STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

July 2, 2012

U.S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Ms. Sarah Elizabeth Hair
NCDOT Coordinator

Subject: Application for an Individual Section 404 Permit and Section 401 Water Quality Certification for the US 74 Shelby Bypass in Cleveland County. Federal Aid Project No. NHF-74(14), State Project No. 8.1801001, WBS Number 34497.1.2, Division 12, TIP R-2707. Debit $570 from WBS Number 34497.1.2

Dear Madam:
The North Carolina Department of Transportation (NCDOT) proposes to construct new location freeway bypass from 0.6 mile west of SR 1162 to SR 1001 in Cleveland County. The R-2707 project, approximately 19 miles in length, will be a four-lane divided highway with full control of access, primarily on new location (a bypass of the City of Shelby), with widening sections to the east and west of the new location section along existing US 74.

Alternative 21 (also known as the Southern Alternative), the Selected Alternative, would include improvement of existing US 74 to a freeway facility from the western project terminus approximately 0.6 mile west of SR 1162 to east of SR 1161; this portion would cross SR 1162, Sandy Run, and SR 1161. The bypass portion of the Southern Alternative would extend from east of SR 1161 to west of Buffalo Creek, where it ties back into existing US 74; it passes approximately 2.2 miles north of the Shelby town center at its northern most point. Existing US 74 from west of Buffalo Creek to the eastern project terminus at SR 1001 would be improved to a freeway facility. In addition to interchanges at the two bypass termini with existing US 74, there would also be interchanges at SR 1162, SR 1313, NC 226, NC 18, NC 150, and SR 2245.

Please see the enclosed ENG 4345, Ecosystem Enhancement Program (EEP) mitigation acceptance letter, permit drawing review minutes (Concurrence Points 4B and 4C for Sections A and B), State Stormwater Management Plans (SMP), Roadway permit drawings, State Historic Preservation Office (SHPO) letter, and design plans (preliminary and final) for the above referenced project.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-707-6100
FAX: 919-212-5785

WEBSITE: WWW.NCDOT.ORG

LOCATION:
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610-4328

Purpose and Need:
The primary purpose of R-2707 is to increase the capacity of the US 74 corridor, thereby improving levels of service, reducing the potential for future traffic congestion, and improving safety. Future traffic projections indicate that in the absence of improvements to the subject section of US 74, traffic conditions on this highway would become unacceptably congested and increasingly unsafe; traffic delays on the existing facility would continue to mount, as would the accident rated, some of which already exceed statewide rates for like facilities. The project will also provide a key economic development corridor between three major North Carolina cities: Asheville (via I-26), Charlotte, and Wilmington. The proposed project would increase mobility for commuters, commercial traffic, and other local and regional users. Increased mobility would lower operating costs for businesses relying on US 74 for the transport of goods and services, allowing the businesses to grow and thereby expand options for employment and place of residence for many commuters by lowering travel times; and enhance the use of other modes of transportation.

Summary of Jurisdictional Impacts:
Overall (Sections A-E), the project will permanently impact approximately 6.04 acres of wetlands and 21,224 linear feet of streams. The project will temporarily impact 0.17 acre of streams. The project will also impact 2.43 acres of surface waters (*i.e.;* ponds).

Sections A and B will permanently impact 4.05 acres of riparian wetland and 5,190 linear feet of stream. These sections will temporarily impact 0.06 acre of stream. Sections A and B will have no impacts to surface waters.

Summary of Utility Impacts:
No impacts to jurisdictional resources as a result of utility relocations have been noted.

Summary of Mitigation:
The project has been design to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design process. However, project impacts will necessitate compensatory mitigation for the unavoidable impacts. Mitigation for impacts resulting from Sections A and B (final design impacts) are provided. Descriptions of these actions are presented in the mitigation portion of this application. At this time, EEP will provide mitigation for the final design impacts of Sections A and B. These impacts will include 5,190 feet of permanent stream impact and 4.05 acres of permanent wetland impact. It has been determined that onsite mitigation is not an option for Sections A, B, and C. Onsite mitigation options for Sections D and E are still under review. Sections C, D, and E are not due to be let in the next 5 years. Therefore, mitigation is not proposed at this time.

PROJECT SCHEDULE

The project will be permitted in phases due to project size, funding, and TIP schedule. Table 1 describes the proposed project sections and phasing. The proposed impacts reported in this Individual Permit for Section A and Section B are based on final design impacts and the impacts for the remaining sections (C, D, and E) are based on preliminary design impacts. Preliminary

design impacts have been calculated using construction limits plus 25 ft. Permit modification requests will be submitted as the final design for each of the remaining sections (C, D, and E) is completed according to the phasing dates provided in Table 1.

Table 1. Project phasing for the US 74 Shelby Bypass (R-2707).

Section Designation	Approximate Section Limits	Approximate Length	TENTATIVE DATE	
			ROW Acquisition	Construction Letting
R-2707 A	West of SR 1162 to west of SR 1314	3.93 miles	FY 2009	FY 2012
R-2707 B	West of SR 1314 to west of NC 226	2.62 miles	FY 2009	FY 2013
R-2707 C	West of NC 226 to west of NC 150	5.34 miles	FY 2015	FY 2019
R-2707 D	West of NC 150 to existing US 74 west of SR 2238	4.09 miles	PY	PY
R-2707 E	Existing US 74 west of SR2238 to west of SR 1001	2.64 miles	PY	PY
TOTAL	**N/A**	**18.62 miles**	**N/A**	**N/A**

NEPA DOCUMENT STATUS

The Final Environmental Impact Statement (FEIS) for the US 74 Shelby Bypass (R-2707) was approved January 25, 2008 with the Record of Decision (ROD) being approved December 1, 2008.

In compliance with the NEPA/404 Merger Process, Concurrence Points 4B and 4C were reached for R-2707A and B on September 8, 2003 and August 10, 2011, respectively.

Right of Way Consultation submitted June 7, 2011.

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 any other reasonable foreseeable transportation improvements.

RESOURCE STATUS

Project R-2707 is located within sub-basins 030804 and 030805 of the Broad River Watershed (HUC 03050105). There are no Outstanding Resource Waters or High Quality Waters within the

project area. The project is located within Water Supply Watersheds (WS-III and WS-IV). The project is adjacent to Water Supply Critical Areas associated with the First Broad River and Kings Mountain Reservoir. The project is approximately 0.5 river mile upstream of the Water Supply Critical Area associated with the First Broad River. The project is approximately 0.5 mile from the Water Supply Critical Area associated with Kings Mountain Reservoir and approximately 2.0 miles downstream of the Water Supply Critical Area associated with Kings Mountain Reservoir.

303 (d) Impaired Waters:
Buffalo Creek and the First Broad River are listed on the 2010 North Carolina Department of Environment and Natural Resources (NCDENR's) 303 (d) and Integrated Lists for impaired waters.

Wetland and stream determinations for R-2707 (Sections A-E) were conducted using the field delineation method outlined in the 1987 Corps of Engineers Wetland Delineation Manual and the 2010 Eastern Mountains and Piedmont Supplement. Mr. Steve Lund of the U.S. Army Corps of Engineers and Ms. Polly Lespinasse of the North Carolina Division of Water Quality reverified the wetlands and surface waters on June 2 and 3, 2009. This Section 404 Individual Permit application includes a request for a final approved Jurisdictional Determination of the resources included in the R-2707 project area.

IMPACTS TO WATERS OF THE U.S.

Tables 2, 3, 4, 5, and 6 summarize the project-wide impacts to jurisdictional water resources for each of the Sections A-E, both final design impacts and preliminary impacts. Section A and B impacts are final design impacts. Sections C through E are preliminary design impacts. Site impact numbers correspond with the permit (hydraulic) drawings included in this application for each of the five separate sections (A-E). The stream and wetland numbers correspond to the jurisdictional delineation maps provided to the agencies. Subsequent Tables 7A though 8B, breakout final impacts for Sections A and B. Brief descriptions of each impact site will follow the section-specific tables.

Table 2. Impacts to jurisdictional streams in Broad River Basin (HUC 03050105).

Project Section	Design Stage	Receiving Waters	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement [a]
R-2707A	Final Impacts	Beaver Creek, Sandy Run Creek	Perm. Fill	1,342	--	USACE & DWQ
			Bank Stabilization	81	--	DWQ
			Temp. Fill	--	0.03[b]	--
			Open Channel	147	--	USACE & DWQ
R-2707B	Final Impacts	Beaverdam Creek, Brushy Creek, First Broad River	Perm. Fill	3,535	--	USACE & DWQ
			Bank Stabilization	85	--	DWQ
			Temp. Fill	--	0.03[b]	--
Total Temporary Impacts:				--	0.06[b]	--
Total Permanent Impacts (Perm. Fill +Bank Stabilization+ Open Channel):				5,190	--	--
Permanent Impacts Requiring DWQ Mitigation (1:1):				5,190	--	--
Permanent Impacts Requiring USACE Mitigation (2:1):				5,024	--	--
Total Impacts Requiring Mitigation (2:1):				5,024	--	10,048[+]

[a] Mitigation for bank stabilization impact required by DWQ – not required by USACE
[b] Value Based on rounding, due to some individual impacts being <0.01 acre
[c] Permanent impact<150' therefore mitigation for bank stabilization impact not required by DWQ
[+] Mitigation proposed by NCDOT (based on mitigation required by USACE exceeding amount required by DWQ)

Table 3. Proposed preliminary impacts to jurisdictional streams in Broad River Basin (HUC 03050105).

Project Section	Design Stage	Impact Length (linear feet)[a]
R-2707C	Preliminary Impacts	7,274
R-2707D	Preliminary Impacts	5,916
R-2707E	Preliminary Impacts	2,844
Total Proposed Impacts:		16,034

[a] Impact Length includes 25 foot slope stake.

Table 4. Impacts to jurisdictional wetlands in Broad River Basin (HUC 03050105).

Project Section	Design Stage	Impact Type	Impact Area (acres)	Temporary Impacts (acres)	Mitigation Requirement
R-2707A	Final Impacts	Perm. Fill	0.35	--	USACE & DWQ
		Temp. Fill	--	--	--
		Excavation	0.03	--	USACE & DWQ
		Mechanized Clearing	0.05	--	USACE & DWQ
R-2707B	Final Impacts	Perm. Fill	3.37	--	USACE & DWQ
		Temp. Fill	--	--	--
		Excavation	--	--	--
		Mechanized Clearing	0.25	--	USACE & DWQ
Total Permanent Impacts (Perm. Fill + Mechanized Clearing + Excavation):			4.05[a]	--	--
Permanent Impacts Requiring DWQ Mitigation:			4.05	--	--
Permanent Impacts Requiring USACE Mitigation:			4.05	--	--
Total Impacts Requiring Mitigation (2:1):			4.05	--	8.10

[a] **Value Based on rounding**

Table 5. Proposed preliminary impacts to wetlands in Broad River Basin (HUC 03050105).

Project Section	Design Stage	Impact Type	Impact Area[a] (acres)
R-2707C	Preliminary Impacts	Perm. Fill	0.85
		Temp. Fill	--
		Excavation	--
		Mechanized Clearing	0.07
R-2707D	Preliminary Impacts	Perm. Fill	0.38
		Temp. Fill	--
		Excavation	--
		Mechanized Clearing	0.02
R-2707E	Preliminary Impacts	Perm. Fill	0.66
		Temp. Fill	--
		Excavation	--
		Mechanized Clearing	<0.01
Total Proposed Impacts:			2.04[b]

[a] **Impact Length includes 25 foot slope stake.**
[b] **Value Based on rounding**

Table 6. Impacts to ponds in Broad River Basin (HUC 03050105).

Project Section	Design Stage	Permanent Impact Area (acres)[a]	Temporary Impacts (acres)
A	Final Impacts	--	--
B	Final Impacts	--	--
C	Preliminary Impacts	2.31	--
D	Preliminary Impacts	0.12	--
E	Preliminary Impacts	--	--
Total Preliminary Impacts:		2.43	--

[a] **Impact Length includes 25 foot slope stake.**

Section A (Final Design)

Table 7A. Section R-2707A – Final Design Stream Impacts.

Permit Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement [a]
1	UT Sandy Run Creek	1-3	Perm. Fill	185	--	USACE & DWQ
			Bank Stabilization	20	--	DWQ
			Temp. Fill	--	<0.01	--
2	UT Beaver Creek	2-2	Perm. Fill	57	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
3	UT Beaver Creek	2-4	Perm. Fill	64	--	USACE
			Bank Stabilization	12	--	--[c]
			Temp. Fill	--	<0.01	--
4	UT Beaver Creek	2-6	Perm. Fill	290	--	USACE & DWQ
			Bank Stabilization	12	--	DWQ
			Temp. Fill	--	<0.01	--
5	Beaver Creek	2-11	Perm. Fill	--	--	--
			Bank Stabilization	17	--	--[c]
			Temp. Fill	--	--	--
6	UT Beaver Creek	2-17	Perm. Fill	290	--	USACE & DWQ
			Bank Stabilization	12	--	DWQ
			Temp. Fill	--	<0.01	--
7	UT Sandy Run Creek	2-21	Perm. Fill	318	--	USACE & DWQ
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
8	UT Sandy Run Creek	NCDOT UT-1	Perm. Fill	19	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
9	UT Sandy Run Creek	NCDOT UT-X	Perm. Fill	119	--	USACE & DWQ
			Bank Stabilization	--	--	--
			Open Channel	147	--	USACE & DWQ
			Temp. Fill	--	<0.01	--
10	UT Sandy Run Creek	NCDOT UT-Y	Perm. Fill	--	--	--
			Bank Stabilization	8	--	--[c]
			Temp. Fill	--	--	--
Total Temporary Impacts:				--	0.03[b]	--
Total Permanent Impacts (Perm. Fill +Bank Stabilization):				1,570		
Permanent Impacts Requiring DWQ Mitigation (1:1):				1,393		
Permanent Impacts Requiring USACE Mitigation (2:1):				1,489		
Total Impacts Requiring Mitigation (2:1):				1,489		2,978[+]

[a] Mitigation for bank stabilization impact required by DWQ – not required by USACE

[b] Value Based on rounding, due to some individual impacts being <0.01 acre

[c] Permanent impact<150' therefore mitigation for bank stabilization impact not required by DWQ

[+] Mitigation proposed by NCDOT (based on mitigation required by USACE exceeding amount required by DWQ)

Table 7B. Section R-2707A – Final Design Wetland Impacts.

Permit Site No.	Wetland JD Reference	Wetland Size (acres)	Impact Type	Impact Area (acres)	Temporary Impacts (acres)	Mitigation Requirement
5	5, 6	0.99	Perm. Fill	0.28	--	USACE & DWQ
			Temp. Fill	--	--	--
			Excavation	0.03	--	USACE & DWQ
			Mechanized Clearing	0.03	--	USACE & DWQ
7	15	0.38	Perm. Fill	0.07	--	USACE & DWQ
			Temp. Fill	--	--	--
			Excavation	--	--	--
			Mechanized Clearing	0.01	--	USACE & DWQ
Total Permanent Impacts (Perm. Fill + Mechanized Clearing + Excavation):				0.43[a]	--	--
Permanent Impacts Requiring DWQ Mitigation:				0.43	--	--
Permanent Impacts Requiring USACE Mitigation:				0.43	--	--
Total Impacts Requiring Mitigation (2:1):				0.43	--	0.86

[a] **Value Based on rounding**

Section R-2707A Permit Site Descriptions

Permit Site 1: Stream 1-3 is a perennial stream that flows generally north to south through the impact area under the existing US 74. Flow from Stream 1-3 will be placed into two (2) 8' X 8' Reinforced Concrete Box Culvert (RCBC) extensions. The upstream reach of Stream 1-3 will receive the appropriate bank stabilization measures. Lateral "base" ditches lined with rip rap will be used to attenuate peak flows resulting from the new impervious area. The new roadway and associated slopes will result in 185 linear feet of permanent stream impacts, plus an additional 20 linear feet associated with bank stabilization measures. Temporary impacts will include <0.01 acre of impact to Stream 1-3. There will be no impacts to wetlands.

Permit Site 2: Stream 2-2 is an intermittent stream that generally flows north to south through the impact area under the existing US 74 into Pond 1 just outside of the impact area. Flow from Stream 2-2 will be placed into a 48" Reinforced Concrete Pipe (RCP) extension. The new roadway and associated slopes measures will result in 57 linear feet of permanent stream impacts. Temporary impacts will include <0.01 acre of impact to Stream 2-2. There will be no impacts to wetlands.

Permit Site 3: Stream 2-4 is an intermittent stream that generally flows north to south through the impact area. Flow from Stream 2-4 will be placed into a 36" RCP IV. A special cut "base" ditch lined with rip rap and a lateral base ditch with permanent soil reinforcement matting will be used to attenuate peak flows resulting from the new impervious area. The new roadway and associated slopes will result in 64 linear feet of permanent stream impacts, plus an additional 12 linear feet associated with bank stabilization measures. Temporary impacts will include <0.01 acre of impact to Stream 2-4. There will be no impacts to wetlands.

Permit Site 4: Stream 2-6 is a perennial stream that generally flows north to south through the

impact area. Flow from Stream 2-6 will be placed into a 36" RCP and a 36" Corrugated Steel Pipe (CSP). A special cut "base" ditch lined with rip rap and a lateral base ditch will be used to attenuate peak flows resulting from the new impervious area. The downstream reach of Stream 2-6 will receive bank stabilization above the rip rap. The new roadway and associated slopes will result in 290 linear feet of permanent stream impacts, plus an additional 12 linear feet associated with bank stabilization measures. Temporary impacts will include <0.01 acre of impact to Stream 2-6. There will be no impacts to wetlands.

Permit Site 5: Stream 2-11 (Beaver Creek) is a perennial stream that will be bridged. Impacts to the stream channel will be limited to 17 linear feet of bank stabilization. The new roadway, associated slope, and lateral ditch measures will result in 0.28 acre of permanent fill affecting Wetlands 5 (N.C. Wetland Assessment Method (NCWAM) bottomland hardwood forest, riparian) and 6 (bottomland hardwood forest, riparian). This impact site will also include 0.03 acre of wetland impact associated with excavation in wetlands with an additional 0.03 acre associated with mechanized clearing of wetlands. There are no temporary impacts associated with Permit Site 5.

Permit Site 6: Stream 2-17 is an intermittent stream that generally flows north to south through the impact area. Flow from Stream 2-17 will be placed into a 42" Load Resistant Factor Design (LRFD). A lateral base ditch lined with rip rap will be used to attenuate peak flows resulting from the new impervious area. The new roadway and associated slopes will result in 290 linear feet of permanent stream impacts, plus an additional 12 linear feet associated with bank stabilization. Temporary impacts will include <0.01 acre of impacts to Stream 2-17. There will be no impacts to wetlands.

Permit Site 7: Permit Site 7 will have impacts to both Stream 2-21 and Wetland 15. Stream 2-21 is an intermittent stream that generally flows north to south through the impact area. Flow from Stream 2-21 will be placed into two (2) 36" RCP. The new roadway and associated slope measures will result in 318 linear feet of permanent stream impacts and 0.07 acre of permanent impact to Wetland 15 (headwater forest, riparian). Temporary impacts will include <0.01 acre of impact to Stream 2-21 with an additional 12 linear feet associated with temporary stream stabilization measures. [Temporary bank stabilization is defined as temporary work impacting the banks, but not resulting in permanent placement of material (rip rap) at or below mean high water]. There will be also be an additional 0.01 acre of impact due to mechanized clearing in wetlands.

Permit Site 8: Stream UT 1 (NCDOT) is an intermittent stream that generally flows north to south through the impact area. Flow from Stream UT 1 will be placed into a 30" RCP. The new roadway and associated slope measures will result in 19 linear feet of permanent stream impacts. Temporary impacts will include 0.01 acre of impacts to Stream UT 1 (NCDOT). There will be no impacts to wetlands.

Permit Site 9: Stream UT X (NCDOT) is a perennial stream that generally flows north to south through the impact area. Flow from the upper portion of Stream UT X will be placed into a 36" RCP for 119 linear feet under the proposed service road. Stream UT X will be placed in an open

channel for an additional 147 linear feet on the south side of the proposed service road. The new roadway, associated slope, and open channel measures will result in 266 linear feet of permanent stream impacts. Temporary impacts will include <0.01 acre of impacts to Stream UT X (NCDOT). There will be no impacts to wetlands.

Permit Site 10: Stream UT Y (NCDOT) is a perennial stream that generally flows east to west through the impact area. Permanent impacts to Stream UT Y (NCDOT) will be limited to 8 linear feet of bank stabilization. There are no temporary or wetland impacts associated with Permit Site 10.

Section B (Final Design)

Table 8A. Section R-2707B – Final Design Stream Impacts.

Permit Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement [a]
1	UT to Beaverdam Creek	2-27	Perm. Fill	397	--	USACE & DWQ
			Bank Stabilization	11	--	DWQ
			Temp. Fill	--	0.01	--
2	UT to Brushy Creek	3-1	Perm. Fill	15	--	USACE
			Bank Stabilization	--	--	-- [c]
			Temp. Fill	--	--	--
3	UT to Brushy Creek	3-3	Perm. Fill	386	--	USACE & DWQ
			Bank Stabilization	15	--	DWQ
			Temp. Fill	--	<0.01	--
4	UT to Brushy Creek	3-5	Perm. Fill	330	--	USACE & DWQ
			Bank Stabilization	15	--	DWQ
			Temp. Fill	--	<0.01	--
5	UT to Brushy Creek	3-6, 3-7	Perm. Fill	585	--	USACE & DWQ
			Bank Stabilization	18	--	DWQ
			Temp. Fill	--	<0.01	--
6	UT to Brushy Creek	3-8	Perm. Fill	245	--	USACE & DWQ
			Bank Stabilization	15	--	DWQ
			Temp. Fill	--	<0.01	--
7	UT to Brushy Creek	3-12	Perm. Fill	5	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
8	Brushy Creek	3-9	Perm. Fill	17	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
9	UT to Brushy Creek	3-10	Perm. Fill	568	--	USACE & DWQ
			Bank Stabilization	11	--	DWQ
			Temp. Fill	--	<0.01	--
11	UT to First Broad River	4-4	Perm. Fill	440	--	USACE & DWQ
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
12	UT to First Broad River	4-1, 4-2, 4-3	Perm. Fill	547	--	USACE & DWQ
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
Total Temporary Impacts:				--	0.03 [b]	--
Total Permanent Impacts (Perm. Fill +Bank Stabilization):				3,620	--	--
Permanent Impacts Requiring DWQ Mitigation (1:1):				3,583	--	--
Permanent Impacts Requiring USACE Mitigation (2:1):				3,535	--	--
Total Impacts Requiring Mitigation (2:1):				3,535	--	7,070 [+]

[a] Mitigation for bank stabilization impact required by DWQ – not required by USACE

[b] Value Based on rounding, due to some individual impacts being <0.01 acre

[c] Permanent impact<150' therefore mitigation for bank stabilization impact not required by DWQ

[+] Mitigation proposed by NCDOT (based on mitigation required by USACE exceeding amount required by DWQ)

Table 8B. Section R-2707B – Final Design wetland impacts.

Permit Site No.	Wetland JD Reference	Wetland Size (acres)	Impact Type	Impact Area (acres)	Temporary Impacts (acres)	Mitigation Requirement
6	18B	<0.01	Perm. Fill	<0.01	--	USACE & DWQ
			Temp. Fill	--	--	--
			Excavation	--	--	--
			Mechanized Clearing	<0.01	--	USACE & DWQ
7	22	7.0	Perm. Fill	3.29	--	USACE & DWQ
			Temp. Fill	--	--	--
			Excavation	--	--	--
			Mechanized Clearing	0.25	--	USACE & DWQ
8	23	0.05	Perm. Fill	0.05	--	USACE & DWQ
			Temp. Fill	--	--	--
			Excavation	--	--	--
			Mechanized Clearing	--	--	--
11	26B	0.02	Perm. Fill	0.01	--	USACE & DWQ
			Temp. Fill	--	--	--
			Excavation	--	--	--
			Mechanized Clearing	--	--	--
12	26A	0.01	Perm. Fill	0.01	--	USACE & DWQ
			Temp. Fill	--	--	--
			Excavation	--	--	--
			Mechanized Clearing	--	--	--
Total Permanent Impacts (Perm. Fill + Mechanized Clearing):				3.37[a]	--	--
Permanent Impacts Requiring DWQ Mitigation:				3.37	--	--
Permanent Impacts Requiring USACE Mitigation:				3.37	--	--
Total Impacts Requiring Mitigation (2:1):				3.37	--	6.74

[a] **Value Based on rounding**

Section R-2707B Permit Site Descriptions

Permit Site 1: Stream 2-27 is a perennial stream that flows generally north to south through the impact area. Flow from Stream 2-27 will be placed into two (2) 10' X 10' RCBC. The downstream reach of Stream 2-27 will receive the appropriate bank stabilization measures. Lateral "base" ditches lined with rip rap will be used to attenuate peak flows resulting from the new impervious area. The new roadway and associated slopes will result in 397 linear feet of permanent stream impacts, plus an additional 11 linear feet associated with bank stabilization measures. Temporary impacts will include <0.02 acre of impact to Stream 2-27. There will be no impacts to wetlands.

Permit Site 2: Stream 3-1 is an intermittent stream that generally flows south to north through the impact area. Flow from Stream 3-1 will be impacted by roadway fill. A lateral "base" ditch will be used to attenuate peak flows resulting from the new impervious area. The new roadway and associated slopes measures will result in 15 linear feet of permanent stream impacts. There will be no temporary impacts and no impacts to wetlands.

Permit Site 3: Stream 3-3 is an intermittent stream that generally flows south to north through the impact area. Flow from Stream 3-3 will be placed into a 66" RCP. The upstream reach will

receive a headwall 5' base head ditch and toe protection. The downstream reach of Stream 3-3 will receive appropriate bank stabilization measures. The new roadway and associated slopes will result in 386 linear feet of permanent stream impacts, plus an additional 15 linear feet associated with bank stabilization measures. Temporary impacts will include <0.01 acre of impact to Stream 3-3. There will be no impacts to wetlands.

Permit Site 4: Stream 3-5 is a perennial stream that generally flows south to north through the impact area. Flow from Stream 3-5 will be placed into a 60" RCP. A lateral base ditch will be used to attenuate peak flows resulting from the new impervious area. The downstream reach of Stream 3-5 will receive appropriate bank stabilization measures. The new roadway and associated slopes will result in 330 linear feet of permanent stream impacts, plus an additional 15 linear feet associated with bank stabilization measures. Temporary impacts will include <0.01 acre of impact to Stream 3-5. There will be no impacts to wetlands.

Permit Site 5: Permit Site 5 will have impacts to Streams 3-6 and 3-7. Streams 3-6 and 3-7 are perennial streams that generally flow south to north through the impact area. Flow from Stream 3-6 will be placed into a 66" RCP and flow from Stream 3-7 will be placed into a 54" RCP. A lateral base ditch will be used to attenuate peak flows resulting from the new impervious area. The downstream reach of Stream 3-6 will receive appropriate bank stabilization measures. The new roadway and associated slopes will result in 585 linear feet of permanent stream impacts, plus an additional 18 linear feet associated with bank stabilization measures. Temporary impacts will include <0.01 acre of impact to streams. There will be no impacts to wetlands.

Permit Site 6: Permit Site 6 will have impacts to both Stream 3-8 and Wetland 18B. Stream 3-8 is a perennial stream that generally flows south to north through the impact area. Flow from Stream 3-8 and Wetland 18B will be placed into a 54" RCP. The downstream reach of Stream 3-8 will receive appropriate bank stabilization measures. The new roadway and associated slopes will result in 245 linear feet of permanent stream impacts, plus an additional 15 linear feet associated with bank stabilization measures. Temporary impacts will include <0.01 acre of impact to Stream 3-5. There will be <0.01 acre of permanent fill impact to Wetland 18B (headwater forest, riparian) and <0.01 ac of wetlands will be impacted by mechanized clearing.

Permit Site 7: Permit Site 7 will have impacts to both Stream 3-12 and Wetland 22. Stream 3-12 is an intermittent stream that generally flows south to north through the impact area.. Flow from Stream 3-12 and Wetland 22 will be impacted by roadway fill. The new roadway and associated slopes and stabilization measures will result in 5 linear feet of permanent stream impacts and 3.29 acres of impacts to Wetland 22 (riverine swamp forest, riparian). There will be 0.25 acre of wetland impacted by mechanized clearing. Temporary impacts will include <0.01 acre of impact to Stream 3-12.

Permit Site 8: Permit Site 8 will have impacts to both Stream 3-9 and Wetland 23. Stream 3-9 (Brushy Creek) is a perennial stream that generally flows north to south through the impact area. Stream 3-9 and Wetland 23 will be impacted by bridging. The new bridge and associated slopes and stabilization measures will result in 17 linear feet of permanent stream impacts and 0.05 acre of impact to Wetland 23 (floodplain pool, riparian). There will be no temporary impacts

associated with Permit Site 8.

Permit Site 9: Stream 3-10 is a perennial stream that generally flows north to south through the impact area. Flow from Stream 3-10 will be placed into a 66" RCP. A lateral base ditch will be used to attenuate peak flows resulting from the new impervious area. The downstream reach of Stream 3-1- will receive appropriate bank stabilization measures. The new roadway and associated slopes will result in 568 linear feet of permanent stream impacts, plus an additional 11 linear feet associated with bank stabilization measures. Temporary impacts will include <0.01 acre of impact to Stream 3-10. There will be no impacts to wetlands.

Permit Site 10: Removed

Permit Site 11: Permit Site 11 will impact Stream 4-4 and Wetland 26B. Stream 4-4 is a perennial stream that generally flows north to south through the impact area. Stream 4-4 and Wetland 26B will be impacted by fill from roadway construction. The new roadway and associated slopes measures will result in 440 linear feet of permanent stream impacts and 0.01 ac of permanent impact to Wetland 26B (headwater forest, riparian). Temporary impacts will include <0.01 ac of impact to Stream 4-4.

Permit Site 12: Permit Site 12 will impact Stream 4-1, 4-2, 4-3, and Wetland 26A. Stream 4-1 is an intermittent stream that generally flows west to east through the impact area. Streams 4-2 and 4-3 are perennial streams that generally flow west to east through the impact area. Streams 4-1, 4-2, and Wetland 26A will be impacted by fill from roadway construction. Stream 4-3 appears to be placed into a 42" Corrugated Steel Pipe (CSP). The new roadway and associated slopes measures will result in 547 linear feet of permanent stream impacts and 0.01 ac of permanent impact to Wetland 26A (headwater forest, riparian). Temporary impacts will include <0.01 ac of stream impacts.

MORATORIUM

No moratoriums are required by the U.S. Fish and Wildlife Service (USFWS) nor were they proposed by the North Carolina Wildlife Resources Commission (NCWRC). Cleveland County is not a NCWRC trout county.

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 September 22, 2010 the USFWS lists one federally protected species for Cleveland County (Table 9).

Table 9. Federally Protected Species Listed for Cleveland County.

Scientific Name	Common Name	Federal Status[a]	Habitat Present	Biological Conclusion
Hexastylis naniflora	Dwarf-flowered heartleaf	T	Yes	May Affect, Likely to Adversely Affect

[a] T-Threatened

The Biological Assessment has been submitted to Federal Highway Administration (FHWA) with digital copies distributed to the pertinent regulatory agencies. The FHWA will submit the Biological Assessment to USFWS. When the USFWS has issued its Biological Opinion; it will be submitted to USACE to complete this application.

INDIRECT CUMULATIVE IMPACT ANALYSIS

Existing rules for the 401 Water Quality Certification Program (15A NCAC 2H .0506(b)(4)) require that the NCDWQ determine that a project "does not result in cumulative impacts, based on past or reasonably anticipated future impacts, that cause or will cause a violation of downstream water quality standards."

An Indirect and Cumulative Effects were addressed as part of the FEIS (Section 4.16). This section concluded the following:

Indirect and Cumulative Effects to the Human Environment

An Indirect and Cumulative Effects Land Use Scenario Assessment (ICE) was completed for this project in September, 2009. The ICE identified and analyzed seven probable development areas (PDA's) associated with the proposed project. Of these PDA's, only two were assessed to have any significant development opportunity, the intersections of Polkville Road and Washburn Switch Road, as these areas have both water and sewer service available and afford a slightly higher degree of travel time savings. Both Cleveland County and the City of Shelby have fairly stringent development management regulations to control growth. These regulations include recently updated land use plans and zoning ordinances, as well as water supply watershed development restrictions. Additionally, regional population and job growth projections suggest that development will occur at a slow to moderate pace, but that land use policies will keep the intensity of any development at a low level.

Indirect and Cumulative Effects to the Natural Environment

The proposed project crosses Buffalo Creek which is listed on the 303(d) impaired streams list by NCDENR. Development regulations within the area of the stream include land use plans and zoning documents, both of which encourage rural development on large lots. The project also crosses the First Broad River which becomes 303(d) impaired downstream of the ICE study area.

Road and Washburn Switch Road. Although properties in the vicinity of these proposed interchanges do not drain directly to the First Broad River, they do drain into tributaries of the First Broad. However, as with the area around Buffalo Creek, all development both within the County and the City of Shelby is strictly regulated with sedimentation, erosion control, and stormwater discharge policies. Additionally, some of the land around the proposed Polkville Road interchange is further protected by Water Supply Watershed and Water Quality Critical designations.

Due to the low level of expected indirect impacts, the cumulative effect of this project, when considered in the context of other past, present, and future actions, and the resulting impact to notable human and natural features should also be minimal. No significant cumulative impacts are anticipated to result from this project.

CULTURAL RESOURCES

Archaeology

There are no archaeological sites within the Selected Alternative that are eligible for the National Register of Historic of Places (NRHP). No further archaeological work is required for this project.

Historic Architectural Resources

There will be an effect to the NRHP – eligible Hamilton – McBrayer Farm for the Selected Alternative, but the effect will not be adverse, provided that highway improvements remain within the current right-of-way limits. See attached letter from SHPO.

SECTION 4(f)

Section 4(f) and *de minimis*

Potential constraints associated with Section 4(f) resources (as defined in Section 4(f) of DOT Act of 1996, as amended, were evaluated and it was determined that the project will have no effect on Section 4(f) resources.

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-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 either on-site or 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

Per the Record of Decision, avoidance and minimization measures for the Planning and Design Phase include the following items:

- Use of 2:1 fill slopes at streams and wetlands to minimize impacts.
- Bridging Beaverdam Creek (Stream #2-11) to minimize impacts.
- Replacement of west ramps with east loop ramps for NC 226 interchange to minimize impacts to Stream #3-10.
- Shifts in horizontal alignment in the vicinity of dwarf-flowered heartleaf (DFHL) Site #22 to minimize impacts to that site.
- Shift in SR2245 horizontal alignment to minimize impacts to Streams #8-8, #8-9, and #8-11, and DFHL Site #32.

Per the Record of Decision and Project Commitments, standard construction practices designed to avoid and minimize impacts during construction are discussed in section 4.15 of the FEIS. The following project-specific measures are proposed for this project:

Brushy Creek

- Trees will be cut at the base to create root wads to help stabilize banks
- Bridges will be designed with sufficient length to allow for wildlife passage
- Deck drainage will not be released directly into the waterway

First Broad River (Stream #4-7)

- Construction of a temporary causeway or work bridge
- Installation of a drainage system on the bridge to divert stormwater runoff away from the river
- Coordination with local water supply administrator; if deemed necessary
- Installation of hazardous spill basins
- Impacts to vegetation will be minimized as much as possible

- Impacts to vegetation will be minimized as much as possible

Dwarf-flowered heartleaf Sites

- Areas containing DFHL plants, but not impacted by the project, will be clearly marked prior to any ground-disturbing activity on the site to assure that construction does not affect the plants.
- A USFWS biologist will attend the preconstruction meeting to discuss the importance of avoiding the plants, and other environmental commitments that are a part of the project.
- If it is determined necessary by the USFWS to relocated impacted plants, the work will be performed by qualified persons. The relocation work could include transplanting the vegetative portions of plants from existing sites to pre-selected, USFWS-approved alternate sites and/or dispersing seed from existing sites to the USFWS-approved sites.

Compensatory Mitigation

Tables 7A through 8B identify the stream and wetland impacts by individual site, respectively, that are subject to mitigation, based on input earlier in the project from the USACE and other resource agencies. Total impacts, for Sections A and B, requiring mitigation by the USACE are 4.05 acres of riparian wetlands and 5,024 linear feet of stream. Total impacts requiring mitigation by NCDWQ are 4.05 acres of riparian wetlands and 5,190 linear feet of stream. At a mitigation ration of 2:1, mitigation credits provided by EEP will be 8.10 acres of riparian wetland and 10,048 linear feet of stream.

Mitigation for Sections A and B will be provided in accordance to Section 404/401 permitting requirements since the Section A and B impacts represent final design. Sections C, D, and E impacts are preliminary at this time and are not due to be let for construction within 5 years. Compensatory mitigation will be provided accordingly during the subsequent permit modifications. These modifications will occur when final design on these remaining Sections has been completed.

Table 10. Status of Onsite Mitigation by Section.

Section	Status of Onsite Mitigation
A	No Onsite Mitigation Feasible
B	No Onsite Mitigation Feasible
C	Onsite Mitigation deemed not feasible due to rock outcropping
D	Onsite mitigation feasibility still in review
E	Onsite mitigation feasibility still in review

At this time, EEP will provide compensatory mitigation for Sections A and B impacts only. At a mitigation ratio of 2:1, mitigation credits provided by EEP will be 8.10 acres of wetland and 10,048 linear feet of stream. It has been determined that onsite mitigation is not an option for Sections A, B, and C. Onsite mitigation options for Sections D and E are still under review.

REGULATORY APPROVALS

Application is hereby made for a USACE Individual 404 Permit as required for the above-described activities. Application is hereby made for a Section 401 Water Quality Certification from the N.C. Division of Water Quality. In compliance with Section 143-215.3DC of the NCAC we have provided a method of debiting $570, as noted in the subject line of this application, as payment for processing the Section 401 Water Quality Certification application. We are providing five copies of this application to DWQ, for their use.

A copy of this permit application will be posted to the DOT website at: http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html. If you have any questions or need additional information, please contact Jeff Hemphill at jhemphill@ncdot.gov or (919) 707-6126.

Sincerely,

for Gregory J. Thorpe, Manager
Project Development and Environmental Analysis Unit

Cc: NCDOT Permit Application Standard Distribution List

U.S. ARMY CORPS OF ENGINEERS **APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT** *(33 CFR 325)*	OMB APPROVAL NO. 0710-0003 EXPIRES: 31 AUGUST 2012

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Middle - Last -	First - Middle - Last -
Company - North Carolina Department of Transportation PD&EA	Company -
E-mail Address - jhemphill@ncdot.gov	E-mail Address -
6. APPLICANT'S ADDRESS:	**9. AGENT'S ADDRESS:**
Address- 1548 Mail Service Center	Address-
City - Raleigh State - NC Zip - 27699 Country - Wake	City - State - Zip - Country -
7. APPLICANT'S PHONE NOs. w/AREA CODE	**10. AGENTS PHONE NOs. w/AREA CODE**
a. Residence b. Business 919-707-6126 c. Fax	a. Residence b. Business c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____ _____
SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
R-2707 Shelby Bypass, Cleveland County, NC

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
First Broad R, Brushy, Beaverdam, Buffalo , Hickory, Sandy Fork	Address
15. LOCATION OF PROJECT Latitude: °N 35.317300 Longitude: °W -81.562577	City - State- Zip-

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)
State Tax Parcel ID Municipality Shelby, NC
Section - Township - Range -

17. DIRECTIONS TO THE SITE
Please see attached vicinity map and cover letter.

18. Nature of Activity (Description of project, include all features)
TIP Project R-2707 is a proposed new location freeway bypass located in Cleveland County, NC. The proposed project is approximately 19 miles in length and will be a four-lane divided highway with full control access, primarily on new location (a bypass of the City of Shelby), with widening sections to the east and west of the new location section along existing US 74.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)
The primary purpose of R-2707 is to increase capacity of the US 74 corridor, thereby improving levels of service, reducing the potential for future traffic congestion, and improving safety.

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

20. Reason(s) for Discharge
Impacts will result from constructing a new location freeway and associated shoulders, new interchanges and ramps, hydraulic structures, and bridges. Temporary discharges will result from construction and access activities. additional permanent impacts will result from bank stabilization measures downstream from installed structures.

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

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
see attached cover letter		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)
Acres see attached cover letter
or
Linear Feet

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

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- Please see adjacent property landowners page in the permit package

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

* 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.

E. L. Lusk — 7.3.12 — for Gregory J. Thorpe, PhD

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.

Ecosystem Enhancement PROGRAM

July 3, 2012

Mr. Gregory J. Thorpe, Ph.D.
Manager, Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-2707A, Shelby Bypass from West of SR 1162 to West of SR 1314, Cleveland County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on June 27, 2012, the impacts are located in CU 03050105 of the Broad River basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Broad 03050105 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	1,349	0.43	0	0	0	0

EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program 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 EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

Suzanne Klimek
EEP Acting Director

cc: Ms. Liz Hair, USACE – Asheville Regulatory Field Office
Mr. David Wainwright, Division of Water Quality, Wetlands/401 Unit
File: R-2707A

Ecosystem Enhancement PROGRAM

July 3, 2012

Mr. Gregory J. Thorpe, Ph.D.
Manager, Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-2707B, Shelby Bypass from West of SR 1314 to West of NC 226, Cleveland County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on June 27, 2012, the impacts are located in CU 03050105 of the Broad River basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Broad 03050105 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	3,620	3.57	0	0	0	0

EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program 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 EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

James B. Stanfill Jr.

Suzanne Klimek
EEP Acting Director

cc: Ms. Liz Hair, USACE – Asheville Regulatory Field Office
Mr. David Wainwright, Division of Water Quality, Wetlands/401 Unit
File: R-2707B

May 25, 2004

Subject: Draft Minutes Interagency Hydraulic Review Meeting (4B) on May 19, 2004, for R-2707A Cleveland County.

Team Members:		Participants:
Steve Lund – USACE	(Present)	Marshall Clawson – NCDOT Hydraulics
John Hennessy– NCDWQ	(Present)	Chris Rivenbark – NCDOT PDEA ONE
Marla Chambers – NCWRC	(Absent)	Doug Taylor – NCDOT Design Services
Marella Buncick – USFWS	(Absent)	Dan Duffield – NCDOT Hydraulic
Christopher Militscher – USEPA	(Absent)	Emily Fentress - Lockner, Inc.
Jennifer Harris – NCDOT PDEA	(Present)	Tim Bassette – Lockner, Inc.
Brian Wrenn-NCDWQ	(Present)	Steve Bonder – Arcadis
		Roberto Scheller – DEO Division 12

Marshall Clawson (MWC) and Steve Bonder (SB) – Overview of the project design

John Hennessy (JH) – Streams been verified?

Tim Bassett (TB) – COE verified in segments

Sheets 4-6

Sheets 7

JH – Fill being removed?

MWC – No, its being retained and used as a service road

Discussion about drainage, steepness, layout of the drainage, etc.

JH – Are there any aquatic species to be concerned with?

MWC - That's a fish and wildlife question, need to check with WRC

Steve Lund (SL) – Is this a trib to Sandy Run Creek? Wants alternating sill in box culvert

SB – Yes, it is a trib

MWC – No problem on the sills, we'll add them

Sheet 8

SB – Overview

JH/TB Discussion on stream type

Sheet 9

JH – Where does that call start from?

SB – Indicated on the plans where the call started

JH – High Quality stuff? What's the pipe size?

SB - 24' or 30"

Sheet 10

JH – Where does that call start from?

SB – Indicated on the plans where the call started

JH – What's the pipe size?

SB – 36"

Discussion about drop boxes

JH – Drop box is Ok in this case

Sheet 11

Sheet 12

Sheet 13

MWC – Wetland boundary looks incorrect? Wetland is going up the side of the hill

Discussion on drainage layout.

Sheet 14

Sheet 15

Sheet 16

MWC – Need to look at using multiple pipes under the road

Sheet 17-21

Sheet 21

Discussion – about ponded area, almost to the outlet of the system.

MWC – Will address after a more thorough hydraulic investigation has been done.

The meeting was adjourned.

Project: R-2707A, US 74 Cleveland County

Subject: Draft Minutes from Interagency 4C Permit Drawing Review Meeting

Date: August 10, 2011

Liz Hare-USACE	(present)
Marella Buncick-USFWS	(absent)
Marla Chambers-NCWRC	(present)
Polly Lespinasse-NCDWQ	(present)
Chris Militscher-EPA	(present)
Mitch Batuzich-FHWA	(present)
Mack Bailey-Structures	(present)
Theresa Ellerby-PDEA	(absent)
Carla S. Dagnino-NEU	(present)
David Harris-REU	(absent)
Dan Grissom-Division 12	(present)

Participants:
Marshall Clawson, NCDOT Hydraulics
Dan Duffield, NCDOT Hydraulics
Zak Hamidi-Roadway (absent)
Alan Ray, NCDOT Roadway
Andre Davenport, NCDOT Structures
Bruce Klappenbach, NCDOT Structures
Tanga Kelly, NCDOT Utilities
James Swinson, NCDOT Utilities
Angela Sanderson, NCDOT-PDEA
Stacy Oberhausen, NCDOT-PDEA
Tim Bassette, NCDOT-PDEA
Teresa Hart, NCDOT-PDEA
Gene Nocerino, NCDOT-NEU
Elizabeth Lush, NCDOT-NEU
Mark Staley, NCDOT-REU
Trish Simon, NCDOT-Division 14 DEO
Steve Bondor, Greenhorne & O'Mara

General

- General introduction was initiated by Marshall Clawson. Introductions were made by all in attendance.
- Marella Buncick was not in attendance, due to conference call issues.

Plan Sheet 7 – Site 1

- Add permanent impact and detail for bank stabilization of stream channel at upstream end of box culvert at end of lateral base ditch, sta 58+30 LT

Plan Sheet 9 – Site 3

- Confirm that upstream limit of jurisdictional stream is shown correctly
- Consider elimination of 90 degree bends in 36" RCP cross pipe and skew pipe instead

Plan Sheet 10 – Site 4

- Confirm that upstream limit of jurisdictional stream is shown correctly

- Add a detail for Stream bank stabilization and use PSRM from TB down to the JS stream.

Plan Sheet 13 – Site 5

- Confirm if wetland at sta 160+00 RT should be total impact instead of mechanized clearing impact

Plan Sheet 15 – Site 6

- Sta 181+90 RT add bend facing downstream to bottom 20' of lateral base ditch to avoid a 90 degree discharge into the stream and potential erosion of opposite bank. If bend is not possible use Class II riprap in lateral ditch.

Plan Sheet 16 – Site 7

- No comment

Plan Sheet 21 – Site 2

- Need to make sure Erosion Control Devices are used to protect the pond.

Plan Sheet 23

Site 10

- Add bend in tail ditch to better align with stream channel and avoid a 90 degree discharge and potential erosion of opposite bank.
- Add PDE around tail ditch and bank stabilization on the other size of the receiving stream to prevent scour.

Site 8

- No comment

Plan Sheet 24 – Site 9

- Revise riprap in detail 24A from Class B to Class I and note to key in.

- Lateral ditch sta 28+90 to 30+25 RT, consider use of larger base width to decrease velocity

Subject: Minutes from Interagency 4C Permit Drawings Review Meeting on August 10, 2011 for R-2707B in Cleveland County

Team Members:

Liz Hare-USACE	(present)
Marella Buncick-USFWS	(present by phone)
Marla Chambers-NCWRC	(present)
Polly Lespinasse-NCDWQ	(present)
Chris Militscher-EPA	(present)
Mitch Batuzich-FHWA	(present)
Khaled Z. Hamidi-Roadway	(absent)
Mack Bailey-Structures	(present)
Theresa Ellerby-PDEA	(absent)
Carla S. Dagnino-NEU	(present)
David Harris-REU	(absent)
Dan Grissom-Division 12	(present)

Participants:
Marshall Clawson, NCDOT Hydraulics
Dan Duffield, NCDOT Hydraulics
Alan Ray, NCDOT Roadway
Andre Davenport, NCDOT Structures
Bruce Klappenbach, NCDOT Structures
Tanga Kelly, NCDOT Utilities
James Swinson, NCDOT Utilities
Angela Sanderson, NCDOT-PDEA
Stacy Oberhausen, NCDOT-PDEA
Tim Bassette, NCDOT-PDEA
Teresa Hart, NCDOT-PDEA
Gene Nocerino, NCDOT-NEU
Elizabeth Lush, NCDOT-NEU
Mark Staley, NCDOT-REU
Trish Simon, NCDOT-Division 14 DEO
Kevin Alford, Mulkey Engineers
Matt Harvey, Mulkey Engineers

The following is a brief summary of the discussions on the project:

General

- General introduction was initiated by Marshall Clawson. Introductions were made by all in attendance.
- Marella Buncick was not in attendance, but was available via conference call.
- The project has two major structures. The major structures consist of a bridge and a culvert.
- All waters within the project are Class C. All are on the 303d list for mercury impairment.
-

Plan Sheet 4

- Proposed 2 @ 10' x 10' at –L- 222+20 (Permit Site 1)
    - The culvert will have sills in order to make one of the barrels a low flow channel
    - Impacts in surface waters from roadway fill.
    - Rip rap at the outlet is not in the stream, banks only, and serves as bank stabilization.
    - Existing CMP to be removed at inlet of proposed culvert.

Plan Sheet 8

- Proposed fill over Jurisdictional Stream –L- 255+70 +/- Lt. (Permit Site 2)
  - Impacts in surface waters from roadway fill.
  - There was concern about what will happen when the stream is filled over. NCDOT will make the Geotechnical Unit aware of site as an area of concern. The Geotechnical Unit will make the recommendations for any underdrains that are needed here.
  - There is a typo on Ditch Detail 2. The rip rap needs to be shown as Class "B" rather than Class "R".

- Proposed 66" RCP at –L- 266+35 (Permit Site 3)
  - Impacts in surface water from proposed culvert.
  - The impacts at the outlet are incorrectly shown. The JS line is not the true location of the stream. The impacts and stream location will be updated on the plans.
  - Rip rap at the outlet is not in the stream, banks only, and serves as bank stabilization.
  - Show matting on the banks on Detail 31.

Plan Sheet 9

- Proposed 60" RCP at –L- 279+32 (Permit Site 4)
  - Impacts in surface waters from roadway fill.
  - The impacts at the outlet are incorrectly shown. The JS line is not the true location of the stream. The impacts and stream location will be updated on the plans.
  - The lateral ditch coming into the inlet needs to be looked at to make sure that Class I Rip Rap is not needed.
  - Rip rap at the outlet is not in the stream, banks only, and serves as bank stabilization.

Plan Sheet 10

- Proposed 66" RCP at –L- 293+15 and Proposed 54" RCP at –L- 294+35 –L- (Permit Site 5)
  - DFHL (Dwarf Flower Heart Leaf) site needs to be shown on the plans. NEU will be providing a new file that will incorporate this.
  - Orange Safety fence should be used to protect the DFHL site. The safety fence is needed to let the contractor know that the DFHL is there and everything possible needs to be done to protect the population.
  - The 15" pipe needs to tie into the 66" RCP with a JB and the 24" pipe needs to tie into the 54" RCP with a JB. The JBs need to be located as closely as possible to the edge of the fill slope.
  - A quantity of orange safety fence will need to be added to the Roadway estimate.

Plan Sheet 11

- Proposed 54" RCP at –L- 294+60 +/- Rt. (Continuation of Permit Site 5)

- Impacts in surface waters from roadway fill.
- Look at stream line at 295+00 Rt. to make sure the drainage from this area is being picked up.

- Proposed fill over Jurisdictional Stream –L- 301+00 +/- Lt.
  - Impacts in surface waters from roadway fill.
  - This area was not originally noted as a JS crossing. The impacts at this area need to be accounted for as impacts in surface waters from roadway fill.
  - NCDOT will make the Geotechnical unit aware of site as an area of concern. The Geotechnical unit will make the recommendations of any underdrains that are needed here.

Plan Sheet 12

- Proposed 54" RCP at –L- 307+20 (Permit Site 6)
  - Impacts in surface waters from roadway fill.
  - Move the outlet of 15" RCP at the downstream side of the 54". This pipe should outlet outside of the banks of the 54" outlet.
  - Rip rap at the outlet is not in the stream, banks only, and serves as bank stabilization.
  - Show matting on the banks on Detail 31.
  - Detail 40 is being called out at the inlet, but does not appear on the plan sheet. Make sure the detail is shown on the plans.

Plan Sheet 13

- Fill in wetlands at –L- 325+19 to 331+50 (Permit Site 7)
  - Permanent fill in wetlands from roadway fill and mechanized clearing.
  - Change all the preformed scour holes in the wetland to rip rap pads. Revise the impacts.
  - Look to see if any of the outlet pipes can be combined to reduce wetland impacts.

Profile Sheet 20

- Change the site on profile sheet 20 from "Site 7" to Site 8".

Plan Sheet 14

- Fill in wetlands at –L- 331+50 to 333+18 (Continuation of Permit Site 7)
  - Impacts in surface water, permanent fill in wetlands, and mechanized clearing from roadway fill.
  - There is a JS shown at 332+95 +/- Rt. that impacts need to be accounted for.
  - There is concern about the equalizer pipes sinking during construction. The Geotechnical Unit will need to look at this issue.

- Bridge at –L- 341+00 +/- (Permit Site 8)
  - The wetlands under the bridge need to shown as a total take rather than hand clearing.

- The stream top of banks and waters edge on the downstream of side of the bridge do not show up and need to be shown on the permits.

Plan Sheet 15

- Proposed 66" RCP at –L- 348+15 (Permit Site 9)
  - The lateral base ditch coming into the inlet needs to be looked at to make sure that Class I Rip Rap is not needed.
  - The PSH at the end of the lateral base ditch needs to be removed and replaced with a pile of stone.
  - Show matting on the banks of the inlet channel.
  - Change the outlet typical to show no rip rap in the channel.

North Carolina Department of Cultural Resources

James B. Hunt Jr., Governor
Betty Ray McCain, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

June 10, 1999

MEMORANDUM

TO: William D. Gilmore, P.E., Manager
Project Development and Environmental Analysis Branch
Division of Highways
Department of Transportation

FROM: David Brook
Deputy State Historic Preservation Officer

SUBJECT: US 74 Shelby Bypass, Cleveland County, R-2707, State Project 8.1801001, ER 99-8828, ER 99-8839

Thank you for your letter of April 23, 1999, transmitting the survey report by Mattson, Alexander and Associates, Inc., concerning the above project. We have also received U.S. Army Corps of Engineers Public Notice for Action No. 199930376 from the Division of Coastal Management.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following eligible for the National Register of Historic Places under the criterion cited:

> Criterion A: The Hamilton-McBrayer Farm is believed to be eligible for nomination to the National Register in the areas of agriculture and commerce. The residence, outbuildings, and adjacent agricultural land are representative of the evolution of a Cleveland County farmstead through the nineteenth and early twentieth centuries.
>
> Criterion C: The Hamilton-McBrayer Farm is believed to be eligible for the architectural significance of the house and outbuildings. The residence is a substantially intact example of nineteenth century domestic architecture and the outbuildings are representative of vernacular building types and methods of construction in rural Cleveland County.

In a letter to you of April 20, 1999, in response to a nationwide permit application on this project, we advised that we previously recommended that an archaeological survey be conducted prior to construction activities. These comments still stand.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763.

DB:slw

cc: Nicholas Graf
Barbara Church
Steve Lund, Army Corps of Engineers, Asheville
Doug Huggett, Division of Coastal Management
Mattson, Alexander and Associates

Federal Aid # NHF-74(14) *TIP* # R-2707 *County*: Cleveland

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Shelby Bypass (US 74)

On August 17, 2000, representatives of the

☒ North Carolina Department of Transportation (NCDOT)
☐ Federal Highway Administration (FHWA)
☒ North Carolina State Historic Preservation Office (SHPO)

reviewed the subject project and agreed

☐ there are no effects on the National Register-listed property/properties located within the project's area of potential effect and listed on the reverse.

☐ there are no effects on the National Register-eligible property/properties located within the project's area of potential effect and listed on the reverse.

☐ there is an effect on the National Register-listed property/properties located within the project's area of potential effect. The property/properties and the effect(s) are listed on the reverse.

☑ there is an effect on the National Register-eligible property/properties located within the project's area of potential effect. The property/properties and effect(s) are listed on the reverse.

Signed:

Richard L. Shumate — 10-19-00
Representative, NCDOT — Date

Michael C Duncan — 10/30/00
FHWA, for the Division Administrator, or other Federal Agency — Date

April Montgomery — 10/19/00
Representative, SHPO — Date

for Renee Gledhill-Earley — 10/19/00
State Historic Preservation Officer — Date

Federal Aid # NHF-74(14) *TIP #* R-2707 *County*: Cleveland

Properties within the area of potential effect for which there is no effect. Indicate if property is National Register-listed (NR) or determined eligible (DE).

Properties within the area of potential effect for which there is an effect. Indicate property status (NR or DE) and describe the effect.

THERE WILL BE NO ADVERSE EFFECT ON THE Mc BRAYER FARM IF: US 74 IS WIDENED TO THE NORTH (AWAY FROM THE PROPERTY) AND A SERVICE ROAD IS ADDED OFF BROADWAY TO SERVICE TRAILERS ALL WITHIN EXISTING R-W. SEE 10/16/00 PRELIM. DESIGN DOC.

Reason(s) why the effect is not adverse (if applicable).

Initialed: NCDOT RLG FHWA [illegible] SHPO [illegible]

North Carolina Department of Cultural Resources

State Historic Preservation Office

David L. S. Brook, Administrator

James B. Hunt Jr., Governor
Betty Ray McCain, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

November 17, 2000

MEMORANDUM

To: William D. Gilmore, P.E., Manager
Project Development and Environmental Analysis Branch

From: David Brook DB for David Brook
Deputy State Historic Preservation Officer

Re: US 74-Shelby Bypass, TIP No. R-2707, Cleveland County, ER 99-8607

Thank you for your letter of August 16, 2000, transmitting the survey report by Richard Silverman, NCDOT concerning the above project.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following property is not eligible for listing in the National Register of Historic Places.

Evans and Edna Cooper House

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919/733-4763.

DB:kgc

cc: Mary Pope Furr, NCDOT
Nicholas Graf, FHwA

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount St., Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919) 733-4763 • 733-8653
ARCHAEOLOGY	421 N. Blount St., Raleigh NC	4619 Mail Service Center, Raleigh NC 27699-4619	(919) 733-7342 • 715-2671

North Carolina Department of Cultural Resources
State Historic Preservation Office
David L. S. Brook, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary

Division of Archives and History
Jeffrey J. Crow, Director

March 21, 2001

MEMORANDUM

To: William D. Gilmore, P.E., Manager
Project Development and Environmental Analysis Branch

From: David Brook /s/ for David Brook
Deputy State Historic Preservation Officer

Re: Archaeological Survey of the Proposed US 74 (Shelby Bypass), Cleveland County, TIP R-2707, ER 98-7624

Thank you for your letter of December 11, 2000, transmitting the archaeological survey report by Caleb Smith of New South Associates concerning the above project.

During the course of the survey sixteen (16) archaeological sites and two (2) cemeteries were located within the project area. Testing was also conducted at 31CL50**. The author has recommended that no further archaeological investigation be conduced in connection with this project. We concur with this recommendation since this project will not involve significant archaeological resources.

The author recommends caution in the vicinities of the two cemeteries, so they will not be disturbed during construction. We concur with this recommendation as well.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919/733-4763.

DB:kgc

cc: John Wadsworth, FHwA

	Location	Mailing Address	Telephone/Fax
Administration	507 N. Blount St, Raleigh, NC	4617 Mail Service Center, Raleigh 27699-4617	(919) 733-4763 •733-8653
Restoration	515 N. Blount St, Raleigh , NC	4613 Mail Service Center, Raleigh 27699-4613	(919) 733-6547 •715-4801
Survey & Planning	515 N. Blount St, Raleigh, NC	4618 Mail Service Center, Raleigh 27699-4618	(919) 733-4763 •715-4801

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

INDIRECT AND CUMULATIVE EFFECTS LAND USE SCENARIO ASSESMENT
Proposed Four-lane Freeway on New Location
TIP R-2707, WBS 34497.1. 2
US 74 Shelby Bypass
Cleveland County

October 2, 2009

Executive Summary

TIP R-2707 proposes to construct an 18.7-mile new bypass to the north of Shelby to relieve the existing US 74 Bypass which has become congested. The project will be an access controlled, four lane road with grass medians. It will include the construction of six interchanges, and the conversion of two other intersections to interchanges. The project will result in decreased travel times and an increase in property access, particularly at the interchanges. The project is also expected to change some travel patterns, particularly for residents in the northern part of the County.

The study area for this project includes roughly 10,950 acres of undeveloped land and the time horizon for this study was 2020. The roadway will run, for the most part, through the extra-territorial jurisdiction (ETJ) of Shelby, and also through unincorporated Cleveland County. The small towns of Lattimore and Mooresboro are included in the study area. A large portion of study area is located in water supply watersheds for both Cleveland County (WS-III) and the City of Shelby (WS-IV). The study area also has two waterways that are considered impaired and listed on the States 303(d) impaired stream list – First Broad River and Buffalo Creek.

Both the County and the City of Shelby have fairly stringent development management regulations which help to control growth. These regulations include updated land use plans and zoning ordinances, as well as water supply watershed development restrictions. Any development as a result of the project is likely to be shifted to the area around the proposed interchange at Washburn Switch Road. The interchange is located in unincorporated Cleveland County, but both the County and the City of Shelby have identified areas around the interchange as potential locations for industrial and business parks. While the entire area has water service, only Shelby can provide sewer service, and therefore may be more appealing to development. Other portions of the study area have limited municipal services (the County provides water service but not sewer service while Shelby provides both within the town boundary and water to its ETJ).

Analysis of the potential indirect and cumulative effects of TIP project R-2707 suggests that development activities in the area may be shifted slightly by

project construction. Analysis of the State and local development regulations suggests that the policies and regulations currently in place will reduce the potential impacts of the minor project related development shifts.

Results from the screening tool used to determine the indirect land use effects as a result of the project indicated that there was a moderate to higher (not high) potential for indirect effects. The overall Tool result, the length and scope of the project, and the availability of developable land with sufficient utilities, suggest that further examination is warranted.

A scenario assessment was conducted on seven probable development areas located at each of the project intersections. The assessment concluded that two proposed interchanges, the US 74 Bypass at Polkville Road and the US 74 Bypass at Washburn Switch Road, could see additional development of larger industrial development projects as a result of the project. The remaining 5 intersections would not see as much growth due to the lack of sewer service.

Because no indirect impacts are anticipated, the cumulative effect of this project, when considered in the context of other past, present, and future actions, and the resulting impact to notable human and natural features should be minimal. No cumulative impacts are anticipated to result from this project.

ICE Introduction

This report will document the steps and information gathered to assess future land use changes that could occur as a result of the project R-2707. The predicted changes, if any, require action from a non-NCDOT party to occur. The majority of the measures taken to avoid, minimize and decrease the impact of future land use changes in the project area would be coordinated with these groups.

Future Land Use Study Area

The Future Land Use Study Area (FLUSA) for the 18.7 mile project, outlined in red in Figure 1, is the area surrounding a construction project that could possibly be indirectly affected by the actions of others as a result of the completion of the project. The study area identifies the areas that were examined for potential increases in development pressures. The study area roughly follows a quarter mile area around the project, with an expanded area of one mile around the interchanges. It also includes the area to the south of existing US 74 to the east of the City of Shelby. The boundary of the study area follows the edges of parcels. Additionally, the FLUSA includes the towns of Lattimore and Mooresboro. The total area of the FLUSA is 22,275 acres, of which 10,950 (49.1 percent) is vacant or undeveloped.

Project Overview

Project R-2707 involves the construction of a four-lane, controlled access freeway on new location to bypass the existing four-lane section of US 74 through Shelby; and the improvement to a full control of access facility of existing US 74 from the eastern bypass terminus to SR 1001 (Stony Point Road), and from the western bypass terminus to 0.6 mile west of SR 1162 (Peachtree Road). The project is intended to raise the levels of service in the area, reduce future congestion, and improve safety. R-2707 also has a secondary purpose of economic development by providing a more efficient corridor for commuters, commercial traffic, and regional and local users. The project will include construction of six interchanges *(page 4-32 of FEIS)*, and the conversion of two existing intersections to interchanges. The project has an approved Environmental Impact Statement (EIS), completed in January 2008 and a Record of Decision in December 2008.

Time Horizon

The time horizon for the indirect and cumulative effects analysis will coincide with the design year of the project, 2020. The year 2020 was used for traffic analysis in the preparation of the EIS, and is a time horizon further removed than the planning documents provided by both City of Shelby and Cleveland County.

Transportation Impact Causing Activity

Travelers using US 74 to go between the Charlotte area and Asheville and the mountains should see a decrease in travel times with the construction of R-2707. The existing US 74 corridor has been developed extensively through Shelby, and many intersections have had stoplights installed which has slowed through traffic. As a controlled access facility, the Shelby Bypass will eliminate signal controlled intersections and instead rely on interchanges. Additionally, there is a great deal of truck traffic that uses the existing highway which contributes to traffic congestion and slower travel times. Construction of the project should decrease travel times to and from the northwestern parts of Cleveland County since residents will no longer have to cut through downtown Shelby to access US 74. Travel patterns will be affected as some travelers will be able to use the bypass more efficiently to reach residences in the northern part of the County. The bypass will also allow residents in the northern part of the county to access US 74 to travel east or west more efficiently.

Most of the project will be constructed on new location, although the project will be a controlled access facility. Land use impacts along the project alignment - away from the interchanges - should be minimal since access to these properties will not be affected. Increased access will be provided to the area surrounding the projects proposed interchanges. While the interchanges will connect to existing roads, the exposure to the parcels surrounding the interchange will be increased as a result of project construction. There are six

proposed interchanges associated with the project. They are (moving west to east):

- Peachtree Road (SR 1162)
- Proposed US 74 Bypass at Existing US 74 to the west of Bradley Road.
- Washburn Switch Road (SR 1313);
- Polkville Road (NC-226);
- Fallston Road (NC-18);
- Cherryville Road (NC-150);
- Proposed US 74 Bypass at Existing US 74 near Hoey Church Road;
- Bethlehem Road (SR 2245);

Construction of these interchanges is likely to create an attractive node for development, particularly in the form of highway commercial retail such as gas stations, fast food restaurants and hotels. Large scale development, however, will likely be muted at most interchanges because there are insufficient sewer facilities to handle it. Although the City of Shelby has sewer service, Cleveland County does not, and Shelby does not have any plans of expanding its service to its ETJ, in which much of the project is located. The interchanges will provide additional access to the middle and northern portions of the County, and may result in more single family developments in these unincorporated areas.

Population and Economic Growth

Cleveland County

According to the State Demographics Unit, Cleveland County's population grew by 3,901 people during the decade of 1997-2007, a rate of 0.4 percent annually. The City of Shelby's growth rate was 0.8 percent annually during the same period. Population projections for the County indicate that the growth will continue at a slightly faster pace (0.8 percent annually) through 2020. Employment, on the other hand, has steadily decreased. Cleveland County lost 10.7 percent of all jobs (a total of 12,307 jobs) between 1997 and 2007. The majority of the jobs lost were in the Manufacturing sector, which lost 49.8 percent of all jobs during the time period. According to the Region C Economic Development Region employment forecasts, the number of jobs will grow by 0.98 percent through the year 2016.

Commuting patterns for Cleveland County shows that while overall workers in the County increased from 1990-2000, the total number of workers staying in the County to work dropped by 7.6 percent. Instead, commuters were more likely to travel to jobs in counties to the east of Cleveland County such as Gaston and Mecklenburg County. According to the 2000 Census, over 8,500 workers travel to one of those counties every day, and the number is rising. Commuting to Gaston County increased by 1.8 percent in the 1990's and commuting to Mecklenburg County increased by 3.5 percent during the same period.

Municipal Utilities

Water service is available throughout Cleveland County, including all of the study area. Cleveland County is one of the few counties in the state that has water service available to its entire area. According to Butch Smith with Cleveland County Water, Cleveland County is currently working with the North Carolina Division of Water Quality to increase the water supply, which is currently at approximately 70% of capacity. However, there has not been a date established for the increase. Water and sewer service is available to residents of Shelby through the City, and Shelby also provides sewer service to Kingstown via a sewer line that runs along NC 226/Polksville Road. Access to this sewer pipe is not available to County residents. Instead, residents outside of the City of Shelby, including its ETJ, County residents and residents of the Towns of Lattimore and Mooresboro, must use septic systems. Since Shelby is one the few providers of a sewer system, it is one of the tools used to direct growth, particularly for large-scale developments. The City requires that any development that wants to use its sewer system be annexed in to the city as a condition of use. Currently, the City is operating at approximately 35% of its total water capacity, and the City of Shelby is not a NPDES Phase II municipality.

Notable Features

The notable features discussed in this section, both human and environmental, are displayed in Figure 2. Data for notable features was obtained from NCDOT, the North Carolina Center for Geographic Information and Analysis, and the Final Environmental Impact Statement.

Human Environment

Cleveland County's mountainous countryside, view sheds and rural heritage are attractive features for many residents. Many of the county's residents work in Charlotte, but prefer to make their homes in Cleveland County. The agricultural heritage of Cleveland County is also a feature that helps retain existing residents and attract newcomers. A drive through the county reveals many fields and pastures associated with the County's large, yet declining, farming base.

Evidence of community cohesion was observed at the intersection of Post Road and Cherryville Road (NC 150) near where the future Cherryville Road Interchange will be constructed. There is a variety of land uses in the area, including retail, commercial, industrial and residential uses. During the site visit, development activity seemed to be concentrated around a retail building that housed a gas station/convenience store, and a tanning salon, with a produce stand immediately adjacent to the building. Portions of this area are within the City of Shelby limits, but sewer service is unavailable in many locations.

One of the County's major employers, the Wal-Mart Distribution Center, is located within the FLUSA. The City of Shelby estimates that between 500-600 truck trips are generated each day, most of which use Polkville Road to access existing US 74.

Convenience store at the corner of Post Road and Cherryville Road

Cleveland County is home to 23 historic properties, many of which are clustered around historic downtown Shelby. The US 74 Shelby Bypass EIS identified an additional 5 properties that were deemed eligible for inclusion on the National Register for Historic Properties. Of the 28 properties identified, three are found within the FLUSA: the George Sperling House and Outbuildings, located at 1219 Fallston Road in Shelby; the Burwell Blanton House on US 74 near Washburn Switch Road; and the Hamilton-McBrayer Farm near Mooresboro. While the properties are within the FLUSA, the construction of US 74 Shelby Bypass will not impact any of the properties.

Comprehensive information on archaeological resources is not available for the entire study area. However, an intensive archaeological investigation was performed for the Preferred Alternative corridor as part of the EIS. Seventeen archaeological sites were identified, but none were considered eligible for inclusion in the National Register of Historic Places. Additionally, there are no existing archaeological sites listed in the National Register of Historic Places.

There are no parks or major recreation areas within the FLUSA, however construction of US 74 Shelby Bypass would lead to increased access to South Mountain State Park, located approximately 20 miles north of Shelby. Construction would also facilitate access to the North Carolina Mountains, especially from Charlotte.

Natural Environment

The North Carolina Natural Heritage Program (NHP) lists rare plants and animals, exemplary examples of natural communities, and special animal habitats found in the state. Within the FLUSA, there have been several occurrences of important natural important plants, animals and natural communities. Dwarf Flowered Heartleaf (*Hexastylis Naniflora*), a plant species classified as "Threatened" both at the state and federal level, is found throughout the study area. A portion of the study area also encroaches in the territory of the Dwarf Chinquapin Oak (*Quercus Prinoides*), a plant species that is proposed for state protection. The study area also contains some of the

identified habitat of the Loggerhead Shrike (*Lanius Ludovicianus*), an endangered bird with special concern status.

According to the US Fish and Wildlife Service, there are no endangered plant species, and no animals listed as either endangered or threatened in Cleveland County. The U.S. Fish & Wildlife Service has listed three plants that are classified as either Threatened or as a Federal Species of Concern (FSC) in Cleveland County as of January 31, 2008. The three plant species are listed below:

- Dwarf-flowered heartleaf – Threatened
- Carolina saxifrage – FSC
- Sweet pinesap – FSC

Of the three plant species, only the dwarf-flowered heartleaf is found within the study area. At some locations, construction of the project will impact the dwarf-flowered heartleaf. Any of the plants that are encountered during construction will be transplanted by a qualified botanist to a different area of protection. The dwarf-flowered heartleaf sites within the right-of-way will be monitored for five years. One of the project commitments made by NCDOT is that during project right-of-way acquisition, it will pursue efforts to obtain conservation easements for those dwarf-flowered heartleaf sites outside of the right-of-way.

There are two impaired streams within the FLUSA, both of which are categorized as 303(d) streams by the North Carolina Division of Water Quality. Buffalo Creek traverses the entire study area and has been identified as having a standard water quality violation. First Broad River is impaired from the Shelby downstream raw water intake to the Broad River, and also has a standard water quality violation.

The FLUSA contains portions of three different water supply watersheds. Development restrictions within water supply watersheds are determined based on the classification of the watershed. The closer to the water intake point, the more restrictive the allowable development is. The three water supply watersheds within the FLUSA, along with their classifications and development restrictions, are shown in Table 1.

Table 1: Water Supply Watersheds within the Future Land Use Study Area

			Permitted Development		
Water Shed	**Class**	**Area**	**Low Density**	**High Density**	**10/70 Provision***
Broad River	WSW-IV	Protected	2 du/ac or 24% built upon area	24-70% built upon area	Allowed
First Broad River	WSW-IV	Protected	2 du/ac or 24% built upon area	24-70% built upon area	Allowed
	WSW-IV	Critical	2 du/ac or 24% built upon area	24-50% built upon area	Not Allowed
Buffalo Creek	WSW-III	Balance	2 du/ac or 24% built upon area	24-50% built upon area	Allowed
	WSW-III	Critical	1 du/ac or 12% built upon area	12-30% built upon area	Not Allowed

* - With the 10/70 Provision, a local government can use 10% of the non-critical area of each watershed within its jurisdiction for new development and expansions to existing development up to a 70% built-upon

area limit -- without storm water control -- if using the low-density option throughout the remainder of the watershed.

The City and County are both taking advantage of the 10/70 provision in the First Broad River watershed, and according to planners only about five acres have been developed using the more dense designation. Within all water supply watersheds, the City of Shelby requires that new developments leave a minimum of a 50-foot vegetative buffer around all perennial streams. Cleveland County requires a 30-foot vegetative buffer around all perennial streams.

Growth Management and Local Policies

Cleveland County

Cleveland County uses a *Land Use Plan* adopted in 2005 to guide and manage the growth occurring within the County. To accomplish this, the steering committee identified nine issues of concern based on feedback from public meetings. These issues included: Rural Character; Cities Towns and Villages; Open Space and Greenways; and Transportation Planning. From these issues of concern, a series of goals and strategies were developed regarding future residential, commercial, and industrial development in unincorporated portions of the County. Concerning the proposed US 74 Bypass, the plan specifically mentions that Cleveland County officials should "work closely with officials from Shelby for areas that lie at and near each of the proposed interchanges along the Shelby Bypass" (page 46) using a coordinated planning approach to synchronize plans, policies and regulations. Another goal is to direct growth towards existing cities and towns to maintain the County's rural character. The plan also identifies strategically located land that can be used for future industrial and business park development. Three of these areas are along the proposed US 74 Shelby Bypass in the vicinity of the Peachtree Road interchange, in the area of the Cherryville Road interchange, and in the area of the Washburn Switch Road interchange.

The County also has a zoning ordinance which covers the unincorporated areas of the County, as well as the town of Mooresboro. Cleveland County had designated the majority of the land around the project as Residential and Restricted Residential, along with some areas of Heavy Industrial uses. Restricted Residential and Residential both allow a maximum of two dwelling units per acre, with the Restricted Residential adding the additional limitation of no multi-family housing. The purpose of the Heavy Industrial district is to accommodate a wide range of assembling, fabricating, manufacturing uses, and support retail and service uses.

City of Shelby

The City of Shelby recently updated their *Future Land Use Plan*, although a copy has not yet been made public. The proposed bypass will pass through land designated in the plan as Agricultural and Medium and Low density residential land uses. Additionally the areas around the existing Wal-Mart Distribution Center and the PPG Industries Fiber Glass Plant on Washburn Switch Road are designated as Employment land uses. Agricultural land use is intended for

farming uses and large lot, single family homes. Land use in the low density residential area is intended to be single family homes on large lots while the areas within the medium density residential land use are for single family homes on large to medium sized lots, and for small multifamily residences (i.e. apartments). The plan also identifies the area around the existing US 74 as a Corridor Revitalization area. Shelby is considering an initiative that would increase access on existing US 74 while improving traffic flow.

Shelby has a separate zoning ordinance that includes its ETJ which it uses to enforce the Plan. The low density residential areas are designated as R-20, which allows two single family homes per acre. These areas generally do not have utility services available. The medium density residential areas are designated as R-10, and allow up to four dwelling units per acre, and typically have both water and sewer available. Finally, the area surrounding the interchange at Washburn Switch Road (SR 1313) is zoned LI – Light Industrial, and is intended to accommodate limited manufacturing, warehousing, wholesaling and related commercial and service activities.

Shelby's overall growth plan, called the *Strategic Growth Plan*, is intended to guide city decisions, be a source of information, and reflect the public input from the citizens of the City on a variety of issues. The report is made up of a growth factors analysis which examines a variety of factors influencing growth in the City, such as population trends and employment trends. The plan also includes vision statements and policies to guide the City through 2015. The US 74 Bypass project is mentioned in the vision statement and is encouraged as a way to improve mobility in the City.

Market for Developable Land

Available Land

There are approximately 22,275 acres of land in the Future Land Use Study Area, of which approximately 11,325 acres are currently developed. Around 10,950 acres of land in the Future Land Use Study Area could be classified as "undeveloped". Of the 10,950 acres, 150 acres fall within the buffer areas within water supply watersheds that Cleveland County and the City of Shelby will not allow development. That leaves 10,800 acres of developable land within the FLUSA. A number of the properties identified as "undeveloped" are currently being farmed or are forested and are used for generating income. Approximately 815 acres of the FLUSA are within the boundaries of a water supply watershed and are therefore under development restrictions outlined earlier.

Development Pressures

Cleveland County

Approximately 14,470 acres of the FLUSA are within Cleveland County, the majority of which can be classified as rural farmland. According to discussions with County planners and verified through a field visit, there are no major

development projects occurring in the Cleveland County portion of the FLUSA. There are also no major residential development projects in the pipeline. The development that is occurring is in the form of low-density single family homes, and is dispersed throughout the study area, but slightly more concentrated to the east of Fallston Road (NC 18). The lack of growth in the County can be attributed to the decreasing employment base, and the lack of intensity can be attributed to the absence of sewer access. Without sewer, new development must rely on septic systems which require larger lot sizes, and less intense development. The County has seen some residential growth in the area between Shelby and Boiling Springs (both of which are serviced by water and sewer), however the growth is occurring outside the study area.

The project is expected to benefit the areas identified in the Cleveland County Land Use Plan as locations for potential industrial and business parks. The area to the north and west of Washburn Switch Road has been identified for light and heavy industrial uses. Increased access to parcels in this area should make it more appealing to companies who want to locate to the area.

Towns of Lattimore and Mooresboro

The small towns of Lattimore and Mooresboro on the western side of the County are rural farming communities whose populations are remaining relatively steady. While access will be improved to these towns, the slow growth rates and the lack of local industry indicate that the project will not bring much new development. Discussions with Cleveland County planners confirmed that there is very little growth occurring in these communities, and construction of US 74 Shelby Bypass is not expected to change that.

City of Shelby

Much of the FLUSA falls within the outskirts of the City of Shelby and its extra territorial jurisdiction. There is very little residential development occurring in the Shelby portion of the study area, and no major development projects are underway. The Land Use Plan attempts to direct growth inward, towards the center of the City. According to discussions with planners from the City, the City has been successful at adhering to the plan, and most of the development that has occurred has occurred within the designated zones. Further, much of the area within the FLUSA does not have sewer service and there are no plans to expand service to these areas.

Another factor influencing development pressures facing Shelby is the low population and employment growth rates. The disappearance of manufacturing jobs in the area has resulted in negative employment growth and slow population growth. And while commuting to jobs in counties to the east of Cleveland has increased, the City of Shelby is likely too far from those counties to see an increase in people relocating to Shelby with the idea of commuting to Charlotte or Gastonia.

In discussing what type of development might occur as a result of the project, both planners from Shelby and the County suggested that highway retail-type development such as gas stations, fast food restaurants and hotels is likely

around the interchanges. The project will also provide additional access to the areas designated by Shelby as employment centers, or light industrial zoning designations. Specifically the light industrial area located near Washburn Switch Road (adjacent to Cleveland County's industrial areas) will have increased access. The increased access could make these areas more appealing to companies looking to locate to Shelby and Cleveland County.

Indirect and Cumulative Effects Screening Matrix

The categories listed on the ICE Screening Matrix (Table 2) have been shown to influence land development decisions in numerous areas statewide and nationally. The measures used to rate the impacts from a high concern for indirect and cumulative effects potential to less concern for indirect and cumulative effects potential are also supported by documentation. Each characteristic is assessed individually and the results of the table are looked at comprehensively to determine the indirect and cumulative effects potential of the proposed project. The scope of the project and change in accessibility categories are given extra-weight to determine if future growth in the area is related to the project modifications. Further examination of potential indirect and cumulative effects will be undertaken on projects that have more categories noted as moderate to high concern.

Table 2

Indirect Land Use Effects Screening Tool - R-2707 - US 74 Shelby Bypass

Rating	Scope of Project	Change in Accessibility	Forecasted Population Growth	Forecasted Employment Growth	Available Land	Water/Sewer Availability	Market for Development	Public Policy	Notable Environmental Features	Result
More Concern	Major New Location	> 10 minutes travel time savings	> 3% annual population growth	Substantial # of New Jobs Expected	5000+ Acres of Land	All services existing / available	Development activity abundant	Less stringent; no growth management	Targeted or Threatened Resource	
⇑	X				X					
↑		X								Likely Indirect Scenario Assessment
⟷						X				
↓			X	X			X	X	X	
⇓										
Less Concern	Very limited Scope	No travel time savings	No population growth or decline	No new Jobs or Job Loses	Limited Land Available	No service available now or in future	Development activity lacking	More stringent; growth management	Features incorporated in local protection	

Screening Tool Results for NC 33

Based on the information gathered, the majority of the categories on the screening tool reflected higher (not high) to moderate concern for indirect and cumulative effects potential. The overall Tool result, the length and scope of the project, and the availability of developable land with sufficient utilities, suggest that further examination is warranted. This tool reflects the potential for indirect and cumulative effects on this project. The examination steps below will

assess whether indirect or cumulative effects are expected, and note where these effects are most probable.

Further Examination

The ICE screening tool noted that land use and development decisions in this area *could* be slightly altered by construction of the project as it is currently proposed. This report will now further examine the probable growth scenarios to determine if impacts to notable features, including waterways, are likely. To properly assess the impacts, the examination will look at the changes that could occur in the area with the proposed project (Build) *and* look at the changes that could occur in the area without (No-Build) the proposed project.

Probable Development Scenarios

To realistically estimate and envision the type of development that could occur in the future land use study area, with and without the project, a number of subareas were examined. Development pressures and regulations, including the proposed future land use, proximity to transportation infrastructure, proximity to water and sewer infrastructure, and proximity to population and economic centers will push different areas along the project to develop in specific ways. The boundaries of subareas in this report, designated as probable development areas or protected areas, were established in an attempt to approximate the geographic boundaries of these different areas. Predictions of the type of development that is likely, with or without the project, were developed for each subarea. The predictions of land use changes in the subareas were the basis for determining whether impacts to notable features, including waterways, are likely in the overall Build and No-Build Scenarios.

Probable Development Areas

Seven areas along the project have been identified as Probable Development Areas (PDA's). These areas are the areas surrounding the four interchanges which would be constructed including the interchanges which will tie the project back into the existing US 74, and the two intersections that would be converted to interchanges. These areas were chosen because the project will have the greatest increase in access to areas surrounding the interchanges. The areas are shown graphically in Figure 3, and the zoning within the PDA's is shown in Figure 4.

1. US 74 and Bethlehem Road (SR 2245)
The subarea surrounding the proposed conversion of the intersection of US 74 and Bethlehem Road to an interchange is comprised of 335 acres on either side of US 74, of which 209 acres are vacant. The current land use in the area is largely farming and some single family homes. R-2707 will include the extension of Bethlehem Road north east to connect with Autumn Woods Drive, and will provide additional access to some properties. The entire subarea falls within Cleveland County's jurisdiction and the land is currently zoned Rural Agriculture, however the majority of the area is identified as Light Industrial in

the updated Land Use Plan. Cleveland County is recommending that before any rezonings are approved in the area, development standards need to be established and put into the Code. In addition to the Light Industrial land use designation, the intersection of US 74 and Bethlehem Road has been identified as a commercial node in the Land Use Plan. Commercial nodes are not specific to properties, but rather serve as planning guide to elected officials as to where commercial development is preferred.

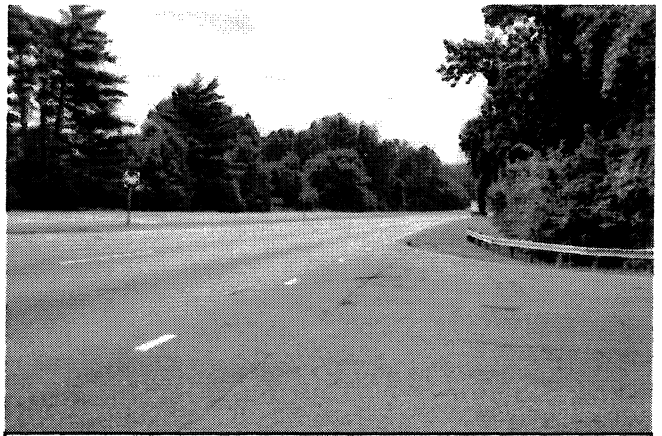
As mentioned, the subarea is entirely within Cleveland County, and therefore is served by water but not sewer. The area is outside of Shelby's ETJ, so it could not be annexed to the City to have sewer service provided.

No Build: This area is likely to remain rural and is not expected to see significant development without construction of the project. The unavailability of sewer service and limited access to the area makes large scale commercial development unlikely. Residential development in the form of single-family homes will likely continue at a slow pace. The No-Build scenario would have minimal ICE impacts.

Build: Construction of the project will increase access to some large parcels that are currently used for farming or are otherwise vacant. Although this land could develop in the form of industrial development without public sewer the size and intensity of the development would likely be much smaller. Residential development may also occur in the area, and if so the demand and market for commercial services will grow. Auto-oriented commercial developments, such as gas stations, fast food restaurants and hotels, are typically located at the confluence of major transportation infrastructure facilities such as the intersections of main roads. This seems to be the most likely type of development to occur in this area, particularly immediately adjacent to the interchange. The construction of the project would have minimal to moderate ICE impacts.

2. US 74 Bypass and Existing US 74

Land use surrounding the proposed interchange that will tie the project back into existing US 74 to the east of Shelby is largely residential with large vacant tracks to the north of the road. With the exception of a small area around existing US 74, the entire PDA is within the jurisdiction of Cleveland County. The City of Shelby has authority over areas immediately surrounding existing US 74 and Hoey Church Road. Cleveland County has classified the areas within its jurisdiction as light industrial (the areas surrounding US 74) and residential (the areas to the north and south of US 74). The area within the jurisdiction of Shelby is classified as



US 74 at Hoey Church Road Intersection looking east, at the area of the proposed Bypass interchange.

low-density residential with some general business allowed along the existing US 74.

Water service is available throughout the PDA. Sewer service is available to Shelby residents within the PDA, but not within its ETJ. In order to access the City's sewer service, any development that would occur in either the ETJ or in the County would have to be annexed into the City. Parcels to the north of existing US 74 are not easily accessible – many only have access through long dirt roads off of local streets. The interchange will not provide any additional access to the area. Construction of the project will result in some limitation of access for businesses and residences on Hoey Church Road. The eastern most end of Hoey Church Road currently ends in an intersection with US 74. This intersection will be eliminated with construction. The project will likely have minimal impacts to land use in this PDA.

No Build: There is little development activity in this area, and the lack of municipal services makes any large scale development unlikely, especially combined with the limited access of the parcels. Dispersed, single-family development will likely continue, as will the occasional development of industrial and business buildings along US 74.

Build: Since the interchange will not provide any additional access to the area, and there are limited municipal services in the area, the likelihood of additional development in the PDA is low. Cutting off access to US 74 for businesses, churches and residences at the eastern end of the project will require some travel pattern adjustments of as much as up to a mile. The construction of the project would have moderate ICE impacts.

3. US 74 Bypass and Cherryville Road (NC-18)
The land use around the proposed interchange connecting Cherryville Road to the proposed bypass is characterized by single family home developments and small businesses, and some industrial uses. It is also on the very edge of Shelby's ETJ, and the subarea is comprised of land in the City of Shelby, its ETJ, and Cleveland County. The area is also served by a CSX rail line which runs from Shelby to Lincoln County. The total area of the PDA is approximately 915 acres, of which 350 acres is classified as vacant.

Cleveland County has designated the area to the north west of the interchange as Light Industrial and Heavy Industrial in their Land Use Plan. The remaining area in Cleveland County is classified as Residential. Shelby has designated the land within their jurisdiction as Agricultural. The zoning in the area matches the land use designations with a combination of low density residential, restricted residential, and heavy industrial zoning designations. Immediately adjacent to the proposed interchange the land has been zoned for General Business by both the County and the City of Shelby. While Shelby's municipal boundary and its ETJ extends all the way to the interchange, the City's water and sewer service is limited only to areas within the city limits. Water service is available throughout the County, but sewer service is not. Most parcels with both sewer and water service are already developed, the exception being a parcel on the corner of Post and Cherryville Road. Although

the area is also served by a rail line which may make industrial development more appealing, the lack of full services will likely mean that any development will have to be less intense.

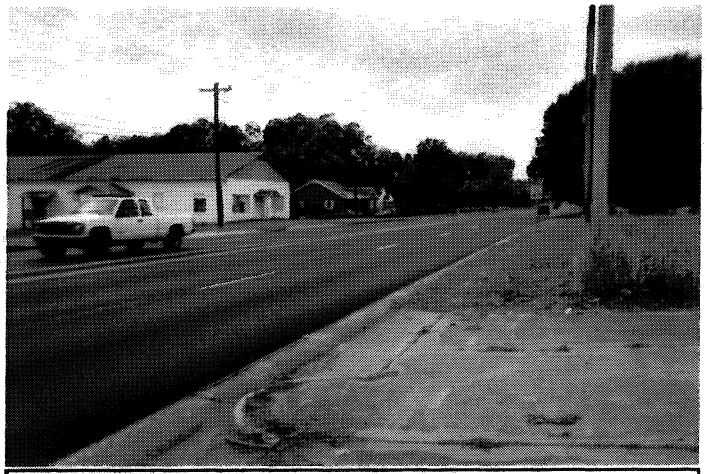
Approximately 290 acres of the PDA is located within the Critical Area of a Class III water supply watershed, and an additional 340 acres is within the Protected Area of the water shed. Development restrictions within these areas were outlined on page 7.

No-Build: This area currently does not have much development occurring, and according to planners there is not much expected to happen in this area. There may be some additional dispersed residential construction, and some industrial development. The area, however, does not have access to a major thoroughfare, and residents must cut through Shelby to access US 74. The No-Build scenario would have minimal ICE impacts.

Build: The increased access to the area may make the industrial areas to the northwest more appealing, particularly with the additional road upgrades on Post Road (which are not part of R-2707). The project will also provide increased access to some large parcels on Cherryville Road which are currently vacant. Since most of the subarea that falls within the City of Shelby has already been developed, any development that would occur would fall outside of municipal sewer service areas. The General Business zoning designation, as well as the tendency for highway retail business to locate near interchanges, likely means that the area immediately adjacent to the interchange would see gas stations and fast food restaurants locate here. The Ordinances for Cleveland County and Shelby do not restrict underground storage tanks within the water supply watershed, so gas station construction is possible in these areas. The construction of the project would have moderate ICE impacts.

4. US 74 Bypass at Fallston Road (NC 150)

Development patterns around the proposed Fallston Road interchange have been mostly dispersed, single family home developments and farms. There are also some commercial uses along Fallston Road to the south of the proposed interchange. The total area of the PDA is approximately 500 acres, of which 200 acres is vacant. Fallston Road runs generally north to south along a ridge line which separates two watersheds, one of which is a water supply watershed (the First Broad River watershed). The lots within the watershed are much larger with more farms.



Fallston Road, looking south at the area of the proposed interchange.

The area is similar to the proposed Cherryville interchange in that a portion of the area falls within Cleveland County's jurisdiction, and

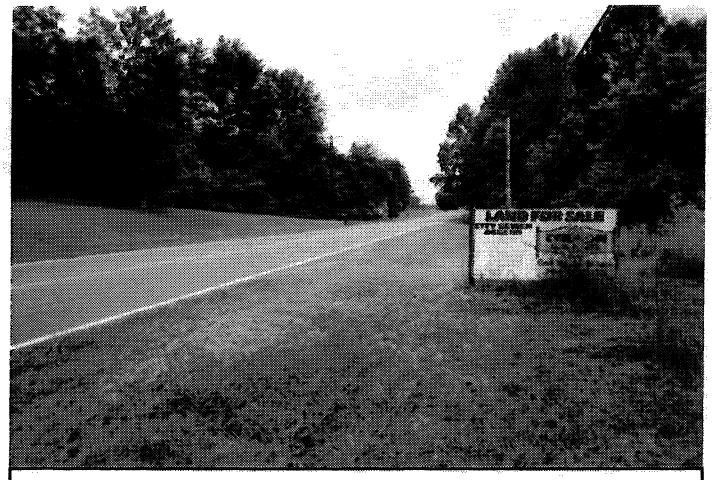
the remainder falls in the City of Shelby and its ETJ. Cleveland County has designated the area for residential uses in its Land Use Plan and zoned it accordingly, as a restricted residential zone. Shelby, which controls the area immediately adjacent to the interchange, has zoned it as a low density residential area (R-20), with commercial and general business uses along the roads. Also, as with the Cherryville interchange, water service is available throughout the area. However, the availability of sewer service is limited, as infrastructure is present only within the municipal limits of Shelby.

No-Build: The area around the proposed interchange is not experiencing any significant development, and instead is characterized by vacant buildings which formerly housed manufacturing-type businesses. While some redevelopment is possible, the declining manufacturing sector is not likely to return. Instead, dispersed single family home construction will likely be the future for the area. The No-Build scenario would have minimal ICE impacts.

Build: The increased access to the area may make residential development more appealing, particularly in some of the vacant land within the City of Shelby's ETJ. The introduction of an interchange to the area may make redevelopment of some of the vacant buildings possible, either in their current form or in the form of highway retail such as gas stations or hotels. Both the City of Shelby and Cleveland County are actively trying to retain the rural feel of the area and have installed land use measures to act as tools to control development. The area has additional restrictions in that there is no sewer service for a large portion of it, and roughly half of it is governed by water supply watershed restrictions. The construction of the project would have moderate ICE impacts.

5. US 74 Bypass at Polkville Road (NC-226)

As the interchanges move west, the landscape becomes increasingly rural. The area around Polkville is characterized by rural homes, farming and vacant/forested land, particularly to the east of the road in the water supply watershed. The area is also home to Wal-Mart's distribution center, a 1-million plus square foot facility that generates tremendous truck traffic which will likely use the interchange. Most of the PDA is within the City of Shelby's ETJ, although the Wal-Mart distribution center and some other areas are within its municipal limits, and some of the area also lies within Cleveland County's jurisdiction. Water is available everywhere, while sewer is only available currently to the distribution facility. The total area of the PDA is 1260 acres, of which 325 acres is vacant.



Property for sale in the vicinity of the Polkville Road interchange.

Cleveland County has identified the

area north of the proposed interchange as a potential commercial node on their land use plan. The node is actually an elongated circle stretching 14,000 feet north and is approximately 2,500 feet wide (the node is shown in Figure 3). Areas outside the node in Cleveland County's jurisdiction are low density residential, and the entire area is zoned as such (restricted residential and rural agricultural). Shelby has zoned the area within its municipal limits as low density residential. The distribution facility is zoned for light industrial, and the entire area west of the road is identified as an employment center in Shelby's Land Use Plan.

Approximately 220 acres of the PDA is located within the Critical Area of a Class IV water supply watershed, and an additional 420 acres is within the Protected Area of the water shed. Development restrictions within these areas were outlined on page 7.

The Charlotte Regional Partnership is actively marketing sites around the interchange. One of the sites is on Randolph Road within the City of Shelby. During field visits, other signs were spotted which advertised parcels for sale with city services to the north of the proposed interchange.

No-Build: The area around the proposed Polkville interchange has seen very little development lately, and little is expected in the near future. There are quite a few industrial sites in the area, however many of them, such as the Doran Mill Company on Polkville Road, are shuttered. The no-build scenario will likely mean that limited development activity will continue. The No-Build scenario would have minimal ICE impacts.

Build: Construction of the Bypass would provide additional access to developable parcels in an area where Shelby wants to locate an employment center and Cleveland County wants to concentrate commercial activity. Increased mobility in the area and the presence of water and sewer would likely make the area an attractive location for development, particularly to the west of Polkville Road. However the slow population and employment growth rates in the County indicate that any development in the PDA will occur over a long term period. Additionally, water supply watershed restrictions on development would limit the intensity of the development. The restrictions would not include prohibiting underground storage tanks, however, since neither Cleveland County nor the City of Shelby restricts them in water supply watersheds. The construction of the project would have moderate ICE impacts.

6. US 74 Bypass and Washburn Switch Road

The area around the proposed Washburn Switch Road interchange is characterized by single family homes on large lots, farms, and light industrial land uses. The area to the south east of the interchange is within the City limits of Shelby, and its ETJ extends to the area immediately surrounding the future interchange. The remainder of the PDA is within Cleveland County's jurisdiction. Shelby has identified this area as an employment center in their land use plan and zoned the area light industrial and low density residential. Cleveland County has also designated a large portion of the PDA as light/heavy

industrial and has zoned the area to accommodate this type of development. The total area for the PDA is 900 acres, of which 550 acres are vacant.

This area has better access than the other PDA's as existing US 74 is less than 1.5 miles down Washburn Switch Road from the proposed interchange. As a result, there have been several industrial companies who have located along the road. The area is also serviced by a spur line belonging to CSX Railroad. The area is also being actively marketed by the Charlotte Regional Partnership, and Cleveland County and the City of Shelby both own properties within the PDA totaling 250 acres.

Industry on Washburn Switch Road, north of the proposed interchange.

No Build: This area will likely continue to attract businesses at a slow place due to access to utilities and its proximity to existing US 74. Some residential growth is also possible, however this portion of the County has traditionally not seen much residential growth, and given the focus on industrial development for the area, that is not expected to change. The No-Build scenario would have minimal ICE impacts.

Build: This area is the most likely to see development as a result of the construction of the Bypass. Additional access to this area will likely increase the attractiveness of the available parcels, and may result in additional industrial development. The availability of large parcels, city services, and shorter travel times to I-85 and Charlotte Douglas International Airport make the area an appealing location for industrial land uses. Some redevelopment may occur as well, particularly at the site on the corner of Randolph Road and Washburn Switch Road, a former industrial facility which has recently closed, and is being actively marketed by the Charlotte Regional Partnership. The construction of the project would have moderate ICE impacts.

7. US 74 Bypass and Existing US 74 and US 74 and Peachtree Road

This PDA contains two interchanges. The first is the interchange to tie the US 74 Bypass back into existing US 74, and the second is the conversion of the intersection of Peachtree Road and US 74 to a freeway style interchange. The interchange tying the project back into the existing roadway will not provide additional access to the area. It will, however result in some local travel pattern changes. Specifically, Westlee Street will be closed off and will not cross the Bypass. In order to get to the other side of the bypass, residents will need to use Kimbrell Road to the east.

The area surrounding the proposed intersections is extremely rural. There are several large-lot single family homes and farms, and a mobile home park. Development activity has been limited and there are no significant development activities planned. The area is entirely within the jurisdiction of Cleveland County, and they have identified the area as light industrial, low density residential, and commercial along existing US 74 in their land use plan. The zoning for the PDA is all low density residential. Additionally, the entire area is within the Broad River water supply watershed, a Class IV water supply watershed. Density restrictions for these watersheds are outlined on page 7. The total area of the PDA is 579 acres, and the total vacant area is 86 acres, however much of the vacant area lies within the future ROW for the project.

No Build: This area will likely remain rural in nature and any development would be in the form of single family homes and some small, light industrial development. The No-Build scenario would have minimal ICE impacts.

Build: Residential development will likely remain in the form of dispersed, single family homes with a low intensity. Although travel times to Gastonia and Charlotte would decrease the most for this area of the project, development momentum is not likely to reach the PDA given the still high travel times associated with commuting to those cities. Some industrial development is possible, however the area does not have sewer service, and therefore would have to rely on septic systems to support development. Areas immediately adjacent to the interchange may see some highway retail development occur, including gas stations (there are no restrictions in Cleveland County for underground storage tanks in water supply watersheds), fast food restaurants, and hotels. For the area around the interchange tying the US 74 Bypass back into existing US 74, no new access will be provided. Some travel patterns will be affected as Westlee Street will be closed. The construction of the project would have minimal to moderate ICE impacts.

Land Use Scenario Assessment Matrix

The categories listed on the Scenario Assessment Matrix (Table 3) have been shown to have a direct relationship to future quality of life and resource impacts. The measures used to rate the impacts from a high concern for quality of life and resource impacts to less concern for quality of life and resource impacts are also supported by documentation and case studies. Each characteristic is assessed individually, for the Build Scenario and the No-Build Scenario, and the results of the table represent a comprehensive determination as to whether greater quality of life or resource impacts are expected to result from the project. In general, the more the Build Scenario and the No-Build Scenario diverge the greater the potential for future quality of life or resource impacts.

Table 3

Indirect Scenario Assessment Matrix - R-2707 - US 74 Shelby Bypass						
Rating	Pressure / Demand for Typically Higher Impact Development	Future Shift of Regional Population Growth to the Growth Area	Pressure for Land Development Outside Regulated Areas	Pressure for Land Development Outside Planned Areas	Development Pattern	Planned / Managed Landuse and Impacts
More Concern	Commercial / Industrial Development with Large Parking Lots Likely	Strong Attraction of Development in this Area	A Large Number of Acres in the Probable Growth Areas are Outside a Regulated Area	A Large Number of Acres in the Probable Growth Areas are Outside a Planned Area	Strip or Sprawling Development Likely	Land Development and Storm Water Management Goals Not Set
⬆						
↑						
↔	Build Scenario	Build Scenario			Build Scenario	Build Scenario No Build Scenario
↓	No-Build Scenario	No-Build Scenario	Build Scenario	Build Scenario No Build Scenario	No-Build Scenario	
⬇			No Build Scenario			
Less Concern	Commercial Development and / or Large Residential Developments Not Likely	No Population Shift Likely	All Probable Growth Areas in a Regulated Area	All Probable Growth Areas in a Regulated Area	Likely to Support and Clustered Development	Growth Areas are Consistent with Land Development and Storm Water Management Goals

Scenario Assessment Conclusions

Based on close examination of the probable development areas, construction of the bypass would only result in more intense or higher impact projects in some areas. Two probable development areas, the (4) US 74 Bypass at Polkville Road and the (5) US 74 Bypass at Washburn Switch Road could see additional development of larger industrial development projects as a result of the project. Two other areas, (2) US 74 Bypass at Cherryville Road and (3) US 74 Bypass at Fallston Road could see some increased residential growth and highway retail growth, but the intensity of the development will be muted by the lack of sewer service in most areas. The remaining two probable development areas, (1) US 74 and Bethlehem Road and (6) US 74 and Peachtree Road are both currently existing intersections and access will not be affected. Project related influence on development in these areas is expected to be minimal.

The project may have a slight influence on regional location decisions. The area north of Shelby will have increased access and may shift some development around the interchanges. However population and employment growth rates in the County and Shelby are low, and land use polices indicate that the intensity of the development would be negated.

All of the land in the study area is regulated by either a municipality or the County. Because of the land use policies in the County and Shelby which require that development within the area of the interchanges remain rural in nature, and because there is limited sewer service available, strip and sprawling style development is not likely. That type of development is more likely to occur nearer to downtown Shelby where it is encouraged.

Widening the roadway is not expected to change the local jurisdiction's ability to implement and meet land development and storm water management goals. The Broad River Basin storm water is regulated by the NC Division of Water

Quality (DWQ) regulations, and controls pollution via a permitting process. Cleveland County and the City of Shelby both have storm water requirements in their development codes which address development that occurs outside of the permitting process.

Cumulative Impacts Summary

Cumulative effects considers past, present, and reasonably foreseeable future actions within the Future Land Use Study Area. Past manmade actions include previous development along the existing sections of US 74 and extensive development of the existing US 74 Bypass. Present actions include the project, and identifying the area around Polkville Road and Washburn Switch Road as future industrial growth areas in local land use plans. Future actions include TIP project U-2221 which proposes to widen NC 180 (Post Road) from NC 226 to NC 150 (Cherryville Road). This project would terminate next to the Cherryville Road interchange, however the project is unfunded.

The project will bypass much of the City of Shelby's commercial activity along existing US 74 Bypass. Many of these businesses rely on the traffic that currently uses US 74 Bypass, but in the future will use the proposed new bypass. The City of Shelby is considering an initiative to increase access to these businesses in an effort to maintain their level of business, however a decision as to how to approach it has not been made.

The proposed project crosses Buffalo Creek which is listed on the 303(d) impaired streams list by NCDENR. Development regulations within the area of the stream include land use plans and zoning documents, both of which encourage rural development on large lots. The project also crosses the First Broad River which becomes impaired further down stream from the project. Indirect effects in the form of increased industrial development are possible at the intersections of Polkville Road and Washburn Switch Road. Although properties in the vicinity of these proposed interchanges do not drain directly to the First Broad River, the streams that they do drain to are tributaries of the First Broad. As with the area around Buffalo Creek, any development both within the County and within Shelby is strictly regulated with sedimentation and erosion control policies.

Impacts to storm water runoff and downstream water quality are not expected from changes in development patterns due to a lack of sewer service throughout a majority of the area, and existing storm water runoff controls. Because no indirect impacts are anticipated, the cumulative effect of this project, when considered in the context of other past, present, and future actions, and the resulting impact to notable human and natural features should be minimal. No cumulative impacts are anticipated to result from this project.

Water Quality Statement

Detailed analysis of the probable development patterns in the area suggest that this project will have little or no effect on future storm water run-off or water quality in this watershed. Regional population and job growth projections suggest that development will occur at a slow to moderate pace, but that land use policies will keep the intensity of any development at a low level. The highest development potential is on the western side of the project at the intersections of Polkville Road and Washburn Switch Road as these areas have both water and sewer service available and have a high degree of travel time savings. Cleveland County, the City of Shelby and NCDWQ have storm water runoff regulations in place to protect stream quality in these areas. Other areas that may develop as a result of the project, such as the areas around the Cherryville Road and Fallston Road interchanges do not have sewer service which will limit development intensity. County, municipal and NCDWQ regulations will address runoff and downstream water quality in these areas as well.

For these reasons, indirect and cumulative effects on the existing resources, including downstream water quality should be minimal. No additional ICE study is recommended.

Direct impacts to natural environmental features and resources are evaluated by NCDOT Natural Environment Unit. Impacts to protected resources will be avoided, minimized, mitigated, or enhanced consistent with NCDOT's programmatic agreements with resource agencies at the time of project permitting.

SOURCES

City of Shelby Strategic Growth Plan, March 3, 2005

City of Shelby Comprehensive Land Use Plan; Future Land Use Map, April 2009

Cleveland County Government website: http://www.clevelandcounty.com

Cleveland County Code of Ordinances

Cleveland County Land Use Plan, April 19, 2005

Cornwell, Brad, City of Shelby Public Utilities Director, Interview 7/22/09

Davis, Butch, Director, Cleveland County Water, Phone Interview, 7/21/09

GIS Data obtained from Cleveland County and City of Shelby, July, 2009

Martin, Chris, Cleveland County Planner, Interview 7/21/09

McCarter, Bill, Cleveland County Planning Director, Phone Interview, 7/31/09

North Carolina Department of Transportation Website, www.ncdot.org

North Carolina State Data Center web page. http://sdc.state.nc.us/

North Carolina Employment Security Commission web page.
http://www.ncesc.com

NC One Map, Data Download Page.
http://www.nconemap.com/GetData/DownloadFTP/tabid/286/Default.aspx

Scharer, Walter, City of Shelby Planning Director, Interview 7/22/09

Shelby, NC, City website: http://www.cityofshelby.com/

US Census Bureau web page. www.census.gov, 1990 and 2000

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY PERDUE
GOVERNOR

GENE CONTI
SECRETARY

June 7, 2011

Memorandum To: Stacy Oberhausen, P.E., Unit Head
Western Region Consultant Engineering Unit

From: Jeff Hemphill, Environmental Specialist
Natural Environment Project Management Unit

Subject: Water resources and protected species review for the preparation of a Federal Highway Administration (FHWA) Right of Way Consultation Addendum for the US 74 Shelby Bypass, from 0.6 mile west of SR 1162 to SR 1001; Cleveland County; TIP No. R-2707(A); State Project No. 8.1801001; F.A. Project No. NHF-74(14).

References: Record of Decision (ROD) approved December 1, 2008
Final Environmental Impact Statement (FEIS) approved January 25, 2008.
A Biological Assessment for Hexastylis naniflora issued January 2004.
A Biological Opinion for Hexastylis naniflora issued May 2004.
Right of Way Consultation submitted February 16, 2010

The following memorandum provides information to assist in the preparation of a FHWA Right of Way Consultation Addendum for R-2707A. It addresses water resources and federally protected species potentially impacted by a service road recently added to the project and serves to update the FEIS and ROD. A service road was added to R-2707A extending west from SR 1162 (Peachtree Road) to accommodate a landowner whose access to his property was limited due to the widening of US 74 Shelby Bypass (Figure 1).

WATER RESOURCES

Water resources crossing the proposed service road are a UT to Sandy Run Creek and UT1 which is an unnamed tributary to the UT to Sandy Run Creek. The UT to Sandy Run Creek flows into a recently manmade pond to the south of the proposed service road then flows west out of the pond to Sandy Run Creek. Sandy Run Creek is classified as WS-IV by NCDWQ. The project is located in the Broad River Basin, Hydrological Cataloguing Unit 03050105. Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project area. No surface waters in the project are designated as a North Carolina Natural or Scenic River, or as a national Wild and Scenic River. No surface

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-715-1500
FAX: 919-715-1501
WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITAL BLVD.
PARKER LINCOLN BUILDING, SUITE 168
RALEIGH NC 27604

waters in the project area are listed on DWQs 303(d) list (2010) of impaired waters in North Carolina nor are any listed within one mile of the project; however, a section of Sandy Run Creek is listed for biological integrity but is located about a mile and a half upstream of the project. There are no wetlands impacted by the proposed service road construction.

PROTECTED SPECIES

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE), Proposed Threatened (PT), are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of September 22, 2010, the United States Fish and Wildlife Service (USFWS) list one federally protected species for Cleveland County (Table 1).

Broadleaf hardwood forests with little underbrush provides good habitat for Dwarf-flowered heartleaf on the eastern half of the proposed service road area; however, a survey on May 26, 2011 performed by NCDOT personnel didn't find any specimens. A revised BA is currently in process for Dwarf-flowered heartleaf found on other areas of the Shelby Bypass project.

Table 1. Federally protected species of Cleveland County.

Scientific Name	Common Name	Status	Habitat	Biological Conclusion
Hexastylis naniflora	Dwarf-flowered heartleaf	T	Yes	Not Likely to Jeopardize the Continued Existence of Hexastylis naniflora.

GREENSHEET COMMITMENTS

No changes have been made to the Greensheet

cc: R-2707A project file, PDEA Branch, NCDOT

STORMWATER MANAGEMENT PLAN

Project: 34497.1.2
TIP No. R-2707A
Cleveland County 06/22/2011

Hydraulics Project Manager: Steve Bondor, P.E. (Greenhorne & O'Mara),
Marshall Clawson, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

The project consists of construction of a new 4 lane divided roadway with shoulder cross section. The total project length of the main line is approximately 3.9 miles with approximately 4 miles of Y lines and interchange ramps. The project includes one box culvert extension and one new bridge stream crossing. The project drainage system consists of grass shoulders, pipe systems with grated inlets in side ditches and median ditches, cross pipe culverts, and various lateral ditches along the fill embankments.

ENVIRONMENTAL DESCRIPTION

The project is located within the Broad River Basin in Cleveland County. The streams are classified as C. Jurisdictional Streams and wetlands are located within the project as follows:

Jurisdictional Streams:
Sta -L- 59+00 UT of Sandy Run Creek
Sta -L- 115+00 UT of Beaverdam Creek
Sta –L- 127+00 UT of Beaverdam Creek
Sta –L- 158+00 Beaverdam Creek
Sta -L- 182+00 UT of Beaverdam Creek
Sta -L- 207+00 UT of Beaverdam Creek
Sta –SR6- 18+50 UT of Sandy Run Creek
Sta –SR6- 29+00 UT of Sandy Run Creek

Jurisdictional Wetlands:
Sta -L- 160+00 LT
Sta -L- 160+00 RT
Sta -L- 207+00

Jurisdictional Surface Water Ponds:
Sta –SR6- 29+00 UT of Sandy Run Creek
Sta –SRV2- 15+80 UT of Beaverdam Creek

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

The primary goal of Best Management Practices (BMPs) is to prevent degradation of the states surface waters by the location, construction and operation of the highway system. The BMPs are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMP measures used on this project to reduce stormwater impacts are:

- Sheet flow on grass shoulders
  Occurs entire project except at shoulder berm gutter and inside interchange loops

- Utilization of roadway side and median ditches as grass swales
  Occurs along entire project median and all roadway side cut ditches

- Rip rap outlet protection at pipe outlet
  Occurs at all pipe outfalls except those with energy dissipaters or preformed scour holes noted below

- Riprap energy dissipaters at pipe outlets
  -L- Sta 29+50 LT
  -RampB- Sta 23+50 LT

- Preformed scour holes at pipe outlets
  Sta -L- 117+50 RT

- Avoid direct discharge of stormwater from bridge to Beaverdam Creek
  Sta –L- 158+00

Major Drainage Structures are located as follows:

Sta -L-59+00	2 - 8' x 8' RCBC
Sta -L-158+00	bridge

STORMWATER MANAGEMENT PLAN

March 11, 2011

Project: 8.1801001
TIP No.: R-2707B
County: Cleveland
Hydraulics Project Manager: Jonathan Scarce, PE (Mulkey Engineers and Consultants)
NCDOT Hydraulics Project Engineer: Marshall W. Clawson, PE (NCDOT Hydraulics Unit)

Project Description:

This project, designated as the "B" section, will be US 74 (Shelby Bypass) from West of Artee Rd. (SR 1314) to West of NC 226. The project is a proposed multilane facility on new location. The overall project is 2.62 miles.

Environmental Description

The project is located in the Broad River Basin, for which no buffer regulations have been implemented. There are two major drainage structures on the project that cross jurisdictional streams. Brushy Creek is listed on the NCDENR classifications list as Class C (Aquatic Life, Secondary Recreation, Fres) waters. Brushy Creek was not listed in the 303(d) list for impaired streams. Unnamed Tributary to Beaverdam Creek is listed on the NCDENR classifications list as Class C (Aquatic Life, Secondary Recreation, Fres) waters. Unnamed Tributary to Beaverdam Creek was not listed in the 303(d) list for impaired streams. Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II) nor Outstanding Resource Waters (ORW) occur within 1.0 miles of the project

Roadway Description:

The proposed roadway cross section is a 4-lane facility, consisting of 12 foot travel lanes, 4 foot full depth paved shoulders toward the grass median, 2 foot grass shoulders toward the median, 10 full depth paved shoulders toward the outside, 2 foot grass shoulders toward the outside and a maximum 46 foot (or minimum 38 foot) grass median. The project drainage system will consist mainly of ditches, cross pipes and storm systems. Storm systems will be used to pick up median drainage along the project and outlet the drainage at the toe of the fill slopes (or into ditches). Storm systems will also be used in order to pick up drainage in the gore areas of the interchange and discharge them into a ditch.

Expressway gutter will be utilized in areas of high fill with guardrail. In these instances, the runoff will be collected in a 2GI and discharged at the toe of fill.

Best Management Practices and Major Structures:

The primary goal of Best Management Practices (BMP's) is to prevent degradation of the states

surface waters by location, construction and operation of the highway system. The BMP's are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMP measures used on this project to reduce stormwater impacts are:

- **Major Structures**

  - A four span bridge will be placed from –L- Station 338+38.00 to –L- Station 342+98.00. The proposed bridge will have spill through abutments. No bents will be placed in the channel. One bent on the east bound bridge will cause a wetland impact of less than 0.01 acres. Deck drains will be placed on the left side of the bridge from Station 341+00 to the end of the bridge. In order to avoid direct discharge into the stream no scuppers will be placed over the actual stream channel.

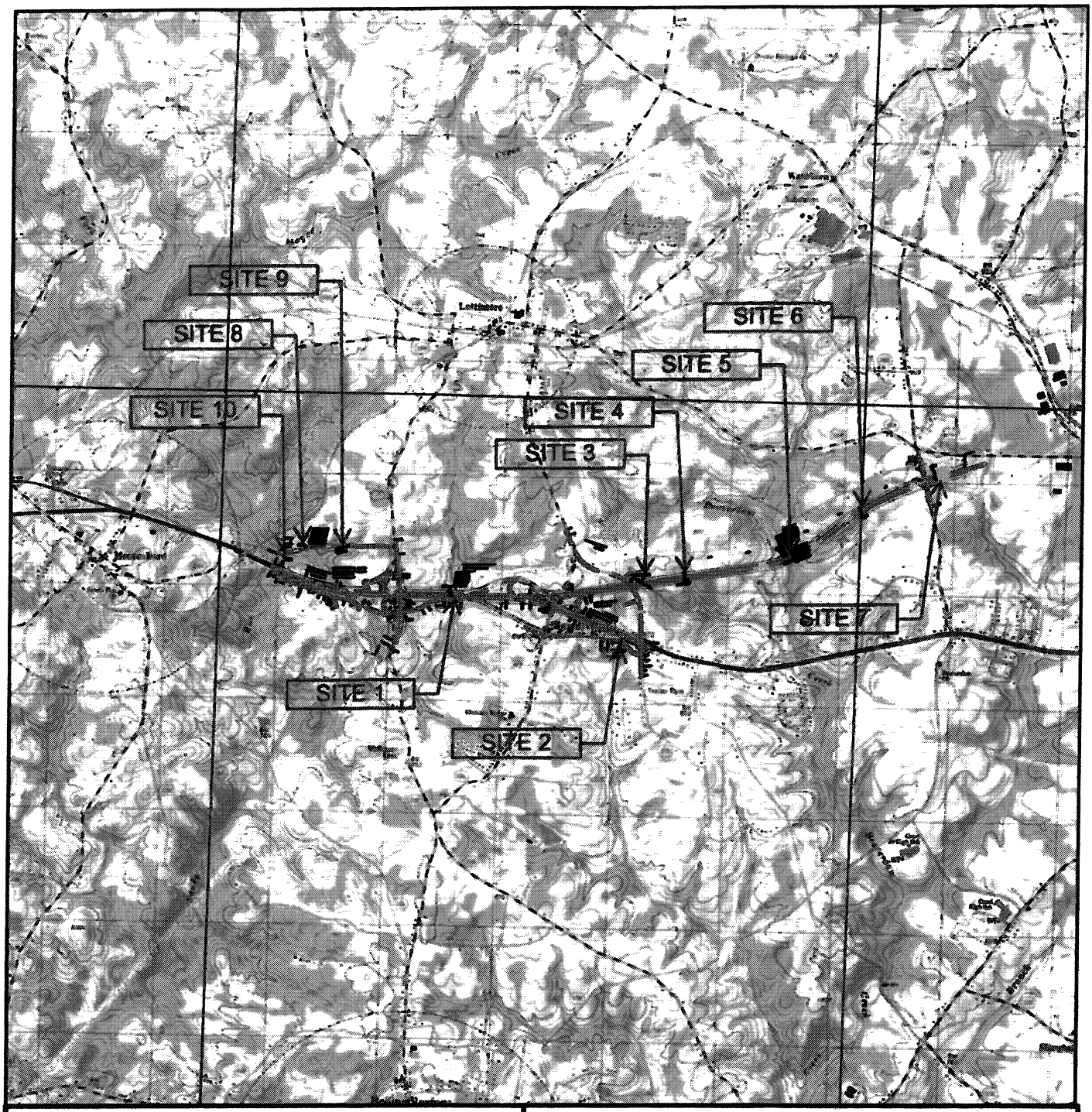
  - A 2@10'x10' RCBC will be placed at –L- Station 222+20.43 on the Unnamed Tributary to Beaverdam Creek. An 8'x13' oval CMP was removed near the inlet of the proposed structure. The existing channel was realigned at the inlet in order to improve streams alignment. The culvert inverts will be buried one foot below the existing stream bed for fish passage. The proposed structure's left culvert barrel will both be benched and have a 2 foot sill at the inlet end which will provide conveyance for overflow. The right culvert barrel will maintain the normal or low flow.

- **Rip Rap Pads**
  Rip Rap pads will be used in order to dissipate energy and reduce velocities at pipe outlets and ditch outlets into the wetlands. These structures are located throughout the project.

- **Preformed Scour Holes at Pipe Outlets**
  Preformed scour holes will be used in order to dissipate energy, reduce velocities and allow sheet flow at pipe outlets where grass lined ditches were not used. These structures are located throughout the project.

- **Grassed Lined and Rip Rap Lined Ditches**
  Grass lined ditches will used in order to filter pollutants from highway runoff and allow diffused flow, as well as non-erosive velocities prior to entering the wetlands. Rip rap will be used in ditches where warranted to prevent erosion. These ditches will end prior to entering the wetlands in most cases. These structures will also be used to carry stormwater to existing channels or streams. The ditch side slopes used on these ditches are 2:1 or flatter. Grass lined and rip rap lined ditches are used throughout the project.

- Storm drainage systems have been designed to avoid direct discharge into streams as much as possible.



TOPO MAP

SCALE 1" = 4000'

NCDOT

DIVSION OF HIGHWAYS
CLEVELAND COUNTY
PROJECT: R-2707A

US 74 - SHELBY BYPASS
FROM WEST OF SR 1162
(PEACHTREE ROAD)
TO WEST OF SR 1313
(WASHBURN SWITCH ROAD)

SHEET **OF** **04/17/12**

Permit Drawing
Sheet 1 of 35

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	58+07 TO 59+13LT	2 @ 8'X8' RCBC						0.05	<0.01	185	20	
	-L-58+34 LT	BANK STABILIZE								20		
2	-SRV2- 15+78 TO 15+83 RT	48" RCP						0.01	<0.01	57	16	
3	-L- 114+11 LT TO 116+70 RT	36" RCP IV						0.01	<0.01	64	6	
		BANK STABILIZE								12		
4	-L-127+10 LT TO 127+51 RT	36" RCP/36" CSP						0.05	<0.01	290	37	
		BANK STABILIZE								12		
5	-L-159+60LT TO 160+26 RT	ROADWAY FILL	0.28		0.02	0.02						
	-L-157+60LT	BANK STABILIZE								17		
	-L-156+55LT	LATERAL DITCH			0.01	0.01						
6	-L- 182+12 TO 183+34 LT	42" LRFD DESIGN						0.03	<0.01	290	28	
		BANK STABILIZE								12		
7	-L- 207+27LT TO 208+24RT	2 @ 36" RCP	0.07			0.01		0.03	<0.01	318	8	
	-L- 208+18 RT	BANK STABILIZE									12	
8	-SR6 18+36 TO 18+47 LT	30" RCP						<0.01	<0.01	19	19	
9	-SR6- 28+48 RT TO 31+00 LT	36" RCP						0.01		119		
		OPEN CHANNEL						0.02	0.01	147	28	
10	-SR6 11+52 RT	BANK STABILIZE								8		
TOTALS:			0.35	0.00	0.03	0.05	0.00	0.20	0.03	1570	173	0

ATN Revised 3/31/06

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

COUNTY
WBS - 34497.1.2 (R-2707A)

SHEET #########

Permit Drawing
Sheet 2 of 35

PROPERTY OWNERS

PARCEL	OWNER NAME	ADDRESS
28	JAMES STEPHEN CORNWELL	117 WESTLEE LATTIMORE NC 28089-0127
91	CHURCH OF GOD-LOUIS GRADY DAVIS-TRUSTEE	PO BOX 1986 SHELBY NC 28151-1986
34	HAMRICK BROTHERS INC.	PO BOX 802 BOILING SPRINGS NC 28017-0802
37	MARY JONES PARNELL	1038 RACE PATH CHURCH ROAD ELLENBORO NC 28040
41	JAMES A. BLACK II	2670 TOWERY ROAD SHELBY NC 28150-9157
42	HOWARD VICTOR BOWEN	3760 ROBERT RIDINGS SHELBY NC 28150

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CLEVELAND COUNTY
PROJECT: 34497.1.2 (R-2707A)

US 74 (SHELBY BYPASS) FROM WEST OF SR 1162 (PEACHTREE ROAD) TO WEST OF SR 1313 (WASHBURN SWITCH ROAD)

SHEET 1 OF 2 06/21/11

Permit Drawing
Sheet 3 of 35

PROPERTY OWNERS

PARCEL	OWNER NAME	ADDRESS
44	MARIE ELAINE CULBERSON	131 RODEO DRIVE DALLAS NC 28034
43	ROBERT PERRY MCSWAIN	3641 TOWERY ROAD SHELBY NC 28150
50	LETHA RAY BEAVER	304 PLATO LEE ROAD SHELBY NC 28150
49	JOHN ROBERT MCBRAYER	4 YATES MCBRAYER DRIVE SHELBY NC 28152-1045
48A	ROBERT FRANCIS BODWELL SR.	408 PLATO LEE ROAD SHELBY NC 28150
48	MALCOLM KEITH & MARIE BEAVER	330 PLATO LEE ROAD SHELBY NC 28450-7037
12	JOHN JASON HUNT	138 PEACHTREE ST. LATTIMORE NC 28089-0277

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CLEVELAND COUNTY
PROJECT: 34497.1.2 (R-2707A)

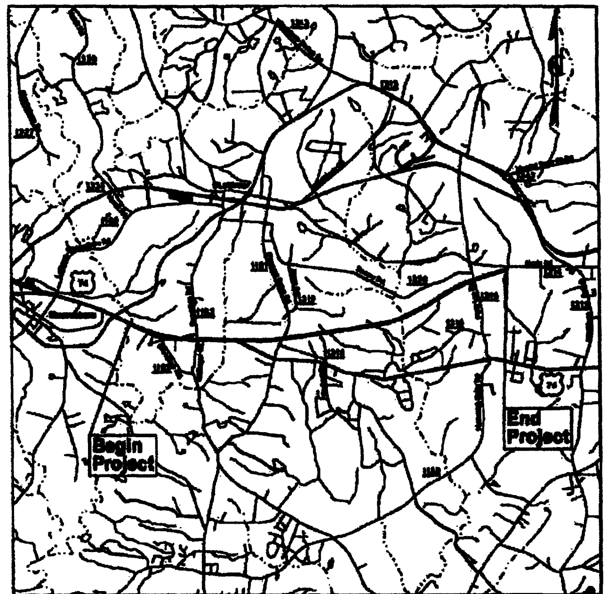
US 74 (SHELBY BYPASS) FROM WEST OF SR 1162 (PEACHTREE ROAD) TO WEST OF SR 1313 (WASHBURN SWITCH ROAD)

SHEET 2 OF 2 06/21/11

Permit Drawing
Sheet 4 of 25

TIP R-2707A

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CLEVELAND COUNTY

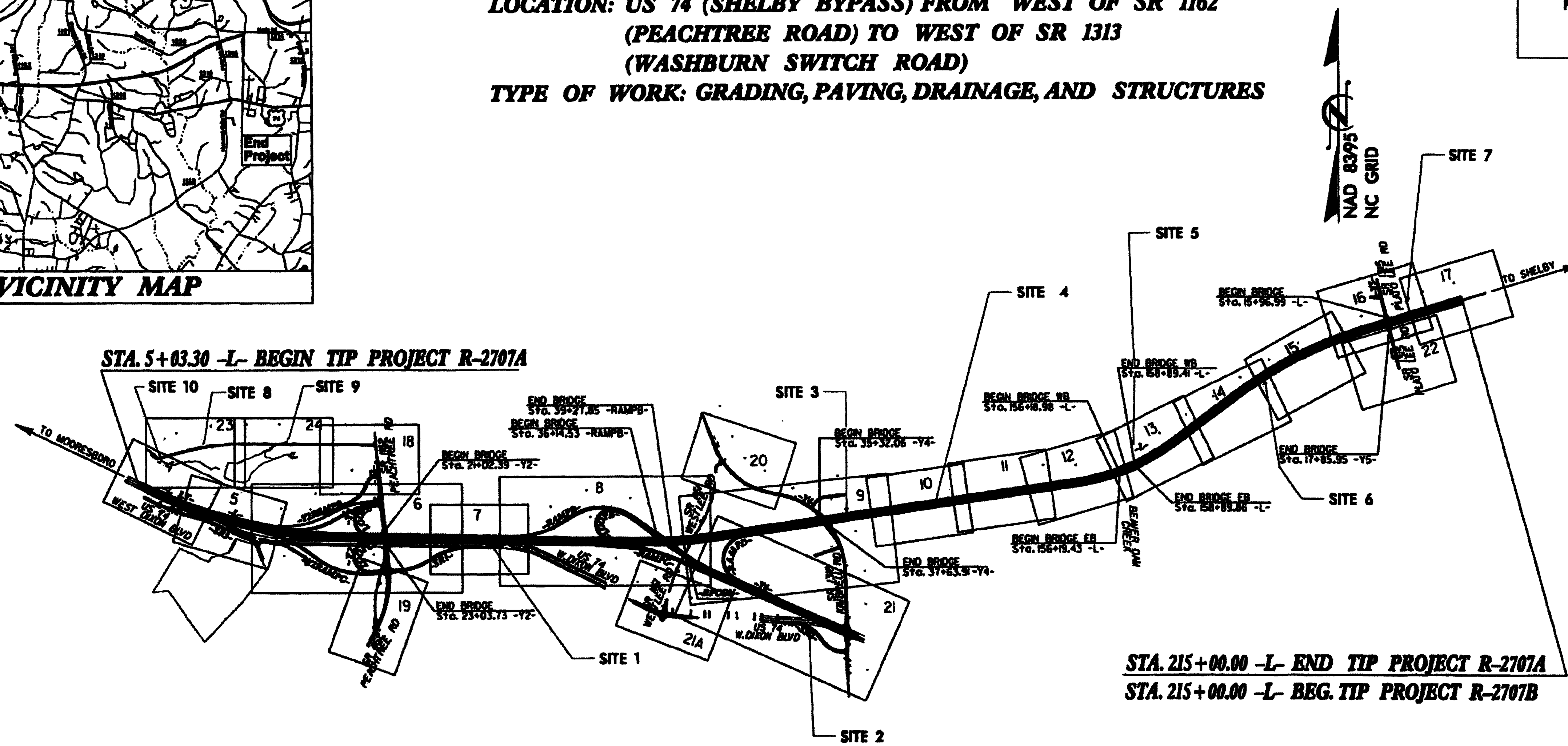
LOCATION: US 74 (SHELBY BYPASS) FROM WEST OF SR 1162 (PEACHTREE ROAD) TO WEST OF SR 1313 (WASHBURN SWITCH ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2707A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34497.1.2	NHF-74(14)	PE

PERMIT DRAWINGS
WETLAND AND
STREAM IMPACTS



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

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

NCDOT CONTACT:
DOUG TAYLOR, P.E.
PROJECT ENGINEER - ROADWAY DESIGN

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100 — PLANS
50 25 0 50 100 — PROFILE (HORIZONTAL)
10 5 0 10 20 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2002 = 24,800
ADT 2025 = 45,400
DHV = 12 %
D = 60 %
T = 14 % *
V = 70 MPH
* TTST 8% DUAL 6%

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-2707A = 3.977 miles
LENGTH OF STRUCTURE TIP PROJECT R-2707A = 0.048 miles
TOTAL LENGTH TIP PROJECT R-2707A = 3.929 miles

Prepared In The Office of:
ARCADIS
for the North Carolina Department of Transportation

2002 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE:
LETTING DATE:

ARCADIS CONTACT
STEVE SMALLWOOD, P.E.
PROJECT ENGINEER
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.
ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE DESIGN ENGINEER P.E.
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

CONTRACT:

REVISIONS
RIGHT OF WAY REVISION: CHANGED STATION TO BE OFF CURVE PT. STA 23+3574 -SR1- 110' RT. 12/ /10 STS
RIGHT OF WAY REVISION: CHANGED 28 TO 17, REMOVED SHARED PROPERTY CONNECTOR, CHANGED PARCEL SOUTH OF -L- FROM 17 TO 28, ADDED 28A.9/ /11 STS

ARCADIS
C & N of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

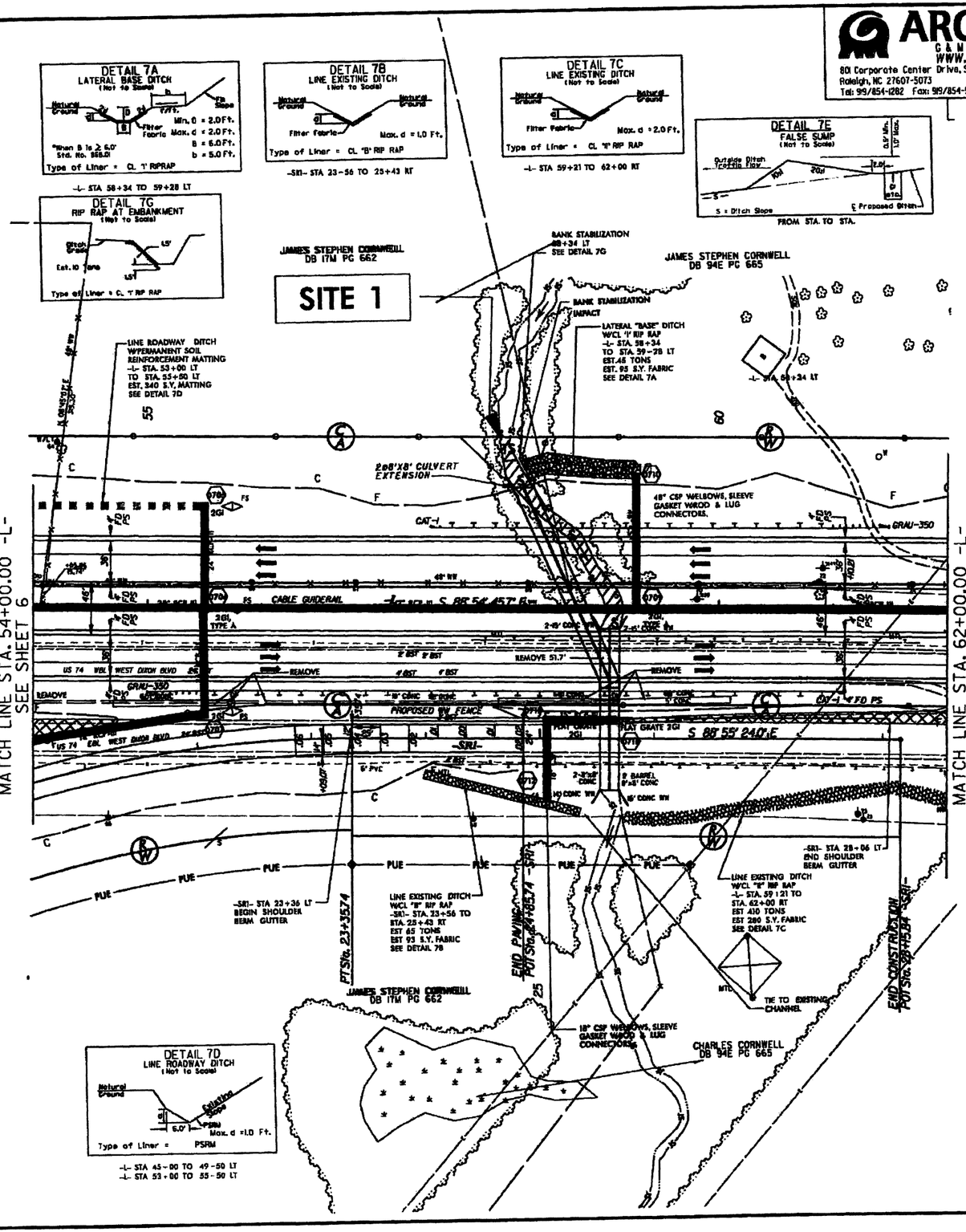
PROJECT REFERENCE NO.	SHEET NO.
R-2707A	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 8395



ARCADIS BIM
Drawn/Created by: Times: #TIME#
File name: #FILE#

Permit Drawing
Sheet 6 of 35

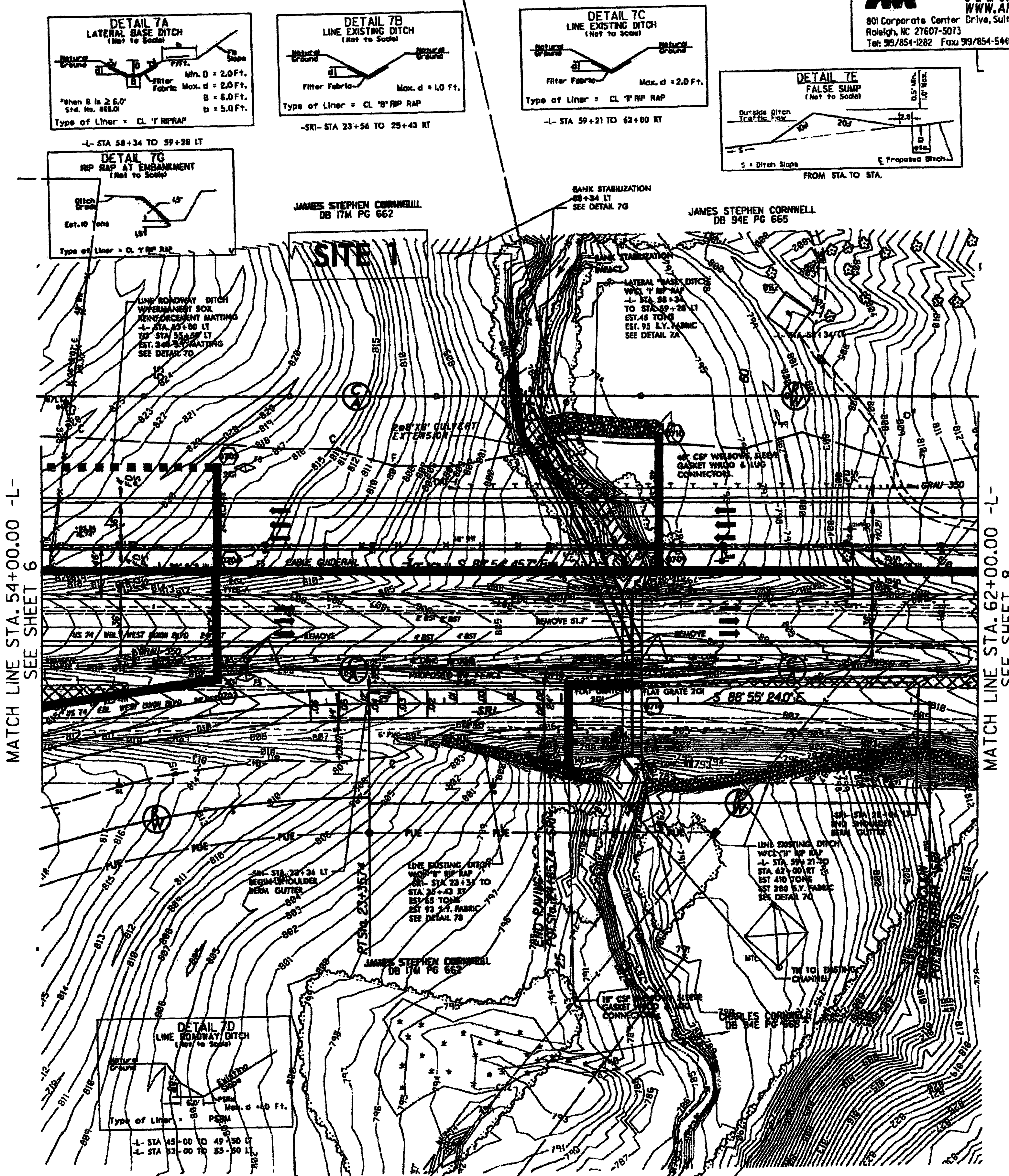
ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS
RIGHT OF WAY REVISION;CHANGED STATION TO BE OFF CURVE PT STA 23+35.74 -SR1- 1/O RT.12/ /10 STS
RIGHT OF WAY REVISION;CHANGED 28 TO 17,REMOVED SHARED PROPERTY CONNECTOR,CHANGED PARCEL SOUTH OF -L- FROM 17 TO 28,ADDED 28A.9/ /11 STS



SEE SHEET 26 FOR -L- PROFILE

MATCH LINE STA. 9+00.00 -L-
SEE SHEET 8

MATCH LINE STA. 27+50.00 -Y4-
SEE SHEET 20

MATCH LINE STA. 47+00.00 -L-
SEE SHEET 10

MATCH LINE STA. 16+00.00 -RAMP0-
SEE SHEET 9

MATCH LINE STA. 47+00.00 -Y4-
SEE SHEET 21

SITE 3

SEE SHEET 9A
FOR ENLARGED PLAN

DENOTES TEMPORARY IMPACTS TO SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

SEE SHEETS 37 AND 38 FOR -L- PROFILE
SEE SHEET 35 FOR -RAMP0- PROFILE
SEE SHEETS 40 AND 41 FOR -Y4- PROFILE

SKETCH SHOWING PROPOSED BRIDGE IN RELATION TO PAVEMENT

ARCADIS
PRELIMINARY PLANS

REVISED
RIGHT OF WAY REVISED/ADDED SERVICE ROAD -LT- OF PARCEL 33 & 34, STA 10+ 00
RIGHT OF WAY REVISED/ADDED SERVICE ROAD -RT- OF PARCEL 33 & 34, STA 10+ 00
RIGHT OF WAY REVISED/ADDED PARCEL 43 STA 0+

Permit Drawing
Sheet 8 of 35

ARCADIS
1600 Perimeter Park Drive, Suite 400
Morrisville, NC 27560-7380
Tel: 919-854-1282 Fax: 919-854-1448
www.arcadis-us.com

R-2247A

PRELIMINARY PLANS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

NAD 83/95

SITE 3

MATCH LINE STA. 9H+00.00 -L-
SEE SHEET 8

MATCH LINE STA. 21+50.00 -Y4-
SEE SHEET 20

MATCH LINE STA. 19+00.00 -L-
SEE SHEET 10

MATCH LINE STA. 16+00.00 -RAMP D-
SEE SHEET 12

MATCH LINE STA. 47+00.00 -Y4-
SEE SHEET 21

SEE SHEET 9A
FOR ENLARGED PLAN

SEE SHEETS 27 AND 28 FOR -L- PROFILE
SEE SHEET 35 FOR -RAMP D- PROFILE
SEE SHEETS 40 AND 41 FOR -Y4- PROFILE

SKETCH SHOWING PROPOSED BRIDGE IN RELATION TO PAVEMENT

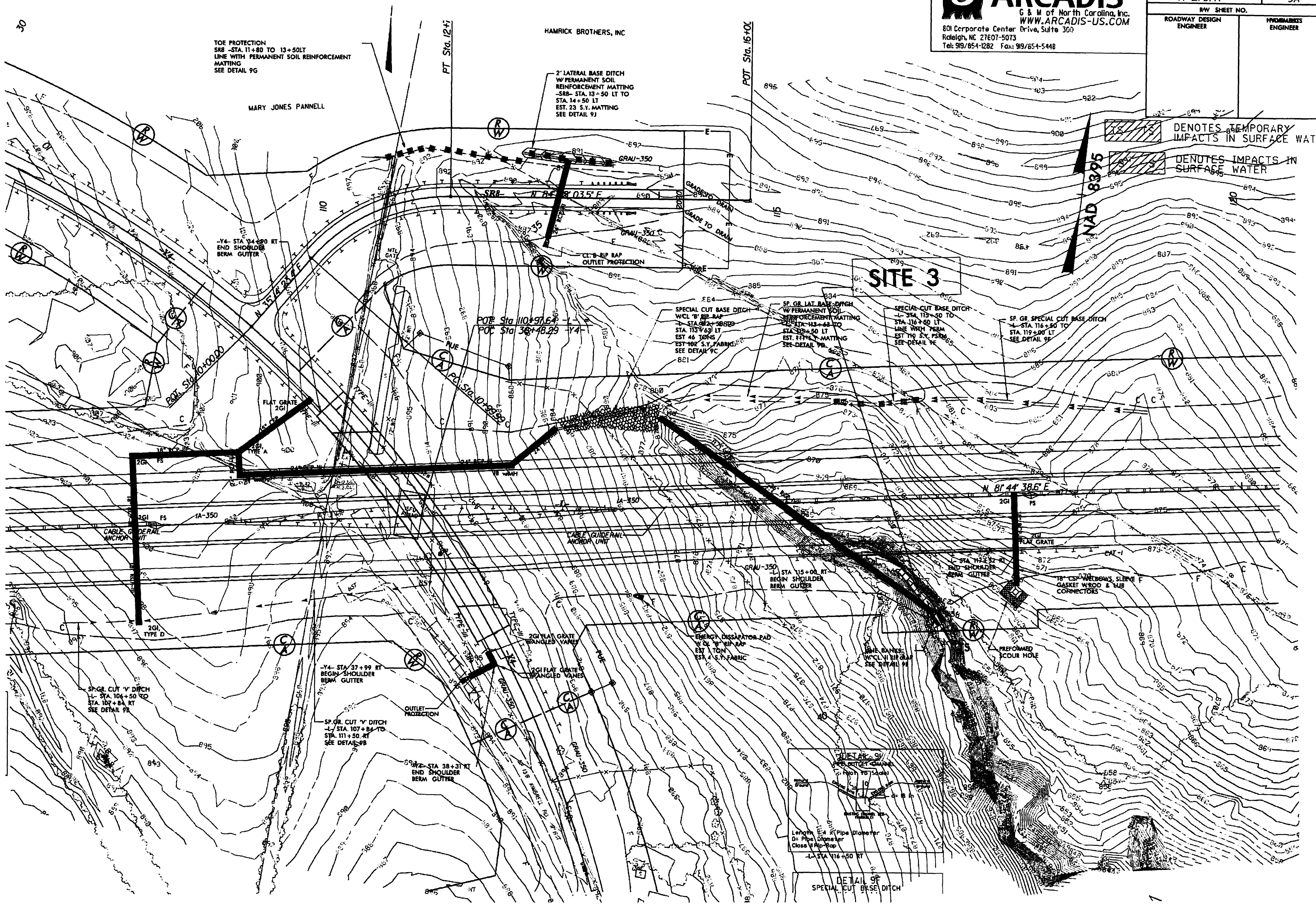
Permit Drawing
Sheet 9 of 35

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	9A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER



Permit Drawing
Sheet 10 of 35

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	9A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

NAD 83/95

SITE 3

TOE PROTECTION
SR8 -STA. 11+80 TO 13+50LT
LINE WITH PERMANENT SOIL REINFORCEMENT MATTING
SEE DETAIL 9G

MARY JONES PANNELL

HAMRICK BROTHERS, INC

PT Sta. 12+; POT Sta. 16+0(

2' LATERAL BASE DITCH
W/PERMANENT SOIL REINFORCEMENT MATTING
-SR8- STA. 13+50 LT TO STA. 14+50 LT
EST. 23 S.Y. MATTING
SEE DETAIL 9J

GRAU-350

-L- SR8 N 84°58'03.5" E

GRADE TO DRAIN

CL. B RIP RAP OUTLET PROTECTION

-Y4- STA 34+90 RT
END SHOULDER BERM GUTTER

N 35°16'21.4" E

POT Sta 10+00.00

POT Sta 110+97.64 -L- =
POC Sta 36+48.29 -Y4-

POC Sta. 10+99.99

PUE

SPECIAL CUT BASE DITCH
W/CL "B" RIP RAP
-L- STA. 112+50 TO STA. 113+63 LT
EST 46 TONS
EST 102 S.Y. FABRIC
SEE DETAIL 9C

SP. GR. LAT. BASE DITCH
W/PERMANENT SOIL REINFORCEMENT MATTING
-L- STA. 113+63 TO STA. 115+50 LT
EST. [illegible] S.Y. MATTING
SEE DETAIL 9D

SPECIAL CUT BASE DITCH
-L- STA. 115+50 TO STA. 116+50 LT
LINE WITH PSRM
EST 110 S.Y. PSRM
SEE DETAIL 9E

SP. GR. SPECIAL CUT BASE DITCH
-L- STA. 116+50 TO STA. 119+00 LT
SEE DETAIL 9F

FLAT GRATE 2GI

18" RCP-III

2GI TYPE A

2GI FS

24" RCP-III

JB wMH

IA-350

CABLE GUIDERAIL ANCHOR UNIT

2GI TYPE D

SP.GR. CUT 'V' DITCH
-L- STA. 106+50 TO STA. 107+84 RT
SEE DETAIL 9B

-Y4- STA 37+99 RT
BEGIN SHOULDER BERM GUTTER

SP.GR. CUT 'V' DITCH
-L- STA. 107+84 TO STA. 111+50 RT
SEE DETAIL 9B

OUTLET PROTECTION

-Y4- STA 38+31 RT
END SHOULDER BERM GUTTER

2GI FLAT GRATE W/ANGLED VANES

SR 1438 FARRELL RD (P 1151)

ENERGY DISSAPATOR PAD
W/CL "B" RIP RAP
EST 1 TON
EST 4 S.Y. FABRIC

N 81°44'38.6" E

-L- STA 115+00 RT
BEGIN SHOULDER BERM GUTTER

-L- STA 117+52 RT
END SHOULDER BERM GUTTER

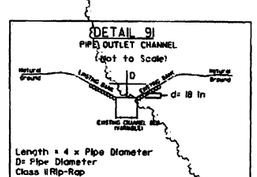
CAT-1

18" CSP W/ELBOWS, SLEEVE GASKET W/ROD & LUB CONNECTORS

LINE BANKS W/CL II RIP RAP
SEE DETAIL 9I

PREFORMED SCOUR HOLE

DETAIL 9I
PIPE OUTLET CHANNEL
(Not to Scale)



-L- STA 116+50 RT

DETAIL 9F
SPECIAL CUT BASE DITCH

REVISIONS

AECADD: C&M
Date: 10-15-99
Filename: 9AE.e

Times & TIMES

ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	10
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

REVISIONS

NAD 8395

MATCH LINE STA. 119+00.00 -L-
SEE SHEET 9

MATCH LINE STA. 132+00.00 -L-
SEE SHEET 11

34
HANNRICK BROTHERS, INC
DB 16-Q PG 798

37
MARY JONES PARNELL
DB 1169 PG 143

SPECIAL CUT BASE DITCH
WCL "B" RIP RAP
-L- STA. 125+50 TO
STA. 127+18 LT
EST 87 TONS
EST 193 S.Y. FABRIC
SEE DETAIL 10A

SPECIAL CUT BASE DITCH
-L- STA. 127+22 TO
STA. 127+75 LT
SEE DETAIL 10B

PROPOSED WW FENCE

N 81°44'38.6" E 201

-L- STA 127+80 RT
BEGIN SHOULDER
BERM GUTTER

-L- STA 129+00 RT
END SHOULDER
BERM GUTTER

FLAT GRATE
2GI

15" CSP ELBOWS, SLEEVE
GASKET WRAP & LUB
CONNECTORS

ENERGY DISSAPATOR PAD
WCL "B" RIP RAP
EST 1 TON
EST 4 S.Y. FABRIC

SITE 4

STREAM BANK STABILIZATION
ABOVE RIPRAP
SEE DETAIL 10E

LINE BANKS WITH
CL. II RIP RAP
SEE DETAIL 10C

DETAIL 10D
PIPE OUTLET CHANNEL
(Not to Scale)

Length = 4 x Pipe Diameter
D= Pipe Diameter
Class II Rip-Rap

-L- STA 127+30 RT

DETAIL 10A
SPECIAL CUT BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 4.0 Ft.
Type of Liner = CL. "B" RIP RAP

-L- STA 125+50 TO 127+18 LT

DETAIL 10B
SPECIAL CUT BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
B = 4.0 Ft.

-L- STA 127+22 TO 129+75 LT

DETAIL 10C
FALSE SUMP
(Not to Scale)

S = Ditch Slope

FROM STA. TO STA.

DETAIL 10E
STREAM BANK STABILIZATION
(Not to Scale)

STA. 127+80 RT

SEE SHEETS 28 AND 29 FOR -L- PROFILE

Permit Drawing
Sheet 12 of 35

ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

MATCH LINE STA. 119+00.00 -L-
SEE SHEET 9

MATCH LINE STA. 132+00.00 -L-
SEE SHEET 11

SITE 4

PROPOSED WW FENCE

HANNOCK BROTHERS, INC
DB 16-0 PG 788

WARREN JONES PARNELL III
DB 1169 PG 143

SPECIAL CUT BASE DITCH
WCL 'B' SIDE SLOPES
-L- STA. 125+18 TO STA. 127+18 LT
EST. 67 TONS
EST. 193 S.Y. FABRIC
SEE DETAIL 10A

SPECIAL CUT BASE DITCH
-L- STA. 127+22 TO STA. 129+75 LT
SEE DETAIL 10B

-L- STA 127+50 RT
RIGHT SHOULDER BERM GUTTER

-L- STA 129+00 RT
END SHOULDER BERM GUTTER

-L- STA 127+50 LT
LEFT SHOULDER BERM GUTTER

ENERGY DISSIPATOR PAD
EST. 1 TONS
EST. 4 S.Y. FABRIC

FLAT GRATE
SEE 840.20

18" CMP Reducing Sleeve (Insert) with a 45° Connection

DETAIL 10D
PERM. ALIGNMENT
(Not to Scale)

STA. 127+50 RT

DETAIL 10C
FALSE SUMP
(Not to Scale)

FROM STA. TO STA.

DETAIL 10A
SPECIAL CUT BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 6.0 Ft.

Type of Liner = CL 'B' RIP RAP

-L- STA 125+50 TO 127+18 LT

DETAIL 10B
SPECIAL CUT BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
B = 6.0 Ft.

-L- STA 127+22 TO 129+75 LT

DETAIL 10C
FALSE SUMP
(Not to Scale)

S = Ditch Slope

DETAIL 10E
PIPE OUTLET CHANNEL
(Not to Scale)

Length = 4 x Pipe Diameter
D= Pipe Diameter
Class II Rip-Rap

-L- STA 127+50 RT

SEE SHEETS 28 AND 29 FOR -L- PROFILE

NAD 83/95

Permit Drawing
Sheet 13 of 35

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

F F DENOTES EXCAVATION IN WETLAND
F F DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING

REVISIONS

RIGHT OF WAY REVISION-NAME CHANGE ON PARCEL 42 & / -11 STS.

SITE 5

NAD 83/95

BEGIN APPROACH EB
Sta 156+03.00 -L-
BEGIN BRIDGE EB
Sta 156+28.00 -L-
END APPROACH EB
Sta 159+08.00 -L-
END BRIDGE EB
Sta 158+83.00 -L-
BEGIN BRIDGE WB
Sta 156+28.00 -L-
BEGIN APPROACH WB
Sta 156+03.00 -L-
END BRIDGE WB
Sta 158+83.00 -L-
END APPROACH WB
Sta 159+08.00 -L-
Sta 157+55.00 -L-
Δ = 88° 22' 38.9"

SKETCH SHOWING PROPOSED BRIDGE IN RELATION TO PAVEMENT

40 MICHAEL J. RIVERA DB 1836 PG 1448
41 JAMES A. BLACK II DB 1230 PG 102
42 HORACE VIRGIL BROWN DB 1507 PG 157

BANK STABILIZATION IMPACT SEE DETAIL 13B
WETLAND IMPACT
NOTE: 6" WEEP DRAINS TO BE LOCATED ON LEFT SIDE EACH BRIDGE AT 12' INTERVALS. DO NOT PLACE OVER CENTER SPAN
6' LATERAL BASE DITCH WCL 'I' RIP RAP -L- STA. 159+04 TO STA. 162+50 LT EST 249 TONS EST 274 S.Y. FABRIC SEE DETAIL 13A
6' BASE DITCH WCL 'I' RIP RAP -L- STA. 157+91 TO STA. 159+04 LT EST 99 TONS EST 89 S.Y. FABRIC SEE DETAIL 13C
-L- STA 161+86 LT END SHOULDER BERM GUTTER
15" CSP WELDED SLEEVE GASKET W/ BOSS & LUG CONNECTORS.
TYPE A
1300 TONS CL. II RIP RAP W/1370 S.Y. FILTER FABRIC
CL II RIP RAP OUTLET PROTECTION
TOTAL TABLE
TOE PROTECTION -L- STA. 159+30 TO 161+55 RT LINE WITH PSRM SEE DETAIL 13E
CHORD
CS Sta. 164+69.59
MATCH LINE STA. 156+00.00 -L- SEE SHEET 12
MATCH LINE STA. 169+50.00 -L- SEE SHEET 14

DETAIL 13D
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S = Ditch Slope
℄ Proposed Ditch
FROM STA. TO STA.

DETAIL 13E
TOE PROTECTION
(Not to Scale)
Type of Liner PSRM
FROM -L- STA. 159+30 TO 161+55 RT

DETAIL 13A
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Fill Slope
Filter Fabric
Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 5.0 Ft.
b = 5.0 Ft.
*When B is ≥ 5.0' Std. No. 868.01
Type of Liner = CL. 'I' RIP. RAP
-L- STA 159+04 TO 162+50 LT

DETAIL 13B
RIP RAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
Est. 10 Tons
Type of Liner = CL. 'I' RIP. RAP
-L- STA. 157+26 LT
-L- STA 157+91 RT

DETAIL 13C
STANDARD BASE DITCH
(Not to Scale)
Natural Ground
Filter Fabric
Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 5.0 Ft.
* When B is < 5.0'
Type of Liner = CL. 'I' RIP. RAP
-L- STA 157+91 TO 159+04 LT

SEE SHEETS 29 AND 30 FOR -L- PROFILE

ARCADIS G&M
Date: 6/DATE/8
File name: 6/FILE/8
Times: 6/TIME/8

Permit Drawing
Sheet 14 of 35

ARCADIS
G & N of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

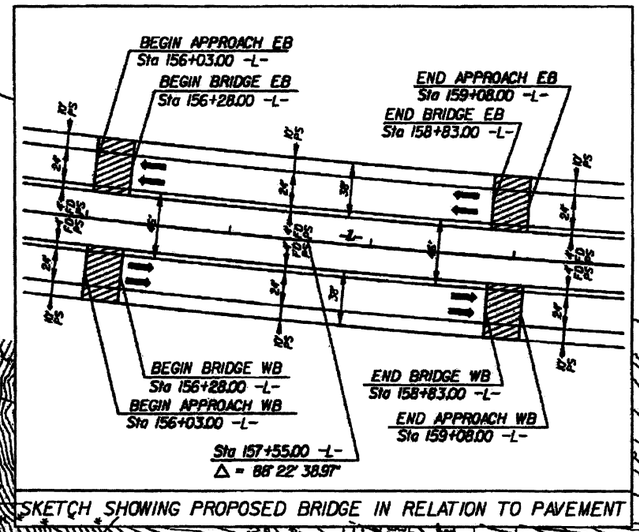
PROJECT REFERENCE NO.	SHEET NO.
R-2707A	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DENOTES EXCAVATION IN WETLAND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING

REVISIONS
RIGHT OF WAY REVISION-NAME CHANGE ON PARCEL 49 R/W ALSTS

SITE 5



SKETCH SHOWING PROPOSED BRIDGE IN RELATION TO PAVEMENT

NAD 83/95

MICHAEL J. RIVERA
DB 1136 PG 1448

BANK STABILIZATION
IMPACT SEE DETAIL 13B

WETLAND IMPACT

NOTE:
6" DECK DRAINS TO BE LOCATED ONE LEFT AND RIGHT EACH BRIDGE AT 12' INTERVALS TYP. NOT PLACE OVER CENTER SPAN

JAMES A. BLACK III
DB 1230 PG 1

4' BASE DITCH
WCL 'I' RIP RAP
-L- STA. 157+91 TO STA. 159+84 LT
EST 191 TONS
EST 191 S.Y. FABRIC
SEE DETAIL 13C

6' LATERAL BASE DITCH
WCL 'I' RIP RAP
-L- STA. 159+84 LT TO STA. 162+50 LT
EST 249 TONS
EST 274 S.Y. FABRIC
SEE DETAIL 13C

SHOULDER BERM GUTTER
-L- STA. 159+84 LT TO STA. 162+50 LT

SHOULDER BERM GUTTER
-L- STA. 141+50 RT TO STA. 143+50 RT

CHORD

MATCH LINE STA. 156+00.00 -L-
SEE SHEET 12

MATCH LINE STA. 169+50.00 -L-
SEE SHEET 14

TOE PROTECTION
-L- STA. 159+39 TO 161+33 RT
LINK WITH RIP-RAP
(SEE DETAIL 13B)

DETAIL 13D
FALSE SUMP
(Not To Scale)

DETAIL 13E
RIP RAP APRON
(Not To Scale)

DETAIL 13B
LATERAL BASE DITCH
(Not To Scale)

DETAIL 13C
STANDARD BASE DITCH
(Not To Scale)

SEE SHEETS 29 AND 30 FOR -L- PROFILE

ARCADIS G&N
Date:
Time: 8:17AM
File:

Permit Drawing
Sheet 16 of 35

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

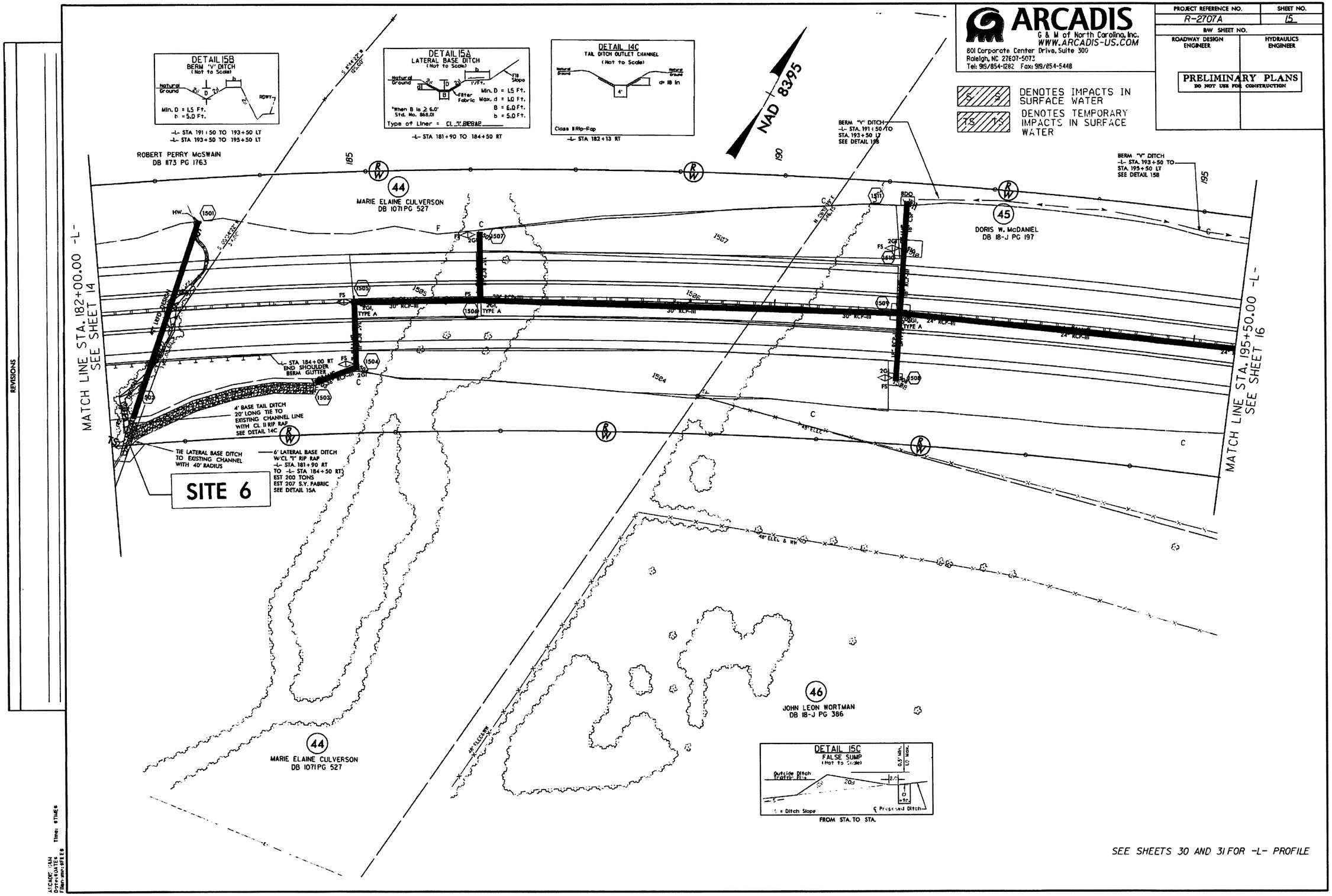
PROJECT REFERENCE NO.	SHEET NO.
R-2707A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS



SEE SHEETS 30 AND 31 FOR -L- PROFILE

ACADPLTSAM
Date:40ATES
File:n:\PROJ\FILES

Time: 8TIMES

Permit Drawing
Sheet 16 of 35

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

DETAIL 15B
BERM "V" DITCH
(Not to Scale)

Min. D = 1.5 Ft.
b = 5.0 Ft.

-L- STA 191+50 TO 193+50 LT
-L- STA 193+50 TO 195+50 LT

ROBERT PERRY McSWAIN
DB 1173 PG 1763

DETAIL 15A
LATERAL BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 6.0 Ft.
b = 5.0 Ft.

*When B is ≥ 6.0'
Std. No. 868.01

Type of Liner = CL. "I" RIPRAP

-L- STA 181+90 TO 184+50 RT

DETAIL 14C
TAIL DITCH OUTLET CHANNEL
(Not to Scale)

Class II Rip-Rap

-L- STA 182+13 RT

NAD 83/95

BERM "V" DITCH
-L- STA 191+50 TO
STA. 193+50 LT
SEE DETAIL 15B

BERM "V" DITCH
-L- STA. 193+50 TO
STA. 195+50 LT
SEE DETAIL 15B

MATCH LINE STA. 182+00.00 -L-
SEE SHEET 14

MATCH LINE STA. 195+50.00 -L-
SEE SHEET 16

44
MARIE ELAINE CULVERSON
DB 1071 PG 527

45
DORIS W. McDANIEL
DB 18-J PG 197

46
JOHN LEON WORTMAN
DB 18-J PG 386

SITE 6

4' BASE TAIL DITCH
28' LONG TIE TO
EXISTING CHANNEL LINE
WITH CL. I RIP RAP
SEE DETAIL 14C

9' LATERAL BASE DITCH
EXISTING CHANNEL
WITH 40' RADIUS

9' LATERAL BASE DITCH
W/CL "I" RIP RAP
-L- STA. 181+90 RT.
TO -L- STA 184+50 RT.
EST 200 TONS
EST 280 S.Y. FABRIC
SEE DETAIL 15A

30" RCP-III
24" RCP-III
24" RCP TYPE A
2GK TYPE A
2GI TYPE A
2GJ TYPE A
2G
F5
C

DETAIL 15C
FALSE SUMP
(Not To Scale)

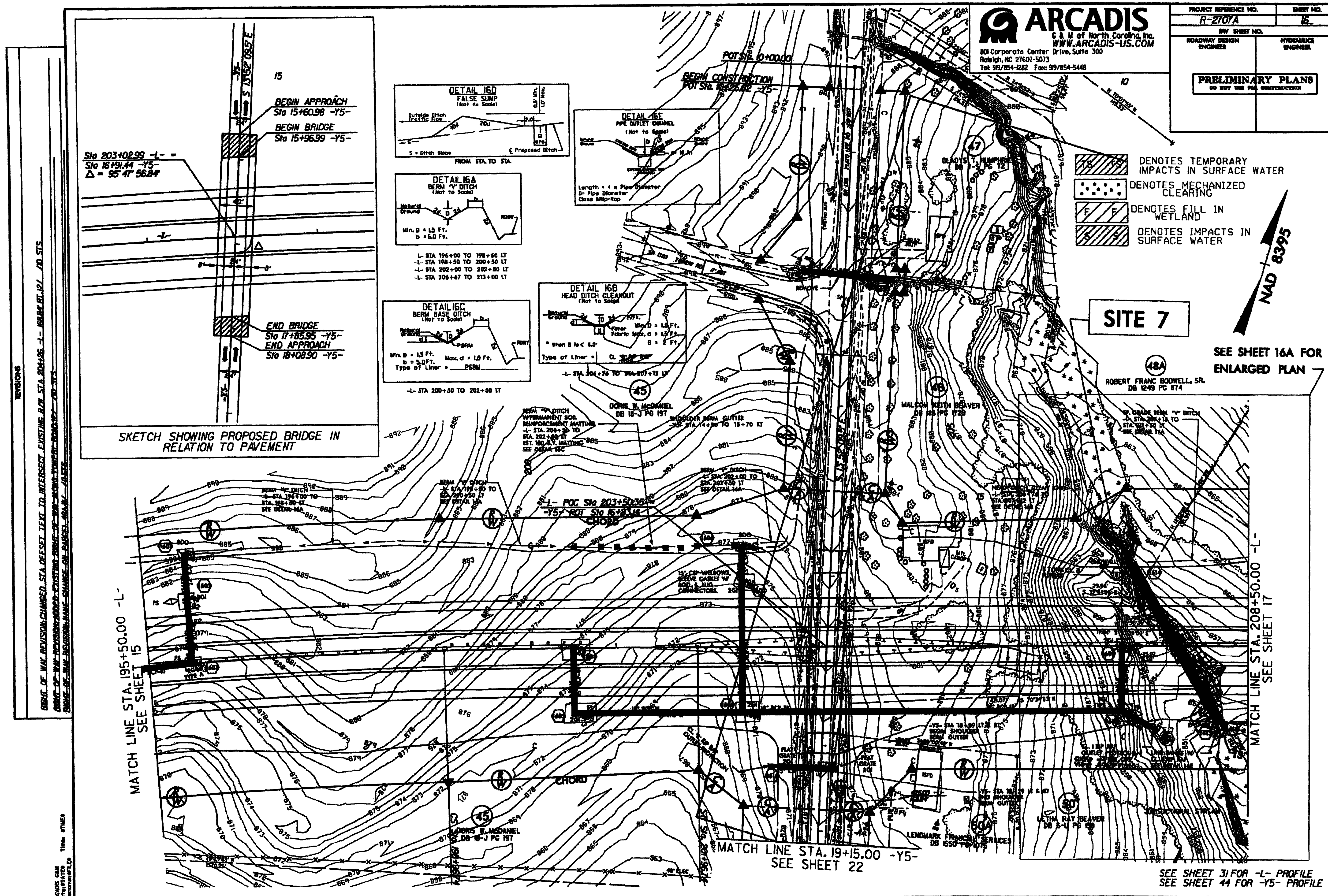
S = Ditch Slope
℄ Proposed Ditch
FROM STA. TO STA.

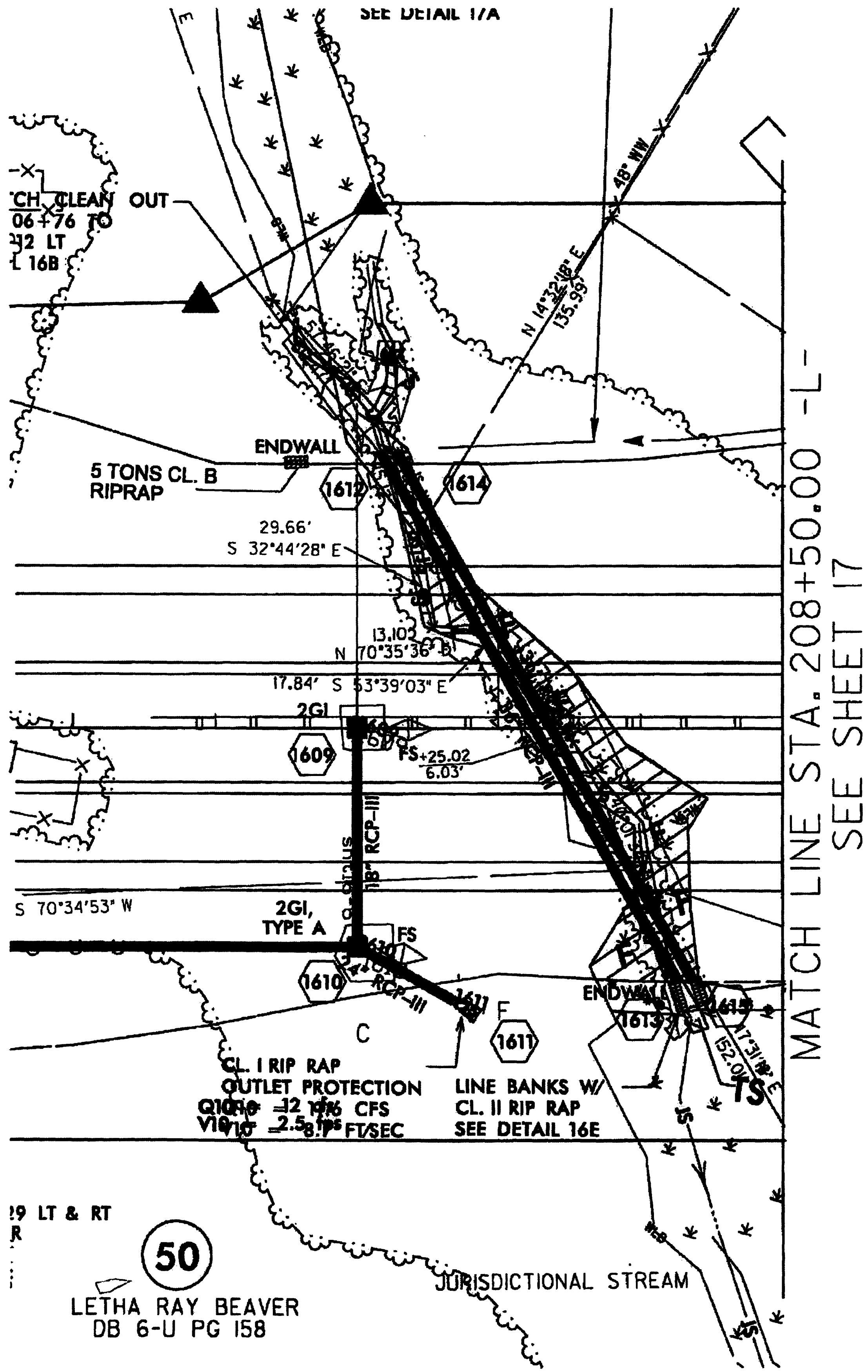
SEE SHEETS 30 AND 31 FOR -L- PROFILE

ARCADIS G&M
File:ROADTER
Filename:SHEET

Time: &TIME$

Permit Drawing
Sheet 12 of 35


ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448
PROJECT REFERENCE NO. R-2707A
SHEET NO. 16
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
NAD 83/95
SITE 7
SEE SHEET 16A FOR ENLARGED PLAN
ROBERT FRANC BODWELL, SR. DB 1249 PG 874
MALCOM KEITH BEAVER
DORIS W. McDANIEL DB 18-J PG 197
LETHA RAY BEAVER
LENDMARK FINANCIAL SERVICES
SKETCH SHOWING PROPOSED BRIDGE IN RELATION TO PAVEMENT
BEGIN APPROACH Sta 15+60.98 -Y5-
BEGIN BRIDGE Sta 15+96.99 -Y5-
END BRIDGE Sta 17+85.95 -Y5-
END APPROACH Sta 18+08.90 -Y5-
Sta 203+02.99 -L- = Sta 16+91.44 -Y5- Δ = 95° 47' 56.84"
DETAIL 16D FALSE SUMP (Not to Scale)
DETAIL 16E PIPE OUTLET CHANNEL (Not to Scale)
DETAIL 16A BERM 'V' DITCH (Not to Scale)
DETAIL 16B HEAD DITCH CLEANOUT (Not to Scale)
DETAIL 16C BERM BASE DITCH (Not to Scale)
-L- POC Sta 203+50.35
-Y5- POT Sta 16+83.14
POT Sta. 10+00.00
BEGIN CONSTRUCTION
MATCH LINE STA. 195+50.00 -L- SEE SHEET 15
MATCH LINE STA. 208+50.00 -L- SEE SHEET 17
MATCH LINE STA. 19+15.00 -Y5- SEE SHEET 22
SEE SHEET 31 FOR -L- PROFILE
SEE SHEET 44 FOR -Y5- PROFILE
REVISIONS



ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	16A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

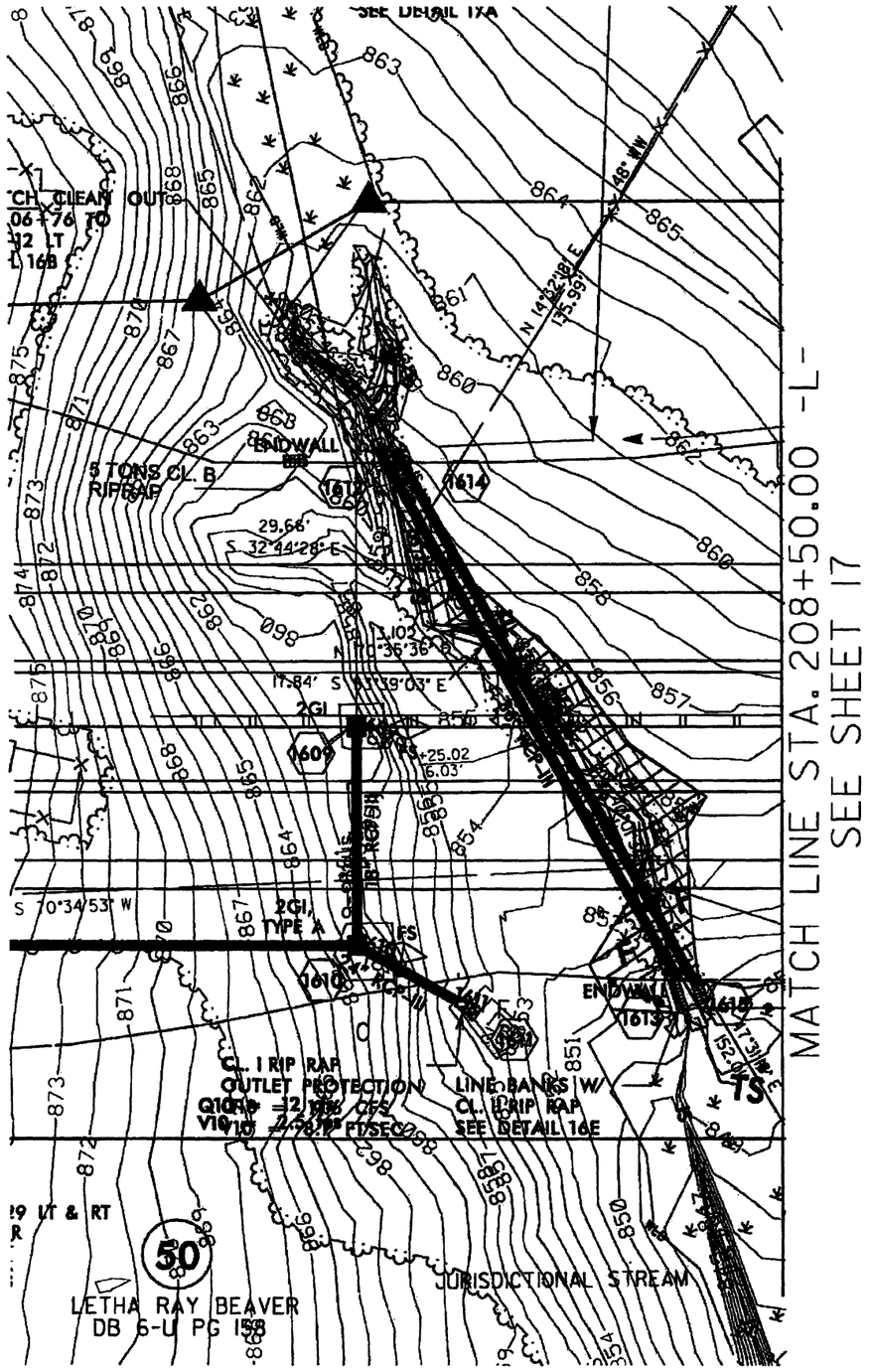
TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
F DENOTES FILL IN WETLAND
S DENOTES IMPACTS IN SURFACE WATER

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	16A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



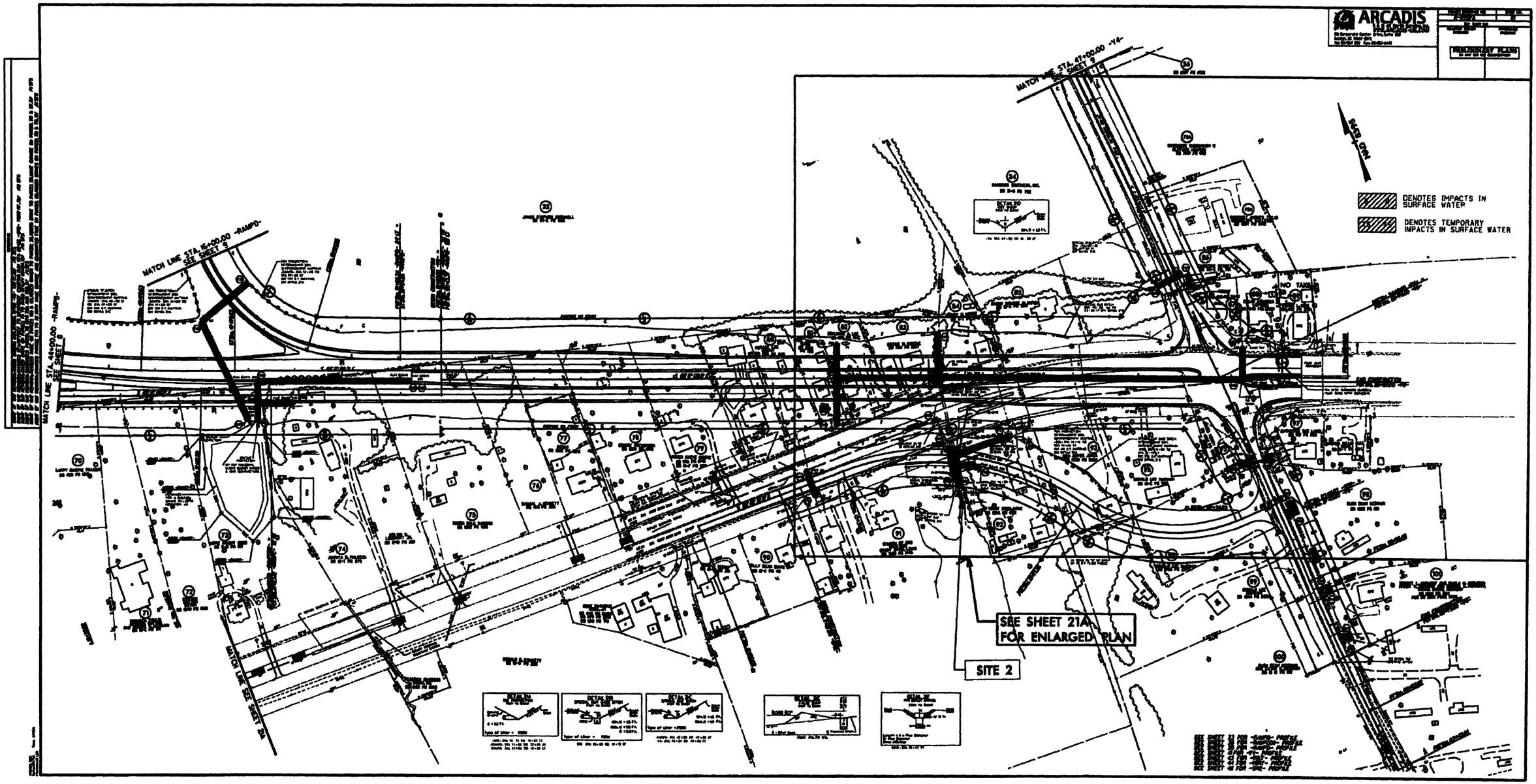
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

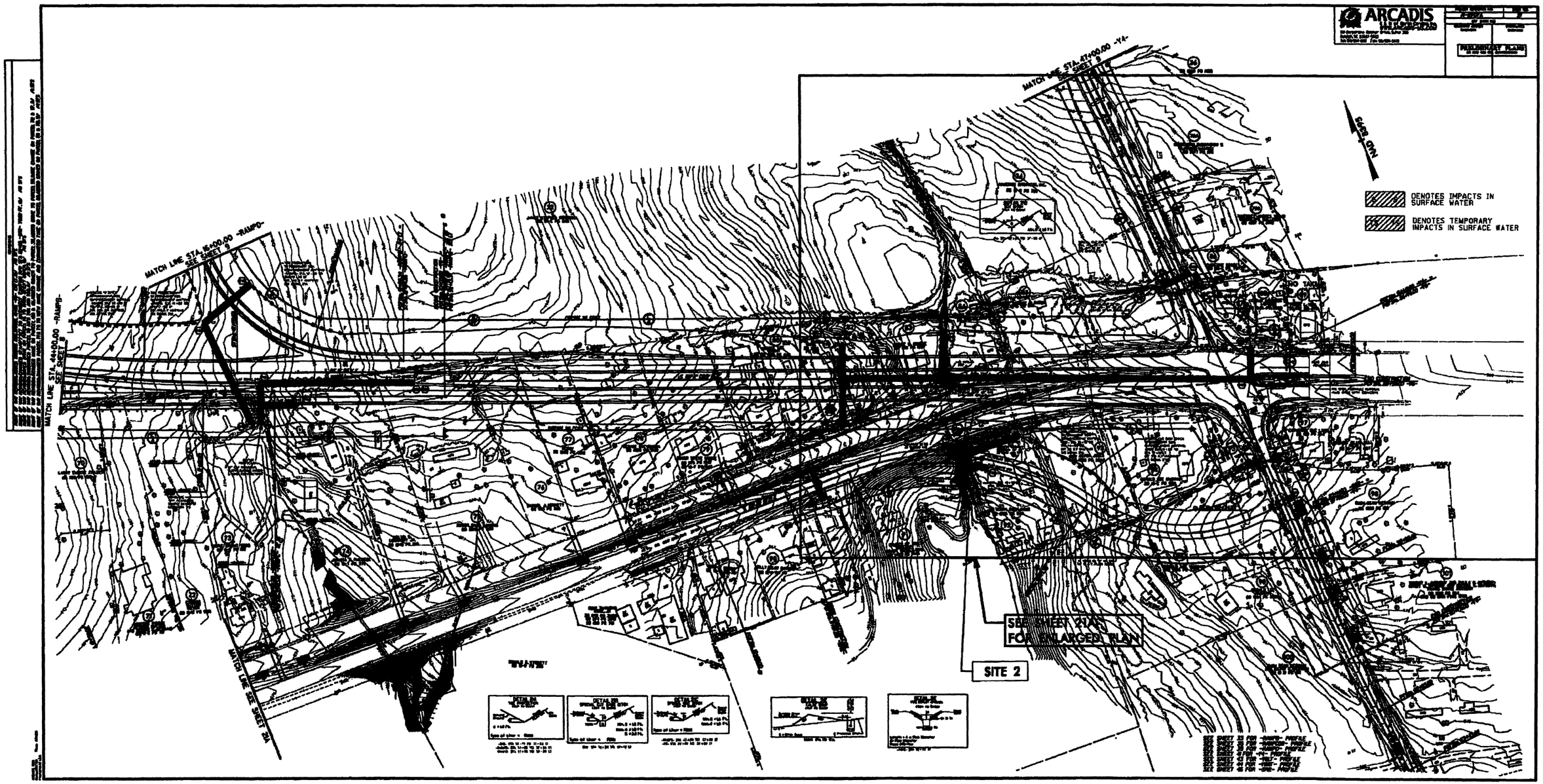
DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

Permit Drawing
Sheet 20 of 35



Permit Drawing
Sheet 21 of 25



Permit Drawing
Sheet 22 of 35

ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	21A
NW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/99

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DETAIL 2-E
PIPE OUTLET C-CHANNEL
(Not to Scale)
Length = 4 x Pipe Diameter
D= Pipe Diameter
Class B Rip-Rap
-RW2- STA 15+77 RT

DETAIL 21D
CUT DITCH
(Not to Scale)
Min. D = 1.5 Ft.
-Y4- STA 47+00 TO 51+50 RT

34 HAMERICK BROTHERS, INC.

78A 78B CLIFFORD HAMRICK

85 DANNY MONROE BLANTON

84 MRUBY H. MOORE

82 BENJAMIN A. LEE

83 OSTINE W. GREENE

86 CHRISTINE STREET

87 CESAR MENDOZA LOPEZ

88

89 NO TAKE

93 DON ASTOR JONES

94 DONALD LEE McSWAIN

95 JAMES HENRY

96 DONALD LEE McSWAIN

97 CATHERINE L. STEIN

98 RUSH DEAN MCSWAIN

91 CHURCH OF GOD TRUSTEES GRADY DAVIS, LOUIS

92 TERRY ROCK-MINE

101

SITE 2

SPECIAL CUT DITCH STA -Y4- 47+10 TO 51+50 RT SEE DETAIL 21D

SPECIAL CUT DITCH STA -Y4- 20+40 TO 23+50 LT SEE DETAIL 21C

CL "B" RIP RAP OUTLET PROTECTION

REMOVE EXIST. HEADWALL EXTEND EXIST. 48" PIPE WITH PIPE COLLAR

CONVERT DI TO JB W/SLAB LID

REMOVE SECTION OF 48" RCP EXTEND 48" PIPE

FLAT GRATE 2GI

TOE PROTECTION W/PERMANENT SOIL REINFORCEMENT MATTING -SB2- STA. 16+15 TO STA. 16+83 LT EST. 48 S.Y. MATTING SEE DETAIL 21A

SPECIAL CUT BASE DITCH W/PERMANENT SOIL REINFORCEMENT MATTING -SB2- STA 16+83 TO STA. 17+13 LT EST. 214 S.Y. MATTING SEE DETAIL 21B

PLUG AND ABANDON

FILL WITH FLOWABLE MATERIAL PLUG ENDS WITH CONCRETE

END CONSTRUCTION POT Sta. 28+50.00 -Y6-

POT Sta. 54+18.60 -Y4-

POT Sta. 26+76.00 -Y6-

POT Sta. 23+14.83 -SB2-

POT Sta. 57+15.00 -Y4-

PC Sta. 13+33.85

PT Sta. 22+34.83

PC Sta. 58+95.46

ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	21A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/95

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

SITE 2

REVISIONS

ARCADIS D&M
DotNet#DATE#
Filename#FILE#
Time: #TIME#

Permit Drawing
Sheet 21A of 25

ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	23
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 8395

-SR6-
PI Sta 11+25.97
Δ = 57° 36' 08.8" (LT)
D = 57° 17' 44.8"
L = 100.53'
T = 54.98'
R = 100.00'
DS = < 20 MPH

-SR6-
PI Sta 20+16.41
Δ = 15° 04' 26.3" (RT)
D = 1° 38' 13.3"
L = 920.82'
T = 463.08'
R = 3,500.00'
DS = 40 MPH
JOHN JACKSON HUNT

DETAIL 23B
LATERAL V-DITCH
(Not to Scale)
Min. D=1.0 Ft.
Min d=1.5 Ft.
Type of Liner= FSBM
-SR6- STA. 11+80 TO 13+00 LT

DETAIL 23A
LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Min. d=1.5 Ft.
B=2.0Ft.
S= 5.0Ft.
*When S is < 6%
Type of Liner= CL. B Rip-Rap
-SR6- STA. 16+00 TO 17+88 RT

DETAIL 23C
STANDARD BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Min. d= 1.5 Ft.
B= 2.0 Ft.
*When S is < 6%
Type of Liner= CL. B Rip-Rap
-SR6- STA. 11+48 TO 11+82 RT

DETAIL 23D
RIP RAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
Est. 10 Tons
LS'
LS'
Type of Liner = CL. B RIP RAP
-SR6- STA. 11+40 RT

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

(12) JOHN JACKSON HUNT
DB 17-E PG 170-172

SITE 8

SITE 10

BEGIN CONSTRUCTION
POT Sta. 10+15.00 -SR6-

POT Sta. 10+00.00

PC Sta. 10+70.99

PT Sta. 11+71.52

JURISDICTION STREAM BEGINS HERE

JURISDICTION STREAM ENDS HERE SUBTERRANEAN

LATERAL V-DITCH
-SR6- STA. 11+80 TO 13+00 LT
LINE WITH PSBM
SEE DETAIL 23B

2' LATERAL BASE DITCH
-SR6- STA. 16+00 TO 17+88 RT
LINE WITH CL B RIP RAP
SEE DETAIL 23A

TAIL DITCH
-SR6- STA. 11+40 TO 11+82
LINE WITH CL B RIP RAP
SEE DETAIL 23C

BANK STABILIZATION
11+40 RT
SEE DETAIL 23D

MATCH LINE STA. 24+00.00 -SR6-
SEE SHEET 24

(1) SWORD OF TRUTH FELLOWSHIP CHURCH
DB 872 PG 2468
72' WOOD

(1A) DALE LEE PARKER
DB 1259 PG 911

(3) BPB REALTY LLC
DB 1496 PG 893

NC GRID
NAD 83

PLANTED PINE SAPLINGS

POND OUTLET STRUCTURE

POND W.S.EL.=780.0'+/-

SEE SHEET 39 FOR -Y2- PROFILE

REVISIONS
ADDED SERVICE ROAD -SR6- ON PARCEL 1A, 12 -STS. 12/ -1200
RIGHT OF WAY REVISION, RELOCATED SERVICE ROAD -SR6- AND REVISED -Y2RAMP8- -STS. 6/ -1200

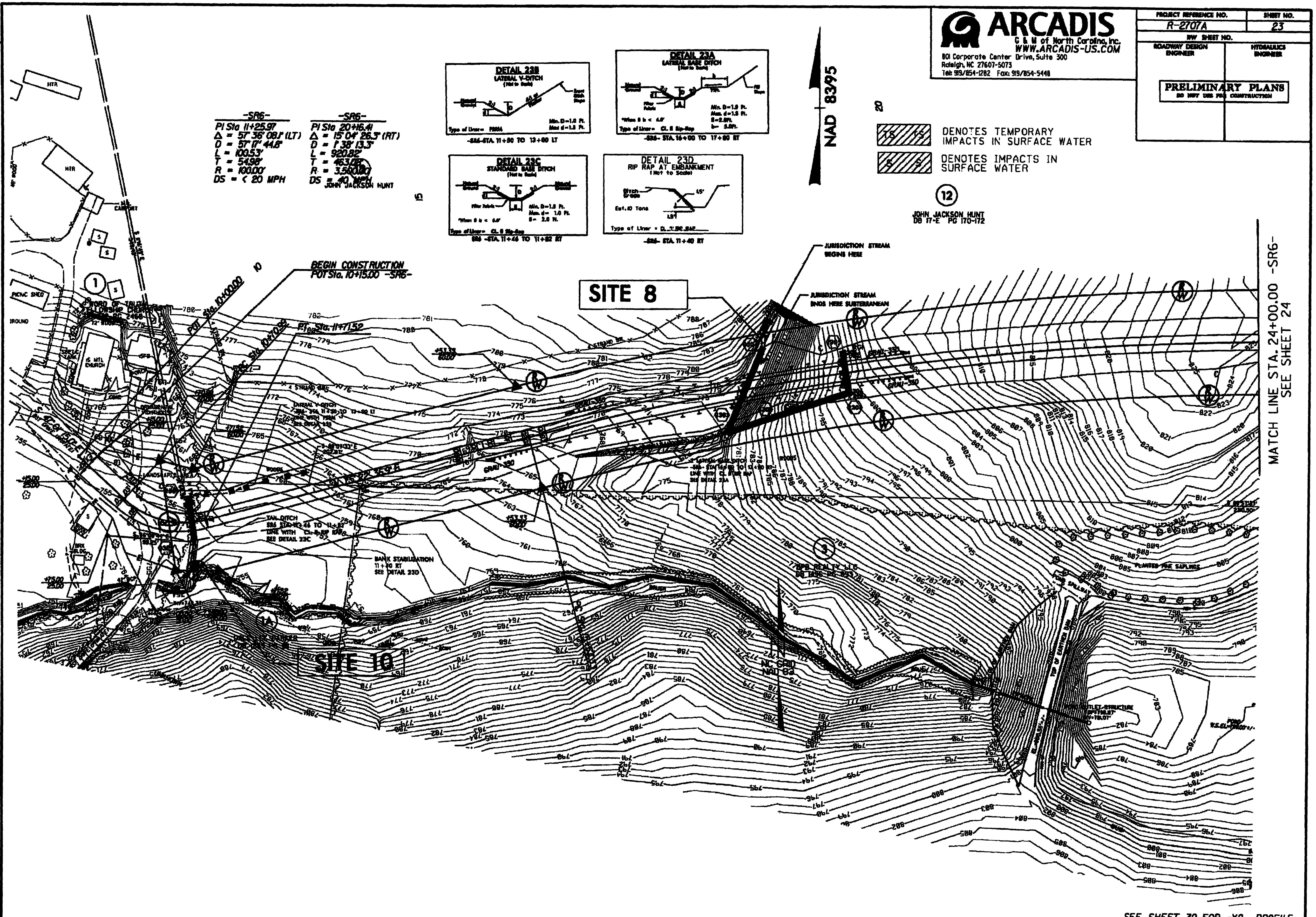
ARCADIS G&M
DotTerm(DATE)
FileName=dgn(FILE)
Time: 9:11AM

Permit Drawing
Sheet 25 of 35

ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	23
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-SR6-
PI Sta 11+25.97
Δ = 57° 36' 08.1" (LT)
D = 57° 17' 44.8"
L = 100.53'
T = 54.98'
R = 100.00'
DS = < 20 MPH
-SR6-
PI Sta 20+16.41
Δ = 15° 04' 26.3" (RT)
D = 1° 38' 13.3"
L = 920.82'
T = 463.08'
R = 3,500.00'
DS = 40 MPH
DETAIL 23B
LATERAL V-DITCH
-SR6- STA. 11+50 TO 13+60 LT
DETAIL 23A
LATERAL BASE DITCH
-SR6- STA. 16+00 TO 17+60 RT
DETAIL 23C
STANDARD BASE DITCH
-SR6- STA. 11+46 TO 11+82 RT
DETAIL 23D
RIP RAP AT EMBANKMENT
(Not to Scale)
Est. 10 Tons
-SR6- STA. 11+40 RT
NAD 83/95
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
JOHN JACKSON HUNT
DB 17-E PG 170-172
JURISDICTION STREAM BEGINS HERE
JURISDICTION STREAM ENDS HERE SUBTERRANEAN
SITE 8
SITE 10
BEGIN CONSTRUCTION
POT Sta. 10+15.00 -SR6-
WORD OF TRUTH FELLOWSHIP CHURCH
BANK STABILIZATION
11+40 RT
SEE DETAIL 23D
TAIL DITCH
SEE DETAIL 23C
NC GRID NAD 83
PLANTED PINE SAPLINGS
MATCH LINE STA. 24+00.00 -SR6-
SEE SHEET 24

SEE SHEET 39 FOR -Y2- PROFILE

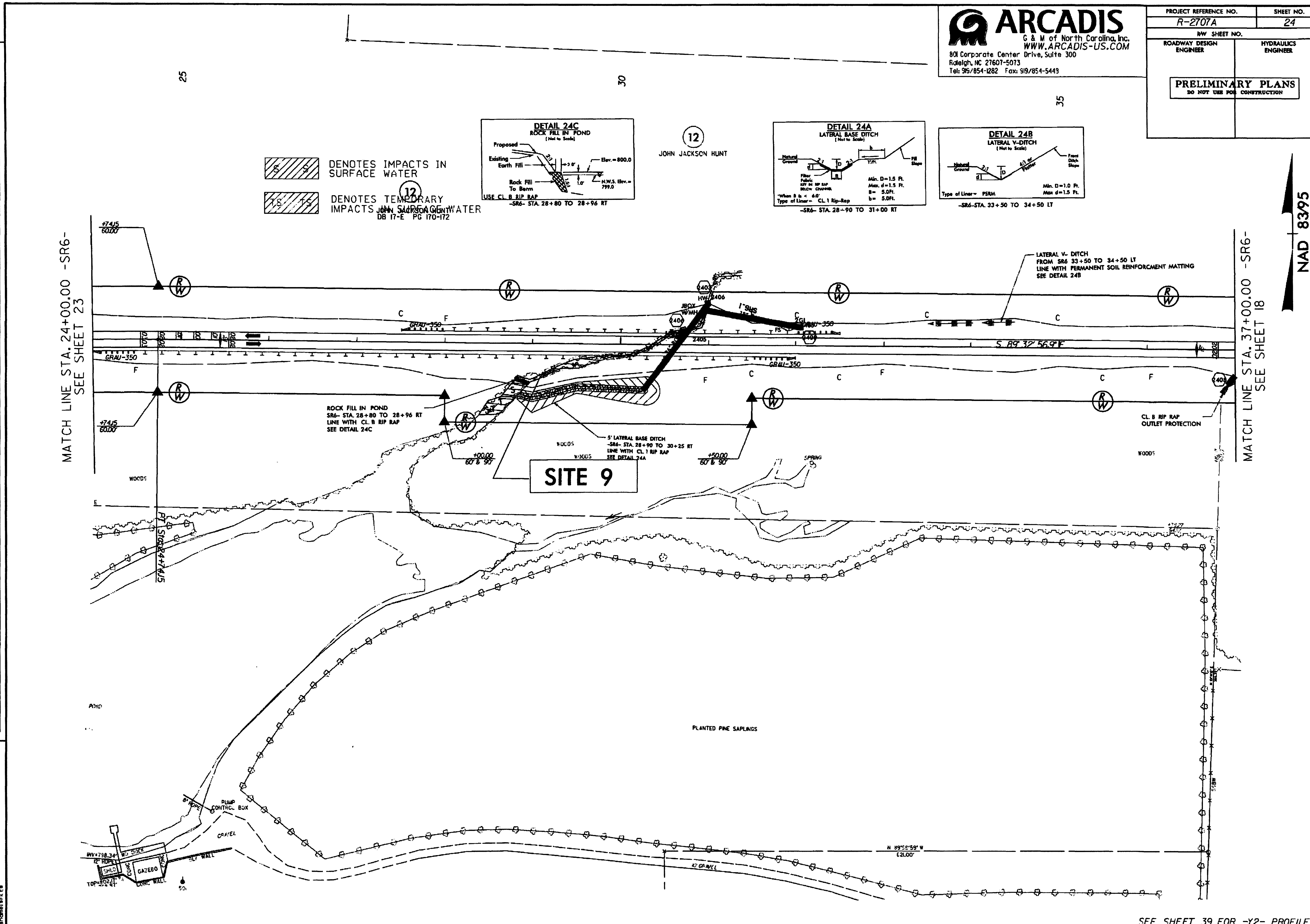
REVISIONS
ADDED SERVICE ROAD -SR6- ON PARCEL 1 & 12 STS 1P/ 1B10
RIGHT OF WAY REVISION, RELOCATED SERVICE ROAD -SR6- AND REVISED -Y2RAMPB- STS 6/ 1201

Permit Drawing
Sheet 26 of 35

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	24
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5443



DETAIL 24C
ROCK FILL IN POND
(Not to Scale)
USE CL. B RIP RAP
-SR6- STA. 28+80 TO 28+96 RT
DETAIL 24A
LATERAL BASE DITCH
(Not to Scale)
-SR6- STA. 28+90 TO 31+00 RT
DETAIL 24B
LATERAL V-DITCH
(Not to Scale)
-SR6-STA. 33+50 TO 34+50 LT
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
JOHN JACKSON HUNT
DB 17-E PG 170-172
MATCH LINE STA. 24+00.00 -SR6- SEE SHEET 23
MATCH LINE STA. 37+00.00 -SR6- SEE SHEET 18
NAD 83/95
LATERAL V- DITCH
FROM SR6 33+50 TO 34+50 LT
LINE WITH PERMANENT SOIL REINFORCMENT MATTING
SEE DETAIL 24B
ROCK FILL IN POND
SR6- STA. 28+80 TO 28+96 RT
LINE WITH CL. B RIP RAP
SEE DETAIL 24C
5' LATERAL BASE DITCH
-SR6- STA. 28+90 TO 30+25 RT
LINE WITH CL 1 RIP RAP
SEE DETAIL 24A
SITE 9
CL. B RIP RAP
OUTLET PROTECTION
S 89° 32' 56.9" E
PLANTED PINE SAPLINGS
PUMP CONTROL BOX
GAZEBO
SEE SHEET 39 FOR -Y2- PROFILE

REVISIONS
ADDED SERVICE ROAD -SR6- & -SR10- ON PARCEL 18 & 12 STS 12/ /10
RIGHT OF WAY REVISION/RELOCATED SERVICE ROAD -SR6- AND REVISED -Y2BMPR- STS 6/ 12/01

Permit Drawing
Sheet 27 of 35

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919.854-1282 Fax: 919.854-6448

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	24
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

ADDED SERVICE ROAD -SR6- & -SR10- ON PARCEL 18, 12 STS 12/
RIGHT-OF-WAY REVISION/RELOCATED SERVICE ROAD -SR6- AND REVISED -12

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

(12) JOHN JACKSON HUNT
DB 17-E PG 170-172

DETAIL 24C
ROCK FILL IN POND
(Not to Scale)

DETAIL 24A
LATERAL BASE DITCH
(Not to Scale)

DETAIL 24B
LATERAL V-DITCH
(Not to Scale)

NAD 83/95

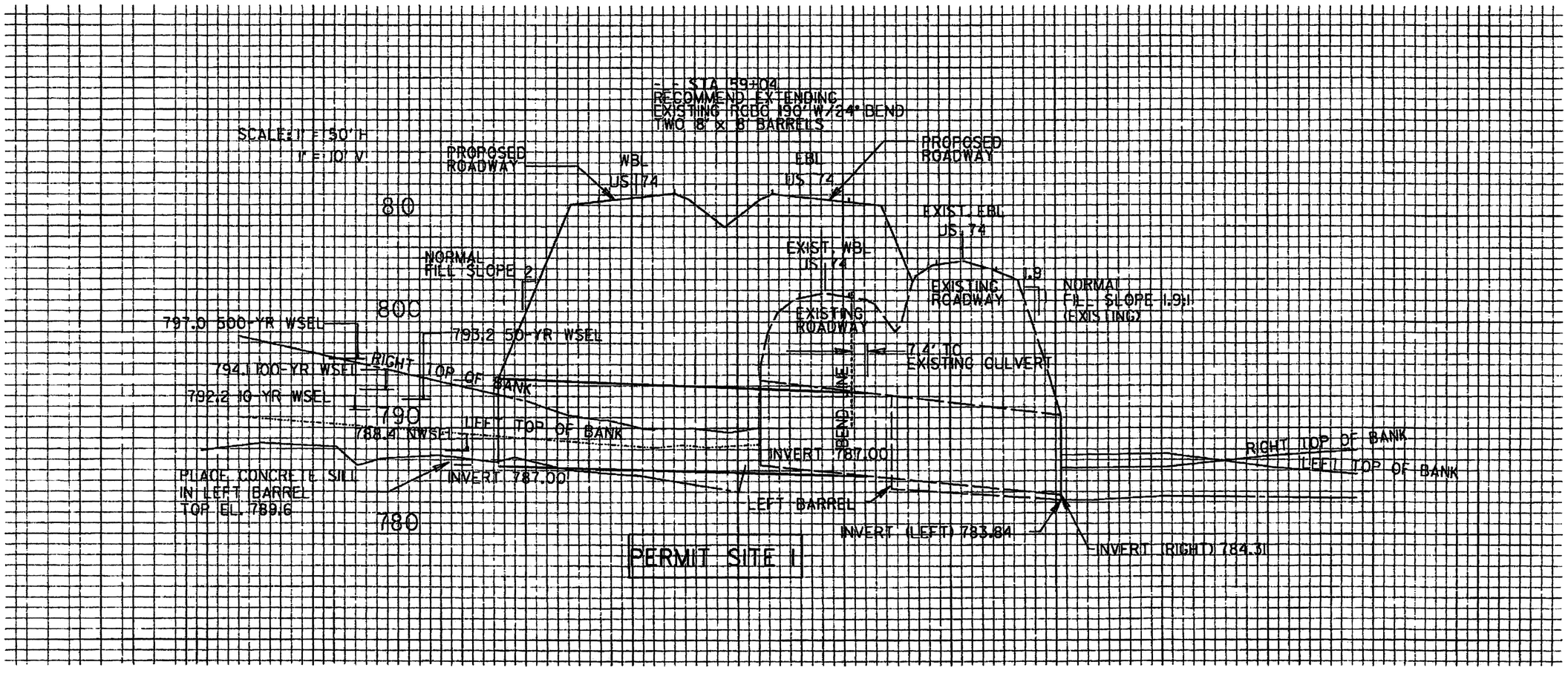
MATCH LINE STA. 24+00.00 -SR6- SEE SHEET 23

MATCH LINE STA. 37+00.00 -SR6- SEE SHEET 18

SITE 9

SEE SHEET 39 FOR -Y2- PROFILE

Permit Drawing
Sheet 28 of 35


SCALE: 1" = 50' H
1" = 10' V
STA 59+04
RECOMMEND EXTENDING
EXISTING RCBC 190' W/24° BEND
TWO 8' x 8' BARRELS
PROPOSED ROADWAY
WBL US 74
EBL US 74
PROPOSED ROADWAY
EXIST. EBL US 74
EXIST. WBL US 74
NORMAL FILL SLOPE 2:1
EXISTING ROADWAY
1:9
NORMAL FILL SLOPE 1.9:1 (EXISTING)
797.9 500-YR WSEL
794.1 100-YR WSEL
792.2 10-YR WSEL
788.4 NWSEL
793.2 50-YR WSEL
RIGHT TOP OF BANK
LEFT TOP OF BANK
190
BEND LINE
71.4' TO EXISTING CULVERT
INVERT 787.00
RIGHT TOP OF BANK
LEFT TOP OF BANK
PLACE CONCRETE SILL IN LEFT BARREL TOP EL. 789.6
INVERT 787.00
LEFT BARREL
INVERT (LEFT) 783.84
INVERT (RIGHT) 784.31
800
790
780
PERMIT SITE I

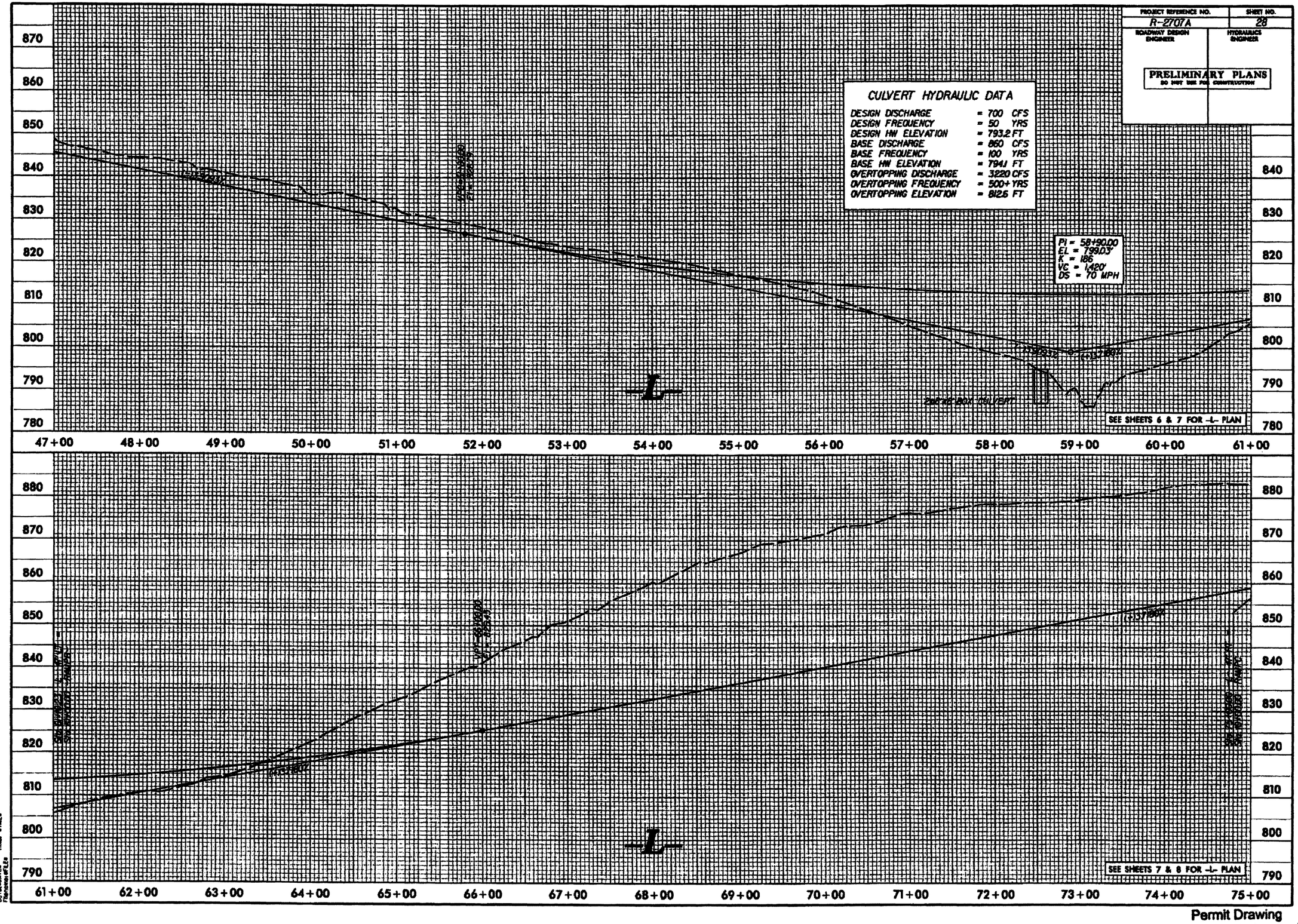
PROJECT REFERENCE NO.	SHEET NO.
R-2707A	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 700 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 793.2 FT
BASE DISCHARGE	= 860 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 794.1 FT
OVERTOPPING DISCHARGE	= 3220 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 812.6 FT

PI = 58+90.00
EL = 799.03'
K = 186
VC = 1,420'
DS = 70 MPH

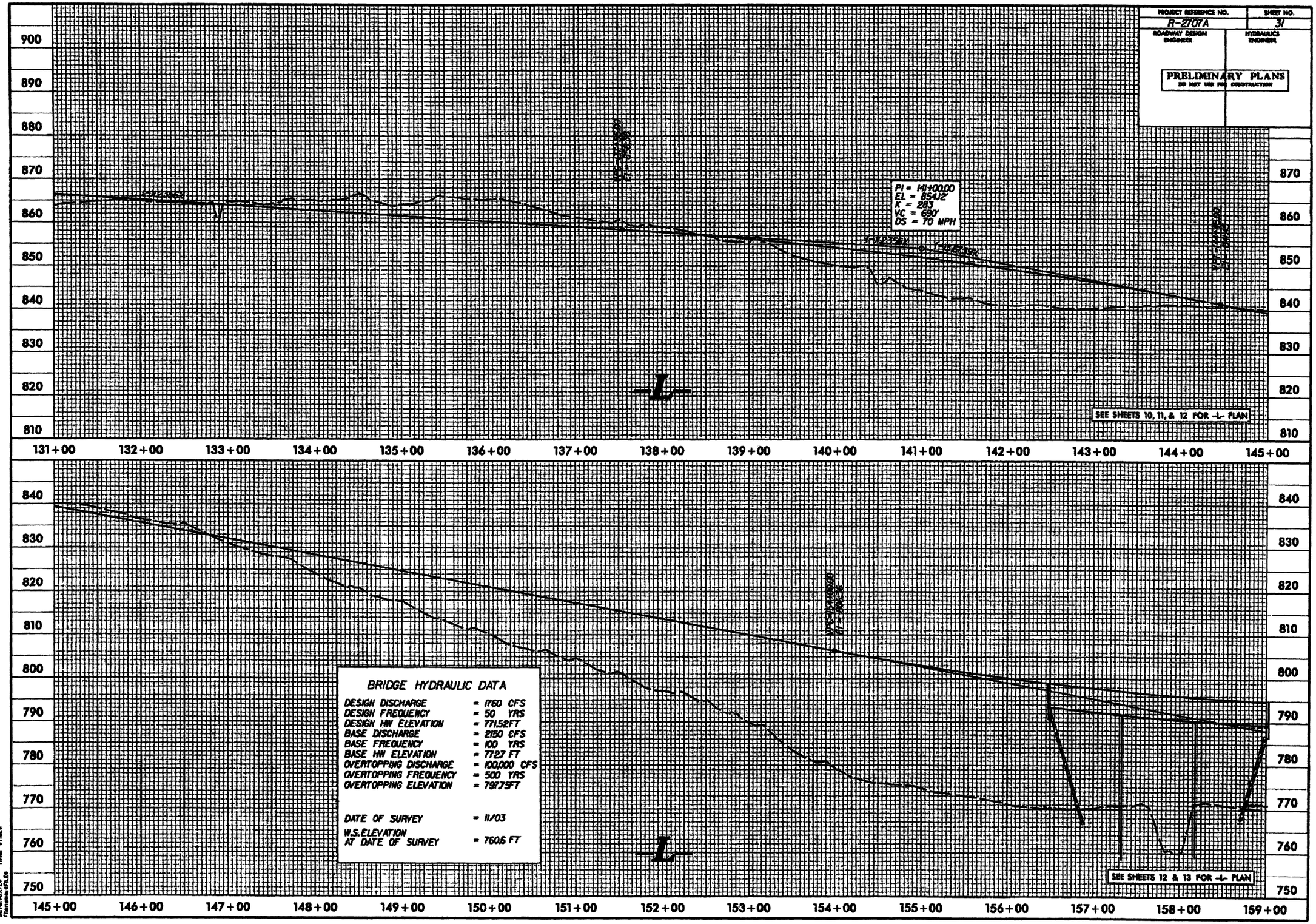


Permit Drawing
Sheet 30 of 35

PROJECT REFERENCE NO.	SHEET NO.
R-2707A	31

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet 31 of 35

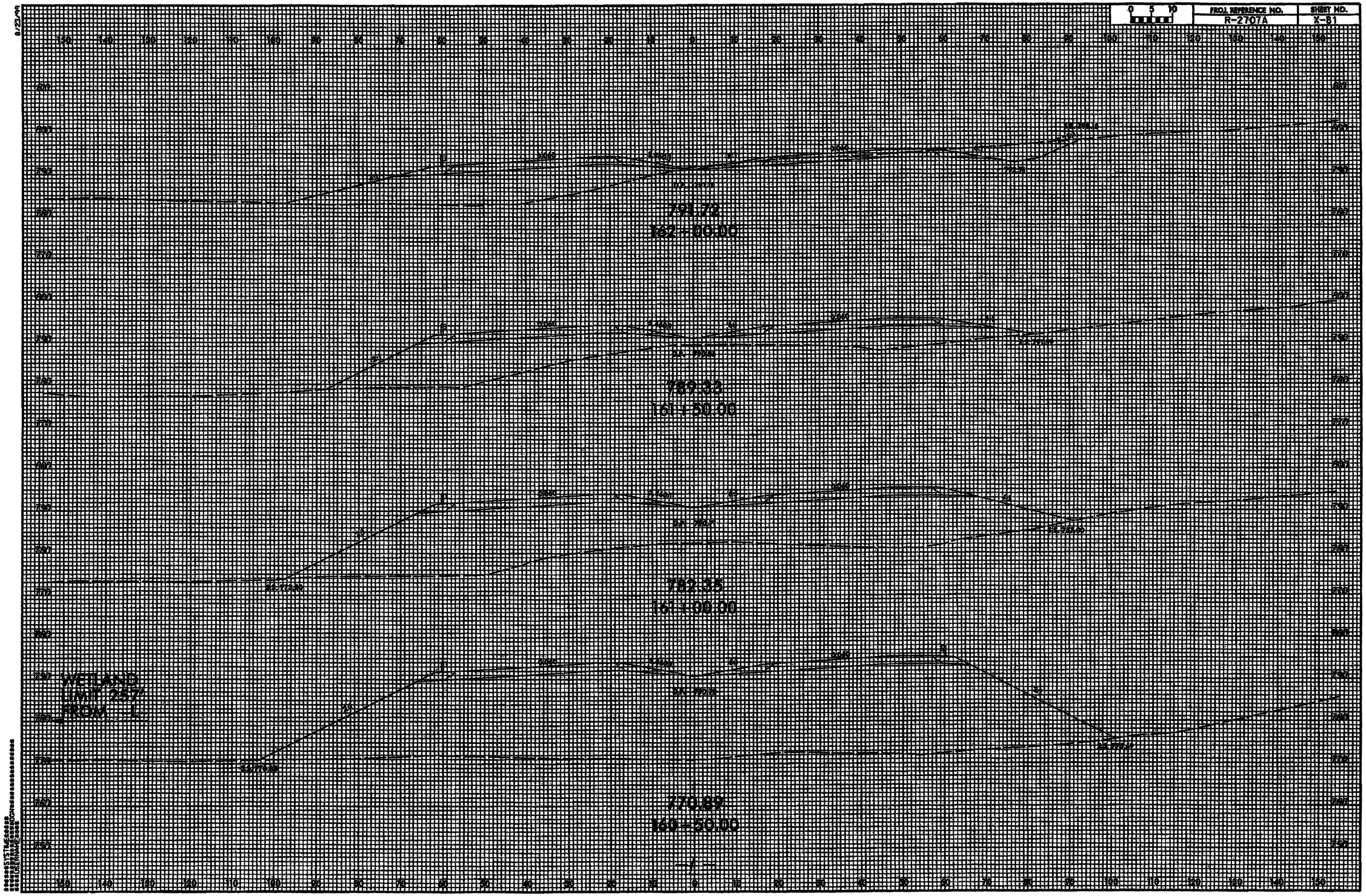
WETLAND LIMIT

CLEARING LIMIT

769.04
160+00.00

768.51
159+50.00

770.00
159+00.00



Permit Drawing
Sheet 32 of 35

WETLAND LIMIT

885+25
207+50.00

880.98
207+00.00

865.30
206+50.00

873.07
206+00.00

878.30
205+50.00

8/23/94

0 5 10

PROJ. REFERENCE NO.	SHEET NO.
R-2707A	X-105

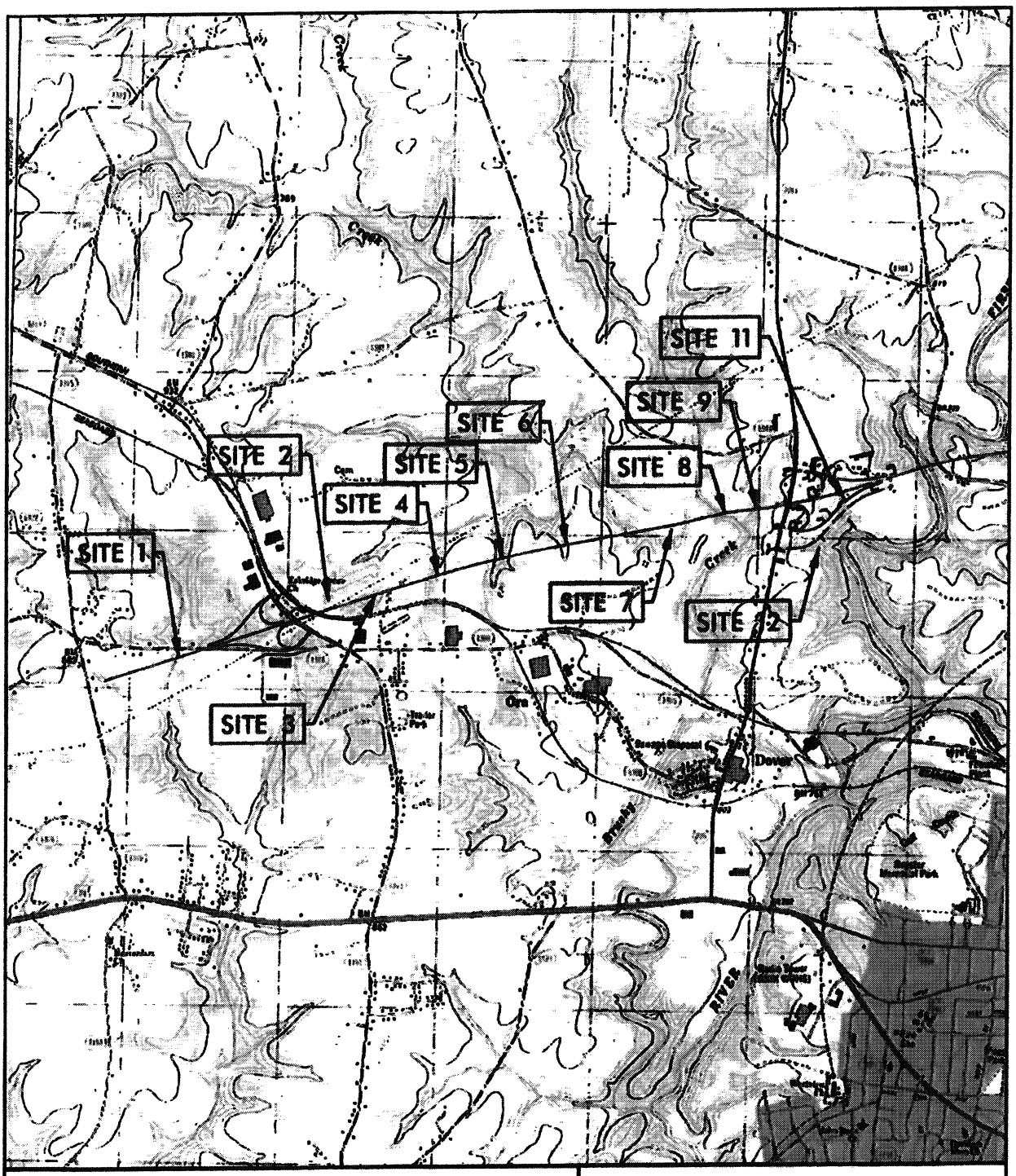
857.30
209+00.00

856.30
208+50.00

WETLAND LIMIT

855.97
208+00.00

Permit Drawing
Sheet 25 of 35



TOPO MAP

SCALE: 1" = 3000'

NCDOT

DIVISION OF HIGHWAYS
CLEVELAND COUNTY
PROJECT: R-2707B

US 74 - SHELBY BYPASS
FROM WEST OF ARTEE RD
TO WEST OF NC 226

SHEET OF **12/12/11**

Permit Drawing
Sheet 1 of 30

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 220+98 - 223+67	2@10'X10' RCBC						0.10	0.01	397	20	
		Bank Stabilization						<0.01	<0.01	11	41	
2	-L- 255+64 - 255+79	Roadway Fill						<0.01		15		
3	-L- 265+48 - 266+92	66" RCP						0.03	<0.01	386	18	
		Bank Stabilization						<0.01		15		
4	-L- 278+37 - 280+52	60" RCP						0.04	<0.01	330	20	
		Bank Stabilization						<0.01		15		
5	-L- 292+39 - 294+80	66" RCP / 54" RCP						0.03	<0.01	585	31	
		Bank Stabilization						<0.01		18		
6	-L- 306+98 - 307+84	54" RCP	<0.01			<0.01		0.02	<0.01	245	21	
		Bank Stabilization						<0.01		15		
7	-L- 325+19 - 333+18	Roadway Fill	3.29			0.25		<0.01	<0.01	5	10	
8	-L- 340+33 - 341+49	Bridge	0.05					<0.01		17		
9	-L- 347+38 - 350+10	66" RCP						0.05	<0.01	568	23	
		Bank Stabilization						<0.01		11		
10	REMOVED											
11	-RPD1- 8+52		0.01					0.05	<0.01	440	10	
12	-Y17- 17+57 - 19+72	Roadway Fill	0.01					0.03	<0.01	547	61	
TOTALS:			3.37			0.25		0.37	0.03	3620	255	

Site 1 remove existing culvert L=50' and replace with open channel L=81'.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CLEVELAND COUNTY
(R-2707B)

SHEET

ATN Revised 3/31/05

Permit Drawing
Sheet 2 of 30

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2707B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34497.1.2	NHF-0074(14)	P.E.
34497.2.8	NHF-0074(107)	ROW

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

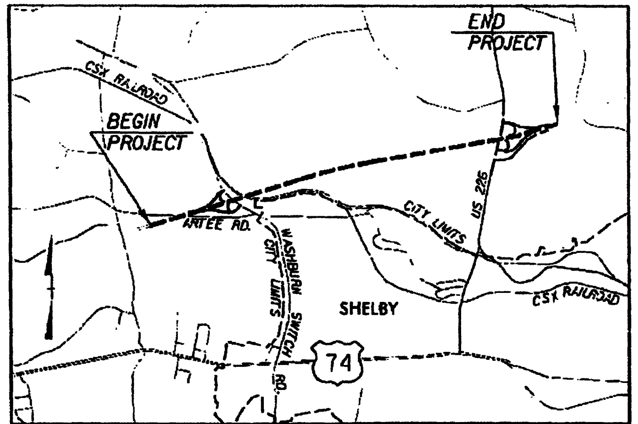
CLEVELAND COUNTY

LOCATION: *US 74 - Shelby Bypass from West of (SR 1314) Artee Rd. to West of NC 226*

TYPE OF WORK: *Grading, Drainage, -Y- Line Paving & Structures*

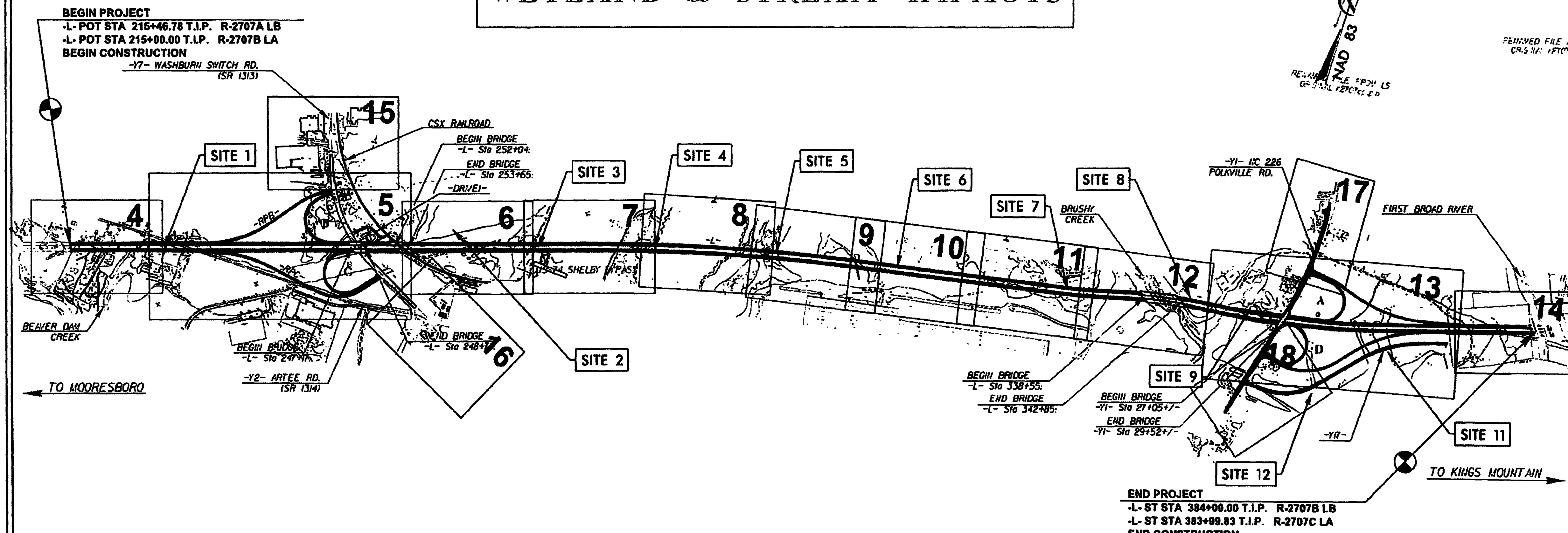
WETLAND & STREAM IMPACTS

R-2707B



VICINITY MAP

R/W Submittal



THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGE.
PROJECT IS NOT WITHIN MUNICIPAL BOUNDARIES.

NCDOT Contact: *K. Zak Hamidi, PE - Project Engineer - Roadway Design Unit*

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100 — PLANS

50 25 0 50 100 — PROFILE (HORIZONTAL)

10 5 0 10 20 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2013 = 19,400
ADT 2033 = 31,100
DHV = 10%
D = 60%
T = 12%
V = 70 MPH
* (DUAL = 5% + TTST = 7%)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-2707B =	3.06 mi.
LENGTH OF STRUCTURES TIP PROJECT R-2707B =	0.14 mi.
TOTAL LENGTH OF TIP PROJECT R-2707B =	3.20 mi.

Prepared in the Office of:
HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 15, 2011

LETTING DATE: JULY 16, 2013

ENRICO A. ROQUE, PE — PROJECT ENGINEER

ANTHONY THOMPSON, PE — ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

CONTRACT:

Permit Drawing
Sheet 3 of 30

HNTB

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	4
R/W SHEET NO.	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

OUTLET TYPICAL

INLET TYPICAL

DETAIL 27
FALSE SUMP
STA 218+45 MED
STA 223+50 MED

DETAIL 15
LATERAL BASE DITCH
STA 220+00 LT TO STA 223+25 LT

NAD 83

SITE

NOTE:
FOR -L- PROFILE SEE SHEET No. 16

BEGIN PROJECT
-L- POT STA 215+46.78 T.I.P. R-2707A LB
-L- POT STA 215+00.00 T.I.P. R-2707B LA
BEGIN CONSTRUCTION
BEGIN GRADING

GRADING ONLY

-L- STA 225+50 SEE SHEET 5

MATCHLINE -L- STA 225+50 SEE SHEET 5

ROBERT RAY HAWKINS
RICHARD & MARCELLE HAWRICK
HERBERT RAY HAWKINS
ROGER W. McMAHAN
ROGER W. & DEBBIE McMAHAN
ROGER/W. & DEBBIE McMAHAN
JOHN E. & GRACE F. WEAVER DB 849 PG 233
JOHNNIE ROBERT MCBRAYER
FRANKLIN TURSEY, INC.

REMOVE CMP
EST. DDE = 35 CY

LATERAL 3' BASE DITCH
W.CL II RR WFF
SEE DETAIL 15

300' TAPER

SPECIAL DITCH GRADE - SEE PROFILE

N 13°00'27.7" E

15" W
2 ELBOWS

18" W ELBOWS
AND ENDWALLS

24" W ELBOWS
AND ENDWALLS

LATERAL V-DITCH
SEE DETAIL 13

LATERAL BASE DITCH
SEE DETAIL 2

CL B RIPRAP OUTLET
PROTECTION WFF

LATERAL V-DITCH
SEE DETAIL 9

CL B RIPRAP
EST. 5 TON
EST. 14 SY FF

BANK STABILIZATION

NON-ERODIBLE
DIFFUSED FLOW

DETAIL 13
LATERAL "V" DITCH
STA 219+00 RT TO STA 220+50 RT

DETAIL 2
LATERAL BASE DITCH
STA 222+00 RT TO STA 223+60 RT

DETAIL 9
LATERAL "V" DITCH
STA 223+50 RT TO STA 225+50 RT

SS DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE

BANK STABILIZATION

Permit Drawing
Sheet 4 of 30

HNTB

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	4
RW SHEET NO.	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

OUTLET TYPICAL

INLET TYPICAL

DETAIL 27
FALSE SUMP
STA 218+45 MED
STA 223+50 MED

DETAIL 15
LATERAL BASE DITCH
STA 220+00 LT TO STA 223+25 LT

NAD 83

SITE

NOTE:
FOR -L- PROFILE SEE SHEET No. 16

BEGIN PROJECT
-L- POT STA 2154678 T.I.P. R-2707A LB
-L- POT STA 2154000 T.I.P. R-2707B LA
BEGIN CONSTRUCTION
BEGIN GRADING

GRADING ONLY

BANK STABILIZATION

MATCHLINE -L- STA 225+50 SEE SHEET 5

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

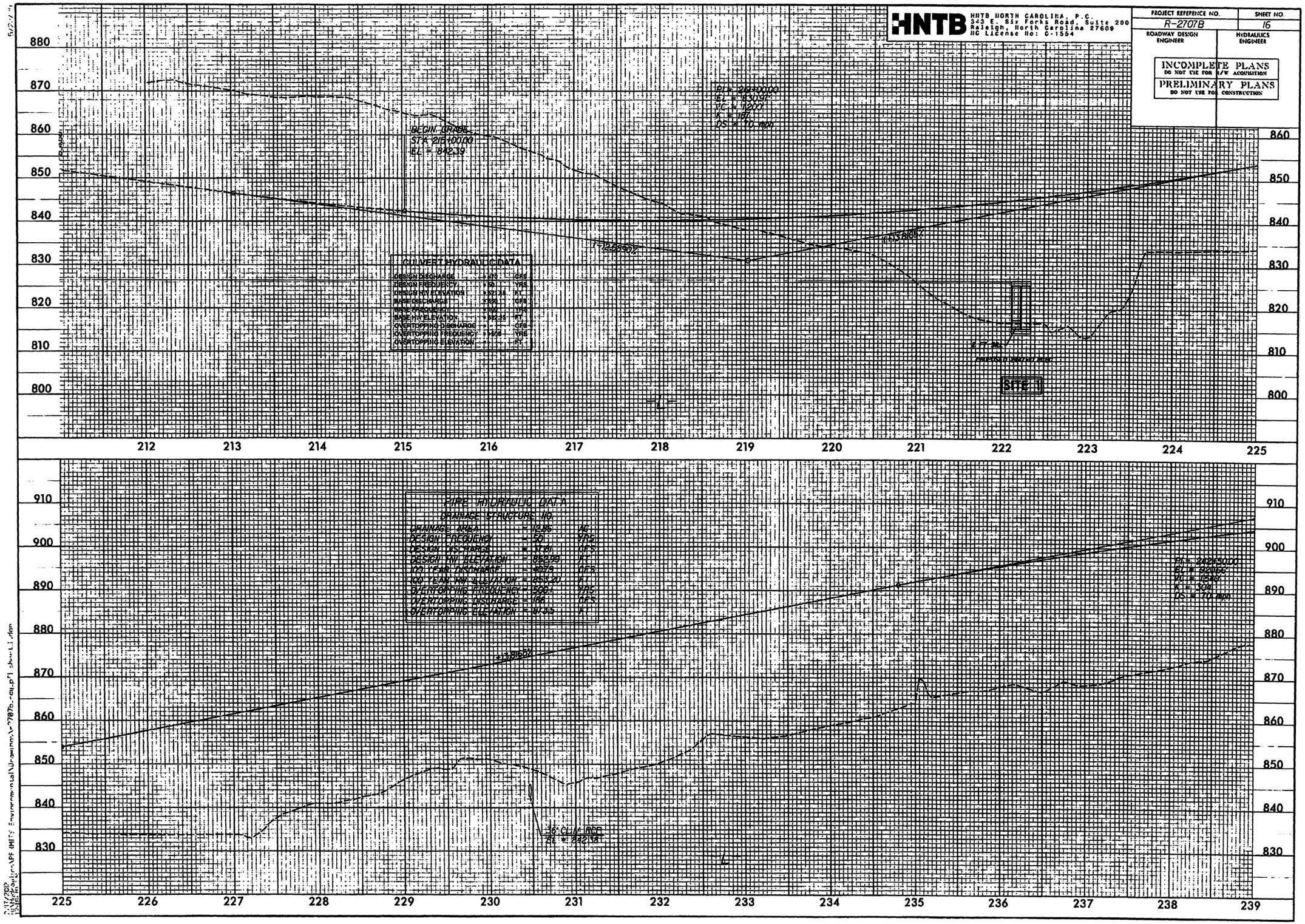
Permit Drawing
Sheet 5 of 15

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet 6 of 20

HNTB

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

PROJECT REFERENCE NO.	SHEET NO
R-2707B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 37
LATERAL BASE DITCH
STA 256+25 LT TO STA 258+00 LT

DETAIL 27
FALSE SLOPE
STA 253+65 MED -L- GRADE = 46% L = 33
STA 257+93 MED -L- GRADE = 46% L = 33

DETAIL 13
LATERAL 'V' DITCH
STA 257+00 RT TO STA 258+00 RT
STA 261+00 RT TO STA 262+12 RT
STA 262+50 LT TO STA 263+65 LT

DETAIL 17
LATERAL 'V' DITCH
STA 255+50 RT TO STA 257+00 RT
STA 262+12 RT TO STA 263+00 RT
STA 258+00 LT TO STA 262+50 LT

DETAIL 42
STA 255+87 EST 2" TONS, EST 3.5 SY FF

DETAIL 39
LATERAL BASE DITCH
STA 252+70 LT TO STA 255+80 LT

DETAIL 2
LATERAL BASE DITCH
STA 256+10 LT TO STA 256+25 LT

DETAIL 34
TOE PROTECTION
STA 264+50 RT TO STA 265+50 RT
STA 265+70 RT TO STA 266+85 RT
STA 258+00 RT TO STA 259+00 RT

DETAIL 31
HEAD DITCH
STA 265+68 RT

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

GRAPHIC SCALE 30 0 100 200 300

NON-EROSIVE DIFFUSED FLOW

ESKRIDGE GROVE BAPTIST CHURCH

17

-L- 254+50.00 198.00 LT.

LATERAL 4' BASE DITCH SEE DETAIL 19

BEGINNING OF JS

SITE 2

-L- 255+90.00 80.00 LT.

LATERAL 2' BASE DITCH SEE DETAIL 2

LATERAL 2' BASE DITCH SEE DETAIL 37

-L- 258+33.00 160.00 LT.

COLEMAN DOGGETT

14

CL B RIPRAP EST 3 TONS EST 10 SY FF

CL B RIPRAP EST 3 TONS EST 10 SY FF

LATERAL 'V' DITCH SEE DETAIL 17

LATERAL 'V' DITCH SEE DETAIL 13

CL B RIPRAP OUTLET PROTECTION WFF CL B=3 TONS FF=10 SY

18" W ELBOWS

18" CL IV RCP

GRADING ONLY

4' FDPS

PS - SEE DETAIL 27

N 73°00'27.7"E

10994

GRADING ONLY

TOE PROTECTION SEE DETAIL 34

LATERAL 'V' DITCH SEE DETAIL 17

300' TAPER

-L- 260+53.14 160.00 RT.

LATERAL 'V' DITCH SEE DETAIL 13

LATERAL 'V' DITCH SEE DETAIL 17

TOE PROTECTION SEE DETAIL 34

HEADWALL 5' BASE HEAD DITCH - SEE DETAIL 31

R 145.00 RT.

R 160.00 RT.

PROPOSED POWERLINE (BY OTHERS)

-L- 256+28.12 160.00 RT.

-L- 256+23.09 160.00 RT.

-L- 258+62.01 258.88 RT.

-L- 255+14.01 83.04 RT.

PROPOSED TOWER (BY OTHERS)

-L- 257+42.43 320.90 RT.

COLEMAN DOGGETT

14

UNKNOWN PROPERTY OWNER

26

FRED L. GLAIZE, II

JIMMY HAWKINS

21

MATCHLINE SEE SHEET 16

PROPOSED TOWER (BY OTHERS)

SITE 3

CL B RIPRAP EST. 1 TONS EST. 5 SY FF

CL II RIPRAP OUTLET PROTECTION WFF NO RR TO BE PLACED IN STREAM BED SEE DETAIL 42

BANK STABILIZATION

15" W ELBOWS

MATCHLINE -L- STA 254+50 SEE SHEET 5

MATCHLINE -L- STA 267+50 SEE SHEET 7

NOTE:
FOR -L- PROFILE SEE SHEET No. 20 & 21

Permit Drawing
Sheet 7 of 30

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

PROJECT REFERENCE NO.	SHEET NO
R-2707B	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 37 LATERAL BASE DITCH
STA 256+25 LT TO STA 258+00 LT

DETAIL 27 FALSE SLOPE

DETAIL 13 LATERAL 'V' DITCH
STA 257+00 RT TO STA 258+00 RT
STA 261+00 RT TO STA 262+12 RT
STA 262+50 LT TO STA 263+65 LT

DETAIL 17 LATERAL 'V' DITCH
STA 255+50 RT TO STA 257+00 RT
STA 262+12 RT TO STA 263+00 RT
STA 258+00 LT TO STA 262+50 LT

DETAIL 42
STA 263+87 RT

DETAIL 39 LATERAL BASE DITCH
STA 252+30 LT TO STA 255+80 LT

DETAIL 2 LATERAL BASE DITCH
STA 254+10 LT TO STA 256+25 LT

DETAIL 34 TOE PROTECTION
STA 264+50 RT TO STA 265+50 RT
STA 265+70 RT TO STA 266+85 RT
STA 258+00 RT TO STA 259+00 RT

DETAIL 31 HEAD DITCH
STA 265+68 RT

NON-ERODIC DIFFUSED FLOW

ESKRIDGE GROVE BAPTIST CHURCH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SCALE: 1" = 50'

PROPOSED TOWER (BY OTHERS)

SITE 3

SITE 2

-L- 255+00 (-L-)
50.00 LT.

LATERAL 1 BASE DITCH SEE DETAIL 2

-L- 255+00
200.00 LT.
LATERAL 2 BASE DITCH SEE DETAIL 2

LATERAL 3 BASE DITCH SEE DETAIL 27

-L- 258+33
60.00 LT.

BEGINNING CL B

COLEMAN DODGETT

CL B RIPRAP EST 3 TONS EST 10 SY FF

LATERAL 'V' DITCH SEE DETAIL 17

LATERAL 'V' DITCH SEE DETAIL 13

CL B RIPRAP OUTLET PROTECTION WFF
CL B=3 TONS
FF=10 SY

CL B RIPRAP EST 1 TONS EST 3 SY FF

CL B RIPRAP OUTLET PROTECTION WFF
NO FILL IN THE PLACES IN STREAM AND SEE DETAIL 42

HDWL

12" W BEVELS

18" CL III RCP

GRADING ONLY

N 73°00'27.71"E

4 FDPS

SEE DETAIL 27

LATERAL 'V' DITCH SEE DETAIL 17

LATERAL 'V' DITCH SEE DETAIL 13

TOE PROTECTION SEE DETAIL 34

30:1 TAPER

-L- 260+53.14
160.00 RT.

LATERAL 'V' DITCH SEE DETAIL 13

PROPOSED POWERLINE (BY OTHERS)

-L- 256+28.12
258.96 RT.

-L- 258+52.12
258.96 RT.

-L- 255+41.01
213.04 RT.

-L- 257+42.43
320.90 RT.

PROPOSED TOWER (BY OTHERS)

COLEMAN DODGETT

MATCHLINE SEE SHEET 16

FRED L. GLAIZE, II

ARMY HAWKINS

MATCHLINE -L- STA 254+50 SEE SHEET 5

MATCHLINE -L- STA 267+50 SEE SHEET 7

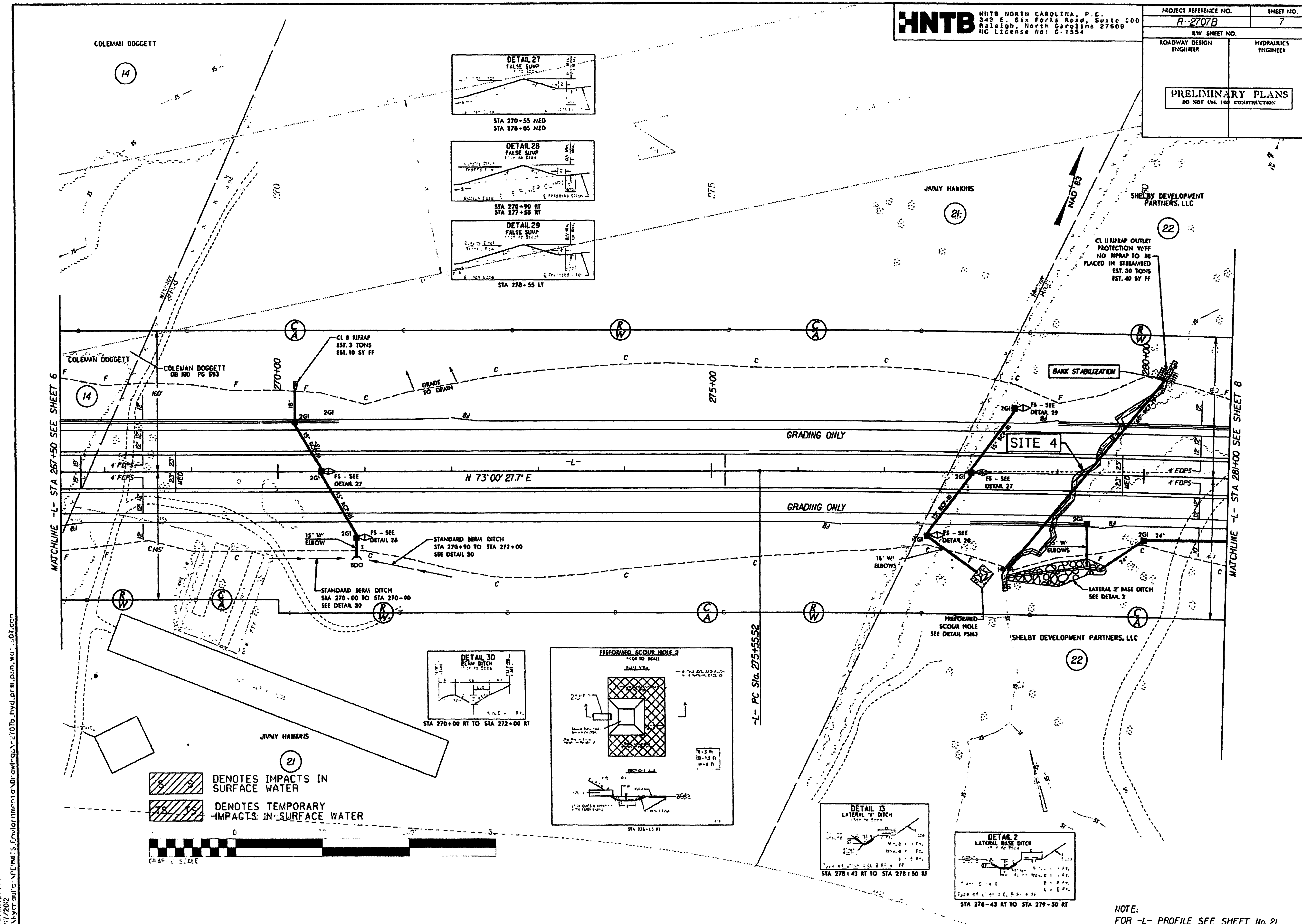
NOTE:
FOR -L- PROFILE SEE SHEET No. 20 & 21

Permit Drawing
Sheet 6 of 30

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



COLEMAN DOGGETT
14
DETAIL 27
FALSE SUMP
STA 270+55 MED
STA 278+05 MED
DETAIL 28
FALSE SUMP
STA 270+90 RT
STA 277+55 RT
DETAIL 29
FALSE SUMP
STA 278+55 LT
JIMMY HAWKINS
21
NAD 83
SHELBY DEVELOPMENT PARTNERS, LLC
22
CL II RIPRAP OUTLET PROTECTION W/FF
NO RIPRAP TO BE PLACED IN STREAMBED
EST. 30 TONS
EST. 40 SY FF
CL B RIPRAP
EST. 3 TONS
EST. 10 SY FF
COLEMAN DOGGETT
DB 1610 PG 593
GRADE TO DRAIN
270+00
275+00
280+00
BANK STABILIZATION
MATCHLINE -L- STA 267+50 SEE SHEET 6
MATCHLINE -L- STA 281+00 SEE SHEET 8
GRADING ONLY
SITE 4
-L-
N 73°00'27.7" E
FS - SEE DETAIL 27
FS - SEE DETAIL 28
FS - SEE DETAIL 29
4' FDPS
15" W/ ELBOW
18" W/ ELBOWS
15" W/ ELBOWS
STANDARD BERM DITCH
STA 270+90 TO STA 272+00
SEE DETAIL 30
STANDARD BERM DITCH
STA 270+00 TO STA 270+90
SEE DETAIL 30
LATERAL 2' BASE DITCH
SEE DETAIL 2
PREFORMED SCOUR HOLE
SEE DETAIL PSH3
SHELBY DEVELOPMENT PARTNERS, LLC
22
-L- PC Sta. 275+55.52
DETAIL 30
BERM DITCH
STA 270+00 RT TO STA 272+00 RT
PREFORMED SCOUR HOLE 3
JIMMY HAWKINS
21
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
DETAIL 13
LATERAL "V" DITCH
STA 278+43 RT TO STA 278+50 RT
DETAIL 2
LATERAL BASE DITCH
STA 278+43 RT TO STA 279+50 RT

NOTE:
FOR -L- PROFILE SEE SHEET No. 21

Permit Drawing
Sheet 9 of 30

HNTB

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE -L- STA 267+50 SEE SHEET 6

MATCHLINE -L- STA 281+00 SEE SHEET 8

DETAIL 27
FALSE SUMP

STA 270+55 MED
STA 278+05 MED

DETAIL 28
FALSE SUMP

STA 270+90 RT
STA 277+55 RT

DETAIL 29
FALSE SUMP

STA 278+55 RT

COLEMAN DOGGETT

COLEMAN DOGGETT
DB 180 PG 393

JIMMY HAWKINS

SHELBY DEVELOPMENT PARTNERS, LLC

CC RIPRAP OUTLET PROTECTION TYPE
NO WIDER THAN 10'
FLARED AT ATTACHED
EST. 40 TONS
EST. 40 SY FF

CC RIPRAP
EST. 8 TONS
EST. 10 SY FF

GRADE TO DRAIN

270+00

275+00

GRADING ONLY

N 75° 00' 27.7" E

FS - SEE DETAIL 27

FS - SEE DETAIL 28

STANDARD BERM DITCH
STA 270+00 TO STA 272+60
SEE DETAIL 30

STANDARD BERM DITCH
STA 270+00 TO STA 270+55
SEE DETAIL 30

18" W 3 ELBOWS

SCOUR HOLE
SEE DETAIL FSH3

SHELBY DEVELOPMENT PARTNERS, LLC

DETAIL 30D
BERM DITCH

STA 270+00 RT TO STA 272+05 RT

PROPOSED SCOUR HOLE 3
NOT TO SCALE

STA 278+05 RT

DETAIL 31
FLUME

STA 278+43 RT TO STA 278+50 RT

DETAIL 2
OUTLET DITCH

STA 278+43 RT TO STA 279+50 RT

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE

NOTE:
FOR -L- PROFILE SEE SHEET No. 21

Permit Drawing
Sheet 10 of 30

HNTB

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

PROJECT REFERENCE NO.	SHEET NO
R-2707B	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 27
FALSE SUMP
STA 281+50 MED
STA 287+05 MED
STA 291+55 MED

DETAIL 28
FALSE SUMP
STA 281+90 LT
STA 291+10 RT

DETAIL 29
FALSE SUMP
STA 281+40 LT

DETAIL 33
BERM DITCH
STA 281-50 RT TO STA 285-50 RT

DETAIL 42
R.P. RIP-RAP AT OUTFALL-MOUNT
STA 293+84 EST 33 TONS EST 31 SY EA

NAD 83

SHELBY DEVELOPMENT PARTNERS, LLC

22

PDE

BANK STABILIZATION

CL II RIP-RAP OUTLET PROTECTION W FF NO WIRE TO BE PLACED IN STREAMBED SEE DETAIL 42

MATCHLINE -L- STA 281+00 SEE SHEET 7

285+00

290+00

MATCHLINE -L- STA 294+50 SEE SHEET 9

SPECIAL DITCH GRADE SEE PROFILE

FS - SEE DETAIL 28

FS - SEE DETAIL 27

FS - SEE DETAIL 29

FUTURE CAT-1

4 FDPS

18" W ELBOW

SPECIAL BERM DITCH W CL B RR & FF SEE DETAIL 33

HDWL

SITE 5

SHELBY DEVELOPMENT PARTNERS, LLC

22

23

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

0 150 300 600

NOTE:
FOR -L- PROFILE SEE SHEET No. 18

NOTE:
FOR -L- PROFILE SEE SHEET No. 21

Permit Drawing

HNTB

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

PROJECT REFERENCE NO	SHEET NO
R-2707B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 27
FALSE SUMP
STA 281+50 RED
STA 287+05 RED
STA 291+35 RED

DETAIL 28
FALSE SUMP
STA 281+90 LT
STA 281+10 RT

DETAIL 29
FALSE SUMP
STA 281+40 LT

DETAIL 33
BERM DITCH
STA 281+50 RT TO STA 285+50 RT

DETAIL 42
R.P. REP AT DOWNSTREAM

NAD 83

SHELBY DEVELOPMENT PARTNERS, LLC

SPECIAL DITCH GRADE SEE PROFILE

SPECIAL BERM DITCH W/CL B RR & EF SEE DETAIL 33

SHELBY DEVELOPMENT PARTNERS, LLC

SITE 5

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SCALE

MATCHLINE -L- STA 281+00 SEE SHEET 7

MATCHLINE -L- STA 294+50 SEE SHEET 9

NOTE:
FOR -L- PROFILE SEE SHEET No. 18

NOTE:
FOR -L- PROFILE SEE SHEET No. 21

Permit Drawing
Sheet 12 of 20

HNTB

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 27
FALSE SUMP
STA 300+05 MED

DETAIL 28
FALSE SUMP
STA 295+85 LT

DETAIL 2
LATERAL BASE DITCH
Min D=1.0 ft
Max d=1.0 ft
B=2.0 ft.
b=5.0 ft
Type of Liner Class B Rip-Rap
FROM STA. 294+63 TO STA. 295+80

NAD 83

22
SHELBY DEVELOPMENT PARTNERS, LLC

WAL-MART STORES EAST, LP
23

-L- PT Sta. 303+96.22

PDE

295+00

300+00

305+00

SPECIAL DITCH GRADE - SEE PROFILE
STA 296+00 LT TO STA 300+00 LT

GRADING ONLY

PS - SEE DETAIL 28

PS - SEE DETAIL 27

N 80° 06' 34.0" E

MATCHLINE -L- STA 294+50 SEE SHEET 8

MATCHLINE -L- STA 306+00 SEE SHEET 10

LATERAL 2' BASE DITCH SEE DETAIL 2

SITE 5

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

WAL-MART STORES EAST, LP

NOTE:
FOR -L- PROFILE SEE SHEET No. 21 & 22

HNTB

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1564

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 27
FALSE SUMP
STA 300+05 MED

DETAIL 28
FALSE SUMP
STA 295+95 RT

DETAIL 2
LATERAL EASE DITCH
FROM STA 294+50 LT TO STA 295+90

SHELBY DEVELOPMENT PARTNERS, LLC

WAL-MART STORES EAST, LP

SPECIAL DITCH GRADE - SEE PROFILE
STA 296+00 LT TO STA 300+00 LT

GRADING ONLY

W 80°06'34.0" E

MATCHLINE -L- STA 294+50 SEE SHEET 8

MATCHLINE -L- STA 306+00 SEE SHEET 10

SEE DETAIL 27

SEE DETAIL 28

SEE DETAIL 2

SITE 5

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NOTE:
FOR -L- PROFILE SEE SHEET No. 21 & 22

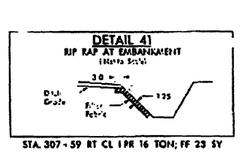
Permit Drawing

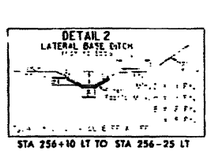
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

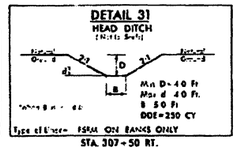
PROJECT REFERENCE NO.	SHEET NO.
R-2707B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

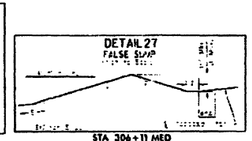
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

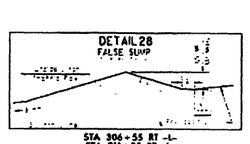
REVISIONS

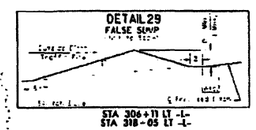


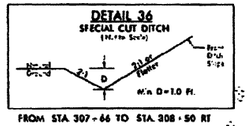


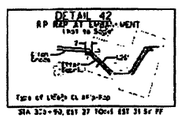












NAD 83

0 50 100 200
GRAPHIC SCALE

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

WAL-MART STORES EAST, LP
23

BANK STABILIZATION
SITE 6
CL II RIPRAP W FF
NO RR TO BE PLACED IN STREAMBED
SEE DETAIL 42
CL B RIPRAP
EST 2 TON
EST 7 SY FF
FS - SEE DETAIL 29
FS - SEE DETAIL 27
FS - SEE DETAIL 28
2GI
4' FDPS
15" RCP-III
12" RCP-III
HDWL
SEE DETAIL 40
HEAD DITCH
DDE = 250 CY
SEE DETAIL 31
SEE DETAIL 41
310+00
315+00
GRADING ONLY
N 80° 06' 34.0" E
-L-
MATCHLINE -L- STA 306+00 SEE SHEET 9
MATCHLINE -L- STA 318+50 SEE SHEET 11
RDWL
WAL-MART STORES EAST, LP
23

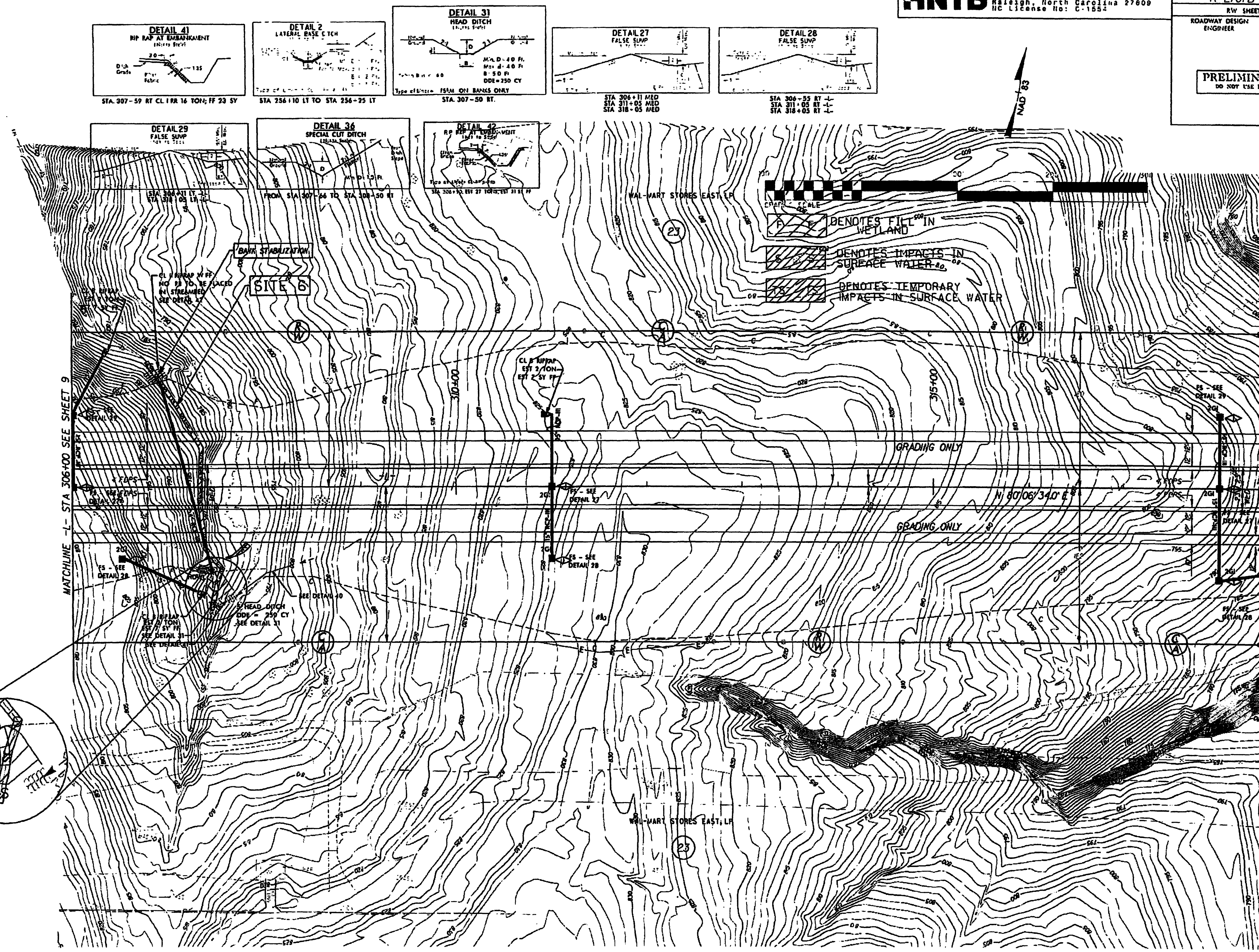
NOTE:
FOR -L- PROFILE SEE SHEET No. 22

Permit Drawing
Sheet 15 of 30

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



DETAIL 41 RIP RAP AT EMBANKMENT
STA. 307-59 RT CL I RR 16 TON; FF 23 SY
DETAIL 2 LATERAL BASE DITCH
STA 256+10 LT TO STA 256+25 LT
DETAIL 31 HEAD DITCH
STA. 307-50 RT.
DETAIL 27 FALSE SUMP
STA 306+11 MED
STA 311+05 MED
STA 318-05 MED
DETAIL 28 FALSE SUMP
STA 306-55 RT -L-
STA 311+05 RT -L-
STA 318+05 RT -L-
DETAIL 29 FALSE SUMP
DETAIL 36 SPECIAL CUT DITCH
FROM STA 307-66 TO STA 308-50 RT
DETAIL 42
NAD 83
WAL-MART STORES EAST, LP
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
BANK STABILIZATION
SITE 6
MATCHLINE -L- STA 306+00 SEE SHEET 9
MATCHLINE -L- STA 318+50 SEE SHEET 11
GRADING ONLY
N 80°06'34.0" E
HEAD DITCH
DDE = 250 CY
SEE DETAIL 31
HDWL

NOTE:
FOR -L- PROFILE SEE SHEET No. 22

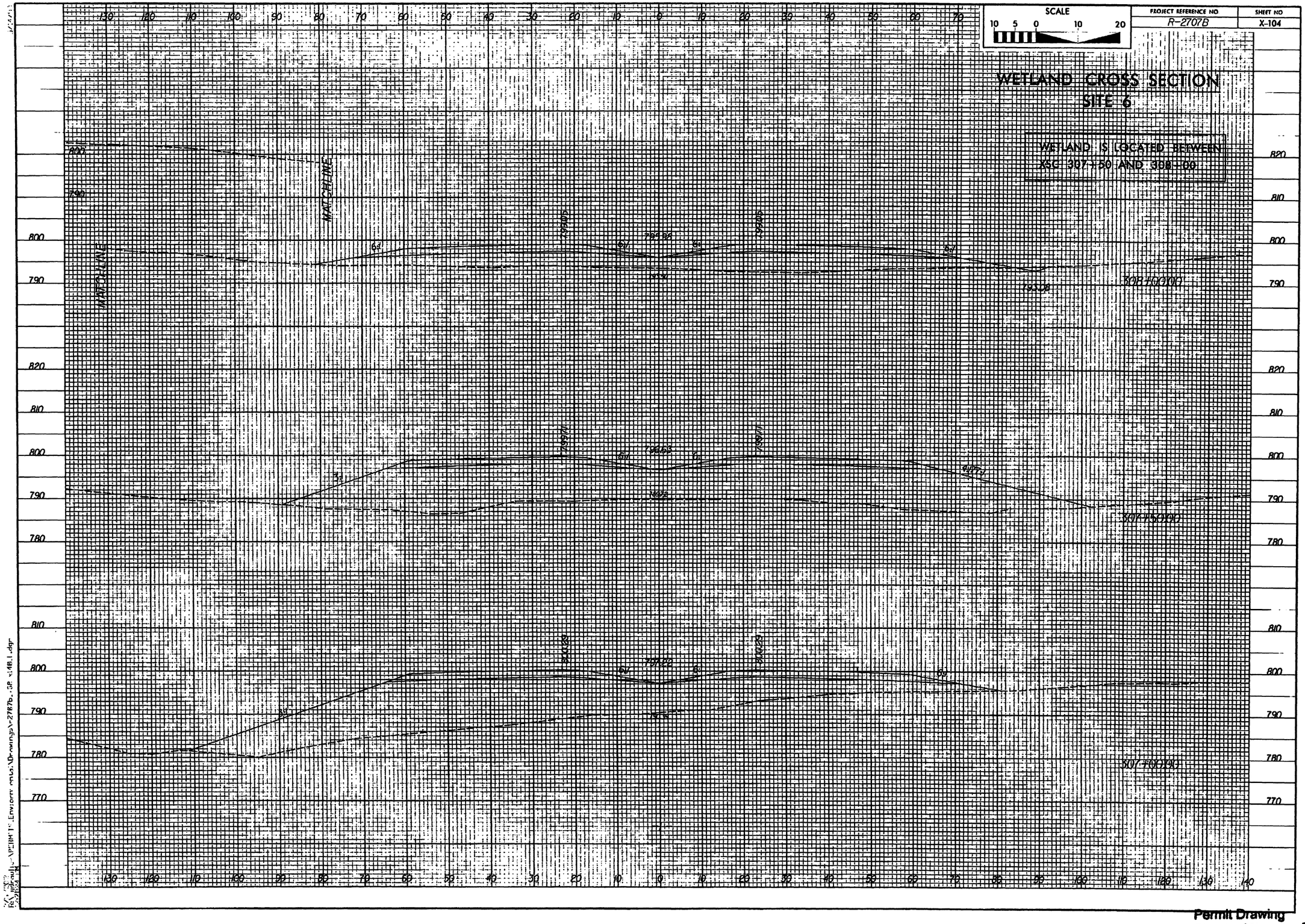
Permit Drawing
Sheet 16 of 30

SCALE
10 5 0 10 20

PROJECT REFERENCE NO	SHEET NO
R-2707B	X-104

WETLAND CROSS SECTION
SITE 6

WETLAND IS LOCATED BETWEEN
XSC 307+50 AND 308+00



Permit Drawing
Sheet 17 of 30

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 34
TOE PROTECTION
STA 325+00 RT TO STA 331+25 RT
STA 321+50 LT TO STA 327+60 LT

DETAIL 21
SLOPE PROTECTION
STA 327+60 LT TO STA 331+50 LT

DETAIL 4
LATERAL BASE DITCH
STA 320+00 RT TO STA 322+65 RT

DETAIL 35
LATERAL "V" DITCH
STA 322+65 RT TO STA 325+00 RT

DETAIL 27
FALSE SUMP
STA. 319+55 -L- MED, GRADE=3%, L=30'
STA. 330+45 -L- MED, GRADE=0.5%, L=20'

DETAIL 28
FALSE SUMP
STA 319+55 -L- RT

DETAIL 29
FALSE SUMP
STA 319+55 -L- LT

NAD 83

WAL-MART STORES EAST, LP
23

320+00
325+00
-L- TS STA 329+14.65
SC Sta. 330+14.65
330+00

CL I RIPRAP W/FF
EST. 32 TON
EST. 54 SY FF

CL B RIPRAP
EST 2 TON
EST 7 SY FF

TOE PROTECTION
SEE DETAIL 34

SLOPE PROTECTION
STA 327+60 LT TO
STA 331+50 LT
SEE DETAIL 21

FS - SEE DETAIL 29
FS - SEE DETAIL 27
FS - SEE DETAIL 28
FS - SEE DETAIL 27

GRADING ONLY

-L-
N 80°06'34.0" E

LATERAL 3' BASE DITCH
SEE DETAIL 4

LATERAL "V" DITCH
SEE DETAIL 35

SITE 7

MATCHLINE -L- STA 318+50 SEE SHEET 10
MATCHLINE -L- STA 331+50 SEE SHEET 12

F/F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

GRAPHIC SCALE

NOTE:
FOR -L- PROFILE SEE SHEET No. 22 & 23

Permit Drawing

HNTB

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 34
TOE PROTECTION
STA 325+00 RT TO STA 331+25 RT
STA 321+50 LT TO STA 327+60 LT

DETAIL 21
SLOPE PROTECTION
STA 327+60 LT TO STA 331+50 LT

DETAIL 4
LATERAL EASE DITCH
STA 320+00 RT TO STA 322+65 RT

DETAIL 35
LATERAL "A" DITCH
STA 322+65 RT TO STA 325+00 RT

DETAIL 27
FALSE SUMP
STA 319+55 -L- RT
STA 319+55 -L- LT

DETAIL 28
FALSE SUMP
STA 319+55 -L- RT

DETAIL 29
FALSE SUMP
STA 319+55 -L- LT

NAD 83

WALMART STORES EAST LP

CL I RIPRAP W/FF
EST. 32 TON
EST. 54 SY FF

CL B RIPRAP
EST 2 TON
EST 7 SY FF

TOE PROTECTION
SEE DETAIL 34

SLOPE PROTECTION
STA 327+60 LT TO
STA 331+50 LT
SEE DETAIL 21

EXISTING EARTH DIKE

GRADING LIMIT

N 80°06'34.0"E

-L-

MATCHLINE -L- STA 318+50 SEE SHEET 10

MATCHLINE -L- STA 331+50 SEE SHEET 12

SEE DETAIL 27

SEE DETAIL 28

LATERAL 3' BASE DITCH
SEE DETAIL 4

LATERAL "D" DITCH
SEE DETAIL 35

SITE

WALMART STORES EAST LP

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

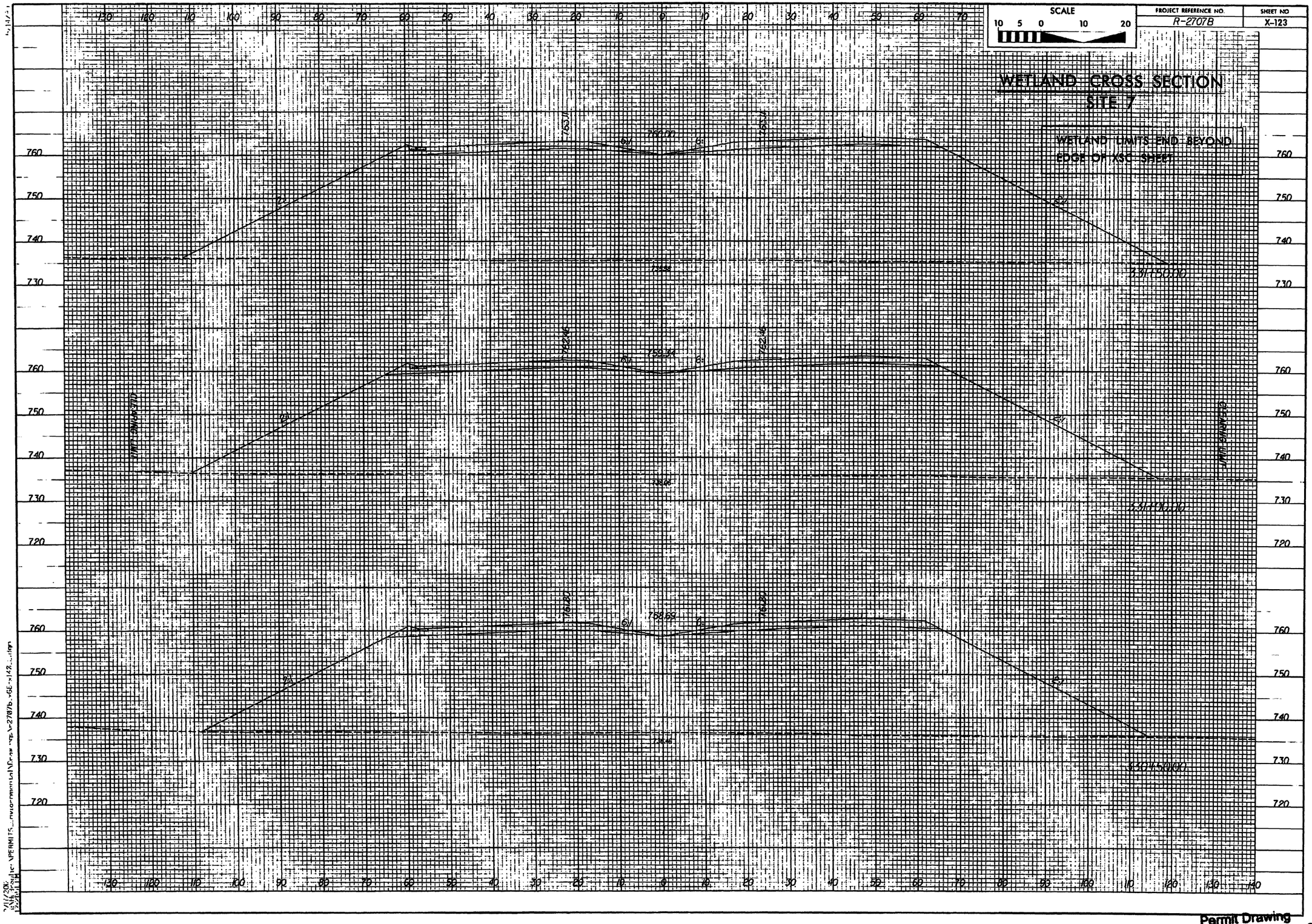
1" = 50' SCALE

(SITE) FOR -L- PROFILE SEE SHEET 11, 12 & 13

Permit Drawing
Sheet 19 of 30

PROJECT REFERENCE NO.	SHEET NO
R-2707B	X-123

WETLAND CROSS SECTION
SITE 7



Permit Drawing
Sheet 20 of 30

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

NAD 83

DETAIL 21
SLOPE PROTECTION
STA 331-50 LT TO STA 333+25 LT

DETAIL 27
FALSE SUMP
STA 335+20 MED

DETAIL 29
FALSE SUMP
STA 339+60 RT

DETAIL 14
LATERAL BASE DITCH
STA 339+62 LT TO STA 343+50 LT

DETAIL 2
LATERAL BASE DITCH
STA 343+50 LT TO STA 345-50 LT
STA 337-50 RT TO STA 339-75 RT

WAL-MART STORES EAST, LP

23

24

NOTE:
6" DECK DRAINS TO BE PLACED ON 12' CENTERS ON SPANS 4 & 5 WBL BRIDGE. NO OTHER DECK DRAINS TO BE PLACED ON BRIDGE(S).

SITE 8

LATERAL 2' BASE DITCH
STA 339+62 LT TO STA 343+50 LT
SEE DETAIL 14

RIP RAP AT EMBANKMENT
SEE DETAIL 41

END BRIDGE
-L- STA 342+85.00

LATERAL 2' BASE DITCH
STA 343+50 LT TO STA 345+50 LT
SEE DETAIL 2

CL II RIPRAP TO ELEV. 742.6
STA 331+50 TO STA 333+25
SEE DETAIL 21

CL B RIPRAP
EST 2 TON
EST 7 SY FF

CL II RIPRAP
WFF

GRADING ONLY

FS -SEE DETAIL 27

TB 2GI 15" RCP-III

15" W/ ELBOWS

BEGIN BRIDGE
-L- STA 338+55.00

SPECIAL DITCH GRADE
STA 335+00 RT TO
STA 336+50 RT
SEE PROFILE

TOE PROTECTION
SEE DETAIL 34

TRANSITION STONE
CL B RIPRAP-1 TON
FF-5 SY

SITE 7

LATERAL 'V' DITCH
STA 336-50 RT TO STA 337-50 RT
SEE DETAIL 13

LATERAL 2' BASE DITCH
STA 337+50 RT TO
EXISTING DITCH
SEE DETAIL 2

ENERGY DISSIPATOR
SEE DETAIL ED#3

FS - SEE DETAIL 29

PREFORMED SCOUR HOLE
SEE DETAIL PSH4

GRADE TO DRAIN

4' FDPS

15" RCP-III

18" wMH

MATCHLINE -L- STA 333+50 SEE SHEET 11

MATCHLINE -L- STA 345+50 SEE SHEET 13

GRAPHIC SCALE

DETAIL 34
TOE PROTECTION
STA 332+25 RT TO STA 333-75 RT

DETAIL 13
LATERAL 'V' DITCH
STA 336+50 RT TO STA 337+50 RT

WAL-MART STORES EAST, LP

23

SKETCH SHOWING BRIDGE / ROADWAY RELATIONSHIP

340+00

4' P.S.

-L-

ENERGY DISSIPATOR ED #3

PLAN VIEW

PROFILE

CLASS B RIPRAP

STA 341+20 RT

PREFORMED SCOUR HOLE

PLAN VIEW

SECTION A-A

STA 343-50 RT

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

DETAIL 41
RIP RAP AT EMBANKMENT

STA. 339+60 LT CL I RR 7 TON; FF 12 SY

NOTE:
FOR -L- PROFILE SEE SHEET No. 23

Permit Drawing
Sheet 21 of 30

HNTB

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

DETAIL 21
SLOPE PROTECTION

DETAIL 27
FALSE SUMP

DETAIL 29
FALSE SUMP

DETAIL 14
LATERAL BASE DITCH

DETAIL 2
LATERAL BASE DITCH

NAD 83

STA 331+50 LT TO STA 333+25 LT

STA 332+20 RT

STA 338+80 RT

STA 339+62 LT TO STA 343+50 LT

STA 343+50 LT TO STA 345+50 LT
STA 327+50 RT TO STA 339+75 RT

WAL-MART STORES EAST, LP

NOTE:
4" DECK DRAINS TO BE PLACED ON 12' CENTERS ON SPANS 1, 2 & 3 OF BRIDGE. NO OTHER DECK DRAINS TO BE PLACED ON BRIDGE.

SITE 8

LATERAL 2' BASE DITCH
STA 339+62 LT TO STA 343+50 LT
SEE DETAIL 14

END BRIDGE
STA 342+85.00

LATERAL 2' BASE DITCH
STA 343+50 LT TO STA 345+50 LT
SEE DETAIL 2

CL B RIPRAP TO ELEV. 742.6
STA 331+50 TO STA 333+25
SEE DETAIL 21

SPECIAL B RIPRAP
EST 2 TON
EST 7 SY FF

CL B RIPRAP
WFF

RIP RAP AT END TREATMENT
SEE DETAIL 41

GRADING ONLY

4 PS

FS SEE DETAIL 27

18" RCP
18" W ELBOWS

GRADE TO DRAIN

4 PDS

MATCHLINE -L- STA 331+50 SEE SHEET 11

MATCHLINE -L- STA 345+50 SEE SHEET 13

BEGIN BRIDGE
L STA. 338+55.00

SPECIAL DITCH GRADE
STA 335+00 RT-LT
STA 336+50 RT
SEE PROFILE

TOE PROTECTION
SEE DETAIL 34

TRANSITION STONE
CL B RIPRAP - 1 TON
FF = 9 SY

SITE 7

LATERAL 'V' DITCH
STA 336+50 RT TO STA 337+50 RT
SEE DETAIL 13

LATERAL 2' BASE DITCH
STA 337+50 RT TO
EXISTING DITCH
SEE DETAIL 2

ENERGY DISSIPATOR
SEE DETAIL 15-3

TOE PROTECTION
SEE DETAIL 34

PREFORMED SCOUR HOLE
SEE DETAIL PSH4

DETAIL 34
TOE PROTECTION

DETAIL 13
LATERAL 'V' DITCH

STA 335+50 RT TO STA 336+50 RT

STA 336+50 RT TO STA 337+50 RT

SKETCH SHOWING BRIDGE / ROADWAY RELATIONSHIP

ENERGY DISSIPATOR ED #34

PLAN VIEW

PROFILE

STA 341+20 RT

PREFORMED SCOUR HOLE

STA 343+50 RT

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

DETAIL 41
RIP RAP AT EMBANKMENTS

STA 339+60 LT CL-TO 2 TON, FF 13 SY

NOTE:
FOR -L- PROFILE SEE SHEET NO. 23

11/1/02
...\Engineering Services\ENVIRONMENTAL\Environmental Drawings\2707b_hyd_prm_psh_wc-alt.dgn

Permit Drawing
Sheet 22 of 30

HNTB

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

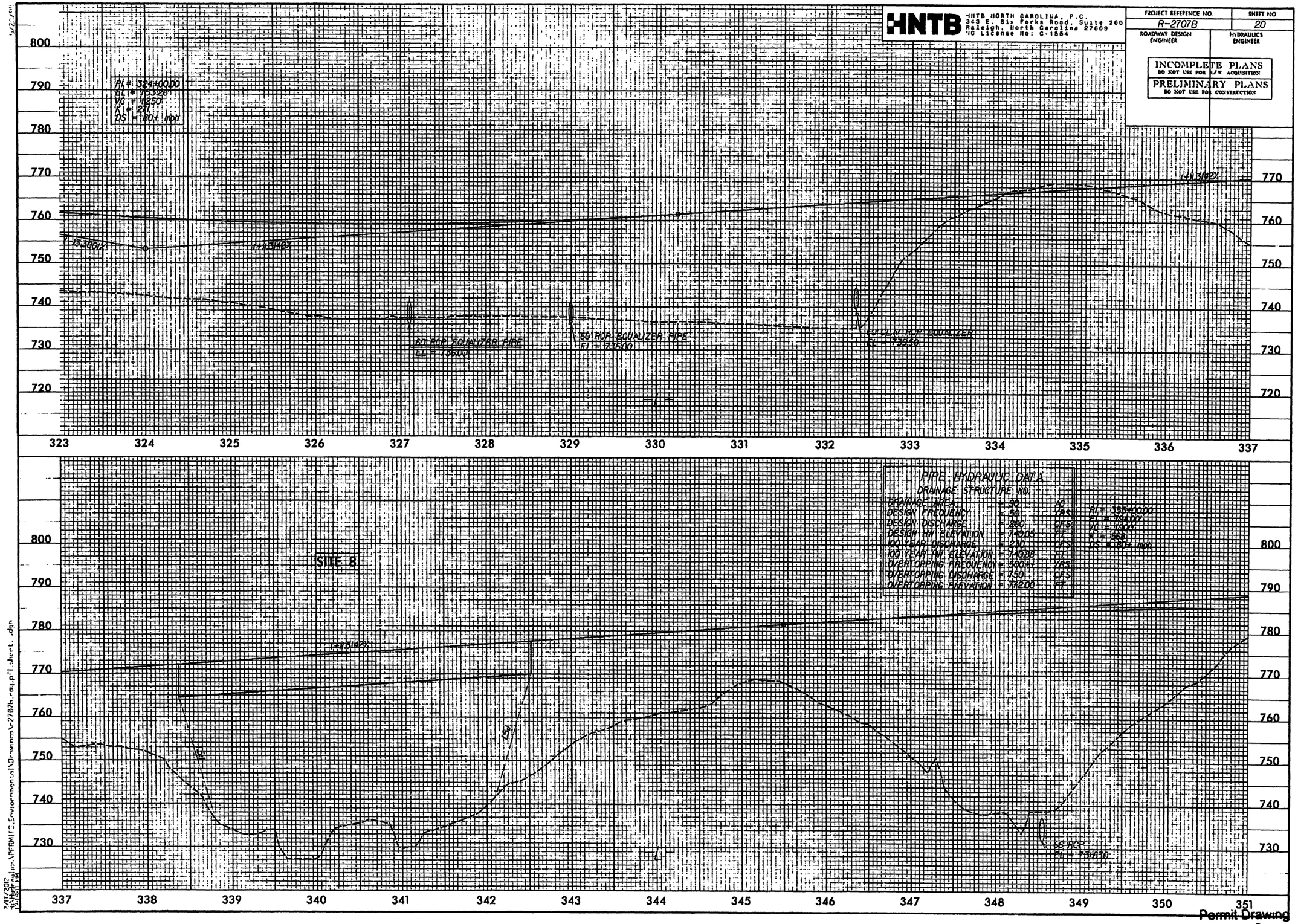
PROJECT REFERENCE NO	SHEET NO
R-2707B	20

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

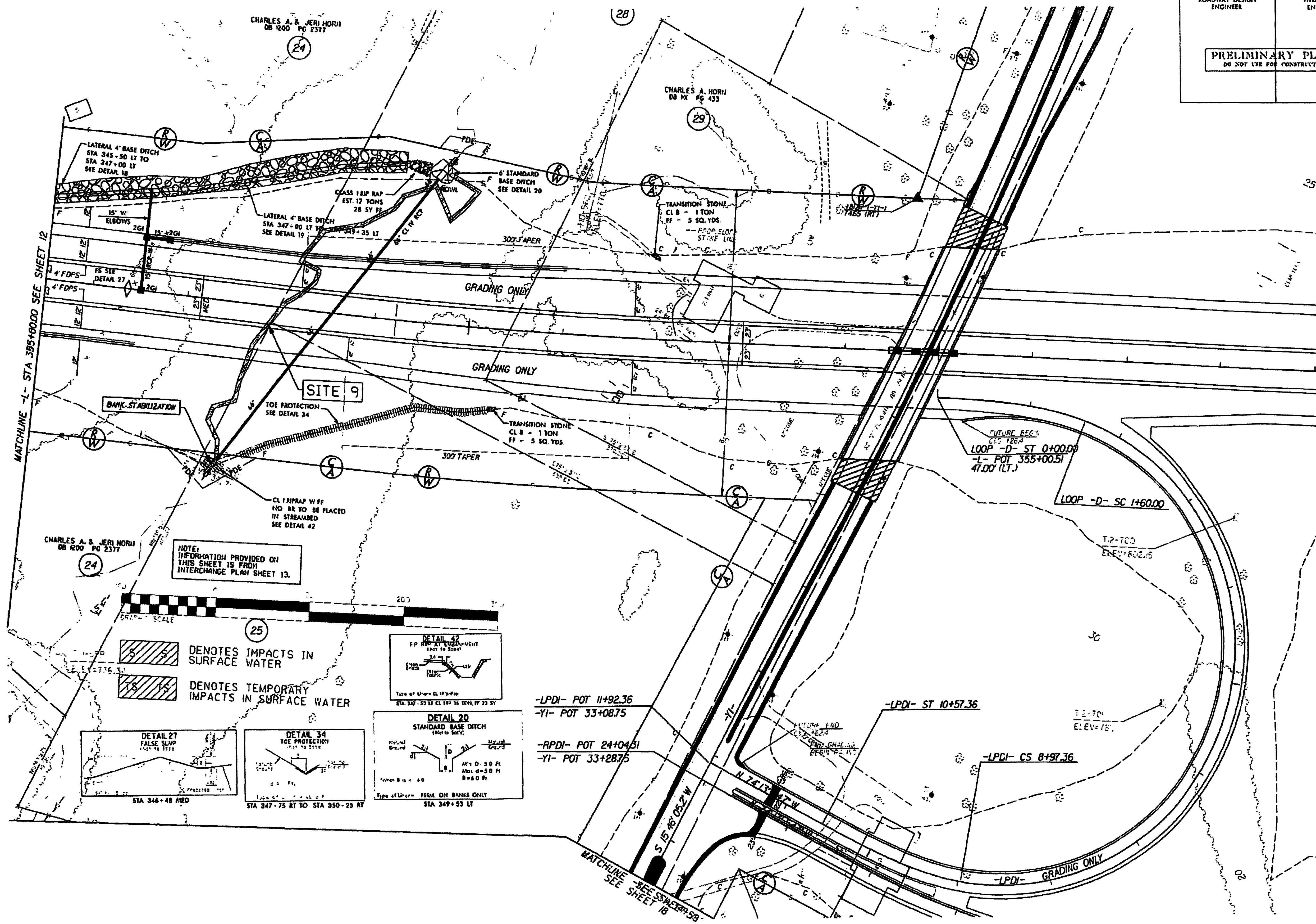


Permit Drawing
Sheet 23 of 30

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

PROJECT REFERENCE NO	SHEET NO
R-2707B	13A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



CHARLES A. & JERI HORN
DB 1200 PG 2377
CHARLES A. HORN
LATERAL 4' BASE DITCH
STA 345+50 LT TO
STA 347+00 LT
SEE DETAIL 18
CLASS I RIP RAP
EST. 17 TONS
28 SY FF
6' STANDARD BASE DITCH
SEE DETAIL 20
LATERAL 4' BASE DITCH
SEE DETAIL 19
TRANSITION STONE
CL B - 1 TON
FF - 5 SQ. YDS.
GRADING ONLY
300' TAPER
MATCHLINE -L- STA 385+00.00 SEE SHEET 12
SITE 9
BANK STABILIZATION
TOE PROTECTION
SEE DETAIL 34
CL I RIPRAP W FF
NO RR TO BE PLACED
IN STREAMBED
SEE DETAIL 42
LOOP -D- ST 0+00.00
-L- POT 355+00.51
47.00' (LT.)
LOOP -D- SC 1+60.00
NOTE:
INFORMATION PROVIDED ON
THIS SHEET IS FROM
INTERCHANGE PLAN SHEET 13.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL 42
DETAIL 27
FALSE SUMP
STA 346+48 MED
DETAIL 34
TOE PROTECTION
STA 347+75 RT TO STA 350+25 RT
DETAIL 20
STANDARD BASE DITCH
STA 349+53 LT
-LPDI- POT 11+92.36
-Y1- POT 33+08.75
-RPDI- POT 24+04.31
-Y1- POT 33+28.75
-LPDI- ST 10+57.36
-LPDI- CS 8+97.36
S 15°46'05.2" W
MATCHLINE SEE SHEET 18
-LPDI-
GRADING ONLY

Permit Drawing
Sheet 24 of 30

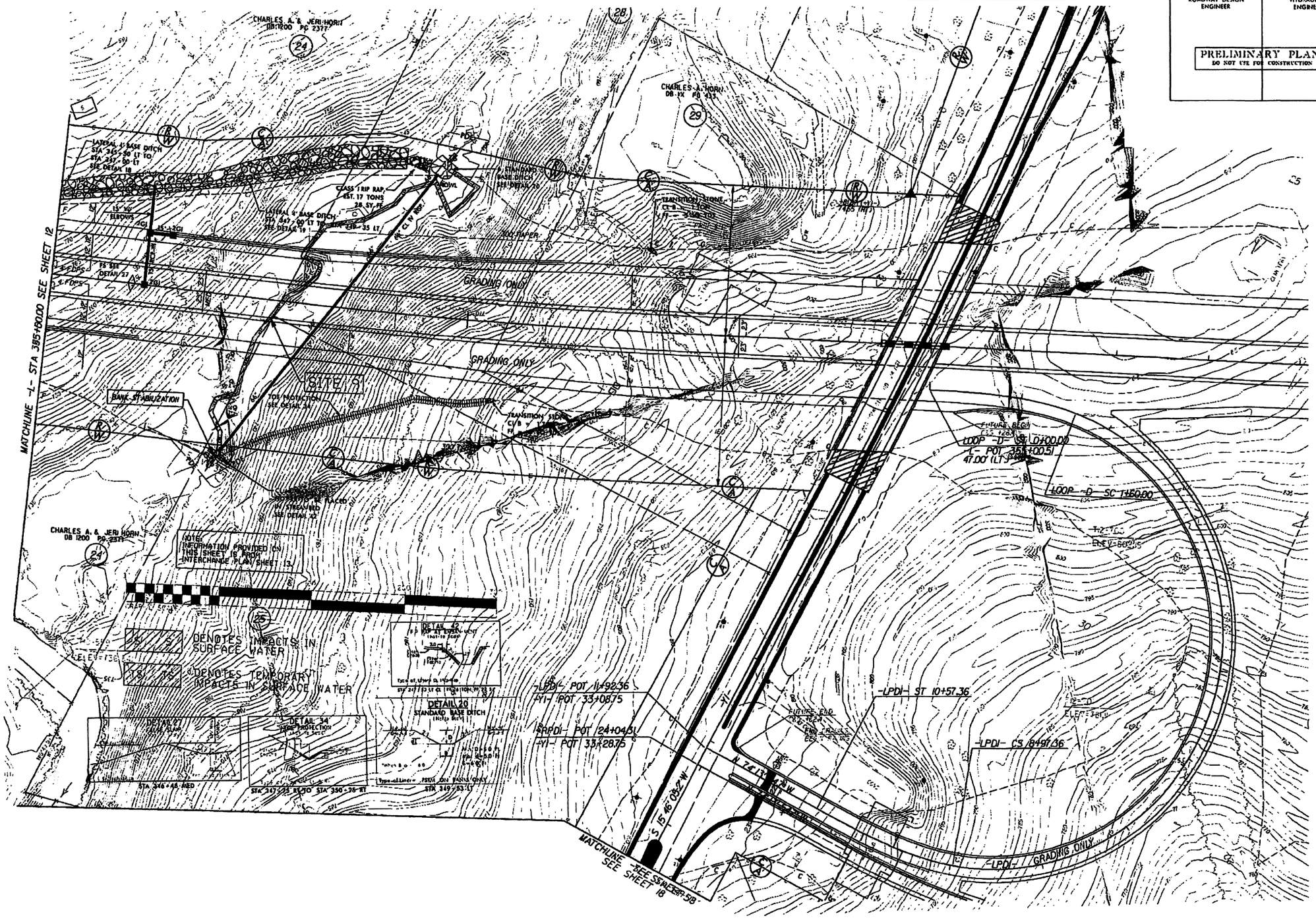
HNTB

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

PROJECT REFERENCE NO	SHEET NO
R-2707B	13A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



Permit Drawing
Sheet 25 of 30

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	13B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

$$$$DATE$$$$
4/18/2012
H:\Hydraulics\PERMITS_Environmental\Drawings\2707b_hyd_prm_psh_wet_sl3b.dgn

-RPAI- GRADING ONLY
-LPAI- GRADING ONLY
LOOP -A- SC 1+60.00
RAMP -A- SC 5+74.56
RAMP -D- SC 2+40.00
RAMP -D- CS 10+19.40
-RPDI- SRS 12+59.40
-Y17-
PT Sta. 366+95.53
PT Sta. 354+21
MATCHLINE -L- STA 374+00 SEE SHEET 14
STA 360+00 SEE SHEET 14
N 73°17'00.3" E
PROP. SLOPE STAKE LINE
PROP. R/W
PROP. C/A FENCE
EXISTING C/A
EST 3 TONS CL B RIP RAP
EST _ SY FILTER FABRIC
EST _ TONS CL I RIP RAP
EST _ SY FILTER FABRIC
TOE PROTECTION
STA 365+00 TO 367+50 LT
SEE DETAIL 5
EST _ TON CL B RIP RAP
EST _ SY FILTER FABRIC
HW W/ SLUICE GATE
HDWL W/ SLUICE GATE
2GI-B W/ FLAT GRATE
2GI-A W/FLAT GRATE
48" CLASS IV W/METHOD B INSTALLATION
HAZARDOUS SPILL BASIN SEE DETAIL 26
TOTAL CAPACITY REQUIRED W/3.5' FREEBOARD = 1,780 CY
TOTAL CAPACITY W/0.5' FREEBOARD = 1,802 CY
SPECIAL 2' LATERAL BASE DITCH W/CL B RIP RAP
STA 12+25 TO 13+00 RT RAMP -D-
SEE DETAIL 9
EST _ TONS CL B RIP RAP
EST _ SY FILTER FABRIC
EST _ CY DDE
LATERAL "V" DITCH LINED W/CL B RIP RAP
STA 32+39 TO 36+39 LT -Y17-
SEE DETAIL 2
EST _ TONS CL B RIP RAP
EST _ SY FILTER FABRIC
EST _ CY DDE
SITE 11
CHARLES A. HORN DB 1652 PG 1882
WILLIAM JAMES HORN
40
41
39
5
35
30

NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 13.

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

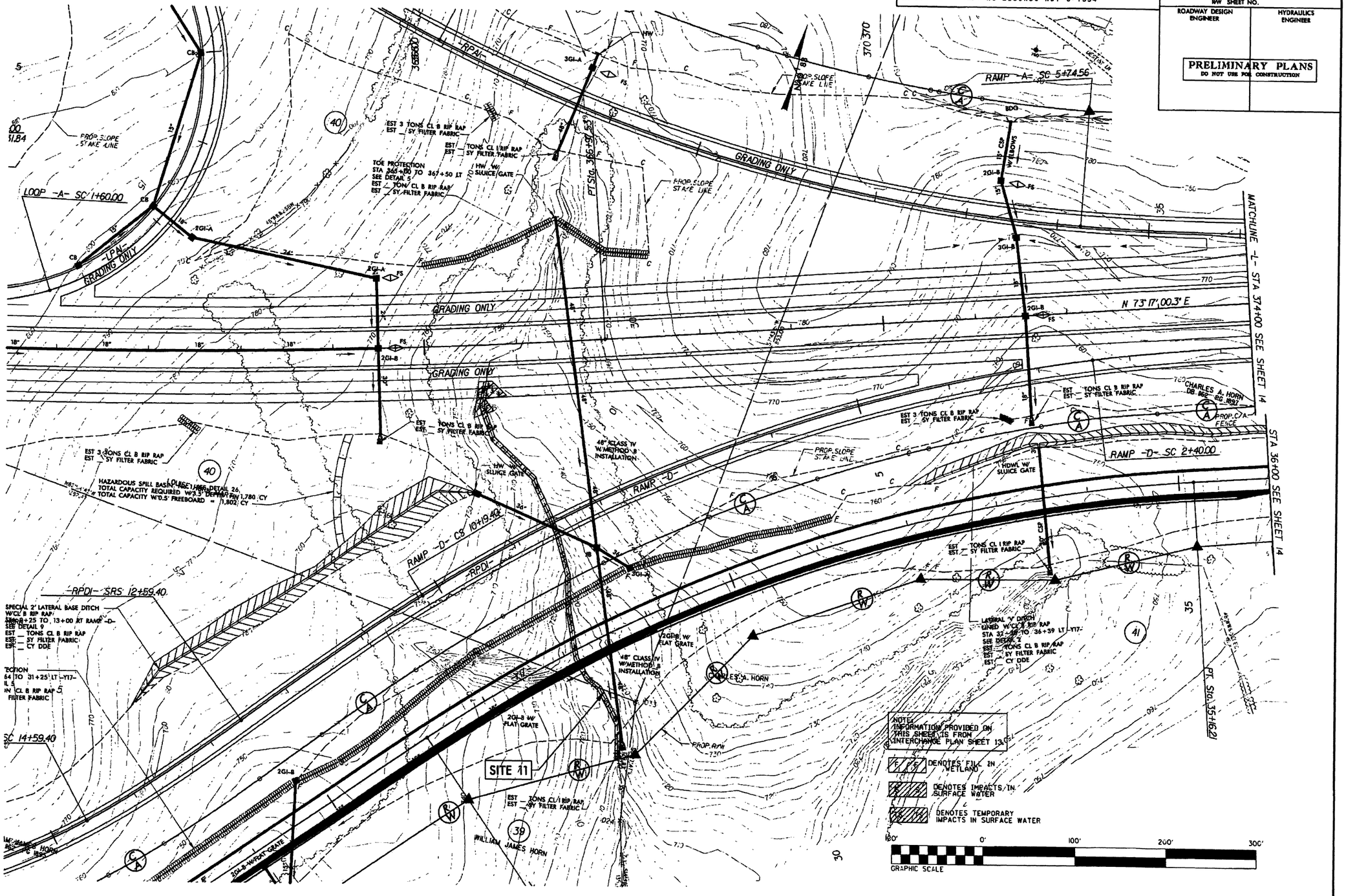
GRAPHIC SCALE
180' 0' 100' 200' 300'

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	13B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



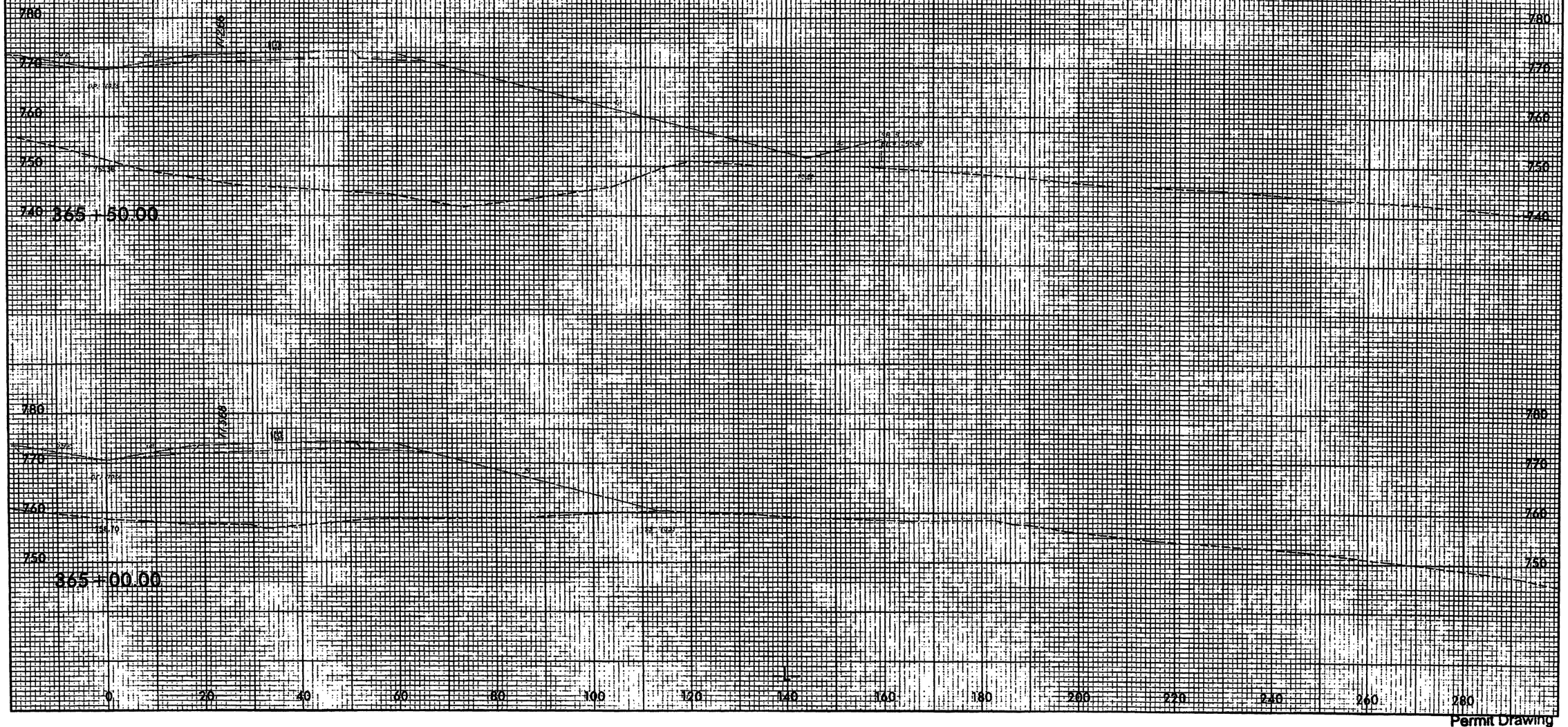
9999DATE$$$$
4/18/2012
R:\Hydraulics\PERMITS_Environmental\Drawings\r2707b_hyd_prm_psh_wet_sht3b.dgn

Permit Drawing
Sheet 27 of 30

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2707C	X-69

WETLAND CROSS SECTION SITE 11

WETLAND DOES NOT SHOW UP ON ANY CROSS-SECTION. IT FALLS BETWEEN 365+00 AND 365+50

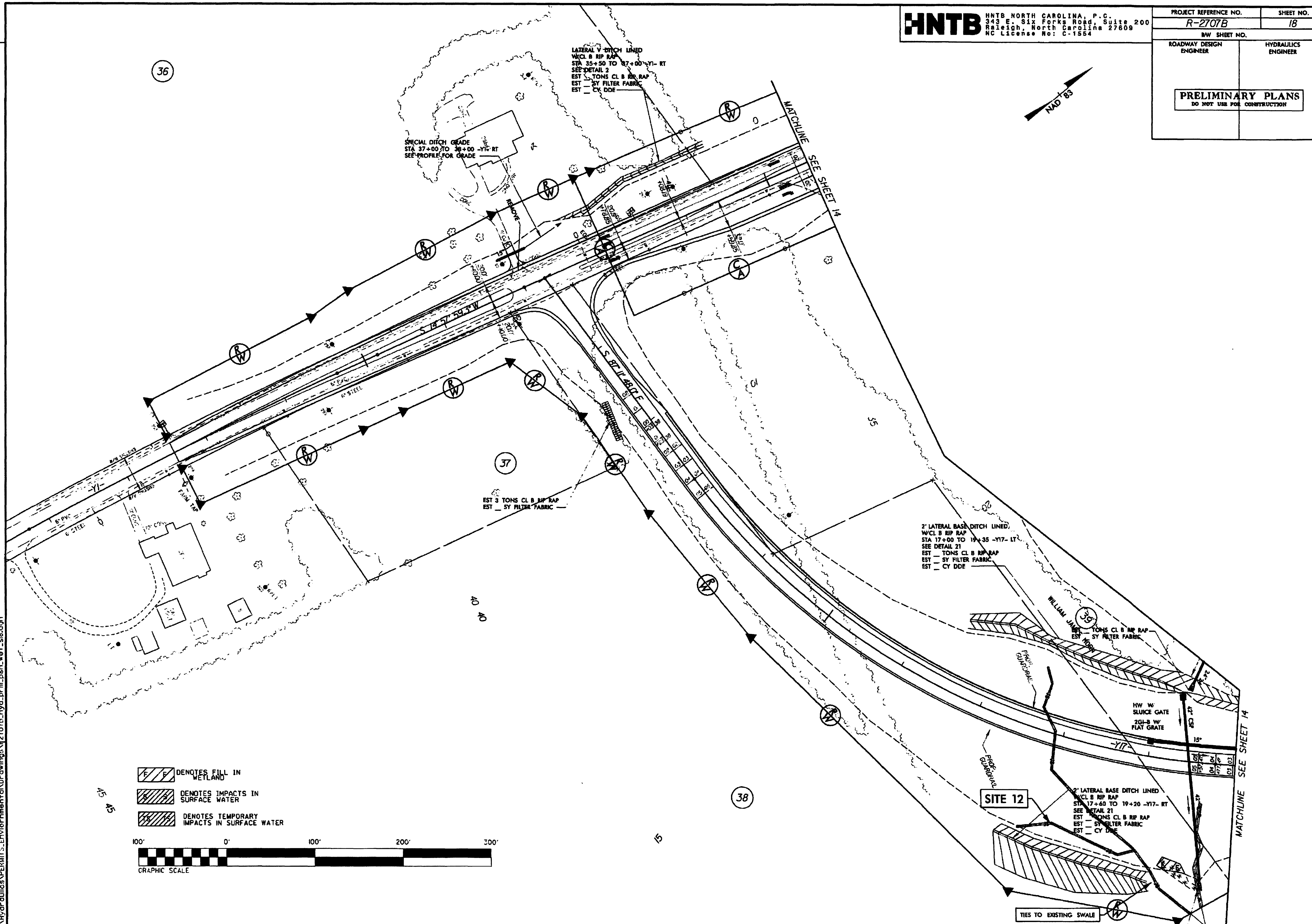


Permit Drawing
Sheet 28 of 30

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



LATERAL V DITCH LINED W/CL B RIP RAP
STA 35+50 TO 37+00 -Y1- RT
SEE DETAIL 2
EST _ TONS CL B RIP RAP
EST _ SY FILTER FABRIC
EST _ CY DDE
SPECIAL DITCH GRADE
STA 37+00 TO 38+00 -Y1- RT
SEE PROFILE FOR GRADE
MATCHLINE SEE SHEET 14
NAD 83
EST 3 TONS CL B RIP RAP
EST _ SY FILTER FABRIC
2' LATERAL BASE DITCH LINED W/CL B RIP RAP
STA 17+00 TO 19+35 -Y17- LT
SEE DETAIL 21
EST _ TONS CL B RIP RAP
EST _ SY FILTER FABRIC
EST _ CY DDE
EST _ TONS CL B RIP RAP
EST _ SY FILTER FABRIC
HW W/ SLUICE GATE
2GI-B W/ FLAT GRATE
-Y17-
SITE 12
2' LATERAL BASE DITCH LINED W/CL B RIP RAP
STA 17+60 TO 19+20 -Y17- RT
SEE DETAIL 21
EST _ TONS CL B RIP RAP
EST _ SY FILTER FABRIC
EST _ CY DDE
TIES TO EXISTING SWALE
MATCHLINE SEE SHEET 14
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
100' 0' 100' 200' 300'
36
37
38

REVISIONS

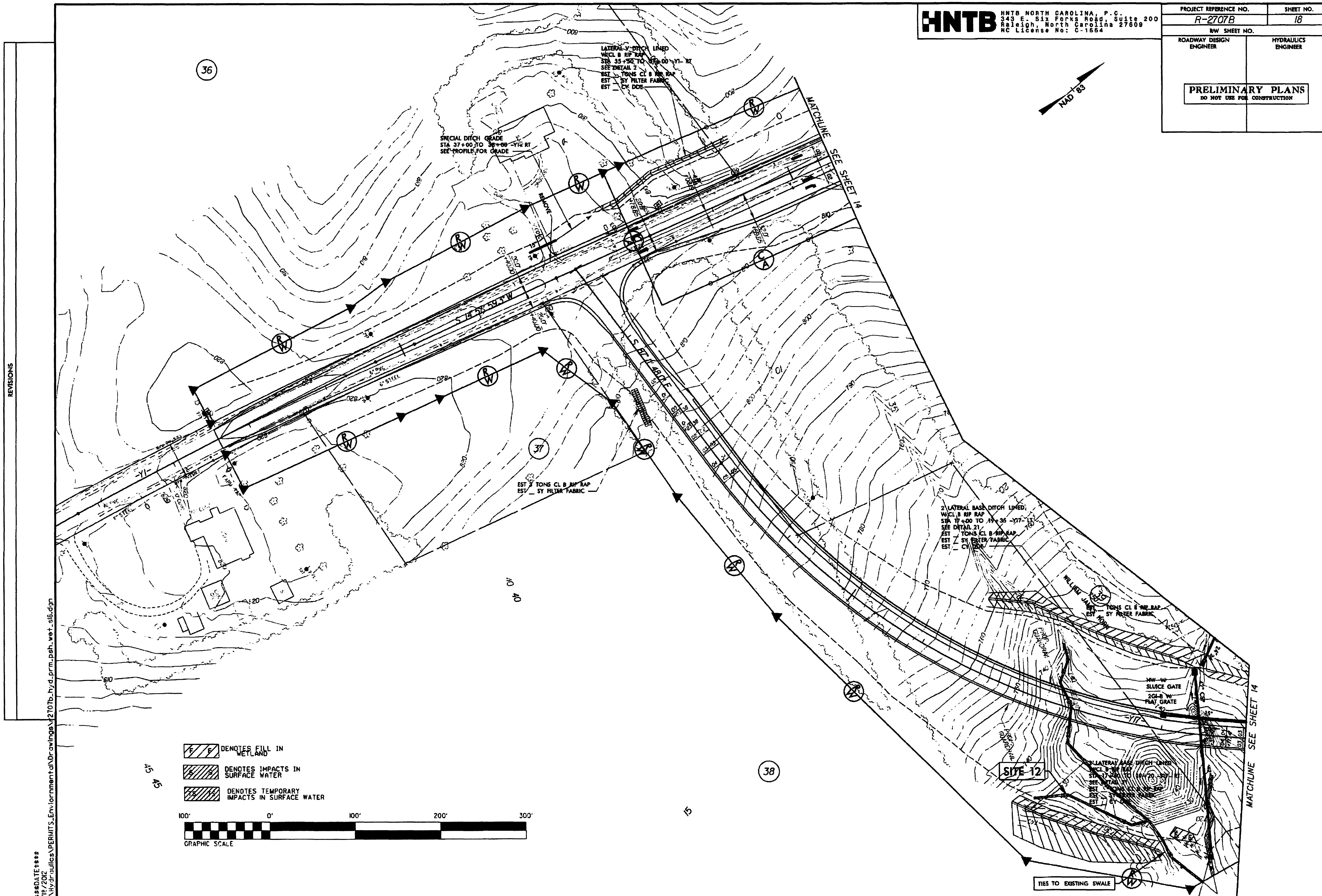
$$$$DATE$$$$
4/19/2012
R:\Hydraulics\PERMITS_Environmental\Drawings\r2707b_hyd_prm_psh_wet_sl8.dgn

Permit Drawing
Sheet 29 of 30

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

PROJECT REFERENCE NO.	SHEET NO.
R-2707B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

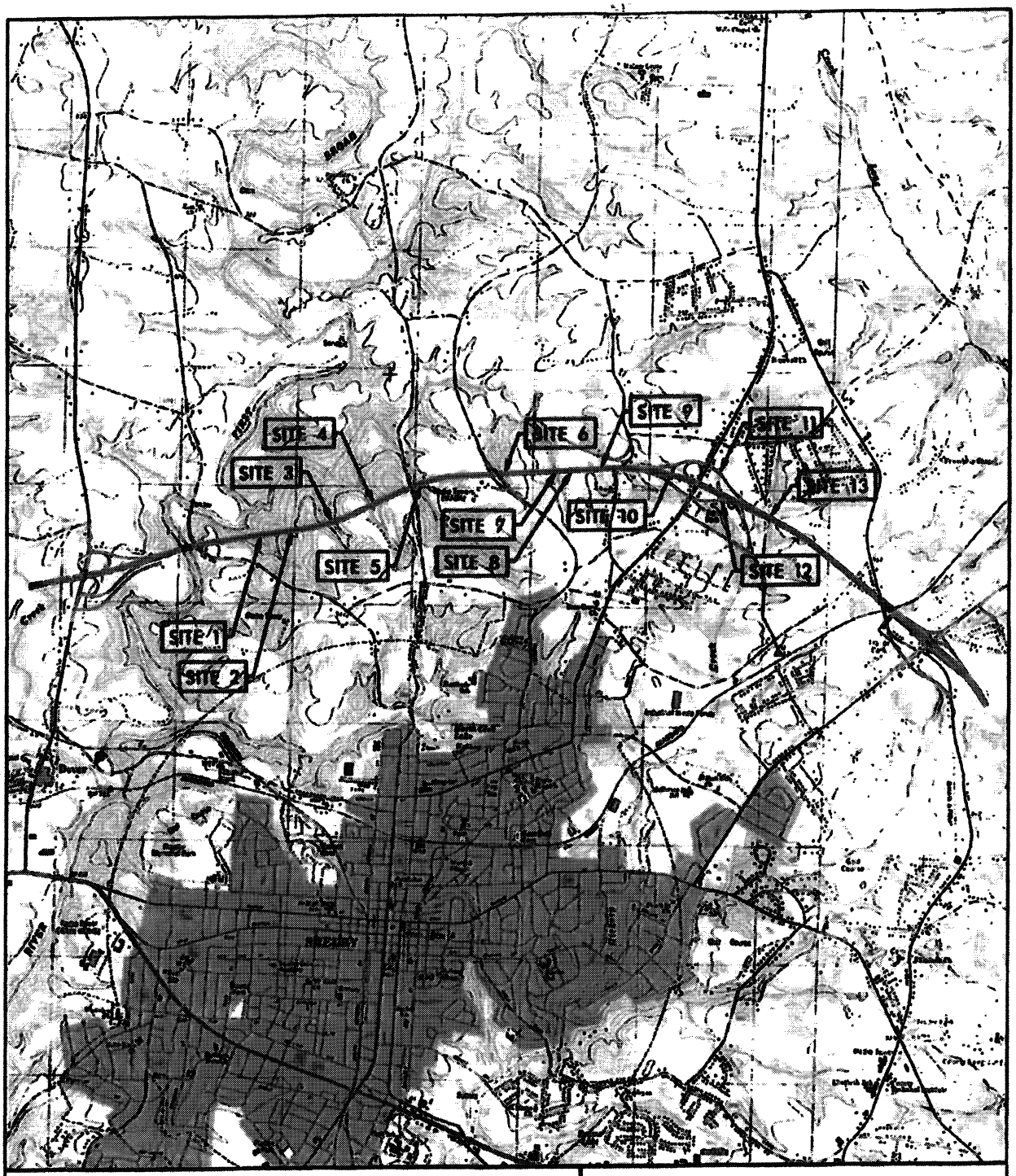
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



MATCHLINE SEE SHEET 14
NAD 83
LATERAL V DITCH LINED W/CL B RIP RAP
STA 35+50 TO 37+00 -Y1- RT
SEE DETAIL 2
EST _ TONS CL B RIP RAP
EST _ SY FILTER FABRIC
EST _ CY DDE
SPECIAL DITCH GRADE
STA 37+00 TO 38+00 -Y1- RT
SEE PROFILE FOR GRADE
REMOVE
-Y1-
EST 3 TONS CL B RIP RAP
EST _ SY FILTER FABRIC
LATERAL BASE DITCH LINED W/CL B RIP RAP
SEE DETAIL 21
EST _ TONS CL B RIP RAP
EST _ SY FILTER FABRIC
EST _ CY DDE
SLUICE GATE
FLAT GRATE
SITE 12
TIES TO EXISTING SWALE
MATCHLINE SEE SHEET 14
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
100' 0' 100' 200' 300'
GRAPHIC SCALE
REVISIONS

$$$$DATE$$$$
4/19/2012
R:\Hydraulics\PERMITS_Environmental\Drawings\r2707b_hyd_prm_psh_wet_s18.dgn

Permit Drawing
Sheet 30 of 30



TOPO MAP

SCALE: 1" = 4000'

NCDOT

DIVISION OF HIGHWAYS
CLEVELAND COUNTY
PROJECT: R-2707C

US 74 - SHELBY BYPASS
FROM WEST OF 226
TO EAST OF NC 150

SHEET **OF** **02/24/12**

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 405+13 - 406+75							0.03	<0.01	374	28	
2	-L- 413+26 - 416+00							0.03	<0.01	397	20	
3	-L- 425+38 - 426+72							0.03	<0.01	323	21	
4	-L- 438+10 - 439+80 Rt	Pond						0.98				
			0.02					0.02	<0.01	182	10	
5	-L- 452+39 - 454+18							0.06	<0.01	683	57	
	Bank Stabilization							0.01		59		
6	-L- 475+63 - 477+10		0.01			<0.01		0.01	<0.01	273	21	
7	-L- 489+55 - 491+56							0.05	<0.01	496	22	
8	-L- 495+07 - 495+74							0.02	<0.01	330	17	
9	-L- 502+67 - 513+70		0.14					0.16	<0.01	1799	48	
10	-RPB2- 10+40 - 11+78							0.01	<0.01	183	20	
11	-RPA2- 14+87 - 18+11		0.49					0.06	<0.01	519	35	
12	-L- 536+91 - 541+08							0.03	<0.01	498	30	
	Bank Stabilization							<0.01		29		
13	-L- 552+30 - 554+65							0.11	<0.01	761	40	
	Bank Stabilization							<0.01		29		
14	-L- 563+56 - 568+17		0.01			0.01		<0.01	<0.01		10	
		Pond						1.33				
15	-Y11REV- 55+02 - 58+70		0.18			0.05		0.01	<0.01	172	17	
16	-Y16REV-14+16 - 14+71							0.02	<0.01	167	13	
TOTALS:			0.85			0.07		2.96	0.03	7274	409	

Note: No Impacts to First Broad River Spanning Structure.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CLEVELAND COUNTY
(R-2707C)

SHEET 2/24/2012

ATN Revised 3/31/05

TIP PROJECT: R-2707C

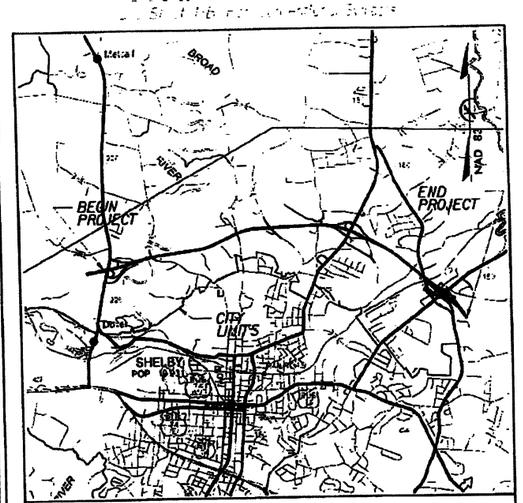
CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CLEVELAND COUNTY

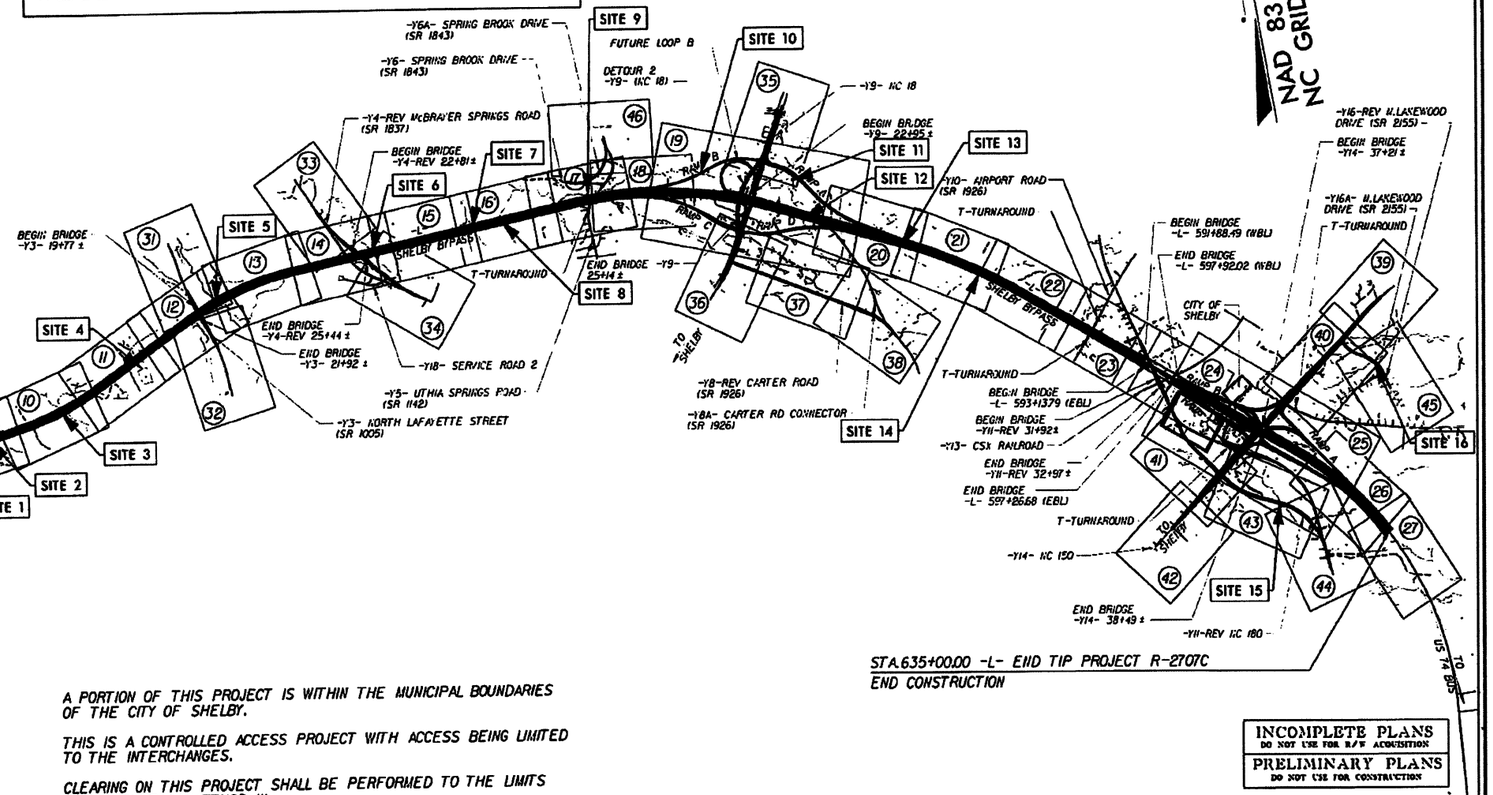
STATE	STATE PROJECT REFERENCE NO	SHEET NO	TOTAL SHEETS
N.C.	R-2707C	1	
STATE B.P. NO.	F.A. PROJ. NO.	DESCRIPTION	
34497.1.4	NHF-74(14)	P.E.	

LOCATION: US 74 SHELBY BYPASS
FROM WEST OF NC 226
TO EAST OF NC 150
TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNING, SIGNALS AND STRUCTURES



VICINITY MAP SHOWING LOCATION OF STATE PROJECT 8.1801001

WETLAND AND STREAM IMPACTS



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF SHELBY.

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO THE INTERCHANGES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

NCDOT CONTACT: DOUG TAYLOR, P.E.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2005	=	20,300
ADT 2025	=	30,900
DHV	=	10 %
D	=	60 %
T	=	11 % *
V	=	70 MPH

* TTST 6% DUAL 5%

PROJECT LENGTH

LENGTH OF ROADWAY STATE PROJECT R-2707C	=	5.20 MILES
LENGTH OF STRUCTURES STATE PROJECT R-2707C	=	0.14 MILES
LENGTH OF STATE PROJECT R-2707C	=	5.34 MILES

Prepared for NCDOT in the Office of:
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4865 FAX

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

TIM R. REID, P.E.
PROJECT ENGINEER

TRENT E. HUFFMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SDG
Sungate Design Group, P.A.
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
MOFFATT & NICHOL
P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
P.E.
STATE HIGHWAY DESIGN ENGINEER

PROJECT REFERENCE NO	SHEET NO.
R-2707C	8
R/W SHEET NO	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE STA 394+00 SEE SHEET 7

MATCHLINE STA 406+00 SEE SHEET 9

GARY ALSOBROOK
DB 1513 PG 2054

OLIVIA WITHROW
DB 1065 PG 243

FRANK THOMAS HANNAH
DB 15C PG 170

SITE 1

OMAR MOLETTE
DB 1171 PG 150

-L-
SHELBY BYPASS

N 82° 07' 30.7" E

VINCE BROOKS
DB 13E PG 254

FRANK THOMAS HANNAH
DB 15C PG 170

FRANK TOMS, JR.
DB 1269 PG 538

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FRANCES LEDFORD
DB 18T PG 364

FOR -L- PROFILE SEE SHEET 50

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE STA 394+00 SEE SHEET 7

MATCHLINE STA 406+00 SEE SHEET 9

GARY ALSOBROOK
DB 1515 PG 2051

OLIVIA WITHROW
DB 1065 PG 243

FRANK THOMAS HANNAH
DB 15C PG 170

OMAR MOLETTE
DB 1119 PG 150

SITE 1

SHELBY BYPASS

N 82° 07' 30" E

BRUCE BROOKS
DB 13E PG 254

FRANK THOMAS HANNAH
DB 15C PG 170

FRANK TOMS, JR.
DB 1269 PG 538

FRANCES LEDFORD
DB 187 PG 364

DENOTES IMPACTS IN SURFACE WATER

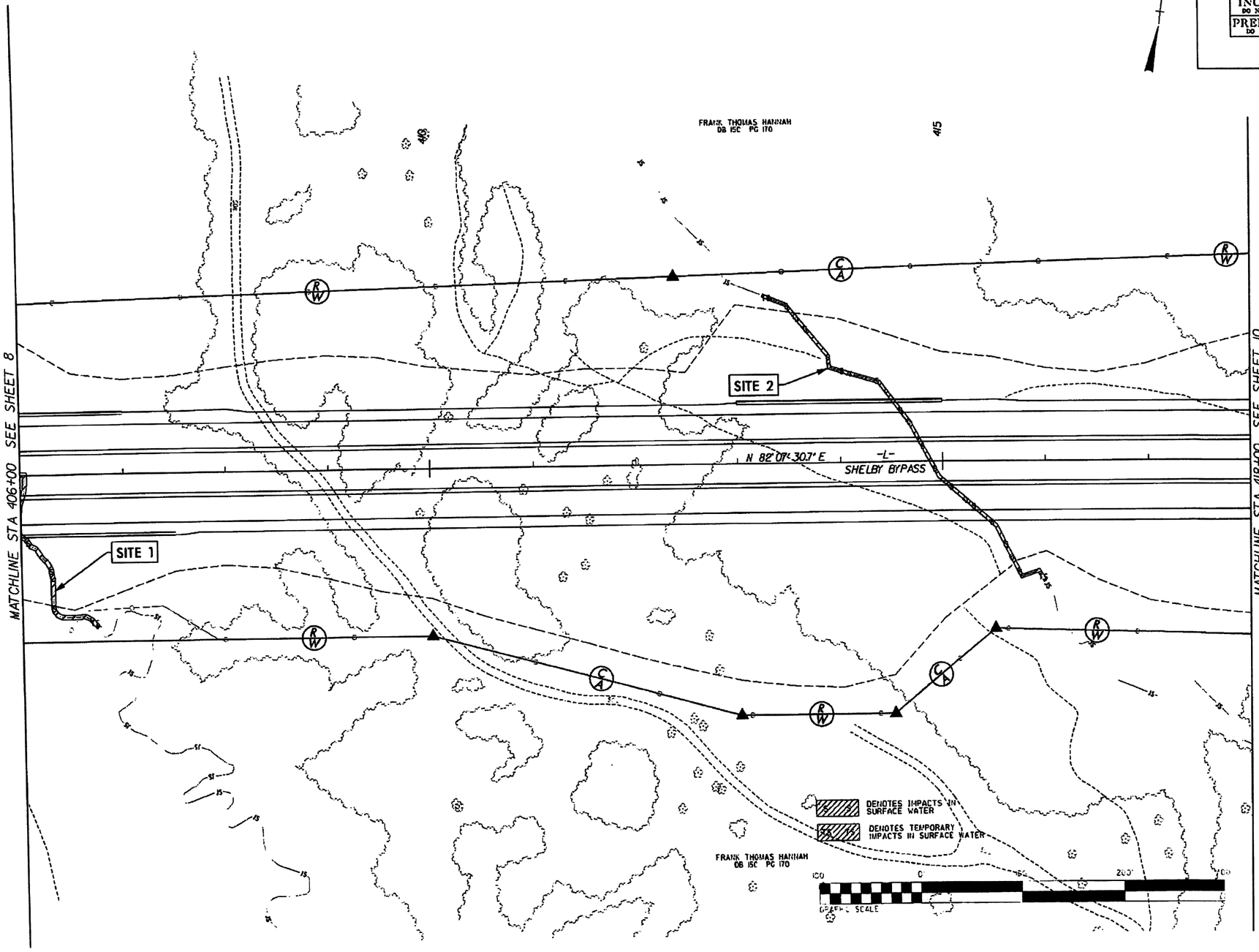
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE

FOR -L- PROFILE SEE SHEET 50

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

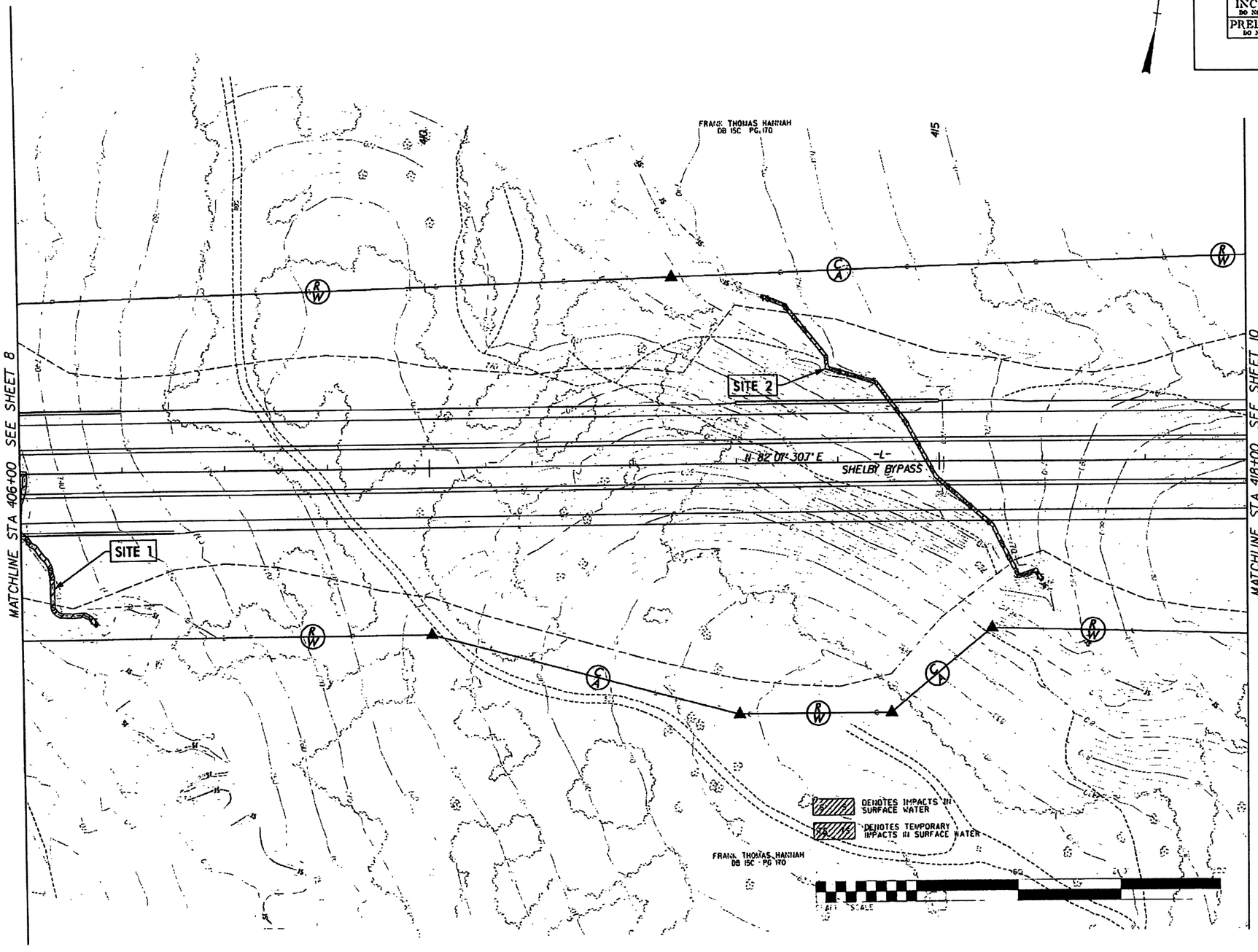
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 50

PROJECT REFERENCE NO	SHEET NO.
R-2707C	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



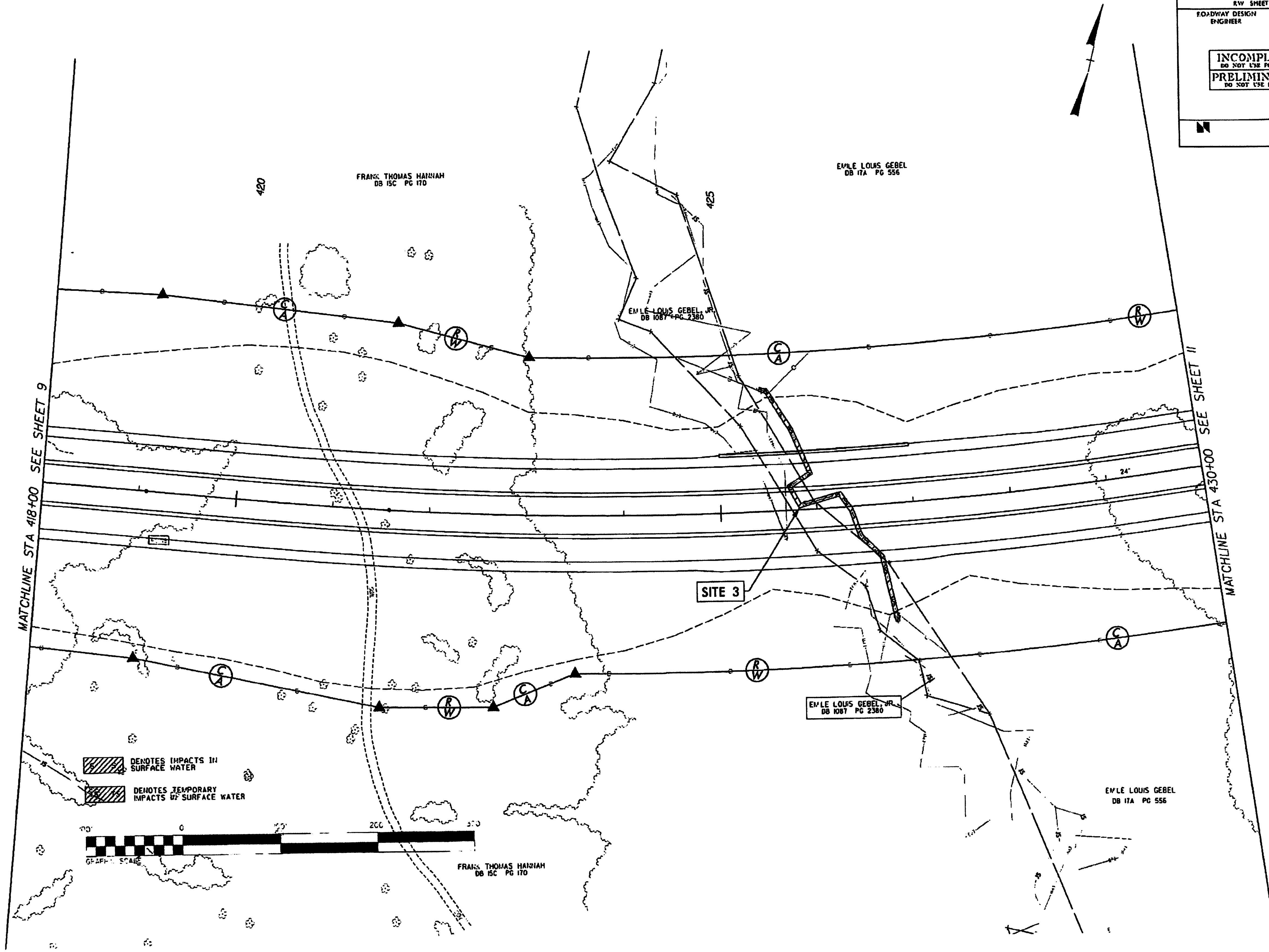
FOR -L- PROFILE SEE SHEET 50

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

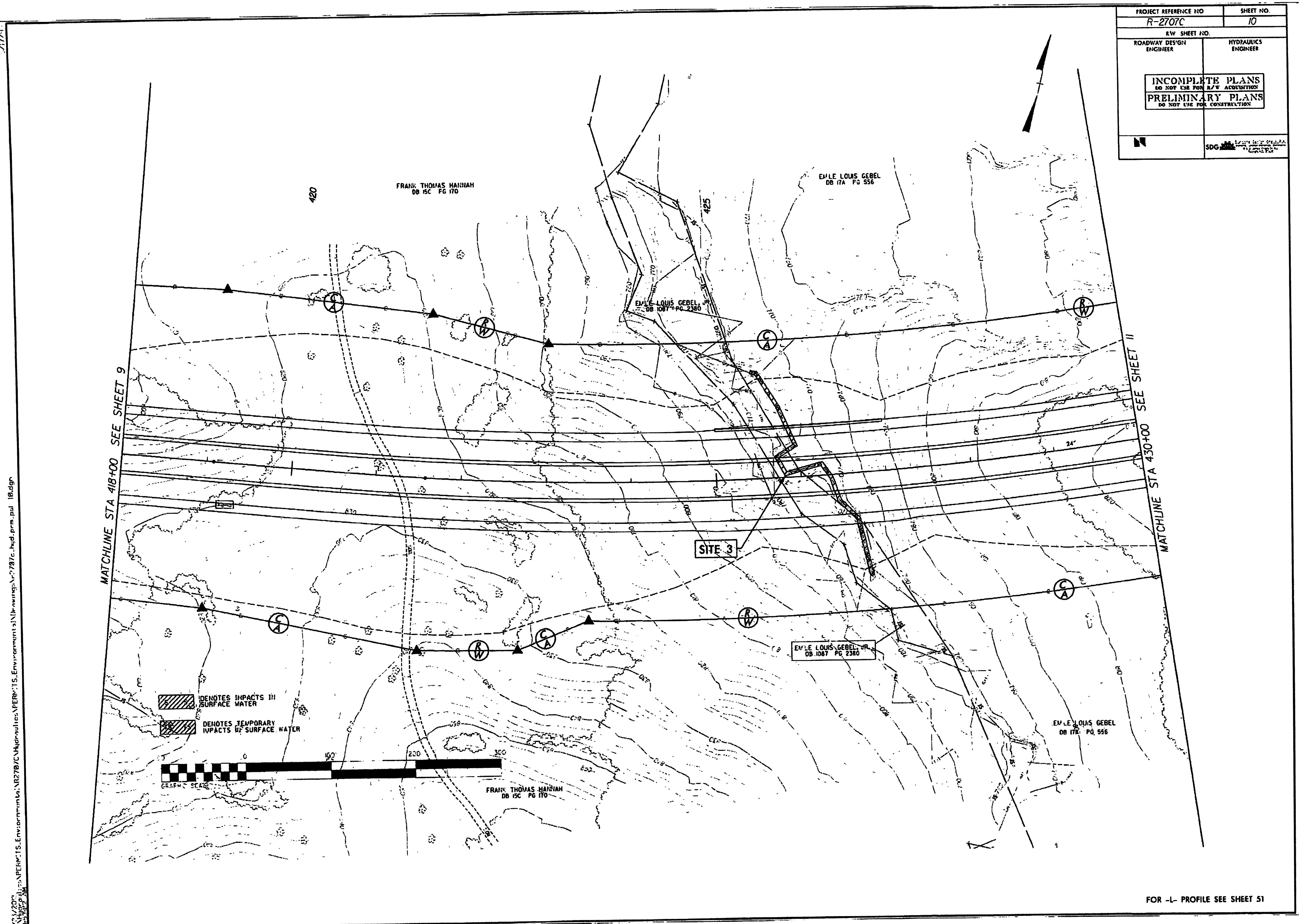
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SDG



FOR -L- PROFILE SEE SHEET 51


PROJECT REFERENCE NO.
R-2707C
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
FRANK THOMAS HANNAH
DB 15C PG 170
EMLE LOUIS GEBEL
DB 17A PG 556
EMLE LOUIS GEBEL, JR.
DB 1087 PG 2380
MATCHLINE STA 418+00 SEE SHEET 9
MATCHLINE STA 430+00 SEE SHEET 11
SITE 3
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
FOR -L- PROFILE SEE SHEET 51

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	51

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

INCOMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION

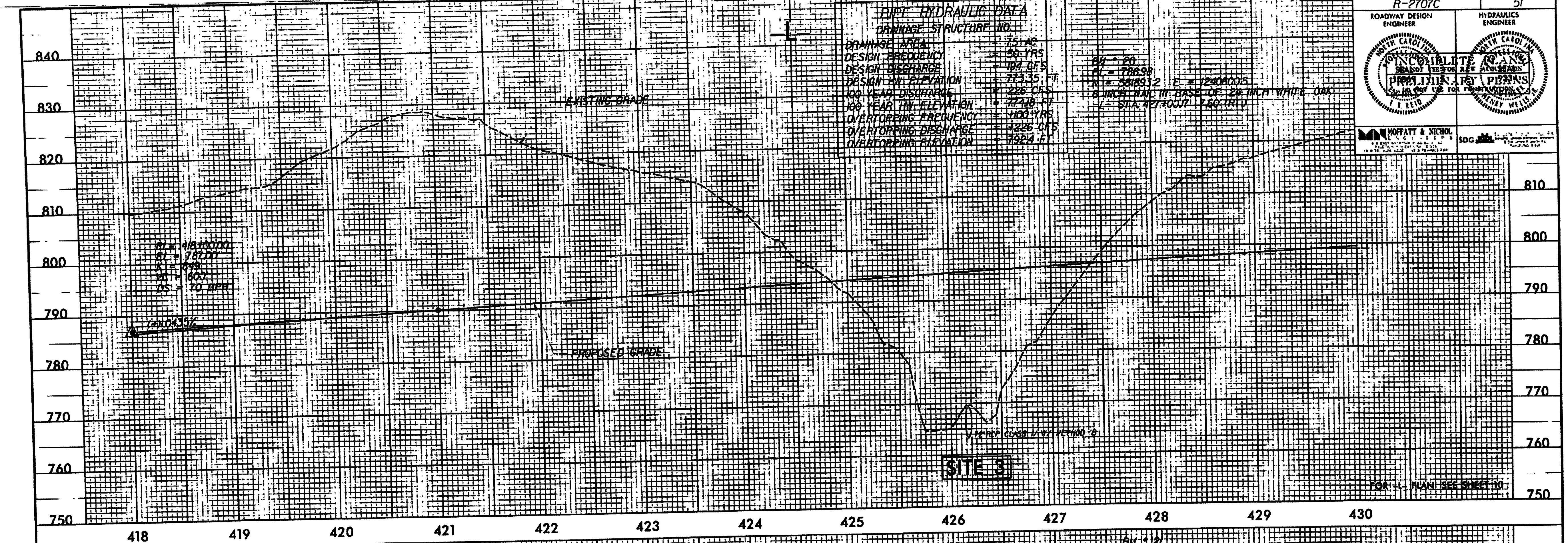
PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

NORTH CAROLINA PROFESSIONAL — T. R. REID

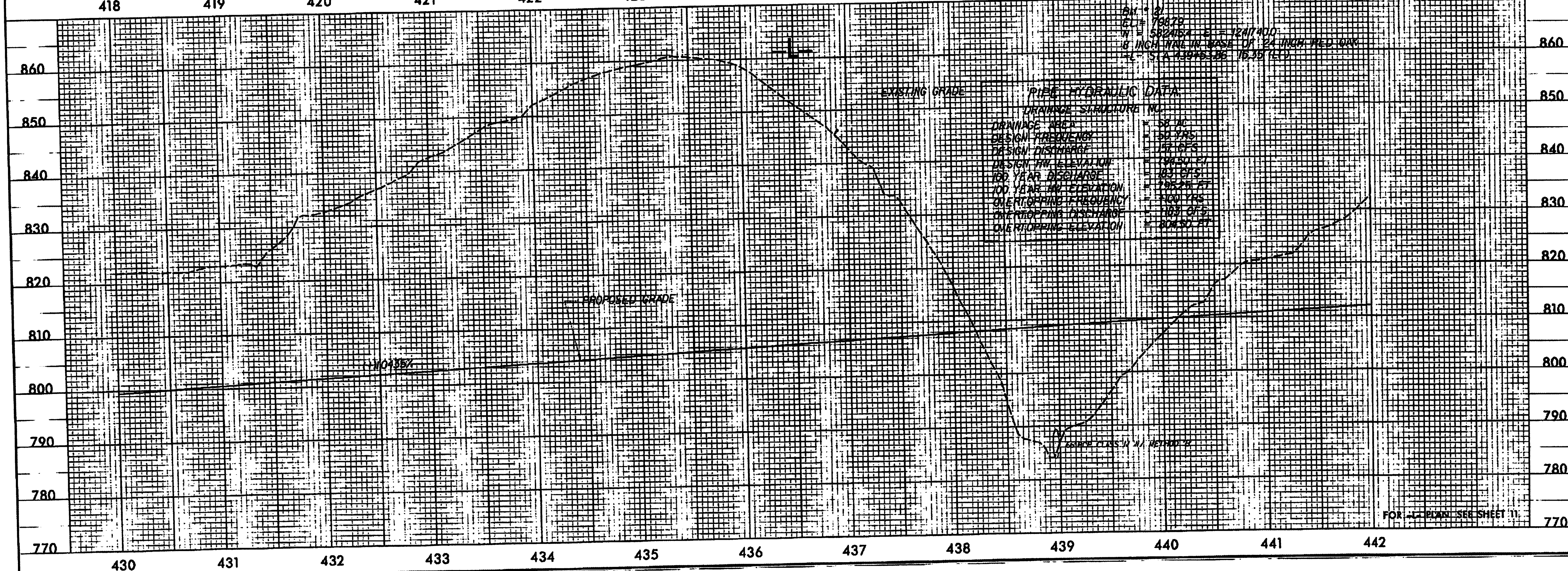
NORTH CAROLINA PROFESSIONAL — HENRY WELLS, JR.

MOFFATT & NICHOL ENGINEERS

SDG



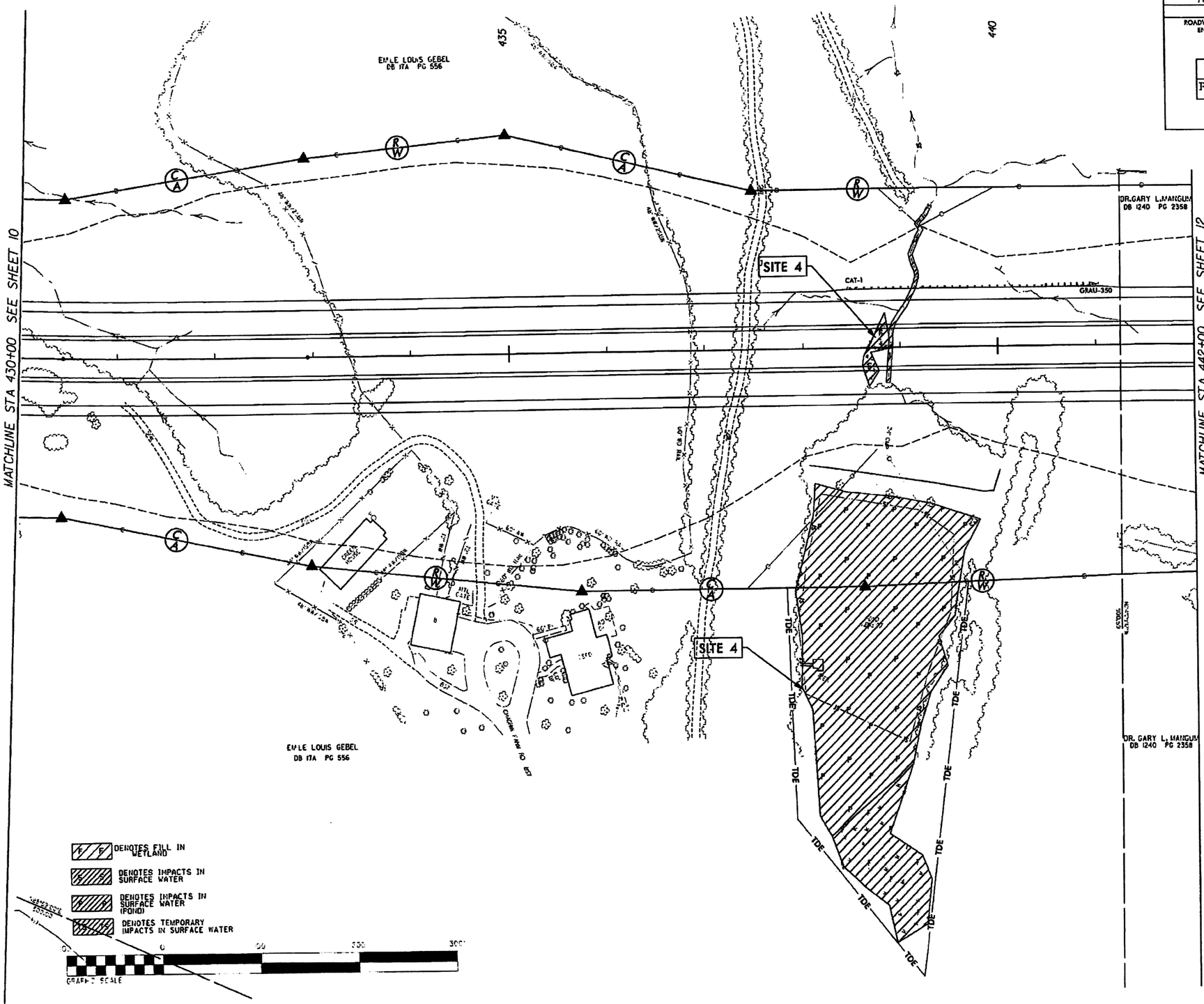
-L-
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.
DRAINAGE AREA = 75 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 194 CFS
DESIGN HW ELEVATION = 773.35 FT
100 YEAR DISCHARGE = 226 CFS
100 YEAR HW ELEVATION = 774.18 FT
OVERTOPPING FREQUENCY = +100 YRS
OVERTOPPING DISCHARGE = +226 CFS
OVERTOPPING ELEVATION = 792.4 FT
BM # 20
EL = 786.98
N = 581893.2 E = 1240600.5
8 INCH NAIL IN BASE OF 20 INCH WHITE OAK
-L- STA 427+00.17 7.60 (RT)
EXISTING GRADE
PI = 418+00.00
EL = 787.00
K = 849
VC = 600'
DS = 70 MPH
(+) 0.435%
PROPOSED GRADE
SITE 3
FOR -L- PLAN SEE SHEET 10
840
830
820
810
800
790
780
770
760
750
418
419
420
421
422
423
424
425
426
427
428
429
430



BM # 21
EL = 798.79
N = 582416.4 E = 1241740.0
8 INCH NAIL IN BASE OF 24 INCH RED OAK
-L- STA 439+63.86 16.35' (LT)
-L-
EXISTING GRADE
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.
DRAINAGE AREA = 58 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 157 CFS
DESIGN HW ELEVATION = 794.50 FT
100 YEAR DISCHARGE = 183 CFS
100 YEAR HW ELEVATION = 795.25 FT
OVERTOPPING FREQUENCY = +100 YRS
OVERTOPPING DISCHARGE = +183 CFS
OVERTOPPING ELEVATION = 804.50 FT
PROPOSED GRADE
(+) 0.435%
FOR -L- PLAN SEE SHEET 11
860
850
840
830
820
810
800
790
780
770
430
431
432
433
434
435
436
437
438
439
440
441
442

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

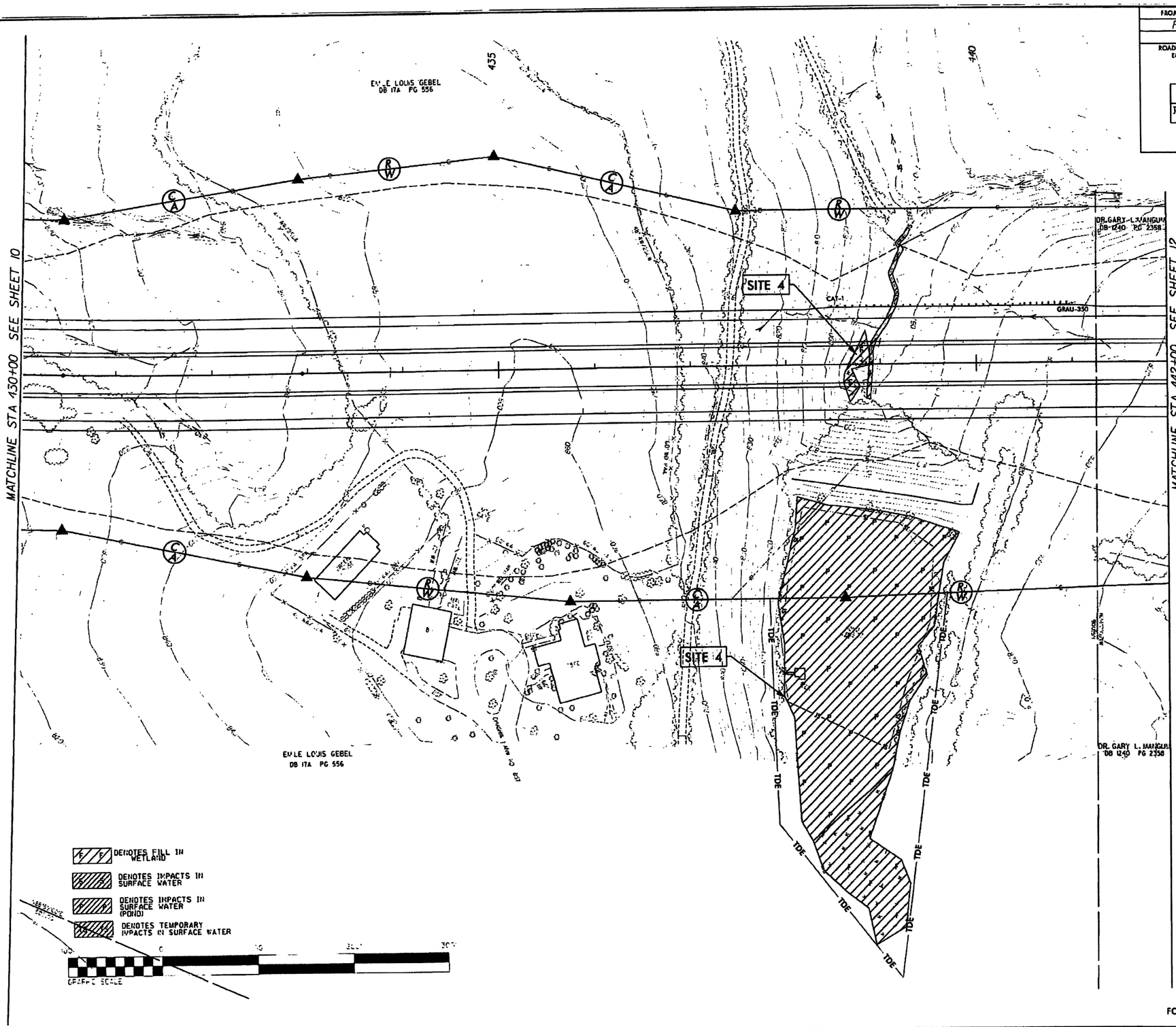


FOR -L- PROFILE SEE SHEET 51

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 51

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2707C	X-182

WETLAND CROSS SECTION
SITE 4

FILL IN WETLANDS OCCURS BETWEEN STA. 438+50 AND STA. 439+00

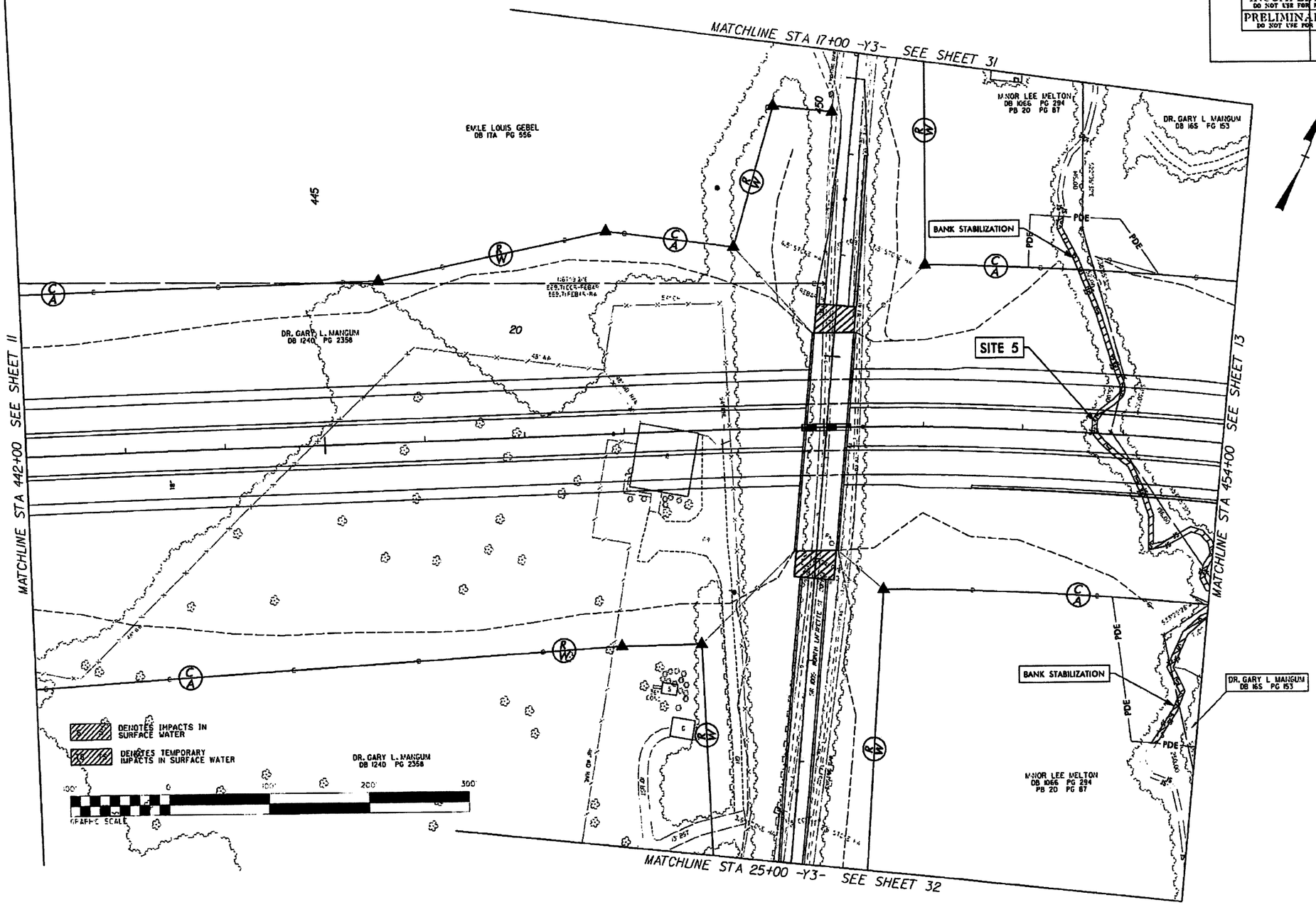
438+50.00

438+00.00

437+50.00

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PROJECT REFERENCE NO.	SHEET NO.
R-2707C	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE STA 17+00 -Y3- SEE SHEET 31

MATCHLINE STA 442+00 SEE SHEET 11

MATCHLINE STA 454+00 SEE SHEET 13

MATCHLINE STA 25+00 -Y3- SEE SHEET 32

EMILE LOUIS GEBEL
DB 17A PG 556

DR. GARY L. MANGUM
DB 1240 PG 2358

MINOR LEE MELTON
DB 1066 PG 294
PB 20 PG 67

DR. GARY L. MANGUM
DB 165 PG 153

BANK STABILIZATION

SITE 5

POE

445

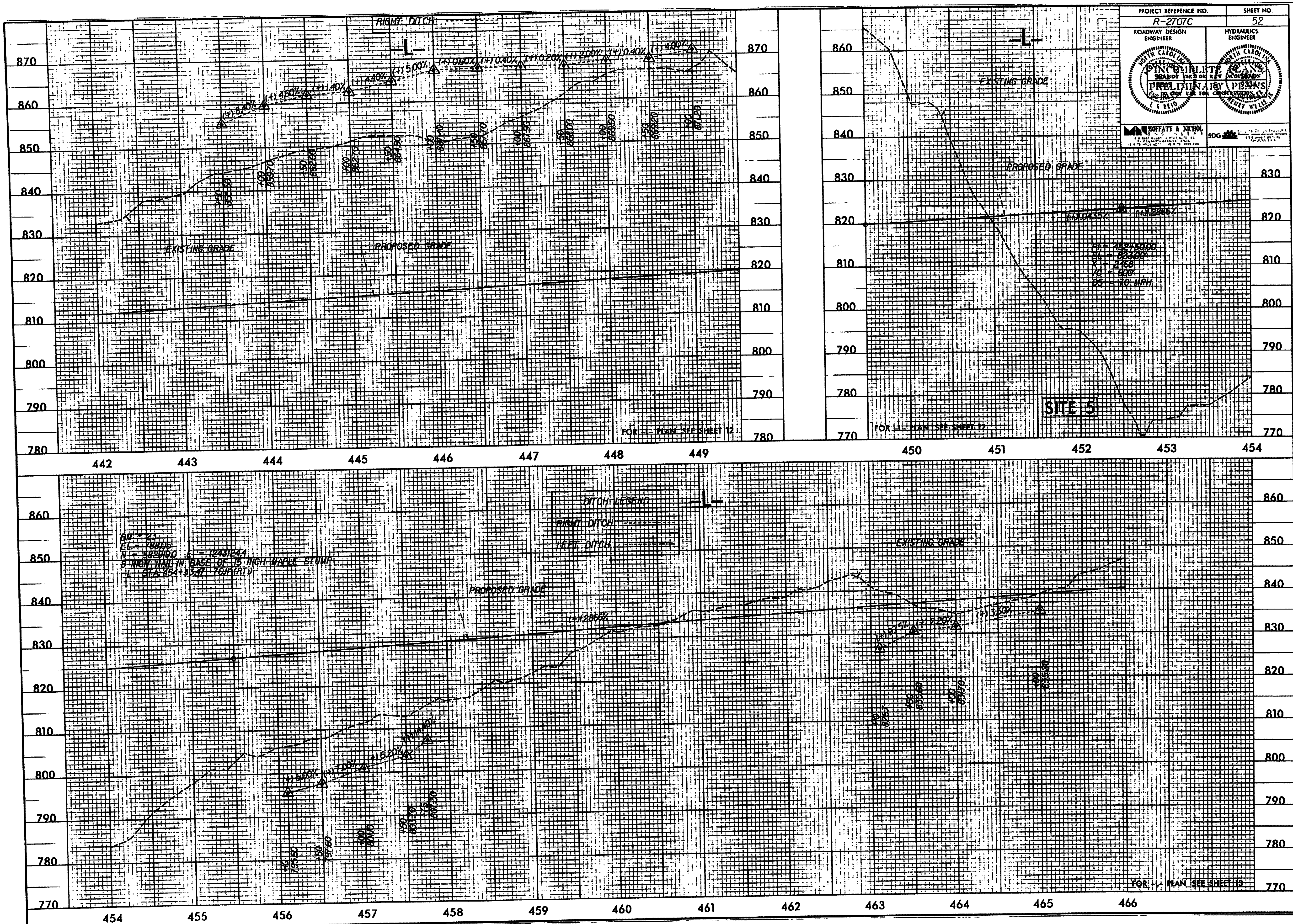
20

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

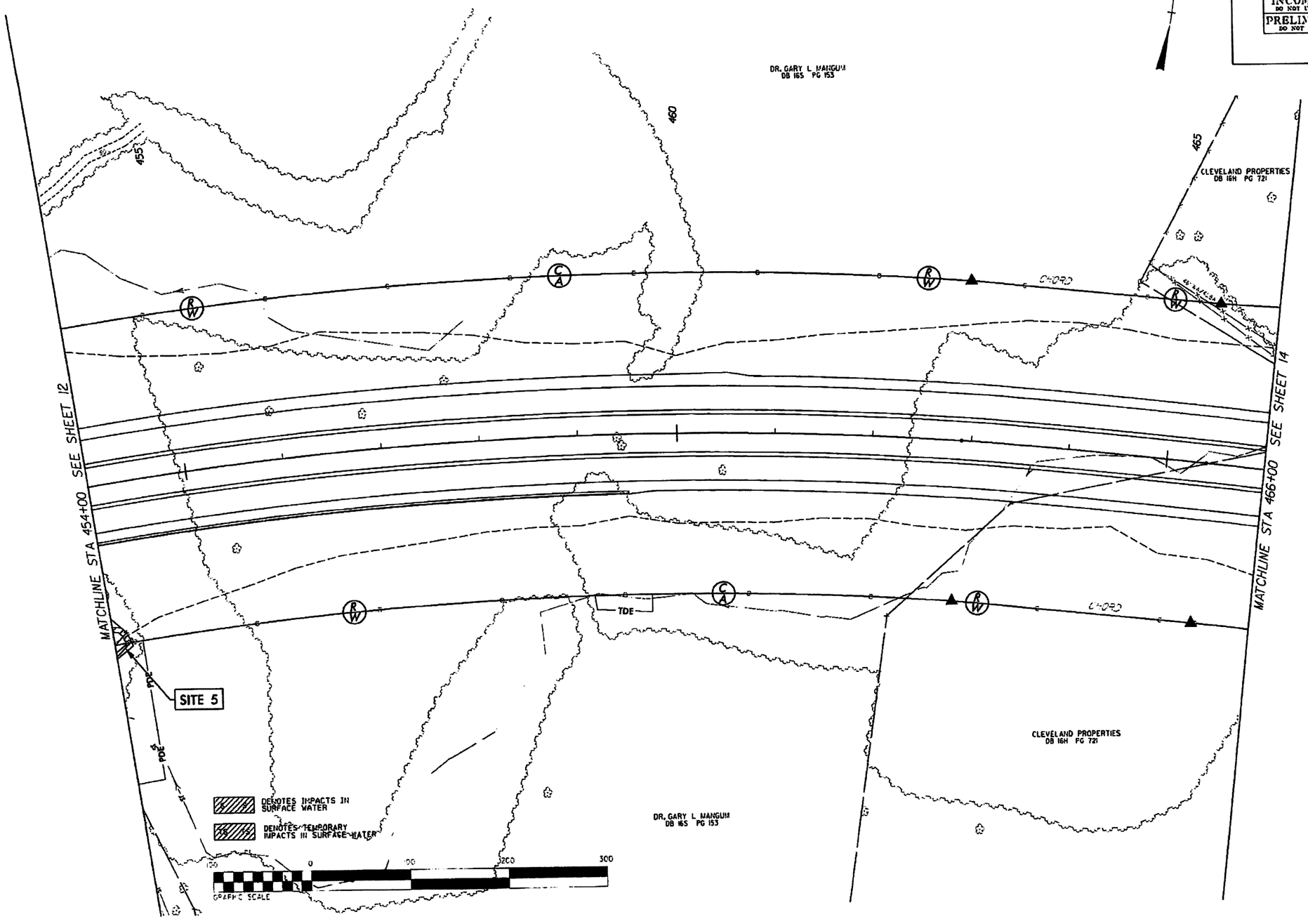
100 0 100 200 300

GRAPHIC SCALE


PROJECT REFERENCE NO.
SHEET NO.
R-2707C
52
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MOFFATT & NICHOL
RIGHT DITCH
-L-
EXISTING GRADE
PROPOSED GRADE
FOR -L- PLAN SEE SHEET 12
SITE 5
DITCH LEGEND
RIGHT DITCH
LEFT DITCH
FOR -L- PLAN SEE SHEET 19
(+) 1.2866%
442
443
444
445
446
447
448
449
450
451
452
453
454
455
456
457
458
459
460
461
462
463
464
465
466

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

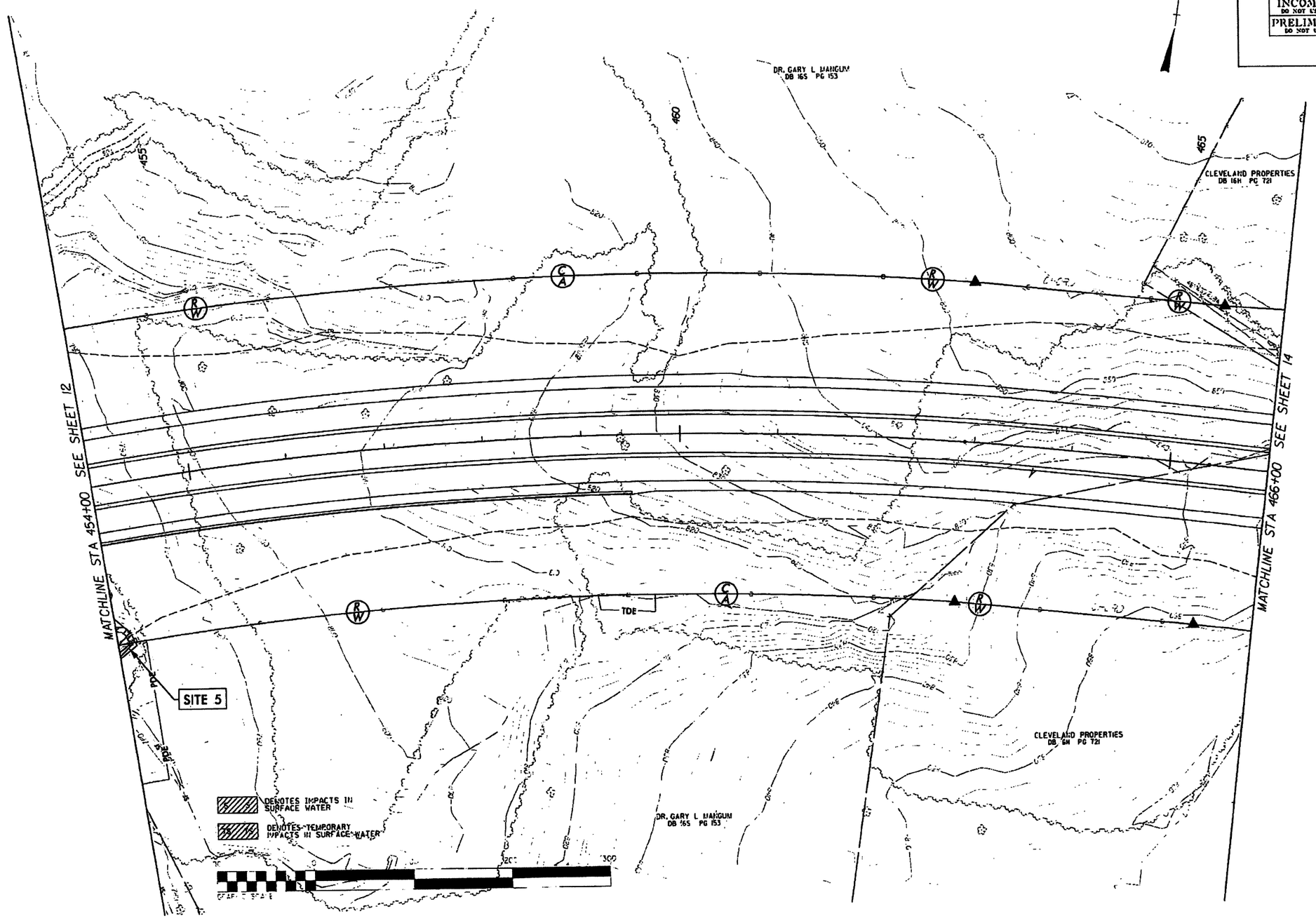


FOR -L- PROFILE SEE SHEET 52

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 52

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE STA 19+00 -Y4-REV SEE SHEET 33

CLEVELAND PROPERTIES
DB 164 PG 721

JAMES RICHARD SPANGLER
DB 108 PG 283

DR. GARY L MANGUM
DB 165 PG 153

S 23°00'00"E

SITE 6

CHESTER PEELER
DB 108 PG 283

MATCHLINE STA 466+00 SEE SHEET 13

CLEVELAND PROPERTIES
DB 16H PG 721

MATCHLINE STA 478+00 SEE SHEET 15

CHESTER PEELER
DB 108 PG 283

MATCHLINE STA 28+00 -Y4-REV SEE SHEET 34

CLEVELAND PROPERTIES
DB 16H PG 721

MATCHLINE STA 15+00 -Y18-

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

0 100 200
GRAPHIC SCALE

FOR -L- PROFILE SEE SHEET 53
FOR -Y4-REV PROFILE SEE SHEET 77
FOR -Y18- PROFILE SEE SHEET 88

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MATCHLINE STA 19+00 -Y4-REV SEE SHEET 33

MATCHLINE STA 466+00 SEE SHEET 13

MATCHLINE STA 478+00 SEE SHEET 15

MATCHLINE STA 28+00 -Y4-REV SEE SHEET 31

MATCHLINE STA 15+00 -Y18-

CLEVELAND PROPERTIES
DB 1611 PG 721

DR. GARY L MANGUM
DB 1615 PG 153

JAMES RICHARD SPANGLER
DB 108 PG 283

CHESTER PEELER
DB 108 PG 283

SITE 6

S 23°44'00" E 333.23'

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE

FOR -L- PROFILE SEE SHEET 53
FOR -Y4-REV PROFILE SEE SHEET 77
FOR -Y18- PROFILE SEE SHEET 88

PROJ. REFERENCE NO.	SHEET NO.
R-2707C	X-244

0 5 10

WETLAND CROSS SECTION
SITE 6

PROJECT REFEPENCE NO	SHEET NO
R-2707C	15
R.W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/E ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

JAMES RICHARD SPANGLER
DB 1178 PG 283

JOE HAVRICK
DB 90E PG 556

CHESTER PEELER
DB 108 PG 283

480

485

SITE 7

MATCHLINE STA 478+00 SEE SHEET 14

MATCHLINE STA 490+00 SEE SHEET 16

-L-
N 87° 35' 28.8" E
SHELBY BYPASS

CHESTER PEELER
DB 108 PG 283

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

JOE HAVRICK
DB 90E PG 556

FOR -L- PROFILE SEE SHEET 53

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

JAMES RICHARD SPANGLER
DB 108 PG 283

JOE HAVRICK
DB 90E PG 556

CHESTER PEELER
DB 108 PG 283

480

485

SITE 7

-L-

N 87° 35' 28.8" E

SHELBY BYPASS

MATCHLINE STA 478+00 SEE SHEET 14

MATCHLINE STA 490+00 SEE SHEET 16

CHESTER PEELER
DB 108 PG 283

30

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

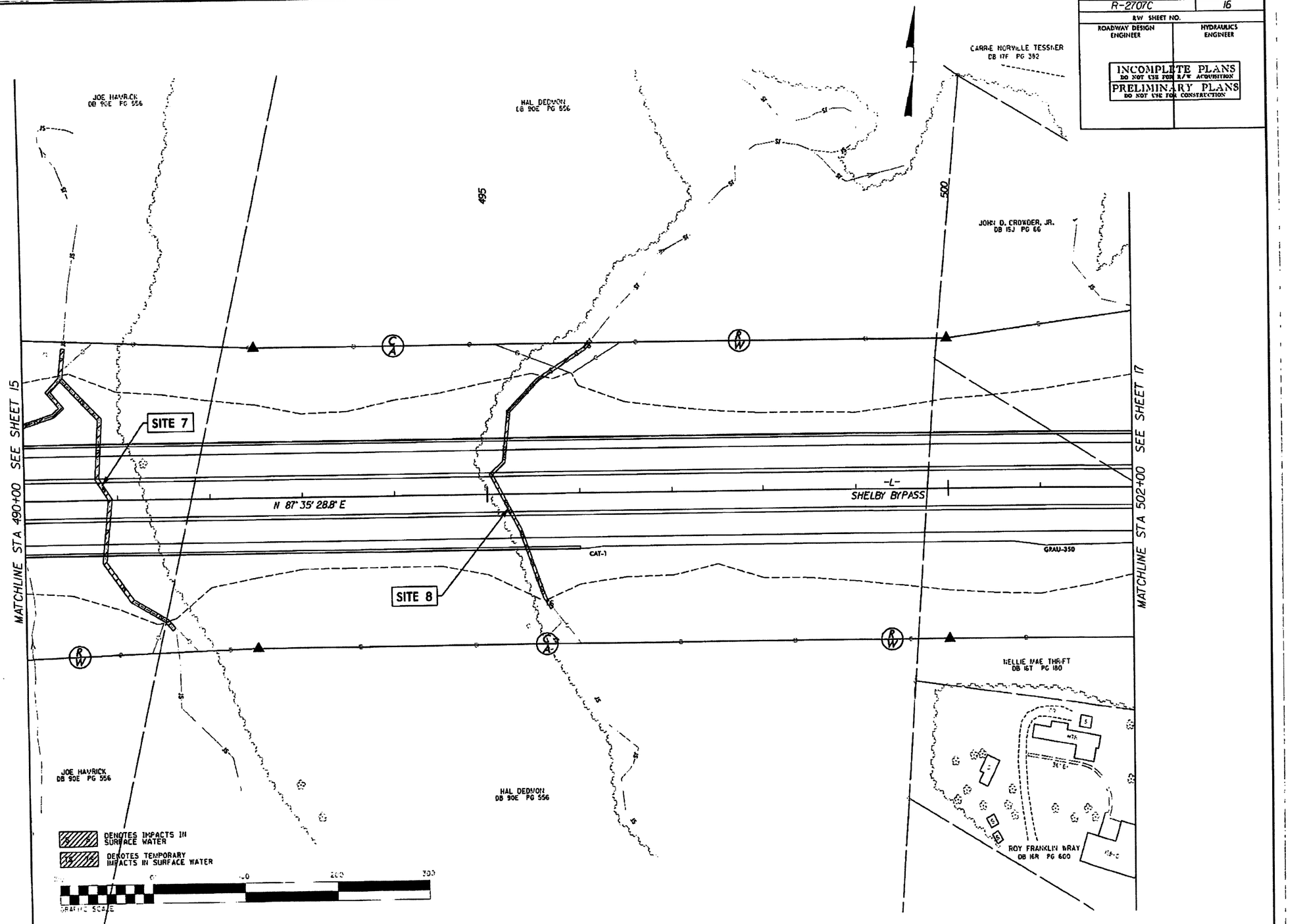
JOE HAVRICK
DB 90E PG 556

GRAPHIC SCALE

FOR -L- PROFILE SEE SHEET 53

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

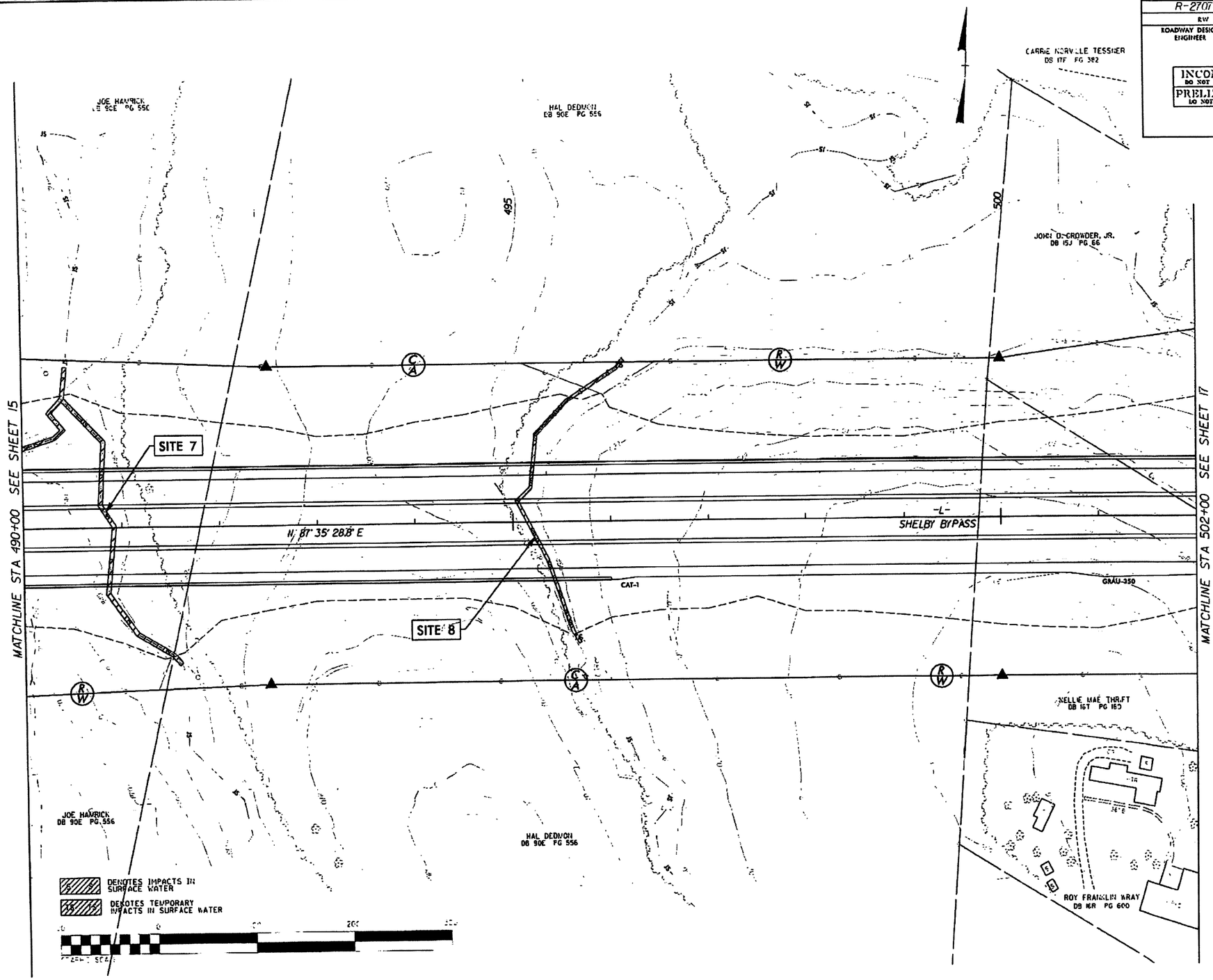
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 54

PROJECT REFERENCE NO	SHEET NO.
R-2701C	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

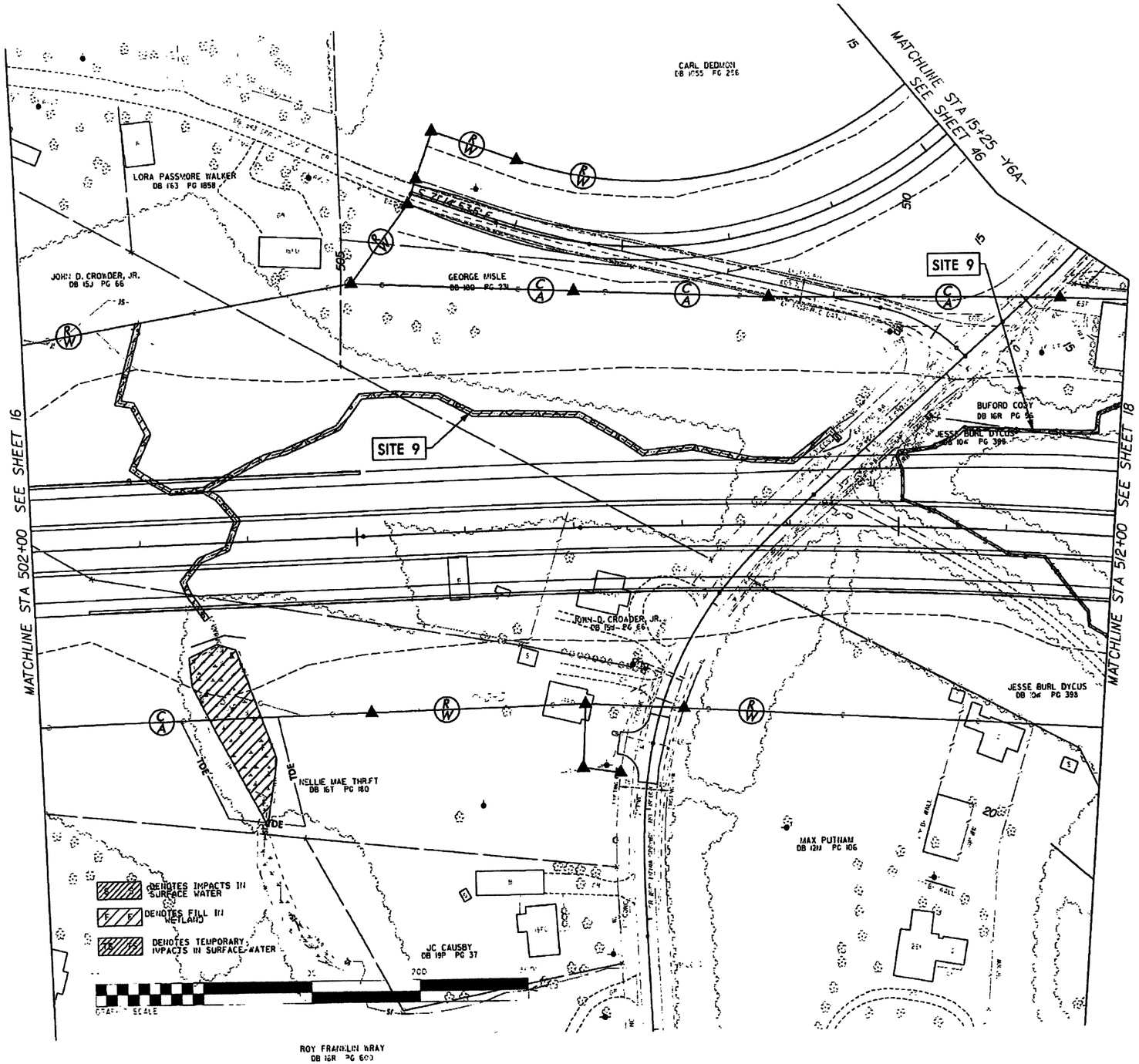
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 54

PROJECT REFERENCE NO	SHEET NO.
R-2707C	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

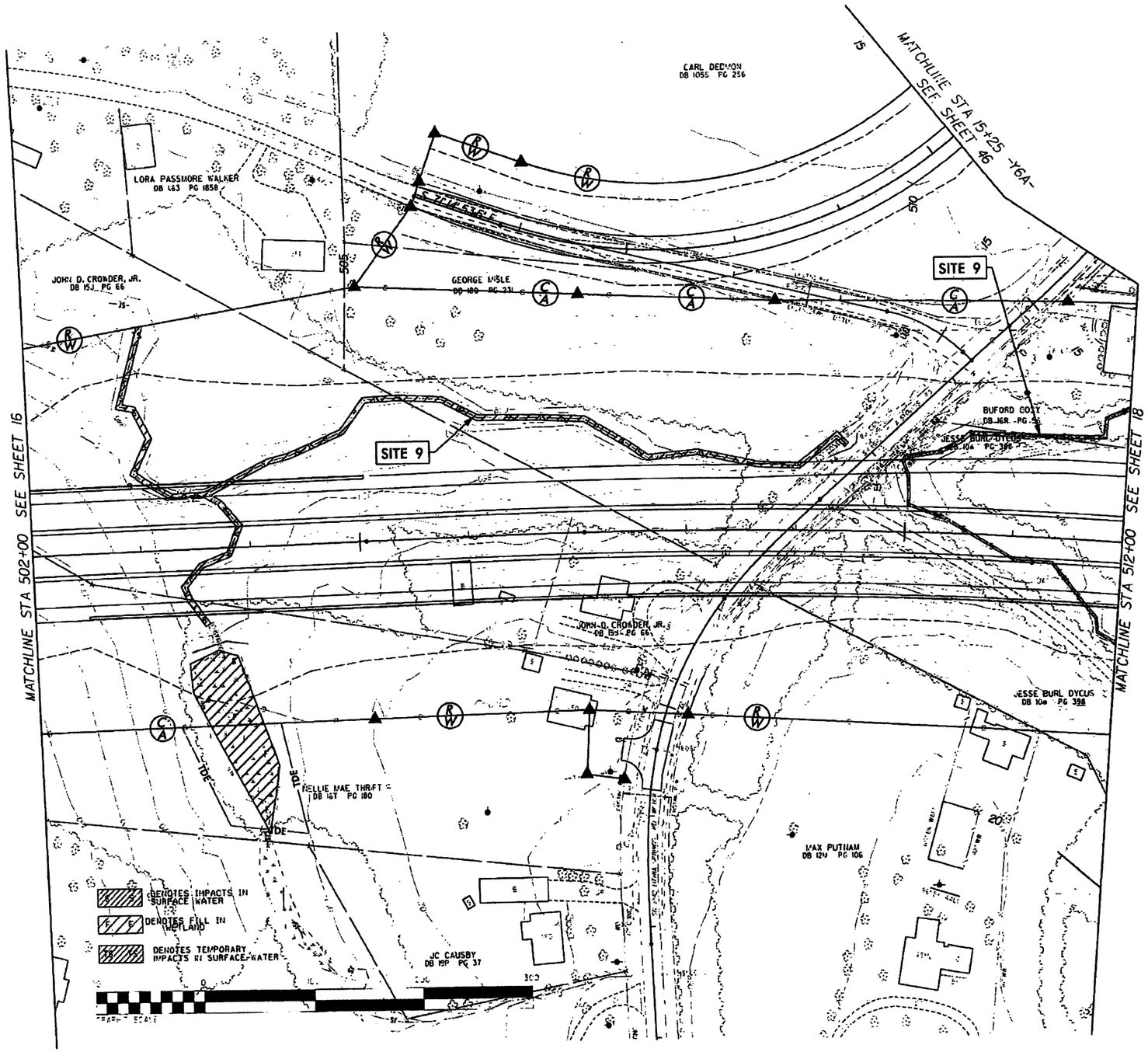
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 54
FOR -Y6A- PROFILE SEE SHEET 78

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

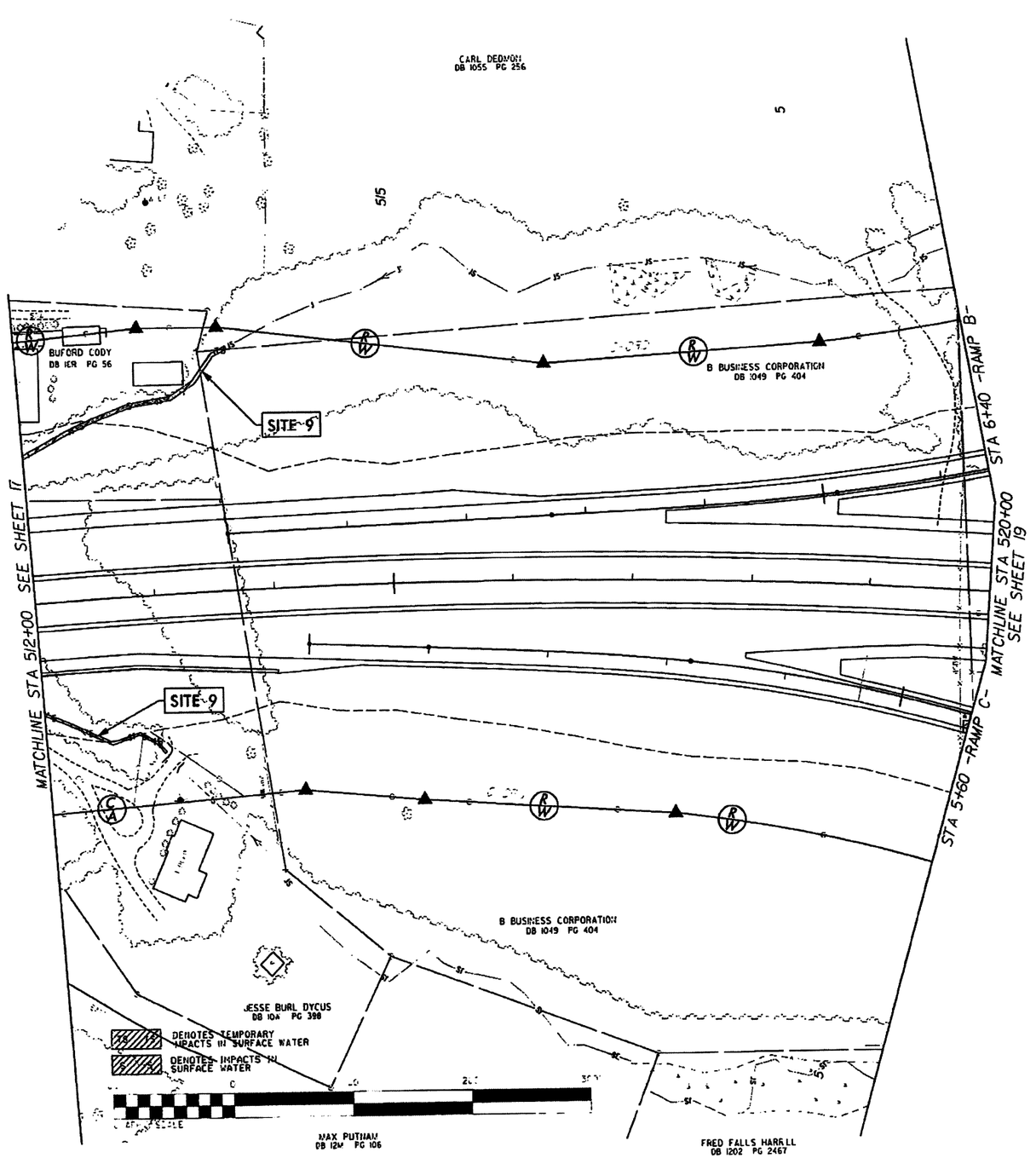


FOR -L- PROFILE SEE SHEET 54
FOR -Y6A- PROFILE SEE SHEET 78

PROJECT REFERENCE NO.	SHEET NO
R-2707C	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

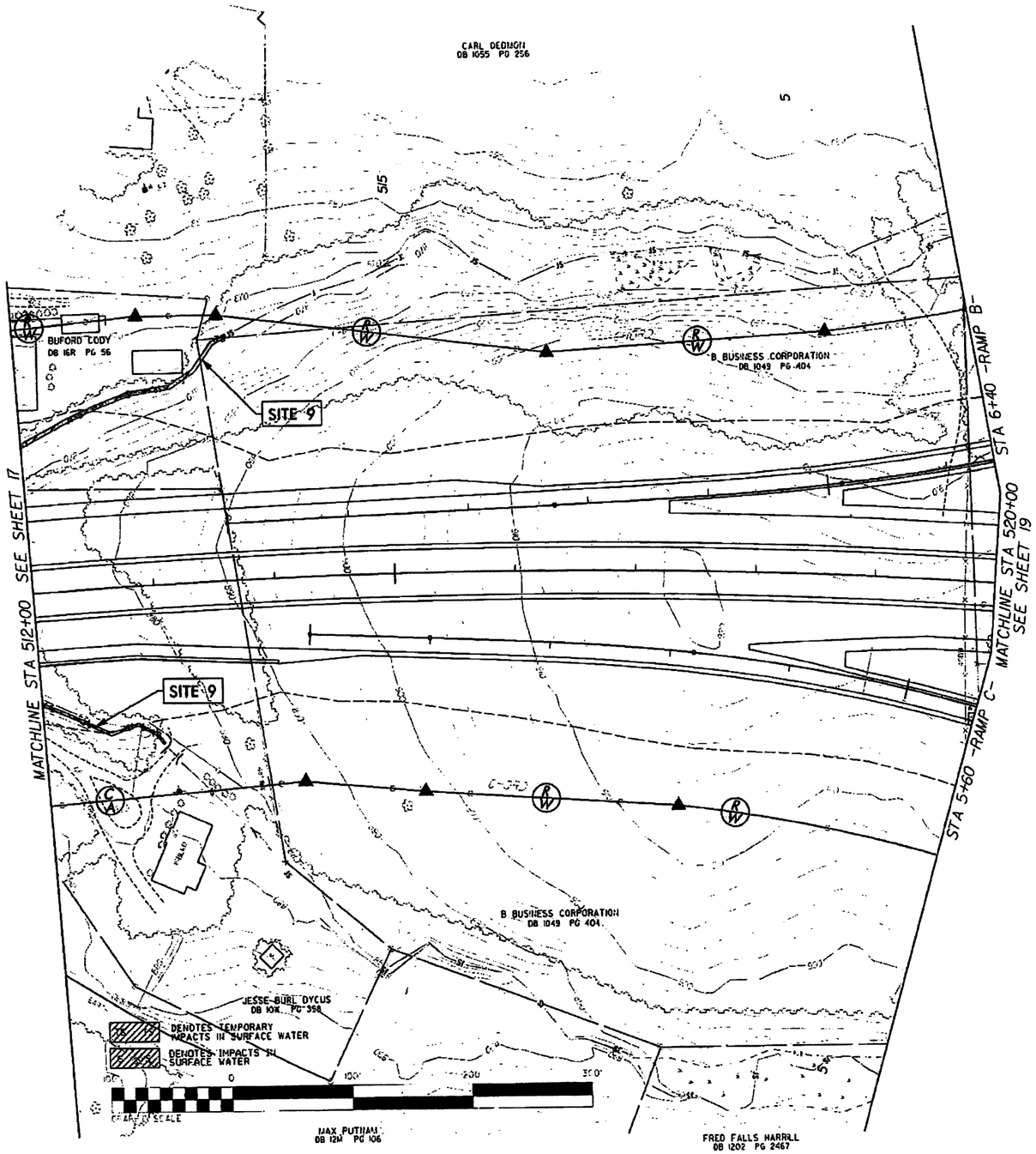
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 55
FOR RAMP -B- PROFILE SEE SHEET 66
FOR RAMP -C- PROFILE SEE SHEET 67
FOR -Y6A- PROFILE SEE SHEET 78

PROJECT REFERENCE NO.	SHEET NO
R-2707C	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 55
FOR RAMP -B- PROFILE SEE SHEET 66
FOR RAMP -C- PROFILE SEE SHEET 67
FOR -Y6A- PROFILE SEE SHEET 78

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	55

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

INCOMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION

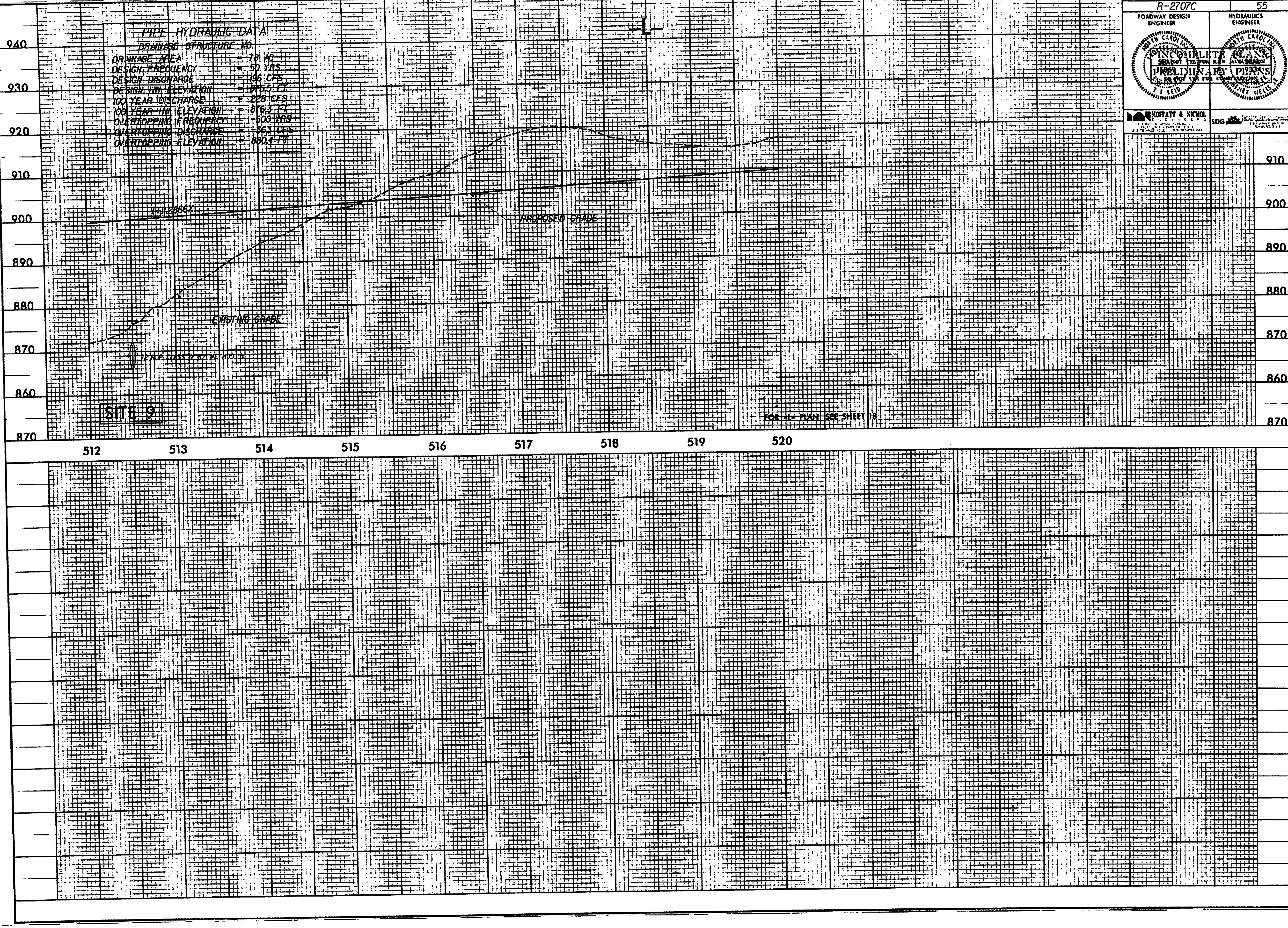
PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL ENGINEERS — SDG

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	78 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	196 CFS
DESIGN HW ELEVATION	=	875.5 FT
100 YEAR DISCHARGE	=	228 CFS
100 YEAR HW ELEVATION	=	876.3 FT
OVERTOPPING FREQUENCY	=	500 YRS
OVERTOPPING DISCHARGE	=	363 CFS
OVERTOPPING ELEVATION	=	880.4 FT



PROJECT REFERENCE NO.	SHEET NO
R-2707C	19A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NAD 83

B

C

CARL DEDMON
DB 1055 PG 256

CARL DEDMON
DB 1410 PG 190

DIAN PENDLETON
DB 1149 PG 350

VELMA PARKER OAKS
DB 1193 PG 613

SITE 10

MAXINE LAN. DANNEY
DB 1102 PG 74

ELIZABETH BULLMAN
DB 426 PG 830

JERRY PENDLETON
DB 1047 PG 653

DONALD TURNER
DB 691 PG 405

THURMAN TURNER
DB 611 PG 558

RAYMOND FELTTHORN
DB 1251 PG 146

EARCIE CORNWELL
DB 782 PG 309

B BUSINESS CORPORATION
DB 1049 PG 404

REMOVE

REMOVE PIPE & CB'S

REMOVE PIPES & CB'S

STA 6+40 RAMP -B-

STA 5+60 RAMP -C-

MATCHLINE STA 520+00
SEE SHEET 18

NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 19.

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

B BUSINESS CORPORATION
DB 1049 PG 404

EST — TONS CL B RIP RAP
EST — SY FILTER FABRIC

2' BASE DITCH
SEE DETAIL 17
EST 11 CY DDE

STD BERM DITCH
STA 9+50 TO 16+00
RAMP -C- LT

PROJECT REFERENCE NO.	SHEET NO
R-2707C	19A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NAD 83

B

C

CARL DEDMON
DB 1055 PG 256

CARL DEDMON
DB 140 PG 190

DIAN PENDLETON
DB 849 PG 350

VELMA PARKER OAKS
DB 193 PG 613

SITE 10

MAXINE LAIL BARNEY
DB 102 PG 74

ELIZABETH BULLMAN
DB 226 PG 830

JERRY PENDLETON
DB 1047 PG 453

LONNIE TURNER
DB 64 PG 405

THURMAN TURNER
DB 64 PG 558

RAYMOND FETTIJOHN
DB 125 PG 146

EARL E CORNAELL
DB 10 PG 309

B BUSINESS CORPORATION
DB 1049 PG 404

B BUSINESS CORPORATION
DB 1049 PG 404

STA 6+40 RAMP -B-

STA 5+60 RAMP -C-

MATCHLINE STA 520+00
SEE SHEET 18

REMOVE

REMOVE PIPE & CB'S

REMOVE PIPES & CB'S

STD BERM DITCH
STA 9+50 TO 16+00
RAMP -C- LT

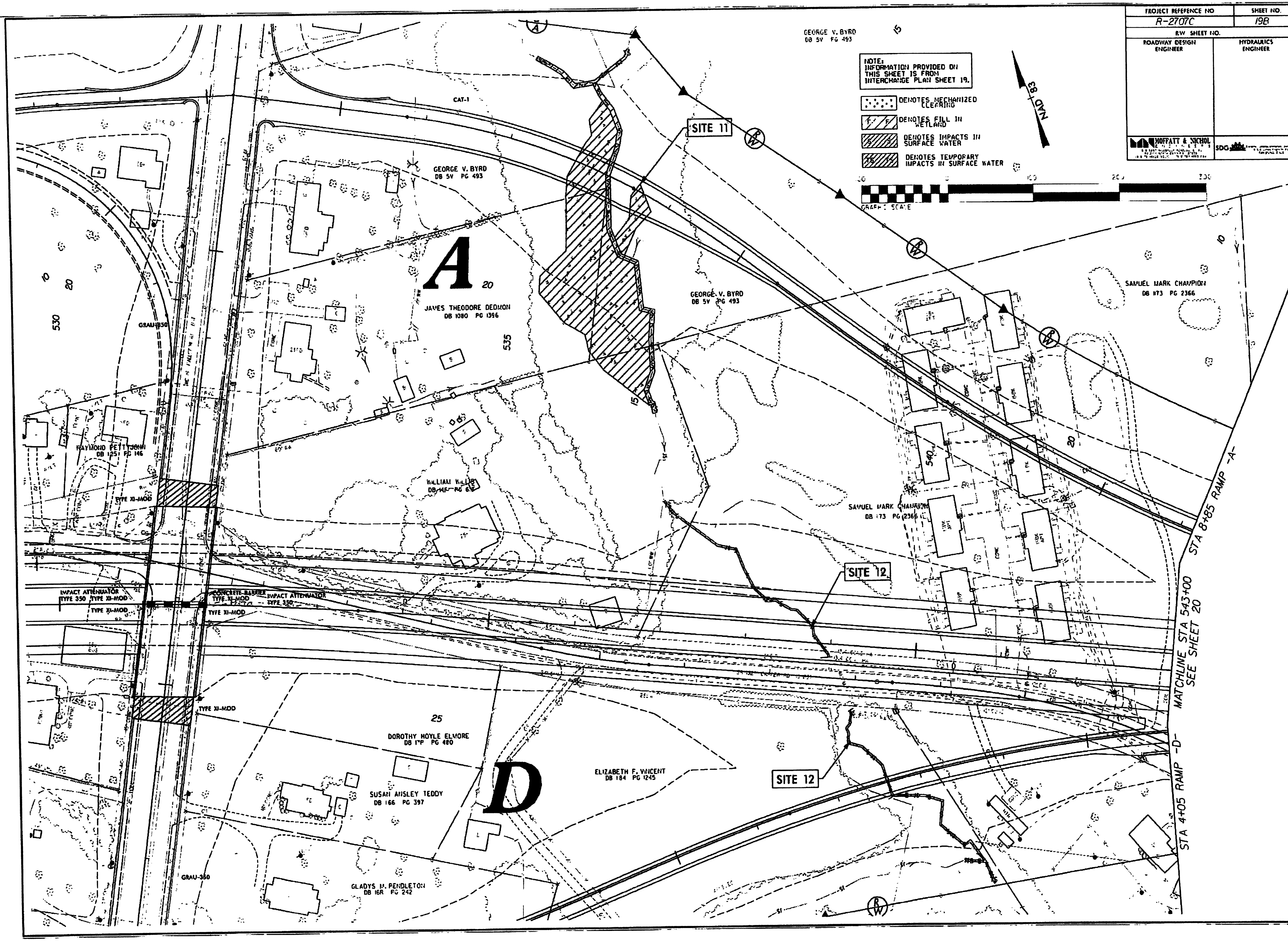
NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 19.

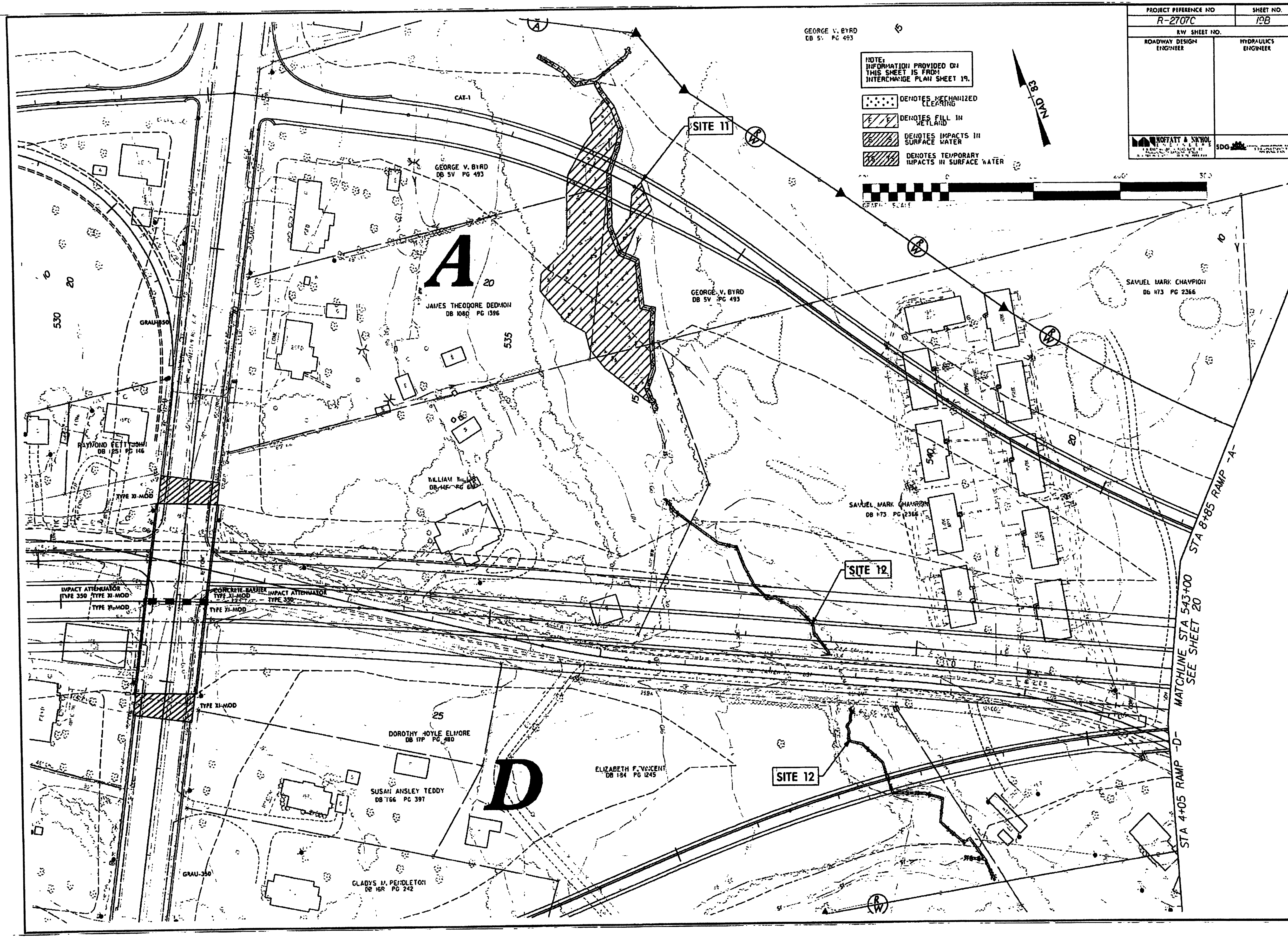
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

EST — TONS CL B RIP RAP
EST — SY FILTER FABRIC

2' BASE DITCH
SEE DETAIL 17
EST 11 CY DDE


PROJECT REFERENCE NO.
R-2707C
SHEET NO.
19B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
MOFFATT & NICHOL
SDG
NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 19.
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83
GRAPHIC SCALE
SITE 11
SITE 12
SITE 12
A
D
GEORGE V. BYRD
DB 5V PG 493
GEORGE V. BYRD
DB 5V PG 493
GEORGE V. BYRD
DB 5V PG 493
JAMES THEODORE DEDMON
DB 1080 PG 1396
SAMUEL MARK CHAMPION
DB 1173 PG 2366
SAMUEL MARK CHAMPION
DB 1173 PG 2366
RAYMOND PETTYJOHN
DB 1251 PG 146
DOROTHY HOYLE ELMORE
DB 1119 PG 480
ELIZABETH F. VINCENT
DB 184 PG 1245
SUSAN ANSLEY TEDDY
DB 166 PG 397
GLADYS M. PENDLETON
DB 16R PG 242
IMPACT ATTENUATOR TYPE 350
TYPE XI-MOD
CONCRETE BARRIER TYPE XI-MOD
IMPACT ATTENUATOR TYPE 350
TYPE XI-MOD
TYPE XI-MOD
TYPE XI-MOD
TYPE XI-MOD
GRAU-350
GRAU-350
CAT-1
STA 8+85 RAMP -A-
MATCHLINE STA 543+00
SEE SHEET 20
STA 4+05 RAMP -D-
530
535
540
20
25



PROJECT REFERENCE NO.
R-2707C
SHEET NO.
19B
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
MOFFATT & NICHOL ENGINEERS
SDG
NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 19.
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83
GEORGE V. BYRD
DB 5V PG 493
SITE 11
SITE 12
SITE 12
A
D
JAMES THEODORE DEDMON
DB 1080 PG 1396
RAYMOND FETT JOHN
DB 1251 PG 146
SAMUEL MARK CHAMPION
DB 873 PG 2366
DOROTHY HOYLE ELMORE
DB 17P PG 480
SUSAN ANSLEY TEDDY
DB 766 PG 397
ELIZABETH F. VINCENT
DB 184 PG 1245
GLADYS M. PENDLETON
DB 16R PG 242
IMPACT ATTENUATOR TYPE 350
TYPE XI-MOD
CONCRETE BARRIER
GRAU-350
MATCHLINE STA 543+00
SEE SHEET 20
STA 8+85 RAMP -A-
STA 4+05 RAMP -D-

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

GEORGE V. BYRD
DB 5V PG 493

MARION ROGERS
DB 9: PG 544
PB 8 PG 47

MARION ROGERS
DB 5: PG 544
PB 8 PG 47

TOMMY WAYNE COSTNER
DB 1246 PG 0710

EMBBY HULL
DB 66 PG 2049

545

550

STA 8+85 -RAMP A-

SAMUEL MARK CHAMPION
DB 473 PG 2366

SITE 13

HENRY B. EDWARDS, JR.
DB 932 PG 827

BOBBY HULL
DB 166 PG 2049

MATCHLINE STA 543+00
SEE SHEET 19

STA 555+00 SEE SHEET 21

STA 4+05 RAMP -D-

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

ARNOLD HINOYLE
DB 166 PG 175

BOBBY HULL
DB 166 PG 2049

BOBBY HULL
DB 166 PG 2049

MARVIN GLENN QUEEN
DB 992 PG 289

FOR -L- PROFILE SEE SHEET 57
FOR RAMP -A- PROFILE SEE SHEET 65
FOR RAMP -D- PROFILE SEE SHEET 68

PROJECT REFERENCE NO	SHEET NO
R-2707C	20
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

GEORGE V. BYRD
DB 5V PG 493

MARION ROGERS
DB 9[illegible] PG 544
PB 8 PG 47

MARION ROGERS
EB 9[illegible] PG 544
PB 8 PG 47

TOMMY WAYNE COSTNER
DB 1248 PG 013

BOBBY HULL
DB 166 PG 2049

545

550

SITE 13

HENRY B. EDWARDS, JR.
DB 1132 PG 827

STA 8+85 -RAMP A-

SAMUEL MARK CHAMPION
DB 873 PG 2366

BOBBY HULL
DB 166 PG 2049

MATCHLINE STA 543+00
SEE SHEET 19

MATCHLINE STA 555+00 SEE SHEET 21

STA 4+05 RAMP -D-

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SPEER L. SCALE DB 166 PG 175

BOBBY HULL
DB 166 PG 2049

BOBBY HULL
DB 166 PG 2049

MARVIN GLENN QUEEN
DB 592 PG 289

FOR -L- PROFILE SEE SHEET 57
FOR RAMP -A- PROFILE SEE SHEET 65
FOR RAMP -D- PROFILE SEE SHEET 68

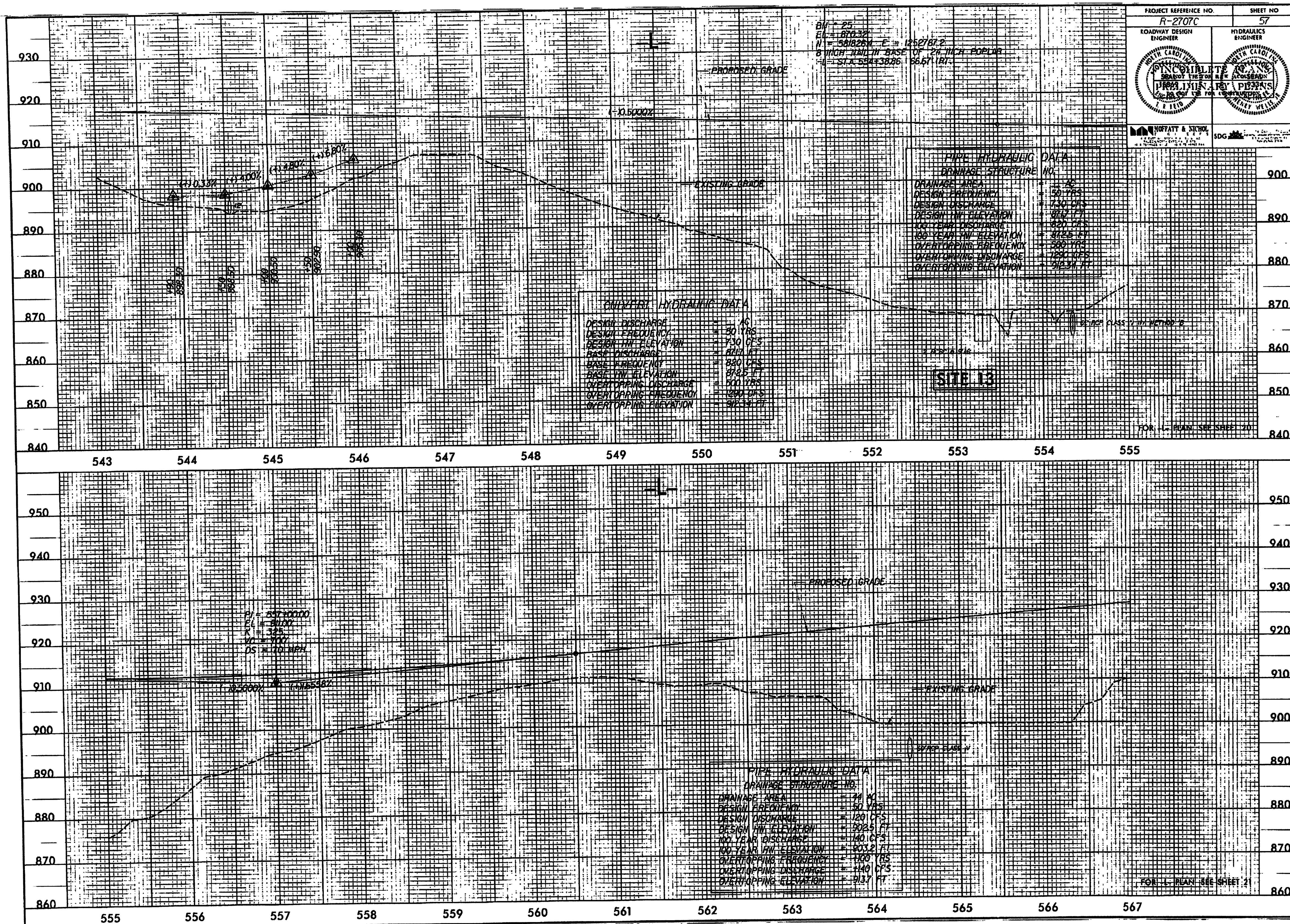
PROJECT REFERENCE NO.	SHEET NO
R-2707C	57

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

INCOMPLETE PLANS — DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS — DO NOT USE FOR CONSTRUCTION

MOFFATT & NICHOL ENGINEERS — SDG



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	AC
DESIGN FREQUENCY	=	50 YRS
DESIGN HW ELEVATION	=	730 CFS
BASE DISCHARGE	=	871.7 FT
BASE FREQUENCY	=	820 CFS
BASE HW ELEVATION	=	872.5 FT
OVERTOPPING DISCHARGE	=	500 YRS
OVERTOPPING FREQUENCY	=	1290 CFS
OVERTOPPING ELEVATION	=	912.34 FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	730 CFS
DESIGN HW ELEVATION	=	871.7 FT
100 YEAR DISCHARGE	=	820 CFS
100 YEAR HW ELEVATION	=	872.5 FT
OVERTOPPING FREQUENCY	=	500 YRS
OVERTOPPING DISCHARGE	=	1290 CFS
OVERTOPPING ELEVATION	=	912.34 FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	44 AC
DESIGN FREQUENCY	=	50 YRS
DESIGN DISCHARGE	=	120 CFS
DESIGN HW ELEVATION	=	902.5 FT
100 YEAR DISCHARGE	=	140 CFS
100 YEAR HW ELEVATION	=	903.2 FT
OVERTOPPING FREQUENCY	=	+100 YRS
OVERTOPPING DISCHARGE	=	+140 CFS
OVERTOPPING ELEVATION	=	913.7 FT

PROJECT REFERENCE NO	SHEET NO
R-2707C	21
RW SHEET NO	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TOMMY WAYNE COSTNER
DB 1248 PG 673

HENRY B. EDWARDS, JR.
DB 732 PG 827

560

565

SITE 14

GRAU-350

CAT-1

BL-132

BL-133

MATCHLINE STA 555+00 SEE SHEET 20

MATCHLINE STA 567+00 SEE SHEET 22

RW

CA

S

TS

TDE

DENOTES IMPACTS IN SURFACE WATER (POND)

DENOTES IMPACTS IN SURFACE WATER

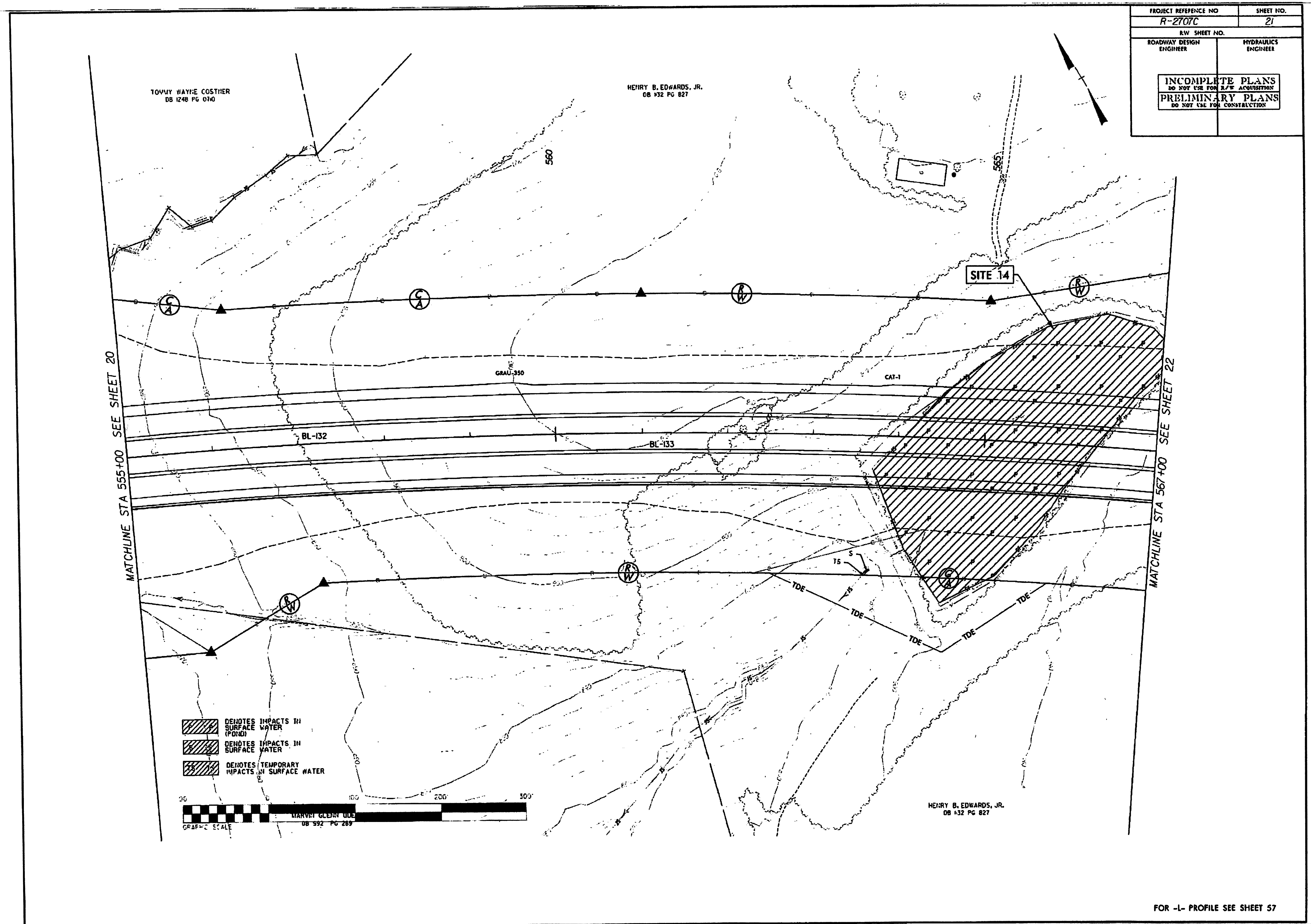
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE

MARVIN GLENN UOE
DB 992 PG 289

HENRY B. EDWARDS, JR.
DB 732 PG 827

FOR -L- PROFILE SEE SHEET 57


PROJECT REFERENCE NO.
R-2707C
SHEET NO.
21
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
HENRY B. EDWARDS, JR.
SITE 14
MATCHLINE STA 555+00 SEE SHEET 20
MATCHLINE STA 567+00 SEE SHEET 22
BL-132
BL-133
CAT-1
TDE
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
FOR -L- PROFILE SEE SHEET 57

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2707C	X-363

WETLAND CROSS SECTION
SITE 14

569+00.00

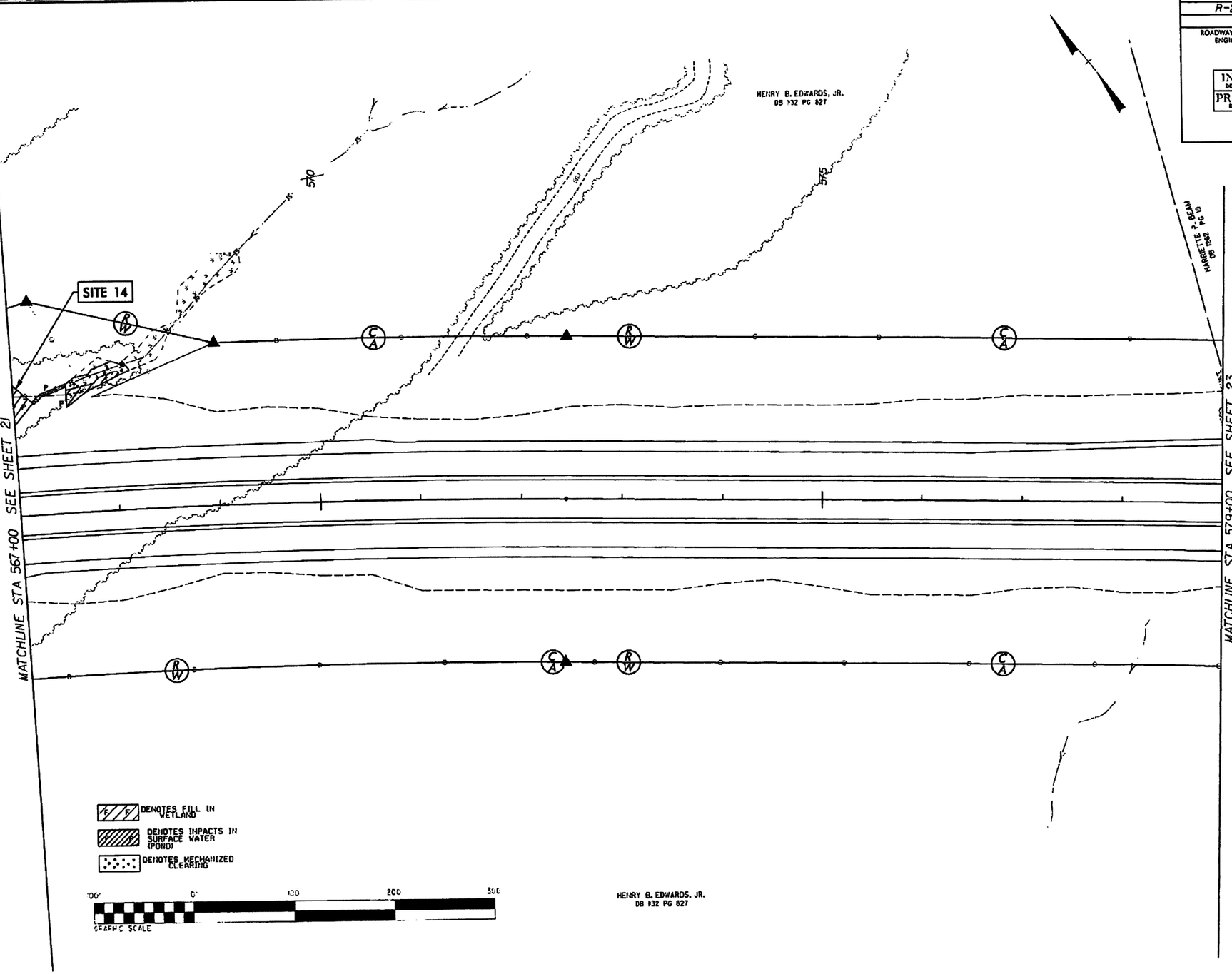
568+50.00

568+00.00

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	22
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

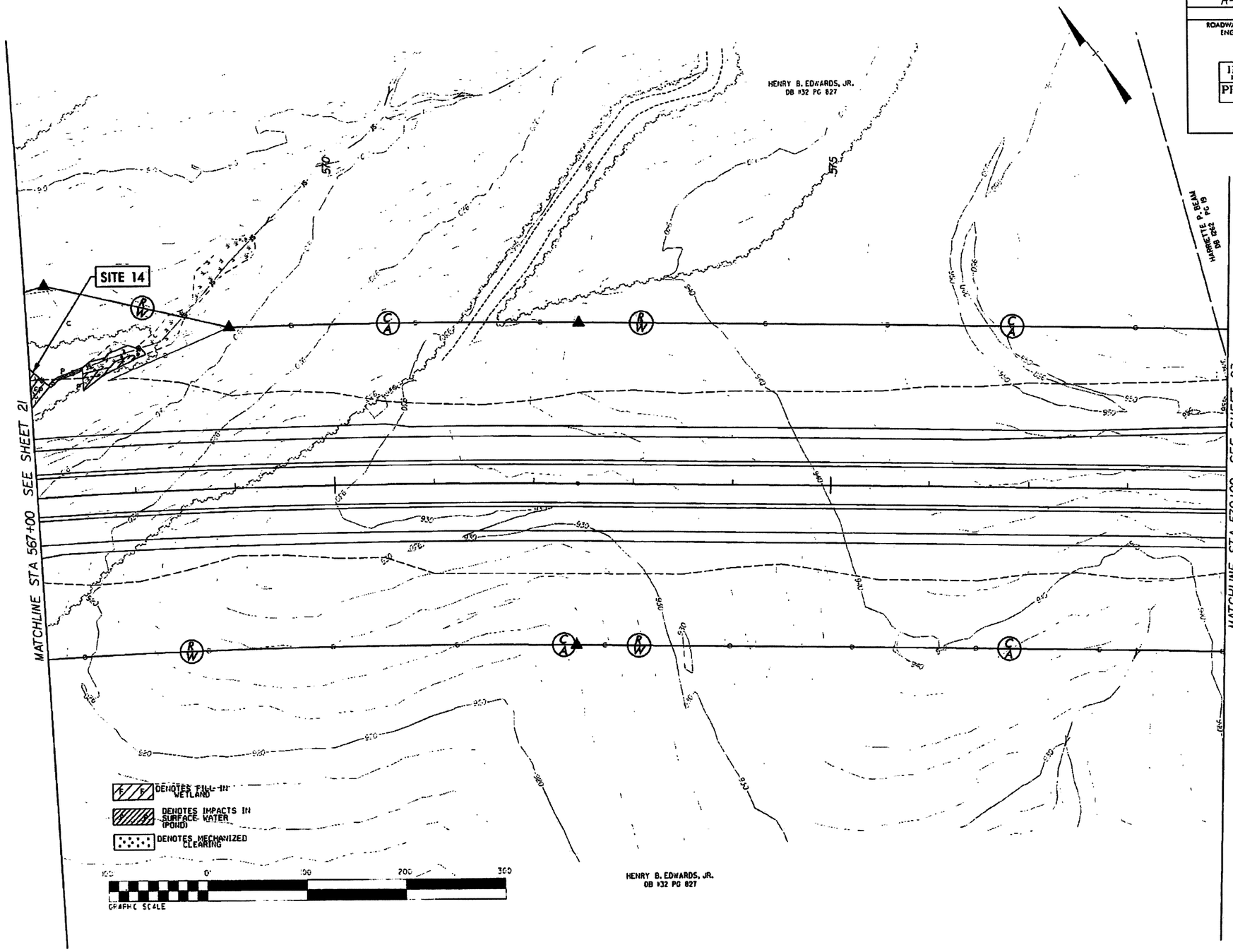


FOR -L- PROFILE SEE SHEET 58

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

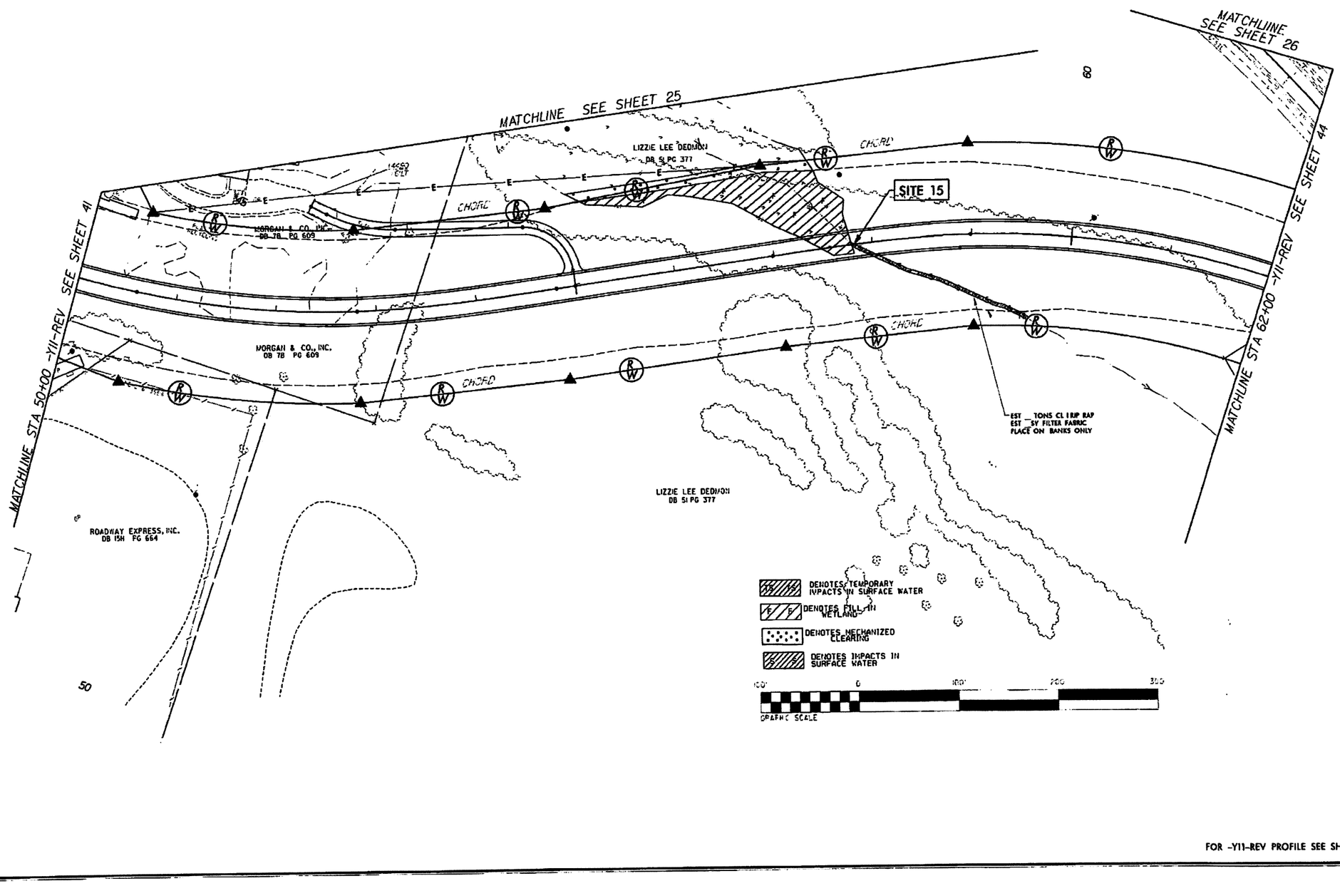


FOR -L- PROFILE SEE SHEET 58

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	43
RW SHEET NO	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

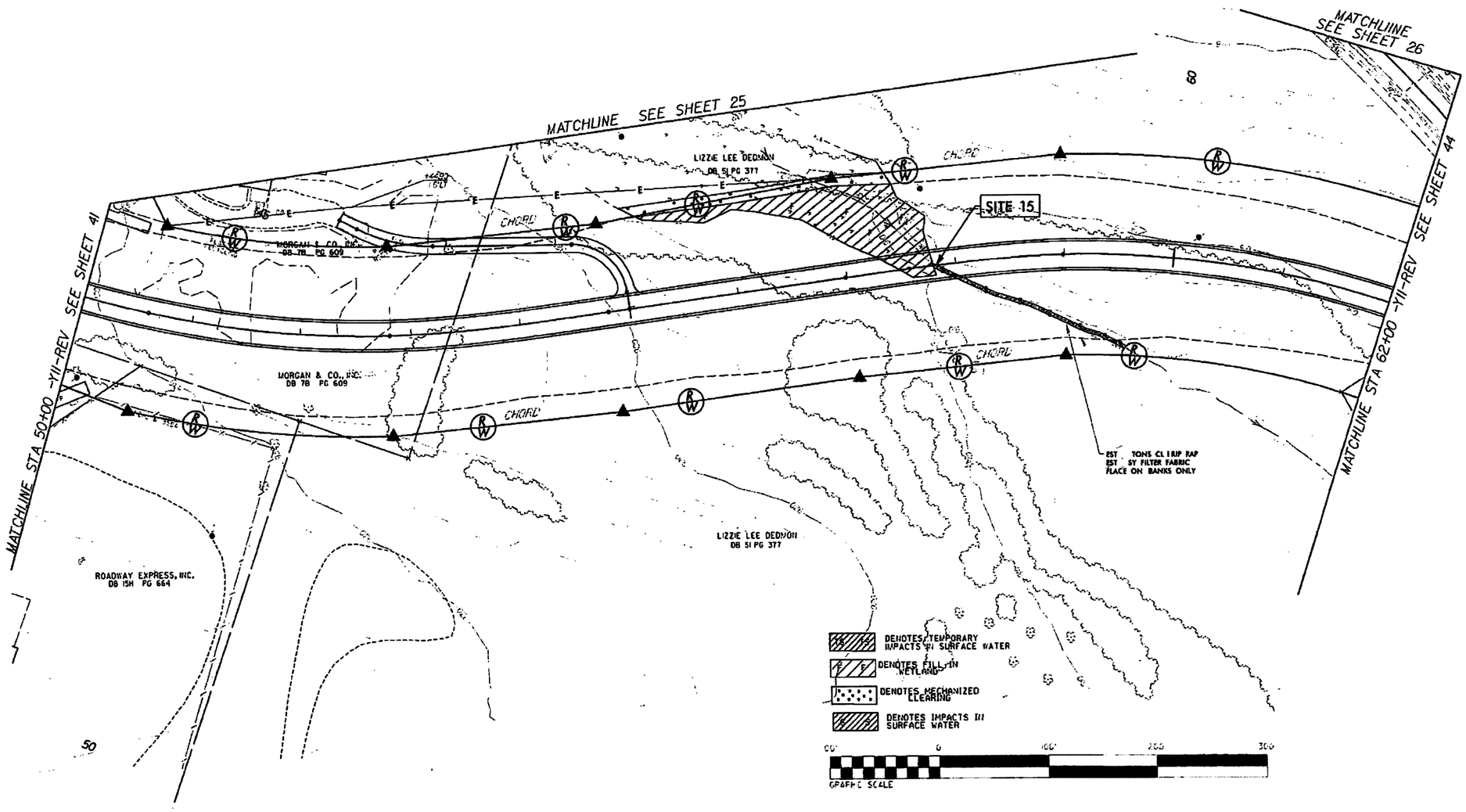
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -Y11-REV PROFILE SEE SHEETS 81 & 82

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	43
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -Y11-REV PROFILE SEE SHEETS 81 & 82

PROJECT REFERENCE NO	SHEET NO.
R-2707C	45
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

SITE 16

MATCHLINE STA 17+00 -Y16-REV SEE SHEET 40

POT Sta. 10+00.00

POT

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE

FOR -Y16-REV PROFILE SEE SHEET 85
FOR -Y16A- PROFILE SEE SHEET 85

PROJECT REFERENCE NO.	SHEET NO.
R-2707C	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

SITE 16

MATCHLINE STA 17+00 -Y16-REV SEE SHEET 40

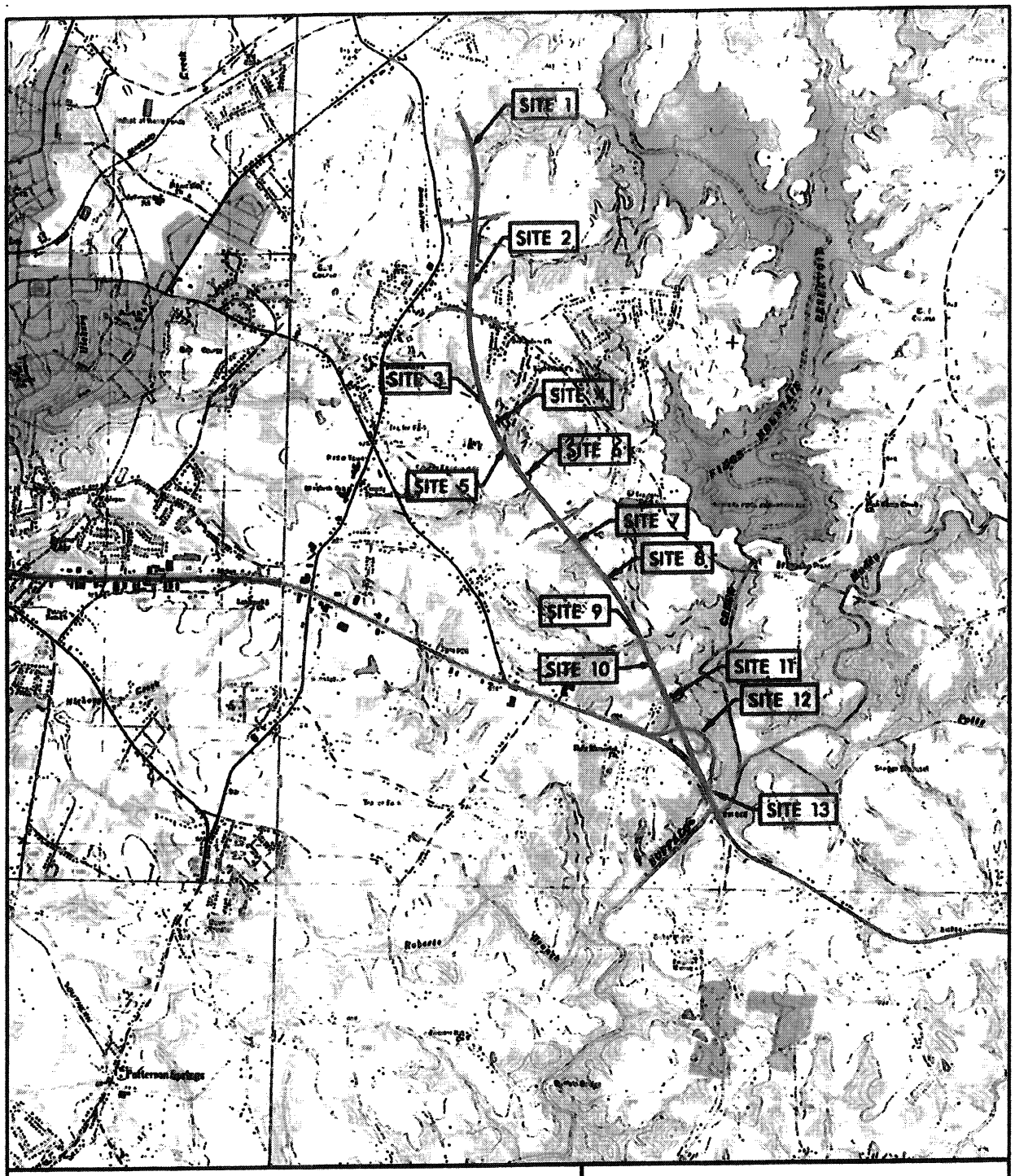
POT STA 10+00.00

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE 1" = 200'

FOR -Y16-REV PROFILE SEE SHEET 85
FOR -Y16A- PROFILE SEE SHEET 85



TOPO MAP

SCALE: 1" = 4000'

NCDOT

DIVISION OF HIGHWAYS
CLEVELAND COUNTY
PROJECT: R-2707D

US 74 - SHELBY BYPASS
FROM EAST OF NC 180
TO EXISTING US 74

SHEET OF 02/24/12

WETLAND PERMIT IMPACT SUMMARY

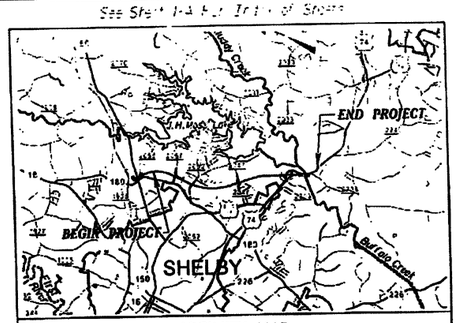
Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 643+78 - 647+11							0.05	<0.01	644	33	
2	-L- 683+32 - 685+10		0.05					0.02	<0.01	480	20	
3	-L- 714+91 - 720+51							0.08	<0.01	763	58	
4	-L- 723+42 - 724+12								0.02		97	
5	-L- 728+15 - 731+94							0.06	<0.01	435	36	
6	-L- 737+35 - 744+14							0.14	0.03	1130	260	
	Bank Stabilization							<0.01		28		
7	-L- 763+42 - 764+51		0.02			<0.01		0.02	<0.01	245	25	
8	-L- 776+62 - 778+43		<0.01					0.06	<0.01	449	21	
9	-L- 796+17 - 797+09							0.04	<0.01	419	54	
	Bank Stabilization							<0.01		48		
10	-L- 804+45 - 805+12		0.04			0.02		0.01		211		
11	-L- 814+25 - 815+87		0.24					0.01	<0.01	248	17	
	Pond							0.12				
12	-RPA- 30+25 - 33+55		0.04					0.01		126		
13	-L- 841+00 - 848+63							0.05	<0.01	690	22	
TOTALS:			0.38			0.02		0.67	0.07	5916	643	

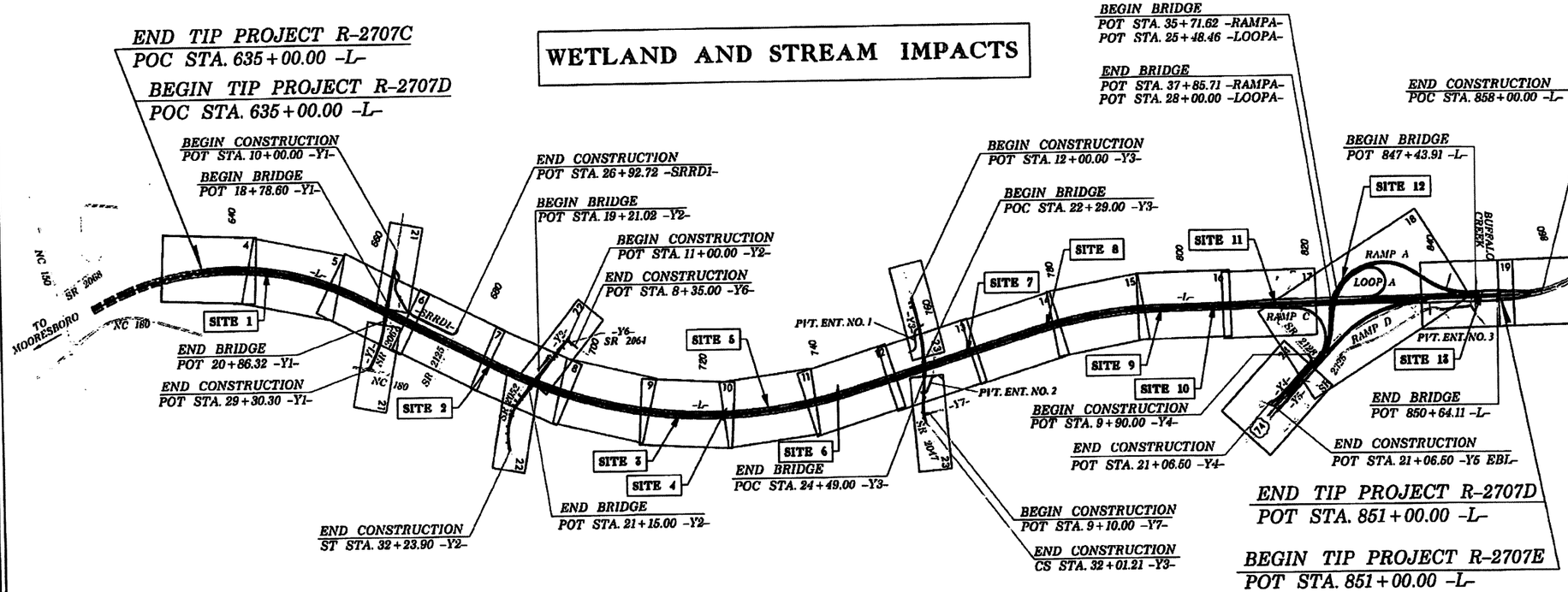
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CLEVELAND COUNTY
(R-2707D)

SHEET 2/24/2012

ATN Revised 3/31/05





TIP PROJECT: R-2707D

CONTRACT:

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2707D	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34497.1.2	NHF-74 (14)	P.E.
34497.2.7		R/W & UTIL.

VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CLEVELAND COUNTY

LOCATION: US 74, SHELBY BYPASS FROM EAST OF NC 180
TO EXISTING US 74, WEST OF SR 2238 (LONG BRANCH ROAD)
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERTS
& STRUCTURES

WETLAND AND STREAM IMPACTS

THIS PROJECT IS NOT WITHIN ANY CITY LIMITS

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

CLEARING FOR THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

DESIGN DATA

ADT 2005 = 40,200
ADT 2025 = 65,800
DHV = 10 %
D = 60 %
T = 14 % *
V = 70 MPH

* TTST 8 % DUAL 6 %

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-2707D	= 4.030 MI.
LENGTH OF STRUCTURE TIP PROJECT R-2707D	= 0.061 MI.
TOTAL LENGTH OF TIP PROJECT R-2707D	= 4.091 MI.

Prepared In the Office of:

Stantec

Stantec Consulting Inc.
Suite 300, 801 Jones Franklin Road
Raleigh, NC U.S.A.
27606

Tel. 919.851.6866
Fax. 919.851.7024
www.stantec.com

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: ____

LETTING DATE: ____

G. SCOTT BOYLES, PE
PROJECT ENGINEER

KEITH F. HUDSON
PROJECT DESIGN ENGINEER

NCDOT CONTACT: DOUG TAYLOR, PE
PROJECT ENGINEER - ROADWAY DESIGN

HYDRAULICS ENGINEER

SIGNATURE: ____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: ____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER ____ P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED ____
DIVISION ADMINISTRATOR ____ DATE

PROJECT REFERENCE NO	SHEET NO
R-2707D	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.
Suite 300, 801 Jones Franklin Road
Raleigh NC
27606
Tel. 919.851.6666
Fax. 919.851.7024
www.stantec.com

50 25 0 50 100

REVISIONS

MATCH SHEET NO. 4
STA. 643+00 -L-

MATCH SHEET NO. 6
STA. 656+50 -L-

645 650 655 304

LELIA YARBOROUGH

DARVEL YARBRO

PDE

SITE 1

SLOPE STAKE LINE

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

0 100 200 300

GRAPHIC SCALE

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO.25

NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO	SHEET NO.
R-2707D	5

RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.
Suite 300, 801 Jones Franklin Road
Raleigh, NC
27606
Tel. 919.851.6866
Fax. 919.851.7024
www.stantec.com

REVISIONS

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO.25

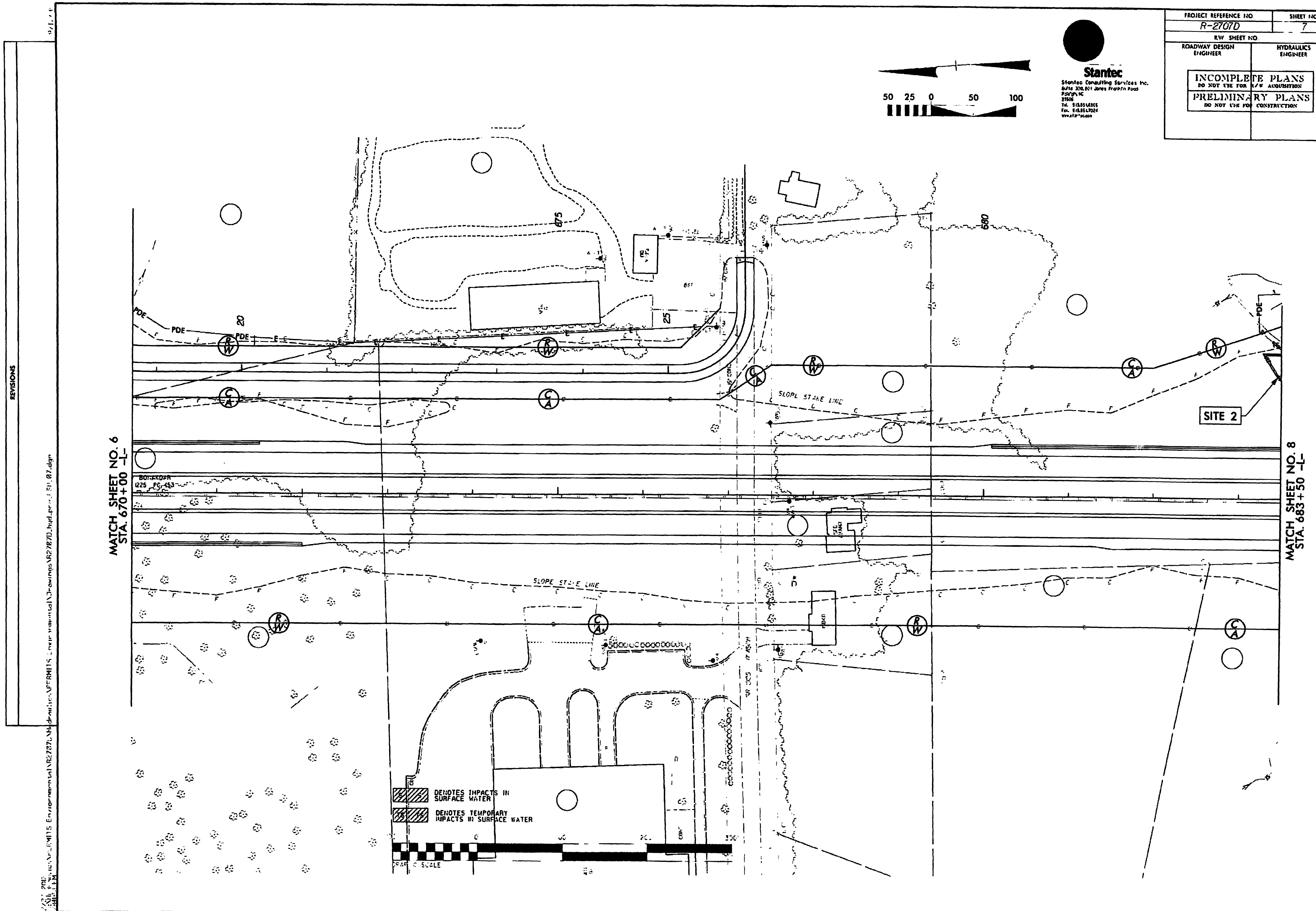
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.



PROJECT REFERENCE NO.	SHEET NO.
R-2707D	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

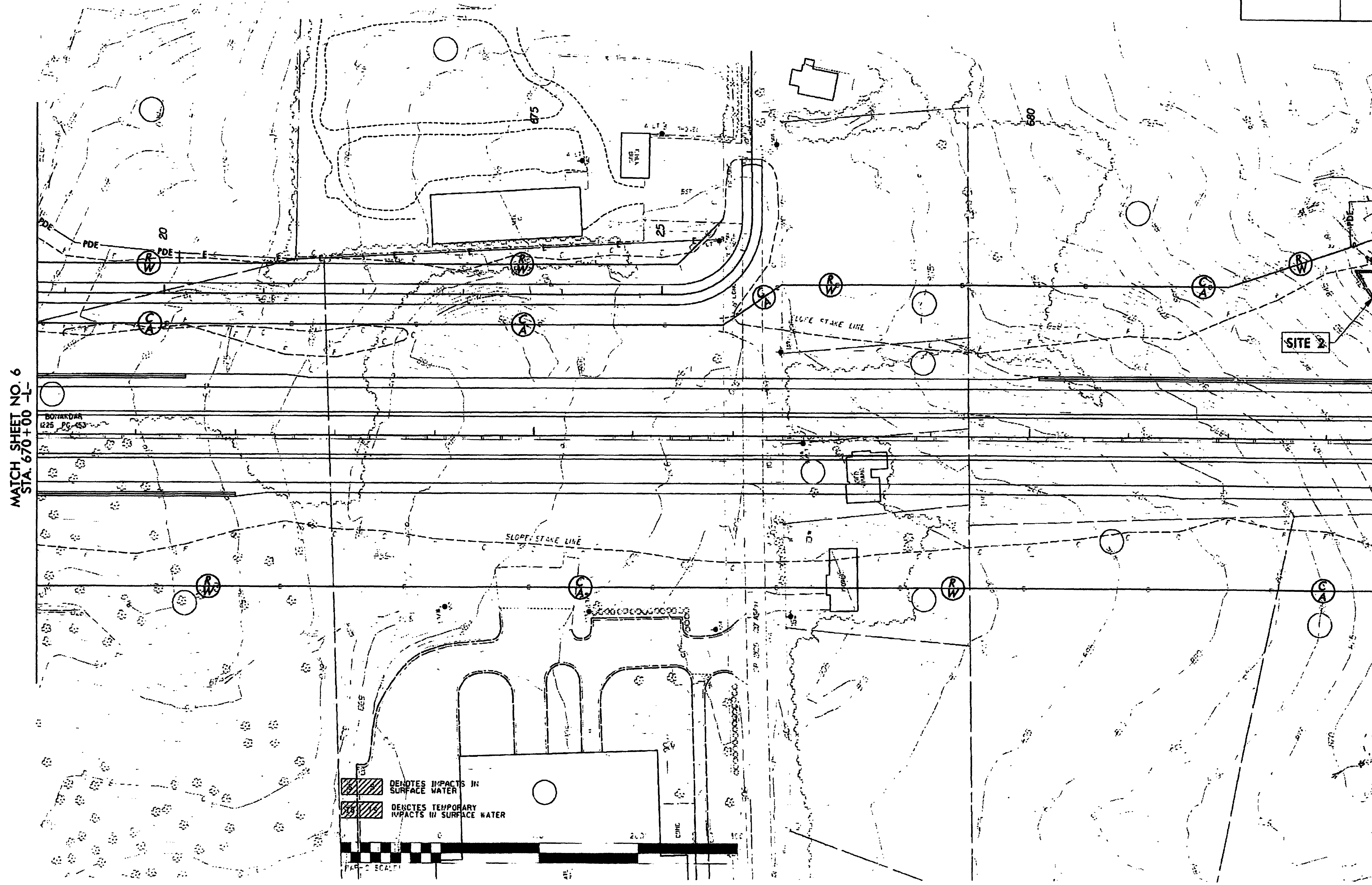
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

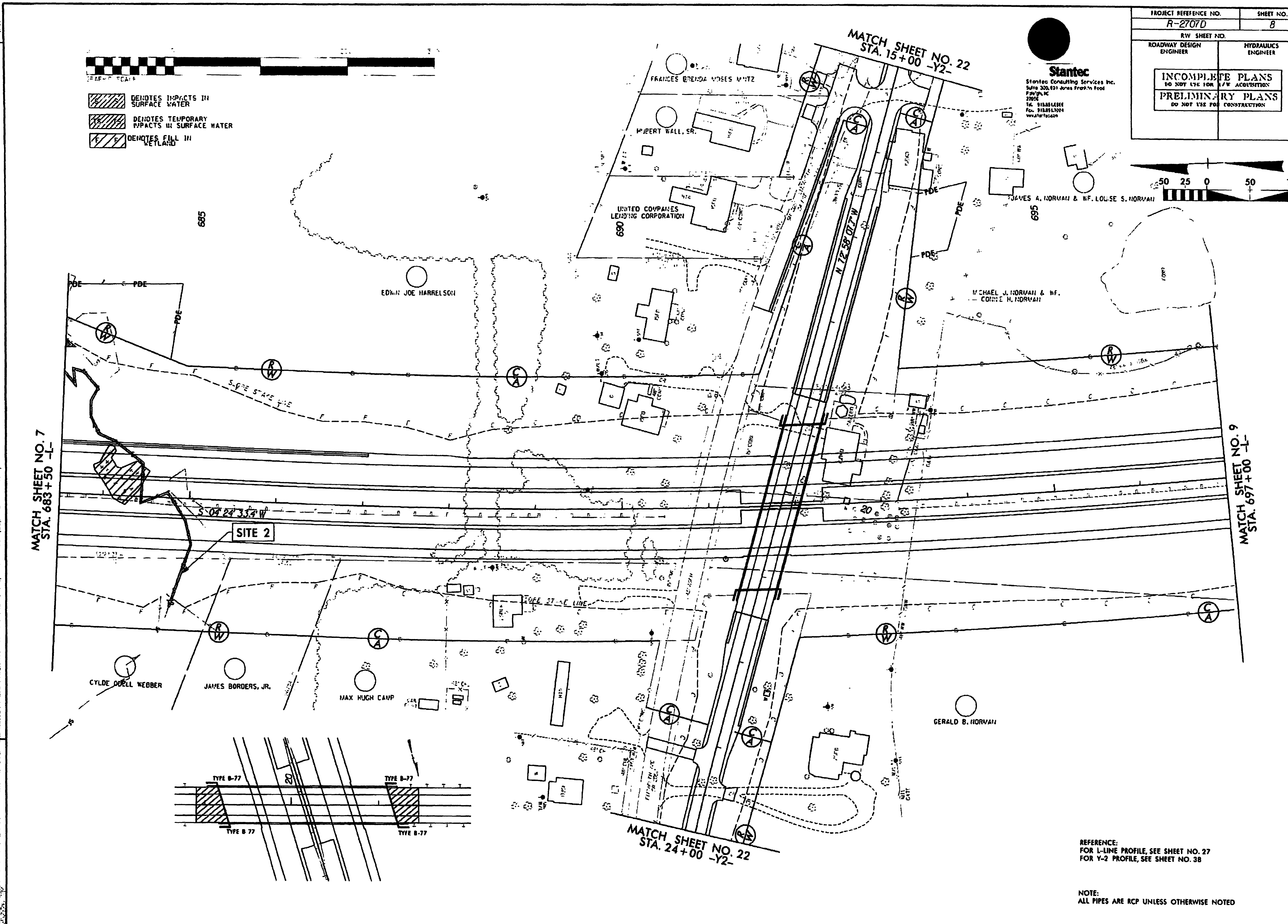
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.

50 25 0 50 100

REVISIONS





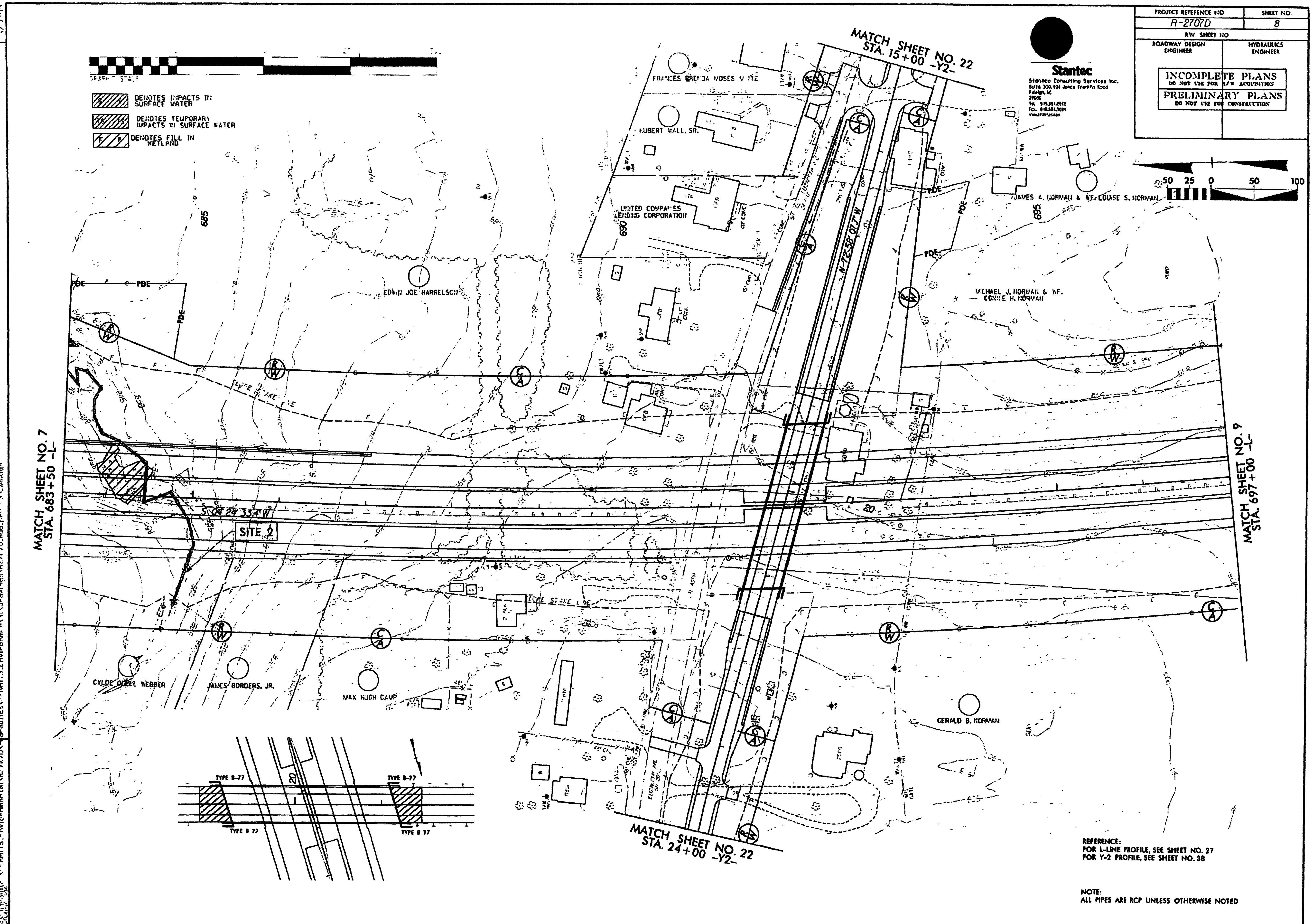
PROJECT REFERENCE NO.
SHEET NO.
R-2707D
8
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Stantec
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
MATCH SHEET NO. 22
STA. 15+00 -Y2-
MATCH SHEET NO. 22
STA. 24+00 -Y2-
MATCH SHEET NO. 7
STA. 683+50 -L-
MATCH SHEET NO. 9
STA. 697+00 -L-
FRANCES BRENDA MOSES MINTZ
HUBERT WALL, SR.
UNITED COMPANIES LENDING CORPORATION
EDWIN JOE HARRELSON
JAMES A. NORMAN & WF. LOUISE S. NORMAN
MICHAEL J. NORMAN & WF. CONNIE H. NORMAN
CYLDE ODELL WEBBER
JAMES BORDERS, JR.
MAX HUGH CAMP
GERALD B. NORMAN
SITE 2
S 04°24'33.4" W
N 72°58'07.7" W
TYPE B-77
REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 27
FOR Y-2 PROFILE, SEE SHEET NO. 38
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	8
RW SHEET NO	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.



DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
MATCH SHEET NO. 22 STA. 15+00 -Y2-
MATCH SHEET NO. 22 STA. 24+00 -Y2-
MATCH SHEET NO. 7 STA. 683+50 -L-
MATCH SHEET NO. 9 STA. 697+00 -L-
SITE 2
FRANCES BRENDA MOSES MITZ
HUBERT WALL, SR.
UNITED COMPANIES LENDING CORPORATION
JAMES A. NORMAN & WF. LOUISE S. NORMAN
MICHAEL J. NORMAN & WF. CONNIE H. NORMAN
EDWIN JOE HARRELSON
CYLDE ODELL WEBBER
JAMES BORDERS, JR.
MAX HUGH CAMP
GERALD B. NORMAN
TYPE B-77
50 25 0 50 100

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 27
FOR Y-2 PROFILE, SEE SHEET NO. 38

NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.
Suite 300, 801 Jones Franklin Road
Raleigh, NC
27606
Tel 919.851.6666
Fax 919.851.7024
www.stantec.com

REVISIONS

GRAPHIC SCALE 0 100 200 300

50 25 0 50 100

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DIVERSE SERVICES U.S., INC.

DONALD CAMP & WF.
HAMETTE CAMP

BARBARA W. MCLARTY

TOMEY GUEST

HENRY B. EDWARDS, JR.

ABIGAL BROWN

THARON K. ALEXANDER & WF.
LEIDA C. ALEXANDER

TROPZIE WHITE MCCLUNEY
MARCHA WHITE HARRIS
OVID ALTON WHITE

BARBARA W. MCLARTY

KENDER ROSS, JR. & WF.
MARY ODELLA ROSS

ANDREW USSERY & WF.
SANDRA USSERY

SLOPE STAKE LINE

SITE 4

SITE 3

JAMES A. NORMAN & WF. LOUISE S. NORMAN

BILLY H. ROBERTS & WF.
MARY M. ROBERTS

NORTH CAROLINA STATE HIGHWAY AND PUBLIC WORKS COMMISSION

MATCH SHEET NO. 9
STA. 710+50 -L-

MATCH SHEET NO. 11
STA. 724+00 -L-

NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

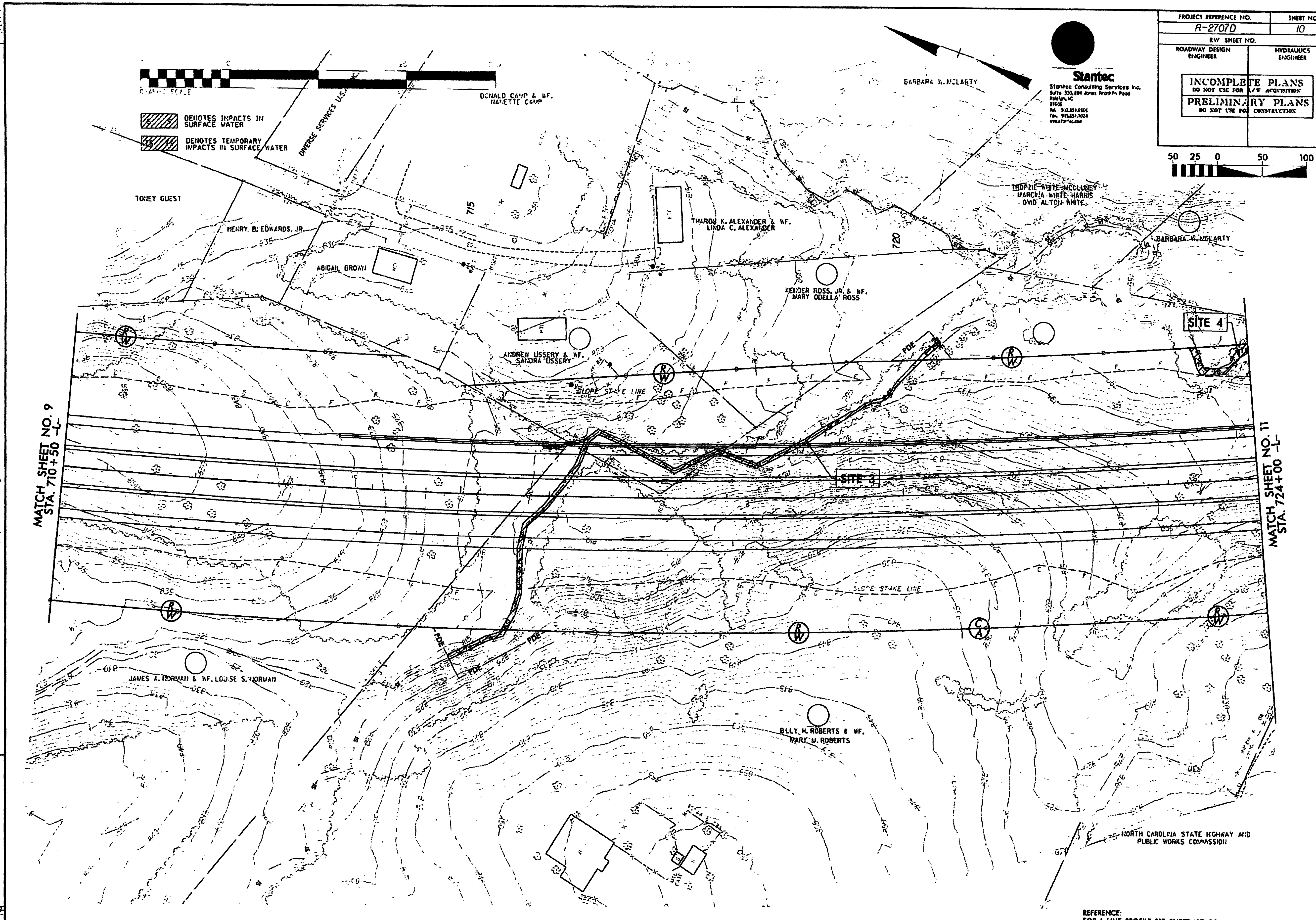
REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 28
FOR NATURAL STREAM DESIGN, SEE DETAIL?

9/17/2012
R:\Projects\PERMITS_Environmental\R2707D\Hydraulics\PERMITS_Environmental\Drawings\R2707D_hyd_prm_PSH_10.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
Stantec
TONEY GUEST
HENRY B. EDWARDS, JR.
ABIGAIL BROWN
DONALD CAMP & WF. NANETTE CAMP
BARBARA W. MCLARTY
THARON K. ALEXANDER & WF. LINDA C. ALEXANDER
KENDER ROSS, JR. & WF. MARY ODELLA ROSS
ANDREW USSERY & WF. SANDRA USSERY
SITE 4
SITE 3
SLOPE STAKE LINE
MATCH SHEET NO. 9 STA. 710+50 -L-
MATCH SHEET NO. 11 STA. 724+00 -L-
JAMES A. NORMAN & WF. LOUISE S. NORMAN
BILLY H. ROBERTS & WF. MARY M. ROBERTS
NORTH CAROLINA STATE HIGHWAY AND PUBLIC WORKS COMMISSION
PDE
715
720
50 25 0 50 100
REVISIONS

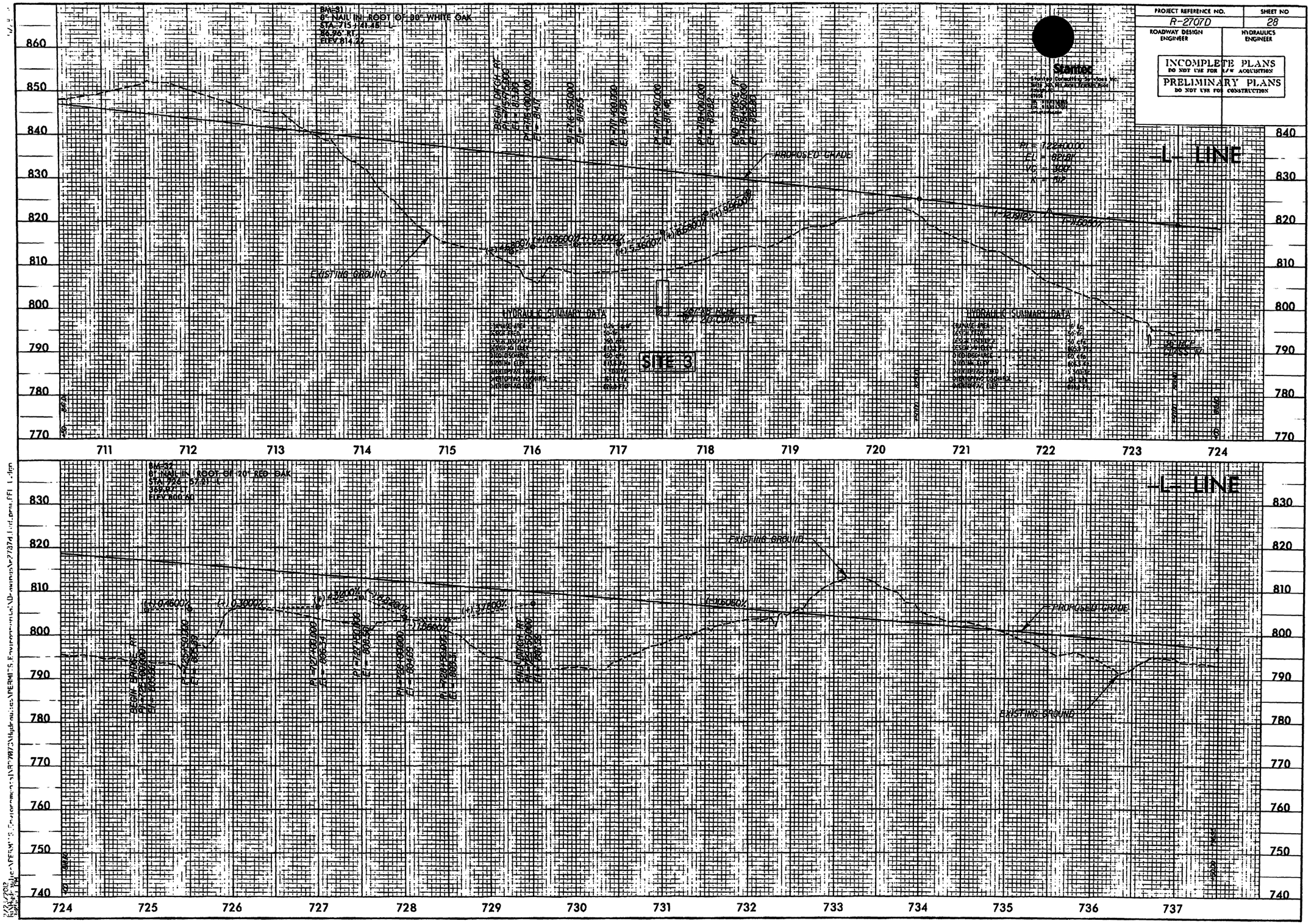
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 28
FOR NATURAL STREAM DESIGN, SEE DETAIL

PROJECT REFERENCE NO.	SHEET NO
R-2707D	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PROJECT REFERENCE NO.	SHEET NO.
R-2707D	11

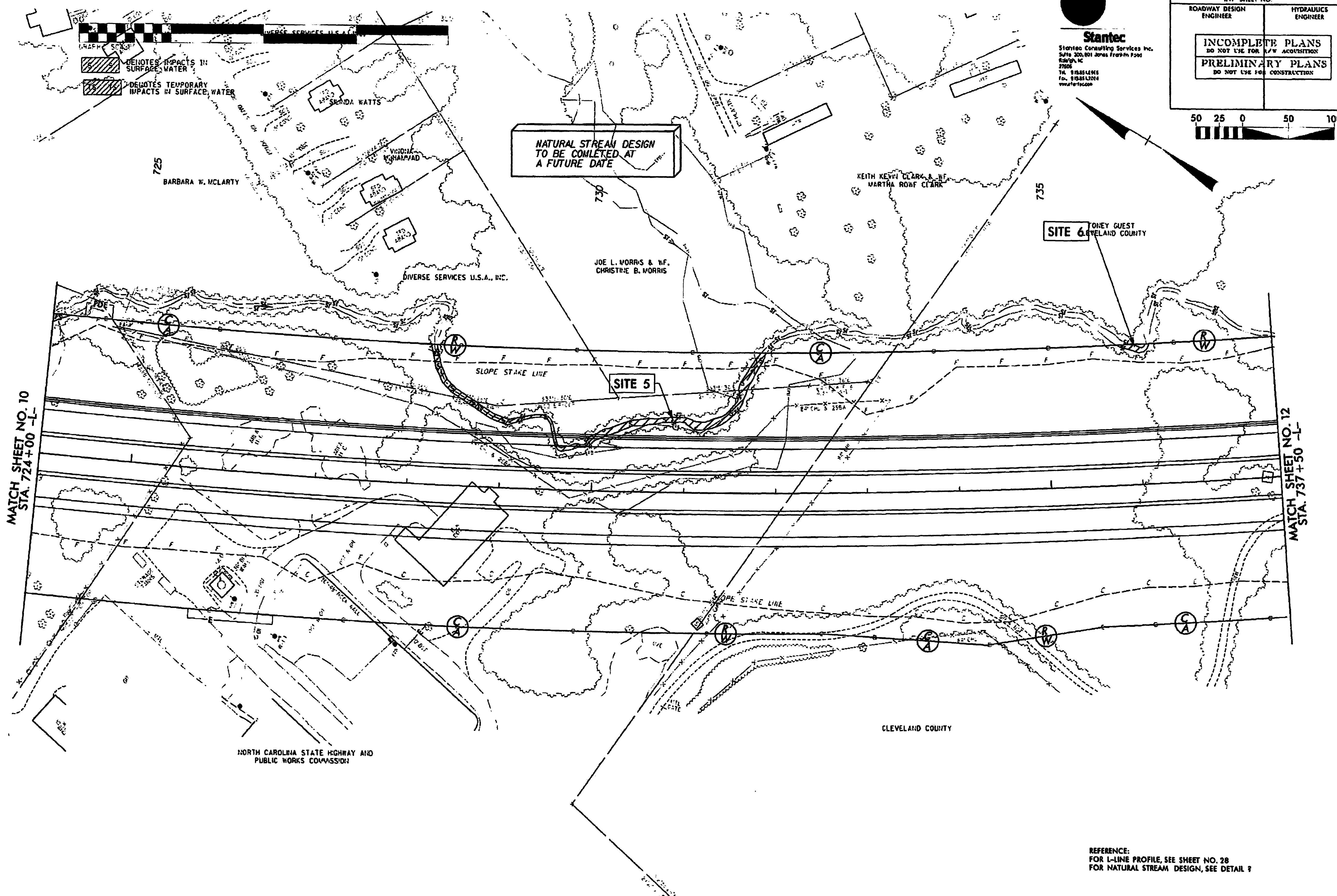
RW SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.
Suite 300, 801 Jones Franklin Road
Raleigh, NC
27606



DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NATURAL STREAM DESIGN TO BE COMLETED AT A FUTURE DATE
BARBARA W. MCLARTY
BRENDA WATTS
DIVERSE SERVICES U.S.A., INC.
JOE L. MORRIS & WF. CHRISTINE B. MORRIS
KEITH KEVIN CLARK & WF. MARTHA ROWE CLARK
SITE 5
SITE 6
SLOPE STAKE LINE
725
730
735
MATCH SHEET NO. 10 STA. 724+00 -L-
MATCH SHEET NO. 12 STA. 737+50 -L-
NORTH CAROLINA STATE HIGHWAY AND PUBLIC WORKS COMMISSION
CLEVELAND COUNTY
50 25 0 50 100

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 28
FOR NATURAL STREAM DESIGN, SEE DETAIL ?

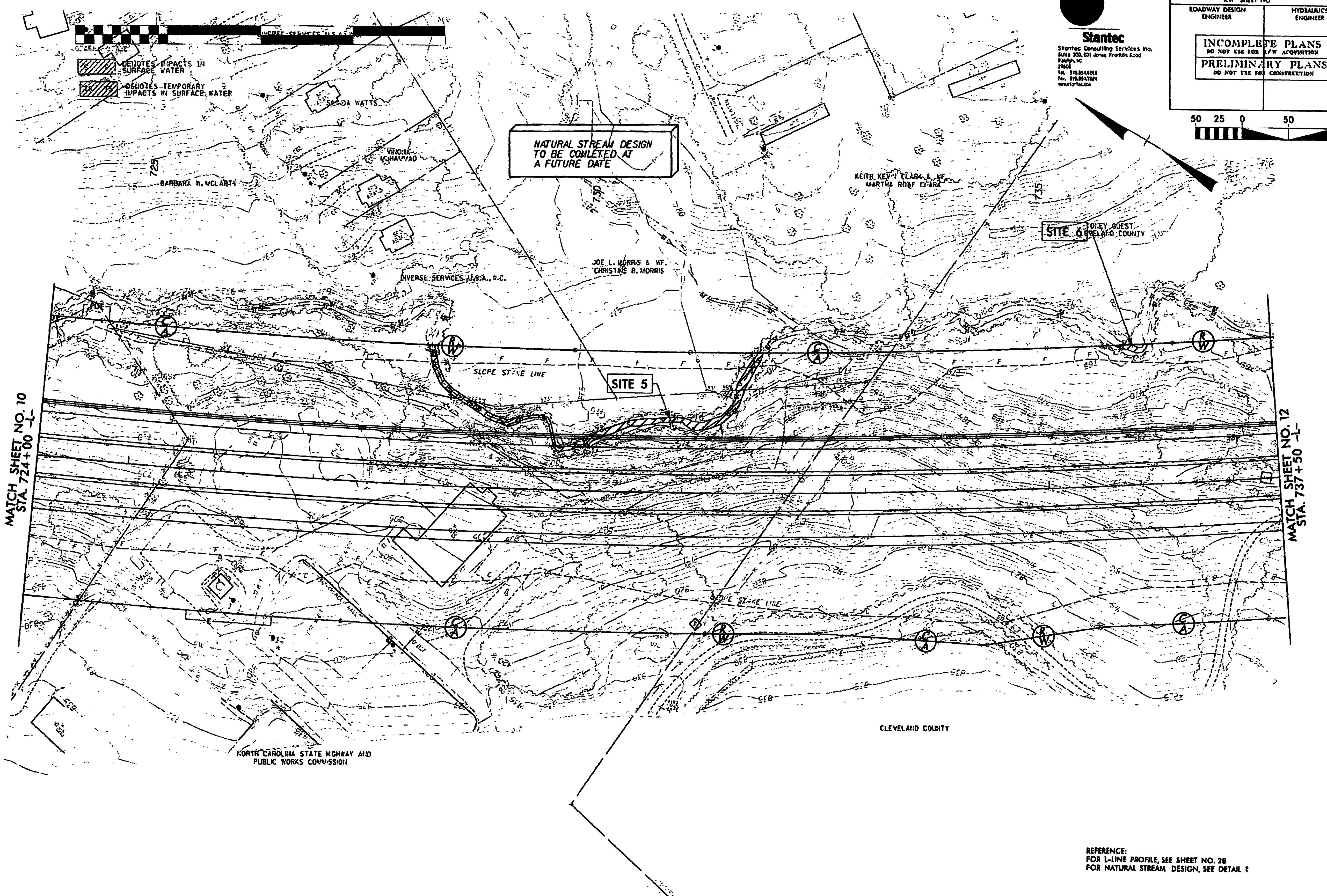
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.



DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NATURAL STREAM DESIGN TO BE COMLETED AT A FUTURE DATE
BARBARA W. MCLARTY
DIVERSE SERVICES U.S.A., P.C.
JOE L. MORRIS & WF. CHRISTINE B. MORRIS
KEITH KEVIN CLARK & WF. MARTHA RUBY CLARK
SITE 5
SITE 6
SLOPE STAKE LINE
MATCH SHEET NO. 10 STA. 724+00 -L-
MATCH SHEET NO. 12 STA. 737+50 -L-
CLEVELAND COUNTY
NORTH CAROLINA STATE HIGHWAY AND PUBLIC WORKS COMMISSION
50 25 0 50 100

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 2B
FOR NATURAL STREAM DESIGN, SEE DETAIL ?

NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

REVISIONS

PROJECT REFERENCE NO	SHEET NO.
R-2707D	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.
Suite 300, 801 Jones Franklin Road
Raleigh, NC
27606
Tel. 919.851.6066
Fax. 919.851.7041
www.stantec.com

50 25 0 50 100

NATURAL STREAM DESIGN TO BE COMLETED AT A FUTURE DATE

TONEY GUEST
CLEVELAND COUNTY

PHILLIP R. RUCKER & WF.
CAROLYN W. RUCKER

SITE 6

BANK STABILIZATION

PDE

SLOPE STAKE LINE

740

745

750

MATCH SHEET NO. 11
STA. 737+50 -L-

MATCH SHEET NO. 13
STA. 751+00 -L-

BOBBY D. FORTENBERRY & WF.
EDNA C. FORTENBERRY

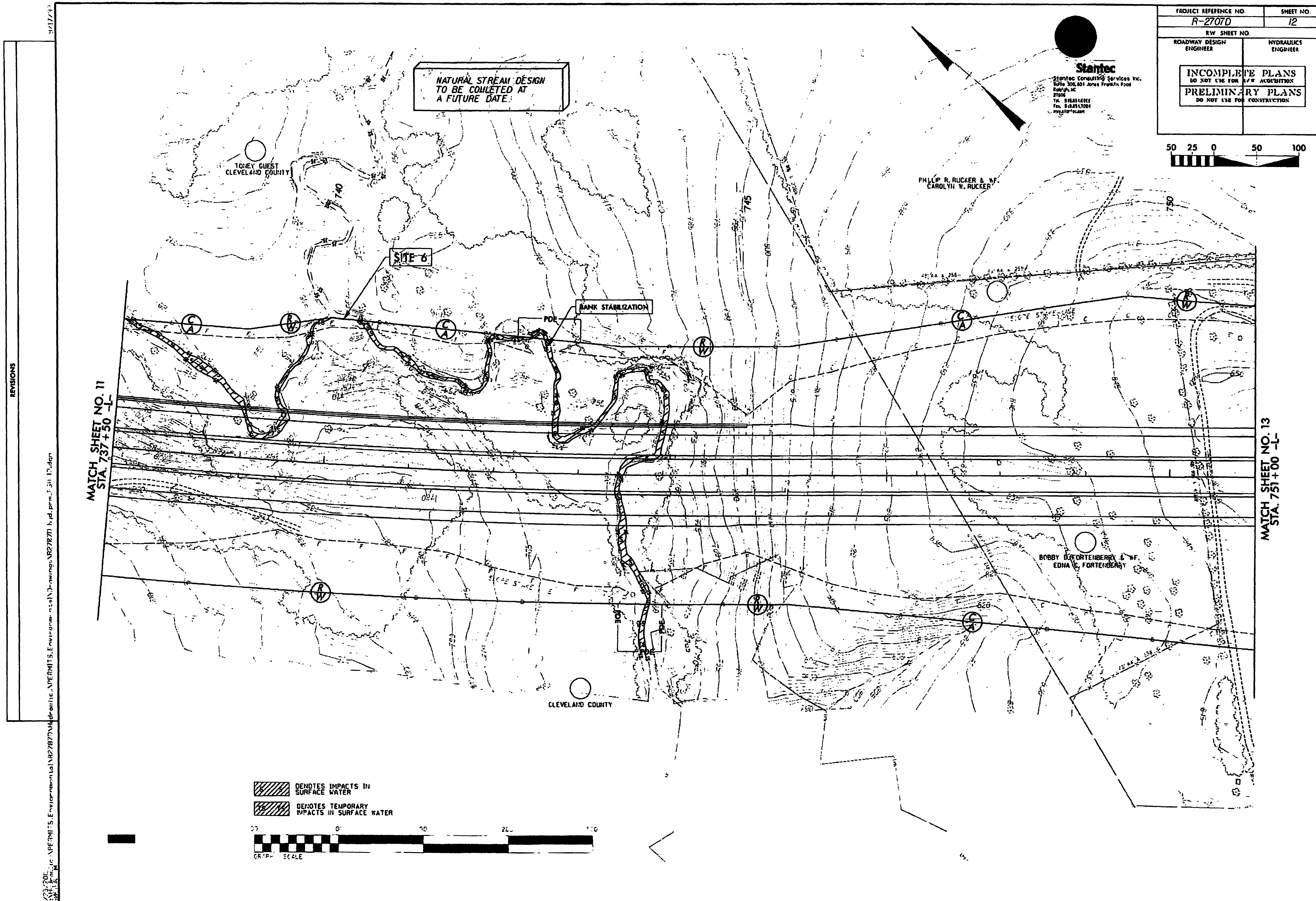
CLEVELAND COUNTY

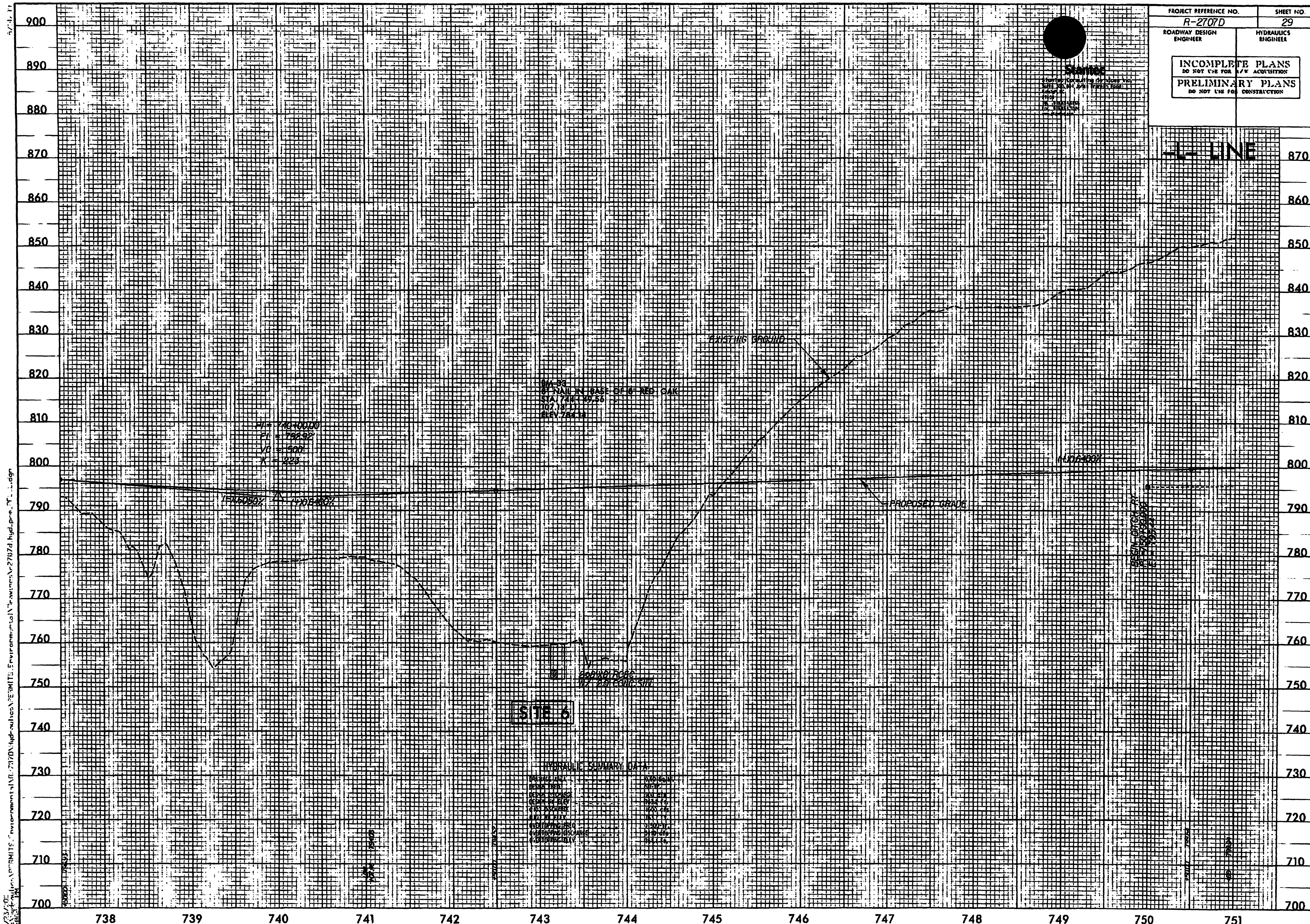
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE

REVISIONS

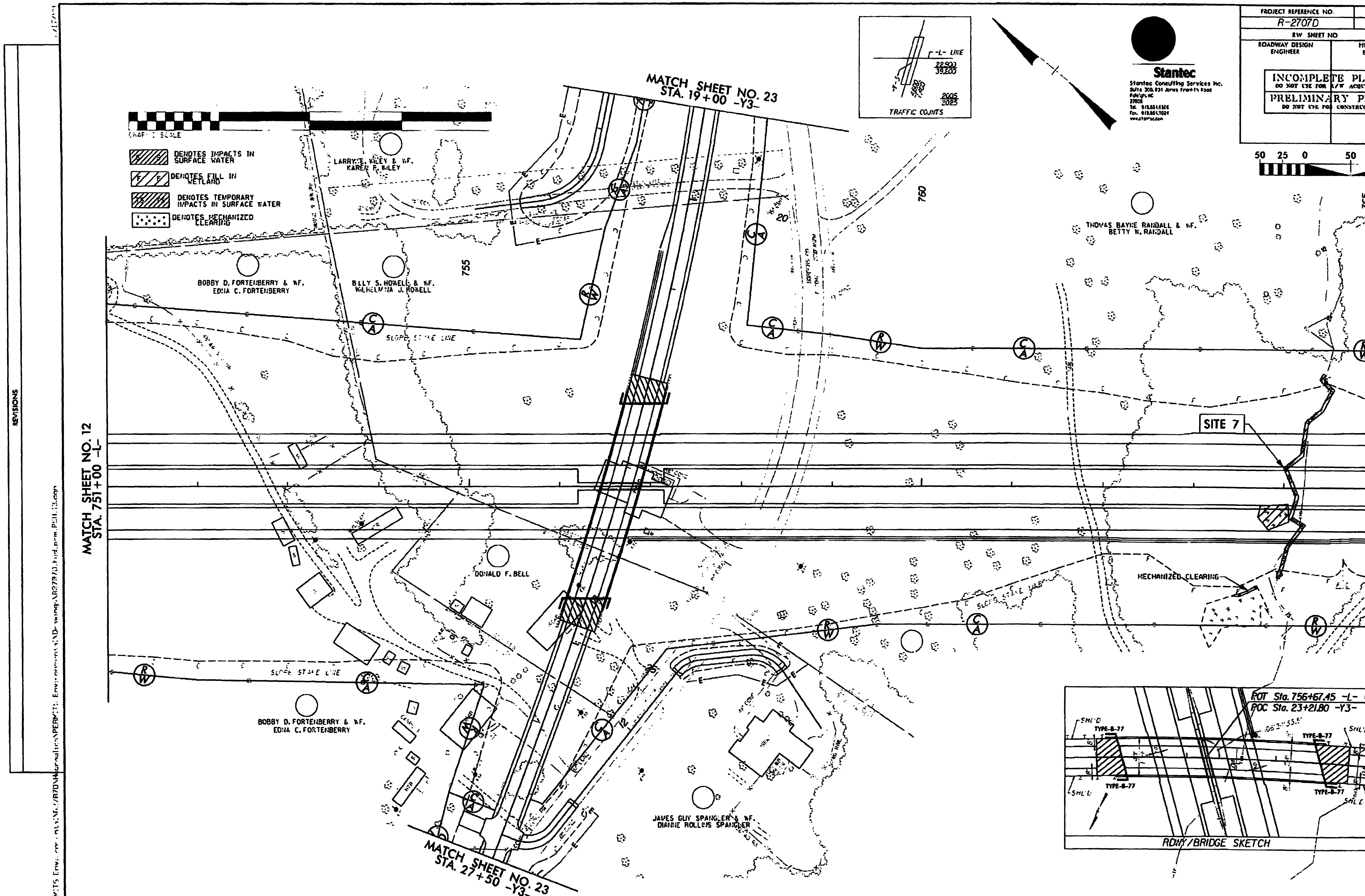

PROJECT REFERENCE NO. R-2707D
SHEET NO. 12
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Stantec
Stantec Consulting Services Inc.
NATURAL STREAM DESIGN TO BE COMPLETED AT A FUTURE DATE
TONEY GUEST
CLEVELAND COUNTY
SITE 6
BANK STABILIZATION
PDE
PHILLIP R. RUCKER & WF.
CAROLYN W. RUCKER
BOBBY D. FORTENBERRY & WF.
EDNA C. FORTENBERRY
CLEVELAND COUNTY
MATCH SHEET NO. 11
STA. 737+50 -L-
MATCH SHEET NO. 13
STA. 751+00 -L-
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPH SCALE
REVISIONS


PROJECT REFERENCE NO.
R-2707D
SHEET NO.
29
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Stantec
-L- LINE
EXISTING GROUND
PROPOSED GRADE
BM-33
SITE 6
HYDRAULIC SUMMARY DATA
738
739
740
741
742
743
744
745
746
747
748
749
750
751

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



MATCH SHEET NO. 23
STA. 19+00 -Y3-
GRAPHIC SCALE
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
TRAFFIC COUNTS
Stantec
LARRY E. WILEY & WF. KAREN P. WILEY
BOBBY D. FORTENBERRY & WF. EDNA C. FORTENBERRY
BILLY S. HOWELL & WF. WILHELMINA J. HOWELL
THOMAS BAYNE RANDALL & WF. BETTY W. RANDALL
DONALD F. BELL
JAMES GUY SPANGLER & WF. DIANNE ROLLINS SPANGLER
SLOPE STAKE LINE
SITE 7
MECHANIZED CLEARING
MATCH SHEET NO. 12
STA. 751+00 -L-
MATCH SHEET NO. 14
STA. 765+00 -L-
MATCH SHEET NO. 23
STA. 27+50 -Y3-
POT Sta. 756+67.45 -L- =
POC Sta. 23+21.80 -Y3-
TYPE-B-77
RDWY/BRIDGE SKETCH
REVISIONS
50 25 0 50 100

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 30
FOR Y-3 PROFILE, SEE SHEET NO. 39

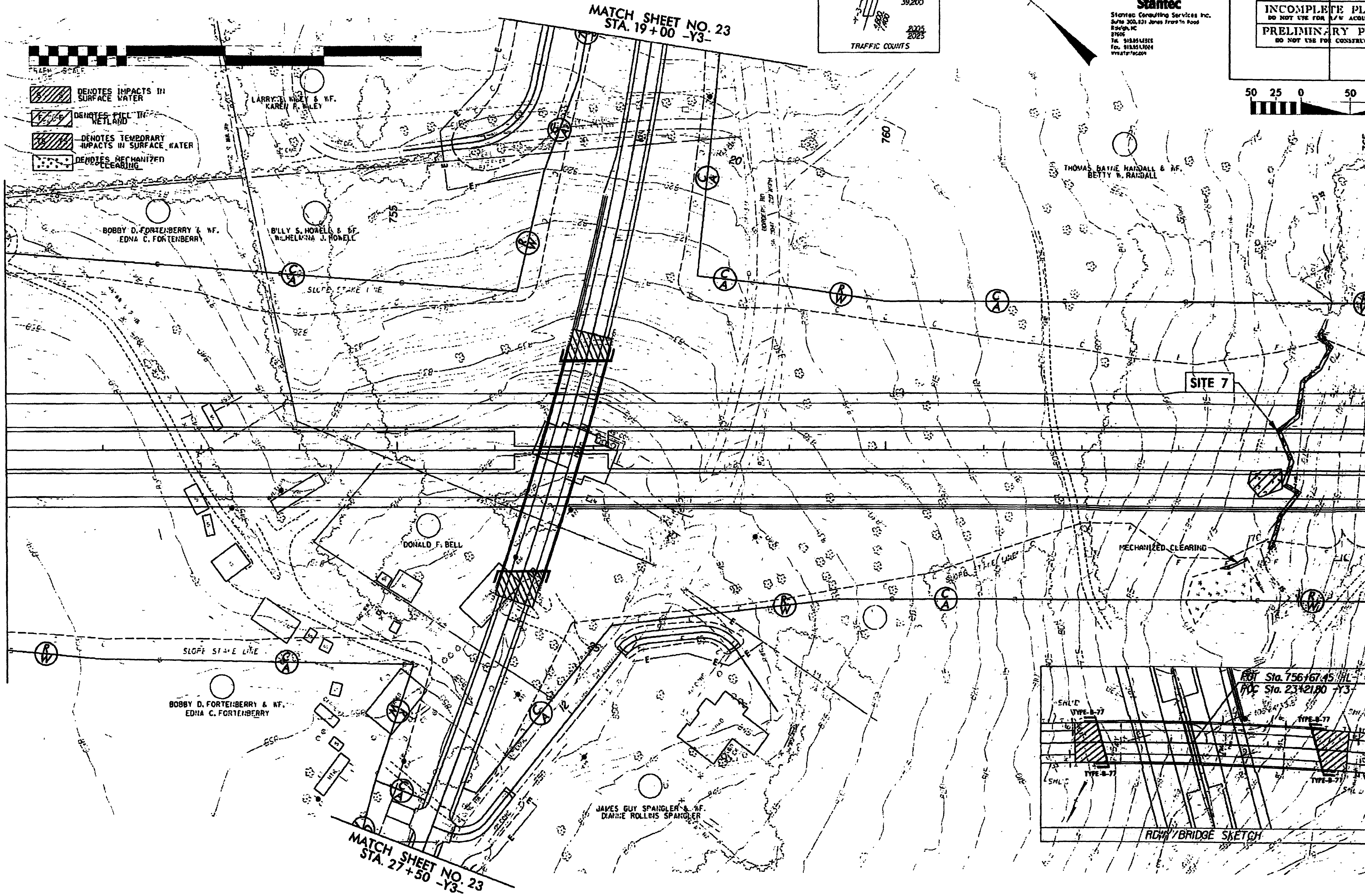
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.

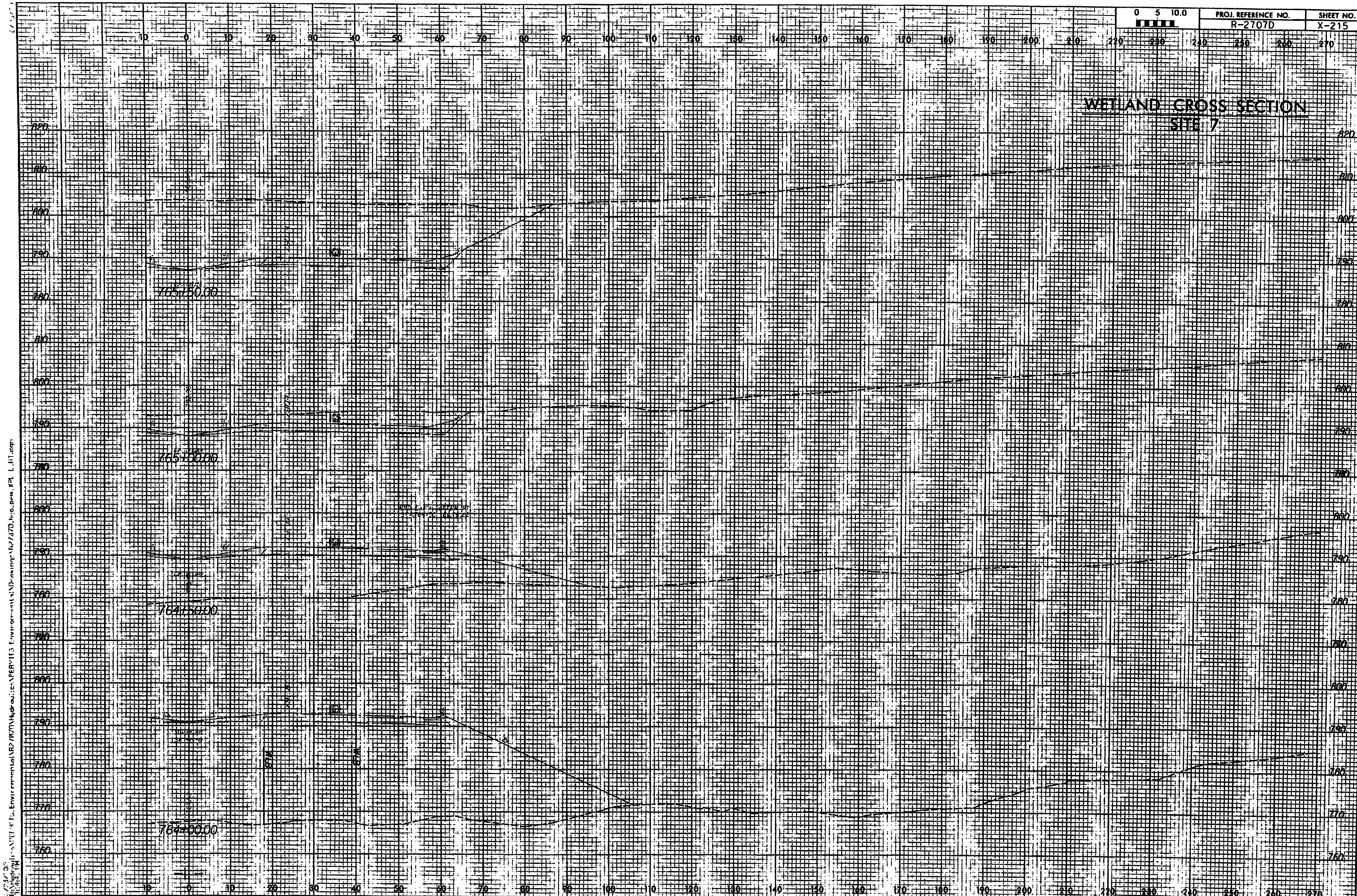


MATCH SHEET NO. 23
STA. 19+00 -Y3-
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
TRAFFIC COUNTS
-L- LINE
LARRY E. WILEY & WF. KAREN F. WILEY
BOBBY D. FORTENBERRY & WF. EDNA C. FORTENBERRY
BILLY S. HOWELL & WF. WILHELMINA J. HOWELL
THOMAS WAYNE RANDALL & WF. BETTY W. RANDALL
SLOPE STAKE LINE
SITE 7
MATCH SHEET NO. 12
STA. 751+00 -L-
MATCH SHEET NO. 14
STA. 765+00 -L-
DONALD F. BELL
MECHANIZED CLEARING
JAMES GUY SPANGLER & WF. DIANNE ROLLINS SPANGLER
MATCH SHEET NO. 23
STA. 27+50 -Y3-
TYPE-B-77
RDWY/BRIDGE SKETCH
50 25 0 50 100

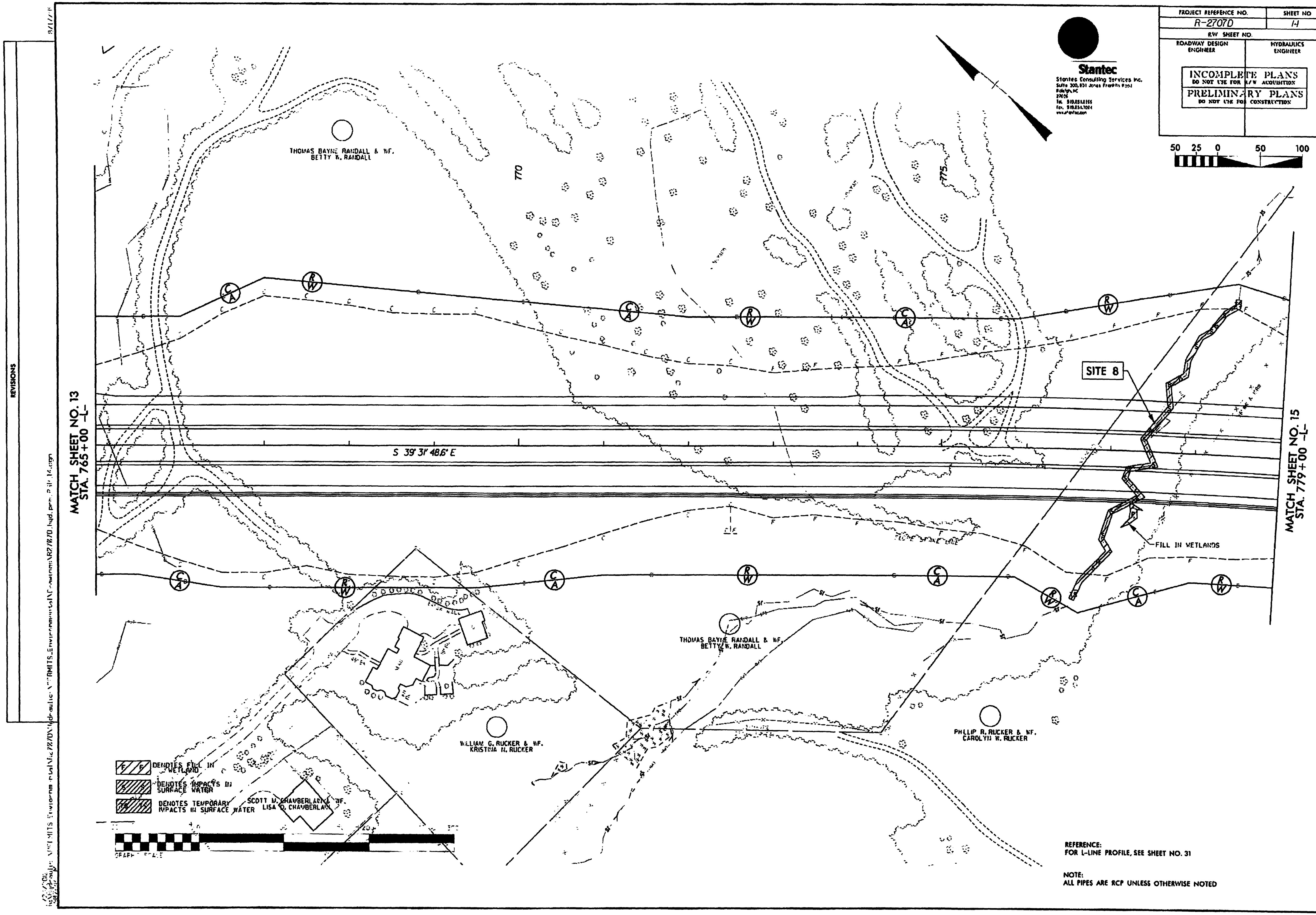
REVISIONS

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 30
FOR Y-3 PROFILE, SEE SHEET NO. 39

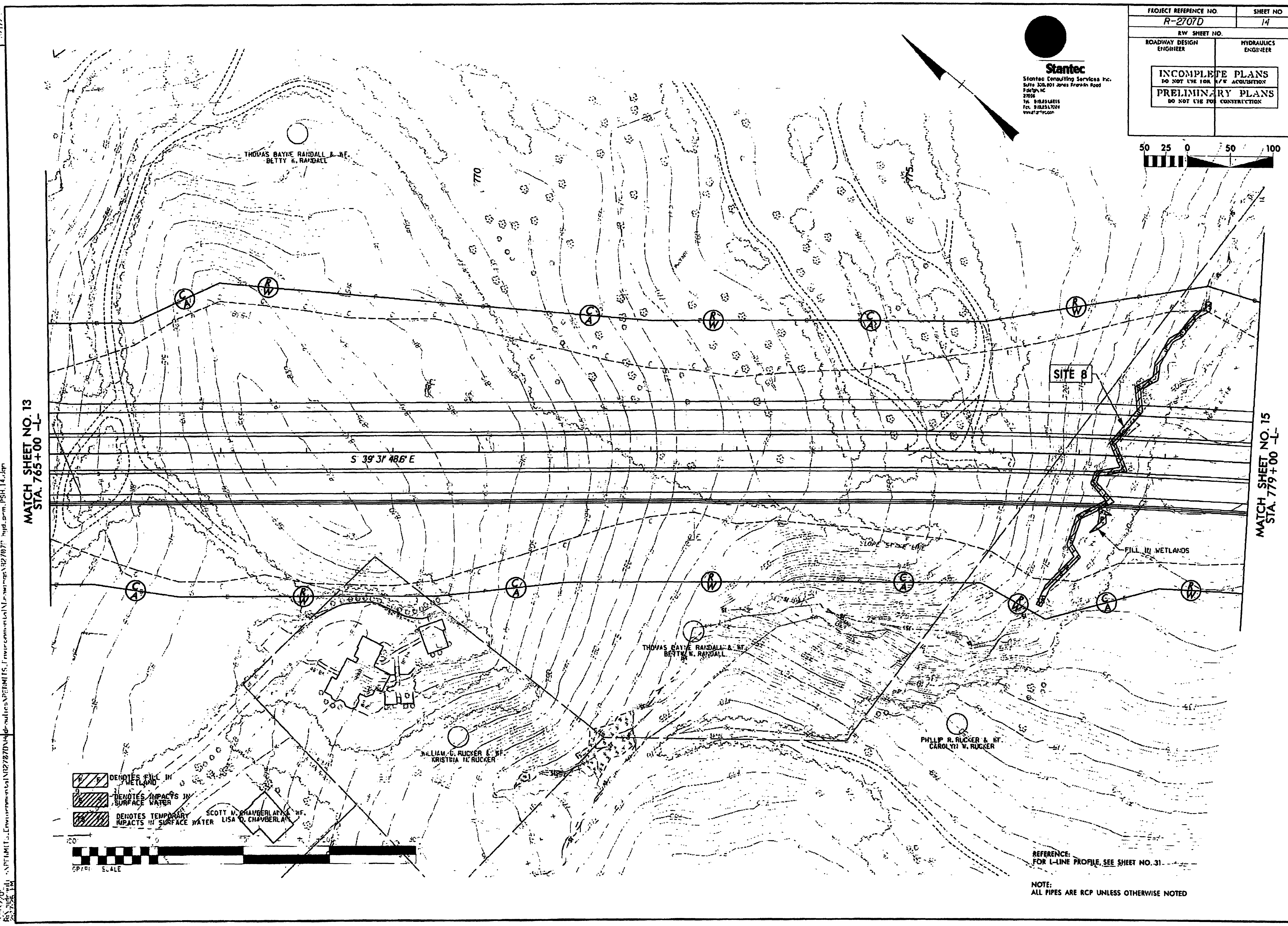
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED



PROJ. REFERENCE NO.
R-2707D
SHEET NO.
X-215
0 5 10.0
WETLAND CROSS SECTION
SITE 7
765+50.00
765+00.00
764+50.00
764+00.00



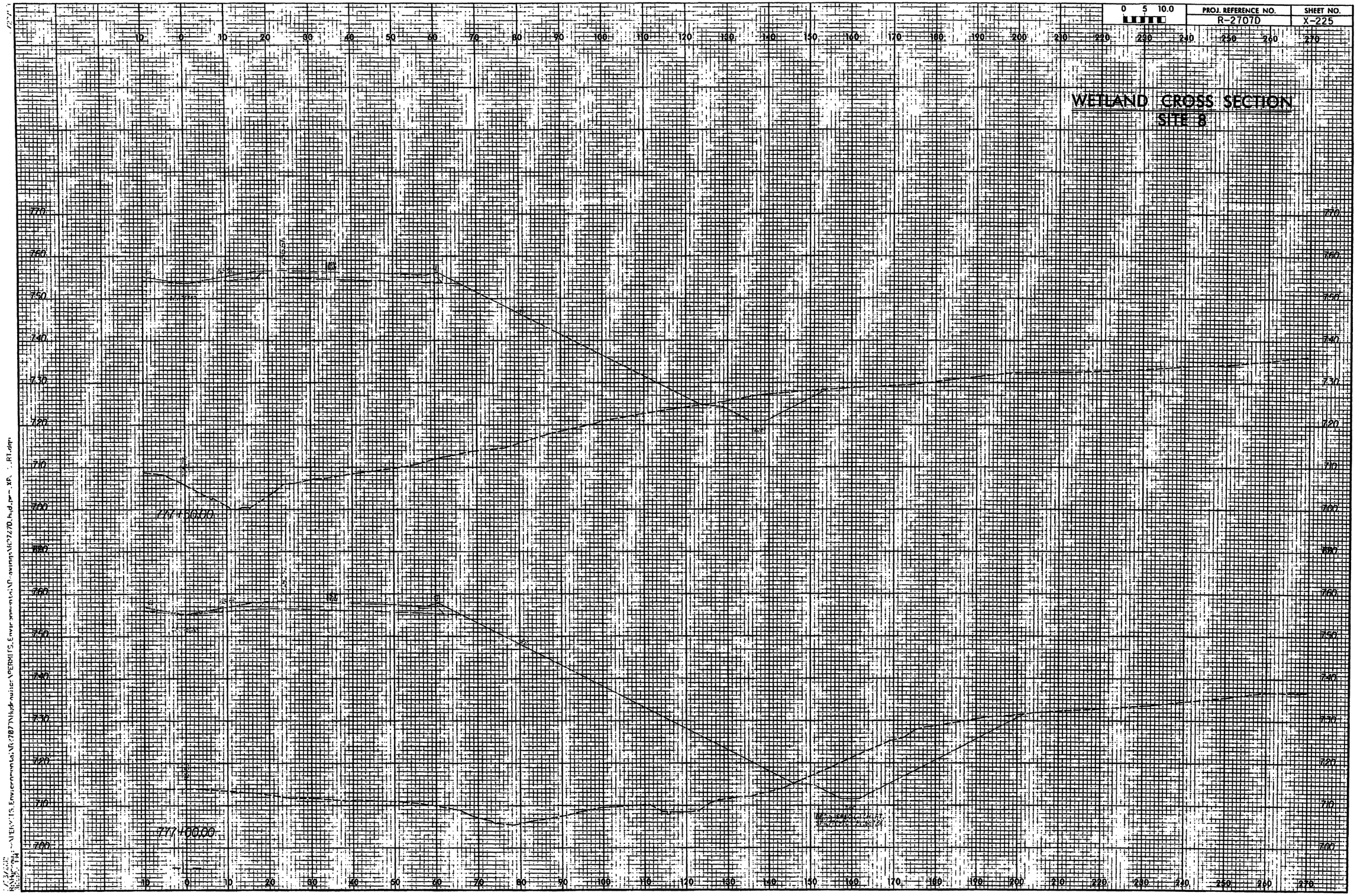
PROJECT REFERENCE NO.
R-2707D
SHEET NO
1-I
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Stantec
50 25 0 50 100
THOMAS BAYNE RANDALL & WF. BETTY W. RANDALL
SITE 8
S 39°31'48.6" E
MATCH SHEET NO. 13 STA. 765+00 -L-
MATCH SHEET NO. 15 STA. 779+00 -L-
FILL IN WETLANDS
THOMAS BAYNE RANDALL & WF. BETTY W. RANDALL
WILLIAM G. RUCKER & WF. KRISTINA H. RUCKER
PHILLIP R. RUCKER & WF. CAROLYN W. RUCKER
SCOTT M. CHAMBERLAIN & WF. LISA D. CHAMBERLAIN
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
REFERENCE: FOR L-LINE PROFILE, SEE SHEET NO. 31
NOTE: ALL PIPES ARE RCP UNLESS OTHERWISE NOTED
REVISIONS


PROJECT REFERENCE NO.
R-2707D
SHEET NO
14
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Stantec
Stantec Consulting Services Inc.
50 25 0 50 100
REVISIONS
THOMAS BAYNE RANDALL & WF.
BETTY K. RANDALL
770
775
SITE 8
S 39°31'48.6" E
MATCH SHEET NO. 13
STA. 765+00 -L-
MATCH SHEET NO. 15
STA. 779+00 -L-
FILL IN WETLANDS
SLOPE STAKE LINE
THOMAS BAYNE RANDALL & WF.
BETTY K. RANDALL
PHILLIP R. RUCKER & WF.
CAROLYN W. RUCKER
WILLIAM C. RUCKER & WF.
KRISTEIN N. RUCKER
SCOTT M. CHAMBERLAIN & WF.
LISA D. CHAMBERLAIN
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 31
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJ. REFERENCE NO.	SHEET NO.
R-2707D	X-225

0 5 10.0

WETLAND CROSS SECTION
SITE 8

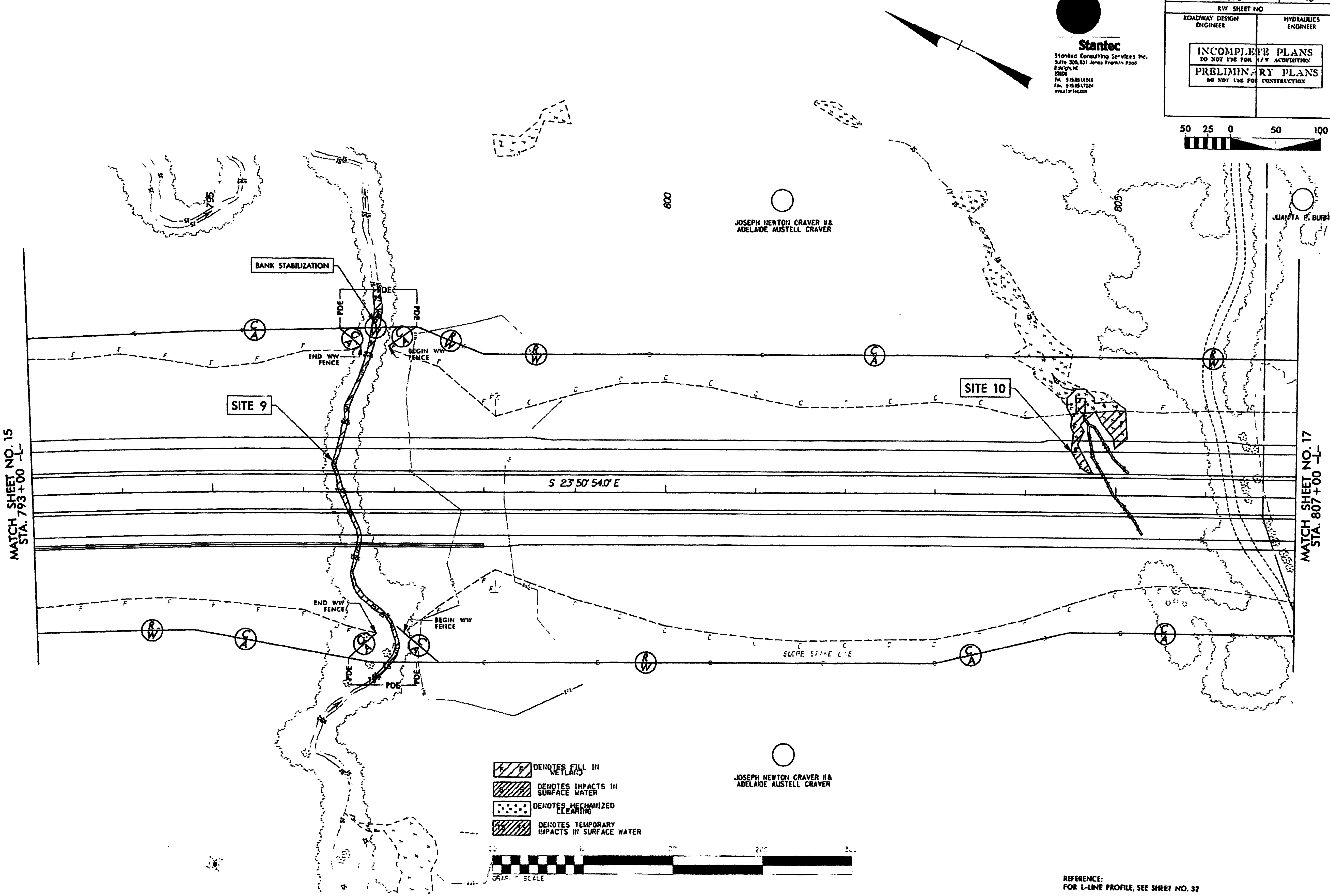


PROJECT REFERENCE NO.	SHEET NO.
R-2707D	16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.


BANK STABILIZATION
PDE
END WW FENCE
BEGIN WW FENCE
SITE 9
SITE 10
MATCH SHEET NO. 15
STA. 793+00 -L-
MATCH SHEET NO. 17
STA. 807+00 -L-
S 23°50' 54.0" E
800
805
795
JOSEPH NEWTON CRAVER III &
ADELAIDE AUSTELL CRAVER
JUANITA F. BURNS
SLOPE STAKE LINE
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
50 25 0 50 100

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 32

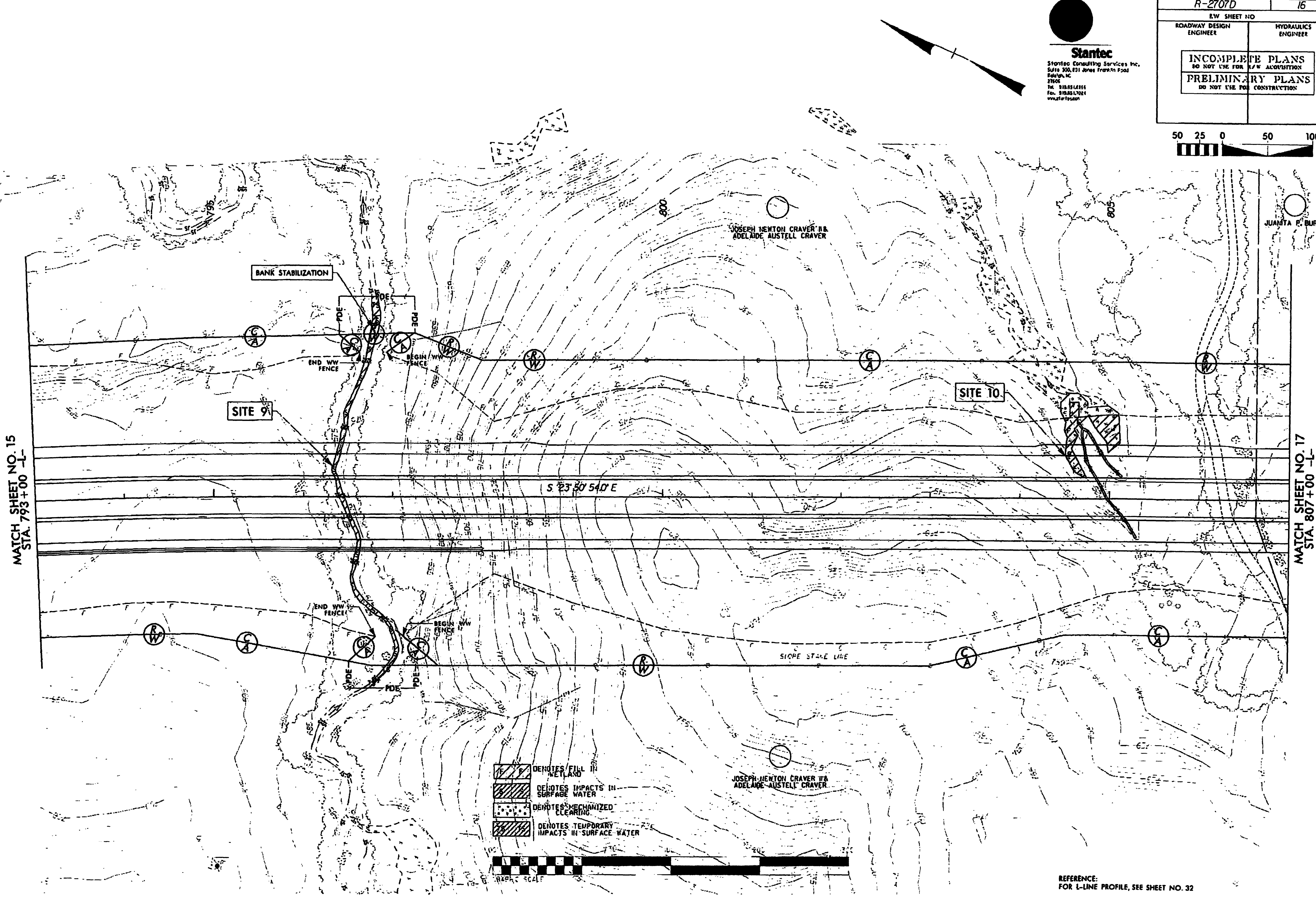
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.



REVISIONS

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 32

NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Station

-L- LINE

HYDRAULIC SUMMARY DATA

EXISTING GROUND

PROPOSED GRADE

760 750 740 730 720 710 700 690 680 670

779 780 781 782 783 784 785 786 787 788 789 790 791 792 793

HYDRAULIC SUMMARY DATA

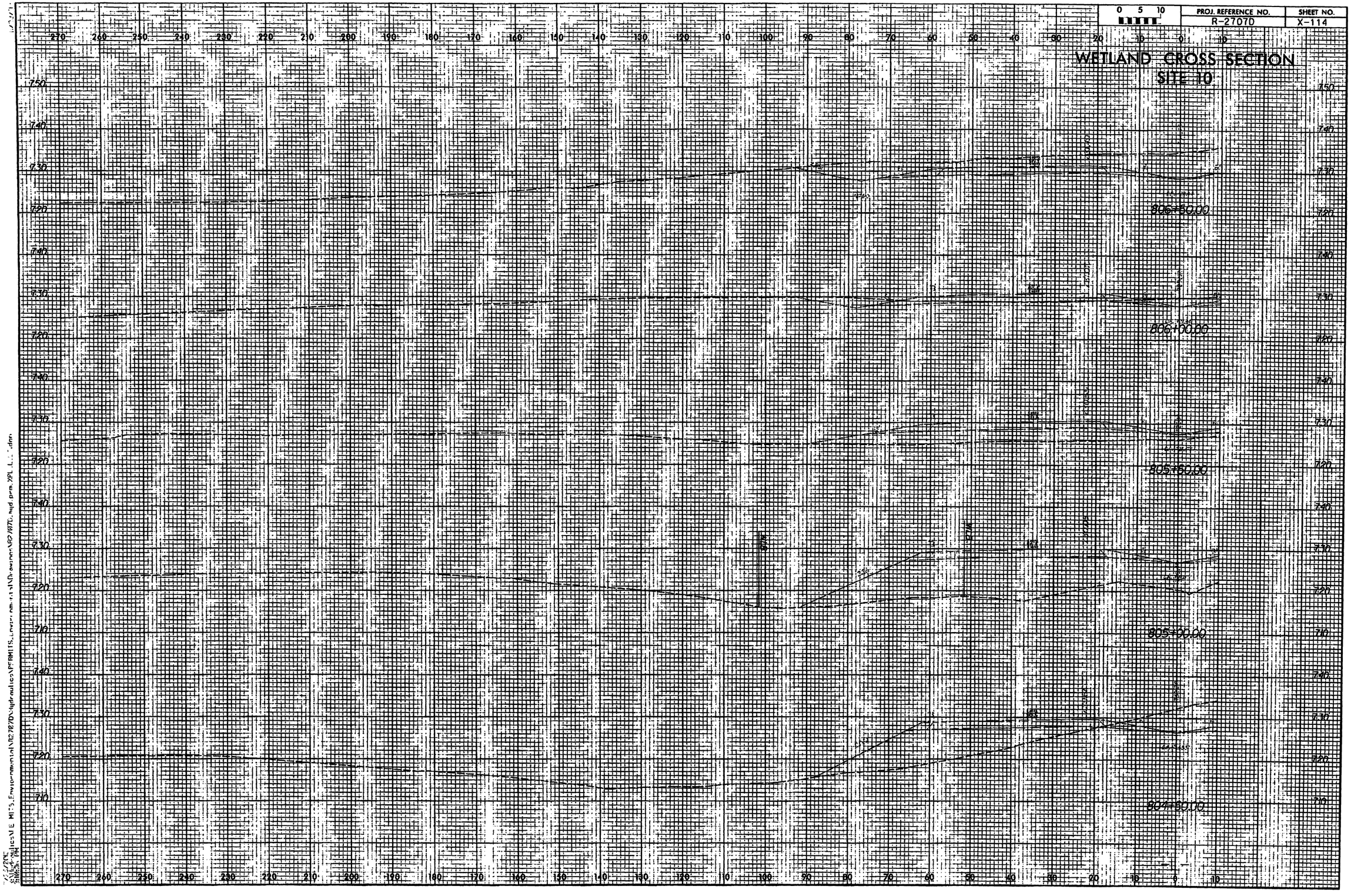
BM-S5
6" NAIL IN TOP OF BEECH STUMP
STA 797+46.66 -L-
OFFSET
ELEV 692.69

SITE 9

793 794 795 796 797 798 799 800 801 802 803 804 805 806 807

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2707D	X-114

WETLAND CROSS SECTION
SITE 10

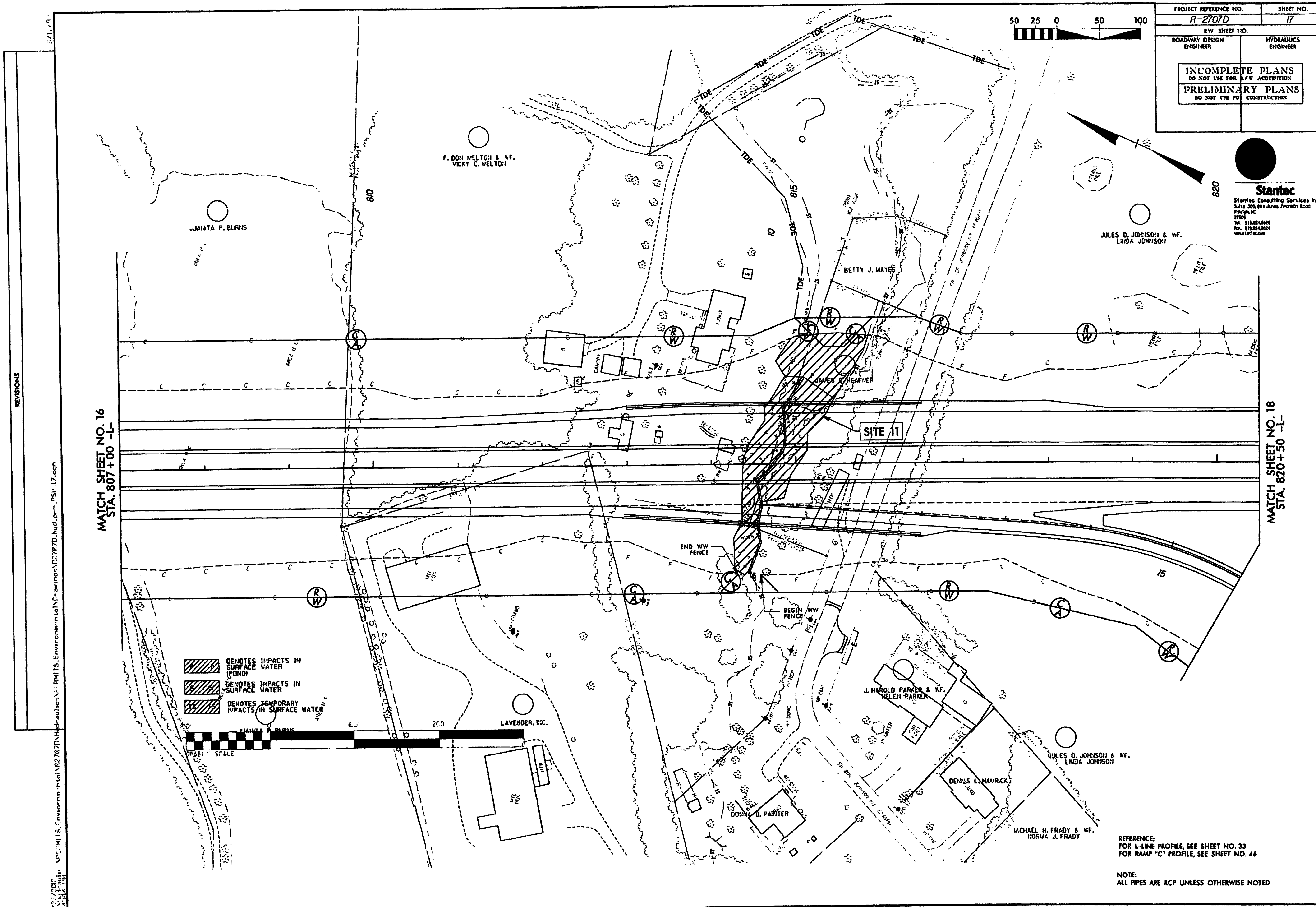


PROJECT REFERENCE NO.	SHEET NO.
R-2707D	17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec
Stantec Consulting Services Inc.
Suite 300, 801 Jones Franklin Road
Raleigh, NC
27606



50 25 0 50 100
MATCH SHEET NO. 16
STA. 807+00 -L-
MATCH SHEET NO. 18
STA. 820+50 -L-
F. DON MELTON & WF.
VICKY C. MELTON
JUANITA P. BURNS
BETTY J. MAYES
JAMES C. HEAFNER
JULES D. JOHNSON & WF.
LINDA JOHNSON
SITE 11
END WW FENCE
BEGIN WW FENCE
J. HAROLD PARKER & WF.
HELEN PARKER
LAVENDER, INC.
DENNIS L. HAMRICK
DONNA D. PAINTER
MICHAEL H. FRADY & WF.
NORMA J. FRADY
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
810
815
820
TDE
REVISIONS

REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 33
FOR RAMP "C" PROFILE, SEE SHEET NO. 46

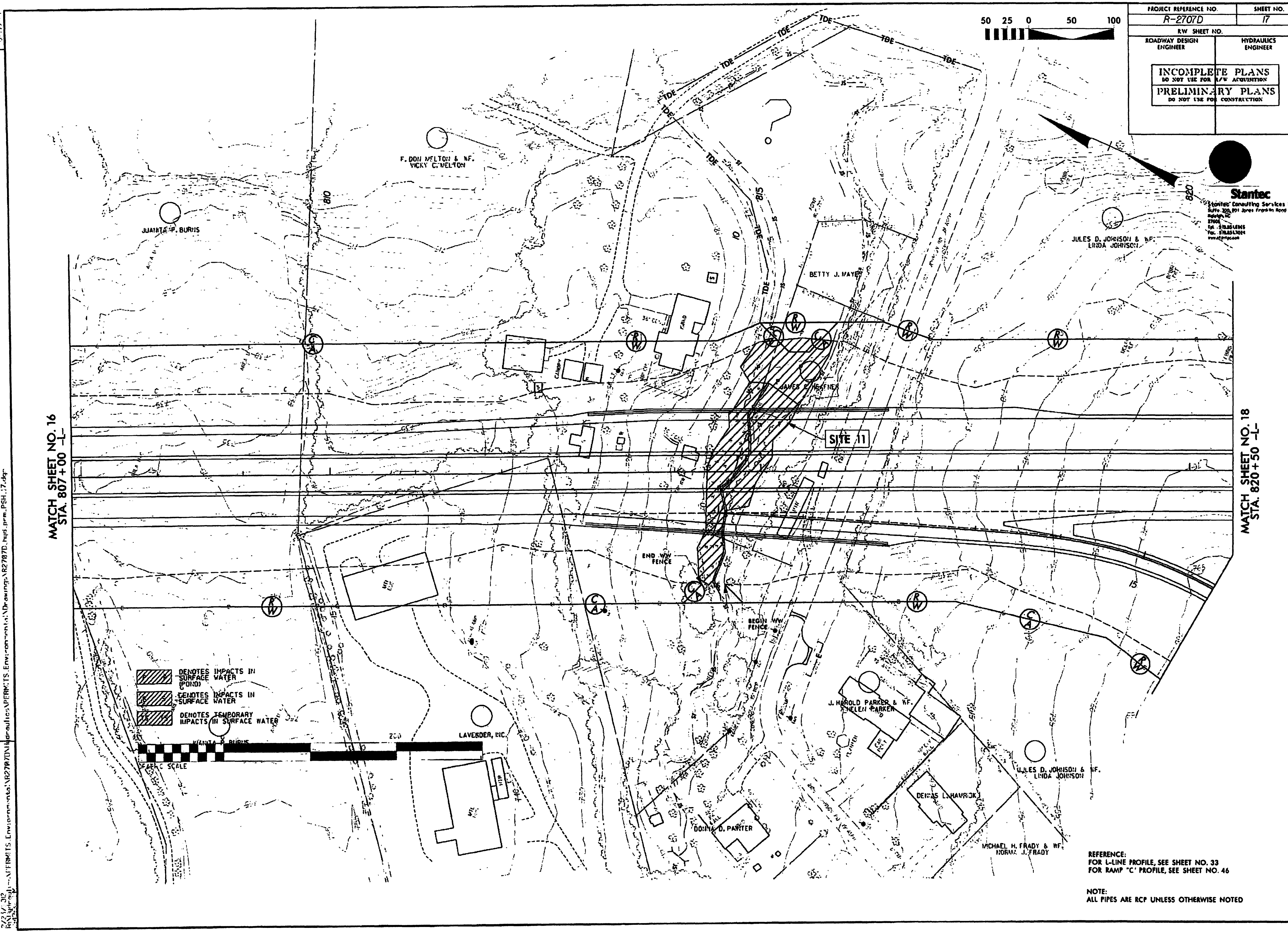
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Stantec



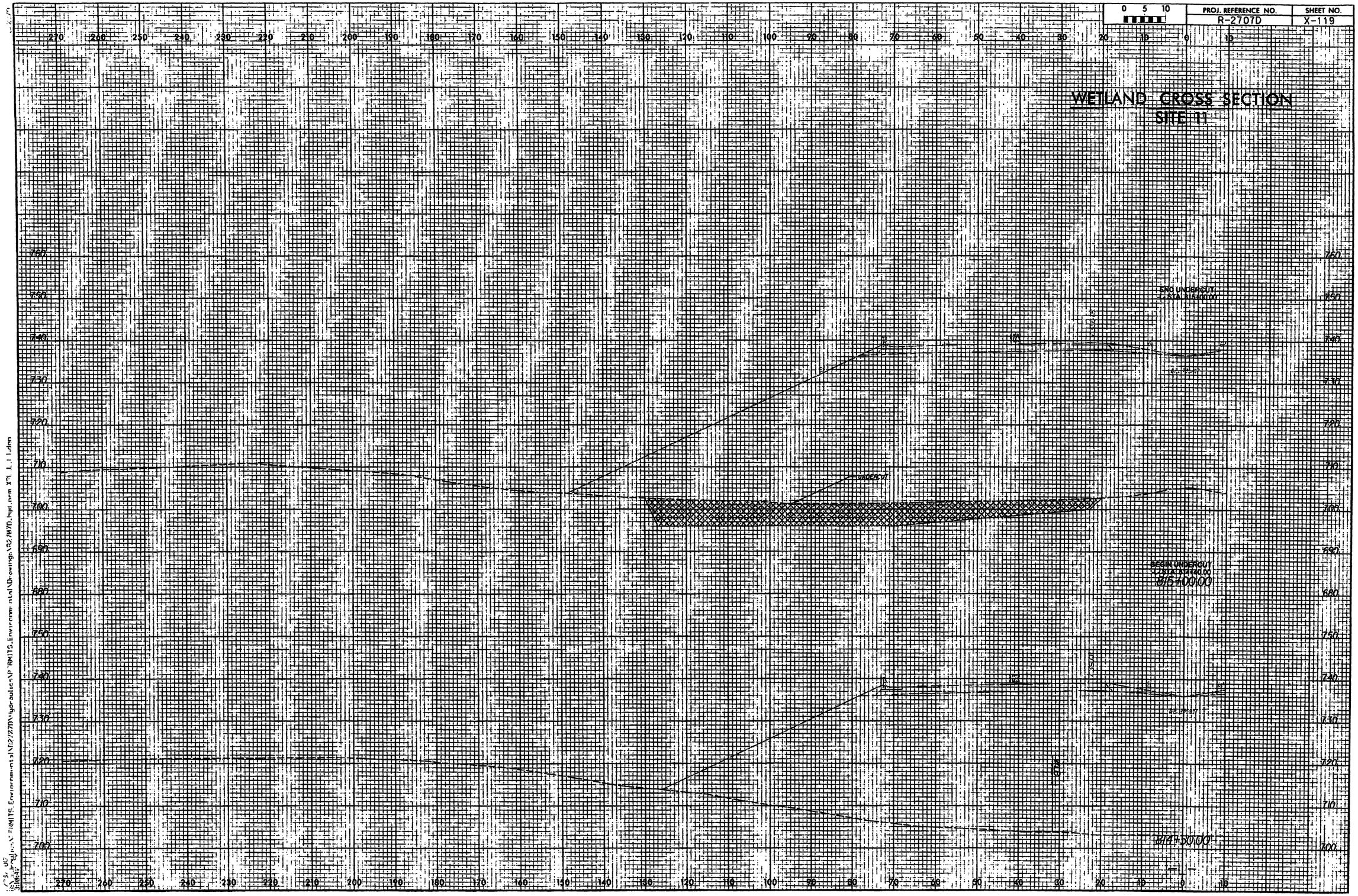
50 25 0 50 100
F. DON MELTON & WF. VICKY C. MELTON
JUANITA P. BURNS
BETTY J. MAYES
JULES D. JOHNSON & WF. LINDA JOHNSON
JAMES C. HEFNER
SITE 11
MATCH SHEET NO. 16 STA. 807+00 -L-
MATCH SHEET NO. 18 STA. 820+50 -L-
END W/W FENCE
BEGIN W/W FENCE
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
JUANITA P. BURNS
LAVENDER, INC.
GRAPHIC SCALE
J. HAROLD PARKER & WF. HELEN PARKER
DENNIS L. HAVRICK
DONNA D. PAYTER
MICHAEL H. FRADY & WF. NORMA J. FRADY
REVISIONS

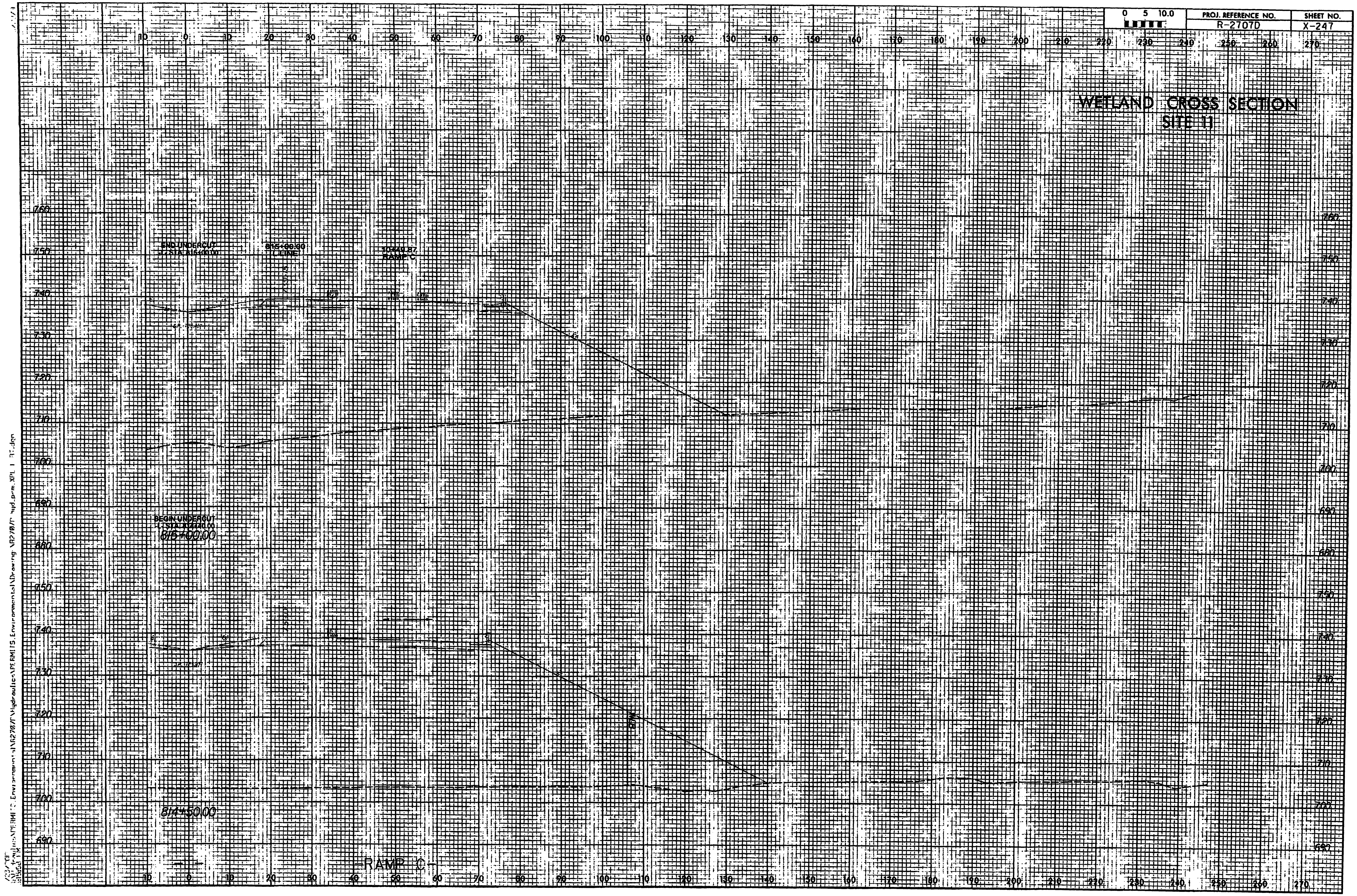
REFERENCE:
FOR L-LINE PROFILE, SEE SHEET NO. 33
FOR RAMP "C" PROFILE, SEE SHEET NO. 46

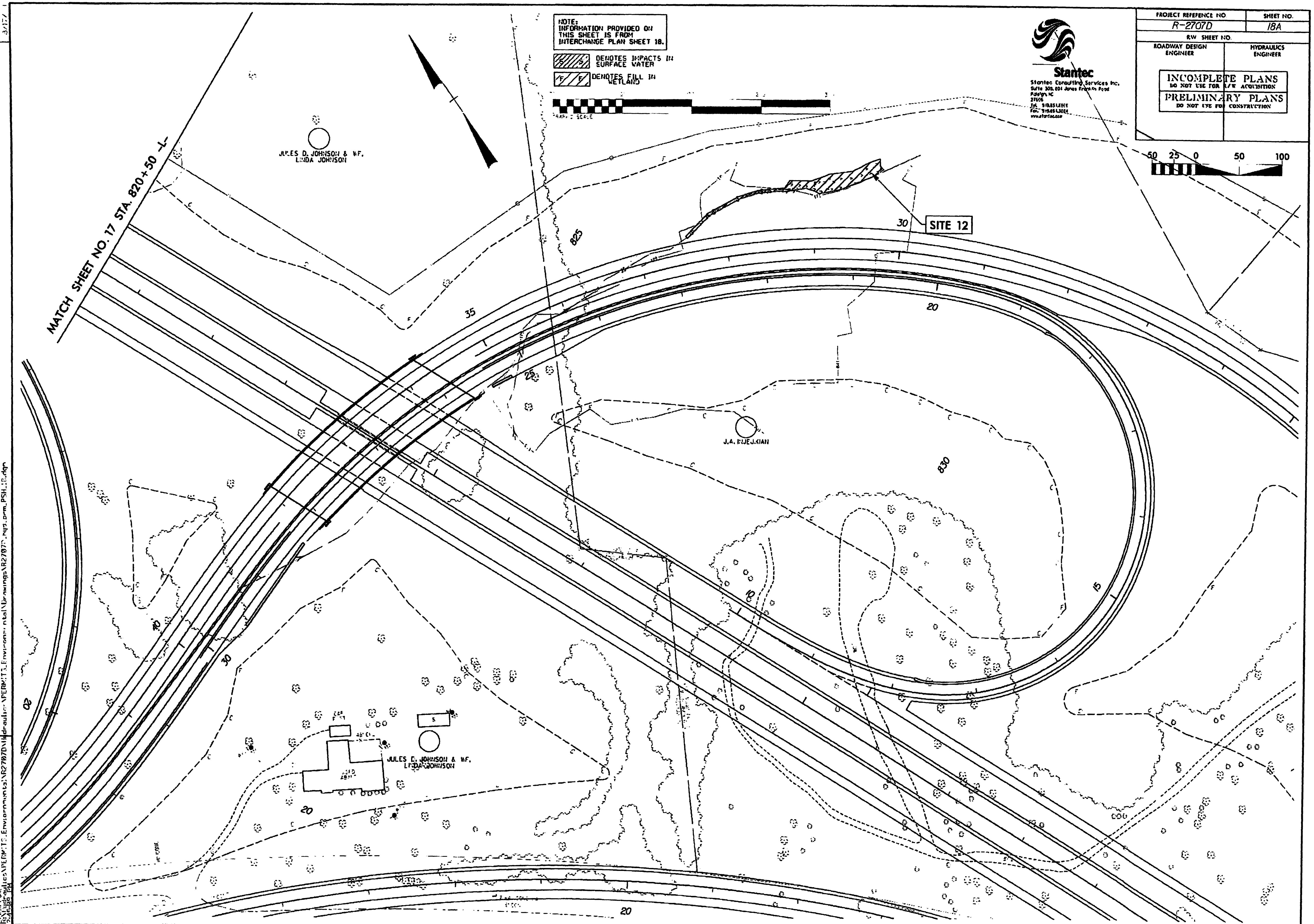
NOTE:
ALL PIPES ARE RCP UNLESS OTHERWISE NOTED

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2707D	X-119

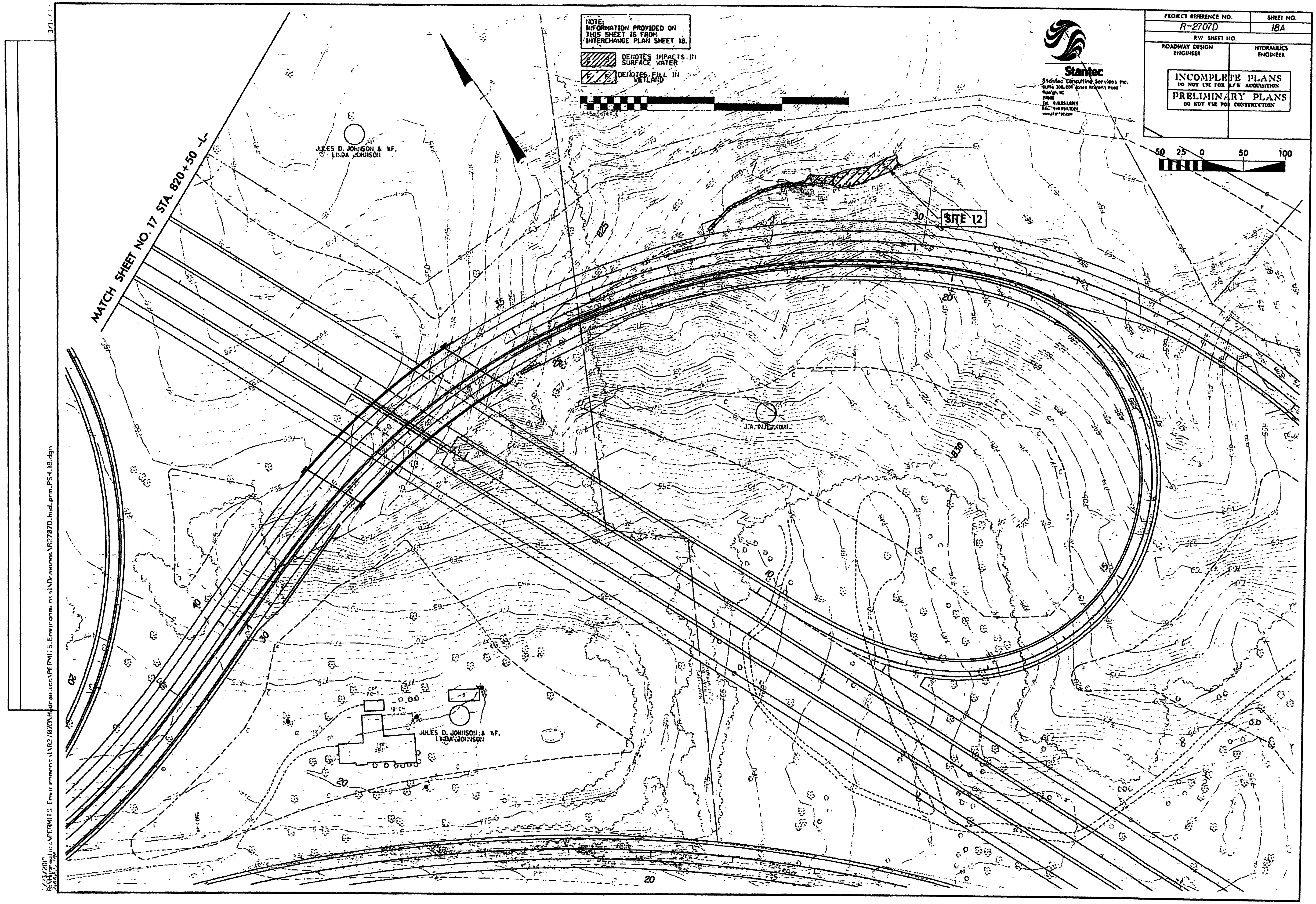
WETLAND CROSS SECTION
SITE 11




0 5 10.0
PROJ. REFERENCE NO.
R-2707D
SHEET NO.
X-247
WETLAND CROSS SECTION
SITE 11
END UNDERCUT
815+00.00
L LINE
RAMP C
BEGIN UNDERCUT
816+00.00
814+50.00
RAMP C



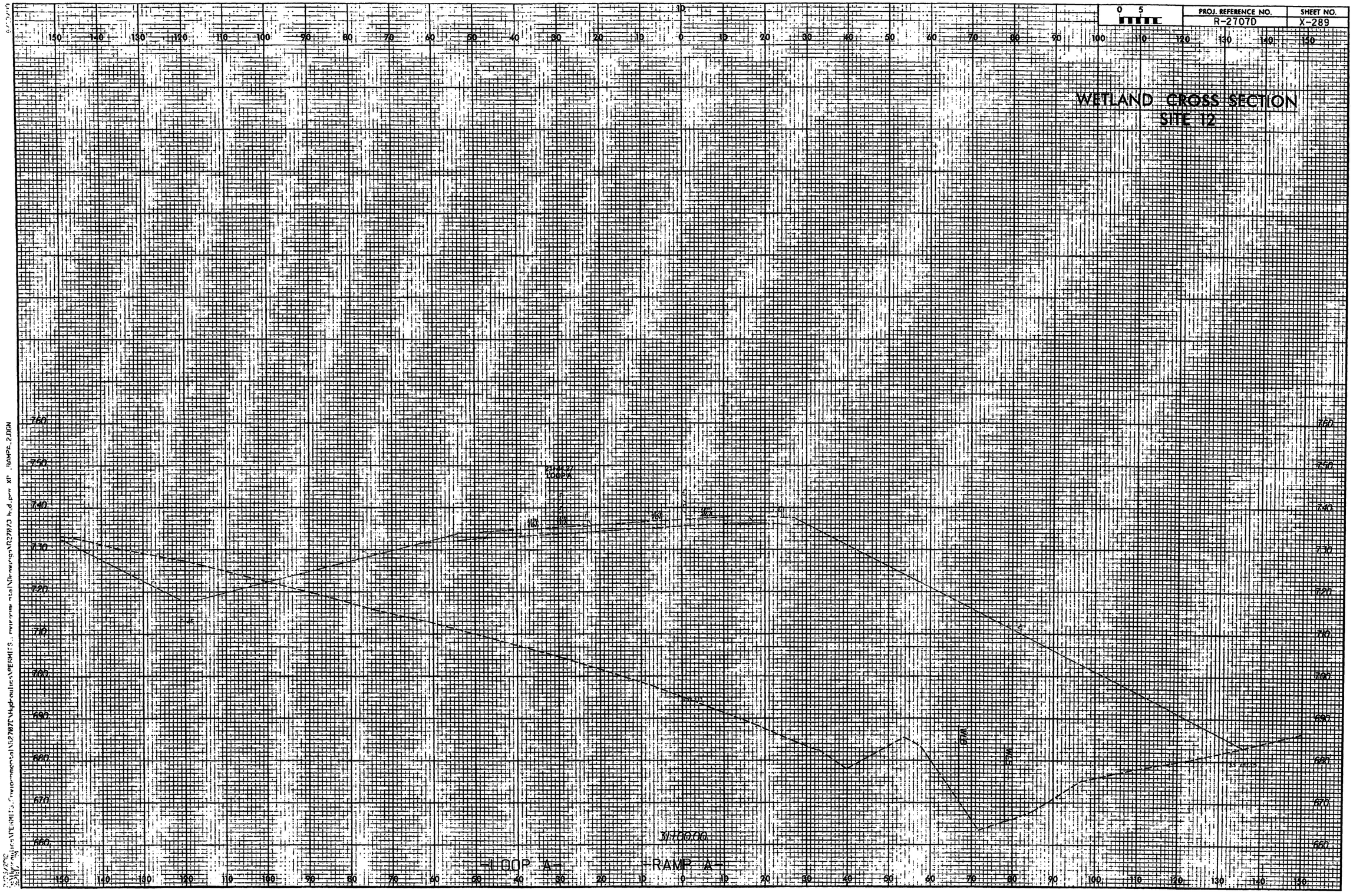
NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 18.
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
Stantec
Stantec Consulting Services Inc.
PROJECT REFERENCE NO.
R-2707D
SHEET NO.
18A
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
50 25 0 50 100
SITE 12
MATCH SHEET NO. 17 STA. 820+50 -L-
JULES D. JOHNSON & WF. LINDA JOHNSON
J.A. KUEJKIAN



NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 18.
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
Stantec
PROJECT REFERENCE NO.
R-2707D
SHEET NO.
18A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
50 25 0 50 100
MATCH SHEET NO. 17 STA. 820+50 -L-
JULES D. JOHNSON & WF. LINDA JOHNSON
SITE 12
JULES D. JOHNSON & WF. LINDA JOHNSON

PROJ. REFERENCE NO.	SHEET NO.
R-2707D	X-289

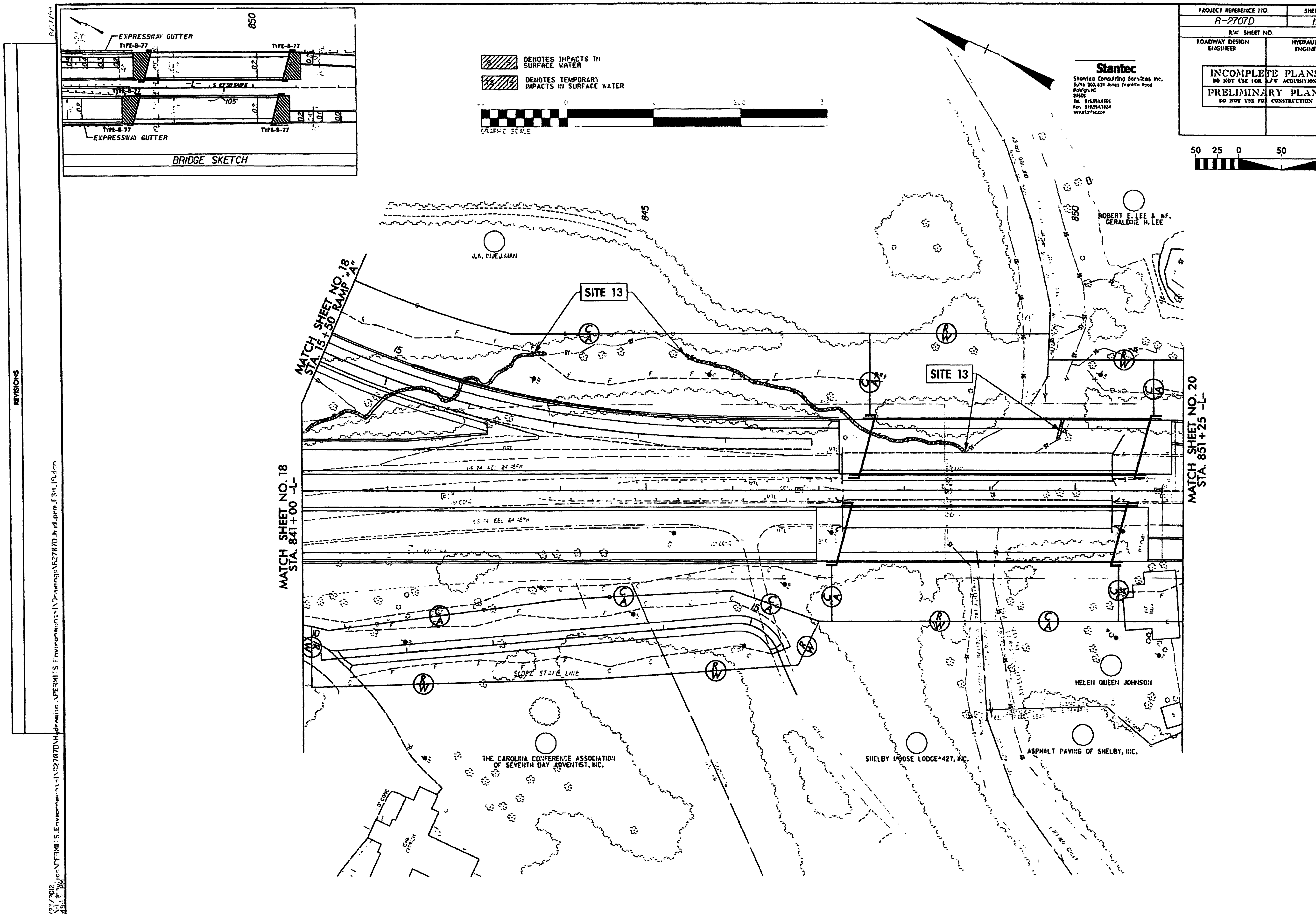
WETLAND CROSS SECTION
SITE 12



PROJECT REFERENCE NO.	SHEET NO.
R-2707D	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



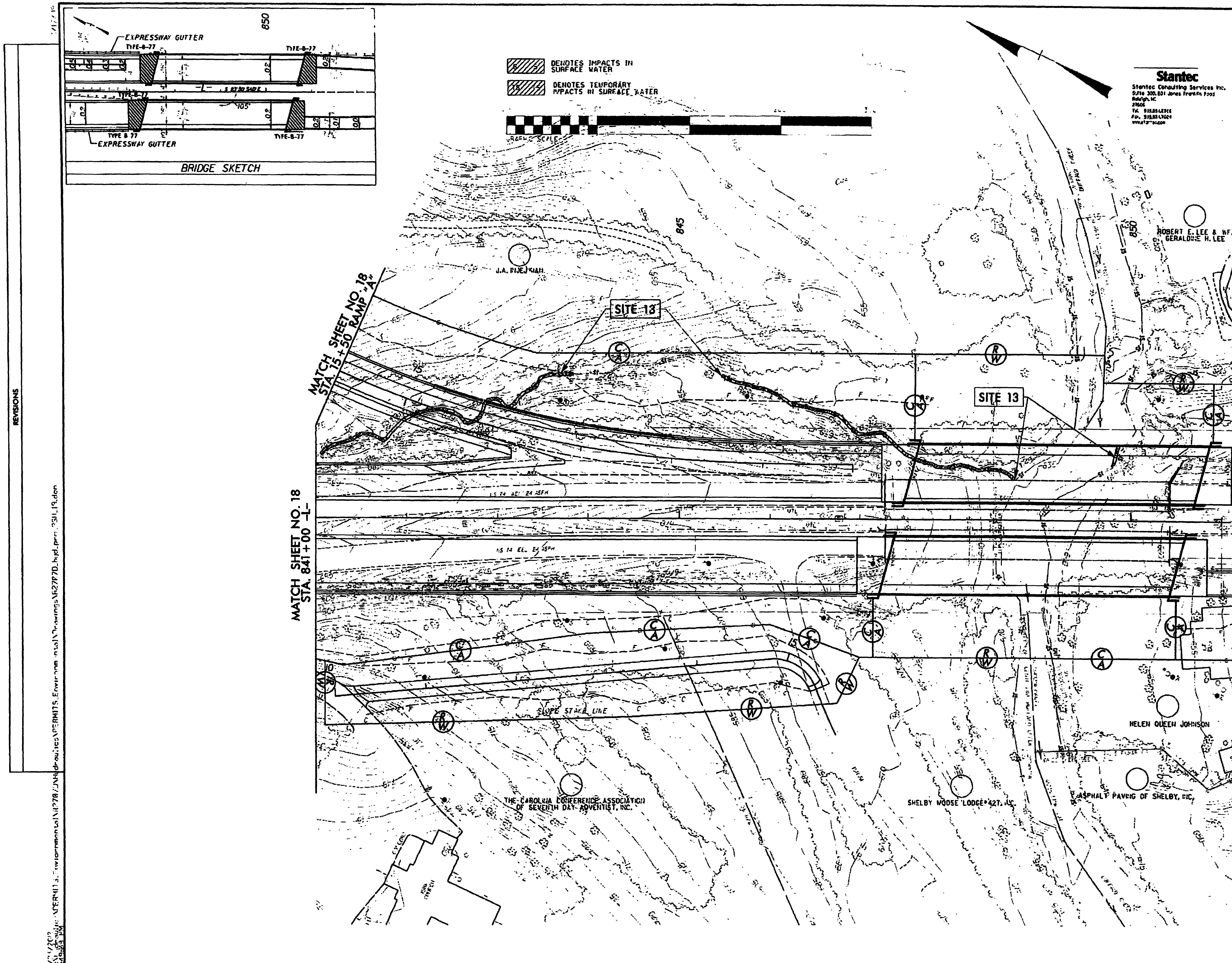
EXPRESSWAY GUTTER
TYPE-B-77
105'
EXPRESSWAY GUTTER
BRIDGE SKETCH
REVISIONS
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
Stantec
50
25
0
50
100
845
850
J.A. INJEJIKIAN
ROBERT E. LEE & WF. GERALDINE H. LEE
SITE 13
SITE 13
MATCH SHEET NO. 18 STA. 15+50 RAMP "A"
MATCH SHEET NO. 18 STA. 841+00 -L-
MATCH SHEET NO. 20 STA. 851+25 -L-
SLOPE STAKE LINE
HELEN QUEEN JOHNSON
THE CAROLINA CONFERENCE ASSOCIATION OF SEVENTH DAY ADVENTIST, INC.
SHELBY MOOSE LODGE #427, INC.
ASPHALT PAVING OF SHELBY, INC.

PROJECT REFERENCE NO.	SHEET NO.
R-2707D	19
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

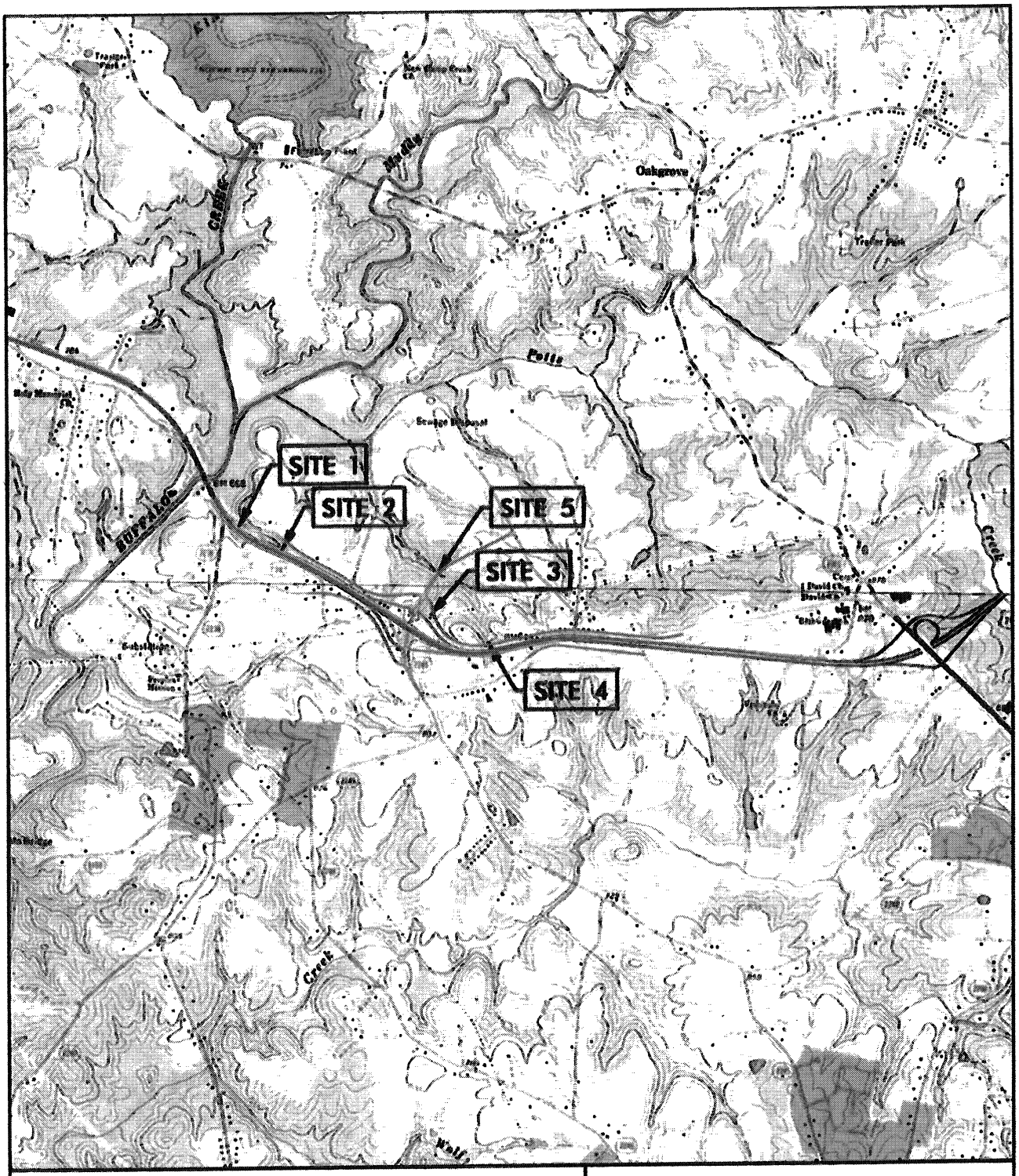
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50 25 0 50 100



EXPRESSWAY GUTTER
TYPE-B-77
BRIDGE SKETCH
850
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
Stantec
845
J.A. BIJESHAH
SITE 13
MATCH SHEET NO. 18 STA. 15+50 RAMP "A"
MATCH SHEET NO. 18 STA. 841+00 -L-
MATCH SHEET NO. 20 STA. 851+25 -L-
ROBERT E. LEE & WF. GERALDINE H. LEE
SLOPE STAKE LINE
HELEN QUEEN JOHNSON
THE CAROLINA CONFERENCE ASSOCIATION OF SEVENTH DAY ADVENTIST, INC.
SHELBY MOOSE LODGE #427, INC.
ASPHALT PAVING OF SHELBY, INC.
REVISIONS



TOPO MAP

SCALE: 1" = 3000'

NCDOT

DIVISION OF HIGHWAYS
CLEVELAND COUNTY
PROJECT: R-2707E

US 74 - SHELBY BYPASS
FROM EXISTING US 74 WEST OF SR 2238 TO WEST OF SR 1001

SHEET OF **02/24/12**

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L-860+55 - 873+50	Roadway Fill				<0.01		0.03	<0.01	318	10	
2	-L-870+93 - 873+51	Roadway Fill	0.01					0.05	<0.01	513	12	
	Bank Stabilization							<0.01		19		
3	-L-903+90 - 909+43		0.63					0.14	<0.01	1565	11	
	Bank Stabilization							<0.01		20		
4	-SR7- 28+50 - 29+42		0.02			<0.01		0.03		194		
5	-Y42- 39+27 - 39+86							0.14	0.01	215	31	
TOTALS:			0.66			<0.01		0.38	0.01	2844	64	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

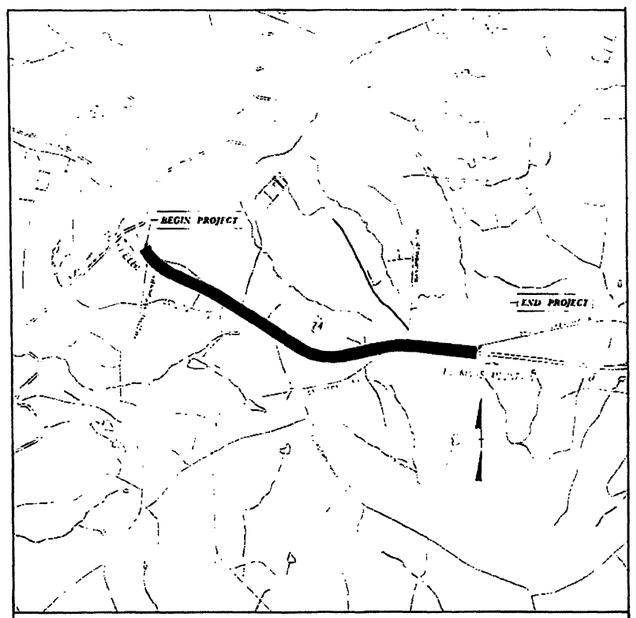
CLEVELAND COUNTY
(R-2707E)

SHEET 2/24/2012

ATN Revised 3/31/05

R-2707E

PROJECT: 34497.1.2



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CLEVELAND COUNTY

STATE	STATE PROJECT REFERENCE NO	SHEET NO	TOTAL SHEETS
N.C.	R-2707E	1	
STATE ITEM NO	F.A. PROJ. NO	DESCRIPTION	
34497.1.2	NHF-74(14)	P.E.	

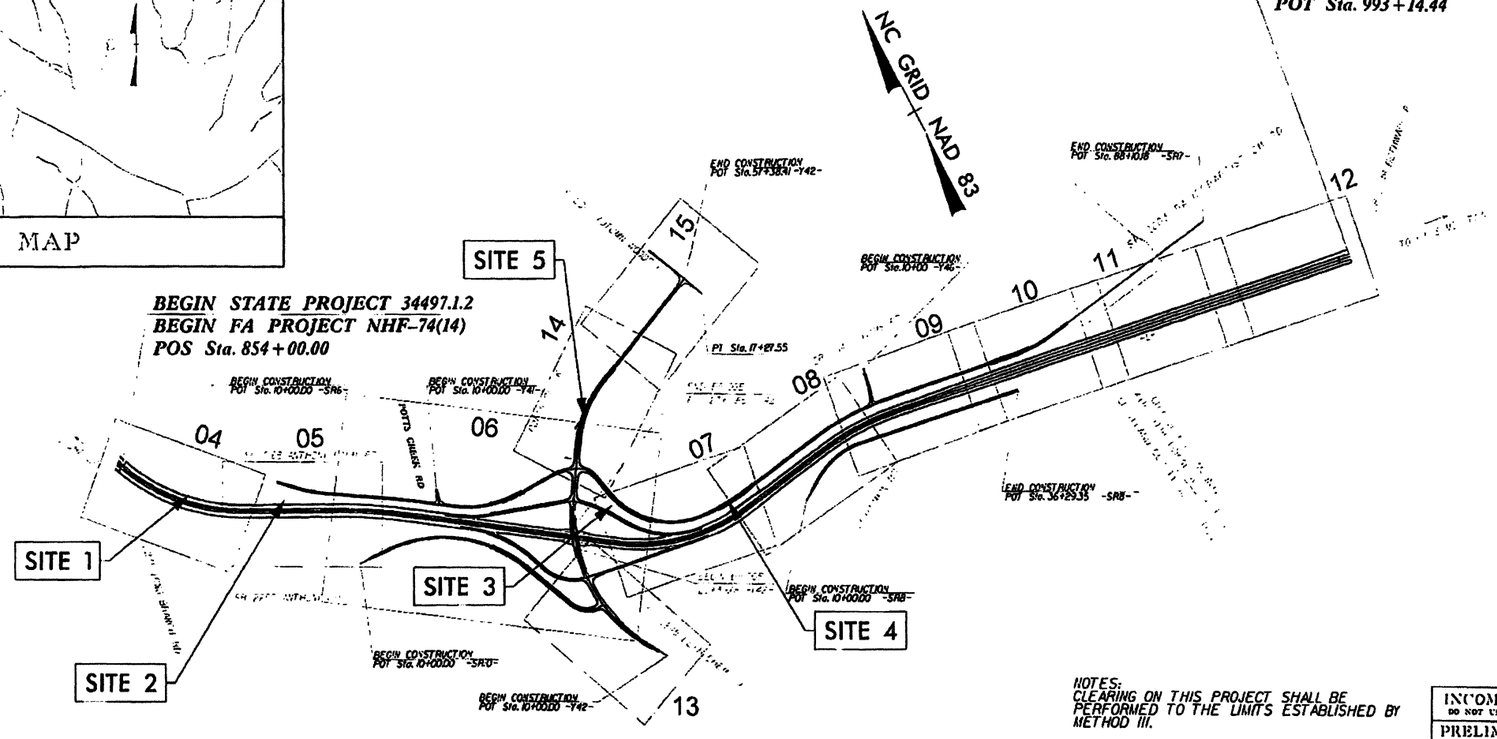
LOCATION: US 74 FROM EXISTING US 74 WEST OF SR 2238 TO WEST OF SR 1001

TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE

WETLAND AND STREAM IMPACTS

BEGIN STATE PROJECT 34497.1.2
BEGIN FA PROJECT NHF-74(14)
POS Sta. 854+00.00

END STATE PROJECT 34497.1.2
END FA PROJECT NHF-74(14)
POT Sta. 993+14.44



NCDOT CONTACT: TERESA BRUTON, P.E. - PROJECT ENGINEER

NOTES:
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

THIS PROJECT IS NOT LOCATED WITHIN THE BOUNDARIES OF ANY MUNICIPALITY.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2005	=	21,100
ADT 2025	=	32,900
DHV	=	10 %
D	=	60 %
T	=	5 % *
V	=	70 MPH

* TTST 8% DUAL 6%

PROJECT LENGTH

LENGTH ROADWAY F.A. PROJECT NHF-74(14	=	2.635 MILES
LENGTH STRUCTURE F.A. PROJECT NHF-74(14)	=	—
TOTAL ROADWAY LENGTH STATE PROJECT 34497.1.2	=	2.635 MILES

Prepared in the Office of:
WILBUR SMITH ASSOCIATES
P.O. BOX 2475 RALEIGH, NC 27602-2475 PHONE (919) 755-0561

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: OCTOBER 21, 2005

LETTING DATE:

DAVID L. WILIER, P.E.
PROJECT ENGINEER

DAVID L. WILIER, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

DATE: 2/24/2015
TIME: 11:10:15 AM
R:\Hydraulics\PERMITS Environmental\R2707E\Hydraulics\PERMITS Environmental\Drawings\R2707E ROY TSH 01.dgn

PROJECT REFERENCE NO	SHEET NO
R-2707E	4
R/W SHEET NO	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WILBUR SMITH ASSOCIATES

SUMMIT DESIGN GROUP, P.A.

REVISIONS

BEG STATE PROJECT R-2707E
POS 854+00.00

SC Sta. 856+32.36

CS Sta. 865+45.64

MATCH TO SHEET 5 STA. 868+00.00

SITE 1

MECHANIZED CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

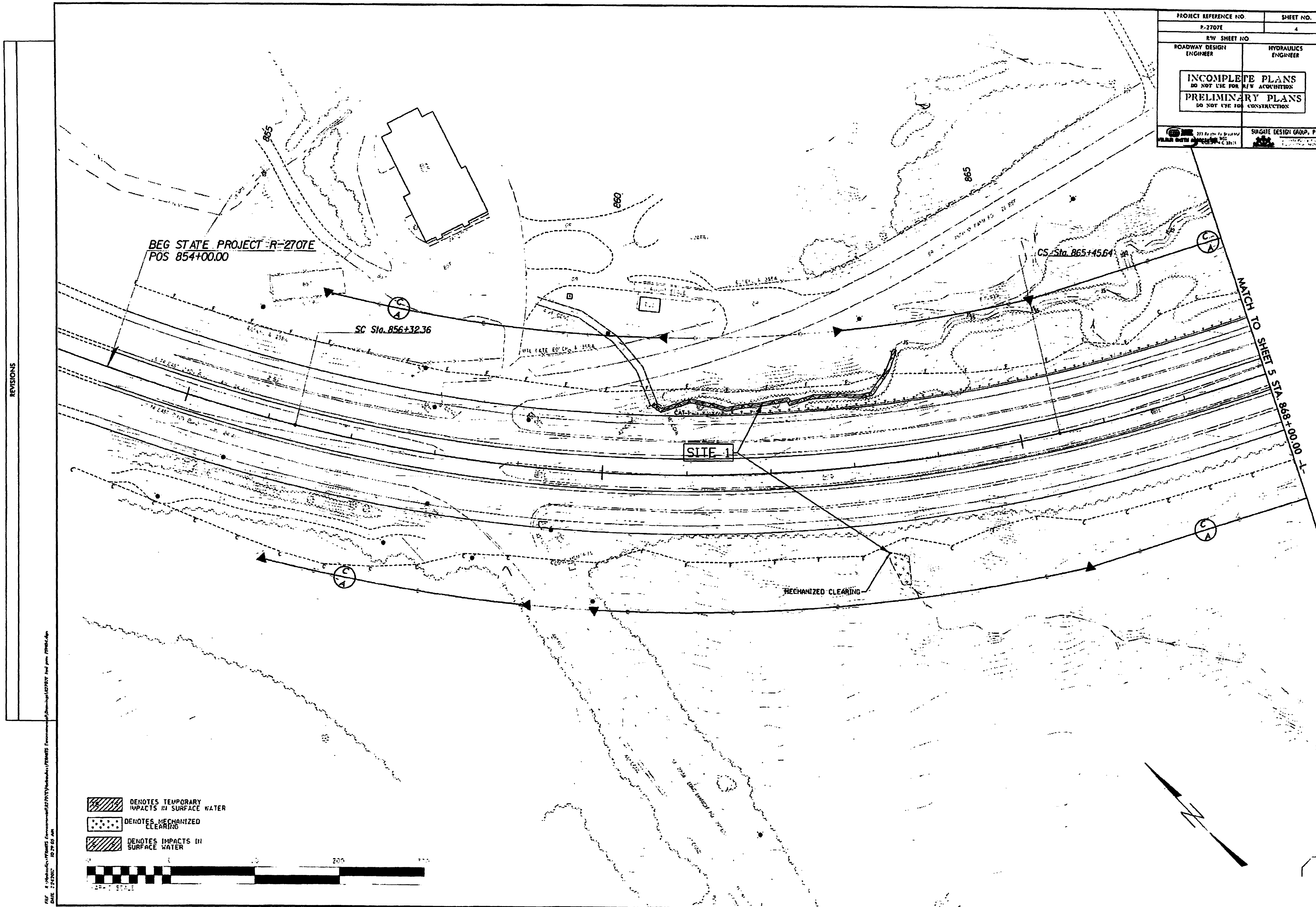
DENOTES MECHANIZED CLEARING

DENOTES IMPACTS IN SURFACE WATER

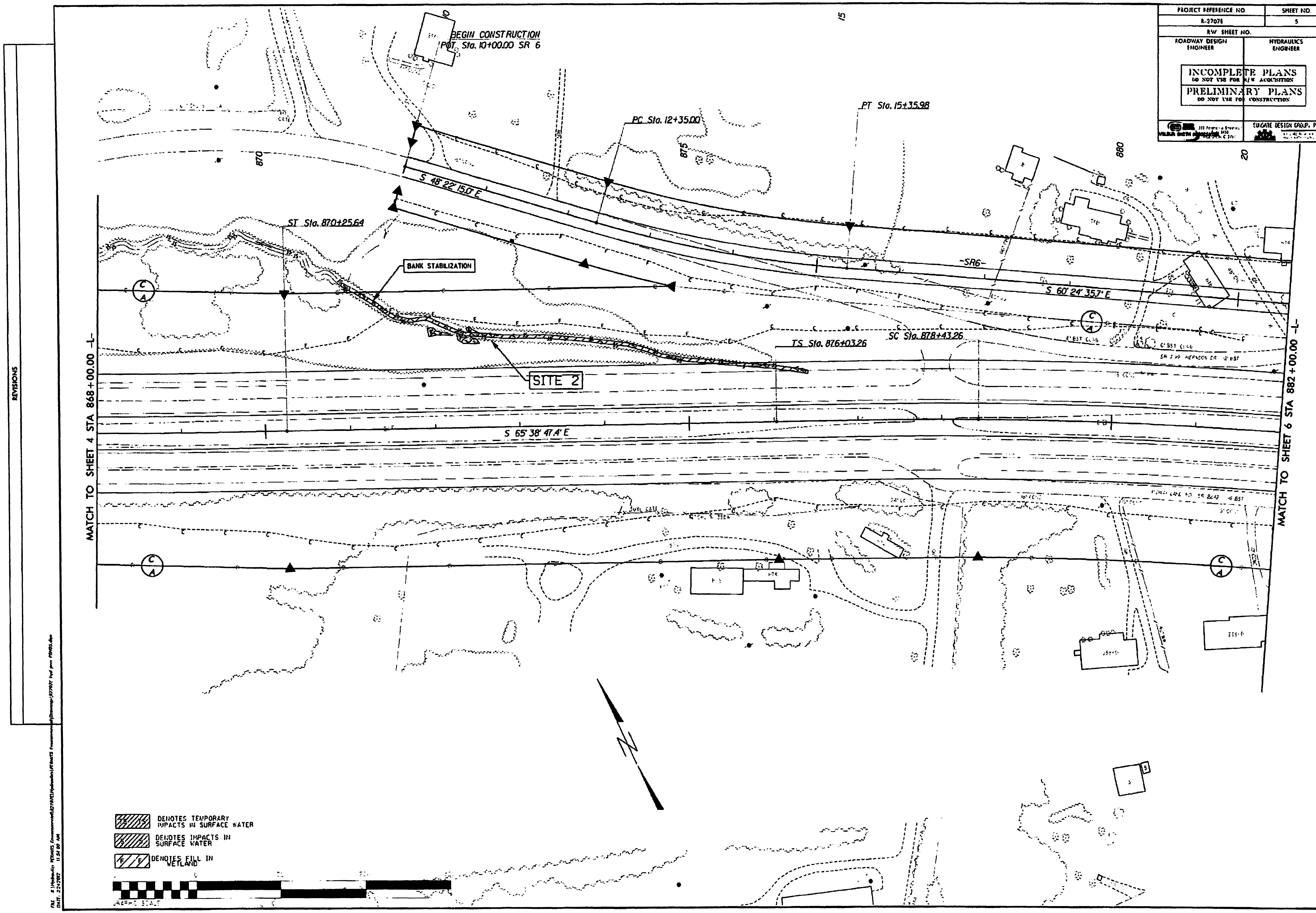
PLAN SCALE

N

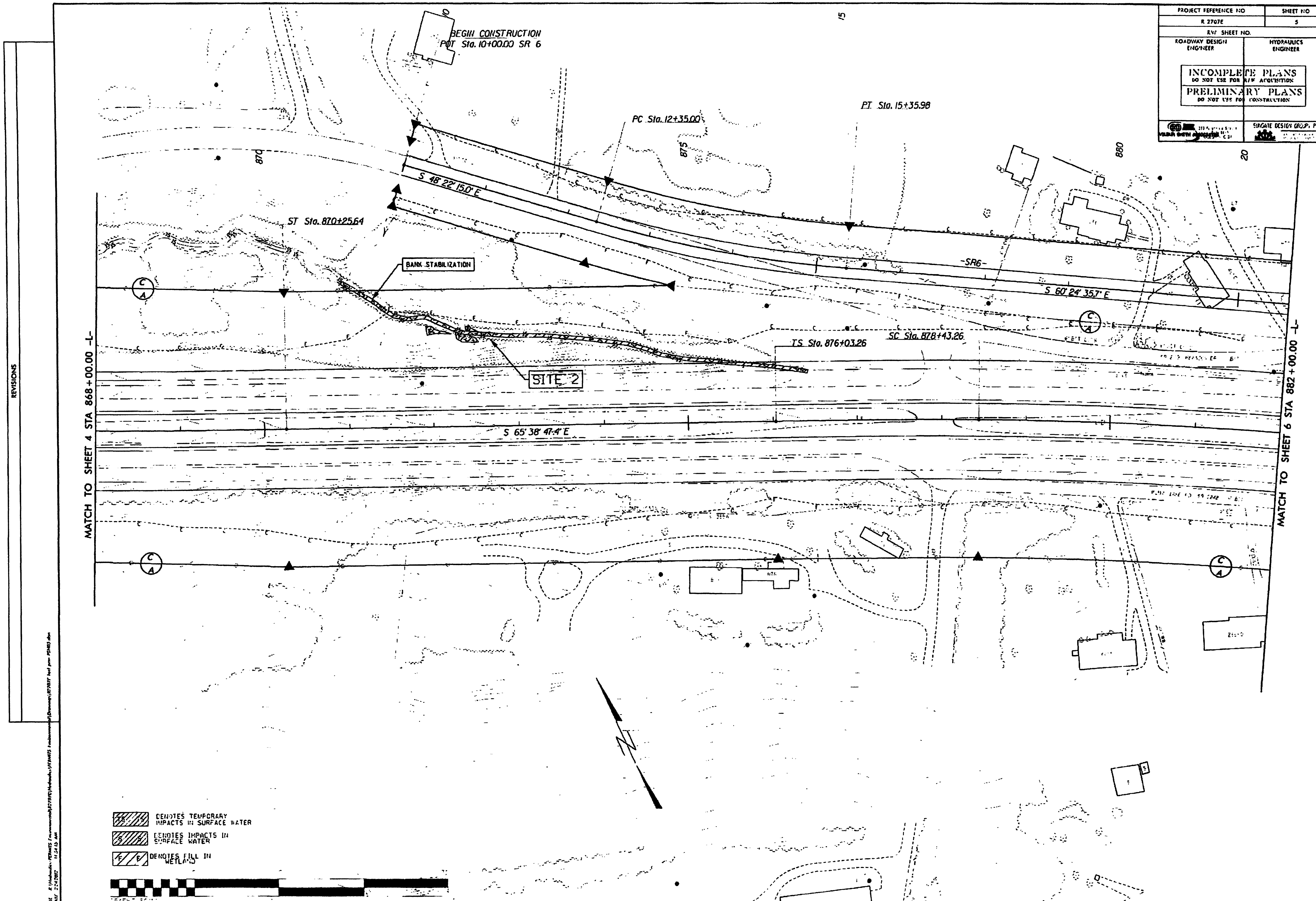
855 860 865



PROJECT REFERENCE NO.
SHEET NO.
R-2707E
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SUGATE DESIGN GROUP, P.A.
REVISIONS
BEG STATE PROJECT R-2707E
POS 854+00.00
SC Sta. 856+32.36
CS Sta. 865+45.64
855
860
865
SITE 1
MECHANIZED CLEARING
MATCH TO SHEET 5 STA. 868+00.00 -L-
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
200



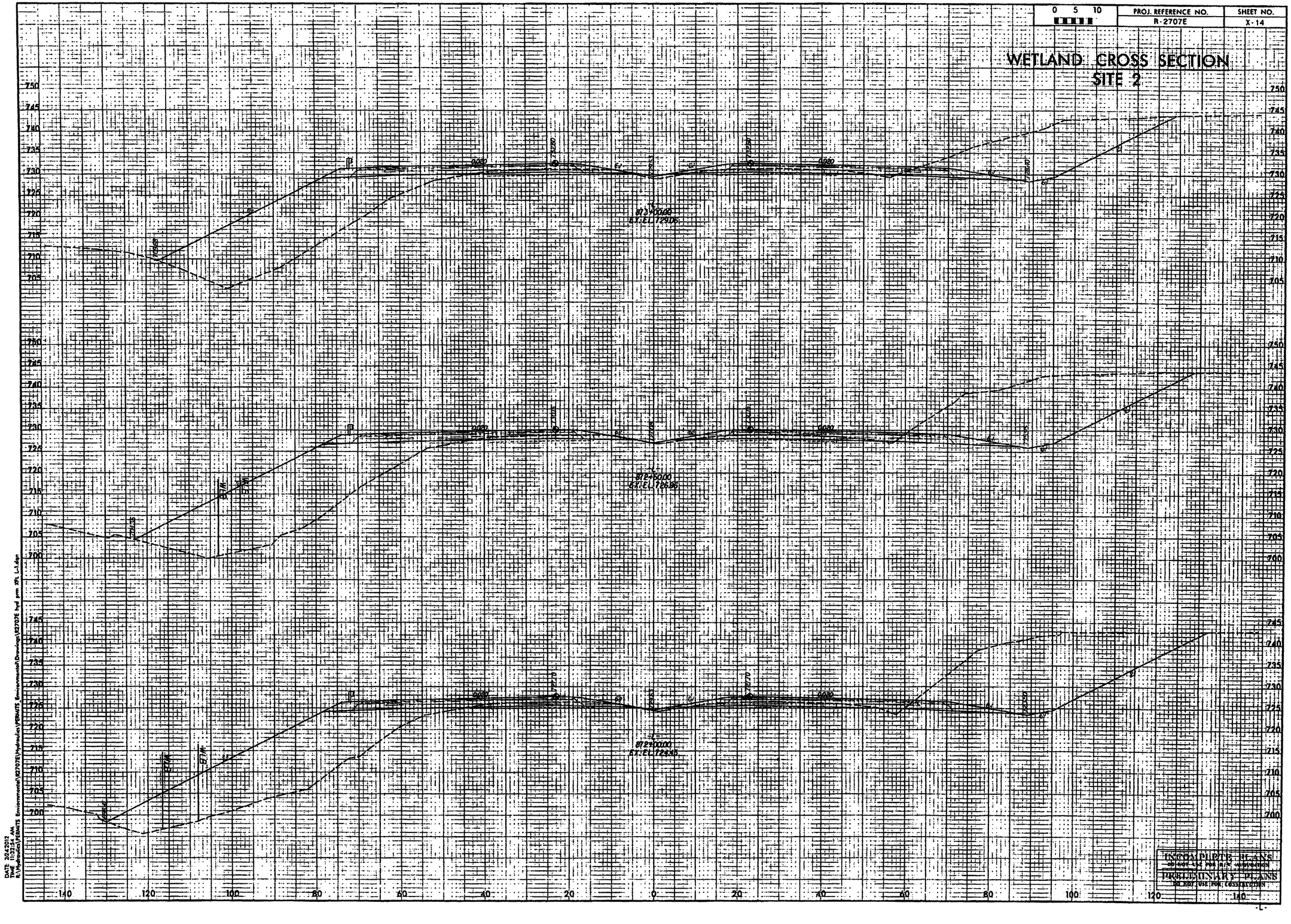
PROJECT REFERENCE NO.
R-2707E
SHEET NO.
5
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SUGATE DESIGN GROUP, P.A.
BEGIN CONSTRUCTION
POT Sta. 10+00.00 SR 6
PC Sta. 12+35.00
PT Sta. 15+35.98
ST Sta. 870+25.64
BANK STABILIZATION
S 48° 22' 15.0" E
-SR6-
S 60° 24' 35.7" E
TS Sta. 876+03.26
SC Sta. 878+43.26
SITE 2
S 65° 38' 47.4" E
MATCH TO SHEET 4 STA 868+00.00 -L-
MATCH TO SHEET 6 STA 882+00.00 -L-
870
875
880
10
15
20
REVISIONS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND



PROJECT REFERENCE NO.
R 2707E
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SUGATE DESIGN GROUP, P.A.
REVISIONS
BEGIN CONSTRUCTION
POT Sta. 10+00.00 SR 6
PC Sta. 12+35.00
PT Sta. 15+35.98
ST Sta. 870+25.64
BANK STABILIZATION
S 48° 22' 15.0" E
-SR6-
S 60° 24' 35.7" E
SITE 2
TS Sta. 876+03.26
SC Sta. 878+43.26
S 65° 38' 47.4" E
MATCH TO SHEET 4 STA 868+00.00 -L-
MATCH TO SHEET 6 STA 882+00.00 -L-
870
875
880
15
20
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLANDS

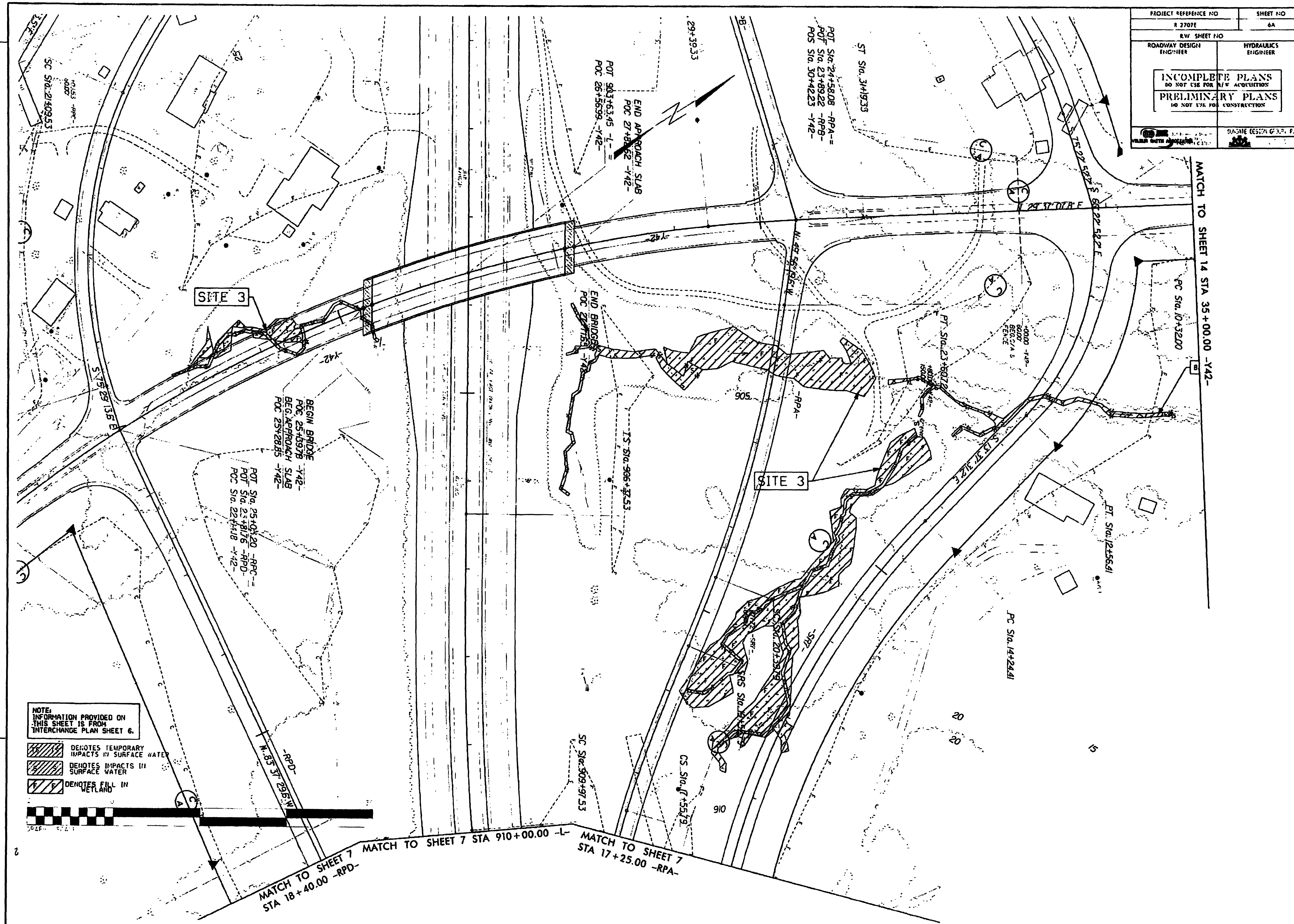
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2707E	X-14

WETLAND CROSS SECTION
SITE 2

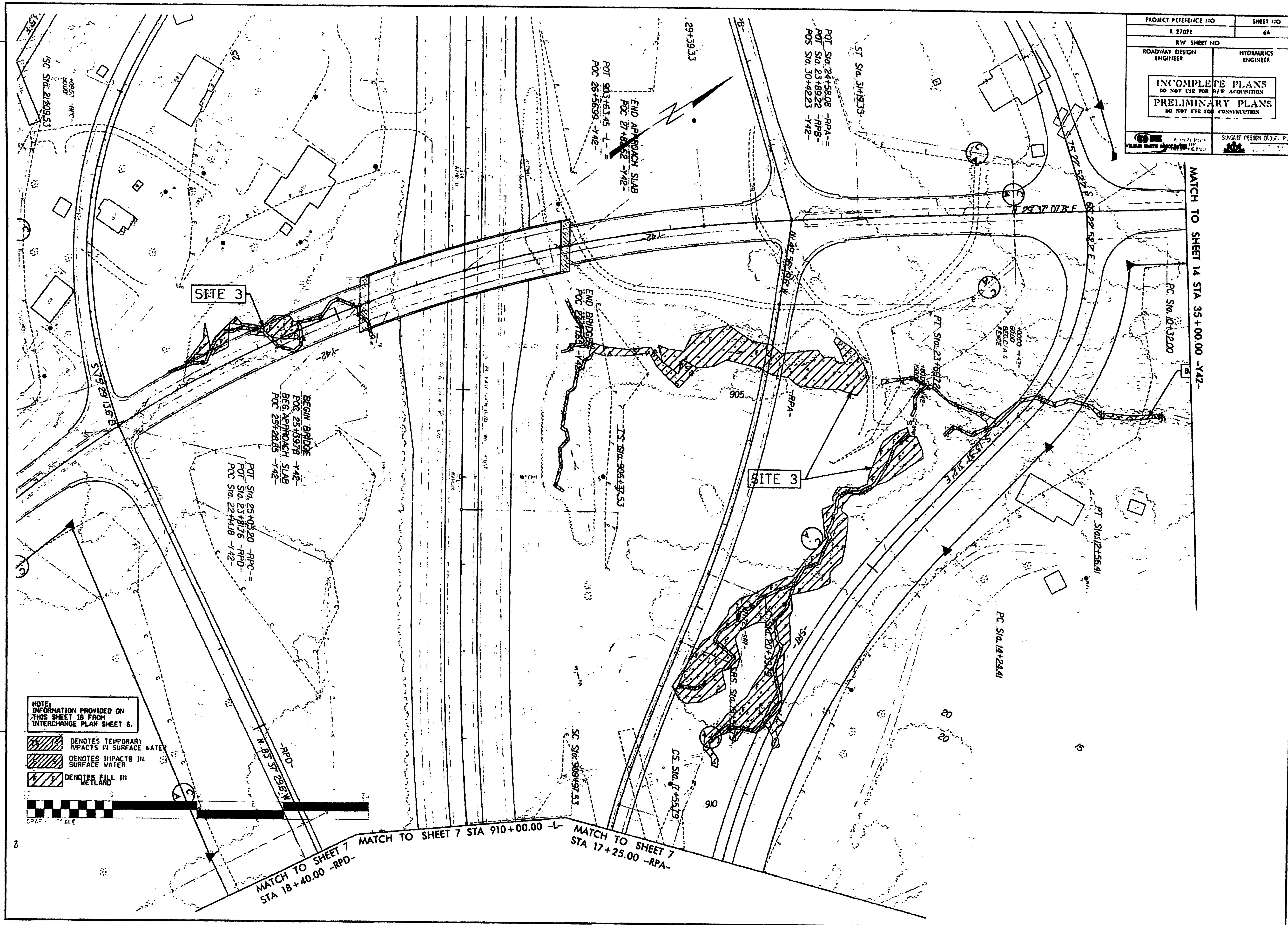


INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 2/24/2012
TIME: 11:32:54 AM
R:\Hydraulics\PERMITS\PERMITS Environmental\R2707E\Hydraulics\PERMITS_Environmental\Drawings\R2707E hyd prm XPL (-L-).dgn

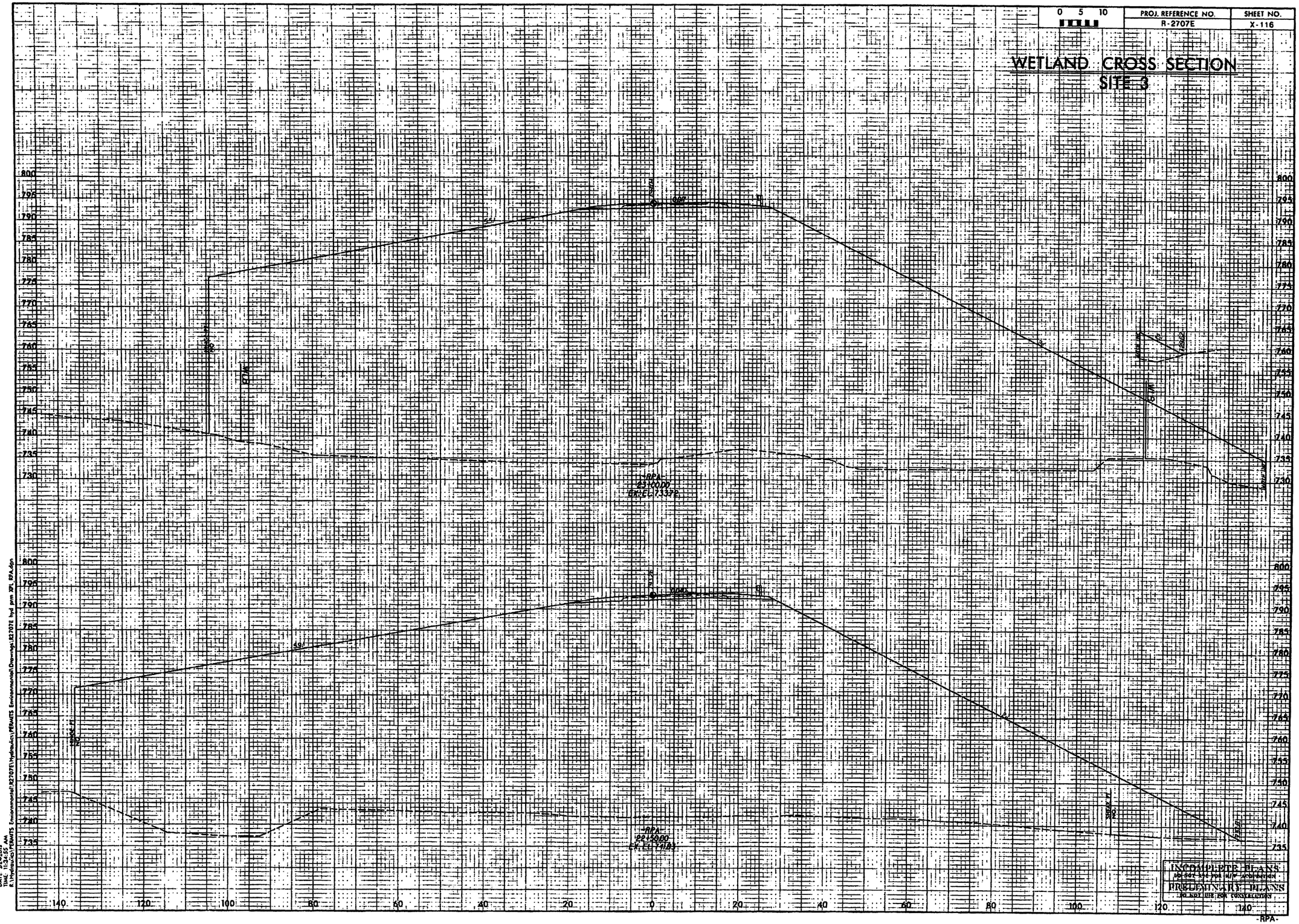


PROJECT REFERENCE NO. R 2707E
SHEET NO. 6A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MATCH TO SHEET 14 STA 35+00.00 -Y42-
MATCH TO SHEET 7 STA 910+00.00 -L-
MATCH TO SHEET 7 STA 18+40.00 -RPD-
MATCH TO SHEET 7 STA 17+25.00 -RPA-
SITE 3
SITE 3
BEGIN BRIDGE
POC 25+59.78 -Y42-
BEG. APPROACH SLAB
POC 25+28.85 -Y42-
END APPROACH SLAB
POC 27+80.52 -Y42-
POT 903+63.45 -L- =
POC 26+56.99 -Y42-
POT Sta. 24+58.08 -RPA- =
POT Sta. 23+89.22 -RPB-
POS Sta. 30+42.23 -Y42-
ST Sta. 31+19.33
POT Sta. 25+00.20 -RPC- =
POT Sta. 23+81.76 -RPD-
PCC Sta. 22+51.8 -Y42-
TS Sta. 906+37.53
SC Sta. 909+97.53
CS Sta. 17+55.79
PC Sta. 10+32.00
PT Sta. 12+56.41
PC Sta. 14+24.41
SC Sta. 21+09.53
-Y42-
-RPA-
-RPD-
905
910
NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 6.
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND


PROJECT REFERENCE NO
SHEET NO
R 2707E
6A
RW SHEET NO
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
MATCH TO SHEET 14 STA 35+00.00 -Y42-
SITE 3
SITE 3
END APPROACH SLAB
POC 27+81.62 -Y42-
POT 903+63.45 -L- =
POC 26+56.99 -Y42-
POT Sta. 24+58.08 -RPA- =
POT Sta. 23+89.22 -RPB-
POS Sta. 30+42.23 -Y42-
ST Sta. 31+18.35
BEGIN BRIDGE
POC 25+69.78 -Y42-
BEG. APPROACH SLAB
POC 25+28.85 -Y42-
POT Sta. 25+03.20 -RPC- =
POT Sta. 23+87.76 -RPD-
POC Sta. 22+44.18 -Y42-
PC Sta. 10+32.00
PT Sta. 12+56.41
PC Sta. 14+24.41
SC Sta. 909+97.53
CS Sta. 906+37.53
NOTE:
INFORMATION PROVIDED ON THIS SHEET IS FROM INTERCHANGE PLAN SHEET 6.
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
MATCH TO SHEET 7 STA 18+40.00 -RPD-
MATCH TO SHEET 7 STA 910+00.00 -L-
MATCH TO SHEET 7 STA 17+25.00 -RPA-

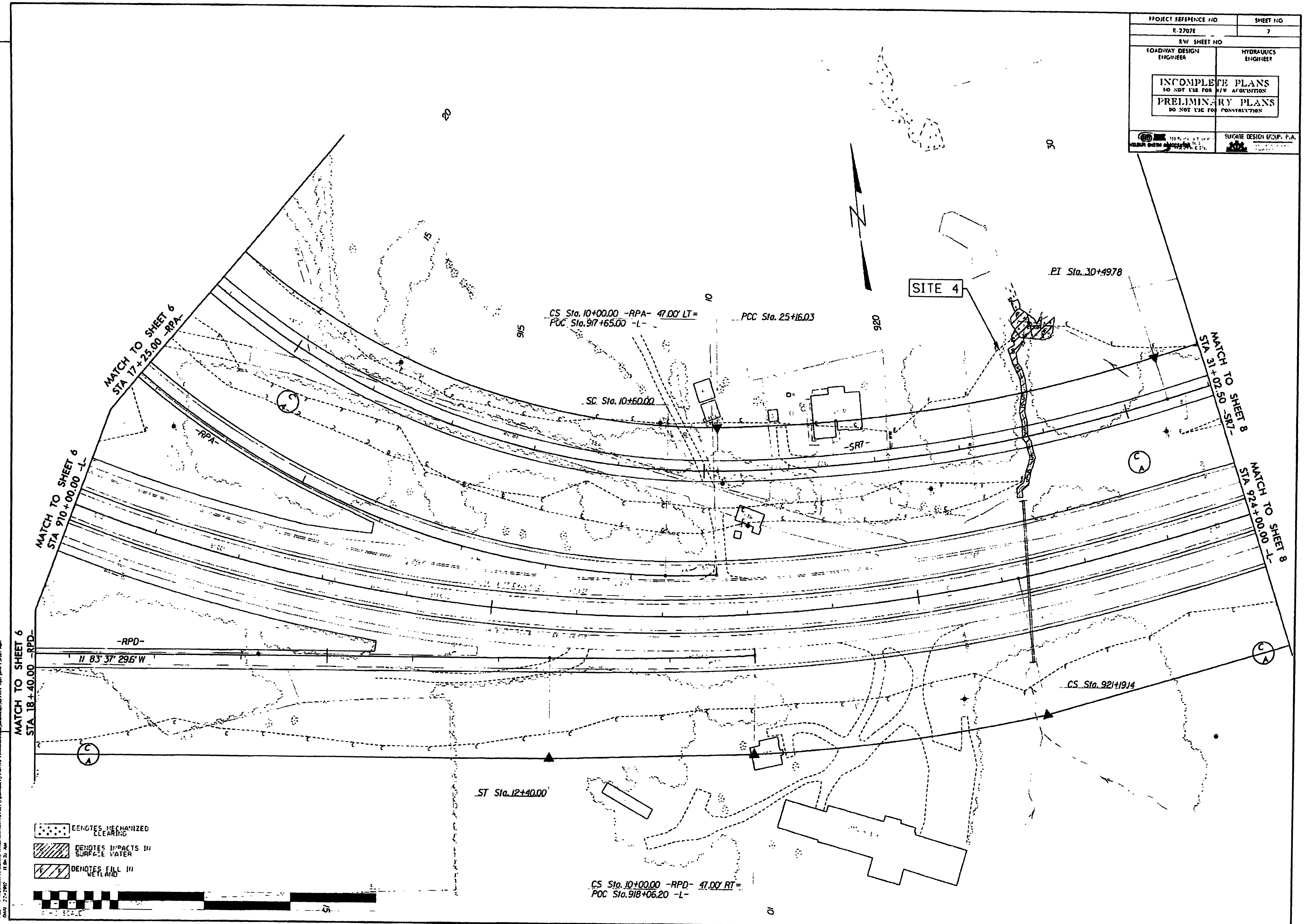
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2707E	X-116

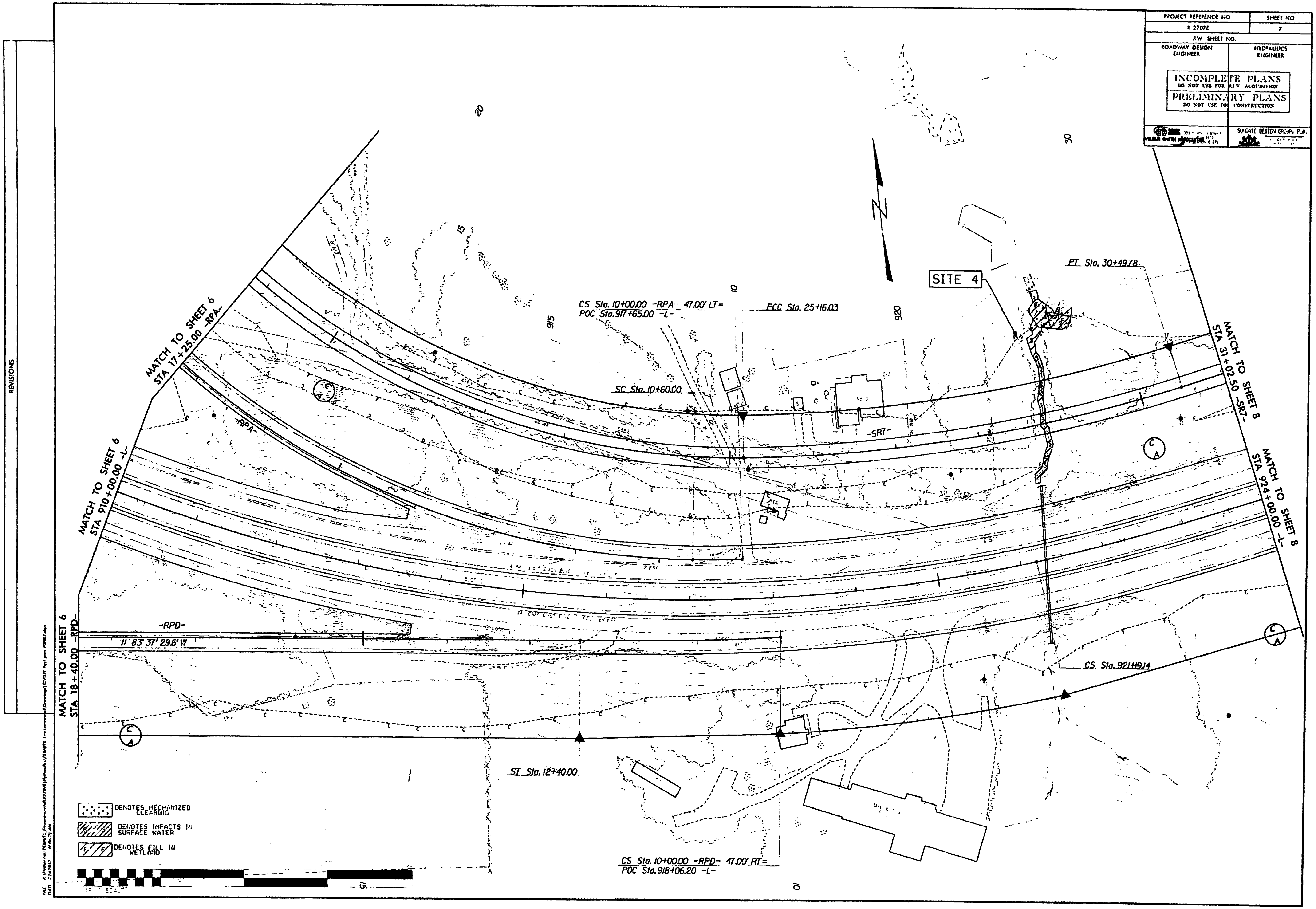
WETLAND CROSS SECTION
SITE 3



INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE 12/4/2012
TIME 11:24:55 AM
R:\Hydraulics\PERMITS Environmental\R2707E\Hydraulics\PERMITS Environmental\Drawings\R2707E hyd prm XPL RPA.dgn


PROJECT REFERENCE NO
SHEET NO
R-2707E
7
R/W SHEET NO
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SUGATE DESIGN GROUP, P.A.
REVISIONS
SITE 4
PI Sta. 30+4978
CS Sta. 10+00.00 -RPA- 47.00' LT =
POC Sta. 917+65.00 -L-
PCC Sta. 25+16.03
SC Sta. 10+60.00
-SR7-
-RPA-
-RPD-
N 83° 37' 29.6" W
CS Sta. 921+19.14
ST Sta. 12+40.00'
CS Sta. 10+00.00 -RPD- 47.00' RT =
POC Sta. 918+06.20 -L-
MATCH TO SHEET 6
STA 17+25.00 -RPA-
MATCH TO SHEET 6
STA 910+00.00 -L-
MATCH TO SHEET 6
STA 18+40.00 -RPD-
MATCH TO SHEET 8
STA 31+02.50 -SR7-
MATCH TO SHEET 8
STA 924+00.00 -L-
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND

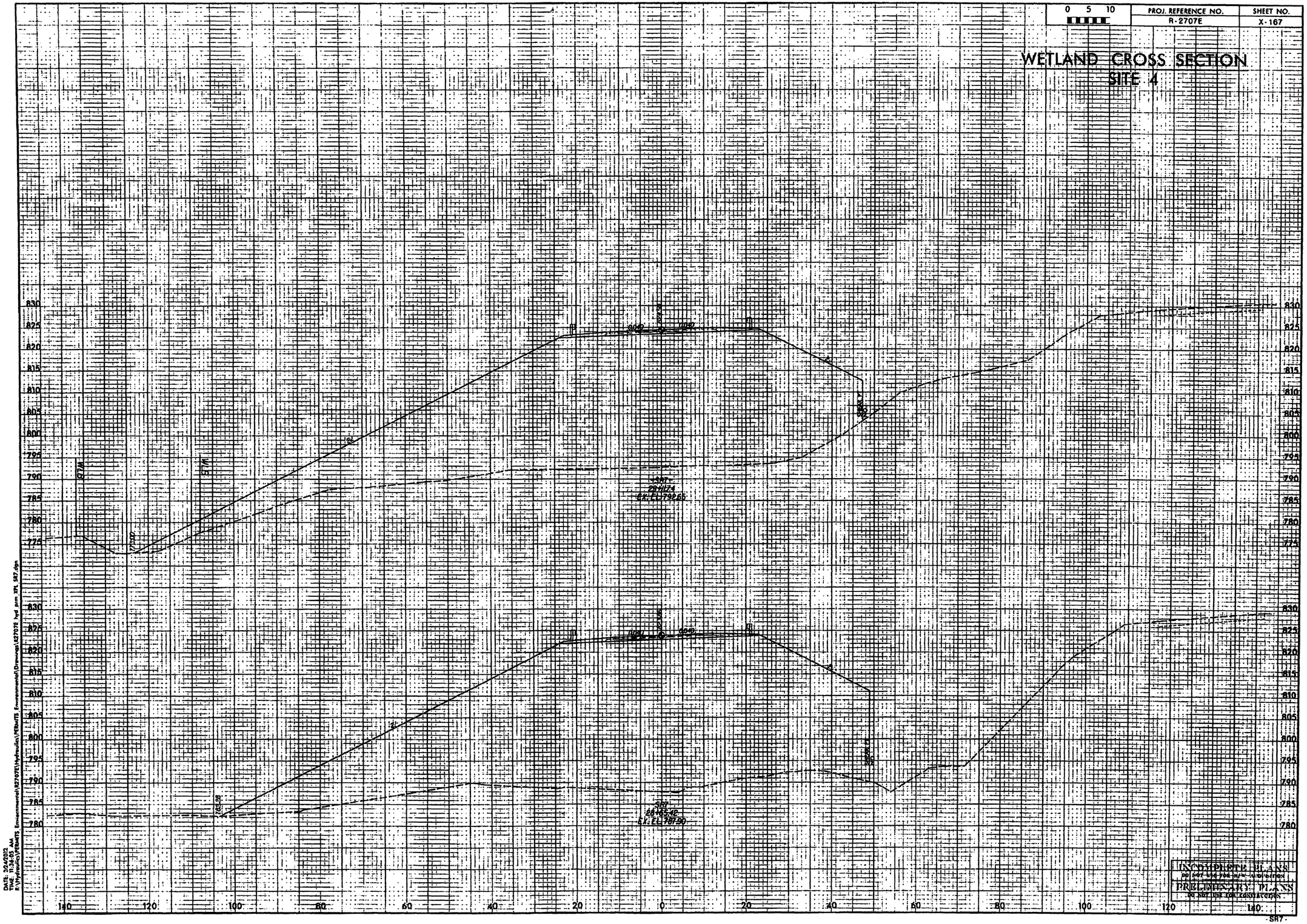


PROJECT REFERENCE NO.
SHEET NO.
R-2707E
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SUNGATE DESIGN GROUP, P.A.
REVISIONS
SITE 4
PT Sta. 30+49.78
CS Sta. 10+00.00 -RPA- 47.00' LT=
POC Sta. 917+65.00 -L-
PCC Sta. 25+16.03
SC Sta. 10+60.00
-SR7-
-RPA-
-RPD-
N 83° 37' 29.6" W
MATCH TO SHEET 6
STA 17+25.00 -RPA-
MATCH TO SHEET 6
STA 910+00.00 -L-
MATCH TO SHEET 6
STA 18+40.00 -RPD-
MATCH TO SHEET 8
STA 31+02.50 -SR7-
MATCH TO SHEET 8
STA 924+00.00 -L-
CS Sta. 921+19.14
ST Sta. 12+40.00
CS Sta. 10+00.00 -RPD- 47.00' RT=
POC Sta. 918+06.20 -L-
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND

0 5 10

PROJ. REFERENCE NO.	SHEET NO.
R-2707E	X-167

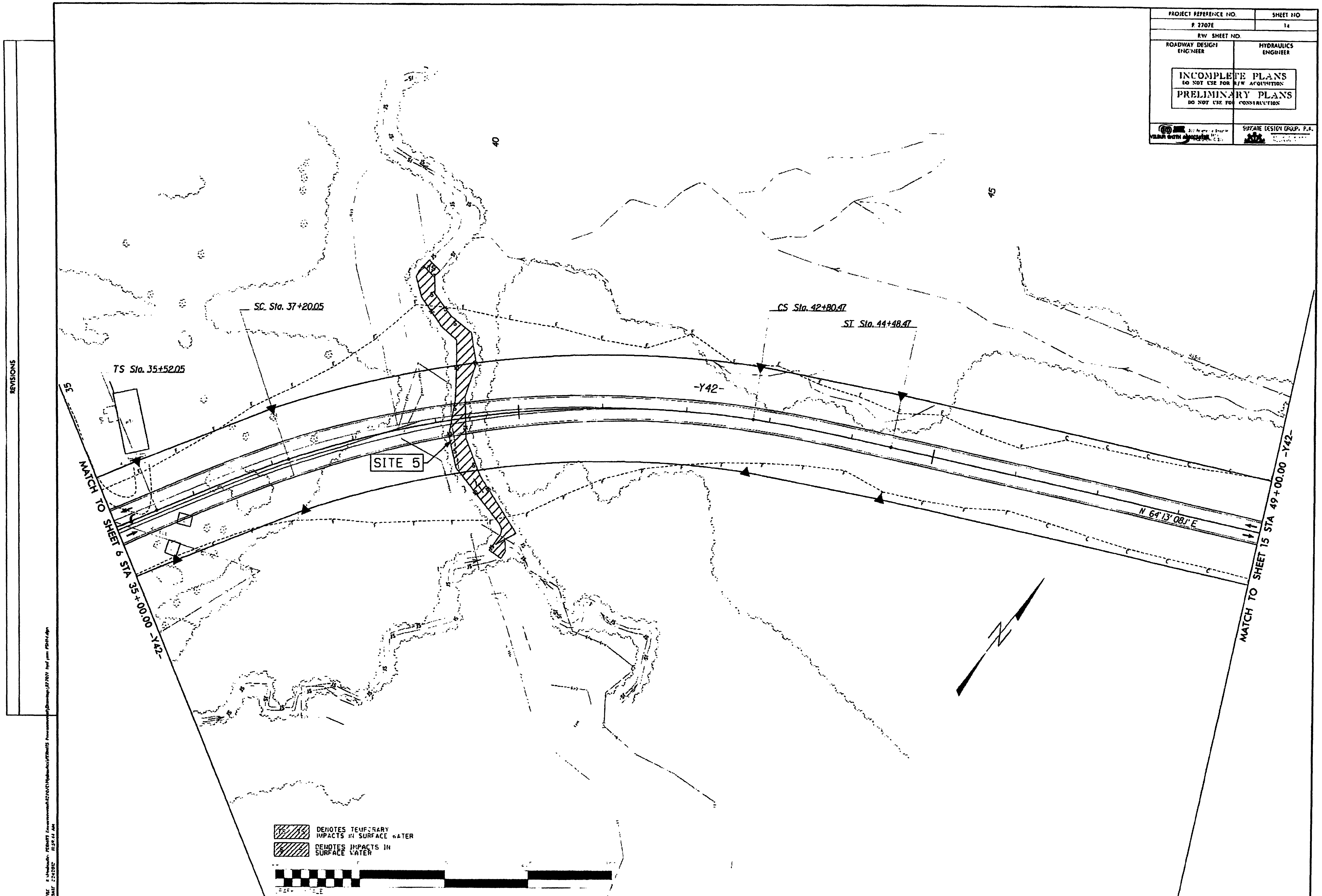
WETLAND CROSS SECTION
SITE 4



DATE: 2/24/2012
TIME: 11:34:05 AM
R:\Hydraulics\PROJECTS_Environmental\R2707E\Hydraulics\PROJECTS_Environmental\Drawings\R2707E_hyd_pmt_XPL_X67.dgn

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

-SR7-



PROJECT REFERENCE NO.
R-2707E
SHEET NO.
14
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SUNGATE DESIGN GROUP, P.A.
REVISIONS
TS Sta. 35+52.05
SC Sta. 37+20.05
CS Sta. 42+80.47
ST Sta. 44+48.47
-Y42-
SITE 5
N 64°13'08" E
MATCH TO SHEET 6 STA 35+00.00 -Y42-
MATCH TO SHEET 15 STA 49+00.00 -Y42-
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
R-2707E	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

VEGA DATA ASSOCIATES, PA

SIGMON DESIGN GROUP, P.A.

REVISIONS

SC Sta. 37+20.05

CS Sta. 42+80.47

ST Sta. 44+48.47

TS Sta. 35+52.05

-Y42-

SITE 5

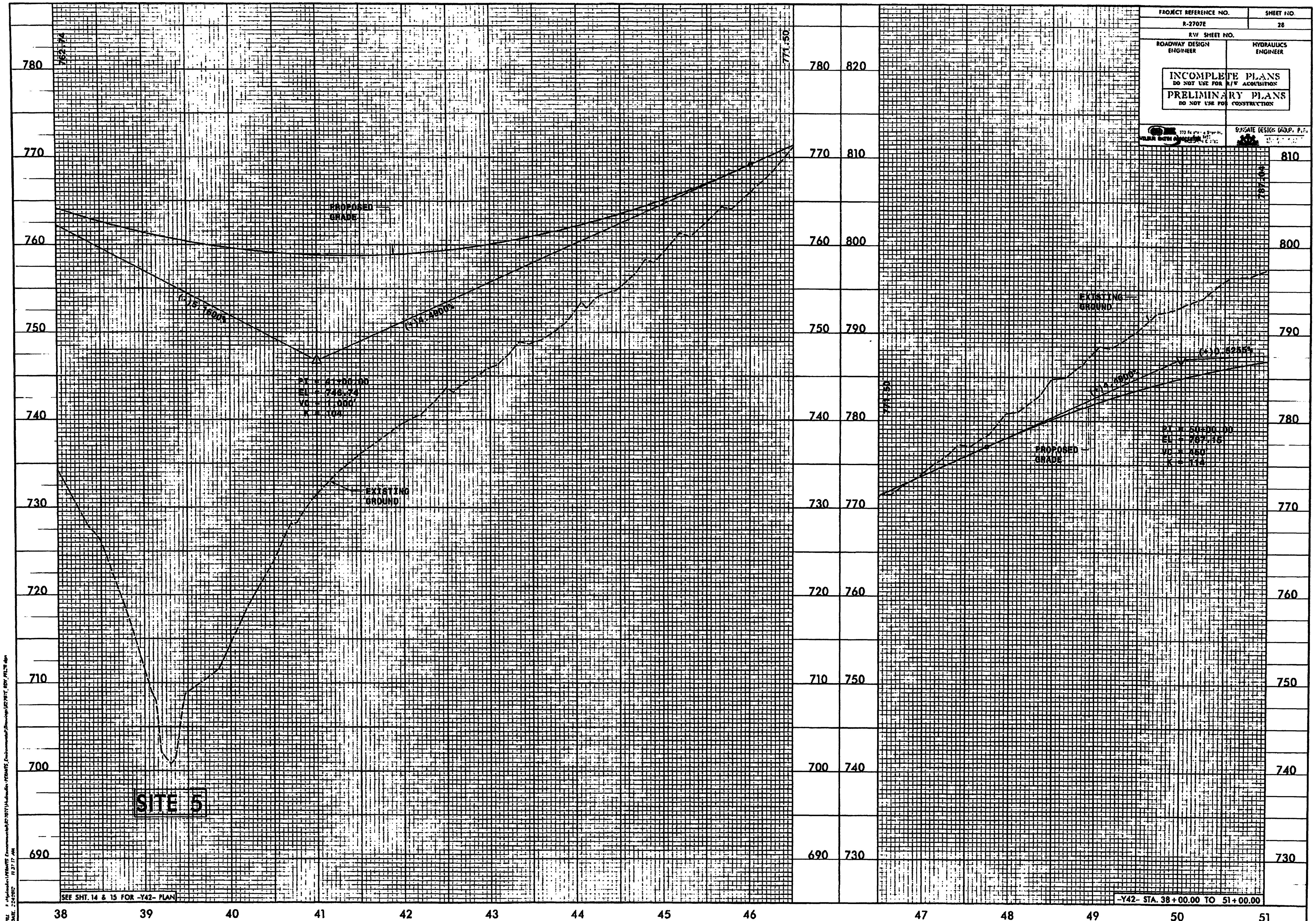
N 64°13'08" E

MATCH TO SHEET 6 STA 35+00.00 -Y42-

MATCH TO SHEET 15 STA 49+00.00 -Y42-

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER



PROJECT REFERENCE NO.
R-2707E
SHEET NO.
28
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
SUNGATE DESIGN GROUP, P.A.
762.74
771.50
787.04
PROPOSED GRADE
EXISTING GROUND
(-)5.1600%
(+)4.4800%
PI = 41+00.00
EL = 746.74
VC = 1,000'
K = 104
PT = 50+00.00
EL = 787.16
VC = 450'
K = 114
(+)0.5255%
SITE 5
SEE SHT. 14 & 15 FOR -Y42- PLAN
-Y42- STA. 38+00.00 TO 51+00.00
780
770
760
750
740
730
720
710
700
690
820
810
800
790
780
770
760
750
740
730
38
39
40
41
42
43
44
45
46
47
48
49
50
51