



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 2.08; Released April 2018)

WBS Element: 35572.1.1 TIP No.: R-2527 County(ies): Montgomery Page 1 of 14

General Project Information

WBS Element:	35572.1.1	TIP Number:	R-2527	Project Type:	Roadway Widening	Date:	8/14/2020
NCDOT Contact:	Brook Anderson, PE		Contractor / Designer:	Reid B. Robol, PE			
Address:	1000 Birch Ridge Drive Raleigh, NC 27610		Address:	940 Main Campus Drive Suite 500 Raleigh, NC 26060			
	Phone:	919-707-6706		Phone:	919-754-5005		
	Email:	beanderson1@ncdot.gov		Email:	rrobol@vhb.com		
City/Town:	PEE DEE		County(ies):	Montgomery			
River Basin(s):	Yadkin-Pee Dee		CAMA County?	No			
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	8.253 Miles	Surrounding Land Use:	Forest, agricultural, rural residential				
	Proposed Project		Existing Site				
Project Built-Upon Area (ac.)	232.0	ac.	160.0	ac.			
Typical Cross Section Description:	4 @ 12 ft lanes with 4' paved shoulder and 6-9' grass shoulder. 42' grass median separating the east and west bound lanes.			2 @ 11' lanes with 2' paved shoulders.			

Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	14535	Year:	2041	Existing:	11839	Year:	2021
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General Project Narrative:
(Description of Minimization of Water Quality Impacts)

Project R-2527 involves the widening of NC 24-27, east of NC 73 to the Troy Bypass, from 2 lanes to 4 lanes with a grass median in-between. This project is located in the Uwharrie National Forest in Montgomery County, North Carolina. There are multiple jurisdictional features that are being impacted but these were minimized whenever possible by using steeper side slopes at 2:1. Rock Plated side slopes at 1.5:1 were utilized from -L- 167+50 to 169+50 LT to minimize pond impacts adjacent to the project. Existing drainage patterns were maintained to best extent practical. Construction phasing and traffic control considerations were considered when laying out new culverts to reduce construction time. Non-symmetric widening was implemented in areas to reduce impacts to wetlands and jurisdictional streams. Bulb-outs were shifted where possible to avoid additional stream and wetland impacts. Grass swales were used where possible. All grass swale lengths exceed the minimum length guidance. Directly connected impervious surfaces were minimized where possible. Runoff from road in shoulder section were designed to drain through grassed ditches in median and outside (cut and lateral ditches) prior to outfall connection. Drop boxes were used in multiple locations to dissipate energy and decrease system outlet velocities draining toward wetlands and streams. Erosion and sediment control devices such as silt fence, wattles, rock checks, stilling basins, special stilling basins, temporary silt ditches, and impervious dikes will be utilized to minimize sediment leaving the site during and after construction. Sensitive area soil stabilization timeframes will be used to cover disturbed areas to minimize sedimentation. All outfalls were stabilized with an energy dissipator basin or rip rap dissipator pad to promote diffuse flow and reduce velocity.

Waterbody Information

Surface Water Body (1):	Rocky Creek (West)		NCDWR Stream Index No.:	13-8-(0.5)			
NCDWR Surface Water Classification for Water Body	Primary Classification:		Water Supply IV (WS-IV)				
	Supplemental Classification:		None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	SB-1		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)			
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Additional Waterbody Information

Surface Water Body (2):	Dumas Creek		NCDWR Stream Index No.:	13-16-1	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:				
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SC		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):	Clarks Creek		NCDWR Stream Index No.:	13-16	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:				
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SD		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 (4):	Lick Fork		NCDWR Stream Index No.:	13-16-4	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:				
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SF-A		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):	Rocky Creek (East)		NCDWR Stream Index No.:	13-25-30-(0.3)	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:				
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SF-B		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)	
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Additional Waterbody Information

Surface Water Body (6):	Rocky Creek (East)		NCDWR Stream Index No.:	13-25-30-(0.5)	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:		High Quality Waters (HQW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SF-B		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 (7):	Smith Branch		NCDWR Stream Index No.:	13-25-30-1	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:				
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SY-B		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)				



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Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	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- 17+65 CL 35.30681, -80.06459	(1)Rocky Creek (West)	0.0	6.0	6.0	0.5	46	410	1.70%	0.7	1.5	0.8	1.5	No	No
5	-L- 22+60 RT 35.30695, -80.06294	(1)Rocky Creek (West)	0.0	6.0	6.0	0.3	32	105	0.47%	1.0	1.0	1.3	1.1	No	No
5	-L- 22+60 RT 35.30695, -80.06294	(1)Rocky Creek (West)	0.0	6.0	6.0	0.3	32	105	0.47%	1.0	1.0	1.3	1.1	No	No
6	-L- 30+35 LT 35.30748, -80.06043	(1)Rocky Creek (West)	0.0	6.0	6.0	2.8	281	380	0.39%	2.2	1.1	2.8	1.2	No	No
6	-L- 35+00 RT 35.30799, -80.05900	(1)Rocky Creek (West)	0.0	6.0	6.0	0.6	64	445	2.03%	1.8	2.0	2.3	2.1	No	No
9	-L- 71+53 CL 35.31284, -80.04884	(1)Rocky Creek (West)	0.0	6.0	4.0	0.4	42	235	0.80%	1.1	1.3	1.4	1.4	No	No
9	-L- 74+00 CL 35.31263, -80.04806	(1)Rocky Creek (West)	0.0	6.0	4.8	0.4	38	210	0.50%	1.0	1.0	1.2	1.1	No	No
10	-L- 76+25 CL 35.31243, -80.04739	(1)Rocky Creek (West)	0.0	6.0	4.8	0.5	46	265	0.50%	1.3	1.1	1.7	1.2	No	No
10	-L- 79+00 CL 35.31192, -80.04663	(1)Rocky Creek (West)	0.0	6.0	6.0	0.4	43	390	0.50%	0.6	0.9	0.8	1.0	No	No
10	-L- 83+00 CL 35.31130, -80.04552	(1)Rocky Creek (West)	0.0	6.0	6.0	0.4	42	390	0.50%	0.6	0.9	0.8	1.0	No	No
10	-L- 87+00 RT 35.31052, -80.04455	(1)Rocky Creek (West)	0.0	6.0	6.0	0.7	70	350	1.10%	1.5	1.5	1.9	1.6	No	No
10	-L- 87+00 CL 35.31068, -80.04442	(1)Rocky Creek (West)	0.0	6.0	6.0	0.5	53	500	1.10%	0.8	1.3	1.0	1.4	No	No
11	-L- 99+26 LT 35.30879, -80.04101	(1)Rocky Creek (West)	0.0	6.0	6.0	0.3	35	325	2.79%	0.6	1.7	0.7	1.8	No	No
12	-L- 103+75 RT 35.30806, -80.03980	(1)Rocky Creek (West)	0.0	6.0	6.0	0.6	55	485	2.79%	1.0	1.9	1.2	2.1	No	No
12	-L- 108+73 RT 35.30729, -80.03842	(1)Rocky Creek (West)	0.0	6.0	6.0	0.5	47	435	2.79%	0.8	1.8	1.0	1.9	No	No
12	-L- 111+85 LT 35.30698, -80.03741	(1)Rocky Creek (West)	0.0	6.0	6.0	0.3	30	125	2.79%	0.8	1.9	1.1	2.0	No	No
12	-L- 115+40 LT 35.30643, -80.03643	(1)Rocky Creek (West)	0.0	6.0	6.0	0.6	64	235	1.50%	1.3	1.7	1.7	1.8	No	No
13	-L- 119+50 LT 35.30579, -80.03530	(2)Dumas Creek	0.0	6.0	6.0	0.8	84	400	1.50%	1.9	1.8	2.4	1.9	No	No
13	-L- 119+50 CL 35.30562, -80.03544	(2)Dumas Creek	0.0	6.0	6.0	0.6	63	640	1.50%	0.9	1.5	1.1	1.6	No	No

Additional Comments

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Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	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?
13	-L- 124+00 CL 35.30492, -80.03419	(2)Dumas Creek	0.0	6.0	6.0	0.4	43	440	1.50%	0.6	1.4	0.8	1.5	No	No
13	-L- 128+25 CL 35.30426, -80.03302	(2)Dumas Creek	0.0	6.0	6.0	0.4	41	415	1.50%	0.6	1.3	0.7	1.4	No	No
14	-L- 131+50 LT 35.30394, -80.03199	(2)Dumas Creek	0.0	6.0	4.0	0.5	53	250	1.84%	1.3	1.9	1.6	2.0	No	No
16	-L- 159+50 CL 35.30342, -80.02311	(2)Dumas Creek	0.0	6.0	5.1	1.0	102	600	0.30%	2.6	1.1	3.4	1.2	No	No
16	-L- 162+75 CL 35.30379, -80.02212	(2)Dumas Creek	0.0	6.0	6.0	0.4	36	360	2.29%	0.5	1.5	0.7	1.6	No	No
17	-L- 166+50 CL 35.30421, -80.02097	(2)Dumas Creek	0.0	6.0	6.0	0.4	43	440	3.00%	0.6	1.8	0.8	1.9	No	No
17	-L- 172+00 CL 35.30482, -80.01928	(2)Dumas Creek	0.0	6.0	6.0	0.3	31	290	3.00%	0.6	1.8	0.8	1.9	No	No
17	-L- 175+00 CL 35.30516, -80.01837	(2)Dumas Creek	0.0	6.0	6.0	0.4	40	400	2.61%	0.6	1.6	0.7	1.8	No	No
18	-L- 180+00 LT 35.30592, -80.01695	(3)Clarks Creek	0.0	6.0	4.0	0.2	21	100	0.80%	0.5	1.1	0.7	1.2	No	No
18	-L- 179+87 CL 35.30573, -80.01689	(3)Clarks Creek	0.0	6.0	6.0	0.1	10	90	0.80%	0.1	0.7	0.2	0.8	No	No
18	-L- 185+85 CL 35.30641, -80.01507	(3)Clarks Creek	0.0	6.0	6.0	0.6	63	585	2.20%	0.9	1.7	1.1	1.8	No	No
18	-L- 190+50 CL 35.30692, -80.01364	(3)Clarks Creek	0.0	6.0	5.7	0.7	70	455	1.00%	1.0	1.3	1.3	1.4	No	No
18	-L- 190+50 LT 35.30710, -80.01372	(3)Clarks Creek	0.0	6.0	4.0	0.5	54	460	1.00%	0.8	1.3	1.0	1.4	No	No
19	-L- 192+21 CL 35.30708, -80.01310	(3)Clarks Creek	0.0	6.0	5.7	0.6	58	350	0.30%	1.6	1.0	2.0	1.0	No	No
19	-L- 194+30 CL 35.30727, -80.01244	(3)Clarks Creek	0.0	6.0	5.7	0.7	69	405	1.74%	1.8	1.9	2.3	2.0	No	No
19	-L- 204+75 CL 35.30799, -80.00905	(3)Clarks Creek	0.0	6.0	6.0	0.3	26	240	2.94%	0.4	1.6	0.5	1.7	No	No
19	-L- 207+07 RT 35.30795, -80.00823	(3)Clarks Creek	0.0	6.0	4.0	0.7	74	330	1.76%	1.4	1.9	1.8	2.0	No	No
19	-L- 207+26 CL 35.30815, -80.00823	(3)Clarks Creek	0.0	6.0	6.0	0.3	34	310	1.76%	0.6	1.5	0.8	1.6	No	No
19	-L- 207+45 LT 35.30836, -80.00823	(3)Clarks Creek	0.0	6.0	6.0	0.6	61	290	1.76%	1.4	1.9	1.8	2.0	No	No

Additional Comments

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Swales

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20	-L- 210+50 LT 35.30856, -80.00723	(3)Clarks Creek	0.0	6.0	4.0	0.7	66	300	0.50%	1.6	1.2	2.0	1.3	No	No
20	-L- 210+50 CL 35.30837, -80.00718	(3)Clarks Creek	0.0	6.0	6.0	0.6	64	600	0.50%	0.9	1.0	1.2	1.1	No	No
20	-L- 210+50 RT 35.30817, -80.00712	(3)Clarks Creek	0.0	6.0	6.0	0.8	80	410	0.50%	1.9	1.2	2.4	1.3	No	No
20	-L- 216+59 CL 35.30877, -80.00519	(3)Clarks Creek	0.0	6.0	6.0	0.7	70	645	0.50%	1.0	1.0	1.2	1.1	No	No
21	-L- 223+15 CL 35.30920, -80.00306	(3)Clarks Creek	0.0	6.0	6.0	0.3	30	275	0.50%	0.4	0.3	0.6	0.9	No	No
21	-L- 226+00 CL 35.30939, -80.00213	(3)Clarks Creek	0.0	6.0	6.0	0.3	28	255	1.57%	0.4	1.2	0.5	1.3	No	No
21	-L- 228+65 CL 35.30956, -80.00127	(3)Clarks Creek	0.0	6.0	6.0	0.1	11	85	3.00%	0.4	1.6	0.6	1.7	No	No
21	-L- 233+50 CL 35.30988, -79.99969	(3)Clarks Creek	0.0	6.0	6.0	0.1	13	105	3.00%	0.4	1.6	0.5	1.7	No	No
22	-L- 238+25 LT 35.31039, -79.99820	(3)Clarks Creek	0.0	6.0	6.0	0.1	12	65	3.00%	0.6	1.8	0.8	1.9	No	No
22	-L- 240+00 CL 35.31030, -79.99757	(3)Clarks Creek	0.0	6.0	6.0	0.3	32	140	0.43%	1.1	1.0	1.4	1.1	No	No
22	-L- 240+00 RT 35.31013, -79.99751	(3)Clarks Creek	0.0	6.0	4.0	0.3	29	140	0.43%	0.5	0.9	0.6	0.9	No	No
23	-L- 243+00 RT 35.31038, -79.99654	(4)Lick Fork	0.0	6.0	5.3	0.2	20	160	1.20%	0.3	1.0	0.4	1.1	No	No
23	-L- 243+54 LT 35.31080, -79.99653	(4)Lick Fork	0.0	6.0	4.0	0.5	46	215	1.60%	1.1	1.7	1.4	1.8	No	No
23	-L- 243+56 CL 35.31061, -79.99644	(4)Lick Fork	0.0	6.0	6.0	0.4	39	215	1.60%	1.3	1.7	1.7	1.8	No	No
23	-L- 247+50 CL 35.31102, -79.99521	(4)Lick Fork	0.0	6.0	6.0	0.3	29	185	3.30%	0.6	1.8	0.7	1.9	No	No
23	-L- 252+00 CL 35.31144, -79.99380	(4)Lick Fork	0.0	6.0	6.0	0.3	33	300	3.30%	0.4	1.7	0.6	1.8	No	No
23	-L- 253+97 CL 35.31163, -79.99318	(4)Lick Fork	0.0	6.0	6.0	0.2	19	195	3.30%	0.3	1.5	0.3	1.6	No	No
24	-L- 258+00 CL 35.31202, -79.99192	(4)Lick Fork	0.0	6.0	6.0	0.4	39	400	3.30%	0.5	1.8	0.7	1.9	No	No
24	-L- 260+50 CL 35.31227, -79.99113	(4)Lick Fork	0.0	6.0	6.0	0.2	24	235	2.90%	0.5	1.7	0.7	1.8	No	No

Additional Comments



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24	-L- 263+00 LT 35.31270, -79.99044	(4)Lick Fork	0.0	6.0	4.0	0.8	83	390	1.20%	2.1	1.8	2.6	1.9	No	No
24	-L- 263+00 CL 35.31251, -79.99035	(4)Lick Fork	0.0	6.0	6.0	0.2	24	235	1.20%	0.3	1.1	0.4	1.2	No	No
24	-L- 263+00 RT 35.31233, -79.99026	(4)Lick Fork	0.0	6.0	4.0	0.6	59	350	1.20%	1.4	1.6	1.8	1.7	No	No
24	-L- 264+82 CL 35.31269, -79.98978	(4)Lick Fork	0.0	6.0	6.0	0.7	74	170	0.30%	0.6	0.7	0.7	0.8	No	No
24	-L- 267+50 CL 35.31295, -79.98894	(4)Lick Fork	0.0	6.0	6.0	0.3	29	290	1.20%	0.4	1.1	0.5	1.2	No	No
24	-L- 270+50 CL 35.31324, -79.98800	(4)Lick Fork	0.0	6.0	6.0	0.4	39	390	1.20%	0.5	1.2	0.7	1.3	No	No
24	-L- 270+50 LT 35.31343, -79.98809	(4)Lick Fork	0.0	6.0	4.0	1.1	114	390	1.20%	1.9	1.7	2.4	1.8	No	No
24	-L- 270+50 RT 35.31306, -79.98792	(4)Lick Fork	0.0	6.0	6.0	0.8	77	390	1.20%	2.0	1.7	2.6	1.8	No	No
25	-L- 274+50 LT 35.31382, -79.98683	(4)Lick Fork	0.0	6.0	4.0	0.5	53	140	1.20%	1.6	1.7	2.0	1.8	No	No
25	-L- 274+50 CL 35.31364, -79.98675	(4)Lick Fork	0.0	6.0	6.0	0.1	15	140	1.20%	0.4	1.1	0.5	1.2	No	No
25	-L- 274+50 RT 35.31345, -79.98666	(4)Lick Fork	0.0	6.0	4.0	0.5	47	200	1.20%	1.5	1.6	1.9	1.7	No	No
25	-L- 276+00 LT 35.31397, -79.98636	(4)Lick Fork	0.0	6.0	4.0	0.2	22	100	1.20%	0.5	1.2	0.6	1.3	No	No
25	-L- 276+00 CL 35.31378, -79.98628	(4)Lick Fork	0.0	6.0	6.0	0.1	15	125	1.20%	0.2	0.9	0.3	1.0	No	No
25	-L- 277+50 CL 35.31393, -79.98581	(4)Lick Fork	0.0	6.0	6.0	0.2	24	240	1.20%	0.4	1.1	0.5	1.2	No	No
25	-L- 280+12 LT 35.31437, -79.98507	(4)Lick Fork	0.0	6.0	4.0	0.7	74	360	1.20%	1.9	1.7	2.4	1.9	No	No
25	-L- 280+00 CL 35.31417, -79.98502	(4)Lick Fork	0.0	6.0	6.0	0.3	34	350	1.20%	0.5	1.2	0.6	1.2	No	No
25	-L- 283+50 CL 35.31452, -79.98393	(4)Lick Fork	0.0	6.0	6.0	0.3	29	290	1.20%	0.4	1.1	0.5	1.2	No	No
25	-L- 283+50 RT 35.31431, -79.98383	(4)Lick Fork	0.0	6.0	6.0	0.7	66	355	1.20%	1.9	1.7	2.4	1.8	No	No
25	-L- 283+85 LT 35.31473, -79.98390	(4)Lick Fork	0.0	6.0	4.0	0.7	74	255	1.20%	1.6	1.7	2.0	1.8	No	No

Additional Comments



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26	-L- 286+50 LT 35.31499, -79.98307	(4)Lick Fork	0.0	6.0	4.0	0.8	83	315	1.20%	1.8	1.7	2.2	1.8	No	No
26	-L- 286+50 CL 35.31481, -79.98299	(4)Lick Fork	0.0	6.0	6.0	0.3	31	315	1.20%	0.5	1.1	0.6	1.2	No	No
26	-L- 289+75 LT 35.31531, -79.98206	(4)Lick Fork	0.0	6.0	4.0	0.7	67	315	1.20%	1.6	1.7	2.0	1.8	No	No
26	-L- 289+75 CL 35.31513, -79.98197	(4)Lick Fork	0.0	6.0	6.0	0.3	31	315	1.20%	0.5	1.1	0.6	1.2	No	No
26	-L- 293+00 LT 35.31563, -79.98104	(4)Lick Fork	0.0	6.0	4.0	0.9	94	137	1.20%	0.8	1.4	0.9	1.5	No	No
26	-L- 293+00 CL 35.31544, -79.98095	(4)Lick Fork	0.0	6.0	6.0	0.3	27	260	1.20%	0.4	1.1	0.5	1.2	No	No
26	-L- 293+00 RT 35.31526, -79.98087	(4)Lick Fork	0.0	6.0	4.0	0.5	47	240	1.20%	1.2	1.5	1.5	1.6	No	No
26	-L- 294+50 LT 35.31578, -79.98057	(4)Lick Fork	0.0	6.0	4.0	0.8	78	100	1.20%	0.7	1.3	0.8	1.4	No	No
26	-L- 295+75 LT 35.31590, -79.98018	(4)Lick Fork	0.0	6.0	4.0	0.3	28	125	1.20%	1.5	1.6	1.9	1.7	No	No
26	-L- 295+75 CL 35.31571, -79.98009	(4)Lick Fork	0.0	6.0	6.0	0.4	40	385	1.20%	0.7	1.3	0.9	1.4	No	No
26	-L- 295+75 RT 35.31553, -79.98000	(4)Lick Fork	0.0	6.0	4.0	0.7	74	375	1.20%	1.9	1.7	2.4	1.8	No	No
27	-L- 300+50 RT 35.31616, -79.97859	(4)Lick Fork	0.0	6.0	6.0	0.3	32	285	1.50%	0.8	1.5	1.0	1.6	No	No
27	-L- 303+50 RT 35.31646, -79.97766	(4)Lick Fork	0.0	6.0	6.0	0.3	28	265	1.50%	0.6	1.4	0.8	1.5	No	No
27	-L- 306+25 CL 35.31674, -79.97680	(4)Lick Fork	0.0	6.0	6.0	0.1	12	115	2.60%	0.1	1.2	0.2	1.3	No	No
27	-L- 307+50 LT 35.31705, -79.97650	(4)Lick Fork	0.0	6.0	6.0	0.2	17	100	2.60%	0.5	1.6	0.6	1.7	No	No
27	-L- 307+50 CL 35.31686, -79.97641	(4)Lick Fork	0.0	6.0	6.0	0.2	17	80	2.60%	0.2	1.3	0.3	1.4	No	No
27	-L- 308+80 LT 35.31717, -79.97609	(4)Lick Fork	0.0	6.0	4.0	0.1	12	60	2.60%	0.3	1.5	0.4	1.6	No	No
27	-L- 309+50 CL 35.31704, -79.97577	(4)Lick Fork	0.0	6.0	6.0	0.3	30	240	2.60%	0.8	1.8	1.0	1.9	No	No
27	-L- 312+00 CL 35.31729, -79.97499	(4)Lick Fork	0.0	6.0	6.0	0.1	13	115	2.60%	0.9	1.9	1.2	2.0	No	No

Additional Comments

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28	-L- 313+15 LT 35.31760, -79.97473	(4)Lick Fork	0.0	6.0	4.0	0.2	23	140	2.60%	0.5	1.6	0.6	1.7	Yes	No
28	-L- 313+15 CL 35.31741, -79.97464	(4)Lick Fork	0.0	6.0	6.0	0.2	19	175	2.60%	0.6	1.7	0.8	1.8	No	No
28	-L- 315+00 CL 35.31760, -79.97406	(4)Lick Fork	0.0	6.0	6.0	0.3	35	285	2.60%	1.0	1.9	1.3	2.0	No	No
28	-L- 318+75 CL 35.31796, -79.97288	(4)Lick Fork	0.0	6.0	6.0	0.4	38	365	2.60%	0.5	1.6	0.7	1.7	No	No
28	-L- 322+50 LT 35.31851, -79.97180	(4)Lick Fork	0.0	6.0	4.0	0.7	74	400	2.40%	1.0	1.9	1.3	2.1	No	No
28	-L- 322+50 CL 35.31833, -79.97171	(4)Lick Fork	0.0	6.0	6.0	0.4	40	400	2.40%	0.6	1.6	0.7	1.7	No	No
29	-L- 328+44 LT 35.31909, -79.96993	(5)Rocky Creek (East)	0.0	6.0	4.0	0.4	39	195	1.96%	0.9	1.8	1.2	1.9	No	No
29	-L- 328+50 CL 35.31892, -79.96983	(5)Rocky Creek (East)	0.0	6.0	6.0	0.2	22	200	1.96%	0.3	1.3	0.4	1.4	No	No
29	-L- 332+00 LT 35.31944, -79.96882	(5)Rocky Creek (East)	0.0	6.0	4.0	0.5	54	325	1.96%	1.1	1.9	1.4	2.0	No	No
29	-L- 332+00 CL 35.3193, -79.96873	(5)Rocky Creek (East)	0.0	6.0	6.0	0.4	37	325	1.96%	0.5	1.4	0.7	1.5	No	No
29	-L- 332+00 RT 35.31907, -79.96865	(5)Rocky Creek (East)	0.0	6.0	4.3	0.7	68	255	1.96%	1.4	1.9	1.8	2.1	No	No
29	-L- 335+00 LT 35.31974, -79.96788	(5)Rocky Creek (East)	0.0	6.0	6.0	0.4	43	290	1.96%	1.0	1.7	1.3	1.8	No	No
29	-L- 335+00 CL 35.31955, -79.96779	(5)Rocky Creek (East)	0.0	6.0	6.0	0.3	31	290	1.96%	0.5	1.4	0.6	1.5	No	No
29	-L- 335+00 RT 35.31937, -79.96771	(5)Rocky Creek (East)	0.0	6.0	6.0	0.7	65	290	1.96%	1.5	1.9	2.0	2.0	No	No
29	-L- 338+50 CL 35.31989, -79.96670	(5)Rocky Creek (East)	0.0	6.0	6.0	0.4	37	340	1.96%	0.6	1.4	0.7	1.5	No	No
30	-L- 341+81 CL 35.32022, -79.96566	(5)Rocky Creek (East)	0.0	6.0	6.0	0.4	35	320	1.96%	0.5	1.4	0.6	1.5	No	No
30	-L- 346+00 CL 35.32063, -79.96435	(5)Rocky Creek (East)	0.0	6.0	6.0	0.4	44	405	1.96%	0.7	1.5	0.8	1.6	No	No
30	-L- 348+75 CL 35.32089, -79.96349	(5)Rocky Creek (East)	0.0	6.0	6.0	0.3	29	265	1.96%	0.4	1.4	0.5	1.5	No	No
30	-L- 352+31 CL 35.32124, -79.96237	(5)Rocky Creek (East)	0.0	6.0	6.0	0.4	38	345	1.96%	0.5	1.4	0.7	1.5	No	No

Additional Comments

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Swales

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31	-L- 355+50 CL 35.32155, -79.96137	(5)Rocky Creek (East)	0.0	6.0	6.0	0.3	33	310	1.96%	0.5	1.4	0.6	1.5	No	No
31	-L- 355+50 RT 35.32137, -79.96128	(5)Rocky Creek (East)	0.0	6.0	4.0	0.4	44	250	1.96%	1.1	1.9	1.5	2.0	No	No
31	-L- 358+24 LT 35.32201, -79.96060	(5)Rocky Creek (East)	0.0	6.0	4.3	0.5	46	275	1.96%	1.1	1.8	1.4	1.9	No	No
31	-L- 358+00 CL 35.32180, -79.96059	(5)Rocky Creek (East)	0.0	6.0	6.0	0.3	27	245	1.96%	0.4	1.3	0.5	1.4	No	No
31	-L- 357+85 RT 35.32160, -79.96055	(5)Rocky Creek (East)	0.0	6.0	4.0	0.4	44	225	1.96%	1.0	1.8	1.3	1.9	No	No
31	-L- 360+50 LT 35.32223, -79.95989	(5)Rocky Creek (East)	0.0	6.0	4.3	0.3	32	215	1.96%	0.8	1.7	1.1	1.8	No	No
31	-L- 360+50 CL 35.32204, -79.95980	(5)Rocky Creek (East)	0.0	6.0	6.0	0.3	27	235	1.96%	0.4	1.3	0.5	1.4	No	No
31	-L- 361+00 RT 35.32191, -79.95956	(5)Rocky Creek (East)	0.0	6.0	6.0	0.6	57	300	1.96%	1.3	1.9	1.7	2.0	No	No
32	-L- 371+00 CL 35.32267, -79.95639	(5)Rocky Creek (East)	0.0	6.0	6.0	0.4	36	125	1.96%	1.2	1.8	1.5	1.9	No	No
32	-L- 371+50 LT 35.32289, -79.95623	(5)Rocky Creek (East)	0.0	6.0	4.0	0.4	37	415	1.96%	0.5	1.5	0.7	1.6	No	No
32	-L- 372+50 CL 35.32269, -79.95589	(5)Rocky Creek (East)	0.0	6.0	6.0	0.2	23	140	1.12%	0.7	1.3	0.9	1.4	No	No
32	-L- 374+50 CL 35.32268, -79.95522	(5)Rocky Creek (East)	0.0	4.0	4.0	0.3	25	260	1.96%	1.0	1.9	1.3	2.0	No	No
32	-L- 376+50 LT 35.32264, -79.95455	(5)Rocky Creek (East)	0.0	6.0	6.0	0.3	26	225	1.12%	1.1	1.4	1.3	1.5	No	No
32	-L- 378+11 LT 35.32256, -79.95401	(5)Rocky Creek (East)	0.0	6.0	6.0	0.3	32	150	2.95%	0.9	1.9	1.1	2.1	No	No
33	-L- 385+00 CL 35.32216, -79.95176	(5)Rocky Creek (East)	0.0	6.0	6.0	0.3	26	240	2.95%	0.4	1.6	0.5	1.7	Yes	No
33	-L- 389+50 CL 35.32191, -79.95028	(5)Rocky Creek (East)	0.0	6.0	6.0	0.5	48	440	2.95%	0.7	1.8	0.9	1.9	Yes	No
33	-L- 393+10 CL 35.32171, -79.94910	(6)Rocky Creek (East)	0.0	6.0	6.0	0.4	39	345	0.30%	0.5	0.7	0.7	0.8	Yes	No
33	-L- 393+50 CL 35.32169, -79.94897	(6)Rocky Creek (East)	0.0	6.0	6.0	0.6	60	350	0.30%	1.0	0.8	1.3	0.9	No	No
34	-L- 397+12 CL 35.32150, -79.94777	(6)Rocky Creek (East)	0.0	6.0	6.0	0.6	61	300	0.50%	1.7	1.2	2.1	1.3	No	No

Additional Comments

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Swales

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34	-L- 400+19 CL 35.32145, -79.94675	(6)Rocky Creek (East)	0.0	6.0	6.0	0.1	12	50	0.50%	0.4	0.8	0.5	0.9	No	No
34	-L- 400+69 CL 35.32145, -79.94658	(6)Rocky Creek (East)	0.0	6.0	6.0	0.4	42	220	0.50%	1.5	1.1	1.9	1.2	No	No
34	-L- 401+70 LT 35.32168, -79.94627	(6)Rocky Creek (East)	0.0	6.0	4.0	0.4	42	110	1.19%	1.0	1.5	1.2	1.6	No	No
34	-L- 403+00 CL 35.32152, -79.94581	(6)Rocky Creek (East)	0.0	6.0	6.0	0.1	12	25	1.63%	0.3	1.1	0.4	1.2	No	No
34	-L- 404+25 CL 35.32156, -79.94539	(6)Rocky Creek (East)	0.0	6.0	6.0	0.3	31	213	2.45%	0.7	1.7	0.9	1.8	No	No
35	-L- 406+50 LT 35.32195, -79.94476	(7)Smith Branch	0.0	6.0	4.0	0.5	46	180	1.04%	1.2	1.5	1.5	1.6	No	No
35	-L- 406+50 CL 35.32174, -79.94467	(7)Smith Branch	0.0	6.0	6.0	0.3	29	185	0.92%	0.7	1.2	1.0	1.3	No	No
35	-L- 410+00 RT 35.32201, -79.94350	(7)Smith Branch	0.0	6.0	6.0	0.1	10	170	0.97%	0.1	0.8	0.2	0.8	No	No
35	-L- 410+25 CL 35.32220, -79.94354	(7)Smith Branch	0.0	6.0	6.0	0.3	31	180	2.58%	0.8	1.8	1.0	1.9	No	No
35	-L- 410+25 LT 35.32238, -79.94367	(7)Smith Branch	0.0	6.0	6.0	0.4	36	180	1.16%	0.9	1.4	1.2	1.5	No	No
35	-L- 414+25 CL 35.32288, -79.94249	(7)Smith Branch	0.0	6.0	5.0	0.7	73	400	1.90%	1.6	1.9	2.1	2.1	No	No
36	-L- 417+22 CL 35.32347, -79.94180	(7)Smith Branch	0.0	6.0	6.0	0.5	49	285	1.70%	1.3	1.7	1.6	1.8	No	No
36	-L- 420+50 LT 35.32427, -79.94123	(7)Smith Branch	0.0	6.0	4.0	0.4	40	200	1.74%	1.0	1.7	1.2	1.8	No	No
36	-L- 420+50 CL 35.32413, -79.94105	(7)Smith Branch	0.0	6.0	6.0	0.3	32	315	1.74%	0.5	1.3	0.6	1.4	No	No
36	-L- 423+60 CL 35.32477, -79.94036	(7)Smith Branch	0.0	6.0	6.0	0.3	31	300	1.40%	0.7	1.4	0.9	1.5	No	No
36	-L- 425+60 CL 35.32518, -79.93991	(7)Smith Branch	0.0	6.0	6.0	0.7	73	190	0.30%	2.6	1.1	3.3	1.1	No	No
36	-L- 427+79 CL 35.32558, -79.93937	(7)Smith Branch	0.0	6.0	6.0	0.5	48	90	1.59%	0.9	1.5	1.1	1.6	No	No
36	-L- 428+80 CL 35.32578, -79.93913	(7)Smith Branch	0.0	6.0	6.0	0.5	48	260	2.20%	1.6	2.0	2.0	2.1	Yes	No
37	-L- 431+50 RT 35.32613, -79.93831	(7)Smith Branch	0.0	6.0	6.0	0.2	21	115	3.63%	0.5	1.9	0.7	2.0	No	No

Additional Comments

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Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	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?
37	-L- 433+00 CL 35.32655, -79.93808	(7)Smith Branch	0.0	6.0	6.0	0.3	28	265	2.66%	0.5	1.6	0.6	1.7	Yes	No
37	-L- 435+75 CL 35.32705, -79.93739	(7)Smith Branch	0.0	6.0	6.0	0.2	24	165	1.47%	0.3	1.1	0.4	1.2	Yes	No
37	-L- 438+46 CL 35.32750, -79.93669	(7)Smith Branch	0.0	6.0	6.0	0.3	28	240	1.80%	0.3	1.2	0.4	1.3	Yes	No
37	-L- 438+46 RT 35.32737, -79.93653	(7)Smith Branch	0.0	6.0	4.0	0.8	83	195	1.80%	1.6	1.9	2.0	2.1	No	No
37	-L- 441+00 CL 35.32797, -79.93604	(7)Smith Branch	0.0	6.0	6.0	0.5	54	345	1.75%	1.4	1.8	1.7	1.9	No	No
37	-L- 441+00 RT 35.32782, -79.93588	(7)Smith Branch	0.0	6.0	4.0	0.7	68	345	2.65%	0.8	1.9	1.0	2.0	No	No
38	-L- 448+37 CL 35.32861, -79.93516	(7)Smith Branch	0.0	6.0	5.8	0.5	48	210	2.16%	0.9	1.8	1.2	1.9	No	No

Additional Comments



North Carolina Department of Transportation
Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 2.08; Released April 2018)

WBS Element: TIP No.: R-2527 County(ies): Montgomery Page 13 of 14

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)	BMP Associated w/ Buffer Rules?
35	-L- 414+23 RT 35.32267, -79.94225	(7)Smith Branch	Riprap Energy Dissipator Basin	Class I	5.2	Pipe	36	46.6	1.2	N/A

Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox (2014), NCDOT Standards, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.



North Carolina Department of Transportation
 Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
 FOR NCDOT PROJECTS



(Version 2.08; Released April 2018)

WBS Element: 35572.1.1 TIP No.: R-2527 County(ies): Montgomery Page 14 of 14

Level Spreaders, Hazardous Spill Basins, and Forebays

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Level Spreader, Hazardous Spill Basin, or Forebay?	Drainage Area (ac)	New Built- Upon Area (ac)	Required / Minimum Treatment			Treatment Achieved		BMP Associated w/ Buffer Rules?
6	-L- 36+30 LT 35.30860, -80.05895	(1) Rocky Creek (West)	Hazardous Spill Basin	3.40	0.16	2yr, tc=10 min, td= 5 min storm runoff + 1,550 cf (cf)	6992.0	cf	9728.0	cf	N/A

*Hazardous spill basins are pollution prevention measures designed for spill containment rather than stormwater treatment. Under Required / Minimum Treatment and Treatment Achieved, provide the minimum required volume and the actual HSB volume, respectively. Refer to the NCDOT Stormwater Best Management Practices Toolbox (2014) for design guidance.

Additional Comments

R-2527 Pipe Table with Embedded Rip Rap Locations

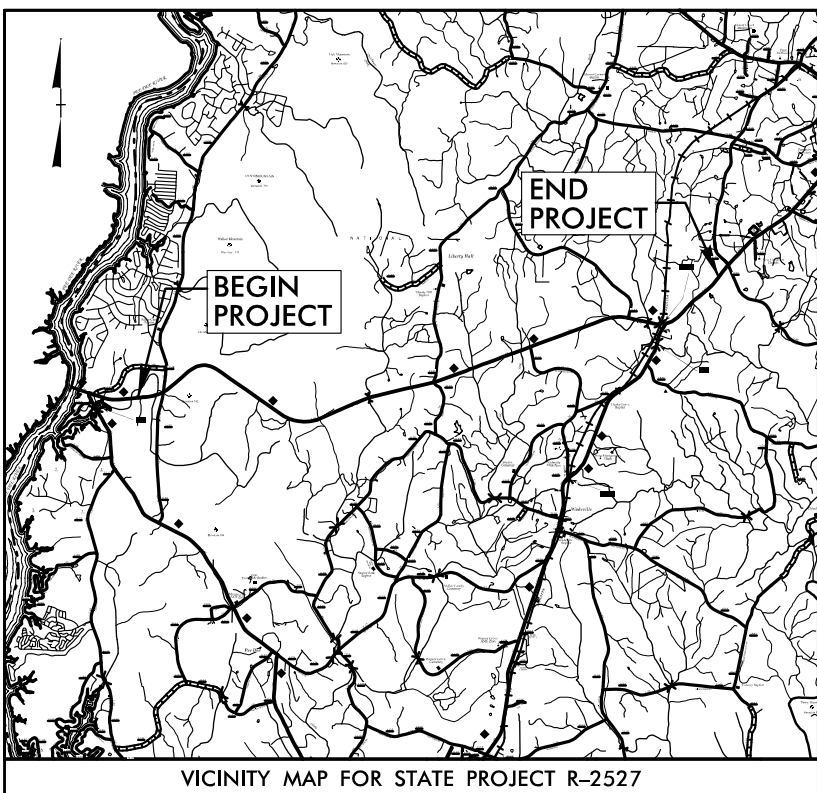
#	Plan Sheet	Station	JS?	NRTR Symbol	Existing Size	RECOMMENDATION	Pipe Buried Depth (ft)	Embedded Rip Rap in Channel Bed?	Embedded Length (FT)	*Notes
1	6	29+68	Yes	SB-1 (Rocky Creek West)	2 @ 9'x7'	Replace with 2@10'x10' RCBC	1	No - On BanksOnly	N/A	
2	6	34+39	Yes	SB-2	24"	Replace with 54" RCP (Analyzed as 48")	1	Yes	16	
3	10	80+60	Yes-Outlet only	SJ	2 @ 24" CMP	Replace with 36" RCP	N/A	Yes	12	
4	11	99+25	Yes-Both ends	SL-A	42"	Retain and extend on both ends	N/A	Yes	14	
5	13	125+46	Yes-Both ends	SM-1	30" & 18"	Replace with 48" RCP	N/A	Yes	16	
6	14/15	141+98	Yes-Both ends	SN	30"	Replace with 42" RCP	N/A	No - On BanksOnly	N/A	
7	15	150+43	Yes-Both ends	SO	30"	Replace with 42" RCP	0.7	Yes	25*	Channel relocation - 12' of existing channel has rip rap embedded.
8	16	159+65	Yes	SC (Dumas Creek)	60"	New 1@7'x8' RCBC	1	Yes	50*	Channel relocation
9	17	167+53	Yes-Both ends	SC-3/SC-2	24"	Replace with 36" RCP	N/A	Yes	N/A*	Channel relocation
10	19	194+60	Yes - Both ends	SD (Clark's Creek)	2@10'x7' RCBC	Replace with 2@14'x9' RCBC	1 in west barrel and 2 in east barrel	No - On BanksOnly	N/A	
11	21	223+24	Yes - Both Ends	SP	60"	66" Welded Steel	1	Yes	N/A*	Channel relocation
12	22	238+25	Yes - Outlet only	SQ	18" RCP	Replace with 24" RCP	N/A	Yes	8	
13	23	243+56	Yes	SR	24	Replace with 36" RCP	1	Yes	12	
14	23	254+00	Yes - Outlet only	SS-1	24" RCP	Replace with 30" system	N/A	No - On BanksOnly	N/A	
15	24	265+65	Yes	SU	NA	New 60" RCP crosspipe	1	Yes	N/A*	Channel relocation
16	24	266+92	Yes - Both ends	SE (UT to Lick Fork)	2 @ 7'x7' RCBC	Replace with 2@9'x7' RCBC	1	Yes	100	Channel relocation
17	27	303+00	Yes	SF-A (Lick Fork)	60" RCP	Replace with 1@8x10 RCBC	1	Yes	N/A*	Channel relocation
18	28	314+73	Yes-Both ends	SW-B	24" RCP	Replace with 42" RCP	1	Yes	14	
19	30	341+81	No	N/A	24"	Replace with 36" RCP	N/A	Yes	N/A*	Not JS
20	30	347+22	Yes-Both ends	SX	36" RCP	Replace with 60" RCP	1	Yes	N/A*	Channel relocation - 113' US, 31' DS
21	31	365+72	Yes	SY-A	1@7'x5' RCBC	Replace with 1@8x10 RCBC	1	Yes	N/A*	Channel relocation - 40' DS
22	33	385+12	Yes	SY-A	1@7'x5' RCBC	Replace with 1@8x10 RCBC	1	Yes	26*	Channel relocation US
23	33	391+98	Yes	SF-B (Rocky Creek)	3@9'x11' RCBC	Replace with 3@14'x12' RCBC	1 in west and middle barrel, 2 in east barrel	No - On BanksOnly	N/A	
24	35	417+22	Yes - Outlet only	SZ	18" RCP	Replace with 30" RCP	N/A	Yes	10	
25	36	427+46	Yes	SY-B (Smith Branch)	1@8'x8' RCBC	Replace with 9'x11' RCBC	1	Yes	N/A*	Channel relocation - 30' DS

Pipe Bury Guidelines:

- Not a JS - Don't Bury
- JS only on one end - Don't Bury
- JS on both ends and has pipe slope over 4% -Don't Bury
- Extensions of current pipes that don't involve replacement - Don't bury
- Bedrock prevents burial - Don't Bury

09/28/99

TIP PROJECT: R-2527



VICINITY MAP FOR STATE PROJECT R-2527
See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MONTGOMERY COUNTY

LOCATION: NC 24-27 FROM NC 73 TO THE TROY BYPASS
TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURE, CULVERTS, AND RAILROAD TRACKWORK

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2527	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
35572.1.1	N/A	P.E.	
35572.2.1	N/A	RIGHT OF WAY	
35572.2.3	N/A	UTILITIES	

90% PLANS

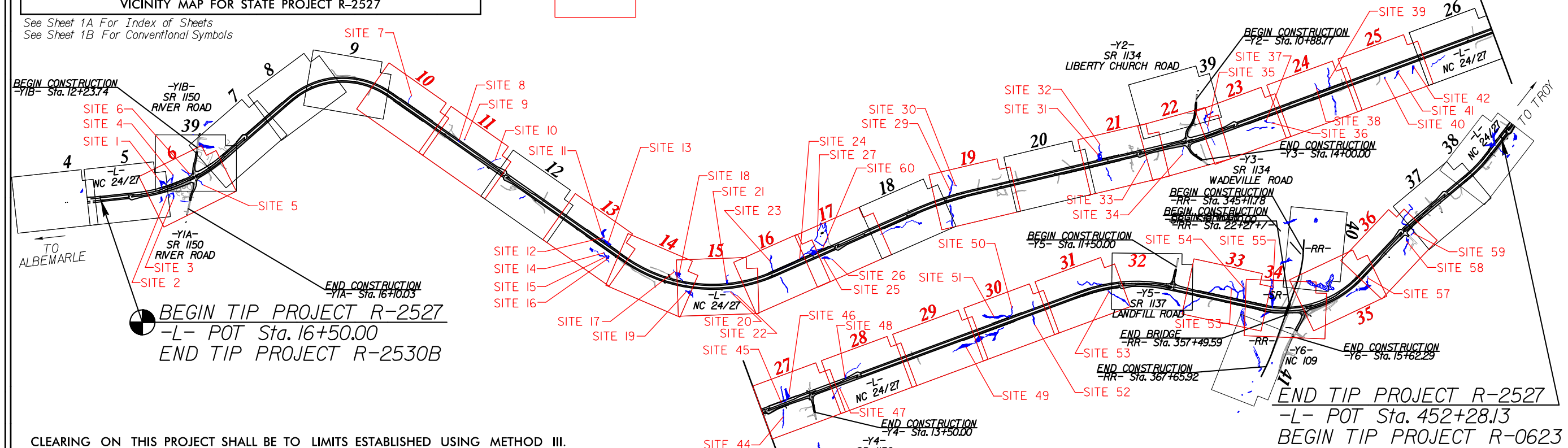
PERMIT DRAWING SHEET 1 OF 91

WETLAND AND SURFACE WATER IMPACTS PERMIT



= SHEETS WITH IMPACTS

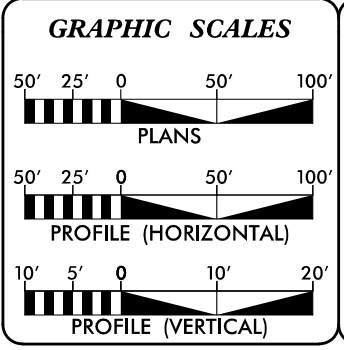
SITE BLOWUPS: 1" = 25'



CLEARING ON THIS PROJECT SHALL BE TO LIMITS ESTABLISHED USING METHOD III.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT:



DESIGN DATA

ADT 2021 =	11,839
ADT 2041 =	14,535
K =	9%
D =	55%
T =	14% *
V =	60 MPH
* TTST = 8% DUAL 6%	
FUNC CLASS = RURAL MINOR ARTERIAL	
REGIONAL TIER	

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2527	=	8.253 mi.
LENGTH STRUCTURES TIP PROJECT R-2527	=	0.000 mi.
TOTAL LENGTH TIP PROJECT R-2527	=	8.253 mi.

Prepared in the Offices of:

2018 STANDARD SPECIFICATIONS

VHB Engineering NC, P.C. (C-37085)
940 Main Campus Drive, Suite 500
Raleigh, NC 27606

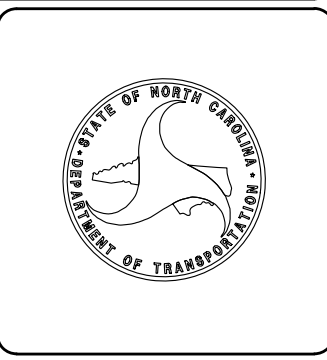
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HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

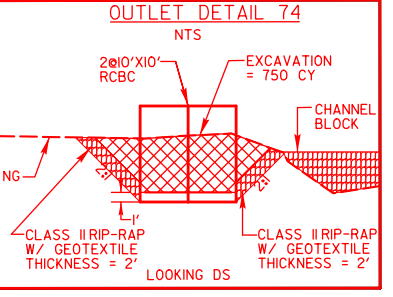
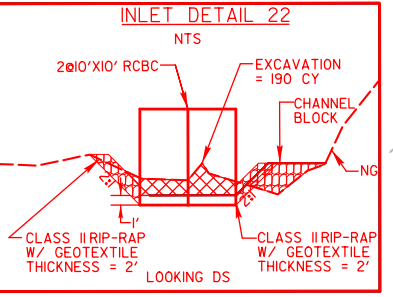
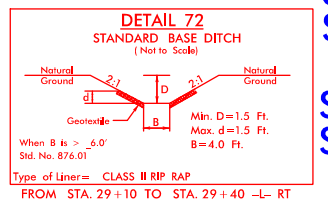
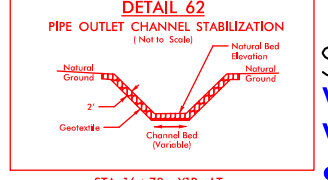
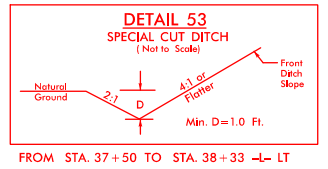
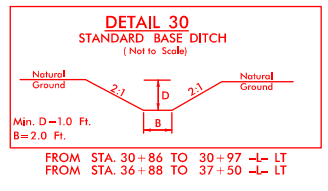
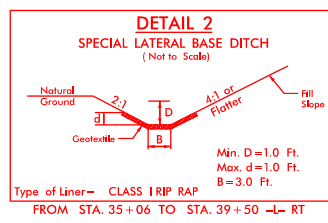
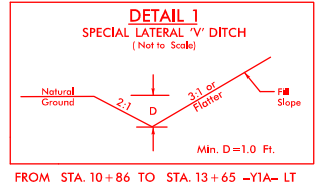
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

**PERMIT DRAWING
SHEET 2 OF 91**



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

WETLAND WF

WETLAND WE

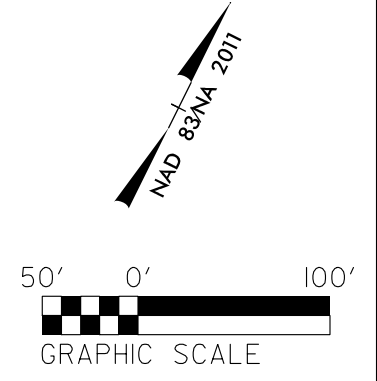
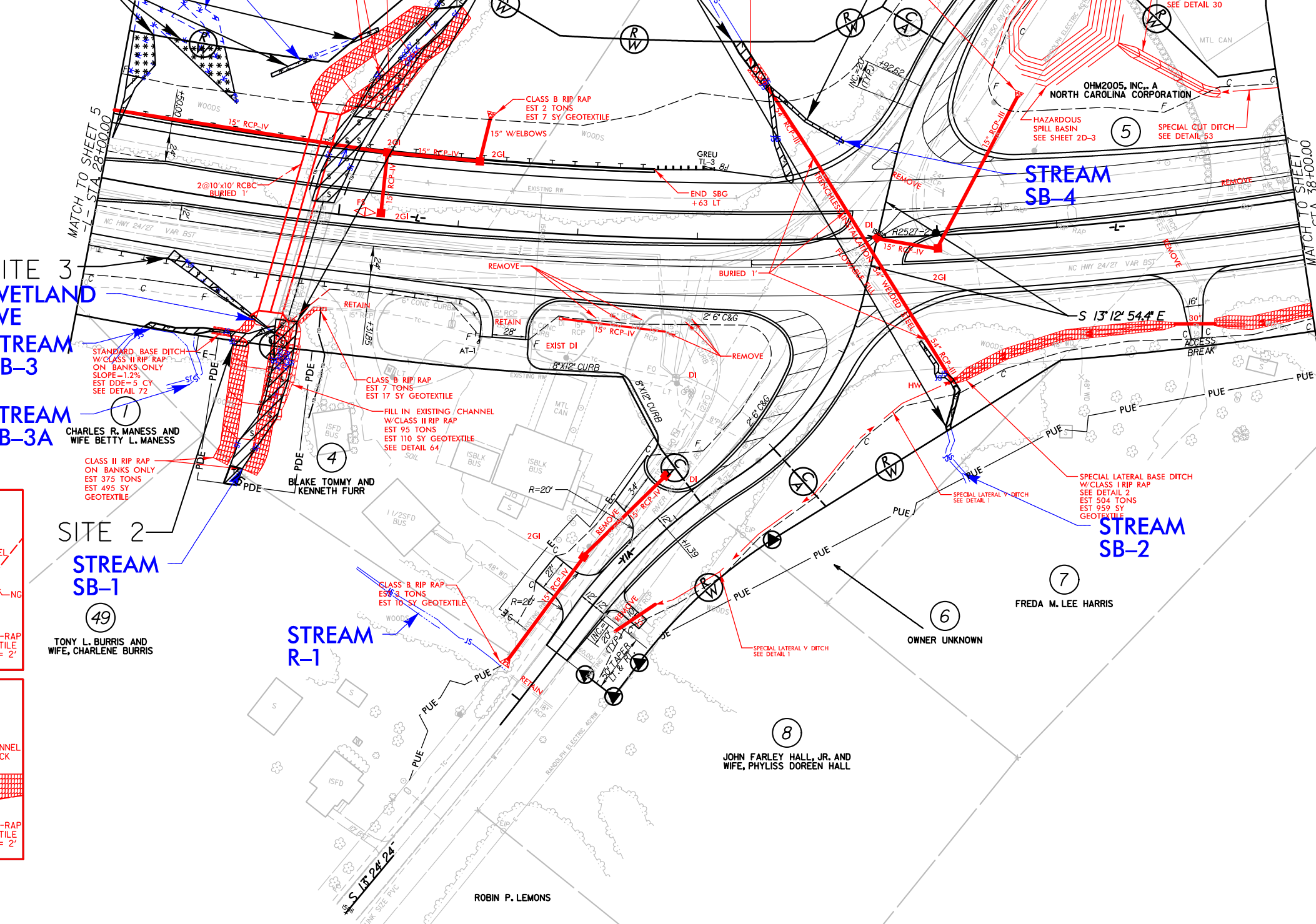
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STREAM SB-3A

STREAM SB-3

STREAM SB-2

STREAM R-1



FOR INTERSECTION DETAIL, SEE SHEET 2B-2

FOR -L- PROFILE, SEE SHEET 42

FOR -Y1A- PROFILE, SEE SHEET 58

FOR -Y1B- PROFILE, SEE SHEET 58

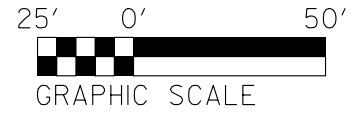
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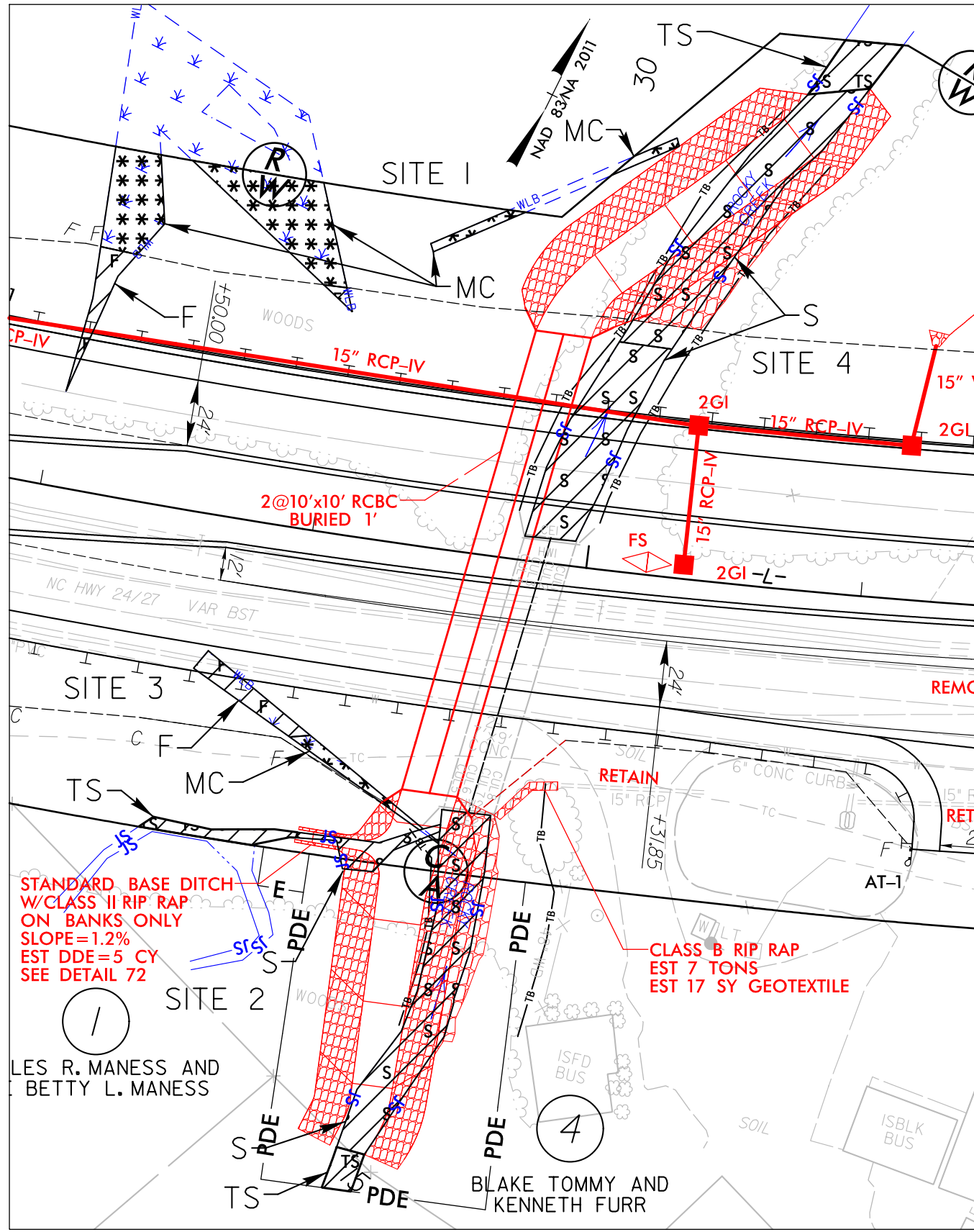
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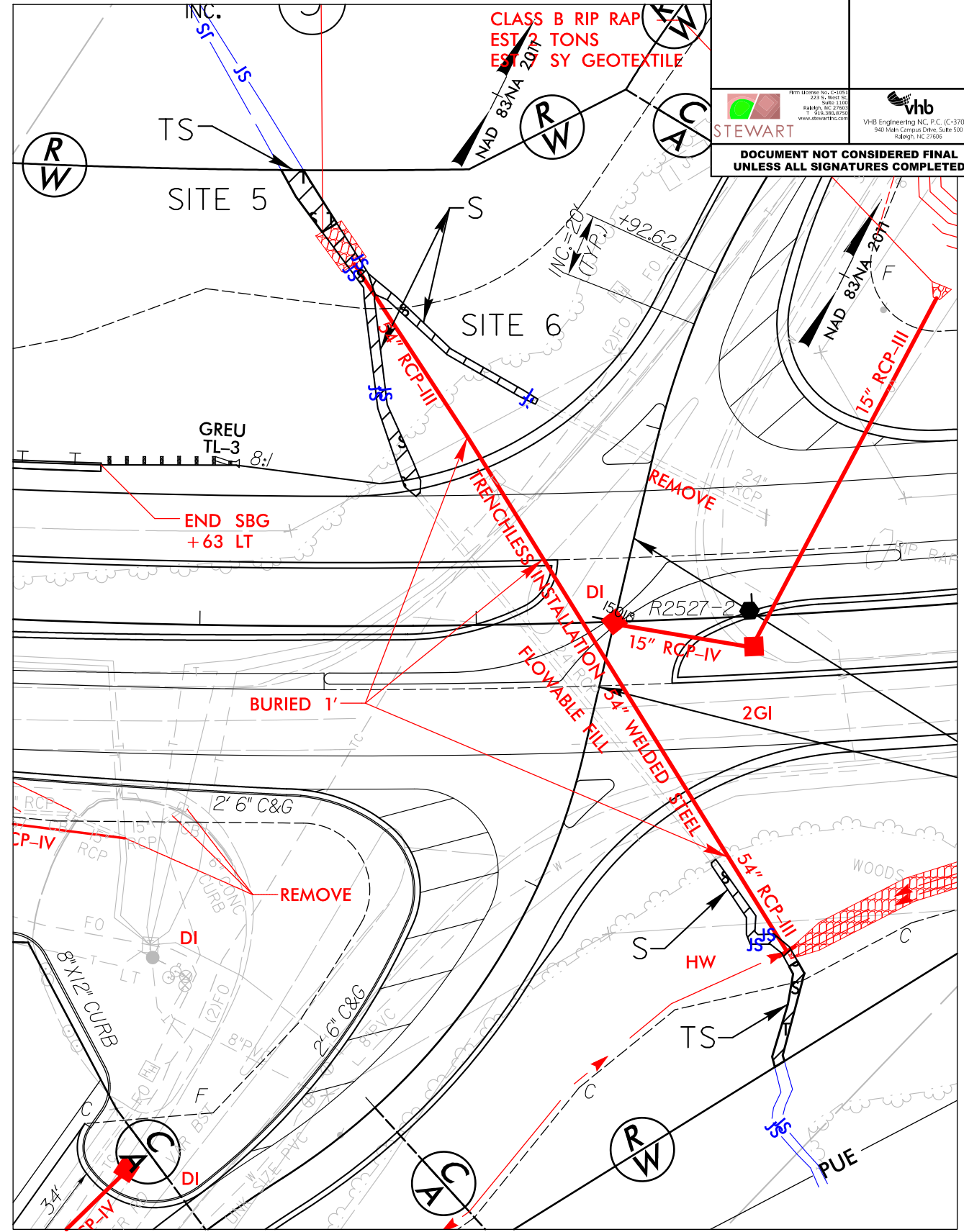
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- DENOTES IMPACTS IN SURFACE WATER
- DENOTES FILL IN WETLAND
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



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SITES 1-4



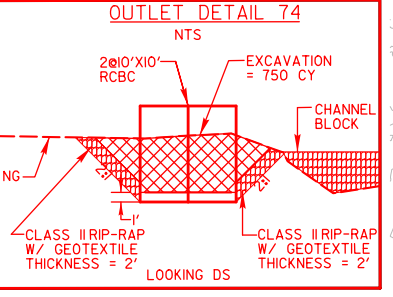
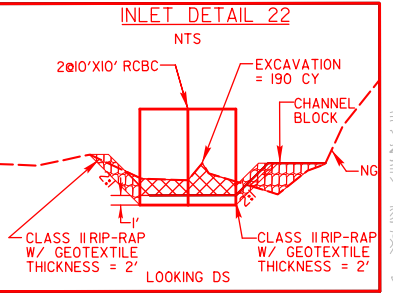
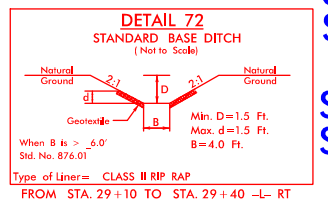
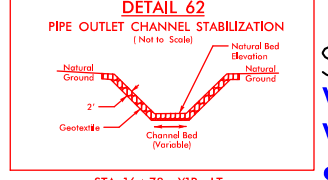
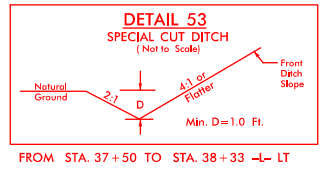
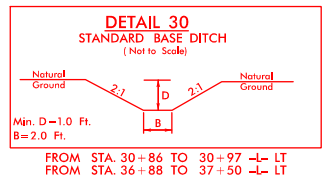
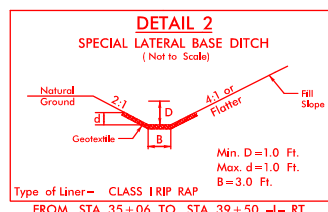
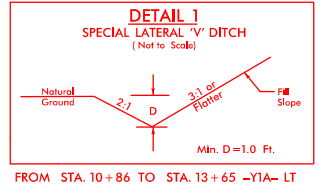
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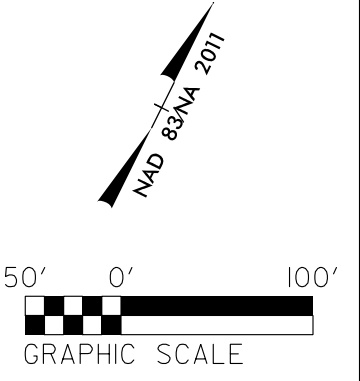
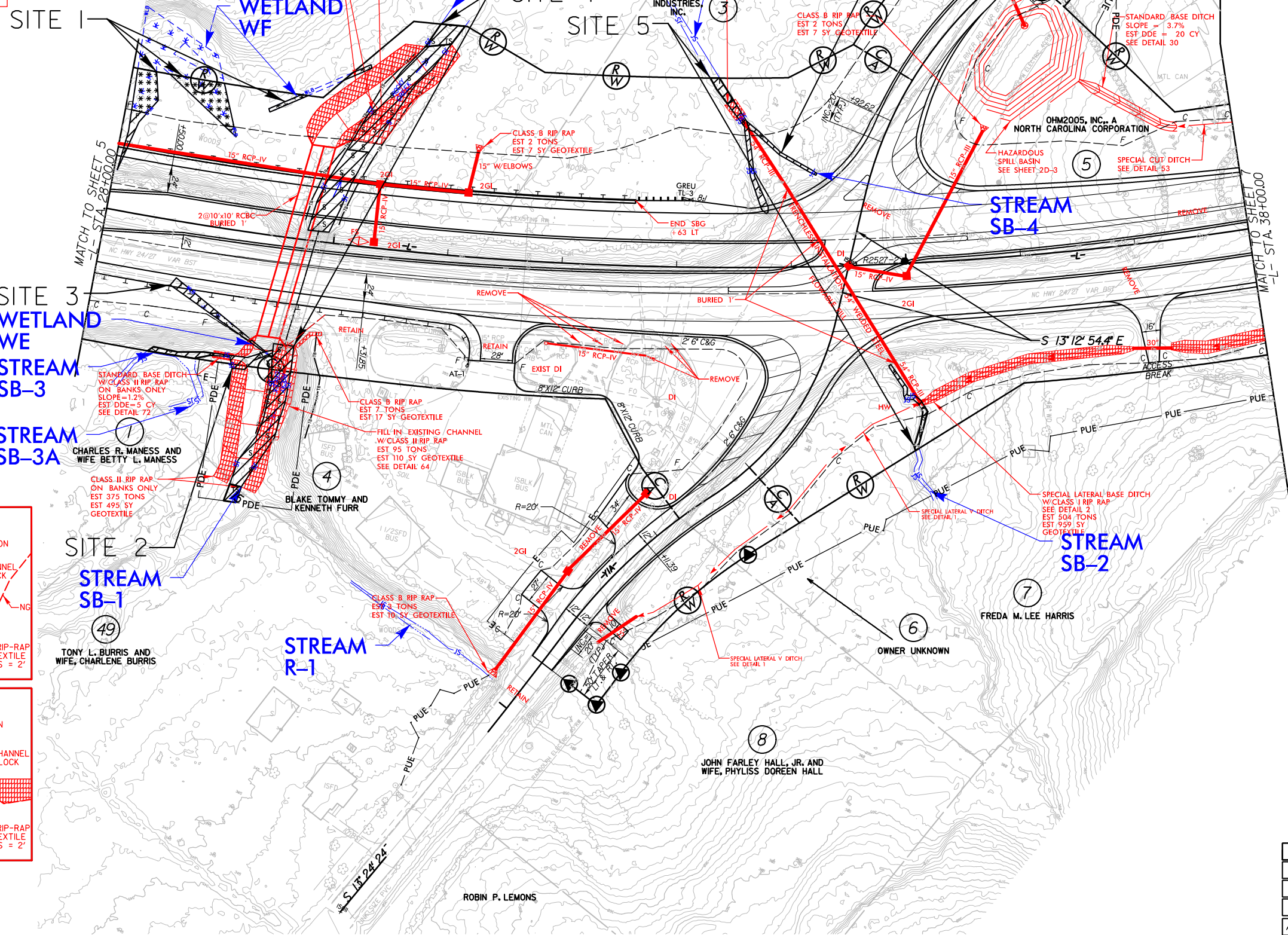
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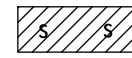

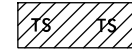


- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER





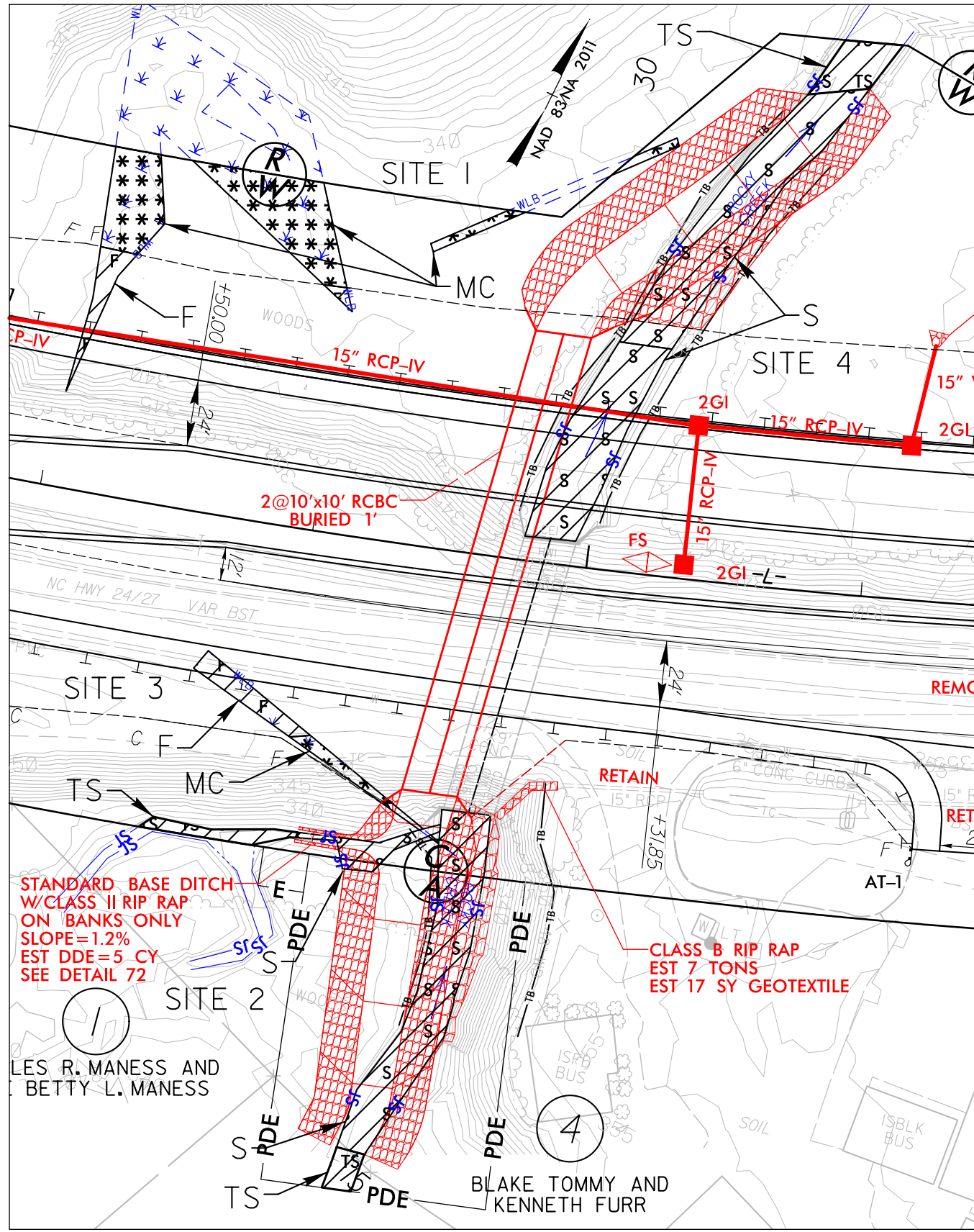
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FOR -Y1A- PROFILE, SEE SHEET 58
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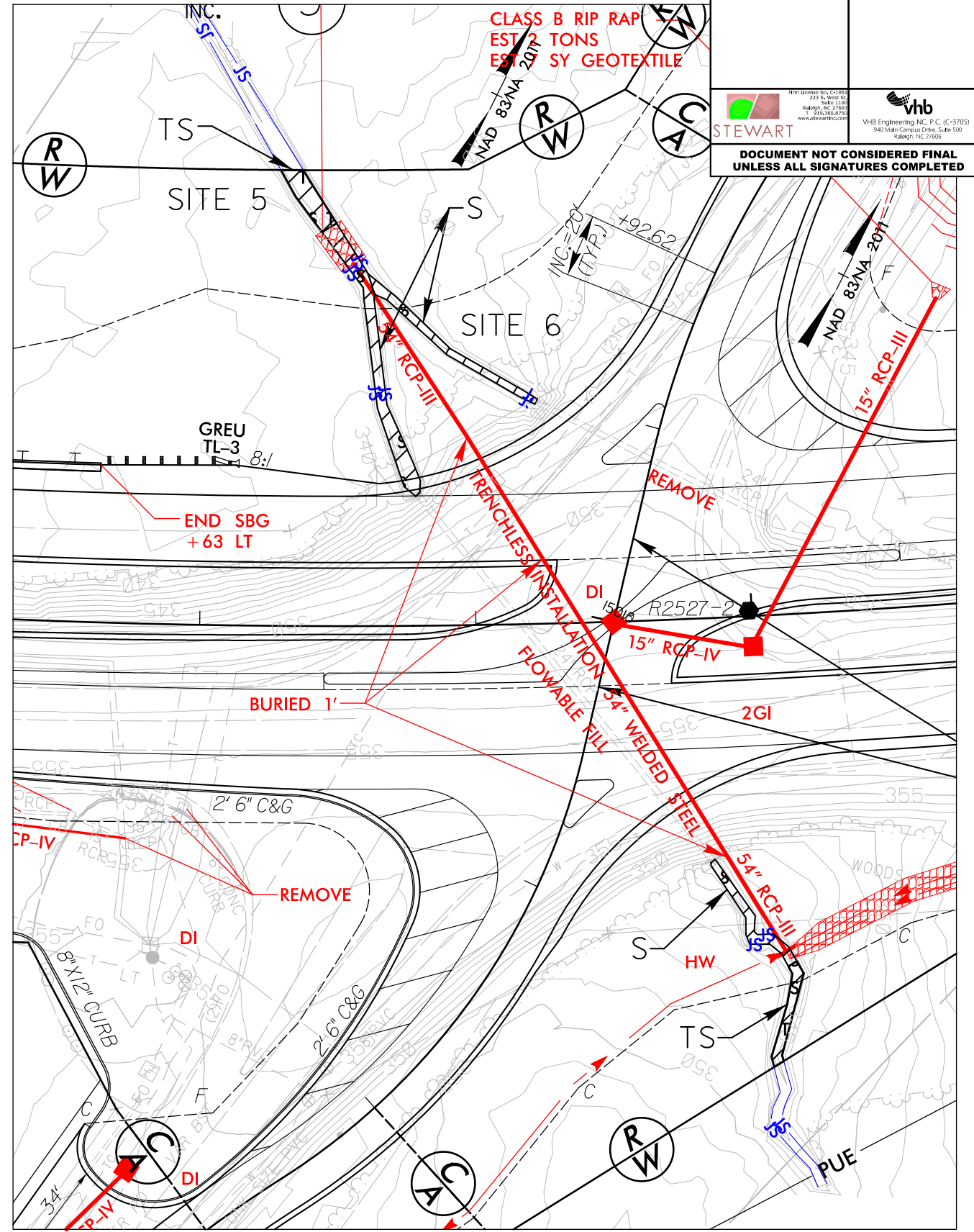
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PROJECT REFERENCE NO. R-2527	SHEET NO. 6
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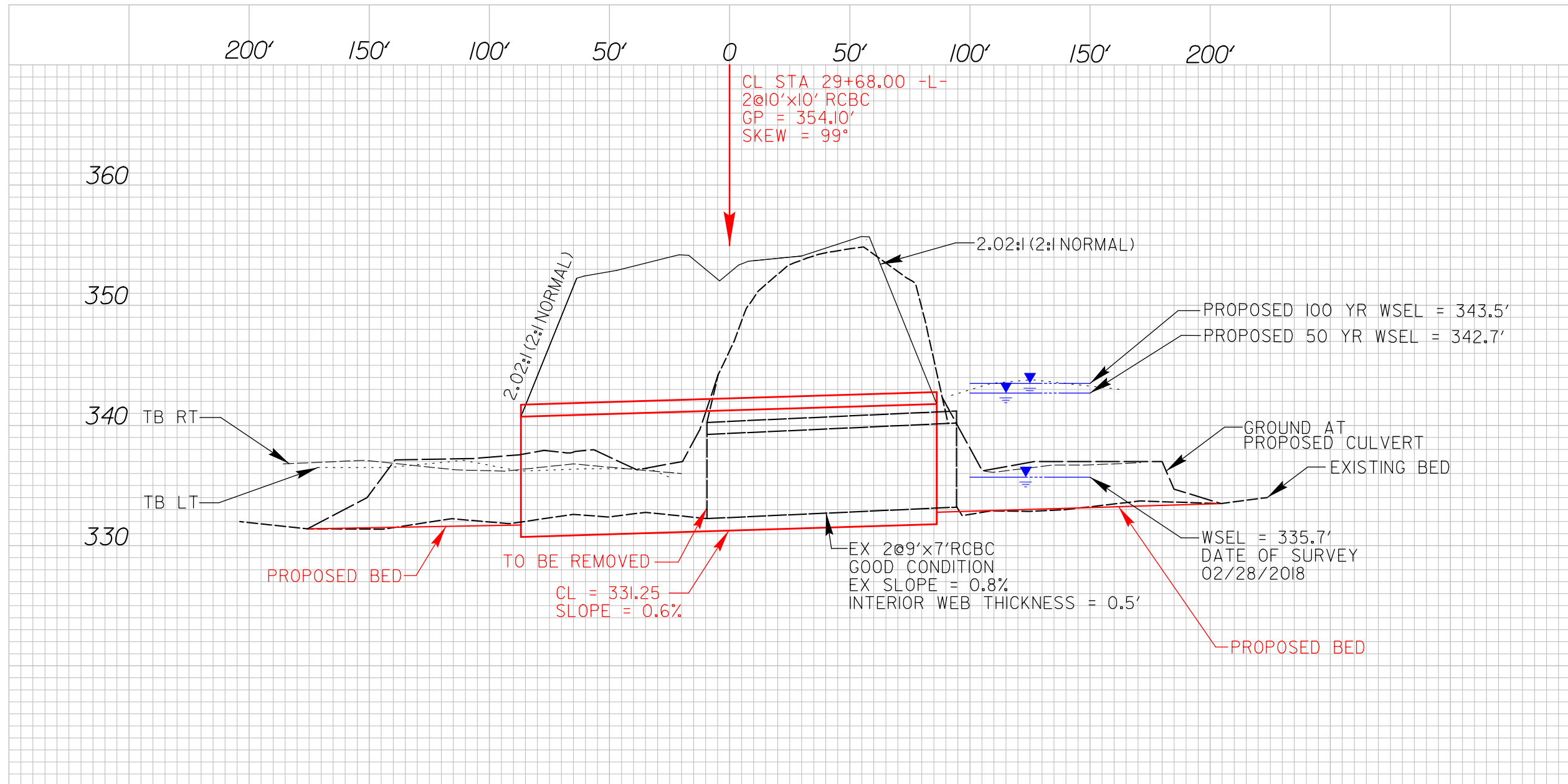
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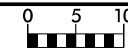


REVISIONS

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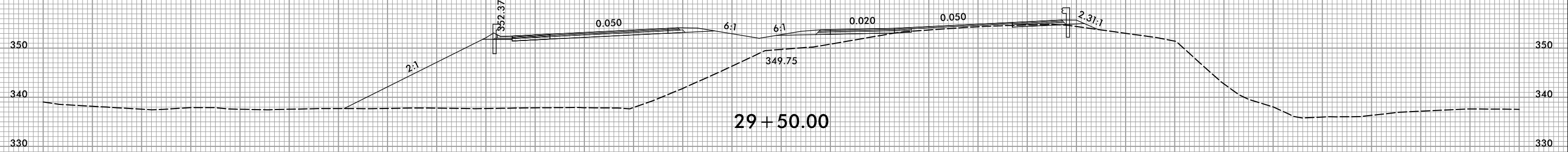
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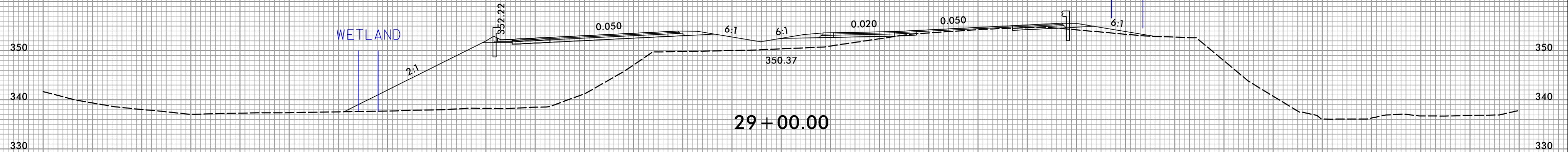
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SHEET 7 OF 91**

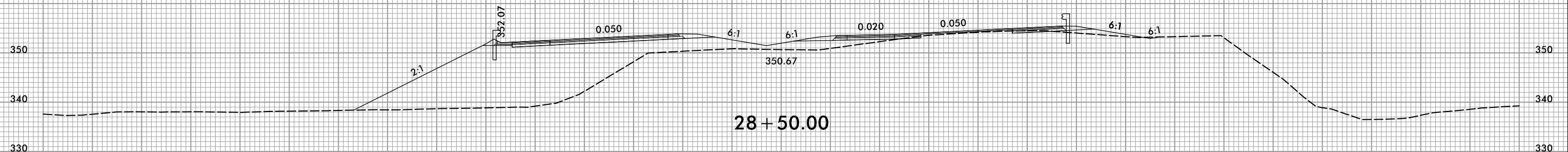


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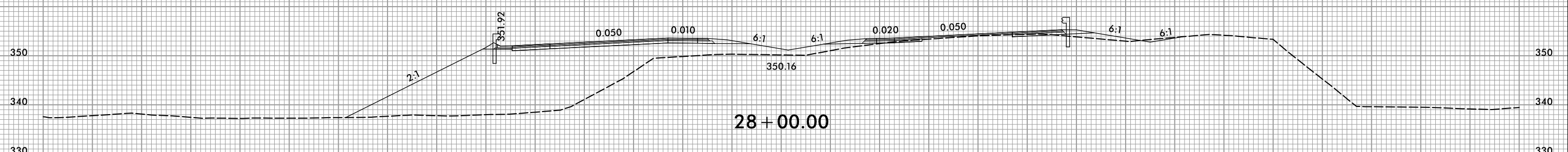
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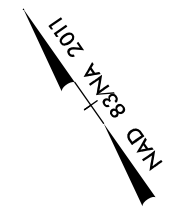
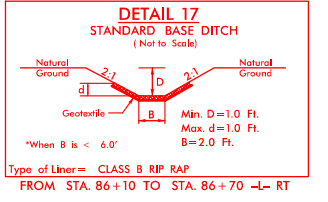
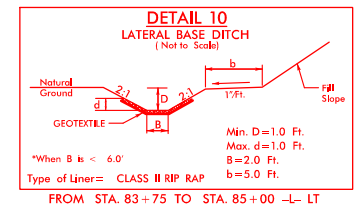
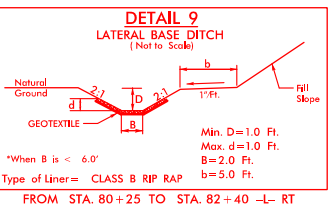
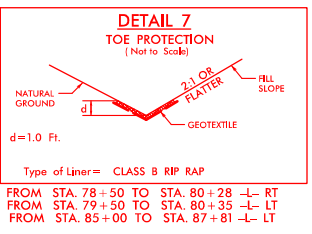
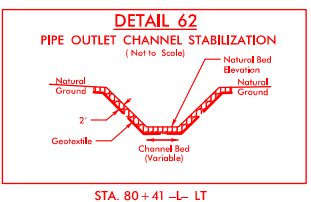


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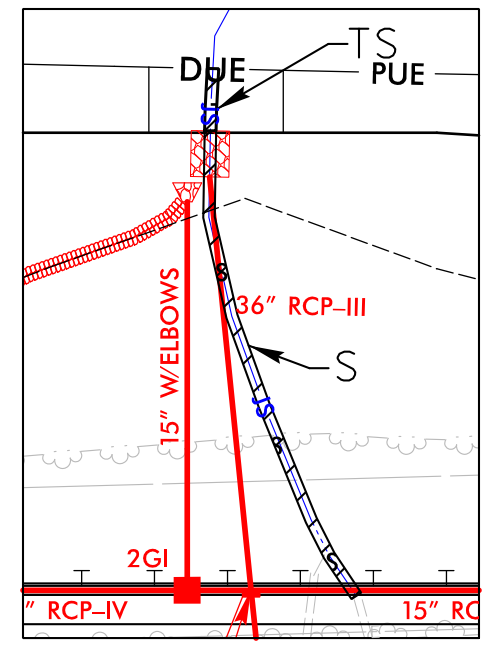
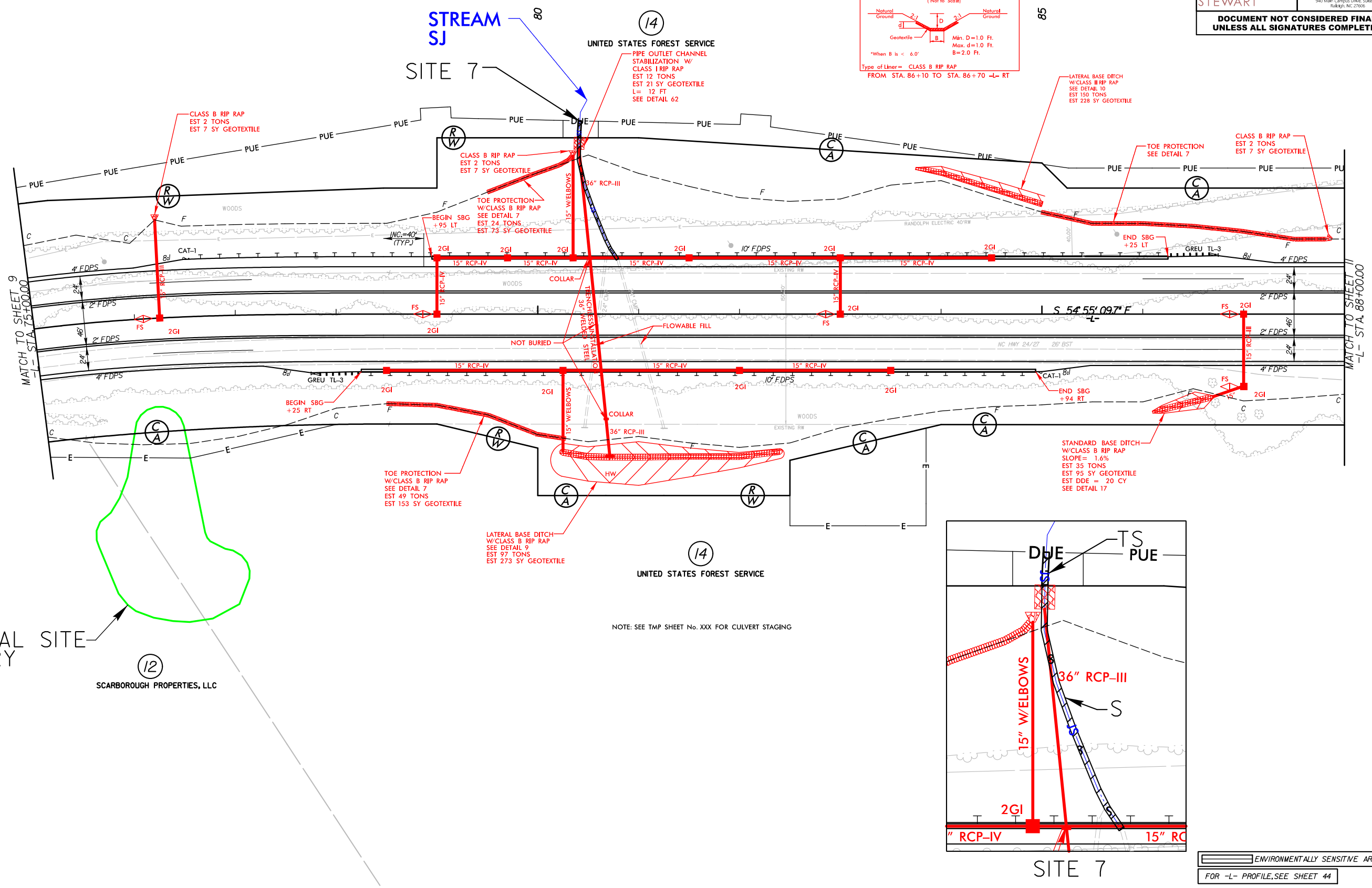
**PERMIT DRAWING
SHEET 8 OF 91**



DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO. R-2527	SHEET NO. 10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>	



HISTORICAL SITE BOUNDARY
SCARBOROUGH PROPERTIES, LLC

NOTE: SEE TMP SHEET No. XXX FOR CULVERT STAGING

ENVIRONMENTALLY SENSITIVE AREA
FOR -L- PROFILE, SEE SHEET 44

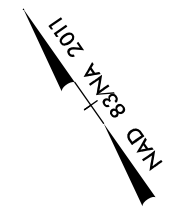
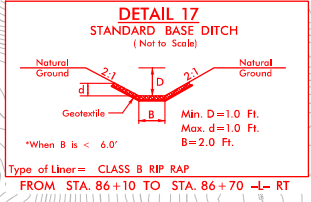
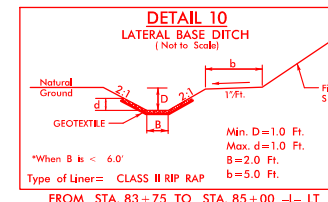
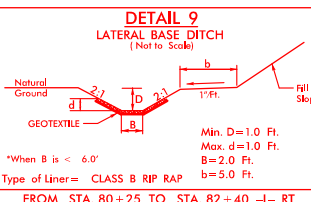
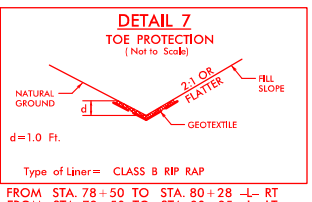
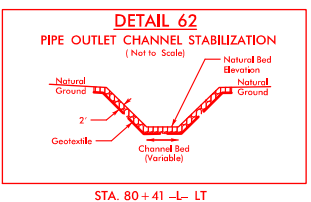
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 Stewart

5/14/99

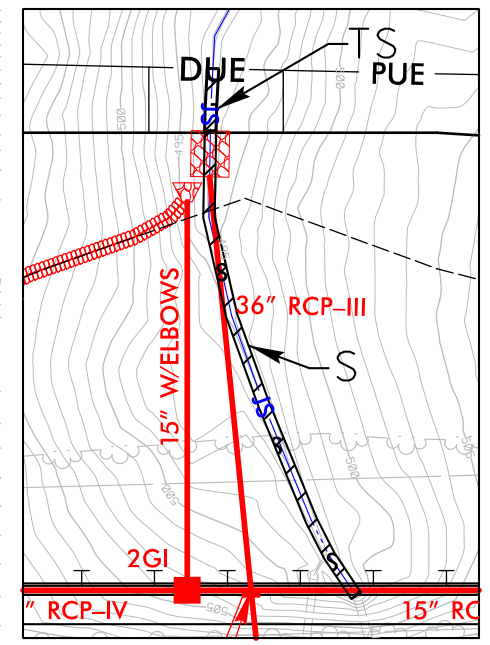
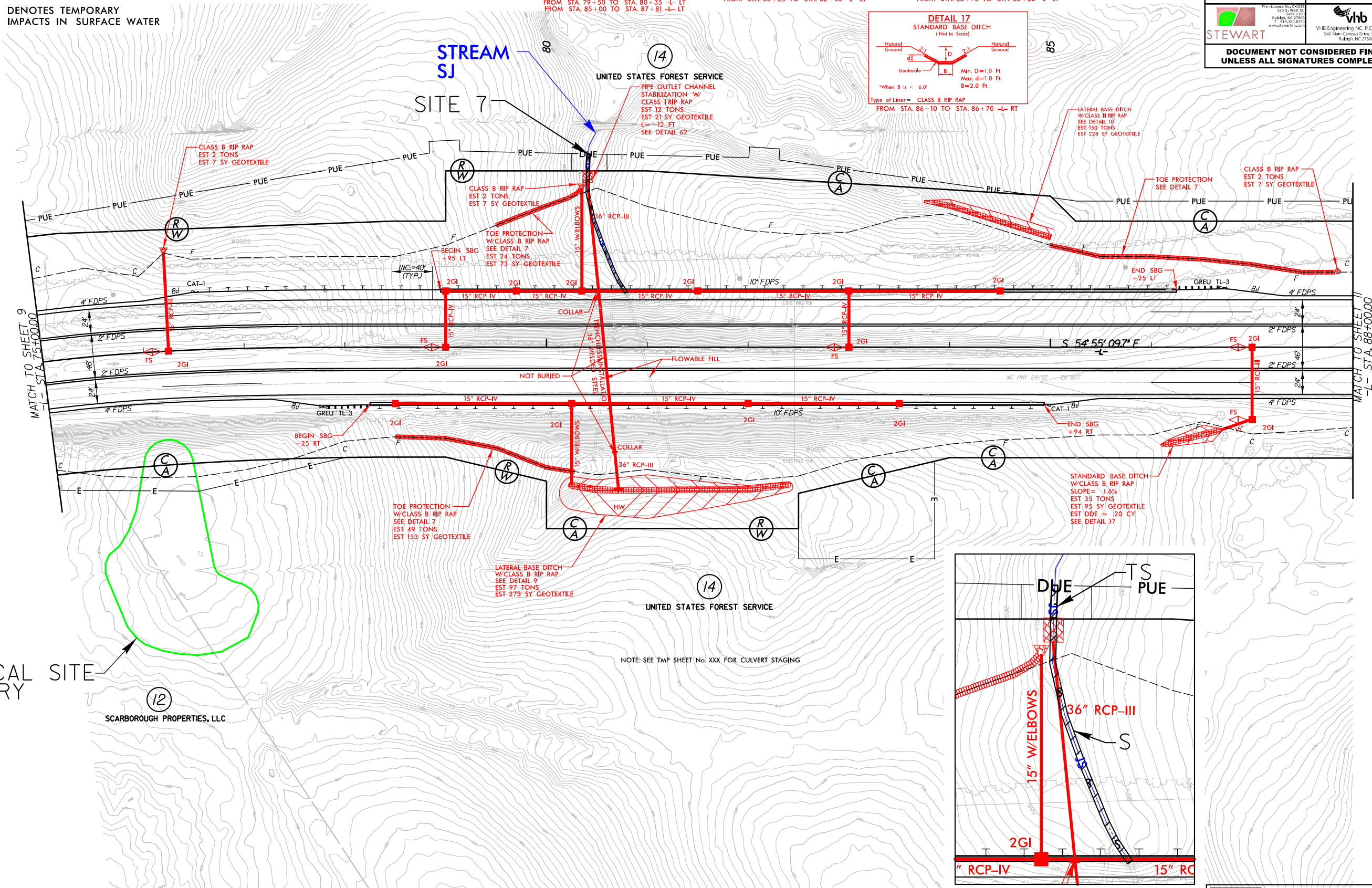
PERMIT DRAWING SHEET 9 OF 91



DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO. R-2527	SHEET NO. 10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

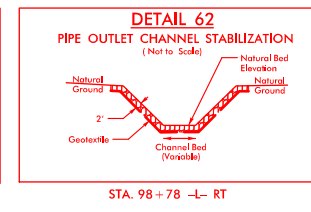
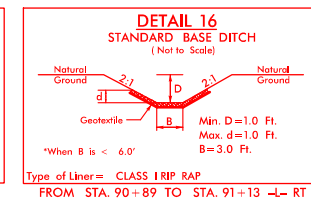
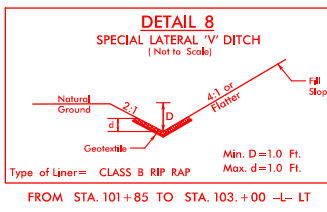
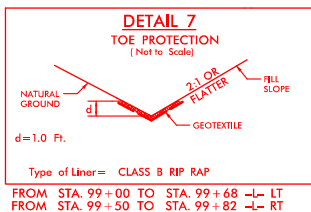
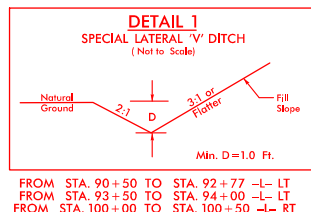


ENVIRONMENTALLY SENSITIVE AREA
FOR -L- PROFILE, SEE SHEET 44

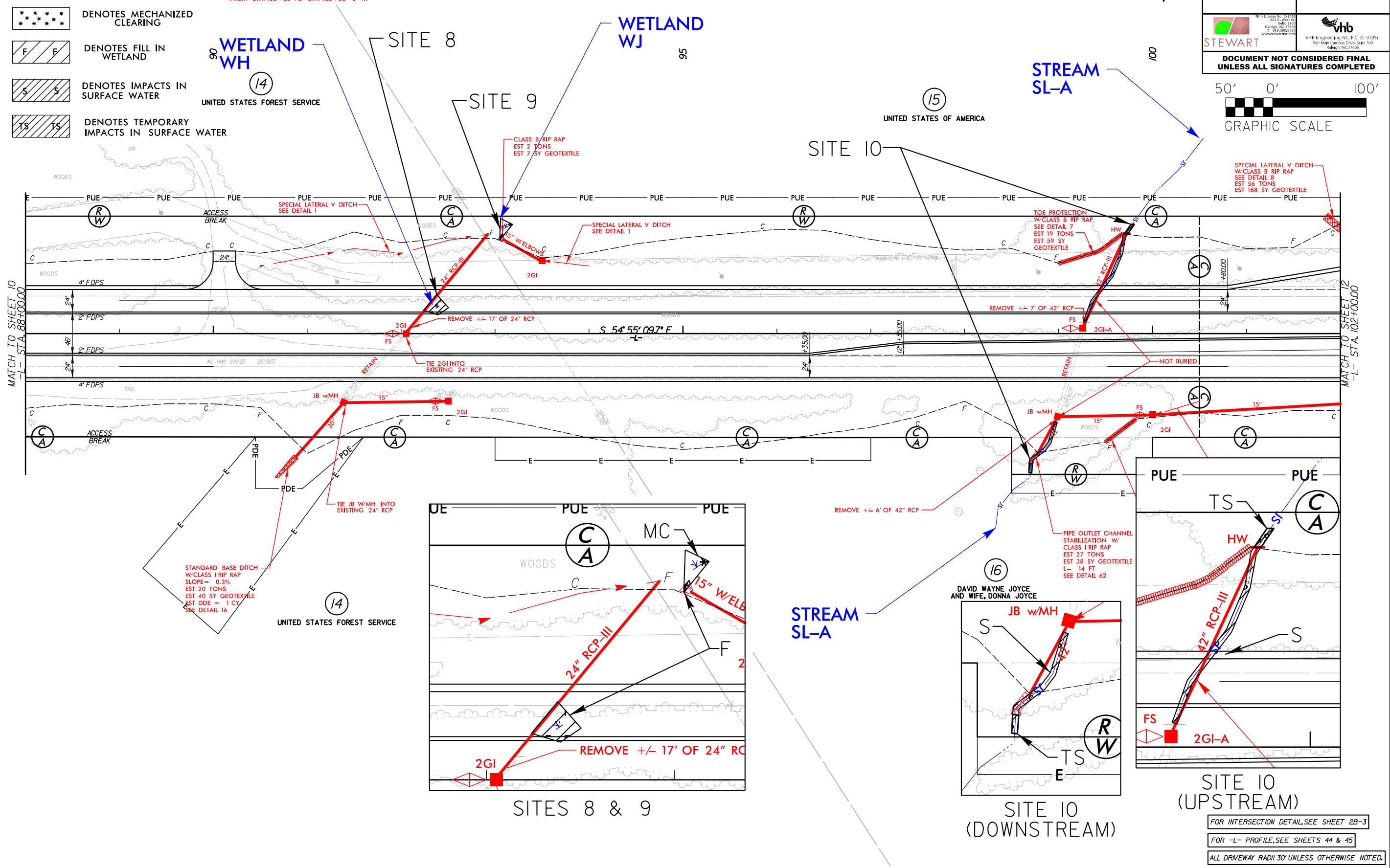
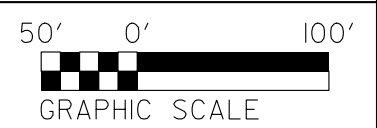
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5/14/99

PERMIT DRAWING SHEET 10 OF 91



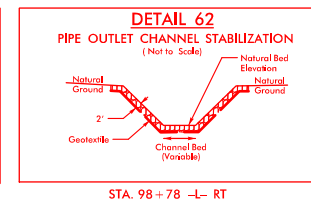
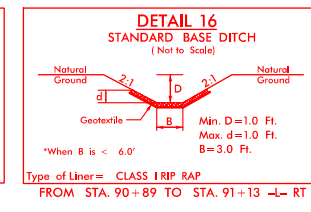
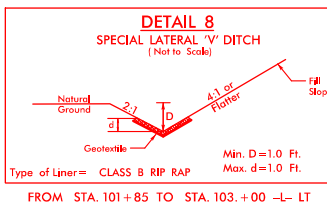
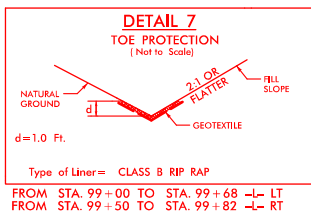
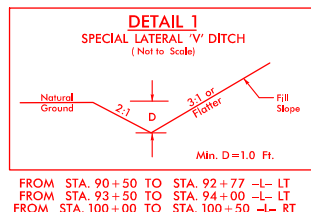
PROJECT REFERENCE NO. R-2527	SHEET NO. 11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



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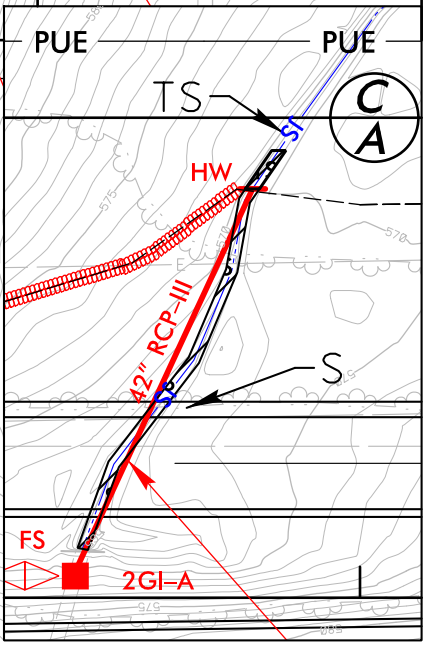
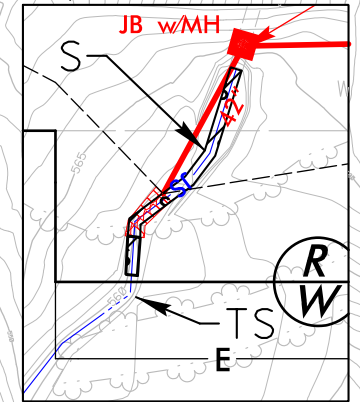
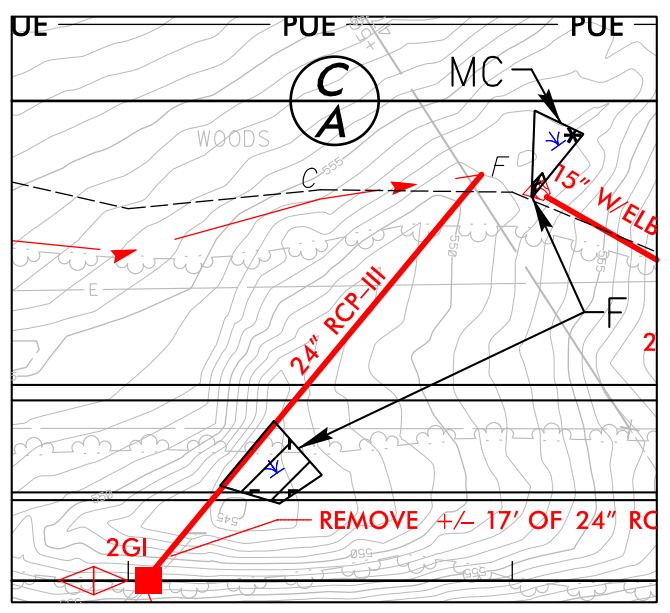
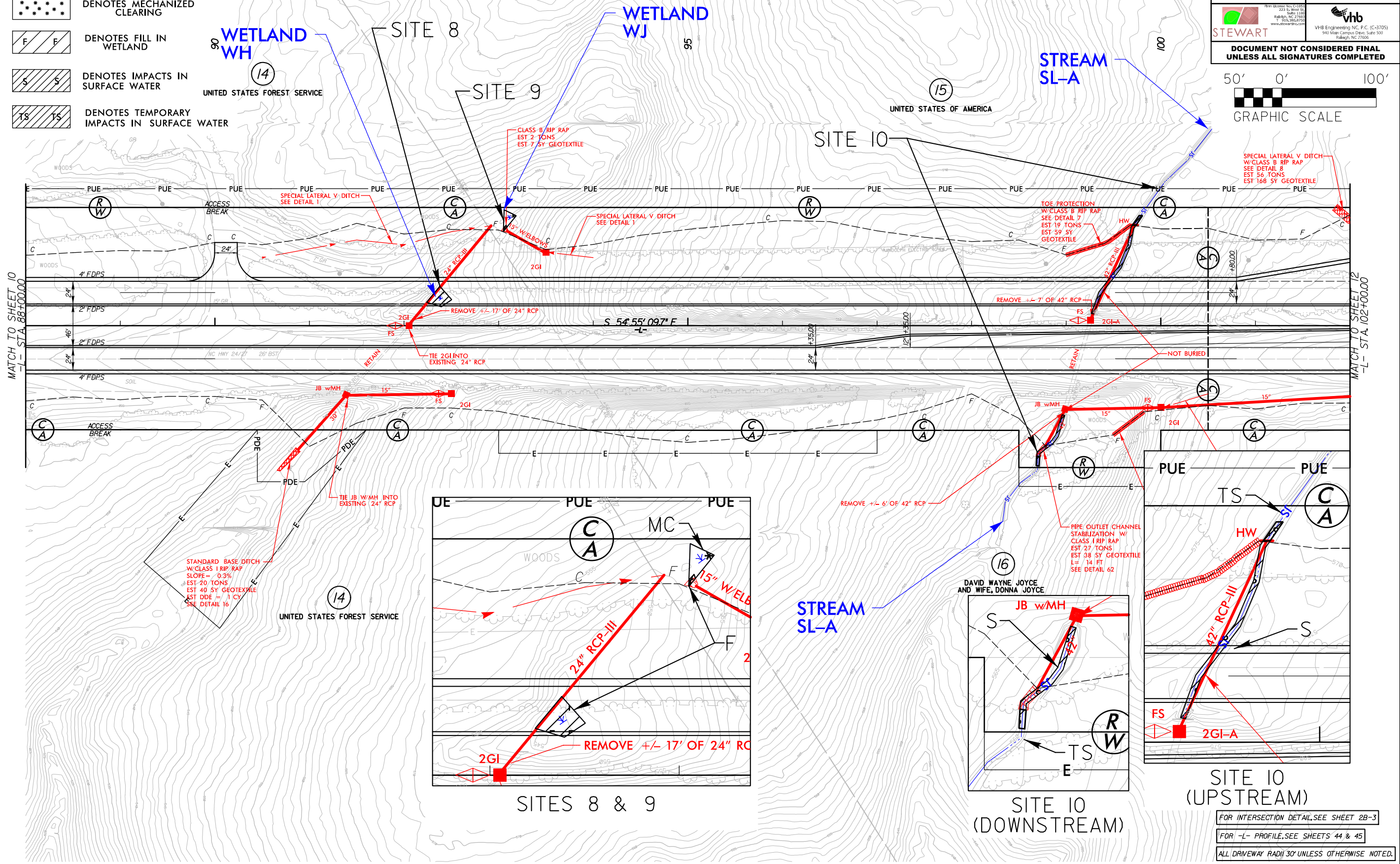
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PERMIT DRAWING SHEET 11 OF 91



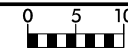
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO. R-2527	SHEET NO. 11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



FOR INTERSECTION DETAIL, SEE SHEET 2B-3
FOR -L- PROFILE, SEE SHEETS 44 & 45
ALL DRIVEWAY RADI 30' UNLESS OTHERWISE NOTED.

8/23/99

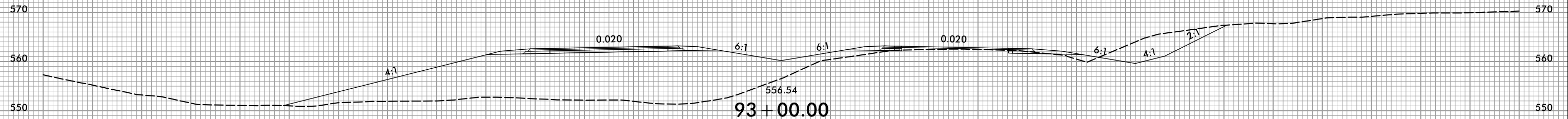
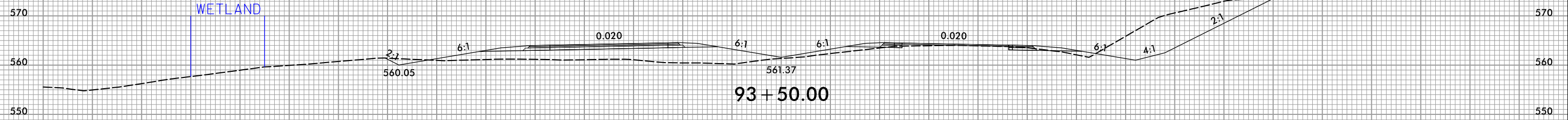


PROJ. REFERENCE NO.
R-2527

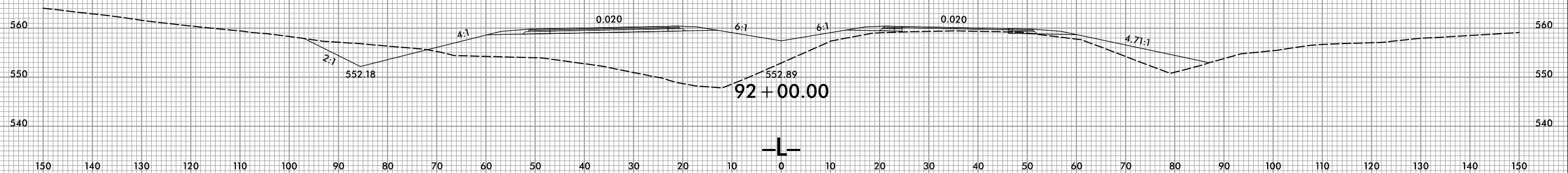
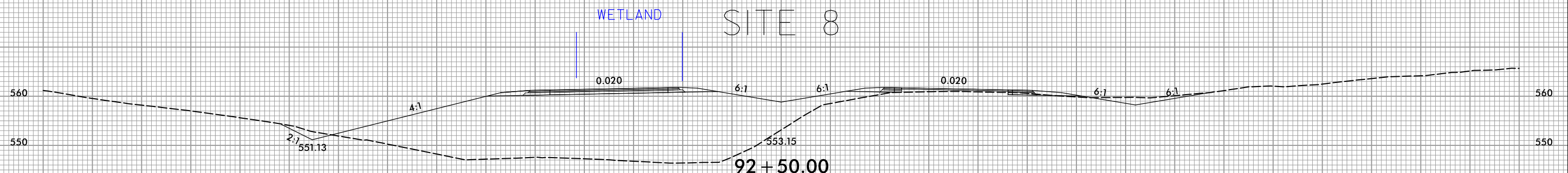
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X-56

PERMIT DRAWING
SHEET 12 OF 91

SITE 9



SITE 8

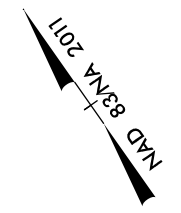
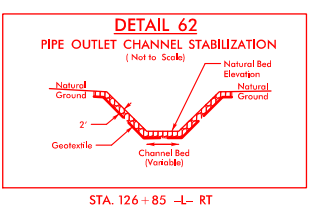
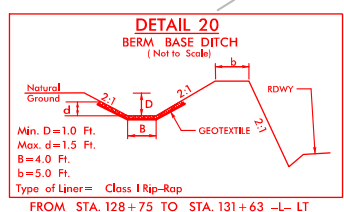
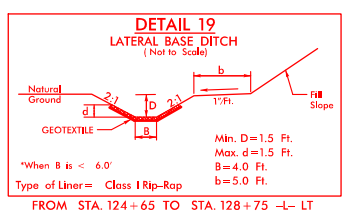
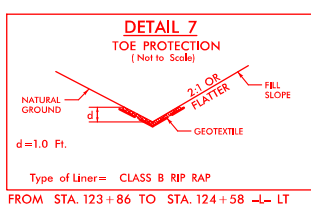


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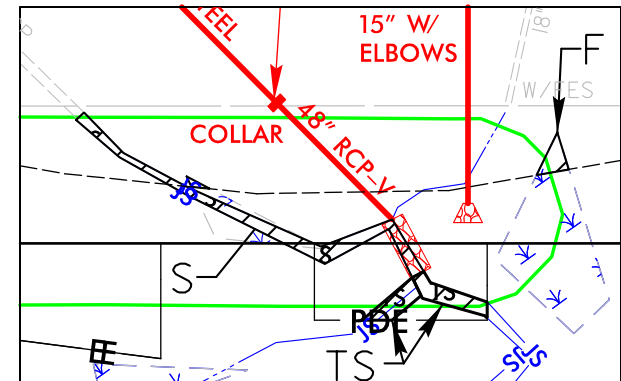
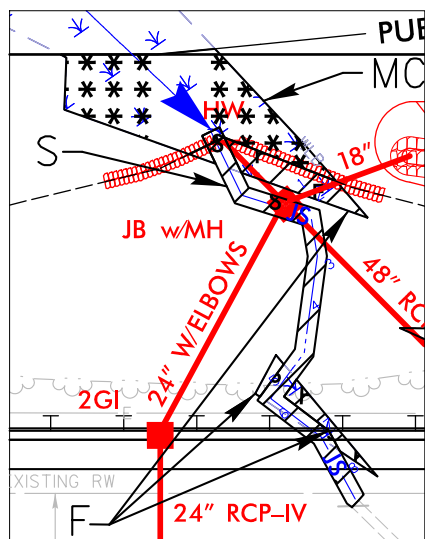
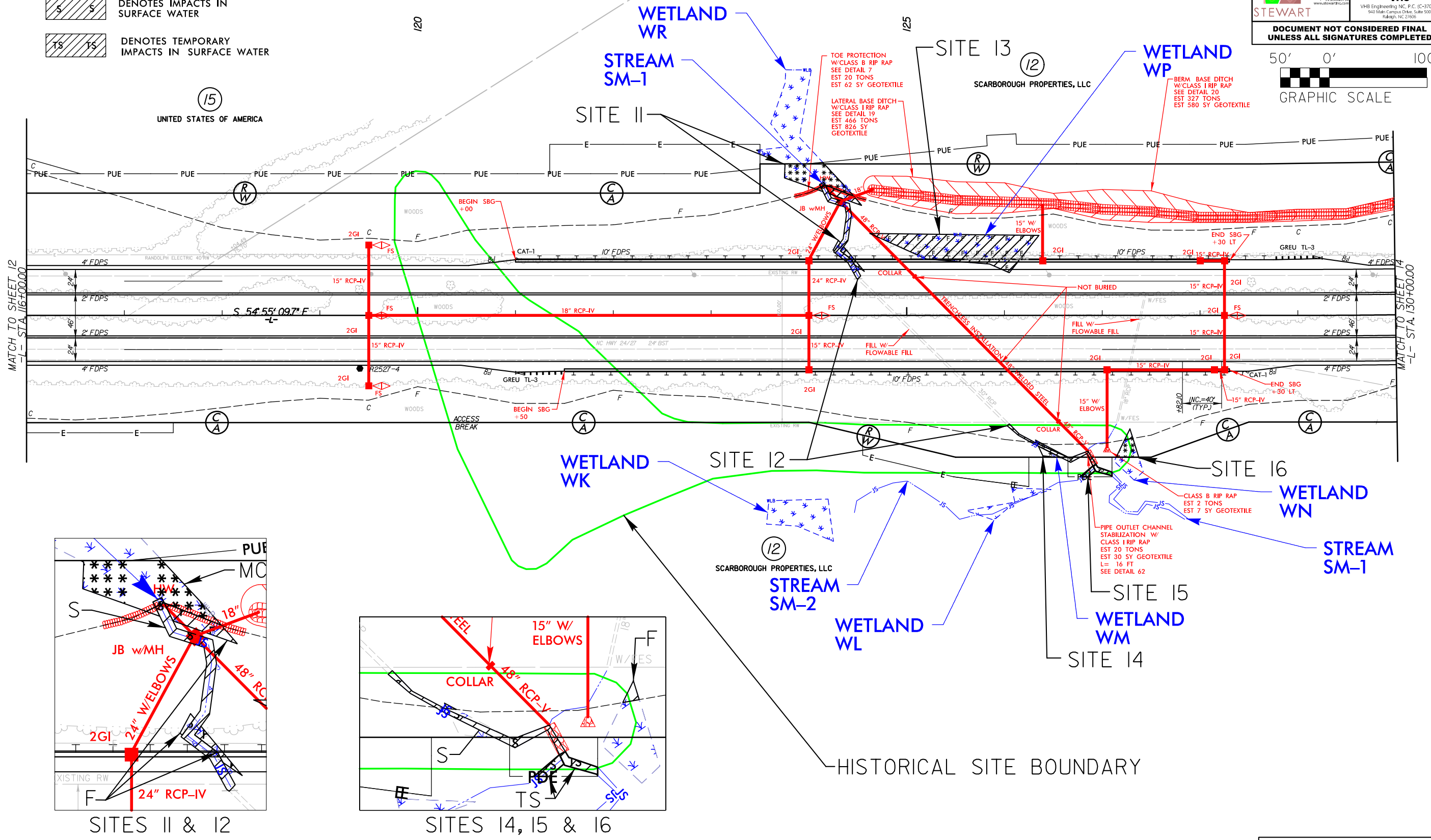
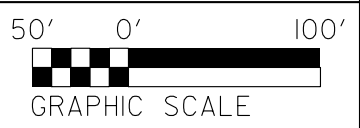
5/14/99

PERMIT DRAWING SHEET 13 OF 91

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



PROJECT REFERENCE NO. R-2527	SHEET NO. 13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



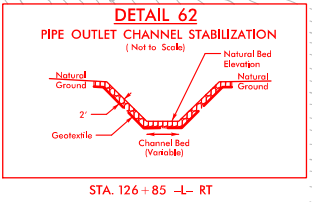
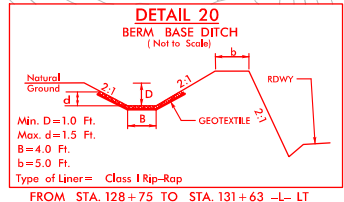
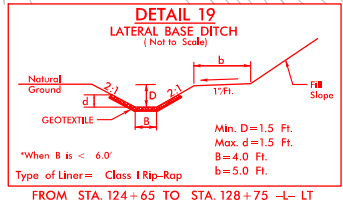
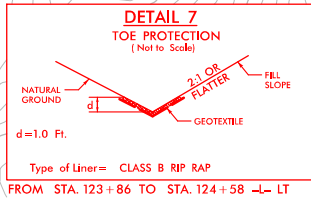
ENVIRONMENTALLY SENSITIVE AREA
FOR -L- PROFILE, SEE SHEETS 45 & 46

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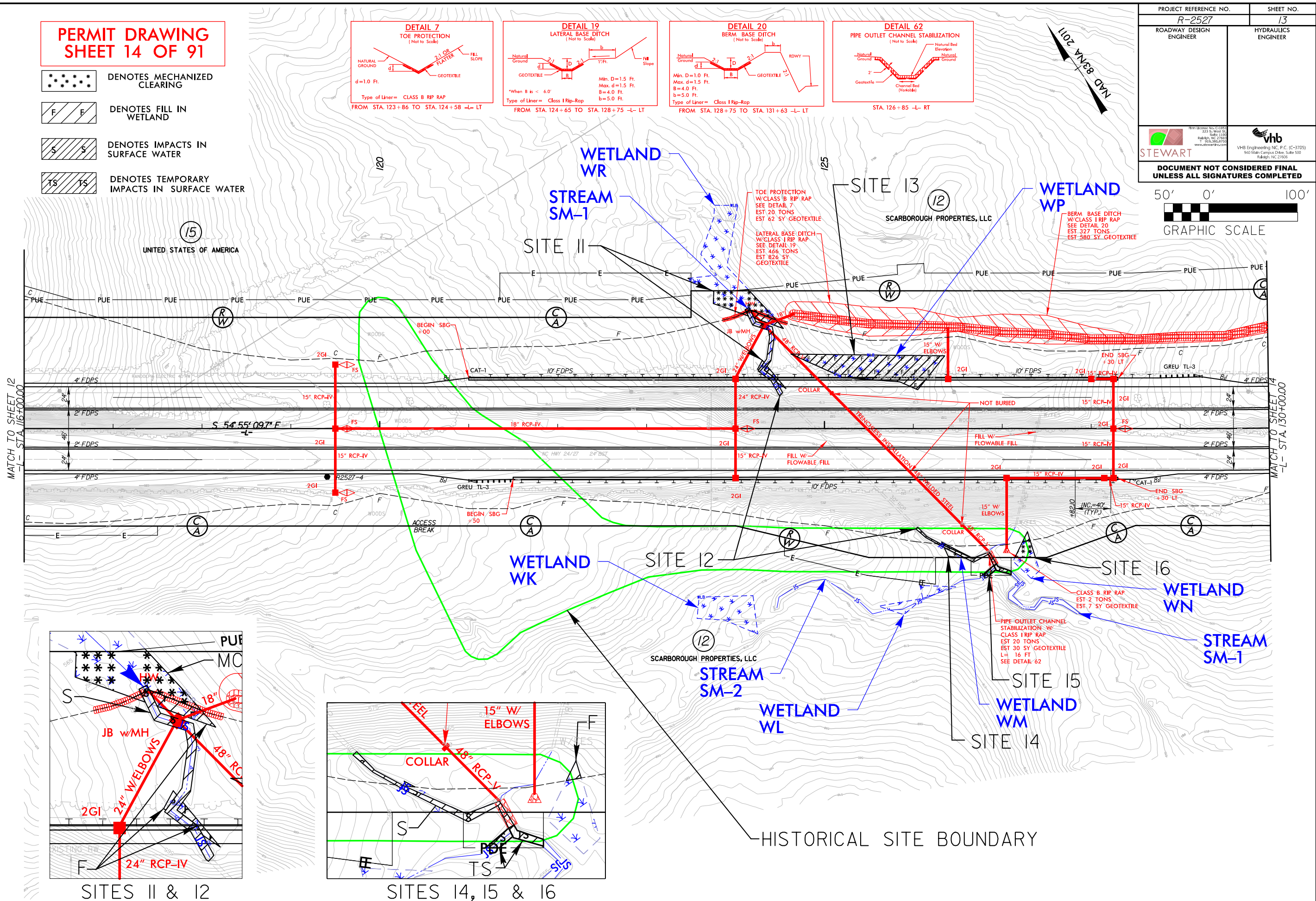
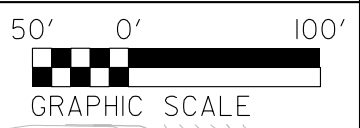
5/14/99

PERMIT DRAWING SHEET 14 OF 91

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

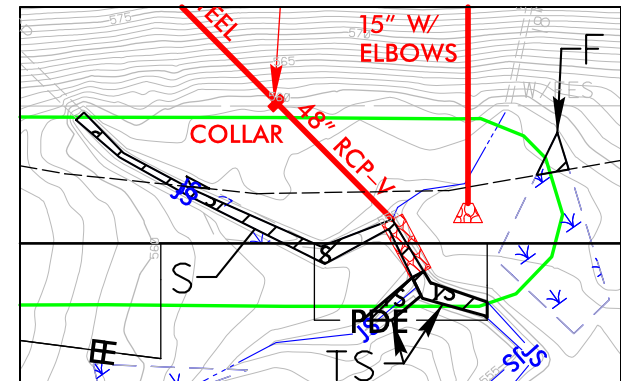
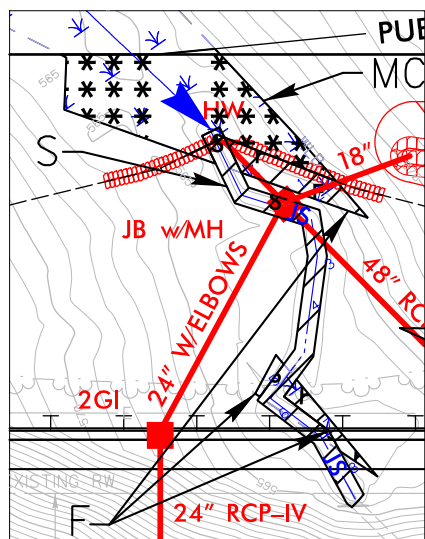


PROJECT REFERENCE NO. R-2527	SHEET NO. 13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



MATCH TO SHEET 12 -L- STA. 116+00.00

MATCH TO SHEET 14 -L- STA. 130+00.00



ENVIRONMENTALLY SENSITIVE AREA

FOR -L- PROFILE, SEE SHEETS 45 & 46

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8/23/99



PROJ. REFERENCE NO.
R-2527

SHEET NO.
X-72

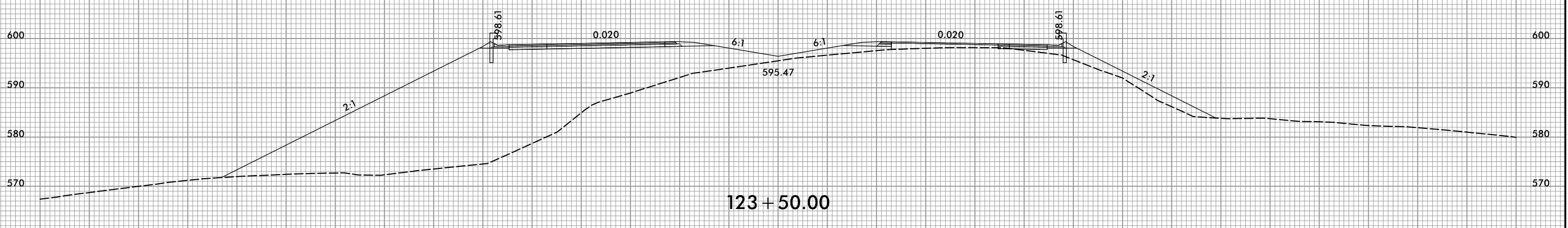
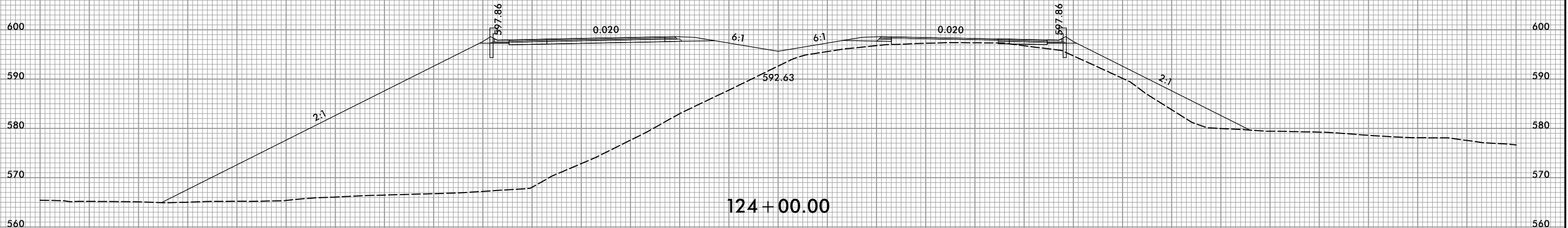
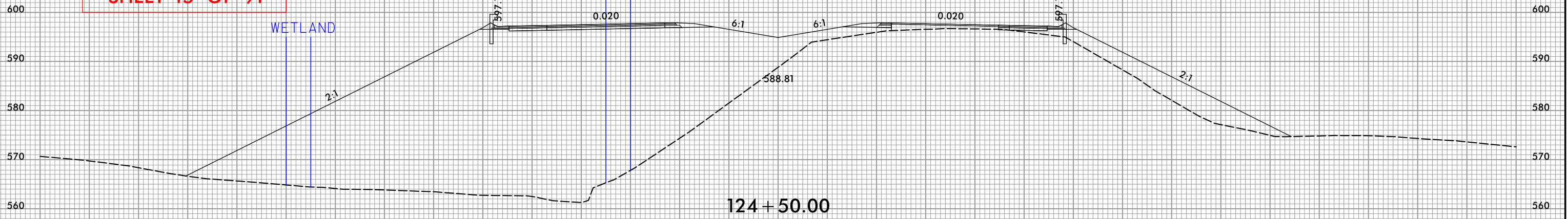
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PERMIT DRAWING
SHEET 15 OF 91

SITE II

WETLAND

WETLAND



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eberger

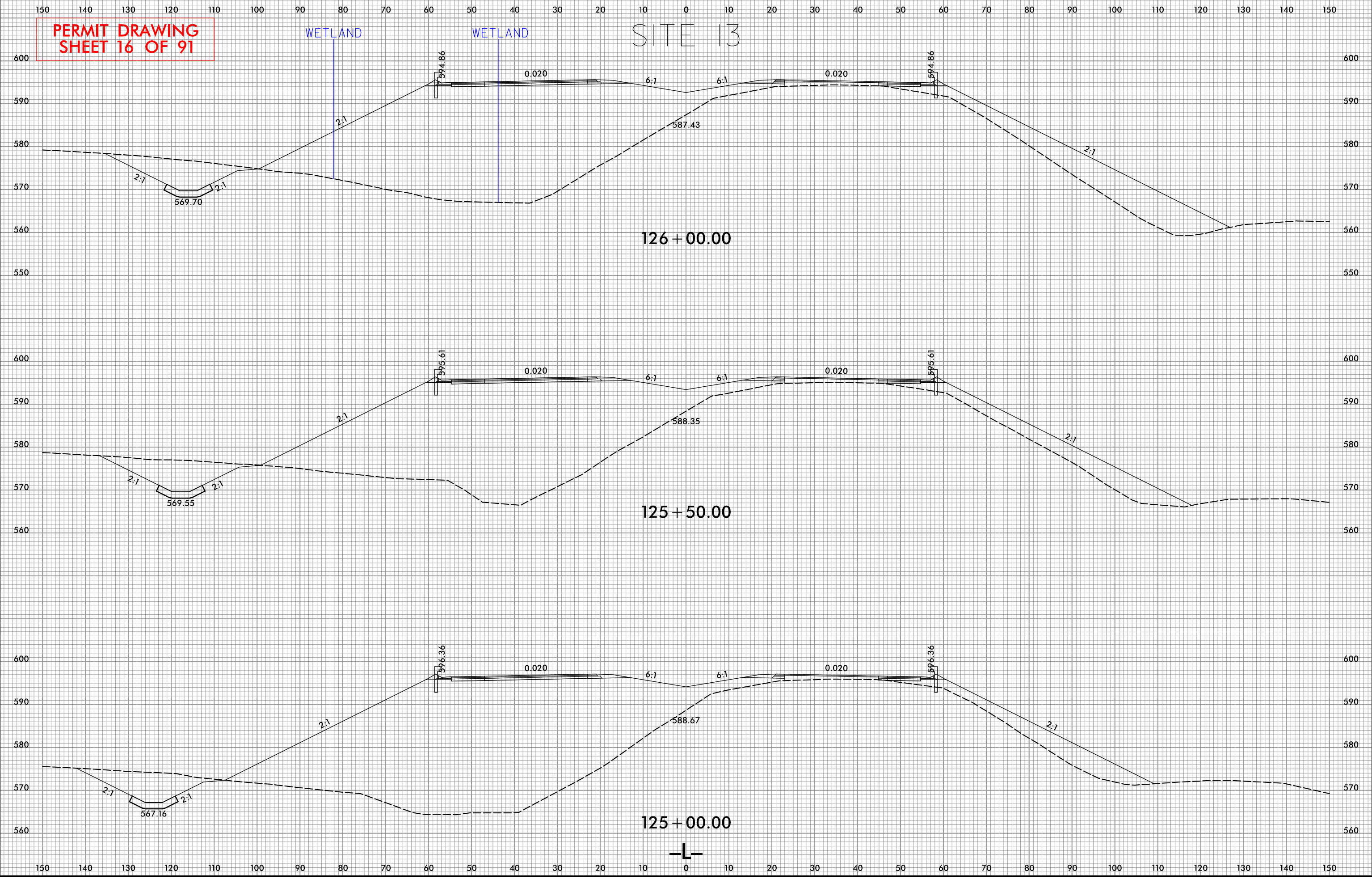
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PROJ. REFERENCE NO. R-2527	SHEET NO. X-73
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**PERMIT DRAWING
SHEET 16 OF 91**

SITE 13



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eberger

8/23/99



PROJ. REFERENCE NO.
R-2527

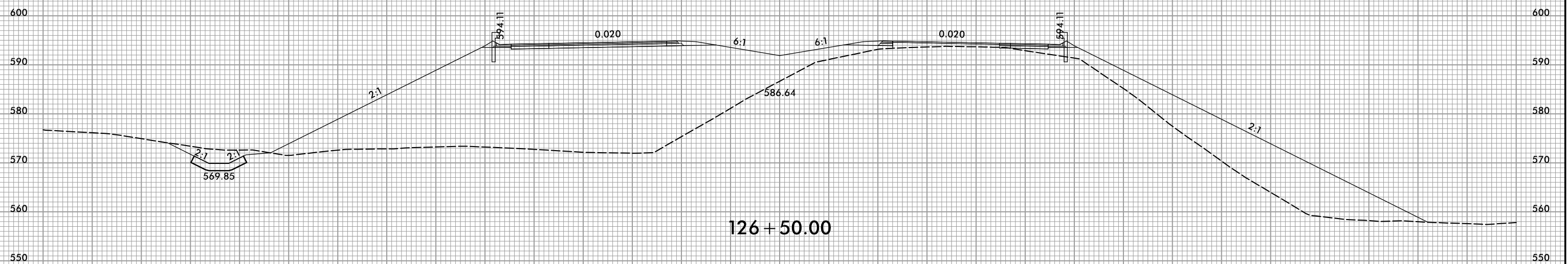
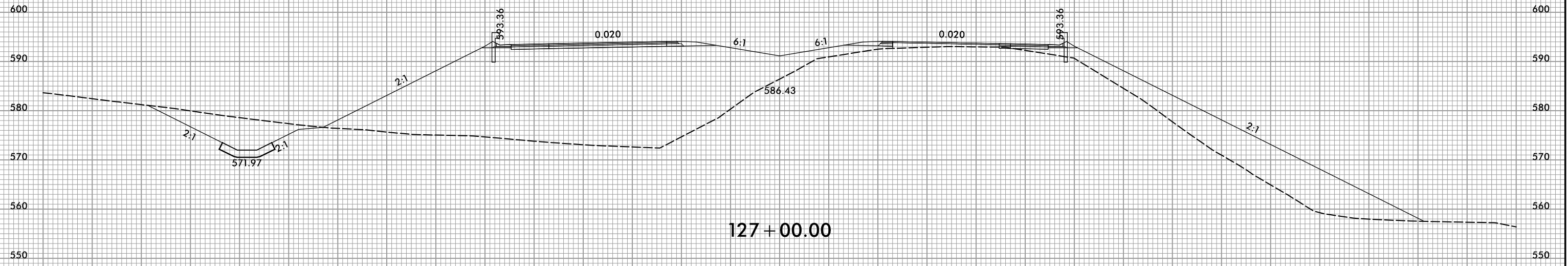
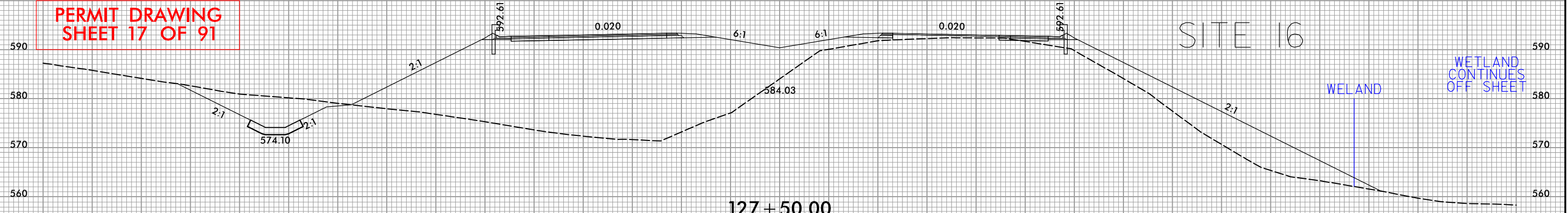
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**PERMIT DRAWING
SHEET 17 OF 91**

SITE 16

WETLAND
CONTINUES
OFF SHEET

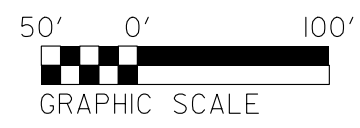


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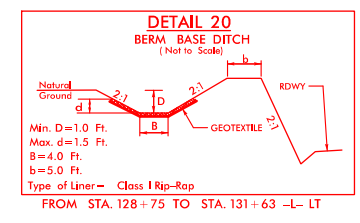
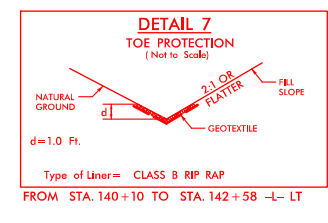
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5/14/99

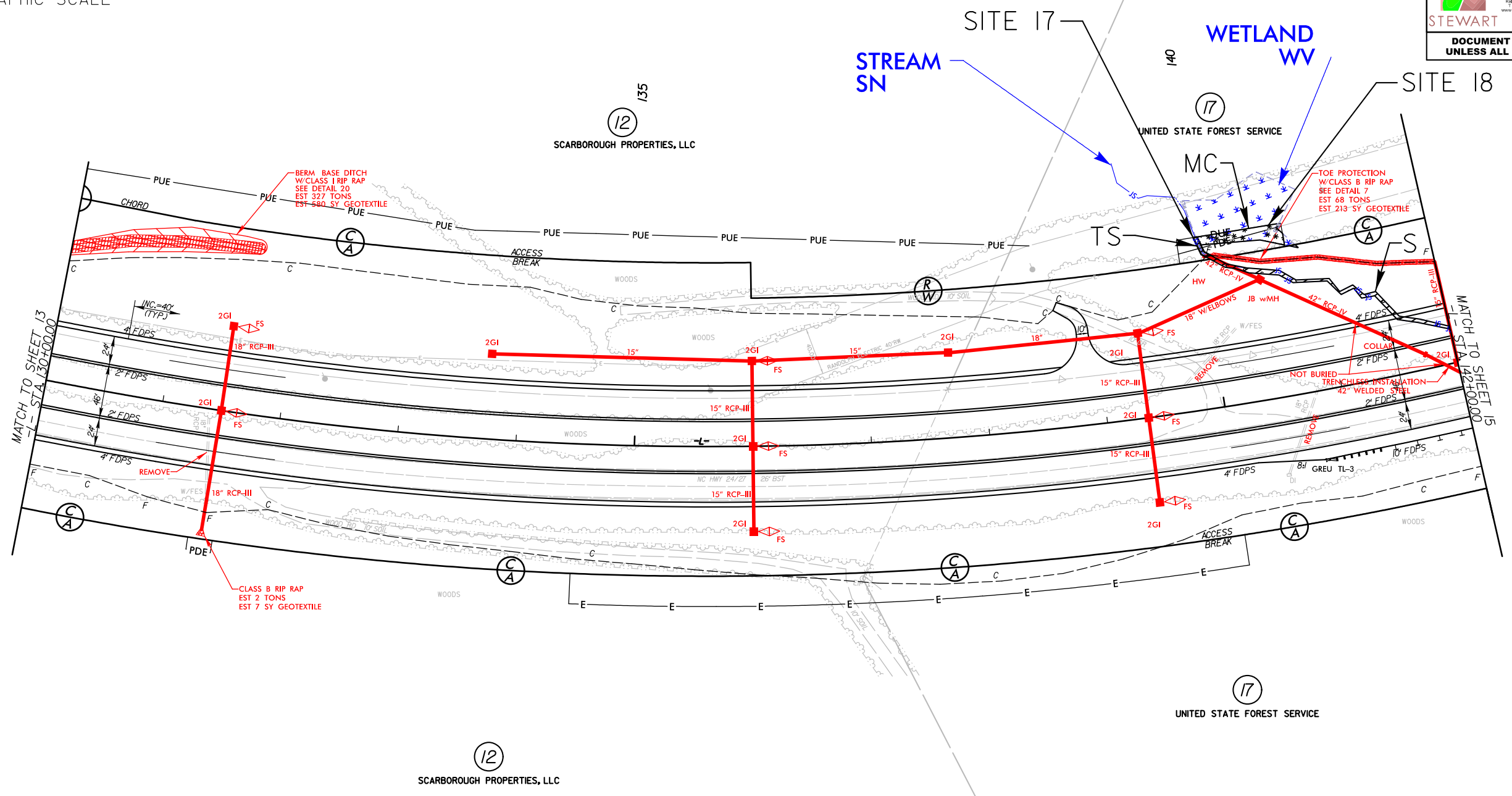
PERMIT DRAWING SHEET 18 OF 91



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



PROJECT REFERENCE NO. R-2527	SHEET NO. 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

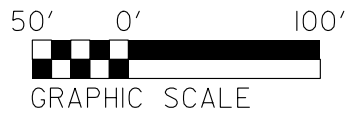


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shepherd

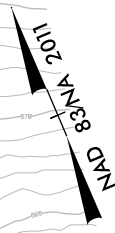
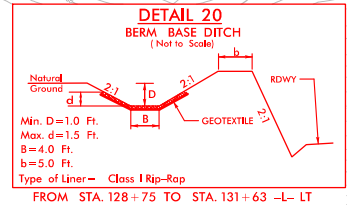
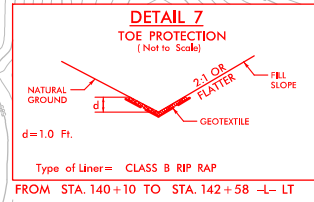
FOR -L- PROFILE, SEE SHEET 46
ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

5/14/99

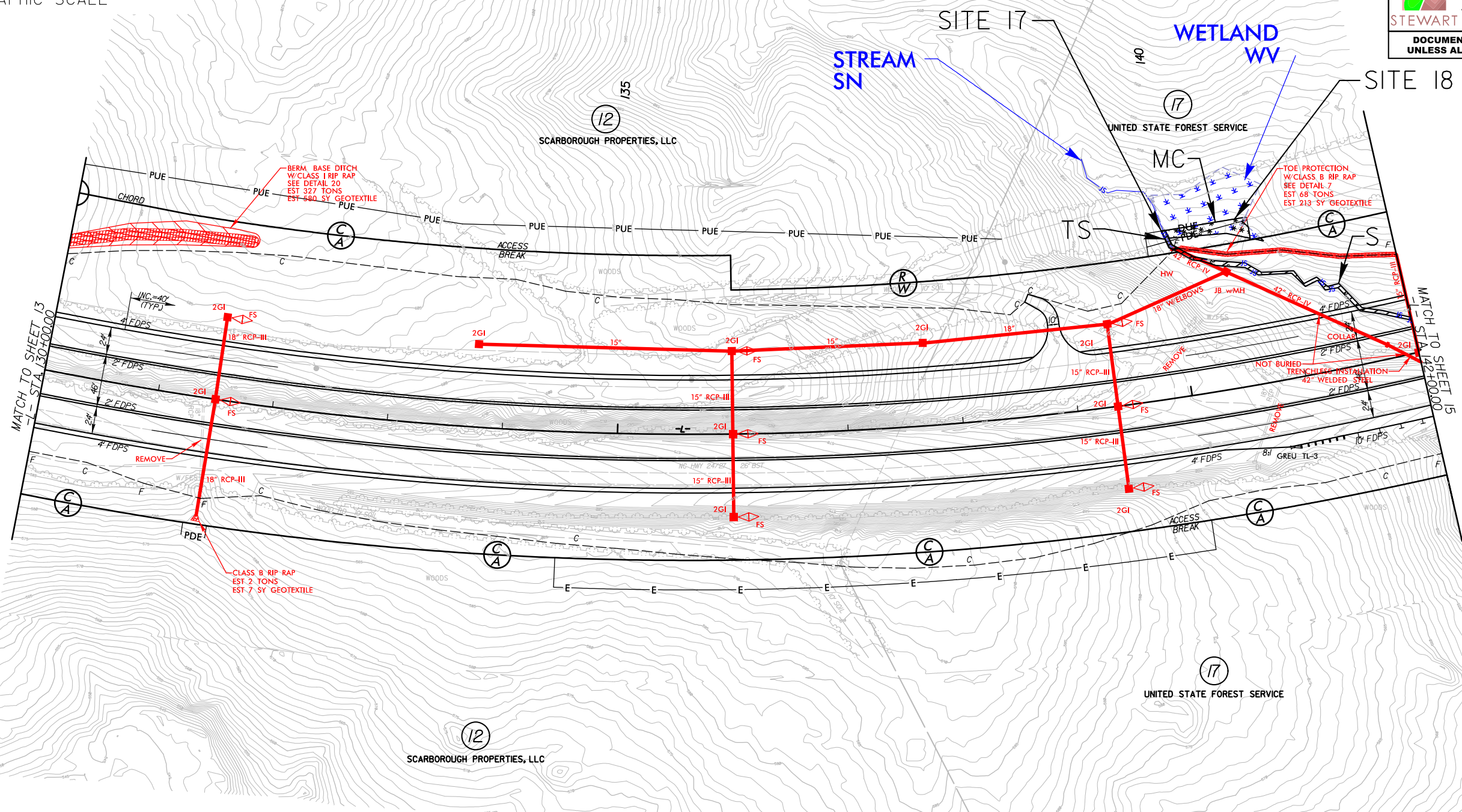
PERMIT DRAWING SHEET 19 OF 91



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



PROJECT REFERENCE NO. R-2527	SHEET NO. 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
STEWART	VHB VHB Engineering NC, P.C. (C-3705) 940 Mike Cannon Drive, Suite 500 Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



3:55:10 PM
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FOR -L- PROFILE, SEE SHEET 46
ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

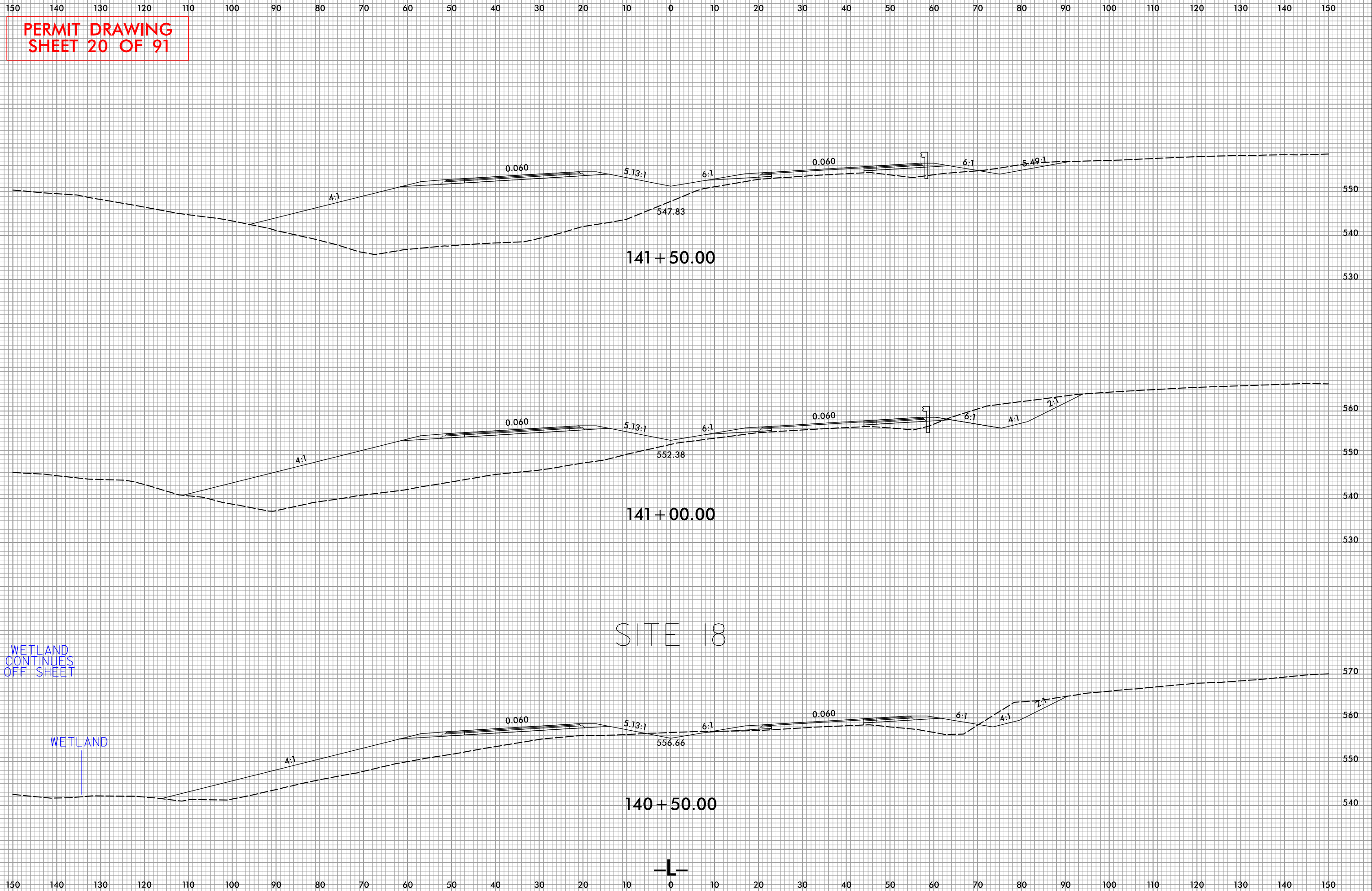
8/23/99



PROJ. REFERENCE NO.
R-2527

SHEET NO.
X-83

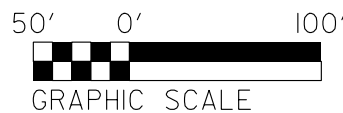
**PERMIT DRAWING
SHEET 20 OF 91**



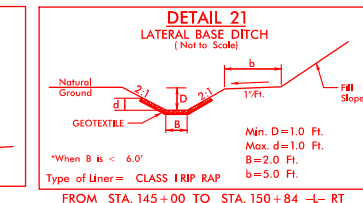
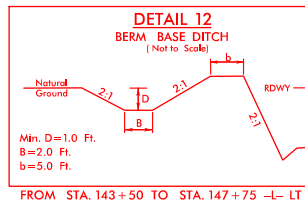
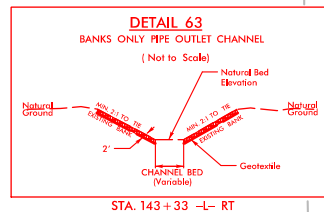
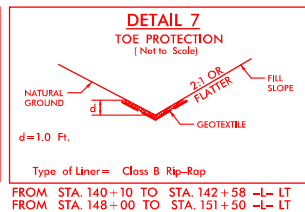
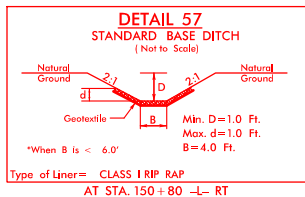
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eberger

5/14/99

PERMIT DRAWING SHEET 21 OF 91

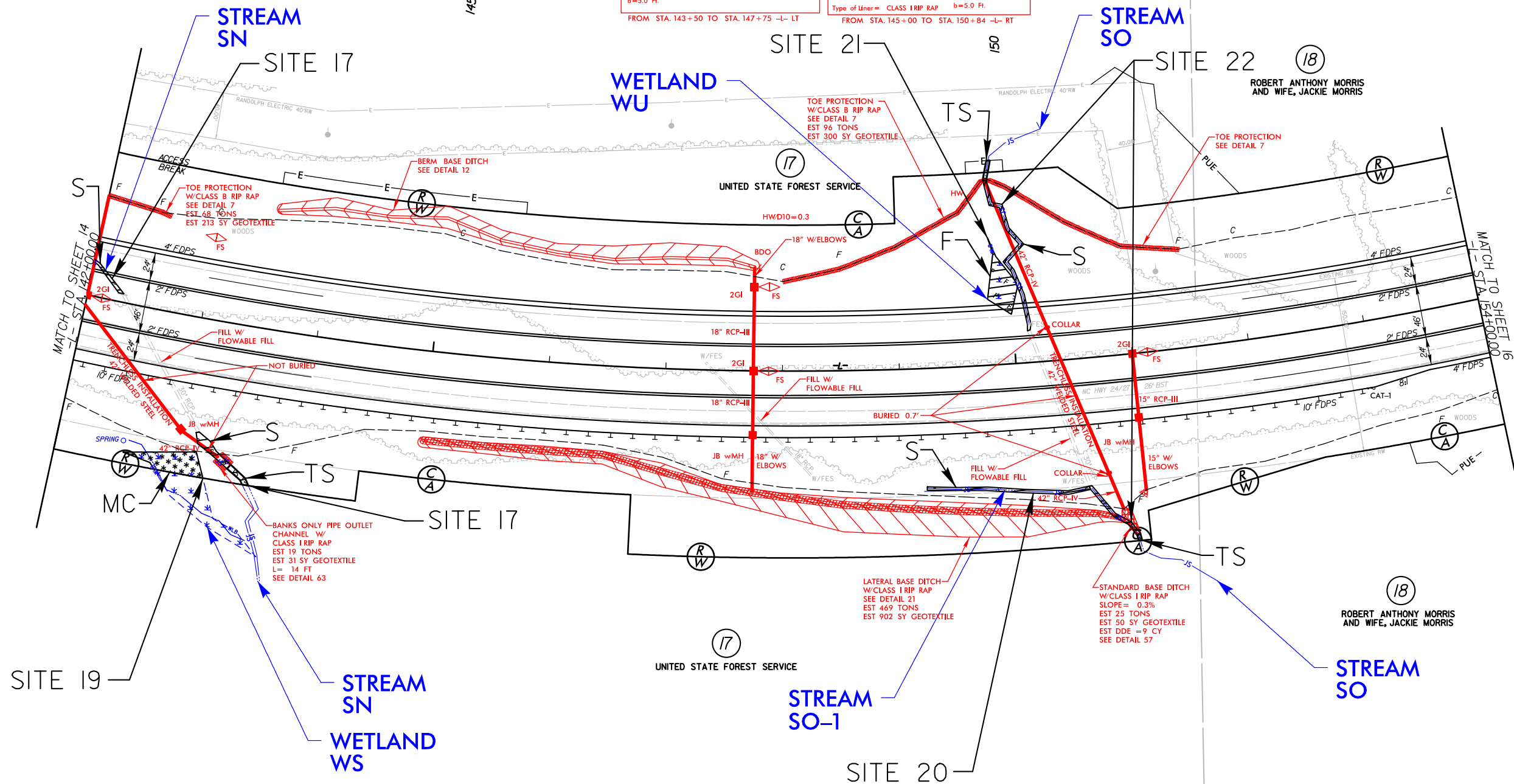


- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



NAD 83NA 2011

PROJECT REFERENCE NO. R-2527	SHEET NO. 15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

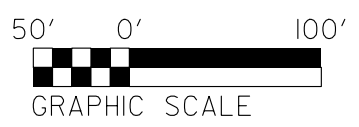


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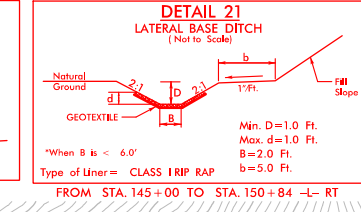
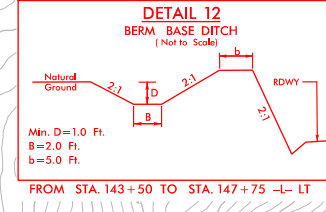
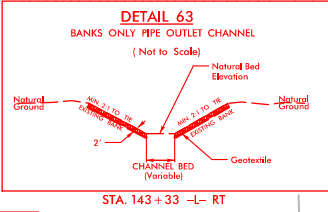
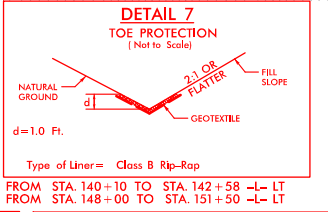
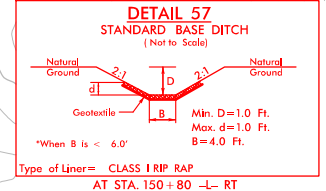
FOR -L- PROFILE, SEE SHEETS 46 & 47

5/14/99

PERMIT DRAWING SHEET 22 OF 91



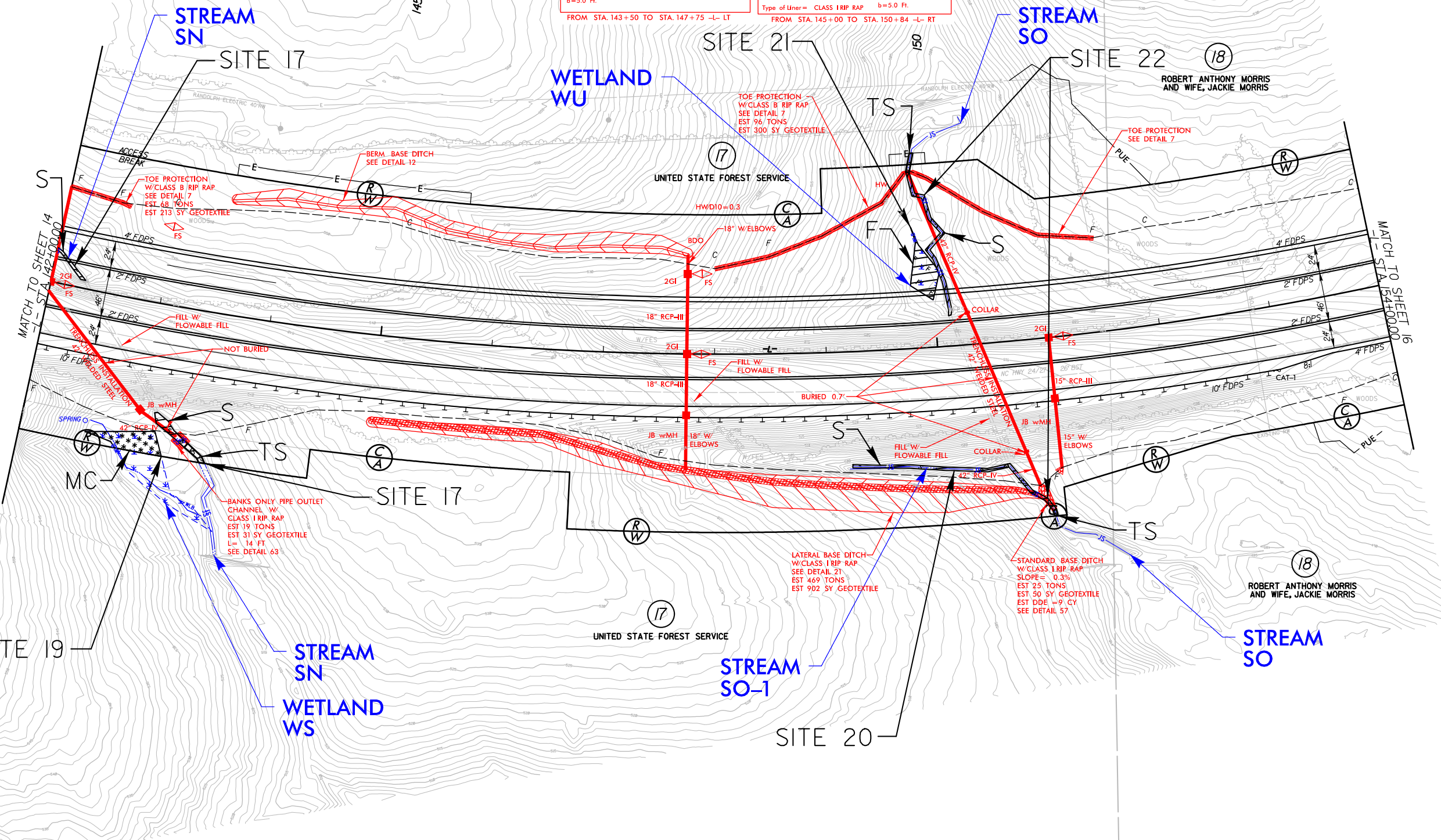
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO. R-2527		SHEET NO. 15	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
STEWART		VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606	

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

NAD 83 N 2011



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8/23/99



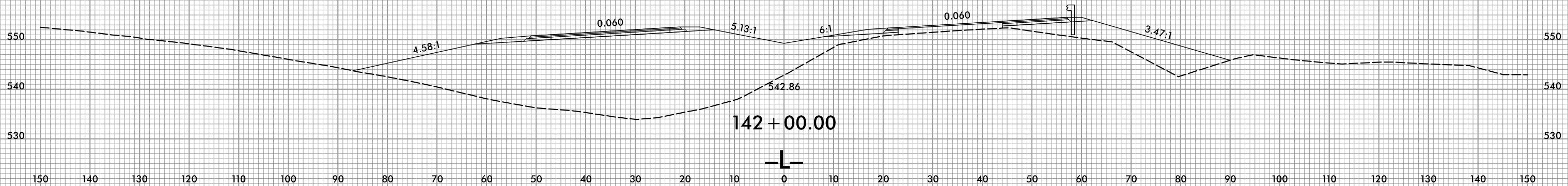
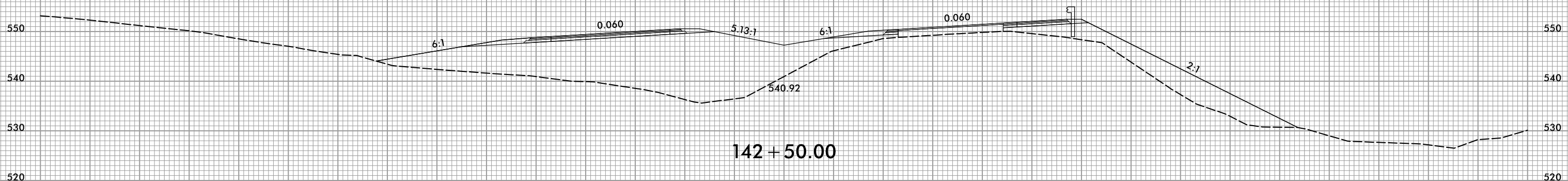
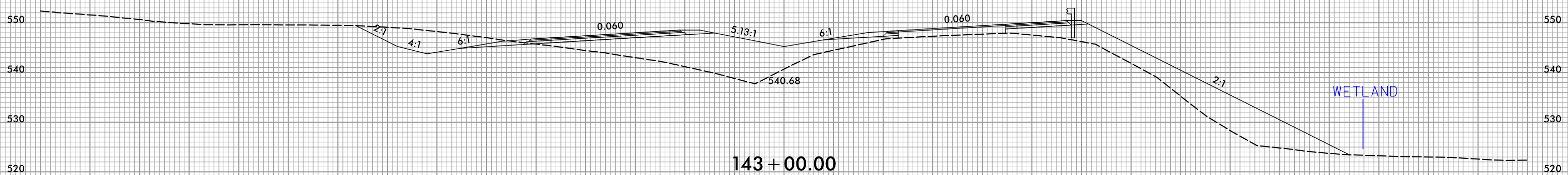
PROJ. REFERENCE NO.
R-2527

SHEET NO.
X-84

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**PERMIT DRAWING
SHEET 23 OF 91**

SITE 19



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eberger

8/23/99

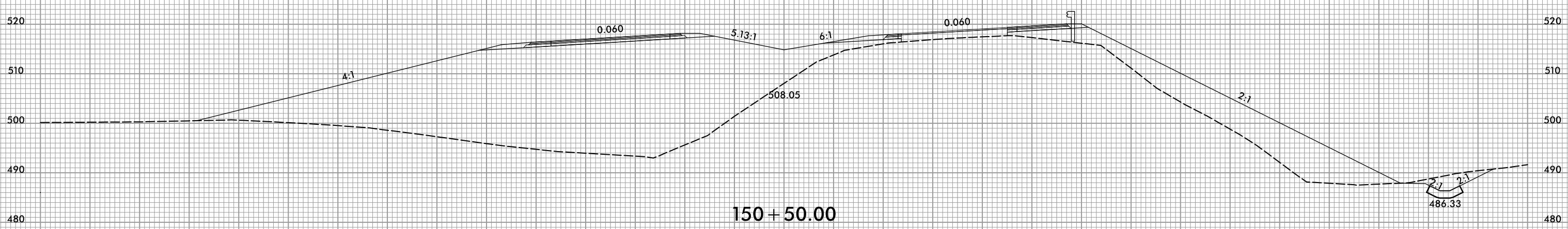
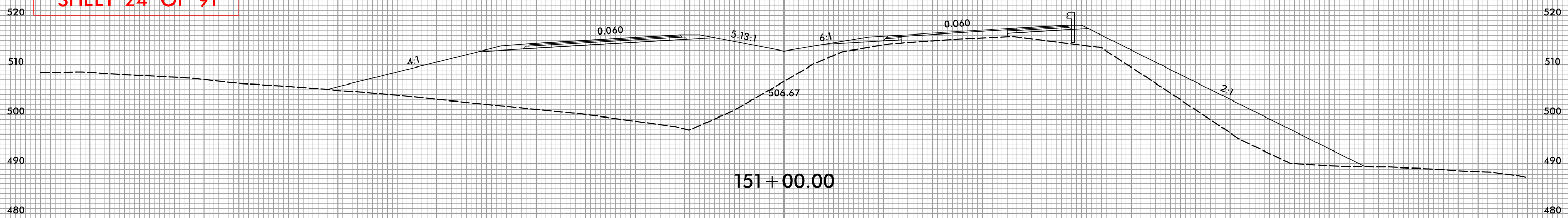


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R-2527

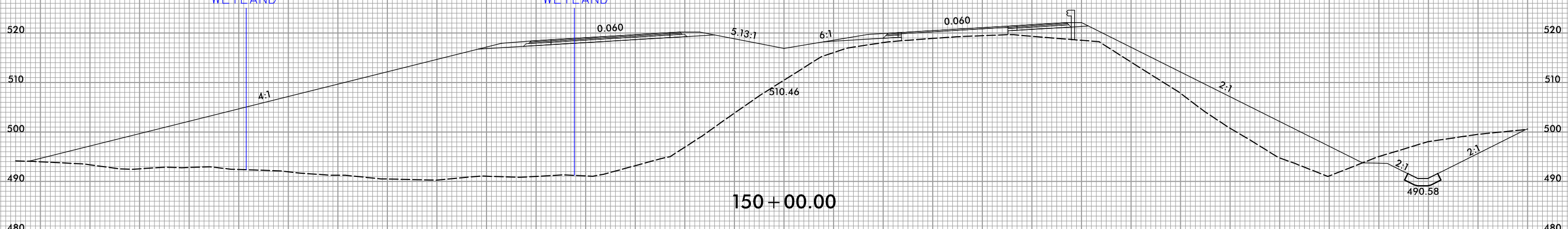
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PERMIT DRAWING
SHEET 24 OF 91



SITE 21



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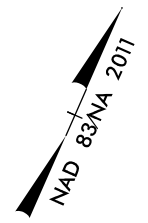
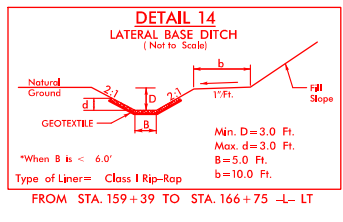
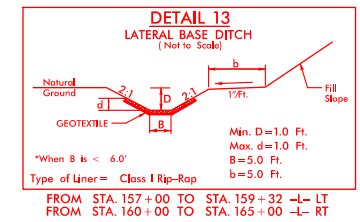
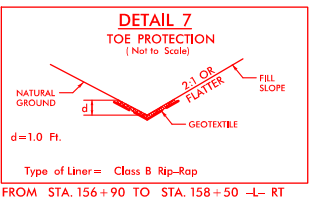
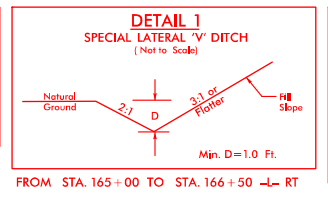
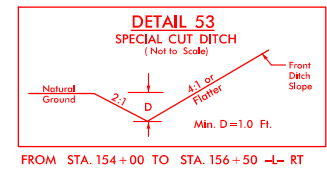
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5/14/99

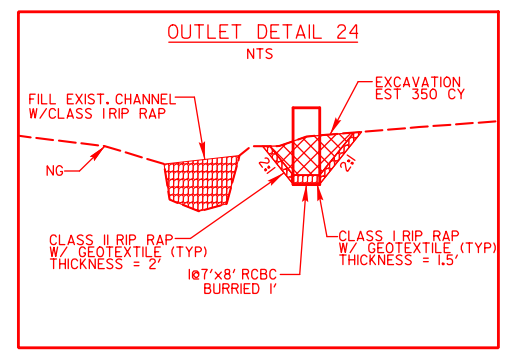
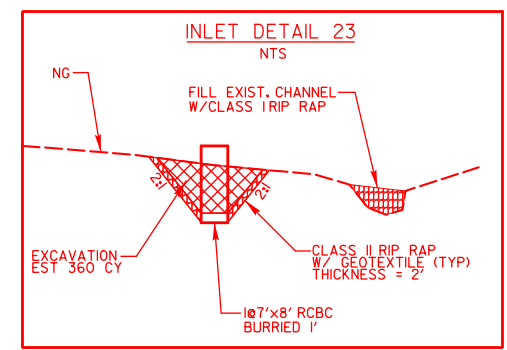
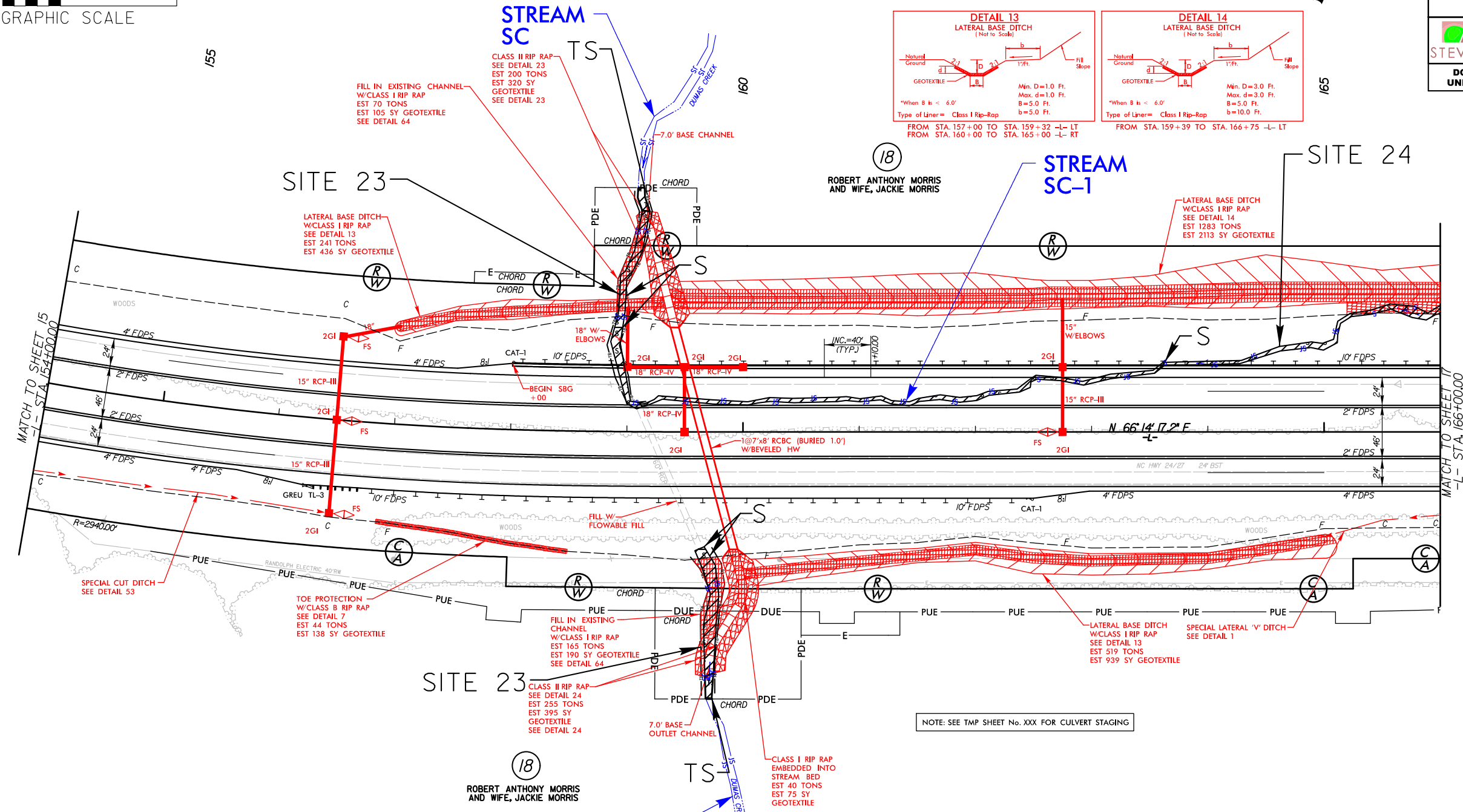
PERMIT DRAWING SHEET 25 OF 91



DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO. R-2527	SHEET NO. 16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



NOTE: SEE TMP SHEET No. XXX FOR CULVERT STAGING

FOR -L- PROFILE, SEE SHEET 47

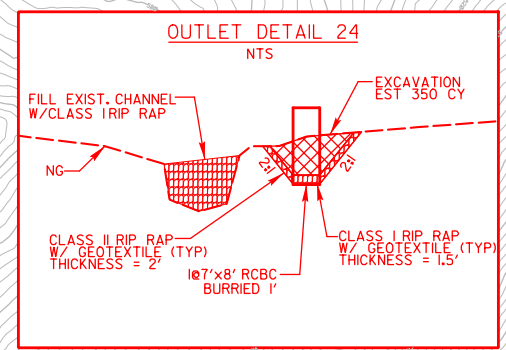
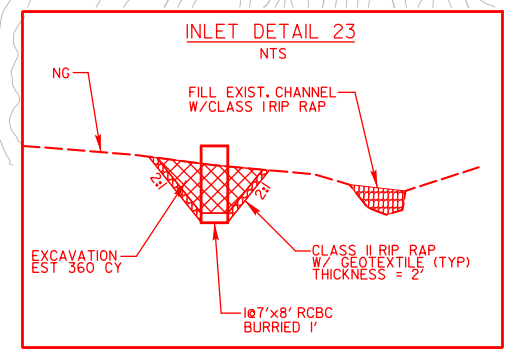
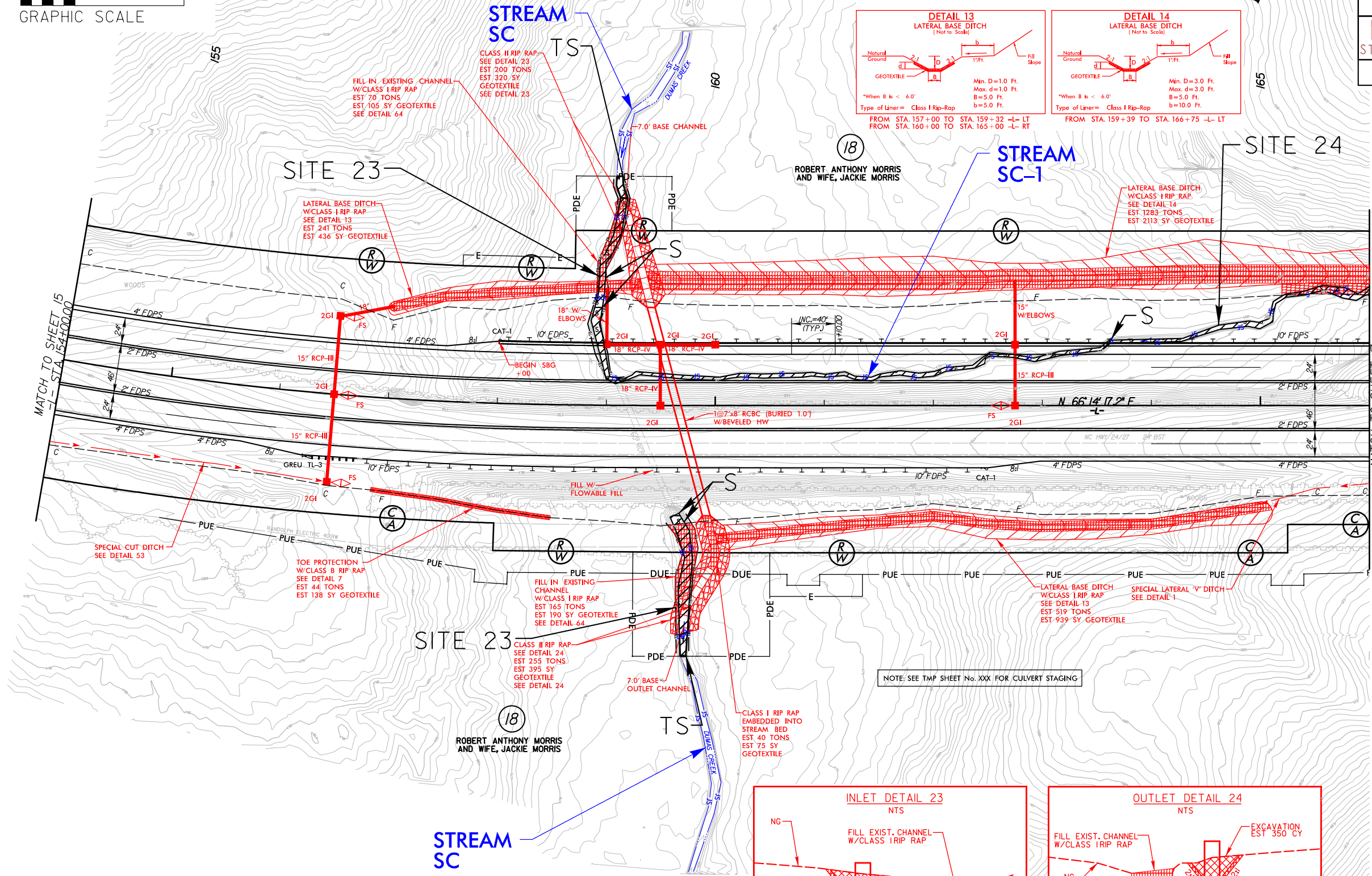
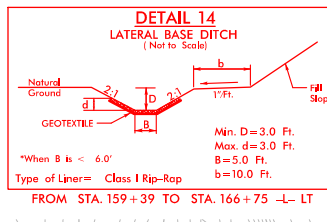
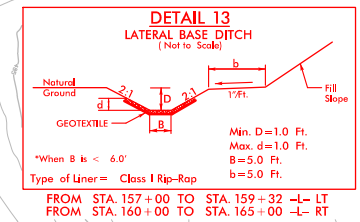
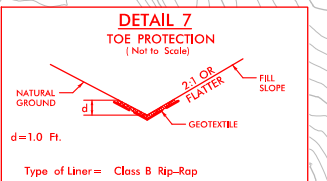
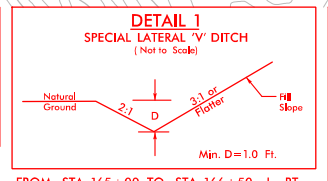
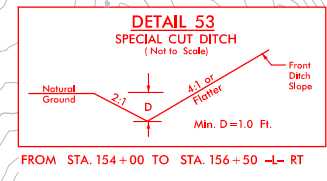
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shender

5/14/99
6:59:04 AM
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PERMIT DRAWING SHEET 26 OF 91



DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER





PROJECT REFERENCE NO. R-2527	SHEET NO. 16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

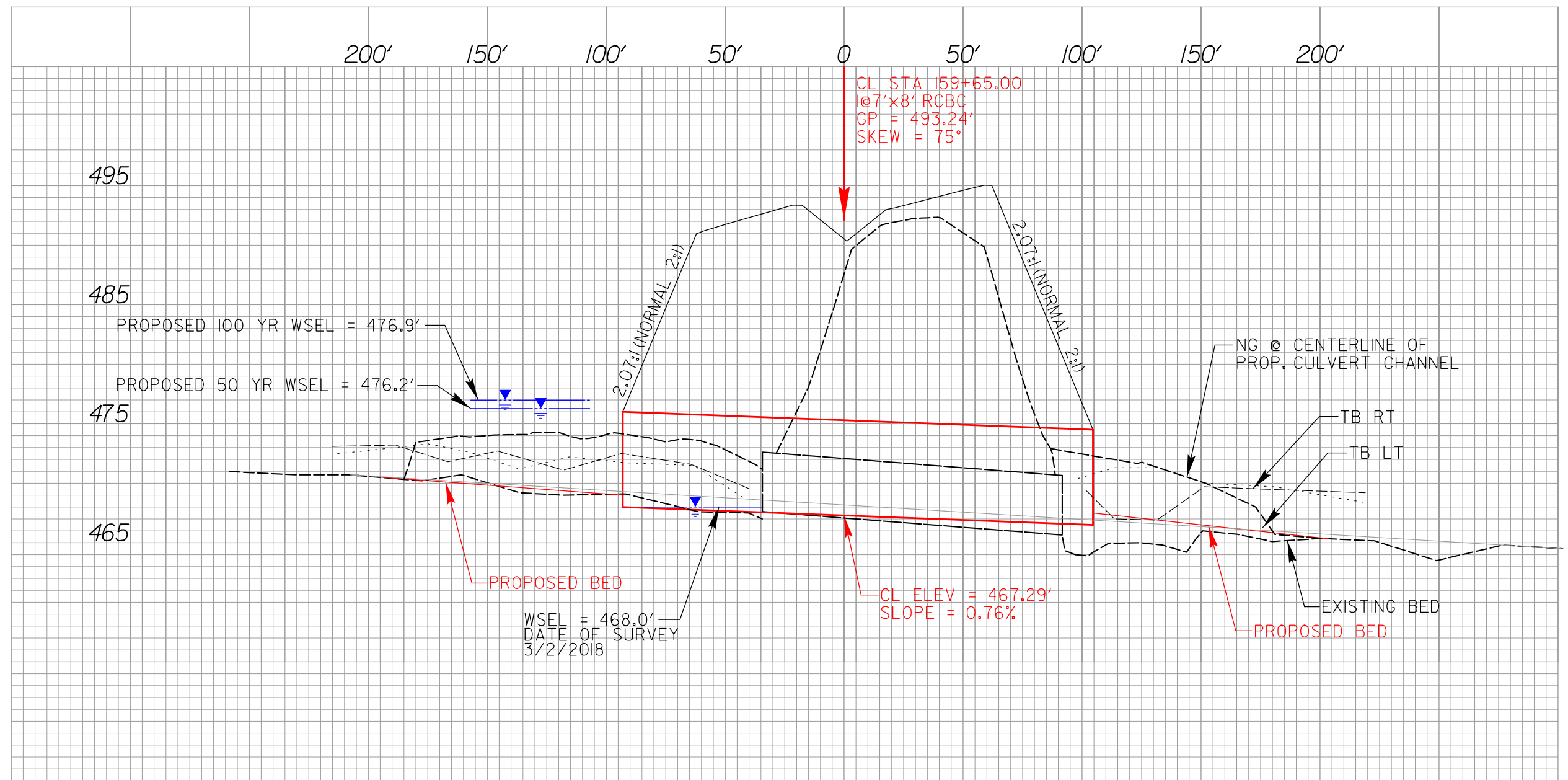
FOR -L- PROFILE, SEE SHEET 47

8/17/99

PERMIT DRAWING
SHEET 27 OF 91

PROJECT REFERENCE NO. R-2527	
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 Firm License No. C-1103 227 S. West St. Raleigh, NC 27603 T 919.386.6766 www.stewartinc.com	 VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

SITES 23 & 24

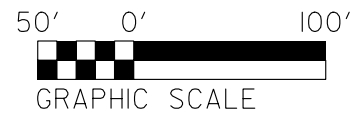


REVISIONS

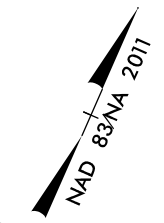
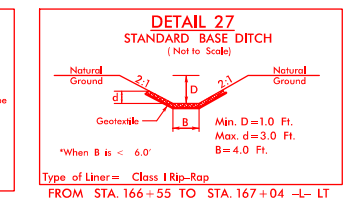
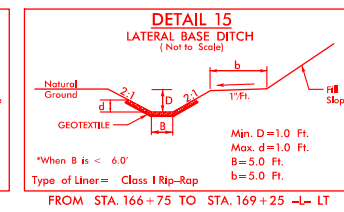
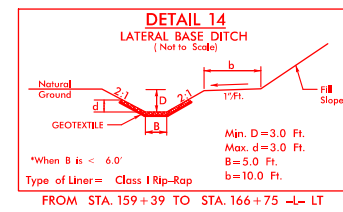
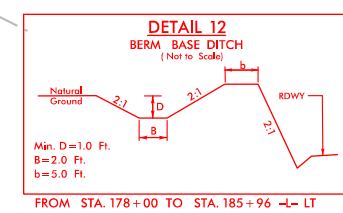
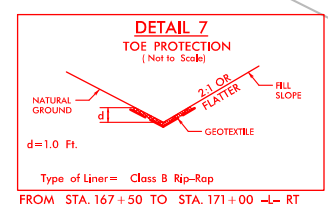
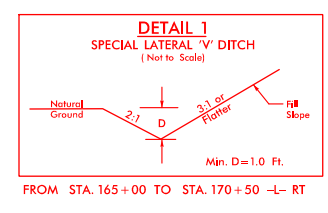
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5/14/99

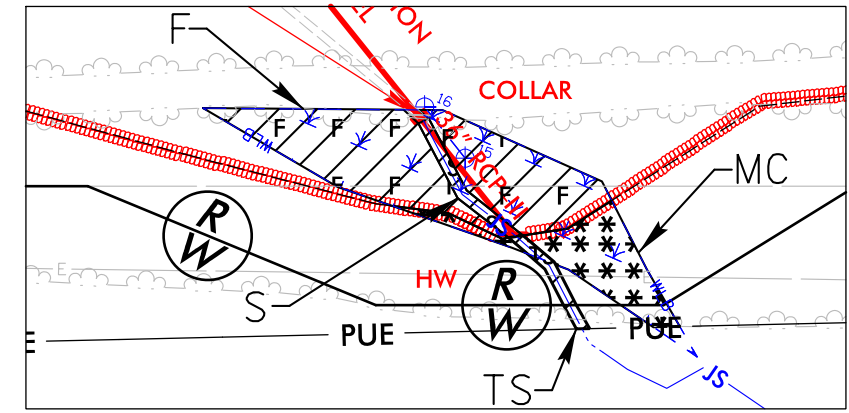
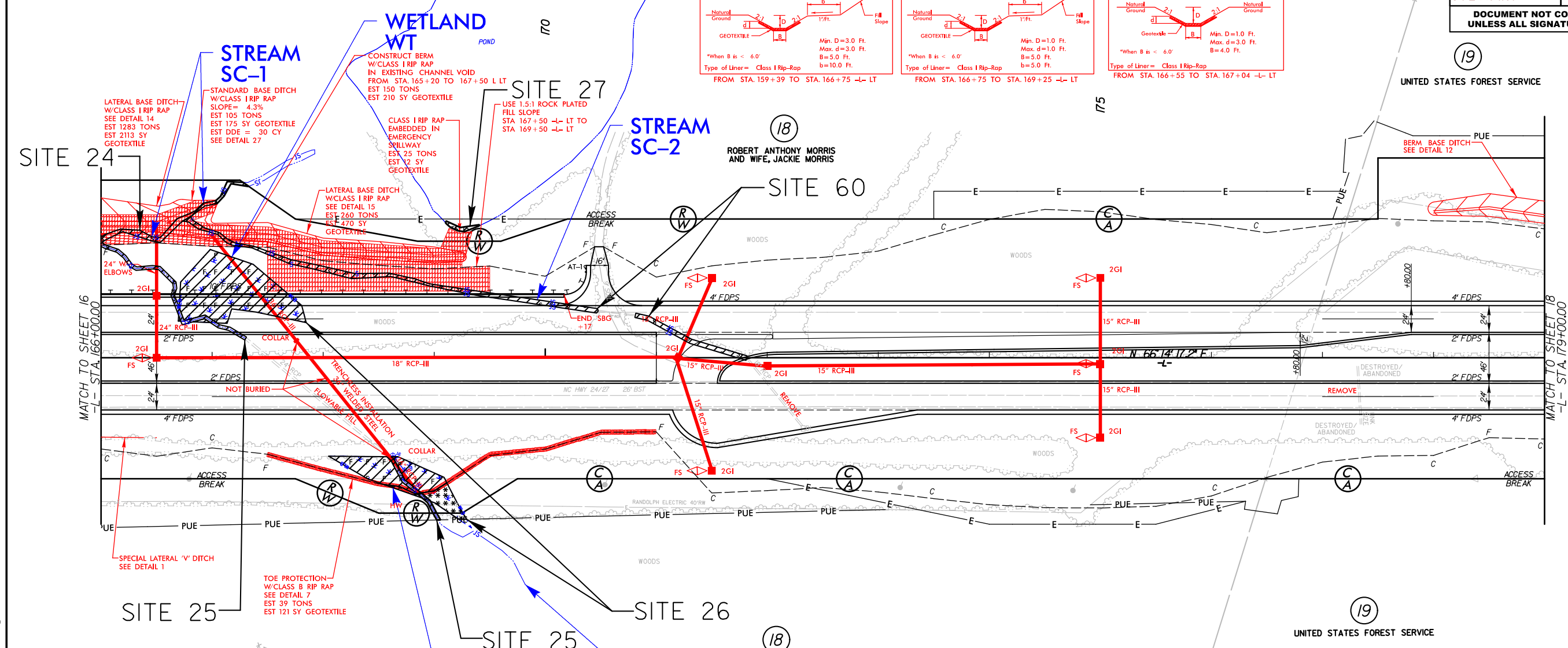
PERMIT DRAWING SHEET 28 OF 91



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



PROJECT REFERENCE NO. R-2527	SHEET NO. 17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

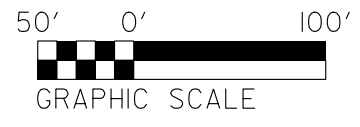


FOR -L- PROFILE, SEE SHEET 47
ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

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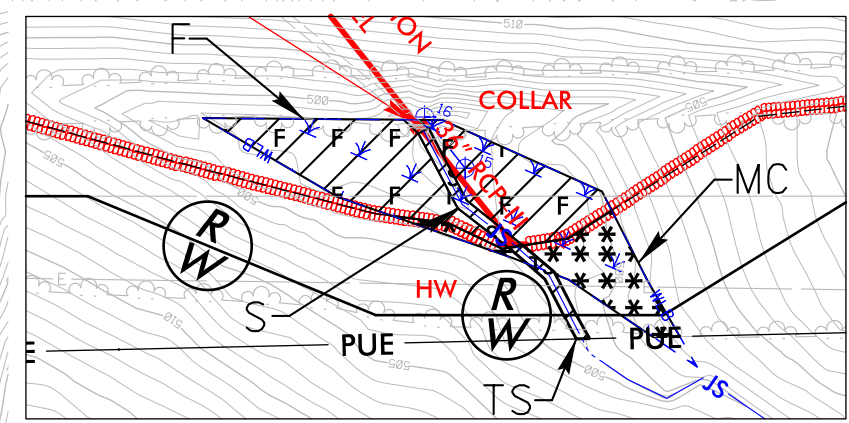
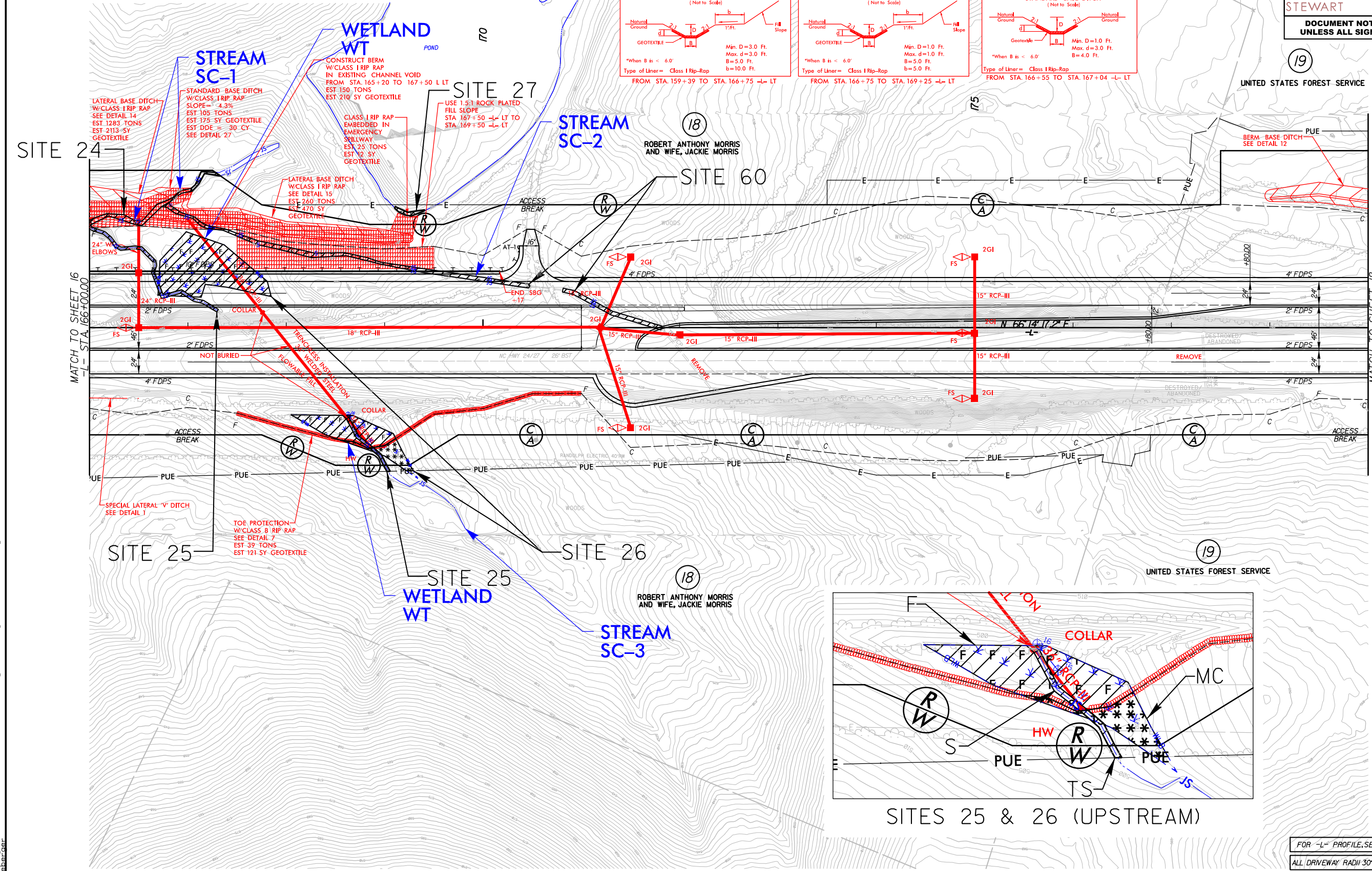
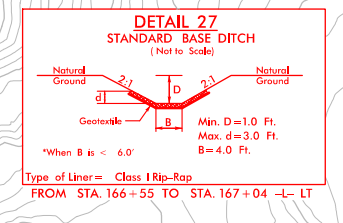
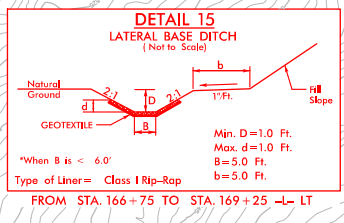
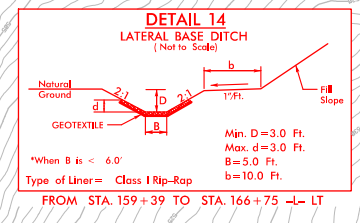
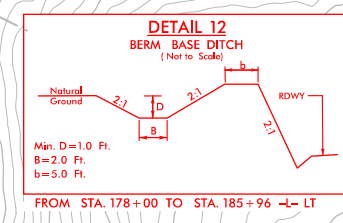
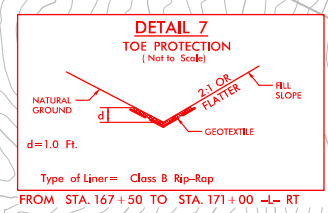
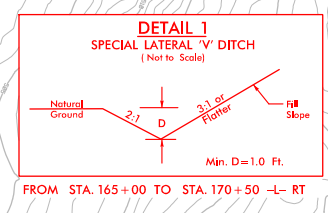
5/14/99

PERMIT DRAWING SHEET 29 OF 91



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

PROJECT REFERENCE NO. R-2527	SHEET NO. 17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SITES 25 & 26 (UPSTREAM)

FOR -L- PROFILE, SEE SHEET 47
ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

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8/23/99

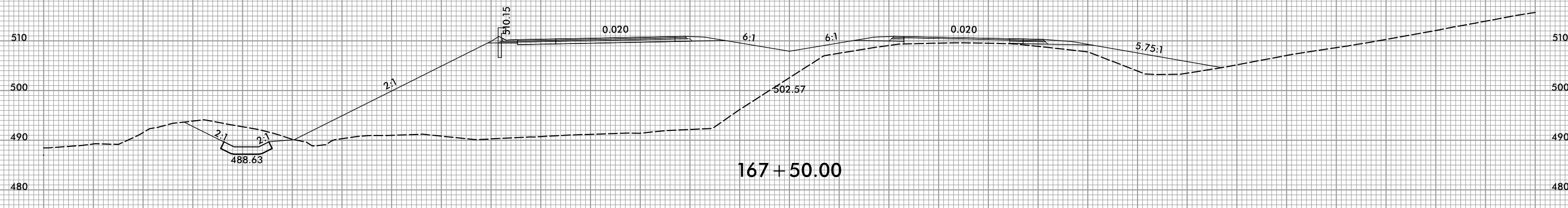
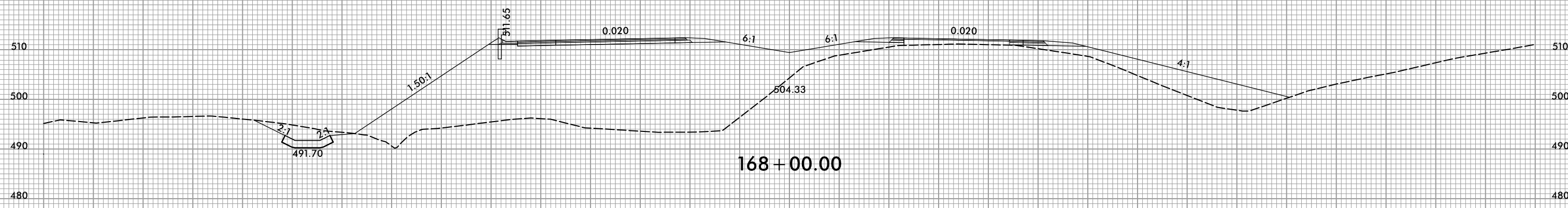


PROJ. REFERENCE NO.
R-2527

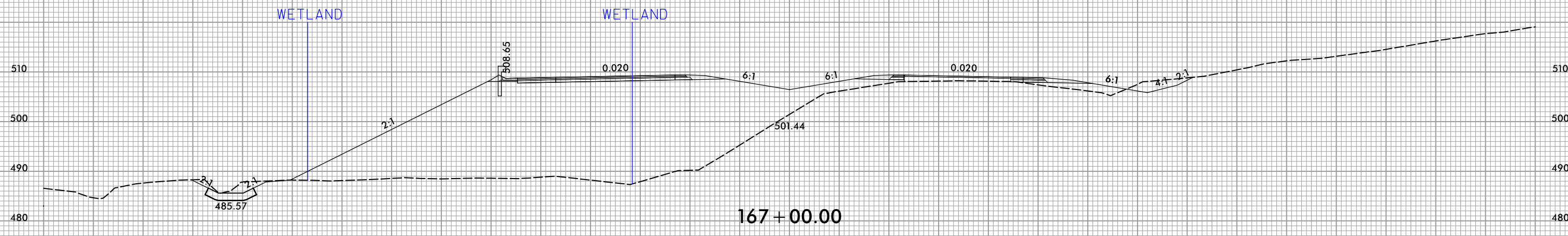
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PERMIT DRAWING
SHEET 30 OF 91

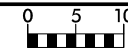


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8/23/99

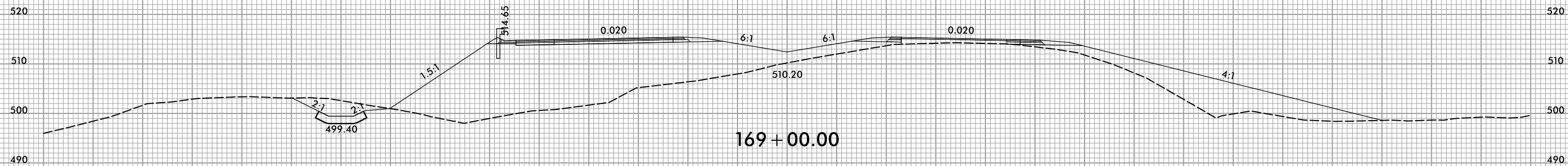
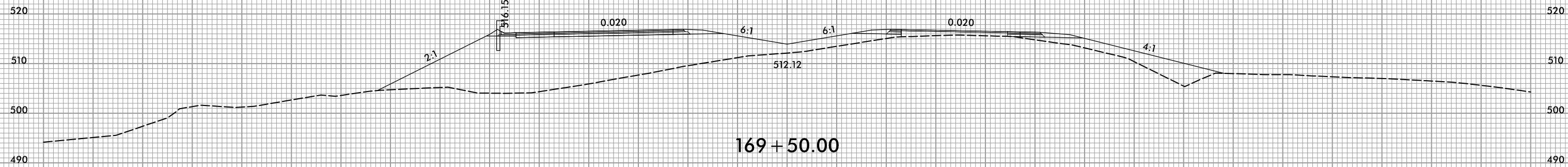


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R-2527

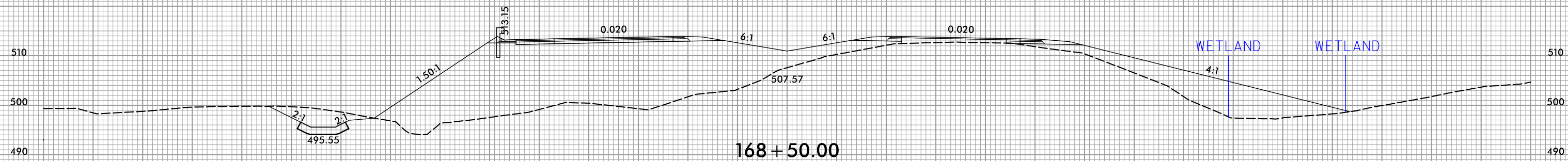
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PERMIT DRAWING
SHEET 31 OF 91



SITE 26

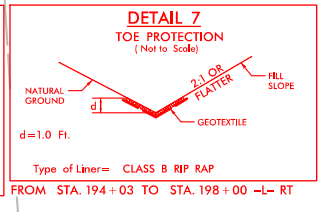
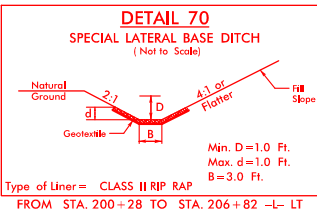
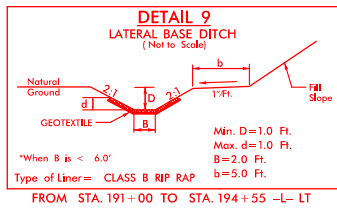
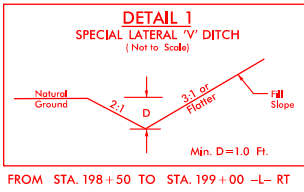


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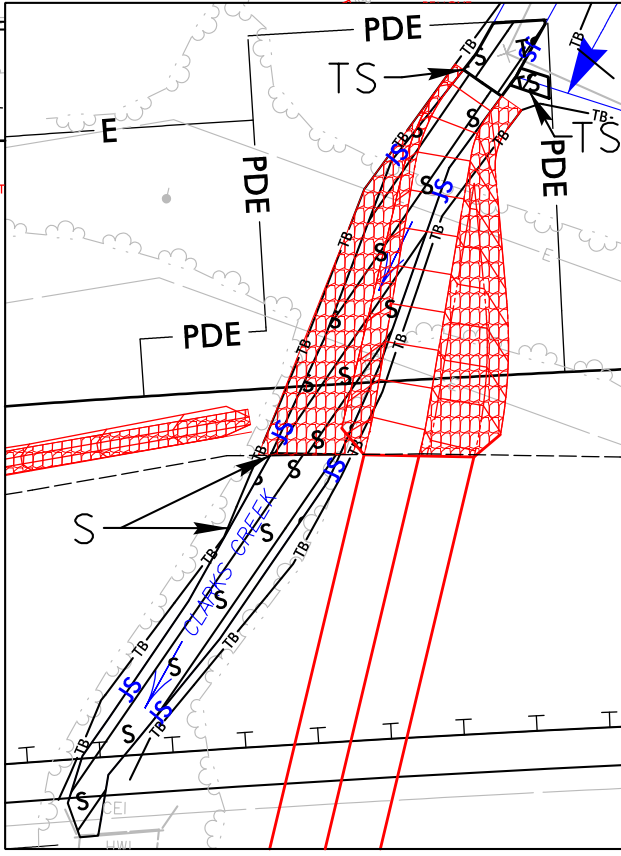
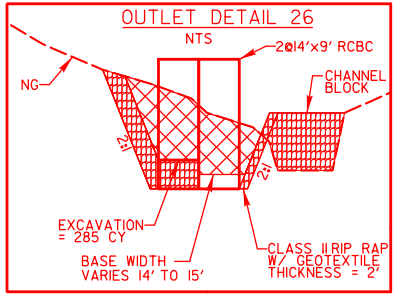
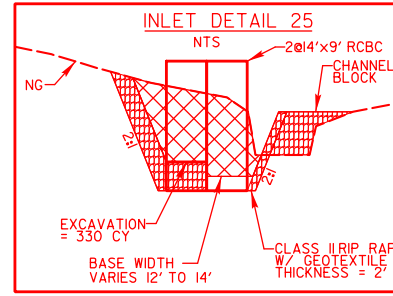
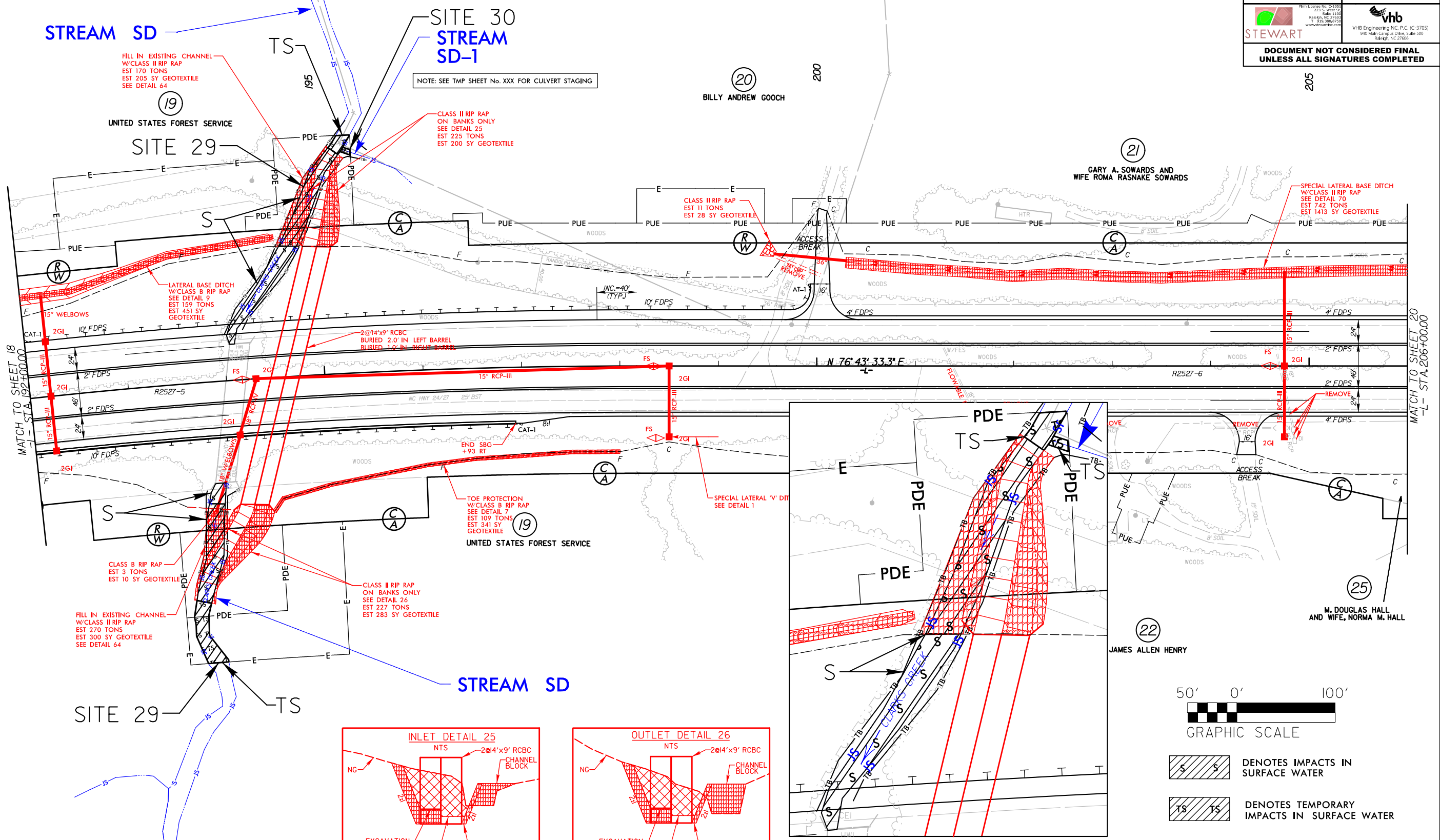
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eberger

5/14/99
7:44:22 AM
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PERMIT DRAWING SHEET 32 OF 91



PROJECT REFERENCE NO. R-2527	SHEET NO. 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SITES 29 & 30 (UPSTREAM)



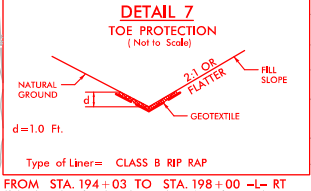
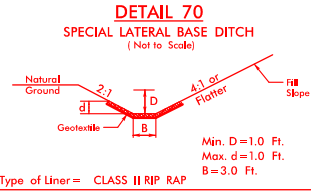
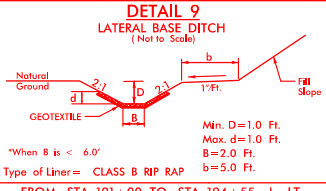
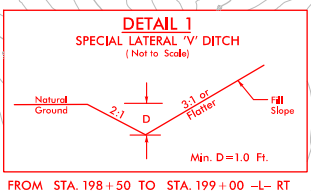
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FOR -L- PROFILE, SEE SHEET 48
ALL DRIVEWAY RADI 30' UNLESS OTHERWISE NOTED.

5/14/99

PROJECT REFERENCE NO. R-2527	SHEET NO. 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

PERMIT DRAWING SHEET 33 OF 91

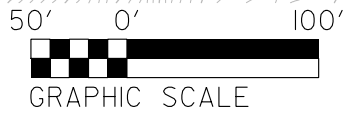
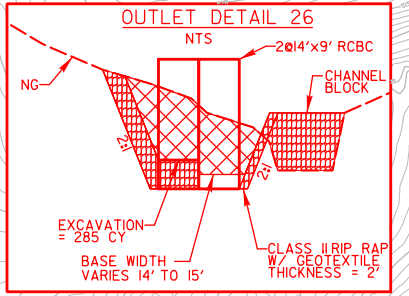
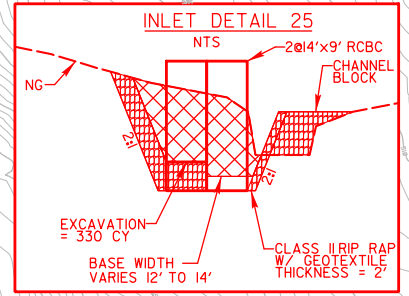
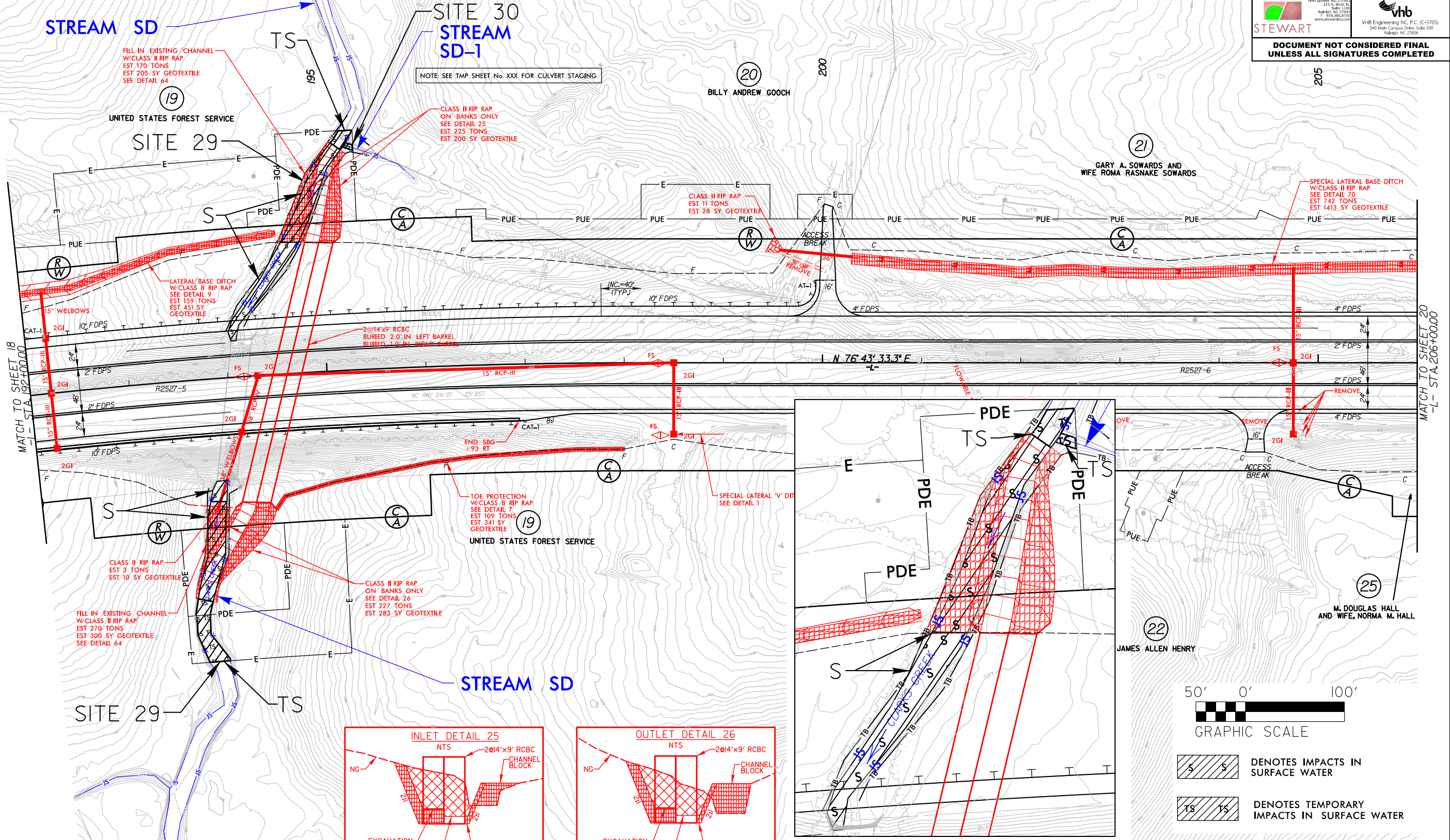


FROM STA. 198+50 TO STA. 199+00 -L- RT

FROM STA. 191+00 TO STA. 194+55 -L- LT

FROM STA. 200+28 TO STA. 206+82 -L- LT

FROM STA. 194+03 TO STA. 198+00 -L- RT



DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITES 29 & 30 (UPSTREAM)



FOR -L- PROFILE, SEE SHEET 48

ALL DRIVEWAY RADI 30' UNLESS OTHERWISE NOTED.

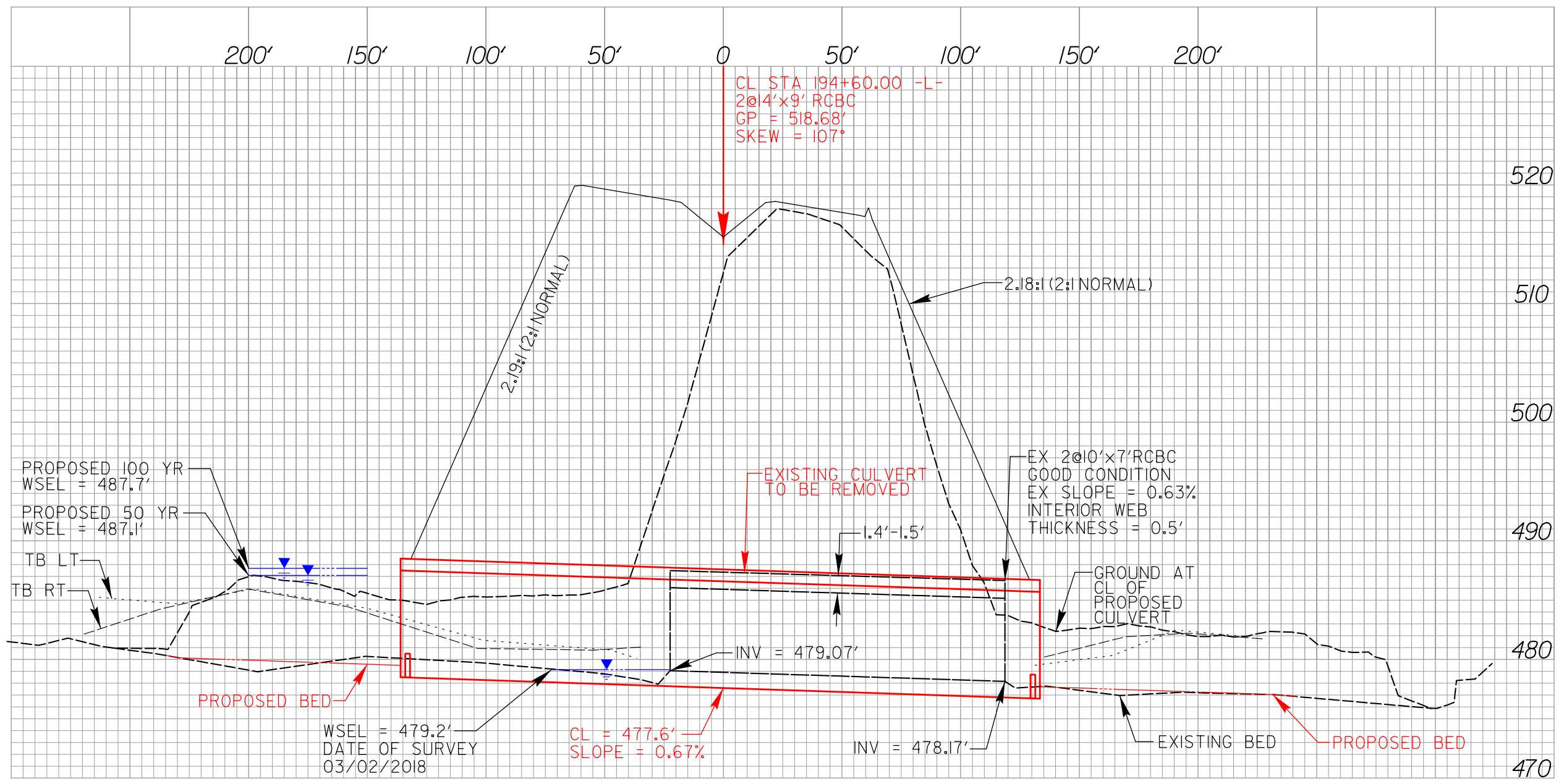
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 5/14/99

8/17/99

PERMIT DRAWING
SHEET 34 OF 91

PROJECT REFERENCE NO. R-2527		SHEET NO.	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 Firm License No. C-1103 217 S. West St. Raleigh, NC 27603 T: 919.386.8764 www.stewartinc.com		 VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

SITES 29 & 30

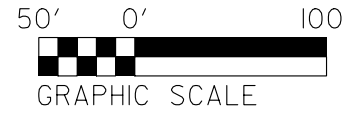


REVISIONS

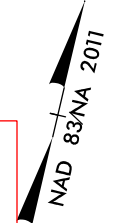
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5/14/99

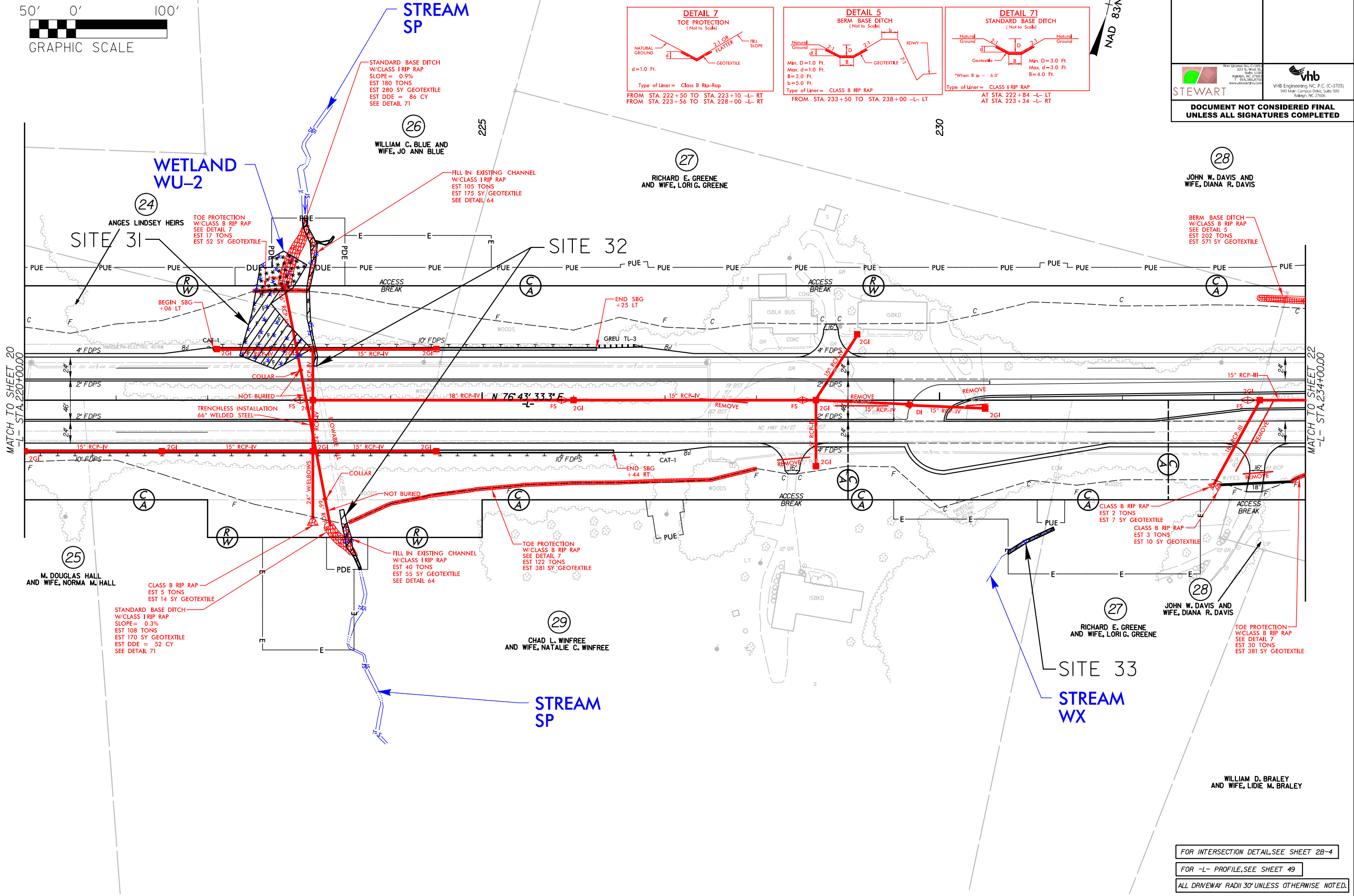
**PERMIT DRAWING
SHEET 35 OF 91**



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



PROJECT REFERENCE NO. R-2527	SHEET NO. 21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



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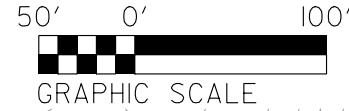
FOR INTERSECTION DETAIL, SEE SHEET 2B-4

FOR -L- PROFILE, SEE SHEET 49

ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

5/14/99
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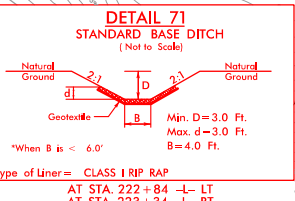
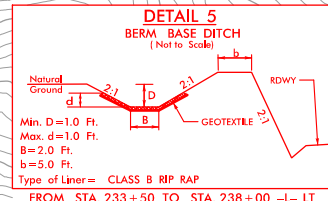
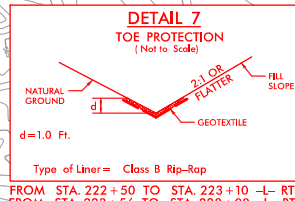
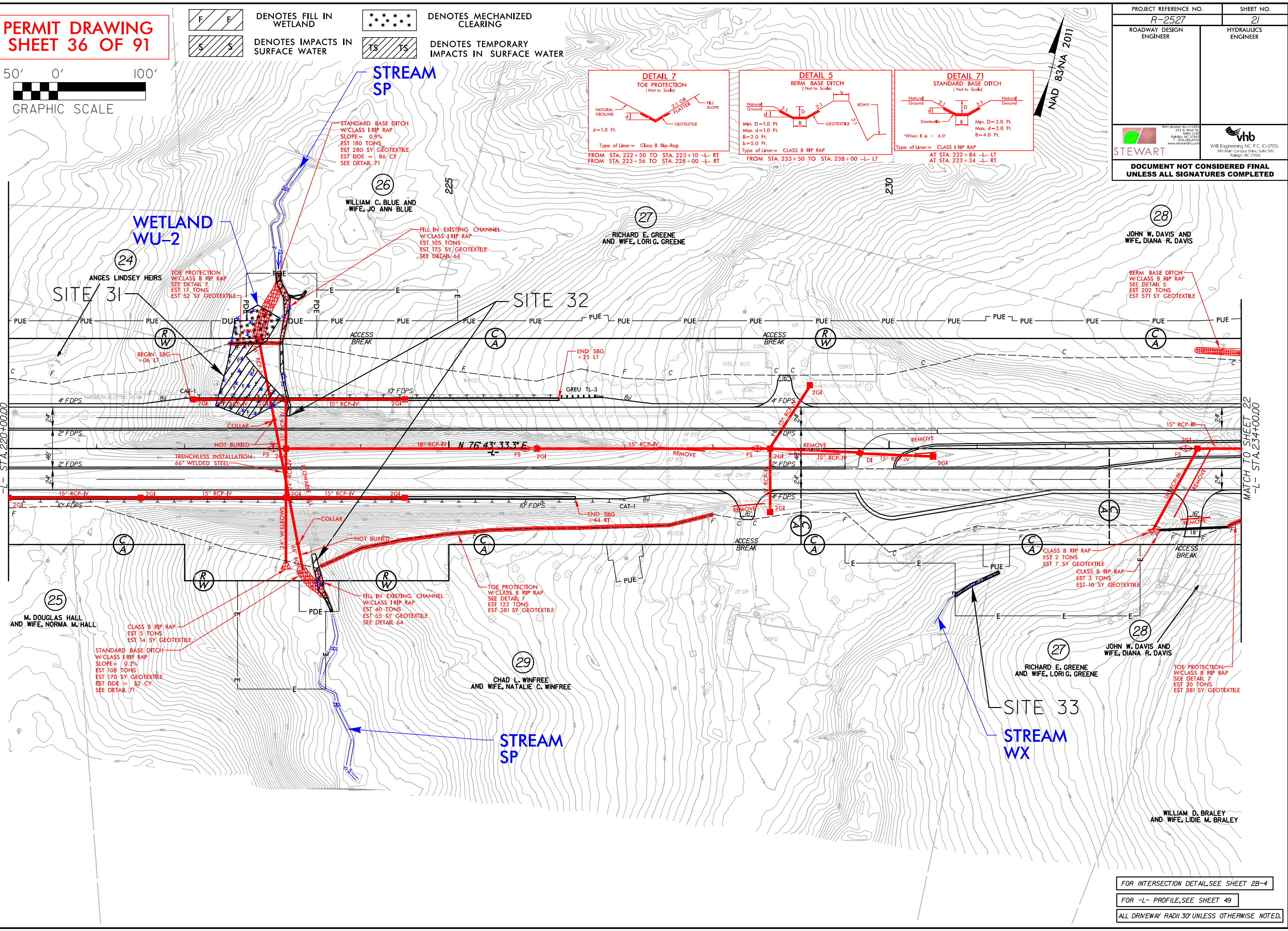
PERMIT DRAWING SHEET 36 OF 91



- | | | | |
|--|----------------------------------|--|--|
| | DENOTES FILL IN WETLAND | | DENOTES MECHANIZED CLEARING |
| | DENOTES IMPACTS IN SURFACE WATER | | DENOTES TEMPORARY IMPACTS IN SURFACE WATER |

PROJECT REFERENCE NO. <i>R-2527</i>	SHEET NO. <i>21</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOR INTERSECTION DETAIL, SEE SHEET 28-4
 FOR -L- PROFILE, SEE SHEET 49
 ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

8/23/99



PROJ. REFERENCE NO.
R-2527

SHEET NO.
X-132

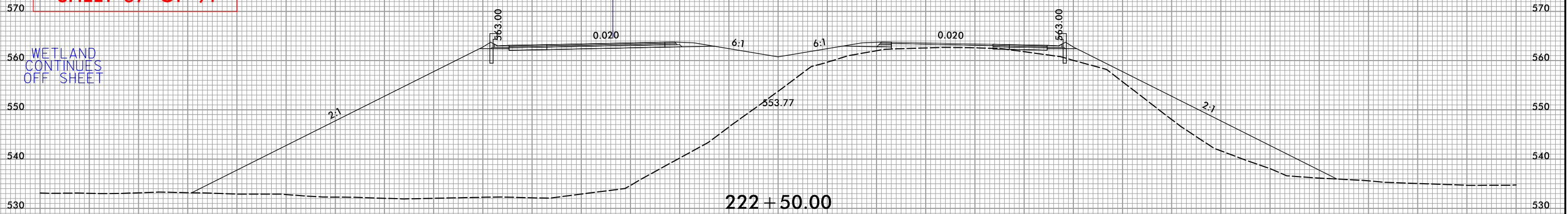
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**PERMIT DRAWING
SHEET 37 OF 91**

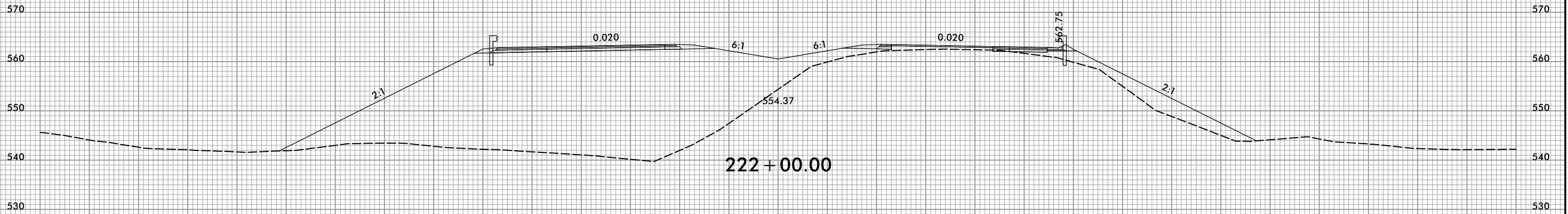
WETLAND

SITE 31

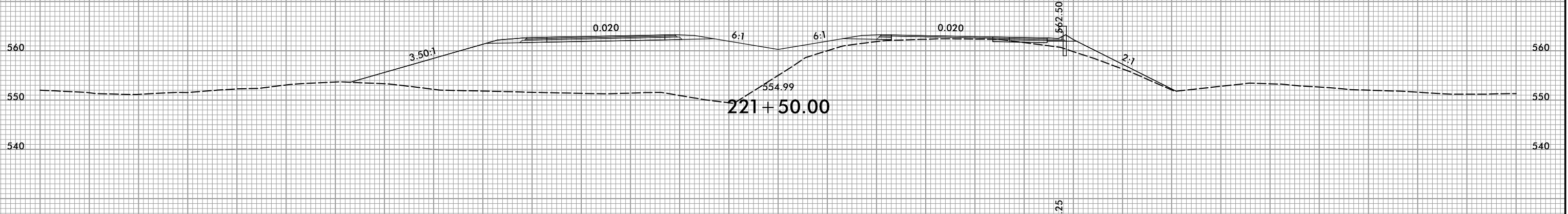
WETLAND
CONTINUES
OFF SHEET



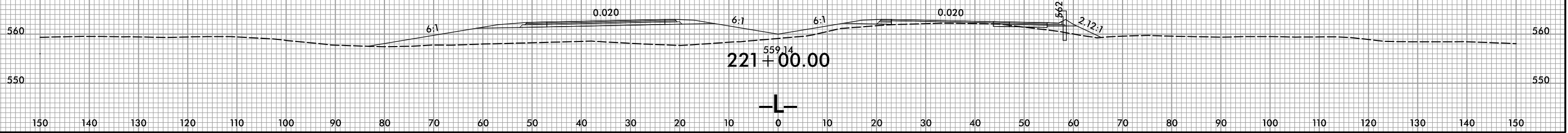
222 + 50.00



222 + 00.00



221 + 50.00

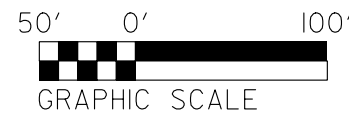


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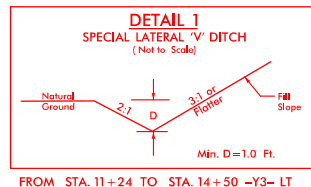
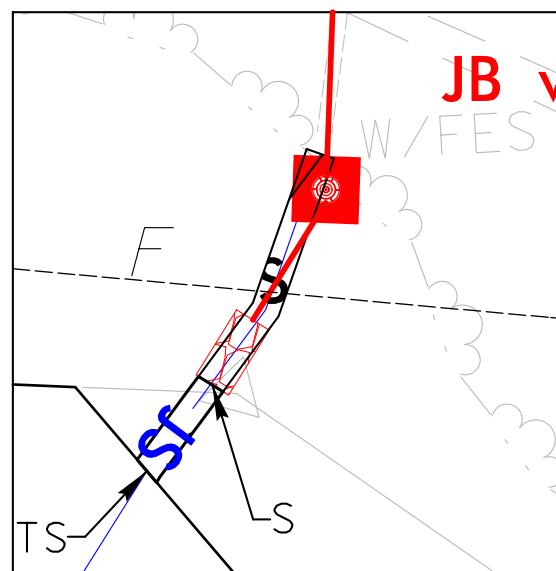
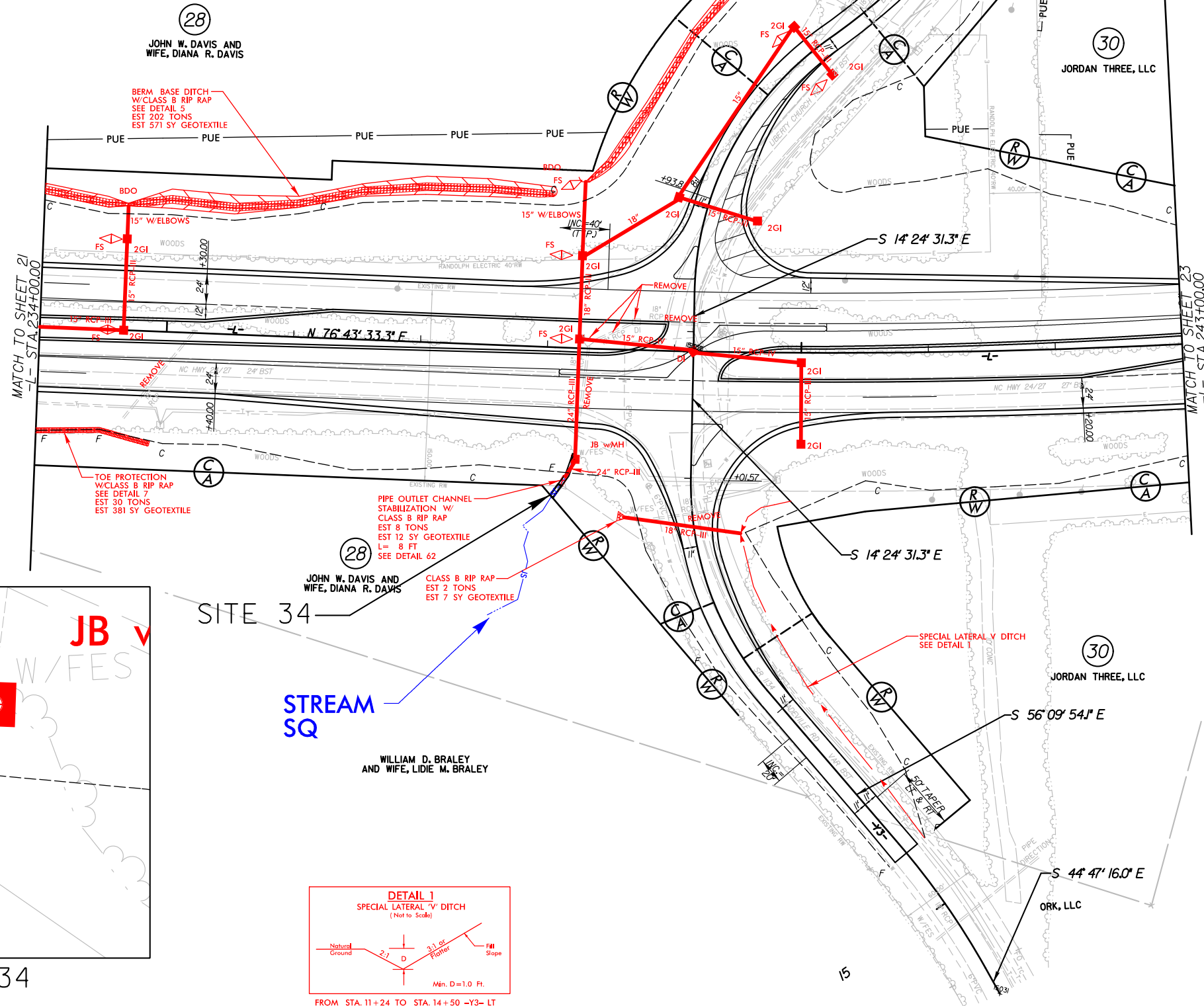
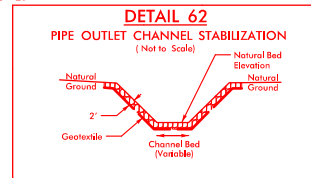
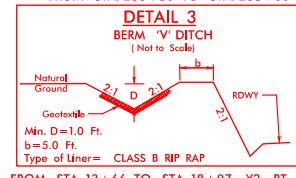
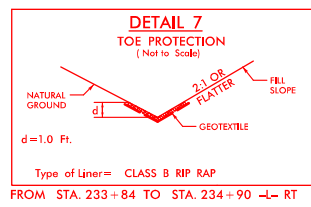
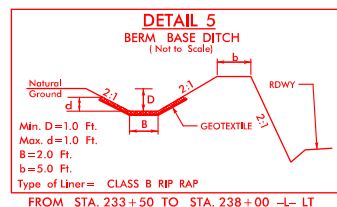
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eberger

5/14/99

PERMIT DRAWING SHEET 38 OF 91



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



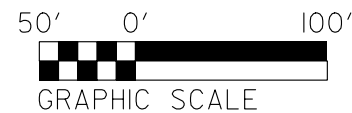
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



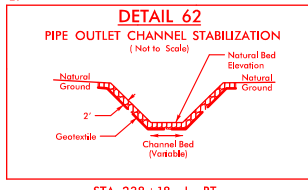
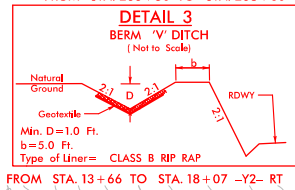
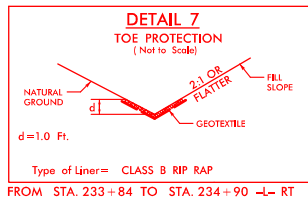
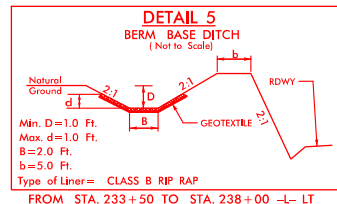
FOR INTERSECTION DETAIL, SEE SHEETS 28-5
FOR -L- PROFILE, SEE SHEETS 49 & 50
FOR -Y2- PROFILE, SEE SHEET 59
FOR -Y3- PROFILE, SEE SHEET 59

5/14/99

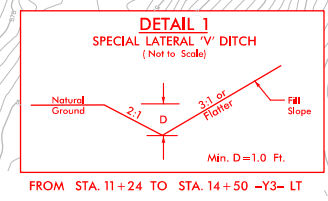
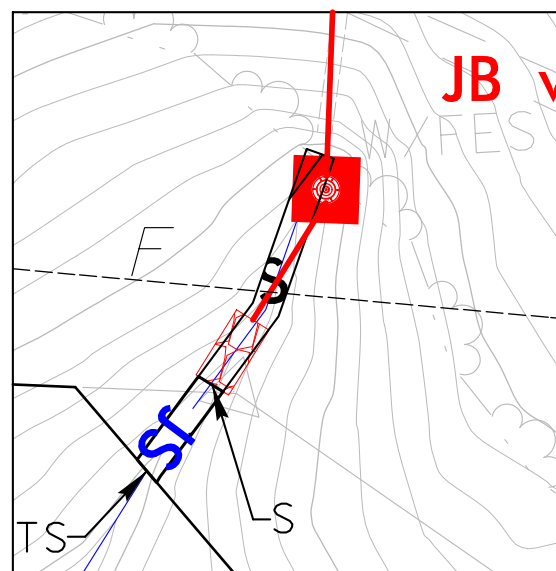
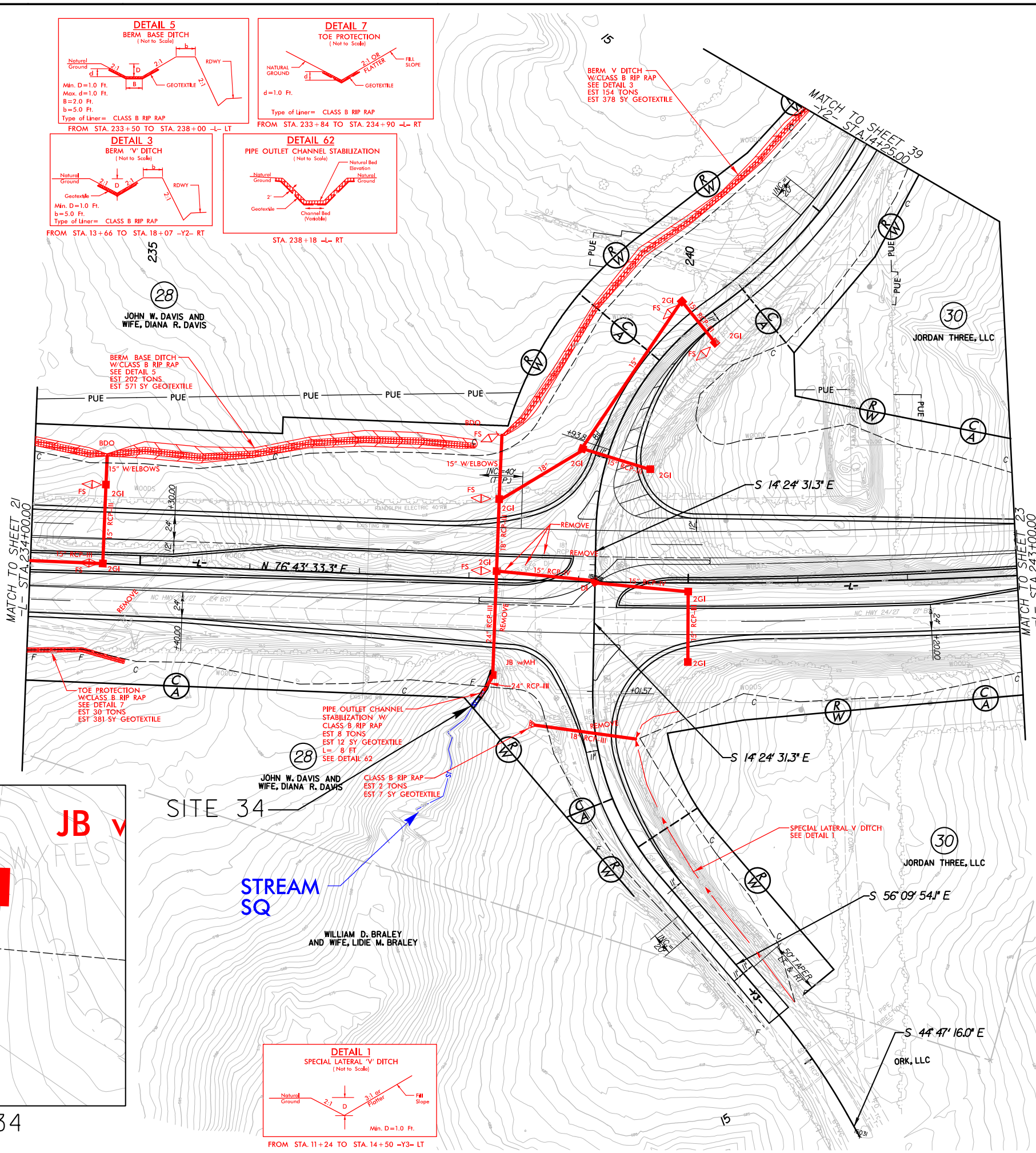
PERMIT DRAWING SHEET 39 OF 91



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



BERM 'V' DITCH
W/CLASS B RIP RAP
SEE DETAIL 3
EST 154 TONS
EST 378 SY GEOTEXTILE

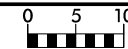


NAD 83/NA 2011

PROJECT REFERENCE NO. R-2527	SHEET NO. 22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>	

FOR INTERSECTION DETAIL, SEE SHEETS 28-5
FOR -L- PROFILE, SEE SHEETS 49 & 50
FOR -Y2- PROFILE, SEE SHEET 59
FOR -Y3- PROFILE, SEE SHEET 59

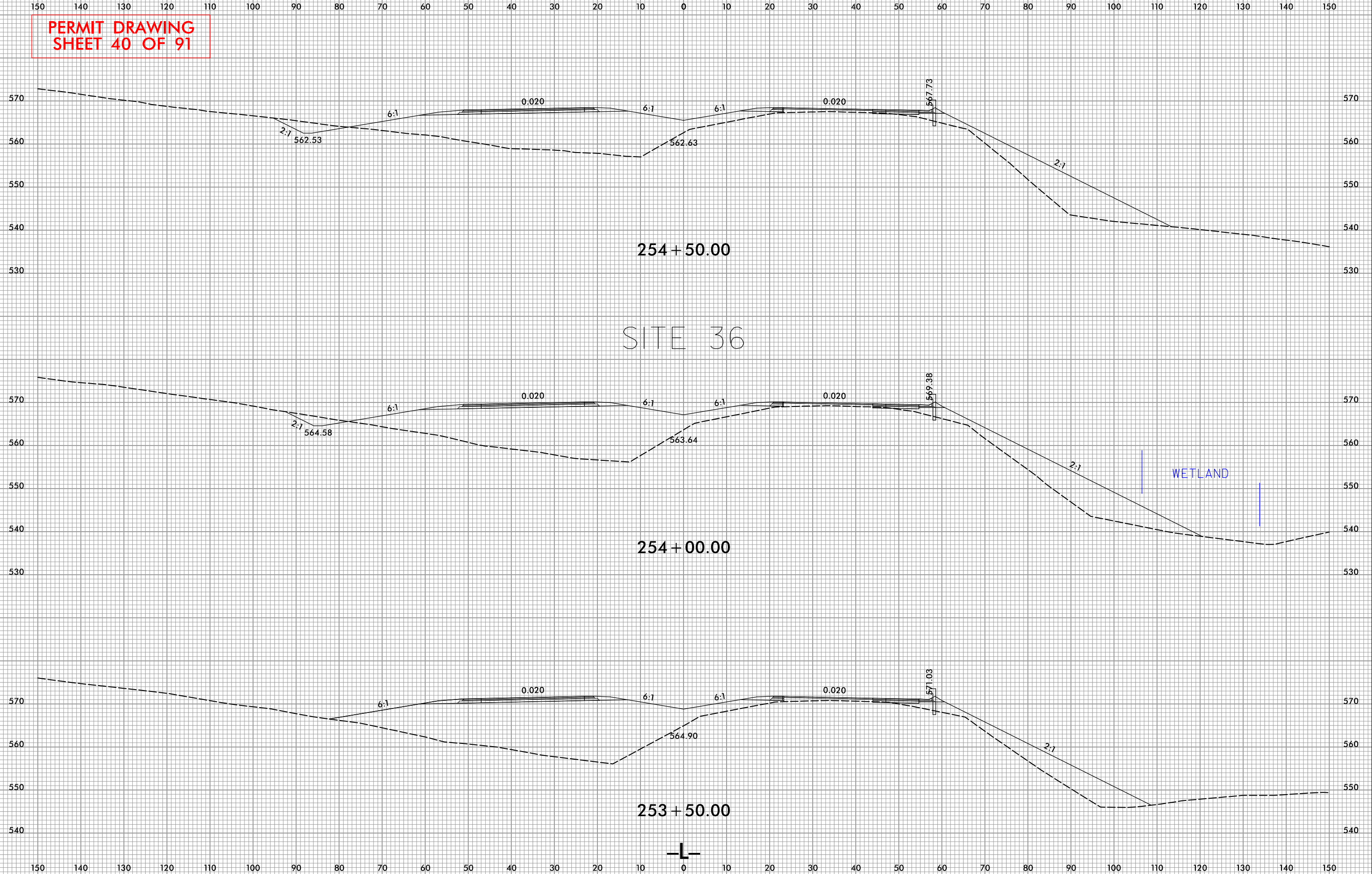
8/23/99



PROJ. REFERENCE NO.
R-2527

SHEET NO.
X-154

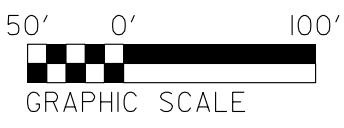
PERMIT DRAWING
SHEET 40 OF 91



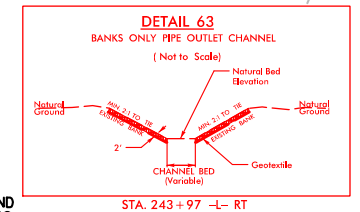
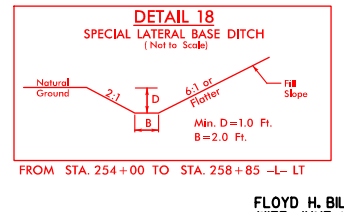
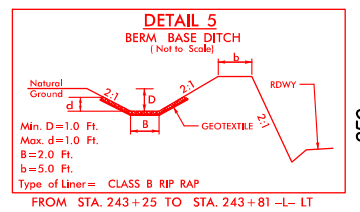
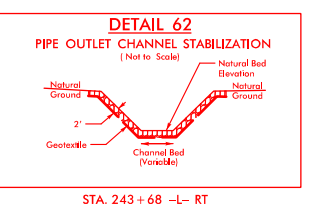
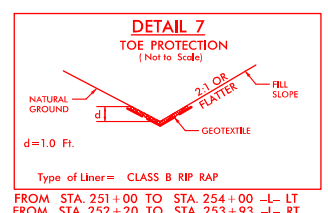
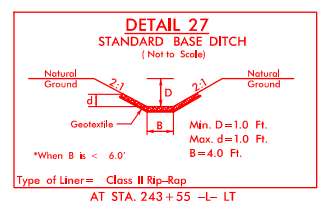
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5/14/99

PERMIT DRAWING SHEET 41 OF 91



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



PROJECT REFERENCE NO. R-2527	SHEET NO. 23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
STEWART	vhb

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

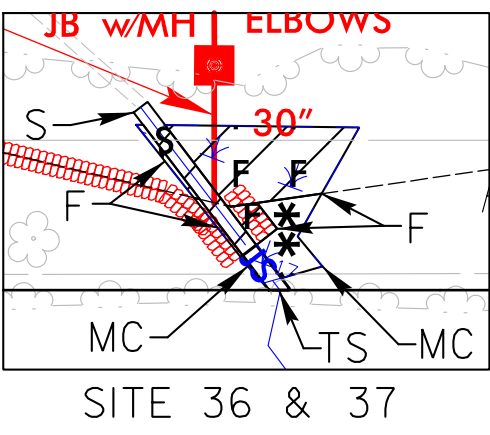
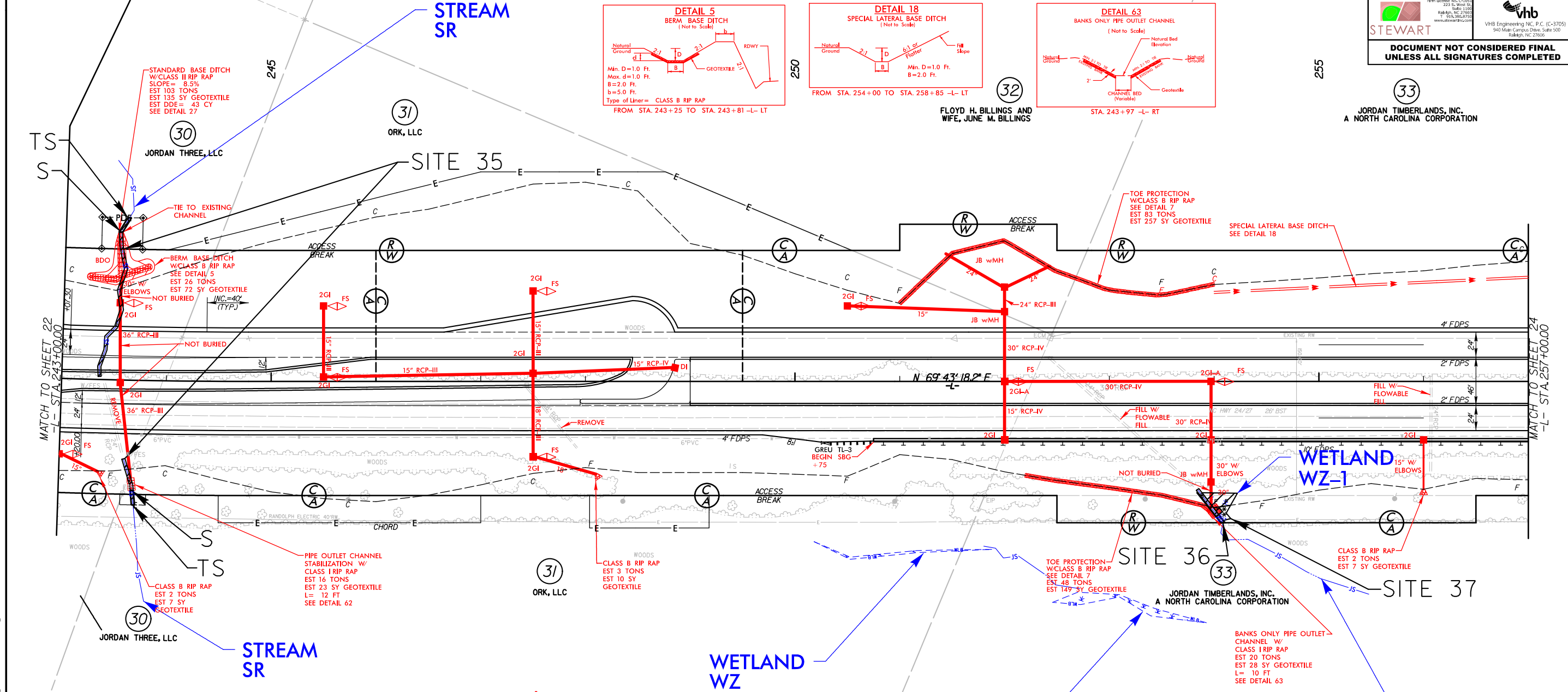


(33) JORDAN TIMBERLANDS, INC. A NORTH CAROLINA CORPORATION

(32) FLOYD H. BILLINGS AND WIFE, JUNE M. BILLINGS

(31) ORK, LLC

(30) JORDAN THREE, LLC

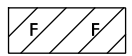


FOR INTERSECTION DETAIL, SEE SHEET 2B-4
FOR -L- PROFILE, SEE SHEET 50

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5/14/99

PERMIT DRAWING SHEET 42 OF 91



DENOTES FILL IN WETLAND



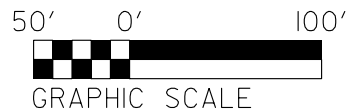
DENOTES MECHANIZED CLEARING



DENOTES IMPACTS IN SURFACE WATER

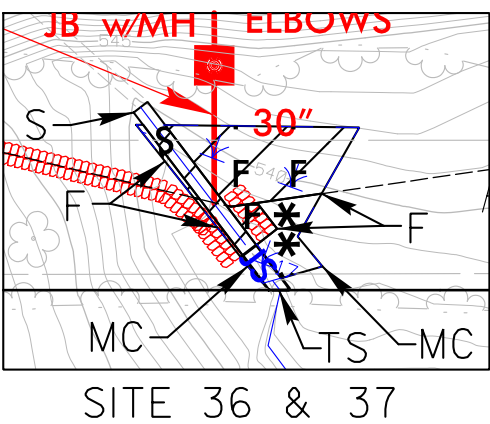
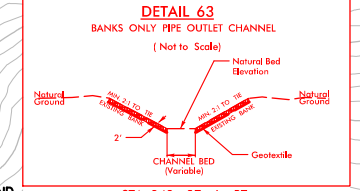
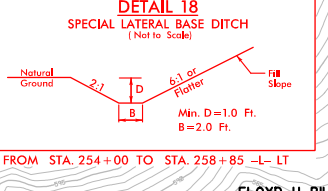
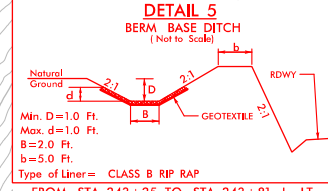
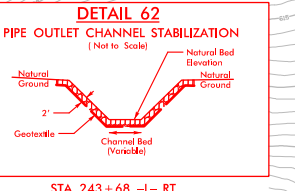
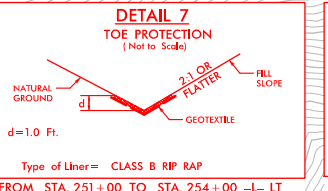
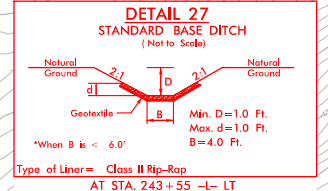
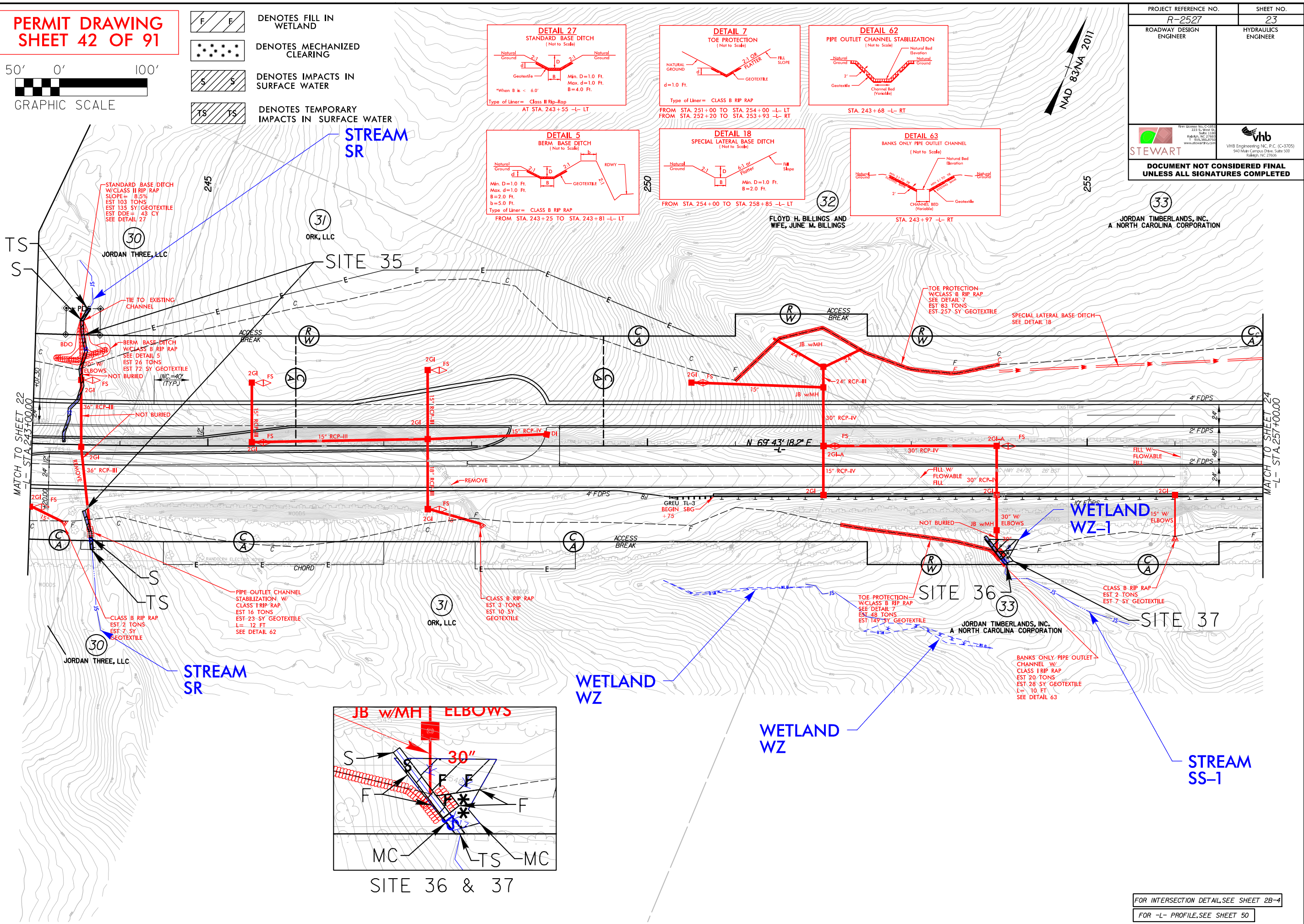


DENOTES TEMPORARY IMPACTS IN SURFACE WATER



GRAPHIC SCALE

PROJECT REFERENCE NO. R-2527	SHEET NO. 23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



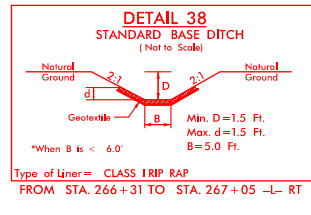
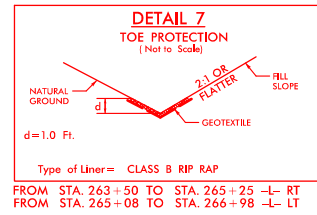
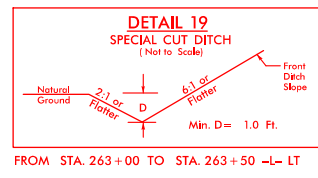
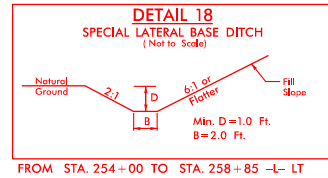
33 JORDAN TIMBERLANDS, INC. A NORTH CAROLINA CORPORATION

5/14/99

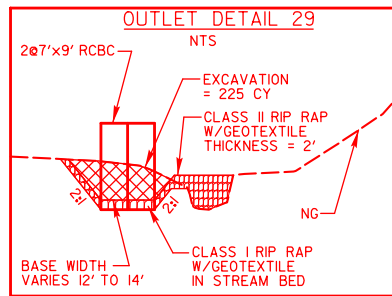
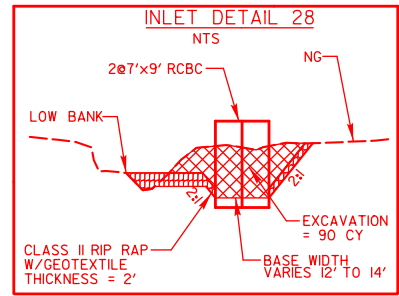
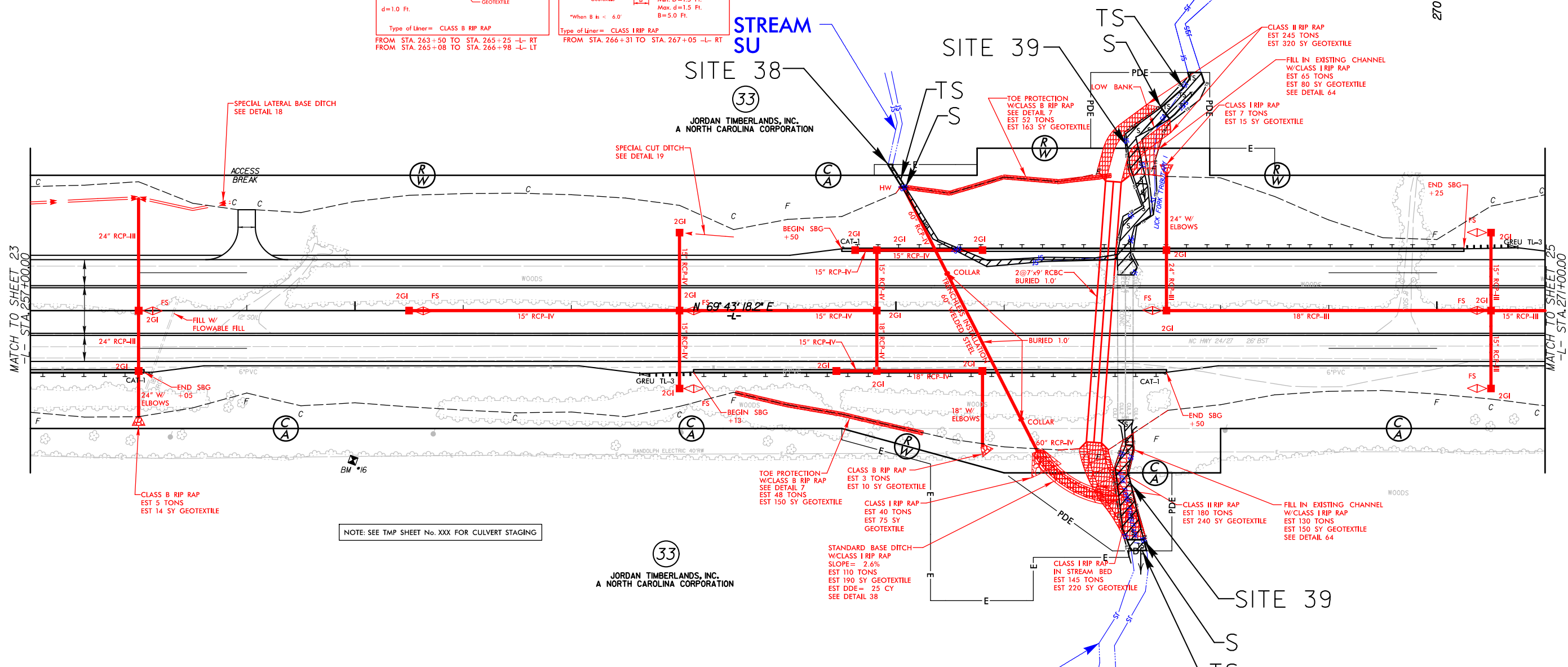
PERMIT DRAWING SHEET 43 OF 91



S DENOTES IMPACTS IN SURFACE WATER
TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



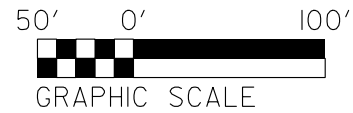
PROJECT REFERENCE NO. R-2527	SHEET NO. 24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
STEWART	vhb
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



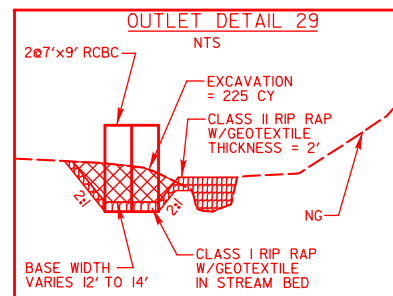
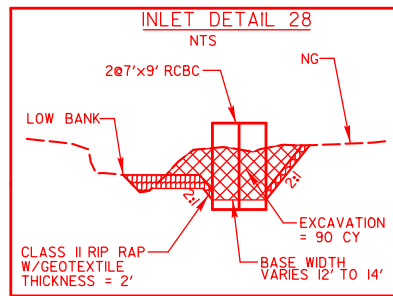
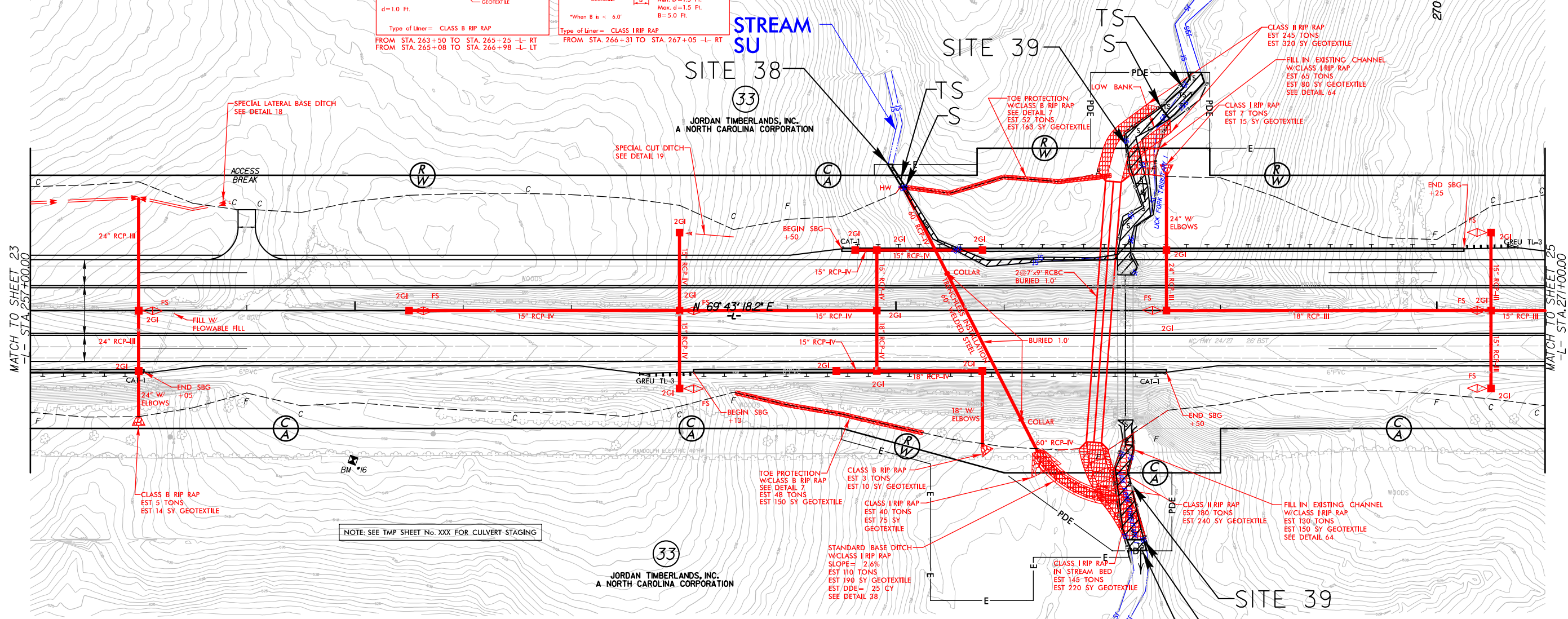
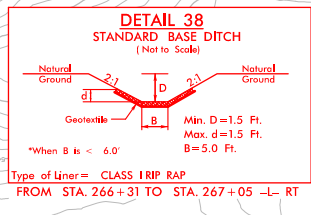
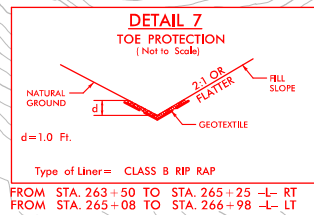
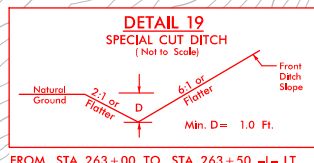
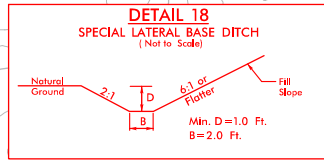
FOR -L- PROFILE, SEE SHEETS 50 & 51
ALL DRIVEWAY RADI 30' UNLESS OTHERWISE NOTED.

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**PERMIT DRAWING
SHEET 44 OF 91**





DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

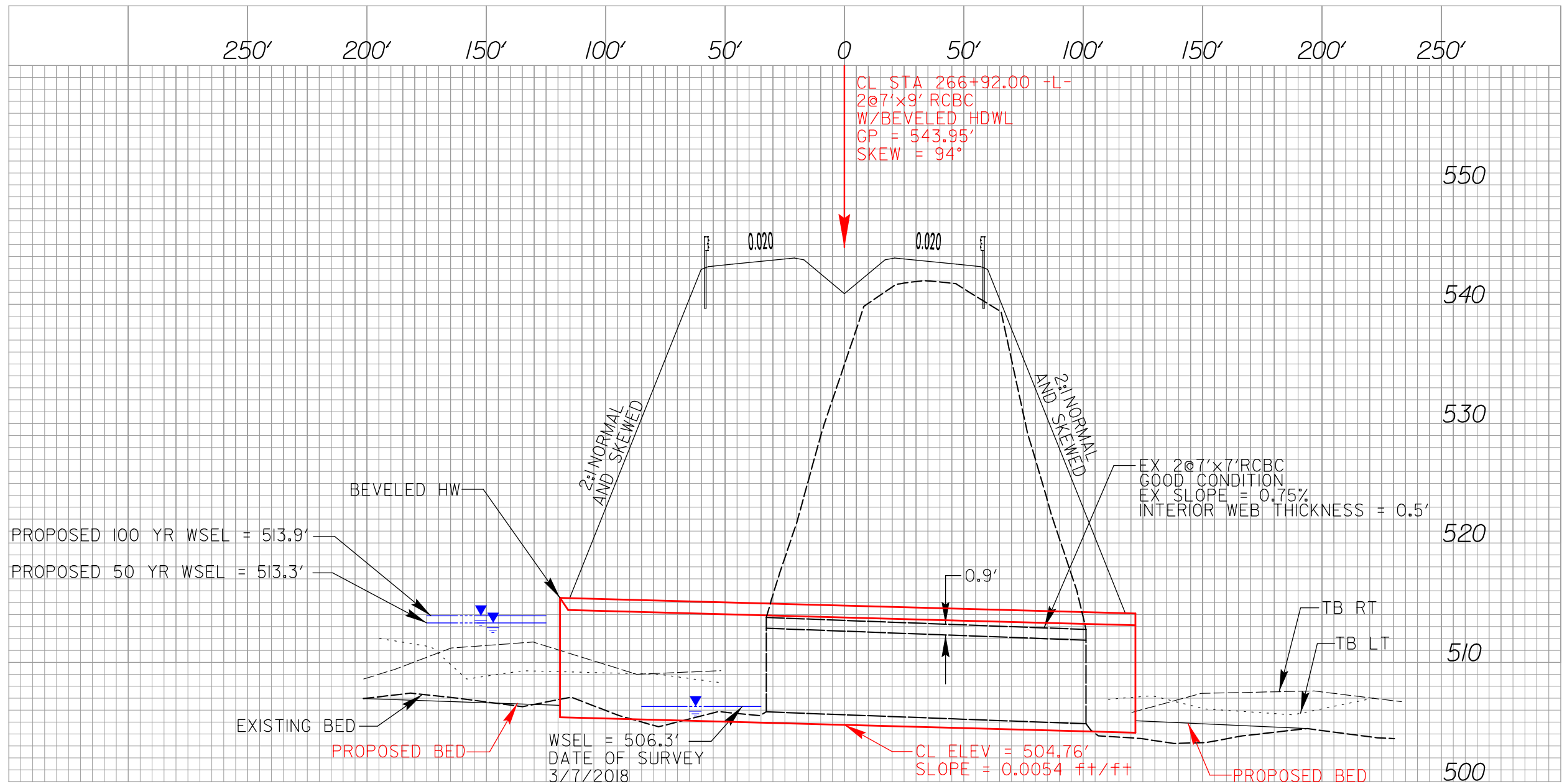


PROJECT REFERENCE NO. R-2527	SHEET NO. 24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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FOR -L- PROFILE, SEE SHEETS 50 & 51
ALL DRIVEWAY RADI 30' UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO. <i>R-2527</i>		SHEET NO.
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
 Firm License No. C-1107 227 S. West St. Raleigh, NC 27603 T 919.386.8789 www.stewartinc.com		 VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

SITE 39

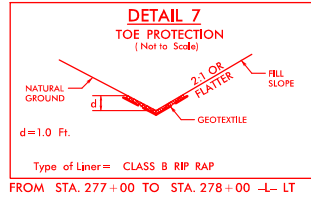
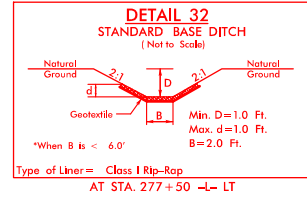
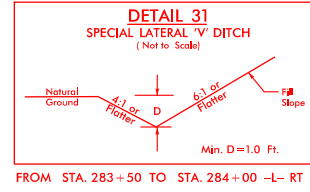
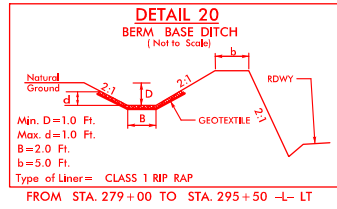


REVISIONS

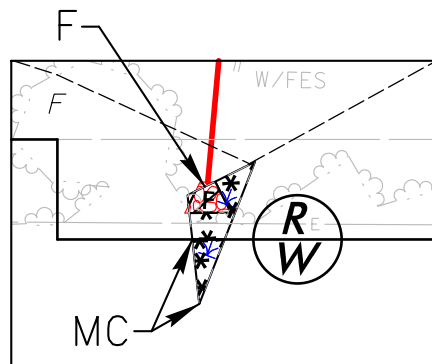
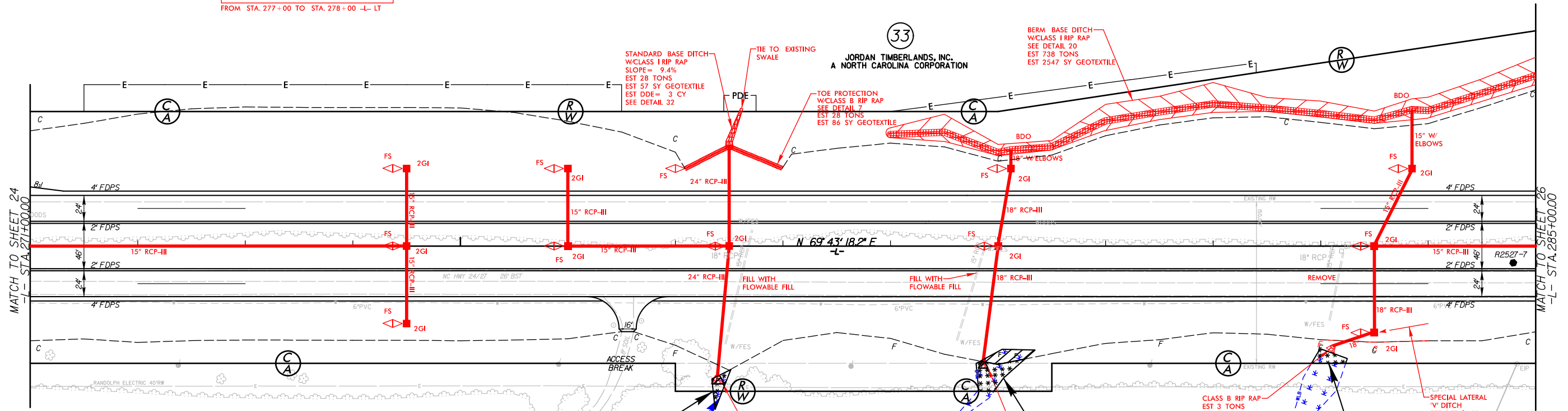
**PERMIT DRAWING
SHEET 46 OF 91**



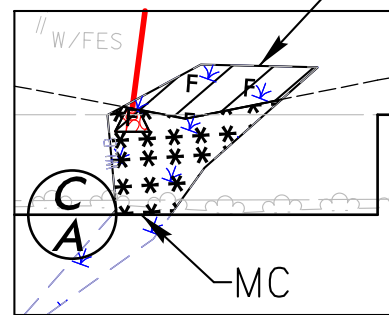
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
STEWART	vhb
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



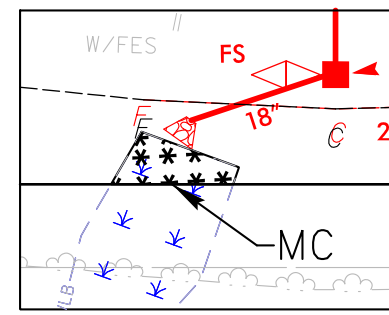
F DENOTES FILL IN WETLAND
M DENOTES MECHANIZED CLEARING



SITE 40 (TOTAL TAKE)



SITE 41



SITE 42

34
WILLIAM JAMES SKIDMORE

FOR -L- PROFILE, SEE SHEET 51
ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

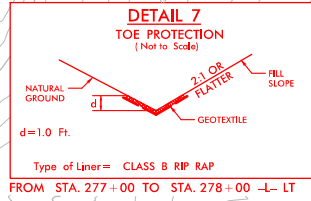
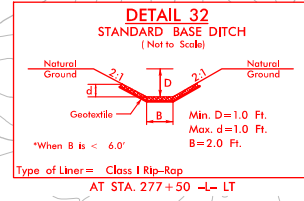
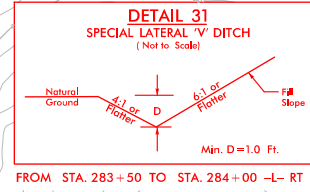
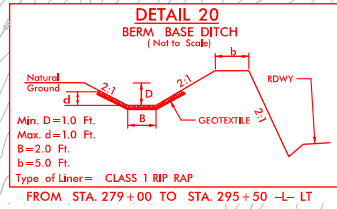
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 5/14/99

**PERMIT DRAWING
SHEET 47 OF 91**

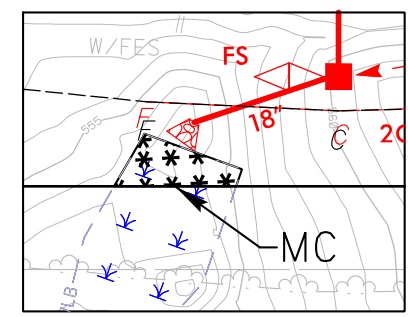
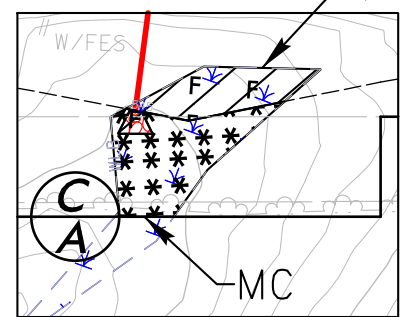
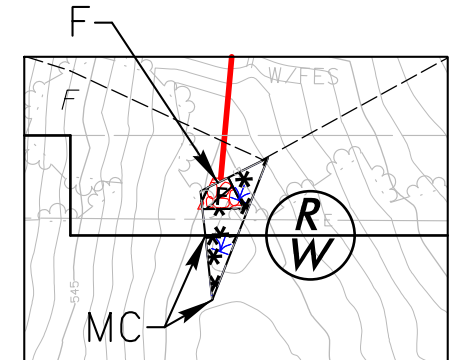
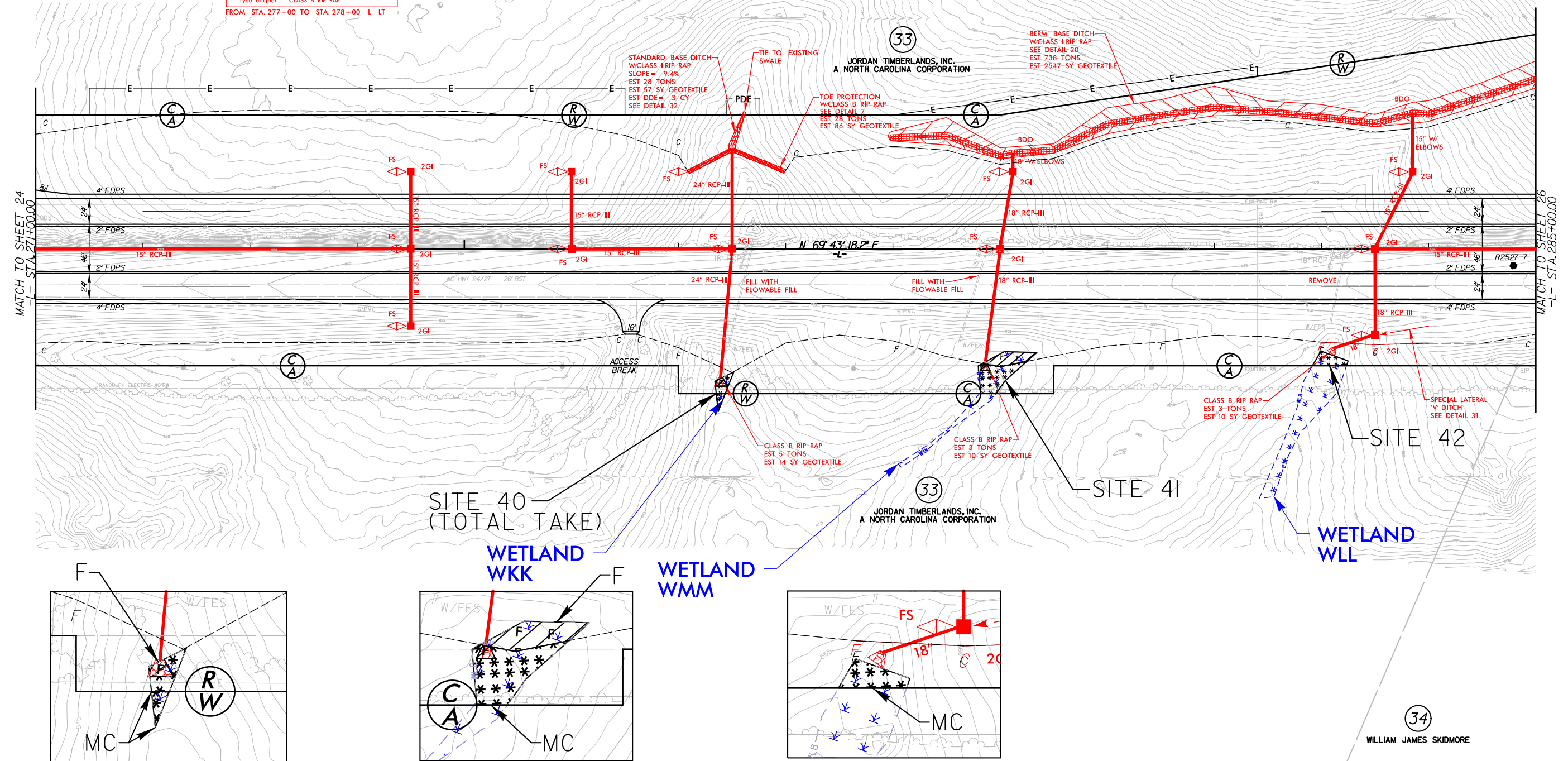


NAD 83/NA 2011

PROJECT REFERENCE NO. R-2527	SHEET NO. 25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>	



DENOTES FILL IN WETLAND
 DENOTES MECHANIZED CLEARING



SITE 40
(TOTAL TAKE)

SITE 41

SITE 42

34
WILLIAM JAMES SKIDMORE

FOR -L- PROFILE, SEE SHEET 51
ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

5/14/99
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8/23/99



PROJ. REFERENCE NO.
R-2527

SHEET NO.
X-167

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**PERMIT DRAWING
SHEET 48 OF 91**

SITE 40

WETLAND
CONTINUES
OFF SHEET

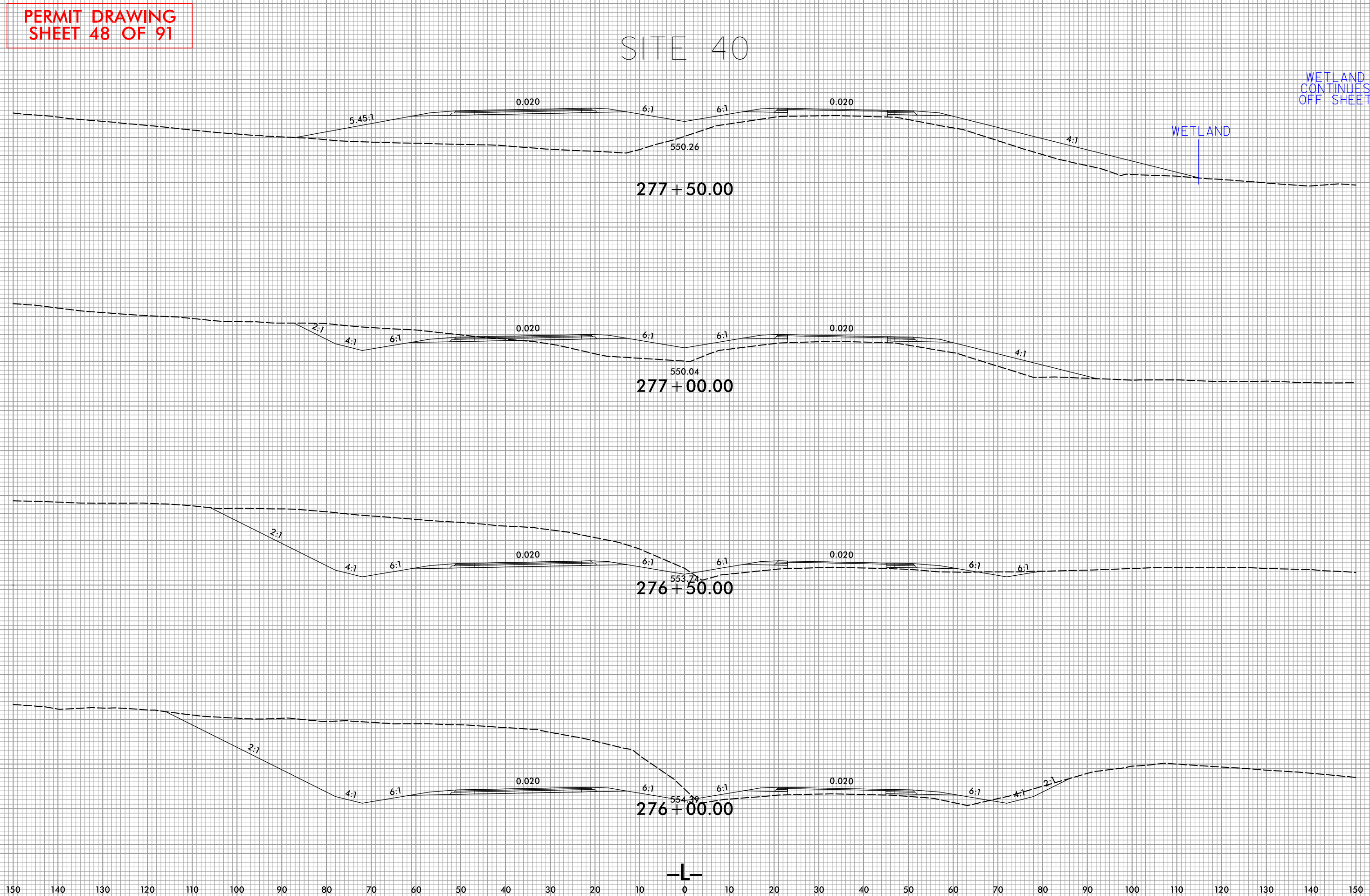
WETLAND

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277+00.00

276+50.00

276+00.00



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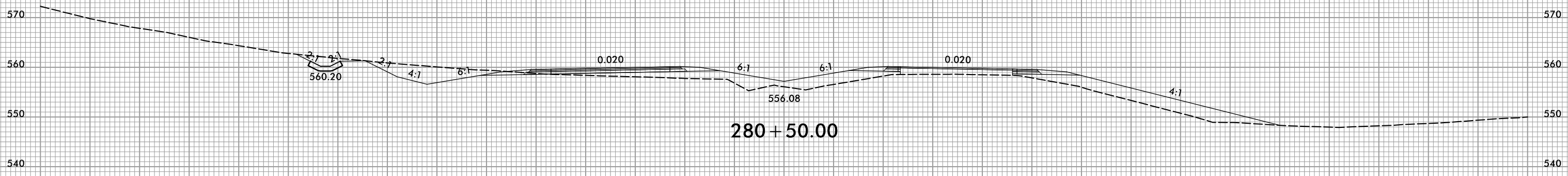


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R-2527

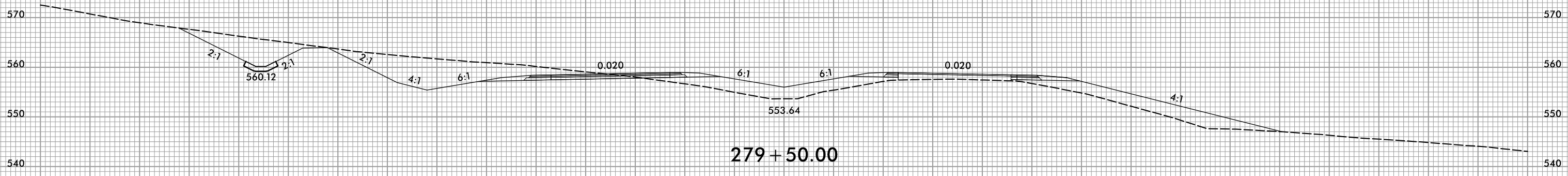
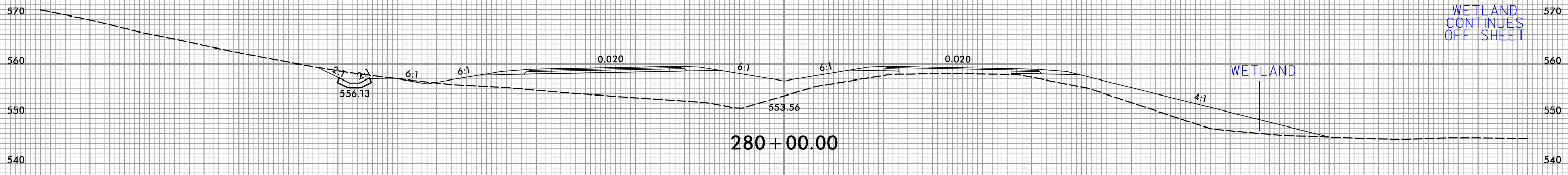
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X-169

PERMIT DRAWING
SHEET 49 OF 91

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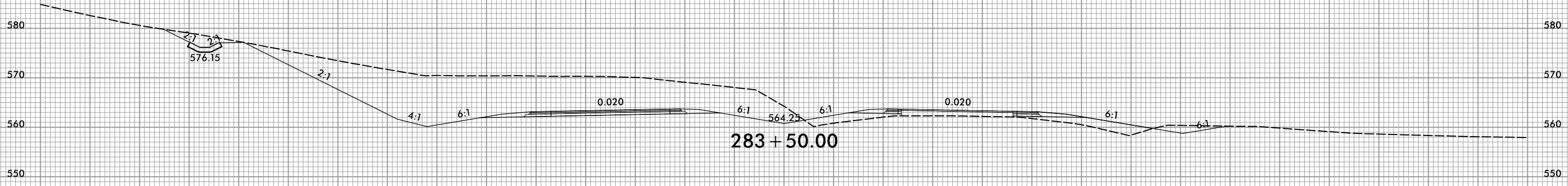
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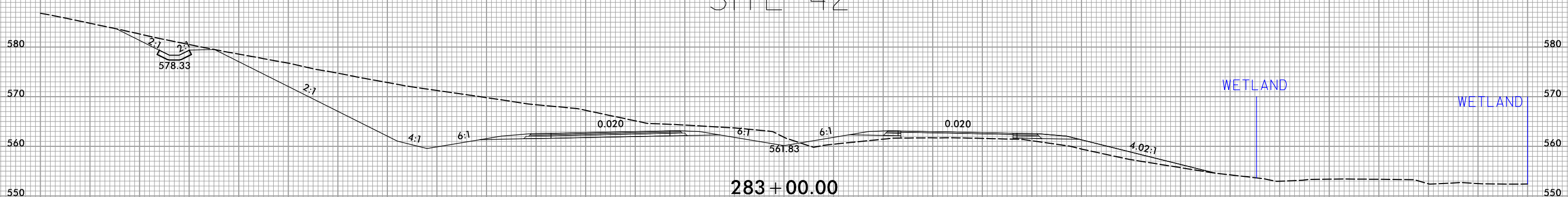
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PERMIT DRAWING
SHEET 50 OF 91

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SITE 42



**PERMIT DRAWING
SHEET 51 OF 91**

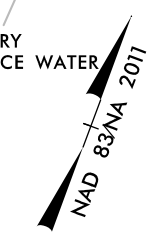
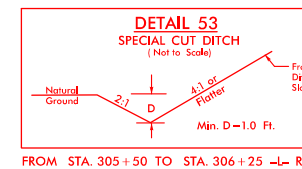
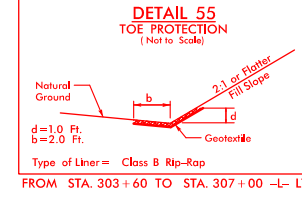
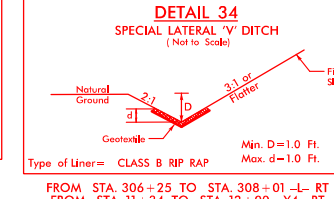
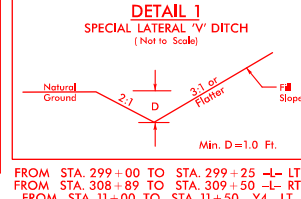
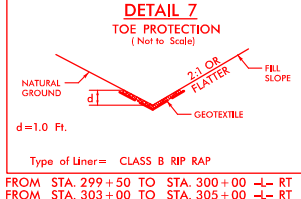
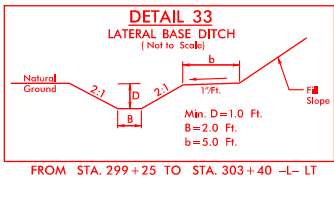
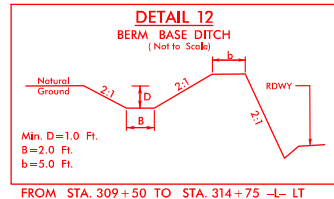


DENOTES FILL IN WETLAND

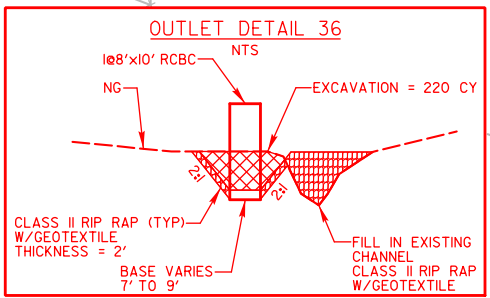
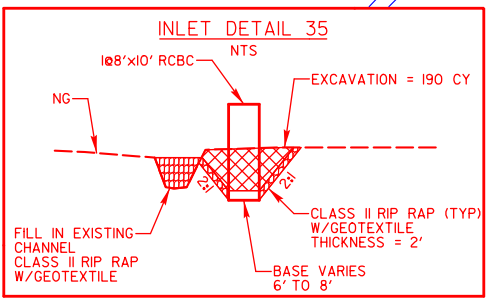
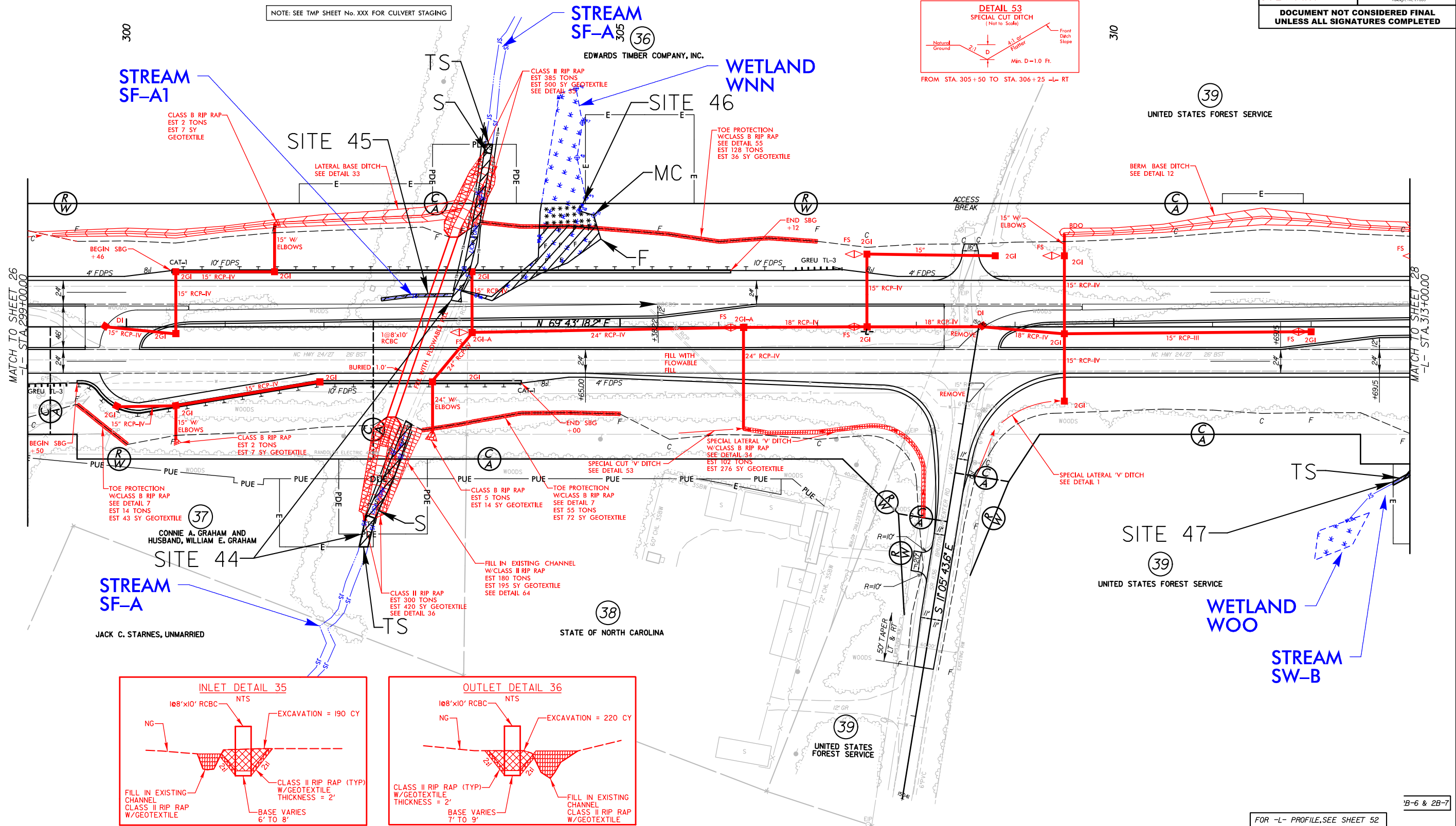
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DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

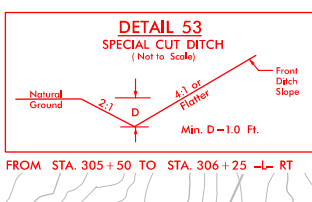
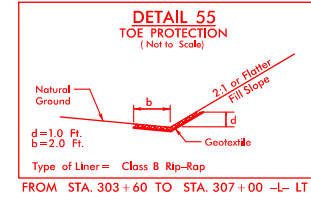
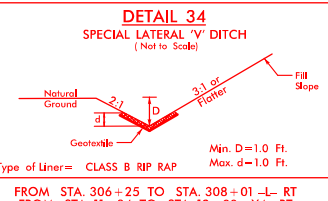
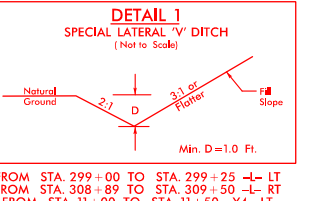
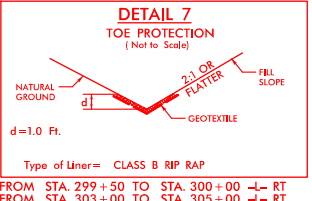
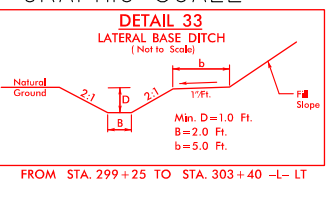
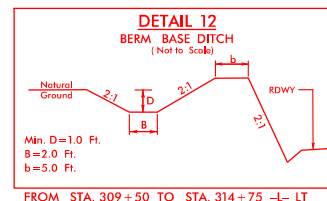


PROJECT REFERENCE NO. R-2527	SHEET NO. 27
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

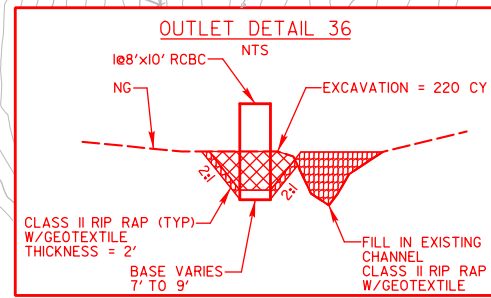
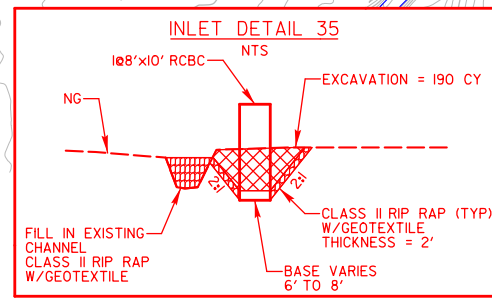
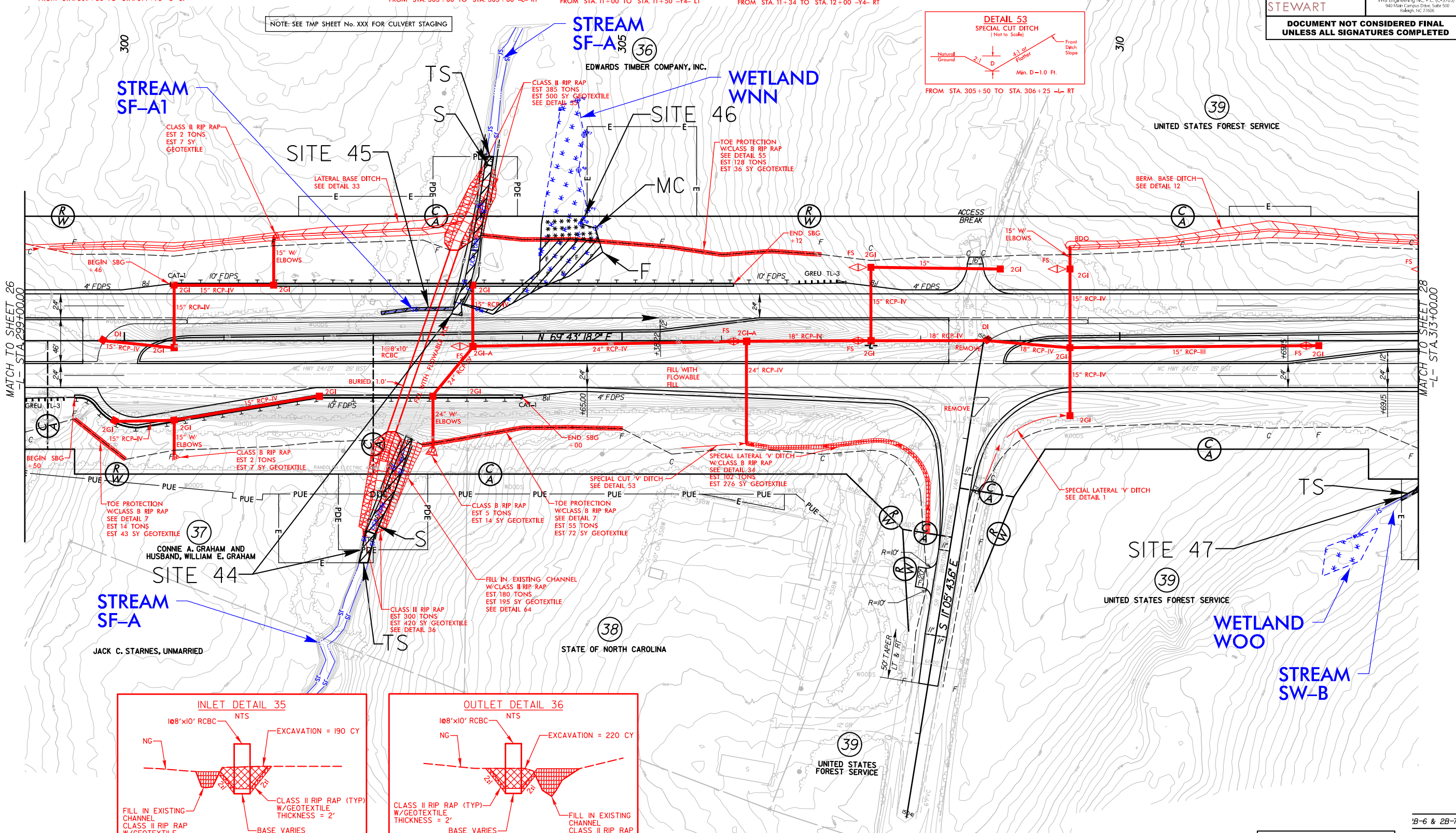


FOR -L- PROFILE, SEE SHEET 52
FOR -Y4- PROFILE, SEE SHEET 60
ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 52 OF 91



PROJECT REFERENCE NO.	R-2527	SHEET NO.	27
ROADWAY DESIGN ENGINEER	STEWART	HYDRAULICS ENGINEER	vhb
VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606		VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			





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shelton

B-6 & 2B-7

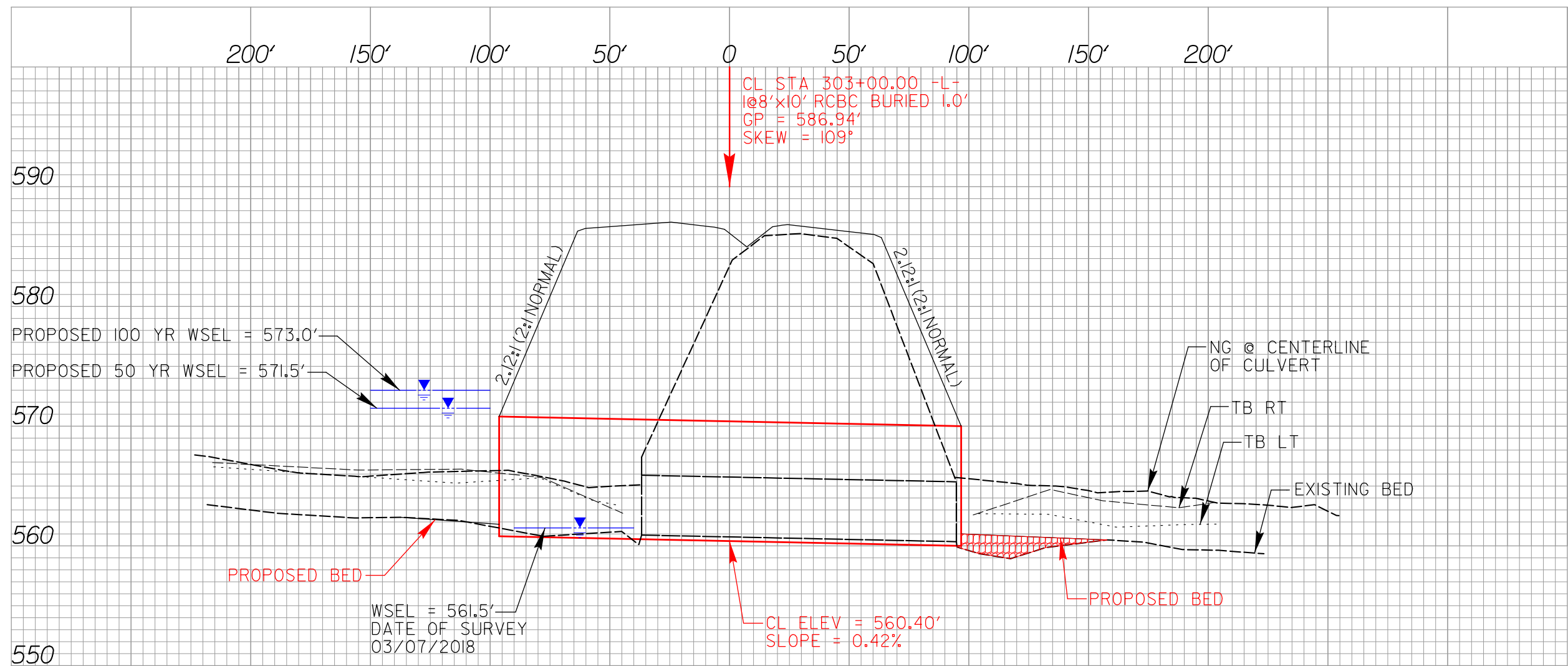
FOR -L- PROFILE, SEE SHEET 52
 FOR -Y4- PROFILE, SEE SHEET 60
 ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

8/17/99

PERMIT DRAWING
SHEET 53 OF 91

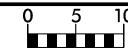
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RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 Firm License No. C-1101 217 S. West St. Raleigh, NC 27603 T 919.386.8766 www.stewartinc.com		 VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

SITES 44, 45, & 46



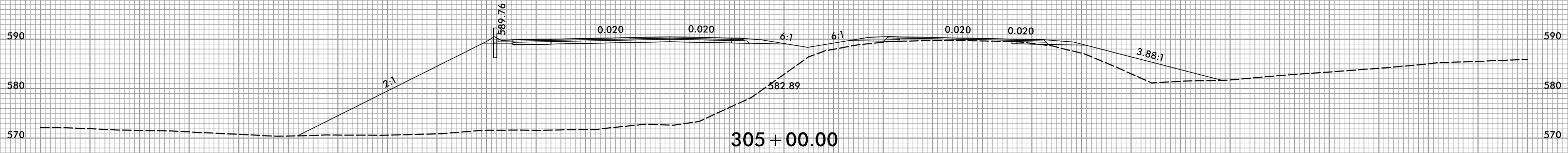
REVISIONS

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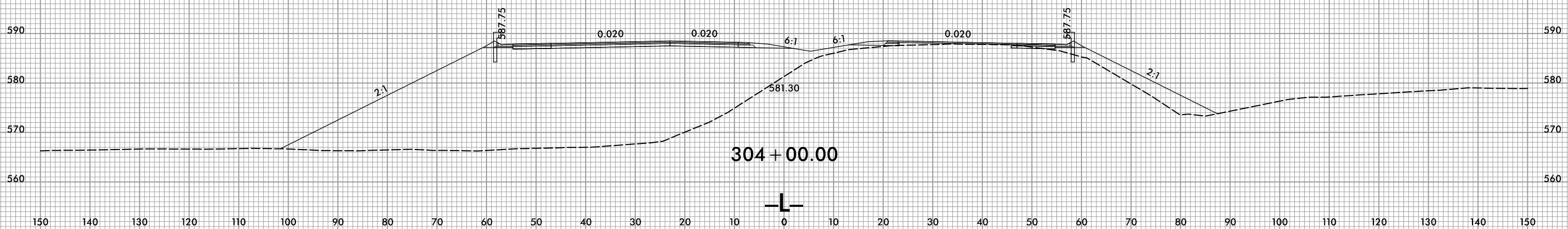
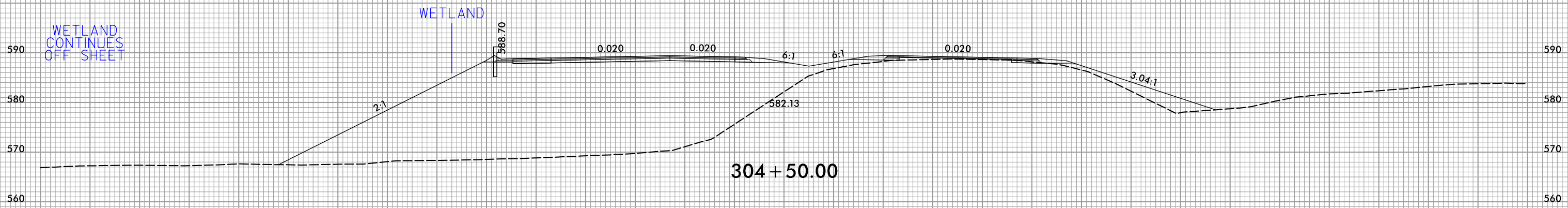


PERMIT DRAWING
SHEET 54 OF 91

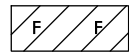
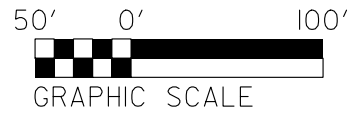
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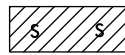
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**PERMIT DRAWING
SHEET 55 OF 91**



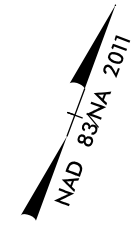
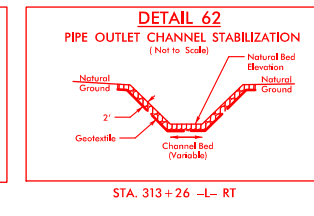
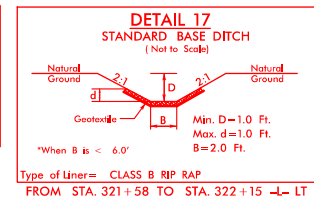
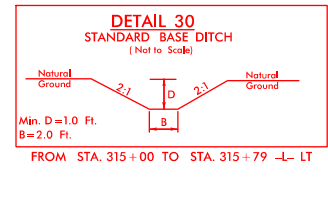
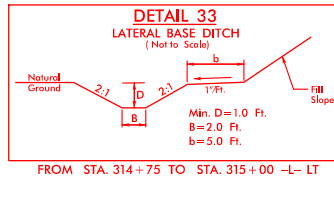
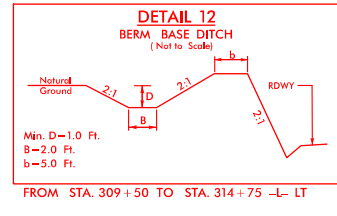
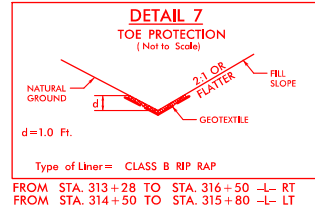
DENOTES FILL IN WETLAND



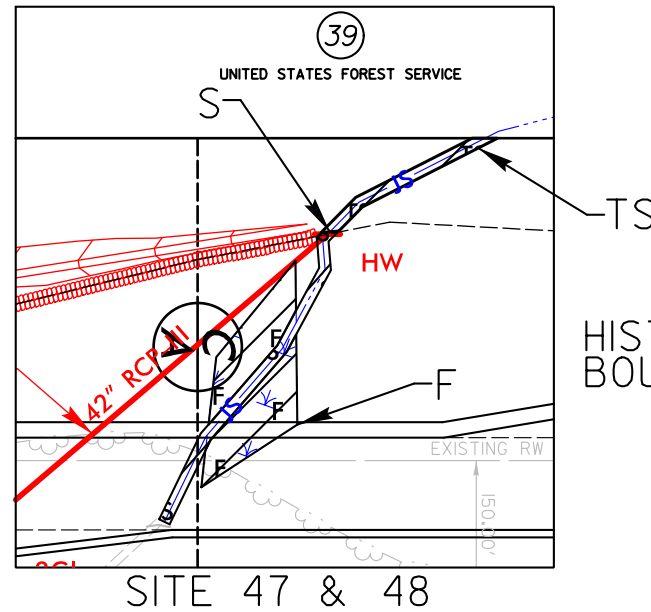
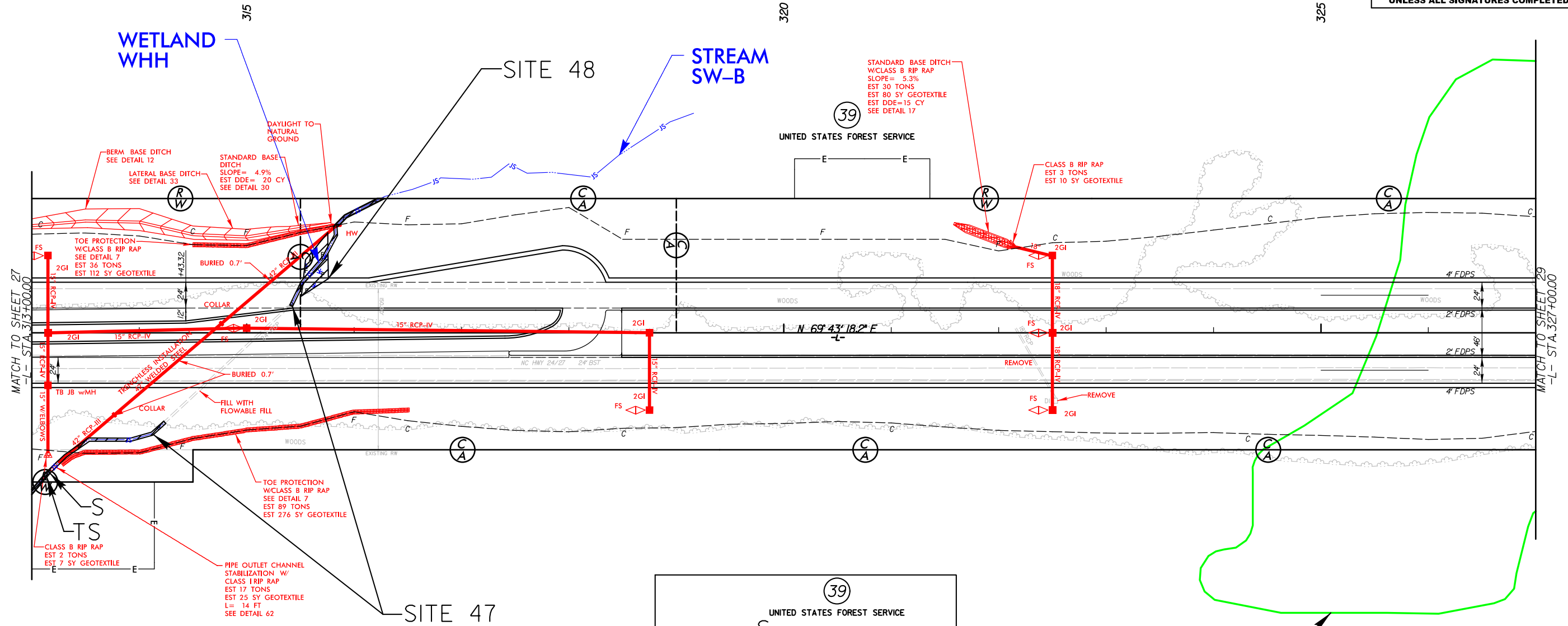
DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER

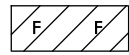
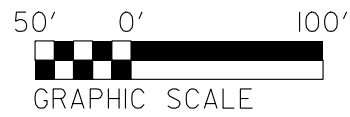


PROJECT REFERENCE NO. <i>R-2527</i>	SHEET NO. <i>28</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



ENVIRONMENTALLY SENSITIVE AREA
FOR INTERSECTION DETAIL, SEE SHEET 28-6
FOR -L- PROFILE, SEE SHEETS 52 & 53

**PERMIT DRAWING
SHEET 56 OF 91**



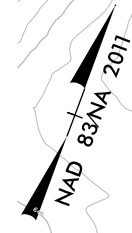
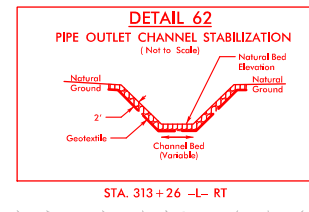
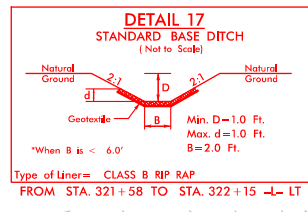
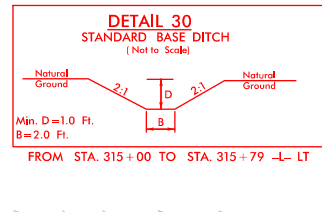
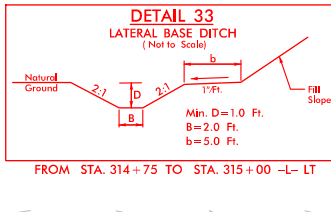
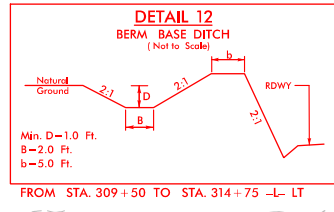
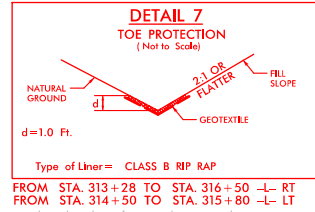
DENOTES FILL IN WETLAND



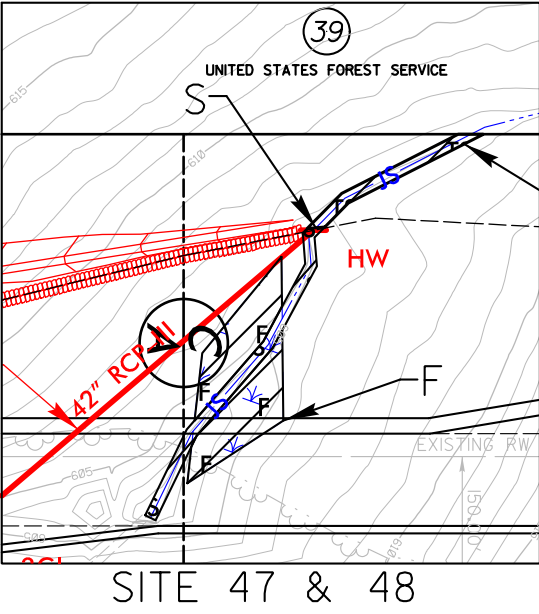
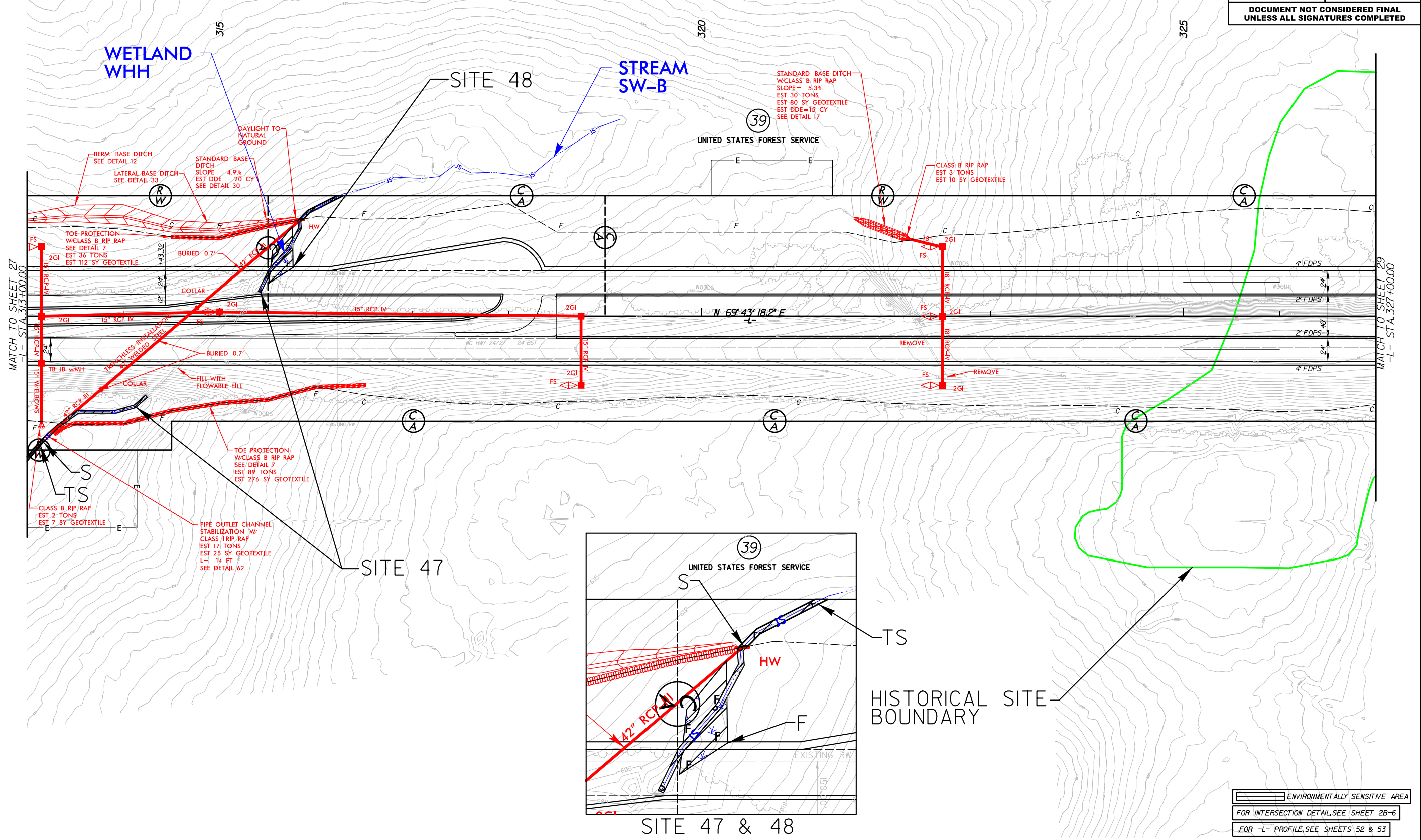
DENOTES IMPACTS IN SURFACE WATER



DENOTES TEMPORARY IMPACTS IN SURFACE WATER

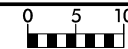


PROJECT REFERENCE NO. R-2527	SHEET NO. 28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



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8/23/99



PROJ. REFERENCE NO.
R-2527

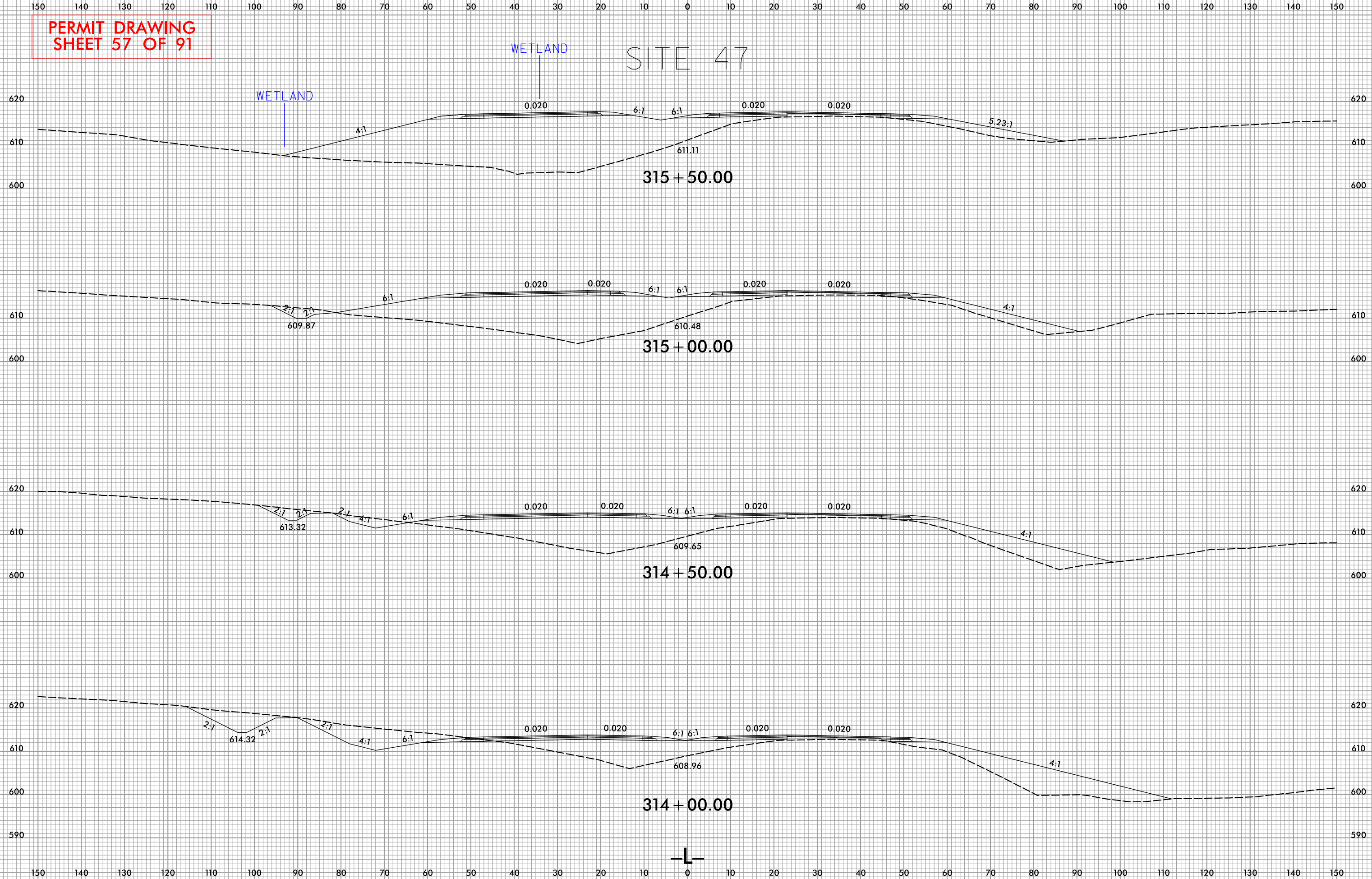
SHEET NO.
X-190

**PERMIT DRAWING
SHEET 57 OF 91**

SITE 47

WETLAND

WETLAND

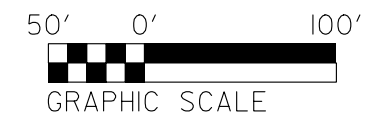


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eberger

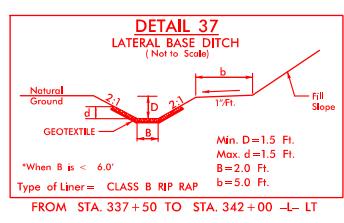
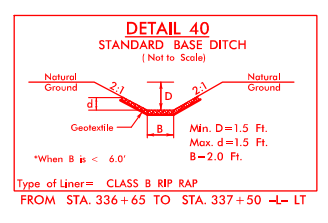
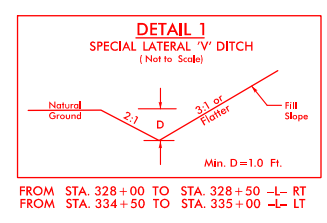


5/14/99

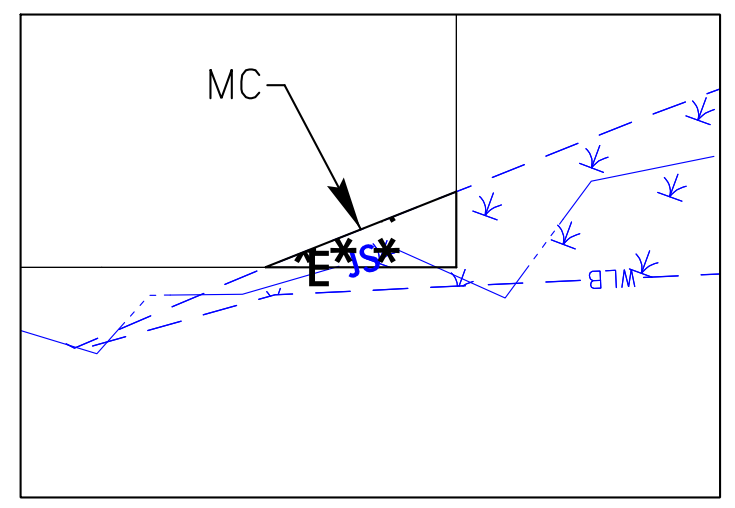
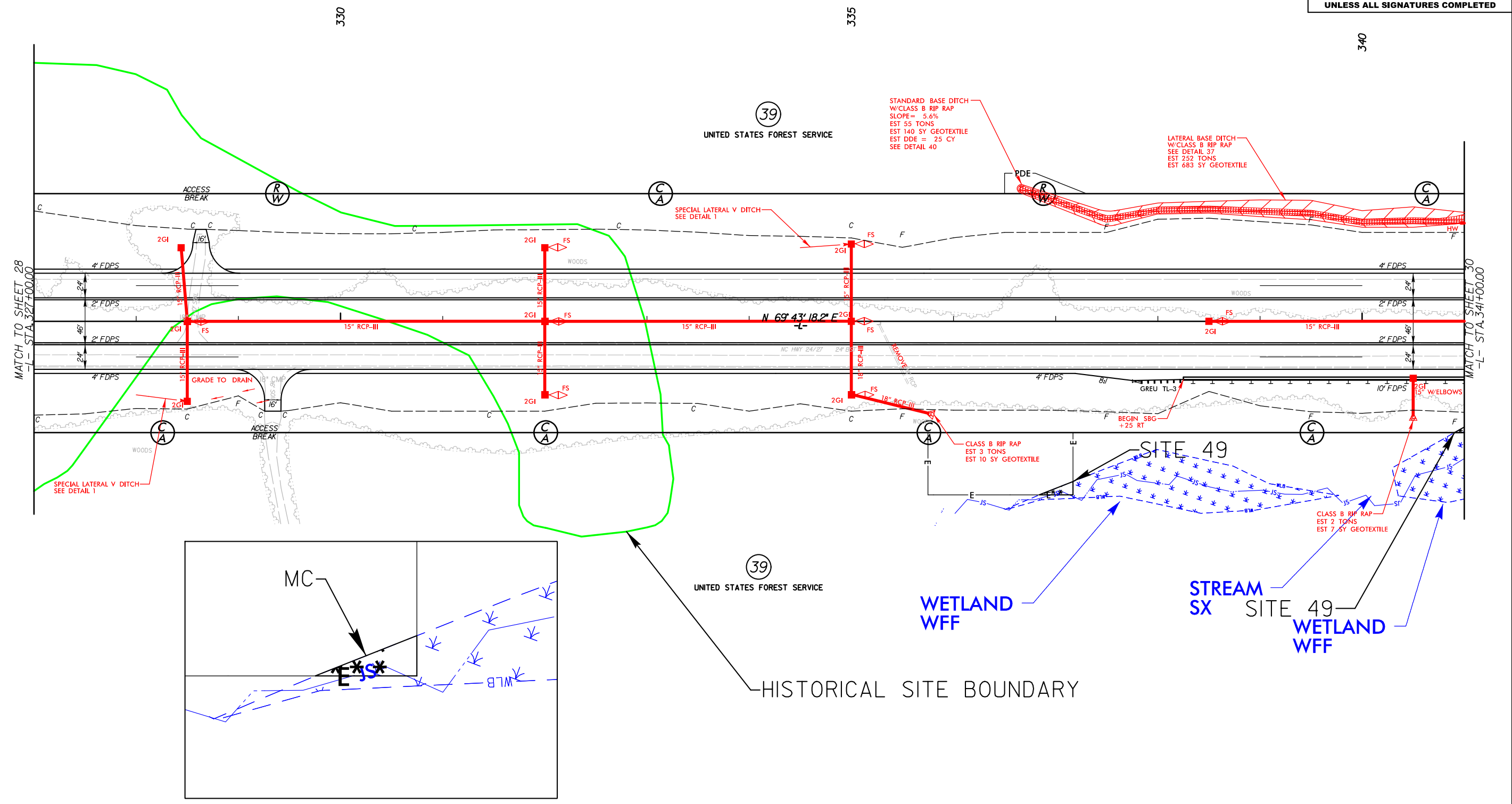
PERMIT DRAWING SHEET 58 OF 91



●●●●●● DENOTES MECHANIZED CLEARING



PROJECT REFERENCE NO. R-2527	SHEET NO. 29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
STEWART	VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



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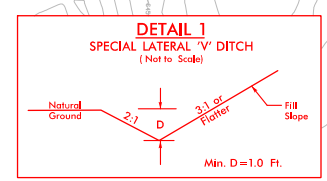
ENVIRONMENTALLY SENSITIVE AREA
FOR -L- PROFILE, SEE SHEET 53
ALL DRIVEWAY RADII 30' UNLESS OTHERWISE NOTED.

5/14/99

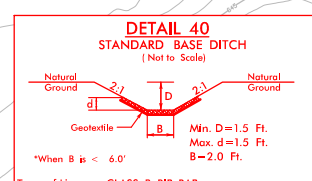
PERMIT DRAWING SHEET 59 OF 91



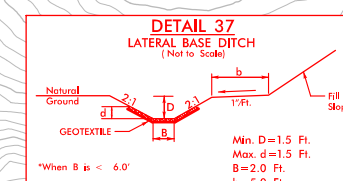
***** DENOTES MECHANIZED CLEARING



FROM STA. 328+00 TO STA. 328+50 -L- RT
FROM STA. 334+50 TO STA. 335+00 -L- LT

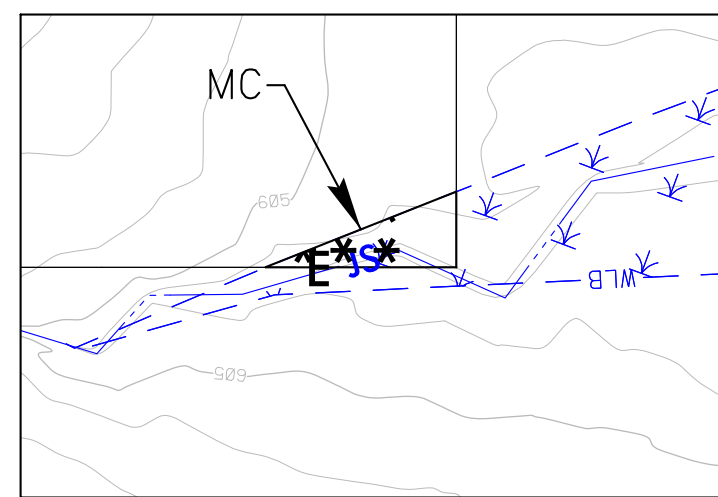
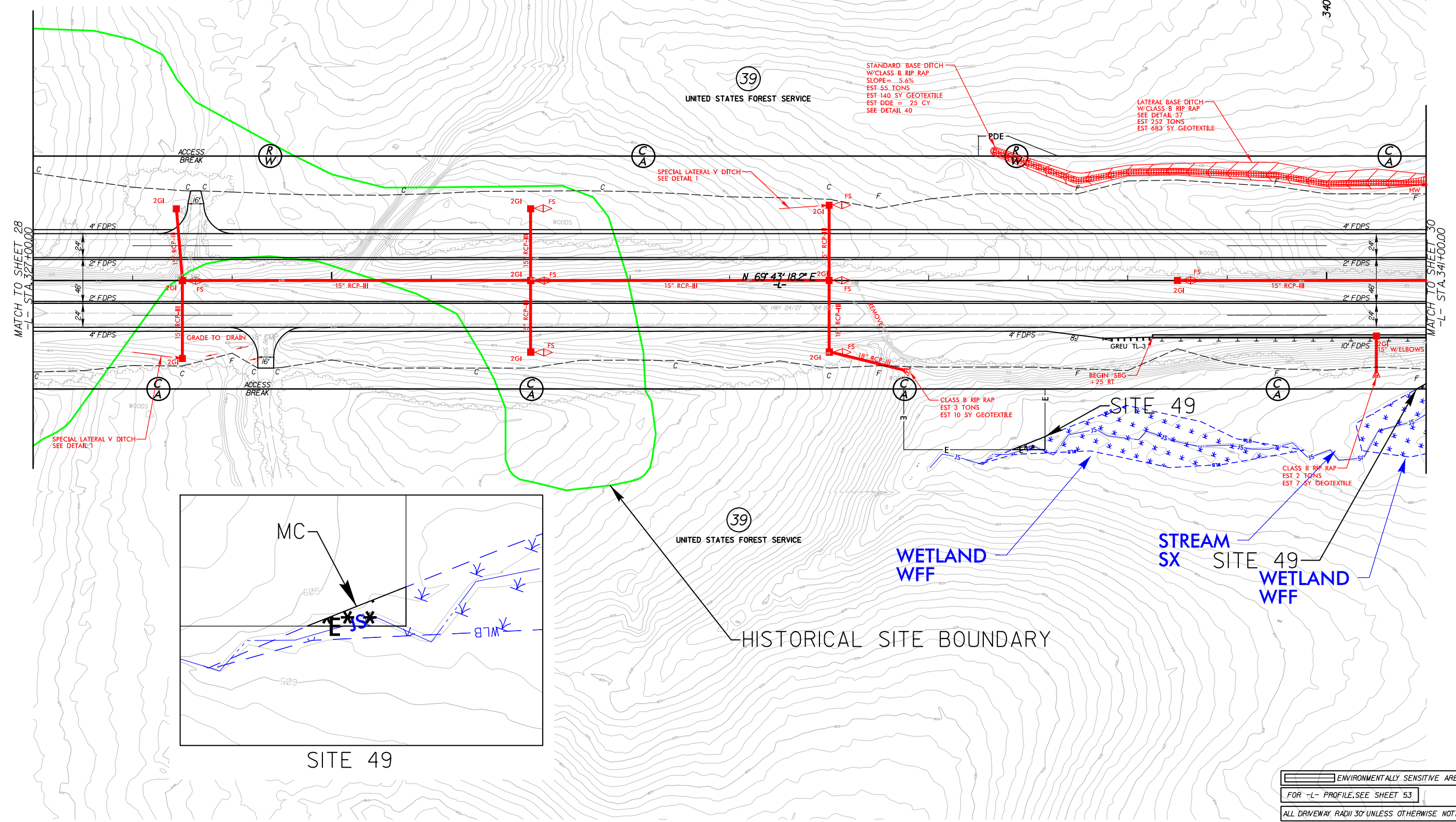


FROM STA. 336+65 TO STA. 337+50 -L- LT
Type of Liner = CLASS B RIP RAP



FROM STA. 337+50 TO STA. 342+00 -L- LT
Type of Liner = CLASS B RIP RAP

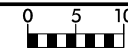
PROJECT REFERENCE NO. R-2527	SHEET NO. 29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
STEWART	vhb
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



ENVIRONMENTALLY SENSITIVE AREA
FOR -L- PROFILE, SEE SHEET 53
ALL DRIVEWAY RADI 30' UNLESS OTHERWISE NOTED.

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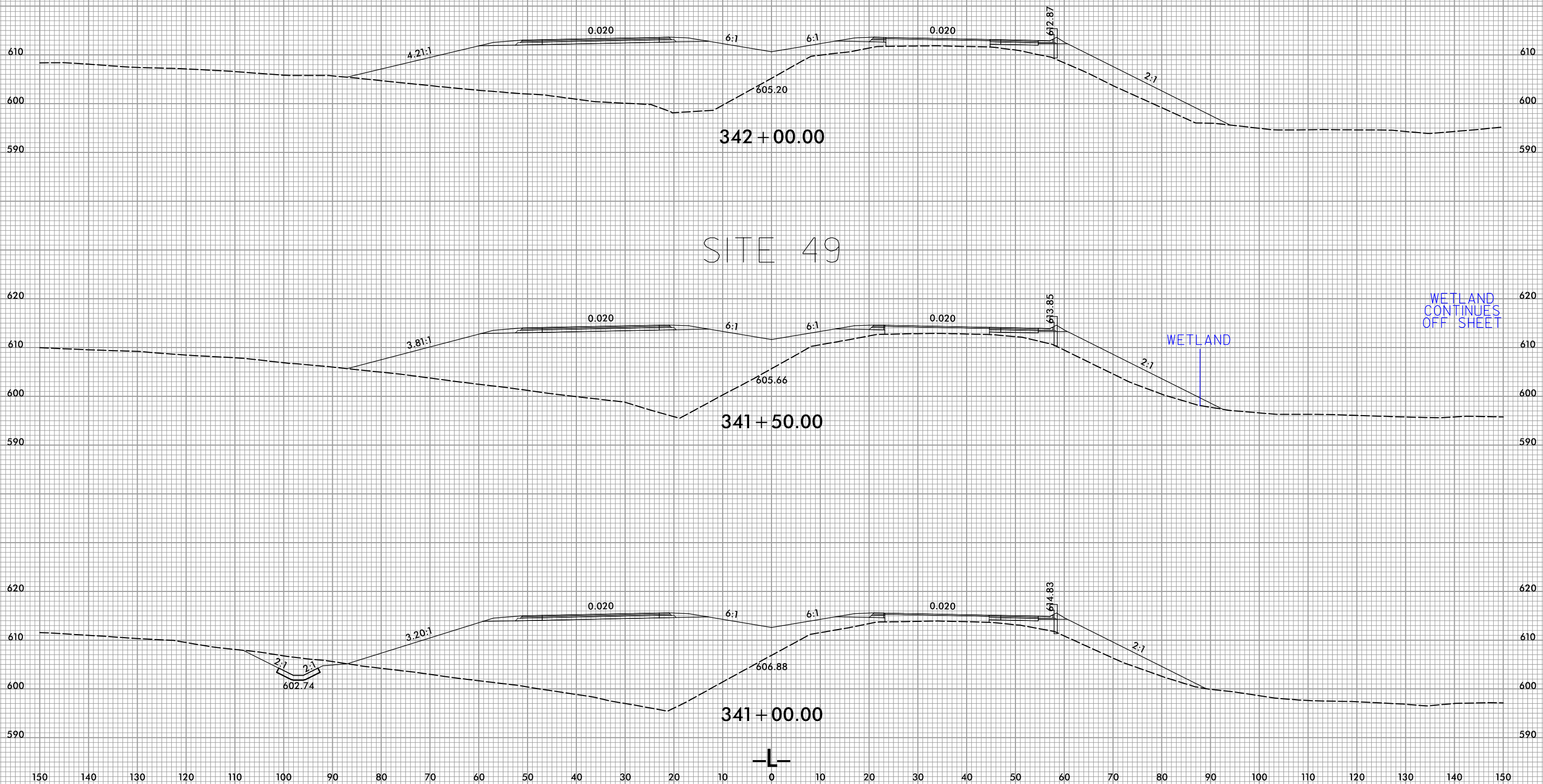


PROJ. REFERENCE NO.
R-2527

SHEET NO.
X-203

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PERMIT DRAWING
SHEET 60 OF 91



SITE 49

WETLAND
CONTINUES
OFF SHEET

WETLAND

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eberger

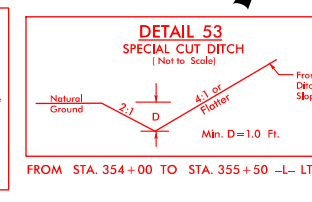
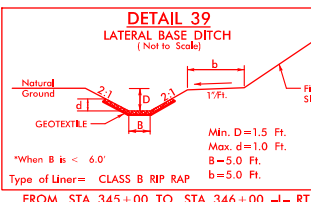
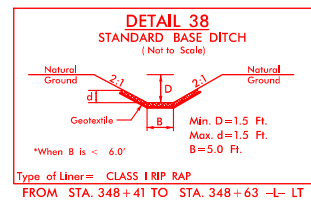
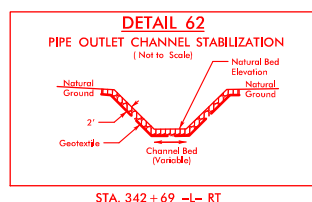
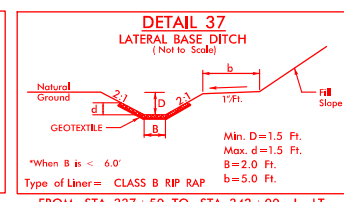
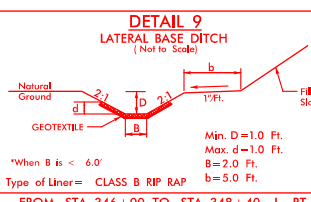
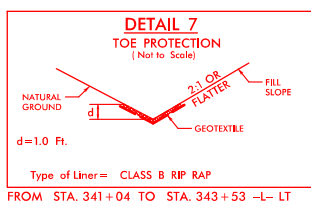
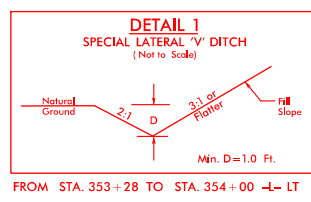
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5/14/99

PERMIT DRAWING SHEET 61 OF 91

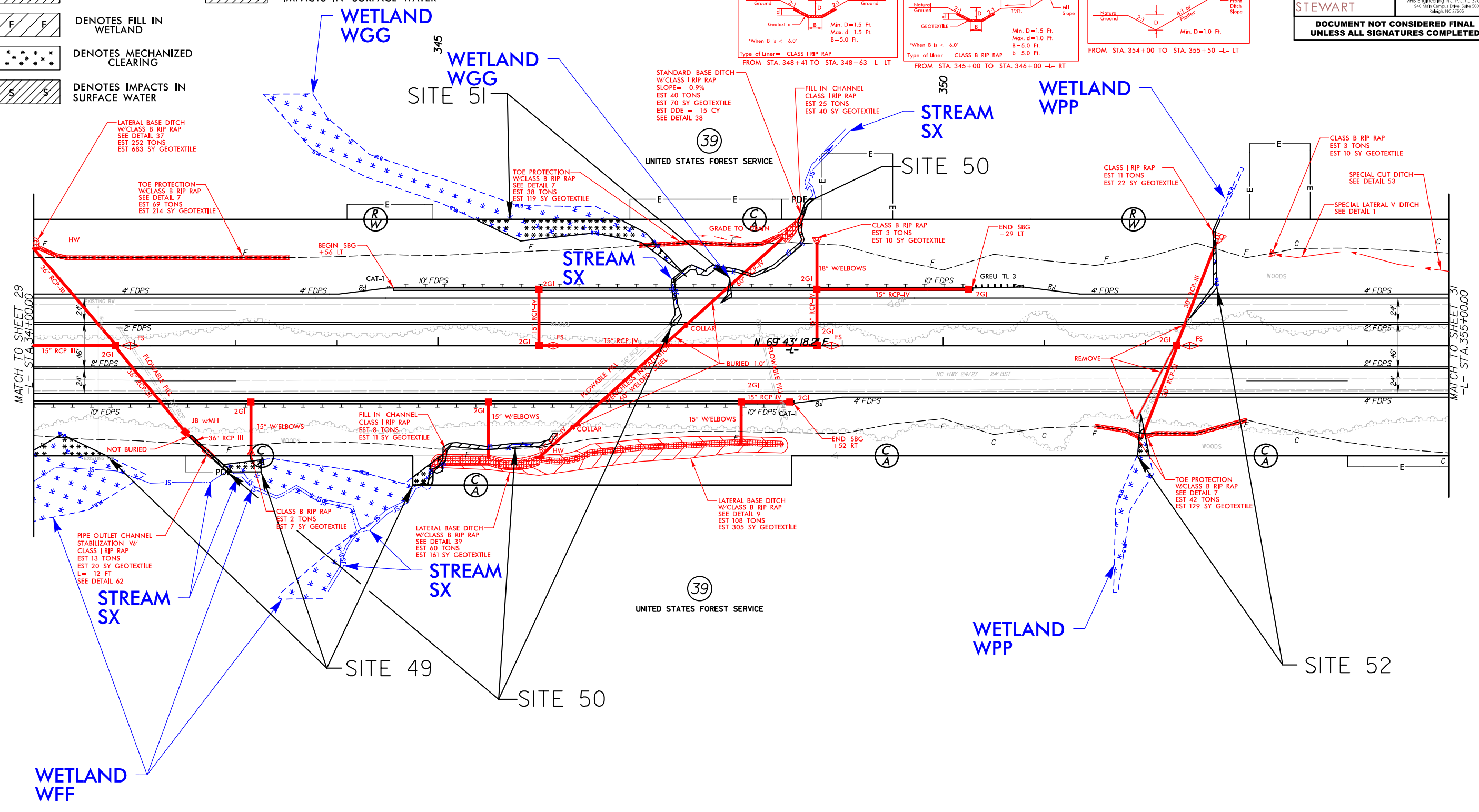


- DENOTES EXCAVATION IN WETLAND
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



NAD 83/NA 2011



PROJECT REFERENCE NO. R-2527	SHEET NO. 30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

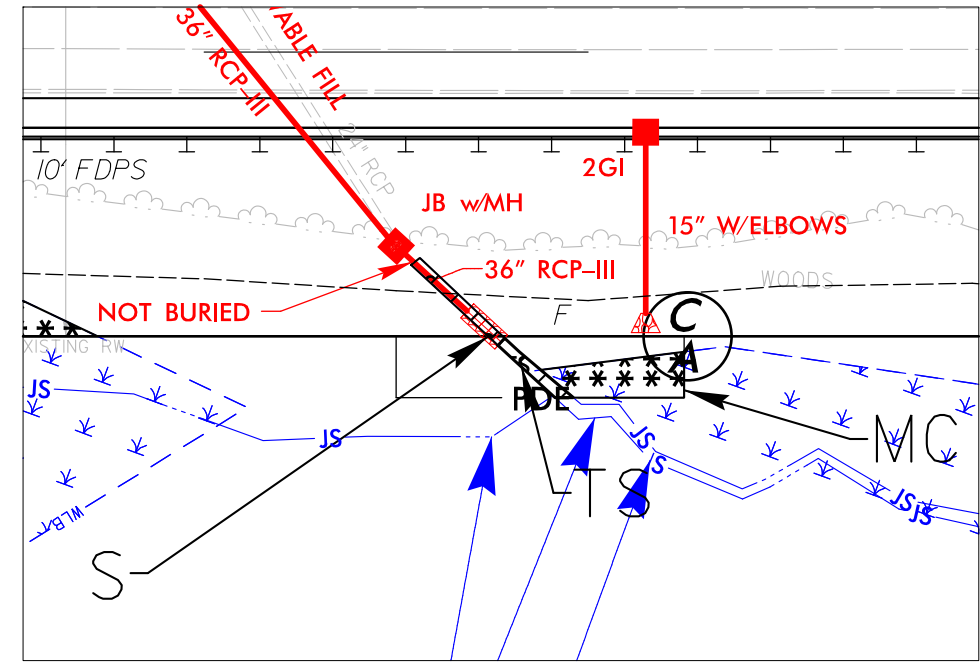


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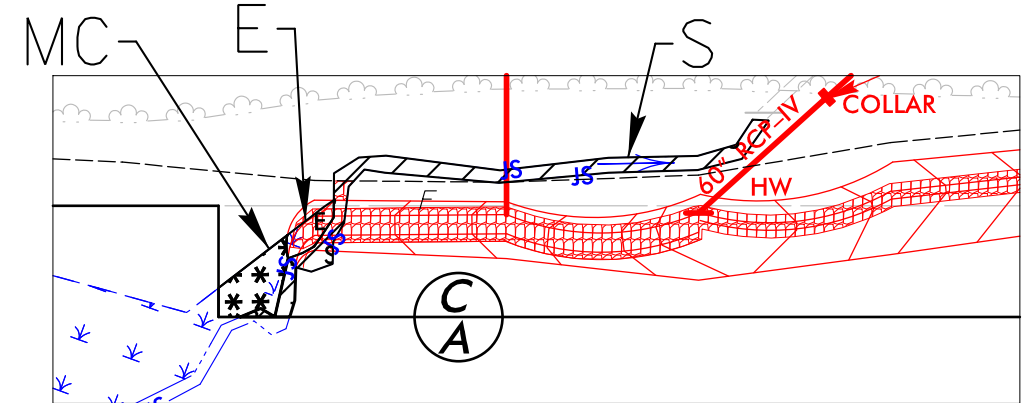
FOR -L- PROFILE, SEE SHEETS 53 & 54

**PERMIT DRAWING
SHEET 62 OF 91**

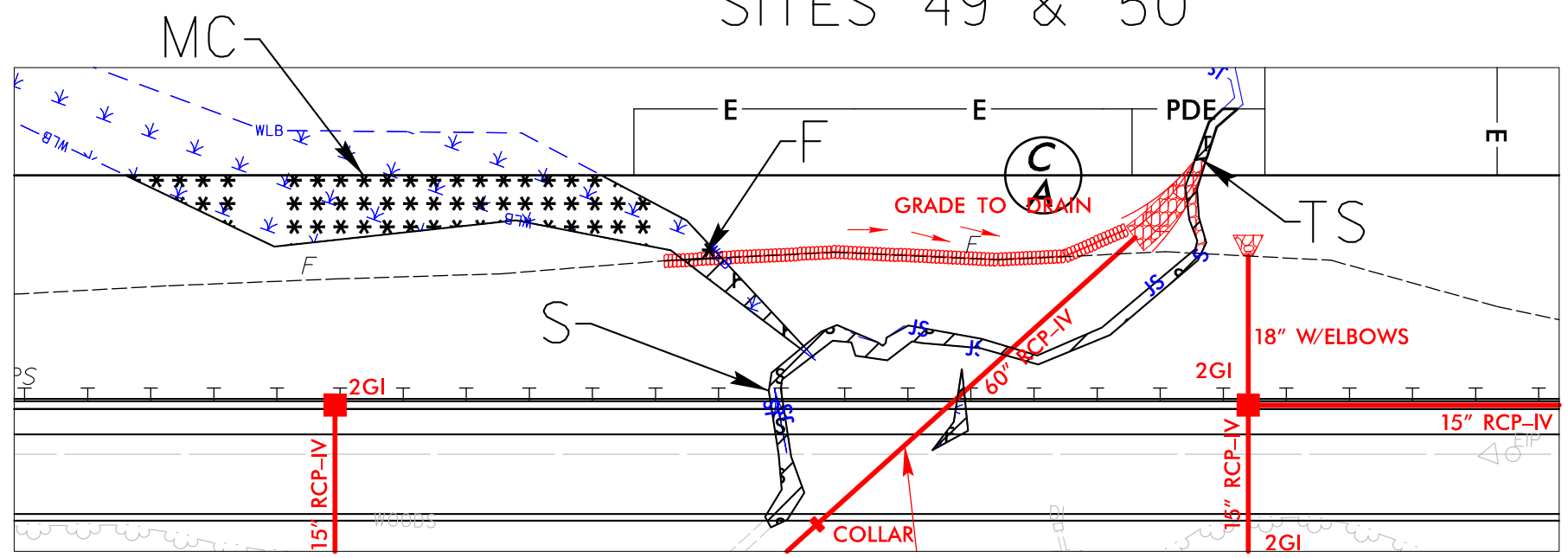
PROJECT REFERENCE NO. <i>R-2527</i>	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 STEWART <small>1900 S. West St. Raleigh, NC 27603 919.386.1000 www.stewartinc.com</small>	 vhb <small>VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606</small>
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



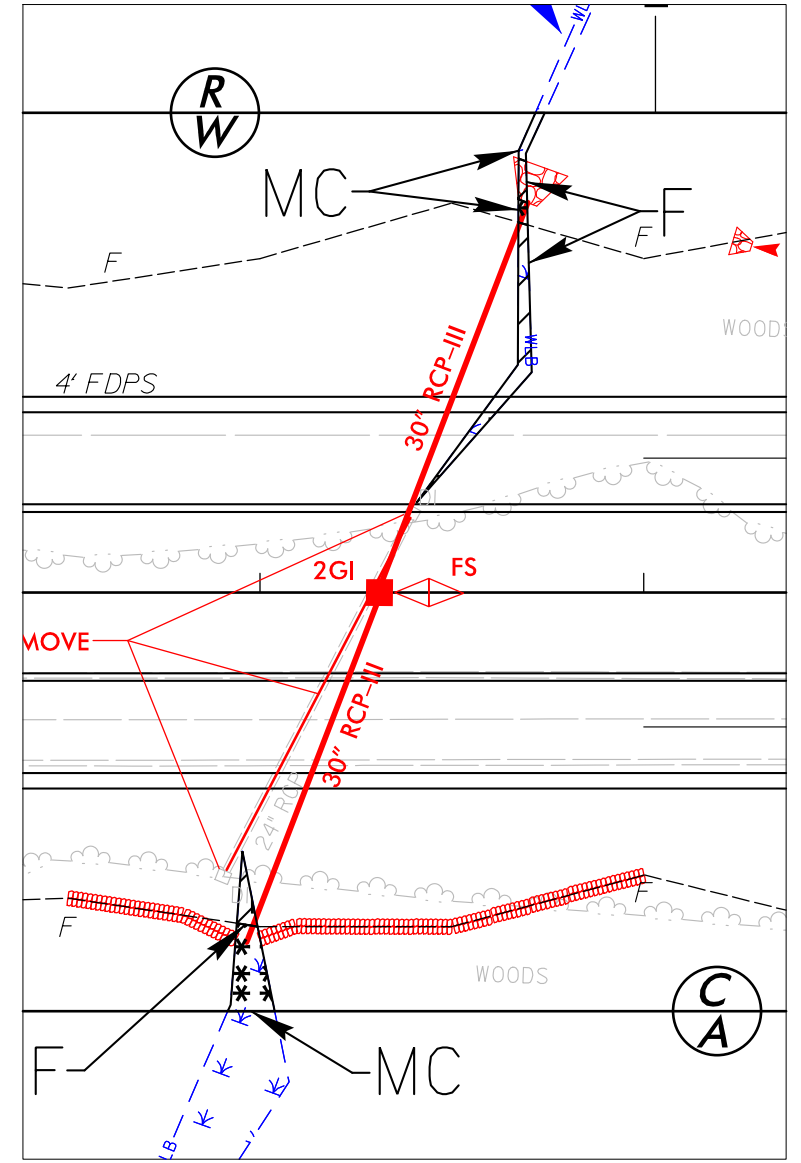
SITES 49 & 50



SITES 49 & 50



SITES 50 & 51

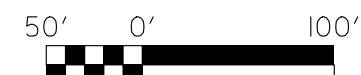


SITE 52

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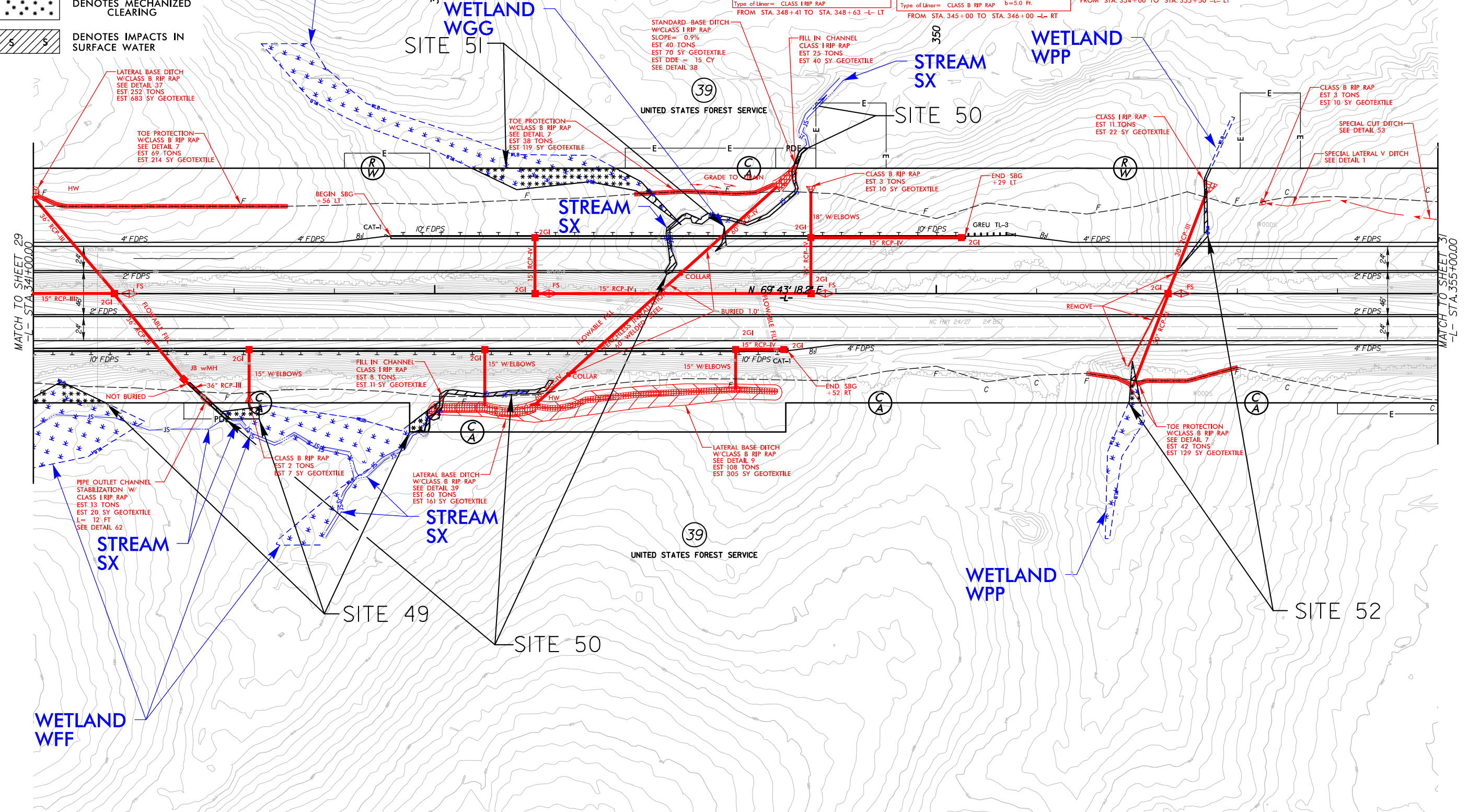
5/14/99

PERMIT DRAWING SHEET 63 OF 91



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



PROJECT REFERENCE NO. R-2527	SHEET NO. 30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 STEWART	 Vhb Vhb Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

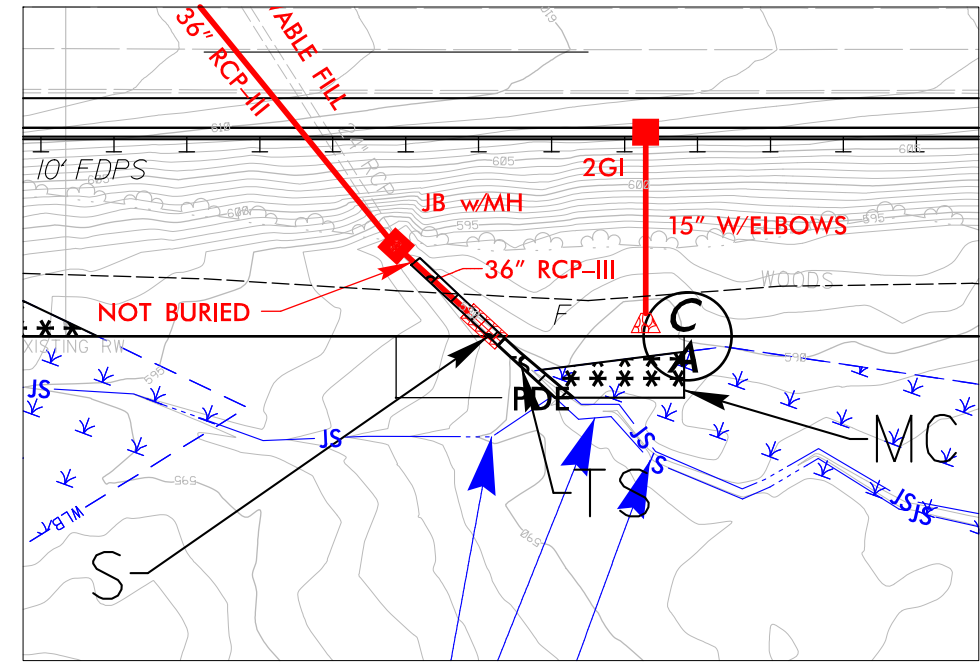


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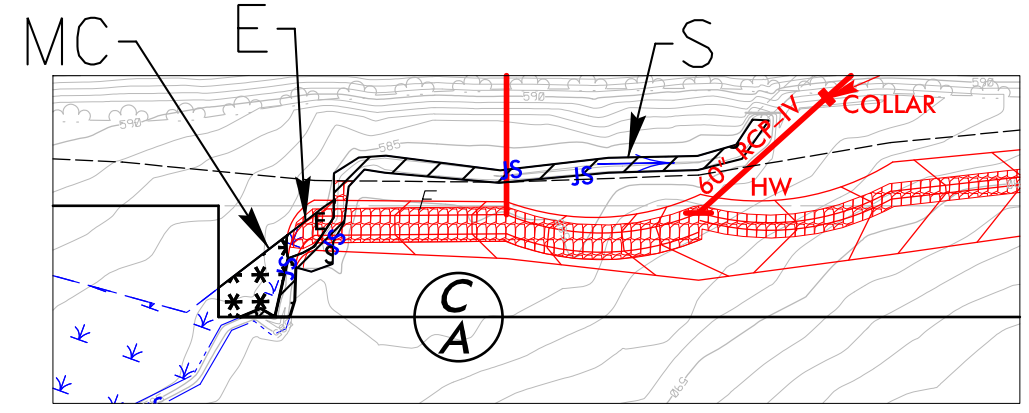
FOR -L- PROFILE, SEE SHEETS 53 & 54

**PERMIT DRAWING
SHEET 64 OF 91**

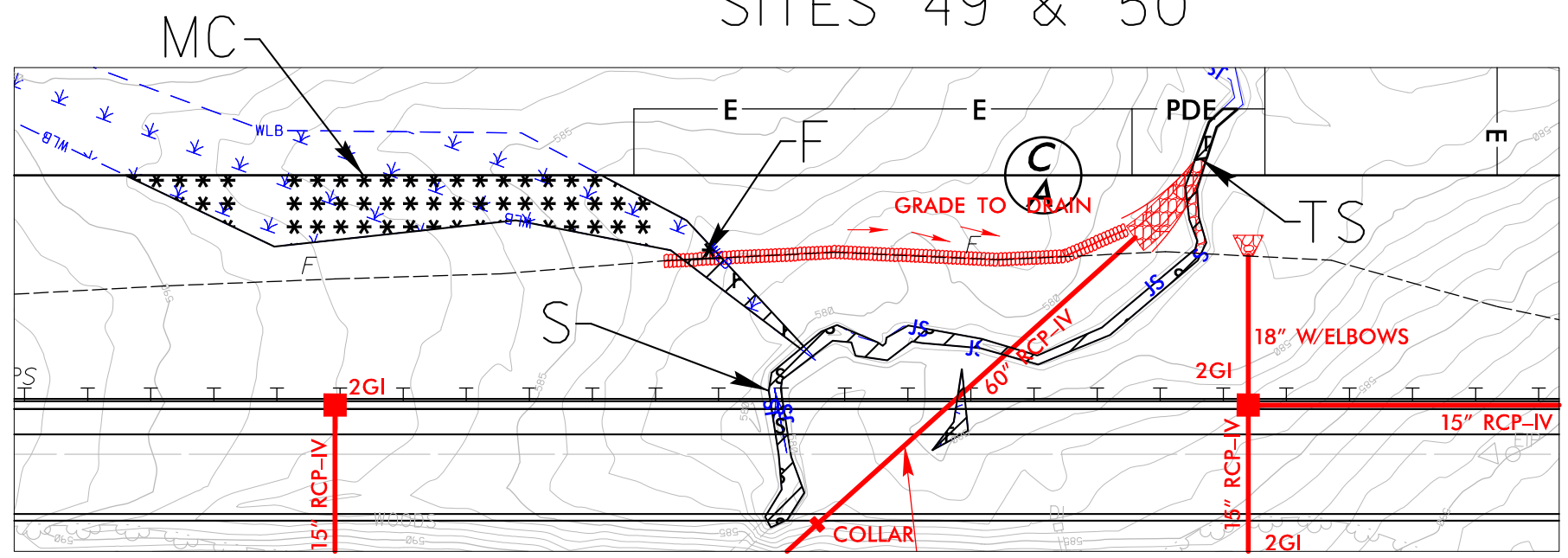
PROJECT REFERENCE NO. <i>R-2527</i>	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 STEWART <small>1900 S. West St. Raleigh, NC 27603 www.stewartinc.com</small>	 VHB <small>VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606</small>
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



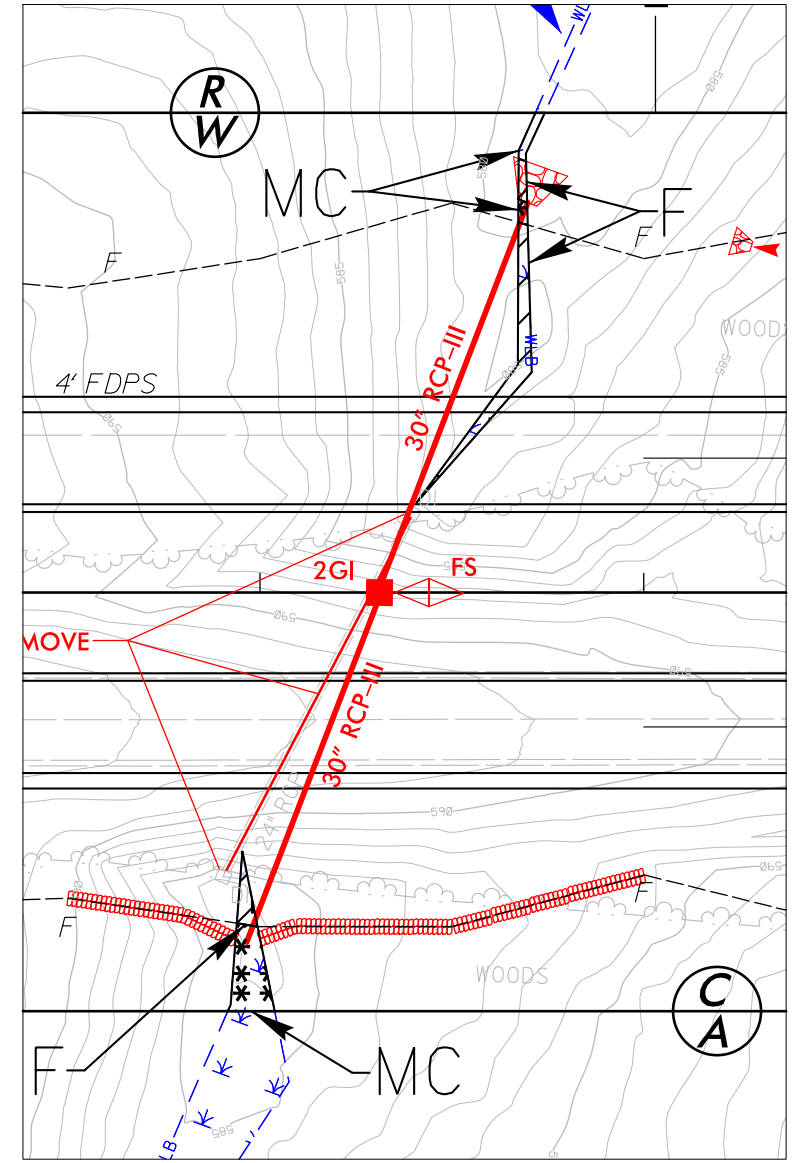
SITES 49 & 50



SITES 49 & 50



SITES 50 & 51



SITE 52

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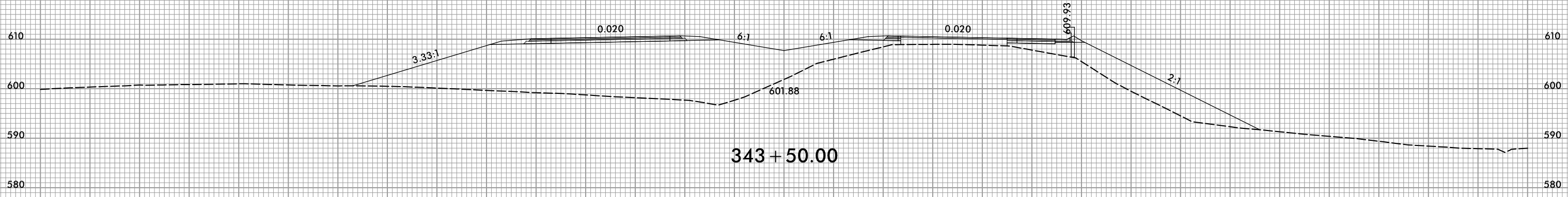


PROJ. REFERENCE NO.
R-2527

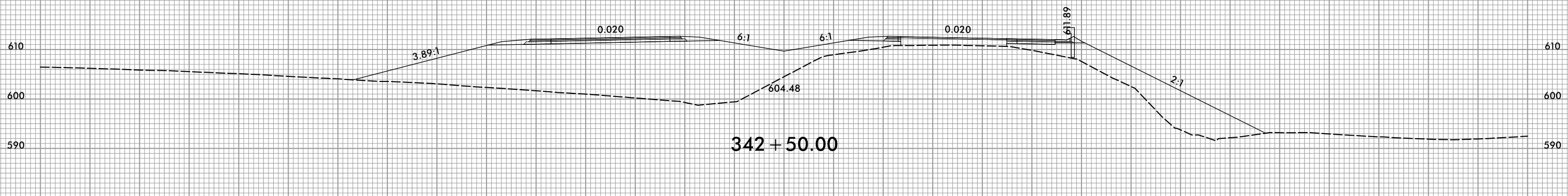
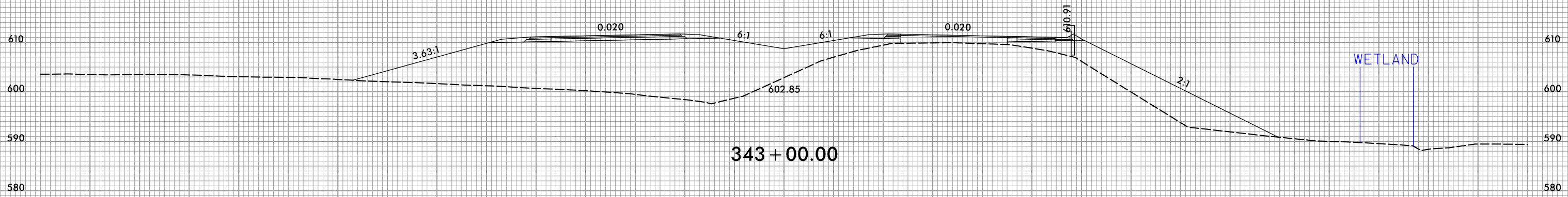
SHEET NO.
X-204

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**PERMIT DRAWING
SHEET 65 OF 91**



SITE 49



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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eberger

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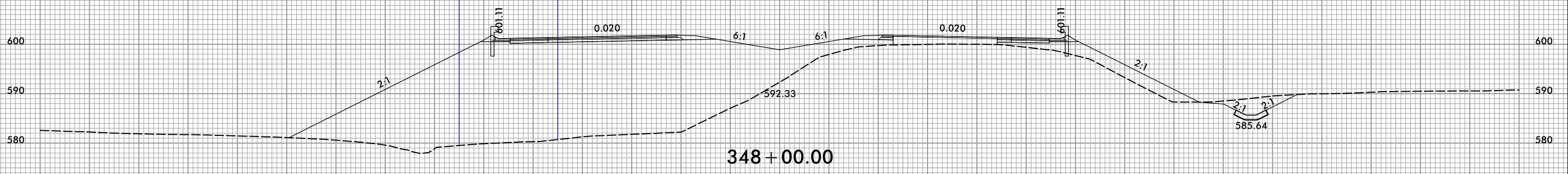
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R-2527	X-207

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PERMIT DRAWING
SHEET 66 OF 91

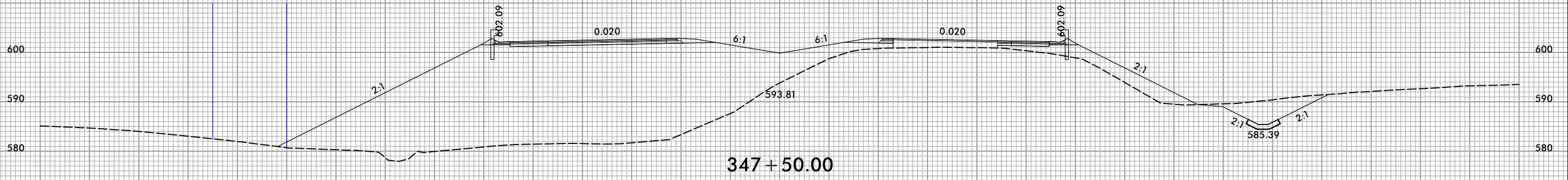
SITE 51

WETLAND WETLAND

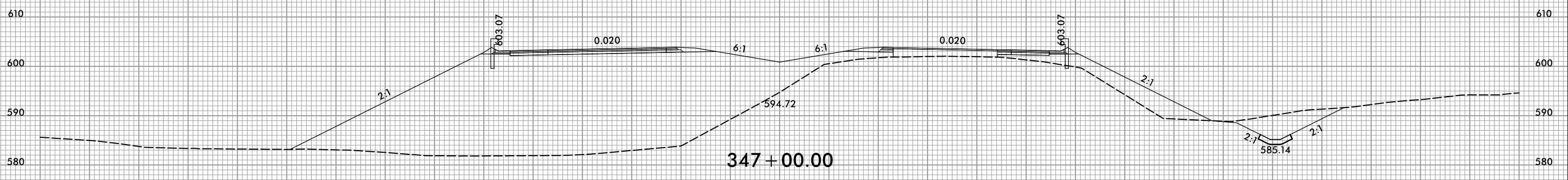


SITE 51

WETLAND WETLAND



SITE 51



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cberger

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PROJ. REFERENCE NO.
R-2527

SHEET NO.
X-209

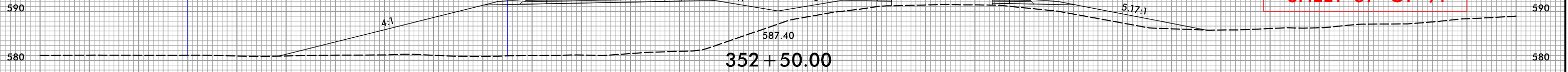
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WETLAND

WETLAND

SITE 52

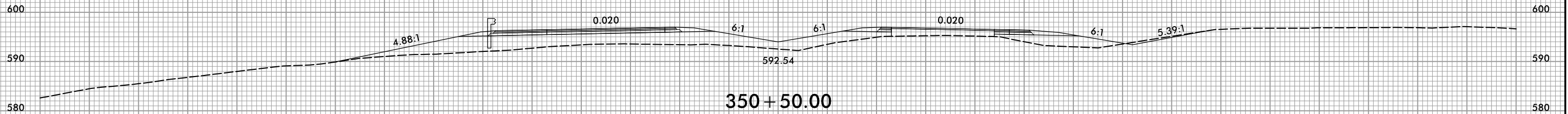
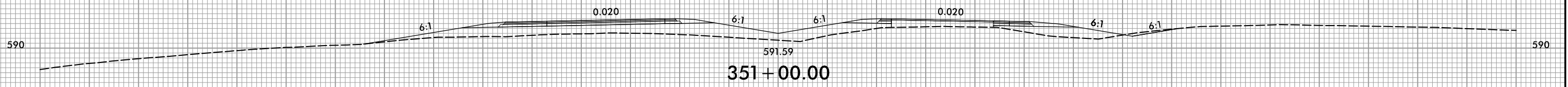
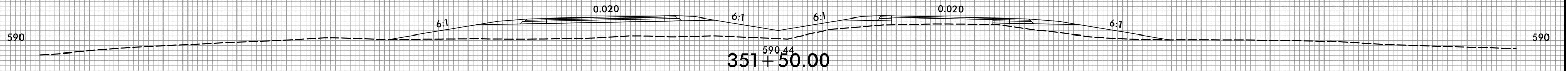
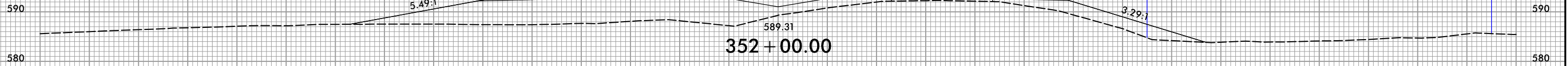
PERMIT DRAWING
SHEET 67 OF 91



SITE 52

WETLAND

WETLAND



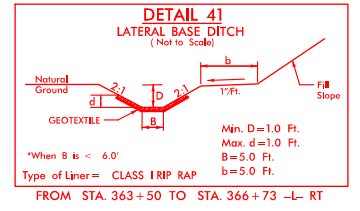
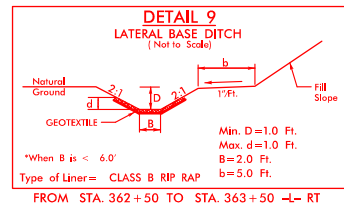
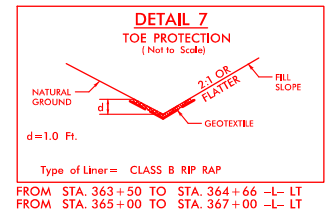
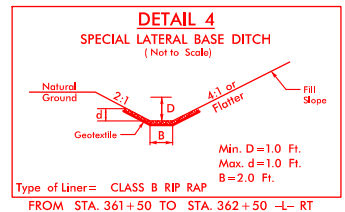
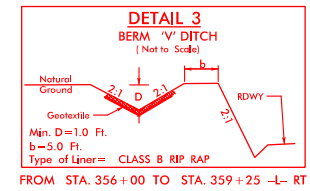
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eberger

5/14/99

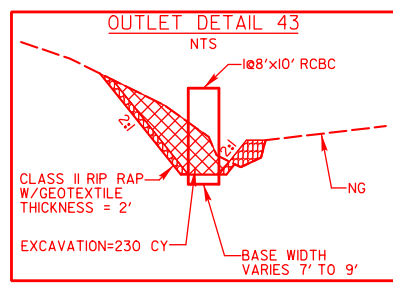
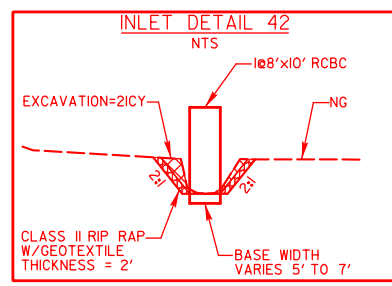
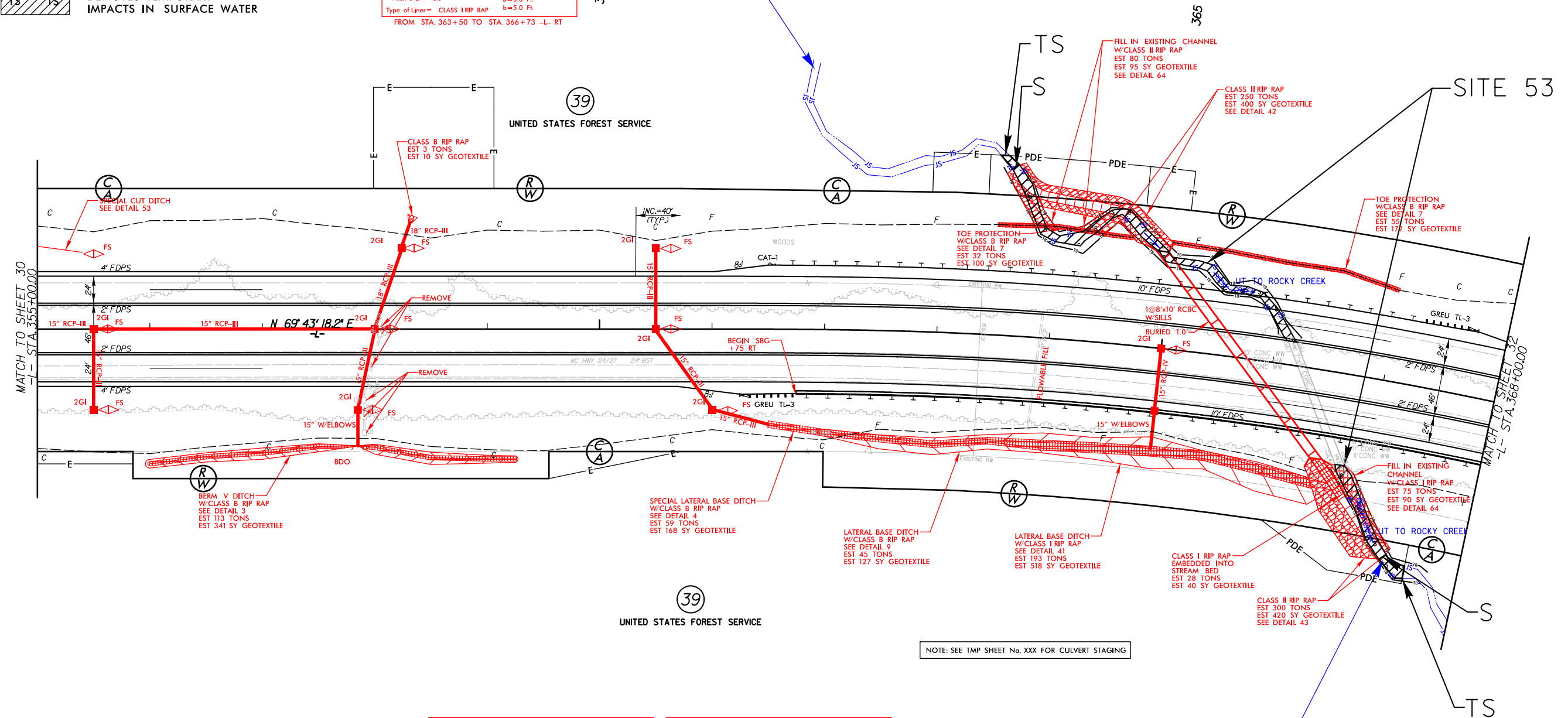
PERMIT DRAWING SHEET 68 OF 91



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER





PROJECT REFERENCE NO. R-2527	SHEET NO. 31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



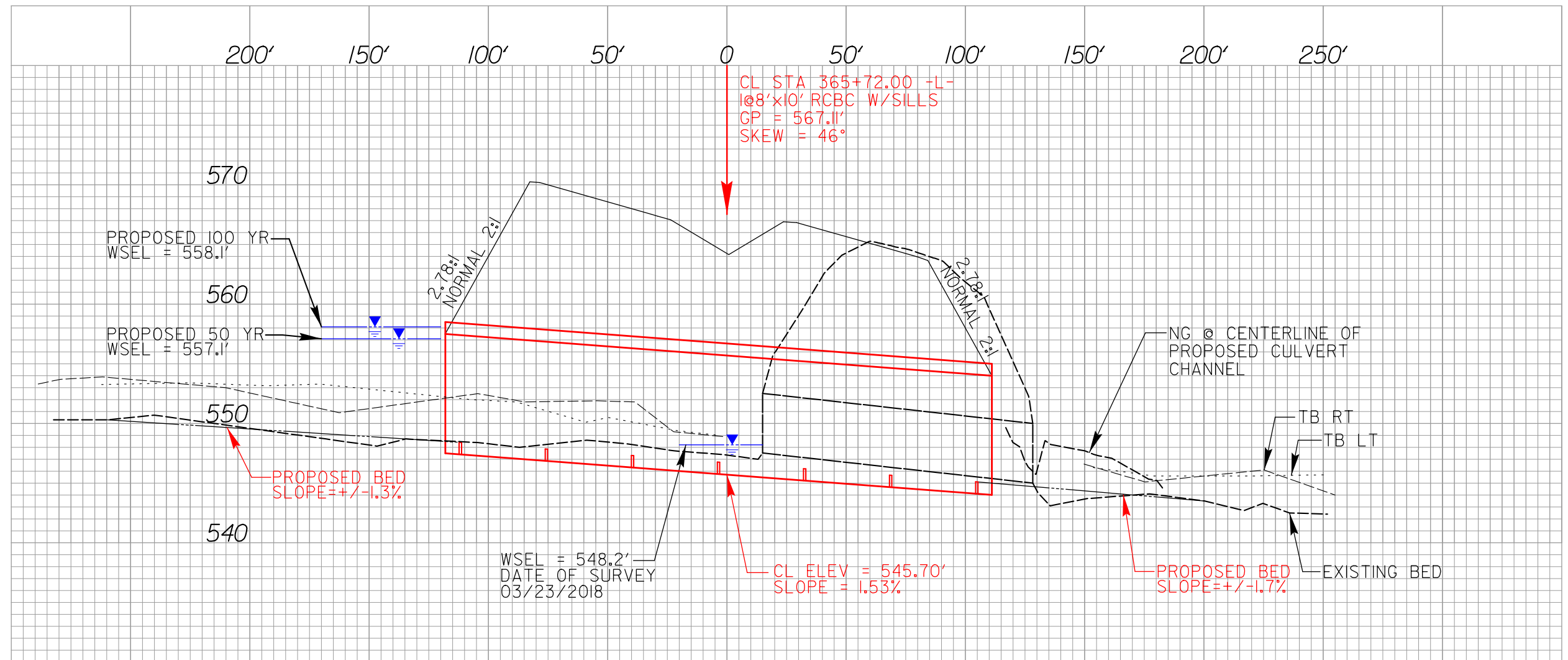
FOR -L- PROFILE, SEE SHEET 54

7:47:00 AM R:\N:\For-Solices\PERMITS_Environmental\Drawings\R2527_Hyd_PPM_PSH31.dgn

PERMIT DRAWING
SHEET 70 OF 91

PROJECT REFERENCE NO. <i>R-2527</i>		SHEET NO.	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 <small>Firm License No. C-1103 217 S. West St. Raleigh, NC 27603 T 919.386.8766 www.stewartinc.com</small>		 <small>VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27605</small>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

SITE 53



REVISIONS

2:14:21 PM
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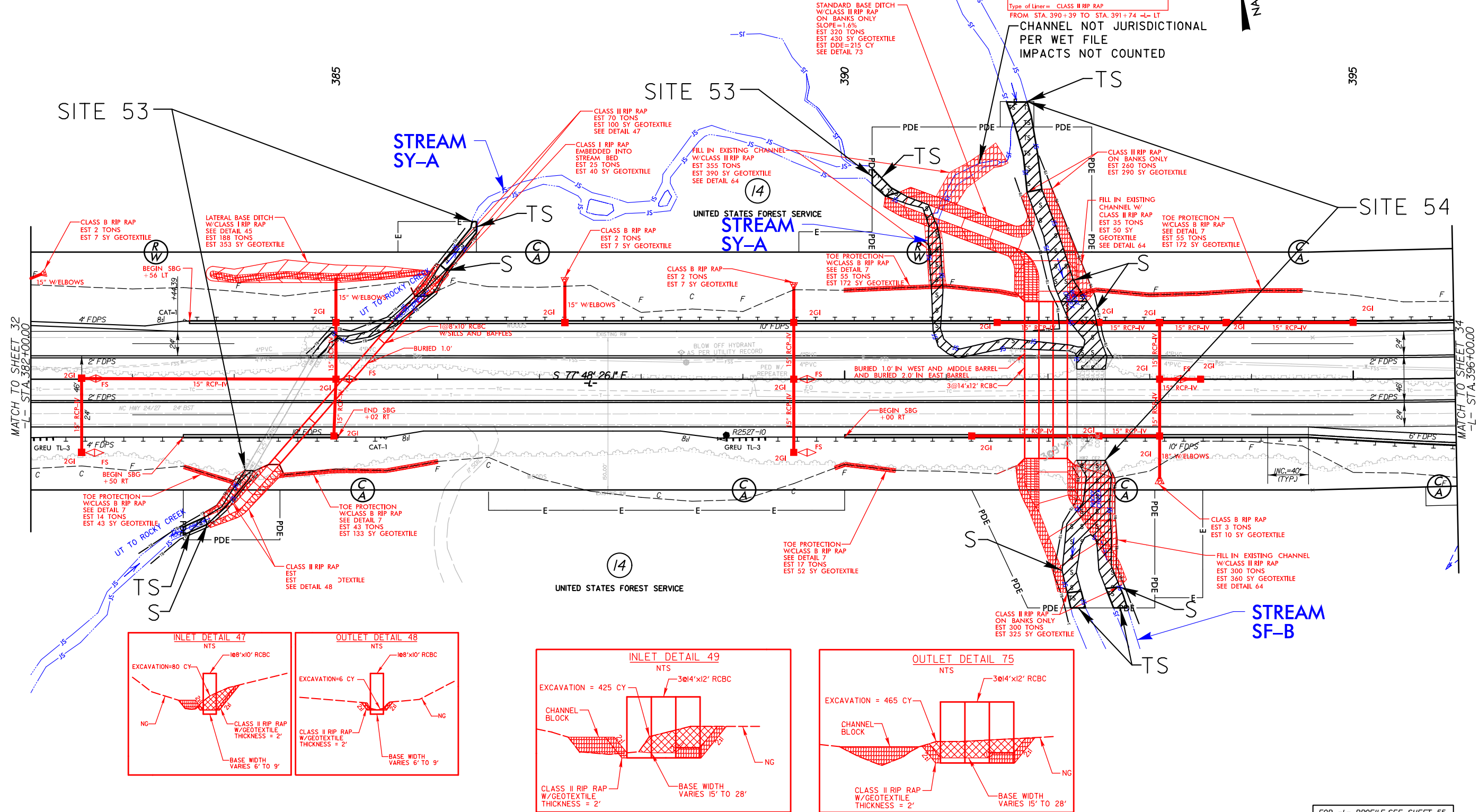
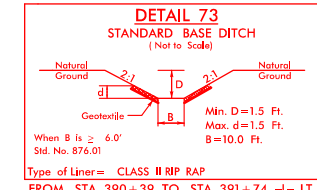
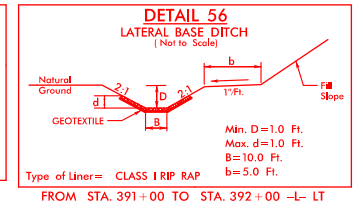
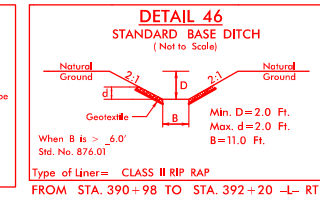
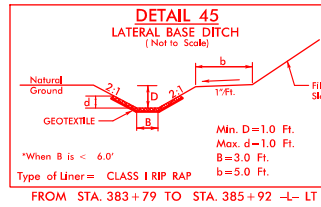
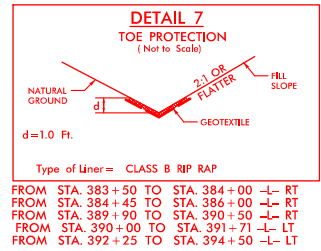
5/14/99

PERMIT DRAWING SHEET 71 OF 91



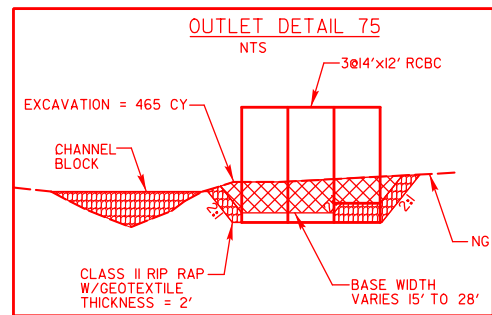
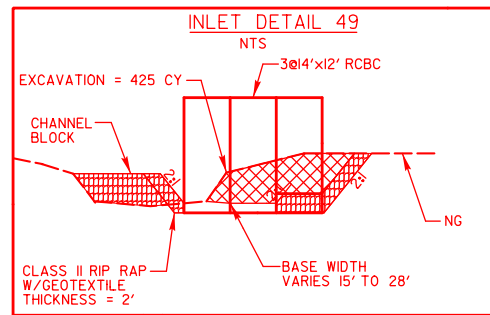
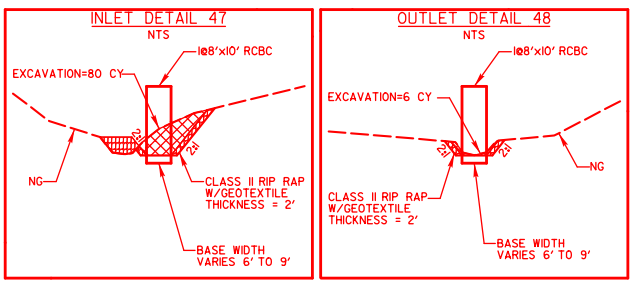
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO. R-2527	SHEET NO. 33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



MATCH TO SHEET 32
-L- STA.382+00.00

MATCH TO SHEET 34
-L- STA.396+00.00



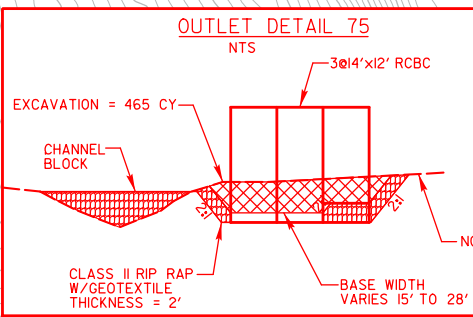
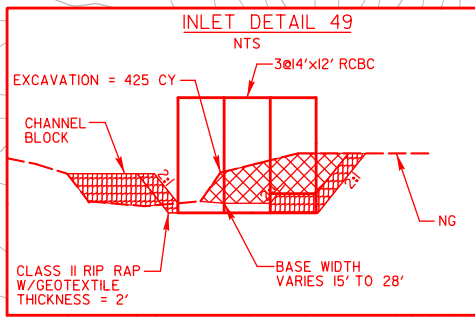
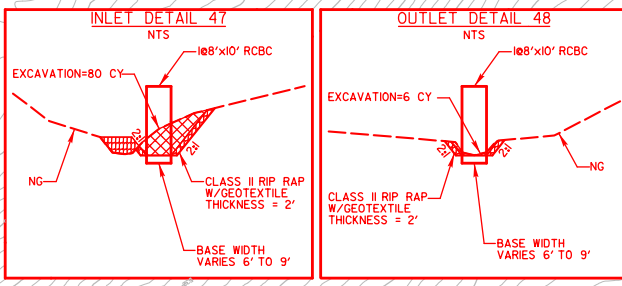
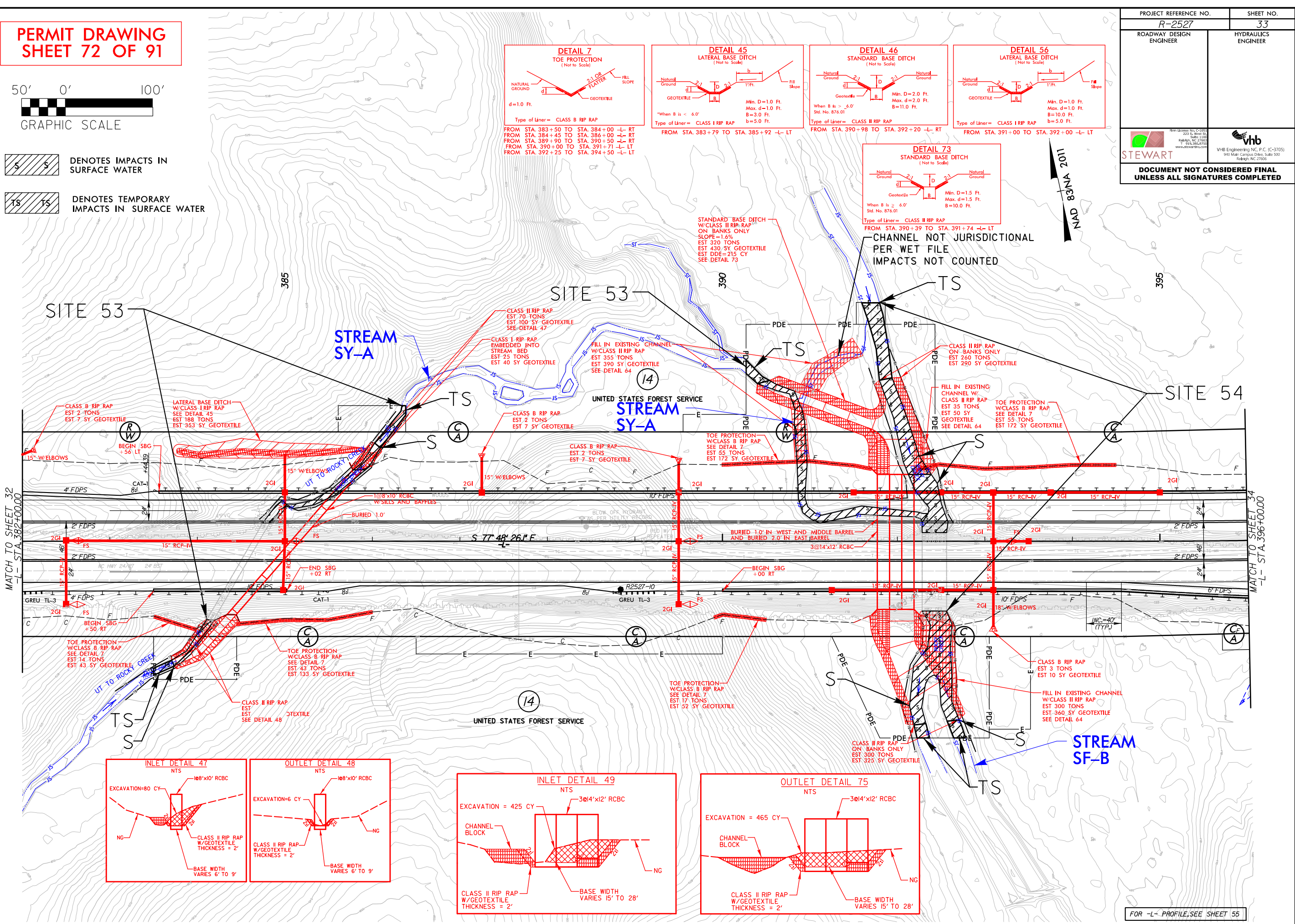
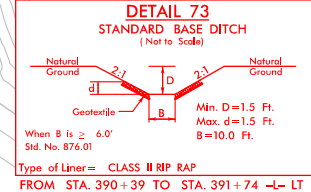
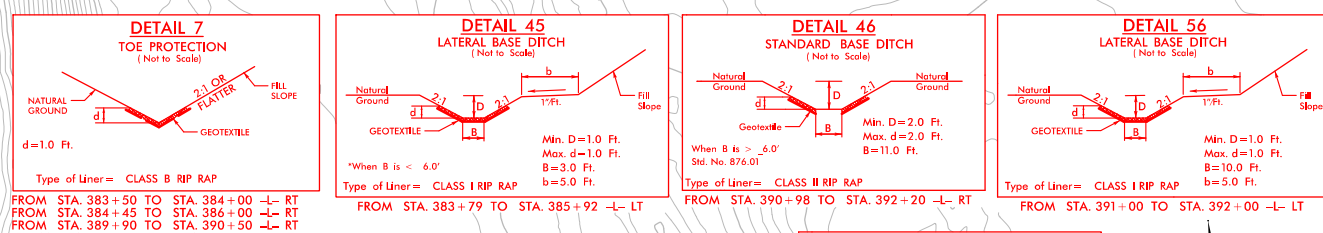
FOR -L- PROFILE, SEE SHEET 55

PERMIT DRAWING SHEET 72 OF 91





DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO. R-2527	SHEET NO. 33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
 223 S. West St. Raleigh, NC 27601 www.stewartinc.com	 VHB Engineering NC, P.C. (C-3705) 940 Mail Campus Drive, Suite 300 Raleigh, NC 27606
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

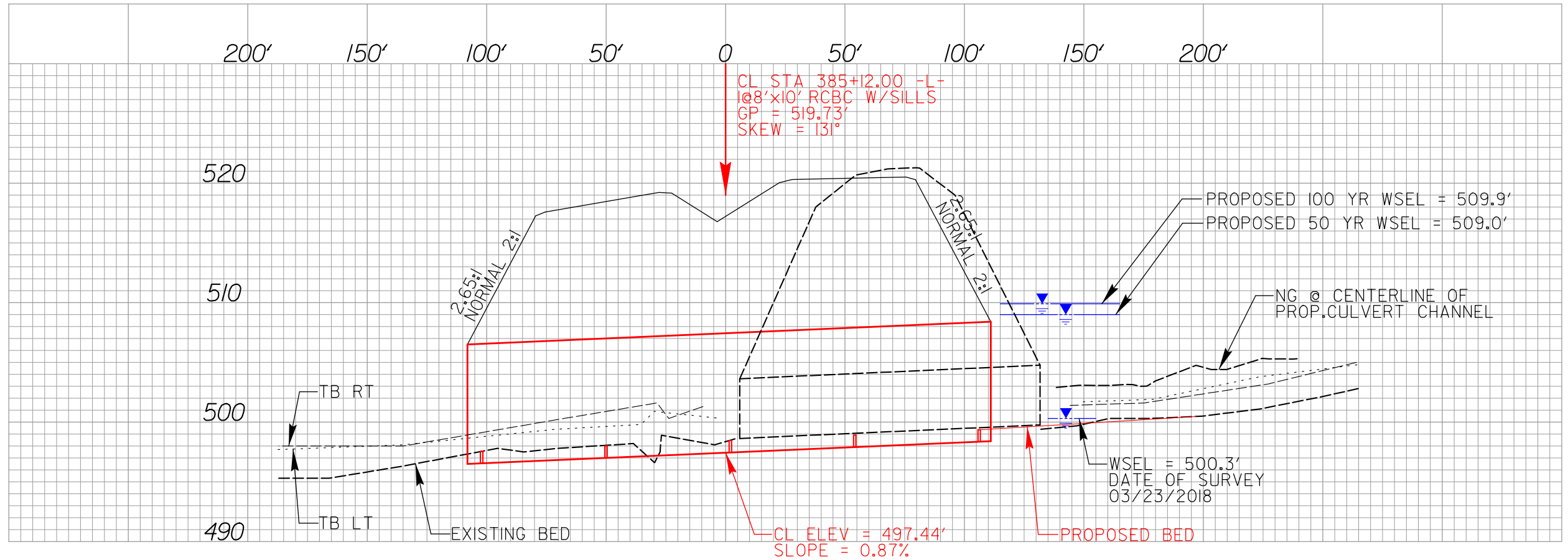


FOR -L- PROFILE, SEE SHEET 55

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PROJECT REFERENCE NO. <i>R-2527</i>		SHEET NO.	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 <small>Firm License No. C-1101 217 S. West St. Raleigh, NC 27603 T 919.386.8766 www.stewartinc.com</small>		 <small>VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27606</small>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



SITE 53



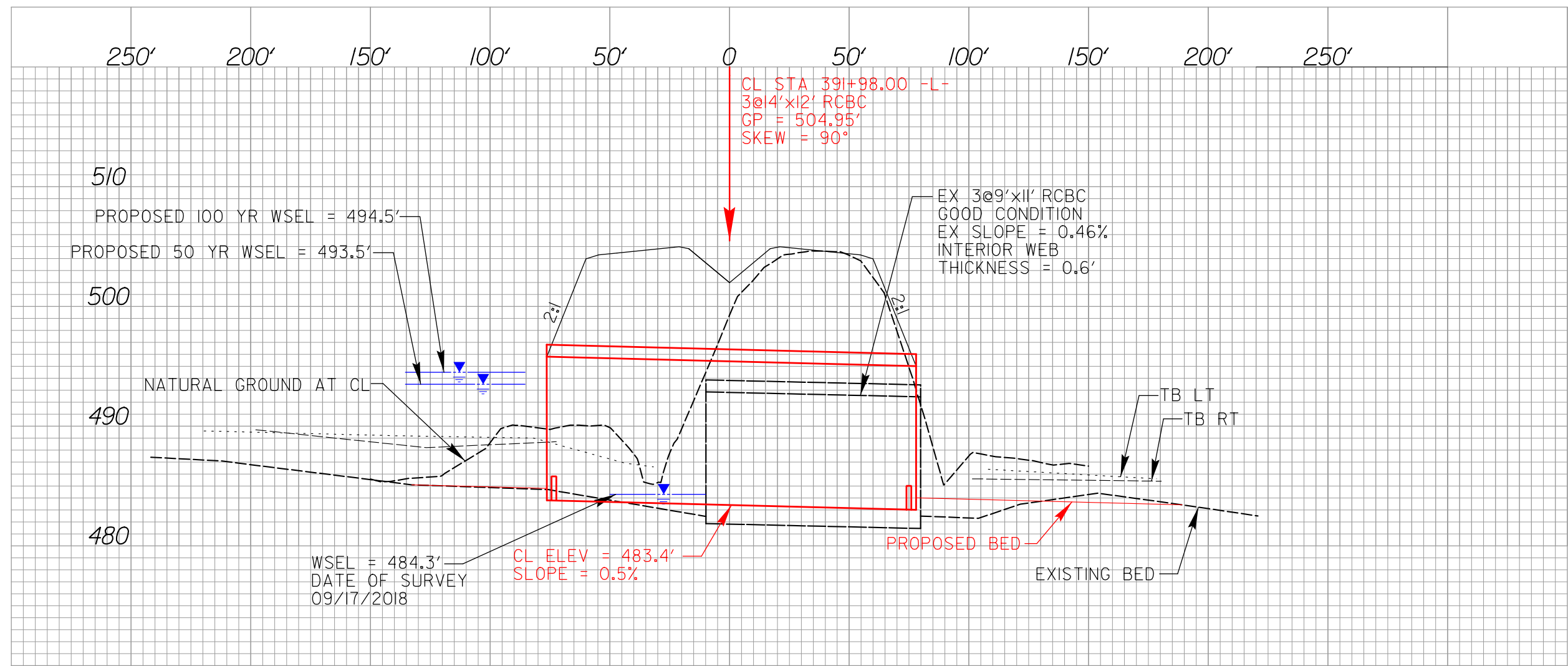
REVISIONS

8/17/99

PERMIT DRAWING
SHEET 74 OF 91

PROJECT REFERENCE NO. R-2527		SHEET NO.	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 Firm License No. C-1103 217 S. West St. Raleigh, NC 27603 T 919.386.8766 www.stewartinc.com		 VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27605	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

SITE 54



REVISIONS

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5/14/99

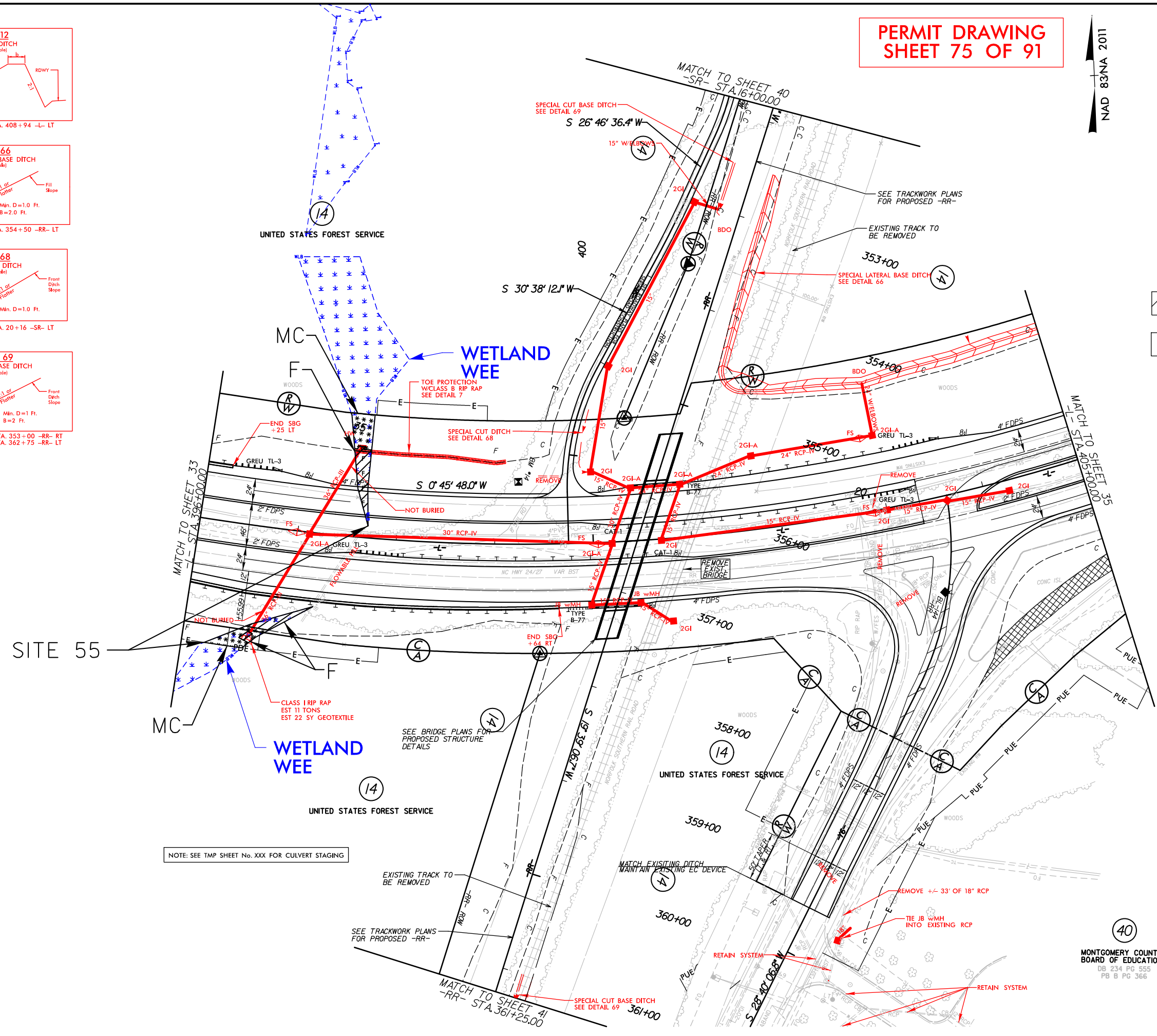
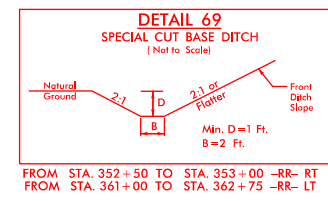
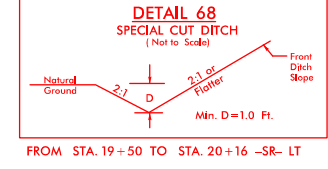
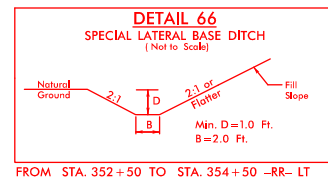
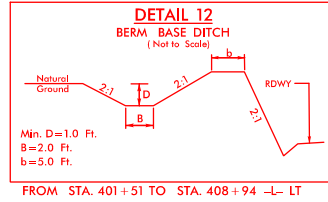
PERMIT DRAWING SHEET 75 OF 91



PROJECT REFERENCE NO. R-2527	SHEET NO. 34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<small>STEWART 223 S. West St. Raleigh, NC 27601 www.stewartinc.com</small>	
<small>VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 100 Raleigh, NC 27606</small>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING



NOTE: SEE TMP SHEET No. XXX FOR CULVERT STAGING

40
MONTGOMERY COUNTY
BOARD OF EDUCATION
DB 234 PG 553
PB 6 PG 366

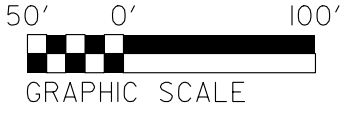
- FOR INTERSECTION DETAIL, SEE SHEET 28-10
- FOR -L- PROFILE, SEE SHEETS 55 & 56
- FOR -Y6- PROFILE, SEE SHEET 61
- FOR -SR- PROFILE, SEE SHEET 62

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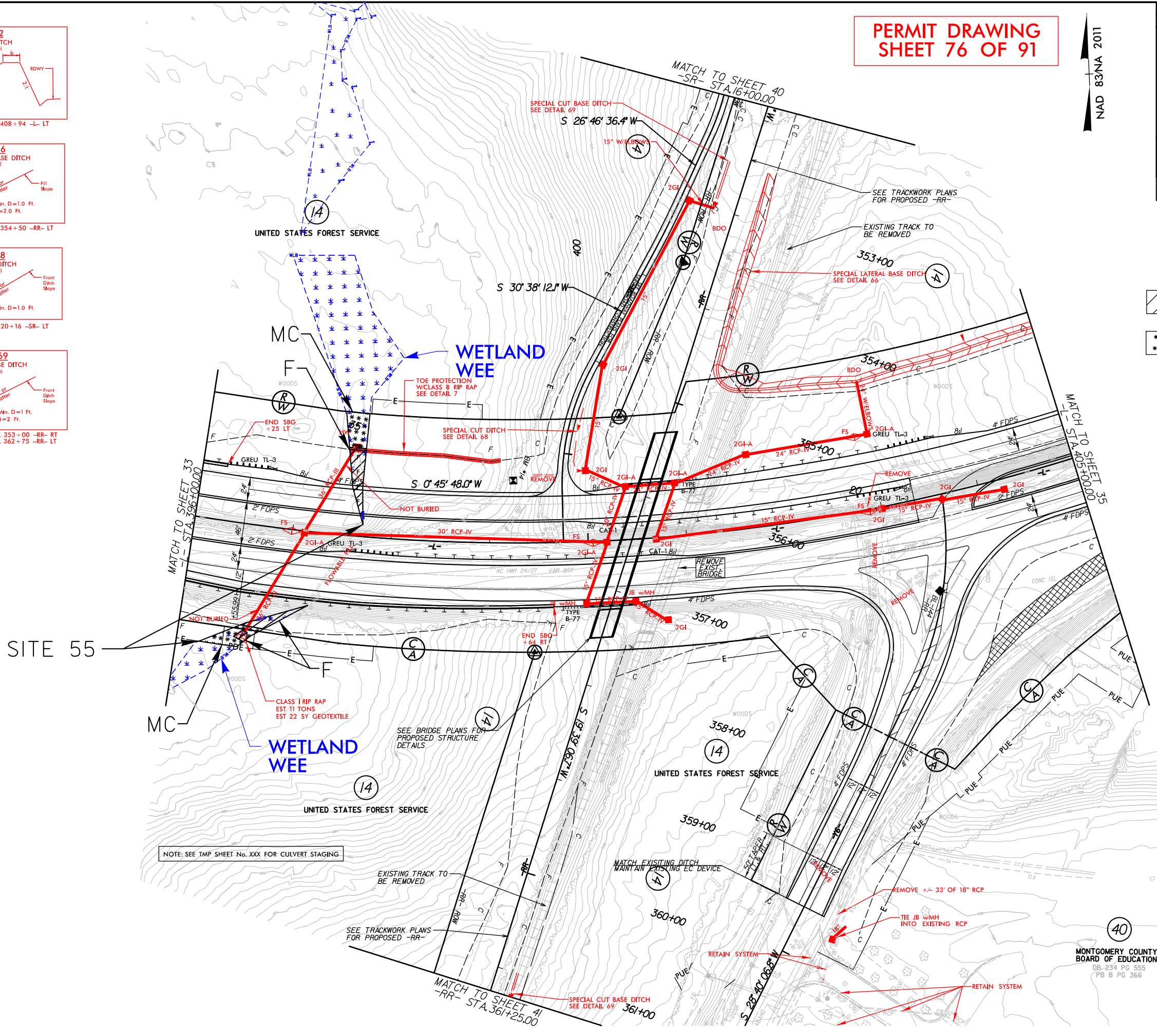
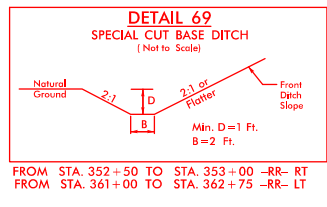
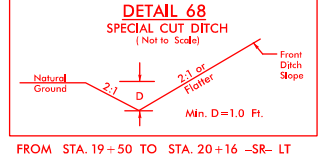
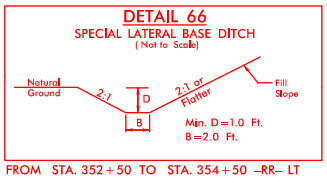
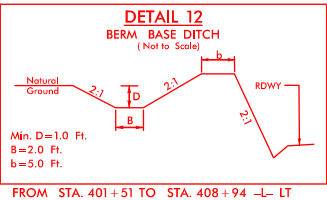
PERMIT DRAWING SHEET 76 OF 91



PROJECT REFERENCE NO. R-2527	SHEET NO. 34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<small>STEWART 1800 Shiloh Rd. #100 Raleigh, NC 27603 www.stewartinc.com</small>	
<small>vhb VHB Engineering, Inc. P.C. (C-3705) 940 Main Campus Drive, Suite 100 Raleigh, NC 27606</small>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING

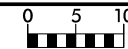


NOTE: SEE TMP SHEET No. XXX FOR CULVERT STAGING

MONTGOMERY COUNTY
BOARD OF EDUCATION
138-234 PG 553
PB 6 PG 366

- FOR INTERSECTION DETAIL, SEE SHEET 28-10
- FOR -L- PROFILE, SEE SHEETS 55 & 56
- FOR -Y6- PROFILE, SEE SHEET 61
- FOR -SR- PROFILE, SEE SHEET 62

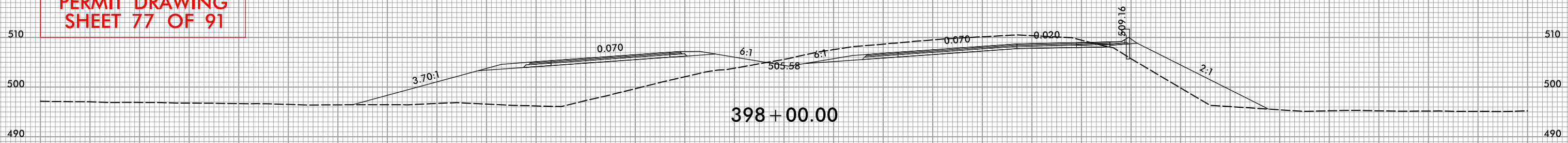
8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2527	X-234

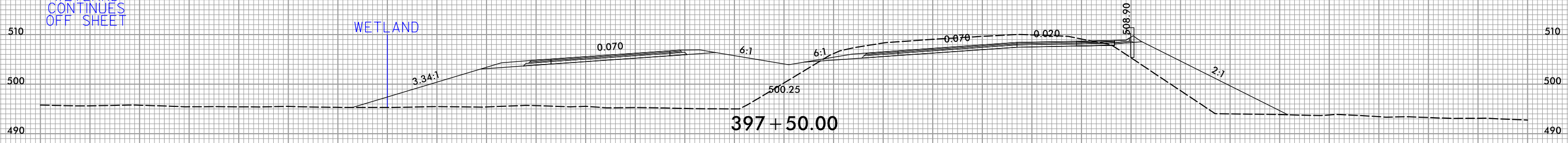
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**PERMIT DRAWING
SHEET 77 OF 91**

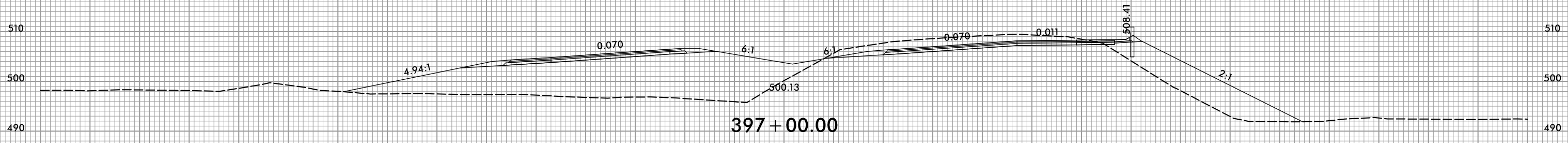


SITE 55

WETLAND
CONTINUES
OFF SHEET

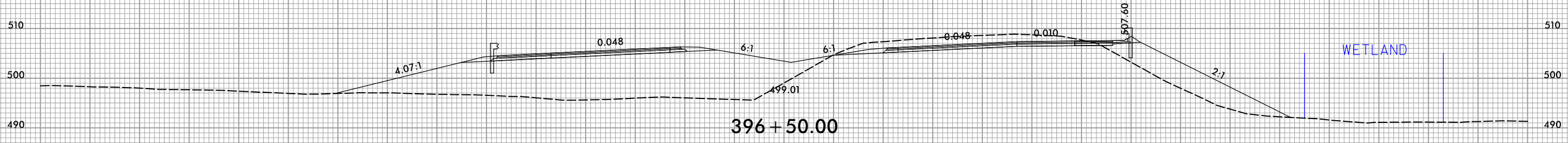


397+50.00



397+00.00

SITE 55



396+50.00

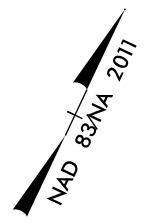
WETLAND



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eberger

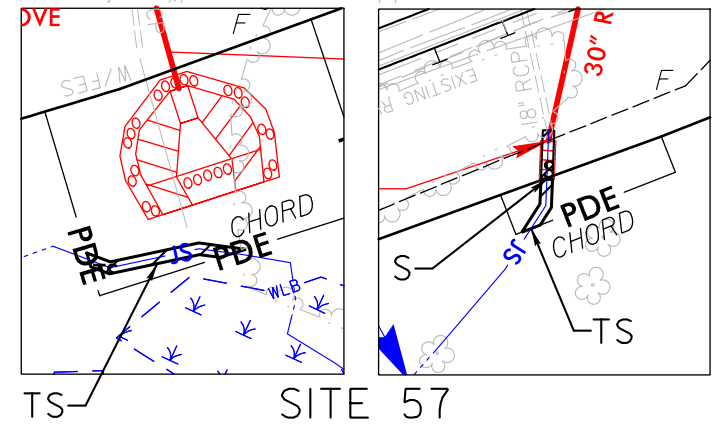
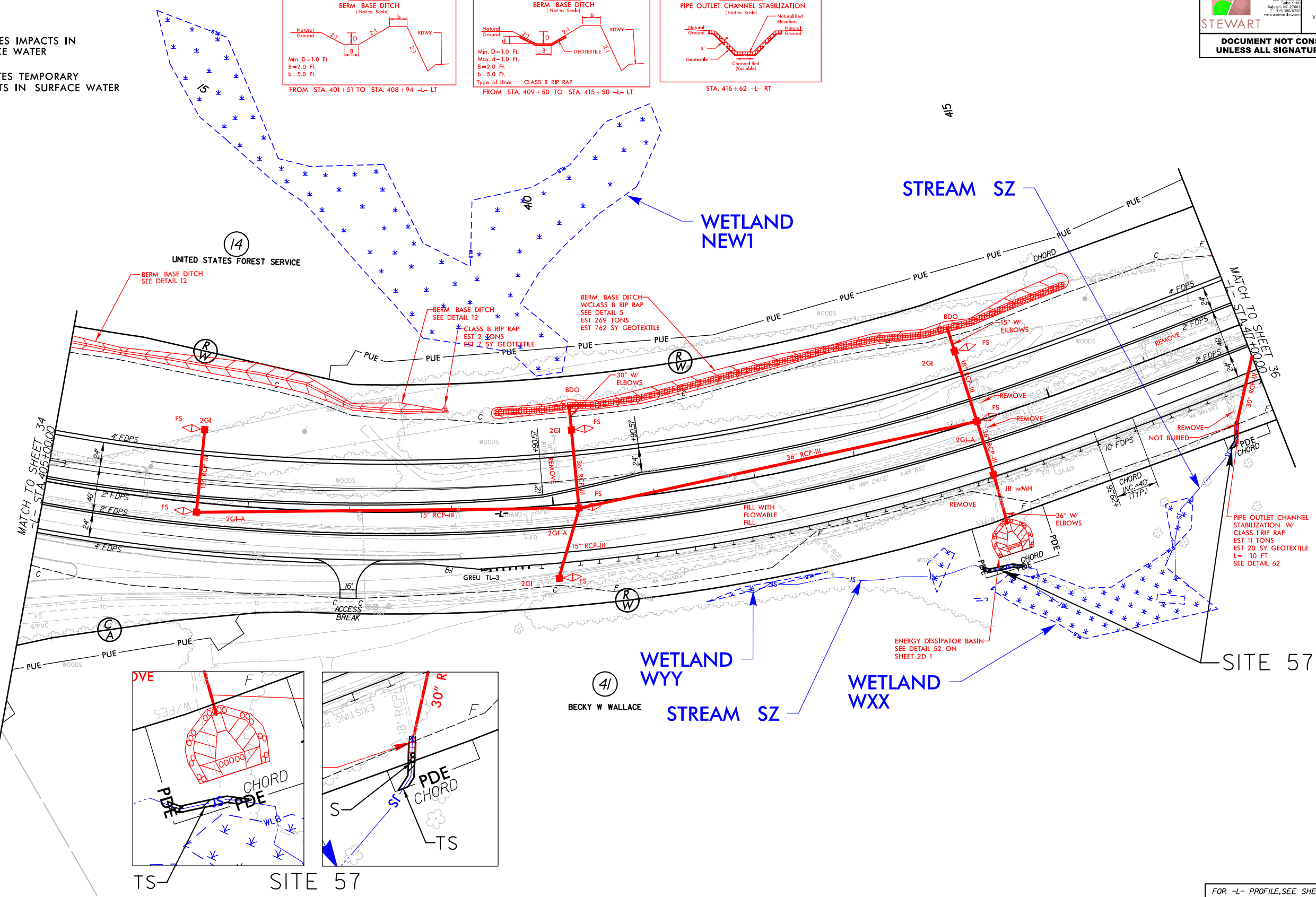
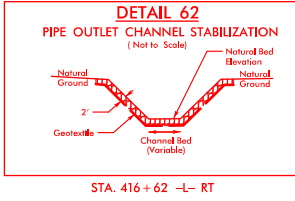
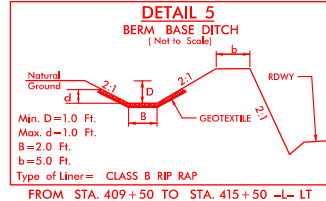
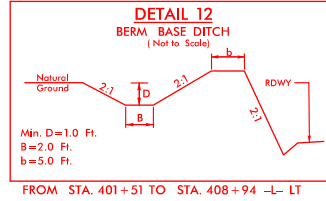
5/14/99

PERMIT DRAWING SHEET 78 OF 91



PROJECT REFERENCE NO. R-2527	SHEET NO. 35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

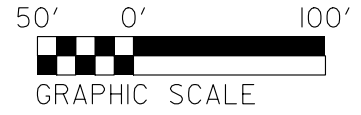


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FOR -L- PROFILE, SEE SHEET 56
ALL DRIVEWAY RADI 30' UNLESS OTHERWISE NOTED.

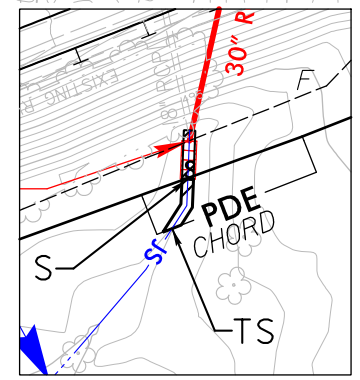
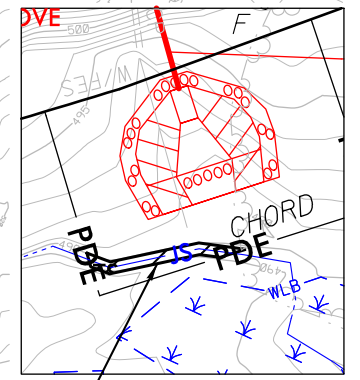
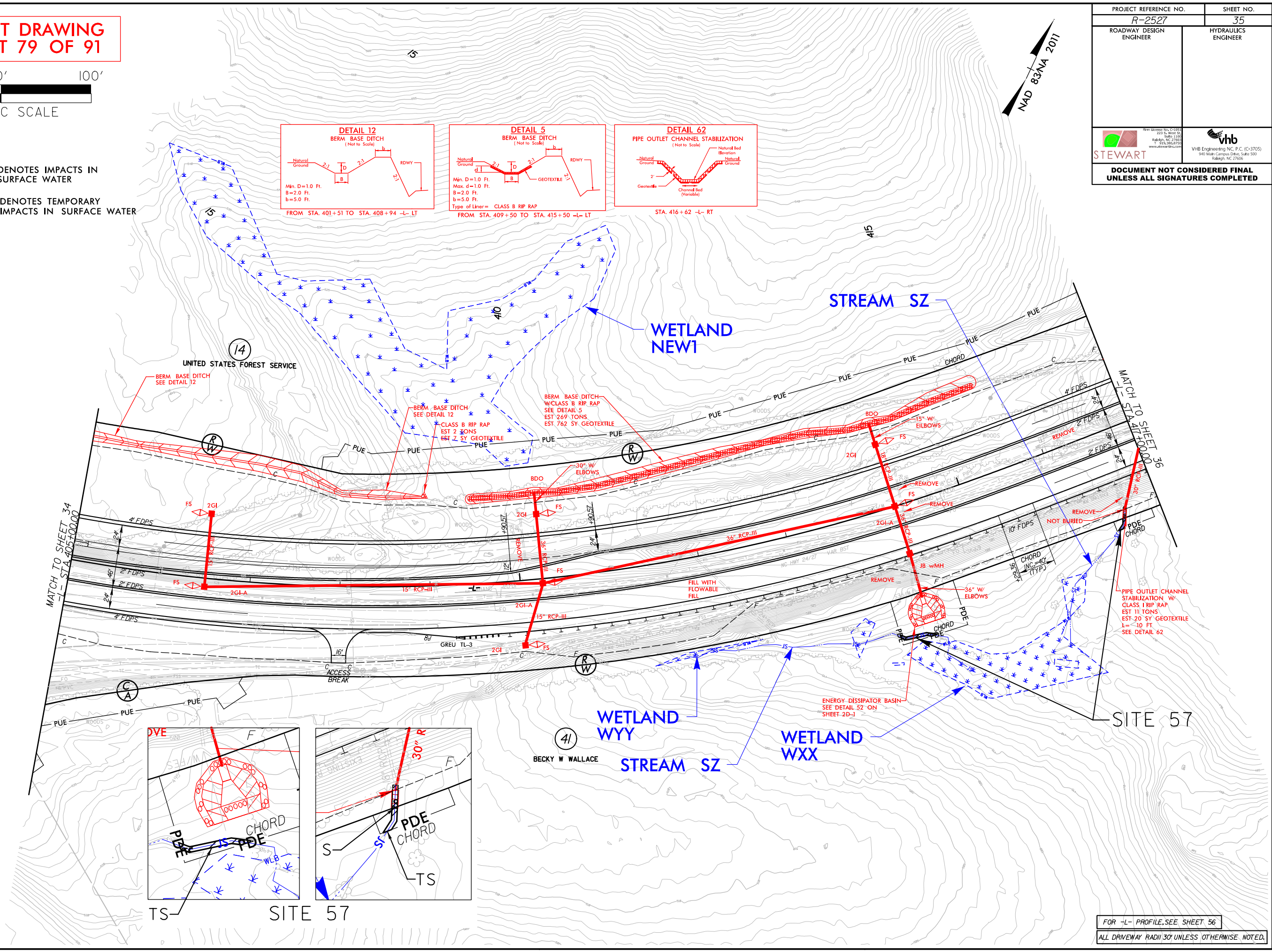
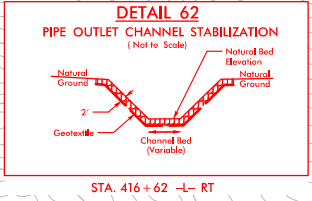
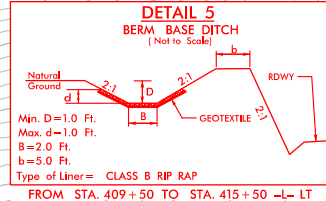
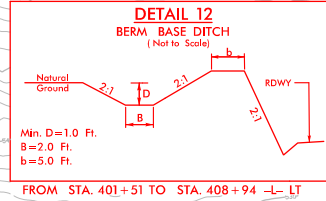
5/14/99

PERMIT DRAWING SHEET 79 OF 91



PROJECT REFERENCE NO. R-2527	SHEET NO. 35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

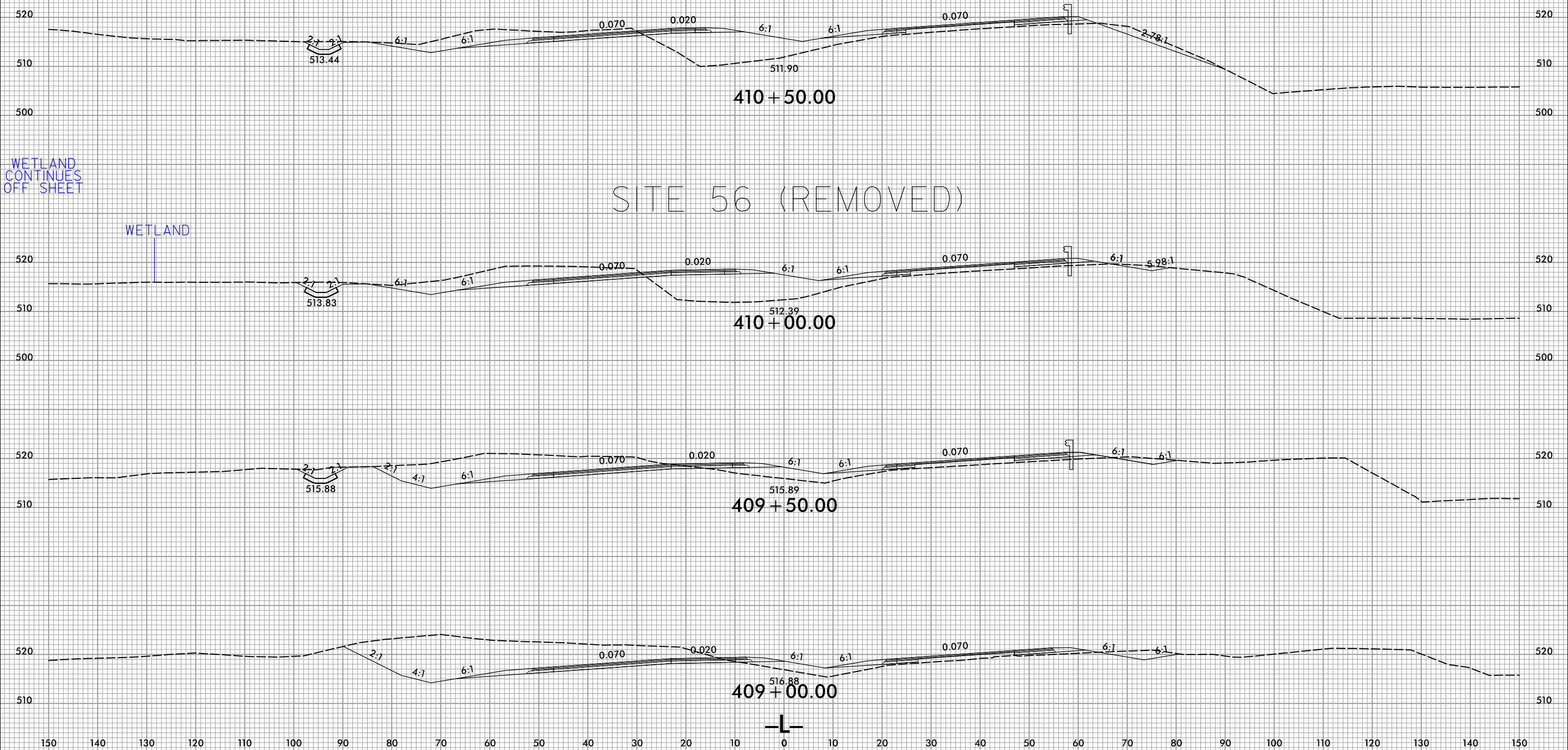


FOR -L- PROFILE, SEE SHEET 56
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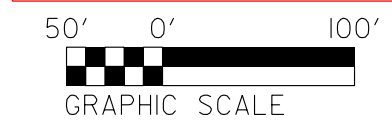
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PERMIT DRAWING
SHEET 80 OF 91



5/14/99

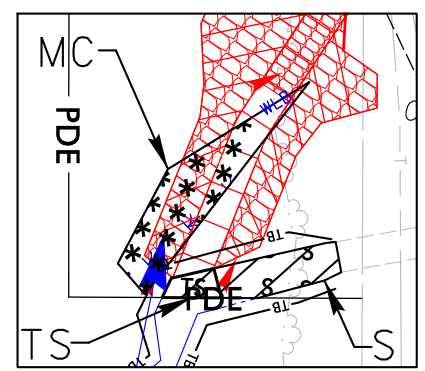
PERMIT DRAWING SHEET 81 OF 91



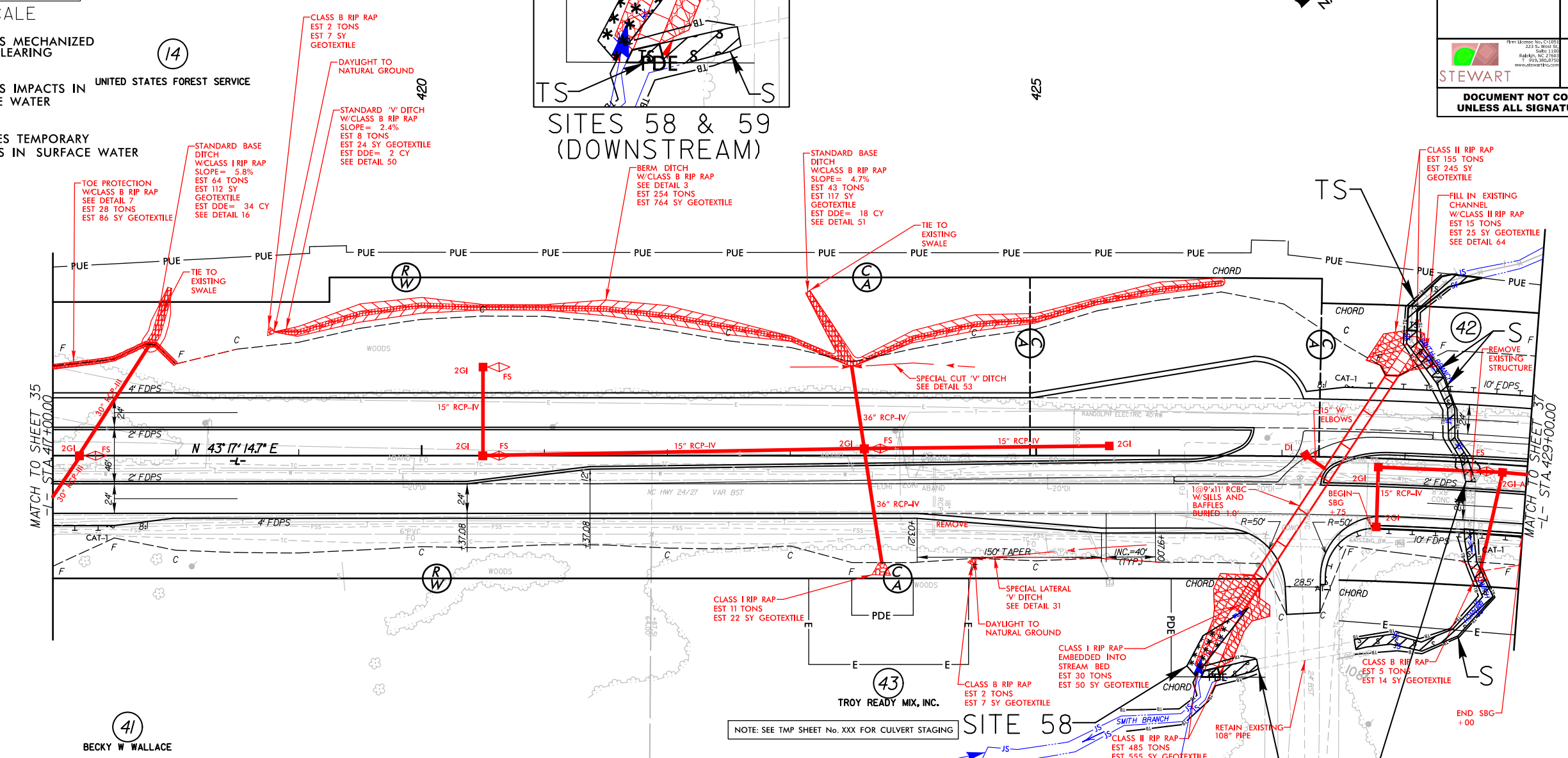
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

UNITED STATES FOREST SERVICE

PROJECT REFERENCE NO. R-2527	SHEET NO. 36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SITES 58 & 59 (DOWNSTREAM)

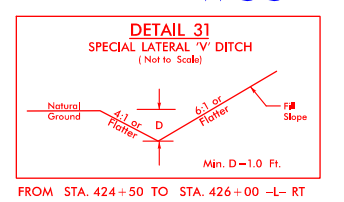
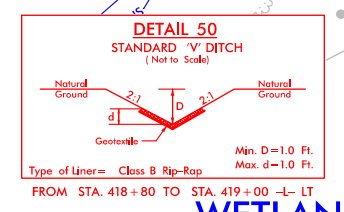
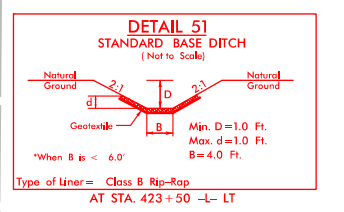
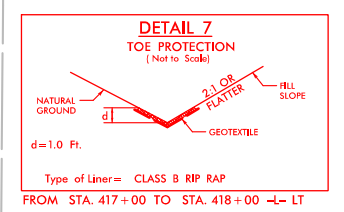
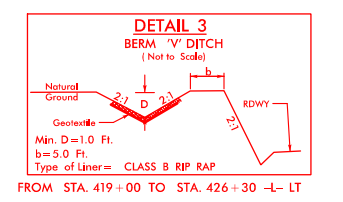
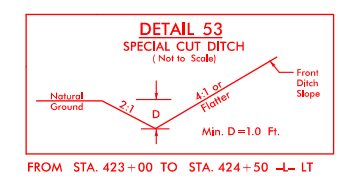
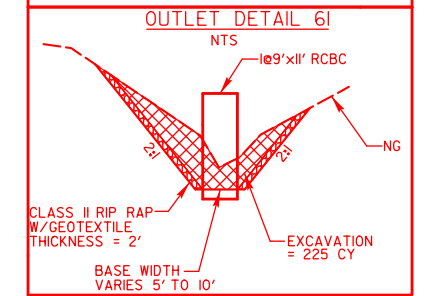
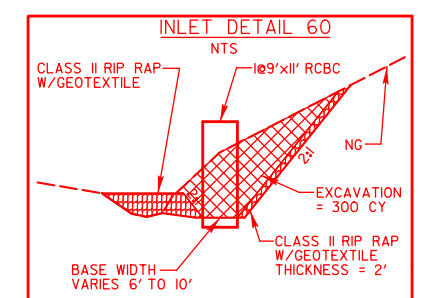


41 BECKY W WALLACE

NOTE: SEE TAMP SHEET No. XXX FOR CULVERT STAGING

43 TROY READY MIX, INC.

44 MCRAE INDUSTRIES, INC.



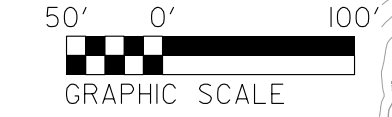
SEE PLAN SHEET 2B-12 FOR TEMP. ACCESS TO CONCRETE PLANT DURING CONSTRUCTION

FOR INTERSECTION DETAIL, SEE SHEET 2B-II
FOR -L- PROFILE, SEE SHEET 56

7:48:04 AM T:\Hydro\Drawings\PERMITS_Environmental\Drawings\R2527_Hyd_PPM_PSH36.dgn

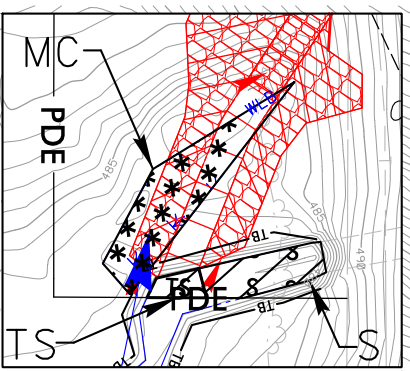
5/14/99

PERMIT DRAWING SHEET 82 OF 91

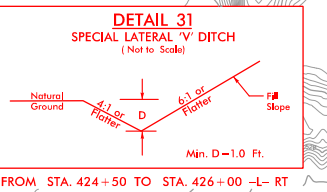
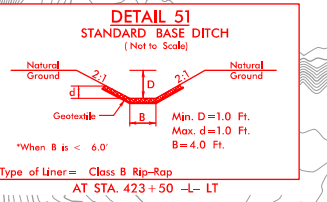
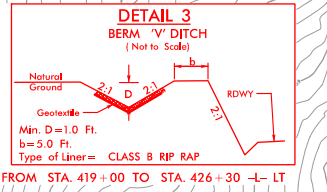
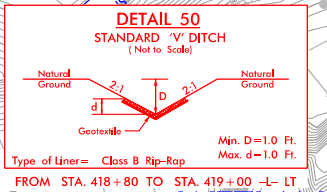
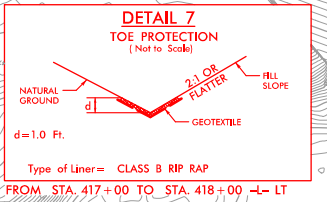
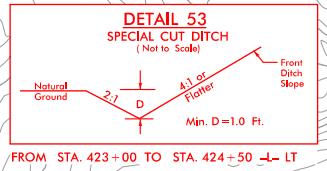
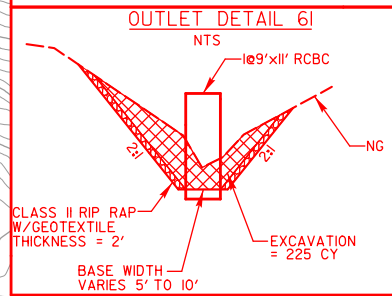
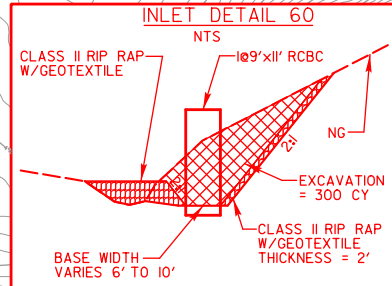
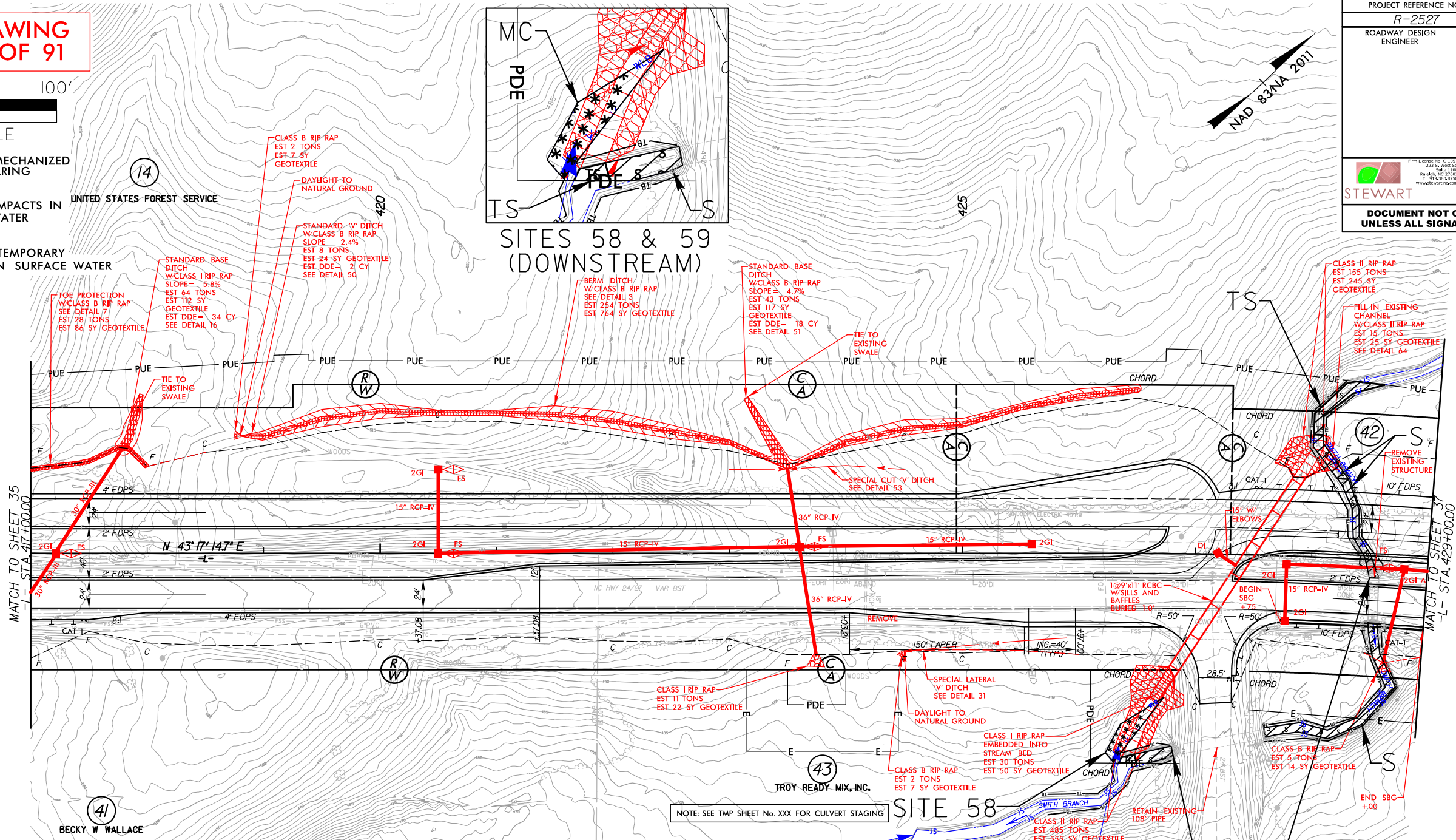


- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO. R-2527	SHEET NO. 36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SITES 58 & 59 (DOWNSTREAM)



STREAM SY-B

WETLAND WCC



SEE PLAN SHEET 2B-12 FOR TEMP. ACCESS TO CONCRETE PLANT DURING CONSTRUCTION

44 MCRAE INDUSTRIES, INC. SITE 59

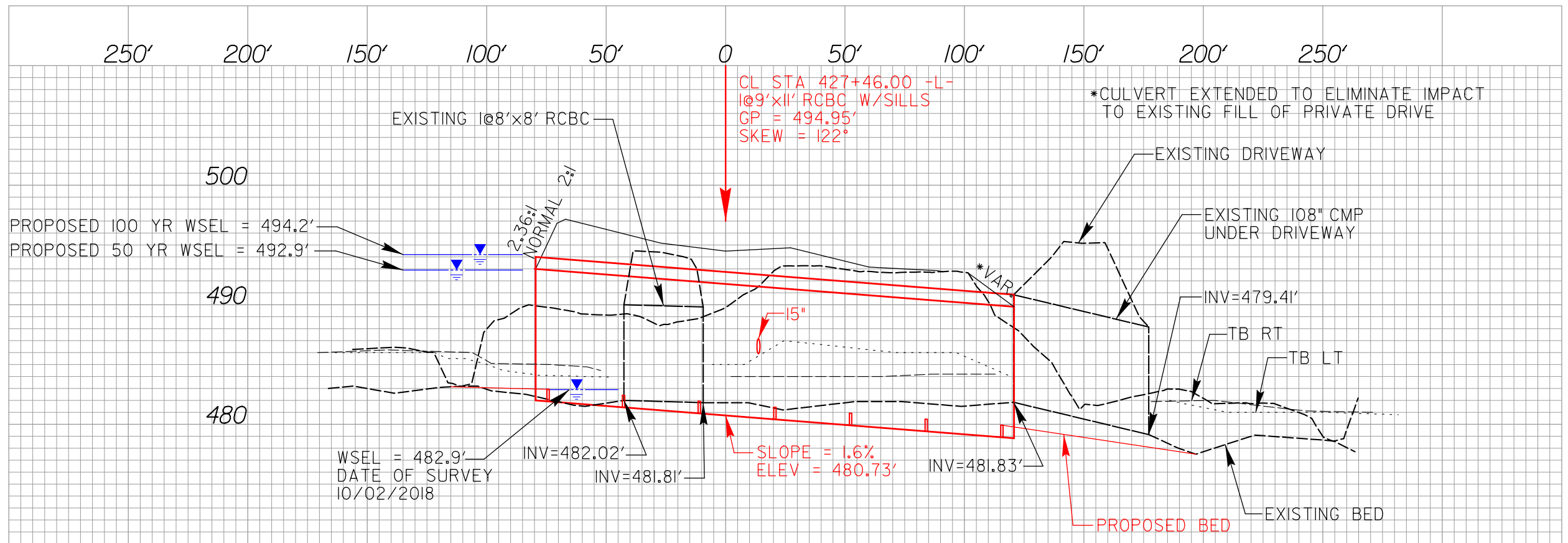
FOR INTERSECTION DETAIL, SEE SHEET 2B-II
FOR -L- PROFILE, SEE SHEET 56

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PERMIT DRAWING
SHEET 83 OF 91

PROJECT REFERENCE NO. R-2527		SHEET NO.	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
 <small>Firm License No. C-1101 217 S. West St. Raleigh, NC 27603 T 919.386.8766 www.stewartinc.com</small>		 <small>VHB Engineering NC, P.C. (C-3705) 940 Main Campus Drive, Suite 500 Raleigh, NC 27605</small>	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

SITES 58 & 59



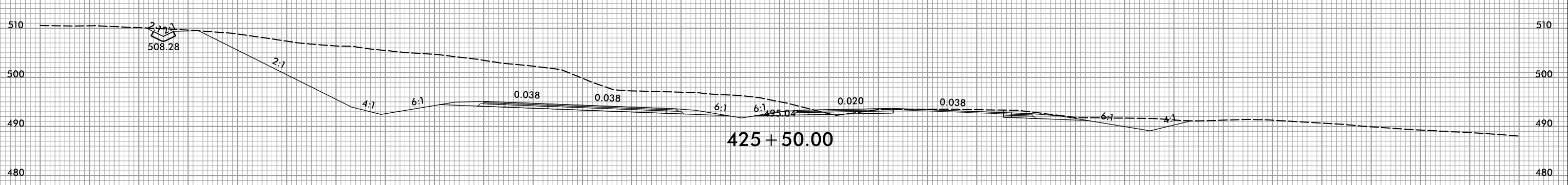
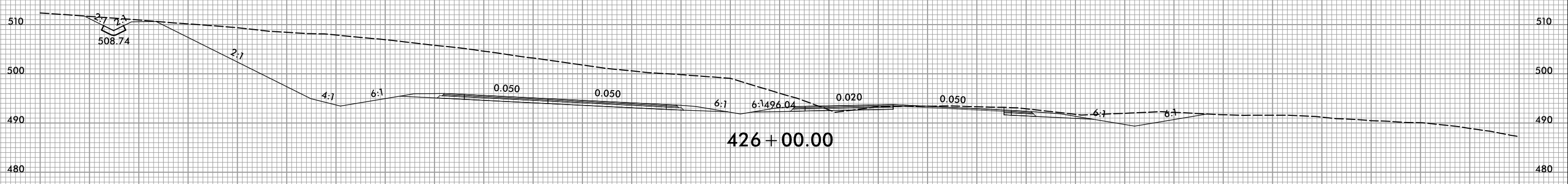
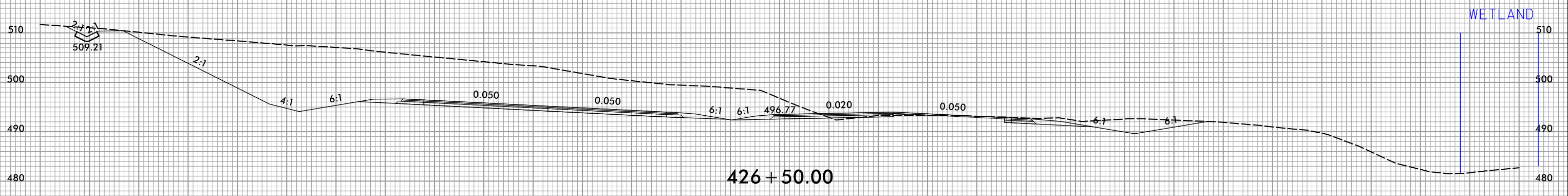
REVISIONS



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

PERMIT DRAWING
SHEET 84 OF 91

SITE 58



WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER 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)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	28+03/29+61 -L- LT	Fill	< 0.01			0.04						
2	28+56/29+60 -L- RT	Channel Improvements						< 0.01	< 0.01	53	59	
3	28+66/29+60 -L- RT	Fill	< 0.01			< 0.01						
4	29+37/29+78 -L- RT	Channel Improvements						0.05	< 0.01	134	15	
4	29+60 -L- LT/29+95 -L- RT	2 @ 10' x 10' RCBC						0.03		78		
4	29+77/30+98 -L- LT	Channel Improvements						0.05	< 0.01	119	20	
5	33+28/33+80 -L- LT	54" Welded Steel						0.01	< 0.01	105	27	
5	34+81/35+03 -L- RT	54" Welded Steel						< 0.01	< 0.01	52	38	
6	33+64/34+24 -L- LT	Fill						< 0.01		77		
7	80+40/80+80 -L- LT	36" RCP-III						< 0.01	< 0.01	129	16	
8	92+24/92+50 -L- LT	24" RCP-III; Fill	< 0.01									
9	93+05/93+19 -L- LT	15" w/ Elbows	< 0.01			< 0.01						
10	98+50/98+99 -L- RT	42" RCP-III						< 0.01	< 0.01	54	10	
10	99+26/100+01 -L- LT	42" RCP-III						< 0.01	< 0.01	106	12	
TOTALS*:			0.02			0.05		0.17	0.03	907	197	0

*Rounded totals are sum of actual impacts

NOTES:

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WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER 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)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
11	123+75/124+57 -L- LT	Fill	< 0.01			0.03						
12	124+11/124+53 -L- LT	48" RCP-IV						< 0.01		123		
12	126+03/127+17 -L- RT	48" RCP-IV						0.01	< 0.01	109	24	
13	124+63/126+35 -L- LT	Fill	0.09									
14	126+32/126+65 -L- RT	Fill; Mechanized Clearing	< 0.01			< 0.01						
15	126+78/126+93 -L- RT	48" RCP-IV							< 0.01		17	
16	127+14/127+37 -L- RT	Fill; Mechanized Clearing	< 0.01			< 0.01						
17	139+95/142+31 -L- LT	42" RCP-IV						0.02	< 0.01	264	20	
17	143+12/143+62 -L- RT	42" RCP-IV						< 0.01	< 0.01	43	19	
18	139+99/140+86 -L- LT	Mechanized Clearing				0.02						
19	142+56/143+24 -L- RT	Mechanized Clearing				0.02						
20	149+20/150+54 -L- RT	Fill						< 0.01		139		
21	149+49/150+06 -L- LT	Fill	0.02									
TOTALS*:			0.11			0.07		0.05	< 0.01	678	80	0

*Rounded totals are sum of actual impacts

NOTES:

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WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER 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)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
22	149+81/150+15 -L- LT	42" RCP-IV						0.01	< 0.01	152	17	
22	150+53/150+93 -L- RT	42" RCP-IV						< 0.01	< 0.01	59	6	
23	158+89/159+19 -L- LT	Channel Improvements						0.01	< 0.01	105	20	
23	58+85 -L- LT/159+67 -L- R	1 @ 7' x 8' RCBC						0.01		78		
24	159+11/167+33 -L- LT	Ditch Excavation; Fill						0.07	< 0.01	845	38	
25	166+00/167+31 -L- LT	Fill						0.01		180		
25	168+61/169+06 -L- RT	36" RCP-III						< 0.01	< 0.01	39	31	
26	166+70/167+85 -L- LT	Fill	0.11									
26	168+05/169+29 -L- RT	Fill; Mechanized Clearing	0.04			0.01						
27	169+07/169+53 -L- LT	Pond Spillway							< 0.01		34	
29	193+48/193+92 -L- RT	Channel Improvements						0.04	0.02	100	54	
29	93+81 -L- RT/194+26 -L- L	2 @ 14' x 9' RCBC						0.04		137		
29	194+03/195+36 -L- LT	Channel Improvements						0.04	< 0.01	113	23	
30	195+27/195+36 -L- LT	Channel Improvements							< 0.01		9	
TOTALS*:			0.15			0.01		0.30	0.04	1808	232	0

*Rounded totals are sum of actual impacts

NOTES:

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WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER 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)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
31	222+35/233+13 -L- LT	Fill; Ditch Excavation	0.08			0.04						
32	223+04/223+38 -L- LT	66" RCP-IV						0.01	< 0.01	155	32	
32	223+44/223+68 -L- RT	66" RCP-IV						< 0.01	< 0.01	53	16	
33	230+75/231+26 -L- RT	Easement							< 0.01		56	
34	238+07/238+26 -L- RT	24" RCP-III						< 0.01	< 0.01	27	11	
35	243+35/243+64 -L- LT	30" w/ Elbows; 36" RCP-III						0.01	< 0.01	145	16	
35	243+59/243+72 -L- RT	36" RCP-III						< 0.01	< 0.01	35	10	
36	253+83/254+10 -L- RT	30" w/ Elbows						< 0.01	< 0.01	31	9	
37	253+84/254+22 -L- RT	Fill	< 0.01			< 0.01						
38	264+93/267+04 -L- LT	60" RCP-IV; Fill						0.02	< 0.01	232	25	
39	267+03/267+32 -L- RT	Channel Improvements						0.03	< 0.01	91	11	
39	67+05 -L- RT/267+35 -L- L	2 @ 7' x 9' RCBC						0.03		122		
39	267+12/267+85 -L- LT	Channel Improvements						0.02	0.01	88	43	
40	277+34/277+52 -L- RT	24" RCP-III	< 0.01			< 0.01						
TOTALS*:			0.09			0.04		0.13	0.03	979	229	0

*Rounded totals are sum of actual impacts

NOTES:

Site 40 represents a total take of Wetland WKK.

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WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER 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)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
41	279+80/280+34 -L- RT	18" RCP-III; Fill	0.01			0.02						
42	282+92/283+225 -L- RT	18" Pipe				< 0.01						
44	302+39/302+89 -L- RT	Channel Improvements						0.02	< 0.01	104	33	
44	303+29/303+56 -L- LT	1 @ 8' x 10' RCBC						0.01		69		
44	302+36/302+89 -L- LT	Channel Improvements						0.01	< 0.01	86	9	
45	302+58/303+31 -L- LT	Fill						< 0.01		73		
46	303+40/304+80 -L- LT	Fill	0.06			0.03						
47	312+83/314+25 -L- RT	42" Welded Steel						< 0.01	< 0.01	124	45	
47	315+40/316+28 -L- LT	42" Welded Steel						< 0.01	< 0.01	89	48	
48	315+51/315+76 -L- LT	Fill	0.02									
49	336+84/337+17 -L RT	Easement				< 0.01						
49	340+90/341+72 -L- RT	Fill	< 0.01			0.02						
49	342+88/343+25 -L- RT	Easement				< 0.01						
49	344+75/345+05 -L- RT	Ditch Excavation			< 0.01	< 0.01						
TOTALS*:			0.09		< 0.01	0.09		0.07	0.01	545	135	0

*Rounded totals are sum of actual impacts

NOTES:

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WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER 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)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
50	342+54/342+96 -L- RT	36" RCP-III						< 0.01	< 0.01	30	24	
50	344+81/346+18 -L- RT	60" RCP-IV						0.01	< 0.01	143	26	
50	347+30/348+72 -L- LT	60" RCP-IV						0.02	< 0.01	227	18	
51	345+37/347+40 -L- LT	60" RCP-IV	< 0.01			0.06						
51	347+80/347+91 -L- LT	60" RCP-IV	< 0.01									
52	351+92/352+04 -L- RT	30" RCP-III	< 0.01			< 0.01						
52	352+41/352+74 -L- LT	30" RCP-III	< 0.01			< 0.01						
53	363+49/364+98 -L- LT	Channel Improvements						0.03	< 0.01	193	16	
53	364+88/366+19 -L- LT	1 @ 8' x 10' RCBC						0.02		152		
53	366+70/367+50 -L- RT	Channel Improvements						0.02	< 0.01	94	29	
53	383+50/384+19 -L- RT	Channel Improvements						< 0.01	< 0.01	70	26	
53	384+11 -L- RT/385+92 -L- LT	1 @ 8' x 10' RCBC						0.02		129		
53	385+78/386+38 -L- LT	Channel Improvements						< 0.01	< 0.01	39	54	
53	390+27/392+35 -L- LT	Channel Improvements						0.06	< 0.01	321	17	
TOTALS*:			0.01			0.07		0.21	0.03	1398	210	0

*Rounded totals are sum of actual impacts

NOTES:

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WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER 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)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
54	391+60/392+58 -L- LT	Channel Improvements						0.04	0.03	113	91	
54	392+28 -L- LT/392+56 -L- R	3 @ 14' x 12' RCBC						0.04		76		
54	392+14/392+62 -L- RT	Channel Improvements						0.09	0.01	139	15	
55	396+23/397+23 -L- RT	36 RCP-III; Fill	0.01			0.01						
55	397+42/397+71 -L- LT	36 RCP-III; Fill	0.02			0.02						
57	413+90/414+27 -L- RT	Dissipator Basin							< 0.01		39	
57	416+67/416+64 -L- RT	30" RCP-III						< 0.01	< 0.01	13	14	
58	426+23/426+74 -L- RT	1 @ 9' x 11' RCBC				0.02						
59	426+35/426+82 -L- RT	Channel Improvements						< 0.01	< 0.01	33	17	
59	427+63/428+79 -L- RT	1 @ 9' x 11' RCBC						0.04		279		
59	427+98/428+54 -L- LT	Channel Improvements						0.02	0.01	33	17	
SHEET 85 TOTALS*			0.02			0.05		0.17	0.03	907	197	
SHEET 86 TOTALS*			0.11			0.07		0.05	< 0.01	678	80	
SHEET 87 TOTALS*			0.15			0.01		0.30	0.04	2414	252	
SHEET 88 TOTALS*			0.09			0.04		0.13	0.03	979	229	
SHEET 89 TOTALS*			0.09		< 0.01	0.09		0.07	0.01	545	135	
SHEET 90 TOTALS*			0.01			0.07		0.21	0.03	1398	210	
SHEET 91 TOTALS*			0.03			0.05		0.24	0.06	686	193	
PROJECT TOTALS*:			0.51		< 0.01	0.38		1.16	0.21	7607	1296	

*Rounded totals are sum of actual impacts

NOTES:

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