PROJECT WBS: 17BP.10.R.141

CONTRACT: DJ00521

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

# UNION COUNTY

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | 17BP.10.R.141 | 1 | |

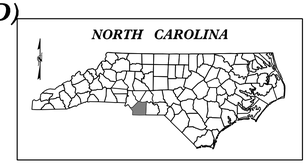
| STATE PROJ. NO. | F. A. PROJ. NO. | DESCRIPTION |
|---|---|---|
| 17BP.10.PE.141 | | P.E. |
| 17BP.10.ROW.141 | | ROW & UTIL |
| 17BP.10.R.141 | | CONSTRUCTION |

***LOCATION: CULVERT #329 WEST FORK OF TWELVEMILE CREEK ON SR 1315 (NEW TOWN RD)***

***TYPE OF WORK: GRADING, PAVING, DRAINAGE, & STRUCTURE***




***FINAL PLANS***

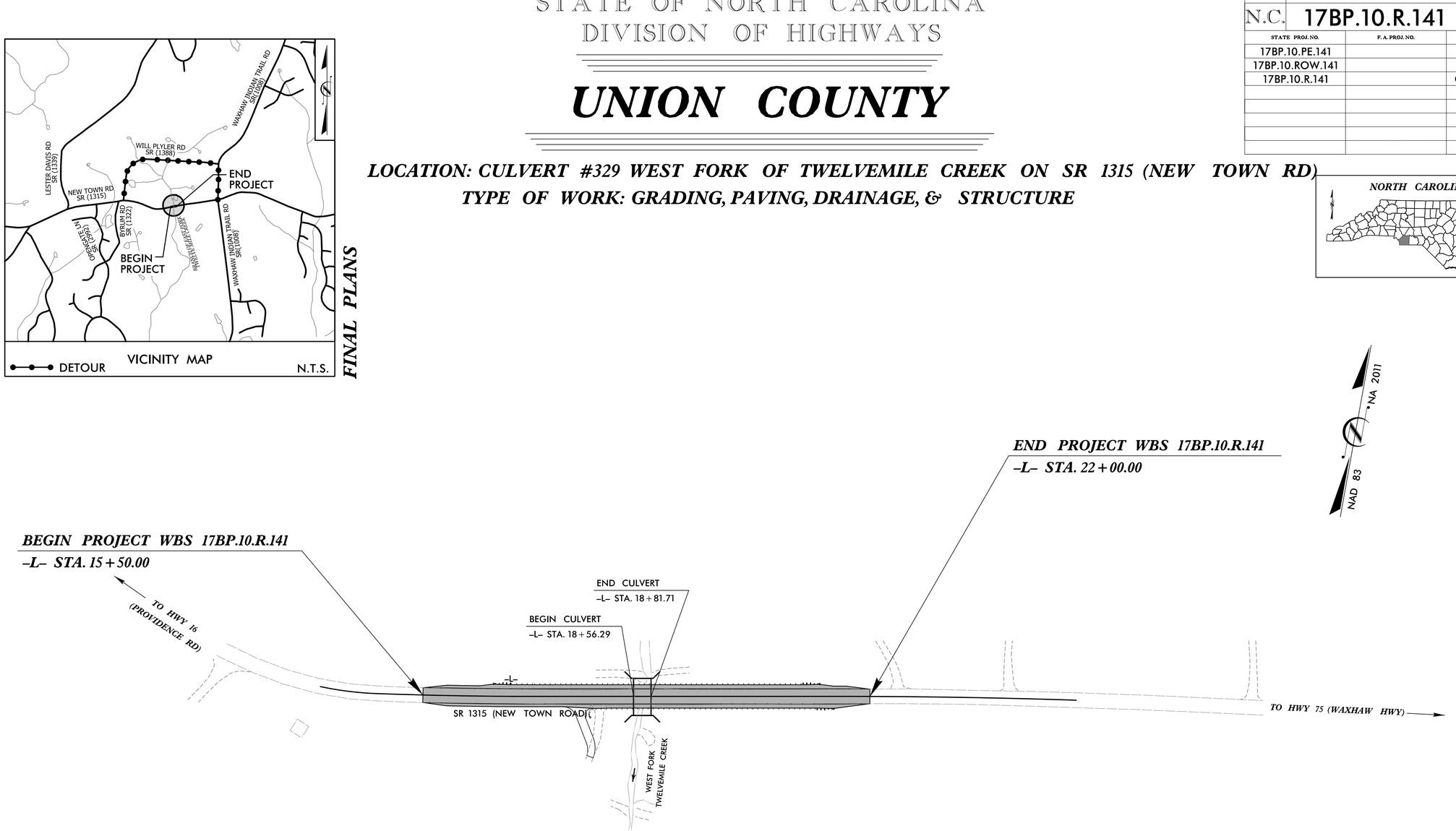






***END PROJECT WBS 17BP.10.R.141***
***–L– STA. 22+00.00***

***BEGIN PROJECT WBS 17BP.10.R.141***
***–L– STA. 15+50.00***




# STRUCTURE

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

***DESIGN DATA***

ADT 2011 = 6,500
ADT 2025 = 13,000
DHV = N/A
D = N/A
T = 7%
V = 45 MPH

FUNC. CLASSIFICATION: MAJOR COLLECTOR

***PROJECT LENGTH***

***LENGTH OF ROADWAY PROJECT WBS 17BP.10.R.141 = .118 MILES***

***LENGTH OF STRUCTURE PROJECT WBS 17BP.10.R.141 = .005 MILES***

***TOTAL LENGTH OF PROJECT WBS 17BP.10.R.141 = .123 MILES***

NCDOT CONTACT: YANWEI MA, PE
Division Bridge Manager

***PLANS PREPARED FOR THE NCDOT BY:***

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

*2024 STANDARD SPECIFICATIONS*

***RIGHT OF WAY DATE:***
AUGUST 16, 2019

***LETTING DATE:***
NOVEMBER 20, 2024

JASON T. GRISCOM, PE
*PROJECT ENGINEER*

SPENCER G. HENSLEY, PE
*PROJECT DESIGNER*

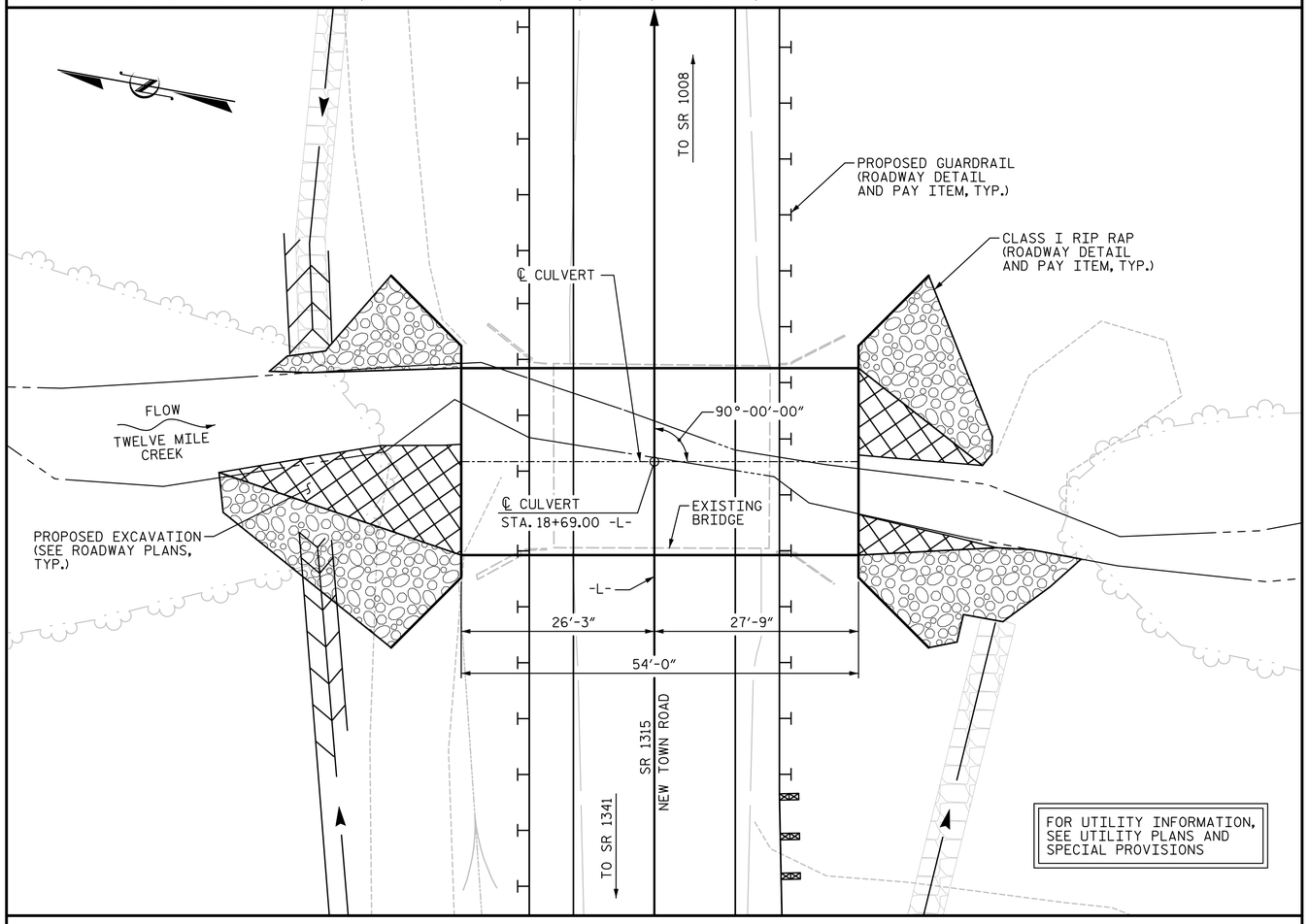
***STRUCTURES ENGINEER***

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029429 ENGINEER JASON T. GRISCOM
11/7/2024

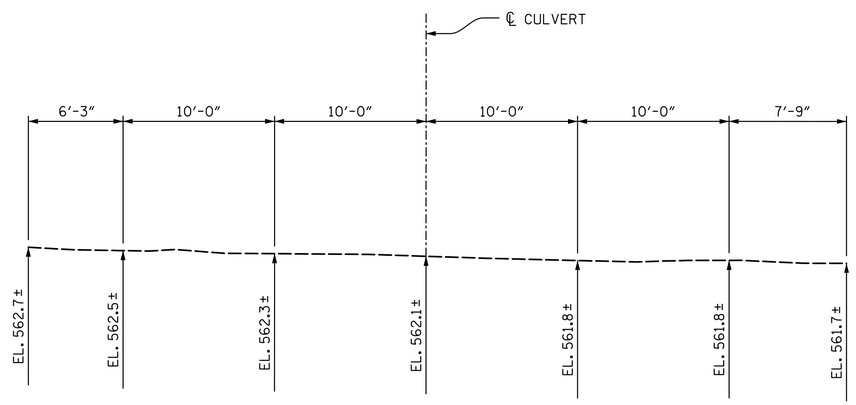
*P.E.*
***SIGNATURE:***

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

BENCHMARK BM-2: BENCH TIE SPIKE IN 42" OAK, STA. 17+33.70 -L-, 66.69' RT., EL. 582.5, N 453232.091, E 1487820.119




LOCATION SKETCH




PROFILE ALONG ℄ CULVERT

## NOTES

ASSUMED LIVE LOAD ----------HL-93 OR ALTERNATE LOADING.

MAXIMUM DESIGN FILL---------- 5.0'

MINIMUM DESIGN FILL---------- 4.5'

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE "STANDARD NOTES" SHEET.

THE DETAILS SHOWN ARE FOR GENERAL LAYOUT ONLY. THE SUPPLIER SHALL PROVIDE DESIGNS AND DETAILS THAT MEET THE REQUIREMENTS OF AASHTO SECTION 12 AND ARE SEALED BY A NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER.

UNLESS OTHERWISE INDICATED, THE SUPPLIER SHALL DESIGN, DETAIL, AND FURNISH ALL STRUCTURAL ELEMENTS AND HARDWARE.

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

THE EXISTING STRUCTURE CONSISTING OF (1) 25'-6"± SPAN OF PRECAST PRESTRESSED CONCRETE CHANNELS WITH A CLEAR ROADWAY WIDTH OF 29'-7"± ON PPC CAPS, TIMBER POSTS, CONCRETE SILLS AND TIMBER BULKHEADS AND LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED CULVERT, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR. THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATION.

FOR OTHER DESIGN DATA AND 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.

NATIVE STREAMBED MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAMBED OR FLOODPLAIN AT THE PROJECT SITE. DURING CONSTRUCTION, ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAMBED MAY BE USED TO LINE THE CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT NATIVE STREAMBED MATERIAL. IF RIP RAP IS USED, NATIVE STREAMBED MATERIAL SHOULD BE PLACED ON TOP TO FILL THE VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE STREAMBED MATERIAL AND RIP RAP IS SUBJECT TO APPROVAL BY THE RESIDENT ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS. THE COST OF PLACEMENT OF THE NATIVE STREAMBED MATERIAL SHALL BE INCLUDED IN THE LUMP SUM BID FOR CULVERT EXCAVATION.

FOR ALUMINUM BOX CULVERT, SEE SPECIAL PROVISIONS.

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

THE ALUMINUM BOX CULVERT SHALL BE PLACED ON THE STANDARD 1.0 FOOT BLANKET OF FOUNDATION CONDITIONING MATERIAL. SEE SECTION 414 OF THE STANDARD SPECIFICATIONS.

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.

## TOTAL STRUCTURE QUANTITIES

| | |
|---|---|
| REMOVAL OF EXISTING STRUCTURE @ STA. 18+69.00 -L- | LUMP SUM |
| ASBESTOS ASSESSMENT | LUMP SUM |
| CULVERT EXCAVATION | LUMP SUM |
| FOUNDATION CONDITIONING MATERIAL | 130 TONS |
| ALUMINUM BOX CULVERT @ STA. 18+69.00 -L- | LUMP SUM |

## HYDRAULIC DATA

DESIGN DISCHARGE: ---------- 300 CFS
FREQUENCY OF DESIGN FLOOD: ---- 25 YRS.
DESIGN HIGH WATER ELEVATION: ---- 565.5
DRAINAGE AREA: ---------- 0.48 SQ. MI.
BASE DISCHARGE (Q100): ---------- 420 CFS
BASE HIGH WATER ELEVATION: ---- 566.2

## OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE: ---------- 3000 CFS
FREQUENCY OF OVERTOPPING FLOOD: --- 500+ YRS.
OVERTOPPING FLOOD ELEVATION: ---- 576.5

## GRADE DATA

GRADE POINT ELEVATION @ STA. 18+69.00 -L- ---------- 576.55

BED ELEVATION @ STA. 18+69.00 -L- ---------- 561.30◆

ROADWAY FILL SLOPES ---------- 2:1 (MAX.)

◆ CULVERT BED TO BE BURIED 6"

PROJECT NO. 17BP.10.R.141

UNION COUNTY

STATION: 18+69.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 329

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029429 ENGINEER JASON T. GRISCOM
11/7/2024

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

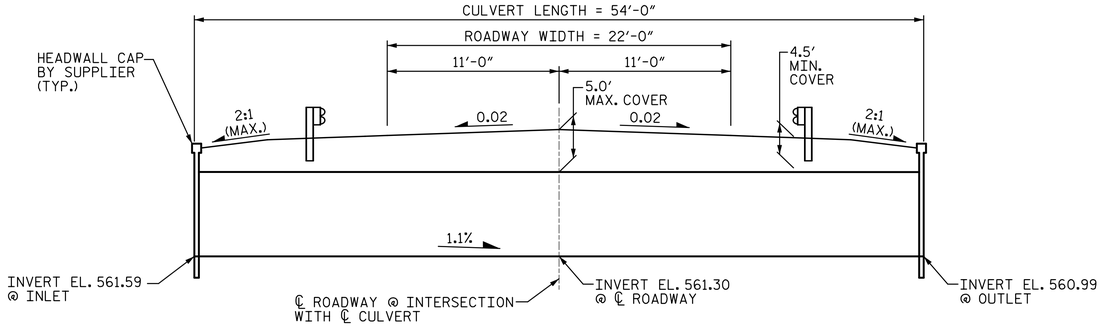
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

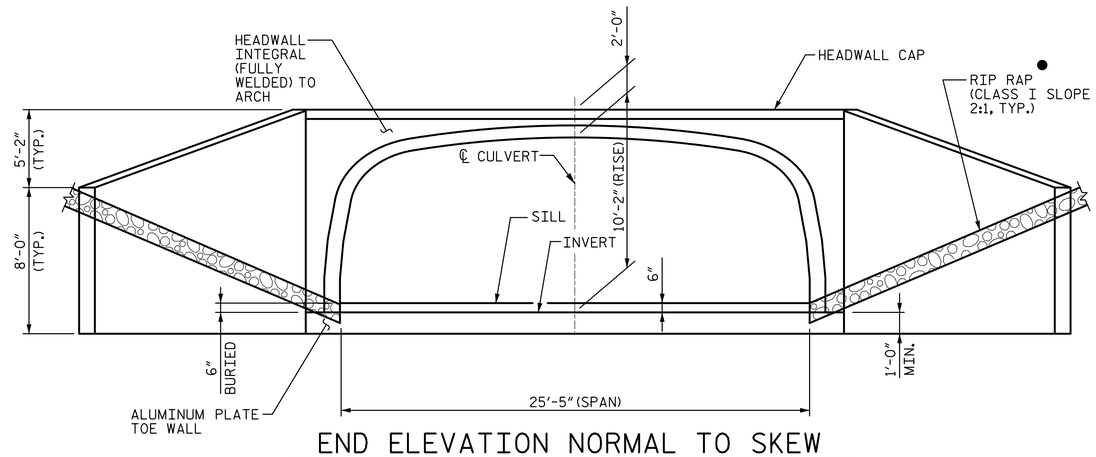
# SINGLE 25'-5" X 10'-2" ALUMINUM BOX CULVERT 90°-00'-00" SKEW

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

DRAWN BY : SGH DATE : 7-19
CHECKED BY : LEM DATE : 9-19
DESIGN ENGINEER OF RECORD : J. GRISCOM DATE : 11-24

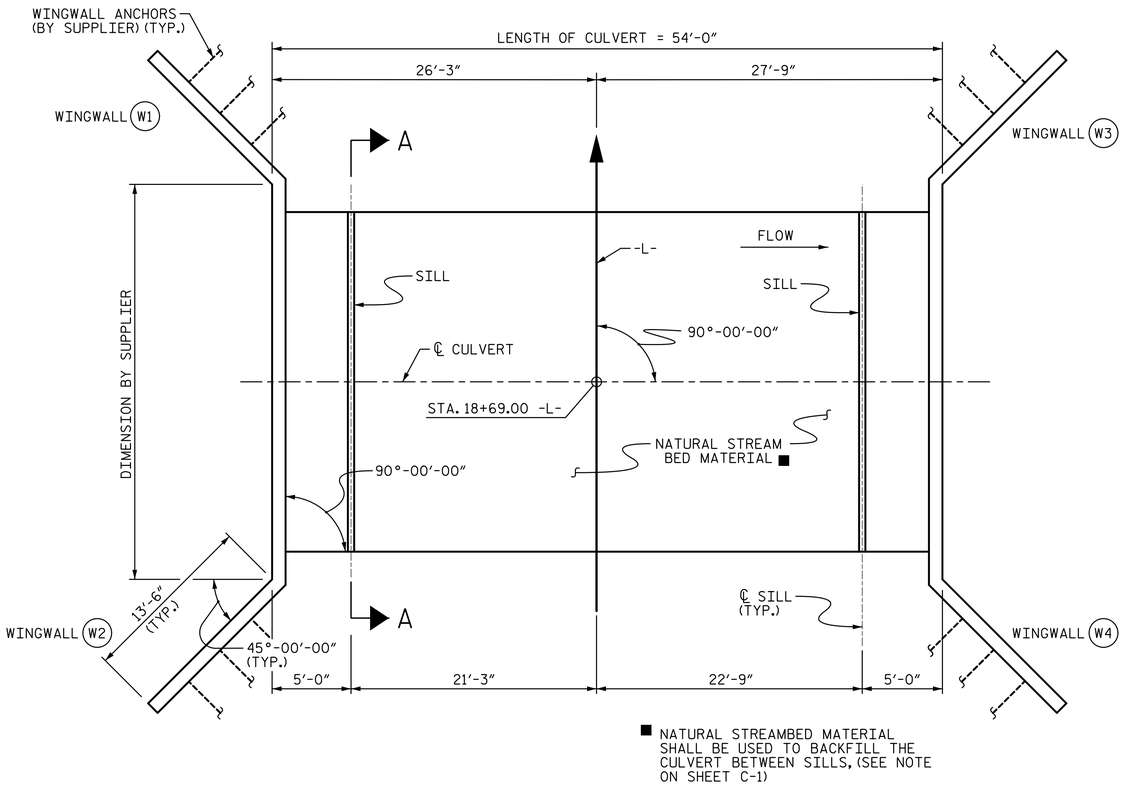



## CULVERT SECTION NORMAL TO ROADWAY




## END ELEVATION NORMAL TO SKEW

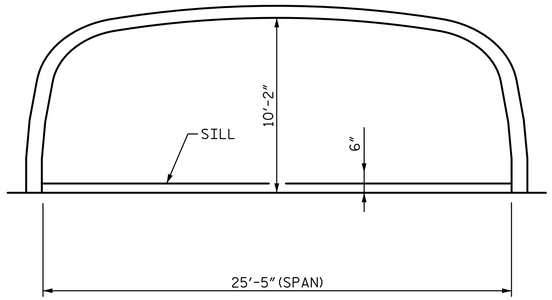
INLET SHOWN, OUTLET SIMILAR




■ NATURAL STREAMBED MATERIAL SHALL BE USED TO BACKFILL THE CULVERT BETWEEN SILLS, (SEE NOTE ON SHEET C-1)

## LENGTH FOR ALUMINUM BOX CULVERT

● ROADWAY DETAIL AND PAY ITEM




## SECTION A-A

TYPICAL EACH SILL LOCATION

PROJECT NO. 17BP.10.R.141

UNION COUNTY

STATION: 18+69.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

# SINGLE 25′-5″ X 10′-2″ ALUMINUM BOX CULVERT 90°-00′-00″ SKEW

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 029429 ENGINEER JASON T. GRISCOM
11/7/2024

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

| | | | |
|---|---|---|---|
| DRAWN BY : | SGH | DATE : | 7-19 |
| CHECKED BY : | LEM | DATE : | 9-19 |
| DESIGN ENGINEER OF RECORD : | J. GRISCOM | DATE : | 11-24 |

8/26/21

# 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 $\frac{7}{8}$" Ø SHEAR STUDS FOR THE $\frac{3}{4}$" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$" Ø STUDS FOR 4 - $\frac{3}{4}$" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$" Ø STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$" Ø STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$"Ø STUDS FOR 4 - $\frac{3}{4}$" 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.