North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	32572.1.13	TIP/Proj No:	A-0009CA	County(ies):	Graham	Page	1	of	6

General Project Information

WBS Element:	32572.1.13	**TIP Number:**	A-0009CA	**Project Type:**	Roadway Widening	**Date:**	11/1/2021
NCDOT Contact:	Josh Deyton, PE			**Contractor / Designer:**	TGS Engineers / Ben Henegar, PE		
Address:	253 Webster Rd Sylva, NC 28779			**Address:**	706 Hillsborough St. - Suite 200 Raleigh, NC 27603		
Phone:	828-586-2141			**Phone:**	919-773-8887 Ext. 123		
Email:	jbdeyton@ncdot.gov			**Email:**	bhenegar@tgsengineers.com		
City/Town:	Robbinsville, NC			**County(ies):**	Graham		
River Basin(s):	Little Tennessee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	3.75 Miles	**Surrounding Land Use:**	Forested, Agriculture, Rural Residential				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	27.8	ac.		15.2	ac.		
Typical Cross Section Description:	1.) Three 12.0' paved lanes, 2.5' curb and gutter, 5.0' sidewalks (LT & RT) - 0.3 Miles 2.) Three 12.0' paved lanes, 10.0' shoulders (8.0' paved / 2.0' grassed), grassed side slopes ranging from 4:1 to 2:1 - 3.45 Miles			1.) Three 12.0' paved lanes, 2.5' curb and gutter, 5.0' sidwalk (LT) - 0.3 Miles 2.) Two 12.0 paved lanes, 8.0' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 3.45 Miles			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	8800	Year: 2045	Existing:	6300	Year:	2019

General Project Narrative: (Description of Minimization of Water Quality Impacts)

STIP project A-0009C is part of Corridor K of the Appalachian Development Highway System (ADHS) and improves the existing alignments of US 129, NC 143, and NC 28 between US 129 south of Robbinsville and the existing four-lane section of NC 28 in Stecoah in Graham County, NC. The project improves roadway shoulders and adding passing / climbing lanes for the length of the project. A-0009C is broken into three projects (A-0009CA, A-0009CB, & A-0009CC).

A-0009CA includes US 129 and NC 143 in Robbinsville and extends to SR 1223 (Beech Creek Rd) along NC 143.

Project minimum measures include:

>2:1 fill slopes.
>1.5:1 cut slopes where possible.
>Expressway gutter and shoulder berm gutter to reduce cross-section width.
>Alignment shifts to avoid relocations and avoid / minimize stream, wetland, and historic resource impacts.
>Alignment shifts and either symmetrical or asymmetrical widening to fit a best-fit alignment to avoid / minimize impacts and reduce earthwork.
>Maximizing shoulder section.
>Providing adequate ground cover.
>Stabilizing embankments and drainage ditches.
>Providing adequate energy dissipation.
>Utilizing natural features and drainage pathways - Existing drainage pathways were utilized to the maximum extent practicable.
>Retaining and extending existing culverts where practicable to minimize in-stream work.

Dry detention basins are proposed to the maximum extent practicable adjacent to Tulula Creek inside the Town of Robbinsville.

General Project Information

Waterbody Information

Surface Water Body (1):	Tulula Creek		**NCDWR Stream Index No.:**	2-190-2-(0.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	Trout Waters (Tr)		
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Talula Creek, SE			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (2):	Tulula Creek		**NCDWR Stream Index No.:**	2-190-2-(14)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	Trout Waters (Tr)	Critical Area (CA)	
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Talula Creek			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (3):	Sweetwater Creek		**NCDWR Stream Index No.:**	2-190-3-(0.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	Trout Waters (Tr)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Sweetwater Creek, SG, SI, SJ, SK, SO, SM, SN, SR, SS, ST, SU, SV, SW, SX			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element: 32572.1.13 **TIP No.:** A-0009CA **County(ies):** Graham

Additional Waterbody Information

Surface Water Body (4):	Slay Bacon Branch		**NCDWR Stream Index No.:**	2-190-3-7	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Slay Bacon Branch			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (5):	Pigpen Branch		**NCDWR Stream Index No.:**	2-190-3-5-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Pigpen Branch			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (6):	Harwood Branch		**NCDWR Stream Index No.:**	2-190-3-5	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Harwood Branch			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (7):	Beech Creek		**NCDWR Stream Index No.:**	2-190-3-3	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Beech Creek			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Swale

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
*5	L	13+50	RT	35.32448	-83.801377	(2)Tulula Creek	0.0	2.0	8.0	2.3	230	250	1.00%	8.4	1.9	11.1	2.1	No	No
6	L	20+05	RT	35.325256	-83.799471	(2)Tulula Creek	0.0	4.0	4.0	0.7	66	195	2.00%	1.3	1.7	1.7	1.8	No	No
6	L	22+00	RT	35.325367	-83.798856	(2)Tulula Creek	0.0	4.0	4.0	0.2	23	200	2.00%	0.5	1.3	0.7	1.4	No	No
6	L	24+00	RT	35.32535	-83.798205	(2)Tulula Creek	0.0	4.0	4.0	0.4	39	200	2.35%	0.9	1.6	1.2	1.7	No	No
*6	L	27+20	LT	35.325326	-83.797108	(2)Tulula Creek	0.0	4.0	2.0	0.9	87	180	1.22%	2.4	1.7	3.2	1.9	No	No
*6	L	27+50	RT	35.325114	-83.797092	(2)Tulula Creek	0.0	4.0	2.0	0.4	40	200	1.09%	1.0	1.3	1.4	1.4	No	No
*7**	L	31+50	RT	35.324785	-83.795813	(3)Sweetwater Creek	0.0	4.0	2.0	1.3	130	100	0.57%	2.6	1.3	3.4	1.4	No	No
*7**	L	34+10	RT	35.324569	-83.794977	(3)Sweetwater Creek	0.0	4.0	2.0	2.6	260	140	0.59%	3.6	1.4	4.8	1.6	No	No
7/8	L	44+40	RT	35.323713	-83.791691	(3)Sweetwater Creek	0.0	4.0	4.0	0.8	76	140	2.29%	1.2	1.7	1.6	1.9	No	No
8**	L	46+70	LT	35.323766	-83.790863	(3)Sweetwater Creek	0.0	4.0	4.0	4.8	480	130	1.52%	3.8	2.0	5.1	2.1	No	No
8**	L	48+50	LT	35.323602	-83.790276	(3)Sweetwater Creek	0.0	4.0	4.0	4.3	430	190	1.45%	4.3	2.0	5.7	2.1	No	No
*8**	L	51+30	LT	35.323362	-83.789401	(3)Sweetwater Creek	0.0	4.0	2.0	1.8	180	70	0.43%	2.9	1.2	3.8	1.3	No	No
*11	L	83+00	LT	35.325405	-83.779683	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	39	250	0.62%	1.1	1.1	1.4	1.2	No	No
*11	L	87+50	LT	35.325285	-83.778144	(3)Sweetwater Creek	0.0	4.0	2.0	0.8	83	200	0.81%	1.9	1.4	2.5	1.5	No	No
*10/11	L	81+50	RT	35.325214	-83.780168	(3)Sweetwater Creek	0.0	4.0	2.0	0.9	86	350	2.31%	1.7	2.0	2.3	2.2	No	No
*12	L	103+50	LT	35.326326	-83.773467	(3)Sweetwater Creek	0.0	4.0	2.0	0.2	20	50	4.00%	0.6	1.9	0.7	2.0	No	No
*12	L	105+50	LT	35.326801	-83.773135	(3)Sweetwater Creek	0.0	4.0	2.0	0.3	26	100	3.66%	0.7	1.9	0.9	2.0	No	No
*12	L	107+00	LT	35.327158	-83.772884	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	37	150	2.58%	1.0	1.8	1.3	1.9	No	No
*12	L	108+00	LT	35.327418	-83.772714	(4)Slay Bacon Branch	0.0	4.0	2.0	0.4	40	100	1.73%	0.8	1.5	1.1	1.6	No	No
*12/13	L	109+00	LT	35.327648	-83.772556	(4)Slay Bacon Branch	2.0	4.0	2.0	1.1	113	150	1.78%	3.0	2.0	4.0	2.2	No	No
*13	L	120+20	LT	35.330022	-83.770150	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	39	330	1.60%	0.7	1.4	0.9	1.5	No	No
*13	L	120+50	RT	35.32988	-83.769960	(3)Sweetwater Creek	0.0	4.0	2.0	1.5	150	300	1.79%	2.4	2.0	3.2	2.1	No	No
*13/14	L	127+50	RT	35.330506	-83.767746	(3)Sweetwater Creek	0.0	4.0	2.0	4.0	400	400	0.51%	4.8	1.5	6.4	1.6	No	No
*14	L	127+00	LT	35.330669	-83.768006	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	11	100	0.68%	0.3	0.8	0.4	0.9	No	No
*14	L	128+00	LT	35.330793	-83.767699	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	11	100	0.77%	0.3	0.9	0.4	0.9	No	No
*14	L	129+50	LT	35.330936	-83.767227	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	12	120	1.03%	0.3	1.0	0.4	1.1	No	No
*14	L	132+00	LT	35.331157	-83.766432	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	13	150	2.72%	0.4	1.4	0.5	1.6	No	No
*14	L	131+00	RT	35.330883	-83.766665	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	41	200	2.71%	0.8	1.8	1.1	1.9	No	No
*15	L	143+50	RT	35.332092	-83.762742	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	8	50	1.50%	0.2	1.0	0.3	1.1	No	No
*15	L	145+00	RT	35.332227	-83.762264	(6)Harwood Branch	0.0	4.0	2.0	0.5	50	200	0.65%	0.8	1.0	1.1	1.1	No	No
*15**	L	150+50	RT	35.332764	-83.760540	(3)Sweetwater Creek	2.0	4.0	2.0	2.9	290	150	0.66%	4.9	1.6	6.5	1.7	No	No
*16	L	152+00	RT	35.332916	-83.760071	(3)Sweetwater Creek	0.0	4.0	2.0	0.2	18	100	0.70%	0.5	0.9	0.7	1.0	No	No
*16	L	153+00	RT	35.333017	-83.759760	(3)Sweetwater Creek	0.0	4.0	2.0	0.5	47	230	0.61%	1.3	1.1	1.7	1.2	No	No
*16	L	155+30	RT	35.333248	-83.759042	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	36	170	0.71%	1.0	1.1	1.3	1.2	No	No
*16	L	158+00	RT	35.333528	-83.758205	(3)Sweetwater Creek	0.0	4.0	2.0	0.5	50	200	1.32%	0.6	1.3	0.8	1.3	No	No
*16	L	160+50	RT	35.333777	-83.757430	(3)Sweetwater Creek	0.0	4.0	2.0	0.7	70	100	1.48%	0.8	1.4	1.1	1.5	No	No
16	L	162+85	RT	35.334049	-83.756688	(3)Sweetwater Creek	0.0	3.0	6.0	0.4	35	100	1.10%	0.4	1.0	0.6	1.1	No	No
*16	L	163+50	RT	35.334153	-83.756511	(3)Sweetwater Creek	0.0	4.0	2.0	1.5	146	200	2.39%	1.8	2.0	2.3	2.2	No	No

Additional Comments

Where slope (and drainage area/discharge) vary, maximum applicable velocity is entered.
*Side slopes average together to meet the minimum recommended 3:1 side slope for purposes of swale criteria.
**Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

Swales

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
*17	L	171+40	RT	35.335685	-83.754553	(3)Sweetwater Creek	0.0	4.0	2.0	1.6	160	220	0.86%	1.9	1.4	2.5	1.5	No	No
18**	L	181+05	RT	35.337919	-83.752797	(3)Sweetwater Creek	0.0	4.0	4.0	3.7	370	155	1.29%	4.4	1.9	5.9	2.1	No	No
18	L	183+15	RT	35.338415	-83.752436	(3)Sweetwater Creek	0.0	4.0	4.0	2.2	220	285	1.79%	2.6	1.9	3.5	2.1	No	No
*18/19	L	194+50	RT	35.340369	-83.749737	(3)Sweetwater Creek	0.0	4.0	2.0	0.7	70	200	0.32%	1.4	0.9	1.9	1.0	No	No
*19	L	199+50	RT	35.340803	-83.748162	(7)Beech Creek	0.0	4.0	2.0	1.5	154	200	1.26%	2.5	1.8	3.3	1.9	No	No

Additional Comments

Where slope (and drainage area/discharge) vary, maximum applicable velocity is entered.

*Side slopes average together to meet the minimum recommended 3:1 side slope for purposes of swale criteria.

**Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

Other Toolbox Best Management Practices

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	BMP Type	Drainage Area (ac)	New Built-Upon Area (ac)	Volume Treated (ac-ft)	Precipitation Depth Treated over NBUA (in)	BMP Associated w/ Buffer Rules?
4	L	14+90	RT	35.32464	-83.800938	(2)Tulula Creek	Dry Detention Basin	2.0	0.1	0.2332	29.44	No
5	Y1	23+55	RT	35.321093	-83.802197	(1)Tulula Creek	Dry Detention Basin	2.0	0.3	0.076	3.20	No

Additional Comments

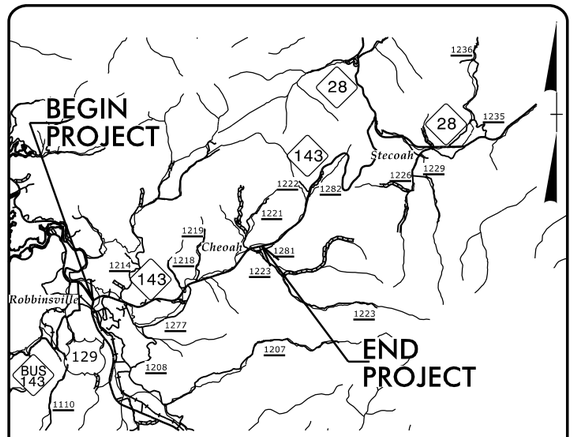
L 19+90 RT - Precipitation Depth Treated over Total Impervious Area = 2.10 Inches

Y1 23+55 RT - Precipitation Depth Treated over Total Impervous Area = 0.69 Inches

09/08/99

TIP PROJECT: A-0009CA

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

PERMIT DRAWING
SHEET 1 OF 42

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CA	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
32572.1.13	APD-0074(178)	PE
32572.2.13	APD-0074(178)	ROW,UTIL.
32572.3.13	APD-0074(178)	CONST.

LOCATION: UPGRADE US 129 FROM SOUTH OF SR 1275 (FIVE POINTS ROAD) TO NC 143 AND UPGRADE NC 143 FROM US 129 TO SR 1223 (BEECH CREEK ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERTS, RETAINING WALLS, AND SIGNALS

WETLAND & STREAM IMPACTS – 11-18-2021 4C MEETING

NAD 83/2011

★ PROPOSED SIGNAL

END CONSTRUCTION
-Y1- STA. 36+70.00

END TIP PROJECT A-0009CA
-L- STA. 208+00.00

BEGIN TIP PROJECT A-0009CA
-L- STA. 10+20.02

BEGIN CULVERT -L- STA. 194+98±
END CULVERT -L- STA. 195+34±

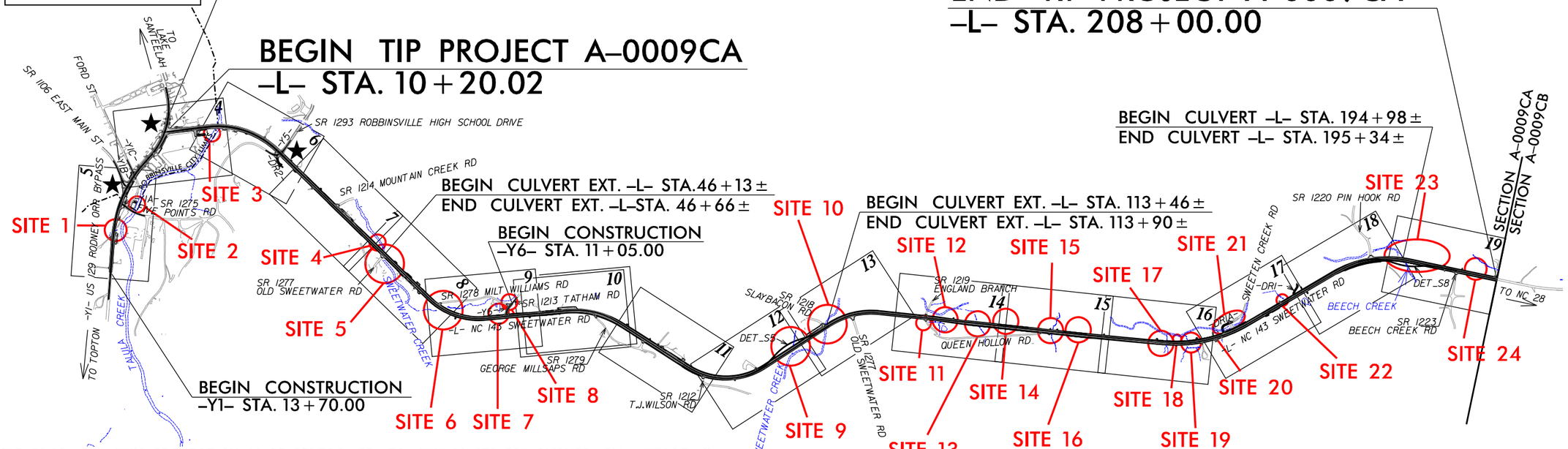
BEGIN CULVERT EXT. -L- STA.46+13±
END CULVERT EXT. -L-STA. 46+66±

BEGIN CONSTRUCTION
-Y6- STA. 11+05.00

BEGIN CULVERT EXT. -L- STA. 113+46±
END CULVERT EXT. -L- STA. 113+90±

BEGIN CONSTRUCTION
-Y1- STA. 13+70.00

SECTION A-0009CA
SECTION A-0009CB



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF ROBBINSVILLE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT:

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2019 = 6300
ADT 2045 = 8800
K = 11 %
D = 57.5 %
T = 7 % *
V = 50MPH – BEGIN PROJECT TO FIVE POINTS RD
60MPH – FIVE POINTS RD TO END OF PROJECT
* TTST = 2% DUAL = 5%
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A-0009CA	=	3.746 MILES
LENGTH STRUCTURE TIP PROJECT A-0009CA	=	0.027 MILES
TOTAL LENGTH TIP PROJECT A-0009CA	=	3.746 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

PLANS PREPARED BY:
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

RIGHT OF WAY DATE:
JULY 16, 2021

LETTING DATE:
AUGUST 16, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

11/3/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_Hyd_prm_tsh.dgn
User:bhenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 2 OF 42

NAD 83/2011

-Y1A- CURVE DATA

PI Sta 12+48.39
Δ = 27° 40' 40.3" (LT)
D = 10° 31' 56.3"
L = 262.79'
T = 134.01'
R = 544.00'
③ -Y1A- PC 11+14.38

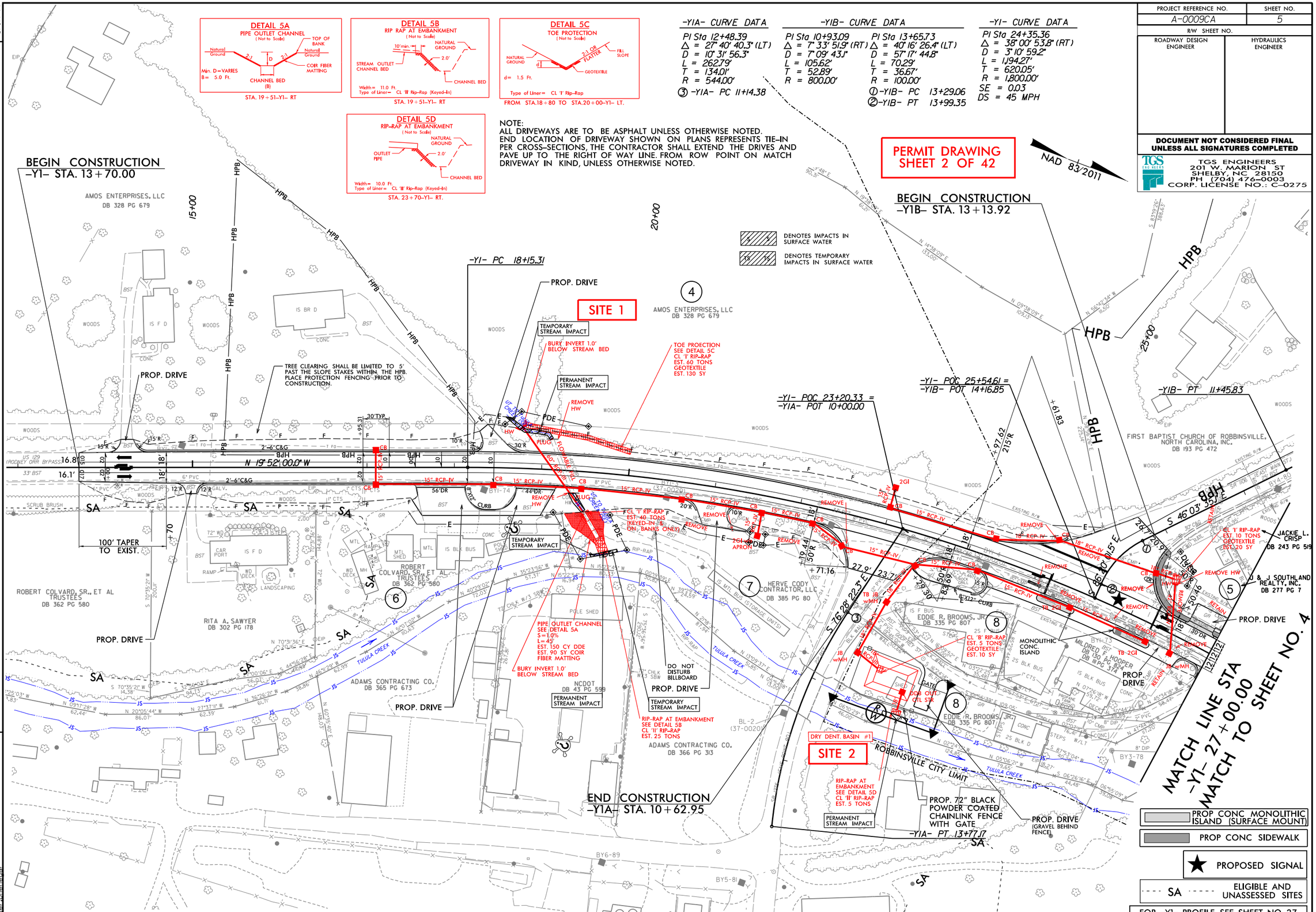
-Y1B- CURVE DATA

PI Sta 10+93.09
Δ = 7° 33' 51.9" (RT)
D = 7° 09' 43.1"
L = 105.62'
T = 52.89'
R = 800.00'

PI Sta 13+65.73
Δ = 40° 16' 26.4" (LT)
D = 57° 17' 44.8"
L = 70.29'
T = 36.67'
R = 100.00'
① -Y1B- PC 13+29.06
② -Y1B- PT 13+99.35

-Y1- CURVE DATA

PI Sta 24+35.36
Δ = 38° 00' 53.8" (RT)
D = 3° 10' 59.2"
L = 1,194.27'
T = 620.05'
R = 1,800.00'
SE = 0.03
DS = 45 MPH



8/17/99

REVISIONS

11/7/2021
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User:jbenger

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SHELBY, NC 28150
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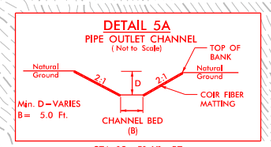
CORP. LICENSE NO.: C-0275

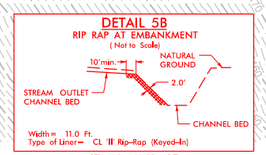
REVISIONS 8/17/99

DETAIL 5A
PIPE OUTLET CHANNEL
(Not to Scale)



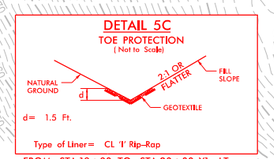
STA. 19+51-Y1- RT

DETAIL 5B
RIP RAP AT EMBANKMENT
(Not to Scale)



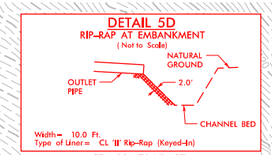
STA. 19+51-Y1- RT

DETAIL 5C
TOE PROTECTION
(Not to Scale)



FROM STA.18+80 TO STA.20+00-Y1- LT.

DETAIL 5D
RIP-RAP AT EMBANKMENT
(Not to Scale)



STA. 23+70-Y1- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

-Y1A- CURVE DATA
PI Sta 12+48.39
Δ = 27° 40' 40.3" (LT)
D = 10° 31' 56.3"
L = 262.79'
T = 134.01'
R = 544.00'
③ -Y1A- PC 11+14.38

-Y1B- CURVE DATA
PI Sta 10+93.09
Δ = 7° 33' 51.9" (RT)
D = 7° 09' 43.1"
L = 105.62'
T = 52.89'
R = 800.00'

PI Sta 13+65.73
Δ = 40° 16' 26.4" (LT)
D = 57° 17' 44.8"
L = 70.29'
T = 36.67'
R = 100.00'
① -Y1B- PC 13+29.06
② -Y1B- PT 13+99.35

-Y1- CURVE DATA
PI Sta 24+35.36
Δ = 38° 00' 53.8" (RT)
D = 3° 10' 59.2"
L = 1,194.27'
T = 620.05'
R = 1,800.00'
SE = 0.03
DS = 45 MPH

PERMIT DRAWING
SHEET 3 OF 42

NAD 83/2011

BEGIN CONSTRUCTION
-Y1- STA. 13+70.00

BEGIN CONSTRUCTION
-Y1B- STA. 13+13.92

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y1- PC 18+15.31

-Y1- POC 23+20.33 =
-Y1A- POT 10+00.00

-Y1- POC 25+54.61 =
-Y1B- POT 14+16.85

-Y1B- PT 11+45.83

SITE 1

SITE 2

TREE CLEARING SHALL BE LIMITED TO 5' PAST THE SLOPE STAKES WITHIN THE HPB. PLACE PROTECTION FENCING PRIOR TO CONSTRUCTION.

TEMPORARY STREAM IMPACT

BURY INVERT 1.0' BELOW STREAM BED

PERMANENT STREAM IMPACT

TOE PROECTION SEE DETAIL 5C CL 'I' RIP-RAP EST. 60 TONS GEOTEXTILE EST. 130 SY

REMOVE HW

PIPE OUTLET CHANNEL SEE DETAIL 5A S=1.0% L=45' EST. 150 CY DDE EST. 90 SY COIR FIBER MATTING

BURY INVERT 1.0' BELOW STREAM BED

RIP-RAP AT EMBANKMENT SEE DETAIL 5B CL 'II' RIP-RAP EST. 25 TONS

CL 'I' RIP-RAP EST. 40 TONS (KEYED-IN & ON BANKS ONLY)

CL 'I' RIP-RAP EST. 10 TONS GEOTEXTILE EST. 20 SY

CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY

RIP-RAP AT EMBANKMENT SEE DETAIL 5D CL 'II' RIP-RAP EST. 5 TONS

DO NOT DISTURB BILLBOARD

PROP. DRIVE

PROP. 72" BLACK POWDER COATED CHAINLINK FENCE WITH GATE

PROP. DRIVE (GRAVEL BEHIND FENCE)

-Y1A- PT 13+77.17

END CONSTRUCTION
-Y1A- STA. 10+62.95

MATCH LINE STA -Y1- 27+00.00 MATCH TO SHEET NO. 4

ROBBINSVILLE CITY LIMIT

US 129 (RODNEY ORR BYPASS)

N 19° 52' 00.0" W

100' TAPER TO EXIST.

AMOS ENTERPRISES, LLC DB 328 PG 679

ROBERT COLVARD, SR., ET AL TRUSTEES DB 362 PG 580

RITA A. SAWYER DB 302 PG 178

ADAMS CONTRACTING CO. DB 365 PG 673

NCDOT DB 43 PG 599

ADAMS CONTRACTING CO. DB 366 PG 313

HERVE CODY CONTRACTOR, LLC DB 385 PG 80

EDDIE R. BROOMS, JR. DB 335 PG 807

MILDRED F. HOOPER DB 130 PG 824 DB 190 PG 374

FIRST BAPTIST CHURCH OF ROBBINSVILLE, NORTH CAROLINA, INC. DB 193 PG 472

JACKIE L. CRISP DB 243 PG 519

D. & J. SOUTHLAND REALTY, INC. DB 277 PG 7

MONOLITHIC CONC. ISLAND

DRY DENT. BASIN #1

TULULA CREEK

PROP CONC MONOLITHIC ISLAND (SURFACE MOUNT)

PROP CONC SIDEWALK

PROPOSED SIGNAL

SA ELIGIBLE AND UNASSESSED SITES

FOR -Y1- PROFILE, SEE SHEET NO. 27

11/3/2021
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PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

-L- CURVE DATA
PI Sta 21+39.93
△ = 51° 06' 09.7" (RT)
D = 4° 56' 21.4"
L = 1,034.62'
T = 554.57'
R = 1,160.00'
SE = 0.04
DS = 50 MPH

-Y5- CURVE DATA
PI Sta 11+51.55
△ = 9° 49' 14.7" (RT)
D = 9° 32' 57.5"
L = 102.84'
T = 51.55'
R = 600.00'

PI Sta 12+96.74
△ = 78° 27' 45.3" (RT)
D = 49° 49' 20.7"
L = 157.48'
T = 93.90'
R = 115.00'

① -Y5- PCC 12+02.84
② -Y5- PT 13+60.33

-DR2- CURVE DATA
PI Sta 11+03.23
△ = 37° 57' 56.5" (LT)
D = 55° 05' 31.5"
L = 68.91'
T = 35.78'
R = 104.00'
SE = NC
③ -DR2- PC 10+67.46
④ -DR2- PT 11+36.37
Ⓑ S 31° 49' 15.2" E

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 4 OF 42

NAD 83/2011

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE STA -L- 16+00.00 MATCH TO SHEET NO. 4

MATCH LINE STA -L- 30+00.00 MATCH TO SHEET NO. 7

ROBBINSVILLE CITY LIMIT

-Y5- POT 10+00.00
-L- POT 26+74.83 = -Y5- POC 12+26.19
-Y5- PC 11+00.00
S 9°55'00.0" W
PROP. DRIVE
RELOCATE FENCE (BY OWNER)
+23.54
30' TYP.
5' SIDEWALK
PROP. HANDRAIL -L-STA. 17+10 TO 17+90, LT
CONNECT TO EXIST. BOX CULVERT
30" RCP-IV
RETAIN 4@12'x14' RCBC
TEMPORARY STREAM IMPACT
TEMPORARY STREAM IMPACT
PROP. DRIVE
PROP. CONCRETE DRIVE
RELOCATE (BY OTHERS)
PERMANENT STREAM IMPACT
PROP. HANDRAIL -L-STA. 16+75 TO 17+60, RT
HEADWALL TO BE EXTENDED SEE STRUCTURE PLANS
RIP-RAP AT EMBANKMENT SEE DETAIL 6A CL 'B' RIP-RAP, ESI 30 TONS
SITE 3
TOMMY R. COLLINS, ET AL DB 195 PG 465 DB 195 PG 468
TOMMY R. COLLINS, ET AL DB 195 PG 465
GREENHOUSE
WD SHED
WD BARN
IS BR D
IS MTL BUS
S BLK BUS
MTL (GAS PUMPS)
DIESEL TANKS
GRAHAM COUNTY BOARD OF EDUCATION
ROBBINSVILLE HS ENTRANCE
PASTURE
JACK E. MILLSAPS DB 355 PG 252
OLIVER L. AMMONS DB 139 PG 127
-L- PT 26+19.98
-Y5- POT 14+50.00
-Y5- POC 12+80.00 = -DR2- POT 10+00.00
N 81°48'00.0" W
S 69°47'11.7" E
150' TAPER
+01.81
+79.98
+75
TIE -L- TYP. CUT DITCH TO -DR2- DITCH S=4.1% SEE DETAIL 6C
SPECIAL LATERAL 'V' DITCH SEE DETAIL 6B
BM#2 ELEV. 2015.91' -BL- STA. 21+59.00 103' RT. CHISELED 'X' IN CONC PAD FOR TRAFFIC SIGNAL BOX
-DR2- POT 12+00.00
END CONSTRUCTION -DR2- STA. 11+60.00
N 83°13'02" W 287.26'
BY5-88
BY5-87
BY5-86

DETAIL 6A
RIP-RAP AT EMBANKMENT
(Not to Scale)
NATURAL GROUND
OUTLET PIPE
2.0'
CHANNEL BED
Width= 22.0 Ft.
Type of Liner= CL 'B' Rip-Rap (Keyed-In)
STA. 16+35-L- RT.

DETAIL 6B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
2:1
Fill Slope
Min. D=1.0 Ft.
FROM STA.10+42 TO STA.11+50-DR2- LT.

DETAIL 6C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Fill Slope
Min. D=1.5 Ft.
FROM STA.27+00 LT TO STA.27+50-L- RT.

PROP CONC SIDEWALK
PROPOSED SIGNAL
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 20
FOR -DR2- PROFILE, SEE SHEET NO. 28

8/13/2021
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User:jbenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

-L- CURVE DATA
PI Sta 21+39.93
△ = 51° 06' 09.7" (RT)
D = 4° 56' 21.4"
L = 1,034.62'
T = 554.57'
R = 1,160.00'
SE = 0.04
DS = 50 MPH

-Y5- CURVE DATA
PI Sta 11+51.55
△ = 9° 49' 14.7" (RT)
D = 9° 32' 57.5"
L = 102.84'
T = 51.55'
R = 600.00'

PI Sta 12+96.74
△ = 78° 27' 45.3" (RT)
D = 49° 49' 20.7"
L = 157.48'
T = 93.90'
R = 115.00'

① -Y5- PCC 12+02.84
② -Y5- PT 13+60.33

-DR2- CURVE DATA
PI Sta 11+03.23
△ = 37° 57' 56.5" (LT)
D = 55° 05' 31.5"
L = 68.91'
T = 35.78'
R = 104.00'
SE = NC

③ -DR2- PC 10+67.46
④ -DR2- PT 11+36.37
Ⓑ S 31° 49' 15.2" E

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 5 OF 42

NAD 83/2011

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y5- POT 10+00.00
-L- POT 26+74.83 = -Y5- POC 12+26.19
-Y5- PC 11+00.00
S 9°55'00.0" W
PROP. DRIVE
TOMMY R. COLLINS, ET AL DB 195 PG 465
RELOCATE FENCE (BY OWNER)
+23.54
30' TYP.
5' SIDEWALK
PROP. HANDRAIL -L-STA. 17+10 TO 17+90, LT
ROBBINSVILLE CITY LIMIT
TUCKA CREEK
CONNECT TO EXIST. BOX CULVERT
30" RCP-IV
RETAIN 4@12'x14' RCBC
TEMPORARY STREAM IMPACT
TEMPORARY STREAM IMPACT
PROP. DRIVE
PROP. CONCRETE DRIVE
-Y5- POT 14+50.00
-L- PT 26+19.98
N 81° 48' 00.0" W
+01.81
S 69° 47' 11.7" E
JACK E. MILLSAPS DB 355 PG 252
PROP. DRIVE
150' TAPER
TIE -L- TYP. CUT DITCH TO -DR2- DITCH S=4.3% SEE DETAIL 6C
SPECIAL LATERAL 'V' DITCH SEE DETAIL 6B
OLIVER L. AMMONS DB 139 PG 127
-Y5- POC 12+80.00 = -DR2- POT 10+00.00
BM#2 ELEV. 2015.91' BL - STA. 24+59.00 103' RT. CHISELED 'X' IN CONC PAD FOR TRAFFIC SIGNAL BOX
-DR2- POT 12+00.00
END CONSTRUCTION -DR2- STA. 11+60.00
MATCH LINE STA -L- 16+00.00 MATCH TO SHEET NO. 4
MATCH LINE STA -L- 30+00.00 MATCH TO SHEET NO. 7
PROP. HANDRAIL -L-STA. 16+75 TO 17+60, RT
RELOCATE (BY OTHERS)
PERMANENT STREAM IMPACT
HEADWALL TO BE EXTENDED SEE STRUCTURE PLANS
RIP-RAP AT EMBANKMENT SEE DETAIL 6A CL 'B' RIP-RAP EST. 30 TONS
SITE 3

DETAIL 6A
RIP-RAP AT EMBANKMENT
(Not to Scale)
NATURAL GROUND
OUTLET PIPE
2.0'
CHANNEL BED
Width= 22.0 Ft.
Type of Liner= CL 'B' Rip-Rap (Keyed-In)
STA. 16+35-L- RT.

DETAIL 6B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
2:1
Fill Slope
Min. D=1.0 Ft.
FROM STA.10+42 TO STA.11+50-DR2- LT.

DETAIL 6C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Fill Slope
Min. D=1.5 Ft.
FROM STA.27+00 LT TO STA.27+50-L- RT.

PROP CONC SIDEWALK
PROPOSED SIGNAL
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 20
FOR -DR2- PROFILE, SEE SHEET NO. 28

8/13/2021
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User:bbenger

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 6 OF 42

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S / S — DENOTES IMPACTS IN SURFACE WATER
F / F — DENOTES FILL IN WETLAND

MATCH LINE STA -L- 44+00.00
MATCH TO SHEET NO. 7

MATCH LINE STA -L- 56+00.00
MATCH TO SHEET NO. 9

-L- PC 54+87.20

SITE 4
SITE 5

12 JACK MILLSAPS DB 327 PG 22
13 HILDRED E. MILLSAPS, TRUSTEE, ET AL DB 195 PG 129
14 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1
15 JAMES HALL DB 253 PG 537
16 DANA J. SMITH DB 145 PG 728
17 ERIC FORD, ET AL DB 360 PG 1
18 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 36 TRACT 2
21 BARRY L. QUEEN DB 388 PG 569

ROCK PLATING -L- STA. 42+00 TO 45+64, LT SEE NCDOT RDY STD 275.01 EST. SY
CULVERT OUTLET CHANNEL SEE DETAIL 8E CL 'II' RIP-RAP EST. 100 TONS EST. 90 CY DDE
PIPE OUTLET CHANNEL SEE DETAIL 8B CL 'I' RIP-RAP EST. 25 TONS EST. 25 CY DDE L=8 FT S=5.0%
15" CSP ROD AND LUG WITH GASKETS (ELBOWS)
30" CSP ROD AND LUG WITH GASKETS (ELBOWS)
CONNECTION TO PROP. RCBC EXT.
CL 'I' RIP-RAP EST. 6 TONS GEOTEXTILE EST. 14 SY
SHOULDER BERM GUTTER -L- STA. 42+00 TO 47+00, LT
DO NOT DISTURB BILLBOARD
PROP. DRIVE
SPECIAL LATERAL 'V' DITCH SEE DETAIL 8A
CL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 7 SY
EXPRESSWAY GUTTER -L- STA. 53+25 TO 55+50, LT
15" RCP-IV
3@12'x9' RCBC EXTENSION
RETAIN AND EXTEND
REMOVE
CL 'I' RIP-RAP EST. 25 TONS
CL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 2 SY
BM#3 ELEV. 2016.24' -BL- STA. 43+76.00 34' RT. SPIKE NAIL IN BASE OF 10" POPLAR
PROP. CONCRETE DRIVE
EXPRESSWAY GUTTER -L- STA. 49+00 TO 52+33, RT
DO NOT DISTURB SIGN
DO NOT DISTURB SEPTIC
720' TAPER
FILL IN WETLAND
BANK STABILIZATION SEE DETAIL 8C CL 'II' RIP-RAP EST. 350 TONS
CULVERT INLET CHANNEL SEE DETAIL 8D CL 'II' RIP-RAP EST. 140 TONS EST. 80 CY DDE
ROCK PLATING -L- STA. 44+50 TO 45+00, RT SEE NCDOT RDY STD 275.01 EST. SY
ROCK PLATING -L- STA. 47+14 TO 48+00, RT SEE NCDOT RDY STD 275.01 EST. SY
SHEETWATER CREEK
UT TO SHEETWATER CREEK (SI)
S 69°47'11.7" E

DETAIL 8A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 4:1 or Flatter, Fill Slope
Min. D=1.5 Ft.
FROM STA.52+00 TO STA.53+00-L- LT.

DETAIL 8B
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground, 2:1, D, d, 1.5', CHANNEL BED (B)
Min. D=4.0 Ft. Max. d=4.0 Ft. B=10.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA.44+88-L- RT.

DETAIL 8C
BANK STABILIZATION
(Not to Scale)
NATURAL GROUND, TOP OF BANK, 2.0', CHANNEL BED
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
FROM STA.47+39 TO STA.48+55-L- RT.

DETAIL 8D
CULVERT INLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)
NWS=1999.2', VARIES 25'-0", 2' KEY-IN, 1.2', 1.5', 1.5', 1.5', CLASS II RIP RAP
STA.47+20-L- RT.

DETAIL 8E
CULVERT OUTLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)
NWS=1999.2', 3' X 2' & 1' BOULDERWALL, 2' KEY-IN, 1.2', 1.5', 1.5', CLASS II RIP RAP
STA.46+00-L- LT.

FOR -L- PROFILE, SEE SHEET NO. 21

REVISIONS
8/17/99
11/3/2021
V:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009_CA_PSH_A-0009CA_hyd_prm_psh_08.dgn
User:bhenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NAD 83/2011

PERMIT DRAWING SHEET 7 OF 42

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE, FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND

MATCH LINE STA -L- 44+00.00
MATCH TO SHEET NO. 7

MATCH LINE STA -L- 56+00.00
MATCH TO SHEET NO. 9

-L- PC 54+87.20

SITE 4
SITE 5

12 JACK MILLSAPS DB 327 PG 22
13 HILDRED E. MILLSAPS, TRUSTEE, ET AL DB 195 PG 129
14 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1
15 JAMES HALL DB 253 PG 537
16 DANA J. SMITH DB 145 PG 728
17 ERIC FORD, ET AL DB 360 PG 1
18 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 36 TRACT 2
21 BARRY L. QUEEN DB 388 PG 569

ROCK PLATING
-L- STA. 42+00 TO 45+64, LT
SEE NCDOT RDY STD 275.01
EST. SY

CULVERT OUTLET CHANNEL
SEE DETAIL 8E
CL 'II' RIP-RAP
EST. 100 TONS
EST. 90 CY DDE

PIPE OUTLET CHANNEL
SEE DETAIL 8B
CL 'I' RIP-RAP
EST. 25 TONS
EST. 25 CY DDE
L=8 FT
S=5.0%

15" CSP ROD AND LUG WITH GASKETS (ELBOWS)

30" CSP ROD AND LUG WITH GASKETS (ELBOWS)

CONNECTION TO PROP. RCBC EXT.

SHOULDER BERM GUTTER
-L- STA. 42+00 TO 47+00, LT

CL 'I' RIP-RAP
EST. 6 TONS
GEOTEXTILE
EST. 14 SY

DO NOT DISTURB BILLBOARD

PROP. DRIVE

SPECIAL LATERAL 'V' DITCH
SEE DETAIL 8A

CL 'B' RIP-RAP
EST. 2 TONS
GEOTEXTILE
EST. 7 SY

EXPRESSWAY GUTTER
-L- STA. 53+25 TO 55+50, LT

15" RCP-IV
3@12'x9' RCBC EXTENSION
RETAIN AND EXTEND
REMOVE
RETAIN
S 69° 47' 11.7" E
SWEETWATER CREEK
CL 'B' RIP-RAP
EST. 2 TONS
GEOTEXTILE
EST. 2 SY
BM#3 ELEV. 2016.24'
-L- STA. 43+76.00 34' RT.
SPIKE NAIL IN BASE OF 30" POPLAR
PROP. CONCRETE DRIVE
DO NOT DISTURB SIGN
FILL IN WETLAND
DO NOT DISTURB SEPTIC
720' TAPER
EXPRESSWAY GUTTER
-L- STA. 49+00 TO 52+33, RT
UT TO SWEETWATER CREEK (SI)
BANK STABILIZATION
SEE DETAIL 8C
CL 'II' RIP-RAP
EST. 350 TONS
CULVERT INLET CHANNEL
SEE DETAIL 8D
CL 'II' RIP-RAP
EST. 140 TONS
EST. 80 CY DDE
ROCK PLATING
-L- STA. 47+14 TO 48+00, RT
SEE NCDOT RDY STD 275.01
EST. SY
ROCK PLATING
-L- STA. 44+50 TO 45+00, RT
SEE NCDOT RDY STD 275.01
EST. SY
PROP. CONCRETE DRIVE
PROP. DRIVE

DETAIL 8A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 4:1 or Flatter, Fill Slope
Min. D=1.5 Ft.
FROM STA.52+00 TO STA.53+00-L- LT.

DETAIL 8B
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground, 2:1, D, d, 1.5', CHANNEL BED (B)
Min. D=4.0 Ft.
Max. d=4.0 Ft.
B=10.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA.44+88-L- RT.

DETAIL 8C
BANK STABILIZATION
(Not to Scale)
NATURAL GROUND, TOP OF BANK, 2.0', CHANNEL BED
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
FROM STA.47+39 TO STA.48+55-L- RT.

DETAIL 8D
CULVERT INLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)
NWS=1999.2', VARIES 25'-0", 2' KEY-IN, 12', 1.5:1, 1.5:1, 7.5', CLASS II RIP RAP
STA.47+20-L- RT.

DETAIL 8E
CULVERT OUTLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)
NWS=1999.2', 3' X 2' & 1' BOULDERWALL, 2' KEY-IN, 12', 1.5:1, CLASS II RIP RAP
STA.46+00-L- LT.

FOR -L- PROFILE, SEE SHEET NO. 21

REVISIONS

8/17/99

11/3/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_08_con.dgn
User:bbenegar

5/14/99

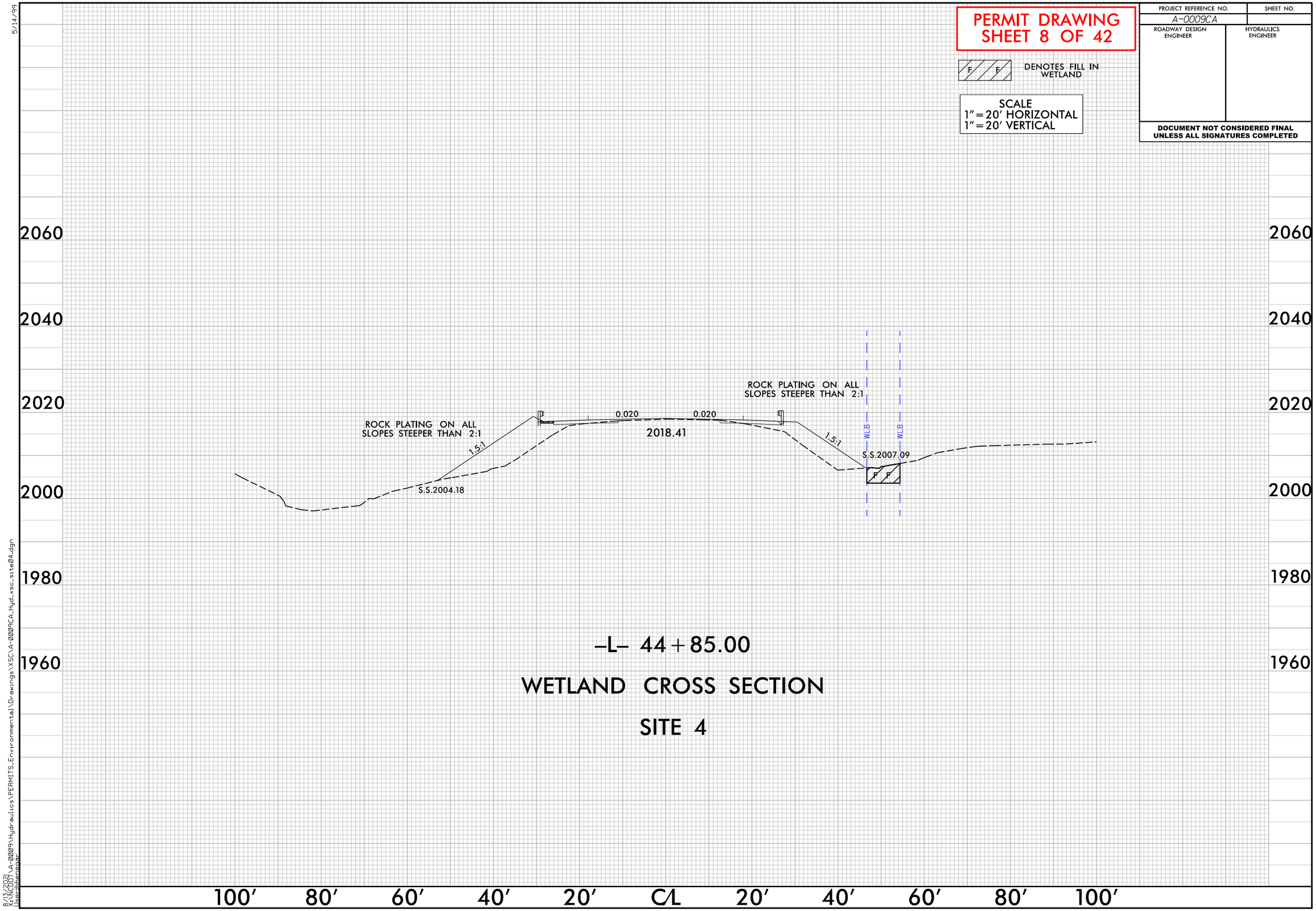
PERMIT DRAWING
SHEET 8 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



-L- 44+85.00

WETLAND CROSS SECTION

SITE 4

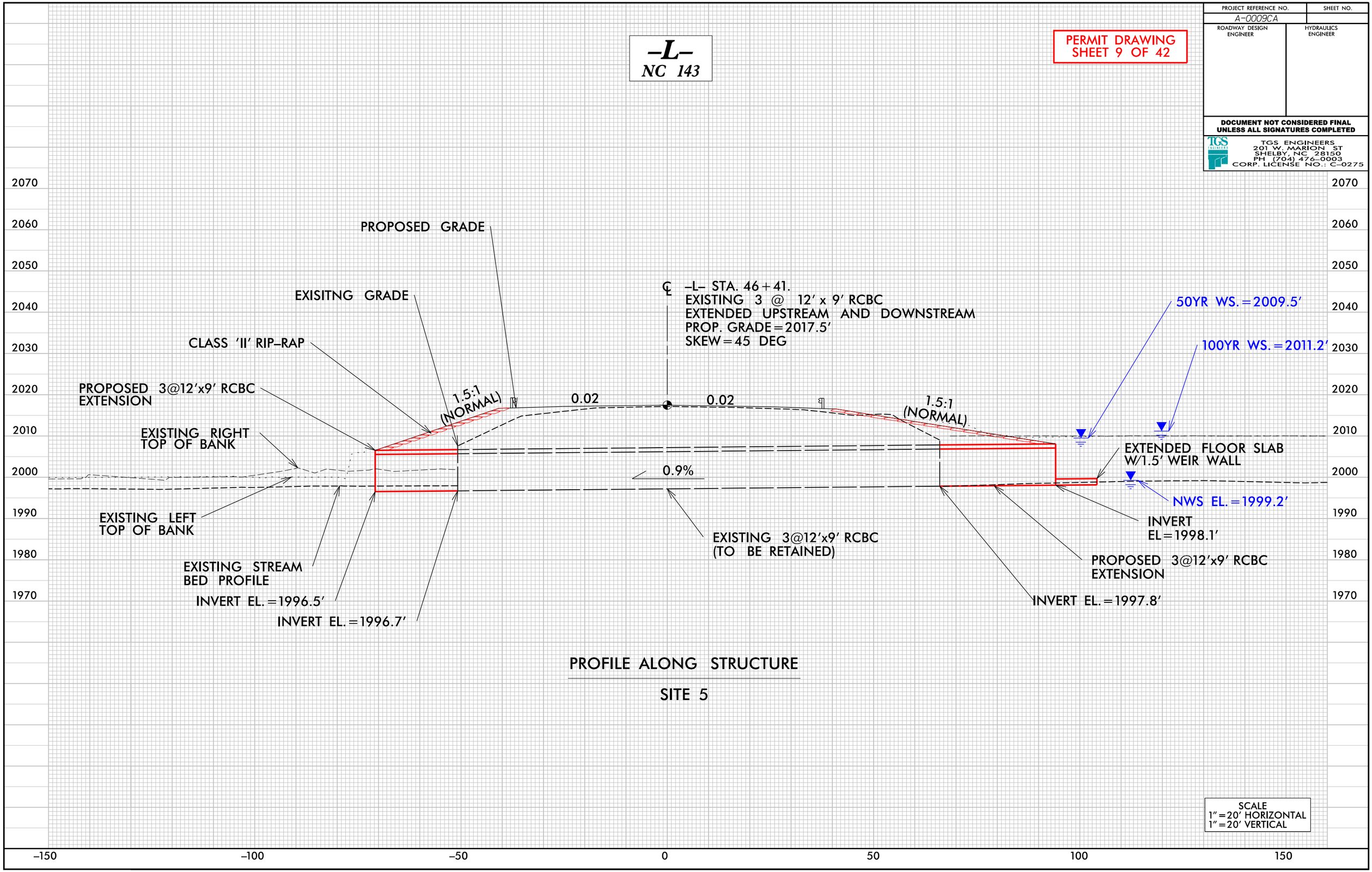
8/13/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\XSC\A-0009CA_Hyd_xsc_site04.dgn
User:jbenson

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 9 OF 42

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



PROFILE ALONG STRUCTURE

SITE 5

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

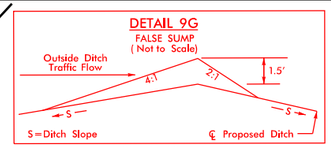
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

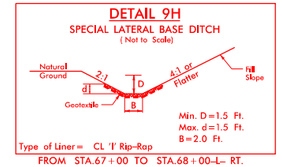
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

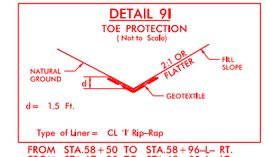
NAD 83/2011

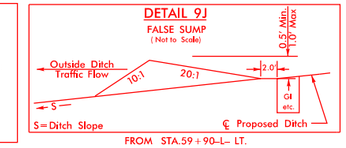
-L- CURVE DATA
PI Sta 59+31.02
△ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

-Y3- CURVE DATA
PI Sta 12+33.55
△ = 43° 48' 04.8" (LT)
D = 57° 17' 44.8"
L = 76.45'
T = 40.20'
R = 100.00'
① -Y3- PC 12+93.35
② -Y3- PT 11+69.80
Ⓑ S 29° 24' 34.8" E









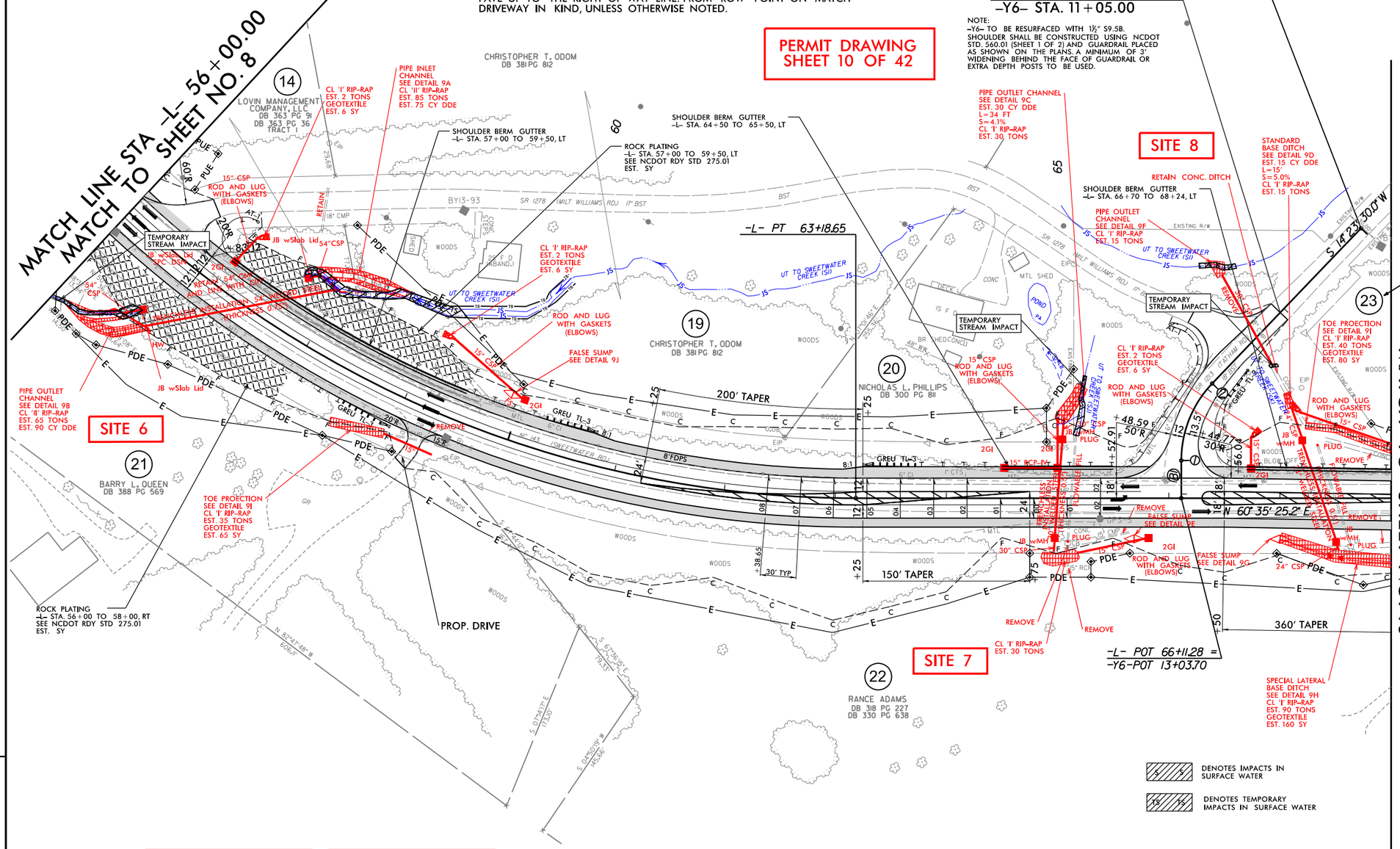
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

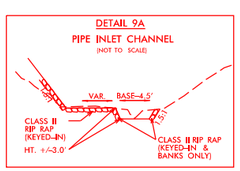
PERMIT DRAWING SHEET 10 OF 42

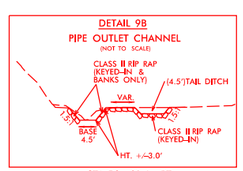
BEGIN CONSTRUCTION
-Y6- STA. 11+05.00

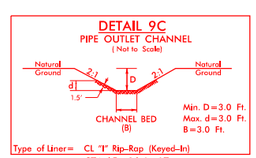
NOTE:
-Y6- TO BE RESURFACED WITH 1½" S9.5B. SHOULDER SHALL BE CONSTRUCTED USING NCDOT STD. 560.01 (SHEET 1 OF 2) AND GUARDRAIL PLACED AS SHOWN ON THE PLANS. A MINIMUM OF 3' WIDENING BEHIND THE FACE OF GUARDRAIL OR EXTRA DEPTH POSTS TO BE USED.

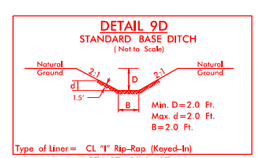
-Y6- POT 10+00.00

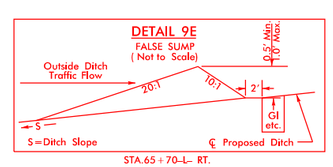


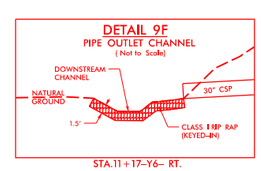












FOR -L- PROFILE, SEE SHEET NO. 22

REVISIONS

8/17/99

8/13/2021
R:\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_09.dgn
Hardbenger

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

-Y3- CURVE DATA
PI Sta 12+33.55
Δ = 43° 48' 04.8" (LT)
D = 57° 17' 44.8"
L = 76.45'
T = 40.20'
R = 100.00'
① -Y3- PC 12+93.35
② -Y3- PT 11+69.80
Ⓑ S 29° 24' 34.8" E

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 11 OF 42

BEGIN CONSTRUCTION
-Y6- STA. 11+05.00

NOTE:
-Y6- TO BE RESURFACED WITH 1½" S9.5B. SHOULDER SHALL BE CONSTRUCTED USING NCDOT STD. 560.01 (SHEET 1 OF 2) AND GUARDRAIL PLACED AS SHOWN ON THE PLANS. A MINIMUM OF 3' WIDENING BEHIND THE FACE OF GUARDRAIL OR EXTRA DEPTH POSTS TO BE USED.

-Y6- POT 10+00.00

NAD 83/2011

MATCH LINE STA -L- 56+00.00
MATCH TO SHEET NO. 8

MATCH LINE STA -L- 68+00.00
MATCH TO SHEET NO. 10

SITE 6

SITE 7

SITE 8

-L- PT 63+18.65

-L- POT 66+11.28 =
-Y6-POT 13+03.70

200' TAPER

150' TAPER

360' TAPER

S 14°23'30.0" W

N 60°35'25.2" E

CHRISTOPHER T. ODOM
DB 381 PG 812

LOVIN MANAGEMENT COMPANY, LLC
DB 363 PG 91
DB 363 PG 36
TRACT 1

NICHOLAS L. PHILLIPS
DB 300 PG 811

BILLY K. ANDERSON
DB 149 PG 543

BARRY L. QUEEN
DB 388 PG 569

RANCE ADAMS
DB 318 PG 227
DB 330 PG 638

PIPE INLET CHANNEL
SEE DETAIL 9A
CL "H" RIP-RAP
EST. 95 TONS
EST. 75 CY DDE

CL "I" RIP-RAP
EST. 2 TONS
GEOTEXTILE
EST. 6 SY

SHOULDER BERM GUTTER
-L- STA. 57+00 TO 59+50, LT

ROCK PLATING
-L- STA. 57+00 TO 59+50, LT
SEE NCDOT RDY STD 275.01
EST. SY

TEMPORARY STREAM IMPACT

15" CSP
ROD AND LUG WITH GASKETS (ELBOWS)

FALSE SUMP
SEE DETAIL 9J

PIPE OUTLET CHANNEL
SEE DETAIL 9B
CL "H" RIP-RAP
EST. 65 TONS
EST. 90 CY DDE

TOE PROECTION
SEE DETAIL 9I
CL "I" RIP-RAP
EST. 35 TONS
GEOTEXTILE
EST. 65 SY

ROCK PLATING
-L- STA. 56+00 TO 58+00, RT
SEE NCDOT RDY STD 275.01
EST. SY

PROP. DRIVE

PIPE OUTLET CHANNEL
SEE DETAIL 9C
EST. 30 CY DDE
L=34 FT
S=4.1%
CL "I" RIP-RAP
EST. 30 TONS

SHOULDER BERM GUTTER
-L- STA. 64+50 TO 65+50, LT

SHOULDER BERM GUTTER
-L- STA. 66+70 TO 68+24, LT

PIPE OUTLET CHANNEL
SEE DETAIL 9F
CL "I" RIP-RAP
EST. 15 TONS

RETAIN CONC. DITCH

STANDARD BASE DITCH
SEE DETAIL 9D
EST. 15 CY DDE
L=15'
S=5.0%
CL "I" RIP-RAP
EST. 15 TONS

TOE PROECTION
SEE DETAIL 9I
CL "I" RIP-RAP
EST. 40 TONS
GEOTEXTILE
EST. 80 SY

FALSE SUMP
SEE DETAIL 9G

CL "I" RIP-RAP
EST. 30 TONS

SPECIAL LATERAL BASE DITCH
SEE DETAIL 9H
CL "I" RIP-RAP
EST. 90 TONS
GEOTEXTILE
EST. 160 SY

UT TO SWEETWATER CREEK (SI)

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 9A
PIPE INLET CHANNEL
(NOT TO SCALE)
CLASS II RIP RAP (KEYED-IN)
HT. +/-3.0'
CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
STA.58+10-L- LT.

DETAIL 9B
PIPE OUTLET CHANNEL
(NOT TO SCALE)
CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
(4.5')TAIL DITCH
BASE 4.5'
HT. +/-3.0'
CLASS II RIP RAP (KEYED-IN)
STA.56+60-L- RT.

DETAIL 9C
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground
CHANNEL BED (B)
Min. D=3.0 Ft.
Max. d=3.0 Ft.
B=3.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA.65+06-L- LT.

DETAIL 9D
STANDARD BASE DITCH
(Not to Scale)
Natural Ground
Min. D=2.0 Ft.
Max. d=2.0 Ft.
B=2.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA.67+10-L- LT.

DETAIL 9E
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
STA.65+70-L- RT.

DETAIL 9F
PIPE OUTLET CHANNEL
(Not to Scale)
DOWNSTREAM CHANNEL
NATURAL GROUND
30" CSP
CLASS II RIP RAP (KEYED-IN)
STA.11+17-Y6- RT.

DETAIL 9G
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
STA. 67+00-L- RT.

DETAIL 9H
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Fill Slope
Geotextile
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
Type of Liner= CL "I" Rip-Rap
FROM STA.67+00 TO STA.68+00-L- RT.

DETAIL 9I
TOE PROTECTION
(Not to Scale)
NATURAL GROUND
FILL SLOPE
GEOTEXTILE
d= 1.5 Ft.
Type of Liner= CL "I" Rip-Rap
FROM STA.58+50 TO STA.58+96-L- RT.
FROM STA.67+20 TO STA.68+00-L- LT.

DETAIL 9J
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
FROM STA.59+90-L- LT.

FOR -L- PROFILE, SEE SHEET NO. 22

8/17/2021
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Usersbenepr

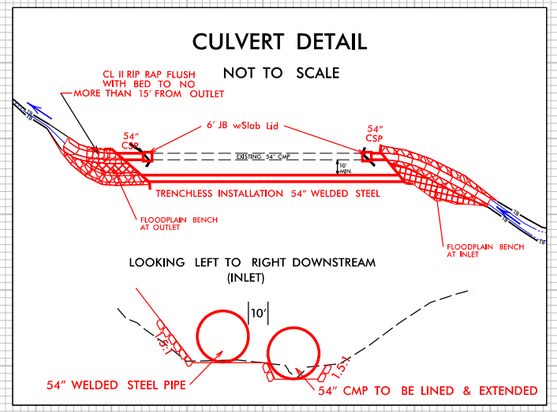
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

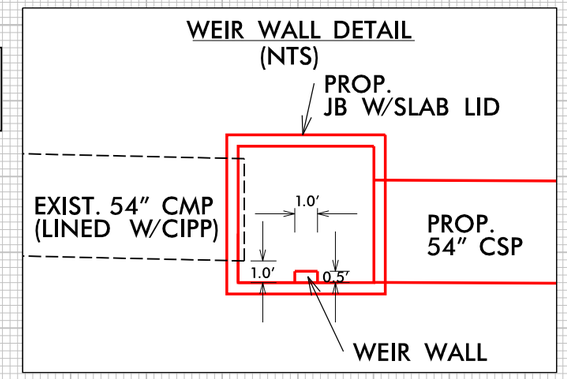
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

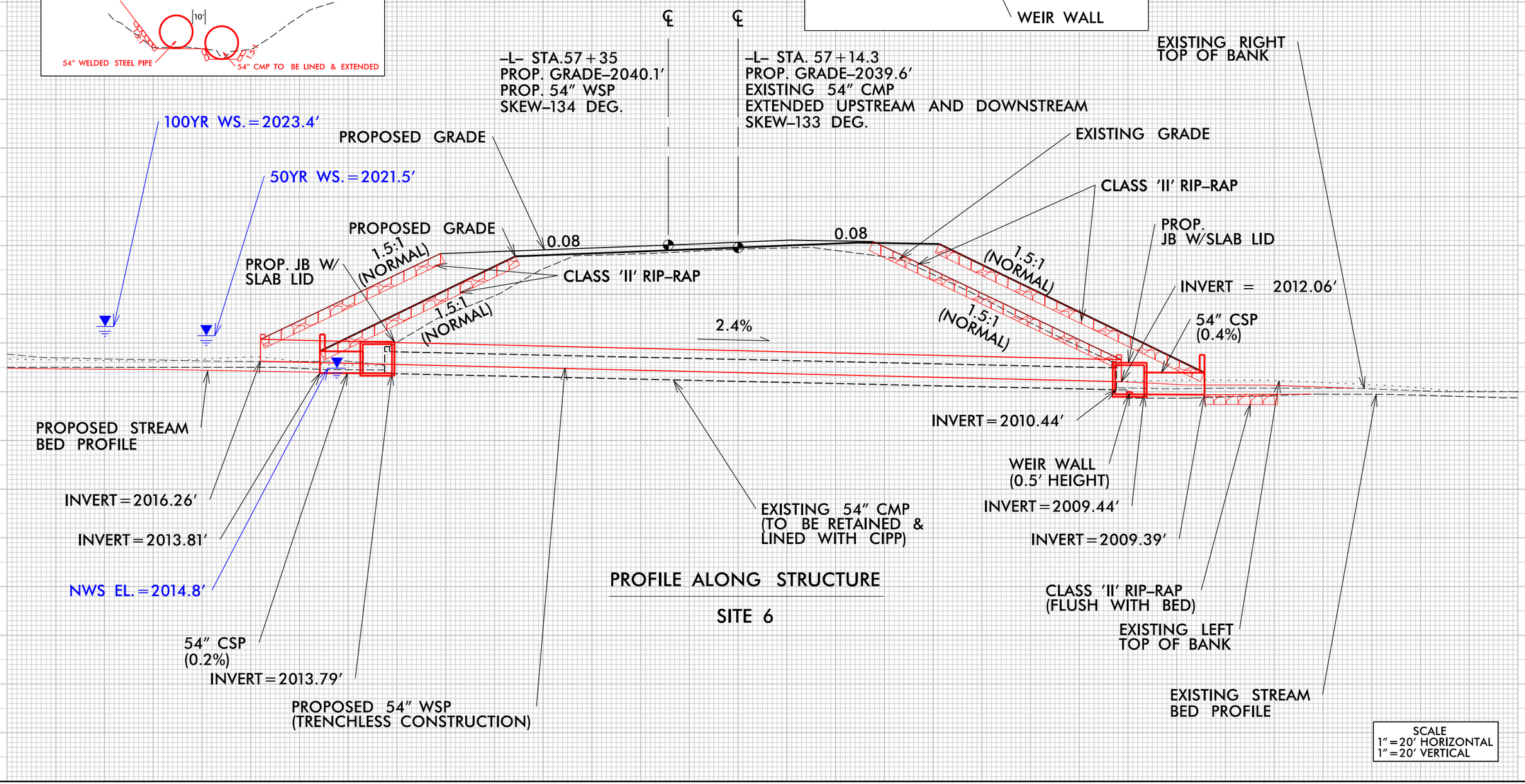
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 12 OF 42

–L–
NC 143







PROFILE ALONG STRUCTURE

SITE 6

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 98+90.11
Δ = 65° 35' 01.6" (LT)
D = 5° 58' 05.9"
L = 1,098.87'
T = 618.49'
R = 960.00'
SE = 0.08
DS = 55 MPH

MATCH LINE STA -L- 96+00.00
MATCH TO SHEET NO. 11

MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 13

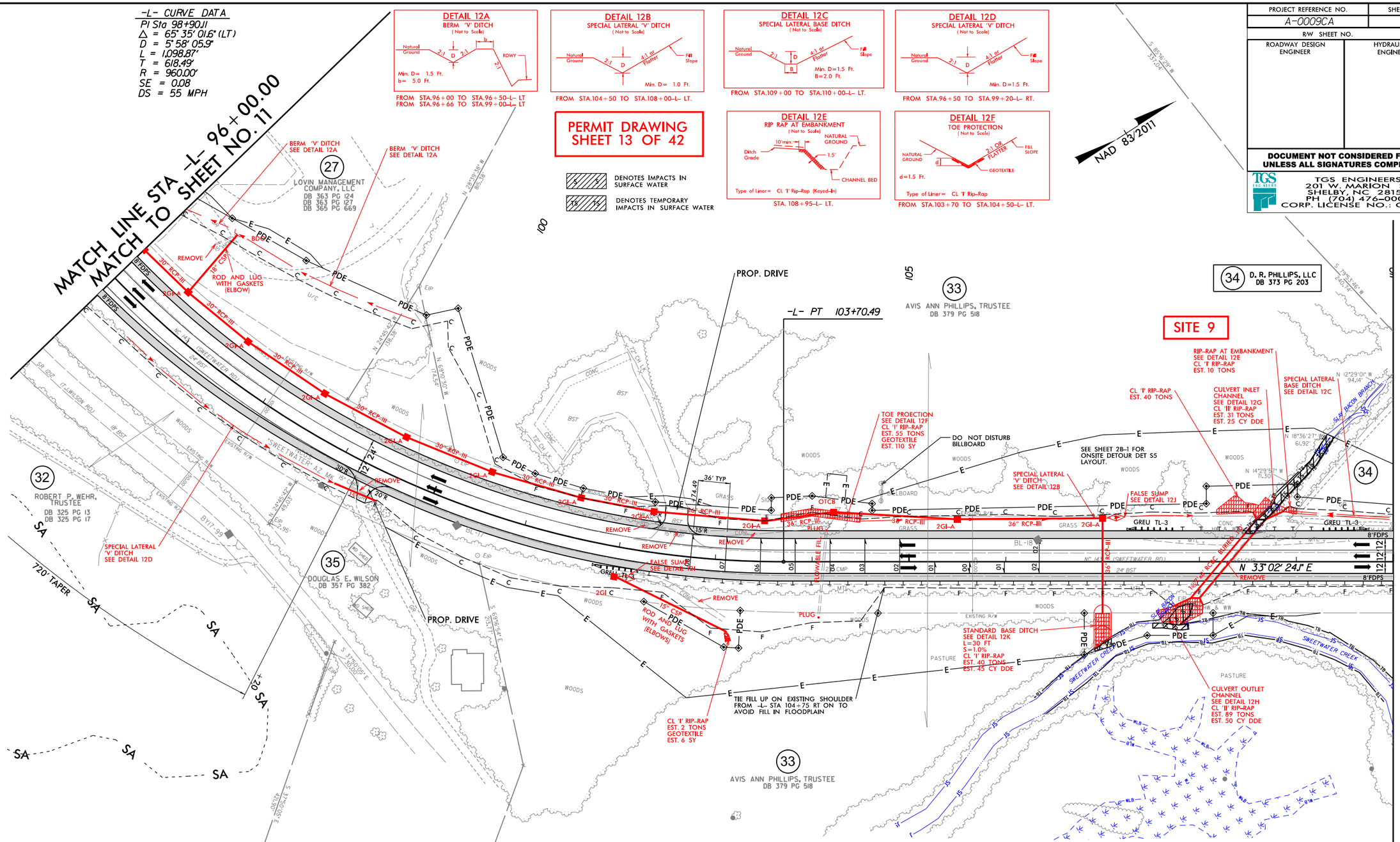
NAD 83/2011

PERMIT DRAWING SHEET 13 OF 42

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 9



DETAIL 12A
BERM 'V' DITCH
(Not to Scale)
Min. D= 1.5 Ft.
b= 5.0 Ft.
FROM STA.96+00 TO STA.96+50-L- LT
FROM STA.96+66 TO STA.99+00-L- LT

DETAIL 12B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1.0 Ft.
FROM STA.104+50 TO STA.108+00-L- LT.

DETAIL 12C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
B=2.0 Ft.
FROM STA.109+00 TO STA.110+00-L- LT.

DETAIL 12D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
FROM STA.96+50 TO STA.99+20-L- RT.

DETAIL 12E
RIP RAP AT EMBANKMENT
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 108+95-L- LT.

DETAIL 12F
TOE PROTECTION
(Not to Scale)
d=1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.103+70 TO STA.104+50-L- LT.

DETAIL 12G
CULVERT INLET CHANNEL
(Not to Scale)
Length=24 Ft.
d=5 Ft. Min.
STA.108+75-L- LT.

DETAIL 12H
CULVERT OUTLET CHANNEL
(Not to Scale)
TOP OF RIP RAP IN BASE TO BE EVEN W/STREAM BED. MIN. 0.5% CHANNEL SLOPE TO SWEETWATER CREEK.
Length=35 Ft.
d=4 Ft. Min.
STA.107+85-L- RT.

DETAIL 12I
FALSE SUMP
(Not to Scale)
S=Ditch Slope
STA.102+00-L- RT.

DETAIL 12J
FALSE SUMP
(Not to Scale)
S=Ditch Slope
STA.107+15-L- LT.

DETAIL 12K
STANDARD BASE DITCH
(Not to Scale)
Min. D=3.0 Ft.
Max. d=3.0 Ft.
B=3.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA.107+00-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 23

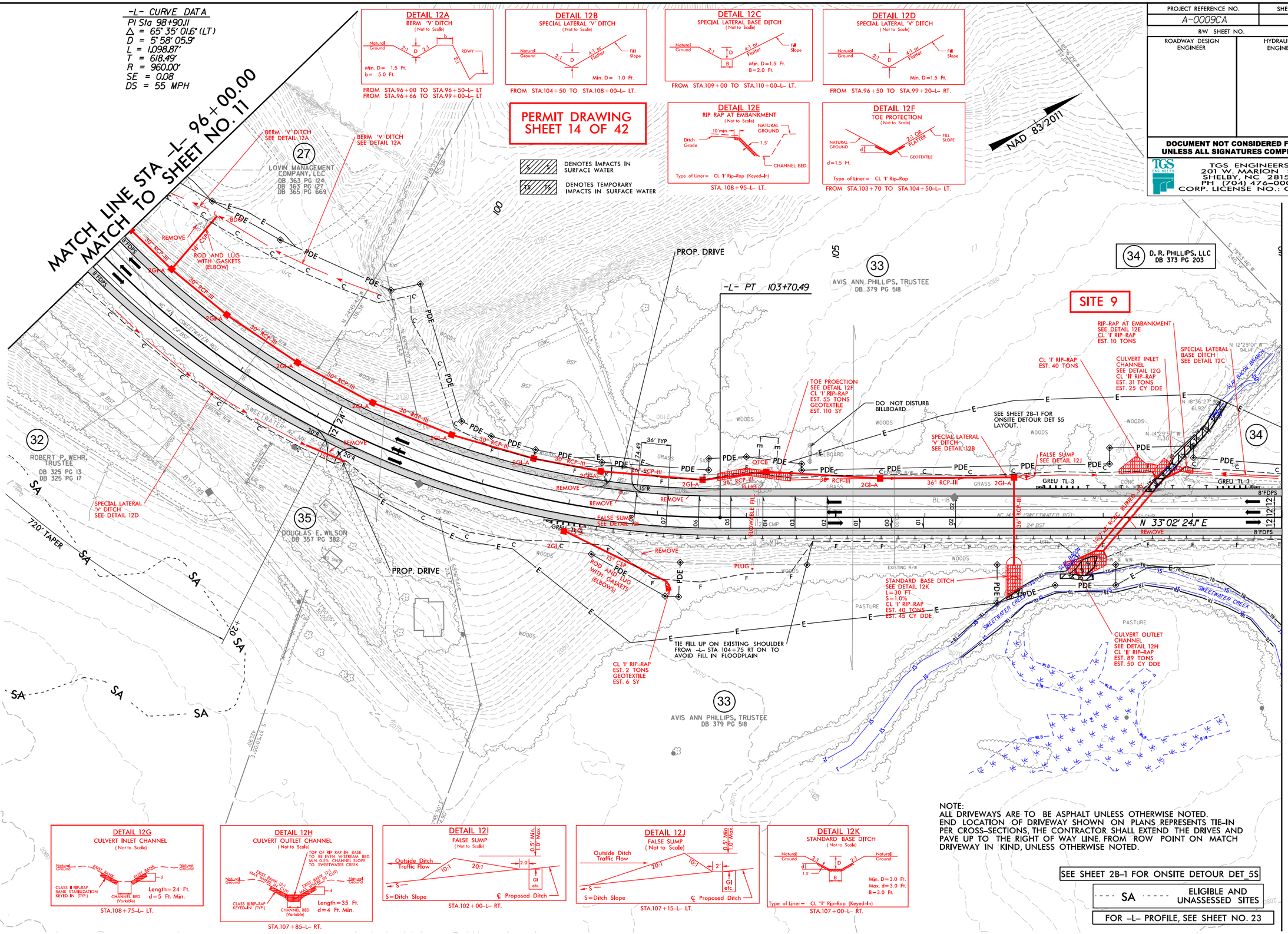
10/6/2021
X:\ROOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_12.dgn
User:bhenson

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA
PI Sta 98+90.11
△ = 65° 35' 01.6" (LT)
D = 5° 58' 05.9"
L = 1,098.87'
T = 618.49'
R = 960.00'
SE = 0.08
DS = 55 MPH



NOTE:
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SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA — ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 23

REVISIONS 8/17/99

10/16/2021
X:\R0001\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_12_con.dgn
User:bbrooks

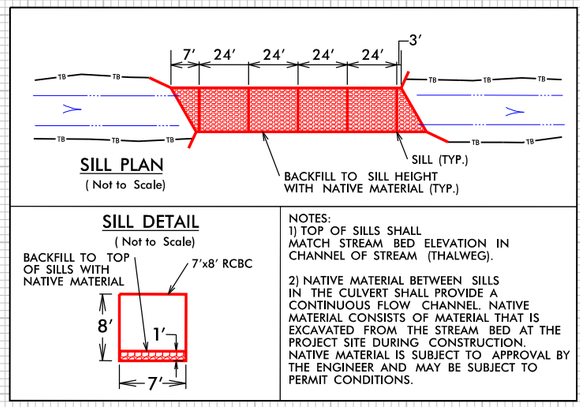
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

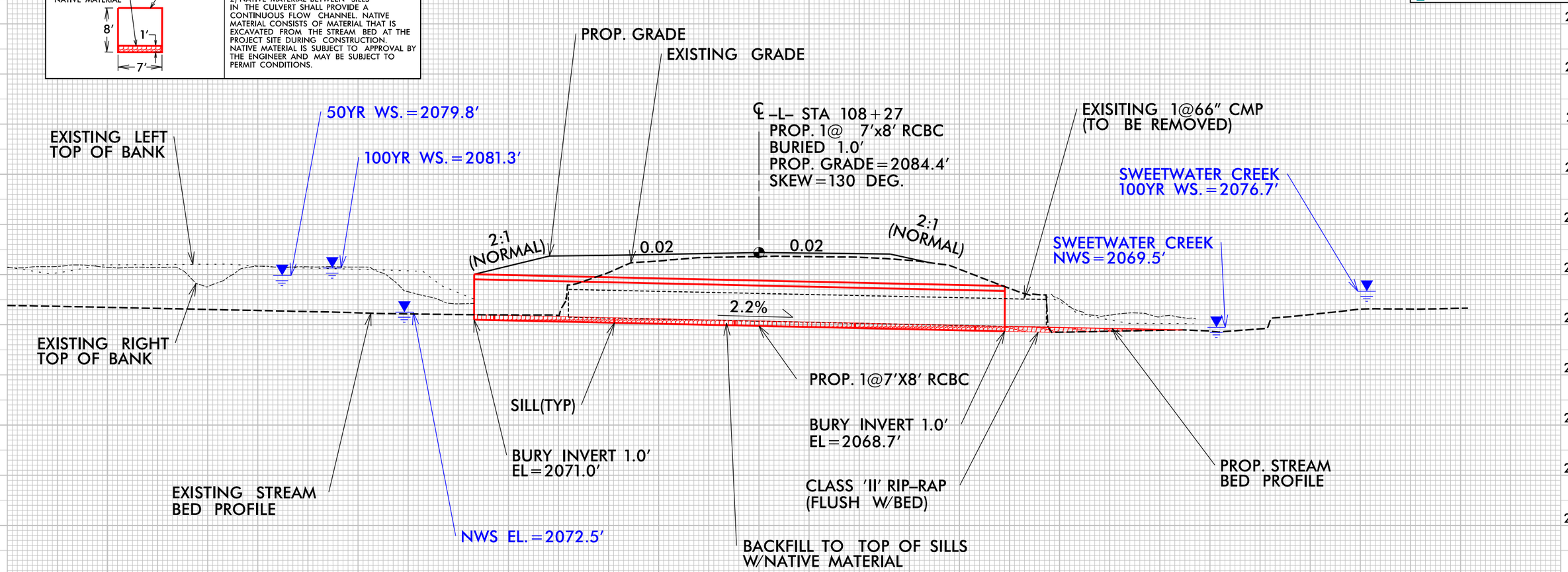
PERMIT DRAWING
SHEET 15 OF 42

-L-
NC 143



NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS 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.



PROFILE ALONG STRUCTURE

SITE 9

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA

PI Sta 117+87.67
△ = 39° 02' 13.1" (RT)
D = 5° 30' 33.2"
L = 708.58'
T = 368.66'
R = 1,040.00'
SE = 0.08
DS = 55 MPH

DETAIL 13A
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, B, 4:1 or Flatter, Fill Slope
Min. D=1.5 Ft.
B=2.0 Ft.
FROM STA.110+00 TO STA.110+50-L- LT.

DETAIL 13B
TOE PROTECTION
(Not to Scale)
NATURAL GROUND, d, 2:1 OR FLATTER, FILL SLOPE, GEOTEXTILE
d=1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.114+50 TO STA.116+00-L- LT.

DETAIL 13C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, B, 4:1 or Flatter, Fill Slope, Geotextile
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.118+50 TO STA.119+50-L- RT.

DETAIL 13D
TOE PROTECTION
(Not to Scale)
NATURAL GROUND, d, 2:1 OR FLATTER, FILL SLOPE, GEOTEXTILE
d=1.5 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.119+50 TO STA.120+50-L- RT.

DETAIL 13E
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow, 10:1, 20:1, 2.0', 0.5' Min. 1.0' Max, G1 etc.
S=Ditch Slope
℄ Proposed Ditch
STA.120+10-L- LT.

PERMIT DRAWING
SHEET 16 OF 42

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 12

SITE 10

SPECIAL LATERAL BASE DITCH SEE DETAIL 13A

PROP. DRIVE

RETAIN AND EXTEND 3@11'x9' RCBC AT INLET

3@11'x9' RCBC EXTENSION

TOE PROECTION SEE DETAIL 13B CL 'I' RIP-RAP EST. 75 TONS GEOTEXTILE EST. 165 SY

CULVERT INLET CHANNEL SEE DETAIL 13F CL 'II' RIP-RAP EST. 90 TONS EST. 15 CY DDE

TEMPORARY STREAM IMPACT

CULVERT OUTLET CHANNEL SEE DETAIL 13G CL 'II' RIP-RAP EST. 50 TONS EST. 90 CY DDE

RETAIN

REMOVE

CL 'I' RIP-RAP EST. 11 TONS GEOTEXTILE EST. 21 SY

RETAIN EXIST. CONC. DITCH

SPECIAL LATERAL BASE DITCH SEE DETAIL 13C CL 'I' RIP-RAP EST. 80 TONS GEOTEXTILE EST. 120 SY

TOE PROECTION SEE DETAIL 13D CL 'B' RIP-RAP EST. 30 TONS GEOTEXTILE EST. 90 SY

CL 'B' RIP-RAP EST. 1 TON GEOTEXTILE EST. 5 SY

ROD AND LUG WITH GASKETS BELOW CMP

FALSE SUMP SEE DETAIL 13E

FLOWABLE FILL

PLUG

34 D. R. PHILLIPS, LLC DB 373 PG 203

33 AVIS ANN PHILLIPS, TRUSTEE DB 379 PG 518

36 GILBERT D. LANCE, ET AL DB 364 PG 530 (DB 57 PG 356)

-L- PC 114+19.01

-L- PT 121+27.59

BM#6 ELEV. 2100.03' -BL- STA. 113+70.00 17' RT. SPIKE NAIL SET IN BASE OF 24" WHITE OAK

N 33°02'24.1" E

N 72°04'37.2" E

MATCH LINE STA -L- 124+00.00
MATCH TO SHEET NO. 14

DETAIL 13F
CULVERT INLET CHANNEL
Looking Downstream (Not to Scale)
REMOVE EXISTING SILTED MATERIAL FROM EACH BARREL, 3@11'x9' RCBC, Approx. Natural Ground @ Exist. Face, Natural Ground, d, MAX, CLASS II RIP-RAP BANK STABILIZATION KEYED-IN (TYP.)
Length=48 Ft.
Min. d=4 Ft.
STA.114+10-L- LT.

DETAIL 13G
CULVERT OUTLET CHANNEL
Looking Downstream (Not to Scale)
REMOVE EXISTING SILTED MATERIAL FROM EACH BARREL, 3@11'x9' RCBC, Natural Ground, d, MAX, CLASS II RIP-RAP BANK STABILIZATION KEYED-IN (TYP.), SINGLE LINE OF 3'x2'x1' BOULDERS
Length=66 Ft.
Min. d=4 Ft.
STA.113+45-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 24

REVISIONS

8/17/99

8/17/2021
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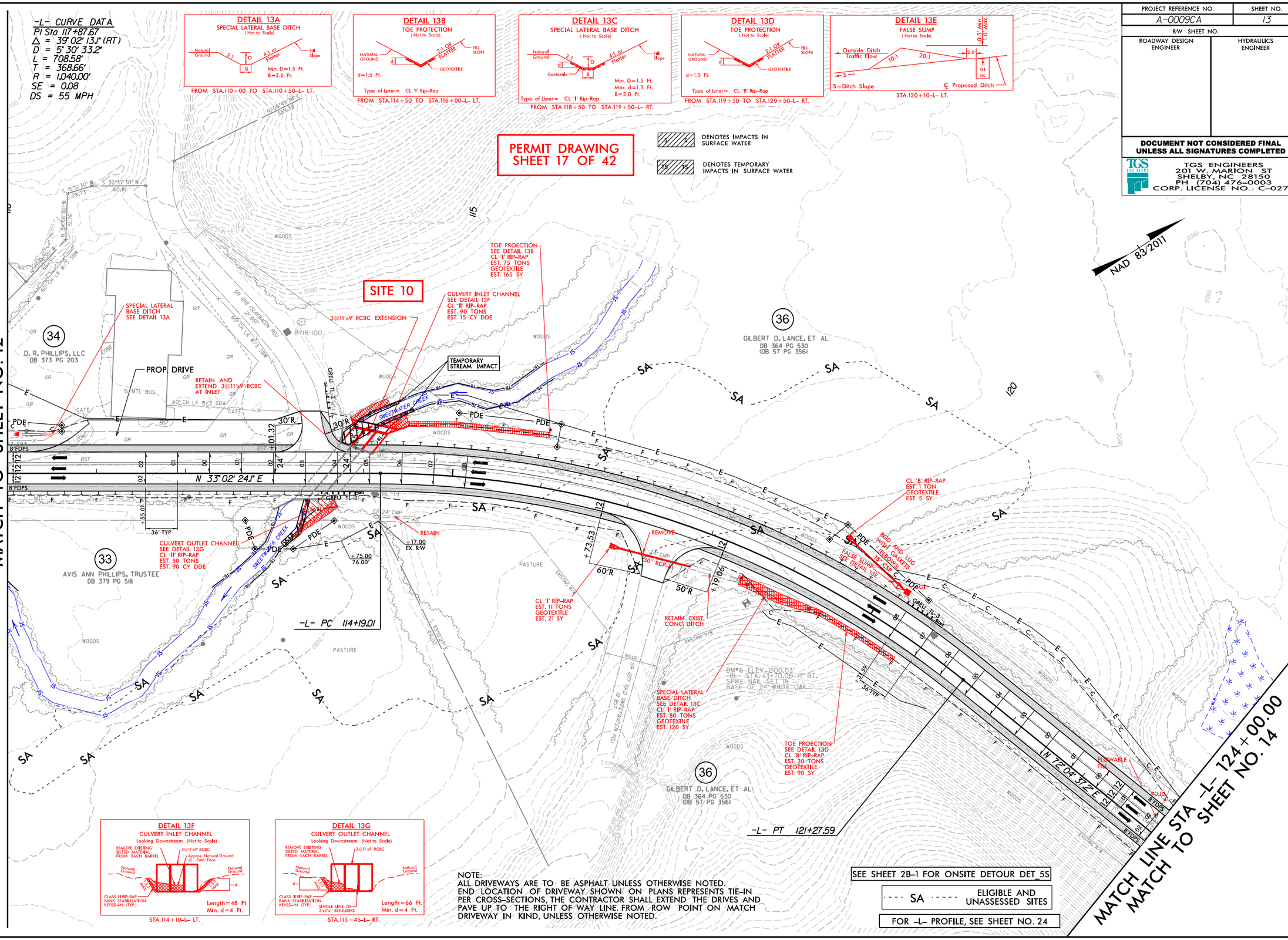
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA
PI Sta 117+87.67
△ = 39° 02' 13.1" (RT)
D = 5° 30' 33.2"
L = 708.58'
T = 368.66'
R = 1,040.00'
SE = 0.08
DS = 55 MPH



NOTE:
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SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 24

REVISIONS

8/17/99

8/17/2021
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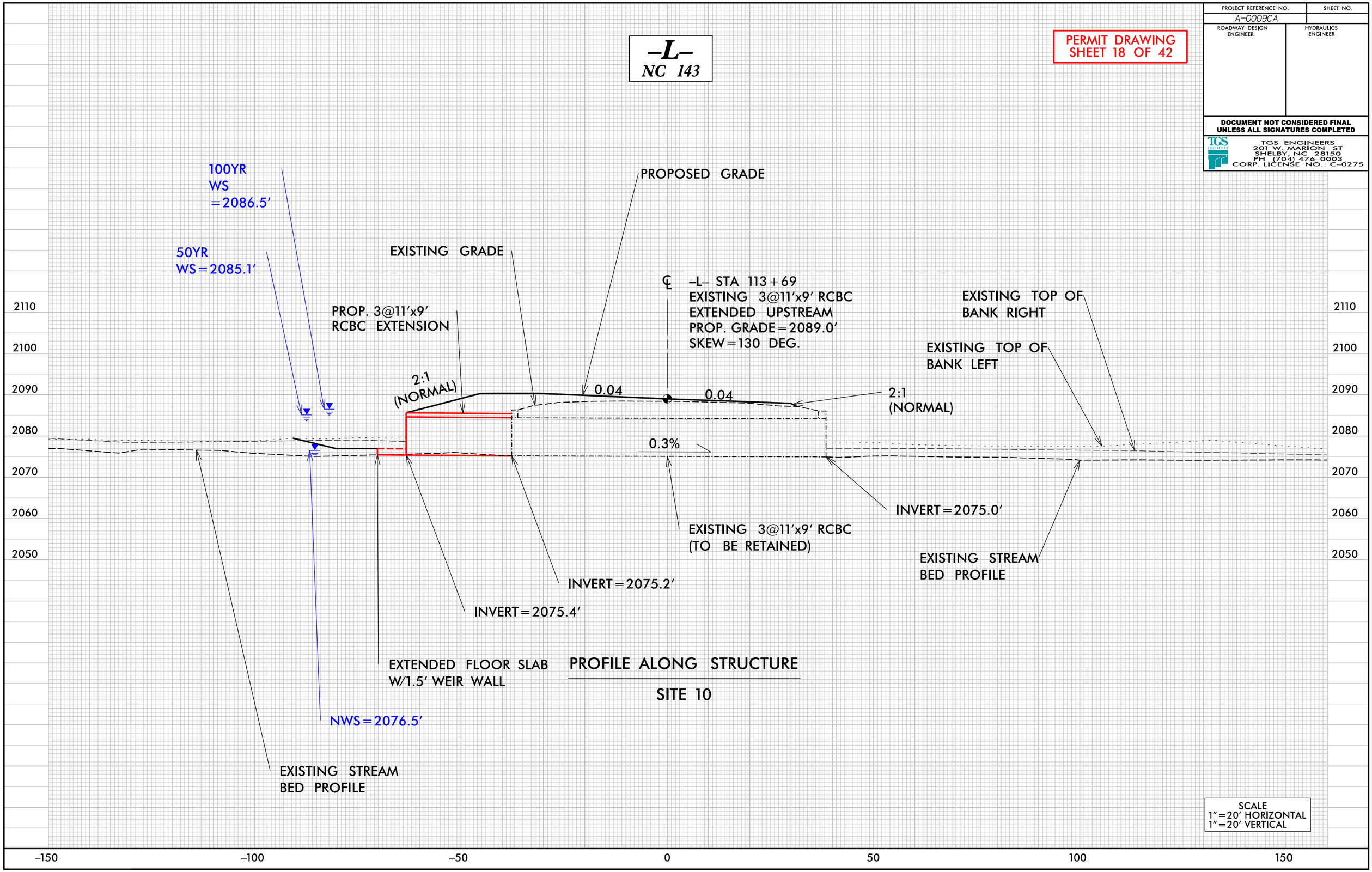
Hasbhenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 18 OF 42

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



PROFILE ALONG STRUCTURE

SITE 10

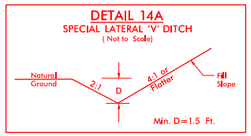
SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

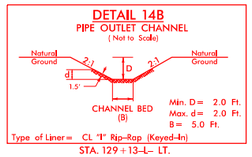
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

DETAIL 14A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



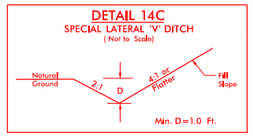
FROM STA.127+00 TO STA.127+25-L- LT.
FROM STA.127+80 TO STA.128+00-L- LT.

DETAIL 14B
PIPE OUTLET CHANNEL
(Not to Scale)



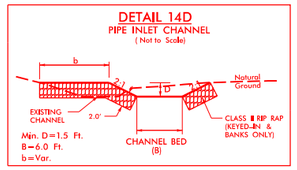
STA. 129+13-L- LT.

DETAIL 14C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



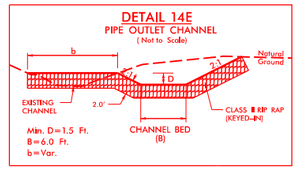
FROM STA.129+50 TO STA.130+70-L- LT.
FROM STA.131+50 TO STA.132+00-L- LT.
FROM STA.130+00 TO STA.131+00-L- RT.

DETAIL 14D
PIPE INLET CHANNEL
(Not to Scale)



STA.135+20-L- RT.

DETAIL 14E
PIPE OUTLET CHANNEL
(Not to Scale)



STA.134+40-L- LT.

NOTE:
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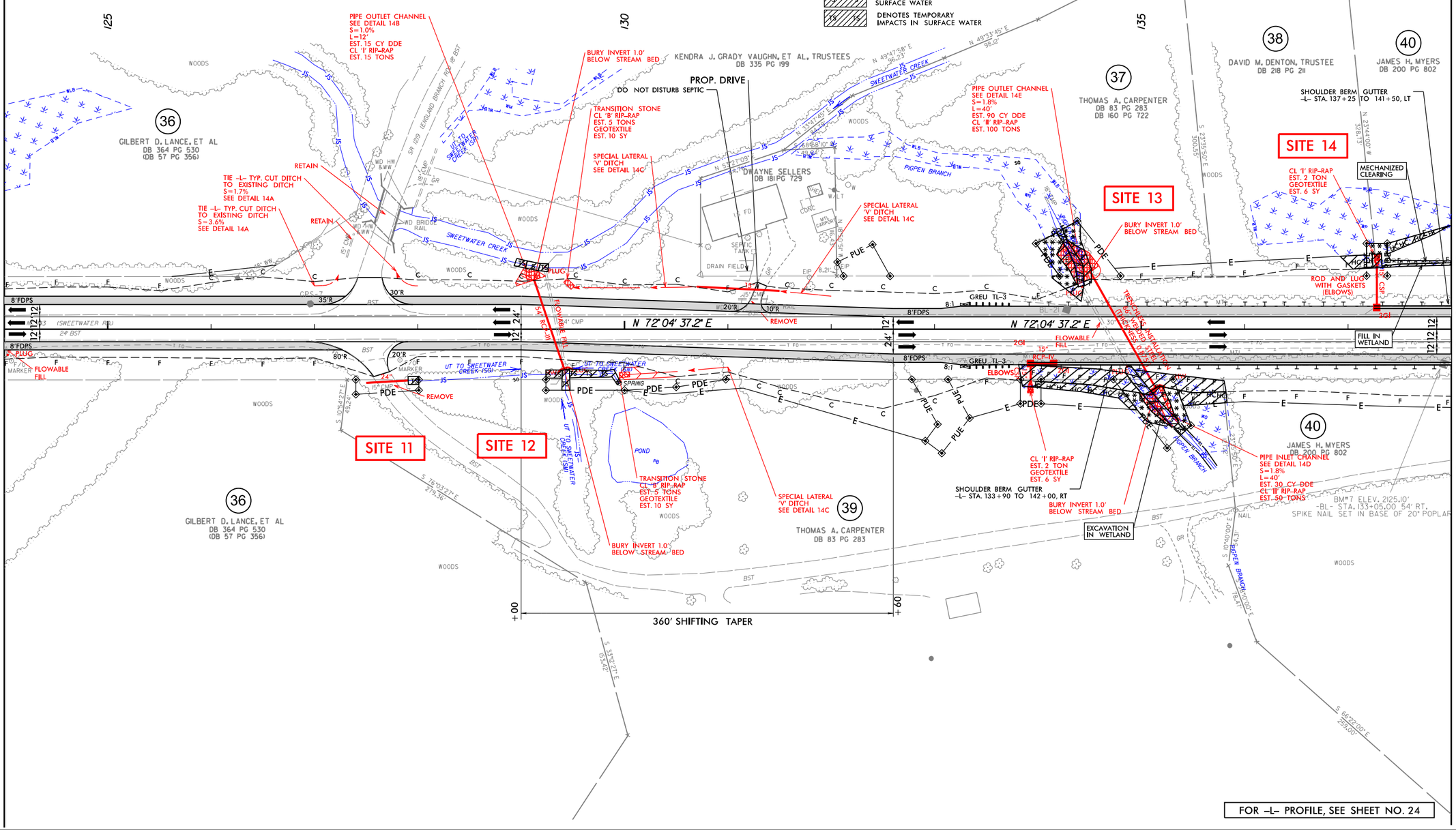
NAD 83/2011

PERMIT DRAWING SHEET 19 OF 42

E E	DENOTES EXCAVATION IN WETLAND
HC HC	DENOTES HAND CLEARING
	DENOTES MECHANIZED CLEARING
F F	DENOTES FILL IN WETLAND
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER



FOR -L- PROFILE, SEE SHEET NO. 24

REVISIONS

8/17/99

10/6/2021
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User:bbenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NAD 83/2011

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 14A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 4:1 or Flatter, Fill Slope
Min. D=1.5 Ft.
FROM STA.127+00 TO STA.127+25-L- LT.
FROM STA.127+80 TO STA.128+00-L- LT.

DETAIL 14B
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground, 2:1, D, d, 1.5', 2:1, Natural Ground
CHANNEL BED (B)
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 5.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 129+13-L- LT.

DETAIL 14C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 4:1 or Flatter, Fill Slope
Min. D=1.0 Ft.
FROM STA.129+50 TO STA.130+70-L- LT.
FROM STA.131+50 TO STA.132+00-L- LT.
FROM STA.130+00 TO STA.131+00-L- RT.

DETAIL 14D
PIPE INLET CHANNEL
(Not to Scale)
b, D, Natural Ground, EXISTING CHANNEL, 2.0', CHANNEL BED (B), CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
Min. D=1.5 Ft.
B=6.0 Ft.
b=Var.
STA.135+20-L- RT.

DETAIL 14E
PIPE OUTLET CHANNEL
(Not to Scale)
b, D, 2:1, Natural Ground, EXISTING CHANNEL, 2.0', CHANNEL BED (B), CLASS II RIP RAP (KEYED-IN)
Min. D=1.5 Ft.
B=6.0 Ft.
b=Var.
STA.134+40-L- LT.

PERMIT DRAWING SHEET 20 OF 42

E E	DENOTES EXCAVATION IN WETLAND
HC HC	DENOTES HAND CLEARING
	DENOTES MECHANIZED CLEARING
F F	DENOTES FILL IN WETLAND
S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE STA -L- 124+00.00 MATCH TO SHEET NO. 13

MATCH LINE STA -L- 138+00.00 MATCH TO SHEET NO. 15

PIPE OUTLET CHANNEL SEE DETAIL 14B S=1.0% L=12' EST. 15 CY DDE CL 'I' RIP-RAP EST. 15 TONS

BURY INVERT 1.0' BELOW STREAM BED

KENDRA J. GRADY VAUGHN, ET AL, TRUSTEES DB 335 PG 199

PROP. DRIVE

DO NOT DISTURB SEPTIC

TRANSITION STONE CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY

SPECIAL LATERAL 'V' DITCH SEE DETAIL 14C

PIPE OUTLET CHANNEL SEE DETAIL 14E S=1.8% L=40' EST. 90 CY DDE CL 'II' RIP-RAP EST. 100 TONS

THOMAS A. CARPENTER DB 83 PG 283 DB 160 PG 722

DAVID M. DENTON, TRUSTEE DB 218 PG 211

JAMES H. MYERS DB 200 PG 802

SHOULDER BERM GUTTER -L- STA. 137+25 TO 141+50, LT

SITE 14

MECHANIZED CLEARING

CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY

ROD AND LUG WITH GASKETS (ELBOWS)

GILBERT D. LANCE, ET AL DB 364 PG 530 (DB 57 PG 356)

RETAIN

TIE -L- TYP. CUT DITCH TO EXISTING DITCH S=1.7% SEE DETAIL 14A

TIE -L- TYP. CUT DITCH TO EXISTING DITCH S=3.6% SEE DETAIL 14A

SWEETWATER CREEK

DRAYNE SELLERS DB 181 PG 729

SPECIAL LATERAL 'V' DITCH SEE DETAIL 14C

SITE 13

BURY INVERT 1.0' BELOW STREAM BED

N 72°04' 37.2" E

REMOVE

FILL IN WETLAND

FLOWABLE FILL

SITE 11

SITE 12

UT TO SWEETWATER CREEK

TRANSITION STONE CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY

SPECIAL LATERAL 'V' DITCH SEE DETAIL 14C

BURY INVERT 1.0' BELOW STREAM BED

THOMAS A. CARPENTER DB 83 PG 283

CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY

SHOULDER BERM GUTTER -L- STA. 133+90 TO 142+00, RT

BURY INVERT 1.0' BELOW STREAM BED

EXCAVATION IN WETLAND

PIPE INLET CHANNEL SEE DETAIL 14D S=1.8% L=40' EST. 30 CY DDE CL 'II' RIP-RAP EST. 50 TONS

BM#7 ELEV. 2125.10 BL STA. 133+08.00 54' RT. SPIKE/NAIL SET IN BASE OF 20" POPLAR

360' SHIFTING TAPER

FOR -L- PROFILE, SEE SHEET NO. 24

REVISIONS

8/17/99

10/6/2021
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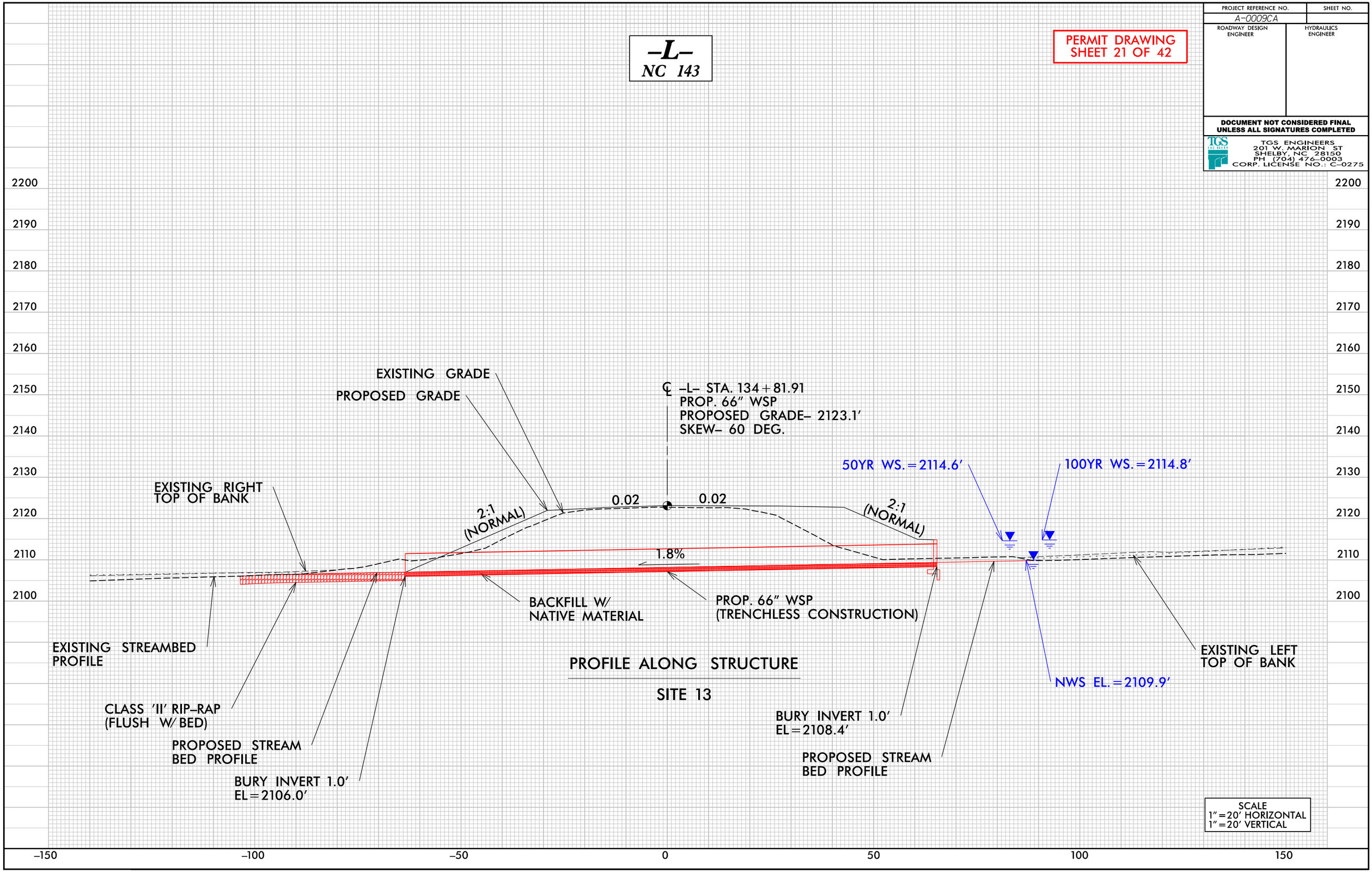
Usersbhenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 21 OF 42



PROFILE ALONG STRUCTURE

SITE 13

5/14/99

PERMIT DRAWING
SHEET 22 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

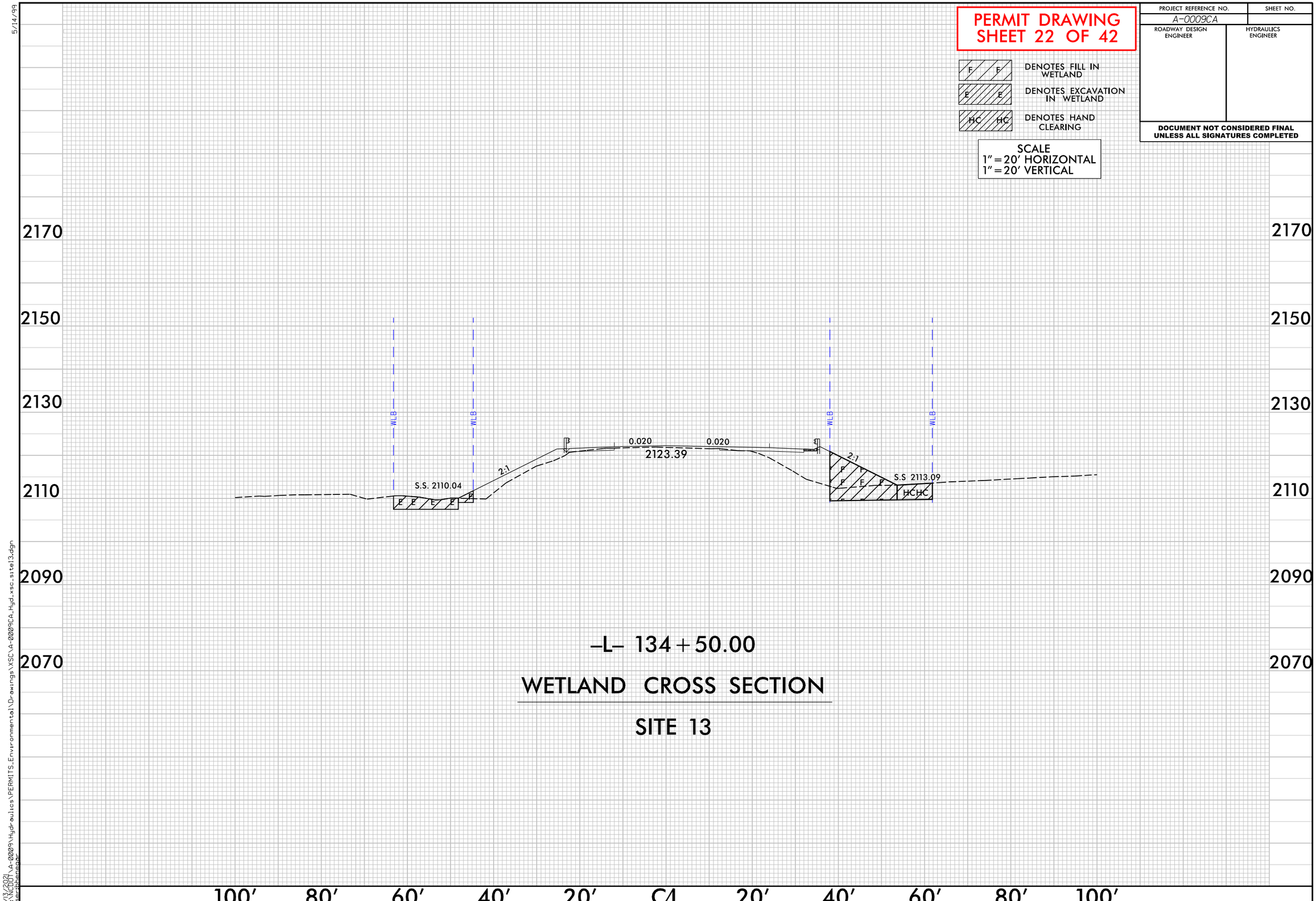
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F — DENOTES FILL IN WETLAND

E E — DENOTES EXCAVATION IN WETLAND

HC HC — DENOTES HAND CLEARING

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



–L– 134 + 50.00

WETLAND CROSS SECTION

SITE 13

8/13/2021
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User:bbenson

5/14/99

PERMIT DRAWING
SHEET 23 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

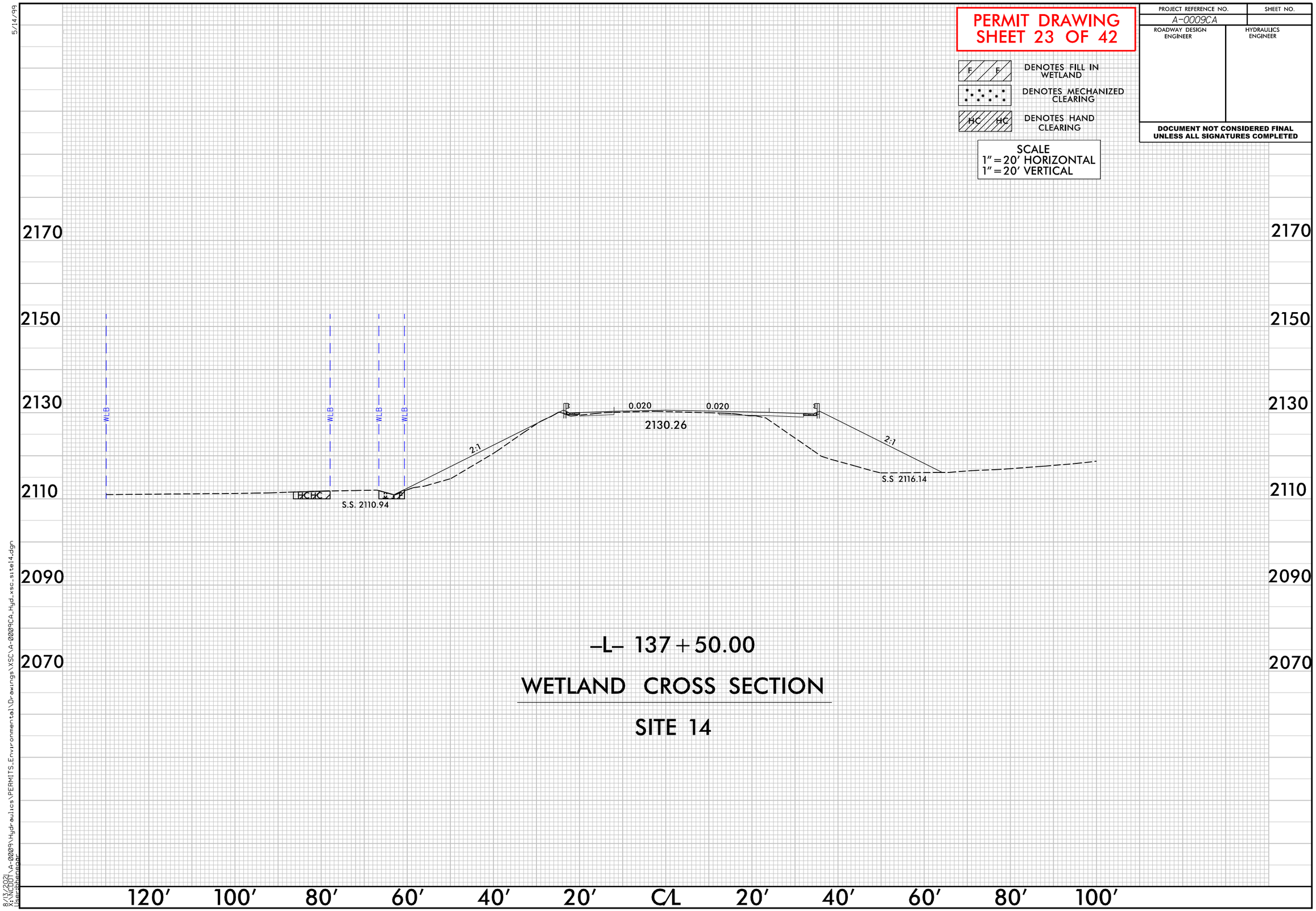
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

HC HC — DENOTES HAND CLEARING

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



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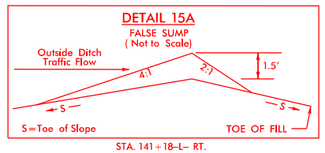
User:bhenagar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

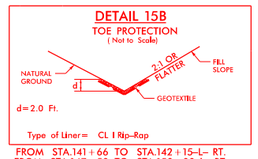
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

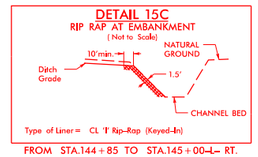
-L- CURVE DATA
PI Sta 149+87.02
Δ = 0° 52' 26.7" (LT)
D = 0° 28' 38.9"
L = 183.07'
T = 91.54'
R = 12,000.00'
SE = NC
DS = 60 MPH



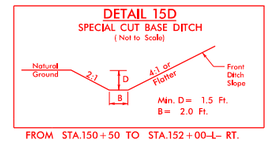
STA. 141+18-L- RT.



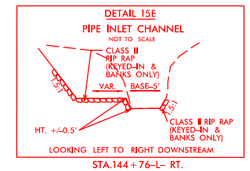
FROM STA.141+66 TO STA.142+15-L- RT.
FROM STA.147+50 TO STA.150+00-L- RT.



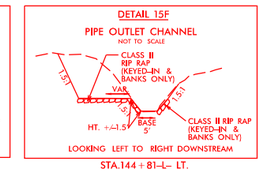
FROM STA.144+85 TO STA.145+00-L- RT.



FROM STA.150+50 TO STA.152+00-L- RT.



STA.144+76-L- RT.



STA.144+81-L- LT.

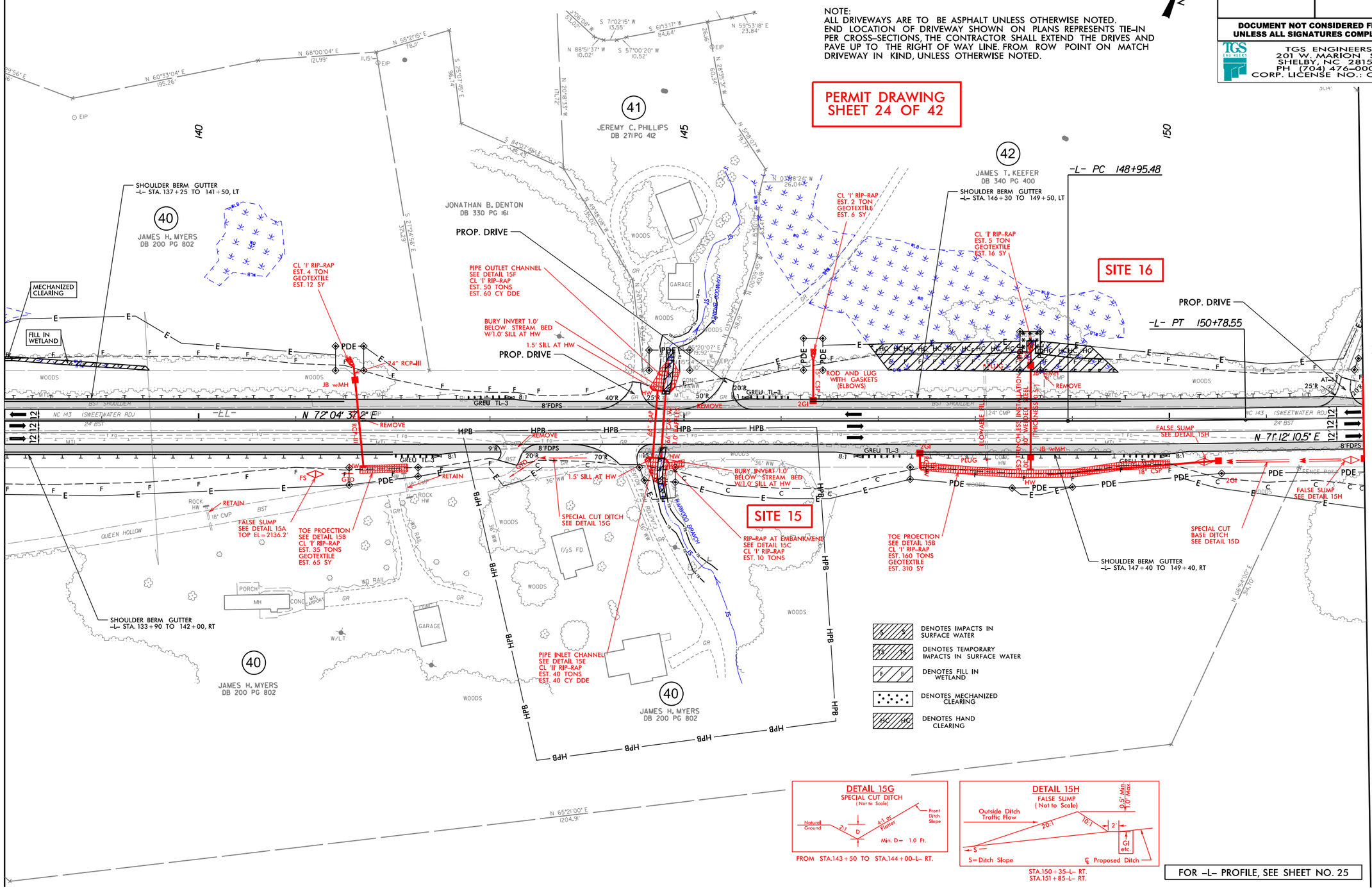
NAD 83/2011

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 24 OF 42

MATCH LINE STA -L- 138+00.00
MATCH TO SHEET NO. 14

MATCH LINE STA -L- 152+00.00
MATCH TO SHEET NO. 16



S	DENOTES IMPACTS IN SURFACE WATER
TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
HC	DENOTES HAND CLEARING

FROM STA.143+50 TO STA.144+00-L- RT.

STA.150+35-L- RT.
STA.151+85-L- RT.

FOR -L- PROFILE, SEE SHEET NO. 25

REVISIONS

8/17/99

8/17/2021
R:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_15.dgn
User:bhenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA
PI Sta 149+87.02
Δ = 0° 52' 26.7" (LT)
D = 0° 28' 38.9"
L = 183.07'
T = 91.54'
R = 12,000.00'
SE = NC
DS = 60 MPH

DETAIL 15A
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow; 4:1; 2:1; 1.5'; S; S=Toe of Slope; TOE OF FILL
STA. 141+18-L- RT.

DETAIL 15B
TOE PROTECTION
(Not to Scale)
NATURAL GROUND; d; 2:1 OR FLATTER; FILL SLOPE; GEOTEXTILE; d=2.0 Ft.
Type of Liner= CL I Rip-Rap
FROM STA.141+66 TO STA.142+15-L- RT.
FROM STA.147+50 TO STA.150+00-L- RT.

DETAIL 15C
RIP RAP AT EMBANKMENT
(Not to Scale)
10' min.; NATURAL GROUND; Ditch Grade; 1.5'; CHANNEL BED
Type of Liner= CL I Rip-Rap (Keyed-In)
FROM STA.144+85 TO STA.145+00-L- RT.

DETAIL 15D
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground; 2:1; D; B; 2:1 or Flatter; Front Ditch Slope; Min. D= 1.5 Ft.; B= 2.0 Ft.
FROM STA.150+50 TO STA.152+00-L- RT.

DETAIL 15E
PIPE INLET CHANNEL
NOT TO SCALE
CLASS II RIP RAP (KEYED-IN & BANKS ONLY); VAR; BASE-5'; 3:1; HT. +/-0.5'; CLASS I RIP RAP (KEYED-IN & BANKS ONLY)
LOOKING LEFT TO RIGHT DOWNSTREAM
STA.144+76-L- RT.

DETAIL 15F
PIPE OUTLET CHANNEL
NOT TO SCALE
CLASS II RIP RAP (KEYED-IN & BANKS ONLY); VAR; BASE 5'; 1.5:1; HT. +/-1.5'; CLASS II RIP RAP (KEYED-IN & BANKS ONLY)
LOOKING LEFT TO RIGHT DOWNSTREAM
STA.144+81-L- LT.

NAD 83/2011

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 25 OF 42

MATCH LINE STA -L- 138+00.00
MATCH TO SHEET NO. 14

MATCH LINE STA -L- 152+00.00
MATCH TO SHEET NO. 16

SITE 16

SITE 15

-L- PC 148+95.48
-L- PT 150+78.55

40 JAMES H. MYERS DB 200 PG 802
41 JEREMY C. PHILLIPS DB 271 PG 412
42 JAMES T. KEEFER DB 340 PG 400
JONATHAN B. DENTON DB 330 PG 161

SHOULDER BERM GUTTER -L- STA. 137+25 TO 141+50, LT
SHOULDER BERM GUTTER -L- STA. 146+30 TO 149+50, LT
SHOULDER BERM GUTTER -L- STA. 147+40 TO 149+40, RT
SHOULDER BERM GUTTER -L- STA. 133+90 TO 142+00, RT
MECHANIZED CLEARING
FILL IN WETLAND
PROP. DRIVE
CL 'I' RIP-RAP EST. 4 TON GEOTEXTILE EST. 12 SY
PIPE OUTLET CHANNEL SEE DETAIL 15F CL 'I' RIP-RAP EST. 50 TONS EST. 60 CY DDE
BURY INVERT 1.0' BELOW STREAM BED W/1.0' SILL AT HW
1.5' SILL AT HW
CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY
CL 'I' RIP-RAP EST. 5 TON GEOTEXTILE EST. 16 SY
ROD AND LUG WITH GASKETS (ELBOWS)
FALSE SUMP SEE DETAIL 15A TOP EL=2136.2'
TOE PROECTION SEE DETAIL 15B CL 'I' RIP-RAP EST. 35 TONS GEOTEXTILE EST. 65 SY
SPECIAL CUT DITCH SEE DETAIL 15G
RIP-RAP AT EMBANKMENT SEE DETAIL 15C CL 'I' RIP-RAP EST. 10 TONS
TOE PROECTION SEE DETAIL 15B CL 'I' RIP-RAP EST. 160 TONS GEOTEXTILE EST. 310 SY
SPECIAL CUT BASE DITCH SEE DETAIL 15D
FALSE SUMP SEE DETAIL 15H
PIPE INLET CHANNEL SEE DETAIL 15E CL 'II' RIP-RAP EST. 40 TONS EST. 40 CY DDE
24" RCP-III
18" CMP
18" CSP
8'FDPS
GREU TL-3
N 72°04' 37.2" E
N 71°12' 10.5" E
NC 143 (SWEETWATER RD)
QUEEN HOLLOW
WOODS
GARAGE
REMOVE
RETAIN

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING

DETAIL 15G
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground; 2:1; D; 4:1 or Flatter; Front Ditch Slope; Min. D= 1.0 Ft.
FROM STA.143+50 TO STA.144+00-L- RT.

DETAIL 15H
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow; 20:1; 10:1; 2'; 0.5' Min. 0.7' Max.; GI etc.; S=Ditch Slope; ℄ Proposed Ditch
STA.150+35-L- RT.
STA.151+85-L- RT.

FOR -L- PROFILE, SEE SHEET NO. 25

REVISIONS
8/17/99

8/13/2021
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Usersbhenger

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

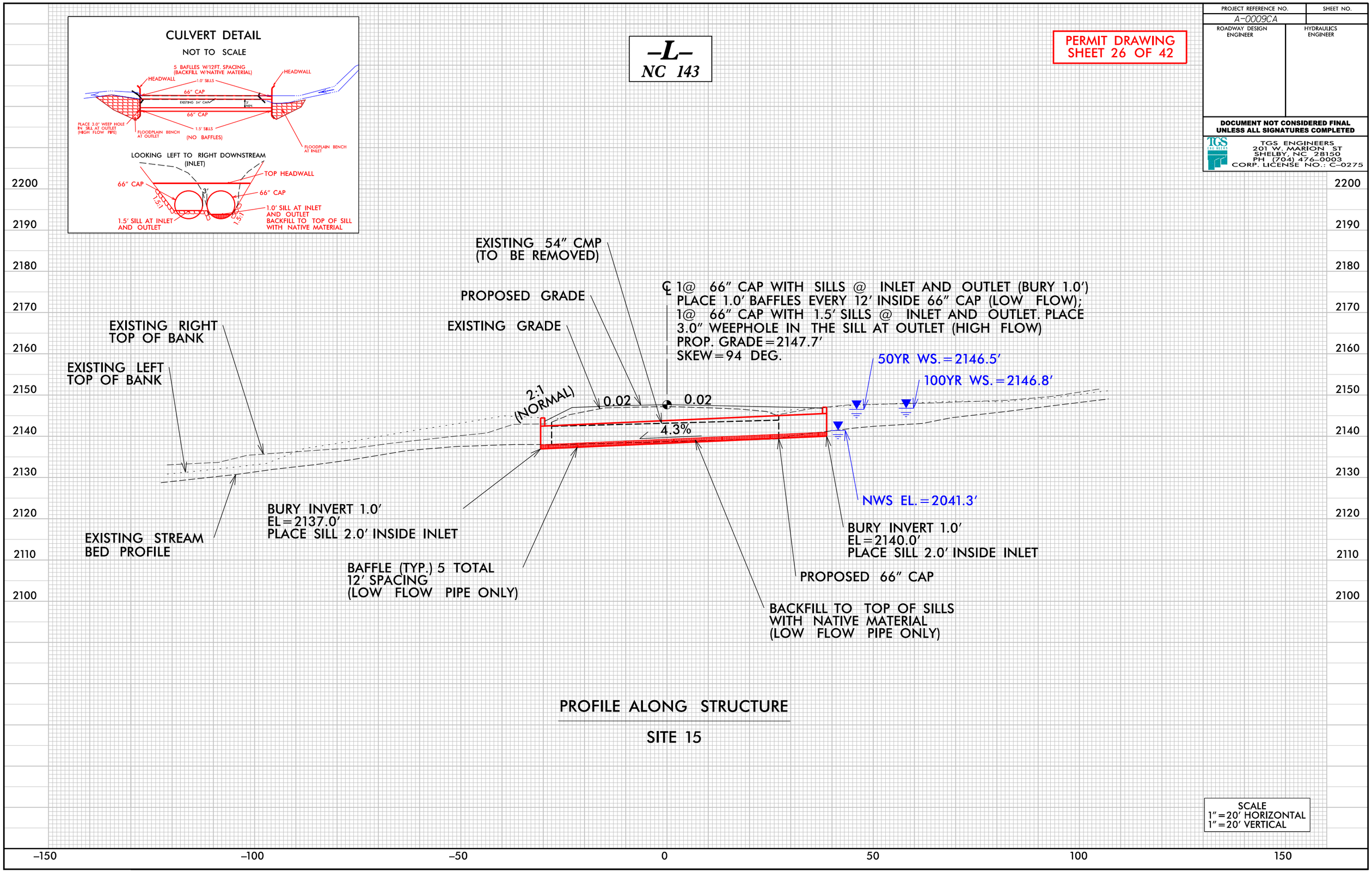
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 26 OF 42

-L-
NC 143

CULVERT DETAIL

NOT TO SCALE



PROFILE ALONG STRUCTURE

SITE 15

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

5/14/99

PERMIT DRAWING
SHEET 27 OF 42

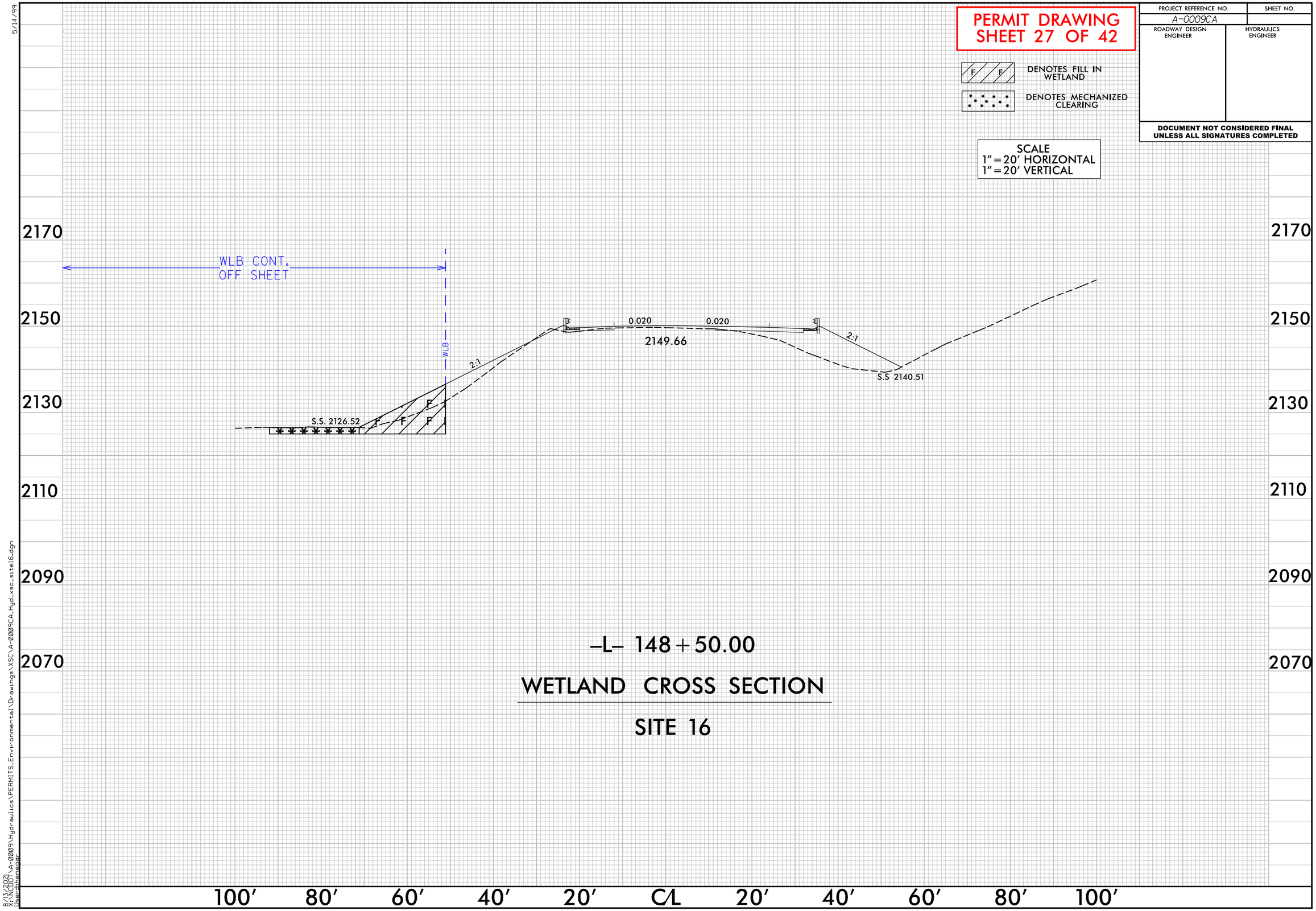
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



–L– 148 + 50.00

WETLAND CROSS SECTION

SITE 16

8/13/2021
KENCOX01
A-0009\Hydraulics\PERMITS_Environmental\Drawings\XSC\A-0009CA_Hyd_xsc_site16.dgn
User:bhenagar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA

PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

DETAIL 16A
BERM 'V' DITCH
(Not to Scale)
Min. D= 1.0 Ft.
Max. D= 1.0 Ft.
b= 5.0 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.152+50 TO STA.154+50-L- RT

DETAIL 16B
BERM BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.154+50 TO STA.156+50-L- RT.

DETAIL 16C
TOE PROTECTION
(Not to Scale)
d= 1.5 Ft.
Type of Liner= EC MATTING
FROM STA.158+00 TO STA.160+00-L- RT.

DETAIL 16D
PIPE INLET CHANNEL
(Not to Scale)
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= CL "II" Rip-Rap (Keyed-In)
STA. 160+25-L- RT.
STA. 160+40-L- RT.

DETAIL 16E
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D=VARIES
Max. d=VARIES
B=3.0 Ft.
Type of Liner= CL "II" Rip-Rap (Keyed-In)
STA.160+35-L- LT.

DETAIL 16F
PIPE INLET CHANNEL
(Not to Scale)
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 4.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 163+00-L- RT.

DETAIL 16G
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D= VARIES
Max. d= VARIES
B= 4.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 163+00-L- LT.

DETAIL 16H
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
FROM STA.157+25 TO STA.158+00-L- RT.
FROM STA.164+00 TO STA.166+00-L- RT.

NOTE:
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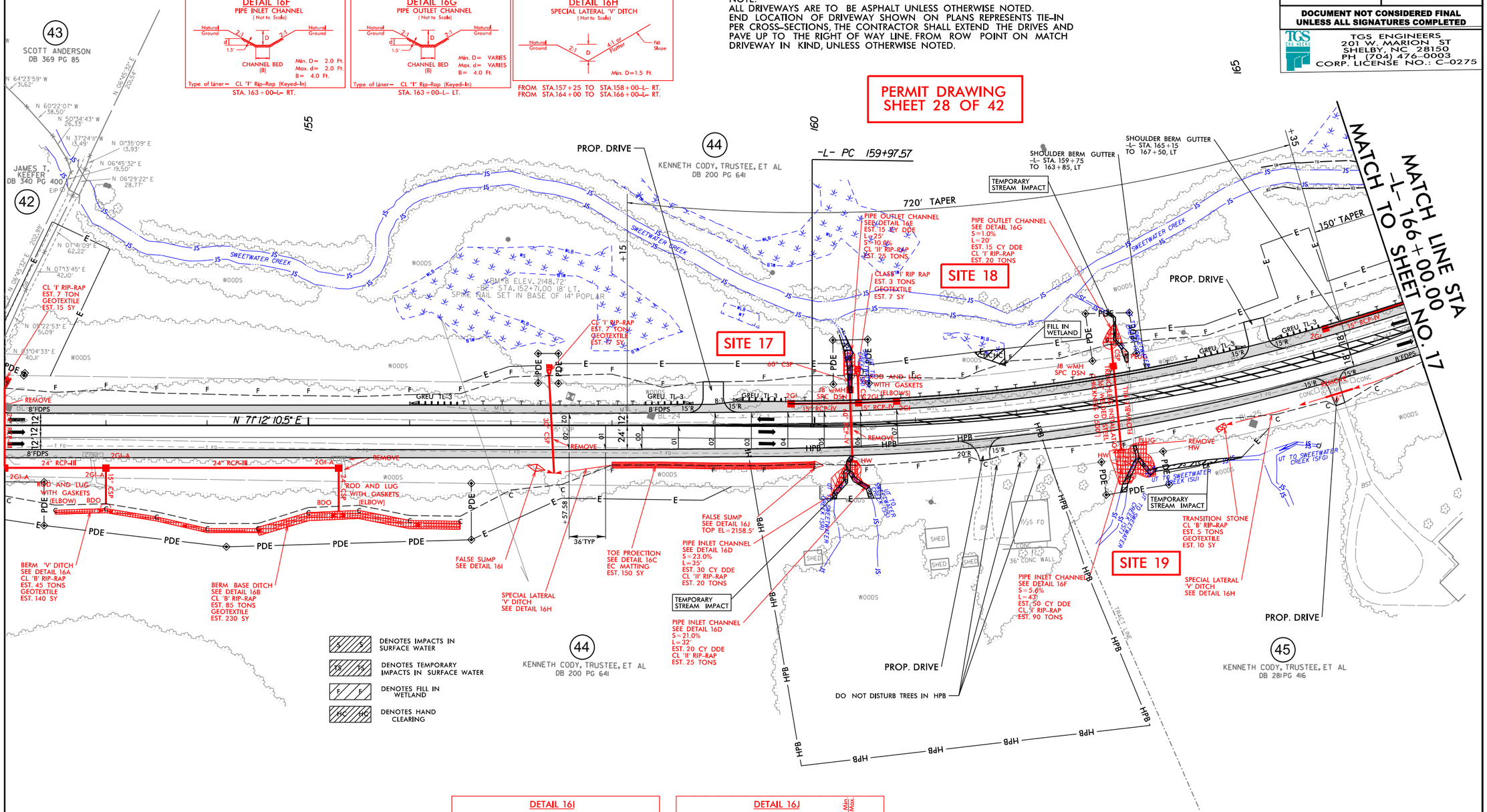
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

PERMIT DRAWING SHEET 28 OF 42



DETAIL 16I
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
STA. 157+25-L- RT.

DETAIL 16J
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
STA.160+00-L- RT.

FOR -L- PROFILE, SEE SHEET NO. 25

REVISIONS

8/17/99

8/16/2021
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User:bbenner

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA

PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

DETAIL 16A
BERM 'V' DITCH
(Not to Scale)
Min. D= 1.0 Ft.
Max. D= 1.0 Ft.
b= 5.0 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.152+50 TO STA.154+50-L- RT

DETAIL 16B
BERM BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.154+50 TO STA.156+50-L- RT.

DETAIL 16C
TOE PROTECTION
(Not to Scale)
d= 1.5 Ft.
Type of Liner= EC MATTING
FROM STA.158+00 TO STA.160+00-L- RT.

DETAIL 16D
PIPE INLET CHANNEL
(Not to Scale)
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
Type of Liner= CL "II" Rip-Rap (Keyed-In)
STA. 160+25-L- RT.
STA. 160+40-L- RT.

DETAIL 16E
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D=VARIES
Max. d=VARIES
B=3.0 Ft.
Type of Liner= CL "II" Rip-Rap (Keyed-In)
STA.160+35-L- LT.

DETAIL 16F
PIPE INLET CHANNEL
(Not to Scale)
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 4.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 163+00-L- RT.

DETAIL 16G
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D= VARIES
Max. d= VARIES
B= 4.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA. 163+00-L- LT.

DETAIL 16H
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
FROM STA.157+25 TO STA.158+00-L- RT.
FROM STA.164+00 TO STA.166+00-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

PERMIT DRAWING SHEET 29 OF 42

MATCH LINE STA -L- 166+00.00 SHEET NO. 17

MATCH LINE STA -L- 152+00.00 SHEET NO. 15

SCOTT ANDERSON DB 369 PG 85

JAMES T. KEEFER DB 340 PG 400

KENNETH CODY, TRUSTEE, ET AL DB 200 PG 641

KENNETH CODY, TRUSTEE, ET AL DB 281 PG 416

-L- PC 159+97.57

720' TAPER

150' TAPER

SHOULDER BERM GUTTER -L- STA. 159+75 TO 163+85, LT

SHOULDER BERM GUTTER -L- STA. 165+15 TO 167+50, LT

TEMPORARY STREAM IMPACT

PROP. DRIVE

SITE 17

SITE 18

SITE 19

SWEETWATER CREEK

BM#8 ELEV. 2148.72' BL STA. 152+71.00 18' LT. SPIKE NAIL SET IN BASE OF 14" POPLAR

CL 'I' RIP-RAP EST. 7 TON GEOTEXTILE EST. 15 SY

PIPE OUTLET CHANNEL SEE DETAIL 16E EST. 15 CY DDE L=25' S=10.0% CL "II" RIP-RAP EST. 25 TONS

CLASS "I" RIP RAP EST. 3 TONS GEOTEXTILE EST. 7 SY

PIPE OUTLET CHANNEL SEE DETAIL 16G S=1.0% L=20' EST. 15 CY DDE CL 'I' RIP-RAP EST. 20 TONS

FALSE SUMP SEE DETAIL 16J TOP EL=2158.5'

PIPE INLET CHANNEL SEE DETAIL 16D S=23.0% L=35' EST. 30 CY DDE CL "II" RIP-RAP EST. 20 TONS

PIPE INLET CHANNEL SEE DETAIL 16D S=21.0% L=32' EST. 20 CY DDE CL "II" RIP-RAP EST. 25 TONS

PIPE INLET CHANNEL SEE DETAIL 16F S=5.6% L=43' EST. 50 CY DDE CL 'I' RIP-RAP EST. 90 TONS

BERM 'V' DITCH SEE DETAIL 16A CL 'B' RIP-RAP EST. 45 TONS GEOTEXTILE EST. 140 SY

BERM BASE DITCH SEE DETAIL 16B CL 'B' RIP-RAP EST. 85 TONS GEOTEXTILE EST. 230 SY

FALSE SUMP SEE DETAIL 16I

SPECIAL LATERAL 'V' DITCH SEE DETAIL 16H

TOE PROECTION SEE DETAIL 16C EC MATTING EST. 150 SY

TRANSITION STONE CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY

SPECIAL LATERAL 'V' DITCH SEE DETAIL 16H

FILL IN WETLAND

DO NOT DISTURB TREES IN HPB

N 71° 12' 10.5" E

24" RCP-III

15" RCP-IV

18" RCP-IV

ROD AND LUG WITH GASKETS [ELBOW]

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES HAND CLEARING

DETAIL 16I
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
STA. 157+25-L- RT.

DETAIL 16J
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
STA.160+00-L- RT.

FOR -L- PROFILE, SEE SHEET NO. 25

REVISIONS

8/17/99

8/16/2021
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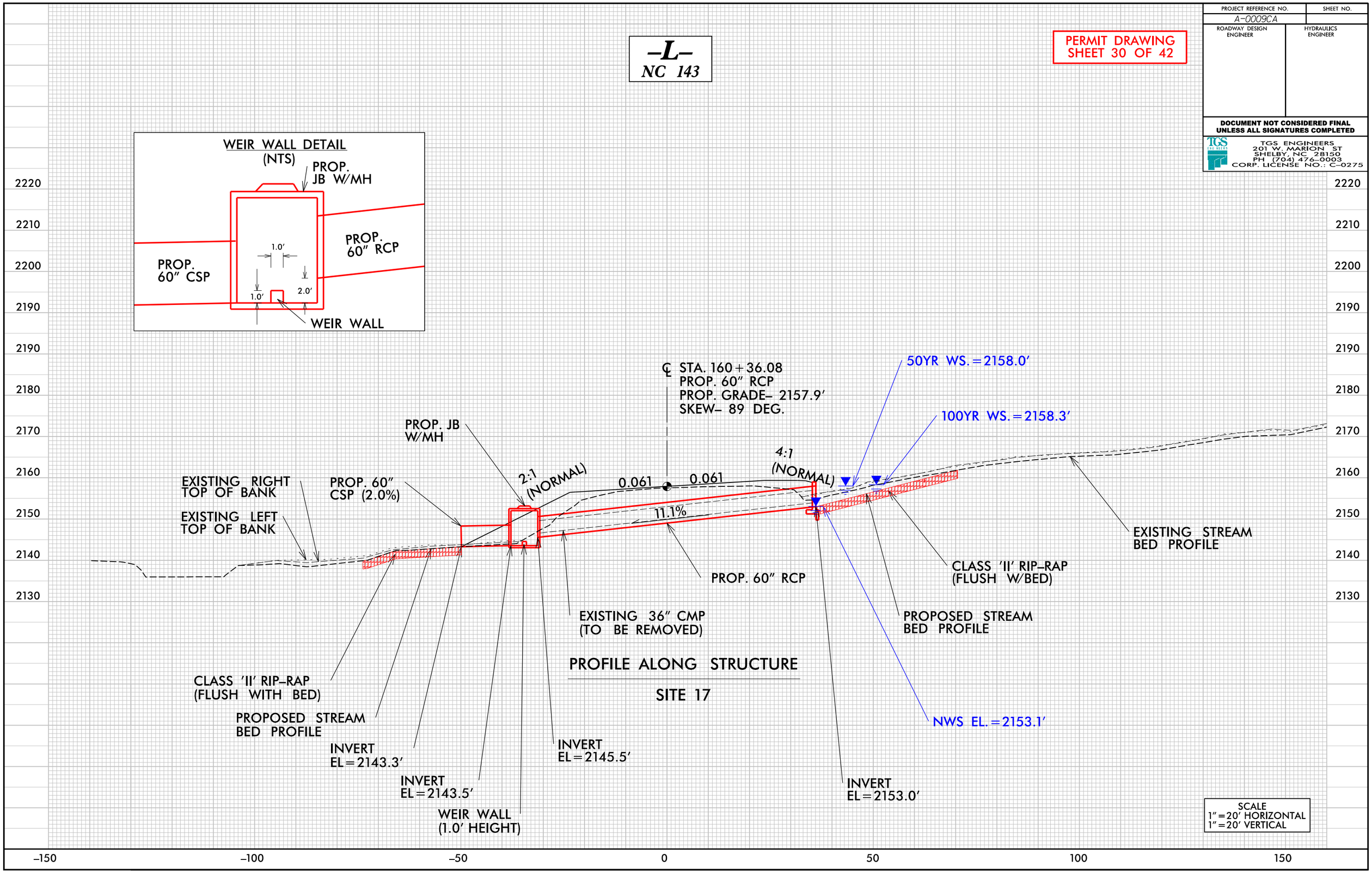
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 30 OF 42

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



5/14/99

PERMIT DRAWING
SHEET 31 OF 42

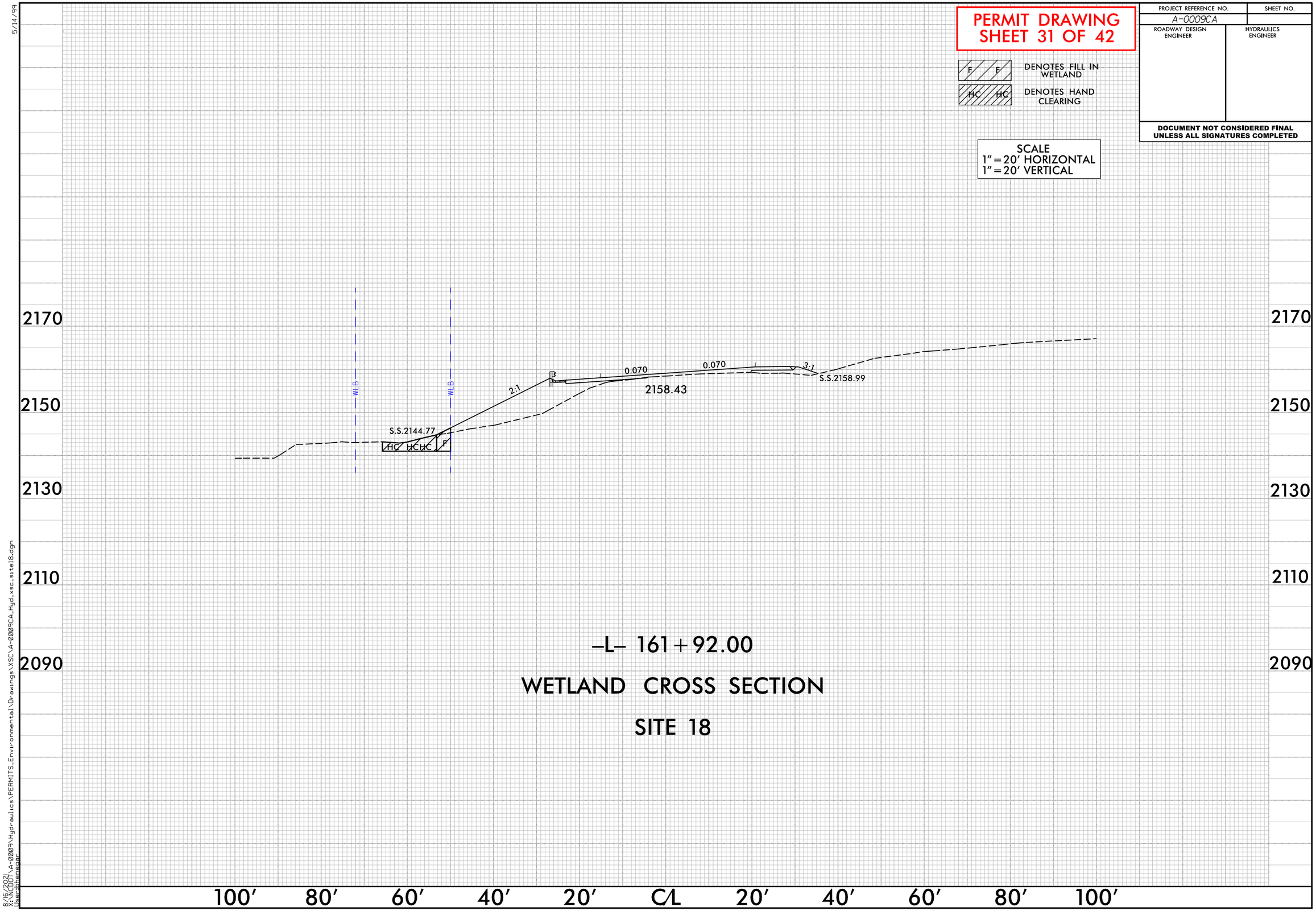
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F/F — DENOTES FILL IN WETLAND

HC/HC — DENOTES HAND CLEARING

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



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PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA
PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

-DRIA- CURVE DATA
PI Sta 11+63.67
Δ = 87° 17' 14.8" (LT)
D = 114° 35' 29.6"
L = 76.17'
T = 47.69'
R = 50.00'
① -DRIA- PC 11+15.98
② -DRIA- PT 11+92.15
(B1) S 43° 53' 58.3" E

-DRI- CURVE DATA
PI Sta 10+41.97
Δ = 48° 49' 47.4" (RT)
D = 190° 59' 09.4"
L = 25.57'
T = 13.62'
R = 30.00'
③ -DRI- PC 11+34.96
④ -DRI- PT 11+67.50
(B2) S 54° 32' 48.2" E

PI Sta 11+53.03
Δ = 62° 08' 27.9" (LT)
D = 190° 59' 09.4"
L = 32.54'
T = 18.08'
R = 30.00'

DETAIL 17A
BANK STABILIZATION
(Not to Scale)
Natural Ground — BOTT. BANK — TOP BANK — Natural Ground
CLASS 'II' RIP-RAP BANK STABILIZATION KEYED-IN T=2.0'
CHANNEL BED (Variable)
Length = See Plan View
FROM STA.167+20 TO STA.168+00-L- LT

DETAIL 17B
TOE PROTECTION
(Not to Scale)
SLOPE STAKE
RETAINING WALL
CL 'II' RIP-RAP
FROM STA.170+08 TO STA.171+22-L- LT

NAD 83/2011

PERMIT DRAWING SHEET 32 OF 42

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER

MATCH LINE STA -L- 166+00.00
MATCH TO SHEET NO. 16

-DRIA- POT 10+00.00
BEGIN CONSTRUCTION
-DRIA- STA. 10+00.00

PROP. RETAINING WALL #4
BEGIN -L- STA. 168+51±
END -L- STA. 171+75±

-L- PT 171+83.07

SITE 20
SITE 21
SITE 22

PIPE OUTLET CHANNEL SEE DETAIL 17F S=8.0% L=22' EST. 15 CY DDE CL 'II' RIP-RAP EST. 25 TONS

PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

BANK STABILIZATION SEE DETAIL 17A CL 'II' RIP-RAP EST. 215 TONS

2GI SPC DSN

30" HDPE

S 43°23' 16.5" W

150' TAPER

720' TAPER

TOE PROTECTION SEE DETAIL 17B CL 'II' RIP-RAP EST. 85 TONS

REMOVE 3@84" CSP AND RESTORE STREAM CL 'II' RIP-RAP EST. 530 TONS

SHOULDER BERM GUTTER -L- STA. 168+51 TO 173+90, LT

STANDARD BASE DITCH SEE DETAIL 17I S=8.7% L=23' EST. 10 CY DDE CL 'II' RIP-RAP EST. 15 TONS GEOTEXTILE EST. 25 SY

PIPE OUTLET CHANNEL SEE DETAIL 17D S=1.5% L=20' EST. 15 CY DDE CL 'II' RIP-RAP EST. 25 TONS

CL 'B' RIP-RAP EST. 3 TON GEOTEXTILE EST. 7 SY

RELOCATE FENCE (BY OWNER)

PROP. DRIVE

48" CSP

N 35°27' 11.8" E

REMOVE 20 LF EXIST. 30" CMP

REMOVE 45 LF EXIST. 30" CMP

TEMPORARY STREAM IMPACT

PROP. DRIVE

-L- POC 168+30.00 = -DRIA- POT 12+64.14

LATERAL BASE DITCH SEE DETAIL 17G CL 'I' RIP-RAP EST. 100 TONS GEOTEXTILE EST. 200 SY

SPECIAL LATERAL BASE DITCH SEE DETAIL 17H CL 'I' RIP-RAP EST. 40 TONS GEOTEXTILE EST. 80 SY

SPECIAL LATERAL BASE DITCH SEE DETAIL 17C

SHOULDER BERM GUTTER -L- STA. 174+51 TO 175+35, RT

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 17K

SPECIAL LATERAL BASE DITCH SEE DETAIL 17J CL 'I' RIP-RAP EST. 260 TONS GEOTEXTILE EST. 440 SY

PROP. DRIVE

PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

SINGLE FACED CONCRETE BARRIER

PROP. RETAINING WALL #5 W/CONCRETE DITCH
BEGIN -L- STA. 175+35±
END -L- STA. 176+65±

SHOULDER BERM GUTTER -L- STA. 176+65 TO 178+00, RT

-L- POT 179+34.25 = -DRI- POT 11+89.39

MATCH LINE STA -L- 180+00.00
MATCH TO SHEET NO. 18

DO NOT DISTRURB LANDSCAPED TREES INSIDE HPB.

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

DETAIL 17C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — D — 4:1 or Flatter — Fill Slope — B
Min. D=1.5 Ft.
B=2.0 Ft.
FROM STA.174+00 TO STA.174+30-L- RT.

DETAIL 17D
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground — 2:1 — D — 2:1 — Natural Ground — d — 1.5' — CHANNEL BED (B)
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 4.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 177+60-L- LT.

DETAIL 17E
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow — 20:1 — 10:1 — 2' — 0.5' Min. 1.0' Max. — GI etc.
S=Ditch Slope
℄ Proposed Ditch
STA.173+88-L- RT.

DETAIL 17F
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground — 2:1 — D — 2:1 — Natural Ground — d — 2.0' — CHANNEL BED (B)
Min. D=VARIES
Max. d=VARIES
B=4.0 Ft.
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 167+30-L- LT.

DETAIL 17G
LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — d — 2:1 — b — 1'/Ft. — Fill Slope — GEOTEXTILE — B
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
*When B is < 6.0'
Type of Liner= CL 'I' Rip-Rap
FROM STA.171+50 TO STA.173+00-L- RT.

DETAIL 17H
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — d — 2:1 — D — 4:1 or Flatter — Fill Slope — Geotextile — B
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.173+00 TO STA.173+50-L- RT.

DETAIL 17I
STANDARD BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — d — D — 2:1 — Natural Ground — Geotextile — B
Min. D= VARIES
Max. d= VARIES
B= 3.0 Ft.
Type of Liner= CL 'II' Rip-Rap
STA.171+50-L- LT.

DETAIL 17J
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — d — D — 2:1 — Fill Slope — Geotextile — B
Min. D= 3.0 Ft.
Max. d= 3.0 Ft.
B= 4.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.178+00 TO STA.180+00-L- RT.

DETAIL 17K
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
RETAINING WALL — BOND BREAKER — VARIES — D — B — 2:1 — NATURAL GROUND — 4"
D= 1.0'
B= 1.0'
FROM STA.175+35 TO STA.176+65-L- RT

SA — ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 26
FOR -DR1A- PROFILE, SEE SHEET NO. 28
FOR -DR1- PROFILE, SEE SHEET NO. 28

REVISIONS
8/17/99

10/16/2021
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User:bbenson

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 33 OF 42

-L- CURVE DATA
PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

-DRIA- CURVE DATA
PI Sta 11+63.67
Δ = 87° 17' 14.8" (LT)
D = 114° 35' 29.6"
L = 76.17'
T = 47.69'
R = 50.00'
① -DRIA- PC 11+15.98
② -DRIA- PT 11+92.15
B1 S 43° 53' 58.3" E

-DRI- CURVE DATA
PI Sta 10+41.97
Δ = 48° 49' 47.4" (RT)
D = 190° 59' 09.4"
L = 25.57'
T = 13.62'
R = 30.00'
③ -DRI- PC 11+34.96
④ -DRI- PT 11+67.50
B2 S 54° 32' 48.2" E

PI Sta 11+53.03
Δ = 62° 08' 27.9" (LT)
D = 190° 59' 09.4"
L = 32.54'
T = 18.08'
R = 30.00'

DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER

DETAIL 17A
BANK STABILIZATION
(Not to Scale)
Natural Ground — BOTT. BANK — TOP BANK — Natural Ground
CLASS 'II' RIP-RAP BANK STABILIZATION KEYED-IN T=2.0'
CHANNEL BED (Variable)
Length = See Plan View
FROM STA.167+20 TO STA.168+00-L- LT

DETAIL 17B
TOE PROTECTION
(Not to Scale)
SLOPE STAKE
RETAINING WALL
CL 'II' RIP-RAP
FROM STA.170+08 TO STA.171+22-L- LT

NAD 83/2011

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

MATCH LINE STA -L- 166+00.00
MATCH TO SHEET NO. 16

MATCH LINE STA -L- 180+00.00
MATCH TO SHEET NO. 18

SITE 20
SITE 21
SITE 22

-DRIA- POT 10+00.00
BEGIN CONSTRUCTION
-DRIA- STA. 10+00.00

PROP. RETAINING WALL #4
BEGIN -L- STA. 168+51±
END -L- STA. 171+75±

-L- PT 171+83.07

720' TAPER
150' TAPER

PIPE OUTLET CHANNEL
SEE DETAIL 17F
S=8.0%
L=22'
EST. 15 CY DDE
CL 'II' RIP-RAP
EST. 25 TONS

PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

BANK STABILIZATION
SEE DETAIL 17A
CL 'II' RIP-RAP
EST. 215 TONS

TOE PROTECTION
SEE DETAIL 17B
CL 'II' RIP-RAP
EST. 85 TONS

REMOVE 3@84" CSP AND RESTORE STREAM
CL 'II' RIP-RAP
EST. 530 TONS

STANDARD BASE DITCH
SEE DETAIL 17I
S=8.7%
L=23'
EST. 10 CY DDE
CL 'II' RIP-RAP
EST. 15 TONS
GEOTEXTILE
EST. 25 SY

SHOULDER BERM GUTTER
-L- STA. 168+51
TO 173+90, LT

PIPE OUTLET CHANNEL
SEE DETAIL 17D
S=1.5%
L=20'
EST. 15 CY DDE
CL 'I' RIP-RAP
EST. 25 TONS

CL 'B' RIP-RAP
EST. 3 TON
GEOTEXTILE
EST. 7 SY

RELOCATE FENCE (BY OWNER)

PROP. DRIVE

TEMPORARY STREAM IMPACT

-L- POC 168+30.00 =
-DRIA- POT 12+64.14

LATERAL BASE DITCH
SEE DETAIL 17G
CL 'I' RIP-RAP
EST. 100 TONS
GEOTEXTILE
EST. 200 SY

SPECIAL LATERAL BASE DITCH
SEE DETAIL 17H
CL 'I' RIP-RAP
EST. 40 TONS
GEOTEXTILE
EST. 80 SY

SPECIAL LATERAL BASE DITCH
SEE DETAIL 17C

SHOULDER BERM GUTTER
-L- STA. 174+51
TO 175+35, RT

CONC. DITCH BEHIND RETAINING WALL
SEE DETAIL 17K

SPECIAL LATERAL BASE DITCH
SEE DETAIL 17J
CL 'I' RIP-RAP
EST. 260 TONS
GEOTEXTILE
EST. 440 SY

REMOVE
45 LF EXIST.
30" CMP

-L- POT 179+34.25 =
-DRI- POT 11+89.39

PROP. DRIVE

SINGLE FACED CONCRETE BARRIER

PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

PROP. RETAINING WALL #5
W/CONCRETE DITCH
BEGIN -L- STA. 175+35±
END -L- STA. 176+65±

SHOULDER BERM GUTTER
-L- STA. 176+65
TO 178+00, RT

DO NOT DISTRURB LANDSCAPED TREES INSIDE HPB.

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

44 KENNETH CODY, TRUSTEE, ET AL DB 281 PG 416
45 KENNETH CODY, TRUSTEE, ET AL DB 281 PG 416
46 GLENDA ODOM, ET AL DB 372 PG 157
47 J. C. PAYNE DB 57 PG 123
48 RICHARD C. GRINDSTAFF DB 366 PG 462
49 PAM FINCHER, ET AL DB 199 PG 293

DETAIL 17C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — D — 4:1 or Flatter — Fill Slope
B
Min. D=1.5 Ft.
B=2.0 Ft.
FROM STA.174+00 TO STA.174+30-L- RT.

DETAIL 17D
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground — 2:1 — D — 2:1 — Natural Ground
d — 1.5'
CHANNEL BED (B)
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 4.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 177+60-L- LT.

DETAIL 17E
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
20:1 — 10:1 — 2' — 0.5' Min. 1.0' Max.
GI etc.
S=Ditch Slope
℄ Proposed Ditch
STA.173+88-L- RT.

DETAIL 17F
PIPE OUTLET CHANNEL
(Not to Scale)
Natural Ground — 2:1 — D — 2:1 — Natural Ground
d — 2.0'
CHANNEL BED (B)
Min. D=VARIES
Max. d=VARIES
B=4.0 Ft.
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 167+30-L- LT.

DETAIL 17G
LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — D — 2:1 — Fill Slope
b — 1'/Ft.
GEOTEXTILE — B
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
*When B is < 6.0'
Type of Liner= CL 'I' Rip-Rap
FROM STA.171+50 TO STA.173+00-L- RT.

DETAIL 17H
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — D — 4:1 or Flatter — Fill Slope
d — Geotextile — B
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.173+00 TO STA.173+50-L- RT.

DETAIL 17I
STANDARD BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — D — 2:1 — Natural Ground
d — Geotextile — B
Min. D= VARIES
Max. d= VARIES
B= 3.0 Ft.
Type of Liner= CL 'II' Rip-Rap
STA.171+50-L- LT.

DETAIL 17J
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Natural Ground — 2:1 — D — 2:1 — Fill Slope
d — Geotextile — B
Min. D= 3.0 Ft.
Max. d= 3.0 Ft.
B= 4.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.178+00 TO STA.180+00-L- RT.

DETAIL 17K
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
RETAINING WALL — BOND BREAKER — VARIES — NATURAL GROUND
D — B — 2:1 — 4"
D= 1.0'
B= 1.0'
FROM STA.175+35 TO STA.176+65-L- RT

SA — ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 26
FOR -DR1A- PROFILE, SEE SHEET NO. 28
FOR -DR1- PROFILE, SEE SHEET NO. 28

REVISIONS
8/17/99

10/16/2021
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User:jbenner

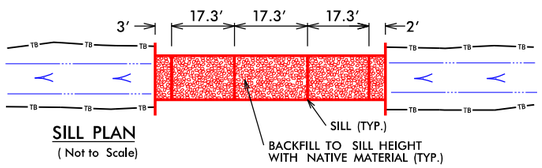
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

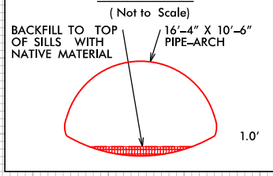
PERMIT DRAWING
SHEET 34 OF 42

-DR1A-
SWEETEN CREEK RD.



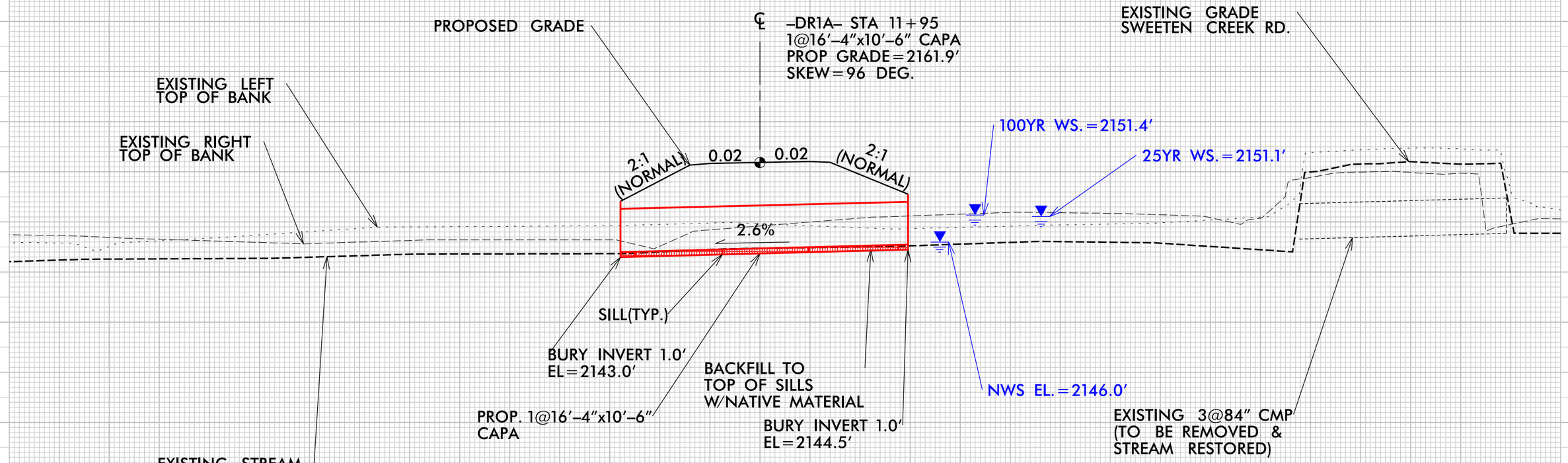
SILL PLAN
(Not to Scale)

SILL DETAIL
(Not to Scale)



NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS 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.



PROFILE ALONG STRUCTURE

SITE 21

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA

PI Sta 190+83.76
△ = 42° 18' 27.4" (RT)
D = 3° 57' 05.2"
L = 1,070.69'
T = 561.07'
R = 1,450.00'
SE = 0.08
DS = 60 MPH

DETAIL 19A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground; 2:1; D; 4:1 or Flatter; Fill Slope; Min. D = 1.0 Ft.
FROM STA.194+00 TO STA.194+50-L- RT.

DETAIL 19B
TOE PROTECTION
(Not to Scale)
NATURAL GROUND; b; d; 2:1 OR FLATTER; FILL SLOPE
d = 1.5 Ft.
b = 3.0 Ft.
Type of Liner = EC MATTING
FROM STA.199+10 TO STA.199+50-L- RT.

DETAIL 19C
SPECIAL BERM
(Not to Scale)
10'; 4:1; 4:1; Existing Ground; Top Elev=2001.0 ft Final =2001.4 ft during Detour
-L- STA 195+00 RT

DETAIL 19D
CULVERT INLET CHANNEL
(Not to Scale)
BACKFILL WITH NATIVE MATERIAL; 2@12'x8' RCBC; Natural Ground; CLASS B RIP-RAP BANK STABILIZATION KEYED-IN (TYP.); 1.5:1 MAX.; d; BURY INVERT 1.0'; BURY INVERT 2.0'; Length = 50 Ft.; Min. d = 3 Ft.
STA.195+50-L- RT.

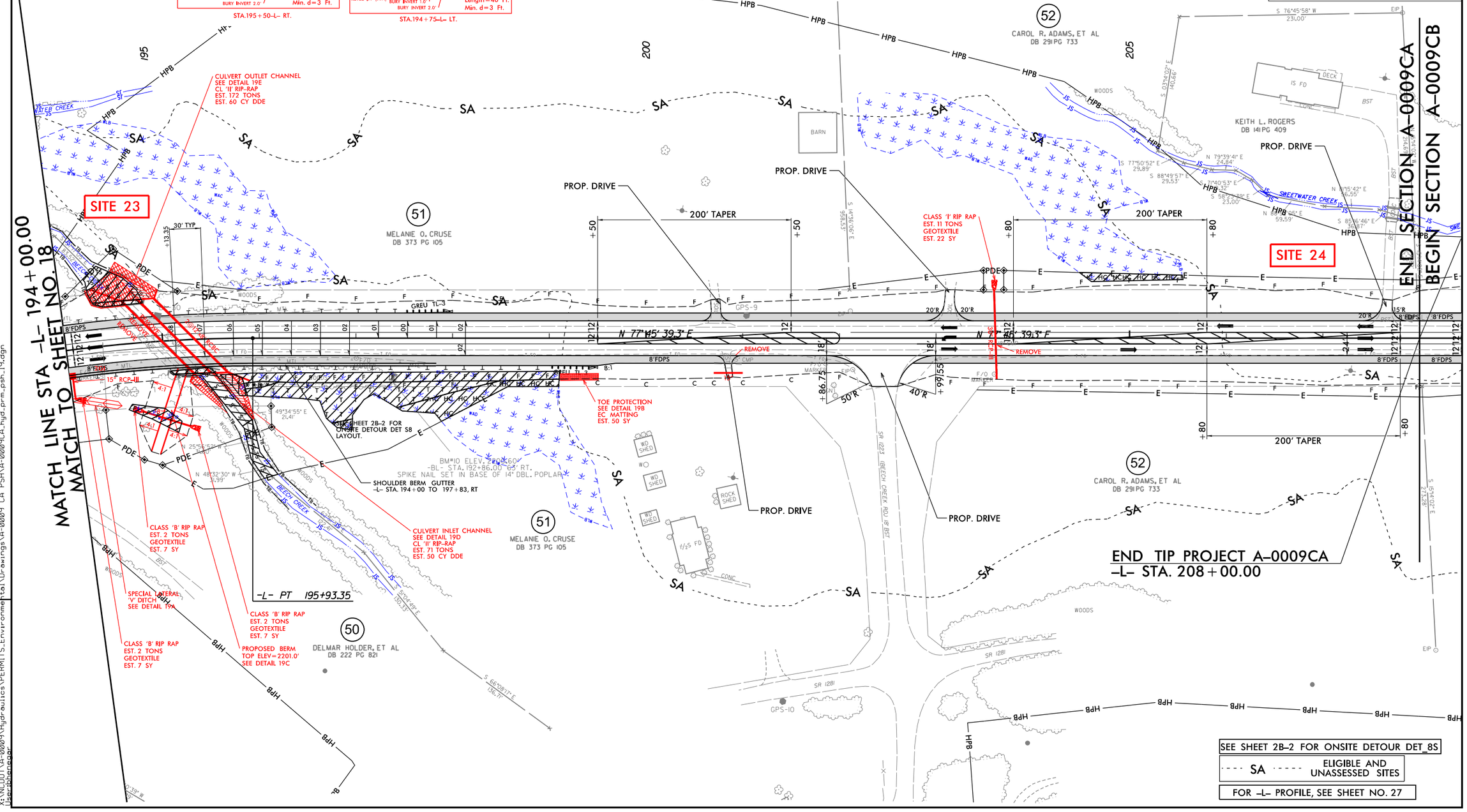
DETAIL 19E
CULVERT OUTLET CHANNEL
(Not to Scale)
FILL SCOUR HOLE WITH CLASS B RIPRAP UP TO ELEV 2189.0' (FILL VOIDS WITH NATIVE MATERIAL); EXISTING GROUND; 2@12'x8' RCBC; BACKFILL WITH NATIVE MATERIAL; Natural Ground; CLASS B RIP-RAP BANK STABILIZATION KEYED-IN (TYP.); 1.5:1 MAX.; d; BURY INVERT 1.0'; BURY INVERT 2.0'; Length = 40 Ft.; Min. d = 3 Ft.
STA.194+75-L- LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 35 OF 42

- T / T — DENOTES TEMPORARY FILL IN WETLAND
- HC / HC — DENOTES HAND CLEARING
- F / F — DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- E / E — DENOTES EXCAVATION IN WETLAND
- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011



REVISIONS

8/17/99

8/18/2021
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PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

-L- CURVE DATA
PI Sta 190+83.76
Δ = 42° 18' 27.4" (RT)
D = 3° 57' 05.2"
L = 1,070.69'
T = 561.07'
R = 1,450.00'
SE = 0.08
DS = 60 MPH

DETAIL 19A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground; 2:1; D; 4:1 or Flatter; Fill Slope; Min. D = 1.0 Ft.
FROM STA.194+00 TO STA.194+50-L- RT.

DETAIL 19B
TOE PROTECTION
(Not to Scale)
NATURAL GROUND; b; d; 2:1 OR FLATTER; FILL SLOPE
d = 1.5 Ft.
b = 3.0 Ft.
Type of Liner = EC MATTING
FROM STA.199+10 TO STA.199+50-L- RT.

DETAIL 19C
SPECIAL BERM
(Not to Scale)
10' ; 4:1 ; 4:1 ; Existing Ground ; Top Elev=2001.0 ft Final =2001.4 ft during Detour
-L- STA 195+00 RT

DETAIL 19D
CULVERT INLET CHANNEL
(Not to Scale)
BACKFILL WITH NATIVE MATERIAL; 2@12'x8' RCBC; Natural Ground; CLASS II RIP-RAP BANK STABILIZATION KEYED-IN (TYP.); 1.5:1 MAX.; d; BURY INVERT 1.0'; BURY INVERT 2.0'
Length = 50 Ft.
Min. d = 3 Ft.
STA.195+50-L- RT.

DETAIL 19E
CULVERT OUTLET CHANNEL
(Not to Scale)
FILL SCOUR HOLE WITH CLASS II RIPRAP UP TO ELEV 2189.0' (FILL VOIDS WITH NATIVE MATERIAL); 2@12'x8' RCBC; BACKFILL WITH NATIVE MATERIAL; EXISTING GROUND; Natural Ground; CLASS II RIP-RAP BANK STABILIZATION KEYED-IN (TYP.); 1.5:1 MAX.; d; BURY INVERT 1.0'; BURY INVERT 2.0'
Length = 40 Ft.
Min. d = 3 Ft.
STA.194+75-L- LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 36 OF 42

NAD 83/2011

- DENOTES TEMPORARY FILL IN WETLAND
- DENOTES HAND CLEARING
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES EXCAVATION IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE STA -L- 194+00.00
MATCH TO SHEET NO. 18

SITE 23

SITE 24

BEGIN SECTION A-0009CB
END SECTION A-0009CA

END TIP PROJECT A-0009CA
-L- STA. 208+00.00

CULVERT OUTLET CHANNEL SEE DETAIL 19E CL 'II' RIP-RAP EST. 172 TONS EST. 60 CY DDE

CULVERT INLET CHANNEL SEE DETAIL 19D CL 'II' RIP-RAP EST. 71 TONS EST. 50 CY DDE

TOE PROTECTION SEE DETAIL 19B EC MATTING EST. 50 SY

PROPOSED BERM TOP ELEV=2201.0' SEE DETAIL 19C

SPECIAL LATERAL 'V' DITCH SEE DETAIL 19A

CLASS 'B' RIP RAP EST. 2 TONS GEOTEXTILE EST. 7 SY

CLASS 'I' RIP RAP EST. 11 TONS GEOTEXTILE EST. 22 SY

SHOULDER BERM GUTTER -L- STA. 194+00 TO 197+83, RT

SEE SHEET 2B-2 FOR ONSITE DETOUR DET S8 LAYOUT.

-L- PT 195+93.35

BM#10 ELEV. 2204.60' -BL- STA. 192+86.00 63' RT. SPIKE NAIL SET IN BASE OF 14" DBL. POPLAR

PROP. DRIVE

200' TAPER

30' TYP

15" RCP-III

REMOVE

8'FDPS

N 77°45' 39.3" E

51 MELANIE O. CRUSE DB 373 PG 105

52 CAROL R. ADAMS, ET AL DB 291 PG 733

50 DELMAR HOLDER, ET AL DB 222 PG 821

KEITH L. ROGERS DB 141 PG 409

SWEETWATER CREEK

BEECH CREEK

SR 1223 (BEECH CREEK RD) (8' BST)

SR 1281

SEE SHEET 2B-2 FOR ONSITE DETOUR DET_8S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 27

8/18/2021
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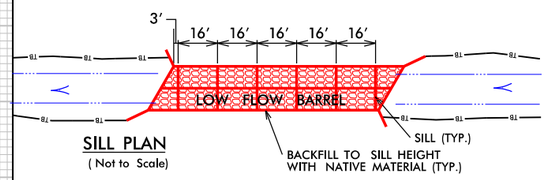
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

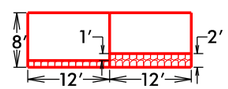
PERMIT DRAWING SHEET 37 OF 42

-L-
NC 143



SILL PLAN
(Not to Scale)

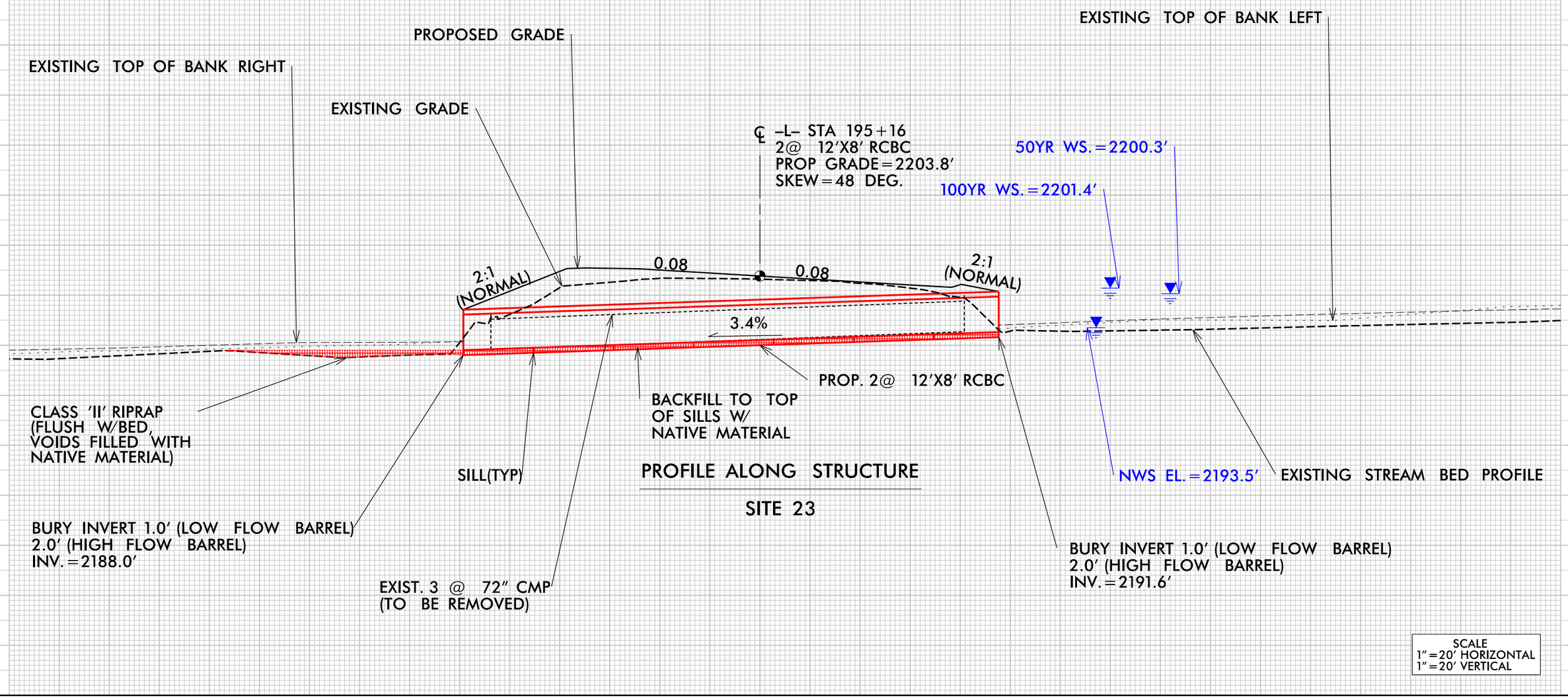
SILL DETAIL
(Not to Scale)



BACKFILL TO TOP OF SILLS /BAFFLES WITH NATIVE MATERIAL

NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS 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.



PROFILE ALONG STRUCTURE

SITE 23

SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

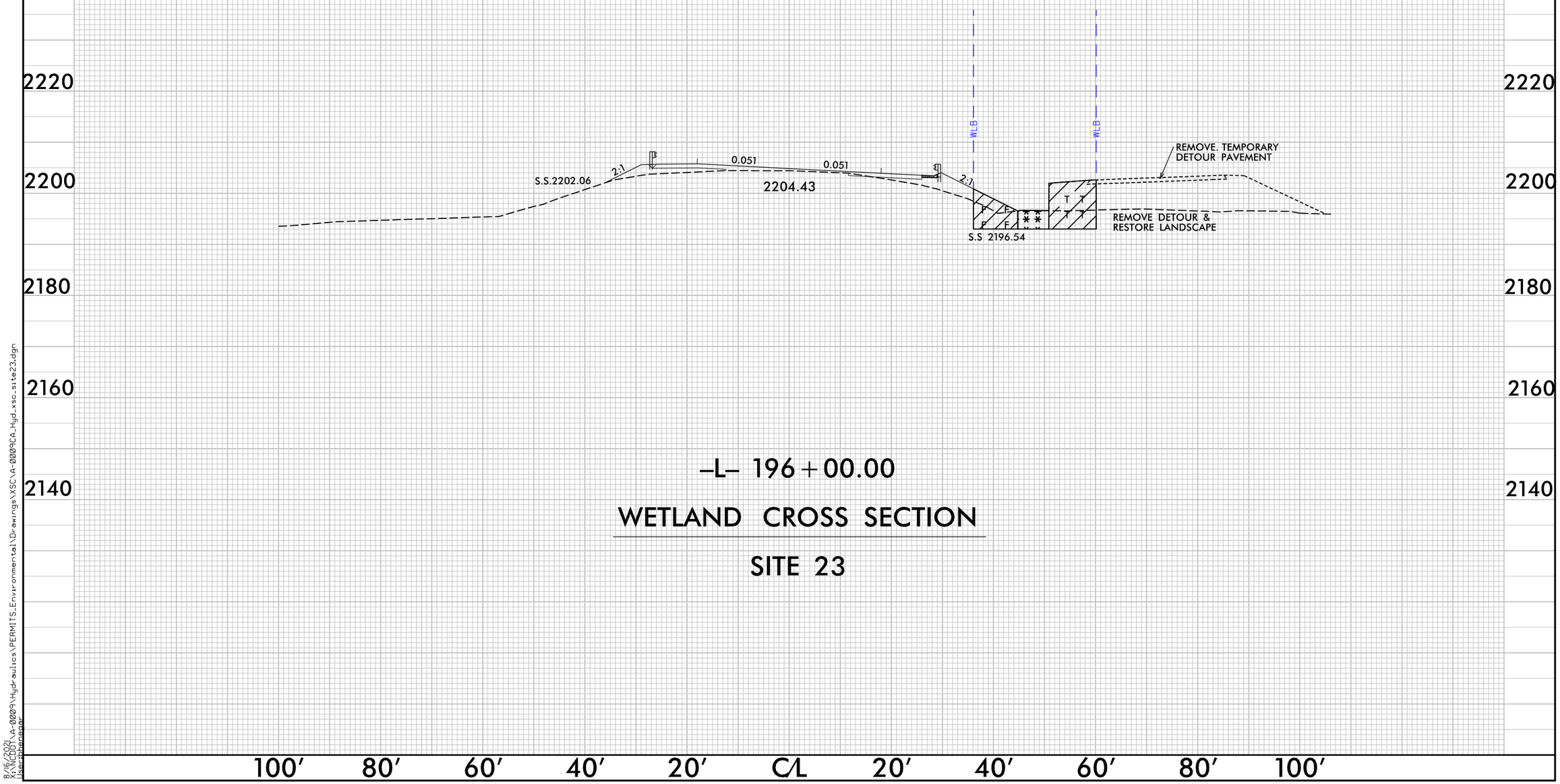
PERMIT DRAWING
SHEET 38 OF 42

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

T T DENOTES TEMPORARY FILL IN WETLAND

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



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WETLAND CROSS SECTION

SITE 23

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User:bhenegar

5/14/99

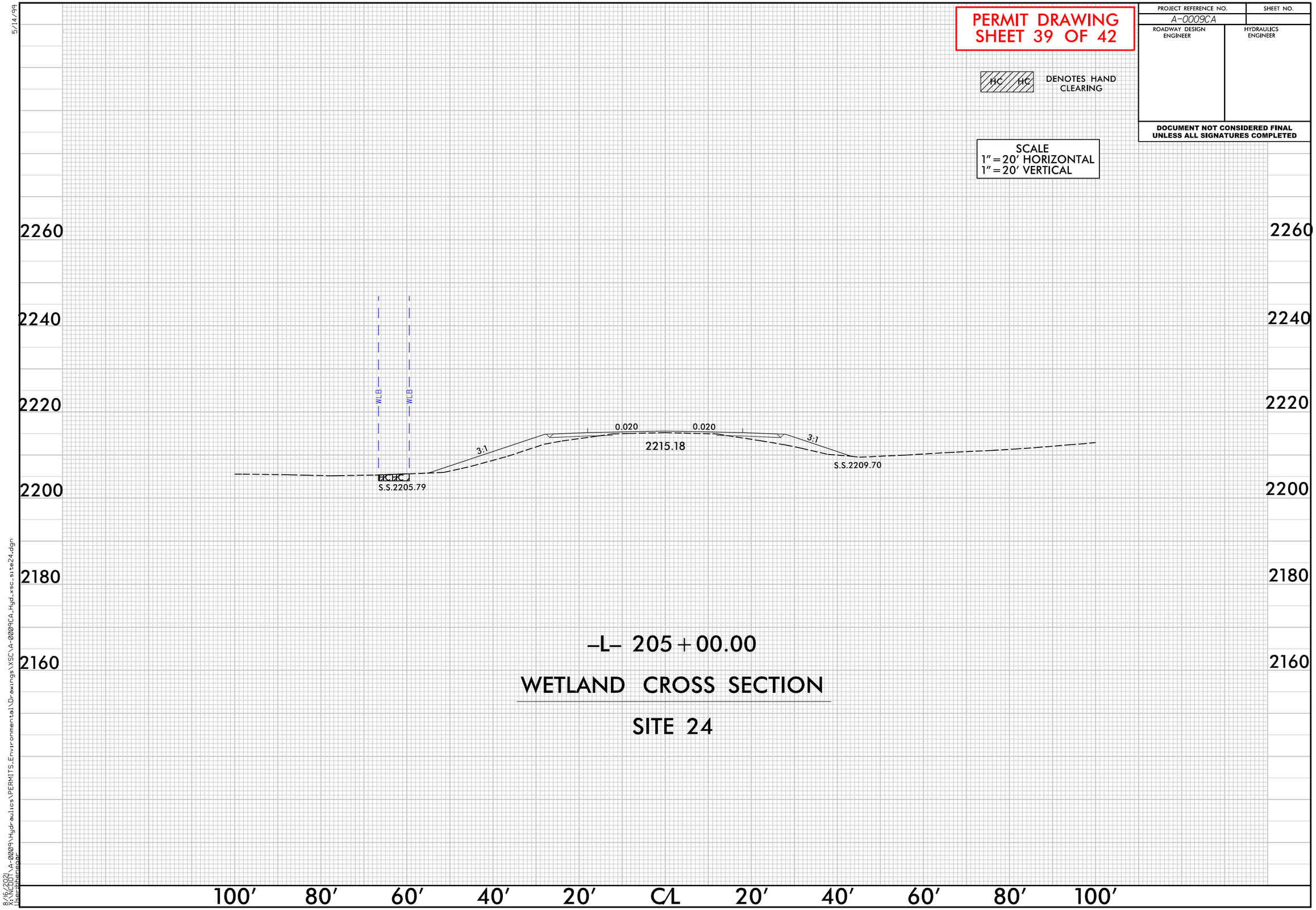
PERMIT DRAWING
SHEET 39 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HC HC DENOTES HAND CLEARING

SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



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WETLAND CROSS SECTION

SITE 24

8/16/2021
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User:bbenson

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-Y1- 18+58 to 19+12 LT	60" RCP	SE	Low						< 0.01	< 0.01	39		20	
1	-Y1- 19+32 to 19+53 RT	60" RCP	SE	Low						< 0.01		24			
1	-Y1- 19+63 to 19+96 RT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		12	20	
2	-Y1A- 12+01 to 12+04 LT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		30		
3	-L- 16+26 to 16+57 RT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		26	15	
4	-L- 44+66 to 45+04 LT	Pipe Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		18	20	
4	-L- 44+91 to 44+98 LT	Pipe Outlet Channel	SG							< 0.01		18			
4	-L- 44+74 to 44+99 RT	Fill in Wetland	WG	Low	< 0.01										
5	-L- 45+71 to 45+97 LT	3@12'x9' RCBC Extension	Sweetwater Creek							< 0.01		15			
5	-L- 45+32 to 45+89 LT	Culvert Outlet Channel	Sweetwater Creek							0.02	0.01		48	10	
5	-L- 46+76 to 47+23 RT	3@12'x9' RCBC Extension	Sweetwater Creek							0.02		44			
5	-L- 47+23 to 47+72 RT	Culvert Inlet Channel	Sweetwater Creek							0.03			48		
5	-L- 47+68 to 48+71 RT	Bank Stabilization	Sweetwater Creek							0.03	< 0.01		93	10	
6	-L- 56+49 to 56+65 RT	Exist. 54" CSP (Lined) & Prop. 54" WSP	SI							< 0.01		18			
6	-L- 56+03 to 56+60 RT	Pipe Outlet Channel	SI							< 0.01	< 0.01		56	8	
6	-L- 57+64 to 57+77 LT	Exist. 54" CSP (Lined) & Prop. 54" WSP	SI							< 0.01		14			
6	-L- 57+70 to 59+23 LT	Pipe Inlet Channel	SI							0.01	< 0.01		91	50	
7	-L- 65+14 to 65+26 LT	Pipe Outlet Channel	SJ							< 0.01	< 0.01	45		11	
8	-L- 66+90 to 66+99 LT	30" CMP	SK								< 0.01			3	
8	-L- 66+27 to 66+61 LT	Pipe Outlet Channel	SI							< 0.01	< 0.01	13		20	
9	-L- 106+92 to 107+09 RT	Standard Base Ditch	Sweetwater Creek								< 0.01			20	
9	-L- 108+47 to 108+68 LT	1@7'x8' RCBC	Slay Bacon Branch							< 0.01		18			
9	-L- 108+60 to 108+82 LT	Culvert Inlet Channel	Slay Bacon Branch							< 0.01			22		
9	-L- 108+76 to 109+39 LT	Impacts to Stream	Slay Bacon Branch								0.02			91	
9	-L- 107+62 to 107+93 RT	Culvert Outlet Channel	Slay Bacon Branch							< 0.01		29			
9	-L- 107+52 to 107+89 RT	Culvert Outlet Channel	Sweetwater Creek								< 0.01			37	
	SHEET TOTALS*:				< 0.01					0.17	0.06	277	444	335	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/1/2021
GRAHAM
A-0009CA
32572.1.13

WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
10	-L- 113+08 to 113 +30 RT	Culvert Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		50	10	
10	-L- 113+76 to 114+18 LT	3@11'x9' RCBC Extension	Sweetwater Creek							0.01		35			
10	-L- 113+93 to 114+55 LT	Culvert Inlet Channel	Sweetwater Creek							< 0.01	< 0.01		32	10	
11	-L- 127+91 to 128+01 RT	24" Side Drain	SO								< 0.01			10	
12	-L- 128+93 to 129+27 LT	Pipe Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		12	18	
12	-L- 129+24 to 129+40 RT	54" RCP	SO								< 0.01			16	
12	-L- 129+39 to 129+47 RT	54" RCP	SM								< 0.01			20	
12	-L- 129+47 to 129+97 RT	54" RCP	SN								< 0.01			53	
13	-L- 133+98 to 134+41 LT	Pipe Outlet Channel	WN	High	< 0.01		0.01	0.03							
13	-L- 134+18 to 134+44 LT	Pipe Outlet Channel	Pigpen Branch							< 0.01	< 0.01	39		10	
13	-L- 134+39 to 134+45 LT	66" WSP	Pigpen Branch							< 0.01		10			
13	-L- 134+85 to 135+09 RT	66" WSP	Pigpen Branch							< 0.01		32			
13	-L- 135+09 to 135+42 RT	Pipe Inlet Channel	Pigpen Branch							< 0.01	< 0.01		42	10	
13	-L- 133+81 to 135+83 RT	Pipe Inlet Channel	WO	High	0.07		< 0.01	0.02	0.03						
14	-L- 136+92 to 139+49 LT	Impacts to Wetland	WP	Low	0.02			0.01	0.01						
15	-L- 144+78 to 144+90 LT	Pipe Outlet Channel	Hardwood Branch							< 0.01	< 0.01		32	10	
15	-L- 144+78 to 144+85 LT	2 @ 66" CAP	Hardwood Branch							< 0.01		3			
15	-L- 144+74 to 144+82 RT	2 @ 66" CAP	Hardwood Branch							< 0.01		11			
15	-L- 144+74 to 144+82 RT	Pipe Inlet Channel	Hardwood Branch							< 0.01	< 0.01		27	16	
16	-L- 146+90 to 149+48 LT	Impacts to Wetland	WR	High	0.09			< 0.01	0.06						
17	-L- 160+27 to 160+38 LT	Pipe Outlet Channel	SR							< 0.01	< 0.01	24		11	
17	-L- 160+34 to 160+38 LT	60" CSP	SR							< 0.01		18			
17	-L- 160+31 to 160+38 RT	60" RCP	SR							< 0.01		6			
17	-L- 160+17 to 160+35 RT	Pipe Inlet Channel	SR							< 0.01	< 0.01	38		5	
17	-L- 160+33 to 160+56 RT	Pipe Inlet Channel	SS							< 0.01	< 0.01	24		11	
SHEET TOTALS*:					0.18		0.02	0.07	0.10	0.07	0.03	240	195	210	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/1/2021
GRAHAM
A-0009CA
32572.1.13

WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
18	-L- 161+64 to 161+94 LT	Impacts to Wetland	WV	High	< 0.01				< 0.01						
19	-L- 163+03 to 163+17 LT	Pipe Outlet Channel	ST							< 0.01	< 0.01	18		14	
19	-L- 163+08 to 163+19 LT	36" CSP	ST							< 0.01		25			
19	-L- 162+90 to 163+13 RT	Pipe Inlet Channel	ST							< 0.01	< 0.01	41		9	
19	-L- 163+11 to 164+09 RT	Pipe Inlet Channel	SU							< 0.01	< 0.01	23		87	
20	-L- 167+07 to 167+31 LT	Pipe Outlet Channel	SV							< 0.01	< 0.01	25		13	
20	-L- 167+28 to 167+40 LT	48" CSP	SV							< 0.01		23			
20	-L- 167+66 to 167+74 RT	48" RCP	SV								< 0.01			8	
21	-L- 167+02 to 168+02 LT	Bank Stabilization	Sweetwater Creek							0.02	< 0.01		101	10	
1 21	-L- 168+02 to 168+62 LT	1@16'-4"x10'-6" CAPA	Sweetwater Creek							0.02		57			
21	-L- 168+62 to 170+18 LT	Bank Stabilization	Sweetwater Creek							0.03	< 0.01		102	10	
21	-DR1A- 10+09 to 10+22 RT	Impacts to Wetland	WY	Medium				< 0.01							
21	-DR1A- 10+21 to 10+29 RT	Impacts to Stream	SW								< 0.01			14	
22	-L- 177+41 to 177+62 LT	Pipe Outlet Channel	SX							< 0.01	< 0.01	21		11	
22	-L- 177+54 to 177+74 LT	48" CSP	SX							< 0.01		25			
23	-L- 194+28 to 194+81 LT	Culvert Outlet Channel	Beech Creek							0.03	< 0.01	27		14	
23	-L- 194+32 to 194+82 LT	2@12'x8' RCBC	Beech Creek							< 0.01		6			
23	-L- 194+59 to 195+12 RT	Impacts to Wetland	WAB	Medium	0.02										
23	-L- 195+06 to 195+54 RT	2 @ 12'x8' RCBC	Beech Creek							< 0.01		6			
23	-L- 195+10 to 196+20 RT	Culvert Inlet Channel	Beech Creek							0.02	0.02		66	62	
23	-L- 195+59 to 199+10 RT	Impacts to Wetland	WAD	High	0.07	0.11	< 0.01	< 0.01	0.05						
24	-L- 204+48 to 205+55 LT	Impacts to Wetland	WAE	Medium					0.02						
SHEET TOTALS*:					0.09	0.11	< 0.01	< 0.01	0.07	0.15	0.04	297	269	252	
PROJECT TOTALS*:					0.28	0.11	0.03	0.07	0.17	0.39	0.14	814	908	797	

*Rounded totals are sum of actual impacts

**Notes:

1. Proposed crossing on Sweeten Creek Rd. includes relocation of the drive and removal of the existing 3 @ 84" CMP crossing (L=40'). The existing crossing to be restored back to channel.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/1/2021
GRAHAM
A-0009CA
32572.1.13

Revised 2018 Feb