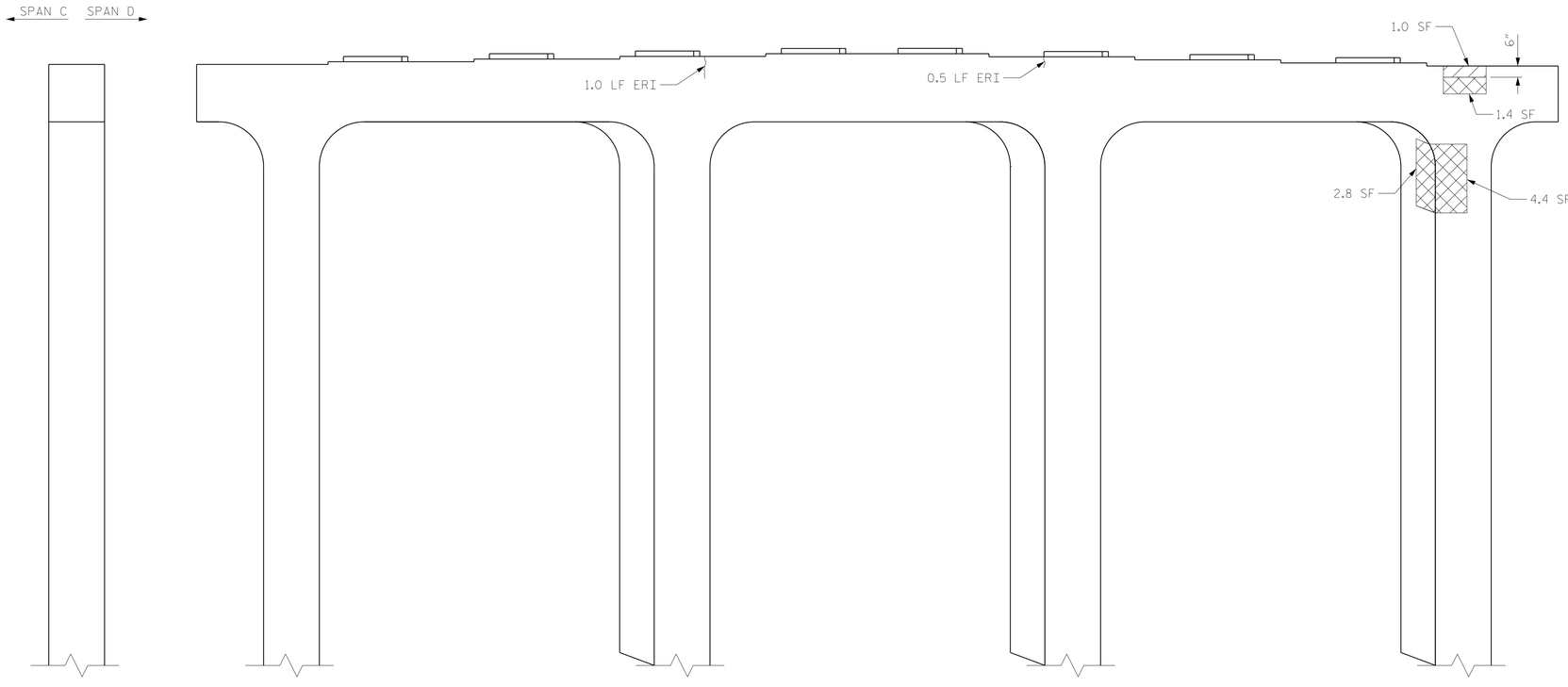
SUBSTRUCTURE BENT 3 SPAN C FACE

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

SHEET NO. S-10

TOTAL SHEETS 16

BOTTOM OF CAP



END VIEW

ELEVATION

SHOTCRETE REPAIR

CONCRETE REPAIR

EPOXY RESIN INJECTION (ERI)

PROJECT NO. U-6020

GRANVILLE COUNTY

BRIDGE NO. 380045

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NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

DocuSigned by: Michael Craig C49E9154658544E...

5/3/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 3 SPAN D FACE

WSP USA Inc.
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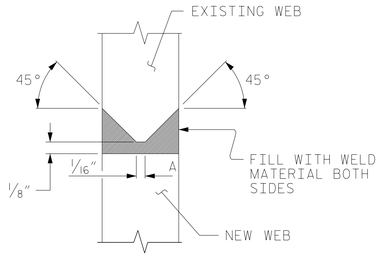
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

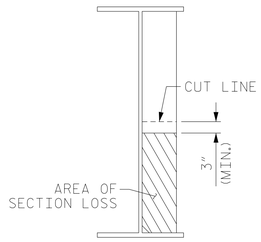
SHEET NO. S-11

TOTAL SHEETS 16

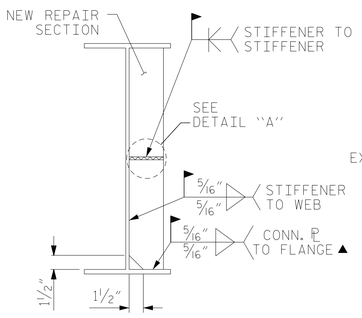
DRAWN BY : J.MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024



DETAIL "A"

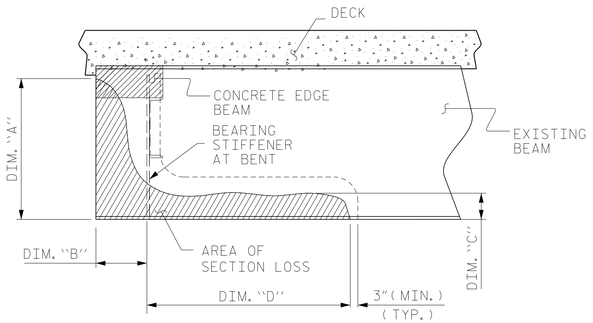


SECTION LOSS
STIFFENER/CONN. ℄
REPAIR

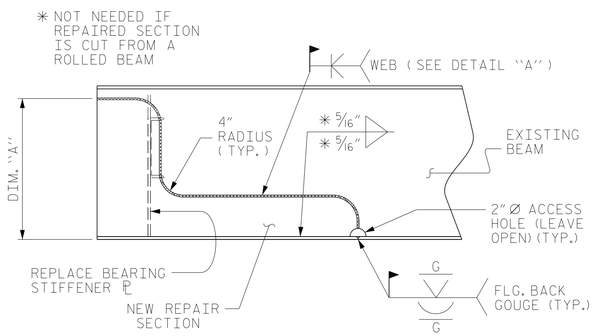


STIFFENER/CONN. ℄
REPAIR

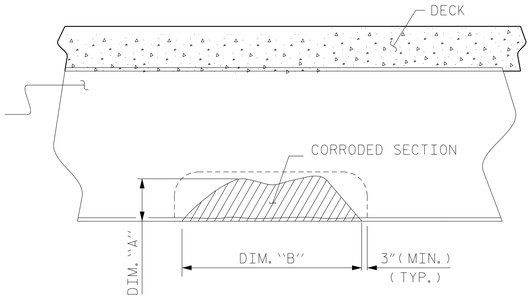
▲ FOR STIFFENERS, MILL TO BEAR AND DO NOT WELD



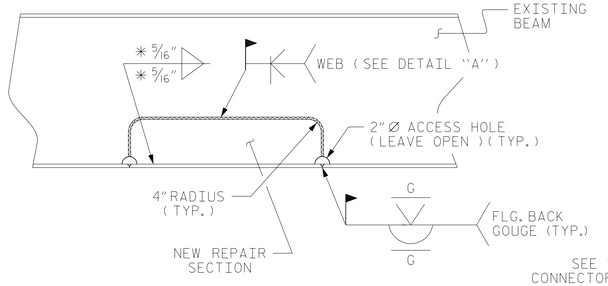
SECTION LOSS
BEAM END REPAIR



BEAM END
REPAIR SECTION



SECTION LOSS
INTERMEDIATE BEAM REPAIR



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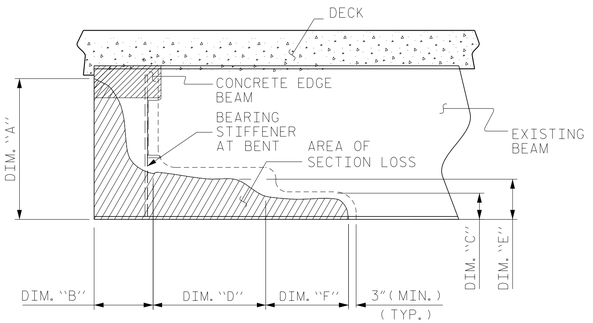
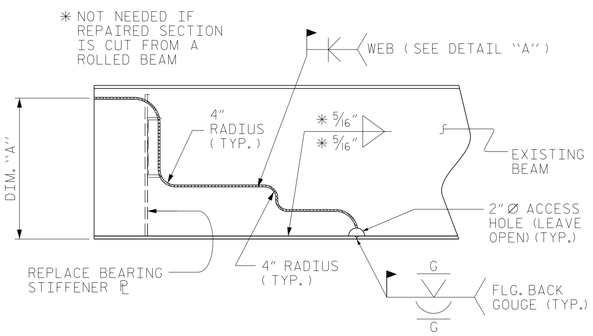
REPAIR SECTION



SECTION LOSS
BEAM END REPAIR



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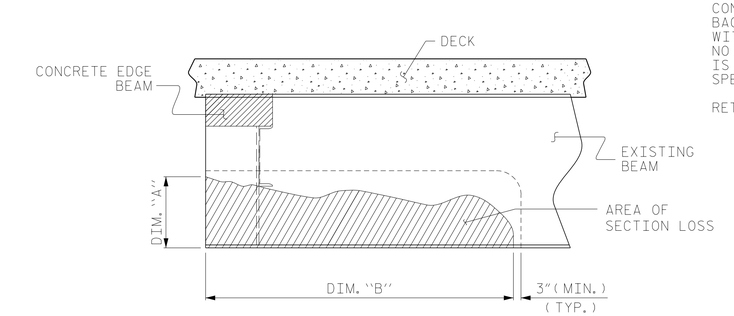
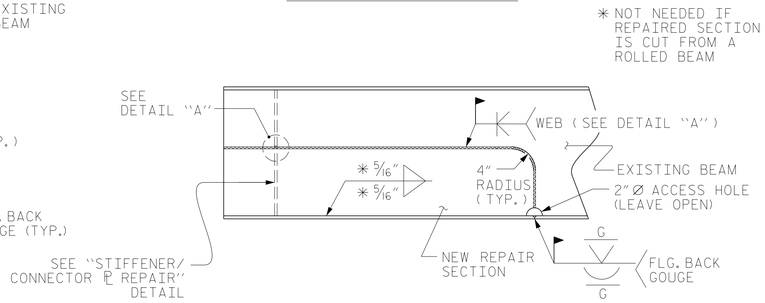


SECTION LOSS
BEAM END REPAIR



BEAM END
REPAIR SECTION

BEAM REPAIR NOTES:

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

REPAIR PLATES SHALL BE MINIMUM 36 KSI STEEL. USE NEW OR SALVAGED "LIKE NEW" STEEL ONLY.

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

PROVIDE RUN-OFF WELD TABS, WHERE APPLICABLE, TO PROVIDE PROPER WELD START AND TERMINATION. SEE NCDOT M&T FIELD WELD MANUAL AND AWS D1.5 SECTION 3.12.

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

BEAM REPAIR SEQUENCE:

COORDINATE SCHEDULE WITH MATERIALS AND TESTS UNIT WELD INSPECTOR AT LEAST FOUR DAYS PRIOR TO ANTICIPATED WORK.

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

JACK BEAM AND SUPPORT WITH BLOCKING TO FREE BEAM END FROM BEARING. LIMIT DIFFERENTIAL JACKING BETWEEN ADJACENT BEAMS TO 1/8".

STEEL DIAPHRAGM CHANNELS AND/OR STIFFENERS MAY BE TEMPORARILY REMOVED, IF NECESSARY, AND REPLACED AFTER BEAM REPAIR.

CUT OUT BY APPROPRIATE MEANS THE DAMAGED BEAM AREA AND/OR BEARING STIFFENER. IF BEAM DETERIORATION EXTENDS INTO THE CONCRETE DIAPHRAGM, CHIP AWAY CONCRETE AND REMOVE DAMAGED AREA.

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

INSTALL THE CUT-TO-FIT SECTION. FULLY WELD ALONG TOP AND SIDES OF PLATE.

ONCE THE REPAIR IS COMPLETE, GRIND ALL WELDS FLUSH. ANY GOUGES OR INDENTATIONS FROM IMPACT ON BEAMS SHALL BE GROUND SMOOTH. CLEAN AREA TO REMOVE DEBRIS AND OILS FROM REPAIR PROCESS PRIOR TO PAINTING.

LOWER SPAN TO BEAR; CHECK FOR DISTRESS.

REMOVE JACKING EQUIPMENT AND TEMPORARY SUPPORTS.

CLEAN AND PAINT STRUCTURAL STEEL. 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 STRUCTURE SPECIAL PROVISIONS.

AFTER BEAMS AND/OR STIFFENERS/CONNECTOR PLATES ARE REPAIRED AND PAINTED, ANY CONCRETE REMOVED FROM THE BENT DIAPHRAGMS, EDGE BEAM OR DECK SHALL BE CAST BACK. 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.

RETURN TRAFFIC TO NORMAL PATTERN.

PROJECT NO. U-6020
GRANVILLE COUNTY
BRIDGE NO. 380045

DRAWN BY : J.MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024

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NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG
DocuSigned by: Michael Craig C49E9154685440...
5/3/2024

WSP USA Inc.
128 TALBERT RD.
SUITE A
MOORESVILLE, NC 28117
TEL: 1.704.662.0100
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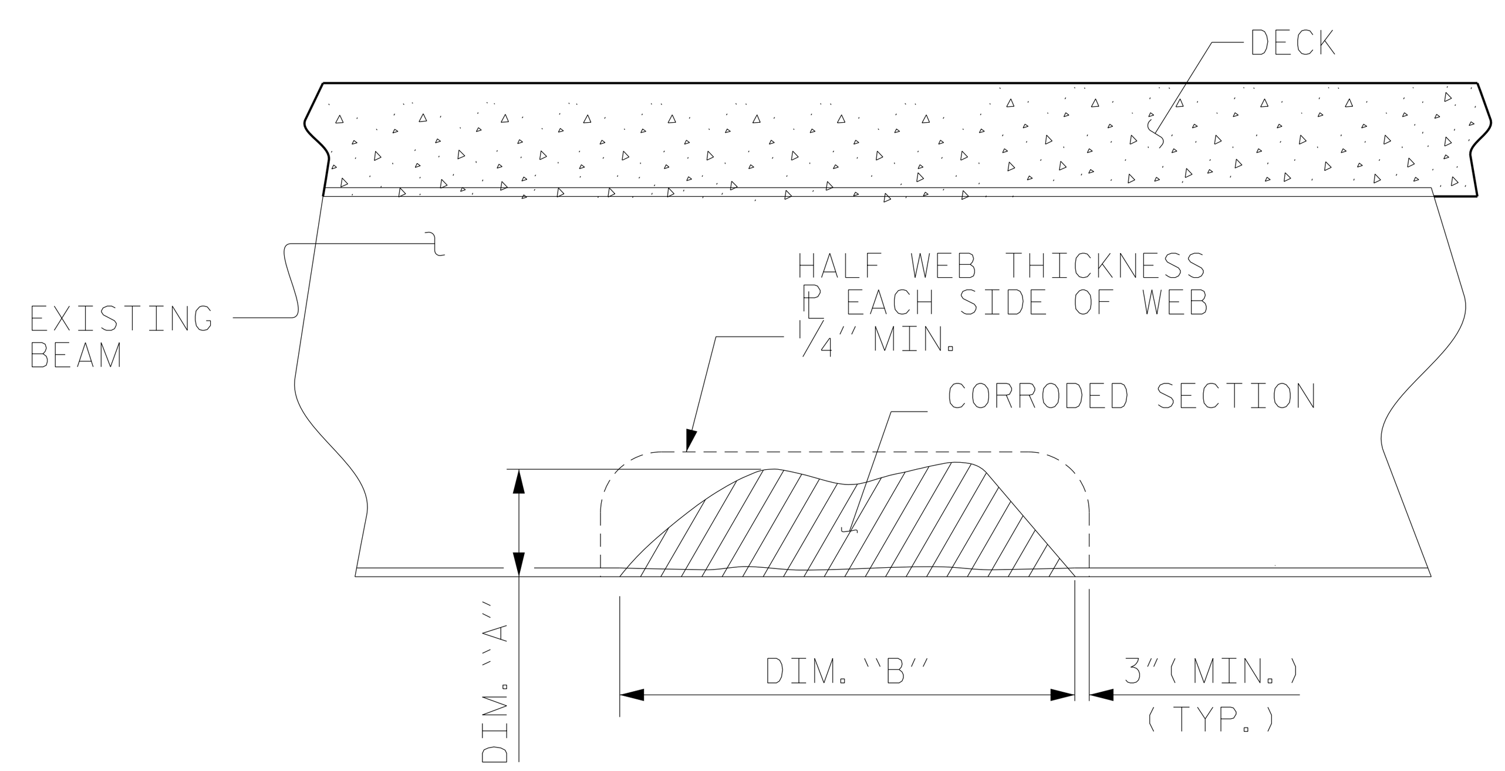
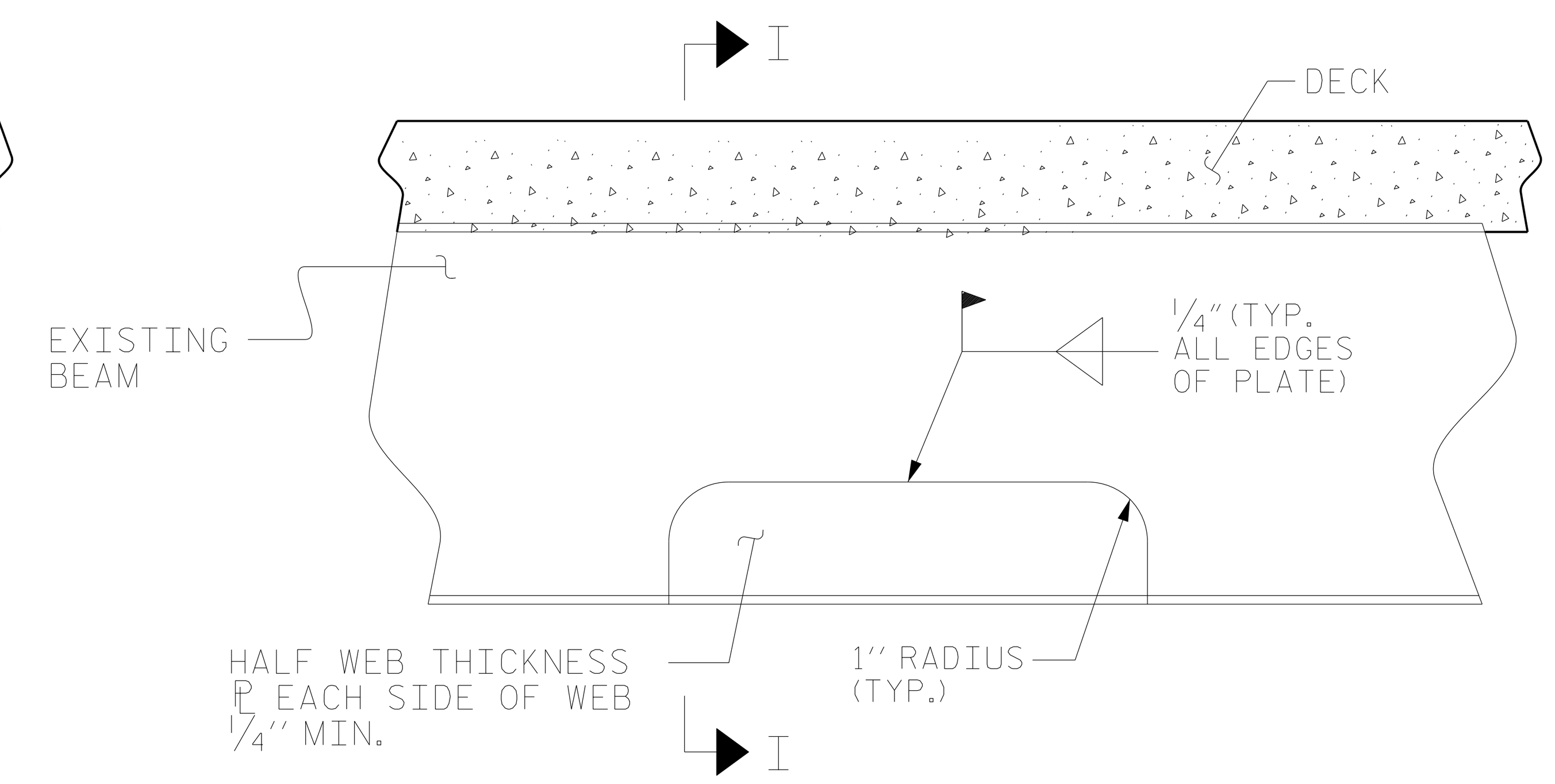
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEAM REPAIR DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			16

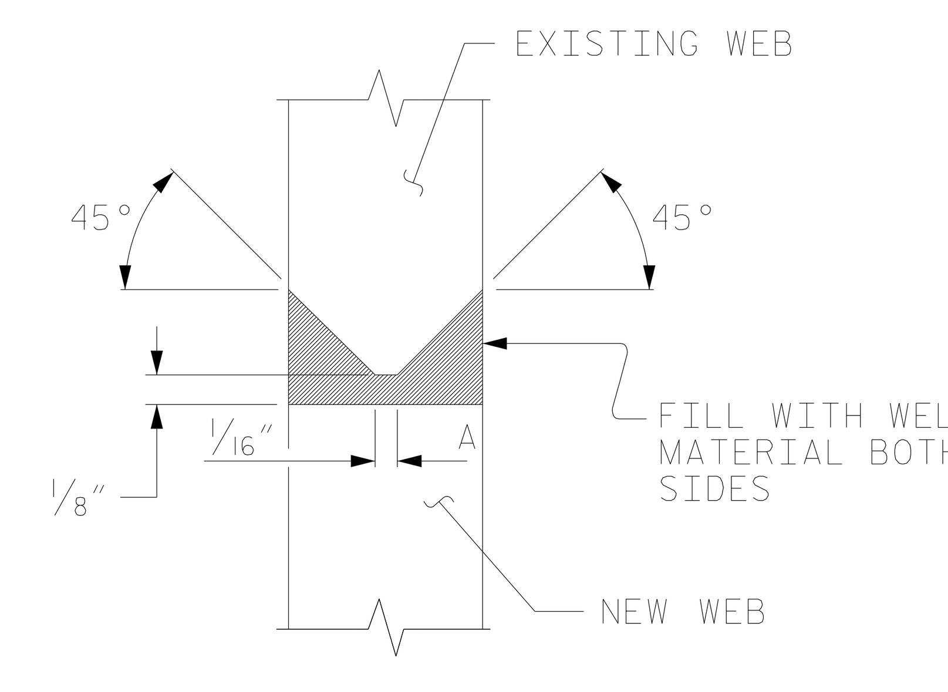


INTERMEDIATE SECTION LOSS
BEAM PLATING REPAIR

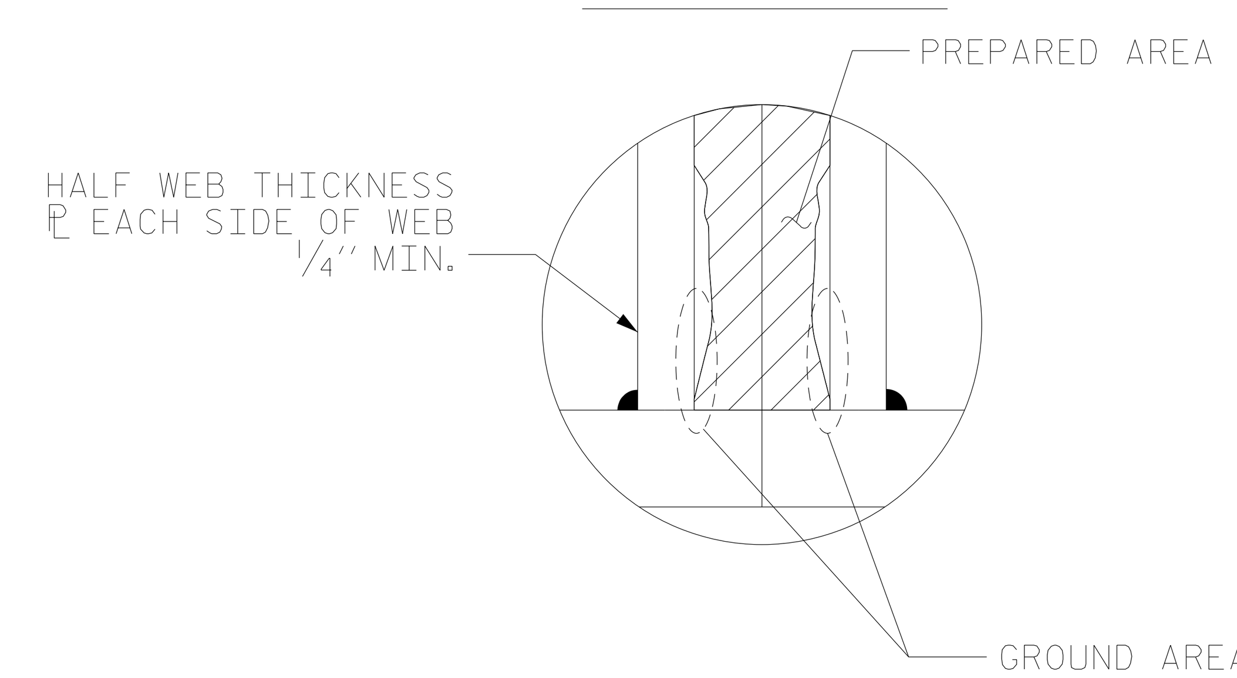


INTERMEDIATE BEAM
PLATING REPAIR

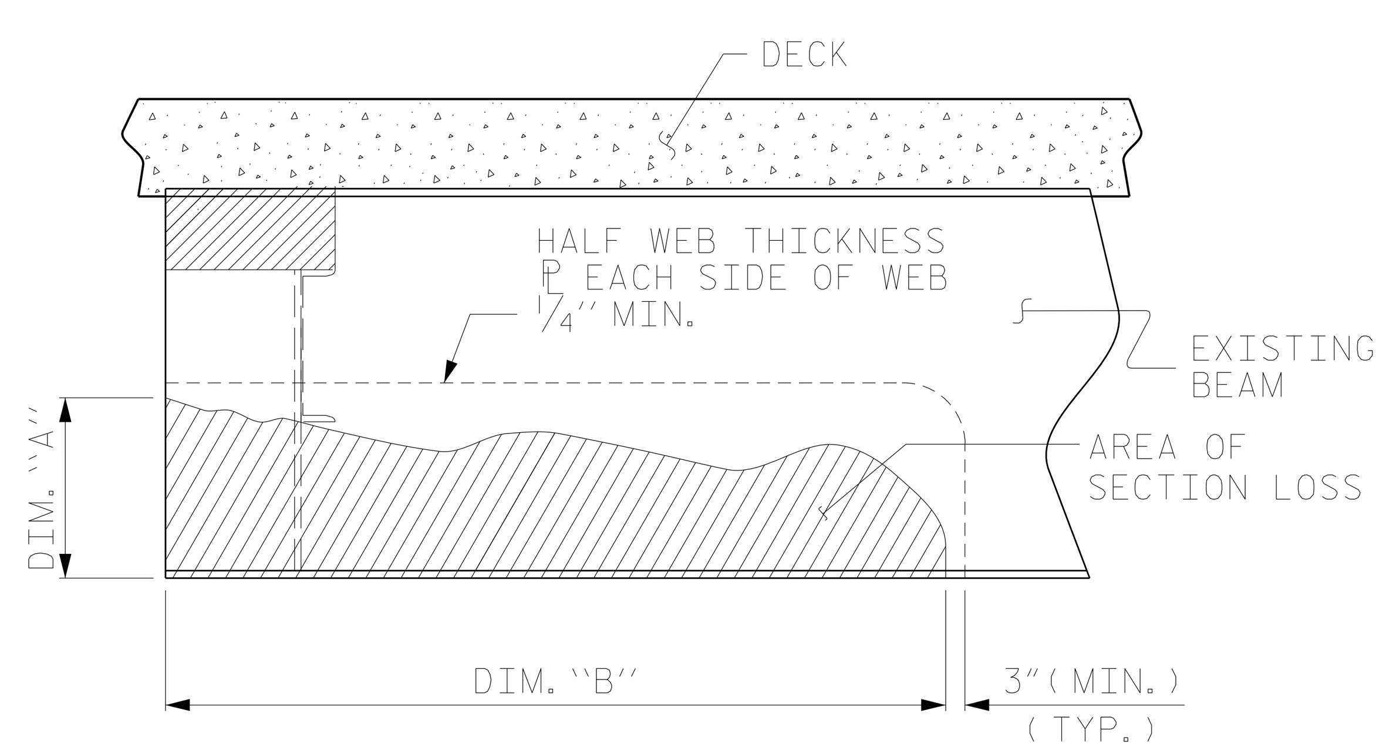
INTERMEDIATE BEAM PLATING REPAIR



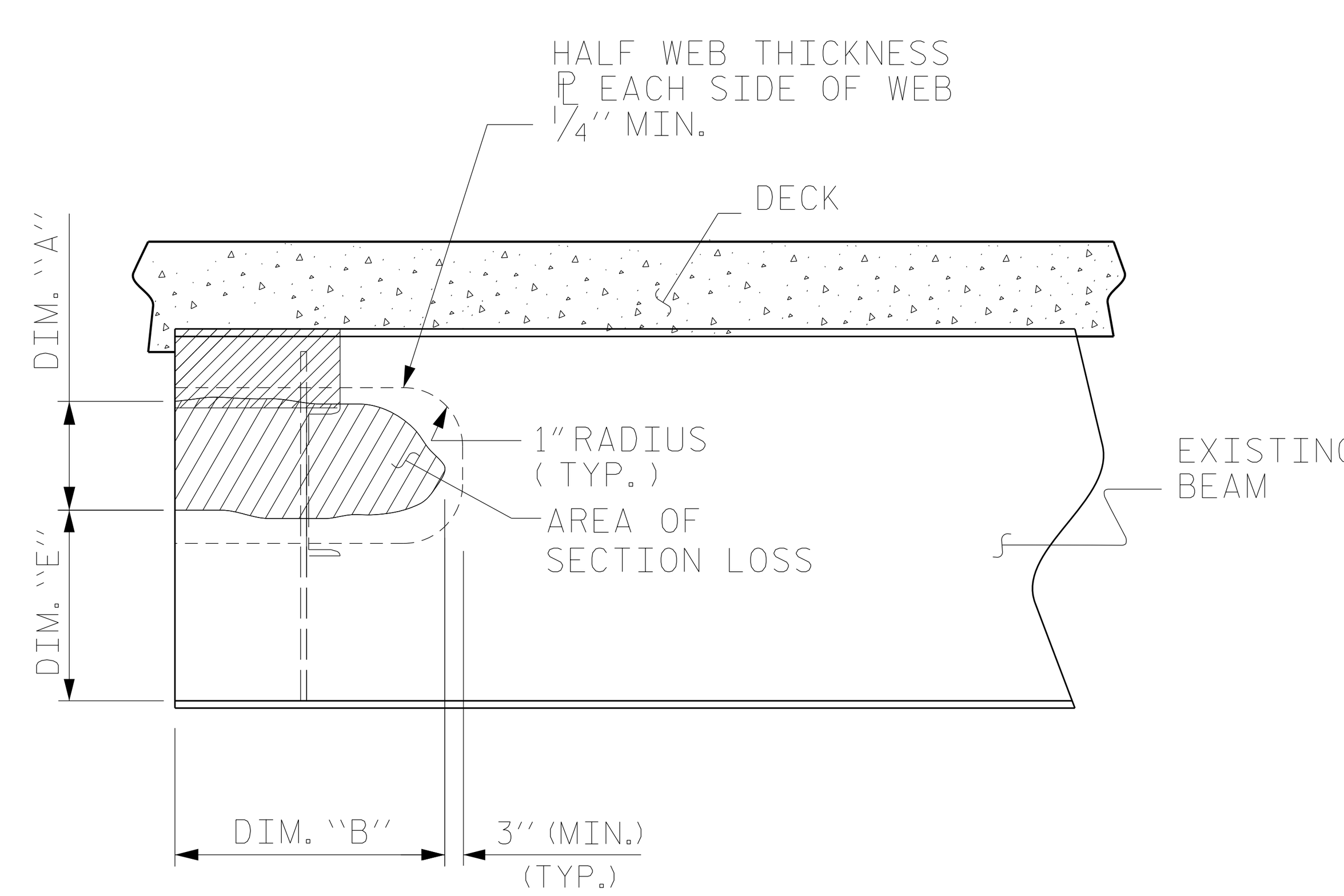
DETAIL ''A''



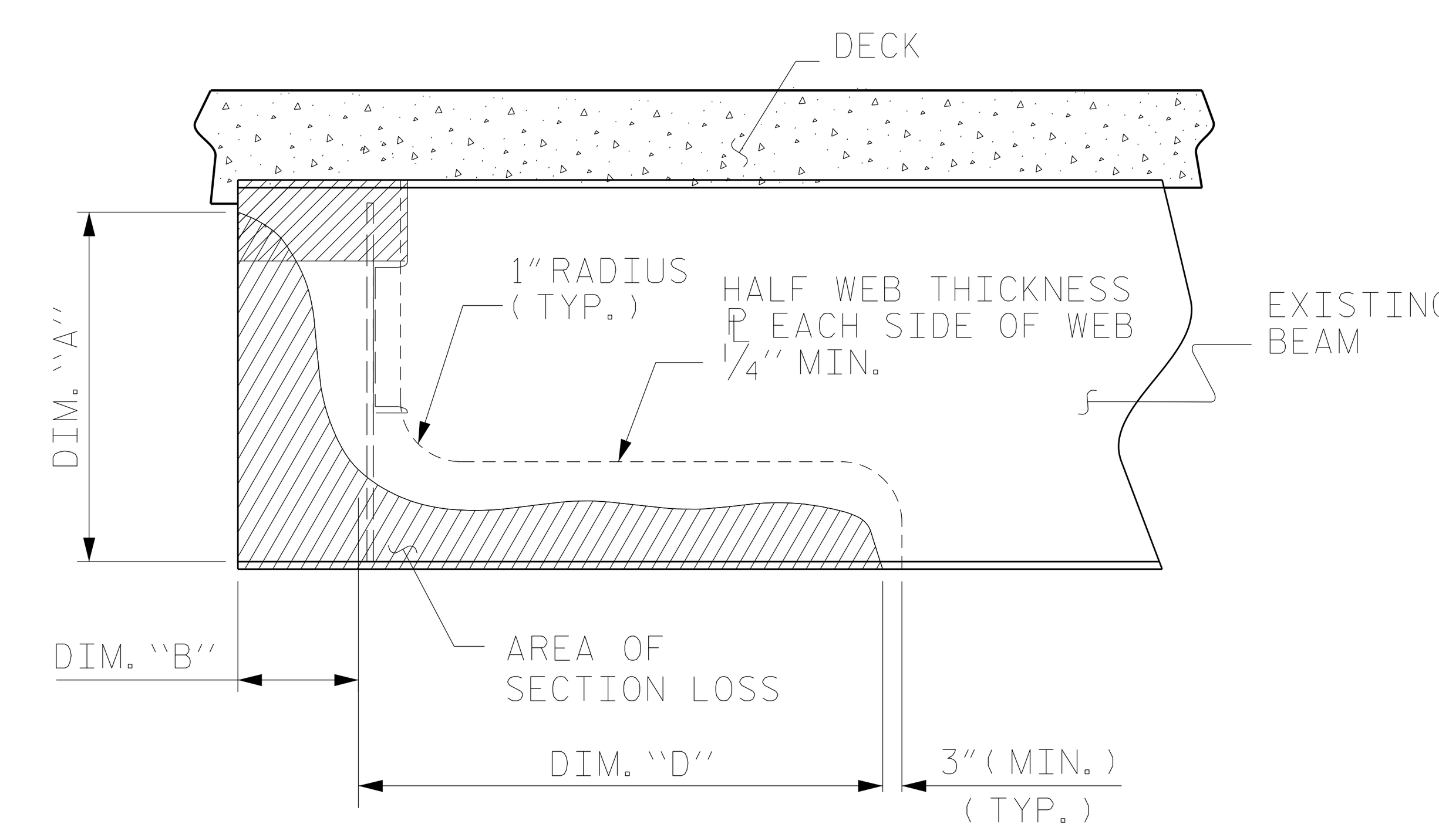
DETAIL ''B''



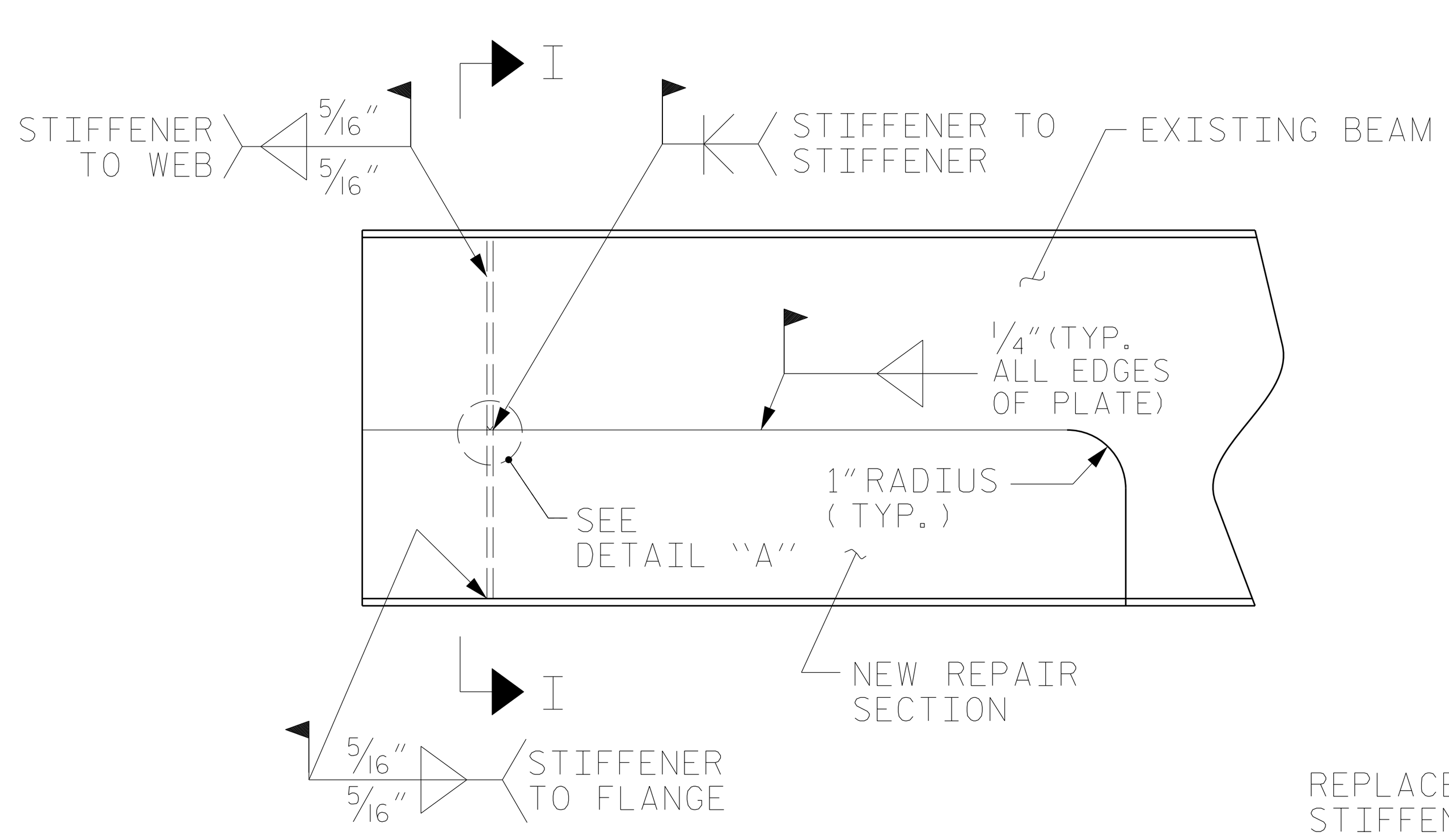
BEAM END SECTION LOSS



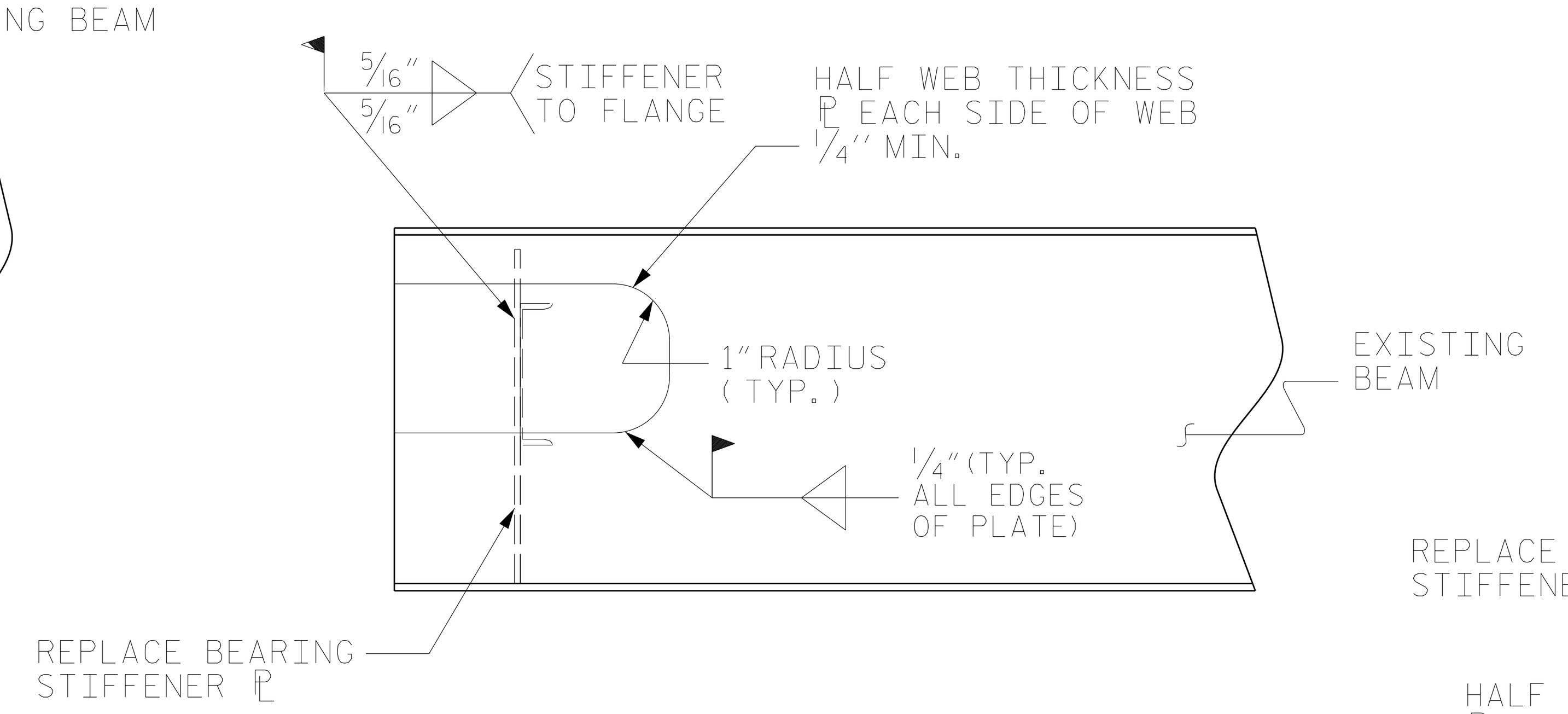
BEAM END SECTION LOSS



BEAM END SECTION LOSS



BEAM END
PLATING REPAIR



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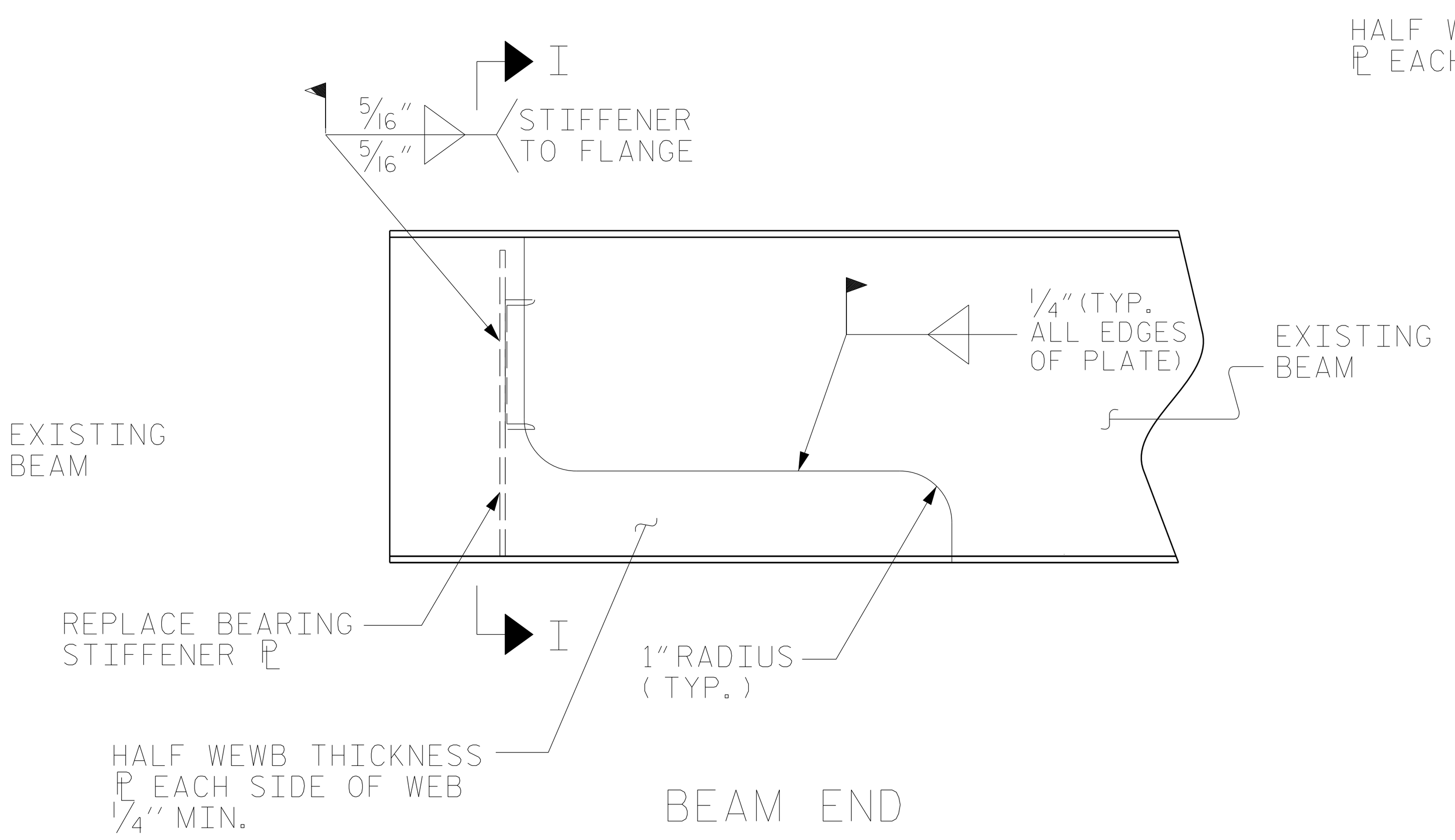
PLATING REPAIR



BEAM END
PLATING REPAIR

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BEAM PLATING REPAIR SEQUENCE:

COORDINATE SCHEDULE WITH MATERIALS AND TESTS UNIT WELD INSPECTOR AT LEAST FOUR DAYS PRIOR TO ANTICIPATED WORK.

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

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

IF NECESSARY, REMOVE EXISTING STIFFENER TO INSTALL WELDED PLATE REPAIR. REPLACE WITH A NEW STIFFENER PLATE OF SIMILAR SIZE. FOR STIFFENER/CONNECTOR PLATE REPAIR DETAILS, SEE ''BEAM REPAIR DETAILS'' SHEET.

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

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.

EACH PLATE SHALL BE APPROXIMATELY ONE-HALF THE ORIGINAL THICKNESS OF THE BEAM WEB.

FULLY WELD ALONG TOP AND SIDES OF PLATE.

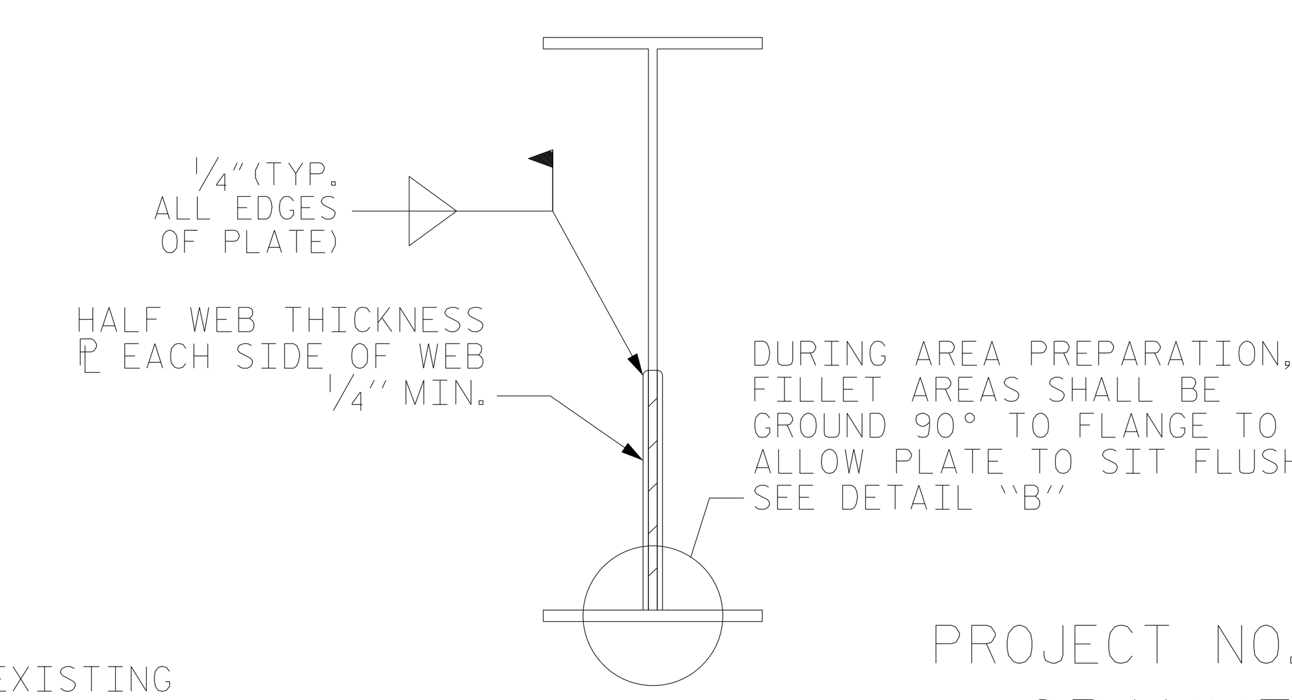
ONCE THE REPAIR IS COMPLETE, GRIND ALL WELDS FLUSH. ANY GOUGES OR INDENTATIONS FROM IMPACT ON BEAMS SHALL BE GROUND SMOOTH. CLEAN AREA TO REMOVE DEBRIS AND OILS FROM REPAIR PROCESS PRIOR PAINTING.

CLEAN AND PAINT STRUCTURAL STEEL. 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 STRUCTURE SPECIAL PROVISIONS.

AFTER BEAMS AND/OR STIFFENERS/CONNECTOR PLATES ARE REPAIRED AND PAINTED, ANY CONCRETE REMOVED FROM THE BENT DIAPHRAGMS SHALL BE CAST BACK. 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 PLATING REPAIR''. FOR BEAM PLATING REPAIR, SEE SPECIAL PROVISIONS.

RETURN TRAFFIC TO NORMAL PATTERN.



SECTION I-I

PROJECT NO. U-6020
GRANVILLE COUNTY
BRIDGE NO. 380045

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027320 MICHAEL W. CRAIG
DocuSigned by: Michael Craig
C49E91546B55449...
5/3/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEAM PLATING REPAIR DETAILS

WSP
WSP USA Inc.
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MOORESVILLE, NC 28117
TEL: 1.704.662.0100
LICENSE NO. F-0165

DRAWN BY :	J.MYA	DATE :	3/2019
CHECKED BY :	J.YANNACCONE	DATE :	3/2019
DESIGN ENGINEER OF RECORD :	MICHAEL W. CRAIG	DATE :	4/2024

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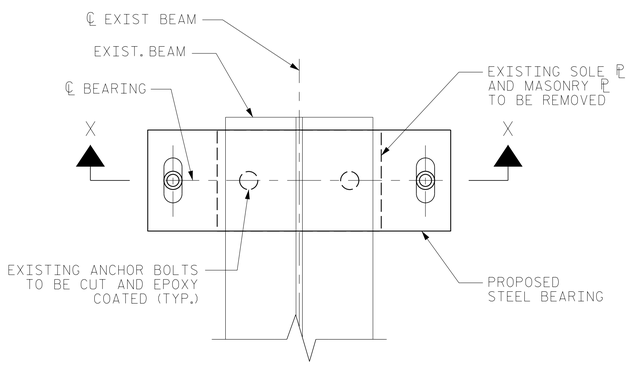
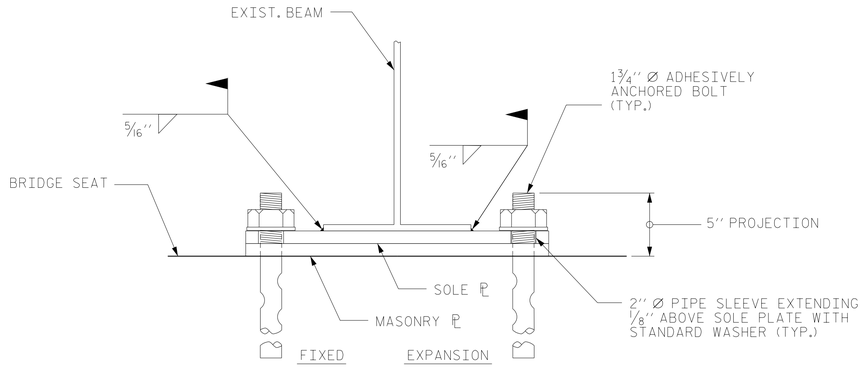
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

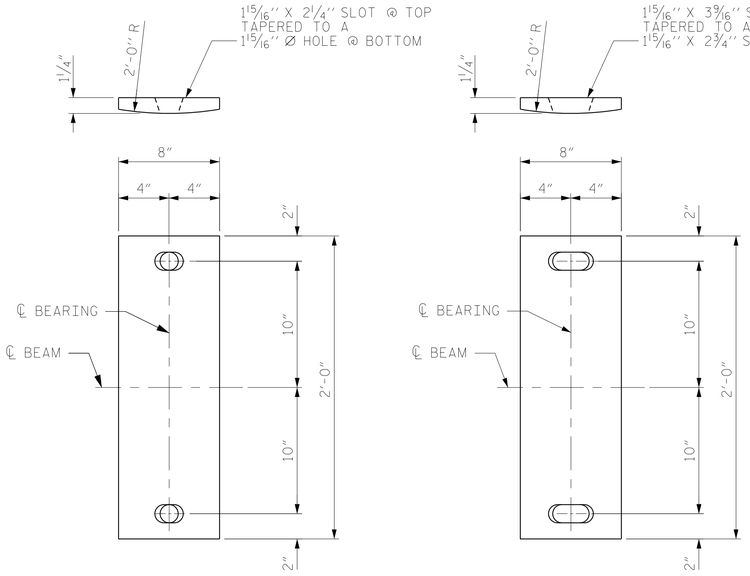
SHEET NO. S-13
TOTAL SHEETS 16



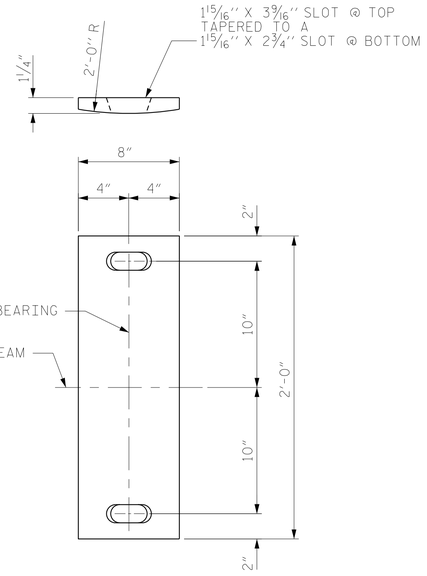
SOLE PLATE PLAN



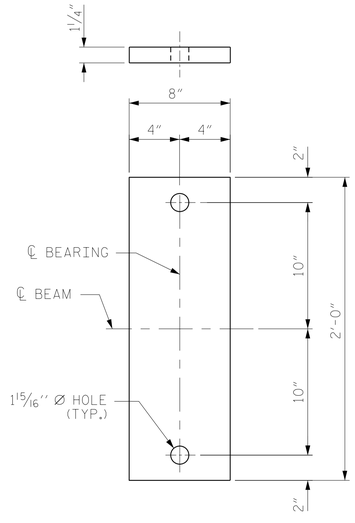
SECTION X-X



SOLE PLATE
(FIXED)



SOLE PLATE
(EXPANSION)



MASONRY PLATE

PLATE DETAILS

NOTES:

CONTRACTOR SHALL FIELD VERIFY PLATE THICKNESS REQUIRED.

CUT EXISTING ANCHOR BOLTS FLUSH TO TOP OF THE CONCRETE. BOLT ENDS SHALL BE COATED WITH AN APPROVED EPOXY PAINT.

THE CONTRACTOR SHALL CORE INTO EXISTING BENT CAP TO INSTALL 1¾″ Ø ANCHOR BOLTS. BOLTS SHALL BE ADHESIVELY ANCHORED. FOR ADHESIVELY ANCHORED ANCHOR BOLTS, SEE STANDARD SPECIFICATIONS.

CONTRACTOR SHALL SUBMIT PROPOSED ADHESIVE FOR APPROVAL. ADHESIVE FOR NEW ANCHOR BOLTS SHALL BE ON THE NCDOT APPROVED PRODUCT LIST FOR THE PROPOSED USED.

EMBEDMENT DEPTH OF ANCHOR BOLT SHALL BE 9″, OR THE DEPTH RECOMMENDED BY THE ADHESIVE MANUFACTURER TO ATTAIN PULL-OUT STRENGTH OF THE TEST LOAD GIVEN BELOW, WHICHEVER DEPTH IS GREATER.

NEW ADHESIVELY ANCHORED BOLTS SHALL BE SUBJECT TO LEVEL 1 FIELD TESTING, IN ACCORDANCE WITH STANDARD SPECIFICATION ARTICLE 420-13 (C), EXCEPT THAT THE TEST LOAD SHALL BE 18,000 LBS. TENSION.

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THE BACKED OFF ½″ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

THE 2″ Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENT OF ASTM D1785.

THE PAYMENT FOR THE PIPE SLEEVES SHALL BE INCLUDED IN THE PAY ITEM, ″STEEL BEARING REPLACEMENT″.

SOLE PLATES, BOLT, NUT, AND WASHERS SHALL BE GALVANIZED ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATION.

REMOVE GALVANIZING OR ANY OTHER COATING AT THE LOCATION OF FIELD WELDS AND PREPARE THE WELD AREAS AS PER ARTICLE 440-7 OF THE STANDARD SPECIFICATION.

FIELD PAINTING IS CONDUCTED AFTER ERECTION, OR WHEN DAMAGE TO A SHOP APPLIED COATING SYSTEM IS REPAIRED OR WHEN STEEL IS OTHERWISE PAINTED OUTSIDE AN ENCLOSED SHOP ENVIRONMENT. THE STRUCTURAL STEEL SHOP COATINGS PROGRAM SHALL BE CONSIDERED IN CONJUNCTION WITH THE PROJECT SPECIAL PROVISIONS FOR FIELD APPLICATIONS.

THE CONTRACTOR SHALL VERIFY THE BOLT SPACING PRIOR TO FABRICATION.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

PROJECT NO. U-6020

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NORTH CAROLINA PROFESSIONAL SEAL 027320 ENGINEER MICHAEL W. CRAIG

DocuSigned by: Michael Craig C49E9154B8B544C...

5/3/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BEARING DETAILS

DRAWN BY : J.MYA DATE : 3/2019
CHECKED BY : J.YANNACCONE DATE : 3/2019
DESIGN ENGINEER OF RECORD : MICHAEL W. CRAIG DATE : 4/2024

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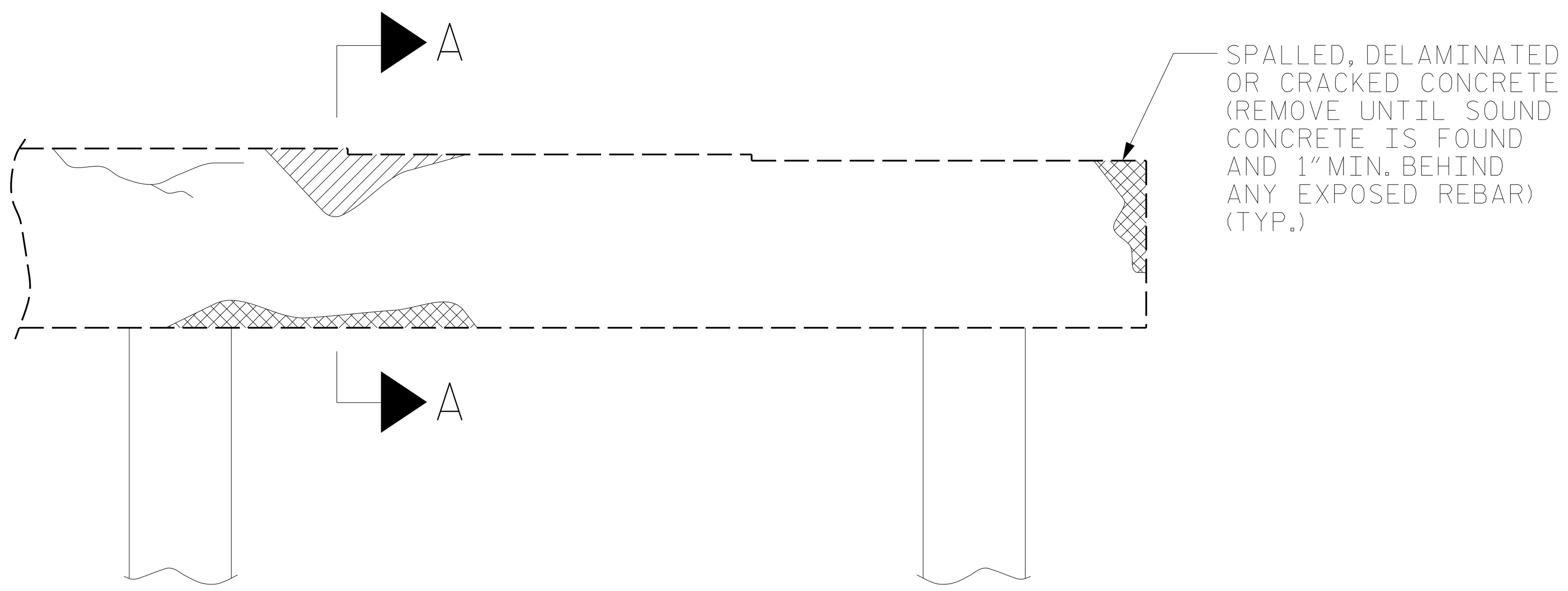
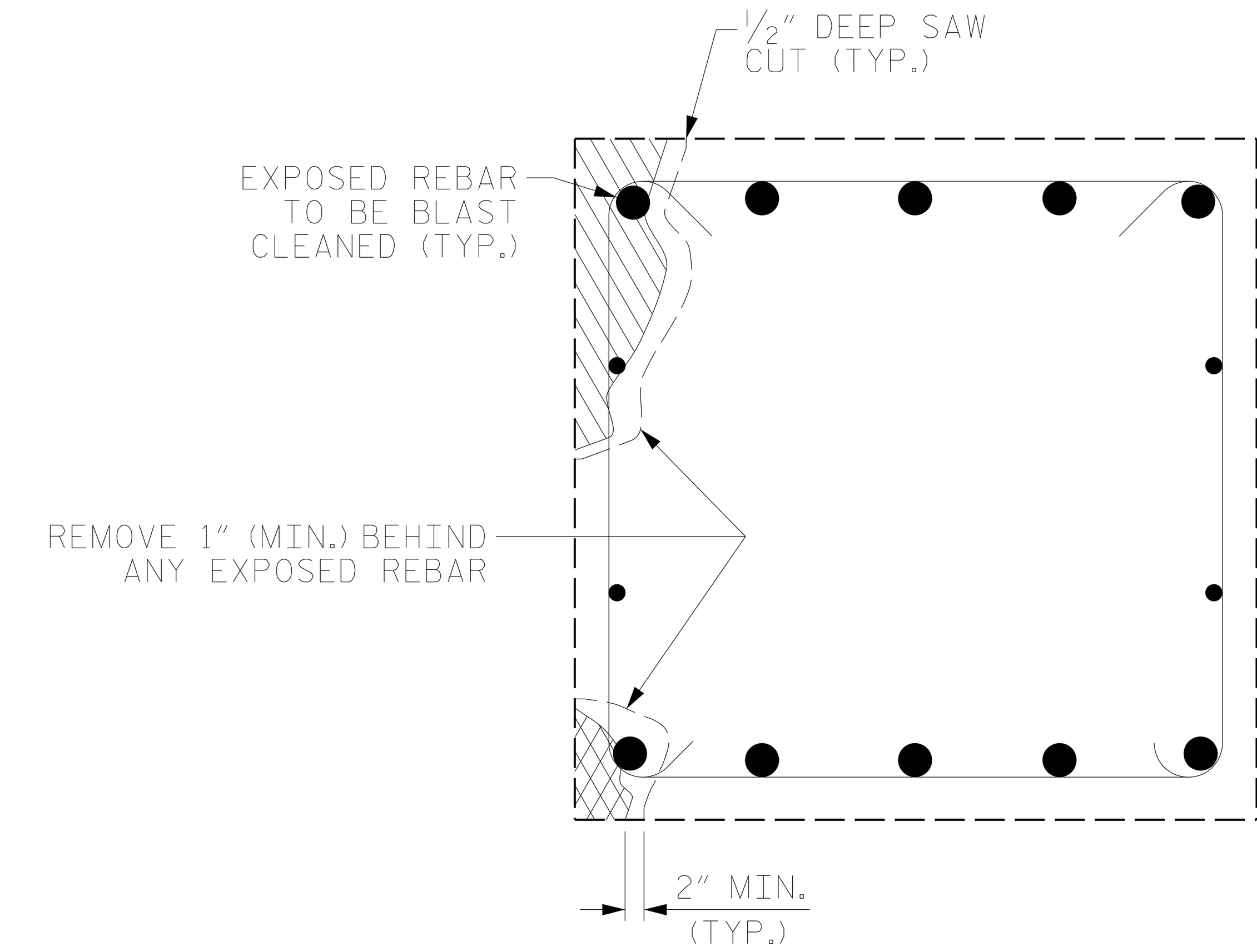
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			16

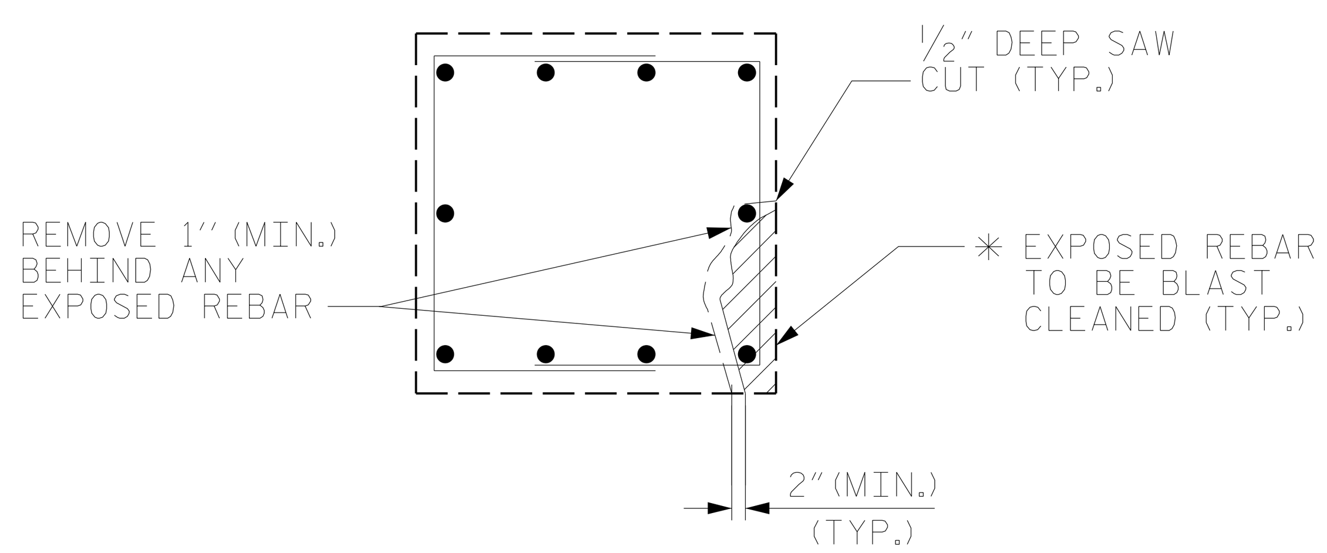


BENT CAP REPAIR



SECTION A-A

CAP REPAIR



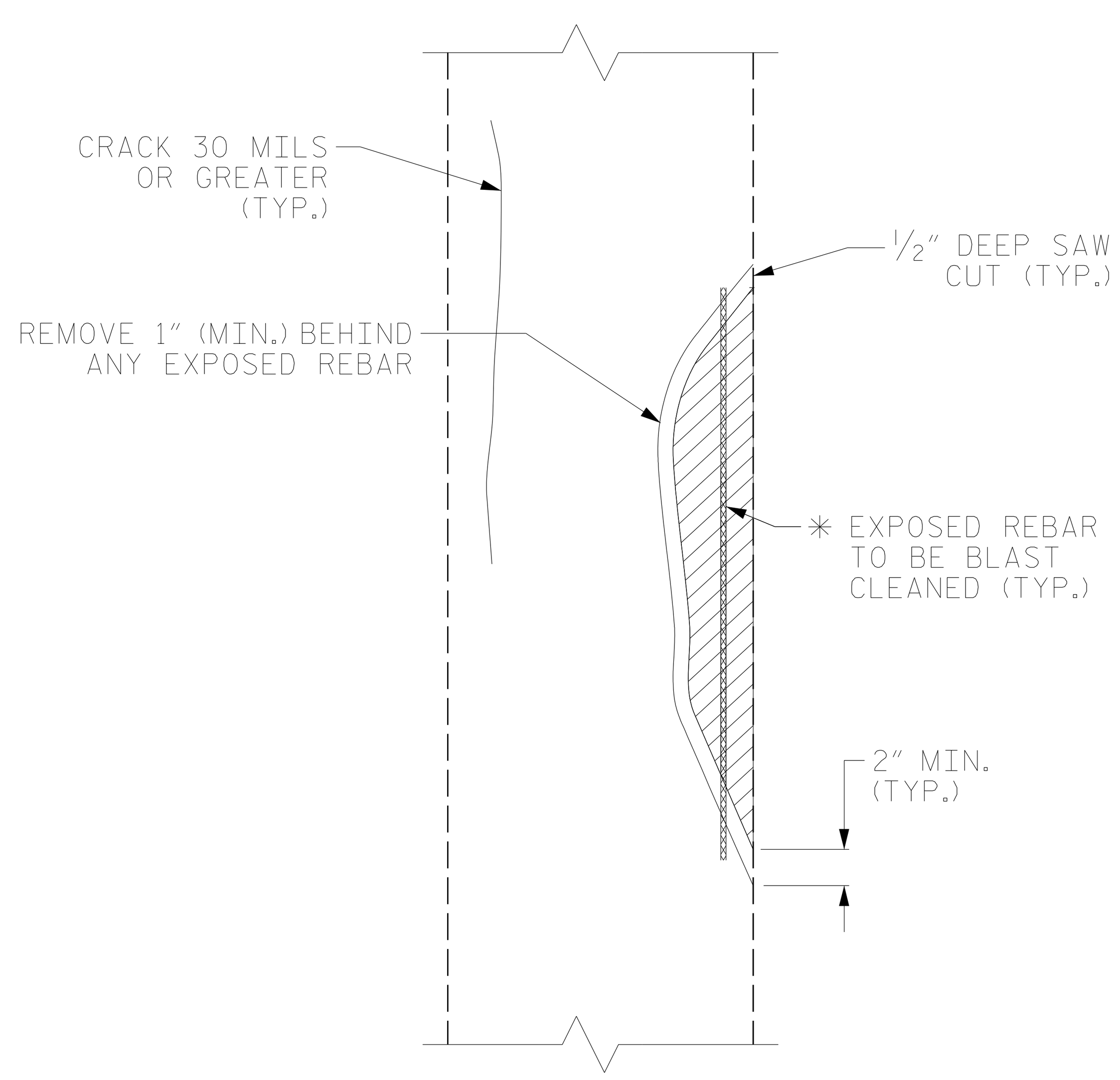
PLAN OF COLUMN

REPAIR KEY

CONCRETE REPAIR AREA (FORM AND POUR)

SHOTCRETE REPAIR AREA

EPOXY RESIN INJECTION



✻ THE MAXIMUM LENGTH OF ANY ONE REPAIR SEGMENT AT ONE TIME SHALL NOT EXCEED 10 FEET. THE REMAINING REPAIR SEGMENTS SHALL BE ADDRESSED ONLY AFTER REPAIR OF THE FIRST SEGMENT IS COMPLETE.

ELEVATION OF COLUMN

COLUMN REPAIR

SPLICE LENGTH TABLE

BAR SIZE	MINIMUM SPLICE LENGTH
#4	2'-4"
#5	2'-9"
#6	4'-0"
#7	5'-3"
#8	6'-9"
#9	8'-6"
#10	10'-11"
#11	13'-4"

NOTES:

TYPICAL BENT CAP REPAIRS ARE SHOWN. REPAIR DETAILS SIMILAR FOR END BENT CAPS AND STRUTS.

SOUND CONCRETE TO DETERMINE EXTENT OF REPAIR LOCATIONS. THE METHOD USED TO DELINEATE THE AREAS OF THE UNSOUND CONCRETE TO BE REPAIRED SHALL NOT PERMANENTLY MARK THE CONCRETE, LEAVE ANY RESIDUE AFTER REMOVAL OR REQUIRE HARSH CHEMICALS TO REMOVE.

THE CONTRACTOR SHALL REMOVE THE DETERIORATED CONCRETE IN ACCORDANCE WITH THE GUIDELINES SET IN THESE NOTES, IN THE SPECIAL PROVISIONS AND STANDARD SPECIFICATIONS.

REMOVE ALL LOOSE OR WEAKENED MATERIAL THEN CLEAN THE AREA OF DIRT, GREASE, OIL AND FOREIGN MATTER.

REMOVE SURFACE CONCRETE TO VERIFY THAT SAWCUT DEPTH WILL NOT DAMAGE EXISTING REINFORCING STEEL. SAW CUT AROUND REPAIR AREA TO A NOMINAL DEPTH OF ½".

REMOVE UNSOUND CONCRETE TO THE EXTENT NECESSARY, MINIMUM 1" BEHIND THE REBAR AND MINIMUM 2" CLEARANCE TO SAW CUT.

NO MORE THAN ONE-THIRD OF THE CAP OR COLUMN CROSS SECTIONAL AREA SHALL BE REMOVED AT ONE TIME. SHOULD IT BECOME NECESSARY TO REMOVE MORE THAN 30% OF A CAP OR COLUMN CROSSECTIONAL AREA, NOTIFY THE ENGINEER PRIOR TO PROCEEDING.

SIMULTANEOUSLY REMOVAL OF UNSOUND CONCRETE MAY BE PERMITTED ON MORE THAN ONE FACE OF A CAP OR COLUMN. IF AREAS OF REMOVAL ARE NOT ADJACENT TO OR DIRECTLY OPPOSITE ONE ANOTHER. IF REMOVAL EXTENDS 1½" BEHIND THE MAIN REINFORCING BARS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING.

CLEAN ALL EXPOSED REINFORCING BARS. FOR BARS WITH MORE THAN 10% SECTION LOSS, SPLICE AND SECURELY TIE SUPPLEMENTAL REINFORCING BARS AS NEEDED.

REINFORCING STEEL WHICH IS DETERMINED BY THE ENGINEER TO BE REPLACED SHALL BE REMOVED TO A POINT WHERE IT IS SOUND. THE PATCH SHALL EXTEND A SUFFICIENT DISTANCE BEYOND THIS POINT TO DEVELOP A SPLICE LENGTH SPECIFIED IN THE TABLE ON THIS SHEET.

FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

COAT ALL SURFACE AREAS ON THE TOP OF THE BENT CAPS, INCLUDING CHAMFER, WITH EPOXY PROTECTIVE COATING.

FOR SHOTCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR CONCRETE REPAIRS, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING, SEE SPECIAL PROVISIONS.

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

PROJECT NO. U-6020
GRANVILLE COUNTY
BRIDGE NO. 380045

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027320 MICHAEL W. CRAIG
DocuSigned by: Michael Craig
5/3/2024

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL CAP AND COLUMN REPAIR DETAILS

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SHEET NO. S-15
TOTAL SHEETS 16

DRAWN BY :	J.MYA	DATE :	3/2019
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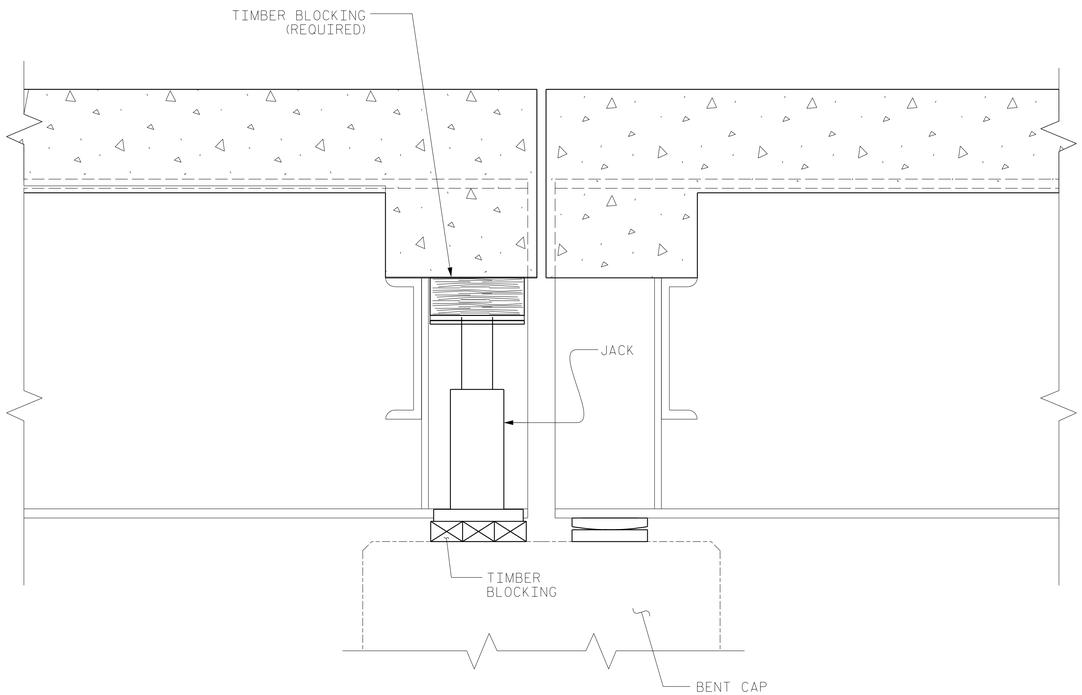

SECTION THRU BENT

NOTE:
SKETCH IS PROVIDED AS AN ILLUSTRATIVE EXAMPLE ONLY. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS, GEOMETRIES, DIMENSIONS, ETC., AND SHALL DEVELOP JACKING PLAN FOR INDIVIDUAL BRIDGES AND BENTS, AS NECESSARY, BASED ON EXISTING CONDITIONS AND REQUIRED AND ANTICIPATED LOADS. CONTRACTOR SHALL SUBMIT JACKING PLAN FOR REVIEW AND SHALL RECEIVE APPROVAL PRIOR TO ORDERING OR FABRICATING JACKING MATERIAL.

NOTES:

THE CONTRACTOR SHALL SUBMIT PLANS AND CALCULATIONS FOR REVIEW AND APPROVAL PRIOR TO MATERIAL PURCHASE OR FABRICATION OF THE JACKING SYSTEM.

THE BEAM SHALL BE LIFTED ENOUGH THAT THE BEAM CLEARS THE BEARINGS AND ALL LOAD IS SUPPORTED BY THE JACKS. AFTER JACKING IS COMPLETE THE CONTRACTOR SHALL PROVIDE A METHOD TO SUPPORT THE BEAM FOR DEAD AND LIVE LOADS AND REMOVE THE JACK DURING THE REPAIR OPERATIONS. IF THE JACKS REMAIN IN PLACE DURING THE ENTIRE JACKING AND REPAIR OPERATION, THEY SHALL HAVE MECHANICAL LOCK-OFF CAPABILITIES.

IF DURING THE JACKING PROCESS OR WHILE THE BEAM IS BEING SUPPORTED THE BEAM SHIFTS FROM ITS ORIGINAL POSITION, ALL WORK SHALL CEASE AND THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.

PRIOR TO JACKING, THE CONTRACTOR SHALL ENSURE THERE ARE NO OBSTACLES PREVENTING THE BEAM FROM BEING LIFTED.

ALL ADJACENT BEARINGS OF BEAMS NOT BEING JACKED MAY BE LOOSENED TO DECREASE THE RESISTANCE OF THE DECK SLAB DURING JACKING. ALL BEARINGS LOOSENED SHALL BE TIGHTENED BACK AFTER REPAIR OPERATIONS ARE COMPLETED AND THE JACKS AND BLOCKING HAVE BEEN REMOVED.

THE MAXIMUM DIFFERENTIAL BETWEEN ADJACENT BEAMS THAT ARE BEING JACKED IS 1/8".

FOR BRIDGE JACKING DETAILS SEE SPECIAL PROVISIONS.

PROJECT NO. U-6020

GRANVILLE COUNTY

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5/3/2024

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RALEIGH

JACKING DETAILS

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

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 ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" 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 ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø 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 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 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. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

REV. 5-7-03 RWW (✓) JTE REV. 10-1-11 MAA (✓) GM REV. 10-23 BNB (✓) NAP
REV. 5-1-06 TLA (✓) GM REV. 12-17 MAA (✓) THC