



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

October 2, 2017

U. S. Army Corps of Engineers
Regulatory Field Office
3331 Heritage Trade Drive Suite 105
Wake Forest, NC 27587

ATTN: Mr. James Lastinger
NCDOT Coordinator

Subject: **Application for an Individual Section 404 and Section 401 Water Quality Certification** for the proposed Winston Salem Northern Beltway from I-40 to US 52 (TIP Nos. R-2247B Phase 2, CA, CB, CD, D, EA, EB, and EC) and from US 52 to US 311 north (U-2579C Phase 2, D, E, and F) and from I-40 Business to US 311 South (U-2579AA and AB) in Forsyth County. State Project Nos. 6.628001T and 8.2625101, Division 9. Debit \$570 from WBS 34409.3.23.

Dear Mr. Lastinger:

The North Carolina Department of Transportation (NCDOT) proposes to construct the Winston Salem Northern Beltway as a six-lane, median-divided facility from I-40 near the Town of Clemmons to US 311 North near the town of Walkertown and from I-40 Business to US 311 South in Forsyth County. The project is approximately 29 miles in length.

This is an application for a phased project. Enclosed you will find the project map for locations of all sections in this phased application. Please see the enclosed ENG 4345 and the MOA for Effects to Cultural Resources and the NLEB email/memo for all project sections. For sections going to LET within five years, see the attached North Carolina Division of Mitigation Services (NCDMS) acceptance letter for U-2579C Phase 2, R-2247CD, and R-2247EC, U-2579AA, AB, D, E, F, and EB and the attached Stream Mitigation Summary for the R-2247EA section. For sections in final design stages see the attached meeting minutes for Concurrence Points 4B and 4C, State Stormwater Management Plans (SMP), final permit drawings, and final roadway design plans for U-2579C Phase 2, R-2247CD, and R-2247EC.

Also attached are the preliminary permit design maps for all sections in the preliminary design stage (U-2579AA, U-2579AB, U-2579D, U-2579E, U-2579F and R-2247EA, R-2247EB, R-2247B Phase 2, R-2247CA, R-2247CB, and R-2247D. See Table 4 for descriptions of section limits.

Purpose and Need:

The Winston-Salem Beltway as a whole will provide benefits that will address various transportation needs. About 100,000 vehicles and trucks travel through the area every day, which is more traffic than the roadways in the area are designed to handle. The Project will help alleviate congestion and enhance safety along heavily traveled routes in Forsyth County, including U.S. 421/Business 40 and U.S. 52. General transportation needs for the entire Project, as identified in the 2007 *SFEIS/FEIS* include the following:

- Poor roadway connectivity in eastern and western Forsyth County
- Capacity deficiencies
- Poor regional, intrastate, and interstate linkage
- Consistency with the state and local land use and transportation plans
- Consistency with the Highway Trust Fund Act
- Poor North/South roadway connectivity within and through western Forsyth County
- Above-average accident rates on area roadways in the eastern section
- Need for a new I-74 corridor, a congressionally designated High Priority Corridor on the National Highway System.

The purposes for building the entire Project include the following:

- Improve roadway connectivity in eastern and western Forsyth County
- Provide congestion relief for area roadways
- Expand options for regional/intrastate/interstate travel
- Help meet the state and local land use and transportation plans
- Help fulfill the Highway Trust Fund Act
- Carry future traffic at a desirable level of service
- Enhance safety
- Provide a corridor for I-74.

Summary of Jurisdictional Impacts:

The preliminary proposed impacts for the overall project (TIP Nos. R-2247B Phase 2, CA, CB, CD, D, EA, EB, and EC and TIP Nos. U-2579AA, AB, C Phase 2, D, E, and F) will be approximately 9.41 acres of permanent wetland impacts and 59,395 linear feet of permanent stream impacts. Reference Tables 2 and 3 for a breakdown of impacts by section. A total of the individual water resources impacted by each section can be found in Table 1.

The impacts reported in this Individual Permit Application for R-2247 Sections CD and EC and U-2579C Phase 2 are based on final design. The proposed impacts for the remaining project sections were determined by offsetting preliminary slope stake lines outward 25 feet on both sides of the alignment and counting impacts to all jurisdictional features within the

resulting area. As the final design is completed for each of the remaining sections, impacts will be updated and permit modification requests will be submitted as necessary.

Table 1. Summary of Water Resources Impacted

Section	Design Stage	Proposed LET	Total # Wetlands Impacted	Total # Streams Impacted
R-2247EC	Final	January 2018	4	4
R-2247CD	Final	January 2018	4	4
U-2579C Phase 2	Final	January 2018	6	5
U-2579AA	Preliminary	FY 2020	5	11
U-2579AB	Preliminary	FY 2020	12	24
U-2579D	Preliminary	March 2018	2	15
U-2579E	Preliminary	March 2018	7	9
U-2579F	Preliminary	March 2018	7	5
R-2247EA	Preliminary	FY 2021	9	16*
R-2247EB	Preliminary	July 218	3	14
R-2247B Phase 2	Preliminary	Post Year	2	6
R-2247CA	Preliminary	Post Year	6*	7*
R-2247CB	Preliminary	Post Year	7*	10*
R-2247D	Preliminary	Post Year	14	16*
Totals			88	146

*Note: (as per example) If a stream or wetland is impacted in multiple sections; it is counted for each section, however, it was only counted once in project totals

Table 2. Summary of Wetland Impacts

Section	Design Stage	Wetland Impact area (ac)	Impacts requiring Mitigation (ac)
R-2247EC	Final	0.31	0.31
R-2247CD	Final	0.04	0.04
U-2579C Phase 2	Final	0.68	0.68
U-2579AA	Preliminary*	1.43	1.43
U-2579AB	Preliminary*	1.50	1.50
U-2579D	Preliminary*	0.08	0.08
U-2579E	Preliminary*	0.99	0.99
U-2579F	Preliminary*	0.24	0.24
R-2247EA	Preliminary*	0.57	0.57
R-2247EB	Preliminary*	0.09	0.09
R-2247B Phase 2	Preliminary*	0.27	0.27
R-2247CA	Preliminary*	0.71	0.71
R-2247CB	Preliminary*	1.98	1.98
R-2247D	Preliminary*	0.52	0.52
Totals		9.41	9.41

*Preliminary impacts were determined by measuring 25' outside of preliminary slope stake lines.

Table 3. Summary of Stream Impacts

Section	Design Stage	Stream Impact (lf)	Impacts Requiring Mitigation (lf)
R-2247EC	Final	865	814
R-2247CD	Final	699	611
U-2579C Phase 2	Final	3,527	3,409
U-2579AA	Preliminary*	3,019	3,019
U-2579AB	Preliminary*	10,351	10,351
U-2579D	Preliminary*	5,043	5,043
U-2579E	Preliminary*	4,864	4,864
U-2579F	Preliminary*	2,544	2,544
R-2247EA	Preliminary*	6,536	6,536
R-2247EB	Preliminary*	6,593	6,593
R-2247B Phase 2	Preliminary*	862	862
R-2247CA	Preliminary*	3,056	3,056
R-2247CB	Preliminary*	5,674	5,674
R-2247D	Preliminary*	5,762	5,762
Totals		59,395	59,138

*Preliminary impacts were determined by measuring 25' outside of preliminary slope stake lines.

Summary of Utility Impacts:

There will be no impacts associated with utility relocations for U-2579C Phase 2, R-2247CD or EC. For all other Sections, the utility relocations will be determined during final design.

Summary of Mitigation:

The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design processes. However, project impacts will necessitate compensatory mitigation for the unavoidable impacts. Mitigation for impacts resulting from U-2579AA, AB, D, E, F, and R-2247EB (preliminary design) and U-2579C Phase 2, and R-2247 Sections CD and EC (final design impacts) has been approved from the Division of Mitigation Services (DMS). DMS will provide the required mitigation for these sections. For Section R-2247EA, the mitigation will be provided by a private mitigation bank (see attached mitigation summary). See Tables 2 and 3 for a summary of impacts and Table 14 for a summary of proposed mitigation. These mitigable impacts include 43,724 linear feet of permanent stream impact and 5.93 acres of permanent wetland impact. It has been determined that onsite mitigation is not an option for this project. R-2247B Phase 2, CA, CB, and D are due to let post year, therefore no mitigation is proposed for these sections at this time.

NEPA DOCUMENT STATUS

A Final Environmental Impact Statement (FEIS) was completed for this project in January 2007 and the Record of Decision (ROD) completed in February 2008. A Construction Consultation for R-2247 EC and CD was completed in June 2016. A Construction Consultation for U-2579C Phase 2, formerly part of U-2579C, was completed in April 2017.

In compliance with the NEPA/404 Merger Process, Concurrence Points 4B and 4C were reached for U-2579C Phase 2 on November 19, 2008 and February 8, 2017, respectively, as part of U-2579C. Concurrence Points 4B and 4C were reached for R-2247CD and R-2247EC on May 17, 2017 and September 20, 2017, respectively.

PROJECT SCHEDULE

The project will be permitted in phases due to project size, funding and STIP schedule. Table 4 describes the proposed project sections and phasing. Permit modification requests will be submitted as the final design is completed for each of the remaining sections according to the phasing dates provided in Table 4.

Table 4. Project Phasing for Winston-Salem Northern Beltway

Section	Approximate Section Limits	Approximate Length (mi)	Construction Letting
R-2247EC	N.C. 65 Interchange, Reconstruct Interchange	1.0	January 2018
R-2247CD	Intersection of U.S. 421 and S. Peace Haven Rd	0.7	January 2018
U-2579C Phase 2	US 311 (New Walkertown Rd) to approx.. 500' east of Old Walkertown Road (SR 4556)	0.1	January 2018
U-2579AA	I-74/U.S. 311 to I-40	0.6	FY 2020
U-2579AB	I-40 to U.S. 421/Business 40	2.7	FY 2020
U-2579D	500 feet east of Old Walkertown Rd (SR 4556) to Baux Mountain Rd (SR211)	3.2	March 2018
U-2579E	Baux Mountain Road to N.C. 8	2.1	March 2018
U-2579F	N.C. 8 to U.S. 52	1.4	March 2018
R-2247EA	N.C. 67 to south of U.S. 52	3.0	FY 2021
R-2247EB	Interchange at U.S. 52 and the beltway	2.7	July 2018
R-2247B Phase 2	South of I-40 to south of U.S. 421 Interchange	2.0	Post Year
R-2247CA	Interchange of U. S. 421 with SR 1348 (Robinhood Road)	1.4	Post Year
R-2247CB	North of the U.S. 421 interchange to Robinhood Road	3.3	Post Year
R-2247D	North of Meadowlark Drive/Robinhood Road to N.C. 67	4.7	Post Year

INDEPENDENT UTILITY

The subject project is in compliance with 23 CFR Part 771.111(f) which lists the Federal Highway Administration (FHWA) characteristics of independent utility of a project:

- (1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope,
- (2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area;
- (3) The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

RESOURCE STATUS

Waters within the project area are located in the Yadkin/Pee Dee River Basin (HUC 03040101) and within the Roanoke River Basin (HUC 03010103). The Sections of the project in the Roanoke River Basin are U-2579F and part of U-2579E. There are twelve (12) named streams (see Table 5 – Project Area Streams) and their associated un-named tributaries within the project. There are no Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply Waters (WS-I or WS-II) waters within 1.0 mile of the project area.

Jurisdictional Determination

An updated Preliminary Jurisdictional Determination (PJD) was obtained on August 3, 2016 for U-2579 - Sections AA, AB, C Phase 2, D, E, and F, and for R-2247 – Sections CA (includes sub-section CD) and EB (includes subsection EC) of the Winston-Salem Northern Beltway. John Thomas/USACE and Dave Wanucha/NCDWR attended the field visits on March 3, 2016, and March 15, 2016. Jurisdictional calls for an updated PJD for the remaining funded portions of R-2247 – Sections EA and EB, along with un-funded portions of R-2247 - Sections B Phase 2, CA, CB and D were reviewed in the field by James Lastinger/USACE and Dave Wanucha/NCDWR on August 18, 2017. Submittal of the final information for an updated PJD for these sections is forthcoming.

303(d) Impaired Waters:

No streams within the project study area, or within one miles of the project study area, are listed on the Final 2014 303(d) list of impaired waters for turbidity or sedimentation.

Table 5. Project Area Streams

Stream Name	Stream Index Number	Best Usage Class	Description
Yadkin/Pee Dee River Subbasin 03-07-04			
Muddy Creek	12-94-(0.5)	C	From source to a point 0.8 mile upstream of mouth
Silas Creek	12-94-10	C	From source to Muddy Creek
Fiddlers Creek	12-94-13-3	C	From source to South Fork Muddy Creek
South Fork Muddy Creek	12-94-13	C	From source to Muddy Creek
Reynolds Creek	12-94-9	C	From source to Muddy Creek
Mill Creek No.	12-94-4	C	From source to Muddy Creek
Mill Creek	12-94-7	C	From source to Muddy Creek
Grassy Creek	12-94-7-3	C	From source to Muddy Creek
Swaim Creek	12-94-13-1	C	From source to South Fork Muddy Creek
Beaver Dam Creek	12-94-2	C	From source to Muddy Creek
Roanoke Subbasin 03-02-01			
Rough Fork	22-25-5-2	C	From source to Buffalo Creek
Trick-Um Creek	22-25-5-1	C	From Source to Buffalo Creek

IMPACTS TO WATERS OF THE U.S.

Tables 6 and 7 summarize the impacts to jurisdictional water resources for the final design of R-2579C Phase 2. Tables 8 and 9 summarize the impacts to jurisdictional water resources for the final design of R-2247CD. Tables 10 and 11 summarize the impacts to jurisdictional water resources for the final design of R-2247EC. Site numbers correspond with the permit (hydraulic) drawings included in this application. The stream and wetland numbers correspond to the NRTR. A brief description of each impact site will follow the tables.

Table 6 – U-2579C Phase 2 Wetland Impacts*

Permit Site	Wetland ID ^{1/}	Wetland Size (ac) ^{2/}	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Impacts Requiring Mitigation (ac)
1	ES-W6, ES-W7, ES-W8	0.57	0.57	--	--	0.57
3B	ES-W21	0.06	0.02	0.01	0.01	0.04
3C	ES- W20	0.06	0.06	--	--	0.06
5	ES-W17	0.02	0.02	--	--	0.02
Total Impacts ^{3/}			0.66	0.01	0.01	0.68

* Wetlands impacted are riparian.

^{1/} Wetland number corresponds to U-2579/R-2247 PJD labeling.

^{2/} Wetland size is based on NCDOT WET file.

^{3/} Rounded Totals are sum of actual impacts to 1/1000th.

Table 7 – U-2579C Phase 2 Stream Impacts

Site	Stream Name (P / I)*	Stream ID ^{1/}	Impact Type	Permanent Impact (lf)	Temporary Impacts (lf)	Mitigation Required? ^{2/}
1	UT to Frazier Creek (P)	ES-S48	Perm. Fill	1148	31	Yes
			Bank Stabilization	40	--	No
2	UT to Frazier Creek (P)	ES-S27	Perm. Fill	552	35	Yes
			Bank Stabilization	45	--	No
3A	UT to Frazier Creek (P)	ES-S28	Perm. Fill	914	55	Yes
			Bank Stabilization	33		No
4	UT to Frazier Creek (P)	ES-S29	Perm. Fill	405	40	Yes
5	UT to Frazier Creek (I)	ES-S45	Perm. Fill	390	--	Yes
Total Temporary Impacts:					161	
Total Permanent Impacts (Perm. Fill + Bank Stabilization):				3527		
Bank Stabilization Impacts:				118		
Total Impacts Requiring Mitigation:				3409 lf †		

*P = Perennial; I = Intermittent

1/ – Stream Number corresponds to U-2579/R-2247 PJD labeling.

2/ – USACE stream mitigation is typically at a ratio of 2:1.

† – Final mitigation requirement will be up to the USACE and DWR. Mitigation for 3409 LF of permanent stream impact (at 2:1 ratio) has been reserved with from DMS.

Permit Site 1: Stream ES-S48 becomes jurisdictional near -L- Station 378+00 +/-Rt under the proposed roadway. This stream will be impacted (1,148 lf) and associated wetlands (ES-W6, ES-W7, and ES-W8) (0.57 ac) will be impacted from roadway fill, converting the natural low point features to the lateral base ditches on either side of the road. A 60-inch corrugated steel pipe (CSP) will convey stormwater from the left of -L- to the right of -L-. A junction box at the 60-inch CSP outlet will be used to flatten the end section of the cross pipe to reduce outlet velocities to the receiving stream. Bank stabilization (40 lf) will be installed at the outlet end of the 60-inch pipe crossing to achieve post-construction stability. There will be 31 feet of temporary impacts from pipe installation.

Permit Site 2: There will be 552 lf of impact to Stream ES-S27 from the installation of a 60-inch CSP. The inlet invert of the 60-inch pipe crossing will not be buried to prevent head-cutting. A junction box will be installed at the outlet and will be utilized to flatten the slope. The outlet will be buried 1-foot, and 20 lf of bank stabilization will be installed at the upstream end of the CSP and 25 linear feet will be installed on the downstream end of the CSP to achieve post-construction stability.

Permit Site 3A: This stream is a pipe-sized crossing; however, NCDOT will use a Reinforced Concrete Box Culvert (RCBC) in order to implement a single sill across the culvert width to retain bed material. Of the 914 lf of permanent stream impact to Stream ES-S28, 864 lf will be from the RCBC and 50 lf will be from the stream re-location at the upstream end of the RCBC to properly align the stream with the RCBC. The culvert will be buried 9 inches (per 4C meeting agreement), and 33 lf of bank stabilization will be used upstream of the culvert to achieve post-construction stability.

Permit Site 3B: There will be a total of 0.04 ac of permanent impacts to Wetland ES-W21, of which there will be 0.02 ac of permanent fill, 0.01 ac of excavation (for the lateral base ditch, which will then be armored), and 0.01 ac of mechanized clearing for erosion control measures.

Permit Site 3C: There will be 0.06 ac (total take) of permanent fill impact to Wetland ES-W20 from roadway fill.

Permit Site 4: Of the 405 lf of permanent stream impact to Stream ES-S29, 370 lf will be from roadway fill and 35 lf will be from ditching (lateral base ditch) and armoring of the ditch. The stream flow will be routed through the armored lateral base ditch to the upstream end of the RCBC near Site 3B. The Merger Team agreed to not use natural stream design at this location.

Permit Site 5: There will be 390 lf of permanent impact to Stream ES-S45 and 0.02 ac of permanent fill impact to Wetland ES-W17 from roadway fill (both total takes) for the interchange ramp/loop combination.

Table 8 – R-2247CD Wetland Impacts*

Site	Wetland ID ^{1/}	Wetland Size (ac) ^{2/}	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Impacts Requiring Mitigation (ac)
1	W60	Greater than 0.14	<0.01	--	<0.01	0.01
2	W62	0.01	<0.01	<0.01	--	0.01
3	W63	0.01	0.01	--	--	0.01
7	W46	0.07	--	--	0.01	0.01
Total Impacts ^{3/}			0.02	<0.01	0.02	0.04

* Wetlands impacted are riparian.

^{1/} Wetland number corresponds to U-2579/R-2247 PJD labeling.

^{2/} Wetland size is based on NCDOT WET file.

^{3/} Rounded Totals are sum of actual impacts to 1/1000th.

Table 9 – R-2247CD Stream Impacts

Site	Stream Name (P /I)*	Stream ID ^{1/}	Impact Type	Permanent Impact (lf)	Temporary Impacts (lf)	Mitigation Required? ^{2/}
2	UT to Muddy Creek (P)	FFFF	Perm. Fill/Ditch	75	7	Yes
4	UT to Silas Creek (P)	KKKK	Perm. Fill/Channel Change	56	4	Yes
5	UT to Silas Creek (P)	KKKK	Perm. Fill/Channel Change	160	--	Yes
			Rip Rap Lined Channel	72	--	Yes
			Channel Change	15	--	Yes
6	Silas Creek (P)	Silas Creek	Channel Change	--	45	No
7	UT to Silas Creek (P)	JJJJ	Perm. Fill	17	6	Yes
			Channel Change	216	20	Yes
8	Silas Creek (P)	Silas Creek	Bank Stabilization	16	10	No
9	Silas Creek (P)	Silas Creek	Bank Stabilization	55	15	No
10	Silas Creek (P)	Silas Creek	Bank Stabilization	17	14	No
Total Temporary Impacts:				--	121	
Total Permanent Impacts (Perm. Fill + Bank Stabilization):				699		
Bank Stabilization Impacts:				88		
Total Impacts Requiring Mitigation:				611 lf †		

*P = Perennial; I = Intermittent

1/ – Stream Number corresponds to U-2579/R-2247 PJD labeling.

2/ – USACE stream mitigation is typically at a ratio of 2:1.

† – Final mitigation requirement will be up to the USACE and DWR. Mitigation for 526 LF of permanent stream impact (at 2:1 ratio) has been reserved with DMS.

Permit Site 1: The existing 18” CMP terminating near Wetland W60 will be filled and replaced with an 18” pipe shifted to the east. These actions will result in <0.01 ac permanent fill in wetlands and <0.01 ac mechanized clearing.

Permit Site 2: The proposed roadway fill slope will permanently fill a portion of Stream FFFF and Wetland W62, and the drainage system discharging water into the stream will be filled and replaced with a 24” pipe discharging into a ditch that will tie into the existing stream. These actions will result in 75 lf of permanent stream impacts and 7 lf of temporary stream impacts. Additionally, there will be <0.01 ac of permanent fill in wetlands and <0.01 ac of excavation in wetlands.

Permit Site 3: The proposed roadway fill slope will completely fill Wetland W63, resulting in 0.01 ac of permanent fill in wetlands.

Permit Site 4: The proposed roadway fill slope will impact Stream KKKK. The existing 42” CMP will be filled and replaced with a 48” Welded Steel Pipe (WSS). The inlet channel will be realigned and armored with rip rap. This action will result in 56 lf of permanent stream impacts and 4 lf of temporary impacts.

Permit Site 5: The proposed fill slope from Ramp D will impact Stream KKKK. The existing 42” CMP will be filled and replaced with a 48” RCP. The outlet channel will be armored with rip rap on the banks and bed. Downstream, the existing 36” CMP will be filled and replaced with a realigned 54” RCP, resulting in a reduction in stream length. These actions will result in 232 lf of permanent stream impacts. At the outlet of the proposed 54” RCP, the channel will be realigned and the banks and channel will be armored with rip rap, resulting in an additional 15 lf of permanent stream impacts.

Permit Site 6: At the outlet of the proposed 54” RCP, the construction of the channel realignment will create 45 lf of temporary stream impacts to Silas Creek.

Permit Site 7: The proposed roadway fill will impact Stream JJJJ. The existing 42” RCP will be filled and replaced with a 60” RCP. These actions will result in 17 lf of permanent stream impacts and 6 lf of temporary stream impacts. Additional construction activities will contribute to 0.01 ac of mechanized clearing in Wetland W46. The proposed 60” RCP will be tied to a proposed 60” Welded Steel Pipe that will be bored and jacked under existing US Hwy 421. Proposed roadway fill at the outlet of the pipe will impact the existing stream. The channel will be shifted south before tying into the existing channel further downstream. This will result in 216 lf of permanent stream impacts and 20 lf of temporary impacts.

Permit Site 8: The existing 24” CMP will be filled and replaced with a 30” pipe. Rip rap bank stabilization will be installed at the outlet, resulting in 16 lf of permanent stream impacts and 10 lf of temporary impacts to Silas Creek.

Permit Site 9: The replacement of the structure over Silas Creek will include grading of the stream banks under the proposed bridge and rip rap bank stabilization. There will be 55 lf of bank stabilization and construction activities will result in 15 lf of temporary stream impacts.

Permit Site 10: Rip rap bank stabilization will be installed on the bank of Silas Creek at the outlet of the 18” RCP. There will be 17 lf of bank stabilization and construction activities will result in 14 lf of temporary stream impacts.

Table 10 – R-2247EC Wetland Impacts*

Site	Wetland ID 1/	Wetland Size (ac) 2/	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Impacts Requiring Mitigation (ac)
1	W49	0.02	<0.01	<0.01	<0.01	0.01
4	W50	0.15	0.04	--	0.02	0.06
5	W26, W48	0.30	0.22	--	0.01	0.24
Total Impacts 3/			0.26	<0.01	0.04	0.31

* Wetlands impacted are riparian.

1/ Wetland number corresponds to U-2579/R-2247 PJD labeling.

2/ Wetland size is based on NCDOT WET file.

3/ Rounded Totals are sum of actual impacts to 1/1000th.

Table 11 – R-2247EC Stream Impacts

Site	Stream Name (P / I)*	Stream ID ^{1/}	Impact Type	Permanent Impact (lf)	Temporary Impacts (lf)	Mitigation Required? ^{2/}
1	UT to Beaver Dam Creek (P)	TT	Perm. Fill/Channel Change	112	20	Yes
			Bank Stabilization	15	--	No
2	UT to Beaver Dam Creek (P)	LLL	Perm. Fill/Channel Change	156	25	Yes
			Bank Stabilization	21	--	No
3	UT to Beaver Dam Creek (P)	LLL	Perm. Fill/Channel Change	165	19	Yes
			Bank Stabilization	15	--	No
4	UT to Beaver Dam Creek (I)	SS	Perm. Fill (42" Pipe)	54	10	Yes
6	UT to Beaver Dam Creek (I)	SS	Perm. Fill/Channel Change	275	44	Yes
7	UT to Grassy Creek (P)	III	Perm. Fill/Channel Change	22	11	Yes
8	UT to Grassy Creek (P)	III	Perm Fill/Channel Change	30	17	Yes
Total Temporary Impacts:				--	146	
Total Permanent Impacts (Perm. Fill + Bank Stabilization):				865		
Bank Stabilization Impacts:				51		
Total Impacts Requiring Mitigation:				814 lf †		

*P = Perennial; I = Intermittent

1/ –Stream Number corresponds to U-2579/R-2247 PJD labeling.

2/ – USACE stream mitigation is typically at a ratio of 2:1.

† – Final mitigation requirement will be up to the USACE and DWR. Mitigation for 814 LF of permanent stream impact (at 2:1 ratio) has been reserved with DMS.

Permit Site 1: The existing 42" CMP carrying Stream TT is being filled and replaced with a new 48" welded steel pipe that will be bored and jacked under existing US 52. On the upstream end, a junction box will tie a 48" RCP to the existing stream. In accordance with agreements made in the concurrence point 4B meeting, the pipe will not be buried. A portion of the stream at the outlet of the proposed pipe will be relocated to accommodate the bore and jack operation around the existing pipe, which will be plugged and left in place. The relocated channel will be constructed with rip rap armoring. The streambanks upstream of the pipe will be stabilized with rip rap and a lateral ditch will tie into the stream from the north. These actions will result in 112 lf of permanent impacts and 15 lf of impacts due to bank stabilization. There will be 20 lf of temporary impacts at the inlet and outlet. Additionally, there will be <0.01 ac of permanent fill, <0.01 ac of excavation, and <0.01 ac of mechanized clearing in Wetland W49.

Permit Site 2: The existing 60" CMP carrying Stream LLL is being filled and replaced with a new 66" welded steel pipe that will be bored and jacked under existing US 52. On the upstream end, a junction box will tie a 66" RCP to the existing stream. In accordance with agreements made in the concurrence point 4B meeting, the pipe will not be buried. A portion of the stream at the outlet of the proposed pipe will be relocated to accommodate the bore and jack operation around the existing pipe, which will be plugged and left in place. The relocated channel will be constructed with rip rap armoring. The streambanks upstream of the pipe will be stabilized with rip rap. A lateral ditch will tie into the stream from the north and a pipe will discharge from the south. These actions will result in 156 lf of permanent impacts and 21 lf of impacts due to bank stabilization. There will be 25 lf of temporary impacts at the inlet and outlet.

Permit Site 3: A 66" RCP will be installed to carry Stream LLL under the proposed new roadway. In accordance with agreements made in the concurrence point 4B meeting, the pipe will not be buried. These actions will result in 165 lf of permanent impacts and 15 lf of impacts due to bank stabilization. Additionally, there will be 19 lf of temporary impacts at the inlet and outlet.

Permit Site 4: To carry Stream SS under the proposed Loop A, a 42" RCP will be installed and tied to a 42" Welded Steel Pipe that will be bored and jacked under existing US 52, replacing the existing 30" CMP that will be filled and left in place. In accordance with agreements made in the concurrence point 4B meeting, the pipe will not be buried. Roadway fill from Loop A, toe protection, and ditch construction will impact Wetland W50 on the upstream side of the proposed pipe. Wetland hydrology will not be disrupted to the point of a total take. These actions will result in 0.04 ac of permanent fill and 0.02 ac of mechanized clearing. Additionally, there will be 54 lf of permanent stream impacts and 10 lf of temporary stream impacts.

Permit Site 5: The proposed roadway slopes will fill the majority of Wetland W26 and construction activities will permanently impact Wetland W48, resulting in 0.22 ac of permanent fill in wetlands and 0.01 ac mechanized clearing. Drainage from the fill slope of proposed Ramp B and natural topography of the site is expected to support the hydrology of the remaining portion of Wetland W26.

Permit Site 6: The outlet of the proposed 42" Welded Steel Pipe that will be bored and jacked under US 52 will require a portion of Stream SS to be relocated to accommodate the bore and jack operation around the existing pipe. The relocated channel will be constructed with rip rap armoring. Downstream of this pipe, a 42" RCP will be installed to carry the stream under proposed Ramp B. In accordance with agreements made in the concurrence point 4B meeting, the pipe will not be buried. The banks and channel at the outlet of the proposed pipe will be armored with rip rap to stabilize the stream. These actions will result in 275 lf of permanent stream impacts and 44 lf of temporary stream impacts.

Permit Site 7: The existing 36" CMP carrying Stream III under existing US 52 will be filled and replaced with a 42" Welded Steel Pipe, to be installed using the bore and jack method. In accordance with agreements made in the concurrence point 4B meeting, the pipe will not be buried. At the upstream end of the proposed pipe, a portion of the stream will be relocated to accommodate the bore and jack operation around the existing pipe. The relocated channel will be constructed with rip rap armoring. Additionally, ditches will tie to the stream from both sides. These actions will result in 22 lf of permanent stream impacts and 11 lf of temporary stream impacts.

Permit Site 8: At the downstream end of the proposed 42" Welded Steel Pipe carrying Stream III under existing US 52, the existing stream banks, channel, and scour hole will be stabilized with rip rap armoring. These actions will result in 30 lf of permanent stream impacts and 17 lf of temporary stream impacts.

Pipe burial requirements provided by the 4B/4C meeting minutes:

As requested in the Concurrence Point 4B meeting for R-2247CD & EC, Table 12 includes all cross pipes in jurisdictional streams and the proposed burial depth of their inverts. Please note that due to the slope of the existing stream channels and the high calculated velocities, all pipes on R-2247CD & EC carrying jurisdictional streams will not be buried based on discussions held during the 4B meeting regarding stream stability.

Table 12 – Pipe Invert Burial Depth in Jurisdiction Streams for R-2247CD & EC

R-2247CD			
Pipe Location	Size & Material	Impact Site	Pipe Invert Burial Depth (feet)
-Y17- 54+96	48" WSP	4, 5	0.0
-DW1- 15+46	54" RCP	5	0.0
-Y17- 63+32	60" WSP	7	0.0
R-2247EC			
Pipe Location	Size & Material	Impact Site	Pipe Invert Burial Depth (feet)
-L- 108+08	48" WSP	1	0.0
-Y1- 26+19	60" RCP	2	0.0
-L- 111+69	66" WSP	3	0.0
-Y62LPA- INT 13+91	42" RCP/WSP	4, 6	0.0
-Y62RPB- INT 19+95	42" RCP	6	0.0
-L- 141+03	42" WSP	7	0.0

MORATORIUM

There is no moratorium for the corridor.

FEDERALLY PROTECTED SPECIES

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of July 24, 2015, the USFWS lists three federally protected species for Forsyth County (Table 12).

Summary of Species with Habitat:

Northern long-eared bat (NLEB):

NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 4(d) rule, codified at 50 C.F.R. § 17.40(o) and effective February 16, 2016. NCDOT may presume its determination is informed by best available information and consider Section 7 responsibilities fulfilled for NLEB. NCDOT made notification to USFWS on April 12, 2016.

Table 13 – Federally protected species listed for Forsyth County

Scientific Name	Common Name	Federal Status*	Habitat Present	Biological Conclusion
<i>Glyptemys muhlenbergii</i>	Bog turtle	T(S/A)	N/A	Not Required
<i>Myotis septentrionalis</i>	Northern long-eared bat	T	Yes	**
<i>Cardamine micranthea</i>	Small-anthered bittercress	E	No	No Effect

* T – Threatened, E – Endangered, T(S/A) Threatened due to similarity of appearance.

** May Affect. NLEB is exempt due to consistency with the 4(d) rule.

INDIRECT CUMULATIVE IMPACT ANALYSIS

Potential indirect and cumulative effects associated with the Winston-Salem Northern Beltway were reevaluated in 2017 to assess possible effects within the context of existing land use and public policy conditions. Overall, the findings of these analyses indicate that substantial local planning efforts are currently in effect to guide land development activities. While the Northern Beltway would provide a controlled access, new location facility across much of northern Forsyth County, local governments in the region have adopted rigorous growth management and stormwater control measures to focus growth in designated areas and protect water quality. Qualitative analyses of the probable development patterns in the Future Land Use Study Area (FLUSA) suggest that change in land use resulting from the project and subsequent private and public development actions is not likely to lead to a notable increase in impervious surface over the No-Build scenario. As a result, no significant impacts to local water resources are expected as a result of indirect or cumulative land use changes. When considered in the context of other past, present, and future actions, the potential indirect and cumulative effects of the Winston-Salem Northern Beltway to downstream water quality should be minimal.

CULTURAL RESOURCES

Section 4(f) and Section 6(f) Resources:

The Northern Beltway Selected Alternative was chosen in part to avoid all direct impacts to Section 4(f) and Section 6(f) resources.

Archaeological and Historic Architectural Resources:

The Federal Highway Administration (FHWA) has determined that the Winston Salem Northern Beltway project will have an effect upon the Alexander Hege House, and upon archaeological sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**, 31FY944, and 31FY1053/1053** (*The double asterisks by some of the site numbers indicate they are historic period [post-European Contact] sites, not prehistoric [pre-Contact]. The site with both numbers means it has components from both periods.*), properties determined eligible for listing in the National Register of Historic Places, and has consulted with the North Carolina State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f), in accordance with the “Amended Memorandum of Agreement Between the Federal Highway Administration and North Carolina State Historic Preservation Office” (MOA), executed by NCDOT in 2006.

Pursuant to the MOA, the following stipulations are in place:

- The NCDOT will develop Data Recovery Plans (DRP) for Sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**, 31FY944, and 31FY1053/1053**, all of which will be affected by the subject property, in consultation with the North Carolina SHPO.
- The NCDOT will ensure that each DRP is implemented after Right-of-Way is acquired or once site location as shown in the DRP.
- Upon completion of Data Recovery efforts, the NCDOT will prepare and forward a Management Summary to the SHPO detailing the results of the Data Recovery field investigations. The Management Summary will contain sufficient information to demonstrate that the field investigation portion of the DRP has been implemented.
- Upon receipt of the Management Summary, the SHPO will respond within ten (10) days to the recommendations contained within the document.
- Upon acceptance of the recommendations contained in the Management Summary, the SHPO will issue the NCDOT documentation that the Data Recovery field investigations have been completed.
- The analysis and report preparation, detailing sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**, 31FY944, and 31FY1053/1053** will be completed by the NCDOT, or their consultants, within twenty-four (24) months after completion of each site’s fieldwork schedule.
- In consultation with SHPO, NCDOT will determine the extent of control-of-access fencing, as well as its type, material, and finish. NCDOT will purchase and then install the control-of-access fencing within the NCDOT right-of-way. NCDOT will maintain the control-of-access fencing.

- NCDOT will align the Alexander Hege House driveway opposite the new intersection ramp, so property access will be under full traffic control. This will allow NCDOT and the property owner full movement for equipment and trucks.
- NCDOT will provide tree protection measures along the National Register boundary lines adjoining project construction areas. NCDOT will exercise best management practices to minimize, as practicable, tree trimming and disturbance of existing plantings along the Nation Register boundary.

Archaeological site 31FY570*, a historic cemetery, will require avoidance or compliance with the North Carolina General Statute, Chapter 70.

Temporary construction easements may be needed on the historic Clayton Family Farm property. It has been determined that these easements do not constitute a use under Section 4(f). No permanent right-of-way will be acquired from the Clayton Family Farm property. All work will be contained in temporary easements, and the encroachment of the property will be minimal. The duration of the temporary encroachment on the Clayton Family Farm property will be shorter than the timeframe for the construction of the project. The land temporarily occupied from the Clayton Family Farm will be fully restored, that is, the Clayton Family Farm property will be returned to a condition that is at least as good as that which existed prior to the project.

Eligibility of Site 31FY64 is unknown because archaeologists were denied access to the property. If the site falls within the Preferred Alternative after final design, an assessment would be conducted prior to construction after is acquired by NCDOT. Currently, the site is adjacent to non-preferred Detail Study Alternative segment E3.

FEMA COMPLIANCE

The project has been coordinated with appropriate state and local officials and the Federal Emergency Management Agency (FEMA) to assure compliance with FEMA, state, and local floodway regulations.

WILD AND SCENIC RIVER SYSTEM

The project will not impact any designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended).

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

Avoidance and Minimization:

NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable. Wetland impacts have been kept to a minimum by avoiding ditching and channelization through wetlands. Existing drainage patterns to the wetlands have been kept to the extent practicable to maintain the hydrology feeding the wetlands. Other specific examples of avoidance and minimization measures include:

- Best Management Practices (BMPs) will be utilized during construction to attempt to reduce the stormwater impacts to receiving streams and wetlands due to erosion and runoff.
- Grassed swales will be utilized on R-2247CD where practicable (see SMP) to reduce water velocity, promote infiltration and provide treatment for discharge before runoff enters streams. These grassed swales have side slopes that are 3:1 or flatter, with many side slopes being 6:1 and 4:1, have a velocity during the 2-Year Storm of less than or equal to 2 feet per second and have a minimum ditch length equivalent to 100 feet per acre of impervious area.
- Riprap aprons/pads will be utilized at all pipe outlets to reduce velocity and erosion at pipe outlets.
- Multiple proposed culverts utilize junction boxes to dissipate energy, reduce the slope of the pipe and provide reduced outlet velocity to the stream bed and bank.
- Culverts will not be buried in areas discussed in the Concurrence Point 4B meeting to promote channel stability in the naturally steep stream channels (see table 12). Additionally, rip rap channel stabilization has been provided at the outlets of large culverts where appropriate to reduce the threat of erosion.
- Rip rap bank stabilization has been provided where appropriate to promote bank stability.
- A dry detention basin has been included on section R-2247CD to treat stormwater runoff and reduce the peak discharge from the site.
- Roadway fill slopes were steepened to 2:1 at jurisdictional stream crossings as allowed by roadway design guidelines in order to reduce stream impact lengths.
- Storm drainage systems were discharged outside of jurisdictional features where practicable.
- Deck drains were not used on the Kester Mill Road bridge over Silas Creek on section R-2247CD.

Compensation:

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. Tables 2 and 3 summarize the wetland and stream impacts for each section of this project. This project will permanently impact 9.41 acres of wetlands and 59,395 linear feet of streams.

At this time, DMS will provide compensatory mitigation for U-2579AA, AB, C Phase 2, D, E, and F and R-2247CD, EC and EB. Project sections R-2247B Phase 2, CA, CB, and D are not due to let within the next 5 years. Table 14 summarizes the total mitigation needs as 5.93 acres of wetlands impacts and 37,248 linear feet of stream impacts. Compensatory mitigation for R-2247B, CA, CB, D, and EA will be provided accordingly during the subsequent permit modifications. These modifications will occur when final designs on the remaining sections have been completed.

Table 14. Summary of Mitigation Provided by DMS for Projects Letting within 5 Years

Section	Design Stage	Wetland Impacts Requiring Mitigation (ac)	Stream Impacts Requiring Mitigation (lf)
R-2247EC	Final	0.31	814
R-2247CD	Final	0.04	611
U-2579C Phase 2	Final	0.68	3,409
U-2579AA	Preliminary	1.43	3,019
U-2579AB	Preliminary	1.50	10,351
U-2579D	Preliminary	0.08	5,043
U-2579E	Preliminary	0.99	4,864
U-2579F	Preliminary	0.24	2,544
R-2247EA	Preliminary	0.57	*
R-2247EB	Preliminary	0.09	6,593
Total		5.93	37,248

*Mitigation for R-2247EA provided by Mitigation Bank. See attached mitigation summary.

Explanation of mitigation provided by DMS

Sections in Final Design (R-2247CD, R-2247EC, and U-2579C Phase 2) and Sections in Preliminary Design with LET dates within 5 years (U-2579AA, U-2579AB, U-2579D, U-2579E, U-2579F, and R-2247EB).

Streams:

Total Project Impacts:	59,395 linear feet
Sections to Let > 5 years:	-15,354 linear feet
Bank Stabilization for Final Design	-257 linear feet
Section R-2247EA using mitigation Bank	-6,536 linear feet (see attached summary)
Balance	37,248 linear feet

Yadkin mitigation = 30,834

Roanoke mitigation = 6,414

Wetlands:

Total Project Impacts:	9.41 acres
Sections to Let > 5 years:	-3.48 acres
Balance	5.93 acres

Yadkin Mitigation = 4.79 acres

Roanoke Mitigation = 1.14 acres

REGULATORY APPROVALS

Section 404: Application is hereby made for a USACE Individual 404 Permit as required for the above-described activities.

Section 401: We are hereby requesting a 401 Water Quality Certification from the N. C. Division of Water Resources. In compliance with Section 143 215.3D(e) of the NCAC, we

REGULATORY APPROVALS

Section 404: Application is hereby made for a USACE Individual 404 Permit as required for the above-described activities.

Section 401: We are hereby requesting a 401 Water Quality Certification from the N. C. Division of Water Resources. In compliance with Section 143 215.3D(e) of the NCAC, we will provide \$570.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line).

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Bill Barrett at wabarrett@ncdot.gov or (919) 707-6103. A copy of this application and distribution list will also be posted on the NCDOT website at: <http://connect.ncdot.gov/resources/Environmental/Pages>.

Sincerely,


for Phil Harris P.E., Manager
Environmental Analysis Unit Head

cc:

NCDOT Permit Application Standard Distribution List.

Attachments:

Project Area Map
ENG Form 4345
NCDMS acceptance Letter
Mitigation Plan Summary for R-2247EA
NLEB email/memo
Cultural Resources MOA
Concurrence Point 4B/4C Meeting Minutes
Stormwater Management Plans
Permit Drawings
Roadway Right-of-Way Plans
Preliminary Sections Permit Maps



Winston-Salem Northern Beltway

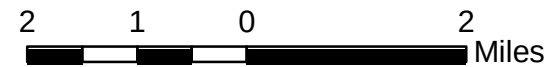
Project R-2247, Project U-2579, and Project U-2579A

Legend

- Freeway/Expressway
- Major Thoroughfare
- Minor Thoroughfare
- Railroad
- County Line

Preferred Alternatives

- Project U-2579
- Project R-2247



Schedule

Project U-2579

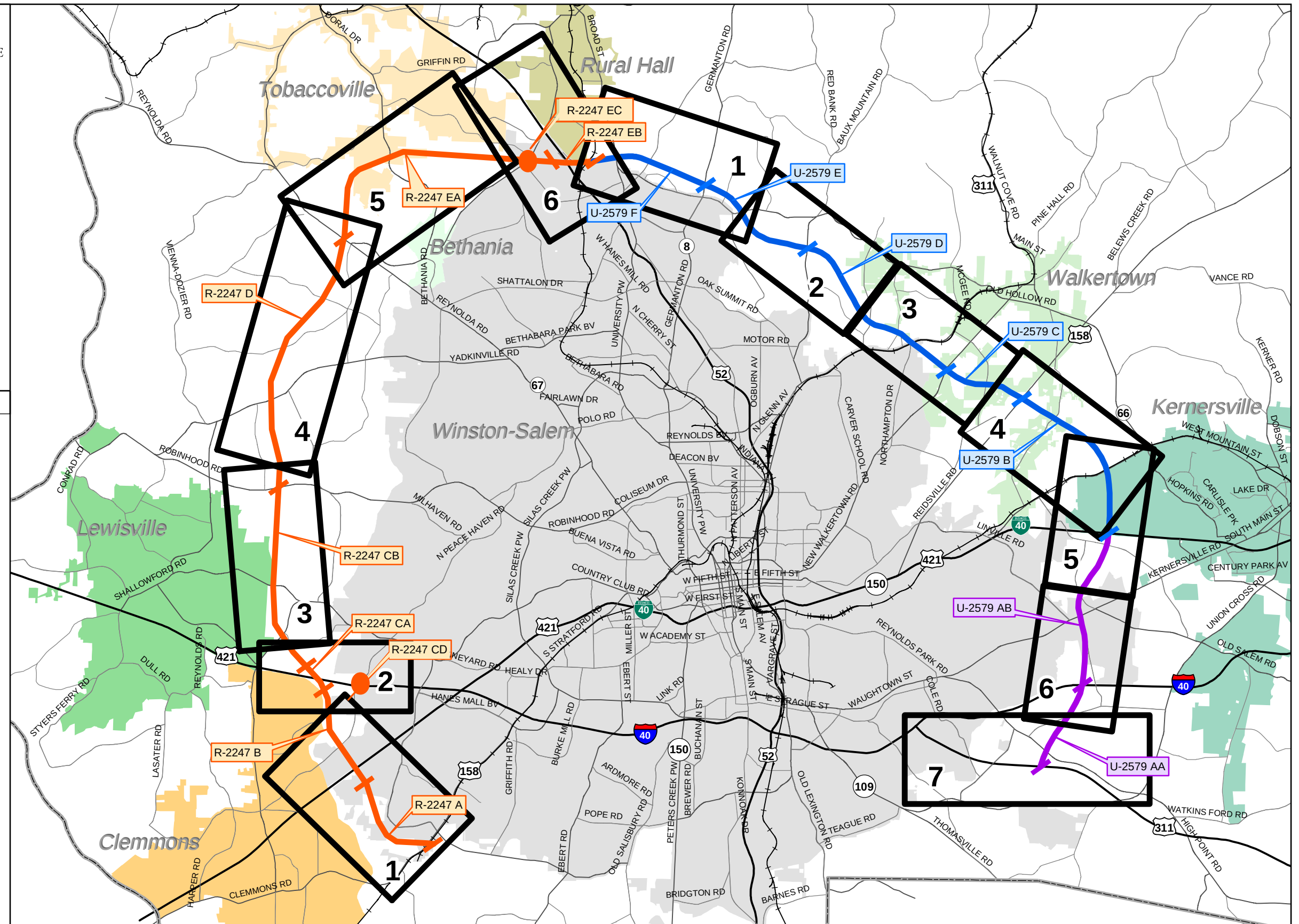
- AA, AB – Right of way: 2018, Construction: 2020
- B – Under Construction
- C – Right of Way: In Progress
Construction: 2018
- D, E, F – Right of Way and Construction:
February 2018
- G – (Replacement of Hastings Hill Road Bridge
over US 421) – Complete

Project R-2247

- EB – Right of Way and Construction: July 2018
- CD, EC – Under Construction
- EA – Right of Way and Construction: 2021
- D – Right of Way and Construction: 2023
- CB – Right of Way and Construction: 2025
- CA – Right of Way and Construction: 2027
- B – Right of Way and Construction: 2027
- A – Right of way and Construction: Post Year*
- F – (Intelligent Transportation Systems for
R-2247B, CA, CB, D, EA, and EB)
– Post Year*

*Unfunded in 2018-2027 State Transportation
Improvement Program

Map last updated August 2017



17. DIRECTIONS TO THE SITE

See permit Cover Letter and attachments.

18. Nature of Activity (Description of project, include all features)

The North Carolina Department of Transportation (NCDOT) proposes to construct the Winston Salem Northern Beltway as a six-lane, median-divided facility from I-40 near the Town of Clemmons to US 311 North near the town of Walkertown and from I-40 Business to US 311 South in Forsyth County. See permit Cover Letter and attachments for more information.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The Winston-Salem Norther Beltway would improve roadway connectivity in Eastern and Western Forsyth County, provide congestion relief for area roadways, expand options for regional/intrastate/interstate travel, help meet the state and local land use and transportation plans, and help fulfill the Highway Trust Fund Act. See permit Cover Letter and attachments for more information.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Roadway fill material will be discharged into streams and wetlands to allow the roadway dimensions that will provide adequate vehicle capacity for the proposed roadway as determined by the NCDOT. See permit Cover Letter and attachments for more information.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type	Type	Type
Amount in Cubic Yards	Amount in Cubic Yards	Amount in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres 9.41 Acres of wetland
or

Linear Feet 59,395 linear feet of stream

23. Description of Avoidance, Minimization, and Compensation (see instructions)

NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable. Wetland impacts have been kept to a minimum by avoiding ditching and channelization through wetlands through the use of toe protection. Existing drainage patterns to the wetlands have been kept to the extent practicable to maintain the hydrology feeding the wetlands. Grassed swales have been utilized where practicable. Direct discharge of storm drainage systems into jurisdiction features has been avoided as practicable. Culverts will not be buried in areas identified on the plans due to naturally steep channels to promote channel stability.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See attachments

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
See attachments					

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

 10-2-2017

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.



ROY COOPER
Governor

September 29, 2017

Mr. Philip S. Harris III, P.E., CPM
Natural Environment Section, PDEA
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: DMS Mitigation Acceptance Letter: **U-2579 / R-2247**, Winston-Salem Northern Beltway – from South of I-40 Southwest of the City to I-74 / US 311 Southeast of the City, Forsyth County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the stream and wetland mitigation for the subject project. Based on the information supplied by you on September 28, 2017, the stream and wetland impacts are located in CU 03040101 of the Yadkin River basin and 03010103 of the Roanoke River basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Stream & Wetlands	River Basin	CU Location	Eco-Region	Stream			Wetlands		
				Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh
Impacts	Yadkin	03040101	CP	0	0	30,834.0	4.79	0	0
Impacts	Roanoke	03010103	CP	0	0	6,414.0	1.14	0	0

*Some of the stream and wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

These impacts and associated mitigation needs were under projected by the NCDOT in the 2017 impact data. DMS will commit to implement sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from DMS.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-707-8420.

Sincerely,


James B. Stanfill
DMS Credit Management Supervisor

Cc: Mr. James Lastinger, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NC Division of Water Resources – Raleigh
File: U-2579 / R-2247



R-2247 EA Stream Mitigation Summary

Compensatory stream mitigation for R-2247 EA will be procured by way of NCDOT contract with private mitigation banks in the 03040101 Hydrologic Unit. All streams impacted by R-2247 EA are within Hydrologic Unit 03040101. Each mitigation bank will be implemented according to the 2008 USACE Mitigation Banking Rules. Each site will be reviewed and approved by the regulatory agencies following the procedures set forth in these rules. All stream mitigation credits to be utilized for R-2247 EA will be released for use prior to submission of the phased permit modification application. Eleven mitigation banks with approved instruments are being contracted to provide mitigation for R-2247 EA, as identified below:

<u>Site Name</u>	<u>Stream Type</u>	<u>Mitigation Bank Developer</u>
Brushy Mountain	Warm	Restoration Systems
Scout	Warm	RES/EBX
Twiman	Warm	RES/EBX
Gideon	Cool	RES/EBX
Green Mesa	Warm	RES/EBX
Compass Point	Cool	RES/EBX
Grassy Creek Tributaries	Warm	Water and Land Solutions
Toms Creek Tributaries	Cool	Water and Land Solutions
Plantation Creek	Cool	Wildlands
White Buffalo	Cool	Wildlands
Critcher Brothers	Cool	Wildlands

Projected credit release from each site was calculated using the standard release schedule established in the 2008 Mitigation Rules. According to the projected credit release schedule submitted by the mitigation bank developers, the following annual and cumulative stream mitigation credits will be released for use by the end of each year:

<u>Year</u>	<u>Stream Type</u>	<u>Annual Credit Release (ft)</u>	<u>Cumulative Stream Credit Release (ft)</u>
12/31/2018	Warm	2,043	2,420
	Cool	<u>377</u>	
	Total	2,420	
12/31/2019	Warm	3,640	12,541
	Cool	<u>6,481</u>	
	Total	10,121	
12/31/2020	Warm	2,238	20,314
	Cool	<u>5,535</u>	
	Total	7,773	
12/31/2021	Warm	3,372	28,317
	Cool	<u>4,631</u>	
	Total	8,003	

NCDOT will purchase two stream mitigation credits to offset each linear foot of streams requiring mitigation impacted by the proposed project.

Barrett, William A

From: Barrett, William A
Sent: Thursday, March 30, 2017 2:24 PM
To: Marella Buncick (marella_buncick@fws.gov)
Cc: Dagnino, Carla S; James.C.Lastinger@usace.army.mil
Subject: R-2247_U-2579 Winston-Salem Northern Beltway

Hi Marella,

Please find attached a Memo for NLEB for [R-2247 and U-2579](#), dated [March 30, 2017](#), for the [Winston-Salem Northern Beltway](#), in [Forsyth](#) County [\[Federal Aid No. NHF-0918\(93\) for U-2579\]](#).

With this submittal, NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 7 4(d) rule, codified at 50 C.F.R. 17.40(o) and effective February 16, 2016. Section 7 responsibilities are therefore considered fulfilled for NLEB.

Please let me know if you have any questions or would like to discuss further.

Thanks

Bill

William A. Barrett
Environmental Senior Specialist
Environmental Coordination & Permitting
PDEA-Natural Environment Section
North Carolina Department of Transportation

919 707 6103 office
wabarrett@ncdot.gov

1598 Mail Service Center
Raleigh, NC 27699-1598

1020 Birch Ridge Drive
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

March 30, 2017

TO: Bill Barrett, Environmental Senior Specialist
Environmental Coordination & Permitting Group Western, NES - PDEA

CC: Ahmad Al-Sharawneh, Project Development Engineer
Project Development Group - Western Region, PDEA

FROM: Chris Manley, Environmental Program Consultant
Biological Surveys Group, NES - PDEA

SUBJECT: *Streamline Section 7 Consultation for the Northern Long-Eared Bat* associated with the Winston-Salem Northern Beltway in Forsyth County, **TIP No. R-2247 and U-2579.**

The North Carolina Department of Transportation (NCDOT, Division 9) proposes to build a Northern Beltway around Winston-Salem from US 158 to US 52 (R-2247, Western Half), and from US 52 south to US 311 (U-2579) in Forsyth County. This memo covers both TIP projects R-2247 and U-2579, including all the sections of each TIP. This project will be built on new location around Winston-Salem. R-2247 will help to alleviate capacity deficiencies and poor north/south roadway connectivity within and through western Forsyth County.

The project to build the Winston-Salem Beltway has been reviewed for effects on the northern long-eared bat (NLEB). As of May 4, 2015, NLEB is listed by the U.S. Fish and Wildlife Service (USFWS) as "Threatened" under the Endangered Species Act of 1973. As of March 30, 2017, NLEB is listed by USFWS (http://www.fws.gov/raleigh/species/cntylist/nc_counties.html) as "Probable/Potential" in Forsyth County. USFWS also established a final rule under the authority of section 4(d) of the Endangered Species Act that provides measures for the conservation of NLEB. The USFWS has tailored the final 4(d) rule to prohibit the take of NLEB from certain activities within areas where they are in decline. This incidental take protection applies only to known NLEB occupied maternity roost trees and known NLEB hibernacula. Effective February 16, 2016, incidental take resulting from tree removal is prohibited if it 1) occurs within a ¼ mile radius of known NLEB hibernacula; or 2) cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot radius from the known maternity tree during the pup season (June 1-July 31).

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
BUSINESS UNIT NAME
ADDRESS 1
CITY, NC ZIP

Telephone: (###) ###-####
Fax: (###) ###-####
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
ADDRESS 2
CITY, NC ZIP

According to the North Carolina Natural Heritage Program (NHP) Biotics Database, most recently updated October 2015, **the nearest NLEB hibernacula record is 80 miles west (EO ID 32171) and no known NLEB roost trees occur within 150 feet of the project area.** EO 32171 represents Black Rock Cliffs Cave near Grandfather Mountain with multiple observations from 1986 to 2011. NCDOT has also reviewed the USFWS Asheville Field office website (http://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html) for consistency with NHP records. This project is located entirely outside of the red highlighted areas (12-digit HUC) that the USFWS Asheville Field Office has determined to be representative of an area that may require consultation.

For the proposed action, NCDOT has committed to the conservation measures listed below:

- 1) No alterations of a known hibernaculum's entrance or interior environment if it impairs an essential behavioral pattern, including sheltering northern long-eared bats (January 1 through December 31);
- 2) No tree removal within a 0.25 mile radius of a known hibernacula (January 1 through December 31); and
- 3) No cutting or destroying a known, occupied maternity roost tree, or any other trees within a 150-foot radius from the known, occupied maternity tree during the period from June 1 through and including July 31.

NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 4(d) rule, codified at 50 C.F.R. § 17.40(o) and effective February 16, 2016. NCDOT may presume its determination is informed by best available information and consider Section 7 responsibilities fulfilled for NLEB.

If you need any additional information, please contact Chris Manley at 919-707-6135.

**AMENDED MEMORANDUM OF AGREEMENT
BETWEEN THE FEDERAL HIGHWAY ADMINISTRATION AND
NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICER
FOR
WINSTON-SALEM NORTHERN BELTWAY
(TIP No.'s R-2247, U-2579 & U-2579A)
Federal Aid No. NHF-0918(14)
TO ADDRESS EFFECTS TO
The Alexander Hege House
and
Archaeological Sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903,
31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**,
31FY944, and 31FY1053/1053**.
Forsyth County, North Carolina**

WHEREAS, the Federal Highway Administration (FHWA) has determined that the Winston-Salem Northern Beltway, Forsyth County, North Carolina (the Undertaking) will have an effect upon the Alexander Hege House and upon archaeological sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**, 31FY944, and 31FY1053/1053**, properties determined eligible for listing in the National Register of Historic Places, and has consulted with the North Carolina State Historic Preservation Officer (SHPO) pursuant to 36 CFR Part 800, regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

WHEREAS, in accordance with 36 CFR Part 800, the North Carolina Department of Transportation (NCDOT) acknowledges and accepts the advice and conditions outlined in the Advisory Council on Historic Preservation's (Council) "Recommended Approach for Consultation on the Recovery of Significant Information from Archaeological Sites," published in the Federal Register (FR Doc. 99-12055) on May 17, 1999; and

WHEREAS, this Amended Memorandum of Agreement (MOA) supercedes a previously executed MOA signed by FHWA, SHPO, and NCDOT on April 26, 1996; and

WHEREAS, NCDOT and Bettie P. Slater, owner of the Alexander Hege House (Owner), participated in the consultation and has been invited to concur in this Amended Memorandum of Agreement (Agreement) pursuant only to the Alexander Hege House; and

WHEREAS, the consulting parties agree that the recovery of significant information from the archaeological sites listed above may be done in accordance with the published guidance; and

WHEREAS, the consulting parties agree that it is in the public interest to expend funds for the recovery of significant information from these archaeological sites to mitigate the adverse effects of the project; and

WHEREAS, the consulting parties concur, to the best of their knowledge and belief, that no Native American Tribes or Native Hawaiian organizations attach religious or cultural importance to the affected property and that no objections from such groups have been raised to the work proposed; and

WHEREAS, to the best of our knowledge and belief, no human remains, associated or unassociated funerary objects or sacred objects, or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), are expected to be encountered in the archaeological work;

NOW, THEREFORE, FHWA and the North Carolina SHPO agree that the Undertaking will be implemented in accordance with the following stipulations in order to take into account the effects of the Undertaking on the historic properties. FHWA will ensure that the following terms and conditions will be implemented in a timely manner and with adequate resources in compliance with the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470).

STIPULATIONS

I. Data Recovery of Archaeological Sites:

- ◆ The NCDOT will develop Data Recovery Plans (DRP) for Sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**, 31FY944, 31FY1053/1053**, all of which will be affected by the subject project, in consultation with the North Carolina SHPO.
- ◆ The NCDOT will ensure that each DRP is implemented after Right-of-Way is acquired or once Right-of-Entry is secured from the property owners and prior to construction activities within the site location as shown in the DRP.
- ◆ As they are developed, each individual DRP will be forwarded for review by the SHPO.
- ◆ Upon completion of each Data Recovery effort, the NCDOT will prepare and forward a Management Summary to the SHPO detailing the results of the Data Recovery field investigations. The Management Summary will contain sufficient information to demonstrate that the field investigation portion of the DRP has been implemented.
- ◆ Upon receipt of the Management Summary, the SHPO will respond within ten (10) days to the recommendations contained within the document.
- ◆ Upon acceptance of the recommendations contained in the Management Summary, the SHPO will issue the NCDOT documentation that the Data Recovery field investigations have been completed.
- ◆ The analysis and report preparation, detailing Sites 31FY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911**, 31FY912**, 31FY921, 31FY925**, 31FY944, 31FY1053/1053** will be completed by the NCDOT, or their consultants, within twenty-four (24) months after completion of each site's fieldwork schedule.

II. Alexander Hege House Recordation:

- ◆ Prior to the initiation of construction, NCDOT will record the existing condition of the Alexander Hege House and its surroundings in accordance with the attached Historic Structures and Landscape Recordation Plan (Appendix A).

III. Alexander Hege House and Project Construction:

- ◆ NCDOT will align the Alexander Hege House driveway opposite the new intersection ramp, so property access will be under full traffic signal control. This will allow NCDOT and the property owner full movement for equipment and trucks.
- ◆ In consultation with SHPO, NCDOT will determine the extent of control-of-access fencing, as well as its type, material, and finish. NCDOT will purchase and then install the control-of-access fencing within the NCDOT right-of-way. NCDOT will maintain the control-of-access fencing.
- ◆ NCDOT will provide tree protection measures along the National Register boundary lines adjoining project construction areas. NCDOT will exercise best management practices to minimize, as practicable, tree trimming and disturbance of existing plantings along the National Register boundary.

IV. Preservation Easement:

- ◆ The Alexander Hege House property owner may pursue a preservation easement for the National Register-eligible Alexander Hege House at the owner's discretion.

OTHER TERMS AND CONDITIONS

Unanticipated Discovery

In accordance with 36 CFR 800.11(a), and prior to initiation of construction activities, NCDOT will ensure preparation of a plan of action should archaeological or architectural resources be inadvertently or accidentally discovered during the construction phase of the project. The plan will provide for an assessment of the significance of the discovery in consultation amongst NCDOT, FHWA, and the SHPO. Inadvertent or accidental discovery of human remains will be handled in accordance with North Carolina General Statutes 65 and 70.

Dispute Resolution

Modification, amendment, or termination of this agreement as necessary will be accomplished by the signatories in the same manner as the original agreement. Disputes regarding the completion of the terms of this agreement will be resolved by the signatories. If the signatories cannot agree regarding a dispute, any one of the signatories may request the participation of the Council to assist in resolving the dispute.

Should the North Carolina SHPO object within (30) days to any plans or documentation provided for review pursuant to this Agreement, FHWA will consult with the North Carolina SHPO to resolve the objection. If FHWA or the North Carolina SHPO determines that the objection cannot be resolved, FHWA will forward all documentation relevant to the dispute to the Council. Within thirty (30) days after receipt of all pertinent documentation, the Council will either:

Provide FHWA with recommendations, which FHWA will take into account in reaching a final decision regarding the dispute, or

Notify FHWA that it will comment pursuant to 36 CFR Section 800.7(c) and proceed to comment. Any Council comment provided in response to such a request will be taken

into account by FHWA in accordance with 36 CFR Section 800.7 (c) (4) with reference to the subject of the dispute.

Any recommendation or comment provided by the Council will be understood to pertain only to the subject of the dispute; FHWA's responsibility to carry out all the actions under this Agreement that are not the subject of the dispute will remain unchanged.

Execution of Agreement

Execution of this Amended Memorandum of Agreement by FHWA and the North Carolina SHPO, its subsequent filing with the Council, and implementation of its terms evidence that FHWA has afforded the Council an opportunity to comment on the Undertaking and its effects on the historic properties, and that FHWA has taken into account the effects of the Undertaking on the historic properties.

Expiration and Extension of Agreement

This agreement will be null and void if its terms are not carried out within five (5) years from the date of its execution, unless the signatories agree in writing to an extension for carrying out its terms.

AGREE:

Federal Highway Administration:

John F. Sullivan, III
for John F. Sullivan, III, P.E.
Division Administrator

Date: 3/29/06

State Historic Preservation Officer:

Jeffrey J. Crow
Jeffrey J. Crow
North Carolina State Historic Preservation Officer

Date: 2/17/06

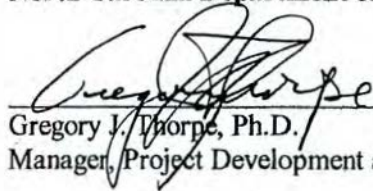
FILED BY:

Advisory Council on Historic Preservation

Date: _____

CONCUR:

North Carolina Department of Transportation:



Gregory J. Thorpe, Ph.D.

Manager, Project Development and Environmental Analysis Branch

Date: 15 Mar 06

CONCUR:

Alexander Hege House:

Bettie P. Slater, Owner

Date: _____

APPENDIX A

**Historic Structures and Landscape Recordation Plan
For the Alexander Hege House and Site
TIP No.'s R-2247, U-2579 & U-2579A
Winston-Salem Northern Beltway
Federal Aid No. NHF-0918(14)
Forsyth County, North Carolina**

Photographic Requirements

- Overall views of the Alexander Hege House and surrounding landscape (elevations and oblique views).
- Selected photographic views of the Alexander Hege House.
- Views of the property and landscape showing the relationship to existing roads.

Photographic Format

- Color slides (all views)
- 35 mm or larger black and white negatives (all views)
- Two (2) sets of black and white contact sheets (all views)
- All processing to be done to archival standards
- All photographs and negatives to be labeled according to Division of Archives and History standards

Copies and Curation

One (1) set of all photographic documentation will be deposited with the North Carolina Division of Archives and History/State Historic Preservation Office to be made a permanent part of the statewide survey and iconographic collection. One contact sheet will be deposited in the files of the Historic Architecture Section of NCDOT.

**MINUTES OF INTERAGENCY 4B MEETING
MEETING FOR PROJECT U-2579C, FORSYTH COUNTY
HELD ON 11/19/2008**

Team Members:

Andrew Nottingham	Hydraulics (Present)
John Thomas	USACE (Present)
Marella Buncick	USFWS (Present)
Marla Chambers	NCWRC (Present)
Amy Euliss	NCDWQ (Present)
Chris Militscher for Kathy Matthews	EPA (Present)
Felix Davila for Donnie Brew	FHWA (Present)
David Harris	REU (Absent)
Tony Houser	Roadway (Present)
Lonnie Brooks	Structures (Present)
Derrick Weaver	PDEA (Absent)
Rachelle Beauregard	NEU (Present)
Keith Raulston	Division 9 (Present)

Participants:

Karen Gullledge	Hydraulics Unit
Greg Price	NEU
Lee Moore	Roadway
John Braxton	Roadway

Note:

U-2579C was separated into 2 phases after the 4B meeting occurred. Meeting minutes have been included in their entirety, although only impact sites 1-5 are applicable to U-2579C Phase II.

DOT began the meeting at 2:00 P.M. with an overview of the project.

Sheets 2F & 2G:

NCWRC inquired whether the stream features shown on these sheets were jurisdictional. NEU responded that they were not jurisdictional streams. No other comments.

Sheet 4:

No comments

Sheet 5:

NEU stated that the stream feature shown on the plans became jurisdictional near -L- Station 378+00 +/- Rt. USFWS inquired whether the drainage from the roadway was going to be discharged directly into the jurisdictional stream. Hydraulics responded that

the roadway drainage would be discharged into lateral ditches prior to reaching the stream. DWQ inquired whether this stream is perennial. NEU responded that it was perennial and jurisdictional up to -L- Station 378+00 +/- Rt.

EPA inquired about the need for a spring box where the jurisdictional stream starts, what fill slopes were used, and the stability of the fill slope in that area due to the steepness of the surrounding terrain. Hydraulics responded that the fill slopes in this area were 2:1 and that a lateral ditch with Class I rip rap would be used from -L- Station 375+00 to 383+00 Rt. Hydraulics will recommend a spring box in this area.

USFWS inquired about the drainage to the proposed cross pipe near -L- Station 381+00. Hydraulics responded that all of the drainage to this pipe was from the natural lay of the land and that only a small amount of roadway drainage would be taken to the pipe via a lateral ditch.

Sheet 6:

Hydraulics stated that the proposed pipe size currently shown (pipe at 387+00) would be upgraded from a 48" to a 60" on the final plans. Hydraulics discussed the proposed design of the cross pipe at -L- Station 387+00; the pipe has a stub out from the stream to a JB because this will align it better with the existing stream at the toe of the fill slope. DWQ inquired whether the stream under the proposed roadway was a jurisdictional stream or not. NEU responded that it was a jurisdictional stream.

Hydraulics stated that the roadway drainage would be taken to lateral ditches to help avoid any erosion problems which may occur with discharging the proposed pipes to the fill slope with no ditches.

Hydraulics discussed the proposed 7'x6' RCBC located at -L- Station 397+70 +/- . Hydraulics discussed trying to daylight as much of the existing stream as possible, but because there is such a large amount of fill, this was not possible. The stream located near -RpB- Station 24+50 will be relocated to the proposed culvert inlet with a lateral base ditch. DWQ inquired about mitigation for the stream on the inlet side of the culvert. Hydraulics stated that this would not be a natural channel design due to the amount of cut required to construct this channel relocation. Hydraulics also stated that there would be no rip rap in the channel relocation. Hydraulics stated that mitigation at the outlet would be needed due to a slight relocation of the channel in order to keep the culvert outlet and stream more inline with each other.

DWQ inquired about the use of grade control structures, such as rock cross vanes, in the channel relocation. Hydraulics stated that the use of rock cross vanes would be investigated. NCWRC inquired as to the length of the channel relocation, recommended natural channel design, and that it was important for the relocation to be stable. Hydraulics stated that the length of the relocation was approximately 220 feet and that natural channel design was not practicable due to the amount of cut required. Construction stated that there had been more success with grade control devices than with natural channel design and recommended investigating grade control measures.

NCWRC inquired about the pipe system on -RpC- near the outlet of the culvert. Hydraulics stated that due to the small size of the plan sheet, it appeared that the system drained to the culvert, but it did not. The roadway drainage is taken to the other side of the ramp and discharged to a lateral ditch. Hydraulics also stated that the areas where the OTCB's were located between the -L- line and the ramps would be graded out and used for detention.

Sheet 6 and 7:

Hydraulics next discussed the proposed pipe crossing at -L- Station 414+00 +/- . DWQ inquired whether the stream feature that is parallel to the -L- line was a jurisdictional stream. NEU stated that it was not, but the stream feature from the pond was jurisdictional. Hydraulics stated that 2:1 fill slopes were going to be used along the -L- line and Ramp D in order to minimize the impacts to the wetlands and stream at this crossing. Roadway questioned this design because of the use of guardrail near the gore area on Ramp D and stated that it was a safety issue if guardrail was used in this area. After review it was determined that the use of 2:1 slopes in this area would not affect the gore area. EPA inquired whether the wetlands not affected would be counted as savings and Hydraulics stated this was correct.

Sheet 8:

EPA inquired about the pond shown on the plans and if it was drained or not. Hydraulics stated that it was drained. DWQ inquired if there were any jurisdictional streams within the area shown as a pond. NEU stated that the jurisdictional stream began below the dam of the pond.

Hydraulics stated that an 8'x8' RCBC would be utilized at this location. USFWS inquired about the slope of the proposed culvert. Hydraulics stated that it was 0.076. USFWS inquired about the outlet design. Hydraulics stated that it had not yet been designed but would likely incorporate rip rap on the banks of the channel.

Sheet 9 & 10:

EPA inquired if there were any jurisdictional streams on either of these sheets. Hydraulics stated that there were none. No other comments.

Sheet 11:

Hydraulics stated that a bridge was discussed in the 2A meeting and the proposed bridge will be approximately 240' in length. A 60" overflow pipe would also be utilized for the wetlands. DWQ inquired what fed the wetlands and NEU/USACOE stated that it was fed by drainage from the existing natural slopes along with any flood waters. NEU stated that the stream feature shown in the wetland was not jurisdictional, but the stream feature that is up stream of the proposed bridge was jurisdictional.

The meeting adjourned at 3:00 P.M.

**Minutes from the Interagency 4C Hydraulic Design Review Meeting
U-2579C - Forsyth County
February 8, 2017**

Team Members:

Monte Matthews, USACE	(present)
James Lastinger, USACE	(present)
Marella Buncick, USFWS	(present)
Marla Chambers, NCWRC	(present)
Dr. Cynthia Van Der Wiele, USEPA	(present)
Dave Wanucha, NCDWR	(not present)
Clarence Coleman, FHWA	(not present)

**Conference Call on 2/23/2017*

Participants:

*Stephen Morgan, Hydraulics
Amy Euliss, Div. 9 DEO
Dave Wanucha, NCDWR
Bill Barrett, NES
Josh Dalton, Sungate Design Group
Brian Elam, Sungate Design Group*

Participants:

Stephen Morgan, Hydraulics
Bruce Payne, Roadway Design
Josh Dalton, Sungate Design Group
Brian Elam, Sungate Design Group
Mark Staley, REU
Bill Barrett, NES
Carla Dagnino, NES
Marc Cheek, Structures
Tanga Sampson, Utilities
Ahmad Al-Sharawneh, PDEA
James Upchurch, TPB
Keith Raulston, Div. Const. Eng. (Not Present)

Note:

U-2579C was separated into 2 phases after the 4C meeting occurred. Meeting minutes have been included in their entirety, although only impact sites 1-5 are applicable to U-2579C Phase II.

Minutes:

Introductions were made by all in attendance.

Josh Dalton proceeded through the permit drawing plan sheets:

General

- Upstream and downstream bank and channel stabilization lengths will be split and noted in the impact summary sheet for use in the permit application.

** A list of pipes, in jurisdictional areas, that are not to be buried will be provided for use in generating the permit application.*

Permit Sheet 6: (Plan Sheet 4)

Site 1:

- Concerns about groundwater initiated discussion regarding the need for spring boxes. Since no springs were located or shown in the current plans, Stephen Morgan stated that the necessity of spring boxes would be determined in the field during construction.

Permit Sheet 9: (Plan Sheet 5)

Site 1:

- Drop structure to be added to 48" cross pipe to reduce outlet velocity. *After the meeting, hydraulics recommended increasing the 48" to 60" to facilitate future "slip-lining", since the pipe is metal.*
- Lateral 5' base ditch, at station 383+50 -L- right, to be flattened or flared to reduce velocity at JS.

Site 2:

- Upstream and downstream bank stabilization lengths will be split and noted in the impact summary sheet for use in the permit application.
- Because of the steeper slope (1.9%), USACE inquired about not burying the inlet end of the 60" cross pipe and USFWS had concerns about outlet velocity. After discussion, it was agreed that the pipe inlet would not be buried and a junction box would be used to flatten pipe slope near the pipe outlet.

Permit Sheet 13: (Plan Sheet 6)

Site 3:

- The drainage area of this crossing would allow for a large pipe, but as a minimization effort the RCBC with sills and baffles will remain as the proposed structure with a 0.5ft burial. *After the meeting, concerns were raised regarding the constructability of the 0.5 baffles and the ability to retain bed material in the culvert. The 2' meander is not sufficient to hold material to provide a low flow channel. The decision was made to remove the low/high sills in favor of one sill 0.75' tall across the culvert width. This will allow Class B rip rap to be used to supplement native bed material. The culvert will be buried 0.75'.*

** DWR had concerns with the alignment of the culvert outlet channel. It was discussed and decided the proposed channel alignment will be adjusted to better tie in with the existing channel.*

Site 4:

- There was a general discussion about the reasoning for the benched lateral 4' base ditch. The 4B minutes indicated there was a desire to provide some natural stream design at that time. In the time since, the team agreed that natural stream design for such short sections is not feasible and stream stability is more critical. USACE indicated there would be no mitigation credit for the benched lateral 4' base ditch.

The design will be revised to an armored open channel with embedded rip rap. The bench and rock sills will be removed from the plans.

Site 5:

- NES proposed 1:1 mitigation since stream is intermittent. No further comments.

Site 6:

- Since the proposed cross pipe has a 7.8% slope and the Jurisdictional Stream will begin at its outlet, rip rap should be used in the channel bed and impacts revised.

Site 7:

- Burial at upstream end of cross pipe to be waived to protect integrity of wetland.

** Discussed reasoning for non-burial at upstream end, DWR ultimately concurred with non-burial.*

** Site 7 and 8 should be combined under one site number. Site 8 will be renamed Site 7A and Site 8 will be omitted.*

Site 7A:

- Cross pipe to be buried at outlet end.
- Wetland declared a total take.

Site 8: OMITTED

Permit Sheet 25: (Plan Sheet 7)

Site 9:

- Due to a flatter grade (1.2%), the pipe will be buried one foot. To ensure stream stability, embed rip rap in channel bed upstream and downstream of cross pipe. Impacts are still to be separated in impact summary.

** Division 9 DEO inquired why sills were not proposed and whether backfilling was discussed in 4C meeting. Upon further discussion, it was decided that the pipe should not be buried and constructed riffles would be used to stabilize the up and downstream bed.*

** The feasibility of successfully embedding rip rap in channel was discussed. It was decided that rip rap smaller than the specified Class 'II' may be required to properly construct channel.*

Permit Sheet 28: (Plan Sheet 8)

Site 10:

- Upon reviewing recent photos of the wetland an inquiry was made as to whether part of the site should be designated as open water. NES will make a determination and update as needed.

Site 11:

- Alignment -SRSA- was not shown on the plans during the 4B review. The access road was added to provide access to parcels cut off by the project. An additional stream crossing will need to be added due to this revision. The proposed structure is a 95"x67" CSPA downstream of the box culvert. Both the RCBC and CSPA will be buried 1.0' with rip rap on banks only. Both are on relatively mild grades (0.59%).

** Division 9 DEO inquired as to why the RCBC is being buried at the inlet end, in a wetland, and not laid at grade. After discussion, it was decided that the RCBC will remain buried at both ends and a constructed riffle or rock sill would be used at the inlet end of the RCBC to control grade and maintain the integrity of the wetland.*

** Hydraulics stated that they would prefer to armor the entire channel between the RCBC and CSPA, rather than banks only, since the proposed channel is in a new location.*

Permit Sheet 34: (Plan Sheet 11)

Site 12:

- Note to be added for temporary channel impact at bridge, indicating it's intended use for temporary crossing during construction.
- Hydraulics inquired as to whether a pipe would be an allowable option for the temporary crossing. If permitted as temporary fill a pipe would be allowed per USACE, however it is not preferred versus a spanning structure. The division will be consulted regarding the question if temporary access should be permitted across the stream.

** The temporary surface water impacts were discussed. Since a temporary crossing will likely be outside the footprint of the proposed structure, it was decided that the temporary impacts should be shifted South, between the structure and proposed bank stabilization.*

Site 13:

- The function of the 2@48" cross pipes were discussed and it was suggested that only 1 pipe was needed to maintain integrity of the wetland. It was agreed that a single 60" RCP would be the best option and that rip rap would not be required at the outlet end. The pipe inverts will not be buried.

Permit Sheet 39: (Plan Sheet 13)

Site 14:

- No comments.

Minutes from the Interagency 4B Hydraulic Design Review Meeting
R-2247CD & EC in Forsyth County
May 17, 2017
NCDOT Century Center
1:00 PM – 2:30 PM

Agency Members:

Dave Wanucha, NCDWR
James Lastinger, USACE
Monte Mathews, USACE
Marla Chambers, NCWRC
Cynthia Van Der Wiele, PhD, USEPA

Participants:

Bill Elam, NCDOT Hydraulics
Craig Lee, NCDOT Hydraulics
Shane McCarthy, NCDOT DB
Michael Shumsky, NCDOT DB
John Nance, NCDOT DB
Amy Euliss, NCDOT Div 9
Mark Staley, NCDOT Roadside
Clarence Bunting, NCDOT Congestion
Carla Dagnino, NCDOT NES
Fred Hanks, Winston Salem MPO
Dan Lenzen, Blythe
Matt Adams, Blythe
Charlie Flowe, KCI
Josh Dalton, Sungate
Brad Smith, Sungate
Randy Howard, Sungate

R-2247CD Minutes:

A general introduction of the project was given and introductions were made by all in attendance. Randy Howard proceeded through the 30% Hydraulic Design plans sheet by sheet.

General Notes:

- Note on plans if cross pipe inverts are to be buried (and to what depth) or not buried. Include a table in the permit application listing all pipes that will not be buried. Note if pipe inverts are to be buried on the drainage summary sheet.
- Include a blow-up view in Permit Drawings for all impact areas.
- Include wetlands as shown in WET file and JS as shown in FS file on Permit Drawings.

Sheet 4:

No Comments

Sheet 5:

No Comments

Sheet 6:

- Randy discussed the existing 42" CMP (Sta. 55+00 -Y17-) to be retained and extended on both the upstream and downstream ends. Marla inquired about the slope. Randy replied that the slope is 3.4%.
- Amy asked if the proposed inlet and outlet would be buried. Randy replied that the current plan is to bury the inverts.
- Amy asked that we provide a list of any pipes that will not be buried with the Permit Drawings.
- There was a discussion about the proposed riprap on streambanks at the outlet of the extended 42" CMP (Sta. 55+00 -Y17- RT).
- Randy proceeded with a general discussion of the proposed dry detention basin (Sta. 49+00 to 53+00 -Y17- RT).

Sheet 7:

- Randy noted that the existing 42" RCP (Sta. 63+50 -Y17-) shown on the plans was field verified to be a 48" RCP with a tapered inlet.
- The proposed 42" Bore & Jack was discussed (Sta. 63+60 -Y17-). The inlet invert was confirmed to be at the bank elevation and will act as a high-flow pipe.
- Randy discussed the proposed outlet channel (64+00 -Y17- RT). It was noted that the existing JS would be relocated. Riprap would be installed at the outlet due to high velocity. The remainder of the channel relocation will have coir fiber matting installed on the banks only.
- Marla stated that fish passage is a concern and requested that all riprap at pipes be keyed in.

Sheet 8:

No Comments

Sheet 9:

No Comments

Sheet 10:

- Randy discussed the proposed bridge (Sta. 11+50 -Y28REV2). It was noted that the existing bridge has collapsed. Pictures of the site were shown and the existing rock in the stream bed and along the banks was discussed.
- Sungate confirmed that the riprap at embankment detail will be used for the proposed riprap streambank stabilization.
- Marla asked if a 10' bench under the bridge was possible for animal passage. Sungate responded that the proposed bridge is located at the top bank and there would not be enough clearance under the bridge for a bench.

R-2247EC Minutes:

Meeting directly followed R-2247CD meeting where a general introduction was given and introductions were made by all in attendance. Brad Smith proceeded through the 30% Hydraulic Design plans sheet by sheet.

General Notes:

- Note on plans if cross pipe inverts are to be buried (and to what depth) or not buried. Include a table in the permit application listing all pipes that will not be buried. Note if pipe inverts are to be buried on the drainage summary sheet.
- Include wetlands as shown in WET file and JS as shown in FS file on Permit Drawings.
- Review period for Individual Permit is 120 days, including the public notice period.
- Construction can commence on upland areas prior to receiving Individual Permit with courtesy notice to USACE.

Sheet 4:

No comments.

Sheet 5:

- Brad and Charlie Flowe explained the location of the noise wall and the future project section EC.
- 108+00 -L- LT
 - Amy asked that a Rip Rap Embankment detail be added. Sungate responded that the ditch could be tied in to the bottom of stream to avoid a drop at the bank.
 - Amy asked that Sungate investigate the possibility of adding rip rap on opposite bank from ditch tie-in if the bank slope is not steeper than 1.5:1.
- 112+50 -L- LT
 - Add Rip Rap Embankment detail for ditch tie-in to JS.
 - Bill and Craig suggested adding rip rap inlet protection on banks between proposed ditch and proposed headwall.
 - Amy asked if there will be utility impacts. There are none anticipated at this site. Utility impacts on the project will be assessed at a later date and any impacts will be included in the permit drawings and application.
- 26+20 -Y1-
 - A discussion was held on the impact to stream stability created by burying the proposed 66" RCP. It was decided that the proposed 66" RCP should not be buried. Pipe size will change to 60" RCP. Determination of pipe burial will be made on a case-by-case basis.

- o Amy asked that the design team makes sure that improvements do not destabilize stream in area of “Stream Disappears” note.
- o Stream is to be considered Jurisdictional in area of “Stream Disappears” note.
- o Rip rap in channel will be installed flush with bed elevation.
- o Brad presented pictures of the existing stream in this area. It was suggested rip rap may not be needed in bed due to existing bed material.

Sheet 6:

- Line from 14+08 to 14+68 -Y62LPA- RT should be boundary of jurisdictional wetland, not JS. Remove JS line from FS.
- A discussion was held on the impact to wetland hydrology if a ditch was cut from 14+08 to 14+58 -Y62LPA- RT. The consensus was to remove the ditch and add toe protection.
- 20+00 -Y62RPB-
 - o To increase channel stability, proposed 48” RCP should not be buried. Pipe size will change to 42” RCP.

Sheet 7:

No comments.

Sheet 8:

No comments.

Sheet 9:

No comments.

Sheet 10:

No comments.

Sheet 11:

No comments.

Meeting adjourned.

**Minutes from the Interagency 4C Permit Drawings Review Meeting
R-2247CD & EC in Forsyth County
September 20, 2017
NCDOT Century Center
10:00 AM – 12:00 PM**

Agency Members:

Dave Wanucha, NCDWR
James Lastinger, USACE
Marella Buncick, USFWS

Participants:

Bill Elam, NCDOT Hydraulics
Craig Lee, NCDOT Hydraulics
Michael Shumsky, NCDOT DB
Amy Euliss, NCDOT Div 9
Carla Dagnino, NCDOT EAU
Matt Adams, Blythe
Charlie Flowe, KCI
Josh Dalton, Sungate
Brad Smith, Sungate
Randy Howard, Sungate
Jeremy Goodwin, NCDOT REU
Bill Barrett, NCDOT EAU
Ken Gilland, HNTB
Ellen McAlexander, HNTB

R-2247CD Minutes:

A general introduction was given and introductions were made by all in attendance. Josh Dalton opened with an explanation of the changes to the hydraulic designs since the 4B meeting regarding the addition of bore and jack pipe replacements. It was noted that meeting minutes will be distributed to participants on 9/21/2017 followed by a 1-week review and comment period. Randy Howard proceeded through the Wetland and Surface Water Impacts Permit drawings plans sheet by sheet.

Site 1:

- No comments

Site 2:

- Show mechanized clearing in wetlands between end of riprap ditch and ROW.
- Provide ditch velocity leaving ROW: $V_{10} = 3.66$ fps

Site 3:

- No comments

Site 4:

- No comments

Site 5:

- Riprap channel bed between proposed pipes.

Site 6:

- No comments

Site 7:

- Add head ditch at disappearing stream location.
- Add safety fence between JS and head ditch.
- Add note: "Treat as jurisdictional if surface water is encountered during construction."

After the meeting, Hydraulics recommended treating the 'disappearing stream' as a jurisdiction stream and providing permanent stream impacts based on site photos. Due to this change, the head ditch, additional safety fence, and note are not necessary.

Site 8:

- No comments

Site 9:

- Include bank stabilization impacts on both sides of channel under bridge.

Site 10:

- No comments

R-2247EC Minutes:

Meeting directly followed R-2247CD meeting where a general introduction was given and introductions were made by all in attendance. Brad Smith proceeded through the Wetland and Surface Water Impacts Permit drawings plans sheet by sheet.

General Notes:

- "Invert not buried" note should be displayed in red on all applicable sites.

Site 1:

- Marella noted concerns about fish passage in proposed 48” welded steel pipe. Consensus was to retain design as shown.

Site 2:

No comments.

Site 3:

No comments.

Site 4:

Adjust JS line or add note to more clearly define beginning of JS.

Site 5:

No comments.

Site 6:

No comments.

Site 7:

No comments.

Site 8:

No comments.

Meeting adjourned.



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element: 34839.1.9 TIP No.: U-2579C County(ies): Forsyth Page 1 of 4

General Project Information

WBS Element:	34839.1.9	TIP Number:	U-2579C	Project Type:	New Location	Date:	1/14/2017
NCDOT Contact:	Stephen Morgan, PE			Contractor / Designer:	Sungate Design Group		
Address:	Hydraulics Unit 1590 Mail Service Center Raleigh, NC 27699-1590			Address:	905 Jones Franklin Rd Raleigh, NC 27606		
	Phone: (919) 707-6739				Phone: (919) 859-2243		
	Email: smorgan@ncdot.gov				Email: belam@sungatedesign.com		
City/Town:	Winston Salem			County(ies):	Forsyth		
River Basin(s):	Yadkin-Pee Dee			CAMA County?	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	1.99	Surrounding Land Use:	Residential, Agricultural, Rural					
	Proposed Project		Existing Site					
Project Built-Up Area (ac.)	43.6	ac.	5.8	ac.				
Typical Cross Section Description:	Three 12ft lanes with 14ft outside shoulders (12ft paved) and 12ft paved inside shoulders in each direction with a 22ft grassed median.		N/A					
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	81,670	Year:	2037	Existing:	65,592	Year:	2017
General Project Narrative: (Description of Minimization of Water Quality Impacts)	I-74 Winston-Salem Northern Beltway from East of US 311 to US 158: Measures have been taken throughout the project to limit impacts to wetlands and surface waters. Two Dry Detention basins will be utilized in the gore areas between the -L- line and Ramps B and C. These basins will serve to attenuate peak stormwater flows, promote settlement of suspended solids and reduce erosive velocities downstream. Further, no deck drains will be used on the Lowery Mill Creek bridge, eliminating potential for direct roadway runoff into surface waters. A rip rap energy dissipator basin will be used at storm drain system outlet, in the Lowery Mill Creek floodplain, to reduce peak flow velocities to Lowery Mill Creek. 2:1 slopes will be used in fill areas to reduce impacts to surrounding wetlands and jurisdictional streams.							

Waterbody Information

Surface Water Body (1):	Lowery Mill Creek		NCDWR Stream Index No.:	12-94-12-3-(0.5)	
NCDWR Surface Water Classification for Water Body	Primary Classification:	Water Supply III (WS-III)			
	Supplemental Classification:				
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:			Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	Yes	Deck Drains Discharge Over Buffer?	No	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	No	(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 2.07; Released October 2016)

WBS Element: 34839.1.9 TIP No.: U-2579C County(ies): Forsyth Page 2 of 4

Additional Waterbody Information

Surface Water Body (2):	Frazier Creek		NCDWR Stream Index No.:	12-94-12-6-1	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:				
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:			Buffer Rules in Effect:		N/A
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					
Surface Water Body (3):			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:		
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 (4):			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:		
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 (5):			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:		
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)					



Preformed Scour Holes and Energy Dissipators

Additional Comments	

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* 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.



(Version 2.07; Released October 2016)

WBS Element: 34839.1.9

TIP No.: U-2579C

County(ies): Forsyth

Page 4 of 4

Other Best Management Practices

[illegible]

Additional Comments

\$\$\$\$SYTIME\$\$\$\$
 \$\$\$\$DGN\$\$\$\$
 \$\$\$\$USERNAME\$\$\$

BEGIN TIP PROJECT
U-2579C

WALKERTOWN CITY LIMIT

OLD WALKERTOWN RD

Southern Corp Rd

Millston Rd

New Walkertown Rd

Dillon Farm Rd

Haven Ln

Williston Rd

Trellis of Exchange

Old Hollow Rd

Rocky Branch Rd

Carroll Rd

WALKERTOWN CITY LIMIT

END TIP PROJECT
U-2579C

WALKERTOWN CITY LIMIT

Old Walkertown Rd

Bellevue Rd

Creek Rd

Old Bellevue Rd

Walkertown South Rd

LIMIT

DETOUR

VICINITY MAP

WETLAND AND SURFACE WATER IMPACTS PERMIT

TO
US 421 /
I-40 BUS

END BRIDGE /
-Y2- POT STA. 22 + 40.02
BEGIN BRIDGE \
-Y2- POT STA. 20 + 18.77

END BRIDGE
-YI- POC STA. 30+34.05

BEGIN TIP PROJECT U-2579C
-L- POT STA. 373+00.00

BEGIN BRIDGE
-YI- POC STA. 28+13.39

SITE 5

END TIP PROJECT U-2579C
BEGIN TIP PROJECT U-2579B
-L- POT STA. 478+00.00

END CONSTRUCTION
-L- POT STA. 483 + 50.00

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

DESIGN DATA

ADT 2017 = 65,592
ADT 2037 = 93,112
K = 10 %
D = 60 %
T = 18 % *
V = 70 MPH
(TTST=12% + DUAL=6%)
FUNC. CLASS=INTERSTATE
STATEWIDE TIER

LENGTH OF ROADWAY PROJECT U-2579C	=	1.941 Miles
LENGTH OF STRUCTURE PROJECT U-2579C	=	0.048 Mile
TOTAL LENGTH OF TIP PROJECT U-2579C	=	1.989 Miles

&

RIGHT OF WAY DATE:
AUGUST 28, 2015

JASON TALLEY, PE
PROJECT ENGINEER

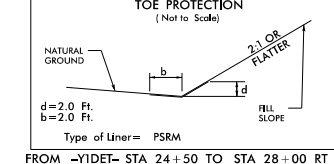
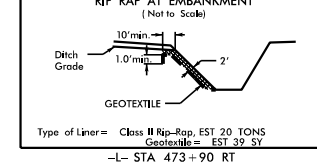
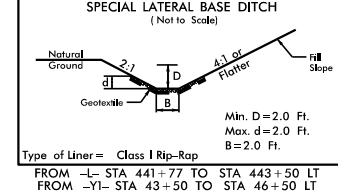
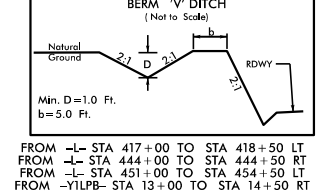
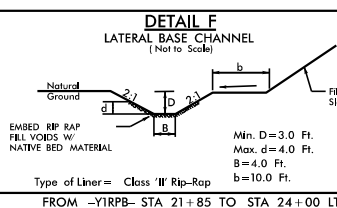
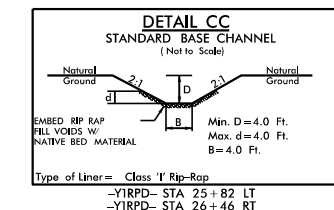
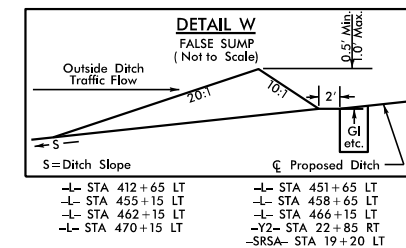
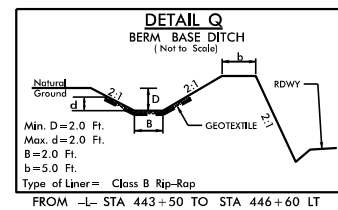
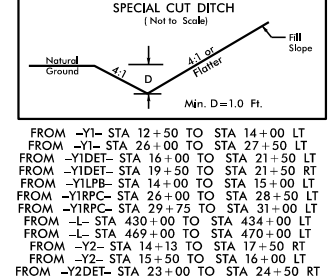
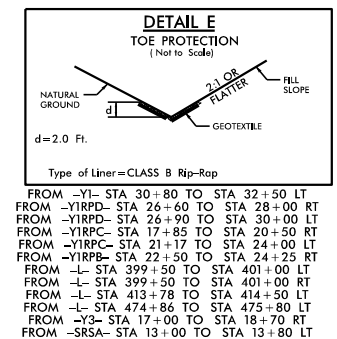
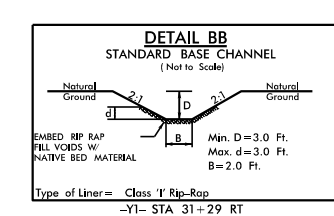
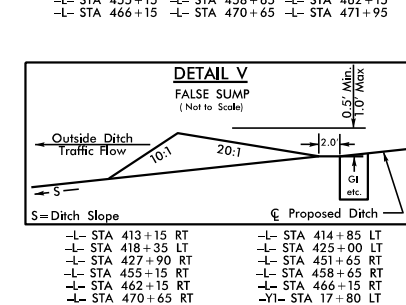
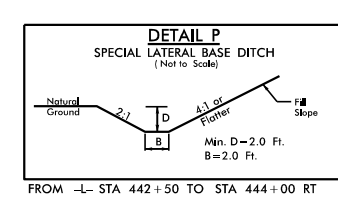
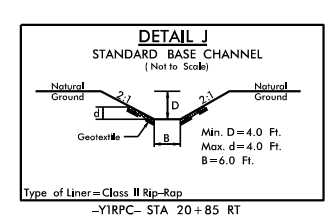
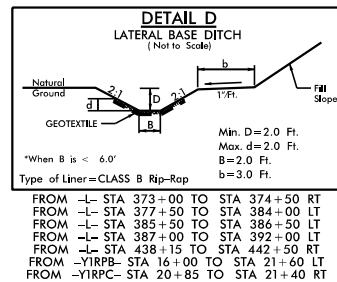
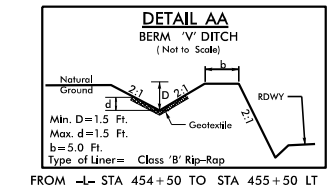
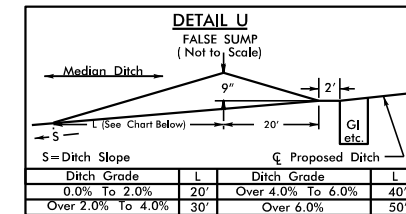
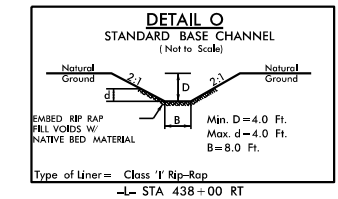
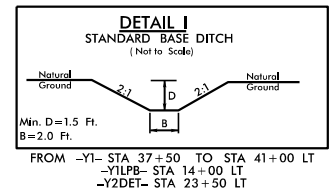
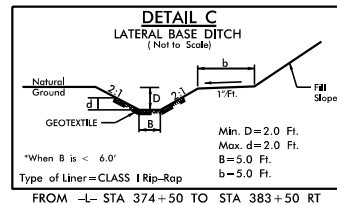
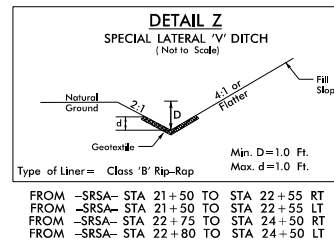
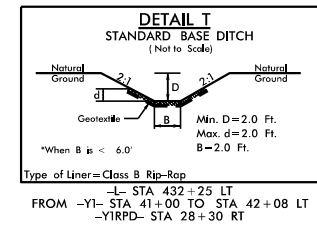
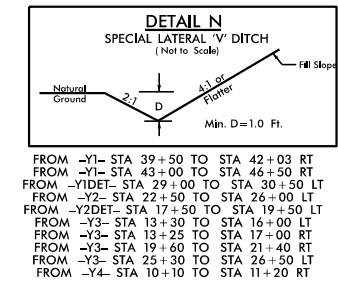
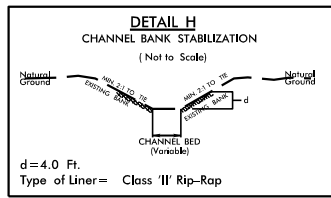
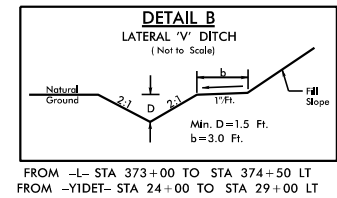
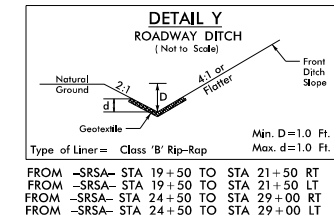
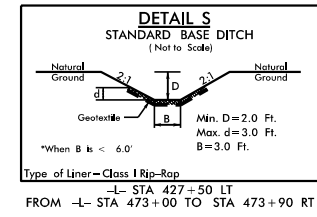
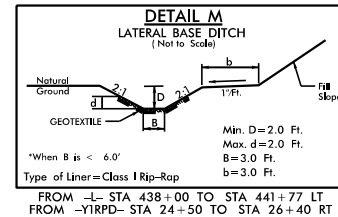
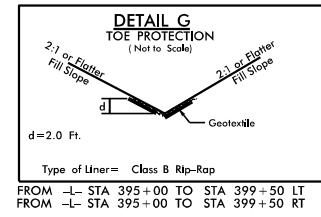
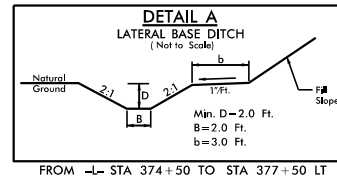
JARED BOND, PE
PROJECT DESIGN ENGINEER

TATIA L. WHITE, PE, PI
NCDOT CONTACT

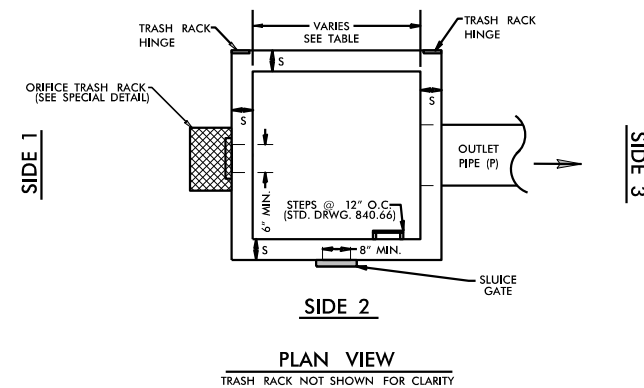
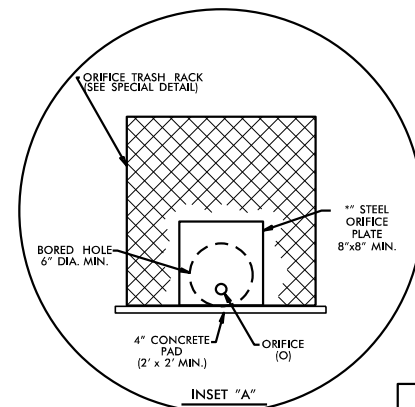
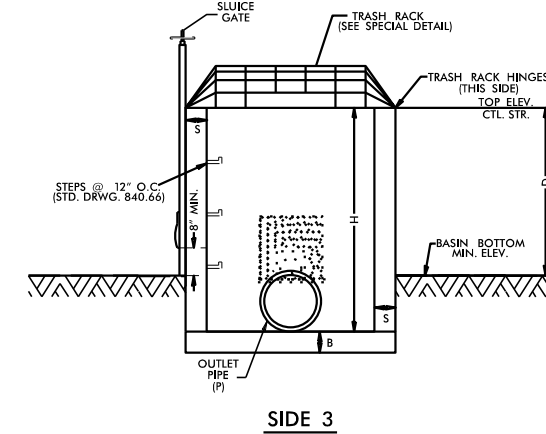
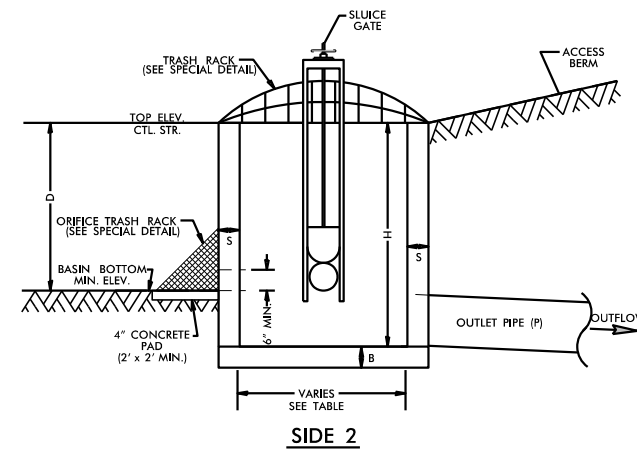
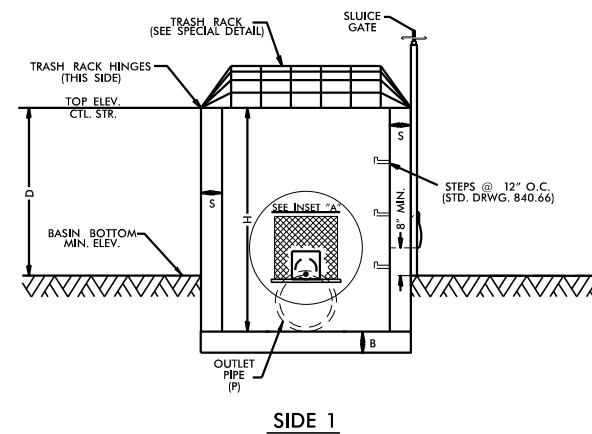
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<i>SIGNATURE:</i> _____	ROADWAY DESIGN ENGINEER

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U-2579C	2D-1
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

**PERMIT DRAWING
SHEET 2 OF 23**



DETAIL EE
DRY DETENTION BASIN DRAWDOWN STRUCTURE
 NOT TO SCALE

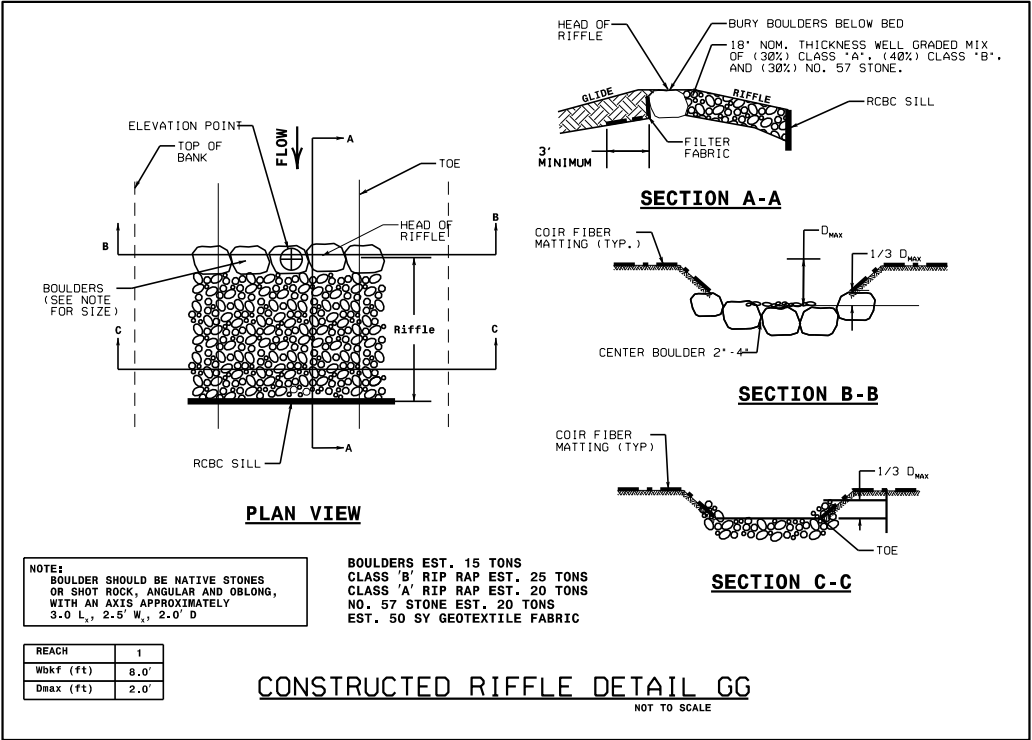
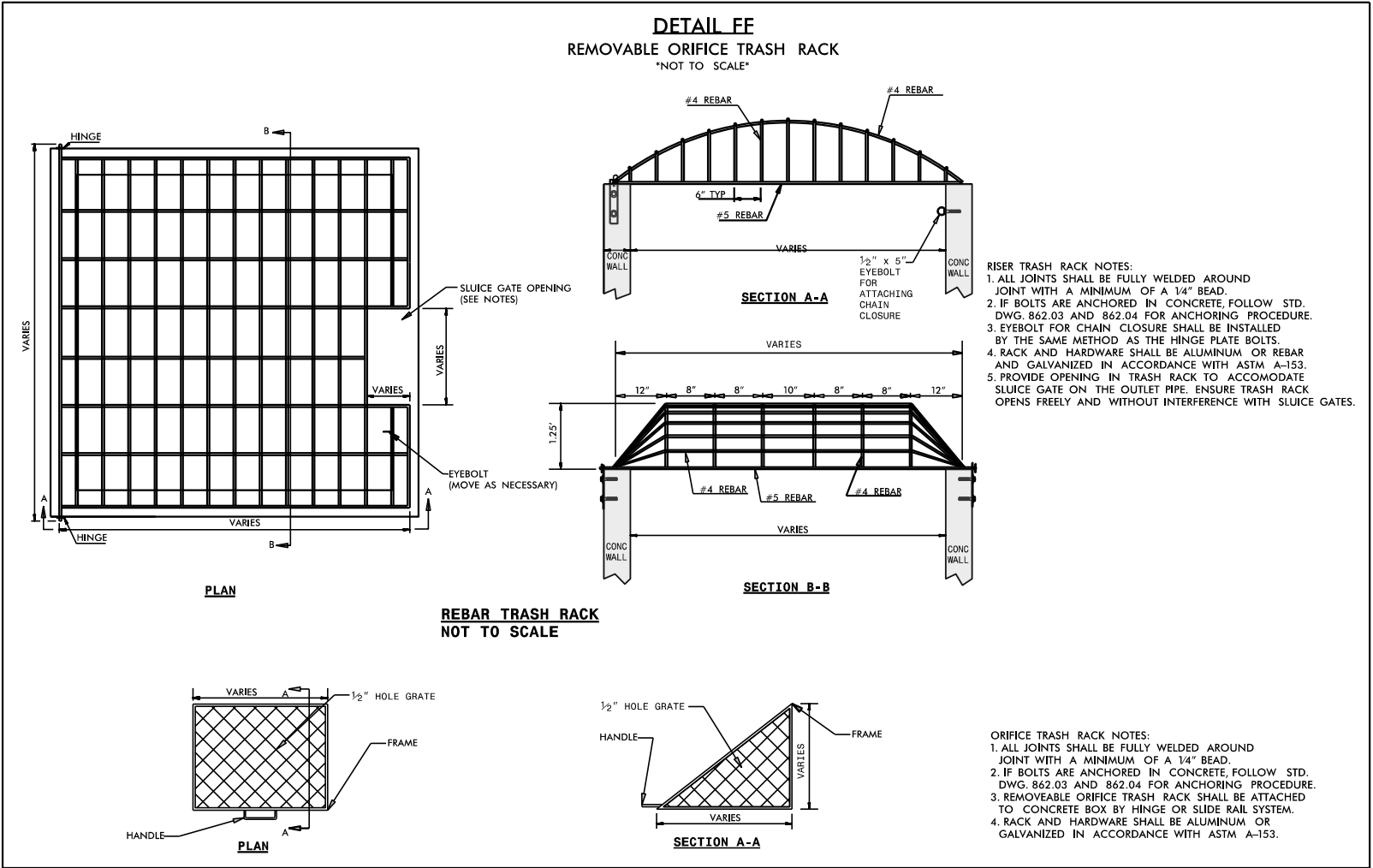


- NOTES:
1. TOP ELEVATION OF CONTROL STRUCTURE (WEIR ELEVATION) SHOULD BE SET AT THE W_{QV} ELEVATION.
 2. 15" MINIMUM DIAMETER FOR OUTLET PIPE.
 3. 2" MINIMUM DIAMETER ORIFICE. IF ORIFICE IS GREATER THAN 6", A STEEL PLATE IS NOT REQUIRED.
 4. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
 5. 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.
 6. SLUICE GATE SHALL PROVIDE WATERTIGHT SEAL. PROVIDE ADEQUATE CLEARANCE FOR GATE OPERATION AND FOR PROPER SEATING OF GATE OVER PIPE.
 7. SELECT BOX STANDARD AS REQUIRED TO ACCOMMODATE SLUICE GATE AND ORIFICE TRASH RACK WIDTH.
 8. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATE.
 9. ADJUST FOOTER DIMENSIONS AS NEEDED FOR ANTI-FLOTATION.
 10. PAYMENT OF TRASH RACKS ARE INCIDENTAL TO BASIN DRAWDOWN STRUCTURE.

[illegible]

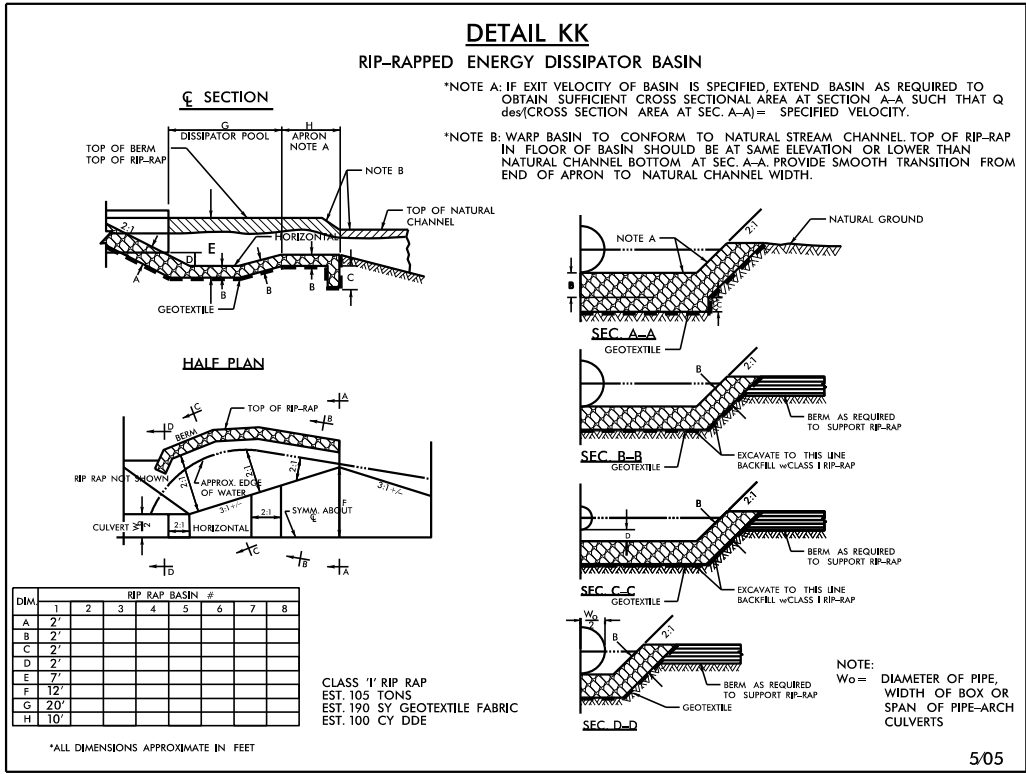
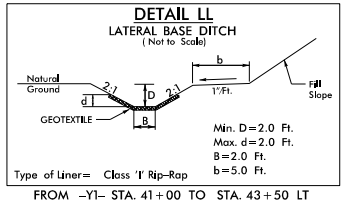
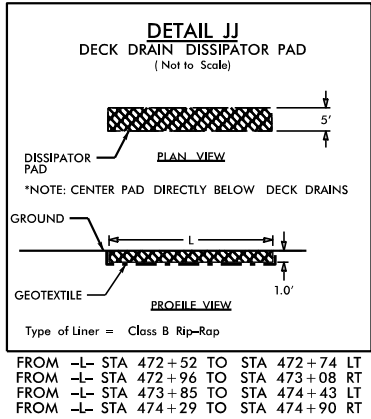
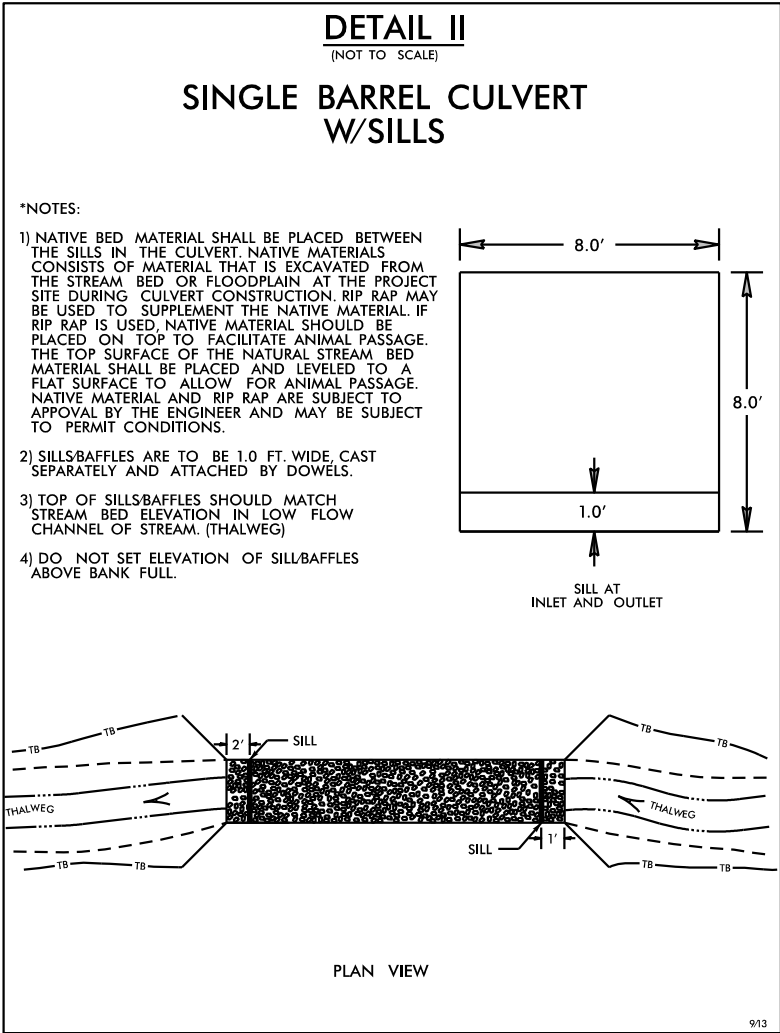
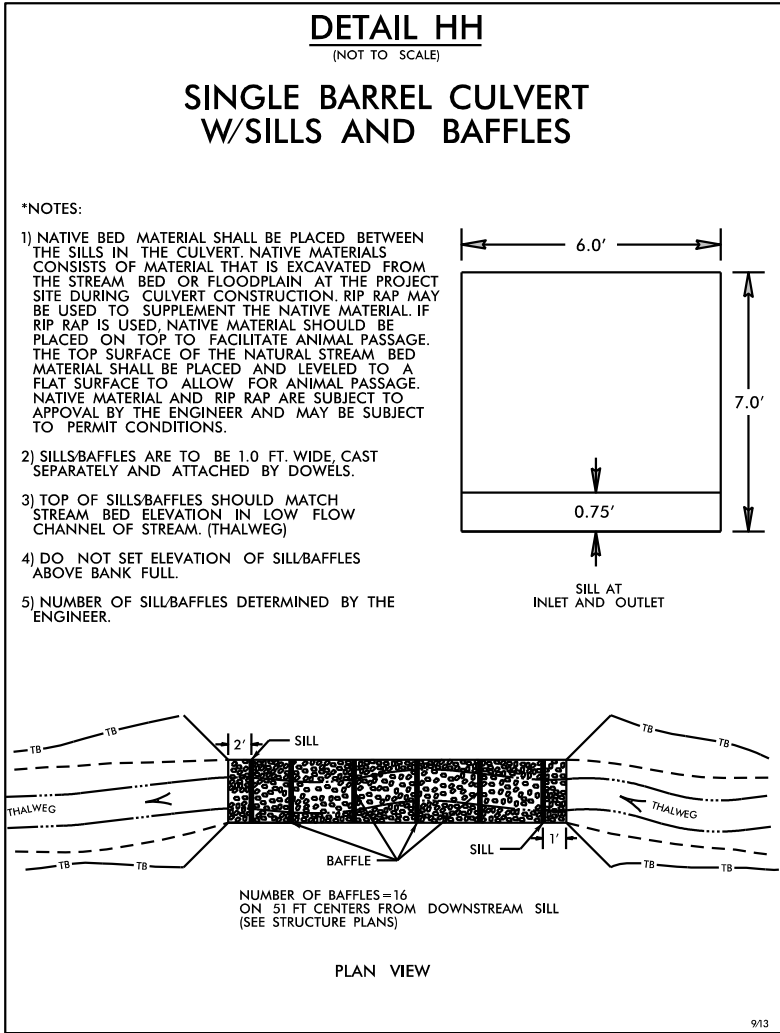
PROJECT REFERENCE NO.		SHEET NO.
U-2579C		2D-3
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

PERMIT DRAWING
SHEET 4 OF 23

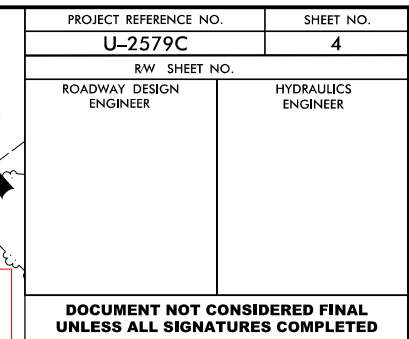


5/14/99

8/27/2017
U259d.d.pr-m-wet-psh-03c.dgn
Reviewed



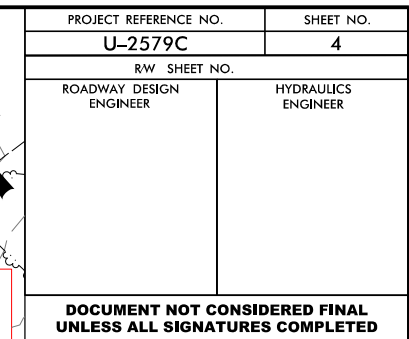
PROJECT REFERENCE NO.	SHEET NO.
U-2579C	2D-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
PERMIT DRAWING SHEET 5 OF 23	



DENOTES FILL IN WETLAND

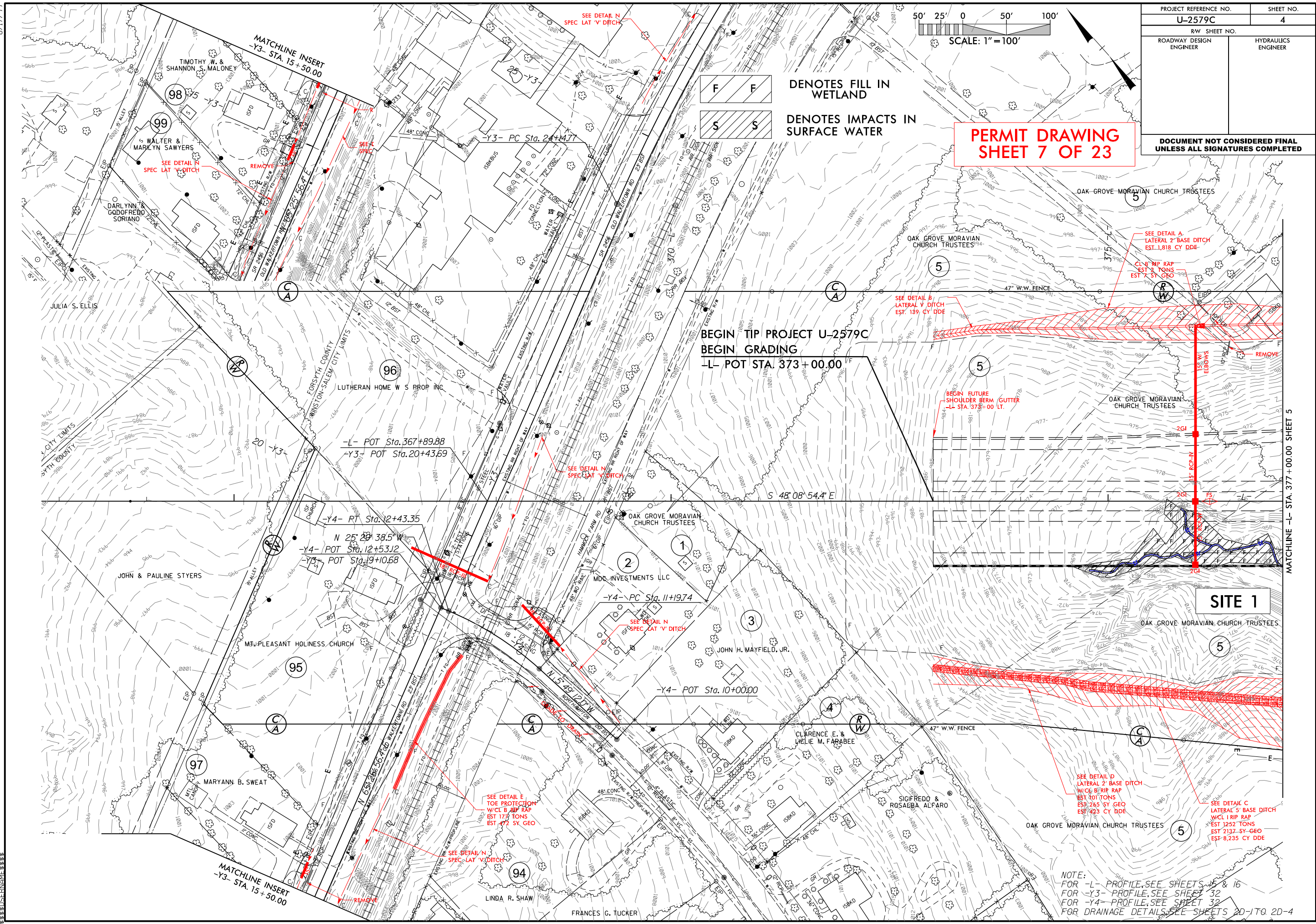
DENOTES IMPACTS IN SURFACE WATER

NOTE:
FOR -L- PROFILE, SEE SHEETS 25 & 26
FOR -Y3- PROFILE, SEE SHEET 32
FOR -Y4- PROFILE, SEE SHEET 32
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4



 DENOTES FILL IN WETLAND

 DENOTES IMPACTS IN SURFACE WATER



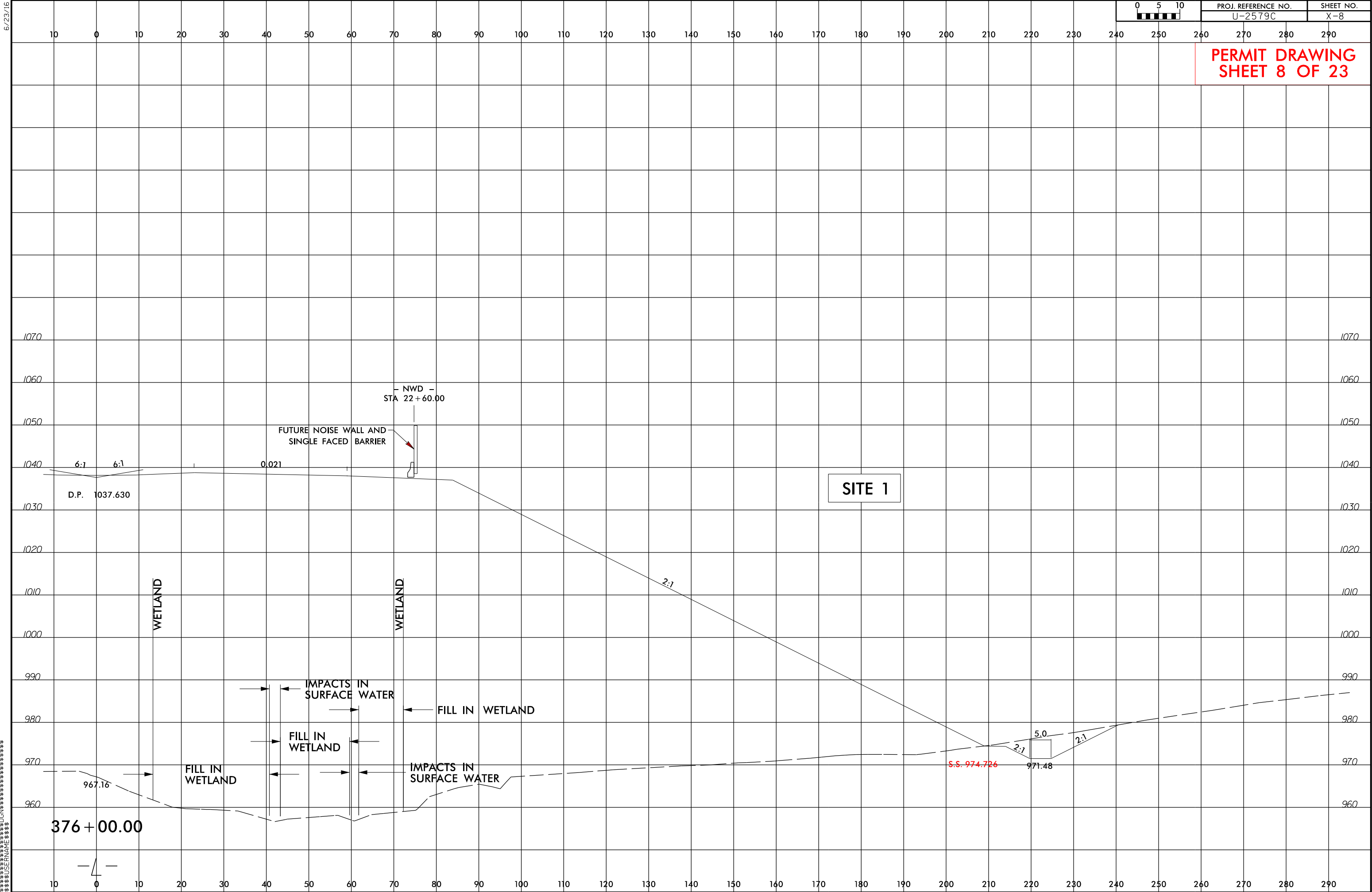
NOTE:
FOR -L- PROFILE, SEE SHEETS 25 & 16
FOR -Y3- PROFILE, SEE SHEET 32
FOR -Y4- PROFILE, SEE SHEET 32
FOR DRAINAGE DETAILS, SEE SHEETS 20-17Q, 20-4

6/23/16



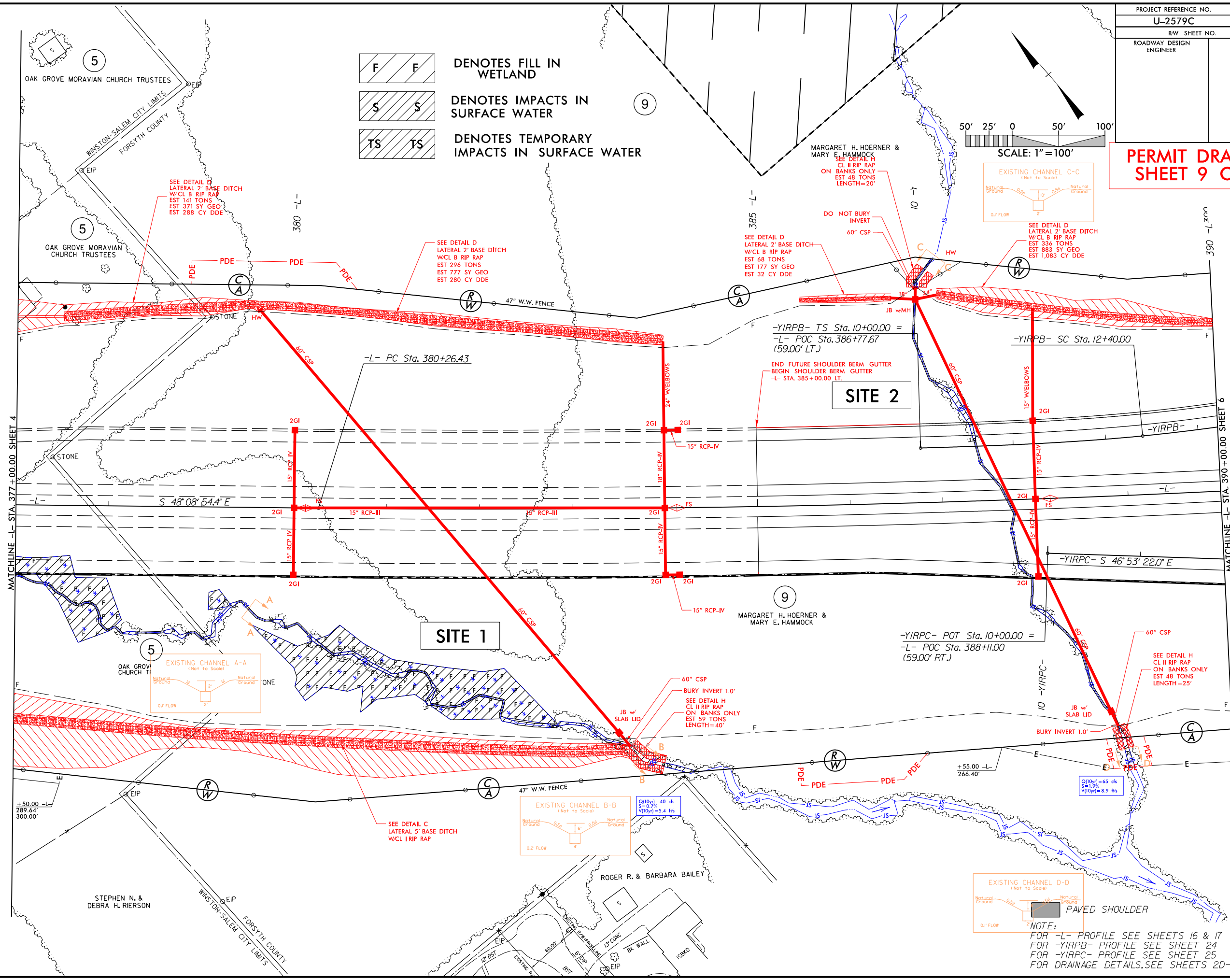
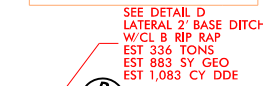
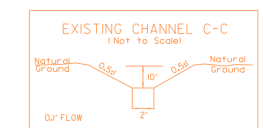
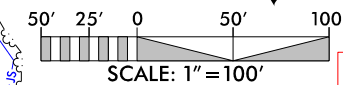
PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-8

PERMIT DRAWING
SHEET 8 OF 23



PROJECT REFERENCE NO.	SHEET NO.
U-2579C	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 9 OF 23

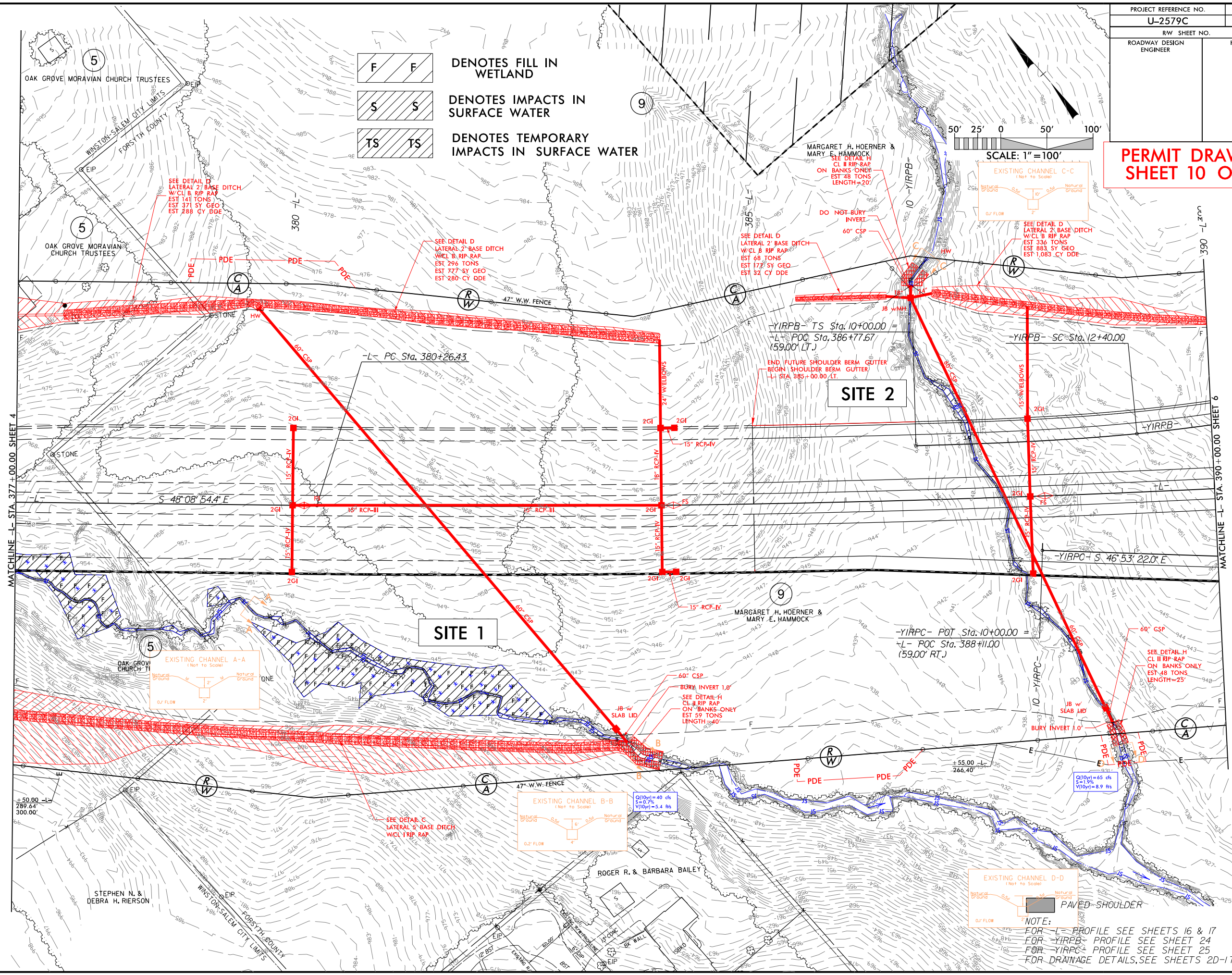


NOTE:
FOR -L- PROFILE SEE SHEETS 16 & 17
FOR -YIRPB- PROFILE SEE SHEET 24
FOR -YIRPC- PROFILE SEE SHEET 25
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4

8/17/99

PROJECT REFERENCE NO.		SHEET NO.
U-2579C		5
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

PERMIT DRAWING
SHEET 10 OF 23



NOTE:
FOR L- PROFILE SEE SHEETS 16 & 17
FOR YIRPB- PROFILE SEE SHEET 24
FOR YIRPC- PROFILE SEE SHEET 25
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4



6/23/16

\$\$\$\$SYTIME\$\$\$\$
\$\$\$\$> 2:00 PM\$\$\$\$
\$\$\$\$DATE\$\$\$\$

050	PROJ. REFERENCE NO.	SHEET NO.
	U-2579C	5C

3002001000381 + 46 -L-100200300

PERMIT DRAWING
SHEET 12 OF 23

1050

1040

1030

1020

1010

1000

990

980

970

960

950

940

930

920

SITE 1

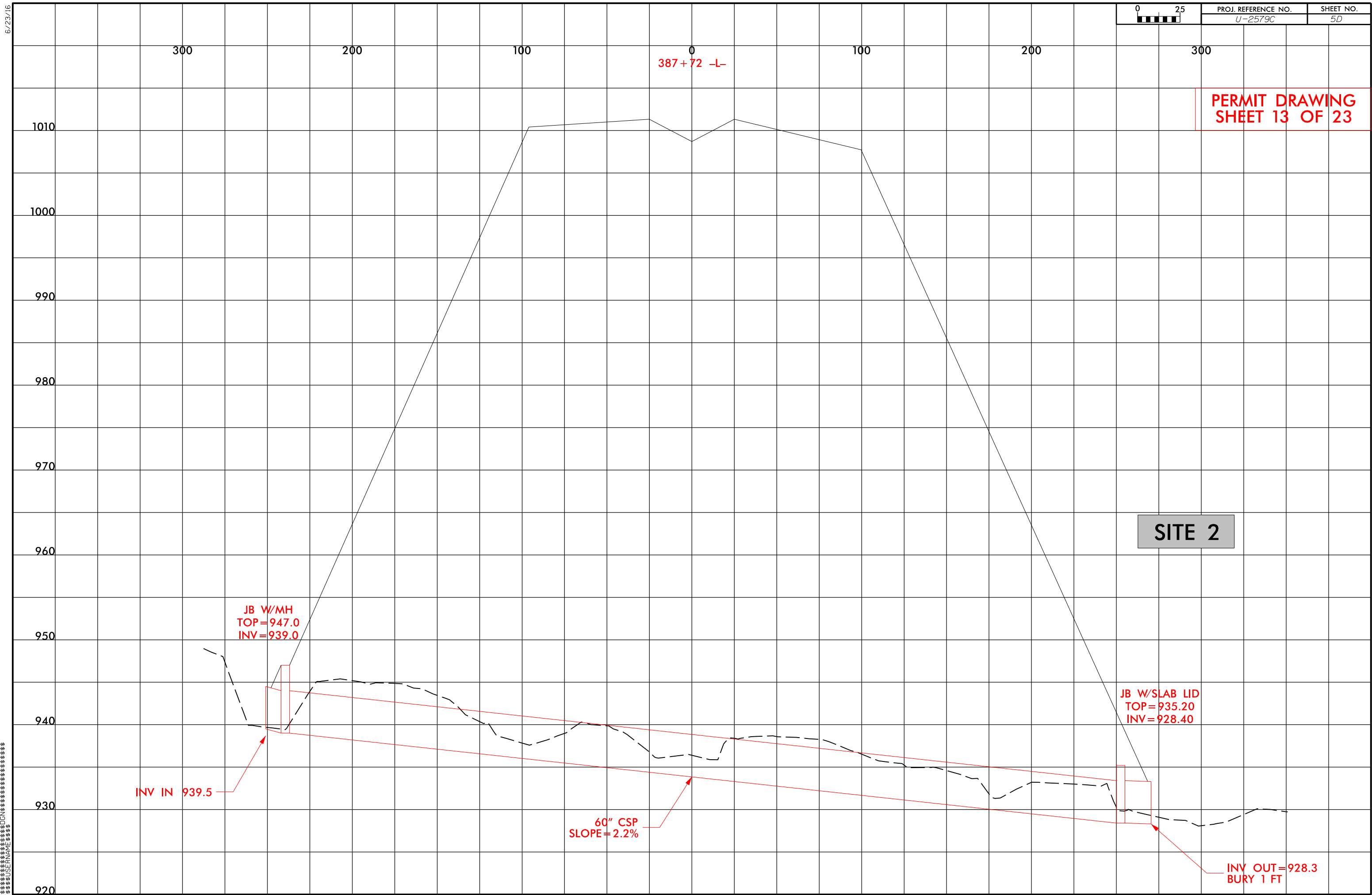
INV IN 969.0

60" CSP
SLOPE = 5.6%

JB W/SLAB LID
TOP = 942.4
INV IN = 935.6
INV OUT = 933.1

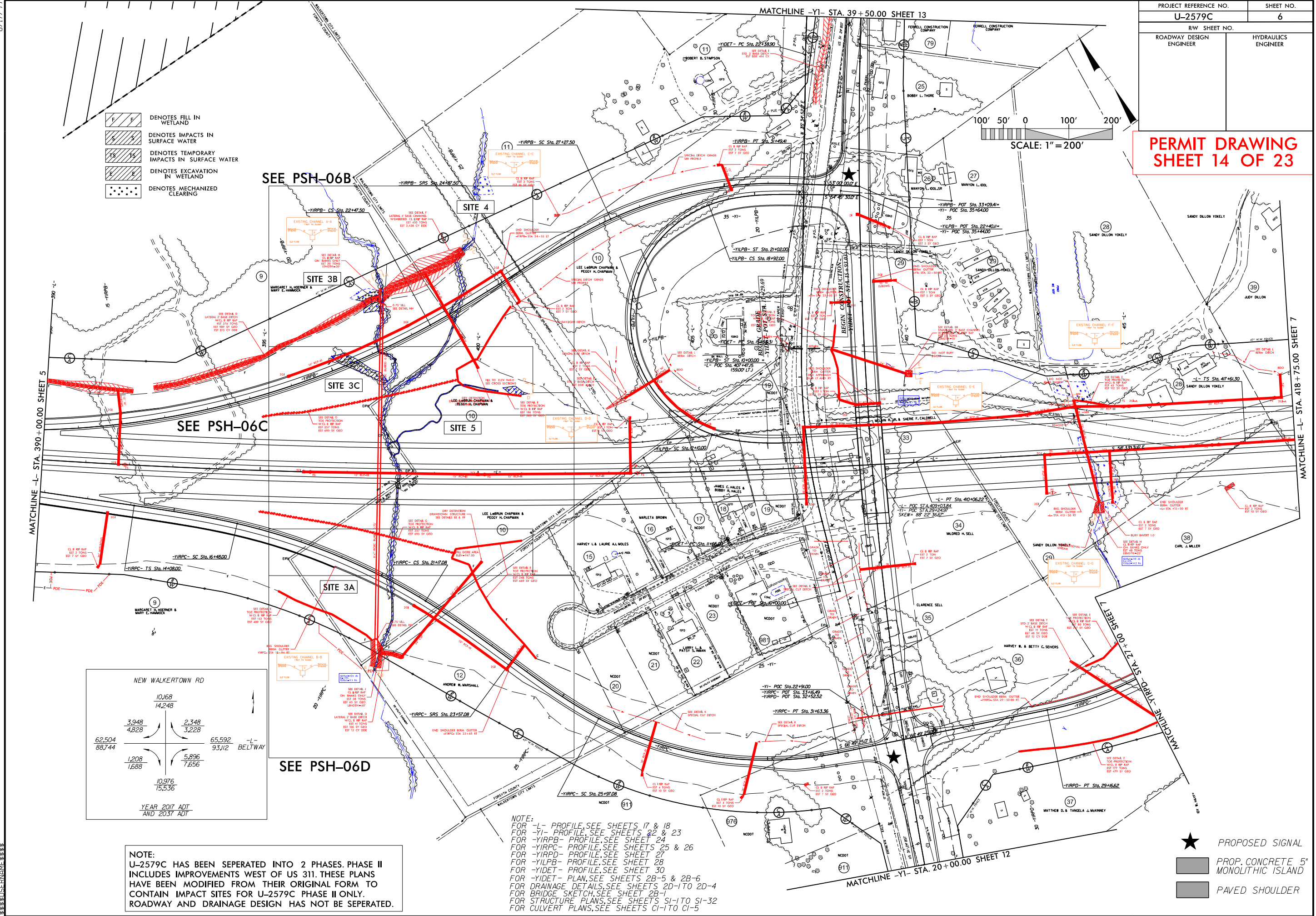
60" CSP
SLOPE = 0.5%

INV OUT = 933.0
BURY 1 FT



PROJECT REFERENCE NO.	SHEET NO.
U-2579C	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 14 OF 23

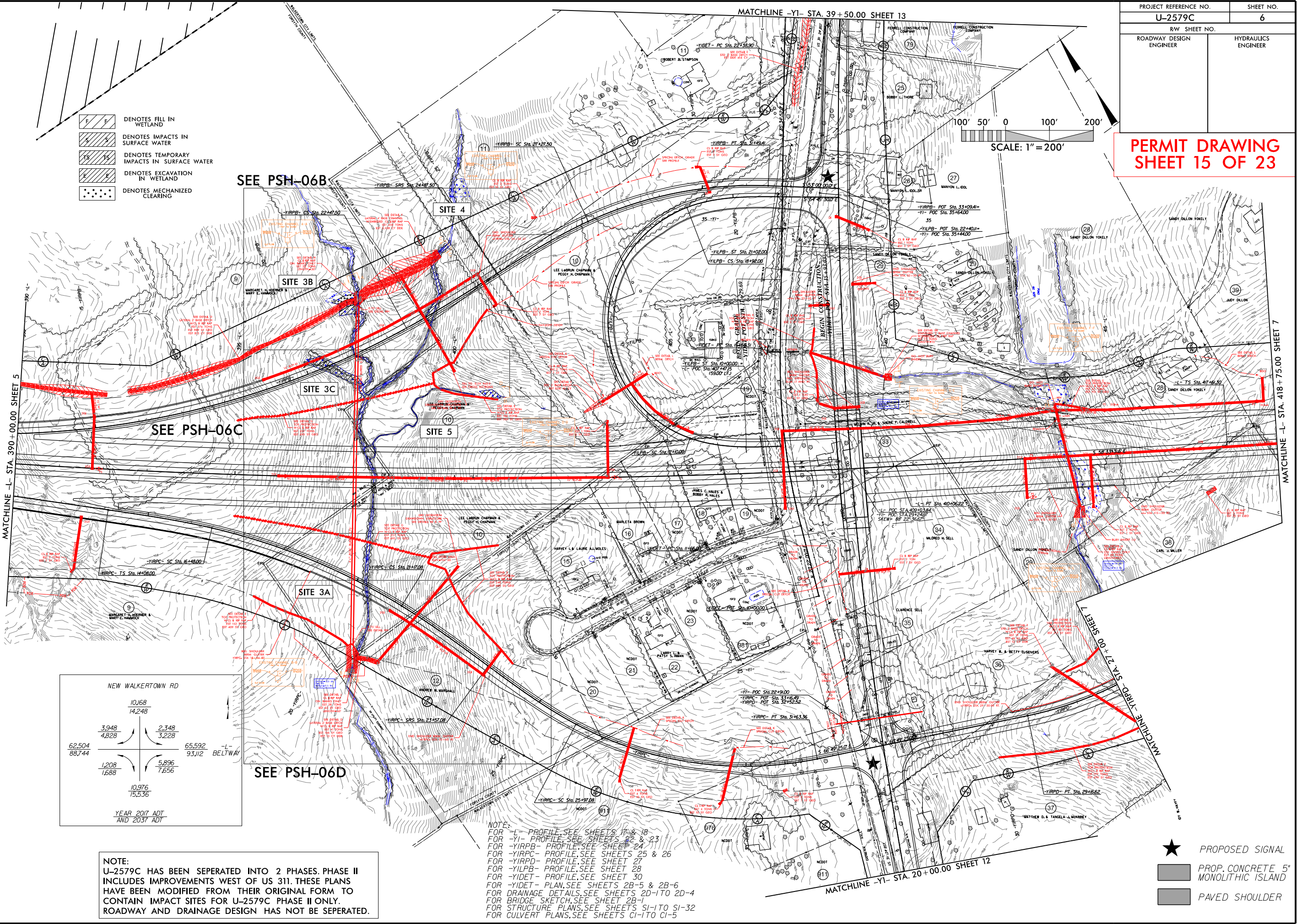


NOTE:
U-2579C HAS BEEN SEPERATED INTO 2 PHASES. PHASE II
INCLUDES IMPROVEMENTS WEST OF US 311. THESE PLANS
HAVE BEEN MODIFIED FROM THEIR ORIGINAL FORM TO
CONTAIN IMPACT SITES FOR U-2579C PHASE II ONLY.
ROADWAY AND DRAINAGE DESIGN HAS NOT BE SEPERATED.

NOTE:
FOR -L- PROFILE SEE SHEETS 17 & 18
FOR -YI- PROFILE SEE SHEETS 22 & 23
FOR -YIRPB- PROFILE SEE SHEET 24
FOR -YIRPD- PROFILE SEE SHEETS 25 & 26
FOR -YILPB- PROFILE SEE SHEET 27
FOR -YIDET- PROFILE SEE SHEET 30
FOR -YIDET- PLAN SEE SHEETS 2B-5 & 2B-6
FOR DRAINAGE DETAILS SEE SHEETS 2D-1 TO 2D-4
FOR BRIDGE SKETCH SEE SHEET 2B-1
FOR STRUCTURE PLANS SEE SHEETS SI-1 TO SI-32
FOR CULVERT PLANS SEE SHEETS CI-1 TO CI-5

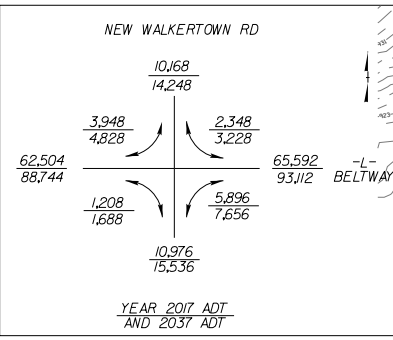
PROJECT REFERENCE NO.	SHEET NO.
U-2579C	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 15 OF 23



- Denotes Fill in Wetland
- Denotes Impacts in Surface Water
- Denotes Temporary Impacts in Surface Water
- Denotes Excavation in Wetland
- Denotes Mechanized Clearing

SCALE: 1" = 200'



NOTE:
U-2579C HAS BEEN SEPERATED INTO 2 PHASES. PHASE II INCLUDES IMPROVEMENTS WEST OF US 311. THESE PLANS HAVE BEEN MODIFIED FROM THEIR ORIGINAL FORM TO CONTAIN IMPACT SITES FOR U-2579C PHASE II ONLY. ROADWAY AND DRAINAGE DESIGN HAS NOT BE SEPERATED.

NOTE:
FOR -L- PROFILE, SEE SHEETS 17 & 18
FOR -YI- PROFILE, SEE SHEETS 22 & 23
FOR -YIRPB- PROFILE, SEE SHEETS 24
FOR -YIRPD- PROFILE, SEE SHEETS 25 & 26
FOR -YIRPB- PROFILE, SEE SHEET 27
FOR -YIRPD- PROFILE, SEE SHEET 28
FOR -YIDET- PROFILE, SEE SHEET 30
FOR -YIDET- PLAN, SEE SHEETS 2B-5 & 2B-6
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4
FOR BRIDGE SKETCH, SEE SHEET 2B-1
FOR STRUCTURE PLANS, SEE SHEETS SI-1 TO SI-32
FOR CULVERT PLANS, SEE SHEETS CI-1 TO CI-5

- PROPOSED SIGNAL
- PROP. CONCRETE 5' MONOLITHIC ISLAND
- PAVED SHOULDER

8/17/99

REVISIONS

8/17/99



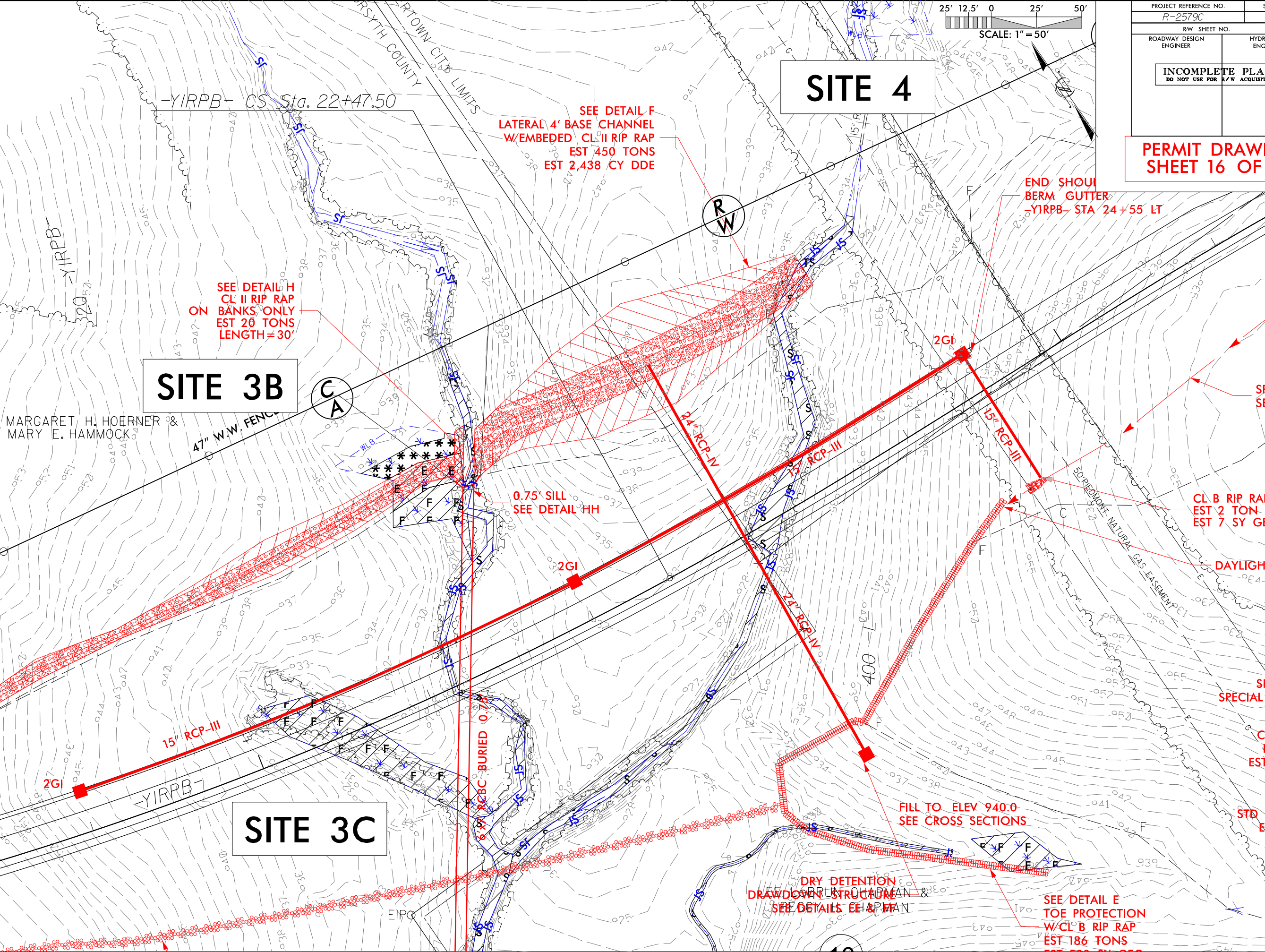
PROJECT REFERENCE NO. <i>R-2579C</i>		SHEET NO. <i>6B</i>	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			

PERMIT DRAWING
SHEET 16 OF 23

SITE 4

SITE 3B

SITE 3C



SEE DETAIL F
LATERAL 4' BASE CHANNEL
W/EMBEDD CL II RIP RAP
EST 450 TONS
EST 2,438 CY DDE

SEE DETAIL H
CL II RIP RAP
ON BANKS ONLY
EST 20 TONS
LENGTH=30'

END SHOULDER
BERM GUTTER
-YIRPB- STA 24+55 LT

0.75' SILL
SEE DETAIL HH

CL B RIP RAP
EST 2 TONS
EST 7 SY GE

DAYLIGHT

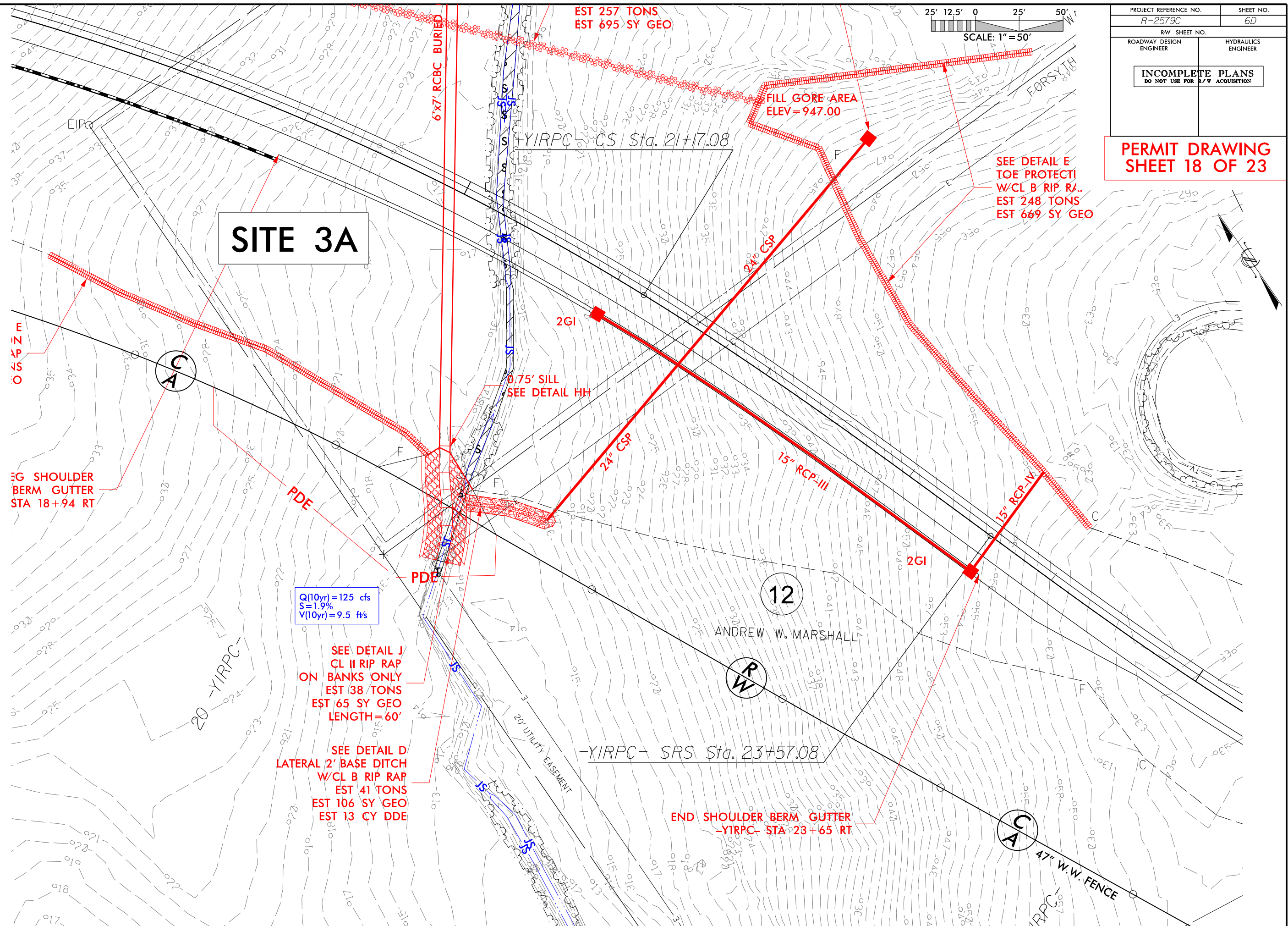
SPECIAL

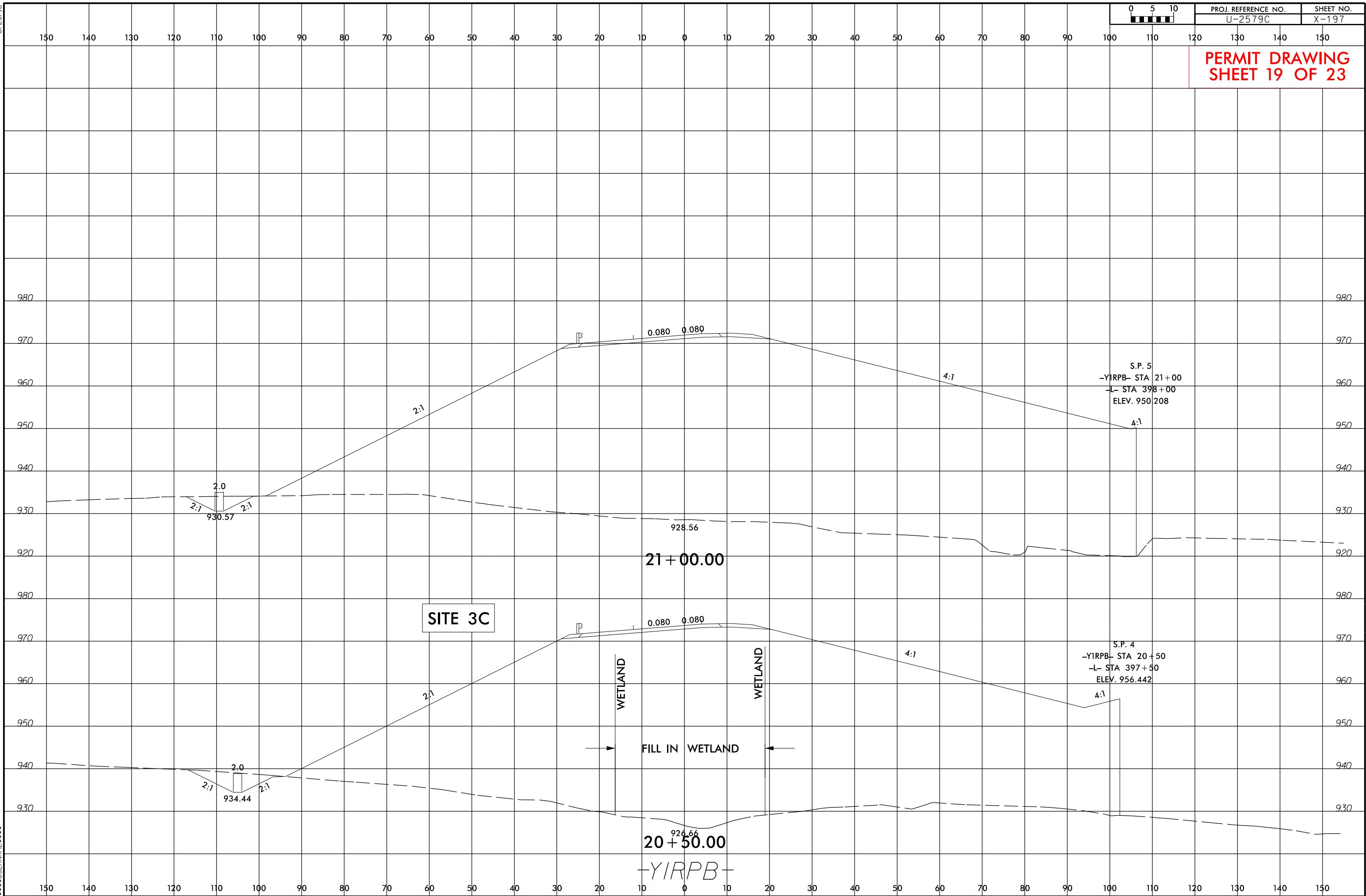
STD

FILL TO ELEV 940.0
SEE CROSS SECTIONS

DRY DETENTION
DRAWDOWN STRUCTURE
SEE DETAILS EE & FF

SEE DETAIL E
TOE PROTECTION
W/CL B RIP RAP
EST 186 TONS



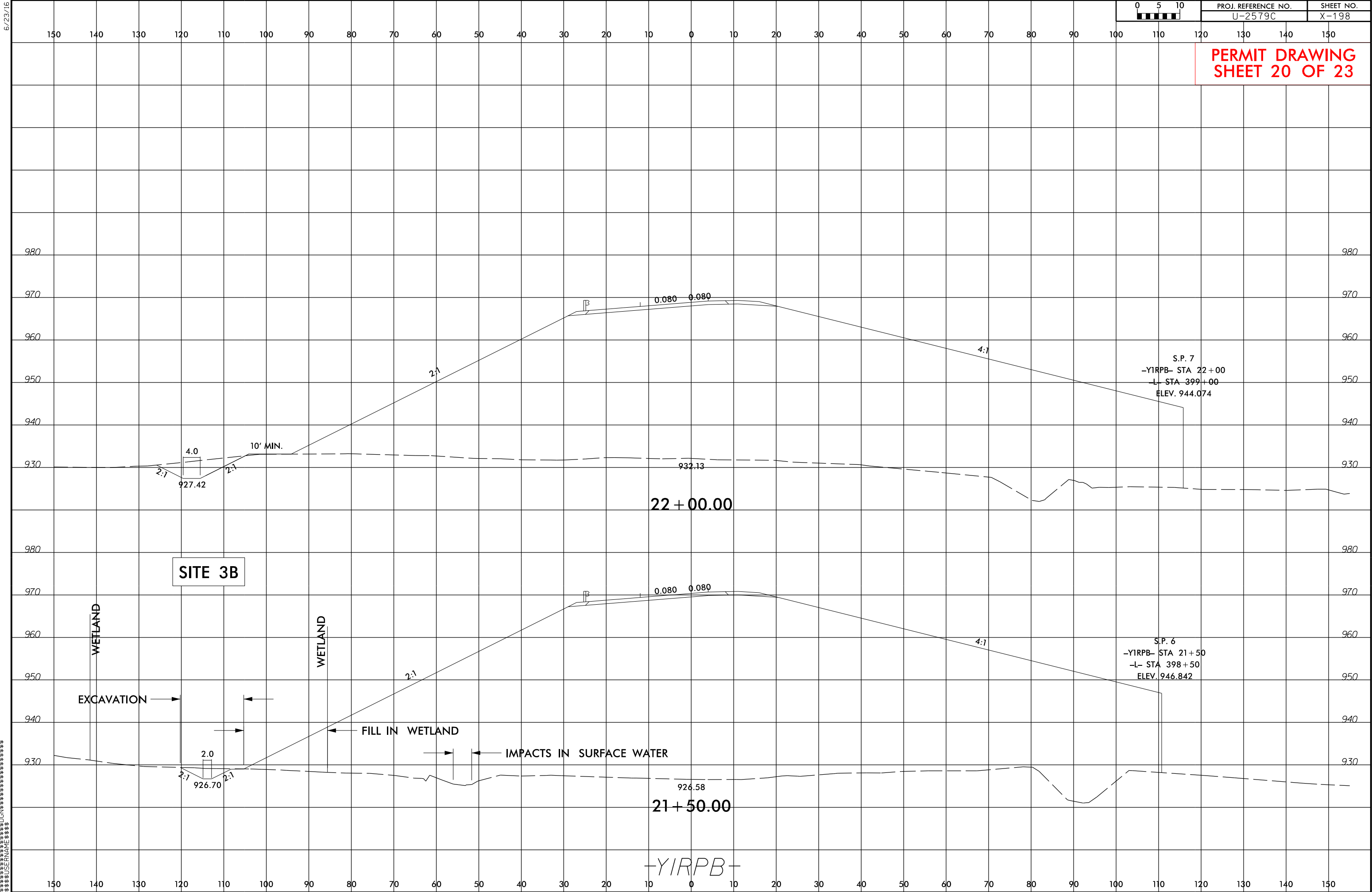


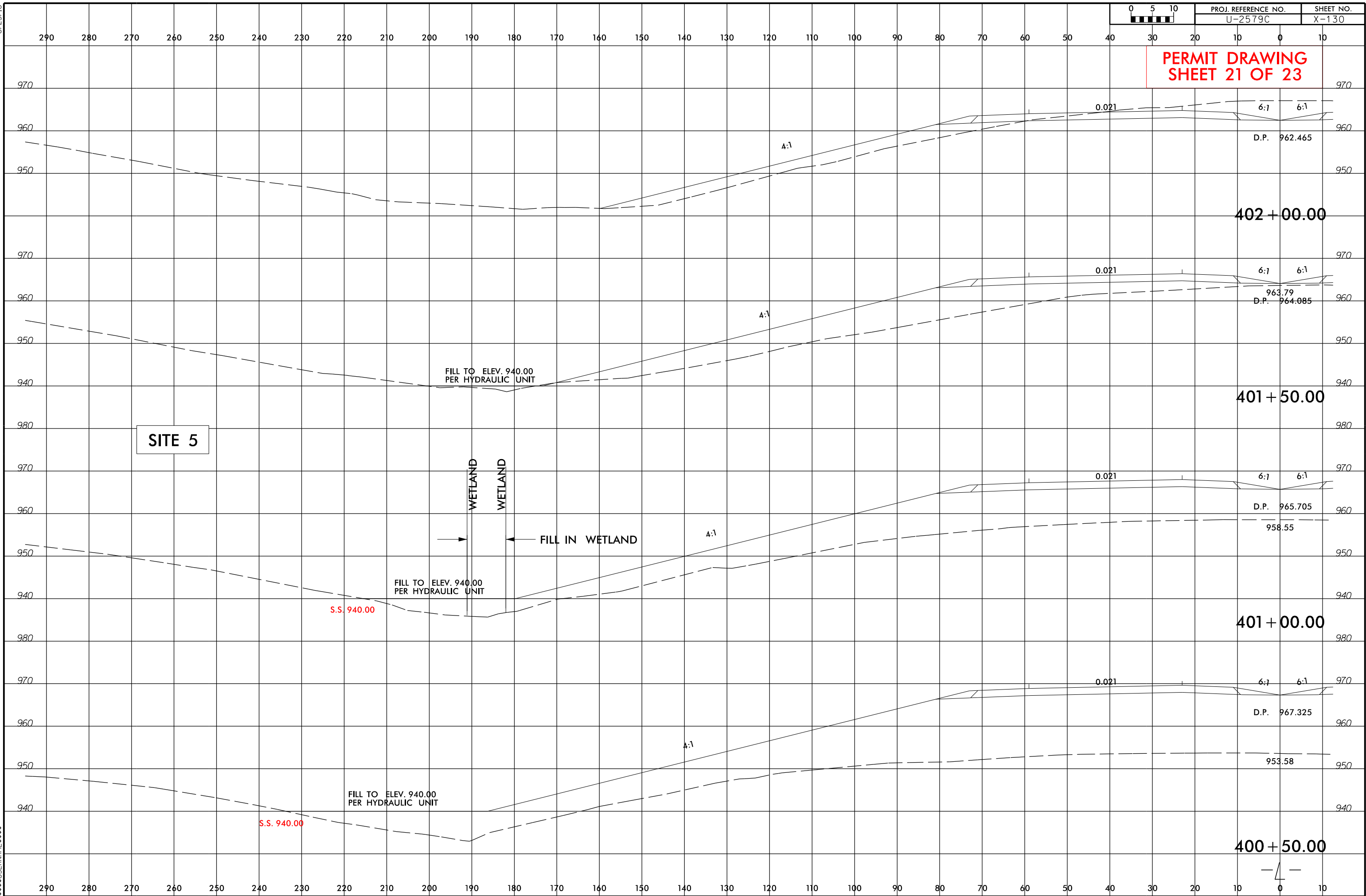
6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-198

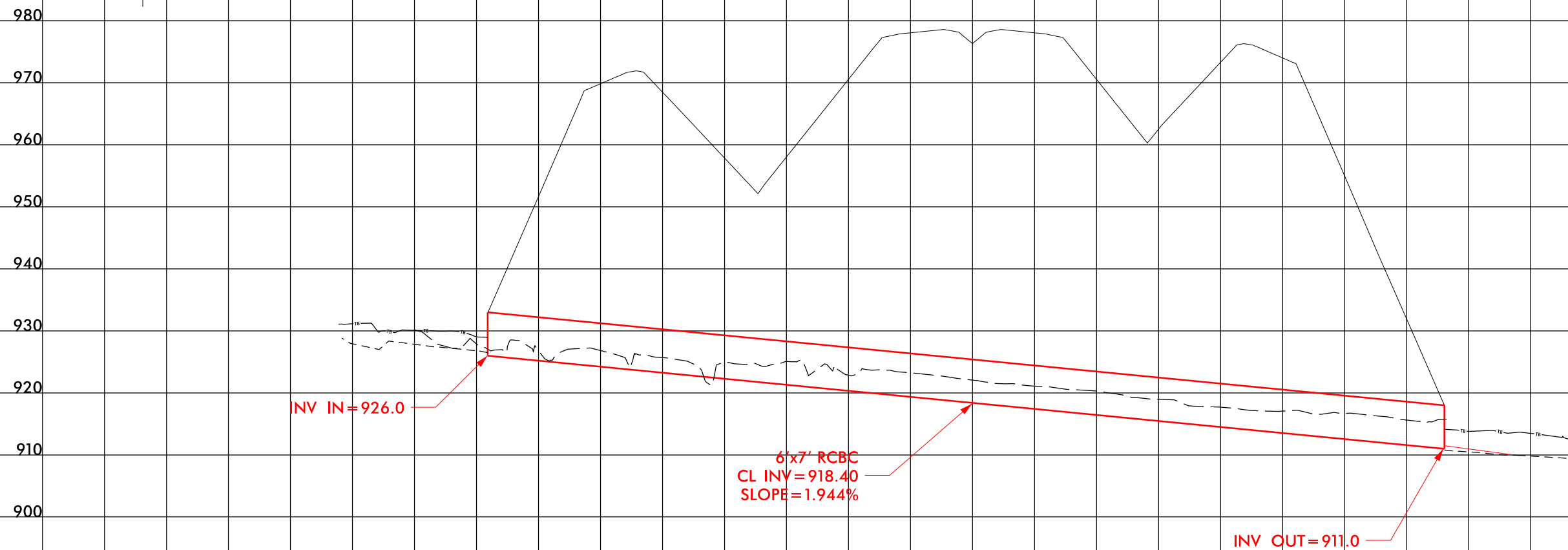
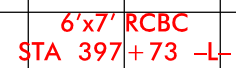
PERMIT DRAWING
SHEET 20 OF 23







SITE 3

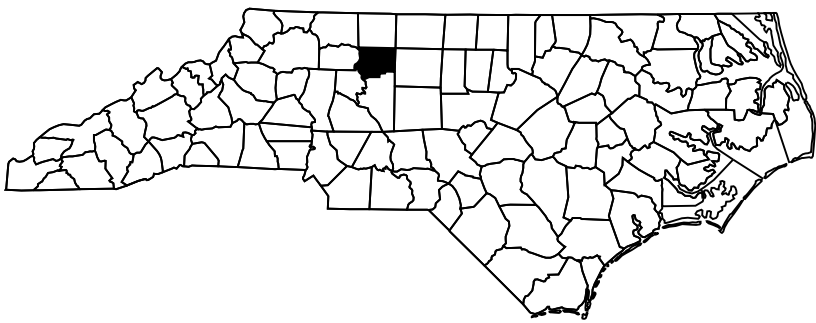


See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579C	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34839.1.9	N/A	PE	
34839.2.6	N/A	R/W	
34839.2.GV18	N/A	R/W	
34839.2.16	N/A	UTIL	
34839.3.GV6	NHP-0918(062)	CONSTR.	



LOCATION: WINSTON - SALEM NORTHERN BELTWAY (EASTERN SECTION)
FROM US 311 TO US 158 (FUTURE I-74)
TYPE OF WORK: WIDENING, GRADING, PAVING, DRAINAGE, SIGNING, SIGNALS,
ITS, CULVERTS AND STRUCTURES.

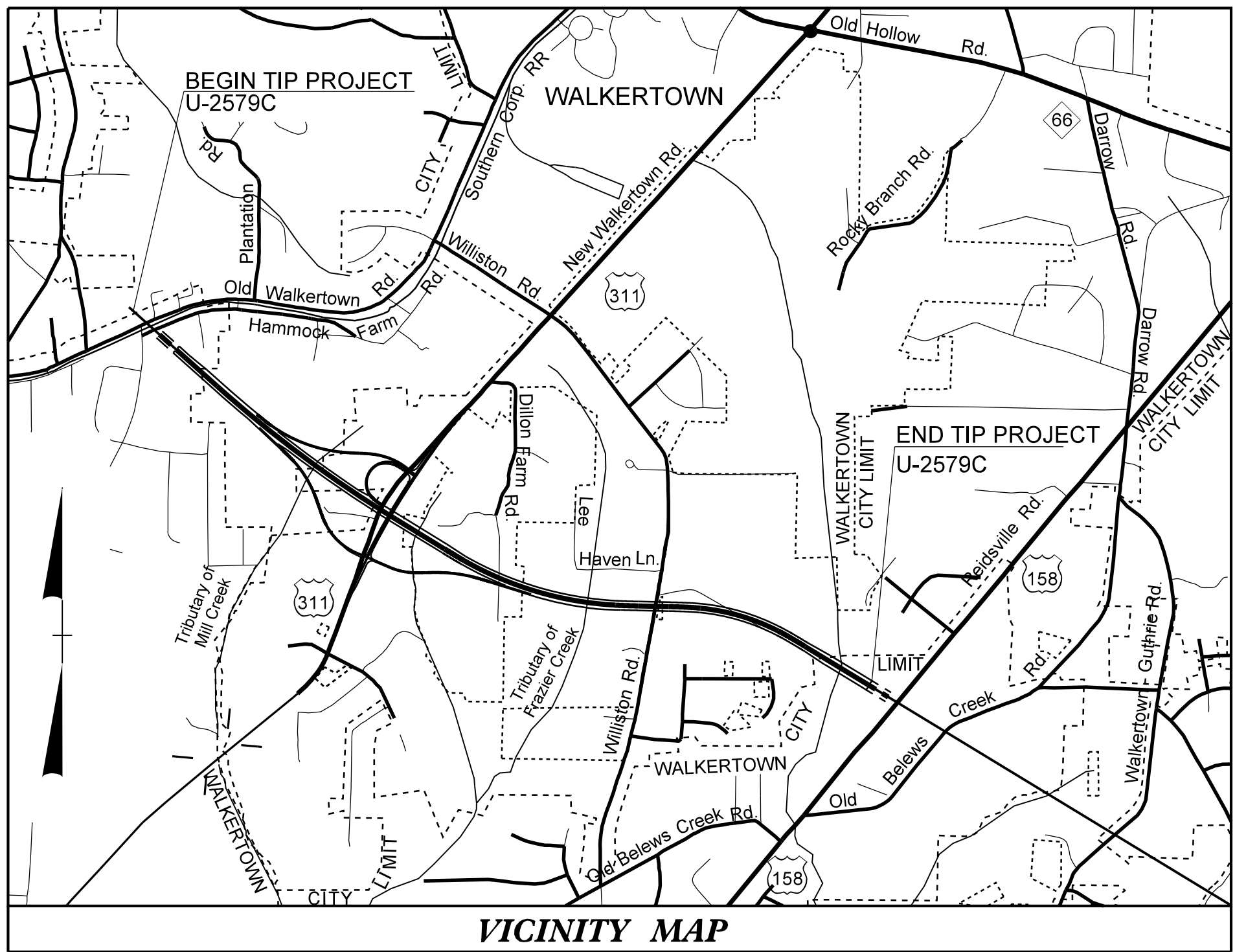
PLFI PLANS

END BRIDGE

-L- POT STA. 474+46.29 (LT)
-L- POT STA. 474+58.61 (RT)

BEGIN BRIDGE

-L- POT STA. 472+36.29 (LT)
-L- POT STA. 472+48.61 (RT)



VICINITY MAP

BEGIN CONSTRUCTION
-L- POT STA. 366+00.00

TO
SR 2211
BAUX MOUNTAIN
ROAD

BEGIN TIP PROJECT U-2579C
-L- POT STA. 373+00.00

END BRIDGE
-Y1- POC STA. 30+34.05

END BRIDGE
-Y2- POT STA. 22+40.27
BEGIN BRIDGE
-Y2- POT STA. 20+18.52

BEGIN BRIDGE
-Y1- POC STA. 28+13.39

END TIP PROJECT U-2579C
BEGIN TIP PROJECT U-2579B
-L- POT STA. 478+00.00

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

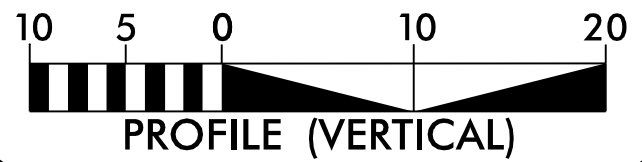
GRAPHIC SCALES



PLANS



PROFILE (HORIZONTAL)



PROFILE (VERTICAL)

DESIGN DATA

ADT 2017 = 65,592
ADT 2037 = 93,112
DHV = 10 %
D = 60 %
T = 18 % *
V = 70 MPH

* TTST 12 % DUAL 6 %

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT U-2579C = 1.989 Miles
LENGTH OF STRUCTURE PROJECT U-2579C = 0.040 Mile
TOTAL LENGTH OF TIP PROJECT U-2579C = 1.949 Miles

PLANS PREPARED BY:

RS&H & SUNGATE DESIGN GROUP, P.A.

8601 SIX FORKS RD, SUITE 260
RALEIGH, NC 27615
919-926-4100

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 28, 2015

LETTING DATE:
OCTOBER 17, 2017

JASON TALLEY, PE
PROJECT ENGINEER

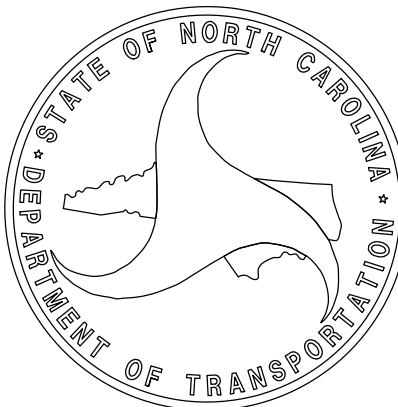
JARED BOND, PE
PROJECT DESIGN ENGINEER

TATIA L. WHITE, PE, PLS
NCDOT CONTACT

HYDRAULICS
ENGINEER

ROADWAY
DESIGN
ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



SIGNATURE:

SIGNATURE:

TIP PROJECT: U-2579C

CONTRACT:

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	1B

BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	
Sign	
Well	
Small Mine	
Foundation	
Area Outline	
Cemetery	
Building	
School	
Church	
Dam	

HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

RIGHT OF WAY:

Baseline Control Point	
Existing Right of Way Marker	
Existing Right of Way Line	
Proposed Right of Way Line	
Proposed Right of Way Line with Iron Pin and Cap Marker	
Proposed Right of Way Line with Concrete or Granite RW Marker	
Proposed Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
Proposed Control of Access	
Existing Easement Line	
Proposed Temporary Construction Easement	
Proposed Temporary Drainage Easement	
Proposed Permanent Drainage Easement	
Proposed Permanent Drainage /Utility Easement	
Proposed Permanent Utility Easement	
Proposed Temporary Utility Easement	
Proposed Aerial Utility Easement	
Proposed Permanent Easement with Iron Pin and Cap Marker	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

VEGETATION:

Single Tree	
Single Shrub	
Hedge	
Woods Line	

Orchard	
Vineyard	

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

UTILITIES:

POWER:	
Existing Power Pole	
Proposed Power Pole	
Existing Joint Use Pole	
Proposed Joint Use Pole	
Power Manhole	
Power Line Tower	
Power Transformer	
U/G Power Cable Hand Hole	
H-Frame Pole	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

GAS:

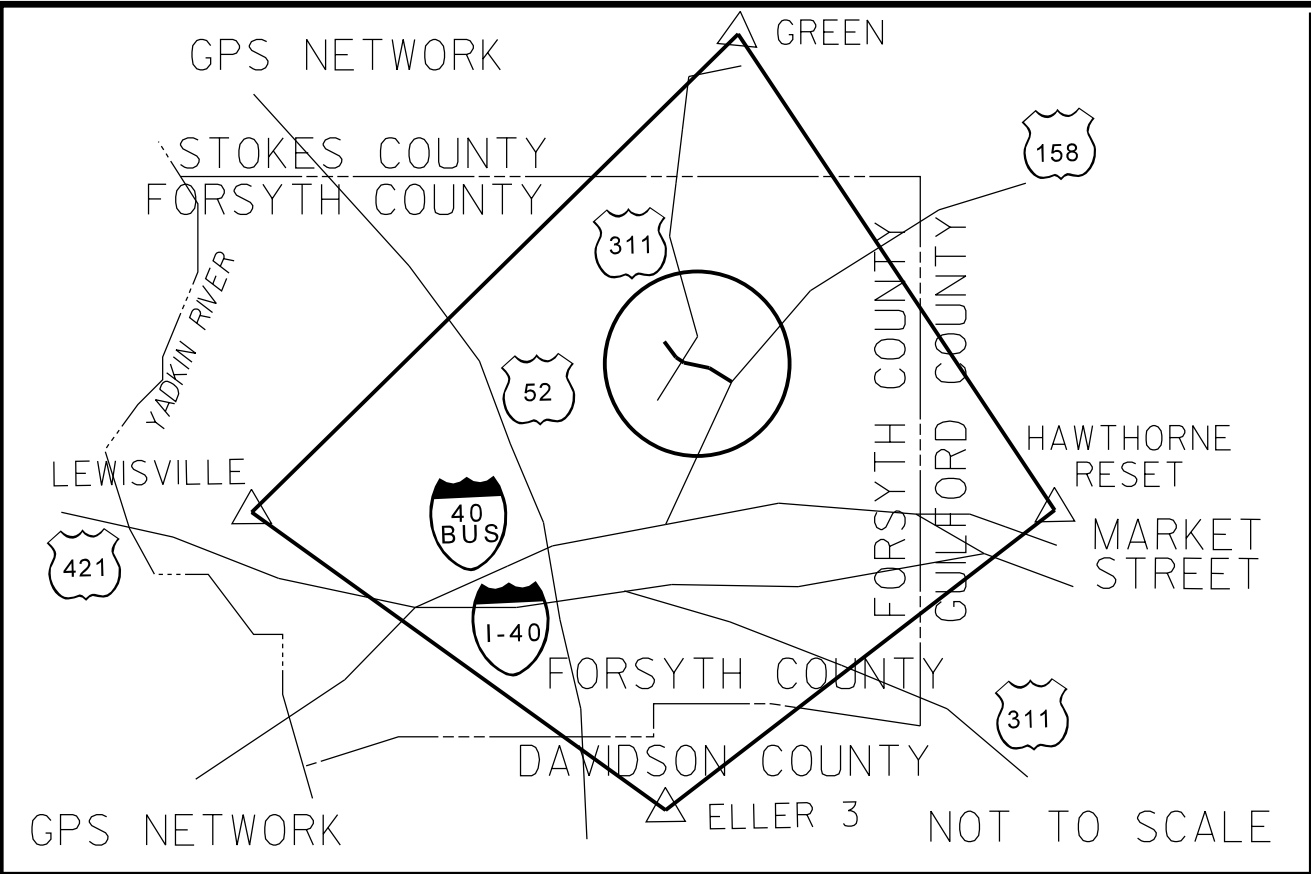
Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

SANITARY SEWER:

Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

MISCELLANEOUS:

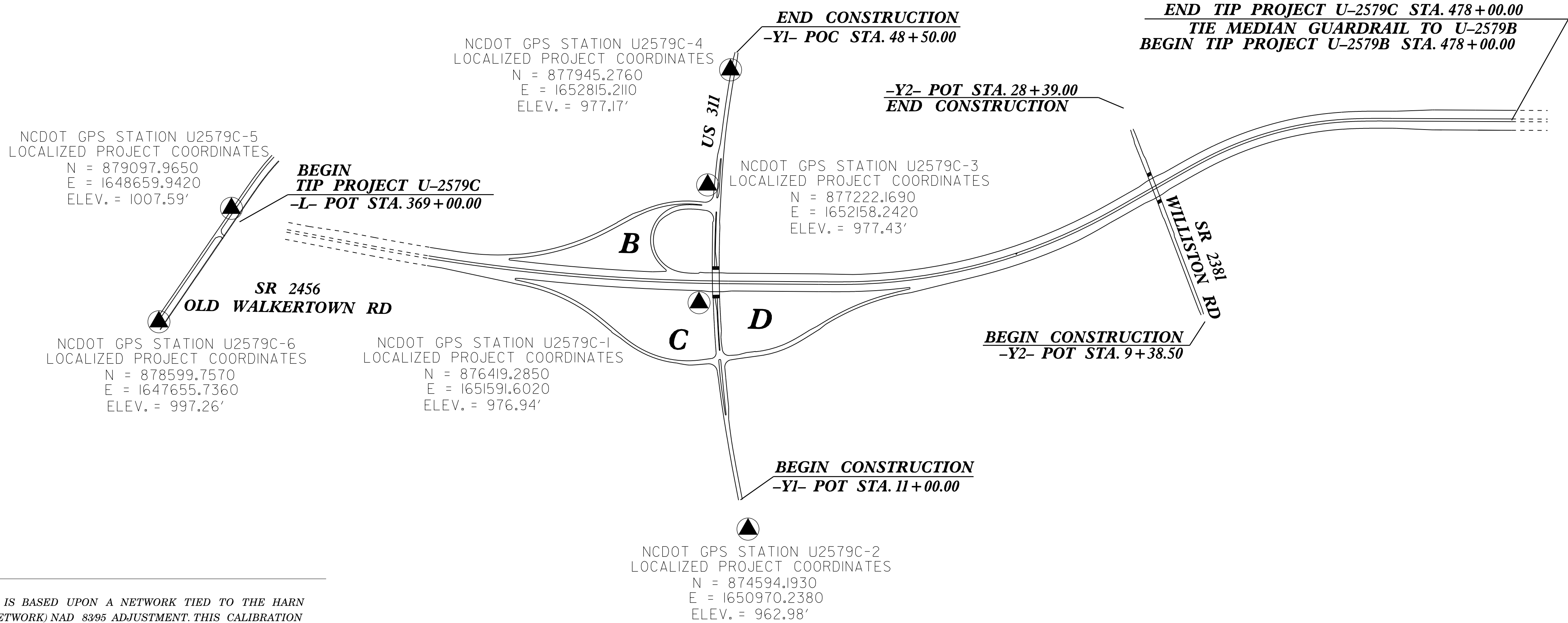
Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	
U/G Tank; Water, Gas, Oil	
Underground Storage Tank, Approx. Loc.	
A/G Tank; Water, Gas, Oil	
Geoenvironmental Boring	
U/G Test Hole LOS A (S.U.E.*)	
Abandoned According to Utility Records	
End of Information	



SURVEY CONTROL SHEET U-2579C



PROJECT REFERENCE NO.	SHEET NO.
U-2579C	1C-1
Location and Surveys	



NOTES:

- THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.
- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)

THE FILES TO BE FOUND ARE AS FOLLOWS:
U2579C_LS_GPSCALIB.HTML
U2579C_LS_WGS84.TXT
U2579C_LS_LOCAL.TXT
U2579C_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

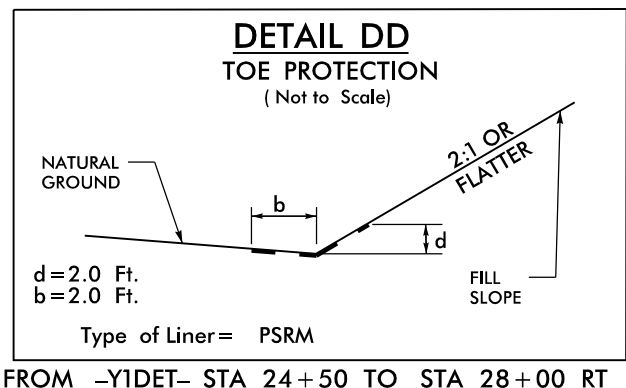
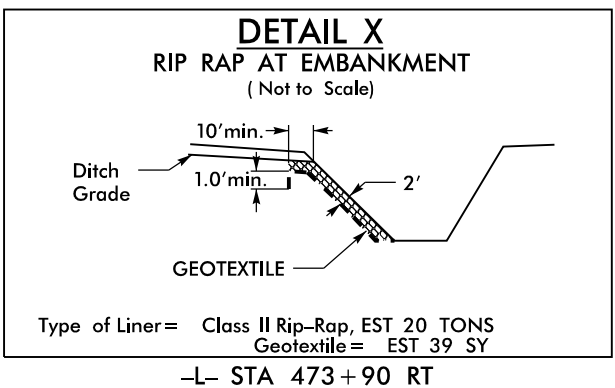
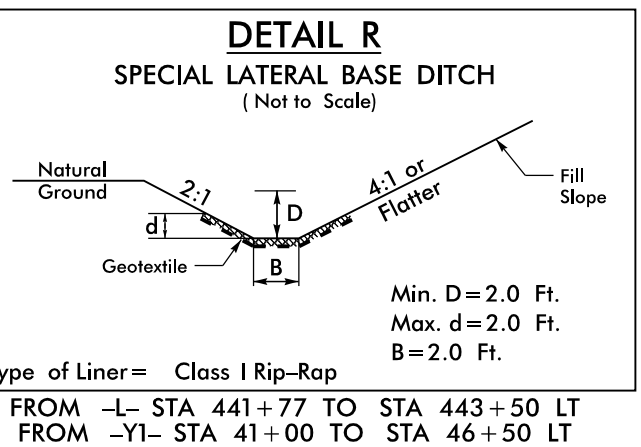
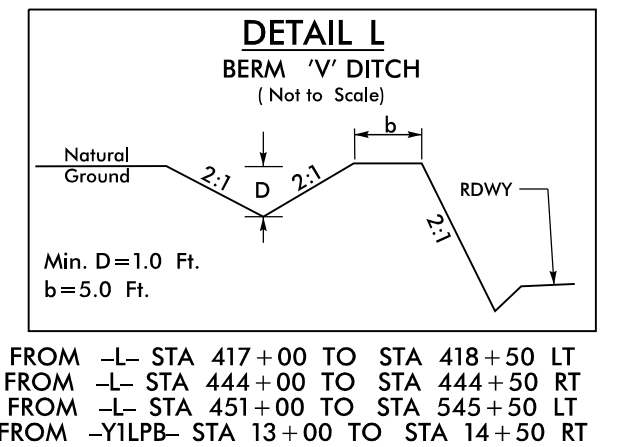
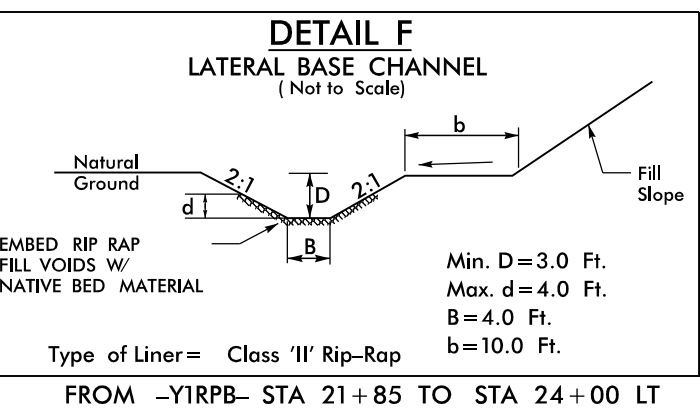
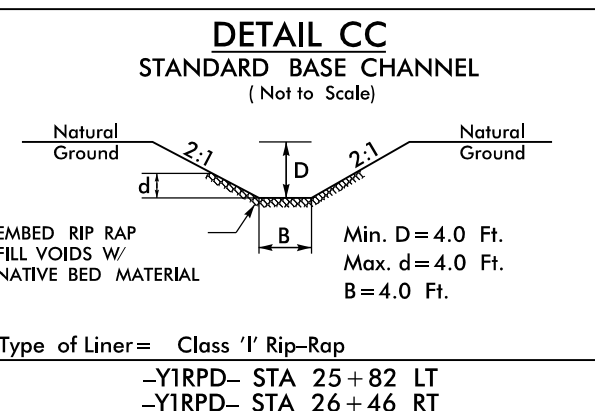
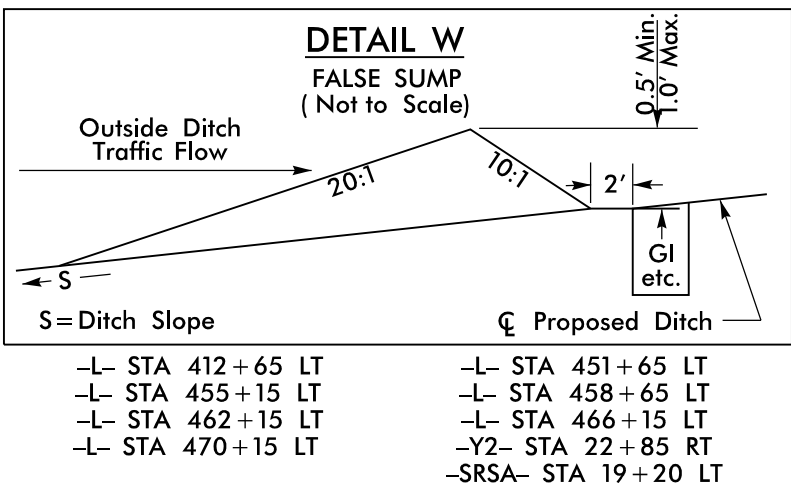
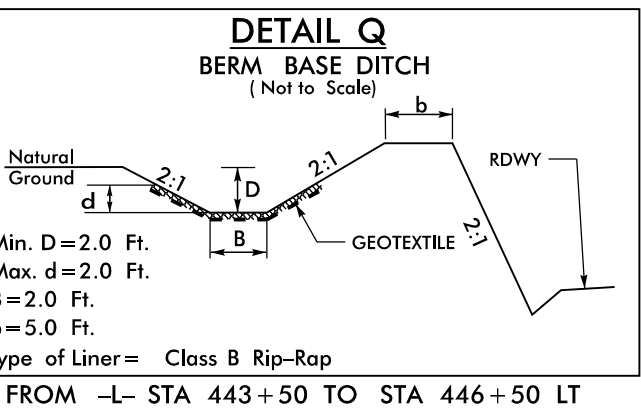
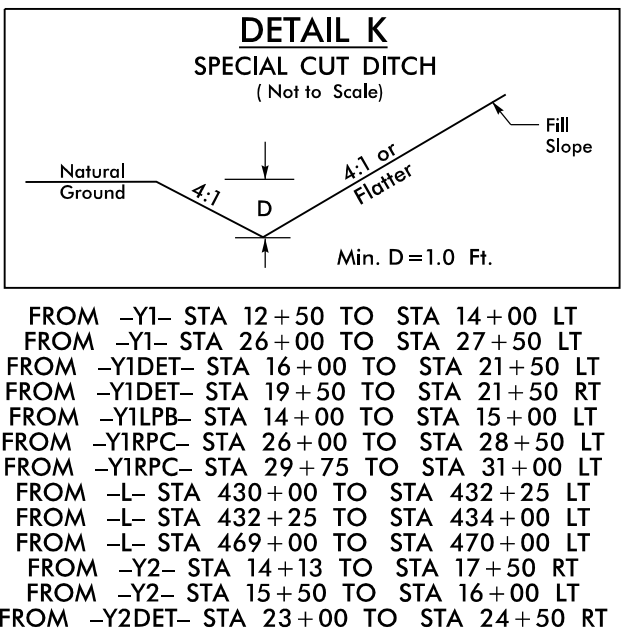
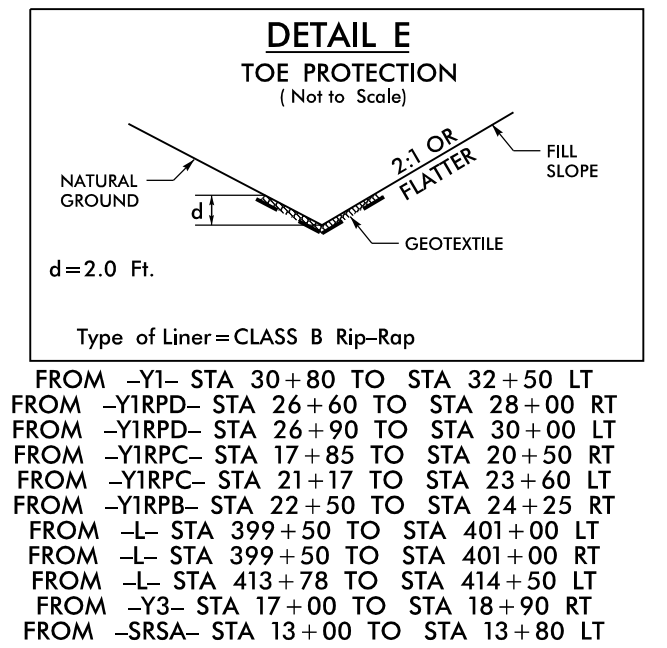
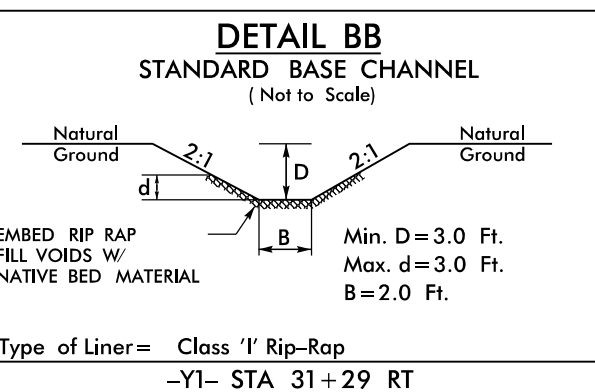
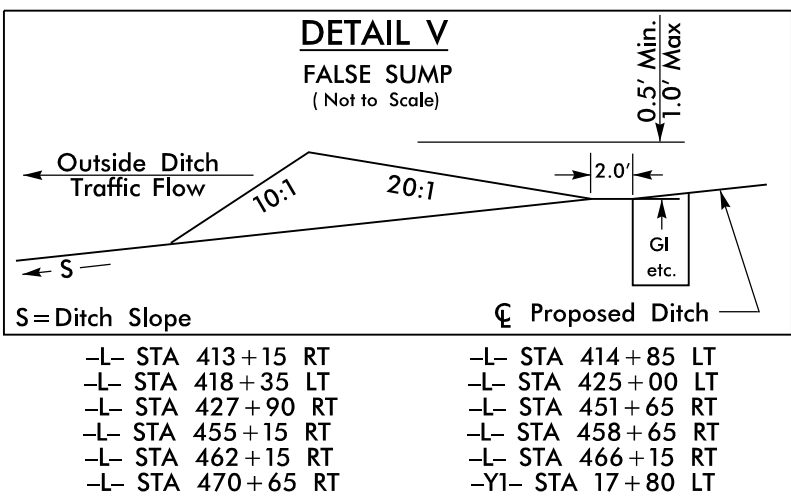
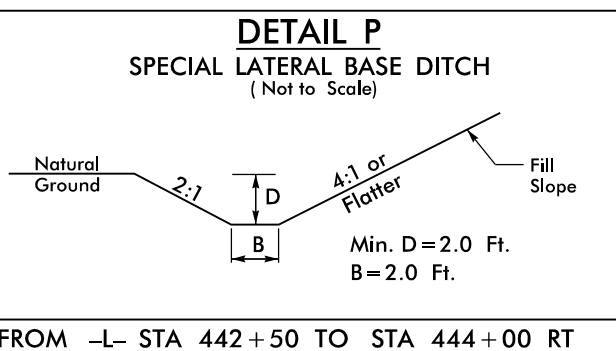
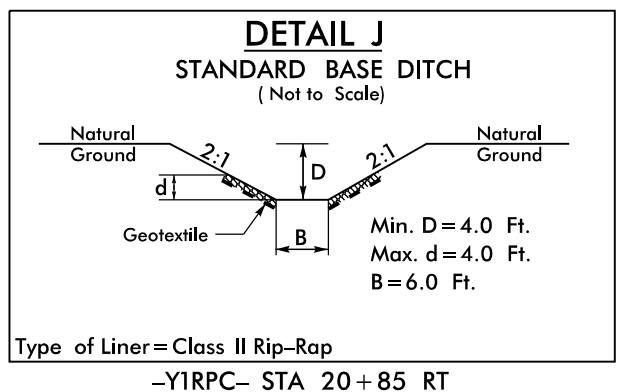
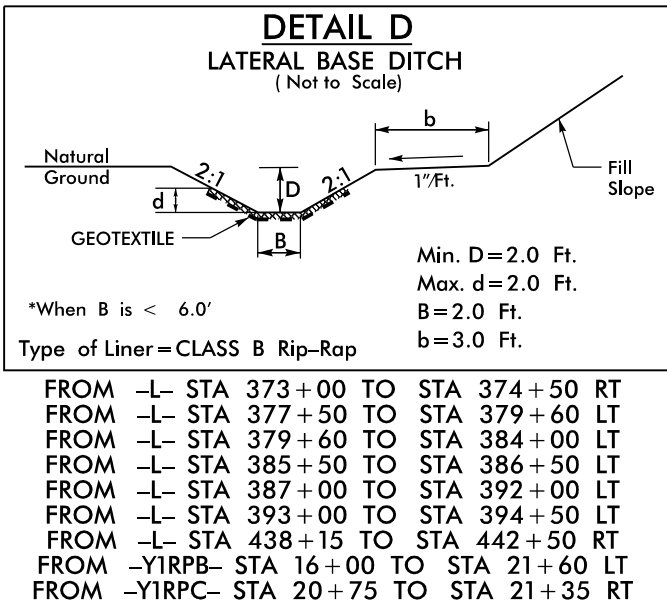
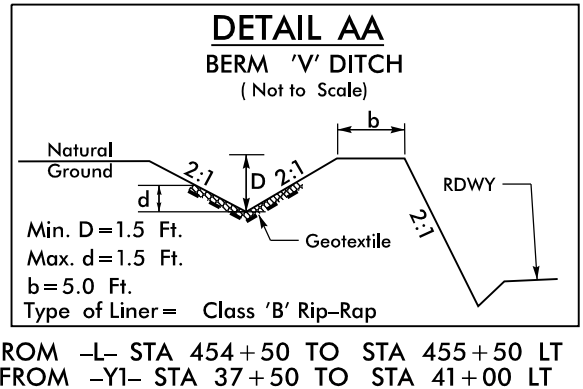
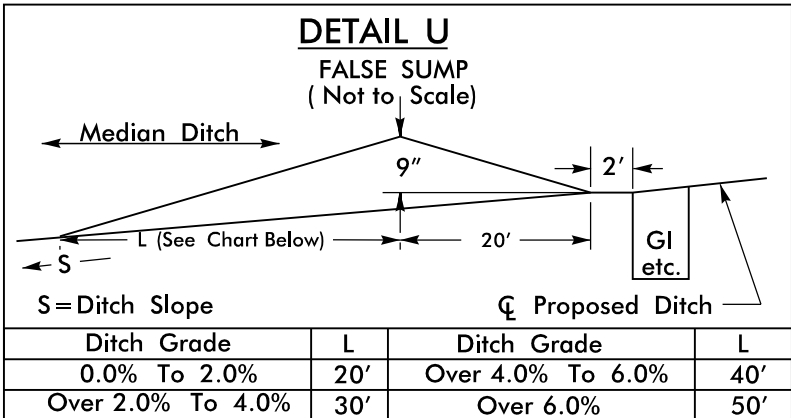
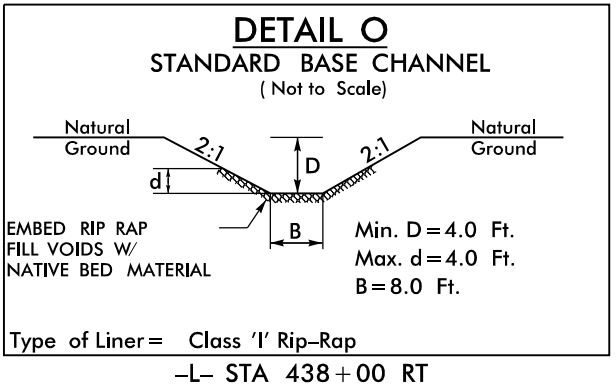
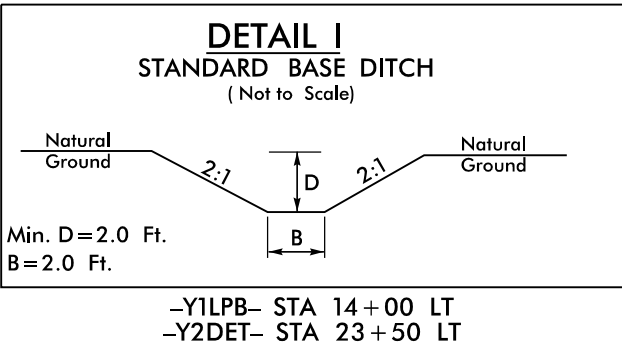
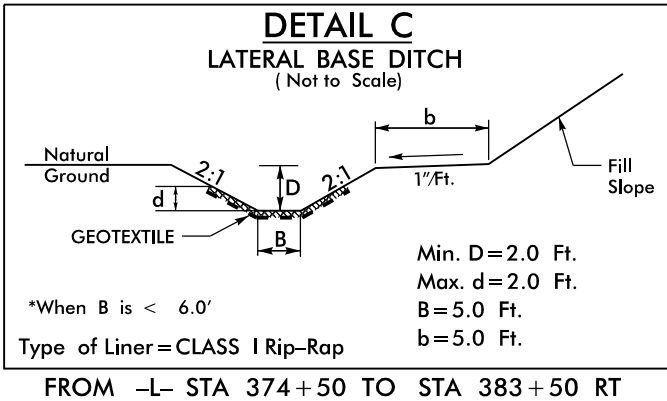
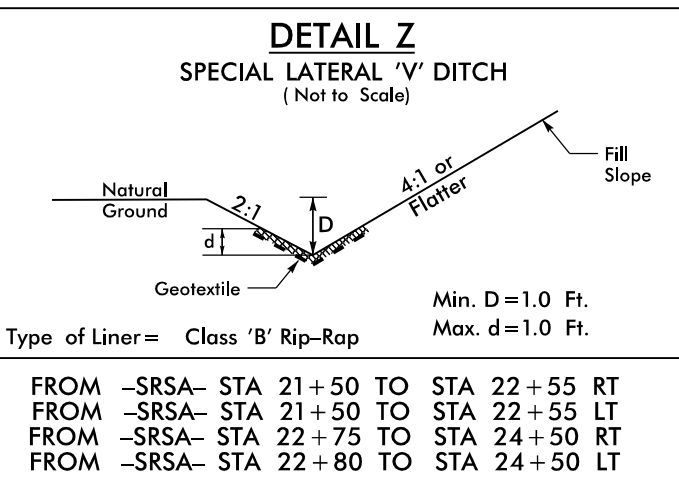
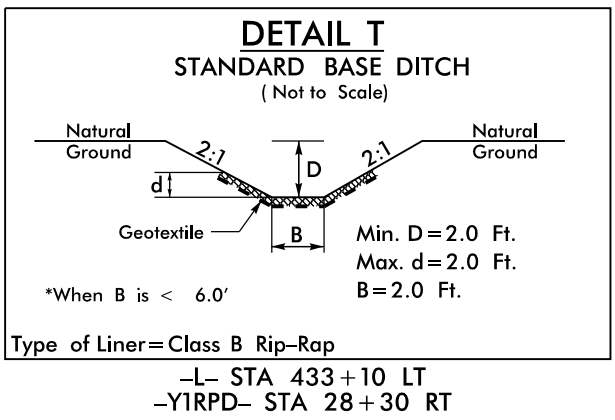
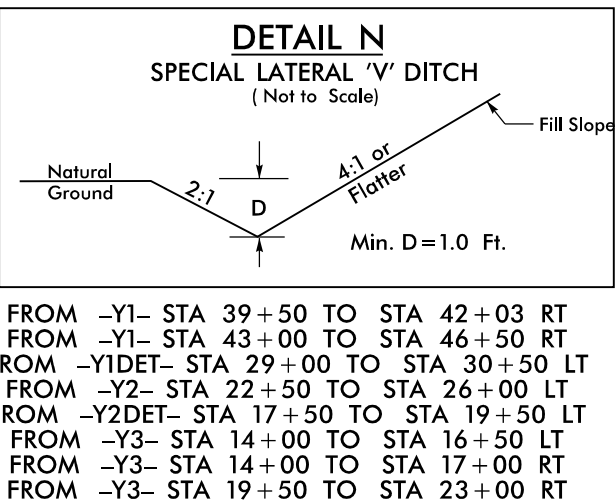
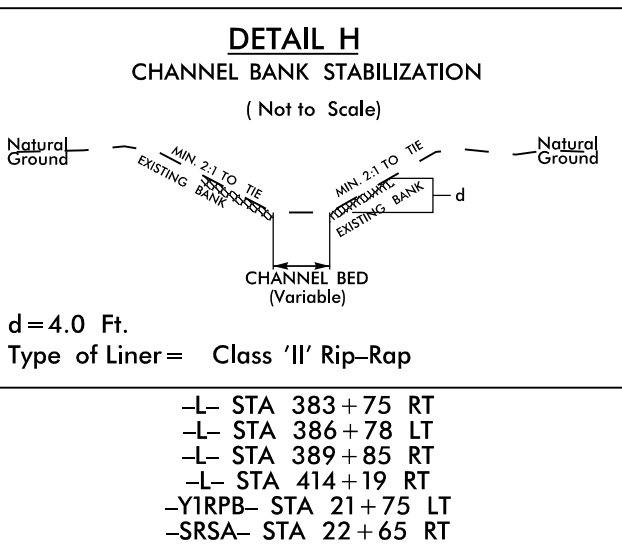
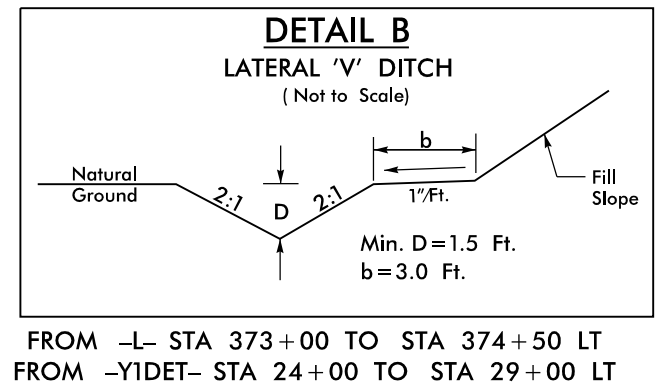
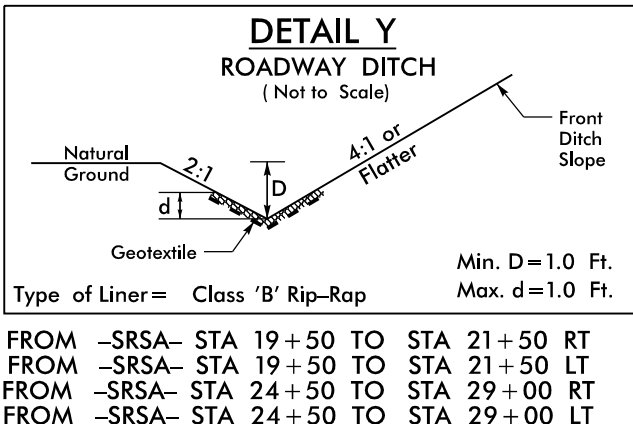
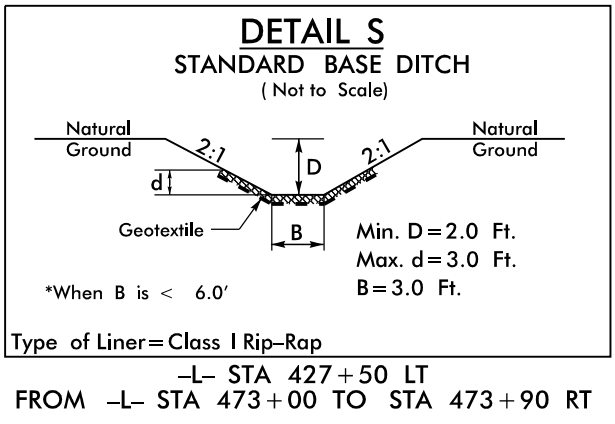
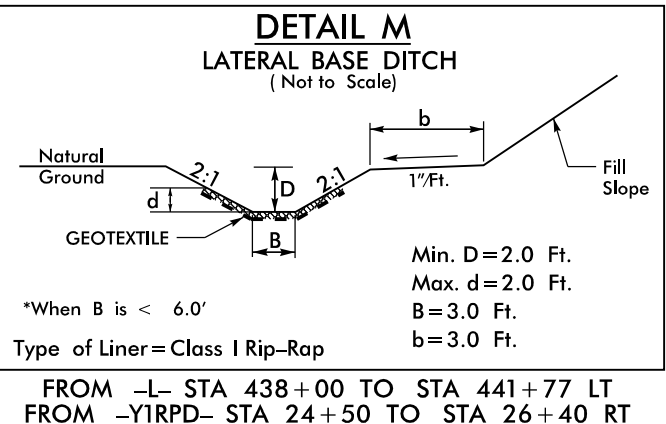
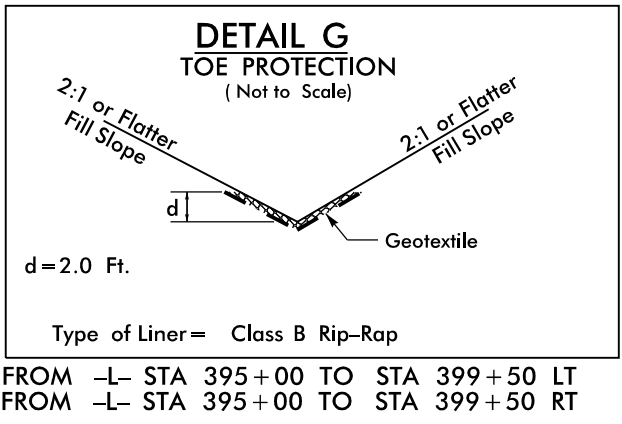
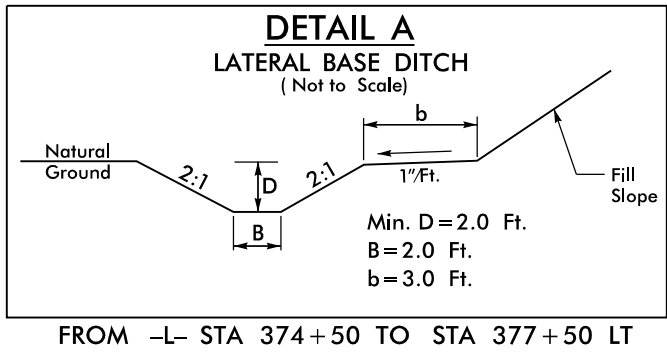
INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "U2579C-1" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 876419.285(++) EASTING: 1651591.602(++)
ELEVATION: 976.94(++)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99995453
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "U2579C-1" TO -L- STATION 390+00.00 IS
N 49°00'53.54" 3884.0262'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

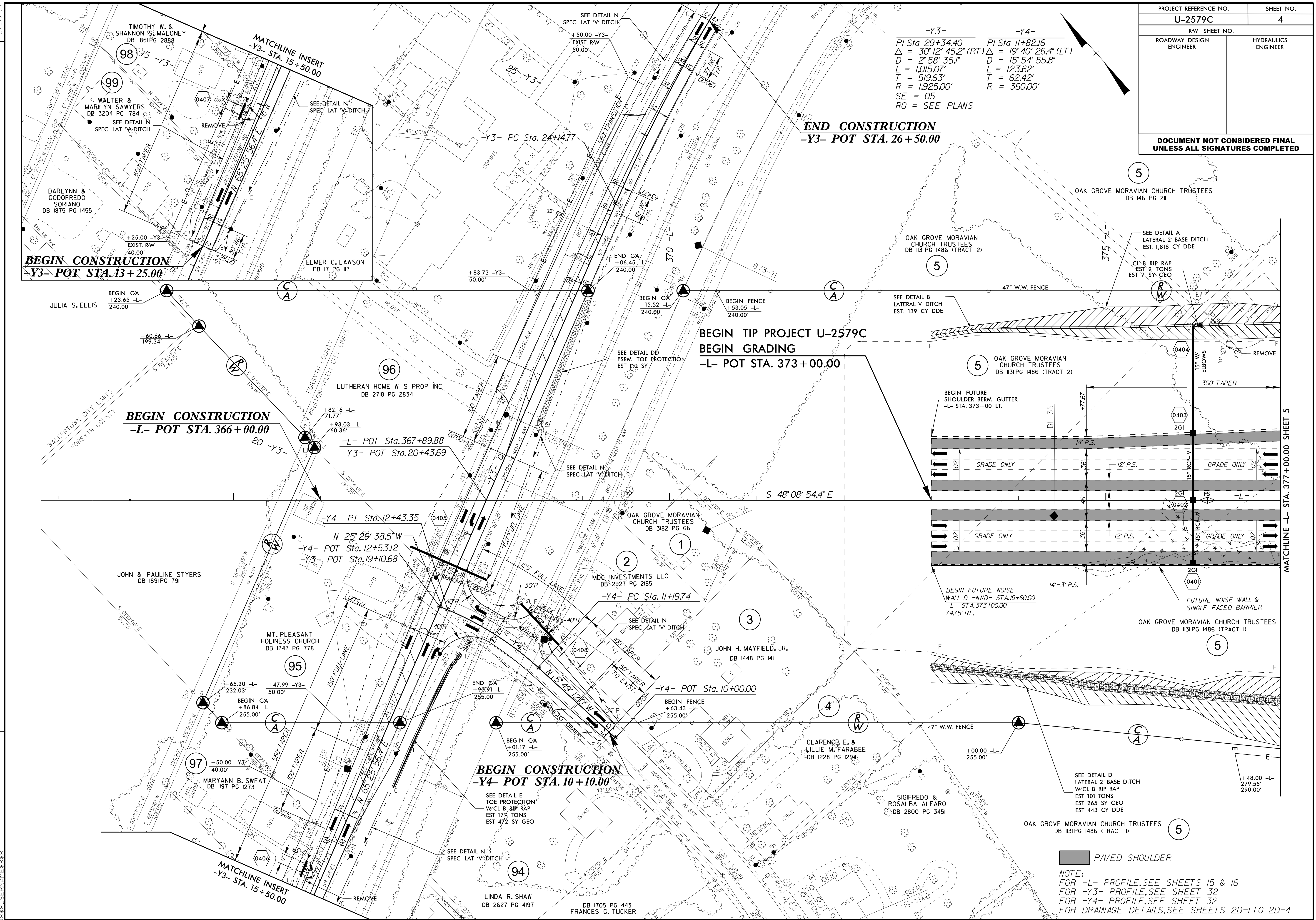
NOTE: DRAWING NOT TO SCALE



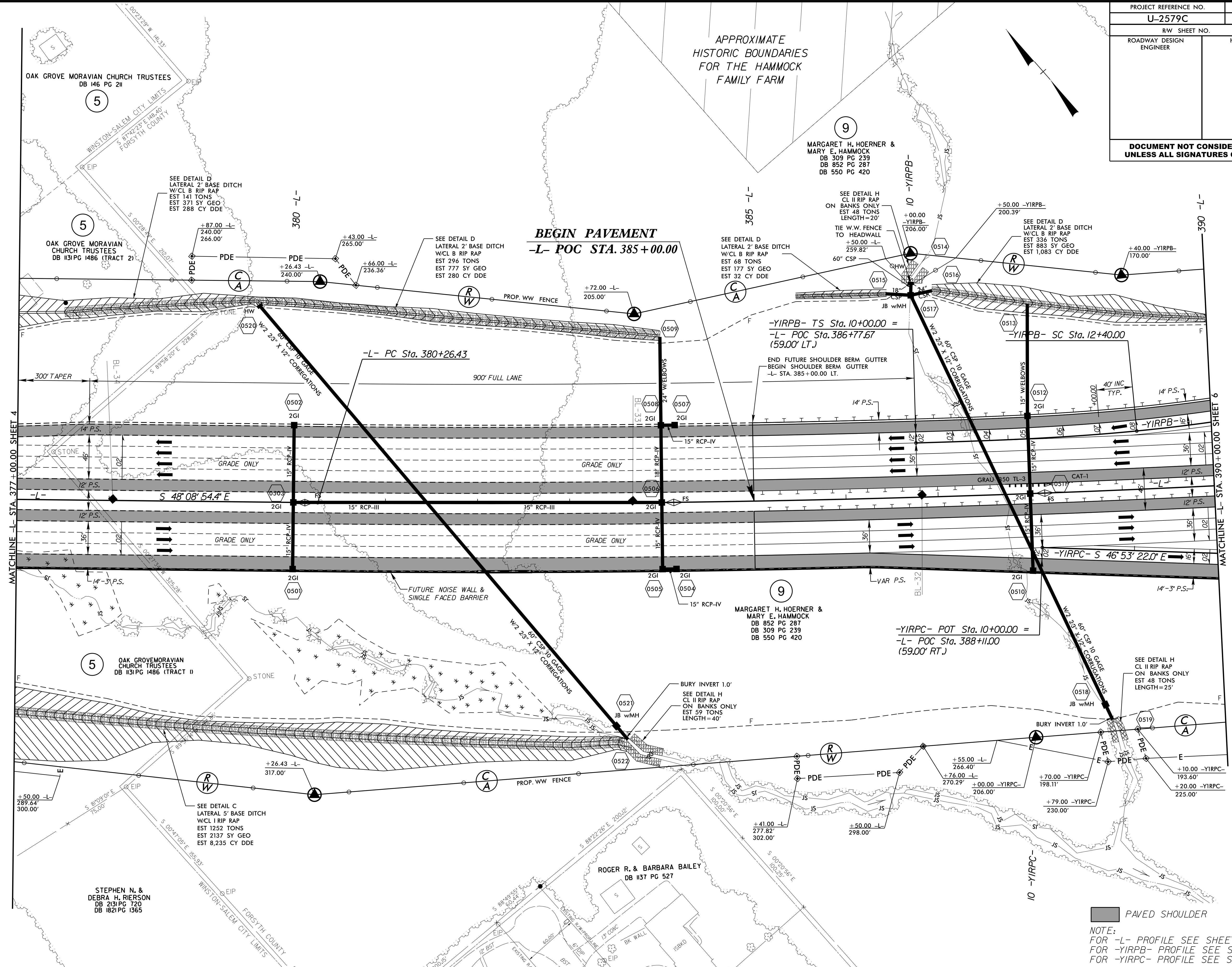
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U-2579C	2D-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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

 *PAVED SHOULDER*

NOTE:
FOR -L- PROFILE, SEE SHEETS 15 & 16
FOR -Y3- PROFILE, SEE SHEET 32
FOR -Y4- PROFILE, SEE SHEET 32
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4



NOTE:
FOR -L- PROFILE SEE SHEETS 16 & 17
FOR -YIRPB- PROFILE SEE SHEET 24
FOR -YIRPC- PROFILE SEE SHEET 25

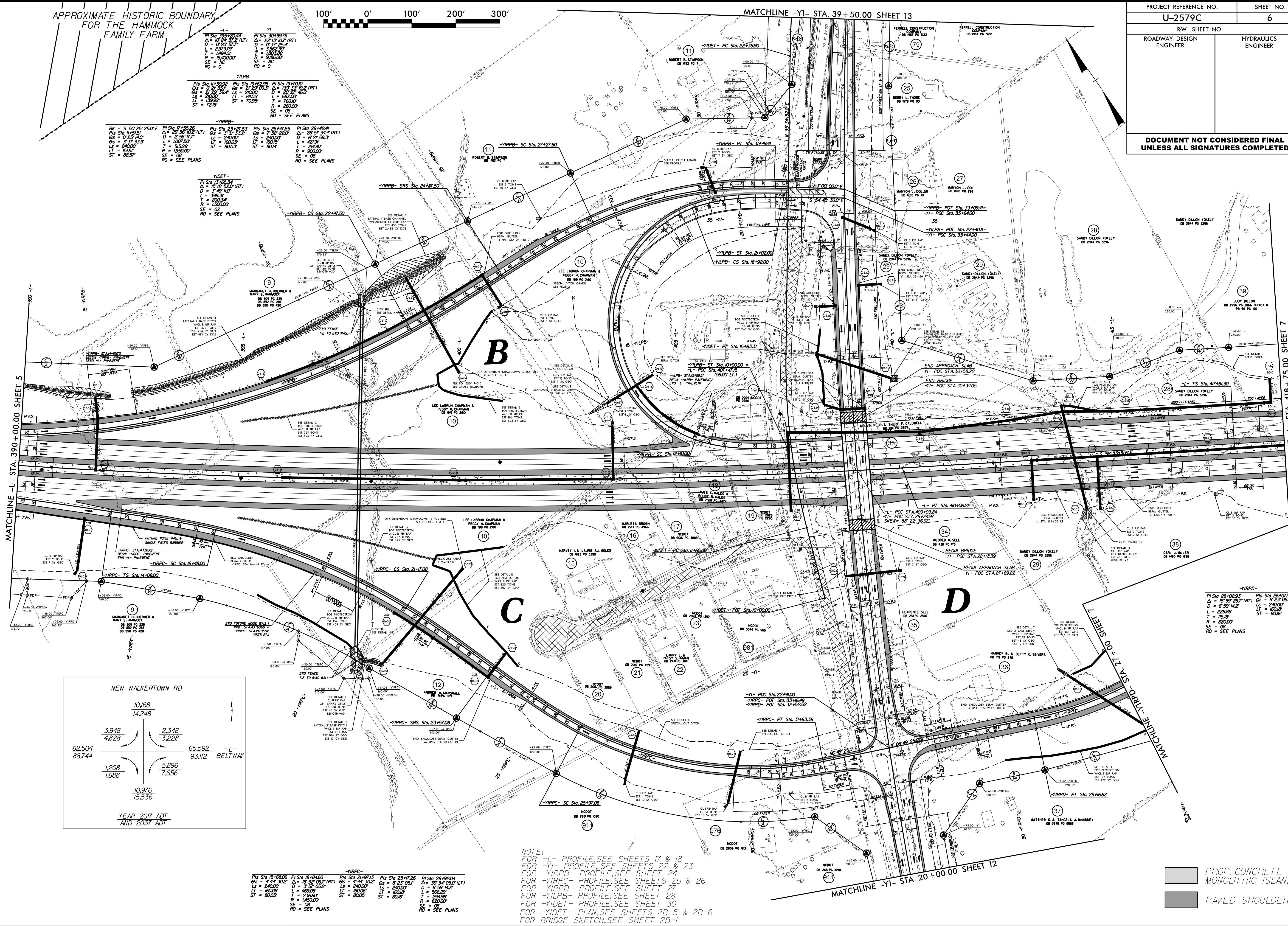
8/17/99

APPROXIMATE HISTORIC BOUNDARY
FOR THE HAMMOCK
FAMILY FARM

100' 0' 100' 200' 300'

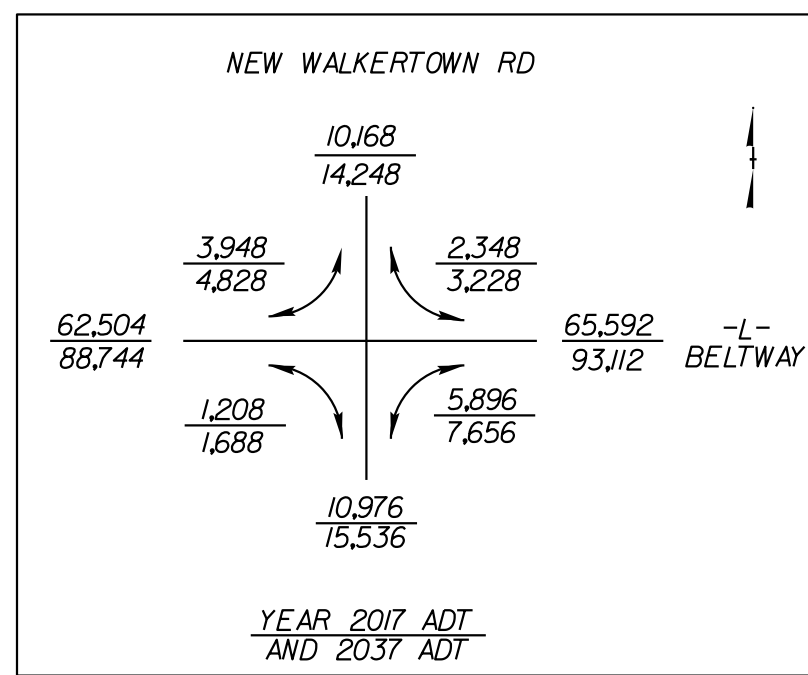
MATCHLINE -YI- STA. 39+50.00 SHEET 13

PROJECT REFERENCE NO.		SHEET NO.
U-2579C		6
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



MATCHLINE -L- STA. 390+00.00 SHEET 5

MATCHLINE -L- STA. 418+75.00 SHEET 7



NOTE:
FOR -L- PROFILE, SEE SHEETS 17 & 18
FOR -YI- PROFILE, SEE SHEETS 22 & 23
FOR -YIRPB- PROFILE, SEE SHEET 24
FOR -YIRPC- PROFILE, SEE SHEETS 25 & 26
FOR -YIRPD- PROFILE, SEE SHEET 27
FOR -YILPB- PROFILE, SEE SHEET 28
FOR -YIDET- PROFILE, SEE SHEET 30
FOR -YIDET- PLAN, SEE SHEETS 2B-5 & 2B-6
FOR BRIDGE SKETCH, SEE SHEET 2B-1

PROP. CONCRETE 5" MONOLITHIC ISLAND
PAVED SHOULDER

REVISIONS
RIGHT OF WAY REVISION 3/7/17 - UPDATED PROPERTY LINE ON PARCEL 39. JMB
RIGHT OF WAY REVISION 3/29/17 - ADDED PUE ON PARCEL 11. JMB
RIGHT OF WAY REVISION 5/3/17 - ADDED TCE ON PARCEL 9. JMB

03 MAY-2017 09:40 U-2579C.psh.6.dgn
S:\PROJECTS\U-2579C\U-2579C.dwg



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element: 34409.3.23 TIP No.: R-2247CD County(ies): Forsyth Page 1 of 4

General Project Information

WBS Element:		34409.3.23		TIP Number: R-2247CD		Project Type: Roadway Widening		Date: 9/25/2017	
NCDOT Contact:		Michael J. Shumsky, PE				Contractor / Designer:		Randal C. Howard, PE	
	Address:	NCDOT Design Build Unit 1595 Mail Service Center Raleigh, NC 27699-1595					Address:	Sungate Design Group, PA 905 Jones Franklin Road Raleigh, NC 27606	
	Phone:	(919) 707-6627					Phone:	(919) 859-2243	
	Email:	mshumsky@ncdot.gov					Email:	rhoward@sungatedesign.com	
City/Town:		Winston-Salem				County(ies):		Forsyth	
River Basin(s):		Yadkin-Pee Dee				CAMA County?		No	
Wetlands within Project Limits?		Yes							

Project Description

Project Length (lin. miles or feet):	.867 miles	Surrounding Land Use:	Medium density residential
	Proposed Project		Existing Site
Project Built-Up Area (ac.)	23.6 ac.		15.9 ac.
Typical Cross Section Description:	Y17 (US 421): Three (3) 12' travel lanes each direction, concrete barrier rail median with 18' paved median shoulders, and 12' paved outside shoulders with grass roadway ditches, both sides.		Y17 (US 421): Two 12' travel lanes with paved shoulders, grass median, and grass roadway ditches, both sides.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 77,735	Year: 2036	Existing: 57,065 Year: 2016
General Project Narrative: (Description of Minimization of Water Quality Impacts)	The R-2247CD project involves US 421 and Peace Haven Road Interchange improvements for future Winston-Salem Northern Beltway along with other improvements to adjacent roadways including realignments. Grass swales have been incorporated in roadside ditches, where possible, to reduce velocities and promote infiltration of runoff. A dry detention basin is proposed to treat runoff and attenuate peak flows for portions on the roadway runoff. Riprap at pipe outlets, ditches, and streambanks has been incorporated to minimize erosion on slopes where vegetation will not be adequate. Storm drainage discharging directly to wetlands has been design to meet non-erosive velocity requirements. Bridge deck drainage for the Kester Mill Road bridge will be collected and discharged outside the limits of the surface-water. NCDOT standards for ground cover, vegetation, and slope stabilization will be adhered to during the life of this project, as specified in the approved NCDOT Erosion and Sediment Control Plan for the project.		

Waterbody Information

Surface Water Body (1):	Muddy Creek	NCDWR Stream Index No.:	12-94-(0.5)
NCDWR Surface Water Classification for Water Body	Primary Classification:	Class C	
	Supplemental Classification:	None	
Other Stream Classification:	None		
Impairments:	None		
Aquatic T&E Species?	No	Comments:	
NRTR Stream ID:		Buffer Rules in Effect:	N/A
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	No
Deck Drains Discharge Over Water Body?	No	Dissipator Pads Provided in Buffer?	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)	



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 2.07; Released October 2016)

WBS Element: 34409.3.23 TIP No.: R-2247CD County(ies): Forsyth Page 2 of 4

Additional Waterbody Information

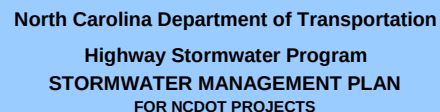
Surface Water Body (2):	Silas Creek		NCDWR Stream Index No.:	12-94-10	
NCDWR Surface Water Classification for Water Body	Primary Classification:	Class C			
	Supplemental Classification:	None			
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				Buffer Rules in Effect:	N/A
Project Includes Bridge Spanning Water Body?	Yes	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	No	(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: 34409.3.23 TIP No.: R-2247CD County(ies): Forsyth Page 3 of 4

[illegible]

Additional Comments



WBS Element: 34409.3.23

TIP No.: R-2247CD

County(ies): Forsyth

Page 4 of 4

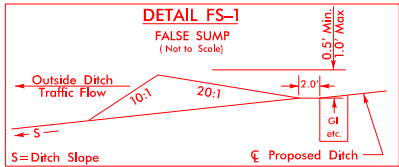
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Additional Comments

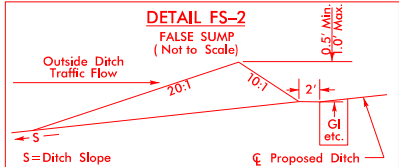
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VICINITY MAP

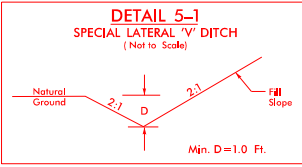




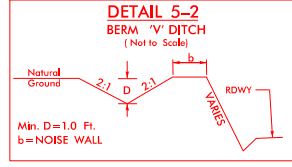
STA. 34+35 -Y17- LT
STA. 35+45 -Y17- LT
STA. 36+90 -Y17- LT
STA. 76+30 -Y17- LT
STA. 13+90 -DW1- RT



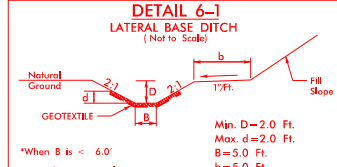
STA. 17+36 -Y25ARPA- RT, STA. 16+40 -Y25ARPA- RT
STA. 24+50 -Y17- RT, STA. 25+25 -Y17- RT
STA. 31+15 -Y17- RT, STA. 60+64 -Y17- RT
STA. 61+15 -Y17- LT, STA. 76+15 -Y17- RT
STA. 79+20 -Y17- RT, STA. 14+15 -DW1- LT



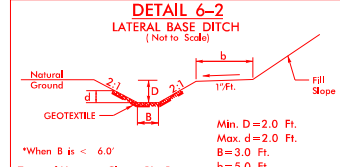
FROM STA. 28+50 TO STA. 30+00 -Y17- LT



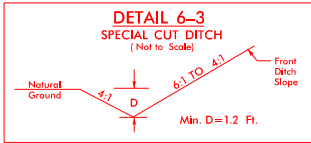
FROM STA. 25+75 TO STA. 28+00 -Y17- RT



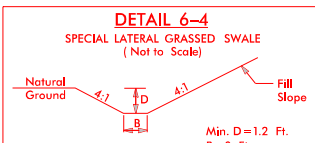
FROM STA. 15+25 TO STA. 16+19.44 -Y25ARPB- LT



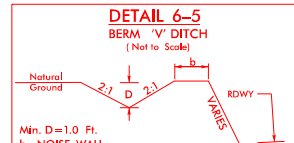
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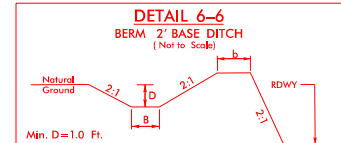
FROM STA. 44+50 TO STA. 46+50 -Y17- LT
FROM STA. 14+25 TO STA. 15+50 -Y25ALPD- RT
FROM STA. 26+50 TO STA. 29+85 -Y25ARPD- RT



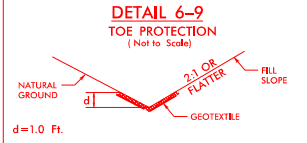
FROM STA. 43+70 TO STA. 46+70 -Y17- RT
FROM STA. 12+00 TO STA. 14+25 -Y25ALPD- RT



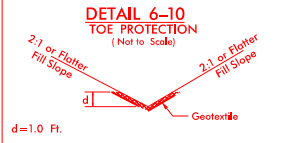
FROM STA. 38+36 TO STA. 40+00 -Y17- RT
FROM STA. 18+00 TO STA. 22+50 -Y25ARPA- RT
FROM STA. 57+50 TO STA. 59+00 -Y17- LT



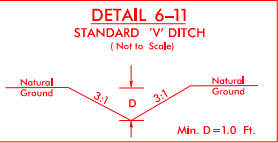
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FROM STA. 52+50 TO STA. 53+00 -Y17- LT



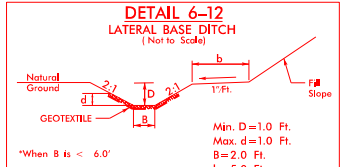
FROM STA. 53+25 TO STA. 54+50 -Y17- LT



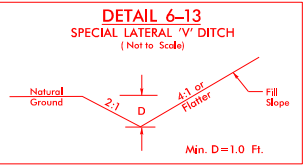
FROM STA. 15+50 TO STA. 18+00 -Y25ARPD- RT



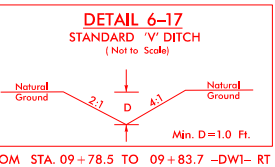
FROM STA. 39+50 TO STA. 40+50 -Y17- RT



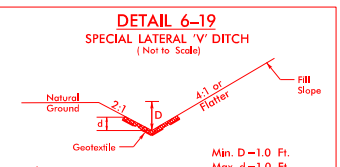
FROM STA. 15+54 TO STA. 16+40 -Y25ARPD- LT
FROM STA. 56+50 TO STA. 59+30 -Y17- RT



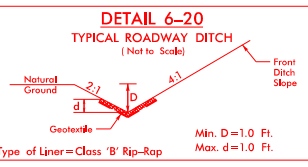
FROM STA. 10+00 TO STA. 12+00 -DW1- LT
FROM STA. 10+00 AROUND CUL-DE-SAC 45 L.F.



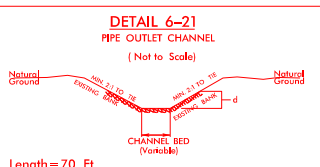
FROM STA. 09+78.5 TO 09+83.7 -DW1- RT



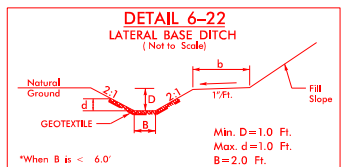
FROM STA. 16+33 TO STA. 20+00 -Y25ARPB- RT



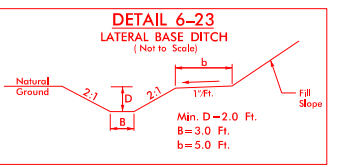
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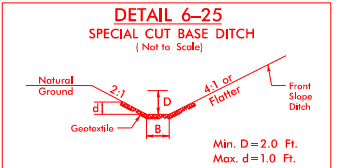
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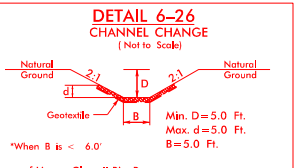
FROM STA. 54+50 TO STA. 57+50 -Y17- LT



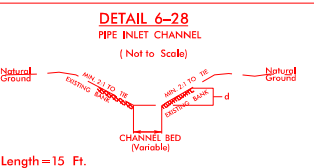
FROM STA. 20+00 TO STA. 22+50 -Y25ARPB- LT



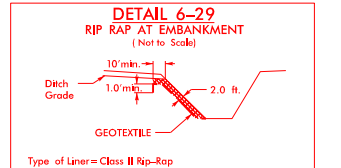
FROM STA. 18+00 TO STA. 19+50 -Y25ARPD- RT



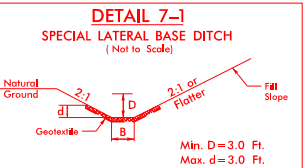
FROM STA. 15+80 TO STA. 15+90 -DW1- RT



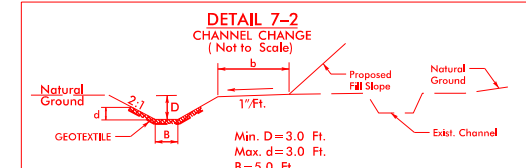
STA. 54+50 -Y17- LT



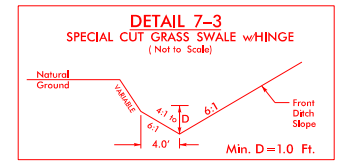
FROM STA. 14+90 TO STA. 15+00 -Y25ARPA- RT



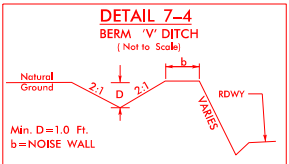
FROM STA. 64+00 TO STA. 64+45 -Y17- RT



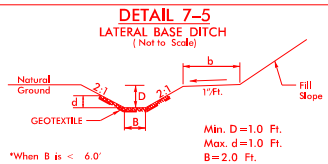
FROM STA. 63+90 TO STA. 66+00 -Y17- RT



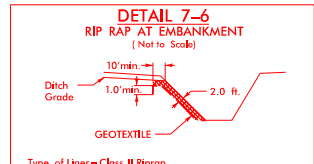
FROM STA. 65+00 TO STA. 65+50 -Y17- LT
FROM STA. 66+50 TO STA. 68+20 -Y17- LT



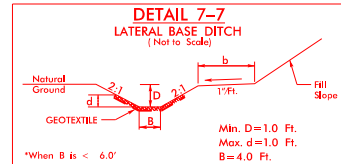
FROM STA. 59+00 TO STA. 60+50 -Y17- LT
FROM STA. 65+00 TO STA. 71+50 -Y17- LT



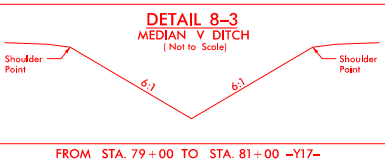
FROM STA. 61+50 TO STA. 63+90 -Y17- RT



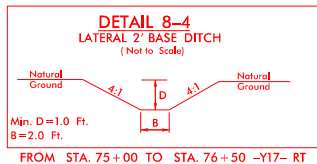
FROM STA. 68+15 TO STA. 68+30 -Y17- RT



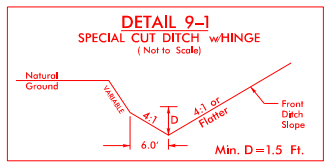
FROM STA. 62+00 TO STA. 62+50 -Y17- LT
FROM STA. 63+50 TO STA. 65+00 -Y17- LT



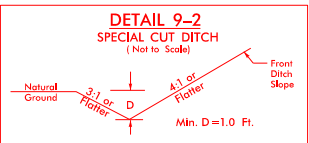
FROM STA. 79+00 TO STA. 81+00 -Y17- RT



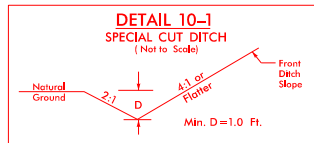
FROM STA. 75+00 TO STA. 76+50 -Y17- RT



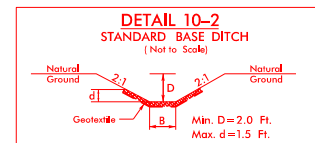
FROM STA. 13+16 TO STA. 15+00 -Y25A- LT



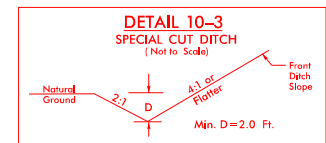
FROM STA. 17+50 TO STA. 19+00 -Y25A- RT



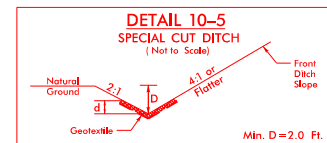
FROM STA. 17+50 TO STA. 20+00 -DW1- LT



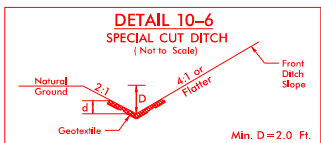
FROM STA. 11+63 TO STA. 11+93 -Y28REV2- LT



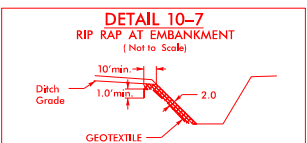
FROM STA. 18+50 TO STA. 19+50 -Y28REV2- LT



FROM STA. 17+50 TO STA. 19+00 -Y28REV2- RT
FROM STA. 14+00 TO STA. 15+50 -Y28REV2- LT



FROM STA. 15+75 TO STA. 16+50 -Y28REV2- RT



FROM STA. 18+01 TO STA. 18+16 -DW1- RT
FROM STA. 11+06 TO STA. 11+29 -Y28REV2- LT
FROM STA. 11+51 TO STA. 11+74 -Y28REV2- LT

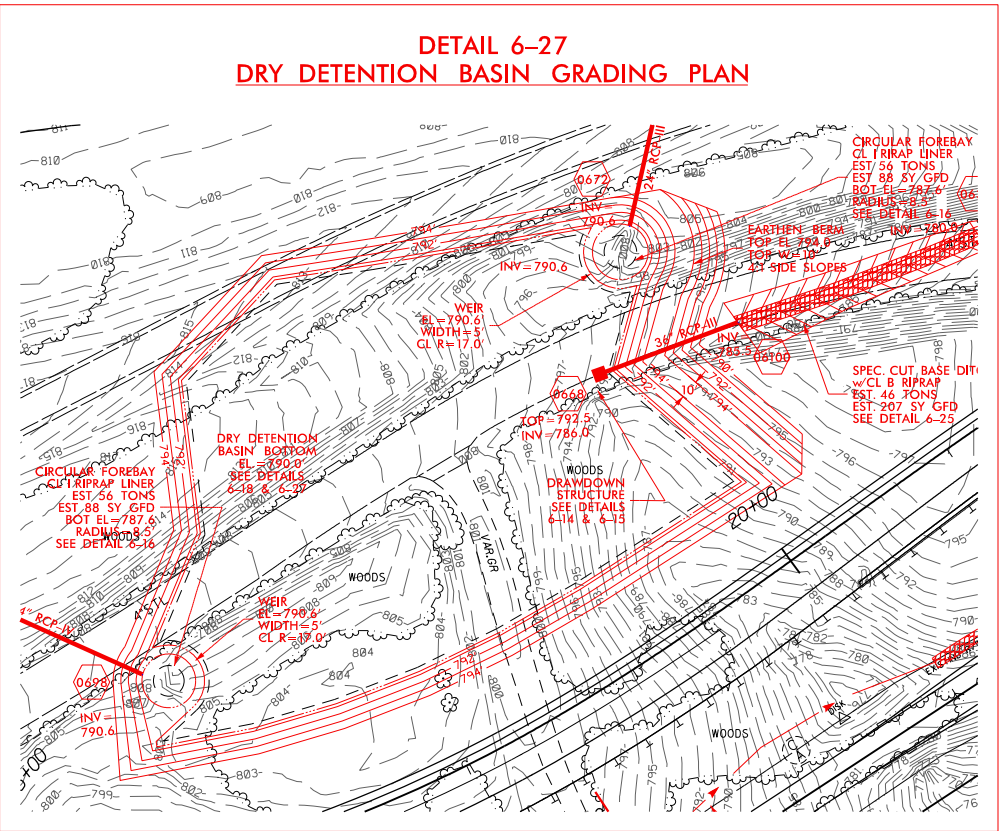
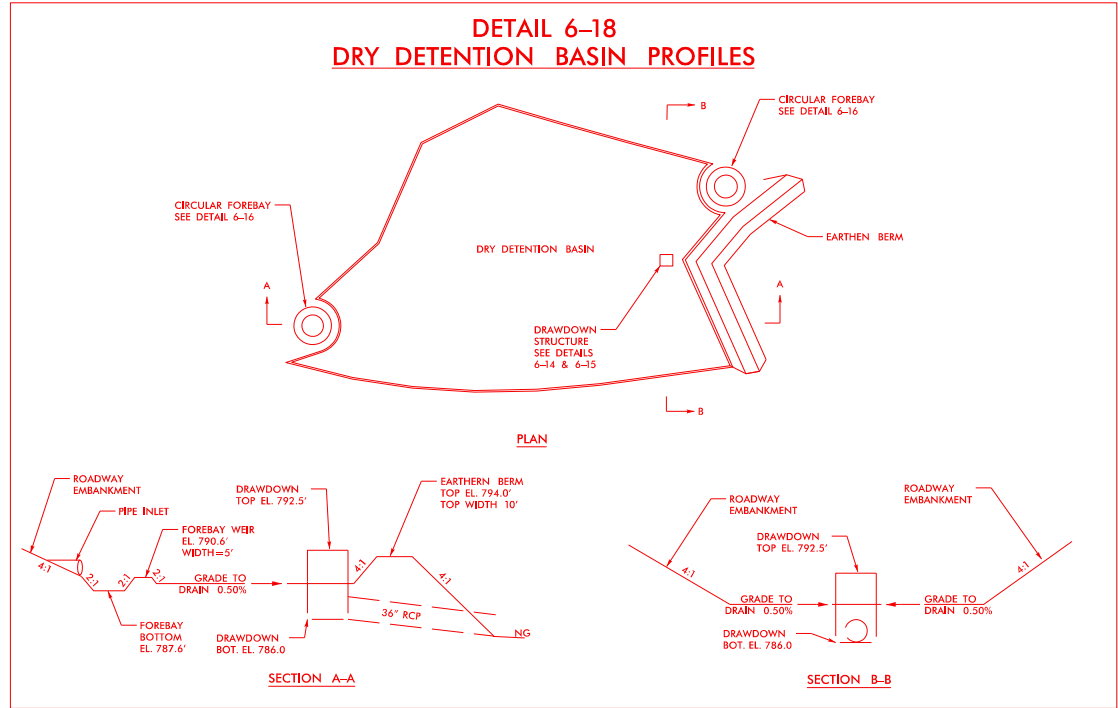
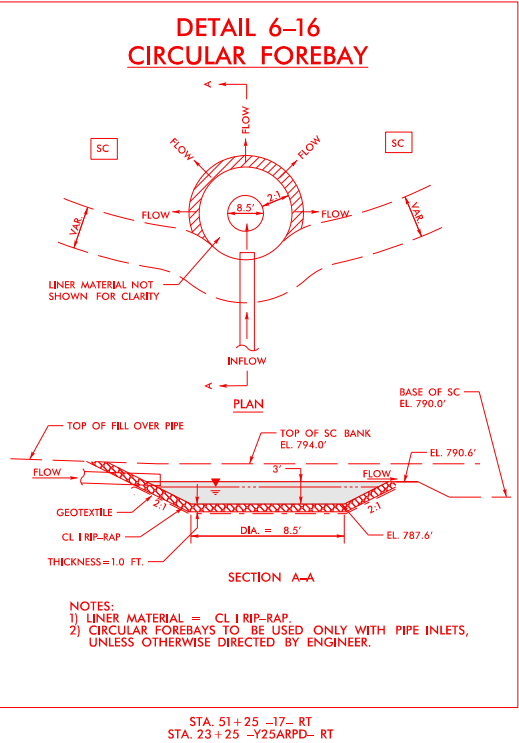
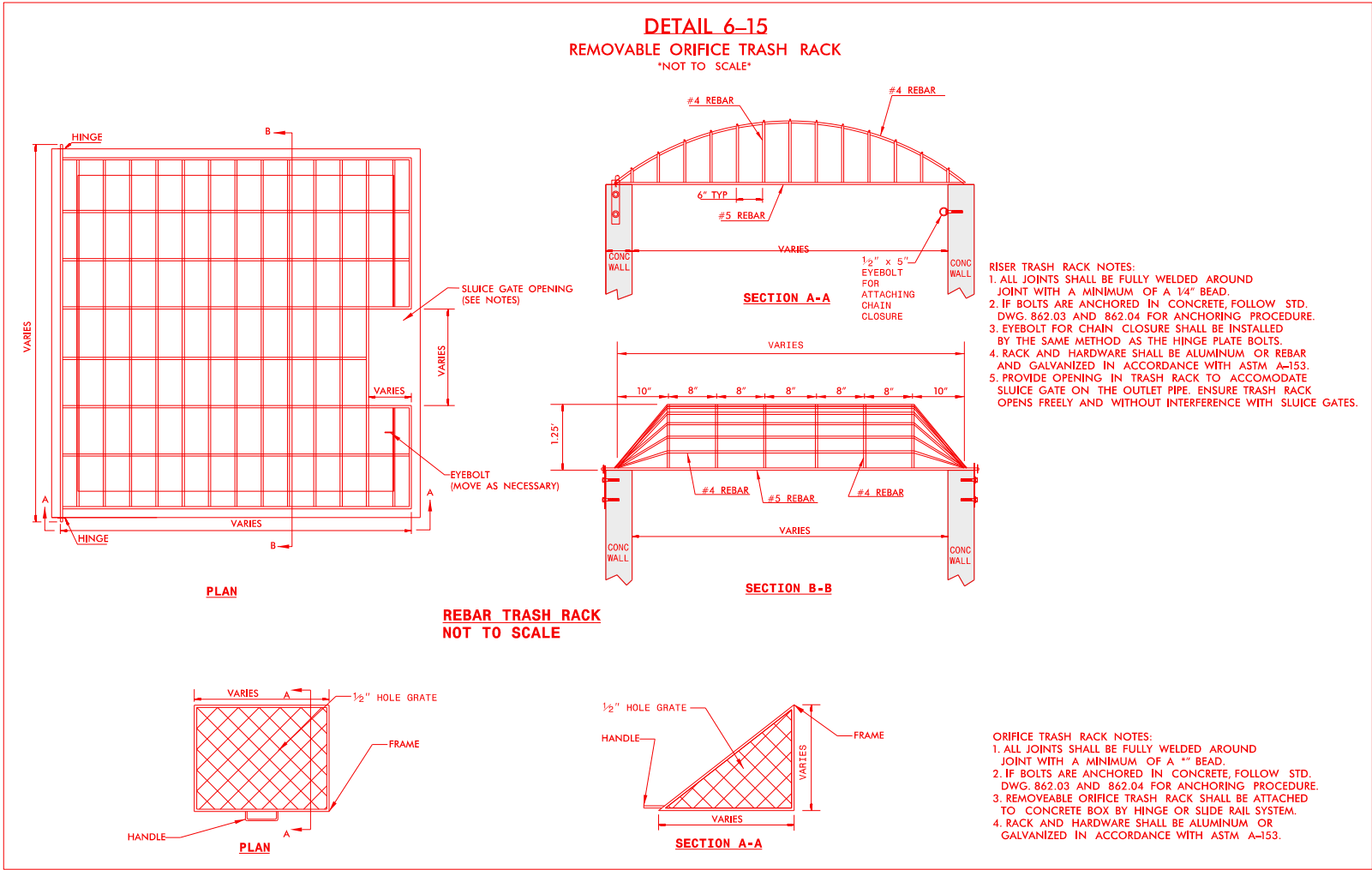
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UNLESS ALL SIGNATURES COMPLETED**

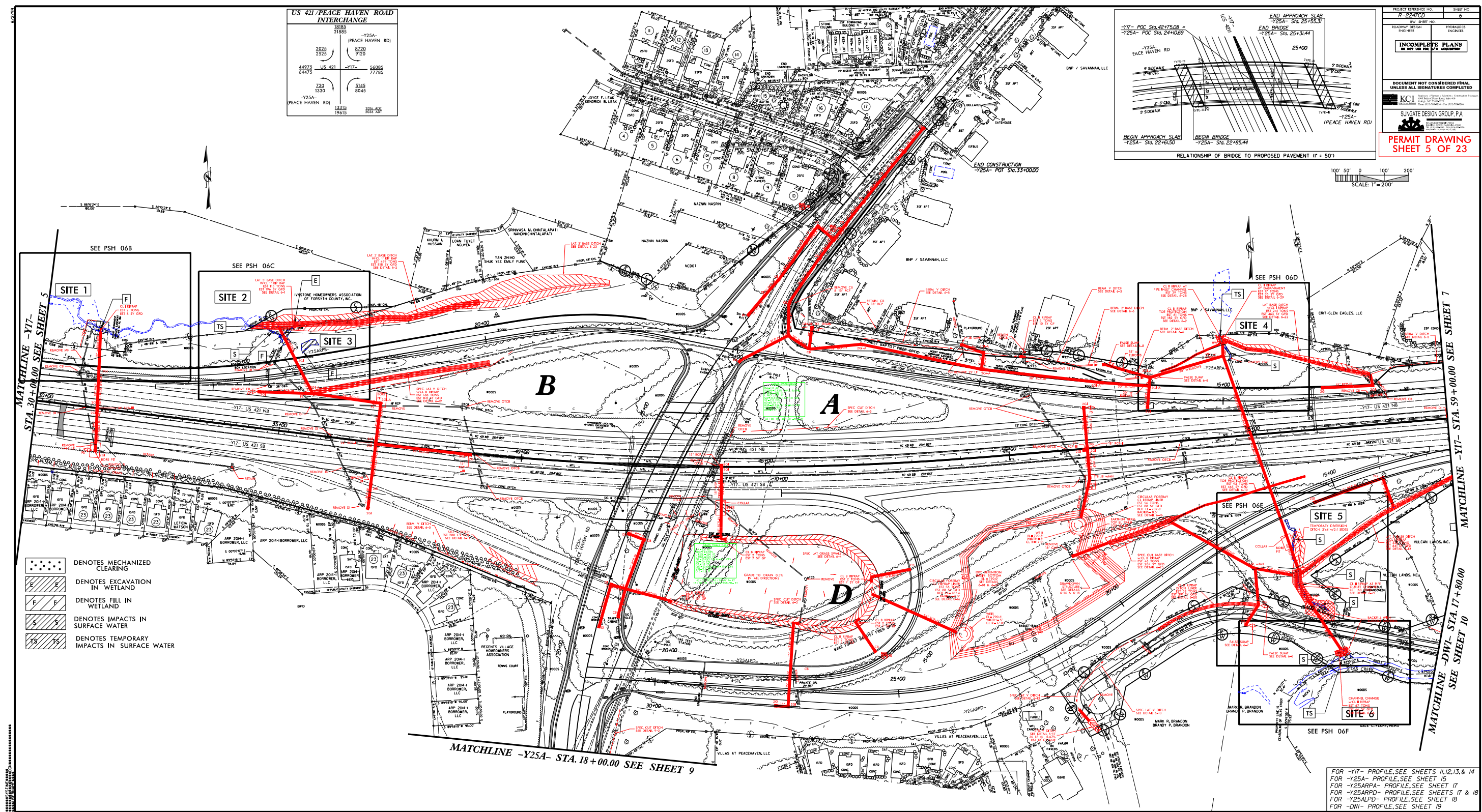


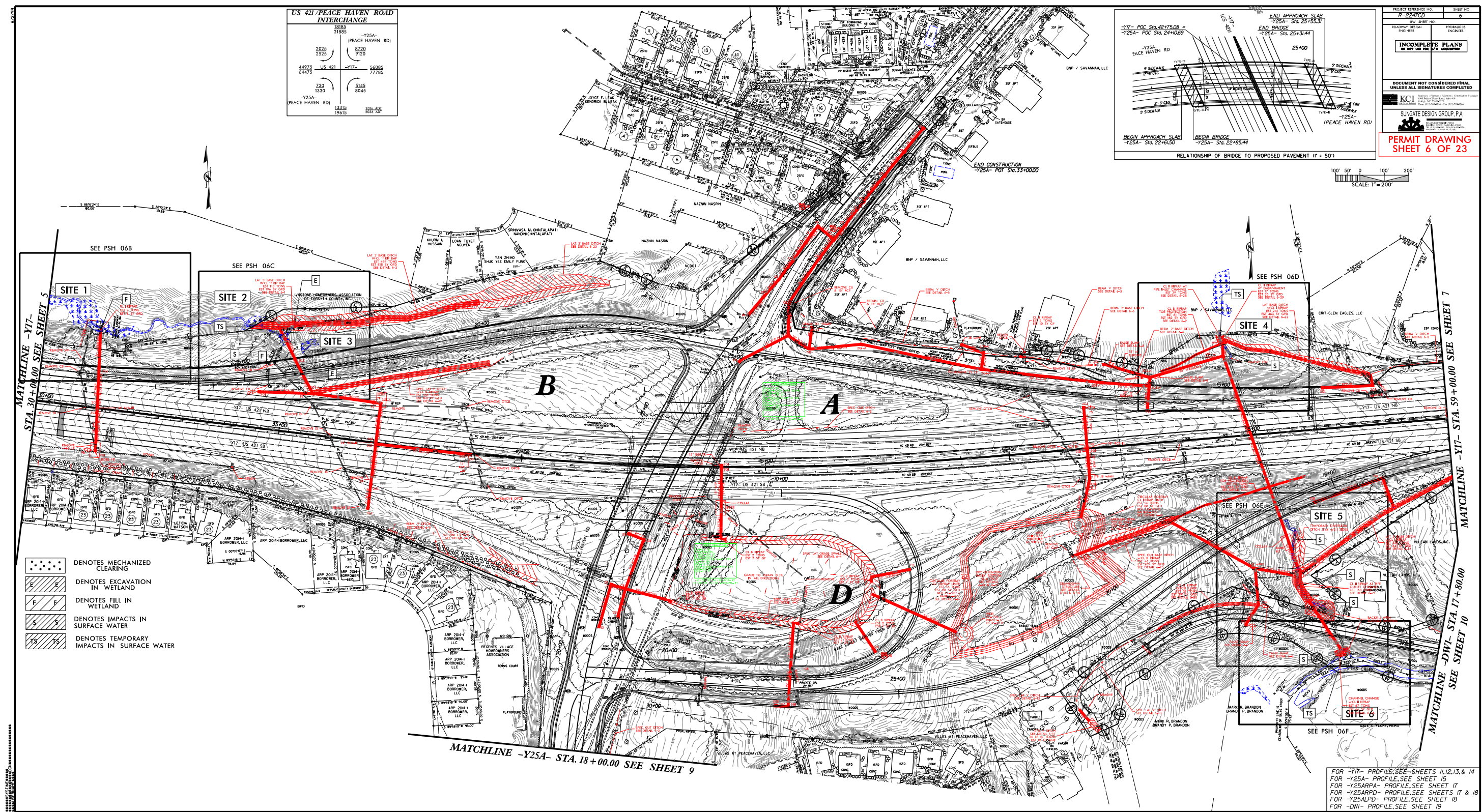
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5 JONES FRANKLIN ROAD
LEIGH, NORTH CAROLINA 27606
L (919) 859-2243
FIRM LICENSE NO. C-890

9/6/2017
R2247CD-Hyd-prm-wet-02D2.dgn
rhoward

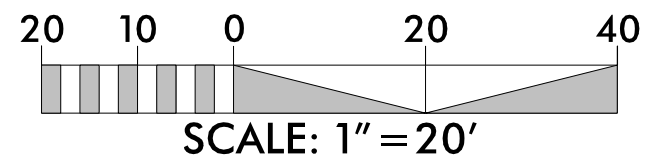






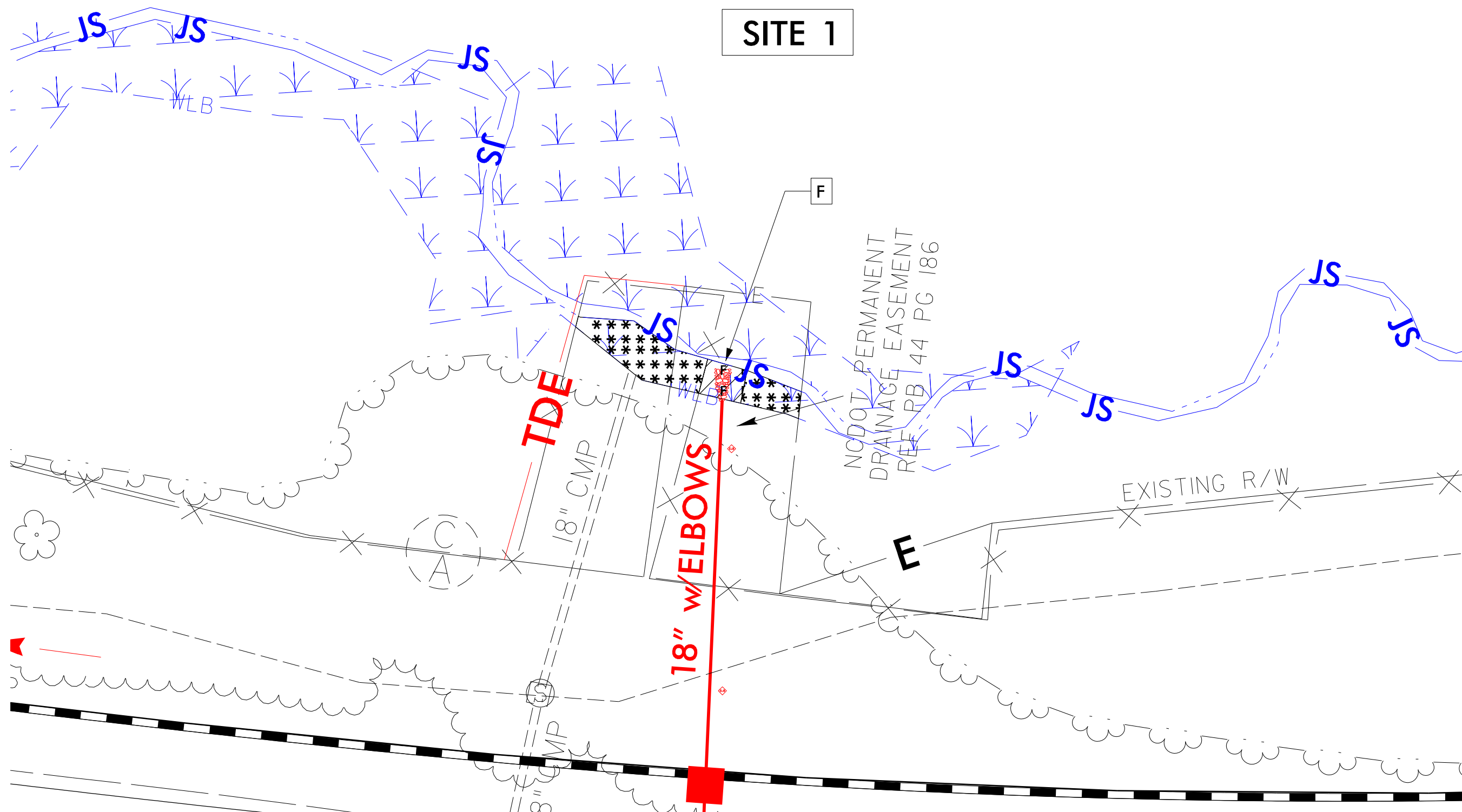
DENOTES FILL IN
WETLAND

DENOTES MECHANIZED
CLEARING



PROJECT REFERENCE NO.	SHEET NO.
<i>R-2247CD</i>	<i>6B</i>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

PERMIT DRAWING
SHEET 7 OF 23



8/17/99

F	F
E	E
S	S
TS	TS
*	*

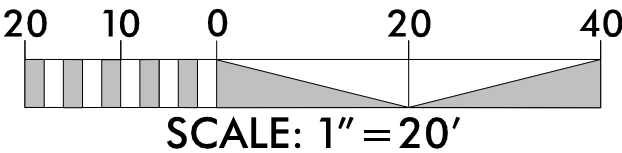
DENOTES FILL IN WETLAND

DENOTES EXCAVATION IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

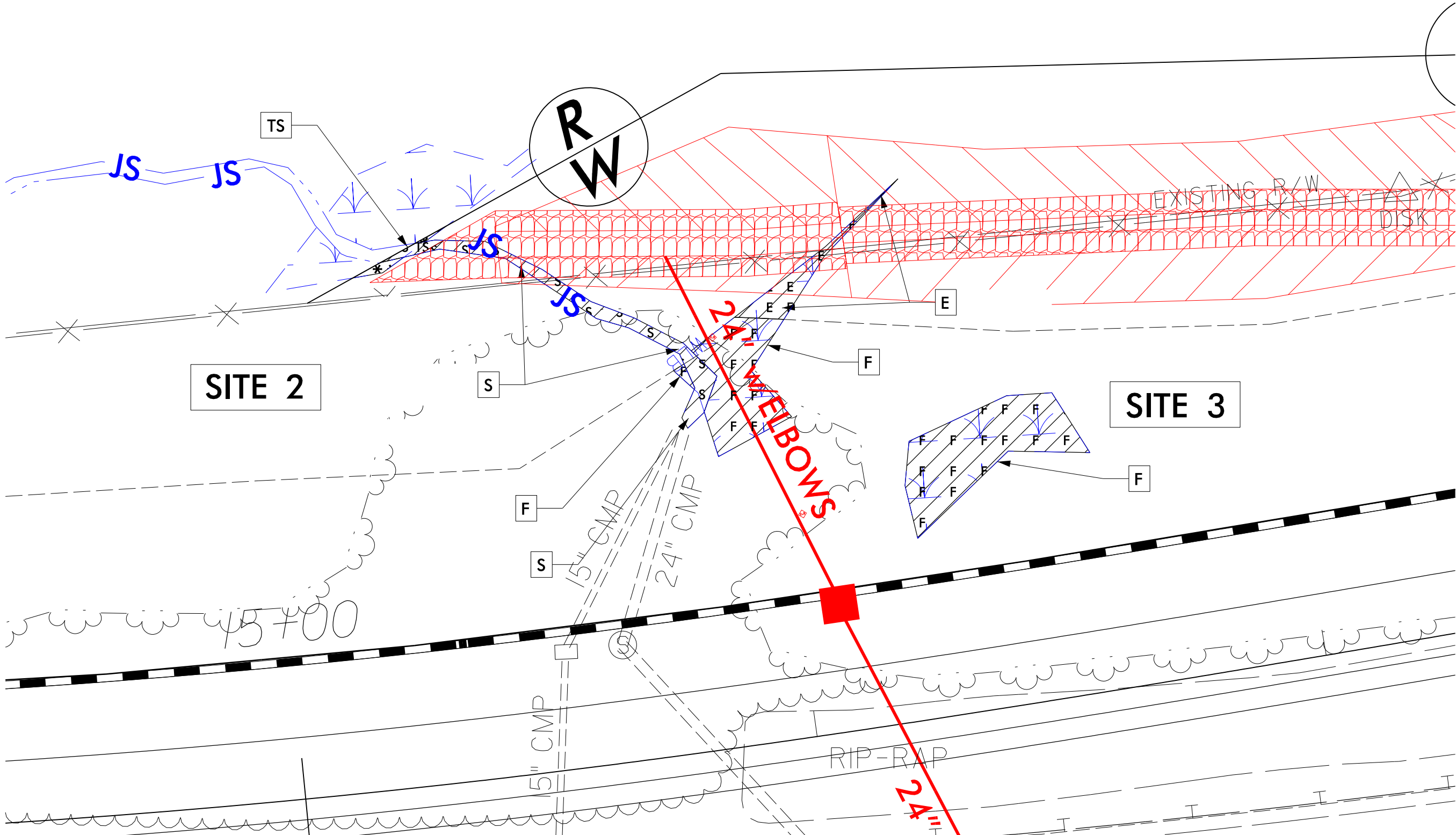
DENOTES MECHANIZED CLEARING



PROJECT REFERENCE NO. <i>R-2247CD</i>	SHEET NO. <i>6C</i>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

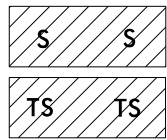
PERMIT DRAWING
SHEET 8 OF 23

REVISIONS

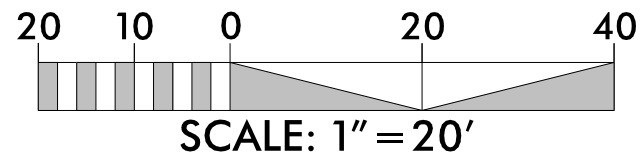


8/17/99

REVISIONS

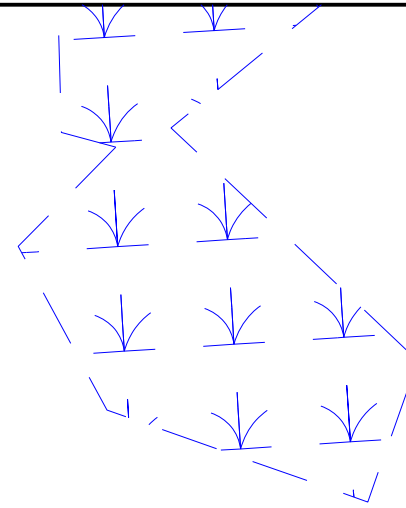


DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

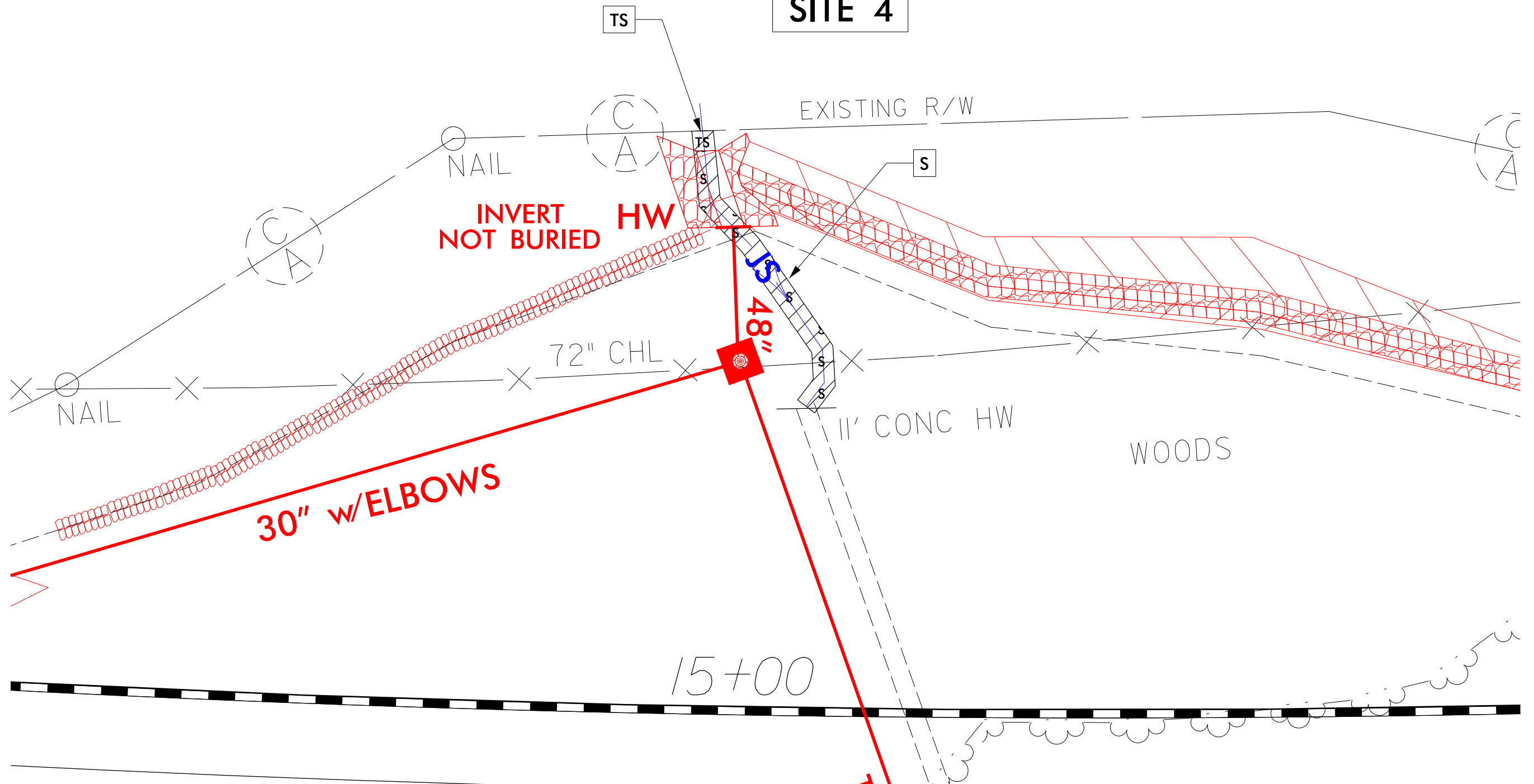


PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	6D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

PERMIT DRAWING
SHEET 9 OF 23



SITE 4



**PERMIT DRAWING
SHEET 11 OF 23**

SITE 6

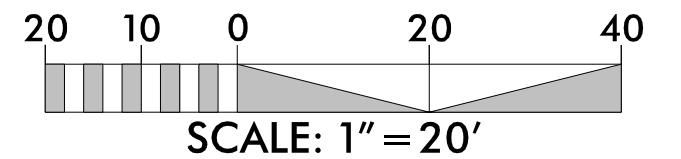
**INVERT
NOT BURIED**

SILAS CREEK

WOODS

WOODS

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

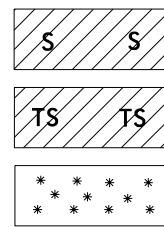


SCALE: 1" = 20'

REVISIONS

8/17/99

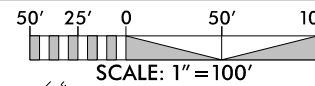
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\$\$\$\$\$DGN\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$



DENOTES IMPACTS IN
SURFACE WATER

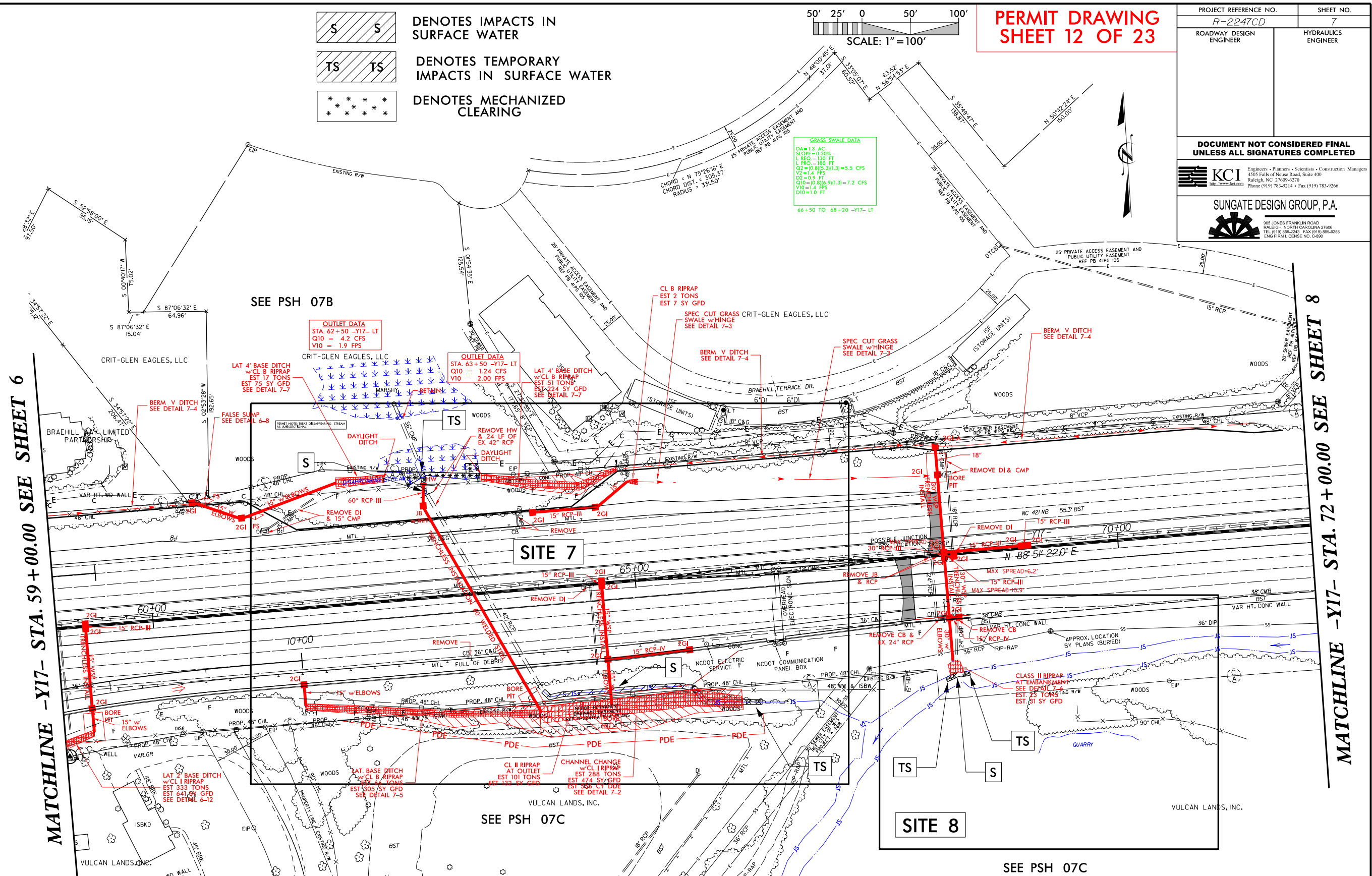
DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

DENOTES MECHANIZED
CLEARING



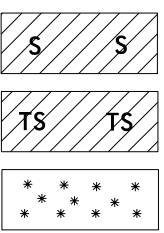
PERMIT DRAWING
SHEET 12 OF 23

PROJECT REFERENCE NO.		SHEET NO.	
R-2247CD		7	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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6/2/99

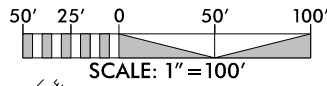
SECTION 13.00 SEE SHEET 13.00



DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

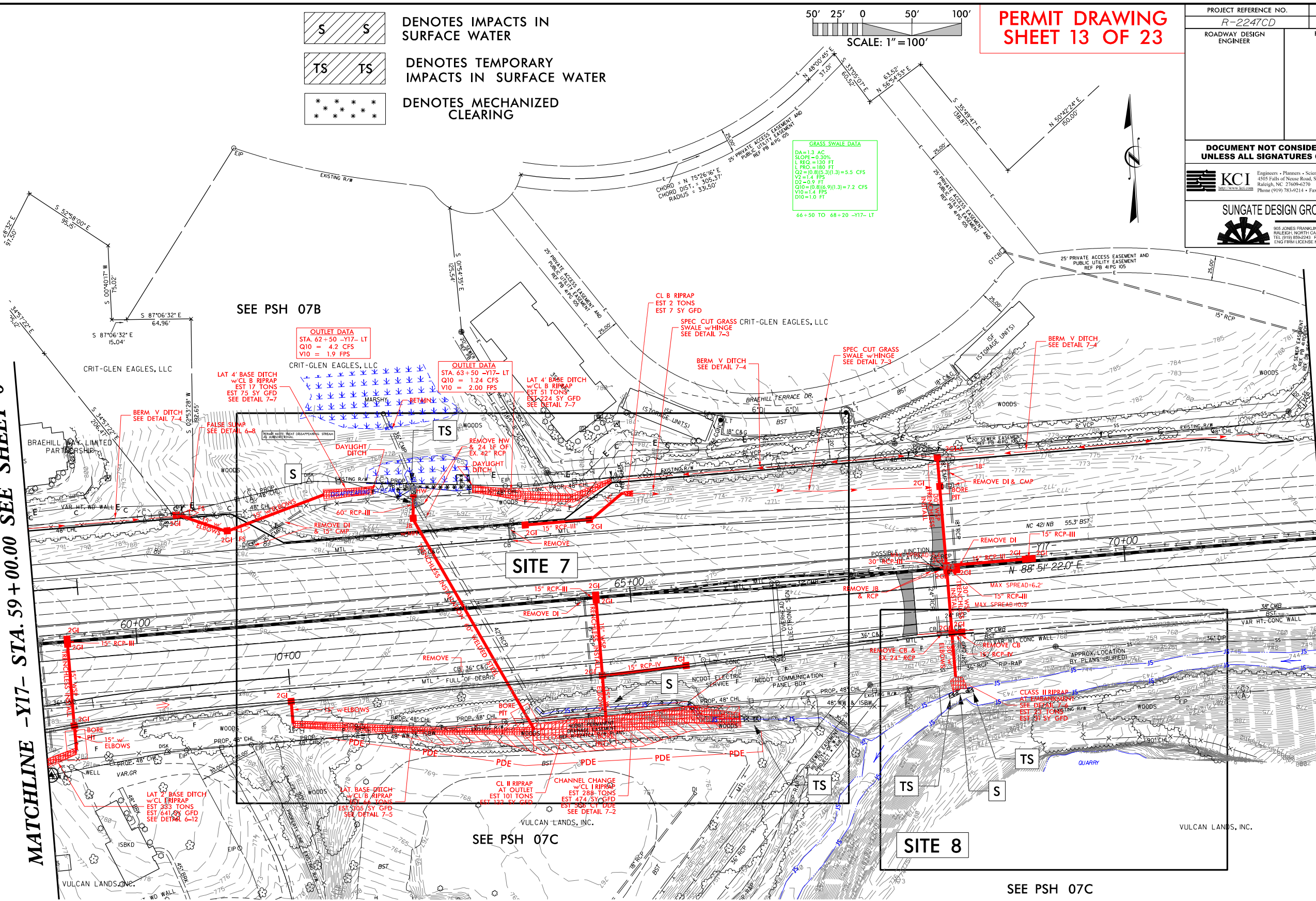


PERMIT DRAWING
SHEET 13 OF 23

PROJECT REFERENCE NO. <i>R-2247CD</i>		SHEET NO. <i>7A</i>	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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 KCI http://www.kci.com		Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266	
		SUNGATE DESIGN GROUP, P.A. 905 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 600-2343 FAX (919) 600-2348 ENG FIRM LICENSE NO. C-890	

MATCHLINE -Y17- STA. 59+00.00 SEE SHEET 6

MATCHLINE -Y17- STA. 72+00.00 SEE SHEET 8



FOR -Y17- PROFILE, SEE SHEETS 12 & 14
FOR -Y25ARPA- PROFILE, SEE SHEET 17
FOR -Y25ARPD- PROFILE, SEE SHEET 17



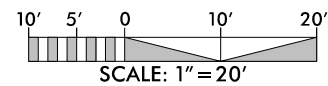
DENOTES MECHANIZED
CLEARING



DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

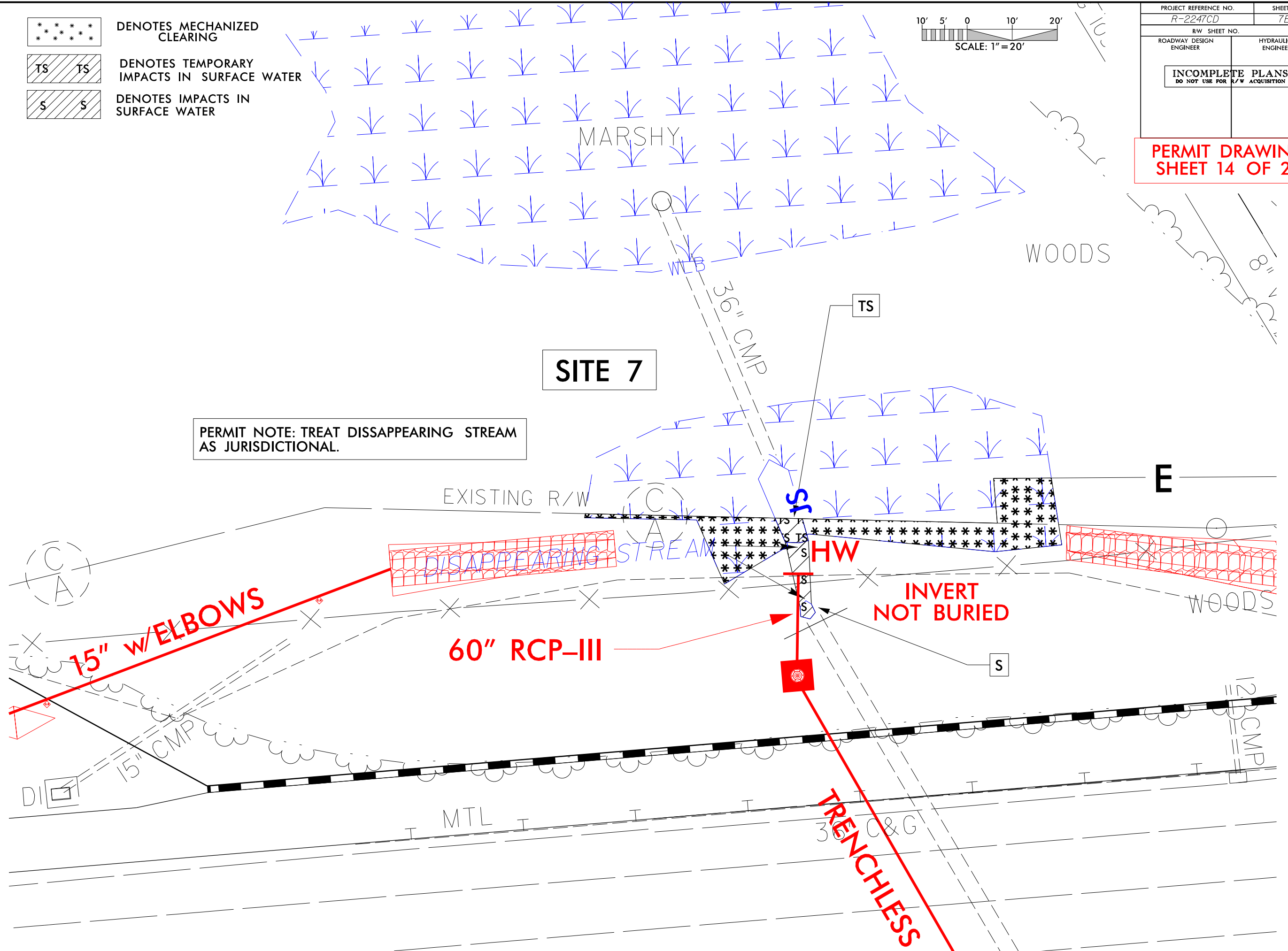


DENOTES IMPACTS IN
SURFACE WATER



PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	7B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

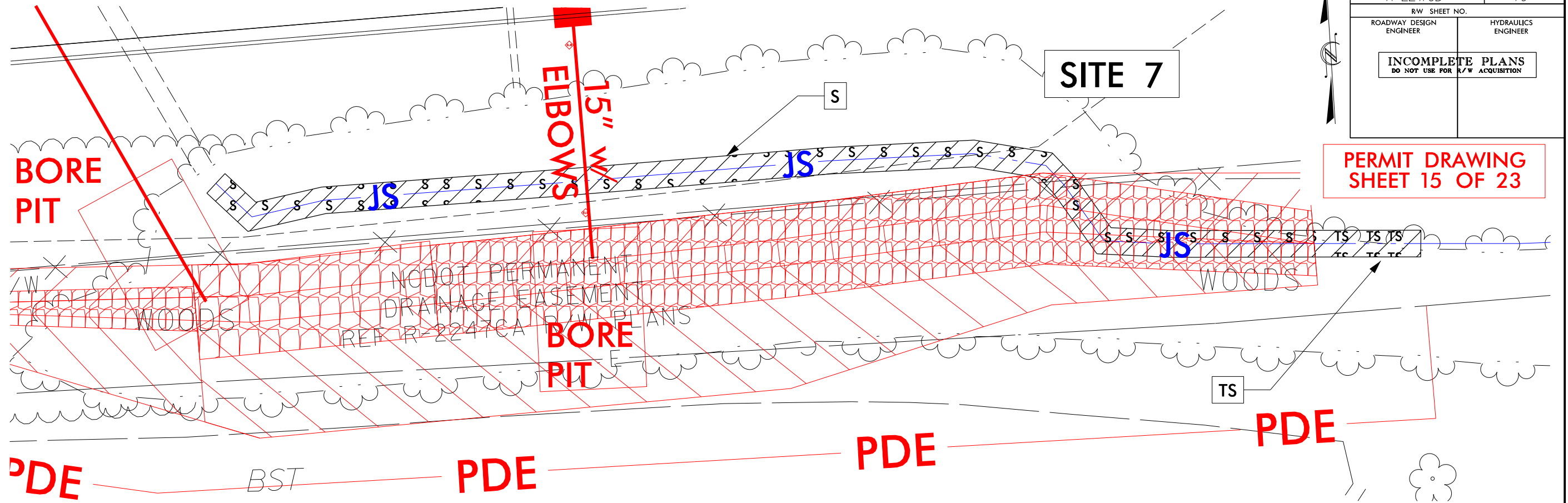
PERMIT DRAWING
SHEET 14 OF 23



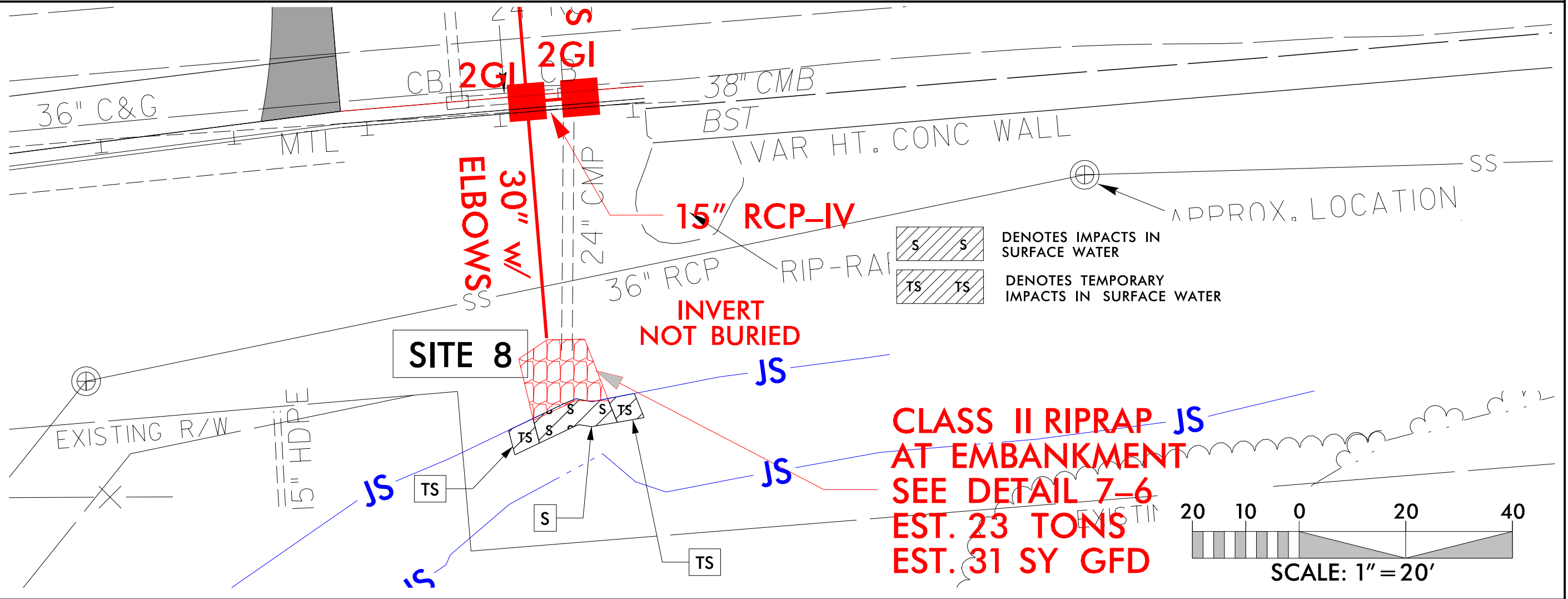
8/17/99

REVISIONS

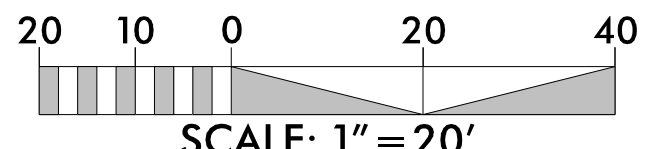
PROJECT REFERENCE NO.	SHEET NO.
R-2247CD	7C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

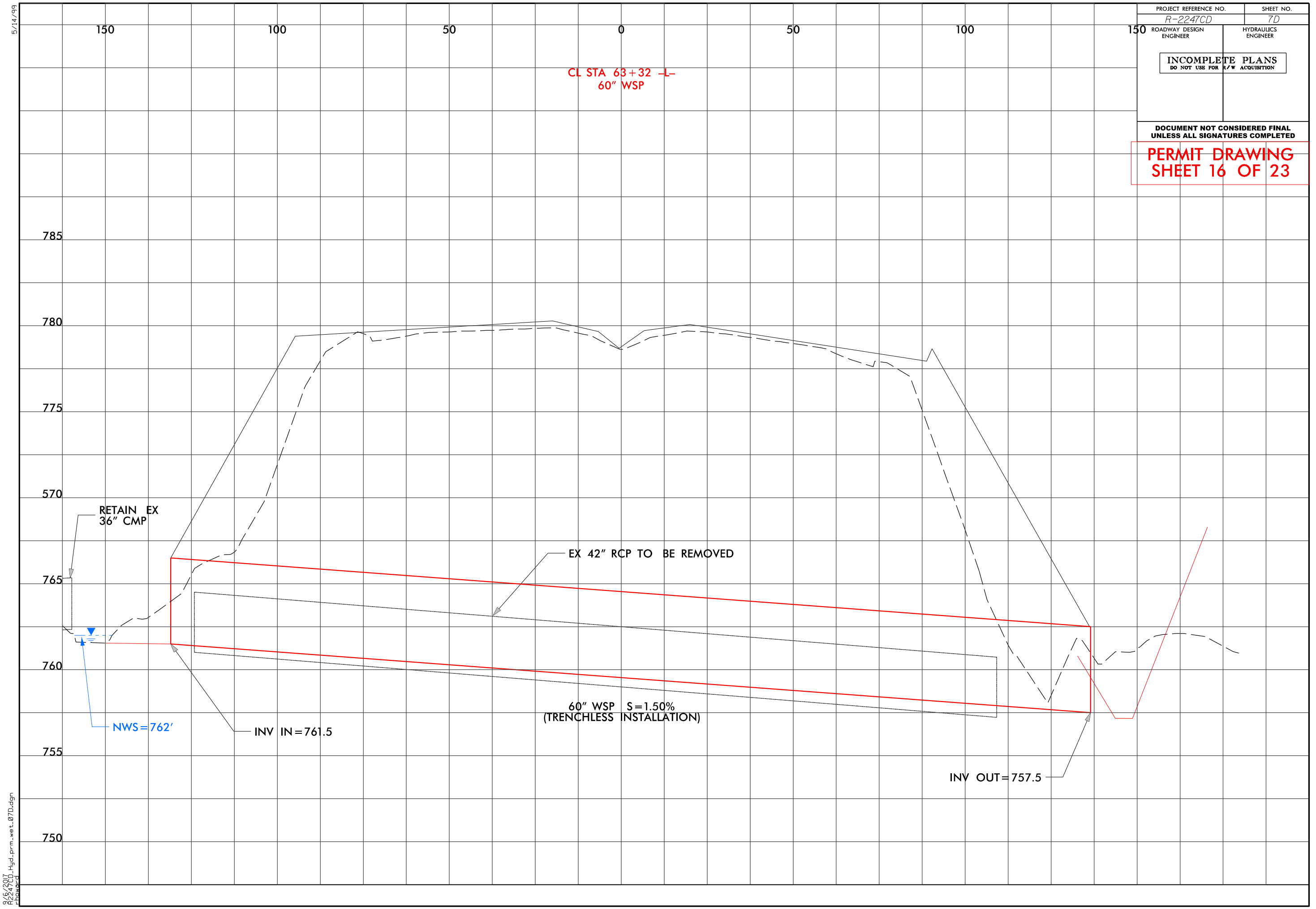


PERMIT DRAWING
SHEET 15 OF 23



CLASS II RIPRAP JS
AT EMBANKMENT
SEE DETAIL 7-6
EST. 23 TONS
EST. 31 SY GFD



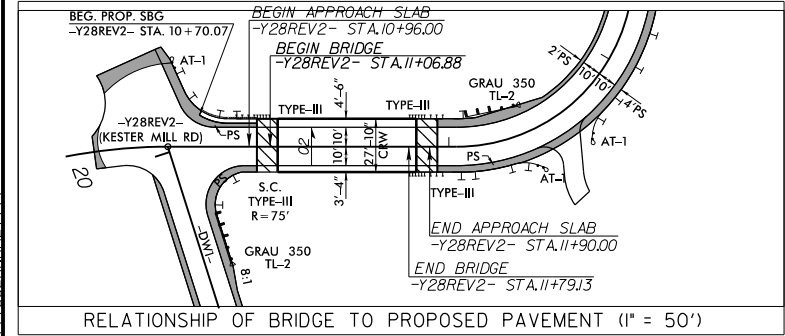
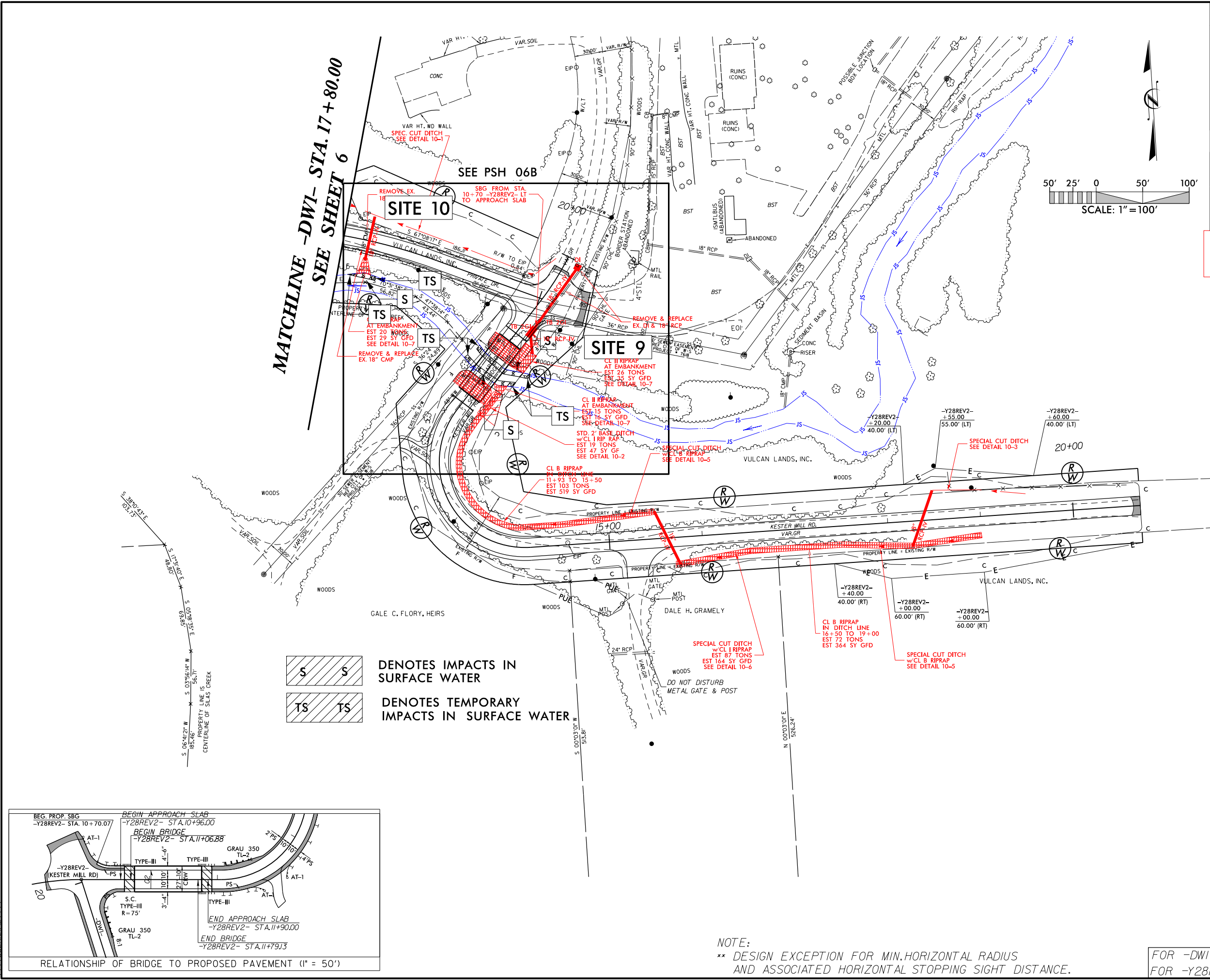


8/14/99
R-2247CD_Hyd_perm_wet_07D.dgn
R-2247CD

6/2/99

PROJECT REFERENCE NO. <i>R-2247CD</i>		SHEET NO. <i>10</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
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 905 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL (919) 855-2245 FAX (919) 855-6258 ENG FIRM LICENSE NO. C-880		

**PERMIT DRAWING
SHEET 17 OF 23**



NOTE:
** DESIGN EXCEPTION FOR MIN. HORIZONTAL RADIUS
AND ASSOCIATED HORIZONTAL STOPPING SIGHT DISTANCE.

FOR -DWI- PROFILE, SEE SHEET 19
FOR -Y28REV2- PROFILE, SEE SHEET 19

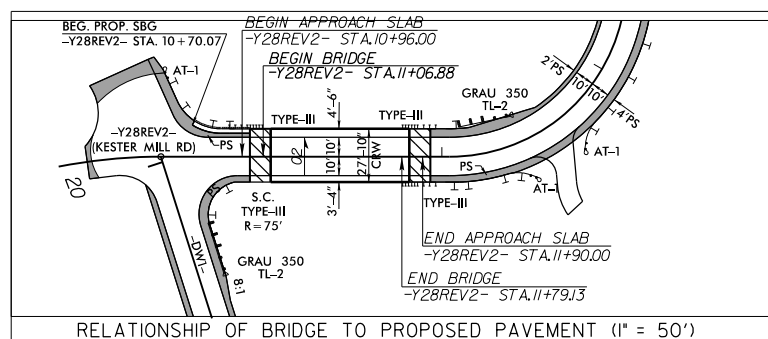
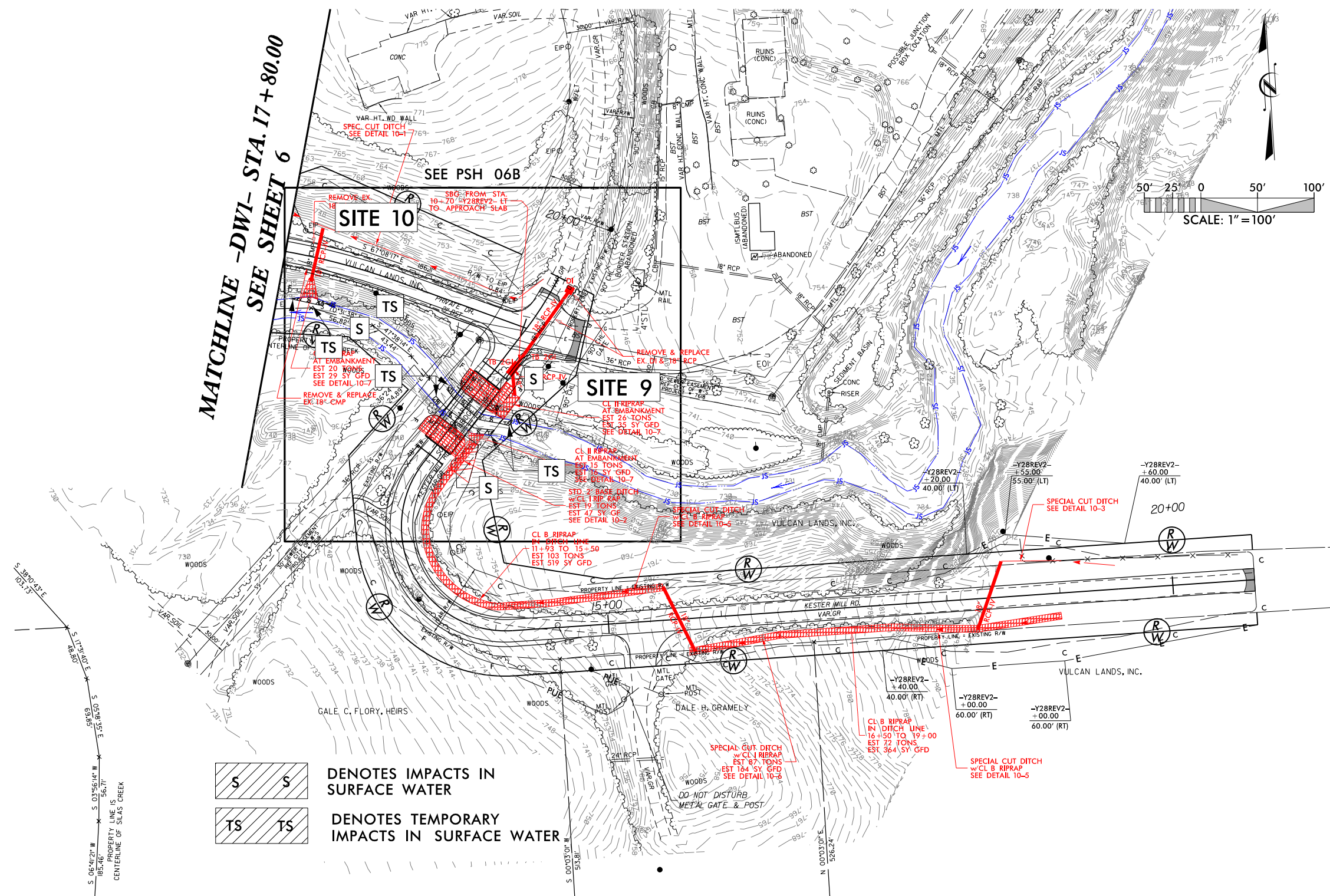
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 Raleigh, NC 27609-6270
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RALEIGH, NORTH CAROLINA 27606
TEL (919) 858-2243 FAX (919) 858-6258
E-MAIL: ASPE@ASPE.ORG WWW: WWW.ASPE.ORG

PERMIT DRAWING
SHEET 18 OF 23



** DESIGN EXCEPTION FOR MIN. HORIZONTAL RADIUS AND ASSOCIATED HORIZONTAL STOPPING SIGHT DISTANCE.

FOR -DWI- PROFILE, SEE SHEET 19
FOR -Y28REV2- PROFILE, SEE SHEET 19



PERMIT DRAWING
SHEET 20 OF 23

BRIDGE HYDRAULIC DATA			
DESIGN DISCHARGE	= 3440	CFS	
DESIGN FREQUENCY	= 25	YRS	
DESIGN HW ELEVATION	= 740.1	FT	
BASE DISCHARGE	= 4550	CFS	
BASE FREQUENCY	= 100	YRS	
BASE HW ELEVATION	= 740.6	FT	
OVERTOPPING DISCHARGE	= 5500	CFS	
OVERTOPPING FREQUENCY	= <500	YRS	
OVERTOPPING ELEVATION	= 741.2	FT	
	=	FT	
DATE OF SURVEY	= 11-23-16		
W.S.ELEVATION AT DATE OF SURVEY	= 729.2	FT	

BEGIN GRADE
-Y28REV2- STA 10+00.00
ELEV = 745.00'
TIE TO EXIST PVI

CL STA 11+47 -Y28REV2
1@70' 24" CORED SLAB W/4' EBC
SKEW=90
CL EL=741.68

BEGIN BRIDGE
-Y28REV2- STA 11+10.88
ELEV = 741.43'

PI= 10+50.00
EL = 741.00'
VC = 100'
K = 11
DS = 15

END BRIDGE
-Y28REV2- STA 11+83.13
ELEV = 741.99'

PI= 13+20.00
EL = 742.89'
VC = 315'
K = 37
DS = 30

EXCAVATE EXISTING FILL
TO EDGE OF CHANNEL
EST 40 CY
(STR. PAY ITEM)

CL 11" RIP RAP
TO TOP OF BERM
SLOPE VARIES 1.5:1 MIN
(STR. PAY ITEM)

NWS AND NWSE ON
11-23-16=729.2

EXISTING BRIDGE
TO BE REMOVED

EXISTING BRIDGE
HAS COLLAPSED

PIPE HYDRAULIC DATA			
18" RCP	Sta. 15+63 -Y28REV2-		
DRAINAGE AREA	= 15	AC	
DESIGN FREQUENCY	= 25	YRS	
DESIGN DISCHARGE	= 5.5	CFS	
DESIGN HW ELEVATION	= 763.1	FT	
100 YEAR DISCHARGE	= 6.1	CFS	
100 YEAR HW ELEVATION	= 763.2	FT	
OVERTOPPING FREQUENCY	= 500	YRS	
OVERTOPPING DISCHARGE	= 18	CFS	
OVERTOPPING ELEVATION	= 766.0	FT	

PIPE HYDRAULIC DATA			
18" RCP	Sta. 18+37 -Y28REV2-		
DRAINAGE AREA	= 0.5	AC	
DESIGN FREQUENCY	= 25	YRS	
DESIGN DISCHARGE	= 1.8	CFS	
DESIGN HW ELEVATION	= 785.4	FT	
100 YEAR DISCHARGE	= 2.0	CFS	
100 YEAR HW ELEVATION	= 875.5	FT	
OVERTOPPING FREQUENCY	= +500	YRS	
OVERTOPPING DISCHARGE	= 18	CFS	
OVERTOPPING ELEVATION	= 789.3	FT	

PIPE HYDRAULIC DATA			
18" RCP	Sta. 18+07 -DWI-		
DRAINAGE AREA	= 2.8	AC	
DESIGN FREQUENCY	= 25	YRS	
DESIGN DISCHARGE	= 7	CFS	
DESIGN HW ELEVATION	= 740.0	FT	
100 YEAR DISCHARGE	= 8	CFS	
100 YEAR HW ELEVATION	= 740.2	FT	
OVERTOPPING FREQUENCY	= +100	YRS	
OVERTOPPING DISCHARGE	= 15	CFS	
OVERTOPPING ELEVATION	= 741.7	FT	

PIPE HYDRAULIC DATA			
54" RCP	Sta. 15+46 -DWI-		
DRAINAGE AREA	= 45	AC	
DESIGN FREQUENCY	= 25	YRS	
DESIGN DISCHARGE	= 110	CFS	
DESIGN HW ELEVATION	= 741.8	FT	
100 YEAR DISCHARGE	= 110	CFS	
100 YEAR HW ELEVATION	= 741.8	FT	
OVERTOPPING FREQUENCY	= +500	YRS	
OVERTOPPING DISCHARGE	= N/A	CFS	
OVERTOPPING ELEVATION	= 744	FT	

PI= 10+55.00
EL = 795.00'
VC = 100'
K = 10
DS = 23

PI= 15+95.00
EL = 743.18'
VC = 380'
K = 41
DS = 32

END RESURFACING
-DWI- STA 20+02.95
ELEV = 741.96

BEGIN GRADE
-DWI- STA 10+00.00
ELEV = 794.42
TIE TO EXIST GRAVEL
DRIVEWAY

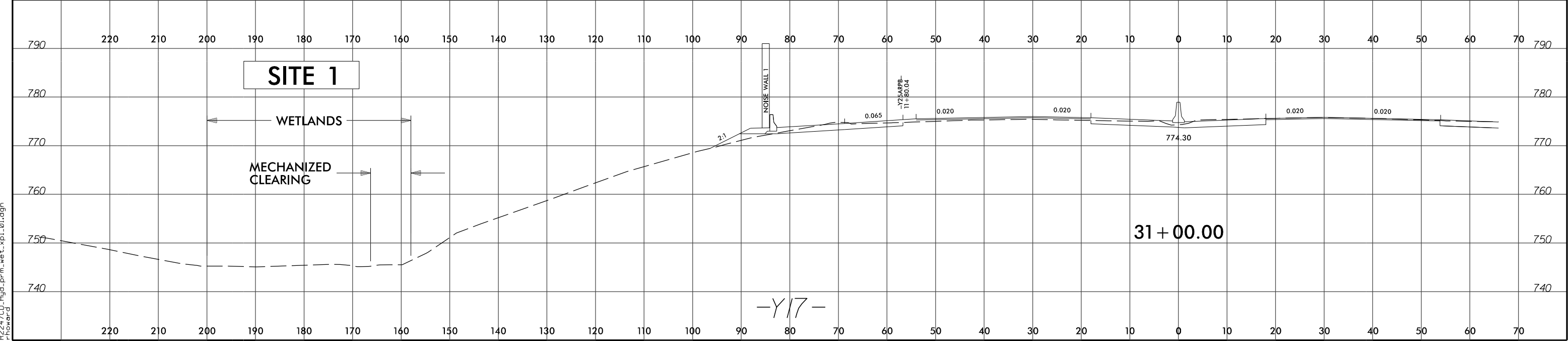
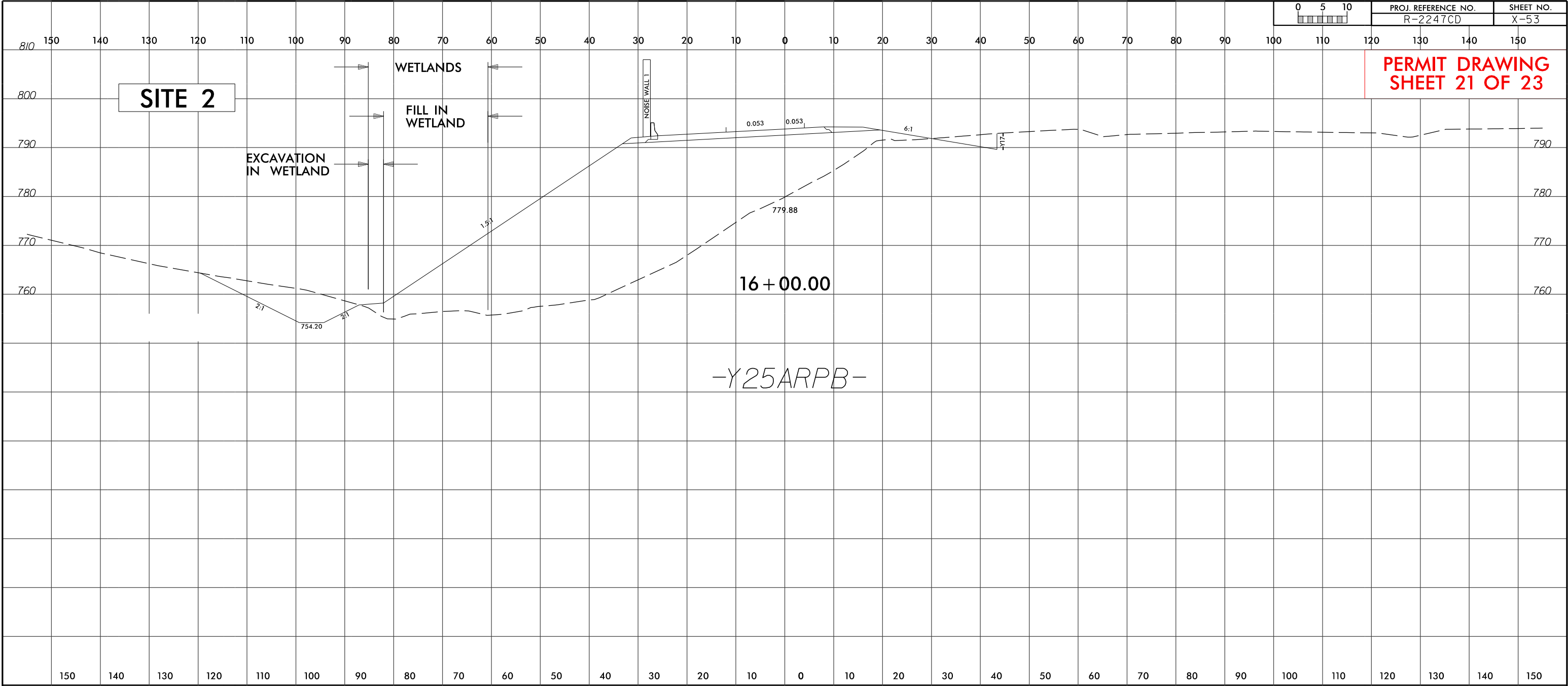
PROPOSED
GRADE

END GRADE
BEGIN RESURFACING
-DWI- STA 15+00.00
ELEV = 753.40

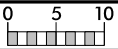
EXISTING
GROUND

PROPOSED
GRADE

8/23/99



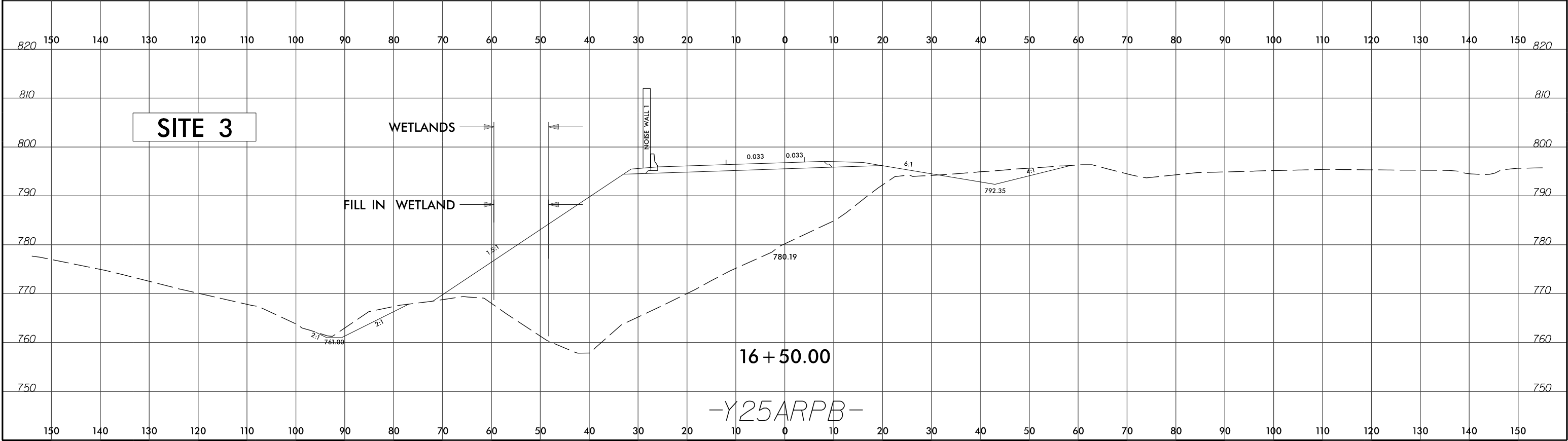
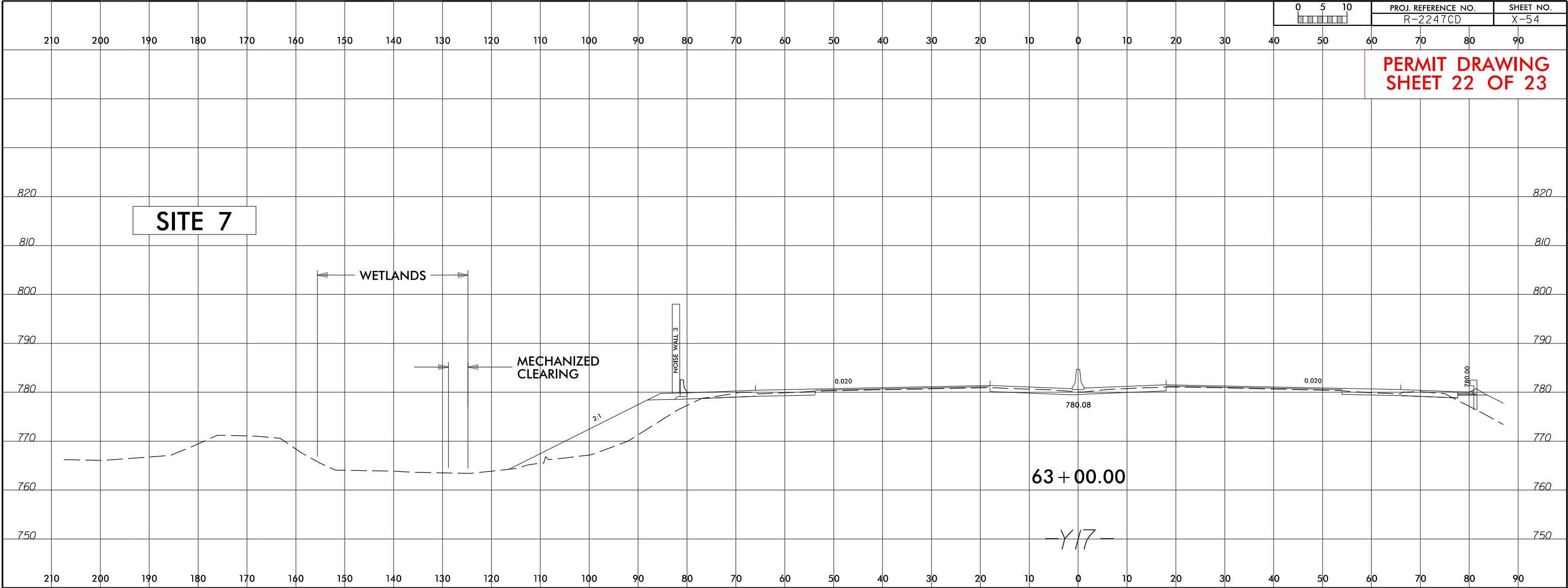
8/23/99



PROJ. REFERENCE NO.
R-2247CD

SHEET NO.
X-54

PERMIT DRAWING
SHEET 22 OF 23

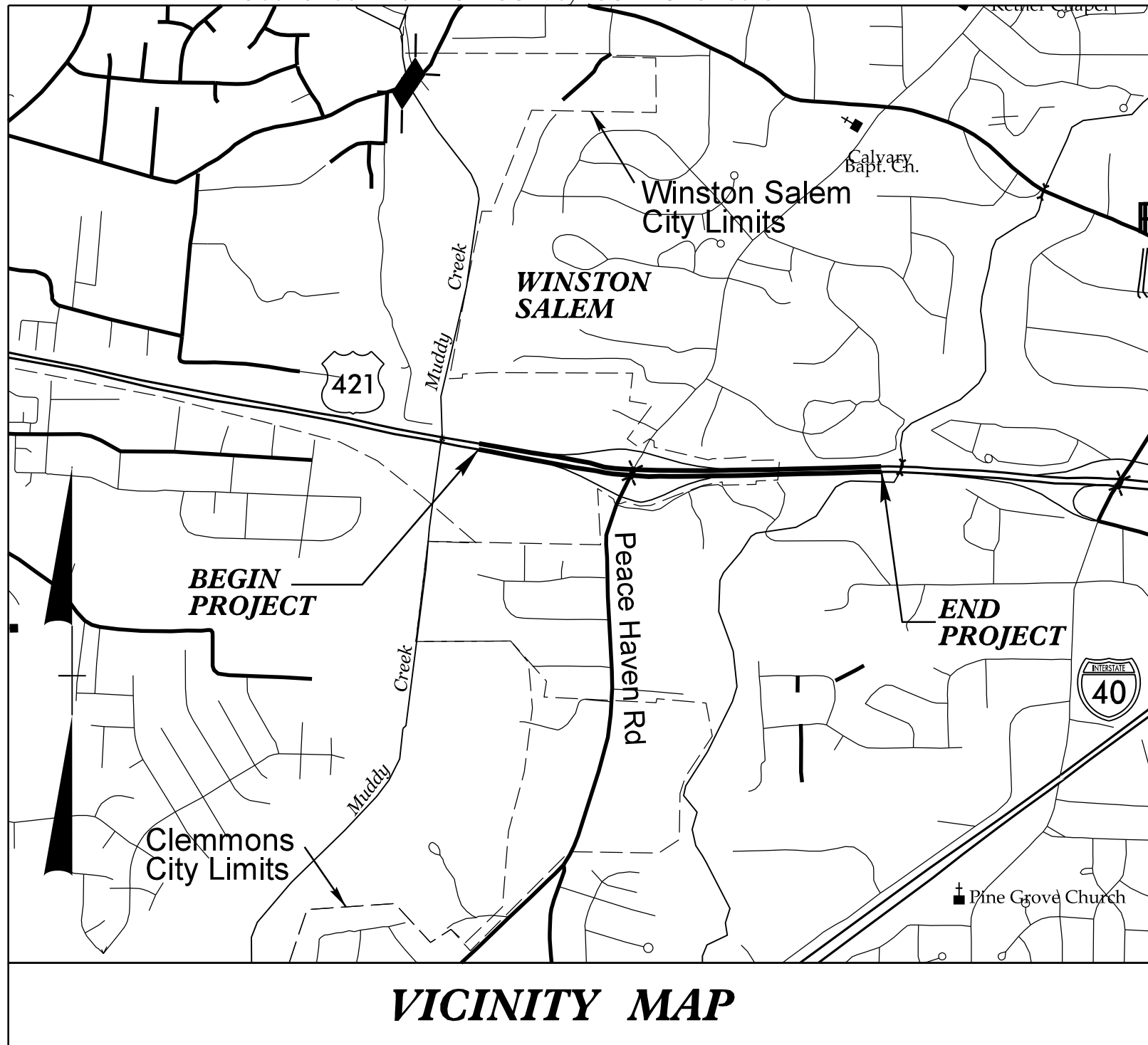


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\$\$\$\$\$USERNAME\$\$\$\$\$

TIP PROJECT: R-2247CD

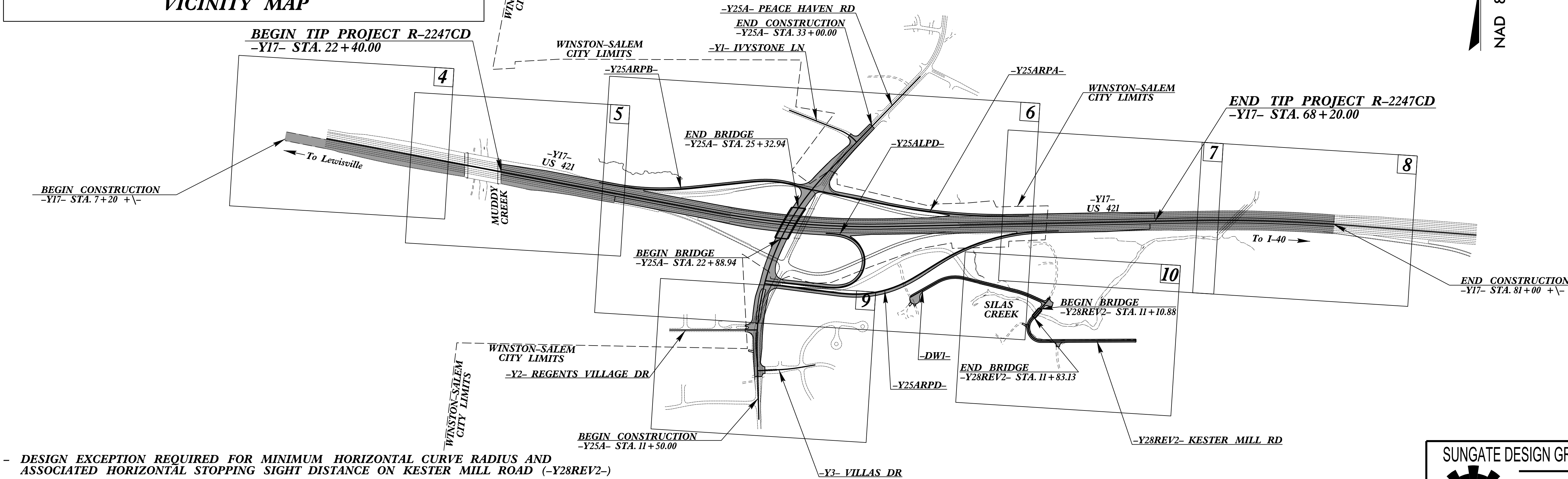
CONTRACT: C203840

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C For Survey Control Sheets



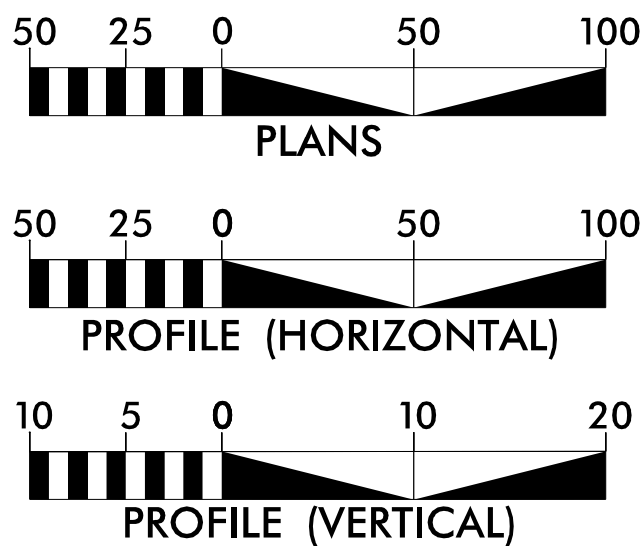
VICINITY MAP

RIGHT-OF-WAY PLANS



- DESIGN EXCEPTION REQUIRED FOR MINIMUM HORIZONTAL CURVE RADIUS AND ASSOCIATED HORIZONTAL STOPPING SIGHT DISTANCE ON KESTER MILL ROAD (-Y28REV2-)
- CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
- THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES
- A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF WINSTON-SALEM

GRAPHIC SCALES



DESIGN DATA

ADT 2016 = 57,065
ADT 2036 = 77,735
DHV = 10 %
D = 65 %
T = 7 % *
V = 70 MPH
* (TTST = 4% + DUAL 3%)
FUNC CLASS = FREEWAY

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2247CD = .867 MI.
TOTAL LENGTH TIP PROJECT R-2247CD = .867 MI.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

LOCATION: WINSTON-SALEM NORTHERN BELTWAY - MODIFICATION OF
THE US 421/SR 1891 (PEACE HAVEN ROAD) INTERCHANGE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, GUARDRAIL,
STRUCTURES, SIGNING, SIGNALS, NOISE WALLS
AND RETAINING WALL

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2247CD	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34409.3.23	NHP-0421(088)	P.E.	
34409.3.23	NHP-0421(088)	R/W & UTIL.	
34409.3.23	NHP-0421(088)	CONST.	

NAD 83 (CORS 96)

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
KCI Associates of N.C., P.A.
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266
<http://www.kci.com>

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 15, 2016

LETTING DATE:
NOVEMBER 15, 2016

NCDOT CONTACT:

K. ZAK HAMIDI, PE
PROJECT ENGINEER - DESIGN BUILD UNIT

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

CHARLES L. FLOWE, P.E.
PROJECT ENGINEER

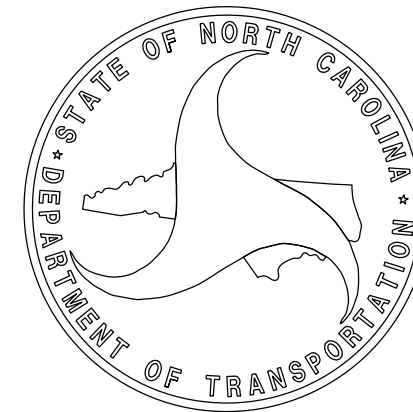
BARRY C. SMITH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.



STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Computed Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	
Sign	
Well	
Small Mine	
Foundation	
Area Outline	
Cemetery	
Building	
School	
Church	
Dam	

HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	
Primary Horiz Control Point	
Primary Horiz and Vert Control Point	
Exist Permanent Easment Pin and Cap	
New Permanent Easement Pin and Cap	
Vertical Benchmark	
Existing Right of Way Marker	
Existing Right of Way Line	
New Right of Way Line	
New Right of Way Line with Pin and Cap	
New Right of Way Line with Concrete or Granite R/W Marker	
New Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
New Control of Access	
Existing Easement Line	
New Temporary Construction Easement	
New Temporary Drainage Easement	
New Permanent Drainage Easement	
New Permanent Drainage /Utility Easement	
New Permanent Utility Easement	
New Temporary Utility Easement	
New Aerial Utility Easement	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

VEGETATION:

Single Tree	
Single Shrub	

*S.U.E. = Subsurface Utility Engineering

Hedge	
Woods Line	
Orchard	
Vineyard	

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

UTILITIES:

POWER:	
Existing Power Pole	
Proposed Power Pole	
Existing Joint Use Pole	
Proposed Joint Use Pole	
Power Manhole	
Power Line Tower	
Power Transformer	
U/G Power Cable Hand Hole	
H-Frame Pole	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

GAS:

Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

SANITARY SEWER:

Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

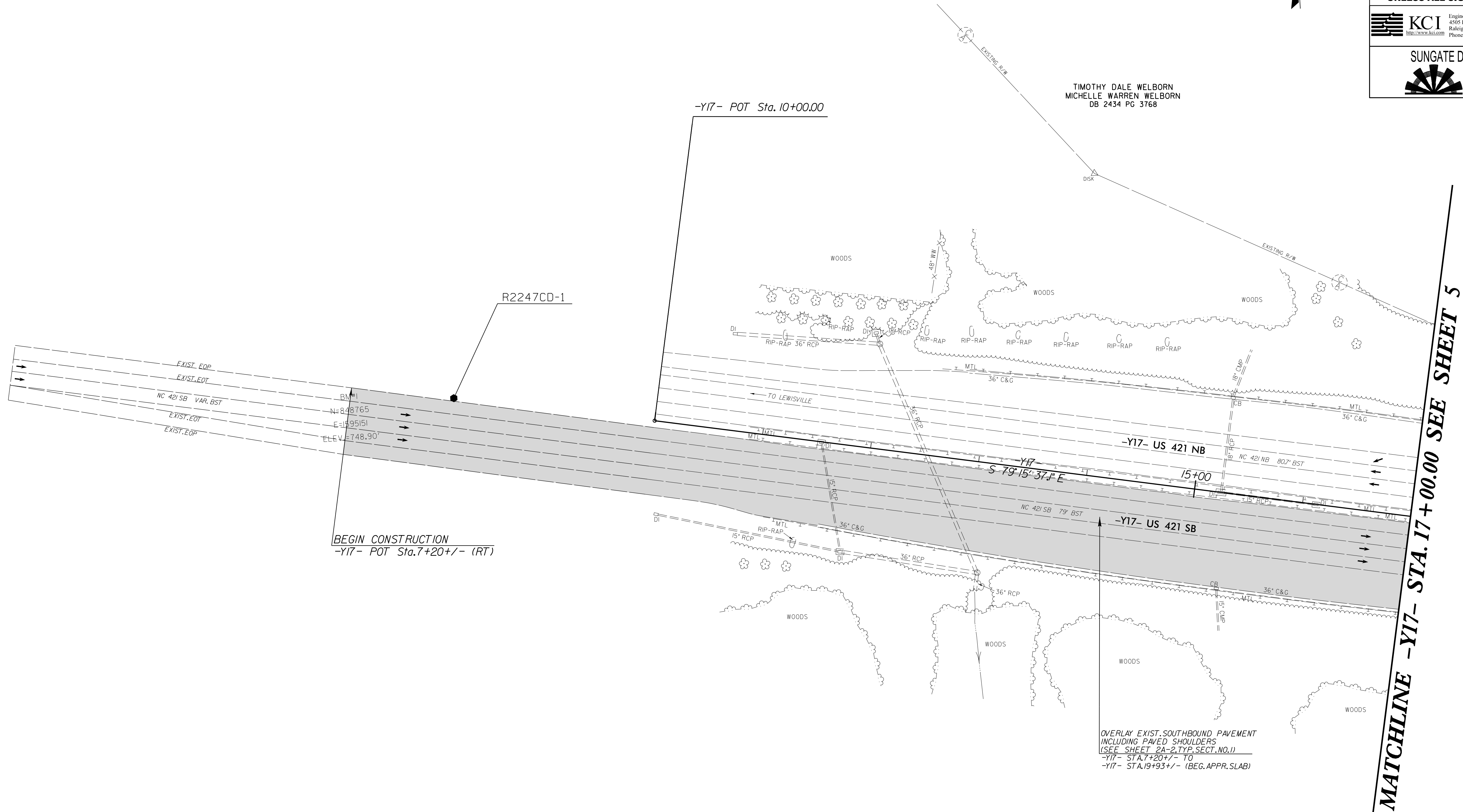
MISCELLANEOUS:

Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	
U/G Tank; Water, Gas, Oil	
Underground Storage Tank, Approx. Loc.	
A/G Tank; Water, Gas, Oil	
Geoenvironmental Boring	
U/G Test Hole LOS A (S.U.E.*)	
Abandoned According to Utility Records	
End of Information	

6/2/99

28 SEP 2017 17:23
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PROJECT REFERENCE NO.		SHEET NO.
R-2247CD		4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
	KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266 http://www.kci.com	
SUNGATE DESIGN GROUP, P.A.  905 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL (919) 850-2243 ENG FIRM LICENSE NO. C-890		





RICHARD F. ALSPAUGH
DB 1939 PG 947
BEGIN TIP PROJECT R-2247CD
-Y17- POT Sta. 22+40.00

$$\frac{-Y_{25ARP} - ST \text{ Sta. } 10+00.00 =}{-Y_{17} - POT \text{ Sta. } 29+20.00, 05 = 54' LT}$$

IVYSTONE HOMEOWNERS ASSOCIATION
OF FORSYTH COUNTY, INC.
DB 2273 PG 341
PB 44 PG 186

OVERLAY EXIST. SOUTHBOUND PAVEMENT
INCLUDING PAVED SHOULDERS
(SEE SHEET 2A-2, TYP. SECT. NO. 1)
-Y17- STA. 7+20 +/- TO
-Y17- STA. 19+93 +/- (BEG. APPR. SLAB)

BEG.DOUBLE FACED CONC.
MEDIAN BARRIER (TYPE T)
-Y17- STA.23+22.00

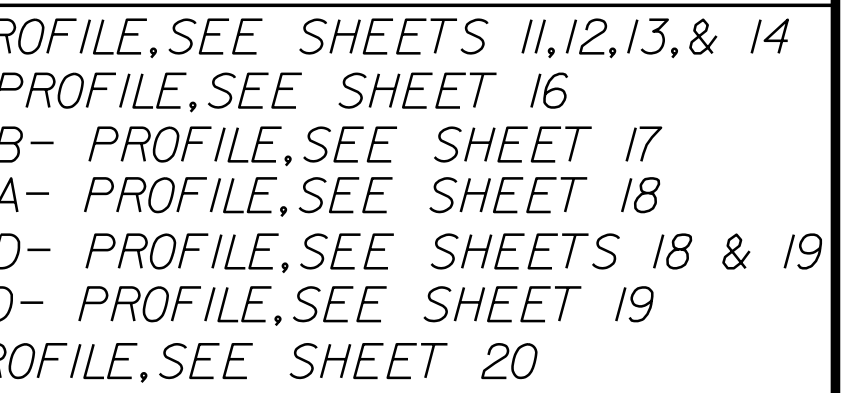
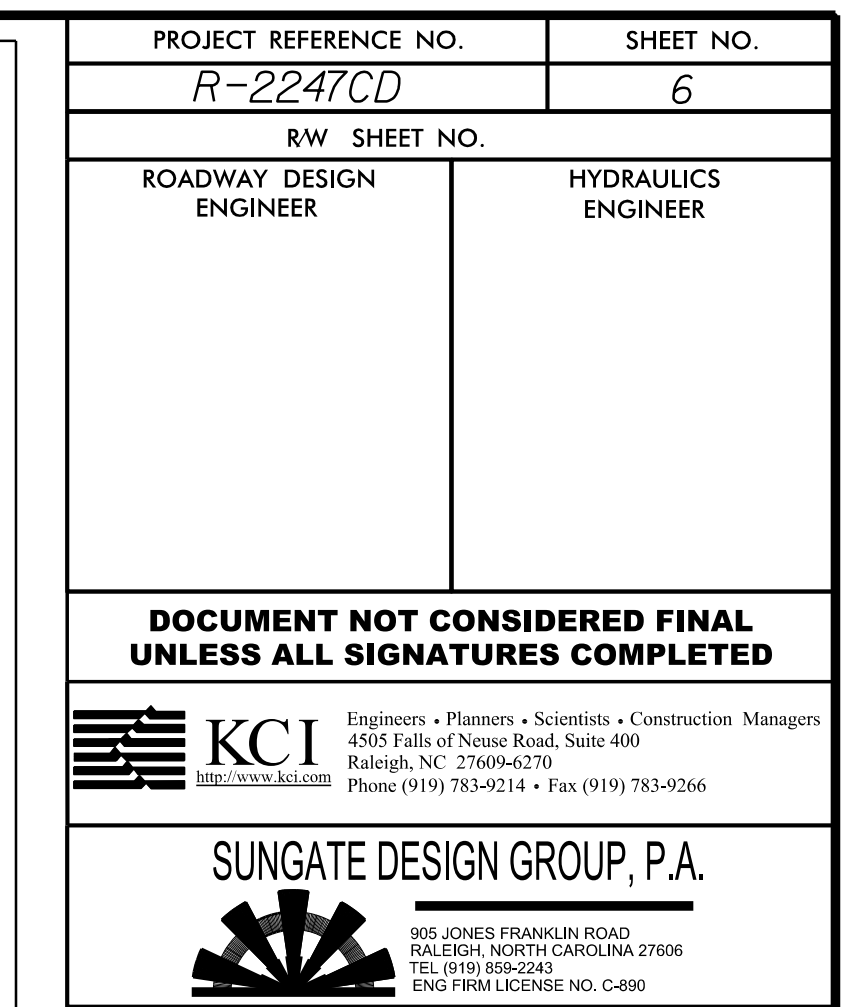
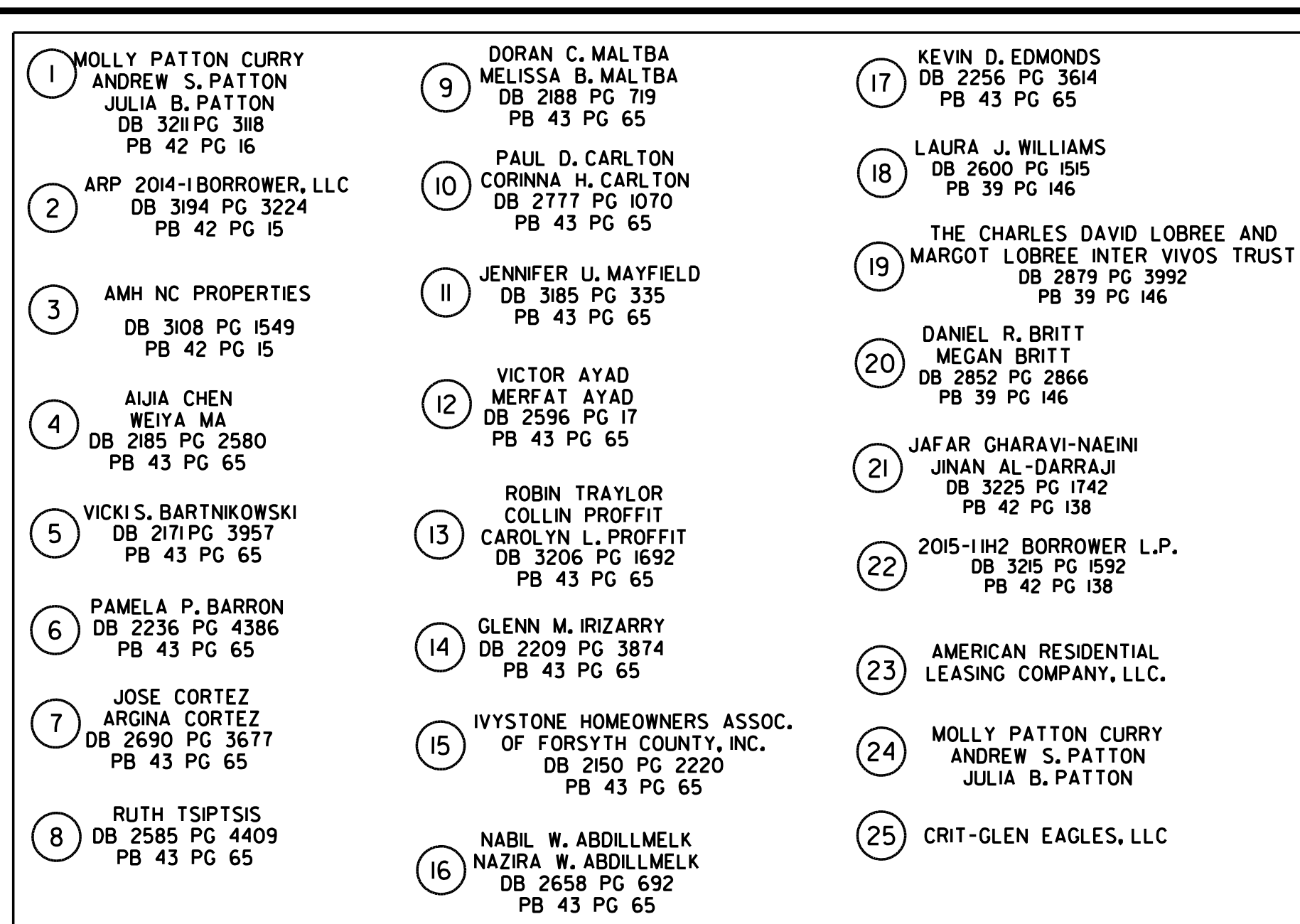
OVERLAY EXIST. SOUTHBOUND PAVEMENT
INCLUDING OUTSIDE PAVED SHOULDER
(SEE SHEET 2A-2, TYP. SECT. NO. 2)
-Y17- STA. 22+38 +/- (END APPR. SLAB)
TO -Y17- STA. 30+50.00

ARP 2014-1BORROWER, LLC
DB 3194 PG 3224
PB 42 PG 16

AMERICAN RESIDENTIAL
LEASING COMPANY, LLC

REGENTS VILLAGE HOMEOWNERS
ASSOCIATION
DB 2475 PG 397I
PB 42 PG 15-17

FOR -Y17- PROFILE,SEE SHEETS 11 & 13
FOR -Y25ARPB- PROFILE,SEE SHEET 17
FOR DRAINAGE DETAILS,SEE SHEETS 2D-1 TO 2D-3
FOR NOISE WALL DETAILS,SEE SHEETS 2N-1 TO 2N-2 AND 2N-6 TO 2N-7



PROJECT REFERENCE NO.		SHEET NO.	
R-2247CD		7	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED  KCI http://www.kci.com Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-9270 Phone (919) 783-9214 • Fax (919) 783-9266			
SUNGATE DESIGN GROUP, P.A.  956 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606 TEL (919) 859-2443 ENG FIRM LICENSE NO. C-880			



FOR -Y17- PROFILE,SEE SHEETS 12,14,& 15 FOR -Y25ARPA- PROFILE,SEE SHEET 18 FOR -Y25ARPD- PROFILE,SEE SHEET 18 FOR NOISE WALL DETAILS,SEE SHEETS 2N-4 TO 2N-5 FOR DRAINAGE DETAILS,SEE SHEETS 2D-1TO 2D-3
--



CRIT-GLEN EAGLES, LLC
DB 2377 PG 3528
PB 41PG 105

FMA, LLC
DB 2639 PG 289

END DOUBLE FACED
CONC.MED.BARRIER
BEG.CONC.MED.TRANSITION
-Y17- STA.77+63.75

-Y17- CS Sta. 79+95.26

-Y17- ST Sta. 82+95.24

1

END OVERLAY (SB & NB) &
END FULL DEPTH PAVED
MEDIAN SHOULDER
-Y17- POS Sta. 80+70 +/-

END CONSTRUCTION
-Y17- POS Sta. 81+00+/-

-Y17- US 421 NB
MEDIAN V DITCH
SEE DETAIL 8-3

-Y17- US 421 SB

VULCAN LANDS, INC.
DB 1661 PG 708

LOWDER RECYCLING & DISPOSAL
DB 2121PG 1488
PB 53 PG 94

SALEM CREEK
PROPERTIES, LLC
DB 2699 PG 2158

HUBBARD REALTY
OF WINSTON-SALEM, INC.
DB 1709 PG 1331
DB 1559 PG 1597

DONALD D. BOLES
DB 703 PG 164

EDWIN LEE BOLES
DB 1637 PG 919
DB 1561 PG 1108

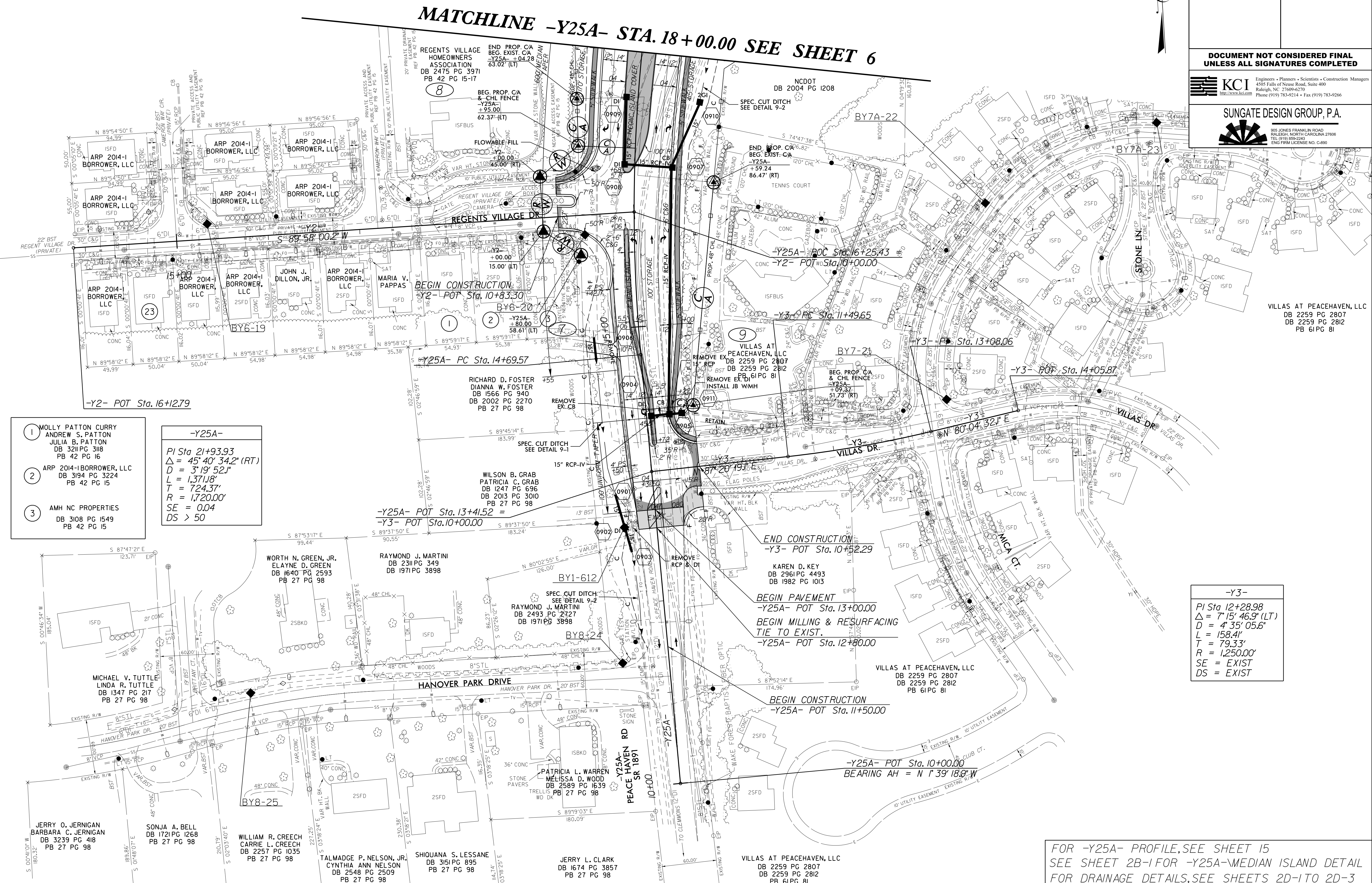
EDWIN LEE BOLES
LARRY E. BOLES
DB 830 PG 502

-Y17-	
<i>PI Sta 75+15.85</i>	<i>Pls Sta 80+95.26</i>
$\Delta = 4^{\circ} 47' 48.8'' (RT)$	$\Theta_s = 0^{\circ} 44' 59.8''$
$D = 0^{\circ} 30' 00.0''$	$L_s = 299.98'$
$L = 959.38'$	$LT = 199.99'$
$T = 479.97'$	$ST = 99.99'$
$R = 11,459.6'$	
$SE = EXIST$	
$DS = EXIST$	

FOR -Y17- PROFILE, SEE SHEETS 13 & 15

6/2/2019 10:23:22 R2247 WS-R-2247CD\Roadway\Proj\N2247CD_Rdy_psh_09.dgn

PROJECT REFERENCE NO. R-2247CD		SHEET NO. 9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
 KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266		
 SUNGATE DESIGN GROUP, P.A. 905 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL (919) 669-2283 ENG FIRM LICENSE NO. C-890		

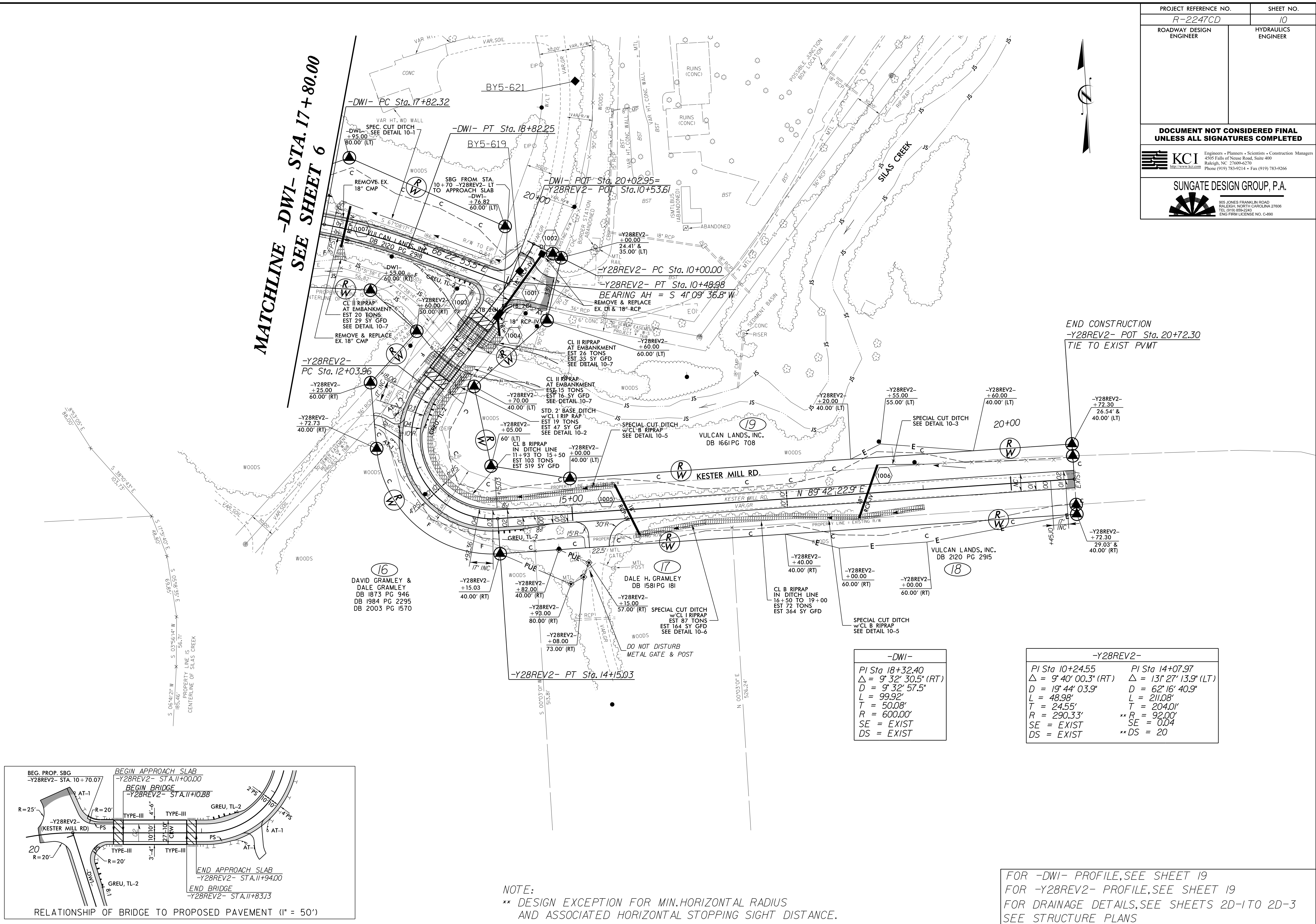


FOR -Y25A- PROFILE, SEE SHEET 15
SEE SHEET 2B-1 FOR -Y25A-MEDIAN ISLAND DETAIL
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-3

6/2/2009

28 SEP 2017 17:23
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PROJECT REFERENCE NO. R-2247CD		SHEET NO. 10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
 KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266 http://www.kci.com		
 SUNGATE DESIGN GROUP, P.A. 905 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27608 TEL (919) 659-2343 ENG FIRM LICENSE NO. C-890		



(16)
DAVID GRAMLEY &
DALE GRAMLEY
DB 1873 PG 946
DB 1984 PG 2295
DB 2003 PG 1570

(17)
DALE H. GRAMLEY
DB 1581 PG 181

(18)
VULCAN LANDS, INC.
DB 2120 PG 2915

-DWI-	
PI Sta 18+32.40	
Δ = 9° 32' 30.5" (RT)	
D = 9° 32' 57.5"	
L = 99.92'	
T = 50.08'	
R = 600.00'	
SE = EXIST	
DS = EXIST	

-Y28REV2-	
PI Sta 10+24.55	PI Sta 14+07.97
Δ = 9° 40' 00.3" (RT)	Δ = 13° 27' 13.9" (LT)
D = 19° 44' 03.9"	D = 62° 16' 40.9"
L = 48.98'	L = 211.08'
T = 24.55'	T = 204.01'
R = 290.33'	** R = 92.00'
SE = EXIST	SE = 0.04
DS = EXIST	** DS = 20



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element: 34409.3.23 TIP No.: R-2247EC County(ies): Forsyth Page 1 of 1

General Project Information

WBS Element:		34409.3.23	TIP Number:		R-2247EC	Project Type:		Roadway Widening	Date:		8/28/2017
NCDOT Contact:		Craig Lee, PE				Contractor / Designer:		Brad T. Smith, EI			
	Address:		NCDOT Design Build Unit 1595 Mail Service Center Raleigh, NC 27699-1595					Address:		Sungate Design Group, PA 905 Jones Franklin Road Raleigh, NC 27606	
	Phone:		(919) 707-6708					Phone:		(919) 859-2243	
	Email:		clee@ncdot.gov					Email:		bsmith@sungatedesign.com	
City/Town:		Winston-Salem				County(ies):		Forsyth			
River Basin(s):		Yadkin-Pee Dee				CAMA County?		No			
Wetlands within Project Limits?		Yes									

Project Description

Project Length (lin. miles or feet):	1.042 miles	Surrounding Land Use:	Medium density residential, business, and industrial					
	Proposed Project			Existing Site				
Project Built-Up Area (ac.)	21.8	ac.	14.1				ac.	
Typical Cross Section Description:	Y62 (NC 65): One 14' travel lane and one 12' travel lane in each direction with 2'-6" curb and gutter drainage, sidewalk, and a concrete island.			Y62 (NC 65): Two 12' travel lanes with grass shoulders and grass roadway ditches, both sides.				
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	79,300	Year:	2035	Existing:	61,700	Year:	2015
General Project Narrative: (Description of Minimization of Water Quality Impacts)	The R-2247EC project involves US 52 and Bethania-Rural Hall Road Interchange improvements for the future Winston-Salem Northern Beltway along with other improvements to adjacent roadways, including realignments. Due to the steep geophraphy of the site, achieving treatment through the use of grass swales is not practicable. Riprap dissipation has been incorporated at drainage pipe outlets and outfalls, where applicable. Proposed cross pipes in jurisdictional streams will not be buried in order to prevent channel degradation as agreed upon during the merger process due to the steep grade of existing streams. Stormwater basins are not used due to the regrading and ramp reconfiguration that will occur on site with the future section EB that will follow this project.							

Waterbody Information

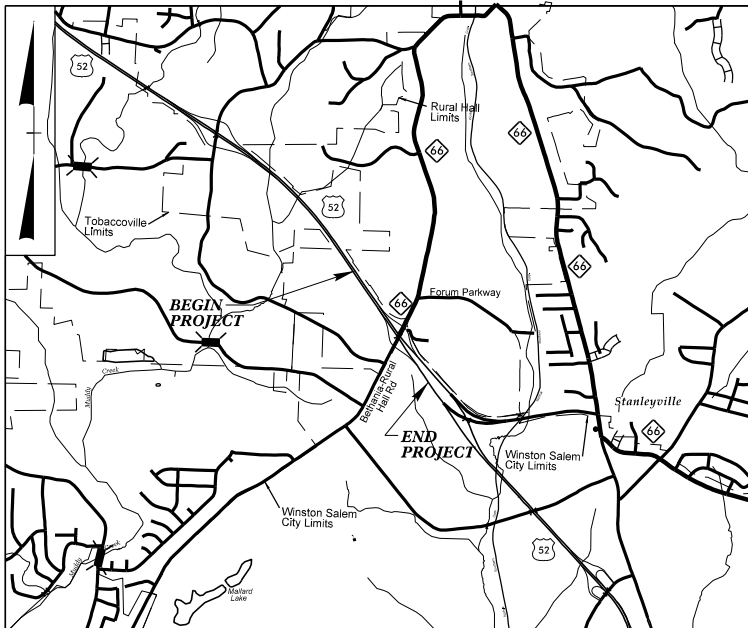
Surface Water Body (1):		Grassy Creek and unnamed tributaries		NCDWR Stream Index No.:		12-94-7-3					
NCDWR Surface Water Classification for Water Body			Primary Classification:		Class C						
			Supplemental Classification:		None						
Other Stream Classification:		None									
Impairments:		None									
Aquatic T&E Species?		No		Comments:							
NRTR Stream ID:		N/A				Buffer Rules in Effect:		N/A			
Project Includes Bridge Spanning Water Body?		No		Deck Drains Discharge Over Buffer?		N/A		Dissipator Pads Provided in Buffer?		N/A	
Deck Drains Discharge Over Water Body?		No		(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)											

09/08/19

TIP PROJECT: R-2247EC

CONTRACT: C203840

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C For Survey Control Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

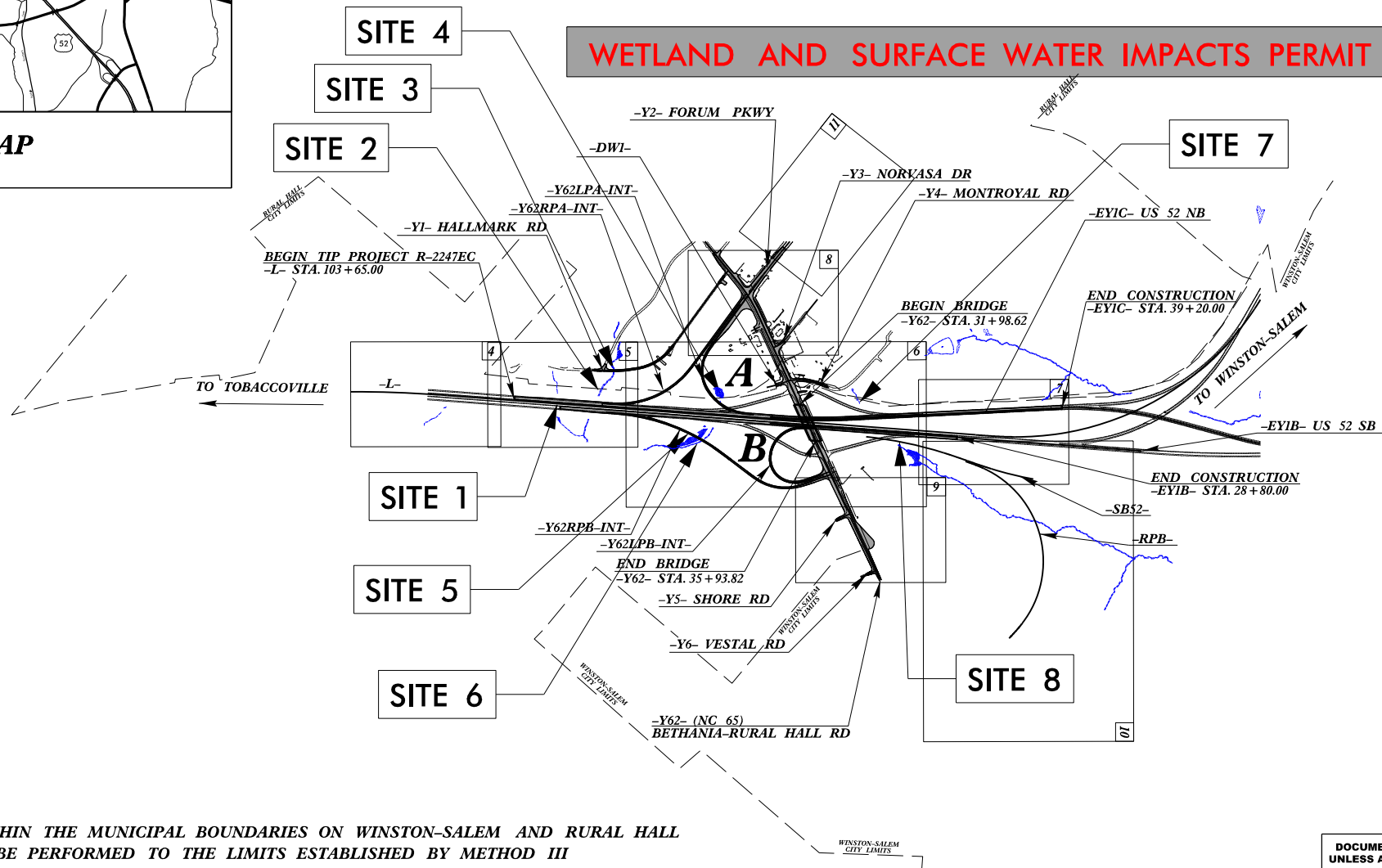
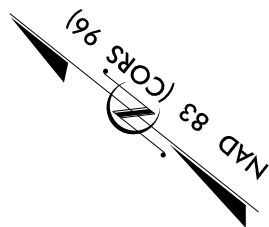
FORSYTH COUNTY

**LOCATION: WINSTON-SALEM NORTHERN BELTWAY - MODIFICATION OF
THE US 52 (FUTURE I-74) /NC 65 (BETHANIA HALL ROAD)
INTERCHANGE**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, GUARDRAIL, CABLE
GUIDERAIL, STRUCTURES, SIGNING, SIGNALS
AND NOISE WALLS**

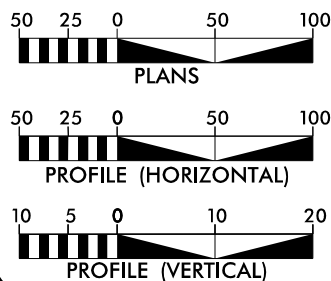
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2247EC	1	
STATE PROJ.NO.		F.A. PROJ.NO.	DESCRIPTION
34409.3.23	NHP-0421(088)	P.E.	
34409.3.23	NHP-0421(088)	R/W & UTIL.	
34409.3.23	NHP-0421(088)	CONST.	
RIGHT OF WAY PLANS			
SUBMITTAL NO.: S-033		DATE: 09/14/17	

**PERMIT DRAWING
SHEET 1 OF 21**



- A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES ON WINSTON-SALEM AND RURAL HALL
- CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
- THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 61,700
ADT 2035 = 79,300
DHV = 10 %
D = 60 %
T = 21 % *
V = 70 MPH
* TTST =14 DUAL 7
FUNC CLASS = FREEWAY

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2247EC = 1.042 MI.
TOTAL LENGTH TIP PROJECT R-2247EC = 1.042 MI.

Prepared In the Office of:
KCI Associates of N.C., P.A.
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 15, 2016

LETTING DATE:
NOVEMBER 15, 2016

NCDOT CONTACT: K. ZAK HAMIDI, P.E.
PROJECT ENGINEER - DESIGN BUILD UNIT

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

CHARLES L. FLOWE, P.E.
PROJECT ENGINEER

BRYAN E. HOUGH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

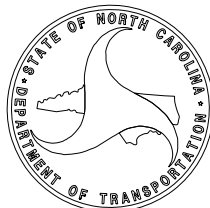
**ROADWAY DESIGN
ENGINEER**

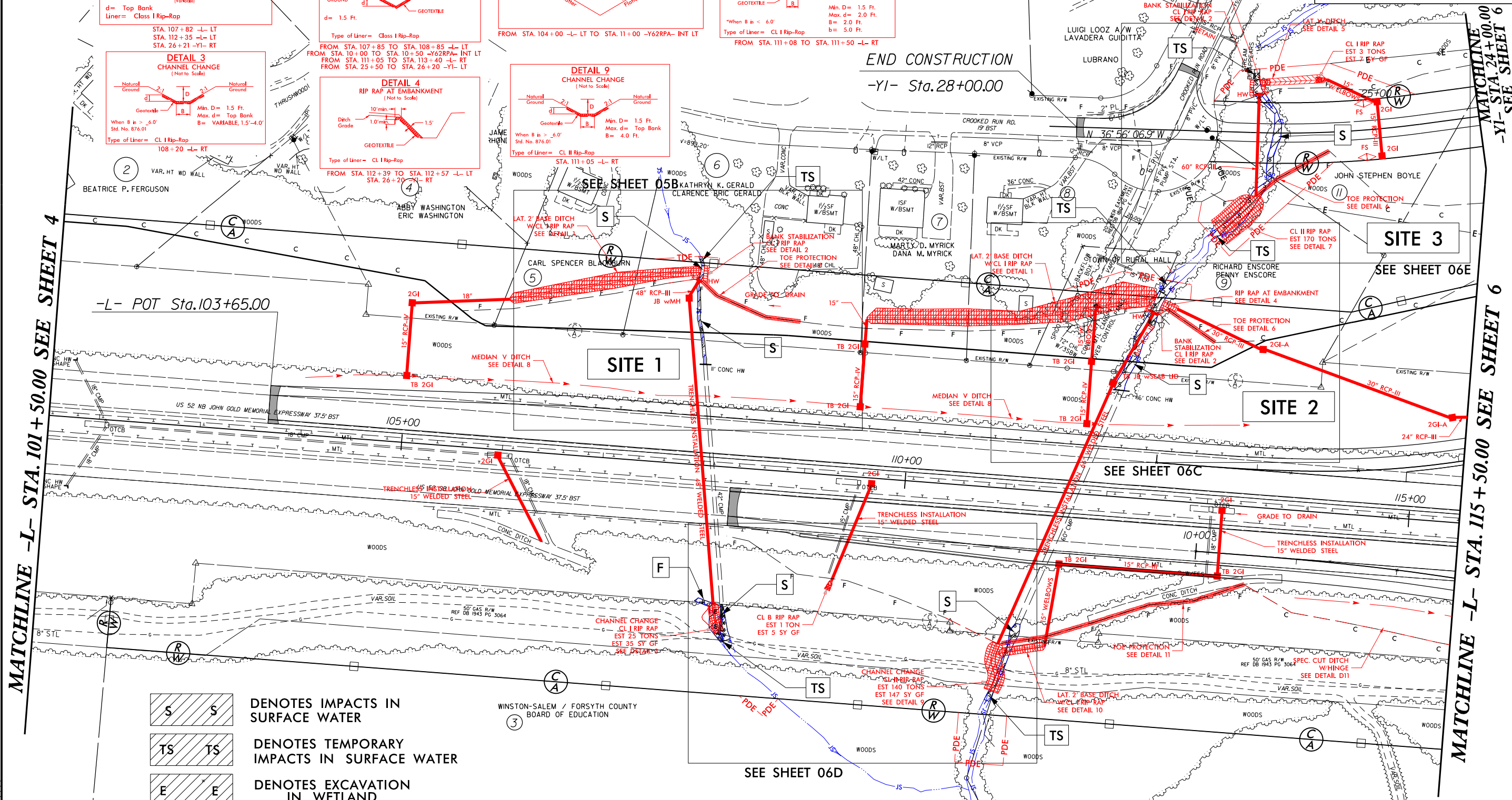
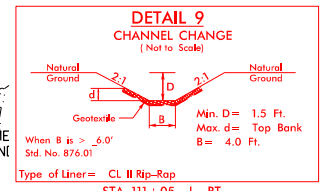
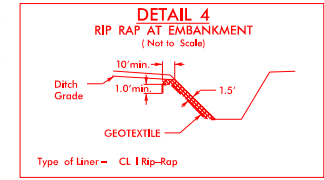
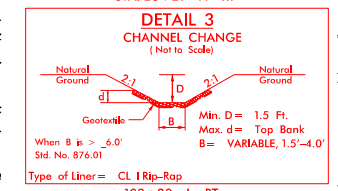
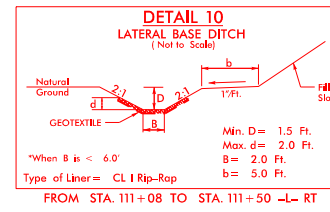
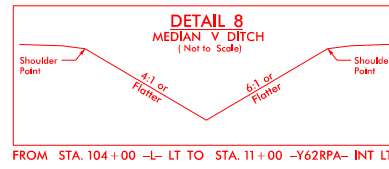
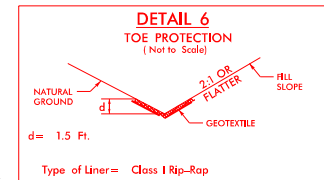
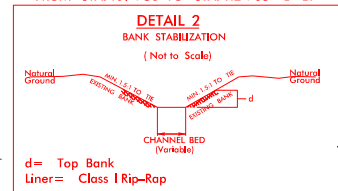
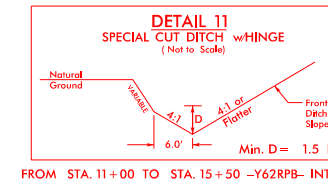
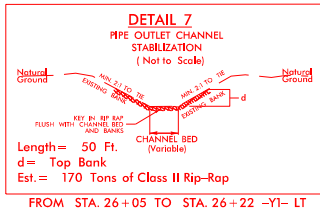
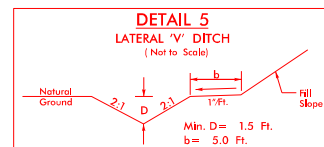
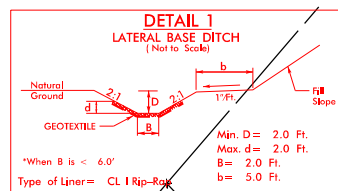
SIGNATURE: _____ P.E.

SUNGATE DESIGN GROUP, P.A.



905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890





A rectangular block with diagonal hatching (lines from top-left to bottom-right). Inside the block, there are two 'S' labels, one on the left and one on the right.

DENOTES IMPACTS IN
SURFACE WATER

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

A rectangular region with diagonal hatching. It contains two bold capital letters 'E' and a small asterisk '*' in the upper right area.

DENOTES EXCAVATION
IN WETLAND



DENOTES MECHANIZED
CLEARING

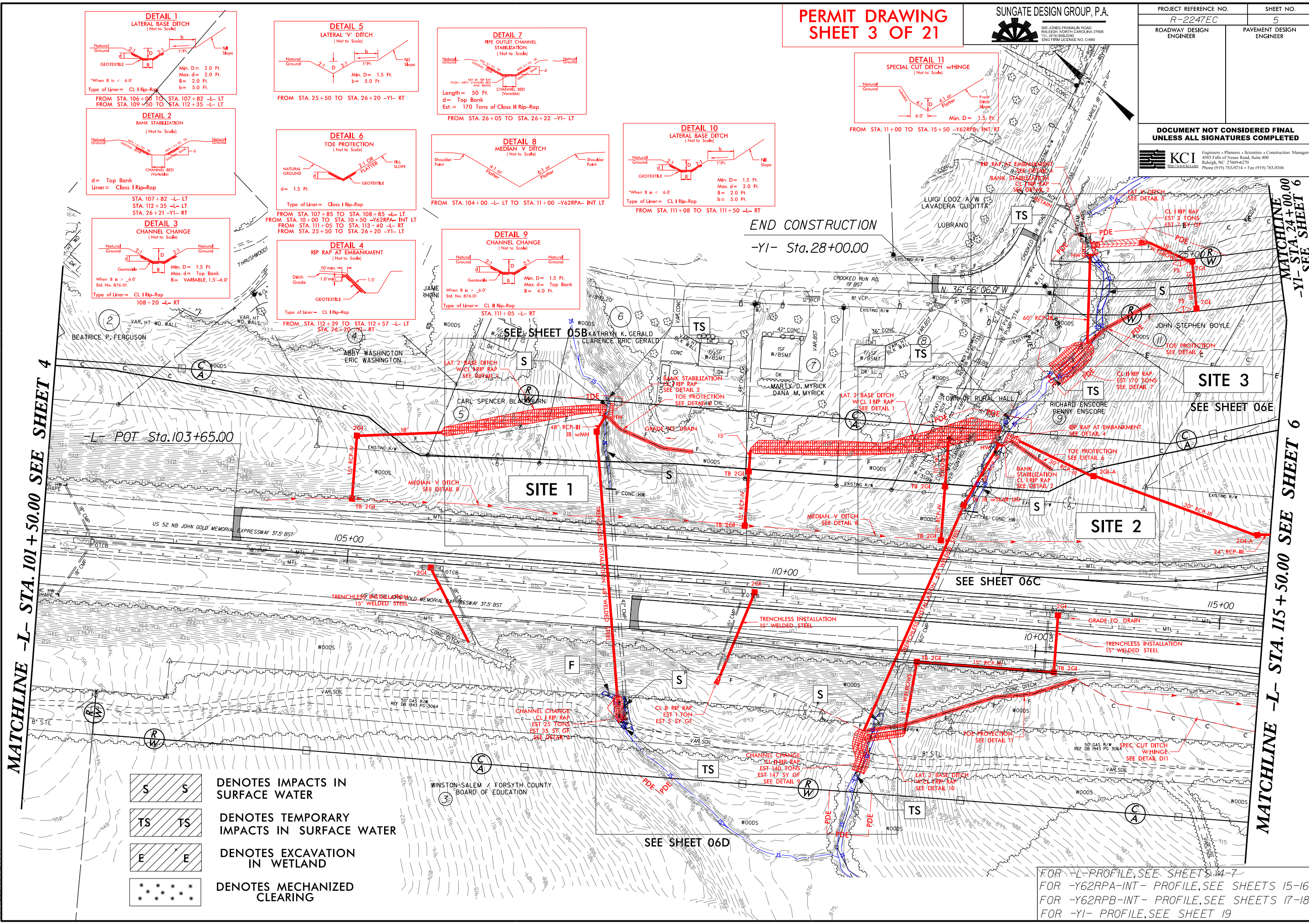
FOR -L-PROFILE, SEE SHEETS 14-7
FOR -Y62RPA-INT- PROFILE, SEE SHEETS 15-16
FOR -Y62RPB-INT- PROFILE, SEE SHEETS 17-18
FOR -YI- PROFILE, SEE SHEET 19

6/2/99

PERMIT DRAWING
SHEET 3 OF 21

SUNGATE DESIGN GROUP, P.A.
885 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 884-2400
FAX (919) 884-2401
E-MAIL: SDC@SUNGATEDESIGN.COM
C-880

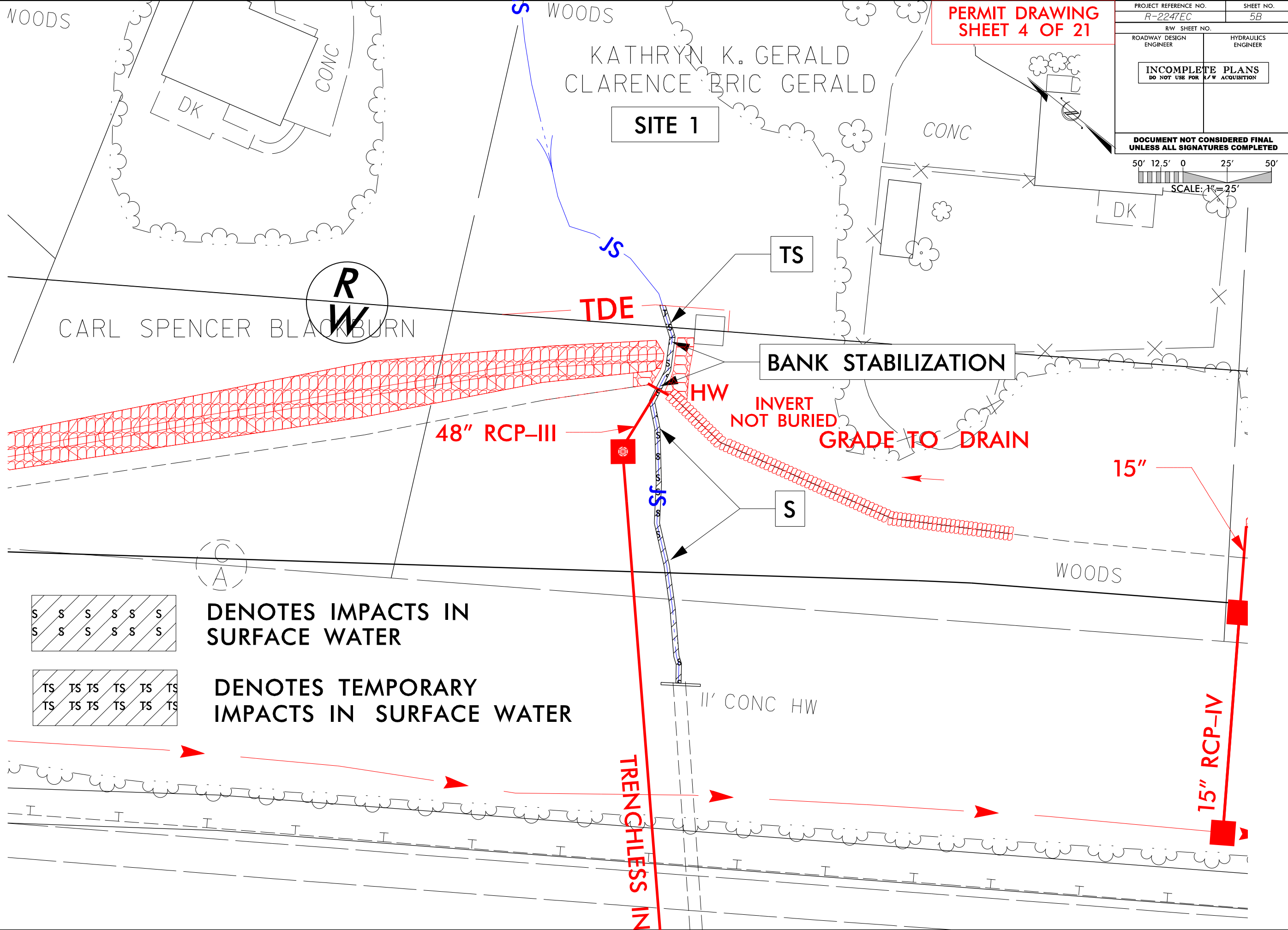
PROJECT REFERENCE NO.	SHEET NO.
R-2247EC	5
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
KCI Engineers • Planners • Scientists • Construction Managers 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609-6270 Phone (919) 783-9214 • Fax (919) 783-9266	



8/17/99

REVISIONS

SYTIME\$\$\$\$\$
\$\$\$\$\$CHH\$\$\$\$\$



PERMIT DRAWING
SHEET 4 OF 21

PROJECT REFERENCE NO. R-2247EC		SHEET NO. 5B	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
50' 12.5' 0 25' 50'			
SCALE: 1"=25'			

PERMIT DRAWING
SHEET 6 OF 21

TRENCHLESS INSTALLATION

50' 12.5' 0 25' 50'

SCALE: 1" = 25'

SITE 1

SITE 2

INVERT NOT BURIED

INVERT NOT BURIED

DENOTES EXCAVATION
IN WETLAND

DENOTES FILL IN WETLAND

DENOTES MECHANIZED
CLEARING

DENOTES IMPACTS IN
SURFACE WATER

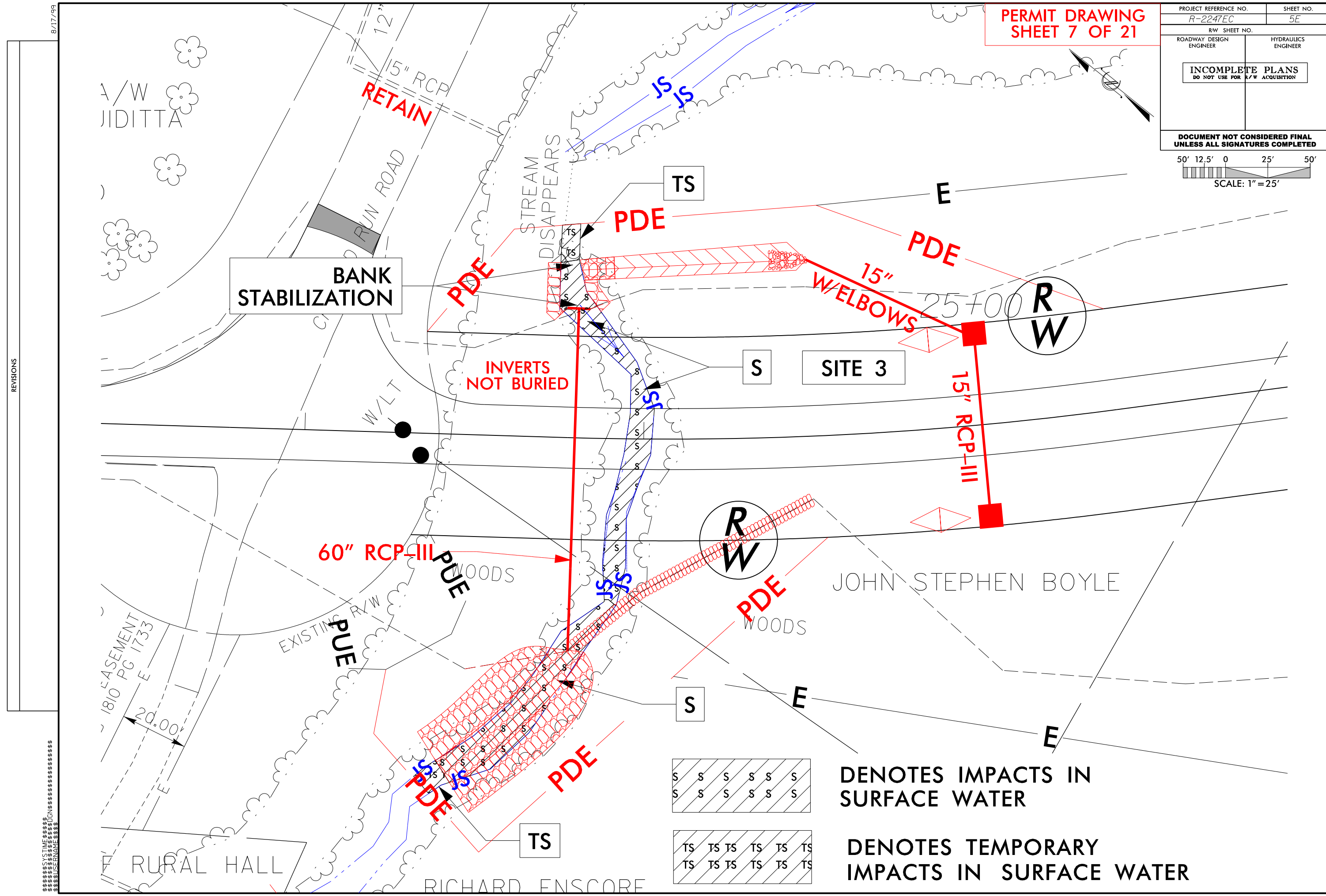
DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

WOODS

WOODS

REVISIONS

8/17/99



5/28/99

SUNGATE DESIGN GROUP P.A.



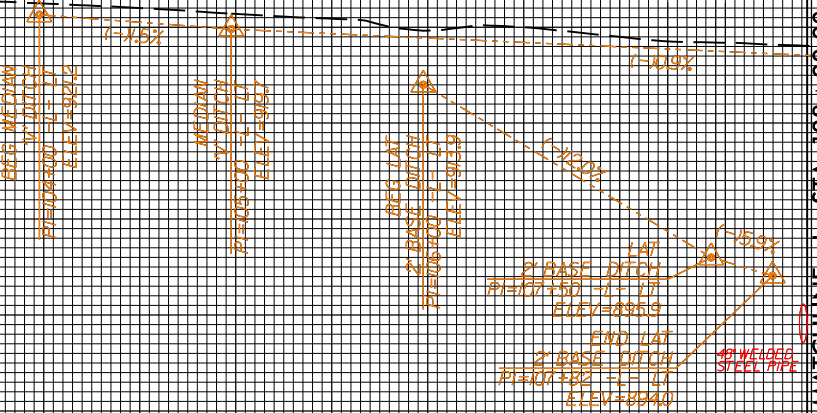
2000 South Highway Road
Kalamazoo, Michigan 49001-1000
Tel: (269) 326-1000
Fax: (269) 326-1001

PROJECT REFERENCE NO. R-2247EC		SHEET NO. 12
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
 KCI		Engineers, Planners, Architects, Construction Managers 1000 East State Street, Suite 200 Kalamazoo, MI 49001-1000 Phone: (269) 326-1000 • Fax: (269) 326-1001

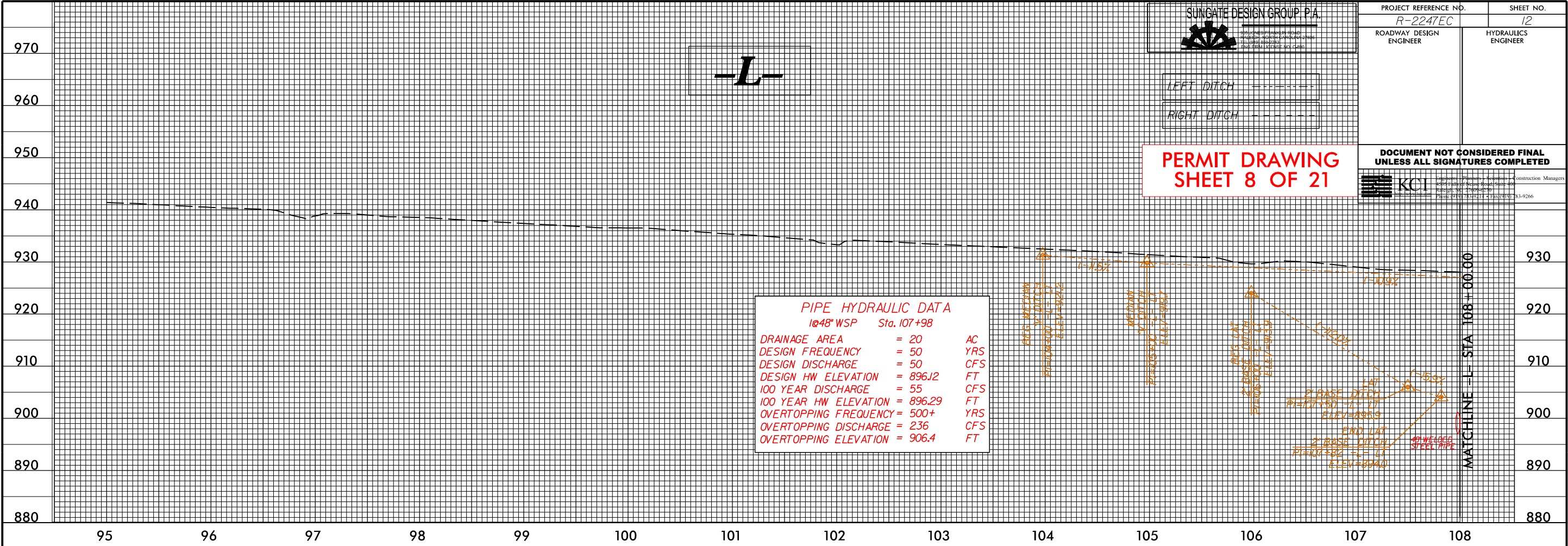
PERMIT DRAWING
SHEET 8 OF 21

PIPE HYDRAULIC DATA
1048" WSP Sta. 107+98

DRAINAGE AREA	= 20	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 50	CFS
DESIGN HW ELEVATION	= 896.12	FT
100 YEAR DISCHARGE	= 55	CFS
100 YEAR HW ELEVATION	= 896.29	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 236	CFS
OVERTOPPING ELEVATION	= 906.4	FT



MATCHLINE -L- STA 108+00.00



-L-

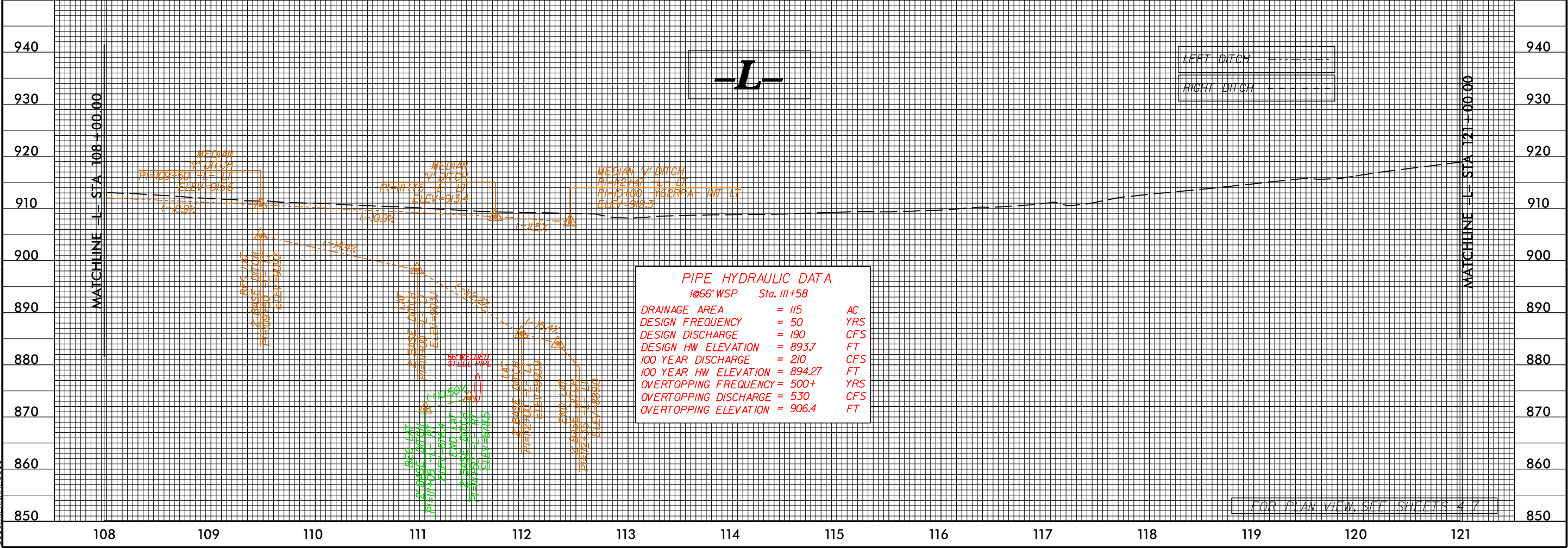
LEFT DITCH
RIGHT DITCH

PIPE HYDRAULIC DATA
1066" WSP Sta. 111+58

DRAINAGE AREA	= 115	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 190	CFS
DESIGN HW ELEVATION	= 893.7	FT
100 YEAR DISCHARGE	= 210	CFS
100 YEAR HW ELEVATION	= 894.27	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 530	CFS
OVERTOPPING ELEVATION	= 906.4	FT

MATCHLINE -L- STA 108+00.00

MATCHLINE -L- STA 121+00.00



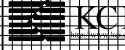
FOR PLAN VIEW, SEE SHEETS 4-7

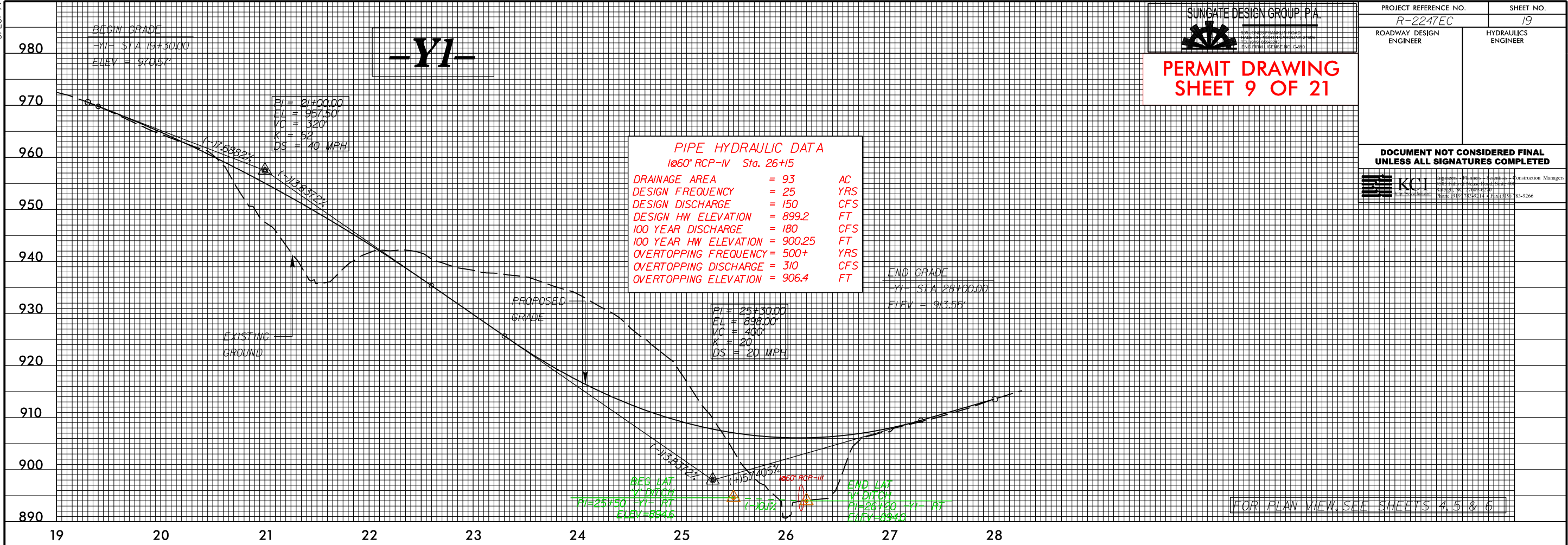
5/28/99

SUNGATE DESIGN GROUP, P.A.
2000 Highway 100, Suite 100
Kalamazoo, MI 49001
Phone: 268-1234 Fax: 268-5678

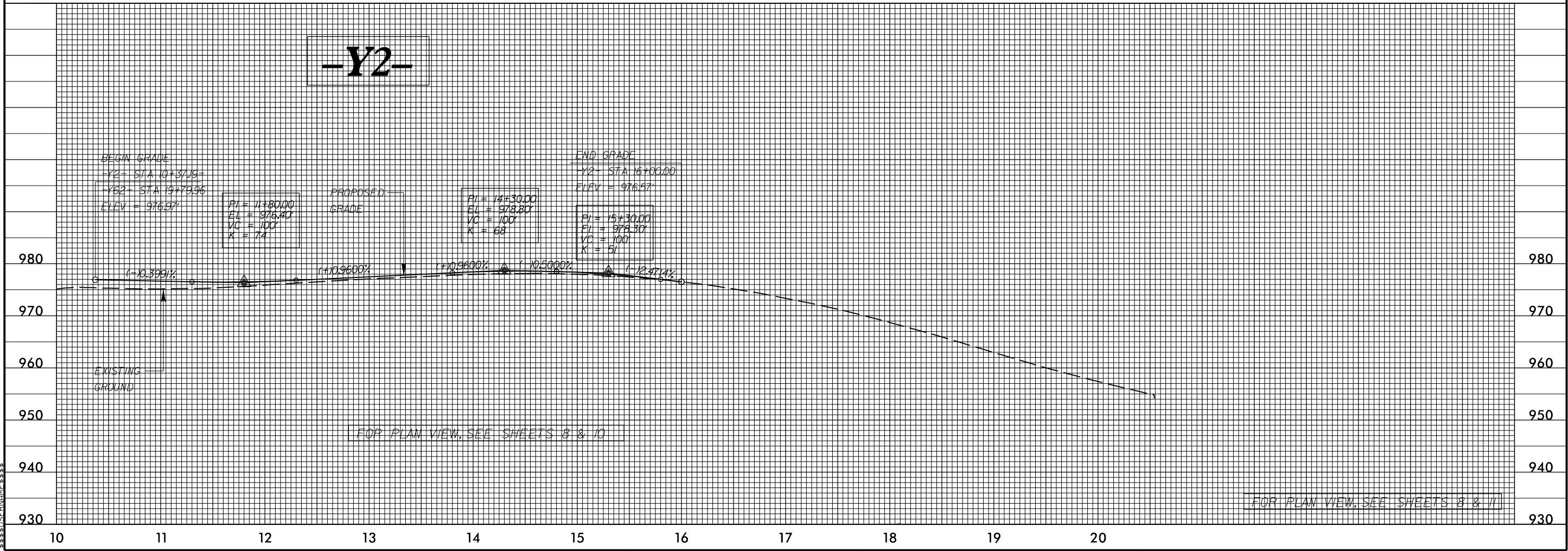
PERMIT DRAWING

SHEET 9 OF 21

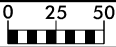
PROJECT REFERENCE NO. R-2247EC		SHEET NO. 19
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
 KCI		Engineer - Roadway Design Engineer - Hydraulics Construction Managers



5/28/99



6/23/16



PROJ. REFERENCE NO.
R-2247EC

SHEET NO.
5H

PERMIT DRAWING
SHEET 10 OF 21

STA 111+58 -L-
1@66" WELDED STEEL
(TRENCHLESS INSTALLATION)

920

910

900

890

880

870

INV IN=888.0

66" RCP
S=3.53%

JB w/SLAB LID
INV=885.2

EX 60' CMP
(FILL W/FLOWABLE FILL)

66" WELDED STEEL
(TRENCHLESS INSTALLATION)
S=3.45%

INV OUT=875.5

STATION
111+58
1@66" WELDED STEEL
(TRENCHLESS INSTALLATION)

100

50

0

50

100

STA 26+18 -YI-
1@60" RCP-IV

905

900

895

890

885

880

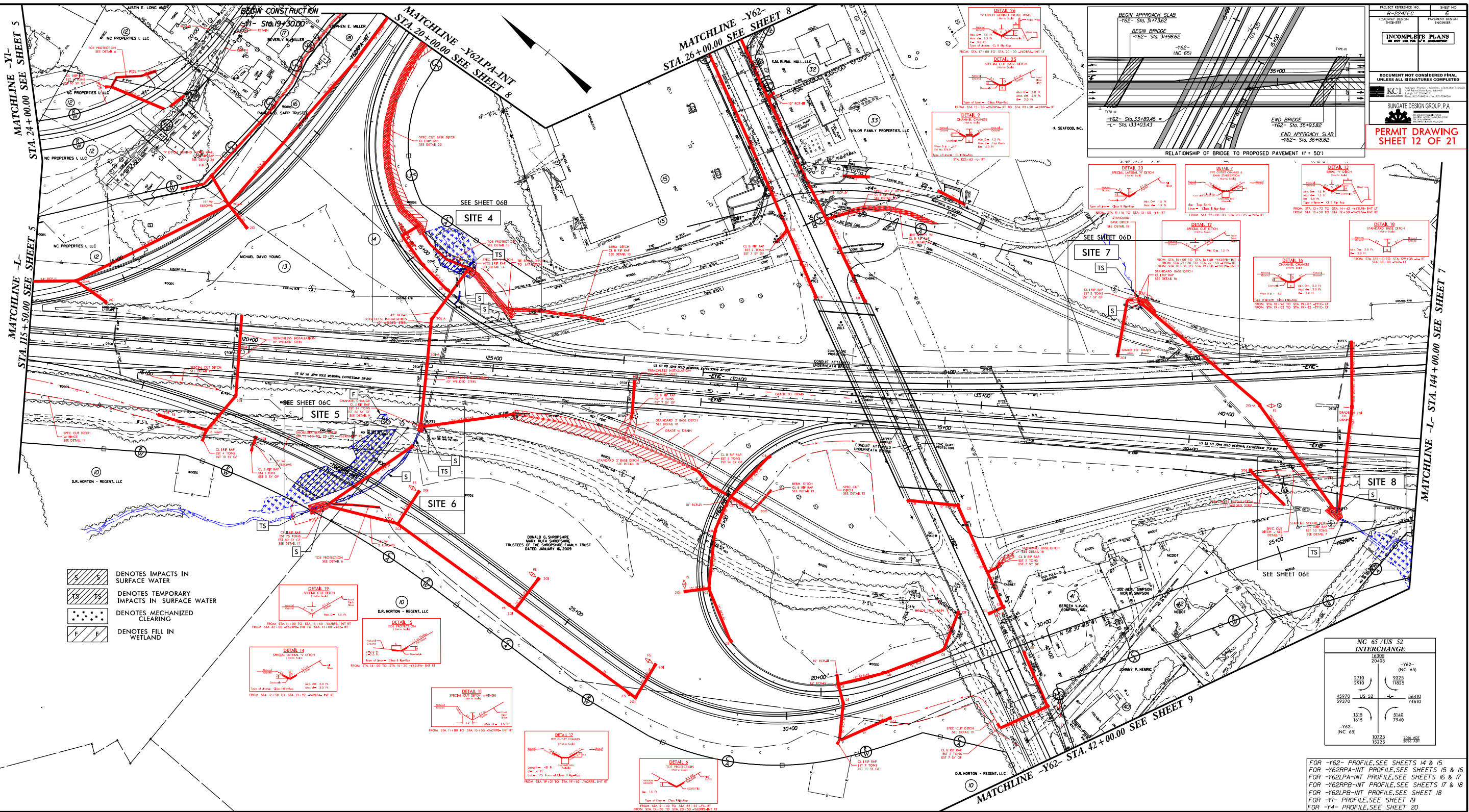
INV IN=892.7

60" RCP-III
S = 2.18%

INV OUT=890.5

6/2/99

6/2/99



PROJECT REFERENCE NO. 6
SHEET NO. 6
R-2247EC
INCOMPLETE PLANS
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED
KCI
SUNGATE DESIGN GROUP, P.A.
PERMIT DRAWING
SHEET 12 OF 21

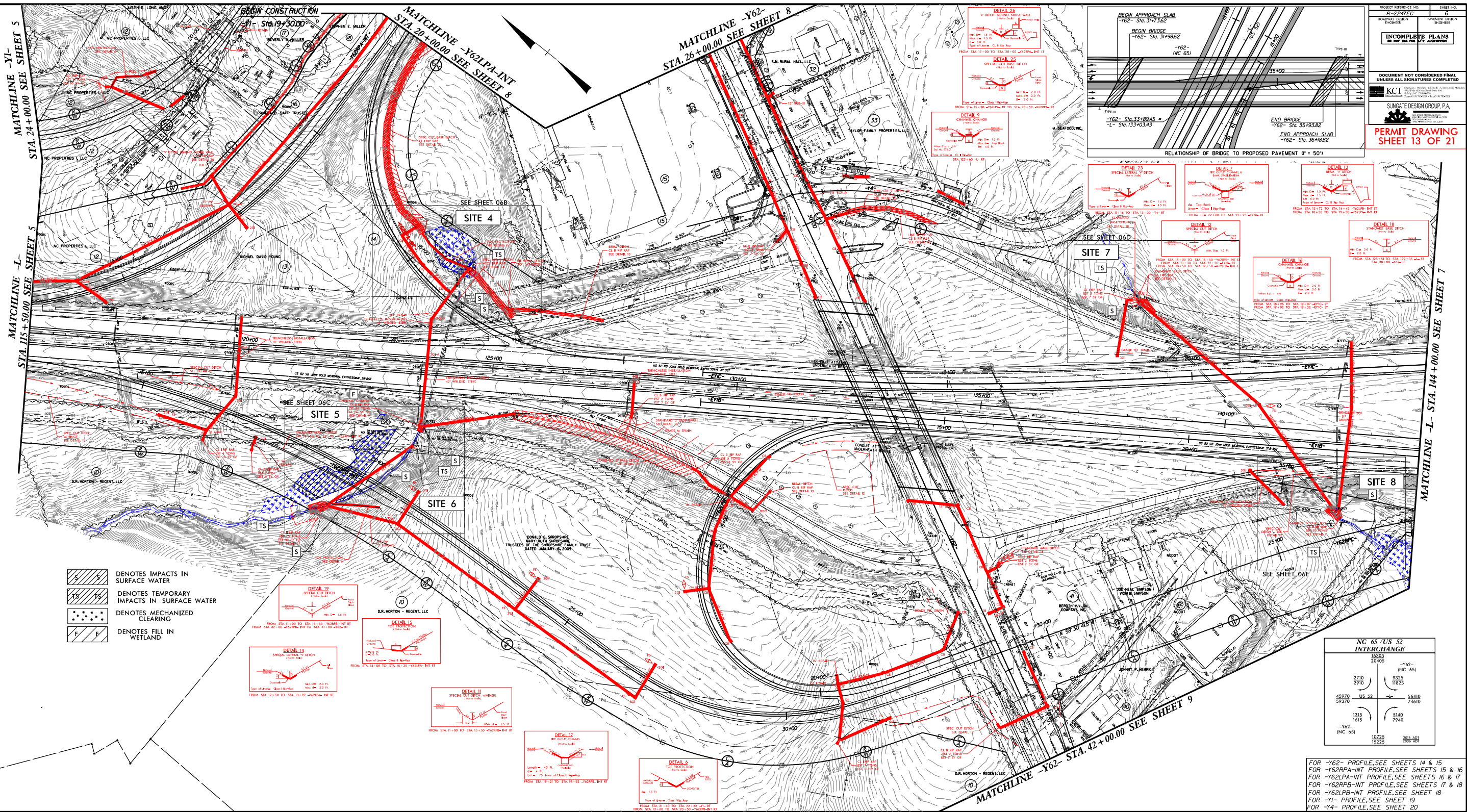
- Denotes IMPACTS IN SURFACE WATER
- Denotes TEMPORARY IMPACTS IN SURFACE WATER
- Denotes MECHANIZED CLEARING
- Denotes FILL IN WETLAND

NC 65 / US 52 INTERCHANGE			
10350	20405	-Y62- (INC. 65)	
2710	2910	8325	11825
45970	59370	US 52	56410
1315	1615	5140	7940
-Y63- (INC. 65)	10725	20410	1036
	15225		

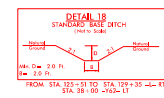
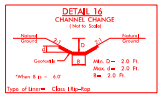
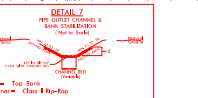
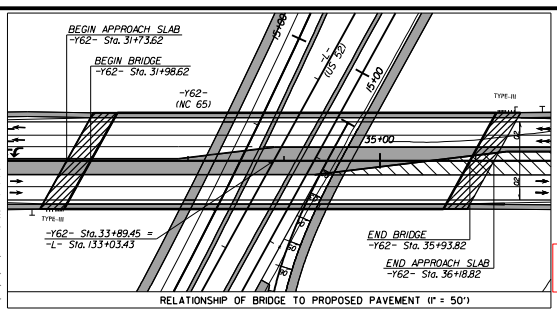
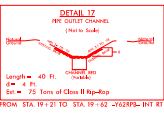
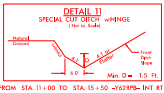
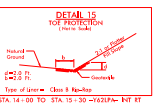
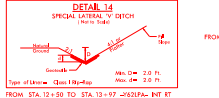
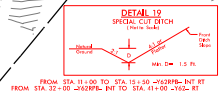
FOR -Y62- PROFILE, SEE SHEETS 14 & 15
FOR -Y62RPA-INT PROFILE, SEE SHEETS 15 & 16
FOR -Y62LPA-INT PROFILE, SEE SHEETS 16 & 17
FOR -Y62RPA-INT PROFILE, SEE SHEETS 17 & 18
FOR -Y62LPA-INT PROFILE, SEE SHEETS 18 & 19
FOR -Y1- PROFILE, SEE SHEET 19
FOR -Y4- PROFILE, SEE SHEET 20

6/2/09

6/2/09



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



NC 65 / US 52
INTERCHANGE

10355	20405	-Y62- (INC. 65)
2710	2910	9325 11825
45970	59370	US 52
1315	1615	54410 74610
-Y63- (INC. 65)	10725	20410

FOR -Y62- PROFILE, SEE SHEETS 14 & 15
FOR -Y62RPA-INT PROFILE, SEE SHEETS 15 & 16
FOR -Y62RPA-INT PROFILE, SEE SHEETS 16 & 17
FOR -Y62RPA-INT PROFILE, SEE SHEETS 17 & 18
FOR -Y62RPA-INT PROFILE, SEE SHEET 18
FOR -Y1- PROFILE, SEE SHEET 19
FOR -Y4- PROFILE, SEE SHEET 20

PROJECT REFERENCE NO.
R-2247EC

SHEET NO.
6

INCOMPLETE PLANS
NO IMP. FOR THE 1/2" ALPHABET

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

KCI
KCI ENGINEERING, INC.
10000 KCI DRIVE
SUITE 100
DALLAS, TEXAS 75243
(214) 343-1000
WWW.KCI-ENGINEERING.COM

SUNGATE DESIGN GROUP, P.A.
10000 KCI DRIVE
SUITE 100
DALLAS, TEXAS 75243
(214) 343-1000
WWW.SUNGATEDESIGNGROUP.COM

PERMIT DRAWING
SHEET 13 OF 21

MATCHLINE -L- STA. 144+00.00 SEE SHEET 7

SITE 4

JS BEGINS HERE

INVERT NOT BURIED

DENOTES IMPACTS IN
SURFACE WATER

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER.

**DENOTES FILL IN
WETLAND**

**DENOTES MECHANIZED
CLEARING**

42" RCP-III
HLESS INSTALLATION
42" WELDED STEEL

REVISIONS

8/17/99

```

$$$SYTIME$$$$$DGN$$$$$
$$$USERNAME$$$$$

```


REVISIONS

```

$$$$$SYSTEM$$$$$
$$$$$DCN$$$$$
$$$$$USERNAME$$$$$

```

5



TS

SITE 7

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
R-2247EC	6D
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	

50' 12.5' 0 25' 50'

SCALE: 1" = 25'

TS	TS TS	TS	TS	TS	TS
TS	TS TS	TS	TS	TS	TS

TDE

S

INVERT NOT BURIED

HW

9/

15" W/ELBOWS

GRADE TO DRAIN

CONC DITCH

~~CONC [DITCH]~~

~~20700~~

TRENCHLESS INSTALLATION

INVERTS
NOT BURIED

SITE 8

DENOTES IMPACTS IN
SURFACE WATER

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

A diagram of a 2D hexagonal lattice. The lattice is represented by a grid of points with diagonal lines connecting them. Shaded sites are marked with 'S' and unshaded sites are marked with 'O'.

TS	TS	TS	TS	TS	TS
TS	TS	TS	TS	TS	TS

 $25 + 00$

-Y62RPC-

EXISTING R/W

VAR. SOIL

WOODS

A circular stamp with a diagonal line from the top-left to the bottom-right. The letter 'C' is in the upper-left quadrant and the letter 'A' is in the lower-right quadrant. Faint background text includes 'GAS R/W', '1927', and 'PCW'.

11

REVISIONS

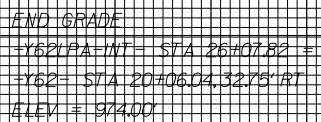
8/17/99

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$$$$$SYTIME$$$$$
$$$$$DON$$$$$
$$$$$USERNAME$$$$$

```

-Y62LPA-INT-



MATCHLINE -Y62LPA-INT- STA 23+00.00

SUNGATE DESIGN GROUP, P.A.



RIGHT DITCH - - - - -

PERMIT DRAWING
SHEET 18 OF 21

R-2247EC

17

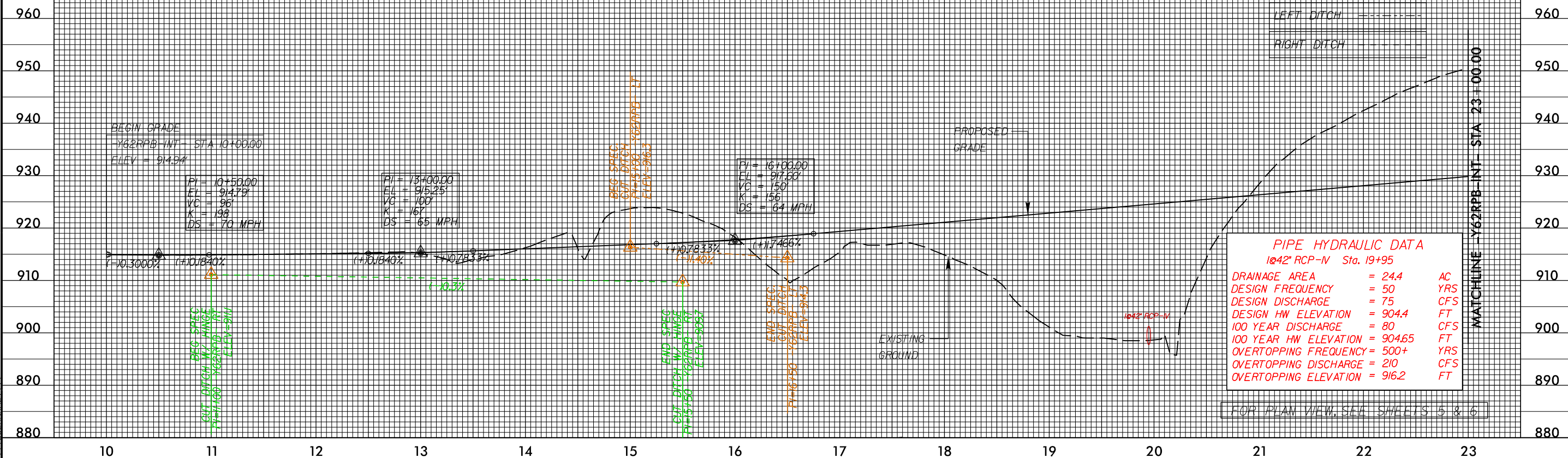
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



KCI
http://www.kci.go.kr

Engineers • Planners • Scientists • Construction Managers
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609-6210
Phone (919) 783-9214 • Fax (919) 83-9266

—Y62RPB—INT—



N = 899178.5460
E = 1614573.3500
EL = 916.18'

RIGHT DITCH

PIPF HYDRAULIC DATA

1@42" RCP-N Sta. 19+95

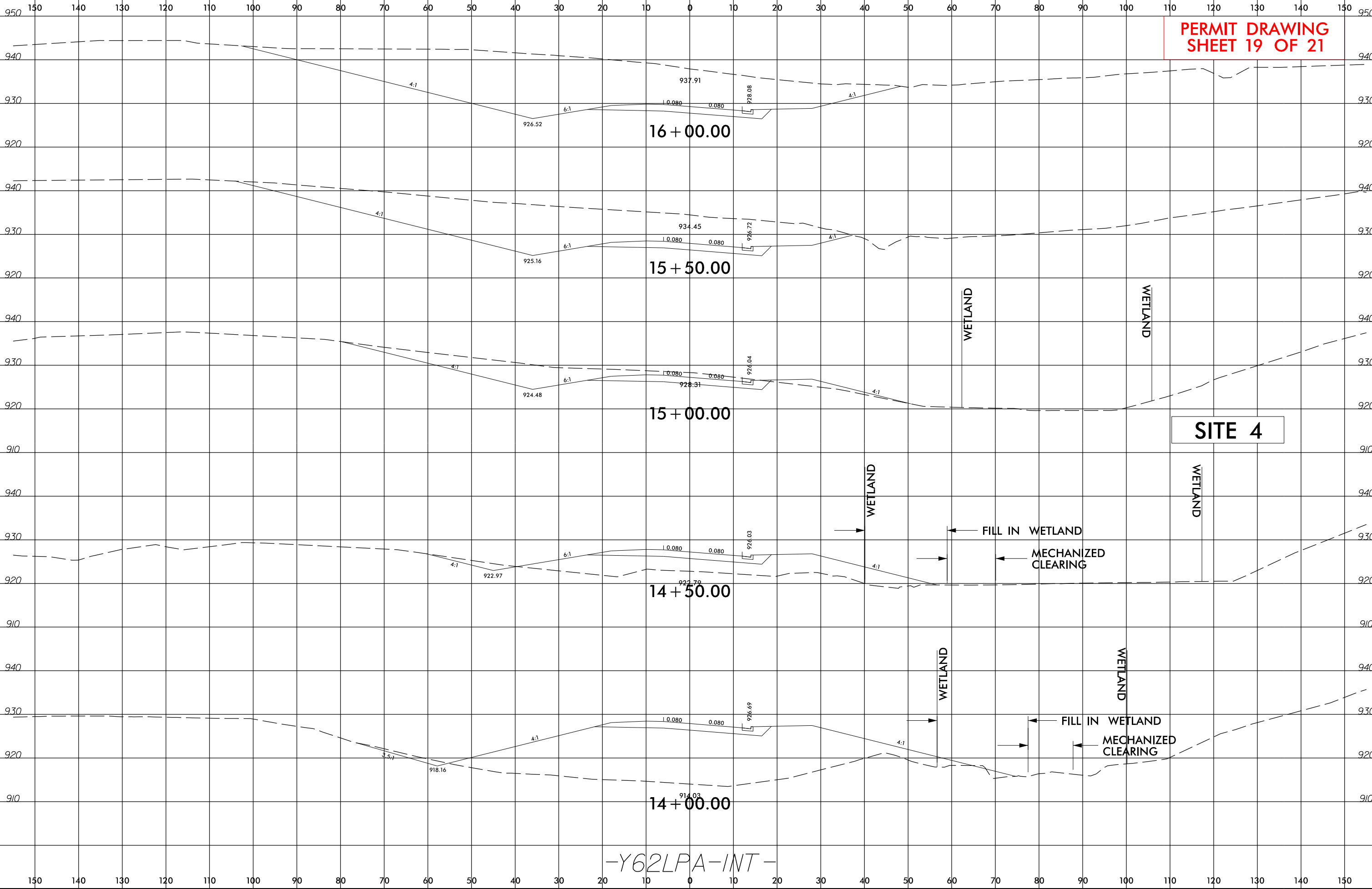
DRAINAGE AREA	= 24.4
DESIGN FREQUENCY	= 50
DESIGN DISCHARGE	= 75
DESIGN HW ELEVATION	= 904.4
100 YEAR DISCHARGE	= 80
100 YEAR HW ELEVATION	= 904.65
OVERTOPPING FREQUENCY	= 500+
OVERTOPPING DISCHARGE	= 210
OVERTOPPING ELEVATION	= 916.2

FOR PLAN VIEW, SEE SHEETS 5 & 6

WATCHLINE - Y62RPB-INT- STA 23+00.00

8/23/99

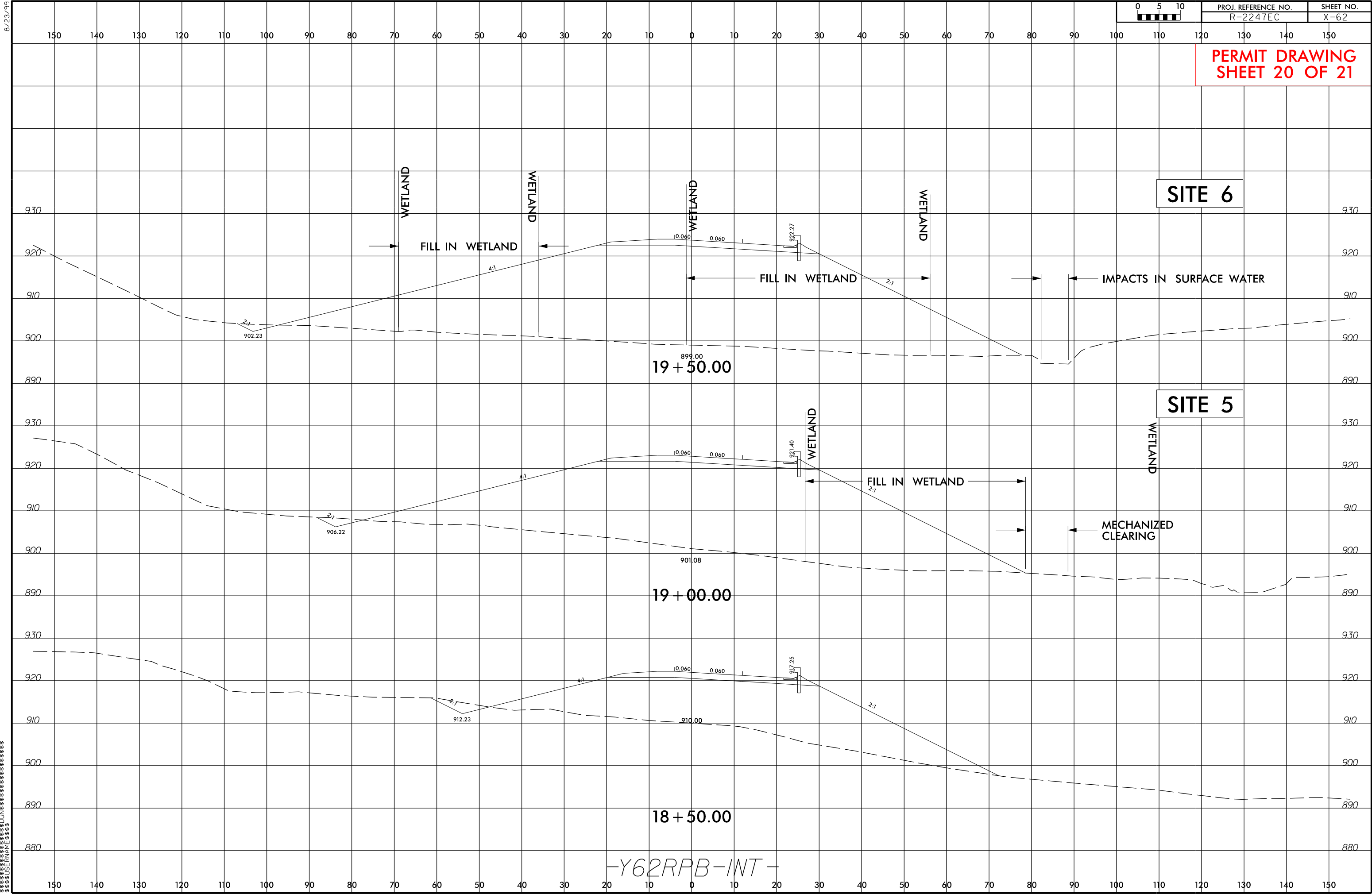
PERMIT DRAWING
SHEET 19 OF 21



-Y62LPA-INT-

8/23/99

PERMIT DRAWING
SHEET 20 OF 21



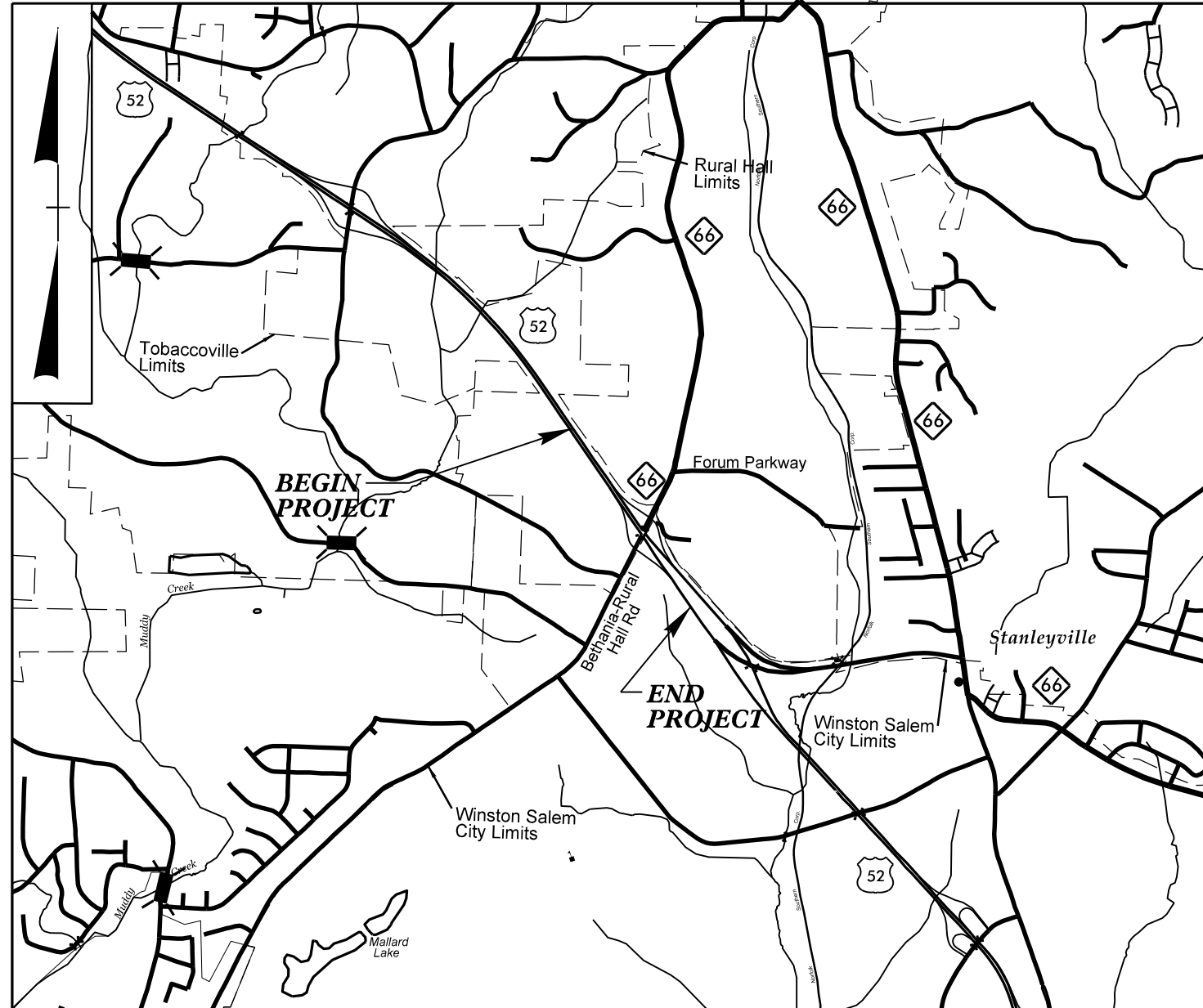
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\$\$\$\$\$SERNAME\$\$\$\$\$

09/08/19

TIP PROJECT: R-2247EC

CONTRACT: C203840

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C For Survey Control Sheets



VICINITY MAP

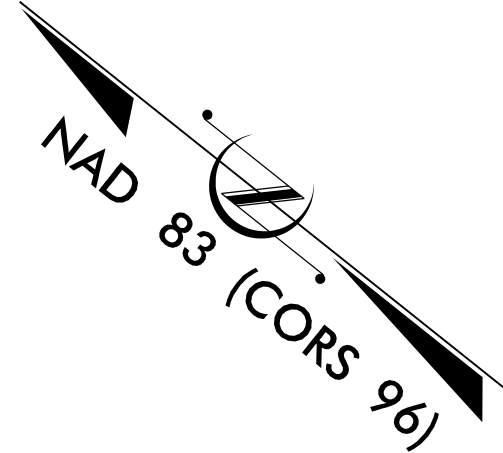
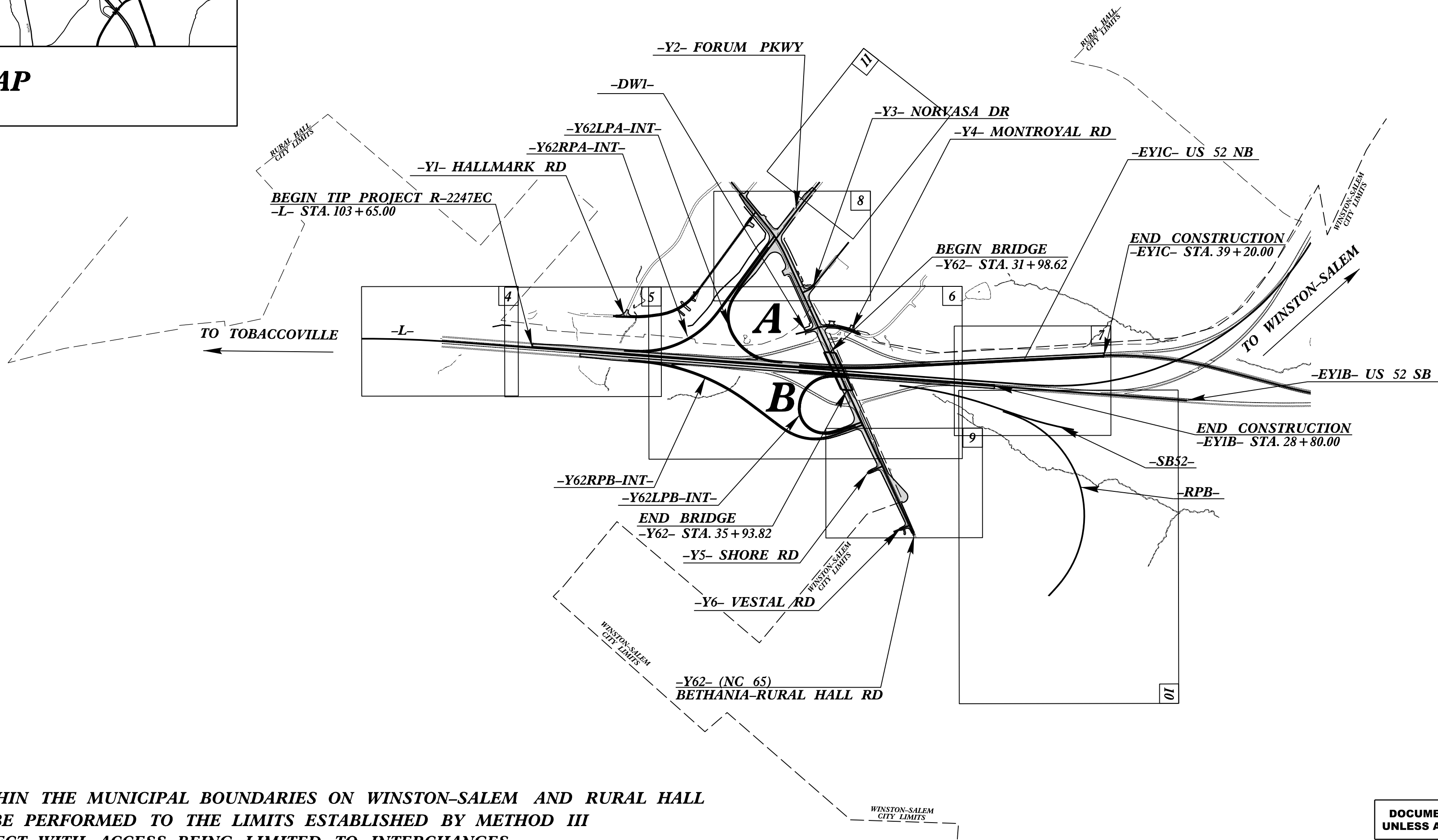
RIGHT OF WAY PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

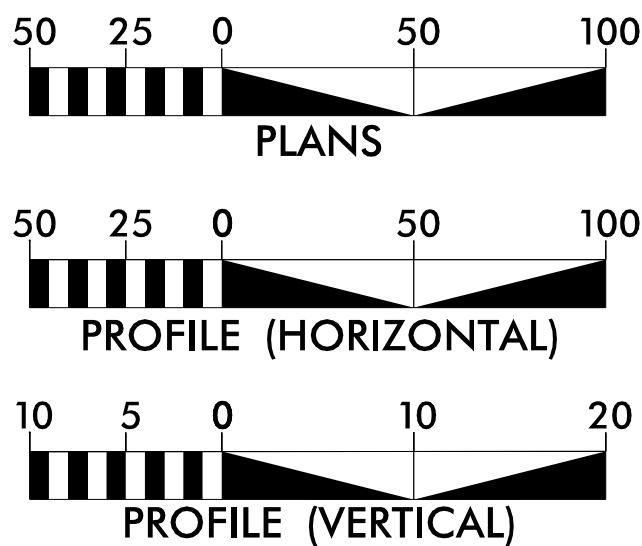
LOCATION: WINSTON-SALEM NORTHERN BELTWAY - MODIFICATION OF
THE US 52 (FUTURE I-74) / NC 65 (BETHANIA HALL ROAD)
INTERCHANGE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, GUARDRAIL, CABLE
GUIDERAIL, STRUCTURES, SIGNING, SIGNALS
AND NOISE WALLS



- A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES ON WINSTON-SALEM AND RURAL HALL
- CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
- THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 61,700
ADT 2035 = 79,300
DHV = 10 %
D = 60 %
T = 21 % *
V = 70 MPH
* TTST = 14 DUAL 7
FUNC CLASS = FREEWAY

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2247EC = 1.042 MI.
TOTAL LENGTH TIP PROJECT R-2247EC = 1.042 MI.

Prepared in the Office of:

KCI Associates of N.C., P.A.
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266
<http://www.kci.com>

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 15, 2016

LETTING DATE:
NOVEMBER 15, 2016

NCDOT CONTACT: K. ZAK HAMIDI, P.E.
PROJECT ENGINEER - DESIGN BUILD UNIT

CHARLES L. FLOWE, P.E.
PROJECT ENGINEER

BRYAN E. HOUGH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

SUNGATE DESIGN GROUP, P.A.

905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

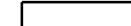
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Computed Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	
Sign	
Well	
Small Mine	
Foundation	
Area Outline	
Cemetery	
Building	
School	
Church	
Dam	

HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	
Primary Horiz Control Point	
Primary Horiz and Vert Control Point	
Exist Permanent Easment Pin and Cap	
New Permanent Easement Pin and Cap	
Vertical Benchmark	
Existing Right of Way Marker	
Existing Right of Way Line	
New Right of Way Line	
New Right of Way Line with Pin and Cap	
New Right of Way Line with Concrete or Granite R/W Marker	
New Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
New Control of Access	
Existing Easement Line	
New Temporary Construction Easement	
New Temporary Drainage Easement	
New Permanent Drainage Easement	
New Permanent Drainage /Utility Easement	
New Permanent Utility Easement	
New Temporary Utility Easement	
New Aerial Utility Easement	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

VEGETATION:

Single Tree	
Single Shrub	

Hedge	
Woods Line	
Orchard	
Vineyard	

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

UTILITIES:

POWER:	
Existing Power Pole	
Proposed Power Pole	
Existing Joint Use Pole	
Proposed Joint Use Pole	
Power Manhole	
Power Line Tower	
Power Transformer	
U/G Power Cable Hand Hole	
H-Frame Pole	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

GAS:

Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

SANITARY SEWER:

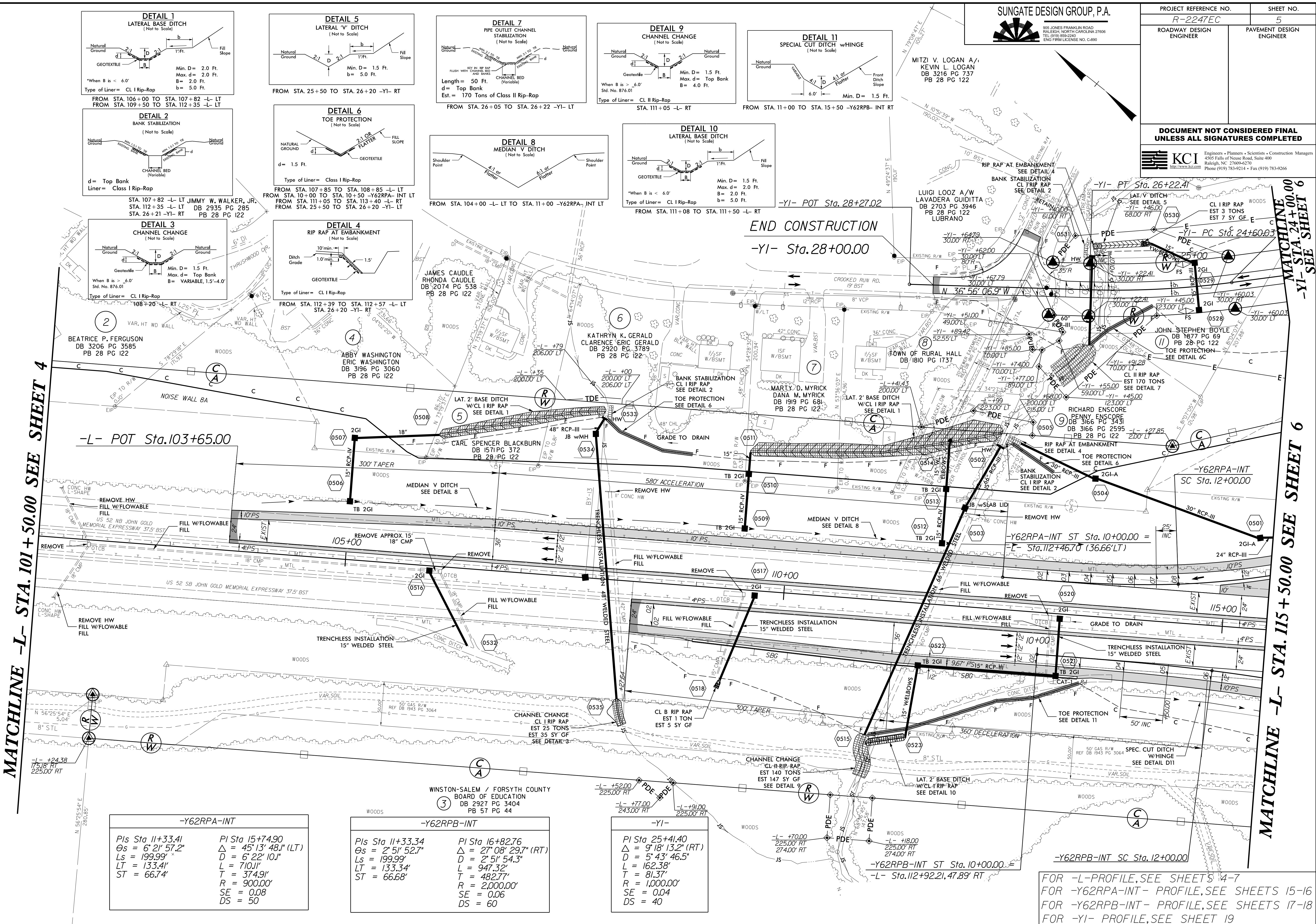
Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

MISCELLANEOUS:

Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	
U/G Tank; Water, Gas, Oil	
Underground Storage Tank, Approx. Loc.	
A/G Tank; Water, Gas, Oil	
Geoenvironmental Boring	
U/G Test Hole LOS A (S.U.E.*)	
Abandoned According to Utility Records	
End of Information	

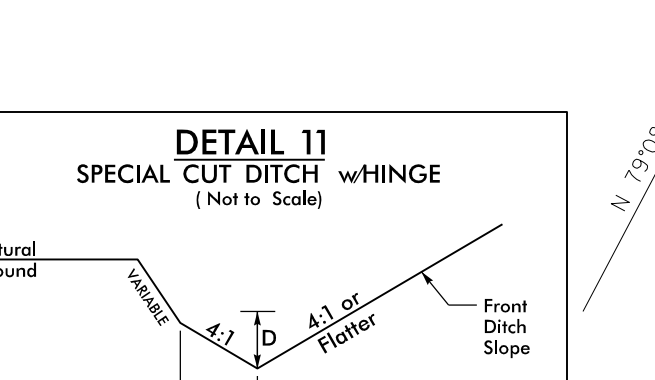
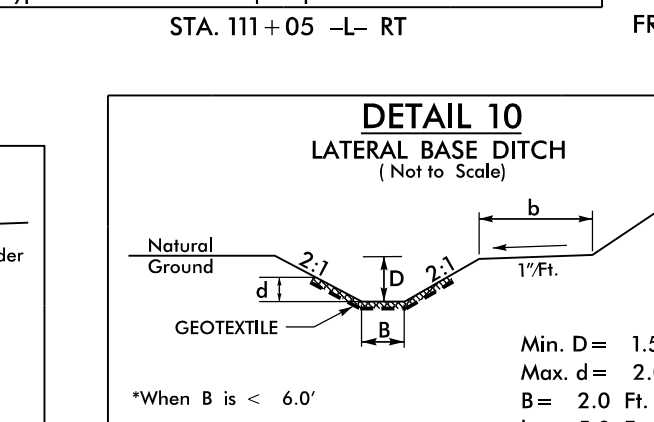
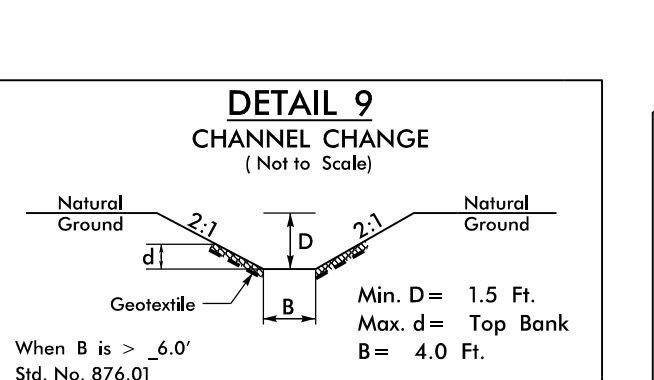
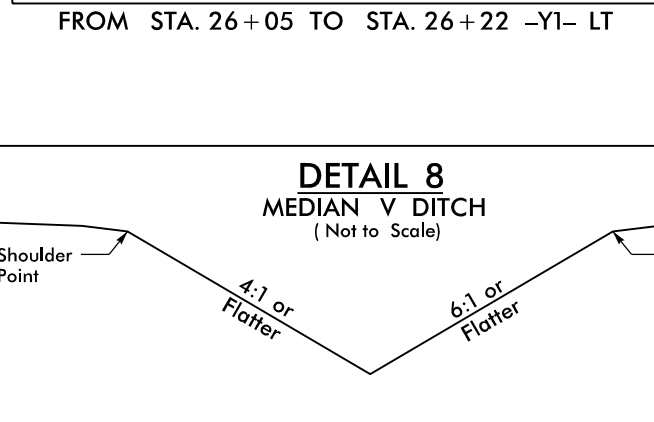
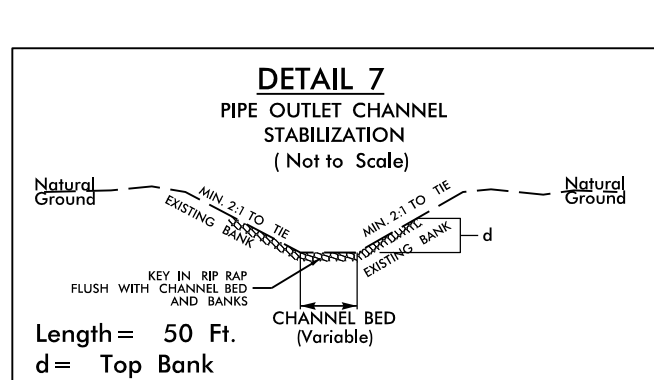
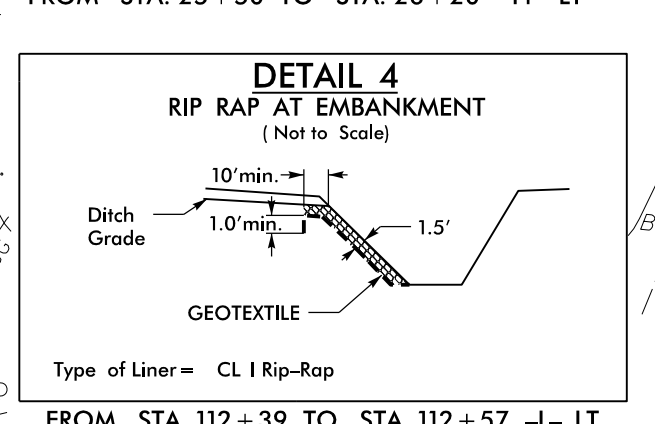
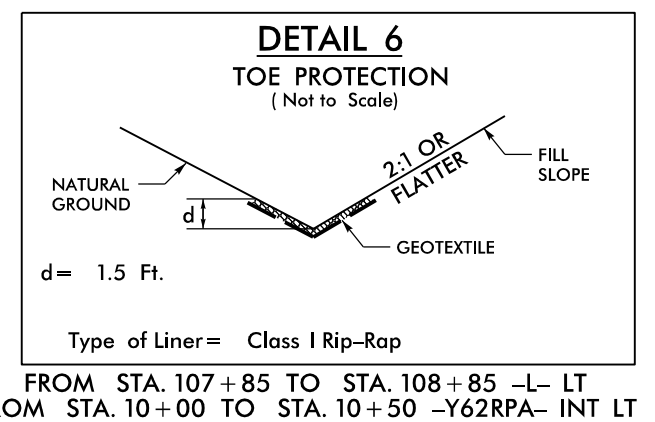
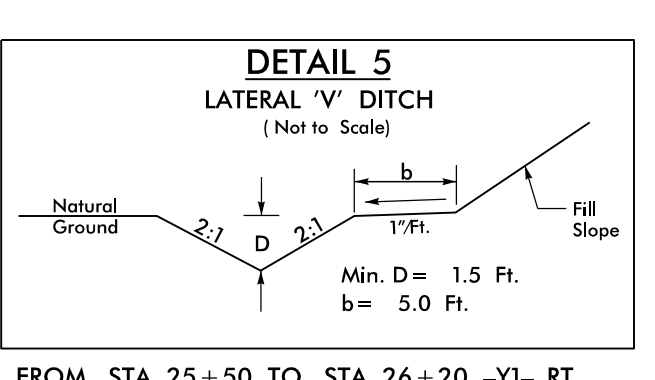
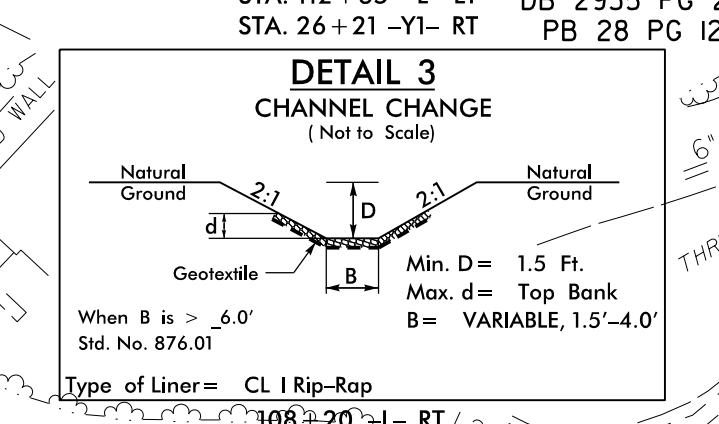
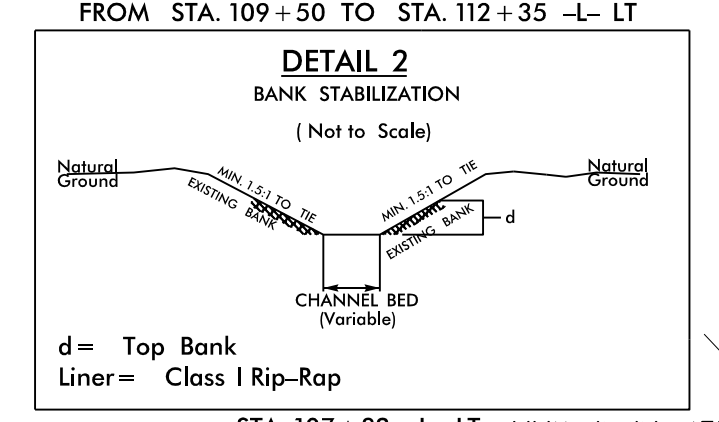
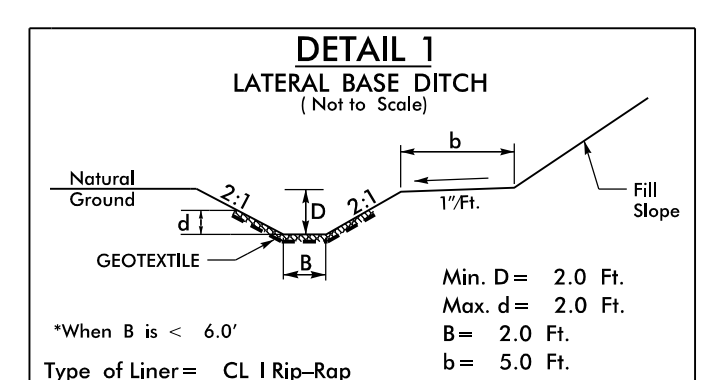
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MATCHLINE -L- STA. 101+50.00 SEE SHEET 4

MATCHLINE -L- STA. 115+50.00 SEE SHEET 6



-Y62RPA-INT

Pls Sta 11+33.41	Pl Sta 15+74.90
Os = 6' 21" 57.2"	Δ = 45' 13" 48.1" (LT)
Ls = 199.99'	D = 6' 22" 10.1"
LT = 133.41'	L = 710.11'
ST = 66.74'	T = 374.91'
	R = 900.00'
	SE = 0.08
	DS = 50

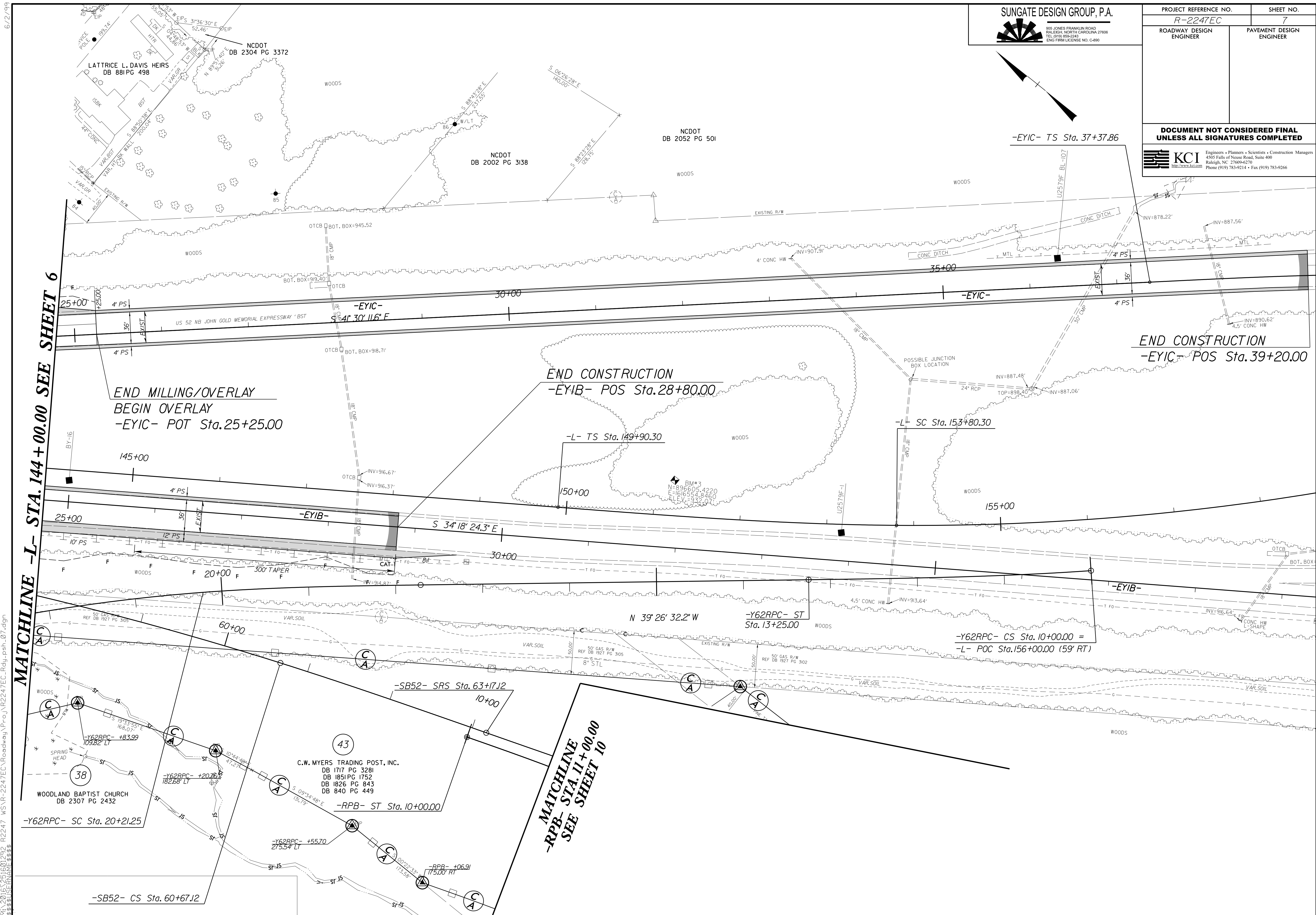
-Y62RPB-INT

Pls Sta 11+33.34	Pl Sta 16+82.76
Os = 2' 51" 52.7"	Δ = 27' 08" 29.7" (RT)
Ls = 199.99'	D = 2' 51" 54.3"
LT = 133.34'	L = 947.32'
ST = 66.68'	T = 482.77'
	R = 2,000.00'
	SE = 0.06
	DS = 60

-YI-

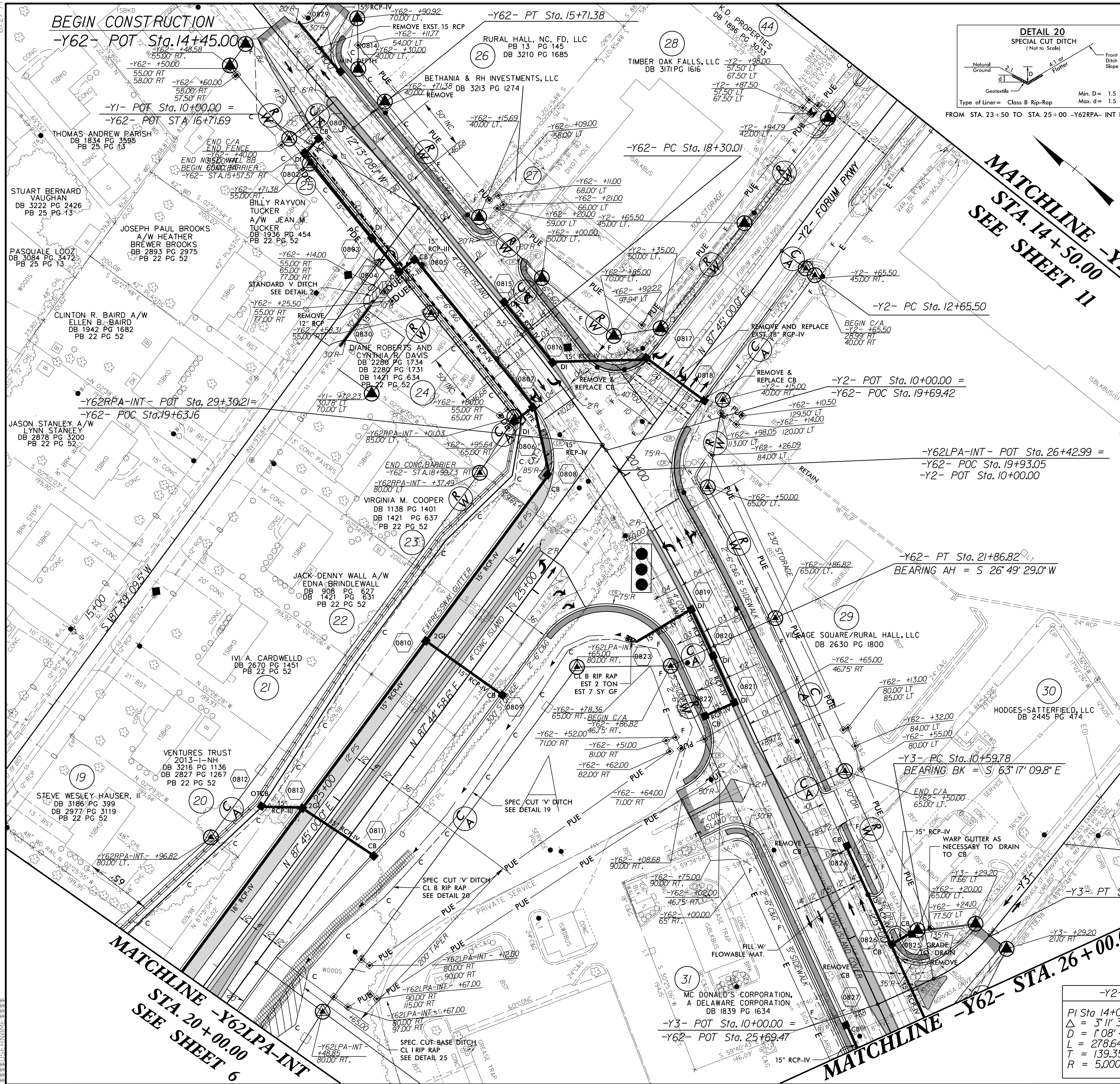
Pl Sta 25+41.40	Δ = 9' 18" 13.2" (RT)
D = 5' 43" 46.5"	L = 162.38'
T = 81.37'	R = 1,000.00'
SE = 0.04	DS = 40

FOR -L-PROFILE, SEE SHEETS 4-7
FOR -Y62RPA-INT- PROFILE, SEE SHEETS 15-16
FOR -Y62RPB-INT- PROFILE, SEE SHEETS 17-18
FOR -YI- PROFILE, SEE SHEET 19



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SUNGATE DESIGN GROUP, P.A.
805 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 889-2243
ENG. FIRM LICENSE NO. C-480

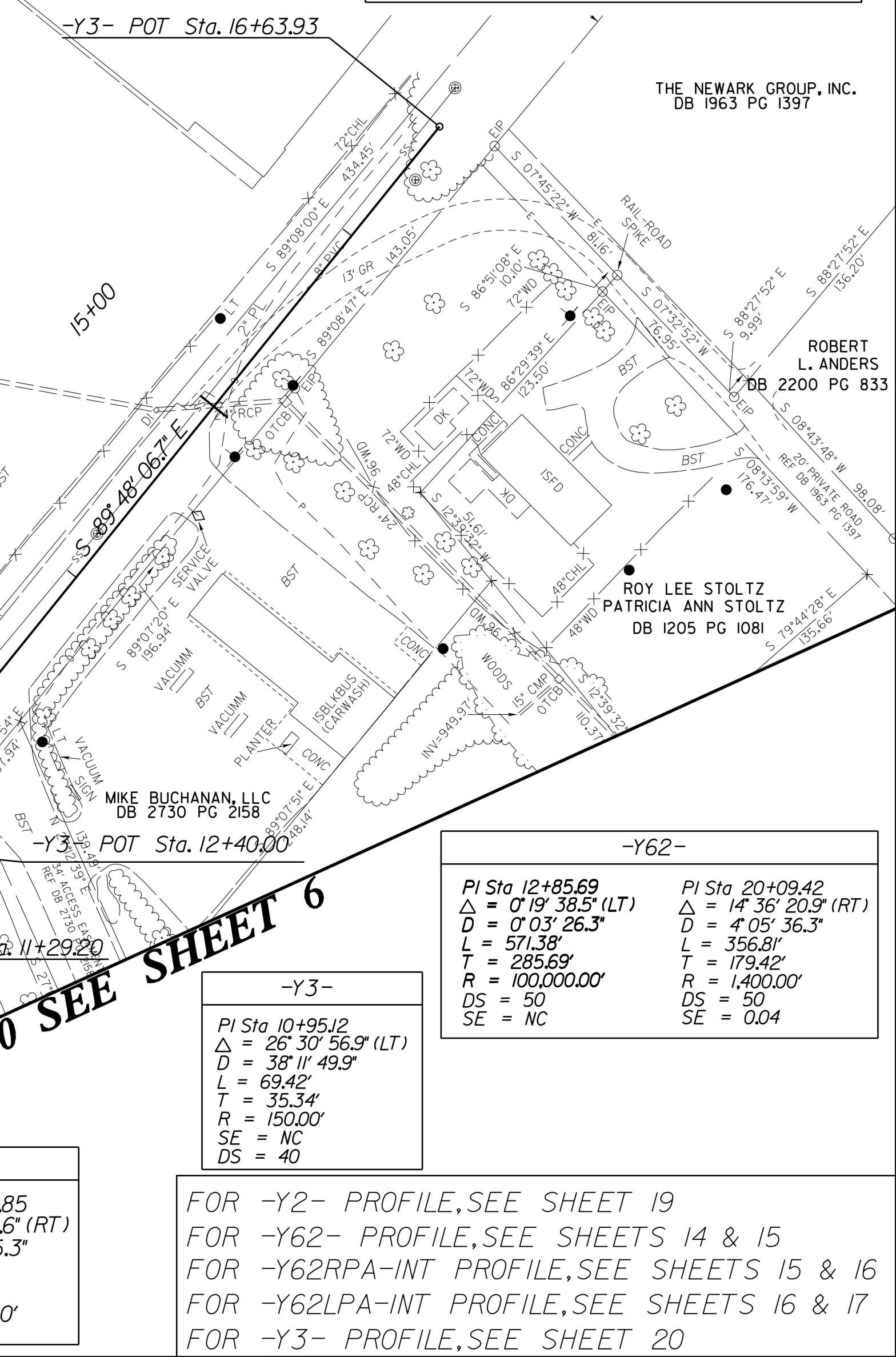
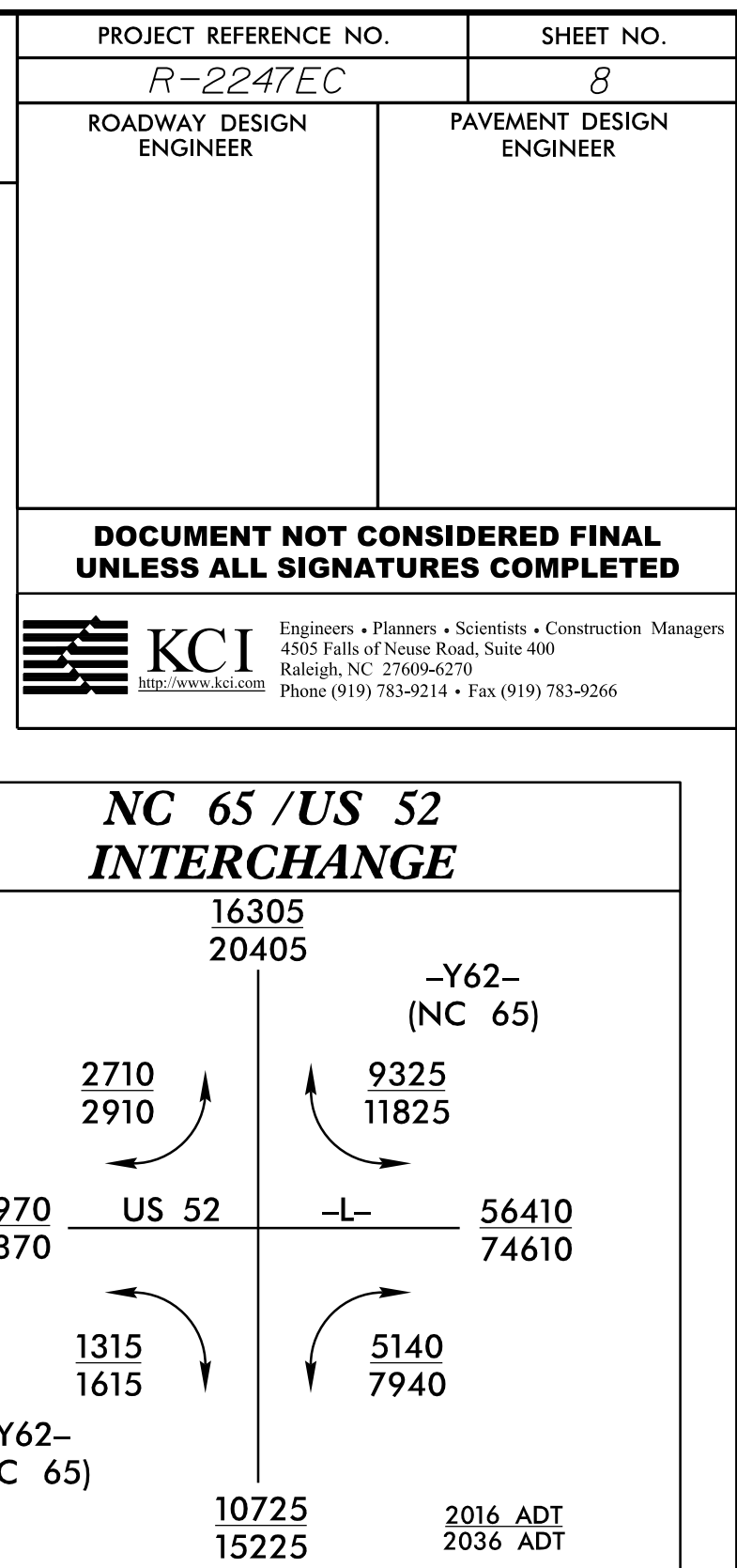
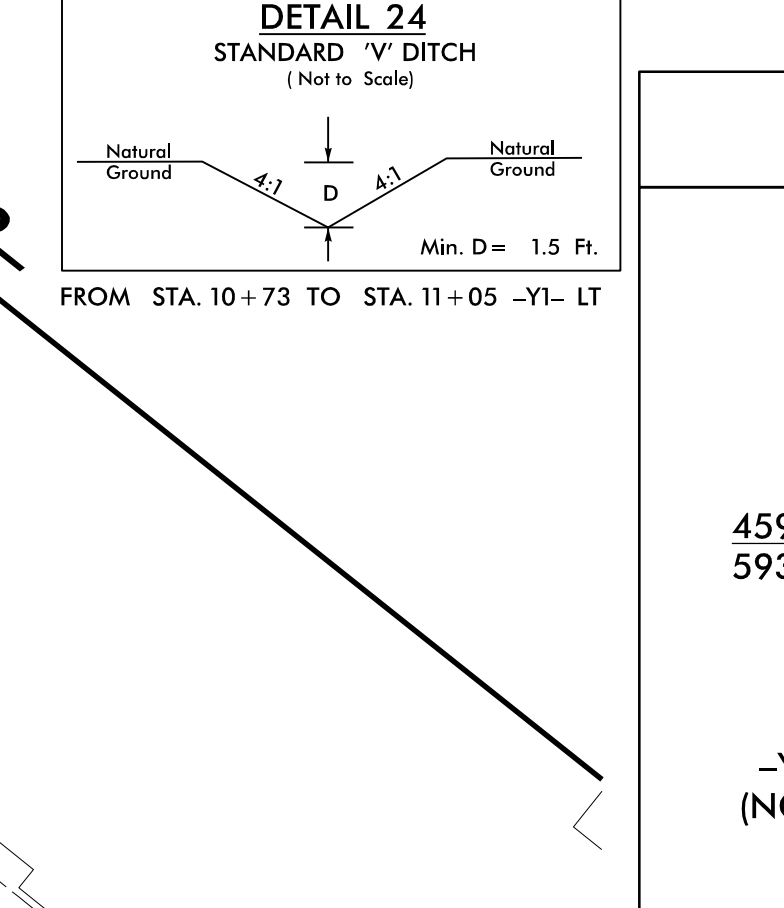
PROJECT REFERENCE NO.
R-2247EC

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

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

KCI
Engineers • Planners • Scientists • Construction Managers
4515 Falls of Neuse Road, Suite 400
Raleigh, NC 27609-6570
Phone (919) 783-9214 • Fax (919) 783-9266



 **KCI** Engineers • Planners • Scientists • Construction Managers
4505 Falls of Neuse Road, Suite 400
Raleigh, NC 27609-6270
<http://www.kci.com>
Phone (919) 783-9214 • Fax (919) 783-9266

MATCHLINE -Y62- STA. 42 + 00.00 SEE SHEET 6

The plan view shows the proposed Y62 road alignment starting at station 42+00.00 and ending at station 42+75.00. Key features include:

- Alignment Points:** Stationing points are marked along the alignment: -Y62- +38.00' RT, -Y62- +34.00' RT, -Y62- +45.00' RT, and -Y62- +60.50' LT.
- Right-of-Way (RT) and Left-of-Way (LT):** The right-of-way width is 104.00' RT, and the left-of-way width is 45.00' LT.
- Proposed Roadway:** A 12' wide roadway is shown with a centerline offset of 6' from the right-of-way line.
- Existing Features:** Existing roads include 12' WIDE C/O RD, 12' WIDE C/O RD, and 12' WIDE C/O RD. Other existing features include a 12' WIDE C/O RD, a 12' WIDE C/O RD, and a 12' WIDE C/O RD.
- Proposed Features:** Proposed features include a 12' WIDE C/O RD, a 12' WIDE C/O RD, and a 12' WIDE C/O RD.
- Other Labels:** Other labels include "END C/A END FENCE", "APPROXIMATE WALL", "JAN DE DB", and "END OF ROAD".

-Y5- PT Sta. 11+61.77

$$\frac{-Y5 - POT \text{ Sta. } 10+00.00}{-Y62 - POT \text{ Sta. } 43+98.85}$$

-Y62- PT Sta. 44+89.64

38
WOODLAND BAPTIST CHURCH
DB 2307 PG 2432

-Y5- PC Sta. 10+91.16
BEARING BK = N 62° 06' 22.8" W

(134)

BOBBY L. PAYNE
DB 949 PG 500
DB 949 PG 501
DB III4 PG 1401
PB 17 PG 49

PERRY D. T.

~~-Y6- POT Sta. 11+66.15~~
~~BEARING BK = N 61° 21' 01.3" W~~

DETAIL 21
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground

2:1

D

4:1 or Flatter

Fill Slope

Min. D = 1.5 Ft.

FROM STA. 47+50 TO STA. 51+00 -Y62- LT

DETAIL 22
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Min. D = 1.0 Ft.

FROM STA. 47 + 75 TO STA. 49 + 45	-Y62- RT
FROM STA. 50 + 50 TO STA. 51 + 00	-Y62- RT

-Y62-

<i>PI Sta</i> 41+55.63	<i>PI Sta</i> 43+78.30
$\Delta = 1^{\circ}16' 33.0''$ (LT)	$\Delta = 1^{\circ}16' 33.0''$ (RT)
<i>D</i> = 0' 34" 22.7"	<i>D</i> = 0' 34" 22.7"
<i>L</i> = 222.68'	<i>L</i> = 222.68'
<i>T</i> = 111.34'	<i>T</i> = 111.34'
<i>R</i> = 10,000.00'	<i>R</i> = 10,000.00'
<i>DS</i> = 50	<i>DS</i> = 50
<i>SE</i> = NC	<i>SE</i> = NC

-Y5-

PI Sta 11+26.54
 $\Delta = 9^{\circ}13'31.9''$ (LT)
 $D = 13^{\circ}03'58.7''$
 $L = 70.61'$
 $T = 35.38'$
 $R = 438.50'$
 $DS = 40$
 $SE = SEE PLANS$

WOODLAND BAPTIST CHURCH
DB 2299 PG 876

WOODLAND BAPTIST CHURCH
DB 2299 PG 876

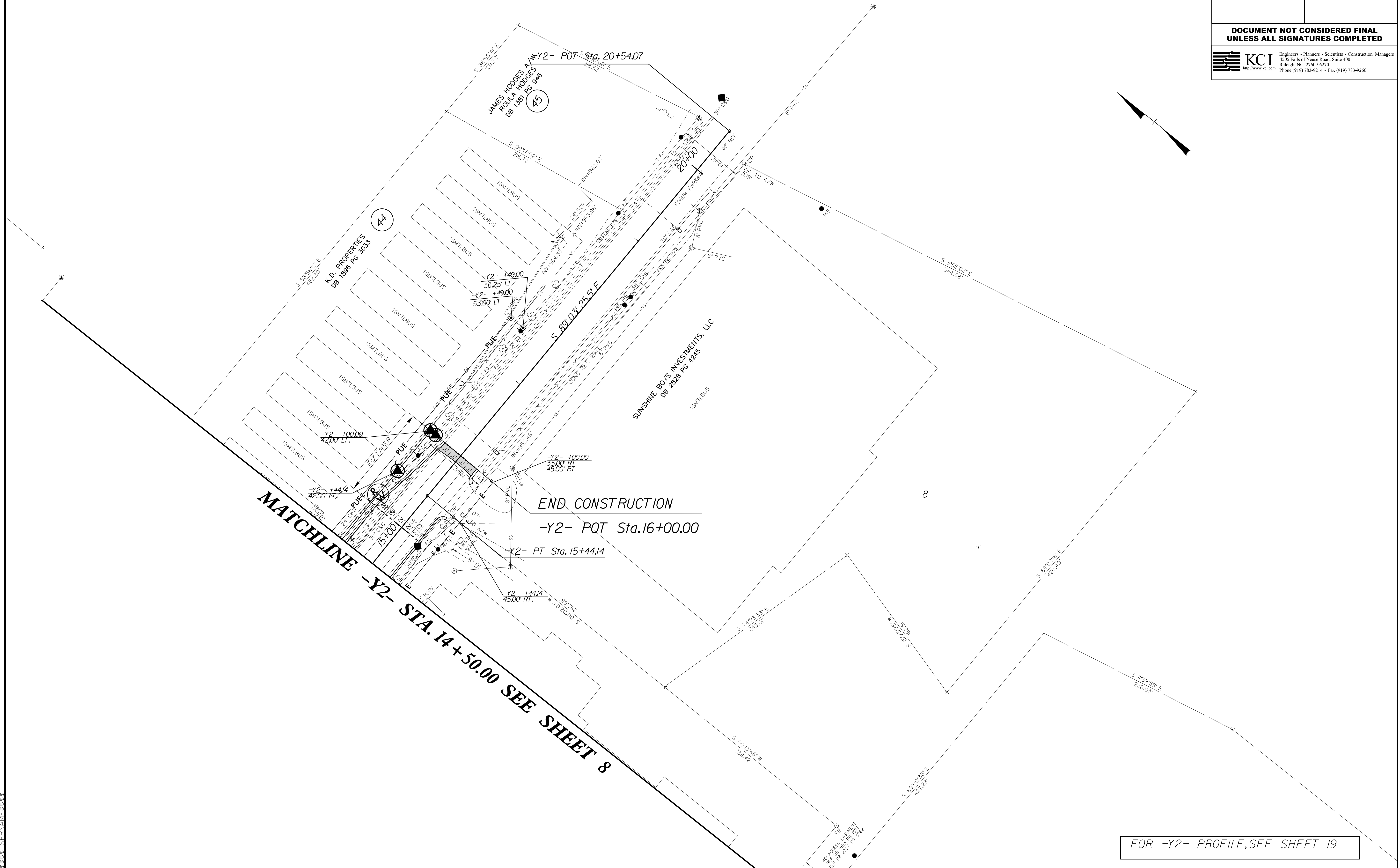
$$\frac{-Y6- POT Sta. 10+00.00}{-Y62- POT Sta. 50+22.10}$$

END CONSTRUCTION

0.00 -Y62- POT Sta. 51+00.00

-Y62- POT Sta. 51+27.10

FOR -Y62- PROFILE, SEE SHEETS 14 & 15
FOR -Y5- PROFILE, SEE SHEET 20
FOR -Y6- PROFILE, SEE SHEET 20



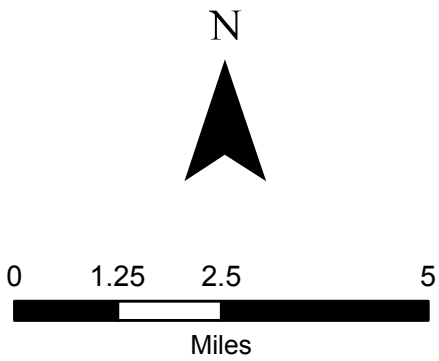
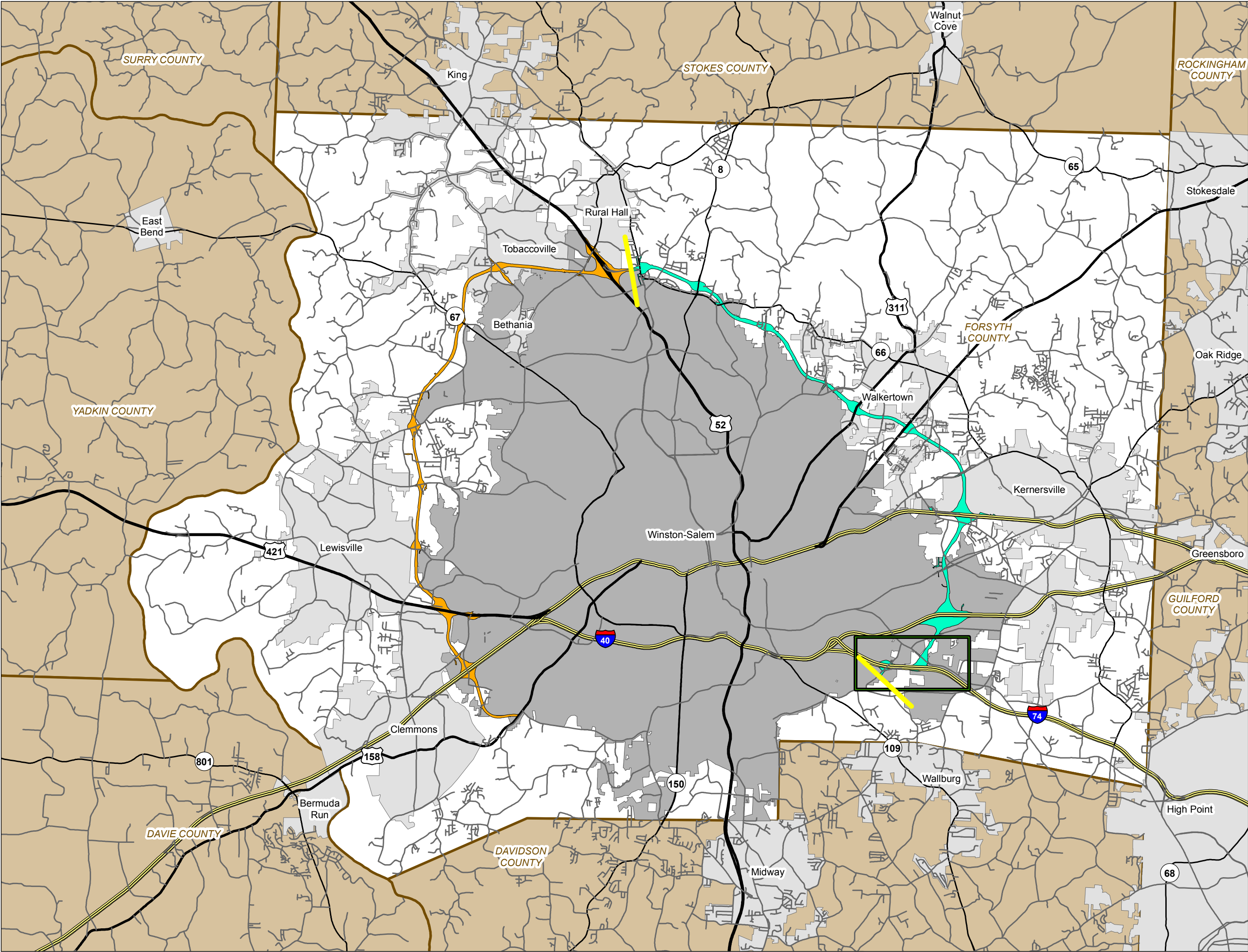
FOR -Y2- PROFILE, SEE SHEET 19

DRAFT Permit Map Set:

U-2579 USACE PERMIT MAPS: **Sections AA, AB, D, E, F**

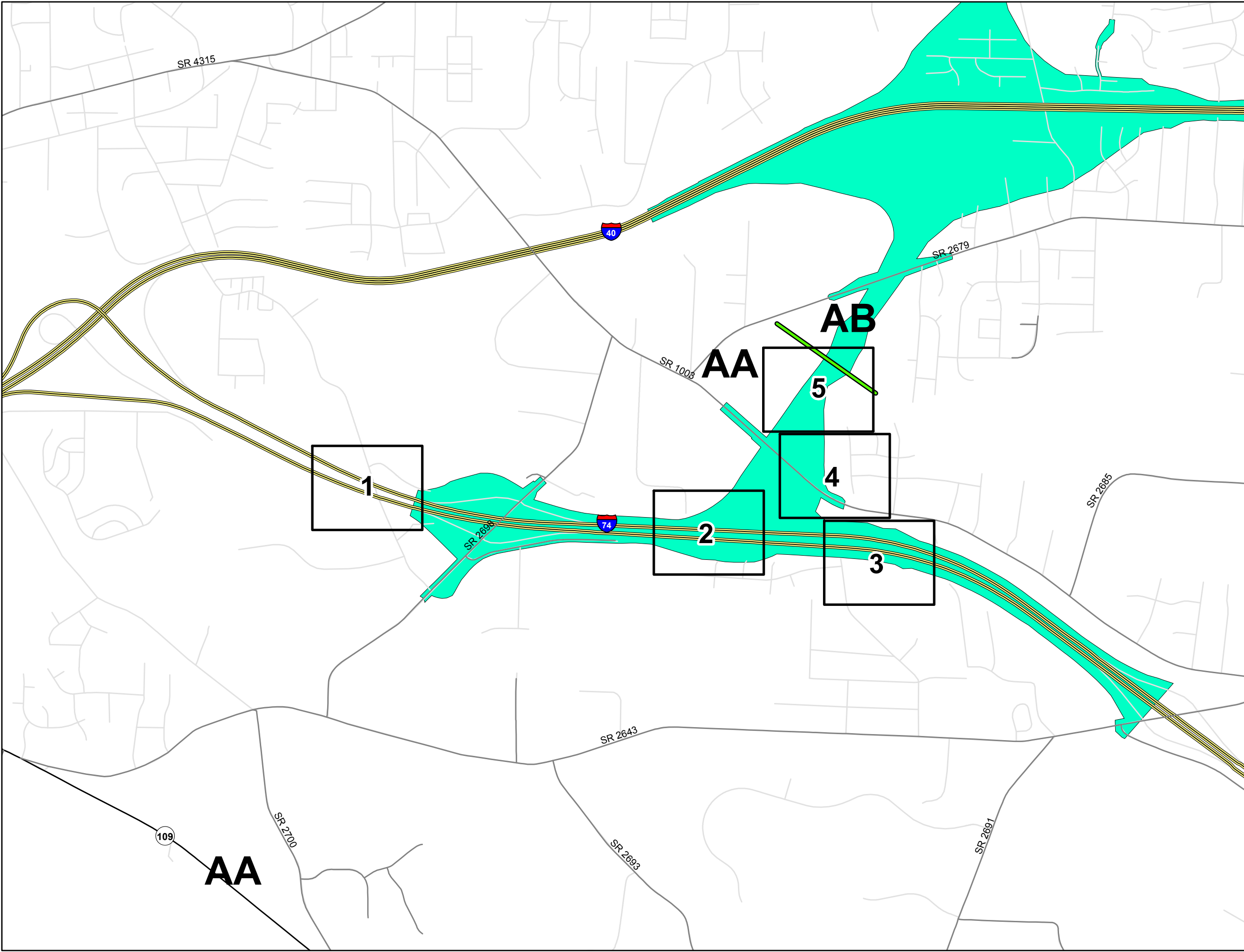
R-2247 USACE PERMIT MAPS: **Sections B Phase II, CA, CB, D, EA, EB**

September 27, 2017



- Legend**
- R-2247 Corridor
 - U-2579 Corridor
 - U-2579AA Section Area
 - U-2579 Project Start / Stop
 - Interstate
 - US Route
 - NC Route
 - Secondary Road

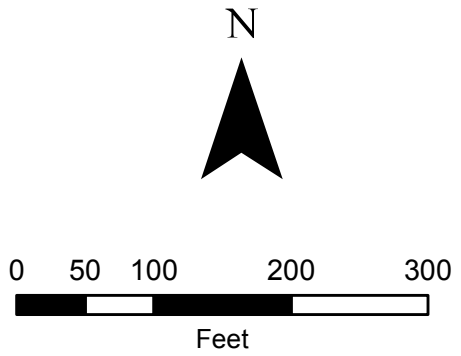
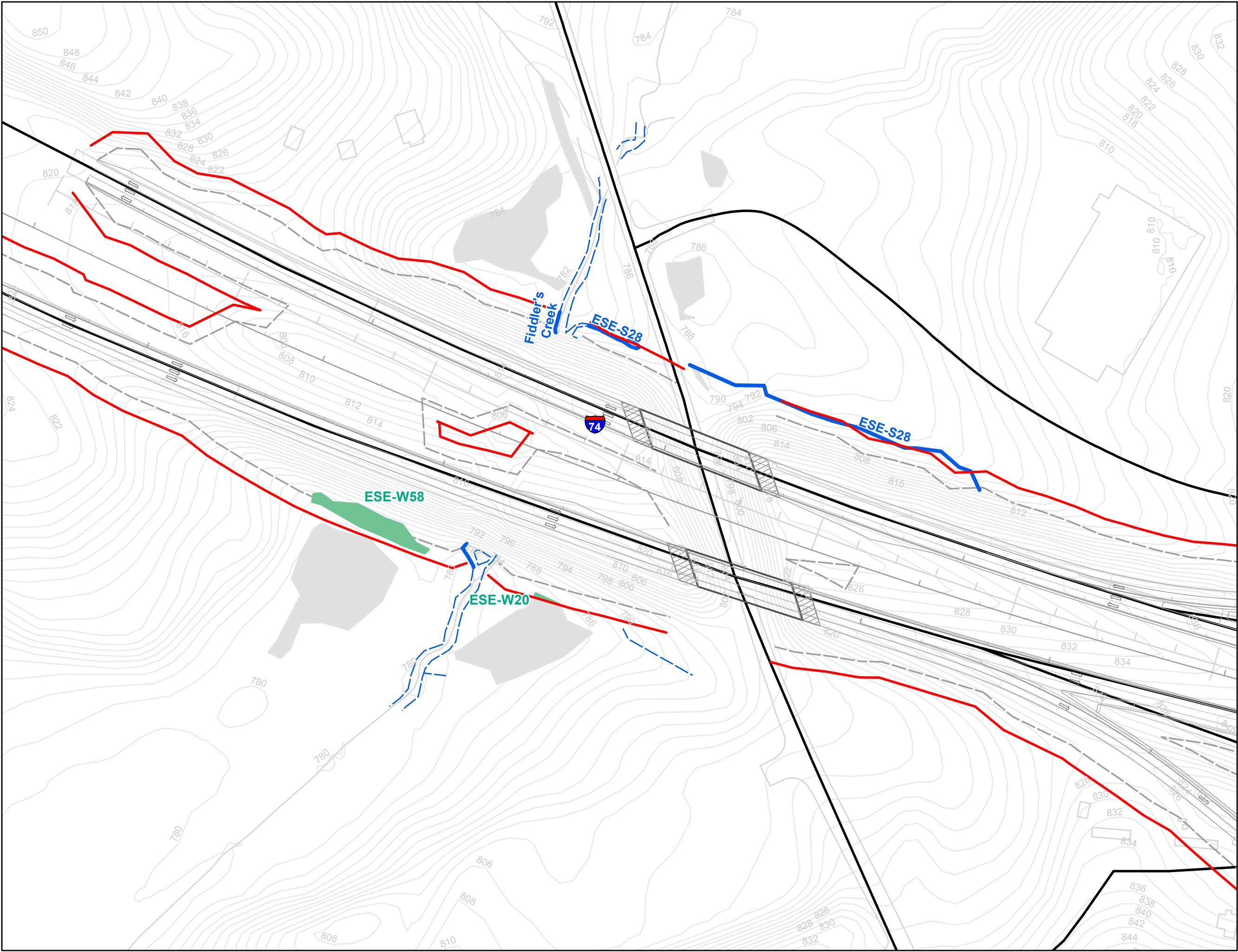
**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AA: Corridor Context**



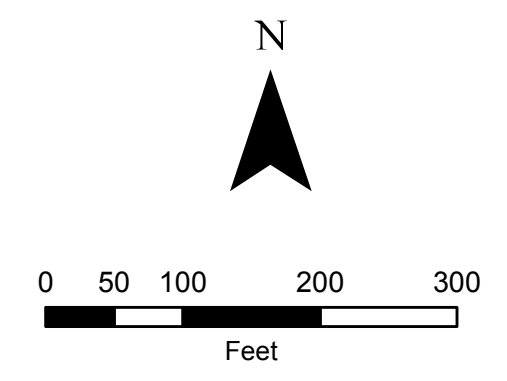
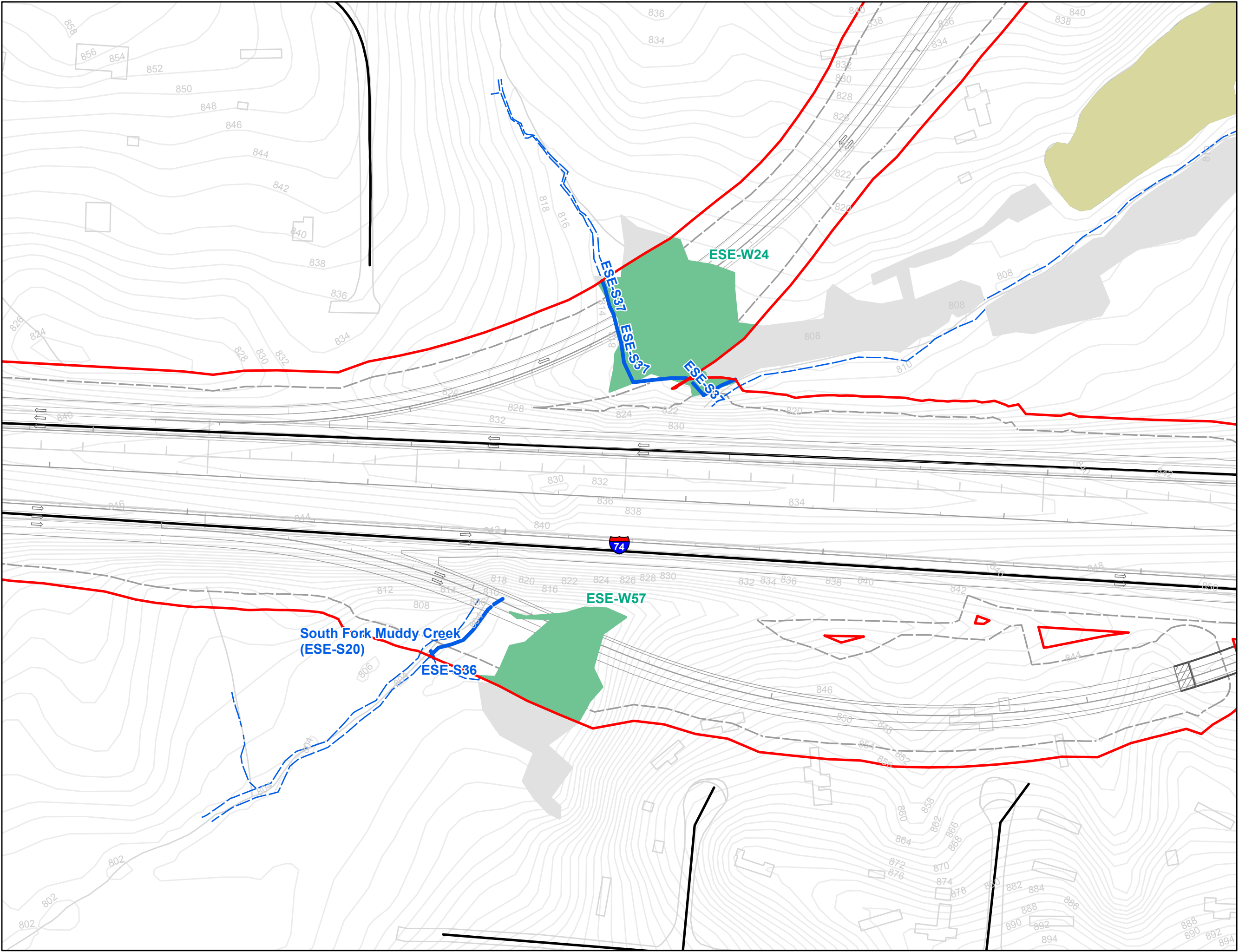
Legend

- U-2579 Corridor
- U-2579 Section Breaks
- Section Map Sheets
- Interstate
- US Route
- NC Route
- Secondary Road
- Other Existing Road

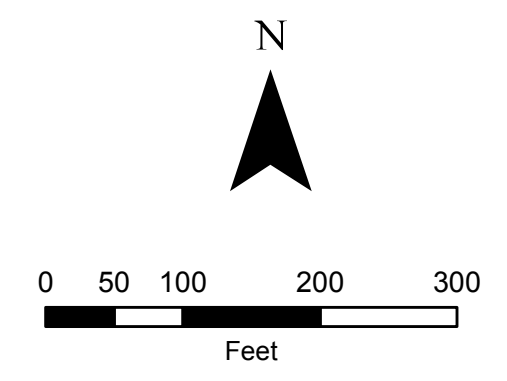
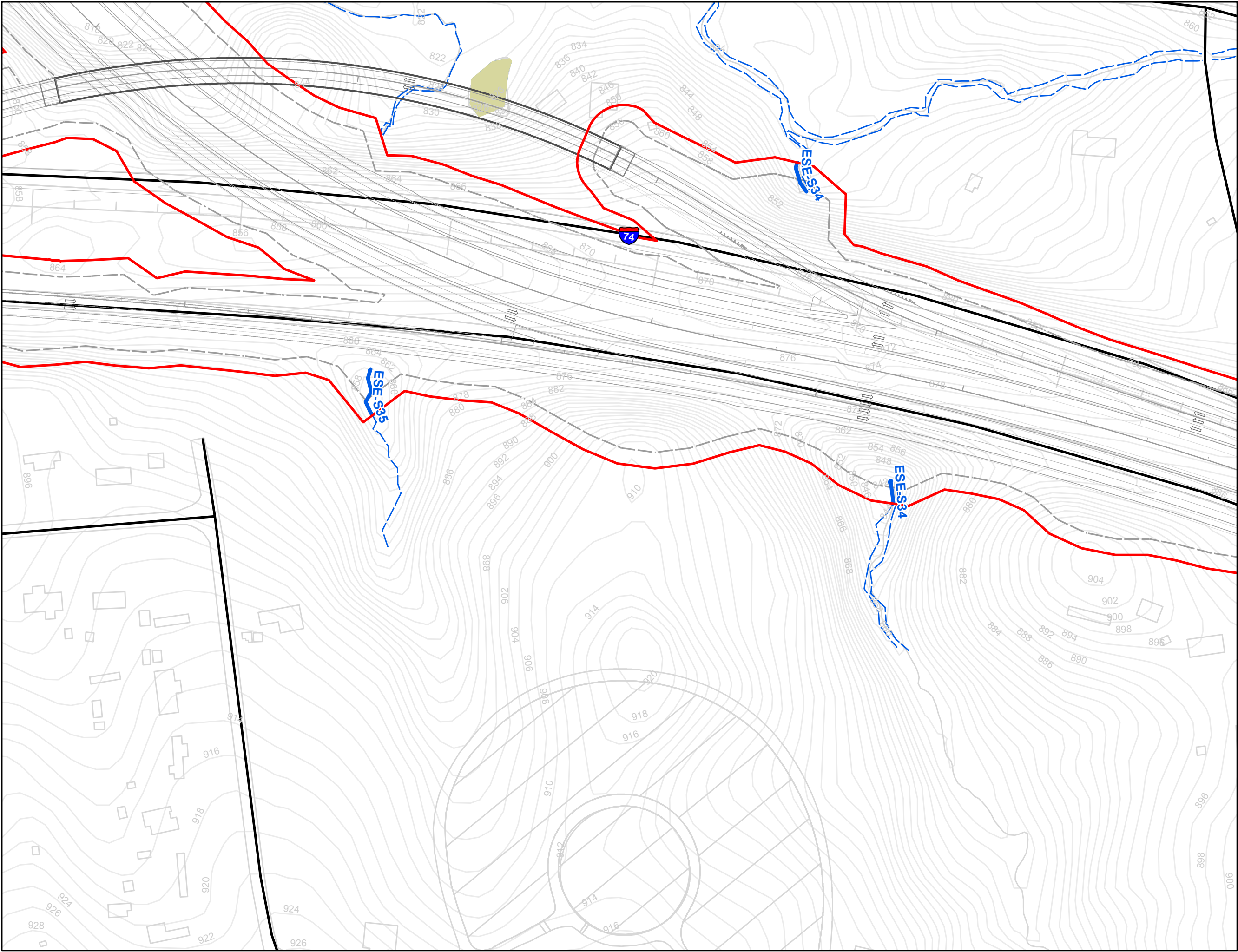
**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AA: Master Sheet**



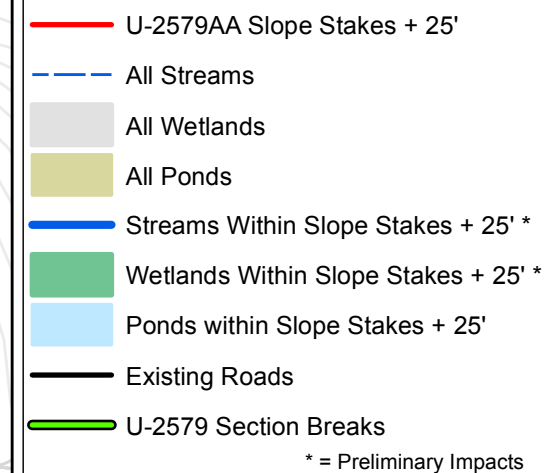
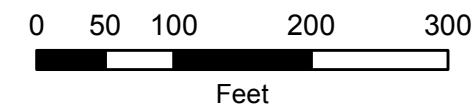
- Legend**
- U-2579AA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts

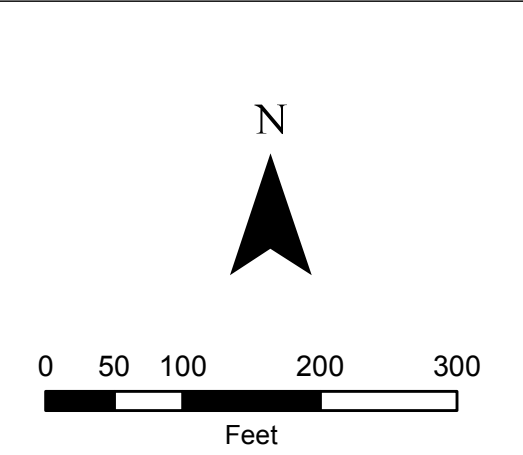
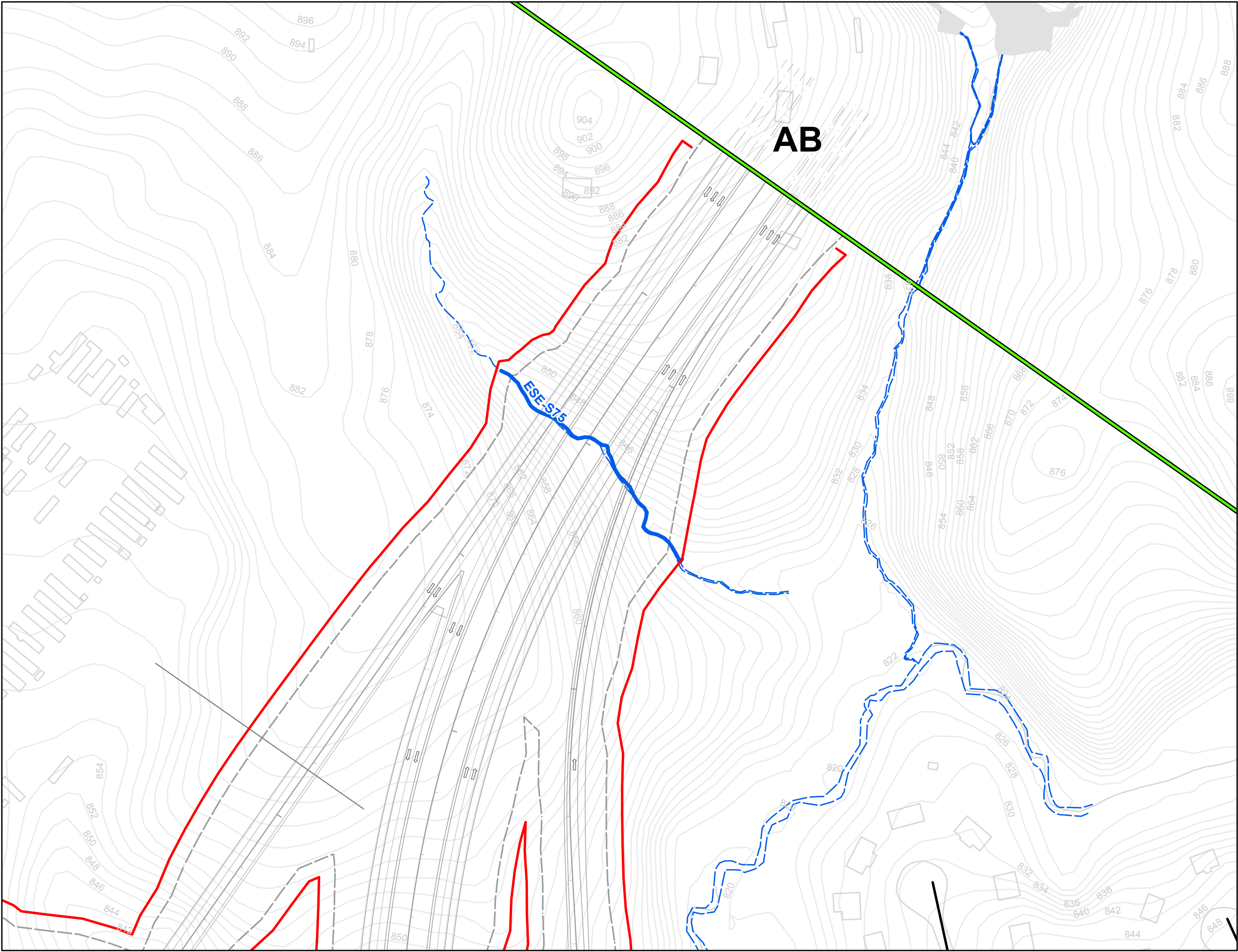


- Legend**
- U-2579AA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts



- Legend**
- U-2579AA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts





- Legend**
- U-2579AA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts

STIP No. U-2579, Section AA

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

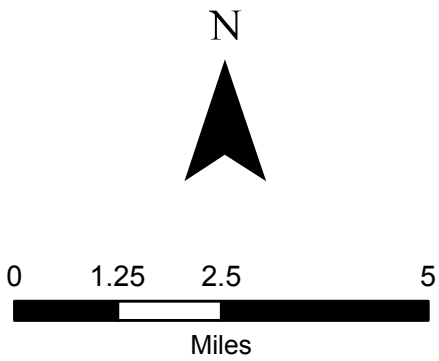
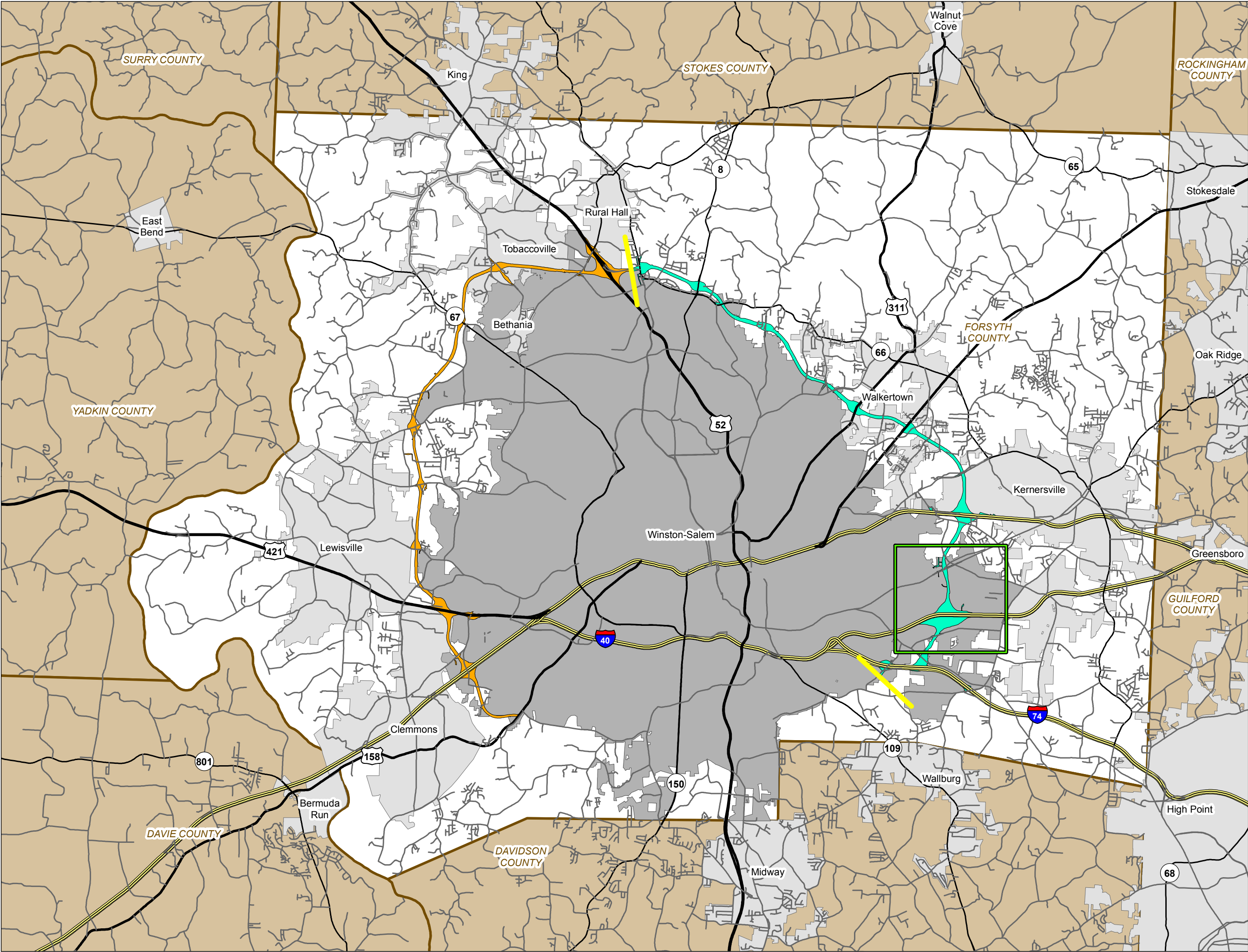
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	ESE-W58	0.09
1	ESE-W20	<0.01
2	ESE-W24	0.84
2	ESE-W57	0.47
4	ESE-W23	0.03
Total:		1.43

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	Fiddler's Creek	78
1	ESE-S28	606
2	South Fork Muddy Creek (ESE-S20)	200
2	ESE-S36	12
2	ESE-S37	274
3	ESE-S34	90
3	ESE-S35	80
4	Swaim Creek (ESE-S18)	535
4	South Fork Muddy Creek (ESE-S20)	562
4	ESE-S23	130
5	ESE-S75	452
Total:		3,019

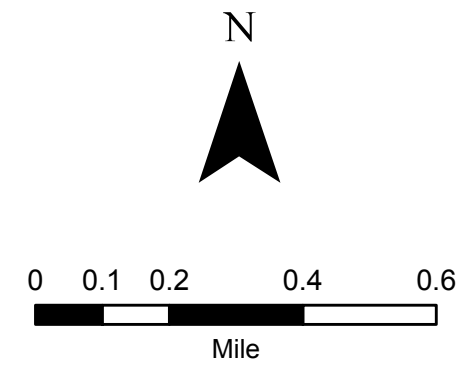
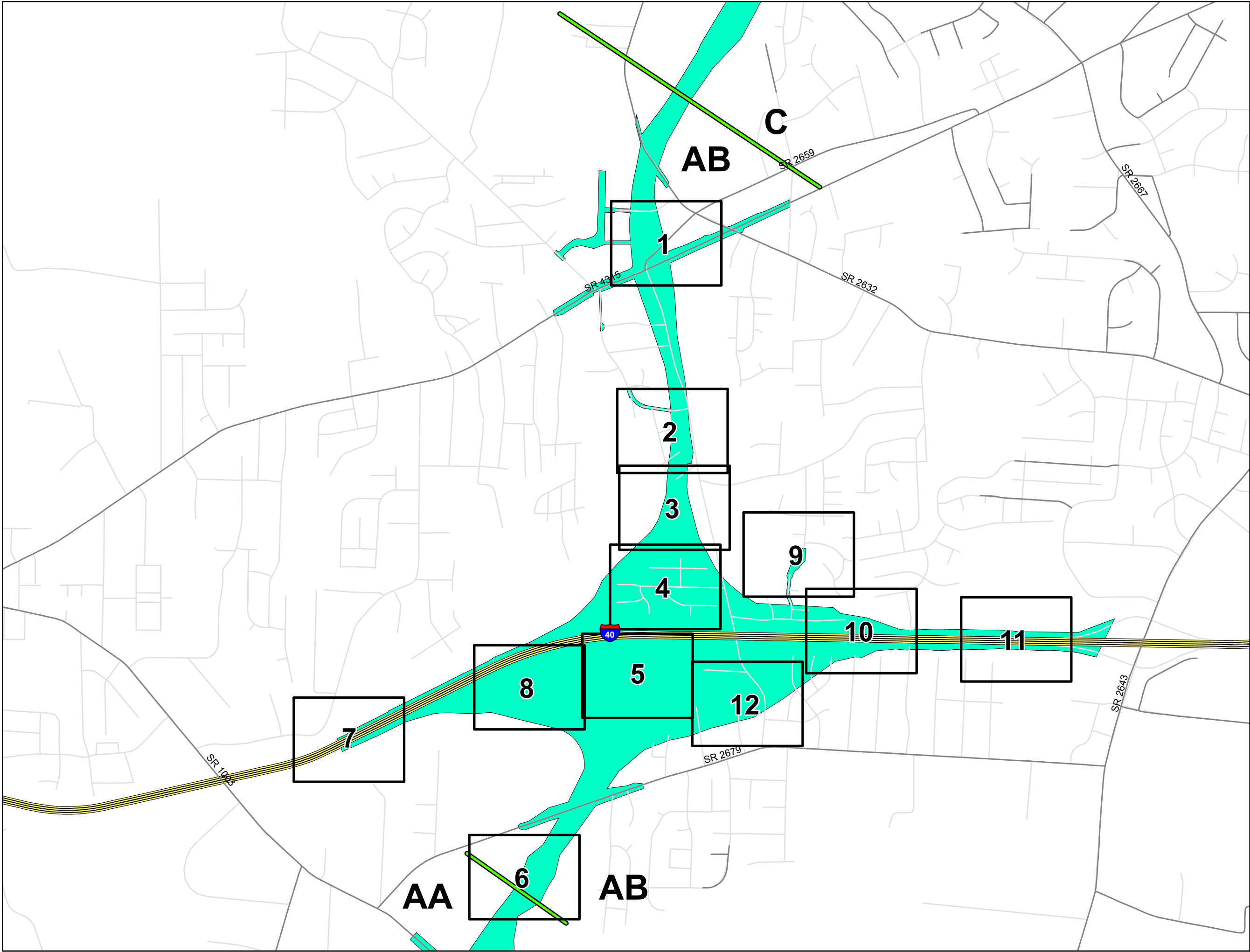
Ponds

<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
4	New, No label	0.06
Total:		0.06



- Legend**
- R-2247 Corridor
 - U-2579 Corridor
 - U-2579AB Section Area
 - U-2579 Project Start / Stop
 - Interstate
 - US Route
 - NC Route
 - Secondary Road

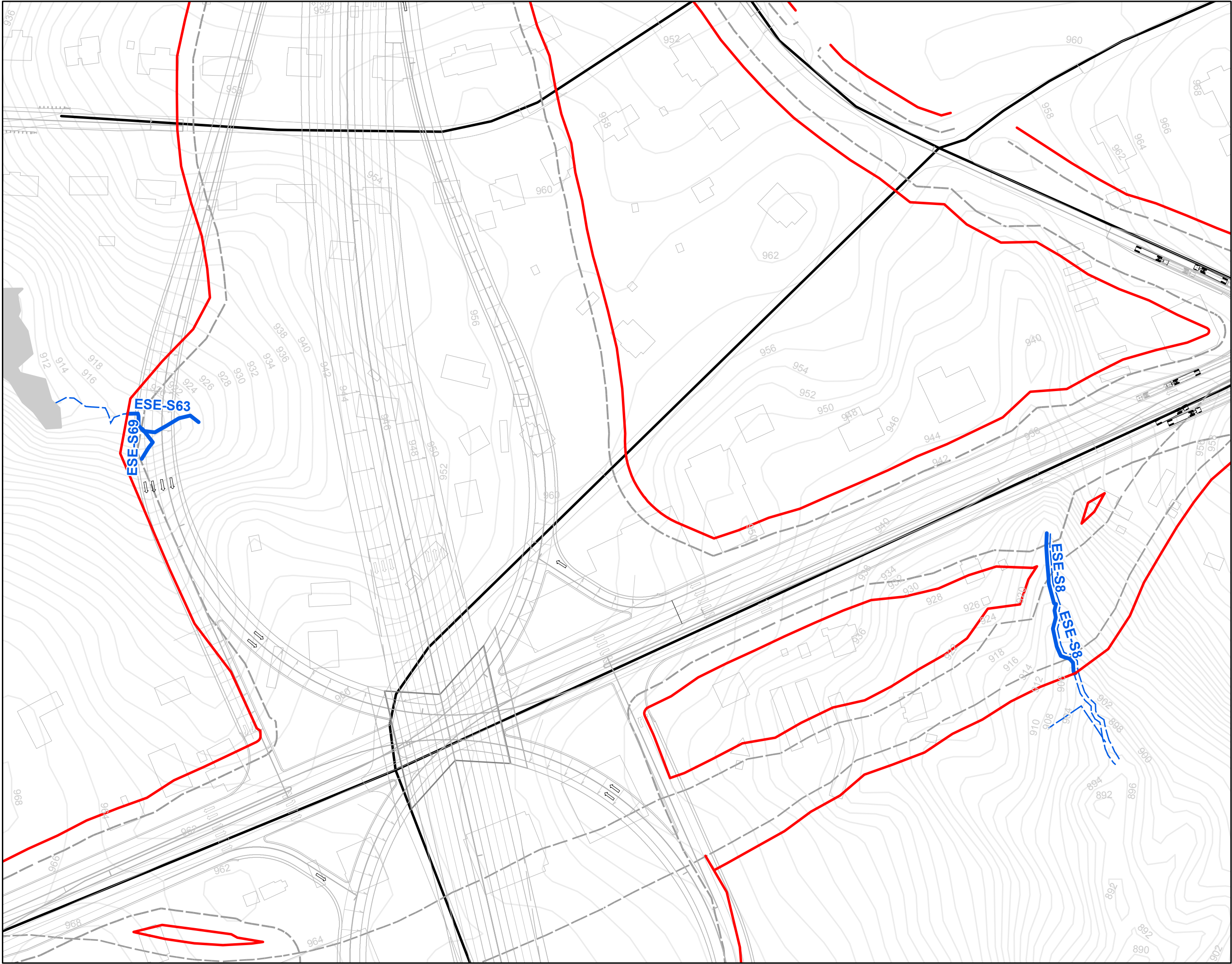
**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AB: Corridor Context**



Legend

- U-2579 Corridor
- U-2579 Section Breaks
- Section Map Sheets
- Interstate
- US Route
- NC Route
- Secondary Road
- Other Existing Road

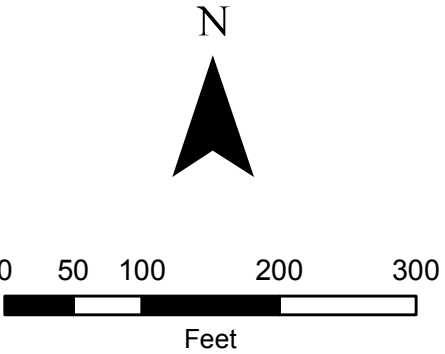
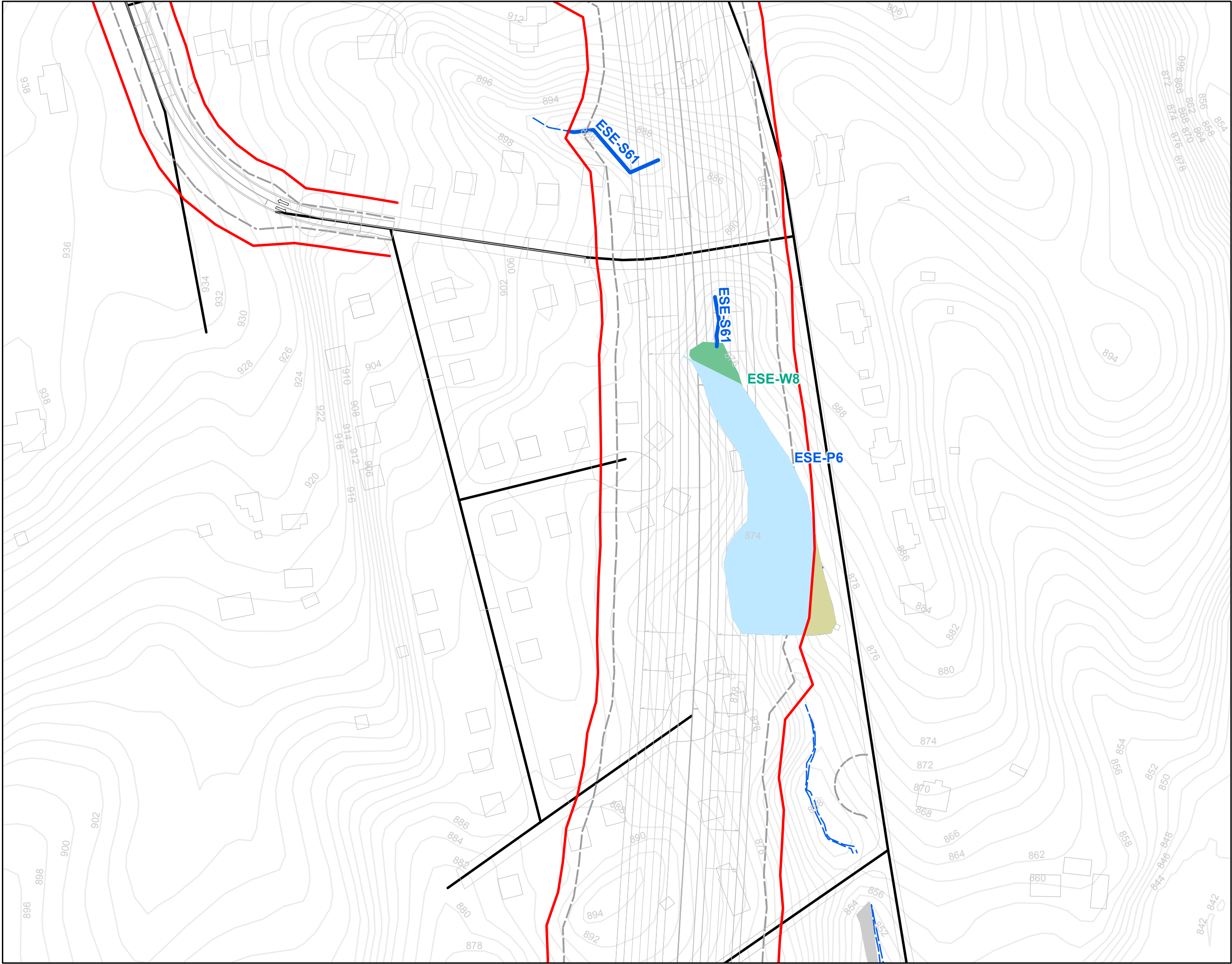
**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AB: Master Sheet**



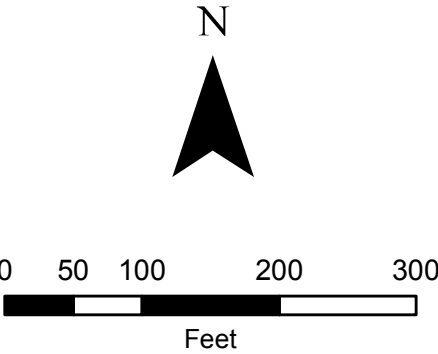
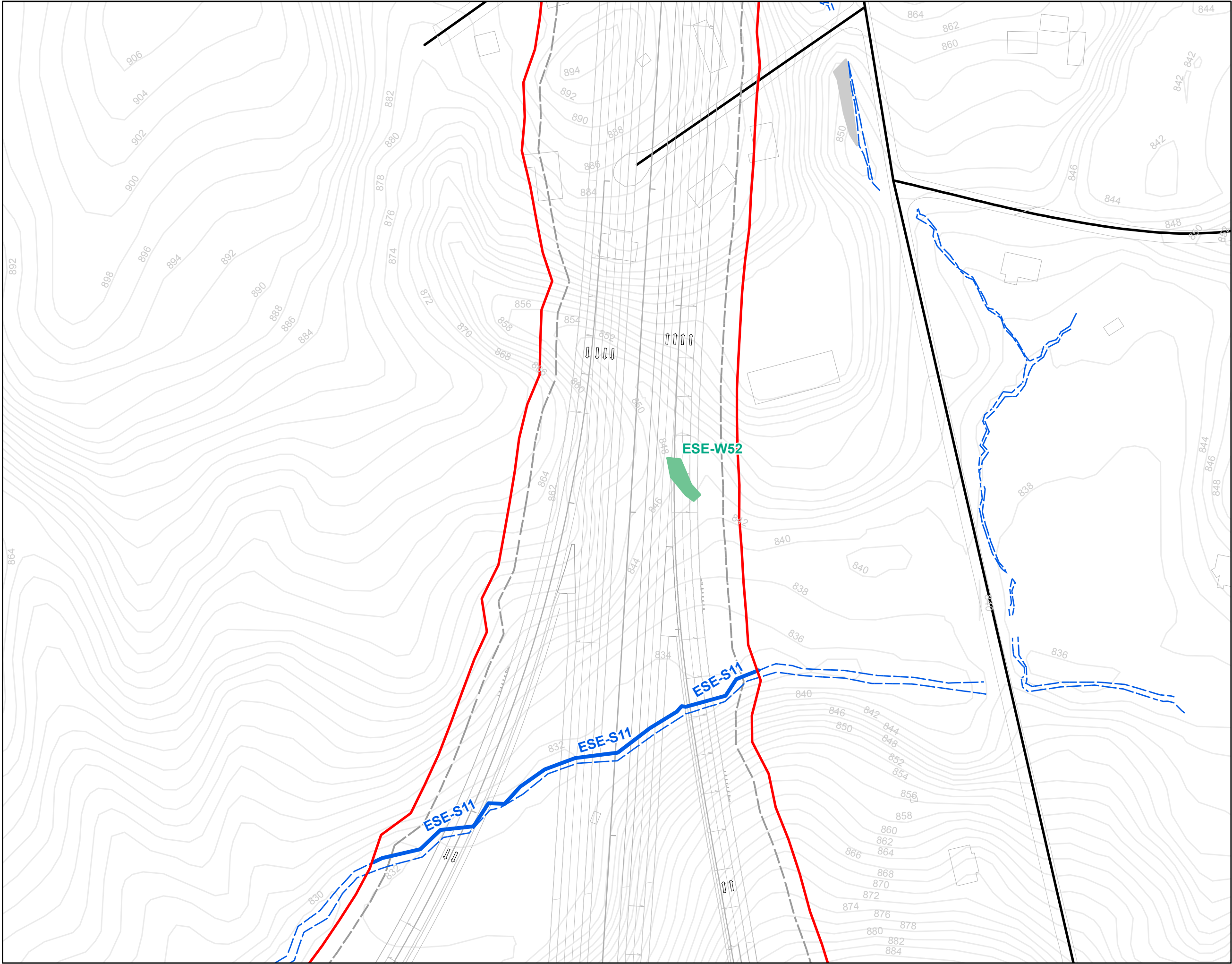
Legend

- U-2579AB Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

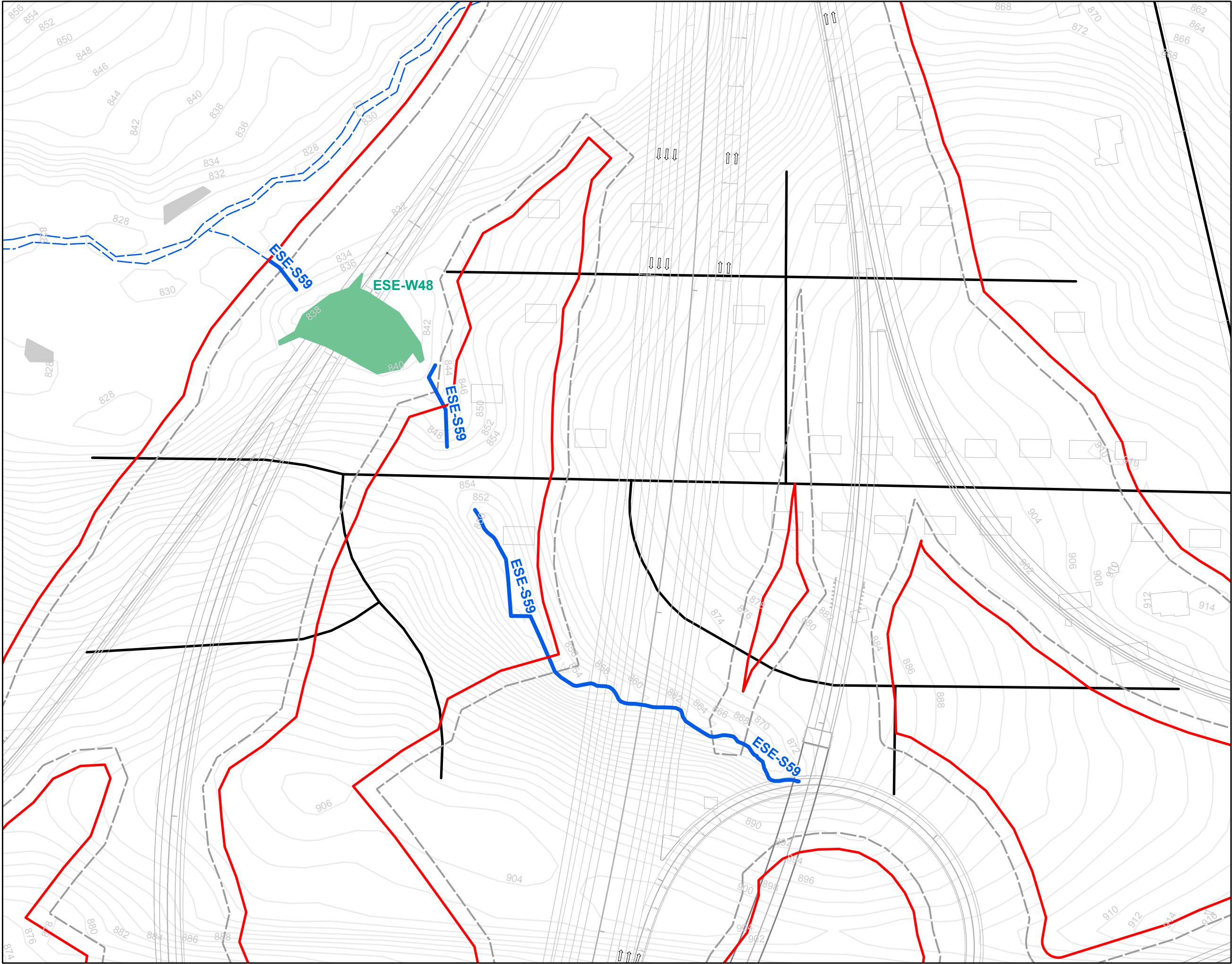
* = Preliminary Impacts



- Legend**
- U-2579AB Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts



- Legend**
- U-2579AB Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts

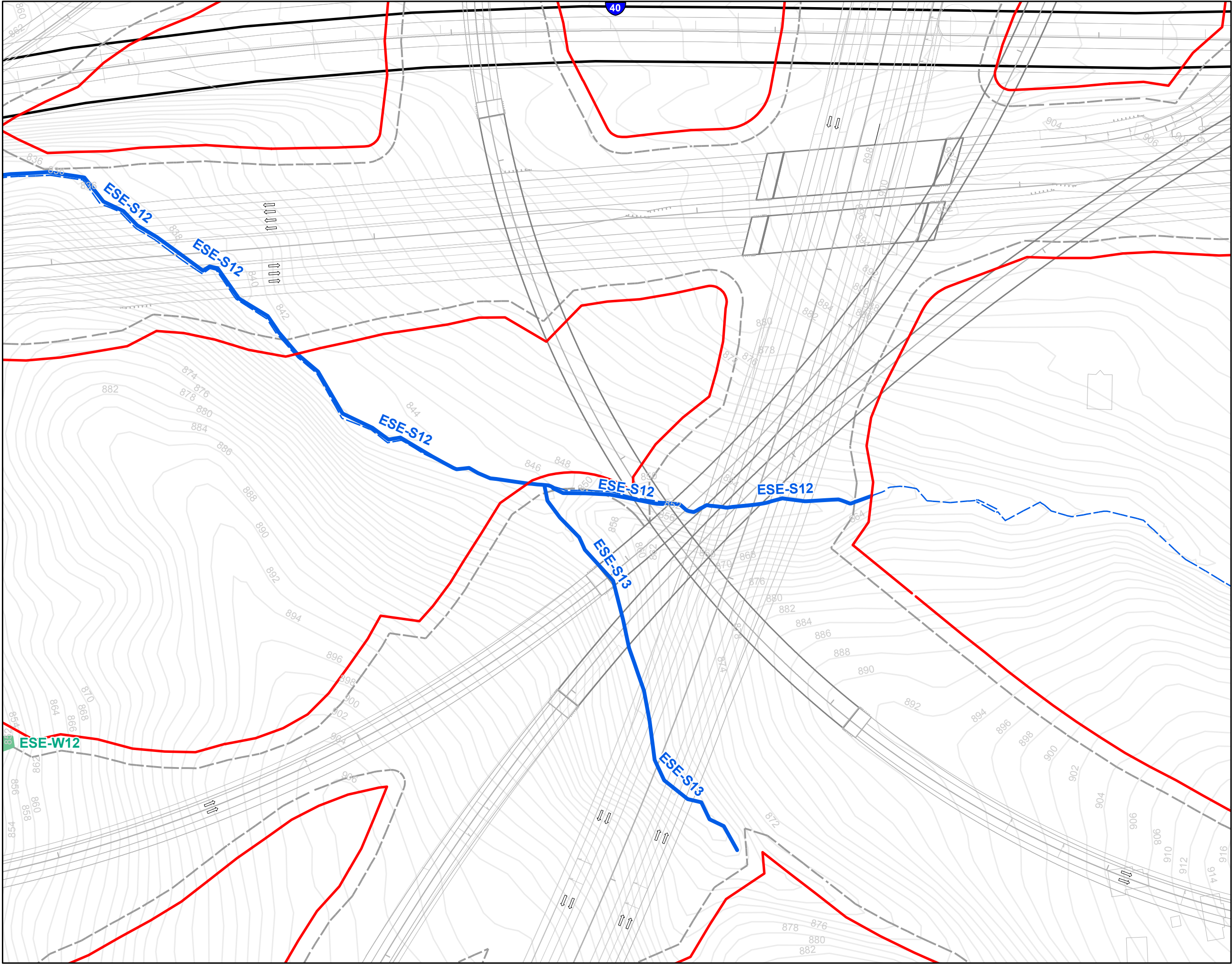


Legend

- U-2579AB Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AB: Sheet 4 of 11**

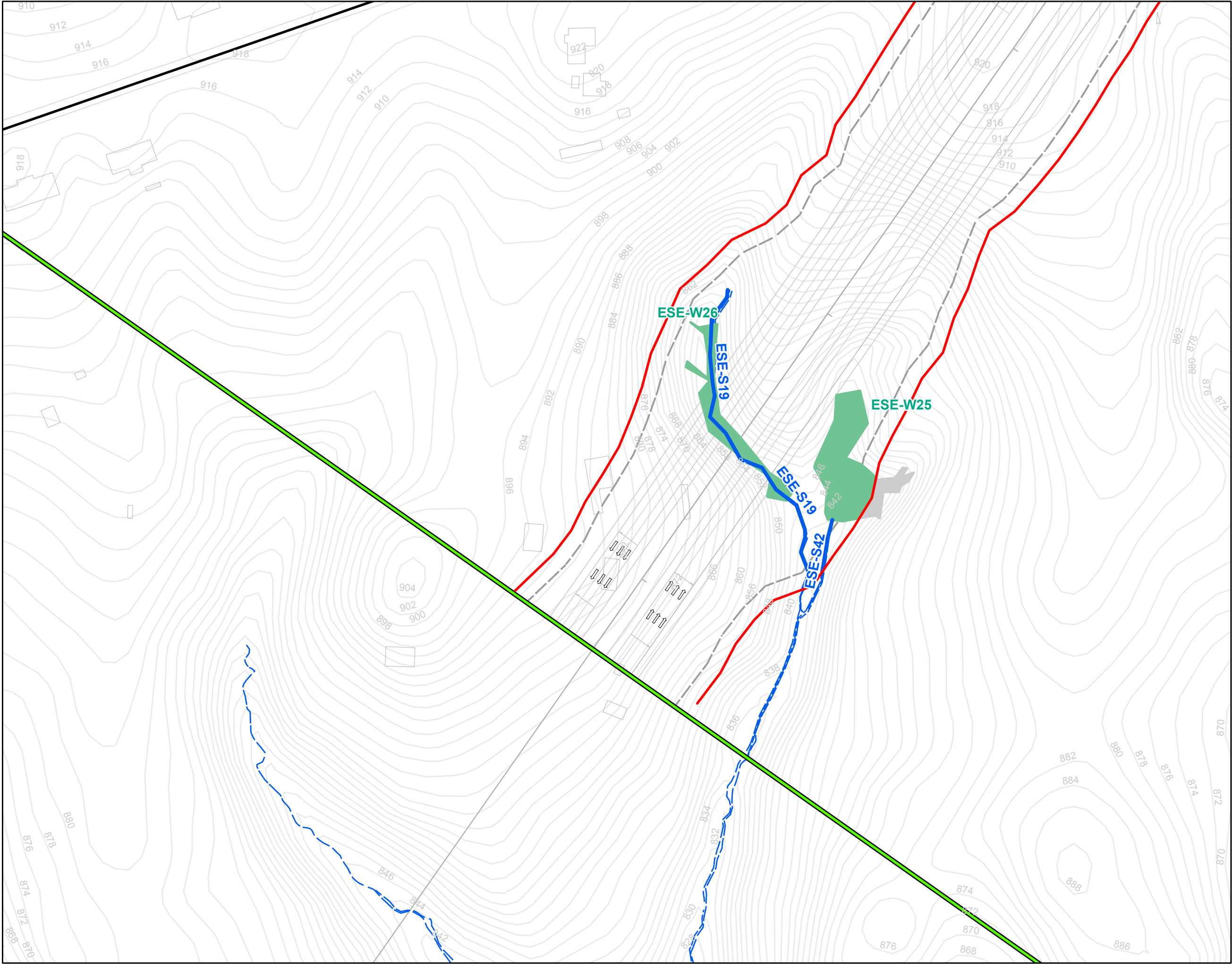


Legend

- U-2579AB Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AB: Sheet 5 of 11**

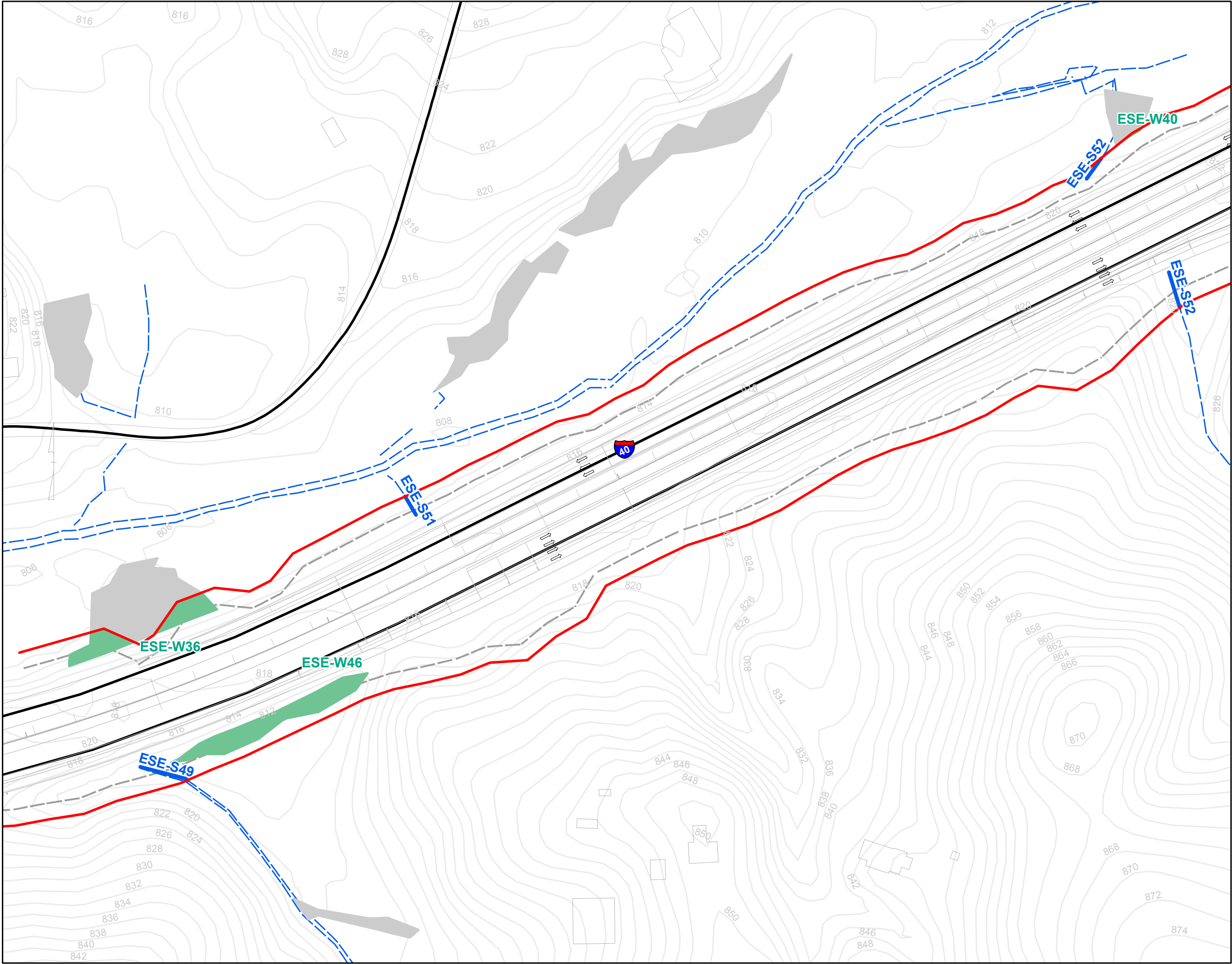


Legend

- U-2579AB Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AB: Sheet 6 of 11**

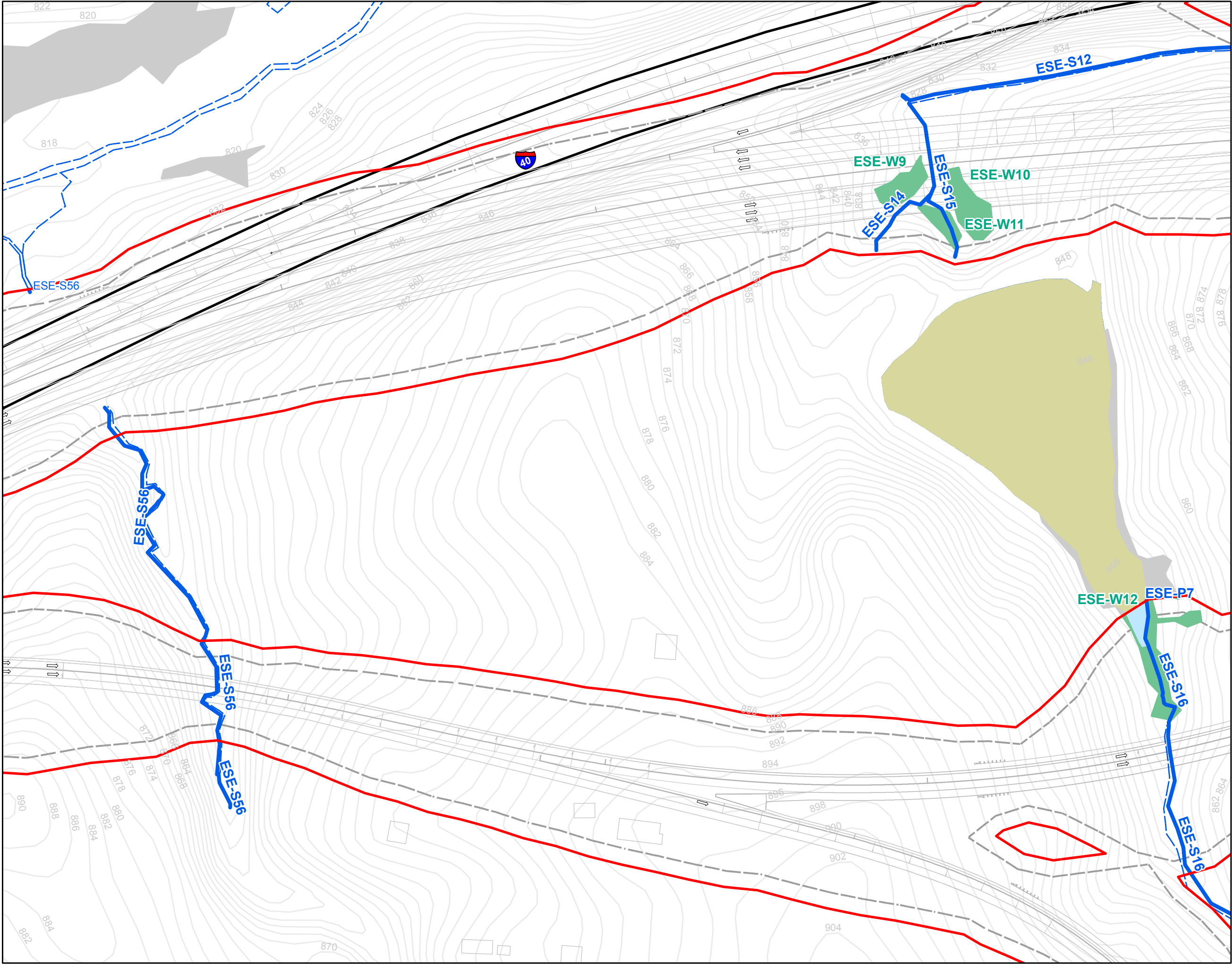


Legend

- U-2579AB Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AB: Sheet 7 of 11**



N

0 50 100 200 300

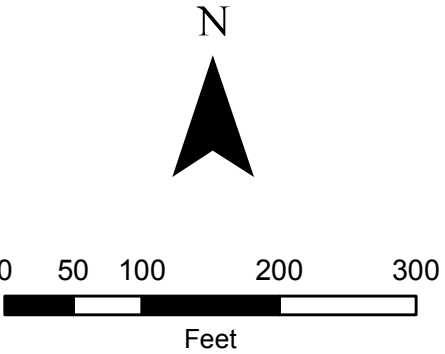
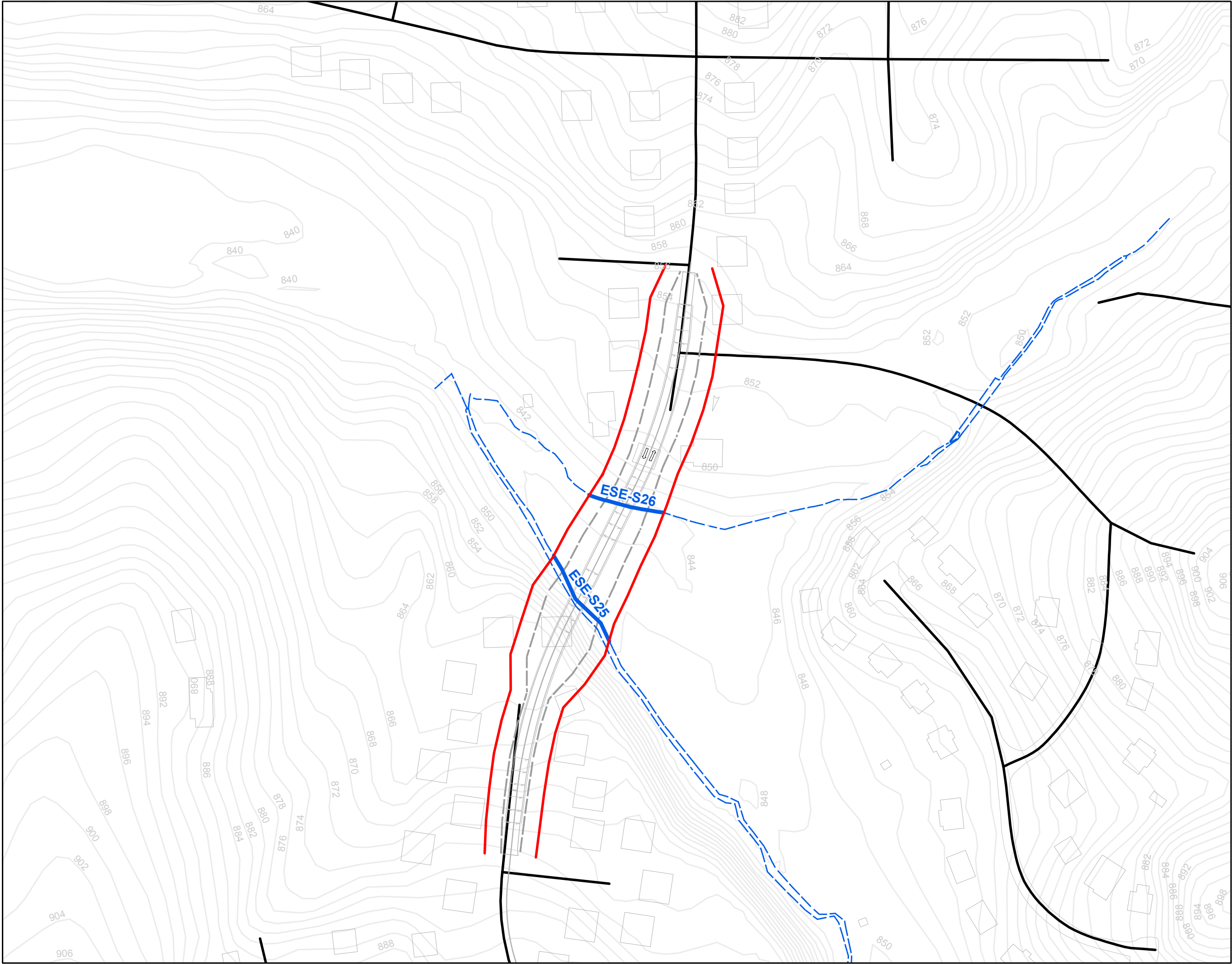
Feet

Legend

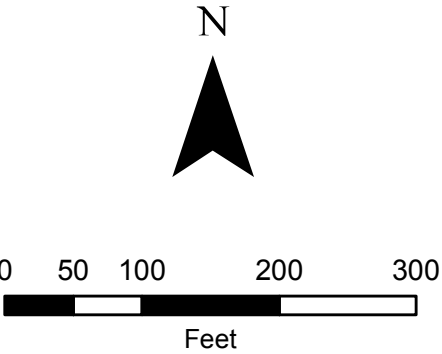
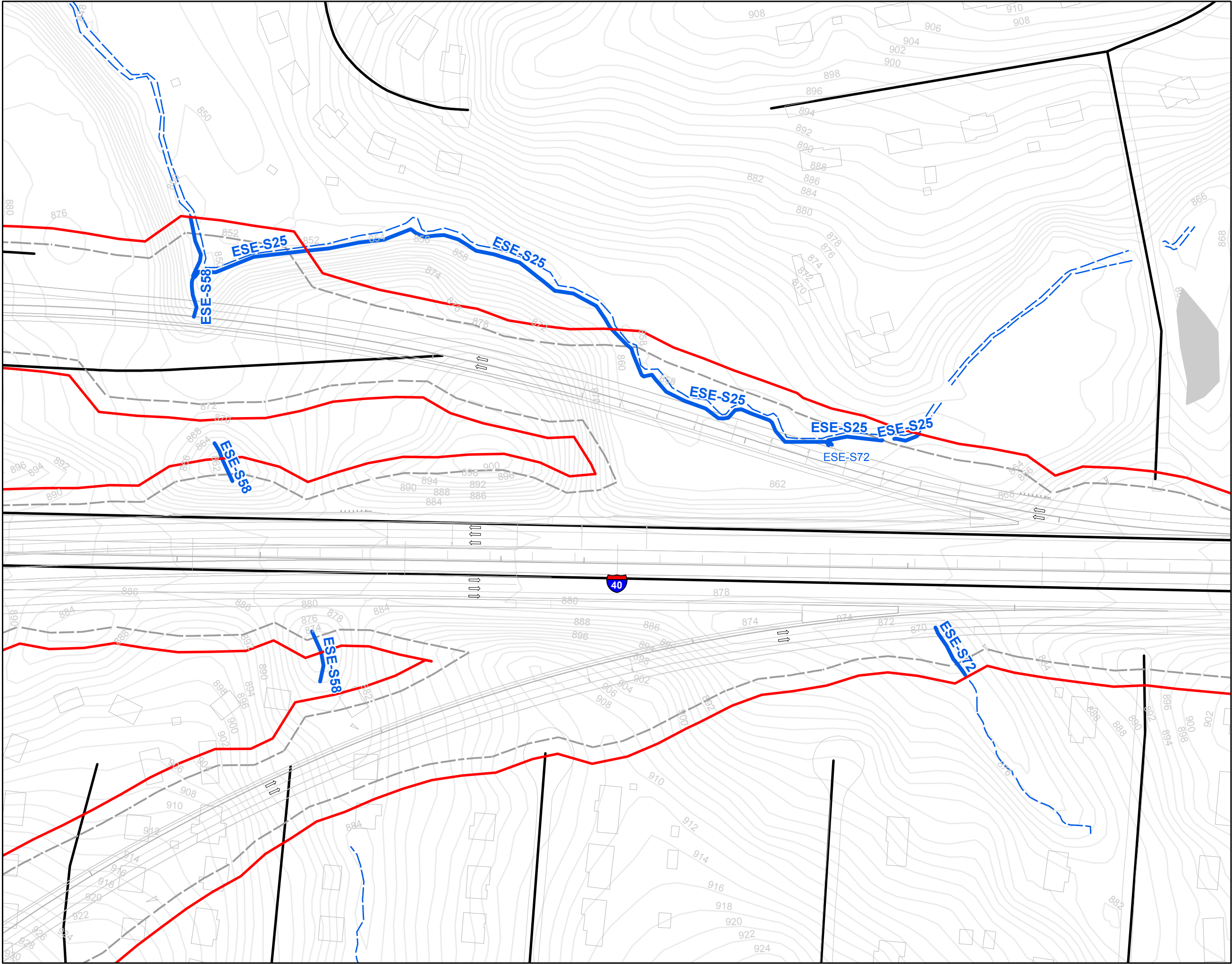
- U-2579AB Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

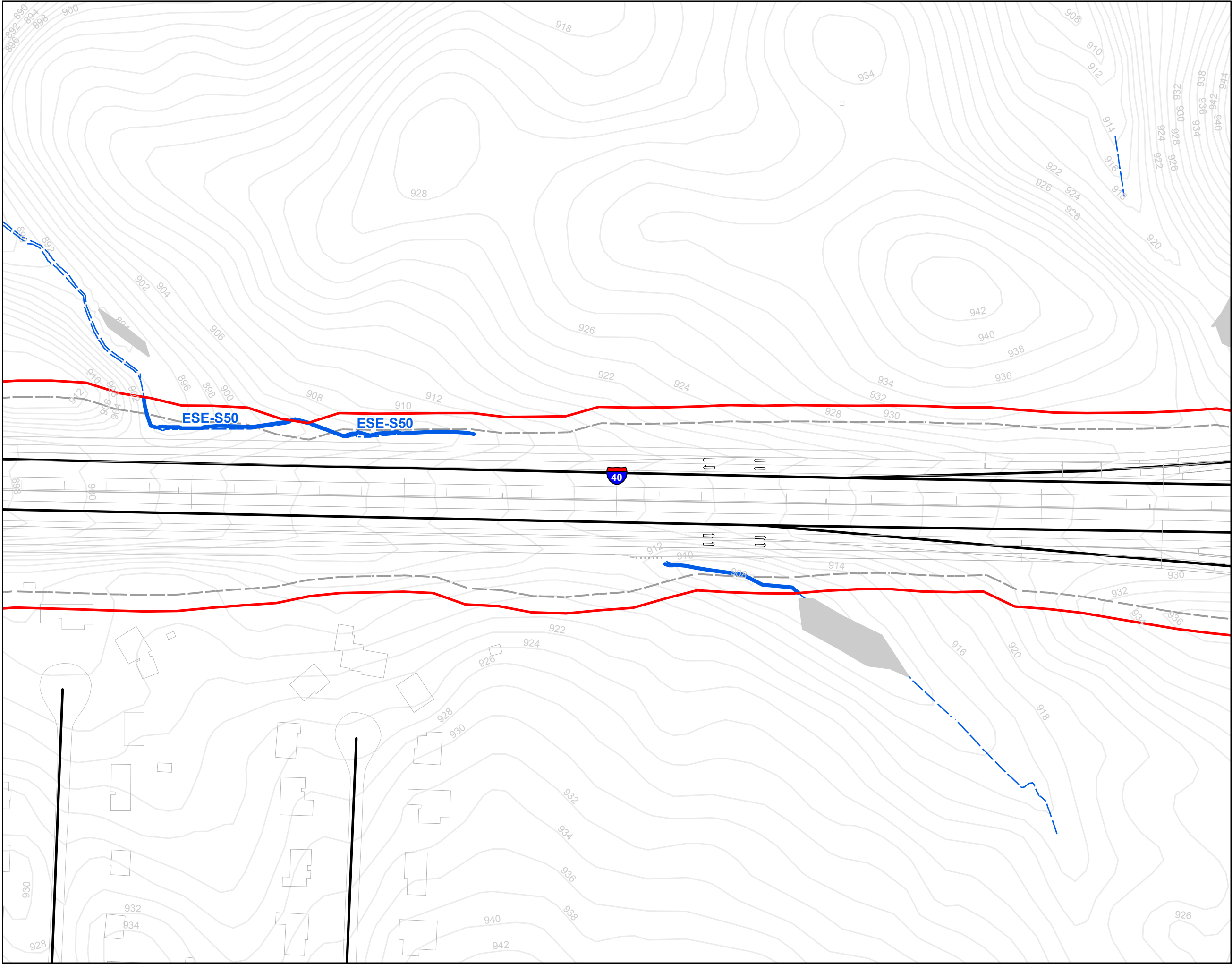
Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AB: Sheet 8 of 11



- Legend**
- U-2579AB Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts



- Legend**
- U-2579AB Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts



N

0 50 100 200 300

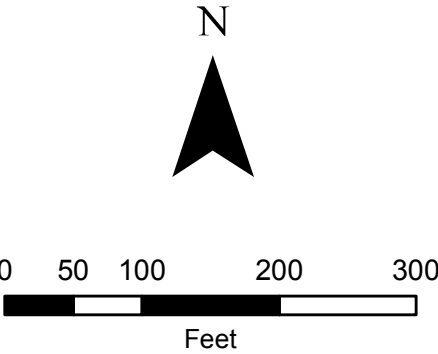
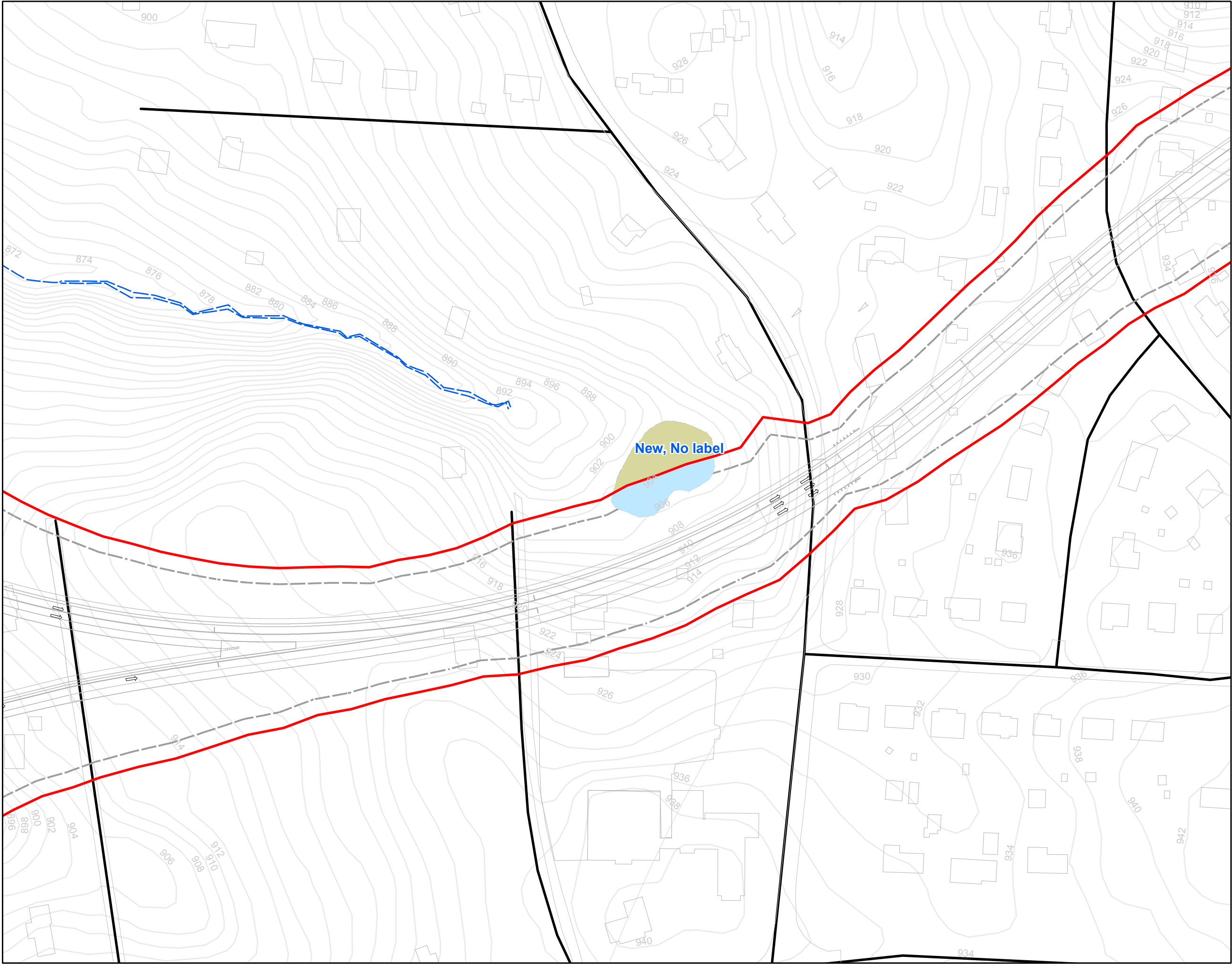
Feet

Legend

- U-2579AB Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section AB: Sheet 11 of 11



- Legend**
- U-2579AB Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts

STIP No. U-2579, Section AB

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

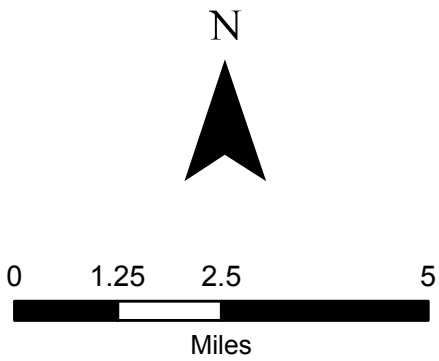
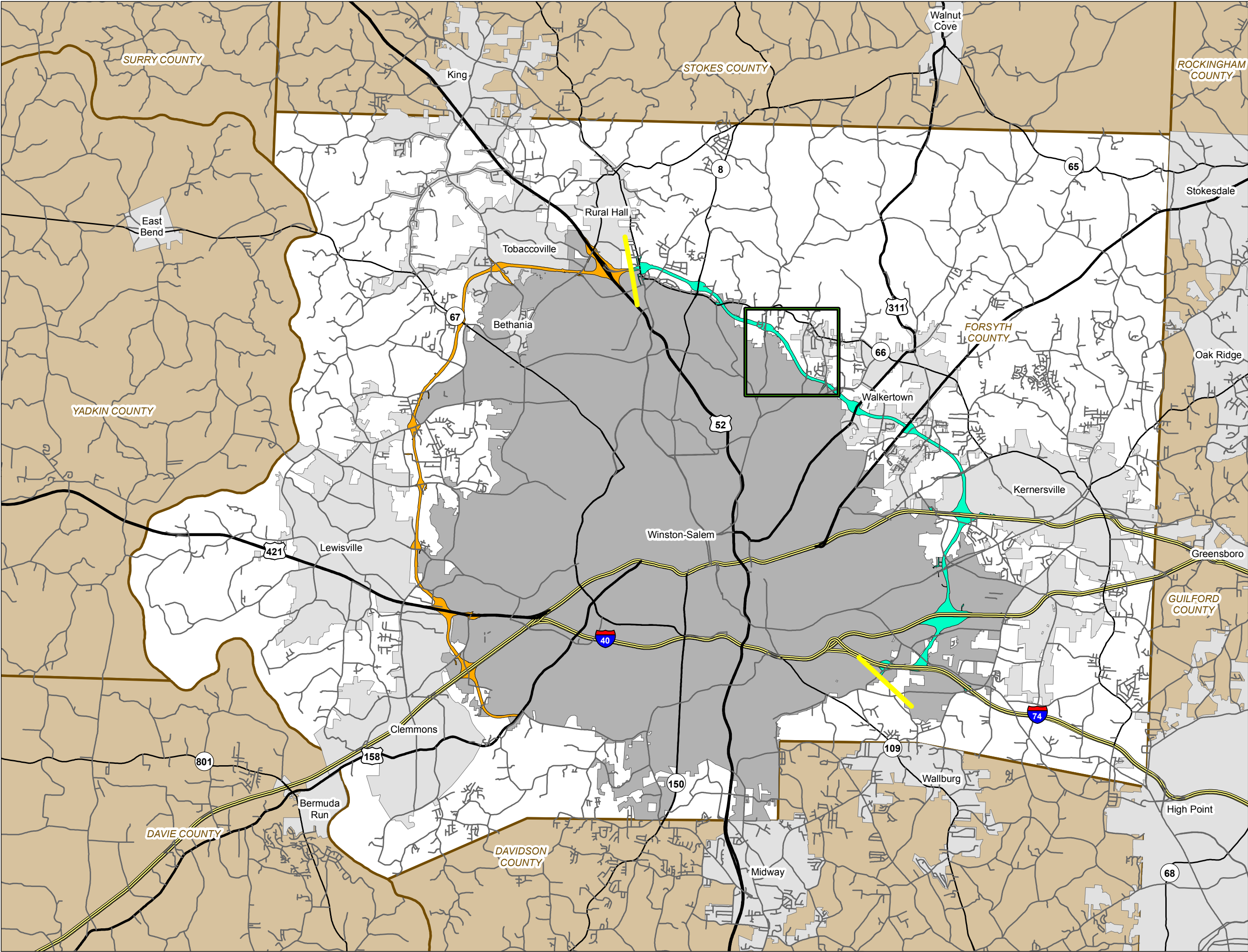
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
2	ESE-W8	0.13
3	ESE-W52	0.03
4	ESE-W48	0.36
6	ESE-W25	0.26
6	ESE-W26	0.14
7	ESE-W36	0.10
7	ESE-W40	<0.01
7	ESE-W46	0.16
8	ESE-W9	0.06
8	ESE-W10	0.09
8	ESE-W11	0.04
8	ESE-W12	0.13
Total:		1.50

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	ESE-S8	234
1	ESE-S63	141
1	ESE-S69	57
2	ESE-S61	250
3	ESE-S11	696
4	ESE-S59	954
5	ESE-S12	1,501
5	ESE-S13	666
6	ESE-S19	539
6	ESE-S42	82
7	ESE-S49	76
7	ESE-S51	33
7	ESE-S52	95
8	ESE-S14	135
8	ESE-S15	273
8	ESE-S16	607
8	ESE-S56	793
8	ESE-S12	503
9	ESE-S25	158
9	ESE-S26	118
10	ESE-S58	209
10	ESE-S72	87
10	ESE-S25	1,374
11	ESE-S50	770
Total:		10,351

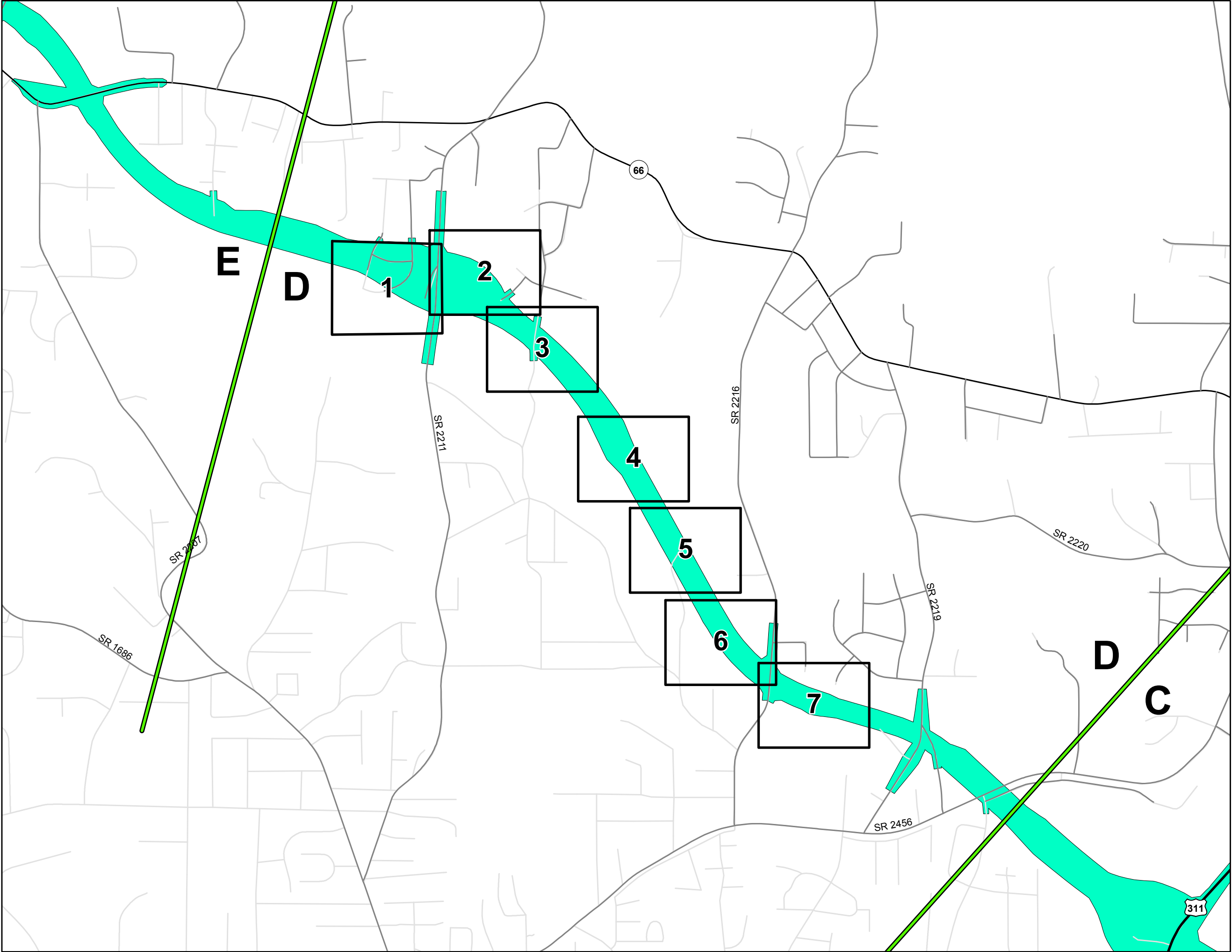
Ponds

<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
2	ESE-P6	0.89
8	ESE-P7	0.03
12	New, No label	0.15
Total:		1.07



- Legend**
- R-2247 Corridor
 - U-2579 Corridor
 - U-2579D Section Area
 - U-2579 Project Start / Stop
 - Interstate
 - US Route
 - NC Route
 - Secondary Road

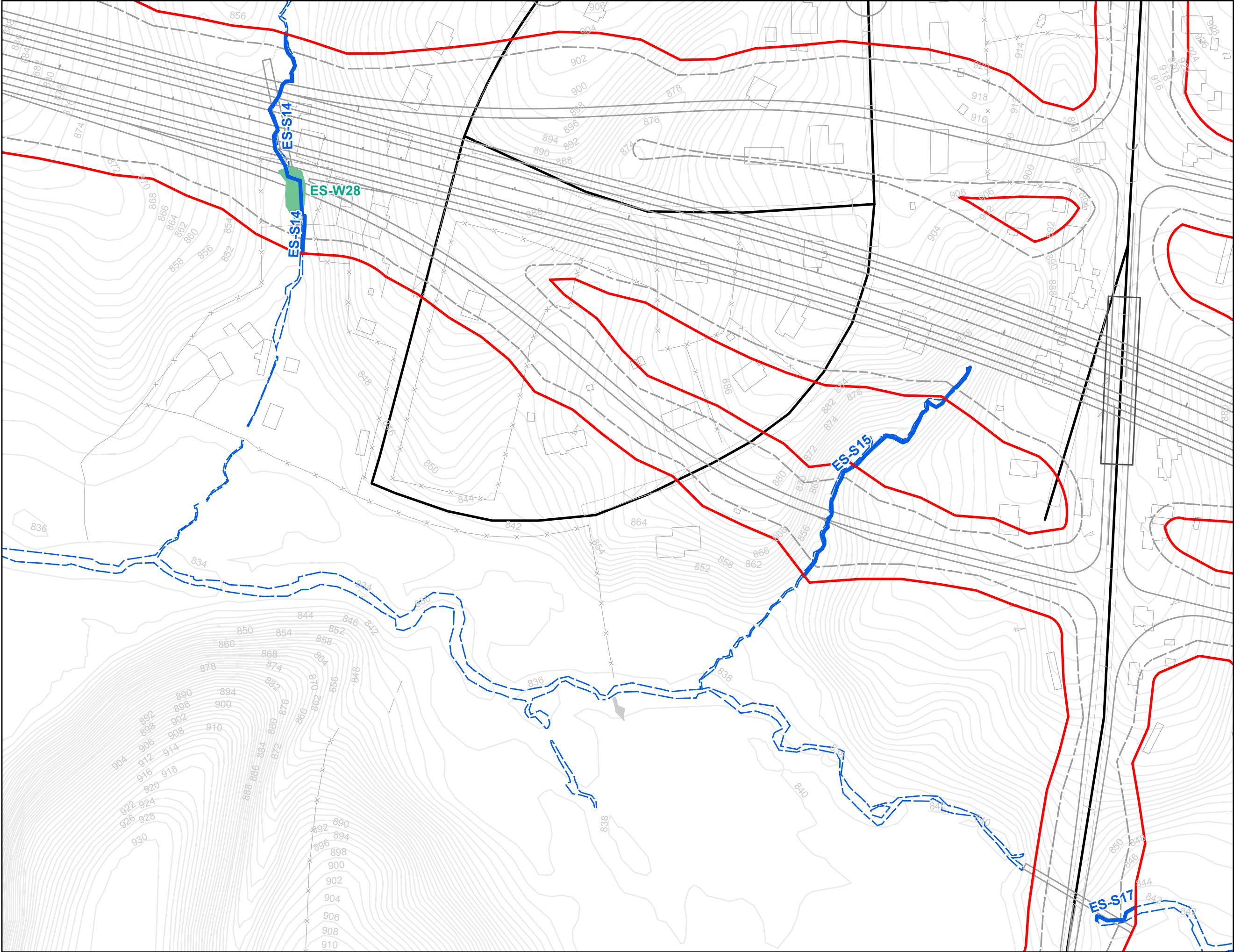
**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section D: Corridor Context**



Legend

- U-2579 Corridor
- U-2579 Section Breaks
- Section Map Sheets
- Interstate
- US Route
- NC Route
- Secondary Road
- Other Existing Road

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section D: Master Sheet**



N

0 50 100 200 300

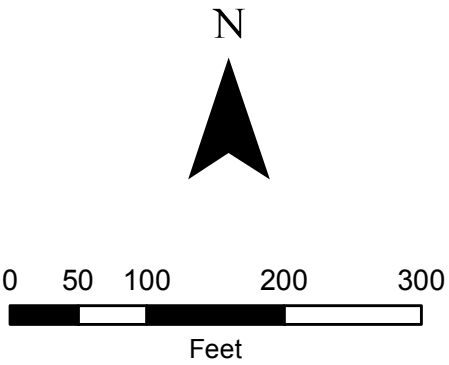
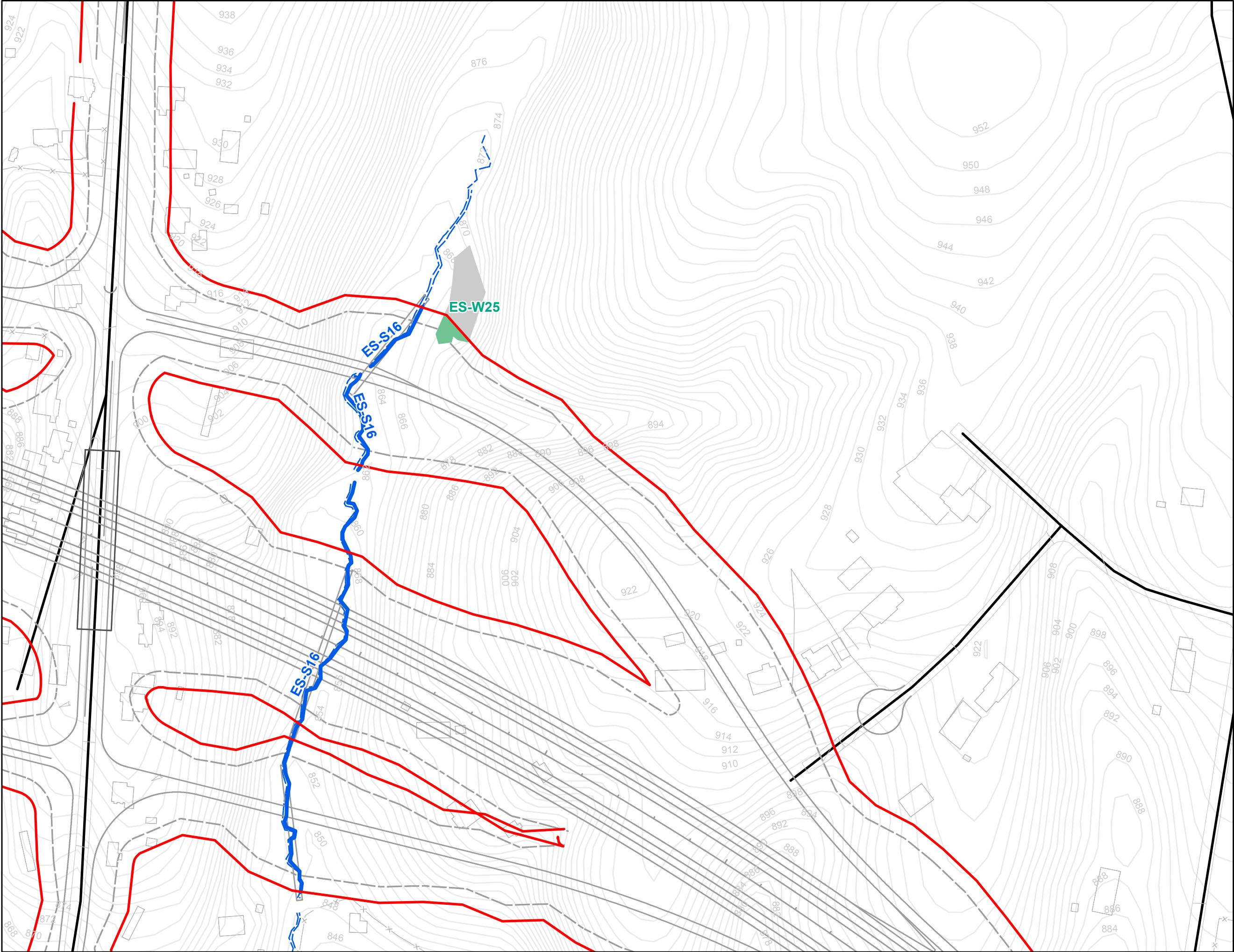
Feet

Legend

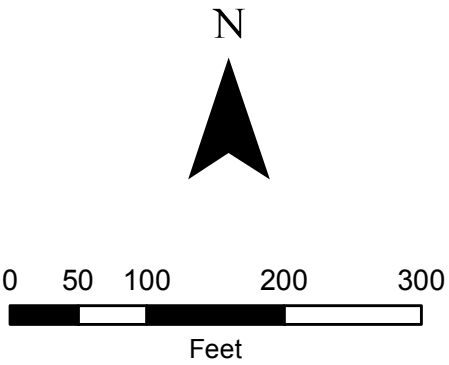
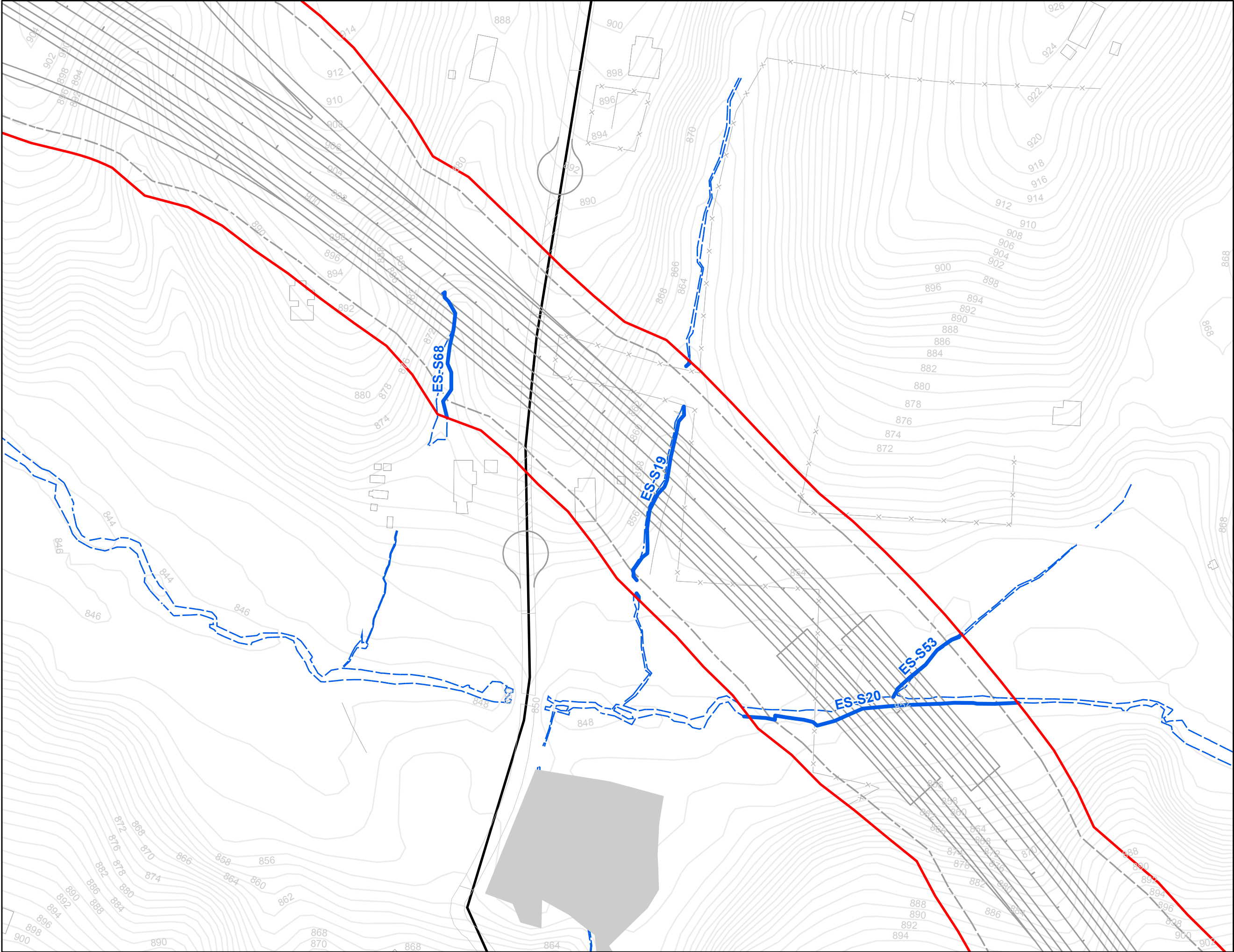
- U-2579D Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

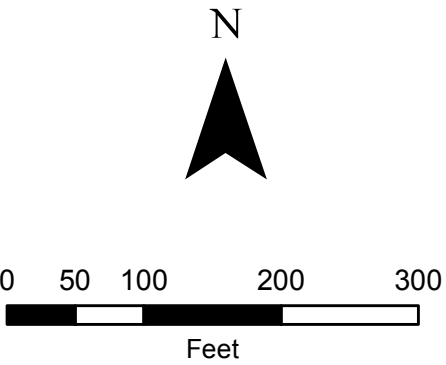
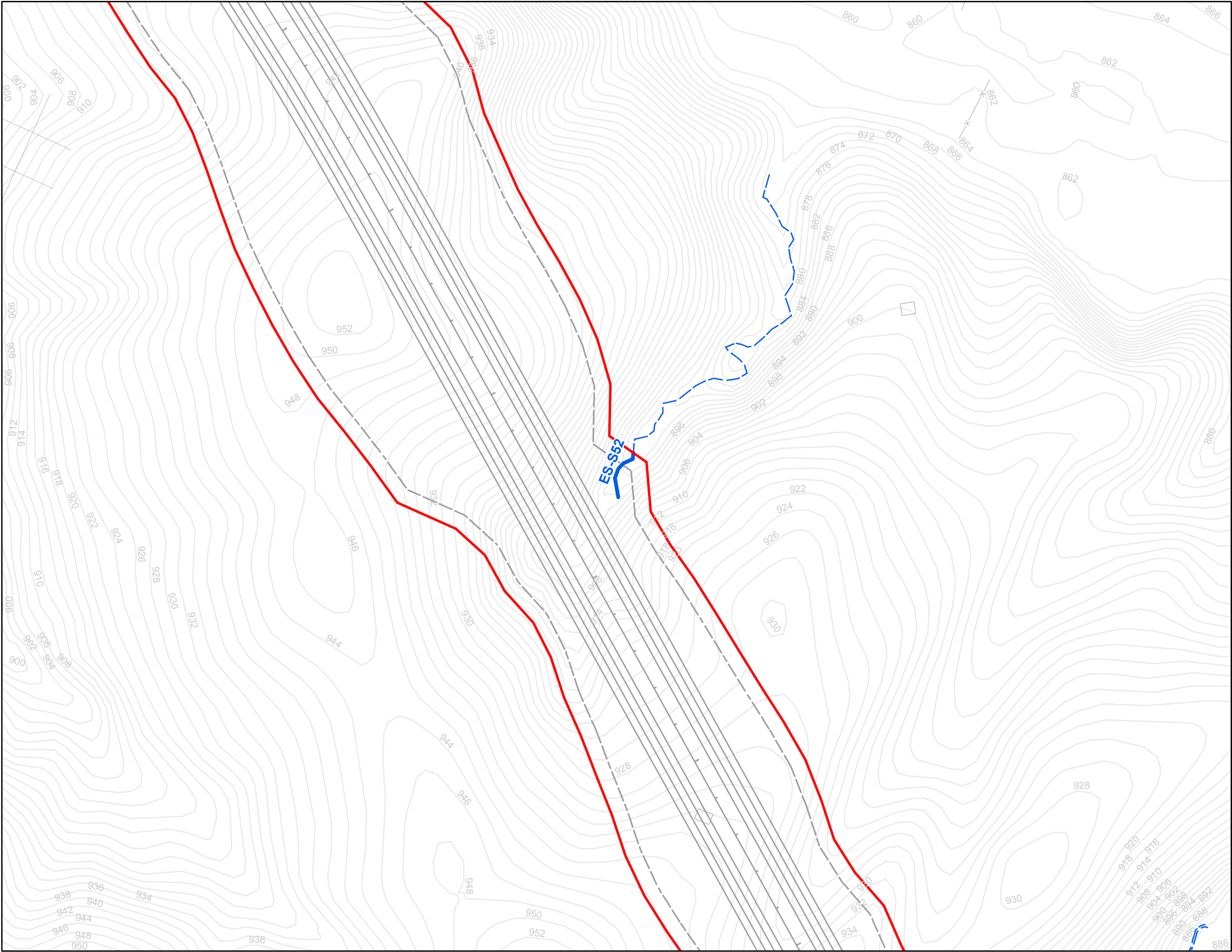
Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section D: Sheet 1 of 7



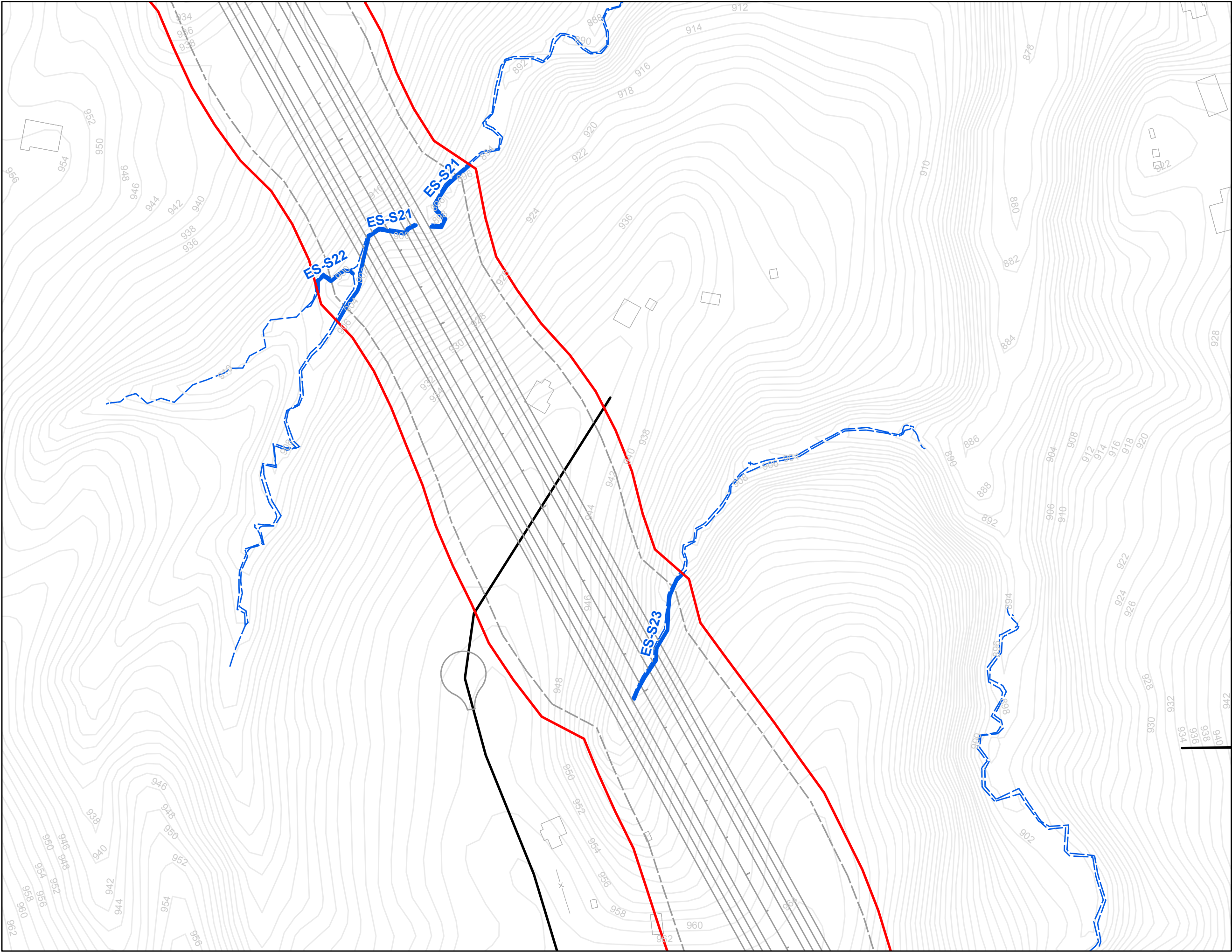
- Legend**
- U-2579D Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts



- Legend**
- U-2579D Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts



- Legend**
- U-2579D Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts



N

0 50 100 200 300

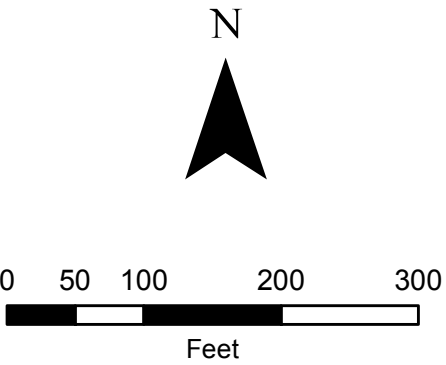
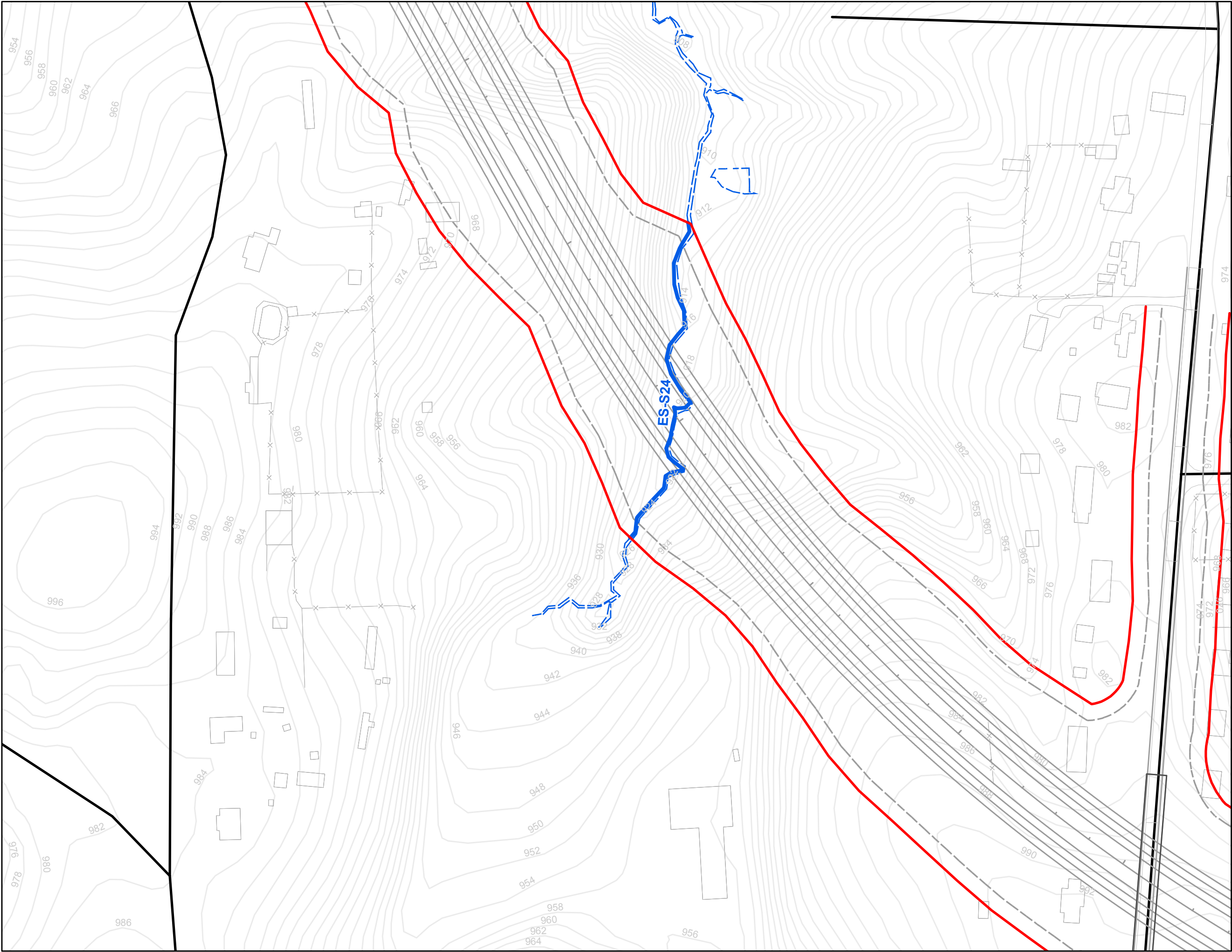
Feet

Legend

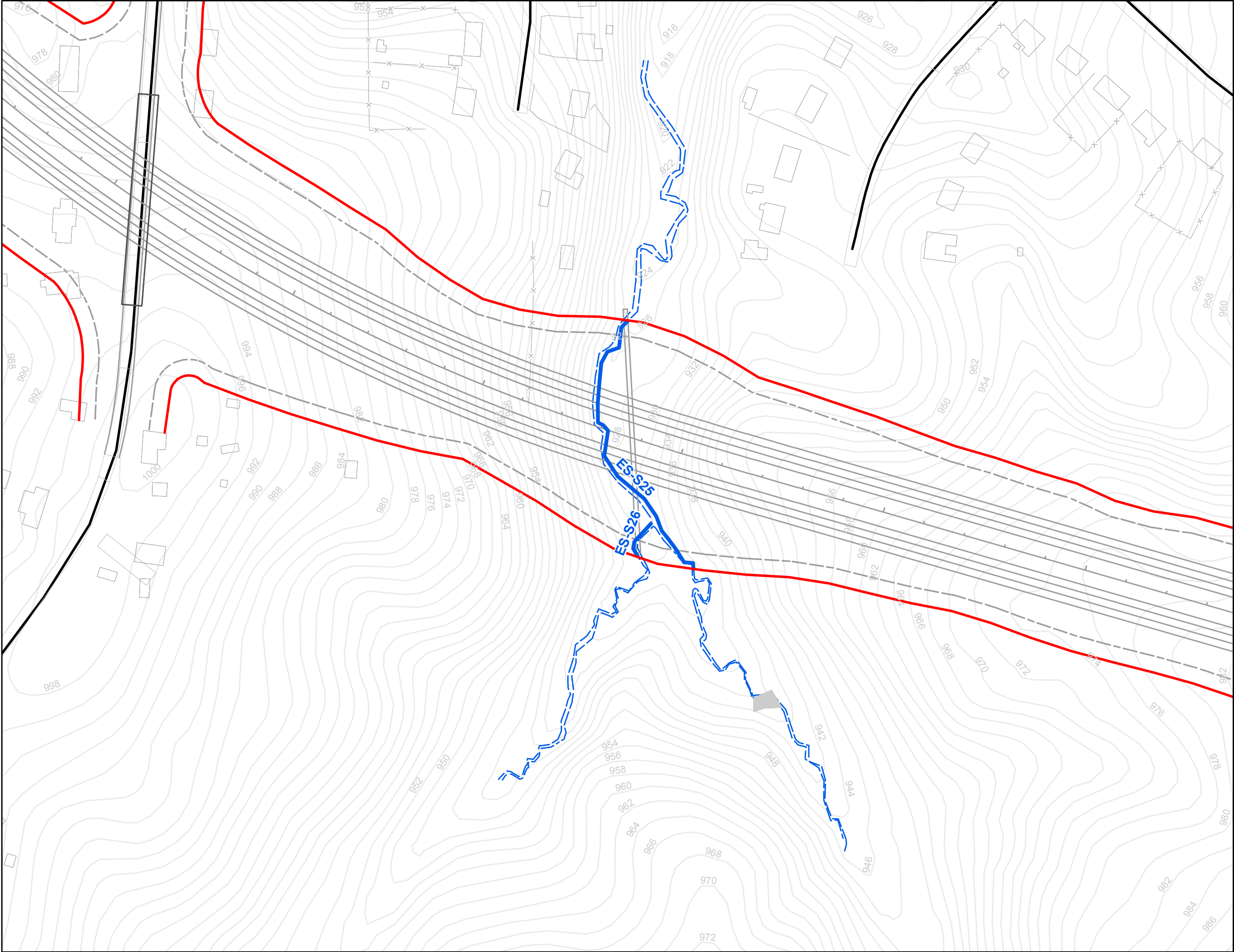
- U-2579D Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section D: Sheet 5 of 7



- Legend**
- U-2579D Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks
- * = Preliminary Impacts



N

0 50 100 200 300

Feet

Legend

- U-2579D Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section D: Sheet 7 of 7

STIP No. U-2579, Section D

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

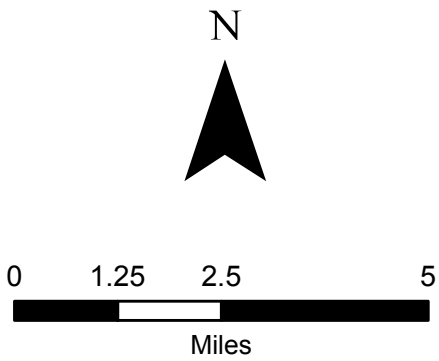
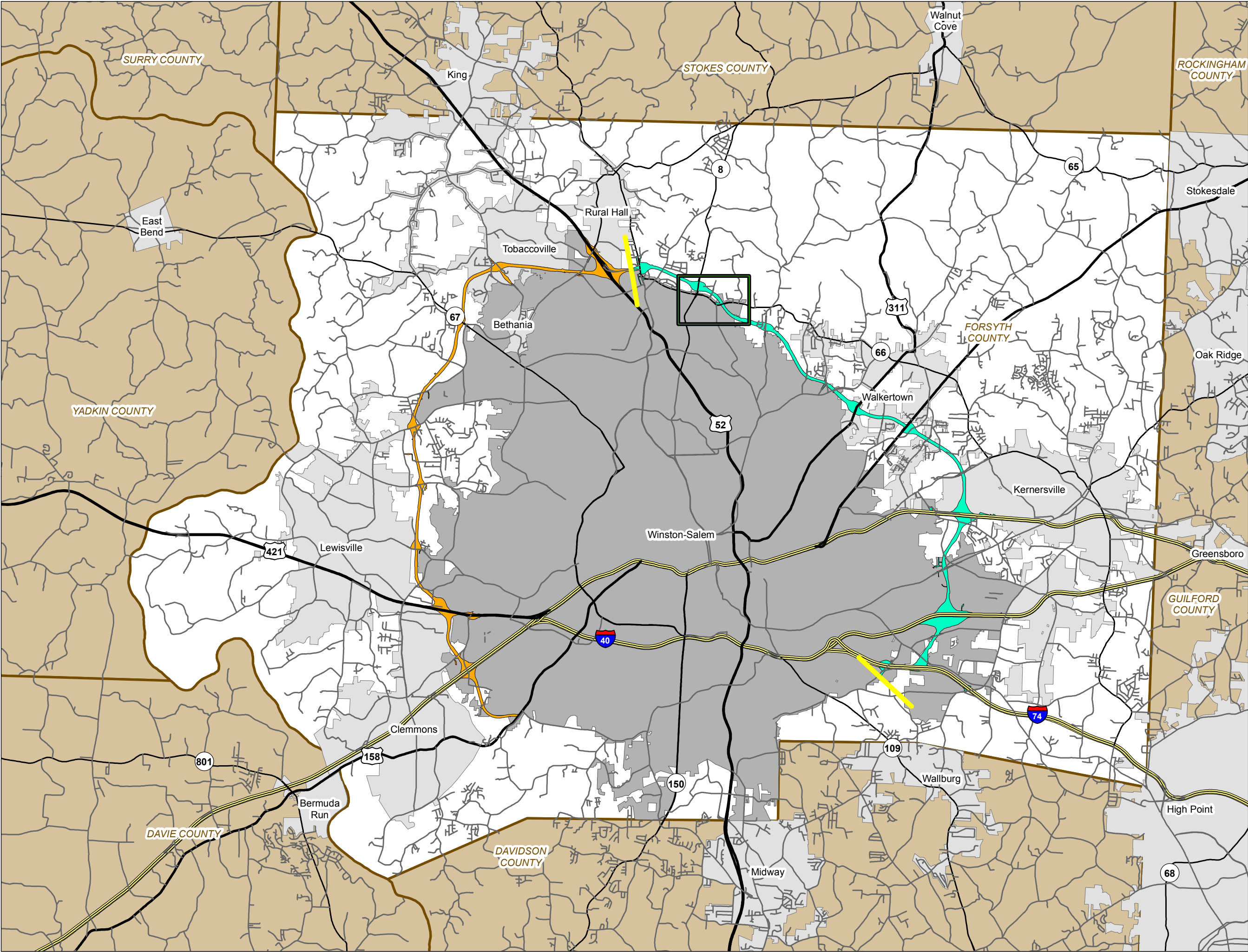
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	ES-W28	0.05
2	ES-W25	0.03
Total:		0.08

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	ES-S14	413
1	ES-S15	508
1	ES-S17	85
2	ES-S16	1,036
3	ES-S19	316
3	ES-S20	444
3	ES-S53	147
3	ES-S68	208
4	ES-S52	83
5	ES-S21	368
5	ES-S22	86
5	ES-S23	217
6	ES-S24	597
7	ES-S25	472
7	ES-S26	63
Total:		5,043

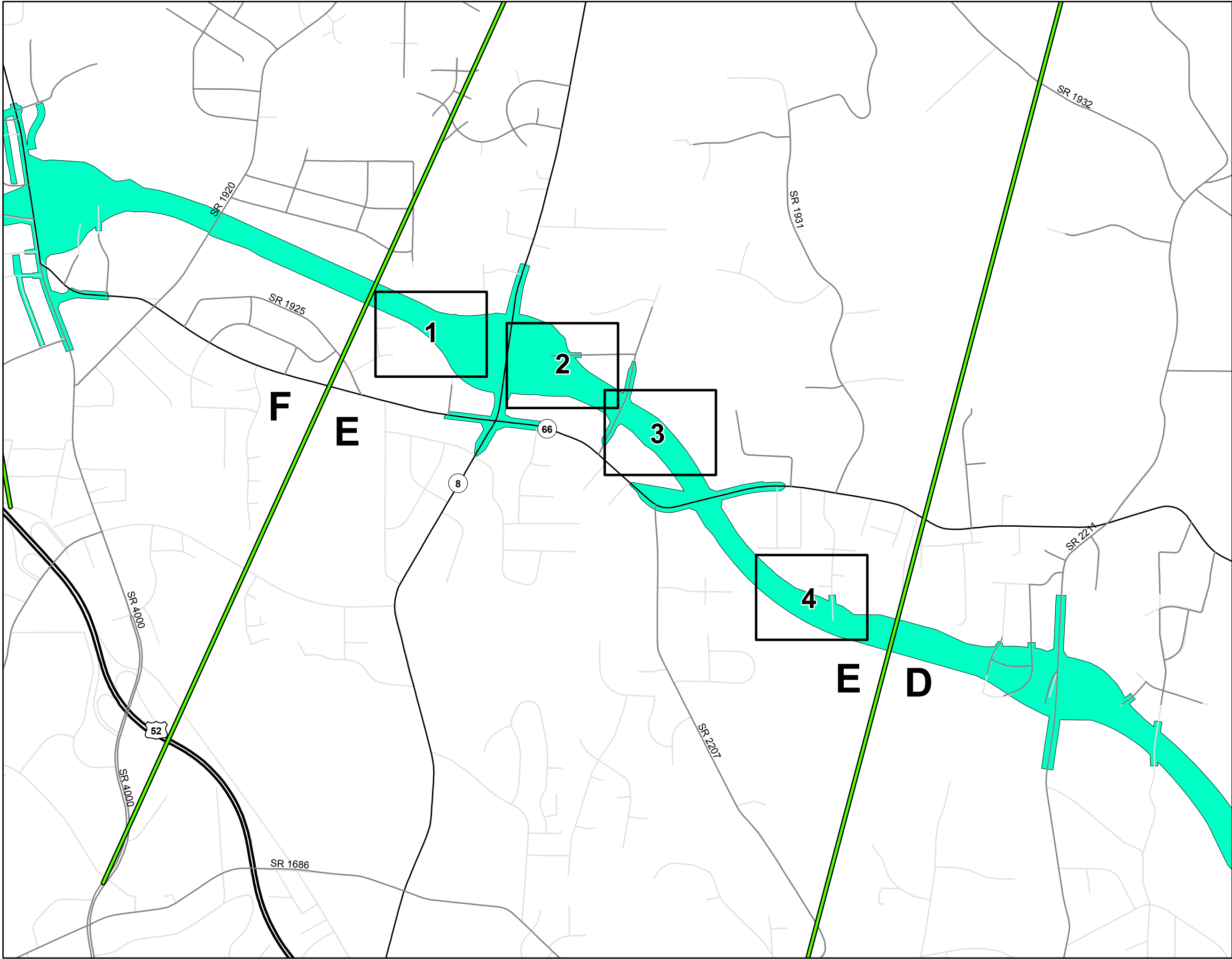
Ponds

none present



- Legend**
- R-2247 Corridor
 - U-2579 Corridor
 - U-2579E Section Area
 - U-2579 Project Start / Stop
 - Interstate
 - US Route
 - NC Route
 - Secondary Road

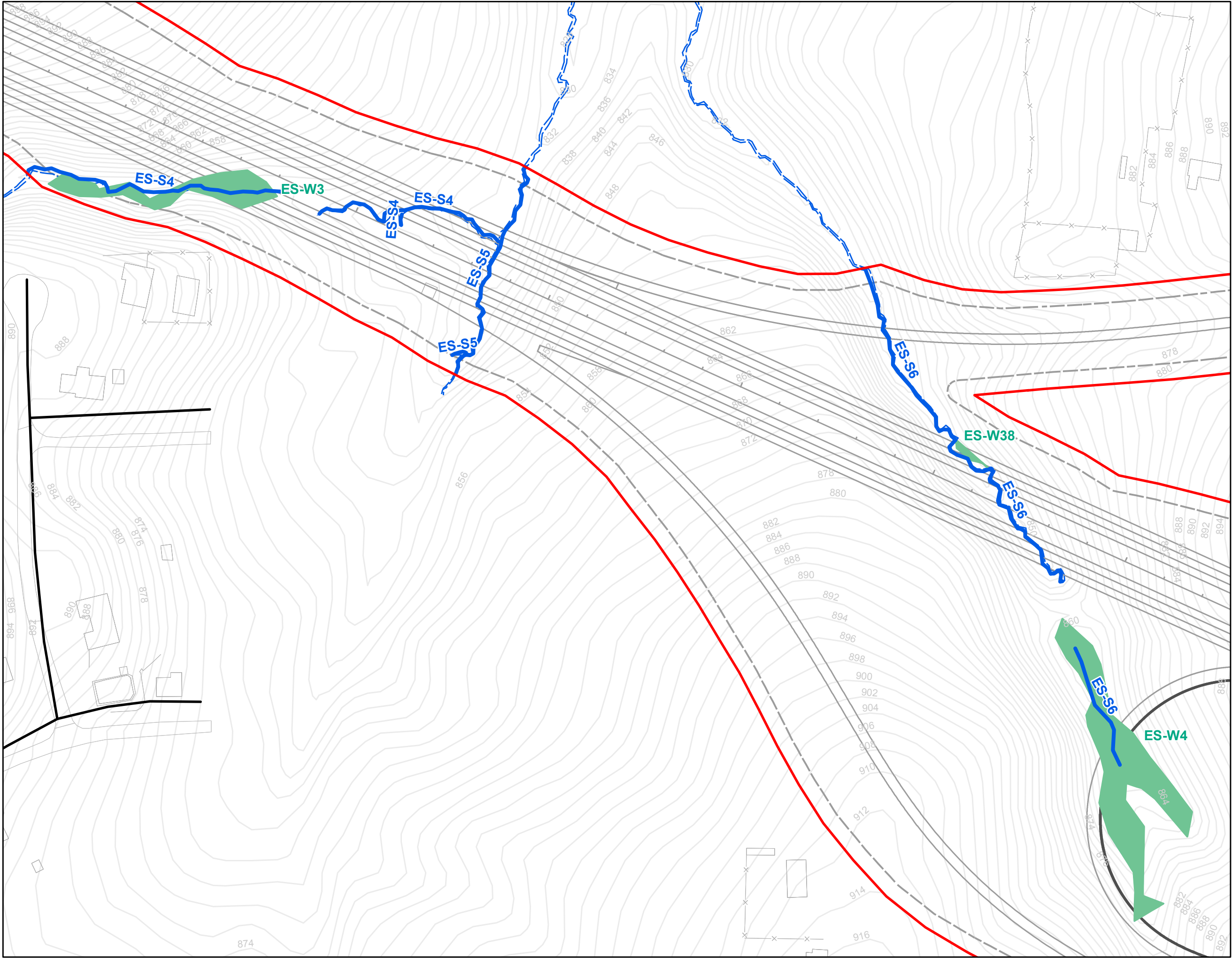
**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section E: Corridor Context**



Legend

-  U-2579 Corridor
-  U-2579 Section Breaks
-  Section Map Sheets
-  Interstate
-  US Route
-  NC Route
-  Secondary Road
-  Other Existing Roads

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section E: Master Sheet**



N

0 50 100 200 300

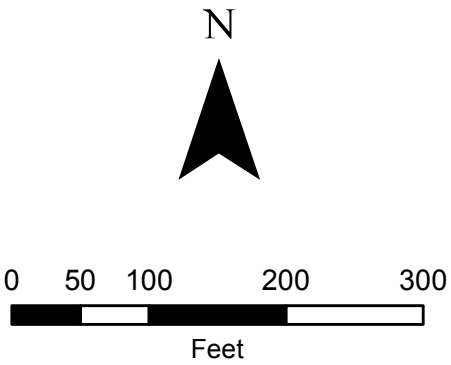
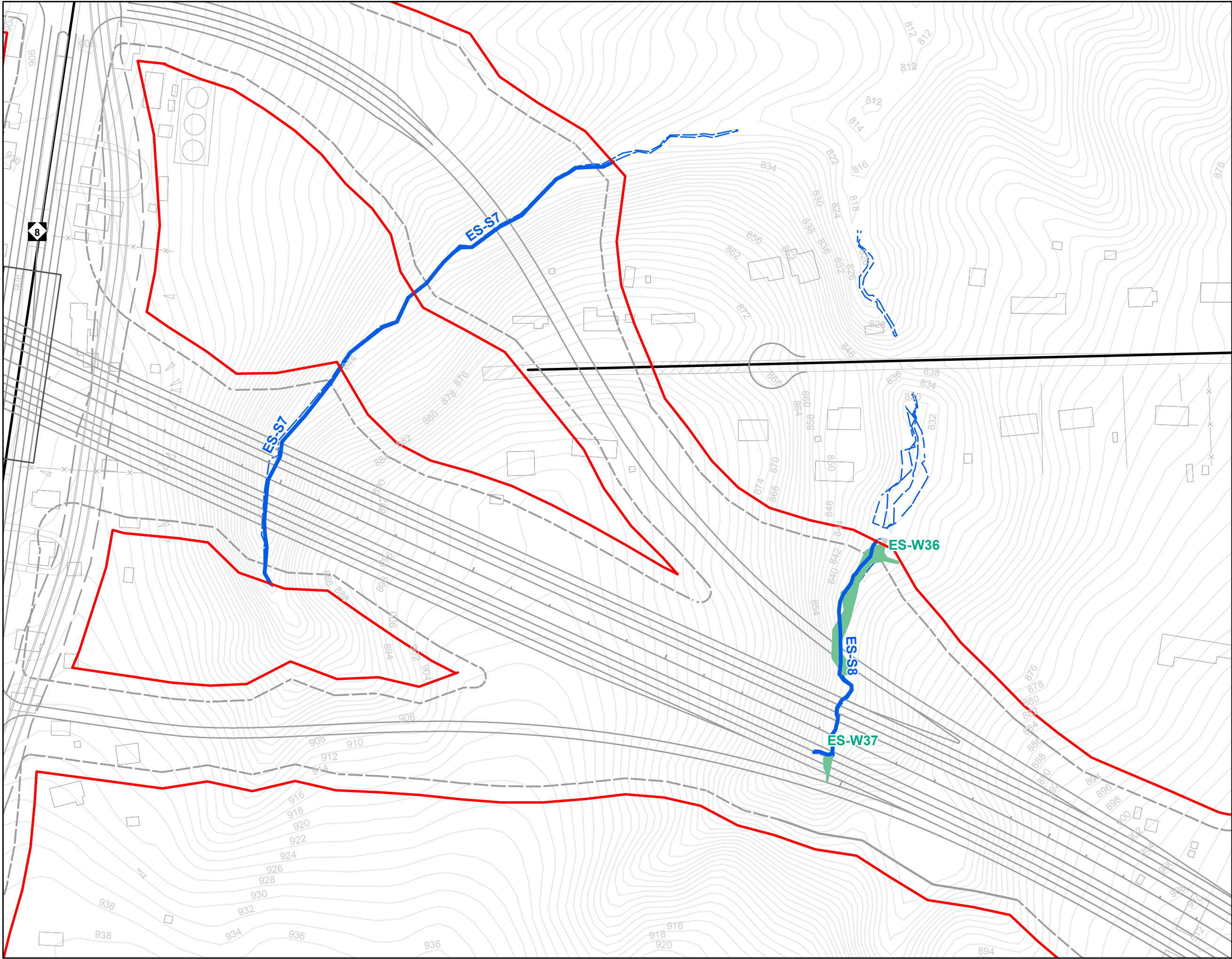
Feet

Legend

- U-2579E Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

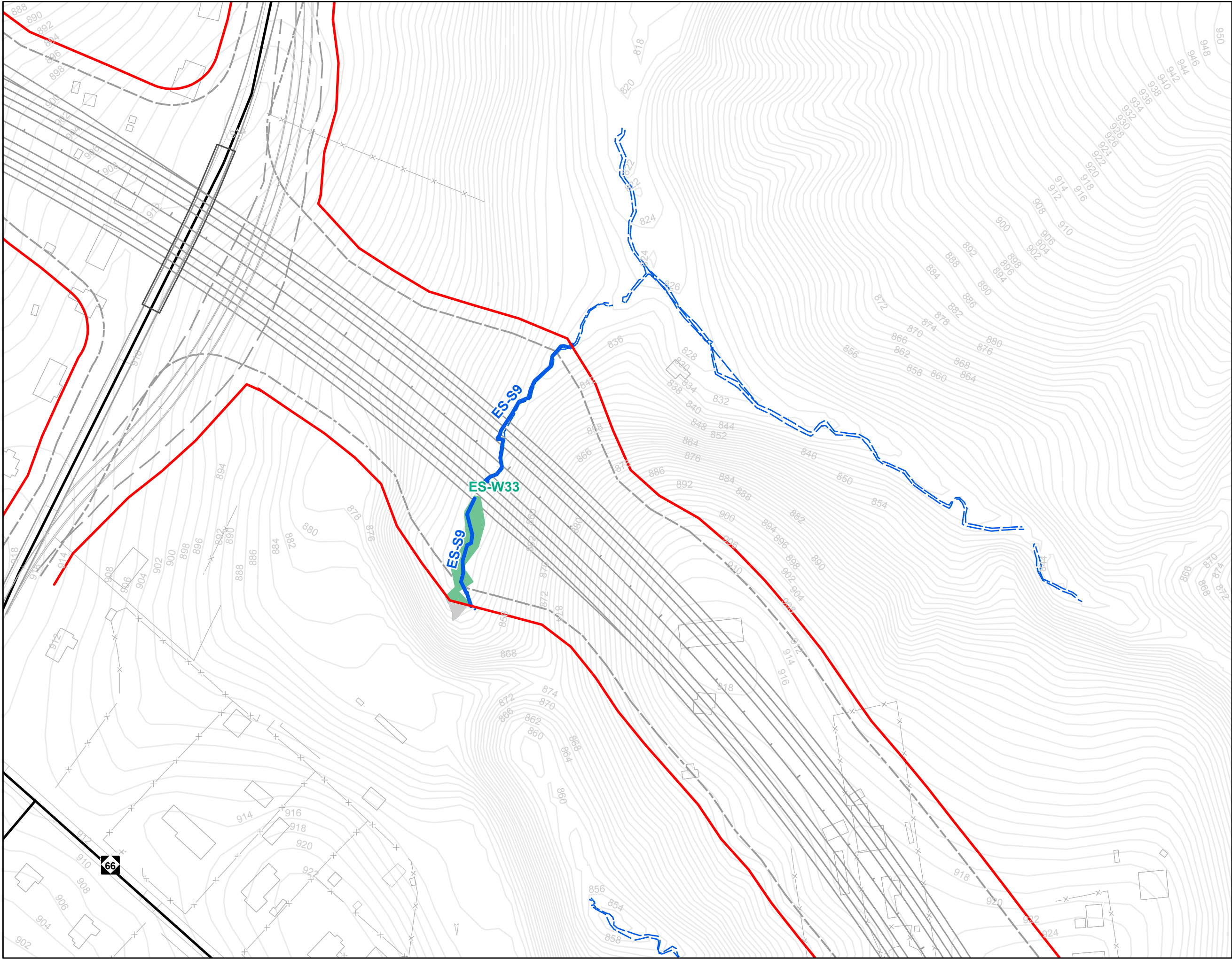
* = Preliminary Impacts

Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section E: Sheet 1 of 4



- Legend**
- U-2579E Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - U-2579 Section Breaks

* = Preliminary Impacts

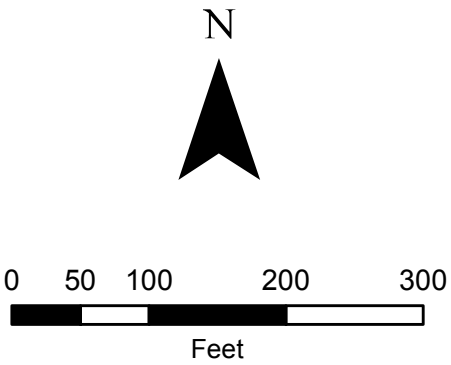
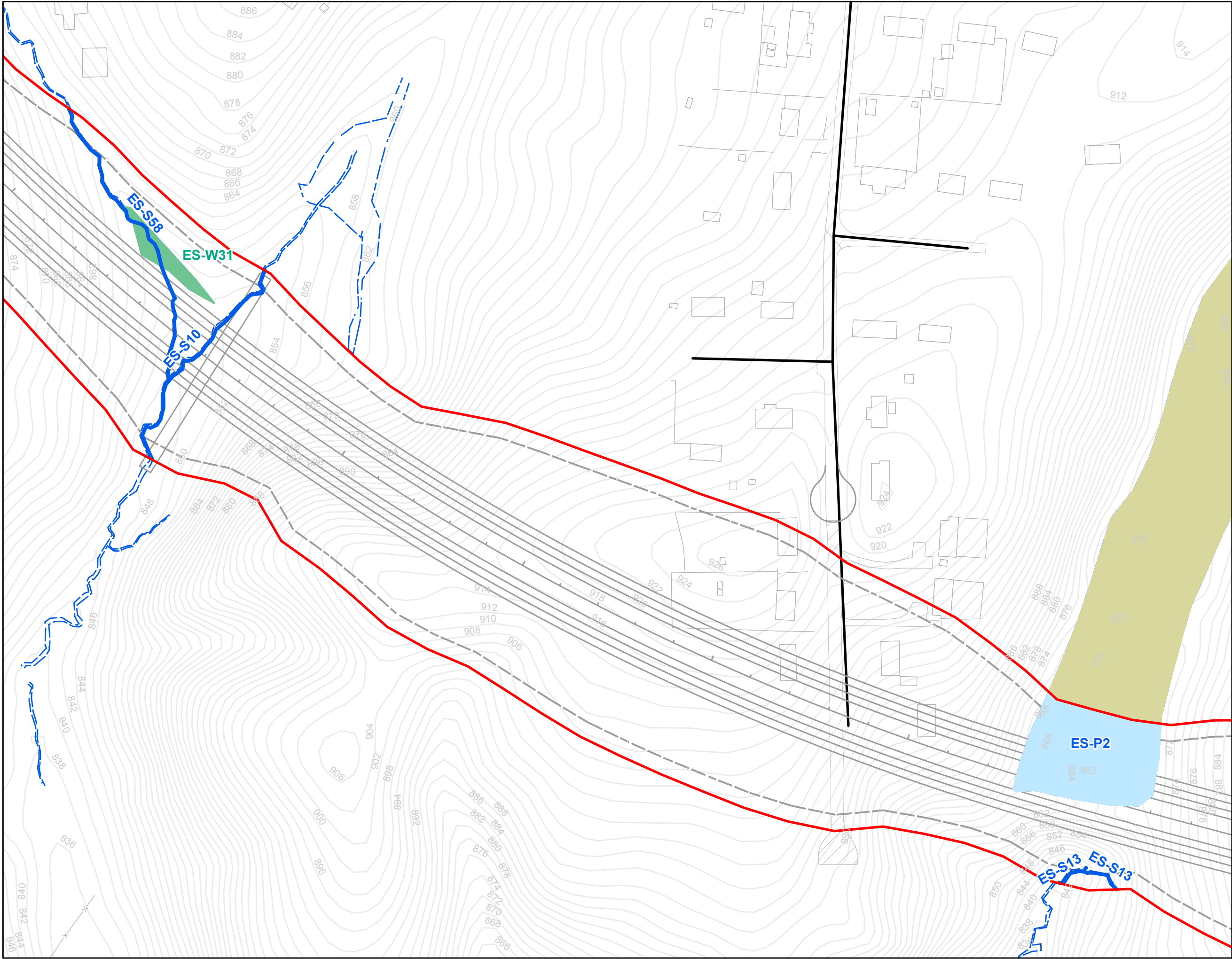


Legend

- U-2579E Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section E: Sheet 3 of 4**



Legend

- U-2579E Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section E: Sheet 4 of 4**

Stip No. U-2579, Section E

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

* = length includes approximately 20' of unnamed tributary

Wetlands

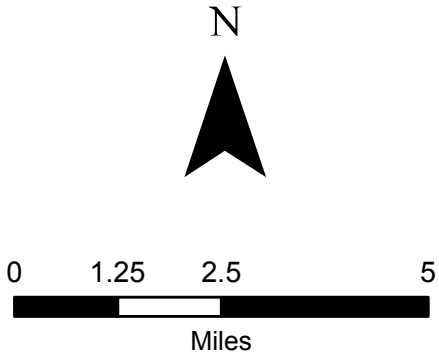
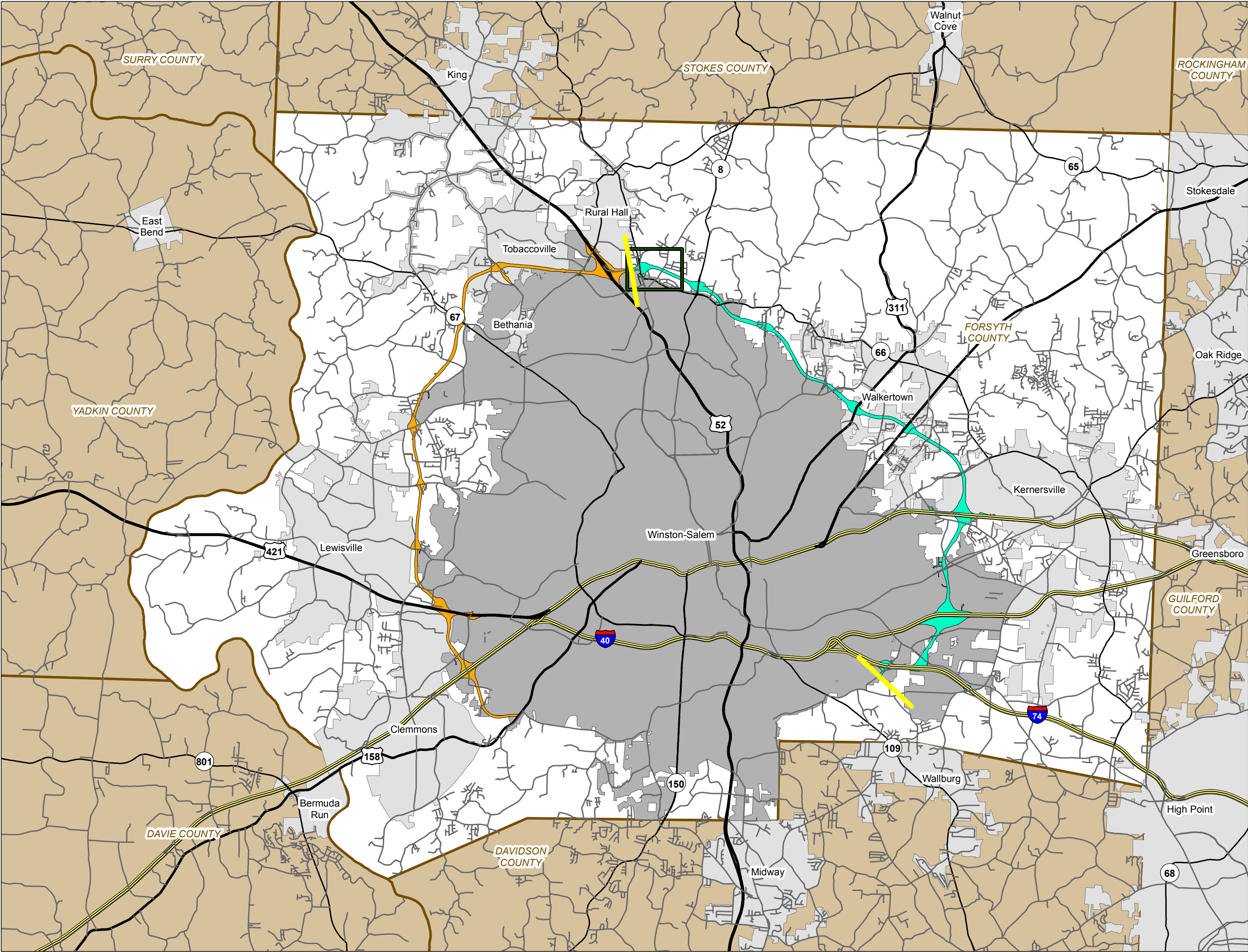
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	ES-W3	0.20
1	ES-W4	0.52
1	ES-W38	0.01
2	ES-W36	0.08
2	ES-W37	0.01
3	ES-W33	0.08
4	ES-W31	0.09
Total:		0.99

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>	
1	ES-S4	788	*
1	ES-S5	401	*
1	ES-S6	882	
2	ES-S7	927	
2	ES-S8	399	
3	ES-S9	473	
4	ES-S10	397	
4	ES-S13	112	
4	ES-S58	485	
Total:		4,864	

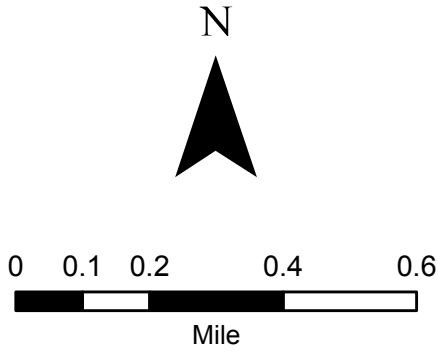
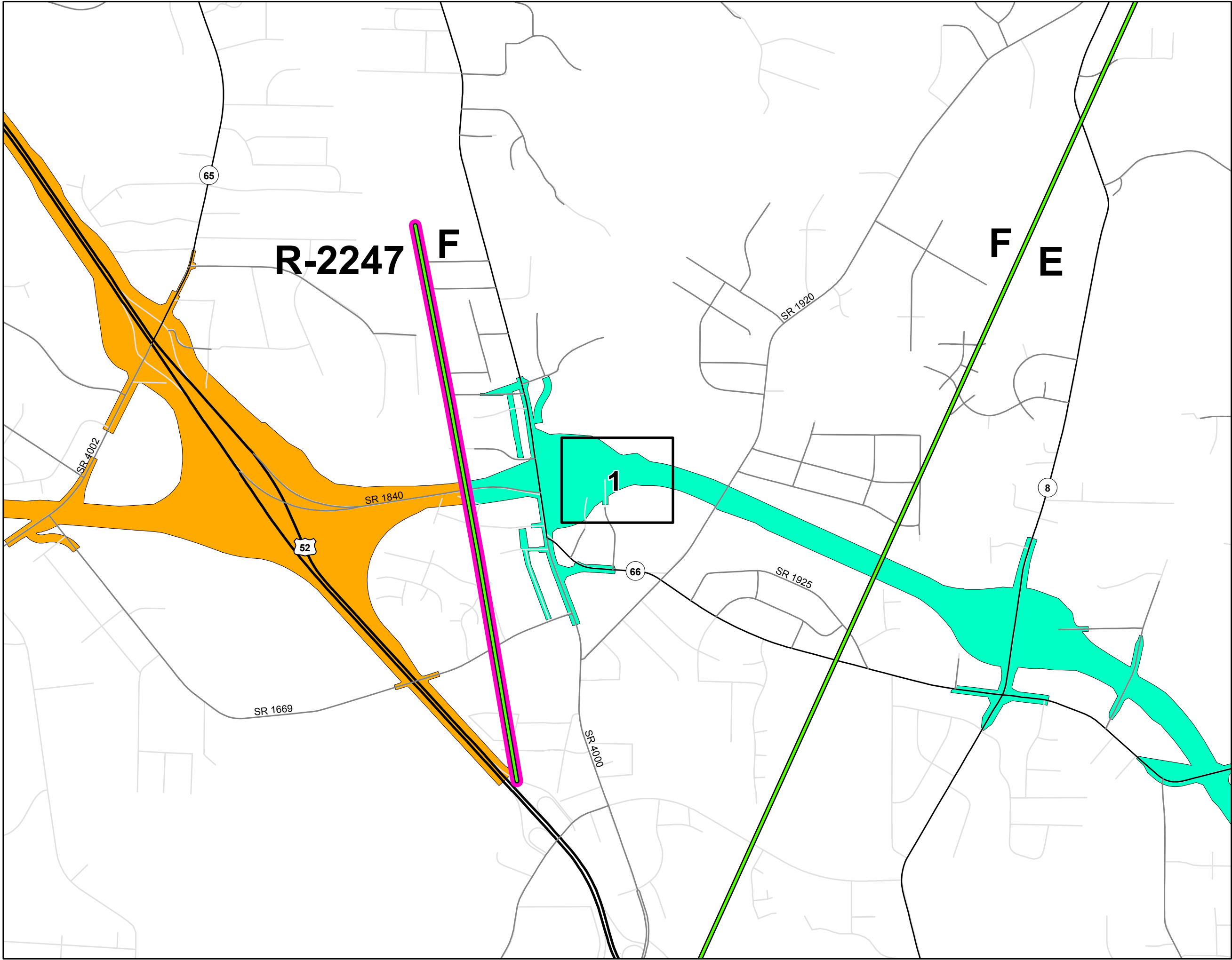
Ponds

<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
4	ES-P2	0.65
Total:		0.65

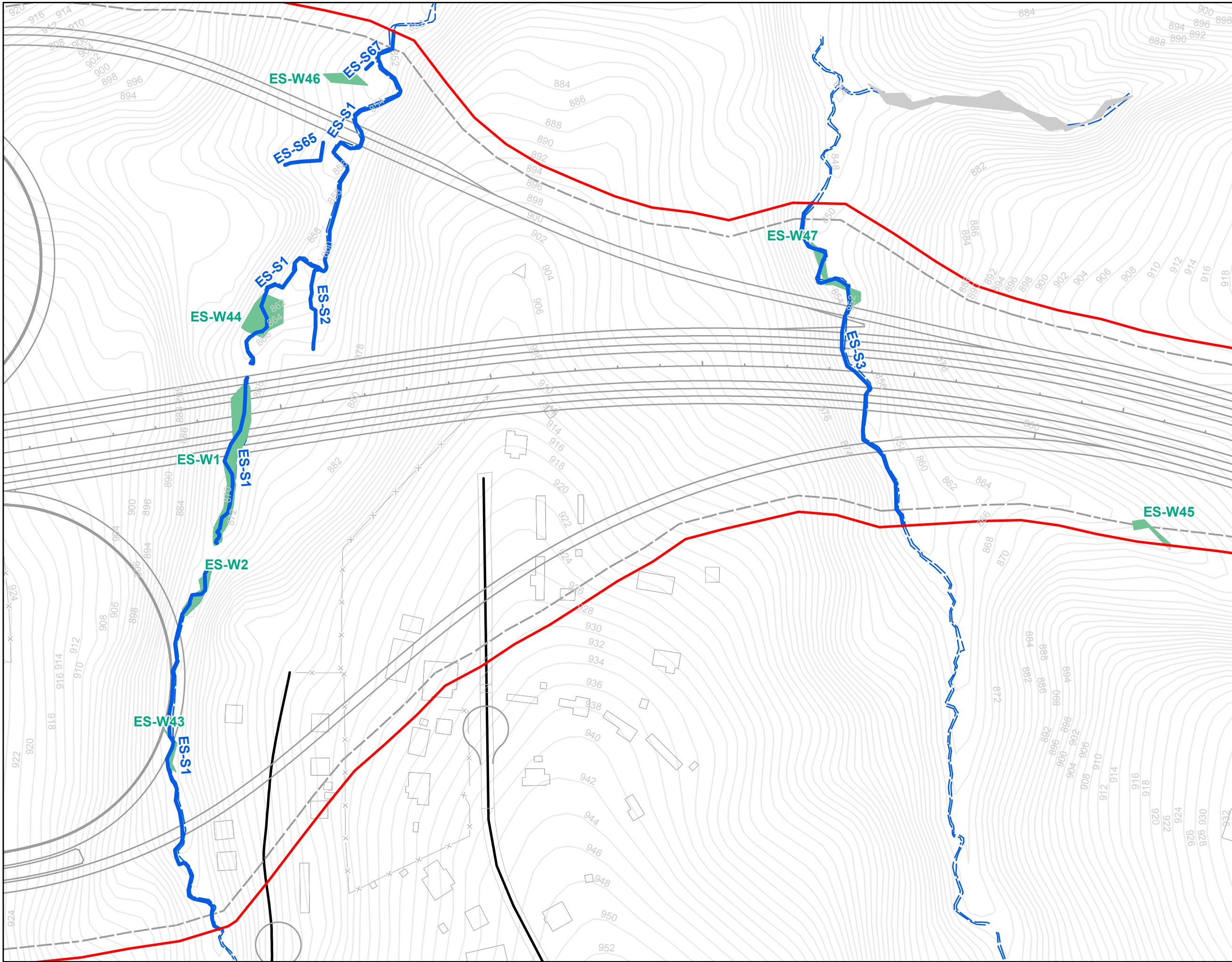


- Legend**
- R-2247 Corridor
 - U-2579 Corridor
 - U-2579F Section Area
 - U-2579 Project Start / Stop
 - Interstate
 - US Route
 - NC Route
 - Secondary Road

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section F: Corridor Context**



- Legend**
- R-2247 Corridor
 - U-2579 Corridor
 - Section Breaks
 - R-2247/U-2579 Section Break
 - Section Map Sheets
 - Interstate
 - US Route
 - NC Route
 - Secondary Road
 - Other Existing Road



Legend

- U-2579F Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams Within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- U-2579 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
U-2579 Streams and Wetlands
Section F: Sheet 1 of 1**

Stip No. U-2579, Section F

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

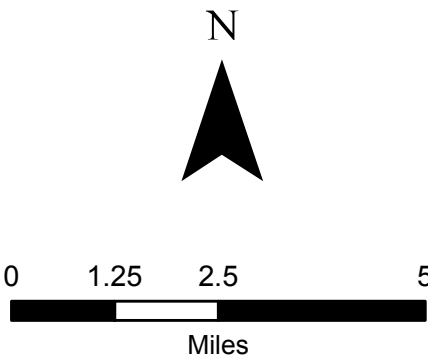
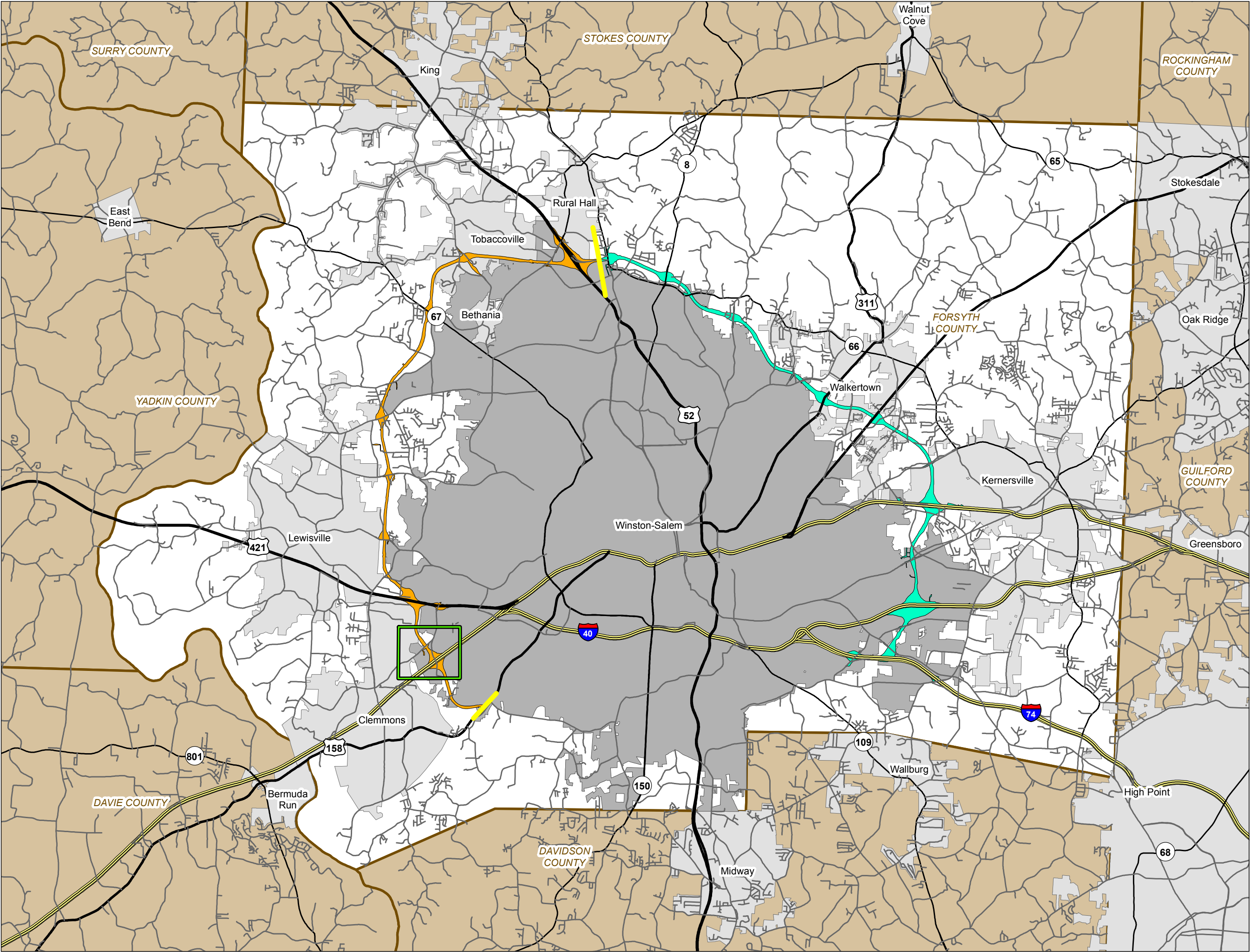
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	ES-W1	0.10
1	ES-W2	0.02
1	ES-W43	0.01
1	ES-W44	0.06
1	ES-W45	0.01
1	ES-W46	0.02
1	ES-W47	0.02
Total:		0.24

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	ES-S1	1,695
1	ES-S2	136
1	ES-S3	616
1	ES-S65	83
1	ES-S67	14
Total:		2,544

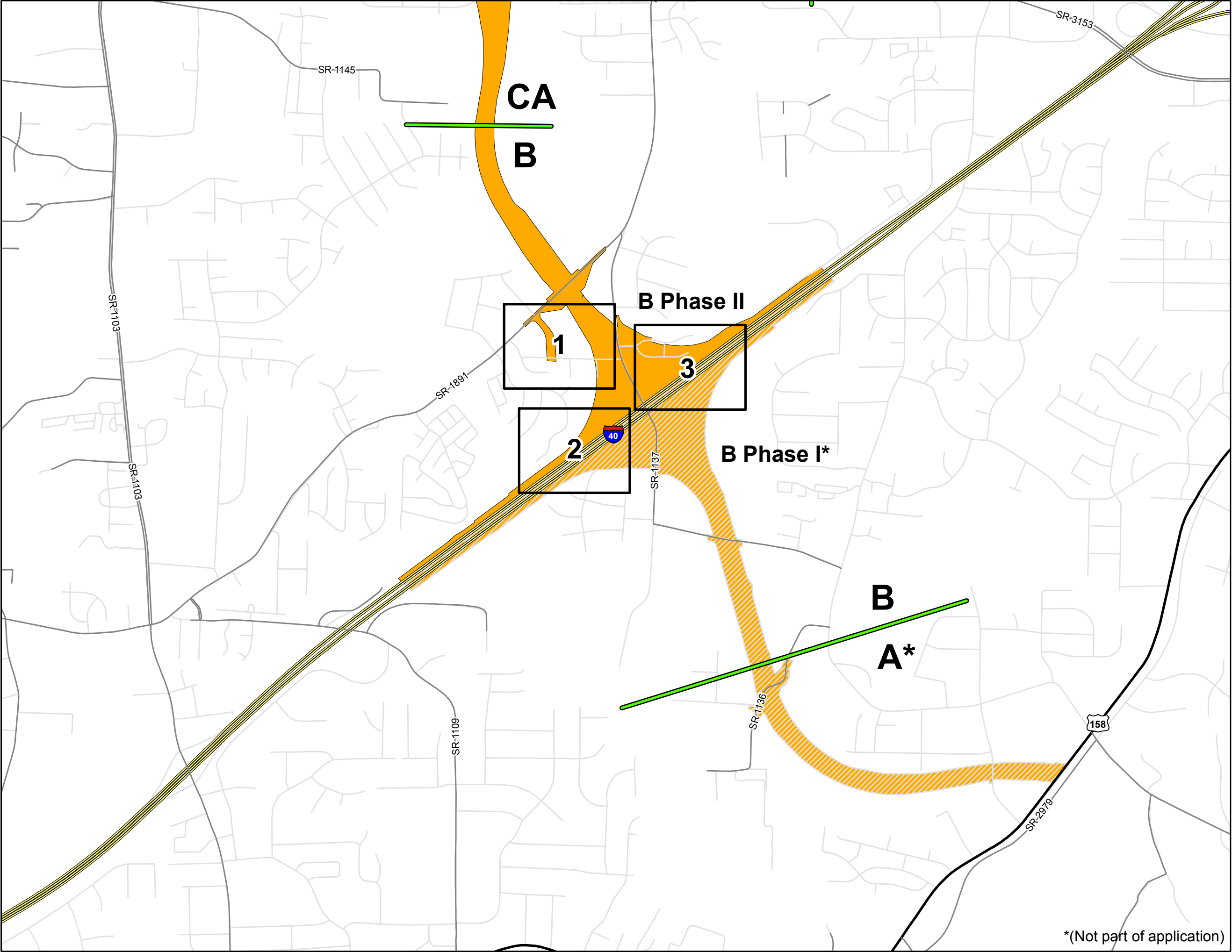
Ponds

none present



- Legend**
- R-2247 Corridor
 - U-2579 Corridor
 - R-2247B Phase II Rectangle
 - R-2247 Project Start / Stop
 - Interstate
 - US Route
 - NC Route
 - Secondary Road

**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section EB: Corridor Context**

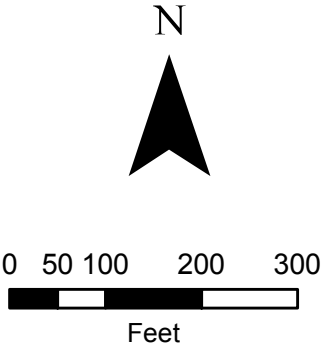
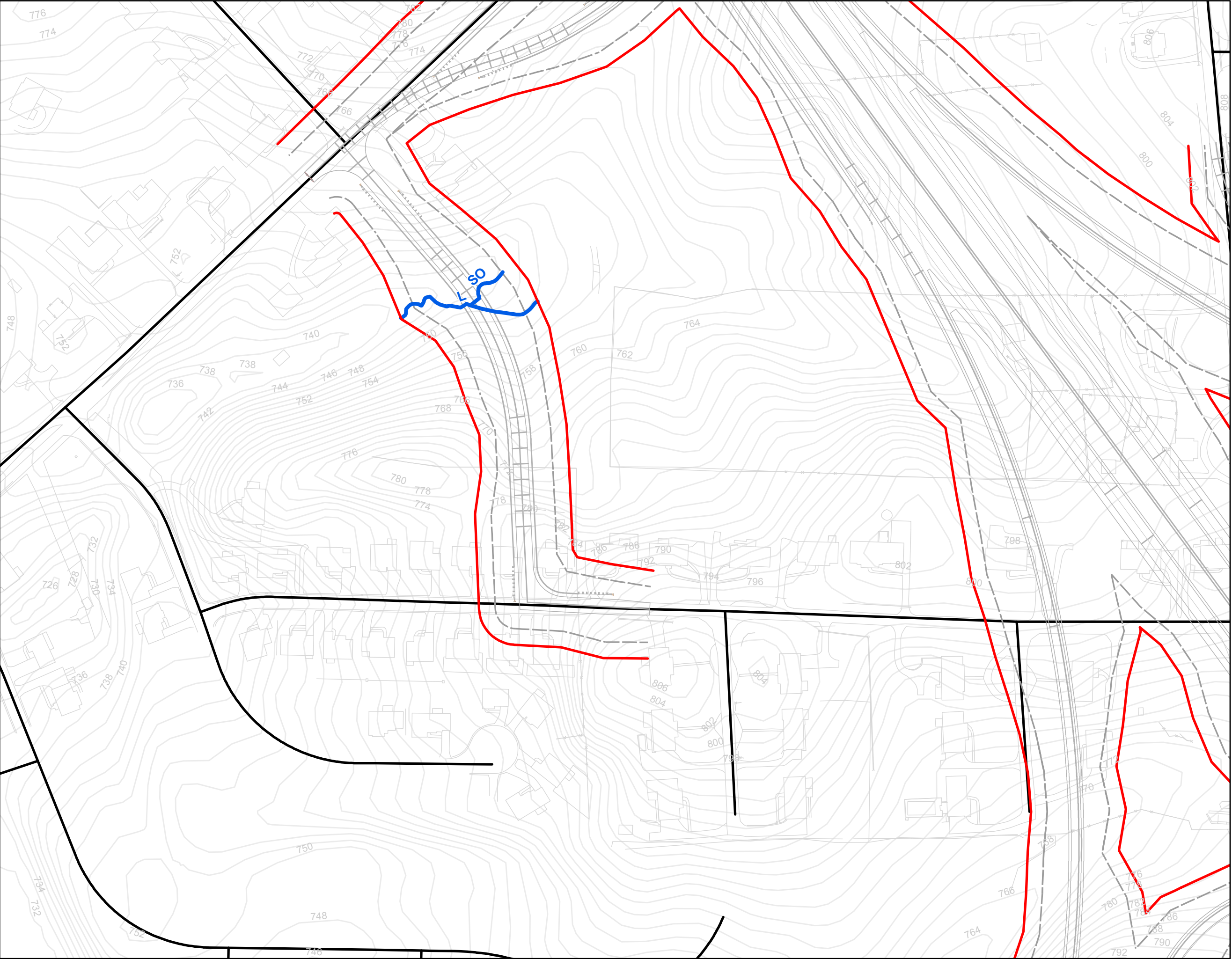


Legend

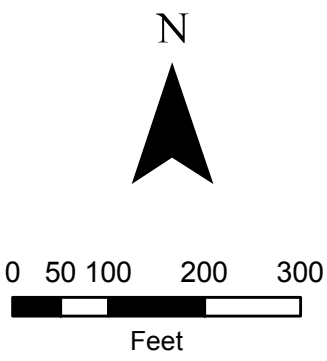
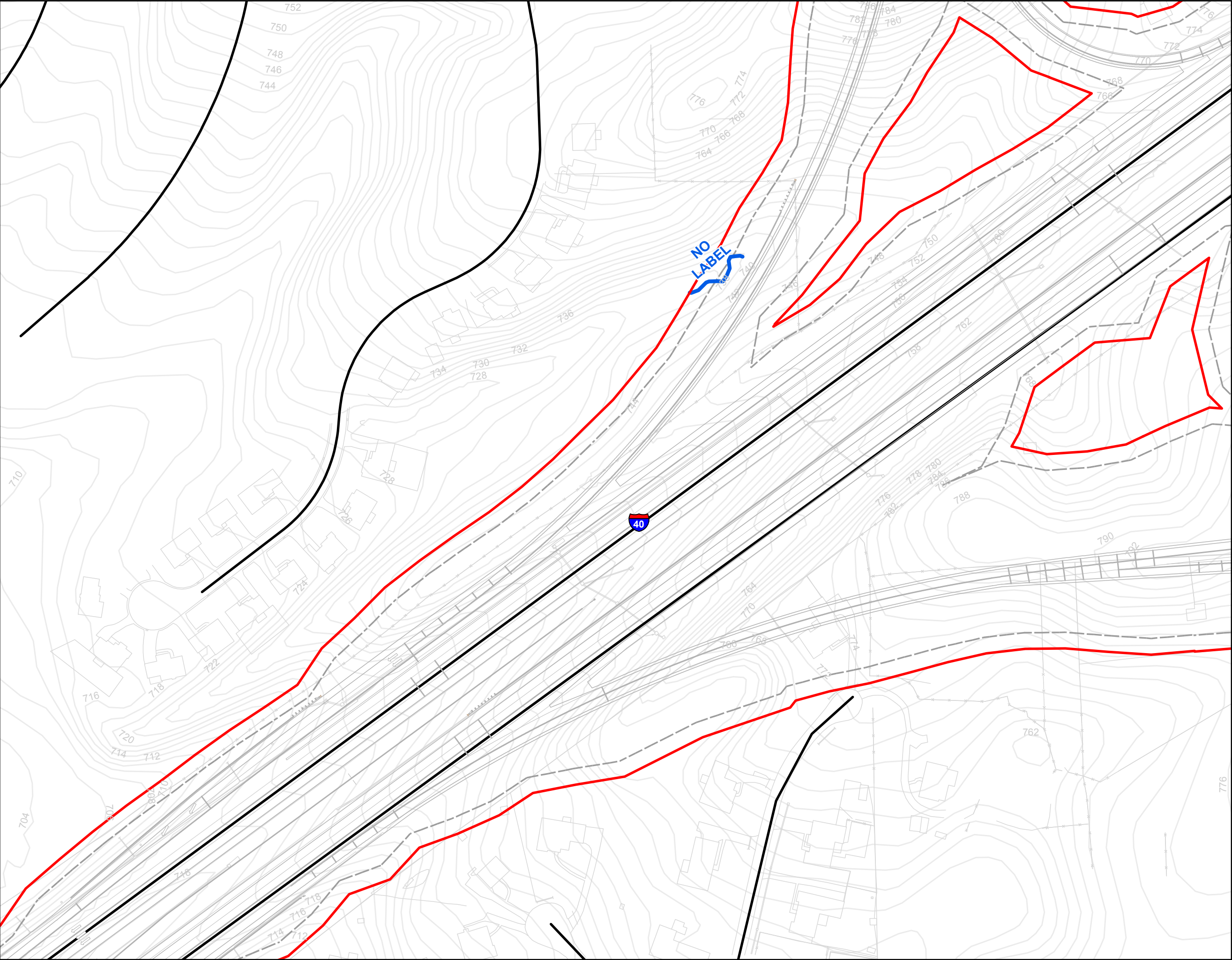
- R-2247 Corridor
- Portions not covered by permit
- R-2247 Section Breaks
- Section Map Sheets
- Interstate
- US Route
- NC Route
- Secondary Road
- Other Existing Road

**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section B Phase II: Master Sheet**

*(Not part of application)



- Legend**
- R-2247B Phase II Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - R-2247 Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- Legend**
- R-2247B Phase II Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - R-2247 Ponds
 - Streams Within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts

Stip No. R-2247, Section B Phase II

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

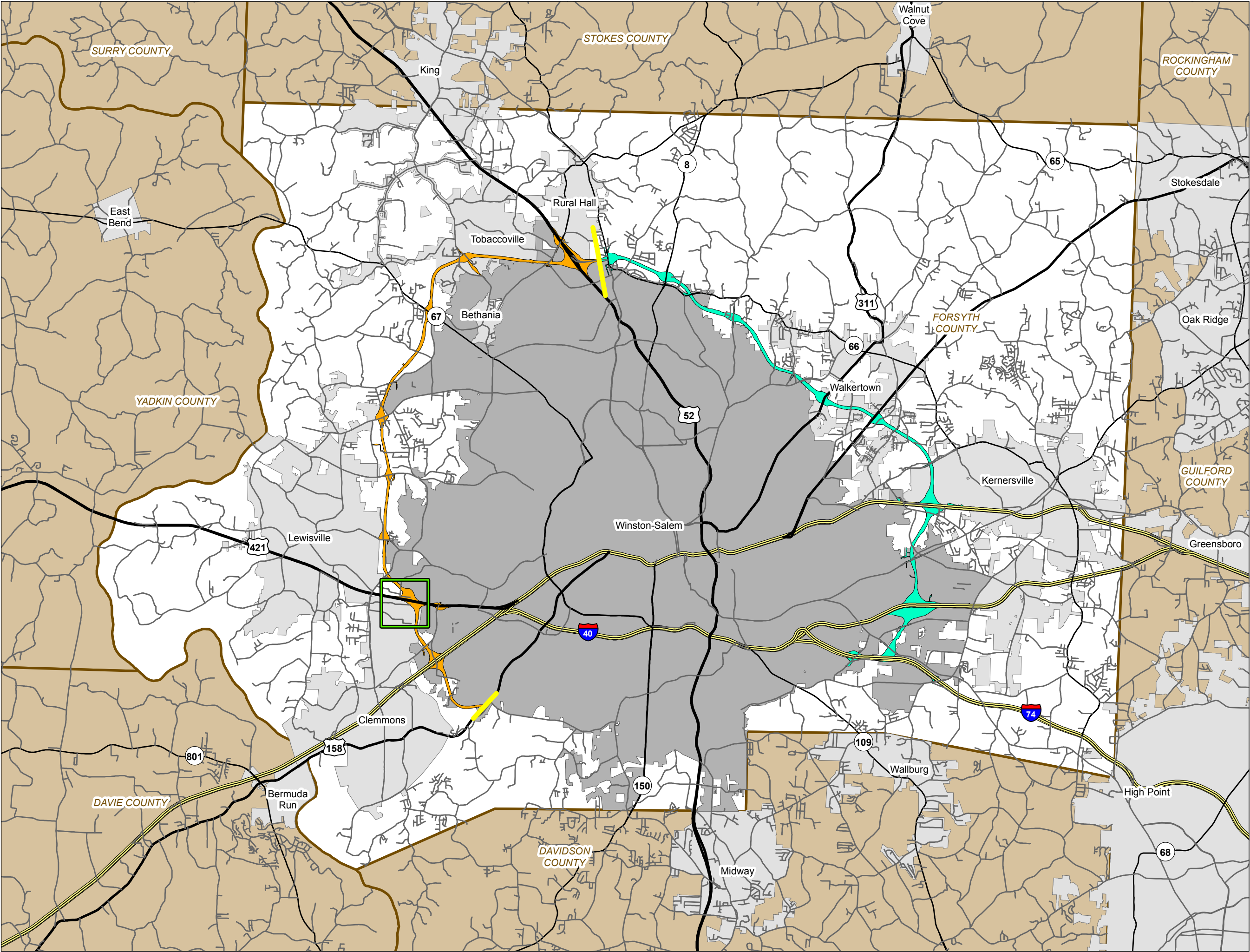
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
3	WR	0.07
3	Wetland 3	0.20
	Total:	0.27

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	L	250
1	SO	81
2	NO LABEL	118
3	Silas Creek (H)	129
3	SP	240
3	I	44
	Total:	862

Ponds

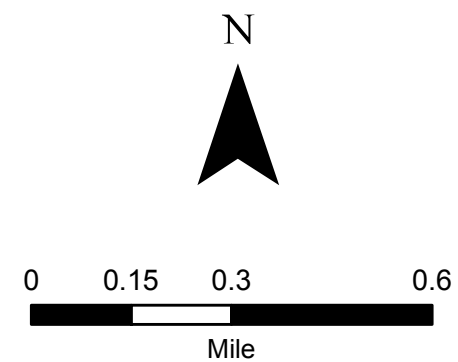
none present

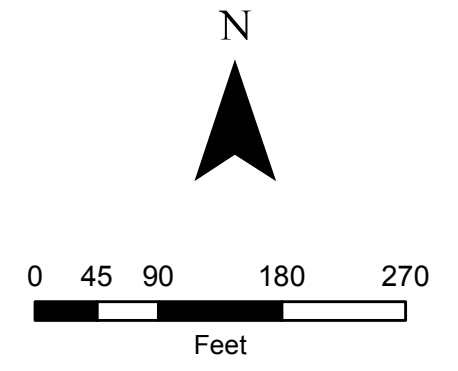
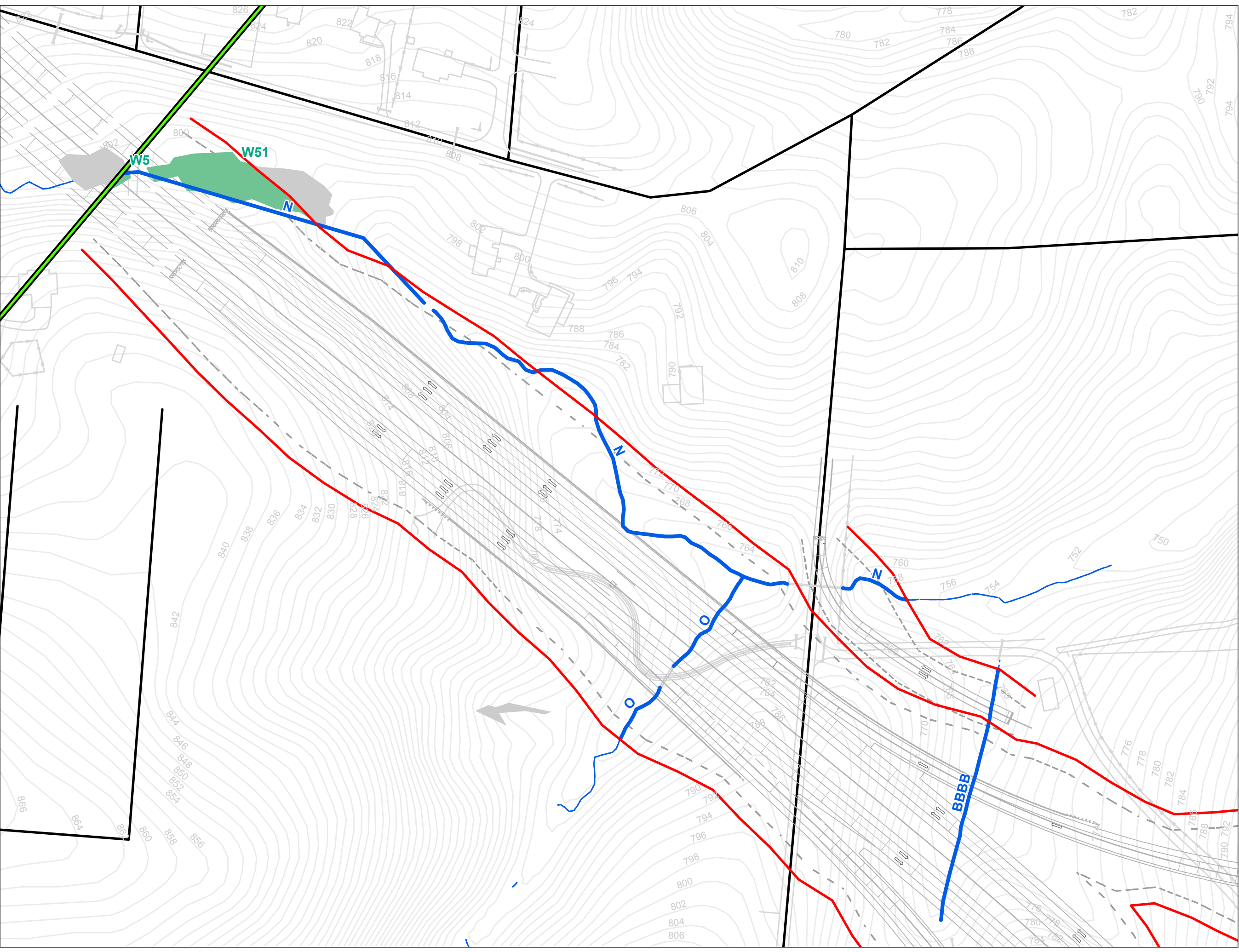


Legend

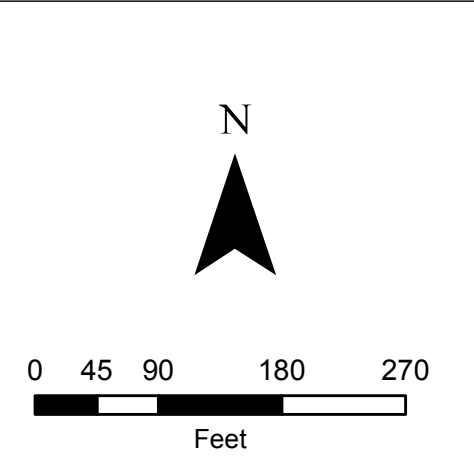
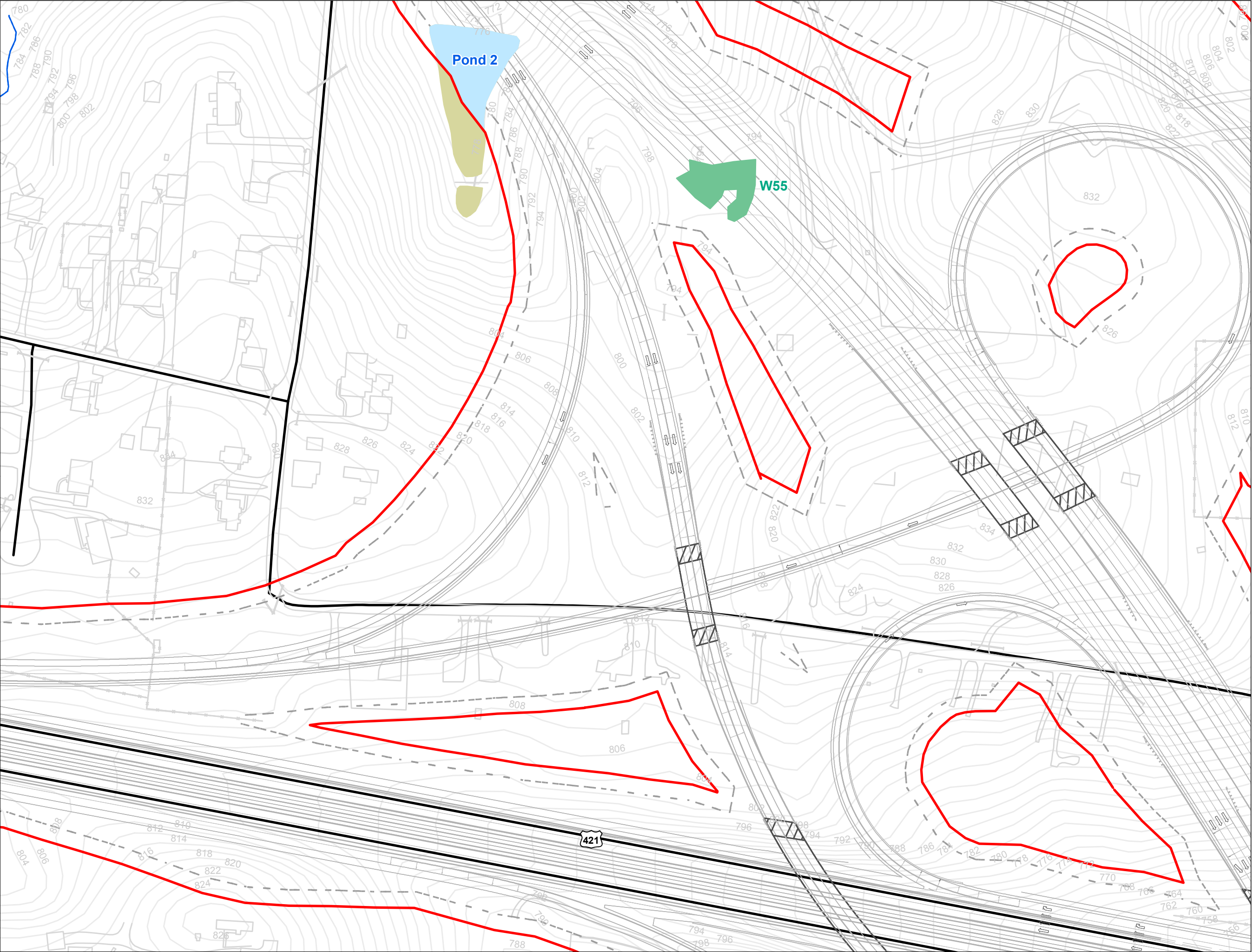
- R-2247 Corridor
- U-2579 Corridor
- R-2247 Project Start / Stop
- CA Rectangle
- Interstate
- US Route
- NC Route
- Secondary Road

**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section CA: Corridor Context**

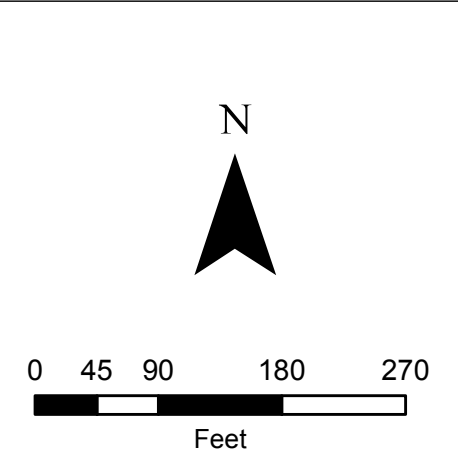
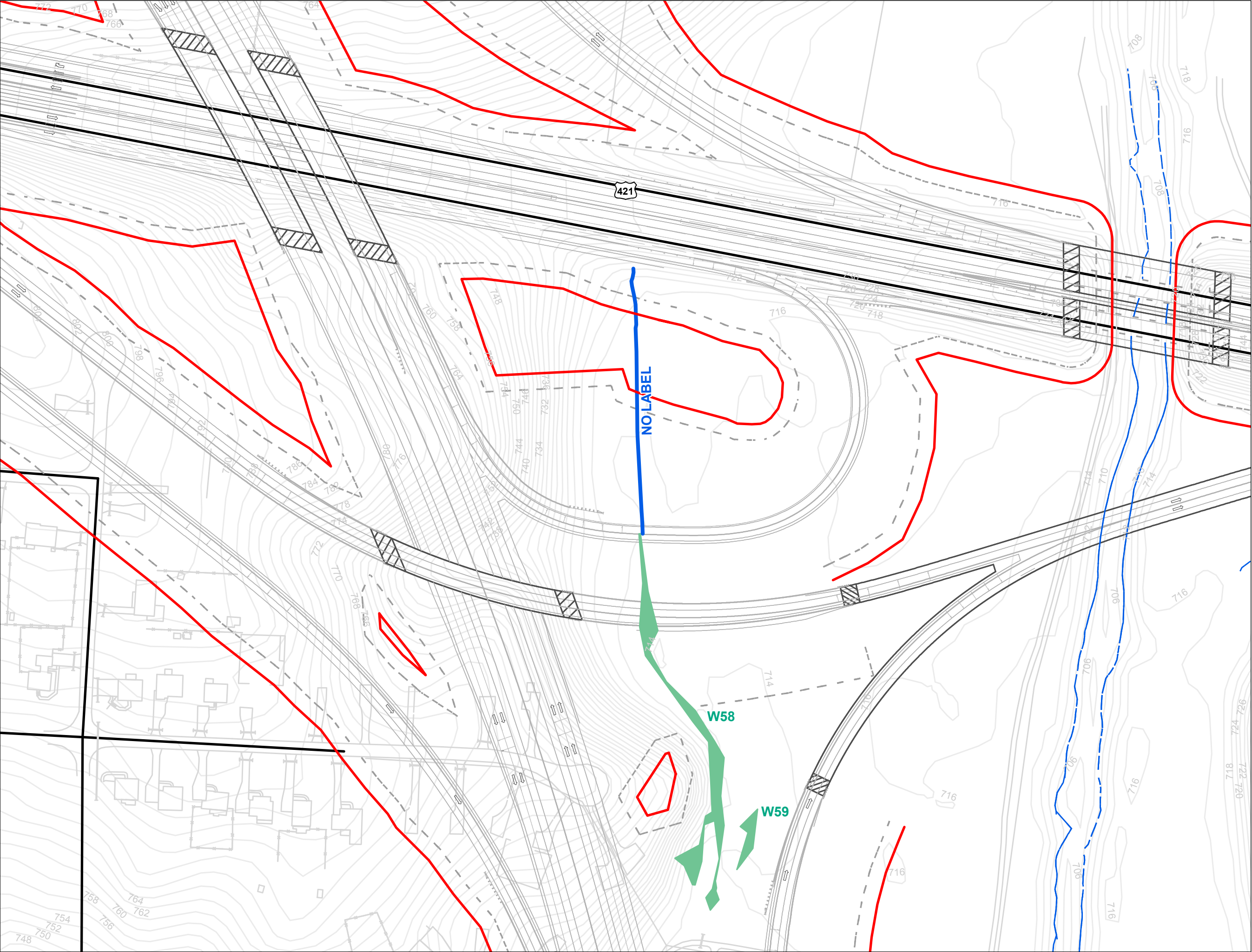




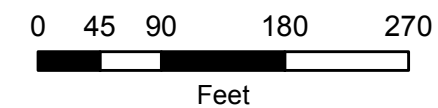
- Legend**
- R-2247CA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



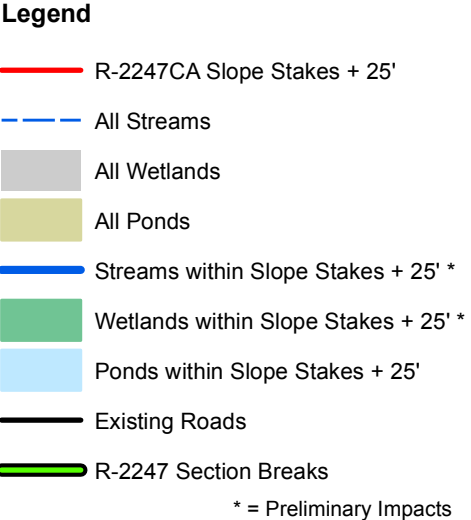
- Legend**
- R-2247CA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



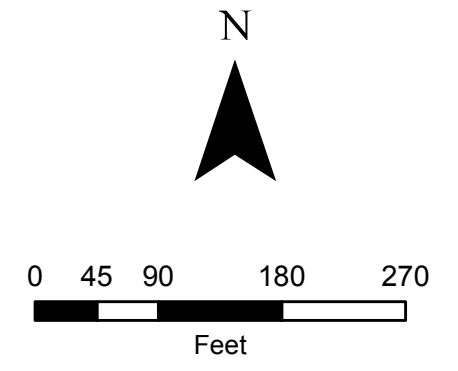
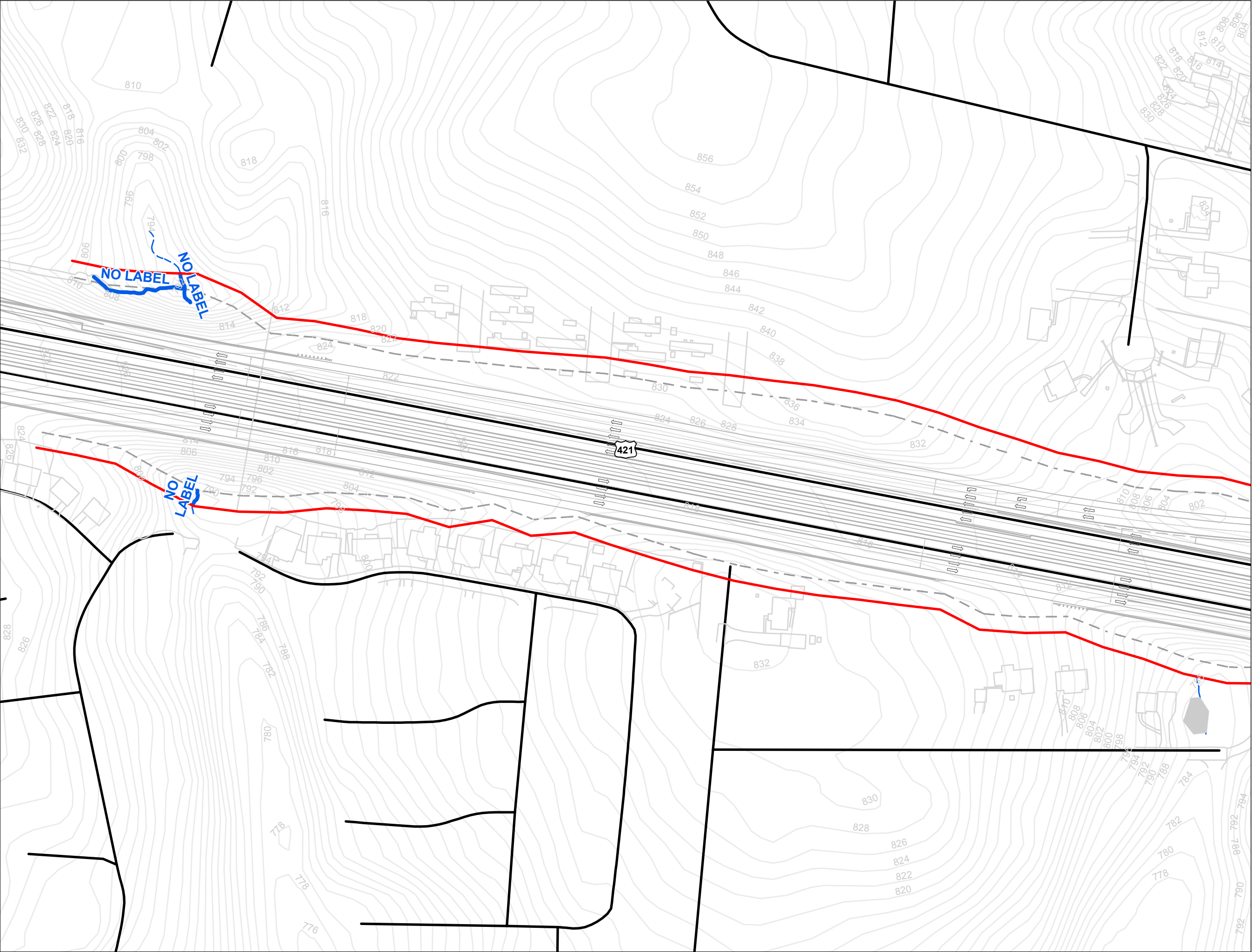
- Legend**
- R-2247CA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- ### Legend
- R-2247CA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section CA: Sheet 5 of 6**



- Legend**
- R-2247CA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts

STIP No. R-2247, Section CA

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

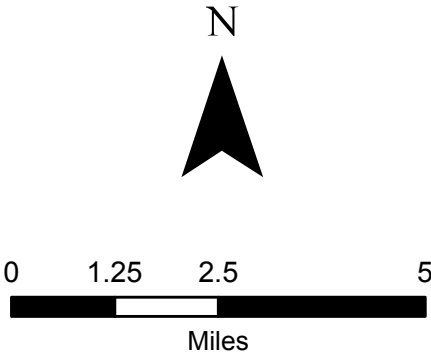
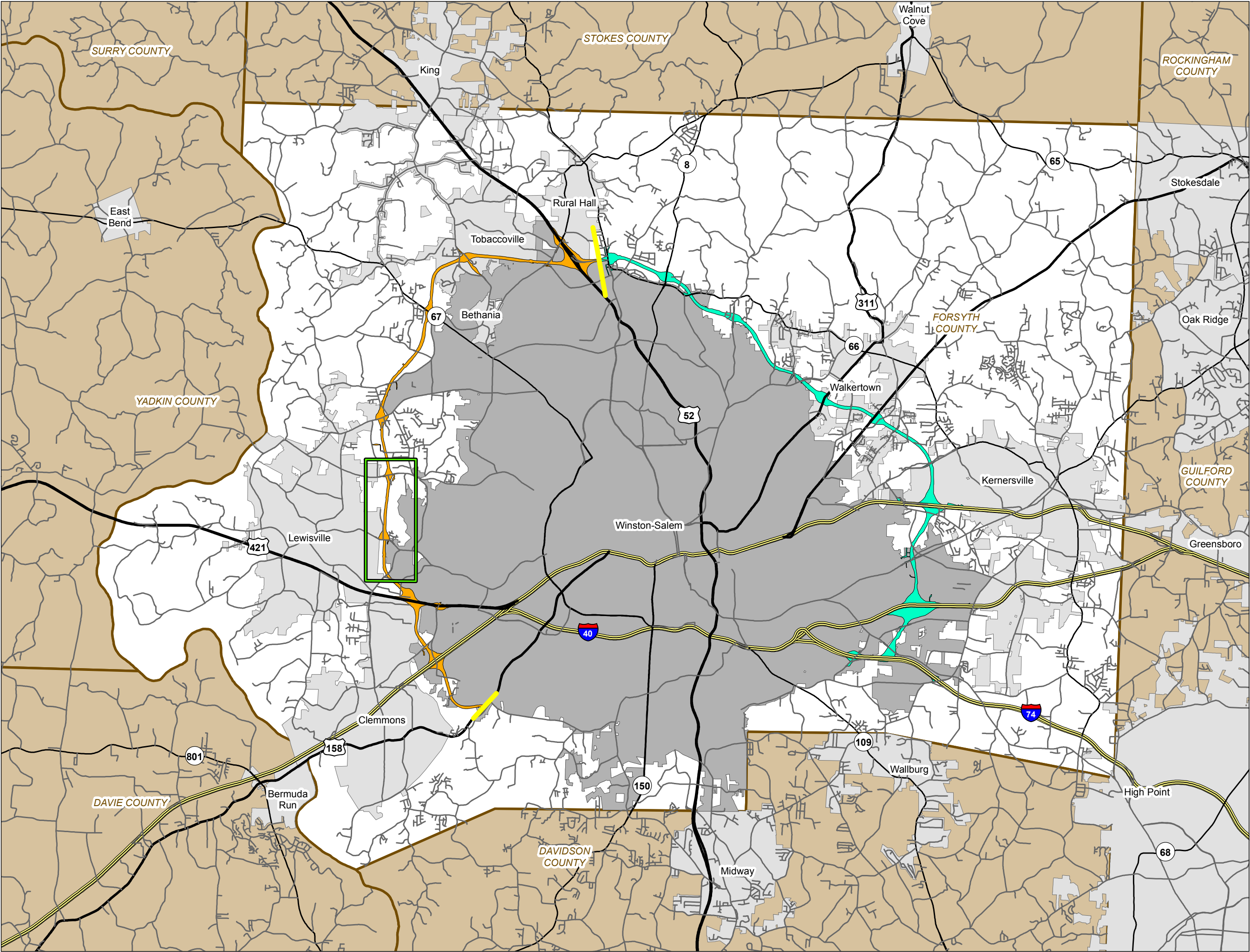
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	W5	0.01
1	W51	0.25
2	W55	0.16
3	W59	0.02
3	W58	0.19
4	W58	0.08
Total:		0.71

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	N	1465
1	O	290
1	BBBB	409
3	NO LABEL	418
5	M	241
6	NO LABEL	155
6	NO LABEL	78
Total:		3,056

Ponds

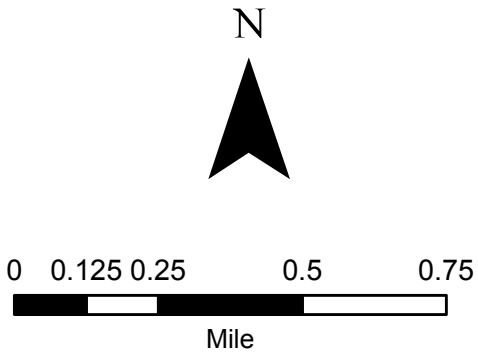
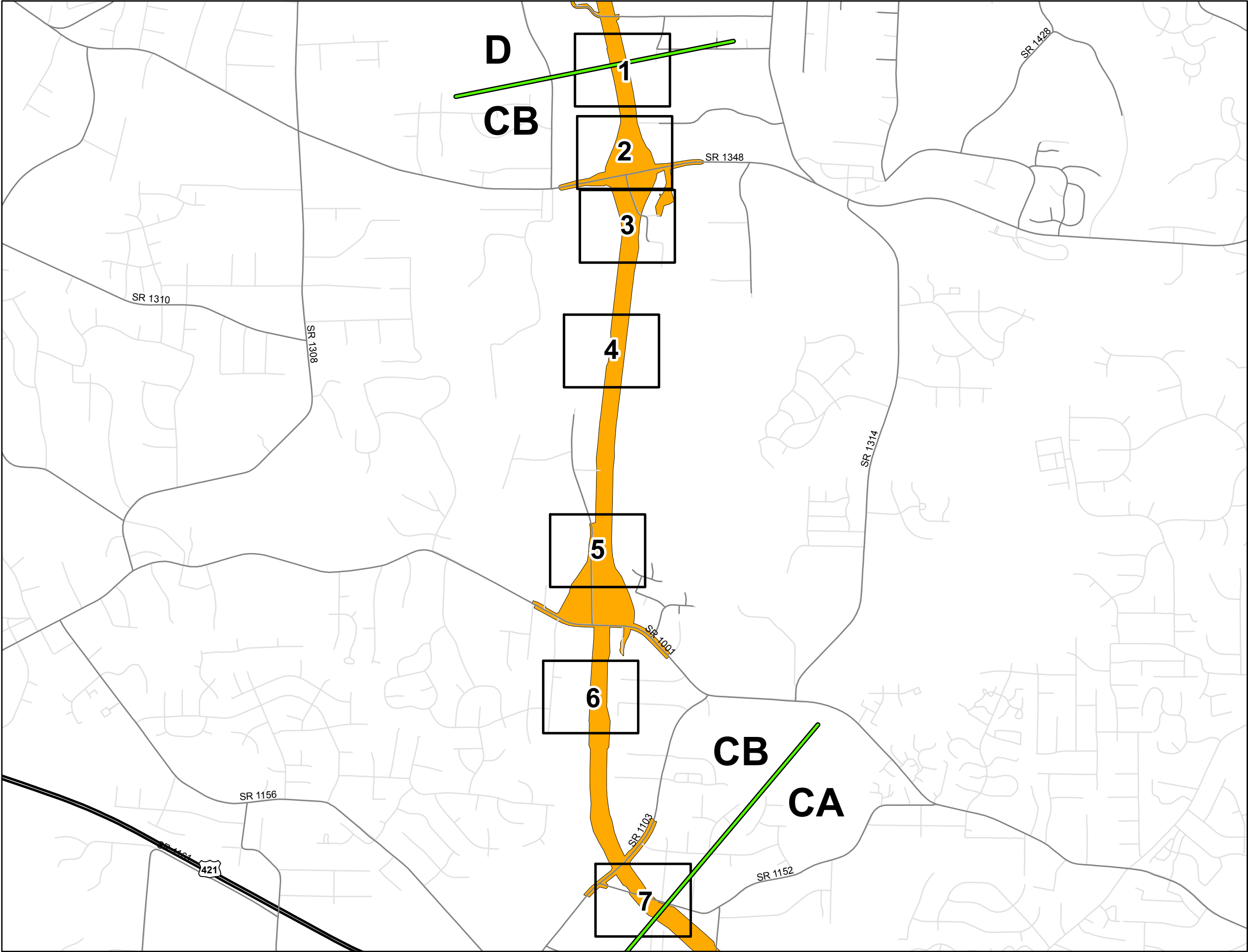
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
2	Pond 2	0.27
Total:		0.27



Legend

- R-2247 Corridor
- U-2579 Corridor
- R-2247 Project Start / Stop
- R-2247CB Rectangle
- Interstate
- US Route
- NC Route
- Secondary Road

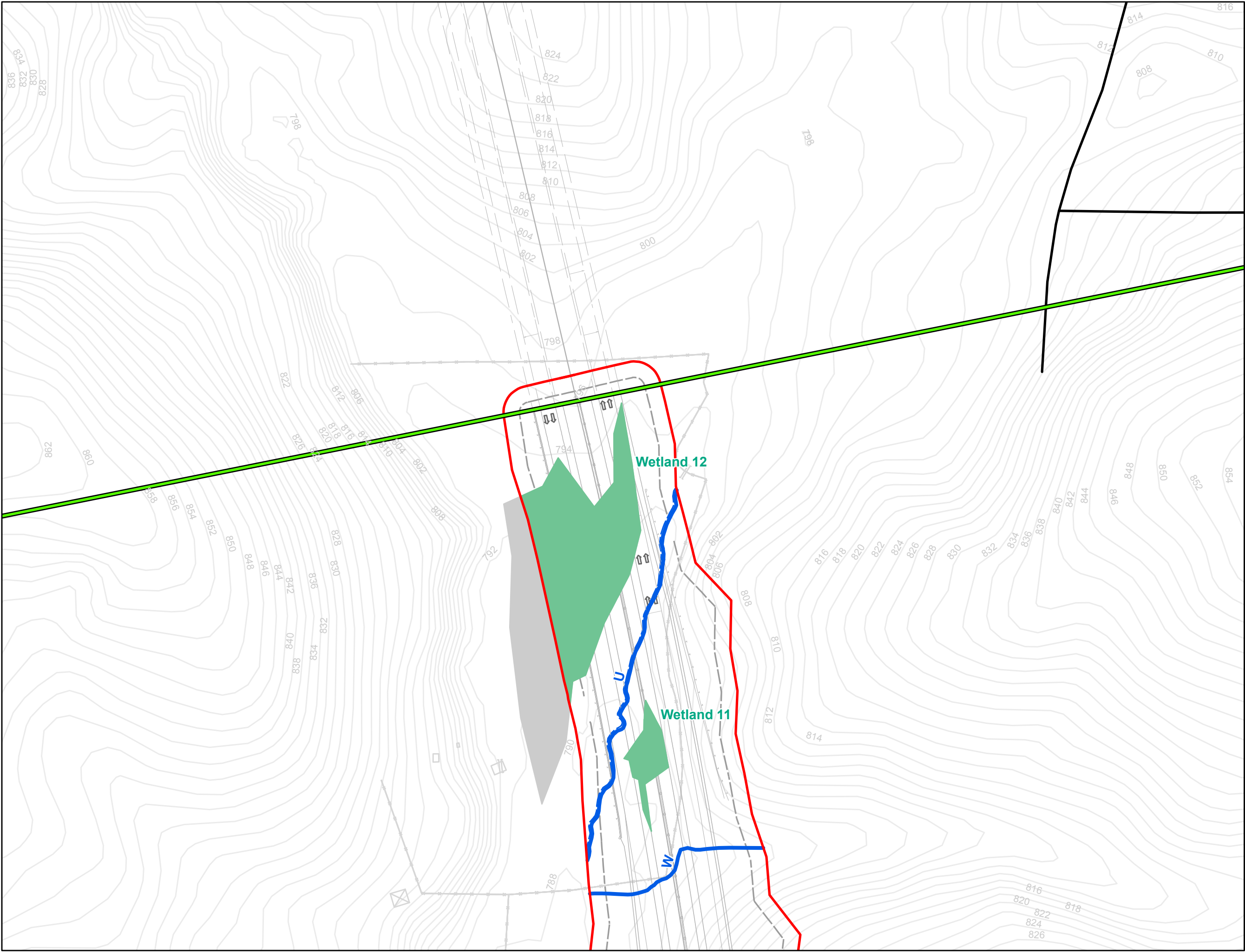
**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section CB: Corridor Context**



Legend

-  R-2247 Corridor
-  R-2247 Section Breaks
-  Section Map Sheets
-  Interstate
-  US Route
-  NC Route
-  Secondary Road
-  Other Existing Road

**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section CB: Master Sheet**



N

0 50 100 200 300

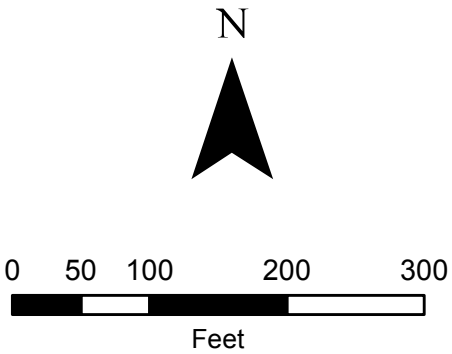
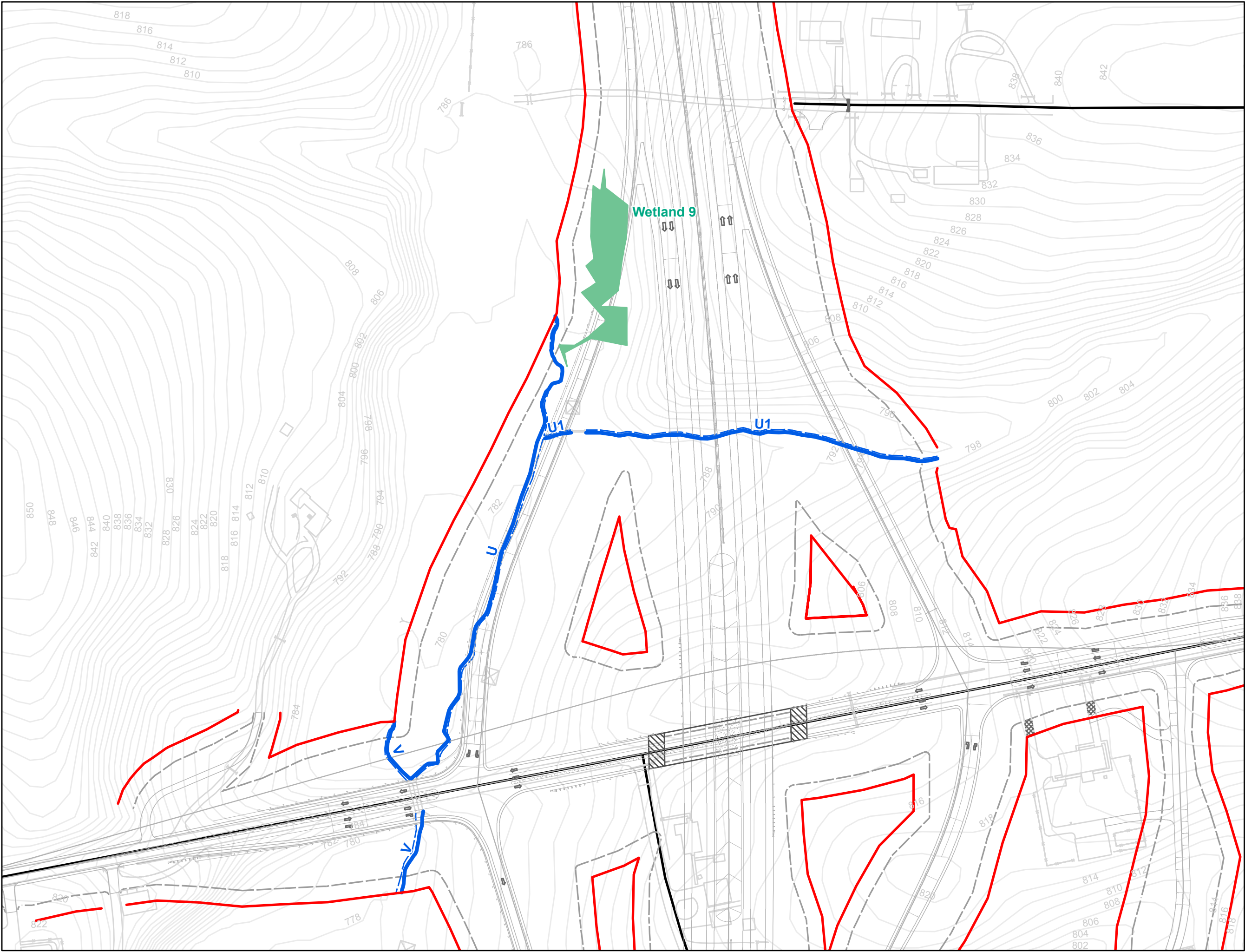
Feet

Legend

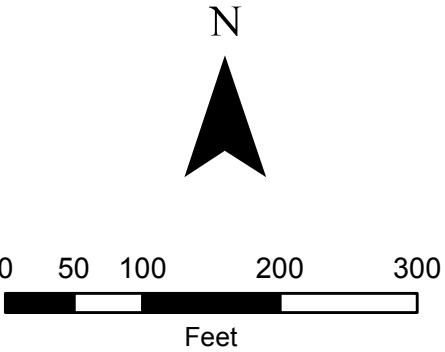
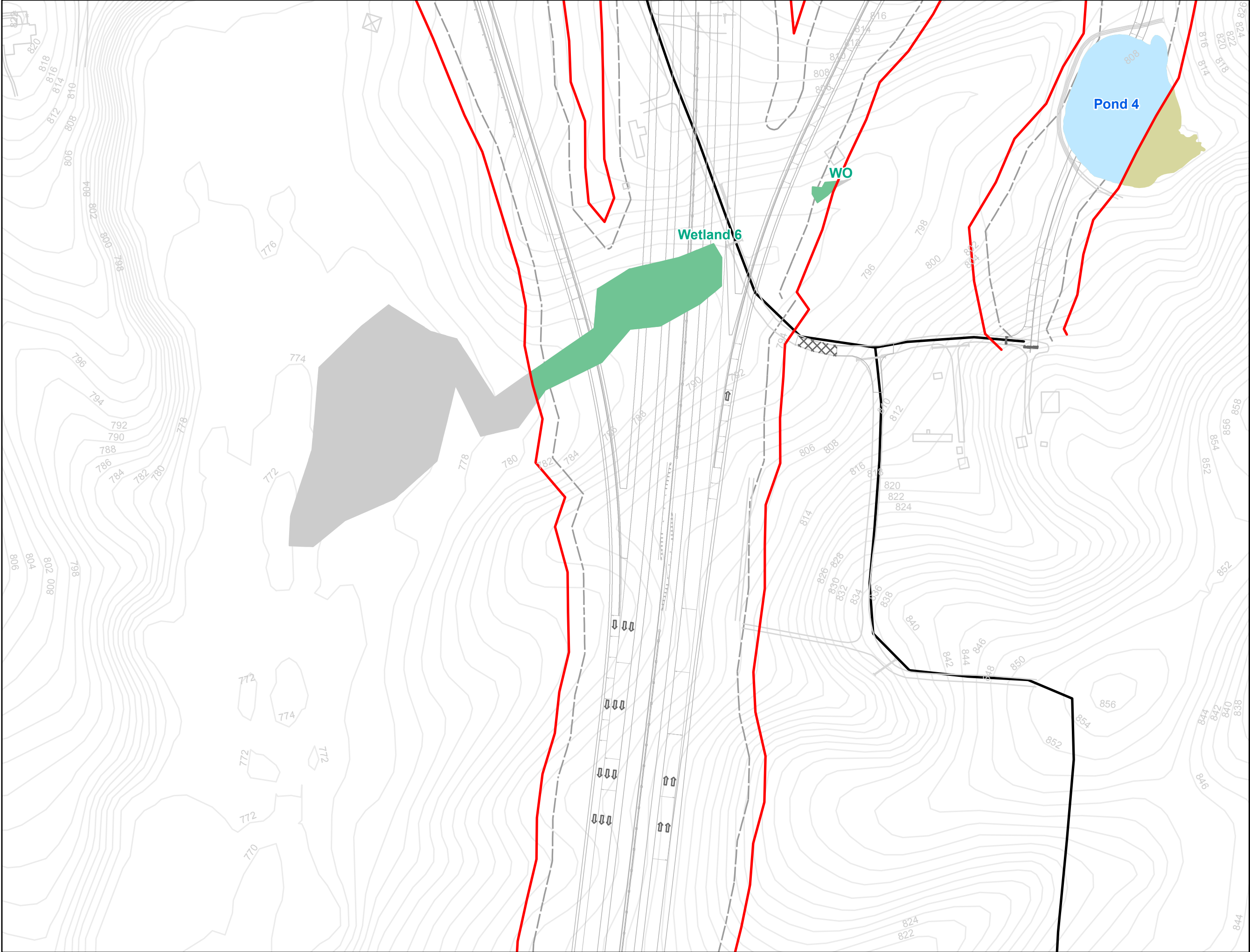
- R-2247CA: Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams within Slope Stakes + 25' *
- Wetlands Within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- R-2247 Section Breaks

* = Preliminary Impacts

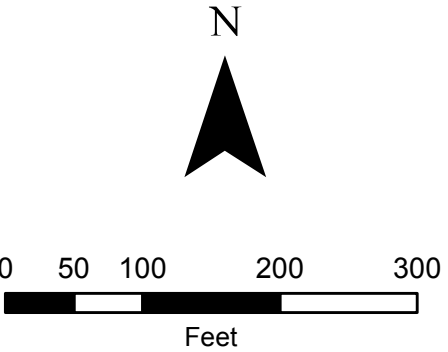
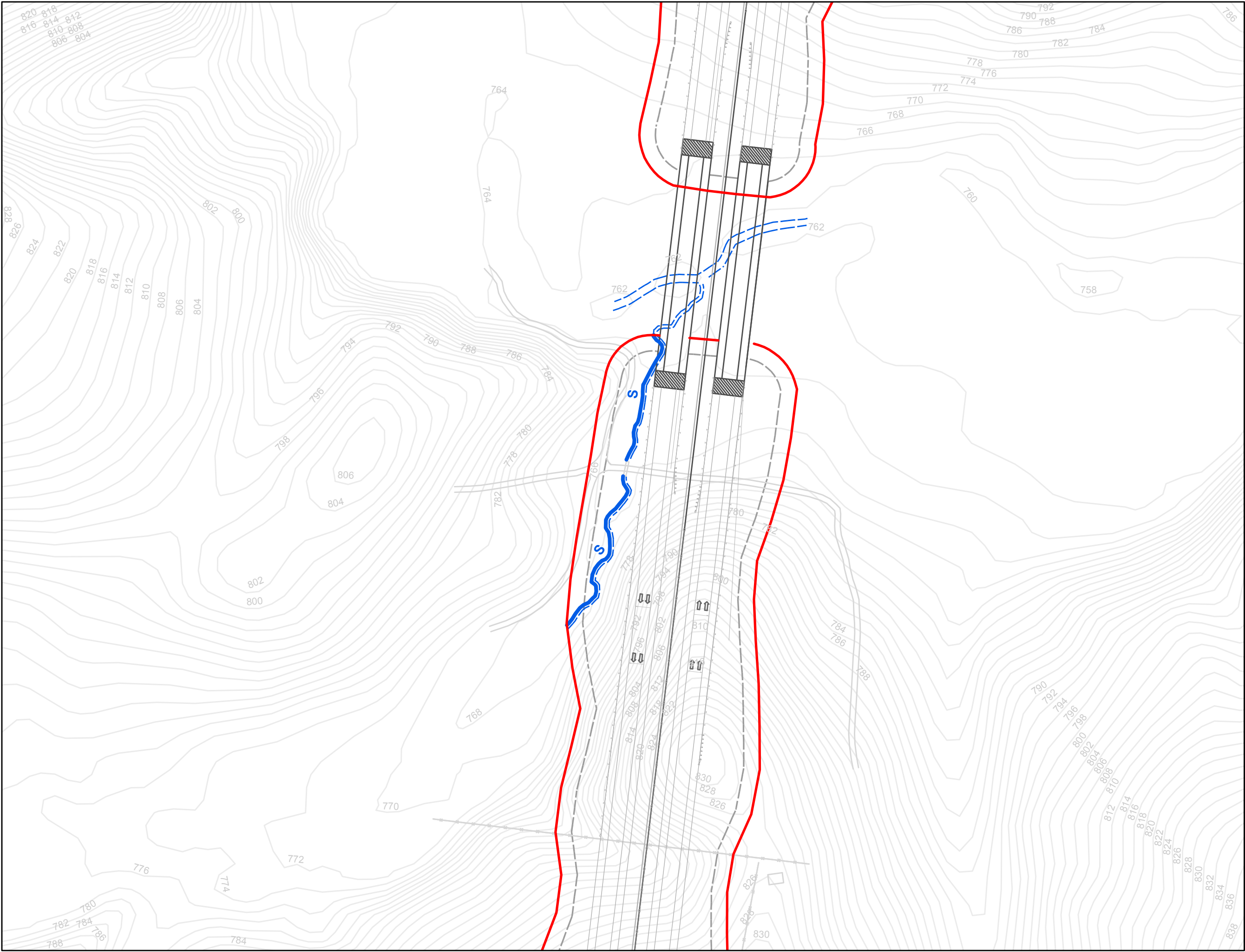
Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section CB: Sheet 1 of 7



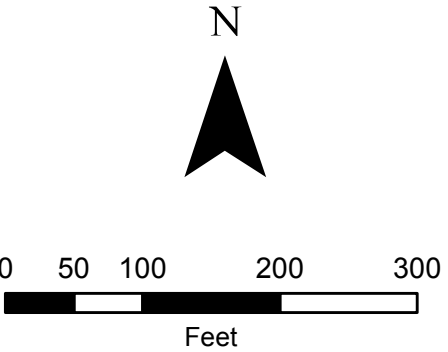
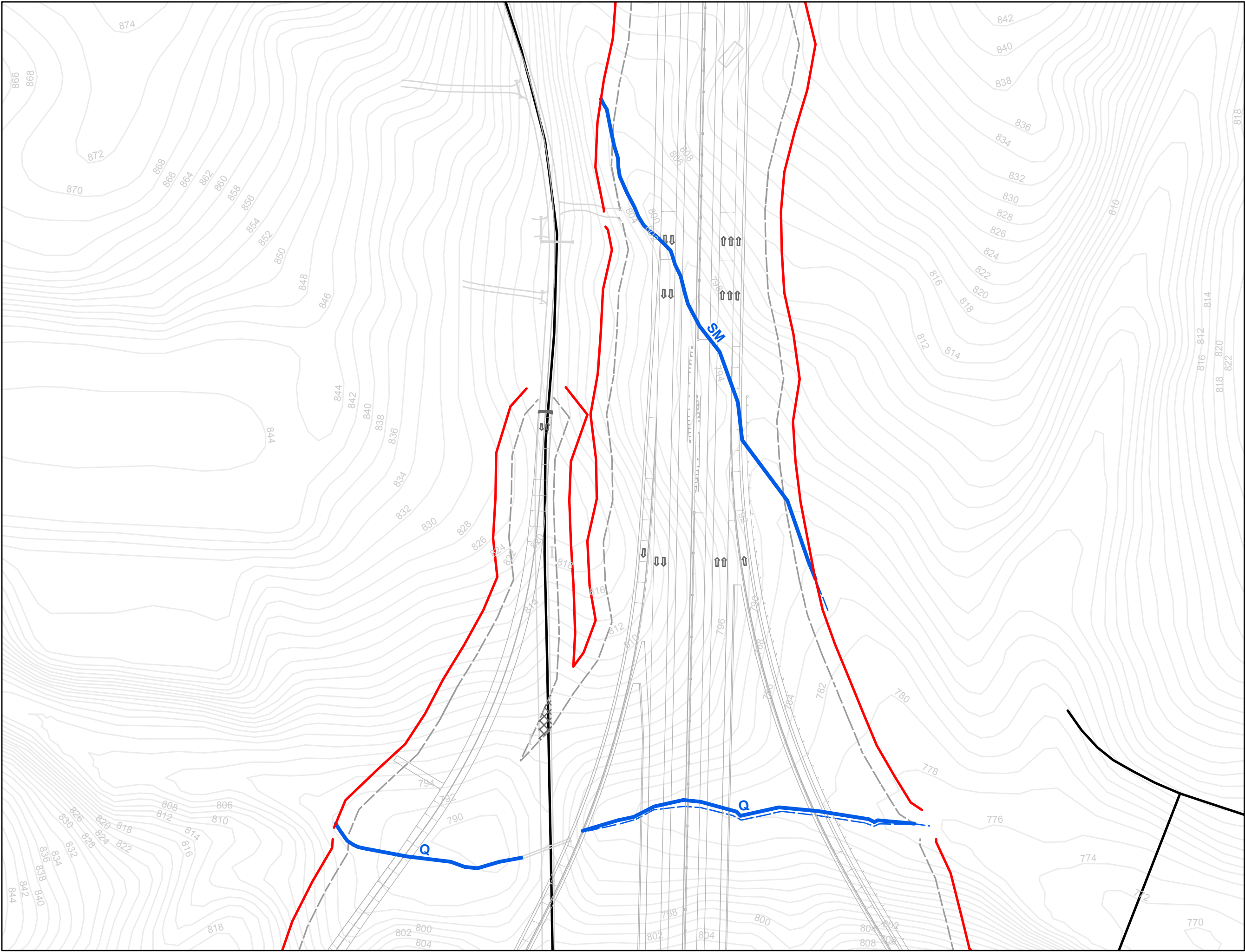
- Legend**
- R-2247CA: Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



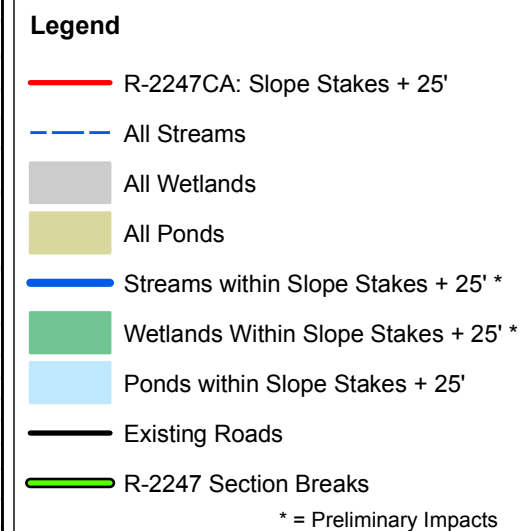
- Legend**
- R-2247CA: Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
 - * = Preliminary Impacts



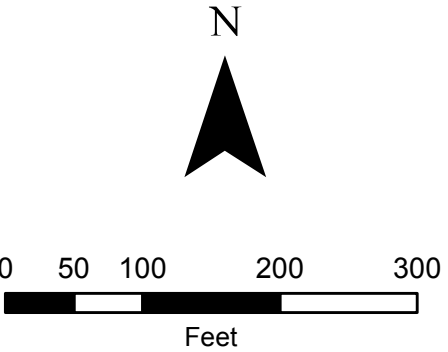
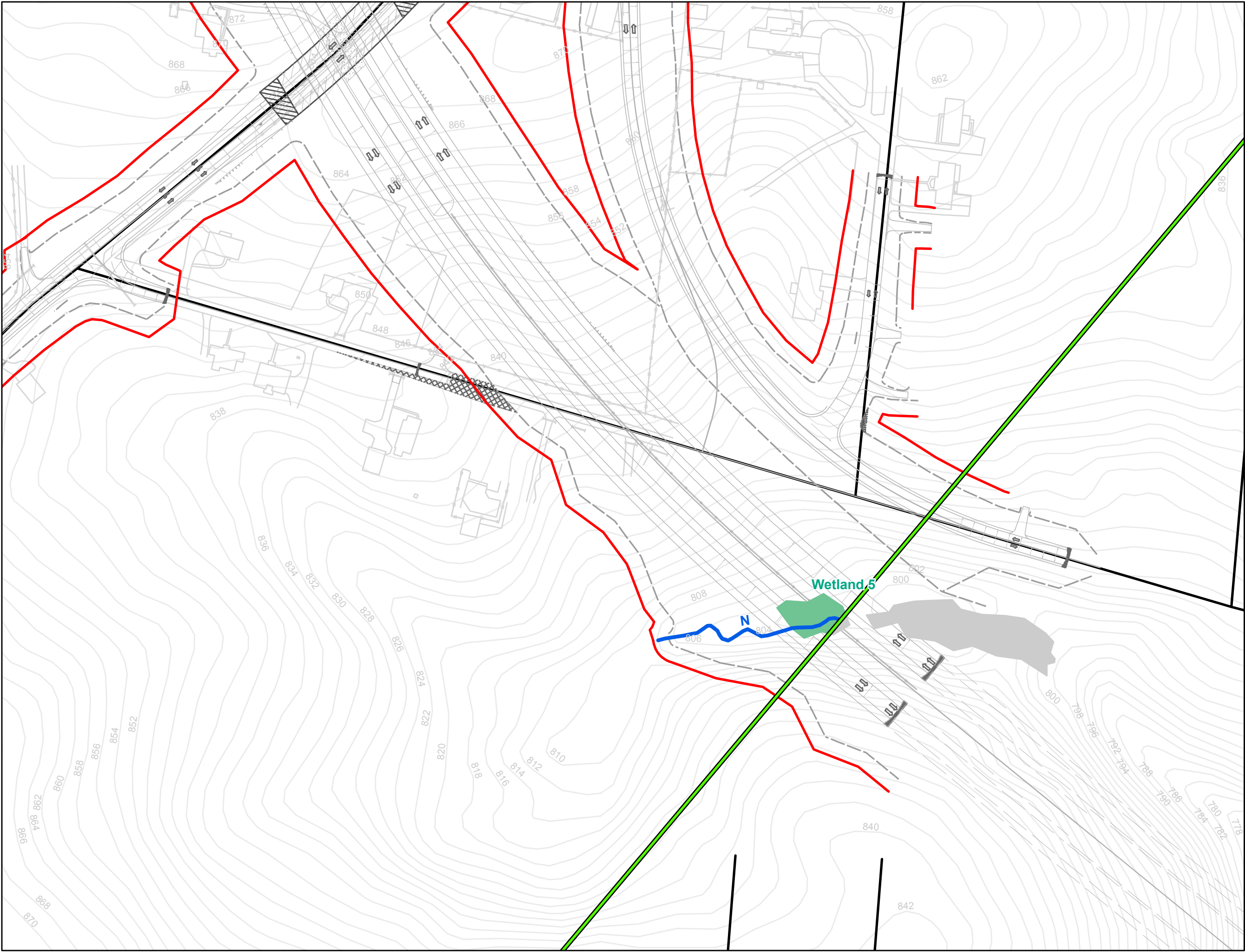
- Legend**
- R-2247CA: Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- Legend**
- R-2247CA: Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section CB: Sheet 6 of 7**



- Legend**
- R-2247CA: Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands Within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
 - * = Preliminary Impacts

STIP No. R-2247, Section CB

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

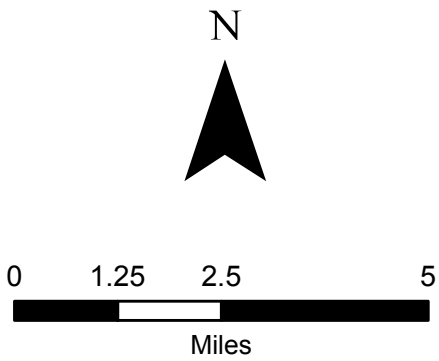
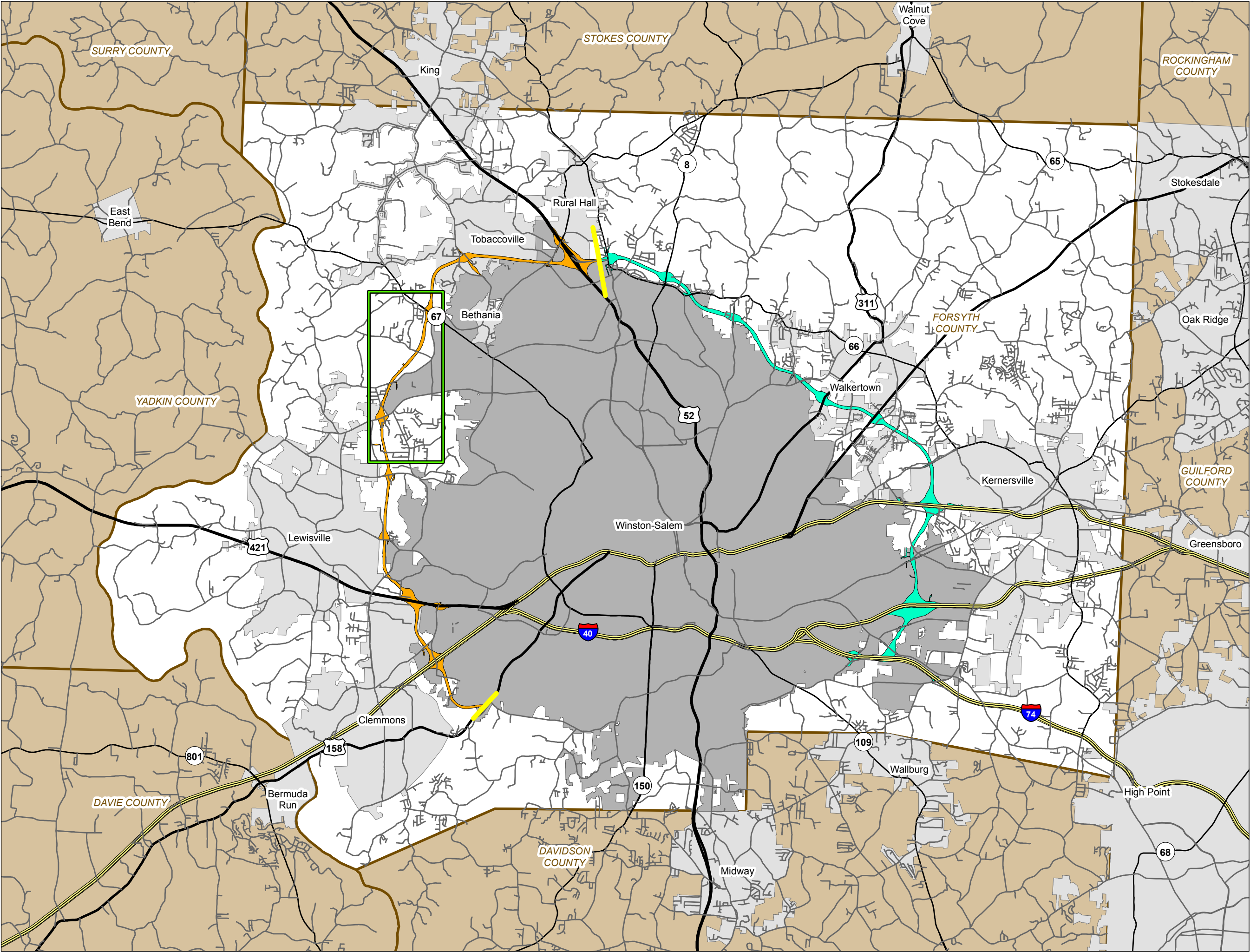
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	Wetland 11	0.12
1	Wetland 12	0.91
2	Wetland 9	0.27
3	Wetland 6	0.54
3	WO	0.02
6	WP	0.02
7	Wetland 5	0.10
Total:		1.98

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	W	310
1	U	627
2	U	816
2	U1	605
2	V	243
4	S	497
5	SM	842
5	Q	852
6	SN	567
7	N	315
Total:		5,674

Ponds

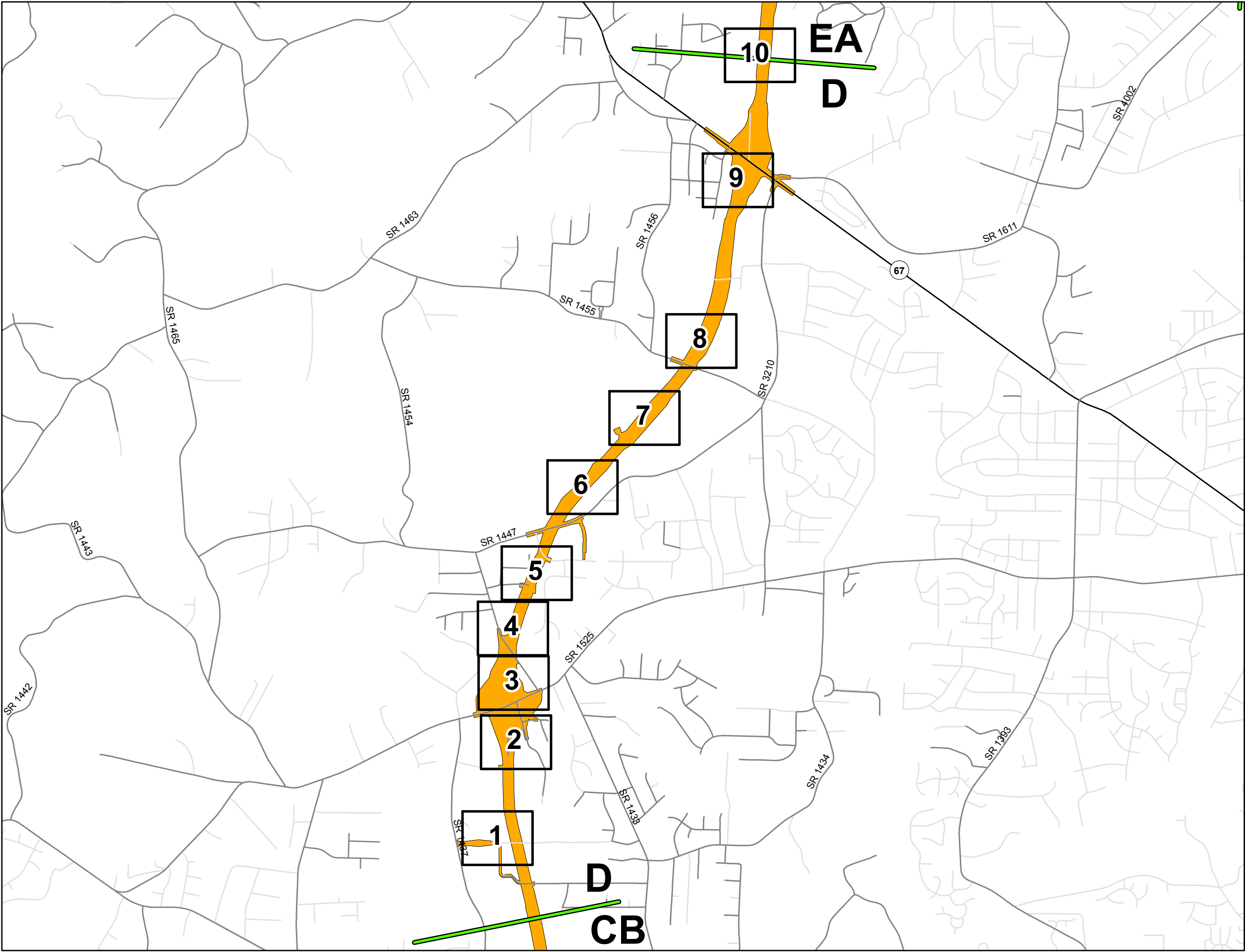
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
3	Pond 4	0.61
6	New, No label	0.12
Total:		0.73



Legend

- R-2247 Corridor
- U-2579 Corridor
- R-2247 Project Start / Stop
- R-2247D Rectangle
- Interstate
- US Route
- NC Route
- Secondary Road

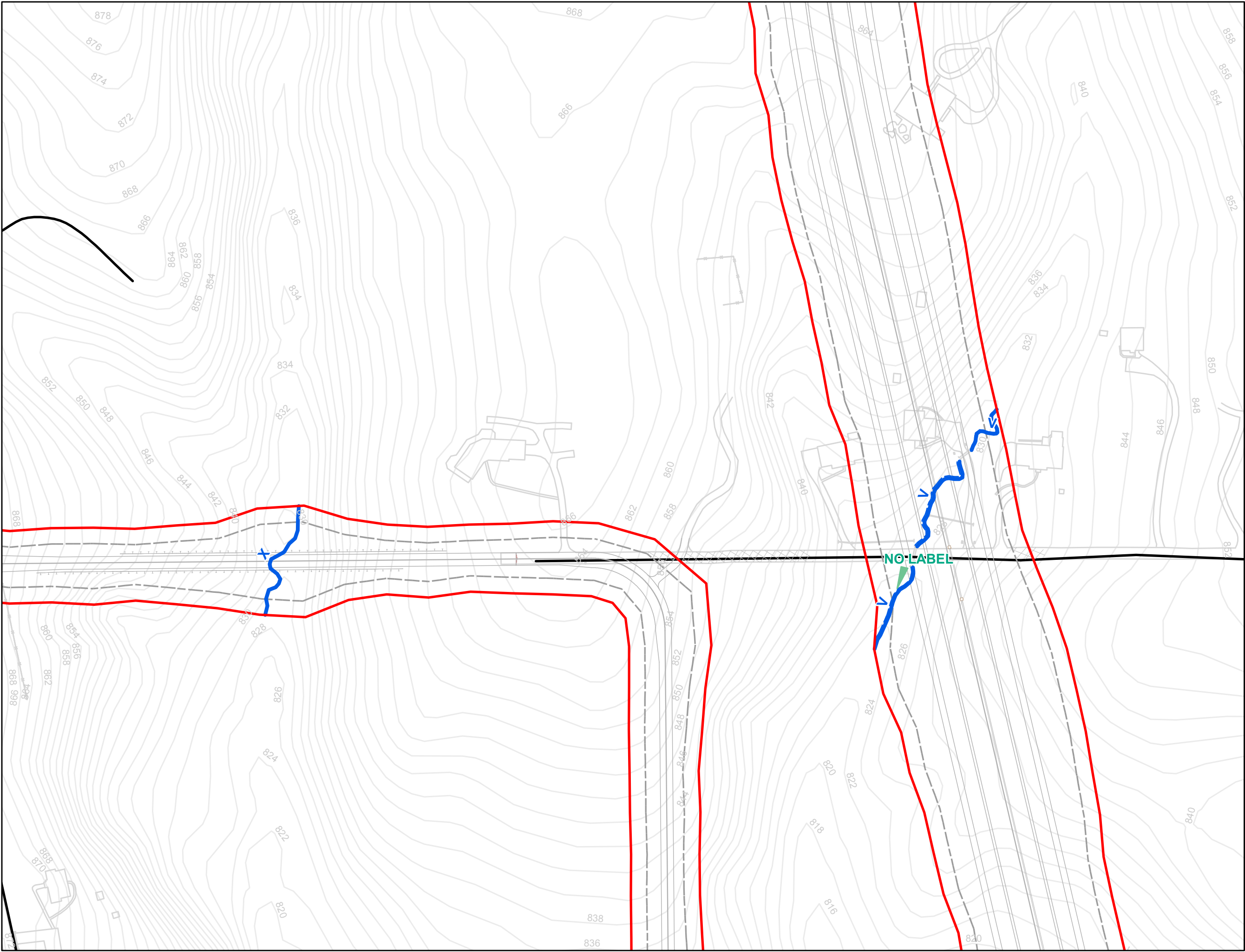
**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section D: Corridor Context**



Legend

- R-2247 Corridor
- R-2247 Section Breaks
- Section Map Sheets
- Interstate
- US Route
- NC Route
- Secondary Road
- Other Existing Road

**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section D: Master Sheet**



N

0 50 100 200 300

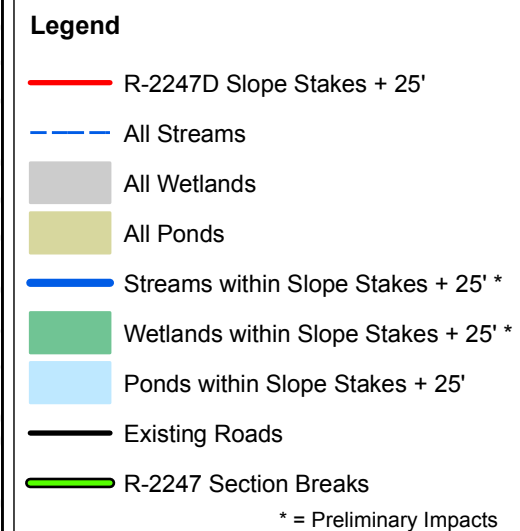
Feet

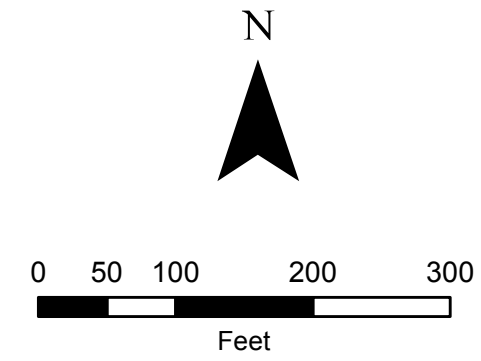
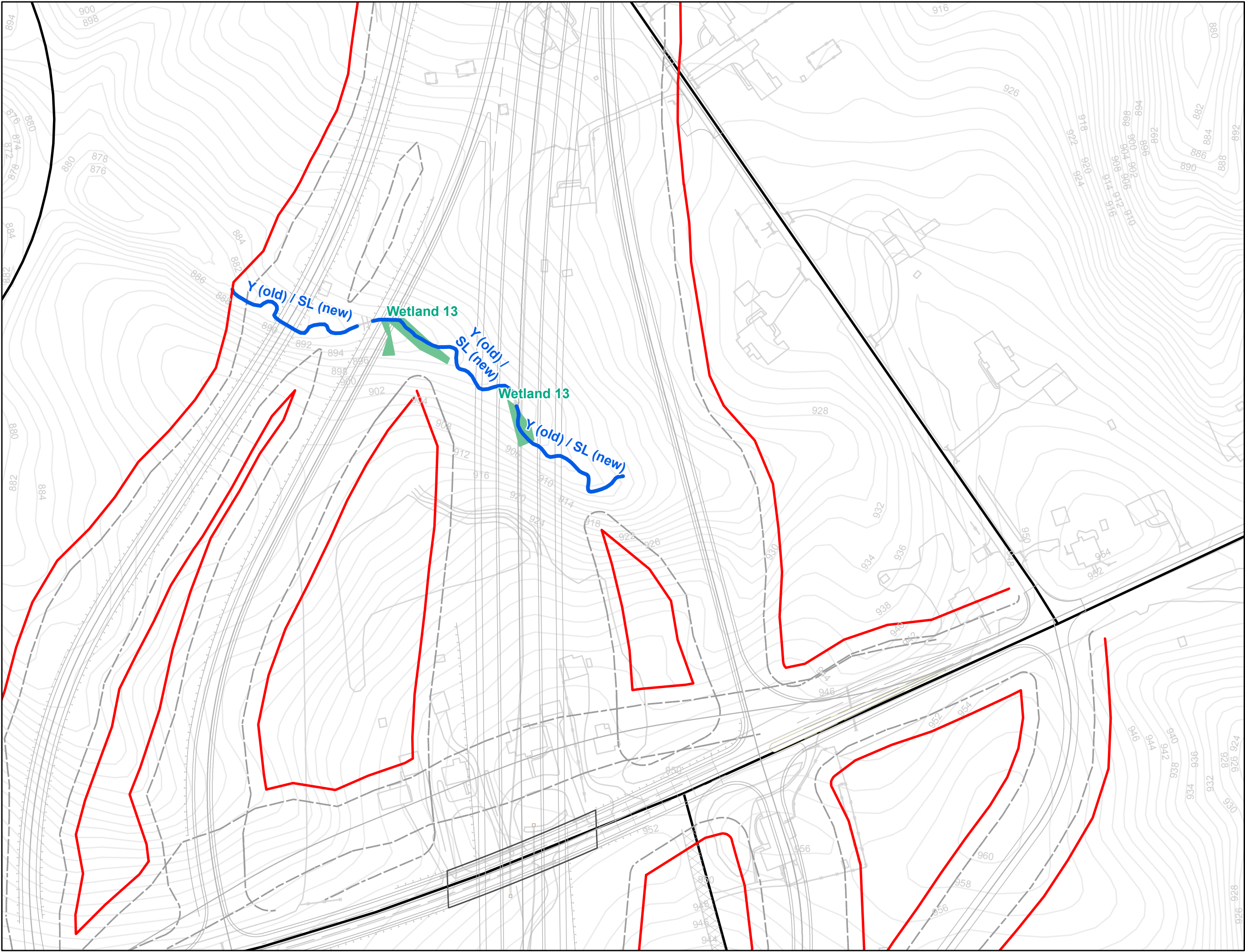
Legend

- R-2247D Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams within Slope Stakes + 25' *
- Wetlands within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- R-2247 Section Breaks

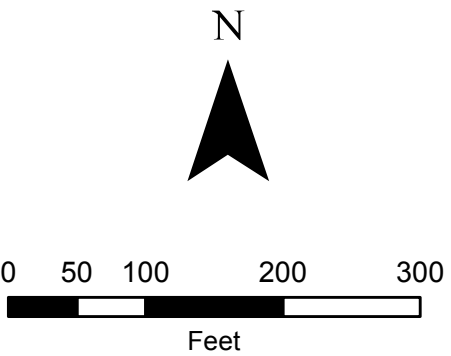
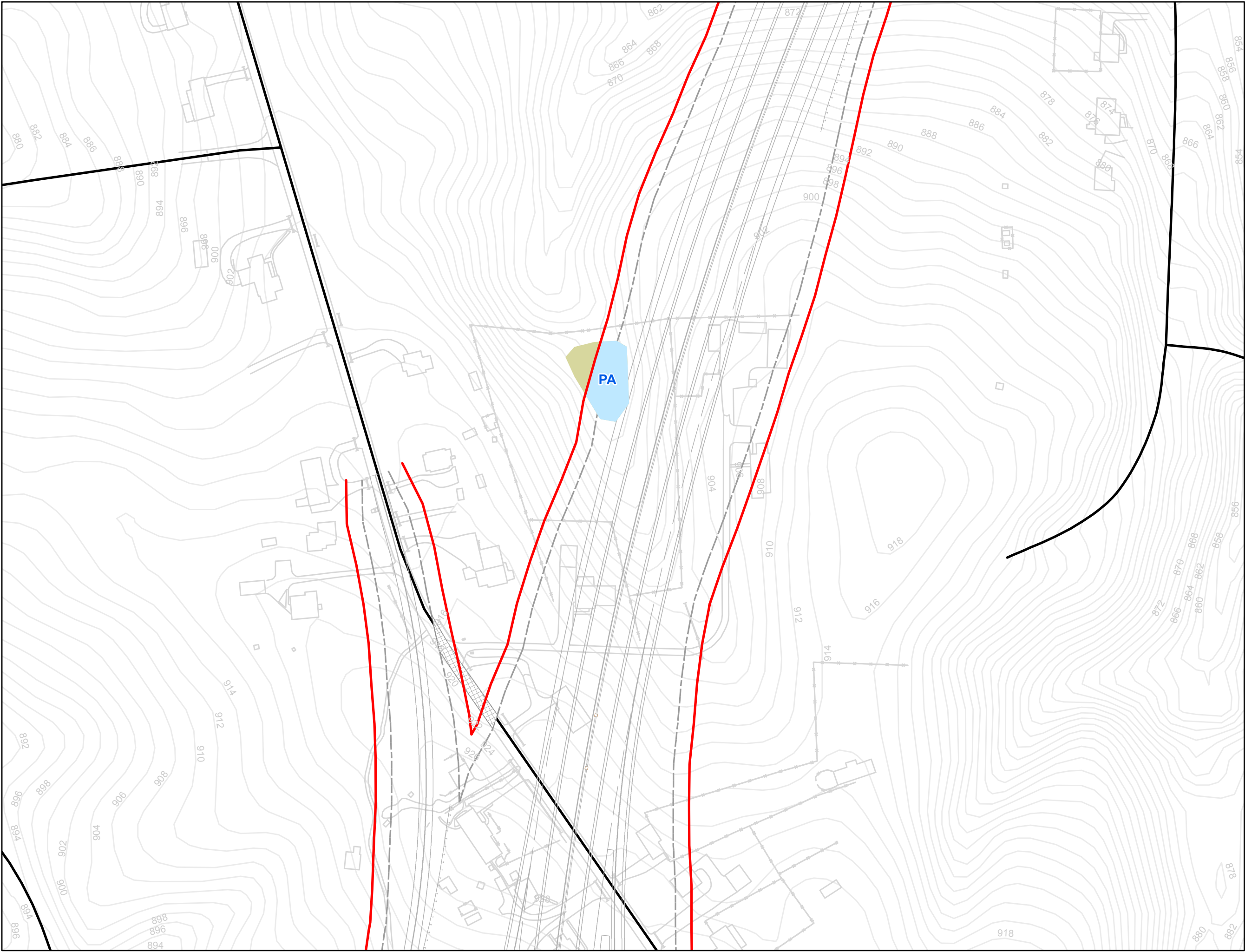
* = Preliminary Impacts

Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section D: Sheet 1 of 10

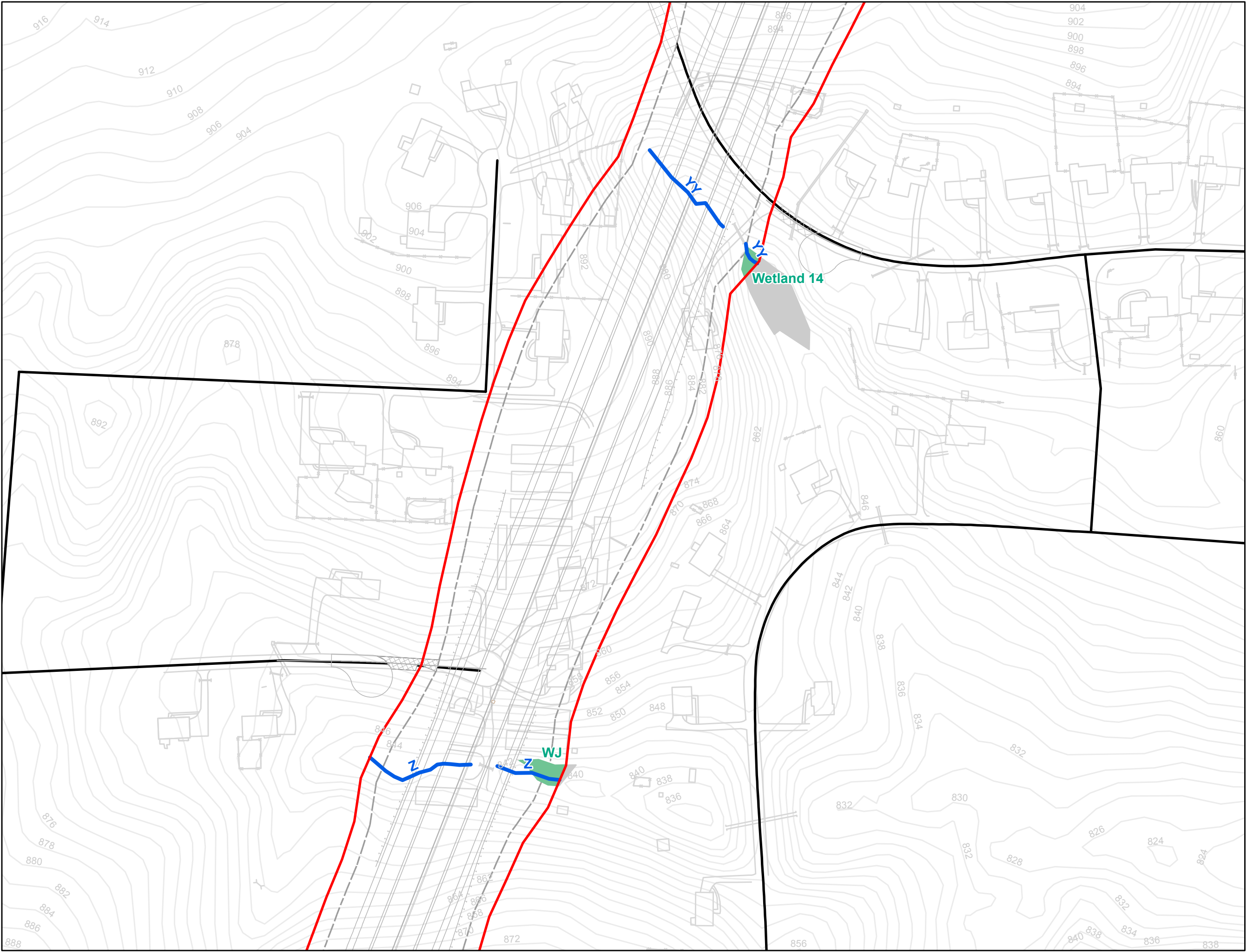




- Legend**
- R-2247D Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- Legend**
- R-2247D Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



N

0 50 100 200 300

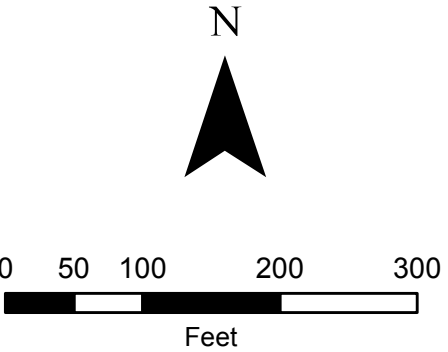
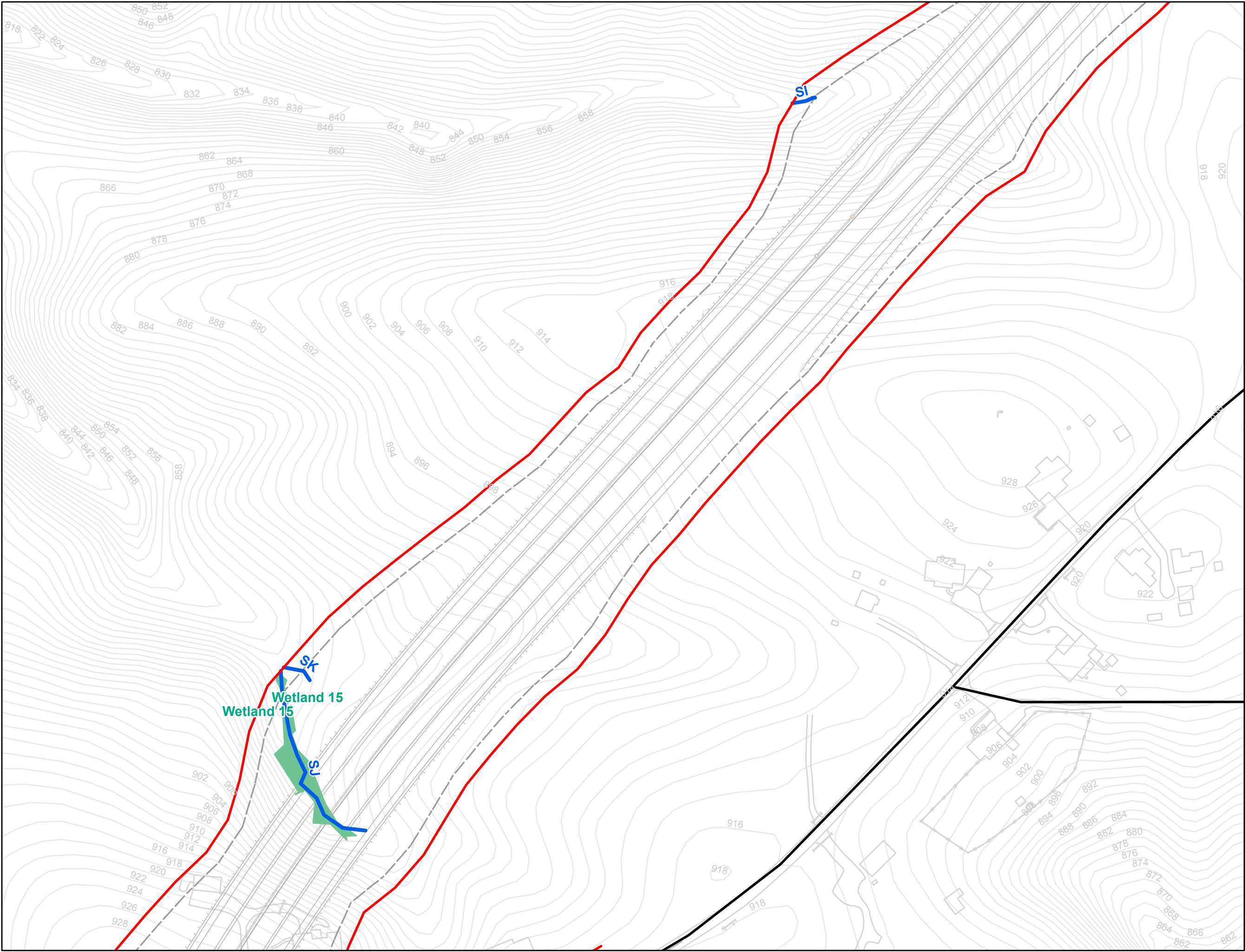
Feet

Legend

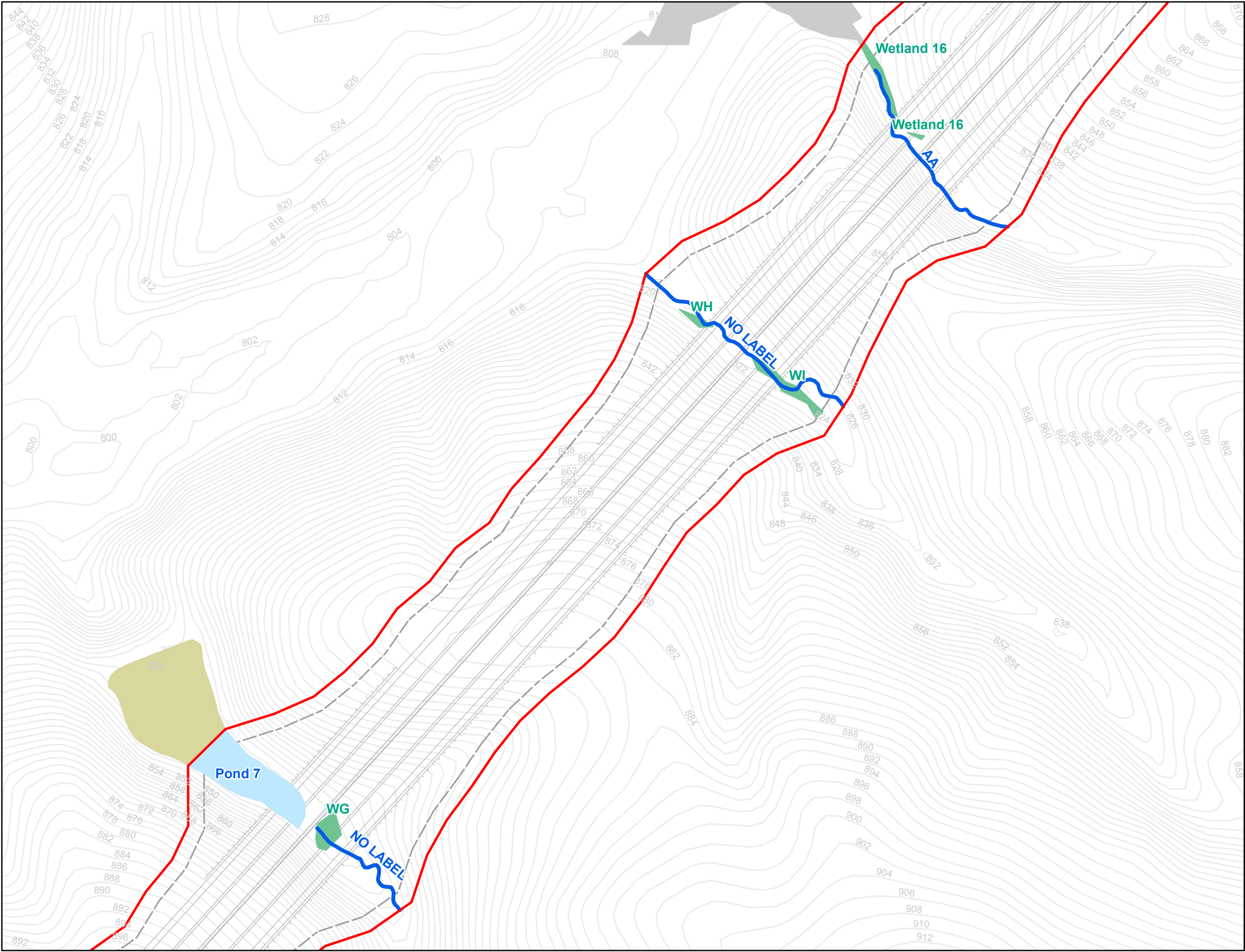
- R-2247D Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams within Slope Stakes + 25' *
- Wetlands within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- R-2247 Section Breaks

* = Preliminary Impacts

Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section D: Sheet 5 of 10



- Legend**
- R-2247D Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts

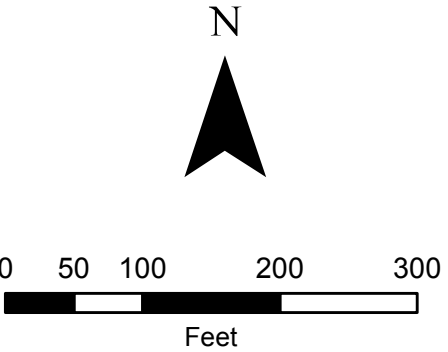
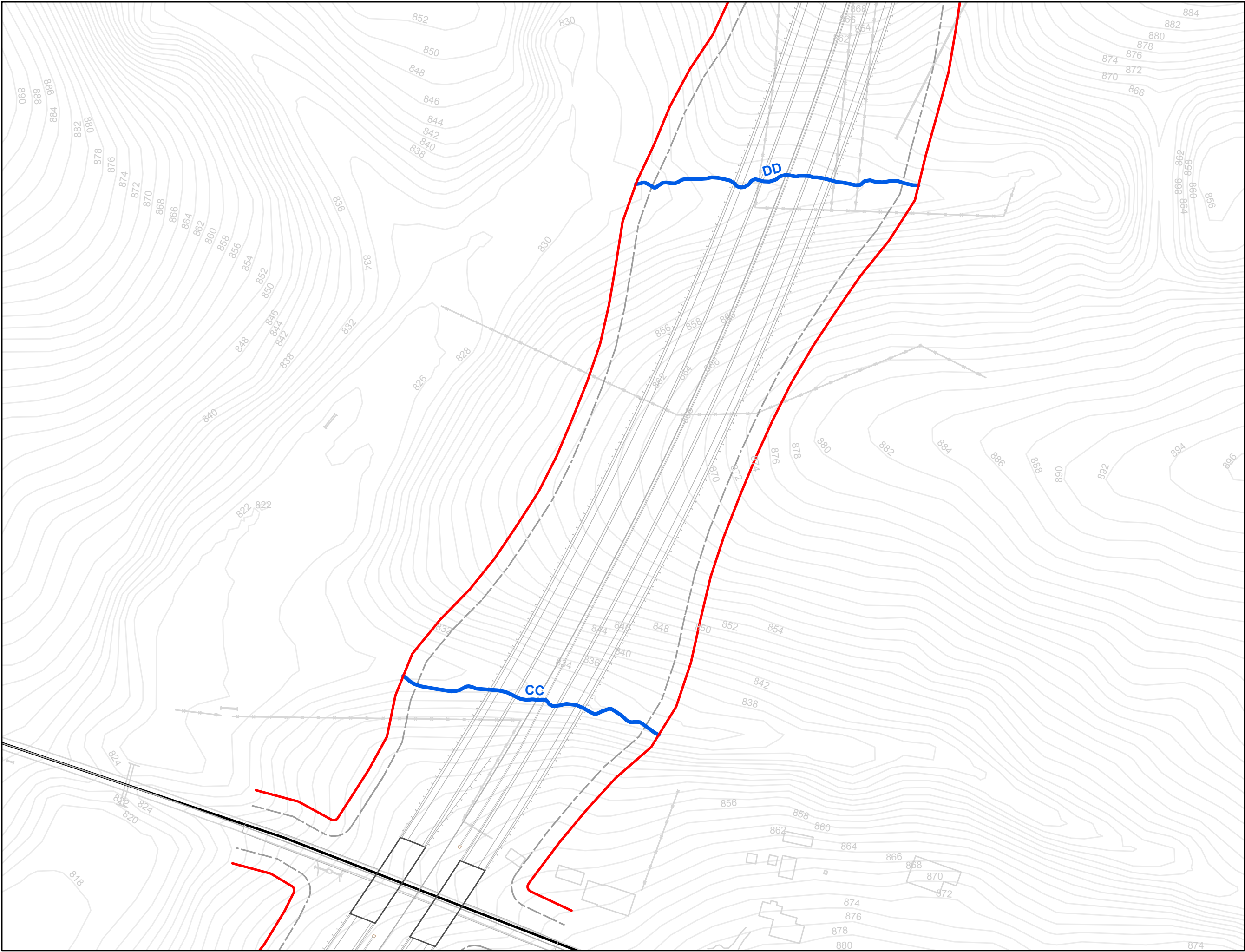


Legend

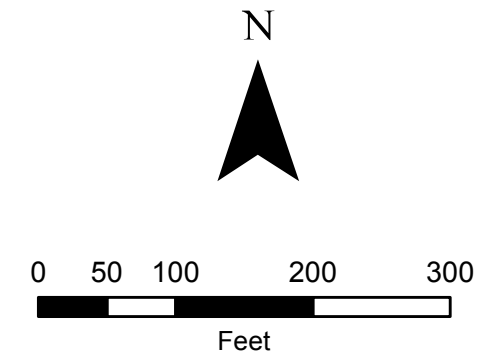
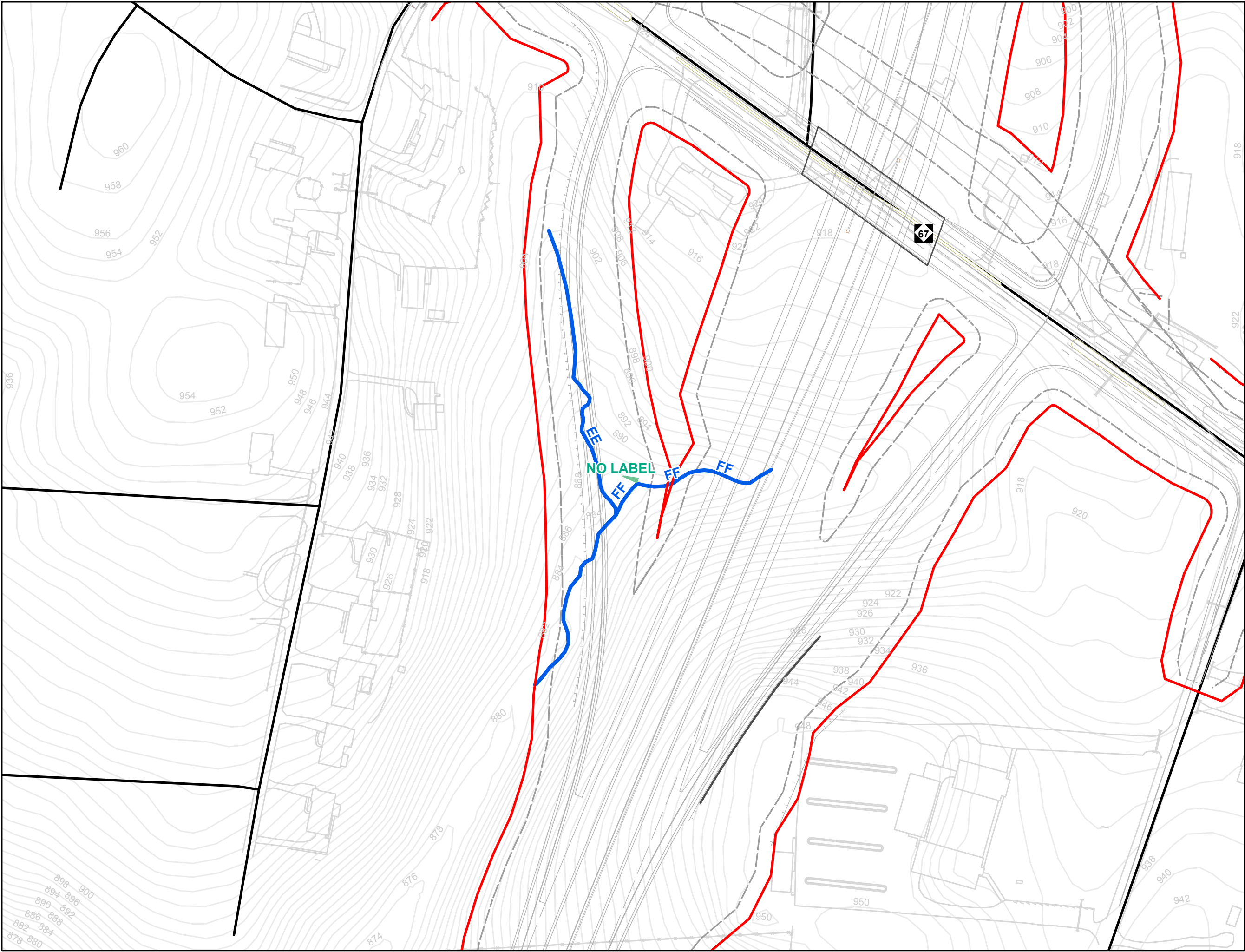
- R-2247D Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams within Slope Stakes + 25' *
- Wetlands within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- R-2247 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section D: Sheet 7 of 10**



- Legend**
- R-2247D Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
 - * = Preliminary Impacts

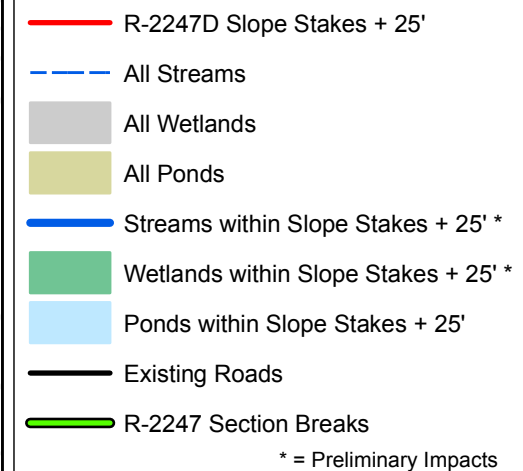
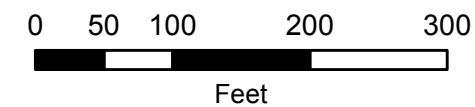


Legend

- R-2247D Slope Stakes + 25'
- All Streams
- All Wetlands
- All Ponds
- Streams within Slope Stakes + 25' *
- Wetlands within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- R-2247 Section Breaks

* = Preliminary Impacts

**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section D: Sheet 9 of 10**



STIP No. R-2247, Section D

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

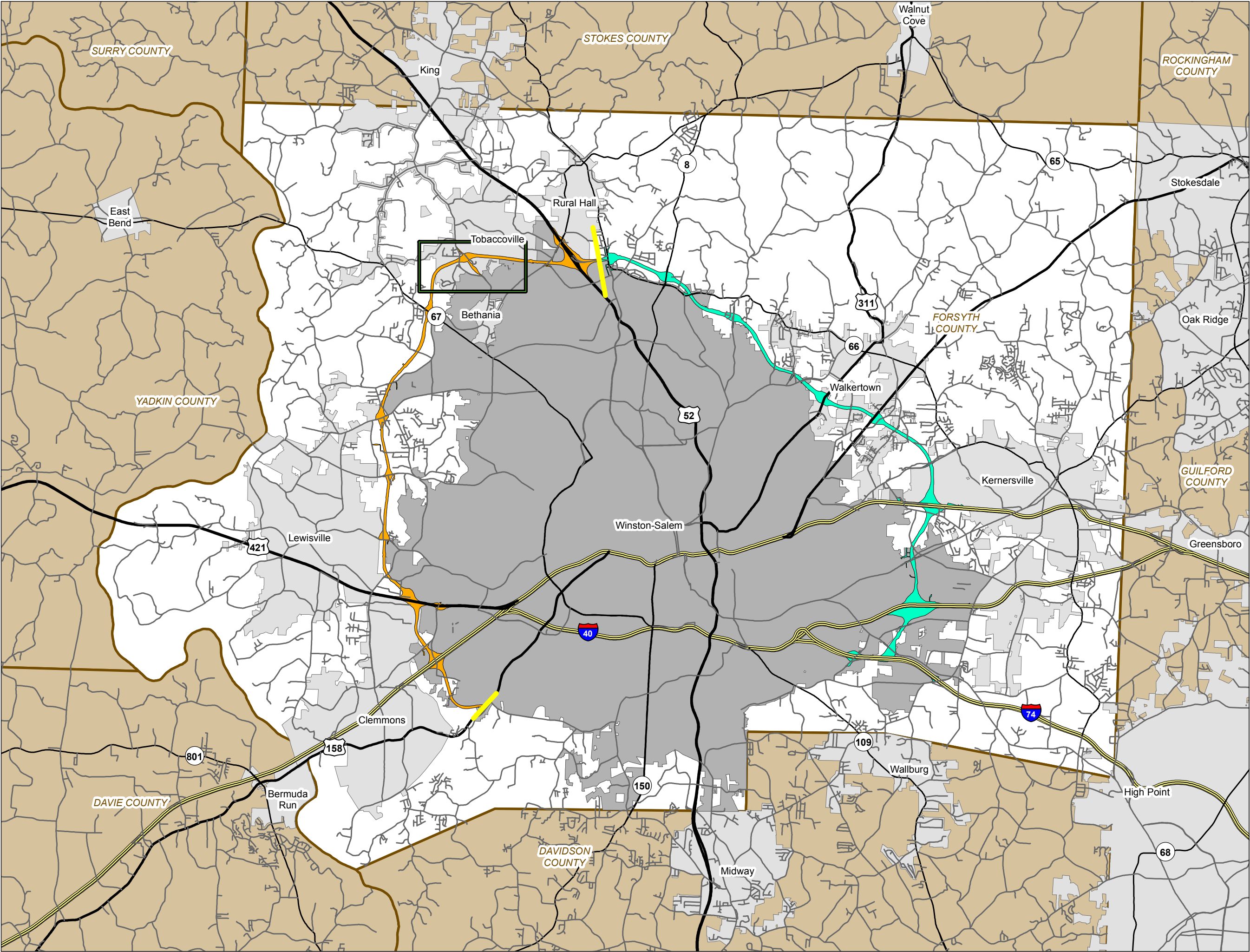
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	NO LABEL	<0.01
2	WK	0.13
3	Wetland 13	0.05
3	Wetland 13	0.03
5	WJ	0.04
5	Wetland 14	0.02
6	Wetland 15 Part 1	0.12
6	Wetland 15 Part 2	0.01
7	WG	0.04
7	WH	0.01
7	WI	0.04
7	Wetland 16 Part 1	0.03
7	Wetland 16 Part 2	<0.01
9	NO LABEL	<0.01
Total:		0.52

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	X	208
1	V	430
3	Y (old); SL (NEW)	794
5	Z	278
5	YY	211
6	SK	49
6	SJ	319
6	SI	37
7	NO LABEL	209
7	NO LABEL	417
7	AA	355
8	CC	434
8	DD	468
9	EE	795
9	FF	286
10	SE	472
Total:		5,762

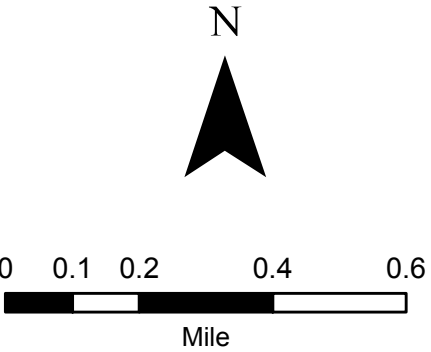
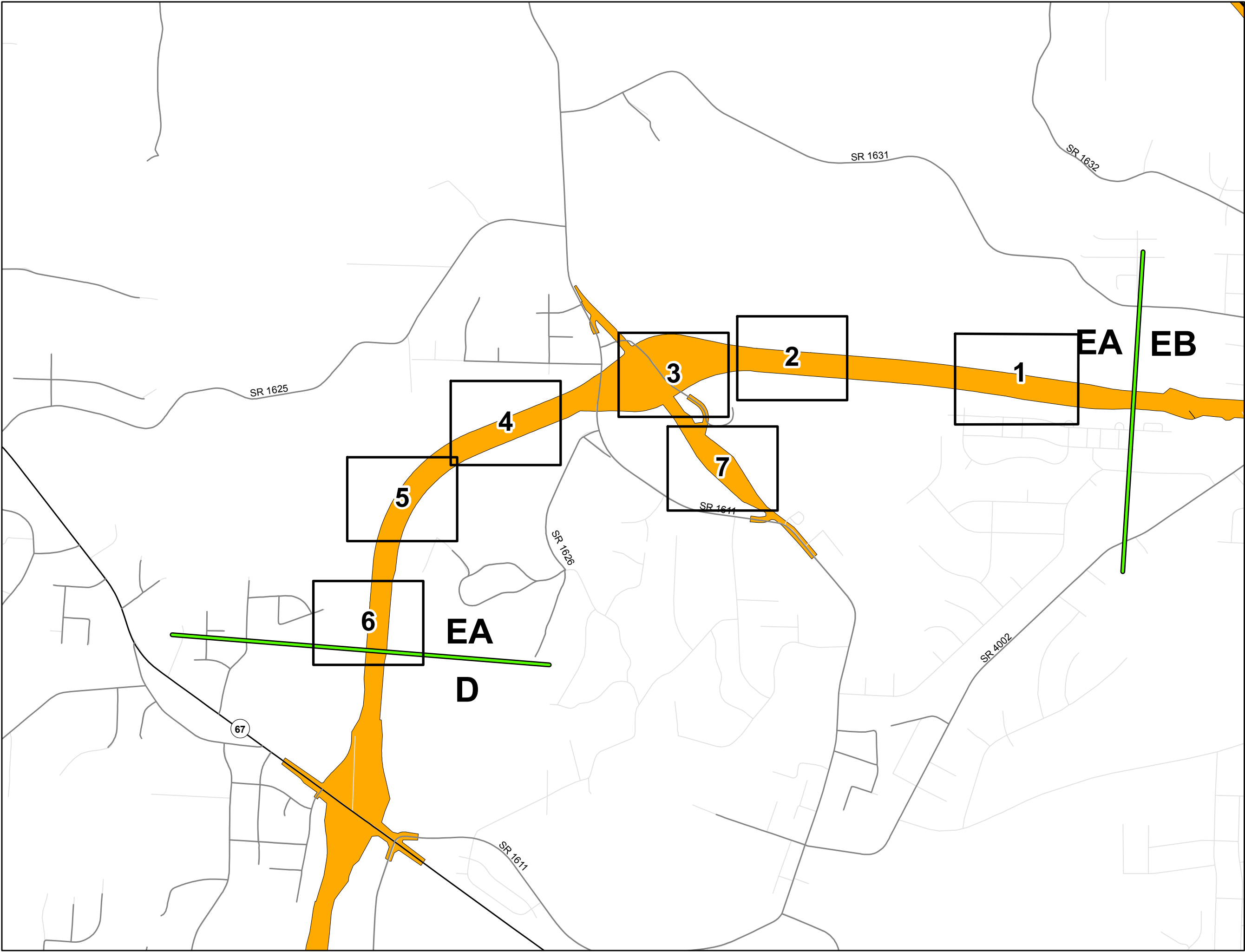
Ponds

<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
4	PA	0.15
7	Pond 7	0.24
Total:		0.39



- Legend**
- R-2247 Corridor
 - U-2579 Corridor
 - R-2247 Project Start / Stop
 - R-2247EA Rectangle
 - Interstate
 - US Route
 - NC Route
 - Secondary Road

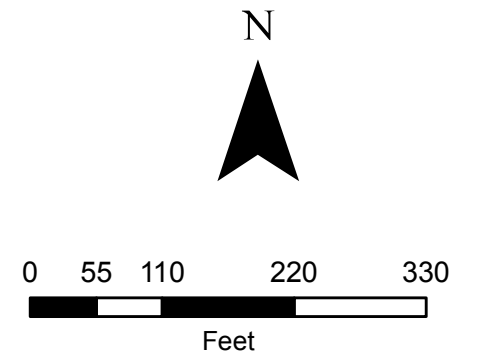
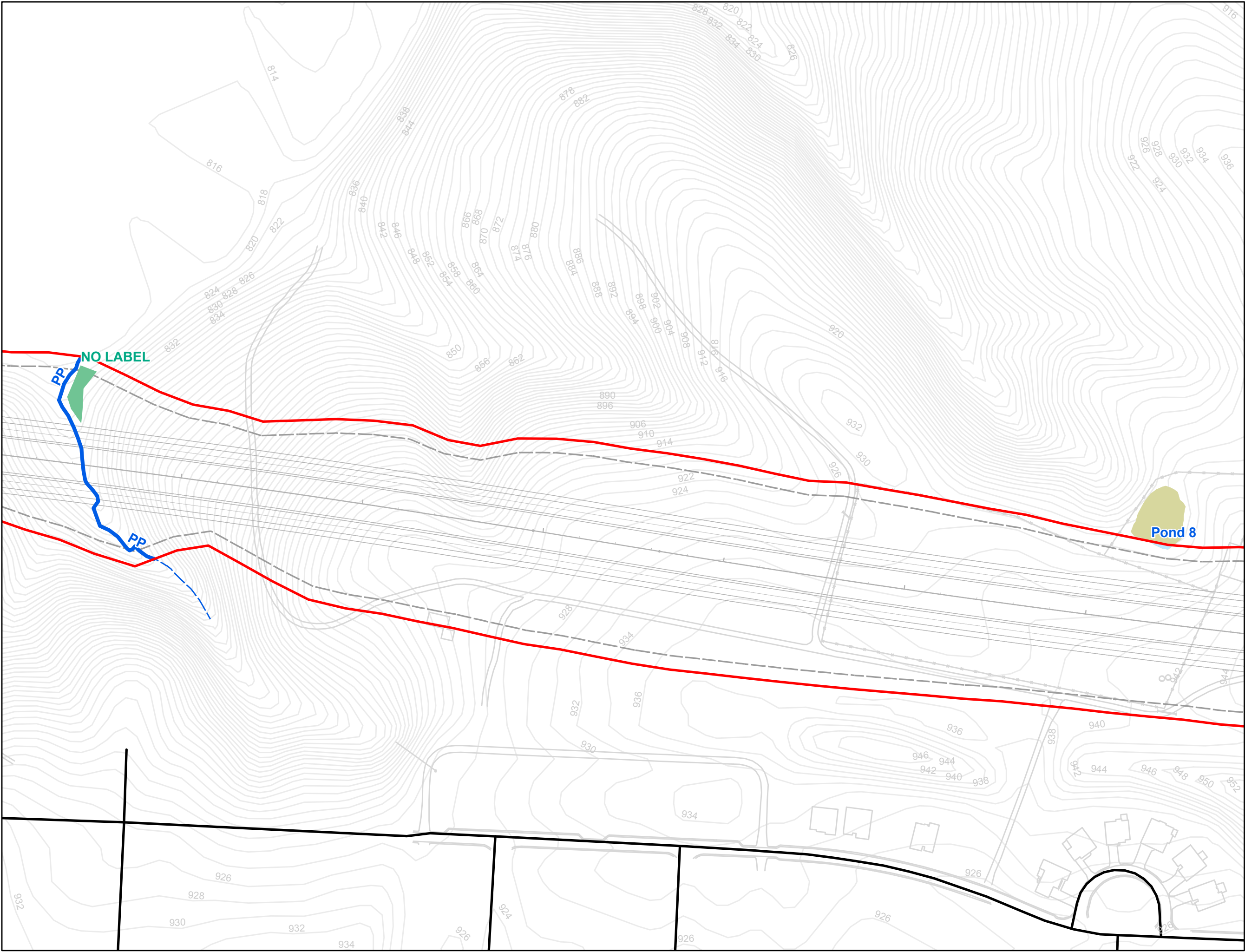
**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section EA: Corridor Context**



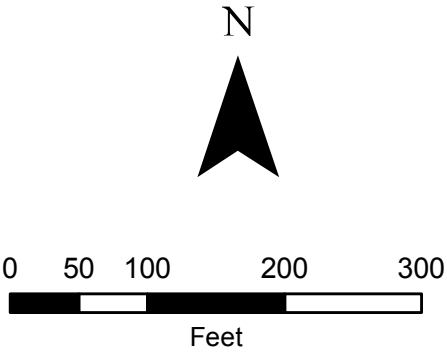
Legend

- R-2247 Corridor
- R-2247 Section Breaks
- Section Map Sheets
- Interstate
- US Route
- NC Route
- Secondary Road
- Other Existing Road

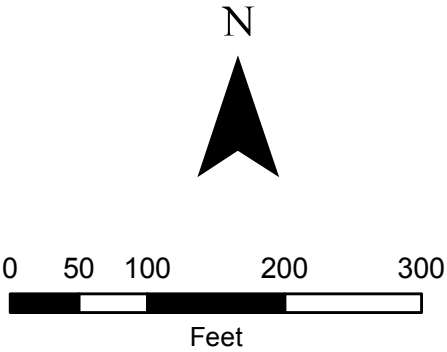
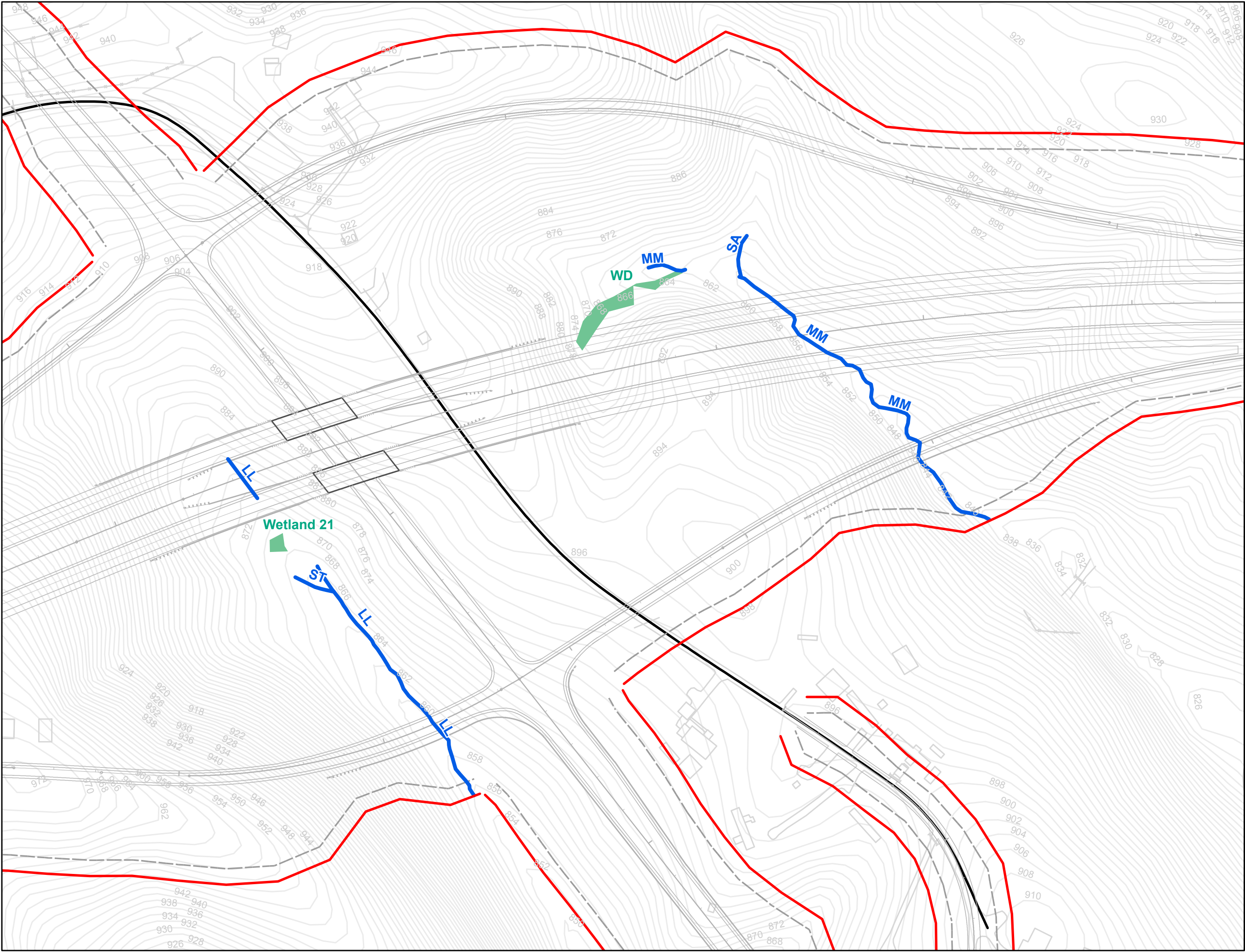
**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section EA: Master Sheet**



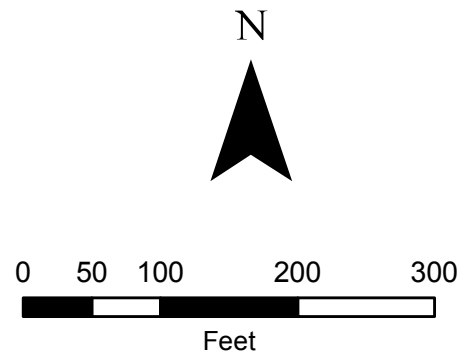
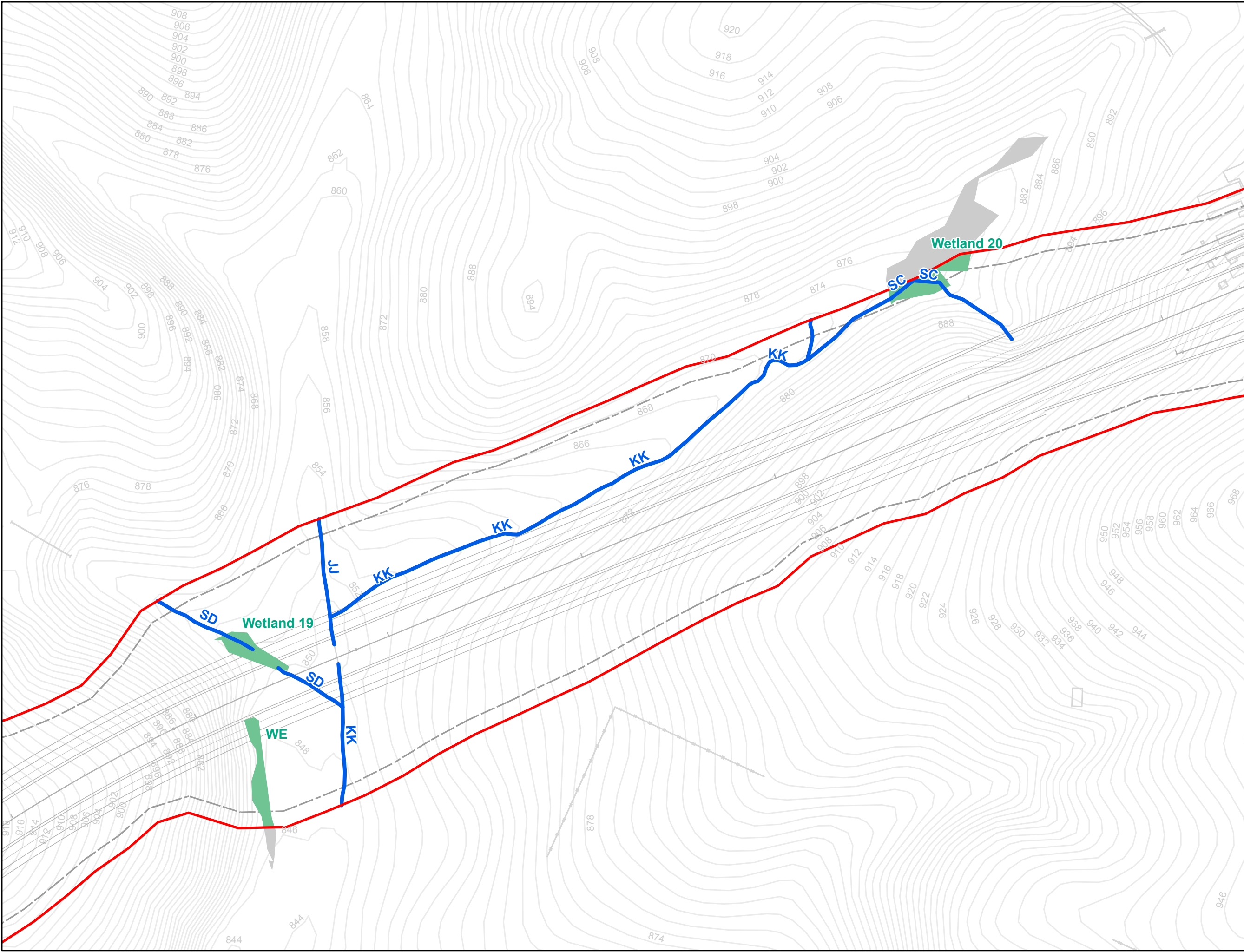
- Legend**
- R-2247EA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



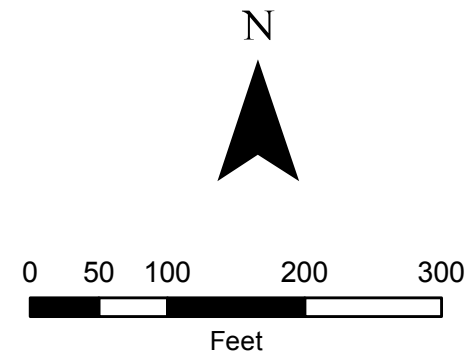
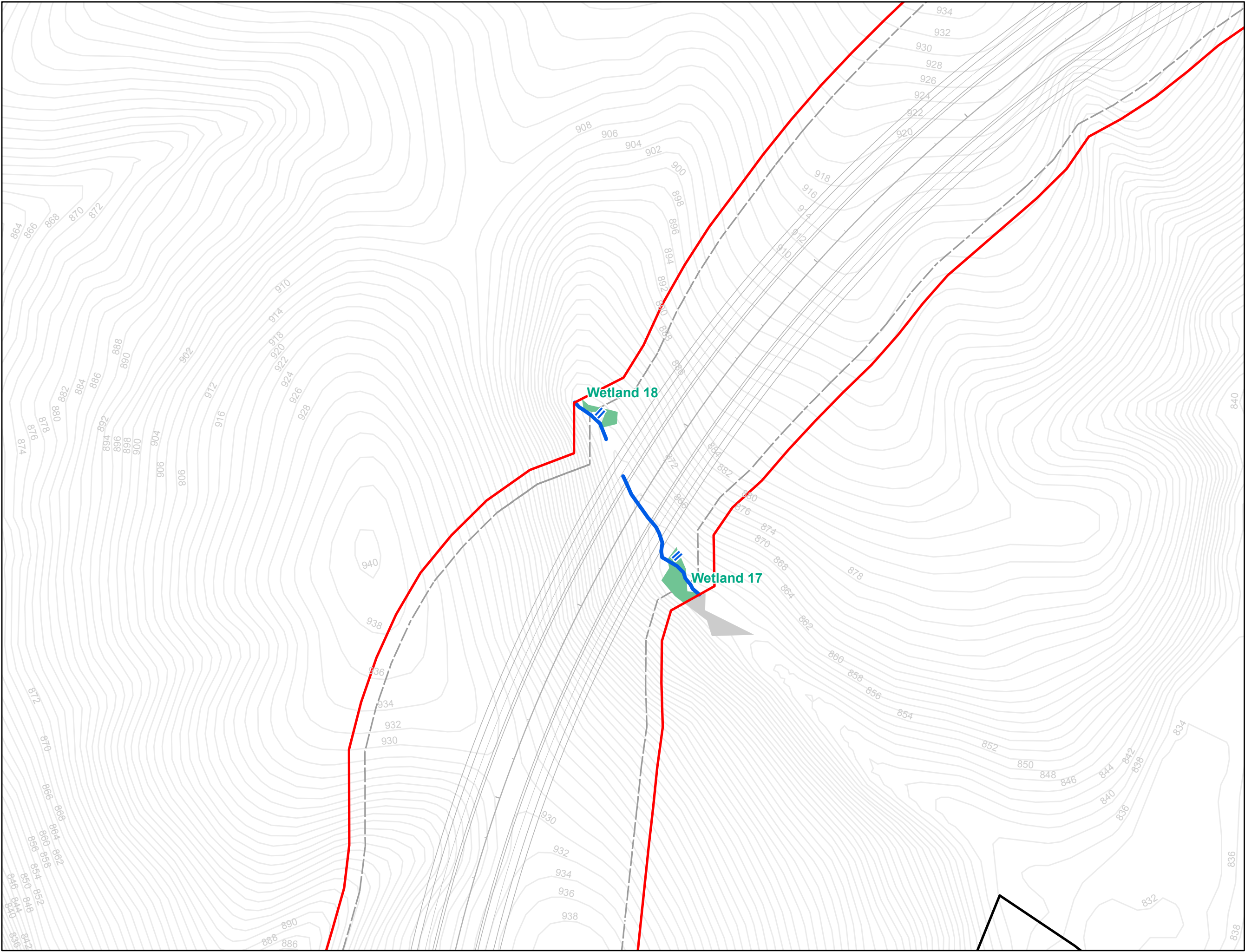
- Legend**
- R-2247EA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



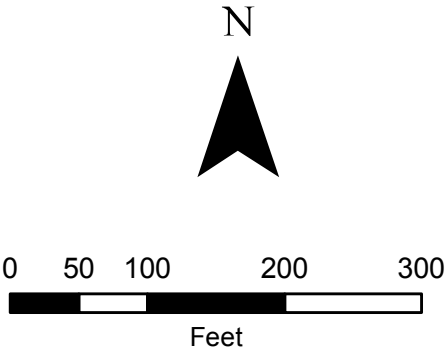
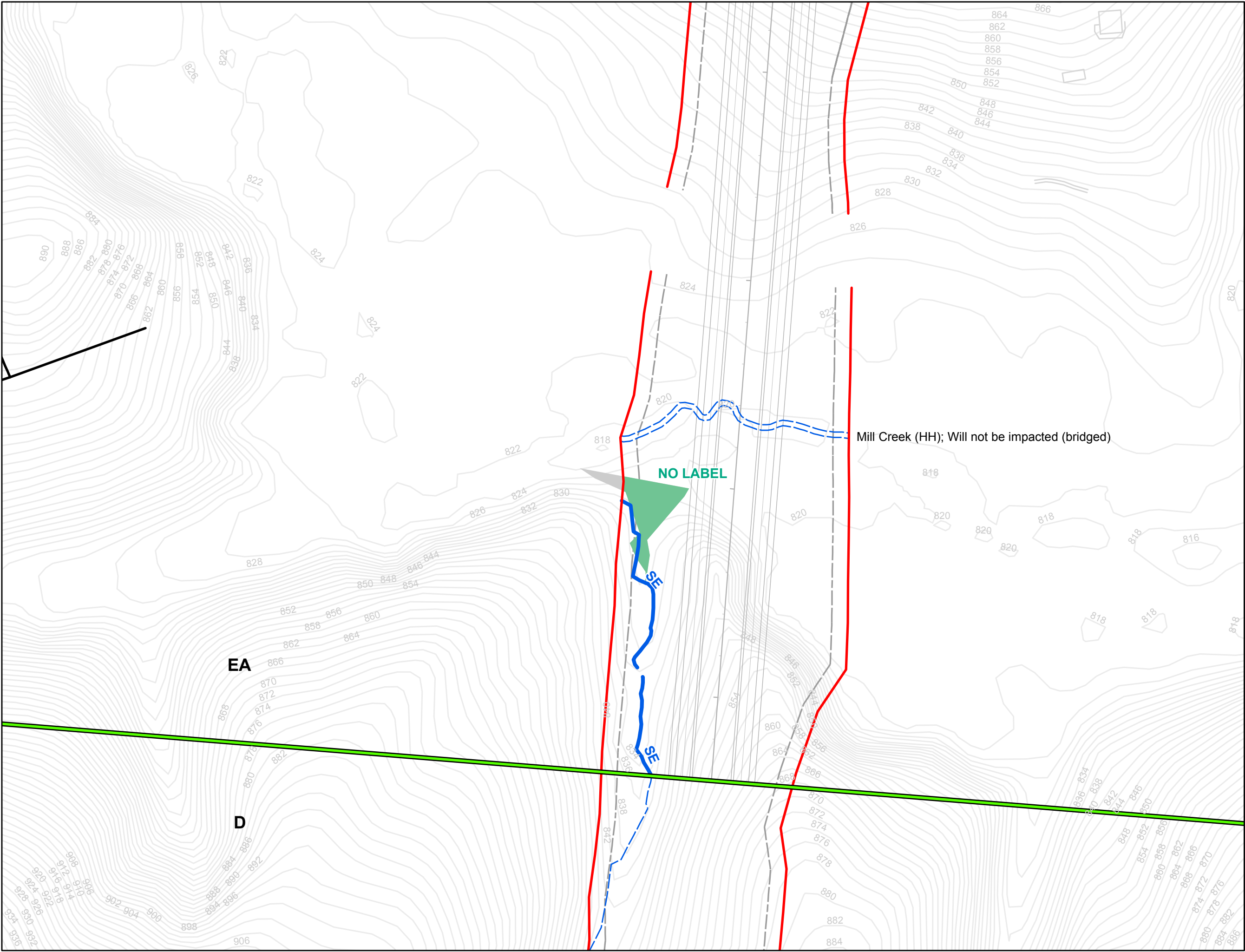
- Legend**
- R-2247EA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



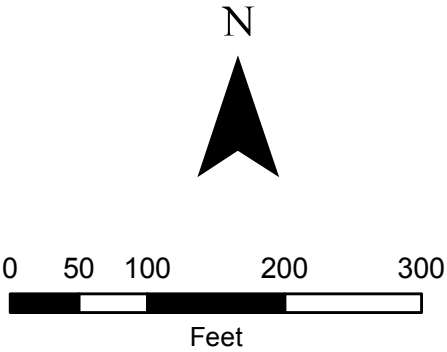
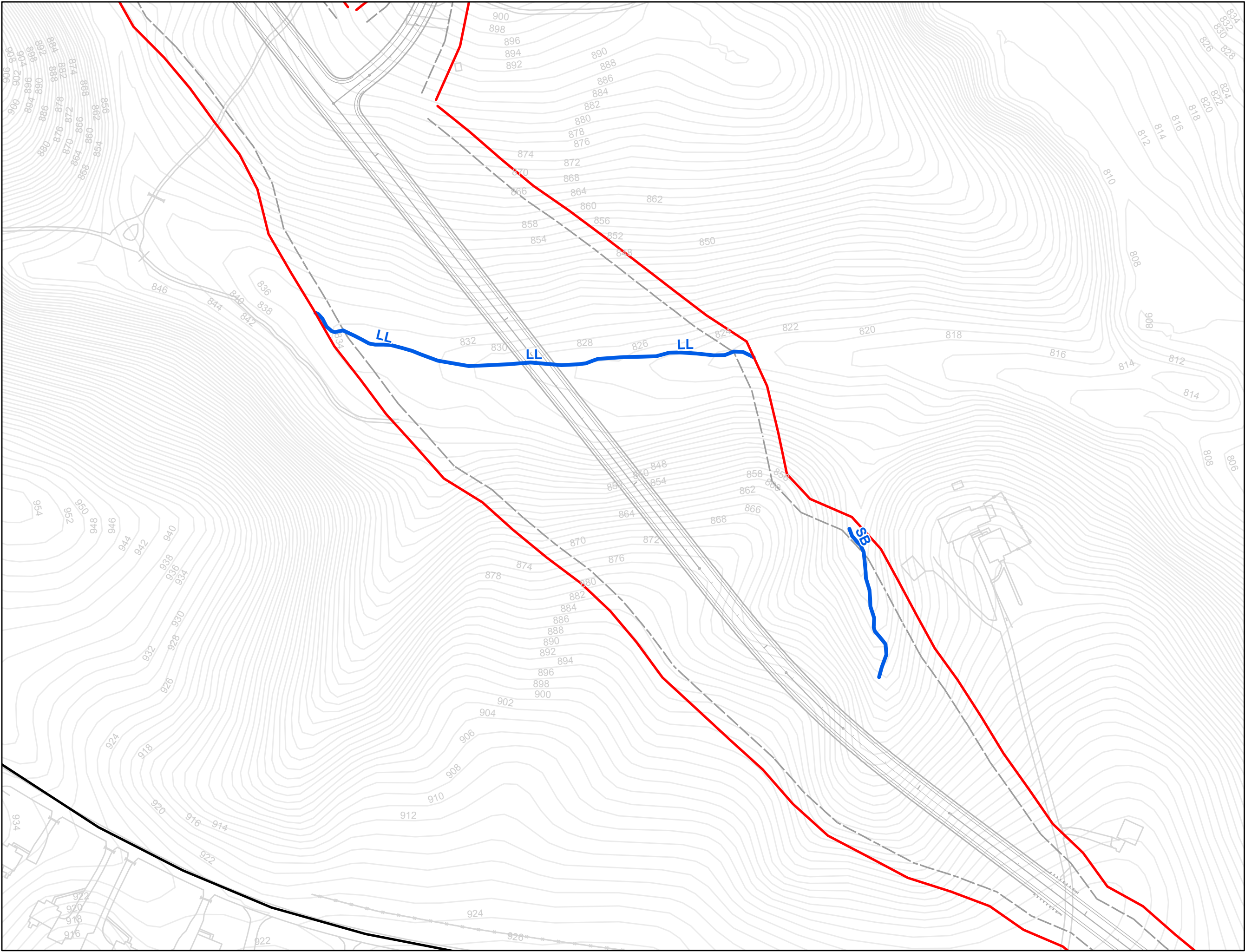
- Legend**
- R-2247EA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- Legend**
- R-2247EA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- Legend**
- R-2247EA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- Legend**
- R-2247EA Slope Stakes + 25'
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts

STIP No. R-2247, Section EA

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

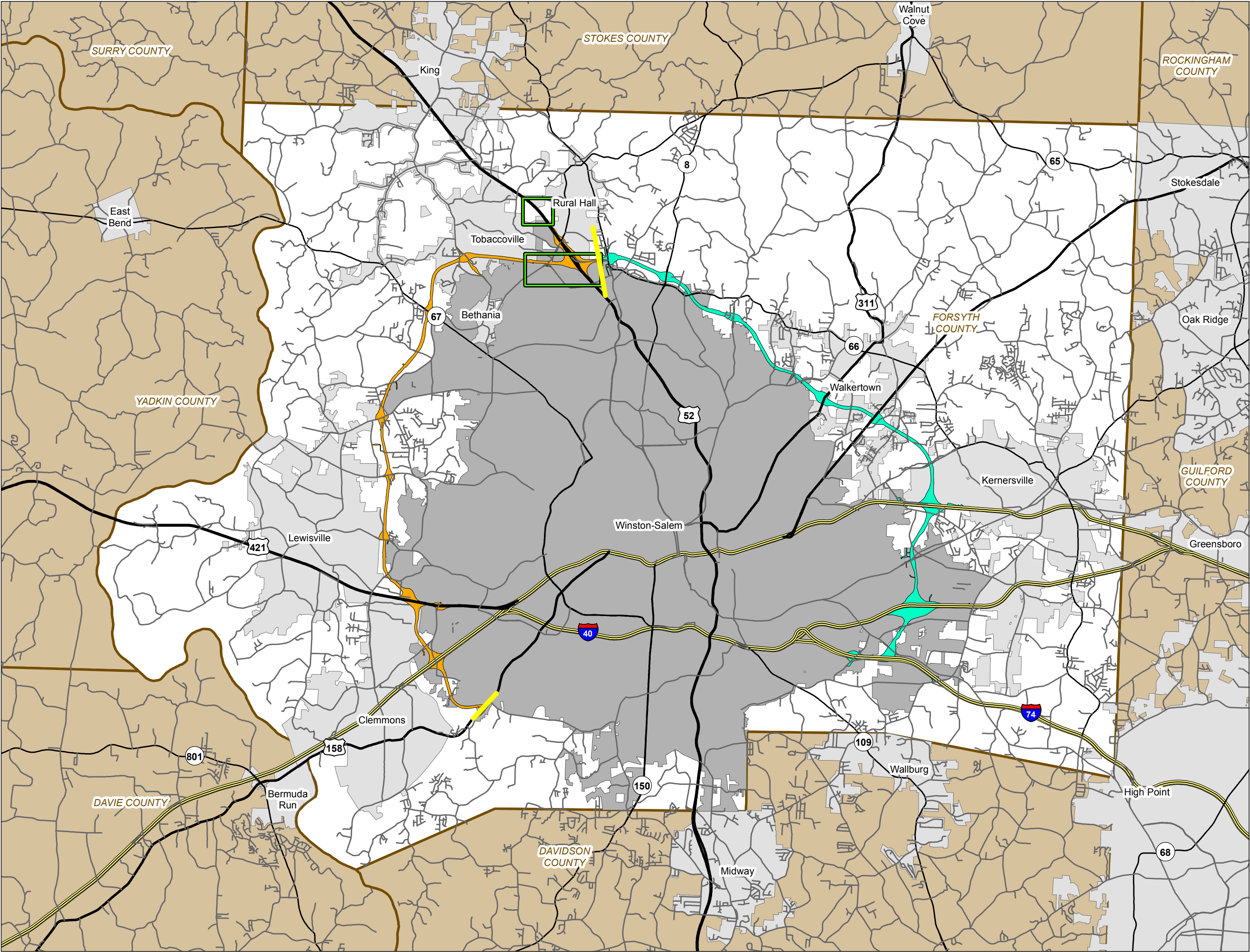
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	NO LABEL	0.05
3	WD	0.08
3	Wetland 21	0.01
4	WE	0.07
4	Wetland 19	0.06
4	Wetland 20	0.08
5	Wetland 18	0.02
5	Wetland 17	0.05
6	NO LABEL	0.15
Total:		0.57

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	PP	462
2	OO	363
2	NN	598
3	MM	665
3	SA	69
3	LL	520
3	ST	65
4	SD	287
4	JJ	156
4	SC	394
4	KK	1211
5	II	309
6	SE	469
7	LL	718
7	SB	250
Total:		6,536

Ponds

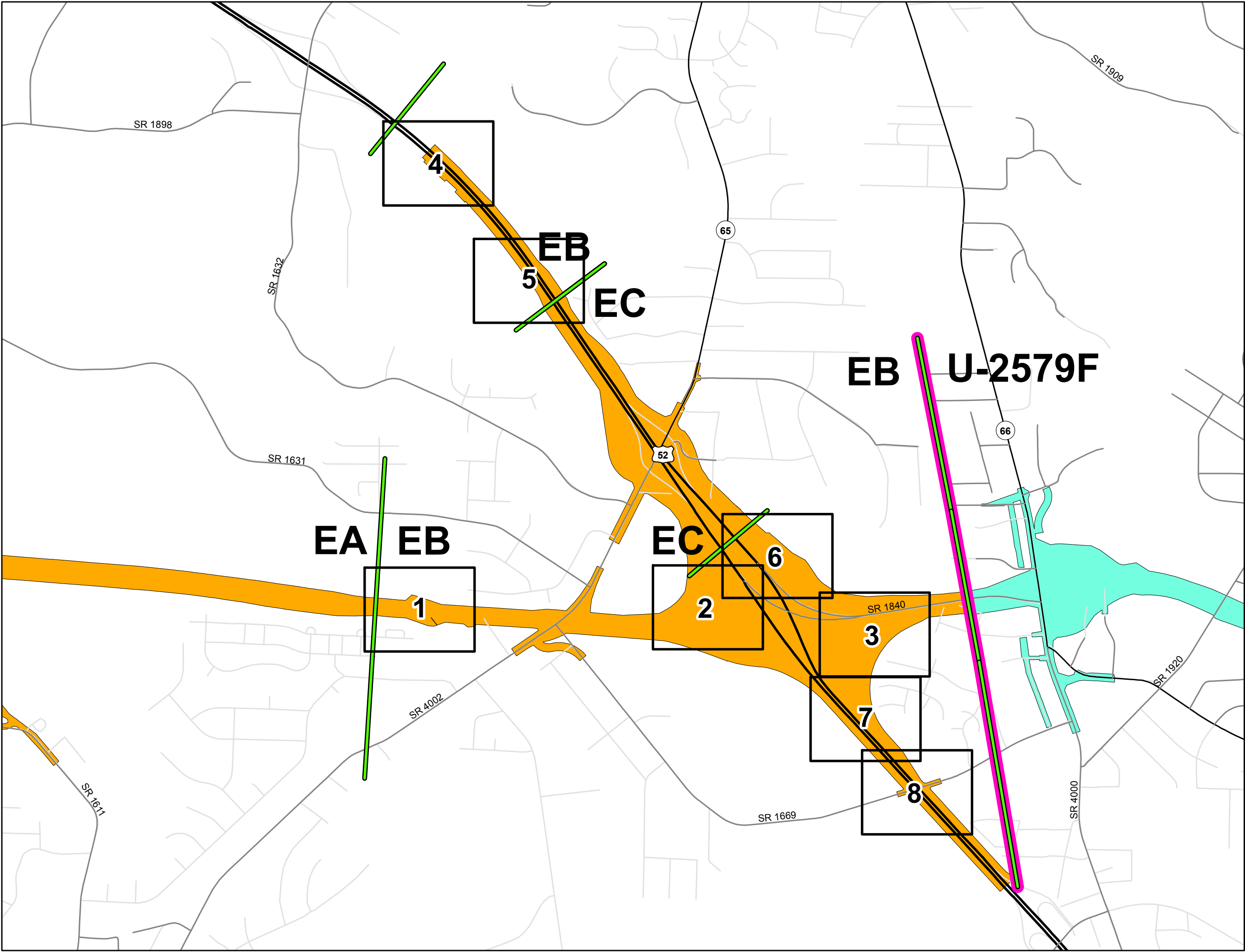
<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	Pond 8	0.01
Total:		0.01



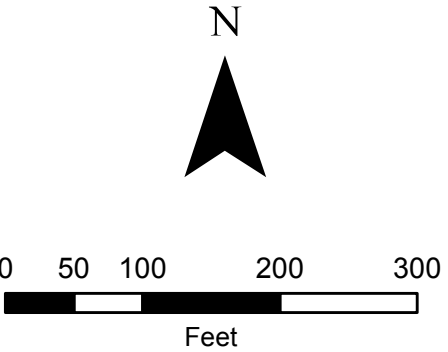
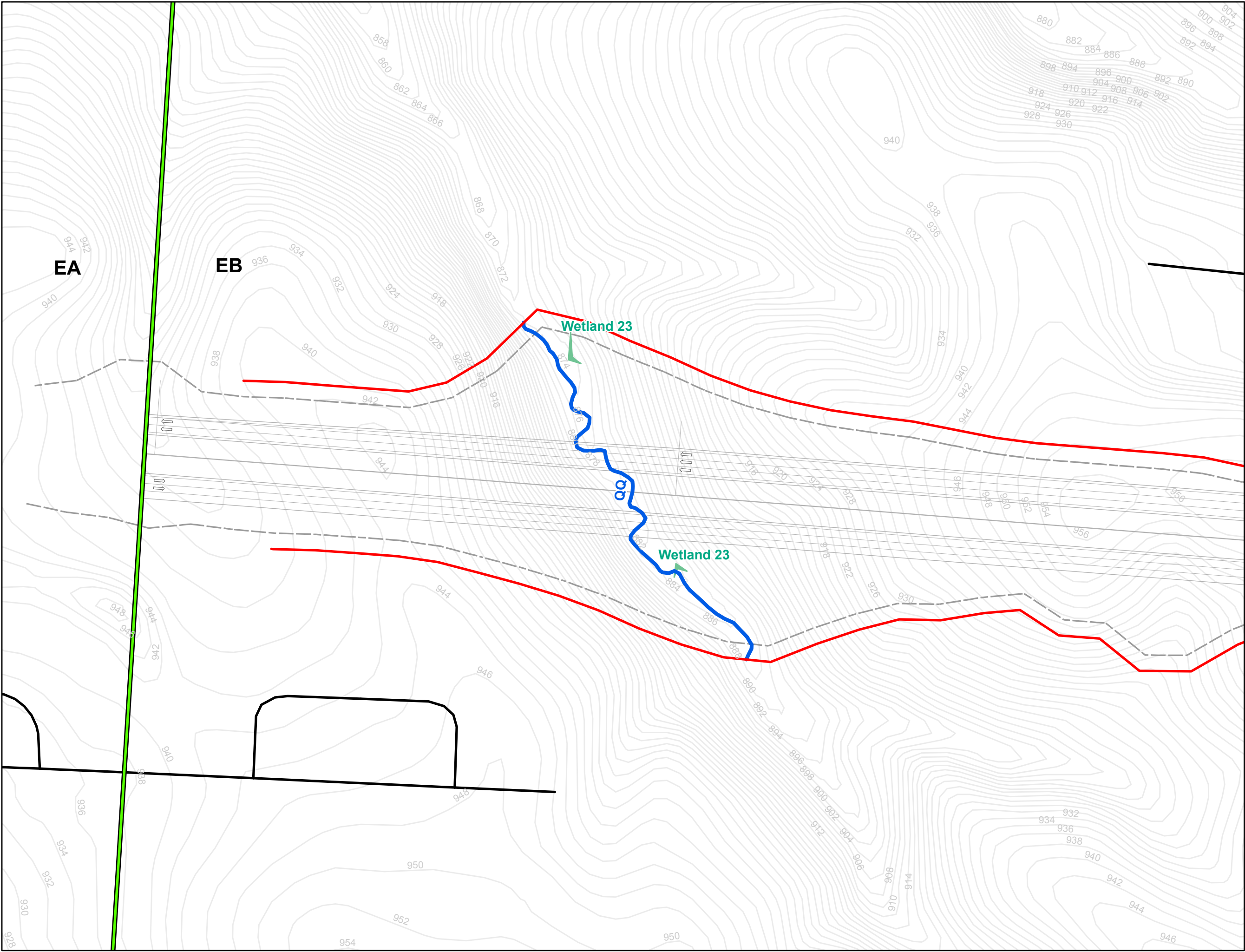
Legend

- R-2247 Corridor
- U-2579 Corridor
- R-2247 Project Start / Stop
- R-2247EB Rectangle
- Interstate
- US Route
- NC Route
- Secondary Road

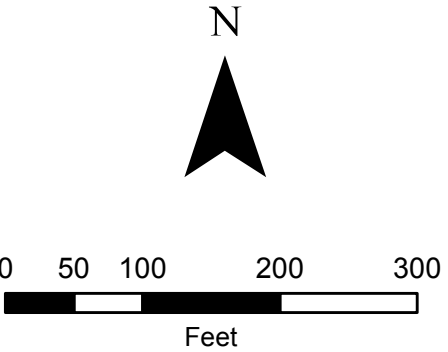
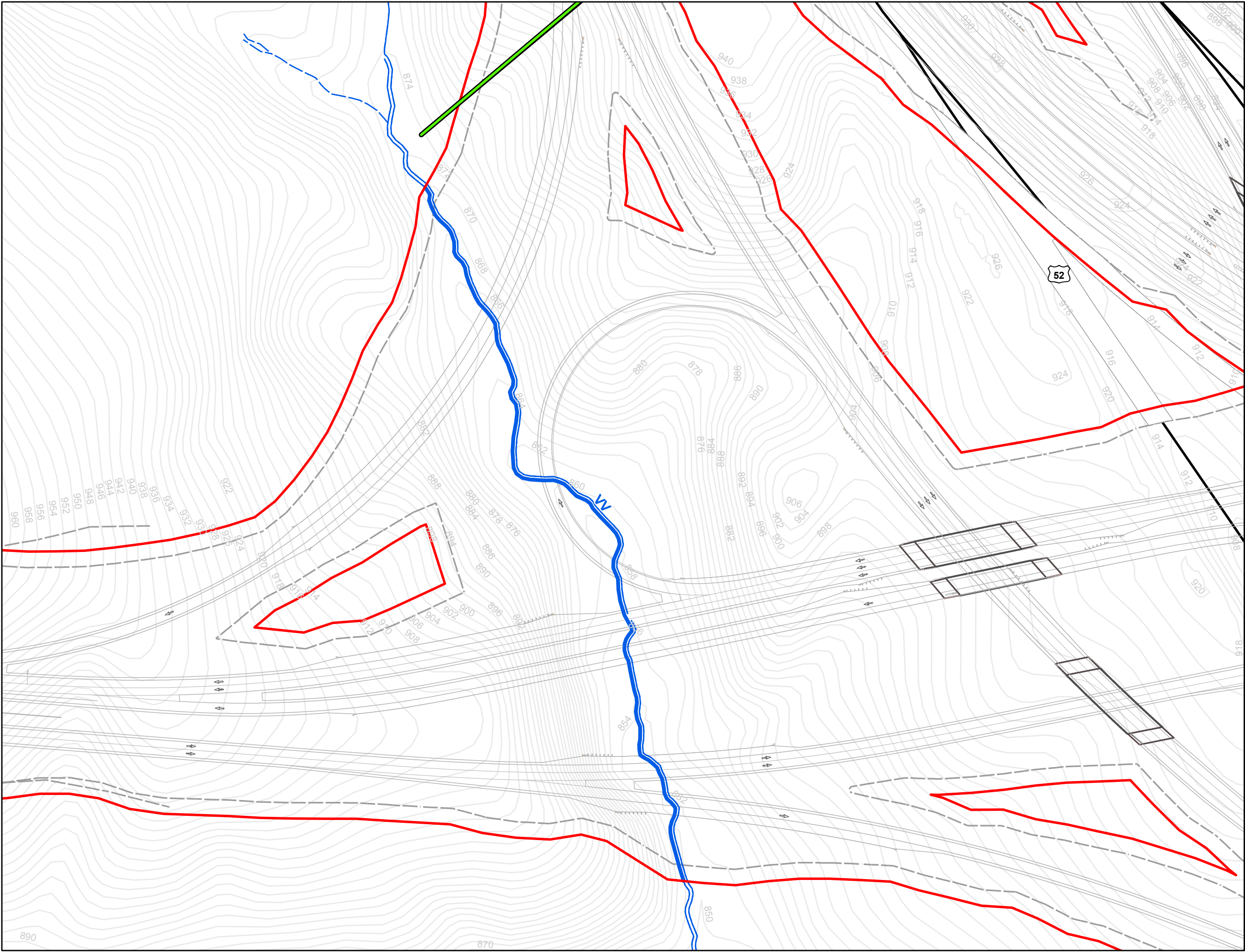
**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section EB: Corridor Context**



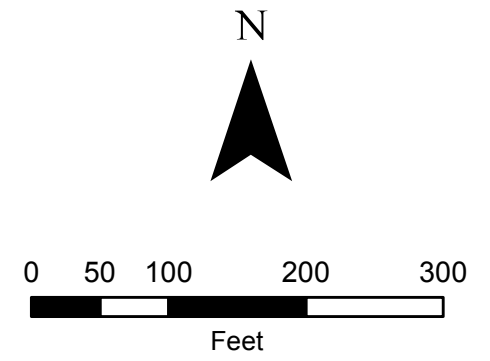
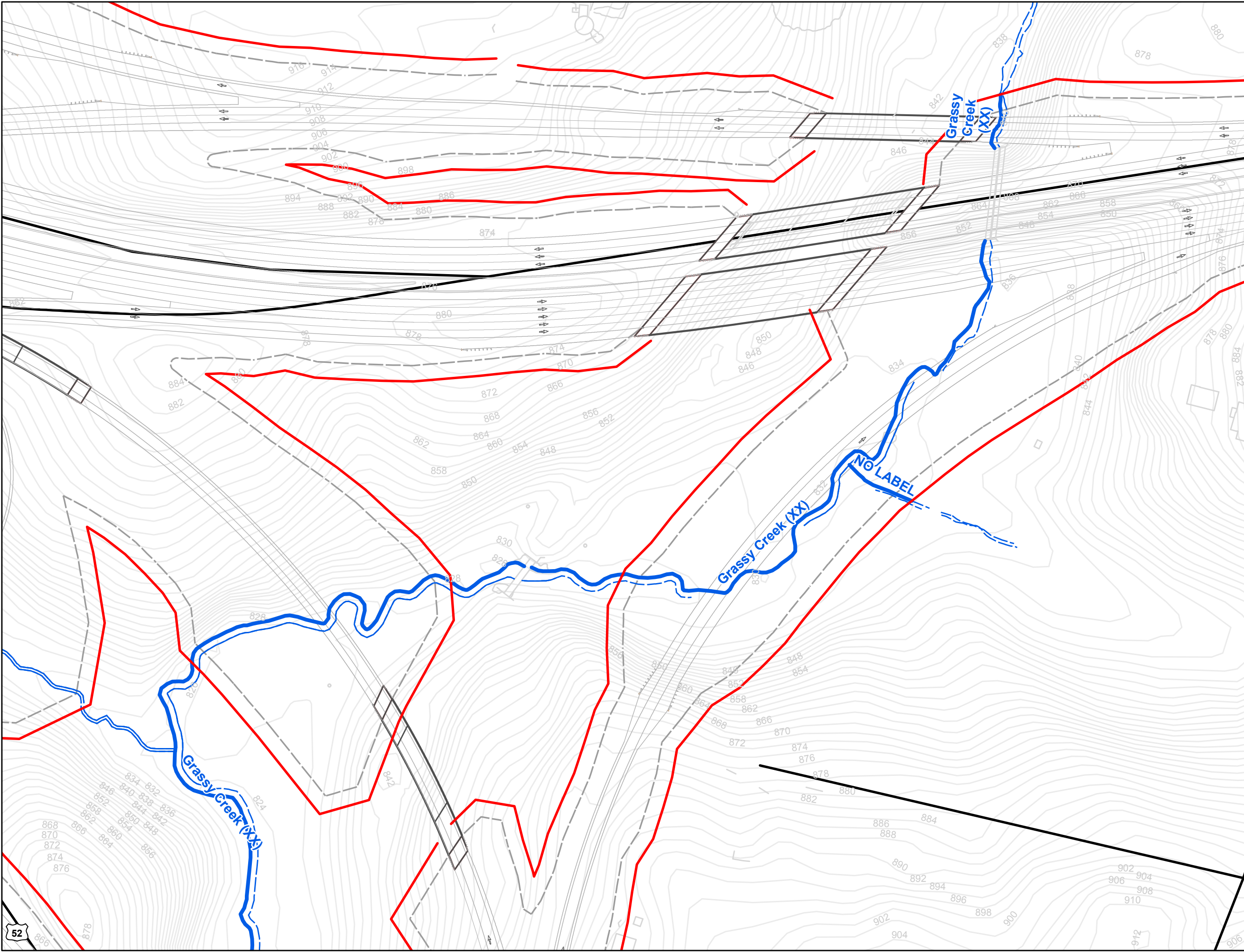
- Legend**
- U-2579 Corridor
 - R-2247 Corridor
 - R-2247 Section Breaks
 - R-2247/U-2579 Section Break
 - Section Map Sheets
 - Interstate
 - US Route
 - NC Route
 - Secondary Road
 - Other Existing Road



- Legend**
- R-2247EB Slope Stakes + 25' *
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- Legend**
- R-2247EB Slope Stakes + 25' *
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts

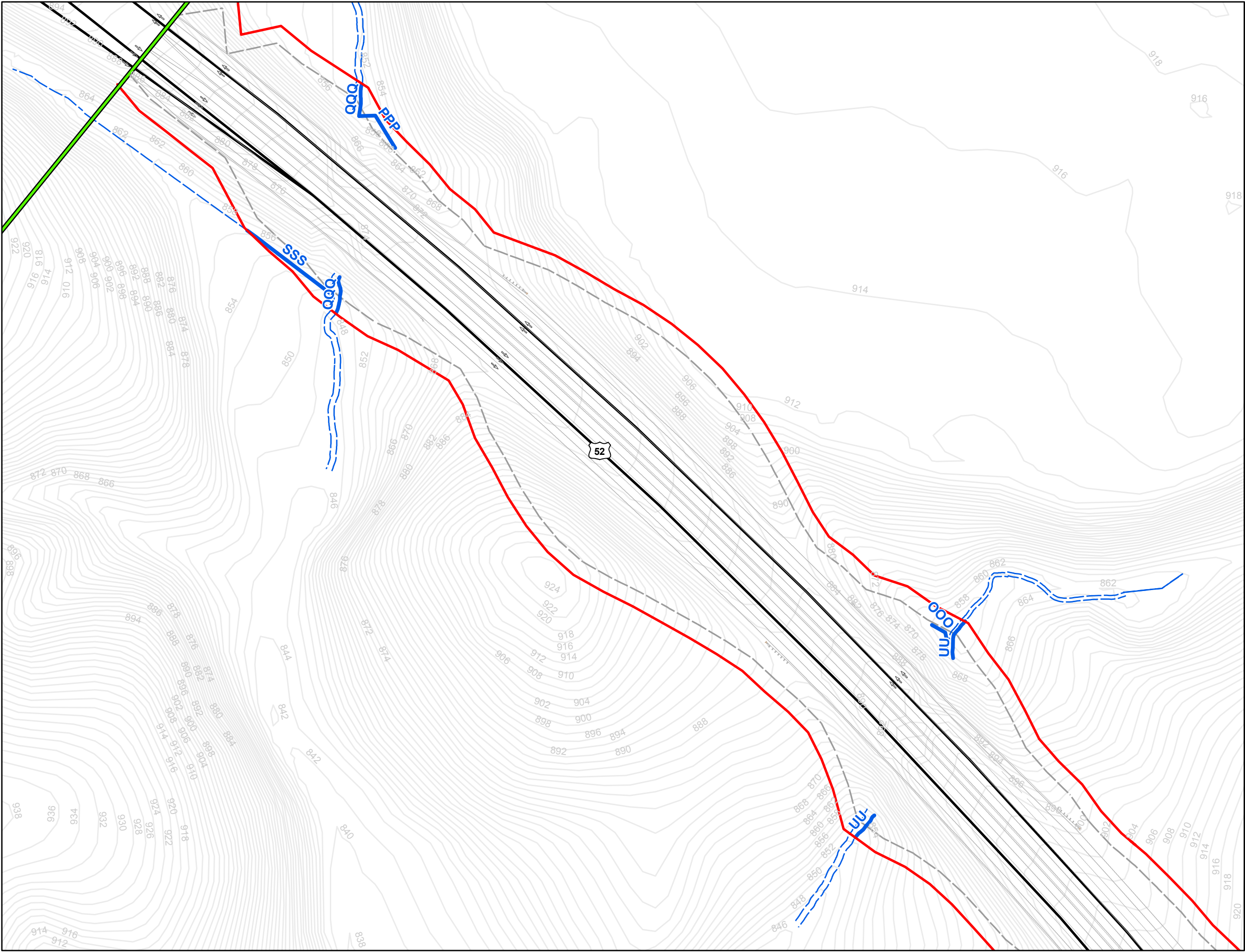


Legend

- R-2247EB Slope Stakes + 25' *
- All Streams
- All Wetlands
- All Ponds
- Streams within Slope Stakes + 25' *
- Wetlands within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- R-2247 Section Breaks

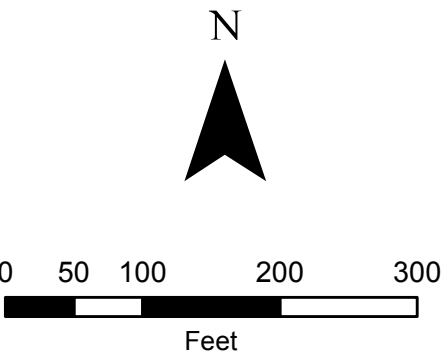
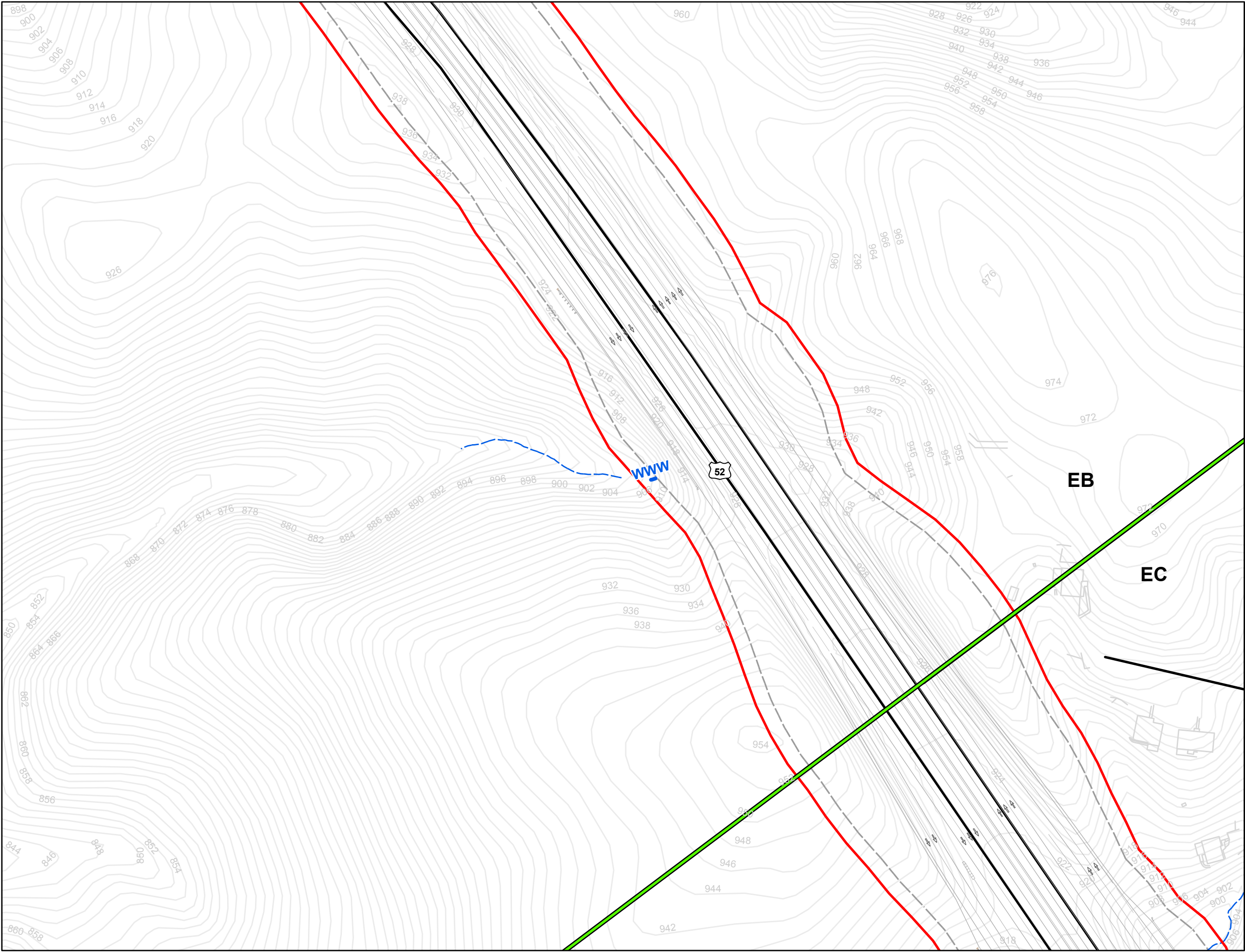
* = Preliminary Impacts

**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section EB: Sheet 3 of 8**

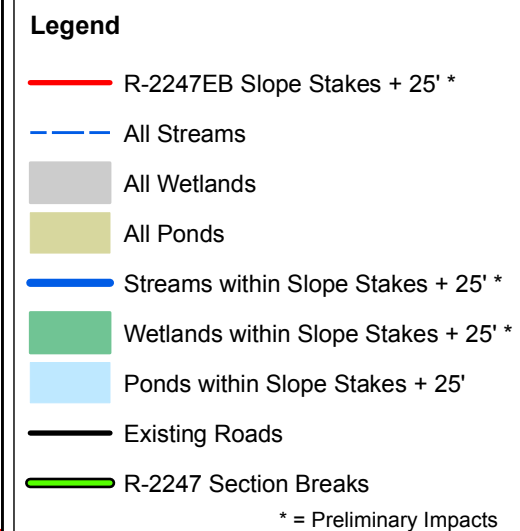


Legend

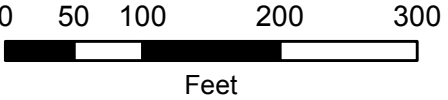
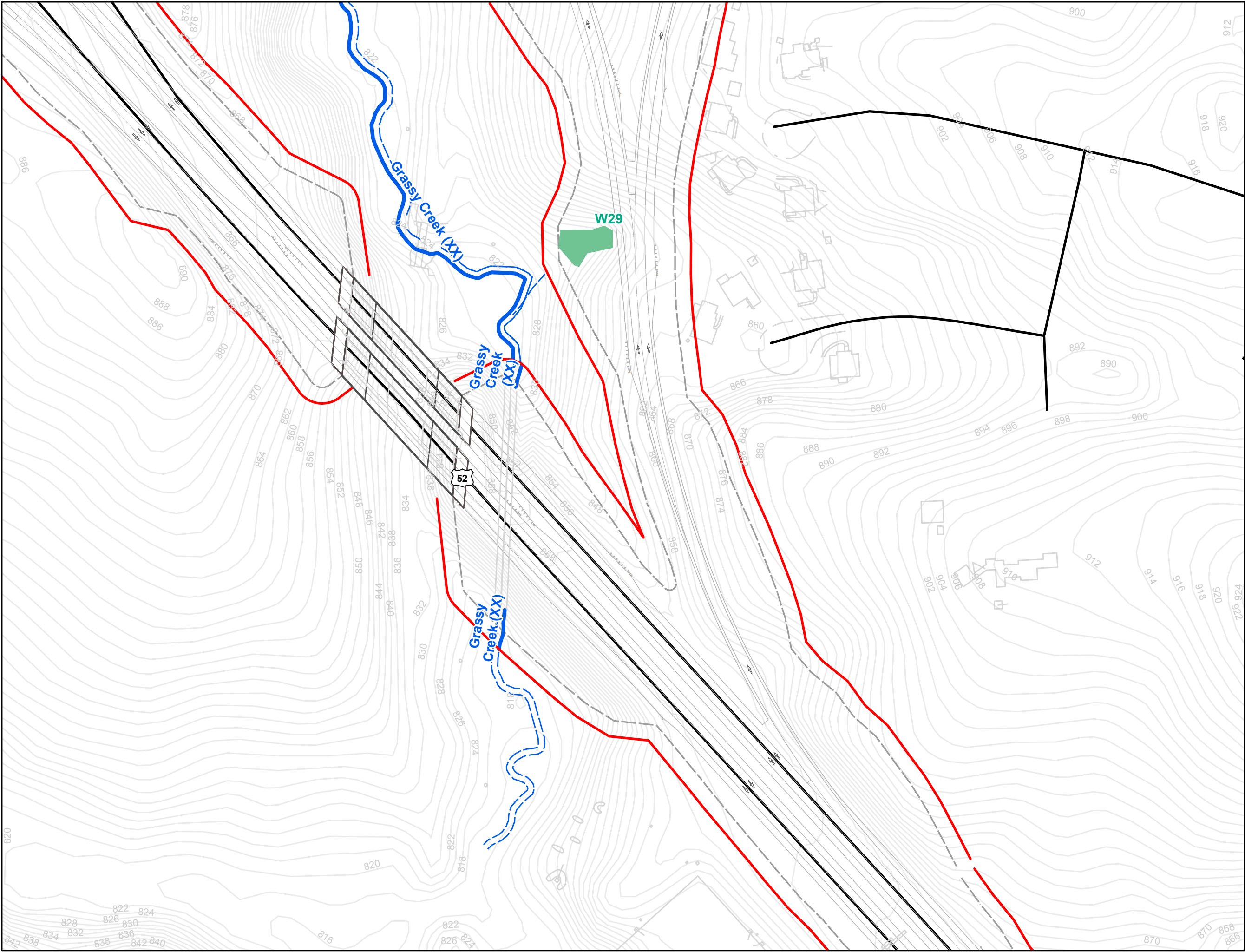
- R-2247EB Slope Stakes + 25' *
- All Streams
- All Wetlands
- All Ponds
- Streams within Slope Stakes + 25' *
- Wetlands within Slope Stakes + 25' *
- Ponds within Slope Stakes + 25'
- Existing Roads
- R-2247 Section Breaks
- * = Preliminary Impacts



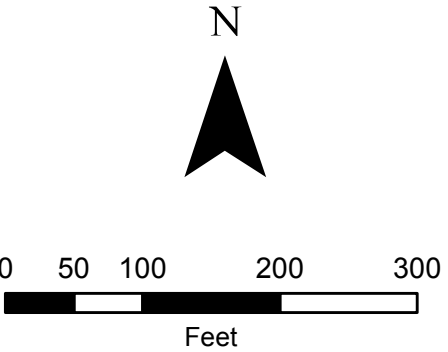
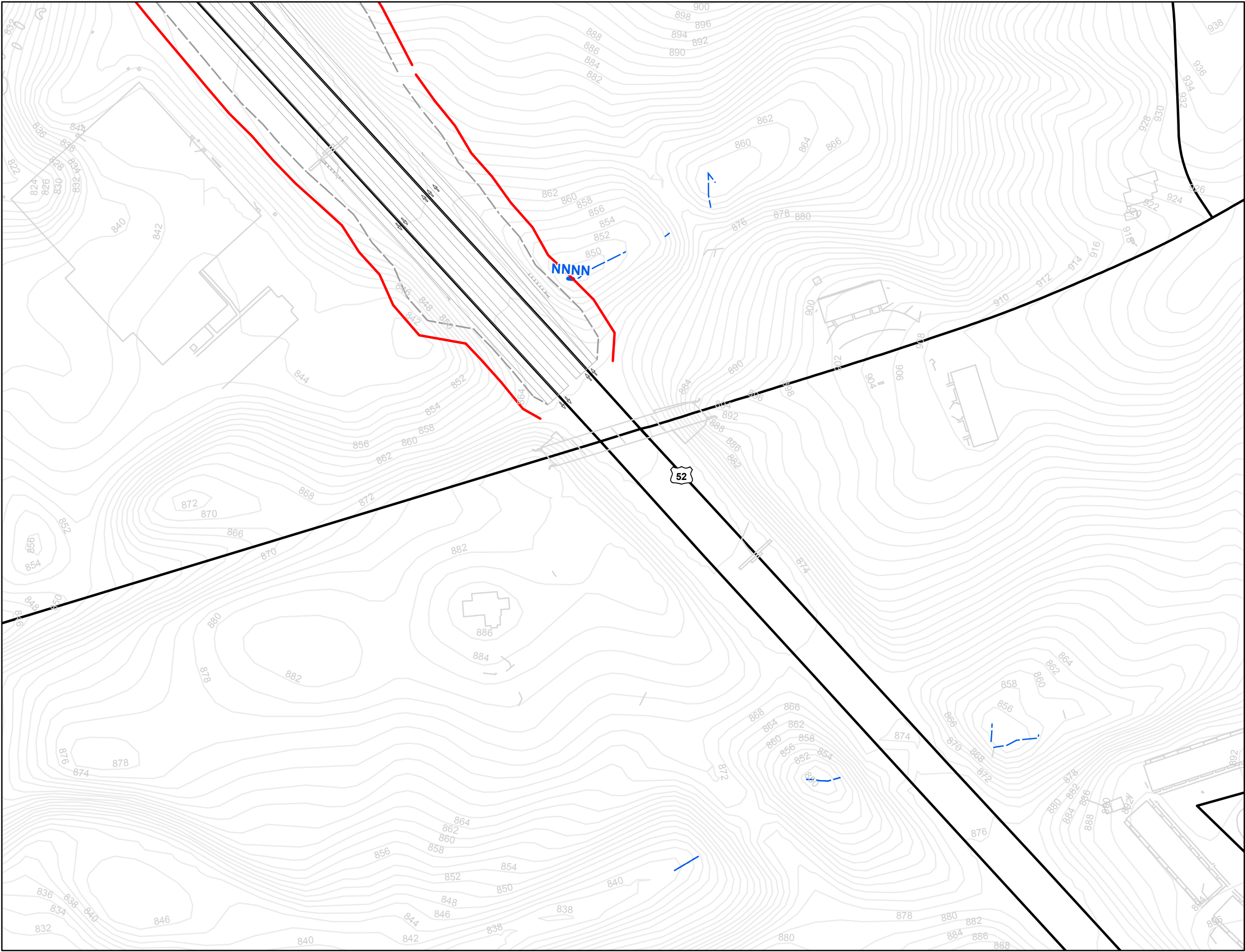
- Legend**
- R-2247EB Slope Stakes + 25' *
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



**Winston-Salem Northern Beltway
R-2247 Streams and Wetlands
Section EB: Sheet 6 of 8**



- Legend**
- R-2247EB Slope Stakes + 25' *
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts



- Legend**
- R-2247EB Slope Stakes + 25' *
 - All Streams
 - All Wetlands
 - All Ponds
 - Streams within Slope Stakes + 25' *
 - Wetlands within Slope Stakes + 25' *
 - Ponds within Slope Stakes + 25'
 - Existing Roads
 - R-2247 Section Breaks
- * = Preliminary Impacts

STIP No. R-2247, Section EB

Summary Sheet: Impacts within slope stakes + 25'

Note: wetland impacts calculated to nearest 0.01 acre; stream impacts calculated to nearest foot

Wetlands

<i>Sheet No.</i>	<i>Identifier</i>	<i>Area (Acres)</i>
1	Wetland 23	0.01
6	W30	0.01
7	W29	0.07
Total:		0.09

Streams

<i>Sheet No.</i>	<i>Identifier</i>	<i>Length (Feet)</i>
1	QQ	774
2	VV	1,276
3	NO LABEL	115
3	Grassy Creek (XX)	2456
4	UU	111
4	QQQ	110
4	SSS	166
4	PPP	85
4	OOO	36
5	WWW	7
6	WW	353
6	CCC	231
7	Grassy Creek (XX)	865
8	NNNN	8
Total:		6,593

Ponds

none present