US Army Corps
Of Engineers
Wilmington District

PUBLIC NOTICE

Issue Date: October 13, 2005
Comment Deadline: November 14, 2005
Corps Action ID #: 199400453

All interested parties are herby advised that the Wilmington District, Corps of Engineers (Corps) has received an application for work within jurisdictional waters of the United States. Specific plans and location information are described below and shown on the attached plans. This Public Notice and all attached plans are also available on the Wilmington District Web Site at www.saw.usace.army.mil/wetlands

Applicant:

Mr. Gregory J. Thorpe, Ph. D.
Environmental Management Director, PDEA
N. C. Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Authority

The Corps will evaluate this application and a decide whether to issue, conditionally issue, or deny the proposed work pursuant to applicable procedures of Section 404 of the Clean Water Act.

Location

The proposed project involves improvements to US Highway 17 (T.I.P. No. R-2404A), beginning from US 13/17 south of Windsor to east of NCSR 1503 (Davis Road) in Bertie County, North Carolina. The proposed project is approximately 9.6 miles long and involves widening 2.3 miles of existing road from 2 to 4 lanes and 7.3 miles of new alignment 5-lane divided highway, including dual 1,700-foot bridges crossing the Cashie River. The proposed project is roughly located to the west, north, and east of Windsor and involves the crossing of three unnamed tributaries to the Cashie River, one unnamed tributary to Hoggard Mill Creek, and the Cashier River. The proposed project is located in the Roanoke River Basin, Hydrologic Unit 03010107. The southwestern starting point of the project is located at Latitude 35.9824797 N, Longitude 76.9574209 W. The eastern ending point is located at approximately Latitude 36.0182817 N, Longitude 76.8308079 W.

Existing Site Conditions

The project study area lies in the rural, unincorporated region of Bertie County. The population center in the study area includes the town of Windsor, North Carolina. Lands within the town limits and along US 13 Bypass and US 17 are classified as developed or urban transition according to the 1988 Bertie County Land Use Plan. The new location section of the selected alternative C2 (LEDPA) impacts mostly undeveloped forestlands and managed pine plantations. Residential properties generally consist of single-family frame or brick residences or mobile homes with outbuildings such as barns and sheds.

The topography in the study area is characterized as relatively flat to gently sloping terrain with an occasional steep slope along streams. Low areas, especially along the Cashie River floodplain are semi-to fully inundated with water much of the year. The study area is located in the Coastal Plain physiographic province of North Carolina.

Streams within the project area are located within the Roanoke River (USGS # 03010107) drainage area. The major drainage system in the project area is the Cashie River and unnamed tributaries to the Cashier River that drain into the Roanoke River system.

Jurisdictional wetlands in the study area are palustrine in nature as defined in Cowardin *et al.* (1979), and as identified on National Wetland Inventory (NWI) mapping. Some of these systems are defined as palustrine but are hydrologically riverine influenced. The wetland systems vary in vegetative composition, depending on hydrological regime and site-specific disturbances. Four wetland types were identified, palustrine forested, palustrine scrub-shrub, palustrine emergent, and palustrine unconsolidated bottom.

The types of general soil associations identified across the project area are: floodplains, stream terraces and uplands. Floodplain associations across the project area are located within the floodplains of the Cashie River. The upland associations can be differentiated into two types: those characterized by nearly level, poorly drained and very poorly drained soils; and those characterized by nearly level to sloping, well drained to somewhat poorly drained soils. Hydric soil mapping units within the project corridor include the Bibb, Bladen, Doravan, Leaf, Rains, Roanoke, and Wehadkee series (USDA 1991).

Applicant's Stated Purpose

The purpose of this project is to improve mobility through Bertie County on US 17 without delays caused by local traffic, improve travel service, improve hurricane evacuation and reduce evacuation travel times, reduce the number of accidents enhancing safety, and fulfill trust fund mandate to improve the intrastate system.

Background

This project is considered a "pipeline" project since it was initiated prior to the integration process for merging the National Environmental Policy Act and Section 404 of the Clean Water Act. The project was brought into the merger process at Concurrence Point 3, LEDPA selection. The Corps of Engineers issued an initial public notice for this project on March 4, 1999. The public notice described four construction alternatives to be considered, alternatives A, B, C1, and C2. The NEPA/404 Merger Team agreed in the selection of alternative C2 in November 1999, as the Least Environmentally Damaging Practicable Alternative (LEDPA).

Project Description

The following description of work is taken from data provided by the applicant. Proposed impacts to jurisdictional areas of T.I.P. R-2404A consist of 68.56 acres of permanent wetland impacts (4.05 acres of riparian wetlands, 64.51 acres of non-riparian wetlands, 0.66 acres of Department of Army non-jurisdictional isolated wetlands), 1.06 acres of fill in surface waters, and 2,035 linear feet of stream channel impacts (1,354 linear feet of important stream channel requiring mitigation and 681 linear feet of un-important channel not requiring mitigation), and 1.32 acres of temporary wetland impacts. The vast majority of proposed wetland impacts occur along the eastern half of the project at Sites 10, 12, 14, and 16 (see Table 4 below). These proposed impacts occur mainly in low quality non-riparian wetlands that are currently at various stages of silviculture management (recent clearcuts, newly planted pine stands, maturing pine plantations). Table 1 summarizes the jurisdictional impacts associated with R-2404A, Table 2 summarizes the impact sites, Table 3 summarizes the jurisdictional stream impacts, and Table 4 summarizes the wetland types and the associated impacts at each site. The Cashie River and its associated bottomland wetland system will be bridged with dual 1,700-foot structures thereby reducing wetland impacts. Utility relocation impacts have been assessed and are included in the above impacts.

Table 1: Summary of Impacts

Permanent Wetland* (acres)	Temporary Wetland^ (acres)	Isolated Wetlands (acres)	Streams^ (linear feet)	Streams Requiring Mitigation (lf)	Surface Waters# (acres)
68.56	**1.32**	**0.66**	**2,035**	**1,354**	**1.06**

* Wetland impact calculations include fill, excavation, and mechanized clearing; difference from permit impact summary sheet is due to inclusion of borrow/haul road impacts.
^ Difference from permit impact summary sheet is due to inclusion of haul road impacts.
# Surface water calculations include ponds and streams without mitigation requirements; difference from permit impact summary sheet is due to rounding to two decimal places at each site.

Table 2: Summary of Impact Sites

Site No.	Permanent Wetland* (ac)	Temporary Wetland (ac)	Streams (lf)	Streams Requiring Mitigation (lf)	Surface Waters^ (ac)
1	0.38	0	286	89	0.76
2	0.01	0	39	0	0.01
3	0.02	0	0	0	0
4	3.61	0	1,450	1,265	0.10
5	0.06	0	0	0	0
6	0.26	0	0	0	0
7@	0.00	0	0	0	0
8	0.28	0	0	0	0
9	0.19	0	0	0	0
10	10.98	0	0	0	0
11	0.00	0	211	0	0.09
12	6.72	0	0	0	0
13	4.59	0	0	0	0
14	30.66	1.30	0	0	0.10
15	0.62	0	0	0	0
16	9.29	0	0	0	0
17	0.81	0	0	0	0
18	0.01	0	0	0	0
19	0.07	0	0	0	0
IP#1 #	0.66	0.02	49	0	0
Total	**69.22 ac**	**1.32 ac**	**2,035 lf**	**1,354 lf**	**1.06 ac**

* Wetland impact calculations include fill, excavation, and mechanized clearing; difference from permit impact summary sheet is due to inclusion of haul roads and rounding to two decimals at each site.
^ Surface water calculations include ponds and streams without mitigation requirements.
@ Site is bridged – 0.01 acres of wetland impacts from piles not included in totals.
# Borrow area impacts not shown on permit impact summary sheet (see Exhibit B). Permanent impacts to isolated wetlands only.

Table 3: Jurisdictional Stream Information

Site No.	Station Number	Impact Structure *	Stream Name #	DWQ Index No.	Stream Status ^	Impact (lf)	Required Mitigation (lf)
1	L 44+50	8x6 RCBC	UT to Cashie R.	24-2-(1)	P	89	89
2	L 85+40	48" RCP	UT to Cashie R.	24-2-(1)	IU	39	0
4	L 138+10	36" RCP	UT to Cashie R.	24-2-(1)	P / IU	1,450	1,265
11	L 264+50	36" RCP	UT to Hoggard Mill Creek	24-2-6	IU	211	0

* Structures: Reinforced concrete box culvert (RCBC), Reinforced concrete pipe (RCP);
# Unnamed tributary (UT); ^ Stream status: Perennial (P), Intermittent Unimportant (IU)

Table 4: Jurisdictional Wetland Information

Site No.	Riparian/ Non-riparian ^	Cowardin Classification ^ #	Impact Type(s)*	Wetland Quality ^	Impact Acreage
1	Riparian	PEM / PFO	F / E / M	Medium	0.38
2	Non-riparian	PFO	M	Low	0.01
3	Non-riparian	PFO	F / M	Medium	0.02
4	Riparian	PFO	F / E / M	Low/Medium/High	3.61
5	Riparian	PFO	F / M	High	0.06
6	Non-riparian	PFO	F / M	Low	0.26
8	Non-riparian	PSS / PFO	F / M	Low	0.28
9	Non-riparian	PFO	F / E / M	Low	0.19
10	Non-riparian	PEM / PSS / PFO	F / M	Low/Medium	10.98
12	Non-riparian	PEM / PSS / PFO	F / M	Low/Medium	6.72
13	Non-riparian	PEM	F / M	Low	4.59
14	Non-riparian	PEM / PSS / PFO	F / M	Low	30.66
15	Non-riparian	PSS	F / M	Low	0.62
16	Non-riparian	PEM / PSS / PFO	F / M	Low/Medium	9.29
17	Non-riparian	PEM	F / M	Low	0.81
18	Non-riparian	PSS	F / M	Low	0.01
19	Non-riparian	PSS	F / M	Low	0.07

^ Based on NRTR-provided data;
# Classification Types: Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), Palustrine Forested (PFO);
* Impact Types: fill (F), excavation (E), and mechanized clearing (M)

Throughout the NEPA and design process this project has been designed to avoid and minimize impacts to jurisdictional areas. Specific strategies have been incorporated and commitments made by NCDOT to avoid and minimize jurisdictional impacts.

On-site mitigation opportunities have been fully evaluated and NCDOT has committed to avoidance and minimization measures to avoid unnecessary impacts to jurisdictional areas. NCDOT proposes to use the North Carolina Ecosystem Enhancement Program to provide the necessary compensatory mitigation for the unavoidable wetland impacts with the project.

As required for projects in the design-build process, staging areas, borrow and waste areas, and haul road impacts have been identified prior to the submission of the permit application. All staging and waste areas will be located entirely in uplands. Eight borrow areas are still under consideration, of which six will likely be used for this project as shown in the attached site location map and Exhibit A). These borrow areas will not impact jurisdictional resources under Section 404 of the Clean Water Act. However, the borrow site located south of Greens Cross Road near the center of the project contains two small (0.66 acre total) isolated wetlands. The USACE verified that these wetlands are isolated, and an isolated wetlands addendum is attached for NCDWQ review. This impact is necessary to avoid using an alternate borrow source that would involve construction of a haul road through high quality wetlands. Instead, the proposed borrow site allows for the use of the existing timber haul road with minor widening and much less impact. Haul road impacts for the borrow site discussed above are included in the impact summary. Exhibit C presents the location of the haul roads and the impacts associated with its improvements. The impacts are limited to 0.02 acres of temporary fill and a pipe extension along 49 linear feet of perennial stream channel. Haul road impacts will be temporary, and the areas will be re-graded to original contours and reforested when the project is completed. Stream banks will be returned to existing conditions and re-vegetated. A reforestation detail is provided within this permit application. The only other haul road impact is at Site 1 (Exhibit B) through the pond that will be drained for roadway construction. These impacts have been included in the permit impact calculations and are shown on the attached plans.

The project is identified as State Project No. 6.019001T, TIP No. R-2404A.

Overall plans showing the location of the proposed construction and impact sites are included with this public notice. Additional detailed plans, including NCDOT's cover letter and supplemental information, dated September 13, 2005, and information about the North Carolina Ecosystem Enhancement Program, may be reviewed at the U.S. Army Corps of Engineers Regulatory Field Office at 107 Union Drive, Suite 202, Washington, North Carolina 27889, or at the offices of the North Carolina Division of Water Quality at the address shown below.

Other Required Authorizations

This notice and all applicable application materials are being forwarded to the appropriate State agencies for review. The Corps will generally not make a final permit decision until the North Carolina Division of Water Quality (NCDWQ) issues, denies, or waives State certification required by Section 401 of the Clean Water Act (PL 92-500). The receipt of the application and this public notice in the NCDWQ Central Office in Raleigh

serves as application to the NCDWQ for certification. A waiver will be deemed to occur if the NCDWQ fails to act on this request for certification within sixty days of the date of the receipt of this notice in the NCDWQ Central Office. Additional information regarding the Clean Water Act certification may be reviewed at the NCDWQ Central Office, Transportation Permitting Unit, 2321 Crabtree Boulevard, Raleigh, North Carolina 27604-2260. All persons desiring to make comments regarding the application for certification under Section 401 of the Clean Water Act should do so in writing delivered to the North Carolina Division of Water Quality (NCDWQ), 1650 Mail Service Center, Raleigh, North Carolina 27699-1650 Attention: Mr. John Hennessy by 7 November 2005.

The applicant has not provided to the Corps, a certification statement that his/her proposed activity complies with and will be conducted in a manner that is consistent with the approved North Carolina Coastal Zone Management Program. Pursuant to 33 CFR 325.2(b)(2), the Corps can not issue a permit for the proposed work until the applicant submits such a certification to the Corps and the North Carolina Division of Coastal Management (NCDCM), and the NCDCM notifies the Corps that it concurs with the applicant's consistency certification.

Essential Fish Habitat

This notice initiates the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act. The Corps' initial determination is that the proposed project will not adversely impact EFH or associated fisheries managed by the South Atlantic or Mid Atlantic Fishery Management Councils or the National Marine Fisheries Service.

Cultural Resources

The Corps has consulted the latest published version of the National Register of Historic Places and has determined that registered properties, or properties listed as being eligible for inclusion therein are located within the project area and/or will be affected by the proposed work. The proposed project will impact two archaeological sites (Sites 31BR192** and 31BR201/201**) eligible for listing on the National Register of Historic Places. The State Historic Preservation Office (SHPO) concurred with the eligibility of these two sites on July 16, 2002. Preparation of a Memorandum of Agreement for Recovery of Significant Information from Archaeological Sites 31BR192** and 31BR201/201** has been completed and signed and is in the process of being forwarded to the Advisory Council on Historic Preservation for filing. Upon completion of the Data Recovery efforts, the NCDOT will prepare and forward a Management Summary to the SHPO detailing the results of the Data Recovery field investigations. The Management Summary will contain sufficient information to demonstrate that the field investigation portion of the Data Recovery Plan has been implemented. Upon acceptance of the recommendations contained in the Management Summary, the SHPO will issue the

NCDOT documentation that the Data Recovery field investigations have been completed. Staging and borrow areas outside the original study limits are currently being reviewed for archaeological resources by a qualified subcontractor. The results of these surveys will be submitted to NCDOT and SHPO for review and concurrence prior to construction.

Endangered Species

The Corps has reviewed the project area, examined all information provided by the applicant and consulted the latest North Carolina Natural Heritage Database. Based on available information, the Corps has determined pursuant to the Endangered Species Act of 1973, that the proposed project will have no effect on federally listed endangered or threatened species or their formally designated critical habitat. See Table 5 below for a description of the Federal Listed Endangered or Threatened Species for Bertie County.

Table 5: Federally-Listed Protected Species for Bertie County, NC *

Scientific Name	**Common Name**	**Federal Status**
Haliaeetus leucocephalus	Bald eagle	Threatened – Proposed for Delisting
Picoides borealis	Red-cockaded woodpecker (RCW)	Endangered
Acipenser brevirostrum	Shortnose sturgeon	Endangered

- Amended to include those species listed by the NC Natural Heritage Program to occur in Bertie County

Surveys for RCW were performed for the original NRTR. A biological conclusion of "No Effect" was reached for this species. On May 19, 2004, USFWS issued a letter of concurrence stating that the Service concurs that this project will have "No Effect" on RCW populations. Minor changes to the roadway alignment have occurred during final design. All changes are within the area covered by the original survey.

The bald eagle, although not listed for Bertie County by the USFWS, is shown as occurring within Bertie County by the North Carolina Natural Heritage Program element occurrence database. No suitable habitat exists for the bald eagle within the project area, with the exception of the Cashie River. Surveys for bald eagles and their nests have been performed at the location of the bridge crossing. No occurrences of this species were noted on the site. Suitable habitat within the project area will be resurveyed prior to construction.

While the shortnose sturgeon is also listed by NCNHP for Bertie County, no surveys have been performed for this species. The construction moratoria for in-water work, which lasts from February 15 to September 30, will limit potential for impacts to this and other anadromous species. Moratoria conservation measures, to be used during construction in non-inundated wetland areas, will include using silt fence to completely contain the construction zone, using a turbidity curtain to separate the construction area

from the Cashie River, and implementation of these two measures prior to commencement of the moratorium. The top-down construction method used for the dual bridges will also serve to limit temporary impacts to these waters by eliminating the need for a work bridge or other construction access.

Evaluation

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values (in accordance with Executive Order 11988), land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property

ownership, and, in general, the needs and welfare of the people. For activities involving the discharge of dredged or fill materials in waters of the United States, the evaluation of the impact of the activity on the public interest will include application of the Environmental Protection Agency's 404(b)(1) guidelines.

Commenting Information

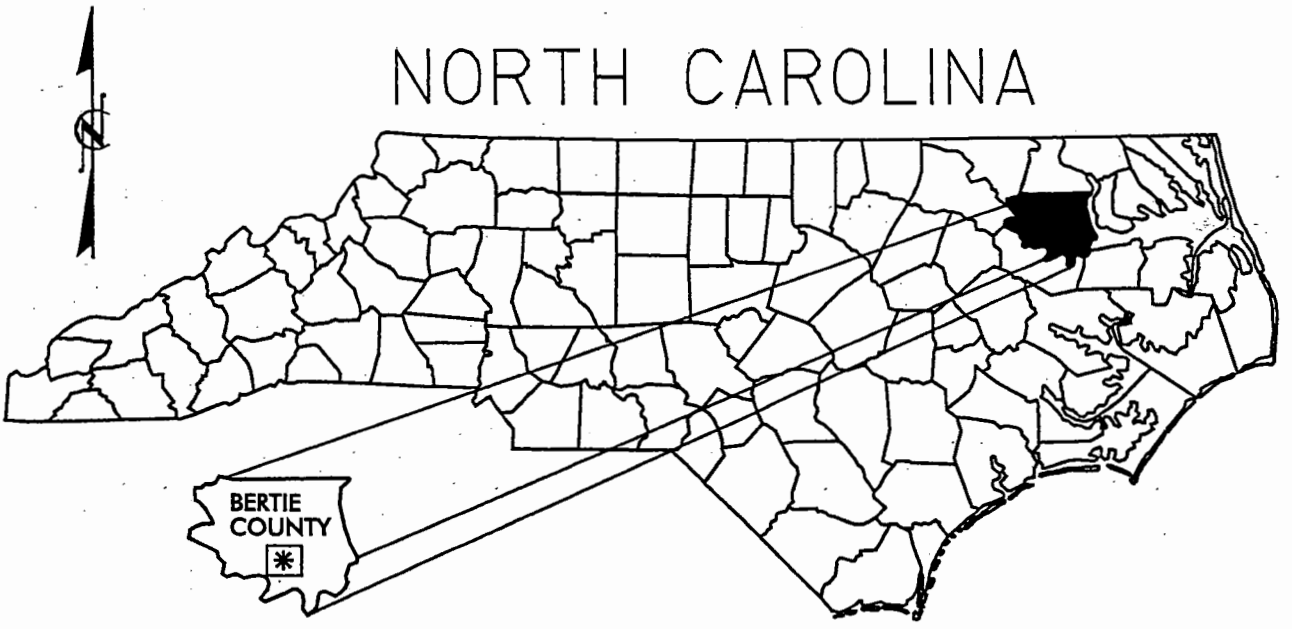
The Corps is soliciting comments from the public; Federal, State and local agencies and officials, including any consolidate State Viewpoint or written position of the Governor; Indian Tribes and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment (EA) and/or an Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA). Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

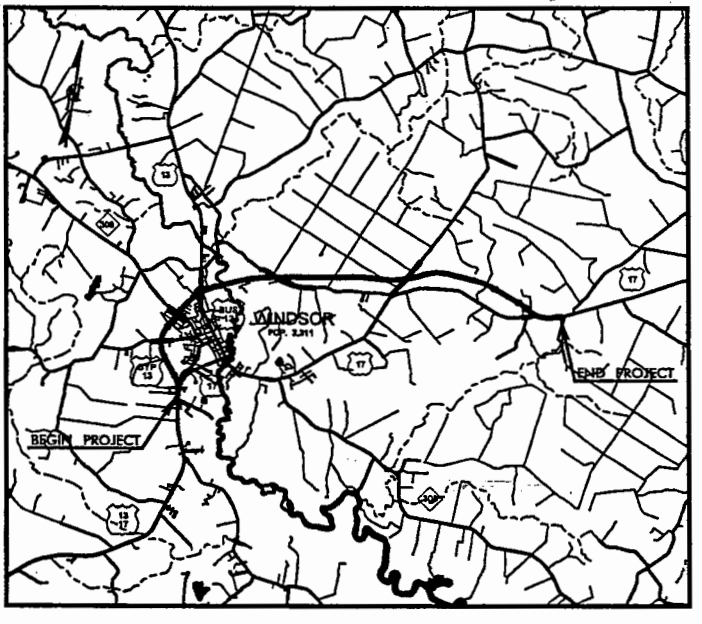
Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider the application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing. Requests for a public hearing shall be granted, unless the District Engineer determines that the issues raised are insubstantial or there is otherwise no valid interest to be served by a hearing.

Written comments pertinent to the proposed work, as outlined above, will be received by the Corps of Engineers, Wilmington District, until 5pm, 14 November 2005.

Comments should be submitted to

William Biddlecome
Washington Regulatory Field Office
P.O. Box 1000
Washington, North Carolina 27889





VICINITY MAPS

NORTH CAROLINA

DIVISION OF HIGHWAYS

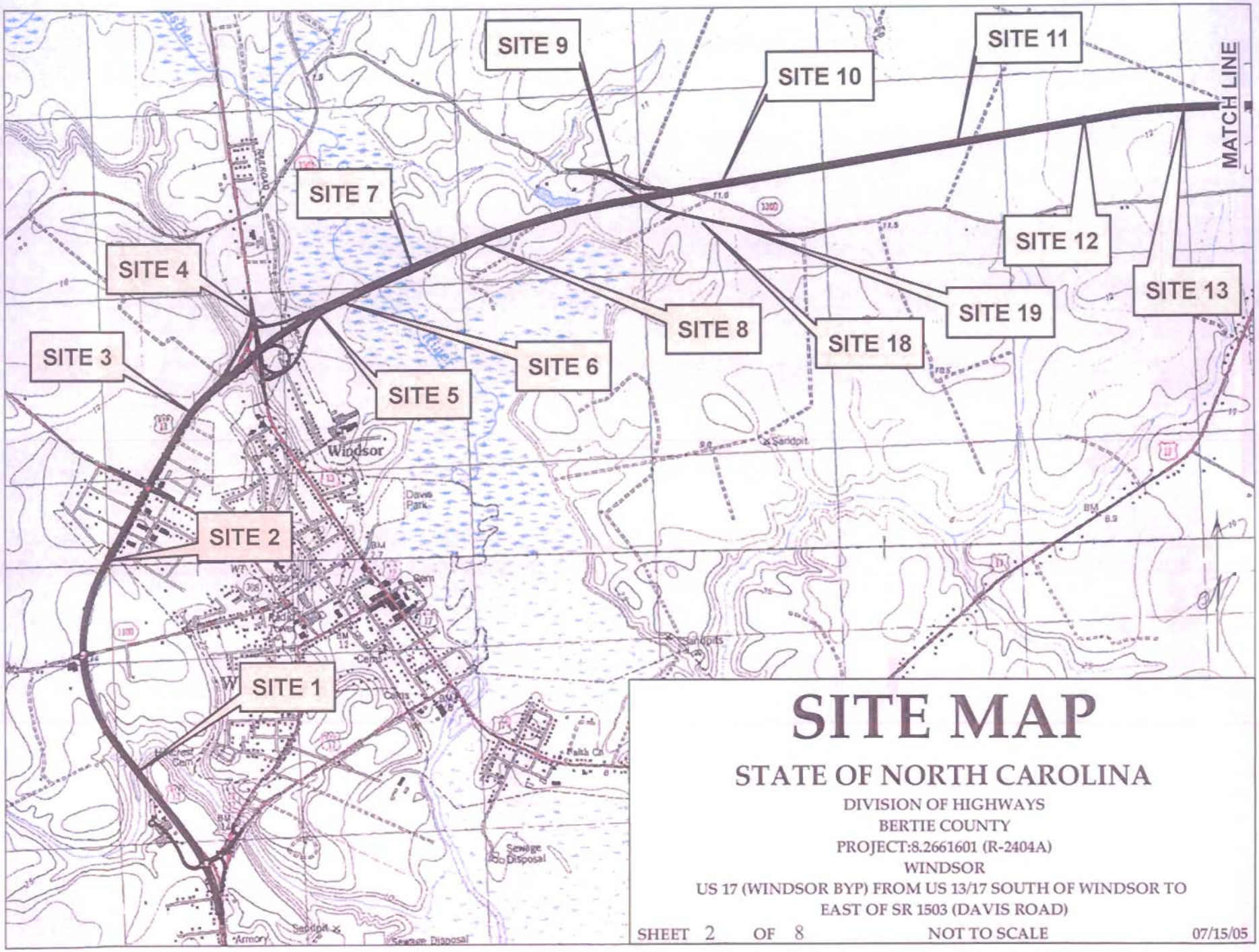
BERTIE COUNTY

PROJECT: C201236 (R-2204A)

WINDSOR

US 17 (WINDSOR BYP) FROM US 13/17, SOUTH OF WINDSOR, TO EAST OF SR 1503 (DAVIS ROAD)

SHEET 1 OF 8 **7/15/05**

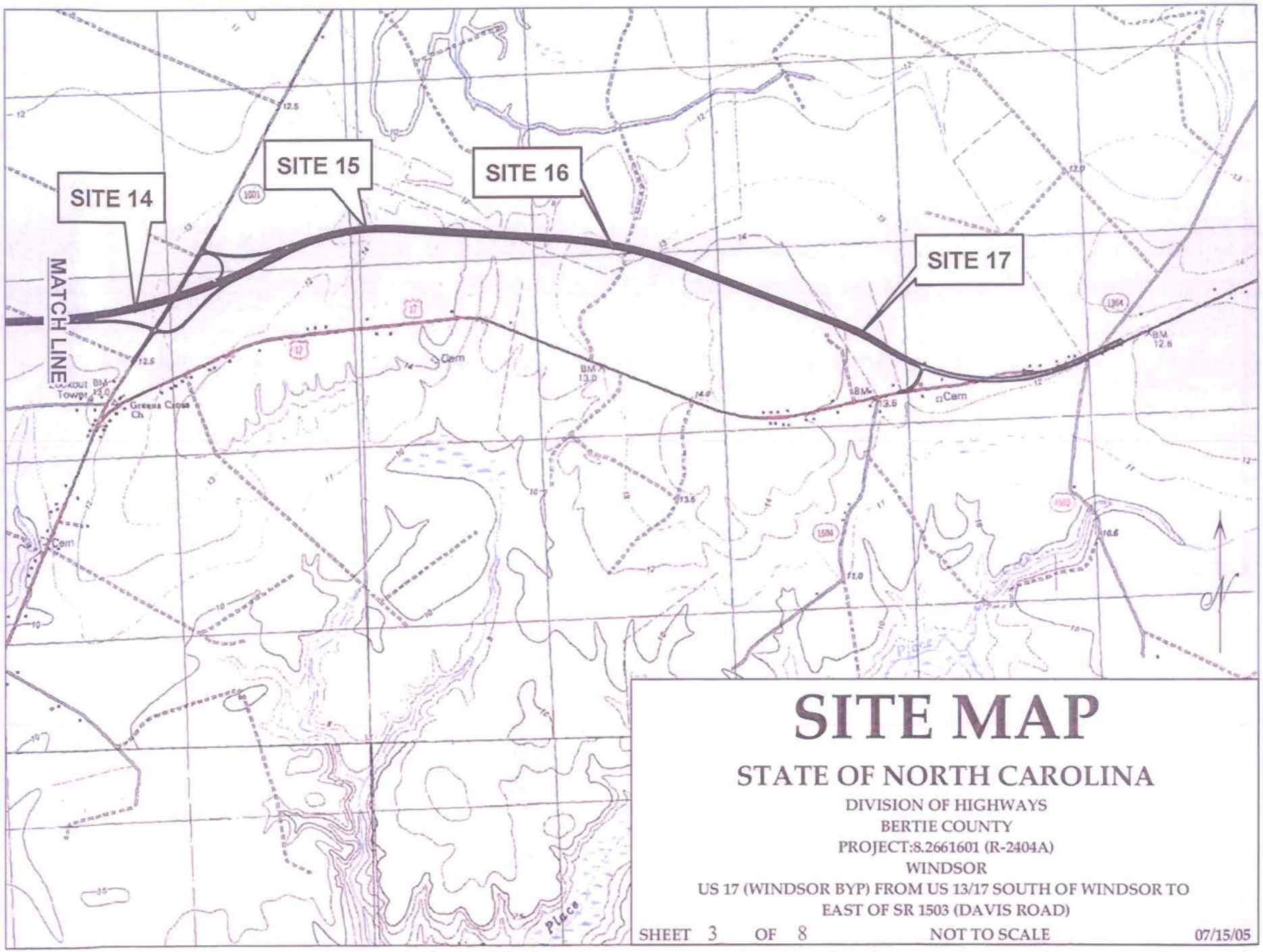


SITE MAP

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS
BERTIE COUNTY
PROJECT:8.2661601 (R-2404A)
WINDSOR
US 17 (WINDSOR BYP) FROM US 13/17 SOUTH OF WINDSOR TO
EAST OF SR 1503 (DAVIS ROAD)

SHEET 2 OF 8 NOT TO SCALE 07/15/05



SITE MAP

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS
BERTIE COUNTY
PROJECT:8.2661601 (R-2404A)
WINDSOR
US 17 (WINDSOR BYP) FROM US 13/17 SOUTH OF WINDSOR TO
EAST OF SR 1503 (DAVIS ROAD)

SHEET 3 OF 8 NOT TO SCALE 07/15/05

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	41+50-49+00	8'x6' RCBC	0.277	0.000	0.016	0.087	0.000	0.758	0.000	286	0	0
2	85+10-88+00	48" RCP	0.000	0.000	0.000	0.011	0.000	0.005	0.000	39	0	0
3	115+60-117+90	30" RCP	0.004	0.000	0.000	0.012	0.000	0.000	0.000	0	0	0
4	129+00-141+80	INTERCHANGE	2.525	0.000	0.067	1.021	0.000	0.103	0.000	1450	0	0
5	144+00-146+10	ROADWAY FILL	0.014	0.000	0.000	0.000	0.045	0.000	0.000	0	0	0
6	149+00-153+50	ROADWAY FILL	0.241	0.000	0.000	0.017	0.000	0.000	0.000	0	0	0
7*	155+00-172+00	BRIDGE	0.001	0.000	0.000	0.000	5.019	0.000	0.000	0	0	0
8	175+80-180+00	ROADWAY FILL	0.270	0.000	0.000	0.011	0.000	0.000	0.000	0	0	0
9	16+50-21+00 -Y5-	30" RCP	0.165	0.000	0.006	0.018	0.000	0.000	0.000	0	0	0
10	217+10-258+60	8-36" EQ PIPES	9.726	0.000	0.000	1.249	0.000	0.000	0.000	0	0	0
11	264+20-267+00	36" RCP	0.000	0.000	0.000	0.000	0.000	0.086	0.003	180	31	0
12	267+30-298+40	5-36" EQ PIPES	5.951	0.000	0.000	0.772	0.000	0.000	0.000	0	0	0
13	299+20-314+70	2-36" EQ PIPES	4.096	0.000	0.000	0.495	0.000	0.000	0.000	0	0	0
14	315+00-370+30	INTERCHANGE	25.393	1.304	0.000	5.269	0.000	0.095	0.000	0	0	0
15	375+50-380+20	ROADWAY FILL	0.524	0.000	0.000	0.099	0.000	0.000	0.000	0	0	0
16	397+30-428+90	2-30" RCP, 3-36" EQ	8.199	0.000	0.000	1.090	0.000	0.000	0.000	0	0	0
17	466+50-470+10	1-36" EQ PIPE	0.711	0.000	0.000	0.102	0.000	0.000	0.000	0	0	0
18	35+10-35+50 -Y5-	ROADWAY FILL	0.001	0.000	0.000	0.006	0.000	0.000	0.000	0	0	0
19	41+60-42+80 -Y5-	18" RCP	0.046	0.000	0.000	0.027	0.000	0.000	0.000	0	0	0
TOTALS:			58.144	1.304	0.089	10.286	5.064	1.047	0.003	1955	31	0

*Additional "shading effect" equal to 2.53 acres of wetland and 127' or 0.41 acres of stream

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BERTIE COUNTY
WBS - 34424.3.7 (R-2404A)

SHEET 9/12/2005

ATN Revised 3/31/05

PERMIT IMPACT SHEET
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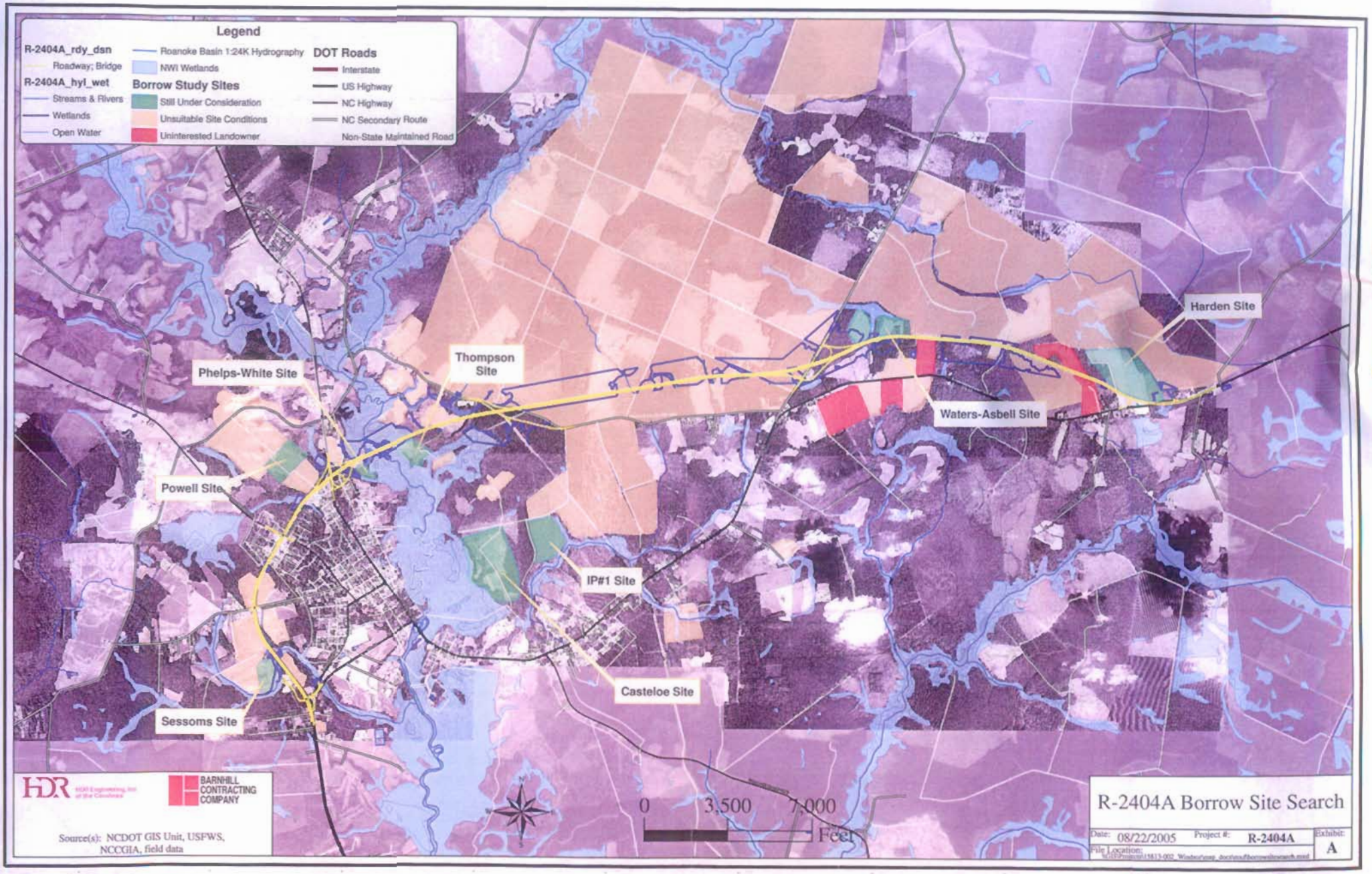
NORTH CAROLINA
DIVISION OF HIGHWAYS
BERTIE COUNTY
PROJECT: C201236 (R-2204A)
WINDSOR
US 17 (WINDSOR BYP) FROM US 13/17, SOUTH OF WINDSOR, TO EAST OF SR 1503 (DAVIS ROAD)


Legend
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NC Highway
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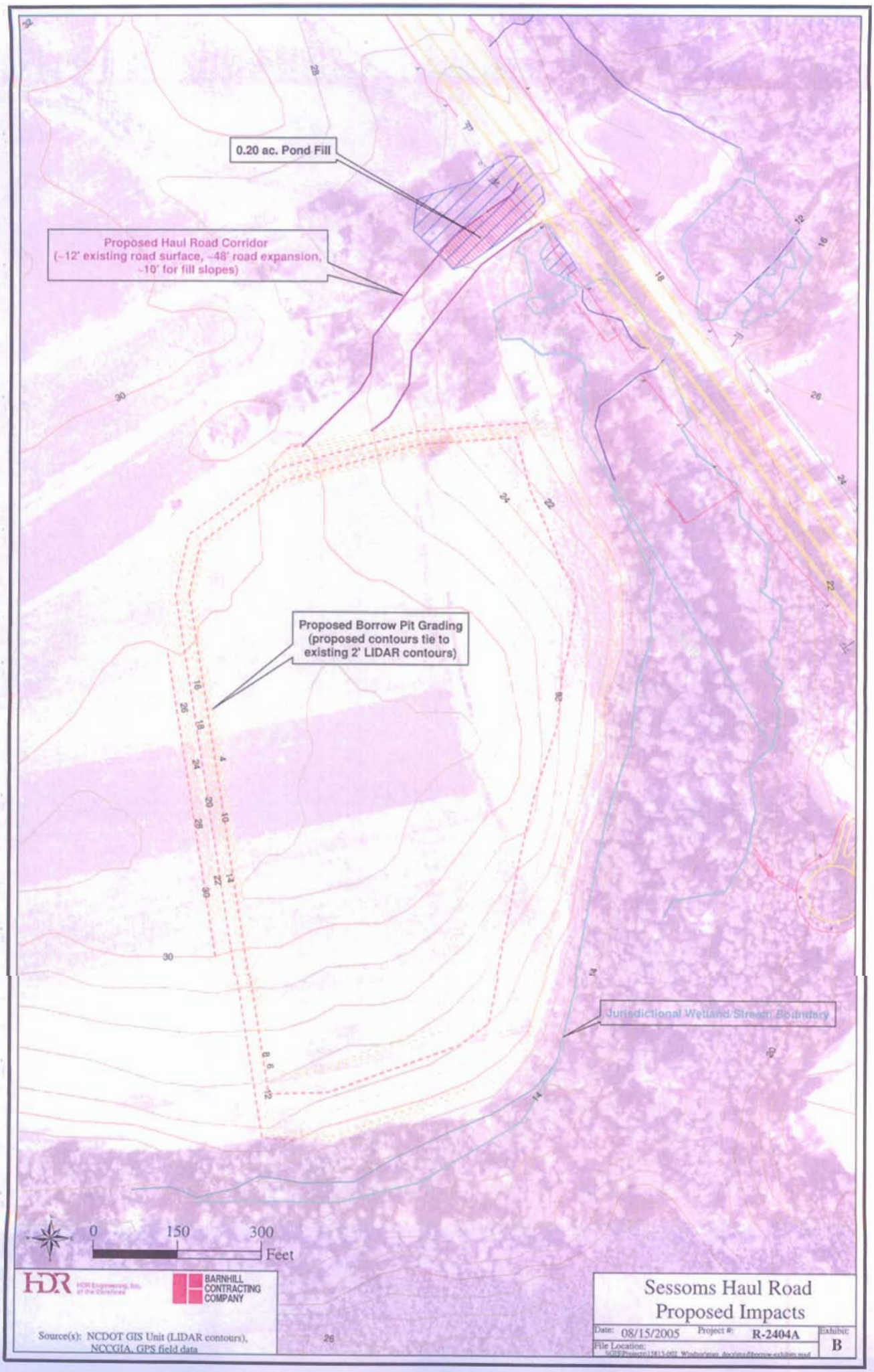
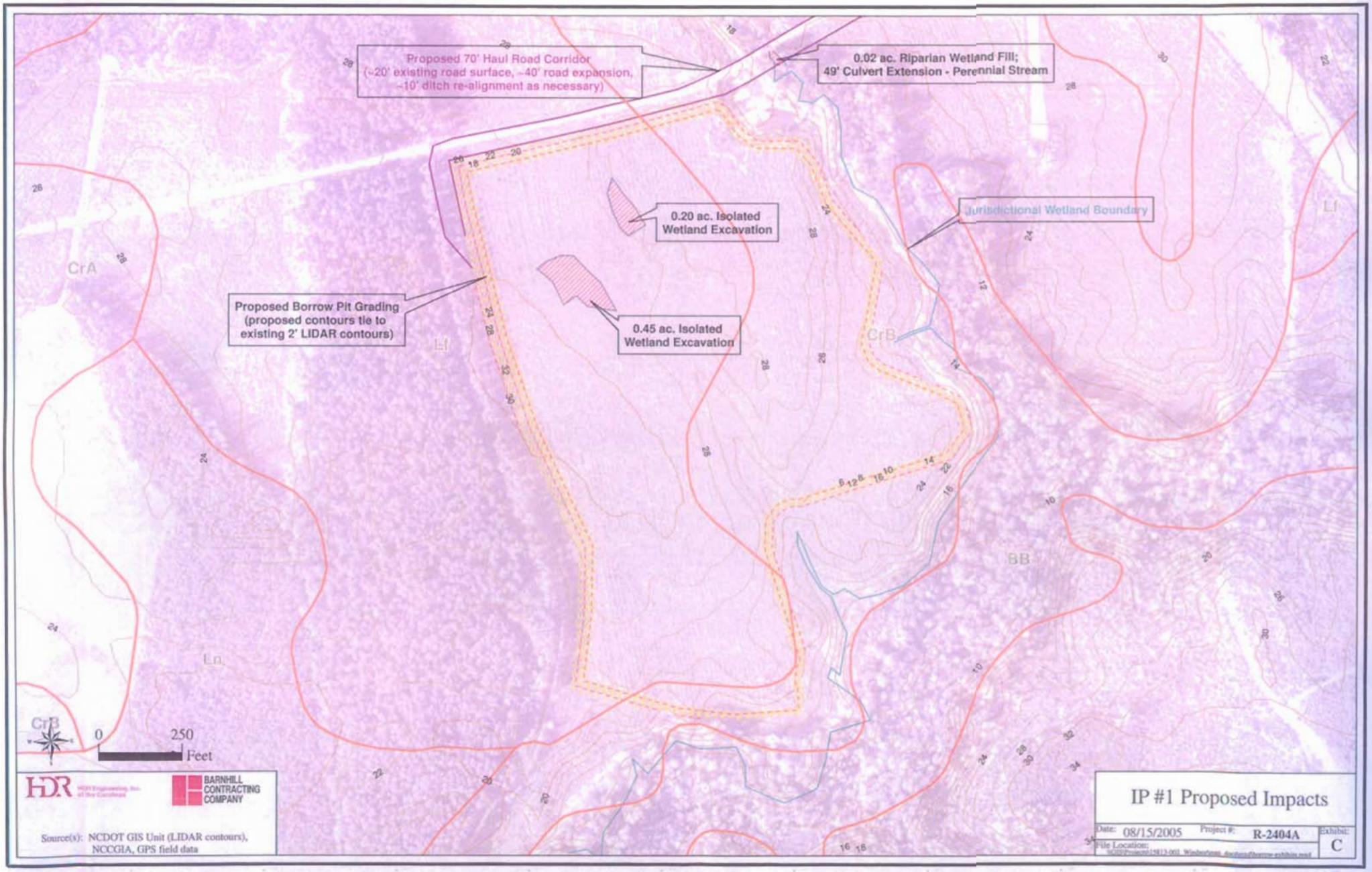
Harden Site
Thompson Site
Phelps-White Site
Waters-Asbell Site
Powell Site
IP#1 Site
Casteloe Site
Sessoms Site
HDR
BARNHILL CONTRACTING COMPANY
Source(s): NCDOT GIS Unit, USFWS, NCCGIA, field data
0 3,500 7,000
Feet
R-2404A Borrow Site Search
Date: 08/22/2005
Project #: R-2404A
Exhibit: A


0.20 ac. Pond Fill
Proposed Haul Road Corridor
(~12' existing road surface, ~48' road expansion,
~10' for fill slopes)
Proposed Borrow Pit Grading
(proposed contours tie to
existing 2' LIDAR contours)
Jurisdictional Wetland/Stream Boundary
0
150
300
Feet
HDR
BARNHILL
CONTRACTING
COMPANY
Source(s): NCDOT GIS Unit (LIDAR contours),
NCCGIA, GPS field data
Sessoms Haul Road
Proposed Impacts
Date: 08/15/2005
Project #: R-2404A
Exhibit:
B
File Location:


Proposed 70' Haul Road Corridor
(~20' existing road surface, ~40' road expansion,
~10' ditch re-alignment as necessary)
0.02 ac. Riparian Wetland Fill;
49' Culvert Extension - Perennial Stream
0.20 ac. Isolated
Wetland Excavation
Jurisdictional Wetland Boundary
Proposed Borrow Pit Grading
(proposed contours tie to
existing 2' LIDAR contours)
0.45 ac. Isolated
Wetland Excavation
CrA
CrB
Lf
BB
0
250
Feet
HDR
BARNHILL
CONTRACTING
COMPANY
Source(s): NCDOT GIS Unit (LIDAR contours),
NCCGIA, GPS field data
IP #1 Proposed Impacts
Date: 08/15/2005
Project #: R-2404A
Exhibit:
C
File Location:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BERTIE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2404A	1	

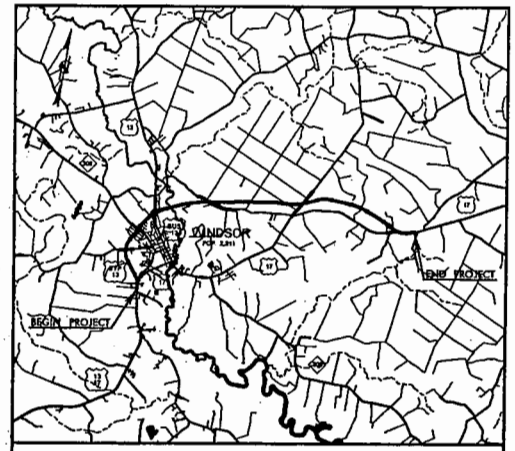
STATE PROJECT NO.	F.A. PROJECT NO.	DESCRIPTION
C201236		CONTRACT NO.
6.019001T & 34424.1.1		PLANNING & PE
34424.3.7		CONST.

See Sheet 1-A For Index of Sheets

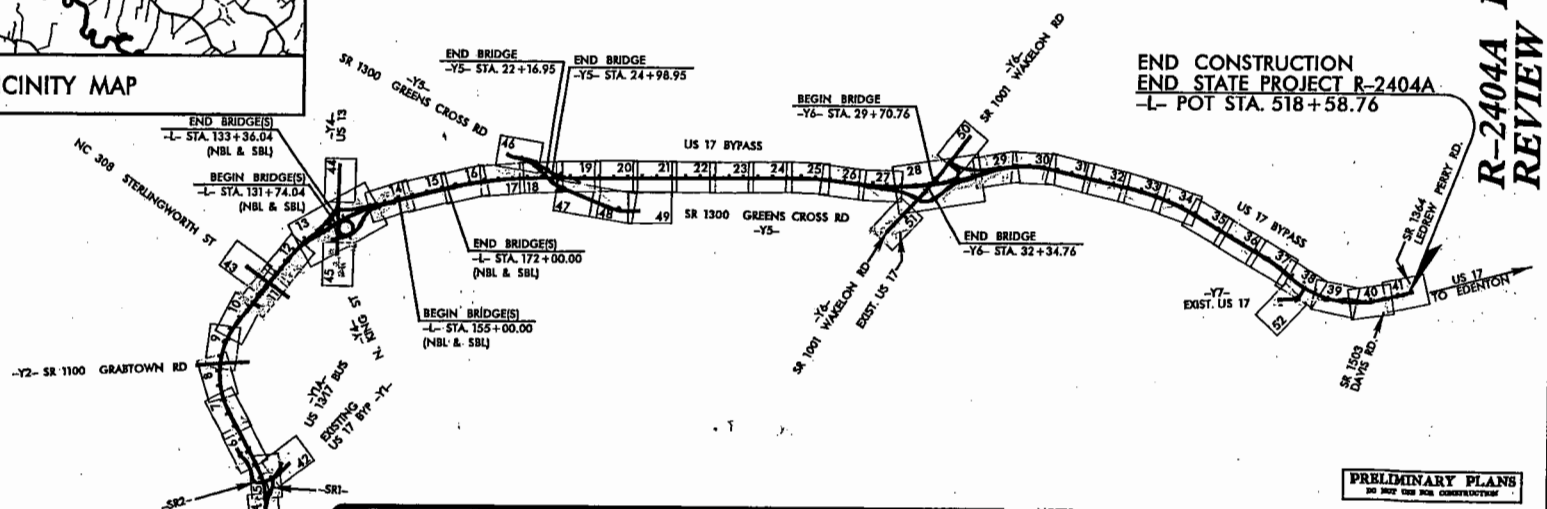
LOCATION: US 17 (WINDSOR BYPASS) FROM US 13/17, SOUTH OF WINDSOR, TO EAST OF SR 1503 (DAVIS ROAD)

TYPE OF WORK: DESIGN-BUILD AS SPECIFIED IN THE SCOPES OF WORK CONTAINED IN THE DESIGN-BUILD PACKAGE

N.C. GRID NAD 83



VICINITY MAP



R-2404A PERMIT REVIEW SET

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT SUBMITTED BY:

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 202 • Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

NOTES:

1) PROPOSED US 13 /US 17 BYPASS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS
2) THE PROPOSED NEW LOCATION US 17 BYPASS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
3) CLEARING ON THIS PROJECT SHALL BE PREPARED TO THE LIMITS ESTABLISHED BY METHOD XX.

GRAPHIC SCALES

50 0 50 100 PLANS

50 0 50 100 PROFILE (HORIZONTAL)

10 0 10 20 PROFILE (VERTICAL)

DESIGN DATA

ADT 2004	=	12,500
ADT 2025	=	21,300
DHV	=	12 %
D	=	55 %
T	=	12 % *
V	=	70 mph (NEW LOC.)

* TTST 8% DUAL 4%
Functional Class: Freeway

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2404A	=	9.241 MILES
LENGTH BRIDGE TIP PROJECT R-2404A	=	0.353 MILES
TOTAL LENGTH STATE PROJECT R-2404A	=	9.594 MILES

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

2002 STANDARD SPECIFICATIONS

NCDOT CONTACT:

RODGER ROCHELLE, PE
STATE ALTERNATIVE DELIVERY SYSTEMS ENGINEER

LETTING DATE:
DECEMBER 23, 2004

DESIGN-BUILD PROJECT 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

PROJECT: C201236 R-2404A

9/8/2005 9:44:13 AM
J:\4A\Permitting\Impact_Sheets\R2404A_hyl_Impacts_tsh.dgn

9/8/05

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

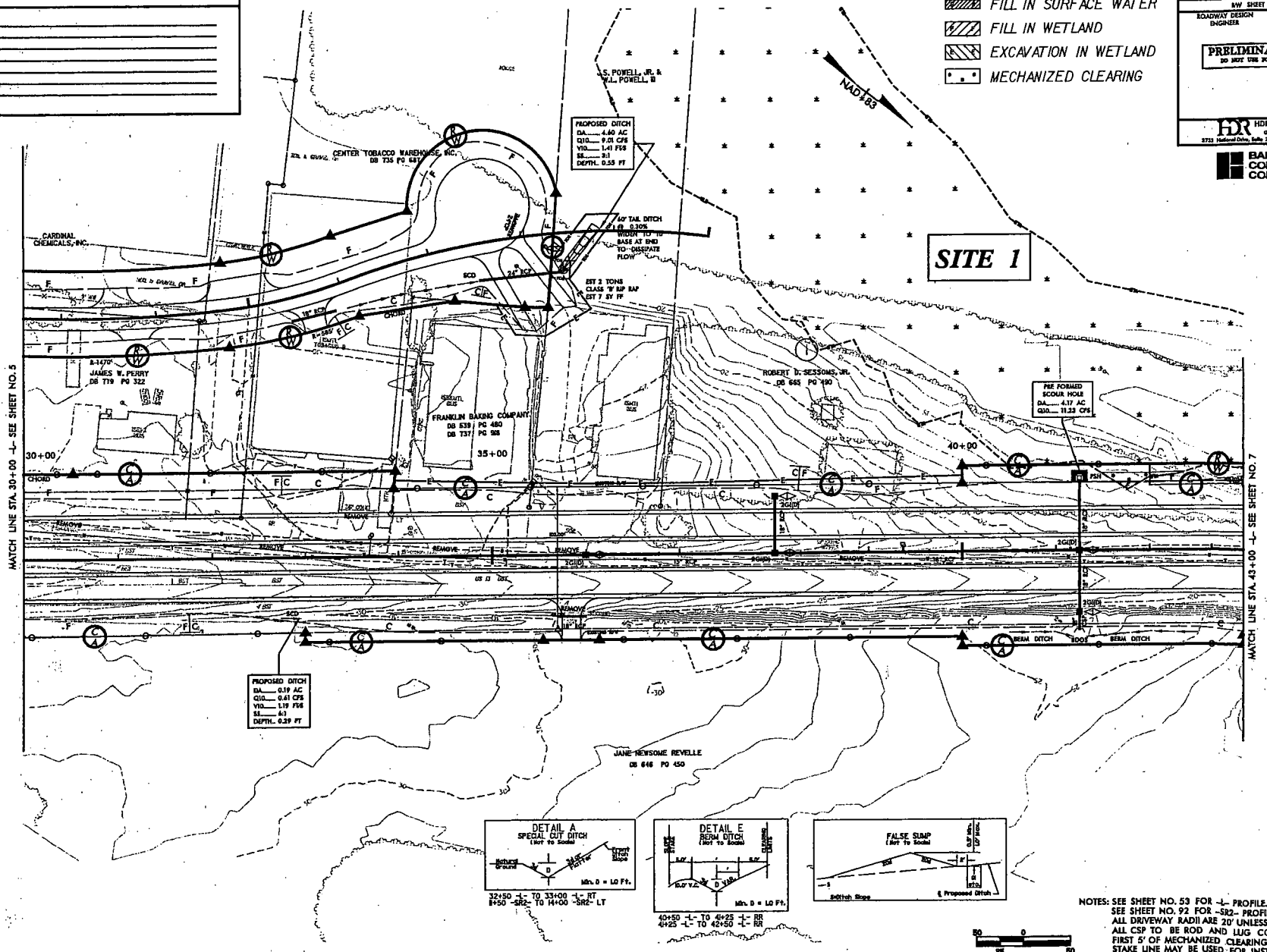
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING



NOTES: SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 92 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 20' UNLESS OTHERWISE NOTED.
ALL CSP TO BE ROD AND LUG CONNECTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

50 0 25 50

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
5733 Harrison Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

SURFACE WATER IMPACTS
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83

SITE 1

(1)

ROBERT D. SESSOMS, JR.
DB 665 PG 490

PROPOSED DITCH
DA..... 0.31 AC
Q10..... 0.60 CFS
V10..... 0.74 FPS
SS..... 4:1
DEPTH.. 0.37 FT

JURISDICTIONAL STREAM INTERMITTENT, UNIMPORTANT

EST 3 TONS CLASS "B" RIP RAP EST 30 SY FF

45+00

50+00

55+00

SHIRLEY G. BROWN
70-E-54 BILL

MATCH LINE STA. 43+00 -L- SEE SHEET NO. 6

MATCH LINE STA. 56+00 -L- SEE SHEET NO. 8

LATERAL DITCH

EXTEND & EXTEND ENDWALL VERTICALLY

PRE FORMED SCOUR HOLE
DA..... 0.86 AC
Q10..... 1.90 CFS

PROPOSED DITCH
DA..... 0.56 AC
Q10..... 1.06 CFS
V10..... 1.18 FPS
SS..... 4:1
DEPTH.. 0.39 FT

JANE NEWSOME REVELLE
DB 646 PG 450

JURISDICTIONAL STREAM PERENNIAL

PROPOSED DITCH
DA..... 0.38 AC
Q10..... 1.21 CFS
V10..... 5.40 FPS
SS..... 3:1
DEPTH.. 0.27 FT

PROPOSED DITCH
DA..... 0.38 AC
Q10..... 1.21 CFS
V10..... 2.31 FPS
SS..... 4:1
DEPTH.. 0.36 FT

LAT V DITCH

EST 11 TONS CLASS "B" RIP RAP EST. 24 SY FF

JURISDICTIONAL STREAM INTERMITTENT, UNIMPORTANT

JURISDICTIONAL STREAM PERENNIAL

PROPOSED DITCH
DA..... 0.94 AC
Q10..... 2.21 CFS
V10..... 2.85 FPS
SS..... 3:1
DEPTH.. 0.54 FT

PROPOSED DITCH
DA..... 0.94 AC
Q10..... 2.21 CFS
V10..... 5.74 FPS
SS..... 3:1
DEPTH.. 0.38 FT

JANE NEWSOME REVELLE
DB 646 PG 450

JURISDICTIONAL STREAM PERENNIAL

PREFORMED SCOUR HOLE

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground — D — 34.0' Platform — Front Ditch Slope

Min. D = 1.0 Ft.

43+00 -L- TO 44+00 -L- RT

FALSE SUMP
(Not to Scale)

Min. D = 1.0 Ft.

2:1 Ditch Slope

E Proposed Ditch

DETAIL L
SPECIAL DITCH GRADE
(Not to Scale)

Front Ditch Slope — 34.0' Platform — D — 34.0' Platform — Front Ditch Slope

Min. D = 1.0 Ft.

44+50 -L- TO 45+00 -L- MEDIAN
45+00 -L- TO 45+50 -L- MEDIAN

DETAIL F
LATERAL "V" DITCH
(Not to Scale)

Natural Ground — D — 34.0' — b — 2:1 Slope — F/Ft. — Fill or Fdr'ts

Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
b = 8.0 Ft.

Type of Liner = CLASS "B" RIP RAP

44+00 -L- TO 44+35 -L- RT
50+70 -L- TO 51+00 -L- RT

DETAIL B
LATERAL "V" DITCH
(Not to Scale)

Natural Ground — D — 34.0' — b — 2:1 Slope — F/Ft.

Min. D = 1.0 Ft.
b = 8.0 Ft.

51+00 -L- TO 52+50 -L- RT

50 0 25 50

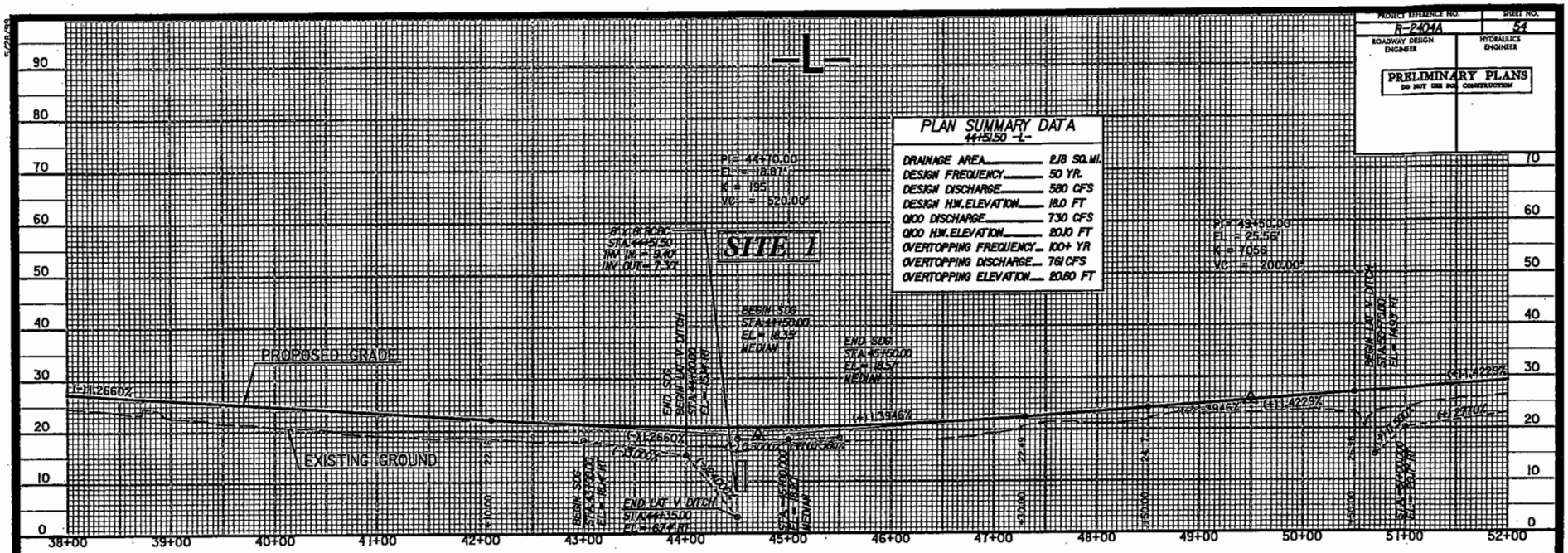
NOTES: SEE SHEET NO. 54 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 20' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

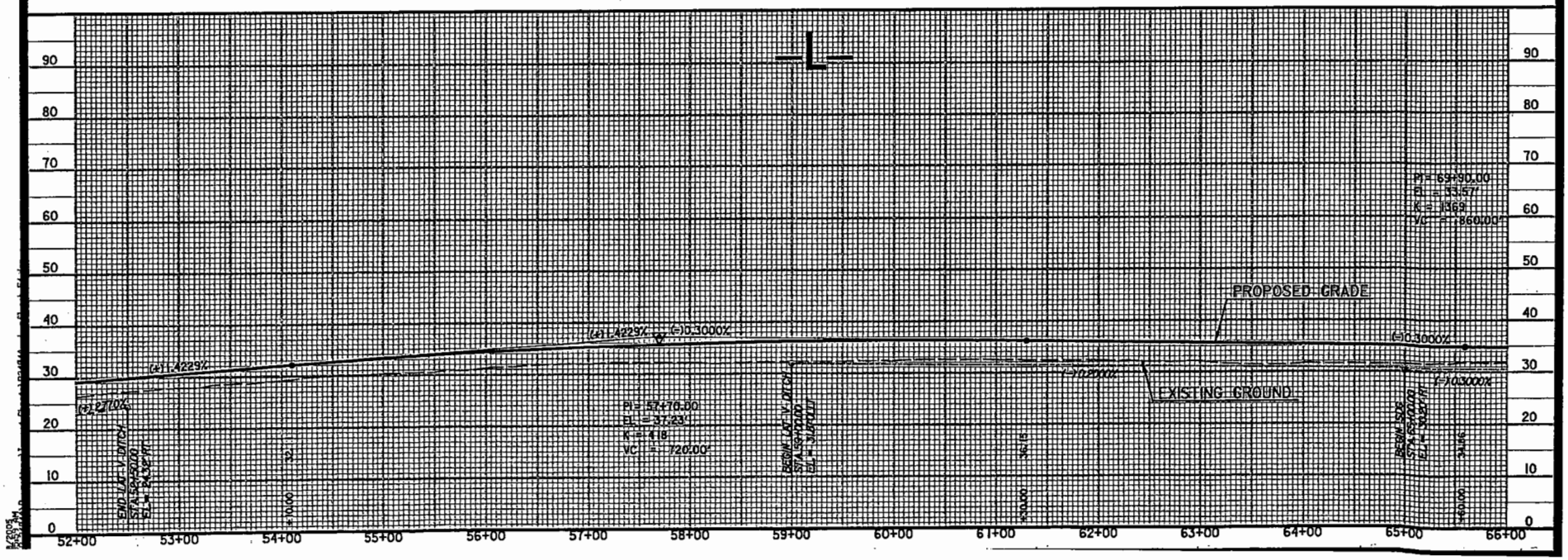
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PLAN SUMMARY DATA
44+15.50 -L-

DRAINAGE AREA	2.18 SQ.MI.
DESIGN FREQUENCY	50 YR.
DESIGN DISCHARGE	580 CFS
DESIGN H.W. ELEVATION	18.0 FT
Q100 DISCHARGE	730 CFS
Q100 H.W. ELEVATION	20.10 FT
OVERTOPPING FREQUENCY	100+ YR
OVERTOPPING DISCHARGE	761 CFS
OVERTOPPING ELEVATION	20.60 FT



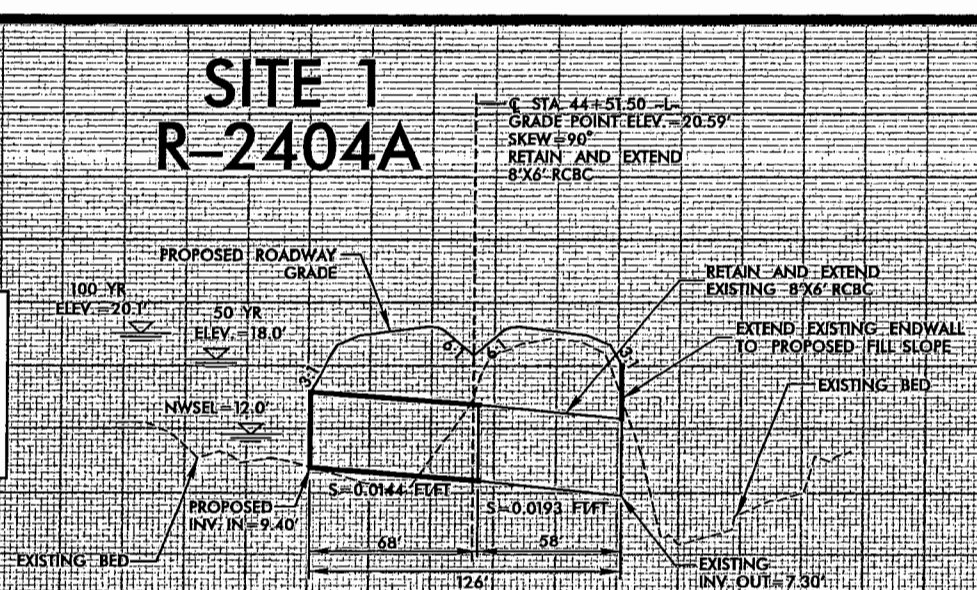


PROJECT REFERENCE NO.	SHEET NO.
R-2404A	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

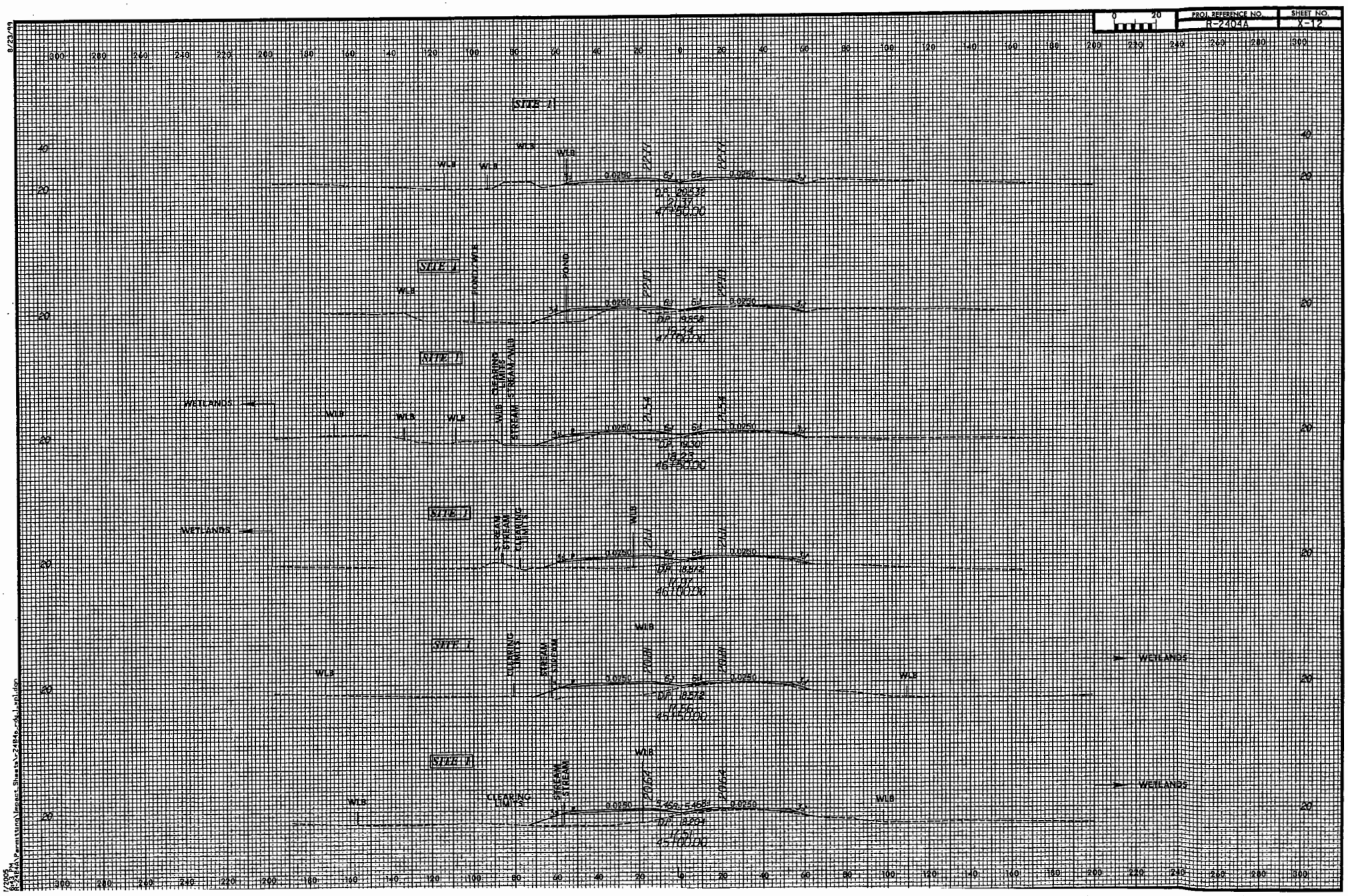
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 1
R-2404A

CUVERT HYDRAULIC DATA STA. 44+51.50 -L-	
DRAINAGE AREA	2.18 SQ. MI.
DESIGN DISCHARGE	580 CFS
DESIGN FREQUENCY	50 YR
DESIGN HIGH WATER ELEV.	18.0 FT
BASE DISCHARGE	730 CFS
BASE HIGH WATER ELEV.	20.1 FT
OVERTOPPING FREQUENCY	100 YR +
OVERTOPPING DISCHARGE	761 CFS
OVERTOPPING ELEV.	20.6 FT



PROFILE ALONG ℄ OF CULVERT


PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-12
SITE 1
WLB
0.0250
D.P. 20.532
21.37
47+50.00
POND/WLB
POND
D.P. 19.858
19.34
47+00.00
CLEARING LIMITS
STREAM/WLB
WETLANDS
D.P. 19.301
18.23
46+50.00
STREAM
CLEARING LIMITS
D.P. 18.912
17.97
46+00.00
D.P. 18.572
17.86
45+50.00
D.P. 18.204
17.51
45+00.00
8/23/99
1/2005
R-2404A\Permitting\Impact Sheets\r-2404a_rdy1.xpl.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	10
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83

MATCH LINE STA. 78+00 -L- SEE SHEET NO. 9

MATCH LINE STA. 91+00 -L- SEE SHEET NO. 11

JANE NEWSOME REVELLE
DB 646 PG 450
MB-3 PG 17

JURISDICTIONAL STREAM INTERMITTENT

CHARLES H. JACKSON
DB 688 PG 606

JUDIE E. BOWEN, JR.
DB 635 PG 779

FERGUSON DIALYSIS, LLC
DB 749 PG 629

FRANCESCO MINED
DB 761 PG 117
MB-2 PG 94

BELLY JOSEPH CLOUGH
DB 759 PG 434
MB-4 PG 33

BERTIE CO. FARM BUREAU
DB 56 PG 409
MB-4 PG 4

CAROLINA PINE & HARDWOOD INC.
DB 779 PG 656

EST 5 TONS CLASS 'B' RIP RAP
EST 14 SY FF

EST 5 TONS CLASS 'B' RIP RAP
EST 10 SY FF

EST 11 TONS CLASS 'B' RIP RAP
EST 28 SY FF

REMOVE 9" OF 18" RCP

REMOVE 15" OF 15" RCP

COLLAR & EXTEND 48" RCP

4' LATERAL BASE DITCH

PROPOSED DITCH
DA..... 1.68 AC
Q10..... 3.62 CFS
V10..... 2.34 FPS
SS..... 3:1
DEPTH.. 0.73 FT

PROPOSED DITCH
DA..... 1.60 AC
Q10..... 3.08 CFS
V10..... 2.43 FPS
SS..... 3:1
DEPTH.. 0.65 FT

PROPOSED DITCH
DA..... 0.37 AC
Q10..... 0.46 CFS
V10..... 0.70 FPS
SS..... 4:1
DEPTH.. 0.33 FT

PROPOSED DITCH
DA..... 0.62 AC
Q10..... 2.30 CFS
V10..... 1.73 FPS
SS..... 3:1
DEPTH.. 0.65 FT

PROPOSED DITCH
DA..... 0.62 AC
Q10..... 2.30 CFS
V10..... 1.73 FPS
SS..... 3:1
DEPTH.. 0.81 FT

PROPOSED DITCH
DA..... 0.16 AC
Q10..... 0.39 CFS
V10..... 0.62 FPS
SS..... 4:1
DEPTH.. 0.28 FT

PROPOSED DITCH
DA..... 0.15 AC
Q10..... 0.29 CFS
V10..... 0.62 FPS
SS..... 4:1
DEPTH.. 0.28 FT

PROPOSED DITCH
DA..... 0.04 AC
Q10..... 0.08 CFS
V10..... 0.67 FPS
SS..... 4:1
DEPTH.. 0.14 FT

PROPOSED DITCH
DA..... 0.37 AC
Q10..... 0.33 CFS
V10..... 0.87 FPS
SS..... 4:1
DEPTH.. 0.22 FT

80+00

85+00

90+00

CHORD

JANE NEWSOME REVELLE
DB 646 PG 450
MB-3 PG 17

SITE 2

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)

Min. D = 1.0 Ft.

78+00 -L- TO 79+00 -L- RT
79+00 -L- TO 80+50 -L- RT
80+50 -L- TO 84+00 -L- RT
84+00 -L- TO 84+69 -L- RT

DETAIL G
LATERAL BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
B = 4 Ft.
b = 8.0 Ft.

85+55 -L- TO 87+45 -L- RT

FALSE SUMP
(Not to Scale)

DETAIL L
SPECIAL DITCH GRADE
(Not to Scale)

Min. D = 1.0 Ft.

84+70 -L- TO 85+34 -L- MEDIAN
85+34 -L- TO 87+20 -L- MEDIAN
87+20 -L- TO 87+67 -L- MEDIAN

50 0 25 50

NOTES: SEE SHEET NO. 55-56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 20' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

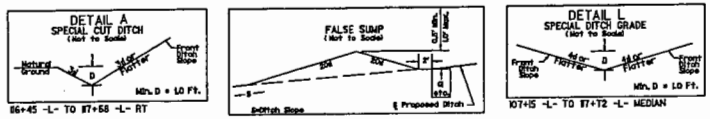
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	12
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

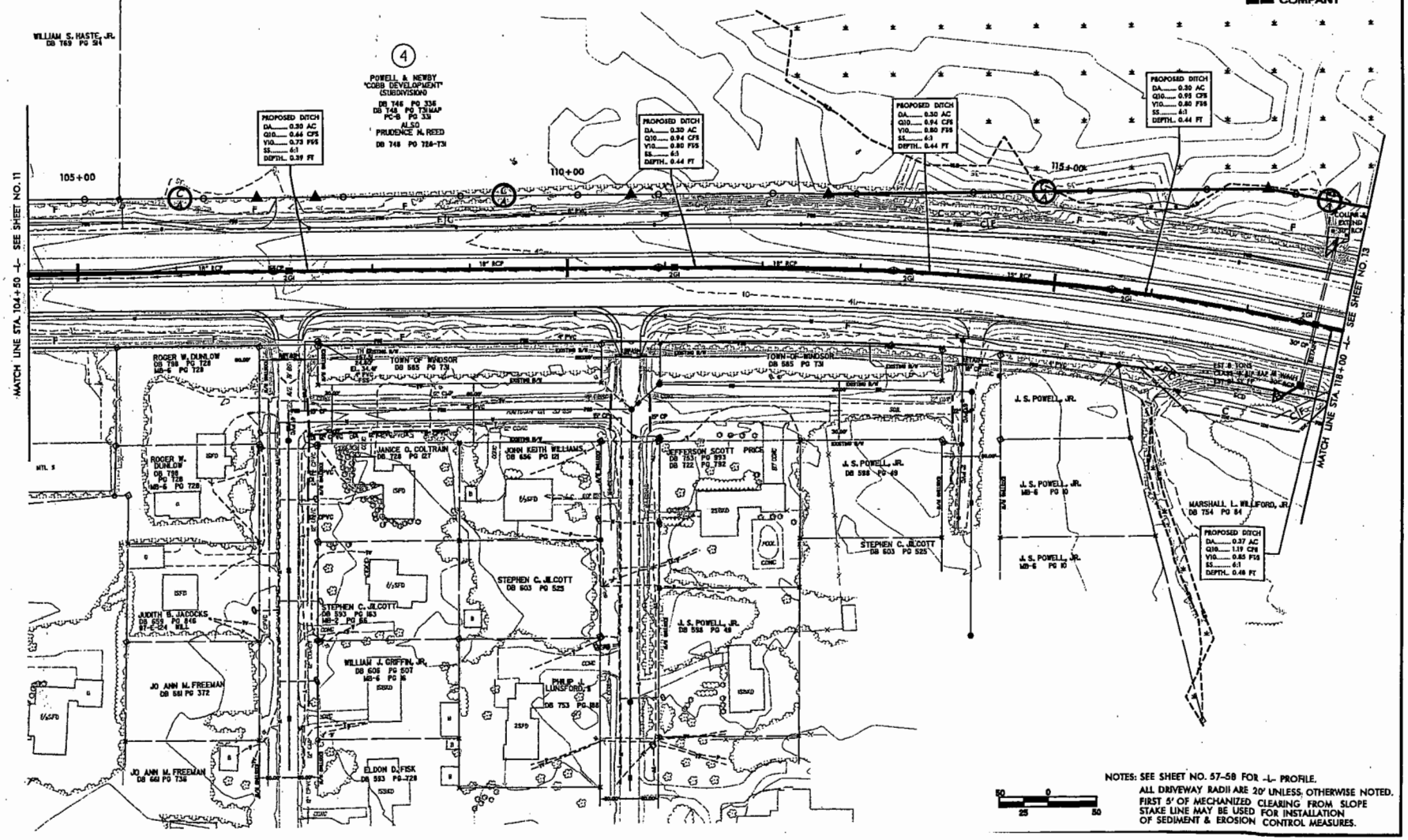
REVISIONS



FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83

SITE 3



NOTES: SEE SHEET NO. 57-58 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 20' UNLESS OTHERWISE NOTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

50 0 25 50

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	13c
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

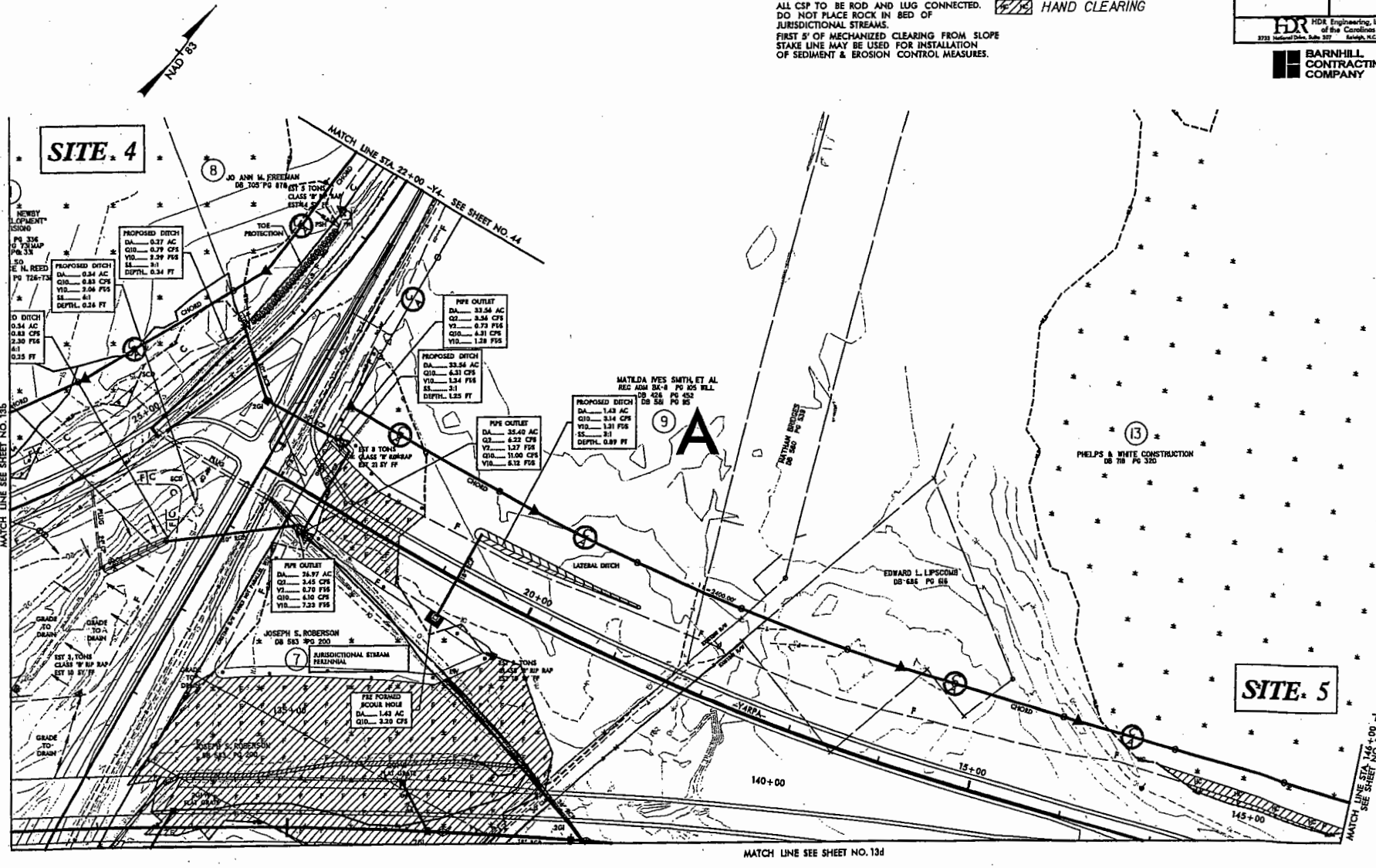
HDR Engineering, Inc. of the Carolinas
2733 National Drive, Suite 207 Raleigh, N.C. 27610

BARNHILL CONTRACTING COMPANY

PAVEMENT TO BE OBLITERATED

NOTES: SEE SHEETS NO. 58-59 FOR -L- PROFILE.
SEE SHEET NO. 76 FOR -Y4- PROFILE.
SEE SHEET NO. 77 FOR -Y4RPA- PROFILE.
SEE SHEET NO. 78 FOR -Y4RPB- PROFILE.
SEE SHEET NO. 79 FOR -Y4RPD- PROFILE.
SEE SHEET NO. 80 FOR -Y4LPD- PROFILE.
SEE SHEET NO. 81 FOR -Y4LPDSPUR- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
HAND CLEARING



PROJECT REFERENCE NO.	SHEET NO.
R-2404A	13b
R/W. SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
2753 National Drive, Suite 207 Raleigh, N.C. 27612

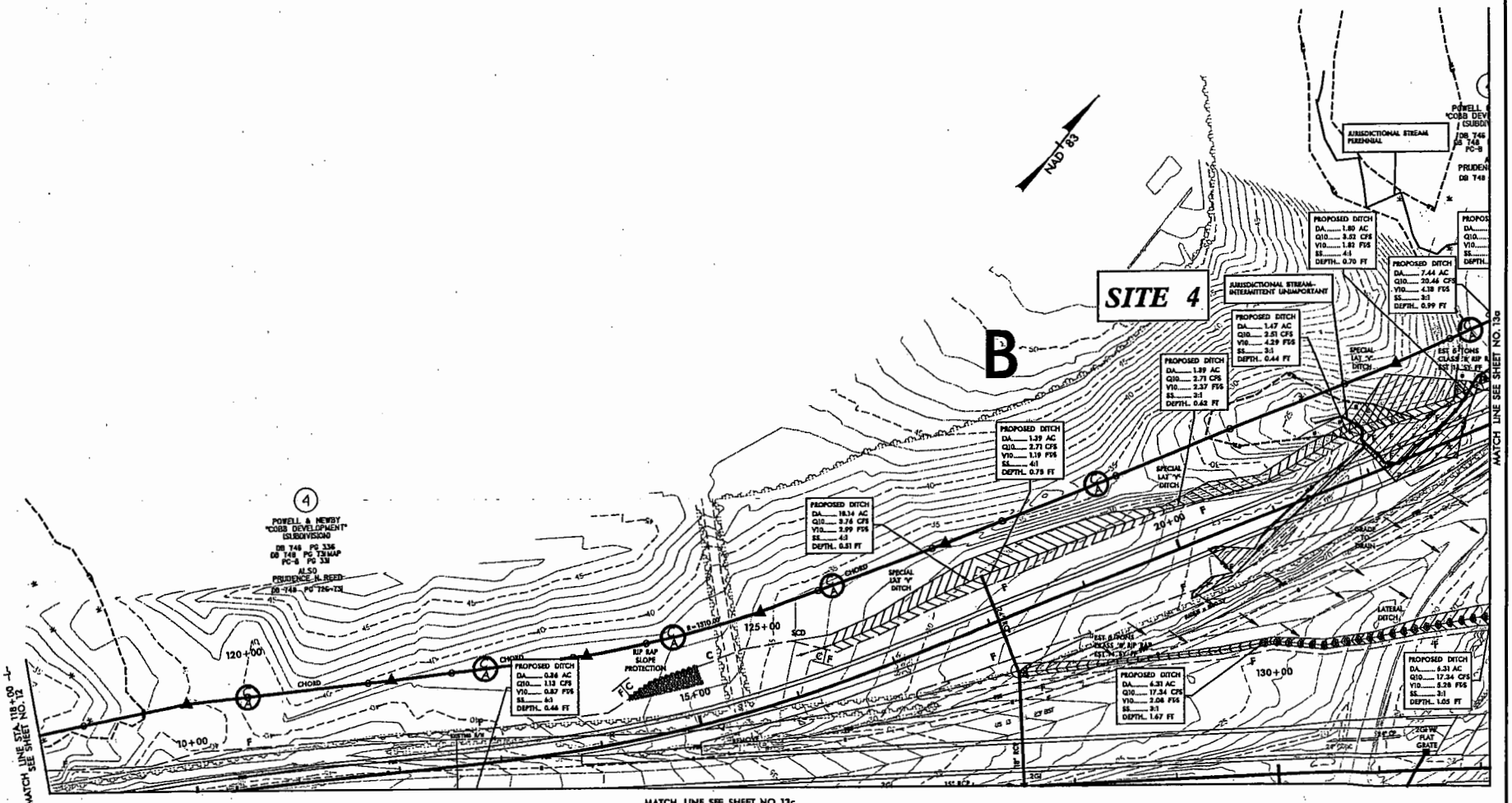
BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

PAVEMENT TO BE OBLITERATED

NOTES: SEE SHEETS NO. 58-59 FOR -L- PROFILE.
SEE SHEET NO. 76 FOR -Y4- PROFILE.
SEE SHEET NO. 77 FOR -Y4RPA- PROFILE.
SEE SHEET NO. 78 FOR -Y4RPB- PROFILE.
SEE SHEET NO. 79 FOR -Y4RPD- PROFILE.
SEE SHEET NO. 80 FOR -Y4LPD- PROFILE.
SEE SHEET NO. 81 FOR -Y4LPDSPUR- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

50 0 25 50



2/2/2005
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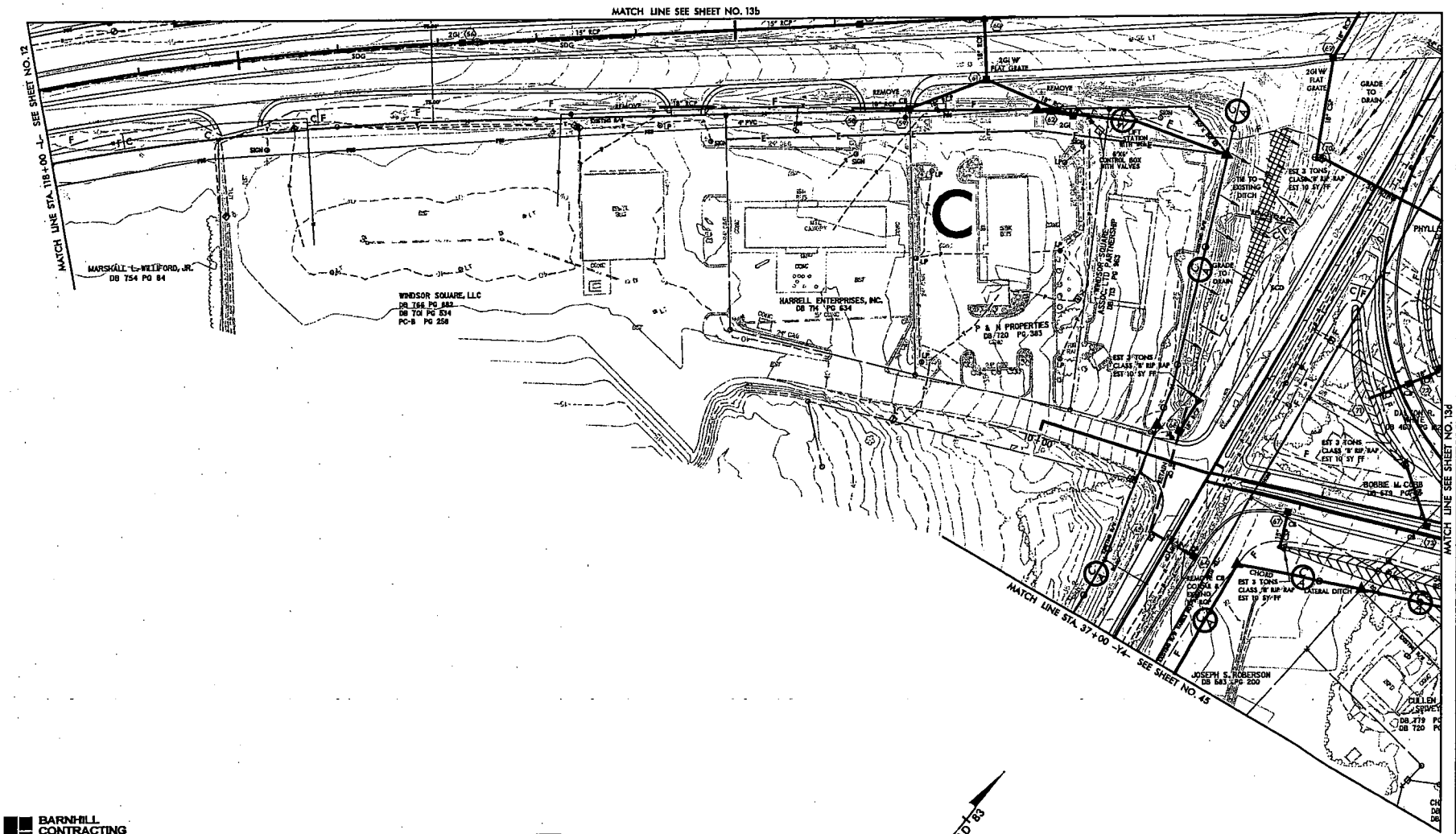


BARNHILL CONTRACTING COMPANY

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	13c
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

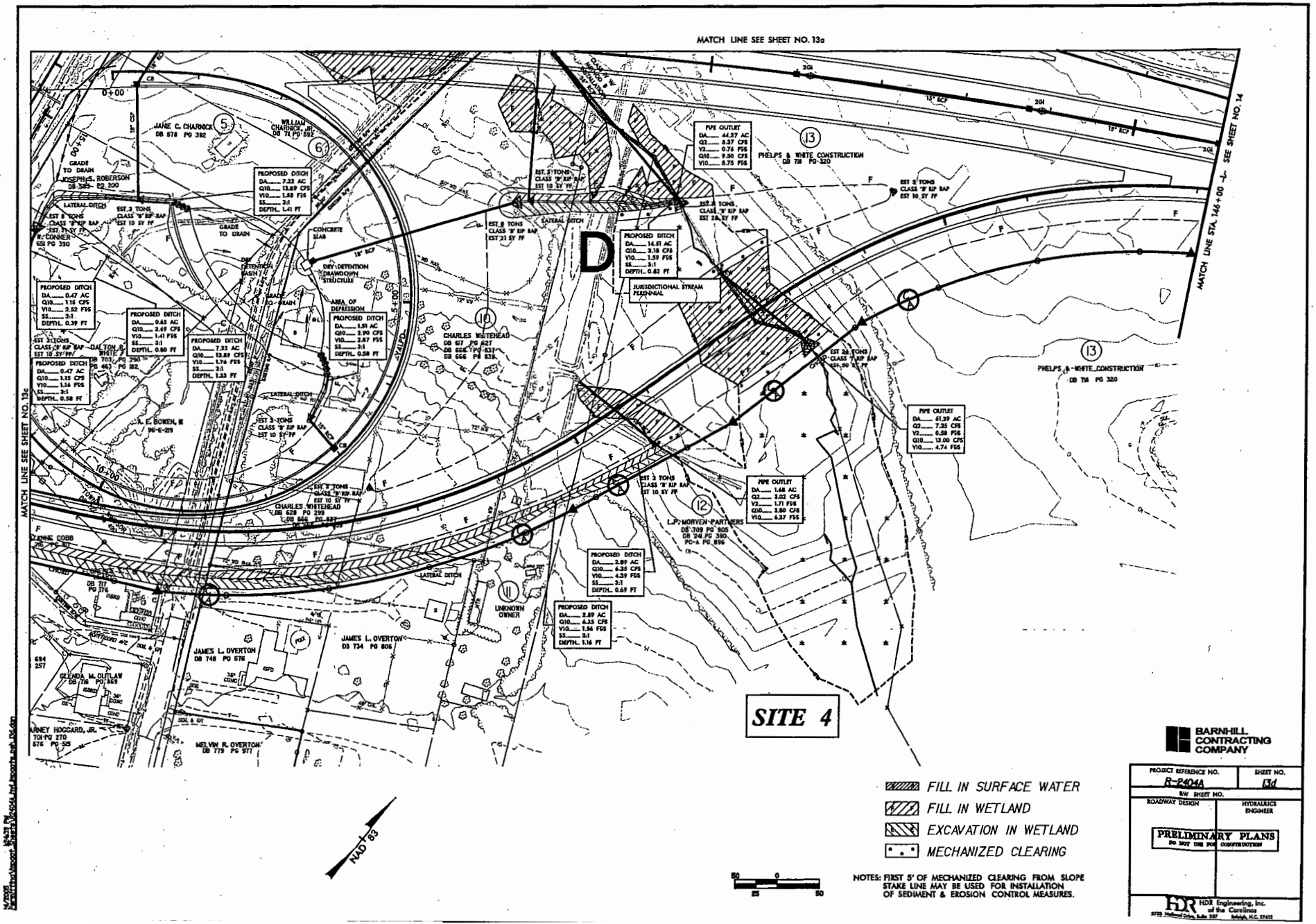
HDR Engineering, Inc. of the Carolinas

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

PAVEMENT TO BE OBLITERATED

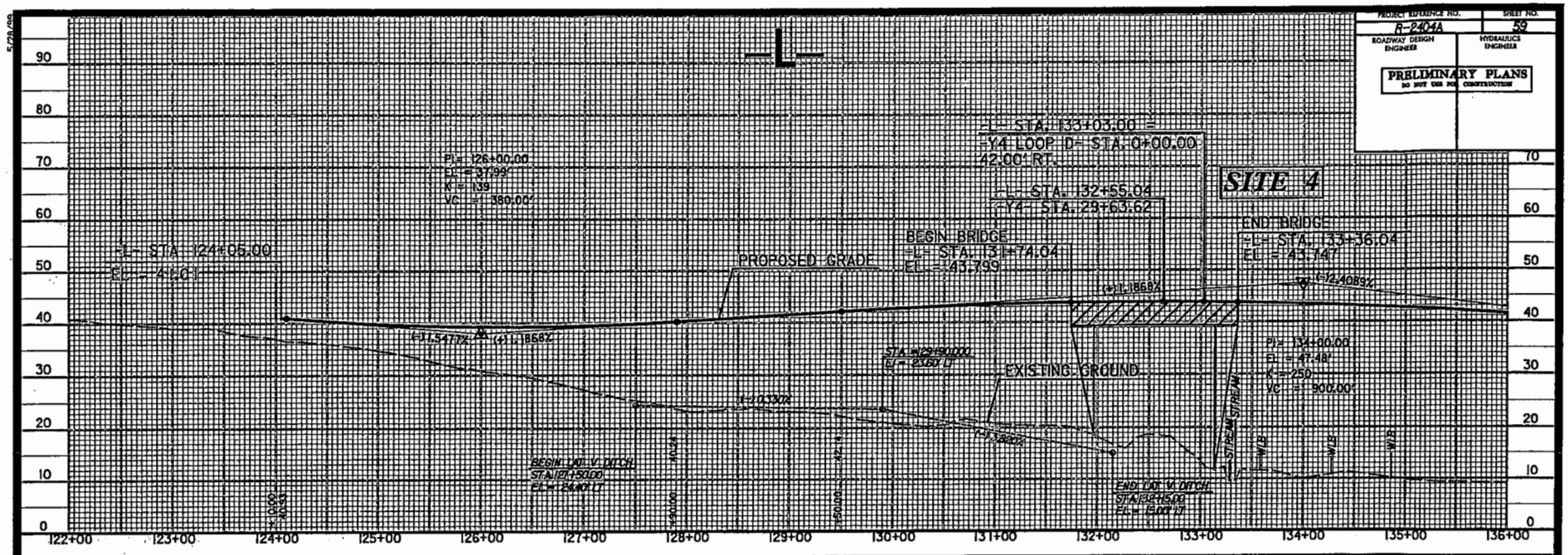
NOTES: SEE SHEETS NO. 58-59 FOR -L- PROFILE.
SEE SHEET NO. 76 FOR -Y4- PROFILE.
SEE SHEET NO. 77 FOR -Y4RPA- PROFILE.
SEE SHEET NO. 78 FOR -Y4RPB- PROFILE.
SEE SHEET NO. 79 FOR -Y4RPD- PROFILE.
SEE SHEET NO. 80 FOR -Y4LPD- PROFILE.
SEE SHEET NO. 81 FOR -Y4LPDSPUR- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

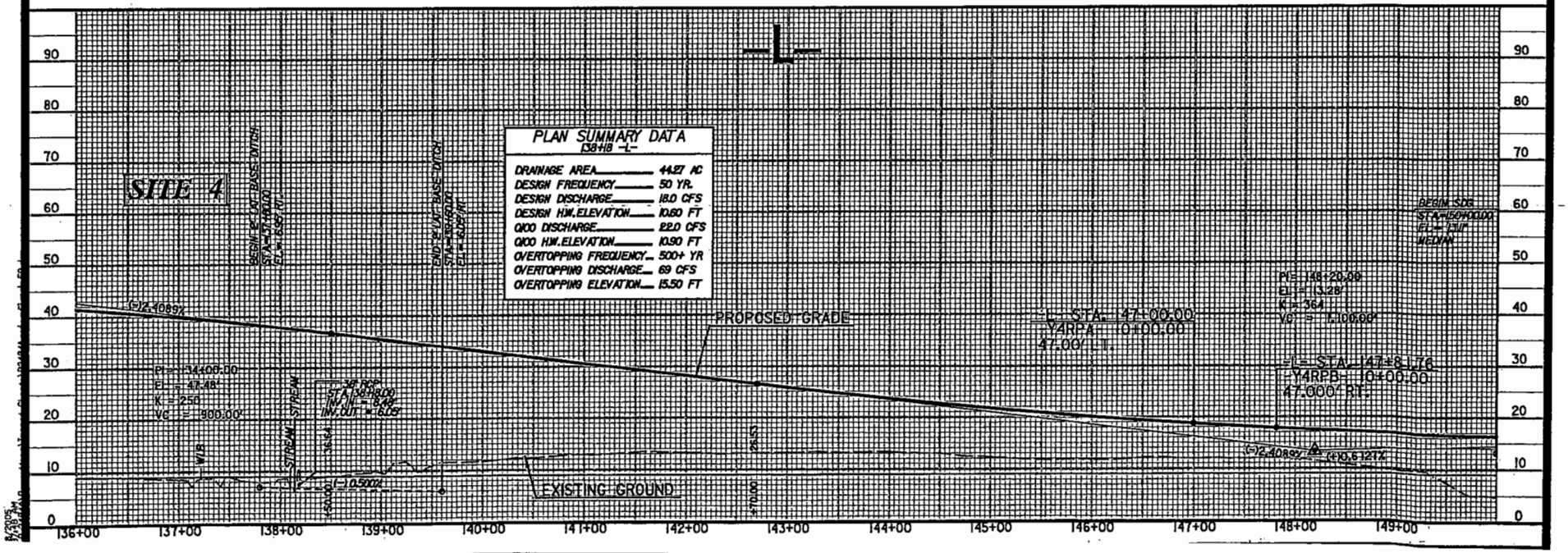
50 0 25 50

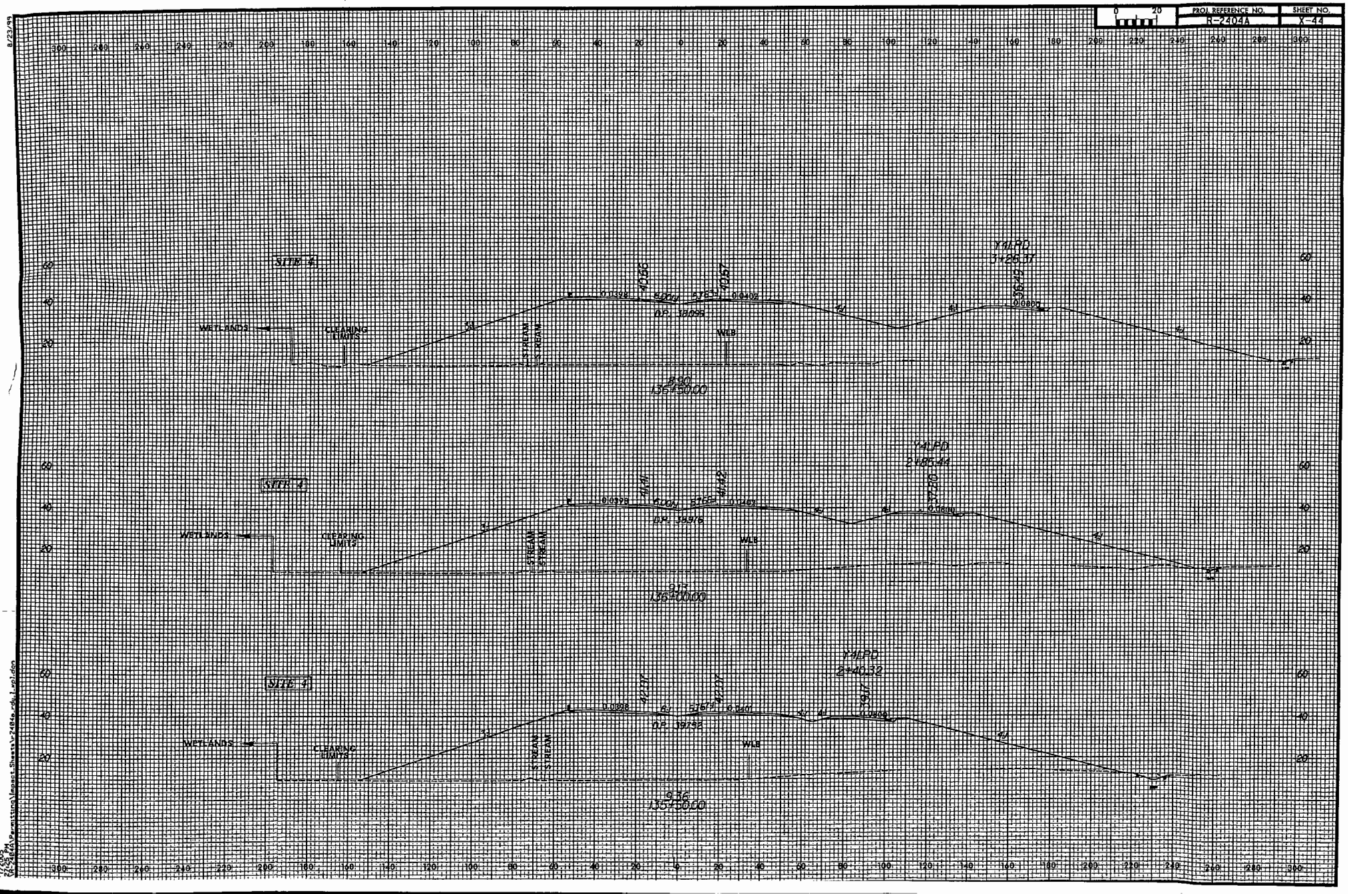

MATCH LINE SEE SHEET NO. 13a
MATCH LINE SEE SHEET NO. 13c
MATCH LINE STA. 146+00 -L- SEE SHEET NO. 14
JANE C. CHARNICK DB 578 PG 392
WILLIAM CHARNICK, JR. DB 71 PG 592
JOSEPH S. ROBERSON DB 583 PG 200
PROPOSED DITCH DA 7.22 AC Q10 13.89 CFS V10 1.58 FPS SS 3:1 DEPTH 1.41 FT
PROPOSED DITCH DA 0.47 AC Q10 1.15 CFS V10 2.52 FPS SS 3:1 DEPTH 0.39 FT
PROPOSED DITCH DA 0.65 AC Q10 2.69 CFS V10 1.41 FPS SS 3:1 DEPTH 0.80 FT
PROPOSED DITCH DA 7.22 AC Q10 13.89 CFS V10 1.76 FPS SS 3:1 DEPTH 1.33 FT
PROPOSED DITCH DA 0.47 AC Q10 1.15 CFS V10 1.16 FPS SS 3:1 DEPTH 0.58 FT
PROPOSED DITCH DA 1.51 AC Q10 2.90 CFS V10 2.87 FPS SS 3:1 DEPTH 0.58 FT
PROPOSED DITCH DA 14.51 AC Q10 3.18 CFS V10 1.59 FPS SS 3:1 DEPTH 0.82 FT
PROPOSED DITCH DA 2.89 AC Q10 6.35 CFS V10 4.39 FPS SS 3:1 DEPTH 0.69 FT
PROPOSED DITCH DA 2.89 AC Q10 6.35 CFS V10 1.56 FPS SS 3:1 DEPTH 1.16 FT
PIPE OUTLET DA 44.27 AC Q2 8.37 CFS V2 0.76 FPS Q10 9.50 CFS V10 8.75 FPS
PIPE OUTLET DA 61.29 AC Q2 7.35 CFS V2 0.58 FPS Q10 13.00 CFS V10 4.74 FPS
PIPE OUTLET DA 1.68 AC Q2 3.02 CFS V2 1.71 FPS Q10 3.80 CFS V10 6.37 FPS
PHELPS & WHITE CONSTRUCTION DB 718 PG 320
JURISDICTIONAL STREAM PERENNIAL
CHARLES WHITEHEAD DB 617 PG 627 DB 666 PG 837 DB 666 PG 839
CHARLES WHITEHEAD DB 628 PG 299 DB 666 PG 837
L.P. MORVEN PARTNERS DB 709 PG 905 DB 241 PG 390 PC-A PG 896
UNKNOWN OWNER
JAMES L. OVERTON DB 734 PG 806
JAMES L. OVERTON DB 748 PG 576
GLENDA M. OUTLAW DB 716 PG 869
MELVIN R. OVERTON DB 779 PG 977
A. E. BOWEN, III 96-E-219
DALTON R. WHITE DB 703 PG 290 DB 463 PG 182
GRADE TO DRAIN
CONCRETE SLAB
DRY DETENTION DRAWDOWN STRUCTURE
AREA OF DEPRESSION
LATERAL DITCH
SITE 4
NAD 83
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
NOTES: FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.
BARNHILL CONTRACTING COMPANY
PROJECT REFERENCE NO. R-2404A
SHEET NO. 13d
R/W SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
HDR Engineering, Inc. of the Carolinas

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	59
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION






PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-44
SITE 4
WETLANDS
CLEARING LIMITS
STREAM
WLB
Y4LPD
3+26.37
8.90
136+50.00
Y4LPD
2+85.44
9.73
136+00.00
Y4LPD
2+40.32
9.36
135+50.00

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	14
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
HAND CLEARING

NAD 83

SITE 7

SITE 6

MATCH LINE STA. 146+00 -L- SEE SHEET NO. 13

MATCH LINE STA. 156+00 -L- SEE SHEET NO. 15

(13) PHELPS & WHITE CONSTRUCTION
DB 718 PG 320

(14) STANLEY L. THOMPSON
DB 737 PG 543
DB 737 PG 539

(15) HARRY L. THOMPSON, ET. AL
DB 741 PG 898
DB 522 PG 335
MB-2 PG 60

L. P. MORVEN PARTNERS
DB 709 PG 905
DB 24 PG 390

EST 3 TONS CLASS "B" RIP RAP
EST 10 SY PR

TOE PROTECTION

PRE FORMED SCOUR HOLE
DA..... 0.68 AC
Q10..... 1.89 CFS

PRE FORMED SCOUR HOLE
DA..... 0.68 AC
Q10..... 1.90 CFS

PROPOSED DITCH
DA..... 0.43 AC
Q10..... 1.34 CFS
V10..... 1.44 FPS
SS..... 6:1
DEPTH.. 0.40 FT

PROPOSED DITCH
DA..... 0.43 AC
Q10..... 0.94 CFS
V10..... 0.83 FPS
SS..... 6:1
DEPTH.. 0.40 FT

CASHIE RIVER

FALSE SUMP
(Not To Scale)

Shallow Slope

℄ Proposed Ditch

PREFORMED SCOUR HOLE

DETAIL L
SPECIAL DITCH GRADE
(Not To Scale)

Min. D = 1.0 Ft.

150+00 -L- TO 151+47 -L- MEDIAN

NOTES: SEE SHEET NO. 59-60 FOR -L- PROFILE
SEE SHEET NO. 77 FOR -Y4RPA- PROFILE.
SEE SHEET NO. 79 FOR -Y4RPD- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

50 0 25 50

V5.7200S
V:\projects\Project_Sites\R2404A_Hydraulics\R2404A_Hydraulics.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	15
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

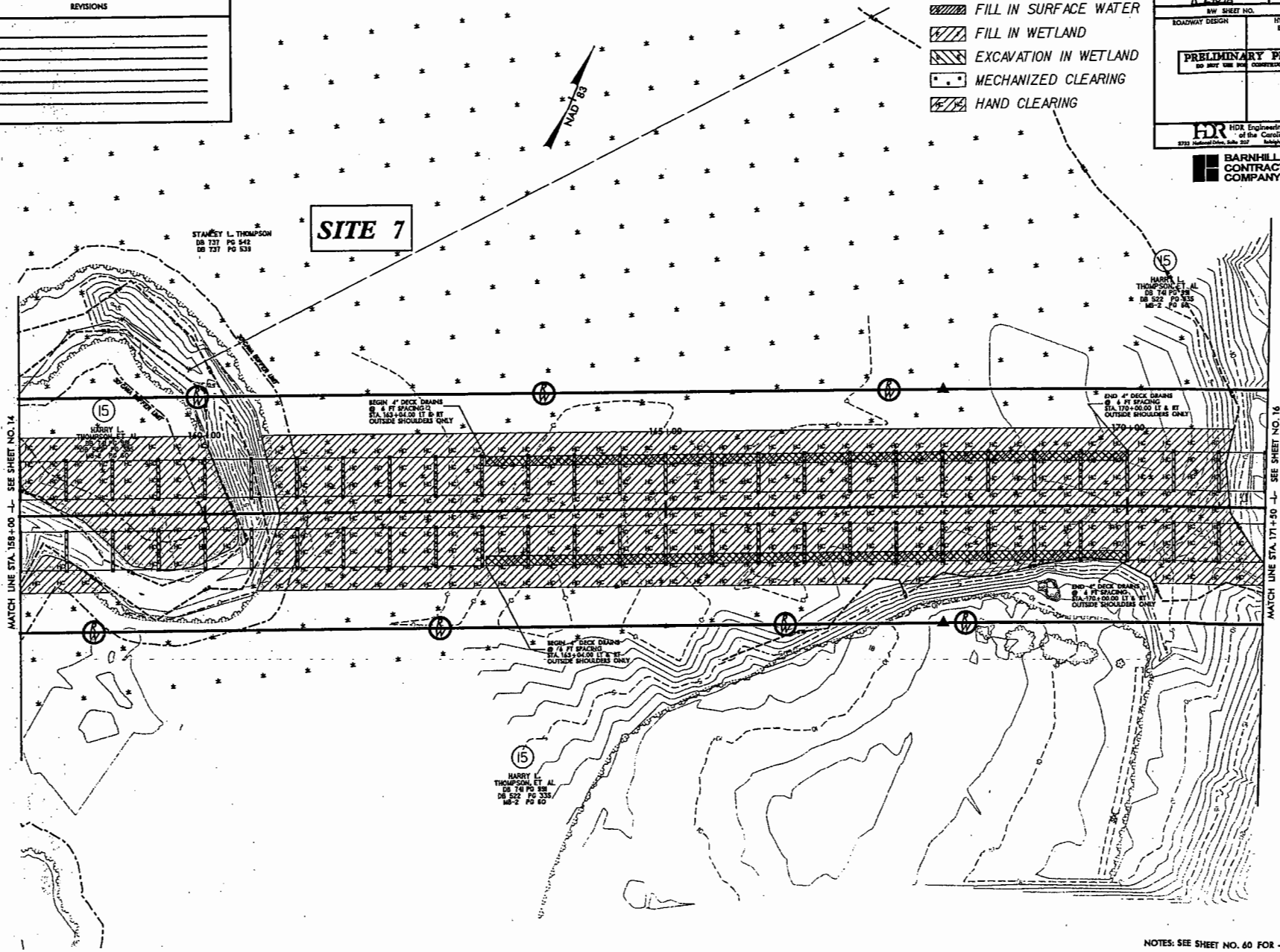
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
5733 National Drive, Suite 202 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

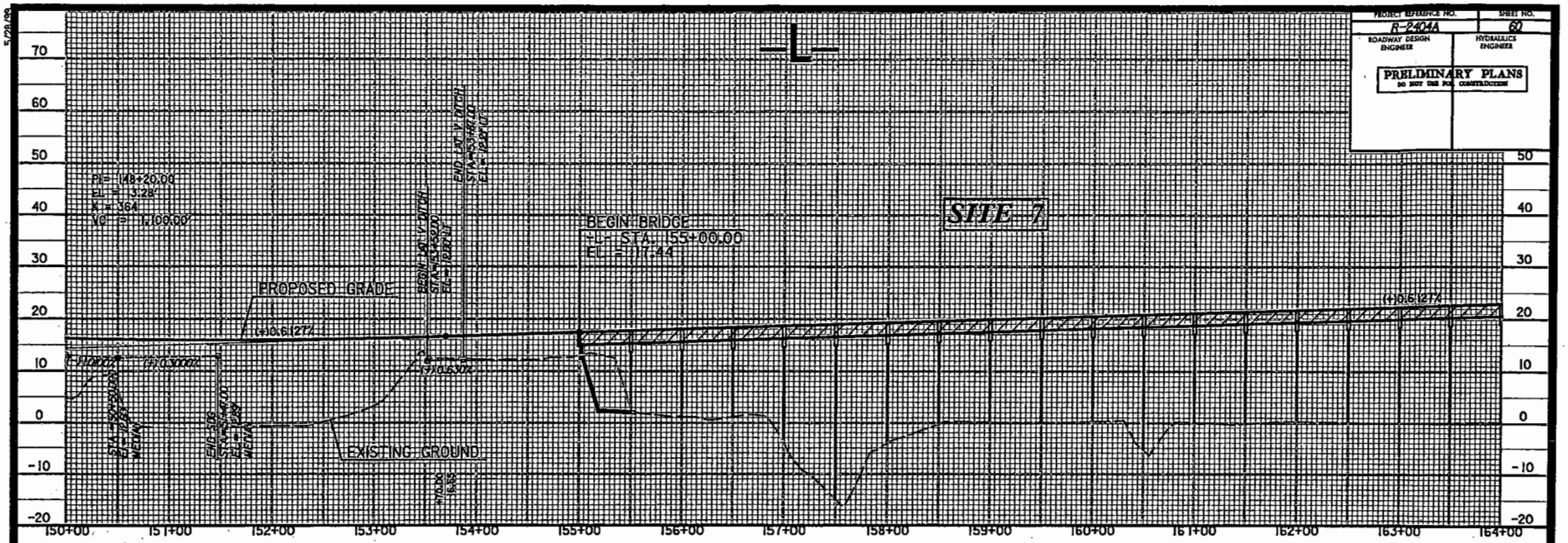
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
HAND CLEARING

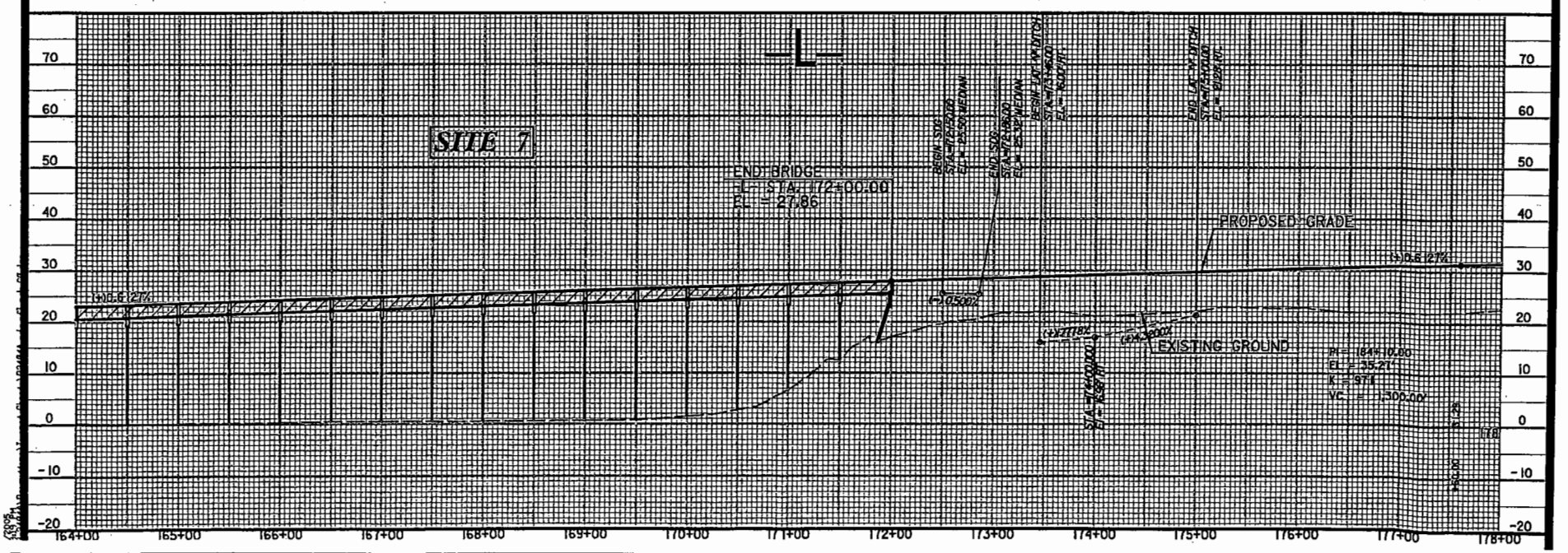


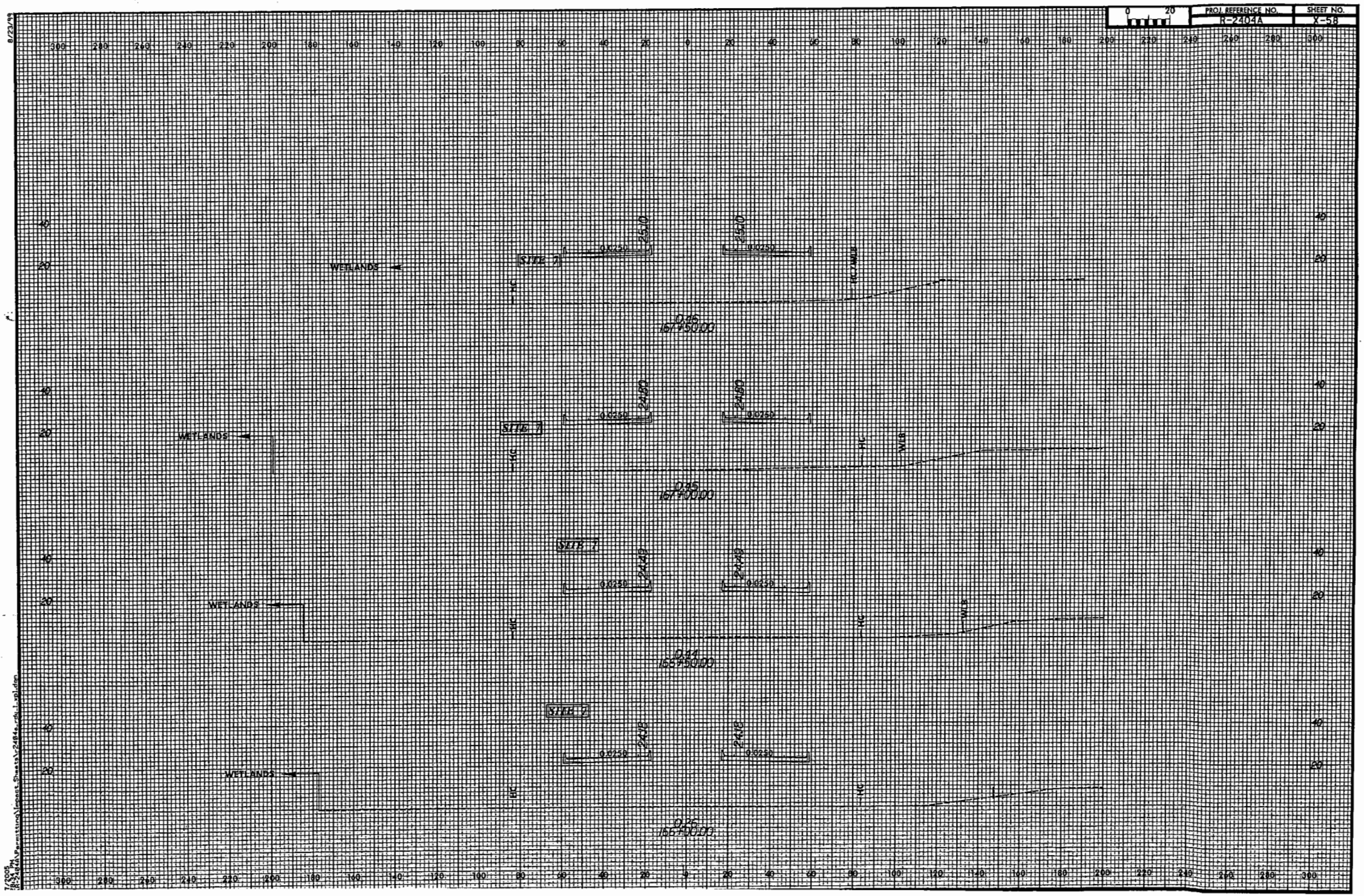
NOTES: SEE SHEET NO. 60 FOR -L- PROFILE.

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	60
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION







PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-58
WETLANDS
SITE 7
0.0250
25.10
24.80
24.49
24.18
HC
WLB
0.46
167+50.00
0.45
167+00.00
0.44
166+50.00
0.26
166+00.00

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	16
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
2732 Meadowview Drive, Suite 207 Raleigh, N.C. 27610

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
HAND CLEARING

NAD 83

SITE 8

MATCH LINE STA. 171+50 -L- SEE SHEET NO. 15

MATCH LINE STA. 184+50 -L- SEE SHEET NO. 17

175+00

180+00

15
HARRY L. THOMPSON, ET AL
DB 741 PG 898
DB 522 PG 335
MB-2 PG 60

PROPOSED DITCH
DA..... 0.05 AC
Q10..... 0.10 CFS
V10..... 0.51 FPS
SS..... 6:1
DEPTH.. 0.18 FT

PRE FORMED SCOUR HOLE
DA..... 0.20 AC
Q10..... 0.99 CFS

2GI W FLAT GRATE

LATERAL 'V' DITCH

EST 3 TONS CLASS 'B' RIP RAP
EST 10 SY FF

PROPOSED DITCH
DA..... 3.15 AC
Q10..... 6.95 CFS
V10..... 2.42 FPS
SS..... 3:1
DEPTH.. 0.94 FT

PROPOSED DITCH
DA..... 3.15 AC
Q10..... 6.95 CFS
V10..... 2.42 FPS
SS..... 3:1
DEPTH.. 0.80 FT

PREFORMED SCOUR HOLE

FALSE SUMP (Not To Scale)

DETAIL L
SPECIAL DITCH GRADE (Not To Scale)
Min. D = 1.0 Ft.
172+50 -L- TO 172+86 -L- MEDIAN

DETAIL B
LATERAL 'V' DITCH (Not To Scale)
Min. D = 1.0 Ft.
b = 5.0 Ft.
173+46 -L- TO 175+00 -L- RT

50 0 25 50

NOTES: SEE SHEET NO. 60-61 FOR -L- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

10/25/07 AM
R2404A_Hydraulics_Layout_Sheets_Site08.dgn

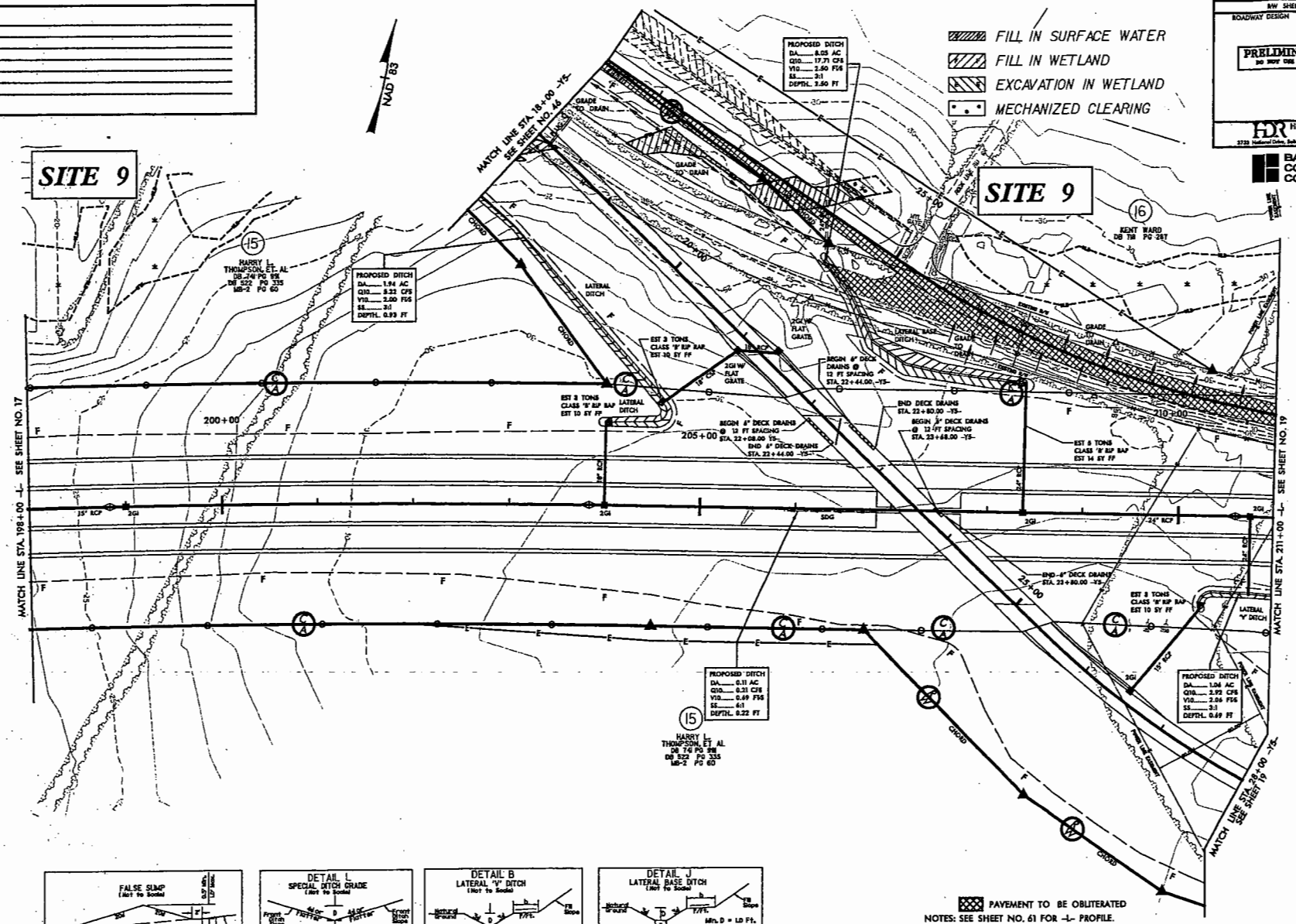
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	18
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
5723 Departure Drive, Suite 207 Raleigh, N.C. 27612

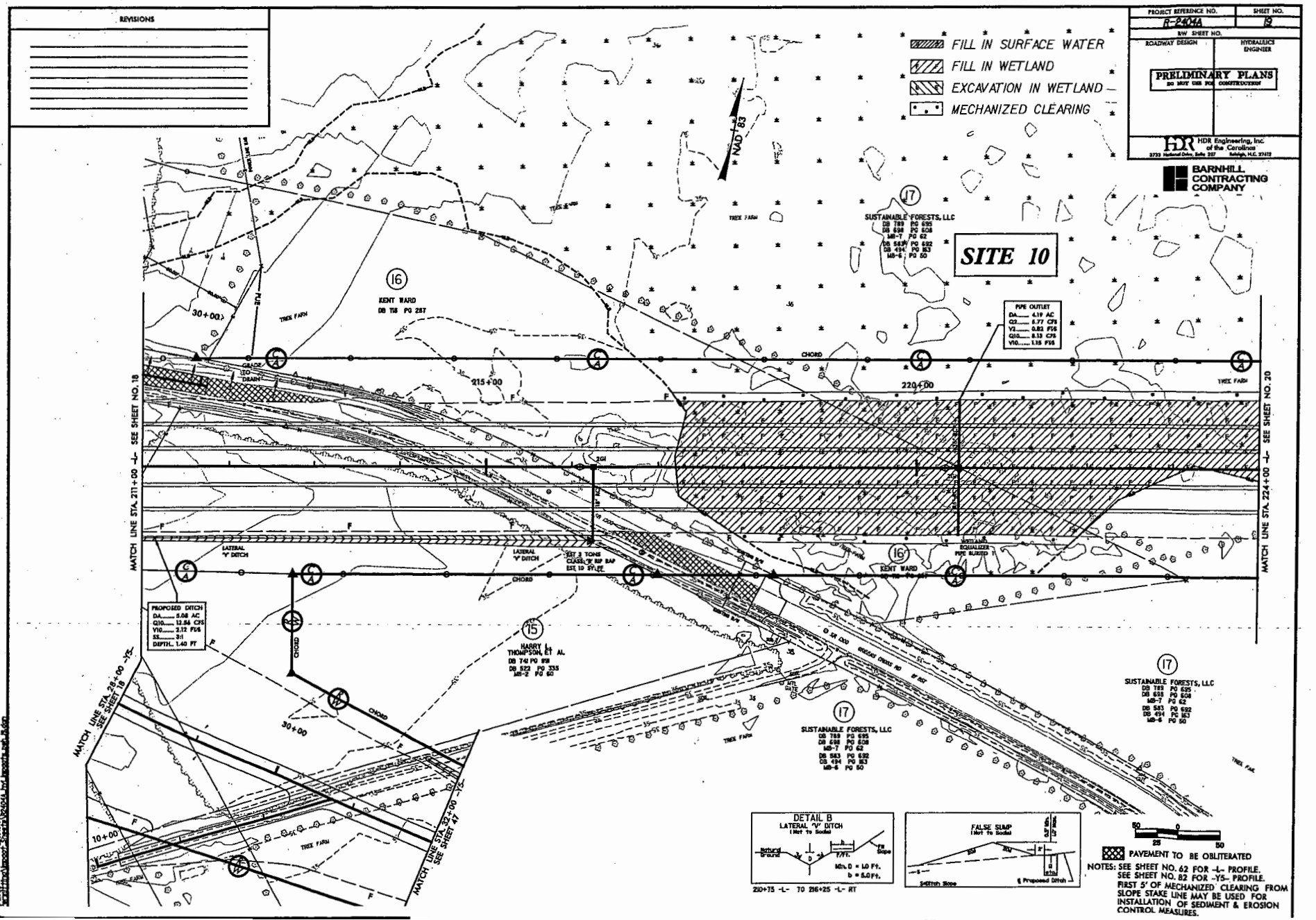
BARNHILL CONTRACTING COMPANY



PAVEMENT TO BE OBLITERATED

NOTES: SEE SHEET NO. 61 FOR -L- PROFILE.
SEE SHEET NO. 82 FOR -Y5- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

2002S
S:\Hydro\Imports\Sheets\R2404A_hyd_imports_sph_B.dgn


REVISIONS
PROJECT REFERENCE NO.
R-2404A
SHEET NO.
19
R/W SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
HDR Engineering, Inc. of the Carolinas
BARNHILL CONTRACTING COMPANY
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
NAD 83
SITE 10
KENT WARD
DB 718 PG 287
SUSTAINABLE FORESTS, LLC
DB 789 PG 695
DB 698 PG 608
MB-7 PG 62
DB 583 PG 692
DB 494 PG 163
MB-6 PG 50
PIPE OUTLET
DA..... 4.19 AC
Q2..... 5.77 CFS
V2..... 0.82 FT/S
Q10..... 8.13 CFS
V10..... 1.15 FT/S
PROPOSED DITCH
DA..... 5.08 AC
Q10..... 12.56 CFS
V10..... 2.12 FT/S
SS..... 3:1
DEPTH.. 1.40 FT
HARRY L. THOMPSON, ET AL
DB 741 PG 918
DB 522 PG 335
MB-2 PG 60
MATCH LINE STA. 211+00 -L- SEE SHEET NO. 18
MATCH LINE STA. 224+00 -L- SEE SHEET NO. 20
MATCH LINE STA. 28+00 -Y5- SEE SHEET 18
MATCH LINE STA. 32+00 -Y5- SEE SHEET 47
30+00
215+00
220+00
10+00
CHORD
TREE FARM
GRADE TO DRAIN
LATERAL 'V' DITCH
EST 3 TONS CLASS 'B' RIP RAP EST 10 SY PE
WETLAND EQUALIZER PIPE BURIED
DETAIL B
LATERAL 'V' DITCH
(Not To Scale)
Natural Ground
Min. D = 1.0 Ft.
b = 5.0 Ft.
210+75 -L- TO 216+25 -L- RT
FALSE SUMP
(Not To Scale)
S=Ditch Slope
℄ Proposed Ditch
PAVEMENT TO BE OBLITERATED
NOTES: SEE SHEET NO. 62 FOR -L- PROFILE.
SEE SHEET NO. 82 FOR -Y5- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

REVISIONS

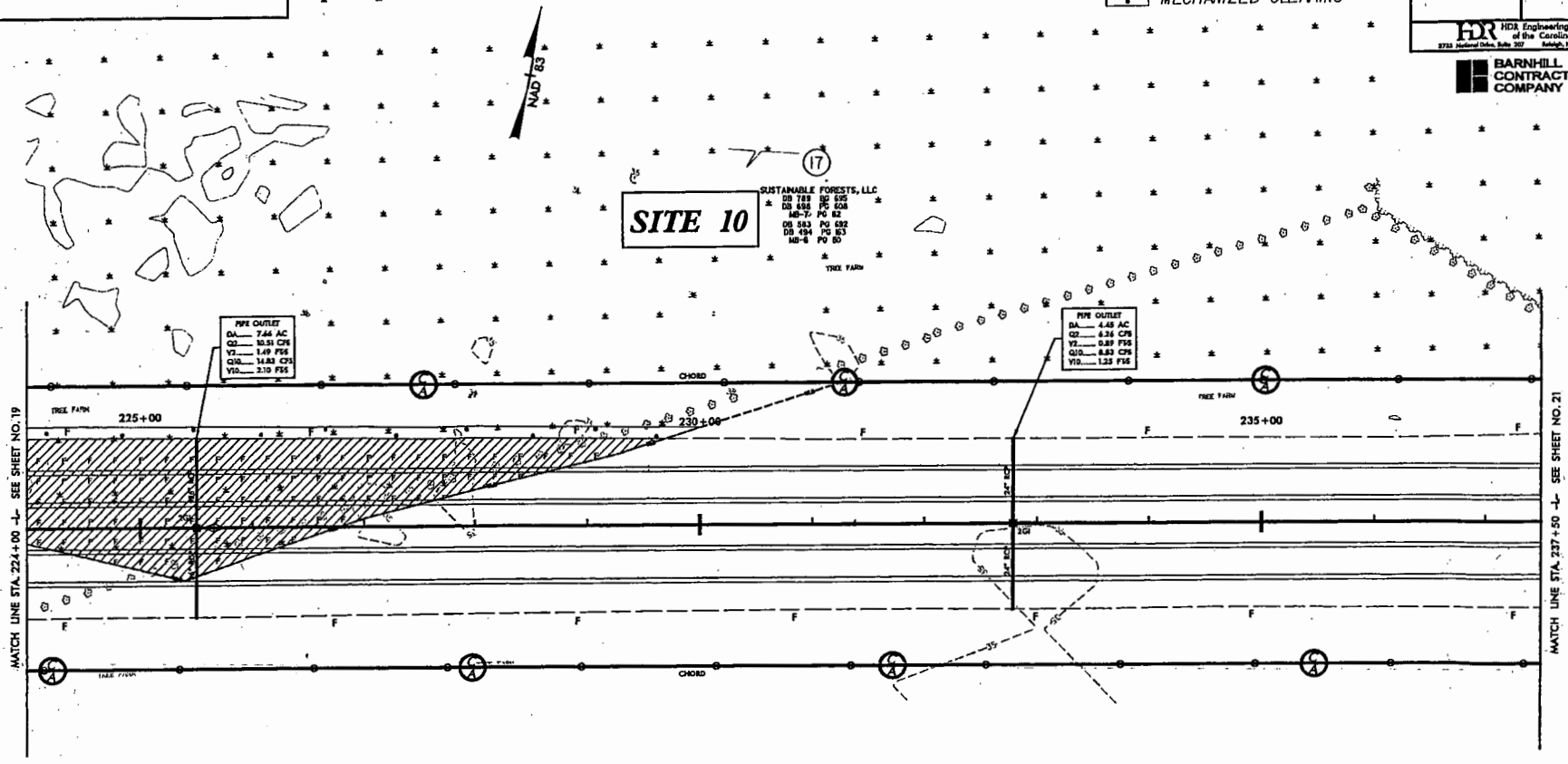
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	20
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

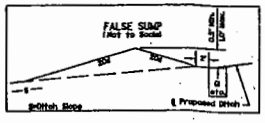
HDR Engineering, Inc. of the Carolinas
2733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING



17
SUSTAINABLE FORESTS, LLC
DB 789 PG 695
DB 698 PG 608
MB-7 PG 82
DB 583 PG 692
DB 494 PG 853
MB-6 PG 50



50 0 25 50

NOTE: FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

NOTES: SEE SHEET NO. 61-62 FOR -L- PROFILE.

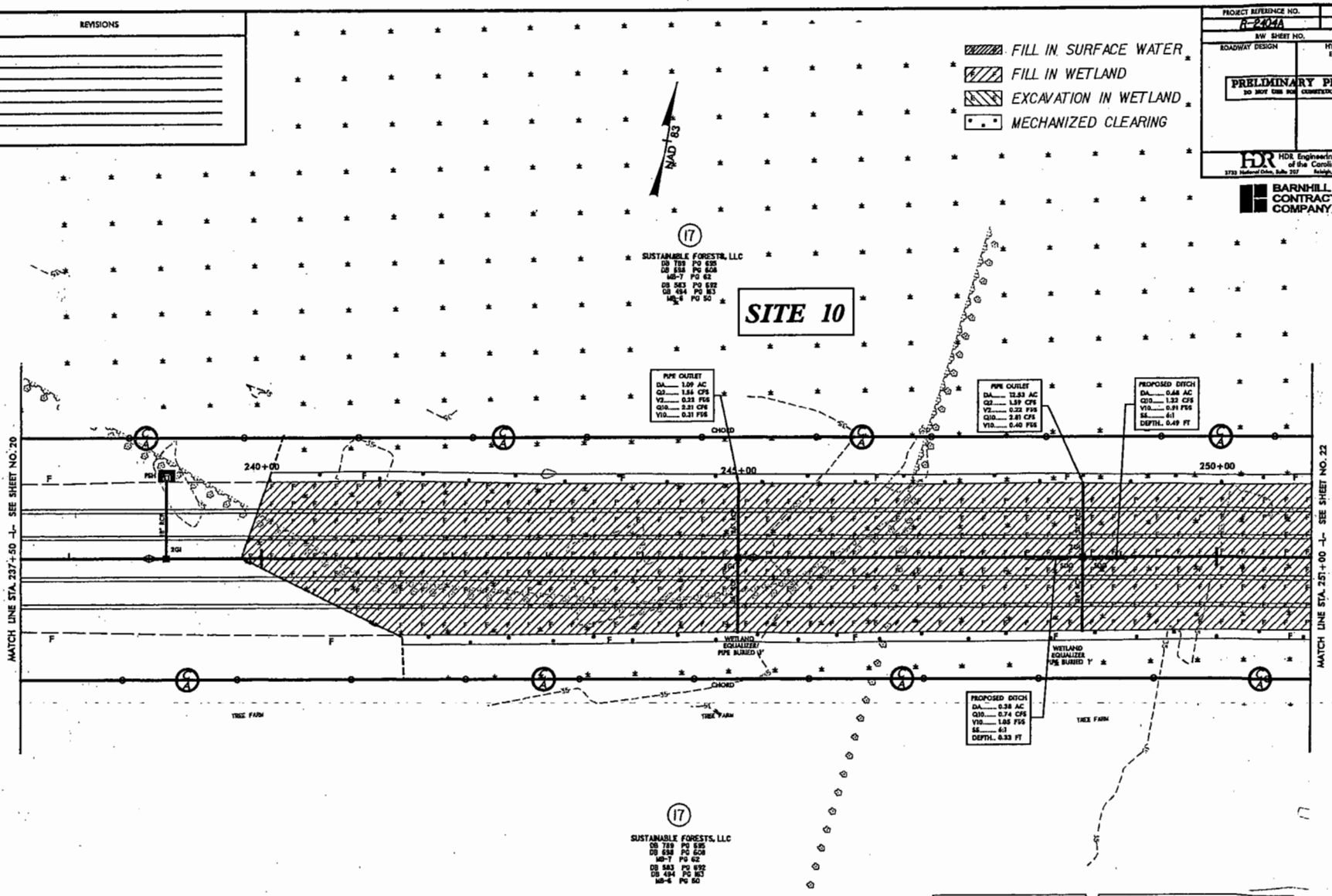
REVISIONS

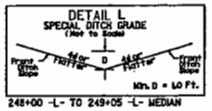
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	21
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

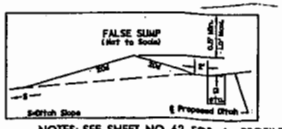
HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY





248+00 -L- TO 249+05 -L- MEDIAN



50 0 25 50

NOTES: SEE SHEET NO. 62 FOR -L- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	22
R/W SHEET NO.	REVISIONS
ROADWAY DESIGN	HYDRAULICS ENGINEER

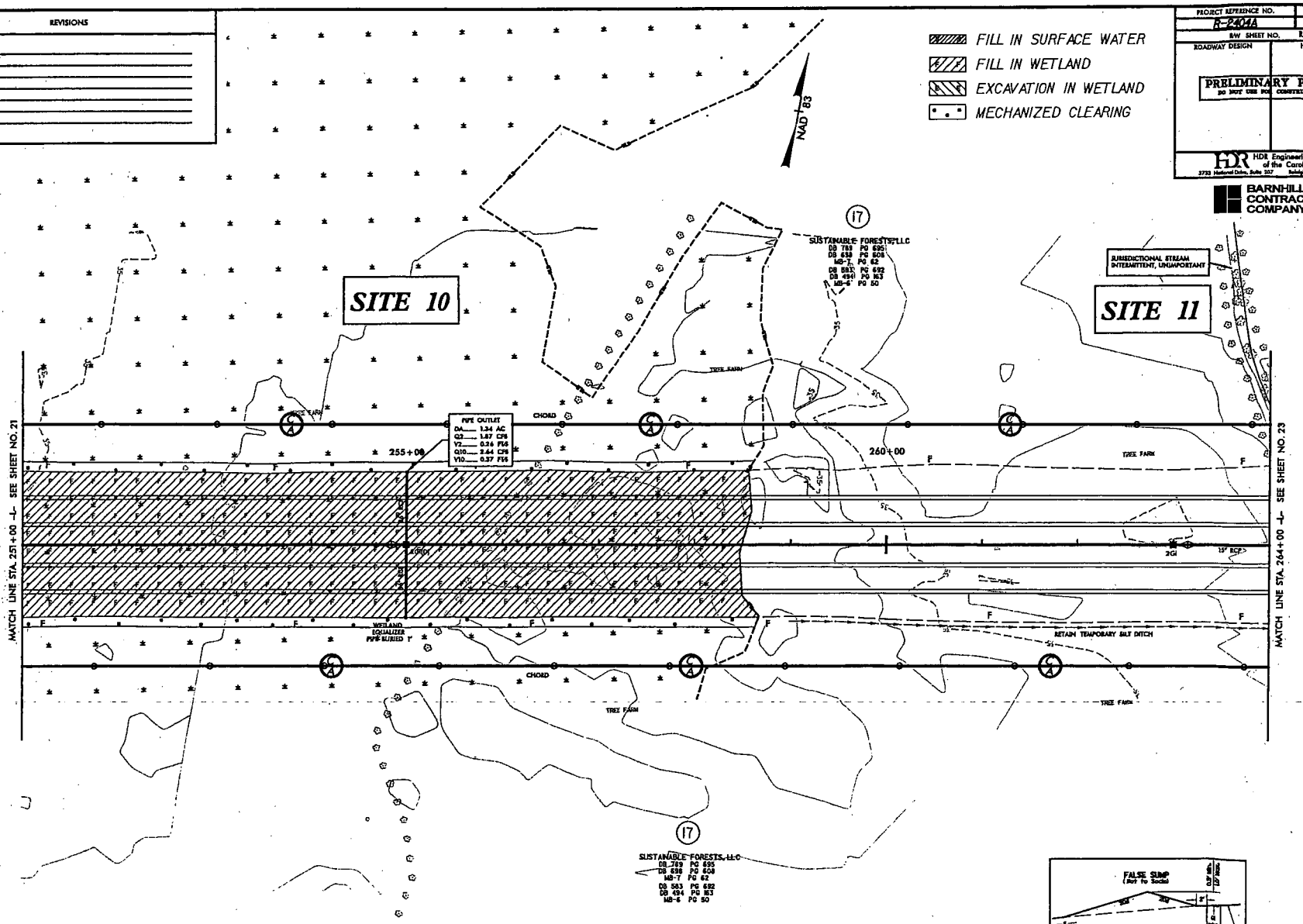
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

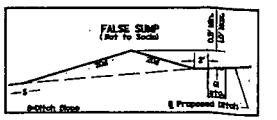
HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83



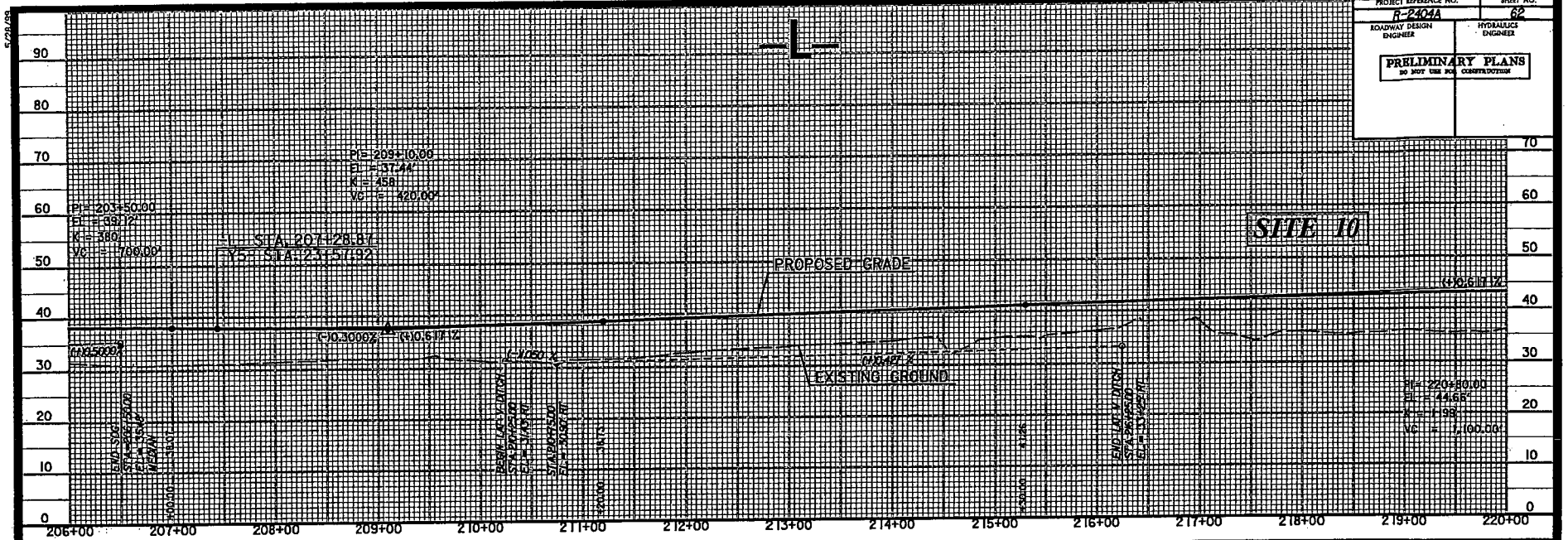


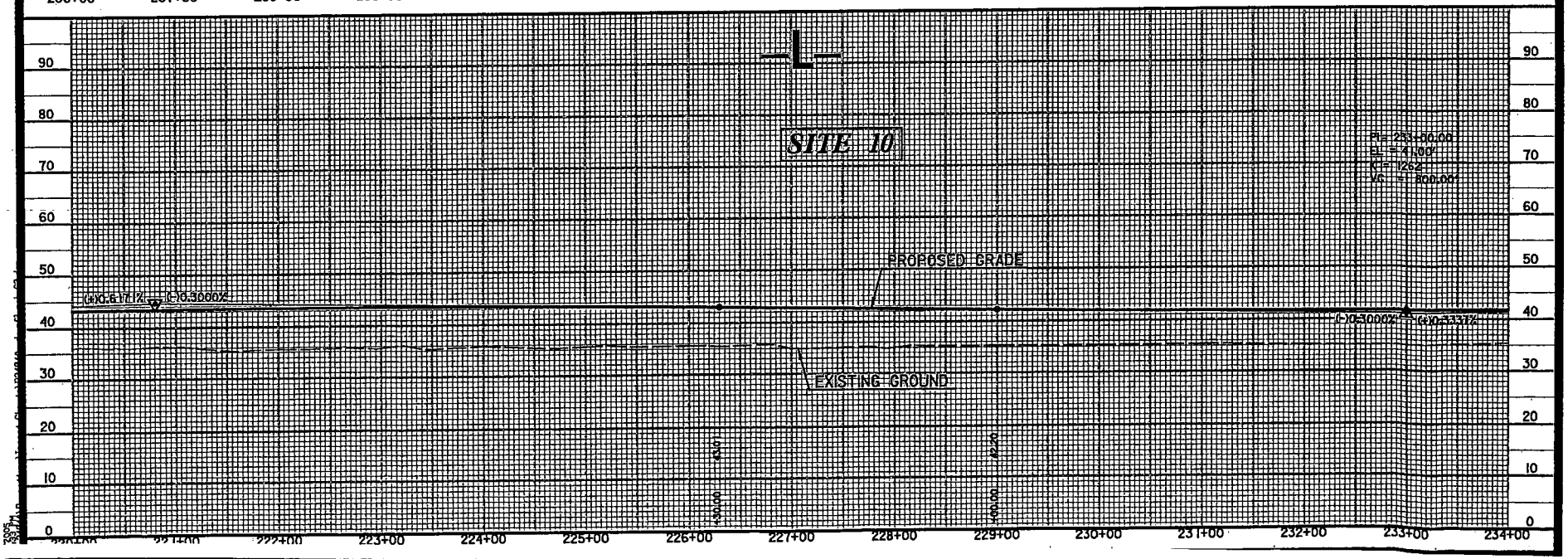
NOTES: SEE SHEET NO. 62-63 FOR -L- PROFILE
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

50 0 25 50

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	62
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

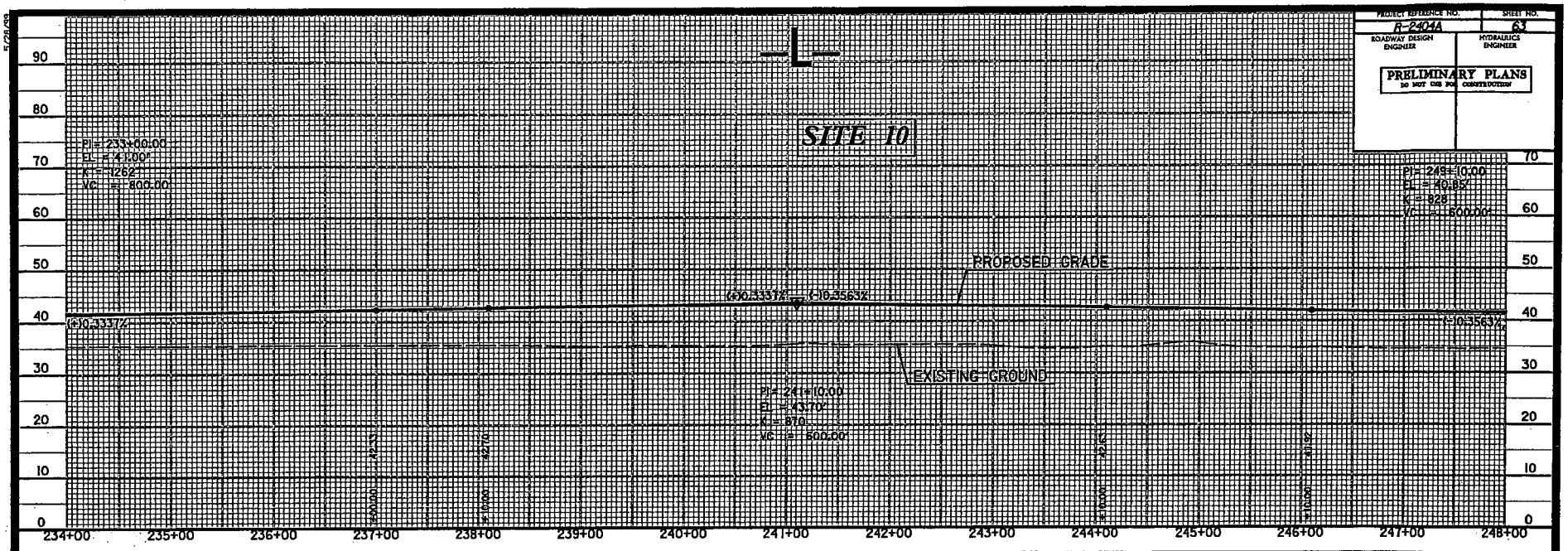
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

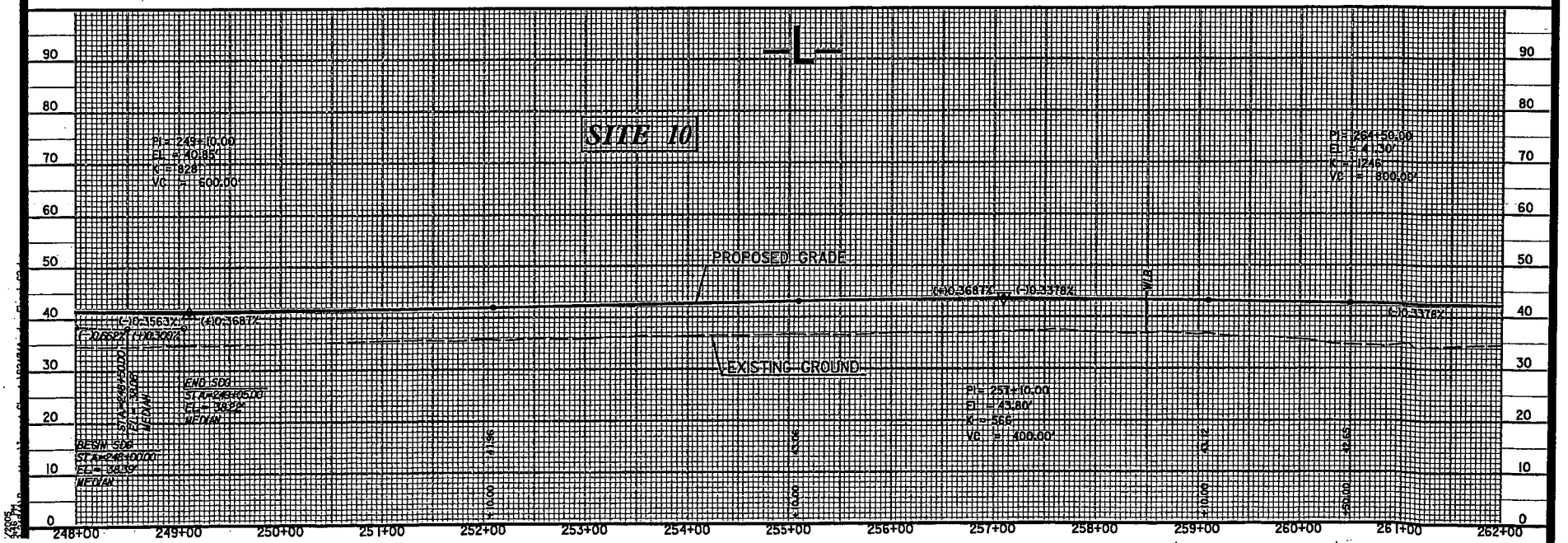


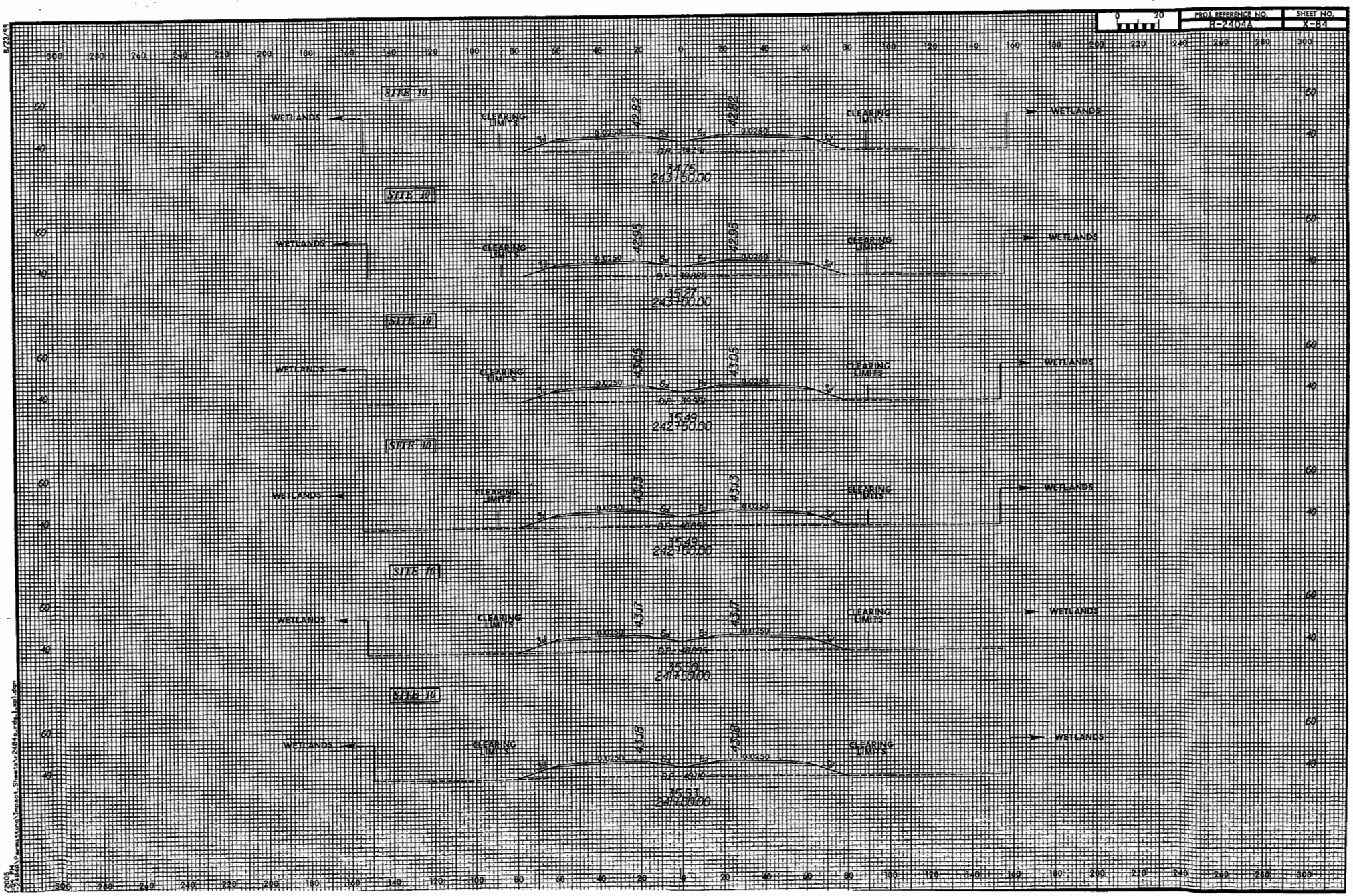


PROJECT REFERENCE NO.	SHEET NO.
R-2404A	63
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION






PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-84
SITE 10
WETLANDS
CLEARING LIMITS
42.82
42.82
0.0250
3:1
3:1
D.P. 39.791
34.75
243+50.00
42.95
42.95
D.P. 39.880
35.27
243+00.00
43.05
43.05
D.P. 39.931
35.49
242+50.00
43.13
43.13
D.P. 40.058
35.49
242+00.00
43.17
43.17
D.P. 40.095
35.50
241+50.00
43.18
43.18
D.P. 40.110
35.53
241+00.00
8/23/99

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	23
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27613

BARNHILL CONTRACTING COMPANY

REVISIONS

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83

(17) SUSTAINABLE FORESTS, LLC
DB 789 PG 635
DB 698 PG 608
MB-T PG 62
DB 583 PG 692
DB 494 PG 853
MB-6 PG 50

SITE 12

SITE 11

MATCH LINE STA. 264+00 -L- SEE SHEET NO. 22

MATCH LINE STA. 277+50 -L- SEE SHEET NO. 24

265+00

270+00

275+00

PROPOSED DITCH
DA..... 18.55 AC
Q10..... 7.5 CFS
V10..... 1.59 FPS
SS..... 3:1
DEPTH. 1.25 FT

EST 3 TONS CLASS "B" RIP RAP
EST 10 SY/FF

EST 11 TONS CLASS "B" RIP RAP
EST 28 SY FF

PIPE OUTLET
DA..... 2.34 AC
Q2..... 3.35 CFS
V2..... 0.47 FPS
Q10..... 4.72 CFS
V10..... 0.67 FPS

PROPOSED DITCH
DA..... 0.16 AC
Q10..... 0.31 CFS
V10..... 0.51 FPS
SS..... 6:1
DEPTH. 0.32 FT

PROPOSED DITCH
DA..... 0.37 AC
Q10..... 0.72 CFS
V10..... 0.78 FPS
SS..... 6:1
DEPTH. 0.39 FT

TREE FARM
LATERAL "A" DITCH
CHORD
SDG
15" RCP
2GI
RW
RETAIN TEMPORARY SILT DITCH
WETLAND EQUALIZER PIPE BURIED 1'
JURISDICTIONAL STREAM INTERMITTENT

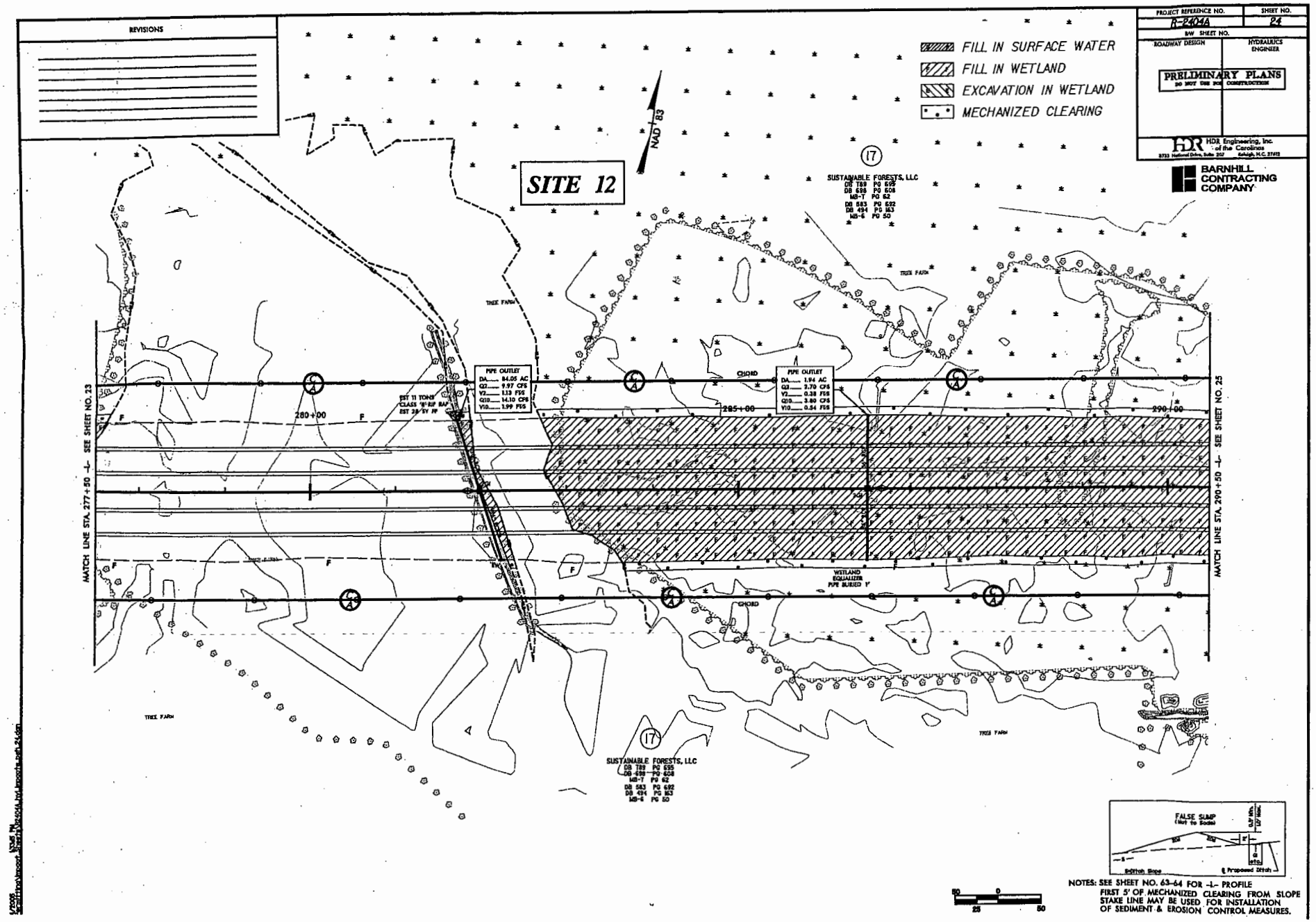
DETAIL B
LATERAL "A" DITCH
(Not To Scale)
Natural Ground
Min. D = 1.0 Ft.
b = 5.0 Ft.
264+25 -L- TO 268+40 -L- LT

DETAIL L
SPECIAL DITCH GRADE
(Not To Scale)
Min. D = 1.0 Ft.
264+00 -L- TO 264+71 -L- MEDIAN

FALSE SUMP
(Not To Scale)
Ditch Slope
℄ Proposed Ditch

50 0 25 50

NOTES: SEE SHEET NO. 63 FOR -L- PROFILE.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.



REVISIONS
PROJECT REFERENCE NO.
R-2404A
SHEET NO.
24
R/W SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
HDR Engineering, Inc. of the Carolinas
BARNHILL CONTRACTING COMPANY
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
NAD 83
SITE 12
SUSTAINABLE FORESTS, LLC
DB 789 PG 695
DB 698 PG 608
MB-7 PG 62
DB 583 PG 692
DB 494 PG 163
MB-6 PG 50
TREE FARM
PIPE OUTLET
DA 84.05 AC
Q2 9.97 CFS
V2 1.13 FT/S
Q10 14.10 CFS
V10 1.99 FT/S
PIPE OUTLET
DA 1.94 AC
Q2 2.70 CFS
V2 0.38 FT/S
Q10 3.80 CFS
V10 0.54 FT/S
EST 11 TONS CLASS 'B' RIP RAP
EST 28 SY FF
CHORD
280+00
285+00
290+00
WETLAND EQUALIZER PIPE BURIED 1'
MATCH LINE STA. 277+50 -L- SEE SHEET NO. 23
MATCH LINE STA. 290+50 -L- SEE SHEET NO. 25
FALSE SUMP (Not to Scale)
Ditch Slope
Proposed Ditch
NOTES: SEE SHEET NO. 63-64 FOR -L- PROFILE
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	25
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83

SITE 12

SITE 13

MATCH LINE STA. 290+50 -L- SEE SHEET NO. 24

MATCH LINE STA. 303+00 -L- SEE SHEET NO. 26

295+00

300+00

CHORD

TREE FARM

SUSTAINABLE FORESTS, LLC
DB 789 PG 695
DB 698 PG 608
MB-7 PG 62
DB 583 PG 692
DB 494 PG 163
MB-6 PG 50

PIPE OUTLET
DA..... 2.39 AC
Q2..... 4.45 CFS
V2..... 0.65 FPS
Q10..... 6.28 CFS
V10..... 0.99 FPS

PIPE OUTLET
DA..... 50.43 AC
Q2..... 8.09 CFS
V2..... 0.72 FPS
Q10..... 9.21 CFS
V10..... 1.37 FPS

PROPOSED DITCH
DA..... 11.00 AC
Q10..... 2.52 CFS
V10..... 0.71 FPS
SS..... 3:1
DEPTH. 0.61 FT

PROPOSED DITCH
DA..... 0.49 AC
Q10..... 2.02 CFS
V10..... 1.01 FPS
SS..... 6:1
DEPTH. 0.58 FT

PROPOSED DITCH
DA..... 0.63 AC
Q10..... 1.84 CFS
V10..... 1.57 FPS
SS..... 6:1
DEPTH. 0.44 FT

PRE FORMED SCOUR HOLE
DA..... 1.31 AC
Q10..... 4.34 CFS

WETLAND EQUALIZER PIPE BURIED

LATERAL BASE DITCH

EST 11 TONS CLASS 'B' RIP RAP EST 8 SY FF

FSH

2GI

SDG

PREFORMED SCOUR HOLE

FALSE SUMP
(Not To Scale)

DETAIL G
LATERAL BASE DITCH
(Not To Scale)
Min. D = 1.0 Ft.
B = 4.0 Ft.
b = 8.0 Ft.
295+00 -L- TO 297+30 -L- RT

DETAIL L
SPECIAL DITCH GRADE
(Not To Scale)
Min. D = 1.0 Ft.
299+70 -L- TO 301+50 -L- MEDIAN

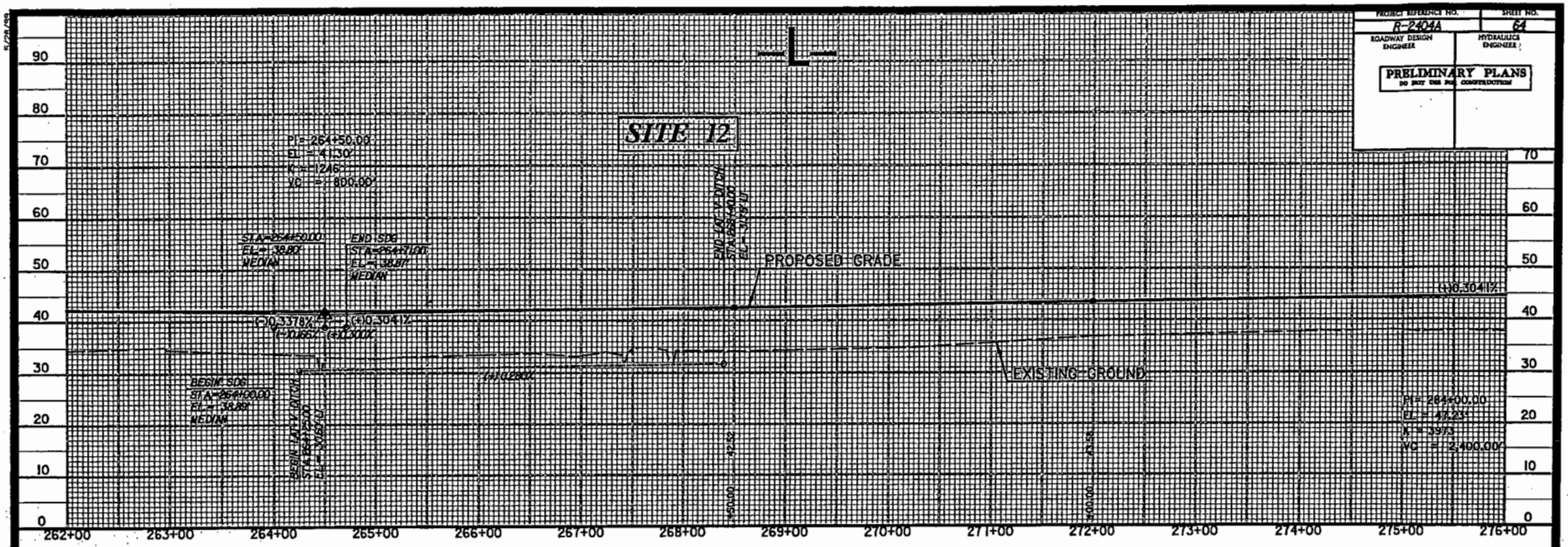
NOTES: SEE SHEET NO. 64 FOR -L- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

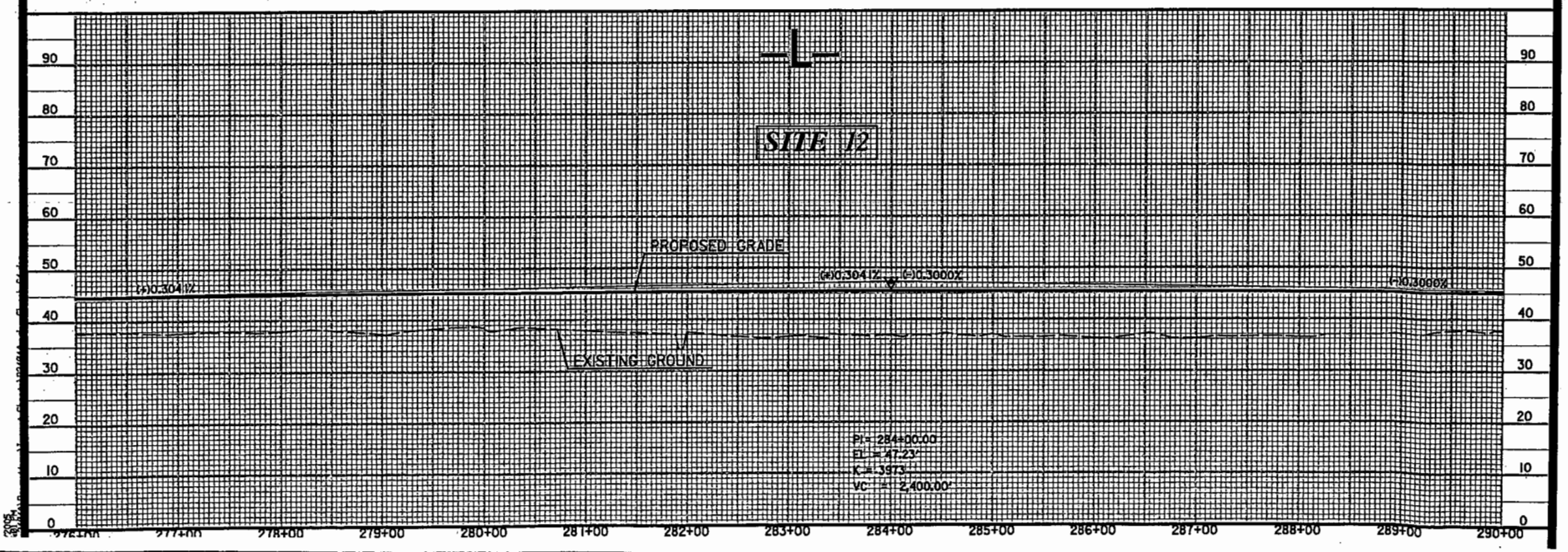
50 0 25 50

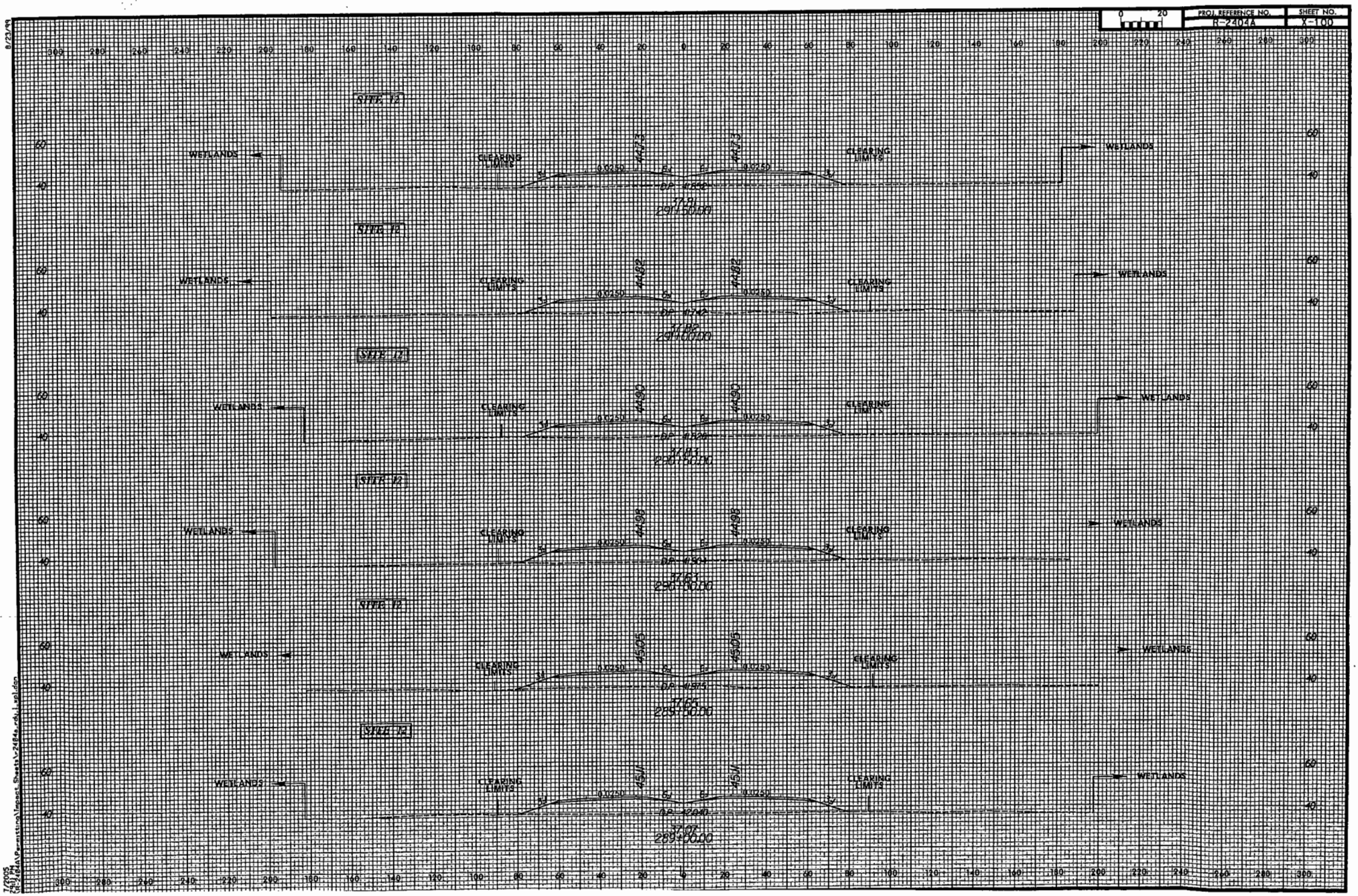
4/2005
N:\Sites\Hydrology\R-2404A_hyd_Reports_sph_25.dgn

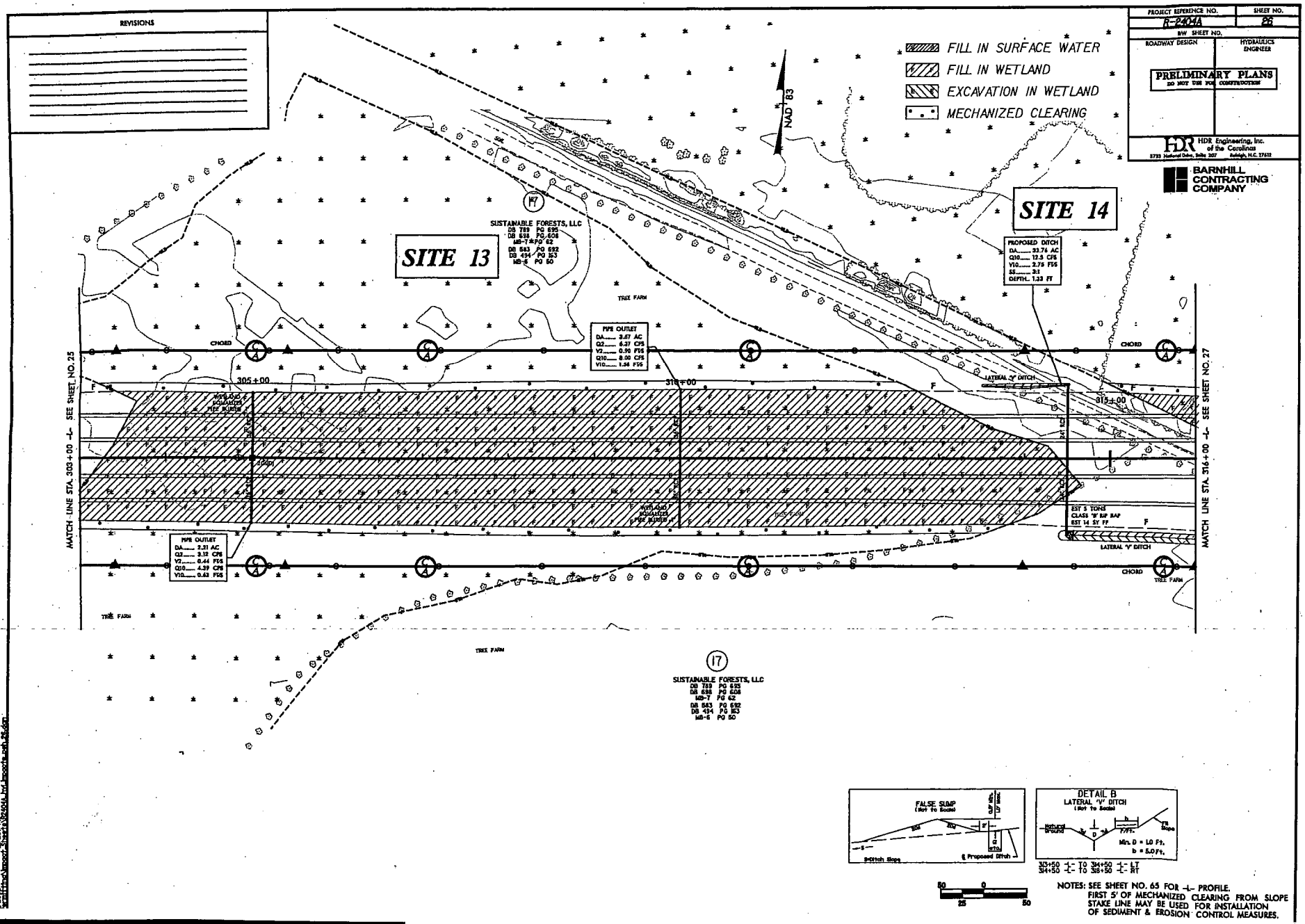
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	64
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

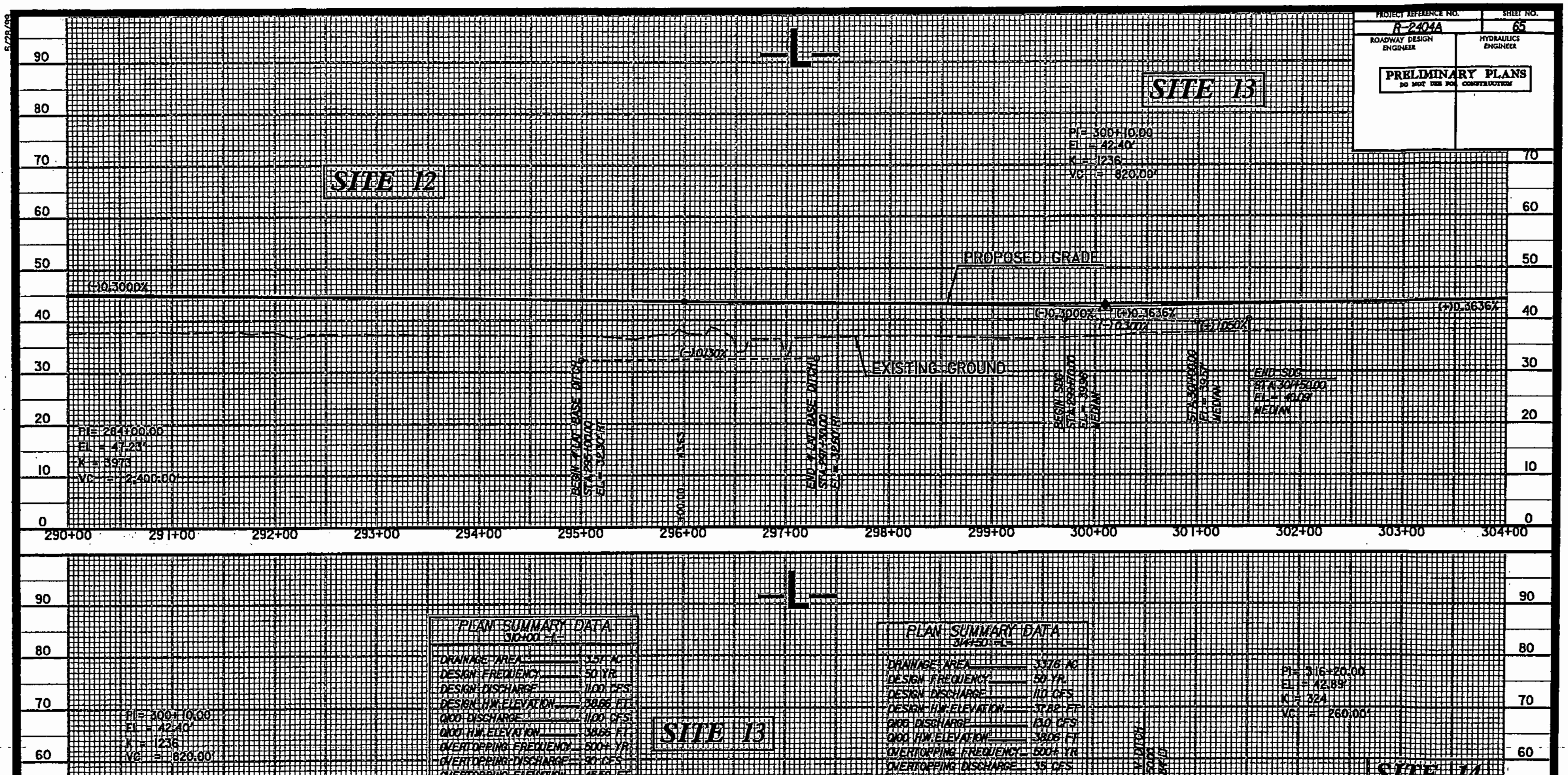





PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-100
SITE 12
WETLANDS
CLEARING LIMITS
0.0250
44.73
D.P. 41.852
37.81
291+50.00
44.82
D.P. 41.742
37.82
291+00.00
44.90
D.P. 41.820
37.83
290+50.00
44.98
D.P. 41.504
37.63
290+00.00
45.05
D.P. 41.575
37.65
289+50.00
45.11
D.P. 42.040
37.07
289+00.00



NOTES: SEE SHEET NO. 65 FOR -L- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.


PROJECT REFERENCE NO.
R-2404A
SHEET NO.
65
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
5/28/99
-L-
SITE 12
SITE 13
PI = 300+10.00
EL = 42.40'
K = 1236
VC = 820.00'
PROPOSED GRADE
(-)0.3000%
(-)0.3000%
(+)0.3636%
(+)0.3636%
(-)0.300%
(+)1.050%
(-)1.030%
EXISTING GROUND
PI = 284+00.00
EL = 47.23'
K = 3973
VC = 2,400.00'
BEGIN LAT BASE DITCH
STA 295+00.00
EL = 32.30' RT
END LAT BASE DITCH
STA 297+50.00
EL = 32.60' RT
BEGIN SDG
STA 299+70.00
MEDIAN
STA 301+00.00
MEDIAN
END SDG
STA 301+50.00
EL = 40.09'
MEDIAN
+00.00
43.63
290+00
291+00
292+00
293+00
294+00
295+00
296+00
297+00
298+00
299+00
300+00
301+00
302+00
303+00
304+00
PLAN SUMMARY DATA
310+00 -L-
DRAINAGE AREA 3.57 AC
DESIGN FREQUENCY 50 YR
DESIGN DISCHARGE 1100 CFS
DESIGN HW ELEVATION 38.66 FT
Q100 DISCHARGE 1100 CFS
Q100 HW ELEVATION 38.66 FT
OVERTOPPING FREQUENCY 500+ YR
OVERTOPPING DISCHARGE 90 CFS
OVERTOPPING ELEVATION 45.50 FT
PLAN SUMMARY DATA
314+50 -L-
DRAINAGE AREA 33.76 AC
DESIGN FREQUENCY 50 YR
DESIGN DISCHARGE 110 CFS
DESIGN HW ELEVATION 37.82 FT
Q100 DISCHARGE 130 CFS
Q100 HW ELEVATION 38.06 FT
OVERTOPPING FREQUENCY 500+ YR
OVERTOPPING DISCHARGE 35 CFS
OVERTOPPING ELEVATION 43.24 FT
SITE 14
PI = 300+10.00
EL = 42.40'
K = 1236
VC = 820.00'
PI = 316+20.00
EL = 42.89'
K = 324
VC = 260.00'
(+)0.3636%
(+)0.3636%
(-)0.5016%
(-)0.5016%
(+)0.3000%
(-)0.869%
(-)0.300%
36" RCP
STA 310+00.00
INV. IN = 36.60
INV. OUT = 36.57
PI = 310+00.00
EL = 46.00'
K = 532
VC = 460.00'
EXISTING GROUND
BEGIN LAT V DITCH
STA 313+50.00
EL = 36.70' LT
BEGIN LAT V DITCH
STA 314+50.00
EL = 35.40' RT
END LAT V DITCH
STA 314+50.00
EL = 35.84' LT
24" RCP
STA 314+50.00
INV. IN = 35.84
INV. OUT = 35.40
+20.00
43.89
+70.00
45.16
+30.00
44.85
+90.00
43.54
+50.00
43.28
304+00
305+00
306+00
307+00
308+00
309+00
310+00
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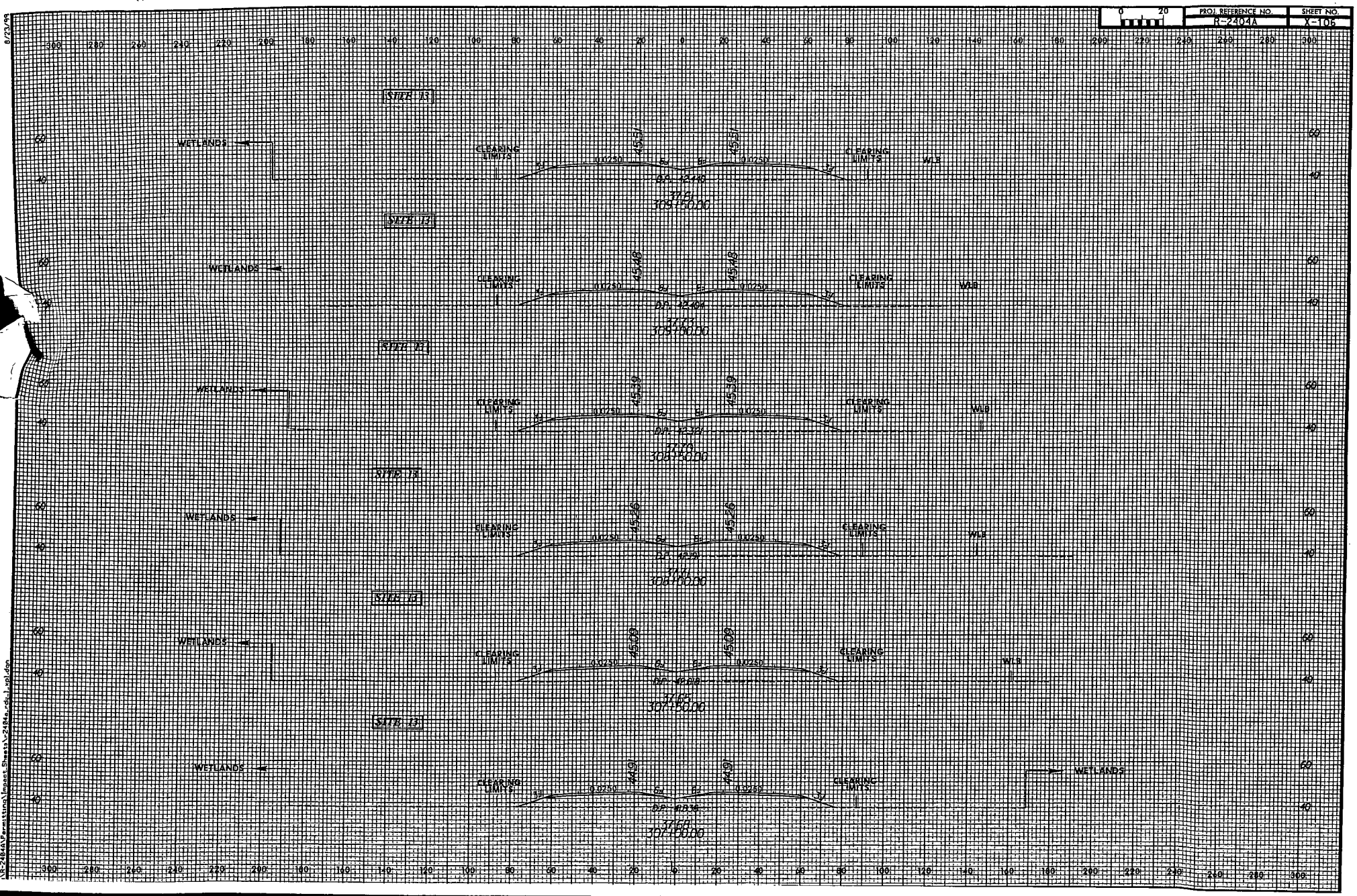
312+00
313+00
314+00
315+00
316+00
317+00
318+00


PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-106
SITE 13
WETLANDS
CLEARING LIMITS
WLB
45.51
45.48
45.39
45.26
45.09
44.91
0.0250
D.P. 42.440
D.P. 42.404
D.P. 42.381
D.P. 42.191
D.P. 42.018
D.P. 41.836
37.61
37.73
37.79
37.71
37.65
37.68
309+50.00
309+00.00
308+50.00
308+00.00
307+50.00
307+00.00
8/23/99
1/7/2005
R-2404A\Permitting\Impact Sheets\r2404a_rdu_1_xpl.dgn

REVISIONS

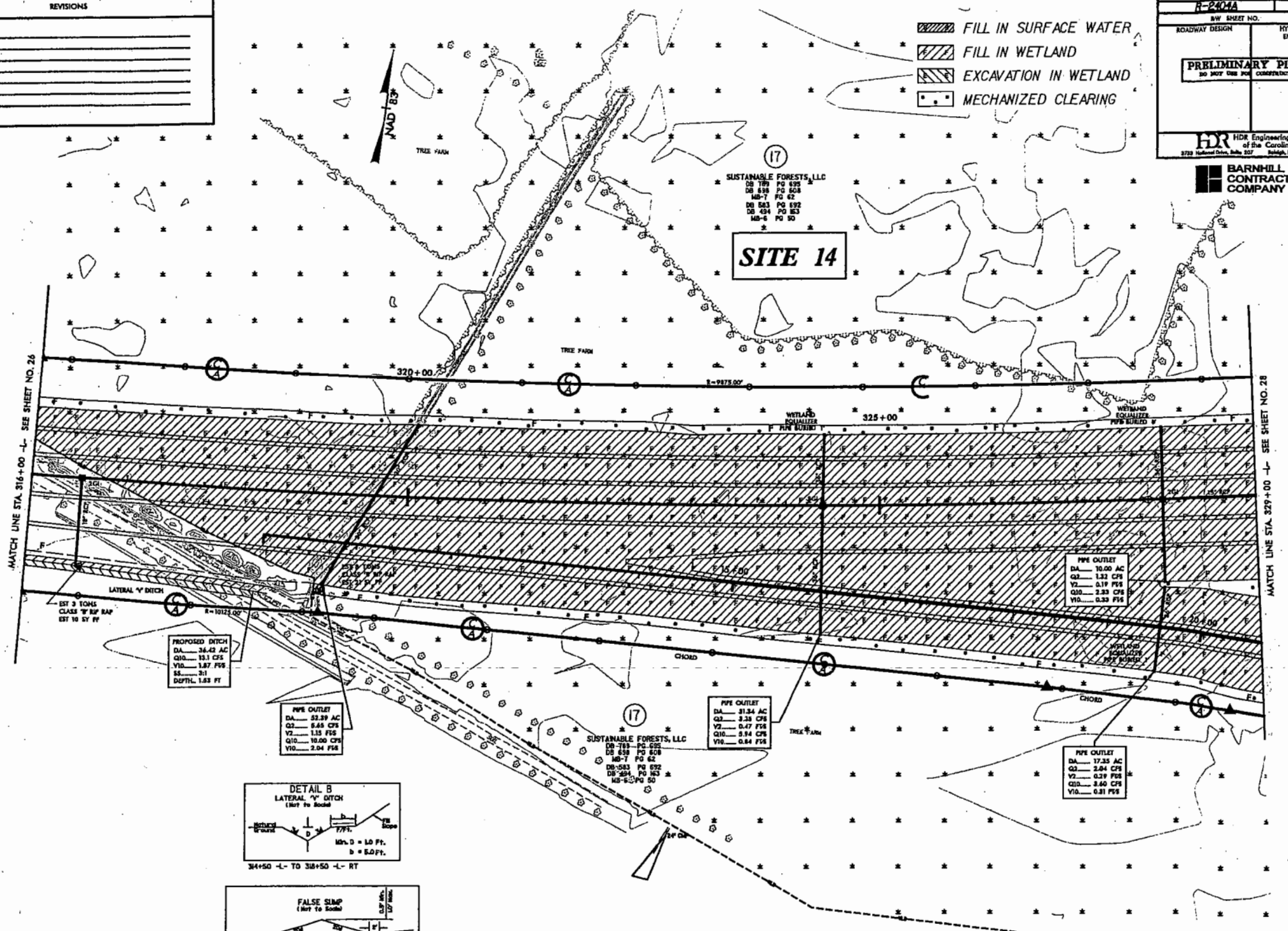
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	27
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING



NOTES: SEE SHEET NO. 65-66 FOR -L- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

NOTES: SEE SHEETS NO. 66-67 FOR -L- PROFILE.
SEE SHEET NO. 84 FOR -Y6- PROFILE.
SEE SHEET NO. 86 FOR -Y6RPA- PROFILE.
SEE SHEET NO. 87 FOR -Y6RPC- PROFILE.
SEE SHEET NO. 88 FOR -Y6RPD- PROFILE.
SEE SHEET NO. 89 FOR -Y6LPA- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

50 0 25 50

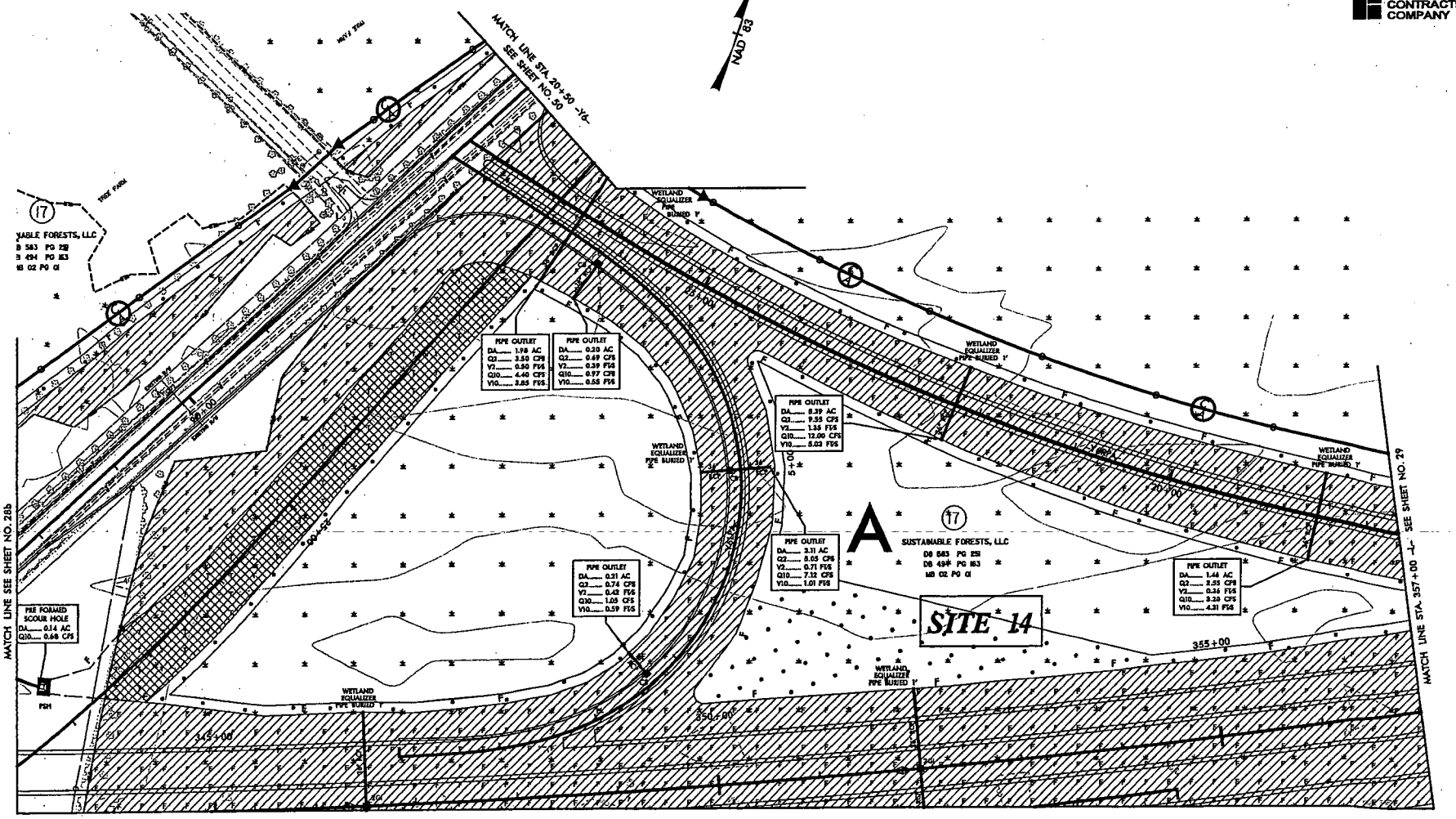
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
TEMPORARY FILL IN WETLAND

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	28a
B/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY



MATCH LINE SEE SHEET NO. 28d

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	28b
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
2753 Hartland Drive, Suite 207 Raleigh, N.C. 27615

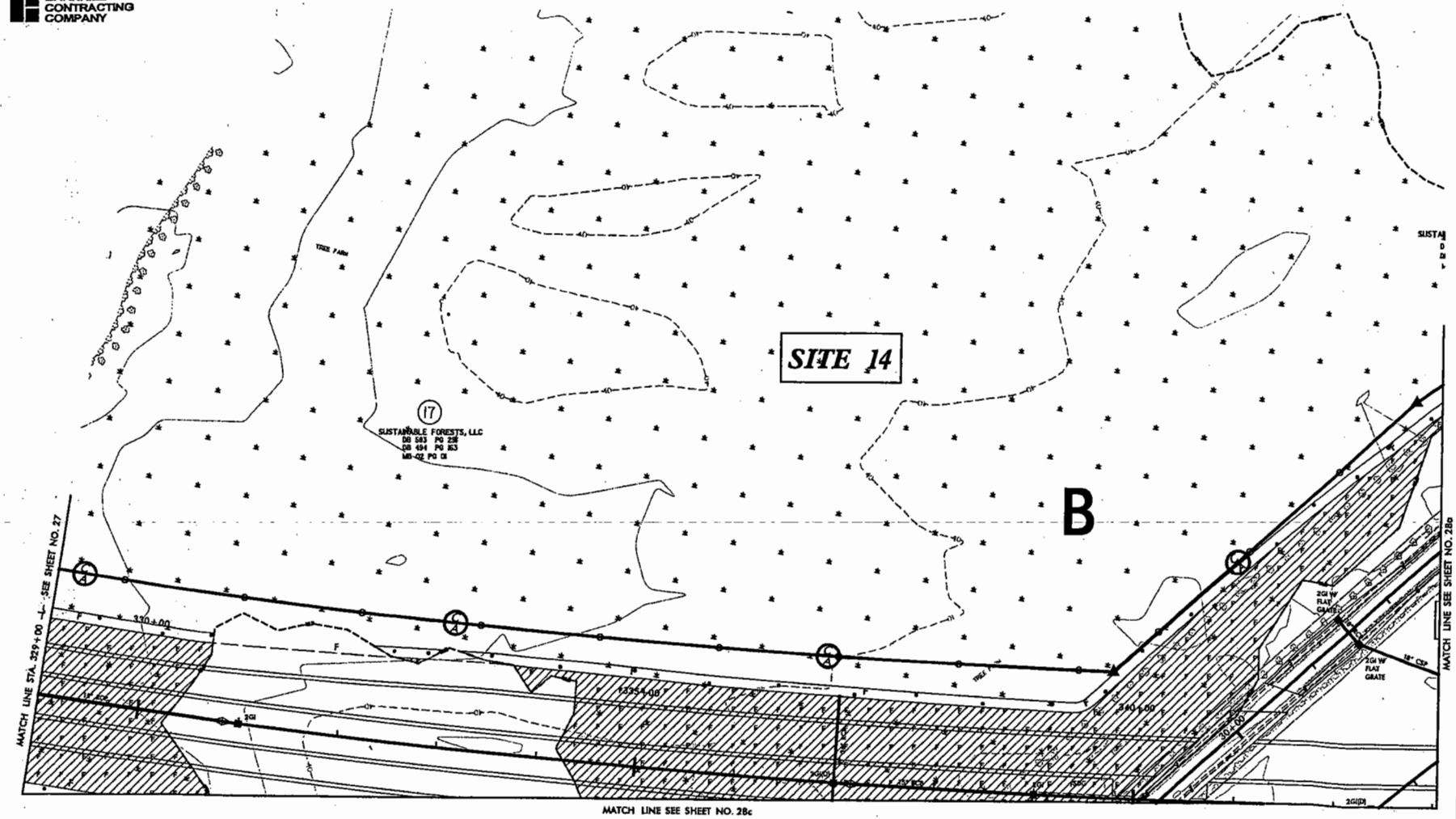
BARNHILL CONTRACTING COMPANY

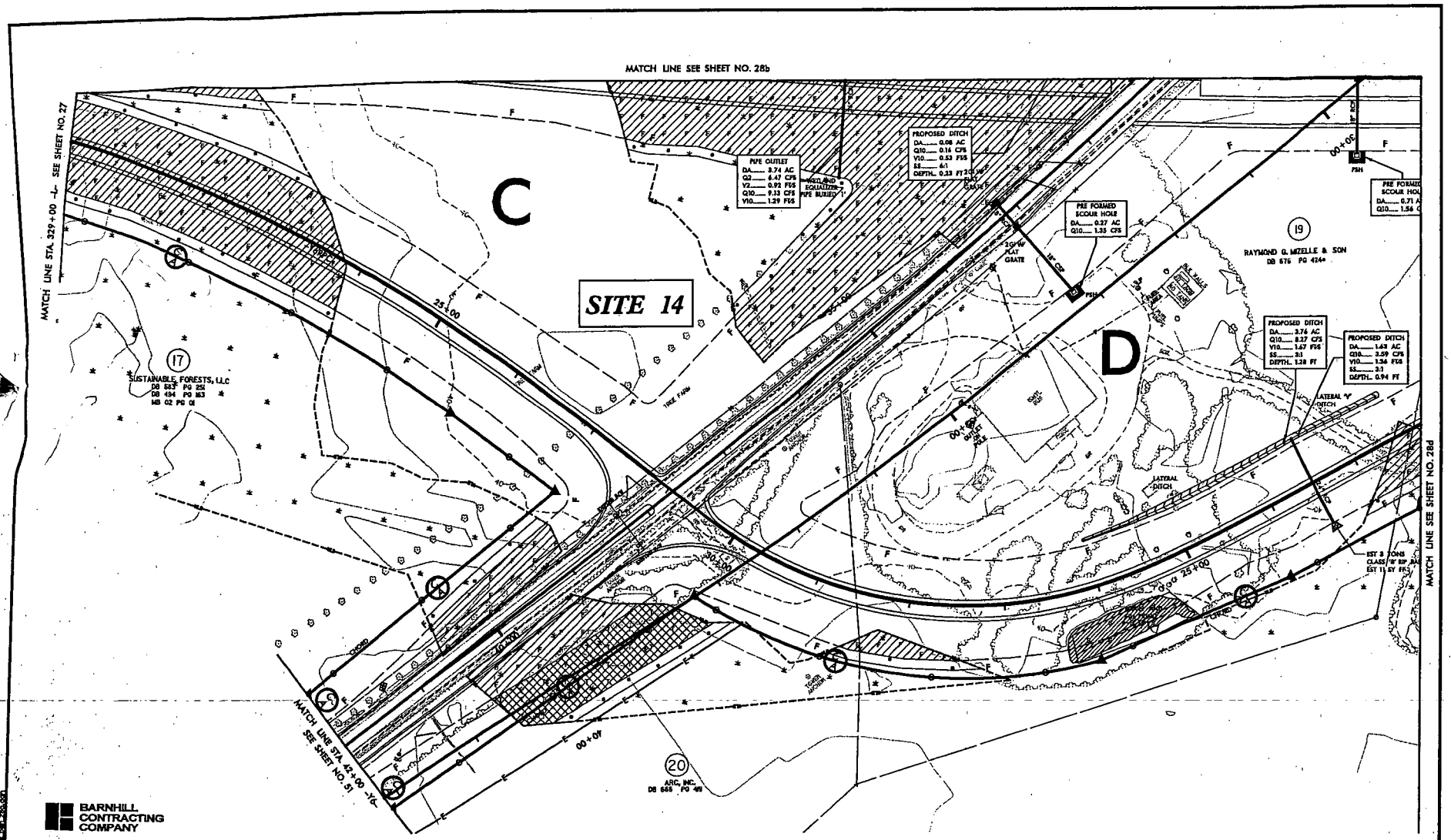
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
TEMPORARY FILL IN WETLAND

NAD 83

50 0 25 50

NOTES: SEE SHEETS NO. 66-67 FOR -L- PROFILE.
SEE SHEET NO. 84 FOR -Y6- PROFILE.
SEE SHEET NO. 86 FOR -Y6RPA- PROFILE.
SEE SHEET NO. 87 FOR -Y6RPC- PROFILE.
SEE SHEET NO. 88 FOR -Y6RPD- PROFILE.
SEE SHEET NO. 89 FOR -Y6LPA- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.





BARNHILL CONTRACTING COMPANY

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	28c
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
TEMPORARY FILL IN WETLAND

NOTES: SEE SHEETS NO. 66-67 FOR -L- PROFILE.
SEE SHEET NO. 84 FOR -Y6- PROFILE.
SEE SHEET NO. 86 FOR -Y6RPA- PROFILE.
SEE SHEET NO. 87 FOR -Y6RPC- PROFILE.
SEE SHEET NO. 88 FOR -Y6RPD- PROFILE.
SEE SHEET NO. 89 FOR -Y6LPA- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

MATCH LINE SEE SHEET NO. 28a

MATCH LINE SEE SHEET NO. 28c

MATCH LINE STA. 357+00 -L- SEE SHEET NO. 29

PIPE OUTLET
DA..... 4.93 AC
Q2..... 7.68 CFS
V2..... 1.09 FPS
Q10..... 10.84 CFS
V10..... 1.53 FPS

PIPE OUTLET
DA..... 21.06 AC
Q2..... 3.40 CFS
V2..... 0.34 FPS
Q10..... 4.24 CFS
V10..... 0.60 FPS

PIPE OUTLET
DA..... 8.57 AC
Q2..... 1.91 CFS
V2..... 0.27 FPS
Q10..... 2.40 CFS
V10..... 0.34 FPS

D

WETLAND BOMALIZER PIPE BURIED 1'

TREE FARM

CHORD

SITE 14

(17)

SUSTAINABLE FORESTS, LLC
DB 583 PG 252
DB 494 PG 863
MB 02 PG 01

DETAIL B
LATERAL "V" DITCH
(Not to Scale)

Natural Ground
Min. D = 1.0 Ft.
b = 5.0 Ft.
Fill Slope

22+50 -Y6RPD- TO 26+00 -Y6RPD- RT

PREFORMED SCOUR HOLE

FALSE SUMP
(Not to Scale)

Existing Ditch Slope
Proposed Ditch Slope
Existing Ditch Slope
Ditch Slope
℄ Proposed Ditch

DETAIL L
SPECIAL DITCH GRADE
(Not to Scale)

Front Ditch Slope
Front Slope
Back Slope
Back Slope
Rear Ditch Slope
Min. D = 1.0 Ft.

339+00 -L- TO 339+79 -L- MEDIAN

NOTES: SEE SHEETS NO. 66-67 FOR -L- PROFILE.
SEE SHEET NO. 84 FOR -Y6- PROFILE.
SEE SHEET NO. 86 FOR -Y6RPA- PROFILE.
SEE SHEET NO. 87 FOR -Y6RPC- PROFILE.
SEE SHEET NO. 88 FOR -Y6RPD- PROFILE.
SEE SHEET NO. 89 FOR -Y6LPA- PROFILE.
SEE SHEET NO. 2-J FOR STRUCTURE DETAIL.
ALL CSP TO BE ROD AND LUG CONNECTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

50 0 25 50

NAD 83

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
TEMPORARY FILL IN WETLAND

BARNHILL CONTRACTING COMPANY

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	28d
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
2730 Meadowview Drive, Suite 207 Raleigh, N.C. 27610

1/2005
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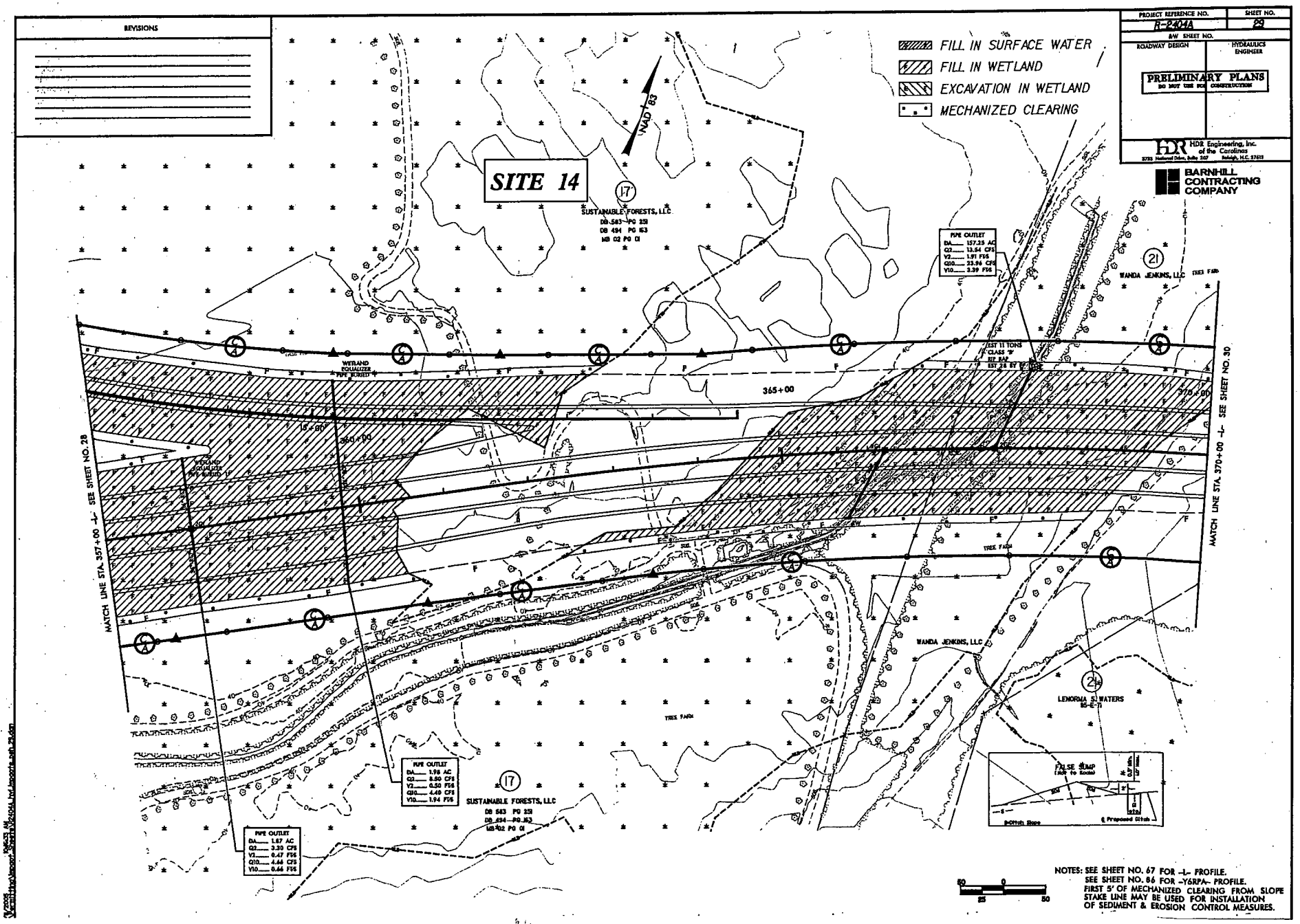


REVISIONS
PROJECT REFERENCE NO.
R-2404A
SHEET NO.
29
R/W SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
HDR Engineering, Inc. of the Carolinas
BARNHILL CONTRACTING COMPANY
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
NAD 83
SITE 14
17
SUSTAINABLE FORESTS, LLC
DB 583 PG 251
DB 494 PG 163
MB 02 PG 01
PIPE OUTLET
DA 157.25 AC
Q2 13.54 CFS
V2 1.91 FT/S
Q10 23.96 CFS
V10 3.39 FT/S
21
WANDA JENKINS, LLC
TREE FARM
WETLAND EQUALIZER PIPE BURIED
EST 11 TONS CLASS 'B' RIP RAP EST 28 SY
365+00
360+00
370+00
MATCH LINE STA. 357+00 -L- SEE SHEET NO. 28
MATCH LINE STA. 370+00 -L- SEE SHEET NO. 30
WANDA JENKINS, LLC
LENORMA S. WATERS
PIPE OUTLET
DA 1.98 AC
Q2 8.50 CFS
V2 0.50 FT/S
Q10 4.40 CFS
V10 1.94 FT/S
17
SUSTAINABLE FORESTS, LLC
DB 583 PG 251
DB 494 PG 163
MB 02 PG 01
PIPE OUTLET
DA 1.87 AC
Q2 3.20 CFS
V2 0.47 FT/S
Q10 4.66 CFS
V10 0.66 FT/S
FALSE SUMP
(Not to Scale)
℄ Proposed Ditch
NOTES: SEE SHEET NO. 67 FOR -L- PROFILE.
SEE SHEET NO. 86 FOR -Y6RPA- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

REVISIONS

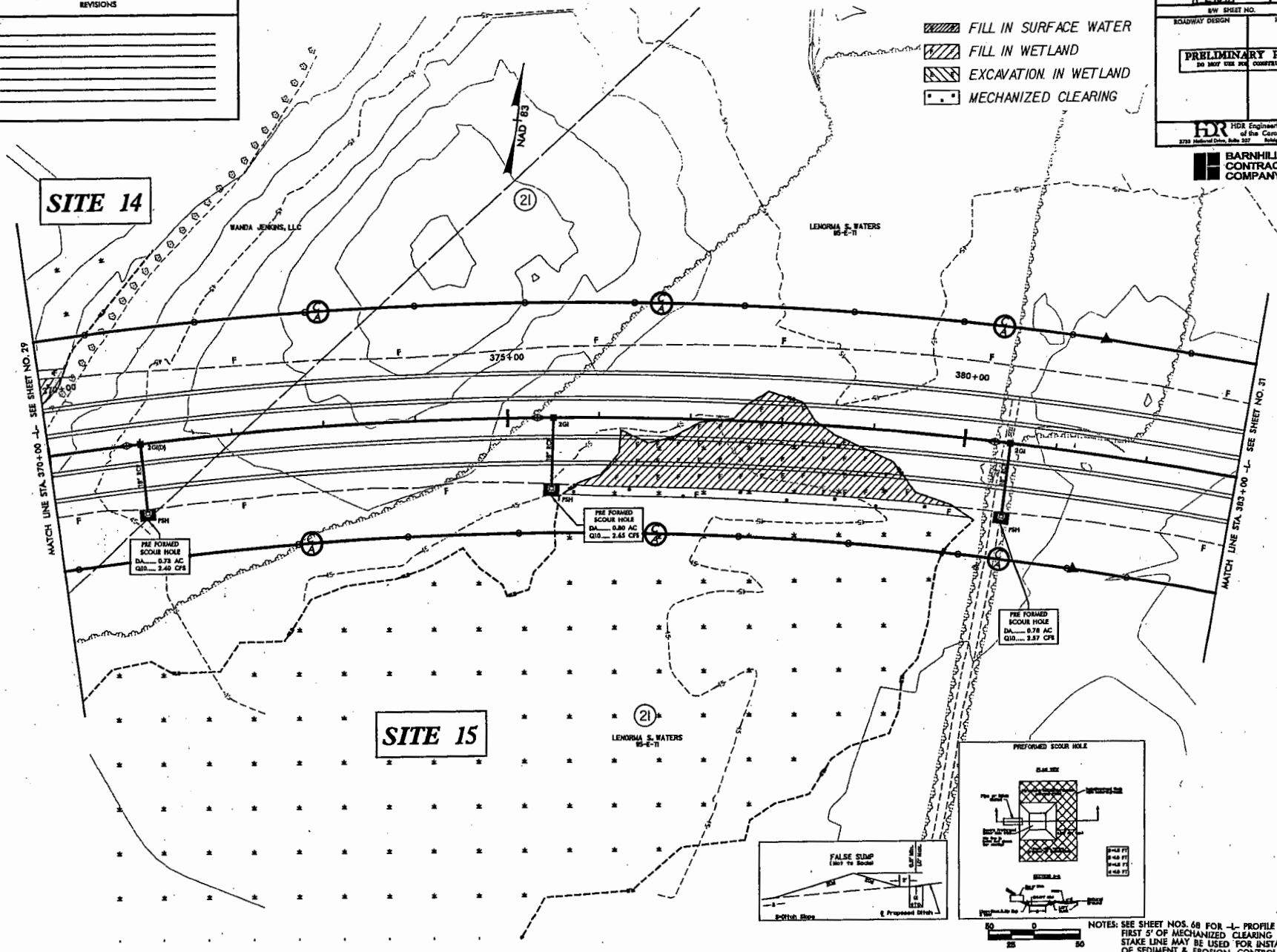
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	30
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
2733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING



NOTES: SEE SHEET NOS. 68 FOR -L- PROFILE
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

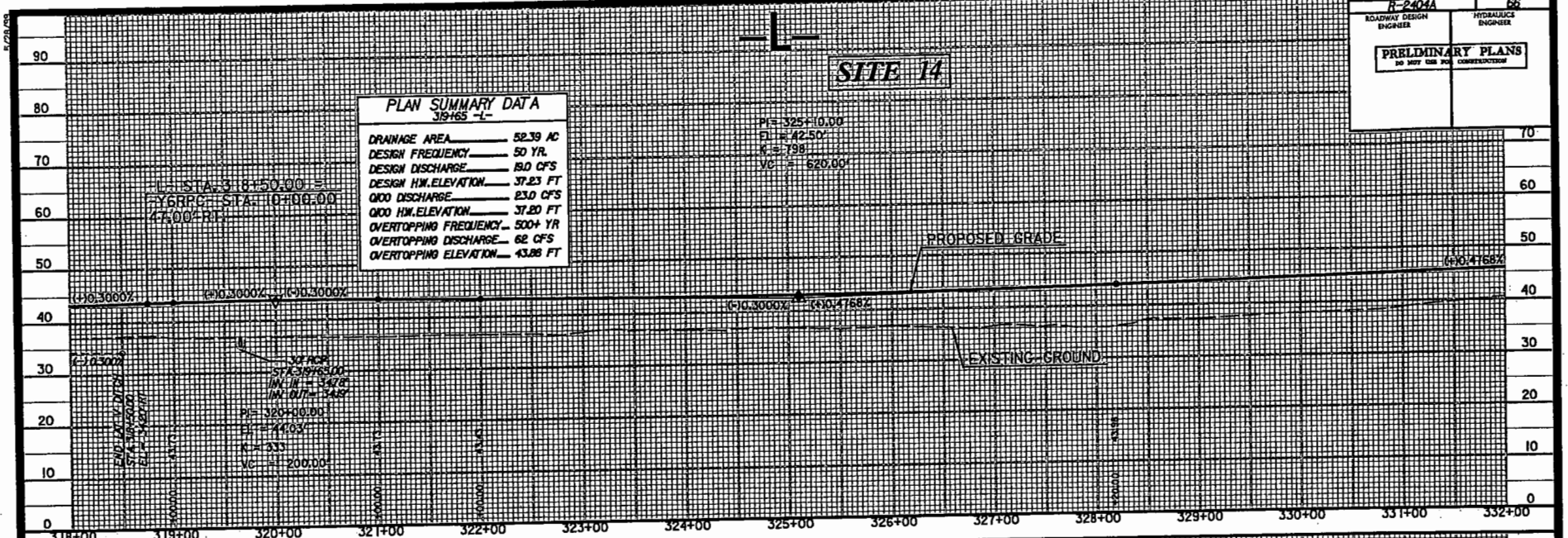
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	66
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

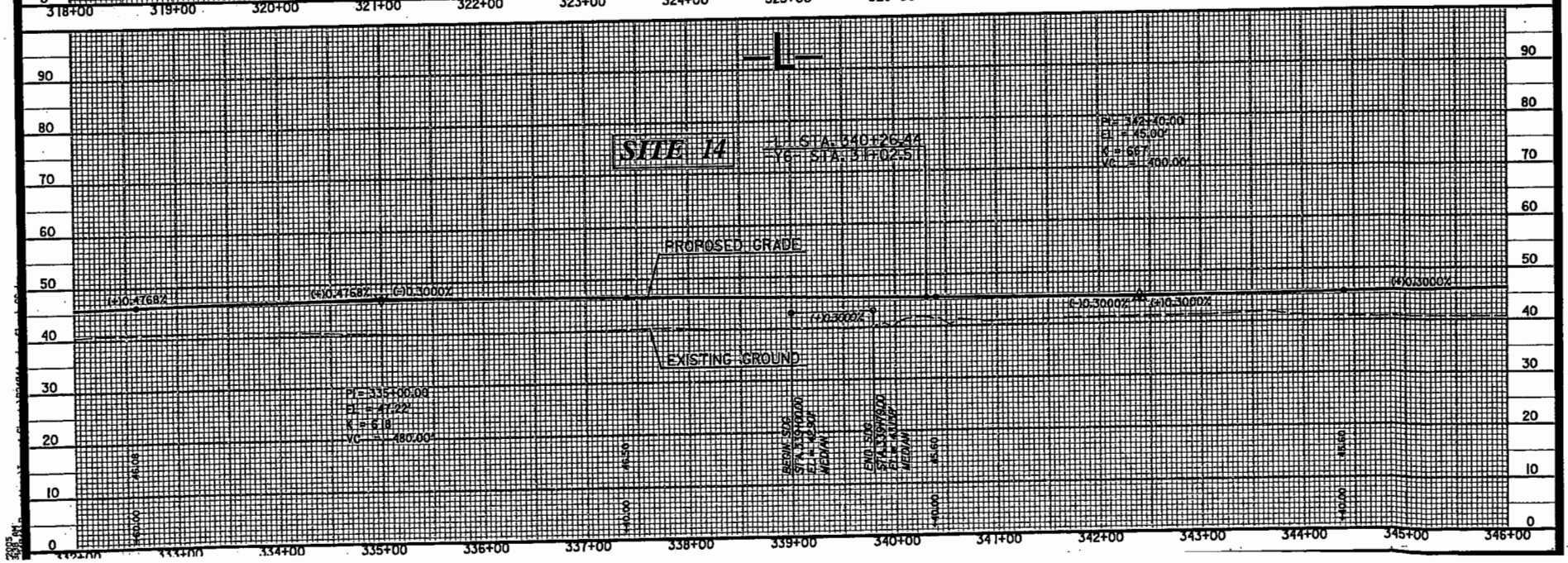
-L- SITE 14

PLAN SUMMARY DATA
319+65 -L-

DRAINAGE AREA	52.39 AC
DESIGN FREQUENCY	50 YR.
DESIGN DISCHARGE	190 CFS
DESIGN H.W. ELEVATION	37.23 FT
Q100 DISCHARGE	230 CFS
Q100 H.W. ELEVATION	37.80 FT
OVERTOPPING FREQUENCY	500+ YR
OVERTOPPING DISCHARGE	62 CFS
OVERTOPPING ELEVATION	43.86 FT

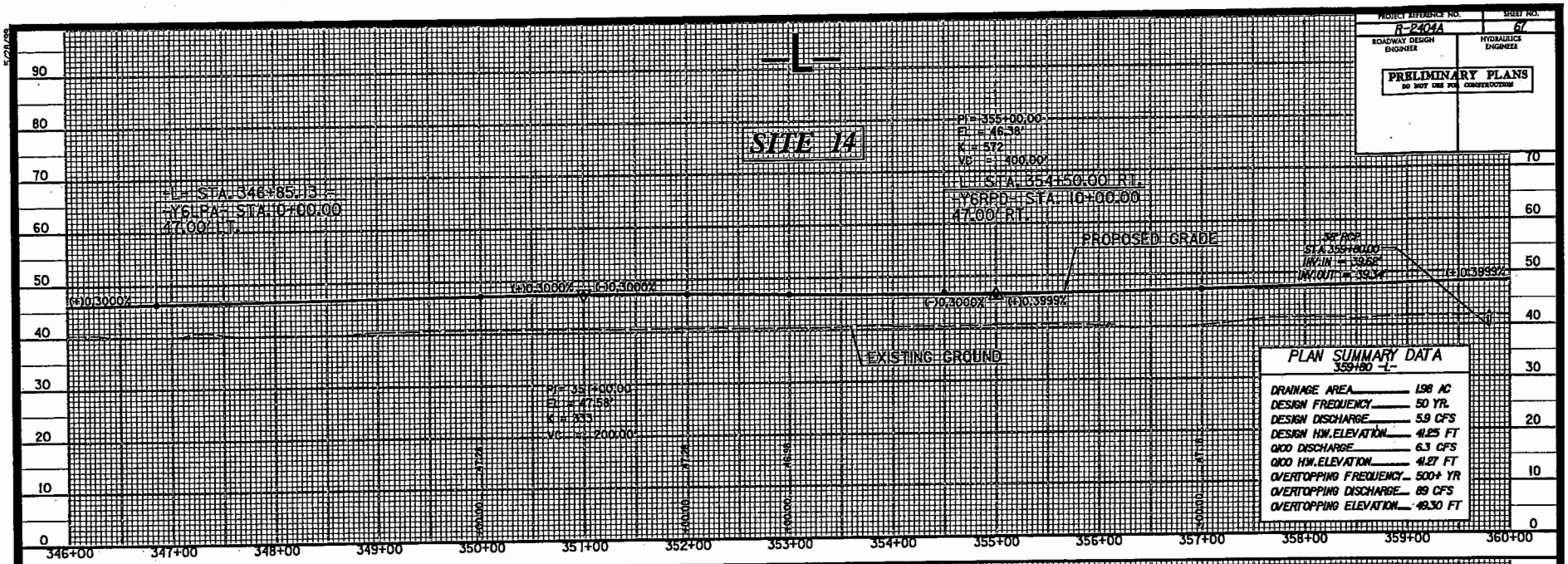


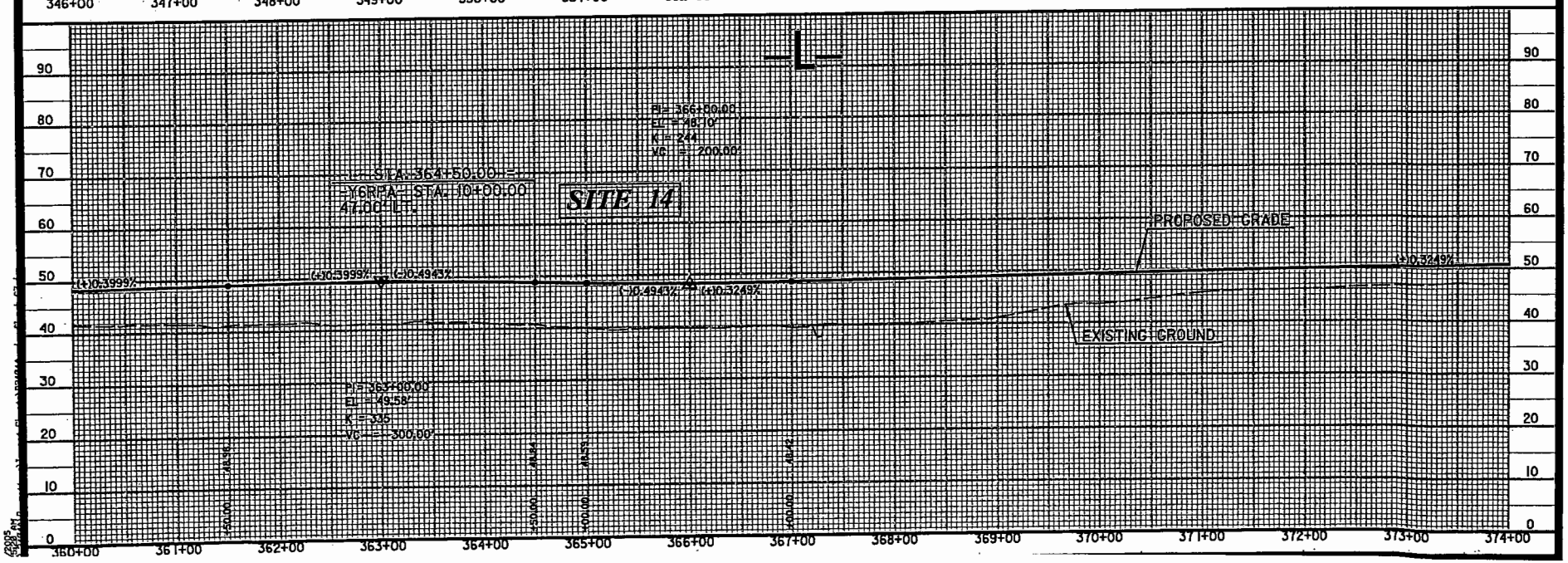
-L- SITE 14

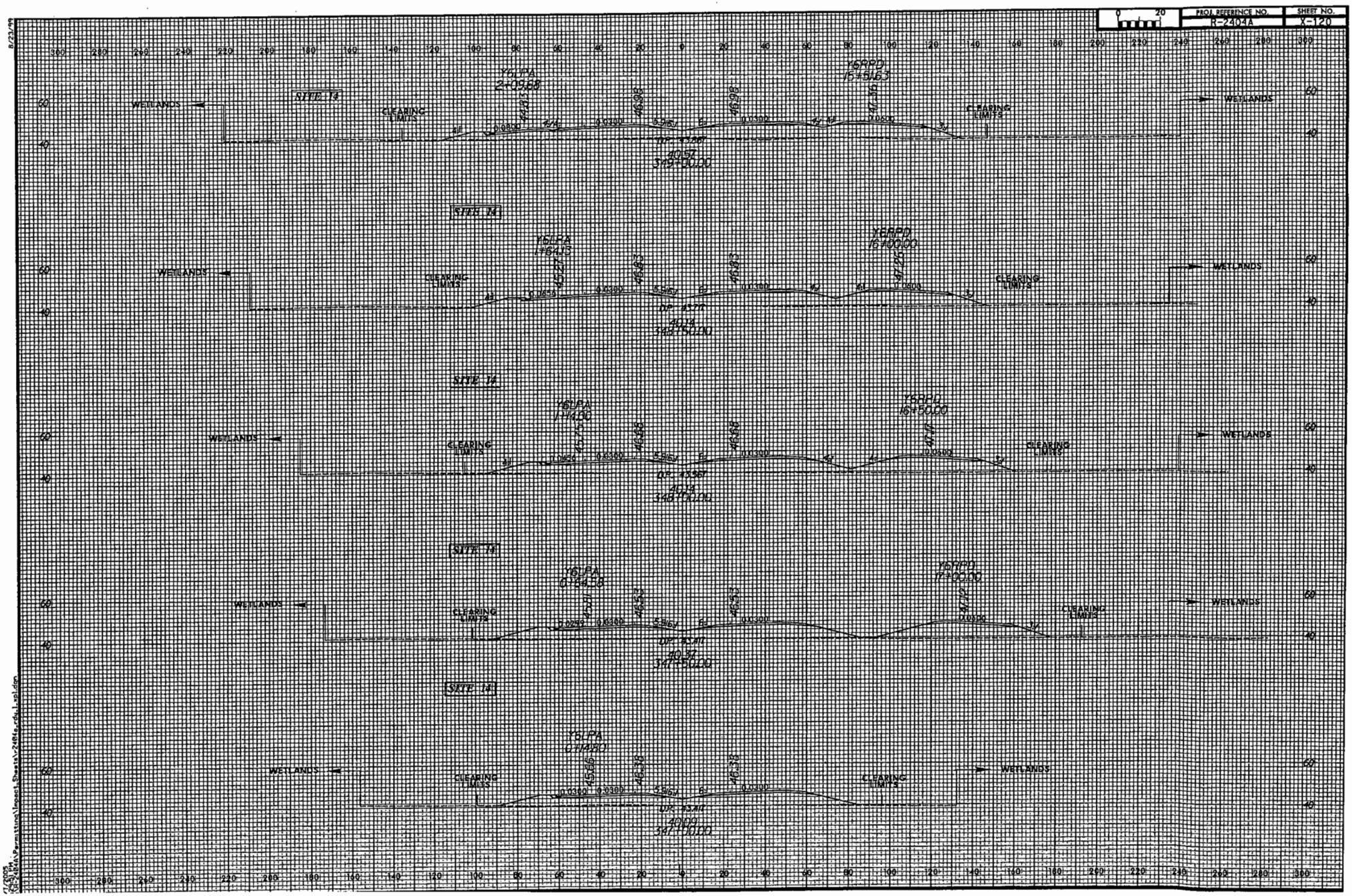


PROJECT REFERENCE NO.	SHEET NO.
R-2404A	61
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION






PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-120
SITE 14
WETLANDS
CLEARING LIMITS
Y6LPA
2+09.68
Y6RPD
15+51.63
DP 43.867
40.57
349+00.00
Y6LPA
1+64.13
Y6RPD
16+00.00
DP 43.77
40.14
348+50.00
Y6LPA
1+14.00
Y6RPD
16+50.00
DP 43.567
40.14
348+00.00
Y6LPA
0+64.58
Y6RPD
17+00.00
DP 43.417
40.37
347+50.00
Y6LPA
0+14.80
DP 43.417
40.09
347+00.00

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	32
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

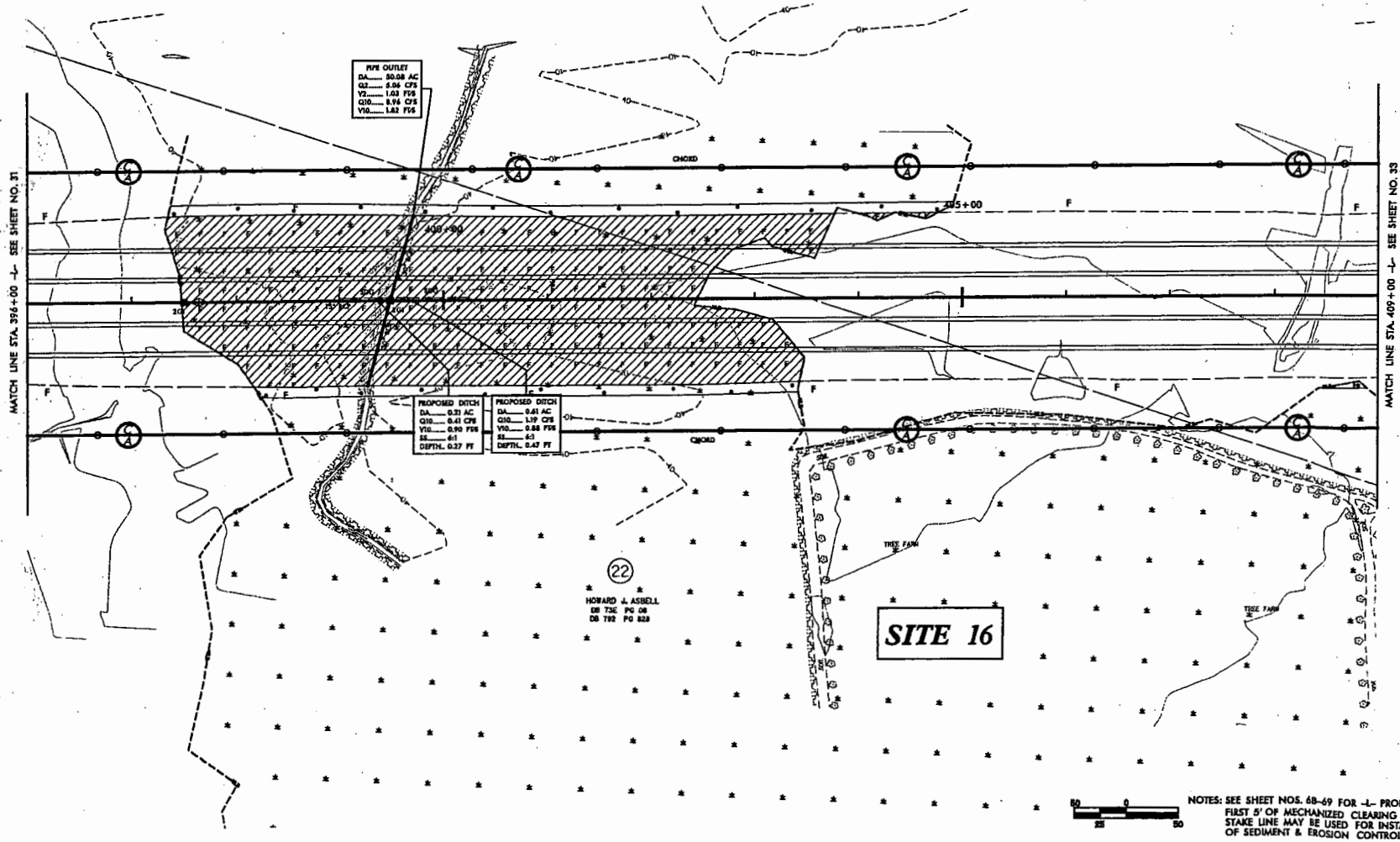
REVISIONS

DETAIL L
SPECIAL DITCH GRADE
(Not to Scale)
Front Ditch Slope
Front Ditch Slope
Min. D = 1.0 Ft.
399+00 -L- TO 400+25 -L- MEDIAN

FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

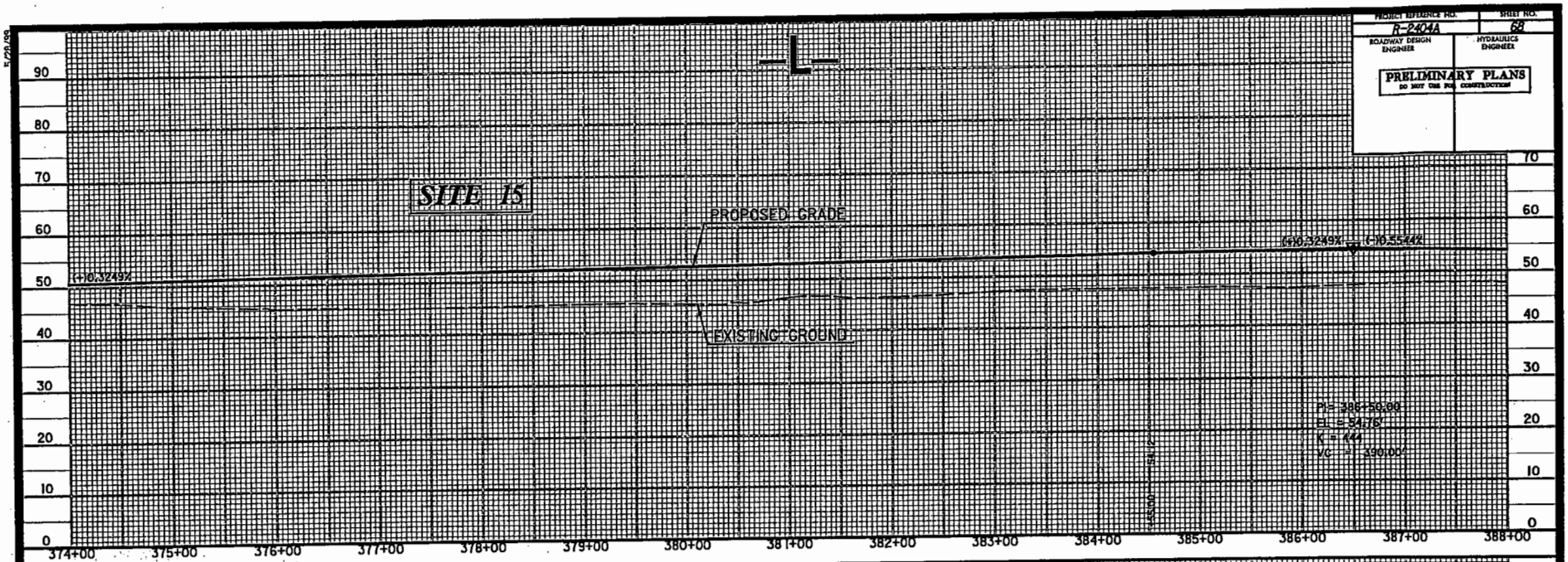
NAD 83

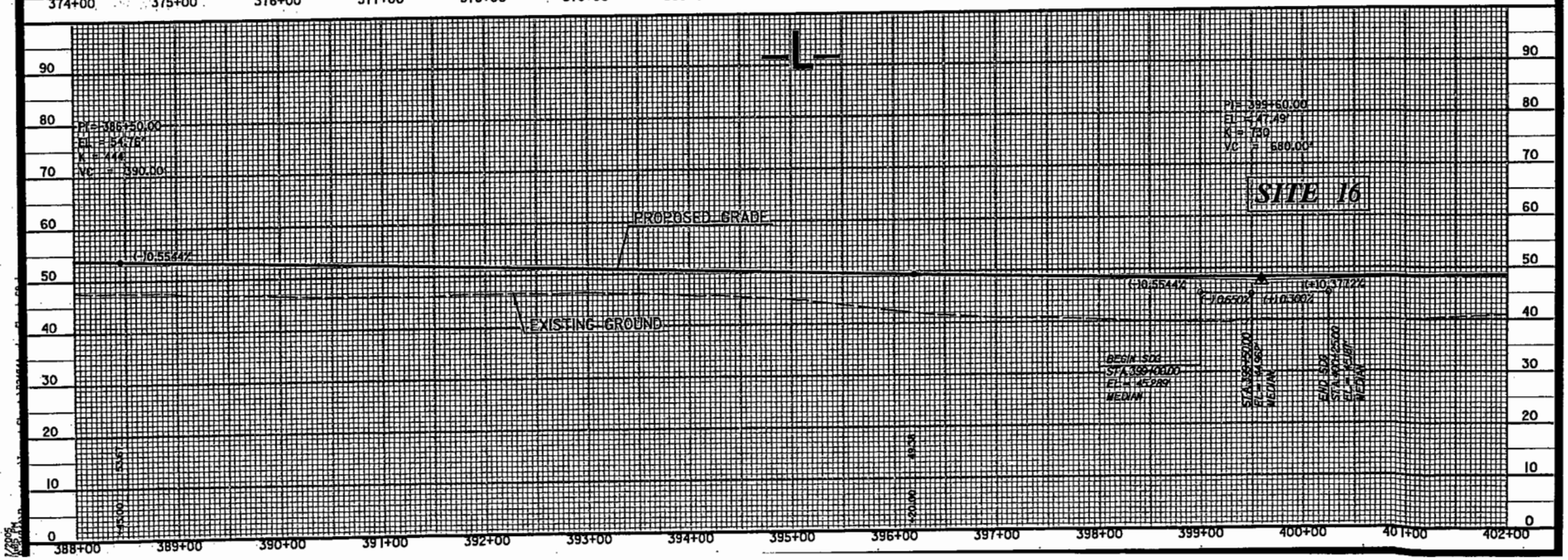


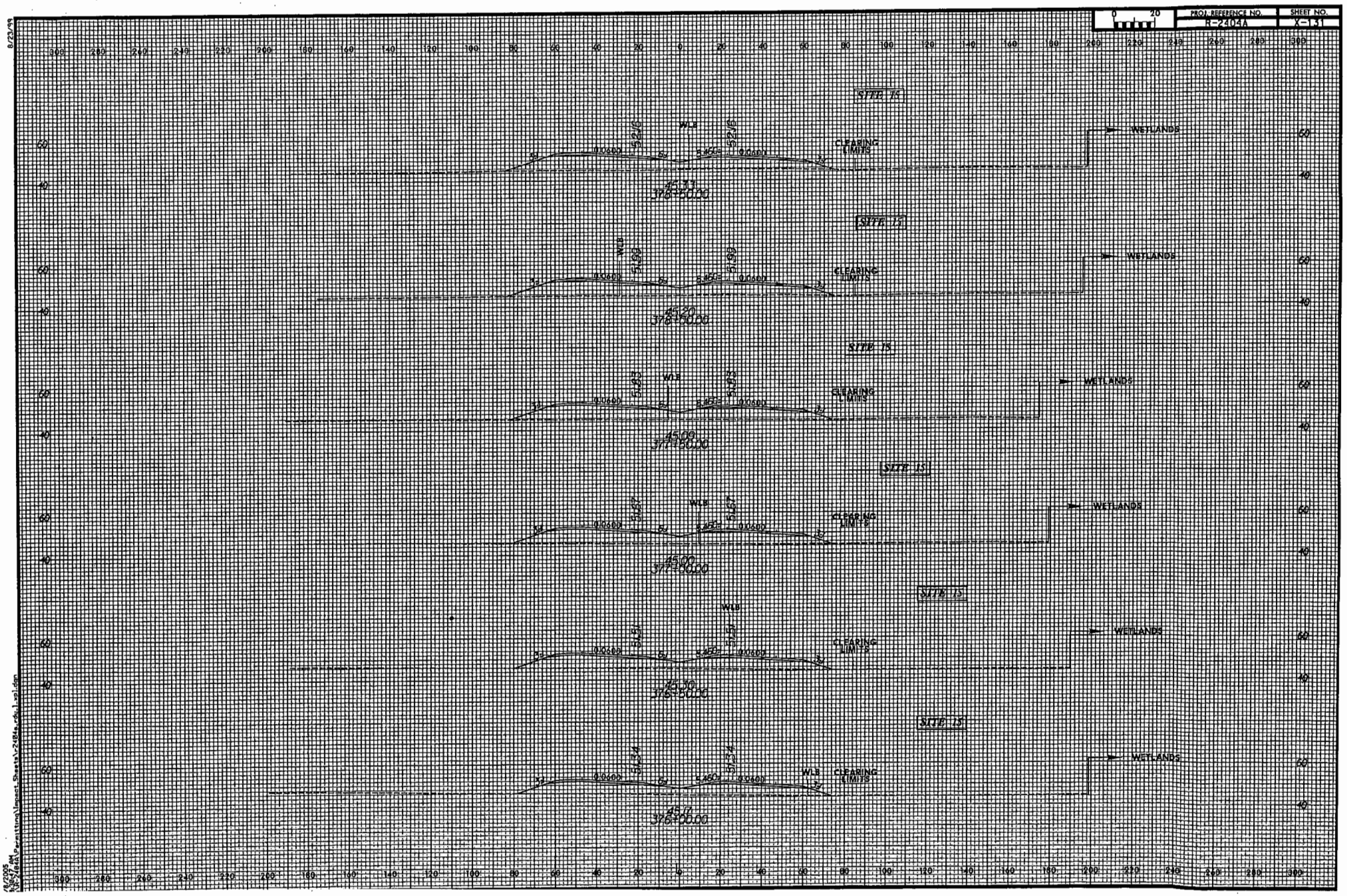
NOTES: SEE SHEET NOS. 68-69 FOR -L- PROFILE
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	68
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

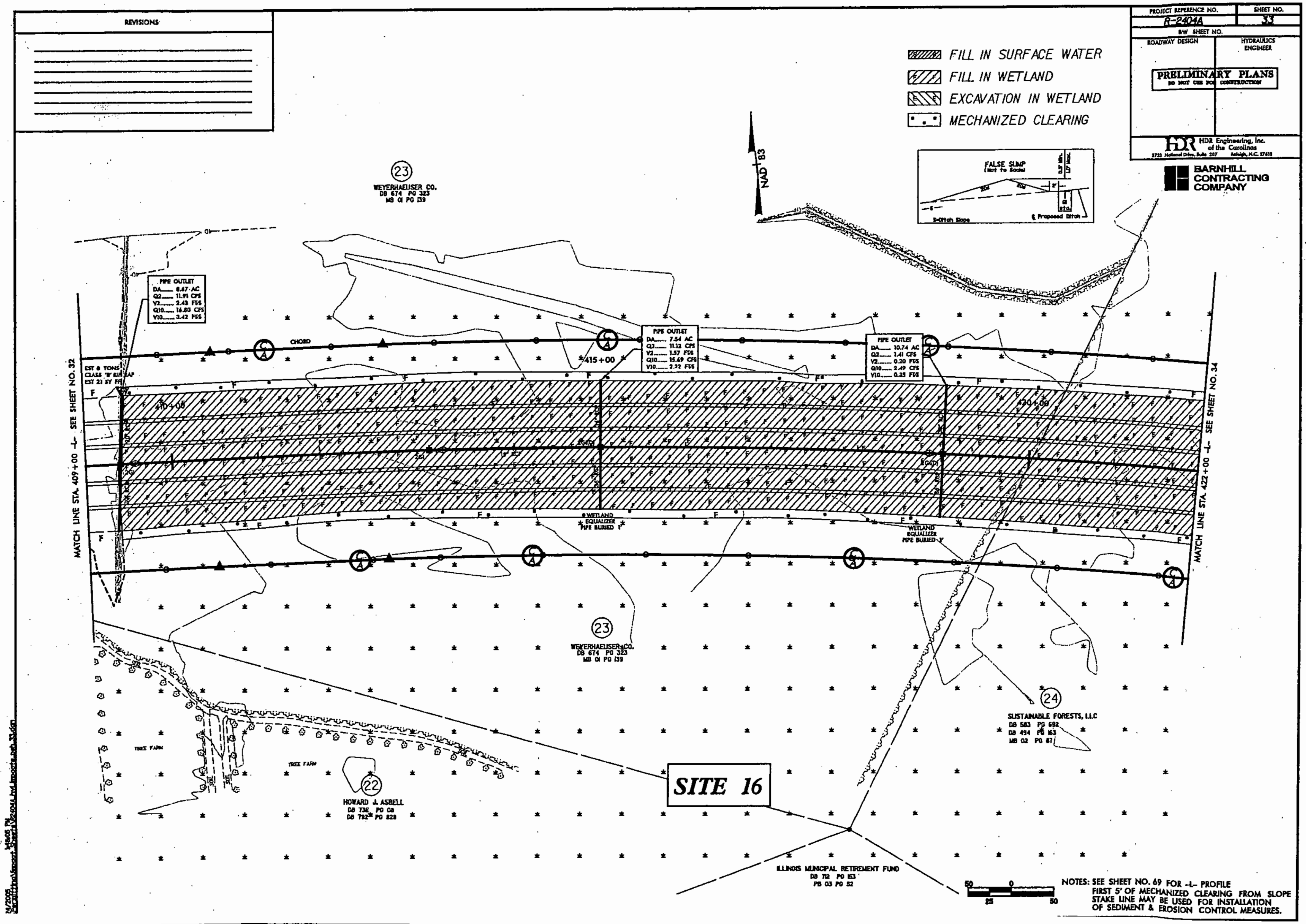
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION







PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-131
SITE 15
WLB
CLEARING LIMITS
WETLANDS
0.0600
5.450
45.33
378+50.00
45.20
378+00.00
45.09
377+50.00
45.00
377+00.00
45.30
376+50.00
45.17
376+00.00



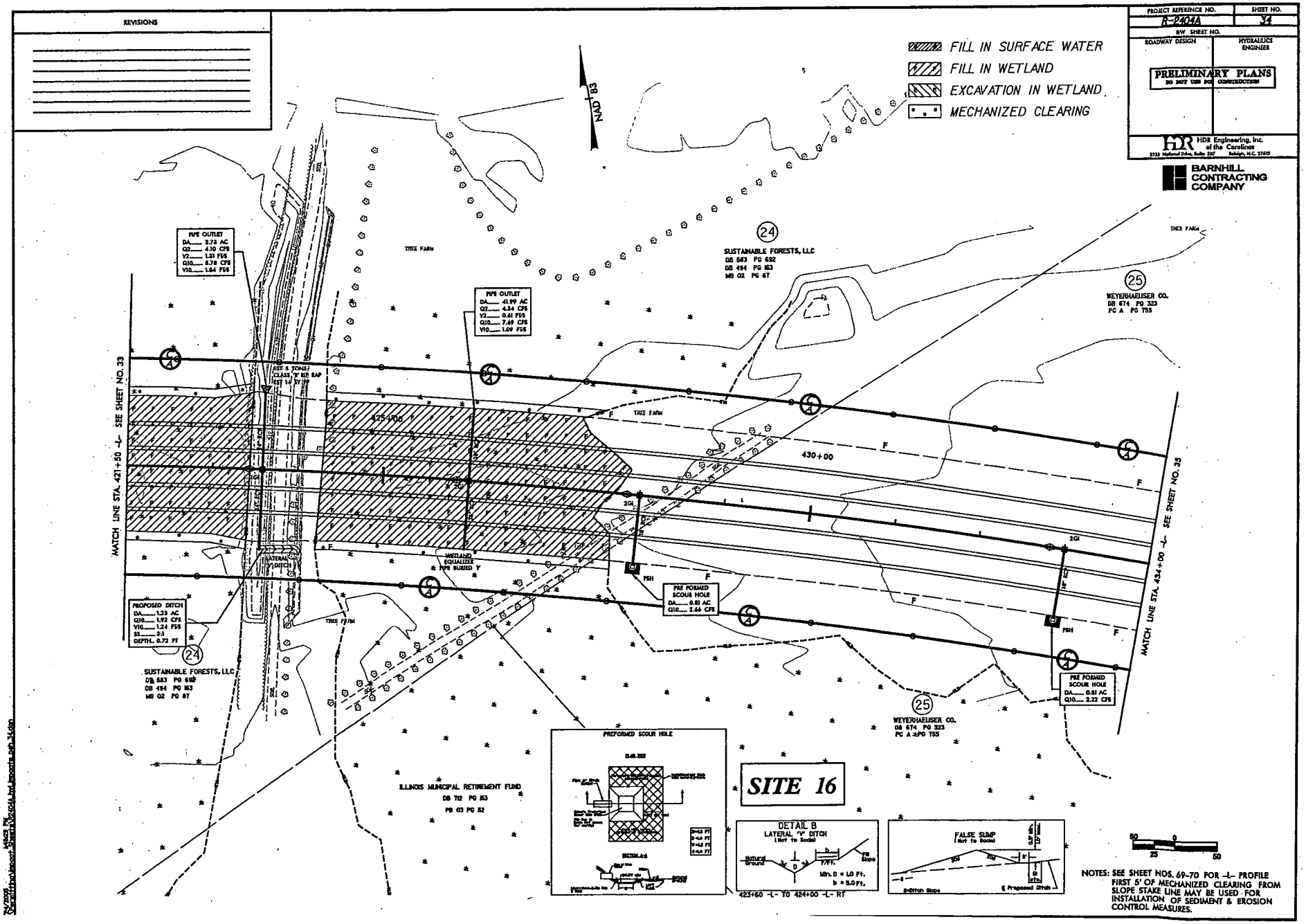
PROJECT REFERENCE NO.	SHEET NO.
R-2404A	33
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas

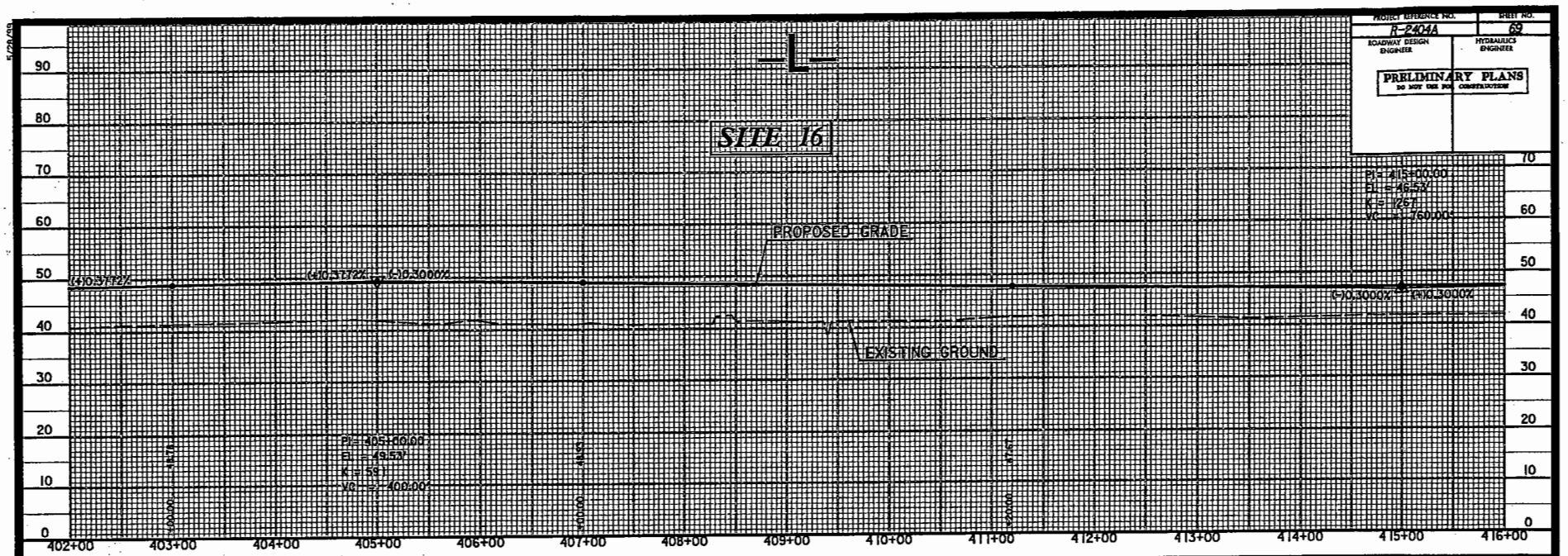
BARNHILL CONTRACTING COMPANY

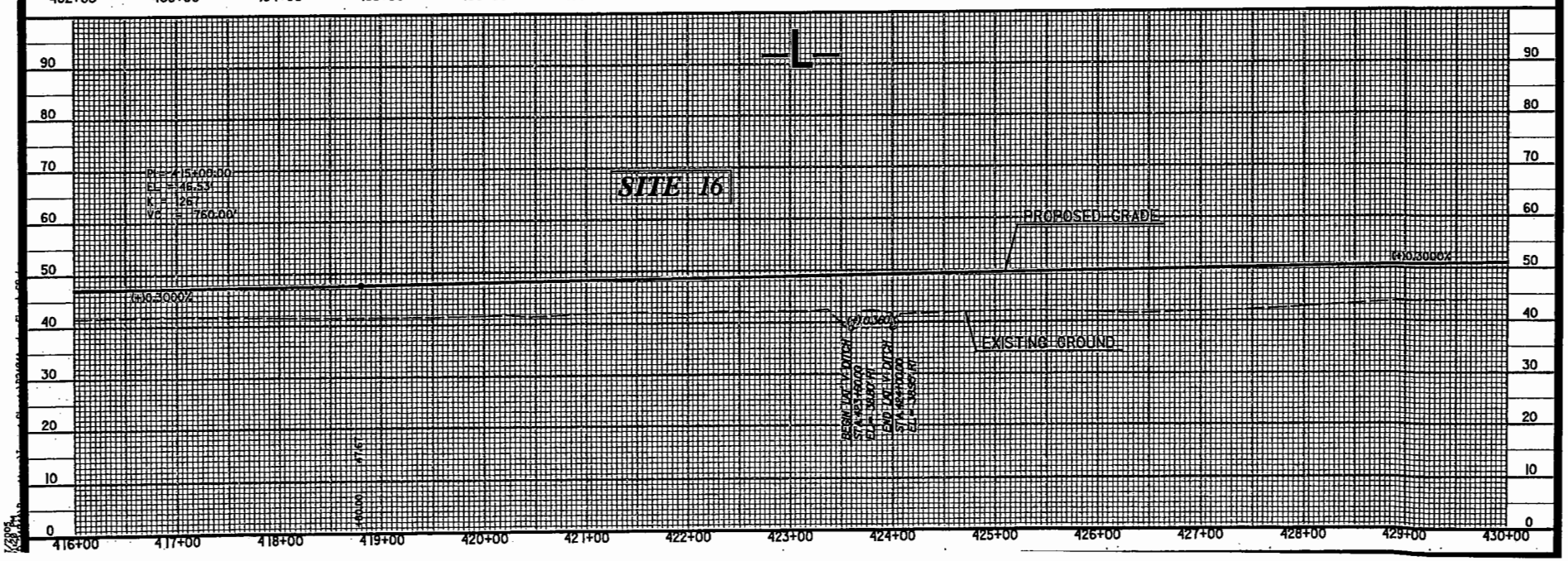
NOTES: SEE SHEET NO. 69 FOR -L- PROFILE
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

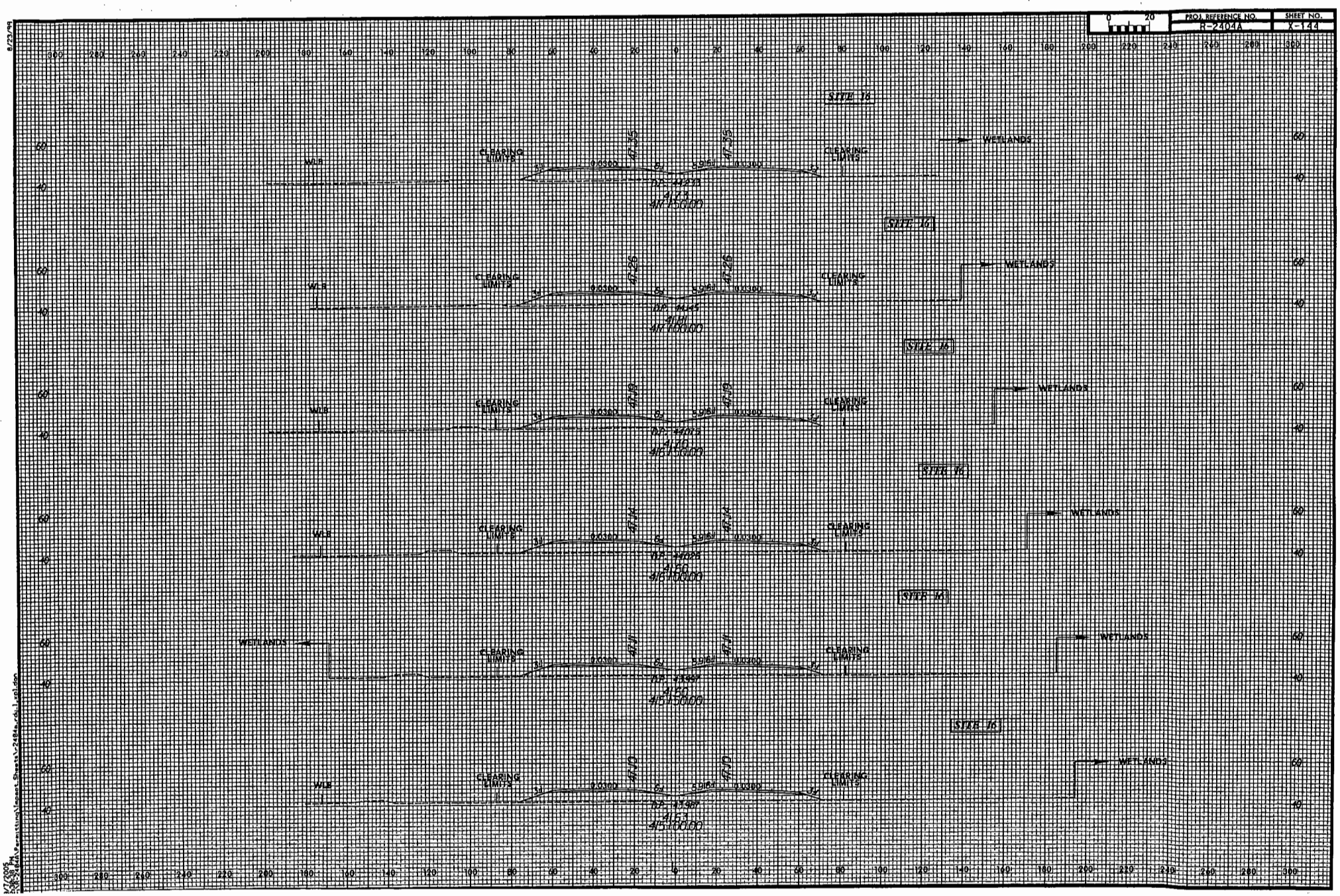

REVISIONS
PROJECT REFERENCE NO.
R-2404A
SHEET NO.
34
R/W SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
HDR Engineering, Inc. of the Carolinas
BARNHILL CONTRACTING COMPANY
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
NAD 83
MATCH LINE STA. 421+50 -L- SEE SHEET NO. 33
MATCH LINE STA. 434+00 -L- SEE SHEET NO. 35
PIPE OUTLET
DA 2.73 AC
Q2 4.10 CFS
V2 1.31 FT/S
Q10 5.78 CFS
V10 1.84 FT/S
PIPE OUTLET
DA 41.99 AC
Q2 4.34 CFS
V2 0.61 FT/S
Q10 7.69 CFS
V10 1.09 FT/S
PROPOSED DITCH
DA 1.23 AC
Q10 1.92 CFS
V10 1.24 FT/S
SS 3:1
DEPTH 0.72 FT
PRE FORMED SCOUR HOLE
DA 0.81 AC
Q10 2.66 CFS
PRE FORMED SCOUR HOLE
DA 0.81 AC
Q10 2.22 CFS
SUSTAINABLE FORESTS, LLC
DB 583 PG 692
DB 494 PG 163
MB 02 PG 67
WEYERHAEUSER CO.
DB 674 PG 323
PC A PG 755
ILLINOIS MUNICIPAL RETIREMENT FUND
DB 712 PG 153
PB 03 PG 52
TREE FARM
WETLAND EQUALIZER PIPE BURIED 'Y'
LATERAL 'Y' DITCH
425+00
430+00
PSH
2GI
PREFORMED SCOUR HOLE
SITE 16
DETAIL B
LATERAL 'Y' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D = 1.0 Ft.
b = 5.0 Ft.
423+60 -L- TO 424+00 -L- RT
FALSE SUMP
(Not to Scale)
Proposed Ditch
50 0 25 50
NOTES: SEE SHEET NOS. 69-70 FOR -L- PROFILE
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	69
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION






PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-144
0 20
SITE 16
WETLANDS
CLEARING LIMITS
WLB
47.35
47.26
47.19
47.14
47.11
47.10
BL 44.78
BL 44.45
BL 44.03
BL 43.78
BL 43.58
BL 43.58
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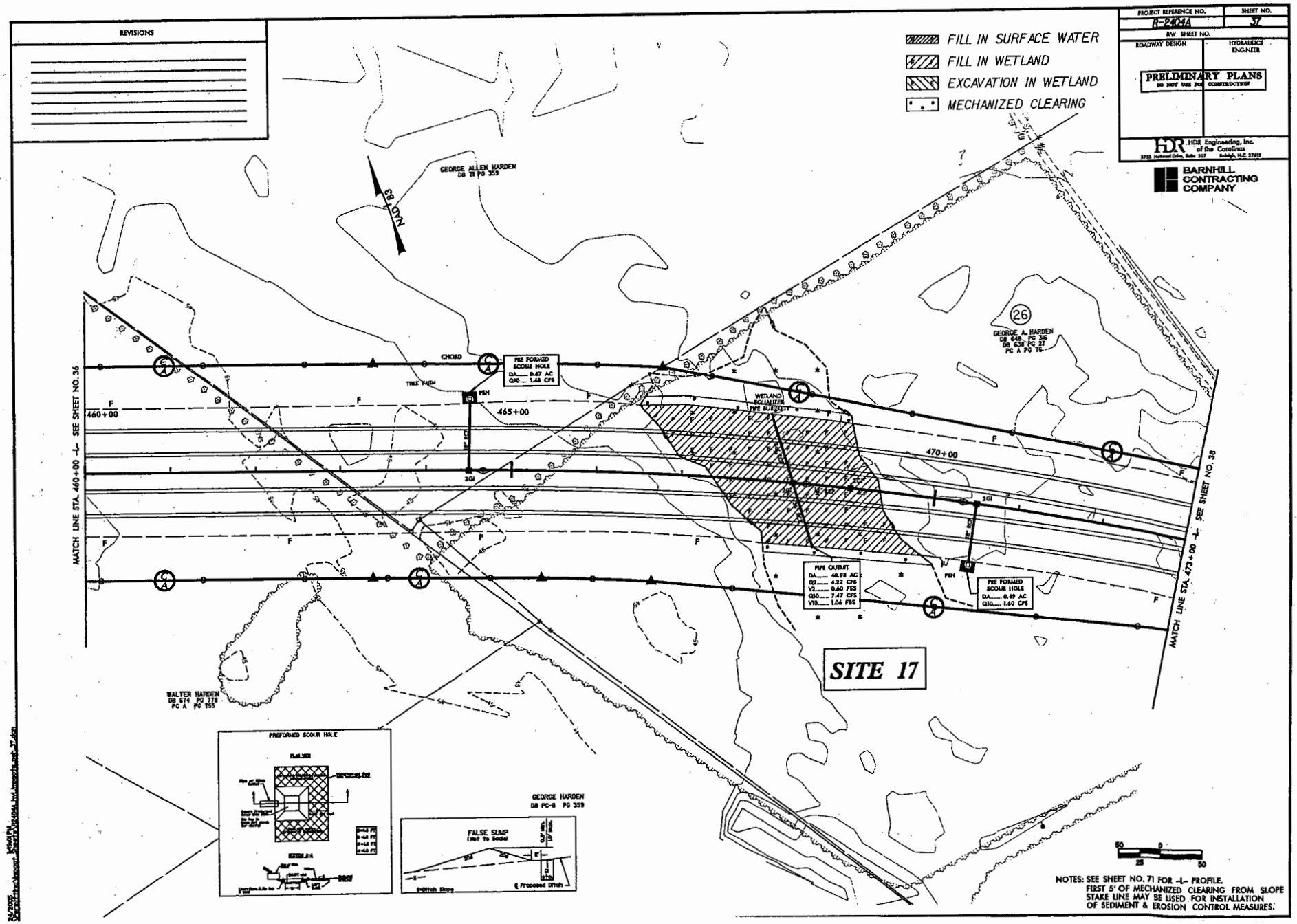
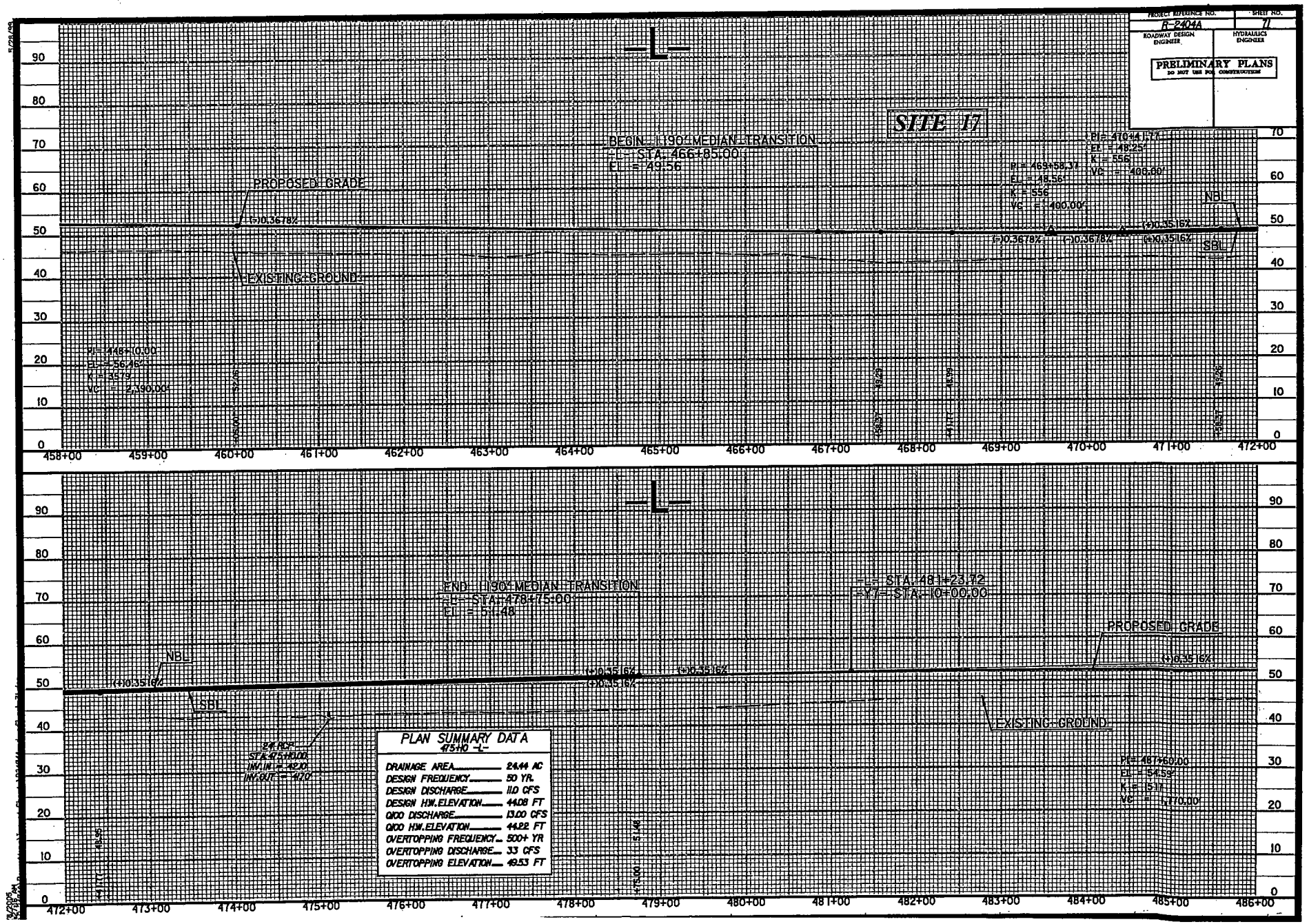
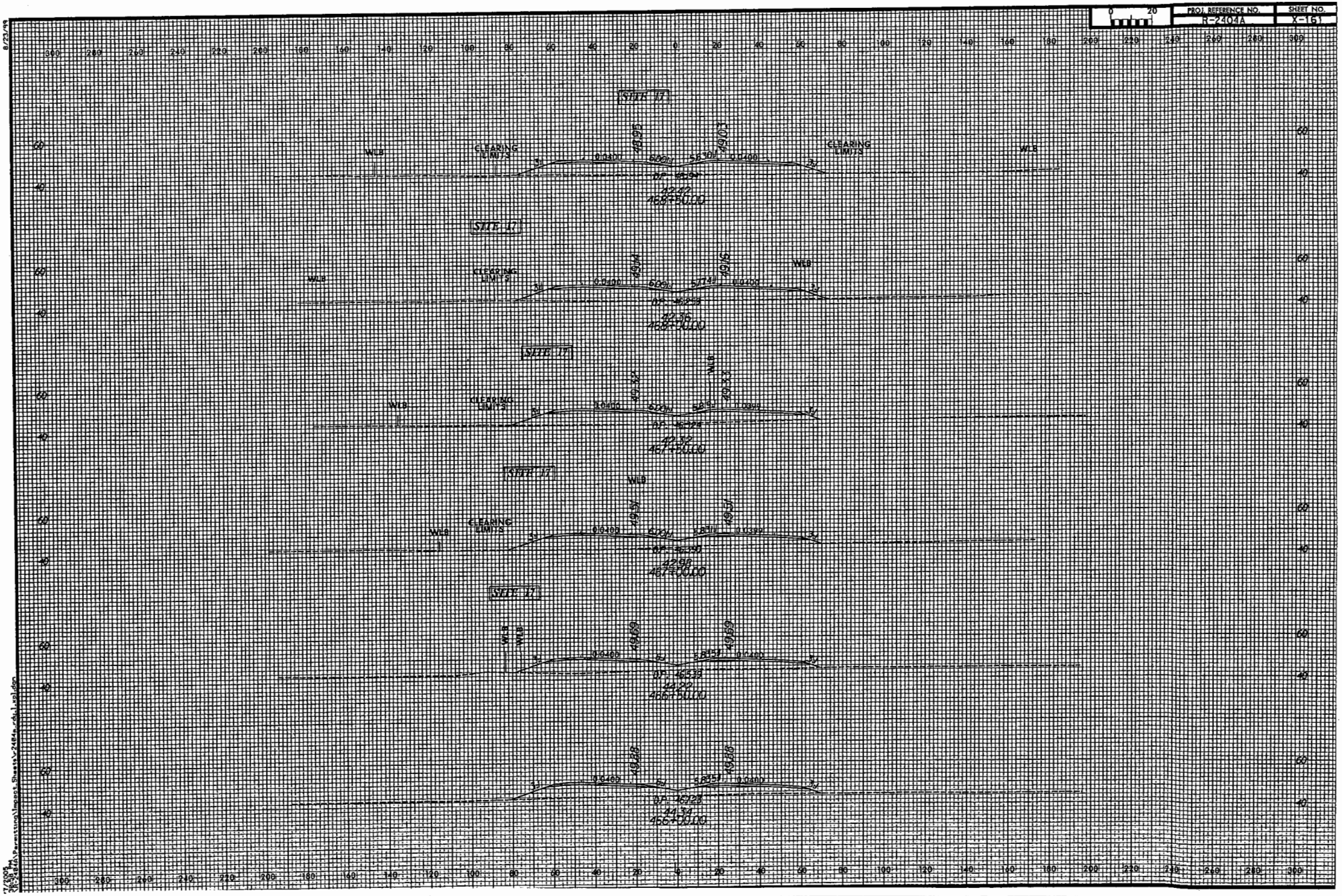


REVISIONS
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
PROJECT REFERENCE NO.
R-2404A
SHEET NO.
37
R/W SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
HDR Engineering, Inc. of the Carolinas
BARNHILL CONTRACTING COMPANY
GEORGE ALLEN HARDEN
DB 71 PG 359
NAD 83
CHORD
TREE FARM
PRE FORMED SCOUR HOLE
DA 0.67 AC
Q10 1.48 CFS
PSH
460+00
465+00
470+00
2GI
WETLAND EQUALIZER PIPE BURIED
26
GEORGE A. HARDEN
DB 648 PG 36
DB 638 PG 27
PC A PG 76
PIPE OUTLET
DA 40.93 AC
Q2 4.22 CFS
V2 0.60 FT/S
Q10 7.47 CFS
V10 1.06 FT/S
PRE FORMED SCOUR HOLE
DA 0.49 AC
Q10 1.60 CFS
MATCH LINE STA. 460+00 -L- SEE SHEET NO. 36
MATCH LINE STA. 473+00 -L- SEE SHEET NO. 38
SITE 17
WALTER HARDEN
DB 674 PG 778
PC A PG 755
PREFORMED SCOUR HOLE
GEORGE HARDEN
DB PC-8 PG 359
FALSE SUMP
(Not to Scale)
Ditch Slope
Proposed Ditch
50 0 25 50
NOTES: SEE SHEET NO. 71 FOR -L- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	71
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION




PROJ. REFERENCE NO.
R-2404A
SHEET NO.
X-161
SITE 17
WLB
CLEARING LIMITS
0.0400
6.00H
5.83H
0.0399
48.95
49.03
42.42
468+50.00
49.14
49.16
42.36
468+00.00
49.32
49.33
42.32
467+50.00
49.51
42.98
467+00.00
49.69
44.22
466+50.00
49.88
44.34
466+00.00

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	46
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

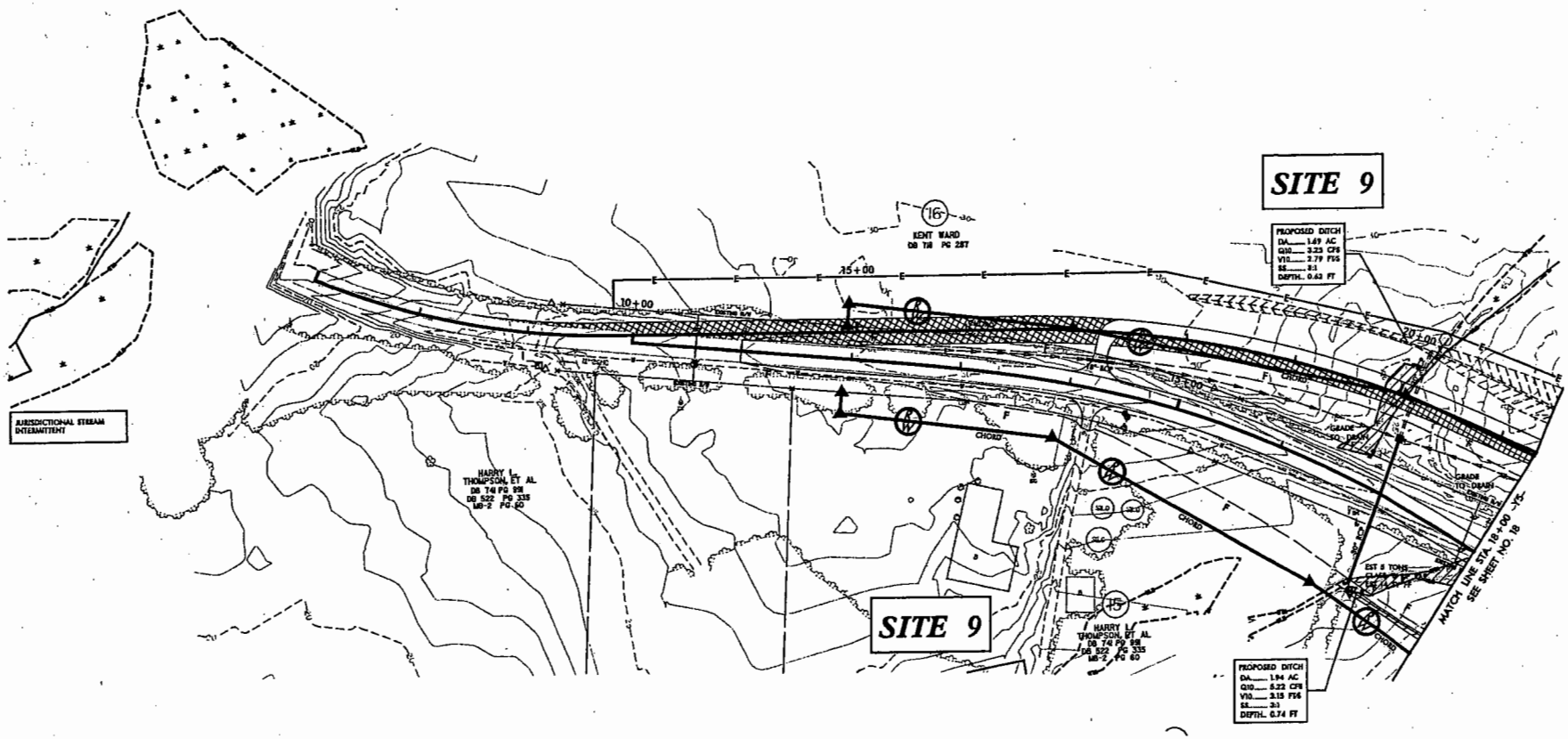
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
2733 National Drive, Suite 202 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83



NOTES: SEE SHEET NO. 82 FOR -YS- PROFILE.
ALL DRIVEWAY RADII ARE 20' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

50 0 25 50

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	47
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

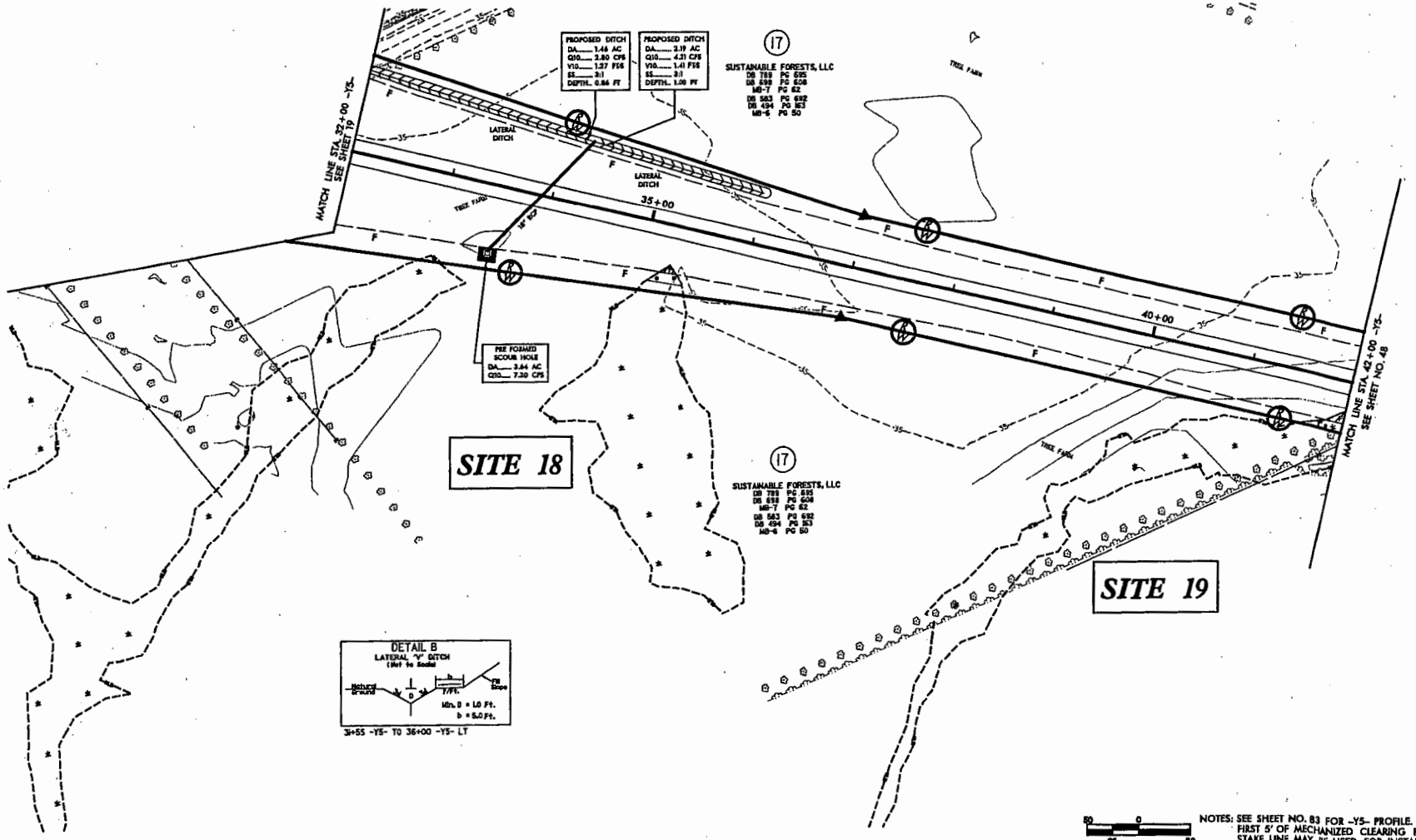
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
2733 Hillsborough Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83



NOTES: SEE SHEET NO. 83 FOR -Y5- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.

PROJECT REFERENCE NO.	SHEET NO.
R-2404A	48
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

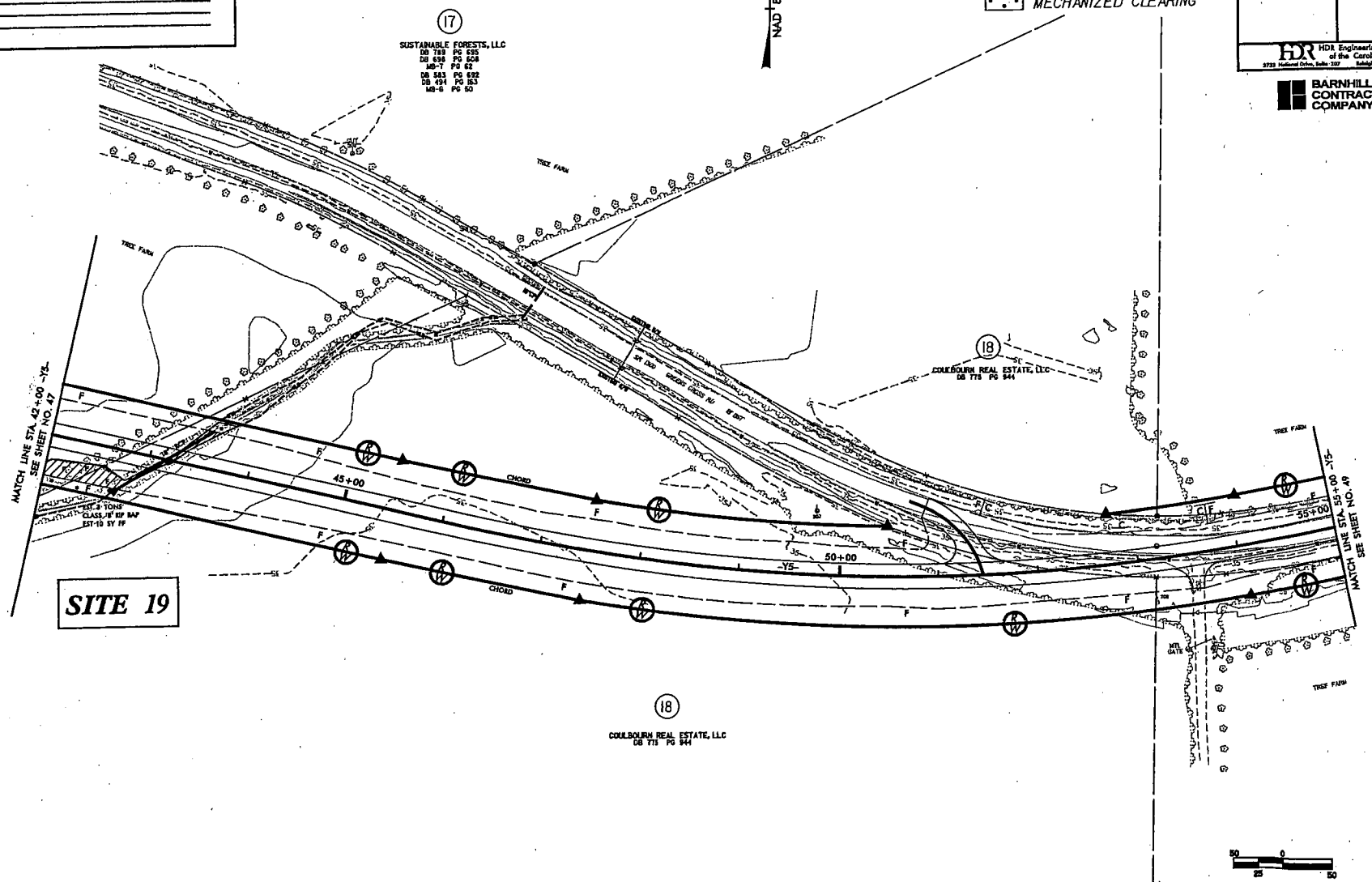
HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

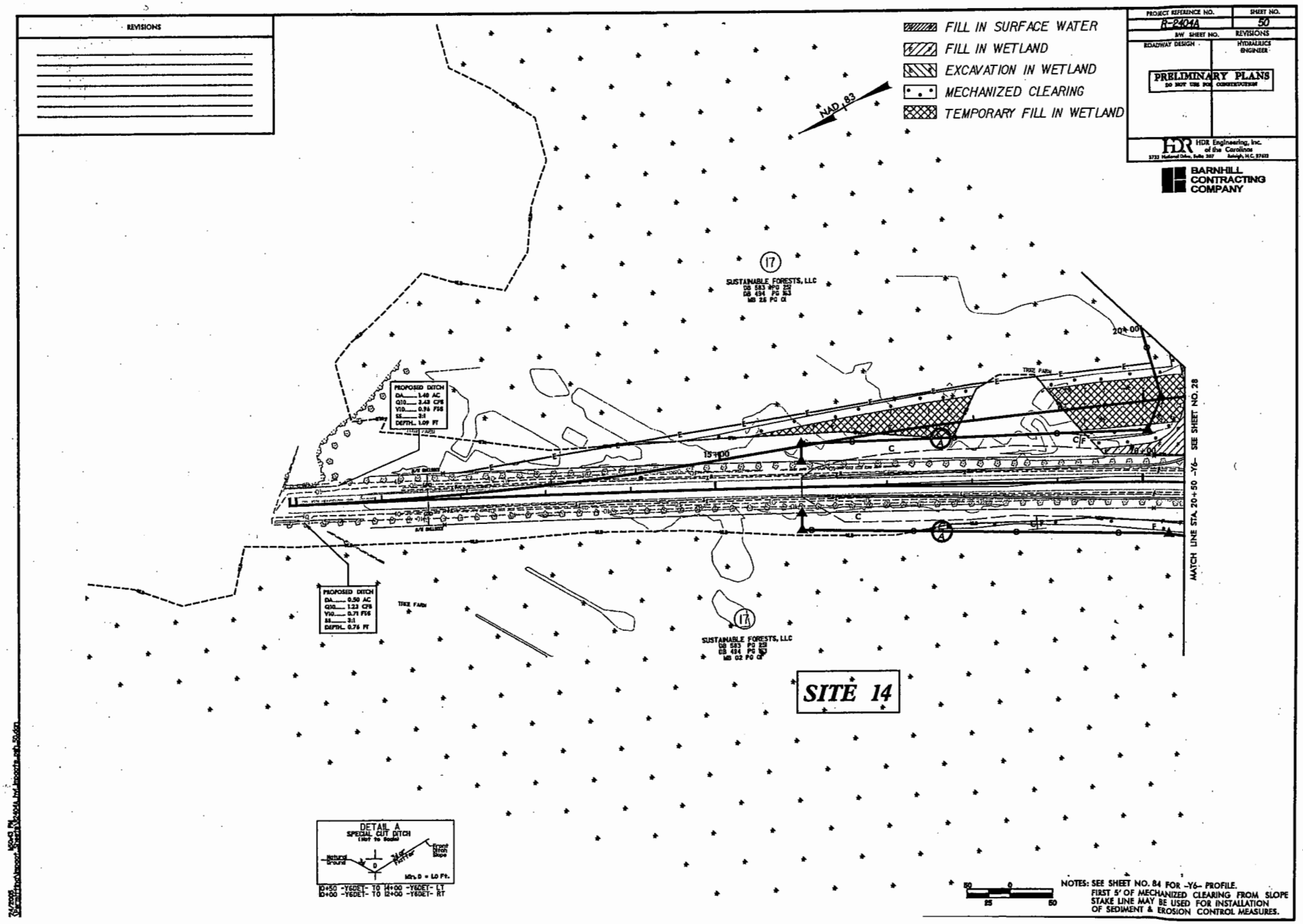
REVISIONS

FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING

NAD 83



NOTES: SEE SHEET NO. 83 FOR -Y5- PROFILE.
ALL DRIVEWAY RADII ARE 20' UNLESS OTHERWISE NOTED.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.


REVISIONS
FILL IN SURFACE WATER
FILL IN WETLAND
EXCAVATION IN WETLAND
MECHANIZED CLEARING
TEMPORARY FILL IN WETLAND
NAD 83
PROJECT REFERENCE NO.
R-2404A
SHEET NO.
50
R/W SHEET NO.
REVISIONS
ROADWAY DESIGN
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
HDR Engineering, Inc. of the Carolinas
BARNHILL CONTRACTING COMPANY
17
SUSTAINABLE FORESTS, LLC
DB 583 PG 251
DB 494 PG 163
MB 25 PG 01
PROPOSED DITCH
DA 1.40 AC
Q10 3.43 CFS
V10 0.96 FPS
SS 3:1
DEPTH 1.09 FT
PROPOSED DITCH
DA 0.50 AC
Q10 1.23 CFS
V10 0.71 FPS
SS 3:1
DEPTH 0.76 FT
TREE FARM
15+00
20+00
MATCH LINE STA. 20+50 -Y6- SEE SHEET NO. 28
SITE 14
DETAIL A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D = 1.0 Ft.
0+50 -Y6DET- TO 14+00 -Y6DET- LT
0+00 -Y6DET- TO 12+00 -Y6DET- RT
NOTES: SEE SHEET NO. 84 FOR -Y6- PROFILE.
FIRST 5' OF MECHANIZED CLEARING FROM SLOPE STAKE LINE MAY BE USED FOR INSTALLATION OF SEDIMENT & EROSION CONTROL MEASURES.