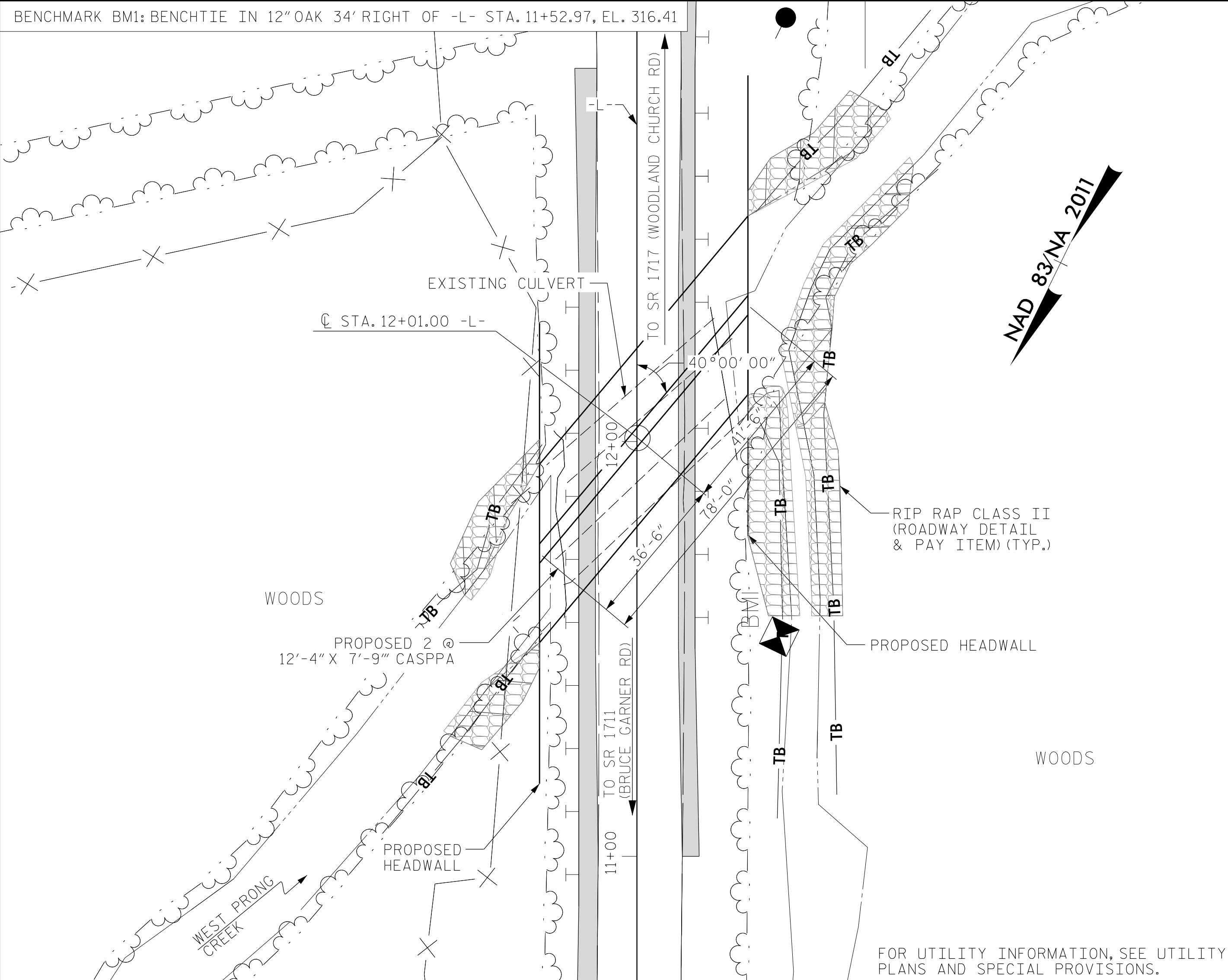


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LOCATION SKETCH

1. ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
2. DESIGN FILL IS 4.5 FEET.
3. THE EXISTING CULVERT INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE 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 CULVERT SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
4. FOR ALUMINUM ALLOY STRUCTURAL PLATE PIPE AND PIPE ARCH, SEE SPECIAL PROVISIONS.
5. FOR OTHER DESIGN DATA AND NOTES, SEE STANDARD NOTES SHEET.
6. FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
7. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
8. HEADWALL SHALL BE DESIGNED FOR LIVE LOAD SURCHARGE.
9. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
10. OVERHEAD POWER LINES RUNNING ALONG THE EAST SIDE OF ROADWAY WILL REMAIN IN PLACE DURING CONSTRUCTION. CONTRACTOR SHALL PLAN FOR INSTALLATION OF CULVERT THAT WILL ACCOMMODATE THIS CONSTRAINT.
11. CONTRACTOR SHALL DELINEATE POWER LINES DURING CONSTRUCTION WITH TEMPORARY SIGNING.
12. FOR REMOVAL OF EXISTING STRUCTURE, SEE SPECIAL PROVISIONS.
13. NO ADDITIONAL PAYMENT IS MADE FOR CULVERT EXCAVATION. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED WITH THE PAY ITEM FOR GRADING.

TOTAL STRUCTURE QUANTITIES	
REMOVAL OF EXISTING STRUCTURE @ STA. 12+01.00 -L-	LUMP SUM
12'-4" X 7'-9" CAA STRUCTURAL PLATE PIPE ARCH, 0.150" THICK	78'-0" LIN. FT.
CLASS A CONCRETE (GUARDRAIL FOOTING)	17.2 CU. YDS.
REINFORCING STEEL (GUARDRAIL FOOTING)	2456 LBS.

ROADWAY DATA

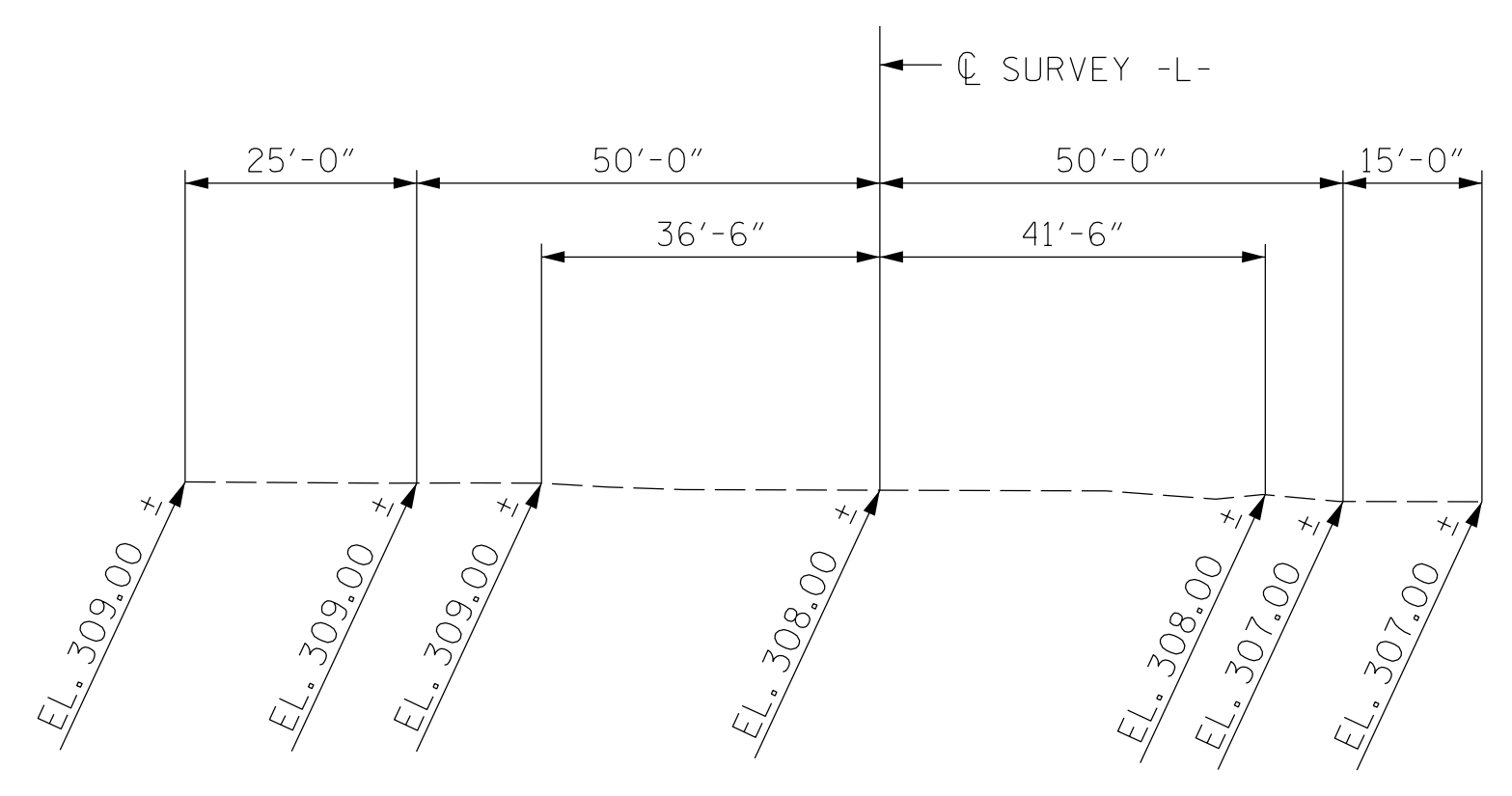
GRADE POINT ELEV. @ STATION 12+01.00 -L- = 319.63
 BED ELEV. @ STATION 12+01.00 -L- = 307.05
 ROADWAY SLOPES 2:1

HYDRAULIC DATA

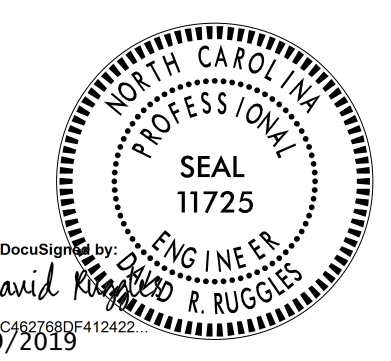
DESIGN DISCHARGE 900 CFS
 FREQUENCY OF DESIGN FLOOD 25 YR.
 DESIGN HIGHWATER ELEV. 315.6 FT.
 DRAINAGE AREA 2.4 SQ. MI.
 BASE DISCHARGE (Q100) 1655 CFS
 BASE HIGHWATER ELEV. 319.9 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE 1500 CFS
 FREQUENCY OF OVERTOPPING FLOOD 100- YR.
 OVERTOPPING FLOOD ELEV. 318.3 FT. *
 * SAG AT STA. 10+48.00 -L-



PROJECT NO. 17BP.5.C.03
 GRANVILLE COUNTY
 STATION: 12+01.00 -L-
 SHEET 1 OF 3



SIGNATURE EXCLUDES GUARDRAIL FUNCTION IF IMPACTED
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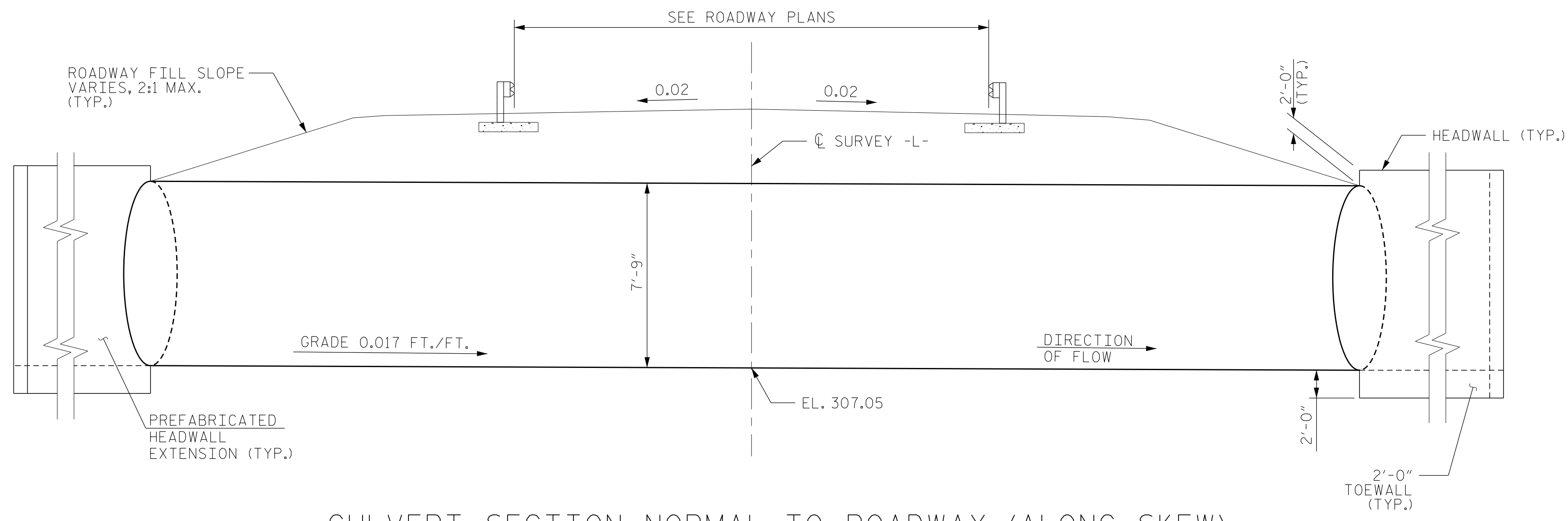
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 2 - 12'-4" X 7'-9"
 CORRUGATED ALUMINUM
 STRUCTURAL PLATE
 PIPE ARCH
 40° SKEW

Firm License No. C-1051
 223 S West St,
 Suite 1100
 Raleigh, NC 27603
 T 919.380.8750
 www.stewartinc.com

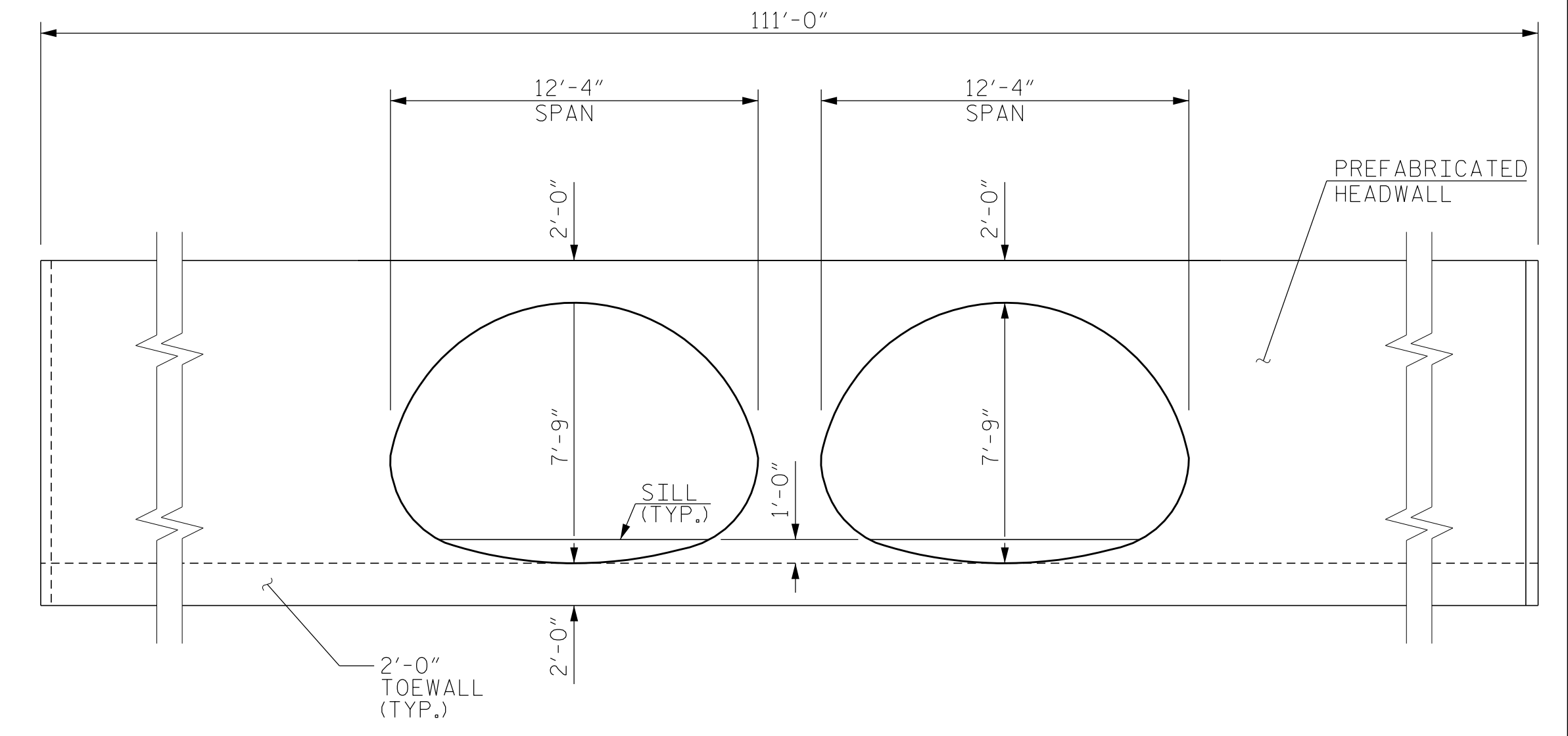
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	C-1
1			3			TOTAL SHEETS
2			4			4

DRAWN BY: E. PHELPS DATE: 4/18
 CHECKED BY: D. RUGGLES DATE: 4/18
 DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 4/18

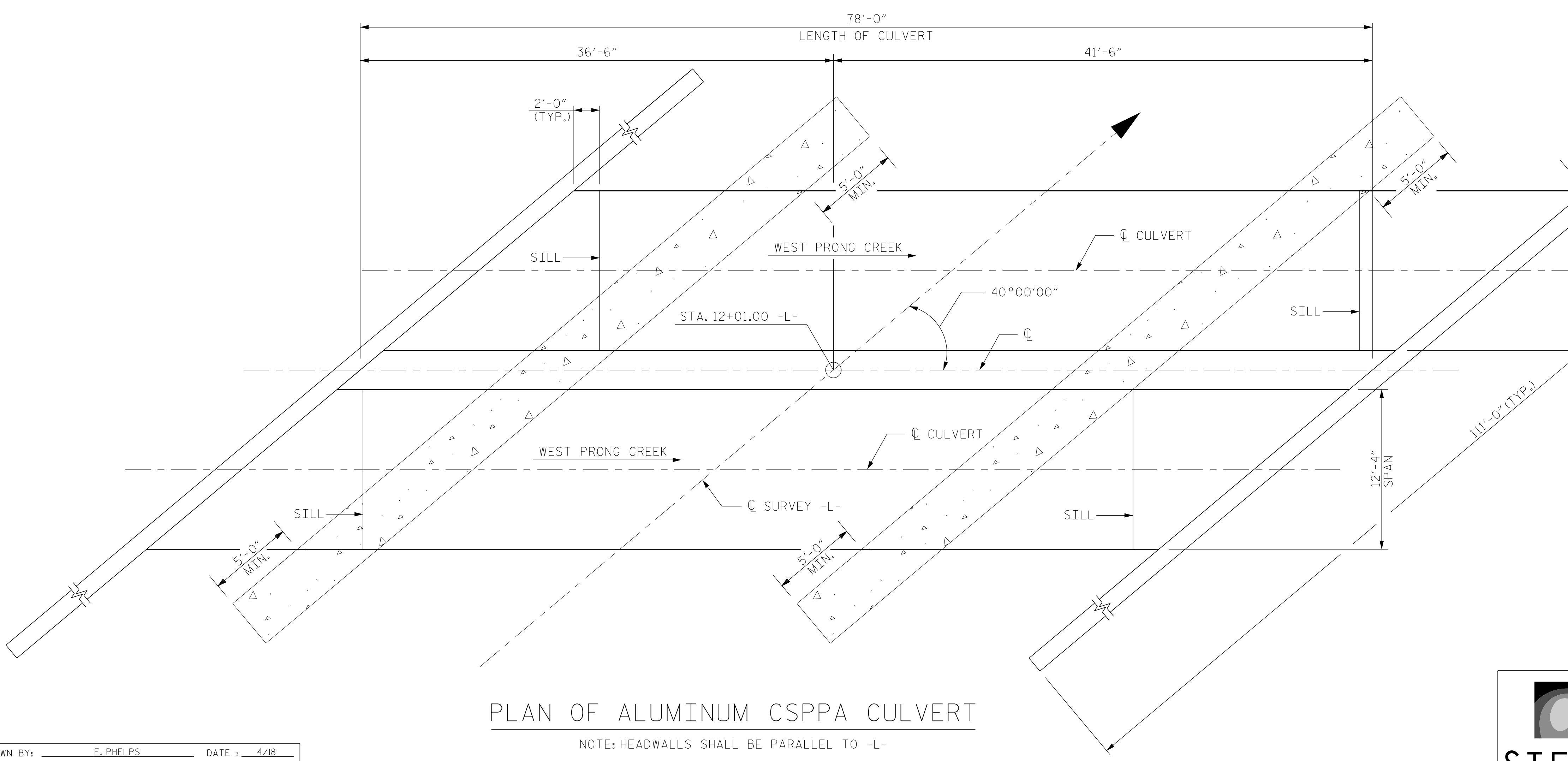
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 1/9/2019
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CULVERT SECTION NORMAL TO ROADWAY (ALONG SKEW)

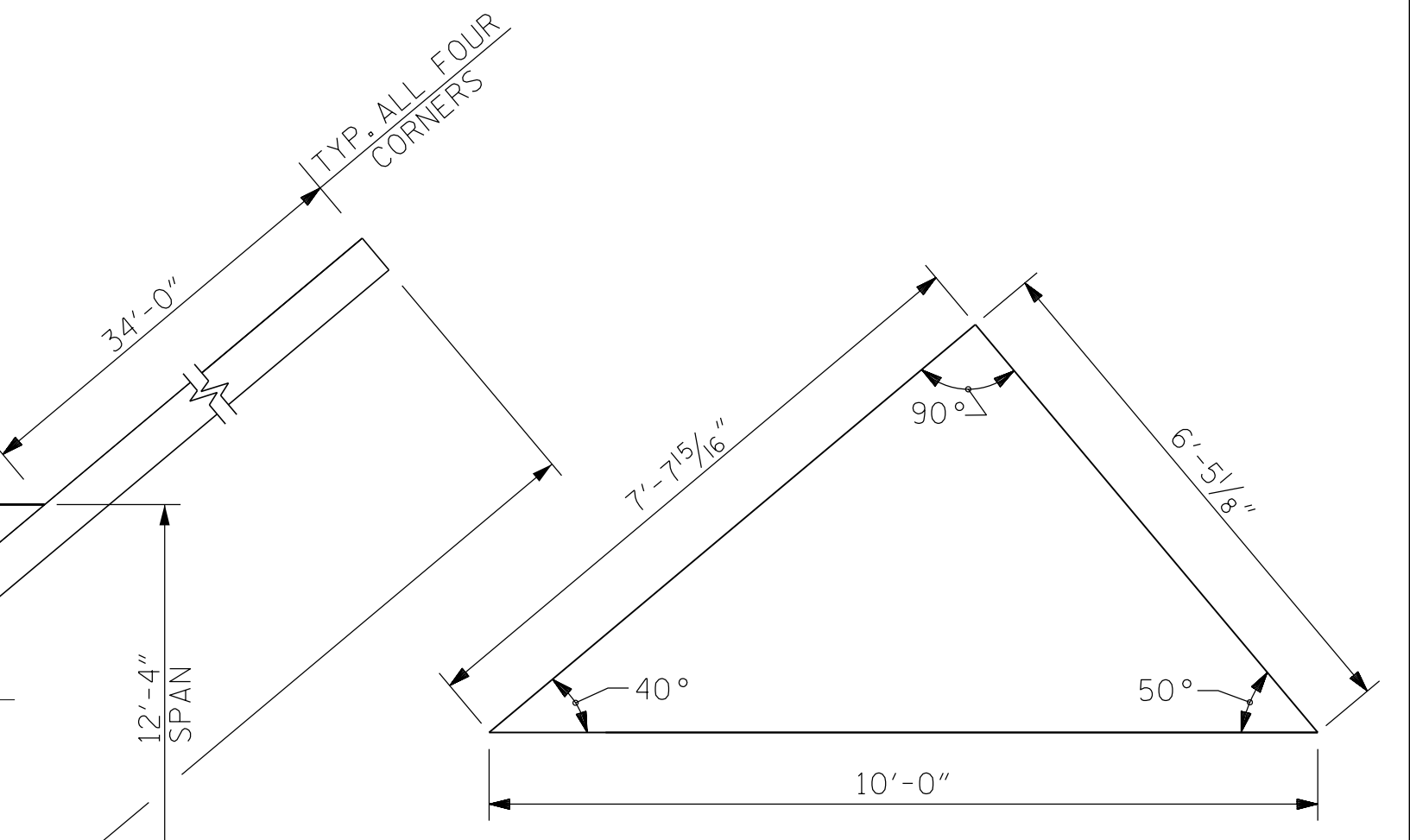


END ELEVATION
(LOOKING DOWNSTREAM)



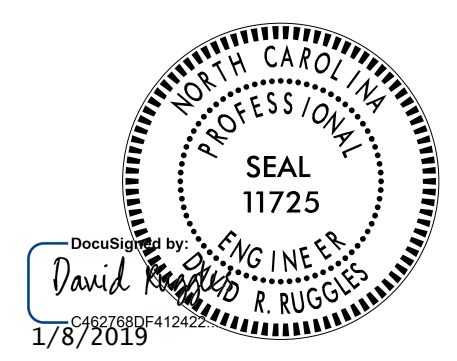
PLAN OF ALUMINUM CSPPA CULVERT

NOTE: HEADWALLS SHALL BE PARALLEL TO -L-



SKEW TRIANGLE

PROJECT NO. 17BP.5.C.03
 GRANVILLE COUNTY
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 SHEET 2 OF 3



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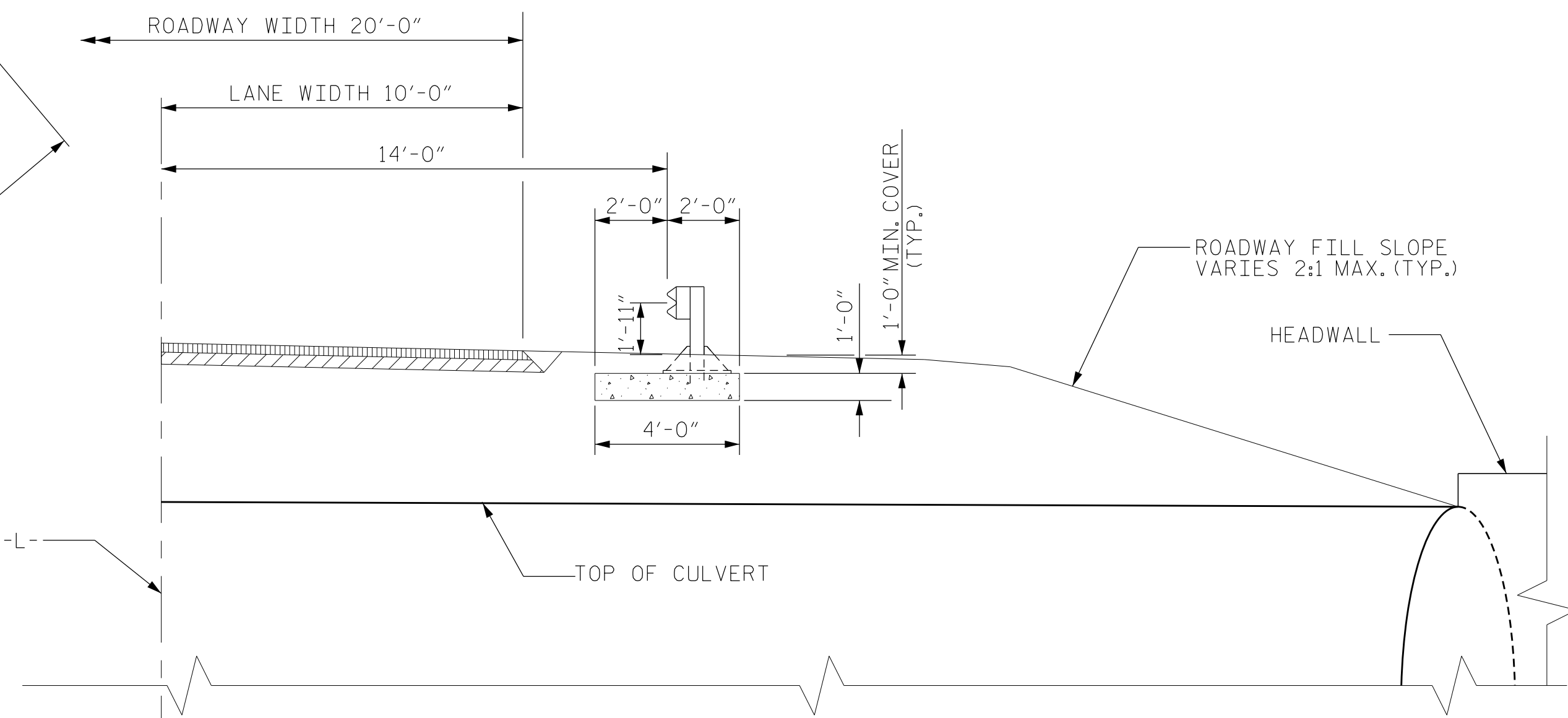
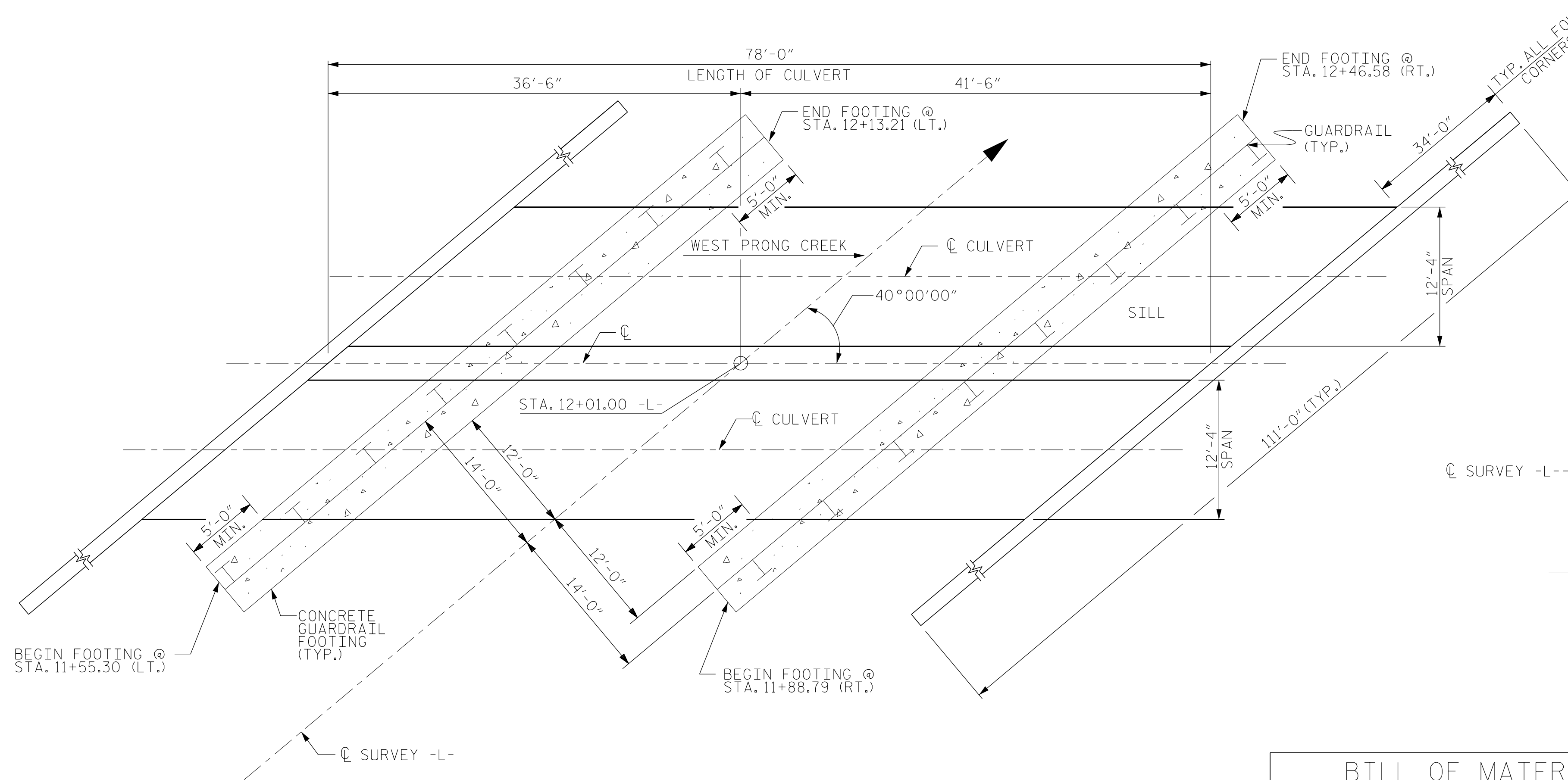
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 2 - 12'-4" X 7'-9"
 CORRUGATED ALUMINUM
 STRUCTURAL PLATE
 PIPE ARCH
 40° SKEW

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

DRAWN BY: E. PHELPS DATE: 4/18
 CHECKED BY: D. RUGGLES DATE: 4/18
 DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 4/18

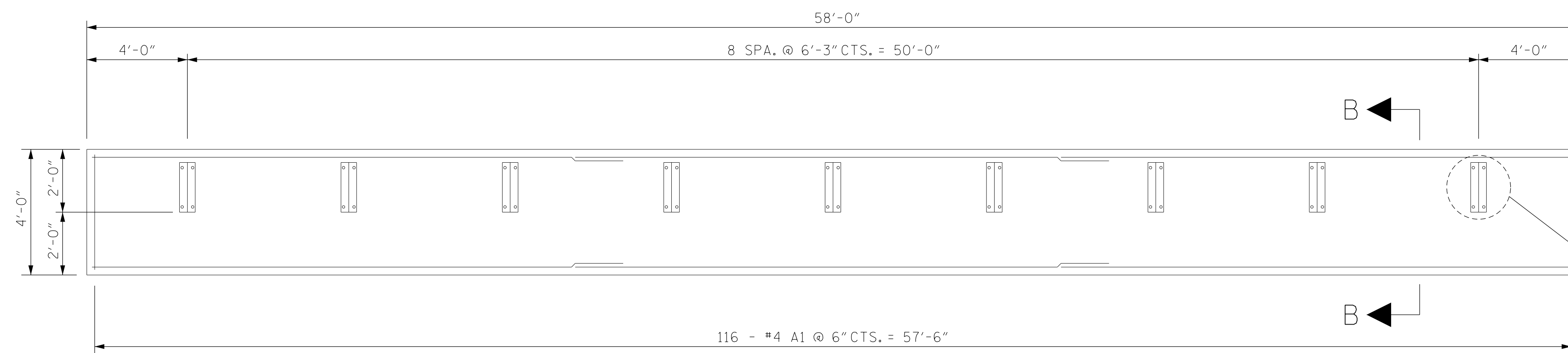
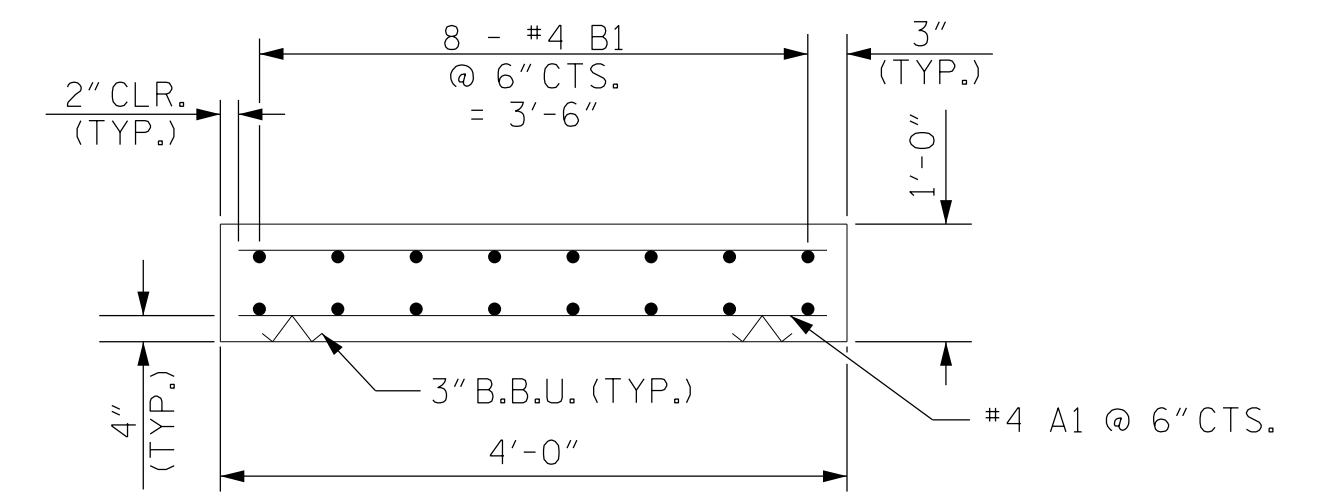
17BP.5.C.03
 9/19/2018
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 USER:ephelps

NOTES: FOR GUARDRAIL ANCHORAGE TO FOOTING DETAILS, SEE NCDOT STD.DWG.862.03, SHEET 7 OF 7.



BILL OF MATERIAL FOR ONE FOOTING (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	116	#4	STR	3'-8"	568
B1	48	#4	STR	20'-7"	660
REINFORCING STEEL				LBS.	1228
CLASS A CONCRETE				CU.YDS.	8.6



NOTE: MINIMUM LAP FOR B1 BARS IS 2'-0"

FOR GUARDRAIL ANCHORAGE, SEE RDWY STD. 862.03, SHEET 7 OF 7.



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Suite 1100
Raleigh, NC 27603
T 919.380.8750
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STEWART

PROJECT NO. 17BP.5.C.03
GRANVILLE COUNTY
STATION: 12+01.00 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GUARDRAIL ASSEMBLY
DETAILS

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

9/19/2018
DRAWN BY: E. PHELPS DATE: 4/18
CHECKED BY: D. RUGGLES DATE: 4/18
DESIGN ENGINEER OF RECORD: D. RUGGLES DATE: 4/18

17BP.5.C.03
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USER:ephelps

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS - - - - - A.A.S.H.T.O. (CURRENT)
LIVE LOAD - - - - - SEE PLANS
IMPACT ALLOWANCE - - - - - SEE A.A.S.H.T.O.
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 A.A.S.H.T.O.
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 2018 "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 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1 1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 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 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 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 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 3/16" 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 1/16" INCH 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.

PROJECT NO. 17BP.5.C.03
GRANVILLE COUNTY
STATION: 12+01.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD NOTES
REVISIONS
SHEET NO. C-4
TOTAL SHEETS 4



Table with 2 columns: Field (DRAWN BY, CHECKED BY, DESIGN ENGINEER OF RECORD) and Value (E. PHELPS, D. RUGGLES, D. RUGGLES) and 2 columns: Field (DATE) and Value (4/18)

STD. NO. SN

17BP.5.C.03
9/19/2018
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