North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element:	35869.3.1	TIP No.:	U-2719	County(ies):	Wake	Page	1	of	5

General Project Information

WBS Element:	35869.3.1	**TIP Number:**	U-2719	**Project Type:**	Roadway Widening	**Date:**	5/31/2019
NCDOT Contact:	Paul Atkinson, PE	**Contractor / Designer:**	HDR Engineering / Joshua Massrock, P.E.				
Address:	1020 Birch Ridge Dr. Raleigh, NC 27610	**Address:**	555 Fayetteville Street, Suite 900 Raleigh, NC 27601				
Phone:	(919)707-6707	**Phone:**	(919) 232-6631				
Email:	patkinson@ncdot.gov	**Email:**	joshua.massrock@hdrinc.com				
City/Town:	Raleigh	**County(ies):**	Wake				
River Basin(s):	Neuse	**CAMA County?**	No				
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	6.25	**Surrounding Land Use:**	Urbanized/ mostly developed
	Proposed Project		**Existing Site**
Project Built-Upon Area (ac.)	270.0 ac.		137.0 ac.
Typical Cross Section Description:	6 lane divided freeway w/ a 22 foot variable median: (2) 12 foot outside paved shoulders, (3) 12 foot travel lanes, (2) 11 foot paved median shoulders - total width of 118'.		4 lane divided freeway w/ a 28 foot grass median: (2) 5 foot outside paved shoulders, (2) 12 foot travel lanes, (2) 4 foot paved median shoulders - total width of 94'.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 183,700	Year: 2040	Existing: 144,810 Year: 2018

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

Project Description: The proposed project (U-2719) widens I-440 / US 1 from south of SR 1313 (Walnut St.) to north of SR 1728 (Wade Ave.). The project will construct approximately 6 miles of 6-lane divided freeway. The project includes 4 major interchanges: Jones Franklin Rd., Western Blvd., Hillsborough St., and Wade Ave. Walnut Creek and House Creek are the two FEMA streams located within the project corridor. Box culverts and circular pipe culverts are used to convey all jurisdictional stream crossings through the project. Wetlands and buffer zones are also located throughout the entire length of the project.

Impact Minimization Efforts: Guardrail with 2:1 slopes were utilized throughout the project to minimize impacts to streams and wetlands. The Team has elected to use reinforced 1.5 :1 slopes from Sta 283+50 -L1- to Sta. 287+50 -L1- to avoid impacts to Simmons Branch as well as right of way impacts to Kaplan Park. Ditches and pipes that outlet adjacent to wetlands have been designed to have non-erosive velocities.

Stormwater BMP Measures: Dry detention basins have been proposed at specific locations along the project. Ditches have been designed to meet grass swale criteria to the maximum extent practical.

Waterbody Information

Surface Water Body (1):	House Creek	**NCDWR Stream Index No.:**	27-33-13		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SC		**Buffer Rules in Effect:**	Neuse	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element: 35869.3.1 **TIP No.:** U-2719 **County(ies):** Wake

Additional Waterbody Information

Surface Water Body (2):	UT to House Creek	**NCDWR Stream Index No.:**	27-33-13		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SA, SD, SE, SK, SAN			**Buffer Rules in Effect:**	Neuse
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):	Bushy Creek	**NCDWR Stream Index No.:**	27-34-3		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SR			**Buffer Rules in Effect:**	Neuse
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):	UT to Bushy Creek	**NCDWR Stream Index No.:**	27-34-3		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SN, SO, SP, SS			**Buffer Rules in Effect:**	Neuse
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):	Simmons Branch, including pond OWC	**NCDWR Stream Index No.:**	27-34-2		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	ST			**Buffer Rules in Effect:**	Neuse
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element: 35869.3.1 **TIP No.:** U-2719 **County(ies):** Wake

Additional Waterbody Information

Surface Water Body (6):	UT to Simmons Branch		**NCDWR Stream Index No.:**	27-34-2	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SU, SV			**Buffer Rules in Effect:**	Neuse
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (7):	Walnut Creek		**NCDWR Stream Index No.:**	27-34-(1)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SX			**Buffer Rules in Effect:**	Neuse
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 (8):	UT to Walnut Creek		**NCDWR Stream Index No.:**	27-34-(1)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SW, SAA, SAI, SAJ, SAK			**Buffer Rules in Effect:**	Neuse
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 (9):	UT to Lynn Branch		**NCDWR Stream Index No.:**	27-43-3	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SAE			**Buffer Rules in Effect:**	Neuse
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)					

North Carolina Department of Transportation

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FOR NCDOT PROJECTS

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WBS Element:	35869.3.1	**TIP No.:**	U-2719	**County(ies):**	Wake	**Page** 4	**of** 5

Additional Waterbody Information

Surface Water Body (10):	UT to Richlands Creek		**NCDWR Stream Index No.:**	27-33-11	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SH			**Buffer Rules in Effect:**	Neuse
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**	
Deck Drains Discharge Over Water Body?		(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 (11):	Rocky Branch, including pond OWA and OWE		**NCDWR Stream Index No.:**	27-34-6	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:	Nutrient Sensitive Waters (NSW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SM			**Buffer Rules in Effect:**	Neuse
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)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

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WBS Element: 35869.3.1 **TIP No.:** U-2719 **County(ies):** Wake

Other Best Management Practices

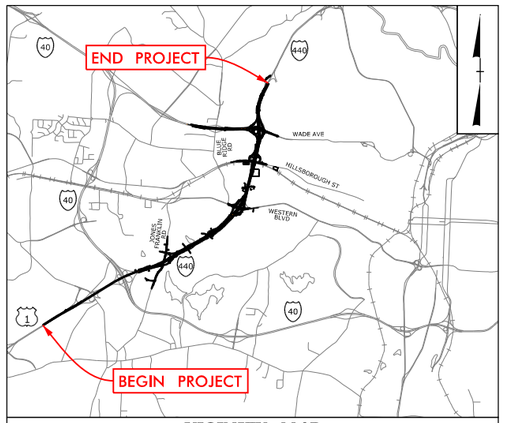
Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	BMP Type	Drainage Area (ac)	New Built-Upon Area (ac)	Volume Treated (ac-ft)	Precipitation Depth Treated over NBUA (in)	BMP Associated w/ Buffer Rules?
12	-L1B- 252+00 Rt. 35.7703830 / -78.7221767	(7)Walnut Creek	Dry Detention Basin	16.0	2.9	0.849	3.65	Yes
14	-L1- 283+00 Rt. 35.7747956 / -78.7132117	(5)Simmons Branch,	Dry Detention Basin	7.1	1.1	0.129	1.52	Yes
20	-Y30- 32+50 Lt. 35.7961316 / -78.6962291	(11)Rocky Branch,	Dry Detention Basin	7.5	1.2	0.146	1.52	Yes
20	-Y30LD- 16+82 Rt. 35.7961150 / -78.6937955	(11)Rocky Branch,	Dry Detention Basin	6.5	2.4	0.289	1.51	Yes
21	-Y35LB- 15+40 Rt. 35.8029831 / -78.6947309	(1)House Creek	Dry Detention Basin	19.5	5.6	0.664	1.49	Yes
21	-Y35RD- 19+50 Rt. 35.8047505 / -78.6930811	(1)House Creek	Dry Detention Basin	8.0	3.4	0.405	1.49	Yes

Additional Comments

TIP PROJECT: U-2719 /U-4437

CONTRACT: C204157

See Sheet 1A-1 For Sheet Symbology



VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

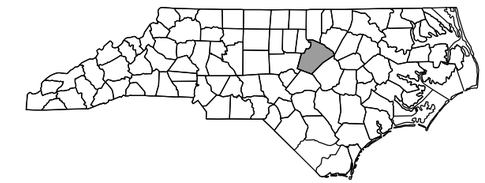
WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2719	1	

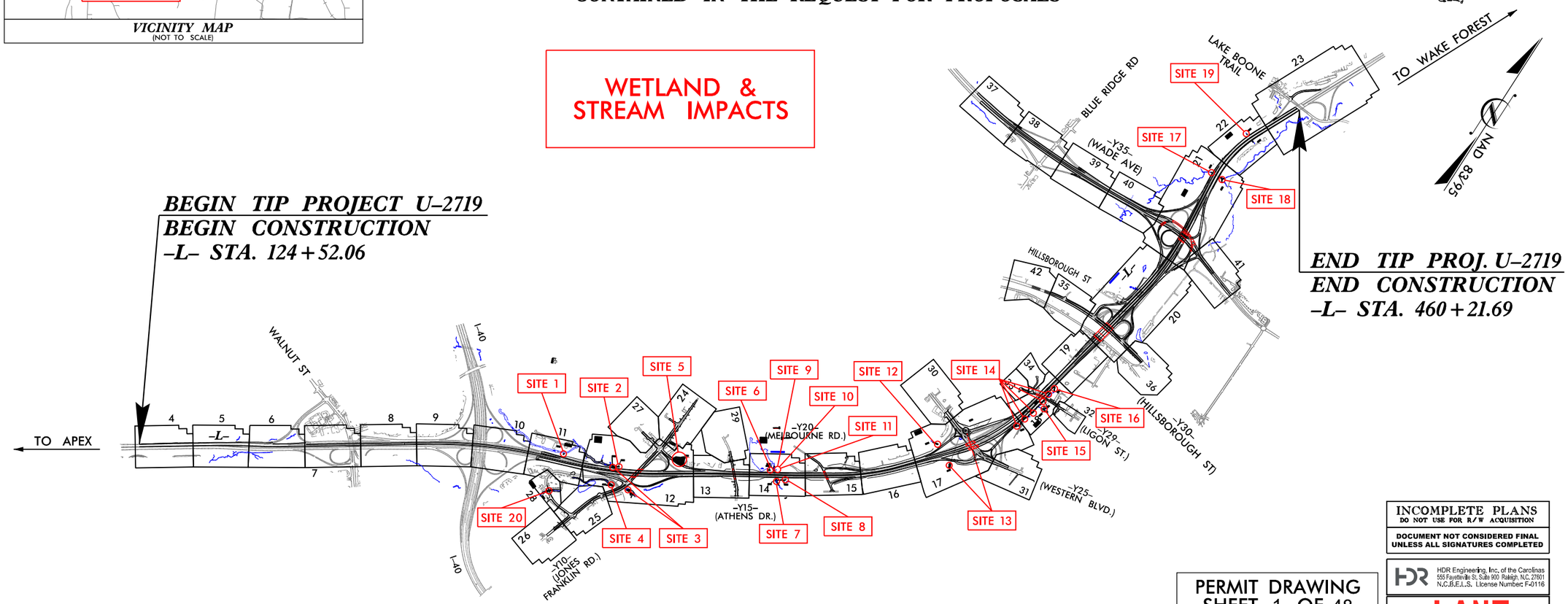
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
35869.3.1	IMSNHS-0440(10)	PE, ROW, UTILITIES
35868.3.4	STBG-0054(030)	& CONSTR.

LOCATION: I-440 /US 1 FROM SOUTH OF SR 1313 (WALNUT STREET) TO NORTH OF SR 1728 (WADE AVENUE)

TYPE OF WORK: DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK CONTAINED IN THE REQUEST FOR PROPOSALS



WETLAND & STREAM IMPACTS



INCOMPLETE PLANS
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PERMIT DRAWING
SHEET 1 OF 48

LANE

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2018 = 144,810
ADT 2040 = 183,700
K = 10 %
D = 55 %
T = 9 % *
V = 70 MPH
* TTST = 5% DUAL = 4%
FUNC CLASS =
INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2719 /U-4437 = 6.087 MILES
LENGTH STRUCTURES TIP PROJECT U-2719 /U-4437 = 0.162 MILES
TOTAL LENGTH TIP PROJECT U-2719 /U-4437 = 6.249 MILES

NCDOT CONTACT: DAVID HERING, PE
DESIGN-BUILD UNIT - PROJECT ENGINEER

Prepared for the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 2, 2018

LETTING DATE: OCTOBER 2, 2018

PAUL MEEHAN, PE
PROJECT ENGINEER

ERSKINE BROOKS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

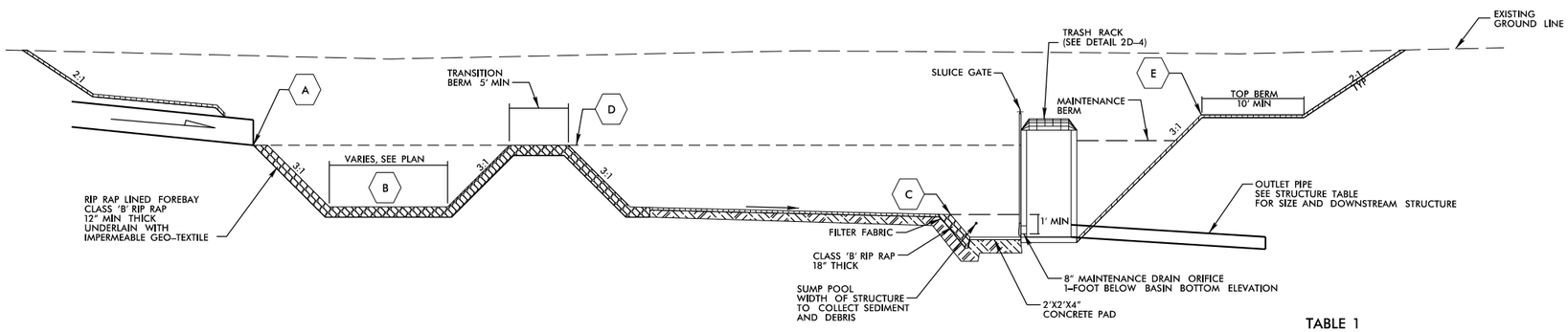
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_TSH.tbl
USER: NWOMACK DATE: 6/3/2019 TIME: 4:28:40 PM
FILE: Lane_Construction_Corp\Lane_I-440_Widening\6.0_CAD_BIM\6.2_WIP\U-2719\Hydraulics\PERMITS_Environmental\Drawings\U2719_PRM_WET_TSH.dgn
09/08/99

DRY DETENTION BASIN

NOT TO SCALE



TYPICAL SECTION
NTS

TABLE 1

ELEVATIONS FOR DRY DETENTION BASIN

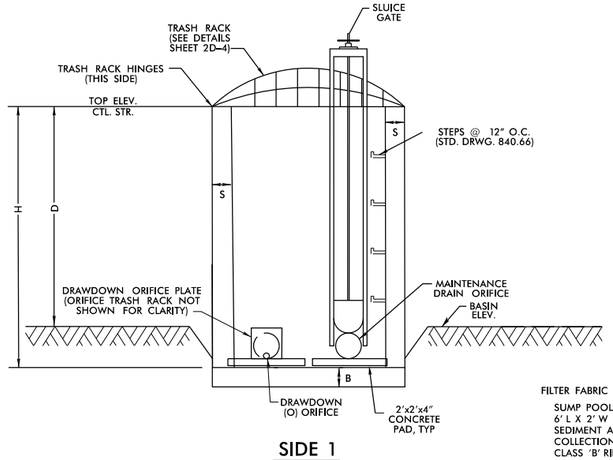
STATION	A (INLET PIPE INVERT)	B (FOREBAY BOTTOM)	C (BOTTOM OF BASIN)	D (FOREBAY BERM)	E (TOP OF BERM)
-Y30LD- 16+82 RT	444.30	441.00	441.00	444.30	446.00
-Y35LB- 15+40 RT	402.31	399.30	399.30	402.30	404.10
-Y35RD- 19+50 RT	400.36	398.30	398.30	400.55	402.10
-L1B- 252+00 RT	360.00	358.00	360.00	360.00	365.00
-L1- 283+00 RT	398.00	397.00	398.00	398.00	400.00

NOTES:

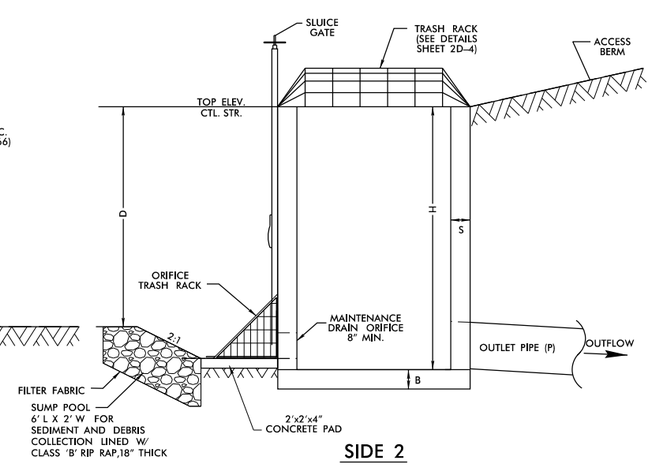
1. SEE PLANS FOR LOCATION AND BASIN DIMENSIONS.
2. IF SEASONAL HIGH WATER TABLE (SHWT) IS WITHIN 2' OF THE MEDIA FILTER BOTTOM, CONTACT THE NCDOT HYDRAULIC UNIT PRIOR TO CONSTRUCTION.
3. ALL DISTURBED BASIN SLOPES DRAINING INTO THE FILTRATION BASIN SHALL BE SODDED WITH FESCUE SOD.
4. ACCESS BERM SHALL BE PROVIDED TO ACCESS CONTROL STRUCTURE ON ALL BASINS AS SHOWN IN DETAIL.
5. FOR BASIN 357+88 –L– LT, FILL EMBANKMENT MATERIAL SHOULD CONSIST OF A–4, A–5, OR A–6 SOILS COMPACTED TO 95% OF AASHTO T–99 (STANDARD PROCTOR)

OUTLET CONTROL STRUCTURE

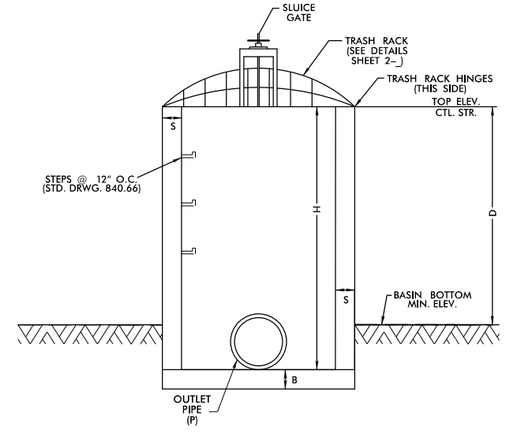
NOT TO SCALE



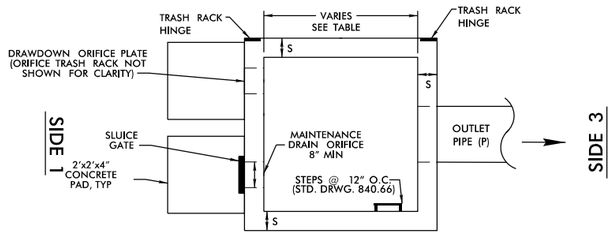
SIDE 1



SIDE 2



SIDE 3



SIDE 2
PLAN VIEW
TRASH RACK NOT SHOWN FOR CLARITY

TABLE 2

MINIMUM DIMENSIONS FOR OUTLET CONTROL STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	CONTROL STRUCTURE INV. ELEV.	CTL. STR. DIMENSIONS (W x L x H)	OUTLET PIPE DIAMETER(P) INCHES	MAINTENANCE ORIFICE DIMENSION	MAINTENANCE ORIFICE INV. ELEV.	DRAWDOWN ORIFICE (O) DIMENSION	DRAWDOWN ORIFICE (O) INV. ELEV.
-Y30LD- 16+82 RT	2045	6	18	444.30	3.30	438.50	4.5 x 4.5 x 5.8	42	1@8" DIA	440.00	1@2" DIA	440.00
-Y35LB- 15+40 RT	2133	6	21	402.30	4.00	396.30	5 x 5 x 6.00	36	1@8" DIA	398.30	1@2" DIA	398.30
-Y35RD- 19+50 RT	2144	6	16	400.55	3.25	395.80	4.5 x 4.5 x 4.75	30	1@8" DIA	397.30	1@1.15" DIA	397.30
-L1B- 252+00 RT	1288	6	6	364.00	6	356.00	4 x 4 x 8	36	1@8" DIA	357.00	1@6" DIA	357.00
-L1- 283+00 RT	1427	6	6	399.00	2	394.00	4 x 4 x 5	24	1@8" DIA	397.00	1@3" DIA	397.00

NOTES:

1. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
2. 8" MIN. ORIFICE WITH SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION. A GATE VALVE MAY BE USED IN LIEU OF THE 8" SLUICE GATE.
3. SLUICE GATE SHALL PROVIDE WATERTIGHT SEAL. PROVIDE ADEQUATE CLEARANCE FOR GATE OPERATION AND FOR PROPER SEATING OF GATE OVER PIPE.
4. SELECT BOX STANDARD AS REQUIRED TO ACCOMMODATE SLUICE GATE AND ORIFICE TRASH RACK WIDTH.
5. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATE.
6. FOOTER DIMENSION (B) IS ADJUSTED FOR ANTI-FLOTATION.
7. WATER TIGHT SEALS ARE REQUIRED AT ALL PIPE CONNECTIONS TO STRUCTURE.

LANE

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PROJECT REFERENCE NO.	SHEET NO.
U–2719	2D–3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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REVISIONS

PERMIT DRAWING
SHEET 2 OF 48

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
USER: JMASSROC DATE: 6/4/2019 TIME: 3:57:01 PM
FILE: Lane_Construction_Corp\Lane_I-440_Widening\6.0_CAD_BIM\6.2_WIP\U-2719\Roadway\Proj\U2719_HYD_PSH 2D Hydro Details.dgn

LANE

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	2D-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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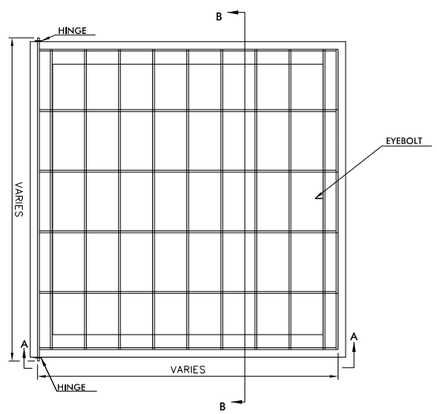
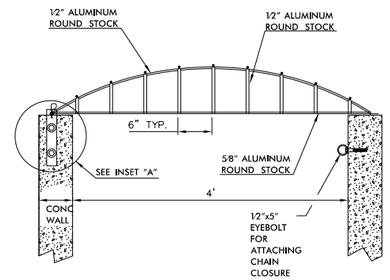
REBAR TRASH RACK

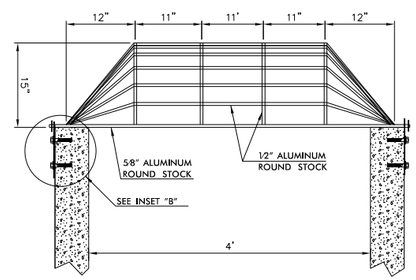
RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM 153.



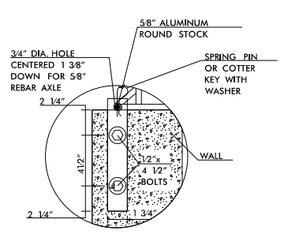
PLAN



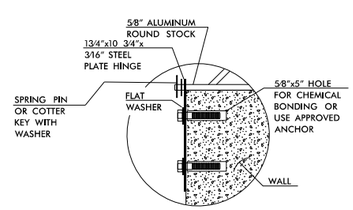
SECTION A–A



SECTION B–B



INSET 'A'

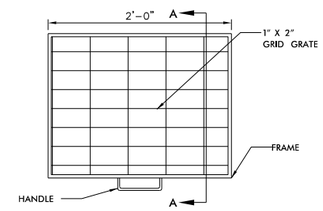


INSET 'B'

REMOVEABLE ORIFICE TRASH RACK

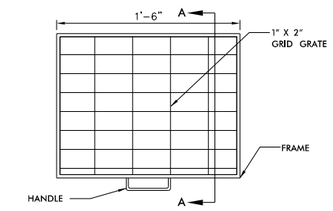
ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 3/16" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.

A



PLAN

B



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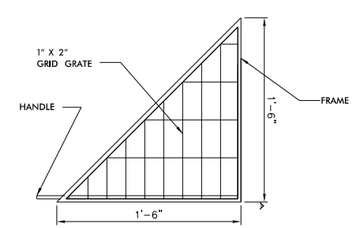
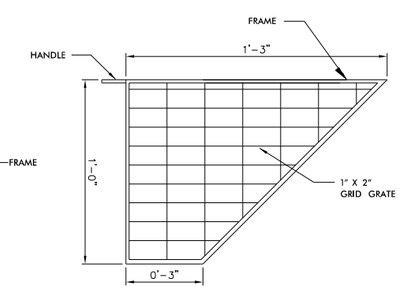


SECTION A–A



SECTION A–A

PERMIT DRAWING
SHEET 3 OF 48

REVISIONS

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LANE

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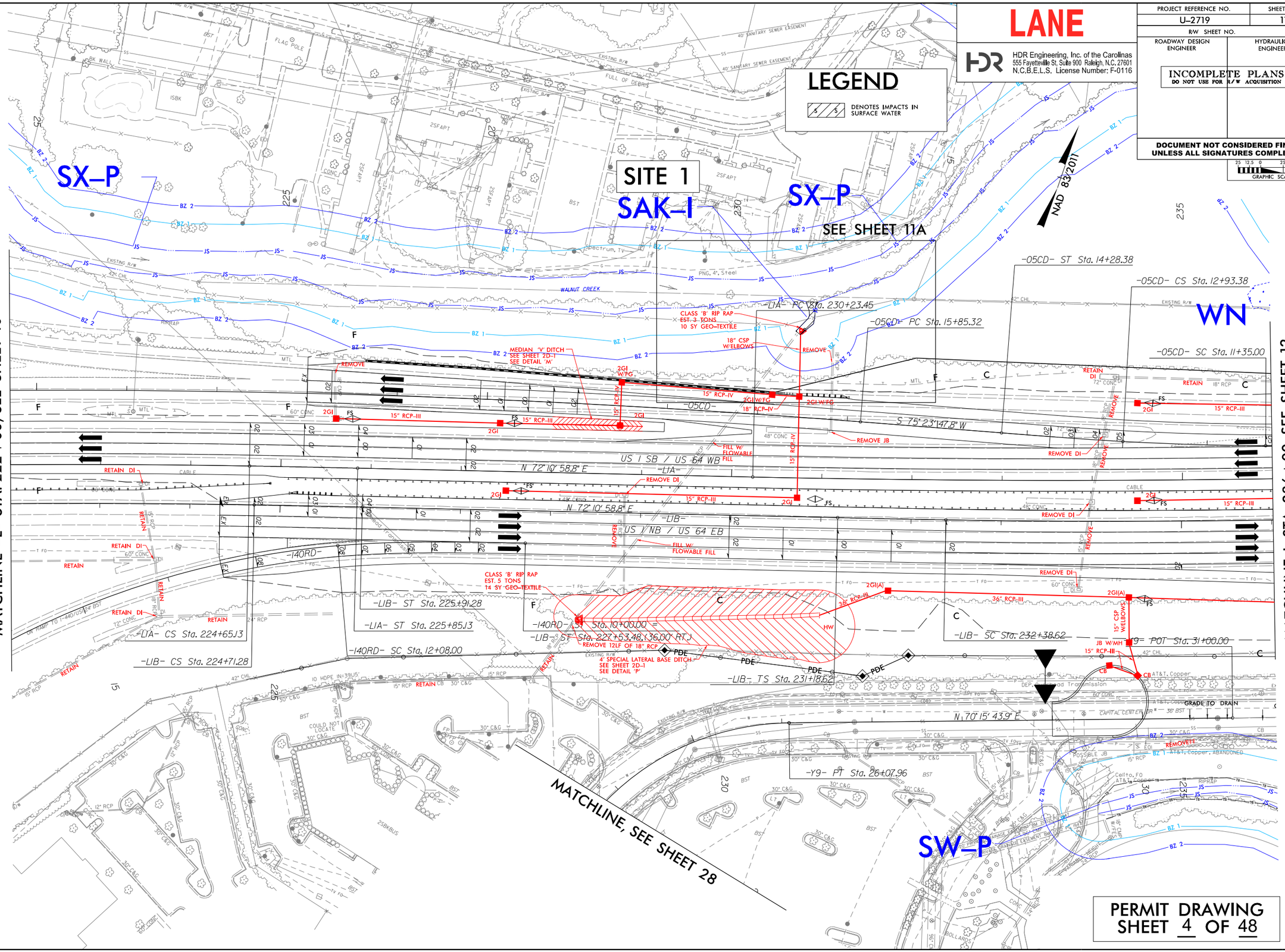
PROJECT REFERENCE NO.	SHEET NO.
U-2719	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 25 12.5 0 25 50



PERMIT DRAWING
SHEET 4 OF 48

REVISIONS

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LANE

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

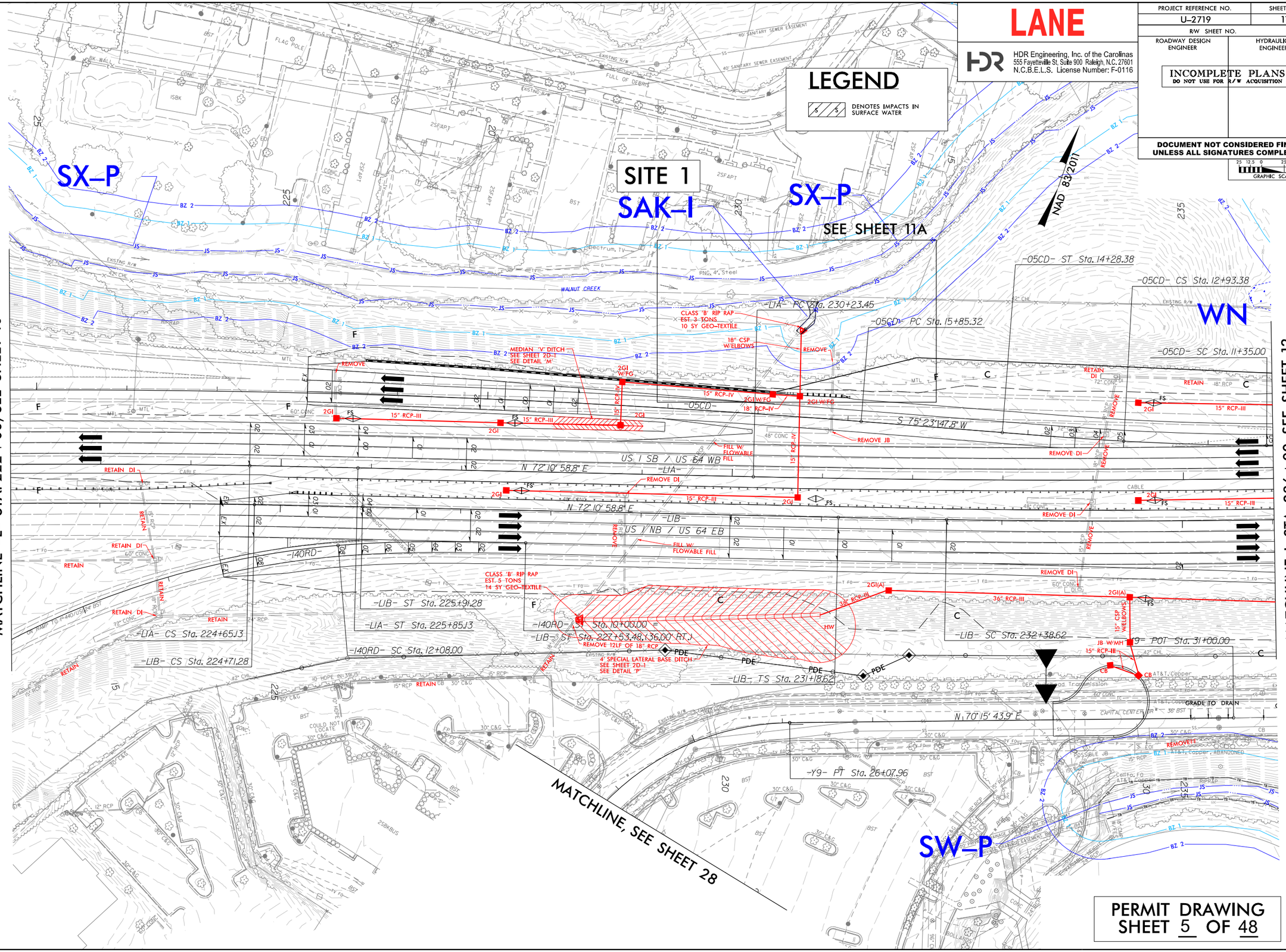
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 25 12.5 0 25 50

LEGEND

DENOTES IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 5 OF 48

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	11A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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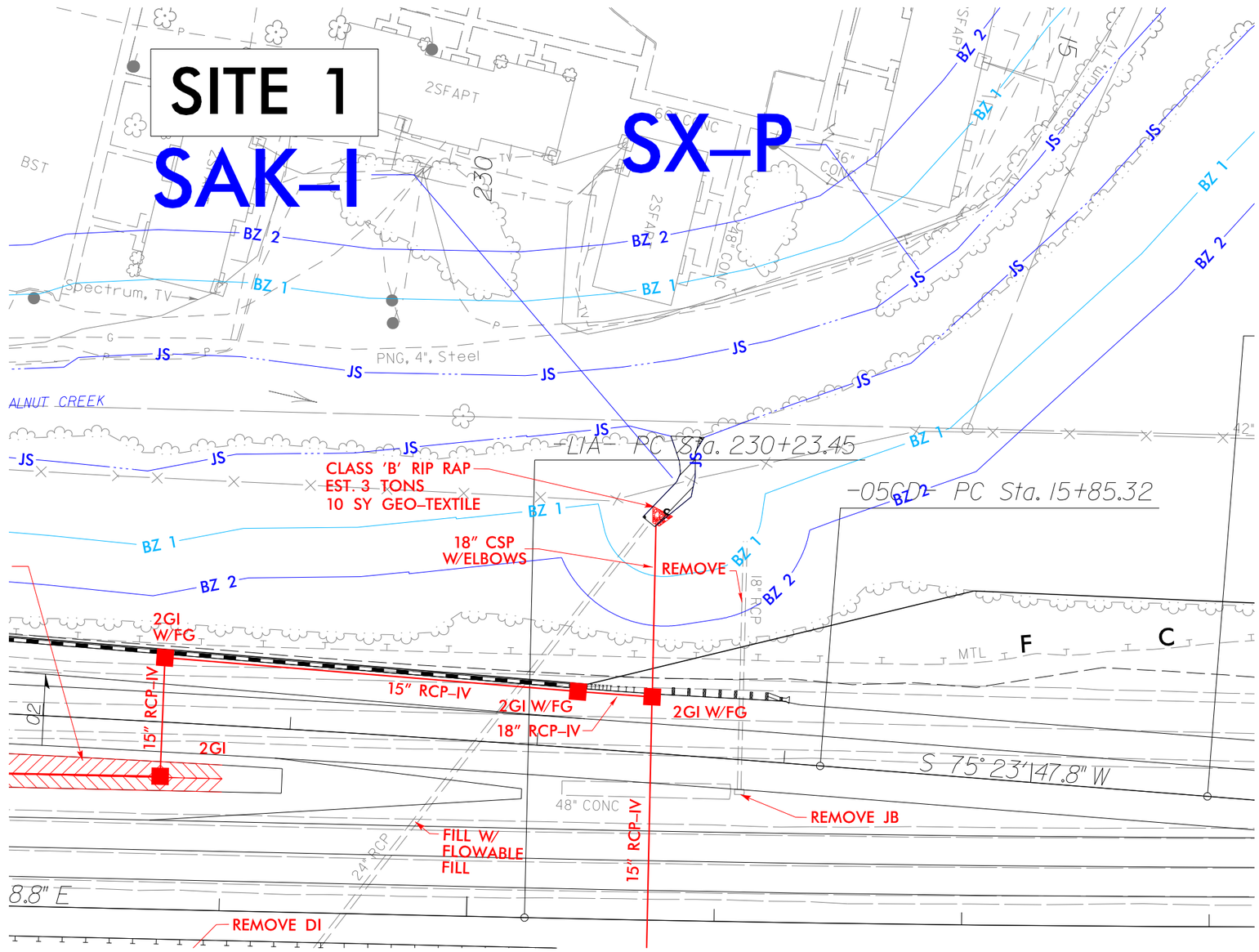
LANE

GRAPHIC SCALE 12.5 0 12.5 25

NAD 83/2011

LEGEND

S S — DENOTES IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 6 OF 48

REVISIONS

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DATE: 6/3/2019
TIME: 4:48:27 PM
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REVISIONS

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER (POND)

DETAIL AY1 — CULVERT OUTLET STABILIZATION

DETAIL AY2 — CULVERT OUTLET STABILIZATION

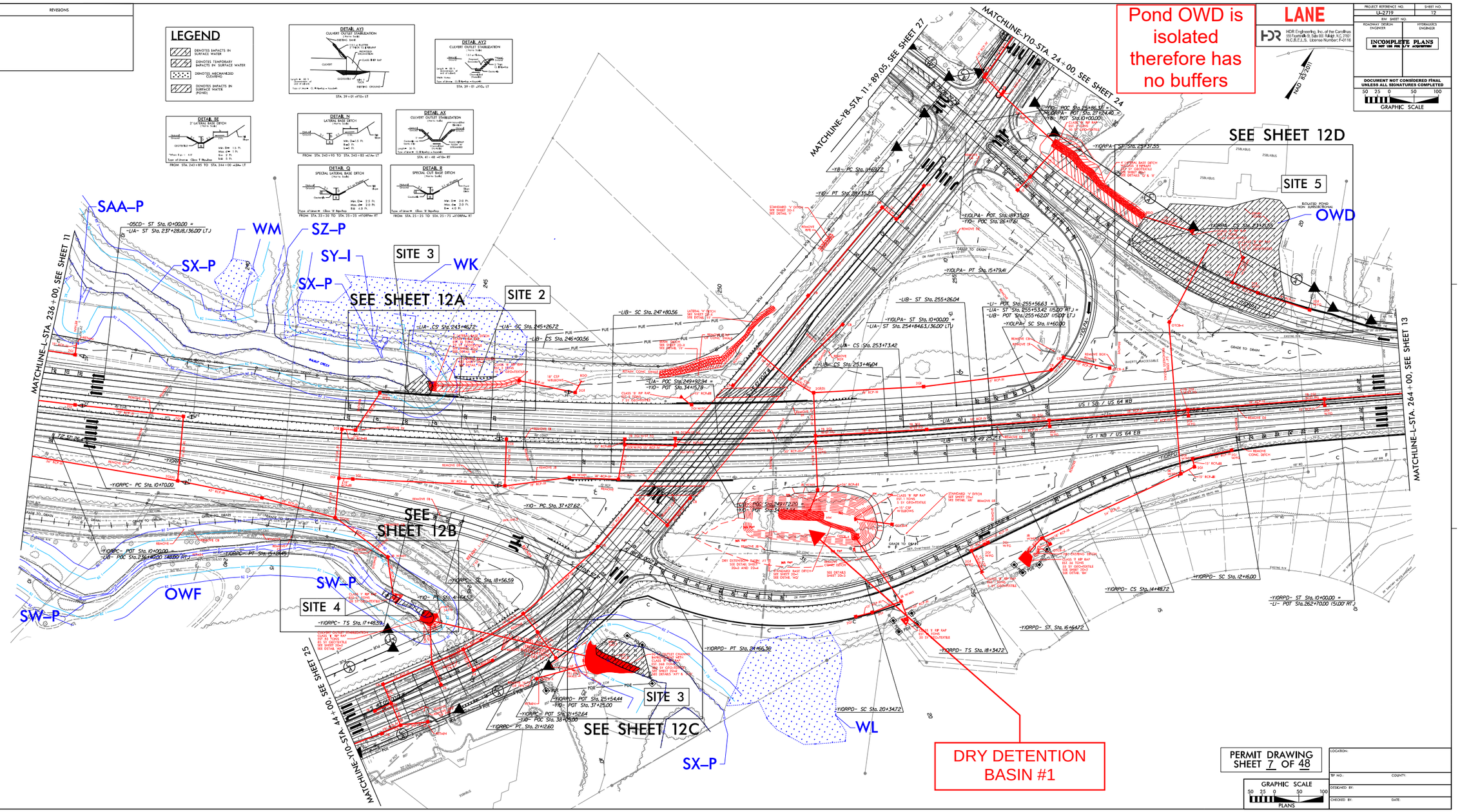
DETAIL BE — 2' LATERAL BASE DITCH

DETAIL N — LATERAL BASE DITCH

DETAIL AX — CULVERT OUTLET STABILIZATION

DETAIL Q — SPECIAL LATERAL BASE DITCH

DETAIL R — SPECIAL CUT BASE DITCH



Pond OWD is isolated therefore has no buffers

DRY DETENTION BASIN #1

LANE

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INCOMPLETE PLANS

PROJECT REFERENCE NO.	SHEET NO.
U-2719	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 50 25 0 50 100

PERMIT DRAWING
SHEET 7 OF 48

GRAPHIC SCALE 50 25 0 50 100
PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

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REVISIONS

LEGEND

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER (POND)

DETAIL AY1 — CULVERT OUTLET STABILIZATION

DETAIL AY2 — CULVERT OUTLET STABILIZATION

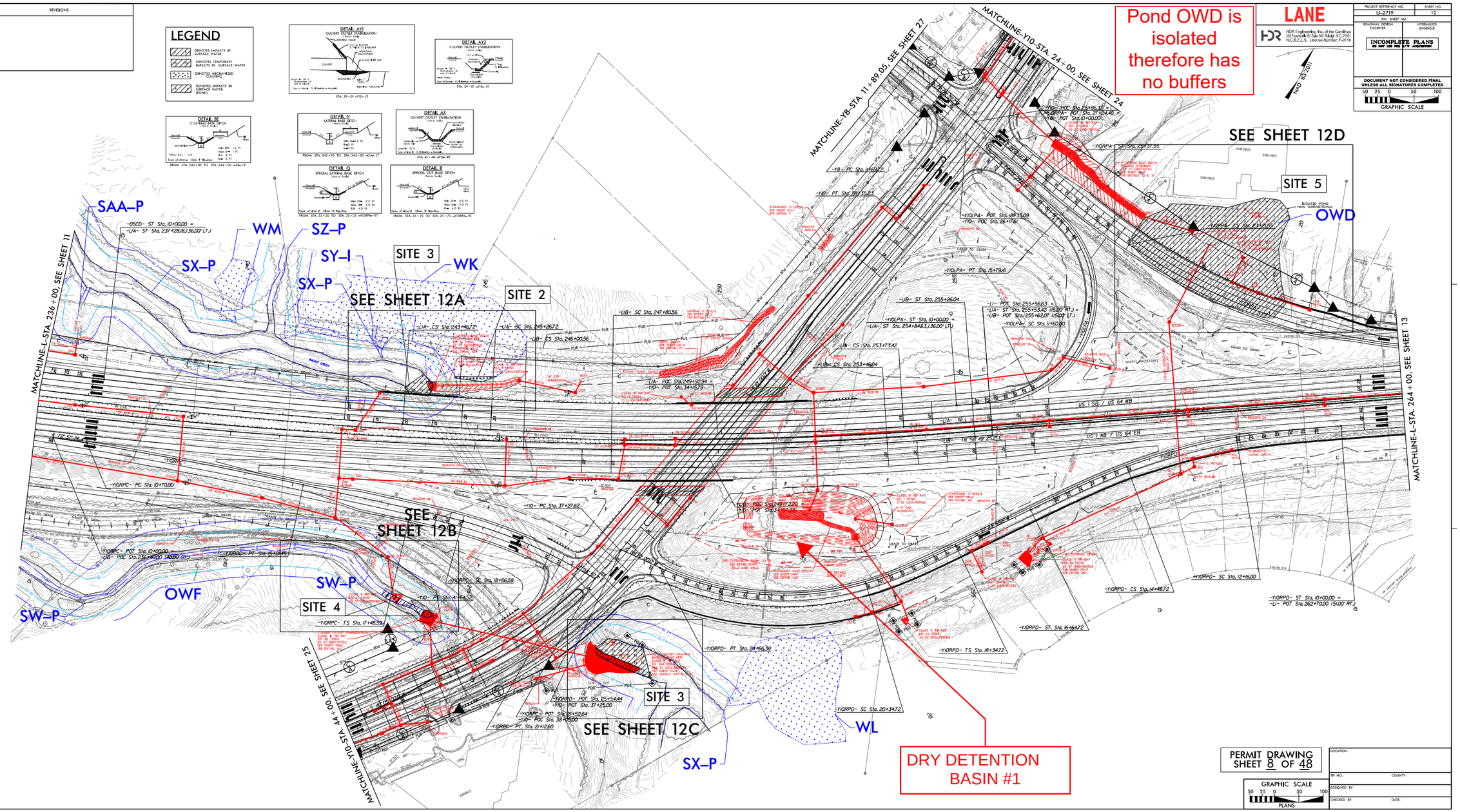
DETAIL BE — 2' LATERAL BASE DITCH

DETAIL N — LATERAL BASE DITCH

DETAIL AX — CULVERT OUTLET STABILIZATION

DETAIL Q — SPECIAL LATERAL BASE DITCH

DETAIL R — SPECIAL CUT BASE DITCH



Pond OWD is isolated therefore has no buffers

DRY DETENTION BASIN #1

LANE

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 50 25 0 50 100

PERMIT DRAWING SHEET 8 OF 48

GRAPHIC SCALE 50 25 0 50 100 PLANS

LOCATION:

TIP NO.: COUNTY:

DESIGNED BY:

CHECKED BY: DATE:

PLOT DATE: 6/17/2019
CADD: MKMACK
FILE: I:\DPM\construction\projects\U-2719\HydraulicsPERMITS\Environmental\Drawings\U2719_H4A17_PRM_SP04.dgn

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	12A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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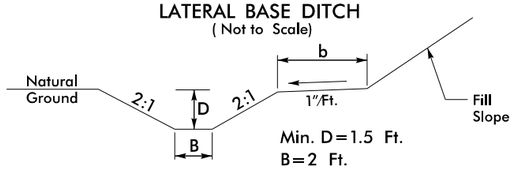
LANE

GRAPHIC SCALE 12.5 0 12.5 25

NAD 83/2011

DETAIL N
LATERAL BASE DITCH
(Not to Scale)

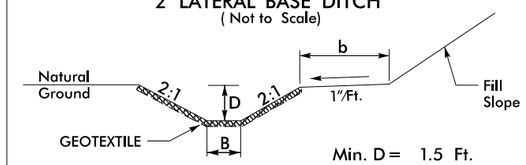


FROM STA. 243+95 TO STA. 245+85 –L1A– LT

LEGEND

S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
* * * * * *	DENOTES MECHANIZED CLEARING

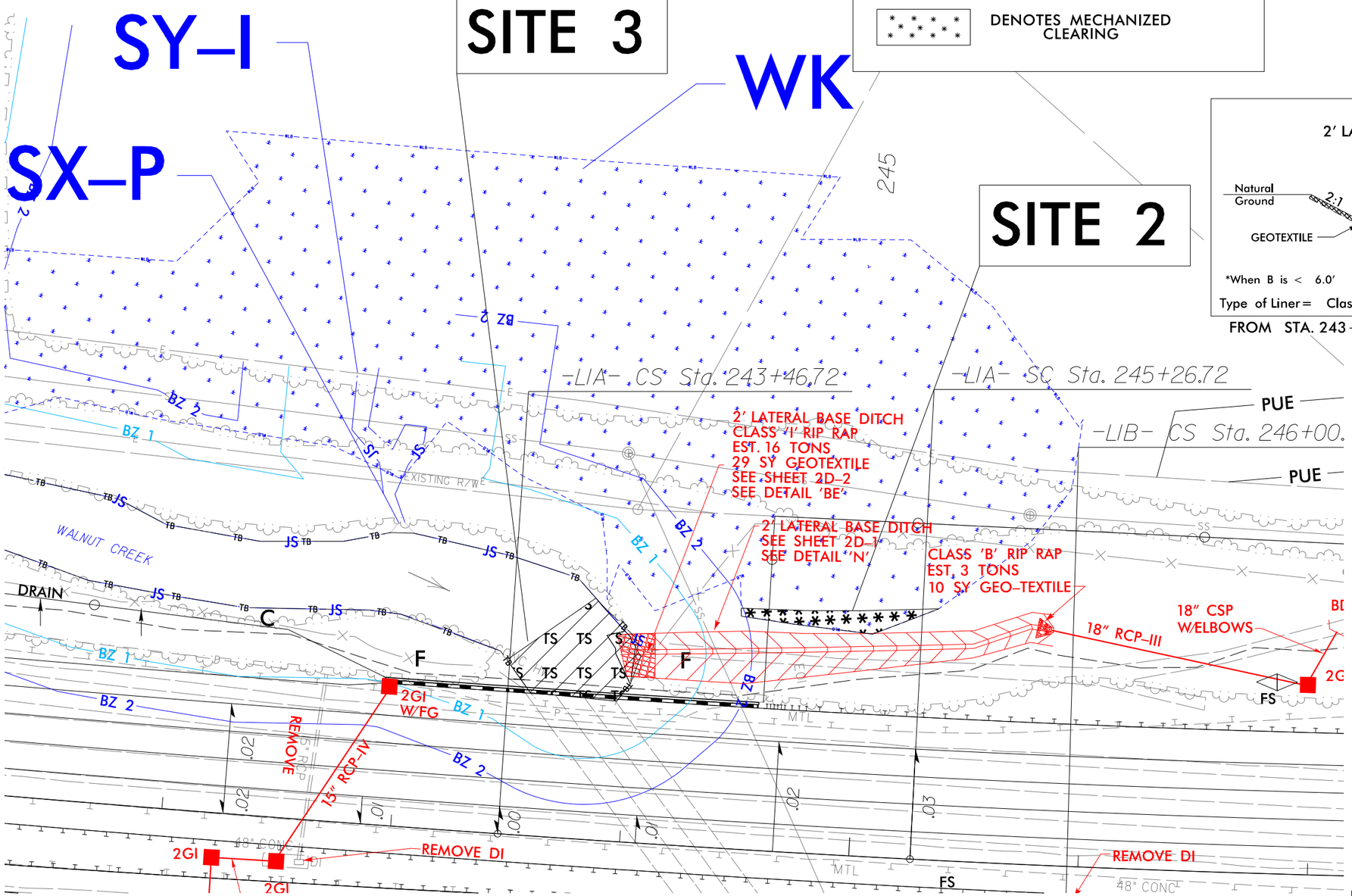
DETAIL BE
2' LATERAL BASE DITCH
(Not to Scale)



*When B is < 6.0'

Type of Liner= Class 'I' Rip-Rap

FROM STA. 243+85 TO STA. 244+00 –LIA– LT



PERMIT DRAWING
SHEET 9 OF 48

REVISIONS

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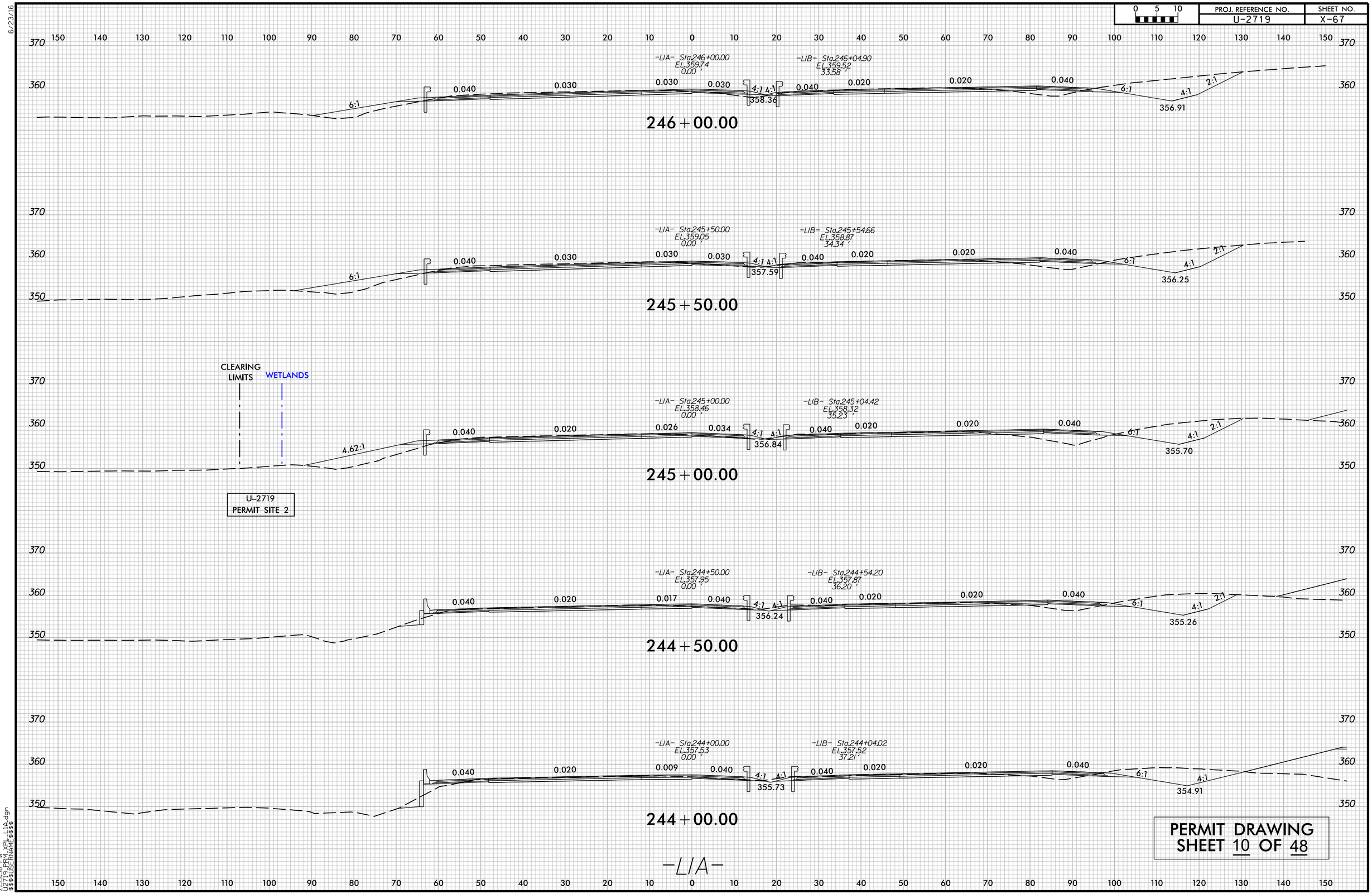
PROJ. REFERENCE NO.	SHEET NO.
U-2719	X-67



PERMIT DRAWING
SHEET 10 OF 48

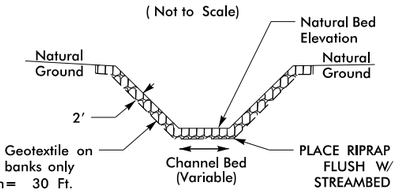
6/23/16

2:35:39 PM
U2719_PM_XPL_L1A.dgn
$$$$USERNAME$$$$

DETAIL AX

CULVERT OUTLET STABILIZATION

(Not to Scale)



Length= 30 Ft.

Type of Liner= CL II Rip-Rap – Keyed-In

STA. 41+48 –Y10– RT

LEGEND

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

12.5 0 12.5 25
GRAPHIC SCALE

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
U-2719	12B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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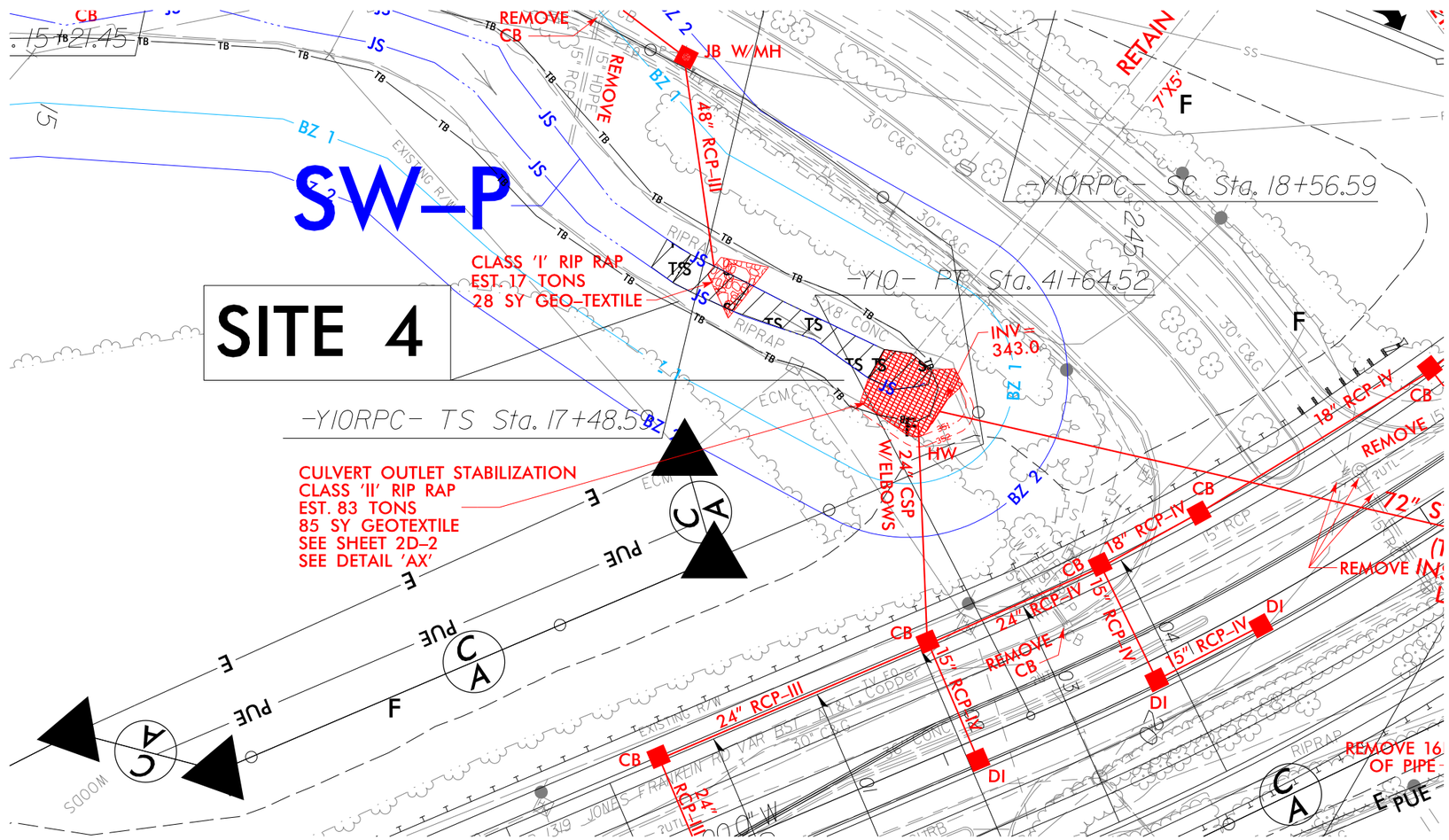
N.C.B.E.L.S. License Number: F-0116

LANE



PERMIT DRAWING
SHEET 11 OF 48

REVISIONS

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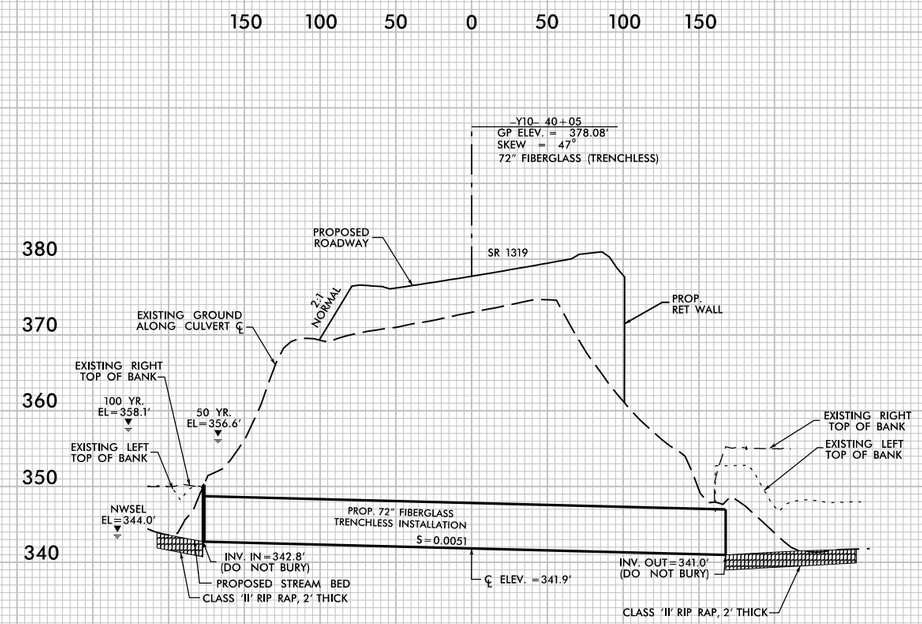
PROJECT REFERENCE NO.	SHEET NO.
U-2719	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 3 AND 4



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 12 OF 48

REVISIONS

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	12C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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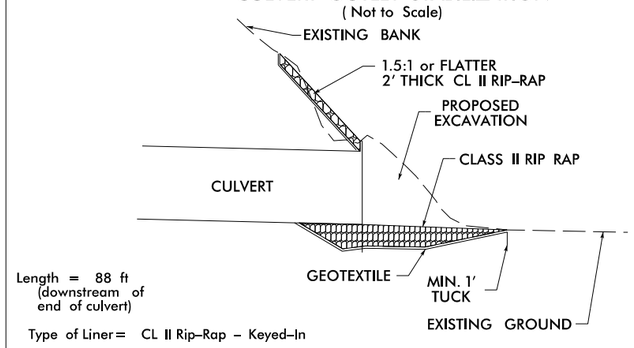
LANE

12.5 0 12.5 25
GRAPHIC SCALE

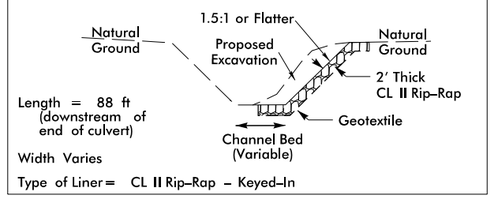
NAD 83/2011

DETAIL AY1
CULVERT OUTLET STABILIZATION
(Not to Scale)



STA. 39+01 -Y10- LT

DETAIL AY2
CULVERT OUTLET STABILIZATION
(Not to Scale)

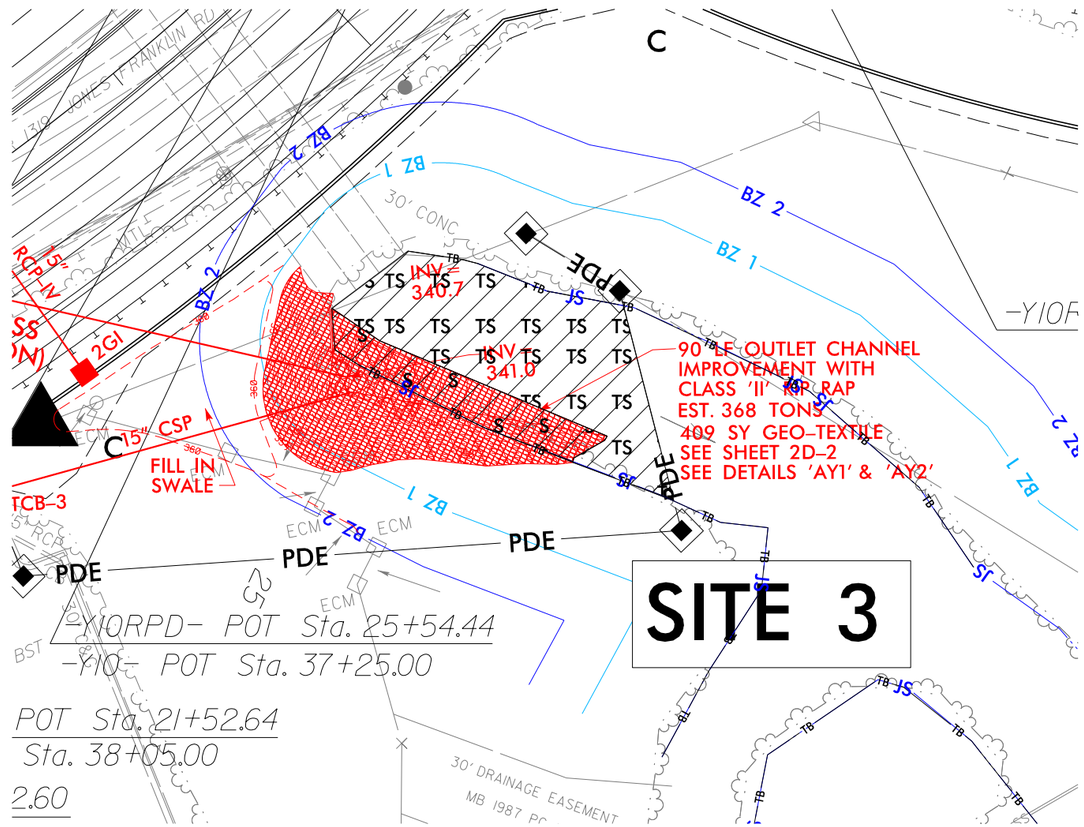


STA. 39+01 -Y10- LT

LEGEND

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 13 OF 48

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	12D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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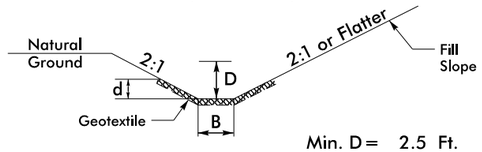
N.C.B.E.L.S. License Number: F-0116

LANE

12.5 0 12.5 25
GRAPHIC SCALE

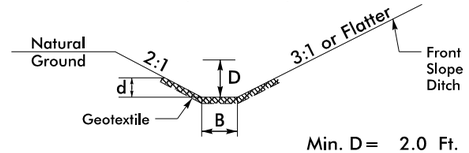
NAD 83/2011

DETAIL Q
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D = 2.5 Ft.
Max. d = 2.0 Ft.
B = 4.0 Ft.
Type of Liner = Class 'B' Rip-Rap
FROM STA. 23+30 TO STA. 25+25 -Y10RPA- RT

DETAIL R
SPECIAL CUT BASE DITCH
(Not to Scale)



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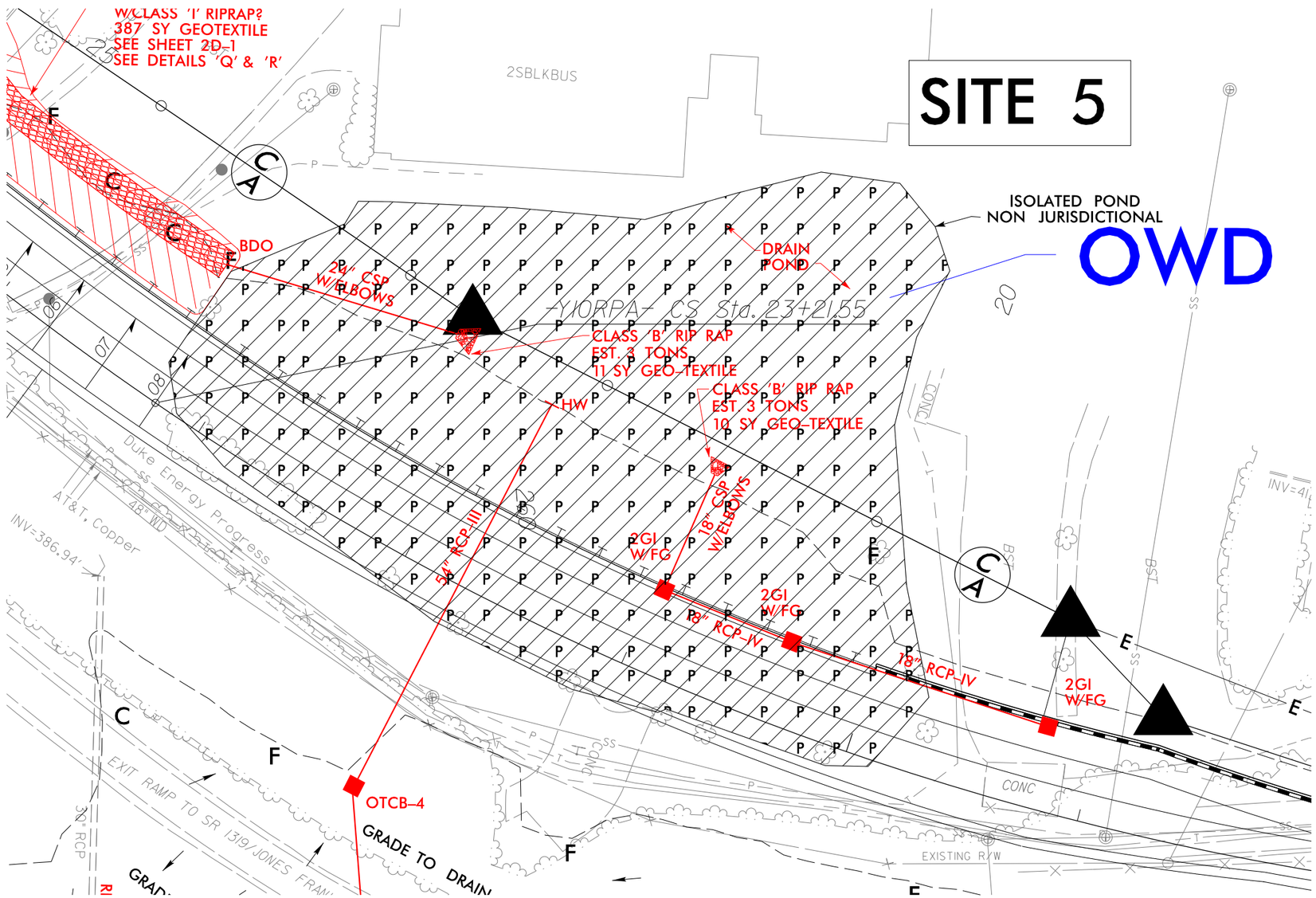
Max. d = 2.0 Ft.
B = 4.0 Ft.
Type of Liner = Class 'B' Rip-Rap
FROM STA. 25+25 TO STA. 25+75 -Y10RPA- RT

LEGEND

P P — DENOTES IMPACTS IN SURFACE WATER (POND)



PERMIT DRAWING
SHEET 14 OF 48

REVISIONS

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LEGEND

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

Pond reconstruction being performed under City of Raleigh contract. No surface water impacts to Pond OWC anticipated from U-2719 project.

LANE

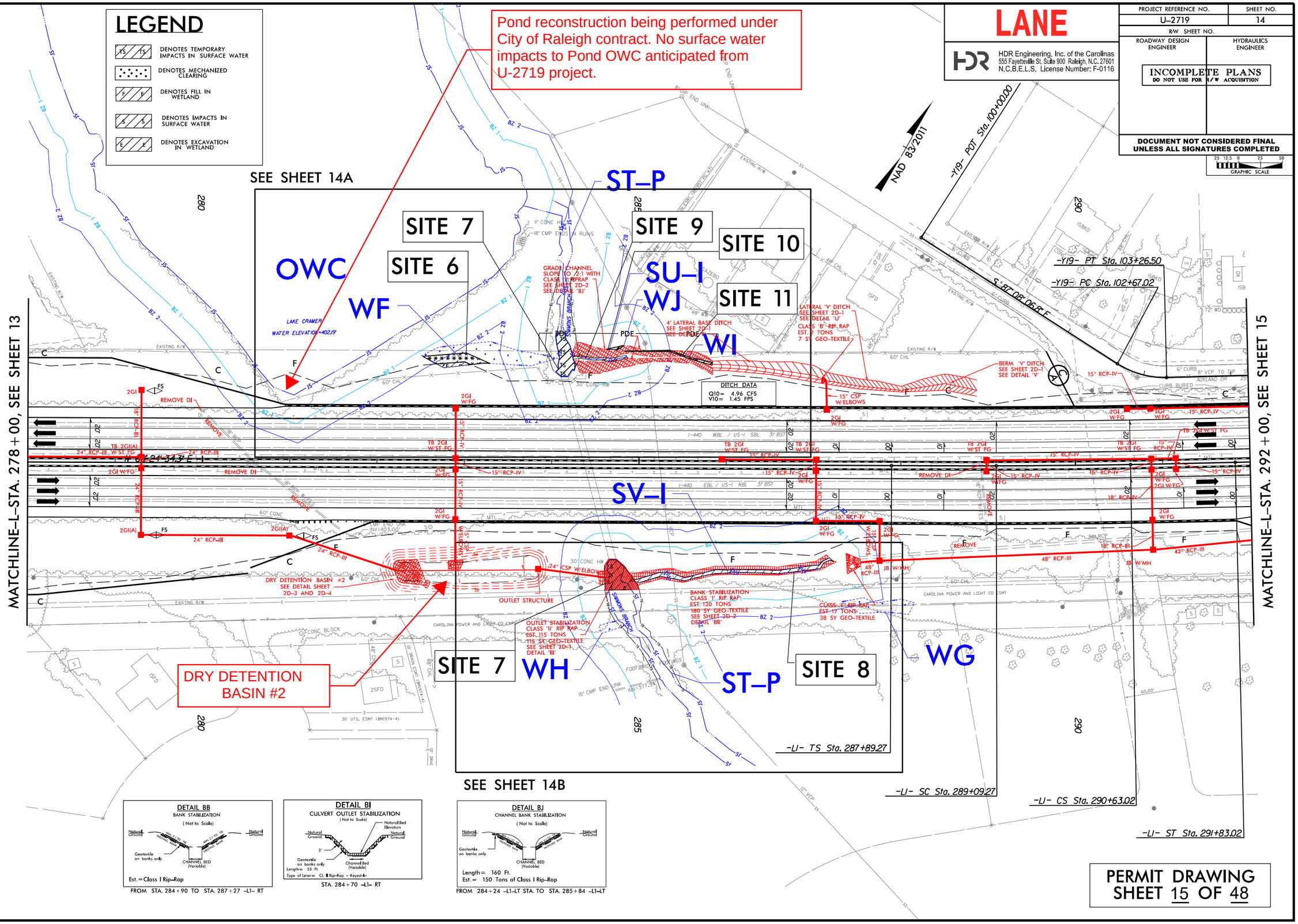
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 25 12.5 0 25 50



PERMIT DRAWING
SHEET 15 OF 48

REVISIONS

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LEGEND

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

Pond reconstruction being performed under City of Raleigh contract. No surface water impacts to Pond OWC anticipated from U-2719 project.

LANE

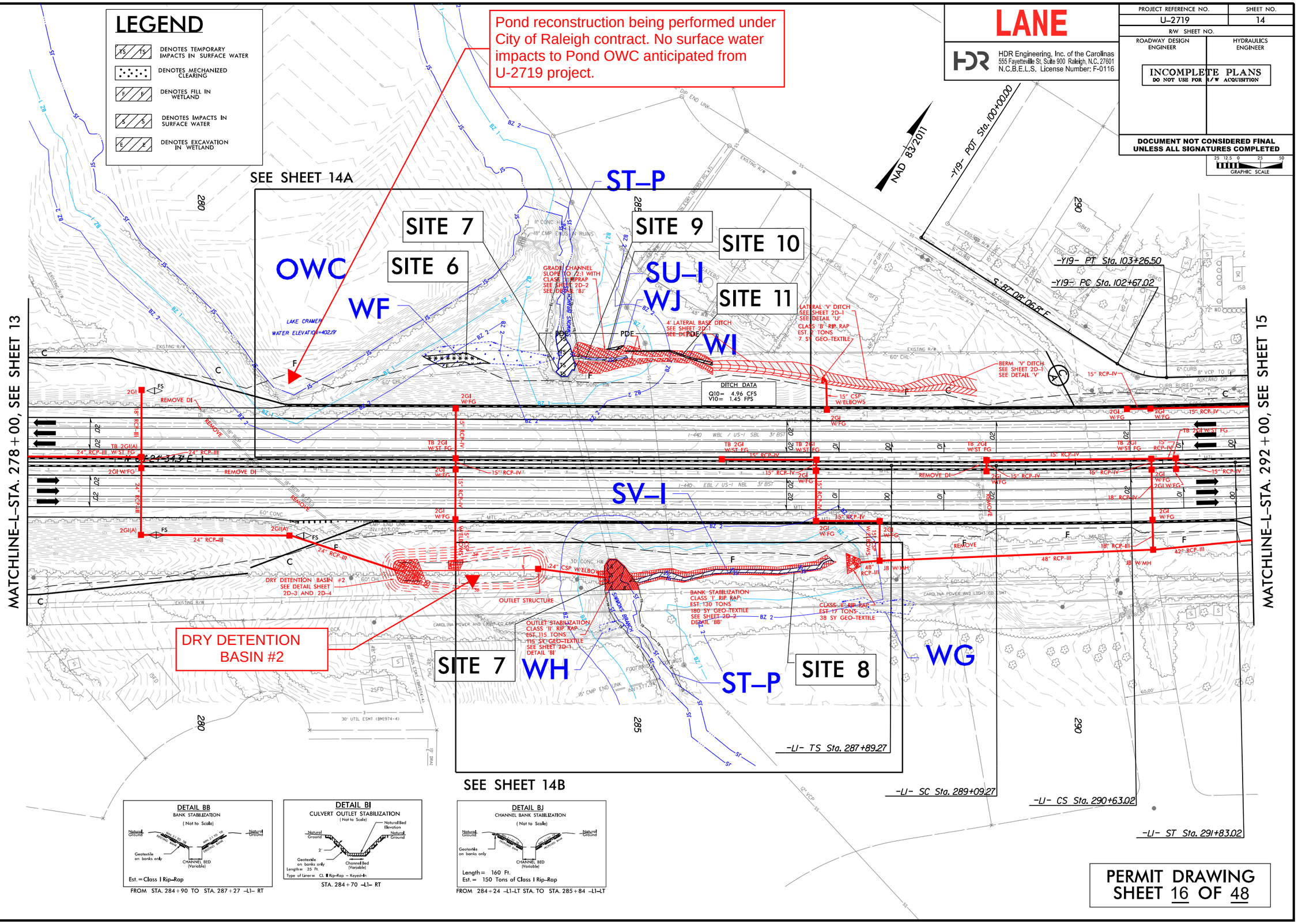
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 25 12.5 0 25 50



DETAIL BB
BANK STABILIZATION
(Not to Scale)
Natural Ground — 2H TO 1V — Existing Bank — Natural Ground
Geotextile on banks only — CHANNEL BED (Variable)
Est. = Class I Rip-Rap
FROM STA. 284+90 TO STA. 287+27 -L1- RT

DETAIL BI
CULVERT OUTLET STABILIZATION
(Not to Scale)
Natural Bed Elevation — Natural Ground — 2' — Geotextile on banks only — Channel Bed (Variable)
Length= 35 Ft.
Type of Liner= CL II Rip-Rap - Keyed-In
STA. 284+70 -L1- RT

DETAIL BJ
CHANNEL BANK STABILIZATION
(Not to Scale)
Natural Ground — 2H TO 1V — Existing Bank — Natural Ground
Geotextile on banks only — CHANNEL BED (Variable)
Length= 160 Ft.
Est. = 150 Tons of Class I Rip-Rap
FROM 284+24 -L1-LT STA. TO STA. 285+84 -L1-LT

PERMIT DRAWING
SHEET 16 OF 48

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	14A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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N.C.B.E.L.S. License Number: F-0116

LANE

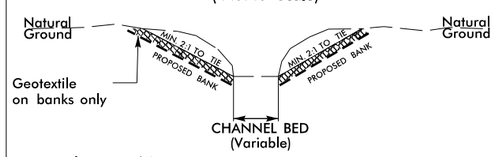
LEGEND

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

DETAIL BJ

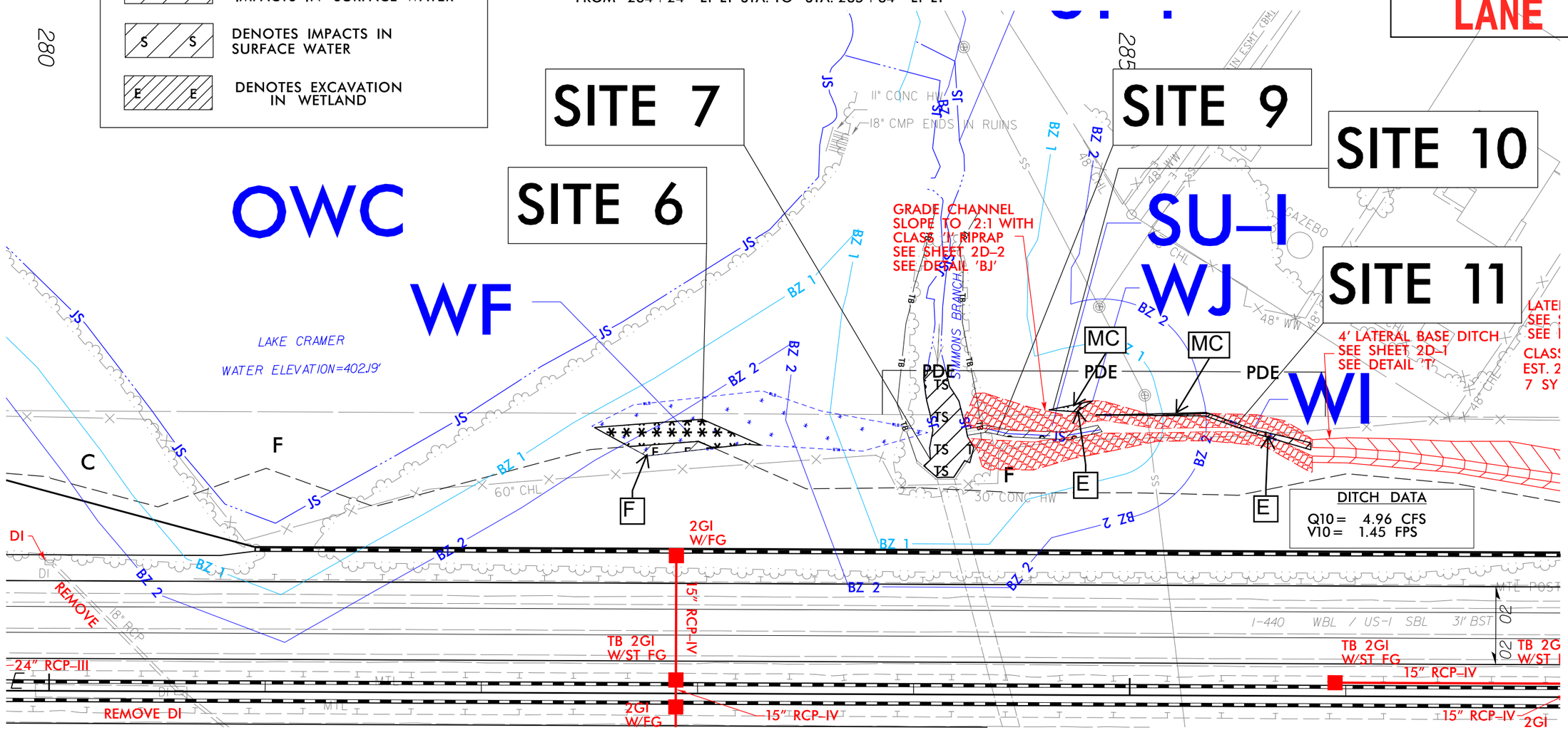
CHANNEL BANK STABILIZATION

(Not to Scale)



Length = 160 Ft.
Est. = 150 Tons of Class I Rip-Rap

FROM 284+24 -L1-LT STA. TO STA. 285+84 -L1-LT



DITCH DATA
Q10 = 4.96 CFS
V10 = 1.45 FPS

PERMIT DRAWING
SHEET 17 OF 48

REVISIONS

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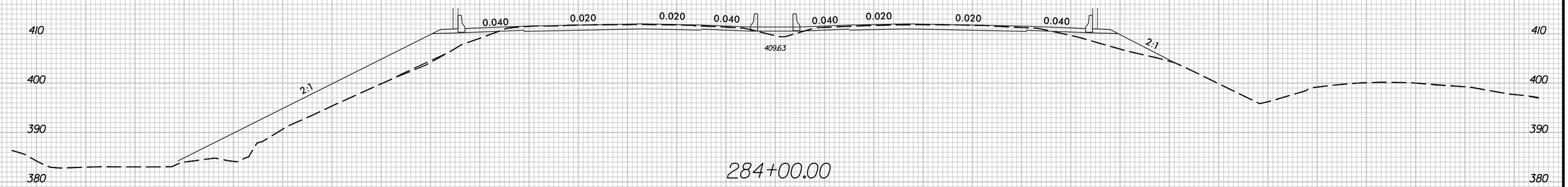
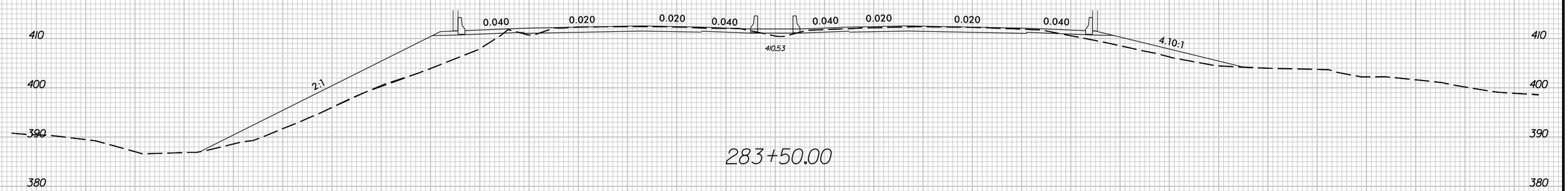
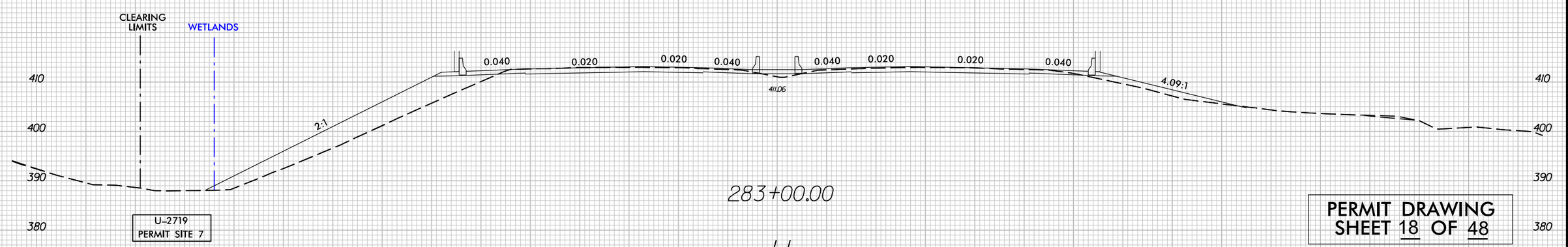
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2719	X-102







PERMIT DRAWING
SHEET 18 OF 48

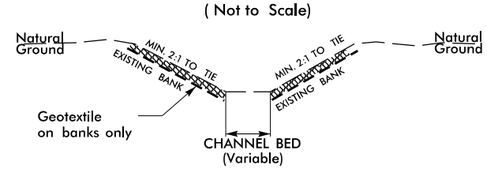
-L1-

10:21:32 AM
U2719_PRM_XPL_L1.dgn
$$$$USERNAME$$$$

LEGEND

S S — DENOTES IMPACTS IN SURFACE WATER

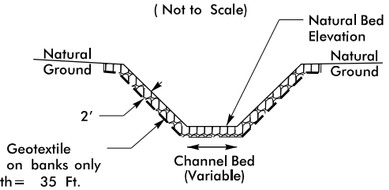
DETAIL BB
BANK STABILIZATION
(Not to Scale)



Est. = Class I Rip–Rap

FROM STA. 284+90 TO STA. 287+27 –L1– RT

DETAIL BI
CULVERT OUTLET STABILIZATION
(Not to Scale)



Length = 35 Ft.

Type of Liner = CL II Rip–Rap – Keyed–In

STA. 284+70 –L1– RT

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
U–2719	14B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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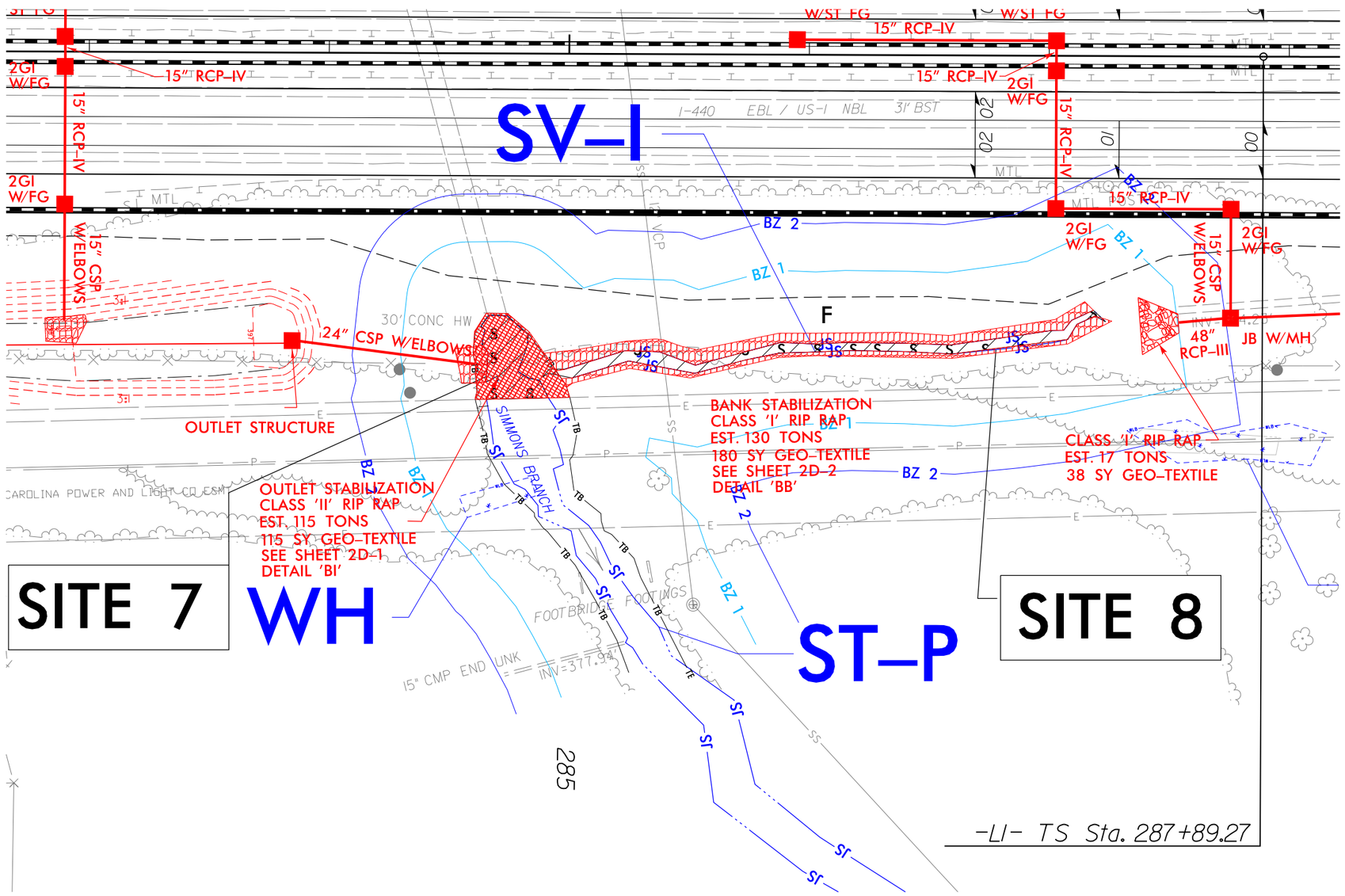
N.C.B.E.L.S. License Number: F-0116

LANE



PERMIT DRAWING
SHEET 19 OF 48

REVISIONS

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REVISIONS

LEGEND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCHLINE-Y25-STA. 25+00, SEE SHEET 30

SEE SHEET 17A

SITE 12

SS-P

SEE SHEET 17C

SITE 13

SR-P

SITE 14

SO-P

SEE SHEET 17B

SEE SHEET 17D

MATCHLINE-L2LT-STA. 326+00, SEE SHEET 16

MATCHLINE-L2LT-STA. 354+00, SEE SHEET 18

MATCHLINE-Y25-STA. 40+00, SEE SHEET 31

A

B

C

D

DETAIL C
6' LATERAL BERM DITCH
(Not to Scale)

DETAIL E
10' STANDARD BERM DITCH
(Not to Scale)

DETAIL H
8' STANDARD BERM DITCH
(Not to Scale)

DETAIL AE
7' ALIGNMENT BERM DITCH
(Not to Scale)

DETAIL AT
CULVERT OUTLET STABILIZATION
(Not to Scale)

DETAIL AU
CHANNEL REFORMING
(Not to Scale)

LANE

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555 Fayetteville St. Suite 800 Raleigh, N.C. 27601
N.C.B.E.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

50 25 0 50 100
GRAPHIC SCALE

NAD 83/2011

PERMIT DRAWING
SHEET 20 OF 48

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:

TIP NO.: COUNTY:

DESIGNED BY:

CHECKED BY: DATE:

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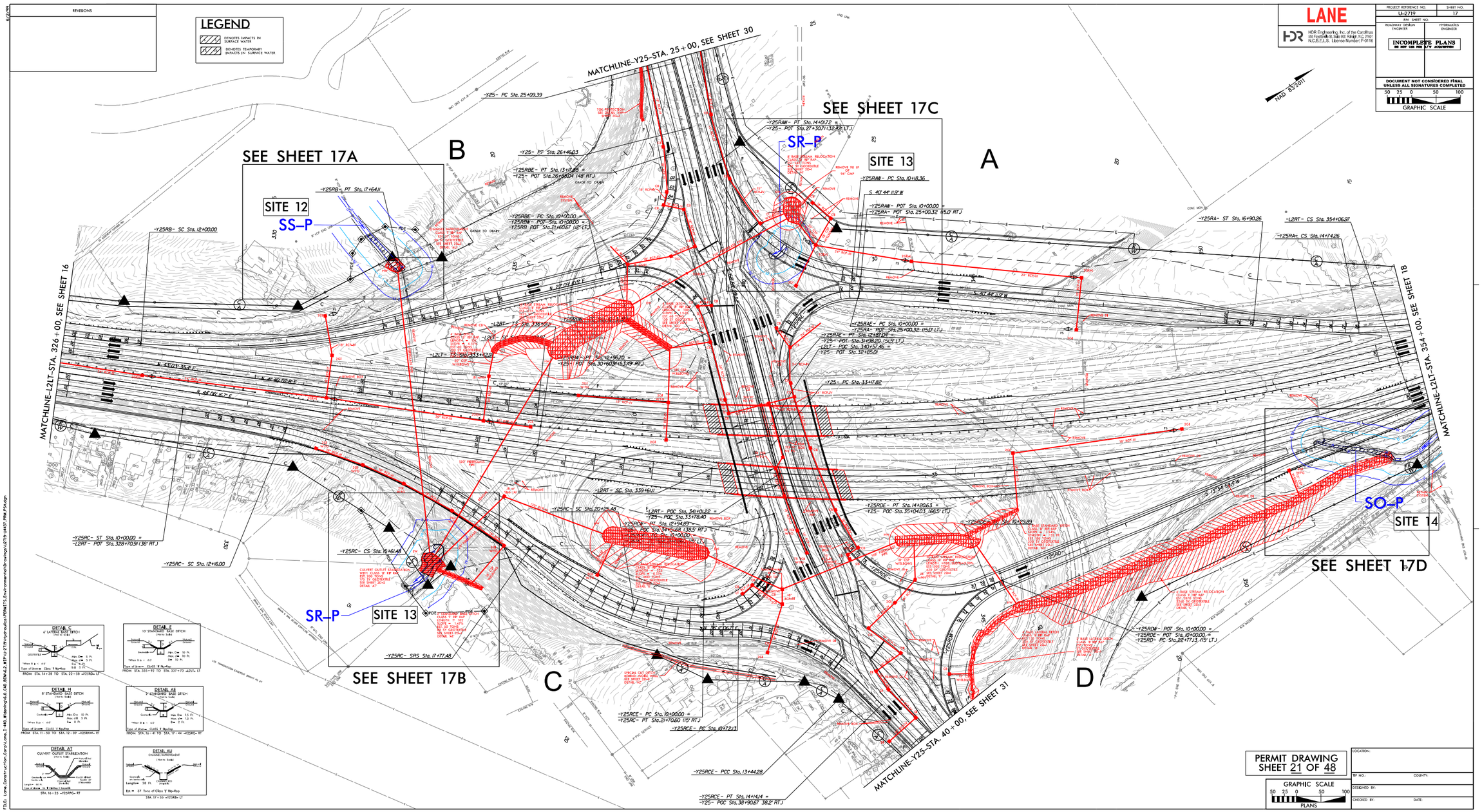
TIME: 4:49:23 PM
DATE: 6/21/2019

REVISIONS

LEGEND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



LANE

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 800 Raleigh, N.C. 27601
N.C.B.E.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

50 25 0 50 100
GRAPHIC SCALE

PERMIT DRAWING
SHEET 21 OF 48

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:

TIP NO.: COUNTY:

DESIGNED BY:

CHECKED BY: DATE:

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DATE: 6/12/2019

LEGEND

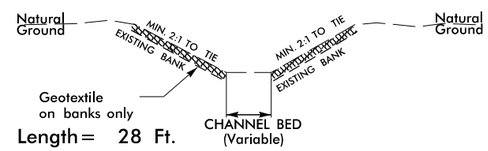
S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL AU

CHANNEL IMPROVEMENT

(Not to Scale)



Length = 28 Ft.

Est. = 37 Tons of Class 'I' Rip–Rap

STA. 17 + 55 –Y25RB– LT

NAD 83/2011

12.5 0 12.5 25 GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
U–2719	17A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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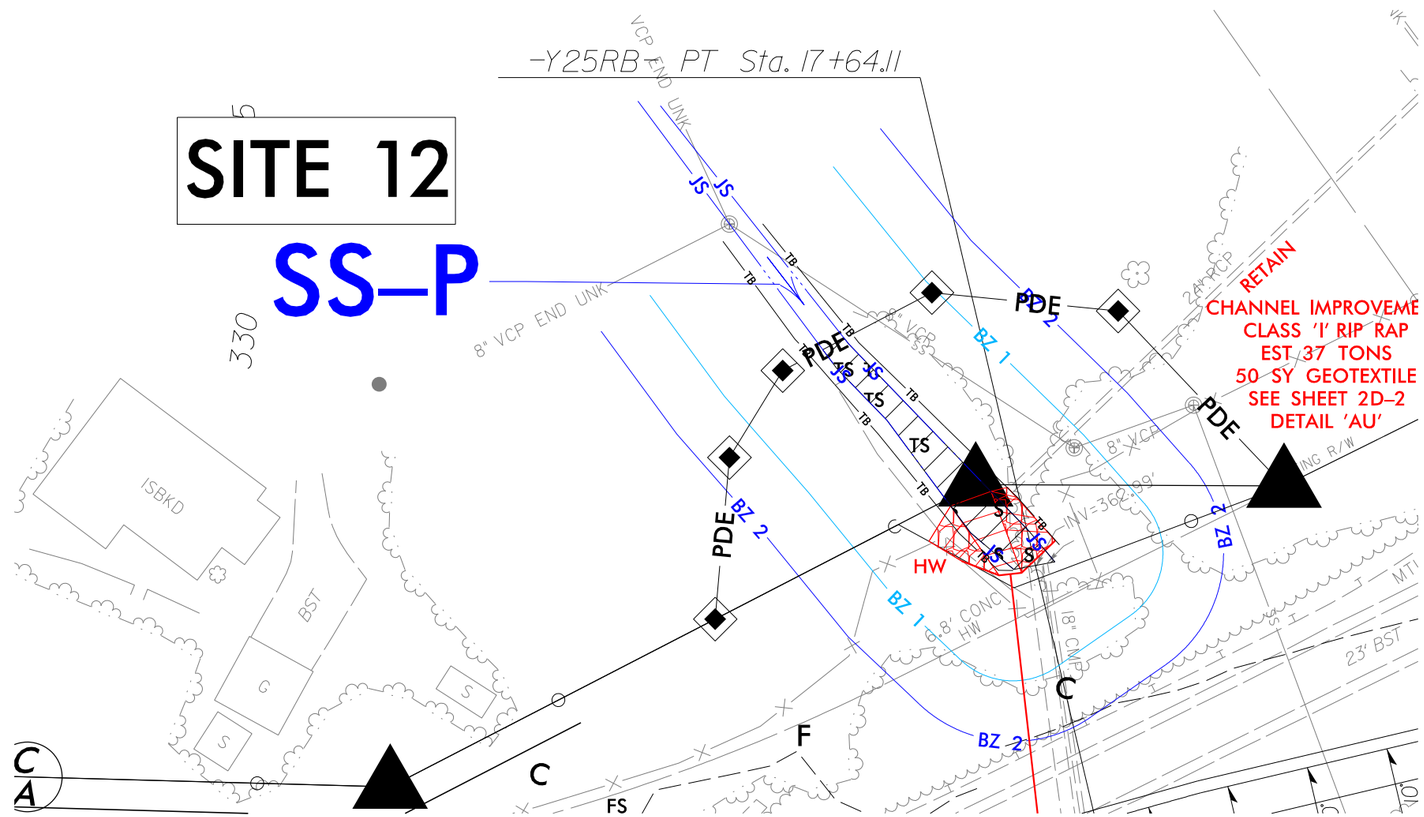
N.C.B.E.L.S. License Number: F-0116

LANE



PERMIT DRAWING
SHEET 22 OF 48

REVISIONS

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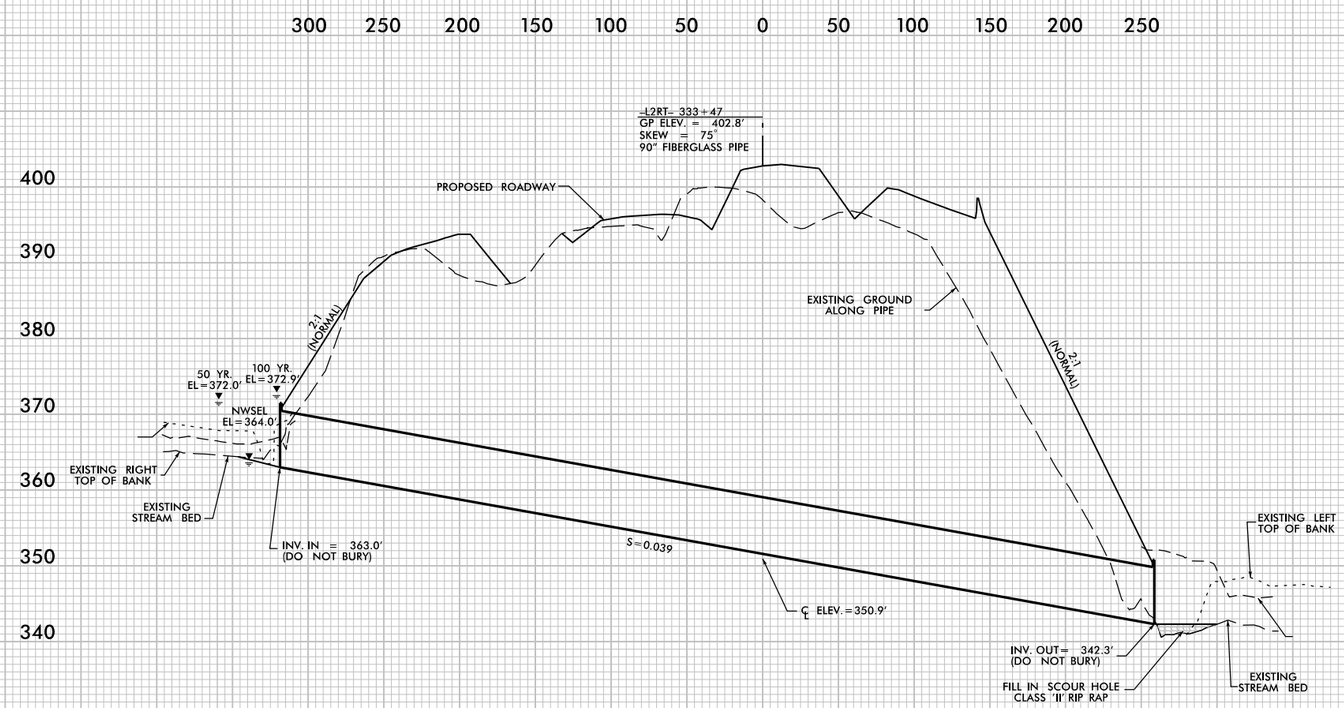
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 12 AND 13



PROFILE ALONG ℄ OF PIPE

PERMIT DRAWING
SHEET 23 OF 48

REVISIONS

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	17B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
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N.C.B.E.L.S. License Number: F-0116

LANE

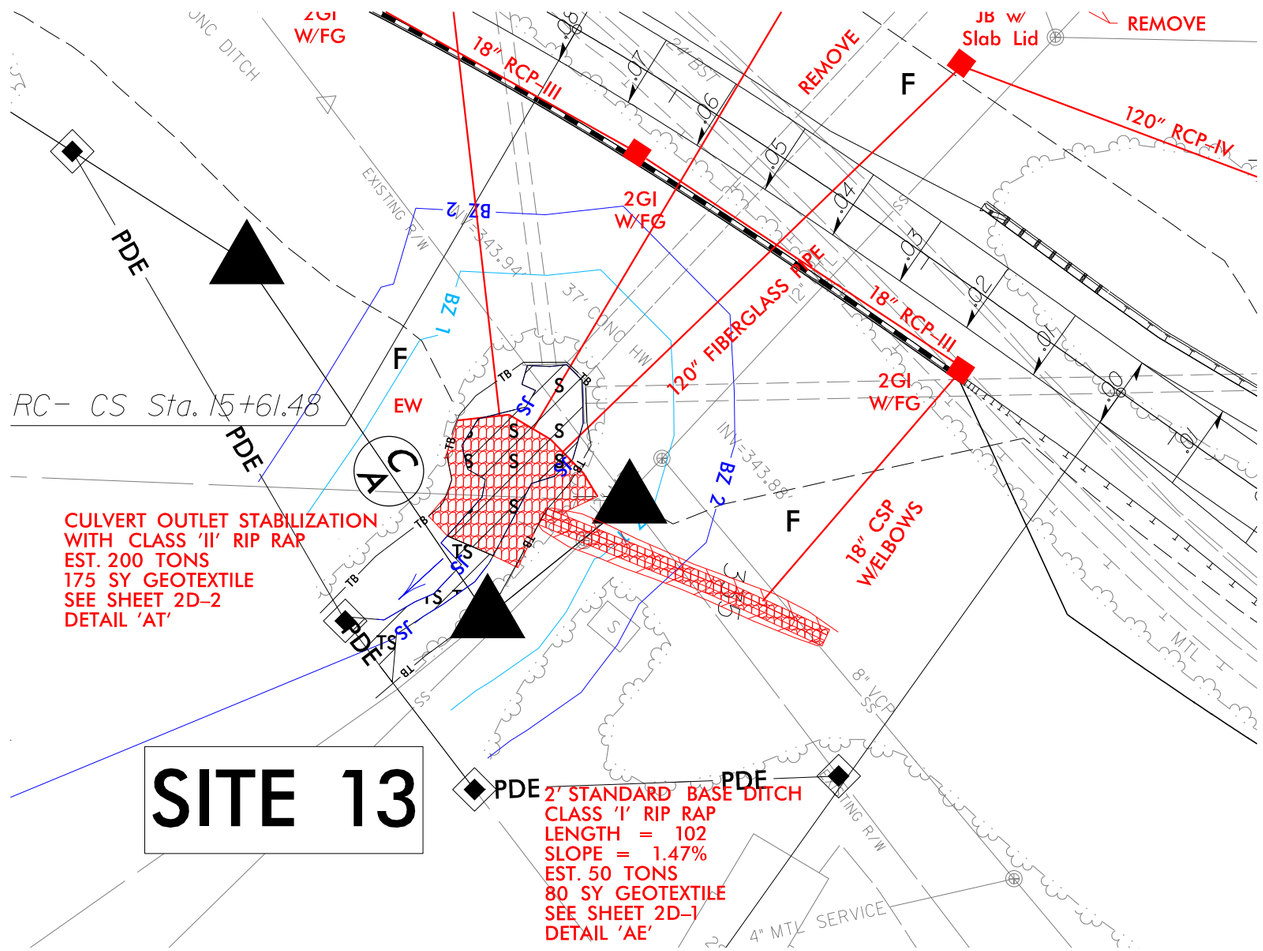
12.5 0 12.5 25
GRAPHIC SCALE

NAD 83/2011

LEGEND

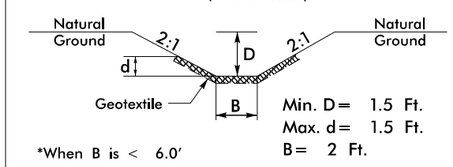
S / S — DENOTES IMPACTS IN SURFACE WATER

TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



DETAIL AE

2' STANDARD BASE DITCH
(Not to Scale)

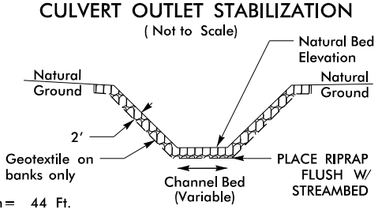


Type of Liner= CLASS 'I' Rip-Rap

FROM STA. 16+41 TO STA. 17+44 -Y25RC- RT

DETAIL AT

CULVERT OUTLET STABILIZATION
(Not to Scale)



Length= 44 Ft.

Type of Liner= CL II Rip-Rap - Keyed-In

STA. 16+25 -Y25RPC- RT

PERMIT DRAWING
SHEET 24 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_200.plt PENTABLE: NCDOT_permits_NOCON.tbl
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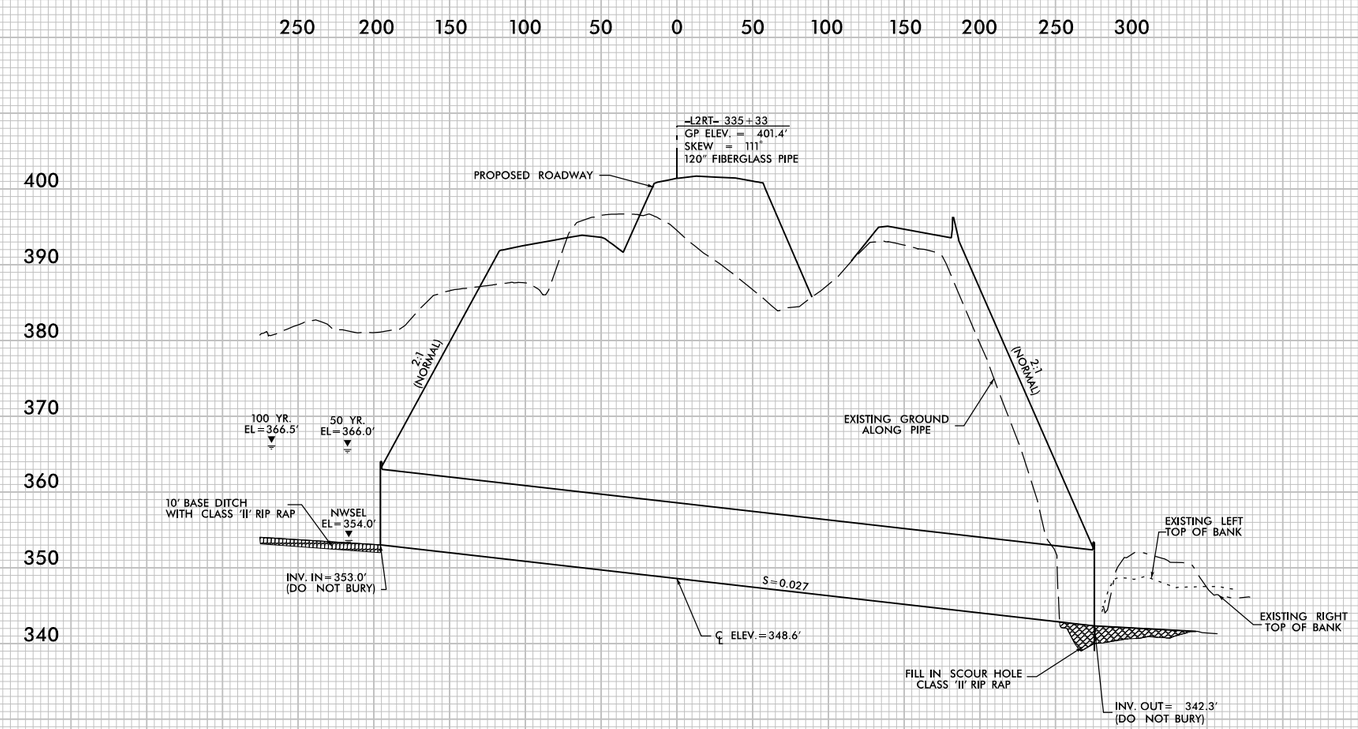
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 13



PROFILE ALONG ℄ OF PIPE

PERMIT DRAWING
SHEET 25 OF 48

REVISIONS

5/14/99

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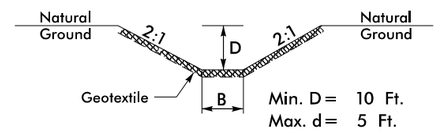
LEGEND

S S — DENOTES IMPACTS IN SURFACE WATER

DETAIL H
8' STANDARD BASE DITCH
(Not to Scale)

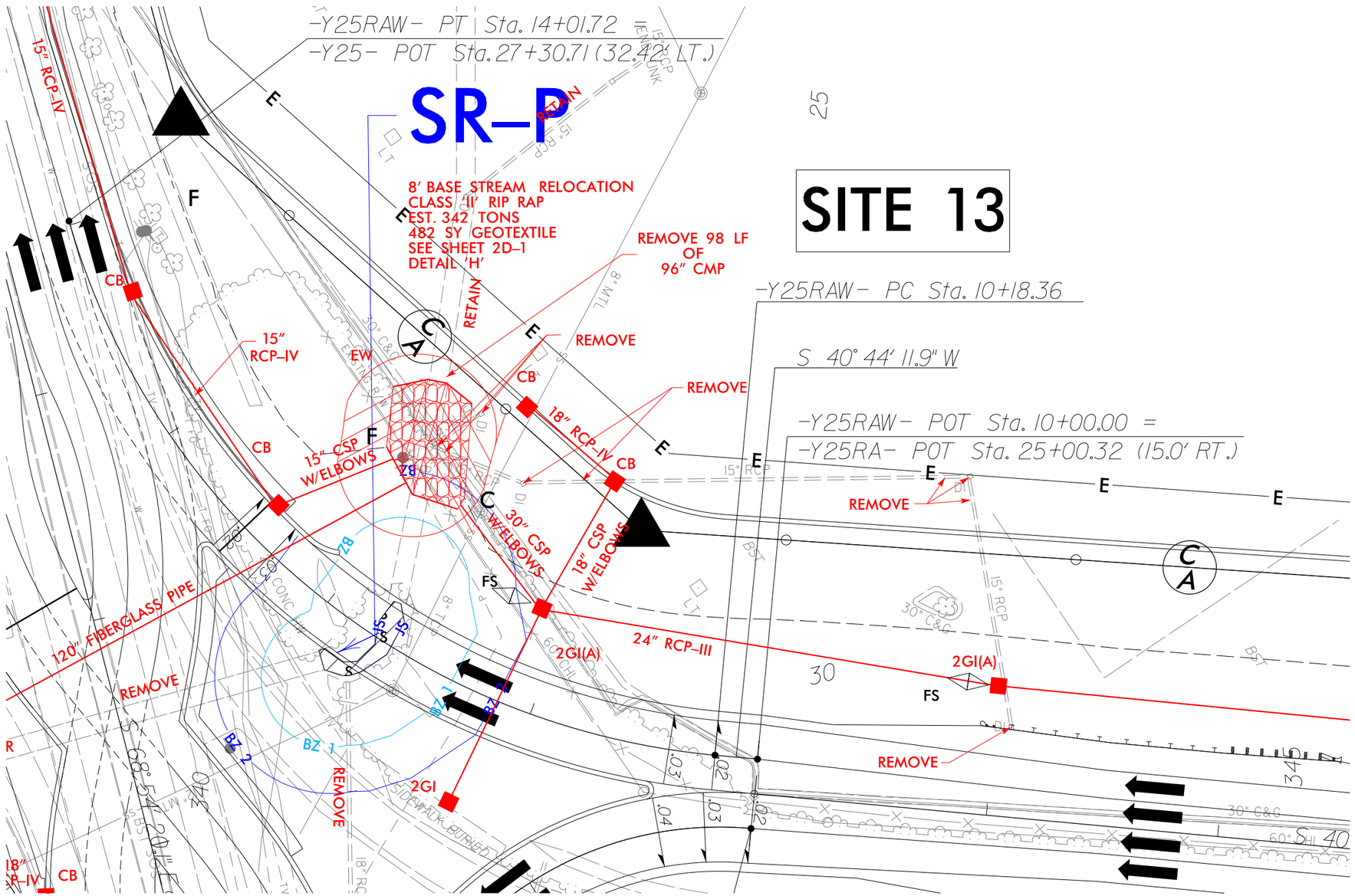


Min. D = 10 Ft.
Max. d = 5 Ft.
B = 8 Ft.

*When B is < 6.0'

Type of Liner = CLASS 'II' Rip–Rap

FROM STA. 11+50 TO STA. 12+09 –Y25RAW– RT



SITE 13

PROJECT REFERENCE NO.	SHEET NO.
U–2719	17C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LANE

PERMIT DRAWING
SHEET 26 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_200.plt PENTABLE: NCDOT_permits_NOCON.tbl
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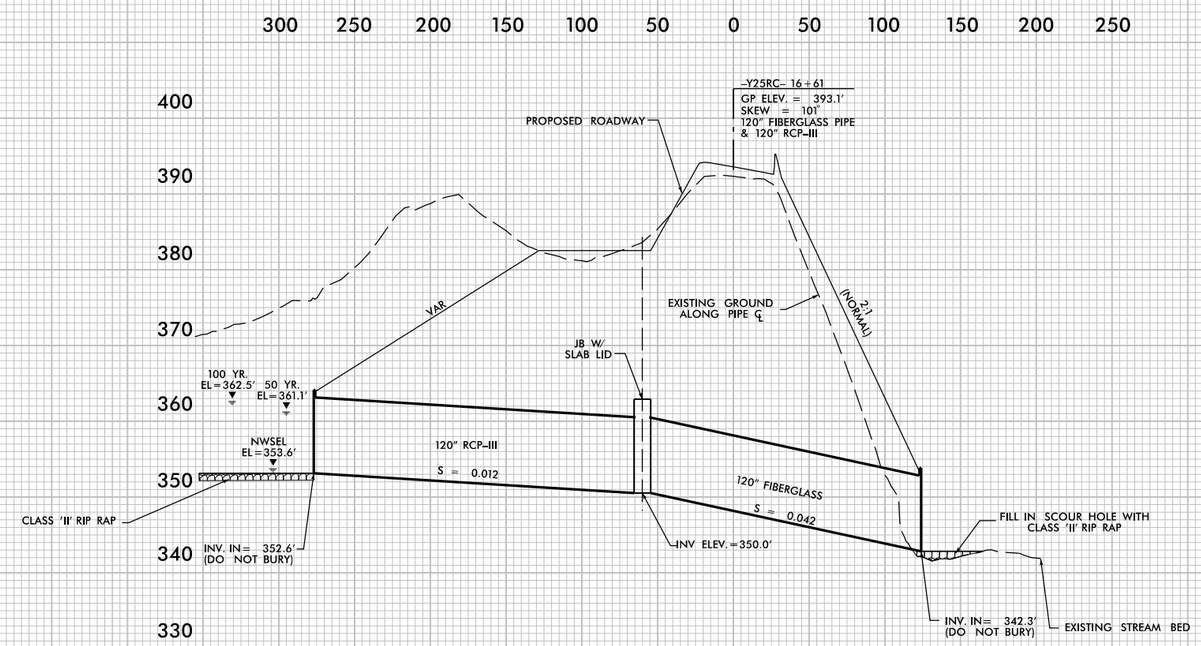
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 13



PROFILE ALONG ℄ OF PIPE

PERMIT DRAWING
SHEET 27 OF 48

REVISIONS

5/14/99

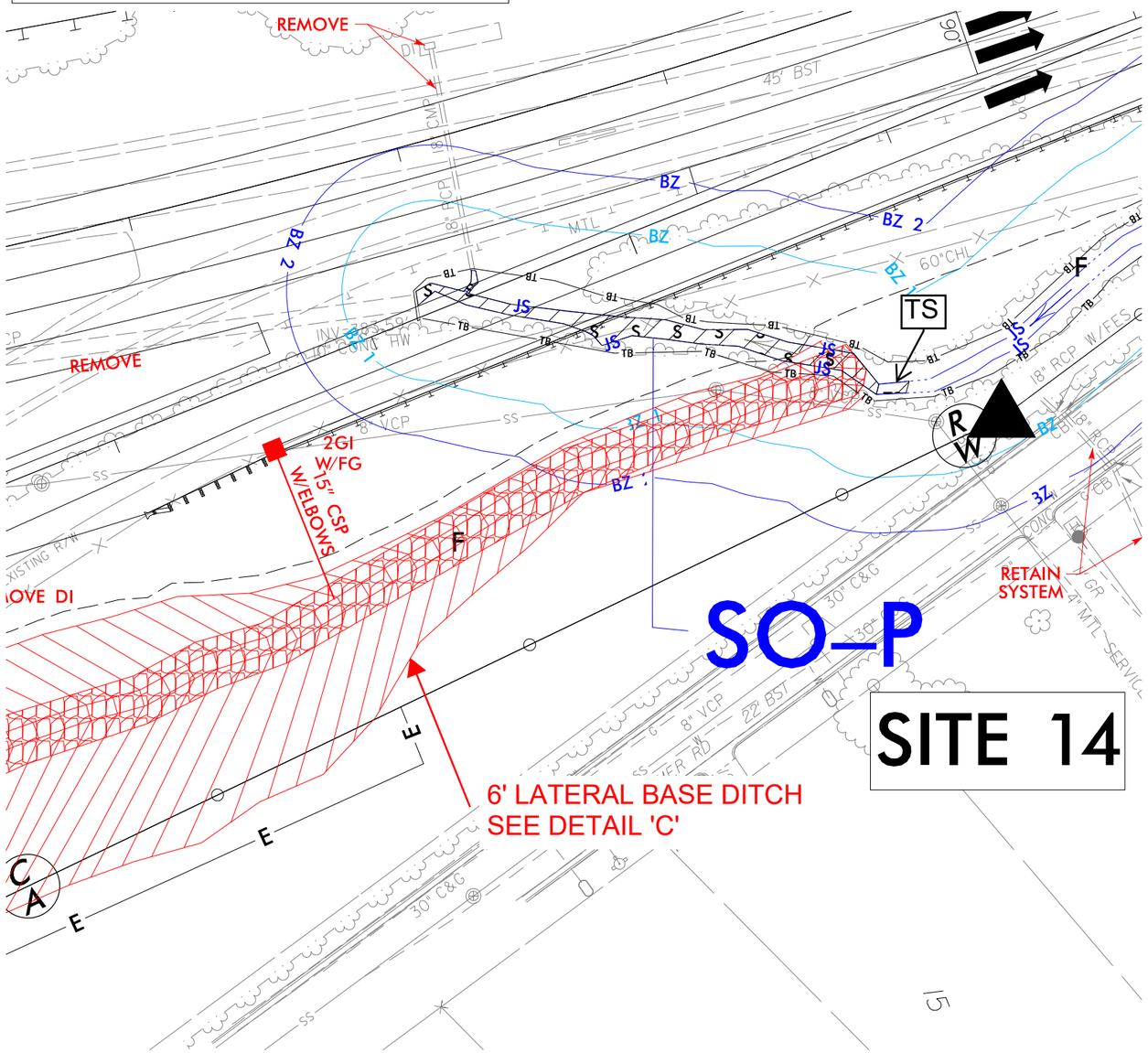
PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
USER: _USERNAME_ DATE: 6/4/2019
FILE: U-2719_CSR_PSH_Y25RPC_1776 PRM_SITE13.dgn

PENTABLE: NCDOT_PFL_XSC_RED BRIDGE.tbl
TIME: 9:55:13 AM

LEGEND

S / S — DENOTES IMPACTS IN SURFACE WATER

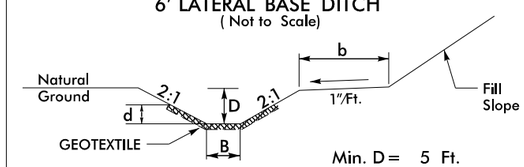
TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



DETAIL C

6' LATERAL BASE DITCH

(Not to Scale)



Min. D = 5 Ft.
Max. d = 5 Ft.
B = 6 Ft.
b = 5 Ft.

*When B is < 6.0'

Type of Liner = Class 'I' Rip-Rap

FROM STA. 14+38 TO STA. 22+58 –Y25RD– LT

NAD 83/2011

GRAPHIC SCALE 12.5 0 12.5 25

PROJECT REFERENCE NO.	SHEET NO.
U-2719	17D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

LANE

PERMIT DRAWING
SHEET 28 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_200.plt
USER: NWOMACK
FILE: Lane_Construction_Corp\Lane_I-440_Widening\6.0_CAD_BIM\6.2_WIP\U-2719\Hydraulics\PERMITS_Environmental\Drawings\U2719-U4437_PRM_PSH.dgn
DATE: 6/3/2019
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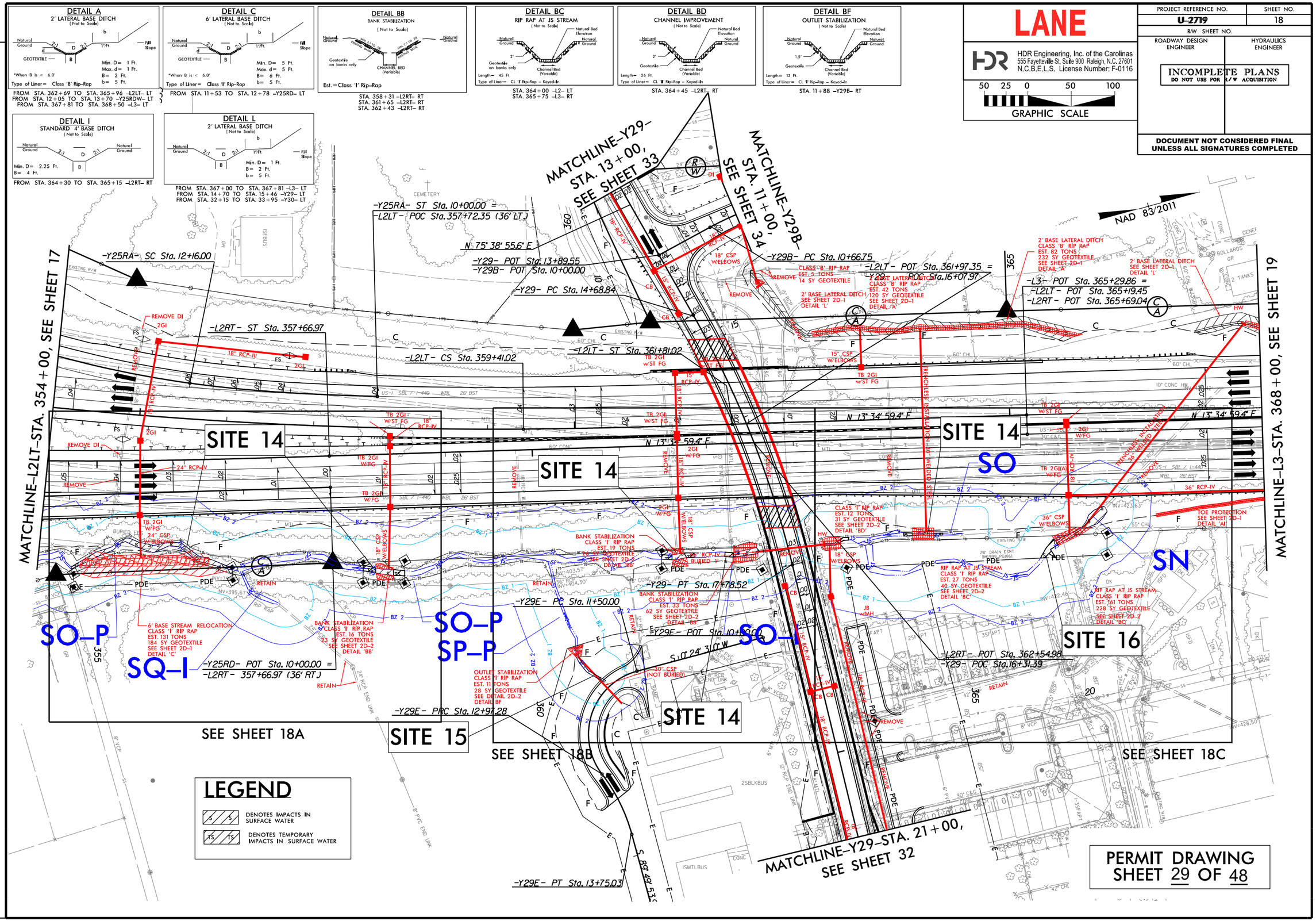
PENTABLE: NCDOT_permits_NOCON.tbl

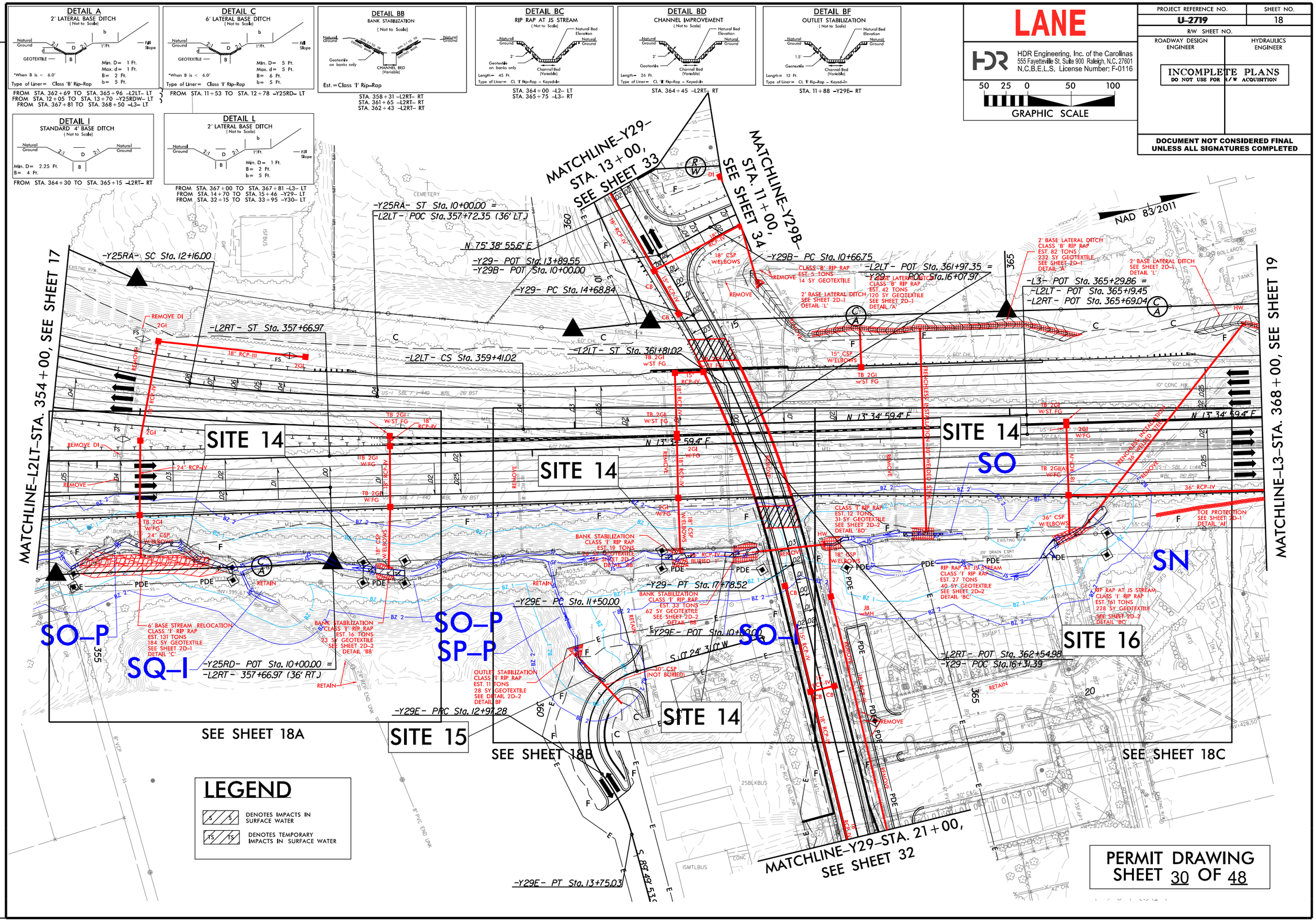


REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl

USER: JMASSROC DATE: 6/5/2019 TIME: 8:06:47 AM

FILE: Lane_Construction_Corp\Lane_I-440_Widening\6.0_CAD_BIM\6.2_WIP\U-2719\Hydraulics\PERMITS_Environmental\Drawings\U2719-U4437_PRM_PSH.dgn



LANE

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N.C.B.E.L.S. License Number: F-0116

50 25 0 50 100
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
U-2719	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_CON.tbl
USER: JMASSROC DATE: 6/5/2019 TIME: 8:09:21 AM
FILE: Lane_Construction_Corp\Lane_I-440_Widening\6.0_CAD_BIM\6.2_WIP\U-2719\Hydraulics\PERMITS_Environmental\Drawings\U2719-U4437_PRM_PSH.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2719	18A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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N.C.B.E.L.S. License Number: F-0116

LANE

GRAPHIC SCALE 12.5 0 12.5 25

NAD 83/2011

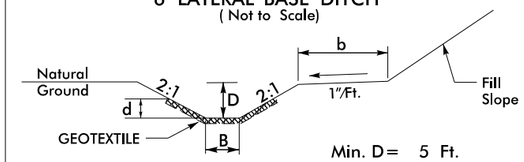
LEGEND

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL C

6' LATERAL BASE DITCH
(Not to Scale)

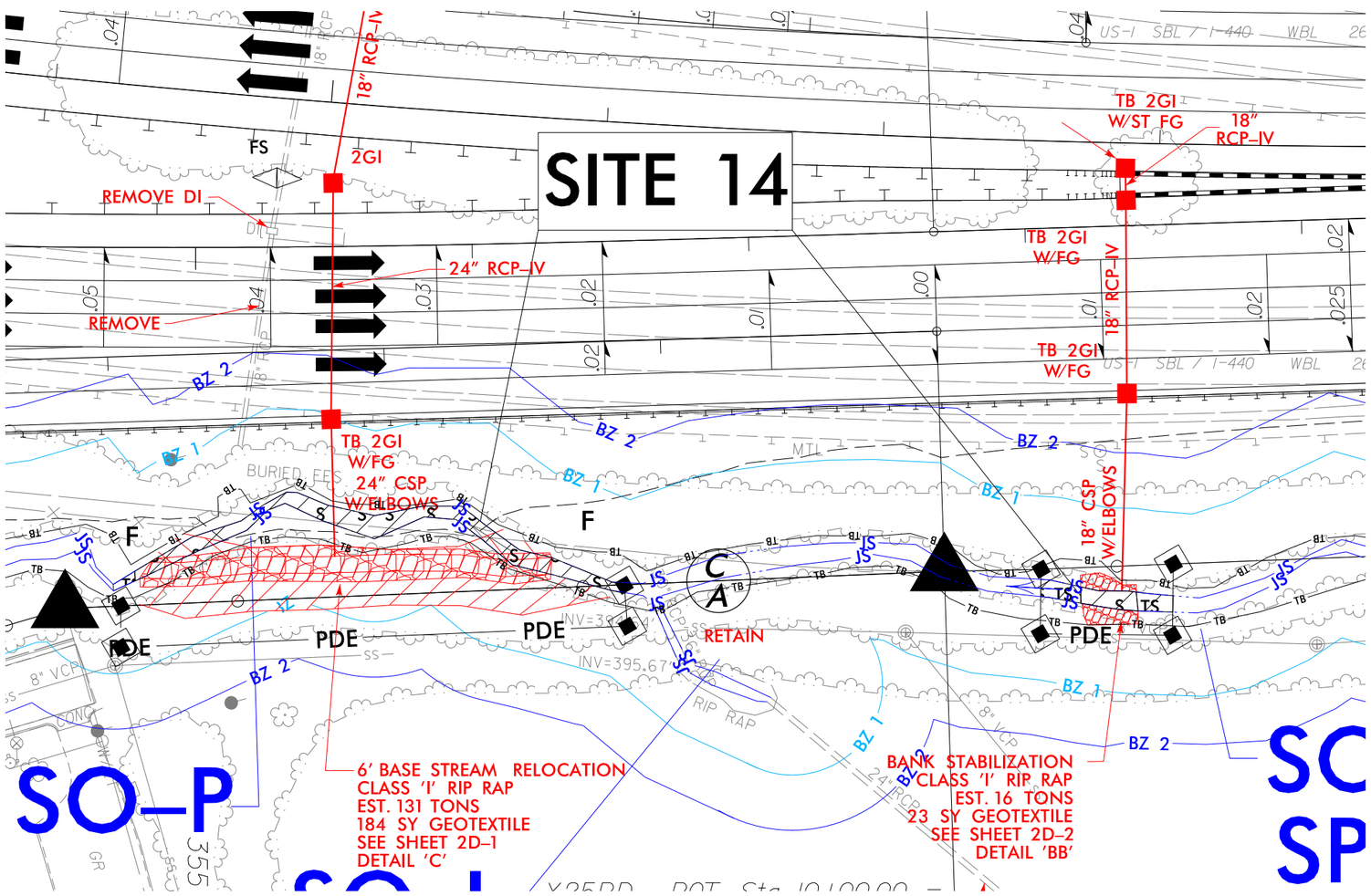


Min. D = 5 Ft.
Max. d = 5 Ft.
B = 6 Ft.
b = 5 Ft.

*When B is < 6.0'

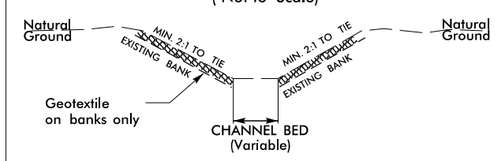
Type of Liner = Class 'I' Rip-Rap

FROM STA. 11+53 TO STA. 12+78 -Y25RD- LT



DETAIL BB

BANK STABILIZATION
(Not to Scale)



Est. = Class 'I' Rip-Rap

STA. 358+31 -L2RT- RT
STA. 361+65 -L2RT- RT
STA. 362+43 -L2RT- RT

PERMIT DRAWING
SHEET 31 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_200.plt PENTABLE: NCDOT_permits_NOCON.tbl
USER: NWOMACK DATE: 6/3/2019 TIME: 4:49:52 PM
FILE: Lane_Construction_Corp\Lane_I-440_Widening\6.0_CAD_BIM\6.2_WIP\U-2719\Hydraulics\PERMITS_Environmental\Drawings\U2719-U4437_PRM_PSH.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2719	18B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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LANE

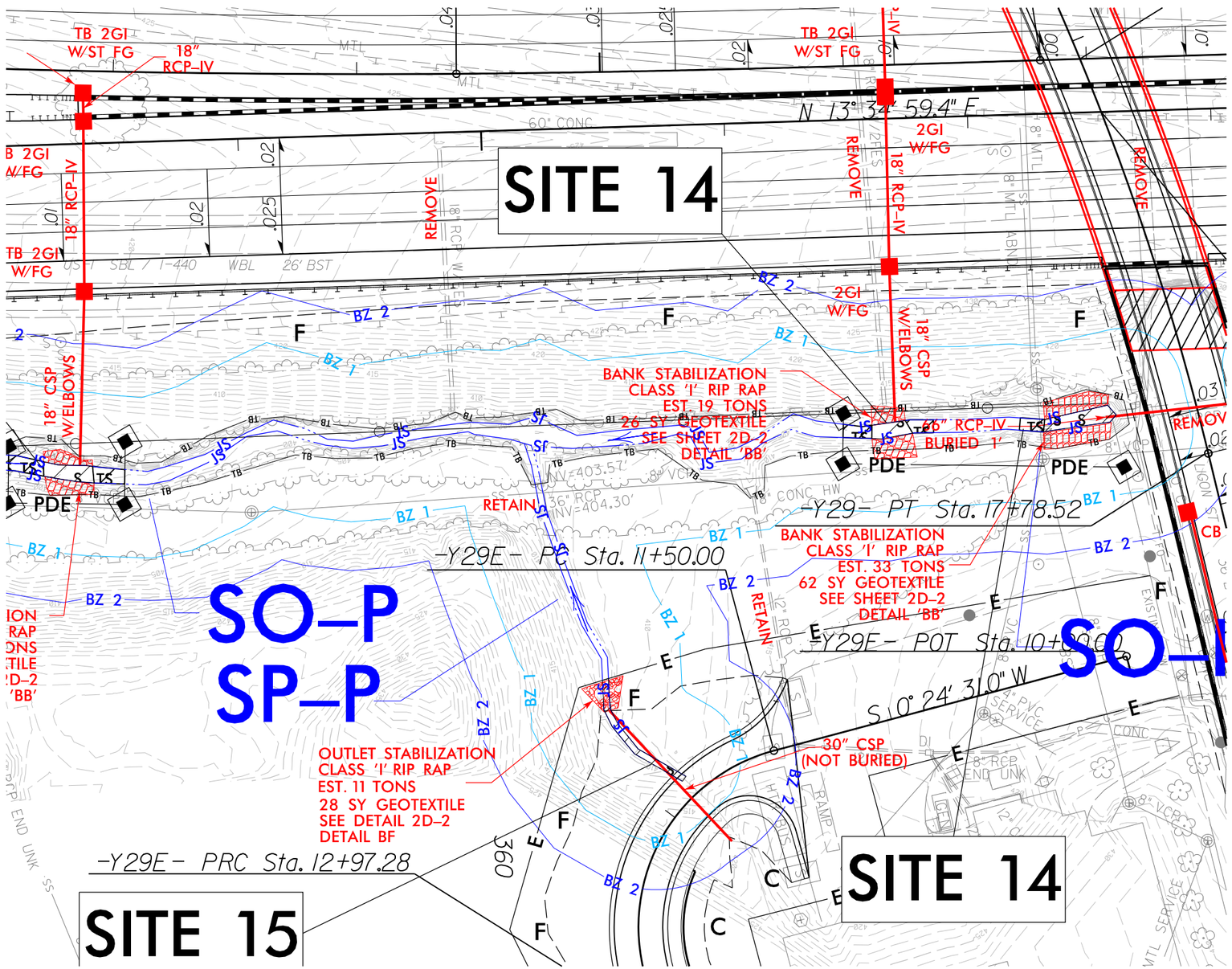
GRAPHIC SCALE 12.5 0 12.5 25

NAD 83/2011

LEGEND

S / S — DENOTES IMPACTS IN SURFACE WATER

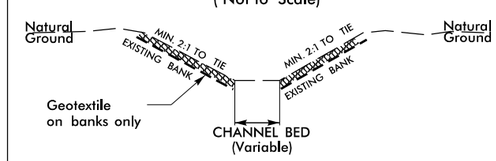
TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



DETAIL BB

BANK STABILIZATION

(Not to Scale)



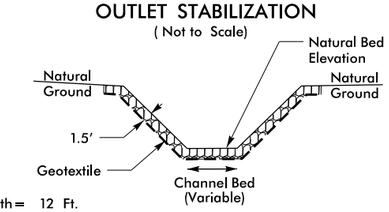
Est. = Class I Rip-Rap

FROM STA. 284+90 TO STA. 287+27 -L1- RT
STA. 358+31 -L2RT- RT
STA. 361+65 -L2RT- RT
STA. 362+43 -L2RT- RT

DETAIL BF

OUTLET STABILIZATION

(Not to Scale)



Length = 12 Ft.
Type of Liner = CL I Rip-Rap - Keyed-In

STA. 11+88 -Y29E- RT

PERMIT DRAWING
SHEET 32 OF 48

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_CON.tbl
USER: JMASSROC DATE: 6/5/2019 TIME: 8:16:20 AM
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REVISIONS

LEGEND

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

DETAIL BC

RIP RAP AT JS STREAM

(Not to Scale)

Length = 45 Ft.

Type of Liner = CL I Rip-Rap - Keyed-In

STA. 364+00 -L2- RT
STA. 365+75 -L3- RT

GRAPHIC SCALE 12.5 0 12.5 25

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
U-2719	18C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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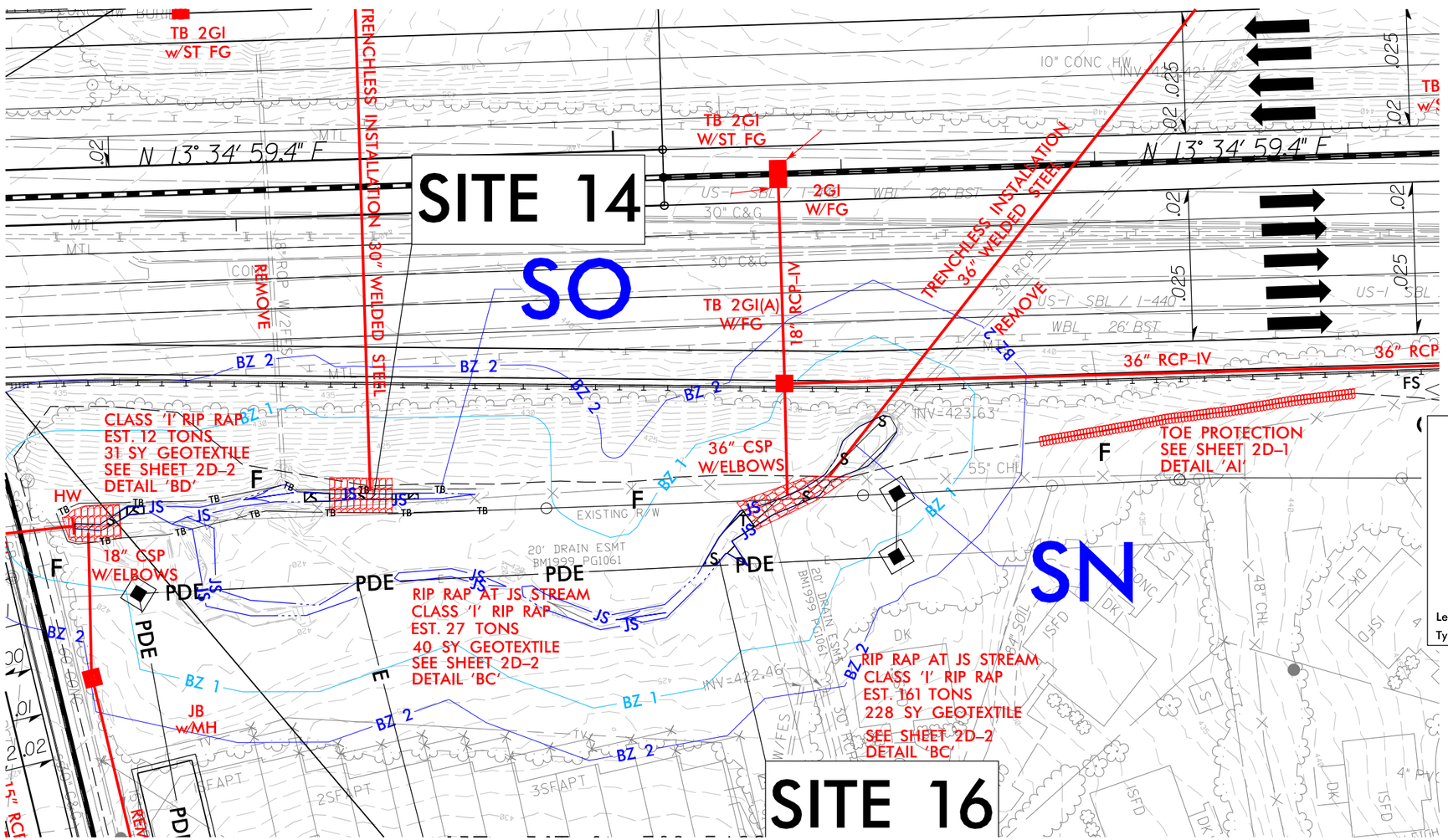
LANE



DETAIL BD

CHANNEL IMPROVEMENT

(Not to Scale)

Length = 26 Ft.

Type of Liner = CL II Rip-Rap - Keyed-In

STA. 364+45 -L2RT- RT

PERMIT DRAWING
SHEET 33 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_CON.tbl
USER: JMASSROC DATE: 6/5/2019 TIME: 8:39:07 AM
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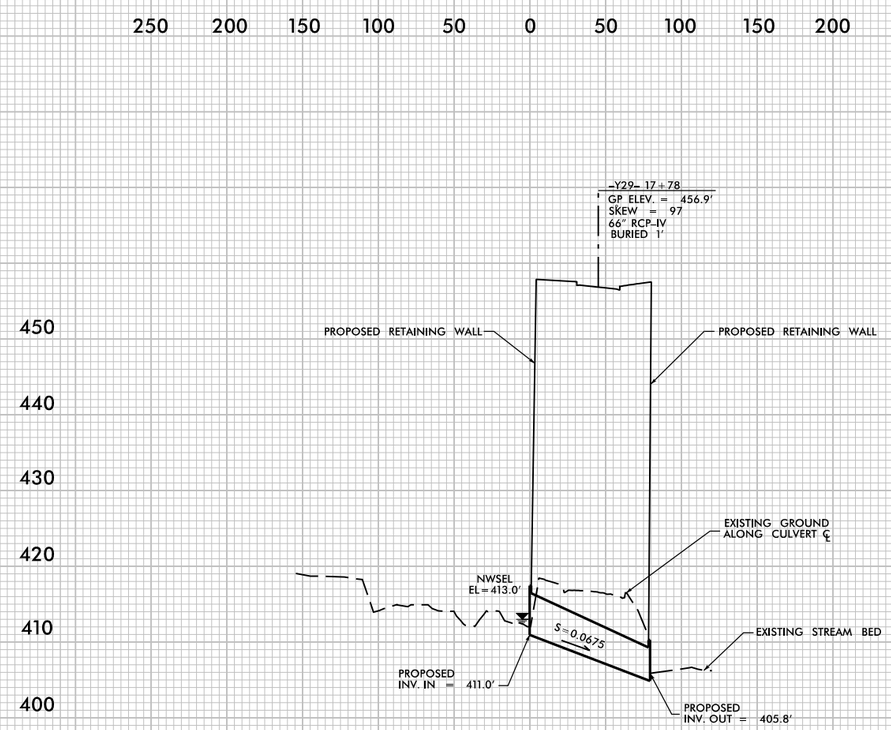
PROJECT REFERENCE NO.	SHEET NO.
U-2719	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 14 & 16



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 34 OF 48

REVISIONS

5/14/99

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_PFL_XSC_RED BRIDGE.tbl
USER: _USERNAME_ DATE: 6/4/2019 TIME: 10:03:32 AM
FILE: U-2719_CSR_PSH_Y29_SITE14 AND 16.dgn

REVISIONS

REFERENCE ONLY – NO IMPACTS

LANE

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N.C.B.E.E.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 50 25 0 50 100

NAD 83/2011

MATCHLINE –Y30– STA. 30+00, SEE SHEET 35

MATCHLINE –L– STA. 381+00, SEE SHEET 19

MATCHLINE –Y35RB– STA. 25+50, SEE SHEET 21

MATCHLINE –L– STA. 409+00, SEE SHEET 21

MATCHLINE –Y3SRC– STA. 12+00, SEE SHEET 21

MATCHLINE –Y30– STA. 43+00, SEE SHEET 36

OWA

DRY DETENTION BASIN #3

PERMIT DRAWING
SHEET 35 OF 48

GRAPHIC SCALE 50 25 0 50 100
PLANS

LOCATION:

TIP NO.: COUNTY:

DESIGNED BY:

CHECKED BY: DATE:

PLOT DRIVER: NCDOT.pdf.color.pmp.200.pt
USER: NMMACK
FILE: G:\Pre-Construction\Carrying\U-2719\Roadway\Lane\U2719_Hydraulics\PERMIT\S_Environmental\Dr-Detail\U2719-LANE7_PRM_PSH.dgn

PENTABLE: NCDOT.pen#16.NODIN.tbl
DATE: 4/9/2019
TIME: 4:06:07 PM

REVISIONS

LANE

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N.C.B.E.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 50 25 0 50 100

REFERENCE ONLY – NO IMPACTS

NAD 83/2011

MATCHLINE –Y30– STA. 30+00, SEE SHEET 35

MATCHLINE –L– STA. 381+00, SEE SHEET 19

MATCHLINE –Y35RB– STA. 25+50, SEE SHEET 21

MATCHLINE –L– STA. 409+00, SEE SHEET 21

MATCHLINE –Y3SRC– STA. 12+00, SEE SHEET 21

MATCHLINE –Y30– STA. 43+00, SEE SHEET 36

OWA

DRY DETENTION BASIN #3

PERMIT DRAWING
SHEET 36 OF 48

GRAPHIC SCALE 50 25 0 50 100
PLANS

LOCATION:	
TIP NO.:	COUNTY:
DESIGNED BY:	
CHECKED BY:	DATE:

PLOT DRIVEN: NCDOT_pdf_color_eng_200.pt
USER: NMMACK
FILE: S:\Transportation\Projects\U-2719\Roadway\LANE\U-2719-Hydraulics\PERMITS\Environmental\Drawings\U2719-LANE7_PRM_PSH.dgn

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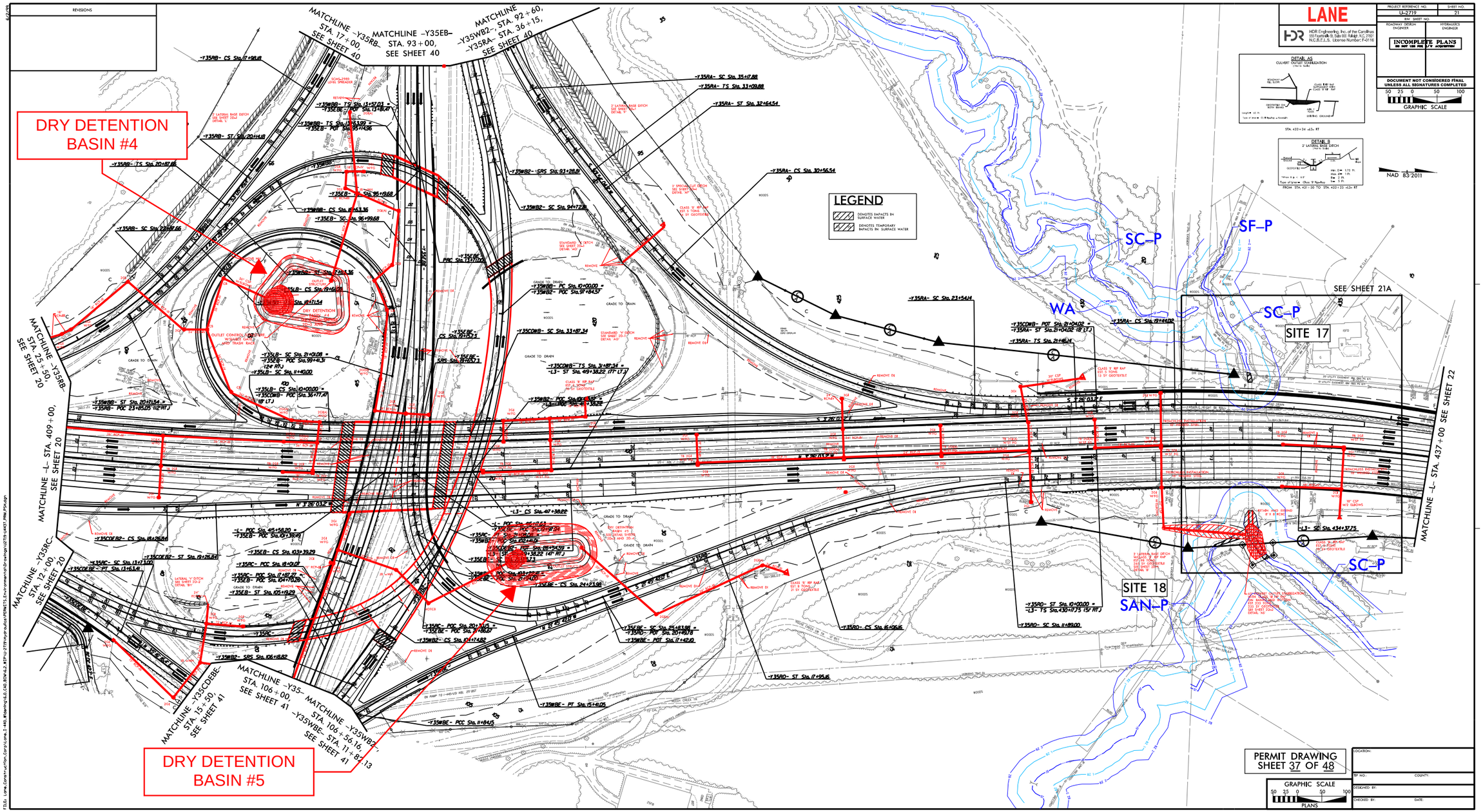
DATE: 4/9/2019
TIME: 4:06:55 PM


LANE
PROJECT REFERENCE NO. U-2719
SHEET NO. 21
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
REVISIONS
MATCHLINE -Y35RB- STA. 17+00, SEE SHEET 40
MATCHLINE -Y35EB- STA. 93+00, SEE SHEET 40
MATCHLINE -Y35WB2- STA. 92+60, -Y35RA- STA. 36+15, SEE SHEET 40
DRY DETENTION BASIN #4
DRY DETENTION BASIN #5
MATCHLINE -Y35RB- STA. 25+50, SEE SHEET 20
MATCHLINE -L- STA. 409+00, SEE SHEET 20
MATCHLINE -Y35RC- STA. 12+00, SEE SHEET 20
MATCHLINE -Y35CDEB2- STA. 15+50, SEE SHEET 41
MATCHLINE -Y35- STA. 106+00, SEE SHEET 41
MATCHLINE -Y35WB2- STA. 106+56.16, -Y35WBE- STA. 11+84.13, SEE SHEET 41
MATCHLINE -L- STA. 437+00 SEE SHEET 22
SEE SHEET 21A
SITE 17
SITE 18
SC-P
SF-P
WA
SAN-P
LEGEND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/2011
PERMIT DRAWING SHEET 37 OF 48
GRAPHIC SCALE
PLANS
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:

REVISIONS

LANE

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N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

50 25 0 50 100
GRAPHIC SCALE

NAD 83/2011

DETAIL A5
CULVERT OUTLET STABILIZATION
(Not to Scale)

DETAIL B
2' LATERAL BASE DITCH
(Not to Scale)

MATCHLINE -Y35RB- STA. 17+00, SEE SHEET 40

MATCHLINE -Y35EB- STA. 93+00, SEE SHEET 40

MATCHLINE -Y35WB2- STA. 92+60, -Y35RA- STA. 36+15, SEE SHEET 40

DRY DETENTION BASIN #4

DRY DETENTION BASIN #5

MATCHLINE -Y35RB- STA. 25+50, SEE SHEET 20

MATCHLINE -L- STA. 409+00, SEE SHEET 20

MATCHLINE -Y35RC- STA. 12+00, SEE SHEET 20

MATCHLINE -Y35CDEB2- STA. 15+50, SEE SHEET 41

MATCHLINE -Y35- STA. 106+00, SEE SHEET 41

MATCHLINE -Y35WB2- STA. 106+56.16, -Y35WBE- STA. 11+82.13, SEE SHEET 41

MATCHLINE -L- STA. 437+00 SEE SHEET 22

SEE SHEET 21A

SITE 17

SITE 18

SC-P

SF-P

WA

SAN-P

LEGEND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 38 OF 48

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:

TIP NO.: COUNTY:

DESIGNED BY:

CHECKED BY: DATE:

PLOT DRIVER: MODOT.pdf.cfgx; MODOT-PDF.pltcfg
USER: JAMASSRC
DATE: 8/7/2019
TIME: 10:30:43 AM
FILE: J:\HDR\Construction\Carolinas\U-2719\Hydraulics\PERMITS\Environmental\Drawings\U2719-SHEET-PERM-PP04.dgn
PENTABLES: MODOT.pen+PTB_CONN.tbl

PROJECT REFERENCE NO.	SHEET NO.
U-2719	21A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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N.C.B.E.L.S. License Number: F-0116

LANE

GRAPHIC SCALE 12.5 0 12.5 25

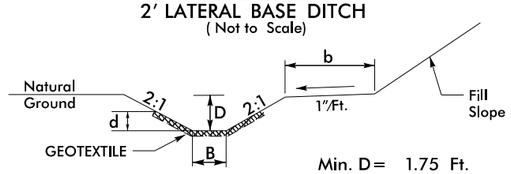
NAD 83/2011

LEGEND

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL B
2' LATERAL BASE DITCH
(Not to Scale)



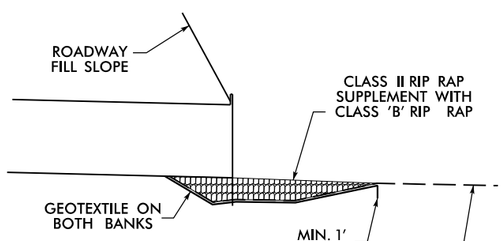
Min. D = 1.75 Ft.
Max. d = 1 Ft.
B = 2 Ft.
b = 5 Ft.

*When B is < 6.0'

Type of Liner = Class 'B' Rip-Rap

FROM STA. 431+50 TO STA. 433+25 -L3- RT

DETAIL AS
CULVERT OUTLET STABILIZATION
(Not to Scale)

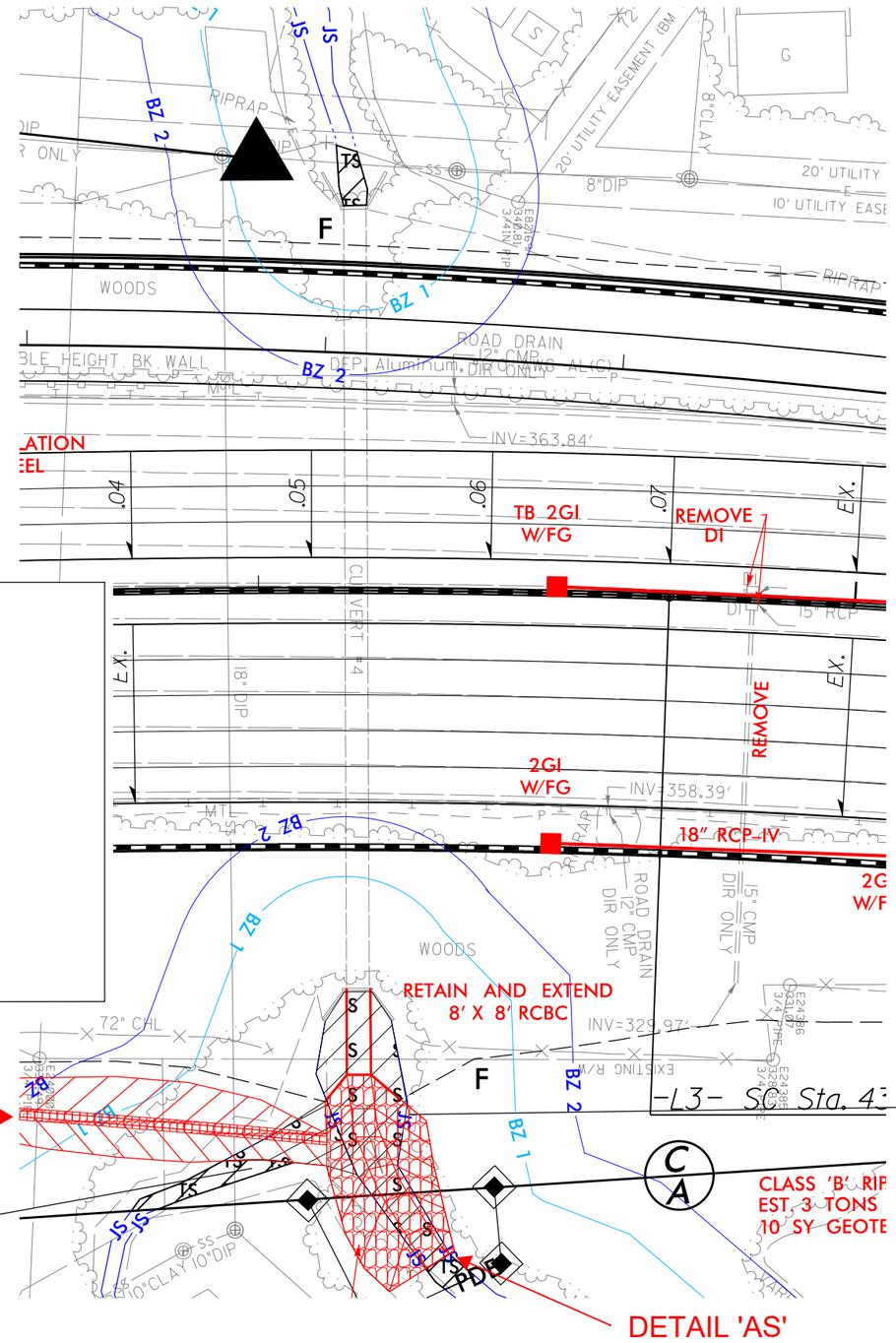


Length = 65 Ft.

Type of Liner = CL II Rip-Rap - Keyed-In

STA. 433+34 -L3- RT

SITE 17



PERMIT DRAWING
SHEET 39 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
USER: JMASSROC DATE: 6/5/2019 TIME: 9:57:56 AM
FILE: Lane_Construction_Corp\Lane_I-440_Widening\6.0_CAD_BIM\6.2_WIP\U-2719\Hydraulics\PERMITS_Environmental\Drawings\U2719-U4437_PRM_PSH.dgn

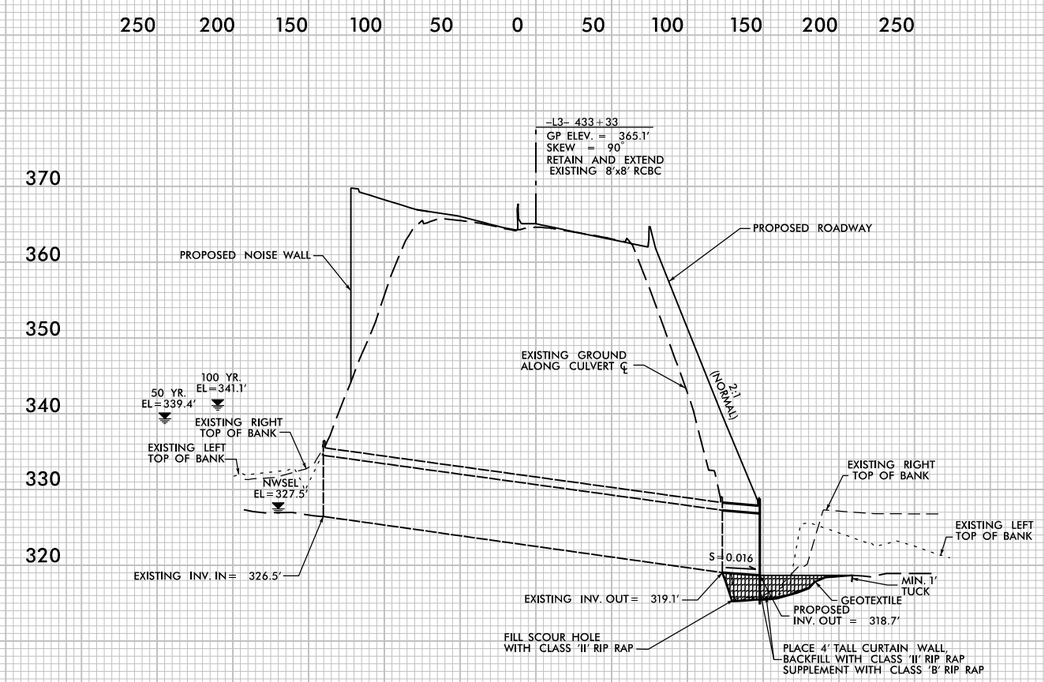
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 17



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 40 OF 48

REVISIONS

5/14/99

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
USER: _USERNAME_ DATE: 6/4/2019
FILE: U-2719_CSR_PSH_L3_43333 PRM SITE17.dgn
PENTABLE: NCDOT_PFL_XSC_RED BRIDGE.tbl
TIME: 10:07:35 AM

LANE

HDR Engineering, Inc. of the Carolinas
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N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

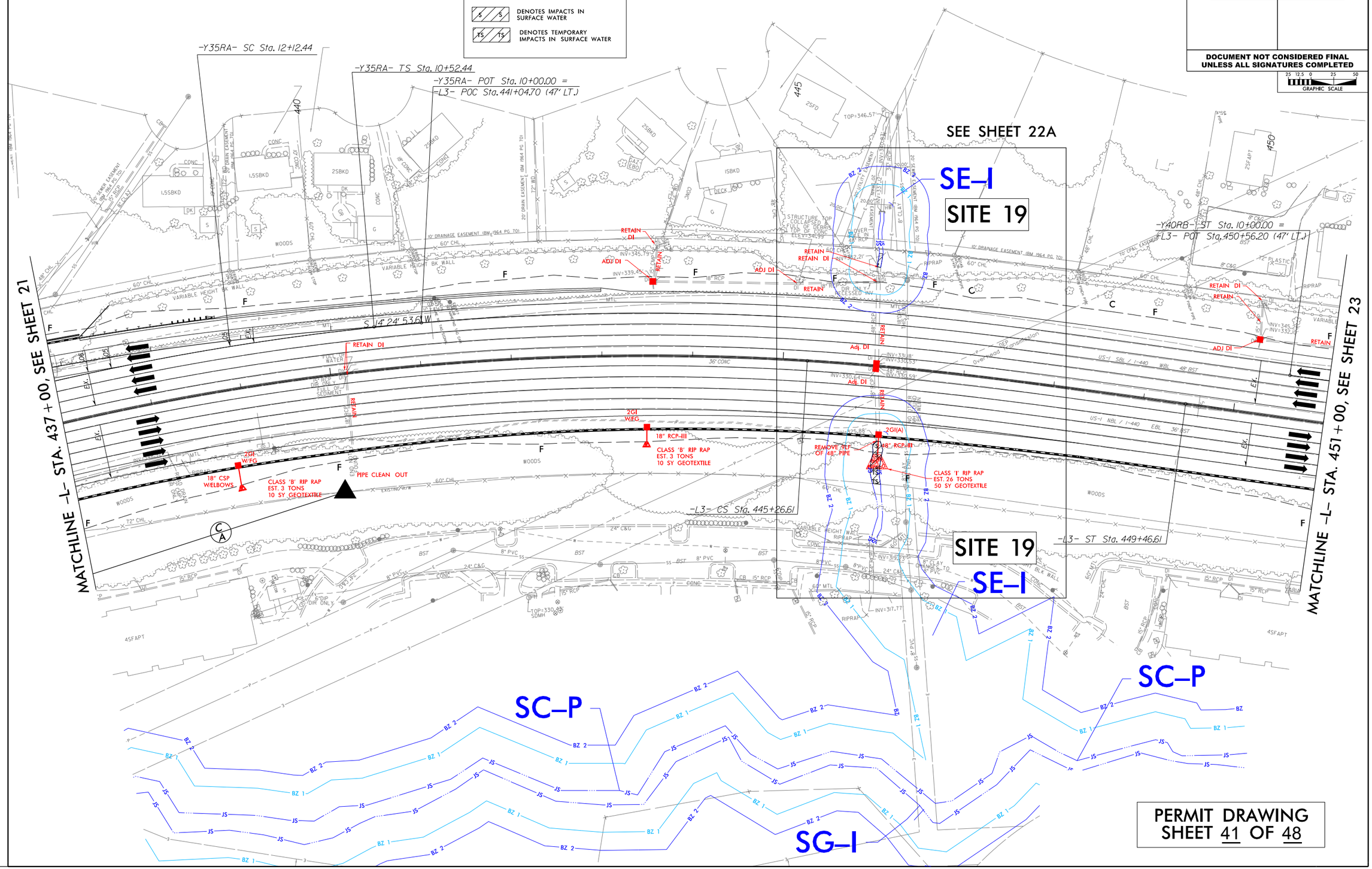
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALE 25 12.5 0 25 50

NAD 83/2011

LEGEND

- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 41 OF 48

REVISIONS

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LANE

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
U-2719	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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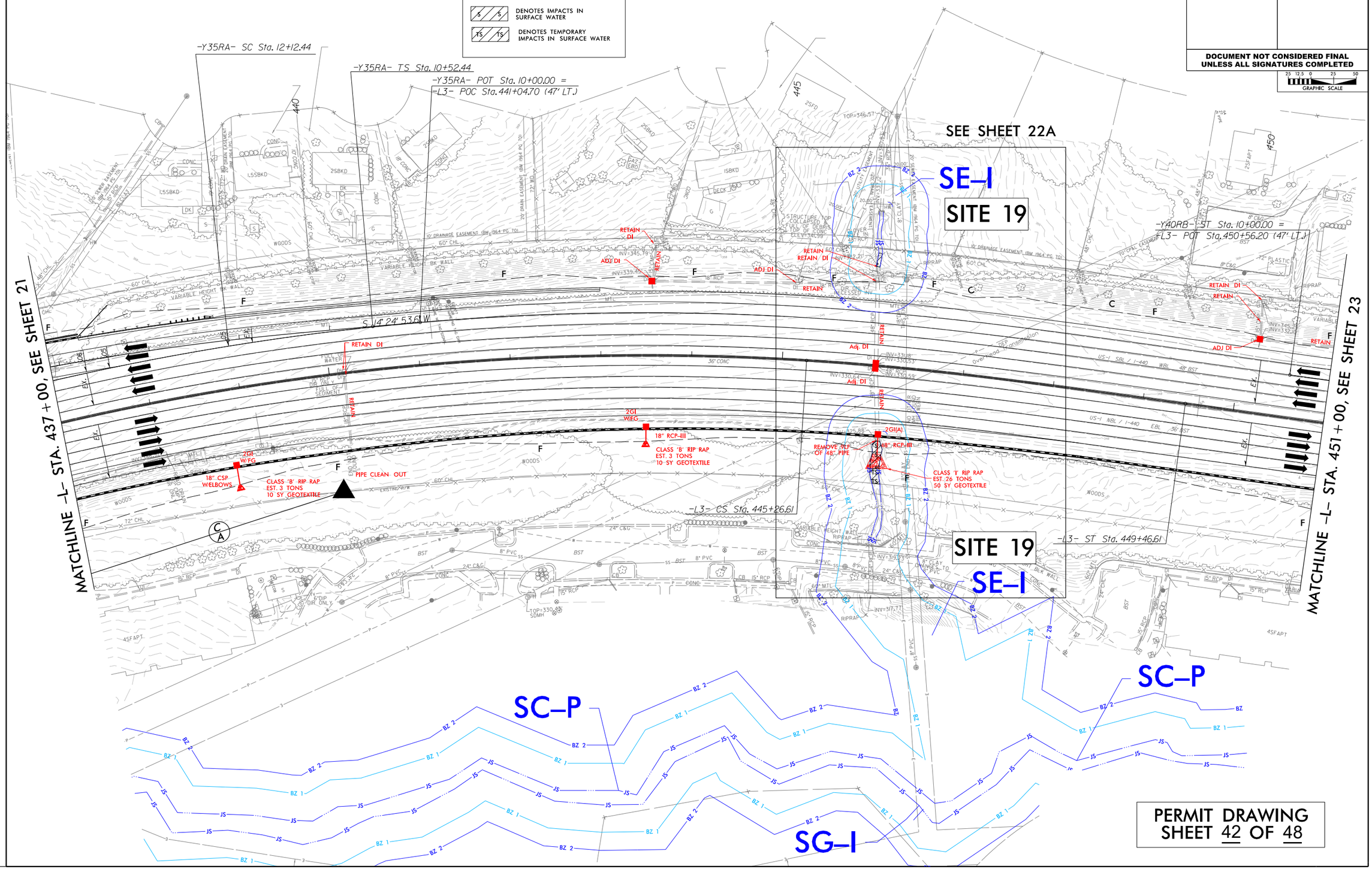
GRAPHIC SCALE 25 12.5 0 25 50

NAD 83/2011

LEGEND

- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 42 OF 48

REVISIONS

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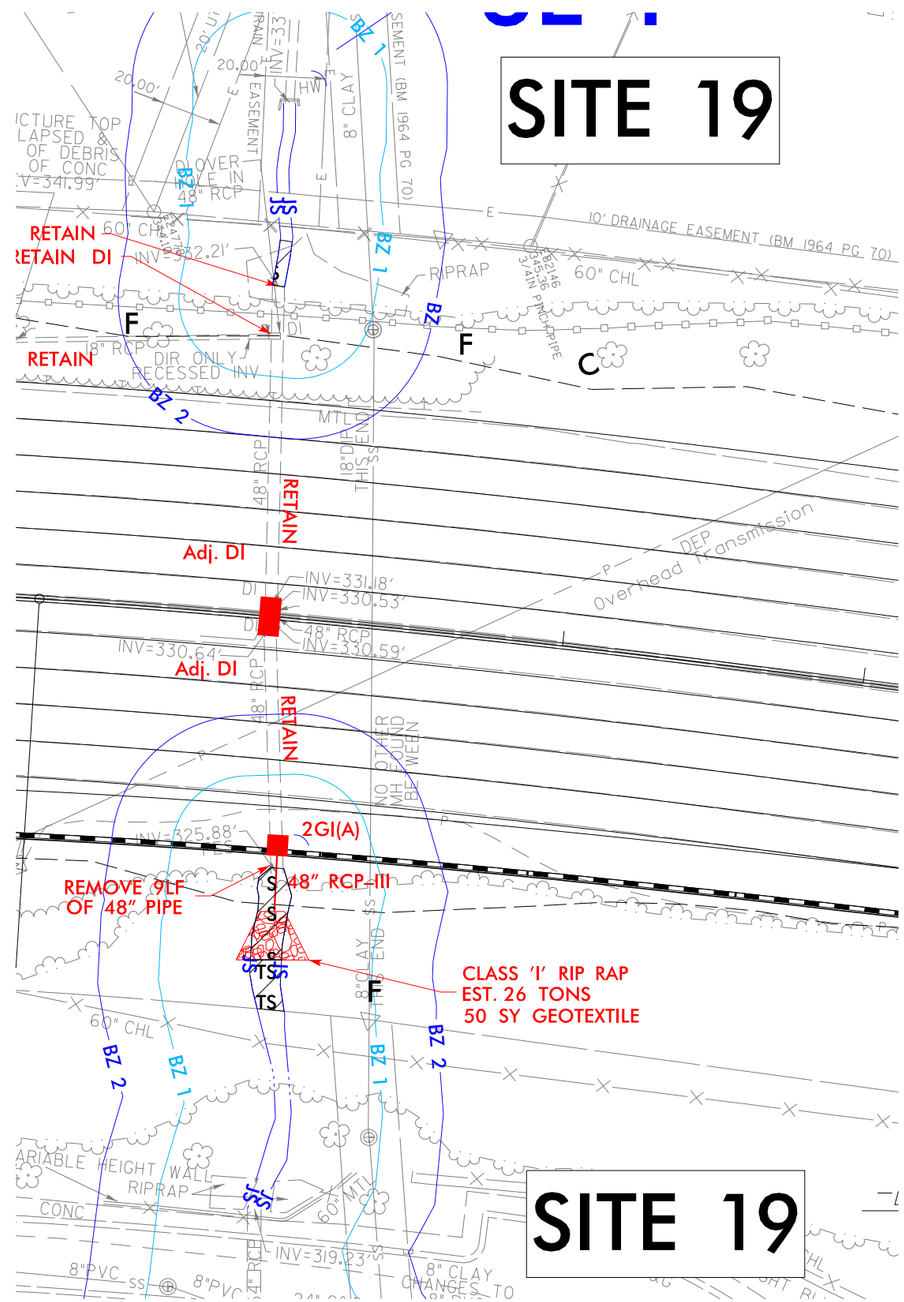
LEGEND

S / S — DENOTES IMPACTS IN SURFACE WATER

TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



12.5 0 12.5 25
GRAPHIC SCALE

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
U-2719	22A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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LANE

PERMIT DRAWING
SHEET 43 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_200.plt PENTABLE: NCDOT_permits_NOCON.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2719	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

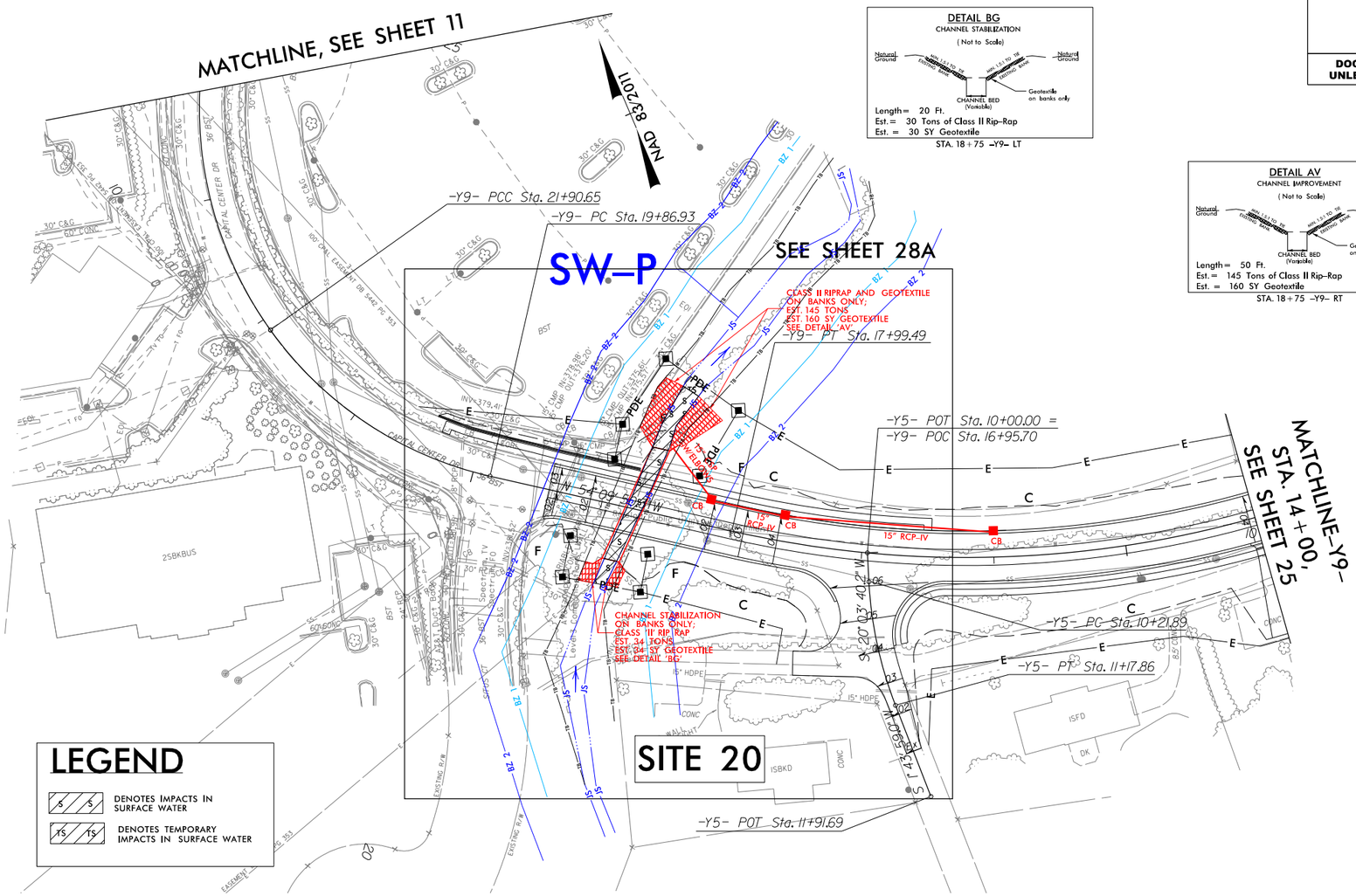
25 12.5 0 25 50
GRAPHIC SCALE

DETAIL BG
CHANNEL STABILIZATION
(Not to Scale)

Length = 20 Ft.
Est. = 30 Tons of Class II Rip-Rap
Est. = 30 SY Geotextile
STA. 18+75 -Y9- LT

DETAIL AV
CHANNEL IMPROVEMENT
(Not to Scale)

Length = 50 Ft.
Est. = 145 Tons of Class II Rip-Rap
Est. = 160 SY Geotextile
STA. 18+75 -Y9- RT



LEGEND

- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 44 OF 48

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2719	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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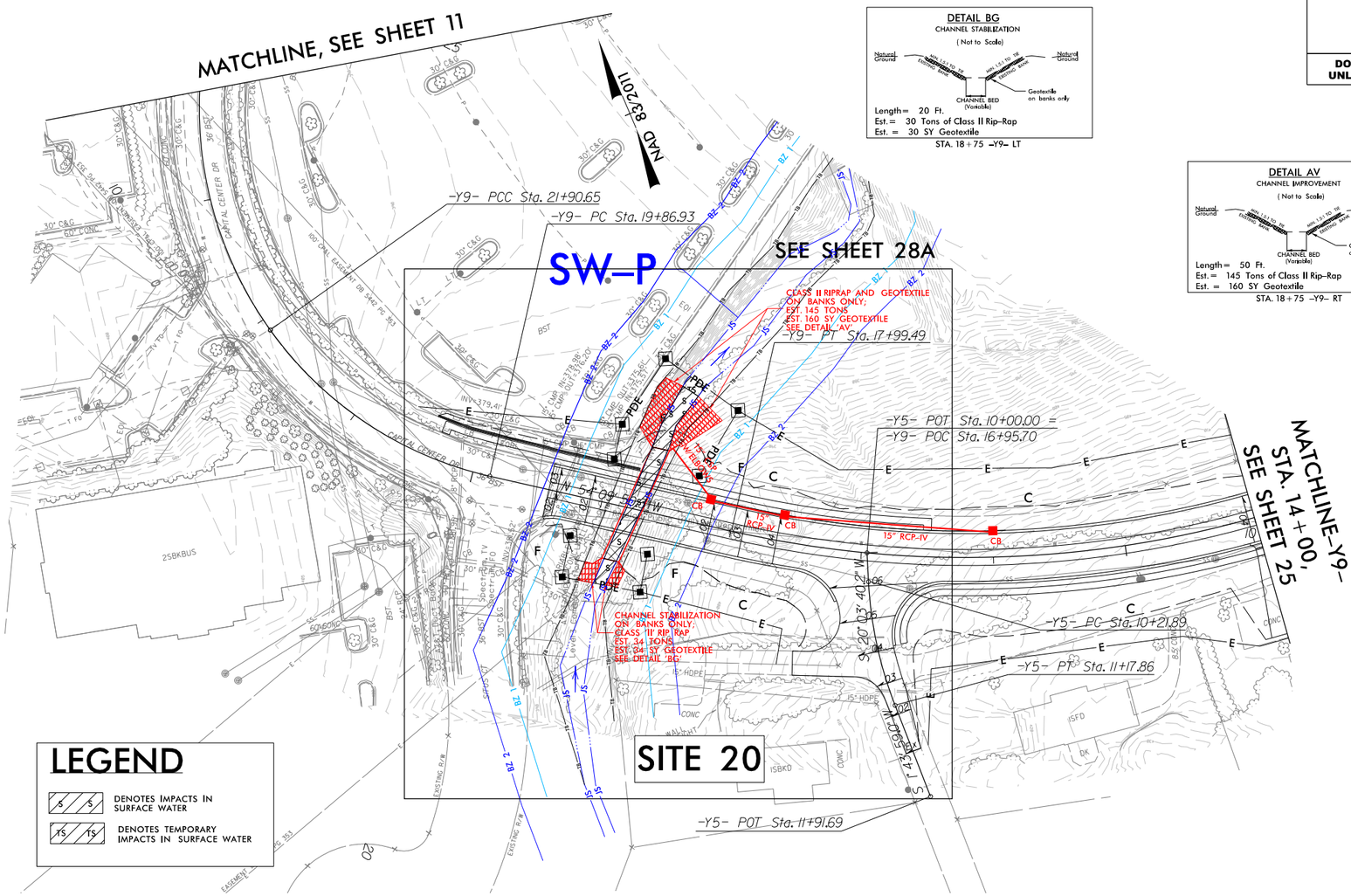
25 12.5 0 25 50
GRAPHIC SCALE

DETAIL BG
CHANNEL STABILIZATION
(Not to Scale)

Length = 20 Ft.
Est. = 30 Tons of Class II Rip-Rap
Est. = 30 SY Geotextile
STA. 18+75 -Y9- LT

DETAIL AV
CHANNEL IMPROVEMENT
(Not to Scale)

Length = 50 Ft.
Est. = 145 Tons of Class II Rip-Rap
Est. = 160 SY Geotextile
STA. 18+75 -Y9- RT



LEGEND

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

PERMIT DRAWING
SHEET 45 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_200.plt PENTABLE: NCDOT_permits_CON.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2719	28A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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LANE

GRAPHIC SCALE 12.5 0 12.5 25

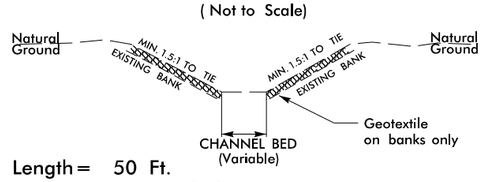
NAD 83/2011

LEGEND

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

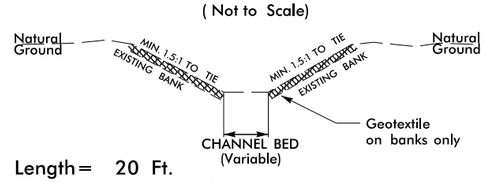
DETAIL AV
CHANNEL IMPROVEMENT
(Not to Scale)



Length = 50 Ft.
Est. = 145 Tons of Class II Rip-Rap
Est. = 160 SY Geotextile

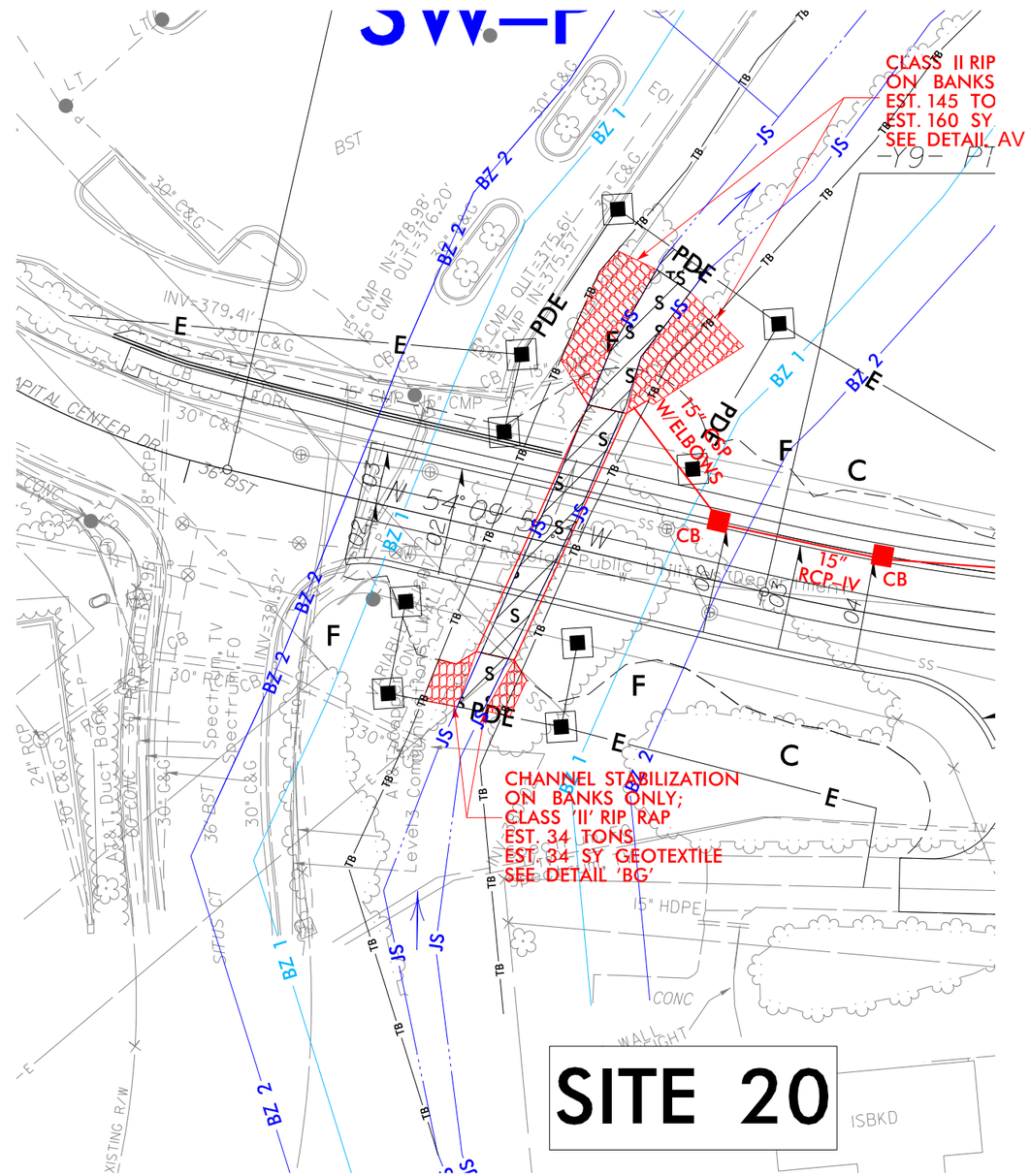
STA. 18+75 –Y9– RT

DETAIL BG
CHANNEL STABILIZATION
(Not to Scale)



Length = 20 Ft.
Est. = 34 Tons of Class II Rip-Rap
Est. = 34 SY Geotextile

STA. 18+75 –Y9– LT



PERMIT DRAWING
SHEET 46 OF 48

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_200.plt PENTABLE: NCDOT_permits_NOCON.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2719	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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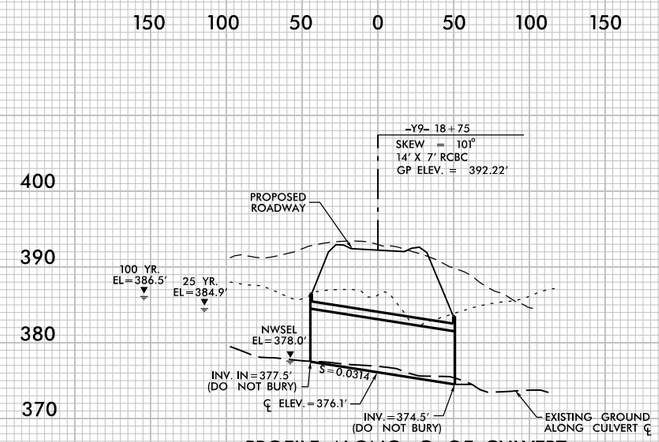
SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 20



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 47 OF 48

REVISIONS

5/14/99

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
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WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	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	SAK	Rip Rap at 18" Outlet						< 0.01		41		
2	WK	Lateral Ditch				0.01						
3	SX	Culvert Clean Out						< 0.01	0.03	9	41	
		Bank Stabilization						0.03	0.09	93	97	
4	SW	Lateral Ditch						0.01	0.02	45	67	
5	OWD	Draining Pond						1.25				
6	WF	Roadway Fill	< 0.01			0.01						
7	ST	Rip Rap at 24" Outlet						0.01	0.02	35	50	
8	***SV	Bank Stabilization						0.02		244		
9	***SU	Bank Stabilization						< 0.01		62		
10	WJ	Bank Stabilization			< 0.01	< 0.01						
11	WI	Bank Stabilization			< 0.01	< 0.01						
12	SS	Channel Imp./Bank Stab.						0.01	0.01	34	65	
13	SR	Outlet Stabilization						0.04	0.01	117	50	
14	**SO	Roadway Fill						0.05	< 0.01	363	20	
		Bank Stabilization						0.01	< 0.01	110	90	
15	SP	30" Culvert						< 0.01		56		
16	SN	36" Welded Steel Pipe						0.01	< 0.01	70	24	
17	SC	8' x 8' Culvert Extension							< 0.01		30	
18	SAN	Lateral Ditch						0.01	< 0.01	31	39	
		Culvert Stabilization						0.04	< 0.01	97	10	
19	SE	48" RCP Extension						< 0.01	< 0.01	29	22	
20	SW	Culvert						0.02	< 0.01	92	20	
		Bank Stabilization						0.01	< 0.01	50	9	
TOTALS*:			< 0.01		< 0.01	0.03		1.55	0.22	1578	634	0

*Rounded totals are sum of actual impacts

NOTES:

**Stream SO is being daylighted for approx. 825 LF that was previously being piped through a 66" RCP.

***Streams SV and SU banks are being stabilized due to existing stream erosion along the banks.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6-5-2019
Wake County
U-2719
35869.3.1

Revised 2018 Feb