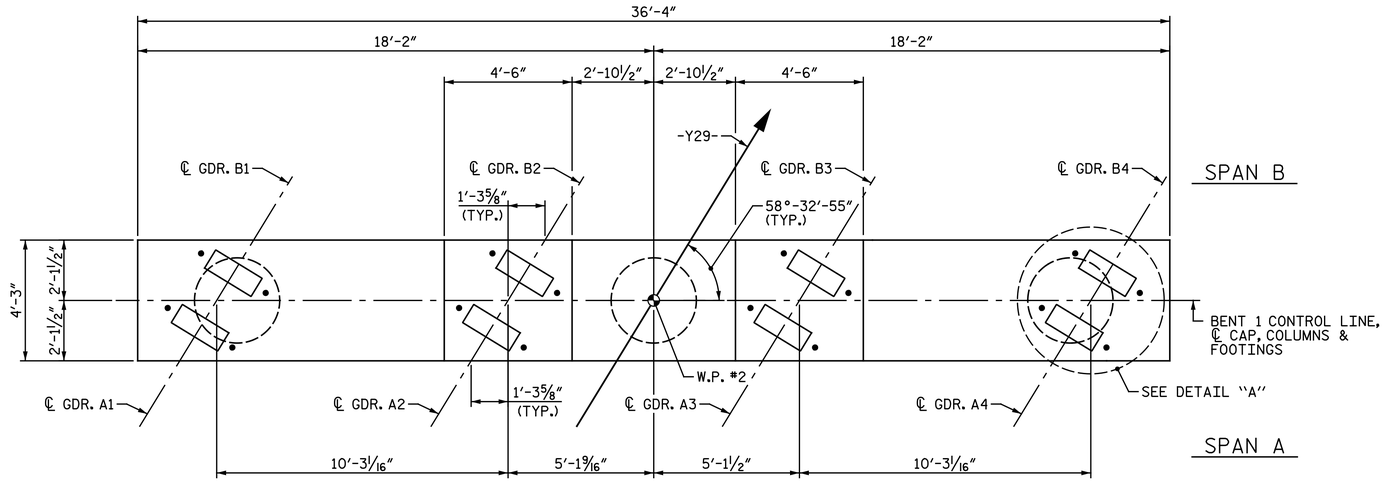
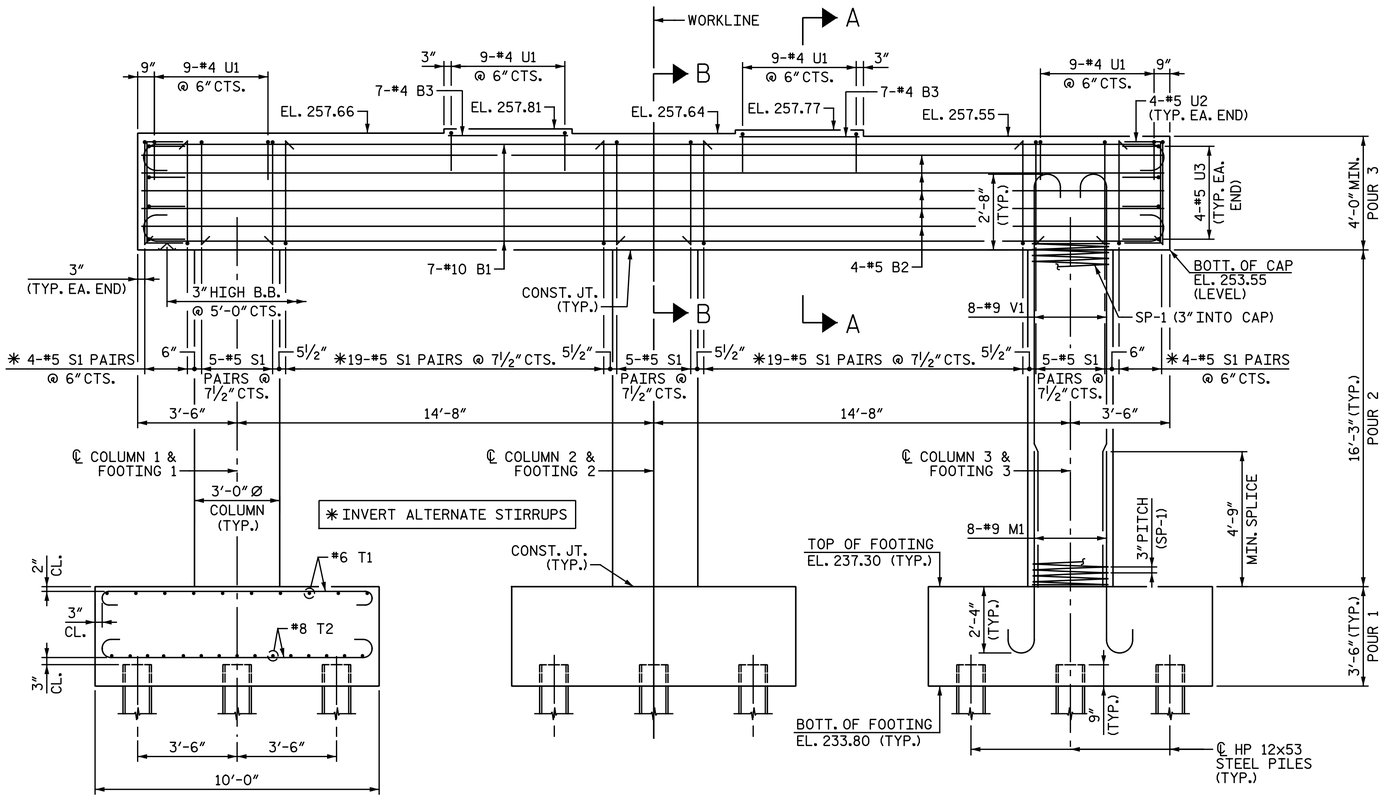


PLAN



ELEVATION

REINFORCING STEEL DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING. DIMENSIONS AND PILE LOCATIONS ARE TYPICAL FOR EACH FOOTING.

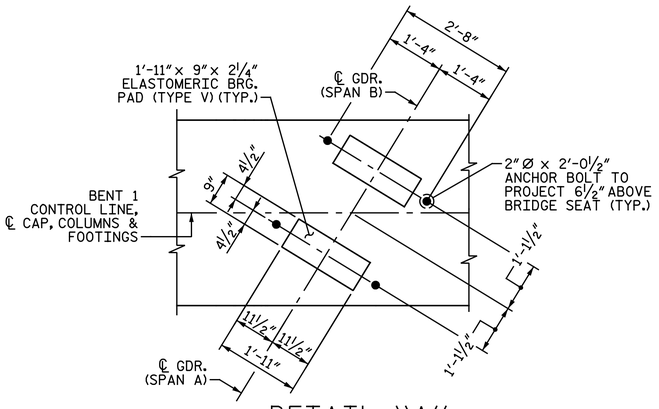
NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS AND COLUMN REINFORCING STEEL.

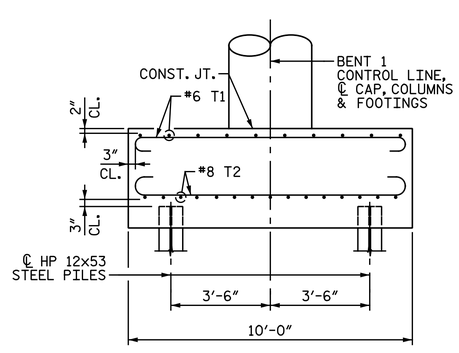
FOR "SECTION A-A" AND "SECTION B-B", SEE "BENT 1 DETAILS" SHEET.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

FOR PILE SPLICE DETAILS, SEE "END BENT 2 DETAILS" SHEET.



DETAIL "A"
(TYP. EA. BRIDGE SEAT)



PARTIAL END ELEVATION
(FOR COLUMN REINFORCING STEEL, SEE ELEVATION)

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29-

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIPUL A. PATEL

DocuSigned by: Vipul A Patel AC3E887A798544D...
4/13/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

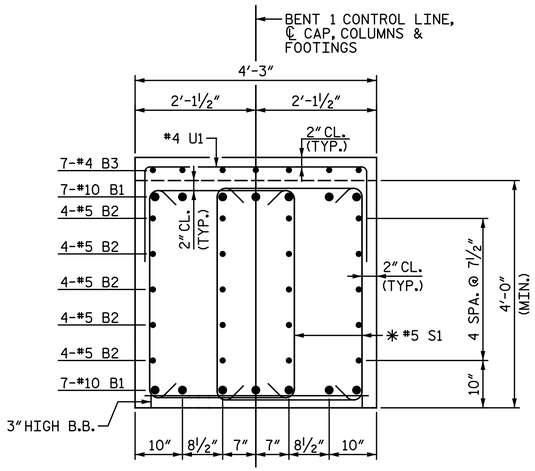
SUBSTRUCTURE

BENT 1

DRAWN BY : C. E. MAYHEW DATE : 11-12-19
CHECKED BY : V. A. PATEL DATE : 1-27-20

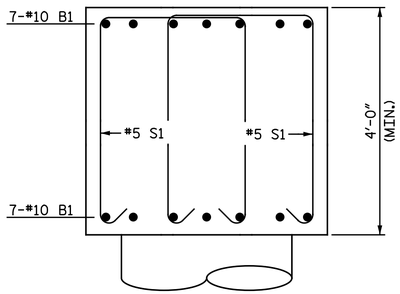
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-20
1			3			TOTAL SHEETS
2			4			28



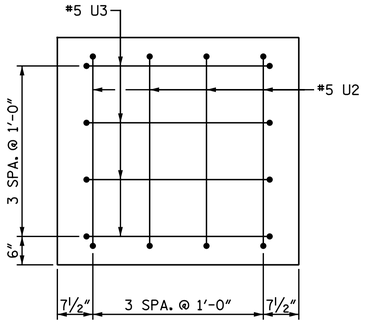
SECTION A-A

✳ INVERT ALTERNATE STIRRUPS



SECTION B-B

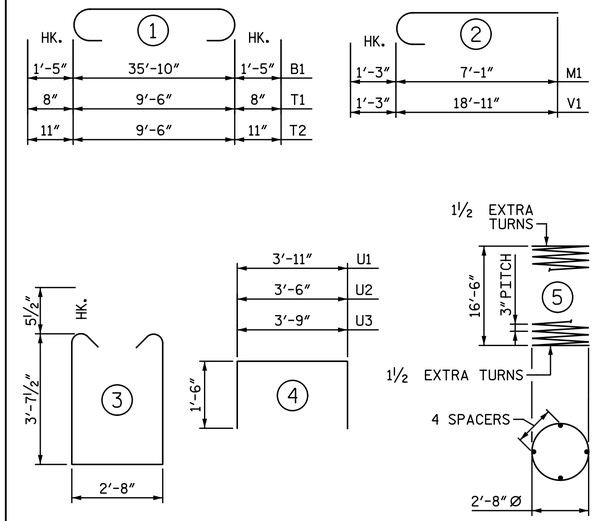
ONLY #9 B1 & #5 S1 SHOWN FOR CLARITY.
(TYP. EA. COLUMN)



END VIEW

(TYP. EA. END)

BAR TYPES



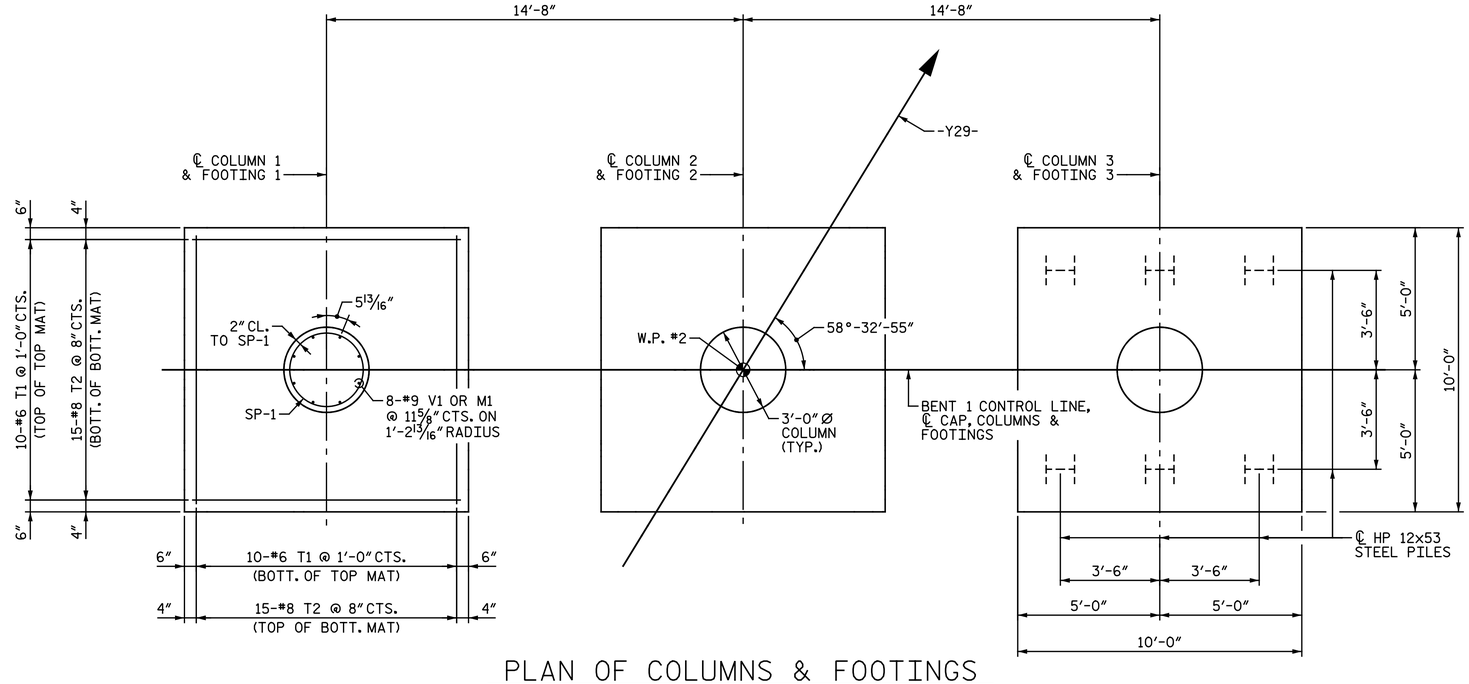
ALL BAR DIMENSIONS ARE OUT TO OUT.

✳✳ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	14	#10	1	38′ - 8″	2,329
B2	20	#5	STR.	36′ - 0″	751
B3	14	#4	STR.	4′ - 2″	39
M1	24	#9	2	8′ - 4″	680
S1	122	#5	3	10′ - 10″	1,378
T1	60	#6	1	10′ - 10″	976
T2	90	#8	1	11′ - 4″	2,723
U1	36	#4	4	6′ - 11″	166
U2	8	#5	4	6′ - 6″	54
U3	8	#5	4	6′ - 9″	56
V1	24	#9	2	20′ - 2″	1,646
REINFORCING STEEL				LBS.	10,798
SP-1	3	✳✳	5	569′ - 3″	1,141
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,141
CLASS A CONCRETE					
POUR 1 - FOOTINGS				C.Y.	38.9
POUR 2 - COLUMNS				C.Y.	12.8
POUR 3 - CAP				C.Y.	23.5
TOTAL CLASS A CONCRETE				C.Y.	75.2
FOUNDATION EXCAVATION FOR BENT				LUMP SUM	
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES				EA.	18
HP 12x53 STEEL PILES					
NO. 18				LIN. FT.	1,170
PILE REDRIVES				EA.	9



PLAN OF COLUMNS & FOOTINGS

REINFORCING STEEL DIMENSIONS AND DETAILS ARE TYPICAL FOR EACH COLUMN AND FOOTING.

DIMENSIONS AND PILE LOCATIONS ARE TYPICAL FOR EACH FOOTING.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29-

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIPUL A. PATEL

DocuSigned by: Vipul A Patel AC3E887A79B544D...

4/13/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

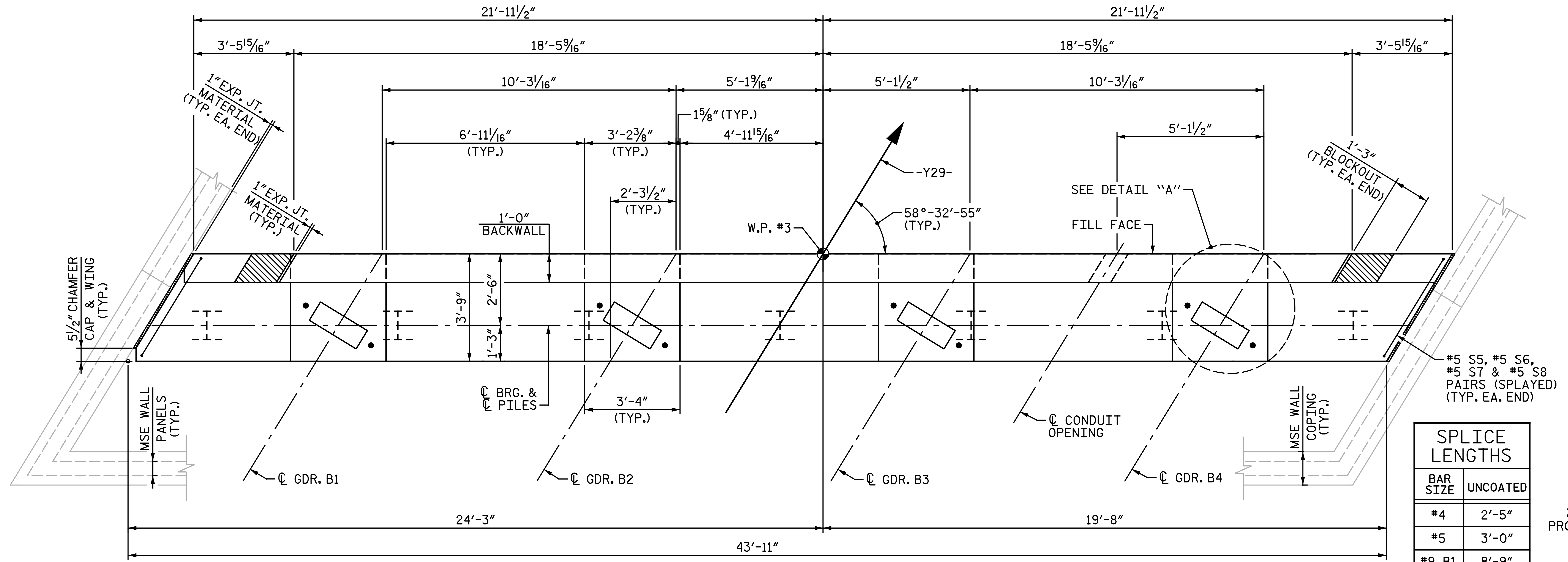
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

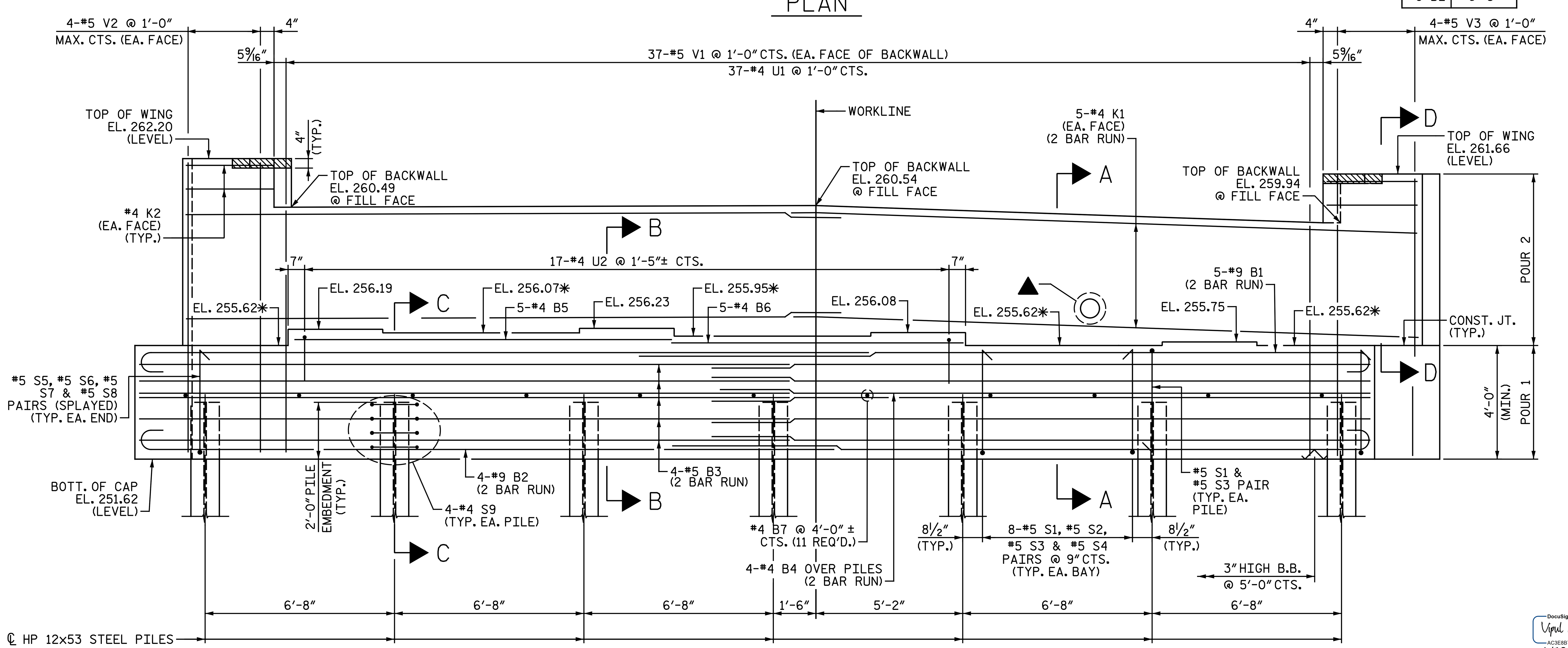
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-21
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : C. E. MAYHEW DATE : 10-11-19
CHECKED BY : V. A. PATEL DATE : 12-30-19



PLAN



ELEVATION

▲ CONDUIT OPENING. SEE DETAIL "E" ON "END BENT 2 DETAILS" SHEET.

FOR END OF CAP REINFORCEMENT, SEE END BENT 2 DETAILS SHEET.

✱ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "SECTION A-A" ON "END BENT 2 DETAILS" SHEET.

NOTES:

FOR "SECTION A-A", "PARTIAL SECTION B-B", "PARTIAL SECTION C-C" AND "PARTIAL SECTION D-D", SEE "END BENT 2 DETAILS" SHEET.

STIRRUPS & U2 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

THE CONCRETE IN THE HATCHED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

FOR MSE WALLS, SEE SPECIAL PROVISIONS.

FOR LOCATION OF MSE WALL AND PILE SLEEVES, SEE MSE WALL PLANS.

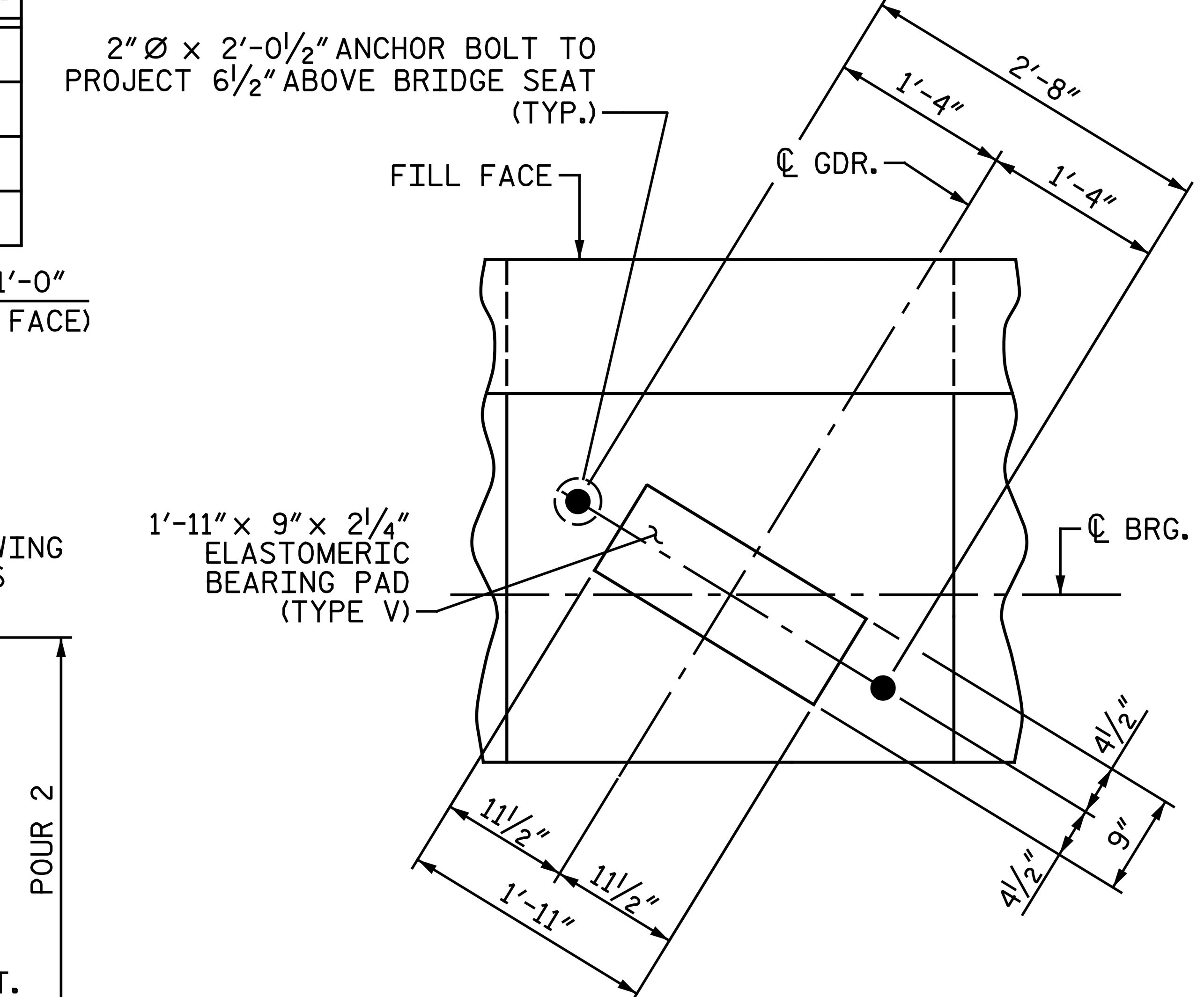
LENGTH OF CAP AND EACH WING SHALL BE FIELD ADJUSTED AS REQUIRED TO PROVIDE 1" EXPANSION JOINT MATERIAL AS SHOWN BETWEEN THESE COMPONENTS AND THE MSE WALL COPING.

FOR MSE REINFORCING STRAP LOAD DETAIL, SEE "END BENT 1 DETAILS" SHEET.

V1 AND K1 BARS IN BACKWALL MAY BE SHIFTED AS NECESSARY TO CLEAR CONDUIT OPENING.

SPLICE LENGTHS

BAR SIZE	UNCOATED
#4	2'-5"
#5	3'-0"
#9 B1	8'-9"
#9 B2	6'-3"



DETAIL "A"

(TYP. EA. BRIDGE SEAT)

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29-

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIPUL A. PATEL

DocuSigned by: Vipul A Patel

AC3E887A798544D...

4/13/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

RALEIGH

SUBSTRUCTURE

END BENT 2

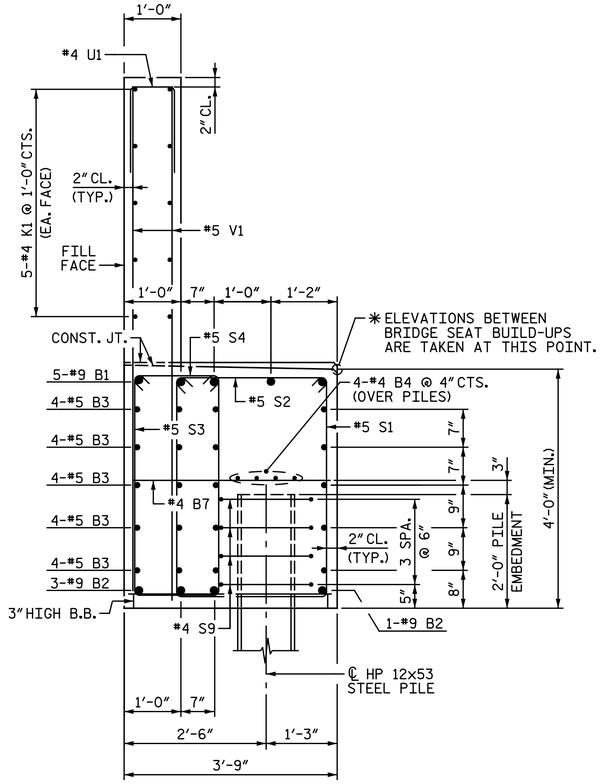
Michael Baker INTERNATIONAL

Michael Baker Engineering 8000 Regency Parkway, Suite 600 Cary, North Carolina 27518 NC License No.: F-1084

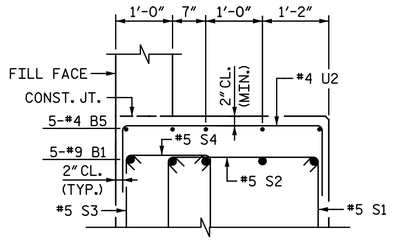
REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S2-22
1				3				TOTAL SHEETS
2				4				28

DRAWN BY : C. E. MAYHEW DATE : 9-24-19

CHECKED BY : V. A. PATEL DATE : 1-27-20

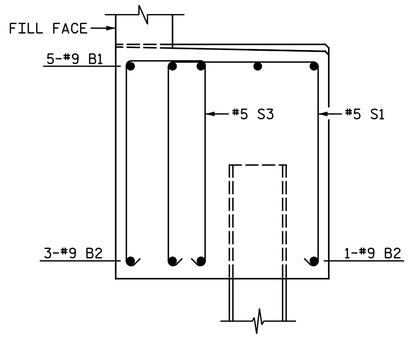


SECTION A-A



PARTIAL SECTION B-B

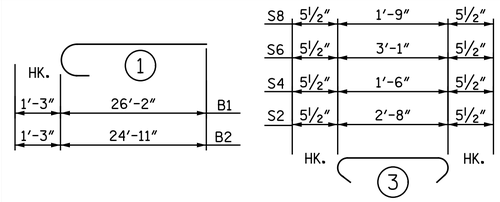
V1 BARS NOT SHOWN FOR CLARITY.



PARTIAL SECTION C-C

ONLY B1, B2, S1 & S3 BARS SHOWN FOR CLARITY.

BAR TYPES



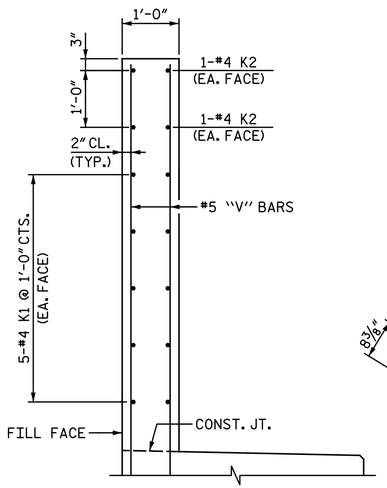
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

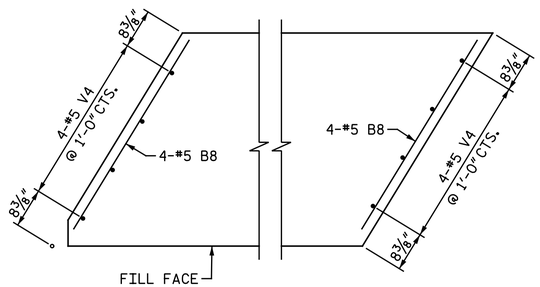
END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	27' - 5"	932
B2	8	#9	1	26' - 2"	712
B3	40	#5	STR.	23' - 4"	973
B4	8	#4	STR.	23' - 0"	123
B5	5	#4	STR.	13' - 2"	44
B6	5	#4	STR.	10' - 1"	34
B7	11	#4	STR.	3' - 5"	25
B8	8	#5	STR.	3' - 7"	30
K1	20	#4	STR.	23' - 0"	307
K2	8	#4	STR.	3' - 1"	16
K3	16	#4	STR.	3' - 8"	39
S1	55	#5	2	10' - 10"	621
S2	48	#5	3	3' - 7"	179
S3	55	#5	2	9' - 8"	555
S4	48	#5	3	2' - 5"	121
S5	2	#5	2	11' - 3"	23
S6	2	#5	3	4' - 0"	8
S7	2	#5	2	9' - 11"	21
S8	2	#5	3	2' - 8"	6
S9	28	#4	4	6' - 6"	122
U1	37	#4	5	3' - 8"	91
U2	17	#4	5	6' - 5"	73
V1	74	#5	STR.	7' - 10"	605
V2	8	#5	STR.	10' - 1"	84
V3	8	#5	STR.	9' - 7"	80
V4	8	#5	STR.	3' - 7"	30

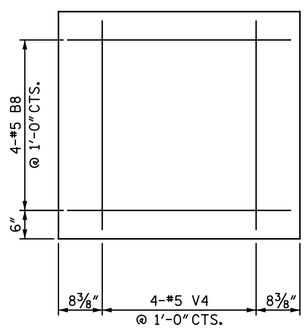
REINFORCING STEEL	LBS.	5,854
CLASS A CONCRETE		
POUR 1 - CAP	C.Y.	26.0
POUR 2 - BACKWALL & WINGS	C.Y.	7.9
TOTAL	C.Y.	33.9
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	EA.	7
HP 12x53 STEEL PILES NO. 7	LIN. FT.	455
PILE REDRIVES	EA.	4



PARTIAL SECTION D-D

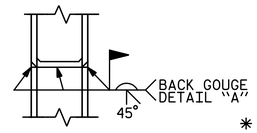


PLAN

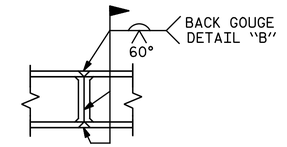


END VIEW

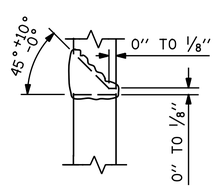
END OF CAP



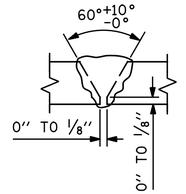
* PILE VERTICAL



* PILE HORIZONTAL OR VERTICAL



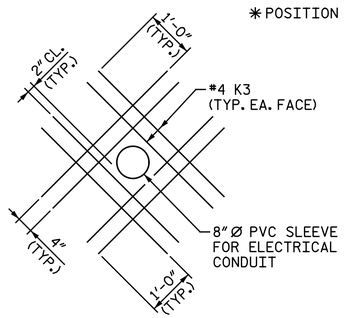
DETAIL "A"



DETAIL "B"

PILE SPLICE DETAILS

*POSITION OF PILE DURING WELDING



DETAIL "E"

THE PVC SLEEVE THROUGH THE BACKWALL SHALL BE LOCATED BY THE ENGINEER. THE K3 BARS MAY BE SHIFTED AS NECESSARY TO CLEAR TOP OF CAP.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29-

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIRUL A. PATEL

DocuSigned by: Virul A Patel AC3E887A78B544D...

4/13/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 2 DETAILS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

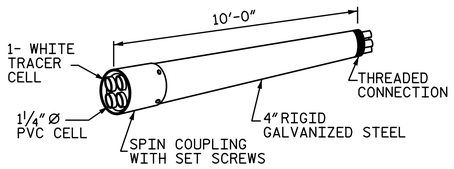
Michael Baker INTERNATIONAL

Michael Baker Engineering 8000 Regency Parkway, Suite 600 Cary, North Carolina 27518 NC License No.: F-1084

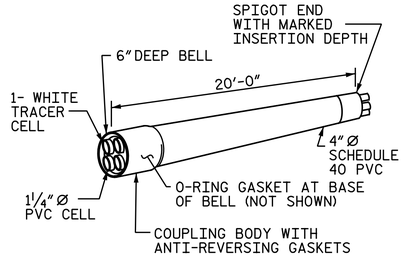
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-23
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : C. E. MAYHEW DATE : 9-24-19

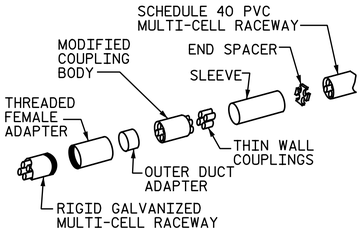
CHECKED BY : V. A. PATEL DATE : 12-30-19



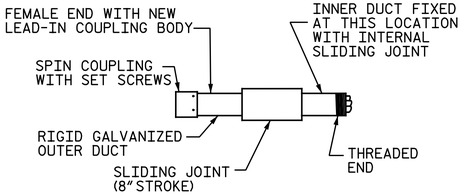
RIGID GALVANIZED (RGC)
MULTI-CELL RACEWAY



SCHEDULE 40 PVC
MULTI-CELL RACEWAY



TRANSITION ADAPTER



EXPANSION JOINT FITTING

NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE TOTAL QUANTITY OF CONDUIT NEEDED TO COMPLETE THE WORK AND THAT THE CONDUIT(S) ARE PLACED AT THE NOTED DIMENSION AND ABOVE THE BOTTOM OF THE GIRDER.

THE INSTALLATION OF THE CONDUIT SYSTEM SHALL BE PAID FOR AS LUMP SUM. THE PRICE SHALL INCLUDE ALL CONDUIT, HANGERS, STABILIZERS, EXPANSION JOINTS, CONCRETE INSERTS, PVC SLEEVES AND ALL NECESSARY HARDWARE TO COMPLETE THE WORK.

THE CONTRACTOR SHALL FIELD VERIFY THAT THE CONDUIT SYSTEM IS NOT IN CONFLICT WITH THE GUARDRAIL POSTS.

SEE DETAIL "C" FOR HANGER ASSEMBLY INSTALLATION.

INSTALL SLEEVES PARALLEL TO GIRDERS. SEE DETAIL "B" FOR SLEEVE INSTALLATION.

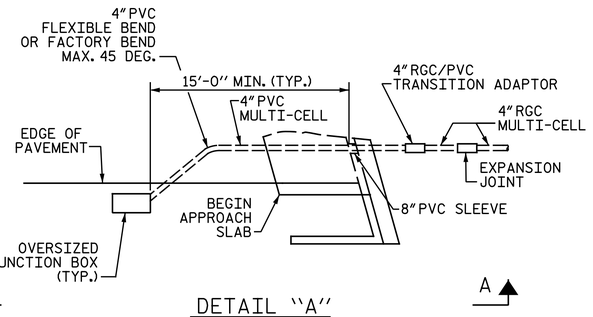
PROVIDE TRANSITION ADAPTOR AND EXPANSION JOINT FOR CONDUIT AT END BENT 1 AND END BENT 2.

INSTALL STABILIZERS MIDWAY BETWEEN DECK EXPANSION JOINTS. STABILIZER CAN NOT BE USED INSTEAD OF A HANGER ASSEMBLY.

THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF ⅝" AND A PULL FORCE OF 1260 lbs.

FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.

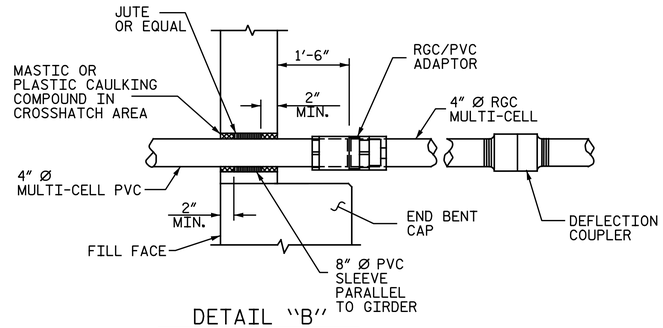
FOR OVERSIZED JUNCTION BOX, SEE ARTICLE 1098-5 OF THE STANDARD SPECIFICATIONS.



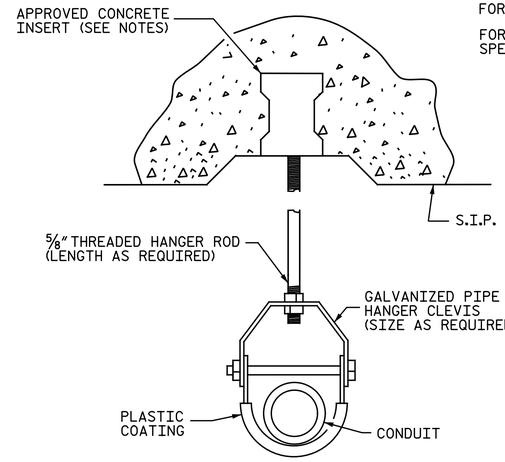
DETAIL "A"
TERMINATION OF CONDUIT AT OVERSIZED JUNCTION BOX

DETAIL "D"

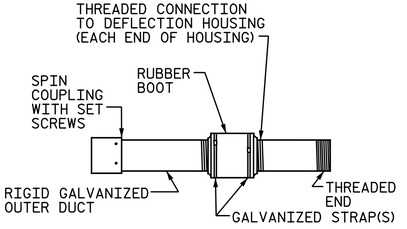
4" MULTI-CELL COMPONENTS



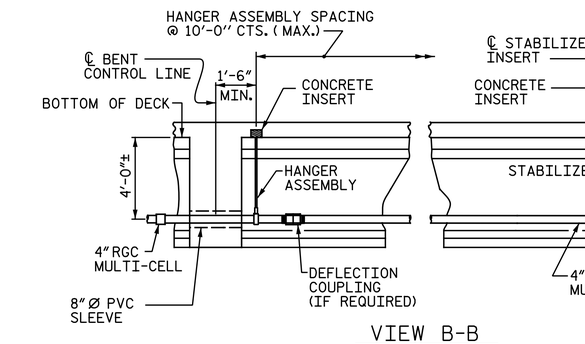
DETAIL "B"
PVC SLEEVE INSTALLATION & RGC/PVC ADAPTOR AT BACKWALL.



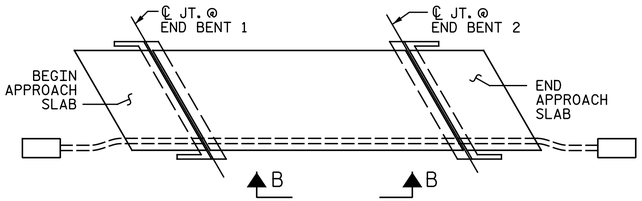
DETAIL "C"
HANGER ASSEMBLY



DETAIL "F"
DEFLECTION COUPLING

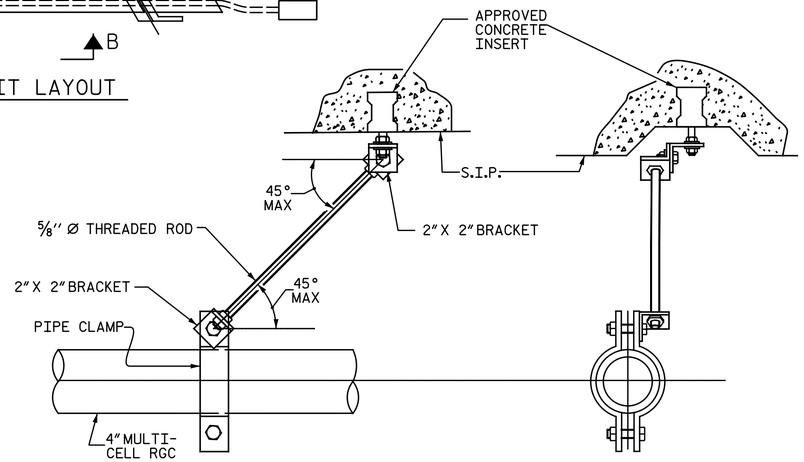


VIEW A-A



CONDUIT LAYOUT

VIEW B-B
PRESTRESSED GIRDERS
CONTINUOUS FOR LIVE LOAD



DETAIL "E"
STABILIZER

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 28+39.21 -Y29-

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIPUL A. PATEL

DocuSigned by: Vipul A Patel AC3E8B7A79B544D...
4/13/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ELECTRICAL CONDUIT SYSTEM FOR SIGNALS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

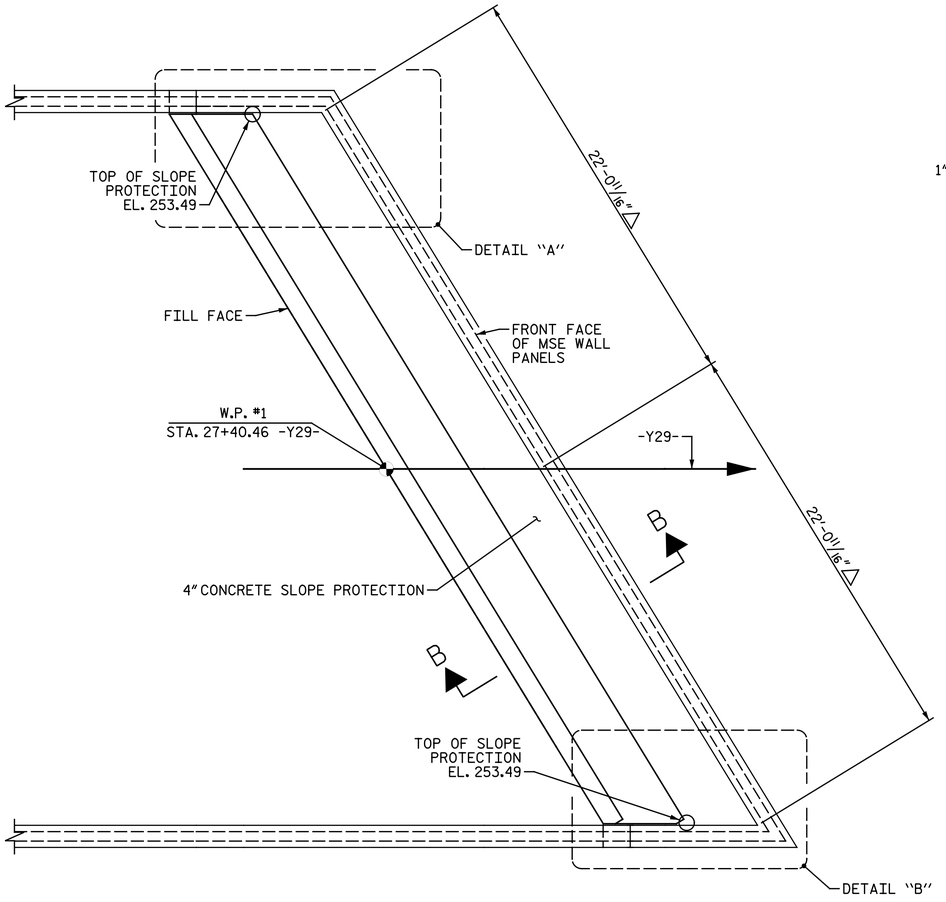
ASSEMBLED BY : N.B. SPEAKS	DATE : 12-26-19	REV. 5/1/06	TLA/GM
CHECKED BY : V.A. PATEL	DATE : 12-30-19	REV. 10/1/11	MAA/GM
DRAWN BY : RWW 2-4-03		REV. 12/17	MAA/THC
CHECKED BY : DBM 2-4-03			

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-24
1			3			TOTAL SHEETS
2			4			28

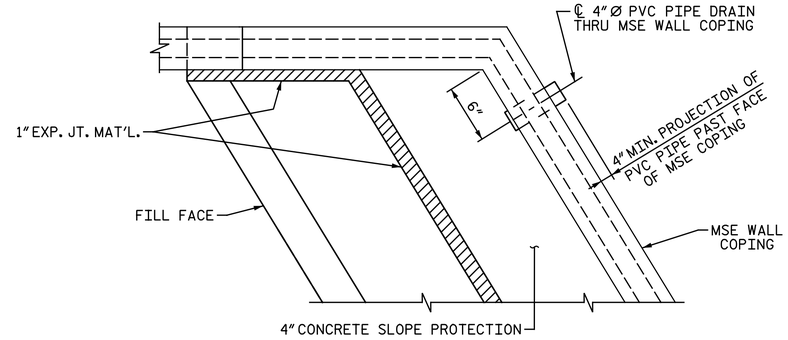
ELECTRIC CONDUIT DETAILS

STD. NO. ECS1

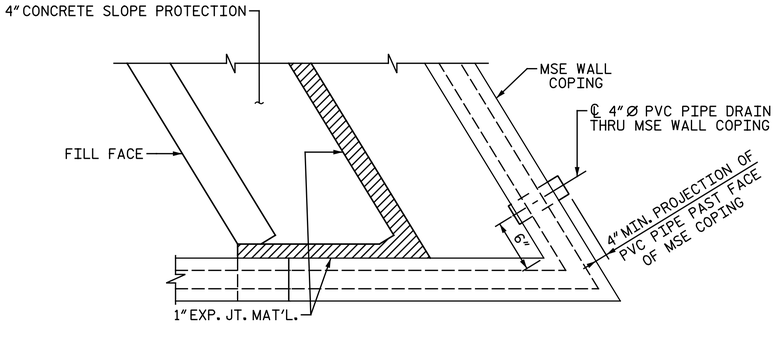


PLAN AT END BENT 1

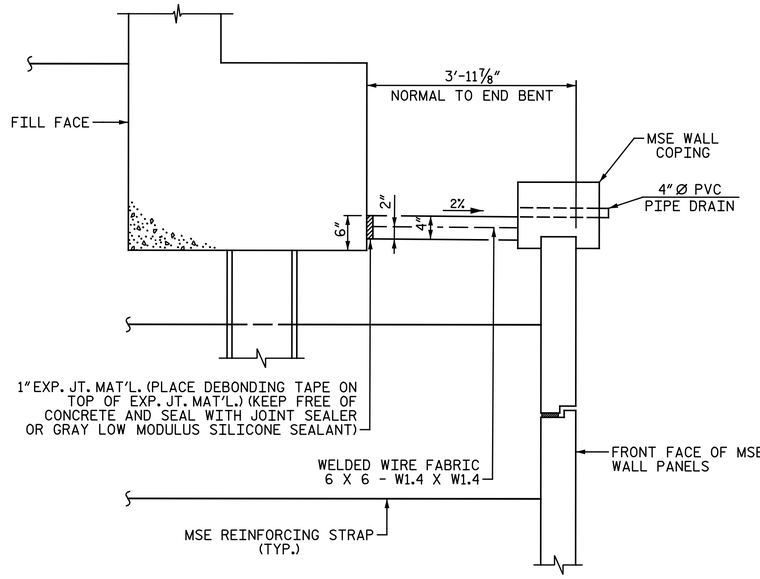
△ DIMENSION TO BE ADJUSTED AS REQUIRED IN FIELD TO MATCH MSE WALL.



DETAIL "A"



DETAIL "B"



SECTION B-B

NOTES:

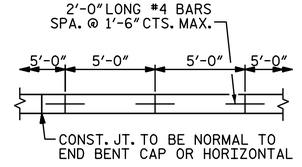
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.

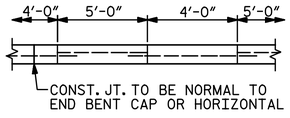
SEE "SLOPE PROTECTION DETAILS" SHEET 2 OF 2 FOR END BENT 2 QUANTITIES.

BRIDGE @ STA. 28+39.21 -Y29-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	15	27

* QUANTITY SHOWN IS BASED ON 5' POURS.



POURING DETAIL



OPTIONAL POURING DETAIL

POUR A 4'-0" STRIP FIRST.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIPUL A. PATEL

DocuSigned by: Vipul A Patel AC3E887A79B544D...

4/13/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

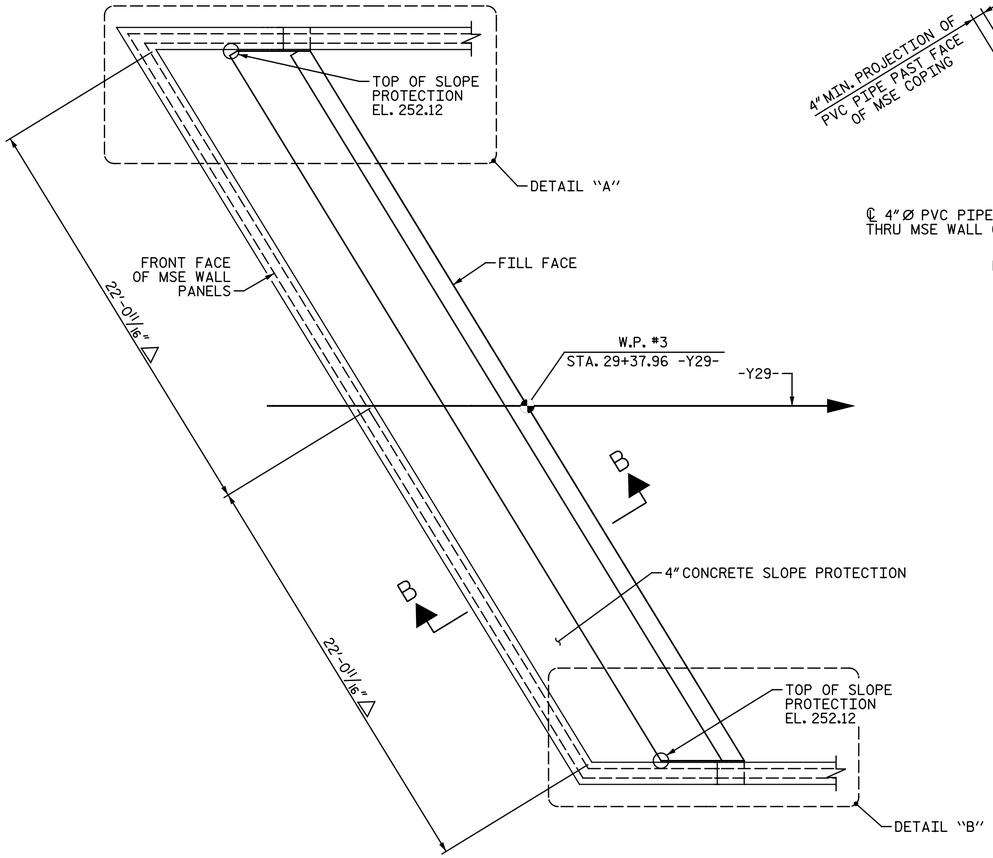
Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-25
1			3			TOTAL SHEETS
2			4			28

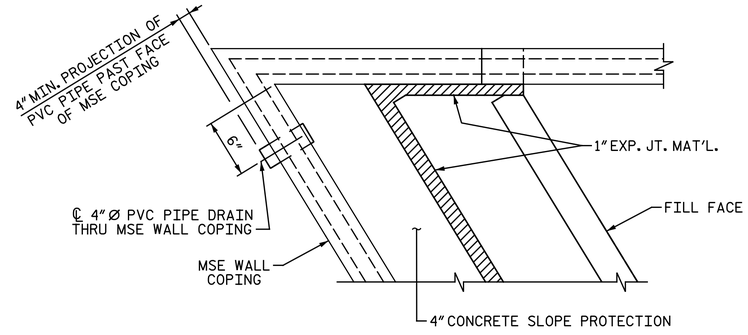
DRAWN BY : N. B. SPEAKS DATE : 8-1-19
CHECKED BY : V. A. PATEL DATE : 1-27-20

NOTE:
SEE NOTES ON ''SLOPE PROTECTION DETAILS'' SHEET 1 OF 2.



PLAN AT END BENT 2

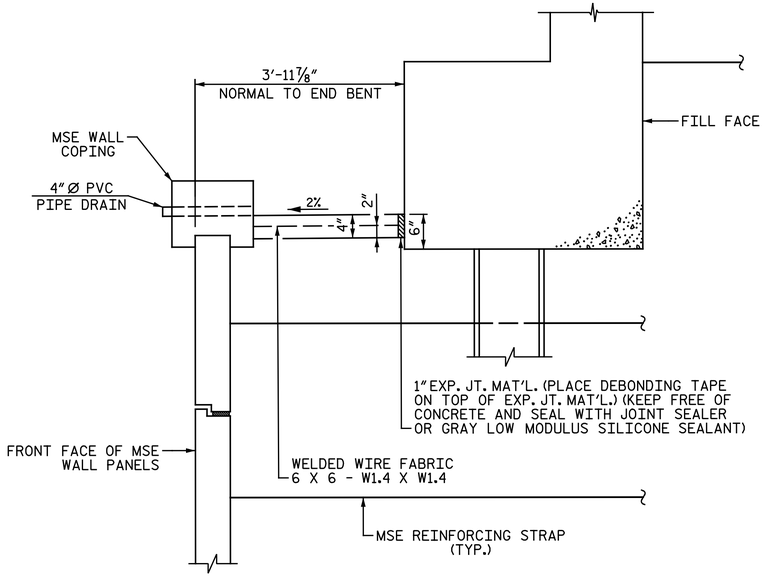
△ DIMENSION TO BE ADJUSTED AS REQUIRED IN FIELD TO MATCH MSE WALL.



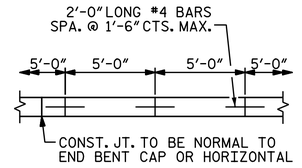
DETAIL ''A''

BRIDGE @ STA. 28+39.21 -Y29-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 2	15	27

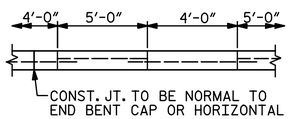
*QUANTITY SHOWN IS BASED ON 5' POURS.



SECTION B-B

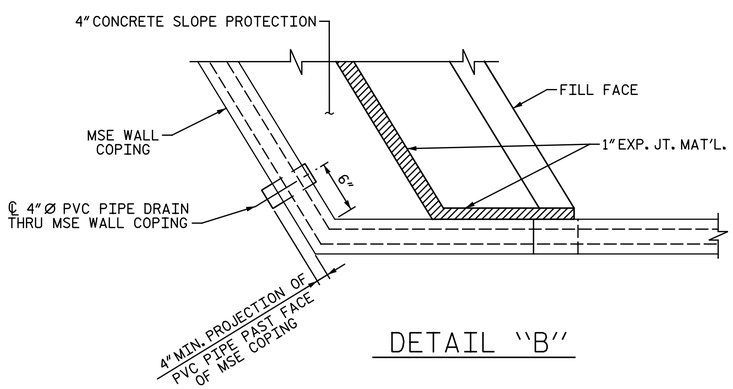


POURING DETAIL



OPTIONAL POURING DETAIL

POUR A 4'-0" STRIP FIRST.



DETAIL ''B''

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 28+39.21 -Y29-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIPUL A. PATEL

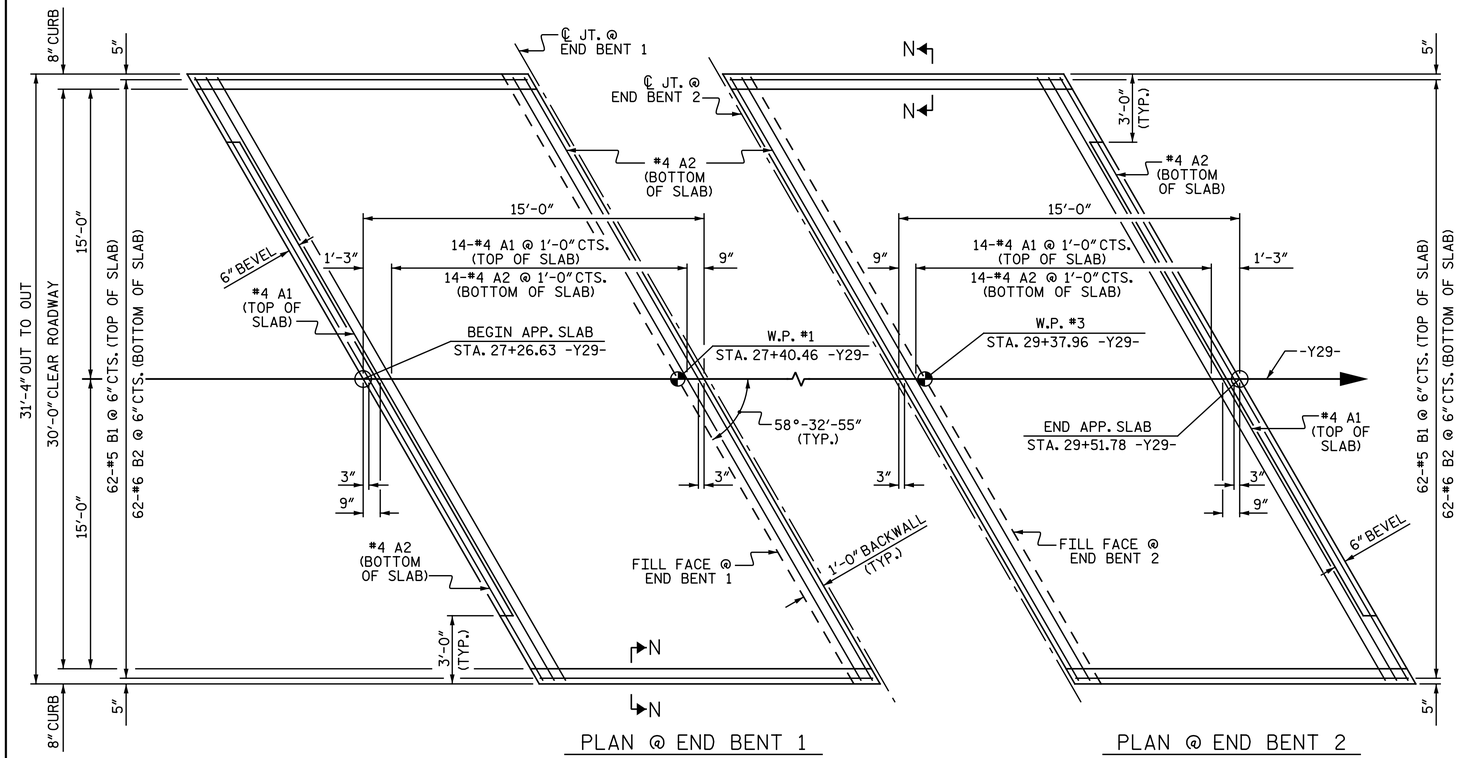
DocuSigned by: Vipul A Patel AC3E8B7A79B544D...
4/13/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

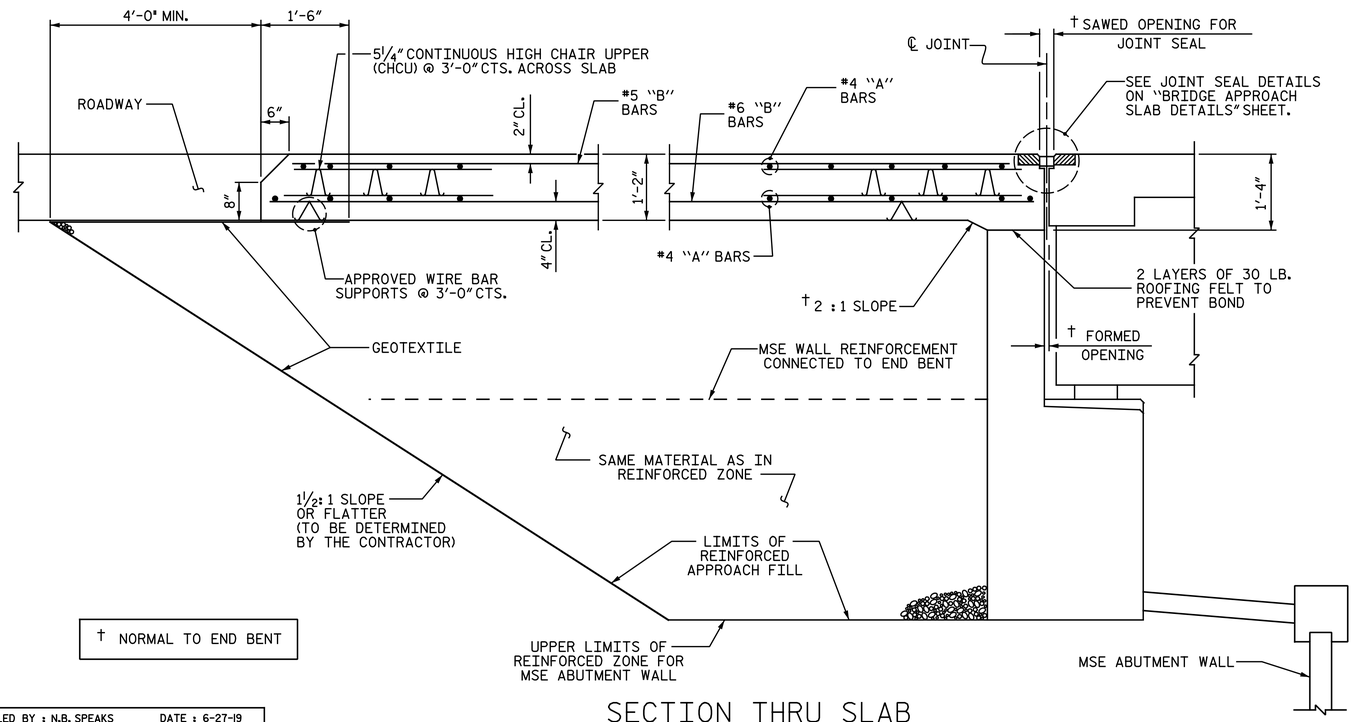
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-26
1			3			TOTAL SHEETS
2			4			28

DRAWN BY : N. B. SPEAKS DATE : 8-2-19
CHECKED BY : V. A. PATEL DATE : 1-27-20



PLAN @ END BENT 1 — PLAN @ END BENT 2

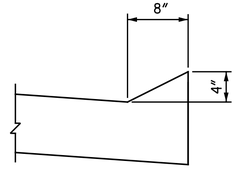
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE III - REINFORCED APPROACH FILL)



SECTION N-N

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT AND BACKFILL MATERIAL SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

BACKFILL MATERIAL SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

BILL OF MATERIAL

APPROACH SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	15	#4	STR.	36′ - 4″	364
A2	16	#4	STR.	36′ - 4″	388
✳B1	62	#5	STR.	13′ - 5″	868
B2	62	#6	STR.	14′ - 7″	1,358
REINFORCING STEEL				LBS.	1,746
✳EPOXY COATED REINFORCING STEEL				LBS.	1,232
CLASS AA CONCRETE				C.Y.	20.5

APPROACH SLAB AT END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	15	#4	STR.	36′ - 4″	364
A2	16	#4	STR.	36′ - 4″	388
✳B1	62	#5	STR.	13′ - 5″	868
B2	62	#6	STR.	14′ - 7″	1,358
REINFORCING STEEL				LBS.	1,746
✳EPOXY COATED REINFORCING STEEL				LBS.	1,232
CLASS AA CONCRETE				C.Y.	20.5

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29-

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIPUL A. PATEL

DocuSigned by: Vipul A Patel AC3EB87A79B544D...

4/13/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

ASSEMBLED BY : N.B. SPEAKS	DATE : 6-27-19
CHECKED BY : V. A. PATEL	DATE : 8-1-19

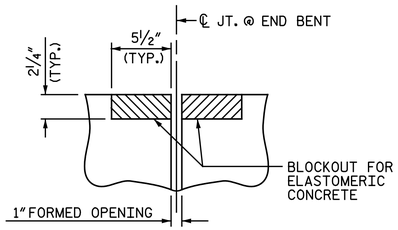
DRAWN BY : EEM 3/95	REV. 12/21/11	MAA/GM
CHECKED BY : VAP 3/95	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

Michael Baker INTERNATIONAL

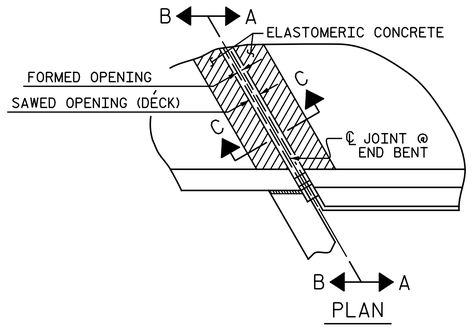
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-27
1			3			TOTAL SHEETS
2			4			28

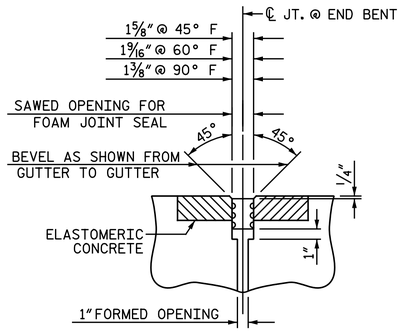
STD. NO. BAS2



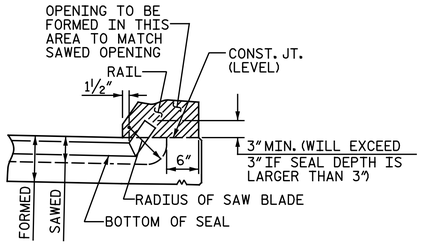
SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC
CONCRETE DIMENSIONS)



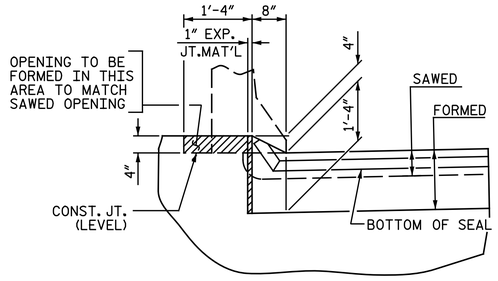
PLAN



SECTION C-C
FOAM JOINT SEAL
(EXPANSION)



SECTION A-A



SECTION B-B

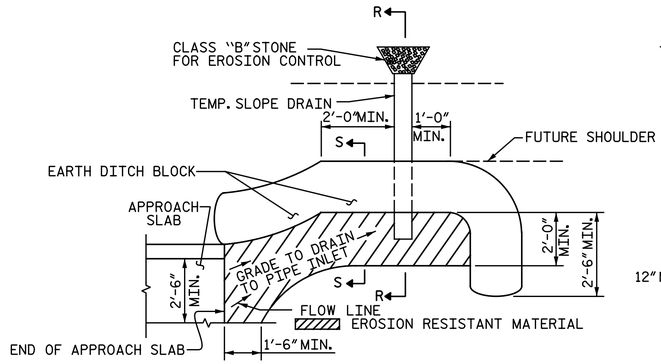
JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

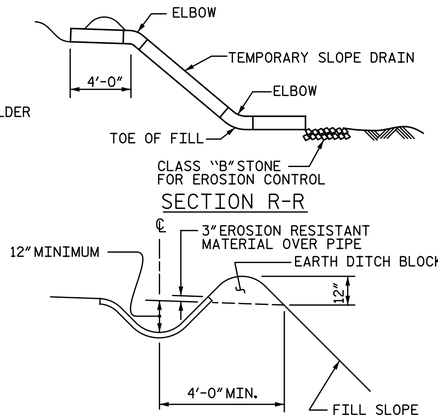
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	6.0
2	6.0
TOTAL	12.0

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

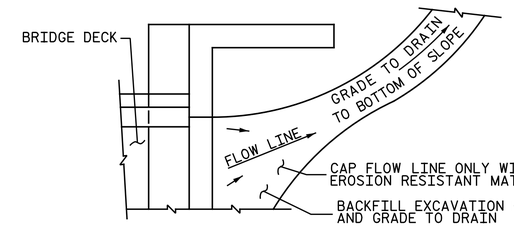
PLAN VIEW



SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 28+39.21 -Y29-

NORTH CAROLINA PROFESSIONAL SEAL 023371 ENGINEER VIPUL A. PATEL

DocuSigned by: Vipul A Patel AC3E887A79B544D...

4/13/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

ASSEMBLED BY : N. B. SPEAKS	DATE : 6-27-19
CHECKED BY : V. A. PATEL	DATE : 7-31-19

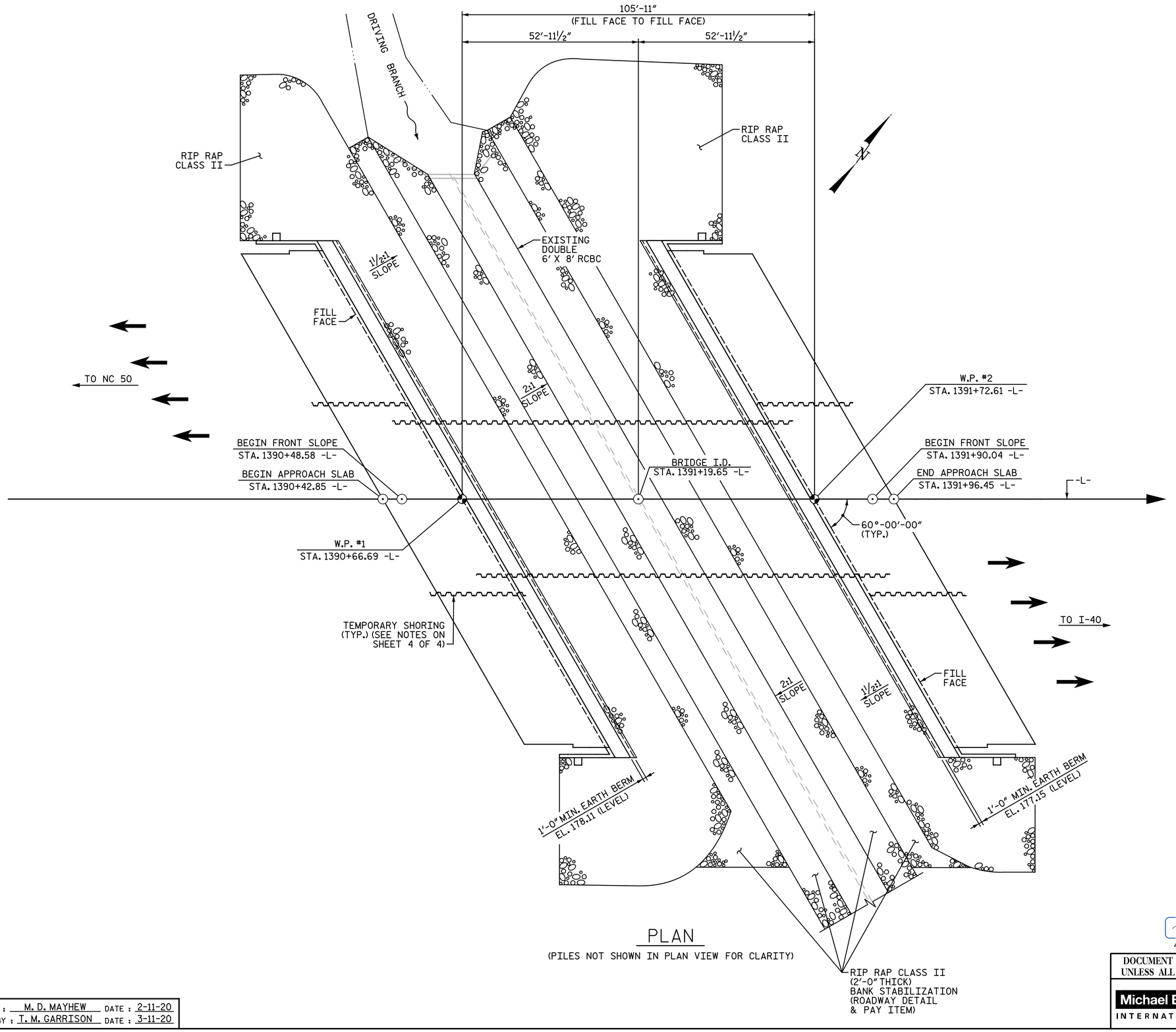
DRAWN BY : FCJ	11/88	REV. 6/13	MAA/GM
CHECKED BY : ARB	11/88	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S2-28
1			3			TOTAL SHEETS
2			4			28

STD. NO. BAS4



PLAN

(PILES NOT SHOWN IN PLAN VIEW FOR CLARITY)

DRAWN BY : M. D. MAYHEW DATE : 2-11-20
CHECKED BY : T. M. GARRISON DATE : 3-11-20

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 1 OF 4 BRIDGE NO. 655

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

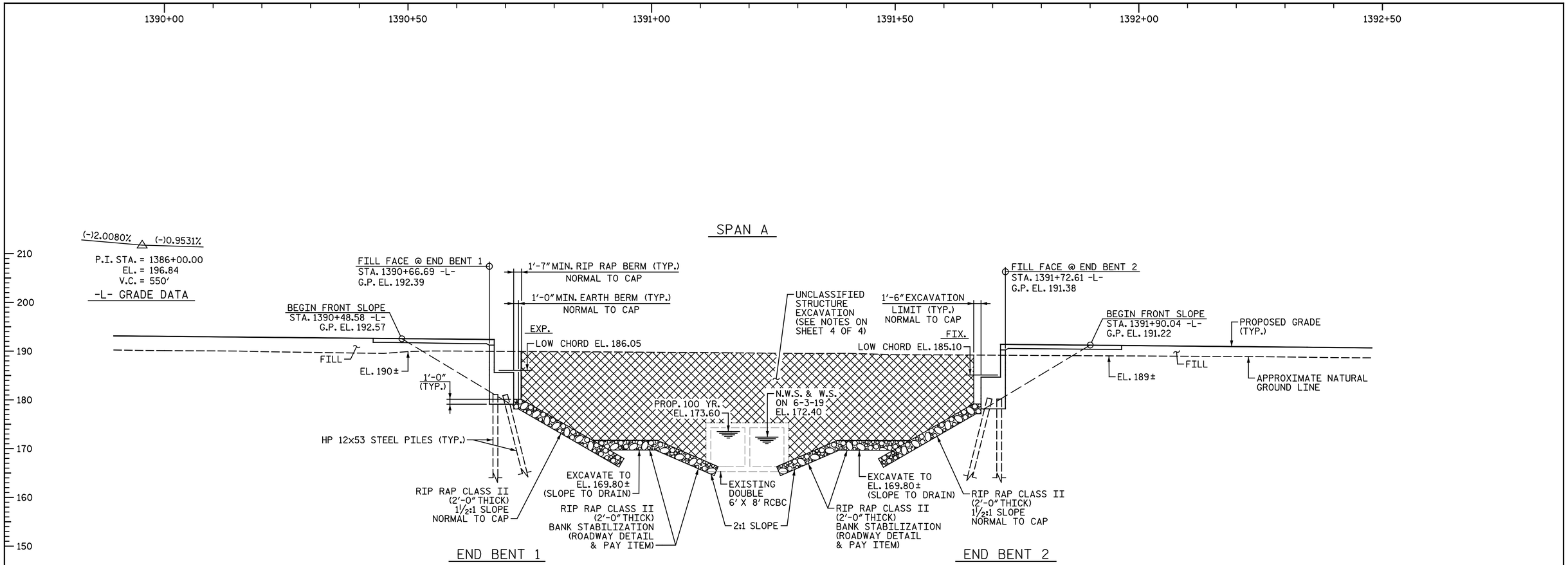
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER DRIVING BRANCH ON I-95 BETWEEN NC 50 AND I-40

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-1
1			3			TOTAL SHEETS
2			4			44



SECTION ALONG -L-

(END BENTS ON SECTION AT RIGHT ANGLES TO END BENTS)

DRAWN BY : M. D. MAYHEW DATE : 2-11-20
CHECKED BY : T. M. GARRISON DATE : 4-17-20

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-
SHEET 2 OF 4 BRIDGE NO. 655

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

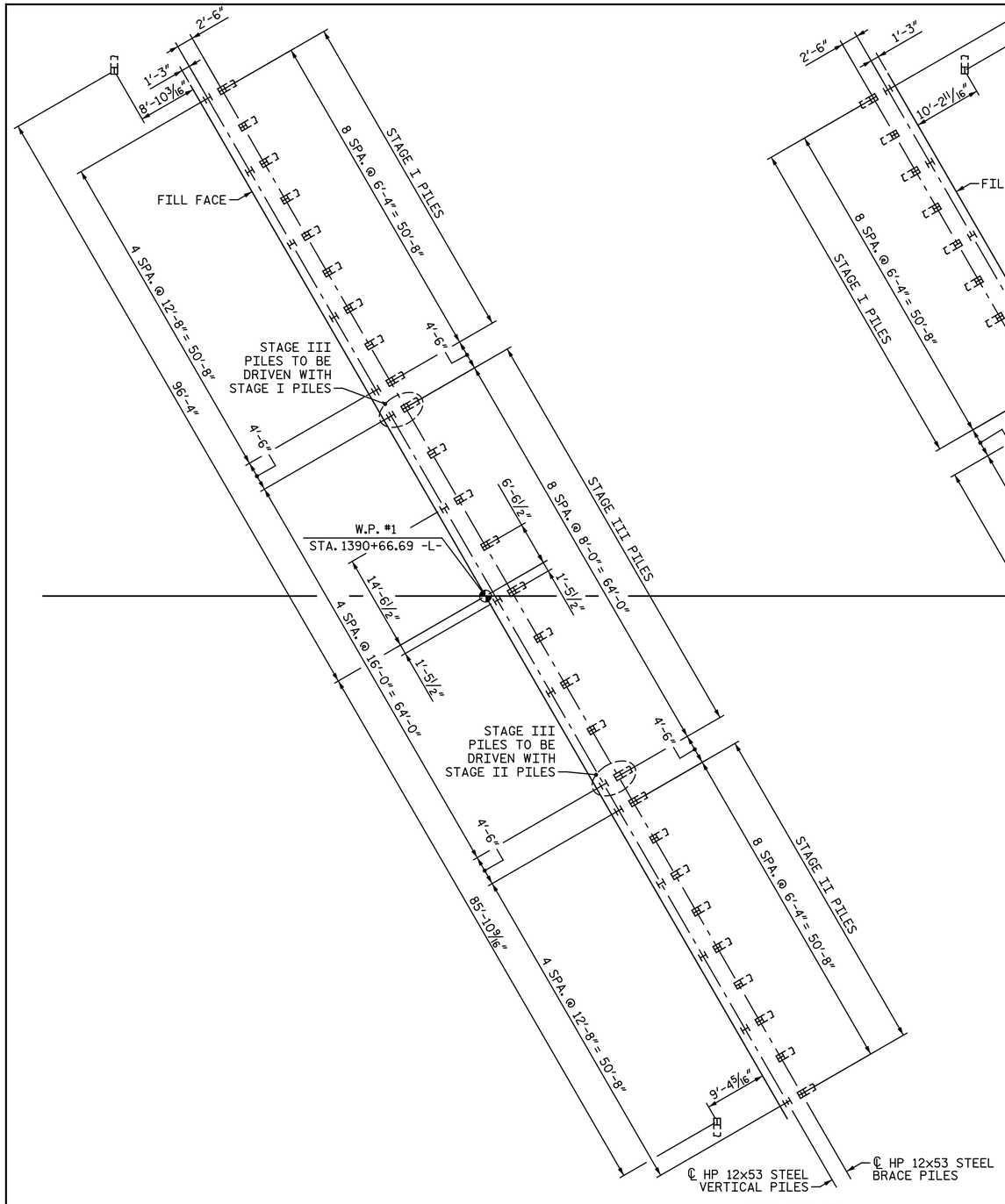
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

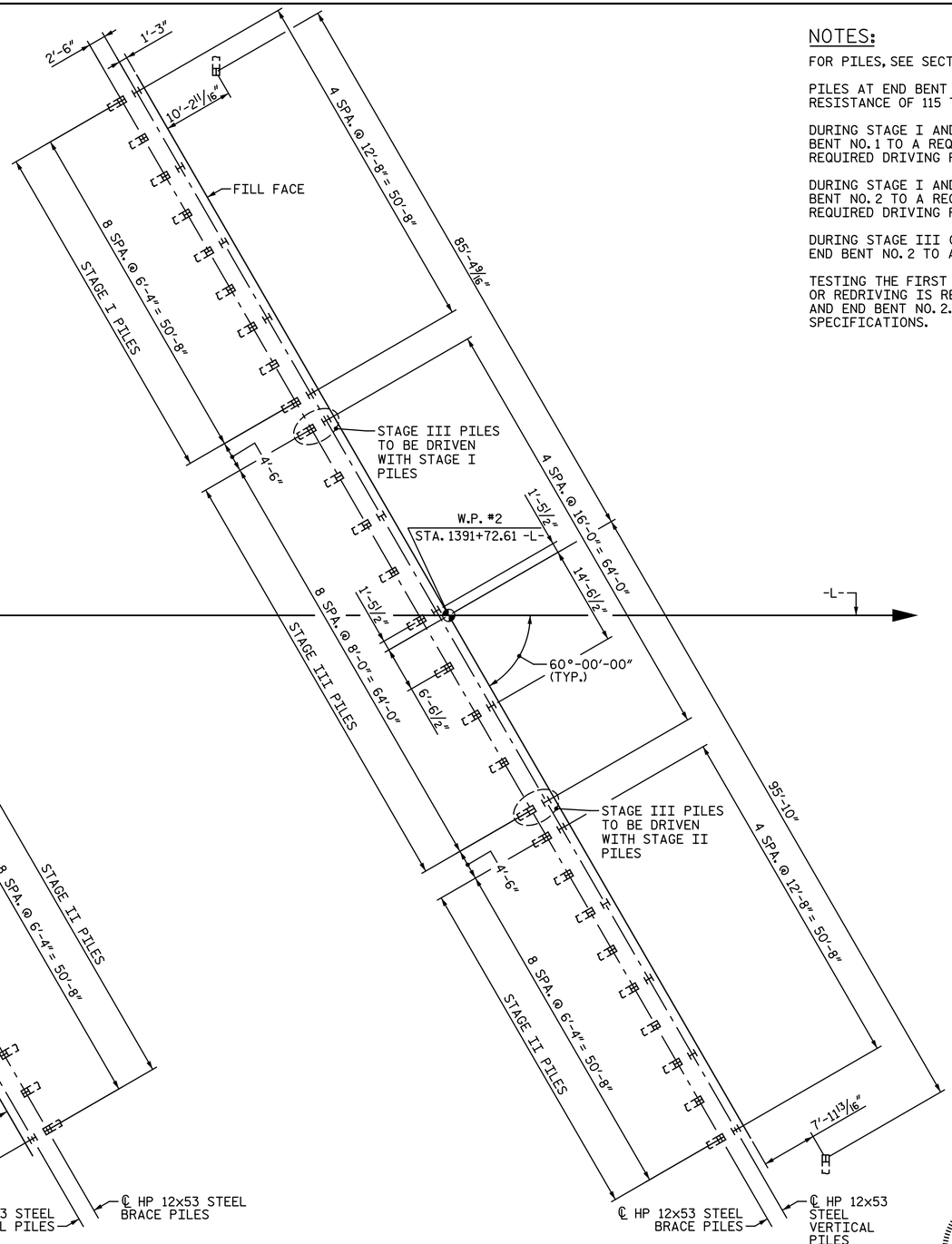
GENERAL DRAWING

FOR BRIDGE OVER
DRIVING BRANCH
ON I-95 BETWEEN
NC 50 AND I-40

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-2
1			3			TOTAL SHEETS
2			4			44



END BENT 1



END BENT 2

NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 115 TONS PER PILE.

DURING STAGE I AND STAGE II OF BRIDGE CONSTRUCTION, DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

DURING STAGE I AND STAGE II OF BRIDGE CONSTRUCTION, DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 215 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

DURING STAGE III OF BRIDGE CONSTRUCTION, DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 155 TONS PER PILE.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED DURING STAGE I OF CONSTRUCTION AT END BENT NO. 1 AND END BENT NO. 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

I - HP 12x53 STEEL VERTICAL PILE

⊟ - HP 12x53 STEEL BRACE PILE BATTERED 3:12

FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINE.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 3 OF 4

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

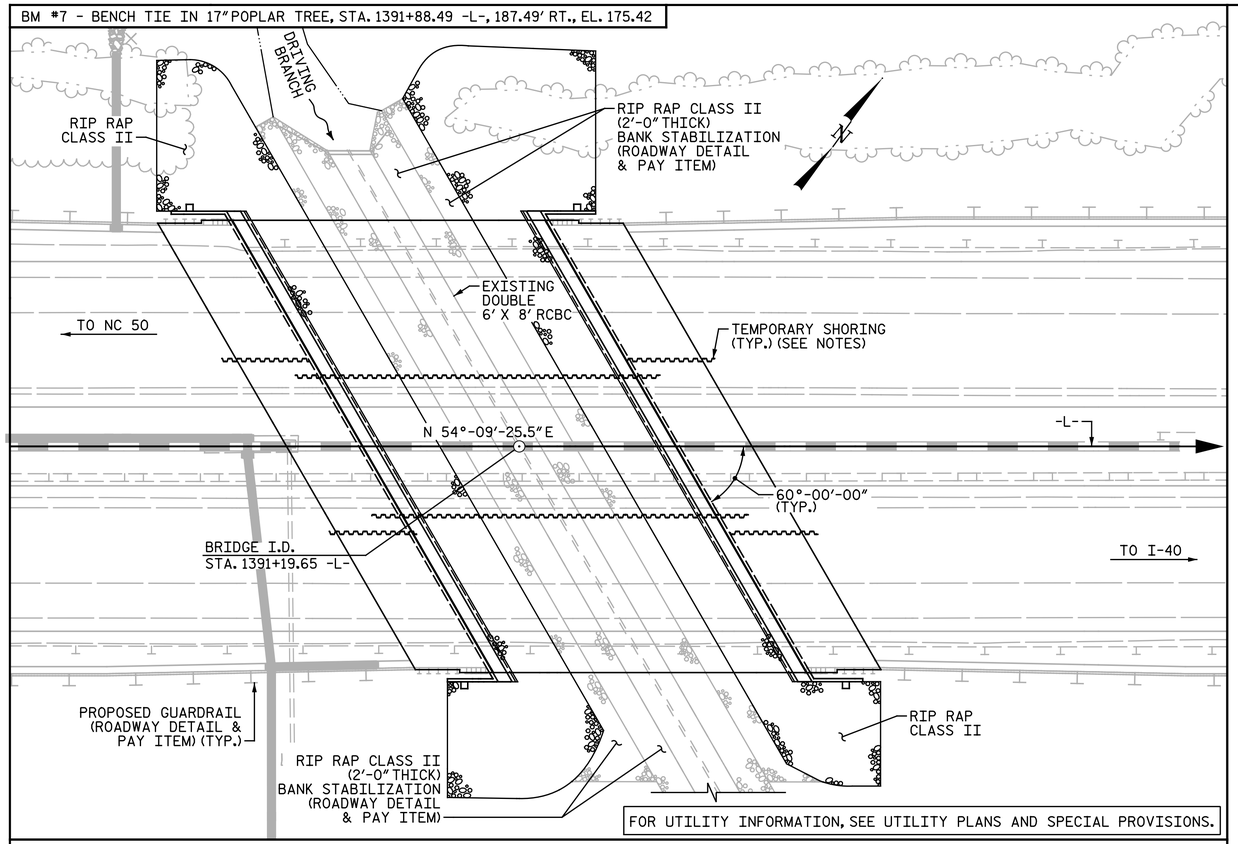
FOR BRIDGE OVER DRIVING BRANCH ON I-95 BETWEEN NC 50 AND I-40

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-3
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : M. D. MAYHEW DATE : 2-27-20
CHECKED BY : T. M. GARRISON DATE : 4-17-20



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 105 FEET± ON LEFT SIDE AND 155 FEET± ON RIGHT SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18-EVALUATING SCOUR AT BRIDGES."

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR ASBESTOS ASSESSMENT FOR CULVERT DEMOLITION, SEE ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES SPECIAL PROVISION.

TOTAL BILL OF MATERIAL

LOCATION	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12X53 STEEL PILES	HP 12X53 STEEL PILES		PILE REDRIVES	CONCRETE BARRIER RAIL	CONCRETE MEDIAN BARRIER	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	45" PRESTRESSED CONCRETE FLORIDA I-BEAMS	
	LUMP SUM	LUMP SUM	EA.	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	EA.	NO.	LIN. FT.	EA.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE					15,430	20,594								248.94	153.41			LUMP SUM	LUMP SUM	16	1,614.33
END BENT 1							307.3		46,164	44	44	3,010	22			790	870				
END BENT 2							307.0		46,057	44	44	3,380	22			895	990				
TOTAL	LUMP SUM	LUMP SUM	2	LUMP SUM	15,430	20,594	614.3	LUMP SUM	92,221	88	88	6,390	44	248.94	153.41	1,685	1,860	LUMP SUM	LUMP SUM	16	1,614.33

HYDRAULIC DATA

DESIGN DISCHARGE	= 530 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 173.40
DRAINAGE AREA	= 1.27 SQ. MI.
BASE DISCHARGE (Q100)	= 570 C.F.S.
BASE HIGH WATER ELEVATION	= 173.60

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 1330 C.F.S.
FREQUENCY OF OVERTOPPING	= 500+ YR.
OVERTOPPING ELEVATION	= 178.00 *

* SP AT STA. 23+00.00 -Y19RPB- RT (SAG)

DRAWN BY : M. D. MAYHEW DATE : 4-26-21
CHECKED BY : T. M. GARRISON DATE : 4-26-21

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M Garrison 61EAF75239434666...
4/27/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER DRIVING BRANCH ON I-95 BETWEEN NC 50 AND I-40

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-4
1			3			TOTAL SHEETS
2			4			44

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE BEAMS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT						
							LIVE-LOAD FACTORS $\gamma_{(LL)}$	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	BEAM LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	BEAM LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS $\gamma_{(LL)}$	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	BEAM LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	⟨1⟩	1.07	--	1.75	0.789	1.59	A	1	49.78	1.021	1.09	A	8	80.05	1.00	0.738	1.07	A	8	49.78	1, 2
		HL-93 (OPERATING)	N/A		1.45	--	1.35	0.789	2.06	A	1	49.78	1.021	1.45	A	8	19.51	N/A	-	-	-	-	-	2
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.45	52.20	1.75	0.789	2.21	A	1	49.78	1.021	1.45	A	8	80.05	1.00	0.789	1.50	A	1	49.78	1, 2
		HS-20 (OPERATING)	36.000		1.93	69.48	1.35	0.789	2.87	A	1	49.78	1.021	1.93	A	8	80.05	N/A	-	-	-	-	-	2
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500		3.86	48.25	1.40	0.789	7.12	A	1	49.78	1.021	5.13	A	8	80.05	1.00	0.738	3.86	A	8	49.78	1, 2
		S3C	21.500		2.25	48.38	1.40	0.789	4.16	A	1	49.78	1.021	2.95	A	8	80.05	1.00	0.738	2.25	A	8	49.78	1, 2
		S3A	22.750		2.14	48.69	1.40	0.789	3.94	A	1	49.78	1.021	2.79	A	8	19.51	1.00	0.789	2.14	A	1	49.78	1, 2
		S4A	26.750		1.87	50.02	1.40	0.789	3.45	A	1	49.78	1.021	2.41	A	8	19.51	1.00	0.738	1.87	A	8	49.78	1, 2
		S5A	30.500		1.65	50.33	1.40	0.789	3.05	A	1	49.78	1.021	2.19	A	8	19.51	1.00	0.789	1.65	A	1	49.78	1, 2
		S6A	34.500		1.49	51.41	1.40	0.789	2.75	A	1	49.78	1.021	1.96	A	8	80.05	1.00	0.738	1.49	A	8	49.78	1, 2
		S7B	38.500		1.35	51.98	1.40	0.789	2.50	A	1	49.78	1.021	1.82	A	8	19.51	1.00	0.738	1.35	A	8	49.78	1, 2
		S7A	40.000	⟨3⟩	1.33	53.20	1.40	0.789	2.46	A	1	49.78	1.021	1.85	A	8	19.51	1.00	0.738	1.33	A	8	49.78	1, 2
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250		1.83	51.70	1.40	0.789	3.38	A	1	49.78	1.021	2.33	A	8	19.51	1.00	0.738	1.83	A	8	49.78	1, 2
		T5B	32.000		1.61	51.52	1.40	0.789	2.97	A	1	49.78	1.021	2.20	A	8	19.51	1.00	0.738	1.61	A	8	49.78	1, 2
		T6A	36.000		1.47	52.92	1.40	0.789	2.71	A	1	49.78	1.021	2.00	A	8	80.05	1.00	0.738	1.47	A	8	49.78	1, 2
		T7A	40.000		1.36	54.40	1.40	0.789	2.51	A	1	49.78	1.021	1.85	A	8	19.51	1.00	0.789	1.36	A	1	49.78	1, 2
		T7B	40.000		1.43	57.20	1.40	0.789	2.65	A	1	49.78	1.021	1.74	A	8	80.05	1.00	0.738	1.43	A	8	49.78	1, 2

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1. A SERVICE III LIVE LOAD FACTOR OF 1.0 WAS USED TO BE CONSISTENT WITH THE VALUE USED DURING DESIGN.
2. DISTANCE FROM LEFT END OF SPAN IS GIVEN WITH RESPECT TO THE CENTERLINE OF BEARING AND IS MEASURED ALONG THE CONTROLLING BEAM.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

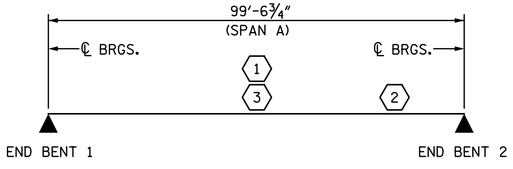
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

BEAM LOCATION

BEAM LOCATION PROVIDED UTILIZES BEAM NUMBER, WHERE BEAM 1 IS THE LEFT EXTERIOR BEAM LOOKING AHEAD STATION. SEE "BEAM LAYOUT" SHEET FOR ALL BEAM LOCATIONS.



LRFR SUMMARY

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE BEAMS (INTERSTATE TRAFFIC)

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

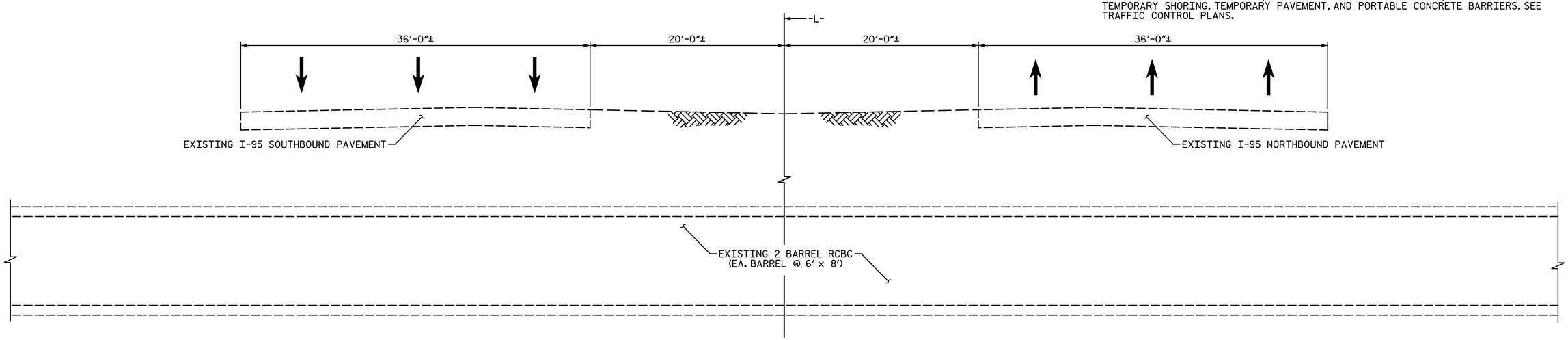
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-5
1			3			TOTAL SHEETS
2			4			44

ASSEMBLED BY : N. B. SPEAKS	DATE : 2-14-20	
CHECKED BY : T. M. GARRISON	DATE : 2-14-20	
DRAWN BY : MAA 1/08	REV. 11/12/08RR	MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11	MAA/GM
	REV. 12/17	MAA/THC

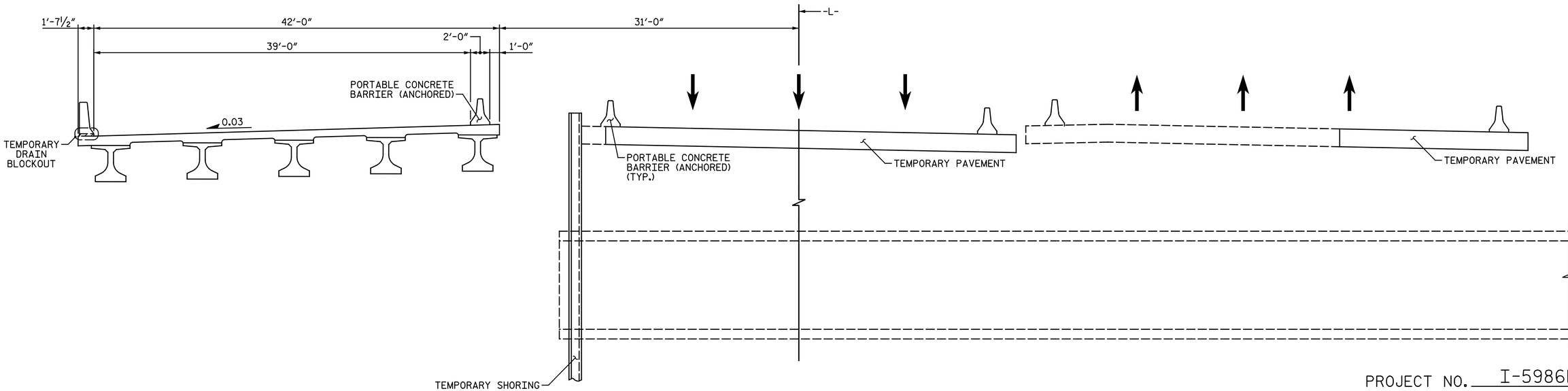
STD. NO. LRFR2

NOTE:

FOR MAINTENANCE OF TRAFFIC, REMOVAL OF EXISTING PAVEMENT, AND LOCATIONS OF TEMPORARY SHORING, TEMPORARY PAVEMENT, AND PORTABLE CONCRETE BARRIERS, SEE TRAFFIC CONTROL PLANS.



EXISTING



STAGE I

MOVE SOUTHBOUND TRAFFIC INTO I-95 MEDIAN SECTION AND SHIFT NORTHBOUND TRAFFIC.
REMOVE PORTION OF EXISTING CULVERT BEHIND TEMPORARY SHORING ON LEFT SIDE OF I-95.
CONSTRUCT LEFT SIDE OF PROPOSED BRIDGE.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE

Michael Baker INTERNATIONAL

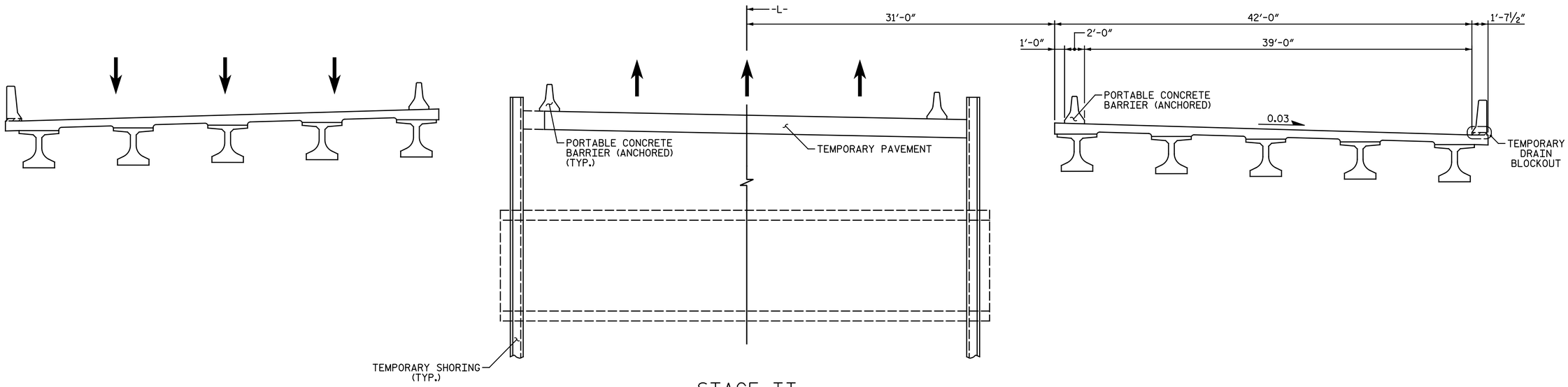
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-6
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : N. B. SPEAKS DATE : 8-19-19
CHECKED BY : T. M. GARRISON DATE : 11-7-19

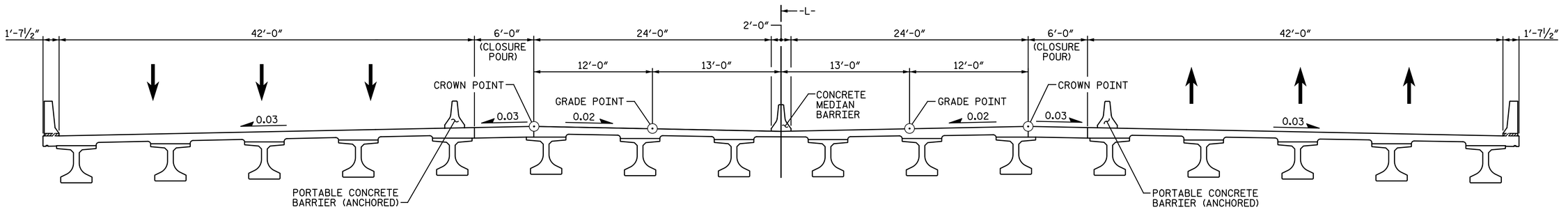
NOTE:

FOR MAINTENANCE OF TRAFFIC, REMOVAL OF EXISTING PAVEMENT, AND LOCATIONS OF TEMPORARY SHORING, TEMPORARY PAVEMENT, AND PORTABLE CONCRETE BARRIERS, SEE TRAFFIC CONTROL PLANS.



STAGE II

MOVE NORTHBOUND TRAFFIC INTO I-95 MEDIAN SECTION AND SOUTHBOUND TRAFFIC ONTO STAGE I.
REMOVE PORTION OF EXISTING CULVERT BEHIND TEMPORARY SHORING ON RIGHT SIDE OF I-95.
CONSTRUCT RIGHT SIDE OF PROPOSED BRIDGE.



STAGE III

MOVE NORTHBOUND TRAFFIC ONTO STAGE II.
REMOVE REMAINING PORTION OF EXISTING CULVERT.
CONSTRUCT CENTER PORTION OF PROPOSED BRIDGE, INCLUDING CLOSURE POURS AND CONCRETE MEDIAN BARRIER.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison
61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

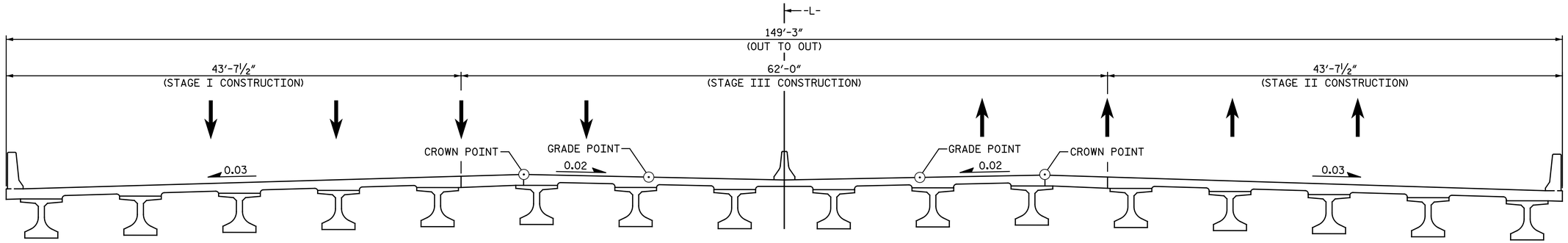
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-7
1			3			TOTAL SHEETS
2			4			44

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

DRAWN BY : N. B. SPEAKS DATE : 8-19-19
CHECKED BY : T. M. GARRISON DATE : 11-11-19



FINAL TYPICAL SECTION

FILL TEMPORARY DRAIN BLOCKOUTS IN EXTERIOR CONCRETE BARRIER RAILS WITH APPROVED GROUT.
REMOVE PORTABLE CONCRETE BARRIERS.
MOVE NORTHBOUND AND SOUTHBOUND TRAFFIC TO FINAL PATTERN.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison
61EAF7523943486...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

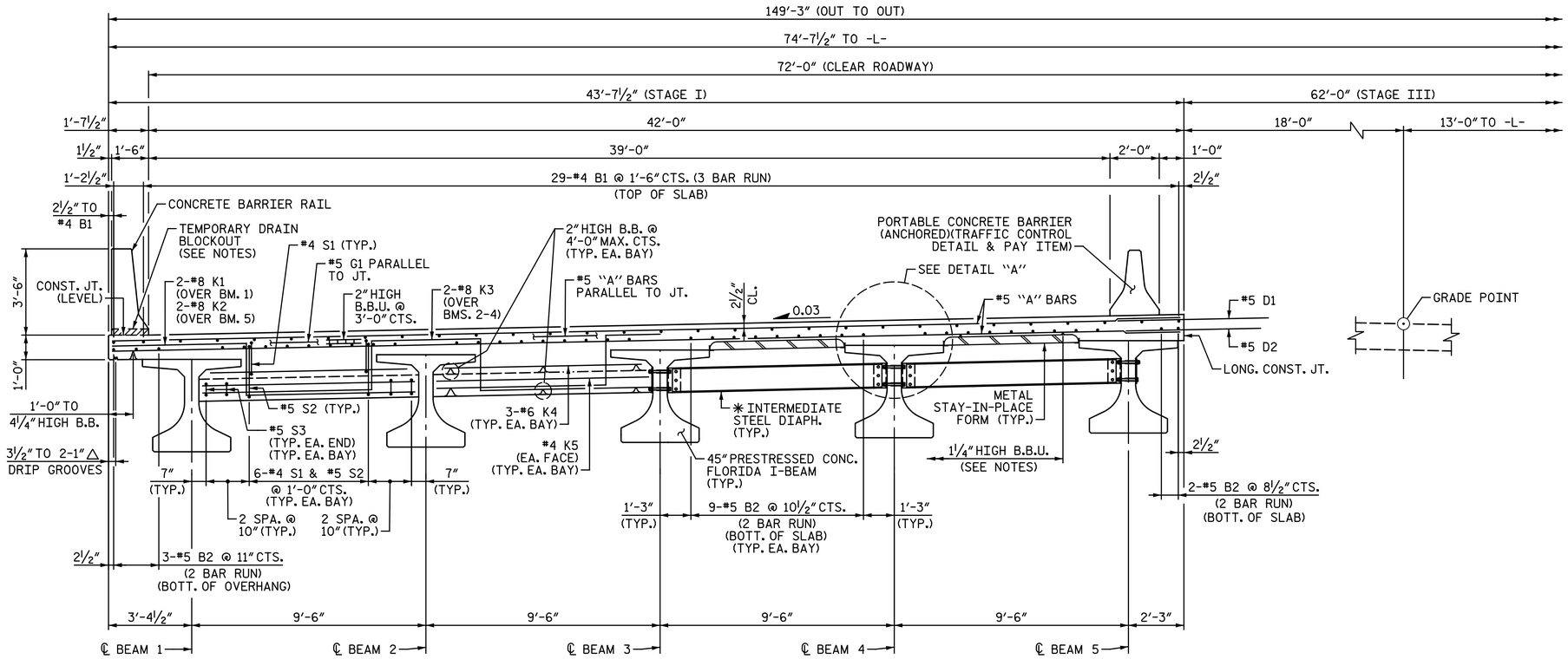
CONSTRUCTION SEQUENCE

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-8
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : N. B. SPEAKS DATE : 8-19-19
CHECKED BY : T. M. GARRISON DATE : 11-11-19



AT END BENT DIAPHRAGM

AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION - STAGE I

(DOWELS SHALL BE SPLICED TO TOP AND BOTTOM SLAB REINFORCING STEEL)

NOTES:

PROVIDE 1¼″HIGH BEAM BOLSTERS UPPER AT 4′-0″CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF ″A″ BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4′-0″ CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF ″A″ BARS A CLEAR DISTANCE OF 2½″ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE BEAMS AND TO FACILITATE INSTALLATION OF CONCRETE BARRIER RAIL AND CONCRETE MEDIAN BARRIER REINFORCEMENT.

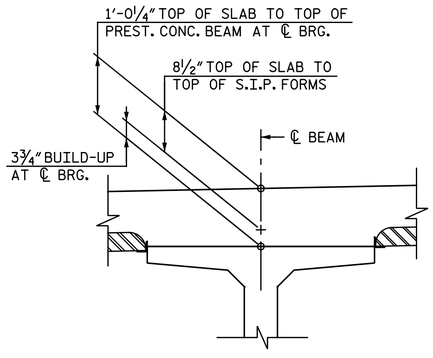
FOR CONCRETE BARRIER RAIL DETAILS, INCLUDING TEMPORARY DRAIN BLOCKOUTS, SEE ″CONCRETE BARRIER RAIL″ SHEET.

FOR CONCRETE MEDIAN BARRIER DETAILS, SEE ″CONCRETE MEDIAN BARRIER″ SHEET.

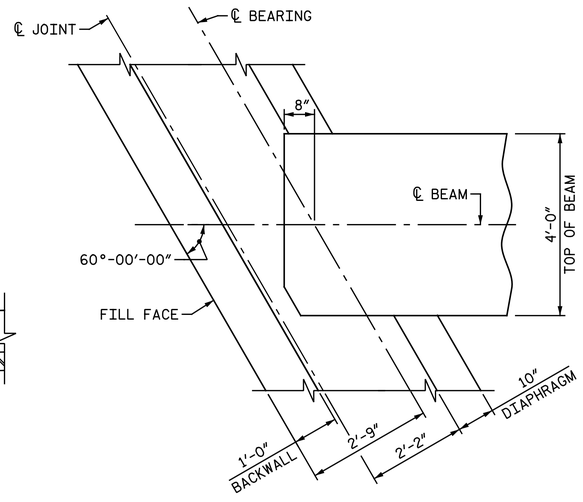
PREVIOUSLY CAST CONCRETE IN A SPAN SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE SPAN.

SEE TRAFFIC CONTROL PLANS FOR LOCATIONS AND PAY LIMITS OF THE ANCHORED PORTABLE CONCRETE BARRIERS.

✳ FOR DETAILS OF INTERMEDIATE DIAPHRAGMS, SEE ″INTERMEDIATE STEEL DIAPHRAGMS FOR 45″FLORIDA I-BEAMS″ SHEET.

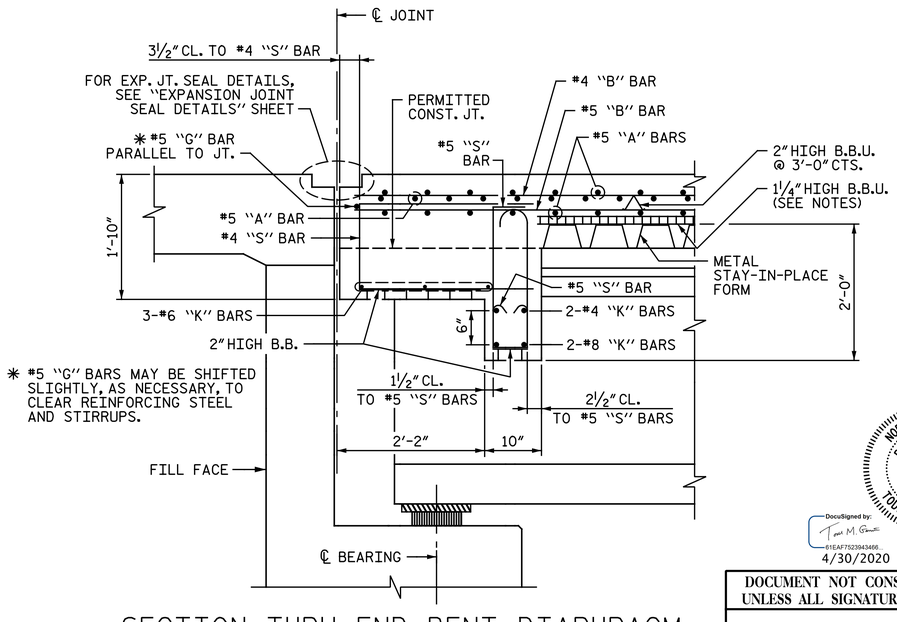


DETAIL ″A″



PLAN AT END BENT DIAPHRAGM

END BENT 1 SHOWN, END BENT 2 SIMILAR



✳ #5 ″G″ BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

SECTION THRU END BENT DIAPHRAGM

END BENT 1 SHOWN, END BENT 2 SIMILAR

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

DRAWN BY : C. E. MAYHEW DATE : 8-22-19
CHECKED BY : T. M. GARRISON DATE : 4-17-20

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-9
1			3			TOTAL SHEETS
2			4			44

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION
STAGE I

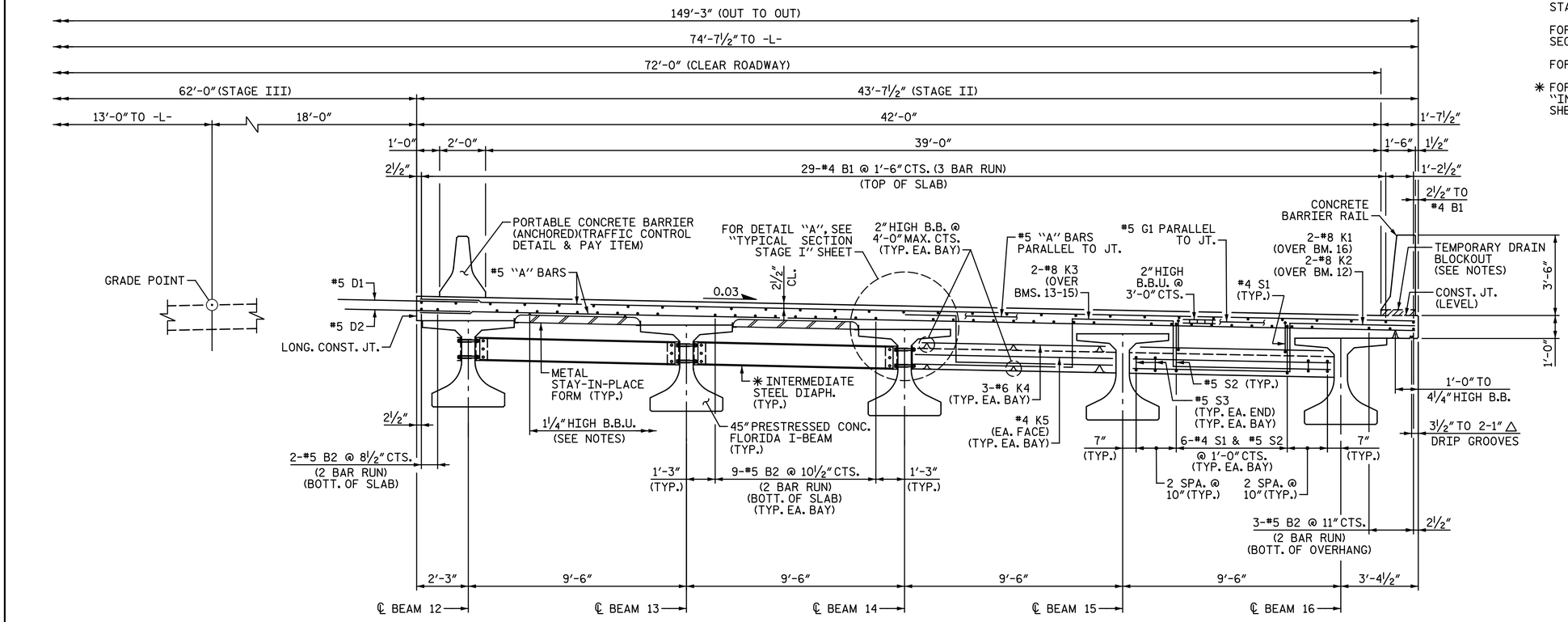
NOTES:

FOR "PLAN AT END BENT DIAPHRAGM", SEE "TYPICAL SECTION STAGE I" SHEET.

FOR "SECTION THRU END BENT DIAPHRAGM", SEE "TYPICAL SECTION STAGE I" SHEET.

FOR ADDITIONAL NOTES, SEE "TYPICAL SECTION STAGE I" SHEET.

* FOR DETAILS OF INTERMEDIATE DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 45" FLORIDA I-BEAMS" SHEET.



AT INTERMEDIATE DIAPHRAGM

AT END BENT DIAPHRAGM

TYPICAL SECTION - STAGE II

(DOWELS SHALL BE SPLICED TO TOP AND BOTTOM SLAB REINFORCING STEEL)

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF75239434A6...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-10
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : C. E. MAYHEW DATE : 8-22-19

CHECKED BY : T. M. GARRISON DATE : 4-17-20

NOTES:

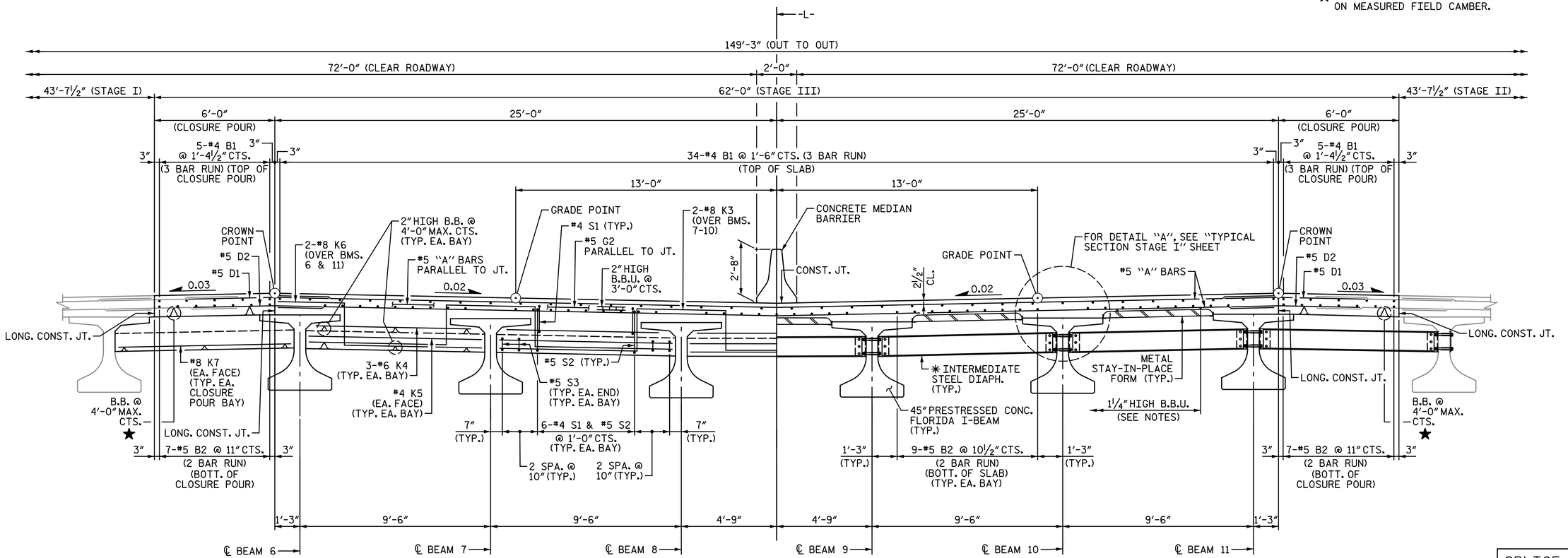
FOR "PLAN AT END BENT DIAPHRAGM", SEE "TYPICAL SECTION STAGE I" SHEET.

FOR "SECTION THRU END BENT DIAPHRAGM", SEE "TYPICAL SECTION STAGE I" SHEET.

FOR ADDITIONAL NOTES, SEE "TYPICAL SECTION STAGE I" SHEET.

✳ FOR DETAILS OF INTERMEDIATE DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 45" FLORIDA I-BEAMS" SHEET.

★ B.B. HEIGHTS IN CLOSURE POUR BAYS TO BE DETERMINED BASED ON MEASURED FIELD CAMBER.



AT END BENT DIAPHRAGM

AT INTERMEDIATE DIAPHRAGM

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#5	2'-6"	2'-2"

TYPICAL SECTION - STAGE III

(DIAPHRAGM REINFORCEMENT DENOTED AS TYP. EA. BAY ALSO TYP. EA. CLOSURE POUR BAY)

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION STAGE III

DRAWN BY : C. E. MAYHEW DATE : 8-22-19
CHECKED BY : T. M. GARRISON DATE : 4-18-20

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

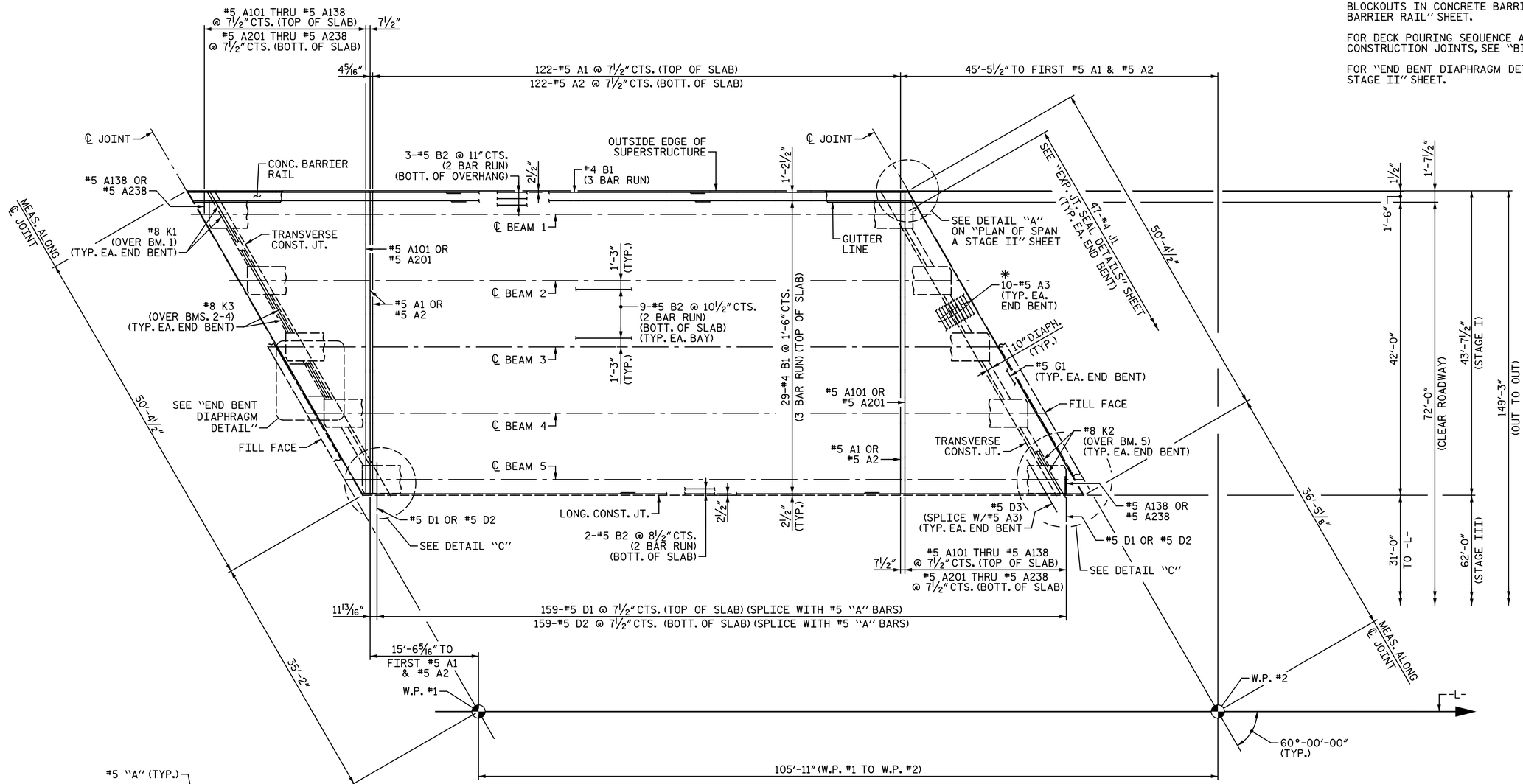
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-11
1			3			TOTAL SHEETS
2			4			44

NOTES:

FOR REINFORCING STEEL AND LOCATION OF TEMPORARY DRAIN BLOCKOUTS IN CONCRETE BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR DECK POURING SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "BILL OF MATERIAL" SHEETS.

FOR "END BENT DIAPHRAGM DETAIL", SEE "PLAN OF SPAN A STAGE II" SHEET.

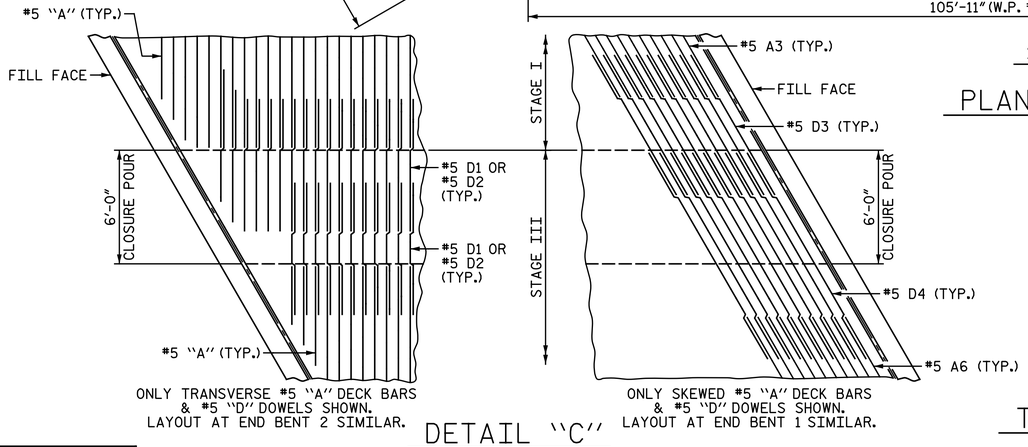


SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"

SPAN A

PLAN OF SPAN

✳ #5 A3 BARS TO BE PLACED PARALLEL TO SKEW & BELOW B1 BARS

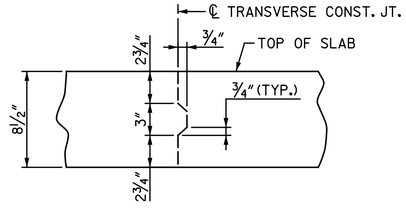


ONLY TRANSVERSE #5 "A" DECK BARS & #5 "D" DOWELS SHOWN. LAYOUT AT END BENT 2 SIMILAR.

ONLY SKEWED #5 "A" DECK BARS & #5 "D" DOWELS SHOWN. LAYOUT AT END BENT 1 SIMILAR.

DETAIL "C"

CLOSURE POUR BETWEEN STAGE I AND STAGE III SHOWN. CLOSURE POUR BETWEEN STAGE II AND STAGE III SIMILAR.



TRANSVERSE CONST. JT. DETAIL

REINFORCING STEEL IN SLAB NOT SHOWN. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT.

DRAWN BY : C. E. MAYHEW DATE : 11-20-19
CHECKED BY : T. M. GARRISON DATE : 4-20-20

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF75239943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering 8000 Regency Parkway, Suite 600 Cary, North Carolina 27518 NC License No. : F-1084

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN A STAGE I

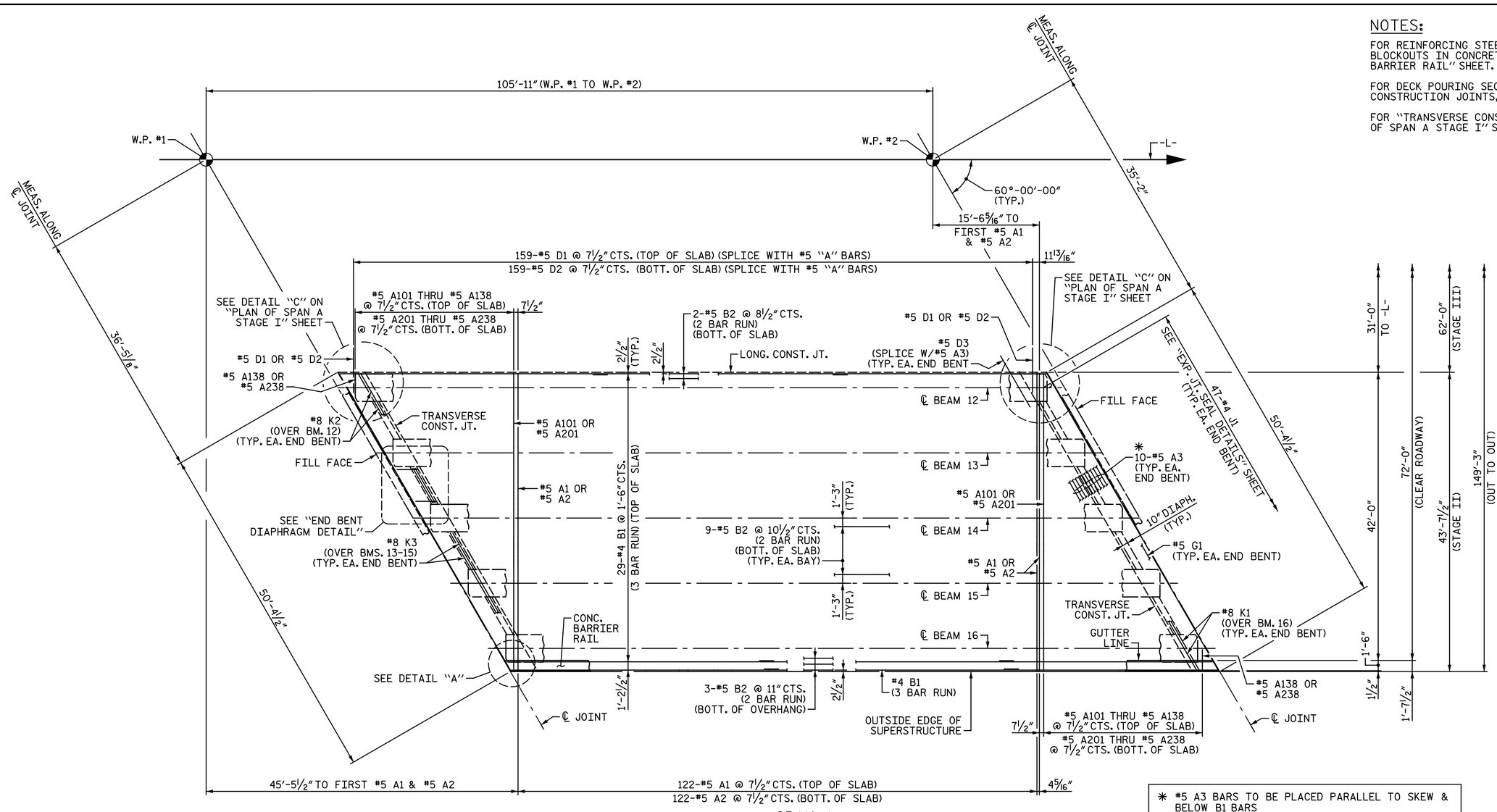
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-12
1			3			TOTAL SHEETS
2			4			44

NOTES:

FOR REINFORCING STEEL AND LOCATION OF TEMPORARY DRAIN BLOCKOUTS IN CONCRETE BARRIER RAIL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR DECK POURING SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "BILL OF MATERIAL" SHEETS.

FOR "TRANSVERSE CONSTRUCTION JOINT DETAIL", SEE "PLAN OF SPAN A STAGE I" SHEET.

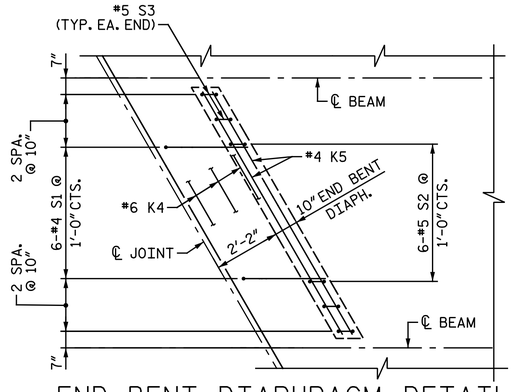


SPAN A

PLAN OF SPAN

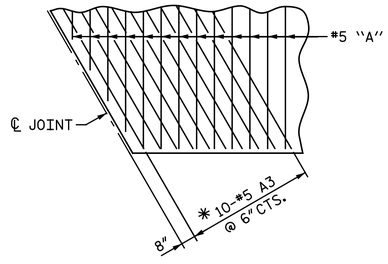
✳ #5 A3 BARS TO BE PLACED PARALLEL TO SKEW & BELOW B1 BARS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"



END BENT DIAPHRAGM DETAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR.
#8 "K" BARS OVER BEAMS NOT SHOWN FOR CLARITY.
(TYP. EA. BAY)



DETAIL "A"

END BENT 1 SHOWN, END BENT 2 SIMILAR.
ADDITIONAL REINFORCEMENT NOT SHOWN FOR CLARITY.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A STAGE II

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF75239434B6...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-13
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : C. E. MAYHEW DATE : 11-20-19
CHECKED BY : T. M. GARRISON DATE : 4-20-20

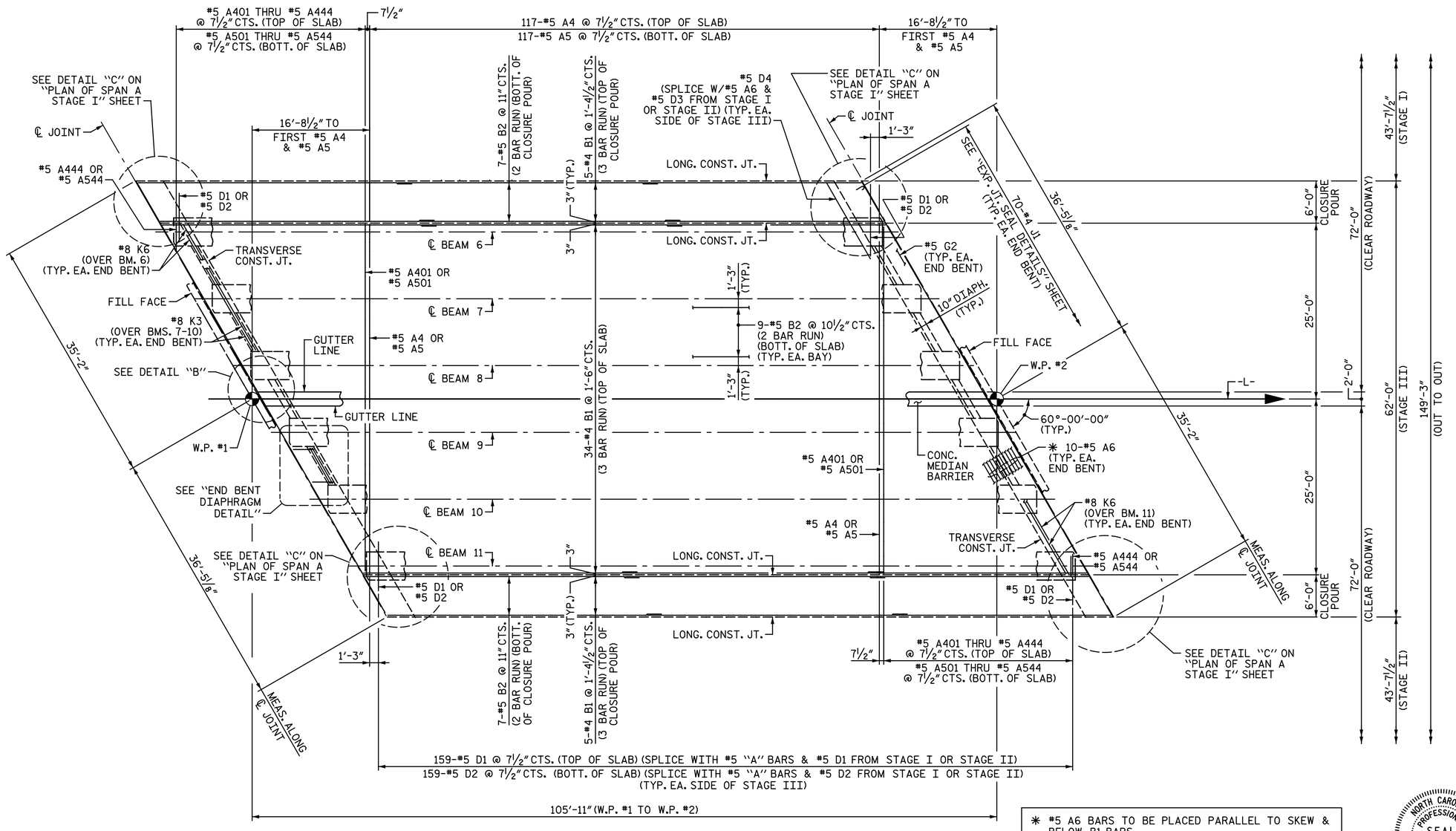
NOTES:

FOR REINFORCING STEEL IN CONCRETE MEDIAN BARRIER, SEE "CONCRETE MEDIAN BARRIER" SHEET.

FOR DECK POURING SEQUENCE AND LOCATION OF TRANSVERSE CONSTRUCTION JOINTS, SEE "BILL OF MATERIAL" SHEETS.

FOR "TRANSVERSE CONSTRUCTION JOINT DETAIL", SEE "PLAN OF SPAN A STAGE I" SHEET.

FOR "END BENT DIAPHRAGM DETAIL", SEE "PLAN OF SPAN A STAGE II" SHEET.



DETAIL "B"
(SIMILAR AT W.P. #2)

✳ #5 A6 BARS TO BE PLACED PARALLEL TO SKEW & BELOW B1 BARS

SPAN A

PLAN OF SPAN

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

DRAWN BY : C. E. MAYHEW DATE : 11-20-19
CHECKED BY : T. M. GARRISON DATE : 4-20-20

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 3 OF 3

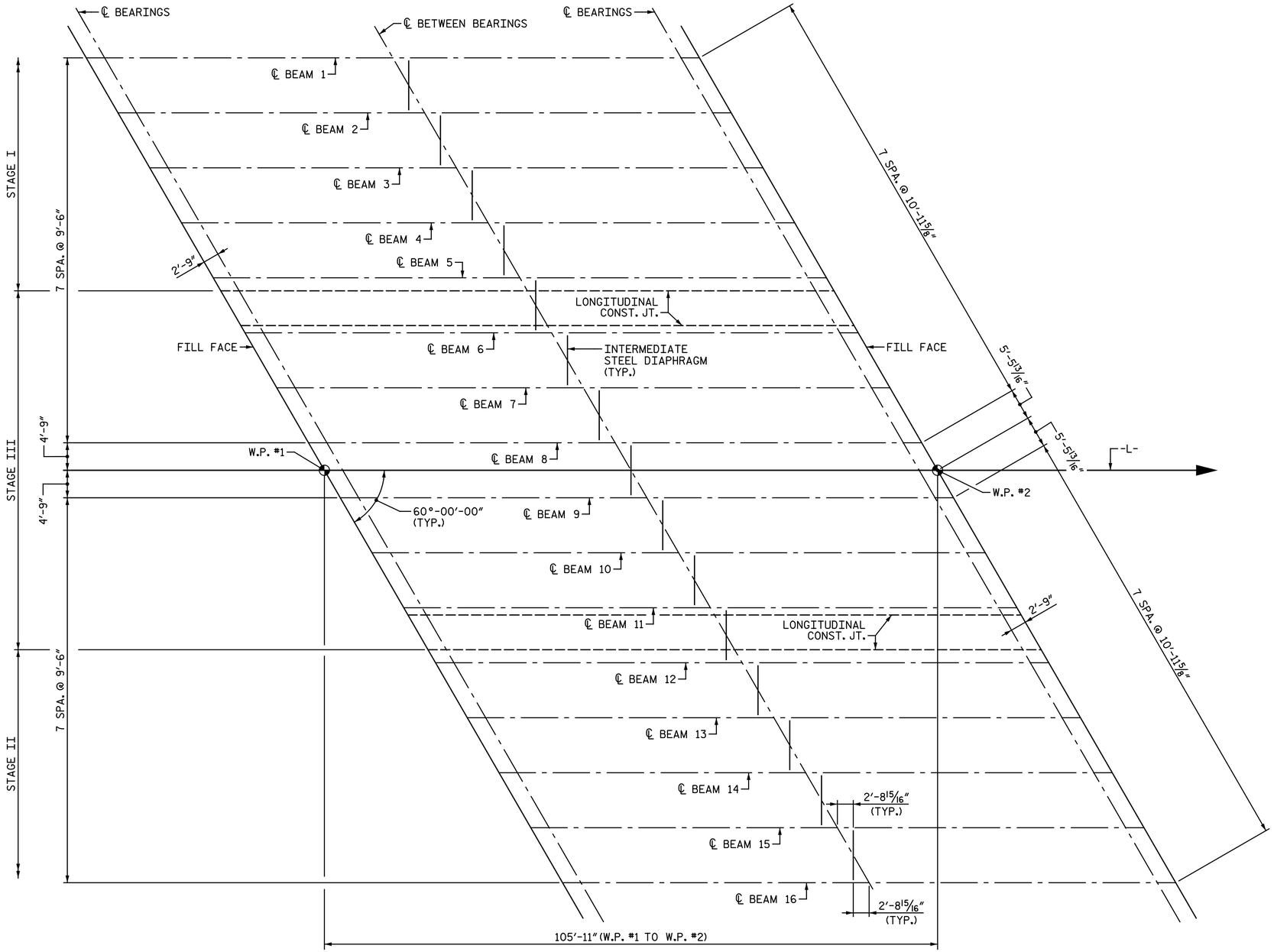
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN A STAGE III

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-14
1			3			TOTAL SHEETS
2			4			44

NOTE:

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 45" FLORIDA I-BEAMS" SHEET.



EXP.
(E1, P2)

FIX.
(E1, P1)

SPAN A

BEAM LAYOUT

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

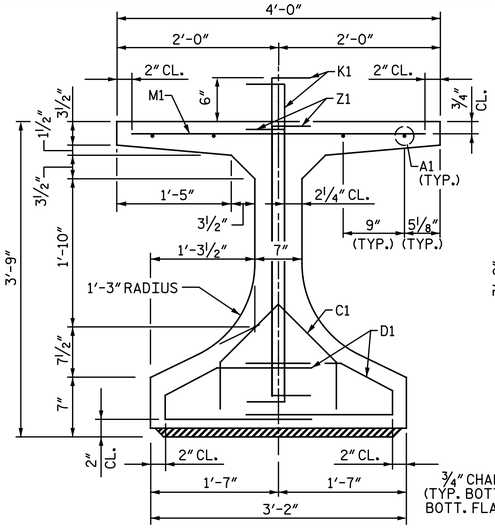
BEAM LAYOUT

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

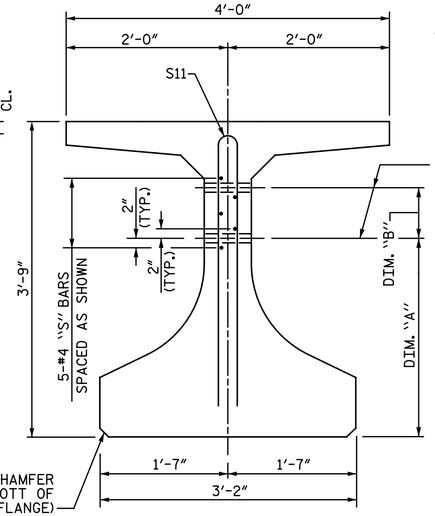
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-15
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : M. D. MAYHEW DATE : 11-18-19
CHECKED BY : T. M. GARRISON DATE : 3-25-20



SECTION A-A

(Y1 BARS NOT SHOWN FOR CLARITY)



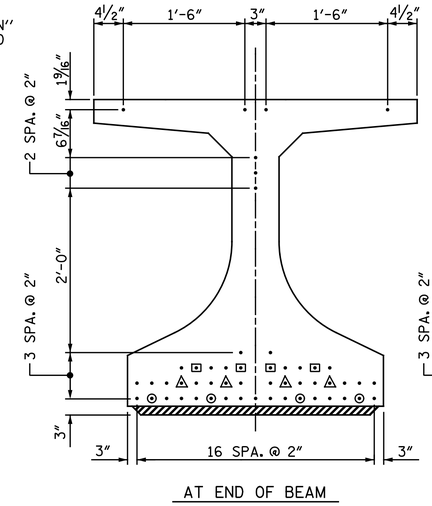
** SECTION B-B

(MAIN BEAM REINFORCEMENT NOT SHOWN FOR CLARITY)

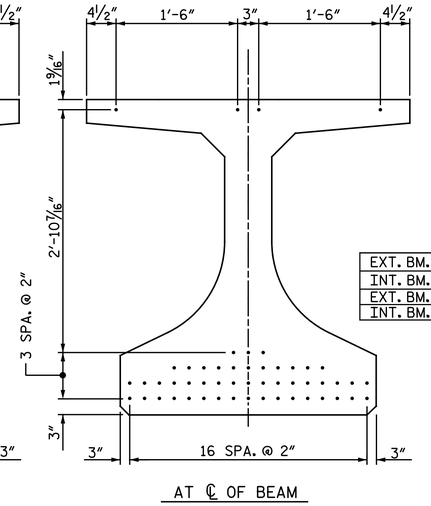
** FOR LOCATION OF SECTION B-B, SEE "PARTIAL ELEVATION" DETAILS ON "45" PRESTRESSED CONCRETE FLORIDA I-BEAM DETAILS" SHEET.

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 8'-0" FROM END OF BEAM
- ◭ STRANDS DEBONDED FOR 10'-0" FROM END OF BEAM
- ◉ STRANDS DEBONDED FOR 12'-0" FROM END OF BEAM

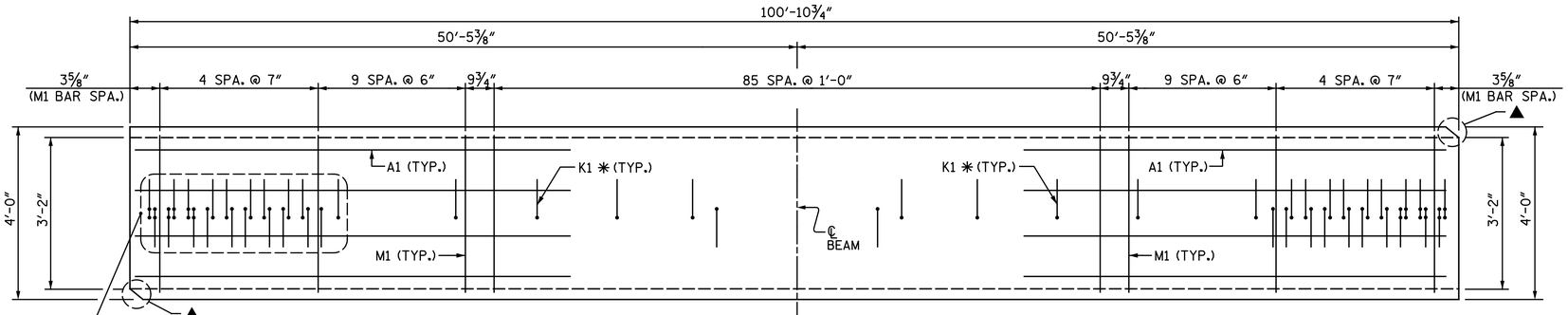


AT END OF BEAM



AT ℄ OF BEAM

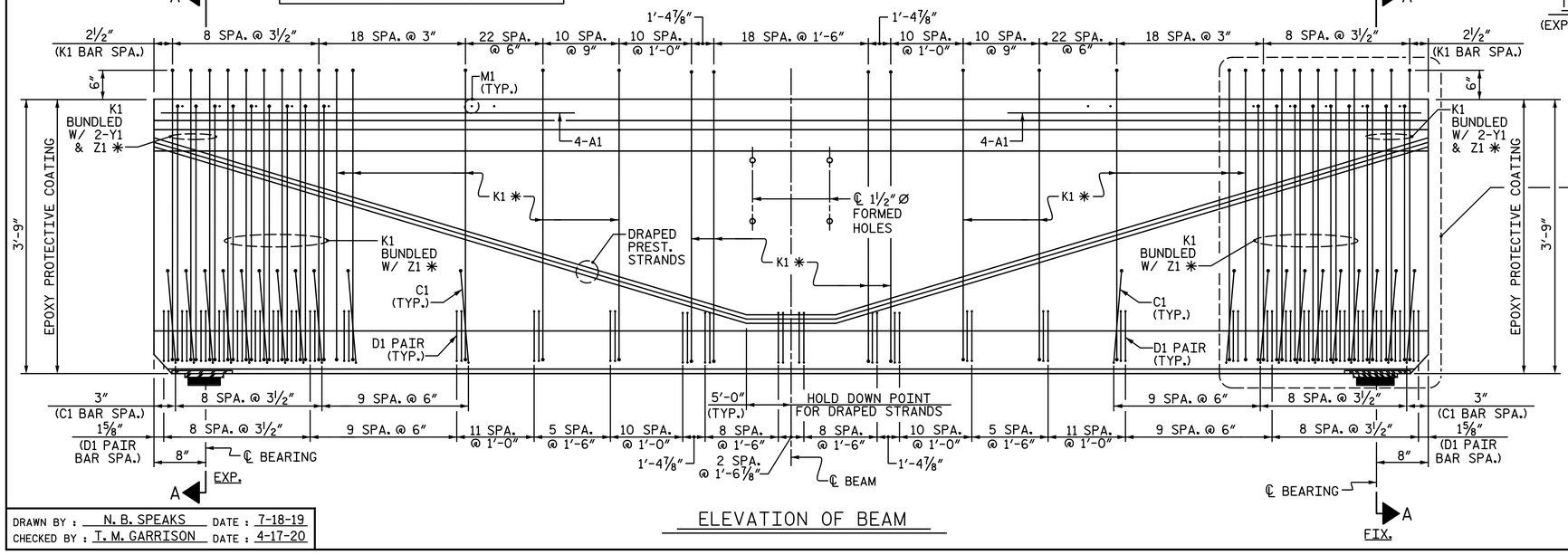
0.6" Ø LOW RELAXATION STRAND LAYOUT



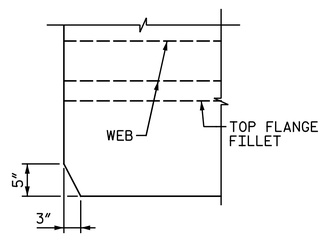
PLAN OF BEAM

* ALTERNATE DIRECTION OF BAR ENDS

▲ SEE "TOP FLANGE CLIP DETAIL"



ELEVATION OF BEAM



TOP FLANGE CLIP DETAIL

(EXPANSION END SHOWN. FIXED END SIMILAR)

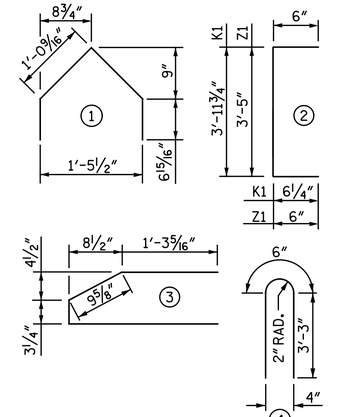
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950 *

REINFORCING STEEL FOR ONE BEAM

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
A1	8	#5	STR.	19'-0"	159
C1	36	#3	1	3'-3"	44
D1	214	#3	3	4'-4"	349
K1	157	#5	2	5'-0"	819
M1	114	#4	STR.	3'-8"	279
EXT. BM.	S11	4	#5	4	7'-0"	29
INT. BM.	S11	8	#5	4	7'-0"	58
EXT. BM.	S12	5	#4	STR.	8'-0"	27
INT. BM.	S13	5	#4	STR.	13'-6"	45
Y1	12	#5	STR.	3'-3"	41
Z1	18	#5	2	4'-5"	83

* NOTE: THE (4) STRANDS ALONG THE TOP FLANGE TO BE STRESSED TO 10,000 LBS. EACH.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE BEAM

	REINFORCING STEEL	7,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
EXT. BEAM	1,830	22.6	52
INT. BEAM	1,877	22.6	52

BEAMS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
16	100'-10 3/4"	1,614.33'

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: T. M. G. 4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

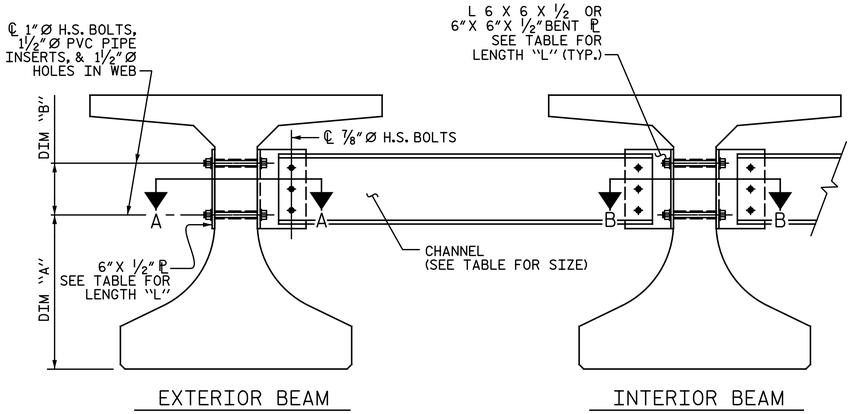
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

45" PRESTRESSED CONCRETE FLORIDA I-BEAM

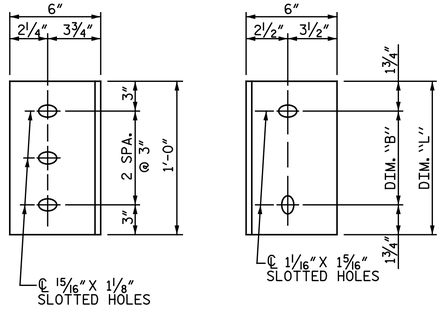
DRAWN BY : N. B. SPEAKS DATE : 7-18-19
CHECKED BY : T. M. GARRISON DATE : 4-17-20

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-16
1			3			TOTAL SHEETS
2			4			44



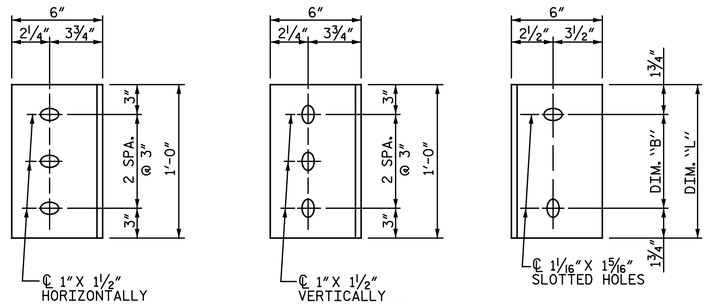
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE WEB FACE

CONNECTOR PLATE DETAILS

NON-CLOSURE POUR BAYS



DIAPHRAGM FACE DETAIL 1
FOR CLOSURE POUR BAY SIDE OF BEAM 5 & BEAM 12

DIAPHRAGM FACE DETAIL 2
FOR CLOSURE POUR BAY SIDE OF BEAM 6 & BEAM 11

WEB FACE

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE BEAM WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

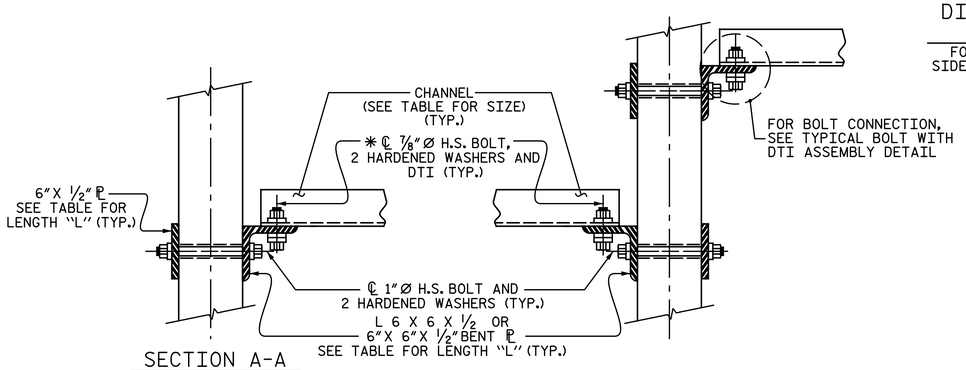
FOR BOLTS THROUGH THE BEAM WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼"PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED BEAMS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE BEAMS.



SECTION A-A

SECTION B-B

CONNECTION DETAILS

NUTS ON BOLTS FOR CONNECTING CHANNELS TO CONNECTOR PLATES IN CLOSURE POUR BAYS SHALL BE LEFT LOOSE FOR PURPOSE OF ADJUSTMENT UNTIL BOTH SIDES OF SLAB HAVE BEEN POURED.

* FOR CONNECTING CHANNELS TO CONNECTOR PLATES IN CLOSURE POUR BAYS, SQUARE HARDENED WASHERS SHALL BE USED IN LIEU OF CIRCULAR HARDENED WASHERS.

TABLE

BEAM TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
45"F.I.B.	MC 12 x 31	2'-2"	8½"	1'-0"

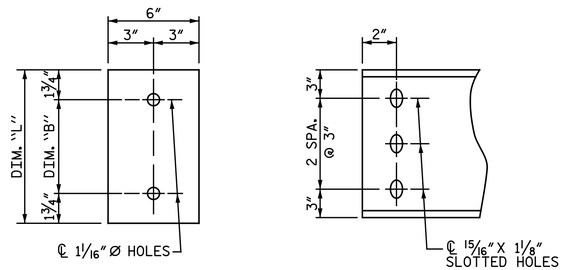
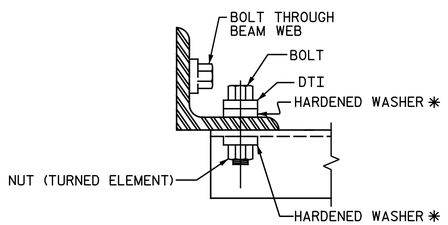


PLATE DETAILS CHANNEL END



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

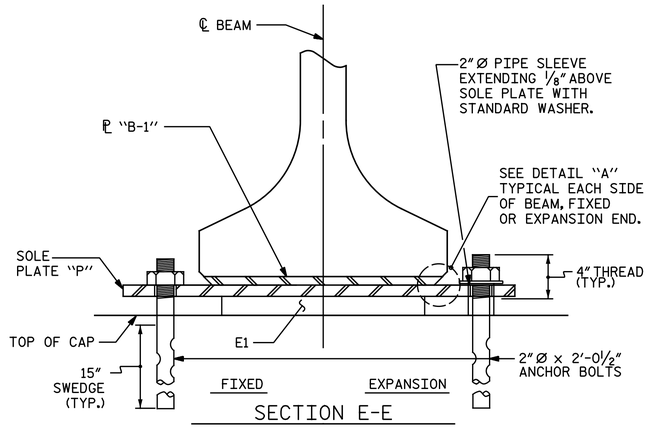
INTERMEDIATE STEEL DIAPHRAGMS FOR 45"FLORIDA I-BEAMS

Michael Baker INTERNATIONAL

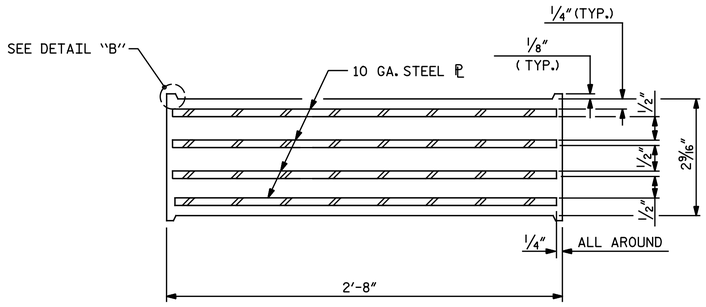
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-17
1			3			TOTAL SHEETS
2			4			44

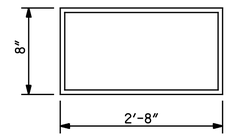
DRAWN BY : N. B. SPEAKS DATE : 7-18-19
CHECKED BY : T. M. GARRISON DATE : 4-17-20



SECTION E-E



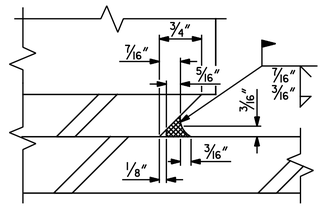
TYPICAL SECTION OF ELASTOMERIC BEARINGS



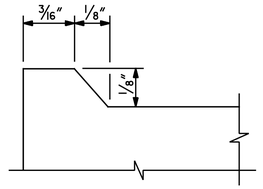
E1 (32 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

BEARING DETAILS



DETAIL "A"



DETAIL "B"

MAXIMUM ALLOWABLE SERVICE LOADS
D.L.+L.L.(NO IMPACT)
245 k

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 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 REQUIREMENTS OF ASTM D1785.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE BEAM, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE BEAMS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

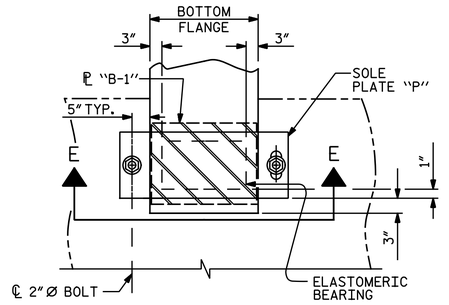
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.110 KSI, IN ACCORDANCE WITH AASHTO M251.

STEEL PLATES IN BEARING PADS SHALL CONFORM TO ASTM A1011 GRADE 36, TYPE 1.

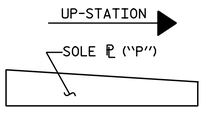
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

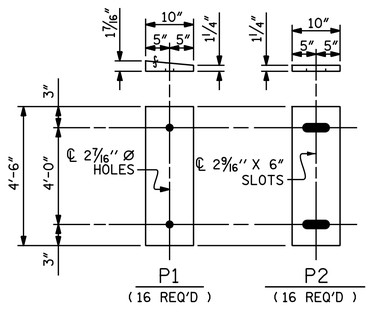


TYPICAL HALF-PLAN (SHOWING FIXED END)

TYPICAL HALF-PLAN (SHOWING EXPANSION END)



SOLE ℄ PLACEMENT DETAIL



SOLE PLATE DETAILS ("P")

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ELASTOMERIC BEARING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-18
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : N. B. SPEAKS DATE : 7-18-19
CHECKED BY : T. M. GARRISON DATE : 3-25-20

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6" Ø LOW RELAXATION	BEAMS 1 & 16										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (BEAM ALONE IN PLACE) ↑	0.000	0.123	0.233	0.320	0.374	0.393	0.374	0.320	0.233	0.123	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.065	0.128	0.177	0.208	0.219	0.208	0.177	0.128	0.065	0.000
FINAL CAMBER ↑	0"	11/16"	1 1/4"	1 11/16"	2"	2 1/16"	2"	1 11/16"	1 1/4"	11/16"	0"
0.6" Ø LOW RELAXATION	BEAMS 2 THROUGH 15										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (BEAM ALONE IN PLACE) ↑	0.000	0.123	0.233	0.320	0.374	0.393	0.374	0.320	0.233	0.123	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.070	0.137	0.190	0.223	0.235	0.223	0.190	0.137	0.070	0.000
FINAL CAMBER ↑	0"	5/8"	1 1/8"	1 9/16"	1 13/16"	1 7/8"	1 13/16"	1 9/16"	1 1/8"	5/8"	0"

* INCLUDES FUTURE WEARING SURFACE.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF BEAM SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE "B" REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE BEAM ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE BEAM SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,000 PSI.

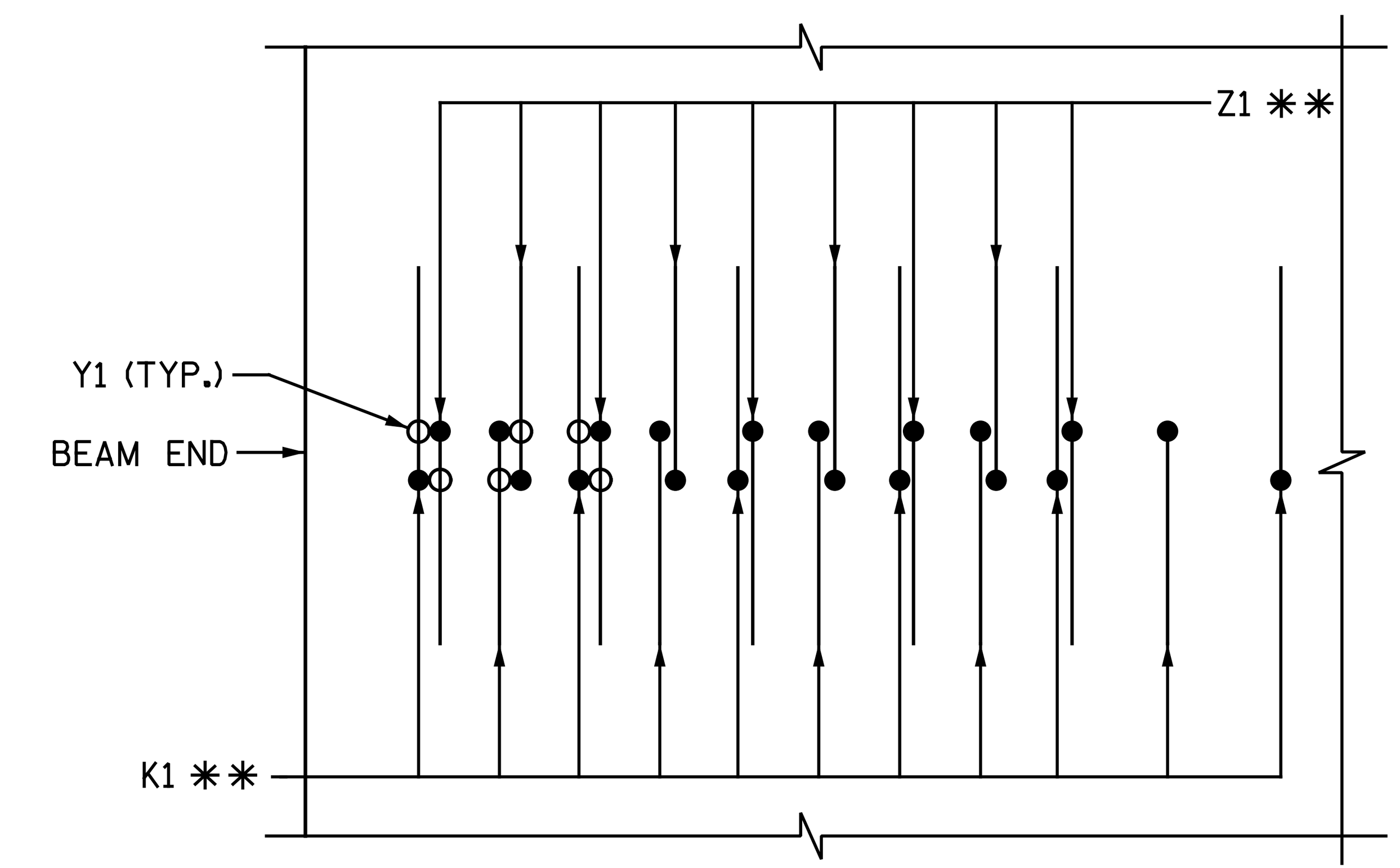
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE BEAM.

THE TOP SURFACE OF THE BEAM, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

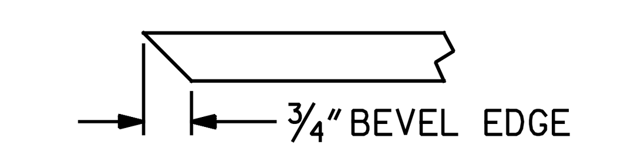
TIE "K" AND "Z" BARS TO FULLY BONDED STRANDS IN THE BOTTOM OR CENTER ROW.

FOR 45" PRESTRESSED CONCRETE FLORIDA I-BEAM, SEE SPECIAL PROVISIONS.



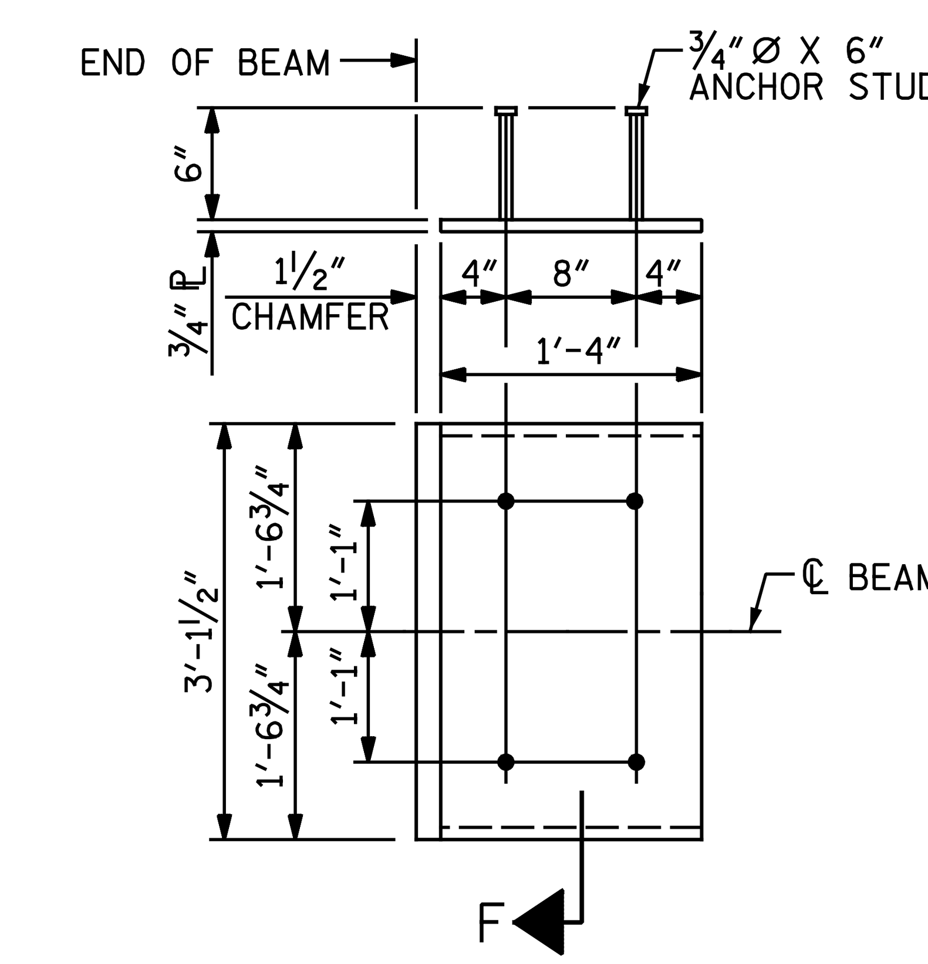
DETAIL "A"

(SHOWING ONLY K1, Y1 & Z1 BARS)
(EXPANSION END SHOWN, FIXED END SIMILAR)



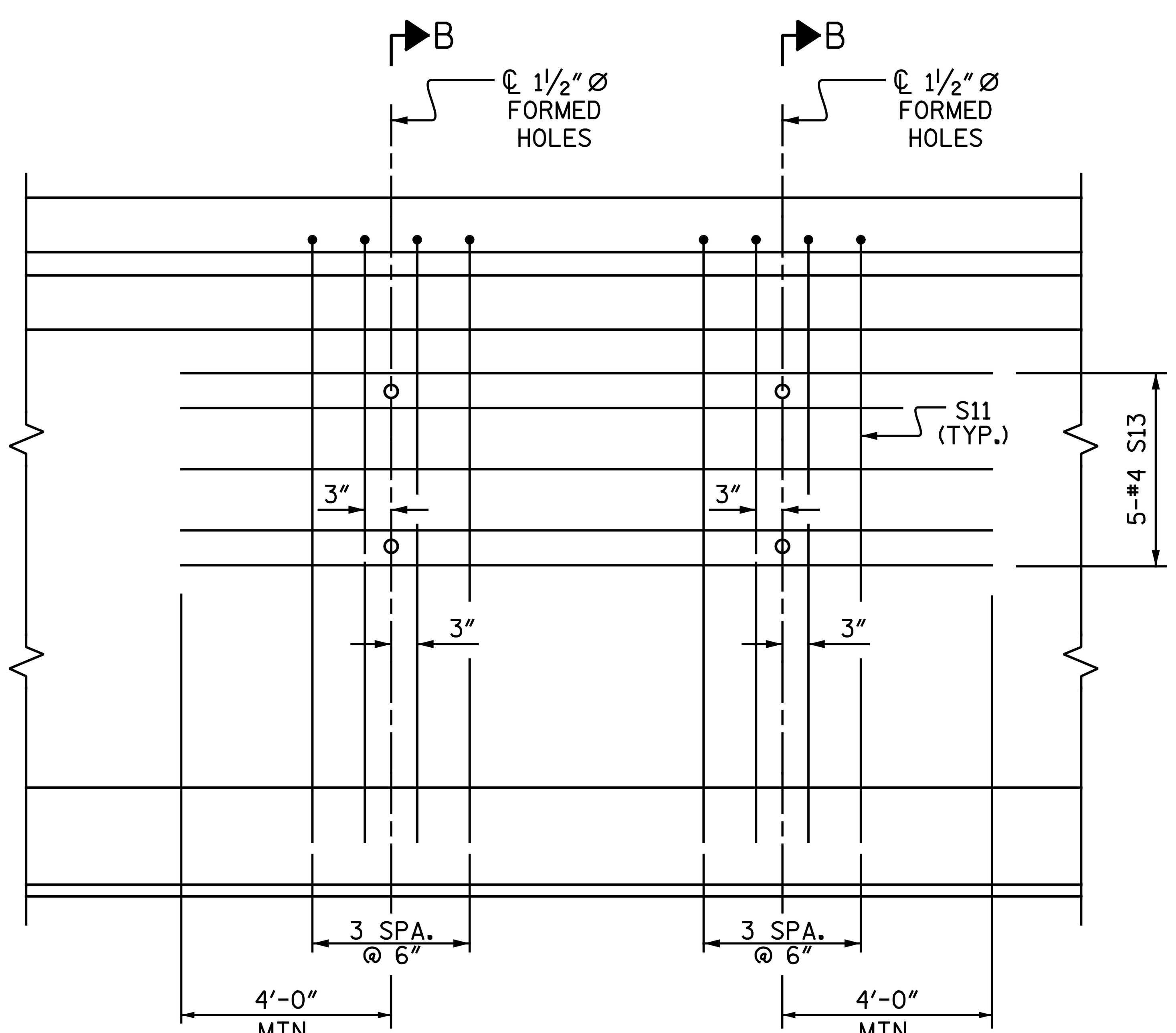
SECTION "F"

(SEE NOTES)



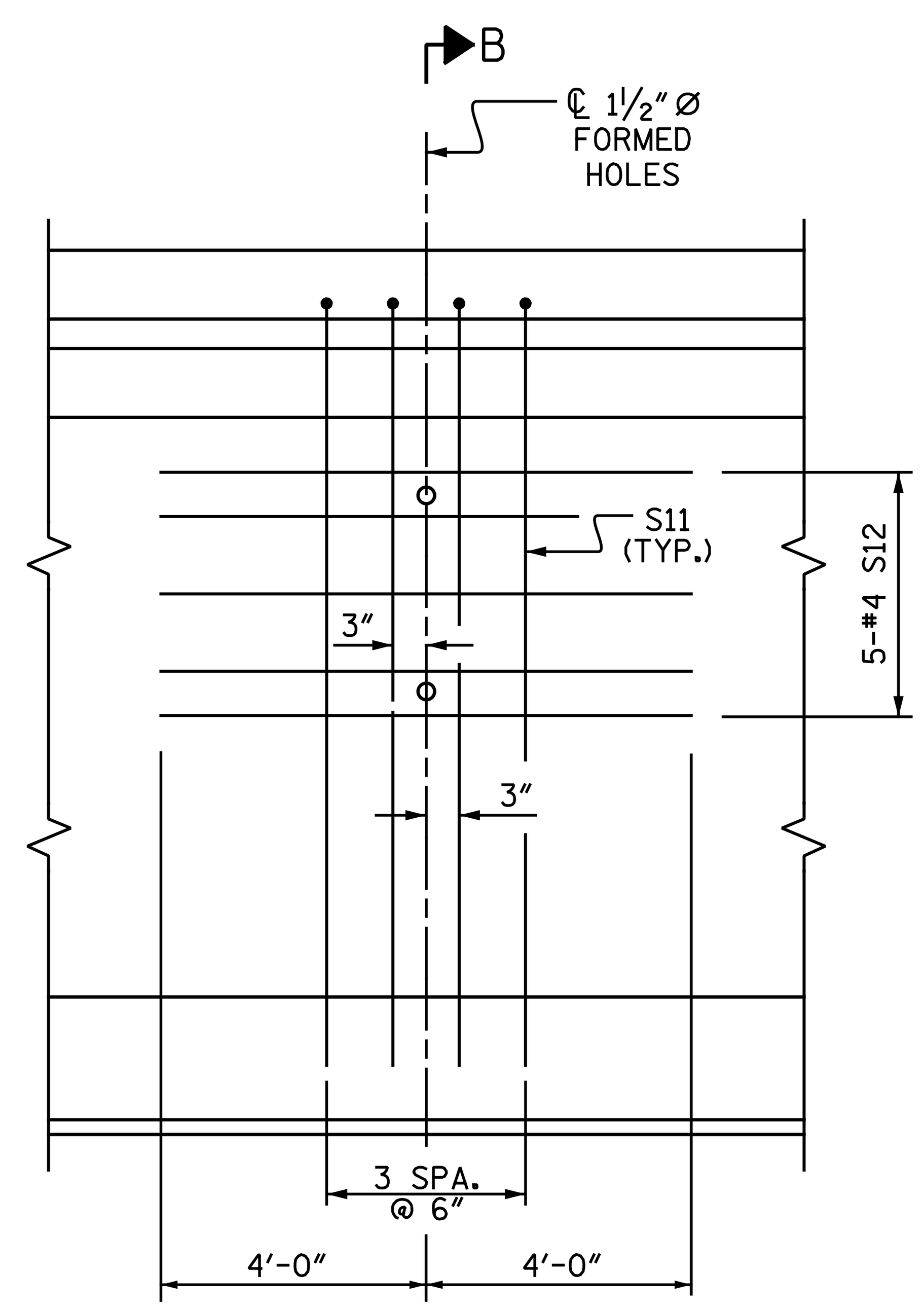
EMBEDDED PLATE "B-1" DETAILS FOR FLORIDA I-BEAMS

(2 REQ'D PER BEAM)



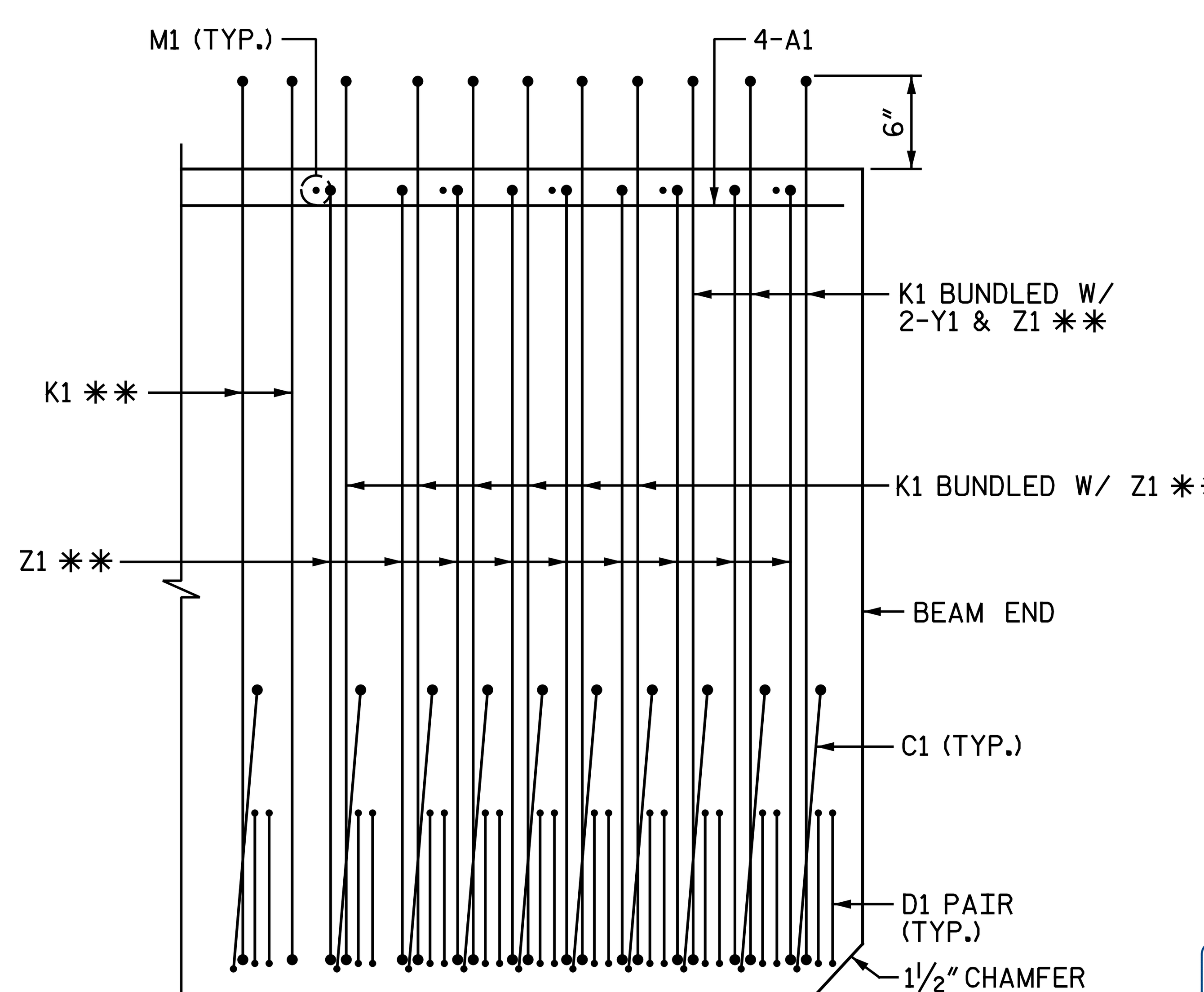
PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM
REINFORCING STEEL FOR INTERIOR BEAMS



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM
REINFORCING STEEL FOR EXTERIOR BEAMS



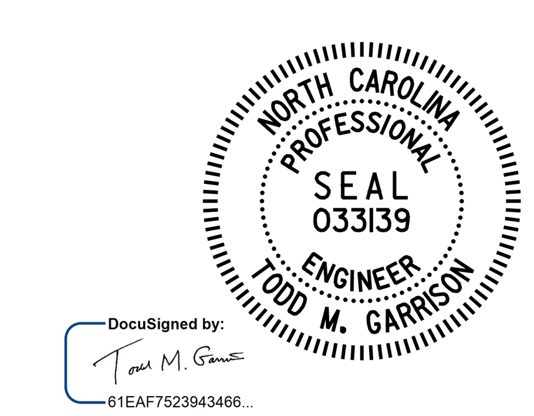
DETAIL "B"

(FLANGES NOT SHOWN FOR CLARITY)
(FIXED END SHOWN, EXPANSION END SIMILAR)

** ALTERNATE DIRECTION OF BAR ENDS

FOR "SECTION B-B", SEE "45" PRESTRESSED CONCRETE FLORIDA I-BEAM" SHEET.

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-



4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

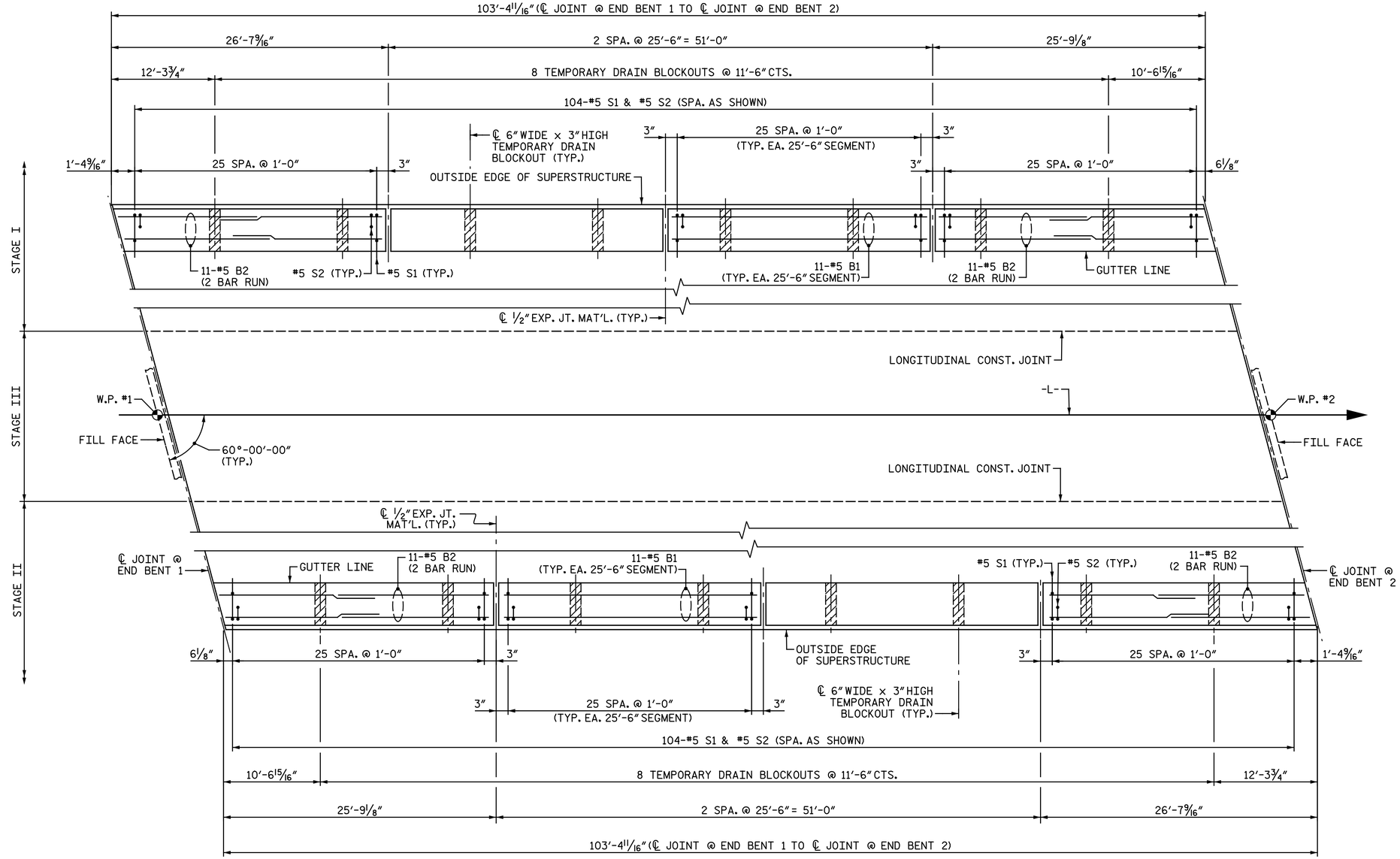
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
45" PRESTRESSED CONCRETE FLORIDA I-BEAM DETAILS

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S3-19
1			3					TOTAL SHEETS
2			4					44

DRAWN BY : N. B. SPEAKS DATE : 7-18-19
CHECKED BY : T. M. GARRISON DATE : 4-17-20



SPAN A

PLAN OF CONCRETE BARRIER RAIL

BARRIER DIMENSIONS ARE MEASURED ALONG OUTSIDE FACE OF RAIL

SPLICE LENGTH	
BAR SIZE	EPOXY COATED
#5	3′-5″

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

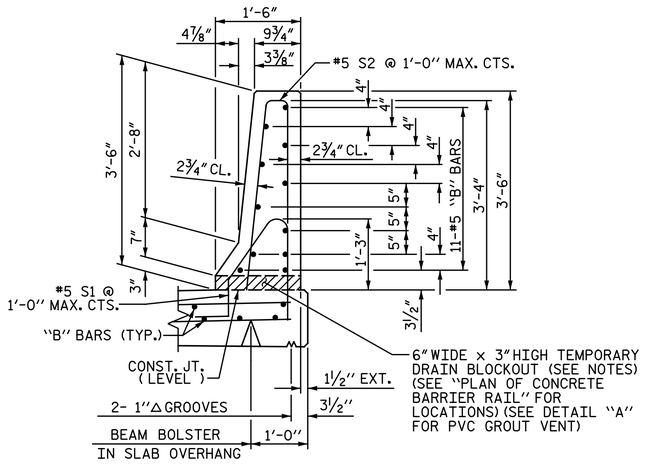
SUPERSTRUCTURE

CONCRETE BARRIER RAIL

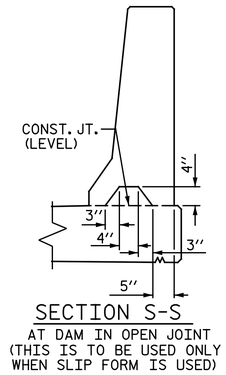
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-20
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : N. B. SPEAKS DATE : 7-18-19

CHECKED BY : T. M. GARRISON DATE : 2-1-20

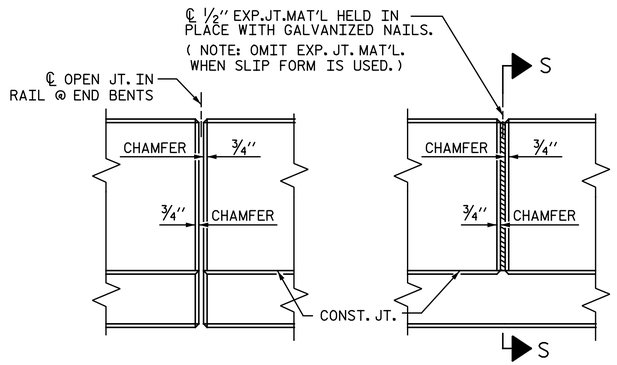


SECTION THRU RAIL



SECTION S-S

AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

NOTES

THE BARRIER RAIL IN THE SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

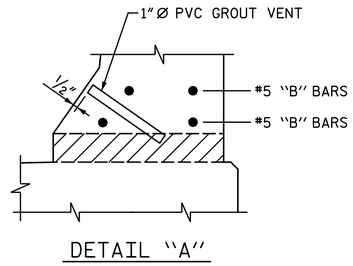
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

TEMPORARY DRAIN BLOCKOUTS FOR STAGE I AND STAGE II CONDITIONS SHALL BE FILLED WITH APPROVED GROUT UPON COMPLETION OF STAGE III CONSTRUCTION.

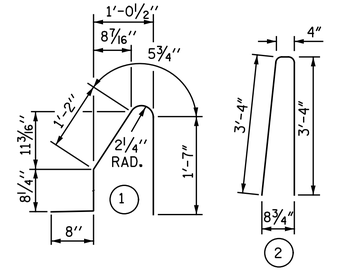
TEMPORARY DRAIN BLOCKOUTS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH CONCRETE BARRIER RAIL REINFORCEMENT AND ½" EXPANSION JOINTS.

THE COST OF THE PVC GROUT VENTS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE BARRIER RAIL.



DETAIL "A"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	22	#5	STR.	25' - 1"	576
✳B2	44	#5	STR.	14' - 10"	681
✳S1	104	#5	1	4' - 7"	497
✳S2	104	#5	2	7' - 0"	759
✳EPOXY COATED REINFORCING STEEL				LBS.	2,513
CLASS AA CONCRETE				CU. YDS.	14.0
CONCRETE BARRIER RAIL				LIN. FT.	103.39

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	22	#5	STR.	25' - 1"	576
✳B2	44	#5	STR.	14' - 10"	681
✳S1	104	#5	1	4' - 7"	497
✳S2	104	#5	2	7' - 0"	759
✳EPOXY COATED REINFORCING STEEL				LBS.	2,513
CLASS AA CONCRETE				CU. YDS.	14.0
CONCRETE BARRIER RAIL				LIN. FT.	103.39

QUANTITIES DO NOT INCLUDE BARRIER RAILS ON THE APPROACH SLABS. FOR BARRIER RAILS ON THE APPROACH SLABS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison
61EAF7523043486...
4/30/2020

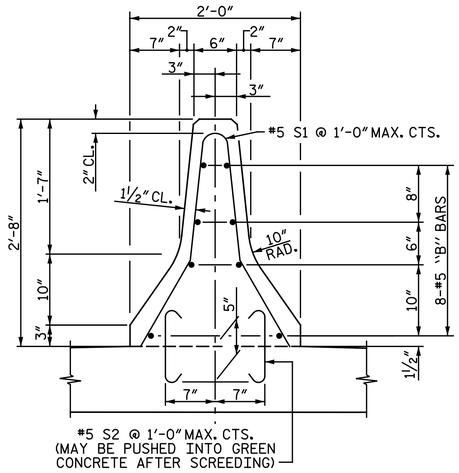
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : N. B. SPEAKS	DATE : 8-5-19	
CHECKED BY : T. M. GARRISON	DATE : 2-1-20	
DRAWN BY : ARB 5/87	REV. 7/12	MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

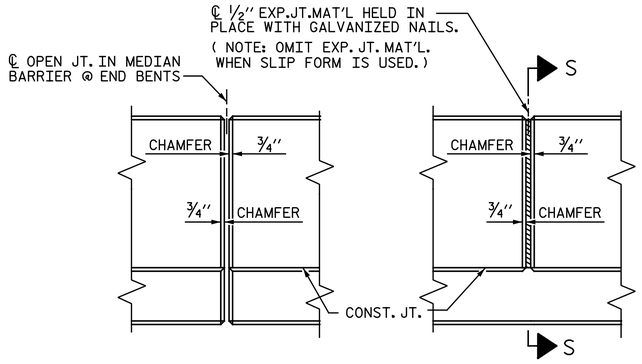
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-21
1			3			TOTAL SHEETS
2			4			44

STD. NO. CBR1

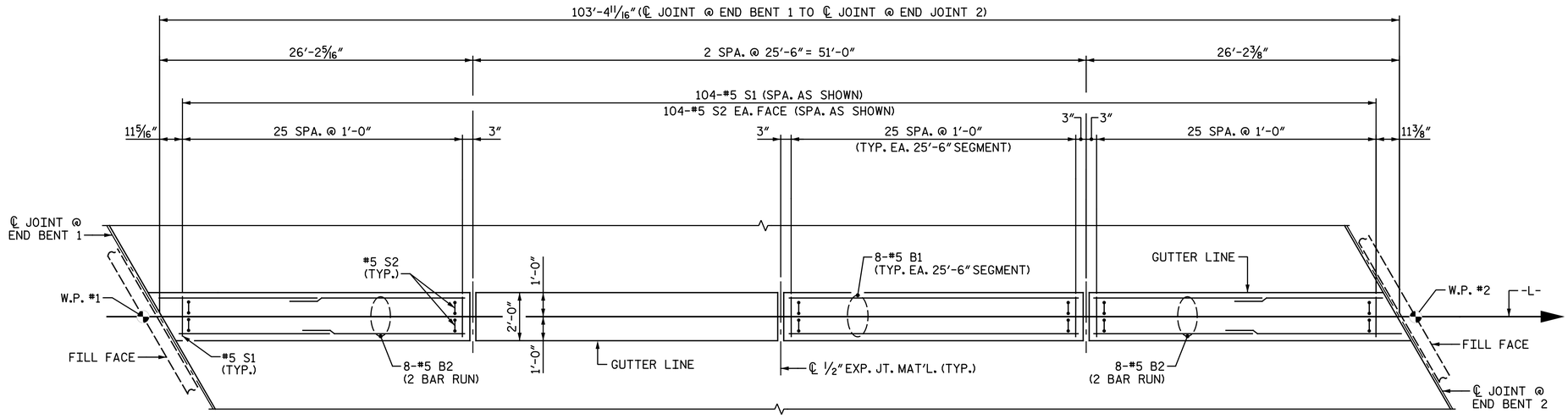


SECTION THRU MEDIAN BARRIER



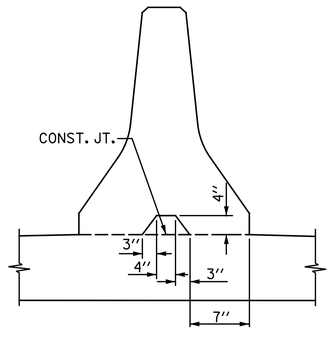
ELEVATION AT EXPANSION JOINTS

MEDIAN BARRIER DETAILS



SPAN A

PLAN OF CONCRETE MEDIAN BARRIER



SECTION S-S

AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)

SPLICE LENGTH	
BAR SIZE	EPOXY COATED
#5	3′-5″

NOTES

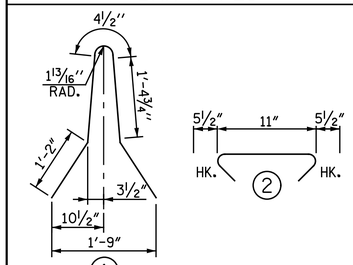
THE CONCRETE MEDIAN BARRIER IN THE SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN CONCRETE MEDIAN BARRIER SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½″ IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CONCRETE MEDIAN BARRIER AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN CONCRETE MEDIAN BARRIER EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF CONCRETE MEDIAN BARRIER SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED DOWELS IN PLACE OF THE #5 S2 BARS DETAILED. LEVEL 2 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS 19 KIPS. THE DOWELS ARE TO BE HOOKED ON ONE END WITH A PROJECTION MATCHING THAT OF THE #5 S2 BARS. THE OPPOSITE END IS TO BE STRAIGHT AND EMBEDDED 6″ INTO THE DECK SLAB.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE MEDIAN BARRIER ONLY

STAGE III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	16	#5	STR.	25′ - 1″	419
✳B2	32	#5	STR.	14′ - 11″	498
✳S1	104	#5	1	5′ - 6″	597
✳S2	208	#5	2	1′ - 10″	398

✳EPOXY COATED

REINFORCING STEEL	LBS.	1,912
CLASS AA CONCRETE	CU. YDS.	10.6
CONCRETE MEDIAN BARRIER	LIN. FT.	103.39

QUANTITIES DO NOT INCLUDE CONCRETE MEDIAN BARRIERS ON THE APPROACH SLABS. FOR MEDIAN BARRIERS ON THE APPROACH SLABS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523043486...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

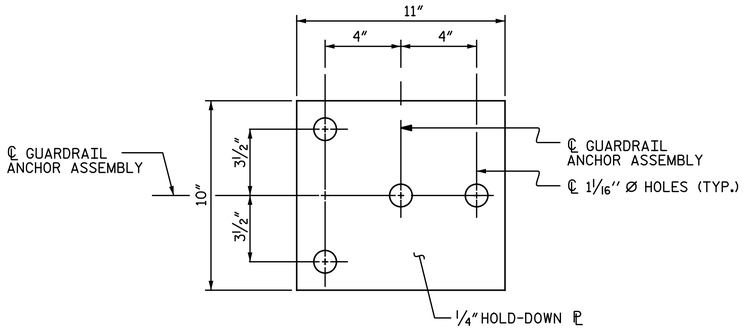
CONCRETE MEDIAN BARRIER

Michael Baker INTERNATIONAL

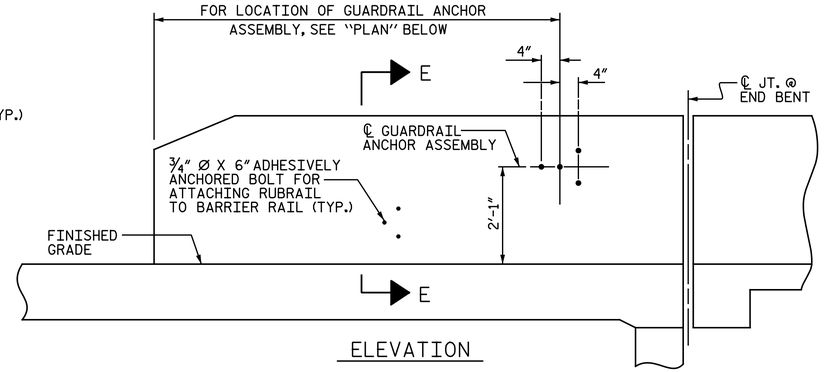
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-22
1			3			TOTAL SHEETS
2			4			44

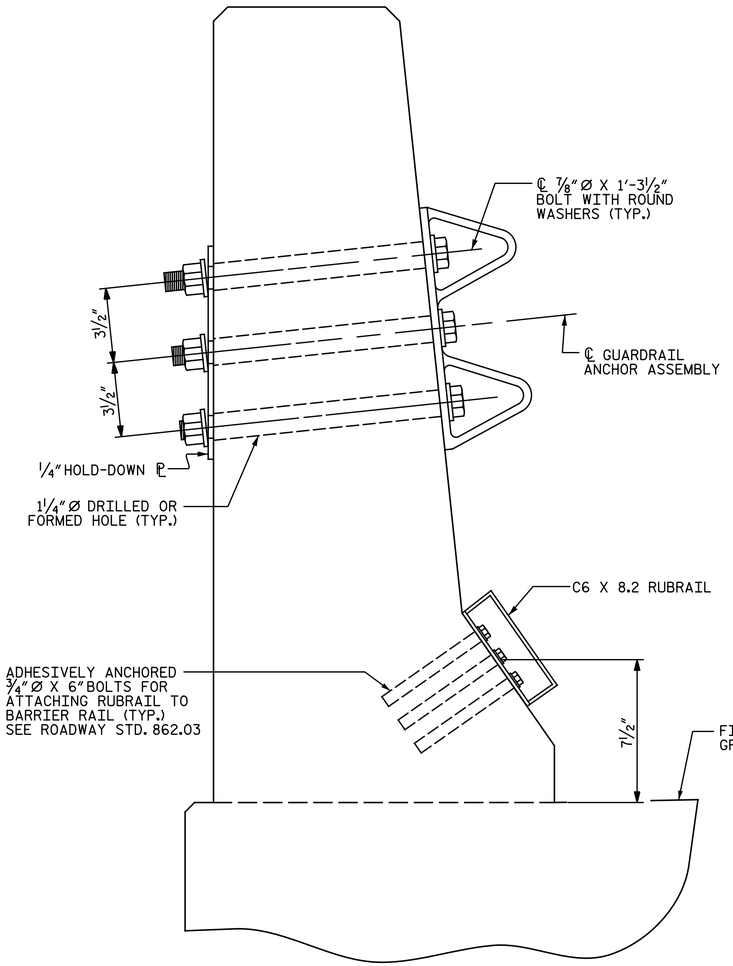
DRAWN BY : N. B. SPEAKS DATE : 8-5-19
CHECKED BY : T. M. GARRISON DATE : 3-11-20



PLAN

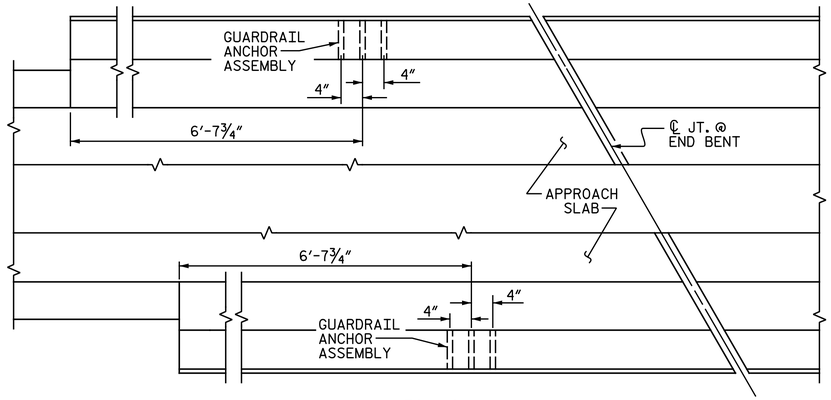


ELEVATION



SECTION E-E

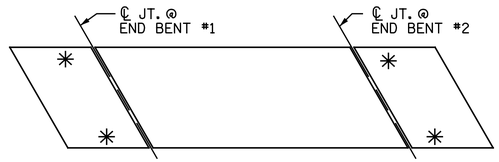
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4″ HOLD-DOWN PLATE AND 4 - 7/8″ Ø BOLTS WITH NUTS AND WASHERS, RUBRAIL, AND ADHESIVELY ANCHORED BOLTS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8″ Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

THE 1 1/4″ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4″ Ø X 6″ BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4″ Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: T. M. Garrison 910A7623943456...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-18-19
CHECKED BY : T. M. GARRISON	DATE : 2-2-20
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

Michael Baker INTERNATIONAL

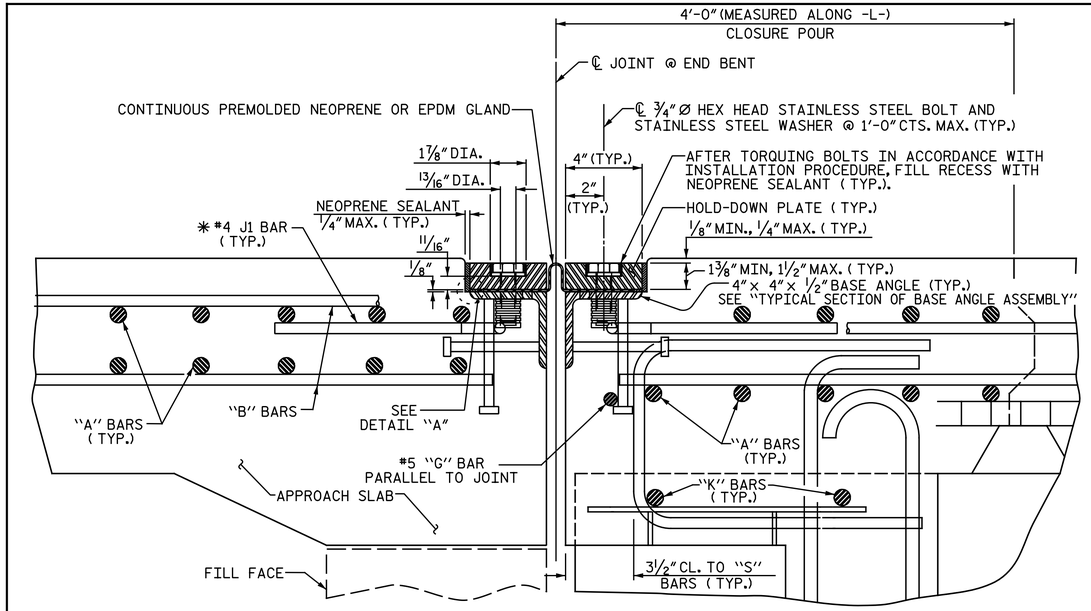
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

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

SHEET NO. S3-23

TOTAL SHEETS 44

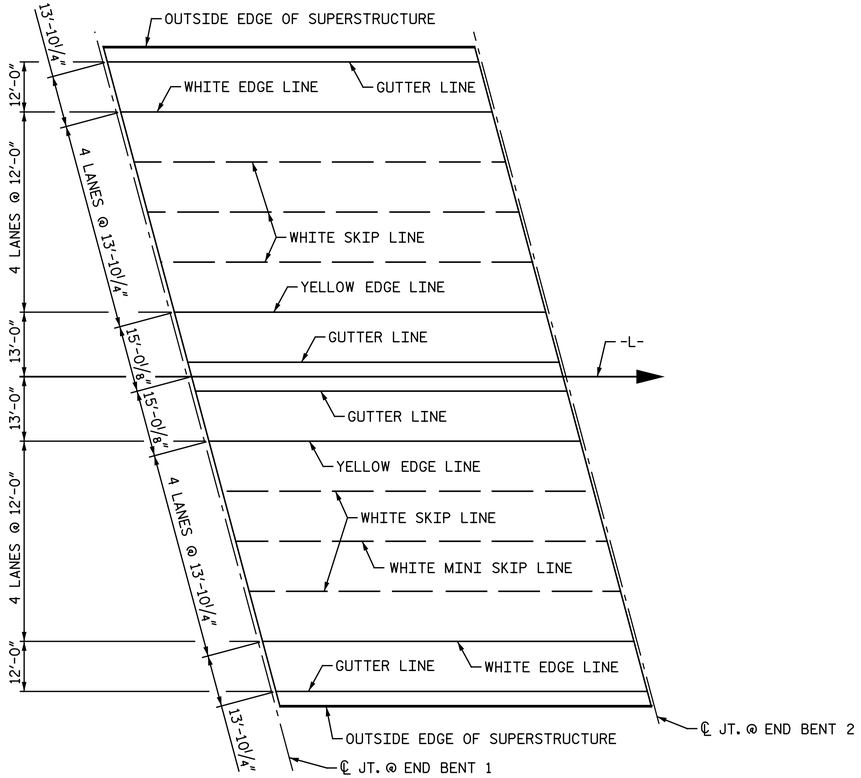
STD. NO. GRA2



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



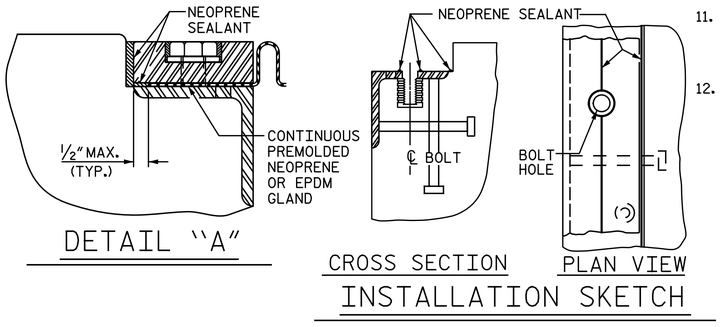
PAVEMENT MARKING ALIGNMENT

INSTALLATION PROCEDURE

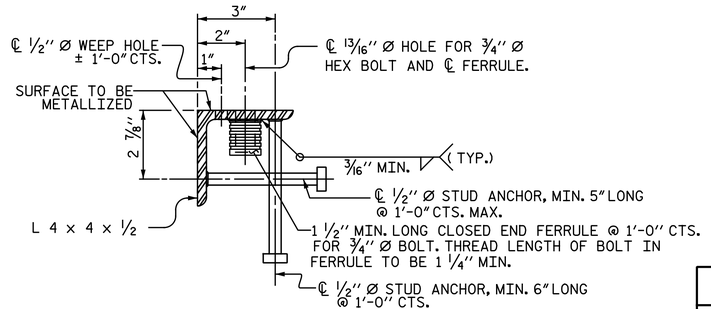
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

GENERAL NOTES

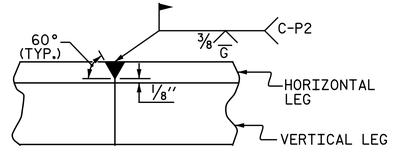
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE " TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



MOVEMENT AND SETTING AT JOINT					
BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
END BENT 1	60°-00'-00"	5/8"	2 3/8"	2 1/4"	2 1/16"
END BENT 2	60°-00'-00"	0"	2 1/4"	2 1/4"	2 1/4"



TYPICAL SECTION OF BASE ANGLE ASSEMBLY



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

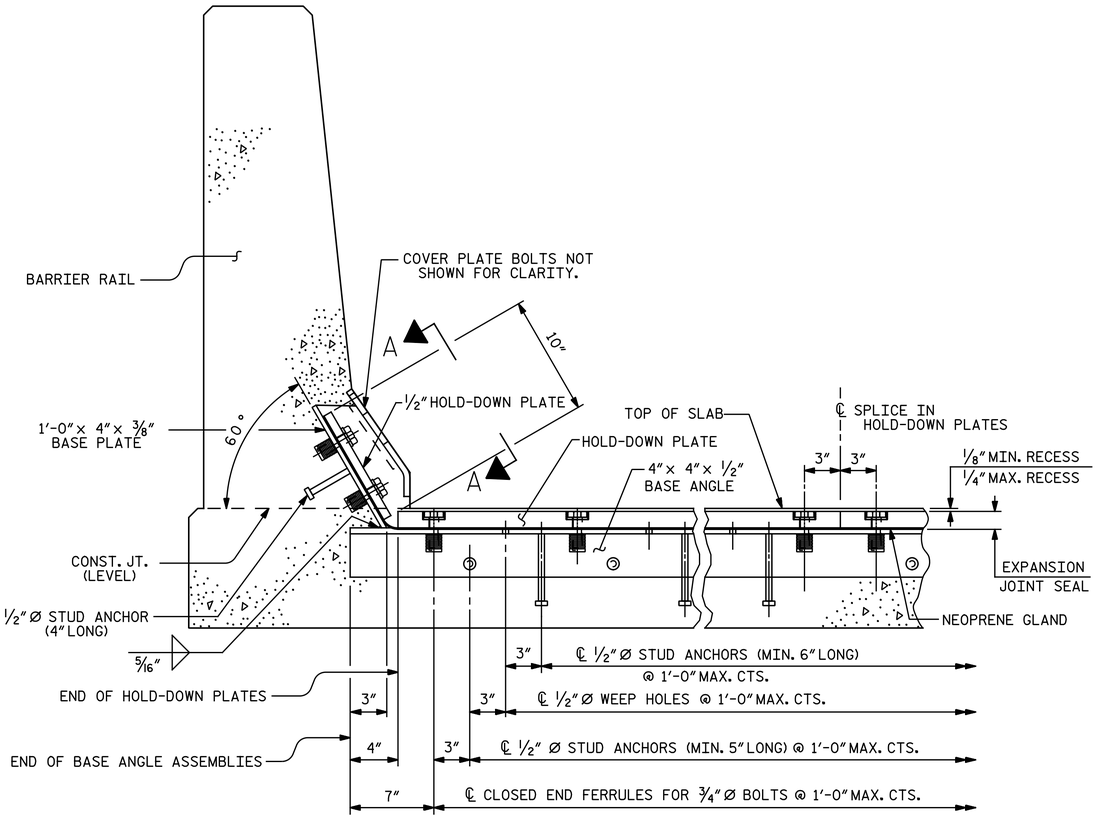
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

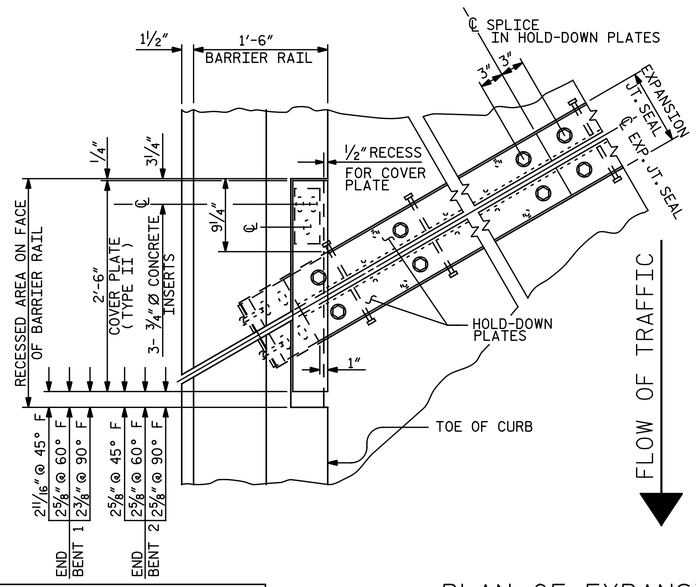
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-24
1			3			TOTAL SHEETS
2			4			44

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-18-19
CHECKED BY : T. M. GARRISON	DATE : 2-2-20
DRAWN BY : REK 9/87	REV. 10/1/11 MAA/GM
CHECKED BY : CRK 10/87	REV. 10/17 MAA/THC
	REV. 6/18 MAA/THC

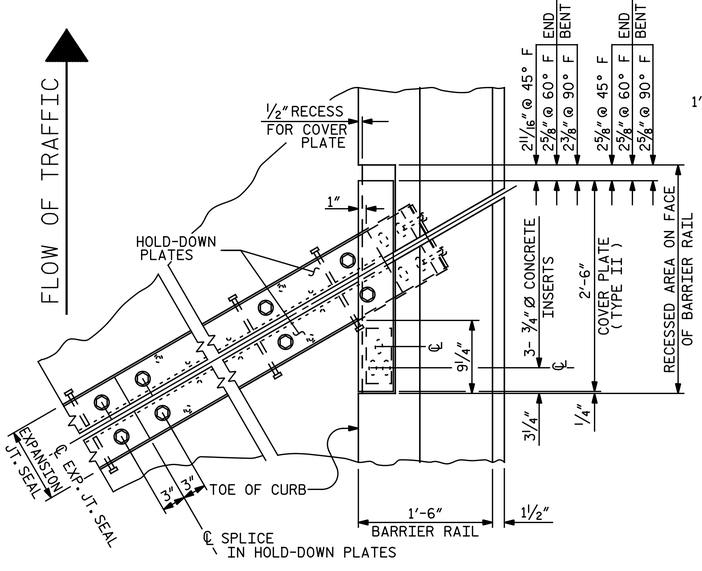
STD. NO. EJS1

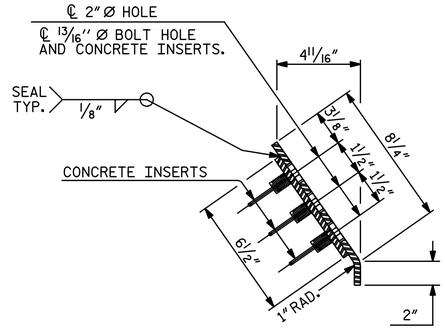


SECTION THRU RAIL NORMAL TO JOINT

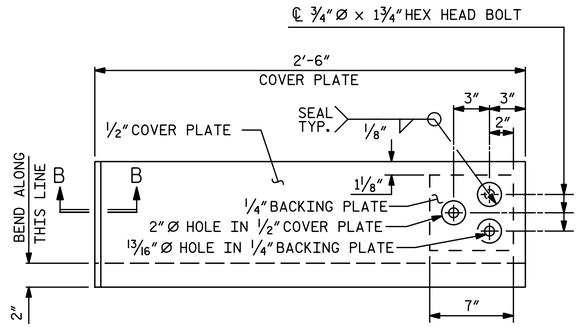


PLAN OF EXPANSION JOINT SEAL



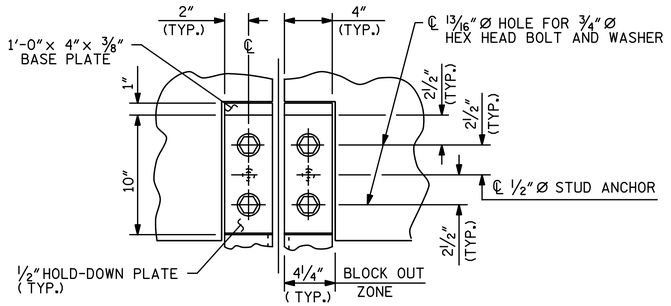


END VIEW

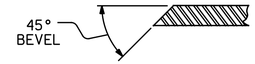


TYPE II - ELEVATION VIEW
(4 REQUIRED)

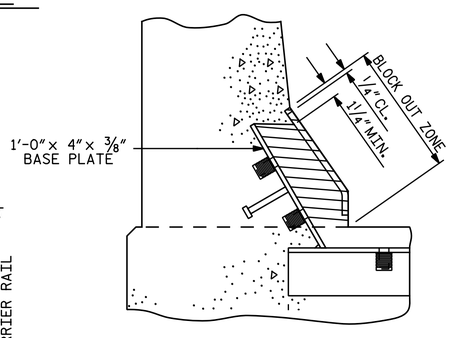
COVER PLATE DETAILS



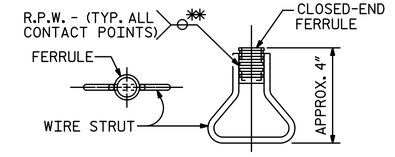
SECTION A - A



SECTION B - B



BLOCK OUT DETAIL
SEE " SECTION A - A " FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

** EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

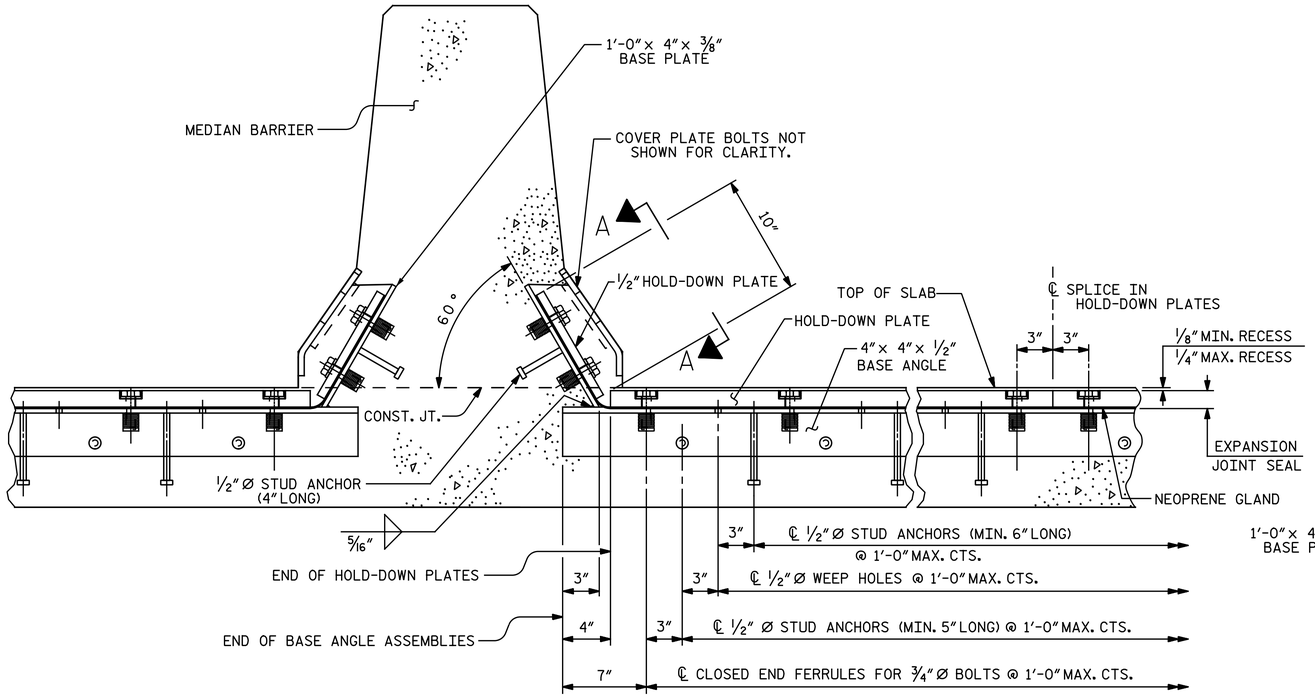
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

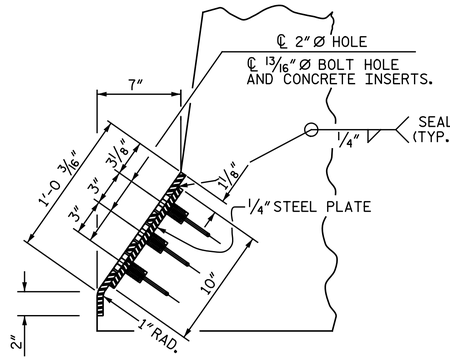
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-25
1			3			TOTAL SHEETS
2			4			44

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-18-19		
CHECKED BY : T. M. GARRISON	DATE : 2-2-20		
DRAWN BY : REK 9/87	REV. 7/12	MAA/GM	
CHECKED BY : CRK 10/87	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

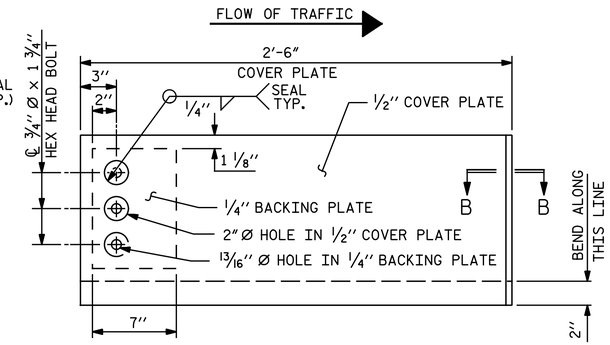
STD. NO. EJS2



SECTION THRU RAIL NORMAL TO JOINT

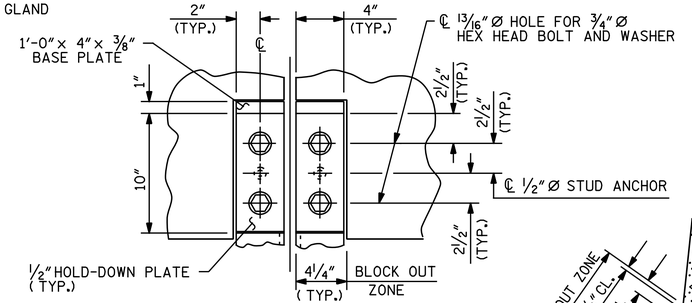


TYPE I-END VIEW

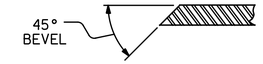


TYPE I - ELEVATION VIEW
(4 REQUIRED)

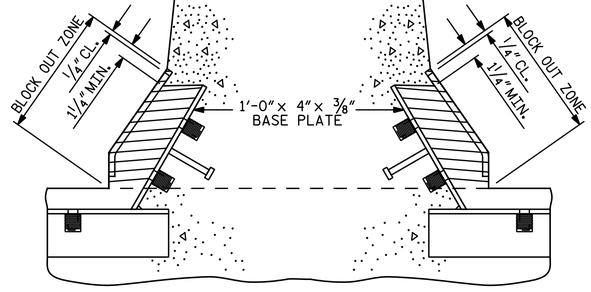
COVER PLATE DETAILS



SECTION A - A

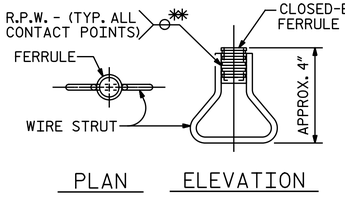


SECTION B - B



BLOCK OUT DETAIL

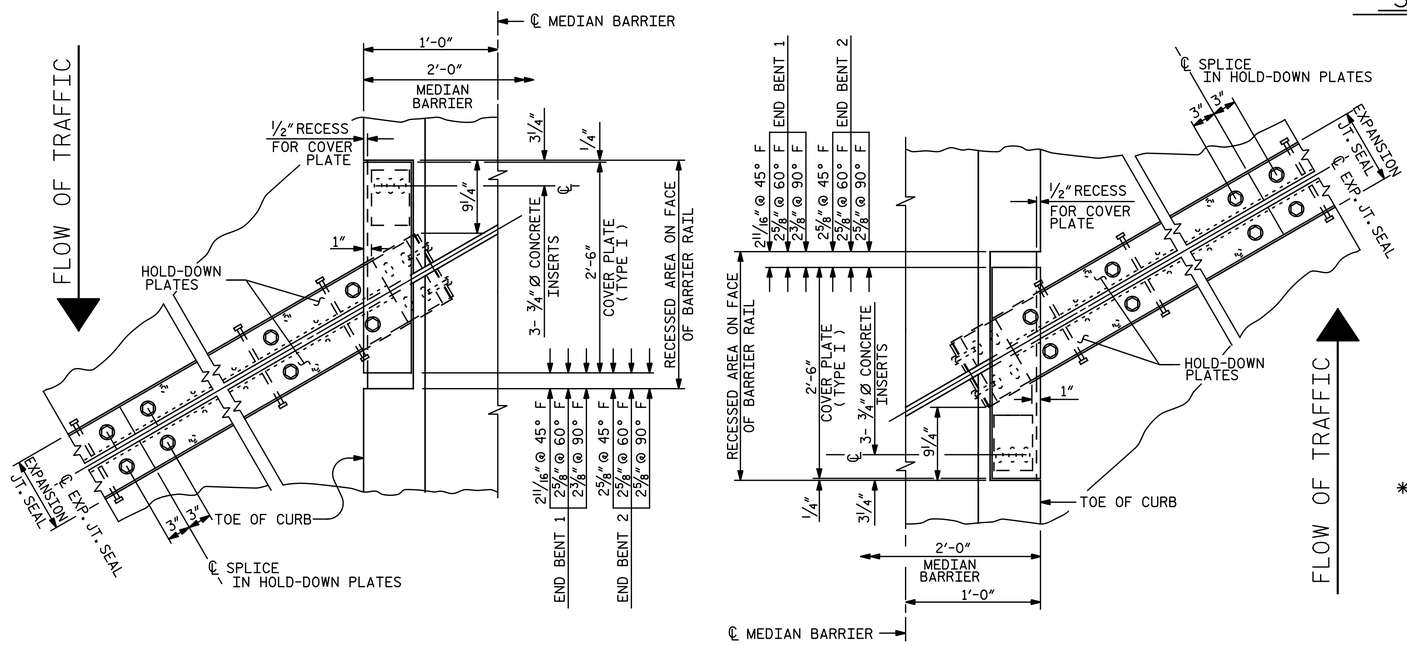
SEE " SECTION A - A " FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

** EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.



PLAN OF EXPANSION JOINT SEAL

DRAWN BY : N. B. SPEAKS DATE : 7-18-19
CHECKED BY : T. M. GARRISON DATE : 2-2-20

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR MEDIAN BARRIER

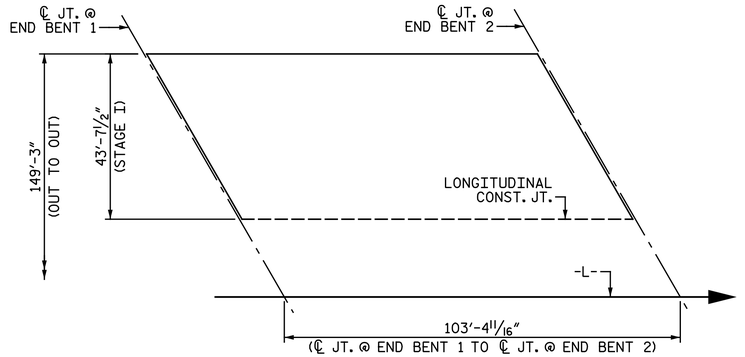
NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

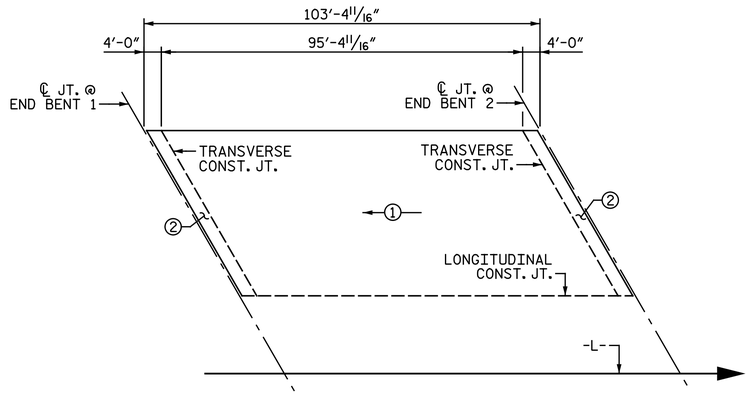
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-26
1			3			TOTAL SHEETS
2			4			44



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(STAGE I SQ. FT. = 4,510)



POURING SEQUENCE

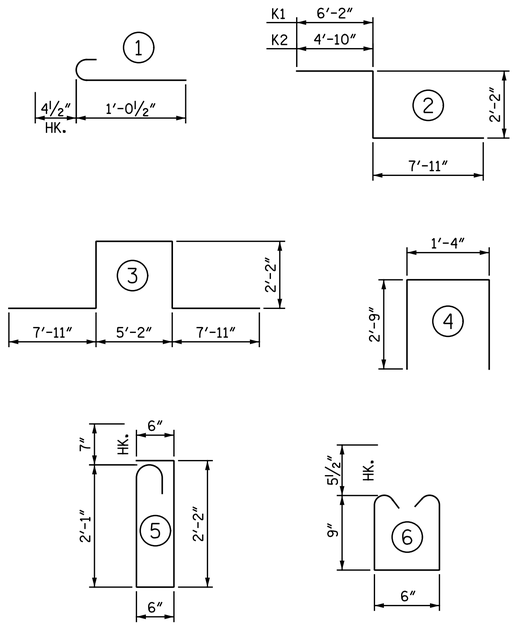
(#) → DENOTES POUR NUMBER AND DIRECTION

REINFORCING BAR SCHEDULE

SPAN A - STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	123	#5	STR.	43′ - 3″	5,548	A211	2	#5	STR.	32′ - 2″	67
A2	123	#5	STR.	43′ - 3″	5,548	A212	2	#5	STR.	31′ - 1″	65
✳ A3	20	#5	STR.	46′ - 11″	979	A213	2	#5	STR.	30′ - 0″	63
						A214	2	#5	STR.	28′ - 11″	60
✳ A101	2	#5	STR.	43′ - 0″	90	A215	2	#5	STR.	27′ - 10″	58
✳ A102	2	#5	STR.	41′ - 11″	87	A216	2	#5	STR.	26′ - 9″	56
✳ A103	2	#5	STR.	40′ - 10″	85	A217	2	#5	STR.	25′ - 8″	54
✳ A104	2	#5	STR.	39′ - 9″	83	A218	2	#5	STR.	24′ - 8″	51
✳ A105	2	#5	STR.	38′ - 8″	81	A219	2	#5	STR.	23′ - 7″	49
✳ A106	2	#5	STR.	37′ - 7″	78	A220	2	#5	STR.	22′ - 6″	47
✳ A107	2	#5	STR.	36′ - 6″	76	A221	2	#5	STR.	21′ - 5″	45
✳ A108	2	#5	STR.	35′ - 5″	74	A222	2	#5	STR.	20′ - 4″	42
✳ A109	2	#5	STR.	34′ - 4″	72	A223	2	#5	STR.	19′ - 3″	40
✳ A110	2	#5	STR.	33′ - 3″	69	A224	2	#5	STR.	18′ - 2″	38
✳ A111	2	#5	STR.	32′ - 2″	67	A225	2	#5	STR.	17′ - 1″	36
✳ A112	2	#5	STR.	31′ - 1″	65	A226	2	#5	STR.	16′ - 0″	33
✳ A113	2	#5	STR.	30′ - 0″	63	A227	2	#5	STR.	14′ - 11″	31
✳ A114	2	#5	STR.	28′ - 11″	60	A228	2	#5	STR.	13′ - 10″	29
✳ A115	2	#5	STR.	27′ - 10″	58	A229	2	#5	STR.	12′ - 9″	27
✳ A116	2	#5	STR.	26′ - 9″	56	A230	2	#5	STR.	11′ - 8″	24
✳ A117	2	#5	STR.	25′ - 8″	54	A231	2	#5	STR.	10′ - 7″	22
✳ A118	2	#5	STR.	24′ - 8″	51	A232	2	#5	STR.	9′ - 6″	20
✳ A119	2	#5	STR.	23′ - 7″	49	A233	2	#5	STR.	8′ - 5″	18
✳ A120	2	#5	STR.	22′ - 6″	47	A234	2	#5	STR.	7′ - 4″	15
✳ A121	2	#5	STR.	21′ - 5″	45	A235	2	#5	STR.	6′ - 3″	13
✳ A122	2	#5	STR.	20′ - 4″	42	A236	2	#5	STR.	5′ - 2″	11
✳ A123	2	#5	STR.	19′ - 3″	40	A237	2	#5	STR.	4′ - 1″	9
✳ A124	2	#5	STR.	18′ - 2″	38	A238	2	#5	STR.	3′ - 0″	6
✳ A125	2	#5	STR.	17′ - 1″	36						
✳ A126	2	#5	STR.	16′ - 0″	33	✳ B1	90	#4	STR.	35′ - 8″	2,144
✳ A127	2	#5	STR.	14′ - 11″	31	B2	82	#5	STR.	52′ - 6″	4,490
✳ A128	2	#5	STR.	13′ - 10″	29						
✳ A129	2	#5	STR.	12′ - 9″	27	✳ D1	159	#5	STR.	7′ - 0″	1,161
✳ A130	2	#5	STR.	11′ - 8″	24	D2	159	#5	STR.	6′ - 6″	1,078
✳ A131	2	#5	STR.	10′ - 7″	22	✳ D3	20	#5	STR.	8′ - 6″	177
✳ A132	2	#5	STR.	9′ - 6″	20						
✳ A133	2	#5	STR.	8′ - 5″	18	✳ G1	2	#5	STR.	49′ - 11″	104
✳ A134	2	#5	STR.	7′ - 4″	15						
✳ A135	2	#5	STR.	6′ - 3″	13	✳ J1	94	#4	1	1′ - 5″	89
✳ A136	2	#5	STR.	5′ - 2″	11						
✳ A137	2	#5	STR.	4′ - 1″	9	✳ K1	4	#8	2	16′ - 3″	174
✳ A138	2	#5	STR.	3′ - 0″	6	✳ K2	4	#8	2	14′ - 11″	159
						✳ K3	12	#8	3	25′ - 4″	812
A201	2	#5	STR.	43′ - 0″	90	✳ K4	24	#6	STR.	9′ - 2″	330
A202	2	#5	STR.	41′ - 11″	87	✳ K5	16	#4	STR.	9′ - 10″	105
A203	2	#5	STR.	40′ - 10″	85						
A204	2	#5	STR.	39′ - 9″	83	✳ S1	48	#4	4	6′ - 10″	219
A205	2	#5	STR.	38′ - 8″	81	✳ S2	48	#5	5	5′ - 10″	292
A206	2	#5	STR.	37′ - 7″	78	✳ S3	32	#5	6	2′ - 11″	97
A207	2	#5	STR.	36′ - 6″	76						
A208	2	#5	STR.	35′ - 5″	74	REINFORCING STEEL LBS. 12,940					
A209	2	#5	STR.	34′ - 4″	72	✳ EPOXY COATED REINF. STEEL LBS. 14,214					
A210	2	#5	STR.	33′ - 3″	69						

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
STAGE I	-	12,940	14,214
POUR 1	139.4	-	-
POUR 2	25.0	-	-
TOTALS ✳✳	164.4	12,940	14,214

✳✳ QUANTITIES FOR BARRIER RAILS & MEDIAN BARRIER ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

STAGE I

APPROACH SLABS	1,914	SQ.FT.
BRIDGE DECK	4,130	SQ.FT.
TOTAL	6,044	SQ.FT.

DRAWN BY : C. E. MAYHEW DATE : 12-10-19
CHECKED BY : T. M. GARRISON DATE : 12-15-19

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

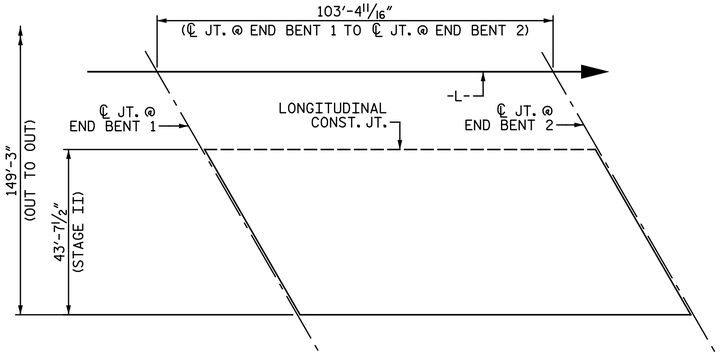
PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

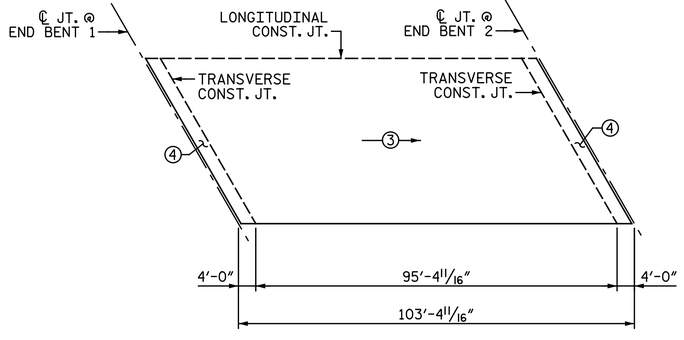
BILL OF MATERIAL STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-27
1			3			TOTAL SHEETS
2			4			44



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(STAGE II SQ. FT. = 4,510)



POURING SEQUENCE

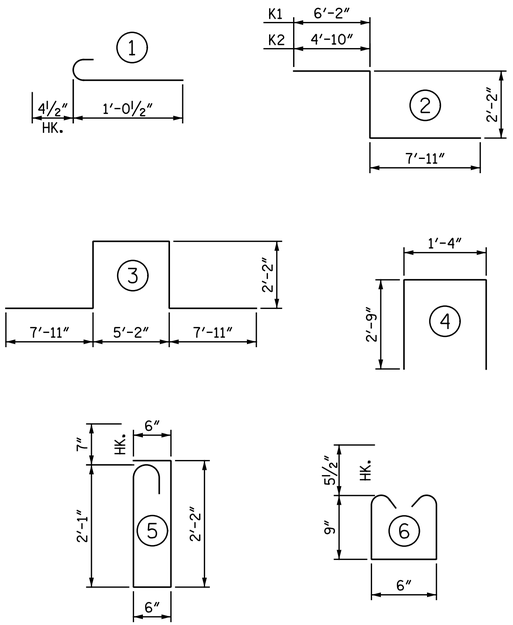
(#)→ DENOTES POUR NUMBER AND DIRECTION

REINFORCING BAR SCHEDULE

SPAN A - STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	123	#5	STR.	43′ - 3″	5,548	A211	2	#5	STR.	32′ - 2″	67
A2	123	#5	STR.	43′ - 3″	5,548	A212	2	#5	STR.	31′ - 1″	65
✳ A3	20	#5	STR.	46′ - 11″	979	A213	2	#5	STR.	30′ - 0″	63
						A214	2	#5	STR.	28′ - 11″	60
✳ A101	2	#5	STR.	43′ - 0″	90	A215	2	#5	STR.	27′ - 10″	58
✳ A102	2	#5	STR.	41′ - 11″	87	A216	2	#5	STR.	26′ - 9″	56
✳ A103	2	#5	STR.	40′ - 10″	85	A217	2	#5	STR.	25′ - 8″	54
✳ A104	2	#5	STR.	39′ - 9″	83	A218	2	#5	STR.	24′ - 8″	51
✳ A105	2	#5	STR.	38′ - 8″	81	A219	2	#5	STR.	23′ - 7″	49
✳ A106	2	#5	STR.	37′ - 7″	78	A220	2	#5	STR.	22′ - 6″	47
✳ A107	2	#5	STR.	36′ - 6″	76	A221	2	#5	STR.	21′ - 5″	45
✳ A108	2	#5	STR.	35′ - 5″	74	A222	2	#5	STR.	20′ - 4″	42
✳ A109	2	#5	STR.	34′ - 4″	72	A223	2	#5	STR.	19′ - 3″	40
✳ A110	2	#5	STR.	33′ - 3″	69	A224	2	#5	STR.	18′ - 2″	38
✳ A111	2	#5	STR.	32′ - 2″	67	A225	2	#5	STR.	17′ - 1″	36
✳ A112	2	#5	STR.	31′ - 1″	65	A226	2	#5	STR.	16′ - 0″	33
✳ A113	2	#5	STR.	30′ - 0″	63	A227	2	#5	STR.	14′ - 11″	31
✳ A114	2	#5	STR.	28′ - 11″	60	A228	2	#5	STR.	13′ - 10″	29
✳ A115	2	#5	STR.	27′ - 10″	58	A229	2	#5	STR.	12′ - 9″	27
✳ A116	2	#5	STR.	26′ - 9″	56	A230	2	#5	STR.	11′ - 8″	24
✳ A117	2	#5	STR.	25′ - 8″	54	A231	2	#5	STR.	10′ - 7″	22
✳ A118	2	#5	STR.	24′ - 8″	51	A232	2	#5	STR.	9′ - 6″	20
✳ A119	2	#5	STR.	23′ - 7″	49	A233	2	#5	STR.	8′ - 5″	18
✳ A120	2	#5	STR.	22′ - 6″	47	A234	2	#5	STR.	7′ - 4″	15
✳ A121	2	#5	STR.	21′ - 5″	45	A235	2	#5	STR.	6′ - 3″	13
✳ A122	2	#5	STR.	20′ - 4″	42	A236	2	#5	STR.	5′ - 2″	11
✳ A123	2	#5	STR.	19′ - 3″	40	A237	2	#5	STR.	4′ - 1″	9
✳ A124	2	#5	STR.	18′ - 2″	38	A238	2	#5	STR.	3′ - 0″	6
✳ A125	2	#5	STR.	17′ - 1″	36						
✳ A126	2	#5	STR.	16′ - 0″	33	✳ B1	90	#4	STR.	35′ - 8″	2,144
✳ A127	2	#5	STR.	14′ - 11″	31	B2	82	#5	STR.	52′ - 6″	4,490
✳ A128	2	#5	STR.	13′ - 10″	29						
✳ A129	2	#5	STR.	12′ - 9″	27	✳ D1	159	#5	STR.	7′ - 0″	1,161
✳ A130	2	#5	STR.	11′ - 8″	24	D2	159	#5	STR.	6′ - 6″	1,078
✳ A131	2	#5	STR.	10′ - 7″	22	✳ D3	20	#5	STR.	8′ - 6″	177
✳ A132	2	#5	STR.	9′ - 6″	20						
✳ A133	2	#5	STR.	8′ - 5″	18	✳ G1	2	#5	STR.	49′ - 11″	104
✳ A134	2	#5	STR.	7′ - 4″	15						
✳ A135	2	#5	STR.	6′ - 3″	13	✳ J1	94	#4	1	1′ - 5″	89
✳ A136	2	#5	STR.	5′ - 2″	11						
✳ A137	2	#5	STR.	4′ - 1″	9	✳ K1	4	#8	2	16′ - 3″	174
✳ A138	2	#5	STR.	3′ - 0″	6	✳ K2	4	#8	2	14′ - 11″	159
						✳ K3	12	#8	3	25′ - 4″	812
A201	2	#5	STR.	43′ - 0″	90	✳ K4	24	#6	STR.	9′ - 2″	330
A202	2	#5	STR.	41′ - 11″	87	✳ K5	16	#4	STR.	9′ - 10″	105
A203	2	#5	STR.	40′ - 10″	85						
A204	2	#5	STR.	39′ - 9″	83	✳ S1	48	#4	4	6′ - 10″	219
A205	2	#5	STR.	38′ - 8″	81	✳ S2	48	#5	5	5′ - 10″	292
A206	2	#5	STR.	37′ - 7″	78	✳ S3	32	#5	6	2′ - 11″	97
A207	2	#5	STR.	36′ - 6″	76						
A208	2	#5	STR.	35′ - 5″	74	REINFORCING STEEL LBS. 12,940					
A209	2	#5	STR.	34′ - 4″	72	✳ EPOXY COATED REINF. STEEL LBS. 14,214					
A210	2	#5	STR.	33′ - 3″	69						

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
STAGE II	-	12,940	14,214
POUR 3	139.4	-	-
POUR 4	25.0	-	-
TOTALS ✳✳	164.4	12,940	14,214

✳✳ QUANTITIES FOR BARRIER RAILS & MEDIAN BARRIER ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

STAGE II		
APPROACH SLABS	1,914	SQ.FT.
BRIDGE DECK	4,130	SQ.FT.
TOTAL	6,044	SQ.FT.

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523043466

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

Michael Baker Engineering 8000 Regency Parkway, Suite 600 Cary, North Carolina 27518 NC License No.: F-1084

DRAWN BY : C. E. MAYHEW DATE : 12-10-19

CHECKED BY : T. M. GARRISON DATE : 4-21-20

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

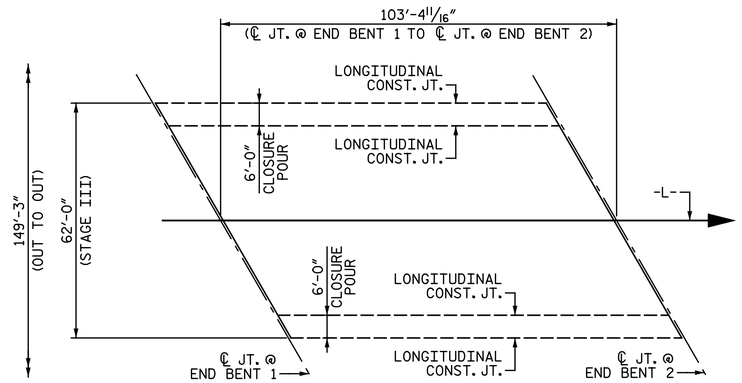
SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

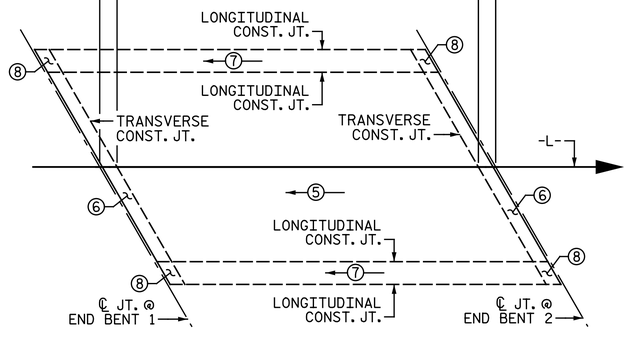
SUPERSTRUCTURE

BILL OF MATERIAL
STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-28
1			3			TOTAL SHEETS
2			4			44



LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB
(STAGE III SQ. FT. = 6,410)



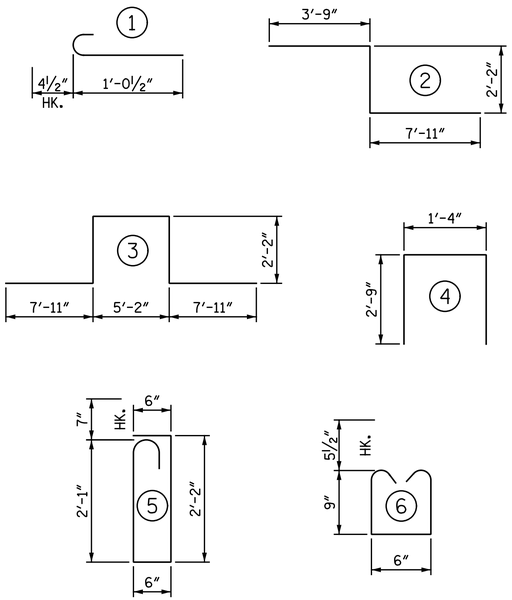
POURING SEQUENCE
(#) → DENOTES POUR NUMBER AND DIRECTION

REINFORCING BAR SCHEDULE

SPAN A - STAGE III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A4	117	#5	STR.	49′ - 8″	6,061	A511	2	#5	STR.	38′ - 5″	80
A5	117	#5	STR.	49′ - 8″	6,061	A512	2	#5	STR.	37′ - 4″	78
✳A6	20	#5	STR.	51′ - 3″	1,069	A513	2	#5	STR.	36′ - 3″	76
						A514	2	#5	STR.	35′ - 2″	73
✳A401	2	#5	STR.	49′ - 3″	103	A515	2	#5	STR.	34′ - 1″	71
✳A402	2	#5	STR.	48′ - 2″	100	A516	2	#5	STR.	33′ - 0″	69
✳A403	2	#5	STR.	47′ - 1″	98	A517	2	#5	STR.	31′ - 11″	67
✳A404	2	#5	STR.	46′ - 0″	96	A518	2	#5	STR.	30′ - 10″	64
✳A405	2	#5	STR.	44′ - 11″	94	A519	2	#5	STR.	29′ - 9″	62
✳A406	2	#5	STR.	43′ - 10″	91	A520	2	#5	STR.	28′ - 8″	60
✳A407	2	#5	STR.	42′ - 9″	89	A521	2	#5	STR.	27′ - 7″	58
✳A408	2	#5	STR.	41′ - 8″	87	A522	2	#5	STR.	26′ - 6″	55
✳A409	2	#5	STR.	40′ - 7″	85	A523	2	#5	STR.	25′ - 5″	53
✳A410	2	#5	STR.	39′ - 6″	82	A524	2	#5	STR.	24′ - 4″	51
✳A411	2	#5	STR.	38′ - 5″	80	A525	2	#5	STR.	23′ - 3″	48
✳A412	2	#5	STR.	37′ - 4″	78	A526	2	#5	STR.	22′ - 2″	46
✳A413	2	#5	STR.	36′ - 3″	76	A527	2	#5	STR.	21′ - 1″	44
✳A414	2	#5	STR.	35′ - 2″	73	A528	2	#5	STR.	20′ - 0″	42
✳A415	2	#5	STR.	34′ - 1″	71	A529	2	#5	STR.	18′ - 11″	39
✳A416	2	#5	STR.	33′ - 0″	69	A530	2	#5	STR.	17′ - 10″	37
✳A417	2	#5	STR.	31′ - 11″	67	A531	2	#5	STR.	16′ - 9″	35
✳A418	2	#5	STR.	30′ - 10″	64	A532	2	#5	STR.	15′ - 8″	33
✳A419	2	#5	STR.	29′ - 9″	62	A533	2	#5	STR.	14′ - 7″	30
✳A420	2	#5	STR.	28′ - 8″	60	A534	2	#5	STR.	13′ - 6″	28
✳A421	2	#5	STR.	27′ - 7″	58	A535	2	#5	STR.	12′ - 5″	26
✳A422	2	#5	STR.	26′ - 6″	55	A536	2	#5	STR.	11′ - 4″	24
✳A423	2	#5	STR.	25′ - 5″	53	A537	2	#5	STR.	10′ - 3″	21
✳A424	2	#5	STR.	24′ - 4″	51	A538	2	#5	STR.	9′ - 2″	19
✳A425	2	#5	STR.	23′ - 3″	48	A539	2	#5	STR.	8′ - 1″	17
✳A426	2	#5	STR.	22′ - 2″	46	A540	2	#5	STR.	7′ - 0″	15
✳A427	2	#5	STR.	21′ - 1″	44	A541	2	#5	STR.	5′ - 11″	12
✳A428	2	#5	STR.	20′ - 0″	42	A542	2	#5	STR.	4′ - 10″	10
✳A429	2	#5	STR.	18′ - 11″	39	A543	2	#5	STR.	3′ - 9″	8
✳A430	2	#5	STR.	17′ - 10″	37	A544	2	#5	STR.	2′ - 8″	6
✳A431	2	#5	STR.	16′ - 9″	35						
✳A432	2	#5	STR.	15′ - 8″	33	✳B1	132	#4	STR.	35′ - 8″	3,145
✳A433	2	#5	STR.	14′ - 7″	30	B2	118	#5	STR.	52′ - 6″	6,461
✳A434	2	#5	STR.	13′ - 6″	28						
✳A435	2	#5	STR.	12′ - 5″	26	✳D1	318	#5	STR.	7′ - 0″	2,322
✳A436	2	#5	STR.	11′ - 4″	24	D2	318	#5	STR.	6′ - 6″	2,156
✳A437	2	#5	STR.	10′ - 3″	21	✳D4	40	#5	STR.	12′ - 7″	525
✳A438	2	#5	STR.	9′ - 2″	19						
✳A439	2	#5	STR.	8′ - 1″	17	✳G2	2	#5	STR.	57′ - 4″	120
✳A440	2	#5	STR.	7′ - 0″	15						
✳A441	2	#5	STR.	5′ - 11″	12	✳J1	140	#4	1	1′ - 5″	132
✳A442	2	#5	STR.	4′ - 10″	10						
✳A443	2	#5	STR.	3′ - 9″	8	✳K3	16	#8	3	25′ - 4″	1,082
✳A444	2	#5	STR.	2′ - 8″	6	✳K4	42	#6	STR.	9′ - 2″	578
						✳K5	28	#4	STR.	9′ - 10″	184
A501	2	#5	STR.	49′ - 3″	103	✳K6	8	#8	2	13′ - 10″	295
A502	2	#5	STR.	48′ - 2″	100	✳K7	8	#8	STR.	9′ - 10″	210
A503	2	#5	STR.	47′ - 1″	98						
A504	2	#5	STR.	46′ - 0″	96	✳S1	84	#4	4	6′ - 10″	383
A505	2	#5	STR.	44′ - 11″	94	✳S2	84	#5	5	5′ - 10″	511
A506	2	#5	STR.	43′ - 10″	91	✳S3	56	#5	6	2′ - 11″	170
A507	2	#5	STR.	42′ - 9″	89						
A508	2	#5	STR.	41′ - 8″	87	REINFORCING STEEL LBS. 17,060					
A509	2	#5	STR.	40′ - 7″	85	✳EPOXY COATED REINF. STEEL LBS. 19,169					
A510	2	#5	STR.	39′ - 6″	82						

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
STAGE III	-	17,060	19,169
POUR 5	158.7	-	-
POUR 6	30.0	-	-
CLOSURE POUR 7	43.3	-	-
CLOSURE POUR 8	10.3	-	-
TOTALS **	242.3	17,060	19,169

** QUANTITIES FOR BARRIER RAILS & MEDIAN BARRIER ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

STAGE III		
APPROACH SLABS	2,694	SQ.FT.
BRIDGE DECK	5,812	SQ.FT.
TOTAL	8,506	SQ.FT.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

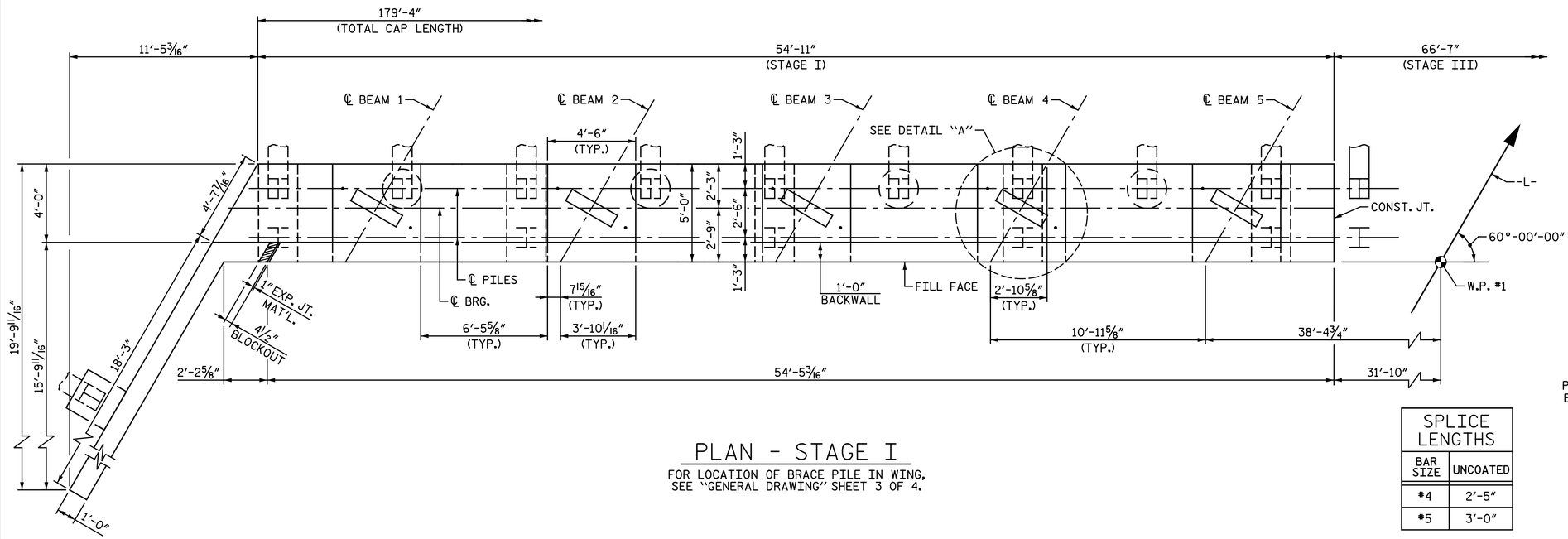
BILL OF MATERIAL
STAGE III

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-29
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : C. E. MAYHEW DATE : 12-10-19
CHECKED BY : T. M. GARRISON DATE : 12-15-19



PLAN - STAGE I

FOR LOCATION OF BRACE PILE IN WING, SEE "GENERAL DRAWING" SHEET 3 OF 4.

SPLICE LENGTHS	
BAR SIZE	UNCOATED
#4	2′-5″
#5	3′-0″

NOTES:

FOR "SECTION A-A", "PARTIAL SECTION B-B", "PARTIAL SECTION C-C", AND "PARTIAL SECTION D-D", SEE "END BENT 1 DETAILS" SHEET.

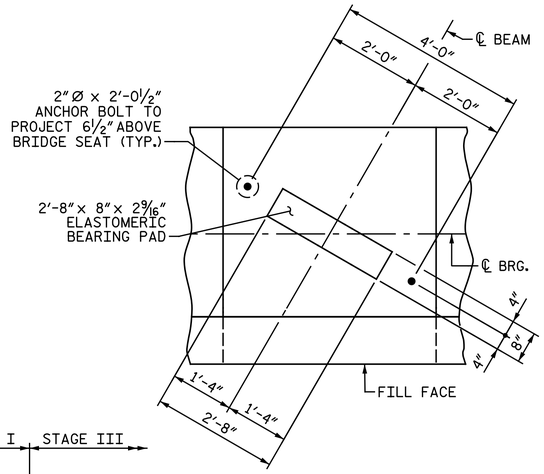
STIRRUPS & "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

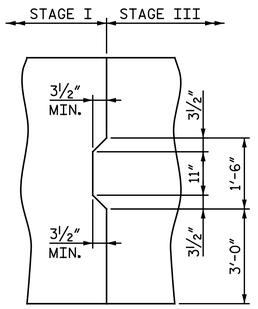
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILD-UPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT A RATE OF 2%.

THE CONCRETE IN THE HATCHED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

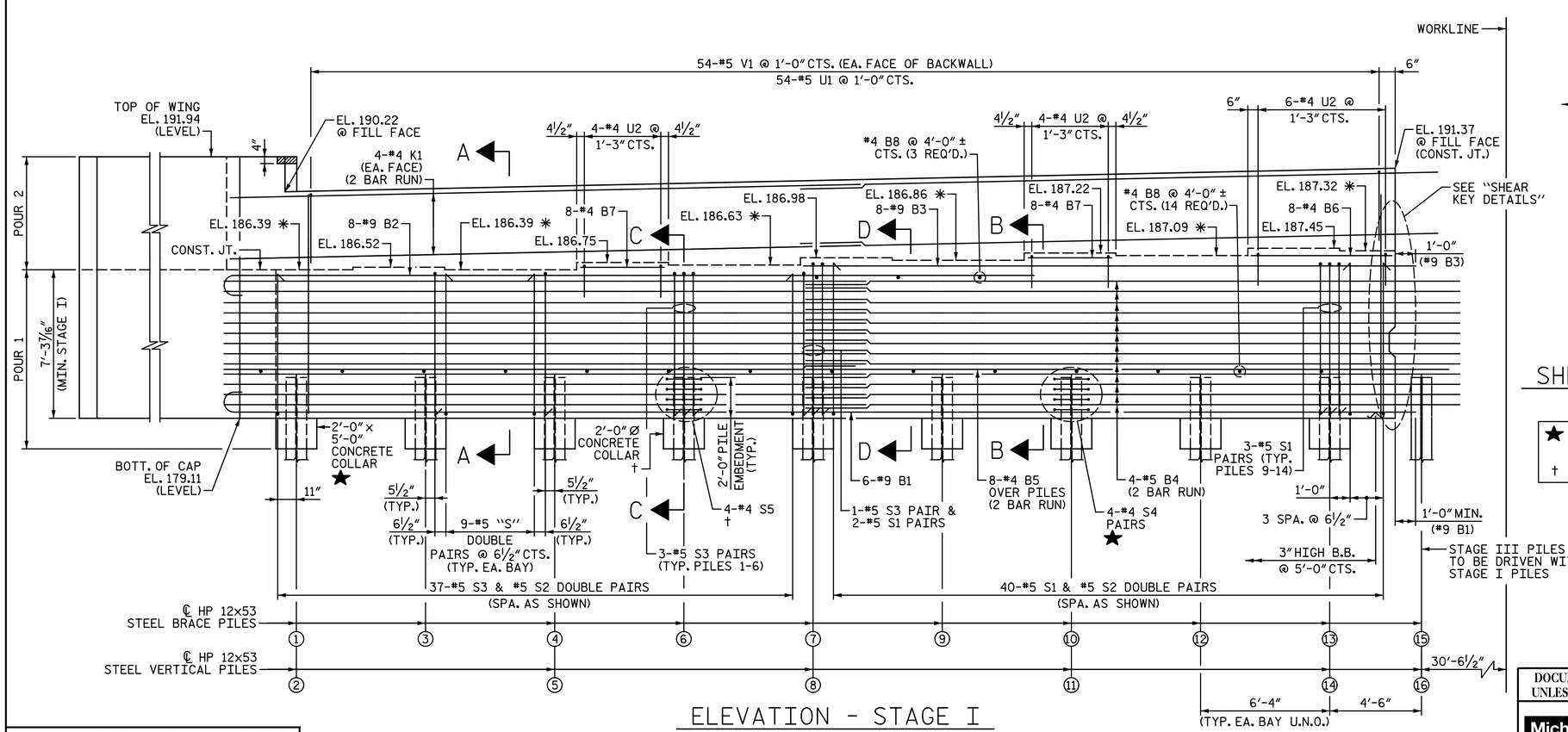


DETAIL "A"

(TYP. EA. BRIDGE SEAT)



SHEAR KEY DETAILS



ELEVATION - STAGE I

✳FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "END BENT 1 DETAILS" SHEET.
U.N.O. DENOTES "UNLESS NOTED OTHERWISE"

★ TYP. PILES 1&2, 4&5, 7&8, 10&11, 13&14

† TYP. PILES 3, 6, 9, 12

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 1 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE I

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

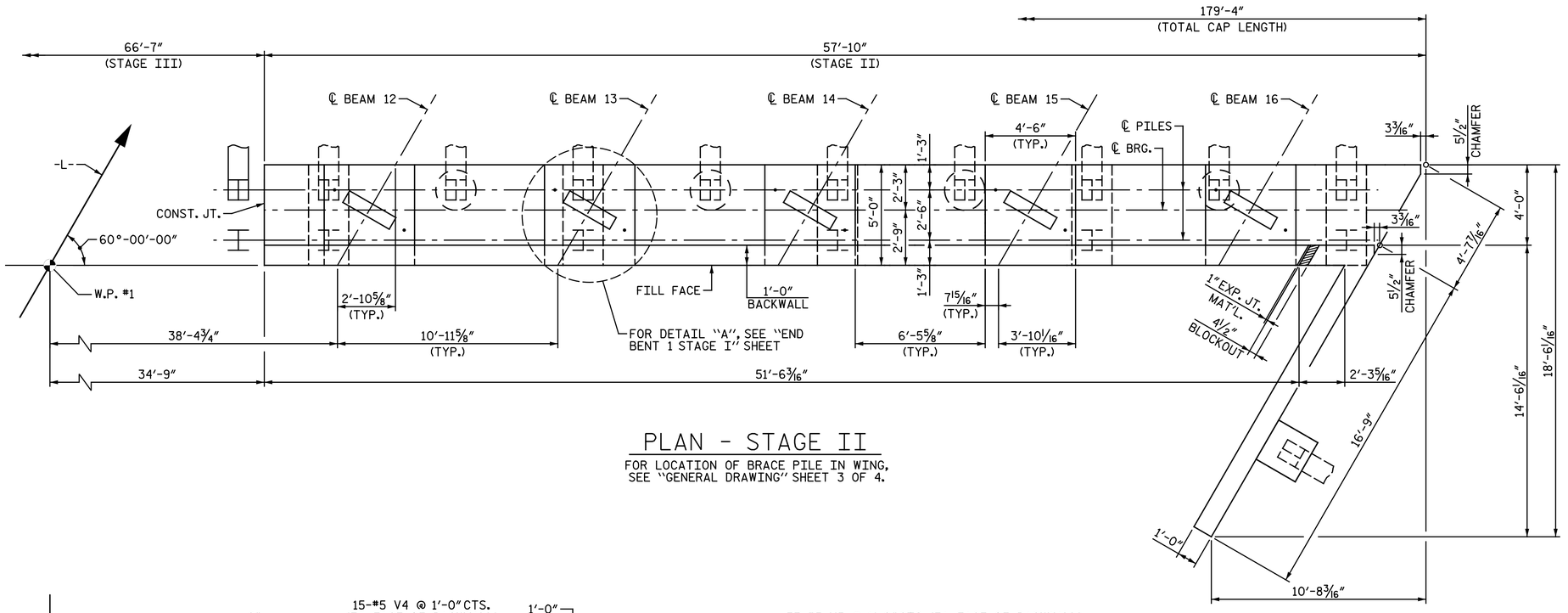
DRAWN BY : C. E. MAYHEW DATE : 2-26-20
CHECKED BY : T. M. GARRISON DATE : 4-17-20

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-30
1			3			TOTAL SHEETS
2			4			44

NOTES:

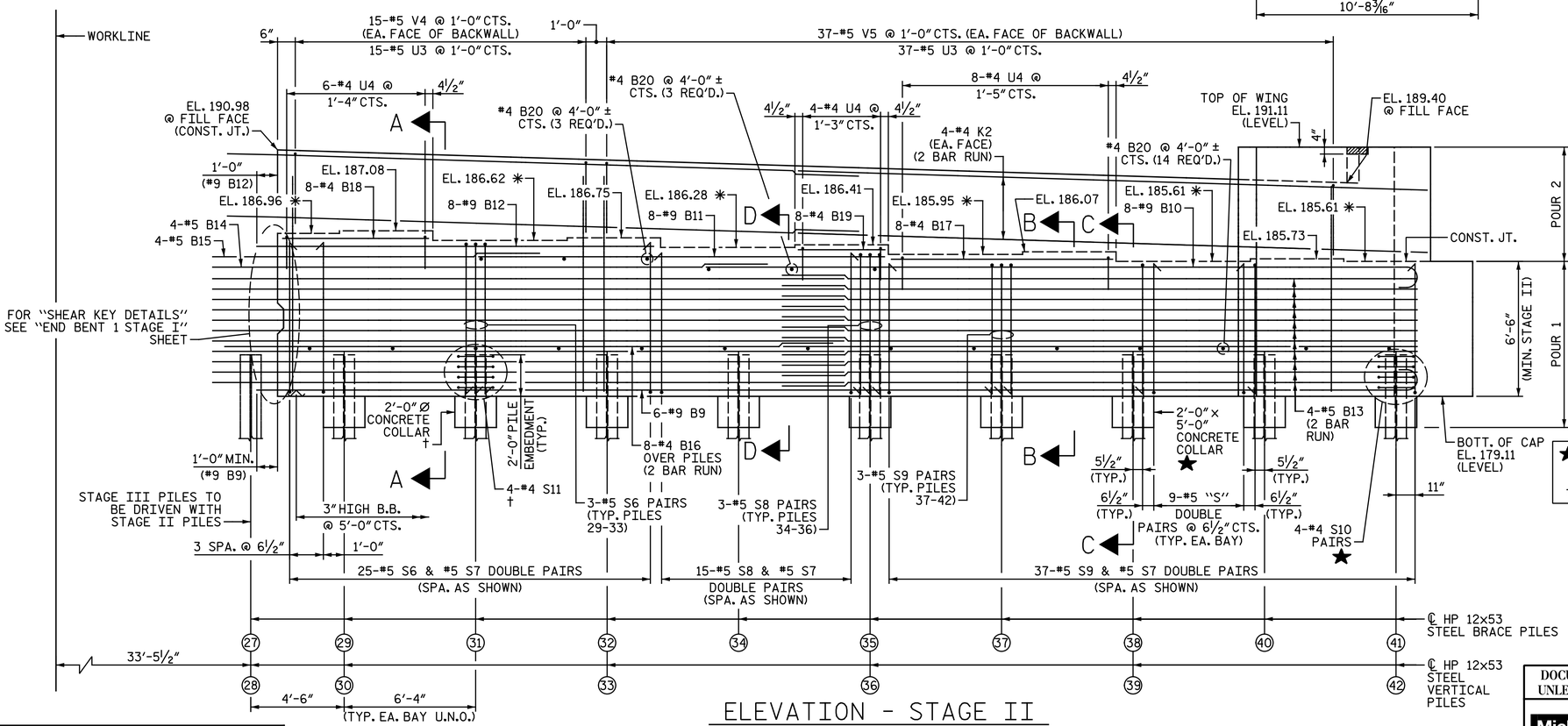
FOR NOTES, SEE "END BENT 1 STAGE I" SHEET.



PLAN - STAGE II

FOR LOCATION OF BRACE PILE IN WING, SEE "GENERAL DRAWING" SHEET 3 OF 4.

SPLICE LENGTHS	
BAR SIZE	UNCOATED
#4	2'-5"
#5	3'-0"



ELEVATION - STAGE II

✳FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "END BENT 1 DETAILS" SHEET.
U.N.O. DENOTES "UNLESS NOTED OTHERWISE"

★ TYP. PILES 29&30, 32&33, 35&36, 38&39, 41&42

† TYP. PILES 31, 34, 37, 40

DRAWN BY : C. E. MAYHEW DATE : 2-26-20
CHECKED BY : T. M. GARRISON DATE : 3-3-20

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-31
1			3			TOTAL SHEETS
2			4			44

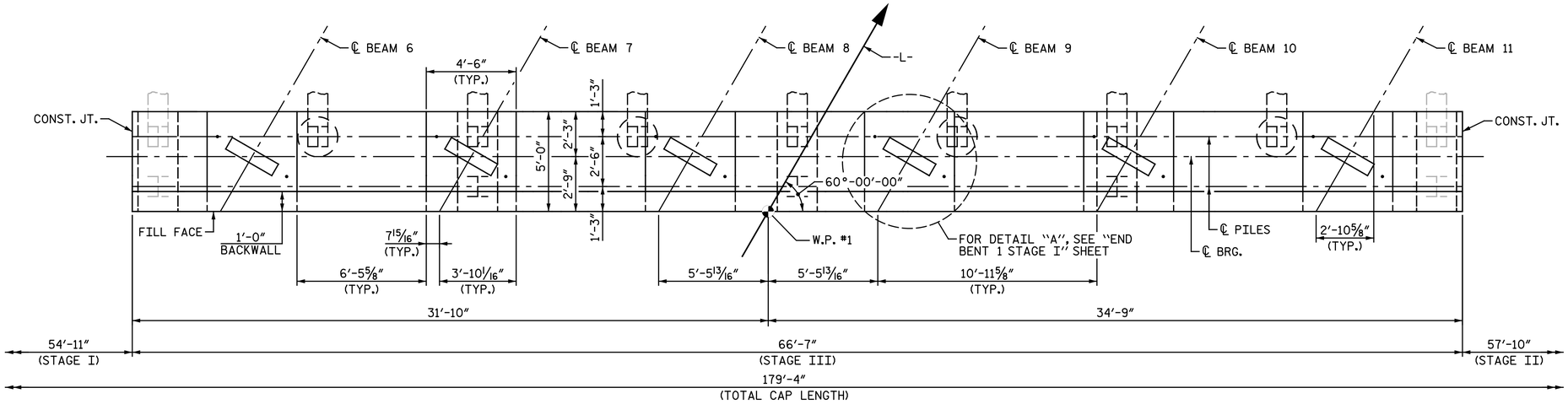
PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-
SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

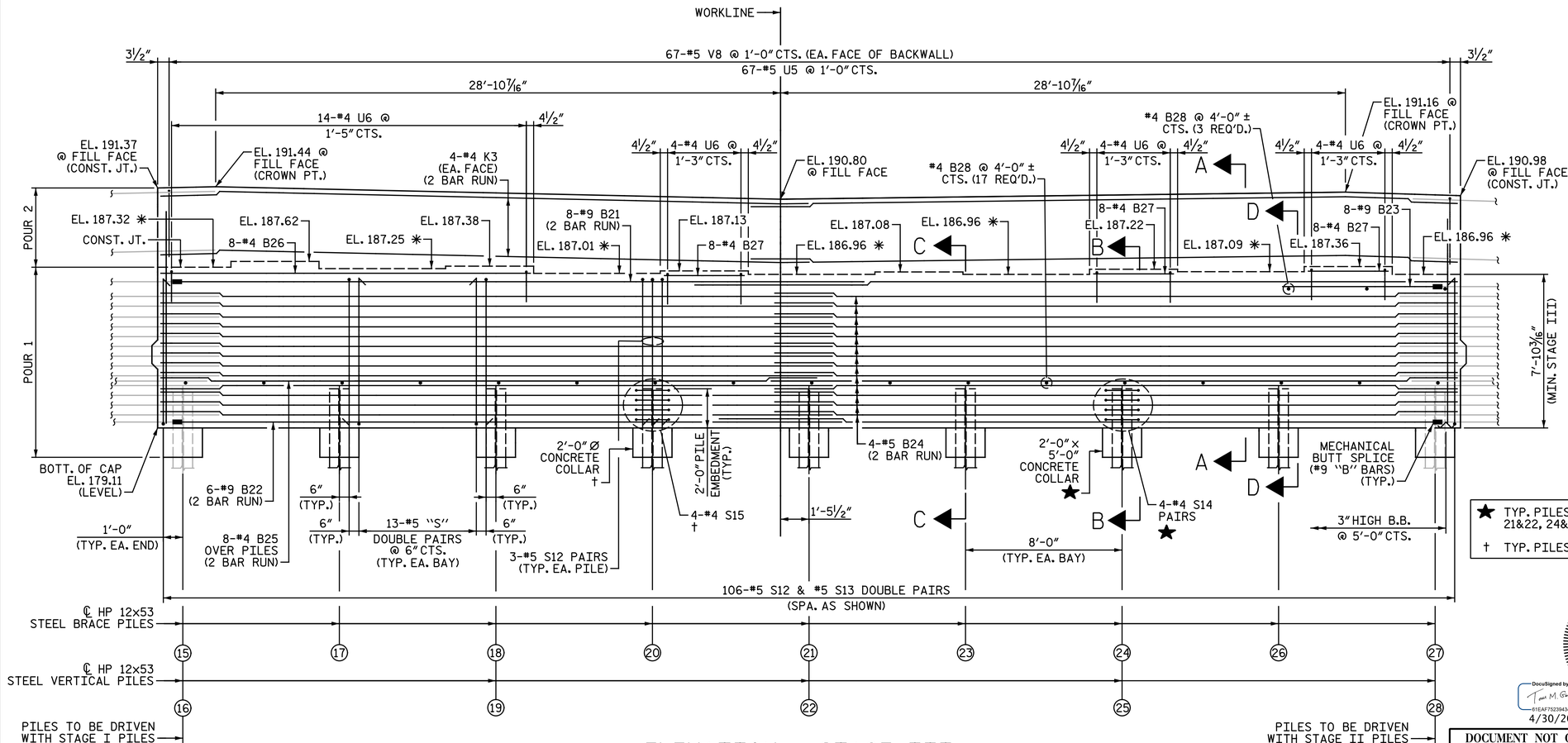
END BENT 1 STAGE II

NOTES:

FOR NOTES, SEE "END BENT 1 STAGE I" SHEET.



PLAN - STAGE III



ELEVATION - STAGE III

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "END BENT 1 DETAILS" SHEET.

SPLICE LENGTHS	
BAR SIZE	UNCOATED
#4	2'-5"
#5	3'-0"
#9 B21	8'-9"
#9 B22	6'-3"

★ TYP. PILES 15&16, 18&19, 21&22, 24&25, 27&28

† TYP. PILES 17, 20, 23, 26

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE III

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

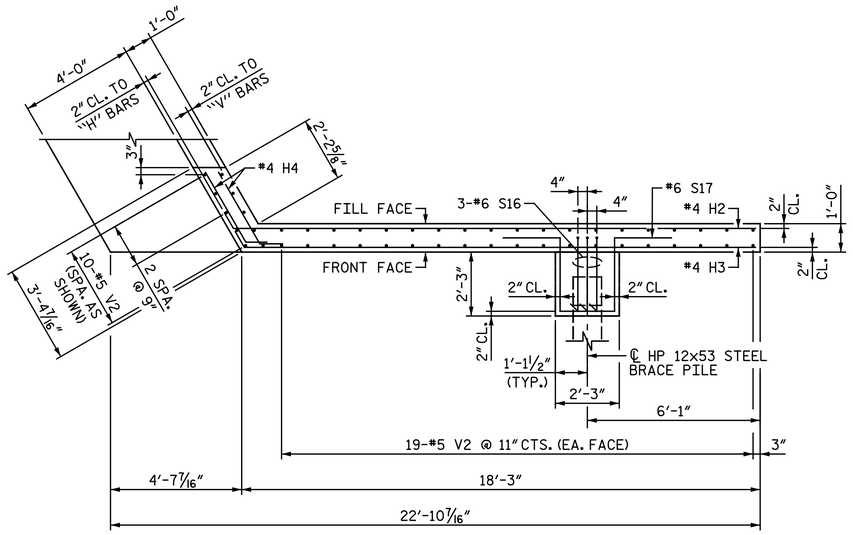
DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : C. E. MAYHEW DATE : 2-26-20
CHECKED BY : T. M. GARRISON DATE : 3-3-20

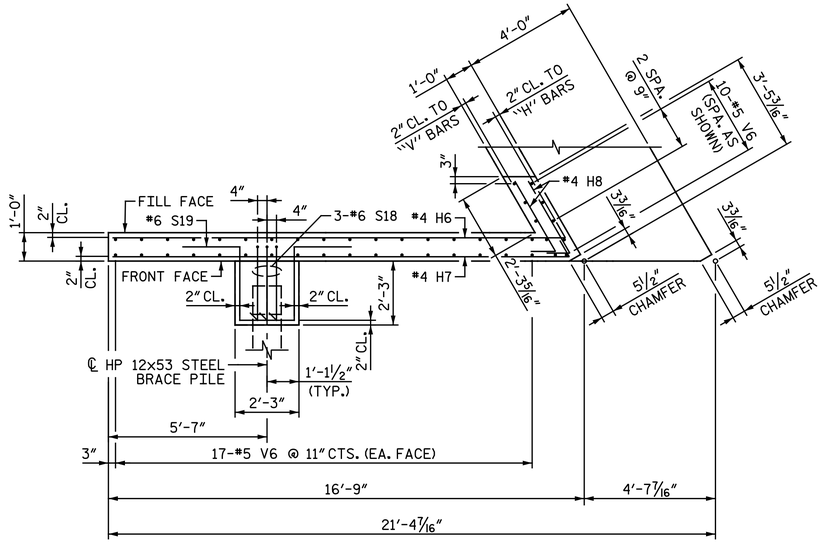
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-32
1			3			TOTAL SHEETS
2			4			44



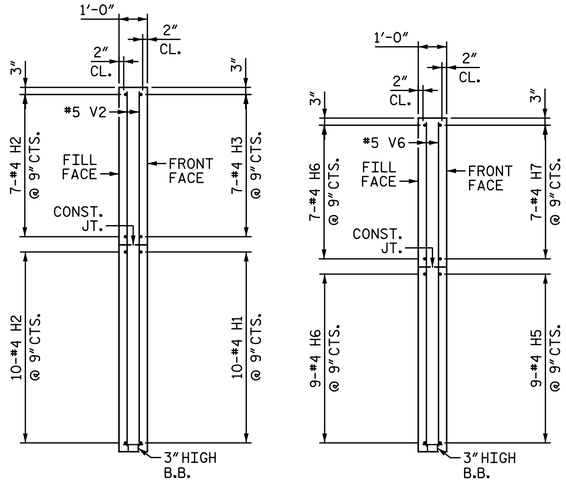
PLAN OF LEFT WING

STAGE I
(H1 & V3 BARS NOT SHOWN FOR CLARITY)
(BLOCKOUT NOT SHOWN FOR CLARITY)



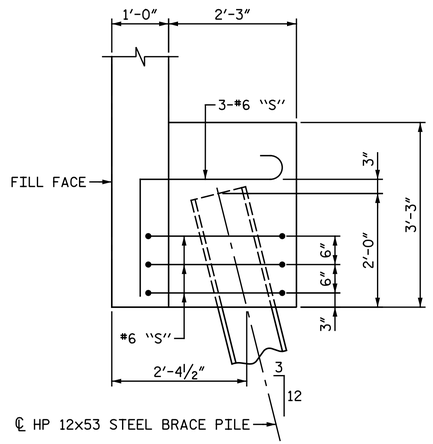
PLAN OF RIGHT WING

STAGE II
(H5 & V7 BARS NOT SHOWN FOR CLARITY)
(BLOCKOUT NOT SHOWN FOR CLARITY)

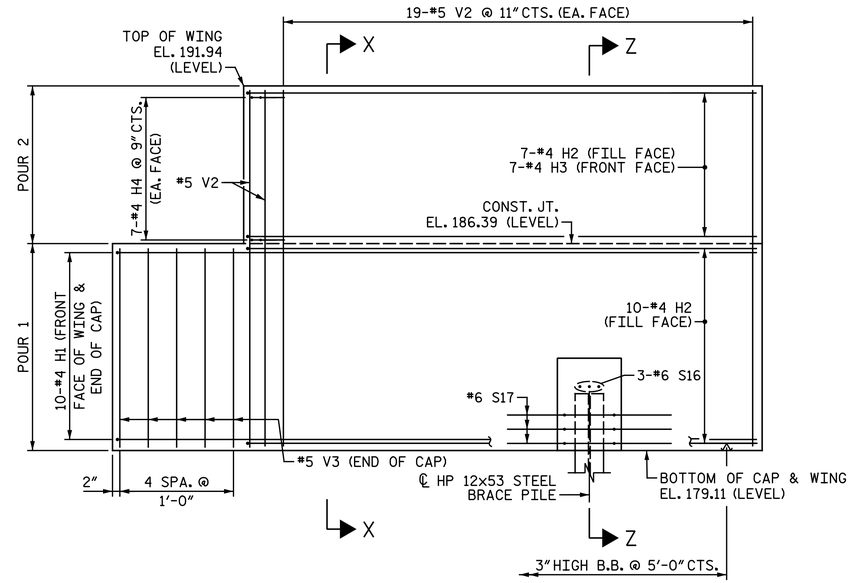


SECTION X-X

SECTION Y-Y

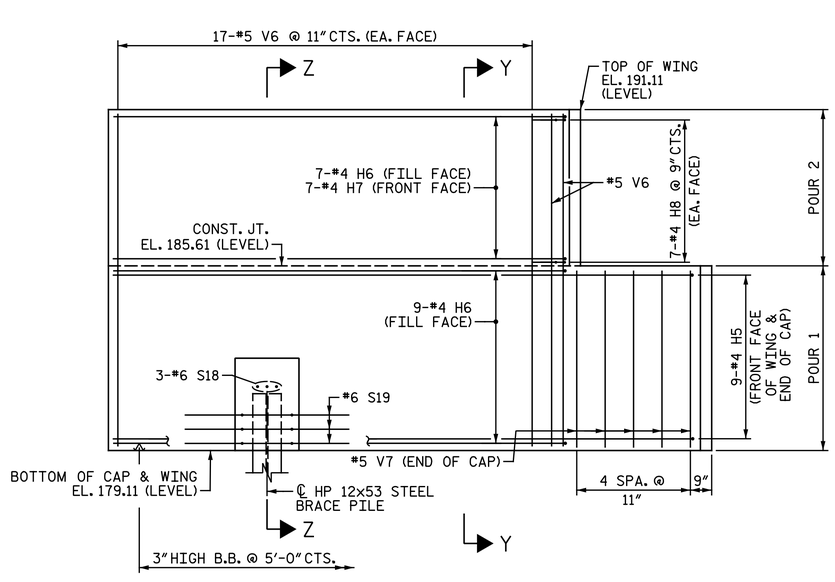


SECTION Z-Z



ELEVATION OF LEFT WING

STAGE I



ELEVATION OF RIGHT WING

STAGE II

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
WING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

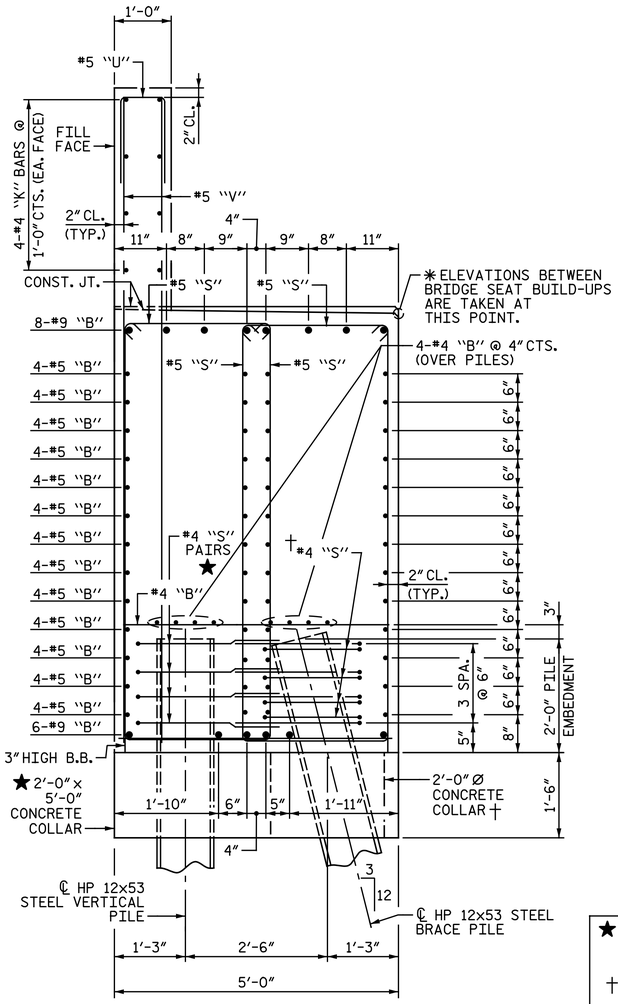
DocuSigned by: Todd M. Garrison
61EAF7523943466...
4/30/2020

DRAWN BY : M. D. MAYHEW DATE : 2-26-20
CHECKED BY : T. M. GARRISON DATE : 3-3-20

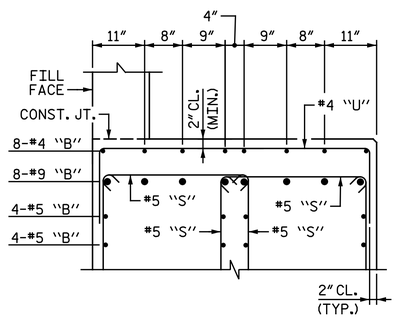
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-33
1			3			TOTAL SHEETS
2			4			44



SECTION A-A



PARTIAL SECTION B-B

"V" & "K" BARS NOT SHOWN FOR CLARITY.

DRAWN BY : M. D. MAYHEW DATE : 2-26-20
CHECKED BY : T. M. GARRISON DATE : 3-4-20

BILL OF MATERIAL

END BENT 1 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	1	59' - 11"	1,222
B2	8	#9	1	38' - 9"	1,054
B3	8	#9	STR.	30' - 0"	816
B4	104	#5	STR.	31' - 11"	3,462
B5	16	#4	STR.	31' - 4"	335
B6	8	#4	STR.	6' - 10"	37
B7	16	#4	STR.	4' - 2"	45
B8	17	#4	STR.	4' - 8"	53
H1	10	#4	5	23' - 2"	155
H2	17	#4	5	19' - 1"	217
H3	7	#4	5	18' - 7"	87
H4	14	#4	5	3' - 6"	33
K1	16	#4	STR.	31' - 4"	335
S1	108	#5	2	18' - 4"	2,065
S2	154	#5	3	3' - 7"	576
S3	100	#5	2	17' - 5"	1,817
S4	40	#4	7	7' - 8"	205
S5	16	#4	4	6' - 6"	69
S16	3	#6	8	5' - 4"	24
S17	3	#6	9	10' - 1"	45
U1	54	#5	7	7' - 4"	413
U2	14	#4	7	7' - 8"	72
V1	108	#5	STR.	10' - 9"	1,211
V2	48	#5	STR.	12' - 5"	622
V3	5	#5	STR.	6' - 11"	36

REINFORCING STEEL	LBS.	15,006
CLASS A CONCRETE		
POUR 1 - CAP, COLLARS, LOWER PART OF WING & WING BRACE PILE CAP	C.Y.	89.3
POUR 2 - BACKWALL & UPPER PART OF WING	C.Y.	12.2
TOTAL	C.Y.	101.5
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	EA.	17
HP 12x53 STEEL PILES NO. 17	LIN. FT.	1,180
PILE REDRIVES	EA.	9

★ TYP. EA. LOCATION WITH BRACE PILE AND VERTICAL PILE PAIR (PILES 1&2, 4&5, 7&8, ETC.)

† TYP. EA. LOCATION WITH SINGLE BRACE PILE (PILES 3, 6, 9, ETC.)

END BENT 1 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B9	6	#9	1	59' - 8"	1,217
B10	8	#9	1	38' - 3"	1,040
B11	8	#9	STR.	19' - 9"	537
B12	8	#9	STR.	19' - 4"	526
B13	88	#5	STR.	31' - 10"	2,922
B14	4	#5	STR.	26' - 9"	112
B15	4	#5	STR.	15' - 9"	66
B16	16	#4	STR.	31' - 3"	334
B17	8	#4	STR.	10' - 9"	57
B18	8	#4	STR.	7' - 1"	38
B19	8	#4	STR.	4' - 2"	22
B20	20	#4	STR.	4' - 8"	62
H5	9	#4	6	21' - 3"	128
H6	16	#4	6	16' - 5"	175
H7	7	#4	6	16' - 8"	78
H8	14	#4	6	3' - 5"	32
K2	16	#4	STR.	30' - 1"	322
S6	68	#5	2	17' - 10"	1,265
S7	154	#5	3	3' - 7"	576
S8	42	#5	2	16' - 10"	737
S9	98	#5	2	15' - 10"	1,618
S10	40	#4	7	7' - 8"	205
S11	16	#4	4	6' - 6"	69
S18	3	#6	8	5' - 4"	24
S19	3	#6	9	10' - 1"	45
U3	52	#5	7	7' - 4"	398
U4	18	#4	7	7' - 8"	92
V4	30	#5	STR.	11' - 1"	347
V5	74	#5	STR.	9' - 11"	765
V6	44	#5	STR.	11' - 8"	535
V7	5	#5	STR.	6' - 2"	32

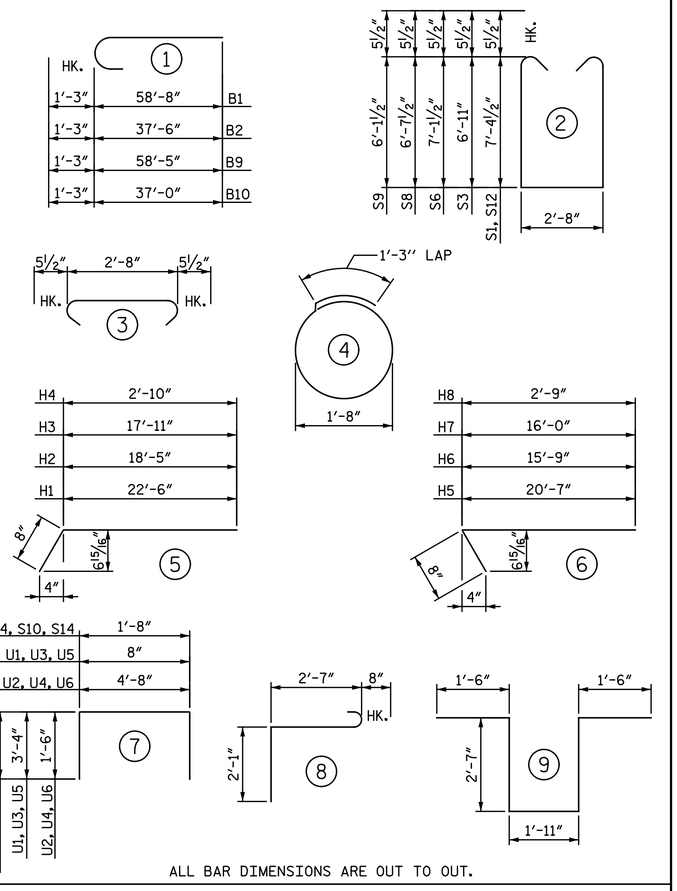
REINFORCING STEEL	LBS.	14,376
CLASS A CONCRETE		
POUR 1 - CAP, COLLARS, LOWER PART OF WING & WING BRACE PILE CAP	C.Y.	82.1
POUR 2 - BACKWALL & UPPER PART OF WING	C.Y.	11.3
TOTAL	C.Y.	93.4
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	EA.	17
HP 12x53 STEEL PILES NO. 17	LIN. FT.	1,180
PILE REDRIVES	EA.	9

END BENT 1 STAGE III

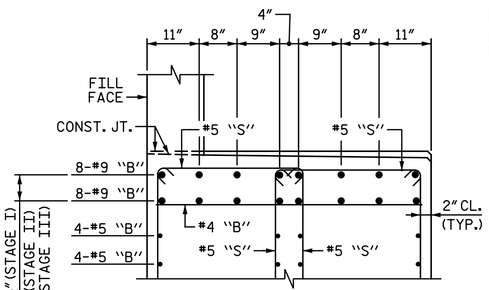
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B21	16	#9	STR.	37' - 1"	2,017
B22	12	#9	STR.	35' - 5"	1,445
B23	8	#9	STR.	7' - 11"	215
B24	104	#5	STR.	34' - 8"	3,760
B25	16	#4	STR.	34' - 4"	367
B26	8	#4	STR.	18' - 10"	101
B27	24	#4	STR.	4' - 2"	67
B28	20	#4	STR.	4' - 8"	62
K3	16	#4	STR.	34' - 4"	367
S12	266	#5	2	18' - 4"	5,086
S13	212	#5	3	3' - 7"	792
S14	40	#4	7	7' - 8"	205
S15	16	#4	4	6' - 6"	69
U5	67	#5	7	7' - 4"	512
U6	26	#4	7	7' - 8"	133
V8	134	#5	STR.	11' - 4"	1,584

REINFORCING STEEL	LBS.	16,782
CLASS A CONCRETE		
POUR 1 - CAP & COLLARS	C.Y.	102.8
POUR 2 - BACKWALL	C.Y.	9.6
TOTAL	C.Y.	112.4
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	EA.	10
HP 12x53 STEEL PILES NO. 10	LIN. FT.	650
PILE REDRIVES	EA.	4

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

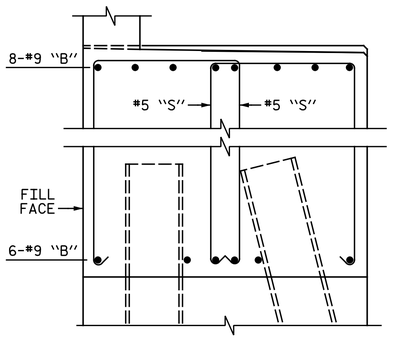


PARTIAL SECTION D-D

"V" & "K" BARS NOT SHOWN FOR CLARITY.

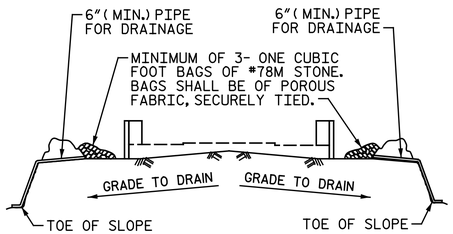
NOTE:

FOR "PILE SPLICE DETAILS", SEE "END BENT 2 DETAILS" SHEET.



PARTIAL SECTION C-C

ONLY #9 "B" & #5 "S" BARS SHOWN FOR CLARITY. (TYP. EA. PILE)



BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 1 DETAILS

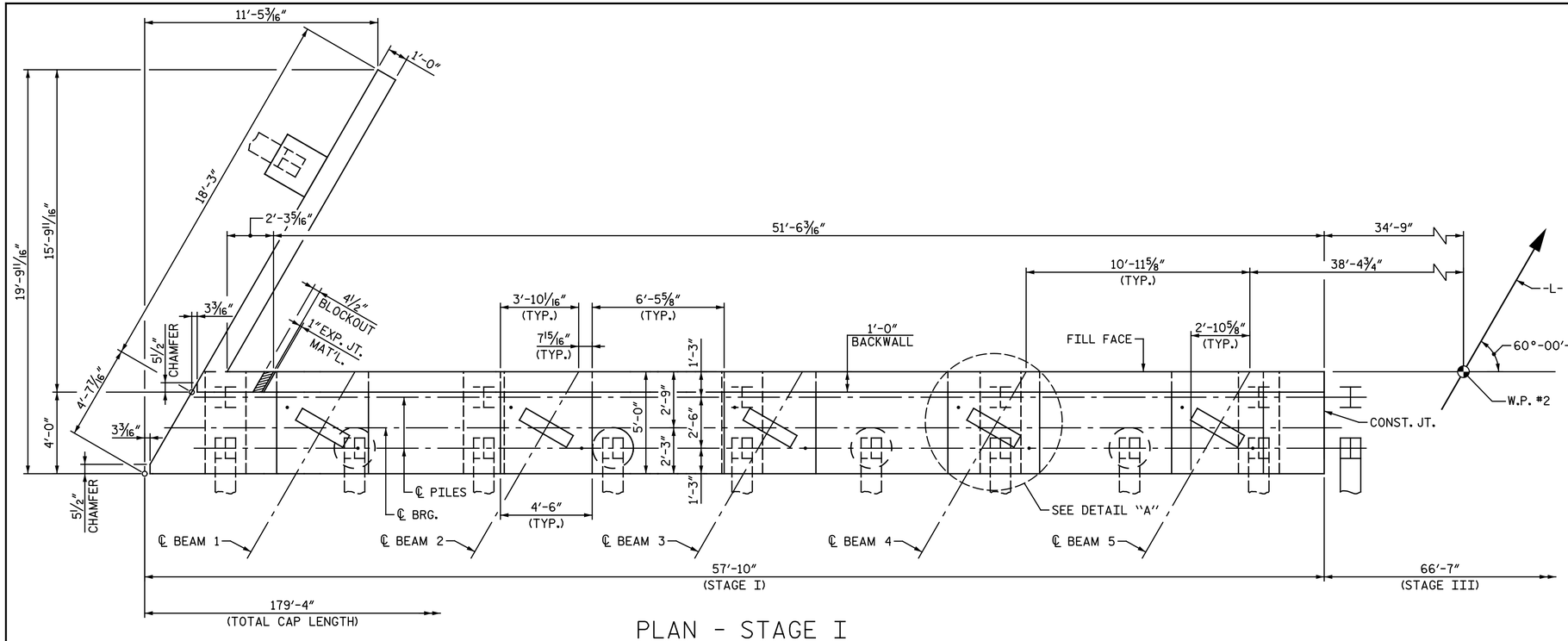
NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 615EAF7523043466
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

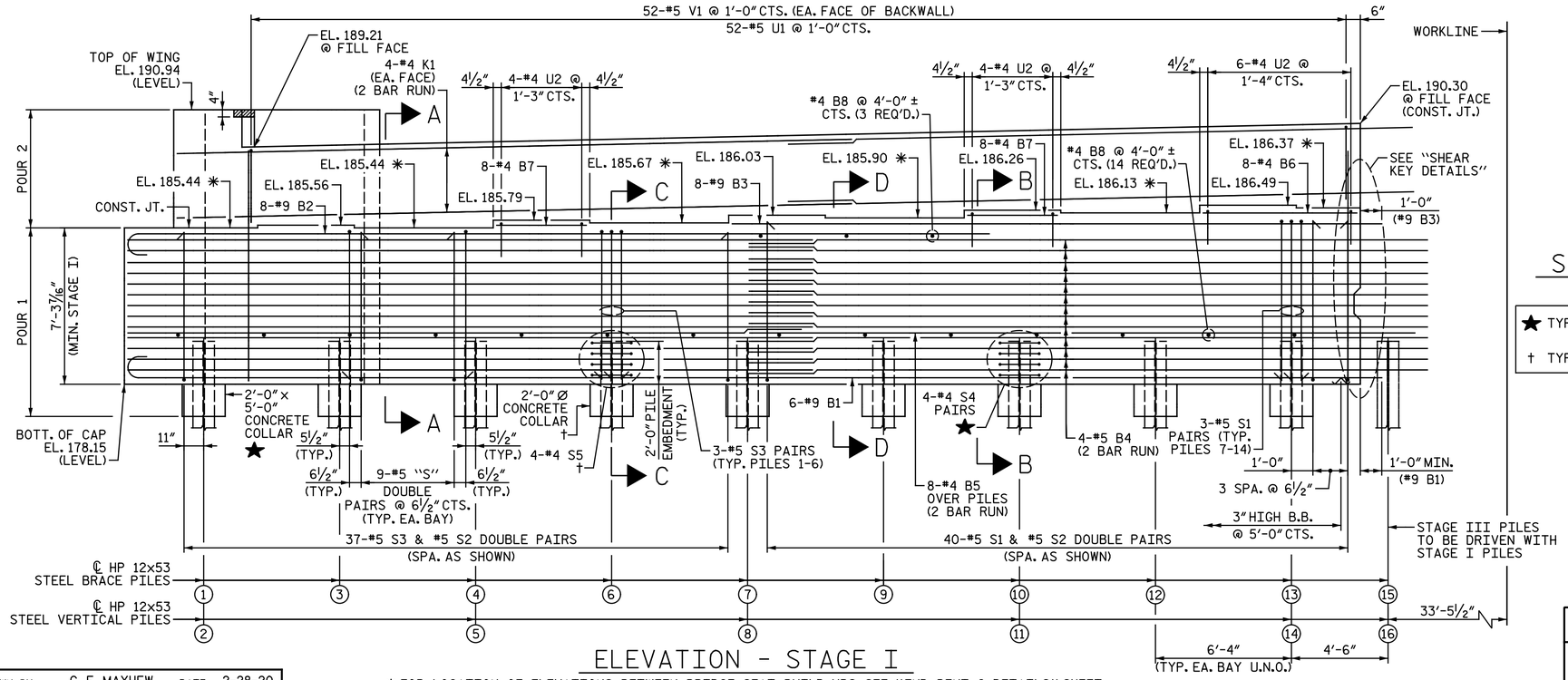
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-34
1			3			TOTAL SHEETS
2			4			44



PLAN - STAGE I

FOR LOCATION OF BRACE PILE IN WING, SEE "GENERAL DRAWING" SHEET 3 OF 4.



ELEVATION - STAGE I

✳FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "END BENT 2 DETAILS" SHEET.
U.N.O. DENOTES "UNLESS NOTED OTHERWISE"

NOTES:

FOR "SECTION A-A", "PARTIAL SECTION B-B", "PARTIAL SECTION C-C", AND "PARTIAL SECTION D-D", SEE "END BENT 2 DETAILS" SHEET.

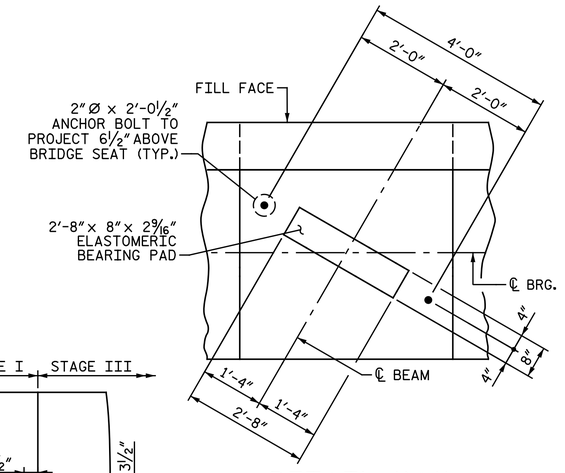
STIRRUPS & "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

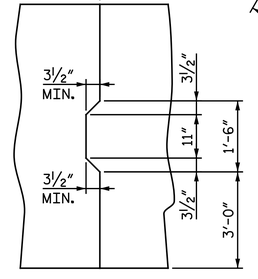
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILD-UPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT A RATE OF 2%.

THE CONCRETE IN THE HATCHED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.



DETAIL "A"

(TYP. EA. BRIDGE SEAT)



SHEAR KEY DETAILS

SPLICE LENGTHS	
BAR SIZE	UNCOATED
#4	2′-5″
#5	3′-0″

★ TYP. PILES 1&2, 4&5, 7&8, 10&11, 13&14

† TYP. PILES 3, 6, 9, 12

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE I

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

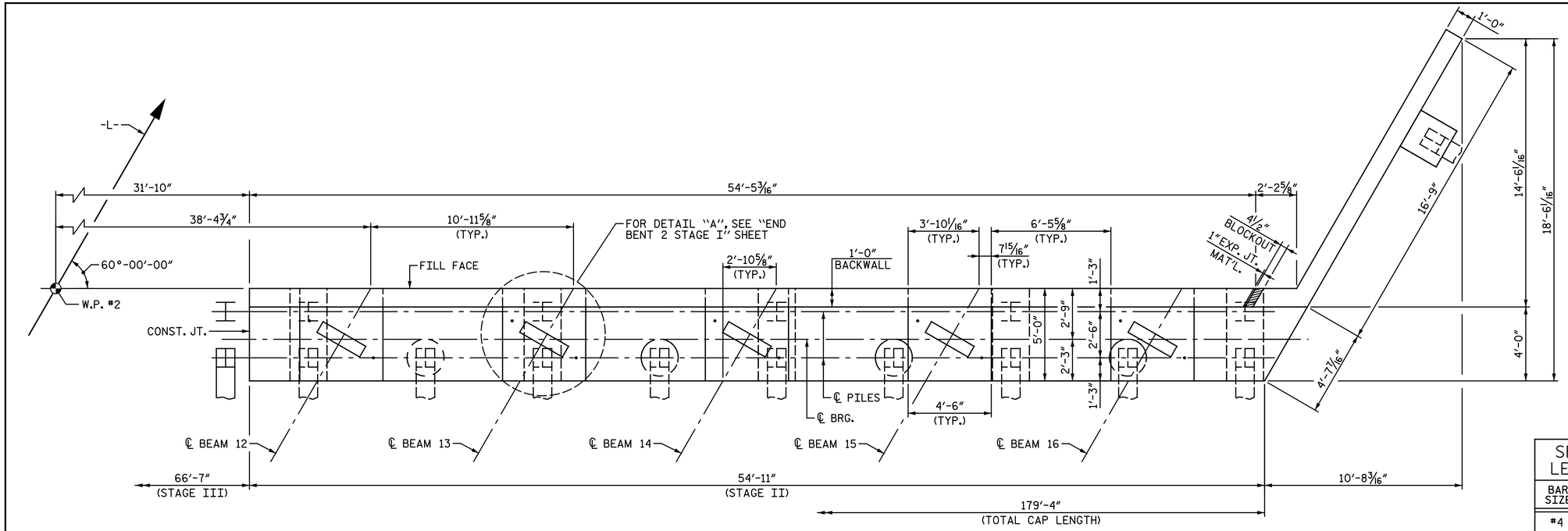
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-35
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : C. E. MAYHEW DATE : 2-28-20
CHECKED BY : T. M. GARRISON DATE : 3-4-20

NOTES:

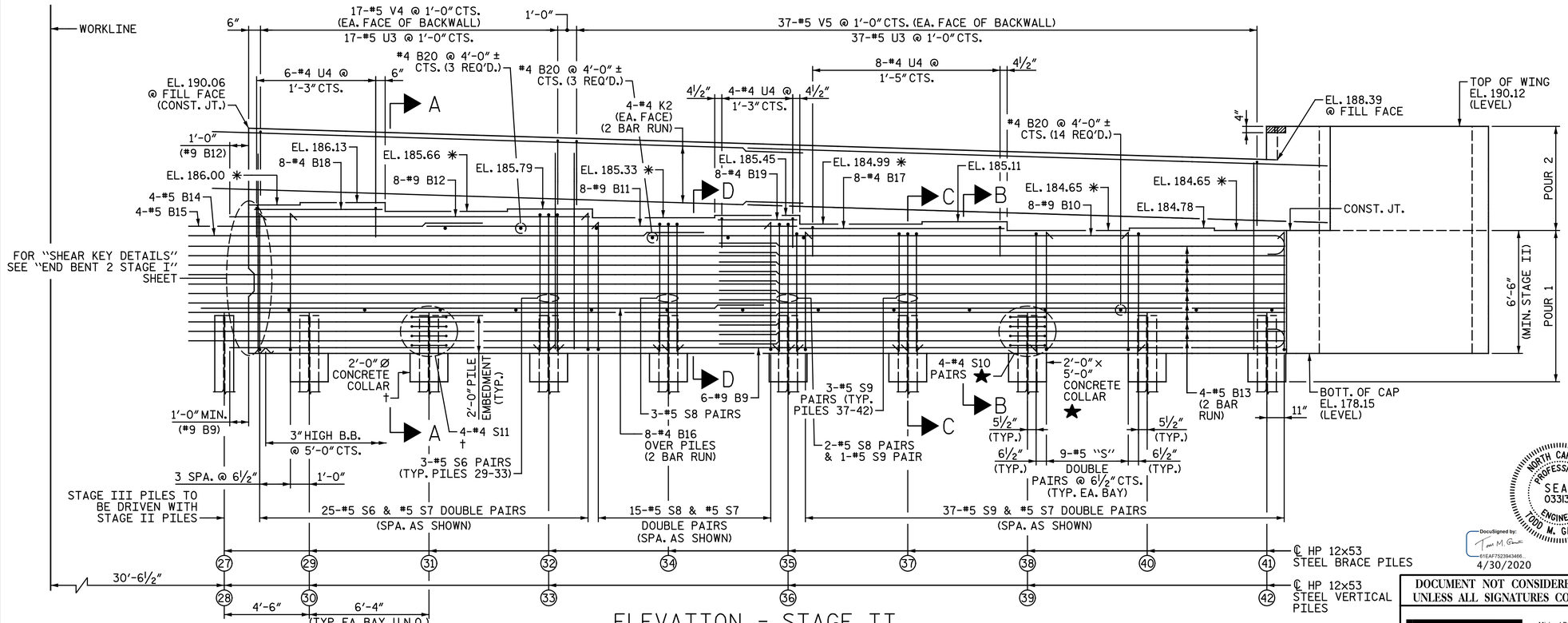
FOR NOTES, SEE "END BENT 2 STAGE I" SHEET.



PLAN - STAGE II

FOR LOCATION OF BRACE PILE IN WING, SEE "GENERAL DRAWING" SHEET 3 OF 4.

SPLICE LENGTHS	
BAR SIZE	UNCOATED
#4	2'-5"
#5	3'-0"



★ TYP. PILES 29&30, 32&33, 35&36, 38&39, 41&42

† TYP. PILES 31, 34, 37, 40

ELEVATION - STAGE II

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "END BENT 2 DETAILS" SHEET. U.N.O. DENOTES "UNLESS NOTED OTHERWISE"

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE II

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

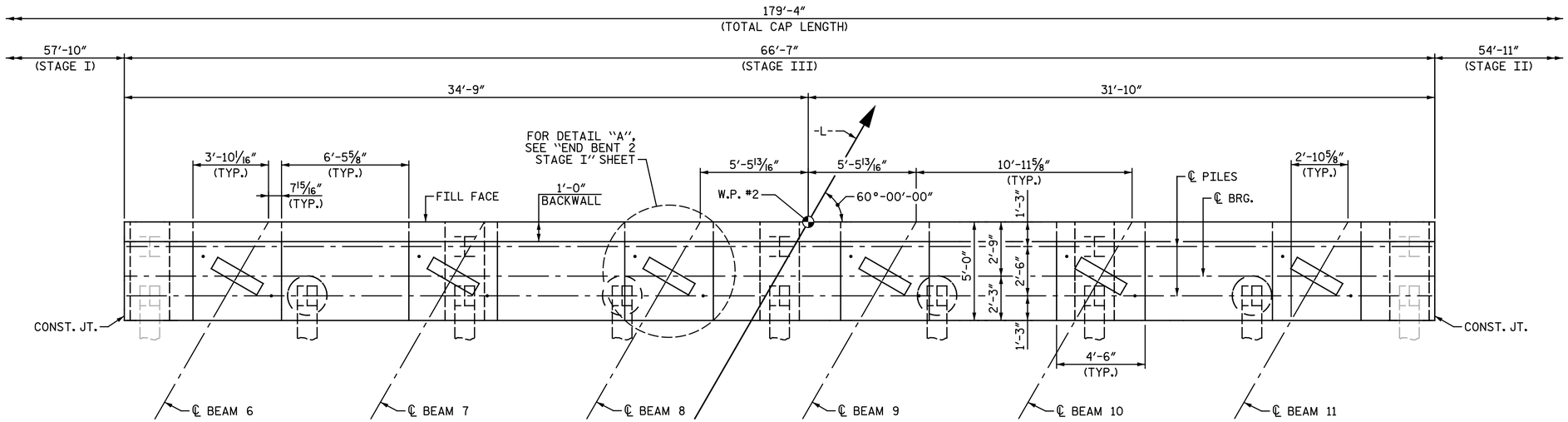
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

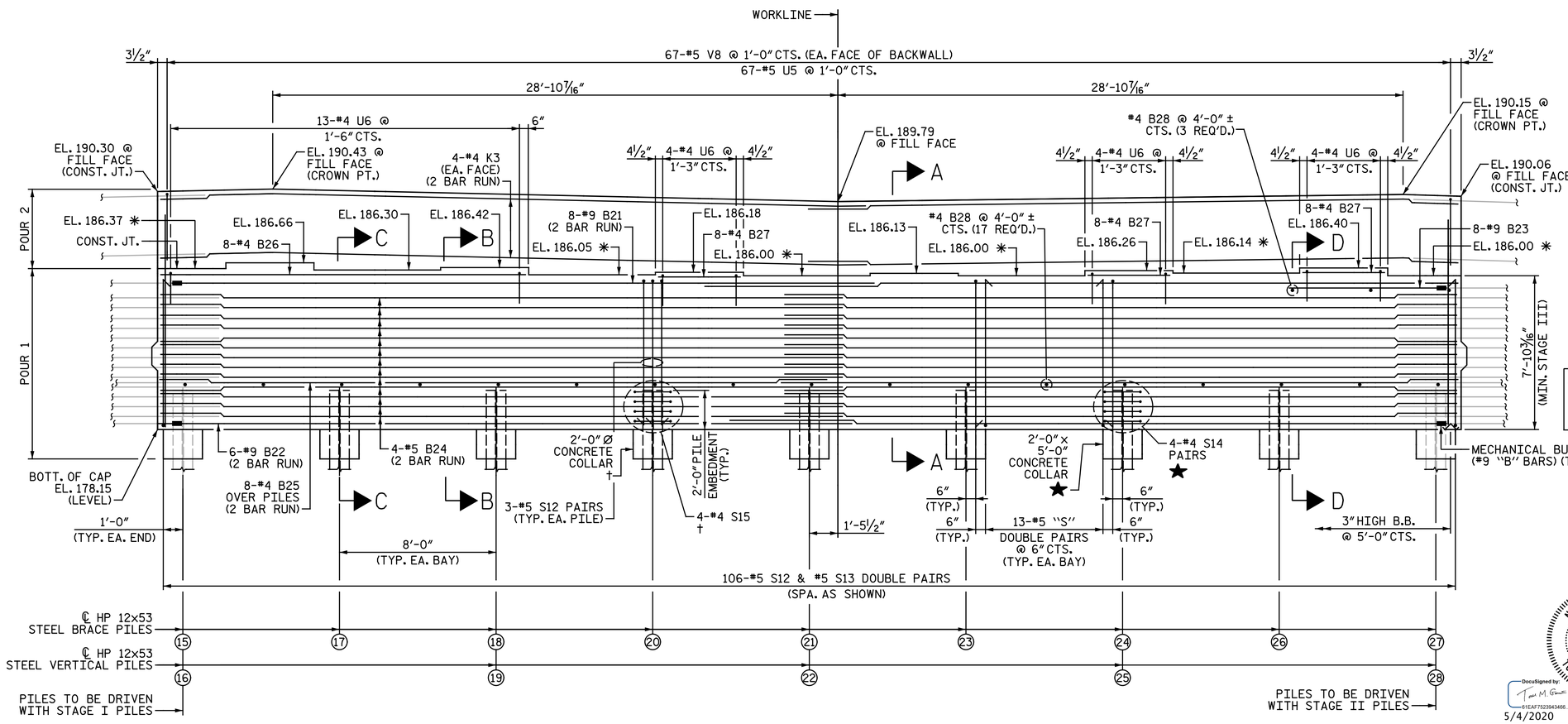
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-36
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : M. D. MAYHEW DATE : 2-28-20
CHECKED BY : T. M. GARRISON DATE : 3-4-20



PLAN - STAGE III



ELEVATION - STAGE III

✱ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILD-UPS, SEE "END BENT 2 DETAILS" SHEET.

NOTES:

FOR NOTES, SEE "END BENT 2 STAGE I" SHEET.

SPLICE LENGTHS	
BAR SIZE	UNCOATED
#4	2′-5″
#5	3′-0″
#9 B21	8′-9″
#9 B22	6′-3″

★ TYP. PILES 15&16, 18&19, 21&22, 24&25, 27&28

† TYP. PILES 17, 20, 23, 26

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE III

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

5/4/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

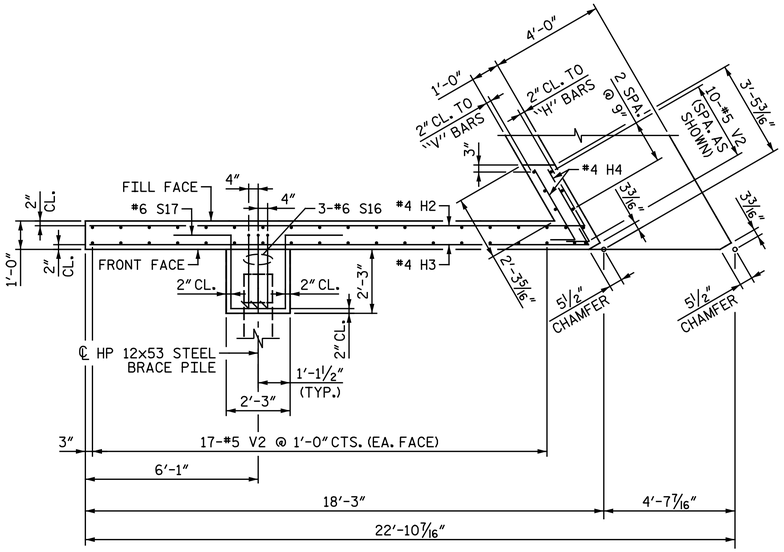
Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-37
1			3			TOTAL SHEETS
2			4			44

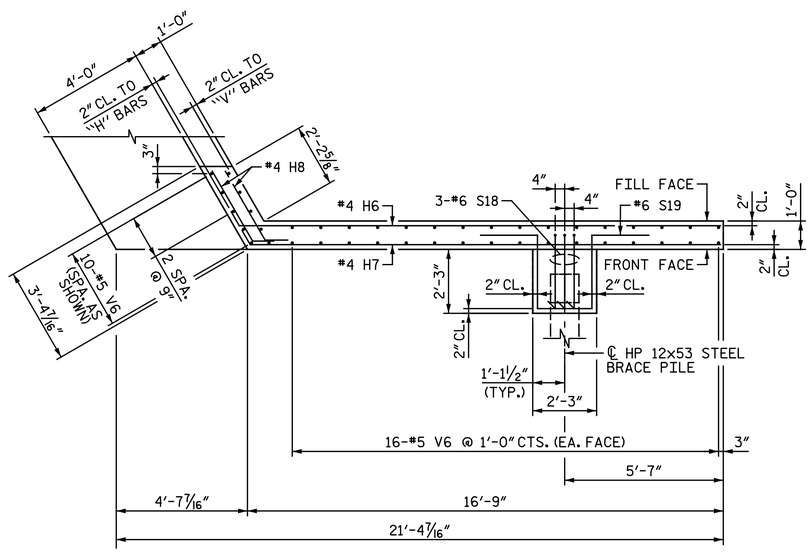
DRAWN BY : C. E. MAYHEW DATE : 2-28-20

CHECKED BY : T. M. GARRISON DATE : 3-4-20



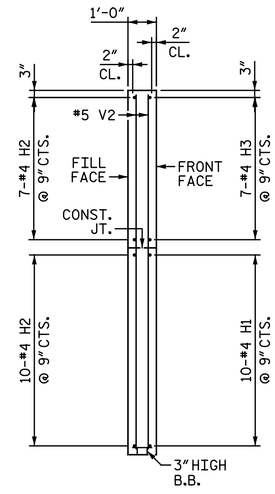
PLAN OF LEFT WING

STAGE I
(H1 & V3 BARS NOT SHOWN FOR CLARITY)
(BLOCKOUT NOT SHOWN FOR CLARITY)

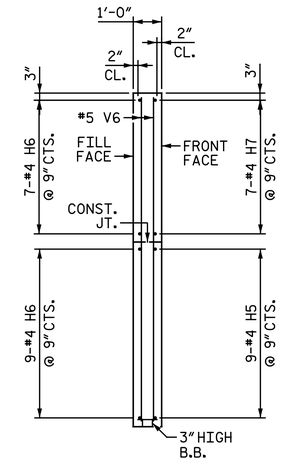


PLAN OF RIGHT WING

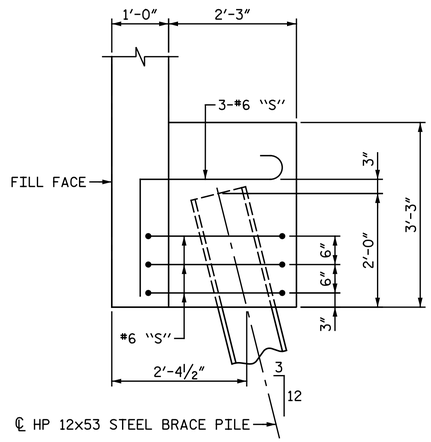
STAGE II
(H5 & V7 BARS NOT SHOWN FOR CLARITY)
(BLOCKOUT NOT SHOWN FOR CLARITY)



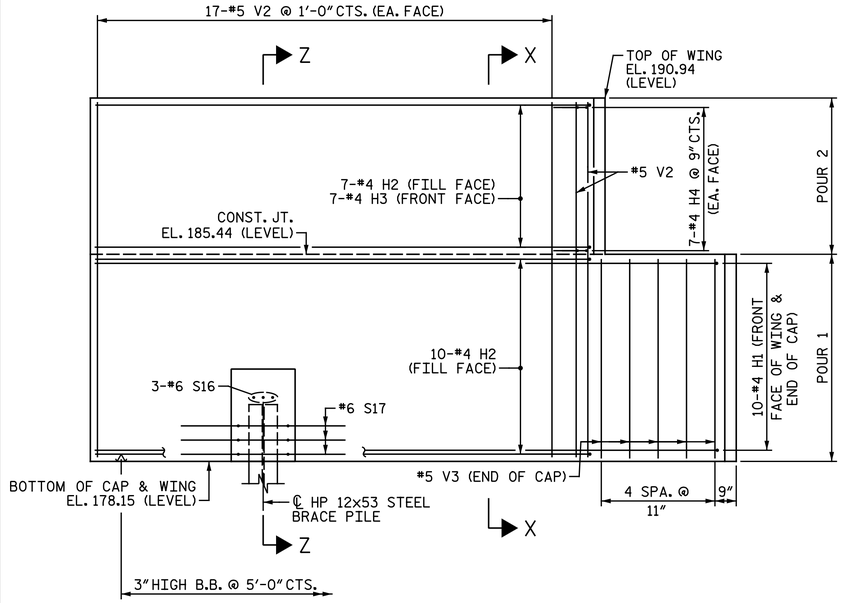
SECTION X-X



SECTION Y-Y

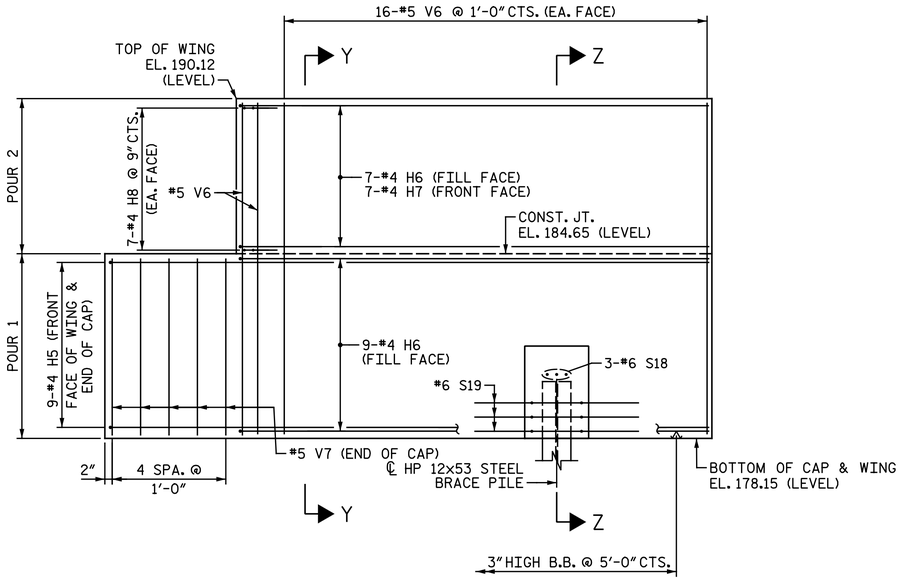


SECTION Z-Z



ELEVATION OF LEFT WING

STAGE I



ELEVATION OF RIGHT WING

STAGE II

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
WING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

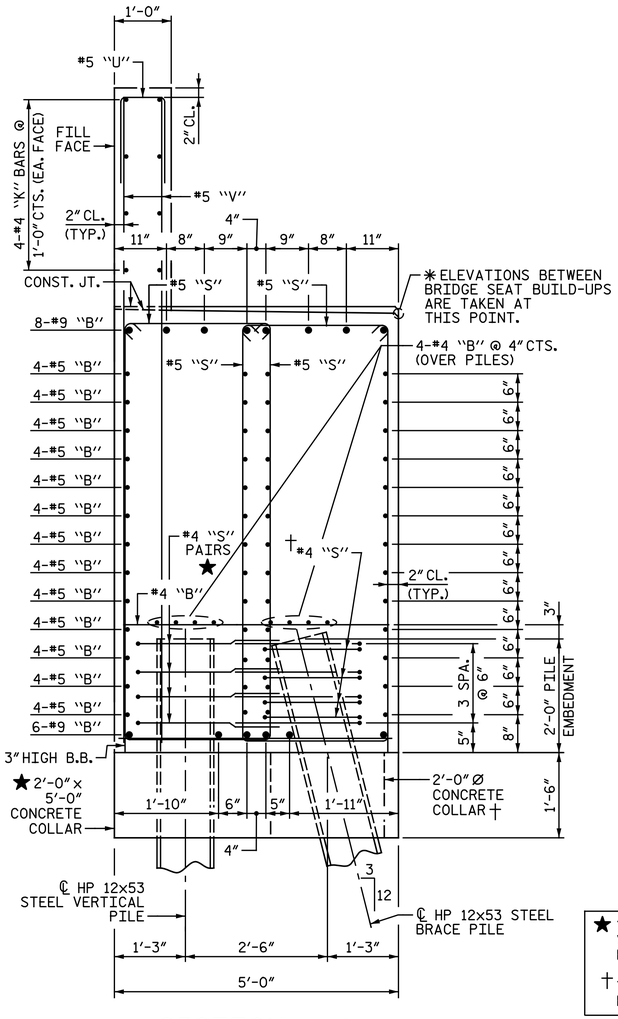
DocuSigned by: T. M. Garrison
61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : M. D. MAYHEW DATE : 2-26-20
CHECKED BY : T. M. GARRISON DATE : 3-5-20

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-38
1			3			TOTAL SHEETS
2			4			44



SECTION A-A

★ TYP. EA. LOCATION WITH BRACE PILE AND VERTICAL PILE PAIR (PILES 1&2, 4&5, 7&8, ETC.)

† TYP. EA. LOCATION WITH SINGLE BRACE PILE (PILES 3, 6, 9, ETC.)

BILL OF MATERIAL

END BENT 2 STAGE I

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#9	1	59' - 11"	1,222
B2	8	#9	1	38' - 2"	1,038
B3	8	#9	STR.	30' - 4"	825
B4	104	#5	STR.	31' - 11"	3,462
B5	16	#4	STR.	31' - 4"	335
B6	8	#4	STR.	7' - 1"	38
B7	16	#4	STR.	4' - 2"	45
B8	17	#4	STR.	4' - 8"	53
H1	10	#4	5	22' - 8"	151
H2	17	#4	5	18' - 0"	204
H3	7	#4	5	18' - 3"	85
H4	14	#4	5	3' - 6"	33
K1	16	#4	STR.	30' - 1"	322
S1	110	#5	2	18' - 4"	2,103
S2	154	#5	3	3' - 7"	576
S3	98	#5	2	17' - 5"	1,780
S4	40	#4	7	7' - 8"	205
S5	16	#4	4	6' - 6"	69
S16	3	#6	8	5' - 4"	24
S17	3	#6	9	10' - 1"	45
U1	52	#5	7	7' - 4"	398
U2	14	#4	7	7' - 8"	72
V1	104	#5	STR.	10' - 8"	1,157
V2	44	#5	STR.	12' - 5"	570
V3	5	#5	STR.	6' - 11"	36

REINFORCING STEEL	LBS.	14,848
CLASS A CONCRETE		
POUR 1 - CAP, COLLARS, LOWER PART OF WING & WING BRACE PILE CAP	C.Y.	89.3
POUR 2 - BACKWALL & UPPER PART OF WING	C.Y.	11.5
TOTAL	C.Y.	100.8
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	EA.	17
HP 12x53 STEEL PILES NO. 17	LIN. FT.	1,340
PILE REDRIVES	EA.	9

END BENT 2 STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B9	6	#9	1	59' - 11"	1,222
B10	8	#9	1	38' - 8"	1,052
B11	8	#9	STR.	19' - 9"	537
B12	8	#9	STR.	19' - 1"	519
B13	88	#5	STR.	31' - 11"	2,929
B14	4	#5	STR.	26' - 5"	110
B15	4	#5	STR.	15' - 6"	65
B16	16	#4	STR.	31' - 4"	335
B17	8	#4	STR.	10' - 9"	57
B18	8	#4	STR.	6' - 10"	37
B19	8	#4	STR.	4' - 2"	22
B20	20	#4	STR.	4' - 8"	62
H5	9	#4	6	21' - 10"	131
H6	16	#4	6	17' - 6"	187
H7	7	#4	6	17' - 0"	79
H8	14	#4	6	3' - 6"	33
K2	16	#4	STR.	31' - 4"	335
S6	68	#5	2	17' - 10"	1,265
S7	154	#5	3	3' - 7"	576
S8	40	#5	2	16' - 10"	702
S9	100	#5	2	15' - 10"	1,651
S10	40	#4	7	7' - 8"	205
S11	16	#4	4	6' - 6"	69
S18	3	#6	8	5' - 4"	24
S19	3	#6	9	10' - 1"	45
U3	54	#5	7	7' - 4"	413
U4	18	#4	7	7' - 8"	92
V4	34	#5	STR.	11' - 0"	390
V5	74	#5	STR.	9' - 10"	759
V6	42	#5	STR.	11' - 8"	511
V7	5	#5	STR.	6' - 2"	32

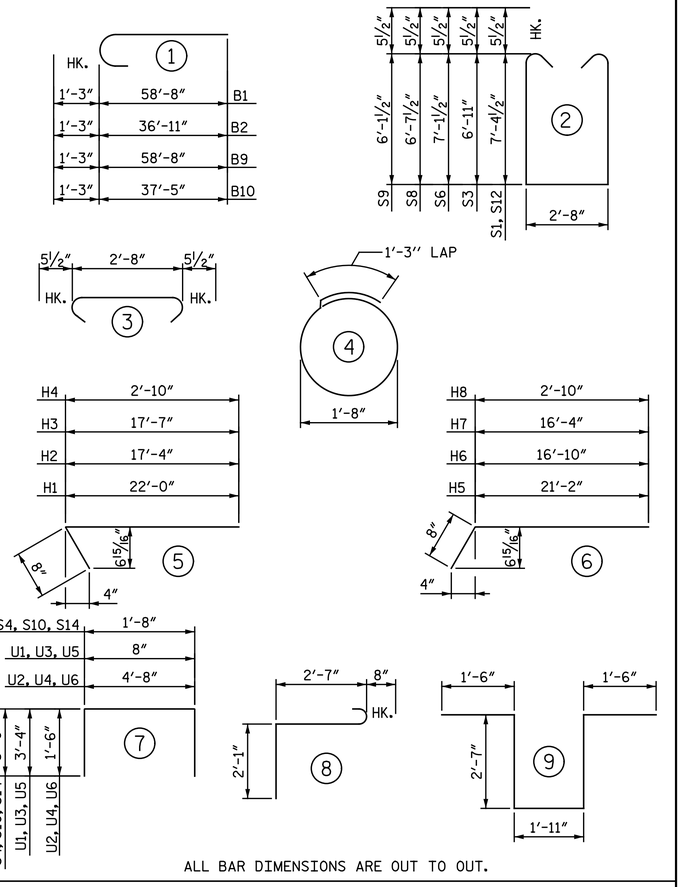
REINFORCING STEEL	LBS.	14,446
CLASS A CONCRETE		
POUR 1 - CAP, COLLARS, LOWER PART OF WING & WING BRACE PILE	C.Y.	82.1
POUR 2 - BACKWALL & UPPER PART OF WING	C.Y.	11.8
TOTAL	C.Y.	93.9
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	EA.	17
HP 12x53 STEEL PILES NO. 17	LIN. FT.	1,340
PILE REDRIVES	EA.	9

END BENT 2 STAGE III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B21	16	#9	STR.	37' - 1"	2,017
B22	12	#9	STR.	35' - 5"	1,445
B23	8	#9	STR.	7' - 11"	215
B24	104	#5	STR.	34' - 8"	3,760
B25	16	#4	STR.	34' - 4"	367
B26	8	#4	STR.	18' - 7"	99
B27	24	#4	STR.	4' - 2"	67
B28	20	#4	STR.	4' - 8"	62
K3	16	#4	STR.	34' - 4"	367
S12	266	#5	2	18' - 4"	5,086
S13	212	#5	3	3' - 7"	792
S14	40	#4	7	7' - 8"	205
S15	16	#4	4	6' - 6"	69
U5	67	#5	7	7' - 4"	512
U6	25	#4	7	7' - 8"	128
V8	134	#5	STR.	11' - 3"	1,572

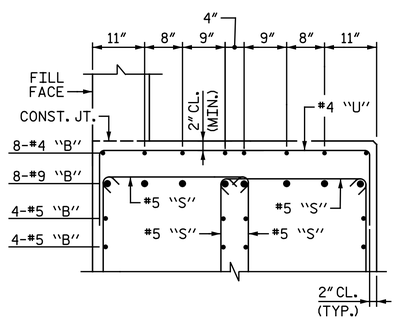
REINFORCING STEEL	LBS.	16,763
CLASS A CONCRETE		
POUR 1 - CAP & COLLARS	C.Y.	102.8
POUR 2 - BACKWALL	C.Y.	9.5
TOTAL	C.Y.	112.3
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	EA.	10
HP 12x53 STEEL PILES NO. 10	LIN. FT.	700
PILE REDRIVES	EA.	4

BAR TYPES



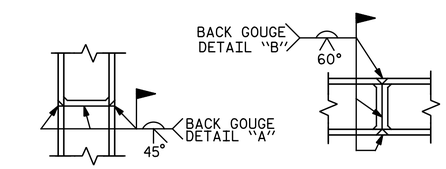
ALL BAR DIMENSIONS ARE OUT TO OUT.

NOTE:
FOR "TEMPORARY DRAINAGE AT END BENT", SEE "END BENT 1 DETAILS" SHEET.

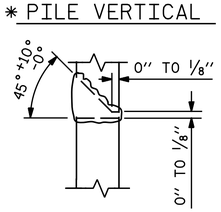


PARTIAL SECTION B-B

"V" & "K" BARS NOT SHOWN FOR CLARITY.

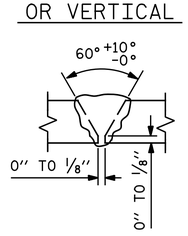


✱ PILE VERTICAL



DETAIL "A"

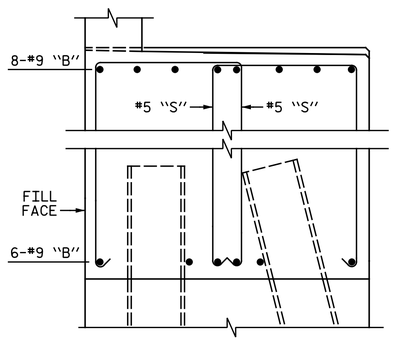
✱ PILE HORIZONTAL OR VERTICAL



DETAIL "B"

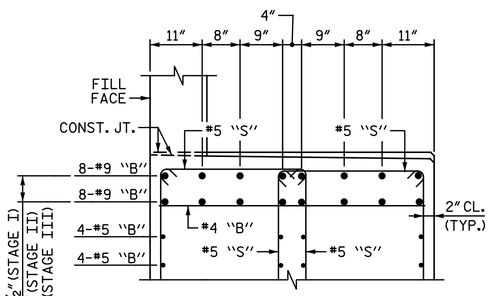
PILE SPLICE DETAILS

✱ POSITION OF PILE DURING WELDING



PARTIAL SECTION C-C

ONLY #9 "B" & #5 "S" BARS SHOWN FOR CLARITY. (TYP. EA. PILE)



PARTIAL SECTION D-D

"V" & "K" BARS NOT SHOWN FOR CLARITY.

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 2 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

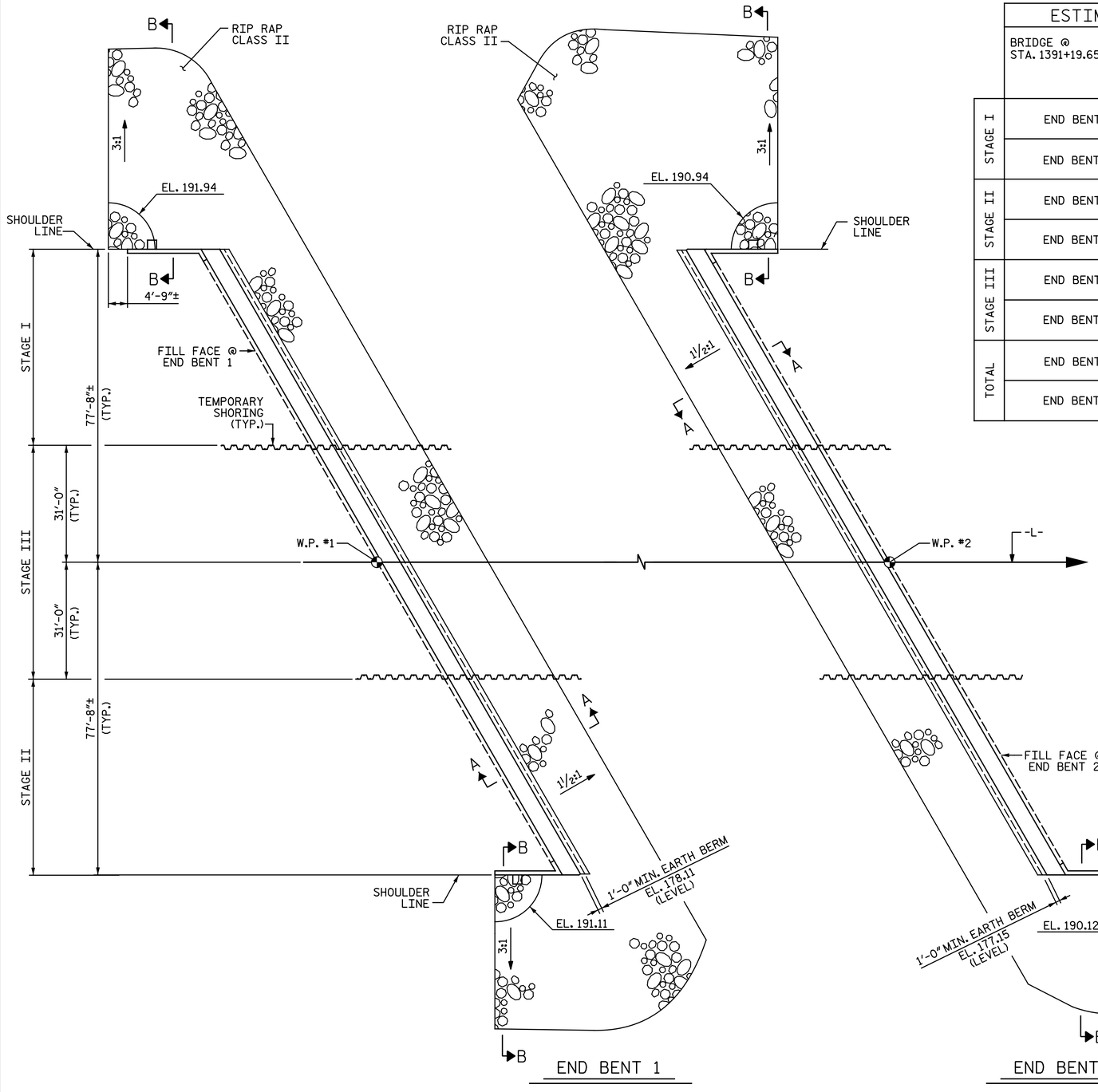
DocuSigned by: Todd M. Garrison
61EAF7523043466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-39
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : M. D. MAYHEW DATE : 2-27-20
CHECKED BY : T. M. GARRISON DATE : 3-5-20

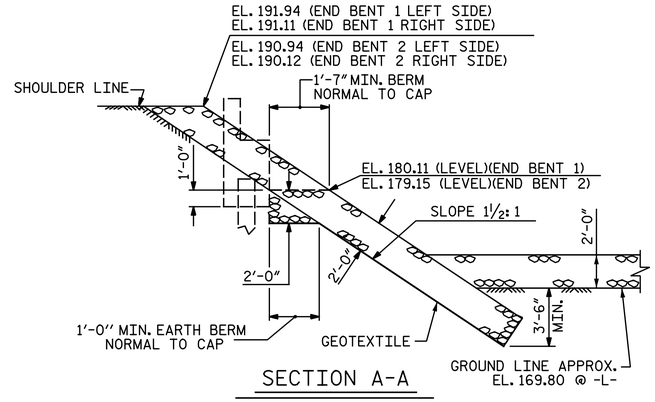


PLAN OF RIP RAP

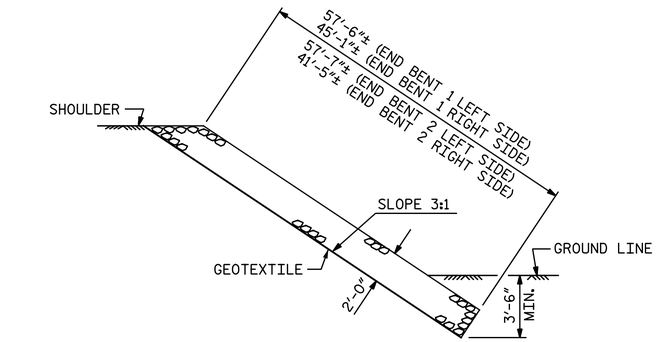
FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS.

ESTIMATED QUANTITIES

	BRIDGE @ STA. 1391+19.65 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
		TONS	SQUARE YARDS
STAGE I	END BENT 1	310	340
	END BENT 2	470	520
STAGE II	END BENT 1	325	360
	END BENT 2	270	300
STAGE III	END BENT 1	155	170
	END BENT 2	155	170
TOTAL	END BENT 1	790	870
	END BENT 2	895	990



SECTION A-A



SECTION B-B

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...

4/30/2020

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

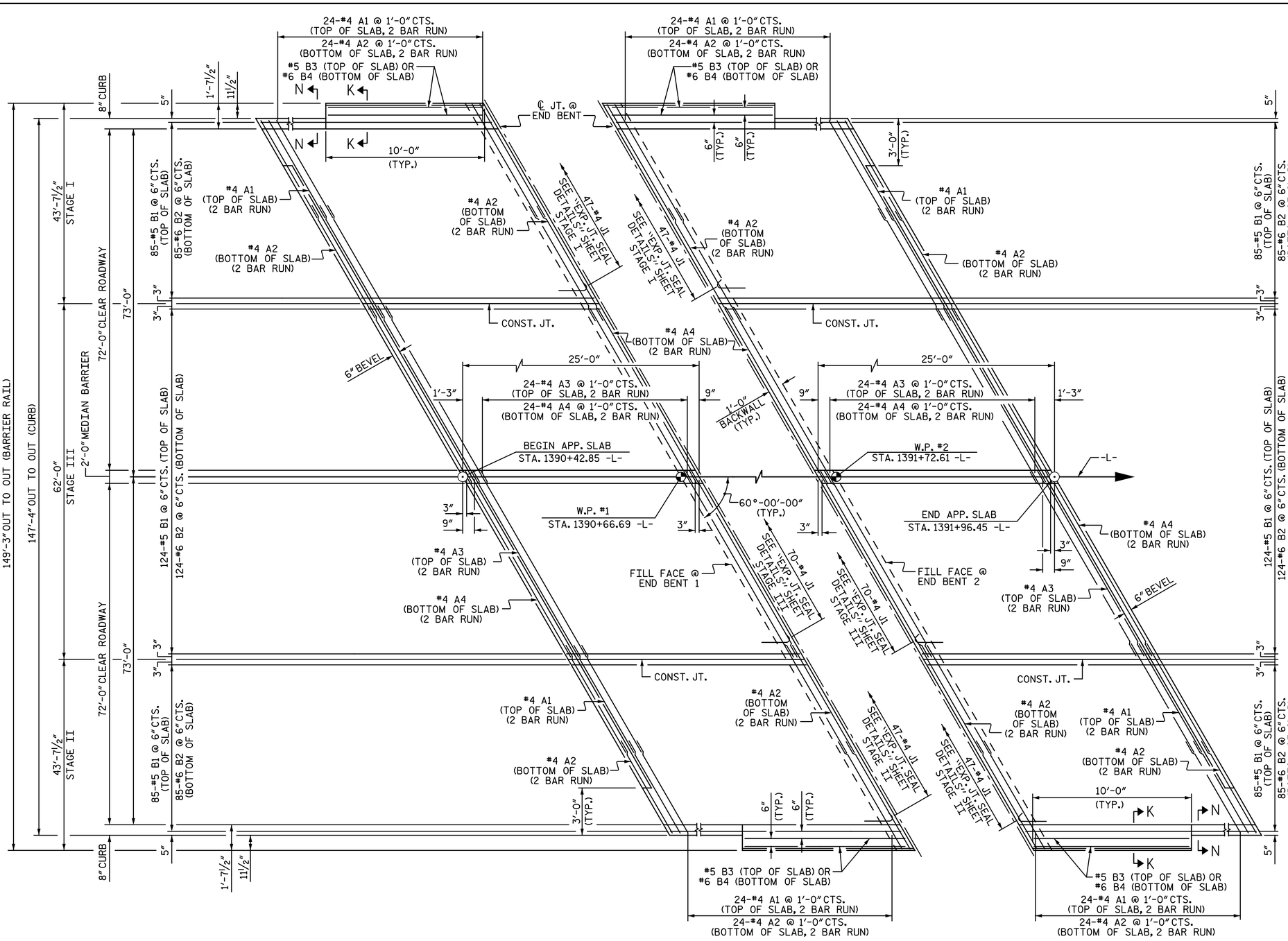
RIP RAP DETAILS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-40
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : N. B. SPEAKS DATE : 2-13-20
CHECKED BY : T. M. GARRISON DATE : 2-13-20



DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

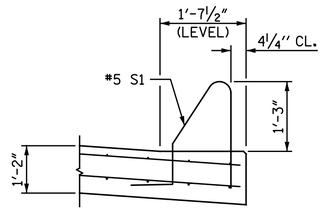
FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

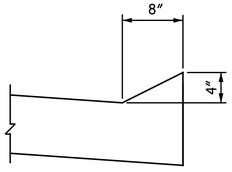
FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL ON SHEET 2 OF 4 IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"



SECTION K-K



SECTION N-N

CURB DETAILS

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

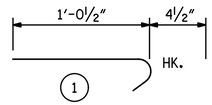
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-41
1			3			TOTAL SHEETS
2			4			44

ASSEMBLED BY : N. B. SPEAKS	DATE : 7-31-19	
CHECKED BY : T. M. GARRISON	DATE : 2-2-20	
DRAWN BY : EEM 3/95	REV. 12/21/11	MAA/GM
CHECKED BY : VAP 3/95	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

STD. NO. BAS2

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

** QUANTITIES FOR BARRIER RAIL OR MEDIAN BARRIER NOT INCLUDED. SEE SHEET 3 OF 4 AND SHEET 4 OF 4.

BILL OF MATERIAL
FOR ONE APPROACH SLAB (2 REQ'D)

STAGE I

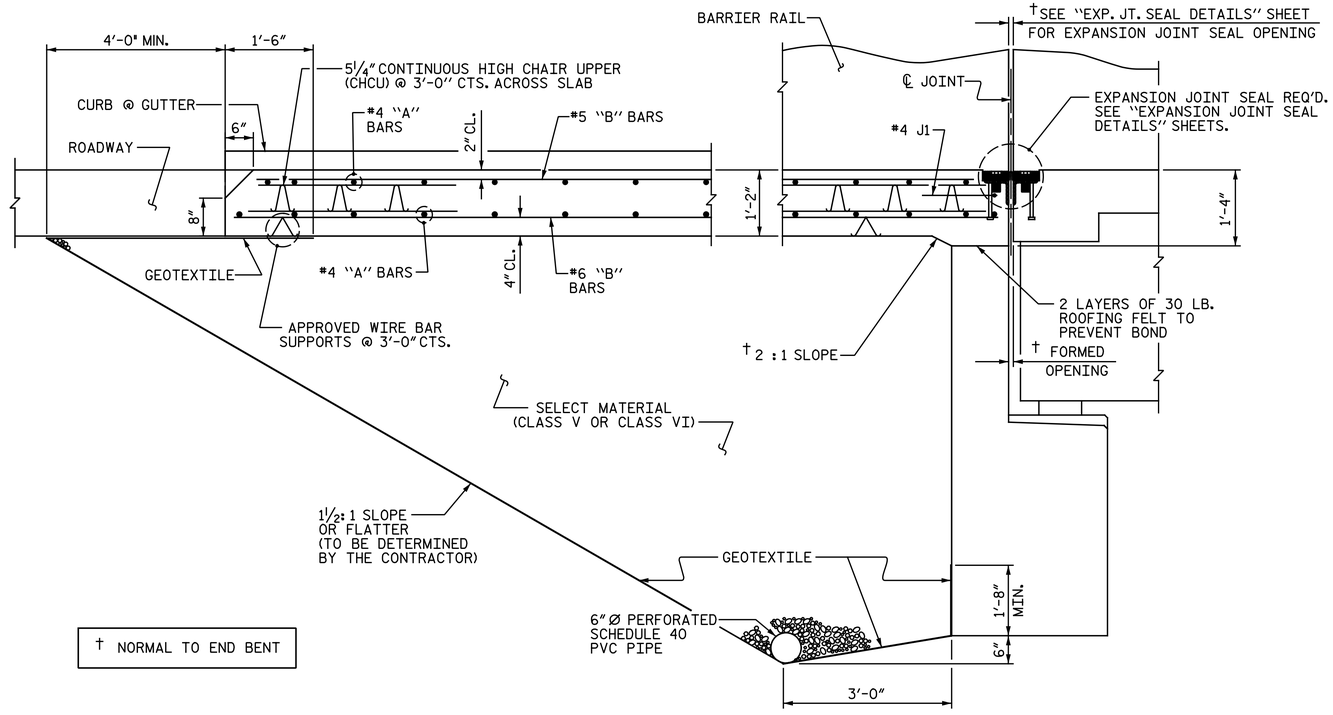
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	50	#4	STR.	27' - 3"	910
A2	52	#4	STR.	27' - 0"	938
✳B1	85	#5	STR.	23' - 7"	2,091
B2	85	#6	STR.	24' - 7"	3,139
✳B3	2	#5	STR.	9' - 8"	20
B4	2	#6	STR.	9' - 8"	29
✳J1	47	#4	1	1' - 5"	44
REINFORCING STEEL **				LBS.	4,106
✳EPOXY COATED REINFORCING STEEL **				LBS.	3,065
CLASS AA CONCRETE **				C.Y.	46.7

STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	50	#4	STR.	27' - 3"	910
A2	52	#4	STR.	27' - 0"	938
✳B1	85	#5	STR.	23' - 7"	2,091
B2	85	#6	STR.	24' - 7"	3,139
✳B3	2	#5	STR.	9' - 8"	20
B4	2	#6	STR.	9' - 8"	29
✳J1	47	#4	1	1' - 5"	44
REINFORCING STEEL **				LBS.	4,106
✳EPOXY COATED REINFORCING STEEL **				LBS.	3,065
CLASS AA CONCRETE **				C.Y.	46.7

STAGE III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A3	50	#4	STR.	36' - 8"	1,225
A4	52	#4	STR.	36' - 6"	1,268
✳B1	124	#5	STR.	23' - 7"	3,050
B2	124	#6	STR.	24' - 7"	4,579
✳J1	70	#4	1	1' - 5"	66
REINFORCING STEEL **				LBS.	5,847
✳EPOXY COATED REINFORCING STEEL **				LBS.	4,341
CLASS AA CONCRETE **				C.Y.	67.2



† NORMAL TO END BENT

SECTION THRU SLAB
(TYPE I - STANDARD APPROACH FILL)

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 2 OF 4

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF75239943466...

4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

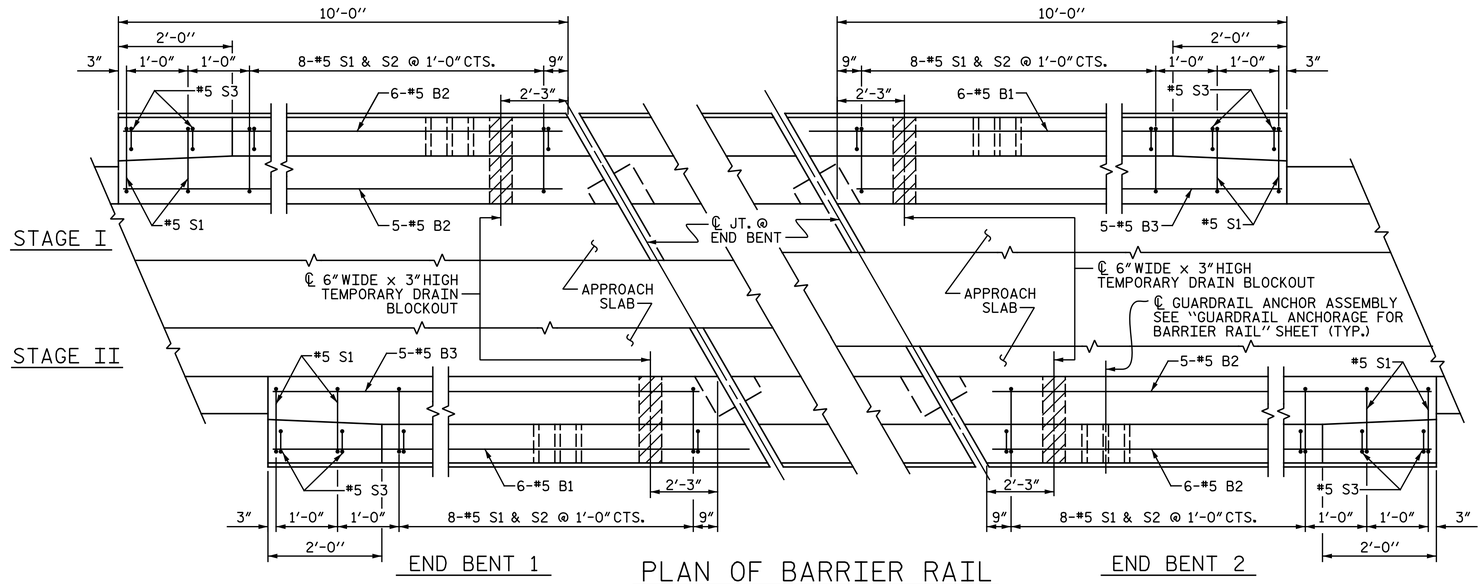
ASSEMBLED BY : N. B. SPEAKS	DATE : 7-31-19
CHECKED BY : T. M. GARRISON	DATE : 2-4-20

DRAWN BY : EEM 3/95	REV. 12/21/11	MAA/GM
CHECKED BY : VAP 3/95	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-42
1			3			TOTAL SHEETS
2			4			44

STD. NO. BAS2



NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR ″CONCRETE BARRIER RAIL″.

THE BARRIER RAIL ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

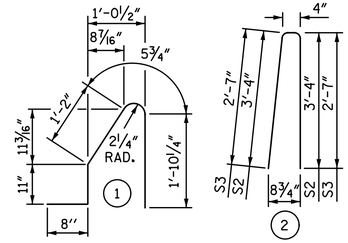
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

TEMPORARY DRAIN BLOCKOUTS FOR STAGE I AND STAGE II CONDITIONS SHALL BE FILLED WITH APPROVED GROUT UPON COMPLETION OF STAGE III CONSTRUCTION.

TEMPORARY DRAIN BLOCKOUTS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH CONCRETE BARRIER RAIL REINFORCEMENT AND RUBRAIL ANCHORAGE.

THE COST OF THE PVC GROUT VENTS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE BARRIER RAIL.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BARRIER RAIL ONLY

STAGE I

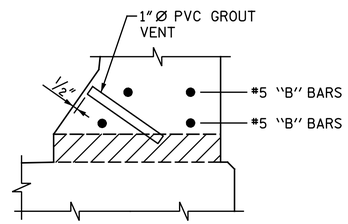
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	6	#5	STR.	10′ - 4″	65
✳B2	11	#5	STR.	9′ - 9″	112
✳B3	5	#5	STR.	9′ - 4″	49
✳S1	20	#5	1	5′ - 1″	106
✳S2	16	#5	2	7′ - 0″	117
✳S3	4	#5	2	5′ - 6″	23

✳EPOXY COATED REINFORCING STEEL	LBS.	472
CLASS AA CONCRETE	CU. YDS.	2.9
CONCRETE BARRIER RAIL	LIN. FT.	21.08

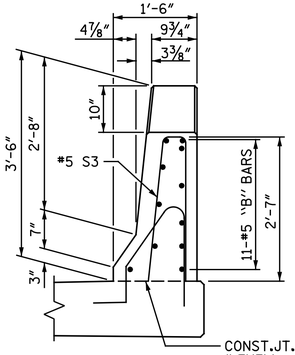
STAGE II

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	6	#5	STR.	10′ - 4″	65
✳B2	11	#5	STR.	9′ - 9″	112
✳B3	5	#5	STR.	9′ - 4″	49
✳S1	20	#5	1	5′ - 1″	106
✳S2	16	#5	2	7′ - 0″	117
✳S3	4	#5	2	5′ - 6″	23

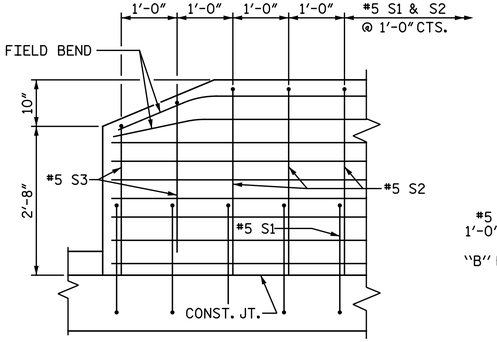
✳EPOXY COATED REINFORCING STEEL	LBS.	472
CLASS AA CONCRETE	CU. YDS.	2.9
CONCRETE BARRIER RAIL	LIN. FT.	21.08



DETAIL ″A″

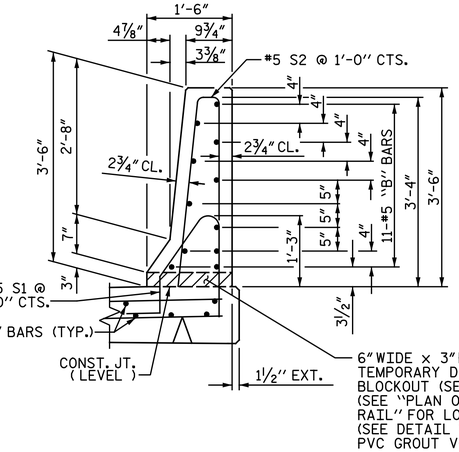


END VIEW

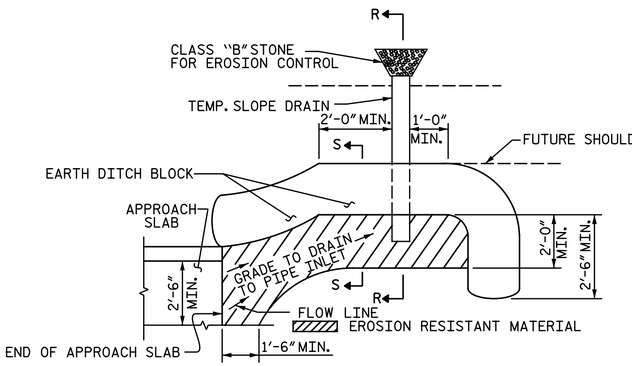


SIDE VIEW

END OF RAIL DETAILS

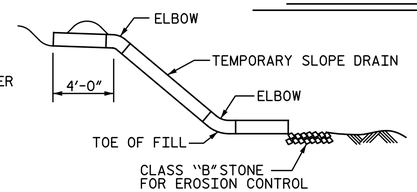


SECTION THRU RAIL

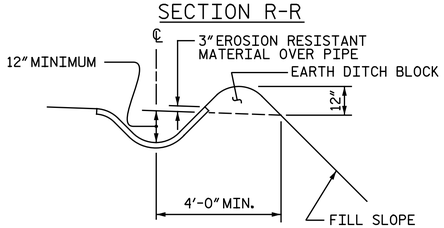


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2″ DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

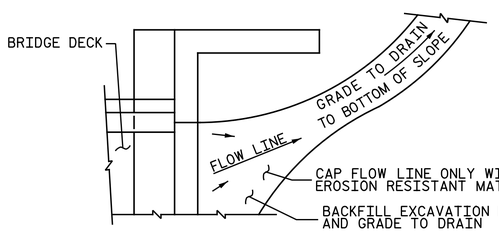
PLAN VIEW



SECTION R-R



SECTION S-S



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

ASSEMBLED BY : N. B. SPEAKS		DATE : 7-27-19	
CHECKED BY : T. M. GARRISON		DATE : 2-4-20	
DRAWN BY : FCJ	11/88	REV. 6/13	MAA/GM
CHECKED BY : ARB	11/88	REV. 12/17	MAA/THC
		REV. 5/18	MAA/THC

STATE OF NORTH CAROLINA
NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

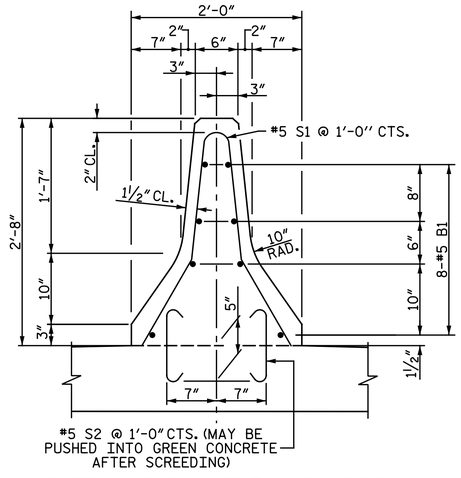
PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 1391+19.65 -L-

SHEET 3 OF 4

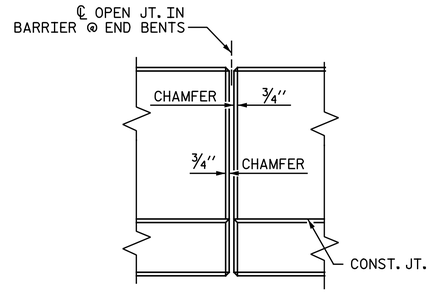
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-43
1			3			TOTAL SHEETS
2			4			44



SECTION THRU MEDIAN BARRIER



ELEVATION AT EXPANSION JOINTS

MEDIAN BARRIER DETAILS

NOTES

THE COST OF THE MEDIAN BARRIER ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE MEDIAN BARRIER".

THE MEDIAN BARRIER ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN MEDIAN BARRIER SHALL BE EPOXY COATED.

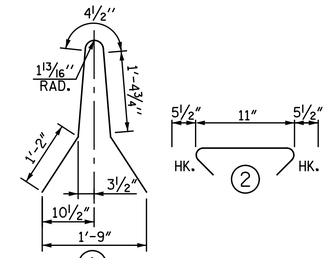
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CONCRETE MEDIAN BARRIER AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN ENDS OF MEDIAN BARRIER SEGMENTS ON THE APPROACH SLABS.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED DOWELS IN PLACE OF THE #5 S2 BARS DETAILED. LEVEL 2 FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE DOWELS IS 19 KIPS. THE DOWELS ARE TO BE HOOKED ON ONE END WITH A PROJECTION MATCHING THAT OF THE #5 S2 BARS. THE OPPOSITE END IS TO BE STRAIGHT AND EMBEDDED 6" INTO THE APPROACH SLAB.

SPLICE LENGTHS

BAR SIZE	EPOXY COATED
#5	3'-5"

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

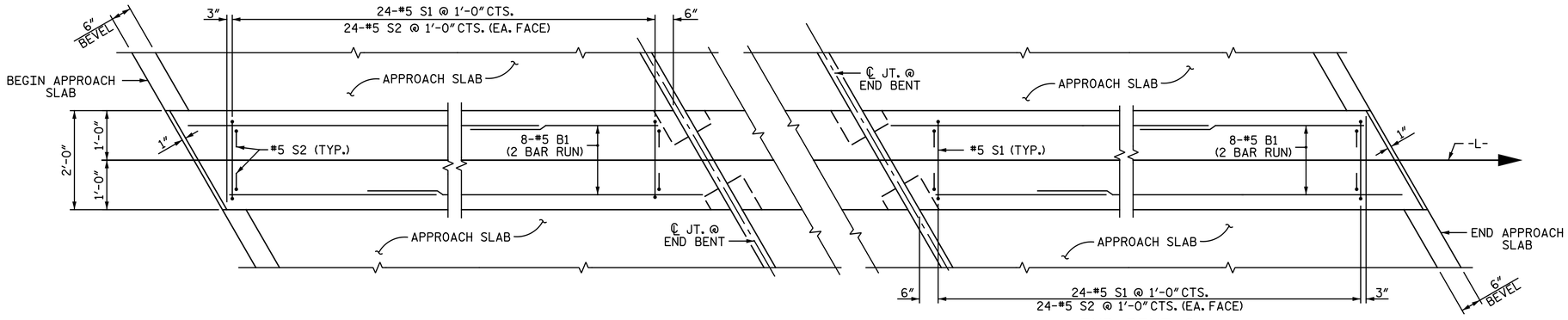
BILL OF MATERIAL

MEDIAN BARRIER ONLY

STAGE III

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	32	#5	STR.	13' - 10"	462
✳S1	48	#5	1	5' - 6"	275
✳S2	96	#5	2	1' - 10"	184

✳EPOXY COATED REINFORCING STEEL	LBS.	921
CLASS AA CONCRETE	CU. YDS.	5.1
CONCRETE MEDIAN BARRIER	LIN. FT.	50.02



END BENT 1 — END BENT 2

PLAN OF CONCRETE MEDIAN BARRIER

DISCONTINUE BEVEL UNDER MEDIAN BARRIER

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 1391+19.65 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

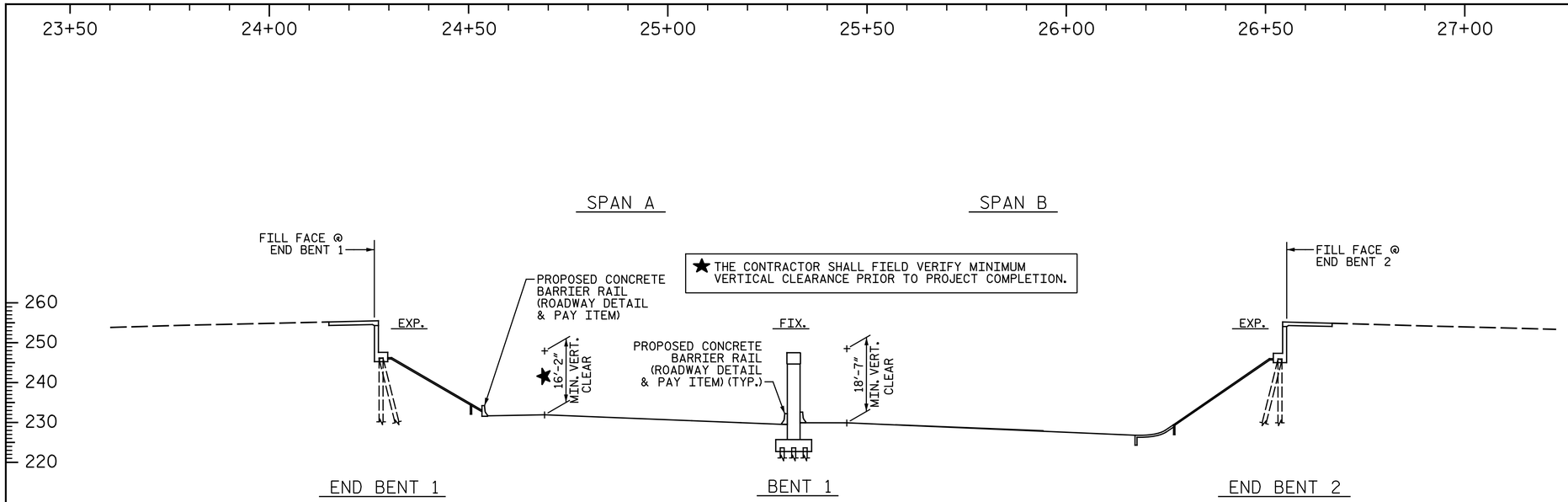
DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/30/2020

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-44
1			3			TOTAL SHEETS
2			4			44

DRAWN BY : N. B. SPEAKS DATE : 8-5-19
CHECKED BY : T. M. GARRISON DATE : 3-11-20

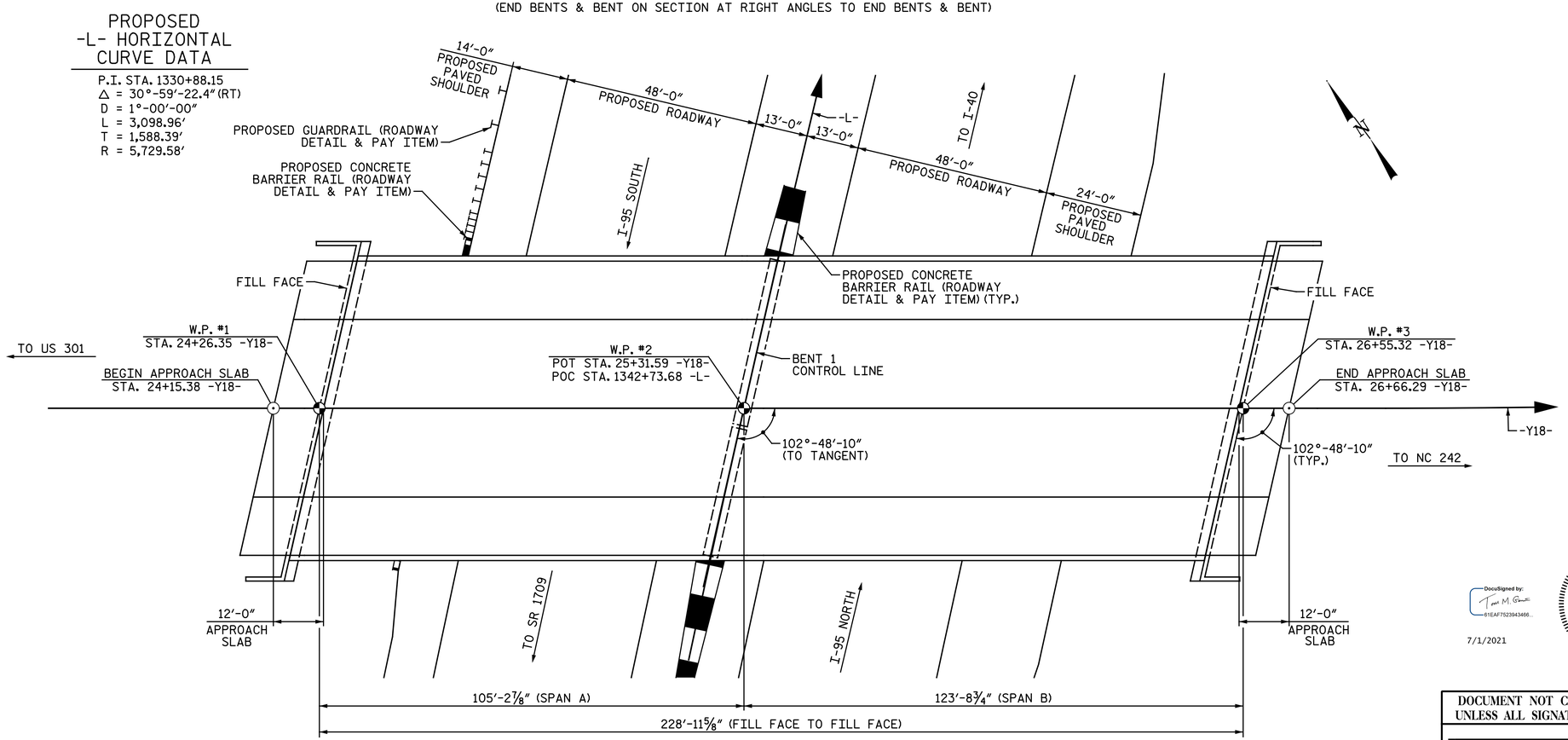


SECTION ALONG -Y18-

(END BENTS & BENT ON SECTION AT RIGHT ANGLES TO END BENTS & BENT)

PROPOSED -L- HORIZONTAL CURVE DATA

P.I. STA. 1330+88.15
△ = 30°-59'-22.4" (RT)
D = 1°-00'-00"
L = 3,098.96'
T = 1,588.39'
R = 5,729.58'



PLAN

(PILES, COLUMNS & FOOTINGS NOT SHOWN IN PLAN VIEW FOR CLARITY)

SCOPE OF WORK

REMOVE EXISTING JOINT SEALS.

PARTIALLY REMOVE CONCRETE IN DESIGNATED BRIDGE DECK AREA BY SCARIFICATION METHODS.

PERFORM REPAIRS IF NECESSARY IN SCARIFIED BRIDGE DECK AREA.

REMOVE EXISTING SIDEWALK AND THREE BAR METAL RAIL ON EACH SIDE OF BRIDGE.

REMOVE ASPHALT PAVEMENT ON APPROACH SLABS IN PROPOSED SIDEWALK AREAS. PREPARE APPROACH SLAB SURFACES FOR PROPOSED SIDEWALK CONSTRUCTION WITH SHOTBLASTING AND OTHER APPROPRIATE METHODS.

CONSTRUCT PROPOSED PARAPET AND TWO BAR METAL RAIL ON EACH SIDE OF BRIDGE.

CONSTRUCT PROPOSED SIDEWALK ON EACH SIDE OF BRIDGE.

CLEAN AND OTHERWISE PREPARE SCARIFIED BRIDGE DECK AREA WITH SHOTBLASTING AND OTHER APPROPRIATE METHODS.

OVERLAY PREPARED BRIDGE DECK AREA WITH POLYMER CONCRETE.

RECONSTRUCT BRIDGE JOINTS AND INSTALL BACKER ROD AND SILICONE JOINT SEALANT.

GROOVE POLYMER CONCRETE DECK.

CLEAN AND PAINT BOTH ENDS OF EACH EXISTING STEEL GIRDER FOR LENGTH OF 9'-3" AND EACH EXISTING STEEL BEARING COMPONENT AT END BENTS AND INTERIOR BENT.

CLEAN AND EPOXY COAT ENTIRE TOP SURFACE OF END BENT CAPS.

CLEAN AND EPOXY COAT TOP SURFACE AND SIDE FACES OF INTERIOR BENT CAP FOR LENGTH OF 3'-0" FROM EACH OUTSIDE END TO ADJACENT COLUMN FACE, AS WELL AS OUTSIDE END FACES OF INTERIOR BENT CAP.

NOTES:

GENERAL DRAWING INFORMATION IS TAKEN FROM THE EXISTING BRIDGE PLANS AND THE ROUTINE INSPECTION REPORT DATED 10/20/2020.

BRIDGE ORIENTATION CONFORMS TO EXISTING BRIDGE PLANS.

I HEREBY CERTIFY THAT THIS STRUCTURE WAS REHABILITATED ACCORDING TO THESE PLANS OR AS NOTED HEREIN.

RESIDENT ENGINEER DATE

DRAWN BY : C. E. MAYHEW DATE : 7-1-21
CHECKED BY : T. M. GARRISON DATE : 7-1-21

DocuSigned by: Todd M. Garrison 61EAF7523943466...
7/1/2021

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

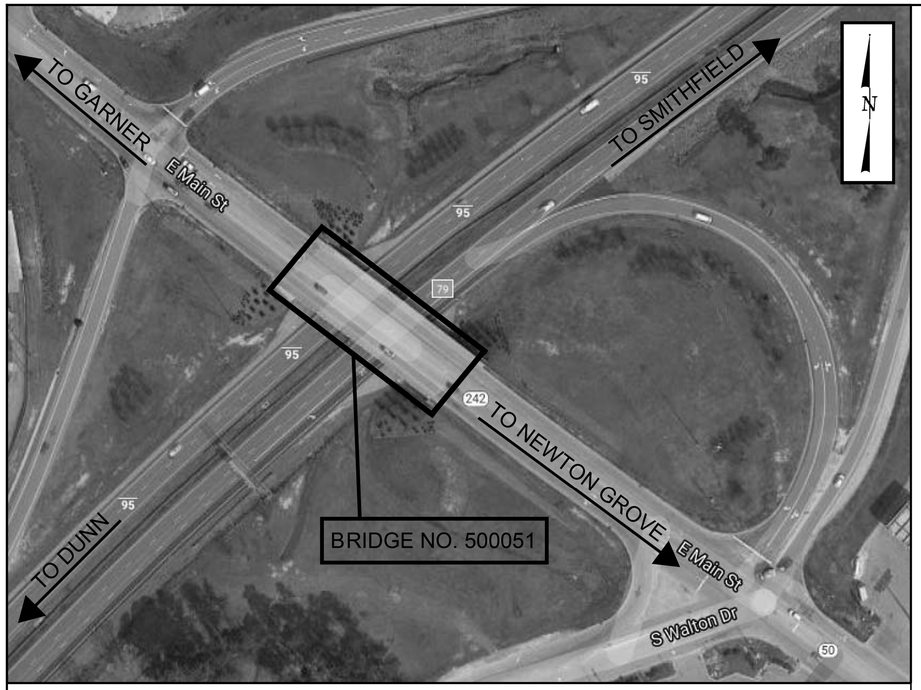
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-1
1			3			TOTAL SHEETS
2			4			14

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE NO. 500051
ON NC 50 OVER I-95

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 25+31.59 -Y18-
1342+73.68 -L-
SHEET 1 OF 2 REHABILITATION OF BRIDGE NO. 500051



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 ASPECTS THAT MAY BE NECESSARY TO PERFORM AND COMPLETE THE PROJECT.

BRIDGE COORDINATES

LATITUDE: 35.3768°
LONGITUDE: -78.5402°

NOTES:

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

THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THAT SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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

WORK ON THE BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL BELOW. THE CONTRACTOR SHALL SUBMIT PLANS FOR CONSTRUCTION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL SUBMIT FOR REVIEW AND APPROVAL A COMPLETE SEQUENCE OF TASKS FOR EACH OPERATION AFFECTING THE BRIDGE SURFACE AND/OR TRAFFIC.

EXISTING JOINTS SHALL BE SEALED PRIOR TO BEGINNING SURFACE PREPARATION OF THE BRIDGE DECK.

THE CONTRACTOR SHALL PROVIDE A METHOD OF HANDLING UNEXPECTED BLOW THROUGH OF THE BRIDGE DECK.

LONGITUDINAL CONSTRUCTION JOINTS OF OVERLAYS SHALL BE LOCATED ALONG THE CENTERLINE OR EDGE OF TRAVEL LANES.

EXISTING BRIDGE CONCRETE DECK SHALL BE REPAIRED AFTER SCARIFICATION AND PRIOR TO THE SURFACE PREPARATION AND APPLICATION OF THE POLYMER CONCRETE OVERLAY AT LOCATIONS DETERMINED BY THE ENGINEER, IF NECESSARY. SUCH LOCATIONS SHALL BE REPAIRED AS OUTLINED IN THE SPECIAL PROVISIONS FOR OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE AND POLYMER CONCRETE BRIDGE DECK OVERLAY.

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 SHALL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATION AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED INTO THE REPAIR QUANTITY TABLE.

EPOXY COATING ENTIRE TOP SURFACE OF END BENT CAPS, TOP SURFACES AND SIDE FACES OF INTERIOR BENT CAP FROM EACH OUTSIDE END TO ADJACENT COLUMN FACE, AND OUTSIDE END FACES OF INTERIOR BENT CAP WILL BE REQUIRED. AT THE TIME OF PREPARATION OF THESE PLANS, IT WAS NOT ANTICIPATED THAT EPOXY COATING WOULD BE REQUIRED ELSEWHERE. HOWEVER, IT MAY BE DETERMINED IN THE FIELD THAT EPOXY COATING ELSEWHERE WILL BE NECESSARY TO PROPERLY COMPLETE THE INTENDED BRIDGE PRESERVATION / REHABILITATION WORK. THE CONTRACTOR SHALL BE PREPARED TO PERFORM SUCH WORK IN A TIMELY MANNER, AS DETERMINED IN THE FIELD.

AT THE TIME OF PREPARATION OF THESE PLANS, IT WAS NOT ANTICIPATED THAT THE FOLLOWING WORK / PAY ITEMS WOULD BE REQUIRED:
- CLASS II SURFACE PREPARATION
- CLASS III SURFACE PREPARATION
- CONCRETE DECK REPAIR FOR PC OVERLAY

HOWEVER, IT MAY BE DETERMINED IN THE FIELD THAT THIS WORK OR OTHER WORK WILL BE NECESSARY TO PROPERLY COMPLETE THE INTENDED BRIDGE PRESERVATION / REHABILITATION WORK. THE CONTRACTOR SHALL BE PREPARED TO PERFORM SUCH WORK IN A TIMELY MANNER, AS DETERMINED IN THE FIELD. SUCH WORK SHALL BE CONSIDERED EXTRA WORK AND SHALL BE ADDRESSED AS PER ARTICLE 104-7 OF THE STANDARD SPECIFICATIONS. PROJECT SPECIAL PROVISIONS THAT OUTLINE REQUIREMENTS FOR THESE POTENTIAL ADDITIONAL WORK ITEMS HAVE BEEN PROVIDED IN PROJECT DOCUMENTS, BUT NO QUANTITIES HAVE BEEN LISTED. ACTUAL PAY ITEMS, QUANTITIES, AND COSTS WILL BE ESTABLISHED, AS REQUIRED, IF EXTRA WORK IS ENCOUNTERED.

FOR SCOPE OF WORK, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURES, SEE SPECIAL PROVISIONS.

FOR PAINTING EXISTING WEATHERING STEEL STRUCTURE, SEE SPECIAL PROVISIONS.

FOR POURABLE SILICONE JOINT SEALANT, SEE SPECIAL PROVISIONS.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

FOR POLYMER CONCRETE BRIDGE DECK OVERLAY, SEE SPECIAL PROVISIONS.

FOR OVERLAY SURFACE PREPARATION FOR POLYMER CONCRETE, SEE SPECIAL PROVISIONS.

FOR EPOXY COATING AND DEBRIS REMOVAL, SEE SPECIAL PROVISIONS.

PAY ITEMS FOR CLASS AA CONCRETE AND EPOXY COATED REINFORCING STEEL INCLUDE PAYMENT FOR CONSTRUCTION OF SIDEWALKS ON BRIDGE AND APPROACH SLABS.

FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

COORDINATE LOCATIONS AND LIMITS OF PROPOSED SIDEWALKS ON APPROACH SLABS WITH ASSOCIATED ROADWAY CONSTRUCTION. SEE ROADWAY PLANS.

ANY DAMAGE TO THE EXISTING DECK DURING THE REMOVAL OF EXISTING SIDEWALK CONCRETE AND 3 BAR METAL RAIL WILL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE DEPARTMENT.

ASPHALT WEARING SURFACE ON APPROACH SLABS IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

TOTAL BILL OF MATERIAL

BRIDGE NO.	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL	POLLUTION CONTROL	TWO BAR METAL RAIL	1'-2" X 3'-7" CONCRETE PARAPET	PAINTING CONTAINMENT FOR BRIDGE #500051	CLEANING AND PAINTING EXISTING WEATHERING STEEL FOR BRIDGE #500051	POURABLE SILICONE JOINT SEALANT	POLYESTER POLYMER CONCRETE MATERIALS	EPOXY POLYMER CONCRETE MATERIALS (ALTERNATE)	EPOXY COATING	PLACING & FINISHING PC OVERLAY	SCARIFYING BRIDGE DECK	SHOTBLASTING BRIDGE DECK
	LUMP SUM	LUMP SUM	SQ. FT.	CU. YDS.	LBS.	LUMP SUM	LIN. FT.	LIN. FT.	LUMP SUM	LUMP SUM	LIN. FT.	CU. YDS.	CU. YDS.	SQ. FT.	SQ. YDS.	SQ. YDS.	SQ. YDS.
500051	LUMP SUM	LUMP SUM	9,662	205.7	9,487	LUMP SUM	437.96	453.67	LUMP SUM	LUMP SUM	149.47	32.0	32.0	464	1,156	1,156	1,192

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 25+31.59 -Y18-
1342+73.68 -L-
SHEET 2 OF 2

DocuSigned by: Todd M. Garrison 61EAF7523943466...
5/17/2021

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE NO. 500051
ON NC 50 OVER I-95

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

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

DRAWN BY : M. D. MAYHEW DATE : 5-12-21
CHECKED BY : T. M. GARRISON DATE : 5-12-21

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE											SERVICE II LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	MOMENT					
								DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	0.64	--	1.75	0.468	0.64	B	9	0.00	0.934	0.73	B	8	18.25	1.30	0.468	1.24	B	9	0.00	1
		HL-93 (OPERATING)	N/A		0.83	--	1.35	0.468	0.83	B	9	0.00	0.934	0.94	B	8	18.25	1.00	0.468	1.61	B	9	0.00	1
		HS-20 (INVENTORY)	36.000	2	1.06	38.16	1.75	0.468	1.07	B	9	0.00	0.934	1.06	B	8	18.25	1.30	0.468	1.99	B	9	72.98	1
		HS-20 (OPERATING)	36.000		1.37	49.32	1.35	0.468	1.39	B	9	0.00	0.934	1.37	B	8	18.25	1.00	0.468	2.59	B	9	72.98	1
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.91	25.79	1.40	0.468	1.91	B	9	0.00	0.467	2.74	B	9	18.25	1.30	0.468	2.95	B	9	0.00	1
		SNGARBS2	20.000		1.70	34.00	1.40	0.468	1.70	B	9	0.00	0.467	2.29	B	9	18.25	1.30	0.468	2.63	B	9	0.00	1
		SNAGRIS2	22.000		1.65	36.30	1.40	0.468	1.65	B	9	0.00	0.934	2.12	B	8	18.25	1.30	0.468	2.55	B	9	0.00	1
		SNCOTTS3	27.250		1.49	40.60	1.40	0.468	1.49	B	9	0.00	0.934	1.67	B	8	18.25	1.30	0.468	2.23	B	9	72.98	1
		SNAGGRS4	34.925		1.33	46.45	1.40	0.468	1.33	B	9	0.00	0.934	1.33	B	8	18.25	1.30	0.468	1.95	B	9	72.98	1
		SNS5A	35.550		1.32	46.93	1.40	0.468	1.32	B	9	0.00	0.934	1.33	B	8	18.25	1.30	0.468	1.93	B	9	72.98	1
		SNS6A	39.950		1.19	47.54	1.40	0.468	1.25	B	9	0.00	0.934	1.19	B	8	18.25	1.30	0.709	1.78	B	8	72.98	1
		SNS7B	42.000		1.15	48.30	1.40	0.468	1.21	B	9	0.00	0.934	1.15	B	8	18.25	1.30	0.709	1.70	B	8	72.98	1
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.37	45.21	1.40	0.468	1.37	B	9	0.00	0.934	1.43	B	8	18.25	1.30	0.468	2.06	B	9	72.98	1
		TNT4A	33.075		1.37	45.31	1.40	0.468	1.37	B	9	0.00	0.934	1.42	B	8	18.25	1.30	0.468	2.05	B	9	72.98	1
		TNT6A	41.600		1.19	49.50	1.40	0.468	1.22	B	9	0.00	0.934	1.19	B	8	18.25	1.30	0.709	1.76	B	8	72.98	1
		TNT7A	42.000		1.17	49.14	1.40	0.468	1.22	B	9	0.00	0.934	1.17	B	8	18.25	1.30	0.709	1.75	B	8	72.98	1
		TNT7B	42.000		1.14	47.88	1.40	0.468	1.22	B	9	0.00	0.934	1.14	B	8	18.25	1.30	0.709	1.78	B	8	72.98	1
		TNAGRIT4	43.000		1.11	47.73	1.40	0.468	1.20	B	9	0.00	0.934	1.11	B	8	18.25	1.30	0.709	1.72	B	8	72.98	1
		TNAGT5A	45.000		1.08	48.60	1.40	0.468	1.17	B	9	0.00	0.934	1.08	B	8	18.25	1.30	0.709	1.64	B	8	72.98	1
		TNAGT5B	45.000	3	1.06	47.70	1.40	0.468	1.17	B	9	0.00	0.934	1.06	B	8	18.25	1.30	0.709	1.62	B	8	72.98	1
FATIGUE		HL-93 (INVENTORY)	γ_{LL}= 0.80	--	1.45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE II	1.00	1.00

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE II LIMIT STATES.

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1. DISTANCE FROM LEFT END OF SPAN IS GIVEN WITH RESPECT TO THE CENTERLINE OF BEARING AND IS MEASURED ALONG THE CONTROLLING GIRDER.
2. A FATIGUE LIVE LOAD FACTOR OF 0.80 WAS USED TO BE CONSISTENT WITH THE LATEST EDITION OF THE MANUAL FOR BRIDGE EVALUATION.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) **

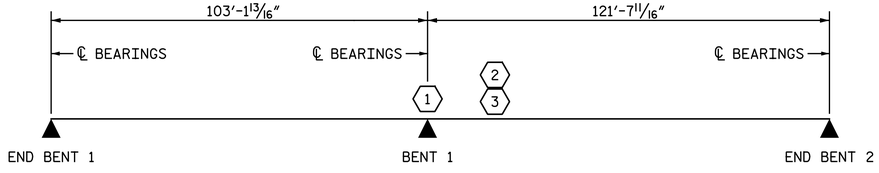
(2) DESIGN LOAD RATING (HS-20) **

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

GIRDER LOCATION PROVIDED UTILIZES GIRDER NUMBERS, WHERE GIRDER 1 IS LEFT EXTERIOR GIRDER LOOKING AHEAD STATION.



LRFR SUMMARY

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 25+31.59 -Y18-

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 515AF7523943466...

4/27/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

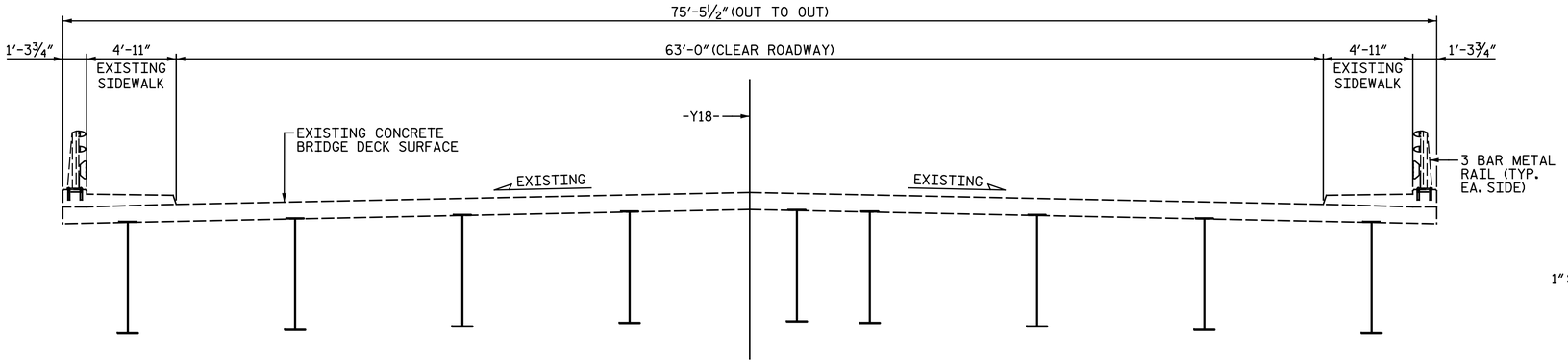
LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : N. B. SPEAKS	DATE : 1-29-21
CHECKED BY : T. M. GARRISON	DATE : 2-1-21
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

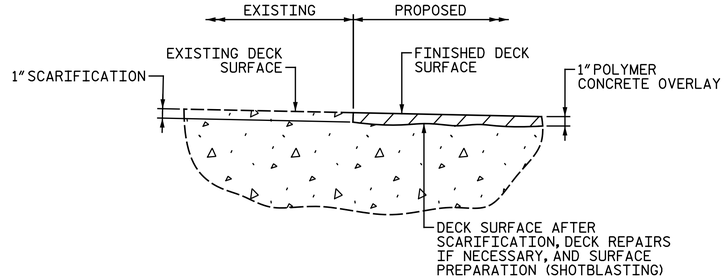
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

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

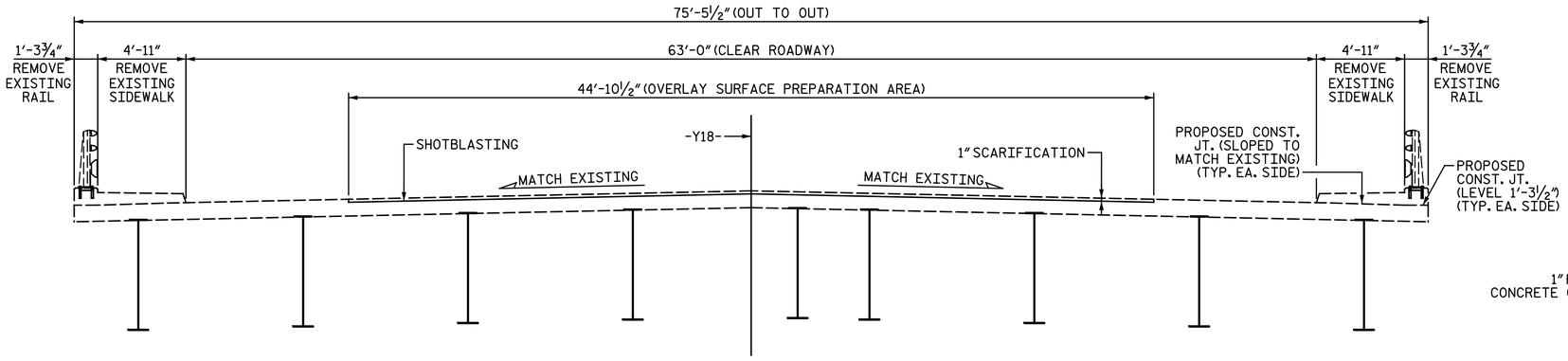
STD. NO. LRFR3



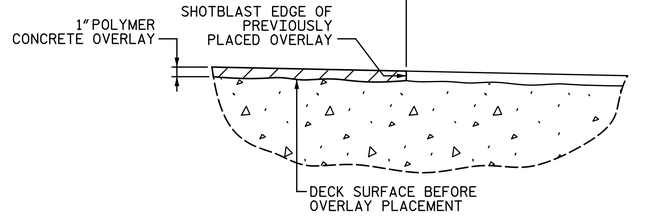
TYPICAL SECTION
(EXISTING)



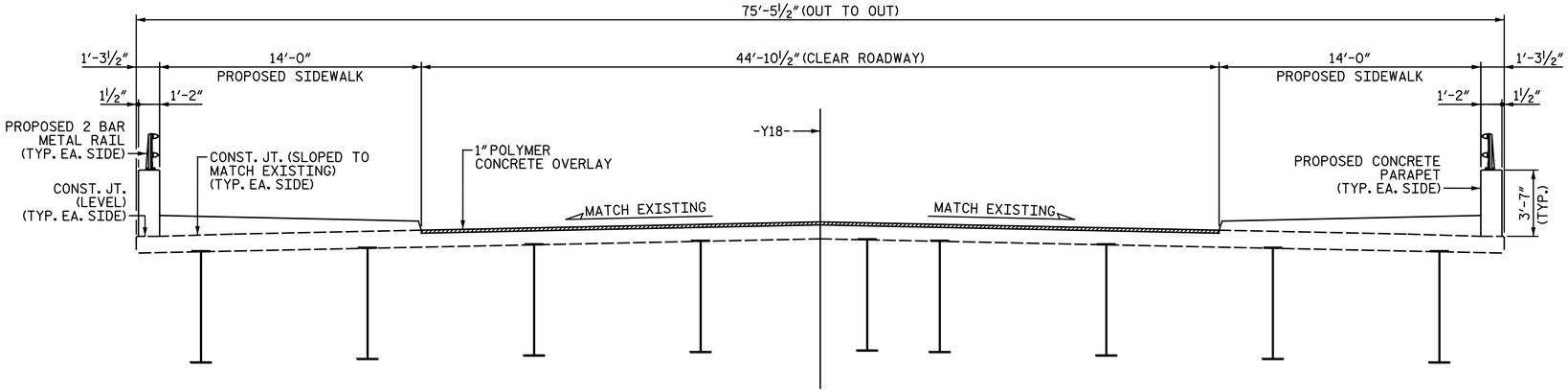
DETAIL FOR POLYMER CONCRETE OVERLAY



TYPICAL SECTION
(DECK PREPARATION AND EXISTING RAIL AND SIDEWALK REMOVAL)



STAGED POLYMER CONCRETE OVERLAY JOINT
(AS NEEDED)



TYPICAL SECTION
(PROPOSED)

NOTES:

SEE TRANSPORTATION MANAGEMENT PLANS FOR LANE WIDTHS, SEQUENCING AND OTHER TRAFFIC CONTROL MEASURES FOR STAGING OF OVERLAY SURFACE PREPARATION, POLYMER CONCRETE PLACEMENT, EXISTING RAIL AND SIDEWALK REMOVAL, AND PROPOSED RAIL AND SIDEWALK CONSTRUCTION.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 25+31.59 -Y18-

DocuSigned by: Todd M. Garrison 61EAF7523943466...

5/17/2021

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION AND SURFACE PREPARATION DETAILS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

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

DRAWN BY : M. D. MAYHEW DATE : 5-12-21
CHECKED BY : T. M. GARRISON DATE : 5-12-21

APPROXIMATE AREA OF CLASS II SURFACE PREPARATION, NOTED BY THE ENGINEER IF DEEMED NECESSARY.

THE CONTRACTOR AND ENGINEER SHALL INSPECT THE DECK SURFACE AFTER SCARIFICATION FOR POTENTIAL CLASS II REPAIRS.

NOTES:

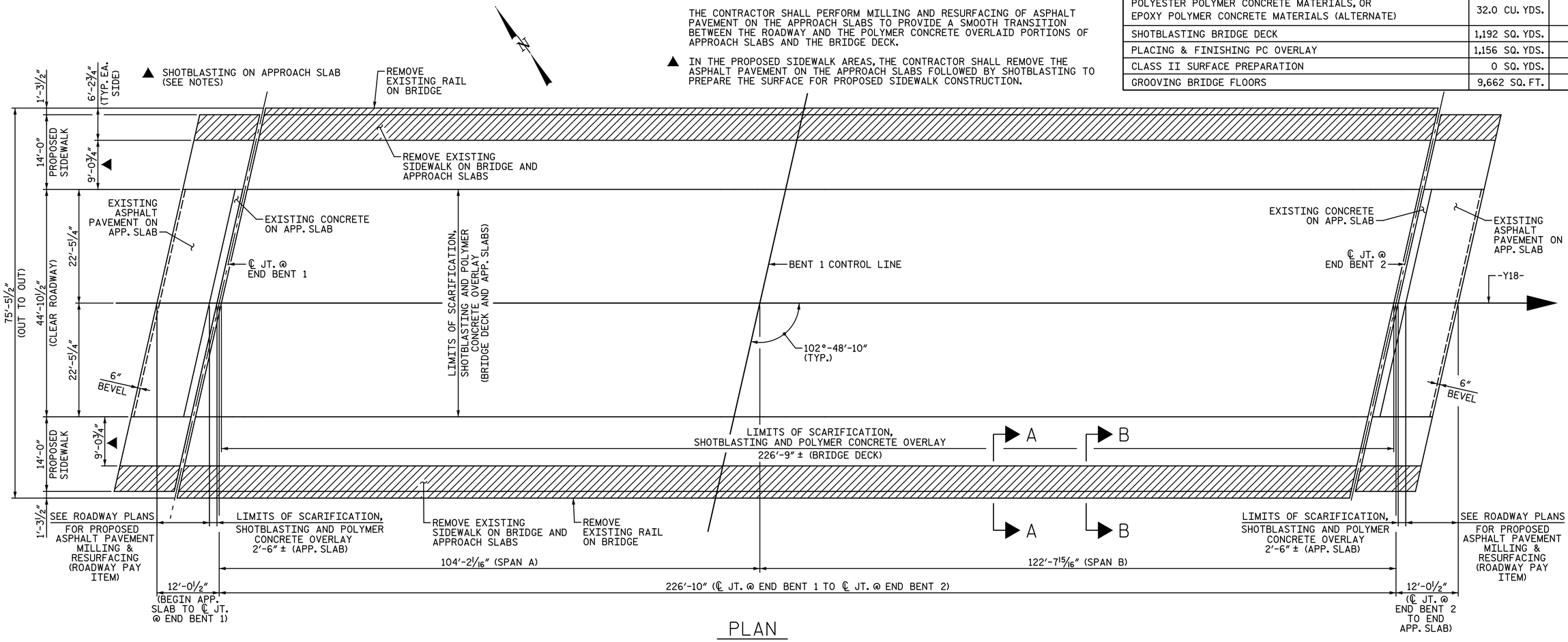
REPAIR LOCATIONS AND ESTIMATED QUANTITIES ARE GIVEN WITH THE BEST INFORMATION AVAILABLE. IF ADDITIONAL REPAIRS NOT SHOWN IN DRAWINGS ARE DEEMED NECESSARY BY ENGINEER, THE ENGINEER WILL NOTE ON THE DRAWINGS THE APPROXIMATE LOCATIONS AND DESCRIPTION OF THE REPAIRS AND ADJUST THE ACTUAL QUANTITIES ENTERED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

THE CONTRACTOR SHALL PERFORM MILLING AND RESURFACING OF ASPHALT PAVEMENT ON THE APPROACH SLABS TO PROVIDE A SMOOTH TRANSITION BETWEEN THE ROADWAY AND THE POLYMER CONCRETE OVERLAID PORTIONS OF APPROACH SLABS AND THE BRIDGE DECK.

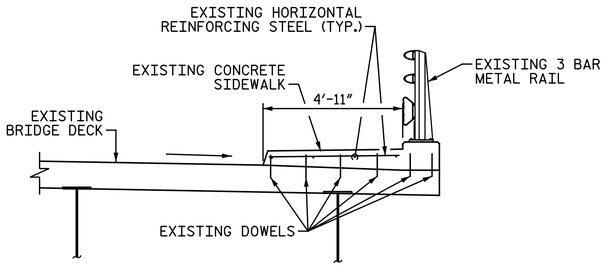
▲ IN THE PROPOSED SIDEWALK AREAS, THE CONTRACTOR SHALL REMOVE THE ASPHALT PAVEMENT ON THE APPROACH SLABS FOLLOWED BY SHOTBLASTING TO PREPARE THE SURFACE FOR PROPOSED SIDEWALK CONSTRUCTION.

SUMMARY OF QUANTITIES FOR BRIDGE DECK AND APPROACH SLABS

OPERATION	ESTIMATE	ACTUAL
SCARIFYING BRIDGE DECK	1,156 SQ. YDS.	SQ. YDS.
POLYESTER POLYMER CONCRETE MATERIALS, OR EPOXY POLYMER CONCRETE MATERIALS (ALTERNATE)	32.0 CU. YDS.	CU. YDS.
SHOTBLASTING BRIDGE DECK	1,192 SQ. YDS.	SQ. YDS.
PLACING & FINISHING PC OVERLAY	1,156 SQ. YDS.	SQ. YDS.
CLASS II SURFACE PREPARATION	0 SQ. YDS.	SQ. YDS.
GROOVING BRIDGE FLOORS	9,662 SQ. FT.	SQ. FT.

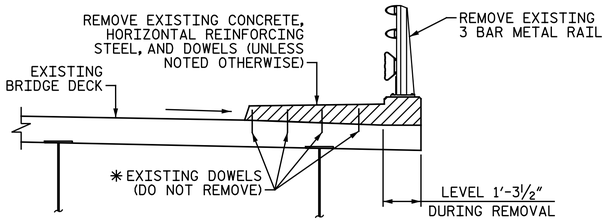


PLAN



SECTION A-A
EXISTING RAIL & SIDEWALK

RIGHT SIDEWALK SHOWN, LEFT SIDEWALK SIMILAR. SIDEWALK ON BRIDGE SHOWN, SIDEWALKS ON APPROACH SLABS SIMILAR.



SECTION B-B
EXISTING RAIL & SIDEWALK REMOVAL

RIGHT SIDEWALK SHOWN, LEFT SIDEWALK SIMILAR. SIDEWALK ON BRIDGE SHOWN, SIDEWALKS ON APPROACH SLABS SIMILAR.

✱ IF EXISTING DOWELS ARE DAMAGED DURING REMOVAL OF EXISTING SIDEWALK, THE CONTRACTOR SHALL REPLACE DAMAGED DOWELS WITH ADHESIVELY ANCHORED DOWELS AT NO ADDITIONAL COST TO THE DEPARTMENT. THE REPLACEMENT DOWELS SHALL BE INSTALLED WITHIN PRACTICAL VICINITY OF THE DAMAGED DOWELS AND SHALL PROJECT 5" ABOVE THE TOP OF THE DECK.

DocuSigned by: Tom M. Garrison 61EAF7523943466...
5/17/2021

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER JOHN M. GARRISON

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 25+31.59 -Y18-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SURFACE PREPARATION AND EXISTING RAIL & SIDEWALK REMOVAL

DRAWN BY : C. E. MAYHEW DATE : 5-12-21
CHECKED BY : T. M. GARRISON DATE : 5-12-21

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

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

NOTES:

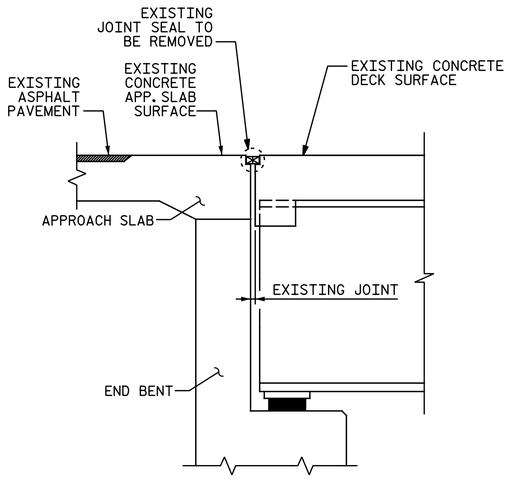
UNLESS NOTED OTHERWISE RETAIN ALL EXISTING REINFORCING STEEL. CLEAN AND REPAIR AS NEEDED.

SILICONE JOINT SEALANT AND BACKER ROD SHALL BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATION.

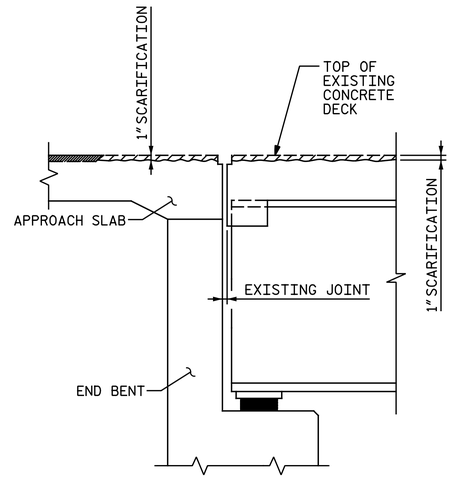
THE INSTALLED SILICONE JOINT SEALANT SHALL BE WATERTIGHT.

FOR POURABLE SILICONE JOINT SEALANT, SEE SPECIAL PROVISIONS.

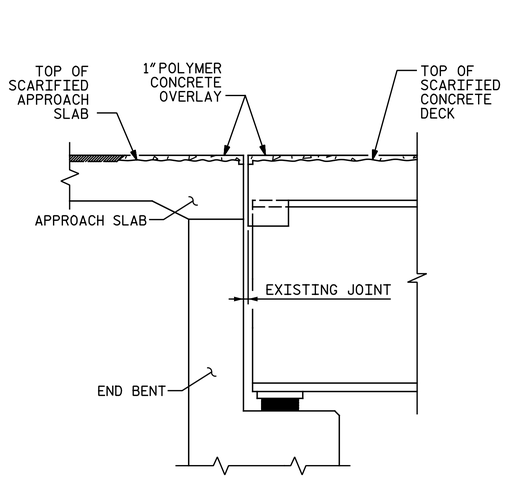
THE CONTRACTOR SHALL NOT BE PERMITTED TO FORM THE JOINTS IN LIEU OF SAWING THE JOINTS.



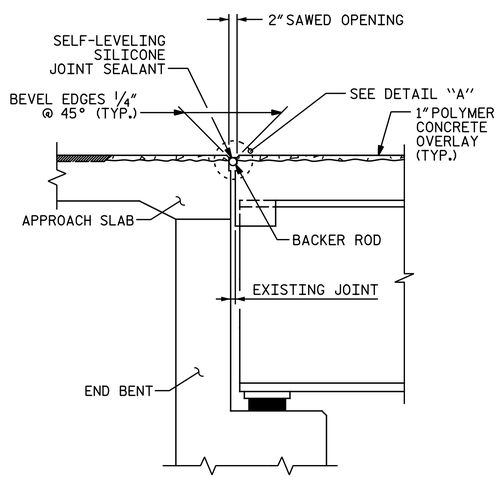
EXISTING JOINT



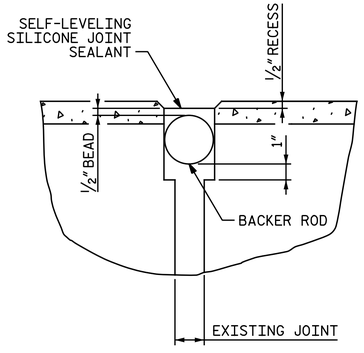
MINIMUM EXISTING JOINT REMOVAL & SCARIFICATION



PROPOSED JOINT PRE-SAWED & POLYMER CONCRETE OVERLAY



PROPOSED JOINT WITH SAWED DIMENSIONS



DETAIL "A"

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 25+31.59 -Y18-

DocuSigned by: Todd M. Garrison 61EAF7523043466...

5/17/2021

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

JOINT REPAIR DETAILS

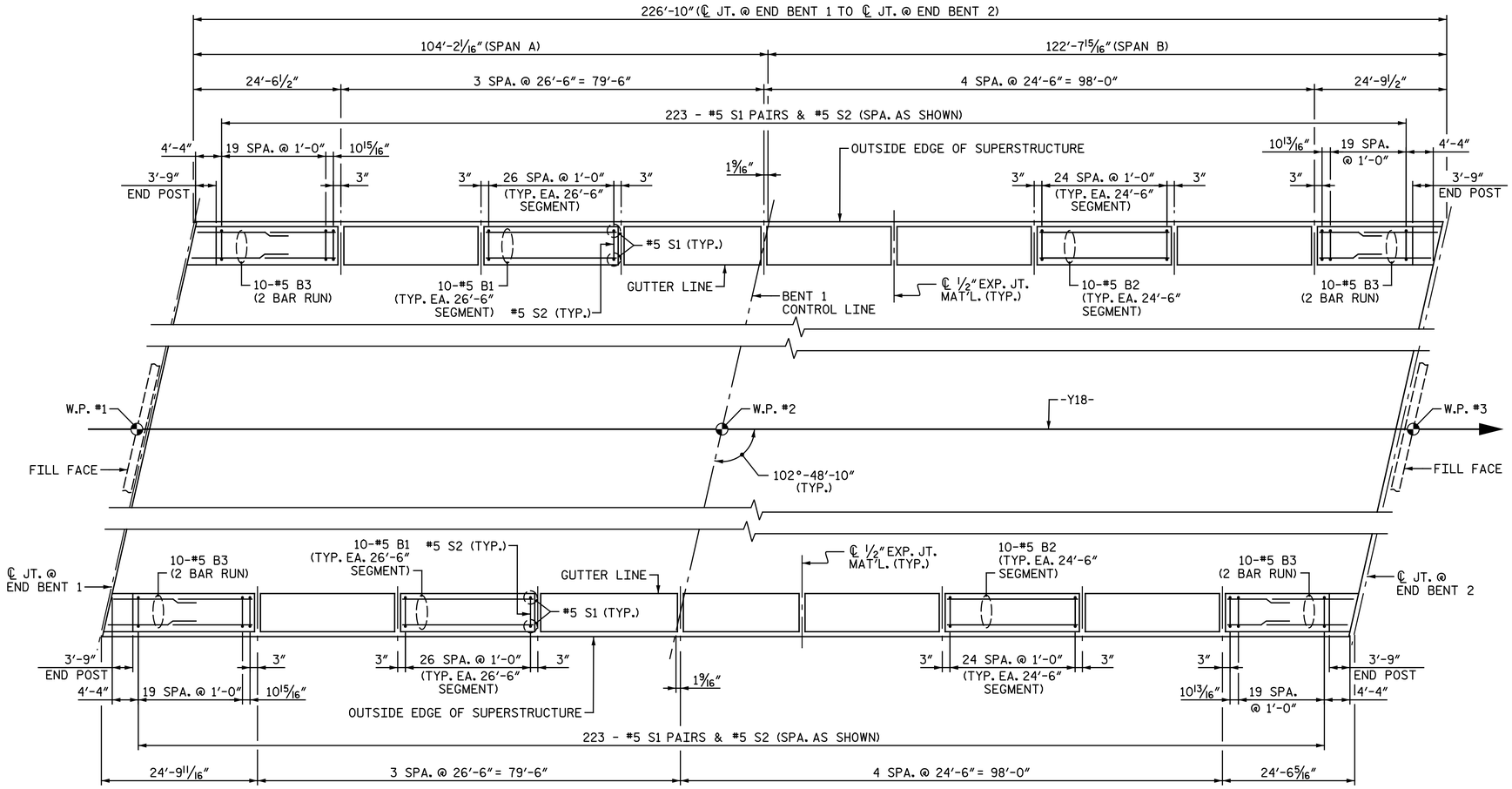
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-6
1			3			TOTAL SHEETS
2			4			14

DRAWN BY : N. B. SPEAKS DATE : 5-12-21
CHECKED BY : T. M. GARRISON DATE : 5-12-21



PLAN OF CONCRETE PARAPET

SEE "PARAPET AND END POST FOR TWO BAR RAIL" DETAILS ON "CONCRETE PARAPET DETAILS" SHEET 2 OF 2 FOR REINFORCING STEEL IN END POSTS.

SIDEWALKS NOT SHOWN FOR CLARITY.

SPLICE LENGTH	
BAR SIZE	EPOXY COATED
#5	3′-5″

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 25+31.59 -Y18-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison 61EAF7523943466...
4/27/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

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

DRAWN BY : N. B. SPEAKS DATE : 3-15-21
CHECKED BY : T. M. GARRISON DATE : 3-15-21

NOTES

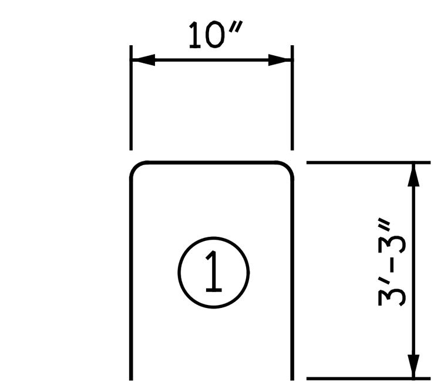
ALL REINFORCING STEEL IN PARAPETS AND END POSTS SHALL BE EPOXY COATED.

FOR DETAILS OF CONCRETE INSERTS IN END POSTS, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND END POSTS AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE #5 S1 AND S3 BARS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM. THE YIELD LOAD FOR THE #5 BARS IS 18.6 KIPS. LEVEL TWO FIELD TESTING IS REQUIRED.

BAR TYPES



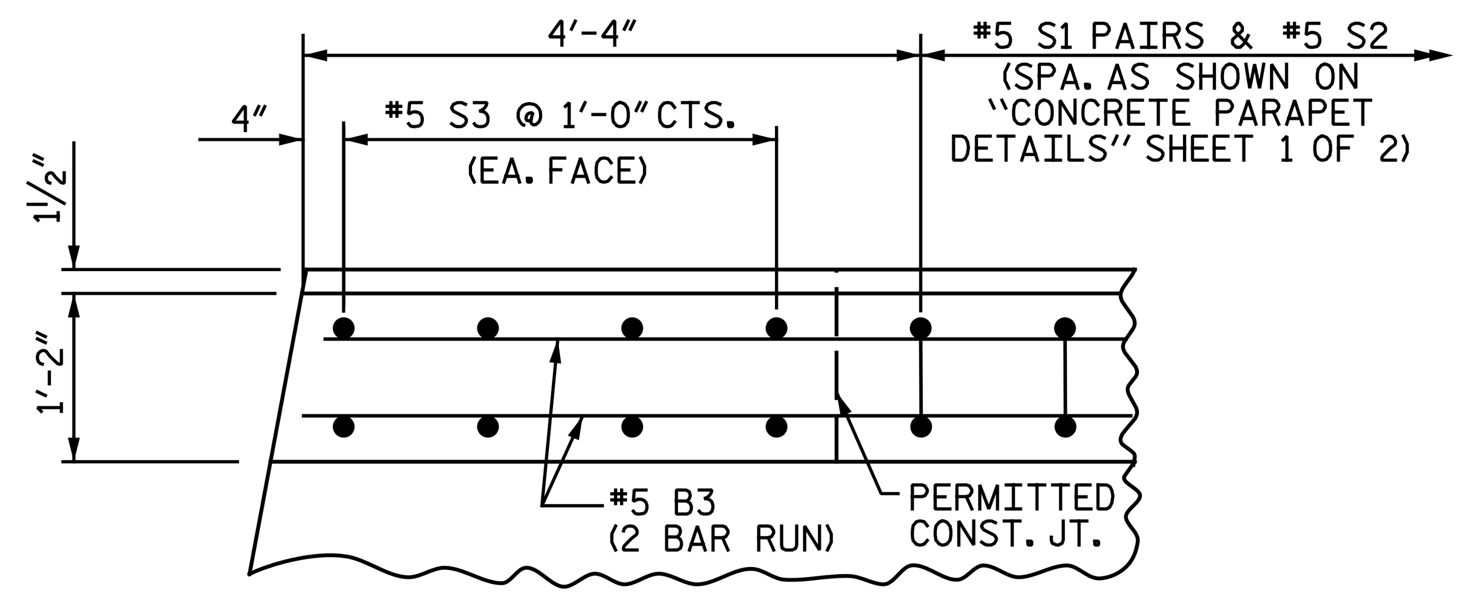
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

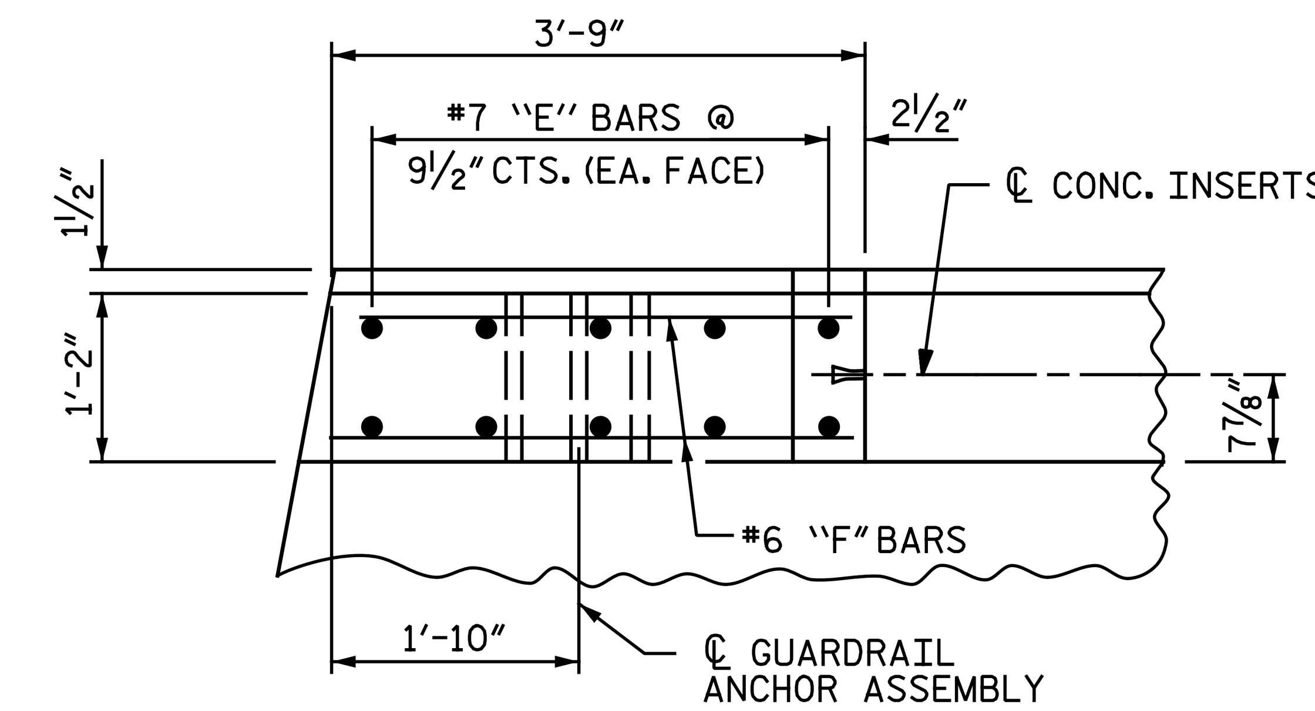
PROPOSED CONCRETE PARAPETS AND END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	60	#5	STR.	26' - 1"	1,632
*B2	80	#5	STR.	24' - 1"	2,010
*B3	80	#5	STR.	13' - 11"	1,161
*E1	8	#7	STR.	3' - 8"	60
*E2	8	#7	STR.	4' - 1"	67
*E3	8	#7	STR.	4' - 7"	75
*E4	8	#7	STR.	5' - 1"	83
*E5	8	#7	STR.	5' - 5"	89
*F1	8	#6	STR.	1' - 8"	20
*F2	4	#6	STR.	3' - 0"	18
*F3	4	#6	STR.	3' - 9"	23
*F4	4	#6	STR.	3' - 2"	19
*F5	4	#6	STR.	3' - 11"	24
*S1	892	#5	STR.	3' - 6"	3,256
*S2	446	#5	1	7' - 4"	3,411
*S3	32	#5	STR.	3' - 11"	131

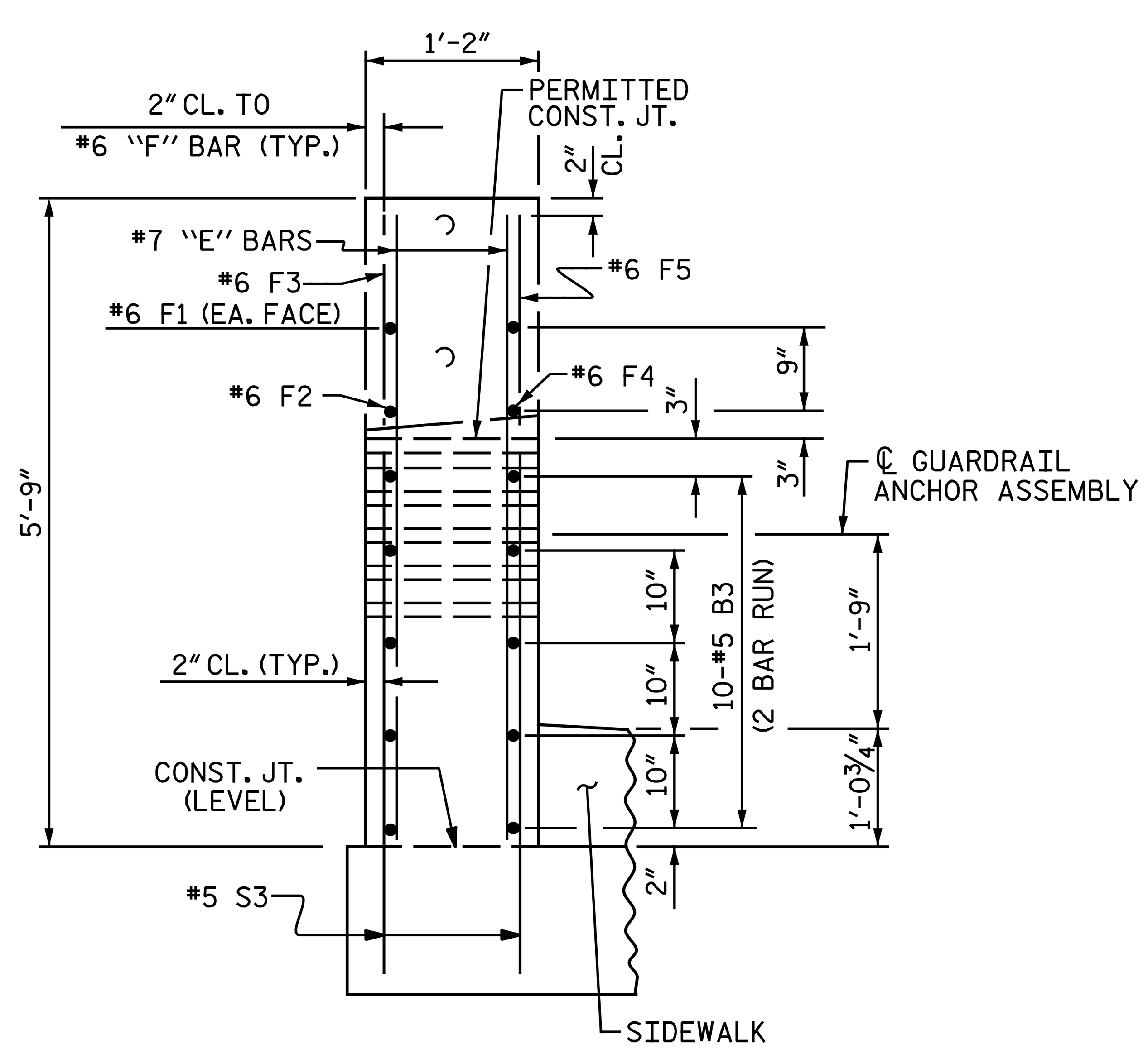
*EPOXY COATED REINFORCING STEEL	LBS.	12,079
CLASS AA CONCRETE	CU. YDS.	71.0
1'-2" x 3'-7" CONCRETE PARAPET	LIN. FT.	453.67



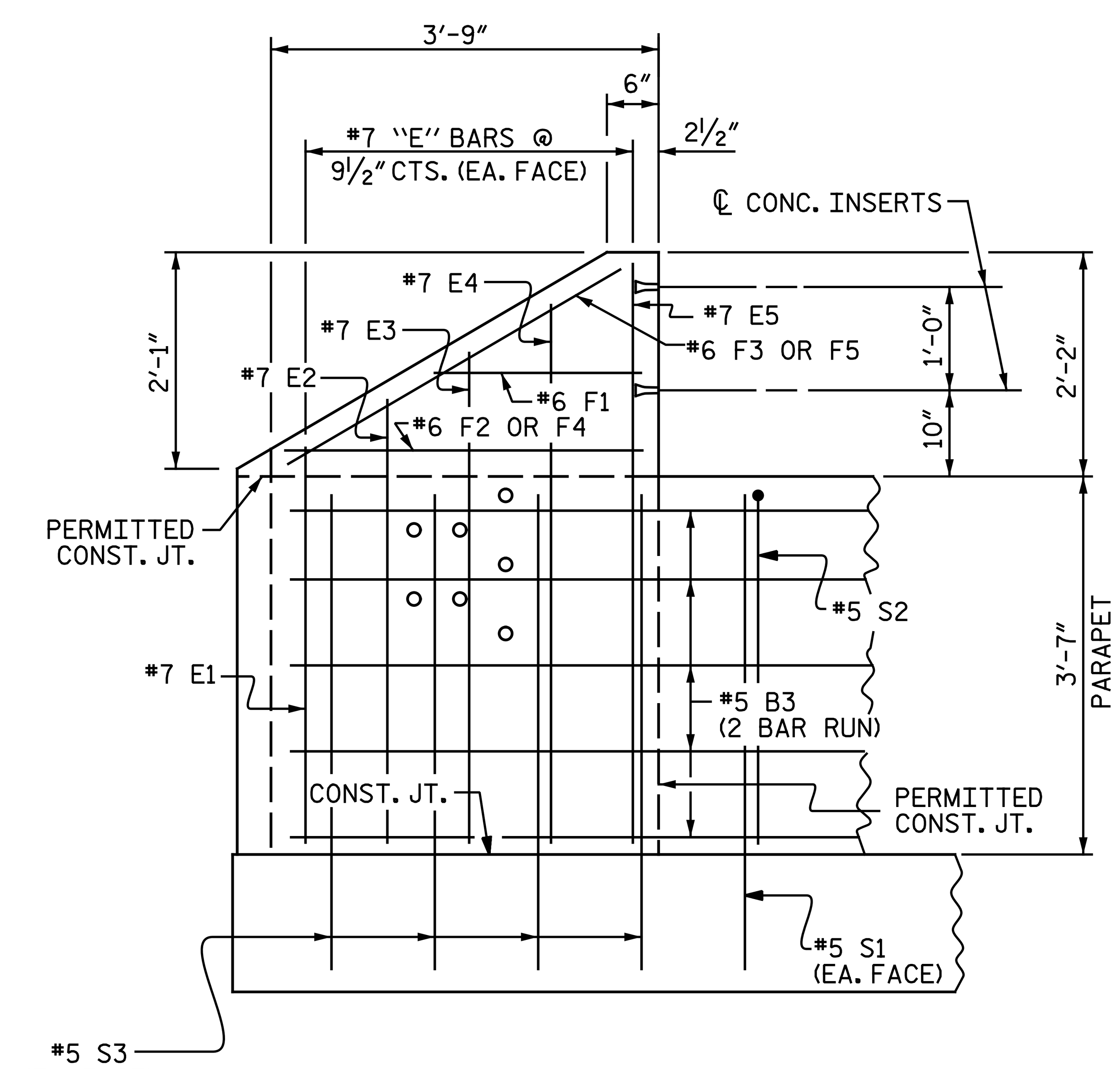
PLAN OF PARAPET



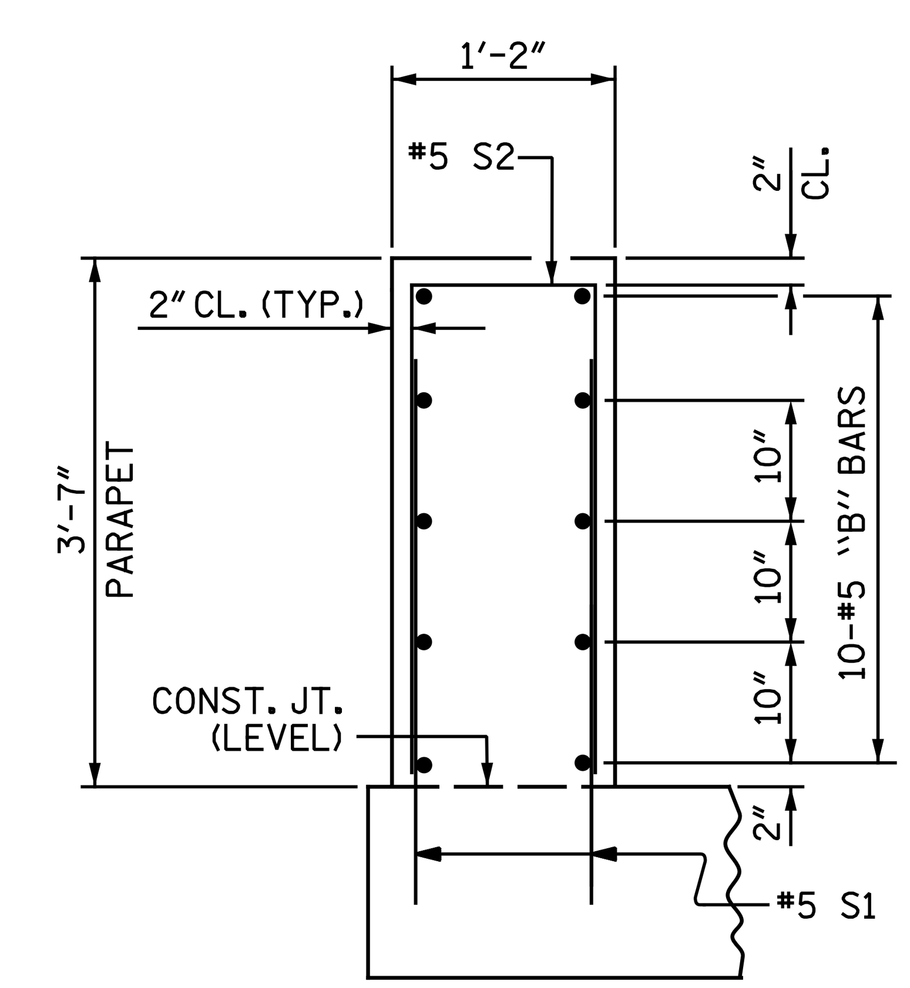
PLAN OF END POST



END VIEW



ELEVATION



SECTION THRU PARAPET

REINFORCING STEEL IN DECK NOT SHOWN FOR CLARITY.
SIDEWALK NOT SHOWN FOR CLARITY.

PARAPET AND END POST FOR TWO BAR RAIL

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 25+31.59 -Y18-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 033139 TODD M. GARRISON

DocuSigned by:
61EAF7523943466
4/27/2021

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONCRETE PARAPET DETAILS

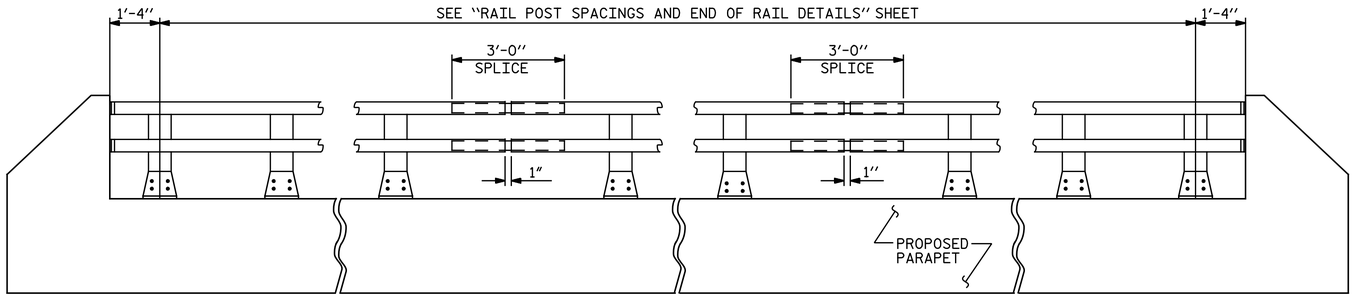
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

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

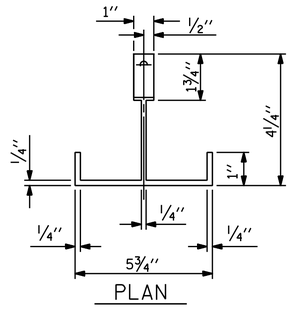
SHEET NO. S4-8
TOTAL SHEETS 14

DRAWN BY : N. B. SPEAKS DATE : 4-29-20
CHECKED BY : T. M. GARRISON DATE : 2-1-21

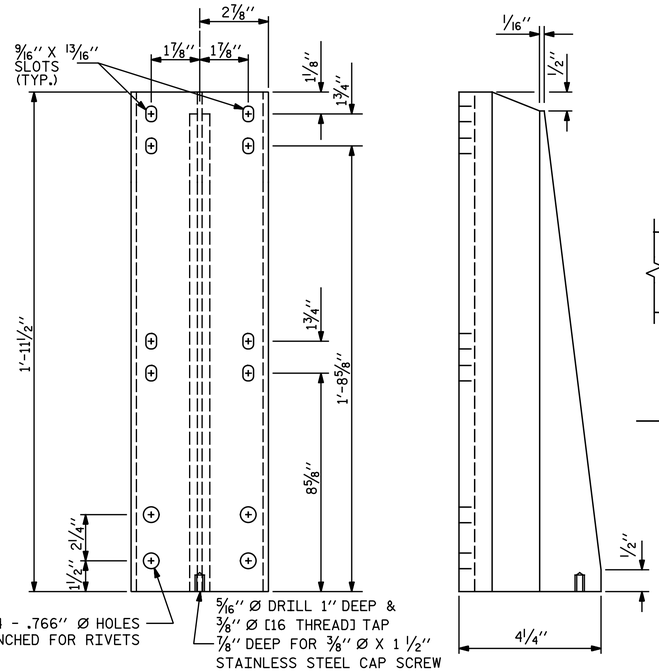


ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET.

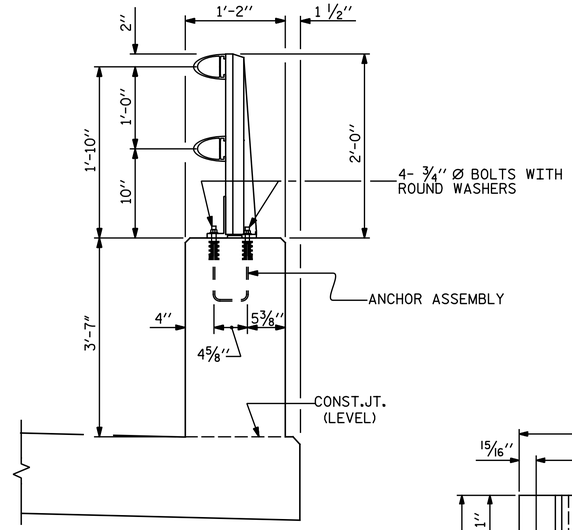


PLAN

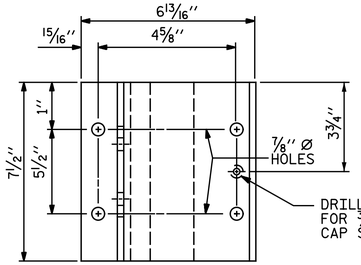


FRONT ELEVATION SIDE ELEVATION

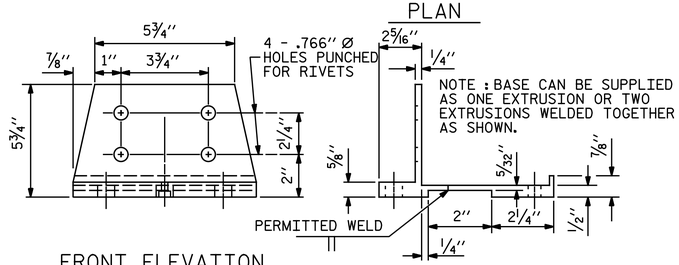
DETAILS OF POST



SECTION THRU PARAPET AND RAIL



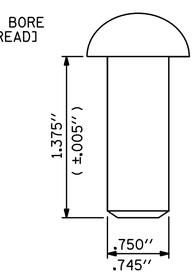
PLAN



FRONT ELEVATION SIDE ELEVATION

POST BASE DETAILS

PAY LENGTH = 437.96 LIN. FT.



RIVET DETAIL

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 25+31.59 -Y18-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

ASSEMBLED BY : C. E. MAYHEW	DATE : 5-8-20
CHECKED BY : T. M. GARRISON	DATE : 2-1-21
DRAWN BY : EEM 6/94	REV. 10/1/11 MAA/GM
CHECKED BY : RGW 6/94	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

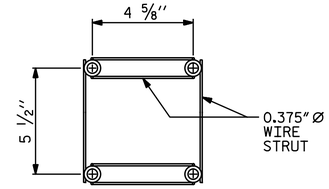
DocuSigned by: Todd M. Garrison 61EAF7823943486...
4/27/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

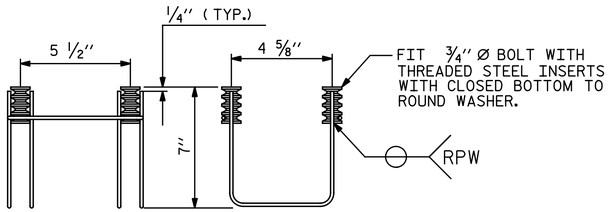
Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

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

STD. NO. BMR3



PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(76 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 2 1/2'' GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

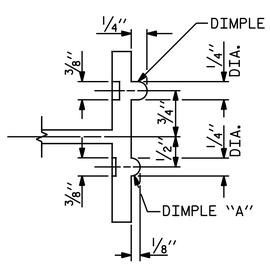
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

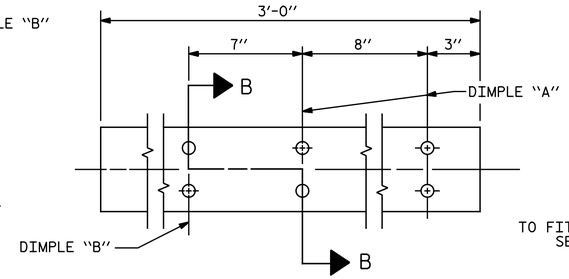
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4'' Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

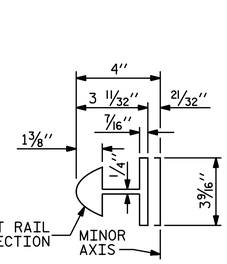
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



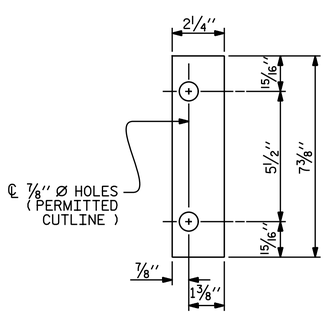
SECTION B - B



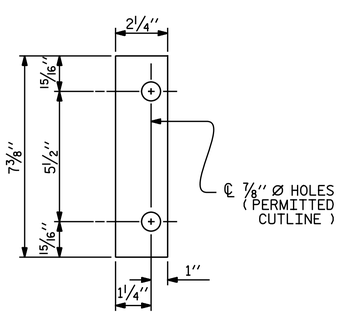
EXPANSION BAR DETAILS



BAR SECTION



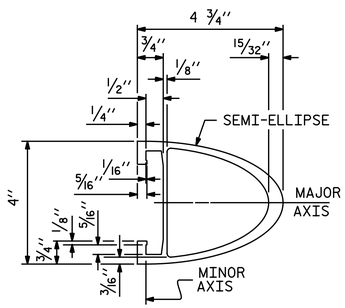
FRONT PLATE



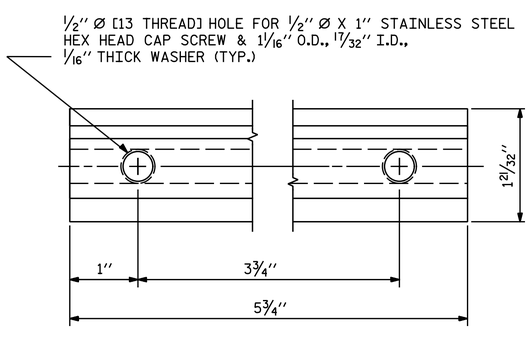
REAR PLATE

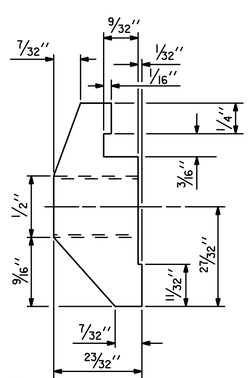
SHIM DETAILS

NOTE :
SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



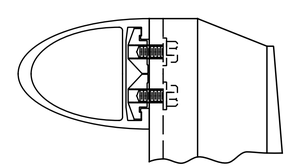
RAIL SECTION



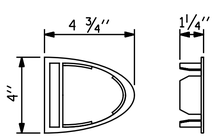


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

DocuSigned by:
Todd M. Garrison
61EAF7523943466...
4/27/2021

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 25+31.59 -Y18-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

ASSEMBLED BY : M. D. MAYHEW	DATE : 4-13-20		
CHECKED BY : T. M. GARRISON	DATE : 2-1-21		
DRAWN BY : EEM 6/94	REV. 5/1/06R	KMM/GM	
CHECKED BY : RGW 6/94	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

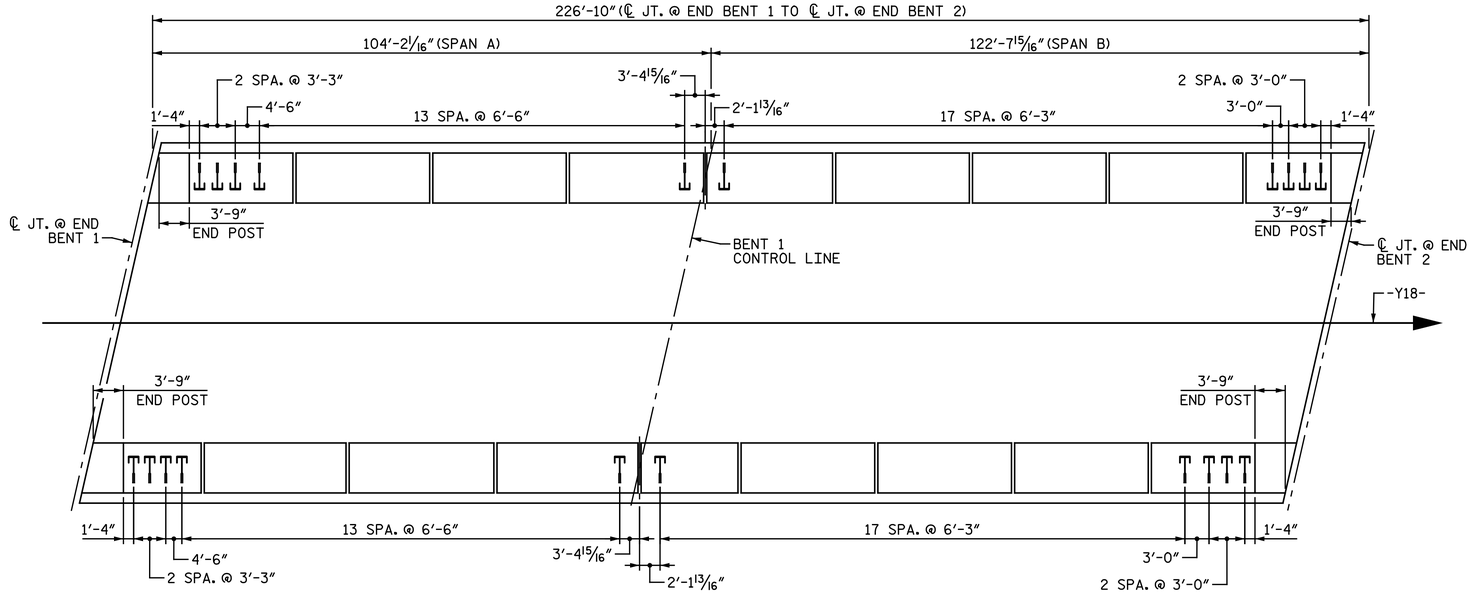
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-10
1			3			TOTAL SHEETS
2			4			14

STD. NO. BMR4



PLAN OF RAIL POST SPACINGS

SIDEWALKS NOT SHOWN FOR CLARITY.

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½''.

B. 1 - ¾'' Ø X 1⅝'' BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾'' Ø X 1⅝'' GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½'' PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾'' STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾''Ø X 1⅝'' BOLT WITH 2'' O.D. WASHER IN PLACE. THE ¾''Ø X 1⅝'' BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

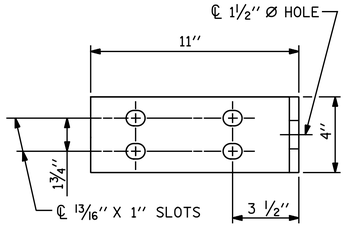
E. ½'' Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

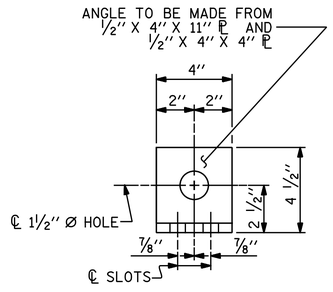
THE ¾'' STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾'' STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½'' PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

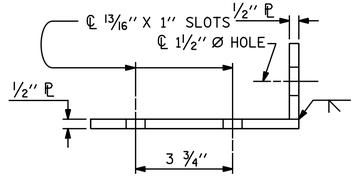
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾'' Ø X 1⅝'' BOLT WITH WASHER SHALL BE REPLACED WITH A ¾''Ø X 6½'' BOLT AND 2'' O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾'' Ø X 1⅝'' BOLT SHALL APPLY TO THE ¾''Ø X 6 ½'' BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



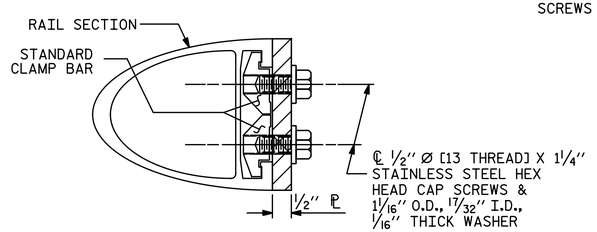
ELEVATION



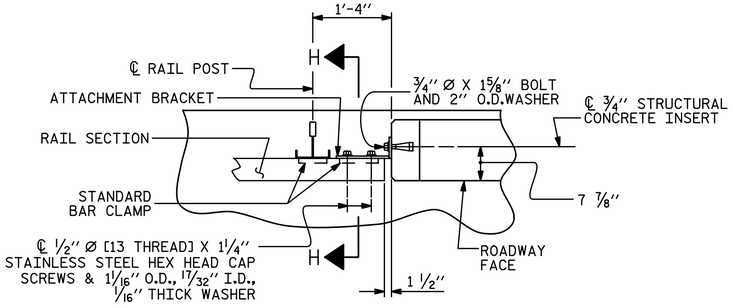
END VIEW



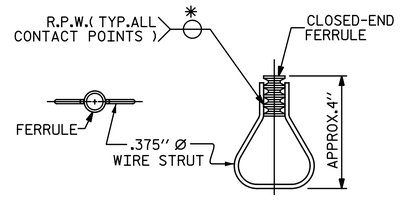
TOP VIEW



SECTION H-H



PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

*EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. I-5986B

JOHNSTON COUNTY

STATION: 25+31.59 -Y18-

DETAILS FOR ATTACHING METAL RAIL TO END POST

ASSEMBLED BY : C. E. MAYHEW	DATE : 4-13-20		
CHECKED BY : T. M. GARRISON	DATE : 2-1-21		
DRAWN BY : FCJ 1/88	REV. 5/1/06	TLA/GM	
CHECKED BY : CRK 3/89	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DocuSigned by: Todd M. Garrison
4/27/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL

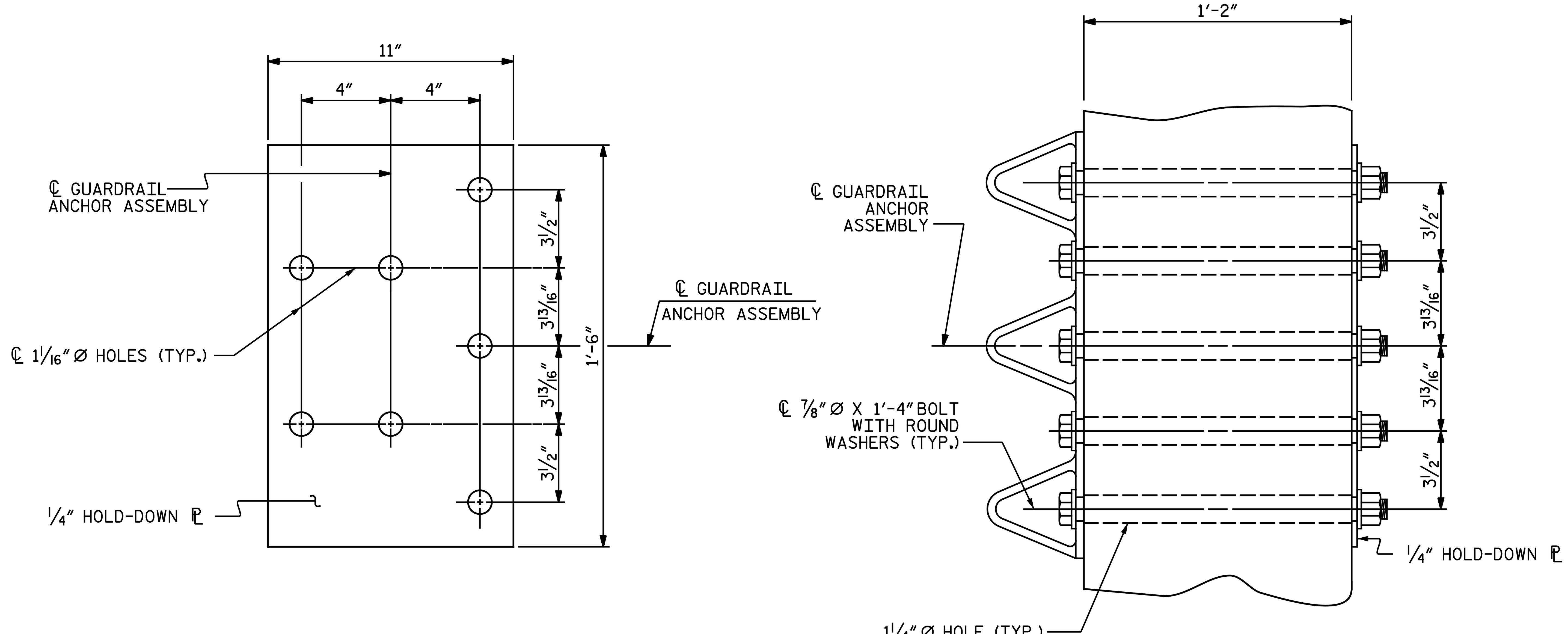
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-11
1			3			TOTAL SHEETS
2			4			14

STD. NO. BMR2



PLAN

END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼″ HOLD DOWN PLATE AND 7 - ⅞″ Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ⅞″ Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

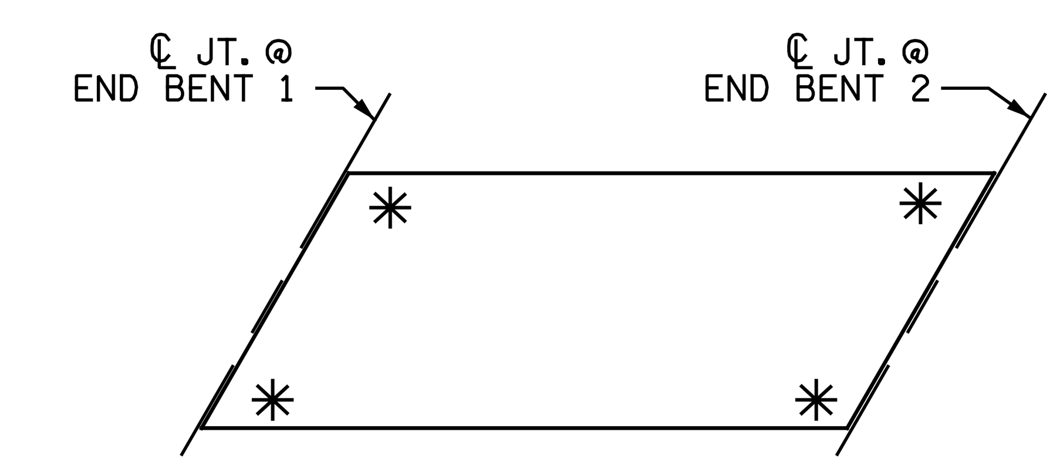
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

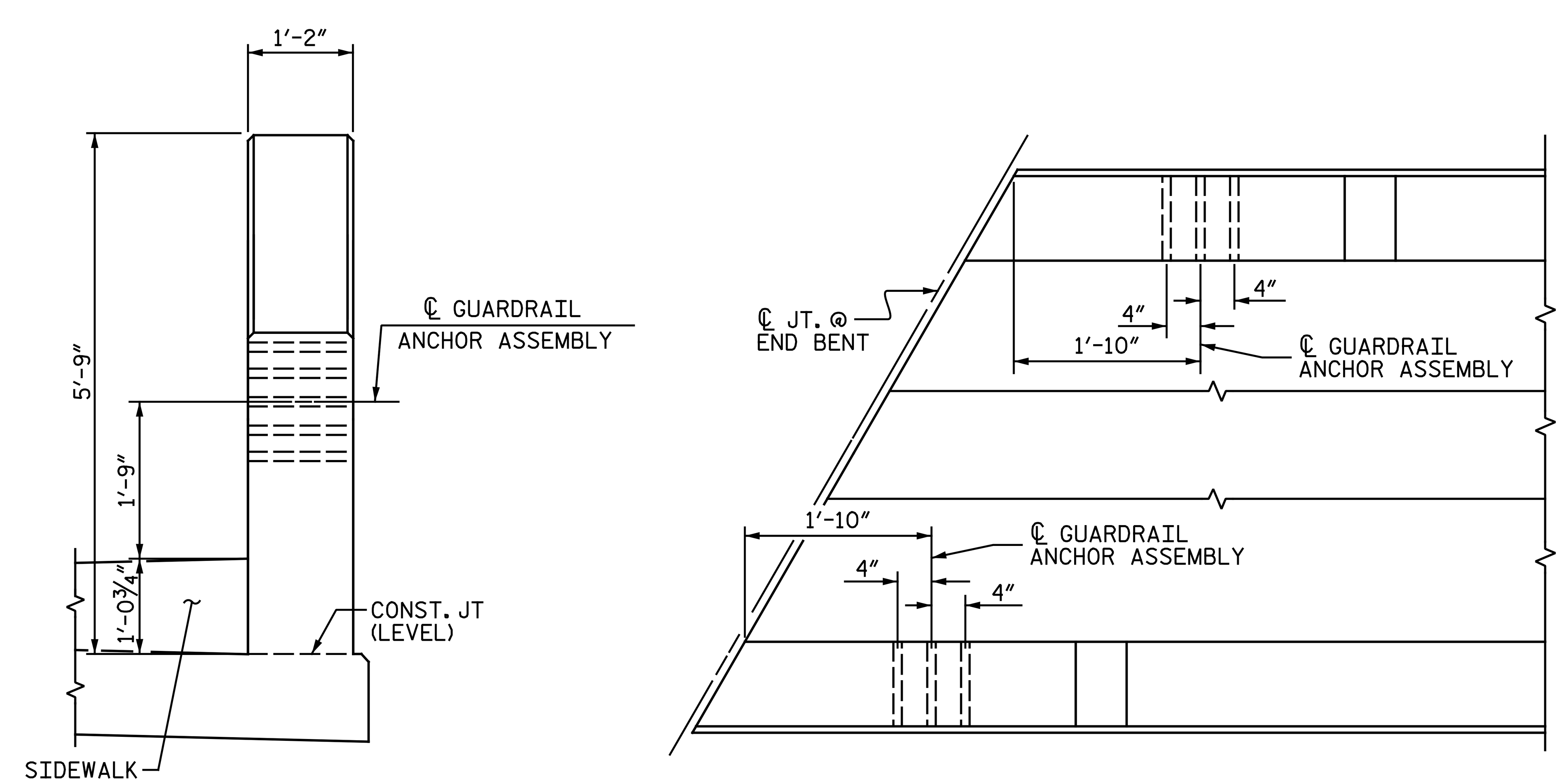
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 1¼″ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



SKETCH SHOWING POINTS OF ATTACHMENT

✱ LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
RIGHT END POST SHOWN, LEFT END POST SIMILAR.

PLAN
END BENT 1 SHOWN, END BENT 2 SIMILAR.

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 25+31.59 -Y18-

SEAL 033139 NORTH CAROLINA PROFESSIONAL ENGINEER TODD M. GARRISON
DocuSigned by: 61EAF7523943466
4/27/2021

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No.: F-1084

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

ASSEMBLED BY : C. E. MAYHEW	DATE : 4-13-20
CHECKED BY : T. M. GARRISON	DATE : 2-1-21
DRAWN BY : MAA 5/10	REV. 1/15 MAA/TMG
CHECKED BY : GM 5/10	REV. 12/17 MAA/THC
	REV. 5/18 MAA/THC

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

REVISIONS

SHEET NO. S4-12
TOTAL SHEETS 14

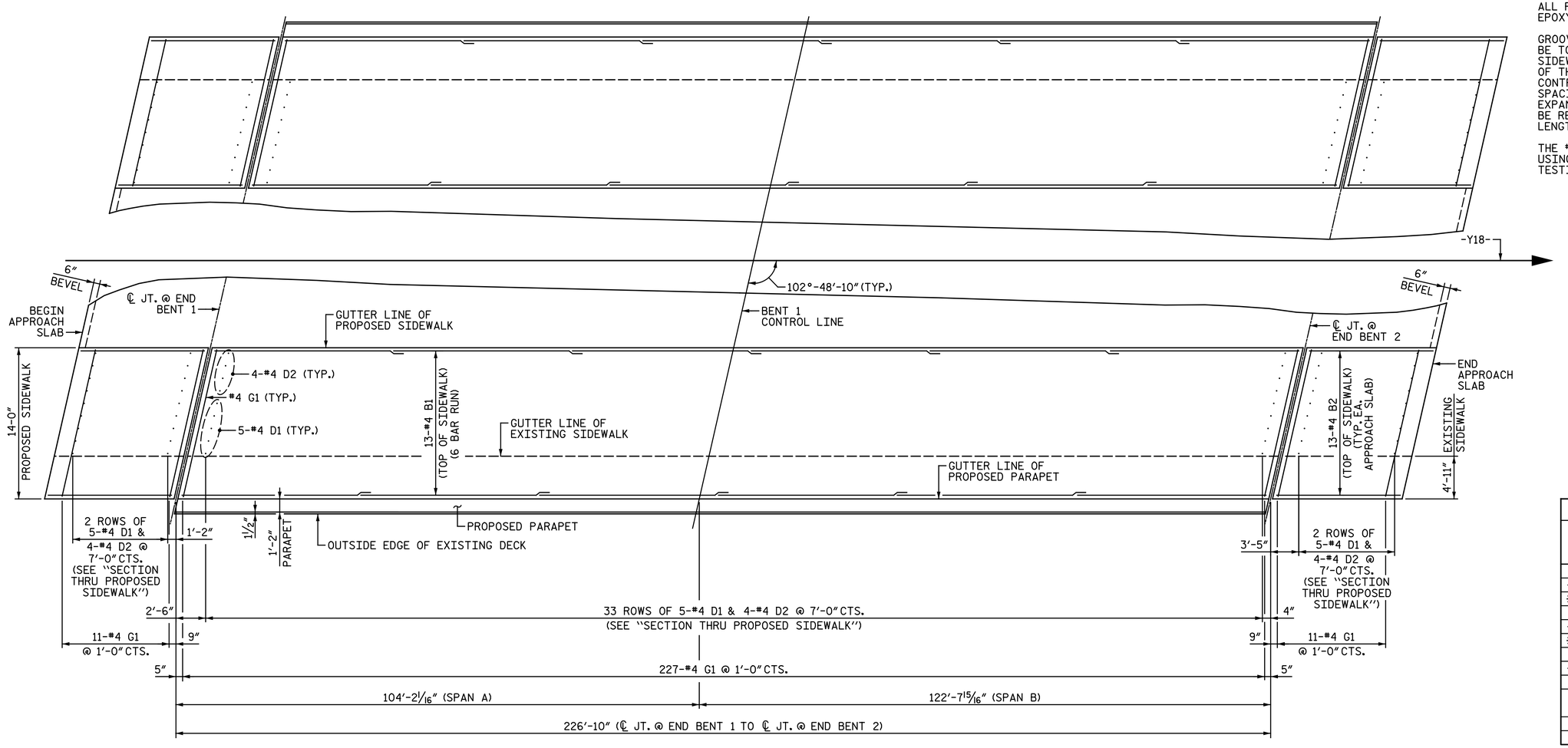
STD. NO. GRA3

NOTES:

ALL REINFORCING STEEL IN SIDEWALKS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FEET TO 10 FEET BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINT WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

THE #4 D1 AND D2 DOWELS SHALL BE INSTALLED USING AN ADHESIVE ANCHORING SYSTEM. FIELD TESTING IS NOT REQUIRED.



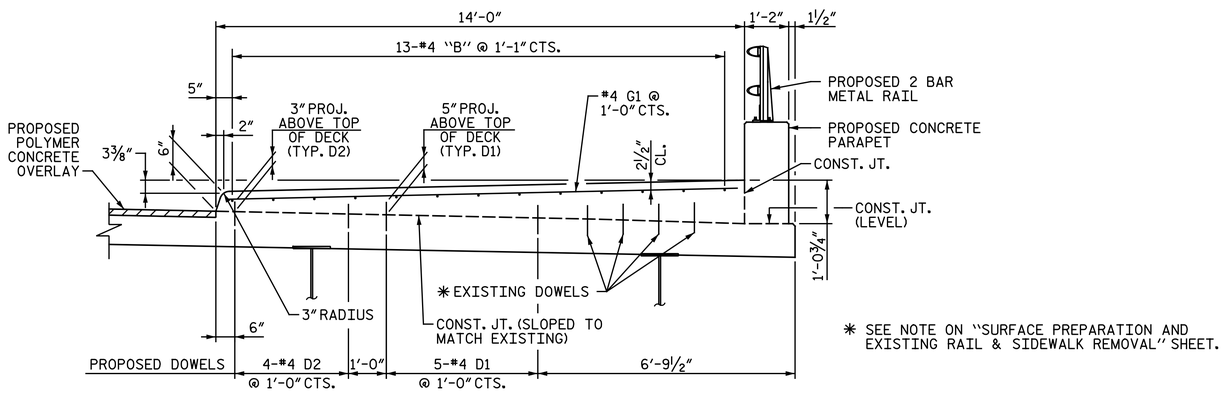
PLAN OF PROPOSED SIDEWALK

DETAILS FOR RIGHT SIDEWALK SHOWN, DETAILS FOR LEFT SIDEWALK SIMILAR.

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	-

BILL OF MATERIAL					
PROPOSED SIDEWALKS					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	156	#4	STR.	39' - 5"	4,108
✳B2	52	#4	STR.	11' - 7"	402
✳D1	370	#4	STR.	11"	227
✳D2	296	#4	STR.	9"	148
✳G1	498	#4	STR.	13' - 10"	4,602
✳EPOXY COATED REINFORCING STEEL				LBS.	9,487
CLASS AA CONCRETE				CU. YDS.	205.7

QUANTITIES INCLUDE SIDEWALKS ON BOTH SIDES OF BRIDGE AND APPROACH SLABS.



✳ SEE NOTE ON "SURFACE PREPARATION AND EXISTING RAIL & SIDEWALK REMOVAL" SHEET.

SECTION THRU PROPOSED SIDEWALK

RIGHT SIDEWALK SHOWN, LEFT SIDEWALK SIMILAR.
SIDEWALK ON BRIDGE SHOWN INCLUDING PARAPET AND 2 BAR METAL RAIL, SIDEWALKS ON APPROACH SLABS SIMILAR EXCLUDING PARAPETS AND 2 BAR METAL RAILS.

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 25+31.59 -Y18-

SHEET 1 OF 2

DocuSigned by: Tom M. Garrison 61EAF7523943466...
5/17/2021

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

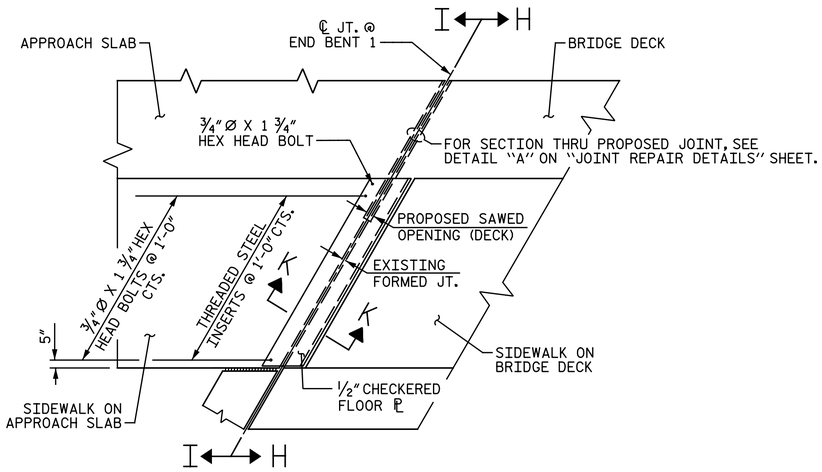
SIDEWALK DETAILS

DRAWN BY : C. E. MAYHEW DATE : 5-12-21
CHECKED BY : T. M. GARRISON DATE : 5-12-21

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

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



PLAN VIEW OF PROPOSED JOINT @ END BENT FOR SIDEWALK

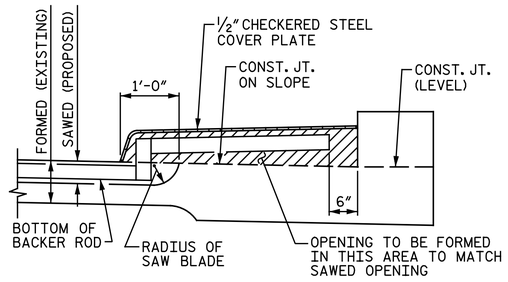
RIGHT SIDEWALK SHOWN, LEFT SIDEWALK SIMILAR.
END BENT 1 SHOWN, END BENT 2 SIMILAR.

NOTES:

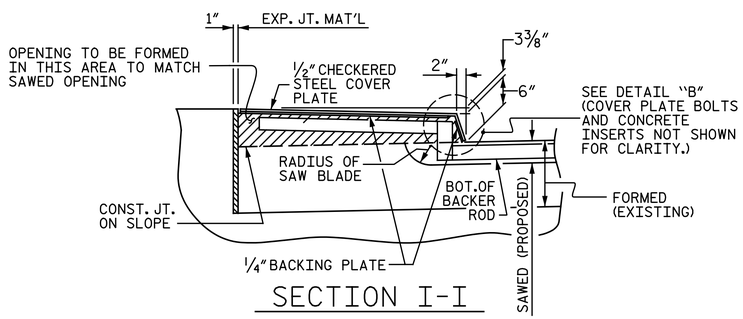
THE STEEL PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 OR APPROVED EQUAL. AFTER FABRICATION, THE PLATES SHALL BE COMMERCIALLY BLAST CLEANED AND EITHER COATED WITH A MINIMUM THICKNESS OF 4 MILS (DRY) OF ZINC-RICH PAINT, GALVANIZED OR METALLIZED TO A MINIMUM THICKNESS OF 6 MILS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE ¾" DIAMETER HEX HEAD BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL.

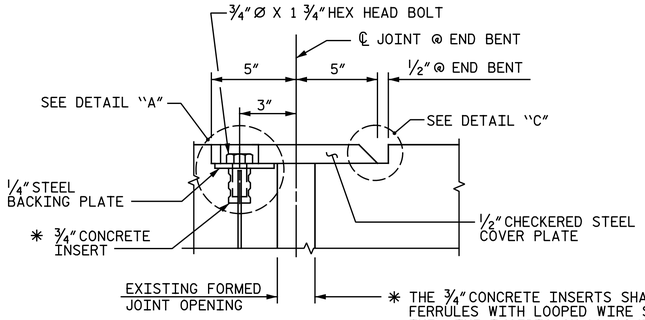
NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATES. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LINEAR FOOT PRICE FOR "POURABLE SILICONE JOINT SEALANT".



SECTION H-H

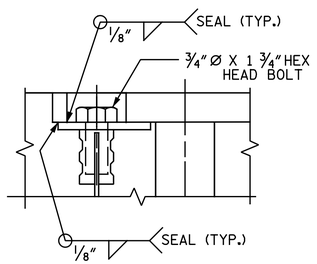


SECTION I-I

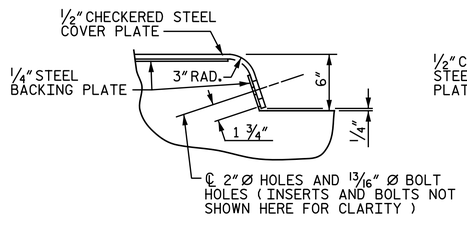


* THE ¾" CONCRETE INSERTS SHALL BE CLOSED-END FERRULES WITH LOOPED WIRE STRUTS ATTACHED TO THEM. THE INSERTS SHALL CONFORM TO AASHTO M169, GRADE 12L14 AND SHALL HAVE A TENSILE WORKING LOAD CAPACITY OF 3000 LBS.

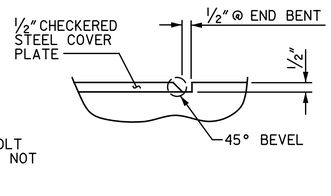
SECTION K-K



DETAIL "A"



DETAIL "B"



DETAIL "C"

JOINT SEAL DETAILS @ END BENT

DRAWN BY : C. E. MAYHEW DATE : 4-22-21
CHECKED BY : T. M. GARRISON DATE : 4-22-21

DocuSigned by: T. M. Garrison 01EAF7523340489... 4/27/2021

NORTH CAROLINA PROFESSIONAL SEAL 033139 ENGINEER TODD M. GARRISON

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Michael Baker INTERNATIONAL
Michael Baker Engineering
8000 Regency Parkway, Suite 600
Cary, North Carolina 27518
NC License No. : F-1084

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

PROJECT NO. I-5986B
JOHNSTON COUNTY
STATION: 25+31.59 -Y18-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SIDEWALK DETAILS