North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

General Project Information

WBS Element:	34232.1.1	**TIP Number:**	I-4400C	**Project Type:** Roadway Widening	**Date:** 3/5/2019
NCDOT Contact:	Wanda H. Austin, PE CPM	**Contractor / Designer:**	Joseph Olson, PE		
Address:	253 Webster Road Sylva, NC 28779	**Address:**	343 E. Six Forks Road, Suite 200, Raleigh, NC 27609		
Phone:	828-586-2141	**Phone:**	919-424-0480		
Email:	whaustin@ncdot.gov	**Email:**	jsolson@HNTB.com		
City/Town:	Asheville	**County(ies):**	Buncombe	Henderson	
River Basin(s):	French Broad	**CAMA County?**	No	No	
Wetlands within Project Limits?	Yes				

Project Description

Project Length (lin. miles or feet):	3.53	**Surrounding Land Use:**	Suburan
	Proposed Project	**Existing Site**	
Project Built-Upon Area (ac.)	115.6 ac.	71.6 ac.	
Typical Cross Section Description:	8-lane divided interstate highway with a closed median and shoulders	4-lane divided interstate highway with a grass median and shoulders	
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 117,900 Year: 2040	Existing: 72,000 Year: 2019	

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

I-4400C involves the widening of Interstate I-26 from a 4-lane, median-divided facility to an 8-lane, median-divided facility from 0.5 mile south of US 25 (Asheville Highway) to 0.3 mile south of NC 280 (Airport Road) and ties into the I-4700 TIP Project. The existing typical section is a 4-lane, median-divided facility consisting of 12-foot travel lanes with grassed median. Existing roadway will be replaced with an 8-lane, median-divided facility consisting of 12-foot travel lanes with paved median. Jurisdictional features including wetlands, streams, and a bridge crossing of Cane Creek are present within project limits. The proposed roadway improvements will require the majority of the existing drainage system to be replaced and new roadway ditches. Retaining walls were used in 2 locations to reduce the extent of impacts along the project corridor. Rip Rap pads were used at pipes outlets throughout the project to reduce water velocities into wetlands and jurisdictional streams. Special design "Energy Dissipators" were used at strategic locations where pipe outlets were adjacent to jurisdictional streams. The Sediment and Erosion Control Plan for I-4400C has been designed using Design Standards in Sensitive Watersheds (DSSW), which includes additional limitations on denuded areas and specifies Erosion Control Measures that are designed to protect during a 25-year storm event. Post Construction Stormwater Program will be implemented throughout I-4400C and the additional sections of the I-4400 corridor to the maximum extent practical.

Waterbody Information

Surface Water Body (1):	SCN - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?	Comments:				
NRTR Stream ID:	SCN	**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element:	34232.1.1	TIP No.:	I-4400C	County(ies):	Buncombe Henderson	Page	2	of	8

Additional Waterbody Information

Surface Water Body (2):	SCK - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SCK			**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):	SCL - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SCL			**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):	SCO - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SCO			**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):	SCP - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SCP			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element: 34232.1.1 **TIP No.:** I-4400C **County(ies):** Buncombe Henderson

Additional Waterbody Information

Surface Water Body (6):	SEN - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?	Comments:				
NRTR Stream ID:	SEN		**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (7):	SCQ - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?	Comments:				
NRTR Stream ID:	SCQ		**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 (8):	SCT - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?	Comments:				
NRTR Stream ID:	SCT		**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 (9):	SCR - UT to Mud Creek	**NCDWR Stream Index No.:**	6-55		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?	Comments:				
NRTR Stream ID:	SCR		**Buffer Rules in Effect:**		
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)					

WBS Element: 34232.1.1 **TIP No.:** I-4400C **County(ies):** Buncombe Henderson

Additional Waterbody Information

Surface Water Body (10):	SCU - UT to Cane Creek		**NCDWR Stream Index No.:**	6-57-(9)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SCU			**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 (11):	SCX - UT to Cane Creek		**NCDWR Stream Index No.:**	6-57-(9)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SCX			**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 (12):	SCW - CANE CREEK		**NCDWR Stream Index No.:**	6-57-(9)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	CANE CREEK			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (13):	SCZ - UT to Kimsey Creek		**NCDWR Stream Index No.:**	6-57-22	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SCZ			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

WBS Element: 34232.1.1 **TIP No.:** I-4400C **County(ies):** Buncombe Henderson

Additional Waterbody Information

Surface Water Body (14):	SCY - Kimsey Creek		**NCDWR Stream Index No.:**	6-57-22	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class B		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SCY			**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 (15):	SDR - UT to Kimsey Creek		**NCDWR Stream Index No.:**	6-57-22	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class B		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	SDR			**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 (16):	S1 - UT to Kimsey Creek		**NCDWR Stream Index No.:**	6-57-22	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:	S1			**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 (17):			**NCDWR Stream Index No.:**		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
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)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34232.1.1 **TIP No.:** I-4400C **County(ies):** Buncombe Henderson

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?
4	-L- Sta. 657+80 RT 35.39801,-82.50265	(2)SCK - UT to Mud Creek	2.0	2.0	2.0	2.6	258	584	5.08%	5.4	2.6	7.2	5.7	No	No
4	-L- Sta. 658+01 RT 35.39802,-82.50268	(2)SCK - UT to Mud Creek	2.0	2.0	2.0	0.5	50	115	1.67%	0.9	1.5	1.2	1.6	No	No
4	-L- Sta. 656+29 LT 35.39695,-82.50255	(2)SCK - UT to Mud Creek	2.0	2.0	2.0	14.5	1450	174	6.70%	31.7	6.6	43.0	7.2	No	No
5	-Y10RPC- Sta. 12+30 RT 35.39880,-82.50540	(5)SCP - UT to Mud Creek	2.0	2.0	2.0	0.5	50	484	18.57%	0.8	3.2	1.2	3.6	No	No
6	-Y10RPA- Sta. 16+08 RT 35.40028,-82.51124	(7)SCQ - UT to Mud Creek	2.0	2.0	2.0	14.4	1438	292	5.60%	32.7	6.2	44.0	6.7	No	No
6	-Y10RPA- Sta. 12+70 RT 35.40100,-82.51195	(8)SCT - UT to Mud Creek	2.0	2.0	2.0	13.9	1388	420	3.86%	27.5	4.2	37.0	4.5	No	No
9	-L- Sta. 727+00 LT 35.41026,-82.51894	(10)SCU - UT to Cane	2.0	2.0	2.0	10.4	1043	1688	0.35%	16.9	1.9	23.0	2.0	No	No
9	-L- Sta. 727+10 LT 35.41028,-82.51897	(10)SCU - UT to Cane	2.0	2.0	2.0	1.4	139	210	1.13%	4.6	2.1	6.2	2.2	No	No
11	-L- Sta. 755+40 RT 35.41720,-82.52316	(12)SCW - CANE	7.0	2.0	2.0	160.0	16000	3040	0.50%	120.0	3.5	210.0	4.0	No	No
12	-L- Sta. 769+25 LT 35.42020,-82.52628	(14)SCY - Kimsey	2.0	2.0	2.0	1.0	97	485	0.32%	1.7	1.0	2.3	1.1	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.:** I-4400C **County(ies):** Buncombe Henderson

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?
6	-Y10RPA- Sta. 16+08 RT 35.40030,-82.51120	(7)SCQ	Riprap Energy Dissipator Basin	Class I	22.1	Pipe	48	36.0	3.1	No
6	-Y10RPA- Sta. 13+59 RT 35.40084,-82.51172	(8)SCT	Riprap Energy Dissipator Basin	Class 'B'	0.5	Pipe	15	2.7	0.5	No
9	-L- Sta. 719+65 RT 35.408808,-82.517098	WBG	Energy Dissipator	Class 'B'	0.4	Pipe	15	1.8	0.7	No
9	-L- Sta. 723+67 RT 35.409753,-82.517796	WBG	Energy Dissipator	Class 'B'	0.4	Pipe	15	1.8	0.7	No
9	-L- Sta. 726+95 LT 35.41026,-82.51891	(10)SCU	Riprap Energy Dissipator Basin	Class I	12.4	Pipe	36	15.0	0.6	No
11	-L- Sta. 747+68 LT 35.415114,-82.522546	WBI	Energy Dissipator	Class 'B'	1.0	Pipe	15	5.3	1.0	No
12	-L- Sta. 765+47 LT 35.41932,-82.52560	(13)SCZ	Riprap Energy Dissipator Basin	Class I	82.0	Culvert	2 x 60	94.0	2.3	No
12	-L- Sta. 766+70 RT 35.419919,-82.525168	WBP	Energy Dissipator	Class 'B'	0.5	Pipe	15	2.3	0.8	No
14	-L- Sta. 790+78 RT 35.42599,-82.52785	(16)S1	Riprap Energy Dissipator Basin	Class 'B'	20.0	Pipe	42	73.2	2.6	No

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.

7/24/2017

TIP PROJECT: I-4400C

CONTRACT: C204265

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-4400C	1	

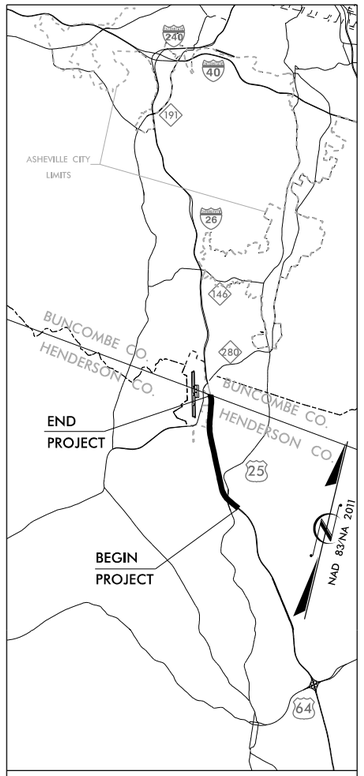
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34232.1.FS4	NHPP-026-1(200)13	I-4400C (P.E.)
34232.2.5	N/A	I-4400C (R/W)
34232.2.7	N/A	I-4400C (UTIL)
34232.3.5	NHPP-026-1(200)13	I-4400C (CONST.)

PERMIT DRAWING
SHEET 1 OF 43

BUNCOMBE & HENDERSON COUNTIES

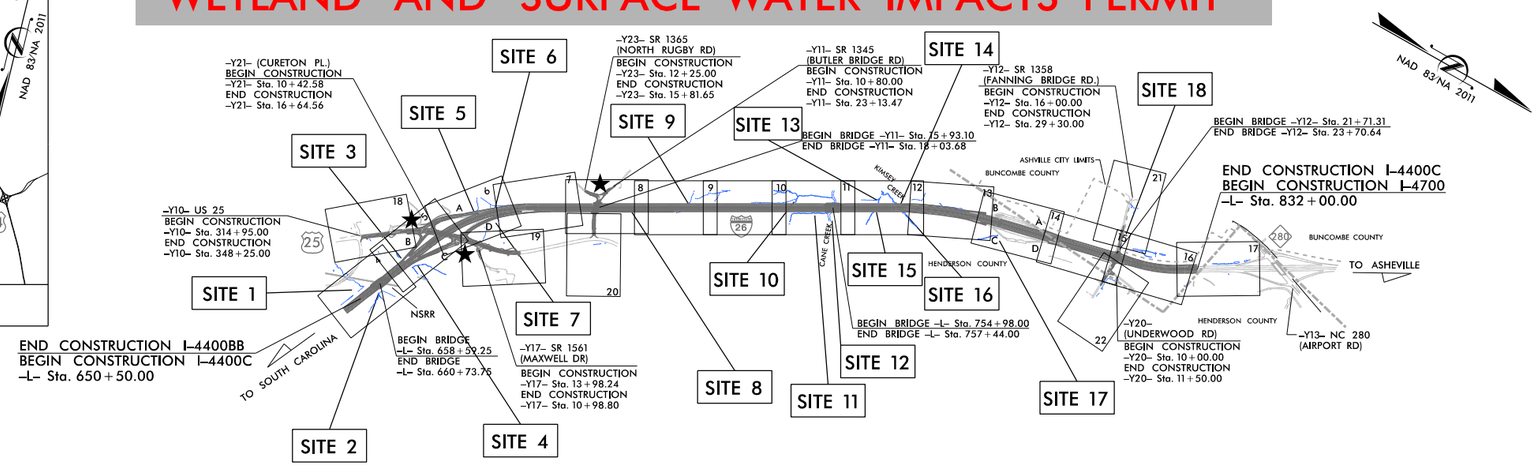
CP4C Meeting Plans 3/6/2019

LOCATION: I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY) TO SOUTH OF NC 280
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS, RETAINING WALLS, SOUND WALLS, SIGNALS, AND SIGNING



VICINITY MAP

WETLAND AND SURFACE WATER IMPACTS PERMIT



NOTE:
1. THIS IS A CONTROLLED- ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

★ PROPOSED TRAFFIC SIGNAL

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 2019 = 65,900
ADT 2040 = 91,000
K = 10%
D = 55%
T = 10% *
V = 65 MPH**
* TTST = 11% DUAL 4%
**70MPH SOUTH OF US-25
FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

TOTAL LENGTH OF ROADWAY TIP PROJECT
I-4400C = 3.438 MI

TOTAL LENGTH OF STRUCTURES OF TIP PROJECT
I-4400C = 0.087 MI

TOTAL LENGTH OF TIP PROJECT
I-4400C = 3.525 MI
NOTE: LENGTHS WERE CALCULATED USING THE L ALIGNMENT

Prepared In the Office of:
HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
July 2018 (I-4400C)

LETTING DATE:
June 2019

JOSEPH OLSON, P.E.
PROJECT ENGINEER

MARC A. WHITMORE, P.E.
PROJECT DESIGN ENGINEER

WANDA AUSTIN, P.E.
NCDOT CONTACT

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 046784 ENGINEER MARC A. WHITMORE P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 047948 ENGINEER JOHN M. BLANCETT P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

7/24/2017
I4400C_RDY_TSH.dgn
3:11 PM

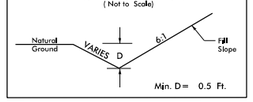
HNTB NORTH CAROLINA, P.C.
343 W. Six Forks Road, Suite 200
Raleigh, North Carolina 27603
NC License Nbr C-1554

PROJECT REFERENCE NO.	SHEET NO.
1-4400C	2D-1
R/W SHEET NO.	
	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 2 OF 43

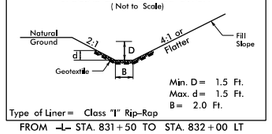
DITCH DETAILS

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



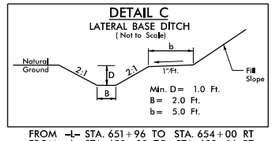
FROM –L– STA. 650+00 TO STA. 651+96 RT

DETAIL B
SPECIAL LATERAL BASE DITCH
(Not to Scale)



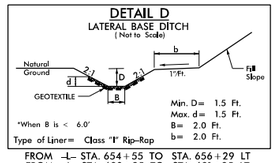
FROM –L– STA. 831+50 TO STA. 832+00 LT

DETAIL C
LATERAL BASE DITCH
(Not to Scale)



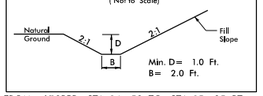
FROM –L– STA. 651+96 TO STA. 654+00 RT
FROM –L– STA. 658+00 TO STA. 659+16 RT
FROM –L– STA. 773+30 TO STA. 773+50 RT
FROM –L– STA. 710+12 TO STA. 711+00 LT
FROM –L– STA. 715+00 TO STA. 716+00 LT
FROM –L– STA. 770+50 TO STA. 774+10 LT
FROM –Y10RPC– STA. 10+00 TO STA. 12+35 RT
FROM –Y10RPA– STA. 18+50 TO STA. 19+00 RT

DETAIL D
LATERAL BASE DITCH
(Not to Scale)



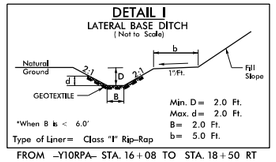
FROM –L– STA. 654+55 TO STA. 656+29 LT
FROM –L– STA. 690+25 TO STA. 691+25 LT
FROM –Y10RPA– STA. 10+00 TO STA. 12+70 RT

DETAIL E
SPECIAL LATERAL BASE DITCH
(Not to Scale)



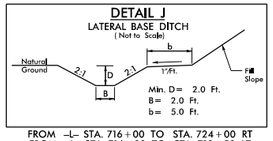
FROM –Y10RPB– STA. 14+50 TO STA. 15+05 RT

DETAIL I
LATERAL BASE DITCH
(Not to Scale)



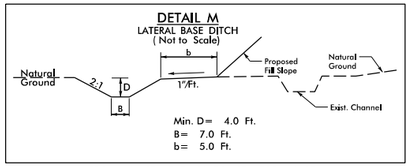
FROM –Y10RPA– STA. 16+08 TO STA. 18+50 RT

DETAIL J
LATERAL BASE DITCH
(Not to Scale)



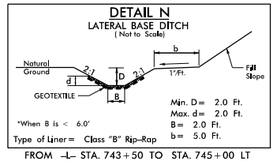
FROM –L– STA. 716+00 TO STA. 724+00 RT
FROM –L– STA. 716+00 TO STA. 719+50 LT

DETAIL M
LATERAL BASE DITCH
(Not to Scale)



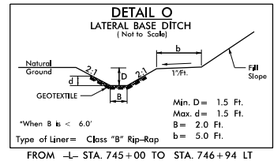
FROM –L– STA. 747+50 TO STA. 755+40 RT

DETAIL N
LATERAL BASE DITCH
(Not to Scale)



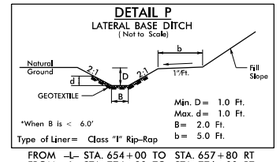
FROM –L– STA. 743+50 TO STA. 745+00 LT

DETAIL O
LATERAL BASE DITCH
(Not to Scale)



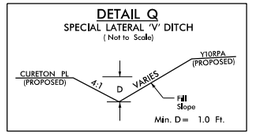
FROM –L– STA. 745+00 TO STA. 746+94 LT

DETAIL P
LATERAL BASE DITCH
(Not to Scale)



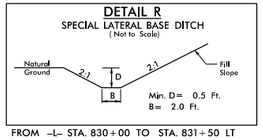
FROM –L– STA. 654+00 TO STA. 657+80 RT
FROM –L– STA. 774+30 TO STA. 776+00 RT
FROM –Y10RPC– STA. 15+00 TO STA. 16+50 RT

DETAIL Q
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



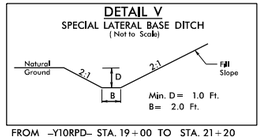
FROM –Y10RPA– STA. 27+30 TO STA. 27+38 RT &
FROM –Y10RPA_SPUR_RT– STA. 10+00 TO STA. 11+56 RT

DETAIL R
SPECIAL LATERAL BASE DITCH
(Not to Scale)



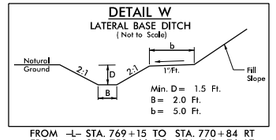
FROM –L– STA. 830+00 TO STA. 831+50 LT

DETAIL V
SPECIAL LATERAL BASE DITCH
(Not to Scale)



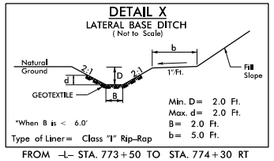
FROM –Y10RPD– STA. 19+00 TO STA. 21+20

DETAIL W
LATERAL BASE DITCH
(Not to Scale)



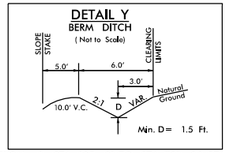
FROM –L– STA. 769+15 TO STA. 770+84 RT
FROM –L– STA. 758+00 TO STA. 761+76 LT

DETAIL X
LATERAL BASE DITCH
(Not to Scale)



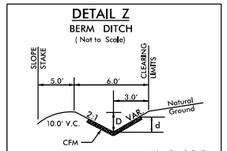
FROM –L– STA. 773+50 TO STA. 774+30 RT

DETAIL Y
BERM DITCH
(Not to Scale)



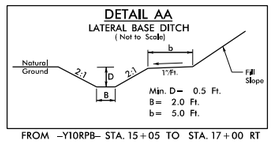
FROM –L– STA. 695+81 TO STA. 701+06 RT

DETAIL Z
BERM DITCH
(Not to Scale)



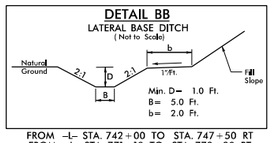
FROM –L– STA. 688+30 TO STA. 695+81 RT

DETAIL AA
LATERAL BASE DITCH
(Not to Scale)



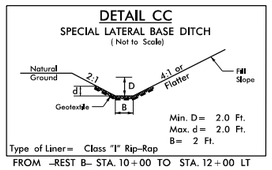
FROM –Y10RPB– STA. 15+05 TO STA. 17+00 RT

DETAIL BB
LATERAL BASE DITCH
(Not to Scale)



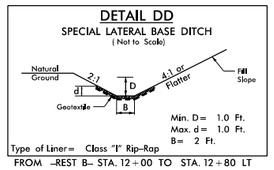
FROM –L– STA. 742+00 TO STA. 747+50 RT
FROM –L– STA. 771+10 TO STA. 773+30 RT
FROM –L– STA. 769+25 TO STA. 770+50 LT
FROM –Y10RPD– STA. 21+20 TO STA. 25+41 RT

DETAIL CC
SPECIAL LATERAL BASE DITCH
(Not to Scale)



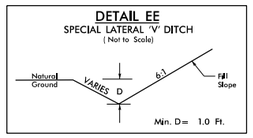
FROM –REST B– STA. 10+00 TO STA. 12+00 LT

DETAIL DD
SPECIAL LATERAL BASE DITCH
(Not to Scale)



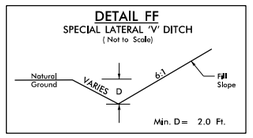
FROM –REST B– STA. 12+00 TO STA. 12+80 LT

DETAIL EE
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



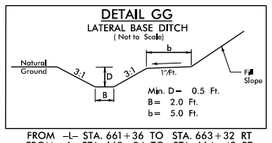
FROM –L– STA. 626+50 TO STA. 828+60 RT

DETAIL FF
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



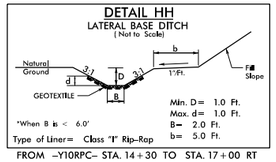
FROM –L– STA. 828+62 TO STA. 832+00 RT

DETAIL GG
LATERAL BASE DITCH
(Not to Scale)



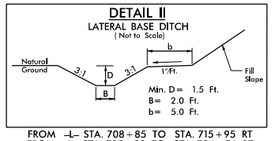
FROM –L– STA. 661+36 TO STA. 663+32 RT
FROM –L– STA. 663+34 TO STA. 664+49 RT
FROM –L– STA. 708+50 TO STA. 708+85 RT
FROM –L– STA. 734+76 TO STA. 737+10 RT
FROM –L– STA. 737+10 TO STA. 740+00 RT
FROM –L– STA. 827+50 TO STA. 830+00 LT

DETAIL HH
LATERAL BASE DITCH
(Not to Scale)



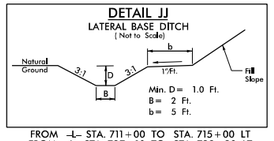
FROM –Y10RPC– STA. 14+30 TO STA. 17+00 RT

DETAIL II
LATERAL BASE DITCH
(Not to Scale)



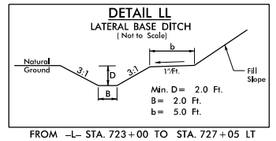
FROM –L– STA. 708+85 TO STA. 715+95 RT
FROM –L– STA. 725+00 TO STA. 734+74 RT
FROM –L– STA. 719+50 TO STA. 723+00 LT

DETAIL JJ
LATERAL BASE DITCH
(Not to Scale)



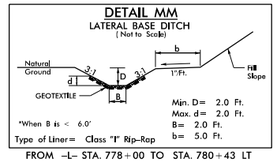
FROM –L– STA. 711+00 TO STA. 715+00 LT
FROM –L– STA. 727+10 TO STA. 729+20 LT
FROM –L– STA. 825+63 TO STA. 827+50 LT

DETAIL LL
LATERAL BASE DITCH
(Not to Scale)



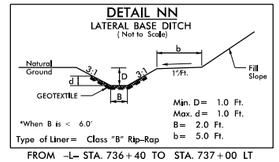
FROM –L– STA. 723+00 TO STA. 727+05 LT

DETAIL MM
LATERAL BASE DITCH
(Not to Scale)



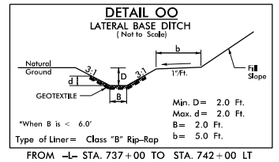
FROM –L– STA. 778+00 TO STA. 780+43 LT

DETAIL NN
LATERAL BASE DITCH
(Not to Scale)



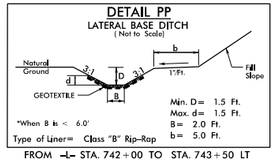
FROM –L– STA. 736+40 TO STA. 737+00 LT

DETAIL OO
LATERAL BASE DITCH
(Not to Scale)



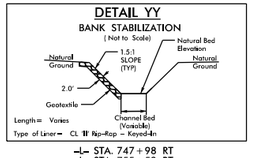
FROM –L– STA. 737+00 TO STA. 742+00 LT

DETAIL PP
LATERAL BASE DITCH
(Not to Scale)



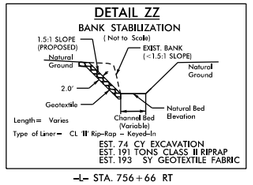
FROM –L– STA. 742+00 TO STA. 743+50 LT

DETAIL YY
BANK STABILIZATION
(Not to Scale)



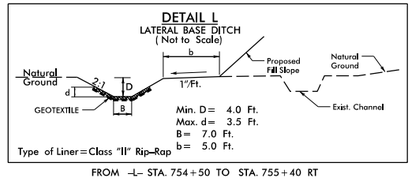
–L– STA. 747+98 RT
–L– STA. 755+53 RT
–L– STA. 756+71 LT

DETAIL ZZ
BANK STABILIZATION
(Not to Scale)



–L– STA. 756+66 RT

DETAIL L
LATERAL BASE DITCH
(Not to Scale)



FROM –L– STA. 754+50 TO STA. 755+40 RT

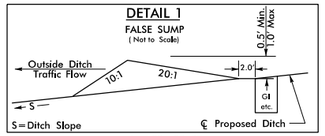
DITCH DETAILS

HNTB NORTH CAROLINA, P.C.
343 W. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License Nbr C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	2D-1
R/W SHEET NO.	
	HYDRAULICS ENGINEER

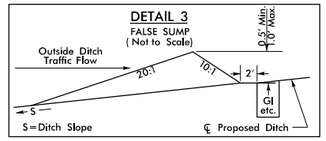
PERMIT DRAWING
SHEET 2A OF 43

DETAIL 1
FALSE SUMP
(Not to Scale)



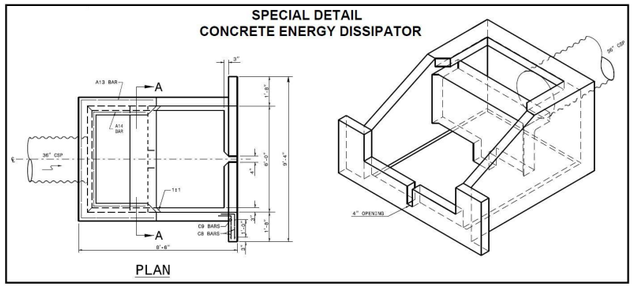
–L– 682+83 RT
–L– 725+09 RT
–L– 789+61 LT
–L– 793+11 LT
–L– 800+11 LT
–RESTA– 10+65 RT
–L– 810+57 LT

DETAIL 3
FALSE SUMP
(Not to Scale)

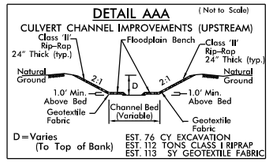


–L– STA. 669+65 LT
–L– STA. 673+90 LT
–L– STA. 678+19 LT
–L– STA. 682+82 LT
–L– STA. 689+83 RT
–L– STA. 699+85 RT
–L– STA. 704+19 RT
–L– STA. 773+41 RT
–L– STA. 783+63 RT
–L– STA. 789+60 RT
–L– STA. 793+11 RT
–L– STA. 800+11 RT
–Y10RPD– STA. 14+69 LT
–Y10RPD– STA. 11+13 LT

SPECIAL DETAIL
CONCRETE ENERGY DISSIPATOR

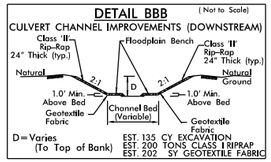


DETAIL AAA
(Not to Scale)
CULVERT CHANNEL IMPROVEMENTS (UPSTREAM)



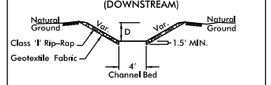
D=Varies (To Top of Bank)
EST. 76 CY EXCAVATION
EST. 112 TONS CLASS I RIPRAP
EST. 113 SY GEOTEXTILE FABRIC

DETAIL BBB
(Not to Scale)
CULVERT CHANNEL IMPROVEMENTS (DOWNSTREAM)



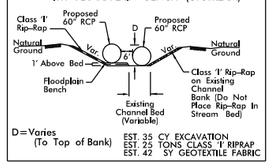
D=Varies (To Top of Bank)
EST. 135 CY EXCAVATION
EST. 200 TONS CLASS I RIPRAP
EST. 202 SY GEOTEXTILE FABRIC

DETAIL CCC
(Not to Scale)
CULVERT CHANNEL IMPROVEMENTS (DOWNSTREAM)



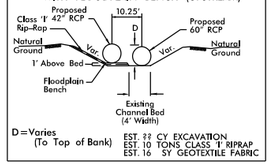
D=Varies (To Top of Bank)
EST. 35 CY EXCAVATION
EST. 44 TONS CLASS I RIPRAP
EST. 73 SY GEOTEXTILE FABRIC

DETAIL DDD
(Not to Scale)
CULVERT CHANNEL IMPROVEMENTS WITH FLOODPLAIN BENCH (UPSTREAM)



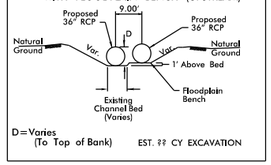
D=Varies (To Top of Bank)
EST. 35 CY EXCAVATION
EST. 25 TONS CLASS 'I' RIPRAP
EST. 42 SY GEOTEXTILE FABRIC

DETAIL EEE
(Not to Scale)
CULVERT CHANNEL IMPROVEMENTS WITH FLOODPLAIN BENCH (UPSTREAM)



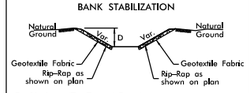
D=Varies (To Top of Bank)
EST. ?? CY EXCAVATION
EST. 10 TONS CLASS 'I' RIPRAP
EST. 16 SY GEOTEXTILE FABRIC

DETAIL FFF
(Not to Scale)
CULVERT CHANNEL IMPROVEMENTS WITH FLOODPLAIN BENCH (UPSTREAM)



D=Varies (To Top of Bank)
EST. ?? CY EXCAVATION

BANK STABILIZATION
DETAIL YYYY
(Not to Scale)
BANK STABILIZATION



D=Varies (To Top of Bank)

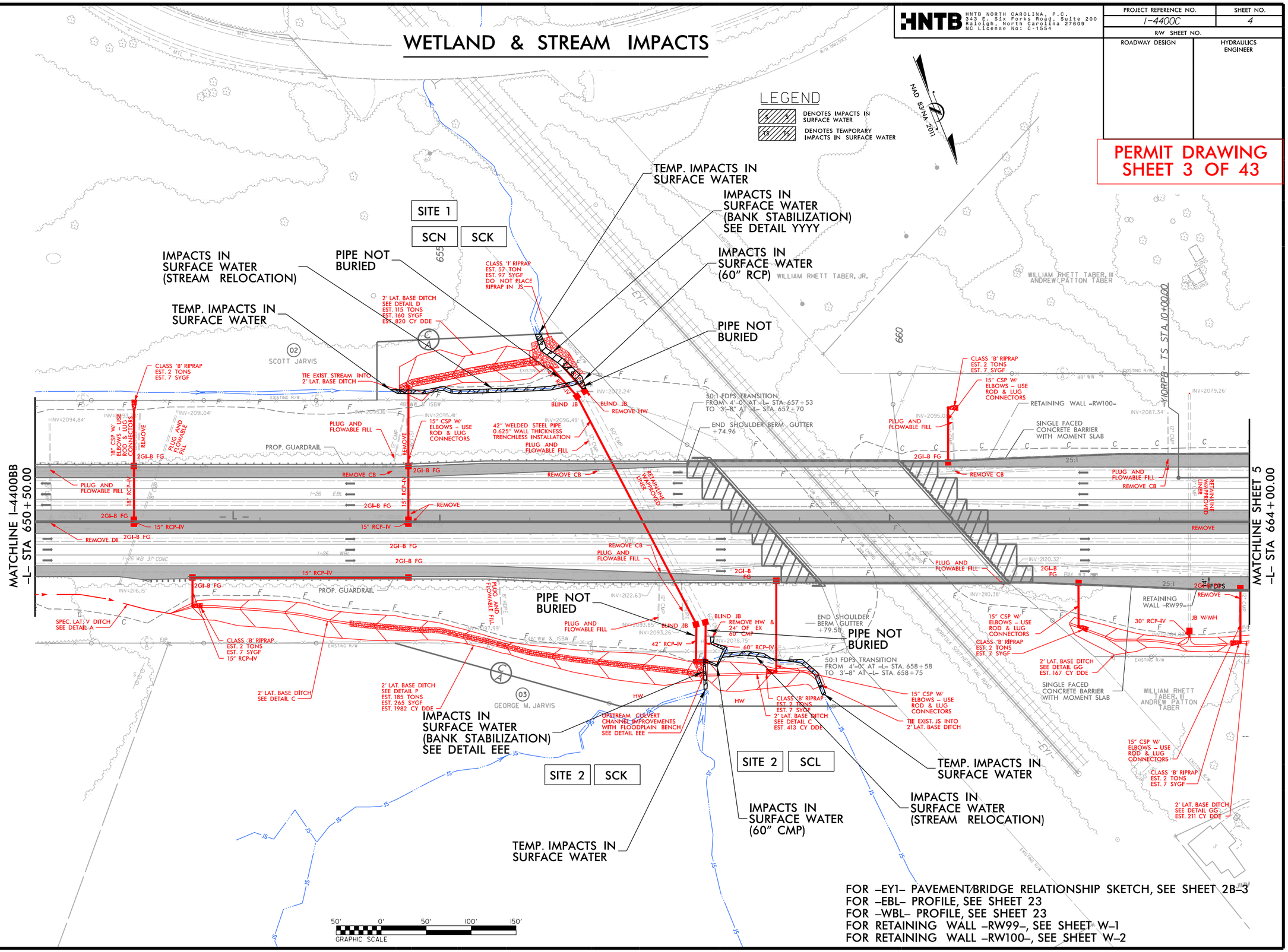
7/19/2017

WETLAND & STREAM IMPACTS

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	4
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 3 OF 43



FOR -EY1- PAVEMENT/BRIDGE RELATIONSHIP SKETCH, SEE SHEET 2B-3
FOR -EBL- PROFILE, SEE SHEET 23
FOR -WBL- PROFILE, SEE SHEET 23
FOR RETAINING WALL -RW99-, SEE SHEET W-1
FOR RETAINING WALL -RW100-, SEE SHEET W-2

3/6/2019
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WETLAND & STREAM IMPACTS

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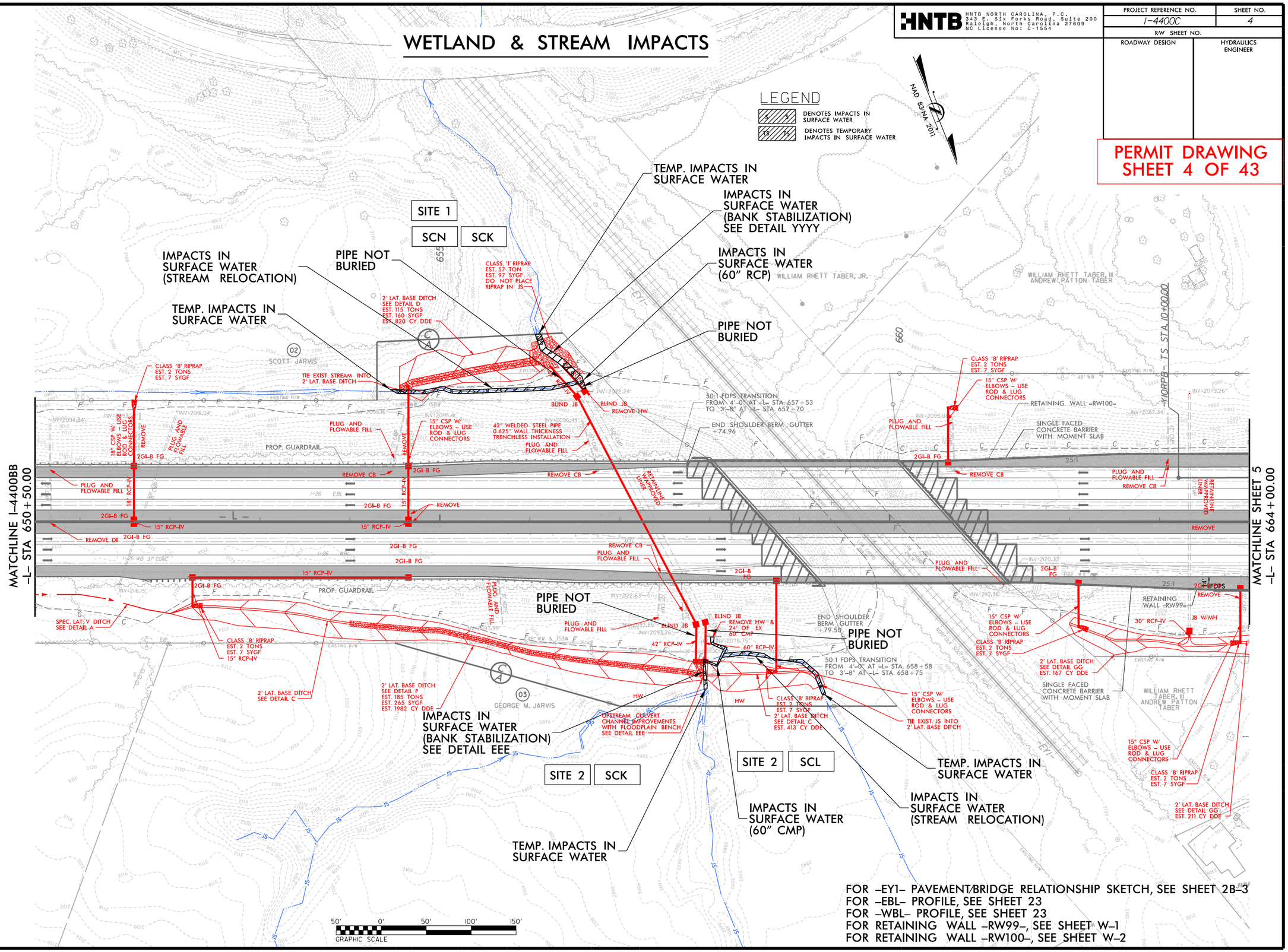
PROJECT REFERENCE NO.	SHEET NO.
I-4400C	4
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 4 OF 43



FOR -EY1- PAVEMENT/BRIDGE RELATIONSHIP SKETCH, SEE SHEET 2B-3
FOR -EBL- PROFILE, SEE SHEET 23
FOR -WBL- PROFILE, SEE SHEET 23
FOR RETAINING WALL -RW99-, SEE SHEET W-1
FOR RETAINING WALL -RW100-, SEE SHEET W-2

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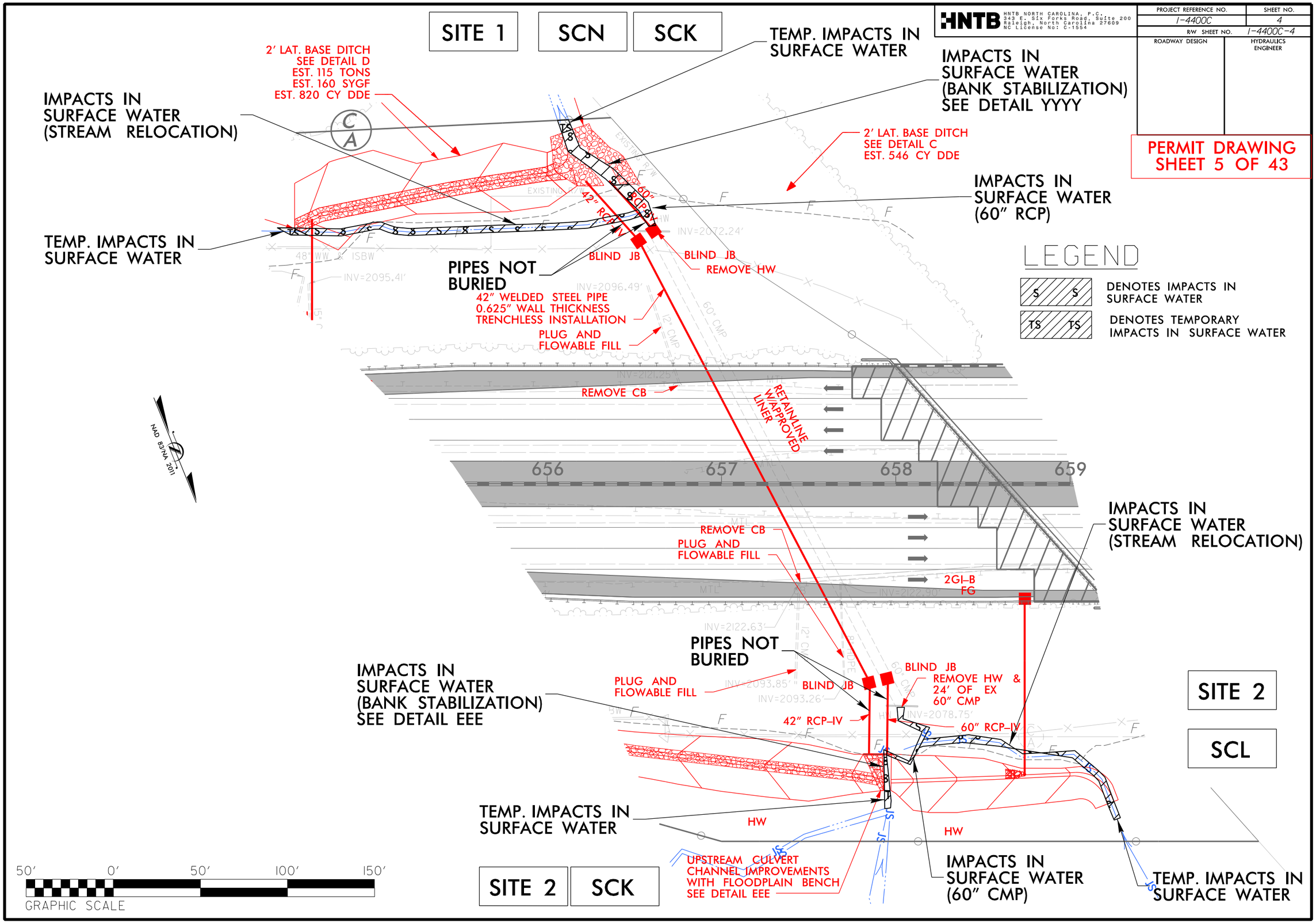
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	4
R/W SHEET NO.	I-4400C-4
ROADWAY DESIGN	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 5 OF 43



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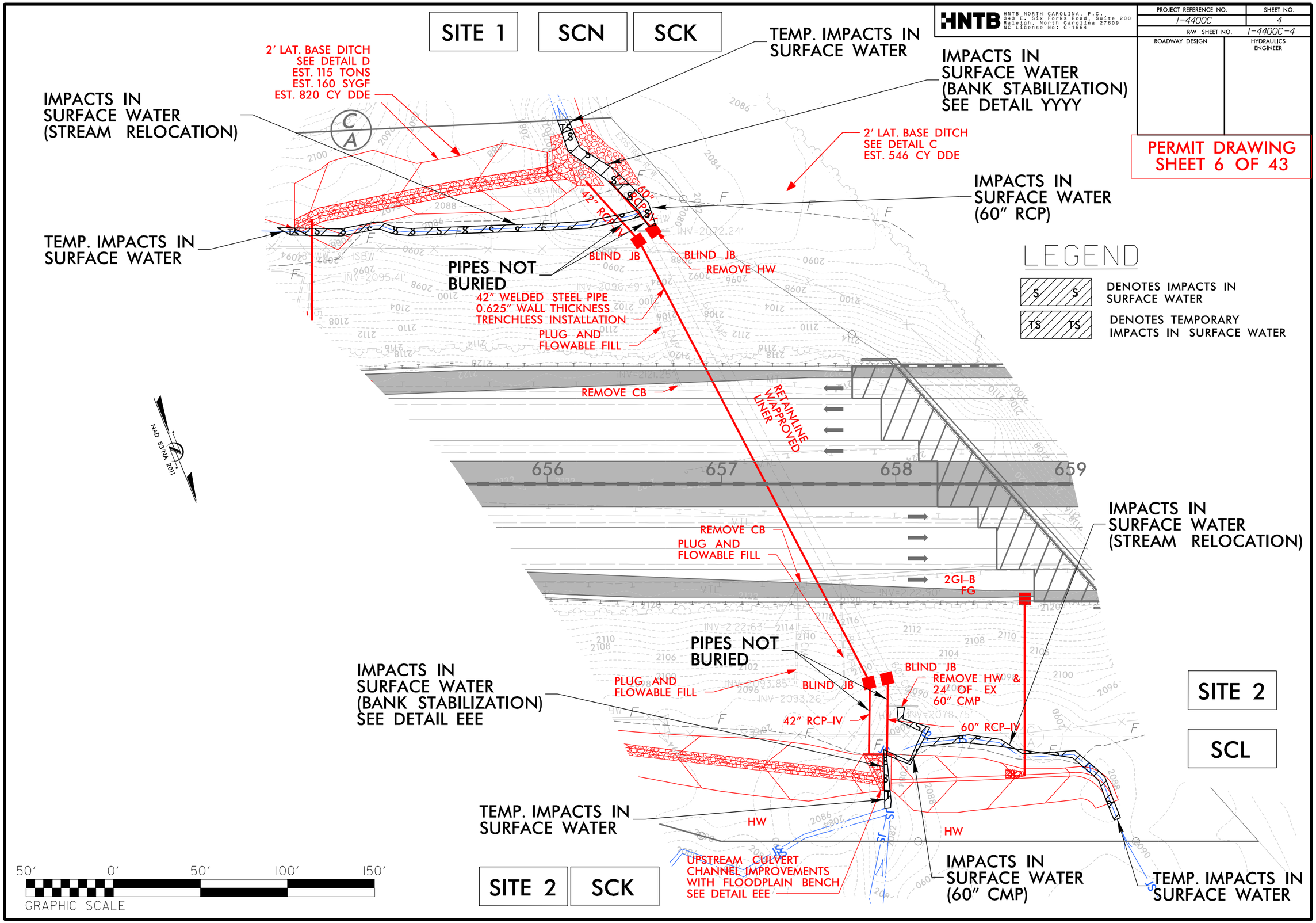
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	4
R/W SHEET NO.	I-4400C-4
ROADWAY DESIGN	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 6 OF 43



LEGEND

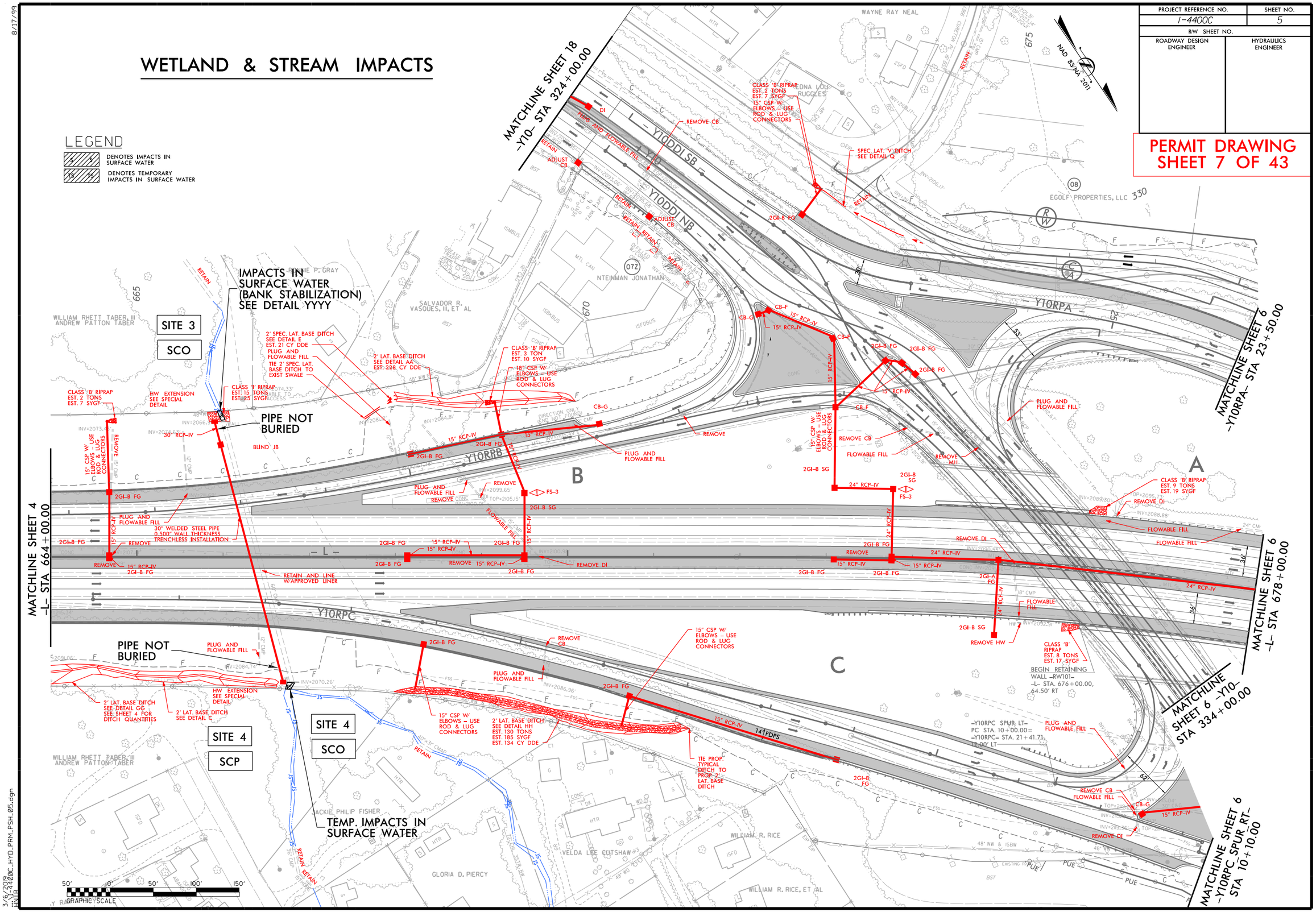
S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 7 OF 43

WETLAND & STREAM IMPACTS



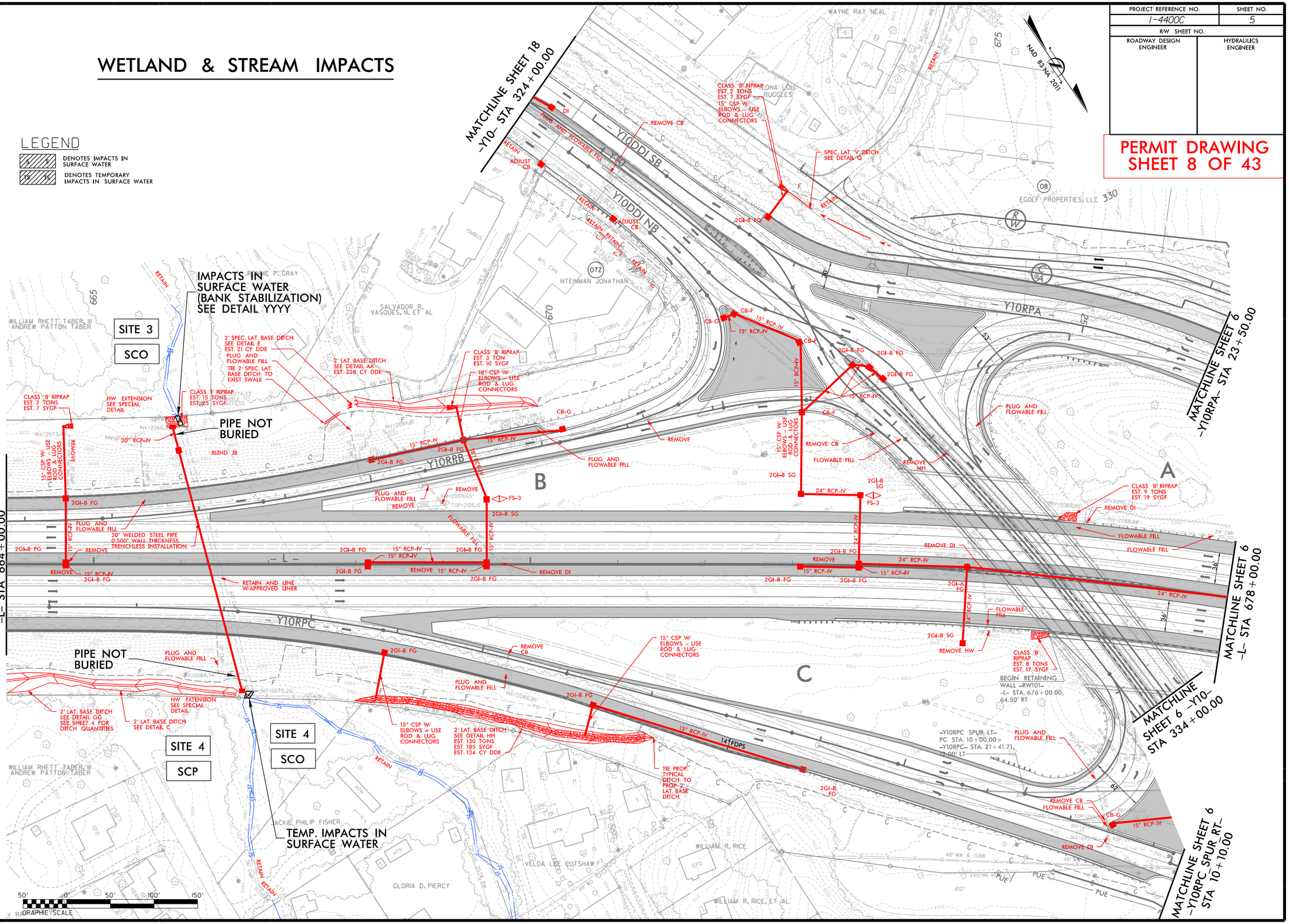
8/17/99

3/6/2019
I-4400C_HYD_PRM_PSH_05.dgn
HNTR

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 8 OF 43

WETLAND & STREAM IMPACTS

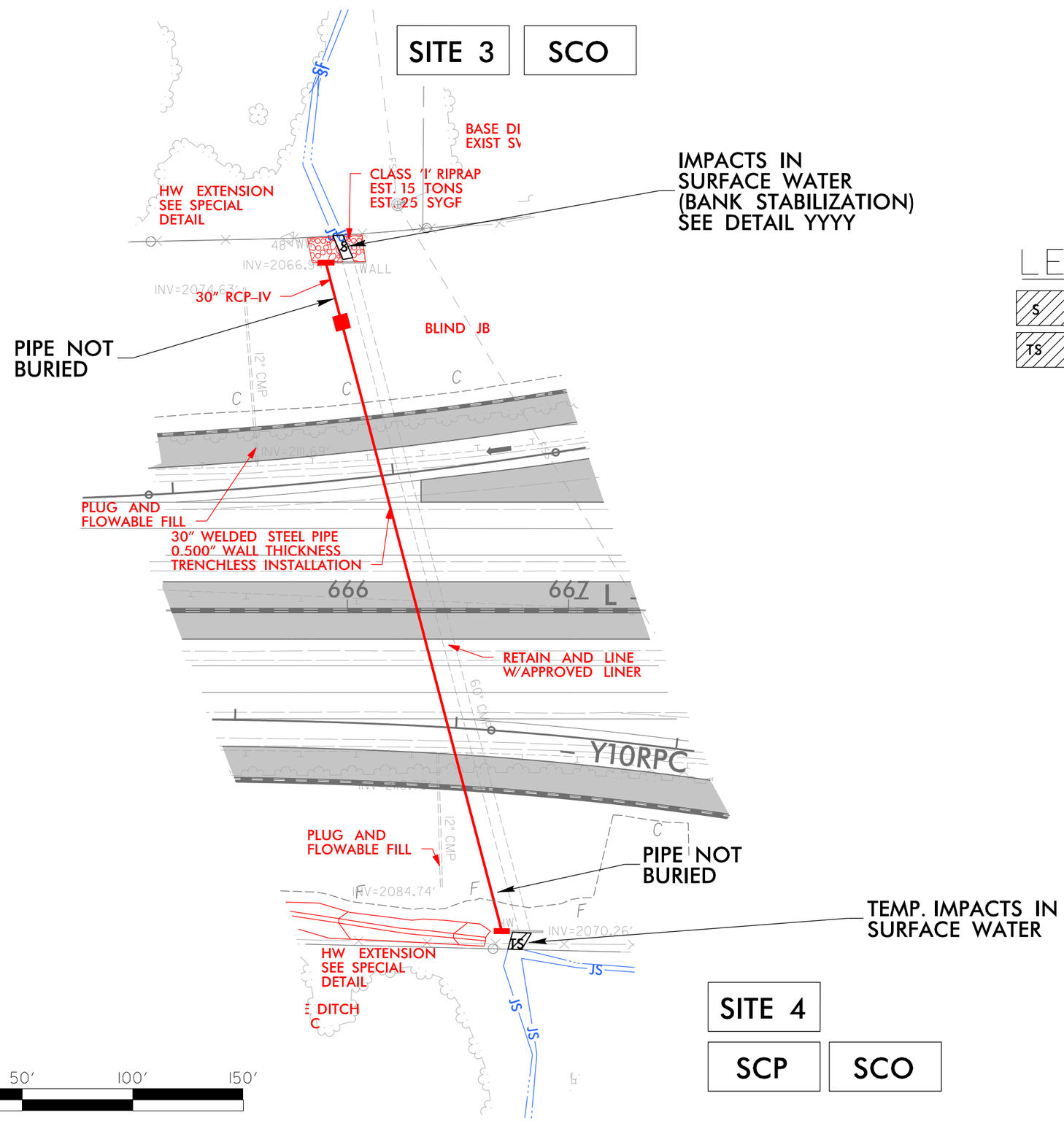


8/17/99

3/6/2019
I-4400C_HYD_PRM_PSH_05.dgn
HNTR

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	5
R/W SHEET NO.	I-4400C-5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 9 OF 43



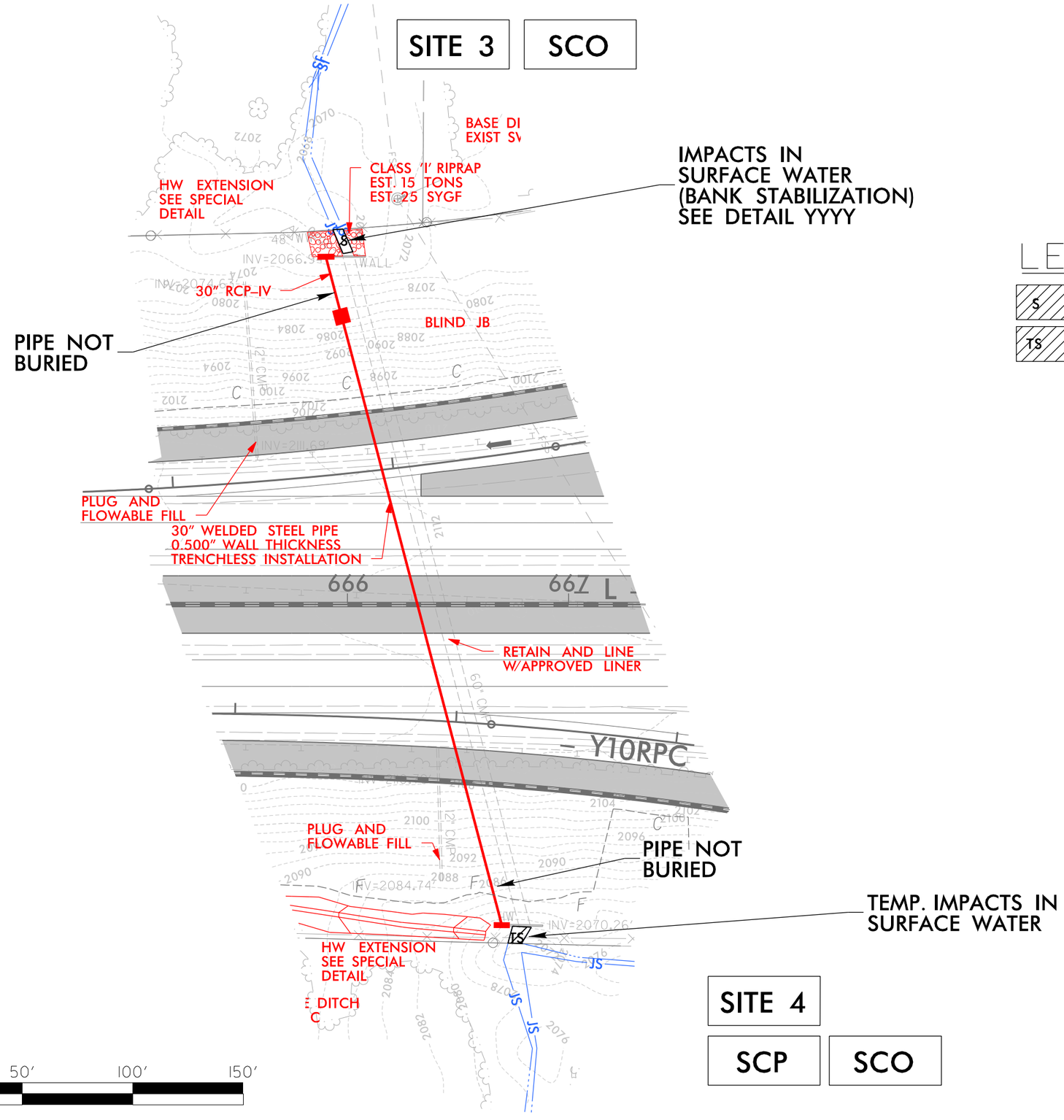
LEGEND

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

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	5
R/W SHEET NO.	I-4400C-5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 10 OF 43

NAD 83/NA 2011



LEGEND

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

WETLAND & STREAM IMPACTS

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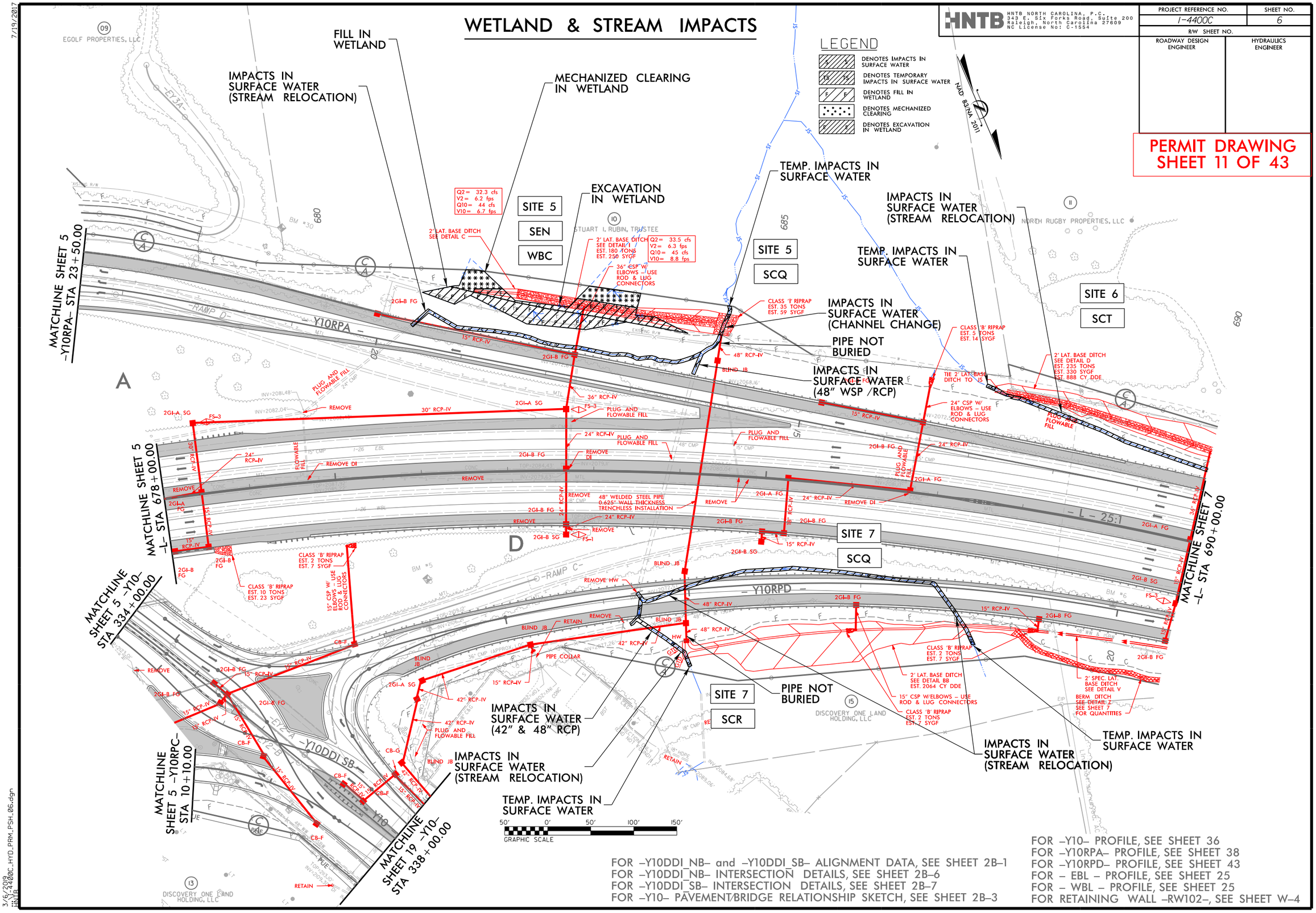
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 11 OF 43



FOR –Y10DDI_NB– and –Y10DDI_SB– ALIGNMENT DATA, SEE SHEET 2B–1
FOR –Y10DDI_NB– INTERSECTION DETAILS, SEE SHEET 2B–6
FOR –Y10DDI_SB– INTERSECTION DETAILS, SEE SHEET 2B–7
FOR –Y10– PAVEMENT/BRIDGE RELATIONSHIP SKETCH, SEE SHEET 2B–3

FOR –Y10– PROFILE, SEE SHEET 36
FOR –Y10RPA– PROFILE, SEE SHEET 38
FOR –Y10RPD– PROFILE, SEE SHEET 43
FOR – EBL – PROFILE, SEE SHEET 25
FOR – WBL – PROFILE, SEE SHEET 25
FOR RETAINING WALL –RW102–, SEE SHEET W–4

7/19/2017
3/5/2019
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WETLAND & STREAM IMPACTS

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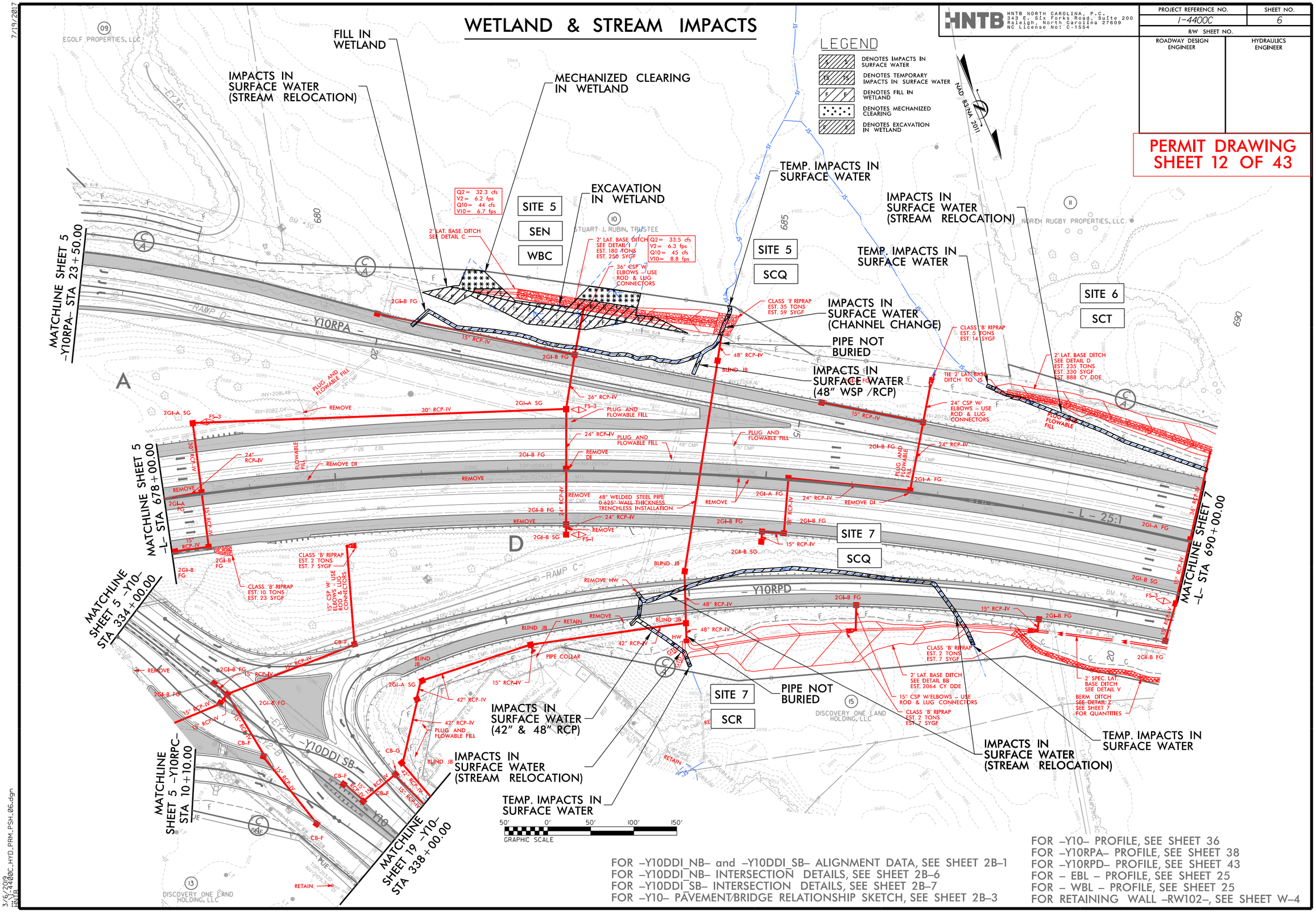
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 12 OF 43



FOR –Y10DDI_NB– and –Y10DDI_SB– ALIGNMENT DATA, SEE SHEET 2B–1
FOR –Y10DDI_NB– INTERSECTION DETAILS, SEE SHEET 2B–6
FOR –Y10DDI_SB– INTERSECTION DETAILS, SEE SHEET 2B–7
FOR –Y10– PAVEMENT/BRIDGE RELATIONSHIP SKETCH, SEE SHEET 2B–3

FOR –Y10– PROFILE, SEE SHEET 36
FOR –Y10RPA– PROFILE, SEE SHEET 38
FOR –Y10RPD– PROFILE, SEE SHEET 43
FOR – EBL – PROFILE, SEE SHEET 25
FOR – WBL – PROFILE, SEE SHEET 25
FOR RETAINING WALL –RW102–, SEE SHEET W–4

7/19/2017
3/6/2019
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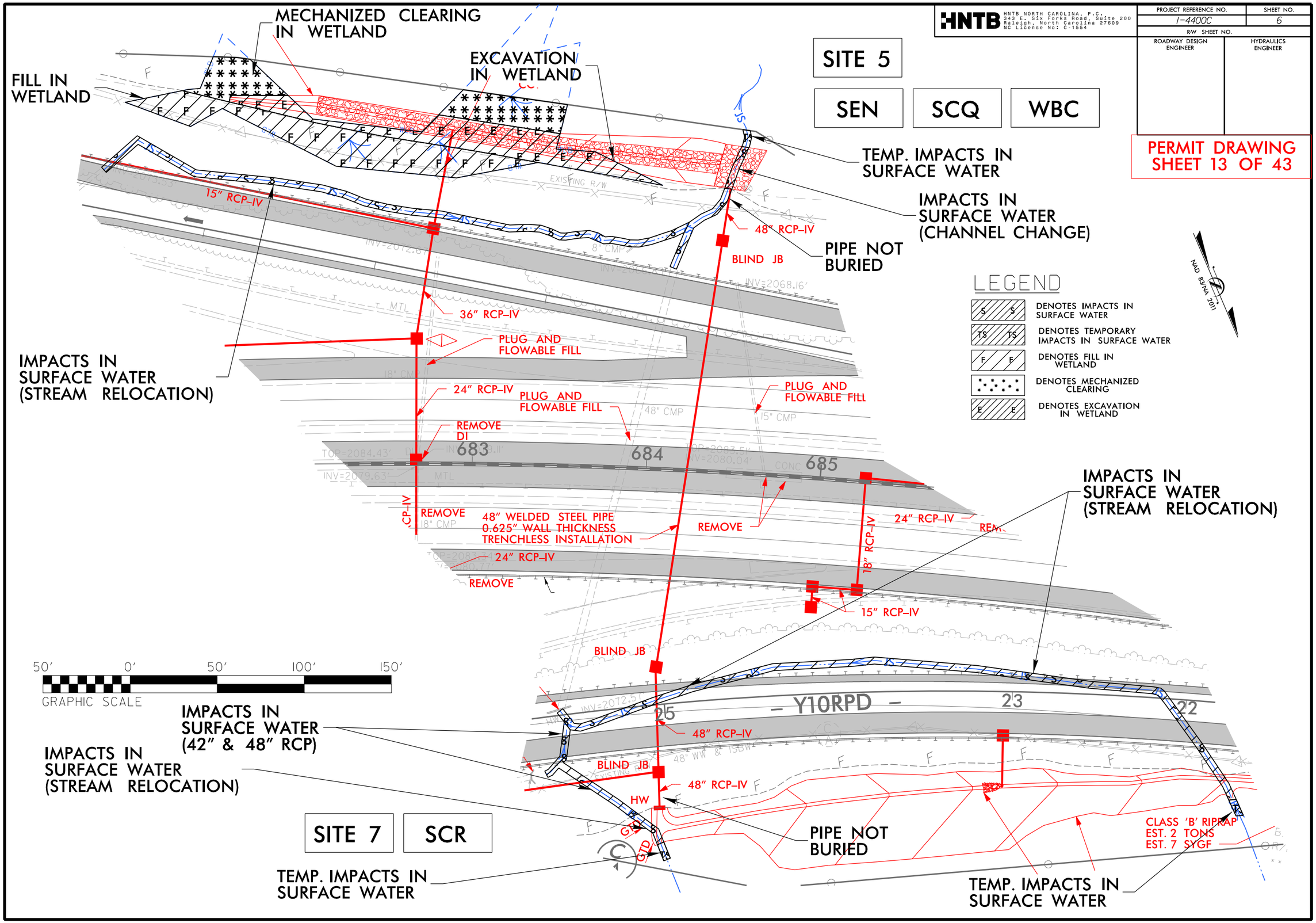
PROJECT REFERENCE NO.	SHEET NO.
I-4400C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 13 OF 43



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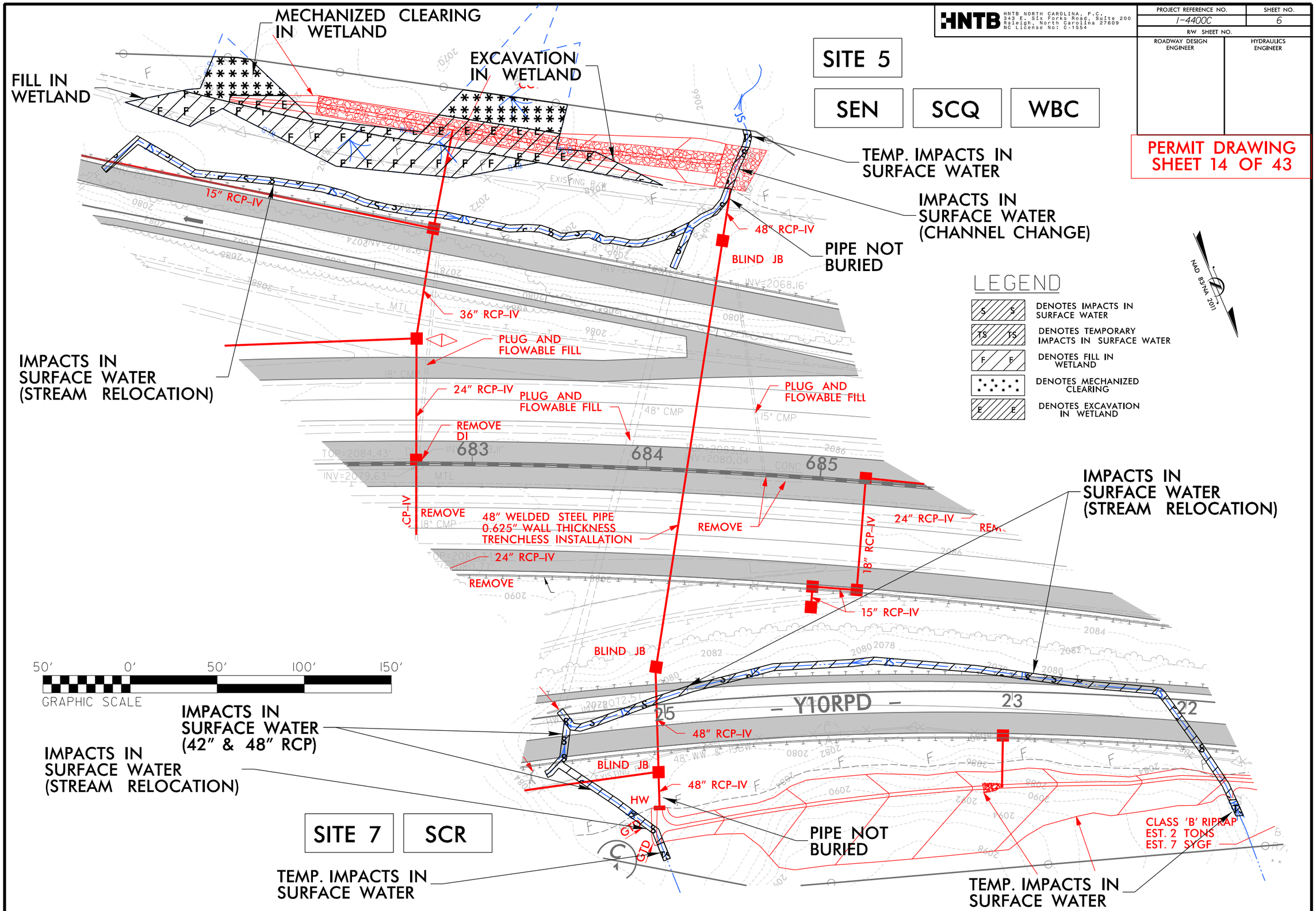
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 14 OF 43

SITE 5

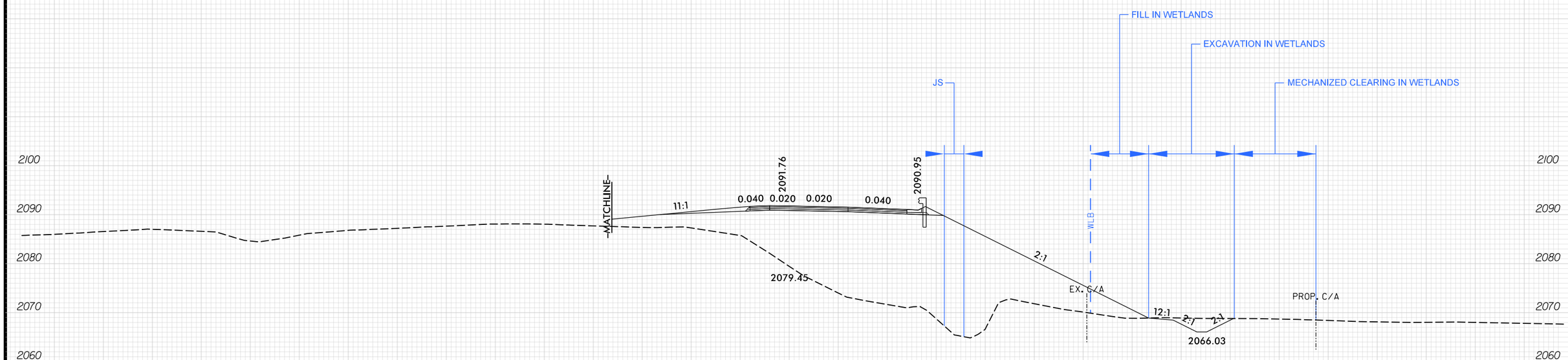
SEN | SCQ | WBC



PROJ. REFERENCE NO.	SHEET NO.
I-4700	

PERMIT DRAWING
SHEET 15 OF 43

WETLAND CROSS SECTIONS



SITE 5

–Y10RPA– 17+50.00

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

BUNCOMBE & HENDERSON COUNTY
PROJECT: I-4400C
I-26
I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY)
TO SOUTH OF NC 280

6/23/16

3/6/2019
I-4400C_HYD_PRM_PSH_XPL
HNTB

7/19/2017

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Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

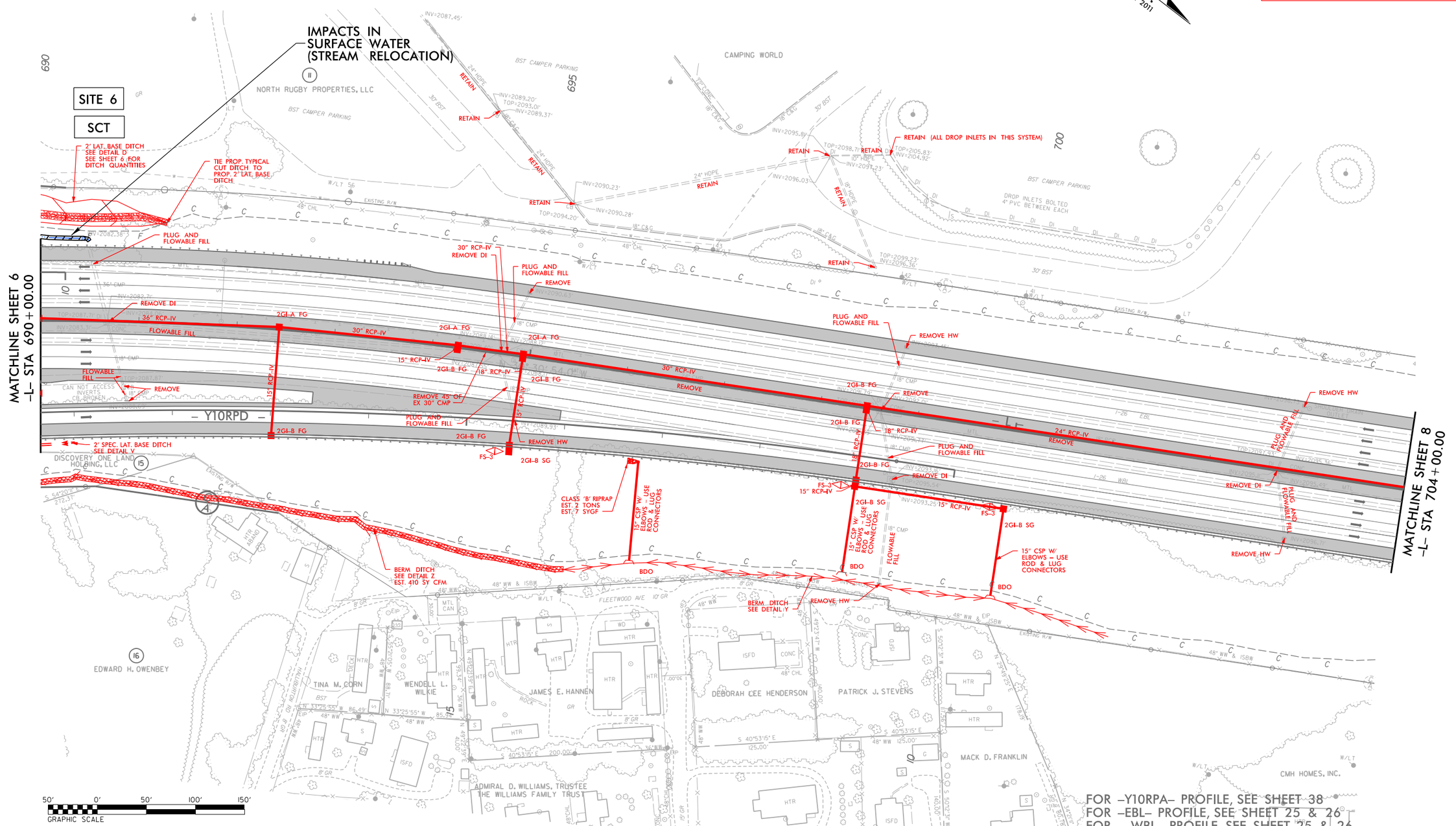
PERMIT DRAWING
SHEET 16 OF 43

WETLAND & STREAM IMPACTS

LEGEND

DENOTES IMPACTS IN SURFACE WATER

NAD 83/NA 2011



FOR -Y10RPA- PROFILE, SEE SHEET 38
FOR -EBL- PROFILE, SEE SHEET 25 & 26
FOR - WBL- PROFILE, SEE SHEET 25 & 26

3/4/2019
I-4400C_HYD_PRM_PSH_07.dgn
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7/19/2017

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Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 17 OF 43

WETLAND & STREAM IMPACTS

LEGEND

DENOTES IMPACTS IN SURFACE WATER

NAD 83/NA 2011

IMPACTS IN SURFACE WATER (STREAM RELOCATION)

SITE 6

SCT

MATCHLINE SHEET 6 -L- STA 690+00.00

MATCHLINE SHEET 8 -L- STA 704+00.00

2' LAT. BASE DITCH SEE DETAIL D SEE SHEET 6 FOR DITCH QUANTITIES

TIE PROP. TYPICAL CUT DITCH TO PROP. 2' LAT. BASE DITCH

PLUG AND FLOWABLE FILL

REMOVE DI

36" RCP-IV

FLOWABLE FILL

30" RCP-IV

15" RCP-IV

18" RCP-IV

24" RCP-IV

REMOVE 45' OF EX 30" CMP

REMOVE HW

2' SPEC. LAT. BASE DITCH SEE DETAIL V

CLASS 'B' RIPRAP EST. 2 TONS EST. 7 SYGF

15" CSP W/ ELBOWS - USE ROD & LUG CONNECTORS

BERM DITCH SEE DETAIL Z EST. 410 SY CFM

BERM DITCH SEE DETAIL Y

BDO

RETAIN

RETAIN (ALL DROP INLETS IN THIS SYSTEM)

DROP INLETS BOLTED 4" PVC BETWEEN EACH

Y10RPD

-L-

NORTH RUGBY PROPERTIES, LLC

CAMPING WORLD

BST CAMPER PARKING

DISCOVERY ONE LAND HOLDING, LLC

EDWARD H. OWENBEY

TINA M. CORN

WENDELL L. WILKIE

JAMES E. HANNEN

DEBORAH CEE HENDERSON

PATRICK J. STEVENS

MACK D. FRANKLIN

CMH HOMES, INC.

ADMIRAL D. WILLIAMS, TRUSTEE THE WILLIAMS FAMILY TRUST

FLEETWOOD AVE

GRAPHIC SCALE 50' 0' 50' 100' 150'

FOR -Y10RPA- PROFILE, SEE SHEET 38
FOR -EBL- PROFILE, SEE SHEET 25 & 26
FOR - WBL- PROFILE, SEE SHEET 25 & 26

3/4/2019
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WETLAND & STREAM IMPACTS

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Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 18 OF 43

★ PROPOSED TRAFFIC SIGNAL

LEGEND

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83/NA 2011

MATCHLINE SHEET 7
-L- STA 704+00.00

MATCHLINE SHEET 9
-L- STA 718+00.00

MATCHLINE SHEET 20
-Y11- STA STA 19+50.00

FILL IN WETLAND

MECHANIZED CLEARING IN WETLAND

SITE 8

WBG

GRAPHIC SCALE 50' 0' 50' 100' 150'

7/19/2017

3/4/2019
I-4400C_HYD_PRM_PSH_08.dgn
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WETLAND & STREAM IMPACTS

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PROJECT REFERENCE NO.	SHEET NO.
I-4400C	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 19 OF 43

★ PROPOSED TRAFFIC SIGNAL

LEGEND

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83/NA 2011

MATCHLINE SHEET 7
-L- STA 704+00.00

MATCHLINE SHEET 9
-L- STA 718+00.00

MATCHLINE SHEET 20
-Y11- STA STA 19+50.00

FILL IN WETLAND

MECHANIZED CLEARING IN WETLAND

SITE 8

WBG

GRAPHIC SCALE 50' 0' 50' 100' 150'

7/19/2017

3/4/2019
I-4400C_HYD_PRM_PSH_08.dgn
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7/19/2017

WETLAND & STREAM IMPACTS

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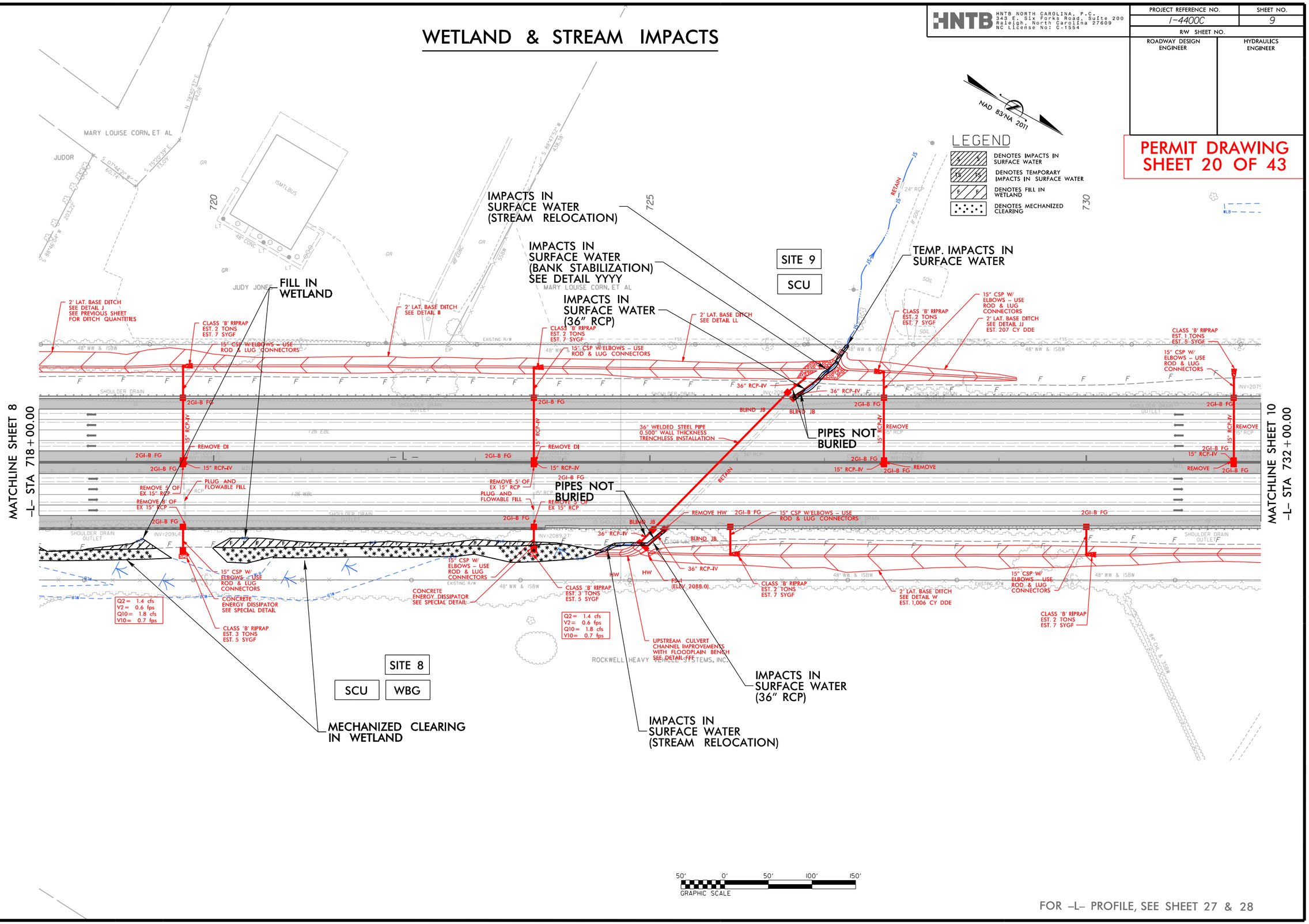
PROJECT REFERENCE NO.	SHEET NO.
I-4400C	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 20 OF 43



FOR –L– PROFILE, SEE SHEET 27 & 28

3/6/2019
I-4400C_HYD_PRM_PSH_09.dgn
HNTB

7/19/2017

WETLAND & STREAM IMPACTS

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PROJECT REFERENCE NO.	SHEET NO.
I-4400C	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 21 OF 43

NAD 83/NA 2011

LEGEND

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

MATCHLINE SHEET 8
-L- STA 718+00.00

MATCHLINE SHEET 10
-L- STA 732+00.00

SITE 9
SCU

SITE 8
SCU
WBG

IMPACTS IN SURFACE WATER (STREAM RELOCATION)

IMPACTS IN SURFACE WATER (BANK STABILIZATION) SEE DETAIL YYY

IMPACTS IN SURFACE WATER (36" RCP)

TEMP. IMPACTS IN SURFACE WATER

FILL IN WETLAND

PIPES NOT BURIED

PIPES NOT BURIED

MECHANIZED CLEARING IN WETLAND

IMPACTS IN SURFACE WATER (36" RCP)

IMPACTS IN SURFACE WATER (STREAM RELOCATION)

2' LAT. BASE DITCH SEE DETAIL J SEE PREVIOUS SHEET FOR DITCH QUANTITIES

CLASS 'B' RIPRAP EST. 2 TONS EST. 7 SYGF

15" CSP W/ELBOWS – USE ROD & LUG CONNECTORS

2' LAT. BASE DITCH SEE DETAIL II

2' LAT. BASE DITCH SEE DETAIL LL

2' LAT. BASE DITCH SEE DETAIL JJ EST. 207 CY DDE

CLASS 'B' RIPRAP EST. 1 TONS EST. 8 SYGF

36" WELDED STEEL PIPE 0.500" WALL THICKNESS TRENCHLESS INSTALLATION

REMOVE DI

REMOVE 5' OF EX 15" RCP

REMOVE 8' OF EX 15" RCP

PLUG AND FLOWABLE FILL

CONCRETE ENERGY DISSIPATOR SEE SPECIAL DETAIL

CLASS 'B' RIPRAP EST. 3 TONS EST. 5 SYGF

Q2= 1.4 cfs
V2= 0.6 fps
Q10= 1.8 cfs
V10= 0.7 fps

UPSTREAM CULVERT CHANNEL IMPROVEMENTS WITH FLOODPLAIN BENCH SEE DETAIL CFE

2' LAT. BASE DITCH SEE DETAIL W EST. 1,006 CY DDE

REMOVE HW

BLIND JB

36" RCP-IV

15" RCP-IV

2GI-B FG

RETAIN

MARY LOUISE CORN, ET AL

JUDOR

JUDY JONES

ISMTL BUS

ROCKWELL HEAVY VEHICLE SYSTEMS, INC.

50' 0' 50' 100' 150'
GRAPHIC SCALE

FOR -L- PROFILE, SEE SHEET 27 & 28

3/6/2019
I-4400C_HYD_PRM_PSH_09.dgn
HNTB

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NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

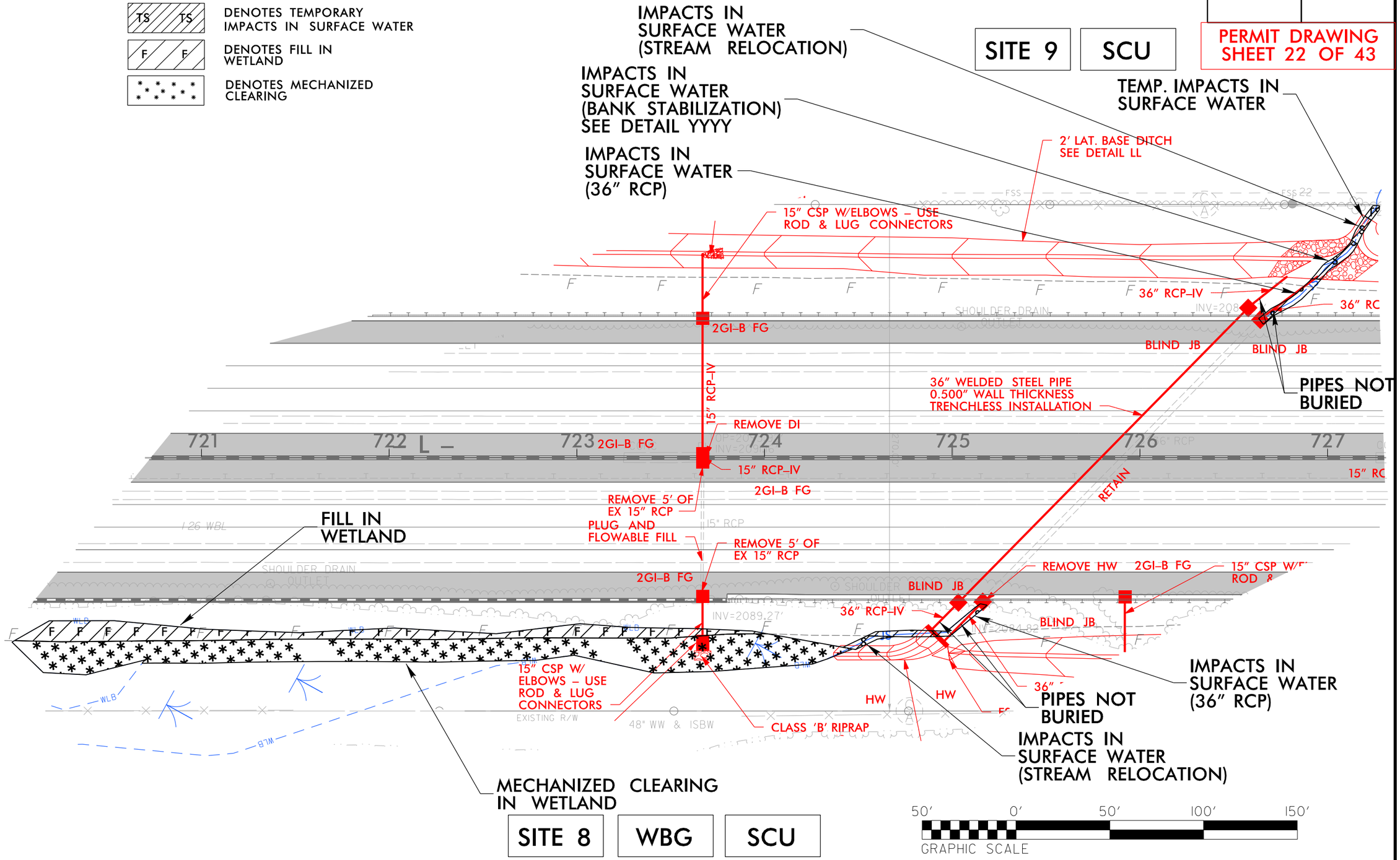
PERMIT DRAWING
SHEET 22 OF 43

WETLAND & STREAM IMPACTS

LEGEND

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

SITE 9 | SCU



SITE 8 | WBG | SCU

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

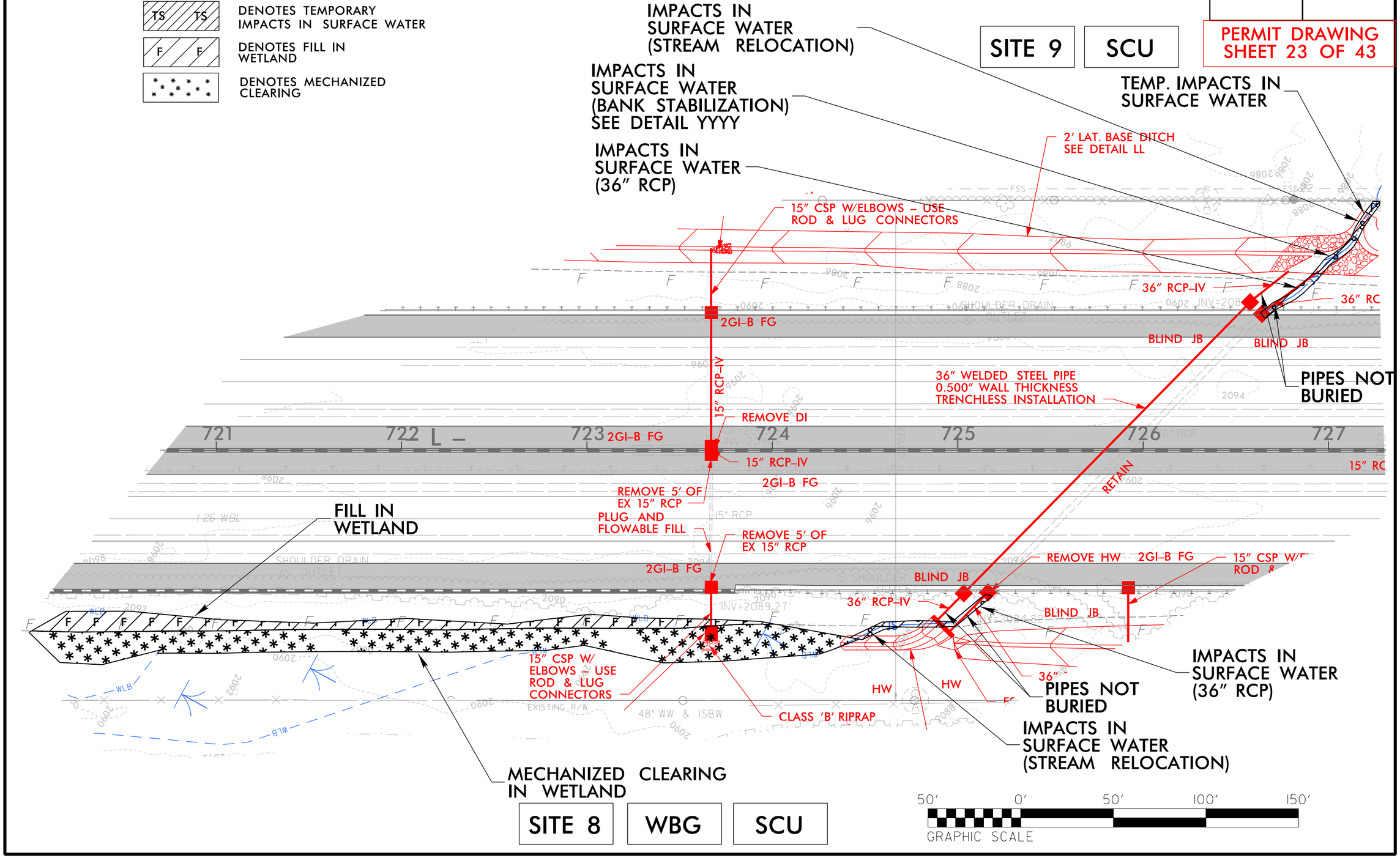
PERMIT DRAWING
SHEET 23 OF 43

WETLAND & STREAM IMPACTS

LEGEND

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

SITE 9 | SCU



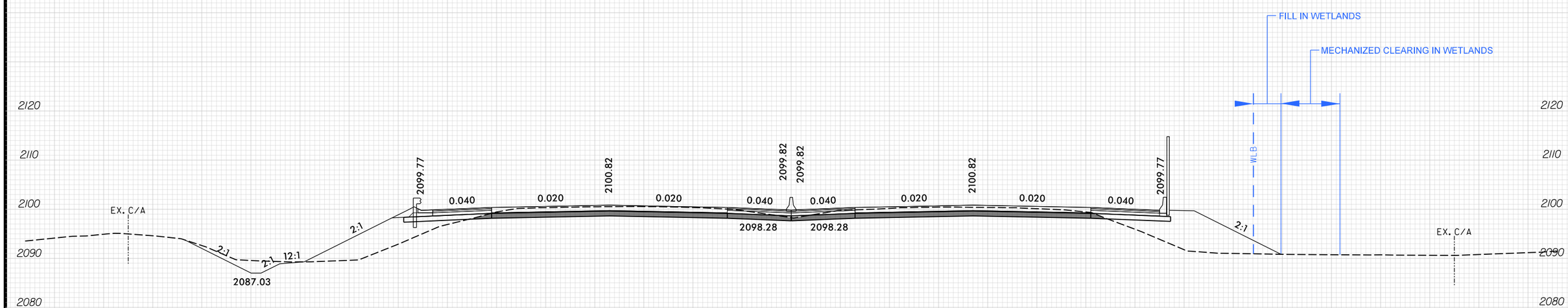
SITE 8 | WBG | SCU

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
I-4700	

PERMIT DRAWING
SHEET 24 OF 43

WETLAND CROSS SECTIONS



SITE 8

–L– 719+00.00

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

BUNCOMBE & HENDERSON COUNTY
PROJECT: I-4400C
I-26
I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY)
TO SOUTH OF NC 280

3/6/2019
I-4400C_HYD_PRM_PSH_XPL
HNTB

WETLAND & STREAM IMPACTS

HNTB NORTH CAROLINA, P.C.
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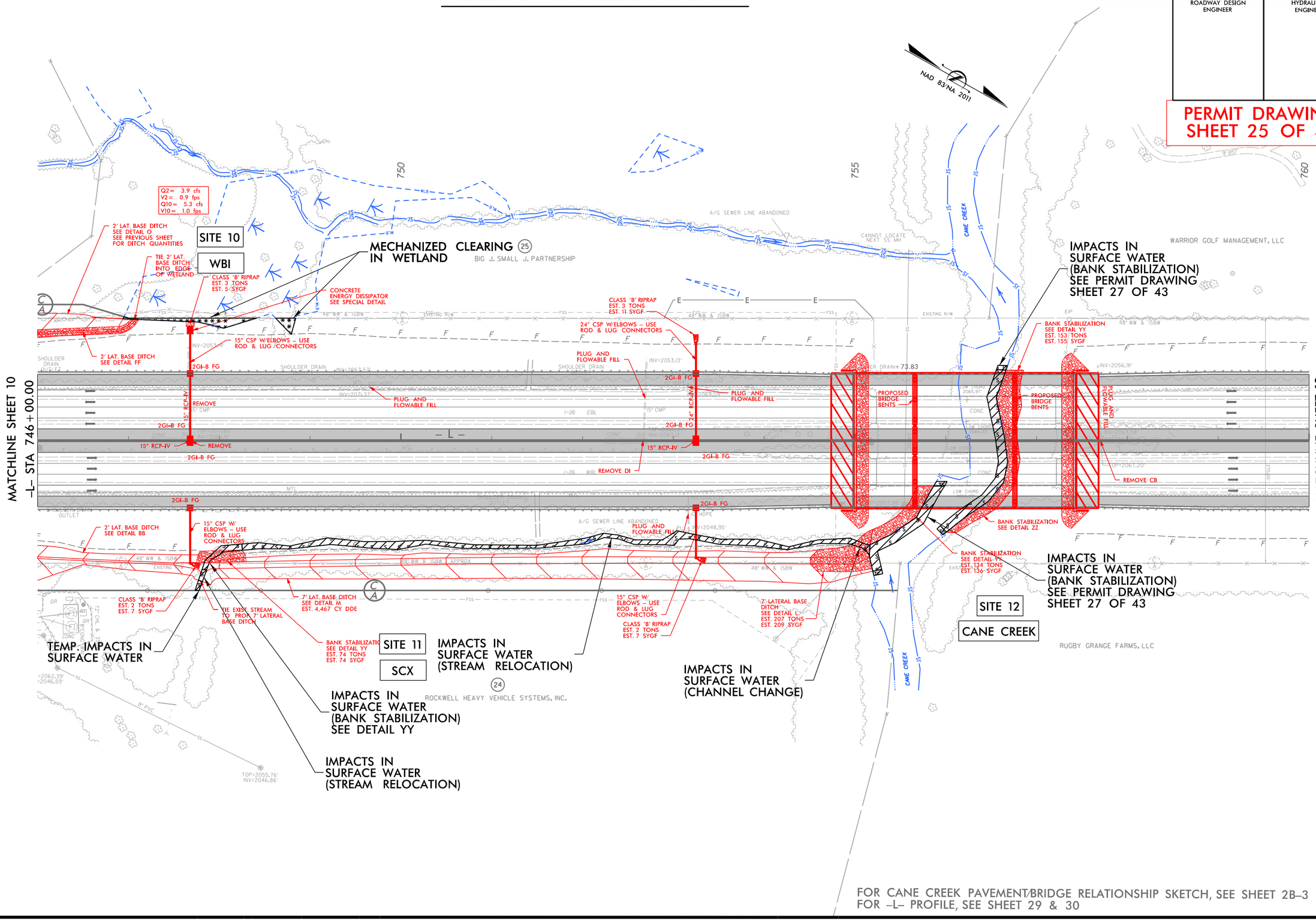
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 25 OF 43



FOR CANE CREEK PAVEMENT/BRIDGE RELATIONSHIP SKETCH, SEE SHEET 2B–3
FOR –L– PROFILE, SEE SHEET 29 & 30

7/19/2017

3/6/2019
I-4400C_HYD_PRM_PSH_11.dgn
HNTB

WETLAND & STREAM IMPACTS

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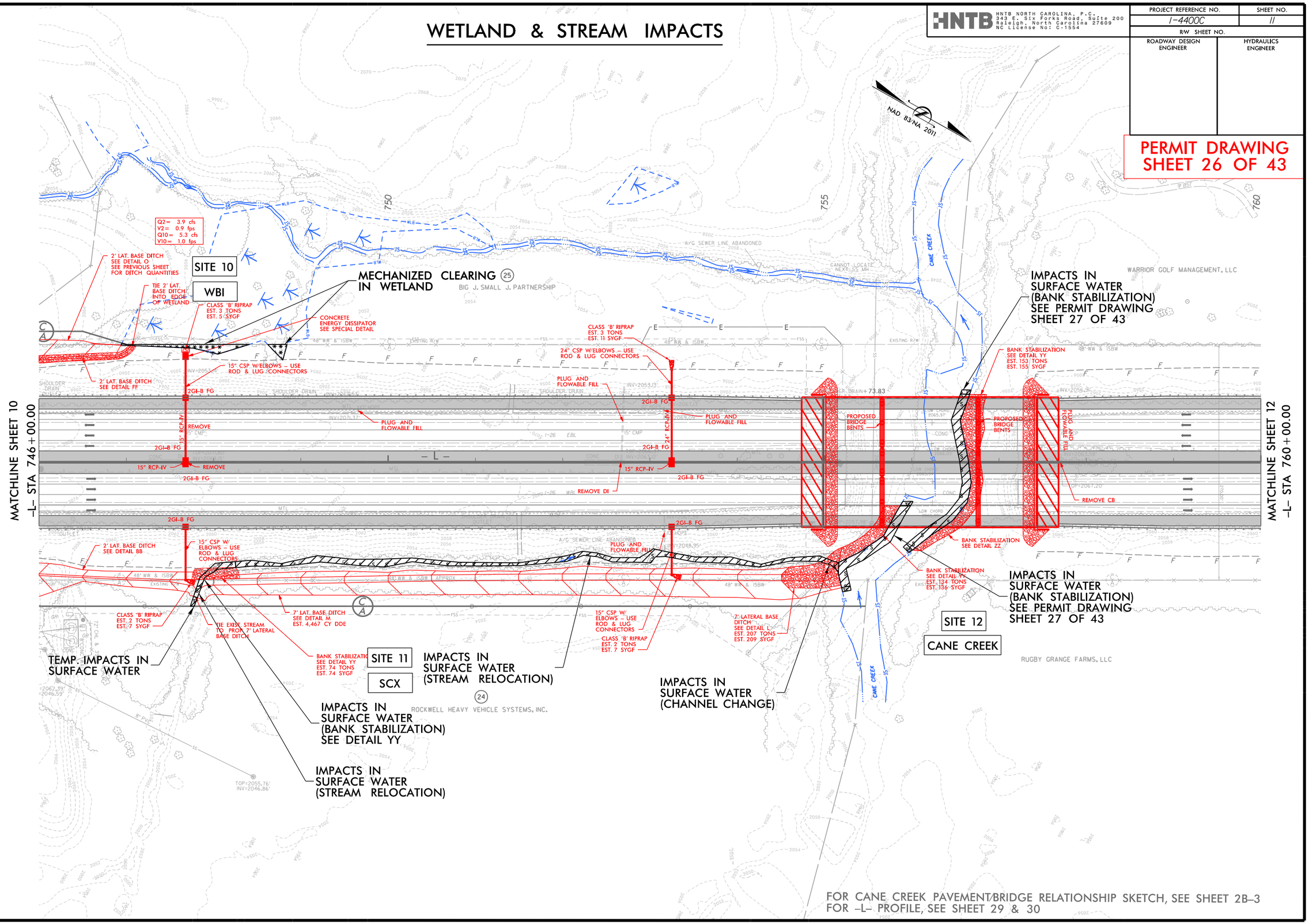
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 26 OF 43



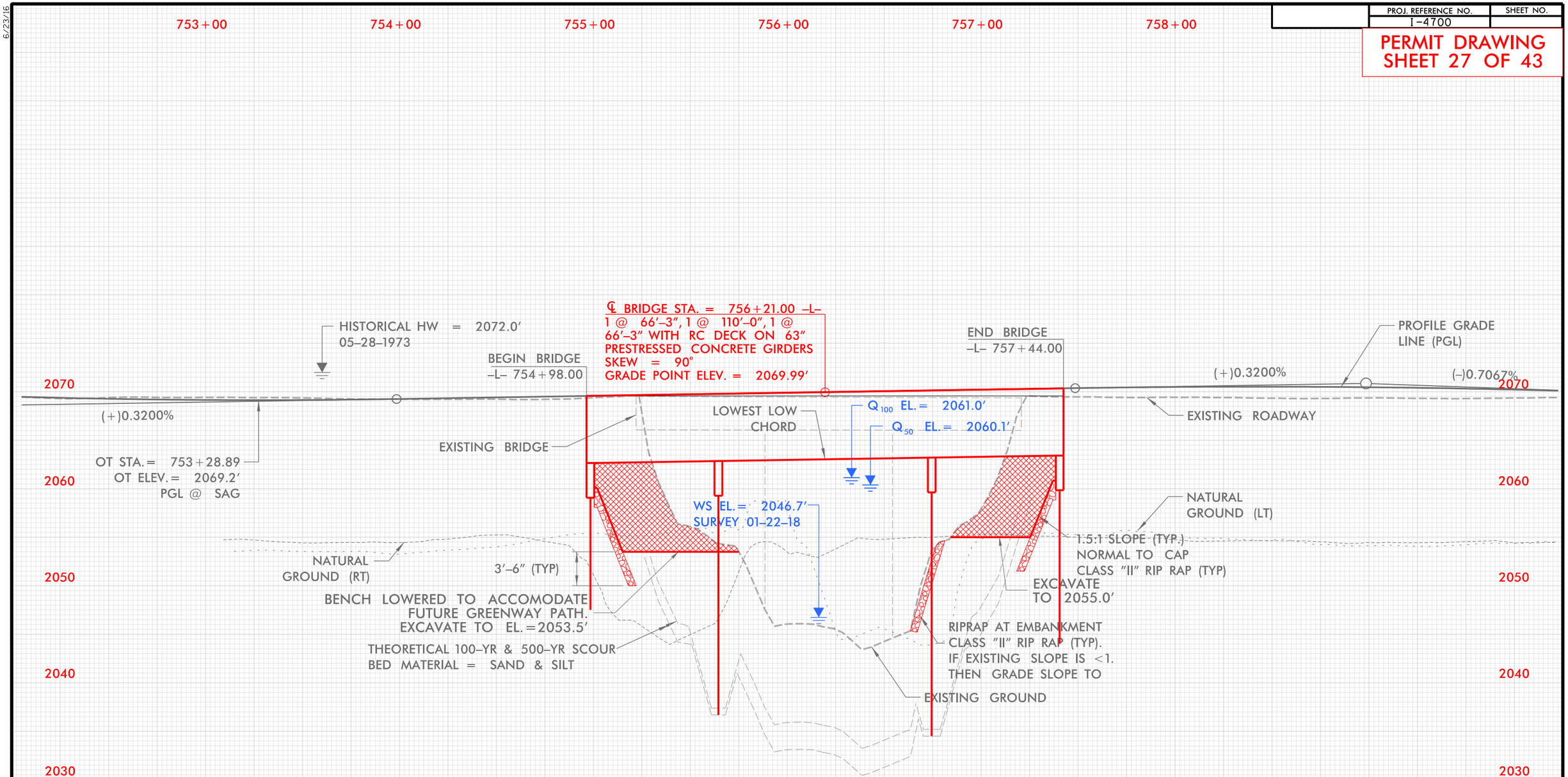
FOR CANE CREEK PAVEMENT/BRIDGE RELATIONSHIP SKETCH, SEE SHEET 2B–3
FOR –L– PROFILE, SEE SHEET 29 & 30

7/19/2017

3/6/2019
I-4400C_HYD_PRM_PSH_11.dgn
HNTB

PROJ. REFERENCE NO.	SHEET NO.
I-4700	

PERMIT DRAWING
SHEET 27 OF 43



PROFILE

BUNCOMBE & HENDERSON COUNTY
PROJECT: I-4400C
I-26
I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY)
TO SOUTH OF NC 280

6/23/16

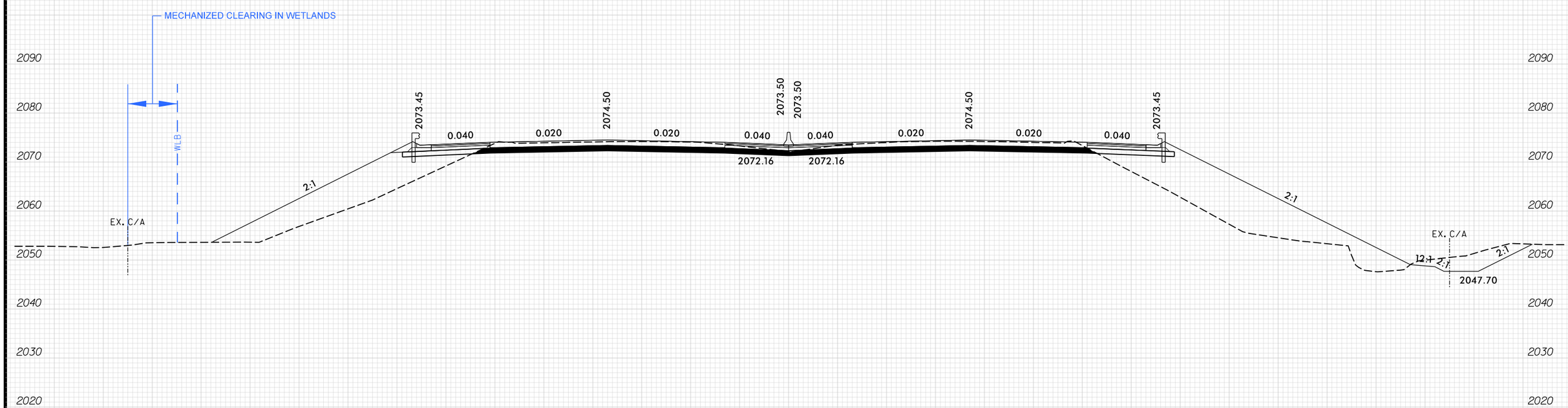
3/4/2019
I-4400C_HYD_PRM_PSH_11A_BDG_PFL.dgn
HNTB

6/23/16

5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-4700	

PERMIT DRAWING
SHEET 28 OF 43

WETLAND CROSS SECTIONS



SITE 10
-L- 748+00.00

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

BUNCOMBE & HENDERSON COUNTY
PROJECT: I-4400C
I-26
I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY)
TO SOUTH OF NC 280

3/6/2019
I-4400C_HYD_PRM_PSH_XPL
HNTB

WETLAND & STREAM IMPACTS

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

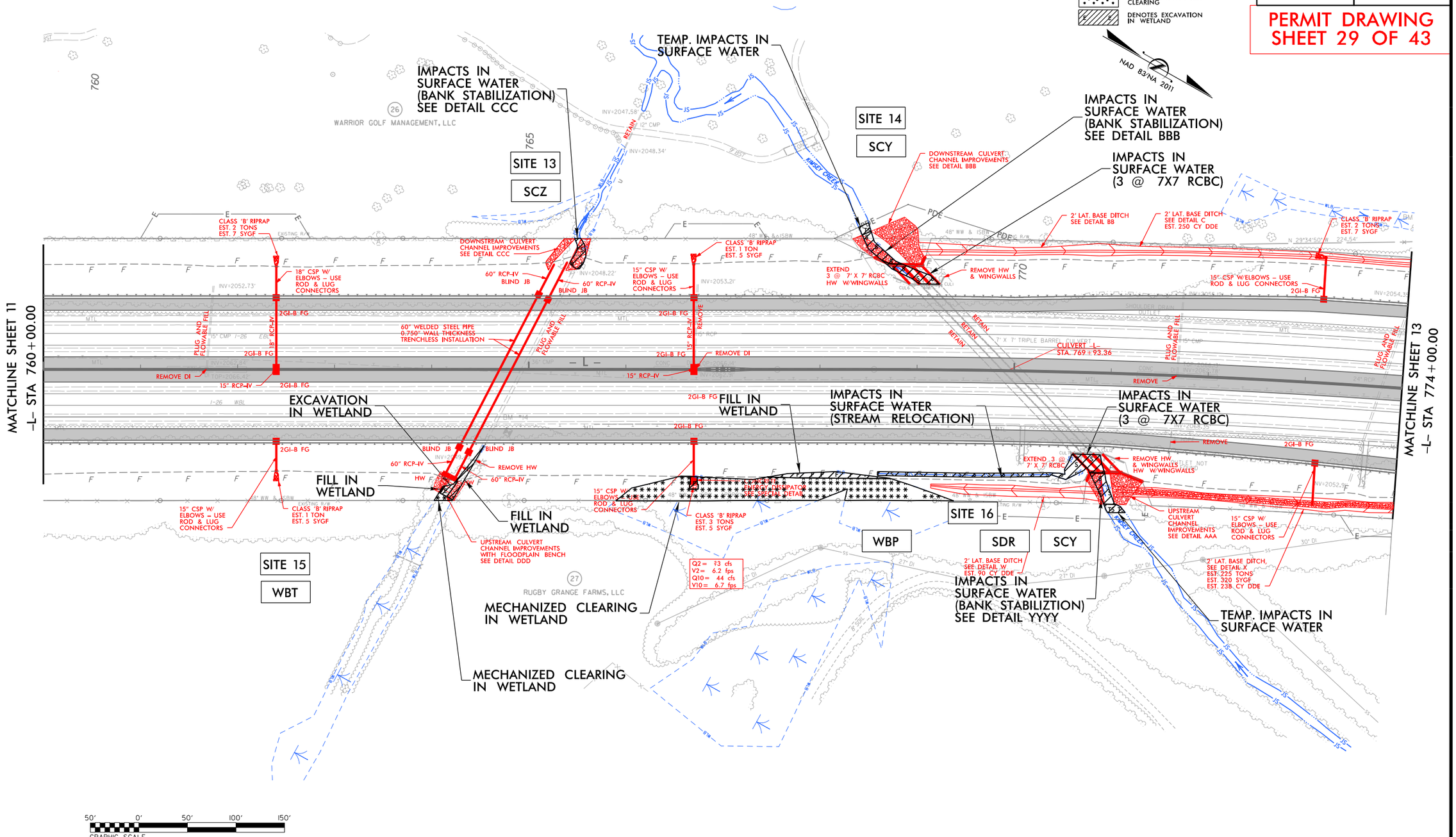
PROJECT REFERENCE NO.	SHEET NO.
I-4400C	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 29 OF 43

LEGEND

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

NAD 83/NA 2011



FOR -L- PROFILE, SEE SHEET 30 & 31

7/19/2017

3/6/2019
I-4400C_HYD_PRM_PSH_12.dgn
HNTB

WETLAND & STREAM IMPACTS

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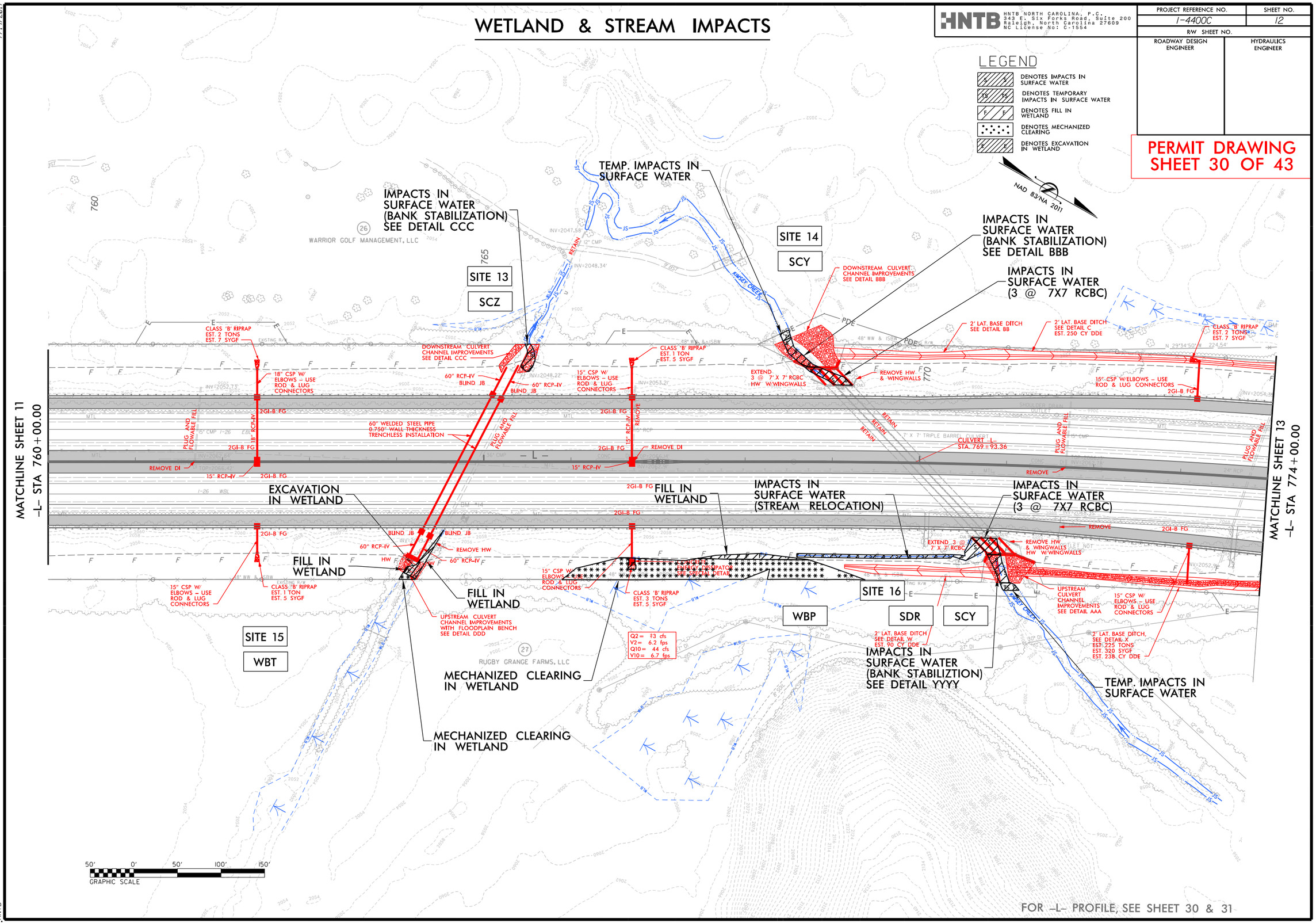
PROJECT REFERENCE NO.	SHEET NO.
I-4400C	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 30 OF 43



FOR -L- PROFILE, SEE SHEET 30 & 31

7/19/2017

3/6/2019
I-4400C_HYD_PRM_PSH_12.dgn
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HNTB NORTH CAROLINA, P.C.
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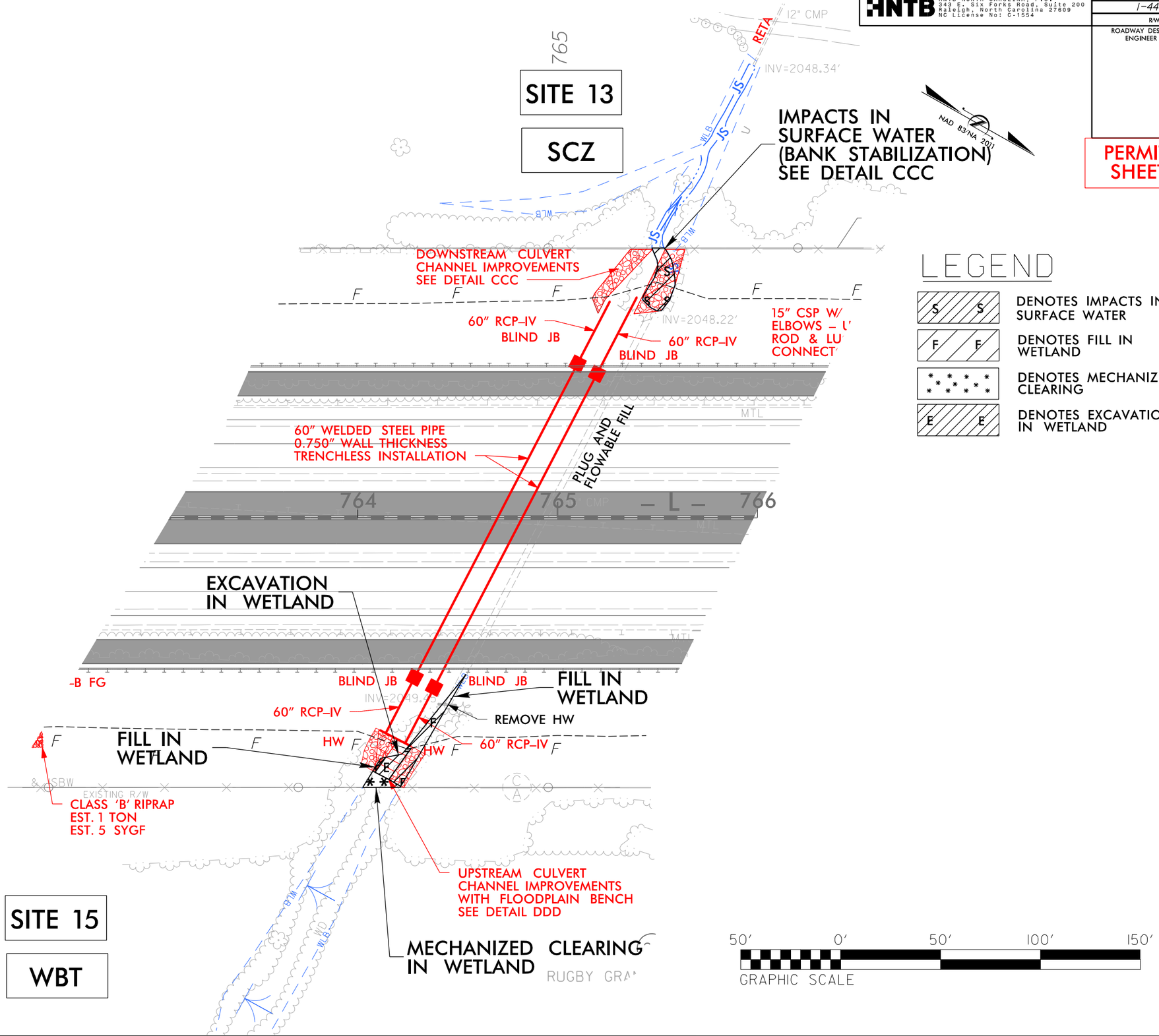
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 31 OF 43



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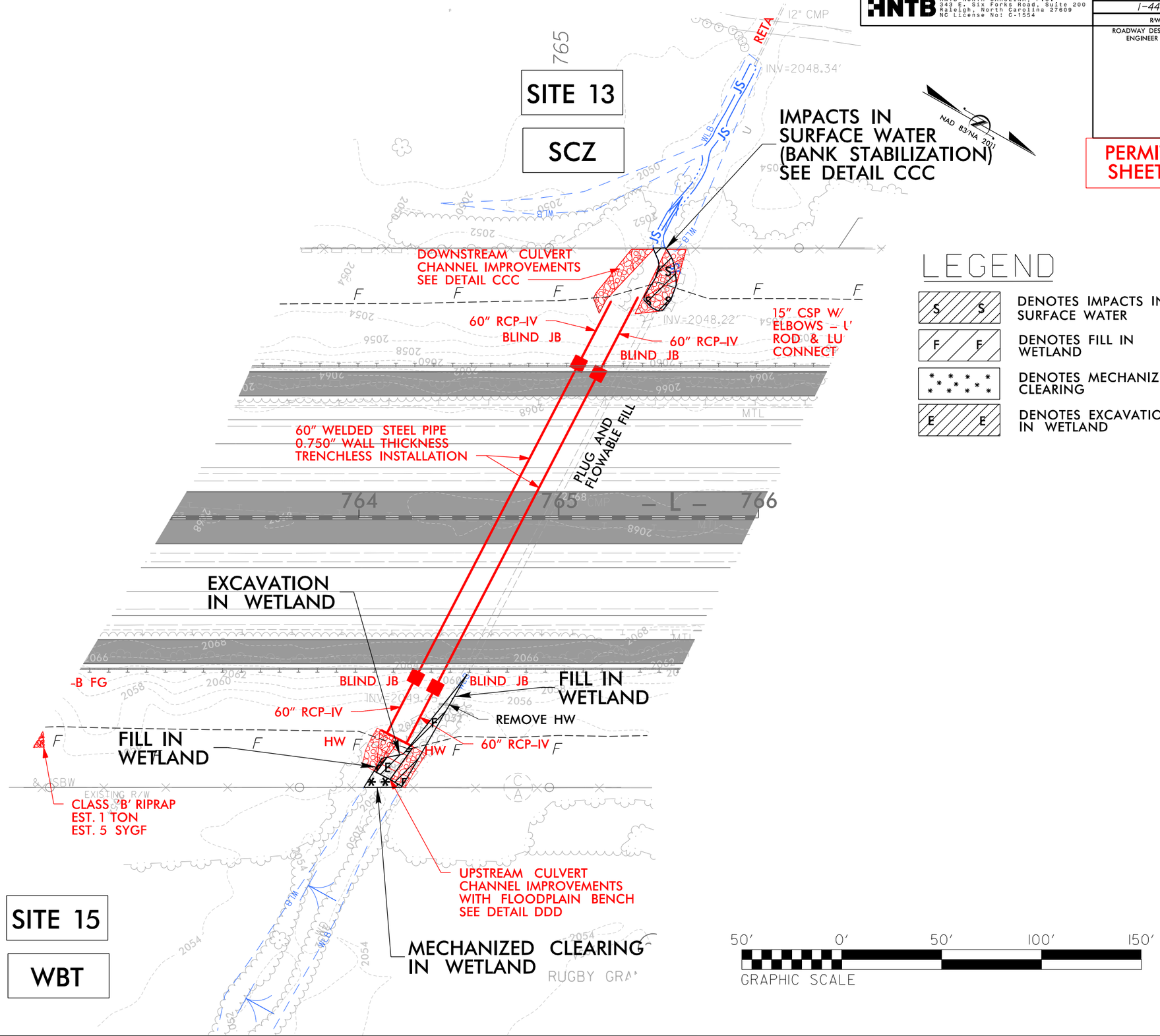
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 32 OF 43



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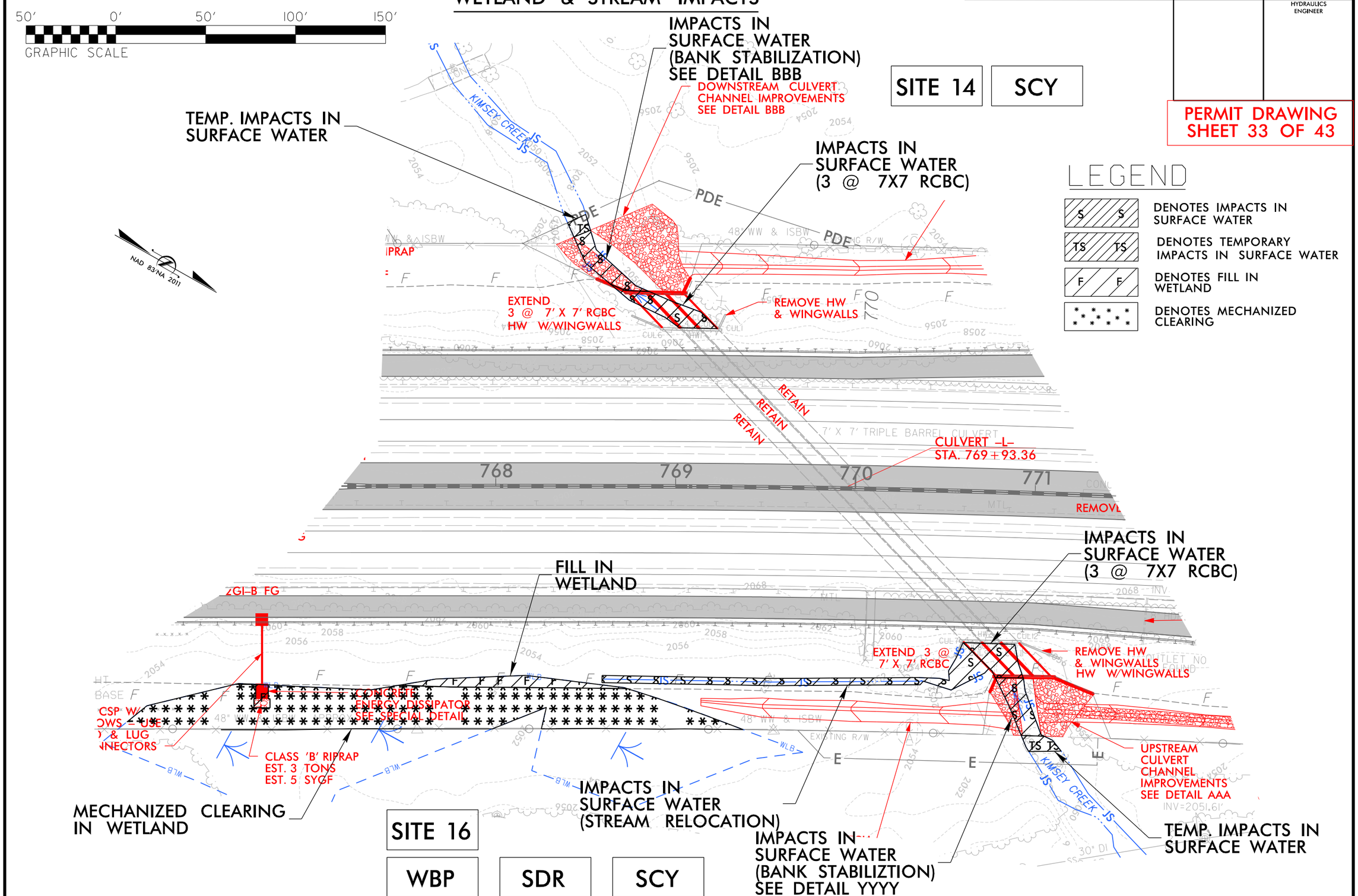
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	12
R/W SHEET NO.	
	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 33 OF 43

WETLAND & STREAM IMPACTS



HNTB NORTH CAROLINA, P.C.
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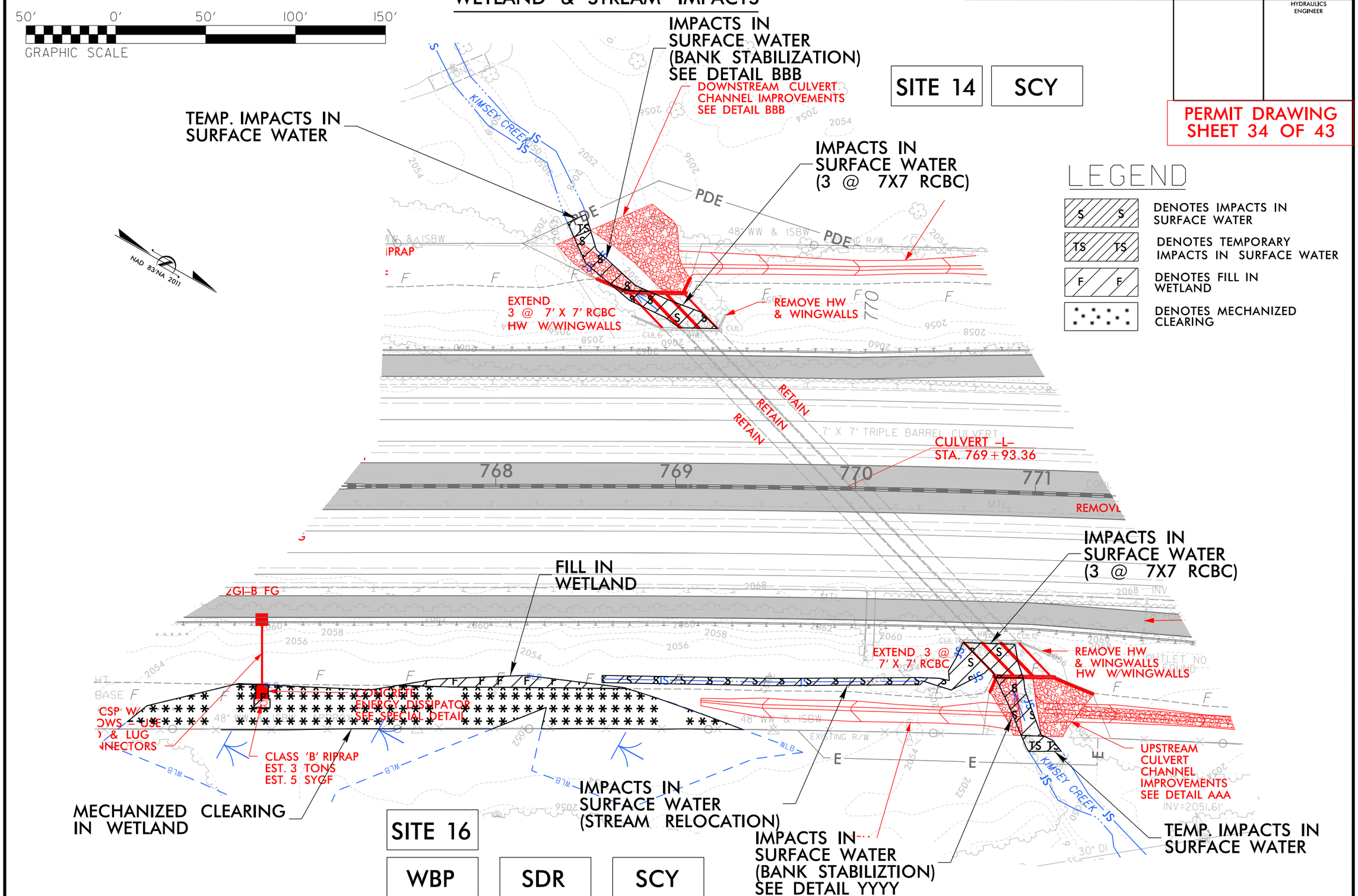
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	12
R/W SHEET NO.	
	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 34 OF 43

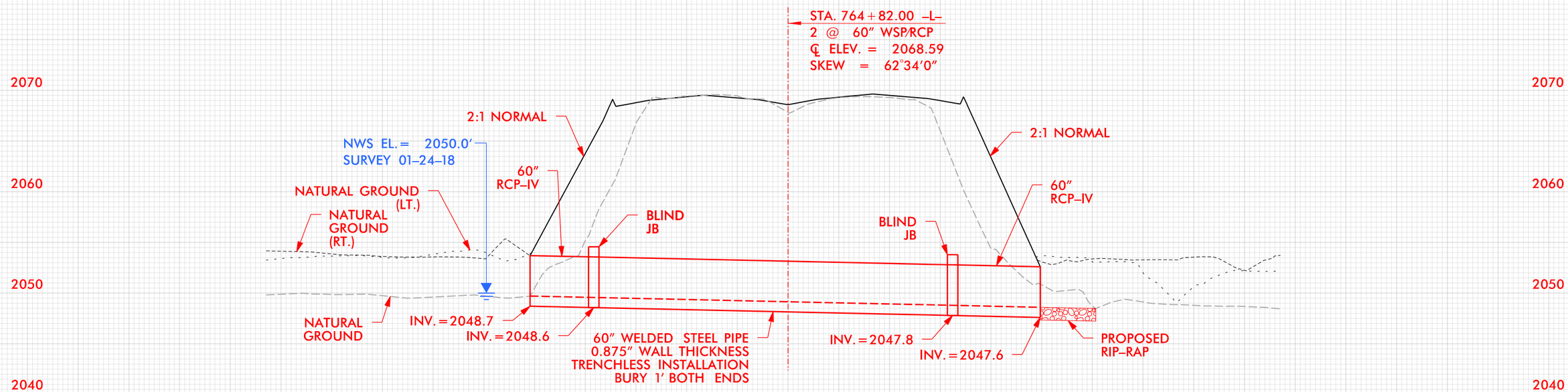
WETLAND & STREAM IMPACTS



6/23/16

PROJ. REFERENCE NO.	SHEET NO.
I-4700	

PERMIT DRAWING
SHEET 35 OF 43

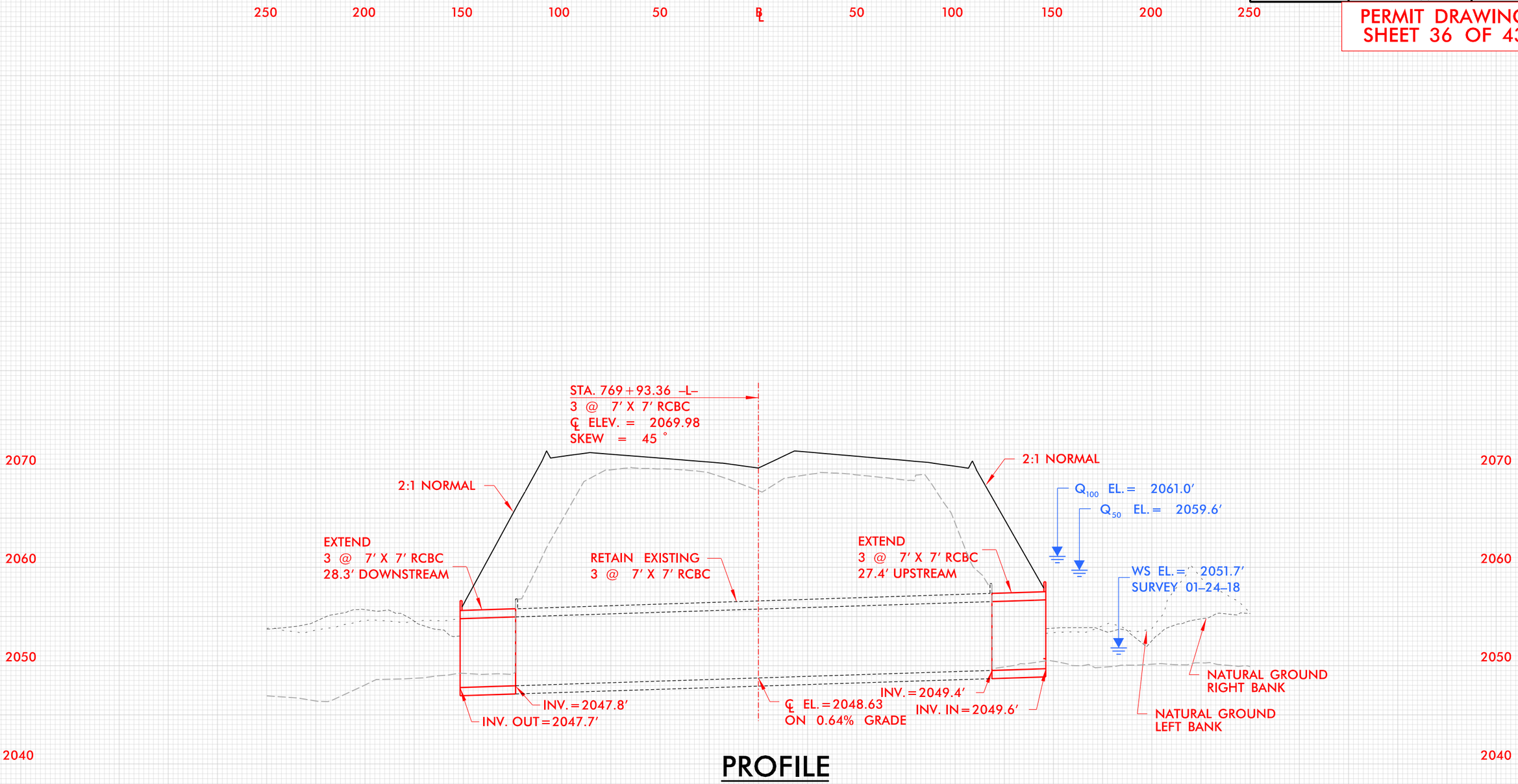


BUNCOMBE & HENDERSON COUNTY
PROJECT: I-4400C
I-26
I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY)
TO SOUTH OF NC 280

3/4/2019
I-4400C_HYD_PRM_PSH_12A_PFL.dgn
HNTB

PROJ. REFERENCE NO.	SHEET NO.
I-4700	

PERMIT DRAWING
SHEET 36 OF 43



PROFILE

BUNCOMBE & HENDERSON COUNTY
PROJECT: I-4400C
I-26
I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY)
TO SOUTH OF NC 280

6/23/16

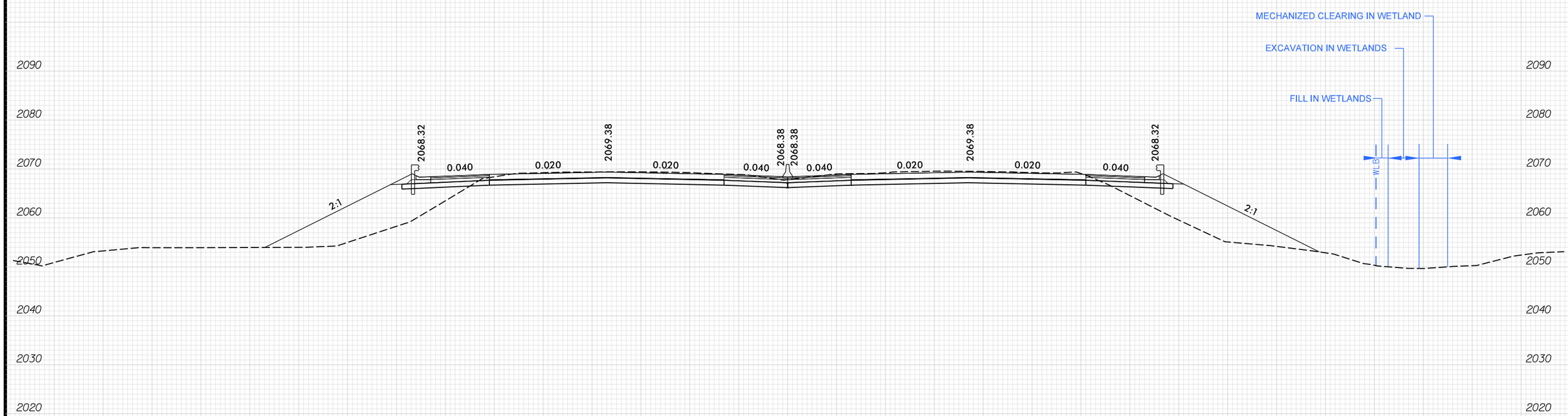
3/4/2019
I-4400C_HYD_PRM_PSH_12B_PFL.dgn
HNTB

6/23/16

5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-4700	

PERMIT DRAWING
SHEET 37 OF 43

WETLAND CROSS SECTIONS



SITE 15
–L– 764+12.00

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

BUNCOMBE & HENDERSON COUNTY
PROJECT: I-4400C
I-26
I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY)
TO SOUTH OF NC 280

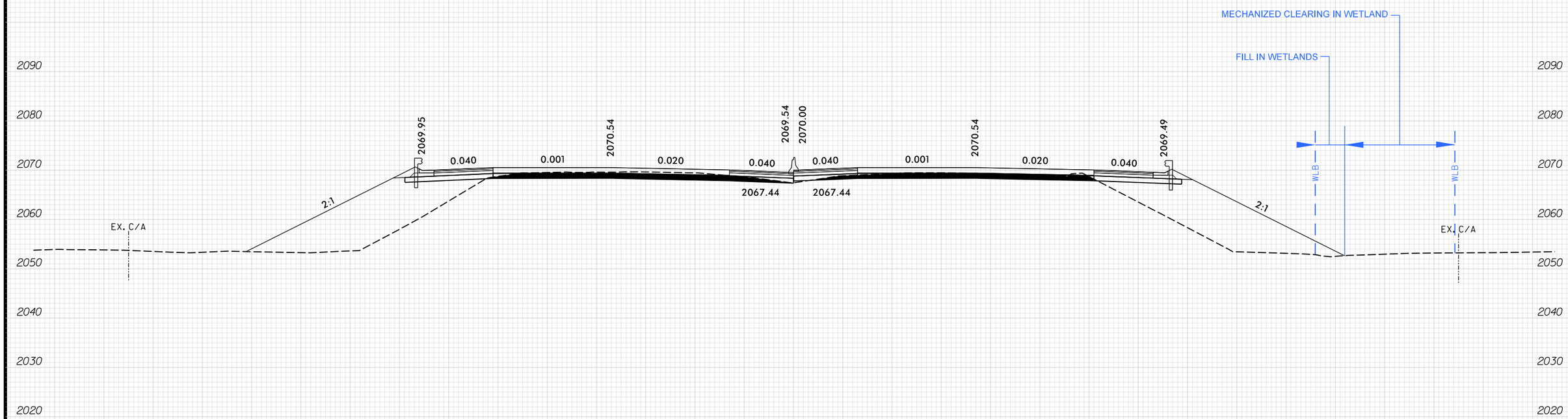
3/6/2019
I-4400C_HYD_PRM_PSH_XPL
HNTB

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
I-4700	

PERMIT DRAWING
SHEET 38 OF 43

WETLAND CROSS SECTIONS



SITE 16
–L– 768+00.00

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

BUNCOMBE & HENDERSON COUNTY
PROJECT: I-4400C
I-26
I-26 BETWEEN US 25 (ASHEVILLE HIGHWAY)
TO SOUTH OF NC 280

3/6/2019
I-4400C_HYD_PRM_PSH_XPL
HNTB

WETLAND & STREAM IMPACTS

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 39 OF 43

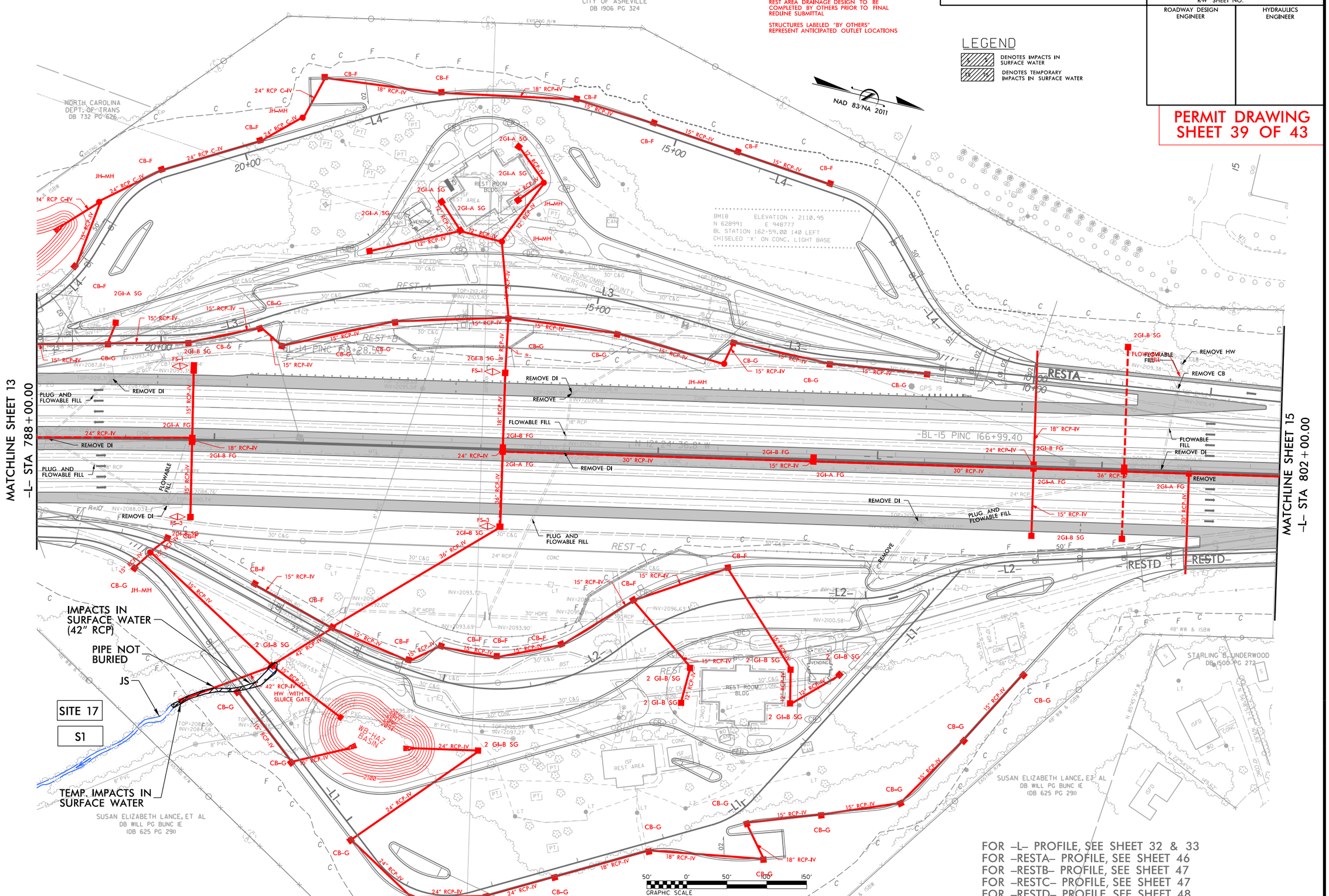
REST AREA DRAINAGE DESIGN TO BE COMPLETED BY OTHERS PRIOR TO FINAL REDLINE SUBMITTAL

STRUCTURES LABELED "BY OTHERS" REPRESENT ANTICIPATED OUTLET LOCATIONS

LEGEND

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

NAD 83/NA 2011



FOR -L- PROFILE, SEE SHEET 32 & 33
FOR -RESTA- PROFILE, SEE SHEET 46
FOR -RESTB- PROFILE, SEE SHEET 47
FOR -RESTC- PROFILE, SEE SHEET 47
FOR -RESTD- PROFILE, SEE SHEET 48

7/19/2017

3/6/2019
I-4400C_HYD_PRM_PSH_14.dgn
HNTB

WETLAND & STREAM IMPACTS

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 40 OF 43

REST AREA DRAINAGE DESIGN TO BE COMPLETED BY OTHERS PRIOR TO FINAL REDLINE SUBMITTAL

STRUCTURES LABELED "BY OTHERS" REPRESENT ANTICIPATED OUTLET LOCATIONS

LEGEND

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

NAD 83/NA 2011

MATCHLINE SHEET 13
-L- STA 788+00.00

MATCHLINE SHEET 15
-L- STA 802+00.00

IMPACTS IN SURFACE WATER (42" RCP)

PIPE NOT BURIED

JS

SITE 17

S1

TEMP. IMPACTS IN SURFACE WATER

FOR -L- PROFILE, SEE SHEET 32 & 33
FOR -RESTA- PROFILE, SEE SHEET 46
FOR -RESTB- PROFILE, SEE SHEET 47
FOR -RESTC- PROFILE, SEE SHEET 47
FOR -RESTD- PROFILE, SEE SHEET 48

7/19/2017

3/6/2019
I-4400C_HYD_PRM_PSH_14.dgn
HNTB

WETLAND & STREAM IMPACTS

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 41 OF 43

LEGEND

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

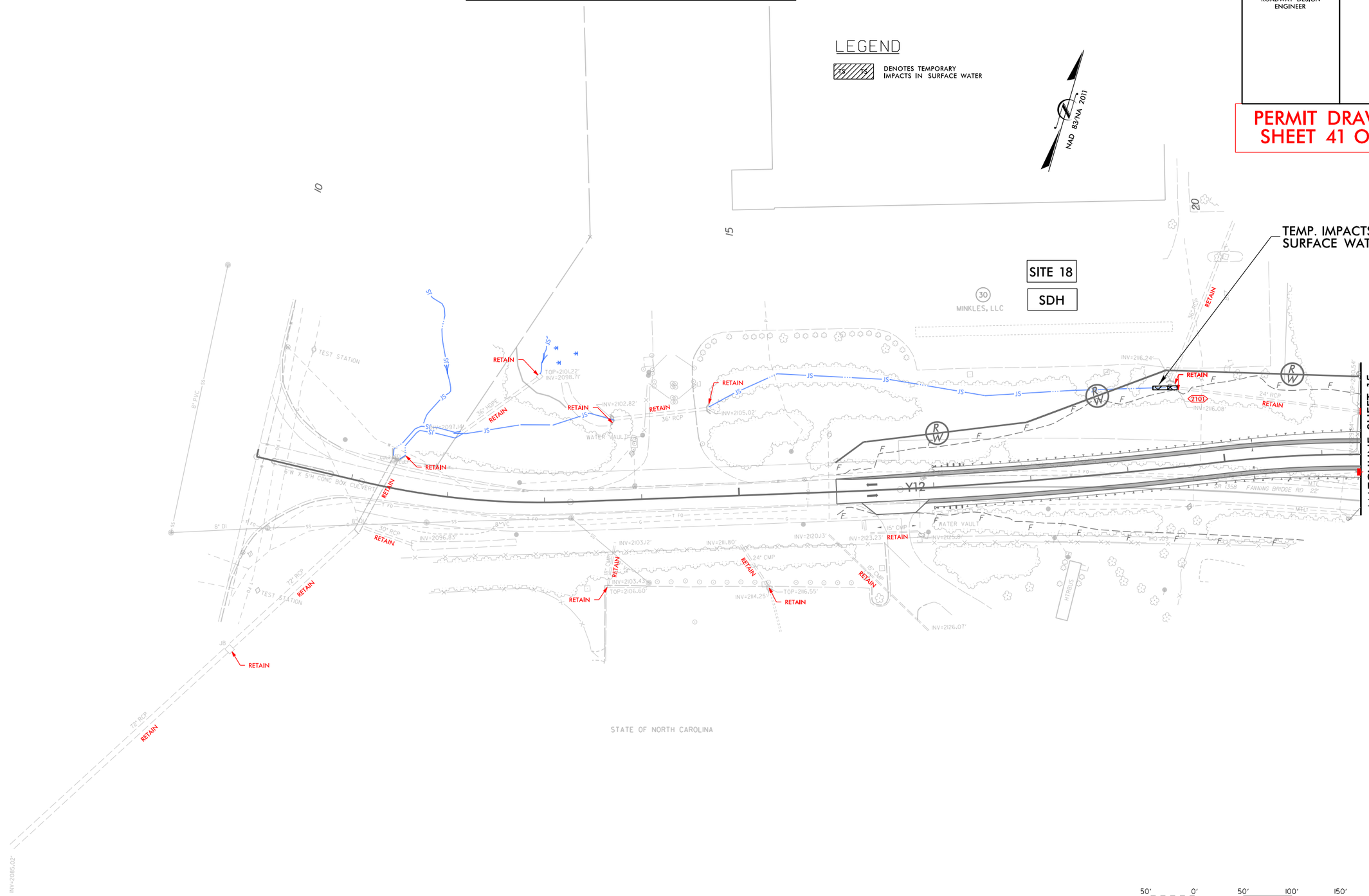
NAD 83/NA 2011

SITE 18

SDH

TEMP. IMPACTS IN SURFACE WATER

MATCHLINE SHEET 15
–Y12– STA 21+40.00



50' 0' 50' 100' 150'
GRAPHIC SCALE

FOR –Y12– PROFILE, SEE SHEET 45

8/22/2017

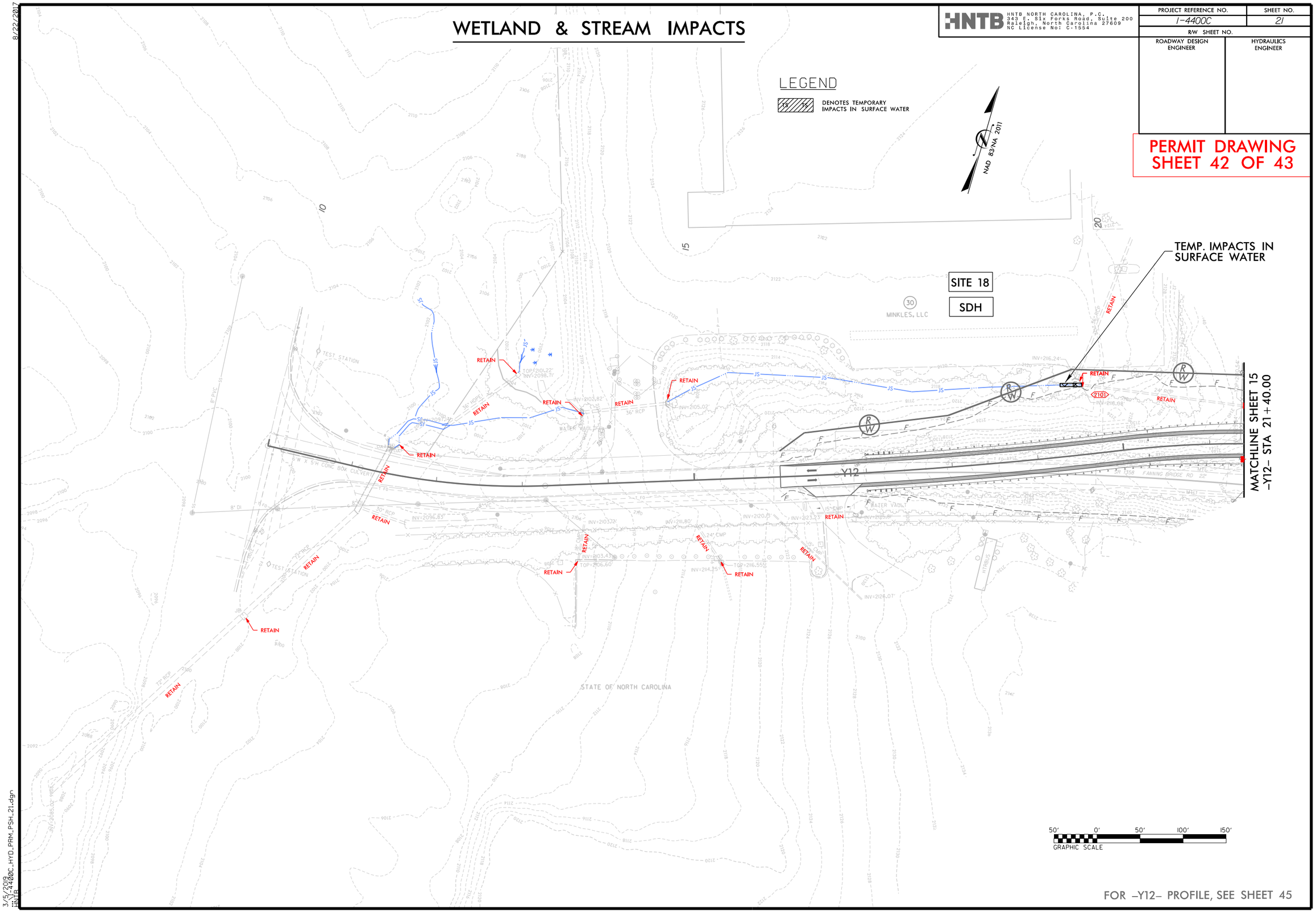
3/3/2018
I-4400C_HYD_PRM_PSH_21.dgn
HNTB

WETLAND & STREAM IMPACTS

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
I-4400C	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 42 OF 43



FOR -Y12- PROFILE, SEE SHEET 45

8/22/2017

3/3/2018
I-4400C_HYD_PRM_PSH_21.dgn
HNTB

WETLAND AND SURFACE WATER IMPACTS SUMMARY

Site No.	Stream Name Stream ID	Station (From/To)	Structure Size / Type	WETLAND IMPACTS Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	UT to Mud Creek / SCN	L 654+45 to 656+54 LT	Stream relocated to Proposed 2' Lat. Base ditch Due to Roadway Widening								197	10	
1	UT to Mud Creek / SCK	L 656+06 to 656+47 LT	Bank Stabilization at outlet of 60" RCP								45	7	
1	UT to Mud Creek / SCK	L 656+37 to 656+62 LT	60" RCP extension Due to Roadway Widening								30		
2	UT to Mud Creek / SCK	L 657+93 to 657+97 RT	Bank Stabilization at inlet of 60" CMP								23	10	
2	UT to Mud Creek / SCK	L 657+95 to 658+19 RT	60" CMP extension Due to Roadway Widening								58		
2	UT to Mud Creek / SCL	L 658+13 to 659+29 RT	Stream relocated to Proposed 2' Lat. Base ditch Due to Roadway Widening								126	10	
3	UT to Mud Creek / SCO	L 665+93 to 666+02 LT	Bank Stabilization at outlet of existing 60" CMP								12		
4	UT to Mud Creek / SCO	L 666+73 to 666+83 RT	Proposed 30" WSP and Head Wall Extension									8	
5	UT to Mud Creek / SEN	Y10RPA 16+28 to 19+65 RT	Stream relocated to Proposed 2' Lat. Base ditch Due to Roadway Widening								353		
5	UT to Mud Creek / SCQ	Y10RPA 16+07 to 16+34 RT	Proposed 48" WSP with 48" RCP extension								58		
5	UT to Mud Creek / SCQ	Y10RPA 16+02 to 16+11 RT	Channel Change*1 at downstream of 48" RCP								26	10	
5	WBC	Y10RPA 16+47 to 19+59 RT	Fill and Proposed 2' Lat. Base ditch in Wetlands Due to Roadway Widening	0.075		0.056	0.044						
6	UT to Mud Creek / SCT	L 687+38 to 690+50 LT	Stream relocated to Proposed 2' Lat. Base ditch Due to Roadway Widening								316	10	
7	UT to Mud Creek / SCR	L 683+99 to 684+20 RT	Stream relocated to 2' Lat. Base ditch due to Roadway Widening								23		
7	UT to Mud Creek / SCR	L 683+46 to 684+04 RT	Propsed 42" RCP and 48" RCP								83	10	
7	UT to Mud Creek / SCQ	L 683+46 to 684+04 RT	Stream relocated to Proposed 2' Lat. Base ditch Due to Roadway Widening								430	10	
8	WBG	L 716+43 to 724+47 RT	Fill in Wetlands Due to Roadway Widening	0.088			0.203						
8	UT to Mud Creek / SCU	L 724+42 to 724+92 RT	Stream relocated to Upstream Culvert Channel Improvements with Floodplain Bench								47		
8	UT to Mud Creek / SCU	L 724+89 to 725+19 RT	Existing 36" RCP Extension Due to Roadway Widening								32		
9	UT to Mud Creek / SCU	L 726+63 to 726+97 LT	Existing 36" RCP Extension Due to Roadway Widening								37		
9	UT to Mud Creek / SCU	L 726+91 to 727+16 LT	Bank Stabilization at outlet of existing 36" RCP with 36"RCP extension								29		
9	UT to Mud Creek / SCU	L 727+13 to 727+28 LT	Stream relocated to 2' Lat. Base ditch due to Roadway Widening								15	8	
10	WBI	L 746+94 to 748+84 LT	Mechanized Clearing in wetland due to Roadway Widening				0.019						
11	UT to Cane Creek / SCX	L 747+73 to 747+86 RT	Stream relocated to Proposed Channel Change								13	11	
11	UT to Cane Creek / SCX	L 747+81 to 748+25 RT	Bank Stabilization at beginning of Channel Change								53		
11	UT to Cane Creek / SCX	L748+25 to 755+02 RT	Stream relocated to Proposed Channel Change								682		
11	UT to Cane Creek / SCX	L 754+95 to 755+17 RT	Channel Change*1 at outlet of Proposed Channel Change								18		
12	Cane Creek	L 755+16 to 756+68 LT / RT	Bank Stabilization								334	20	
13	UT to Kimsey Creek / SCZ	L 765+43 to 765+59 LT	Bank Stabilization at the outlet of 2 @ 60" RCP								32		
14	Kimsey Creek / SCY	L 768+40 to 768+85 LT	Bank Stabilization at outlet of 3 @ 7X7 RCBC								45	9	
14	Kimsey Creek / SCY	L 768+64 to 769+22 LT	Proposed 3 @ 7X7 RCBC								48		
15	WBT	L 764+02 to 764+54 RT	Fill and Proposed Upstream Culvert Channel Improvements	0.007		0.002	0.002						
16	WBP	L 765+90 to 769+39 RT	Fill in Wetlands Due to Roadway Widening	0.014			0.152						
16	UT to Kimsey Creek / SDR	L 768+59 to 770+77 RT	Stream relocated to Proposed 2' Lat. Base ditch Due to Roadway Widening								216		
16	Kimsey Creek / SCY	L 770+62 to 770+97 RT	Proposed 3 @ 7X7 RCBC								22		
16	Kimsey Creek / SCY	L 770+81 to 771+19 RT	Bank Stabilization at inlet of 3 @ 7X7 RCBC								34	10	
17	UT to French Broad River / S1	L 789+57 to 790+79 RT	Proposed 42" RCP								122	10	
18	UT to French Broad River / SDH	Y12 19+34 to 19+60 LT	Temporary impacts from constructing Roadway fill slope			0.002	0.011					25	
TOTALS*:				**0.18**	**0.00**	**0.06**	**0.43**	**0.00**	**0.00**	**0.00**	**3557**	**178**	**0**

*Rounded totals are sum of actual impacts

NOTES:

*1: Emedding Riprap

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/13/2018
Buncombe & Henderson County
I-4700

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