

09/08/19

CONTRACT: C204739 **TIP PROJECT: A-0009CB**

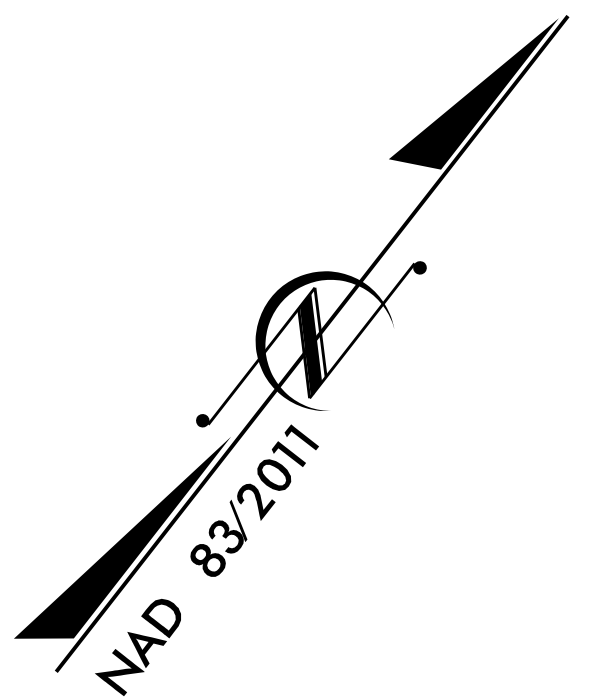
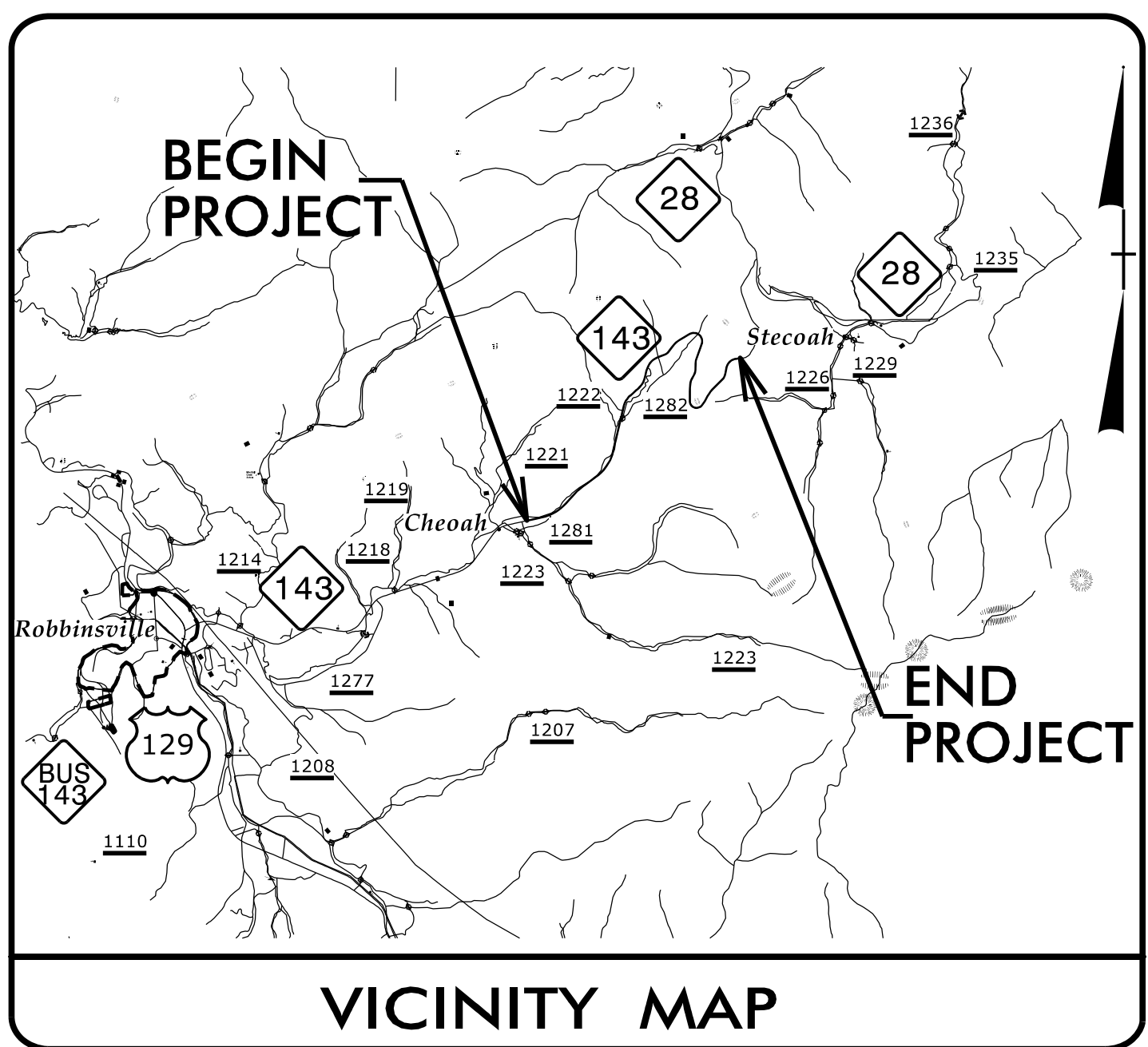
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

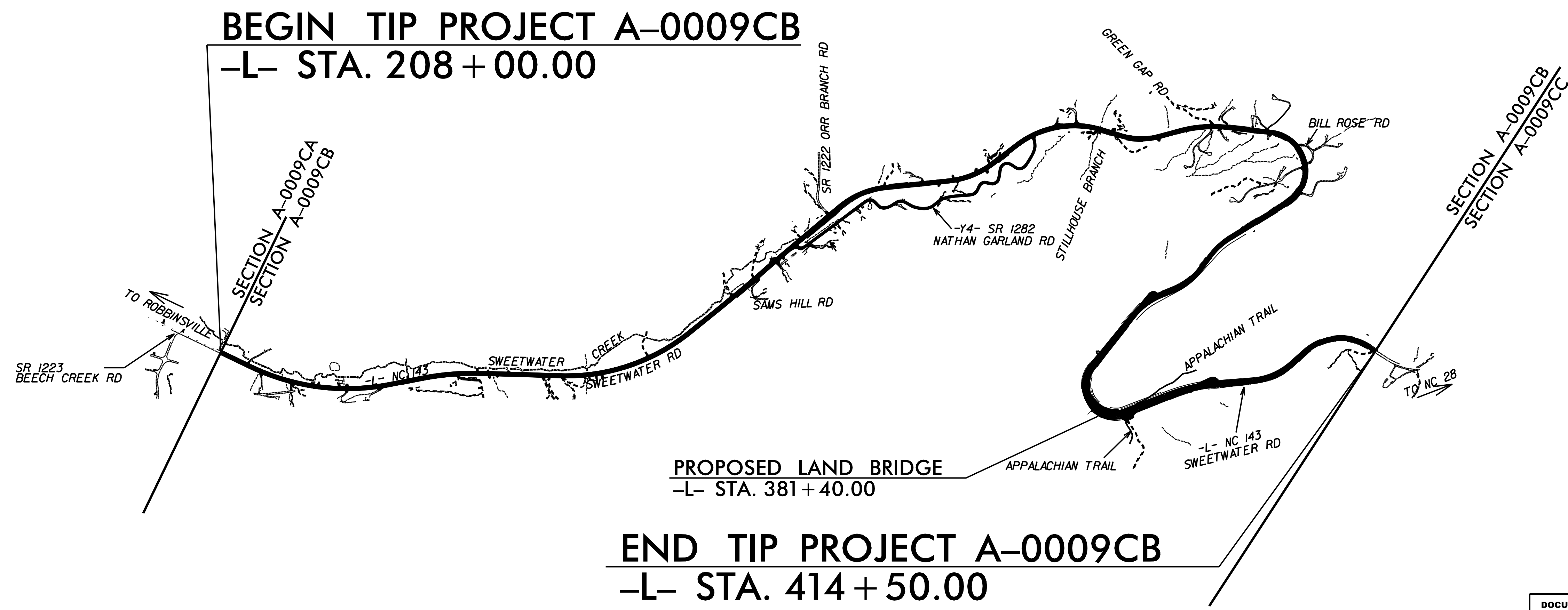
LOCATION: UPGRADE NC 143 FROM SR 1223 (BEECH CREEK RD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL

TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALLS, AND STRUCTURES

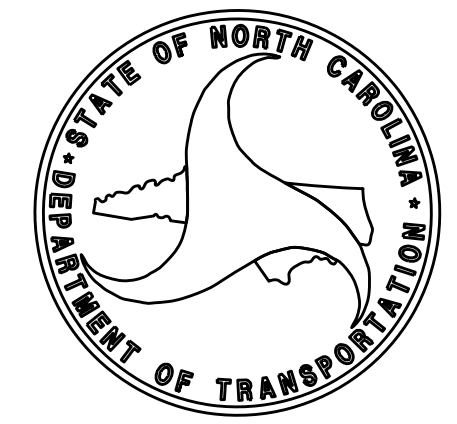
| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------|-----------------------------|-------------|--------------|
| N.C. | A-0009CB | | |
| STATE PROJ. NO. | F.A. PROJ. NO. | DESCRIPTION | |
| 32572.1.14 | 0129008 | PE | |
| 32572.2.14 | 0129008 | ROW,UTIL. | |
| 32572.3.14 | 0129008 | CONST. | |
| | | | |
| | | | |
| | | | |



STRUCTURES



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

| | |
|-----------------------|--------|
| ADT 2022 = | 6590 |
| ADT 2045 = | 8800 |
| K = | 11 % |
| D = | 57.5 % |
| T = | 7 % * |
| V = | 60 MPH |
| * TTST = 2% DUAL = 5% | |
| FUNC CLASS = | |
| RURAL ARTERIAL | |
| REGIONAL TIER | |

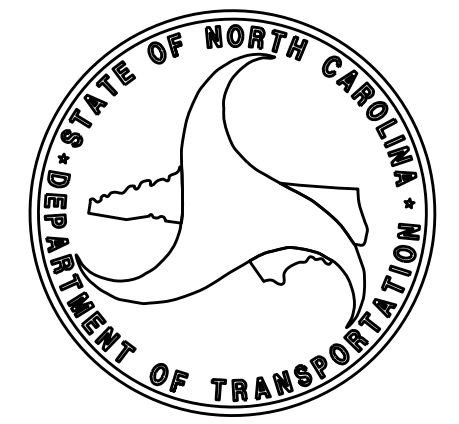
PROJECT LENGTH

| | |
|---------------------------------------|-------------|
| LENGTH ROADWAY TIP PROJECT A-0009CB = | 3.911 MILES |
| TOTAL LENGTH TIP PROJECT A-0009CB = | 3.911 MILES |

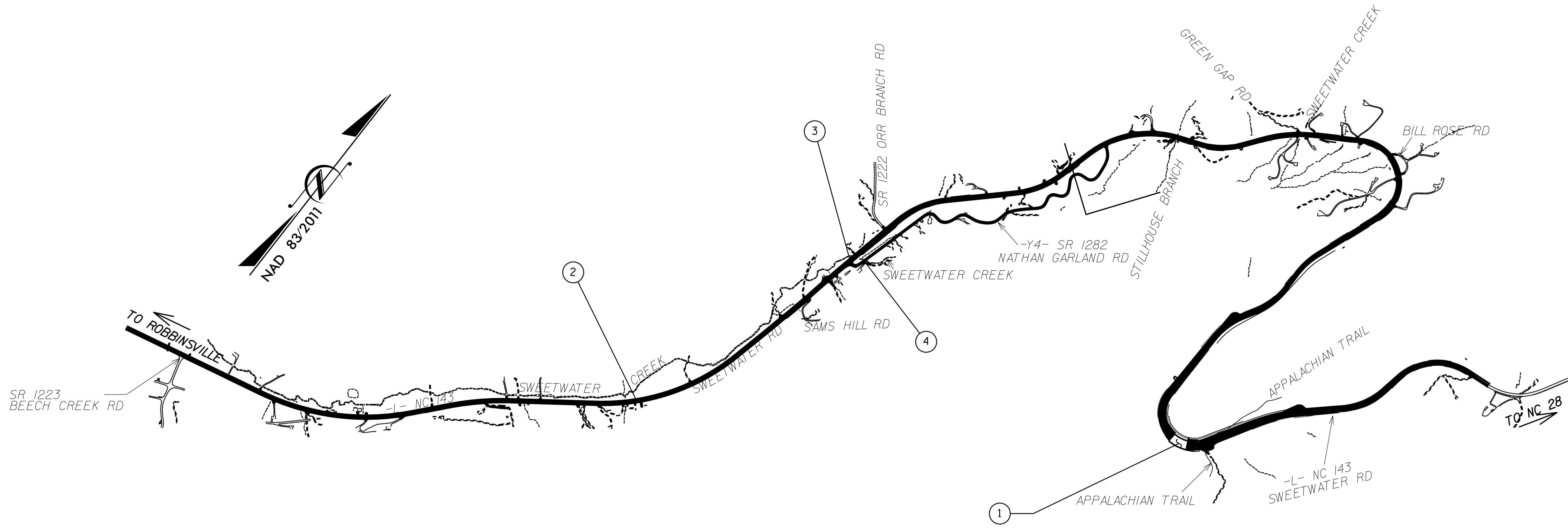
NC DOT CONTACT: WANDA H. AUSTIN, PE

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>PLANS PREPARED BY:</p> <p>TGS ENGINEERS 201 W MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO. C-0275</p> | <p>PLANS PREPARED FOR:</p> <p>NORTH CAROLINA DEPARTMENT OF TRANSPORTATION</p> <p>DIVISION 14 252 Webster Rd Sylva, NC 28779</p> |
| <p>LETTING DATE: SEPTEMBER 20, 2022</p> | <p>MARC CHEEK, PE STRUCTURES DESIGN ENGINEER</p> |
| <p>2018 STANDARD SPECIFICATIONS</p> | |

STRUCTURES DESIGN ENGINEER



5/26/2022
\$\$\$\$\$\$\$\$\$DCN\$\$\$\$\$\$\$\$\$
User: tsbwlll@ms



| INDEX | | | |
|-------|---------------|------------------------------------------------------|----------------|
| 1 | 381+40.00 -L- | PRECAST CONCRETE ARCH LAND BRIDGE | S-1 THRU S-6 |
| 2 | 250+00.00 -L- | 7'-11" X 5'-7" CORRUGATED ALUMINUM PIPE ARCH CULVERT | C1-1 THRU C1-3 |
| 3 | 278+67.70 -L- | 12'-10" X 8'-4" ALUMINUM PIPE ARCH CULVERT | C2-1 THRU C2-3 |
| 4 | 12+13.10 -Y4- | 20'-11" X 6'-1" ALUMINUM BOX CULVERT | C3-1 THRU C3-3 |

DOCUMENT NOT CONSIDERED FINAL
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TGS ENGINEERS
 706 HILLSBOROUGH STREET
 SUITE 200
 RALEIGH, NC 27603
 PH (919) 773-8887
 CORP. LICENSE NO.: C-0275

PROJECT NO. A-0009CB
GRAHAM COUNTY

SHEET 1 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STRUCTURE INDEX

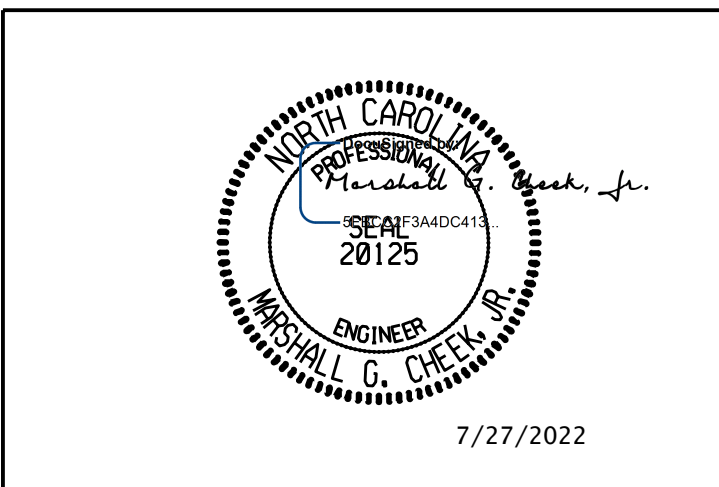
DRAWN BY : S.B. WILLIAMS DATE : 6-22
 CHECKED BY : MGC DATE : 6-22

| REVISIONS | | | | | | SHEET NO. |
|-----------|-----|-------|-----|-----|-------|--------------|
| NO. | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS |
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| INDEX | | | |
|-------|--------------------------------|------------------------------------------------------------|-------------------------|
| WALL | STATION | DESCRIPTION | SHEET NUMBERS |
| W7 | 269+25.00 -L- TO 272+19.00 -L- | CAST-IN-PLACE GRAVITY RETAINING WALL | W7-1 THRU W7-3 |
| W9 | 290+80.00 -L- TO 292+85.00 -L- | CAST-IN-PLACE GRAVITY RETAINING WALL | W7-1 THRU W7-3 |
| W10 | 316+45.00 -L- TO 317+67.00 -L- | MSE RETAINING WALL | W10-1 THRU W10-3 |
| W11 | 330+82.00 -L- TO 333+24.00 -L- | CAST-IN-PLACE GRAVITY RETAINING WALL | W7-1 THRU W7-3 |
| W12 | 341+76.00 -L- TO 344+11.00 -L- | SOIL NAIL RETAINING WALL | W12-1 THRU W12-3 |
| W13 | 344+69.00 -L- TO 346+76.00 -L- | SOIL NAIL RETAINING WALL | W13-1 THRU W13-4 |
| W14 | 347+95.00 -L- TO 350+64.00 -L- | SOIL NAIL RETAINING WALL | W13-1 THRU W13-4 |
| W15 | 352+29.00 -L- TO 368+35.00 -L- | SOIL NAIL RETAINING WALL | W15-1 THRU W15-5 |
| W16 | 366+70.00 -L- TO 369+72.00 -L- | SHORED MSE RETAINING WALL | W16-1 THRU W16-8 |
| W17 | 369+40.00 -L- TO 375+26.00 -L- | SOIL NAIL RETAINING WALL | W17-1 THRU W17-3 |
| W18 | 375+25.00 -L- TO 378+15.00 -L- | SHORED MSE RETAINING WALL | W18-1 THRU W18-6 |
| W19A | 376+65.00 -L- TO 380+50.00 -L- | TIERED SOIL NAIL RETAINING WALL | W19-1 THRU W19-11 |
| W19B | 382+30.00 -L- TO 408+04.00 -L- | TIERED SOIL NAIL RETAINING WALL | W19-1 THRU W19-11 |
| W19C | 380+50.00 -L- | MSE RETAINING WALL WITH CAST-IN-PLACE CONCRETE FACE | W19C-1 THRU W19C-2 |
| W20 | 409+44.00 -L- TO 411+75.00 -L- | SOIL NAIL RETAINING WALL | W20-1 THRU W20-3 |
| W28 | 389+25.00 -L- TO 392+00.00 -L- | SHORED MSE RETAINING WALL | W28_29-1 THRU W28_29-10 |
| W29 | 393+90.00 -L- TO 395+90.00 -L- | SHORED MSE RETAINING WALL | W28_29-1 THRU W28_29-10 |
| W29A | 396+75.00 -L- TO 398+75.00 -L- | SHORED MSE RETAINING WALL | W29A-1 THRU W29A-6 |
| W38 | 319+29.00 -L- TO 321+08.00 -L- | CAST-IN-PLACE GRAVITY RETAINING WALL | W7-1 THRU W7-3 |
| W42 | 382+30.00 -L- TO 383+50.00 -L- | SHORED MSE RETAINING WALL WITH CAST-IN-PLACE CONCRETE FACE | W42-1 THRU W42-5 |

PROJECT NO. A-0009CB
GRAHAM COUNTY

SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

 STRUCTURE INDEX

DRAWN BY : S.B. WILLIAMS DATE : 6-22
 CHECKED BY : MGC DATE : 6-22

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|------------------------------------------------------------------------------------------------------------------------------|-----|-----------|-------|-----|-----|-------|--------------|-----------|
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | | REVISIONS | | | | | | SHEET NO. |
| TGS ENGINEERS 706 HILLSBOROUGH STREET SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275 | NO. | BY: | DATE: | NO. | BY: | DATE: | TOTAL SHEETS | |
| | 1 | | | 3 | | | 4 | |

NOTES

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.
 FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE AT STATION 381+40.00 -L-, SEE SPECIAL PROVISIONS.
 FOR PRECAST CONCRETE ARCH BRIDGE, SEE SPECIAL PROVISIONS.
 FOR MEMBRANE WATERPROOFING SYSTEM, SEE SPECIAL PROVISIONS.

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

THE DETAILS SHOWN HERE ARE FOR GENERAL LAYOUT ONLY. THE CONTRACTOR SHALL SUPPLY DESIGNS AND DETAILS FOR REVIEW AND APPROVAL THAT MEET THE REQUIREMENTS OF AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND SHALL BE SEALED BY A NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER.

THESE PLANS SHALL BE USED IN CONJUNCTION AND COORDINATE WITH THE PRECAST CONCRETE ARCH BRIDGE MANUFACTURER'S PLANS. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WITH CONSTRUCTION.

ARCHITECTURAL CONCRETE SURFACE TREATMENT SHALL BE APPLIED TO THE OUTSIDE FACES OF THE CONCRETE ARCH LAND BRIDGE, CONCRETE BENTS AND CONCRETE PARAPETS AS DETAILED ON THE PLANS. FOR ARCHITECTURAL CONCRETE SURFACE TREATMENT, SEE SPECIAL PROVISIONS.

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

FOR PAYMENT FOR WILDLIFE FENCE, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

THE WILDLIFE FENCE ON THE PRECAST CONCRETE ARCH BRIDGE SHALL BE INSTALLED PRIOR TO FILL BEING PLACED ON THE UNITS.

FINAL ELEVATIONS OF THE PRECAST REINFORCED ARCH BRIDGE, INCLUDING TOP OF PARAPET ELEVATIONS, ARCH PEDESTAL ELEVATIONS AND FOOTING ELEVATIONS SHALL BE DETERMINED BY THE CONTRACTOR IN ACCORDANCE WITH THE REQUIRED MINIMUM VERTICAL AND HORIZONTAL CLEARANCES, FILED CONDITIONS AND DIMENSIONS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

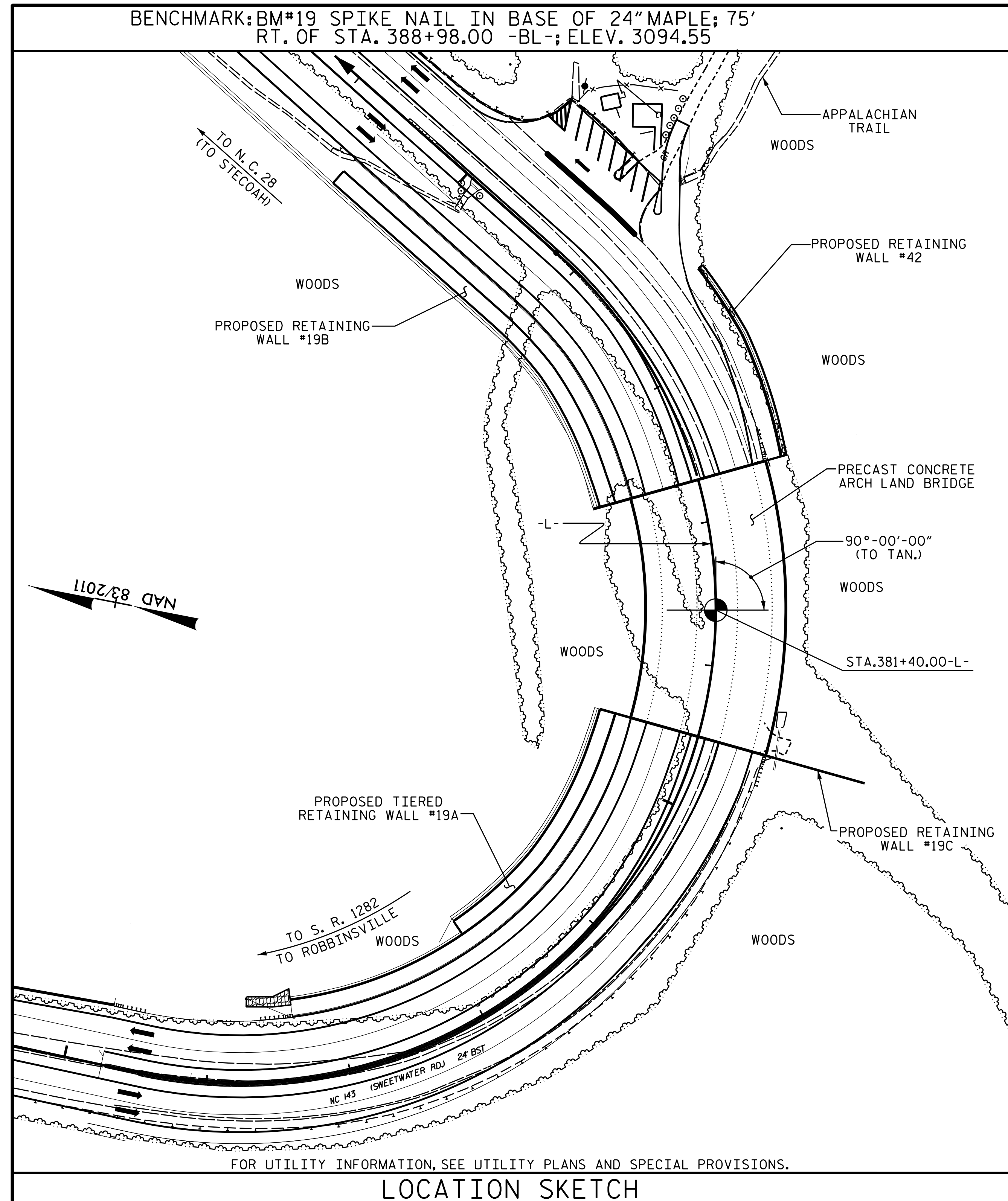
TOTAL STRUCTURE QUANTITIES

| | |
|------------------------------------------|--------------|
| PRECAST CONCRETE ARCH BRIDGE | LUMP SUM |
| MEMBRANE WATERPROOFING SYSTEM | LUMP SUM |
| ARCHITECTURAL CONCRETE SURFACE TREATMENT | 3000 SQ. FT. |

SAMPLE BAR REPLACEMENT

| SIZE | LENGTH |
|------|---------|
| #3 | 6'-2" |
| #4 | 7'-4" |
| #5 | 8'-6" |
| #6 | 9'-8" |
| #7 | 10'-10" |
| #8 | 12'-0" |
| #9 | 13'-2" |
| #10 | 14'-6" |
| #11 | 15'-10" |

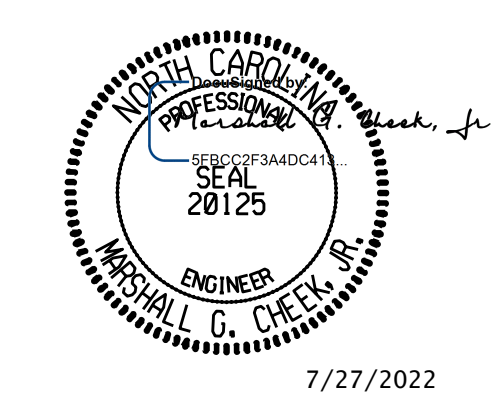
NOTE:
 SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND $f_y = 60\text{ksi}$.



LOCATION SKETCH

PROJECT NO. A-0009CB
GRAHAM COUNTY
 STATION: 381+40.00 -L-

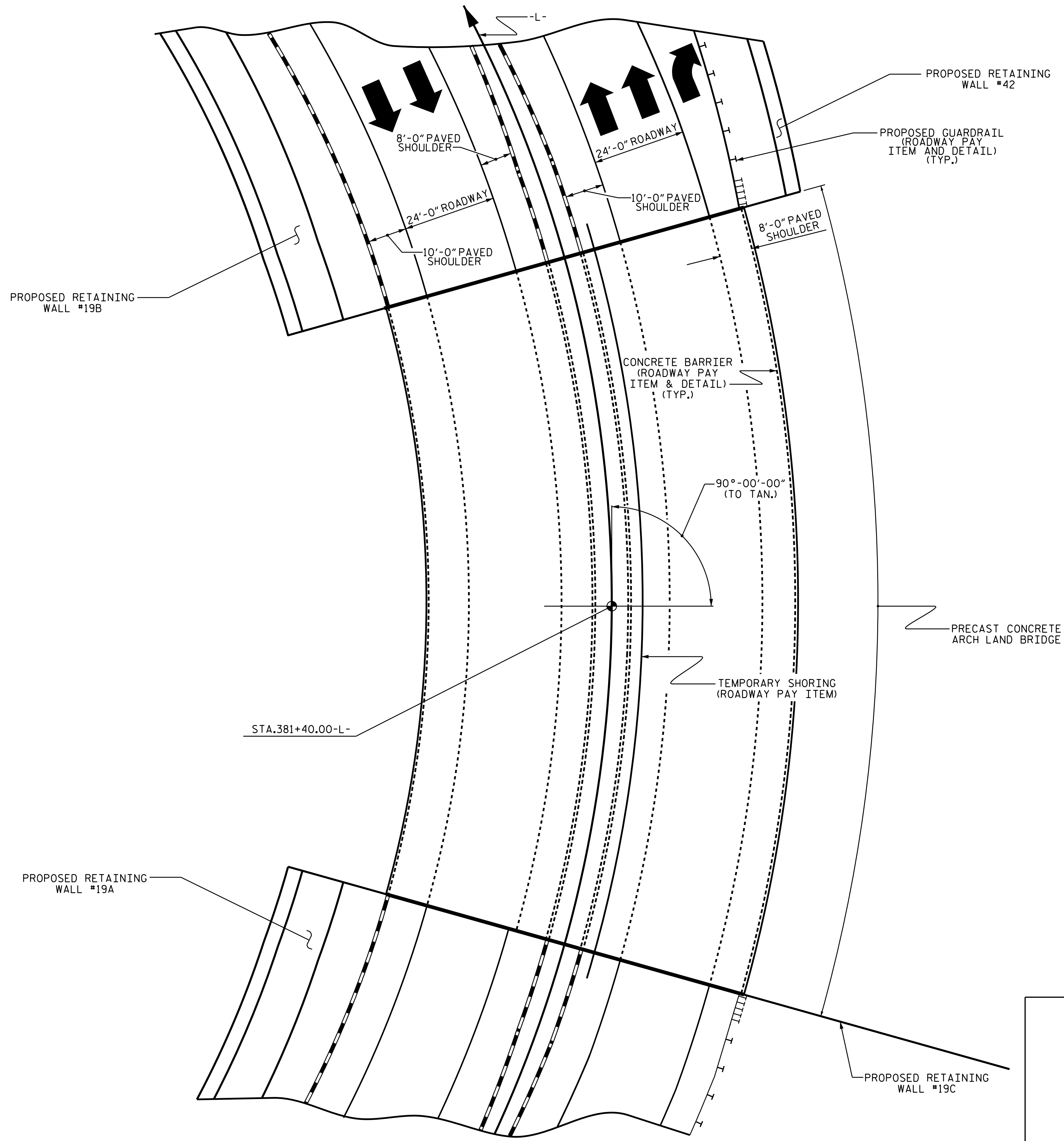
SHEET 1 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
PRECAST CONCRETE ARCH LAND BRIDGE
 OVER NC 143 BETWEEN SR 1282 AND NC 28

| | | | | | |
|------------------------------------------------------------------------------------------------------------------------------|-----|-------|-----|-----|-------------------|
| DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED | | | | | |
| TGS ENGINEERS 706 HILLSBOROUGH STREET SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275 | | | | | |
| REVISIONS | | | | | |
| NO. | BY: | DATE: | NO. | BY: | DATE: |
| 1 | | | 3 | | |
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| | | | | | SHEET NO. S-1 |
| | | | | | TOTAL SHEETS 6 |

DRAWN BY : S. B. WILLIAMS DATE : 3-22
 CHECKED BY : MGC DATE : 3-22



PI STA. = 388+01.79
 Δ = 150°-28'-04.5" (LT.)
 D = 17°-24'-54.5"
 L = 864.01'
 T = 1248.21'
 R = 329.00'

HORIZONTAL CURVE DATA -L-

6.7245% Δ -7.1756%

PI = 384+15.00 -L-
 EL = 3,157.47
 VC = 1,470

GRADE DATA -L-

PROJECT NO. A-0009CB
GRAHAM COUNTY
 STATION: 381+40.00 -L-
 SHEET 2 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

PROFESSIONAL ENGINEER
 Marshall G. Check Jr.
 SEAL
 20125
 ENGINEER
 MARSHALL G. CHECK JR.
 7/27/2022

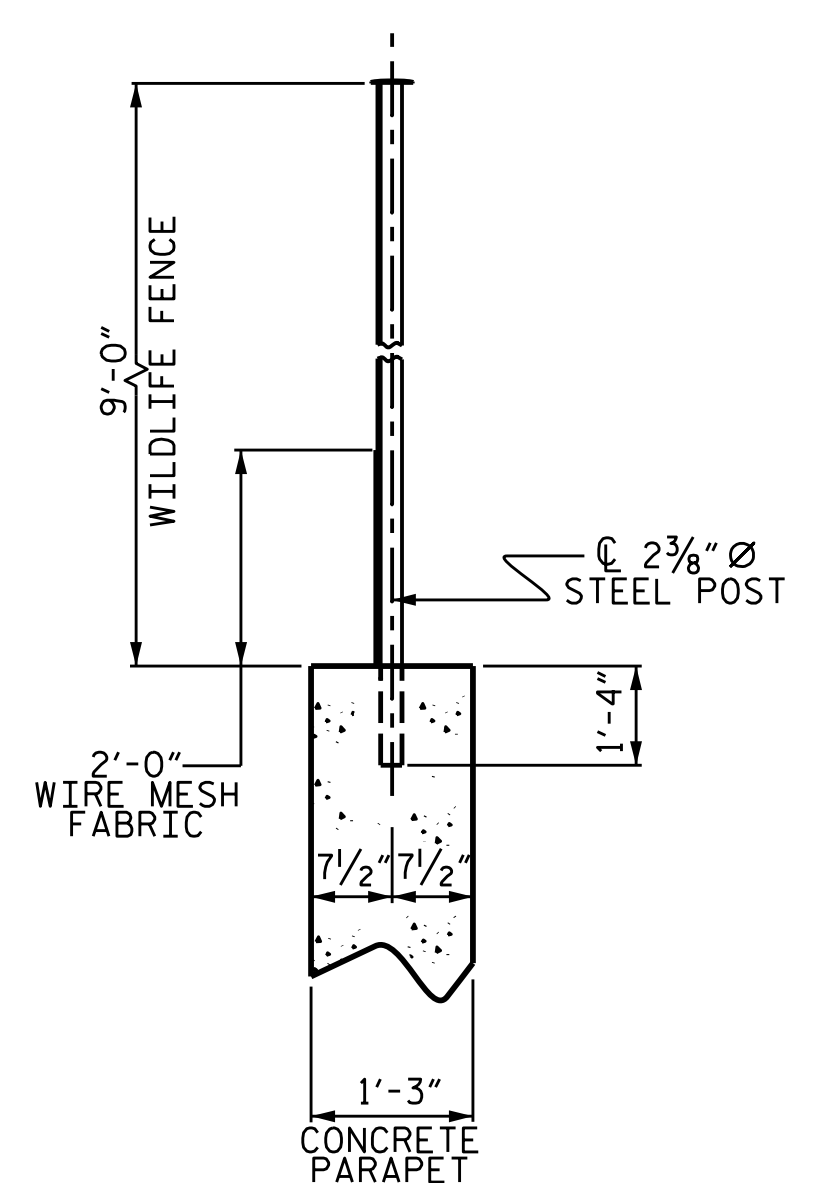
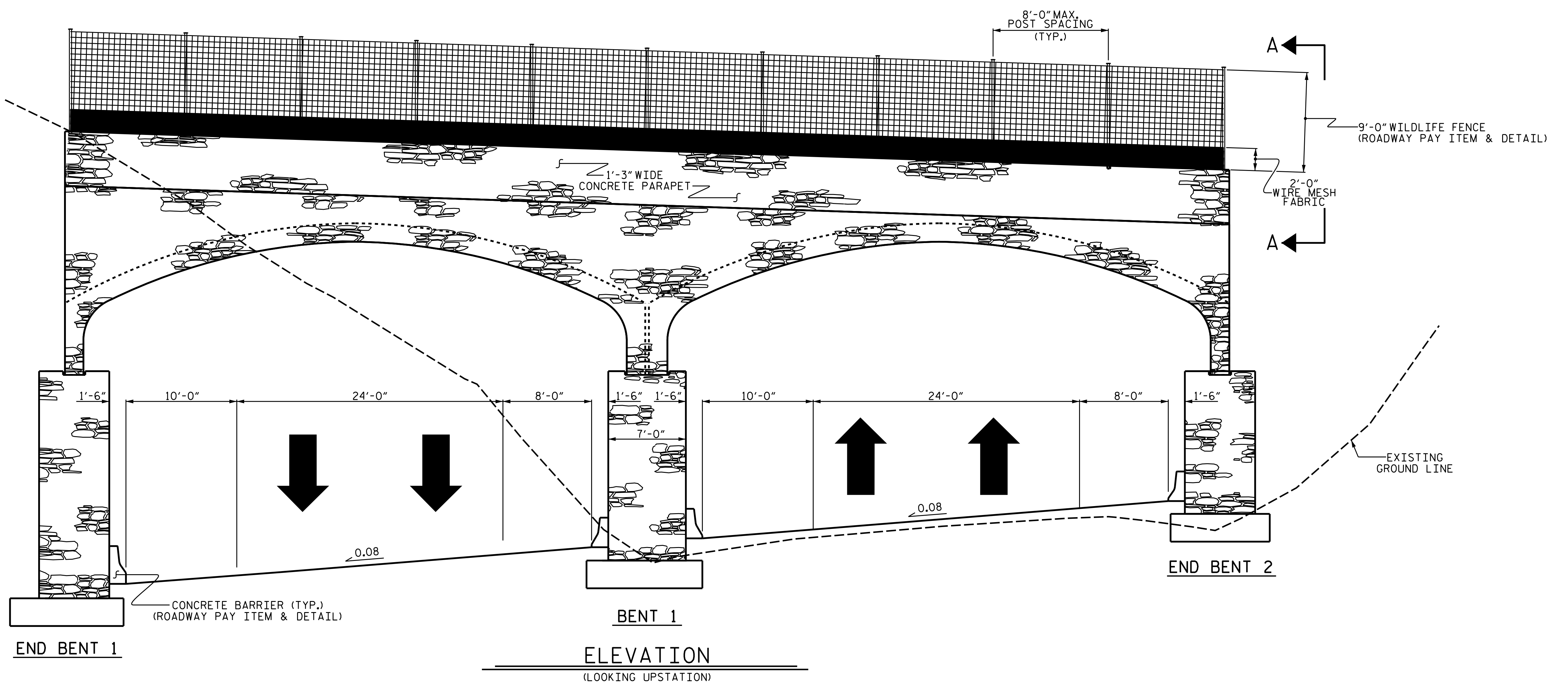
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TGS ENGINEERS
 706 HILLSBOROUGH STREET
 SUITE 200
 RALEIGH, NC 27603
 PH (919) 773-8887
 CORP. LICENSE NO.: C-0275

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

DRAWN BY : S. B. WILLIAMS DATE : 3-22
 CHECKED BY : MCC DATE : 3-22

PLAN
 ARCH PEDESTALS & FOOTINGS NOT SHOWN FOR CLARITY



SECTION A-A

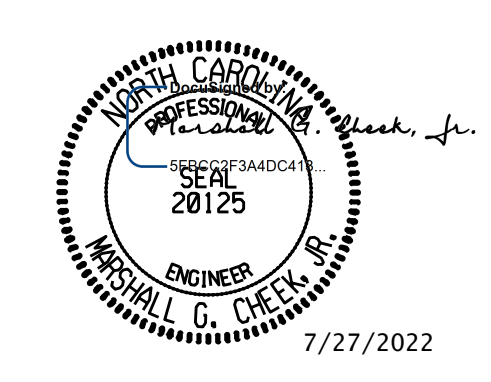
ELEVATION
(LOOKING UPSTATION)

NOTES

THE WILDLIFE FENCE POST SHALL BE EMBEDDED INTO THE PARAPET IN A SLEEVE OR BLOCKOUT AND ANCHORED WITH AN EPOXY OR CONCRETE GROUT ANCHORING SYSTEM. THE POST HOLE OPENING SHALL BE A MINIMUM OF 1/2" LARGER THAN THE OUTER DIAMETER OF THE POST. FOR WILDLIFE FENCE, SEE ROADWAY SPECIAL PROVISIONS.

PROJECT NO. A-0009CB
GRAHAM COUNTY
 STATION: 381+40.00 -L-

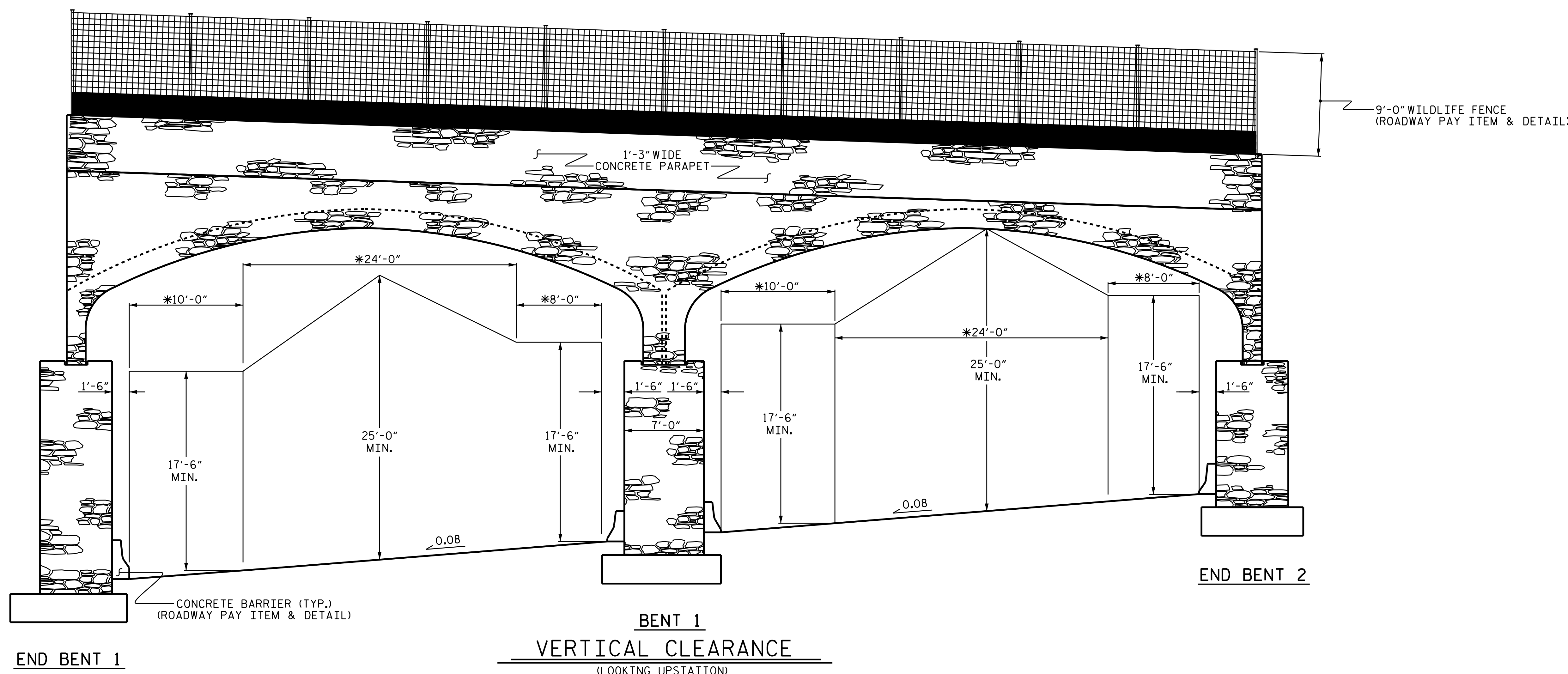
SHEET 3 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**PRECAST CONCRETE
 ARCH LAND BRIDGE**
 OVER NC 143 BETWEEN
 SR 1282 AND NC 28

DRAWN BY : S. B. WILLIAMS DATE : 2-22
 CHECKED BY : MGC DATE : 3-22

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| TGS ENGINEERS 706 HILLSBOROUGH STREET SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275 | | | | | | NO. | BY: | DATE: | NO. | BY: | DATE: | S-3 | |
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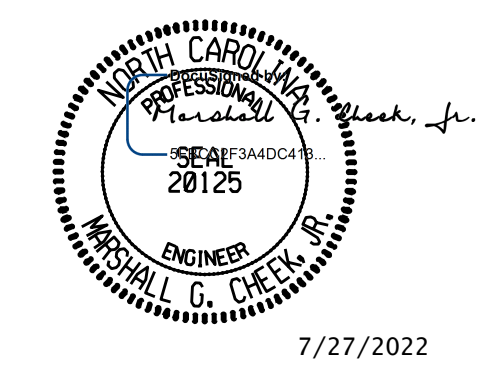


BENT 1
VERTICAL CLEARANCE
 (LOOKING UPSTATION)

*RADIAL DIMENSION
 THE CROWN OF EACH ARCH SHALL BE BUILT TO THE SAME ELEVATION WHILE MAINTAINING MINIMUM VERTICAL CLEARANCES.

PROJECT NO. A-0009CB
GRAHAM COUNTY
 STATION: 381+40.00 -L-

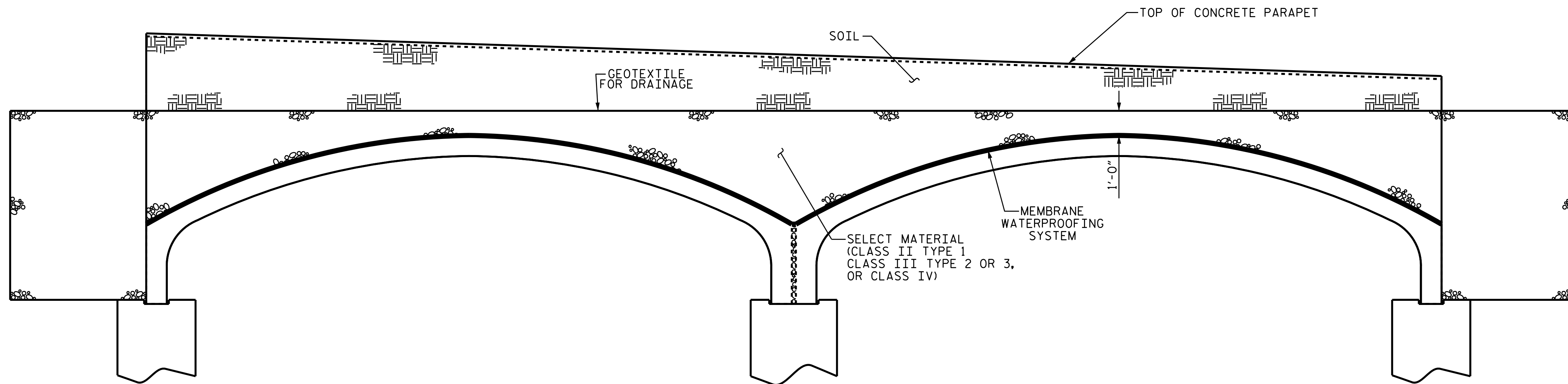
SHEET 4 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**PRECAST CONCRETE
 ARCH LAND BRIDGE**
 OVER NC 143 BETWEEN
 SR 1282 AND NC 28

DRAWN BY : S. B. WILLIAMS DATE : 2-22
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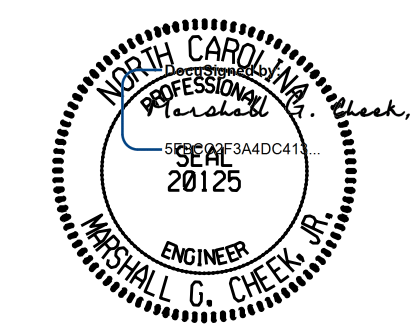
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| TGS ENGINEERS 706 HILLSBOROUGH STREET SUITE 200 RALEIGH, NC 27603 PH (919) 773-8887 CORP. LICENSE NO.: C-0275 | | | | | | NO. | BY: | DATE: | NO. | BY: | DATE: | S-4 | |
| | | | | | | 1 | | | 3 | | | TOTAL SHEETS | |
| | | | | | | 2 | | | 4 | | | 6 | |



PARTIAL SECTION THRU BRIDGE
 WILDLIFE FENCE NOT SHOWN FOR CLARITY

PROJECT NO. A-0009CB
GRAHAM COUNTY
 STATION: 381+40.00 -L-

SHEET 5 OF 6



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**PRECAST CONCRETE
 ARCH LAND BRIDGE**

OVER NC 143 BETWEEN
 SR 1282 AND NC 28

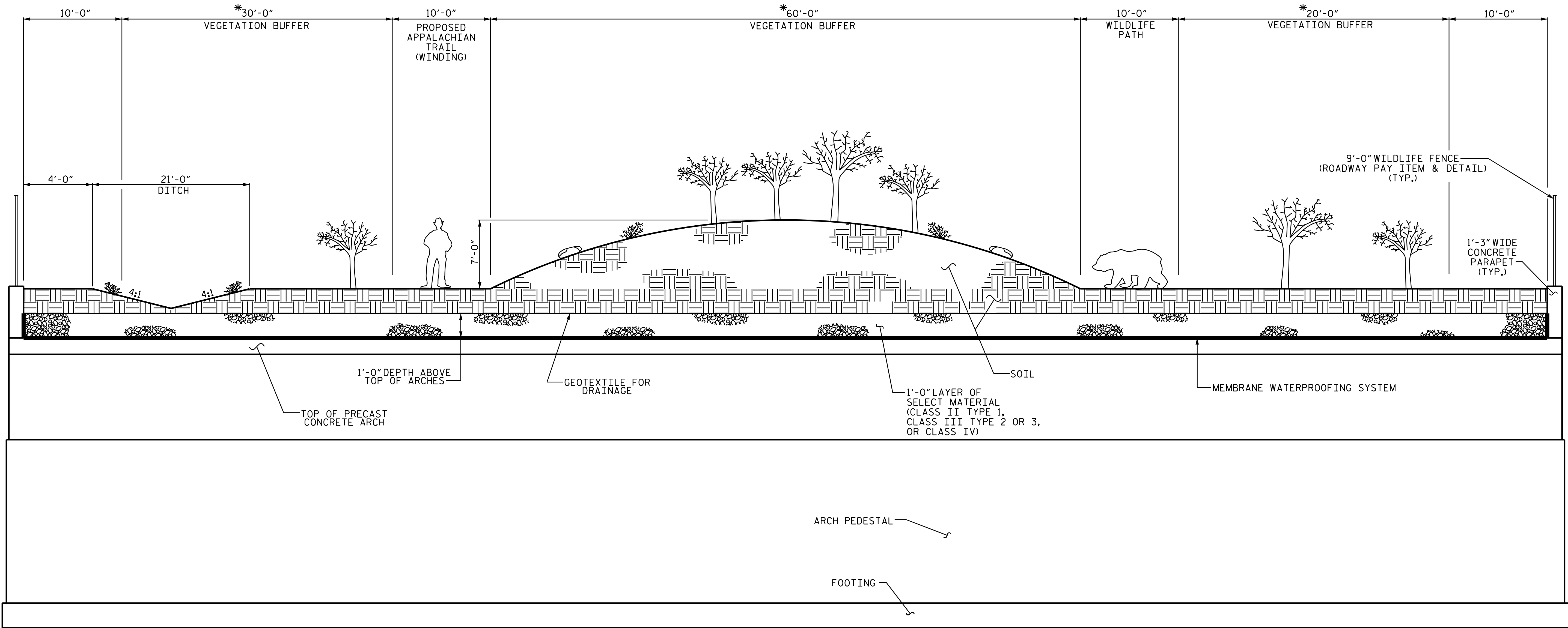
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 PH (919) 773-8887
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| NO. | BY: | DATE: | NO. | BY: | DATE: | S-5 |
| 1 | | | 3 | | | TOTAL SHEETS |
| 2 | | | 4 | | | 6 |

← TO ROBBINSVILLE

TO STECOAH →



LAND BRIDGE TYPICAL

FOR LAND BRIDGE GRADING PLAN, SEE ROADWAY PLANS

* MINIMUM DIMENSION IS MEASURED FROM INSIDE RADIUS ON THE CURVE

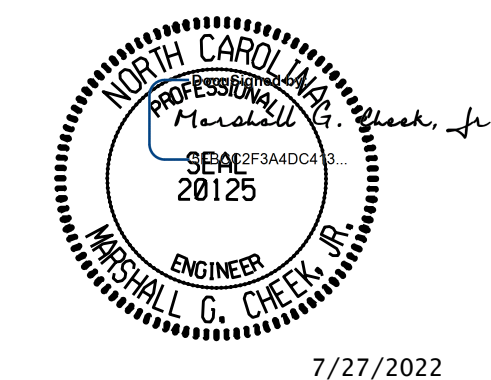
THE CONTRACTOR SHALL ENSURE THAT THE MAXIMUM FILL ON THE CROWN OF EACH PRECAST CONCRETE ARCH DOES NOT EXCEED 14'.

PROJECT NO. A-0009CB

GRAHAM COUNTY

STATION: 381+40.00 -L-

SHEET 6 OF 6



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

**PRECAST CONCRETE
ARCH LAND BRIDGE**
OVER NC 143 BETWEEN
SR 1282 AND NC 28

DRAWN BY : S. B. WILLIAMS DATE : 2-22
CHECKED BY : MGC DATE : 3-22

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TGS ENGINEERS
706 HILLSBOROUGH STREET
SUITE 200
RALEIGH, NC 27603
PH (919) 773-8887
CORP. LICENSE NO.: C-0275

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