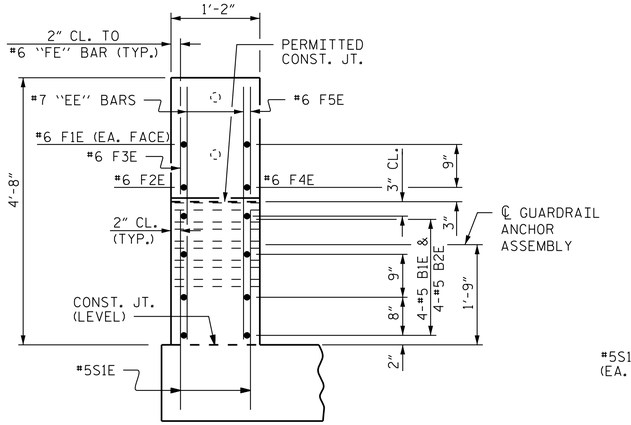
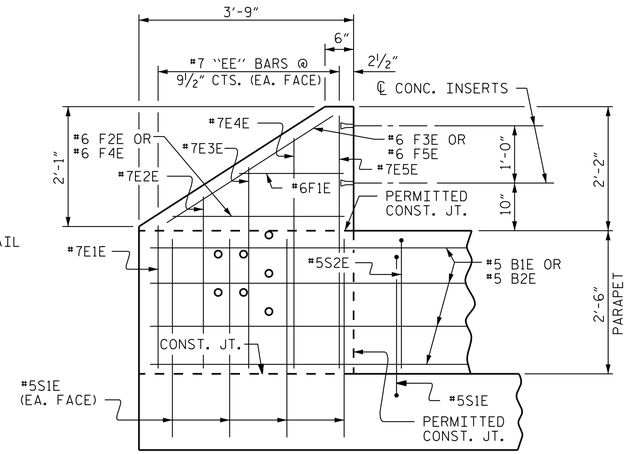
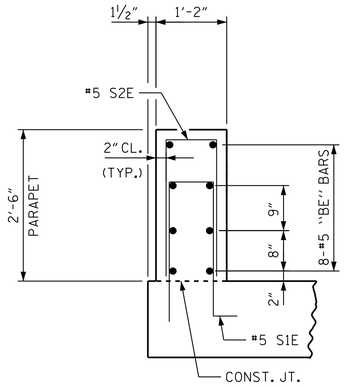



END VIEW



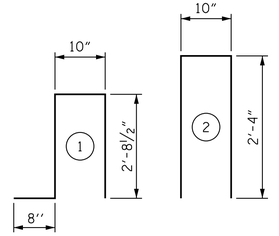

ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL




SECTION THRU PARAPET

## BAR TYPES




ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL

CONCRETE PARAPET AND TWO END POSTS

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1E | 8 | #5 | STR | 22'-4" | 186 |
| B2E | 8 | #5 | STR | 22'-0" | 184 |
| B3E | 24 | #5 | STR | 24'-7" | 615 |
| | | | | | |
| E1 | 4 | #7 | STR | 2'-6" | 20 |
| E2 | 4 | #7 | STR | 3'-0" | 25 |
| E3 | 4 | #7 | STR | 3'-6" | 29 |
| E4 | 4 | #7 | STR | 4'-0" | 33 |
| E5 | 4 | #7 | STR | 4'-4" | 35 |
| | | | | | |
| F1E | 4 | #6 | STR | 1'-10" | 11 |
| F2E | 2 | #6 | STR | 3'-0" | 9 |
| F3E | 2 | #6 | STR | 3'-5" | 10 |
| F4E | 2 | #6 | STR | 3'-3" | 10 |
| F5E | 2 | #6 | STR | 3'-9" | 11 |
| | | | | | |
| S1E | 120 | #5 | 1 | 6'-11" | 866 |
| S2E | 112 | #5 | 2 | 5'-6" | 642 |

| | | |
|---|---|---|
| EPOXY COATED REINFORCING STEEL | LBS. | 2,686 |
| CLASS AA CONCRETE | C.Y. | 13.1 |
| 1'-2" X 2'-6" CONCRETE PARAPET | | 119.6 LF |

## NOTES:

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

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

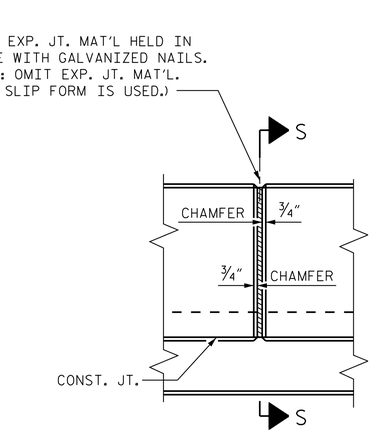
THE #5S1E & #5S2E BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL IN PARAPET.

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

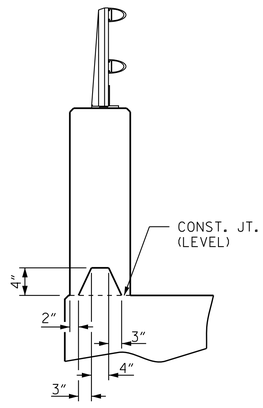
FOR DETAILS OF GUARDRAIL ANCHOR ASSEMBLIES, SEE "GUARDRAIL ANCHORAGE DETAILS FOR METAL RAIL" SHEET.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET 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.

CONCRETE IN PARAPETS SHALL BE CLASS AA NORMAL WEIGHT CONCRETE.

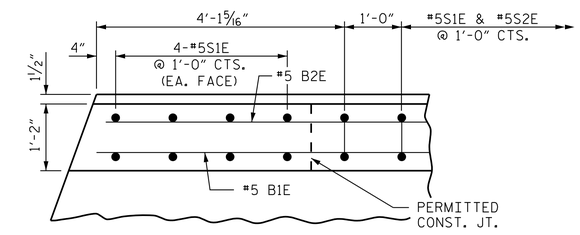



ELEVATION AT EXPANSION JOINTS

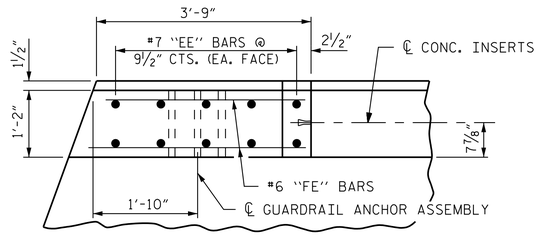



SECTION S-S

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




PLAN OF PARAPET




PLAN OF END POST

ELEVATION AT EXPANSION JOINTS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

# CONCRETE PARAPET DETAILS

(LEFT SIDE)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



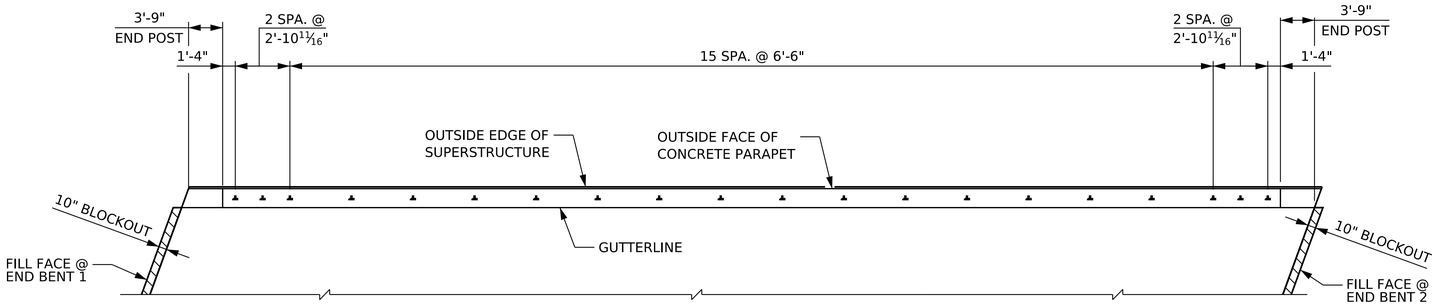
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-24 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

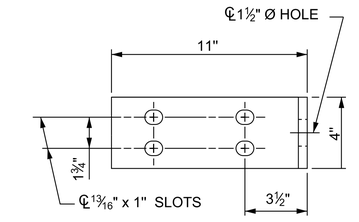
| | |
|---|---|
| DRAWN BY: T. K. BOYD | DATE: 01/2025 |
| CHECKED BY: E. W. SPRABERRY | DATE: 01/2025 |
| DESIGN ENGINEER OF RECORD: A. L. PHILLIPS | DATE: 01/2025 |

3/18/2025 K:\ROT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_2MR4_180541.dgn

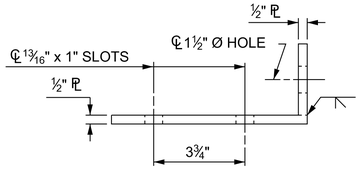
BRIDGE 2L



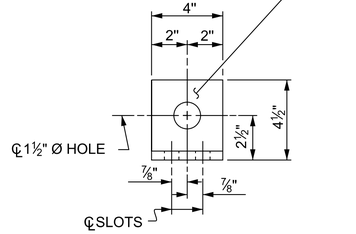

## PLAN OF RAIL POST SPACINGS



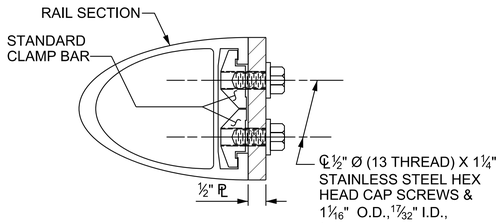

ELEVATION




TOP VIEW




END VIEW (FIX AND EXP.)




SECTION H-H (FIX)

FIXED

## DETAILS FOR ATTACHING METAL RAIL TO END POST

## 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 ASTM A36 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 ).

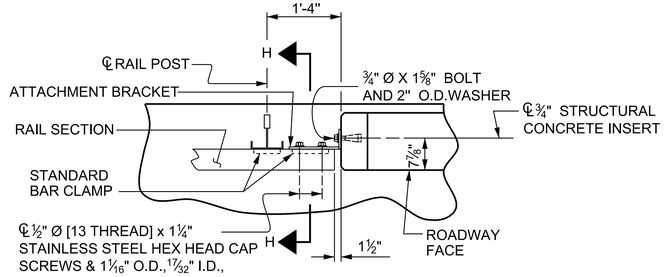
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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.

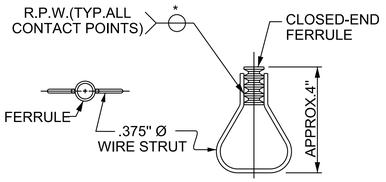
THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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 6½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.




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. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

## RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR ONE OR TWO BAR METAL RAILS

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-25 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

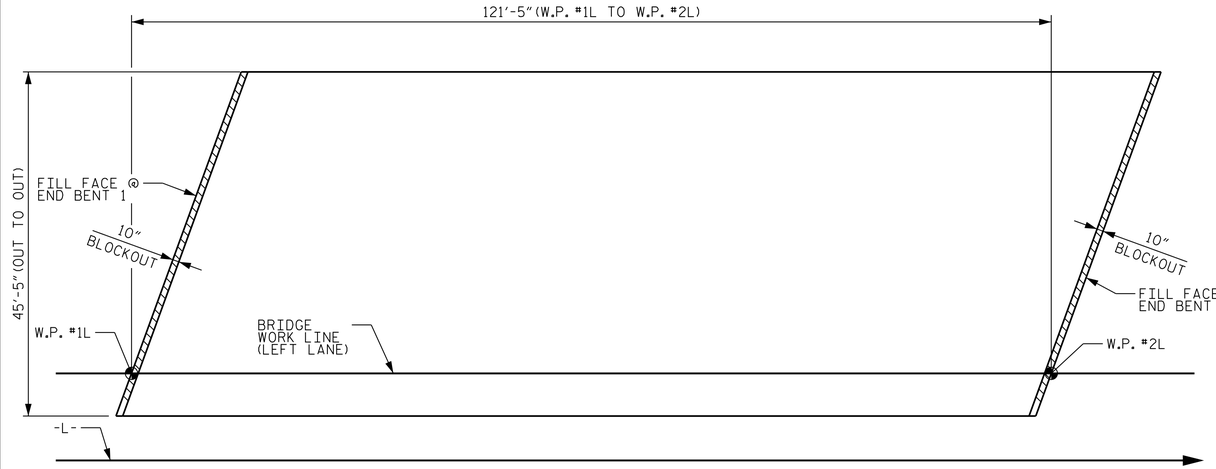
| | | |
|---|---|---|
| ASSEMBLED BY : T. K. BOYD | DATE : 01/2025 | |
| CHECKED BY : A. L. PHILLIPS | DATE : 01/2025 | |
| DRAWN BY : FCJ 1/88 | REV. 10/1/11 | MAA/GM |
| CHECKED BY : CRK 3/89 | REV. 12/17 | MAA/THC |
| | REV. 10/23 | BNB/SNM |

3/18/2025

K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_2MR5_180541.dgn

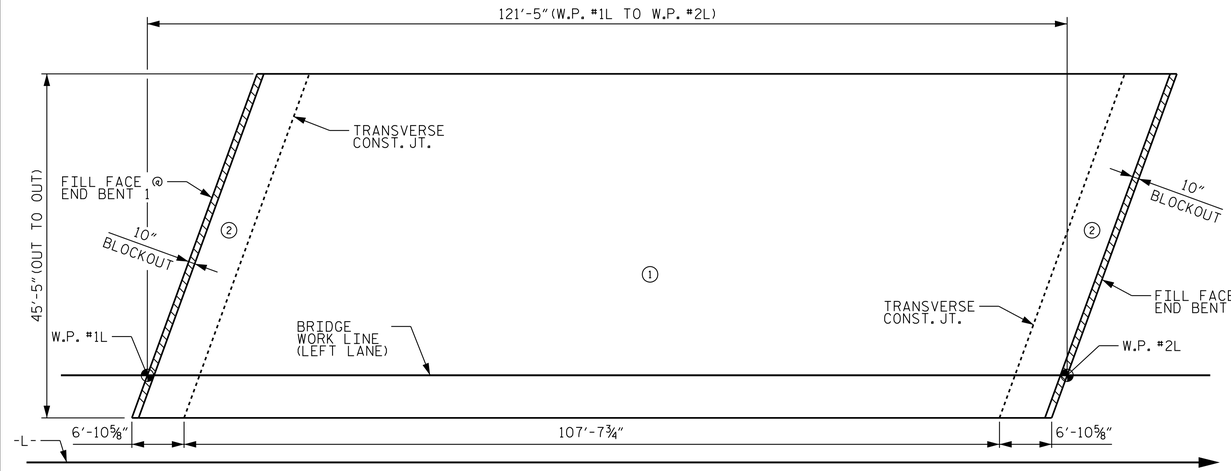
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

BRIDGE 2L STD. NO. BMR2



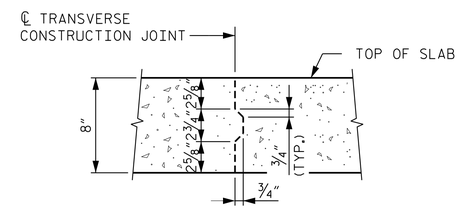

## LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 5,434 )




## POUR SEQUENCE

| GROOVING BRIDGE FLOORS | |
|---|---|
| APPROACH SLABS | 1,750 SQ.FT. |
| BRIDGE DECK | 4,188 SQ.FT. |
| TOTAL | 5,938 SQ.FT. |



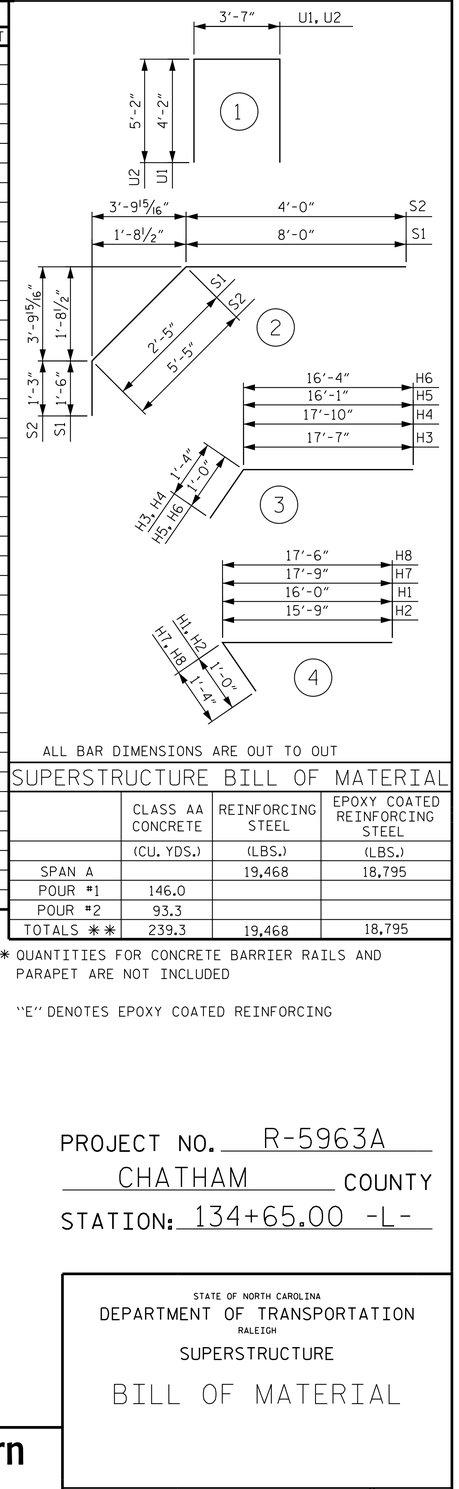

## TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

REINFORCING STEEL IN SLAB NOT SHOWN, LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

| BILL OF MATERIAL — SUPERSTRUCTURE | | | | | |
|---|---|---|---|---|---|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| A1E | 177 | #5 | STR | 45'-1" | 8,323 |
| A2 | 177 | #5 | STR | 45'-1" | 8,323 |
| A101E | 2 | #5 | STR | 43'-8" | 91 |
| A102E | 2 | #5 | STR | 42'-1" | 88 |
| A103E | 2 | #5 | STR | 40'-5" | 84 |
| A104E | 2 | #5 | STR | 38'-10" | 81 |
| A105E | 2 | #5 | STR | 37'-3" | 78 |
| A106E | 2 | #5 | STR | 35'-8" | 74 |
| A107E | 2 | #5 | STR | 34'-1" | 71 |
| A108E | 2 | #5 | STR | 32'-5" | 68 |
| A109E | 2 | #5 | STR | 30'-10" | 64 |
| A110E | 2 | #5 | STR | 29'-3" | 61 |
| A111E | 2 | #5 | STR | 27'-8" | 58 |
| A112E | 2 | #5 | STR | 26'-0" | 54 |
| A113E | 2 | #5 | STR | 24'-5" | 51 |
| A114E | 2 | #5 | STR | 22'-10" | 48 |
| A115E | 2 | #5 | STR | 21'-3" | 44 |
| A116E | 2 | #5 | STR | 19'-7" | 41 |
| A117E | 2 | #5 | STR | 18'-0" | 38 |
| A118E | 2 | #5 | STR | 16'-5" | 34 |
| A119E | 2 | #5 | STR | 14'-10" | 31 |
| A120E | 2 | #5 | STR | 13'-2" | 28 |
| A121E | 2 | #5 | STR | 11'-7" | 24 |
| A122E | 2 | #5 | STR | 10'-0" | 21 |
| A123E | 2 | #5 | STR | 8'-5" | 18 |
| A124E | 2 | #5 | STR | 6'-10" | 14 |
| A125E | 2 | #5 | STR | 5'-2" | 11 |
| A126E | 2 | #5 | STR | 3'-7" | 8 |
| A127E | 4 | #5 | STR | 2'-0" | 8 |
| A201 | 2 | #5 | STR | 43'-8" | 91 |
| A202 | 2 | #5 | STR | 42'-1" | 88 |
| A203 | 2 | #5 | STR | 40'-5" | 84 |
| A204 | 2 | #5 | STR | 38'-10" | 81 |
| A205 | 2 | #5 | STR | 37'-3" | 78 |
| A206 | 2 | #5 | STR | 35'-8" | 74 |
| A207 | 2 | #5 | STR | 34'-1" | 71 |
| A208 | 2 | #5 | STR | 32'-5" | 68 |
| A209 | 2 | #5 | STR | 30'-10" | 64 |
| A210 | 2 | #5 | STR | 29'-3" | 61 |
| A211 | 2 | #5 | STR | 27'-8" | 58 |
| A212 | 2 | #5 | STR | 26'-0" | 54 |
| A213 | 2 | #5 | STR | 24'-5" | 51 |
| A214 | 2 | #5 | STR | 22'-10" | 48 |
| A215 | 2 | #5 | STR | 21'-3" | 44 |

| BILL OF MATERIAL — SUPERSTRUCTURE | | | | | |
|---|---|---|---|---|---|
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
| A216 | 2 | #5 | STR | 19'-7" | 41 |
| A217 | 2 | #5 | STR | 18'-0" | 38 |
| A218 | 2 | #5 | STR | 16'-5" | 34 |
| A219 | 2 | #5 | STR | 14'-10" | 31 |
| A220 | 2 | #5 | STR | 13'-2" | 28 |
| A221 | 2 | #5 | STR | 11'-7" | 24 |
| A222 | 2 | #5 | STR | 10'-0" | 21 |
| A223 | 2 | #5 | STR | 8'-5" | 18 |
| A224 | 2 | #5 | STR | 6'-10" | 14 |
| A225 | 2 | #5 | STR | 5'-2" | 11 |
| A226 | 2 | #5 | STR | 3'-7" | 8 |
| A227 | 4 | #5 | STR | 2'-0" | 8 |
| | | | | | |
| B1E | 93 | #4 | STR | 26'-11" | 1,672 |
| B2E | 182 | #6 | STR | 24'-2" | 6,606 |
| B3 | 90 | #5 | STR | 41'-2" | 3,864 |
| B4 | 40 | #5 | STR | 24'-2" | 1,008 |
| | | | | | |
| H1 | 12 | #6 | 4 | 17'-0" | 306 |
| H2 | 12 | #6 | 4 | 16'-9" | 302 |
| H3 | 12 | #8 | 3 | 18'-11" | 606 |
| H4 | 12 | #8 | 3 | 19'-2" | 614 |
| H5 | 12 | #6 | 3 | 17'-1" | 308 |
| H6 | 12 | #6 | 3 | 17'-4" | 312 |
| H7 | 12 | #8 | 4 | 19'-1" | 611 |
| H8 | 12 | #8 | 4 | 18'-10" | 603 |
| | | | | | |
| K1 | 20 | #4 | STR | 28'-1" | 375 |
| K2 | 8 | #4 | STR | 6'-4" | 34 |
| K3 | 8 | #4 | STR | 7'-10" | 42 |
| K4 | 16 | #4 | STR | 9'-1" | 97 |
| K5 | 8 | #4 | STR | 6'-2" | 33 |
| K6 | 4 | #4 | STR | 5'-1" | 14 |
| K7 | 4 | #4 | STR | 5'-11" | 16 |
| K8 | 8 | #4 | STR | 6'-5" | 34 |
| K9 | 4 | #4 | STR | 4'-7" | 12 |
| K10 | 24 | #4 | STR | 2'-10" | 45 |
| | | | | | |
| S1E | 60 | #4 | 2 | 11'-11" | 478 |
| S2E | 60 | #4 | 2 | 10'-8" | 428 |
| | | | | | |
| U1 | 64 | #4 | 1 | 11'-11" | 509 |
| U2 | 12 | #4 | 1 | 13'-11" | 112 |

## 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.) |
| SPAN A | | 19,468 | 18,795 |
| POUR #1 | 146.0 | | |
| POUR #2 | 93.3 | | |
| TOTALS ** | 239.3 | 19,468 | 18,795 |

** QUANTITIES FOR CONCRETE BARRIER RAILS AND PARAPET ARE NOT INCLUDED

"E" DENOTES EPOXY COATED REINFORCING

| SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS | | | | | |
|---|---|---|---|---|---|
| BAR SIZE | SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL | | APPROACH SLABS | | PARAPET AND BARRIER RAIL |
| | EPOXY COATED | UNCOATED | EPOXY COATED | UNCOATED | |
| #4 | 1'-11" | 1'-7" | 1'-11" | 1'-7" | 2'-6" |
| #5 | 2'-5" | 2'-0" | 2'-5" | 2'-0" | 3'-1" |
| #6 | 2'-10" | 2'-5" | 3'-7" | 2'-5" | 3'-8" |
| #7 | 4'-2" | 2'-9" | | | |
| #8 | 4'-9" | 3'-2" | | | |

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-26 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025 K:\RDT_Structures_Bridge\NC\01103634 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_BMI_180541.dgn

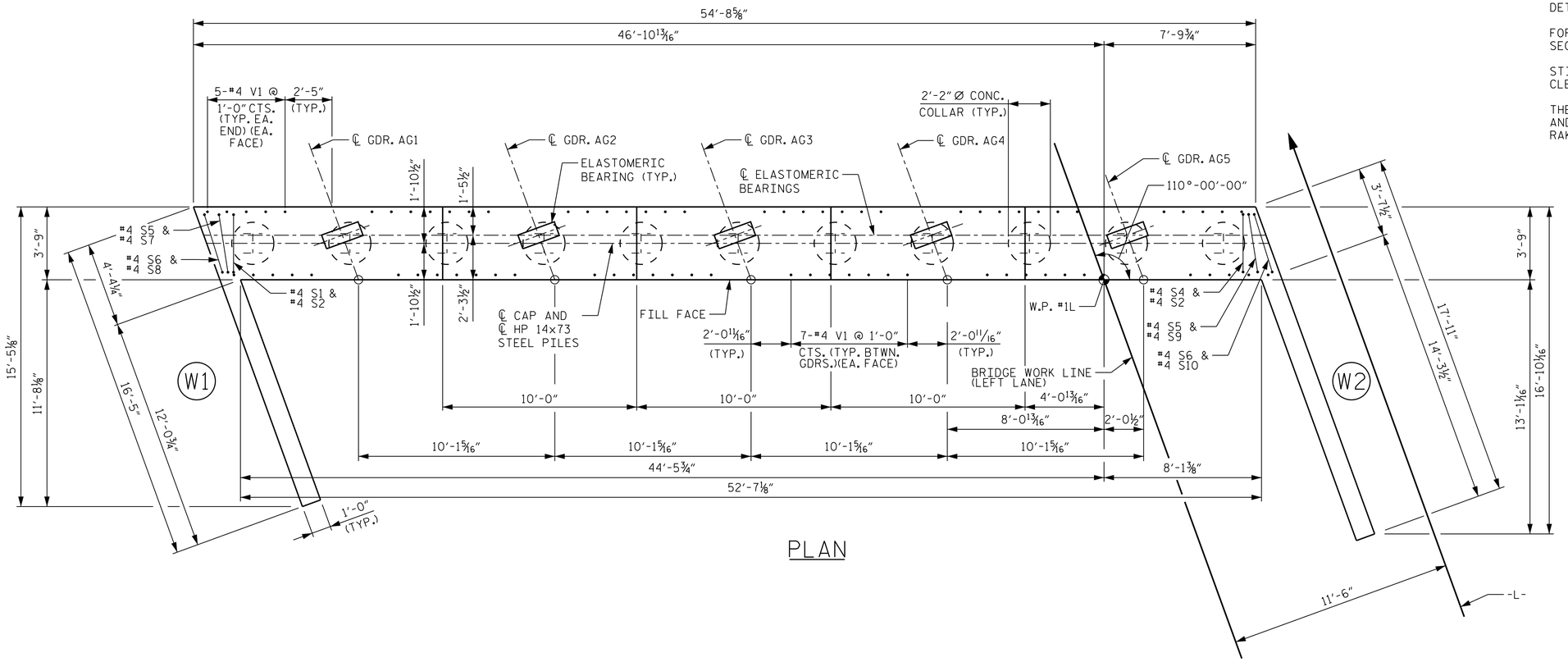
# NOTES

FOR PILE SPLICE DETAILS, AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

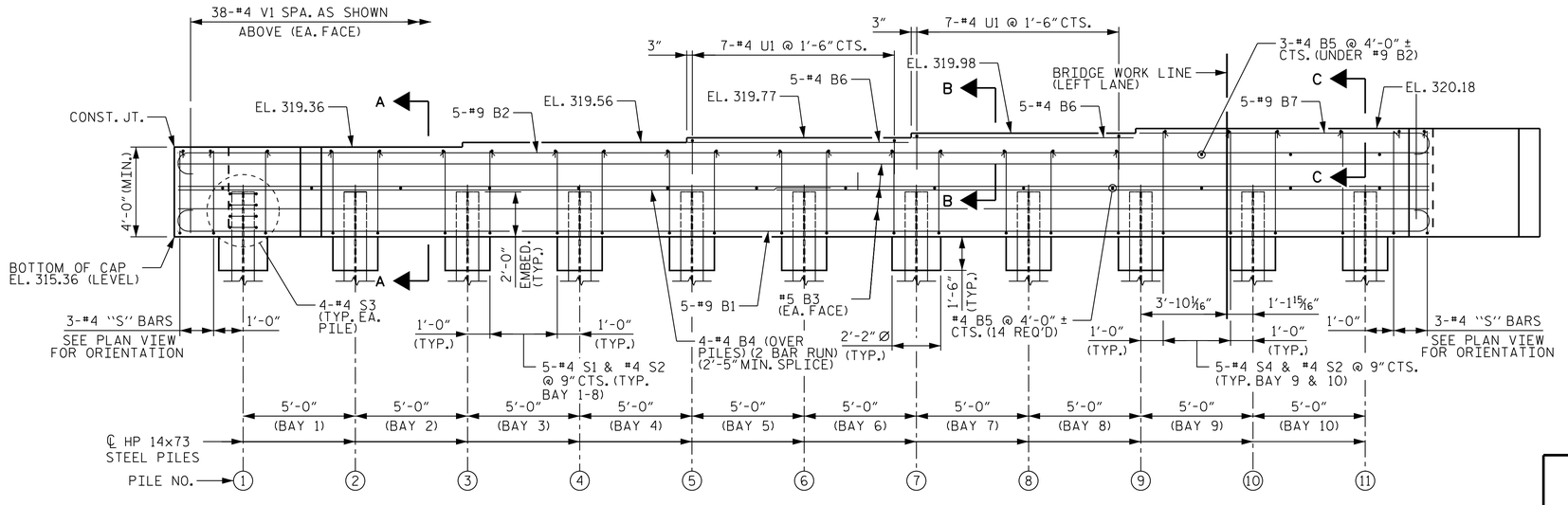
FOR SECTION A-A, PARTIAL SECTION B-B AND PARTIAL SECTION C-C, SEE SHEET 3 OF 3.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP SURFACE OF POUR #1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".




PLAN




ELEVATION

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
PLAN AND ELEVATION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

| | | |
|---|---|---|
| DRAWN BY: T. K. BOYD | DATE: 01/2025 | |
| CHECKED BY: E. W. SPRABERRY | DATE: 01/2025 | |
| DESIGN ENGINEER OF RECORD: A. L. PHILLIPS | DATE: 01/2025 | |

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Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
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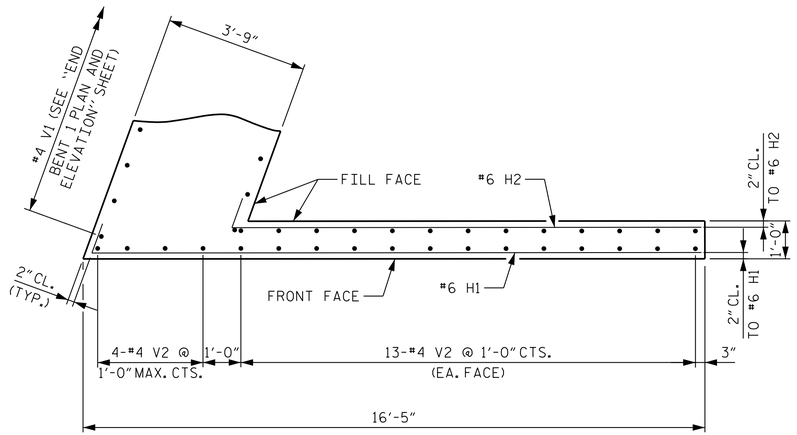
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-27 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

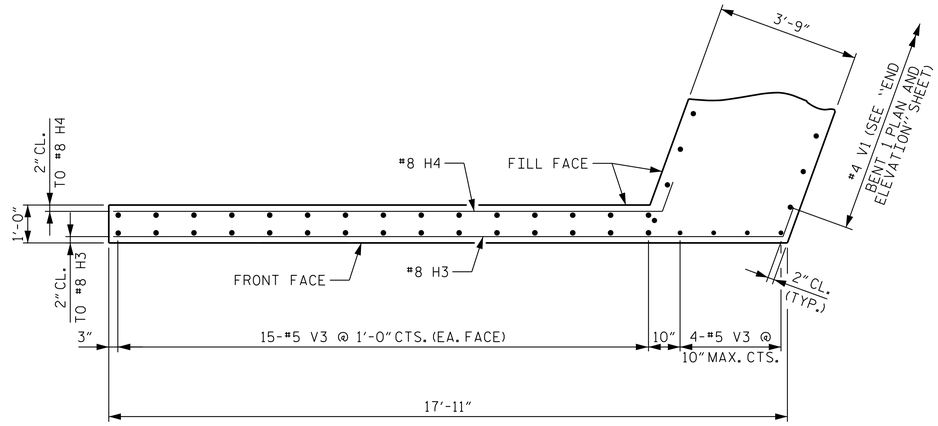
BRIDGE 2L

3/18/2025

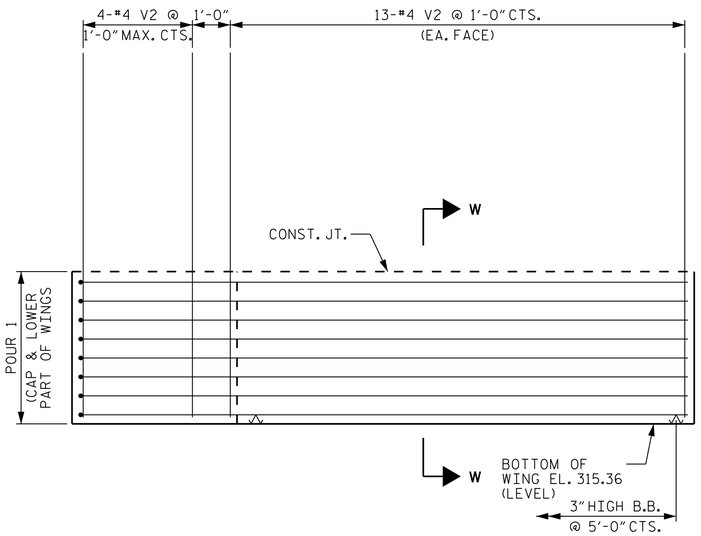
K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_EL1_80541.dgn



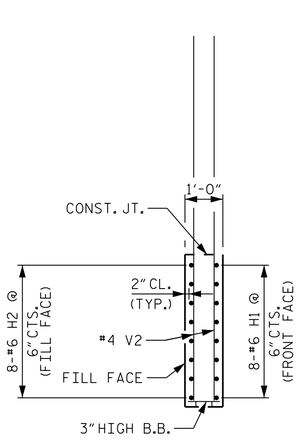

PLAN OF WING W1



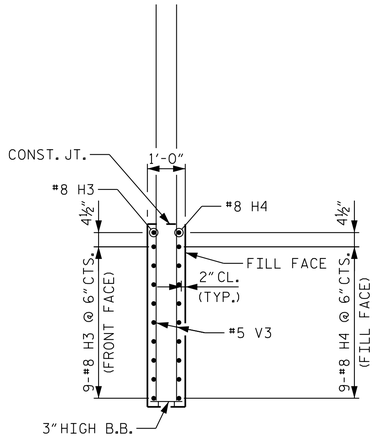

PLAN OF WING W2



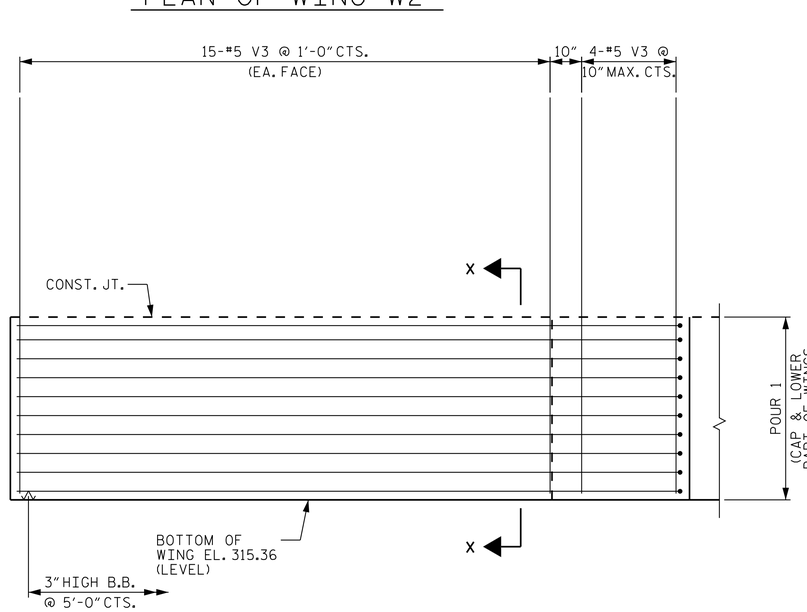

ELEVATION OF WING W1




SECTION W-W




SECTION X-X




ELEVATION OF WING W2

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

# END BENT 1 SECTION AND DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



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|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-28 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

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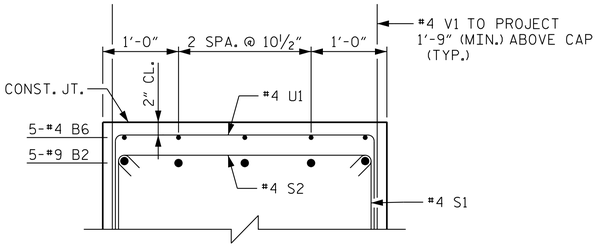
| | | |
|---|---|---|
| DRAWN BY: T. K. BOYD | DATE: 01/2025 | |
| CHECKED BY: E. W. SPRABERRY | DATE: 01/2025 | |
| DESIGN ENGINEER OF RECORD: A. L. PHILLIPS | DATE: 01/2025 | |

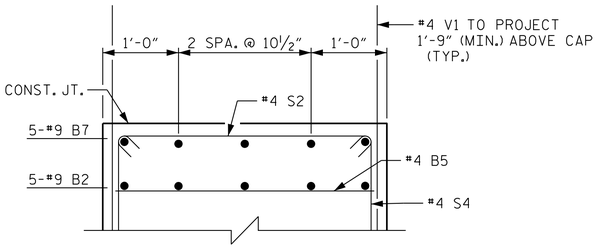
3/18/2025

K:\ROT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMULE2_180541.dgn

BRIDGE 2L




PARTIAL SECTION B-B



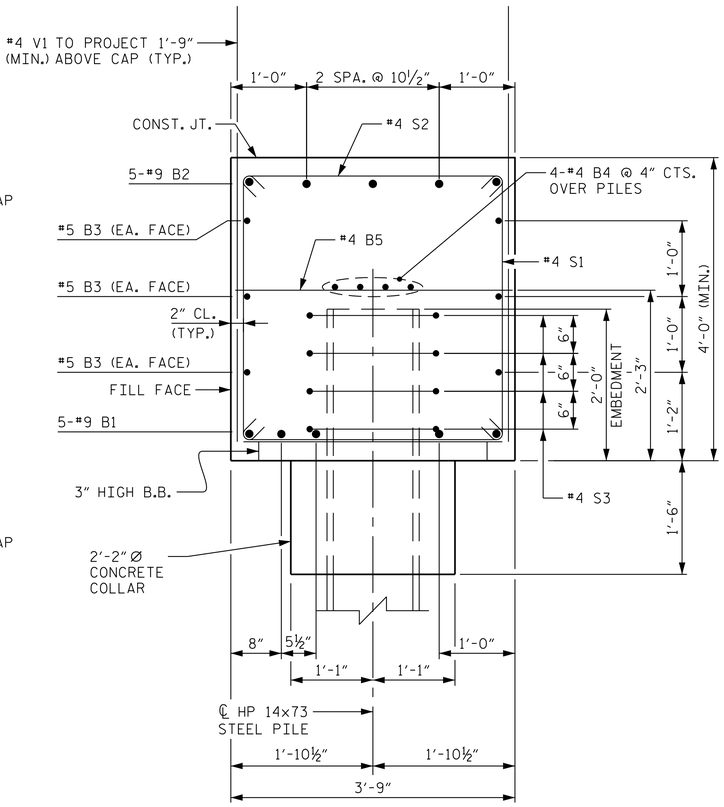

PARTIAL SECTION C-C


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.

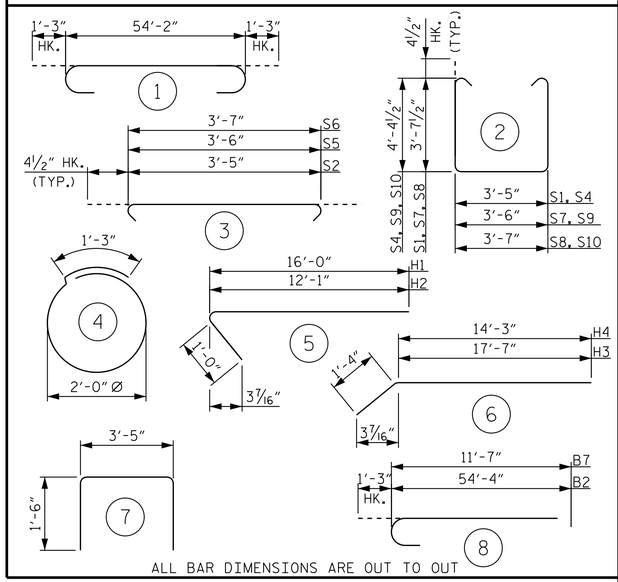
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

TEMPORARY DRAINAGE AT END BENT




SECTION A-A



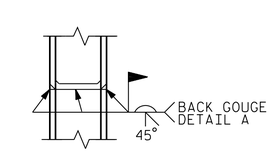

## BILL OF MATERIAL

### END BENT 1

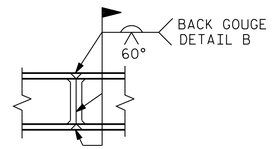
| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1 | 5 | #9 | 1 | 56'-8" | 963 |
| B2 | 5 | #9 | 8 | 55'-7" | 945 |
| B3 | 6 | #5 | STR | 54'-4" | 340 |
| B4 | 8 | #4 | STR | 28'-5" | 152 |
| B5 | 17 | #4 | STR | 3'-5" | 39 |
| B6 | 10 | #4 | STR | 9'-10" | 66 |
| B7 | 5 | #9 | 8 | 12'-10" | 218 |
| | | | | | |
| H1 | 8 | #6 | 5 | 17'-0" | 204 |
| H2 | 8 | #6 | 5 | 13'-1" | 157 |
| H3 | 10 | #8 | 6 | 18'-11" | 505 |
| H4 | 10 | #8 | 6 | 15'-7" | 416 |
| | | | | | |
| S1 | 41 | #4 | 2 | 11'-5" | 313 |
| S2 | 52 | #4 | 3 | 4'-2" | 145 |
| S3 | 44 | #4 | 4 | 7'-7" | 223 |
| S4 | 11 | #4 | 2 | 12'-11" | 95 |
| S5 | 2 | #4 | 3 | 4'-3" | 6 |
| S6 | 2 | #4 | 3 | 4'-4" | 6 |
| S7 | 1 | #4 | 2 | 11'-6" | 8 |
| S8 | 1 | #4 | 2 | 11'-7" | 8 |
| S9 | 1 | #4 | 2 | 13'-0" | 9 |
| S10 | 1 | #4 | 2 | 13'-1" | 9 |
| | | | | | |
| U1 | 14 | #4 | 7 | 6'-5" | 60 |
| | | | | | |
| V1 | 76 | #4 | STR | 5'-6" | 279 |
| V2 | 30 | #4 | STR | 9'-6" | 190 |
| V3 | 34 | #5 | STR | 10'-5" | 369 |

REINFORCING STEEL 5,725 LBS.

CLASS A CONCRETE BREAKDOWN
POUR 1 (CAP, LOWER WING WALLS, & COLLARS) 40.2 C.Y.

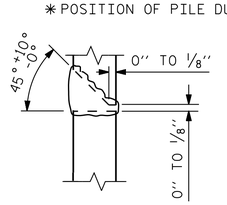



✳PILE VERTICAL

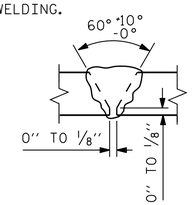



✳PILE HORIZONTAL OR VERTICAL

✳POSITION OF PILE DURING WELDING.




DETAIL "A"




DETAIL "B"

HP PILE SPLICE DETAILS

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# END BENT 1 SECTION AND DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
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| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-29 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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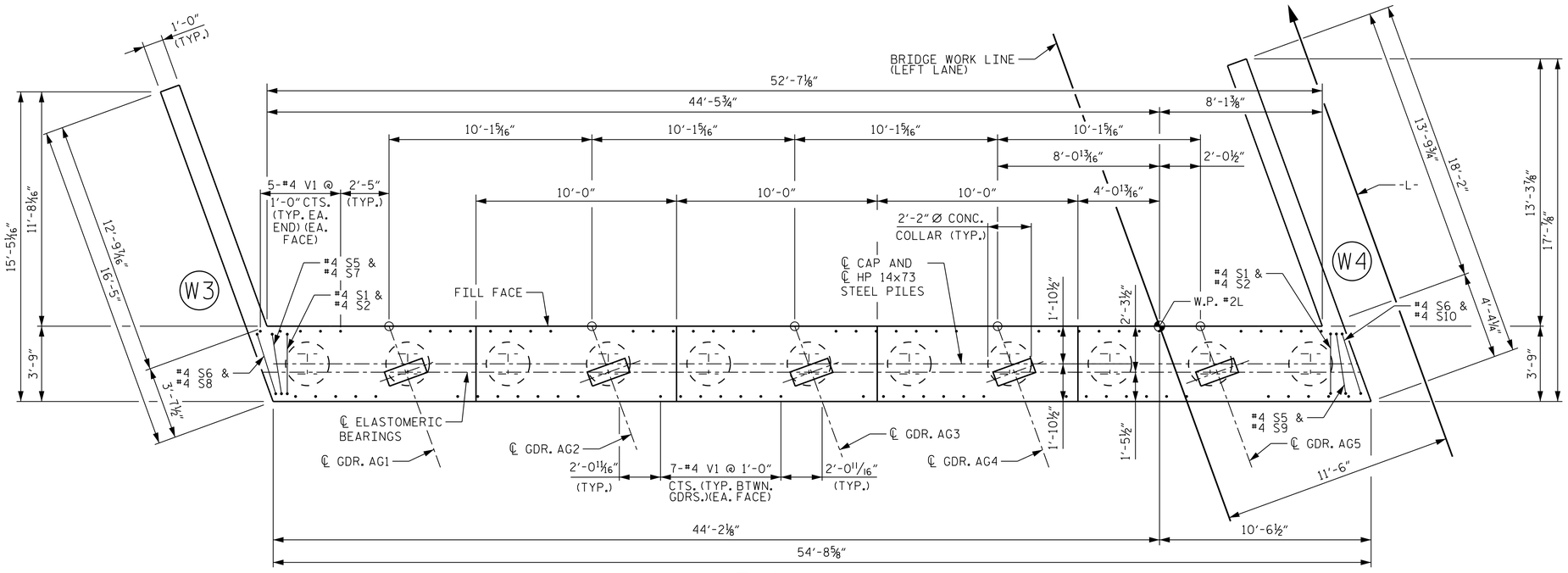
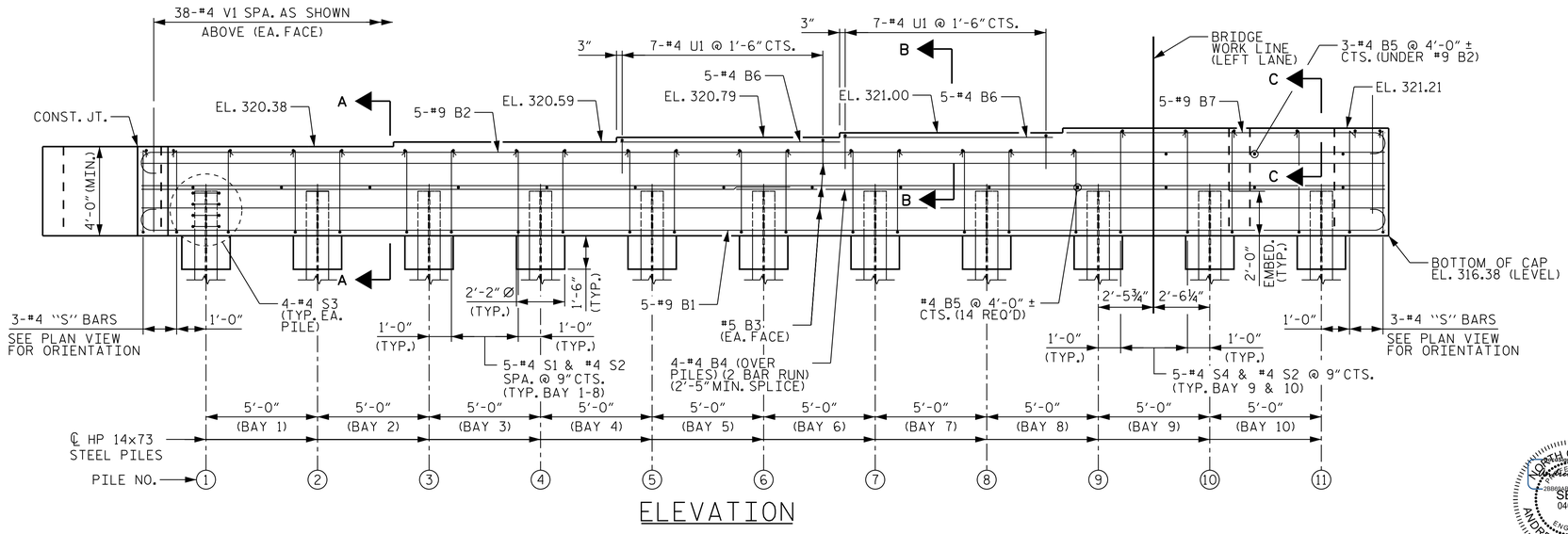
3/18/2025 K:\ROT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_E3_180541.dgn




PLAN




ELEVATION

## NOTES

FOR PILE SPLICE DETAILS, AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

FOR SECTION A-A, PARTIAL SECTION B-B AND PARTIAL SECTION C-C, SEE SHEET 3 OF 3.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP SURFACE OF POUR #1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

# END BENT 2 PLAN AND ELEVATION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-30 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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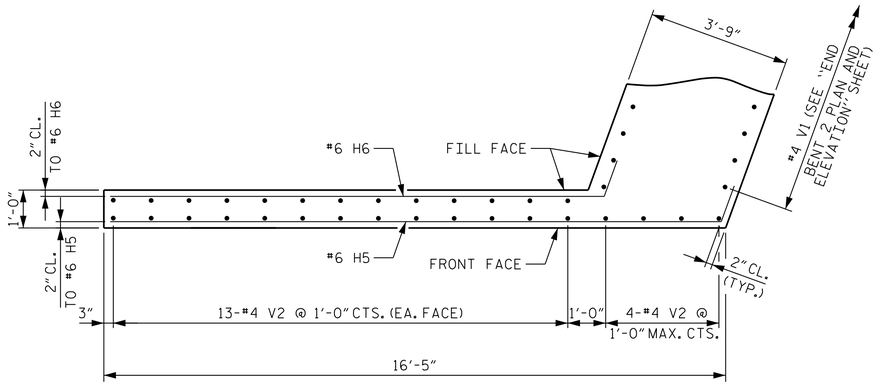
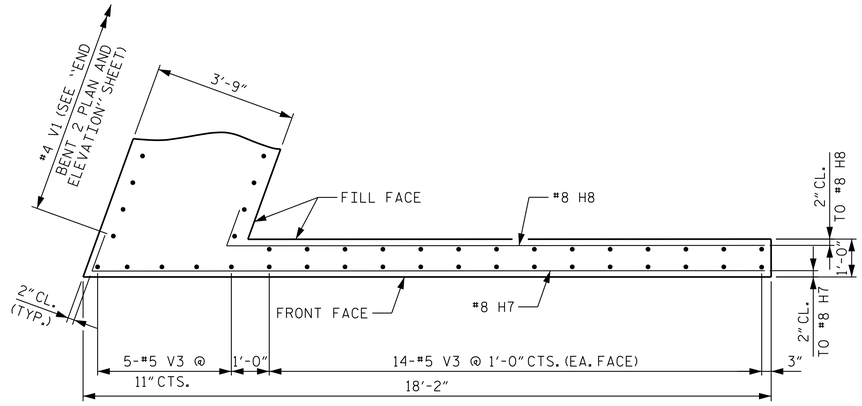
BRIDGE 2L

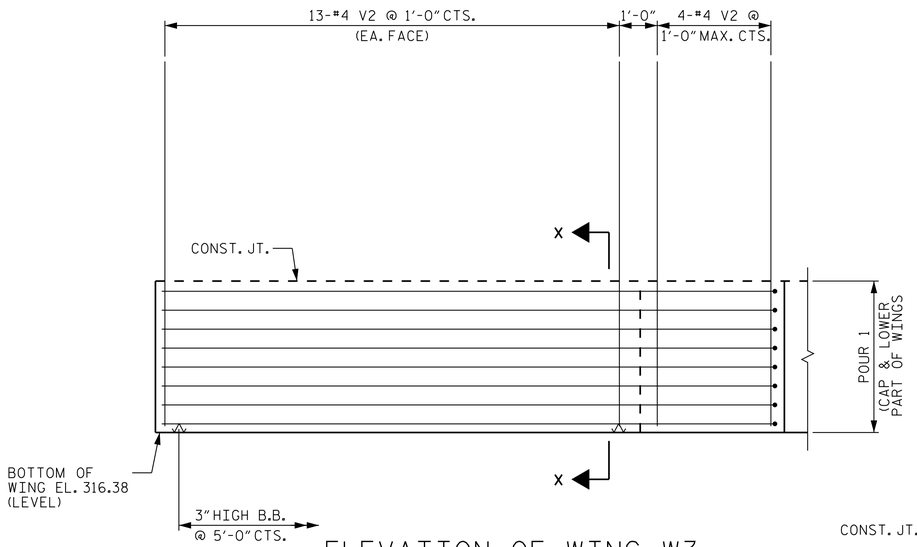
3/18/2025 K:\RDT\Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_E4_180541.dgn



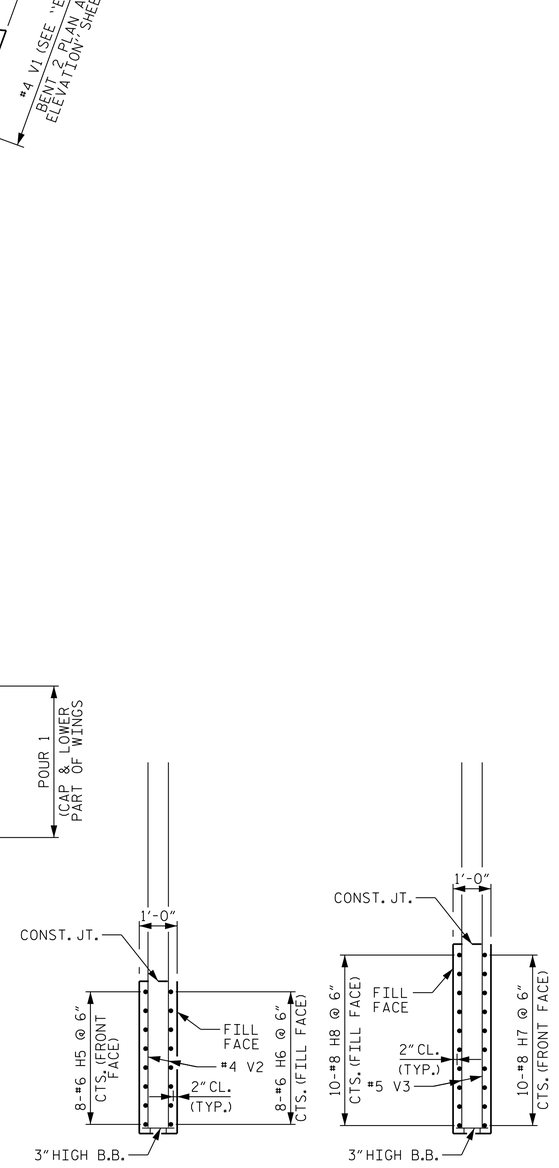

## PLAN OF WING W3




## PLAN OF WING W4



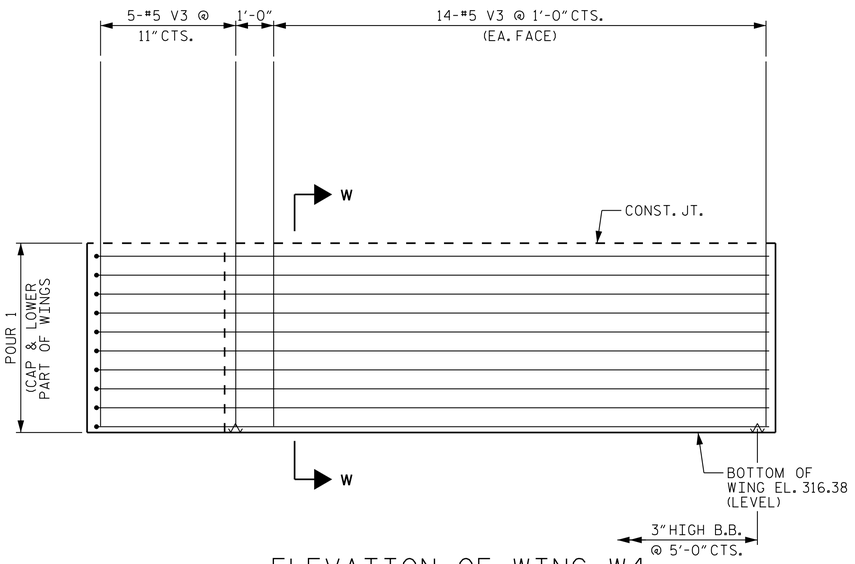

## ELEVATION OF WING W3




## SECTION X-X




## SECTION W-W




## ELEVATION OF WING W4

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
SECTION AND DETAILS

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-31 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
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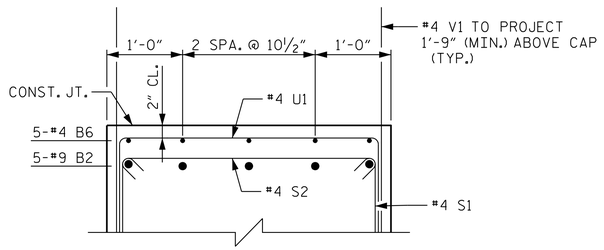
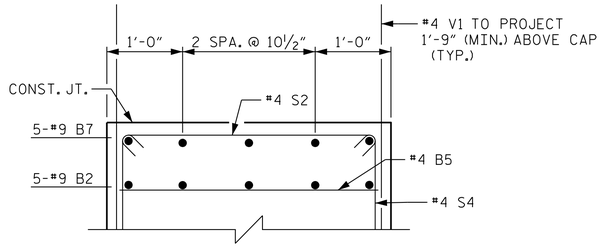
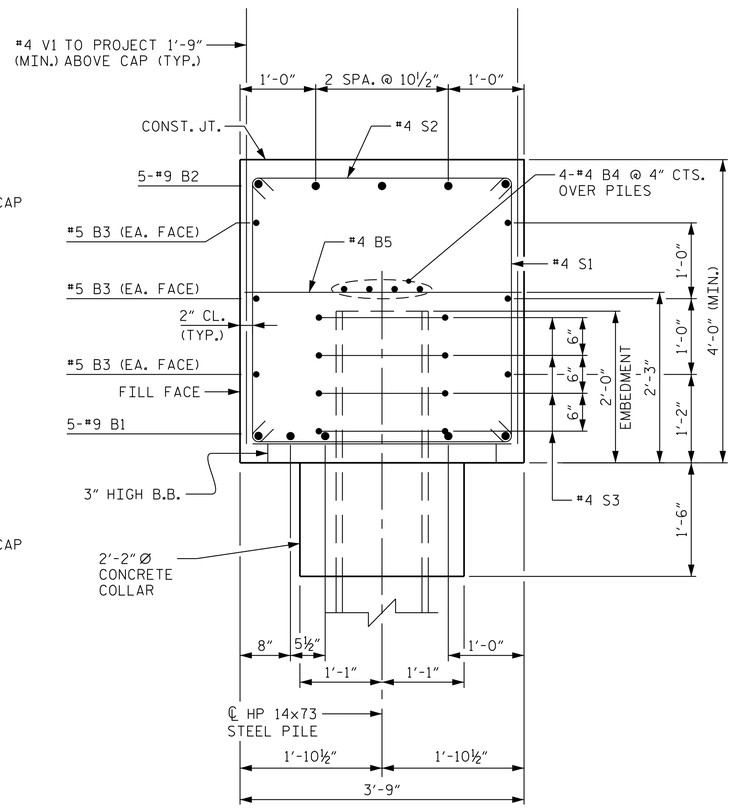


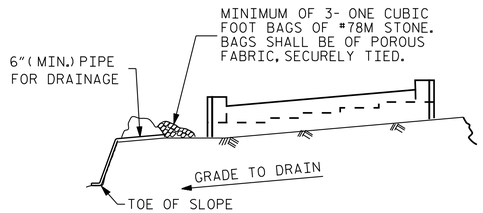

PARTIAL SECTION B-B




PARTIAL SECTION C-C




SECTION A-A

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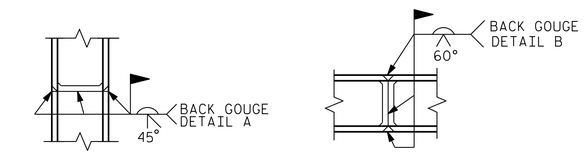
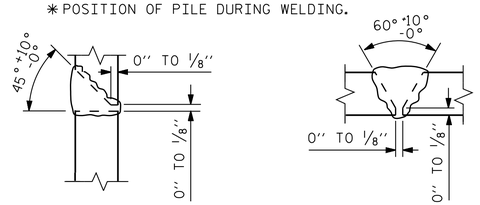
## TEMPORARY DRAINAGE AT END BENT




✳PILE VERTICAL

✳PILE HORIZONTAL OR VERTICAL

✳POSITION OF PILE DURING WELDING.

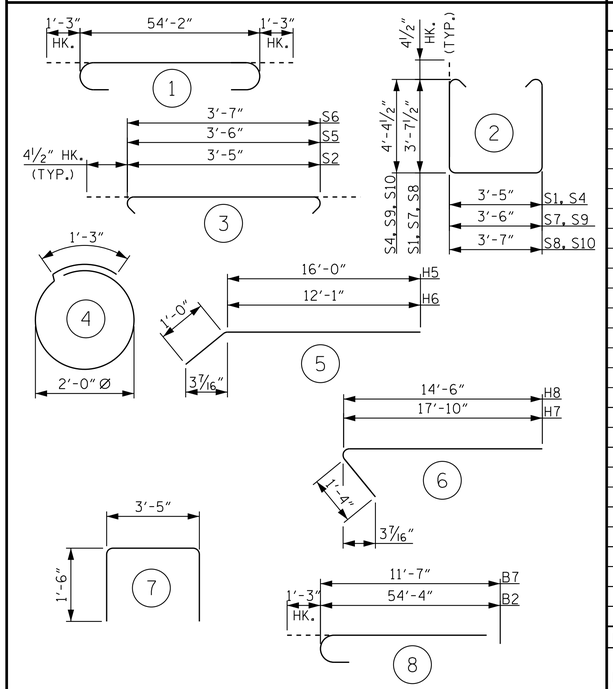



DETAIL "A"

DETAIL "B"

## HP PILE SPLICE DETAILS

## BAR TYPES




ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL

### END BENT 2

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1 | 5 | #9 | 1 | 56'-8" | 963 |
| B2 | 5 | #9 | 8 | 55'-7" | 945 |
| B3 | 6 | #5 | STR | 54'-4" | 340 |
| B4 | 8 | #4 | STR | 28'-5" | 152 |
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| S3 | 44 | #4 | 4 | 7'-7" | 223 |
| S4 | 11 | #4 | 2 | 12'-11" | 95 |
| S5 | 2 | #4 | 3 | 4'-3" | 6 |
| S6 | 2 | #4 | 3 | 4'-4" | 6 |
| S7 | 1 | #4 | 2 | 11'-6" | 8 |
| S8 | 1 | #4 | 2 | 11'-7" | 8 |
| S9 | 1 | #4 | 2 | 13'-0" | 9 |
| S10 | 1 | #4 | 2 | 13'-1" | 9 |
| | | | | | |
| U1 | 14 | #4 | 7 | 6'-5" | 60 |
| | | | | | |
| V1 | 76 | #4 | STR | 5'-6" | 279 |
| V2 | 30 | #4 | STR | 9'-6" | 190 |
| V3 | 33 | #5 | STR | 10'-5" | 359 |

REINFORCING STEEL 5,729 LBS.

CLASS A CONCRETE BREAKDOWN
POUR 1 (CAP, LOWER WING WALLS, & COLLARS) 40.3 C.Y.

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# END BENT 2 SECTION AND DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



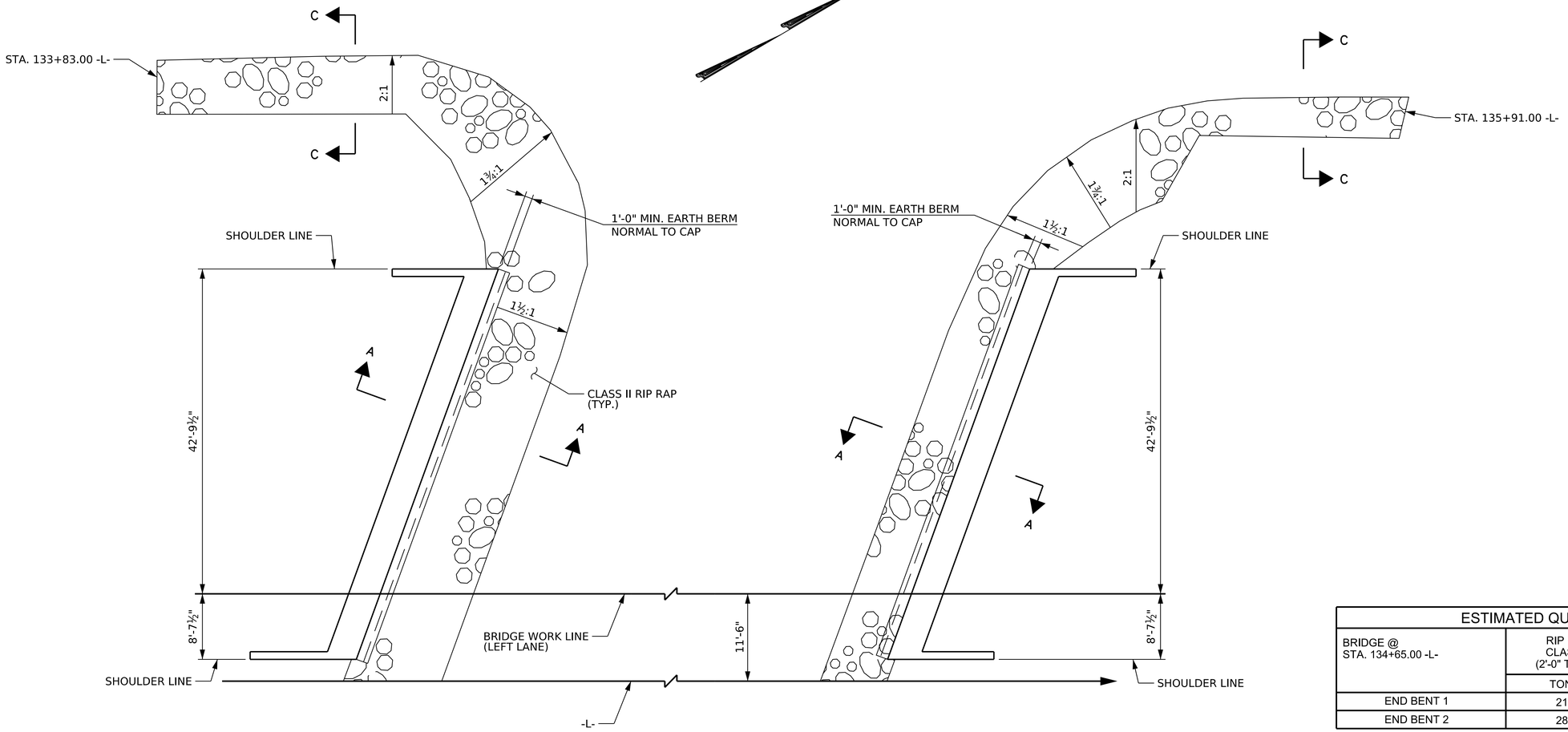
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-32 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

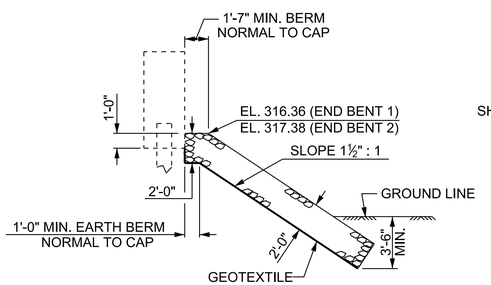
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025
K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_E6_180541.dgn

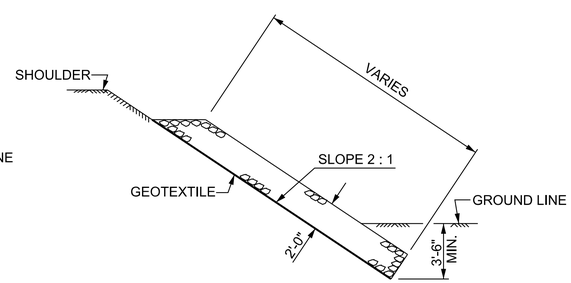
BRIDGE 2L




END BENT 1 PLAN END BENT 2




SECTION A-A




SECTION C-C

BERM RIP RAPPED

| ESTIMATED QUANTITIES | | |
|---|---|---|
| BRIDGE @ STA. 134+65.00 -L- | RIP RAP CLASS II (2'-0" THICK) | GEOTEXTILE FOR DRAINAGE |
| | TONS | SQUARE YARDS |
| END BENT 1 | 210 | 234 |
| END BENT 2 | 280 | 312 |

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-33 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

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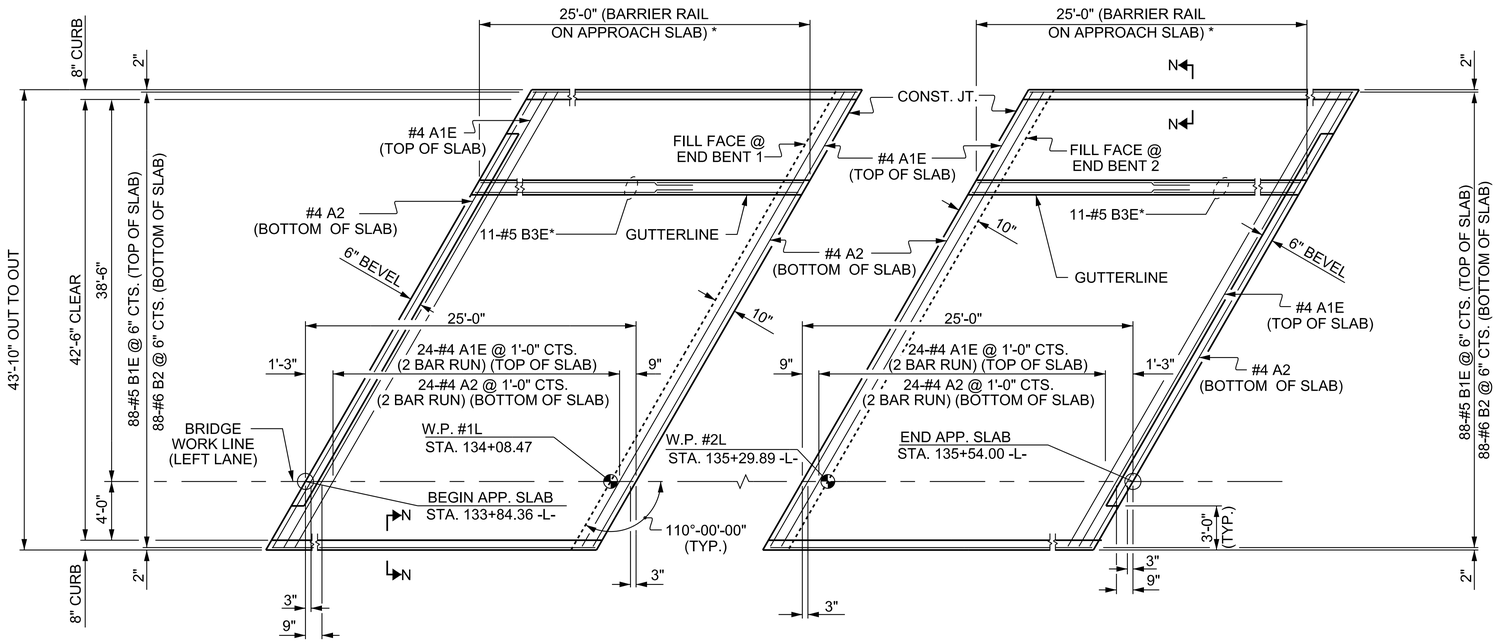
| | | | |
|---|---|---|---|
| ASSEMBLED BY : T. K. BOYD | | DATE : 01/2025 | |
| CHECKED BY : R.M. KROL | | DATE : 01/2025 | |
| DRAWN BY : REK 1/84 | REV. 10/11/11 | | MAA/GM |
| CHECKED BY : RDU 1/84 | REV. 12/21/11 | | MAA/GM |
| | REV. 12/17 | | MAA/THC |

3/18/2025 K:\RDT_Structures_Bridge\NC\01103734 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_RR1_180541.dgn

BRIDGE 2L STD. NO. RR1




DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

## BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| *A1E | 52 | #4 | STR | 24'-2" | 839 |
| A2 | 52 | #4 | STR | 24'-0" | 834 |
| | | | | | |
| *B1E | 88 | #5 | STR | 24'-1" | 2,210 |
| B2 | 88 | #6 | STR | 24'-7" | 3,249 |
| | | | | | |
| REINFORCING STEEL | | | | | 4,083 LBS. |
| * EPOXY COATED REINFORCING STEEL | | | | | 3,049 LBS. |
| | | | | | |
| CLASS AA CONCRETE | | | | | 47.3 C. Y. |

## SPLICE LENGTHS

| BAR SIZE | EPOXY COATED | UNCOATED |
|---|---|---|
| #4 | 1'-11" | 1'-7" |
| #5 | 2'-5" | 2'-0" |
| #6 | 3'-7" | 2'-5" |

## NOTES

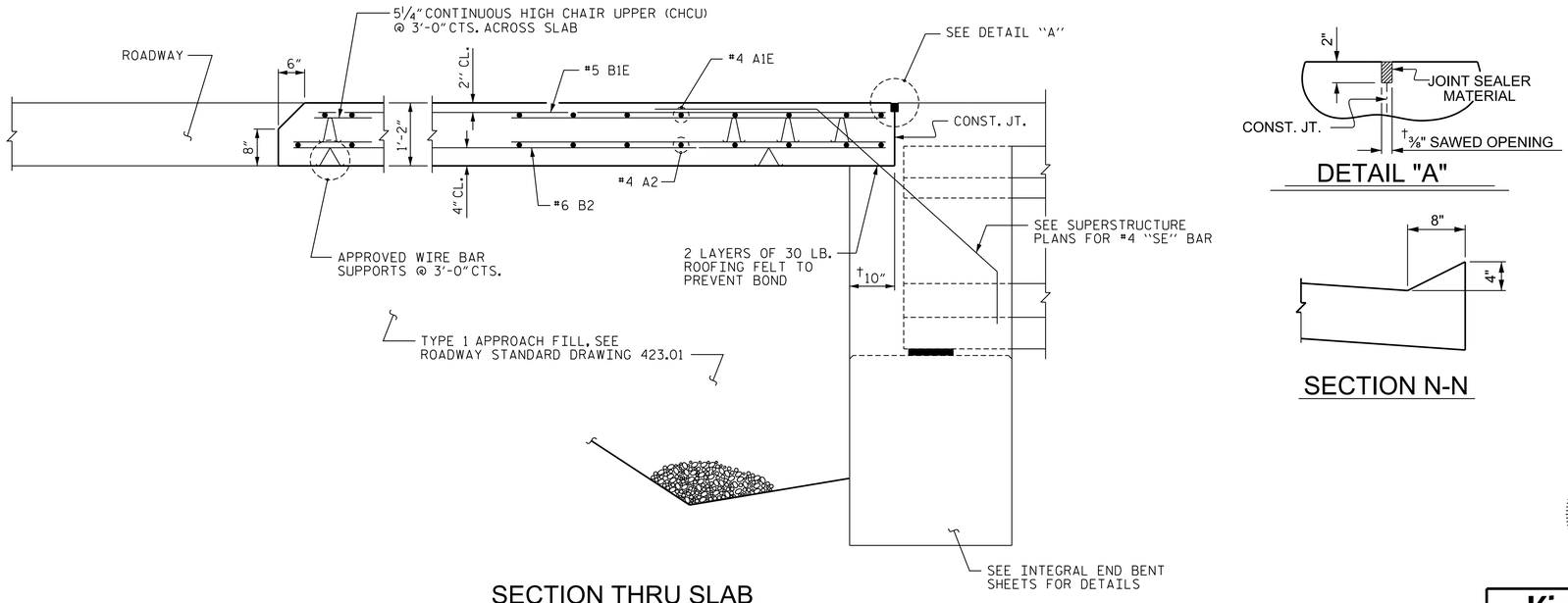
FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

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.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

* FOR BARRIER RAIL ON APPROACH SLAB DETAILS, REINFORCING AND BILL OF MATERIALS, SEE SHEET 2 OF 2.




SECTION THRU SLAB

†NORMAL TO END BENT




DETAIL "A"




SECTION N-N

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-34 |
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NC LICENSE # F-0102



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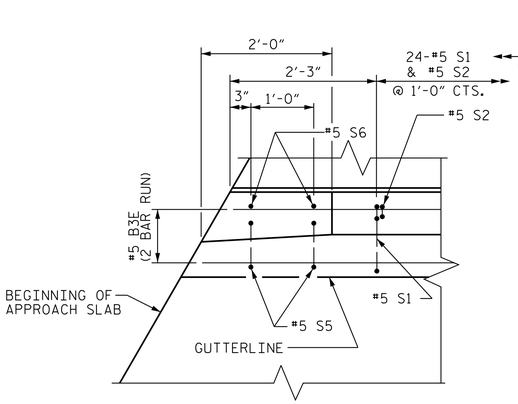
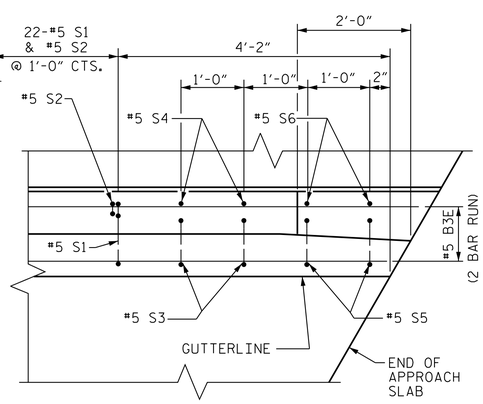
| | | | |
|---|---|---|---|
| ASSEMBLED BY : T. K. BOYD | | DATE : 01/2025 | |
| CHECKED BY : R.M. KROL | | DATE : 01/2025 | |
| DRAWN BY : TLA 10/05 | REV. 12/17 | MAA/THC | |
| CHECKED BY : GM 5/06 | REV. 06/19 | BNB/THC | |
| | REV. 07/23 | BNB/SNM | |

3/18/2025 K:\RDT_Structures_Bridge\NC\0110367.34 - R-5963A&B\Cad\Dgn\Bridge_2L\R-5963A_SMU_AS1_180541.dgn

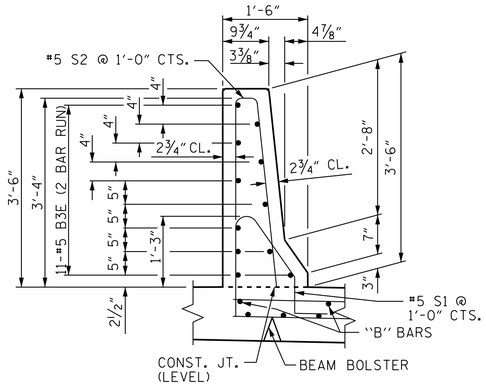
BRIDGE 2L STD. NO. BAS5




PLAN AT END BENT 1




PLAN AT END BENT 2




SECTION THRU RAIL

## NOTES

AT THE CONTRACTOR'S OPTION, THE APPROACH SLAB MAY BE CAST MONOLITHICALLY WITH THE INTEGRAL END BENT DIAPHRAGM AND THE END SECTION OF BRIDGE DECK. IF CAST WITH THE INTEGRAL DIAPHRAGM, THE LAYERS OF ROOFING FELT SHALL BE OMITTED. IF CAST SEPARATE FROM THE INTEGRAL DIAPHRAGM, APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

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.

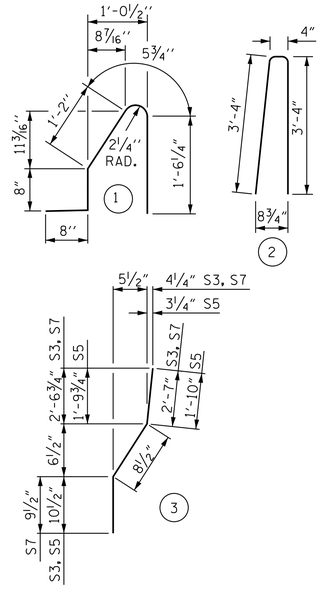
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

THE #5 S3, #5 S4, #5 S5 AND #5 S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, #5 S4, #5 S5 AND #5 S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

** THE CONTRACTOR MAY USE ADHESIVELY ANCHORED #5 S7 & #5 S8 BARS. LEVEL 2 FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE #5 S7 & #5 S8 IS 18.6 KIPS. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

BARRIER RAIL ON APPROACH SLAB SHALL BE PAID FOR BY LINEAR FOOT OF CONCRETE BARRIER RAIL.

## BAR TYPES



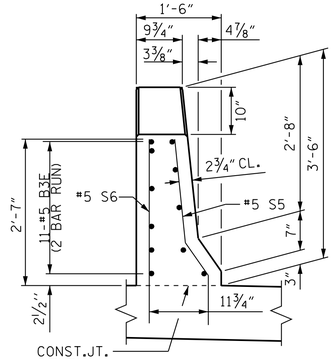

ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL

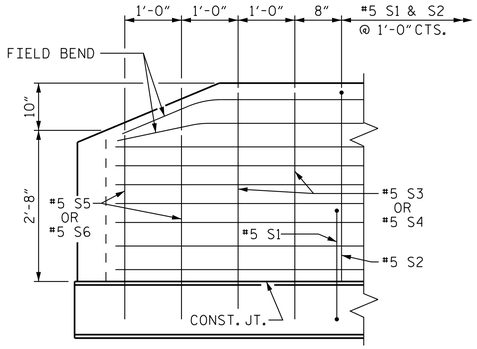
FOR CONCRETE BARRIER RAIL ONLY

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B3E | 44 | #5 | STR | 14'-1" | 646 |
| | | | | | |
| S1E | 46 | #5 | 1 | 4'-6" | 216 |
| S2E | 46 | #5 | 2 | 7'-0" | 336 |
| S3E | 2 | #5 | 3 | 4'-2" | 9 |
| S4E | 2 | #5 | STR | 4'-0" | 8 |
| S5E | 4 | #5 | 3 | 3'-5" | 14 |
| S6E | 4 | #5 | STR | 3'-3" | 14 |
| S7E | 46 | #5 | 3 | 4'-1" | 196 |
| S8E | 46 | #5 | STR | 3'-11" | 182 |
| EPOXY COATED REINFORCING STEEL | | | | | 1,243 LBS. |
| CLASS AA CONCRETE | | | | | 6.7 CU. YDS. |
| CONCRETE BARRIER RAIL | | | | | 50.0 LIN. FT. |

** FOR OPTIONAL ADHESIVE ANCHORING (NOT INCLUDED IN TOTAL QUANTITY)

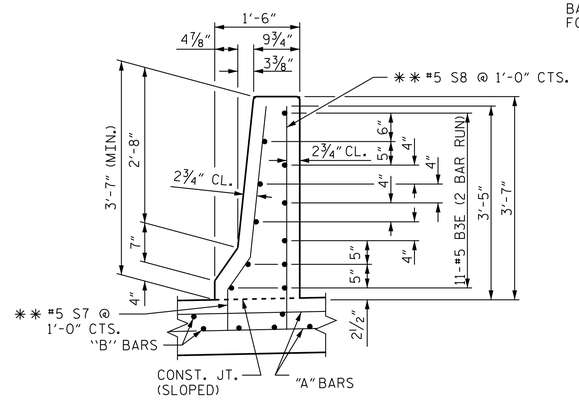



END VIEW




SIDE VIEW

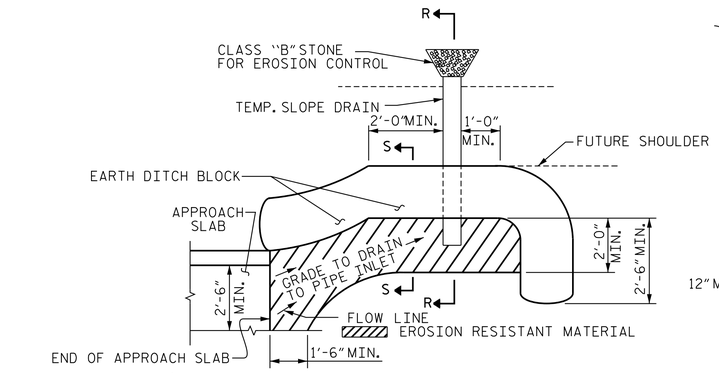
(END BENT 1 SHOWN, END BENT 2 SIMILAR)




OPTIONAL SECTION THRU INTERIOR RAIL

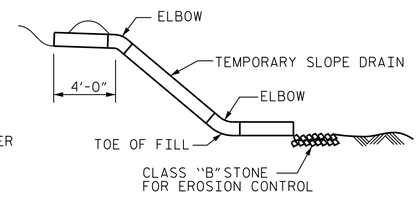
## SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

| BAR SIZE | PARAPETS AND BARRIER RAIL |
|---|---|
| #4 | 2'-6" |
| #5 | 3'-1" |
| #6 | 3'-8" |

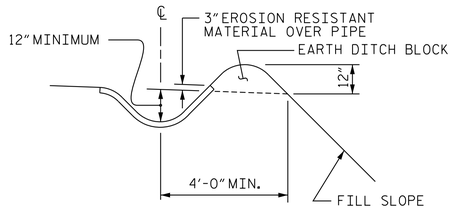



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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



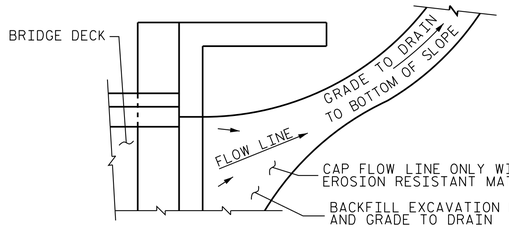

SECTION R-R




SECTION S-S

# 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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# BRIDGE APPROACH SLAB DETAILS

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S2-35 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

ASSEMBLED BY : T. K. BOYD DATE : 01/2025
CHECKED BY : R.M. KROL DATE : 01/2025

DRAWN BY : TLA 10/05
CHECKED BY : GM 5/06

REV. 12/21/11 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

3/18/2025

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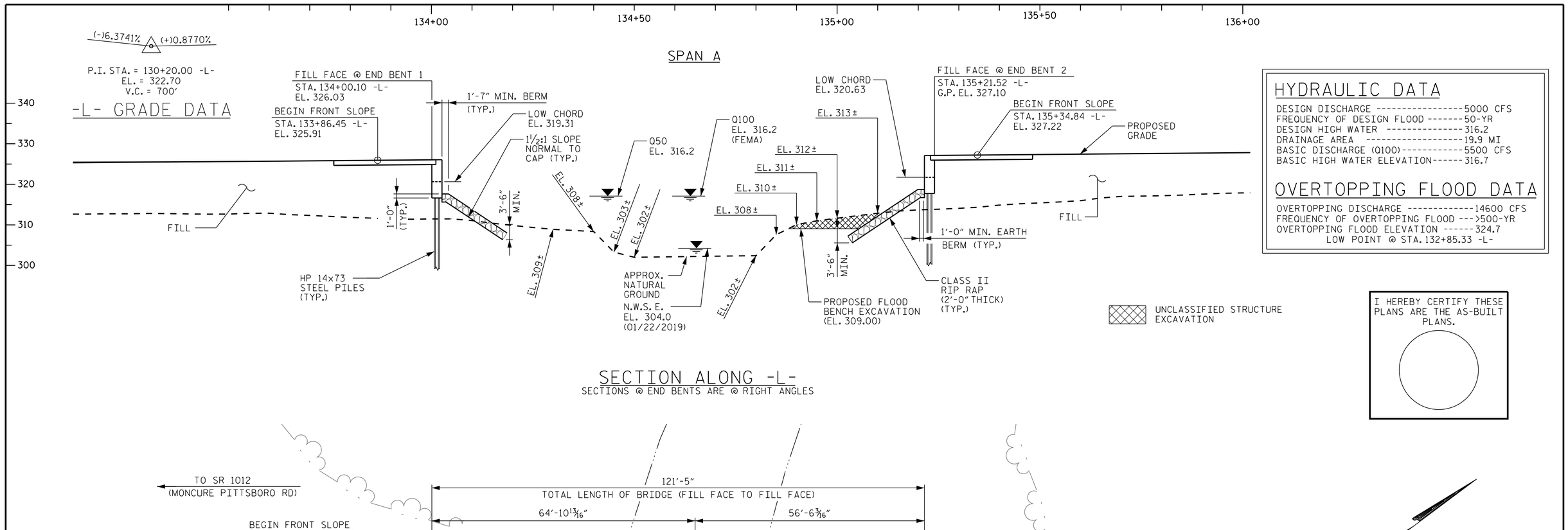
BRIDGE 2L




## HYDRAULIC DATA

| | |
|---|---|
| DESIGN DISCHARGE | 5000 CFS |
| FREQUENCY OF DESIGN FLOOD | 50-YR |
| DESIGN HIGH WATER | 316.2 |
| DRAINAGE AREA | 19.9 MI |
| BASIC DISCHARGE (Q100) | 5500 CFS |
| BASIC HIGH WATER ELEVATION | 316.7 |

## OVERTOPPING FLOOD DATA

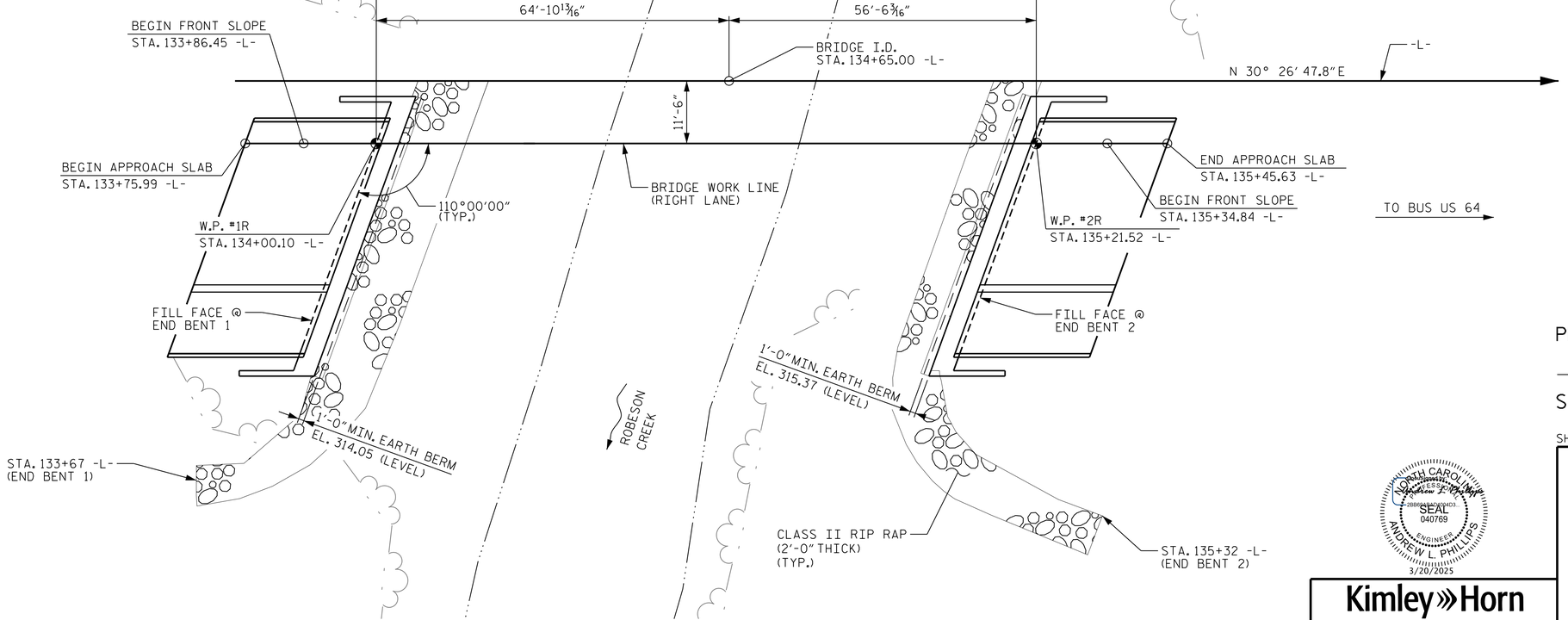
| | |
|---|---|
| OVERTOPPING DISCHARGE | 14600 CFS |
| FREQUENCY OF OVERTOPPING FLOOD | >500-YR |
| OVERTOPPING FLOOD ELEVATION | 324.7 |

LOW POINT @ STA. 132+85.33 -L-

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS.

## SECTION ALONG -L-

SECTIONS @ END BENTS ARE @ RIGHT ANGLES




## PLAN

PILES NOT SHOWN IN PLAN VIEW FOR CLARITY

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# GENERAL DRAWING

FOR BRIDGE OVER ROBESON CREEK
ON SR 2700 (CHATHAM PARK WAY)
BETWEEN
SR 1012 AND BUS US 64

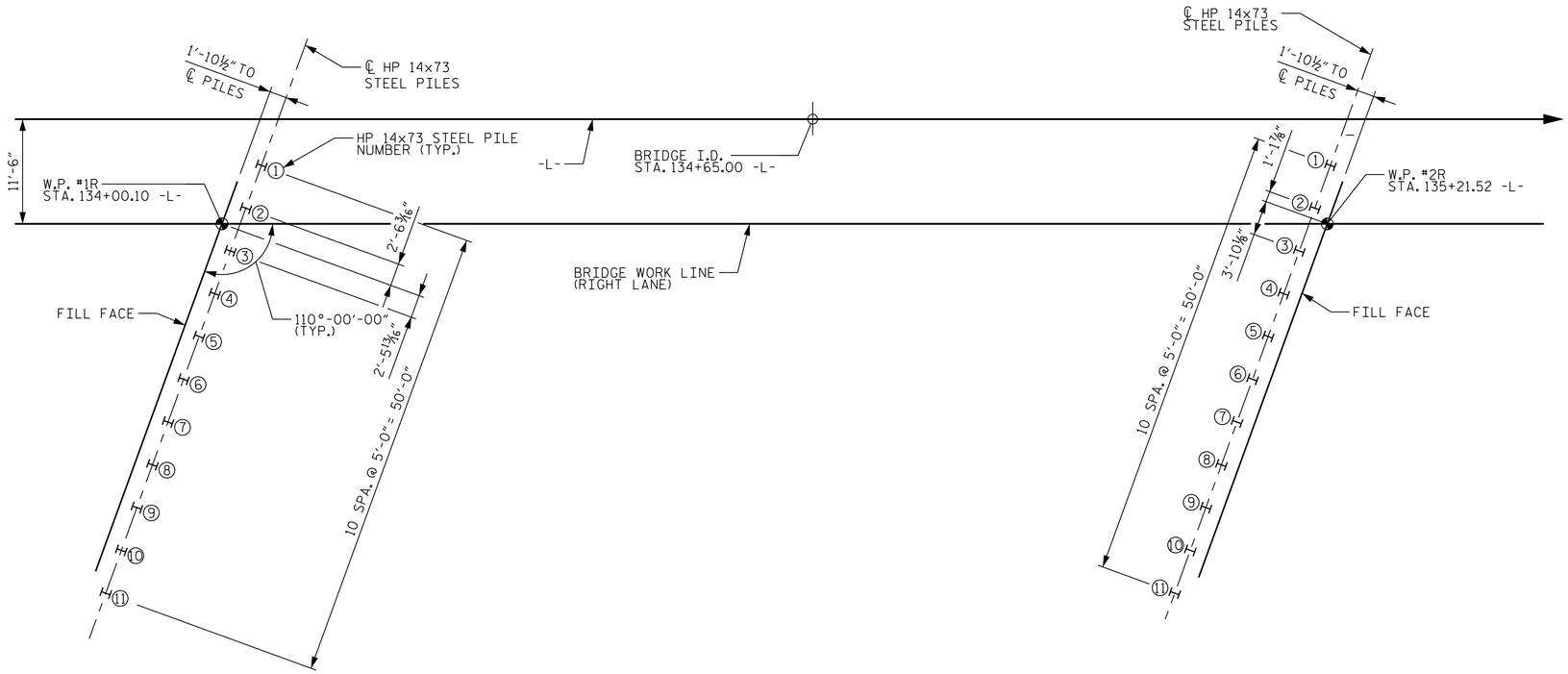
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-1 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 1 OF 4 BRIDGE NO. 180542

BRIDGE 2R

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_G01_180542.dgn




END BENT 1
INTEGRAL

END BENT 2
INTEGRAL

# FOUNDATION LAYOUT

(DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE)

## NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 4

NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
040769
ENGINEER
ANDREW L. PHILLIPS
3/20/2025

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NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# GENERAL DRAWING

FOR BRIDGE OVER ROBESON CREEK
ON SR 2700 (CHATHAM PARK WAY)
BETWEEN
SR 1012 AND BUS US 64

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

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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BRIDGE 2R

# SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

| End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5") | Number of Piles per Line | Factored Resistance per Pile KIPS | Pile Cut-Off (Top of Pile) Elevation FT | Estimated Pile Length per Pile FT | Scour Critical Elevation FT | Driven Piles | | | Predrilling for Piles ** | | | Drilled-In Piles | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Minimum Pile Tip (Tip No Higher Than) Elevation FT | Required Driving Resistance (RDR)* per pile KIPS | Pile Redrives Quantity EACH | Predrilling Length per Pile LIN FT | Predrilling Elevation (Elevation Not To Predrill Below) FT | Maximum Predrilling Diameter INCHES | Pile Excavation (Bottom of Hole) Elevation FT | Pile Excavation Not In Soil per Pile LIN FT | Pile Excavation In Soil per Pile LIN FT |
| End Bent No. 1 (Piles 1-6) | 6 | 220 | See Substructure Plans | 20 | | | 380 | | | | | | | |
| End Bent No. 1 (Piles 7-11) | 5 | 220 | See Substructure Plans | 15 | | | 390 | | | | | | | |
| End Bent No. 2 (Piles 1-6) | 6 | 220 | See Substructure Plans | 25 | | | 370 | | | | | | | |
| End Bent No. 2 (Piles 7-11) | 5 | 220 | See Substructure Plans | 15 | | | 370 | | | | | | | |
| | | | | | | | | | | | | | | |
| TOTAL QUANTITY: | | | | | | | | | | | | | | |

$$^{*}\,RDR = \frac{Factored\ Resistance + Factored\ Drag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Drag\ Load\ Resistance + Nominal\ Resistance\ from\ Scourable\ Material$$

** Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

# PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

| End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5") | Factored Axial Load per Pile KIPS | Factored Drag Load per Pile KIPS | Factored Dead Load * per Pile KIPS | Dynamic Resistance Factor | Nominal Drag Resistance per Pile KIPS | Nominal Scour Resistance per Pile KIPS |
|---|---|---|---|---|---|---|
| End Bent No. 1 (Piles 1-6) | 220 | 5 | | 0.60 | 4 | |
| End Bent No. 1 (Piles 7-11) | 220 | 8.75 | | 0.60 | 7 | |
| End Bent No. 2 (Piles 1-11) | 220 | | | 0.60 | | |
| | | | | | | |
| | | | | | | |

* Factored Dead Load is factored weight of pile above the ground line.

# SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

| End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5") | Pipe Pile Plates EACH | Steel Pile Points | | |
|---|---|---|---|---|
| | | Pipe Pile Cutting Shoes EACH | Pipe Pile Conical Points EACH | H-Pile Points EACH |
| End Bent No. 1 (Piles 1-11) | | | | 11 |
| End Bent No. 2 (Piles 1-11) | | | | 11 |
| | | | | |
| | | | | |
| | | | | |
| TOTAL QUANTITY: | | | | 22 |
| | | | | |

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Kelly de Montbrun, #045542) on 01-13-2025.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
3/20/2025

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NC LICENSE # F-0102



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DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
PILE FOUNDATION TABLES

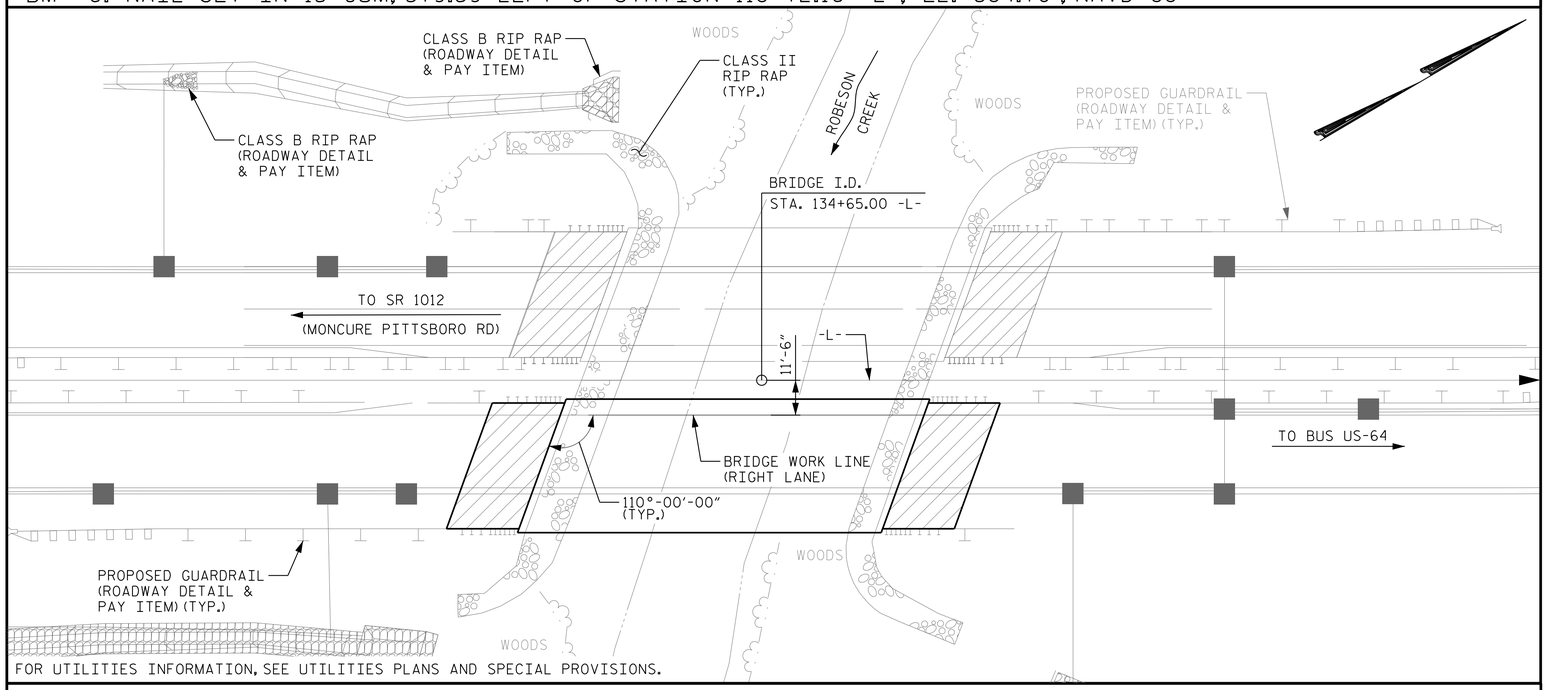
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-3 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-
SHEET 3 OF 4

BRIDGE 2R

K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_FT1_180542.dgn
3/18/2025

BM #6: NAIL SET IN 15' GUM, 379.59' LEFT OF STATION 118+72.16 -L-, EL. 384.70', NAVD 88




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 11'-6" RIGHT AND 50'-0" LEFT OF BRIDGE WORKLINE (LEFT LANE) 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 EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THIS STRUCTURE WAS EVALUATED WITH "HEC-18 EVALUATING SCOUR AT BRIDGES."

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

## TOTAL BILL OF MATERIAL

| | UNCLASSIFIED STRUCTURE EXCAVATION | REINFORCED CONCRETE DECK SLAB | GROOVING BRIDGE FLOORS | CLASS A CONCRETE | BRIDGE APPROACH SLABS | REINFORCING STEEL | FIB 54" PRESTRESSED CONCRETE GIRDERS | | PILE DRIVING EQUIPMENT SETUP FOR HP 14x73 STEEL PILES | HP 14x73 STEEL PILES | | STEEL PILE POINTS | TWO BAR METAL RAIL | CONCRETE BARRIER RAIL | 1'-2"X 2'-6" CONCRETE PARAPET | RIP RAP CLASS II (2'-0" THICK) | GEOTEXTILE FOR DRAINAGE | ELASTOMERIC BEARINGS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LUMP SUM | SQ. FT. | SQ. FT. | CU. YDS. | LUMP SUM | LBS. | NO. | LIN. FT. | EA. | NO. | LIN. FT. | EA. | LIN. FT. | LIN. FT. | LIN. FT. | TONS | SQ. YDS. | LUMP SUM |
| SUPERSTRUCTURE | LUMP SUM | 5,434 | 5,938 | | LUMP SUM | | 5 | 589.79 | | | | | 112.1 | 289.3 | 119.6 | | | LUMP SUM |
| END BENT 1 | | | | 41.3 | | 5,848 | | | 11 | 11 | 195 | 11 | | | | 160 | 178 | |
| END BENT 2 | | | | 40.5 | | 5,745 | | | 11 | 11 | 225 | 11 | | | | 250 | 278 | |
| TOTAL | LUMP SUM | 5,434 | 5,938 | 81.8 | LUMP SUM | 11,593 | 5 | 589.79 | 22 | 22 | 420 | 22 | 112.1 | 289.3 | 119.6 | 410 | 456 | LUMP SUM |

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS 3/20/2025

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NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER ROBESON CREEK
ON SR 2700 (CHATHAM PARK WAY)
BETWEEN
SR 1012 AND BUS US 64

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

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

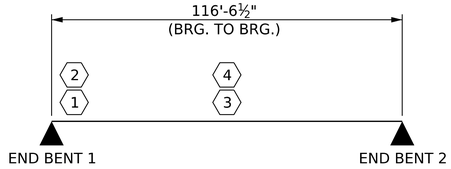
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_CD2_180542.dgn

BRIDGE 2R

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

| LOAD TYPE | | 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 (γ LL) | 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) | LIVE-LOAD FACTORS ( γ LL) | DISTRIBUTION FACTORS (DF) | RATING FACTOR | SPAN | GIRDER LOCATION | DISTANCE FROM LEFT END OF SPAN (ft) | |
| DESIGN LOAD | | HL-93 (INVENTORY) | N/A | ⟨1⟩ | 1.04 | -- | 1.75 | 0.870 | 1.33 | A | E | 58.270 | 0.920 | 1.04 | A | I | 11.654 | 0.80 | 0.870 | 1.15 | A | E | 58.270 | |
| | | HL-93 (OPERATING) | N/A | | 1.38 | -- | 1.35 | 0.870 | 1.92 | A | E | 58.270 | 0.920 | 1.38 | A | I | 11.654 | N/A | -- | -- | -- | -- | -- | |
| | | HS-20 (INVENTORY) | 36.000 | ⟨2⟩ | 1.48 | 53.28 | 1.75 | 0.870 | 1.72 | A | E | 58.270 | 0.920 | 1.48 | A | I | 11.654 | 0.80 | 0.870 | 1.67 | A | E | 58.270 | |
| | | HS-20 (OPERATING) | 36.000 | | 1.96 | 70.56 | 1.35 | 0.870 | 2.49 | A | E | 58.270 | 0.920 | 1.96 | A | I | 11.654 | N/A | -- | -- | -- | -- | -- | |
| LEGAL LOAD | SINGLE VEHICLE (SV) | SNSH | 13.500 | | 4.04 | 54.54 | 1.40 | 0.870 | 5.81 | A | E | 58.270 | 0.920 | 4.86 | A | I | 11.654 | 0.80 | 0.870 | 4.04 | A | E | 58.270 | |
| | | SNGARBS2 | 20.000 | | 2.89 | 57.80 | 1.40 | 0.870 | 4.16 | A | E | 58.270 | 0.920 | 3.35 | A | I | 11.654 | 0.80 | 0.870 | 2.89 | A | E | 58.270 | |
| | | SNAGRIS2 | 22.000 | | 2.69 | 59.18 | 1.40 | 0.870 | 3.87 | A | E | 58.270 | 0.920 | 3.07 | A | I | 11.654 | 0.80 | 0.870 | 2.69 | A | E | 58.270 | |
| | | SNCOTTS3 | 27.250 | | 2.01 | 54.77 | 1.40 | 0.870 | 2.89 | A | E | 58.270 | 0.920 | 2.36 | A | I | 11.654 | 0.80 | 0.870 | 2.01 | A | E | 58.270 | |
| | | SNAGGRS4 | 34.925 | | 1.63 | 56.93 | 1.40 | 0.870 | 2.35 | A | E | 58.270 | 0.920 | 1.89 | A | I | 11.654 | 0.80 | 0.870 | 1.63 | A | E | 58.270 | |
| | | SNS5A | 35.550 | | 1.60 | 56.88 | 1.40 | 0.870 | 2.30 | A | E | 58.270 | 0.920 | 1.89 | A | I | 11.654 | 0.80 | 0.870 | 1.60 | A | E | 58.270 | |
| | | SNS6A | 39.950 | | 1.45 | 57.93 | 1.40 | 0.870 | 2.08 | A | E | 58.270 | 0.920 | 1.70 | A | I | 11.654 | 0.80 | 0.870 | 1.45 | A | E | 58.270 | |
| | | SNS7B | 42.000 | | 1.38 | 57.96 | 1.40 | 0.870 | 1.98 | A | E | 58.270 | 0.920 | 1.64 | A | I | 11.654 | 0.80 | 0.870 | 1.38 | A | E | 58.270 | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33.000 | | 1.76 | 58.08 | 1.40 | 0.870 | 2.53 | A | E | 58.270 | 0.920 | 2.06 | A | I | 11.654 | 0.80 | 0.870 | 1.76 | A | E | 58.270 | |
| | | TNT4A | 33.075 | | 1.76 | 58.21 | 1.40 | 0.870 | 2.54 | A | E | 58.270 | 0.920 | 2.02 | A | I | 11.654 | 0.80 | 0.870 | 1.76 | A | E | 58.270 | |
| | | TNT6A | 41.600 | | 1.43 | 59.49 | 1.40 | 0.870 | 2.05 | A | E | 58.270 | 0.920 | 1.71 | A | I | 11.654 | 0.80 | 0.870 | 1.43 | A | E | 58.270 | |
| | | TNT7A | 42.000 | | 1.42 | 59.64 | 1.40 | 0.870 | 2.05 | A | E | 58.270 | 0.920 | 1.68 | A | I | 11.654 | 0.80 | 0.870 | 1.42 | A | E | 58.270 | |
| | | TNT7B | 42.000 | | 1.45 | 60.90 | 1.40 | 0.870 | 2.09 | A | E | 58.270 | 0.920 | 1.62 | A | I | 11.654 | 0.80 | 0.870 | 1.45 | A | E | 58.270 | |
| | | TNAGRIT4 | 43.000 | | 1.40 | 60.20 | 1.40 | 0.870 | 2.01 | A | E | 58.270 | 0.920 | 1.57 | A | I | 11.654 | 0.80 | 0.870 | 1.40 | A | E | 58.270 | |
| | | TNAGT5A | 45.000 | ⟨3⟩ | 1.32 | 59.40 | 1.40 | 0.870 | 1.90 | A | E | 58.270 | 0.920 | 1.53 | A | I | 11.654 | 0.80 | 0.870 | 1.32 | A | E | 58.270 | |
| | | TNAGT5B | 45.000 | | 1.32 | 59.40 | 1.40 | 0.870 | 1.89 | A | E | 58.270 | 0.920 | 1.49 | A | I | 11.654 | 0.80 | 0.870 | 1.32 | A | E | 58.270 | |
| EMERGENCY VEHICLE (EV) | | EV2 | 28.750 | | 2.03 | 58.36 | 1.30 | 0.870 | 3.15 | A | E | 58.270 | 0.920 | 2.49 | A | I | 11.654 | 0.80 | 0.870 | 2.03 | A | E | 58.270 | |
| | | EV3 | 43.000 | ⟨4⟩ | 1.34 | 57.62 | 1.30 | 0.870 | 2.08 | A | E | 58.270 | 0.920 | 1.64 | A | I | 11.654 | 0.80 | 0.870 | 1.34 | A | E | 58.270 | |




LRFR SUMMARY

## LOAD FACTORS:

| DESIGN LOAD RATING FACTORS | LIMIT STATE | γDC | γDW |
|---|---|---|---|
| | 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.

2.

3.

4.

| ⟨#⟩ CONTROLLING LOAD RATING |
|---|
| ⟨1⟩ DESIGN LOAD RATING (HL-93) |
| ⟨2⟩ DESIGN LOAD RATING (HS-20) |
| ⟨3⟩ LEGAL LOAD RATING * * |
| ⟨4⟩ EMERGENCY VEHICLE LOAD RATING ** |
| * * SEE CHART FOR VEHICLE TYPE |
| **GIRDER LOCATION** |
| I - INTERIOR GIRDER |
| EL - EXTERIOR LEFT GIRDER |
| ER - EXTERIOR RIGHT GIRDER |

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

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Raleigh, NC 27601-1772
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NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

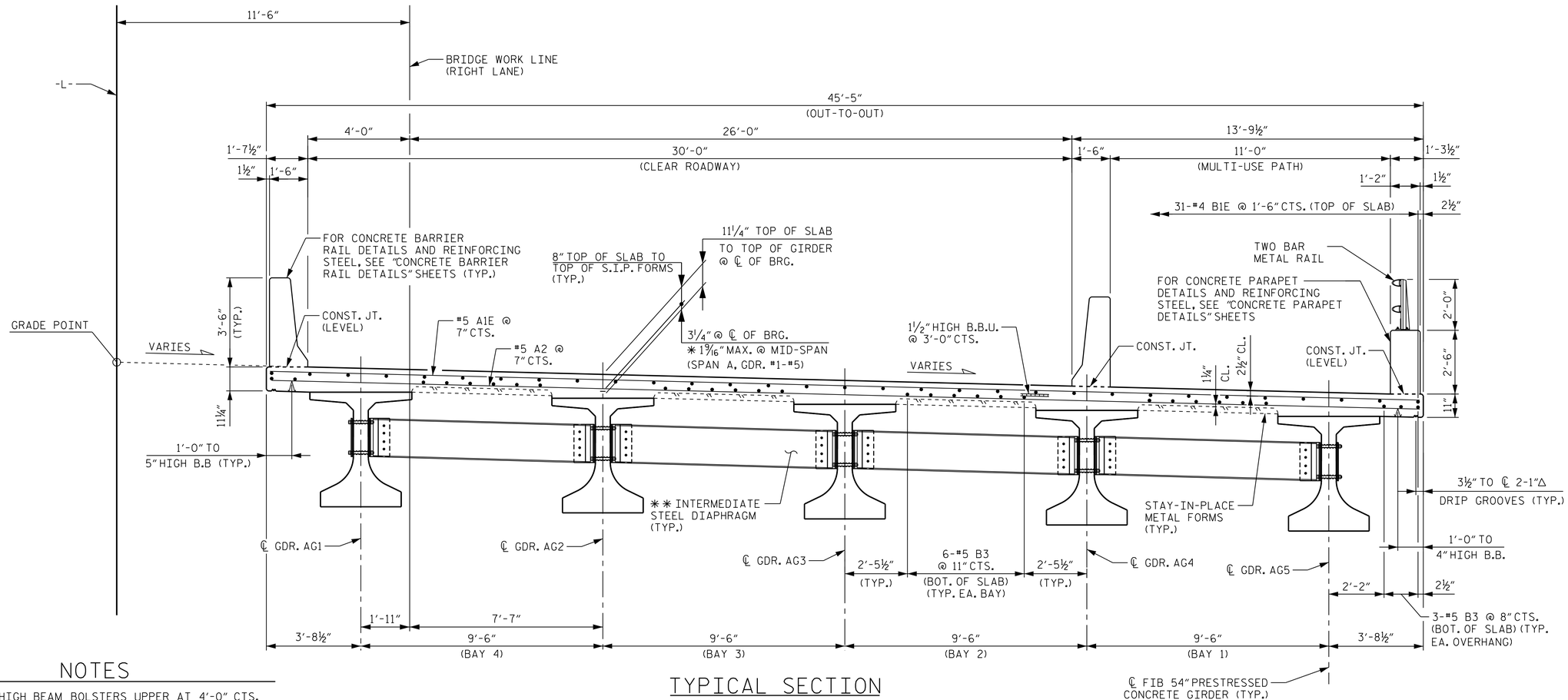
(NON-INTERSTATE TRAFFIC)

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-5 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_003_180542.dgn




## TYPICAL SECTION

(SHOWING INTERMEDIATE DIAPHRAGM)

✳BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

## 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 GIRDERS.

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

✳✳FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 54" F.I.B." SHEET.

SEE ROADWAY PLANS FOR STATIONS AT SUPERELEVATION TRANSITION.

| | | |
|---|---|---|
| DRAWN BY: T. K. BOYD | DATE: 01/2025 |
| CHECKED BY: E. W. SPRABERRY | DATE: 01/2025 |
| DESIGN ENGINEER OF RECORD: A. L. PHILLIPS | DATE: 01/2025 |

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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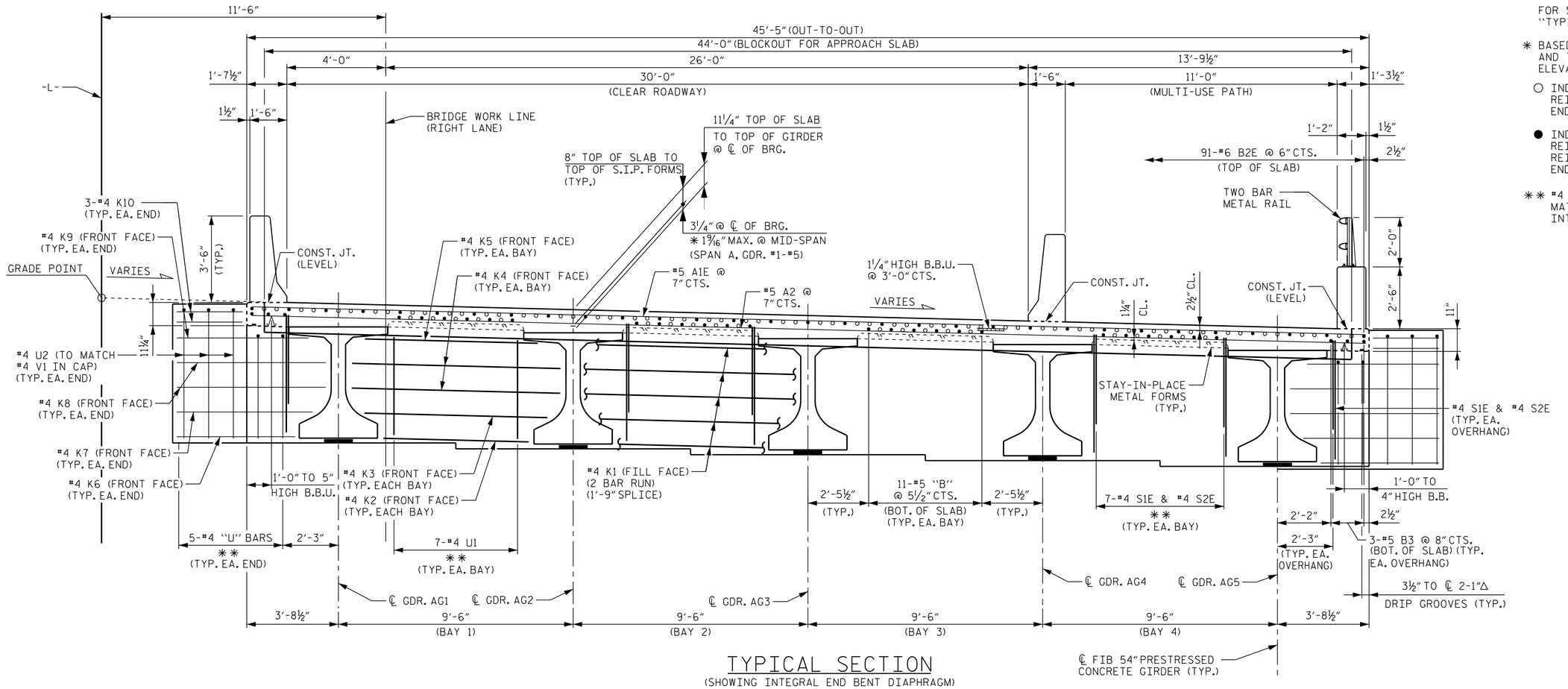
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

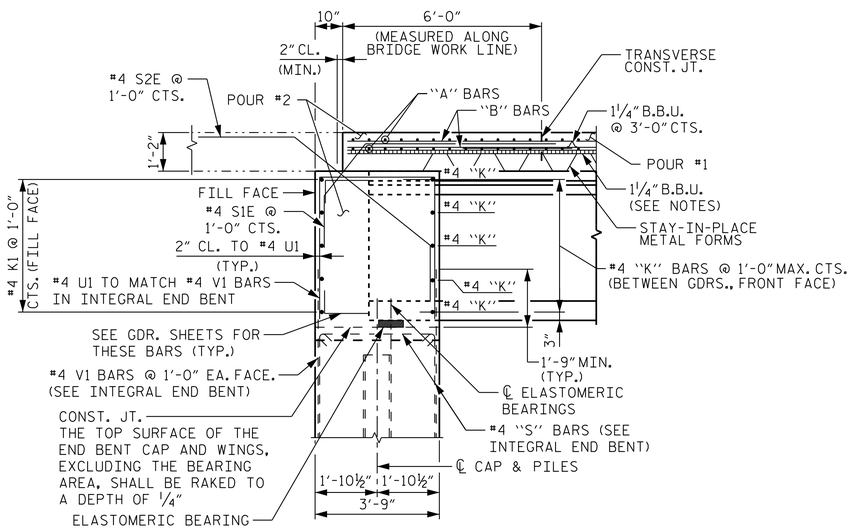
TYPICAL SECTION

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-6 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

BRIDGE 2R




## TYPICAL SECTION
(SHOWING INTEGRAL END BENT DIAPHRAGM)




## END OF GIRDER DETAIL AT INTEGRAL END BENT

## NOTES

FOR SUPERSTRUCTURE NOTES, SEE "TYPICAL SECTION" SHEET 1 OF 2.

* BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

○ INDICATES NON-CONTINUOUS REINFORCING STEEL OVER INTEGRAL END BENT.

● INDICATES CONTINUOUS REINFORCING STEEL SPLICED WITH REINFORCING STEEL OVER INTEGRAL END BENT

** #4 S1E, #4 S2E, AND #4 U1 BARS TO MATCH WITH THE #4 "V" BARS IN INTEGRAL END BENT CAP

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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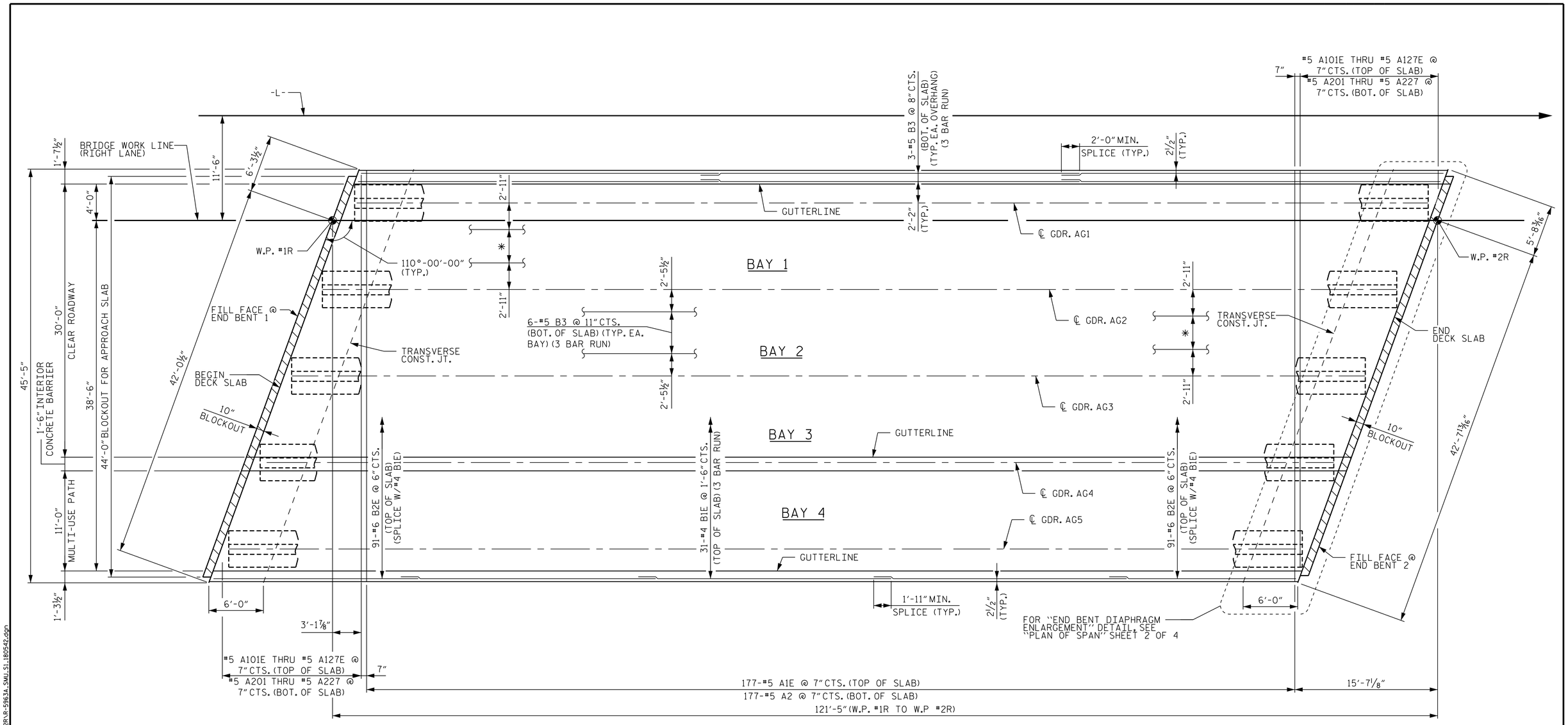
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-7 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025 K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_TS2_180542.dgn

BRIDGE 2R




# PLAN OF SPAN

✱5-#5 B4 @ 11" CTS. (BOT. OF SLAB) (TYP. EA BAY OVER INTEGRAL END BENT)

## NOTES

FOR NOTES, SEE "PLAN OF SPAN" SHEET 2 OF 4.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS
3/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
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| 1 | | | 3 | | | TOTAL SHEETS |
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BRIDGE 2R

## NOTES:

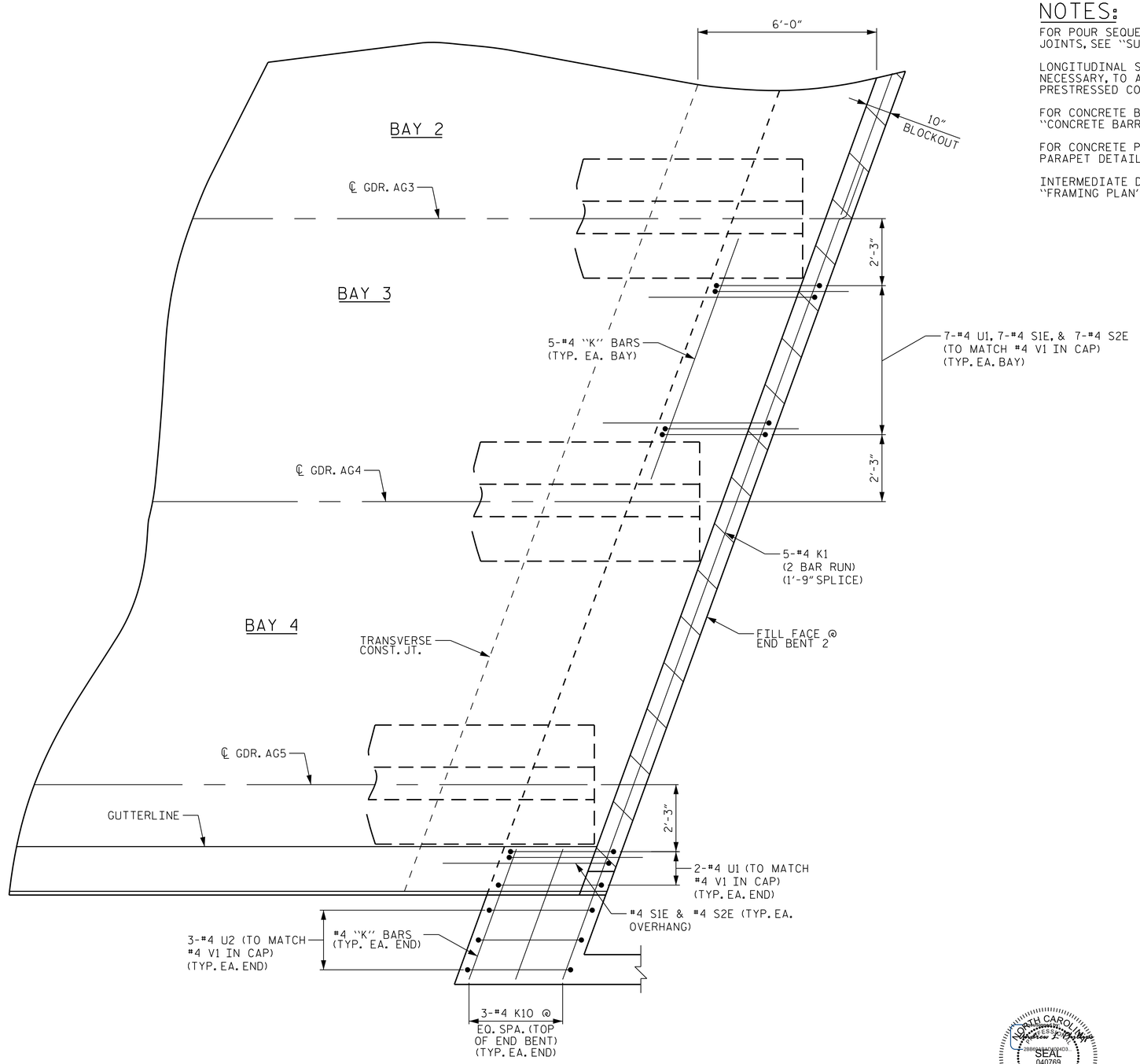
FOR POUR SEQUENCE AND LOCATION OF CONSTRUCTION JOINTS, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

FOR CONCRETE BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL DETAILS" SHEET.

FOR CONCRETE PARAPET REINFORCING STEEL, SEE "CONCRETE PARAPET DETAILS" SHEET.

INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY, SEE "FRAMING PLAN" SHEET.




## END BENT DIAPHRAGM ENLARGEMENT

(END BENT 2 SHOWN, END BENT 1 SIMILAR)

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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NC LICENSE # F-0102



PROJECT NO. R-5963A
CHATHAM COUNTY
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SHEET 2 OF 4

STATE OF NORTH CAROLINA
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RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

| REVISIONS | | | | | | SHEET NO. |
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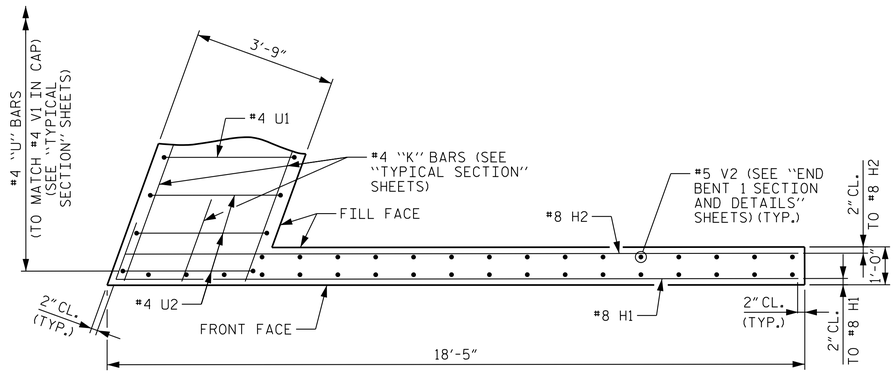
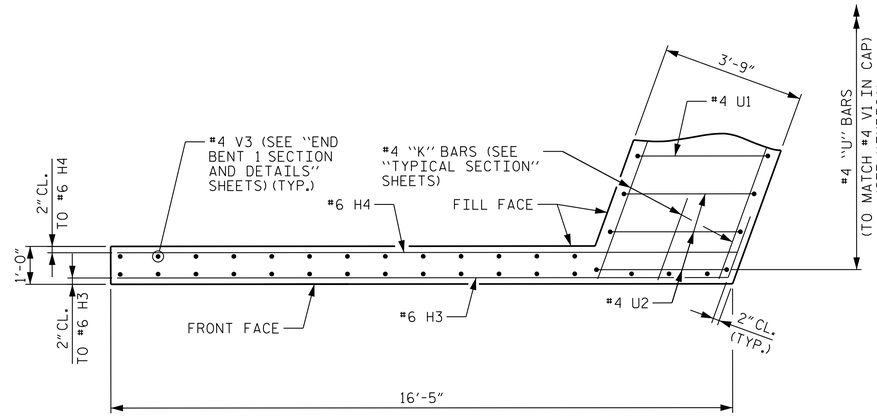
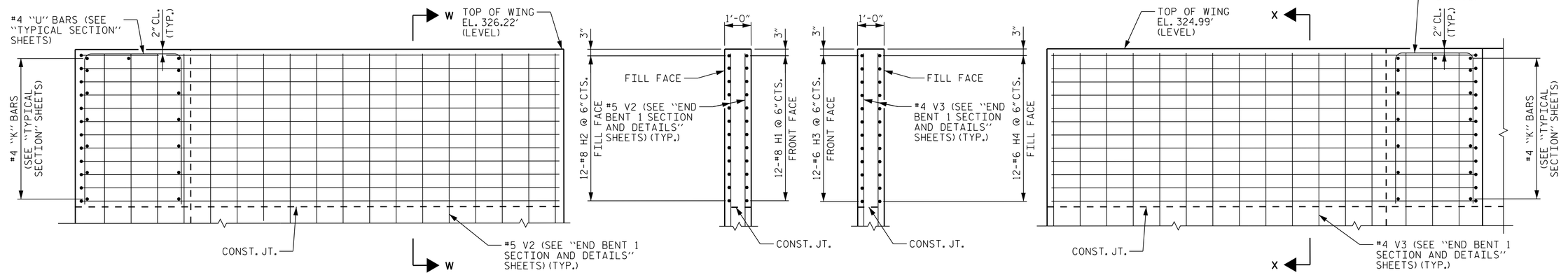
BRIDGE 2R




PLAN OF WING W1




PLAN OF WING W2




ELEVATION OF WING W1 | SECTION W-W | SECTION X-X | ELEVATION OF WING W2

## UPPER WINGS AT INTEGRAL END BENT 1

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "END BENT 1 SECTION AND DETAILS" SHEETS

PROJECT NO. R-5963A

CHATHAM COUNTY

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SHEET 3 OF 4

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PLAN OF SPAN DETAILS @ END BENT 1

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|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-10 |
| 1 | | | 3 | | | TOTAL SHEETS |
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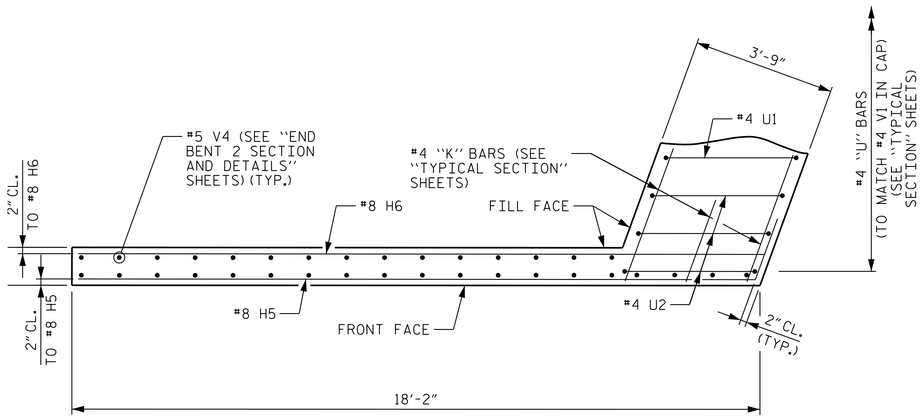
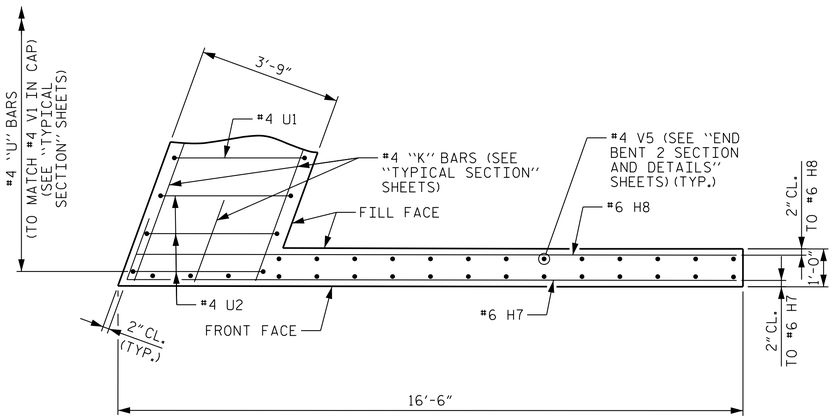
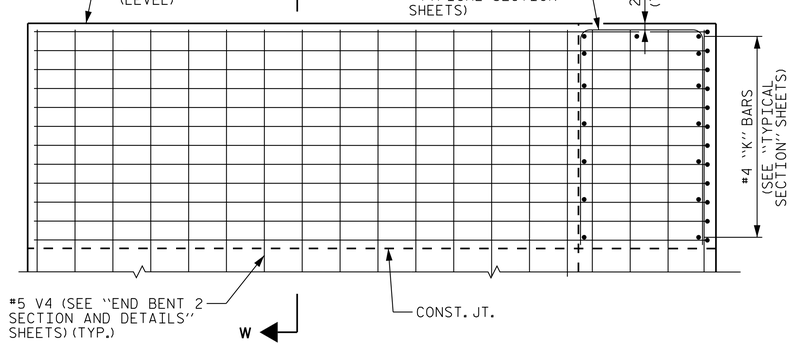


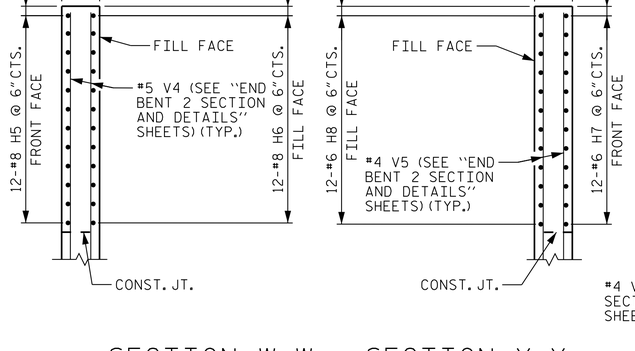

PLAN OF WING W3



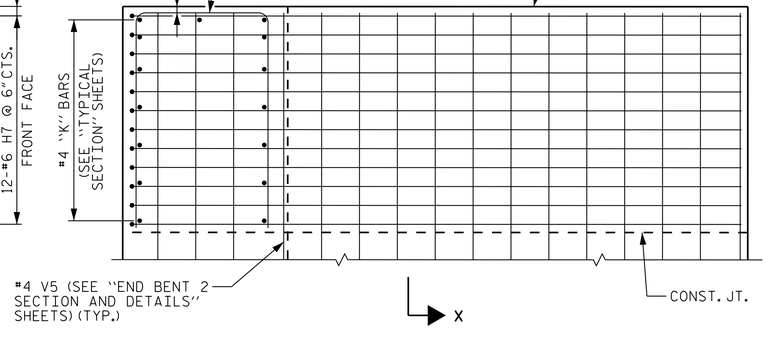

PLAN OF WING W4




ELEVATION OF WING W3




SECTION W-W SECTION X-X




ELEVATION OF WING W4

# UPPER WINGS AT INTEGRAL END BENT 2

FOR LOWER WING REINFORCING STEEL AND DETAILS, SEE "END BENT 2 SECTION AND DETAILS" SHEETS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE

PLAN OF SPAN DETAILS @ END BENT 2

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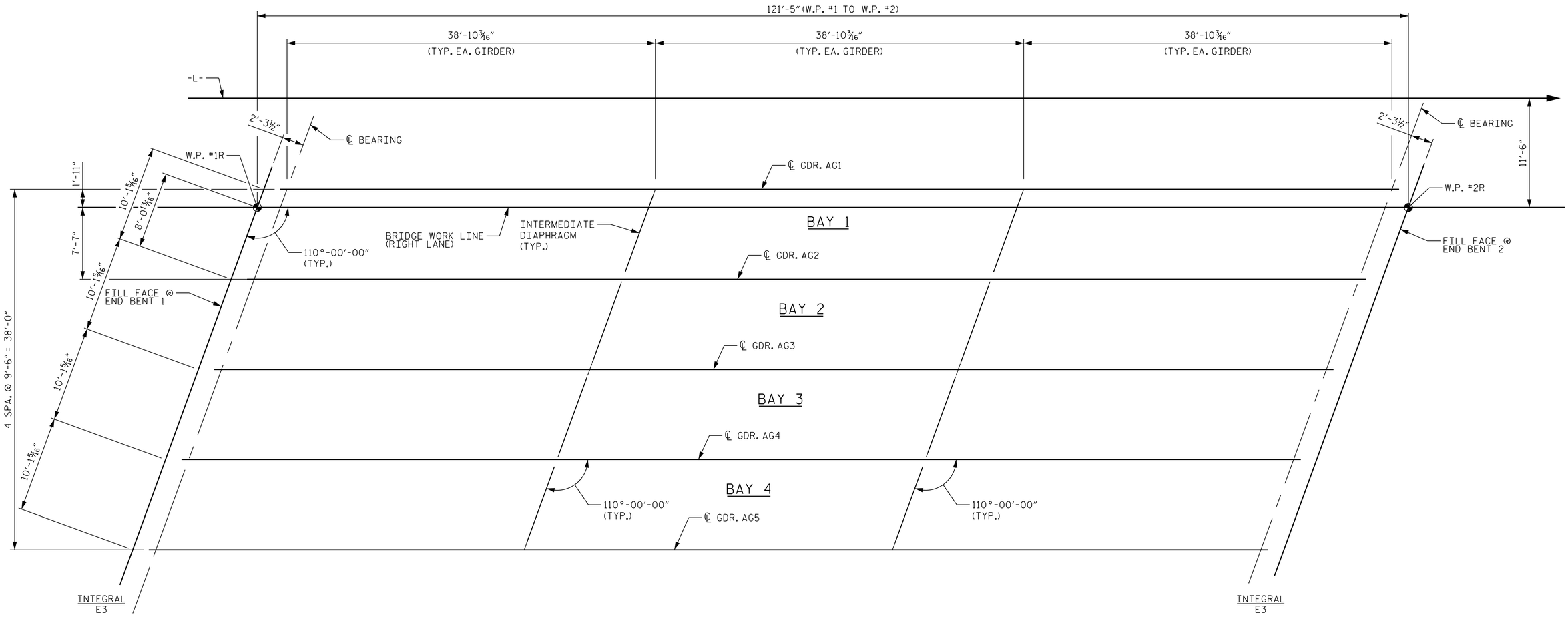
BRIDGE 2R

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# FRAMING PLAN

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3/20/2025

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BRIDGE 2R

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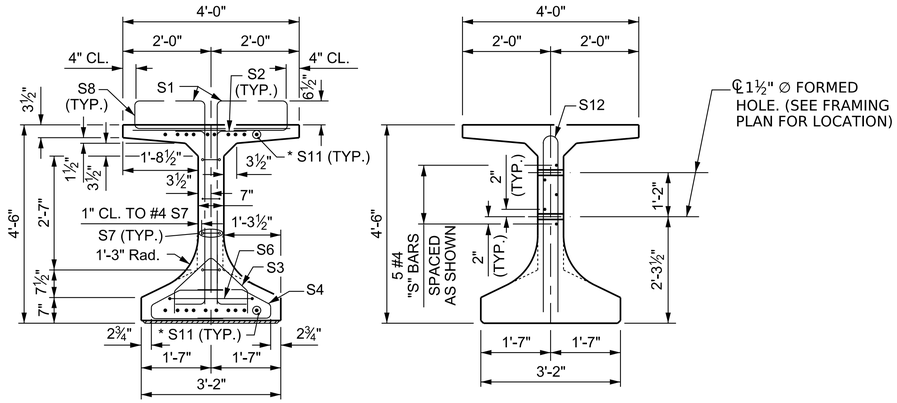


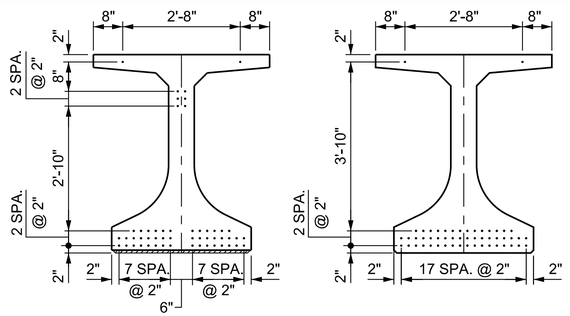

## SECTION A-A

* FOR S11 BARS, SEE DETAIL "A" ON SHEET 2 OF 3




## SECTION C-C

(S8 AND S10 BARS NOT SHOWN)



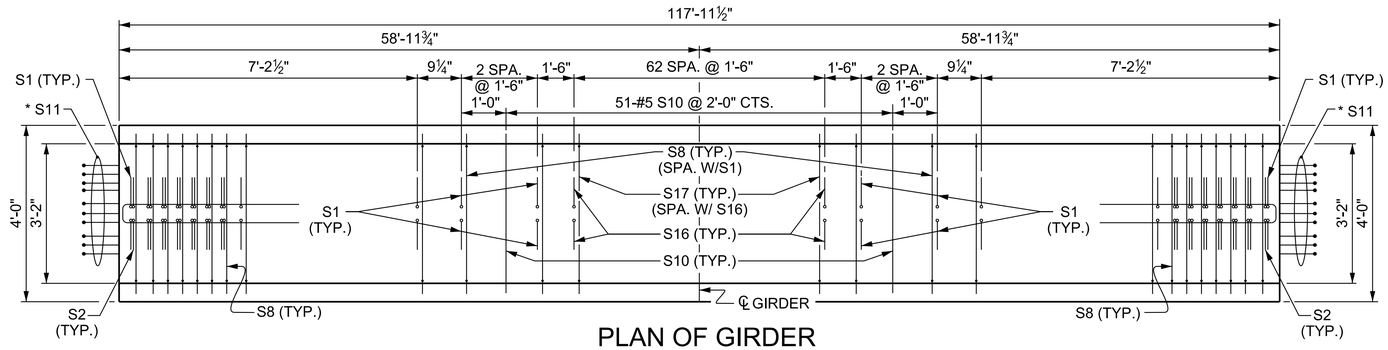

AT END OF GIRDER

AT ℄ OF GIRDER

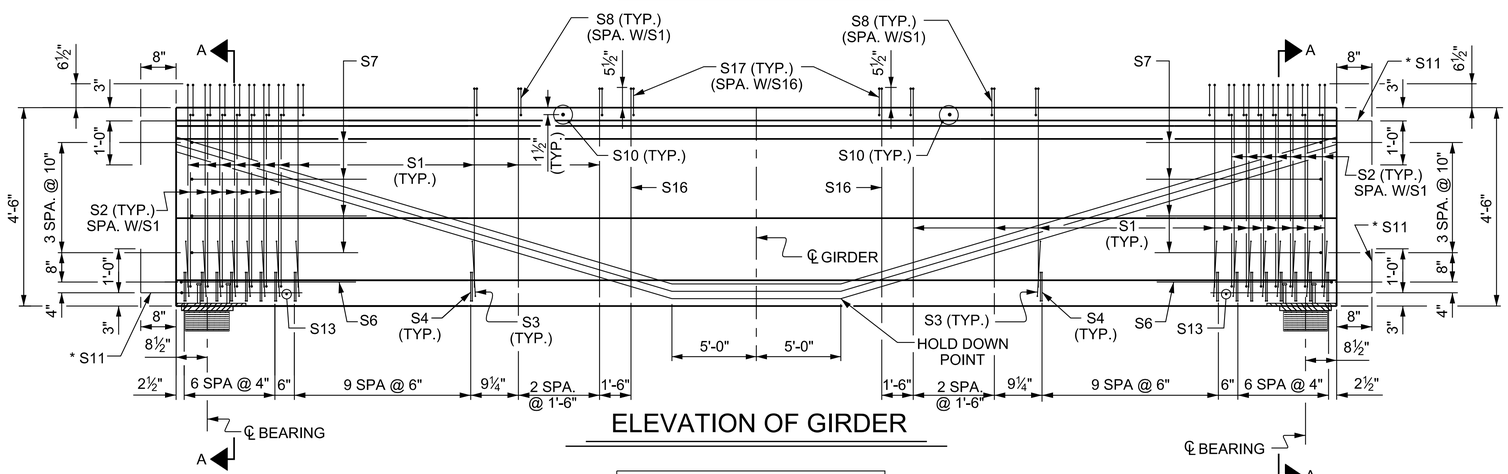
## 0.6" Ø LOW RELAXATION STRAND LAYOUT

### DEBONDING LEGEND

- FULLY BONDED STRANDS



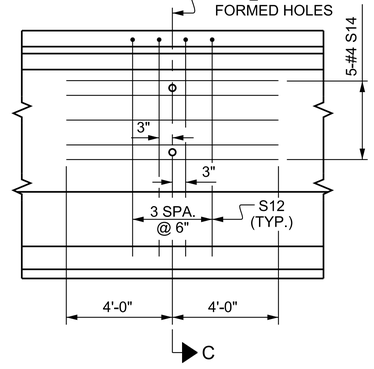

## PLAN OF GIRDER




## ELEVATION OF GIRDER

* NOTE:

S11 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.




## PARTIAL ELEVATION

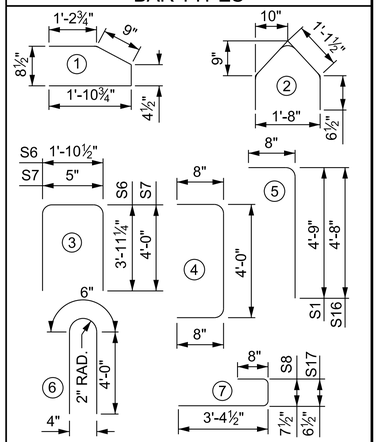
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1-5

| 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 GDR

| BAR | NUMBER | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| S1 | 80 | #6 | 5 | 5'-5" | 651 |
| S2 | 28 | #6 | 4 | 5'-4" | 224 |
| S3 | 34 | #3 | 2 | 3'-4" | 43 |
| S4 | 68 | #3 | 1 | 4'-3" | 109 |
| S6 | 2 | #5 | 3 | 9'-9" | 20 |
| S7 | 8 | #4 | 3 | 8'-5" | 45 |
| S8 | 80 | #5 | 7 | 4'-8" | 389 |
| S10 | 51 | #5 | STR | 3'-8" | 195 |
| * S11 | 40 | #6 | STR | 4'-8" | 280 |
| S12 | 8 | #5 | 6 | 8'-6" | 71 |
| S13 | 2 | #3 | STR | 2'-10" | 2 |
| S14 | 10 | #4 | STR | 8'-0" | 53 |
| S16 | 126 | #5 | 5 | 5'-4" | 701 |
| S17 | 126 | #5 | 7 | 4'-7" | 602 |
| | | | | | |
| | | | | | |

### BAR TYPES




ALL BAR DIMENSIONS ARE OUT-TO-OUT

### QUANTITIES FOR ONE GIRDER

| REINFORCING STEEL | 9,000 PSI CONCRETE | 0.6" Ø L.R. STRANDS |
|---|---|---|
| LB. | C.Y. | No. |
| 3,385 | 28.3 | 52 |
| | | |

### GIRDERS REQUIRED

| NUMBER | LENGTH | TOTAL LENGTH |
|---|---|---|
| 5 | 117'-11½" | 589'-9½" |
| | | |

PROJECT NO. R-5963A

CHATHAM COUNTY

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SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# 54" FIB PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

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3/20/2025

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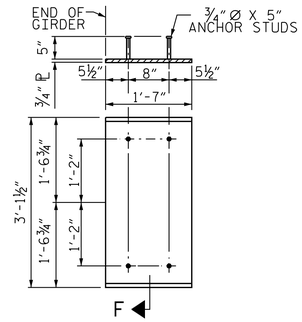
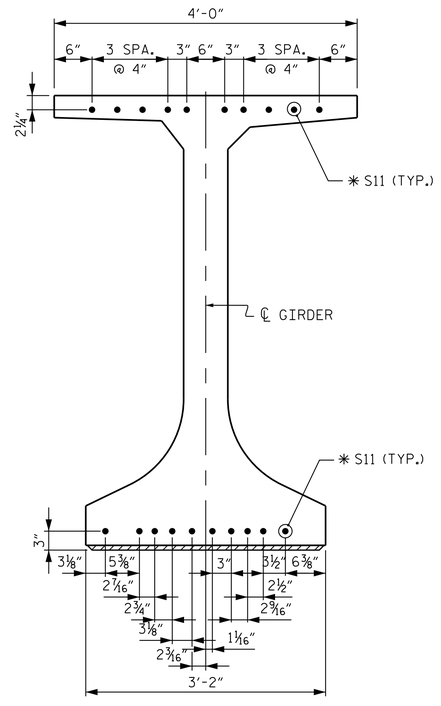
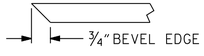



## EMBEDDED PLATE "B-1" DETAILS FOR FIB GIRDER

(2 REQ'D PER GIRDER)




## DETAIL "A"




## SECTION "F"

(SEE NOTES)

# 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.

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 SUB SECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,000 PSI.

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

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼".

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 ½" OF THE THEORETICAL LOCATION SHOWN.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
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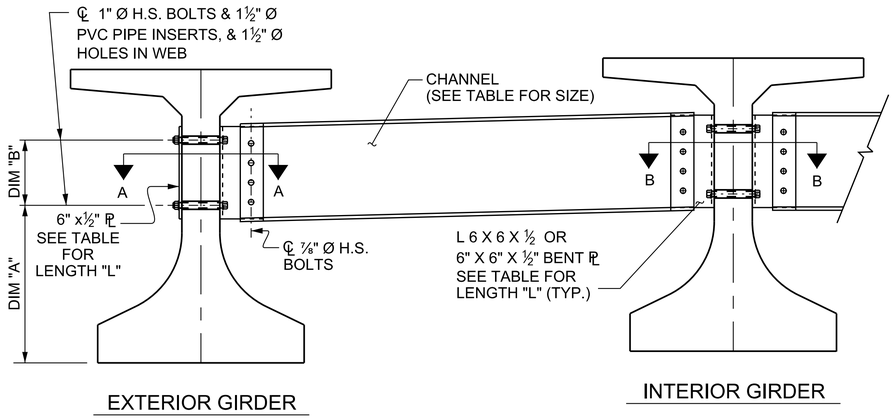
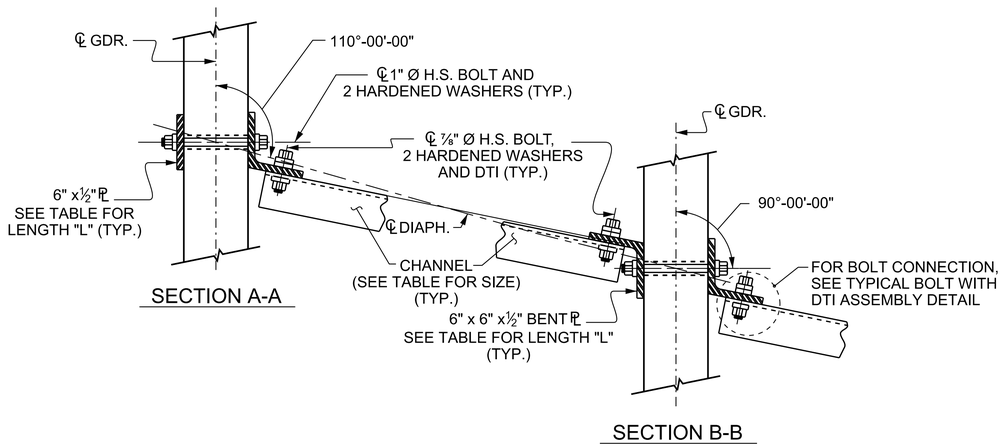
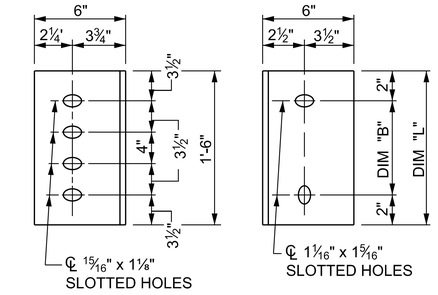
BRIDGE 2R STD. NO. FIB54




## PART SECTION AT INTERMEDIATE DIAPHRAGM

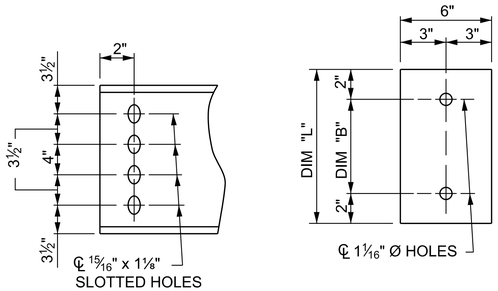



## CONNECTION DETAILS

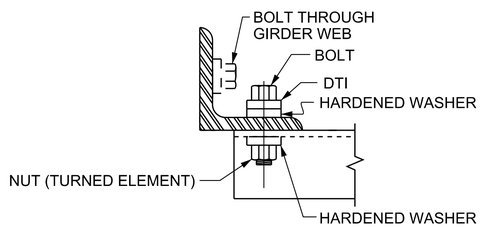



DIAPHRAGM FACE WEB FACE

## CONNECTOR PLATE DETAILS




CHANNEL END PLATE DETAILS




## BOLT WITH DTI ASSEMBLY DETAIL

## 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 ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

THE PLATES, BENT PLATES, 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 GIRDER 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 GIRDERS 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 GIRDERS.

## TABLE

| GIRDER TYPE | CHANNEL SIZE | DIM "A" | DIM "B" | DIM "L" |
|---|---|---|---|---|
| 54" FIB | MC 18 x 42.7 | 2'-3½" | 1'-2" | 1'-6" |

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS
FOR 54"FIB

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-15 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025 K:\ROT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_G4_180542.dgn

BRIDGE 2R STD. NO. FIB 54

# DEAD LOAD DEFLECTION TABLE FOR GIRDERS

## SPAN A

### GIRDER AG1

| FORTIETH POINTS | BRG. | 0.025 | 0.050 | 0.075 | 0.100 | 0.125 | 0.150 | 0.175 | 0.200 | 0.225 | 0.250 | 0.275 | 0.300 | 0.325 | 0.350 | 0.375 | 0.400 | 0.425 | 0.450 | 0.475 | 0.500 | 0.525 | 0.550 | 0.575 | 0.600 | 0.625 | 0.650 | 0.675 | 0.700 | 0.725 | 0.750 | 0.775 | 0.800 | 0.825 | 0.850 | 0.875 | 0.900 | 0.925 | 0.950 | 0.975 | BRG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAMBER (GIRDER ALONE IN PLACE) ↑ | 0.000 | 0.036 | 0.073 | 0.109 | 0.145 | 0.172 | 0.199 | 0.226 | 0.252 | 0.271 | 0.289 | 0.308 | 0.326 | 0.337 | 0.348 | 0.359 | 0.370 | 0.373 | 0.377 | 0.380 | 0.384 | 0.380 | 0.377 | 0.373 | 0.370 | 0.359 | 0.348 | 0.337 | 0.326 | 0.308 | 0.289 | 0.271 | 0.252 | 0.226 | 0.199 | 0.172 | 0.145 | 0.109 | 0.073 | 0.036 | 0.000 |
| ✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓ | 0.000 | 0.018 | 0.036 | 0.054 | 0.072 | 0.089 | 0.106 | 0.123 | 0.140 | 0.153 | 0.167 | 0.180 | 0.193 | 0.202 | 0.210 | 0.219 | 0.227 | 0.230 | 0.233 | 0.236 | 0.239 | 0.236 | 0.233 | 0.230 | 0.227 | 0.219 | 0.210 | 0.202 | 0.193 | 0.180 | 0.167 | 0.153 | 0.140 | 0.123 | 0.106 | 0.089 | 0.072 | 0.054 | 0.036 | 0.018 | 0.000 |
| FINAL CAMBER ↑ | 0 | 1/4" | 7/16" | 11/16" | 7/8" | 1" | 1 1/8" | 1 1/4" | 1 3/8" | 1 7/16" | 1 1/2" | 1 9/16" | 1 5/8" | 1 5/8" | 1 5/8" | 1 11/16" | 1 11/16" | 1 3/4" | 1 3/4" | 1 3/4" | 1 3/4" | 1 3/4" | 1 3/4" | 1 3/4" | 1 11/16" | 1 11/16" | 1 5/8" | 1 5/8" | 1 5/8" | 1 9/16" | 1 1/2" | 1 7/16" | 1 3/8" | 1 1/4" | 1 1/8" | 1" | 7/8" | 11/16" | 7/16" | 1/4" | 0 |

### GIRDER AG2

| FORTIETH POINTS | BRG. | 0.025 | 0.050 | 0.075 | 0.100 | 0.125 | 0.150 | 0.175 | 0.200 | 0.225 | 0.250 | 0.275 | 0.300 | 0.325 | 0.350 | 0.375 | 0.400 | 0.425 | 0.450 | 0.475 | 0.500 | 0.525 | 0.550 | 0.575 | 0.600 | 0.625 | 0.650 | 0.675 | 0.700 | 0.725 | 0.750 | 0.775 | 0.800 | 0.825 | 0.850 | 0.875 | 0.900 | 0.925 | 0.950 | 0.975 | BRG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAMBER (GIRDER ALONE IN PLACE) ↑ | 0.000 | 0.036 | 0.073 | 0.109 | 0.145 | 0.172 | 0.199 | 0.226 | 0.252 | 0.271 | 0.289 | 0.308 | 0.326 | 0.337 | 0.348 | 0.359 | 0.370 | 0.373 | 0.377 | 0.380 | 0.384 | 0.380 | 0.377 | 0.373 | 0.370 | 0.359 | 0.348 | 0.337 | 0.326 | 0.308 | 0.289 | 0.271 | 0.252 | 0.226 | 0.199 | 0.172 | 0.145 | 0.109 | 0.073 | 0.073 | 0.000 |
| ✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓ | 0.000 | 0.019 | 0.037 | 0.056 | 0.075 | 0.092 | 0.110 | 0.127 | 0.145 | 0.159 | 0.173 | 0.187 | 0.200 | 0.209 | 0.218 | 0.227 | 0.236 | 0.239 | 0.242 | 0.245 | 0.248 | 0.245 | 0.242 | 0.239 | 0.236 | 0.227 | 0.218 | 0.209 | 0.200 | 0.187 | 0.173 | 0.159 | 0.145 | 0.127 | 0.110 | 0.092 | 0.075 | 0.056 | 0.037 | 0.037 | 0.000 |
| FINAL CAMBER ↑ | 0 | 3/16" | 7/16" | 5/8" | 7/8" | 15/16" | 1 1/16" | 1 3/16" | 1 5/16" | 1 5/16" | 1 3/8" | 1 7/16" | 1 1/2" | 1 9/16" | 1 9/16" | 1 9/16" | 1 5/8" | 1 5/8" | 1 5/8" | 1 5/8" | 1 5/8" | 1 5/8" | 1 5/8" | 1 5/8" | 1 5/8" | 1 9/16" | 1 9/16" | 1 9/16" | 1 1/2" | 1 7/16" | 1 3/8" | 1 5/16" | 1 5/16" | 1 3/16" | 1 1/16" | 15/16" | 7/8" | 5/8" | 7/16" | 7/16" | 0 |

### GIRDERS AG3 & AG4

| FORTIETH POINTS | BRG. | 0.025 | 0.050 | 0.075 | 0.100 | 0.125 | 0.150 | 0.175 | 0.200 | 0.225 | 0.250 | 0.275 | 0.300 | 0.325 | 0.350 | 0.375 | 0.400 | 0.425 | 0.450 | 0.475 | 0.500 | 0.525 | 0.550 | 0.575 | 0.600 | 0.625 | 0.650 | 0.675 | 0.700 | 0.725 | 0.750 | 0.775 | 0.800 | 0.825 | 0.850 | 0.875 | 0.900 | 0.925 | 0.950 | 0.975 | BRG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAMBER (GIRDER ALONE IN PLACE) ↑ | 0.000 | 0.036 | 0.073 | 0.109 | 0.145 | 0.172 | 0.199 | 0.226 | 0.252 | 0.271 | 0.289 | 0.308 | 0.326 | 0.337 | 0.348 | 0.359 | 0.370 | 0.373 | 0.377 | 0.380 | 0.384 | 0.380 | 0.377 | 0.373 | 0.370 | 0.359 | 0.348 | 0.337 | 0.326 | 0.308 | 0.289 | 0.271 | 0.252 | 0.226 | 0.199 | 0.172 | 0.145 | 0.109 | 0.073 | 0.073 | 0.000 |
| ✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓ | 0.000 | 0.020 | 0.040 | 0.060 | 0.079 | 0.098 | 0.117 | 0.136 | 0.154 | 0.169 | 0.184 | 0.198 | 0.213 | 0.222 | 0.232 | 0.241 | 0.250 | 0.253 | 0.257 | 0.260 | 0.263 | 0.260 | 0.257 | 0.253 | 0.250 | 0.241 | 0.232 | 0.222 | 0.213 | 0.198 | 0.184 | 0.169 | 0.154 | 0.136 | 0.117 | 0.098 | 0.079 | 0.060 | 0.040 | 0.040 | 0.000 |
| FINAL CAMBER ↑ | 0 | 3/16" | 3/8" | 5/8" | 13/16" | 7/8" | 1" | 1 1/16" | 1 3/16" | 1 1/4" | 1 1/4" | 1 5/16" | 1 3/8" | 1 3/8" | 1 3/8" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 7/16" | 1 3/8" | 1 3/8" | 1 3/8" | 1 5/16" | 1 1/4" | 1 1/4" | 1 3/16" | 1 1/16" | 1" | 7/8" | 13/16" | 5/8" | 3/8" | 3/8" | 0 |

### GIRDER AG5

| FORTIETH POINTS | BRG. | 0.025 | 0.050 | 0.075 | 0.100 | 0.125 | 0.150 | 0.175 | 0.200 | 0.225 | 0.250 | 0.275 | 0.300 | 0.325 | 0.350 | 0.375 | 0.400 | 0.425 | 0.450 | 0.475 | 0.500 | 0.525 | 0.550 | 0.575 | 0.600 | 0.625 | 0.650 | 0.675 | 0.700 | 0.725 | 0.750 | 0.775 | 0.800 | 0.825 | 0.850 | 0.875 | 0.900 | 0.925 | 0.950 | 0.975 | BRG. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAMBER (GIRDER ALONE IN PLACE) ↑ | 0.000 | 0.036 | 0.073 | 0.109 | 0.145 | 0.172 | 0.199 | 0.226 | 0.252 | 0.271 | 0.289 | 0.308 | 0.326 | 0.337 | 0.348 | 0.359 | 0.370 | 0.373 | 0.377 | 0.380 | 0.384 | 0.380 | 0.377 | 0.373 | 0.370 | 0.359 | 0.348 | 0.337 | 0.326 | 0.308 | 0.289 | 0.271 | 0.252 | 0.226 | 0.199 | 0.172 | 0.145 | 0.109 | 0.073 | 0.073 | 0.000 |
| ✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓ | 0.000 | 0.018 | 0.037 | 0.055 | 0.074 | 0.091 | 0.108 | 0.126 | 0.143 | 0.157 | 0.170 | 0.184 | 0.197 | 0.206 | 0.215 | 0.223 | 0.232 | 0.235 | 0.238 | 0.241 | 0.244 | 0.241 | 0.238 | 0.235 | 0.232 | 0.223 | 0.215 | 0.206 | 0.197 | 0.184 | 0.170 | 0.157 | 0.143 | 0.126 | 0.108 | 0.091 | 0.074 | 0.055 | 0.037 | 0.037 | 0.000 |
| FINAL CAMBER ↑ | 0 | 3/16" | 7/16" | 5/8" | 7/8" | 1" | 1 1/16" | 1 3/16" | 1 5/16" | 1 3/8" | 1 7/16" | 1 1/2" | 1 9/16" | 1 9/16" | 1 5/8" | 1 5/8" | 1 5/8" | 1 11/16" | 1 11/16" | 1 11/16" | 1 11/16" | 1 11/16" | 1 11/16" | 1 11/16" | 1 5/8" | 1 5/8" | 1 5/8" | 1 9/16" | 1 9/16" | 1 1/2" | 1 7/16" | 1 3/8" | 1 5/16" | 1 3/16" | 1 1/16" | 1" | 7/8" | 5/8" | 7/16" | 7/16" | 0 |

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

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

NORTH CAROLINA
Andrew L. Phillips
SEAL
040769
ENGINEER
ANDREW L. PHILLIPS
3/20/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



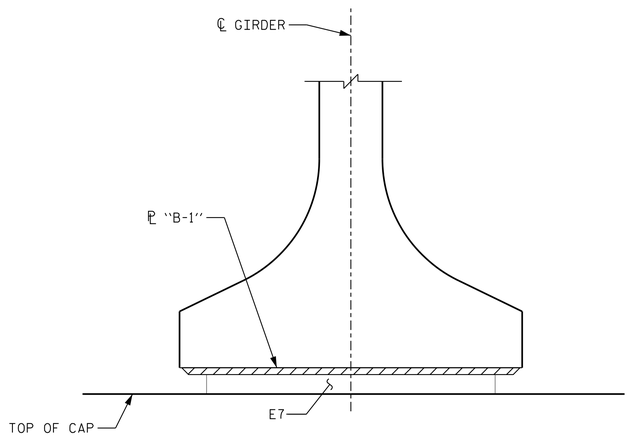
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

# GIRDER DEFLECTION AND CAMBER SCHEDULES

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-16 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

3/18/2025
K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge 2R\R-5963A_SMU_DLL180542.dgn




SECTION E-E

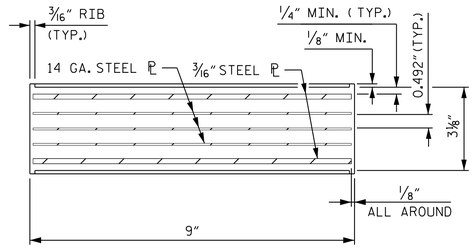
| MAXIMUM ALLOWABLE SERVICE LOADS | |
|---|---|
| D.L.+L.L.(NO IMPACT) | |
| TYPE VIII | 390 K |

| MAXIMUM ALLOWABLE EXPANSION LENGTH | |
|---|---|
| TYPE VIII | 225 FT. |

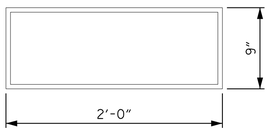
## NOTES

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.



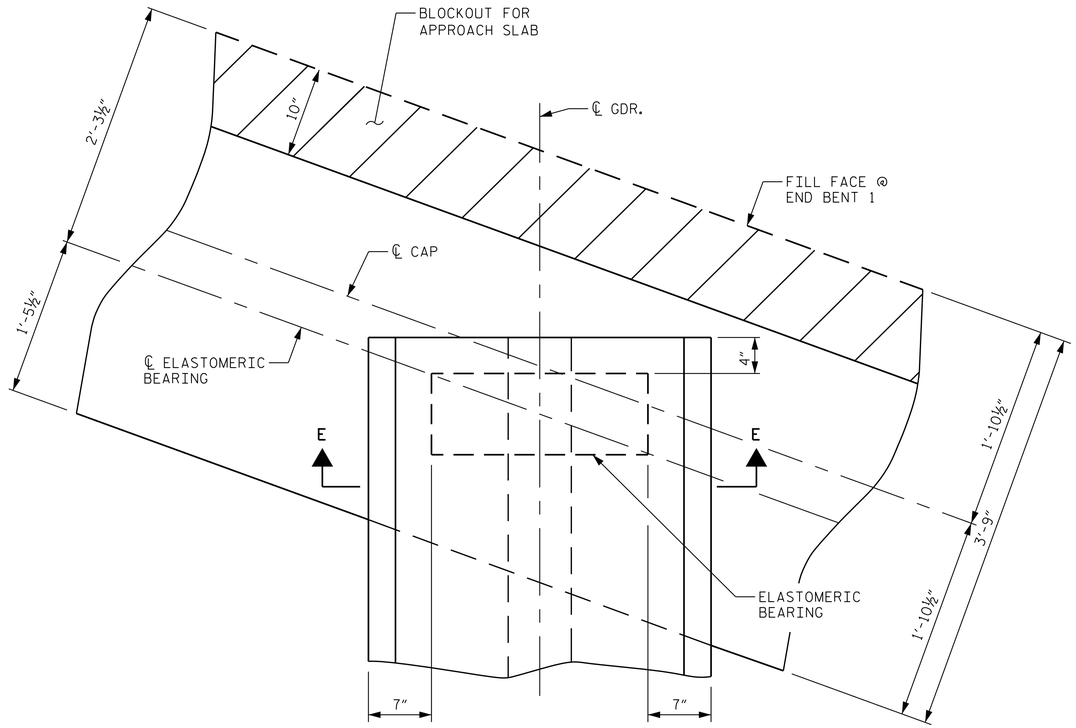

TYPICAL SECTION OF ELASTOMERIC BEARINGS




E7 (10 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE VIII




PLAN VIEW AT INTEGRAL END BENT

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

# ELASTOMERIC BEARING DETAILS

FIB SUPERSTRUCTURE

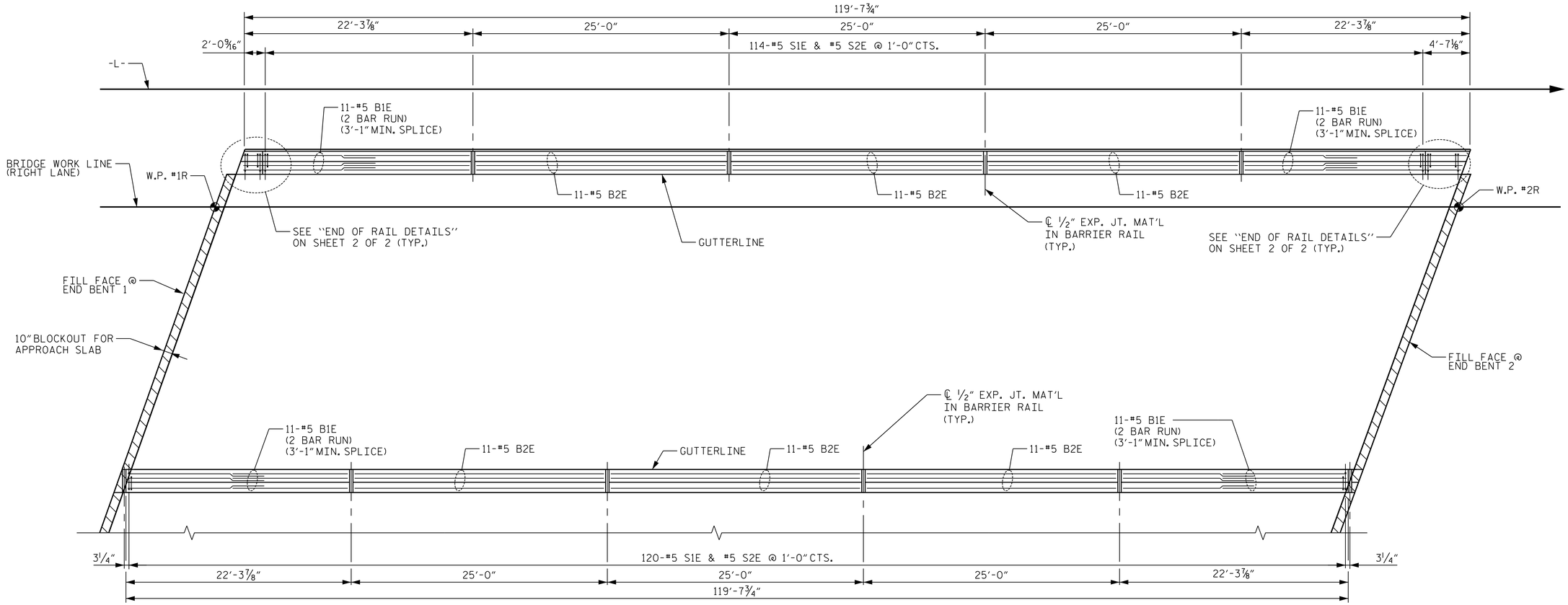
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-17 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

BRIDGE 2R STD. NO. EB5

3/18/2025 K:\RDT_Structures_Bridge\NC\01103734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_BGI_180542.dgn




# PLAN OF BARRIER RAIL

ALL DIMENSIONS ARE MEASURED ALONG THE OUTSIDE FACE OF THE BARRIER RAIL

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE
BARRIER RAIL

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-18 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

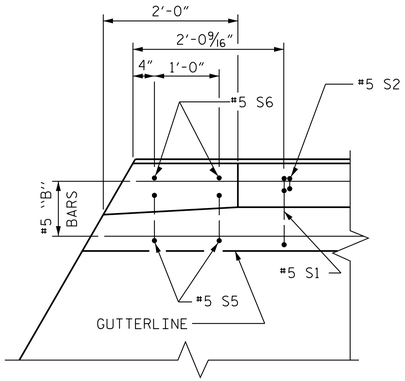


DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

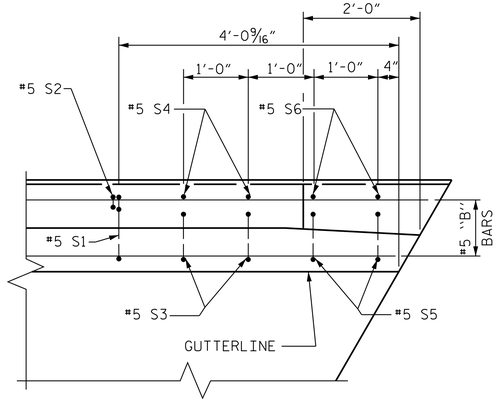
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_BRI_180542.dgn

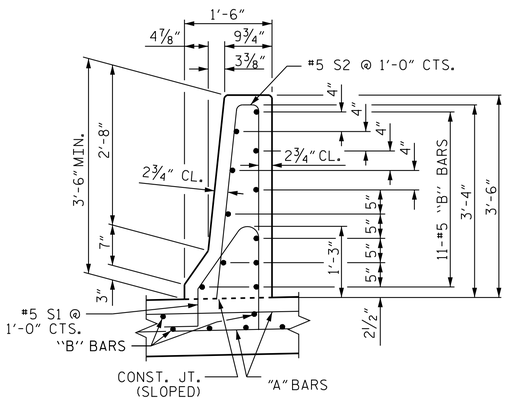
BRIDGE 2R



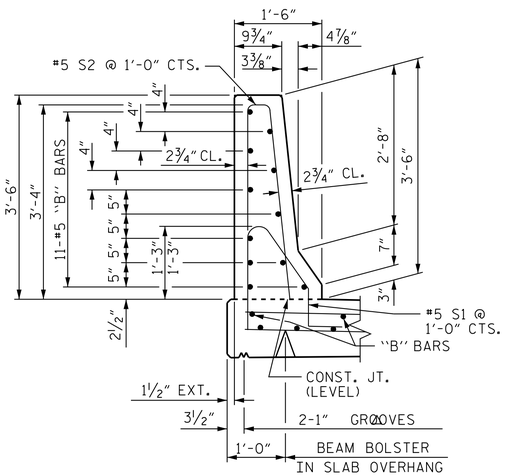

PLAN AT
END BENT 1



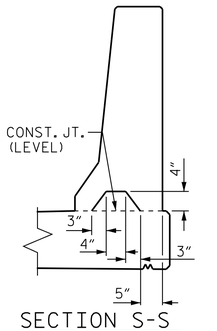

PLAN AT
END BENT 2



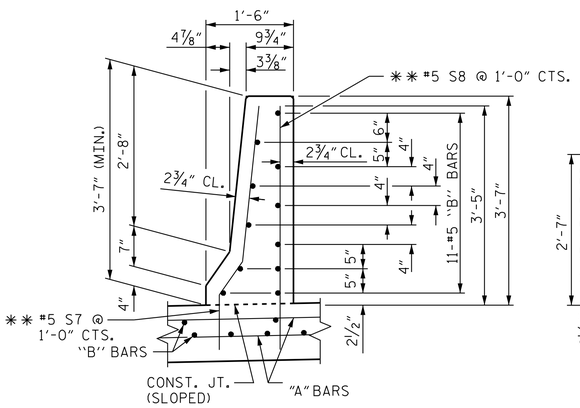

SECTION THRU INTERIOR RAIL



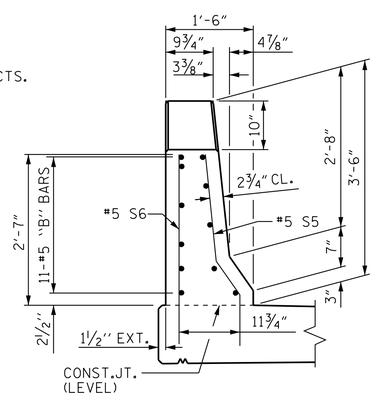

SECTION THRU EXTERIOR RAIL



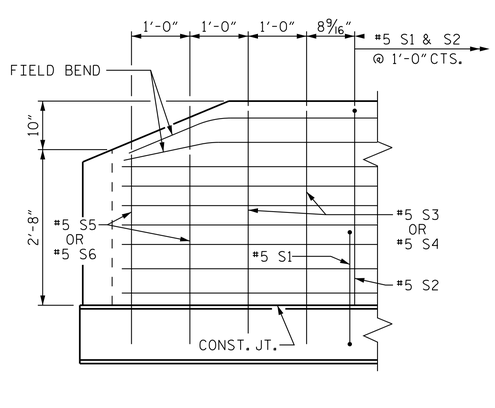

SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)




OPTIONAL SECTION THRU INTERIOR RAIL




END VIEW
(EXTERIOR BARRIER RAIL)




SIDE VIEW
(EXTERIOR BARRIER RAIL)

# NOTES

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

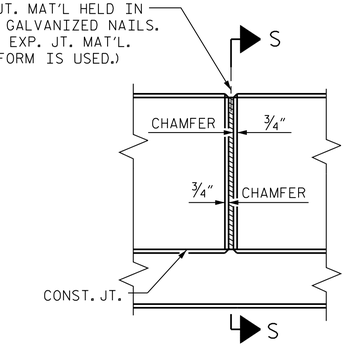
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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.

THE #5 S3, #5 S4, #5 S5 AND #5 S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, #5 S4, #5 S5 AND #5 S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

** THE CONTRACTOR MAY USE ADHESIVELY ANCHORED #5 S7 & #5 S8 BARS. LEVEL 2 FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE #5 S7 & #5 S8 IS 18.6 KIPS. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

℄ ½" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)

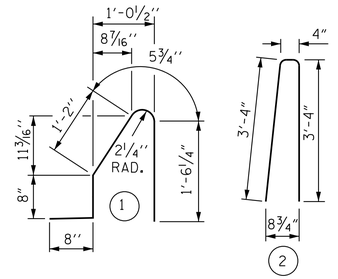


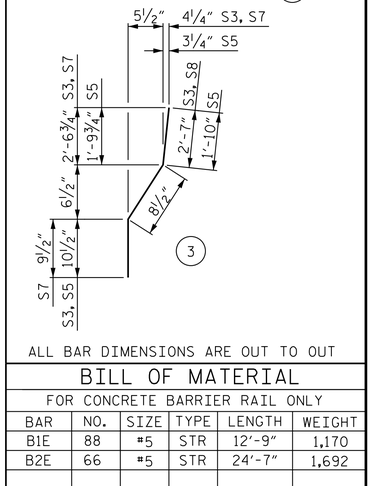

ELEVATION AT EXPANSION JOINTS

# BARRIER RAIL DETAILS

** FOR OPTIONAL ADHESIVE ANCHORING (NOT INCLUDED IN TOTAL QUANTITY)

## BAR TYPES




ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1E | 88 | #5 | STR | 12'-9" | 1,170 |
| B2E | 66 | #5 | STR | 24'-7" | 1,692 |
| | | | | | |
| S1E | 234 | #5 | 1 | 4'-6" | 1,098 |
| S2E | 234 | #5 | 2 | 7'-0" | 1,708 |
| S3E | 2 | #5 | 3 | 4'-2" | 9 |
| S4E | 2 | #5 | STR | 4'-0" | 8 |
| S5E | 4 | #5 | 3 | 3'-5" | 14 |
| S6E | 4 | #5 | STR | 3'-3" | 14 |
| S7E | 120 | #5 | 3 | 4'-1" | 511 |
| S8E | 120 | #5 | STR | 3'-11" | 490 |

| | |
|---|---|
| EPOXY COATED REINFORCING STEEL | 5,713 LBS. |
| | 40.2 CU. YDS. |
| CONCRETE BARRIER RAIL | 239.3 LIN. FT. |

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
CONCRETE
BARRIER RAIL

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



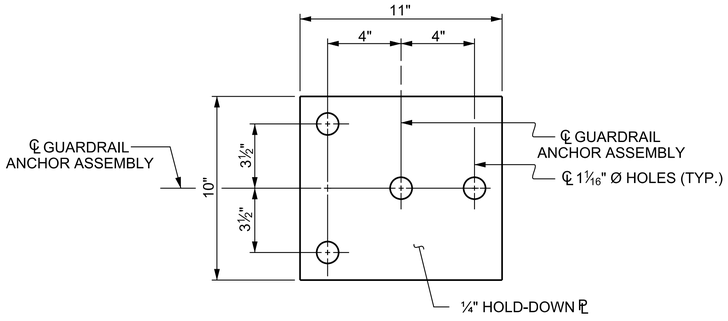
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-19 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

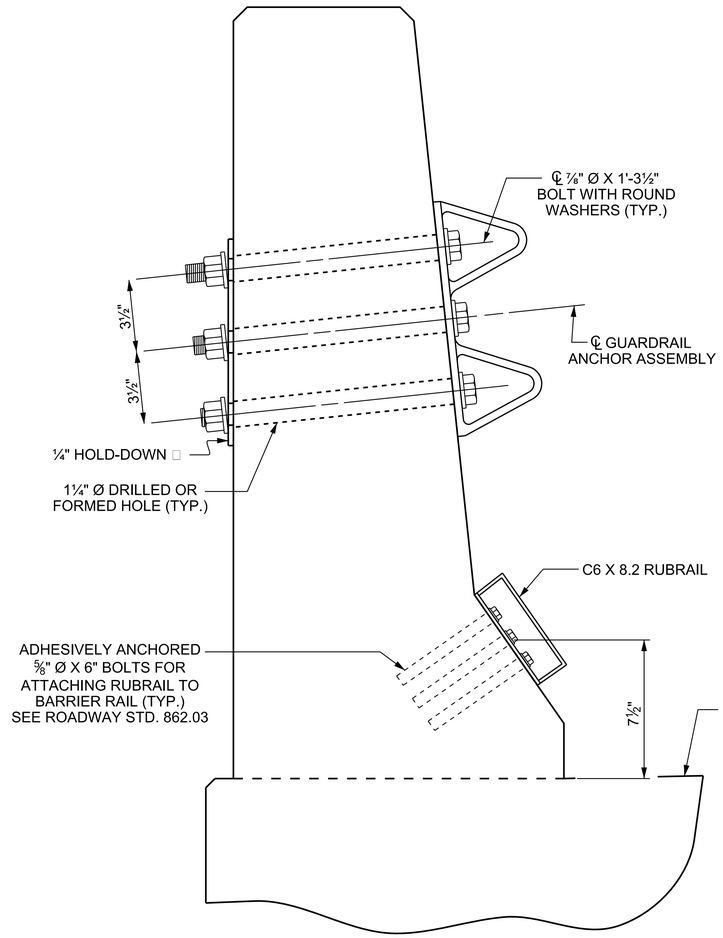
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_BR2_180542.dgn

BRIDGE 2R

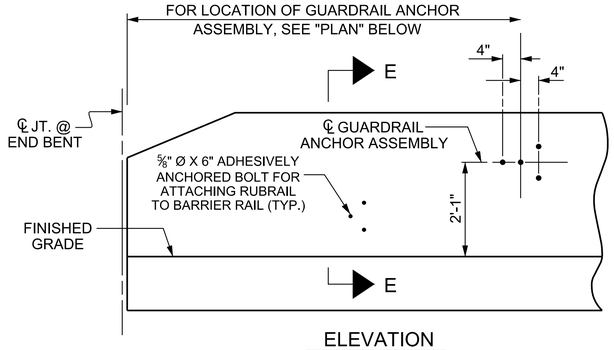



PLAN

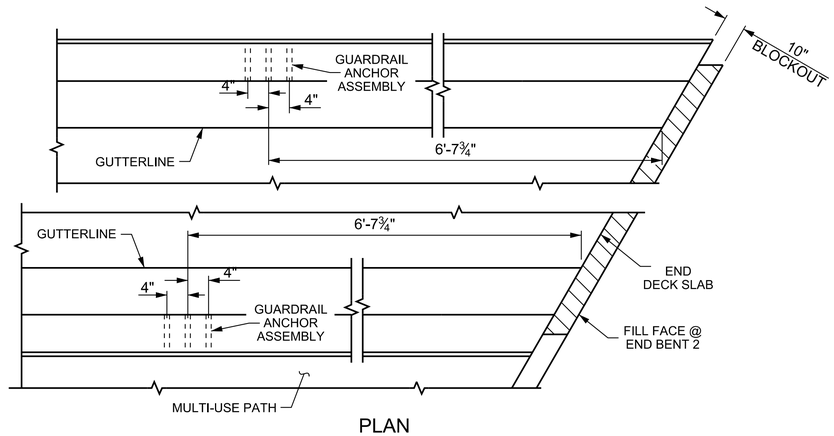



SECTION E-E

## GUARDRAIL ANCHOR ASSEMBLY DETAILS




ELEVATION




PLAN

## LOCATION OF ANCHORS FOR GUARDRAIL

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

## NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼" HOLD-DOWN PLATE AND 4 -⅞"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 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.)

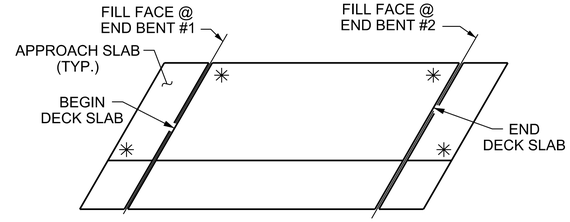
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 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.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE ⅝" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ⅝" 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.




SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS 3/20/2025

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NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# GUARDRAIL ANCHORAGE FOR BARRIER RAIL

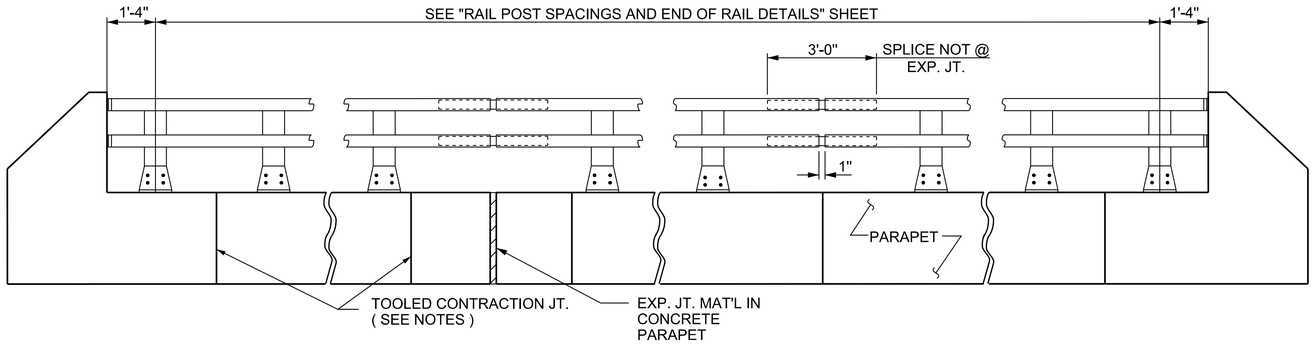
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-20 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

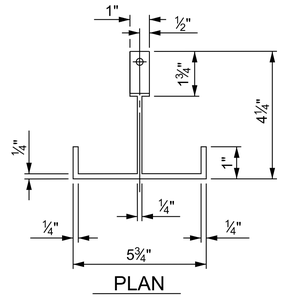
BRIDGE 2R STD. NO. GRA2

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_GR2_180542.dgn

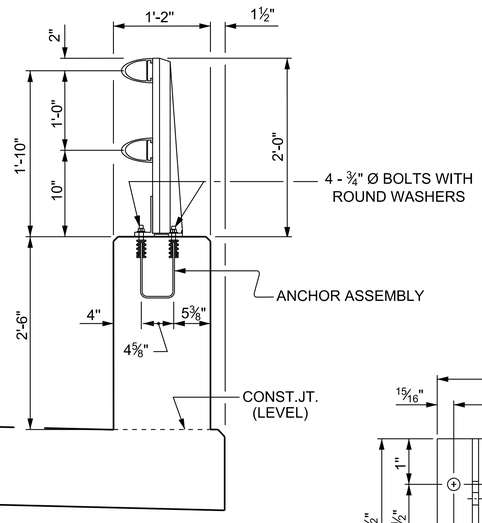


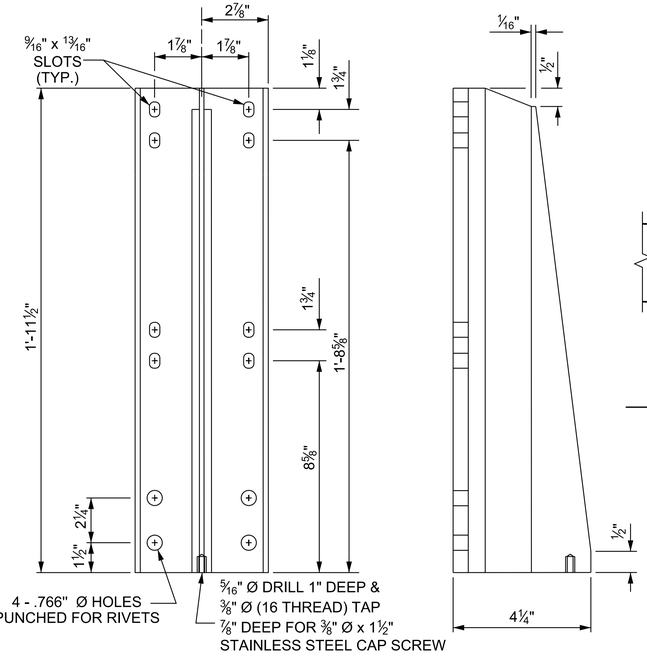

## ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 5 OF 5.




PLAN

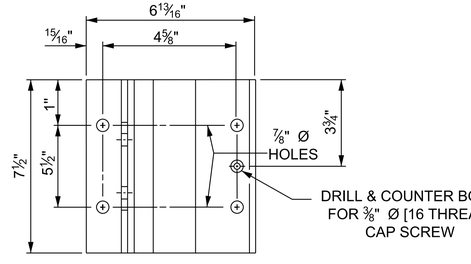


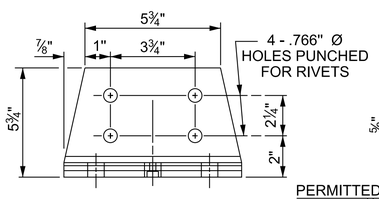

FRONT ELEVATION — SIDE ELEVATION

## DETAILS OF POST

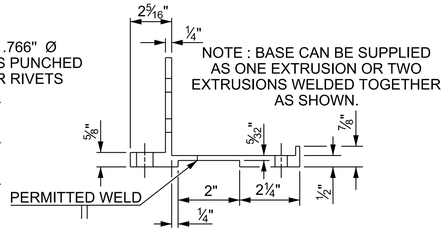
## SECTION THRU PARAPET AND RAIL




PLAN

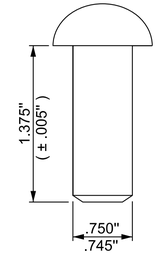



FRONT ELEVATION




SIDE ELEVATION

## POST BASE DETAILS




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

MATERIALS AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: ASTM A36 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO ASTM A123.

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 A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A1011 FOR GRADE 36, 40, 45 OR ASTM A1008 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

### 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,½" 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.

PAY LENGTH = 112.1 LIN. FT.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# 2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



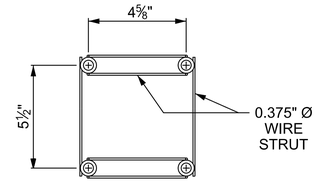
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-21 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

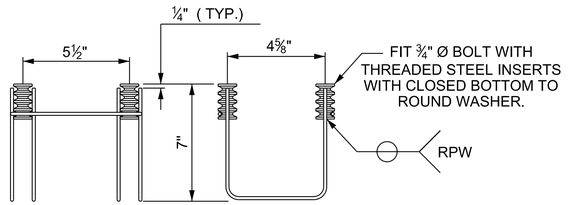
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_2MR1_180542.dgn

BRIDGE 2R




PLAN




SIDE VIEW ELEVATION

## 4-BOLT METAL RAIL ANCHOR ASSEMBLY

( 20 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 ¾" FERRULES.

B. 4 - ¾" Ø x 2½" 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 ¾" Ø x 2½" 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.

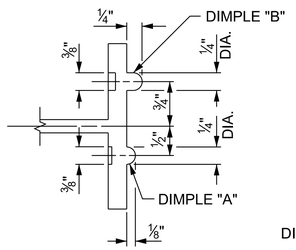
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF ASTM A123.

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.

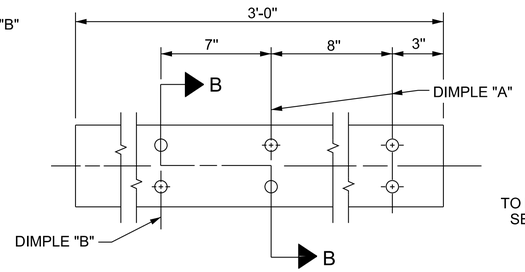
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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 ¾" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

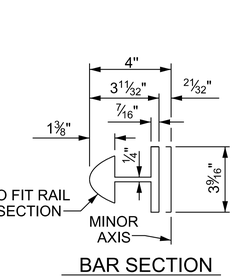
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY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



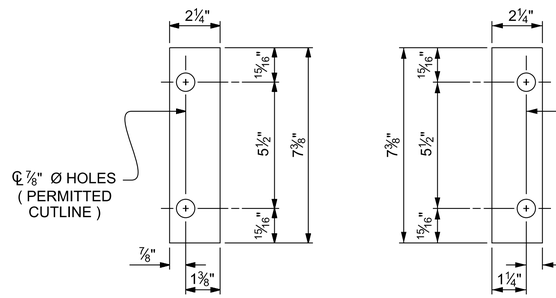

SECTION B-B




EXPANSION BAR DETAILS




BAR SECTION



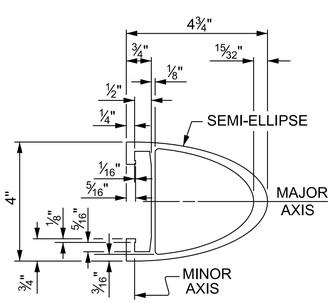

FRONT PLATE



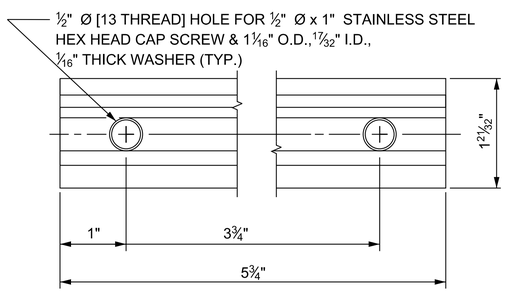

REAR PLATE

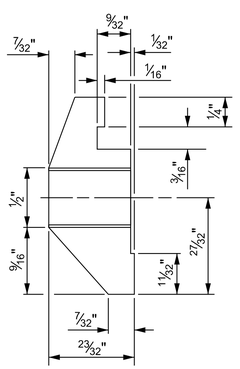
## SHIM DETAILS

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



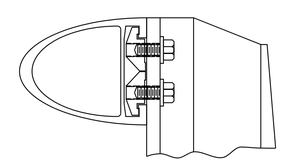

RAIL SECTION



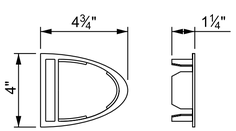




CLAMP BAR DETAIL

( 4 REQUIRED PER POST )



CLAMP ASSEMBLY




RAIL CAP

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-22 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

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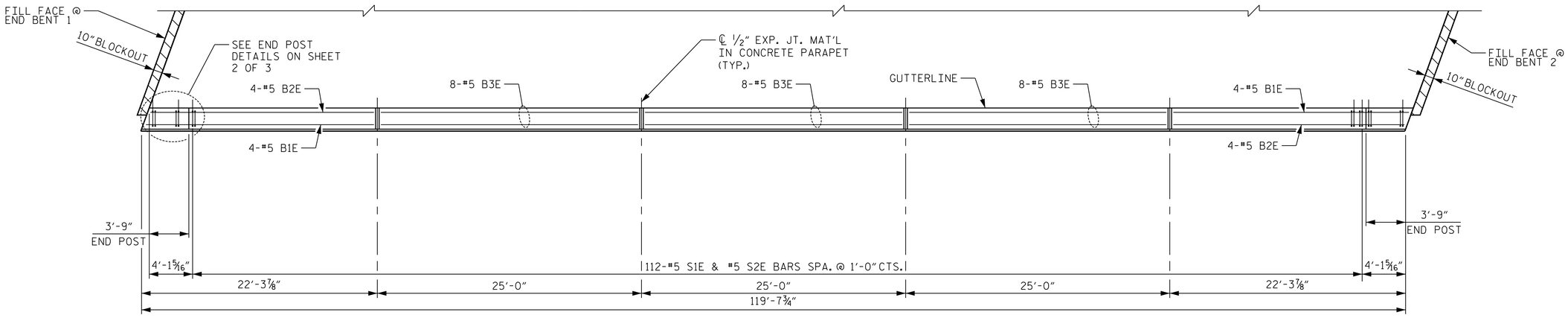
DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

3/18/2025 K:\RDT_Structures_Bridge\NC\01036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_2MR2_180542.dgn




PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

# CONCRETE PARAPET DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS ENGINEER
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
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NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
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| 1 | | | 3 | | | TOTAL SHEETS |
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DRAWN BY: T. K. BOYD DATE: 01/2025
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DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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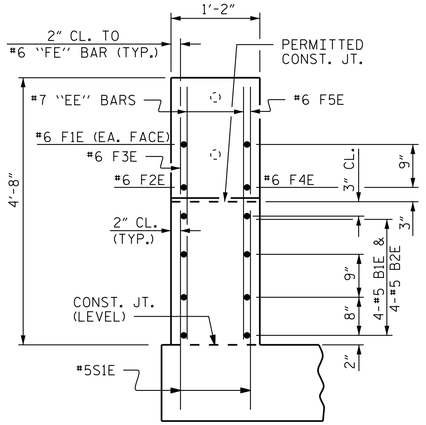
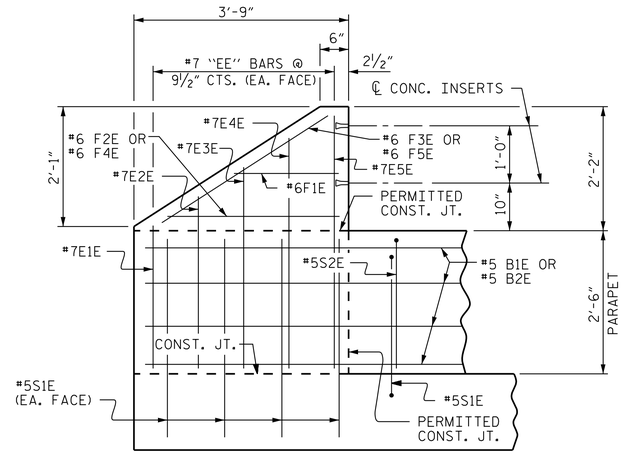
K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_2MR3_180542.dgn
3/18/2025

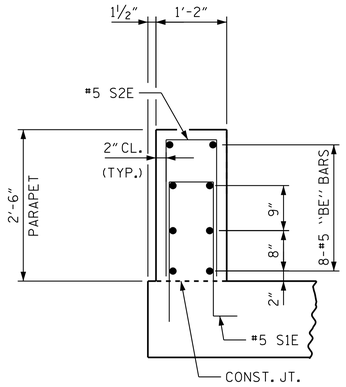



END VIEW



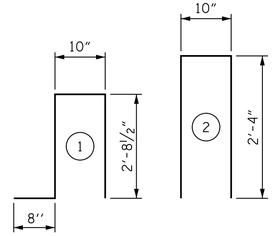

ELEVATION

PARAPET AND END POST FOR TWO BAR RAIL




SECTION THRU PARAPET

## BAR TYPES




ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL

CONCRETE PARAPET AND TWO END POSTS

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1E | 8 | #5 | STR | 22'-4" | 186 |
| B2E | 8 | #5 | STR | 22'-0" | 184 |
| B3E | 24 | #5 | STR | 24'-7" | 615 |
| | | | | | |
| E1 | 4 | #7 | STR | 2'-6" | 20 |
| E2 | 4 | #7 | STR | 3'-0" | 25 |
| E3 | 4 | #7 | STR | 3'-6" | 29 |
| E4 | 4 | #7 | STR | 4'-0" | 33 |
| E5 | 4 | #7 | STR | 4'-4" | 35 |
| | | | | | |
| F1 | 4 | #6 | STR | 1'-10" | 11 |
| F2 | 2 | #6 | STR | 3'-0" | 9 |
| F3 | 2 | #6 | STR | 3'-5" | 10 |
| F4 | 2 | #6 | STR | 3'-3" | 10 |
| F5 | 2 | #6 | STR | 3'-9" | 11 |
| | | | | | |
| S1E | 120 | #5 | 1 | 6'-11" | 866 |
| S2E | 112 | #5 | 2 | 5'-6" | 642 |

| | | |
|---|---|---|
| EPOXY COATED REINFORCING STEEL | LBS. | 2,686 |
| CLASS AA CONCRETE | C.Y. | 13.1 |
| 1'-2" X 2'-6" CONCRETE PARAPET | | 119.6 LF |

## NOTES:

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

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

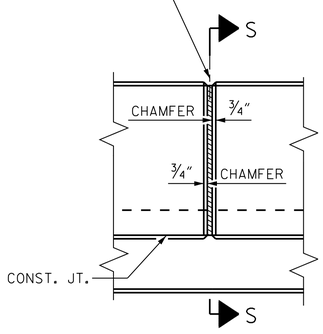
THE #5S1E & #5S2E BARS MAY BE SHIFTED SLIGHTLY IN ORDER TO MAINTAIN A 2" MINIMUM CLEARANCE TO THE ½" EXPANSION JOINT MATERIAL IN PARAPET.

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

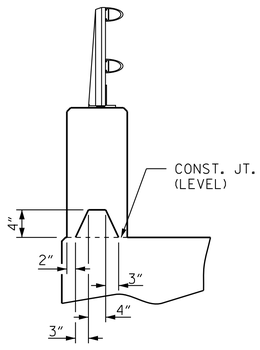
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED 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.

CONCRETE IN PARAPETS SHALL BE CLASS AA NORMAL WEIGHT CONCRETE.

℄ ½" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED.)

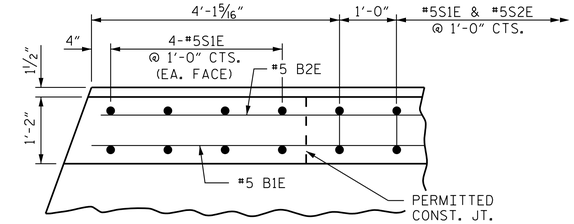



ELEVATION AT EXPANSION JOINTS

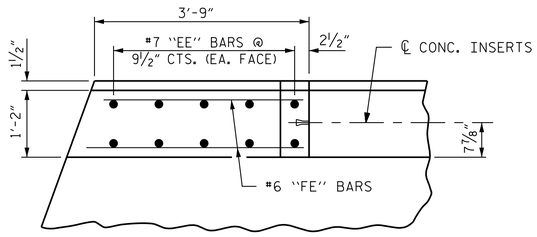



SECTION S-S

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




PLAN OF PARAPET




PLAN OF END POST

ELEVATION AT EXPANSION JOINTS

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

# CONCRETE PARAPET DETAILS

(LEFT SIDE)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
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| 1 | | | 3 | | | TOTAL SHEETS |
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DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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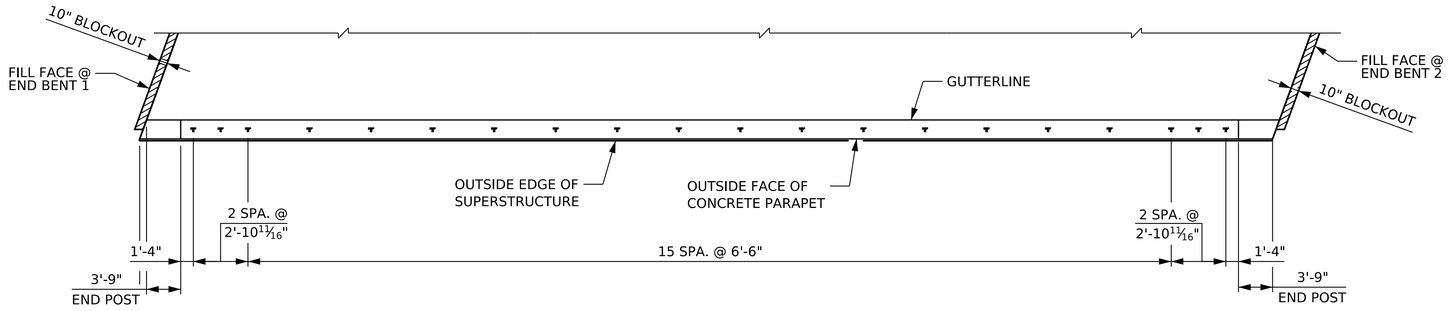
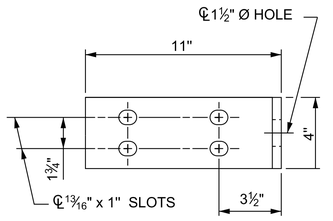
3/18/2025

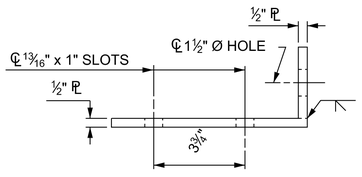
BRIDGE 2R



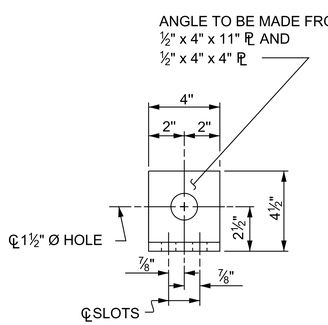

## PLAN OF RAIL POST SPACINGS



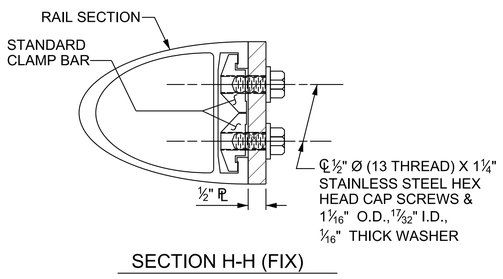

ELEVATION




TOP VIEW



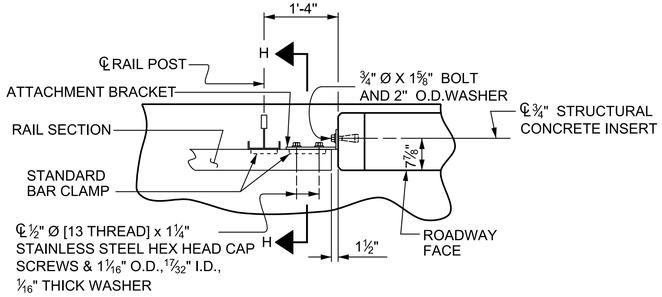

END VIEW (FIX AND EXP.)



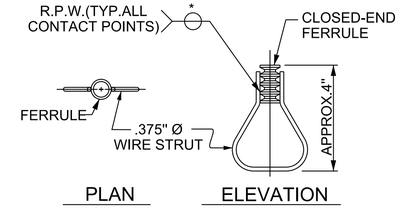

SECTION H-H (FIX)

FIXED

## DETAILS FOR ATTACHING METAL RAIL TO END POST




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.

## 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 ASTM A36 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 6½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS
3/20/2025

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NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# RAIL POST SPACINGS AND END OF RAIL DETAILS

FOR ONE OR TWO BAR METAL RAILS

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-25 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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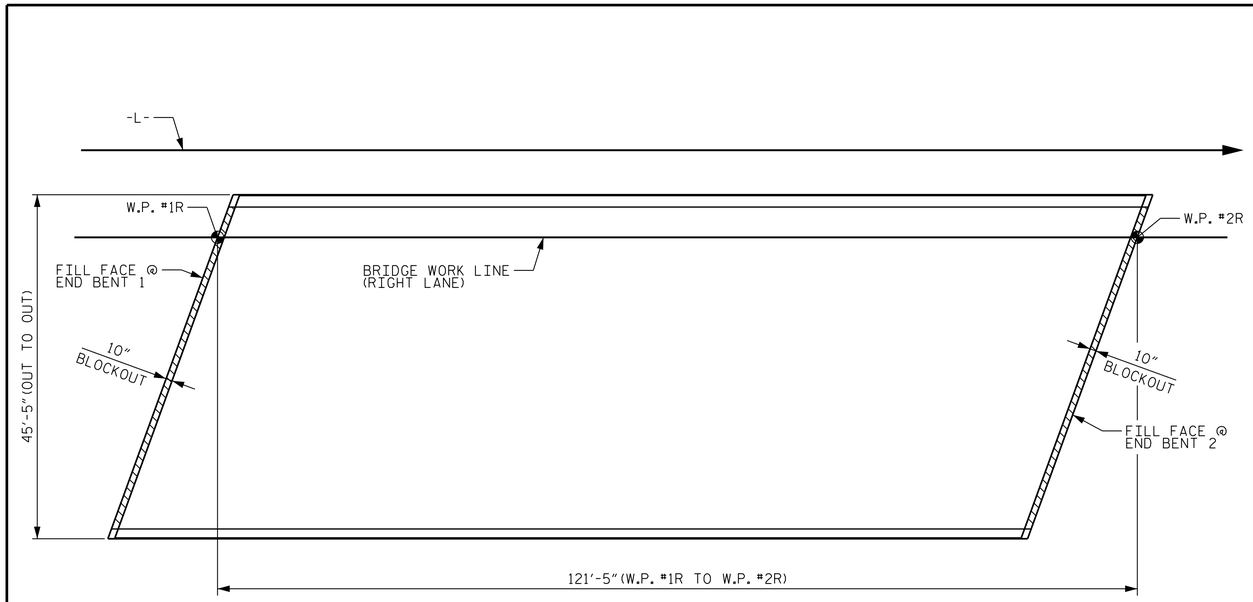
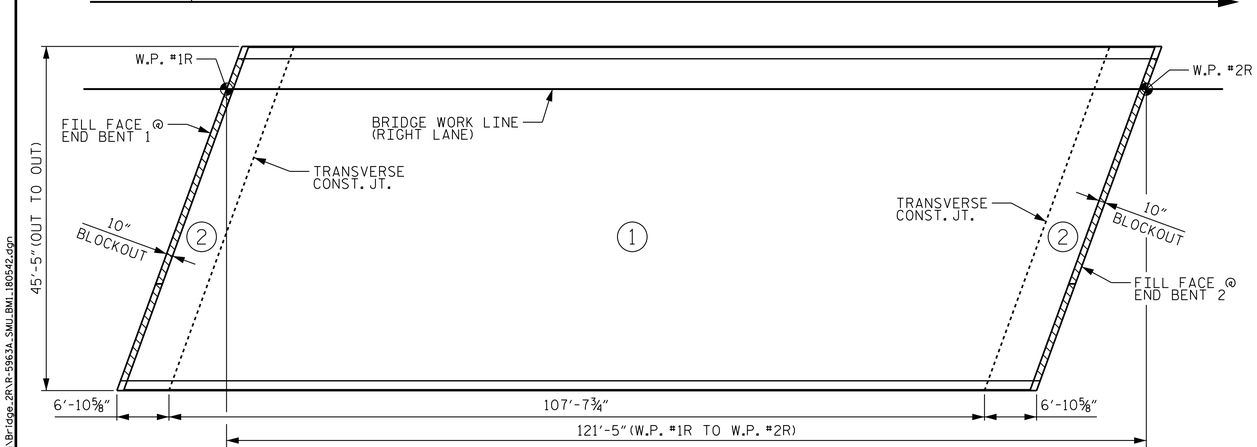
BRIDGE 2R STD. NO. BMR2

3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_2MR5_180542.dgn



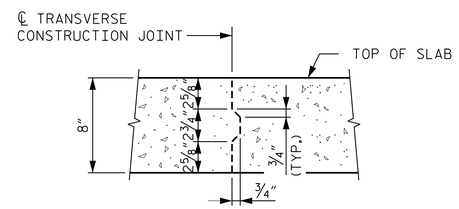

## LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 5,434 )




## POUR SEQUENCE

| GROOVING BRIDGE FLOORS | |
|---|---|
| APPROACH SLABS | 1,750 SQ.FT. |
| BRIDGE DECK | 4,188 SQ.FT. |
| TOTAL | 5,938 SQ.FT. |




## TRANSVERSE CONSTRUCTION JOINT IN DECK SLAB

REINFORCING STEEL IN SLAB NOT SHOWN, LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT.

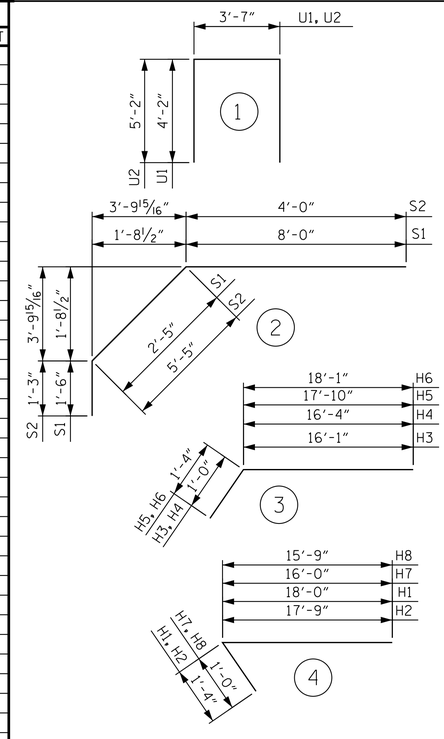
## BILL OF MATERIAL — SUPERSTRUCTURE

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| A1E | 177 | 5 | STR | 45'-1" | 8,323 |
| A2 | 177 | 5 | STR | 45'-1" | 8,323 |
| A101E | 2 | 5 | STR | 43'-8" | 91 |
| A102E | 2 | 5 | STR | 42'-1" | 88 |
| A103E | 2 | 5 | STR | 40'-5" | 84 |
| A104E | 2 | 5 | STR | 38'-10" | 81 |
| A105E | 2 | 5 | STR | 37'-3" | 78 |
| A106E | 2 | 5 | STR | 35'-8" | 74 |
| A107E | 2 | 5 | STR | 34'-1" | 71 |
| A108E | 2 | 5 | STR | 32'-5" | 68 |
| A109E | 2 | 5 | STR | 30'-10" | 64 |
| A110E | 2 | 5 | STR | 29'-3" | 61 |
| A111E | 2 | 5 | STR | 27'-8" | 58 |
| A112E | 2 | 5 | STR | 26'-0" | 54 |
| A113E | 2 | 5 | STR | 24'-5" | 51 |
| A114E | 2 | 5 | STR | 22'-10" | 48 |
| A115E | 2 | 5 | STR | 21'-3" | 44 |
| A116E | 2 | 5 | STR | 19'-7" | 41 |
| A117E | 2 | 5 | STR | 18'-0" | 38 |
| A118E | 2 | 5 | STR | 16'-5" | 34 |
| A119E | 2 | 5 | STR | 14'-10" | 31 |
| A120E | 2 | 5 | STR | 13'-2" | 28 |
| A121E | 2 | 5 | STR | 11'-7" | 24 |
| A122E | 2 | 5 | STR | 10'-0" | 21 |
| A123E | 2 | 5 | STR | 8'-5" | 18 |
| A124E | 2 | 5 | STR | 6'-10" | 14 |
| A125E | 2 | 5 | STR | 5'-2" | 11 |
| A126E | 2 | 5 | STR | 3'-7" | 8 |
| A127E | 4 | 5 | STR | 2'-0" | 8 |
| A201 | 2 | 5 | STR | 43'-8" | 91 |
| A202 | 2 | 5 | STR | 42'-1" | 88 |
| A203 | 2 | 5 | STR | 40'-5" | 84 |
| A204 | 2 | 5 | STR | 38'-10" | 81 |
| A205 | 2 | 5 | STR | 37'-3" | 78 |
| A206 | 2 | 5 | STR | 35'-8" | 74 |
| A207 | 2 | 5 | STR | 34'-1" | 71 |
| A208 | 2 | 5 | STR | 32'-5" | 68 |
| A209 | 2 | 5 | STR | 30'-10" | 64 |
| A210 | 2 | 5 | STR | 29'-3" | 61 |
| A211 | 2 | 5 | STR | 27'-8" | 58 |
| A212 | 2 | 5 | STR | 26'-0" | 54 |
| A213 | 2 | 5 | STR | 24'-5" | 51 |
| A214 | 2 | 5 | STR | 22'-10" | 48 |
| A215 | 2 | 5 | STR | 21'-3" | 44 |

## BILL OF MATERIAL — SUPERSTRUCTURE

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| A216 | 2 | 5 | STR | 19'-7" | 41 |
| A217 | 2 | 5 | STR | 18'-0" | 38 |
| A218 | 2 | 5 | STR | 16'-5" | 34 |
| A219 | 2 | 5 | STR | 14'-10" | 31 |
| A220 | 2 | 5 | STR | 13'-2" | 28 |
| A221 | 2 | 5 | STR | 11'-7" | 24 |
| A222 | 2 | 5 | STR | 10'-0" | 21 |
| A223 | 2 | 5 | STR | 8'-5" | 18 |
| A224 | 2 | 5 | STR | 6'-10" | 14 |
| A225 | 2 | 5 | STR | 5'-2" | 11 |
| A226 | 2 | 5 | STR | 3'-7" | 8 |
| A227 | 4 | 5 | STR | 2'-0" | 8 |
| | | | | | |
| B1E | 93 | 4 | STR | 26'-11" | 1,672 |
| B2E | 182 | 6 | STR | 24'-2" | 6,606 |
| B3 | 90 | 5 | STR | 41'-2" | 3,864 |
| B4 | 40 | 5 | STR | 24'-2" | 1,008 |
| | | | | | |
| H1 | 12 | 8 | 4 | 19'-4" | 619 |
| H2 | 12 | 8 | 4 | 19'-1" | 611 |
| H3 | 12 | 6 | 3 | 17'-1" | 308 |
| H4 | 12 | 6 | 3 | 17'-4" | 312 |
| H5 | 12 | 8 | 3 | 19'-2" | 614 |
| H6 | 12 | 8 | 3 | 19'-5" | 622 |
| H7 | 12 | 6 | 4 | 17'-0" | 306 |
| H8 | 12 | 6 | 4 | 16'-9" | 302 |
| | | | | | |
| K1 | 20 | 4 | STR | 28'-1" | 375 |
| K2 | 8 | 4 | STR | 6'-4" | 34 |
| K3 | 8 | 4 | STR | 7'-10" | 42 |
| K4 | 16 | 4 | STR | 9'-1" | 97 |
| K5 | 8 | 4 | STR | 6'-2" | 33 |
| K6 | 4 | 4 | STR | 5'-1" | 14 |
| K7 | 4 | 4 | STR | 5'-11" | 16 |
| K8 | 8 | 4 | STR | 6'-5" | 34 |
| K9 | 4 | 4 | STR | 4'-7" | 12 |
| K10 | 24 | 4 | STR | 2'-10" | 45 |
| | | | | | |
| S1E | 60 | 4 | 2 | 11'-11" | 478 |
| S2E | 60 | 4 | 2 | 10'-8" | 428 |
| | | | | | |
| U1 | 64 | 4 | 1 | 11'-11" | 509 |
| U2 | 12 | 4 | 1 | 13'-11" | 112 |

## 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.) |
| SPAN A | | 19,500 | 18,795 |
| POUR #1 | 146.0 | | |
| POUR #2 | 93.4 | | |
| TOTALS ** | 351.6 | 19,500 | 18,795 |

**QUANTITIES FOR CONCRETE BARRIER RAILS AND PARAPET ARE NOT INCLUDED

"E" DENOTES EPOXY COATED REINFORCING

## SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

| BAR SIZE | SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL | | APPROACH SLABS | | PARAPET AND BARRIER RAIL |
|---|---|---|---|---|---|
| | EPOXY COATED | UNCOATED | EPOXY COATED | UNCOATED | |
| #4 | 1'-11" | 1'-7" | 1'-11" | 1'-7" | 2'-6" |
| #5 | 2'-5" | 2'-0" | 2'-5" | 2'-0" | 3'-1" |
| #6 | 2'-10" | 2'-5" | 3'-7" | 2'-5" | 3'-8" |
| #7 | 4'-2" | 2'-9" | | | |
| #8 | 4'-9" | 3'-2" | | | |

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-26 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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3/18/2025 K:\RDT\Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_BMI_180542.dgn

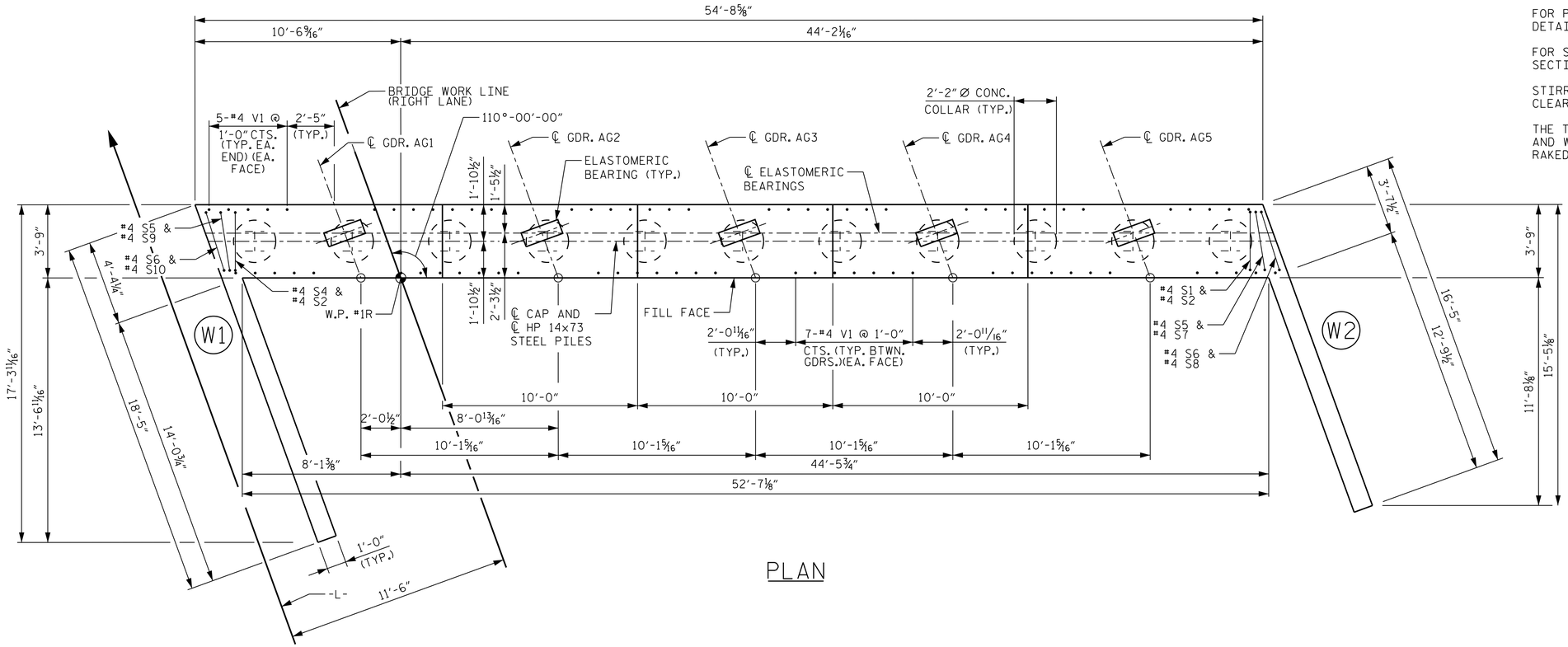
# NOTES

FOR PILE SPLICE DETAILS, AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

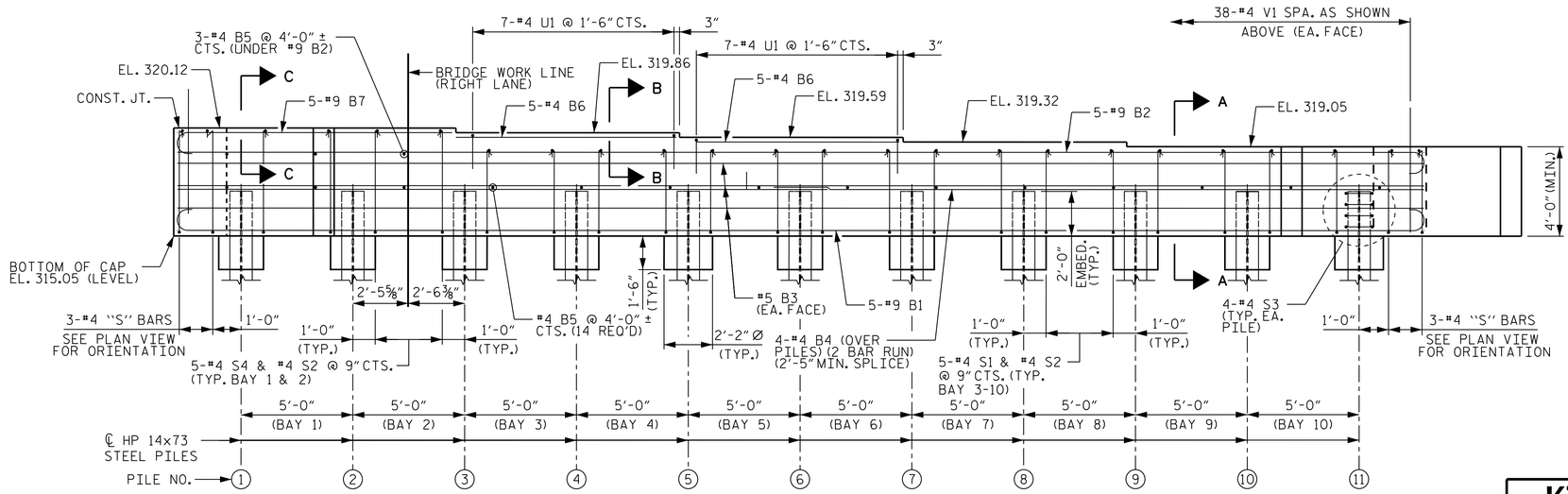
FOR SECTION A-A, PARTIAL SECTION B-B AND PARTIAL SECTION C-C, SEE SHEET 3 OF 3.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP SURFACE OF POUR #1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".




PLAN




ELEVATION

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
PLAN AND ELEVATION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

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421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-27 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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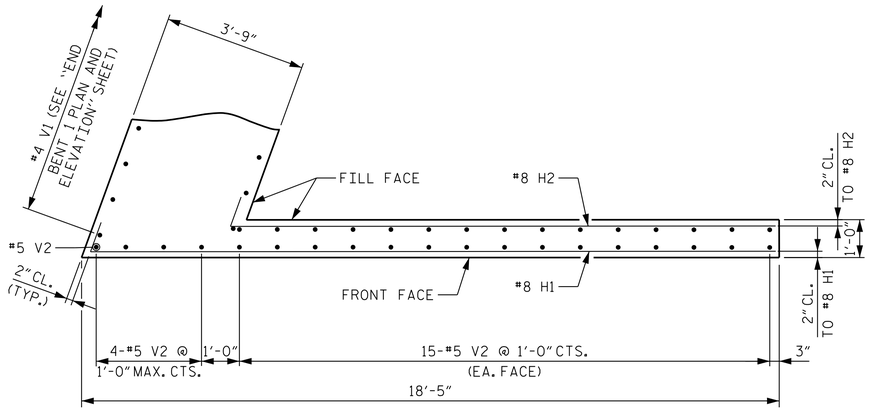
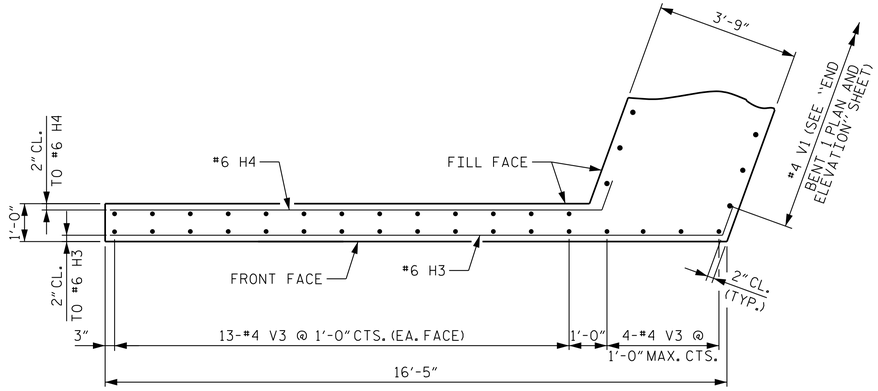



## PLAN OF WING W1

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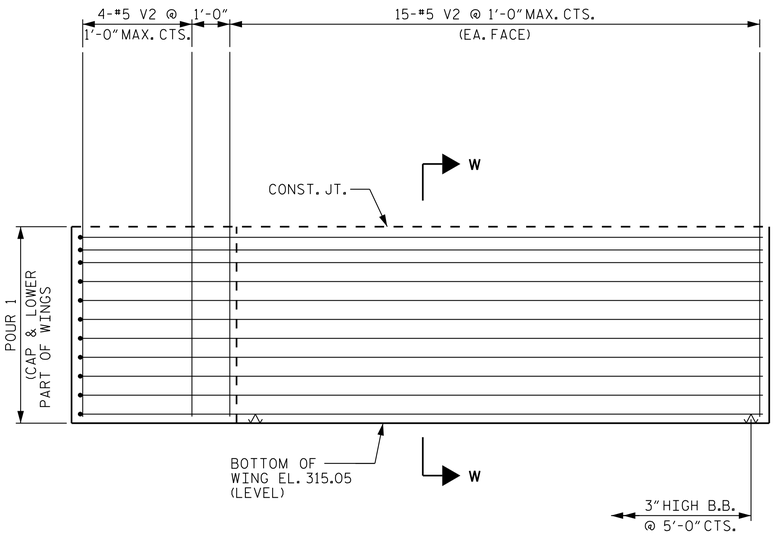
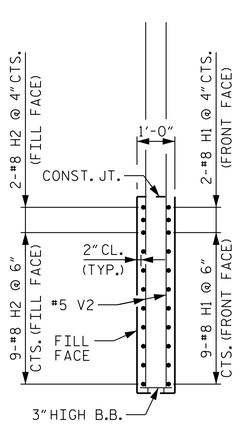
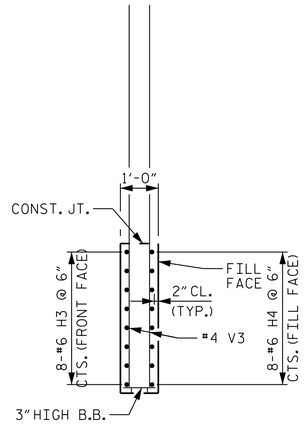


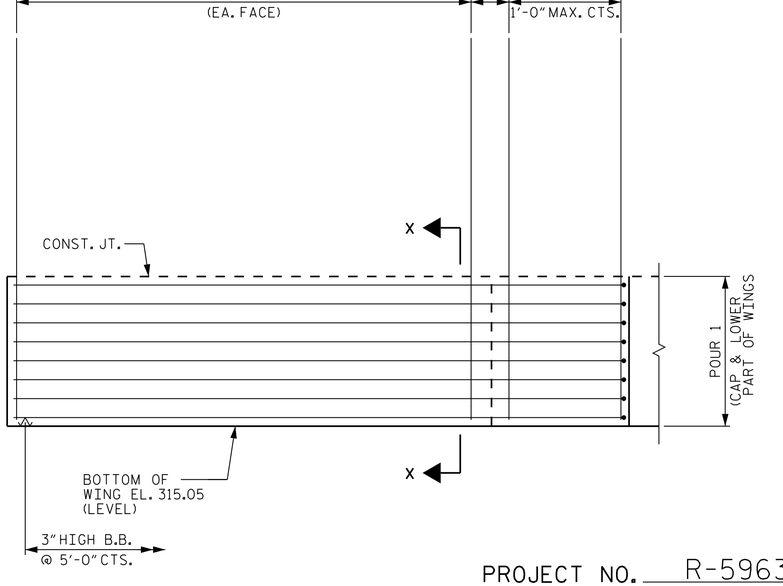

## ELEVATION OF WING W1




## SECTION W-W




## SECTION X-X




## ELEVATION OF WING W2

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

# END BENT 1 SECTION AND DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
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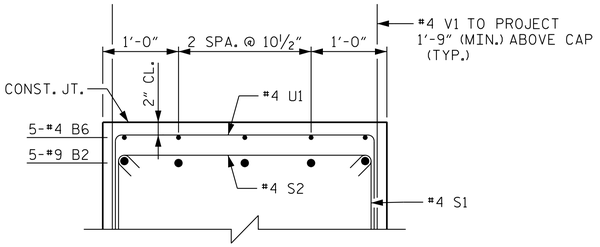
Phone (919) 677-2000
NC LICENSE # F-0102



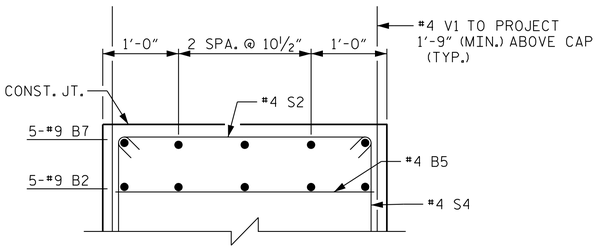
| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-28 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

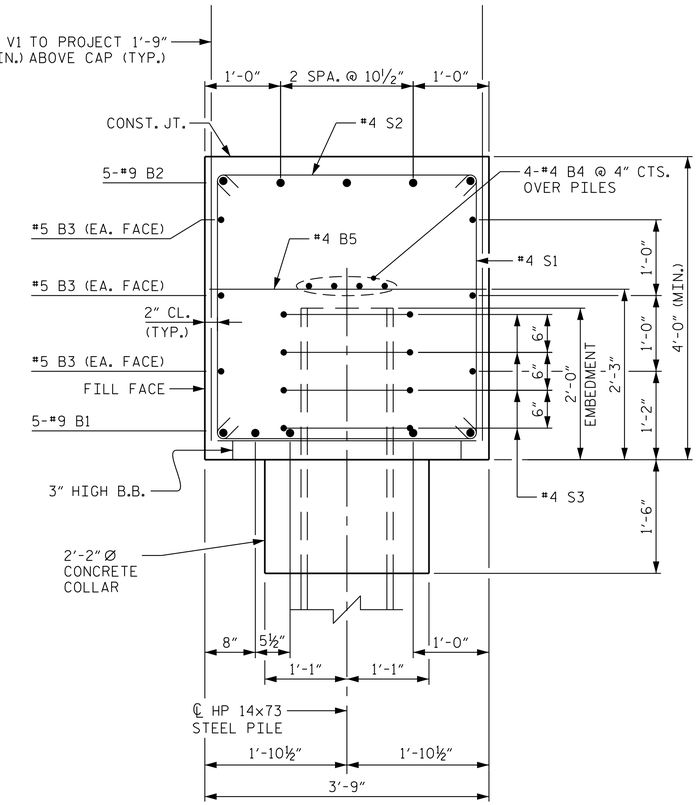
**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



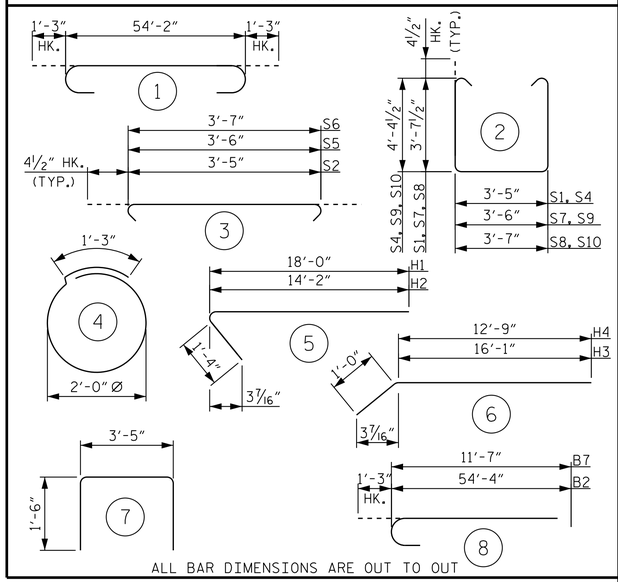

PARTIAL SECTION B-B




PARTIAL SECTION C-C




SECTION A-A



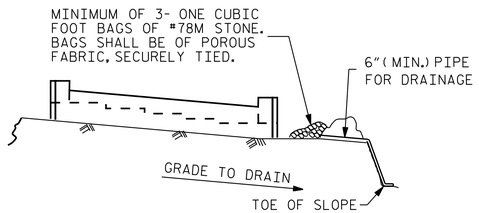

## BILL OF MATERIAL

### END BENT 1

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1 | 5 | #9 | 1 | 56'-8" | 963 |
| B2 | 5 | #9 | 8 | 55'-7" | 945 |
| B3 | 6 | #5 | STR | 54'-4" | 340 |
| B4 | 8 | #4 | STR | 28'-5" | 152 |
| B5 | 17 | #4 | STR | 3'-5" | 39 |
| B6 | 10 | #4 | STR | 9'-10" | 66 |
| B7 | 5 | #9 | 8 | 12'-10" | 218 |
| | | | | | |
| H1 | 11 | #8 | 5 | 19'-4" | 568 |
| H2 | 11 | #8 | 5 | 15'-6" | 455 |
| H3 | 8 | #6 | 6 | 17'-1" | 205 |
| H4 | 8 | #6 | 6 | 13'-9" | 165 |
| | | | | | |
| S1 | 41 | #4 | 2 | 11'-5" | 313 |
| S2 | 52 | #4 | 3 | 4'-2" | 145 |
| S3 | 44 | #4 | 4 | 7'-7" | 223 |
| S4 | 11 | #4 | 2 | 12'-11" | 95 |
| S5 | 2 | #4 | 3 | 4'-3" | 6 |
| S6 | 2 | #4 | 3 | 4'-4" | 6 |
| S7 | 1 | #4 | 2 | 11'-6" | 8 |
| S8 | 1 | #4 | 2 | 11'-7" | 8 |
| S9 | 1 | #4 | 2 | 13'-0" | 9 |
| S10 | 1 | #4 | 2 | 13'-1" | 9 |
| | | | | | |
| U1 | 14 | #4 | 7 | 6'-5" | 60 |
| | | | | | |
| V1 | 76 | #4 | STR | 5'-6" | 279 |
| V2 | 34 | #5 | STR | 10'-9" | 381 |
| V3 | 30 | #4 | STR | 9'-6" | 190 |

REINFORCING STEEL 5,848 LBS.

CLASS A CONCRETE BREAKDOWN
POUR 1 (CAP, LOWER WING WALLS, & COLLARS) 41.3 C.Y.

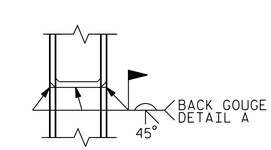



BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

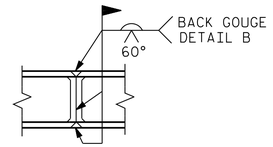
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

TEMPORARY DRAINAGE AT END BENT

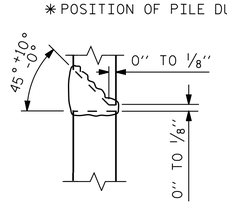



✳PILE VERTICAL

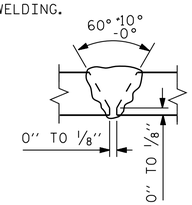



✳PILE HORIZONTAL OR VERTICAL

✳POSITION OF PILE DURING WELDING.




DETAIL "A"




DETAIL "B"

HP PILE SPLICE DETAILS

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

# END BENT 1 SECTION AND DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-29 |
| 1 | | | 3 | | | TOTAL SHEETS |
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| | | |
|---|---|---|
| DRAWN BY: T. K. BOYD | DATE: 01/2025 | |
| CHECKED BY: E. W. SPRABERRY | DATE: 01/2025 | |
| DESIGN ENGINEER OF RECORD: A. L. PHILLIPS | DATE: 01/2025 | |

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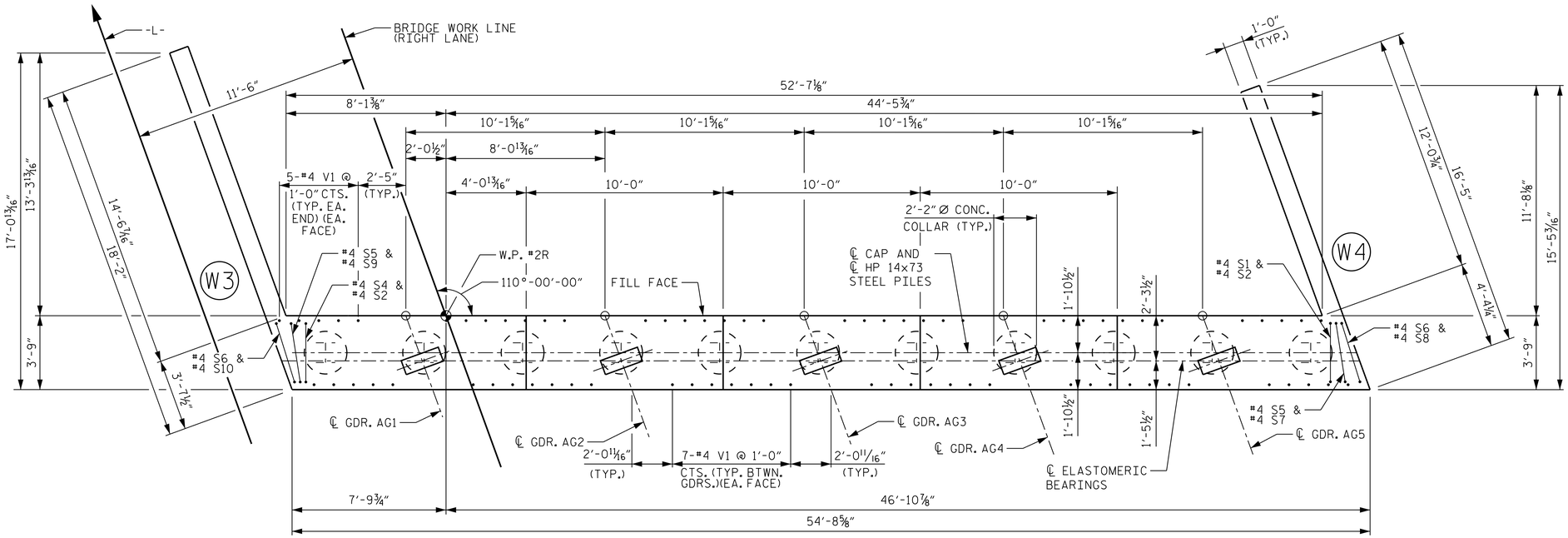
## NOTES

FOR PILE SPLICE DETAILS, AND TEMPORARY DRAINAGE DETAILS, SEE SHEET 3 OF 3.

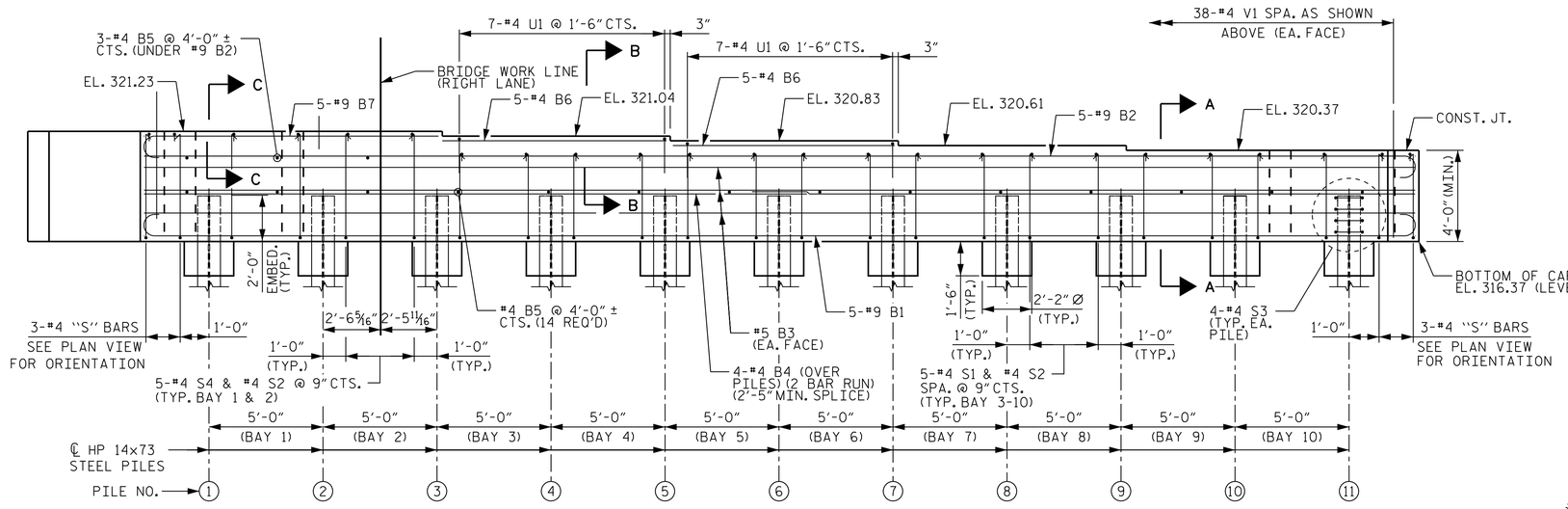
FOR SECTION A-A, PARTIAL SECTION B-B AND PARTIAL SECTION C-C, SEE SHEET 3 OF 3.

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR #4 V1 BARS.

THE TOP SURFACE OF POUR #1 OF THE END BENT CAP AND WINGS, EXCLUDING THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".




PLAN




ELEVATION

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

# END BENT 2 PLAN AND ELEVATION

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-30 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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|---|---|---|
| DRAWN BY: | T. K. BOYD | DATE: 01/2025 |
| CHECKED BY: | E. W. SPRABERRY | DATE: 01/2025 |
| DESIGN ENGINEER OF RECORD: | A. L. PHILLIPS | DATE: 01/2025 |

3/18/2025

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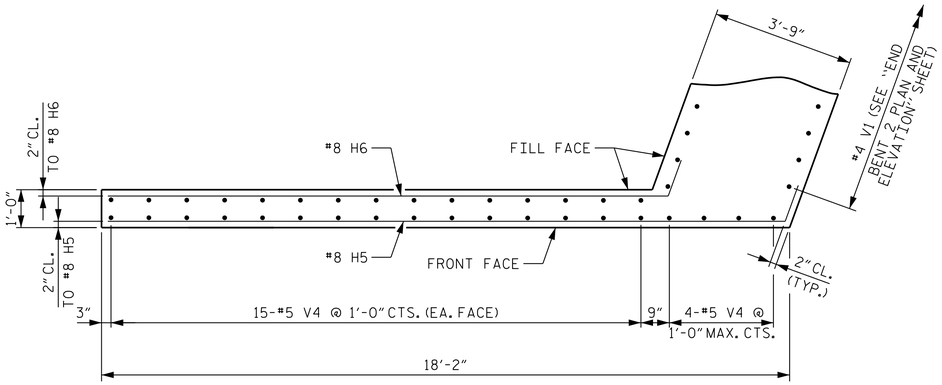
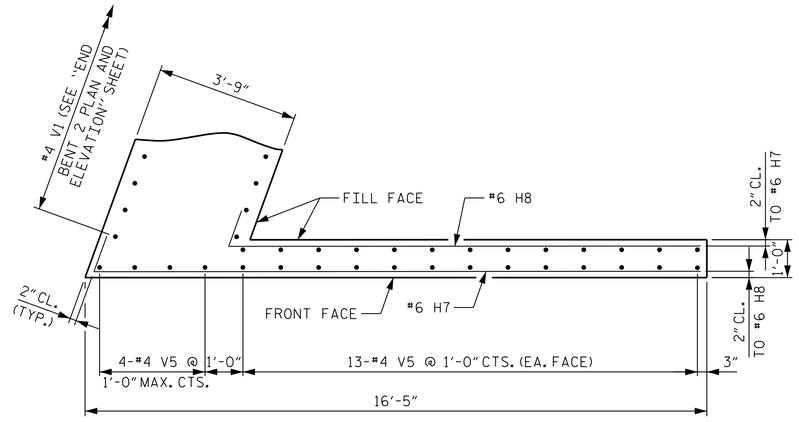
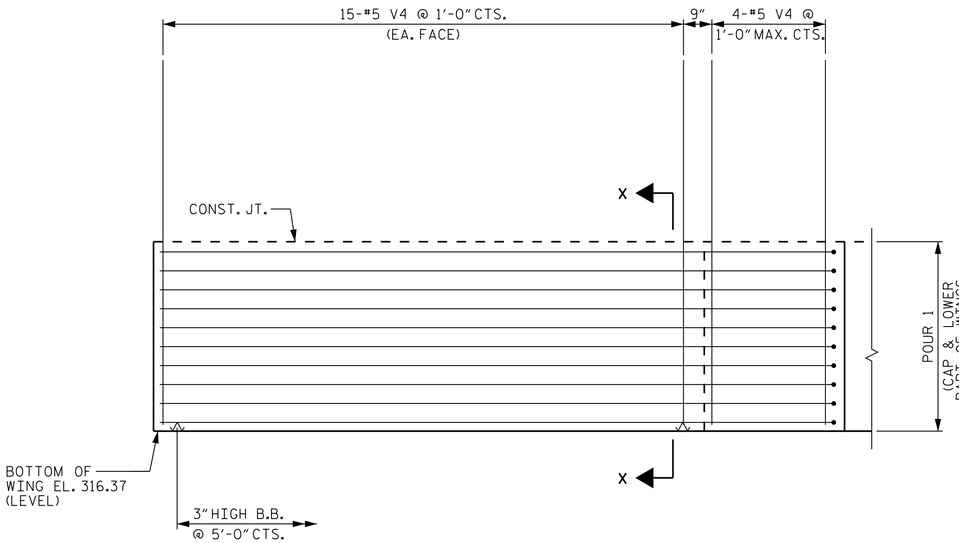
BRIDGE 2R



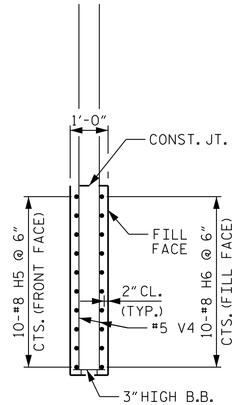

## PLAN OF WING W3



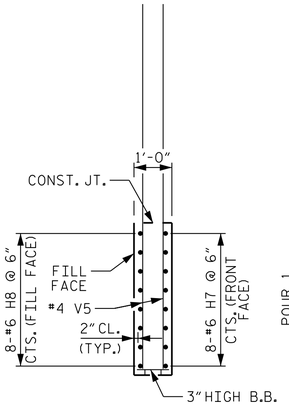

## PLAN OF WING W4



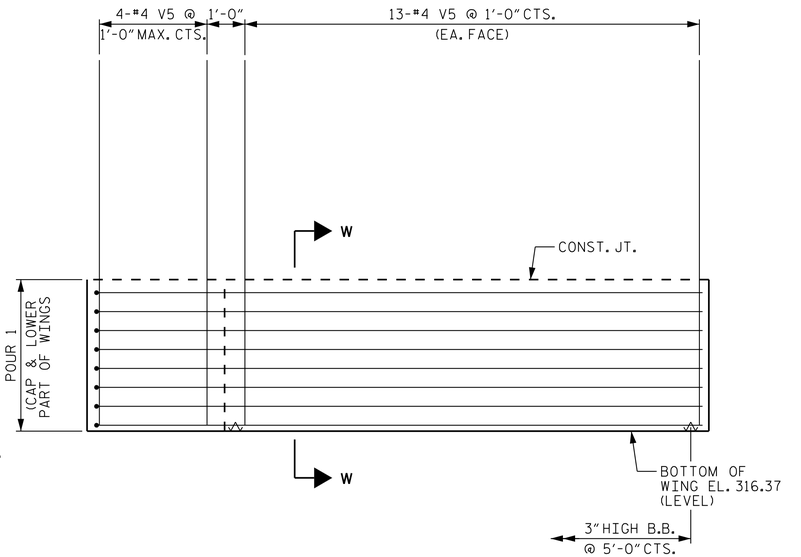

## ELEVATION OF WING W3




## SECTION X-X




## SECTION W-W




## ELEVATION OF WING W4

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 3/20/2025

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NC LICENSE # F-0102



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

# END BENT 2 SECTION AND DETAILS

| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-31 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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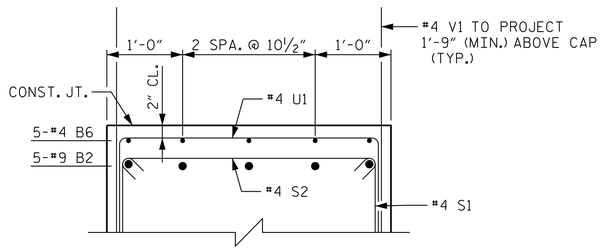
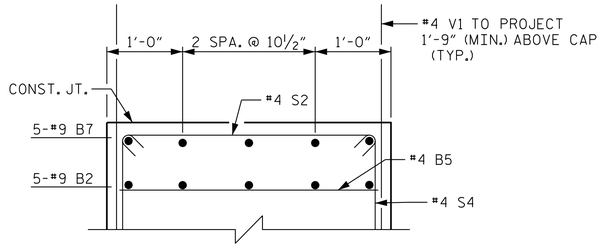
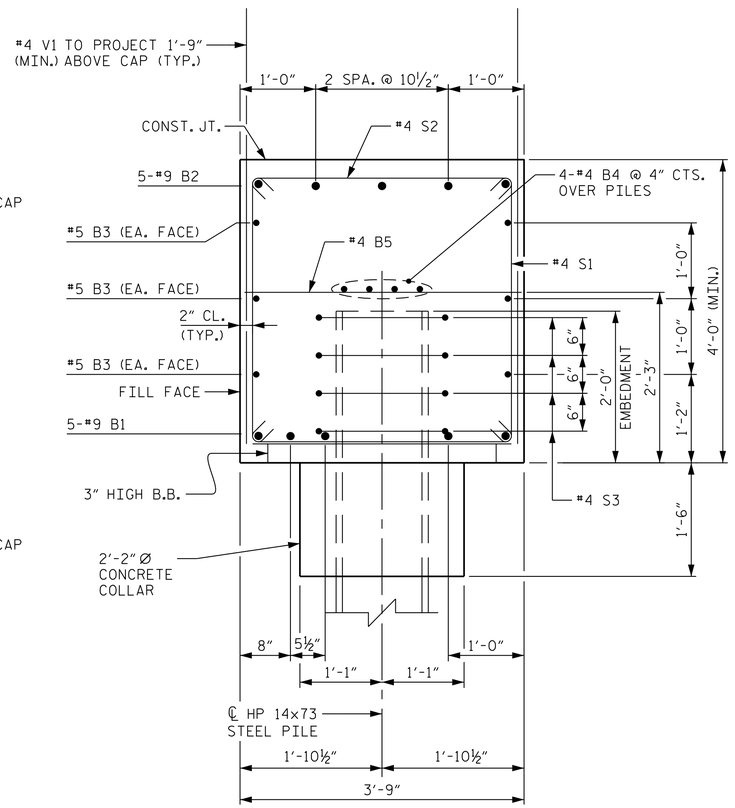



PARTIAL SECTION B-B

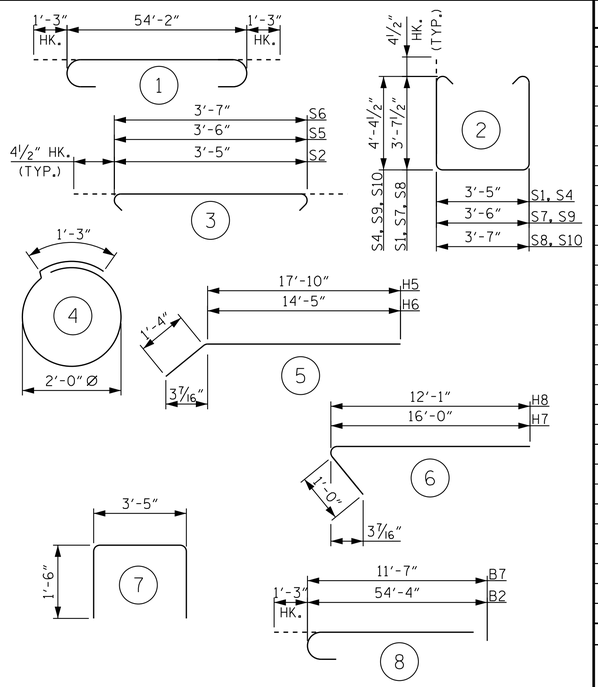



PARTIAL SECTION C-C




SECTION A-A

## BAR TYPES




ALL BAR DIMENSIONS ARE OUT TO OUT

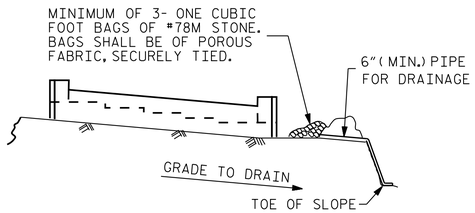
## BILL OF MATERIAL

### END BENT 2

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B1 | 5 | #9 | 1 | 56'-8" | 963 |
| B2 | 5 | #9 | 8 | 55'-7" | 945 |
| B3 | 6 | #5 | STR | 54'-4" | 340 |
| B4 | 8 | #4 | STR | 28'-5" | 152 |
| B5 | 17 | #4 | STR | 3'-5" | 39 |
| B6 | 10 | #4 | STR | 9'-10" | 66 |
| B7 | 5 | #9 | 8 | 12'-10" | 218 |
| | | | | | |
| H5 | 10 | #8 | 5 | 19'-2" | 512 |
| H6 | 10 | #8 | 5 | 15'-9" | 421 |
| H7 | 8 | #6 | 6 | 17'-0" | 204 |
| H8 | 8 | #6 | 6 | 13'-1" | 157 |
| | | | | | |
| S1 | 41 | #4 | 2 | 11'-5" | 313 |
| S2 | 52 | #4 | 3 | 4'-2" | 145 |
| S3 | 44 | #4 | 4 | 7'-7" | 223 |
| S4 | 11 | #4 | 2 | 12'-11" | 95 |
| S5 | 2 | #4 | 3 | 4'-3" | 6 |
| S6 | 2 | #4 | 3 | 4'-4" | 6 |
| S7 | 1 | #4 | 2 | 11'-6" | 8 |
| S8 | 1 | #4 | 2 | 11'-7" | 8 |
| S9 | 1 | #4 | 2 | 13'-0" | 9 |
| S10 | 1 | #4 | 2 | 13'-1" | 9 |
| | | | | | |
| U1 | 14 | #4 | 7 | 6'-5" | 60 |
| | | | | | |
| V1 | 76 | #4 | STR | 5'-6" | 279 |
| V4 | 34 | #5 | STR | 10'-7" | 375 |
| V5 | 30 | #4 | STR | 9'-7" | 192 |

REINFORCING STEEL 5,745 LBS.

CLASS A CONCRETE BREAKDOWN
POUR 1 (CAP, LOWER WING WALLS, & COLLARS) 40.5 C.Y.

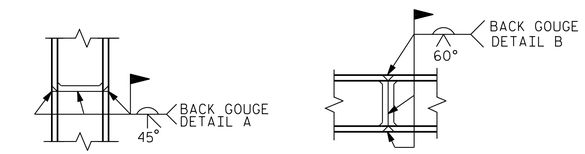



BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

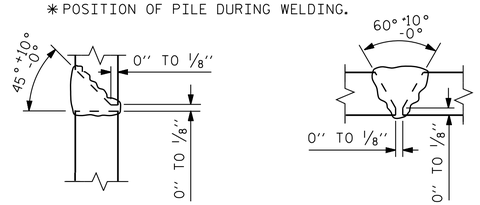
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

## TEMPORARY DRAINAGE AT END BENT




✳PILE VERTICAL ✳PILE HORIZONTAL OR VERTICAL

✳POSITION OF PILE DURING WELDING.




DETAIL "A" DETAIL "B"

## HP PILE SPLICE DETAILS

PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
SECTION AND DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-32 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

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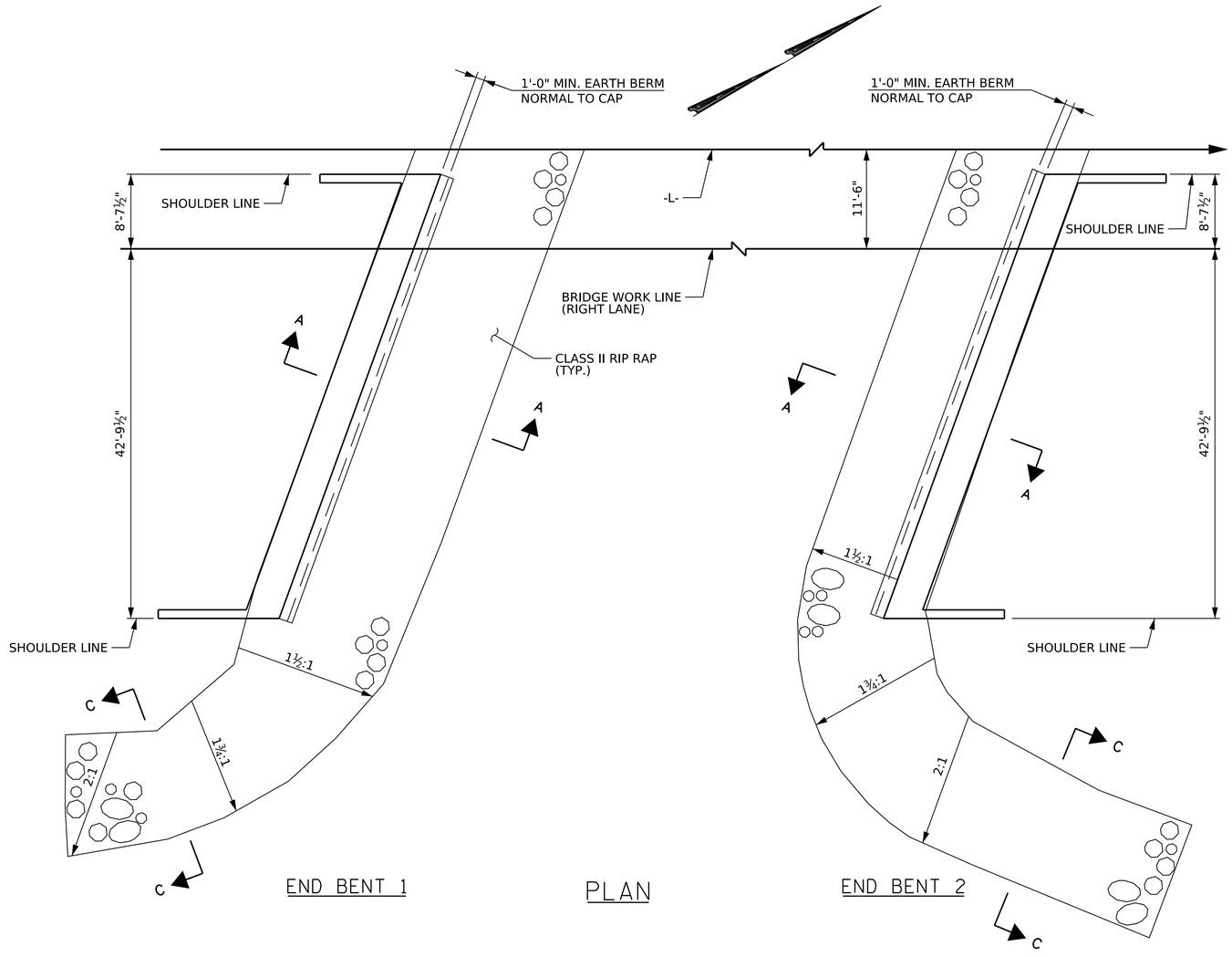
3/18/2025 K:\RDT_Structures_Bridge\NC\011036734 - R-5963A&B\Cad\Dgn\Bridge_2R\R-5963A_SMU_E6_180542.dgn

BRIDGE 2R

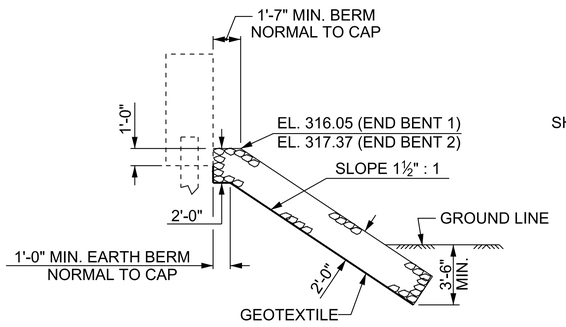



END BENT 1

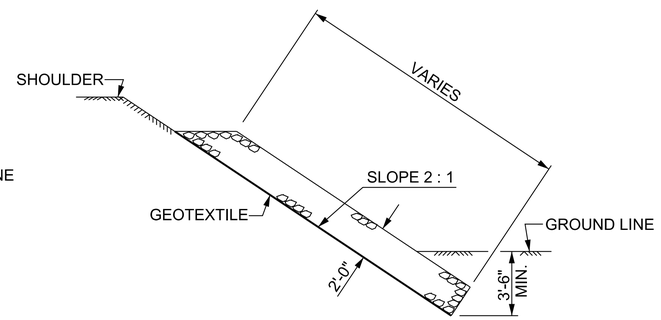
PLAN

END BENT 2

| ESTIMATED QUANTITIES | | |
|---|---|---|
| BRIDGE @ STA. 134+65.00 -L- | RIP RAP CLASS II (2'-0" THICK) | GEOTEXTILE FOR DRAINAGE |
| | TONS | SQUARE YARDS |
| END BENT 1 | 160 | 178 |
| END BENT 2 | 250 | 278 |




SECTION A-A




SECTION C-C

BERM RIP RAPPED

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS 3/20/2025

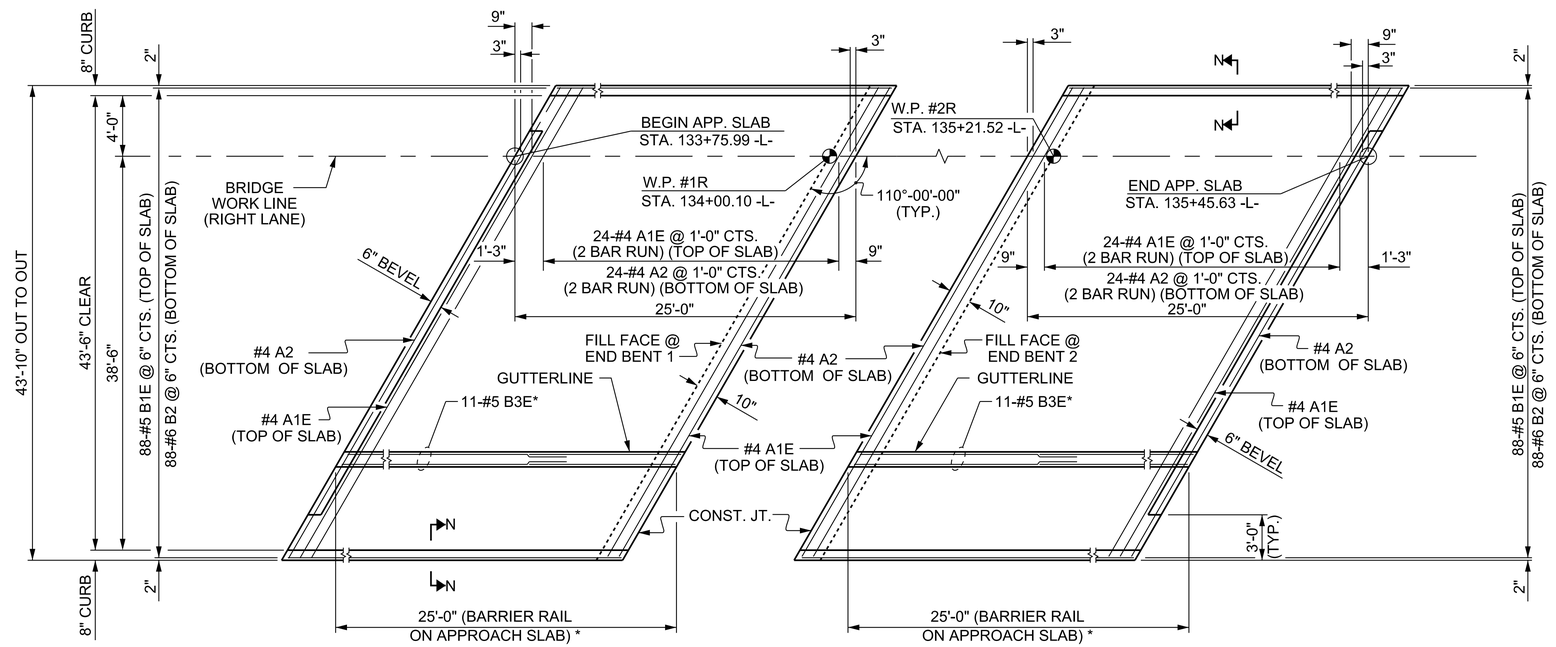
Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-33 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

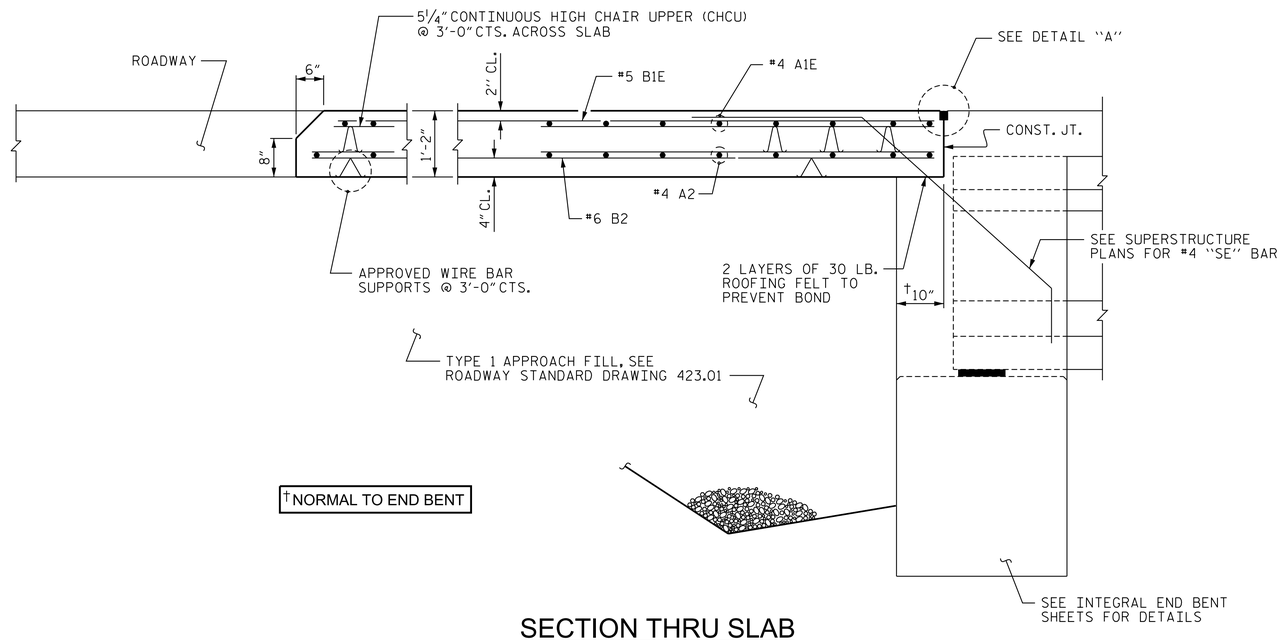
DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**



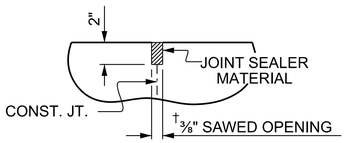

PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

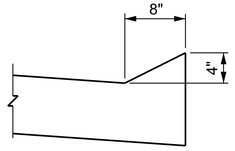



SECTION THRU SLAB

†NORMAL TO END BENT




DETAIL "A"




SECTION N-N

## BILL OF MATERIAL

FOR ONE APPROACH SLAB
(2 REQ'D)

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| A1E | 52 | #4 | STR | 24'-2" | 839 |
| A2 | 52 | #4 | STR | 24'-0" | 834 |
| | | | | | |
| B1E | 88 | #5 | STR | 24'-1" | 2,210 |
| B2 | 88 | #6 | STR | 24'-7" | 3,249 |
| | | | | | |
| REINFORCING STEEL | | | | 4,083 LBS. | |
| EPOXY COATED REINFORCING STEEL | | | | 3,049 LBS. | |
| | | | | | |
| CLASS AA CONCRETE | | | | 47.3 C. Y. | |

## SPLICE LENGTHS

| BAR SIZE | EPOXY COATED | UNCOATED |
|---|---|---|
| #4 | 1'-11" | 1'-7" |
| #5 | 2'-5" | 2'-0" |
| #6 | 3'-7" | 2'-5" |

## NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

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

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.

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTORS OPTION "TYPE 1A - ALTERNATE APPROACH FILL" (ROADWAY STD. 423.02) MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT IN LIEU OF "TYPE 1 - APPROACH FILL".

* FOR BARRIER RAIL ON APPROACH SLAB DETAILS, REINFORCING AND BILL OF MATERIALS, SEE SHEET 2 OF 2.

PROJECT NO. R-5963A

CHATHAM COUNTY

STATION: 134+65.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

# BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

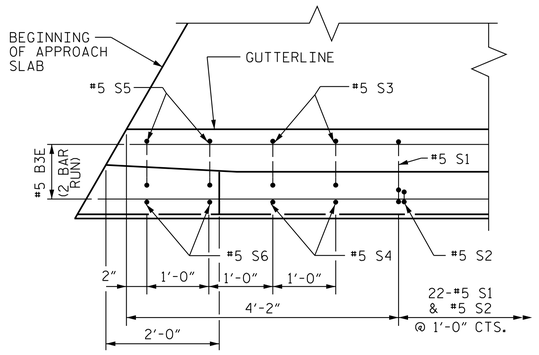


| REVISIONS | | | | | | SHEET NO. |
|---|---|---|---|---|---|---|
| NO. | BY: | DATE: | NO. | BY: | DATE: | S3-34 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 35 |

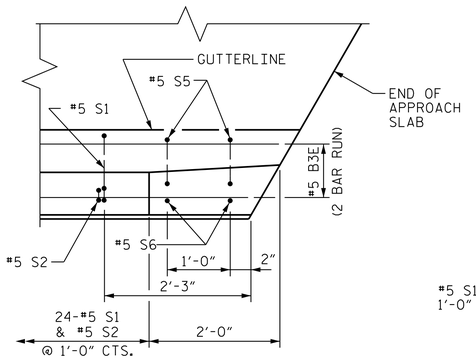
DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

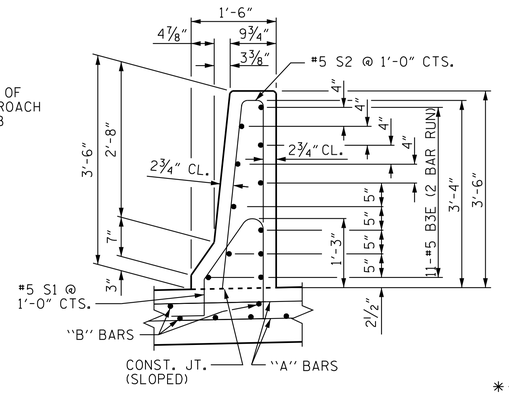
BRIDGE 2R




PLAN AT END BENT 1




PLAN AT END BENT 2




SECTION THRU RAIL

## NOTES

AT THE CONTRACTOR'S OPTION, THE APPROACH SLAB MAY BE CAST MONOLITHICALLY WITH THE INTEGRAL END BENT DIAPHRAGM AND THE END SECTION OF BRIDGE DECK. IF CAST WITH THE INTEGRAL DIAPHRAGM, THE LAYERS OF ROOFING FELT SHALL BE OMITTED. IF CAST SEPARATE FROM THE INTEGRAL DIAPHRAGM, APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

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.

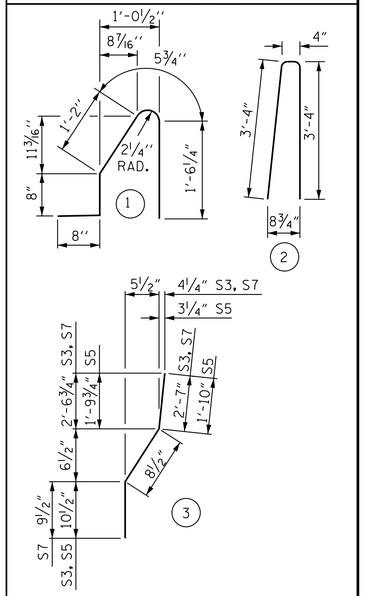
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

THE #5 S3, #5 S4, #5 S5 AND #5 S6 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3, #5 S4, #5 S5 AND #5 S6 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

** THE CONTRACTOR MAY USE ADHESIVELY ANCHORED #5 S7 & #5 S8 BARS. LEVEL 2 FIELD TESTING IS REQUIRED AND THE YIELD LOAD OF THE #5 S7 & #5 S8 IS 18.6 KIPS. FOR ADHESIVELY ANCHORED BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS.

BARRIER RAIL ON APPROACH SLAB SHALL BE PAID FOR BY LINEAR FOOT OF CONCRETE BARRIER RAIL.

## BAR TYPES



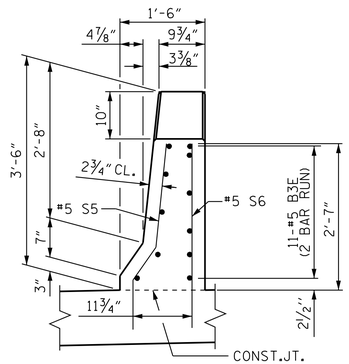

ALL BAR DIMENSIONS ARE OUT TO OUT

## BILL OF MATERIAL

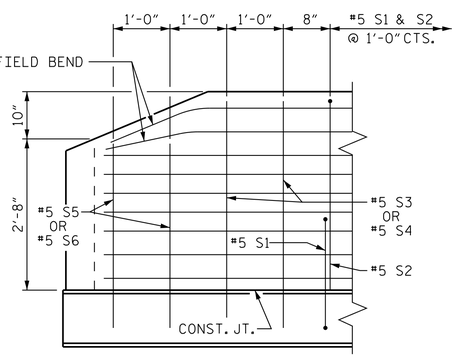
FOR CONCRETE BARRIER RAIL ONLY

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|---|---|---|---|---|---|
| B3E | 44 | #5 | STR | 14'-1" | 646 |
| | | | | | |
| S1E | 46 | #5 | 1 | 4'-6" | 216 |
| S2E | 46 | #5 | 2 | 7'-0" | 336 |
| S3E | 2 | #5 | 3 | 4'-2" | 9 |
| S4E | 2 | #5 | STR | 4'-0" | 8 |
| S5E | 4 | #5 | 3 | 3'-5" | 14 |
| S6E | 4 | #5 | STR | 3'-3" | 14 |
| S7E | 46 | #5 | 3 | 4'-1" | 196 |
| S8E | 46 | #5 | STR | 3'-11" | 188 |

| | |
|---|---|
| EPOXY COATED REINFORCING STEEL | 1,219 LBS. |
| CLASS AA CONCRETE | 6.7 CU. YDS. |
| CONCRETE BARRIER RAIL | 50.0 LIN. FT. |

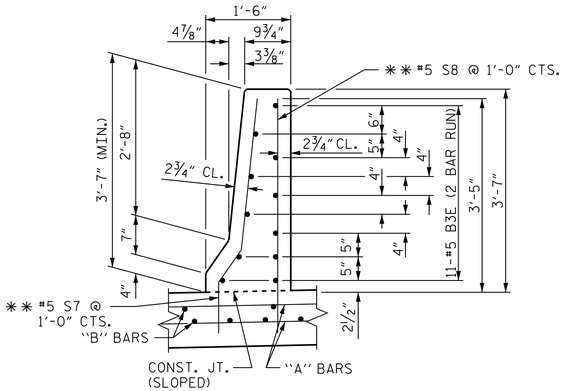



END VIEW




SIDE VIEW

(END BENT 1 SHOWN, END BENT 2 SIMILAR)

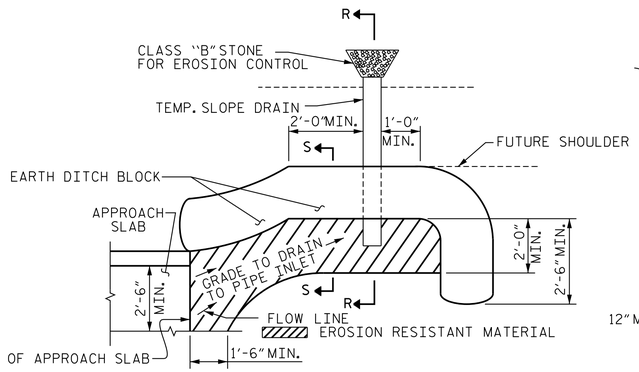



OPTIONAL SECTION THRU INTERIOR RAIL

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

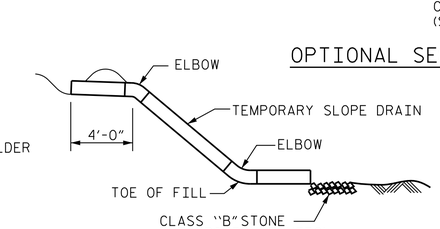
| BAR SIZE | PARAPETS AND BARRIER RAIL |
|---|---|
| #4 | 2'-6" |
| #5 | 3'-1" |
| #6 | 3'-8" |

** FOR OPTIONAL ADHESIVE ANCHORING (NOT INCLUDED IN TOTAL QUANTITY)

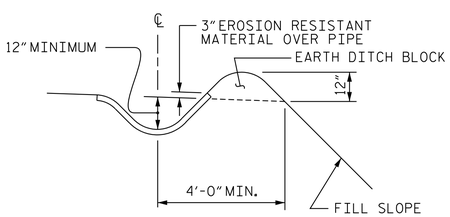



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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



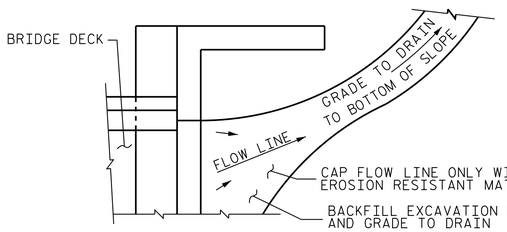

SECTION R-R




SECTION S-S

## 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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ENGINEER ANDREW L. PHILLIPS
3/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102



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PROJECT NO. R-5963A
CHATHAM COUNTY
STATION: 134+65.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

# BRIDGE APPROACH SLAB DETAILS

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

DRAWN BY: T. K. BOYD DATE: 01/2025
CHECKED BY: E. W. SPRABERRY DATE: 01/2025
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE: 01/2025

3/18/2025
K:\RDT_Structures_Bridge\NC\011036734 - R-5963AAB\Cadd\Dgn\Bridge_2R\R-5963A_SMU_AS2_180542.dgn

BRIDGE 2R

# STANDARD NOTES

DESIGN DATA:

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

## MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

## CONCRETE:

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

## CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A ¼" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

## DOWELS:

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

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

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

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

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

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

## REINFORCING STEEL:

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

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

## STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞"Ø STUDS FOR 4 - ¾" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{5}{16}$" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

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

## HANDRAILS AND POSTS:

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

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

## SPECIAL NOTES:

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