

15/7/2024 9:02:00

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols

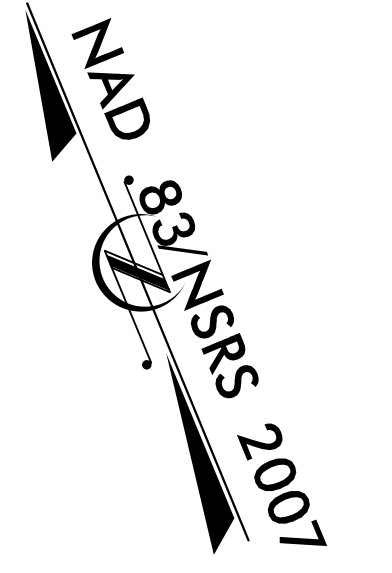
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------|-----------------------------|--------------|--------------|
| N.C. | U-6202 | S-0 | |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 48662.1.1 | | PE | |
| 48662.2.1 | | ROW | |
| 48662.2.2 | | UTILITY | |
| 48662.3.1 | | CONSTRUCTION | |

NEW HANOVER COUNTY

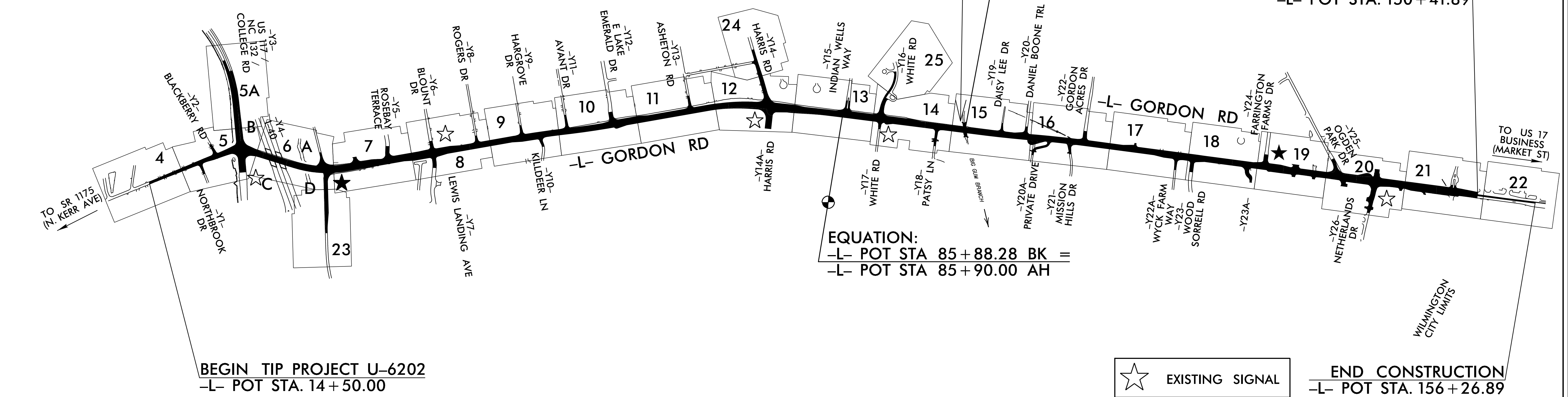
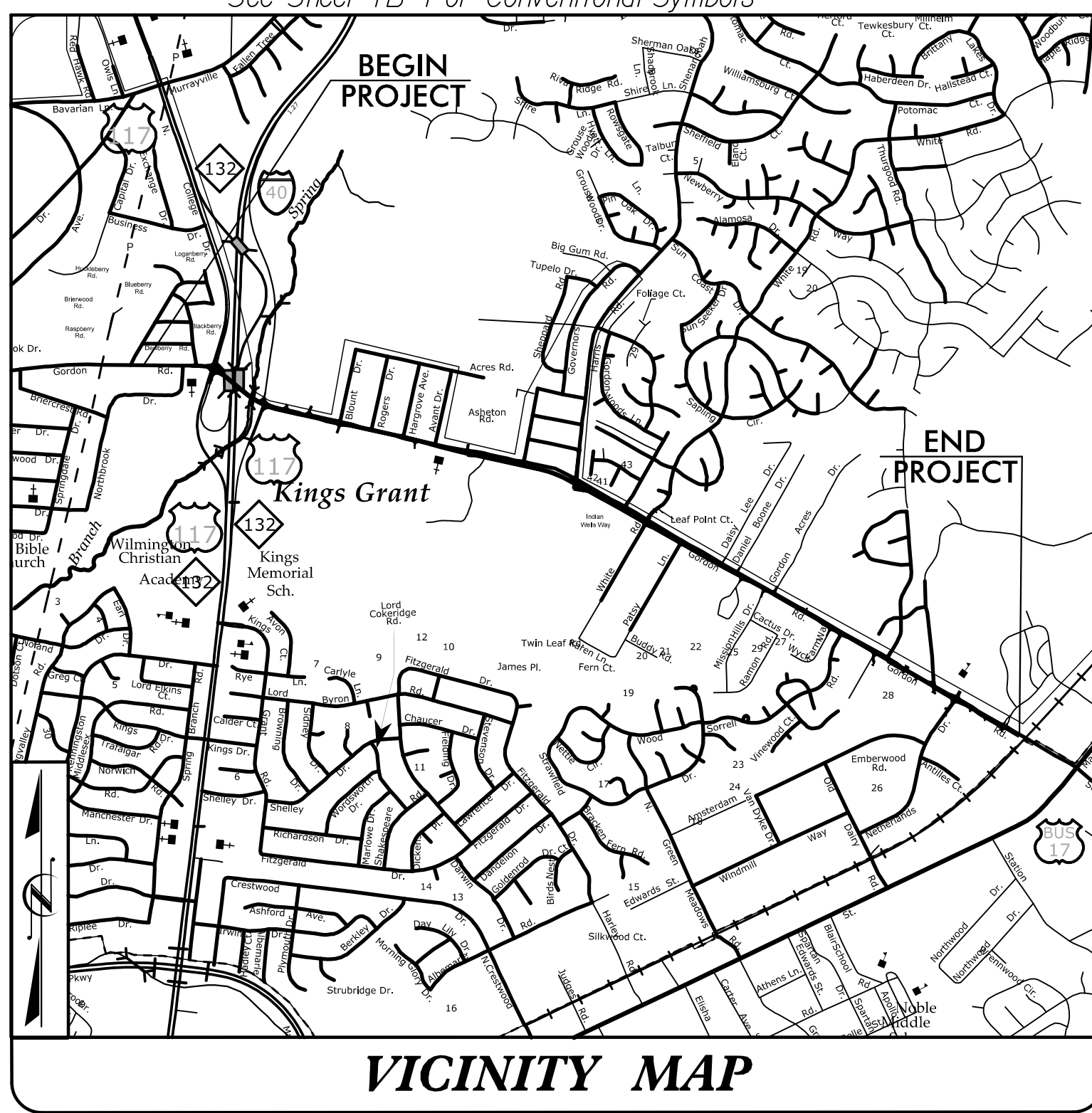
LOCATION: SR 2048 (GORDON ROAD) FROM
WEST OF INTERSTATE-40 TO
WEST OF US 17 BUS (MARKET STREET)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERT, AND SIGNALS



TIP PROJECT: U-6202

CONTRACT: C204942



STRUCTURES

| | |
|---|-----------------|
| ☆ | EXISTING SIGNAL |
| ★ | PROPOSED SIGNAL |

END CONSTRUCTION
-L- POT STA. 156 + 26.89

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

DESIGN DATA

| | |
|-----------------------------|--------|
| ADT 2024 = | 27,600 |
| ADT 2044 = | 35,300 |
| K = | 8 % |
| D = | 55 % |
| T = | 4 % * |
| V = | 50 MPH |
| * TTST = 1% DUAL 3% | |
| FUNC CLASS = URBAN ARTERIAL | |
| REGIONAL TIER | |

PROJECT LENGTH

| | |
|---|-------------|
| LENGTH OF ROADWAY T.I.P. PROJECT U-6202 = | 2.574 MILES |
| TOTAL LENGTH OF T.I.P. PROJECT U-6202 = | 2.574 MILES |
| LENGTH BASED ON -L- CENTERLINE | |

PREPARED IN THE OFFICE OF:

HNTB HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

FOR NCDOT DIVISION 3

| | |
|-------------------------------------|--|
| 2024 STANDARD SPECIFICATIONS | J. MATTHEW PICKENS, PE PROJECT ENGINEER |
| RIGHT OF WAY DATE: JUNE 17, 2022 | ANDREW J. McOMBER, PE PROJECT DESIGN ENGINEER |
| LETTING DATE: NOVEMBER 19, 2024 | BRIAN HARDING, PE NCDOT CONTACT |

STRUCTURES ENGINEER

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 27819/16/2024 ENGINEER DAVID W. HAWKINS

Signed by: David W. Hawkins P.E.
SIGNATURE: _____ P.E.



LOAD AND RESISTANCE FACTOR RATING (LRFR)
SUMMARY FOR REINFORCED CONCRETE BOX CULVERTS

| LOAD TYPE | VEHICLE | WEIGHT (W) (TONS) | CONTROLLING LOAD RATING Ⓢ | MINIMUM RATING FACTORS (RF) | TONS = W x RF | STRENGTH I LIMIT STATE | | | | | | | | COMMENT NUMBER | | |
|------------------------|-----------------------------------|----------------------|---------------------------------|-----------------------------------|---------------|------------------------|---------|--------------|--|---------------|---------|--------------|--|----------------|-----|--|
| | | | | | | MOMENT | | | | SHEAR | | | | | | |
| | | | | | | RATING FACTOR | BOX NO. | ELEMENT TYPE | DISTANCE FROM LEFT END OF ELEMENT (FT) | RATING FACTOR | BOX NO. | ELEMENT TYPE | DISTANCE FROM LEFT END OF ELEMENT (FT) | | | |
| DESIGN LOAD | HL-93 (INVENTORY) | N/A | Ⓢ1 | 1.455 | -- | 1.75 | 3.403 | 1 | TOP SLAB | 9.0 | 1.455 | 1 | BOTTOM SLAB | 8.4 | | |
| | HL-93 (OPERATING) | N/A | | 1.886 | -- | 1.35 | 4.411 | 1 | TOP SLAB | 9.0 | 1.886 | 1 | BOTTOM SLAB | 8.4 | | |
| | HS-20 (INVENTORY) | 36.000 | Ⓢ2 | 2.065 | 74.34 | 1.75 | 3.403 | 1 | TOP SLAB | 9.0 | 2.065 | 1 | BOTTOM SLAB | 8.4 | | |
| | HS-20 (OPERATING) | 36.000 | | 2.677 | 96.36 | 1.35 | 4.411 | 1 | TOP SLAB | 9.0 | 2.677 | 1 | BOTTOM SLAB | 8.4 | | |
| LEGAL LOAD | SINGLE VEHICLE (SV) | SNSH | | 4.688 | 63.29 | 1.40 | 11.332 | 1 | TOP SLAB | 9.0 | 4.688 | 1 | BOTTOM SLAB | 8.4 | | |
| | | SNGARBS2 | 20.000 | | 4.319 | 86.38 | 1.40 | 8.026 | 1 | TOP SLAB | 9.0 | 4.319 | 1 | BOTTOM SLAB | 8.4 | |
| | | SNAGRIS2 | 22.000 | | 4.440 | 97.68 | 1.40 | 7.428 | 1 | TOP SLAB | 9.0 | 4.440 | 1 | BOTTOM SLAB | 8.4 | |
| | | SNCOTTS3 | 27.250 | Ⓢ3 | 2.168 | 59.09 | 1.40 | 7.281 | 1 | TOP SLAB | 9.0 | 2.168 | 1 | BOTTOM SLAB | 8.4 | |
| | | SNAGGRS4 | 34.925 | | 2.699 | 94.25 | 1.40 | 6.525 | 1 | TOP SLAB | 9.0 | 2.699 | 1 | BOTTOM SLAB | 8.4 | |
| | | SNS5A | 35.550 | | 3.064 | 108.93 | 1.40 | 7.394 | 1 | TOP SLAB | 9.0 | 3.064 | 1 | BOTTOM SLAB | 8.4 | |
| | | SNS6A | 39.950 | | 3.090 | 123.43 | 1.40 | 7.454 | 1 | TOP SLAB | 9.0 | 3.090 | 1 | BOTTOM SLAB | 8.4 | |
| | SNS7B | 42.000 | | 3.287 | 138.05 | 1.40 | 7.923 | 1 | TOP SLAB | 9.0 | 3.287 | 1 | BOTTOM SLAB | 8.4 | | |
| | TRUCK TRACTOR SEMI-TRAILER (TTST) | TNAGRIT3 | 33.000 | | 2.970 | 98.02 | 1.40 | 7.171 | 1 | TOP SLAB | 9.0 | 2.970 | 1 | BOTTOM SLAB | 8.4 | |
| | | TNT4A | 33.075 | | 3.408 | 112.73 | 1.40 | 8.211 | 1 | TOP SLAB | 9.0 | 3.408 | 1 | BOTTOM SLAB | 8.4 | |
| | | TNT6A | 41.600 | | 3.407 | 141.75 | 1.40 | 8.209 | 1 | TOP SLAB | 9.0 | 3.407 | 1 | BOTTOM SLAB | 8.4 | |
| | | TNT7A | 42.000 | | 3.725 | 156.46 | 1.40 | 8.963 | 1 | TOP SLAB | 9.0 | 3.725 | 1 | BOTTOM SLAB | 8.4 | |
| | | TNT7B | 42.000 | | 3.725 | 156.46 | 1.40 | 8.963 | 1 | TOP SLAB | 9.0 | 3.725 | 1 | BOTTOM SLAB | 8.4 | |
| | | TNAGRIT4 | 43.000 | | 2.611 | 112.25 | 1.40 | 6.316 | 1 | TOP SLAB | 9.0 | 2.611 | 1 | BOTTOM SLAB | 8.4 | |
| TNAGT5A | | 45.000 | | 2.819 | 126.87 | 1.40 | 6.812 | 1 | TOP SLAB | 9.0 | 2.819 | 1 | BOTTOM SLAB | 8.4 | | |
| TNAGT5B | 45.000 | | 2.819 | 126.87 | 1.40 | 6.812 | 1 | TOP SLAB | 9.0 | 2.819 | 1 | BOTTOM SLAB | 8.4 | | | |
| EMERGENCY VEHICLE (EV) | EV2 | 28.750 | | 3.443 | 99.00 | 1.30 | 6.229 | 1 | TOP SLAB | 9.0 | 3.443 | 1 | BOTTOM SLAB | 8.4 | | |
| | EV3 | 43.000 | Ⓢ4 | 1.896 | 81.52 | 1.30 | 5.251 | 1 | TOP SLAB | 9.0 | 1.896 | 1 | BOTTOM SLAB | 8.4 | | |

LOAD FACTORS:

DESIGN LOAD RATING FACTORS

| LOAD TYPE | MAX FACTOR | MIN FACTOR |
|-----------|------------|------------|
| DC | 1.25 | 0.90 |
| DW | 1.50 | 0.65 |
| EV | 1.30 | 0.90 |
| EH | 1.35 | 0.90 |
| ES | 1.35 | 0.90 |
| LS | 1.75 | -- |
| WA | 1.00 | -- |

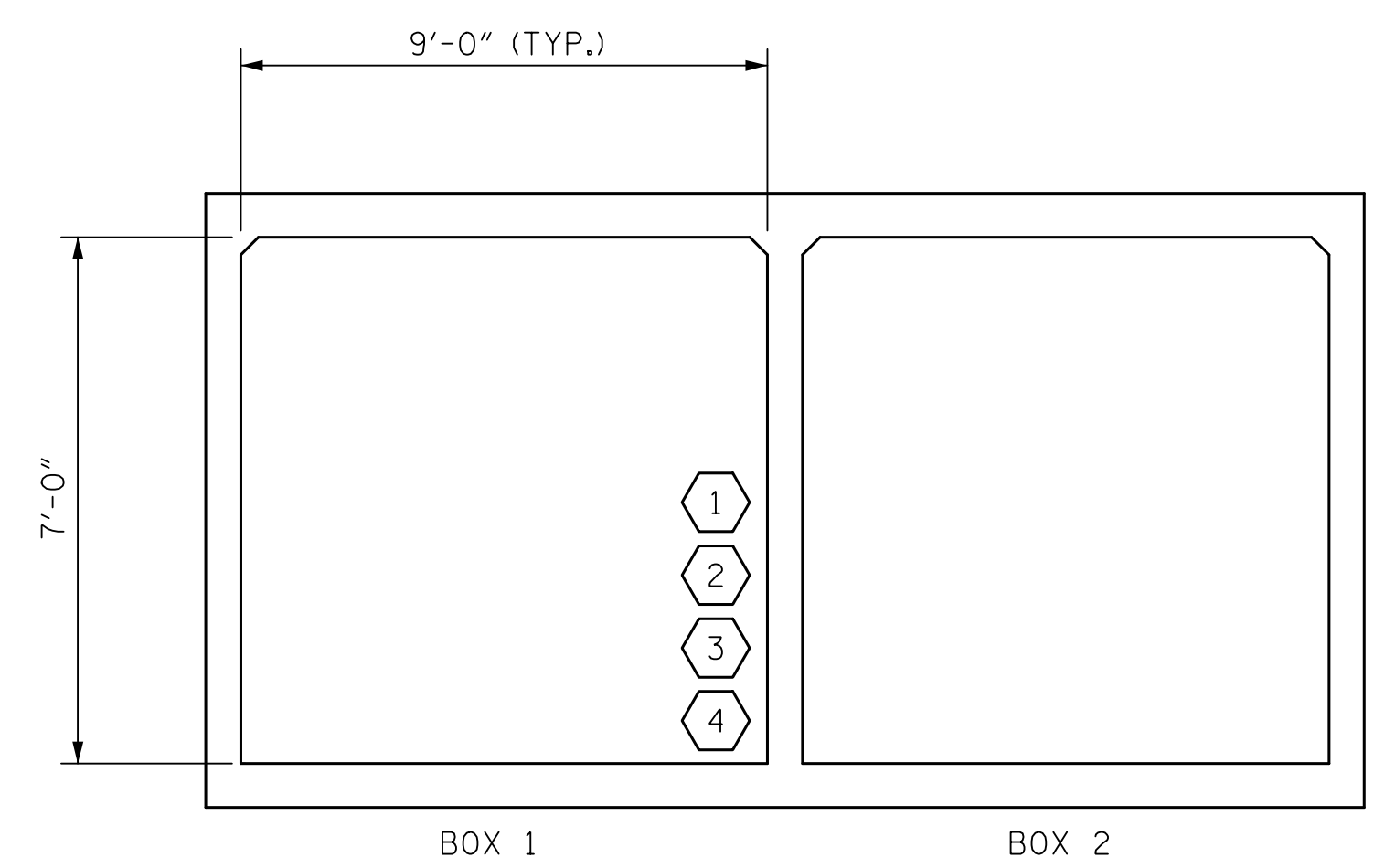
NOTES:

RATING FACTORS ARE BASED ON THE STRENGTH I LIMIT STATES.

COMMENTS:

-
-
-
-

| | |
|-------------------------------|----------------------------------|
| Ⓢ | 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 | |



LRFR SUMMARY
(LOOKING DOWNSTREAM)

PROJECT NO. U-6202
NEW HANOVER COUNTY
STATION: 98+33.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR
REINFORCED CONCRETE
BOX CULVERTS
(NON-INTERSTATE TRAFFIC)

SEAL 27812
ENGINEER
DAVID W. HAWKINS
4/1/2024

HNTB HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 12/23
CHECKED BY: N. HART DATE: 12/23
DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 12/23

DWG. NO. 2

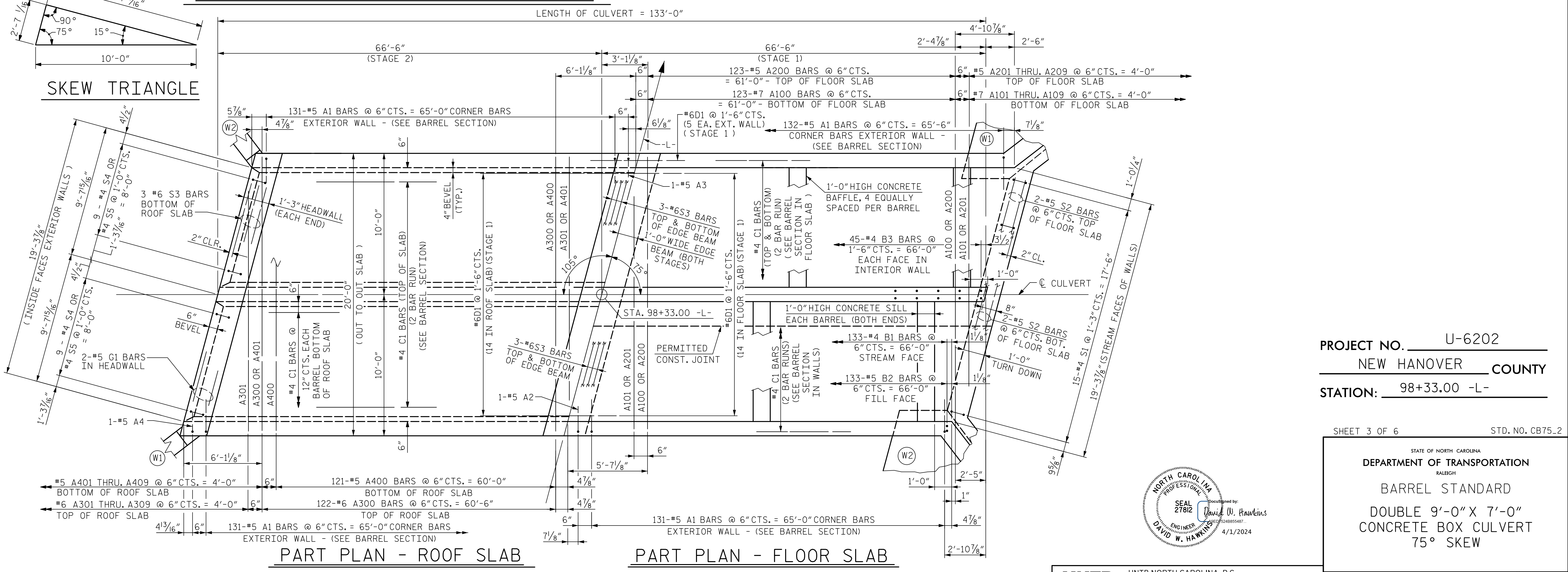
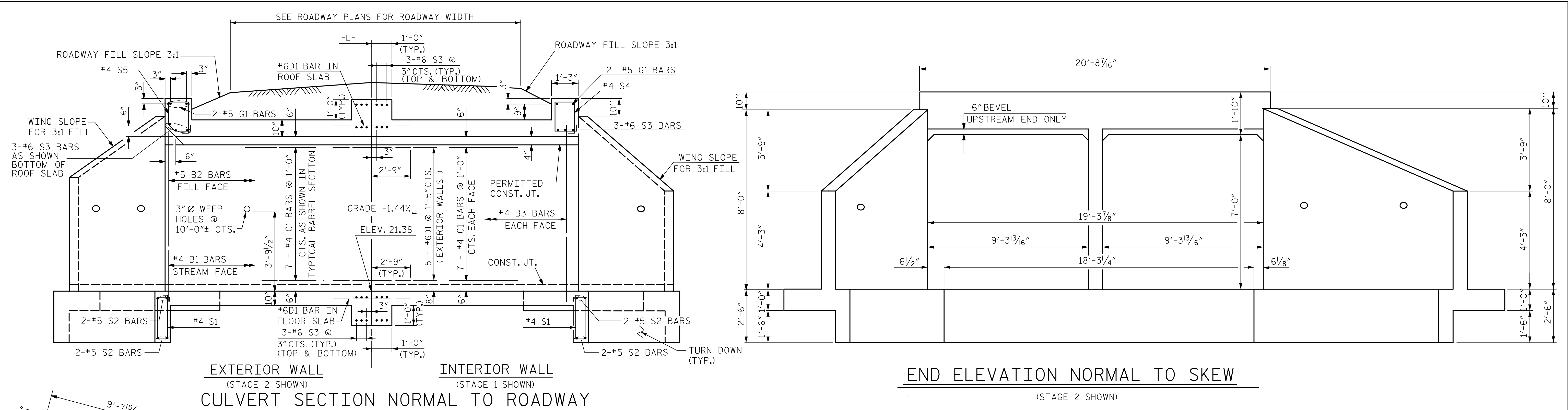
| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|----------------|
| NO. | BY | DATE | NO. | BY | DATE | C1-2 |
| 1 | | | 3 | | | TOTAL SHEETS 6 |
| 2 | | | 4 | | | |

STD. NO. LRFR5

| | |
|-------------------------|----------------------|
| ASSEMBLED BY: M. WRIGHT | DATE: 12/23 |
| CHECKED BY: N. HART | DATE: 12/23 |
| DRAWN BY: WMC 7/11 | REV. 10/1/11 MAA/GM |
| CHECKED BY: GM 7/11 | REV. 12/1/11 MAA/THC |
| | REV. 04/23 BNB/AAI |

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

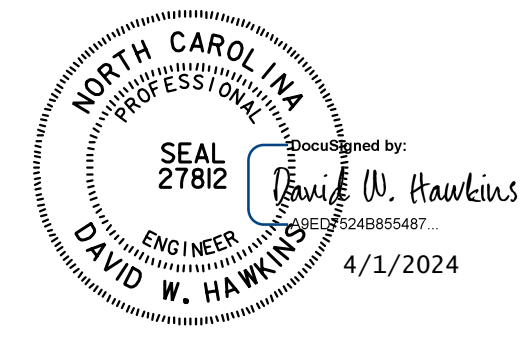
2/15/2024
\\hntb\proj\6202\6202_002\6202_SMI_C102_002_641.XYZ.dgn



PROJECT NO. U-6202
 NEW HANOVER COUNTY
 STATION: 98+33.00 -L-

SHEET 3 OF 6 STD. NO. CB75-2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 BARREL STANDARD
 DOUBLE 9'-0" X 7'-0"
 CONCRETE BOX CULVERT
 75° SKEW



HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DESIGNED BY: M. WRIGHT DATE: 10/22
 CHECKED BY: P. BARBER DATE: 12/22
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 12/23

DWG. NO. 3

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|----------------|
| NO. | BY | DATE | NO. | BY | DATE | C1-3 |
| 1 | | | 3 | | | TOTAL SHEETS 6 |
| 2 | | | 4 | | | |

ASSEMBLED BY: MEW DATE: 10/22
 CHECKED BY: PJB DATE: 12/22

DRAWN BY: TTS 11/90 REV. 6/19 MAA/THC
 CHECKED BY: ARB 11/90

2/15/2024
 V:\Projects\9803\9803.dwg

NOTE: STAGE 1 REINFORCING AND STAGE 2 REINFORCING ARE SAME BY ROTATION AT STATION 98+33.00 -L-/EDGE BEAMS EXCLUDING #6D1 DOWEL BARS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ADDITIONAL NOTES

SUBGRADE SHOULD BE VERIFIED BY ENGINEER OR THEIR REPRESENTATIVE PRIOR TO PLACING FOUNDATION CONDITIONING MATERIAL.

NO BACKFILLING OF EXTERIOR WALLS SHALL BE PERMITTED UNTIL ROOF SLAB HAS BEEN PLACED AND CURED. CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY BRACING WALLS UNTIL TOP SLAB IS COMPLETE.

AT THE DIRECTION OF THE ENGINEER, UNDERCUT SOFT/LOOSE SOILS THAT MAY BE ENCOUNTERED BENEATH THE BOTTOM OF THE FOUNDATION CONDITIONING MATERIAL. BACKFILL UNDERCUT AREAS WITH FOUNDATION CONDITIONING MATERIAL.

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

THE RESIDENT ENGINEER SHALL CHECK THE LENGTH OF CULVERT BEFORE STAKING IT OUT TO MAKE CERTAIN THAT IT WILL PROPERLY TAKE CARE OF THE FILL.

DIMENSIONS FOR WING LAYOUT AS WELL AS ADDITIONAL REINFORCING STEEL EMBEDDED IN BARREL ARE SHOWN ON WING SHEET.

NO PRECAST REINFORCED BOX CULVERT OPTION WILL BE ALLOWED.

STAGING NOTES

CONCRETE IN CULVERT TO BE POURED IN THE FOLLOWING ORDER:

STAGE I: AFTER DIVERTING EXISTING STREAM FLOW TO EXISTING CULVERT THROUGH TEMPORARY PIPE AND MOVING TRAFFIC TO NORTH SIDE, COMPLETE STAGE I.

1. CONSTRUCT STAGE I WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF VERTICAL WALLS.
2. CONSTRUCT REMAINING STAGE I PORTION OF WALL AND WINGS FULL HEIGHT FOLLOWED BY ENTIRE ROOF SLAB AND HEADWALL.

STAGE II: AFTER DIVERTING FLOW FROM COMPLETED STAGE I CULVERT BACK TO TEMPORARY PIPE AT MEDIAN, INSTALLING TEMPORARY SHORING AND SHIFTING TRAFFIC SOUTH (SEE TRAFFIC CONTROL PLANS), CONSTRUCT STAGE II OF CULVERT.

1. CONSTRUCT STAGE II WING FOOTINGS AND FLOOR SLAB INCLUDING 4" OF VERTICAL WALLS.
2. CONSTRUCT REMAINING STAGE II PORTIONS OF THE WALLS AND WINGS FOLLOWED BY THE ENTIRE ROOF SLAB AND HEADWALL.

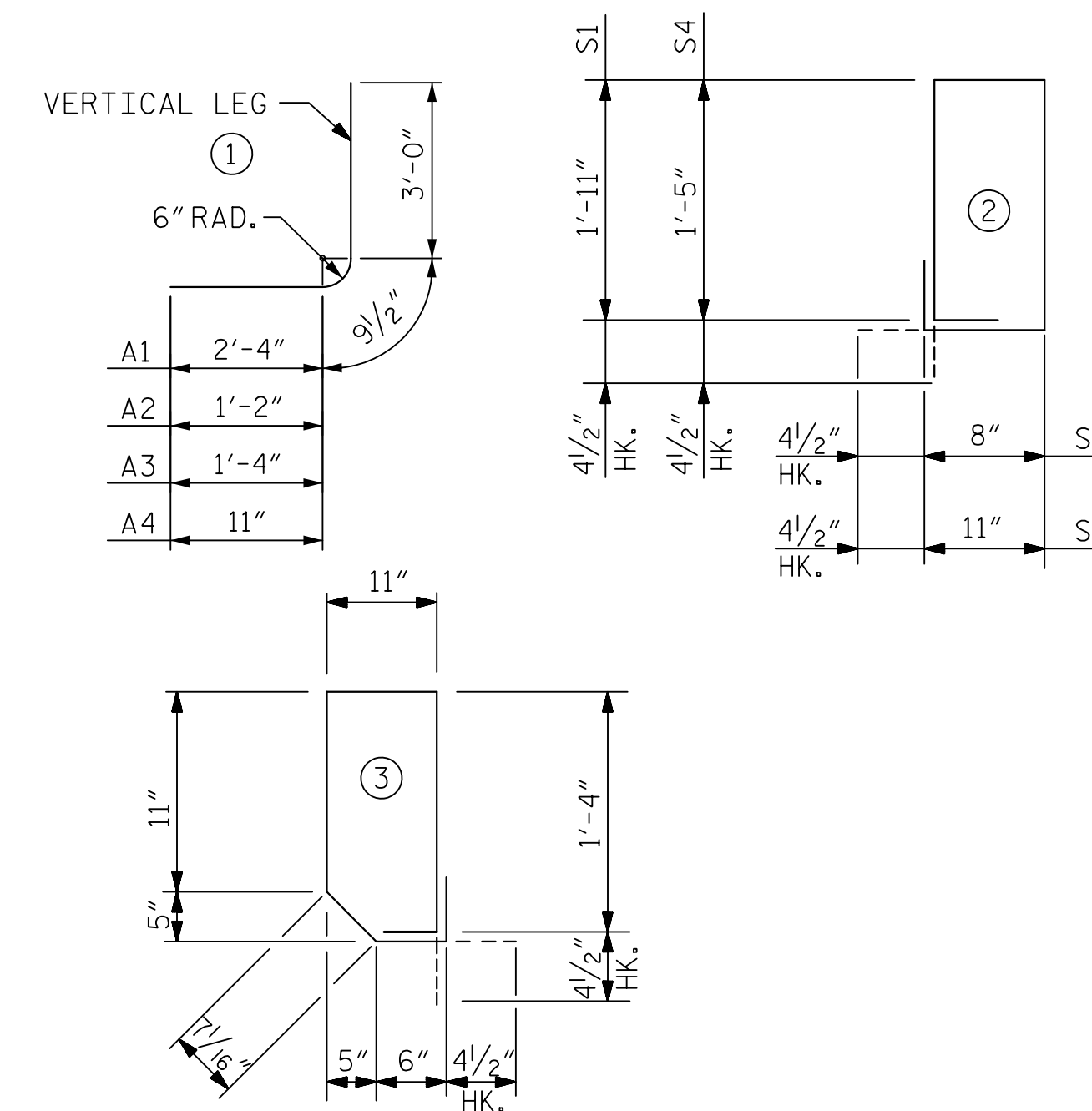
BILL OF MATERIAL - STAGE I

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-------------------|-----|------|------|---------|--------|
| A1 | 525 | 5 | 1 | 6'-2" | 3,377 |
| A2 | 1 | 5 | 1 | 5'-0" | 5 |
| A3 | 1 | 5 | 1 | 5'-2" | 5 |
| A4 | 1 | 5 | 1 | 4'-9" | 5 |
| A100 | 123 | 7 | STR | 19'-8" | 4,944 |
| A101 | 2 | 7 | STR | 18'-8" | 76 |
| A102 | 2 | 7 | STR | 16'-10" | 69 |
| A103 | 2 | 7 | STR | 14'-11" | 61 |
| A104 | 2 | 7 | STR | 13'-1" | 53 |
| A105 | 2 | 7 | STR | 11'-3" | 46 |
| A106 | 2 | 7 | STR | 9'-4" | 38 |
| A107 | 2 | 7 | STR | 7'-6" | 31 |
| A108 | 2 | 7 | STR | 5'-7" | 23 |
| A109 | 2 | 7 | STR | 3'-9" | 15 |
| A200 | 123 | 5 | STR | 19'-8" | 2,523 |
| A201 | 2 | 5 | STR | 18'-8" | 39 |
| A202 | 2 | 5 | STR | 16'-10" | 35 |
| A203 | 2 | 5 | STR | 14'-11" | 31 |
| A204 | 2 | 5 | STR | 13'-1" | 27 |
| A205 | 2 | 5 | STR | 11'-3" | 23 |
| A206 | 2 | 5 | STR | 9'-4" | 19 |
| A207 | 2 | 5 | STR | 7'-6" | 16 |
| A208 | 2 | 5 | STR | 5'-7" | 12 |
| A209 | 2 | 5 | STR | 3'-9" | 8 |
| A300 | 122 | 6 | STR | 19'-8" | 3,604 |
| A301 | 2 | 6 | STR | 18'-4" | 55 |
| A302 | 2 | 6 | STR | 16'-5" | 49 |
| A303 | 2 | 6 | STR | 14'-7" | 44 |
| A304 | 2 | 6 | STR | 12'-9" | 38 |
| A305 | 2 | 6 | STR | 10'-10" | 33 |
| A306 | 2 | 6 | STR | 9'-0" | 27 |
| A307 | 2 | 6 | STR | 7'-1" | 21 |
| A308 | 2 | 6 | STR | 5'-3" | 16 |
| A309 | 2 | 6 | STR | 3'-4" | 10 |
| A400 | 122 | 5 | STR | 19'-8" | 2,503 |
| A401 | 2 | 5 | STR | 18'-4" | 38 |
| A402 | 2 | 5 | STR | 16'-5" | 34 |
| A403 | 2 | 5 | STR | 14'-7" | 30 |
| A404 | 2 | 5 | STR | 12'-9" | 27 |
| A405 | 2 | 5 | STR | 10'-10" | 23 |
| A406 | 2 | 5 | STR | 9'-0" | 19 |
| A407 | 2 | 5 | STR | 7'-1" | 15 |
| A408 | 2 | 5 | STR | 5'-3" | 11 |
| A409 | 2 | 5 | STR | 3'-4" | 7 |
| B1 | 266 | 4 | STR | 8'-3" | 1,466 |
| B2 | 266 | 5 | STR | 6'-4" | 1,757 |
| B3 | 90 | 4 | STR | 8'-3" | 496 |
| C1 | 248 | 4 | STR | 34'-8" | 5,743 |
| D1 | 38 | 6 | STR | 5'-6" | 314 |
| D2 | 18 | 6 | STR | 1'-5" | 38 |
| G1 | 2 | 5 | STR | 20'-4" | 42 |
| S1 | 15 | 4 | 2 | 5'-11" | 59 |
| S2 | 4 | 5 | STR | 20'-4" | 85 |
| S3 | 15 | 6 | STR | 20'-4" | 458 |
| S4 | 18 | 4 | 2 | 5'-5" | 65 |
| REINFORCING STEEL | | | | LBS. | 28,608 |

BILL OF MATERIAL - STAGE II

| BAR | NO. | SIZE | TYPE | LENGTH | WEIGHT |
|-------------------|-----|------|------|---------|--------|
| A1 | 525 | 5 | 1 | 6'-2" | 3,377 |
| A2 | 1 | 5 | 1 | 5'-0" | 5 |
| A3 | 1 | 5 | 1 | 5'-2" | 5 |
| A4 | 1 | 5 | 1 | 4'-9" | 5 |
| A100 | 123 | 7 | STR | 19'-8" | 4,944 |
| A101 | 2 | 7 | STR | 18'-8" | 76 |
| A102 | 2 | 7 | STR | 16'-10" | 69 |
| A103 | 2 | 7 | STR | 14'-11" | 61 |
| A104 | 2 | 7 | STR | 13'-1" | 53 |
| A105 | 2 | 7 | STR | 11'-3" | 46 |
| A106 | 2 | 7 | STR | 9'-4" | 38 |
| A107 | 2 | 7 | STR | 7'-6" | 31 |
| A108 | 2 | 7 | STR | 5'-7" | 23 |
| A109 | 2 | 7 | STR | 3'-9" | 15 |
| A200 | 123 | 5 | STR | 19'-8" | 2,523 |
| A201 | 2 | 5 | STR | 18'-8" | 39 |
| A202 | 2 | 5 | STR | 16'-10" | 35 |
| A203 | 2 | 5 | STR | 14'-11" | 31 |
| A204 | 2 | 5 | STR | 13'-1" | 27 |
| A205 | 2 | 5 | STR | 11'-3" | 23 |
| A206 | 2 | 5 | STR | 9'-4" | 19 |
| A207 | 2 | 5 | STR | 7'-6" | 16 |
| A208 | 2 | 5 | STR | 5'-7" | 12 |
| A209 | 2 | 5 | STR | 3'-9" | 8 |
| A300 | 122 | 6 | STR | 19'-8" | 3,604 |
| A301 | 2 | 6 | STR | 18'-4" | 55 |
| A302 | 2 | 6 | STR | 16'-5" | 49 |
| A303 | 2 | 6 | STR | 14'-7" | 44 |
| A304 | 2 | 6 | STR | 12'-9" | 38 |
| A305 | 2 | 6 | STR | 10'-10" | 33 |
| A306 | 2 | 6 | STR | 9'-0" | 27 |
| A307 | 2 | 6 | STR | 7'-1" | 21 |
| A308 | 2 | 6 | STR | 5'-3" | 16 |
| A309 | 2 | 6 | STR | 3'-4" | 10 |
| A400 | 121 | 5 | STR | 19'-8" | 2,482 |
| A401 | 2 | 5 | STR | 18'-4" | 38 |
| A402 | 2 | 5 | STR | 16'-5" | 34 |
| A403 | 2 | 5 | STR | 14'-7" | 30 |
| A404 | 2 | 5 | STR | 12'-9" | 27 |
| A405 | 2 | 5 | STR | 10'-10" | 23 |
| A406 | 2 | 5 | STR | 9'-0" | 19 |
| A407 | 2 | 5 | STR | 7'-1" | 15 |
| A408 | 2 | 5 | STR | 5'-3" | 11 |
| A409 | 2 | 5 | STR | 3'-4" | 7 |
| B1 | 266 | 4 | STR | 8'-3" | 1,466 |
| B2 | 266 | 5 | STR | 6'-4" | 1,757 |
| B3 | 90 | 4 | STR | 8'-3" | 496 |
| C1 | 248 | 4 | STR | 34'-8" | 5,743 |
| D2 | 18 | 6 | STR | 1'-5" | 38 |
| G1 | 2 | 5 | STR | 20'-4" | 42 |
| S1 | 15 | 4 | 2 | 5'-11" | 59 |
| S2 | 4 | 5 | STR | 20'-4" | 85 |
| S3 | 15 | 6 | STR | 20'-4" | 458 |
| S5 | 18 | 4 | 3 | 5'-1" | 61 |
| REINFORCING STEEL | | | | LBS. | 28,269 |

BAR TYPE



BAR DIMENSIONS ARE OUT TO OUT

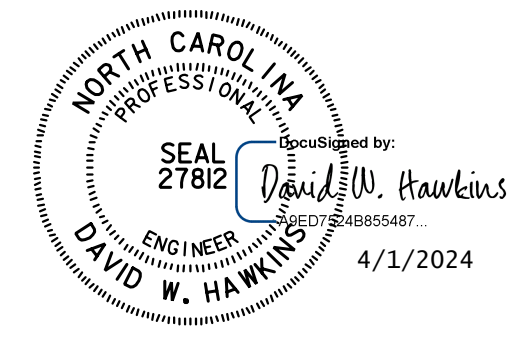
SPLICE LENGTH CHART

| BAR | SIZE | SPLICE LENGTH |
|------|------|---------------|
| "C" | #4 | 2'-5" |
| A200 | #5 | 2'-4" |
| A100 | #7 | 3'-2" |

PROJECT NO. U-6202
 NEW HANOVER COUNTY
 STATION: 98+33.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 DOUBLE BARREL
 9'-0" x 7'-0"
 CONCRETE BOX CULVERT



HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

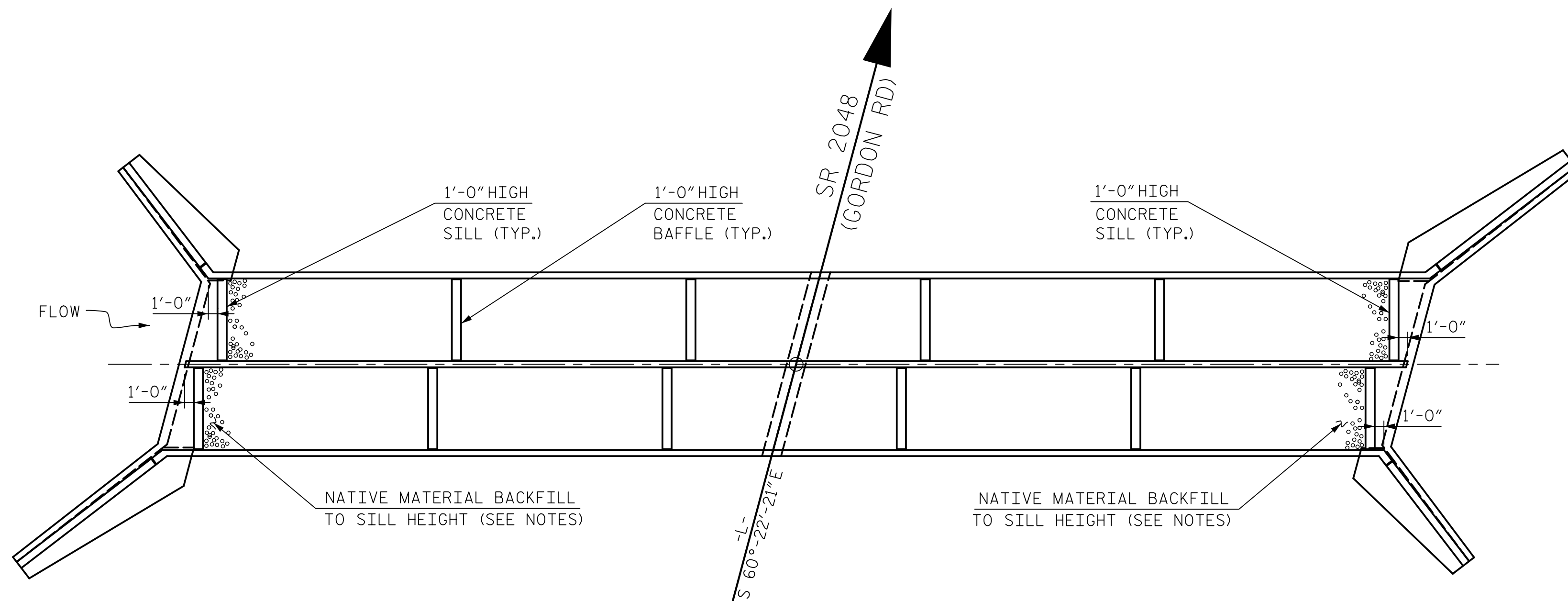
DESIGNED BY: M. WRIGHT DATE: 10/22
 CHECKED BY: P. BARBER DATE: 12/22
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 12/23

DWG. NO. 4

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

| REVISIONS | | | | | | SHEET NO. |
|-----------|----|------|-----|----|------|--------------|
| NO. | BY | DATE | NO. | BY | DATE | C1-4 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 6 |

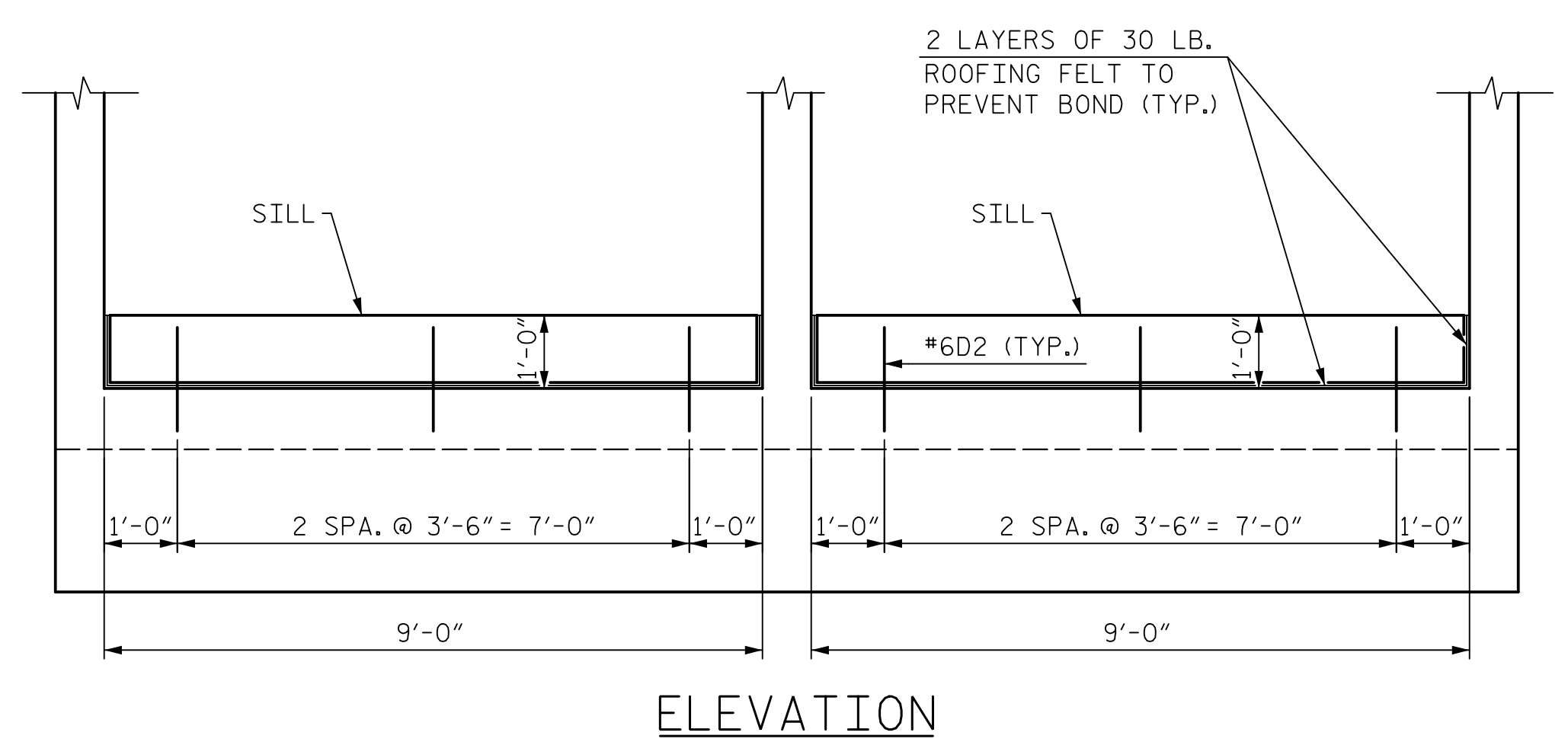
2/15/2024
 V:\Projects\2024\10_099_UG202_SML_C104_004_64XXX.dgn
 2019 East Region LSC - Division 3U-6202 (Gordon Rd - New Hanover Co) Structures\09N\10_099_UG202_SML_C104_004_64XXX.dgn



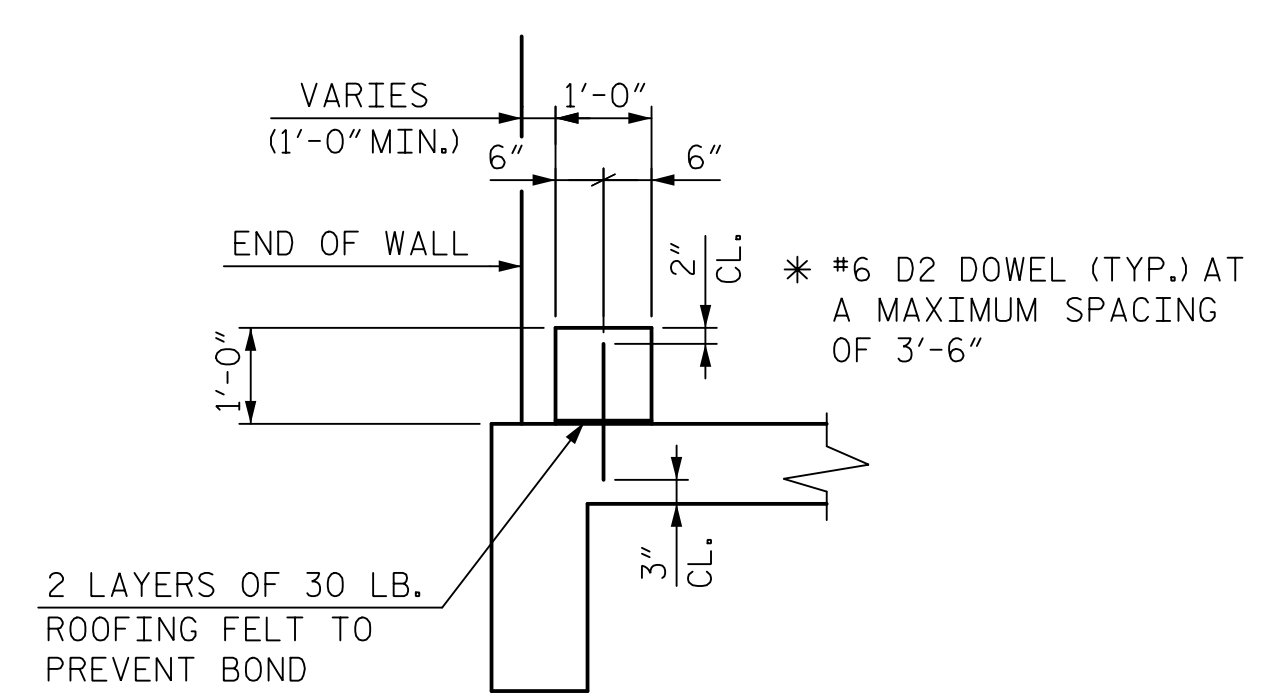
SILL LAYOUT PLAN

NOTE: THE ENTIRE COST OF WORK REQUIRED TO PLACE EXCAVATED OR SUPPLEMENTAL MATERIAL AS SHOWN ON THE PLANS SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR CULVERT EXCAVATION.

NOTE: NATIVE MATERIAL PLACED BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.



ELEVATION



SECTION THROUGH SILL

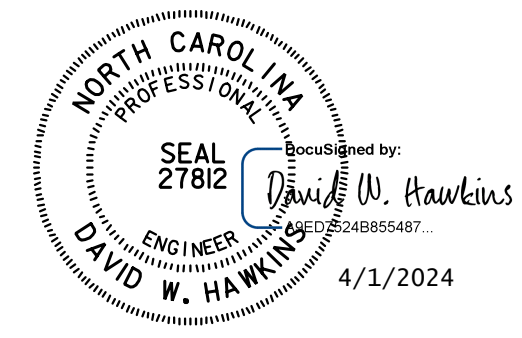
* DOWELS MAY BE PUSHED INTO GREEN CONCRETE AFTER SLAB HAS BEEN FLOAT FINISHED.
NOTE: CONCRETE SILL SHOWN, CONCRETE BAFFLE SIMILAR.

PROJECT NO. U-6202
NEW HANOVER COUNTY
 STATION: 98+33.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DOUBLE BARREL
 9'-0" x 7'-0"
 CONCRETE BOX
 CULVERT DETAILS



HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 12/23
 CHECKED BY: B. ALSTON DATE: 12/23
 DESIGN ENGINEER OF RECORD: D. HAWKINS DATE: 12/23

DWG. NO. 5

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

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

2/15/2024
 \\hntbpc01\projects\1652_2019_East_Raplan_LSC - Division 3\U-6202 (Gordon Rd)_New_Hanover\03Structures\06\10.011_U6202_SML_C1005_005_644XX.dgn

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

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

SPECIAL NOTES:

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