STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 22, 2007

U.S. Army Corps of Engineers
P.O. Box 1890
Wilmington, North Carolina 28402

Attention: Richard Spencer
NCDOT Coordinator, Division 8

Subject: **Application for Individual Section 404 Permit and Individual Section 401 Water Quality Certification** for US 1 widening, from SR 1528 in Richmond County to existing multi-lanes north of the Moore County line, State Project No. 6.589009T, TIP R-2502B, Division 8
$570 debit WBS No. 34438.1.1.

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to widen Highway US 1 in Richmond and Moore Counties. Proposed widening will begin north of SR 1528 in Richmond County to the existing divided facility north of the Moore County line, a distance of approximately 3 miles. The proposed project consists of constructing a four-lane 46 foot median divided facility with partial and full control access. The 298 feet long bridge crossing Drowning Creek will be replaced with dual 440 feet long, 40 feet wide pre stressed modified concrete girder, which will span the entire creek. This application package consists of this cover letter, ENG form 4345, permit drawings, half size plan sheets, Ecosystem Enhancement Program (EEP) confirmation letter, North Carolina Department of Cultural Resources Letter, and Hydraulic Review meeting minutes.

Purpose and Need: The main purpose of the proposed US 1 widening is to improve capacity and safety within the project limits.

Summary of Impacts: R-2502B is in the Lumber River Basin, Hydrologic Cataloging Unit 03040203. Permanent impacts on jurisdictional areas of the proposed project consist of a total of 5.18 acres of riverine wetlands. There will be no stream or temporary wetland impacts associated with the project.

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

TELEPHONE: 919-715-1334
FAX: 919-715-5501

WEBSITE: WWW.NCDOT.ORG

LOCATION:
2728 CAPITOL BOULEVARD
SUITE 240
RALEIGH NC 27604

Summary of Mitigation:
The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the Environmental Assessment (EA) document and design processes. However, project impacts will still require mitigation. Impacts that will require mitigation include 5.18 acres of riverine wetlands. The Ecosystem Enhancement Program (EEP) will provide compensatory mitigation for these wetland impacts.

SEPA DOCUMENT STATUS

The Final State Environmental Assessment (EA) was approved on September 28, 2000 and the Finding of No Significant Impact (FONSI) was approved on March 30, 2005 for R-2502 sections A and B. There are no jurisdictional impacts associated with section A. After documents were approved they were circulated to the agencies. Additional copies are available upon request.

INDEPENDENT UTILITIES

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

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

RESOURCE STATUS

Delineations:
Wetland and stream determination and delineations within R-2502B were conducted by NCDOT Biologists in April, May, and June 2000 using the field delineation method outlined in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987). A jurisdictional determination from Mr. Richard Spencer of the USACE Wilmington Regulatory Field Office was issued on November 13, 2003.

IMPACTS TO WATERS OF THE UNITED STATES

Wetlands:
The project lies in the Coastal Plain Physiographic Province in the Lumber River Basin (Hydrologic Cataloging Unit 03040203, Sub-basin 03-07-50). Wetland impacts due to proposed construction occur at 9 sites. Table 1 is a list of impacts to jurisdictional wetland resources (which include impacts resulting from fill, hand clearing, and mechanized clearing), riverine or non-riverine status, community type, and cowardin classification. The calculations and drawings are presented in the attached permit drawings. Total impacts include 5.18 acres of riverine wetlands. Hand clearing will be done for the construction of the new bridge and for use of the temporary work bridge. The available fill material would not support 2:1 slopes. All sites use 3:1 slopes in wetlands except for Site 1. Site 1 shows 4:1 slopes as the fill material for this specific location would not support a 3:1 slope.

Table 1. Wetland Impacts

Site #	Community Type	Permanent Wetland Impacts (ac)	Riverine/ Non-Riverine	Cowardin Classification	Hand Clearing in Wetlands (ac)
Site 1	Coastal Plain Small Stream Swamp	0.06	Riverine	PFO6F	0
Site 2	Coastal Plain Small Stream Swamp	0.18	Riverine	PFO6F	0
Site 3	Streamhead Pocosin	0.83	Riverine	PFO6C	0
Site 4	Successional Pine Forest	0.49	Riverine	PSS1C	0
Site 5	Coastal Plain Small Stream Swamp	1.27	Riverine	PFO6F	0
Site 6	Coastal Plain Small Stream Swamp	0.12	Riverine	PFO6F	0
Site 7	Coastal Plain Small Stream Swamp	1.47	Riverine	PFO6F	0
Site 8	Coastal Plain Small Stream Swamp	0.76	Riverine	PFO6F	0
Site 9	Coastal Plain Small Stream Swamp	0	Riverine	PFO6F	1.4
Total		**5.18**			**1.4**

Streams:
There will be no stream impacts due to highway construction. One perennial stream, Drowning Creek, is the only stream crossing associated with this project. A temporary work bridge spanning Drowning Creek will be used for construction of the new bridge. Currently there are no bents in the stream at this location. Drowning Creek [DWQ Index No. 14-2-(6.5)] has a best usage classification of WS-II, Sw, HQW. Drowning Creek does not appear on the 2006 Final 303(d) list nor do any streams within one mile of the project. No WS-I or ORWs occur within 1.0 mile of the project.

Bridge Demolition:
Existing Bridge No. 42 was built in 1923 it is 298 feet long and 25.9 feet wide. It consists of seven-spans between 40 and 43 feet each. The bridge superstructure consists of reinforced concrete deck girders. The substructure of the bridge consists of reinforced concrete abutments on pile footings and interior concrete post and web on pile footings. All precautions will be taken to prevent existing bridge components from falling into Waters of the U.S. All guidelines for bridge demolition and removal will be followed in addition to Best Management Practices for the Protection of Surface Waters.

Utility Impacts:
Utility relocations will be conducted in jurisdictional areas. Above ground utility lines will be moved from the east side of US 1 to the west side of US 1. Utility lines are being moved to avoid increased wetland impacts on the eastern side of US 1. Above ground utility lines will cross US 1 at station –L- 414+51.00 and continue into Moore County until station –L- 453+89.93 where they will reconnect with the east side of US 1. Timber matts will be used wherever heavy equipment may be needed to access wetland areas. Hand clearing in wetlands will also be utilized to avoid permanent impacts. Total permanent wetland utility impacts will be 21 square feet due to the placement of 12 utility poles and 2 guy wires (see Table 2).

There will be no additional wetland impacts associated with the placement of an underground water line from Special Forces Way (station –L- 414+51.00) to beyond the project limits in Moore County (station –L- 460+00.00). The water line will be placed in proposed permitted areas and it will be directionally drilled under Drowning Creek to avoid impacts.

Table. 2 Wetland Utility Impacts

Site #	Community Type	Permanent Wetland Impacts (sq. feet)	Riverine/ Non-Riverine	Hand Clearing in Wetlands (ac)
Site 1	Streamhead Pocosin	5.0	Riverine	0.23
Site 2	Coastal Plain Small Stream Swamp	7.0	Riverine	0.43
Site 3	Coastal Plain Small Stream Swamp	9.0	Riverine	1.27
Total		**21.0**		**1.93**

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 May 10, 2007, the U.S. Fish and Wildlife Service (FWS) lists six federally protected species for Richmond County and four for Moore County (Table 3).

Table 3. Federally Protected Species for Richmond and Moore Counties

Scientific Name	Common Name	County	Status	Habitat Present	Biological Conclusion
Haliaeetus leucocephalus	Bald Eagle	Richmond	De-listed	No	Not Required
Picoides borealis	Red-cockaded Woodpecker	Richmond/Moore	E	Yes	May Affect, Not Likely to Adversely Affect
Schwalbea americana	American Chaffseed	Moore	E	No	No Effect
Rhus michauxii	Michaux's sumac	Richmond/Moore	E	Yes	No Effect
Notropis mekistocholas	Cape Fear Shiner	Moore	E	No	No Effect
Lasmigona decorata	Carolina heelsplitter	Richmond	E	No	No Effect
Lysimachia asperulaefolia	Rough-leaved loosestrife	Richmond	E	No	No Effect
Acipenser brevirostrum	Shortnose sturgeon	Richmond	E	No	No Effect

"E" denotes Endangered (a species that is in danger of extinction throughout all or a significant portion of its range).
"T" denotes Threatened "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

Biological Conclusions of No Effect have been rendered in the EA for American chaffseed, Cape Fear shiner, Carolina heelsplitter, rough-leaved loosestrife, and the shortnose sturgeon due to lack of suitable habitat.

The bald eagle has been added to the list of threatened species in Richmond County after approval of the FONSI dated March 30, 2005, but has been delisted as of August 8, 2007. It is not subject to Section 7 consultation and a biological conclusion is not required. However, the bald eagle remains protected by the Bald and Golden Eagle Protection Act. The location of the project is in both rural and disturbed areas northeast of the City of Rockingham. No foraging habitat for bald eagles is present however suitable nesting trees (*Pinus taeda*, *Pinus elliottii,* and *Pinus palustris* > 50 years of age) are present within 660 feet of the project. Surveys within 0.5 miles of the project did not locate bald eagles or their nests.

Suitable habitat for the red-cockaded woodpecker (RCW) exists within the project area. RCW surveys were conducted within one-half mile of the project study area by Dr. J.H. Carter III and Associates on April 2003 and April/June 2007. Eight inactive clusters were located within one-half mile of the project corridor. The U.S Fish and Wildlife Service has concurred with a biological conclusion of "may affect-not likely to adversely affect" the RCW for this project in a letter dated Feb. 11, 2004 (FONSI appendix A-1).

Suitable habitat for Michaux's sumac exists within the project area. The project area was surveyed in May 2000 and 2004 by NCDOT biologists. Two populations of Michaux's sumac were found within the existing US 1 right of way. One population is located south of Marston (EO 59.54) and is included with TIP project R-2502A. This population will not be affected. The other population is located north of Hoffman (EO 56.55). The proposed project (R-2502B) will affect this site. Because this is a state-funded project no federal permits are required in the area of these protected plants, section 7 of the Endangered Species Act does not apply in this case and consultation with the U.S Fish and Wildlife Service is not required.

NCDOT has coordinated with the U.S Fish and Wildlife Service regarding the project's effect on these plants. NCDOT has modified the project design in order to reduce the number of plants

affected. The following steps will be taken by NCDOT to limit impacts to this federally-protected plant:

- Plants within the proposed construction limits of the project will be relocated to a protected area prior to construction. This relocation will be coordinated with the U.S Fish and Wildlife Service, the NC Natural Heritage Program, and the NC Wildlife Resources Commission. (Plants have been relocated in Feb. 2006 and Feb. 2007)

CULTURAL RESOURCES

Historic Architecture:
NCDOT Architectural historians surveyed the area of potential effect of the proposed project. No properties eligible for or listed on the National Register of Historic Places were identified within the area of potential effect. The State Historic Preservation Office concurred with these findings in a letter dated October 1, 1999 (EA document, appendix A-21).

Archaeology:
The State Historic Preservation Office (SHPO) requested additional work be conducted on two archaeological sites in the project area (sites 31RH133&133** and 31RH319&319**). This additional work was requested to determine whether or not the sites were eligible for listing on the National Register.

NCDOT Archaeologists undertook additional investigations at sites 31RH133&133** and 31RH319&319** following right of way acquisition. The SHPO determined that no additional investigations are necessary in a letter dated May 23, 2007. A copy of this letter has been enclosed.

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.

ICE STUDY

A full report on the Indirect and Cumulative Effects (ICE) for TIP No. R-2502B has been sent to the Division of Water Quality. Additional copies are available at NCDOT's Communities Unit upon request.

Existing Conditions

- Richmond County and nearby portions of Moore and Scotland Counties are experiencing minimal growth. The potential for growth is likely limited by declining employment, environmental features (such as wetlands and water supply watersheds), and the large amount of state, federal, and privately owned or protected lands (such as Camp Mackall, the Sandhills Game Lands, and property of the Sandhills Area Land Trust).
- The majority of TIP R-2502 falls within Richmond County, which has established zoning and other ordinances to control development. The Growth Impact Study Area (GISA) of the project also encompasses portions of Moore and Scotland Counties, as well as the Town of Hoffman, all of which have land planning strategies in place.
- US 1 is a national road with the primary purpose of transporting people and goods through the GISA of TIP R-2502. Major regional termini of US 1 include Columbia, South Carolina to the south and Raleigh to the north. US 1 also provides a link

between the local cities of Rockingham and Southern Pines. Some traffic on this road could be attributed to tourists driving to the numerous golf courses of Southern Pines or to the North Carolina Motor Speedway prior to its recent closure.

Potential Indirect and Cumulative Impacts

- TIP R-2502 proposes to widen an existing roadway facility in a low-growth, primarily rural area that contains numerous undevelopable tracts of land. It is unlikely that the project will generate development pressure within the GISA upon completion.
- Potential cumulative impacts include spillover growth from neighboring communities (the City of Rockingham and the towns of Southern Pines and Pinehurst) and increased regional traffic flow due to the creation of I-73/74.

WILD AND SCENIC RIVERS

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

ESSENTIAL FISH HABITAT

The project will not impact any essential fish habitat afforded protection under the Magnuson-Stevens Act of 1996 (16 U.S.C 1801 et *seq.*).

MITIGATION OPTIONS

The US Army Corps of Engineers (USACE) has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy that embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of the waters of the United States. CEQ has defined mitigation of wetland and surface-water impacts to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20).

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. This project has gone through NEPA/404 and Merger 01 Concurrence Points 4B and 4C for avoidance and minimization (minutes attached). Avoidance measures were taken during the planning and minimization measures were incorporated as part of the project design. Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts. No stream impacts are associated with this project as the bridge was designed to span Drowning Creek and avoid impacts.

Avoidance: Impacts to jurisdictional wetlands could not be avoided. Avoided impacts to Drowning Creek by spanning the creek.

Minimization: The following techniques were implemented:

Project Wide Minimization Measures

- NCDOT will implement Best Management Practices for Bridge Demolition and Removal.
- NCDOT will strictly adhere to "Design Standards in Sensitive Watersheds" (15A NCAC 04B .0024) (HQW standards) throughout design and construction of the portion of the project north of SR 1004 (Bostick Road)

- A Hazardous spill catch basin will be constructed at the Drowning Creek crossing
- The use of turbidity curtains during in-stream work will be studied during development of erosion control plans for the project and curtains will be utilized if it is determined they will be effective in the conditions found in Drowning Creek.
- NCDOT BMP's for the protection of surface waters will be strictly enforced during the construction of this project

Site Specific Minimization Measures, Wetland Impacts

Site 1

- Station -L- 395+00 Lt, Lateral V ditch was designed to maintain low velocities so that rip rap will not be placed in the wetland.

Site 2

- Station –L- 411+71 Rt, Mechanized clearing in the wetland is taken only to construction boundaries instead of the right of way boundary.

Site 3

- Station –L- 417+78 Lt, Mechanized clearing in the wetland is taken only to construction boundaries instead of the right of way boundary.
- Station –L- 424+39 Lt, Hazardous spill basin will be constructed and can be used in the event of a hazardous chemical spill.

Site 5

- Station –L- 427+77 Lt, Mechanized clearing in the wetland is taken only to construction boundaries instead of the right of way boundary.

Site 6

- Station –L- 427+77 Rt, Mechanized clearing in the wetland is taken only to construction boundaries instead of the right of way boundary.

Site 7

- Station –L- 445+74 Lt, Mechanized clearing in the wetland is taken only to construction boundaries instead of the right of way boundary.
- Station –L- 448+00 Lt, Hazardous spill basin will be constructed and can be used in the event of a hazardous chemical spill.

Site 8

- Station –L- 448+00 Rt, Hazardous spill basin will be constructed and can be used in the event of a hazardous chemical spill.
- Station –L- 445+74 Lt, Mechanized clearing in the wetland is taken only to construction boundaries instead of the right of way boundary.

Site 9

- Station –L- 434+00, Hand clearing will be used instead of mechanized clearing.
- Station –L- 434+00, Drowning Creek will be spanned, no bents will be placed in the stream.

Site Specific Minimization Measures, Wetland Utility Impacts

Utility Sites 1-3

- Hand clearing will be used instead of mechanized clearing
- Directional bore will be used to install water line under Drowning Creek

<u>Compensatory Mitigation:</u>

Construction for the widening of US 1 will result in 5.18 acres of permanent wetland impacts. Mitigation will be required for 5.18 acres of riverine wetland impacts within the Lumber River basin Hydrologic Cataloging Unit 03040203. These wetland impacts will be mitigated through the EEP. A copy of the EEP confirmation letter is included with this application.

PROJECT SCHEDULE

This project has a let date of June 18, 2008, review date of April 29, 2008, and date of availability of July 23, 2008.

REGULATORY APPROVALS

Application is hereby made for a Department of the Army Section 404 Individual Permit as required for the above-described activities for the proposed TIP project R-2502B. We are also hereby requesting a Section 401 Water Quality Certification from the Division of Water Quality. In compliance with Section 143-215.3D(e) of the NCAC, we will provide $570 to act as payment for processing the Section 401 permit application. We are providing five copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review.

Thank you for your assistance with this project. A copy of this permit application will be posted on the NCDOT website at: http://www.ncdot.org/doh/preconstruct/pe/. If you have any questions or need any additional information about this project, please contact James Pflaum at (919) 715-7217.

Sincerely,

for E. D. Lunk

Gregory J. Thorpe, Ph.D
Environmental Management Director, PDEA

w/attachment

Mr. John Hennessy, NCDWQ (5 Copies)
Mr. Travis Wilson, NCWRC
Ms. Kathy Matthews, USEPA
Mr. Ronald Mikulak, USEPA – Atlanta, GA
Mr. Clarence W. Coleman, P.E., FHWA
Mr. Gary Jordan, USFWS
Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Tim Johnson, P.E., Division 8 Engineer
Mr. Art King, Division 8 Environmental Officer

w/o attachment

Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Mr. Jay McInnis, P.E., PDEA
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch
Mr. Carl Goode, PE, Human Environment Unit Head
Ms. Leilani Paugh, NEU

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT
(33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires December 31, 2004

Public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes 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 this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. 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

Authority: Rivers and Harbors Act, Section 10, 33 USC 403: Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413, Section 103. 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. 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 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 COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME North Carolina Department of Transportation Project Development & Environmental Analysis	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
6. APPLICANT'S ADDRESS 1598 Mail Service Center Raleigh, NC 27699	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOs. W/AREA CODE a. Residence b. Business 919-733-3141	10. AGENT'S PHONE NOs. W/AREA CODE a. Residence b. Business

11. **STATEMENT OF AUTHORIZATION**

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.

APPLICANT'S SIGNATURE _____ DATE _____

NAME, LOCATION, AND DESCRIPTION OR PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions

Widening of US 1 from north of SR 1528 to the existing divided facility north of Moore County line

13. NAME OF WATERBODY, IF KNOWN (if applicable)
Drowning Creek

14. PROJECT STREET ADDRESS (if applicable)

15. LOCATION OF PROJECT

Richmond and Moore — COUNTY
NC — STATE

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) **Section, Township, Range, Lat/Lon, and/or Accessors's Parcel Number, for example.**

17. DIRECTIONS TO THE SITE

US 1 south, from north of Marston to south of Pinebluff.

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

Improve US 1 from SR 1528 (Richmond County) to existing divided facility north of Moore County line by widening and constructing turn lanes. US 1 will be widened from two to four lanes, on existing location, separated by a 46 foot grass median with 10 foot outside shoulders, four feet of which will be paved. The project length is approximately 3 miles and will impact 5.18 acres of wetlands and 0 linear feet of stream. There will be 3.33 acres of hand clearing in wetlands for utility line installation and bridge replacement activities.

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

Public transportation and improve traffic operations, level of service, and safety along the proposed section of US 1.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Needed in order to provide a wider road base for the highway widening.

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

See attached permit drawings.

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

5.18 acres of permanent impacts (includes fill and mechanized clearing)

23. Is Any Portion of the Work Already Complete? Yes ___ No _X_ IF YES, DESCRIBE THE COMPLETED WORK

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

See Attached List

25. List of Other Certifications 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

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the 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. Fuck 10-24-07

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.

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Reaves Landscaping and Design, Inc.
P.O. Box 1178
Pinebluff, NC 28373

Robert McLeod
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Gordon Matthews
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OCT 9 2007
DIVISION OF HIGHWAYS
PDEA-OFFICE OF NATURAL ENVIRONMENT

Ecosystem
PROGRAM

October 9, 2007

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

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-2502B, Widening of US 1 from SR 1528 to Existing Facility in Richmond County, Moore and Richmond Counties

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory riparian and nonriparian wetland mitigation for the subject project. Based on the information supplied by you on October 1, 2007, the impacts are located in CU 03040203 of the Lumber River Basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Riparian Wetlands: 5.18 acres

This mitigation acceptance letter replaces the mitigation acceptance letter issued August 21, 2007. EEP commits to implementing sufficient compensatory wetland mitigation to offset the impacts associated with this project by the end of the MOA Year in which this project is permitted, in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, fully executed on March 8, 2007. 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,

William D. Gilmore, P.E.
EEP Director

cc: Mr. Richard Spencer, USACE – Wilmington
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: R-2502B Revised

Ecosystem
PROGRAM

October 9, 2007

Mr. Richard Spencer
U. S. Army Corps of Engineers
Wilmington Regulatory Field Office
Post Office Box 1890
Wilmington, North Carolina 28402-1890

Dear Mr. Spencer:

Subject: EEP Mitigation Acceptance Letter (revised):

R-2502B, Widening US 1 from SR 1528 to Existing Facility in Richmond County, Richmond and Moore Counties; Lumber River Basin (Cataloging Unit 03040203); Southern Piedmont (SP) Eco-Region

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory riparian and nonriparian mitigation for the unavoidable impact associated with the above referenced project. As indicated in the NCDOT's mitigation request dated October 1, 2007, compensatory riparian mitigation from EEP is required for approximately 5.18 acres of impacts.

This mitigation acceptance letter replaces the mitigation acceptance letter issued October 5, 2007. Compensatory wetland mitigation associated with this project will be provided in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the N. C. Department of Environment and Natural Resources, the N. C. Department of Transportation, and the U. S. Army Corps of Engineers fully executed on March 8, 2007 (Tri-Party MOA). EEP commits to implement sufficient compensatory riparian and nonriparian wetland mitigation up to 5.90 riparian and 4.46 nonriparian wetland credits to offset the impacts associated with this project by the end of the MOA year in which this project is permitted. 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,

William D. Gilmore, P.E.
EEP Director

cc: Mr. Gregory J. Thorpe, Ph.D., NCDOT-PDEA
Mr. John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: R-2502B Revised

MAY 31 2007

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

May 23, 2007

MEMORANDUM

To: Matt Wilkerson
NCDOT - Office of Human Environment

FROM: Peter Sandbeck PBS for Peter Sandbeck

SUBJECT: US 1 from SR 1001 to Existing 4 Lanes, R-2502, Richmond County, GS 98-0082

Thank you for the additional information that you and your staff provided to us regarding the above project. To review, environmental commitments noted in a previously submitted EA and FONSI stated that additional archaeological investigations would be undertaken at sites, 31RH133&133** and 31RH319&319** following acquisition of right-of-way.

In a recent meeting with Steve Claggett, State Archaeologist and John Mintz, Assistant State Archaeologist, Shane Peterson, Staff Archaeologist, Office of Human Environment, North Carolina Department of Transportation provided us with detailed drawings, artifact inventories, and relevant horizontal and vertical stratigraphic data that previously was not available. On the basis of this information, we have determined that additional archaeological investigations at sites 31RH133&133** and 31RH319&319** are not necessary or warranted.

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 considerations. If you have any questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-4763/733-8653
RESTORATION	515 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-6547/715-4801
SURVEY & PLANNING	515 N. Blount Street, Raleigh, NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-6545/715-4801

Subject: Minutes from Interagency 4B Hydraulic Design Review Meeting on February 18, 2004 for R-2502B in Richmond/Moore Counties

Team Members:

Richard Spencer-USACE	(present)
Beth Barns -NCDWQ	(absent)
Travis Wilson-NCWRC	(present)
Gary Jordan-USFWS	(absent)
Chris Militscher-EPA	(present)
Brett Feulner-PDEA	(present)
Jay McInnis-PDEA	(present)

Participants:

Marshall Clawson, NCDOT Hydraulics
Dan Duffield, NCDOT Hydraulics
David Scheffel, NCDOT Design Services Design
Malcolm Watson, NCDOT Design Services Design
Grant Ginn, HSMM
Roy Currin, HSMM

Beth's Comments via e-mail, that on Jan. 15 meeting (DOT PD&EA, USACE, and DWQ) made the decision to conduct an on-site 2A-4A meeting to discuss bridge length. DWQ recognizes the tremendous commitment on the part of DOT for the longer bridge length. It is difficult to determine if the longer bridge is 'long enough' given the high quality bottomland hardwood system being impacted by this project. The impacts from this project are within a WSII SW HQW CA area. Due to the CA designation, the proper placement and number of the haz. spill catch basins is very important. It is an important factor to get the drainage from the old bridge system into a haz. spill catch basin. Please determine the depth to ground water under the proposed basin on sheet 13. Drowning Creek is on the 303(d) list for 'fish advisory for mercury'.

I would like to review the meeting minutes, and I may have more comments based on the minutes.

Jay McInnis – Taking this project back to 2A to discuss a bridge length.

Discussion – It is agreed that since this is a pipeline project that the alignment is pretty much already set and all that needs to be discussed is the length of the bridge and a site visit will be scheduled in the near future.

Richard – Need to check with DQW about the location of the Hazardous Spill Basins

Marshall – They are not required through out the whole project, but will check with DWQ

Richard – Need to make sure the driveway tie to the property in the wetlands near the bridge is included in the permit now, so during construction a permit mod won't have to be issued for this.

Richard – Would like to see where the terrace is so he can have an idea of the floodplain

Richard – Need to reserve my comments until after the site visit

Richard and Travis – Need to have Geotech go out before we can have a site visit, so the water table will be known before hand.

Meeting Adjourned

Subject: Minutes from Interagency 4~~B~~C Hydraulic Design Review Meeting on August 17, 2005 for R-2502B in Richmond/Moore Counties

Team Members:

Richard Spencer-USACE	(present)
Brian Wrenn - NCDWQ	(present)
Polly Lespinasse - NCDWQ	(present)
Travis Wilson-NCWRC *	(absent)
Gary Jordan-USFWS	(present)
Chris Militscher-EPA	(present)
Rachelle Beaugard –NEU	(present)
Jay McInnis-PDEA	(absent)

Participants:

Marshall Clawson, NCDOT Hydraulics
Dan Duffield, NCDOT Hydraulics
David Scheffel, NCDOT Design Services Design
Roy Currin, HSMM
Mark Staley, Roadside Environmental
John Olinger, Division 8
Art King, Division 8
Vang Woua, Utilities

* Notified by email

4B- Was held on February 18, 2004

Marshall (MC) – Introduction and started the permit review

MC - Site 1

Chris Militscher (CM) – Have these plans changed from the 4B?

Roy Currin (RC) – Yes, the last 1/3 of the project has been narrowed, starting at sheet 12

Mark Staley (MS) – Need to add some mechanized clearing for erosion control to all sites.

MC – Site 2 and 3

MC - Site 2 and 3 one are on the left and on the right, overview

CM – Is this a forebay or what?

MC – explanation

CM - Where these looked at for ground water elevations? Did we find this out before the design?

RC- Yes, we redesigned due to the ground water

Richard Spencer (RS) Can we put in a liner?

MC – Yes

Brian Wrenn (BW) – A clay liner is better suited

Site 3 – Continue –overview

Site 4 – Continue –overview

Site 5 – Continue –overview

Site 6 – Continue –overview

CM – Sta 435 +00 is this a wetland?

MC and RC – No these are actually a high areas

John Olinger (JO) – How are we going to maintain these Hazardous Spill Basin?

David Scheffel (DS) – We can put a break in the guard rail.

RS – There is an existing pipe, what are we doing with it?

RC – We are replacing it with a new cross pipe

MC – There is a conflict box that keeps the water separate

Vang Woua (VW) – 8" Duct Iron Pipe we will need to relocate it

CM – Is this utility addition impacts?

VW – No

MC – Next site which is the Bridge

We'll fix the plans to show the bents as they are missing, both proposed and existing.

JO – Can we get the permit to show Hand Clearing?

RS – This is not my call, I'm fine with hand cleared

MC – We'll show HC to the R/W

BW – Any impact due to the bridge, such as fill, causeway, etc?

MC – No
BW – No excavation?

MC – No

Discussion on drive way shown at matchline on sheet 14

RC – This is control of access

RS – Is this bridge going to be drilled shaft?

MC – We'll get up with structures

RS – Is there anyway we can get these lines off the plan view? It looks like pipes leaving the bridge.

RC – We'll try

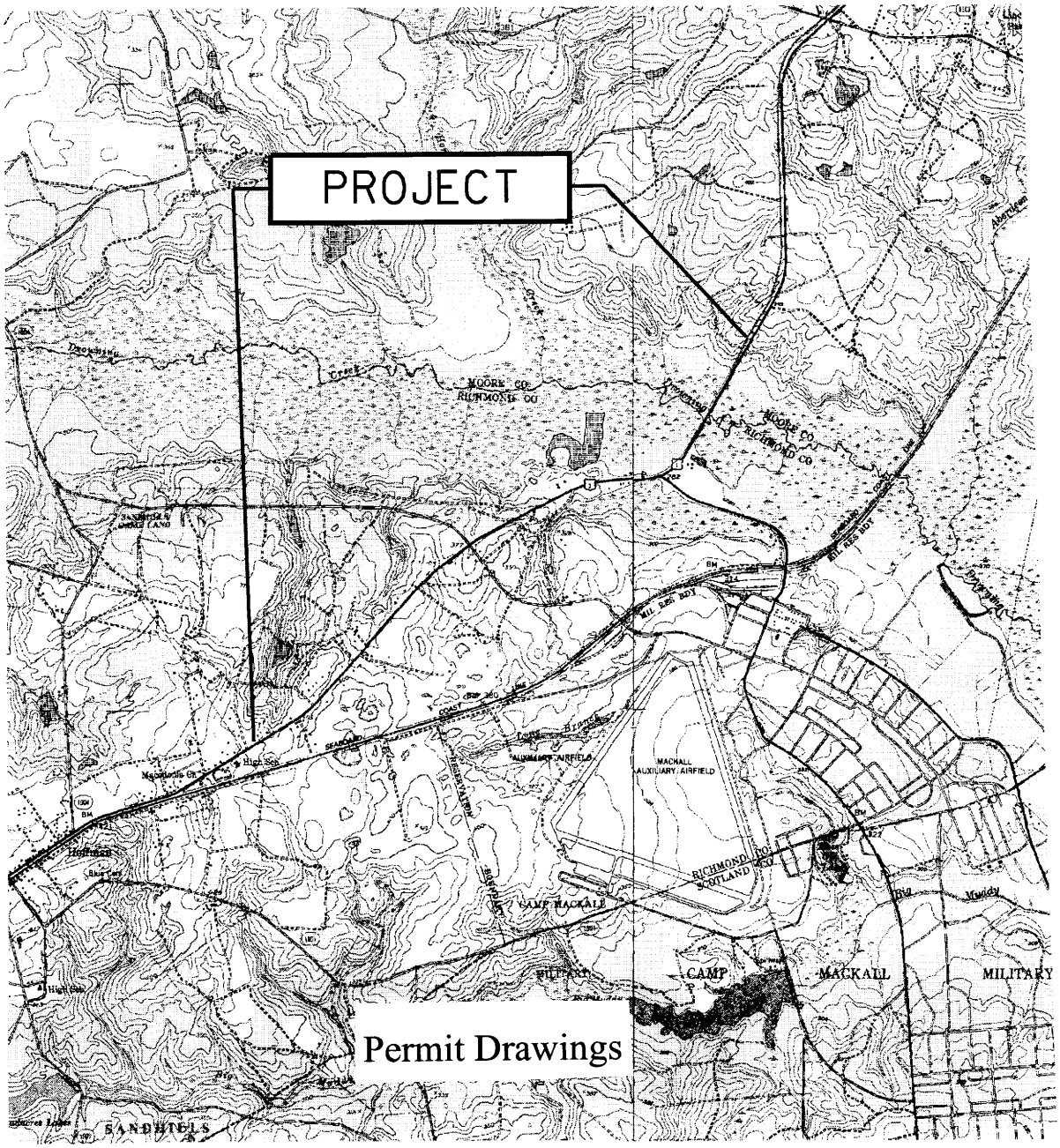
BW – Could we enter the Hazardous Spill basin differently?

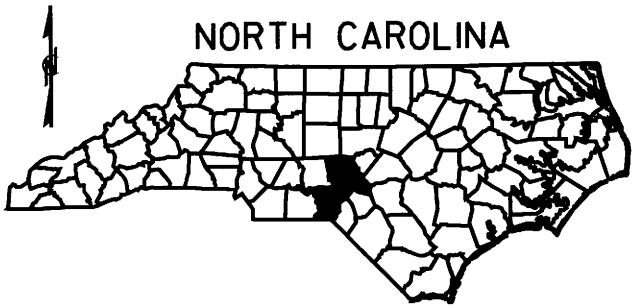
MC – Well if we move the pipe we will be bucking the grade, how about we move the Hazardous Spill basin outlet away from the outlet of the pipe to allow for some reaction time to shut the gate

RS – Make sure you count the PDE as impacted area as they usually completely clear it

Meeting Adjourned

VICINITY MAP





NCDOT

DIVISION OF HIGHWAYS

RICHMOND/ MOORE COUNTIES

PROJECT: 34438.1.1 (R-2502B)

WIDENING OF US 1

FROM NORTH OF SR 1528 TO

THE EXISTING DIVIDED FACILITY

NORTH OF THE RICHMOND

COUNTY LINE

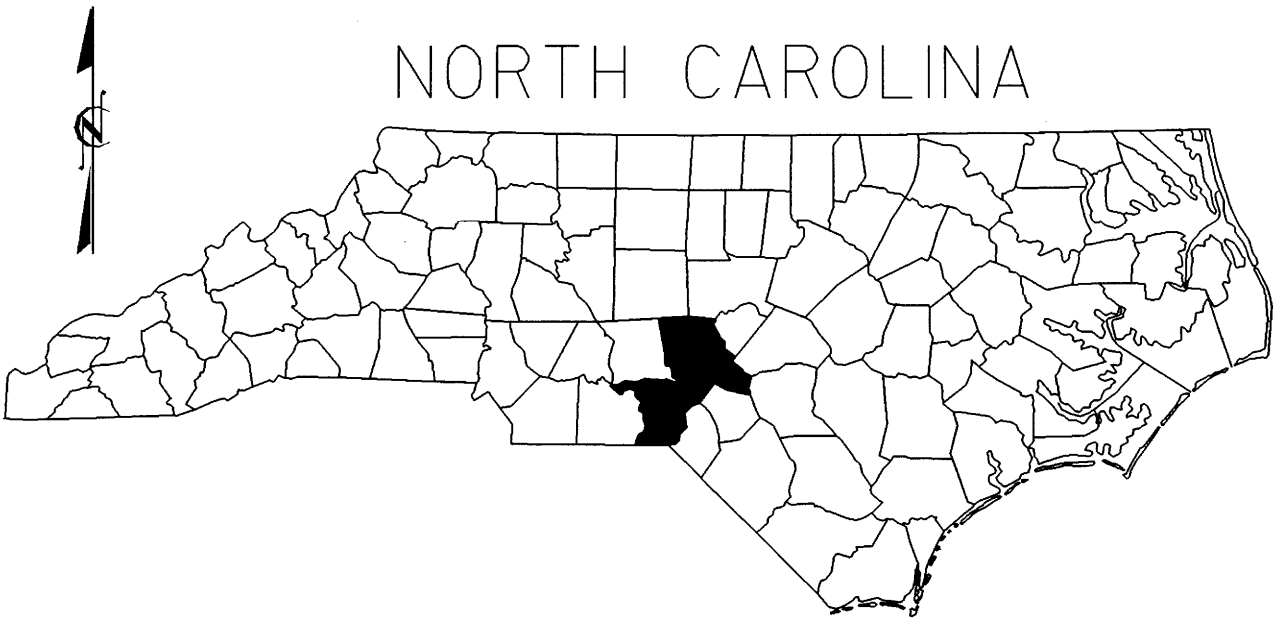
SHEET 1 **OF** 15 **05/24/2007**

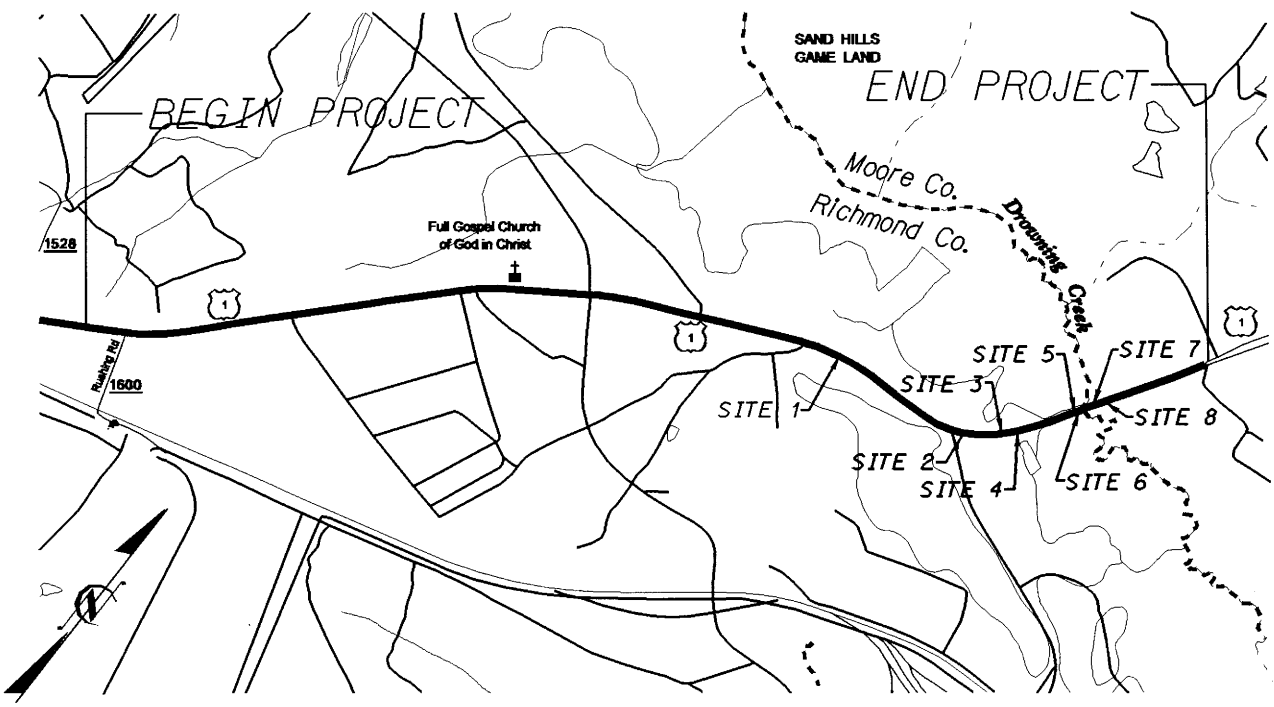
PROPERTY OWNERS

NAME AND ADDRESS

OWNERS NAME	ADDRESS
Shirley Ann Tyner	P. O. Box 52 Hoffman, NC 28347
Bowater, Inc.	P.O. Box 188 Mt. Gilead, NC 27306
James E. Pugh	125 Applecross Road Pinehurst, NC 28374
Reaves Landscaping and Design, Inc.	P.O. Box 1178 Pinebluff, NC 28373
Robert McLeod	265 North Ridge Street Southern Pines, NC 28387
Gordon Matthews	277 Thunder Road Pinebluff, NC 28373

NCDOT
DIVISION OF HIGHWAYS
RICHMOND / MOORE COUNTIES
PROJECT: 34438.1.1 (R-2502B)
WIDENING OF US 1
FROM NORTH OF SR 1528 TO
THE EXISTING DIVIDED FACILITY
NORTH OF THE RICHMOND
COUNTY LINE





SITE MAP

NCDOT
DIVISION OF HIGHWAYS
RICHMOND / MOORE COUNTIES
PROJECT: 34438.1.1 (R-2502B)
WIDENING OF US 1
FROM NORTH OF SR 1528 TO
THE EXISTING DIVIDED FACILITY
NORTH OF THE RICHMOND
COUNTY LINE

SHEET 3 **OF** 16 **07 / 15 / 05**

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Hand Clearing (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	394+82 To 395+73		0.04				0.02					
2	411+98 To 414+00		0.09				0.09					
3	414+51 To 424+07		0.62				0.21					
4	418+26 To 423+95		0.39				0.10					
5	426+56 To 432+28		1.13				0.14					
6	427+54 To 432+25		0.03				0.09					
7	436+25 To 447+51		1.19				0.28					
8	436+24 To 447+01		0.50				0.26					
9	432+17 to 435+37	Bridge (440 ft x 36 ft dual's)				1.40						
TOTALS:			3.99	0.00	0.00	1.40	1.19	0.00	0.00	0.00	0.00	0.00

Form Revised 3/22/01

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
RICHMOND/MOORE COUNTIES
PROJECT 34438.1.1 (R-2502B)
WIDENING OF US 1 FROM NORTH OF
SR1528 TO EXISTING DIVIDED FACILITY
NORTH ON THE RICHMOND CO. LINE

06/04/07

ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

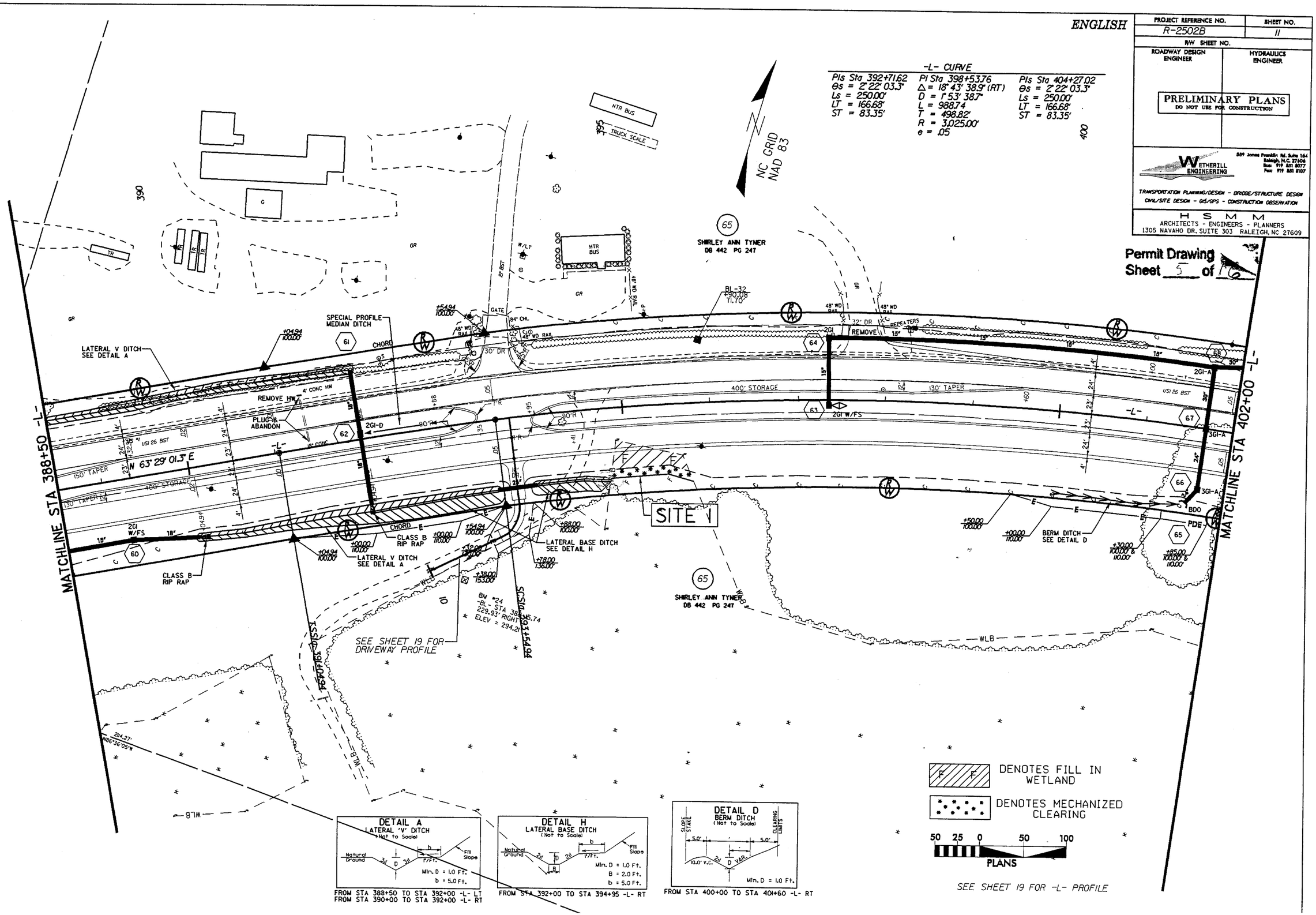
WETHERILL ENGINEERING
509 James Franklin Rd. Suite 164
Raleigh, N.C. 27604
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

HSMM
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

Permit Drawing
Sheet 5 of 16

-L- CURVE

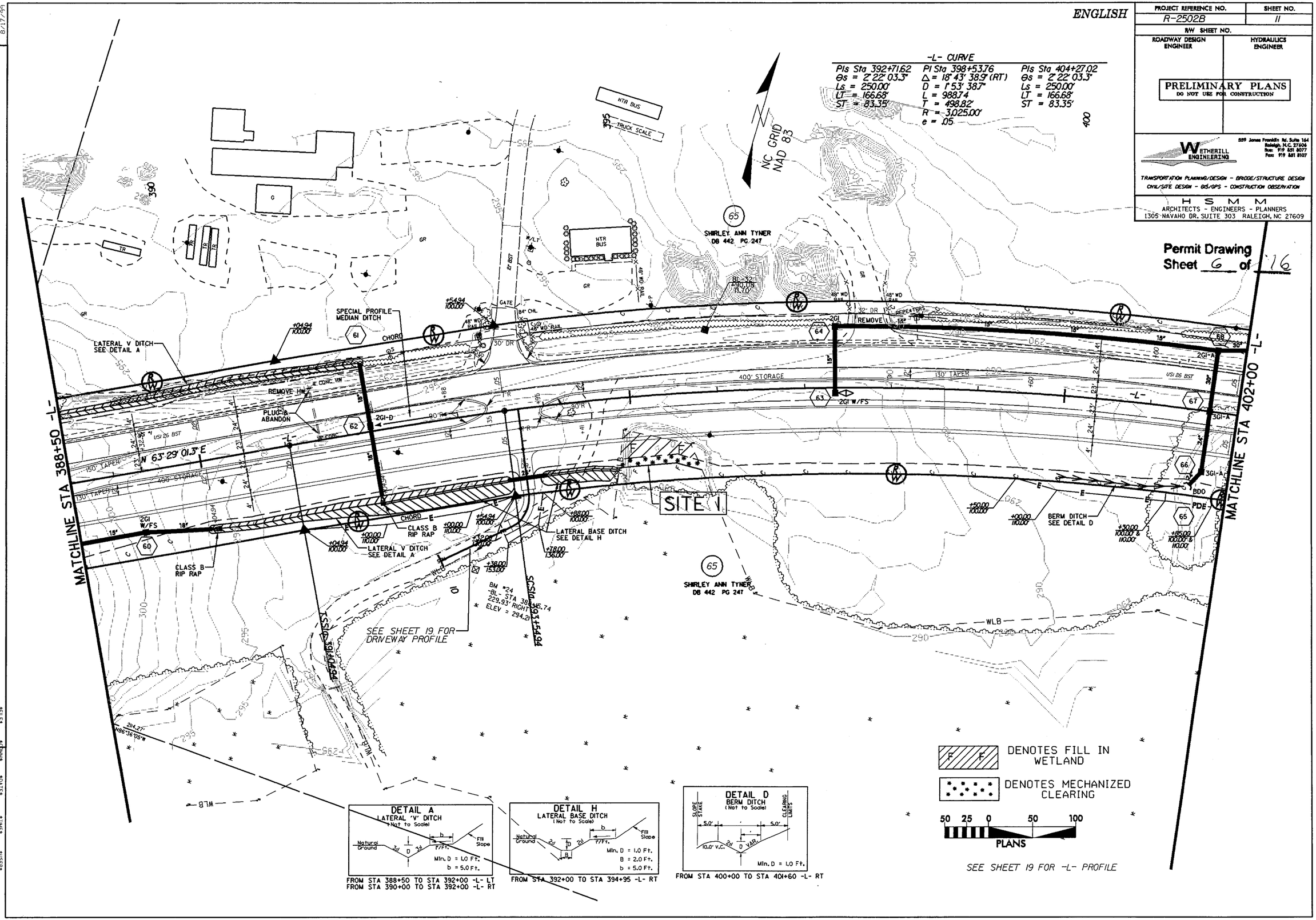
PIs Sta 392+71.62	PI Sta 398+53.76	PIs Sta 404+27.02
θs = 2° 22' 03.3"	Δ = 18° 43' 38.9" (RT)	θs = 2° 22' 03.3"
Ls = 250.00'	D = 1° 53' 38.7"	Ls = 250.00'
LT = 166.68'	L = 988.74	LT = 166.68'
ST = 83.35'	T = 498.82'	ST = 83.35'
	R = 3,025.00'	
	e = .05	



REVISIONS

R/W REVISION - PROVIDED LEFT-OVER ONTO PARCEL 63.BAM

8/17/99


ENGLISH
PROJECT REFERENCE NO.
R-2502B
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
WETHERILL ENGINEERING
559 James Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION
H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609
Permit Drawing
Sheet 6 of 16
-L- CURVE
PIs Sta 392+71.62
Θs = 2° 22' 03.3"
Ls = 250.00'
LT = 166.68'
ST = 83.35'
PI Sta 398+53.76
Δ = 18° 43' 38.9" (RT)
D = 1° 53' 38.7"
L = 988.74
T = 498.82'
R = 3,025.00'
e = .05
PIs Sta 404+27.02
Θs = 2° 22' 03.3"
Ls = 250.00'
LT = 166.68'
ST = 83.35'
NC GRID NAD 83
HTR BUS
TRUCK SCALE
SHIRLEY ANN TYNER
DB 442 PG 247
SPECIAL PROFILE MEDIAN DITCH
LATERAL V DITCH SEE DETAIL A
REMOVE HW
PLUG & ABANDON
400' STORAGE
130' TAPER
150' TAPER
N 63° 29' 01.3" E
MATCHLINE STA 388+50 -L-
MATCHLINE STA 402+00 -L-
SITE 1
CLASS B RIP RAP
LATERAL V DITCH SEE DETAIL A
LATERAL BASE DITCH SEE DETAIL H
BERM DITCH SEE DETAIL D
SEE SHEET 19 FOR DRIVEWAY PROFILE
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
50 25 0 50 100
PLANS
SEE SHEET 19 FOR -L- PROFILE
DETAIL A
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D = 1.0 Ft.
b = 5.0 Ft.
FROM STA 388+50 TO STA 392+00 -L- LT
FROM STA 390+00 TO STA 392+00 -L- RT
DETAIL H
LATERAL BASE DITCH
(Not to Scale)
Min. D = 1.0 Ft.
B = 2.0 Ft.
b = 5.0 Ft.
FROM STA 392+00 TO STA 394+95 -L- RT
DETAIL D
BERM DITCH
(Not to Scale)
SLOPE STAKE
CLEARING LIMITS
Min. D = 1.0 Ft.
FROM STA 400+00 TO STA 401+60 -L- RT
REVISIONS
R/W REVISION - PROVIDED LEFT-OVER ONTO PARCEL 63.BAM
8/17/99

ENGLISH

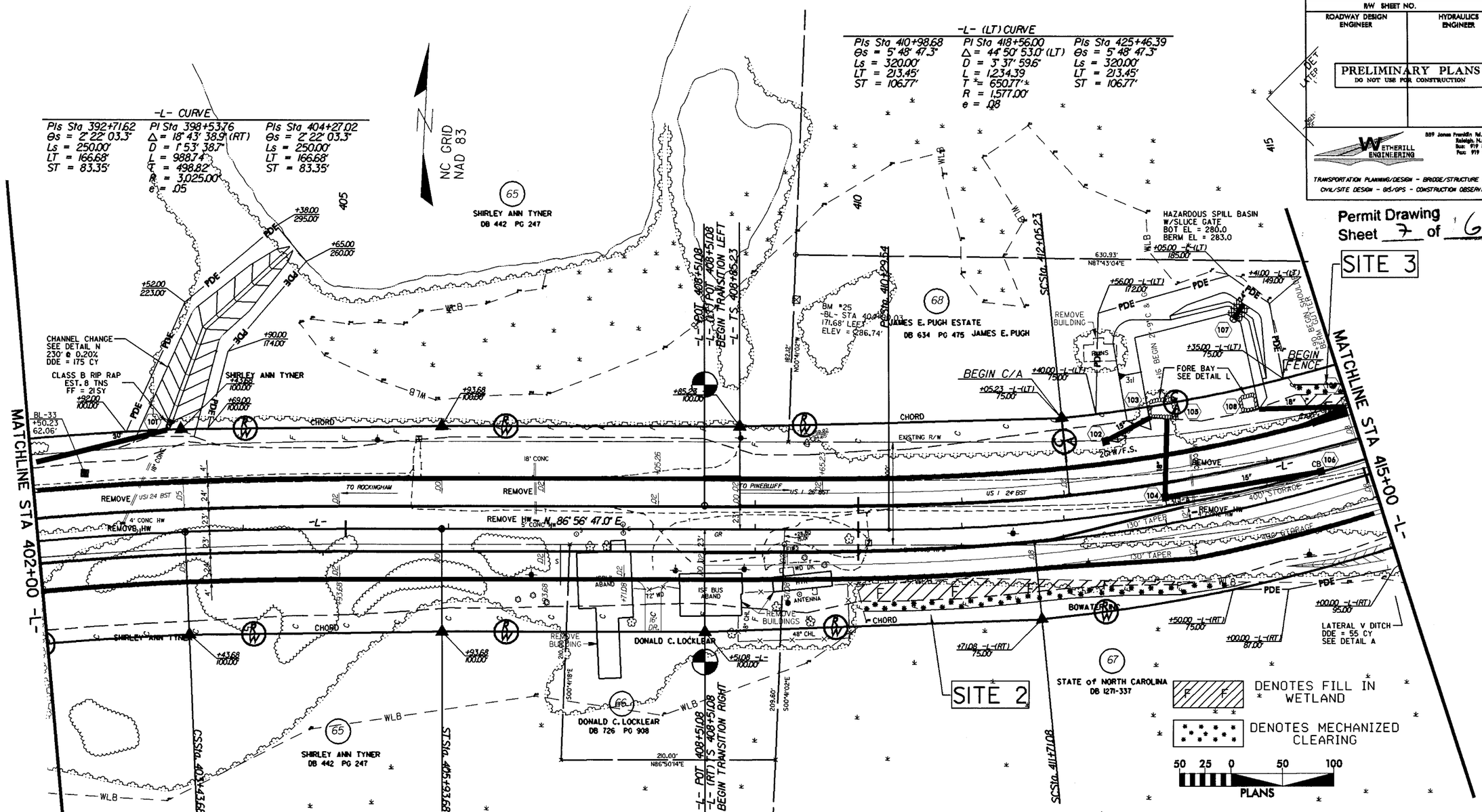
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
389 James Franklin Rd. Suite 144
Raleigh, N.C. 27604
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Permit Drawing
Sheet 7 of 16

SITE 3



*-L- (RT) CURVE

PIs Sta 410+64.52	PI Sta 418+46.30	PIs Sta 425+57.58
Θs = 5° 38' 54.2"	Δ = 45° 10' 39.2" (LT)	Θs = 5° 38' 54.2"
Ls = 320.00'	D = 3° 31' 48.9"	Ls = 320.00'
LT = 213.44'	L = 1,279.73	LT = 213.44'
ST = 106.77'	T = 675.22'	ST = 106.77'
	R = 1,623.00'	
	e = .08	

*-L- CURVE

PI Sta 418+88.78
Δ = 56° 28' 27.5" (LT)
D = 3° 34' 51.6"
L = 1,577.06'
T = 859.25'
R = 1,600.00'

DETAIL L
FORE BAY
(Not to Scale)
Type of Liner = CLASS B RIP RAP
STA 413+07 -L- LT
STA 414+02 -L- LT

DETAIL A
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D = 1.0 Ft.
b = 5.0 Ft.
FROM STA 413+95 TO STA 415+10 -L- RT

SEE SHEET 20 FOR -L- PROFILE

REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 67 & 68, BAM
R/W REVISION - REVISED PROPERTY OWNER NAME ON PARCEL NO.65 & ADDED DRIVEWAY ON PARCEL NO.66, (BAM)

8/17/99

ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
529 Jones Franklin Rd. Suite 144
Raleigh, N.C. 27606
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Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

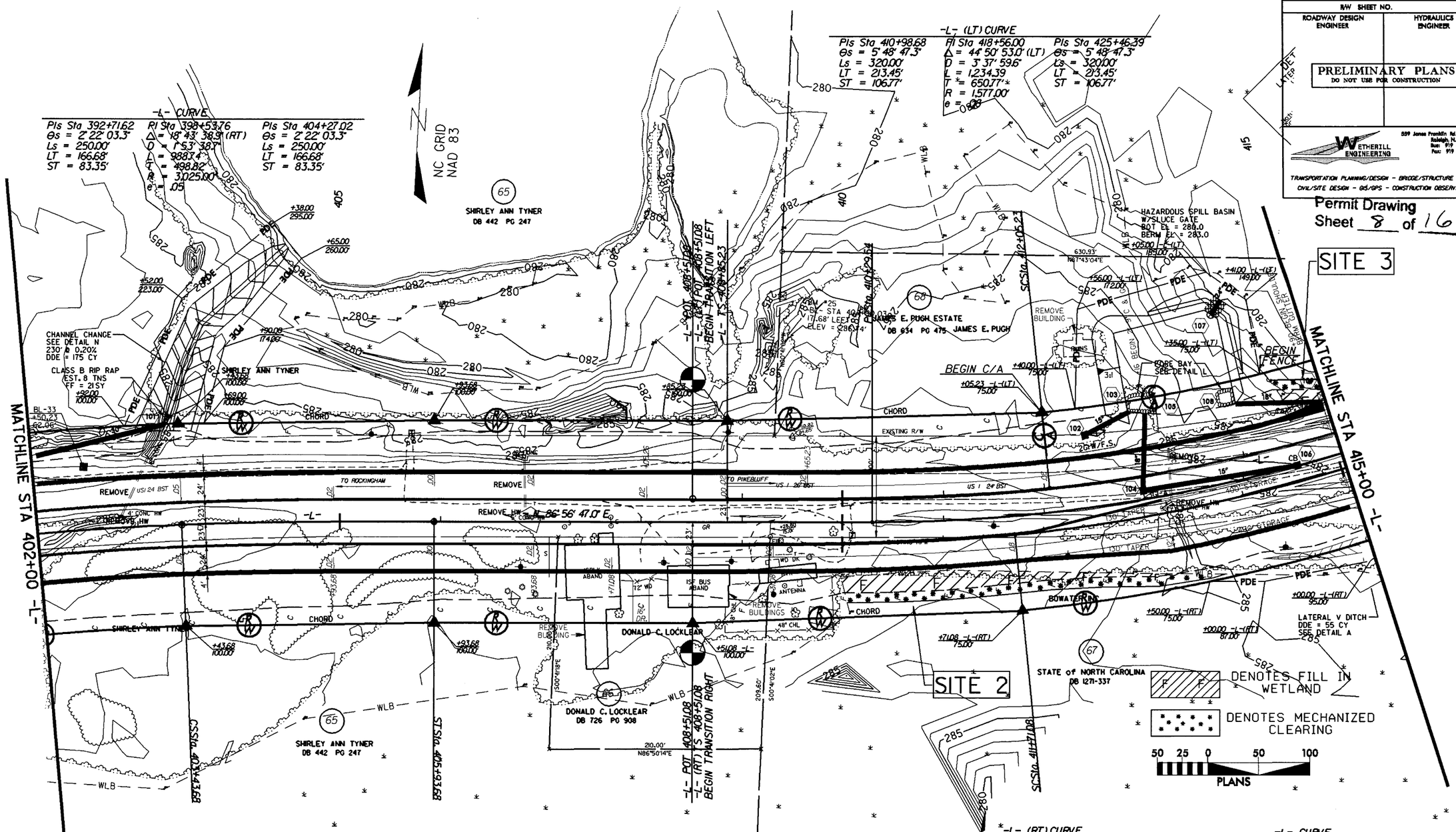
Permit Drawing
Sheet 8 of 16

SITE 3

8/17/99

REVISIONS

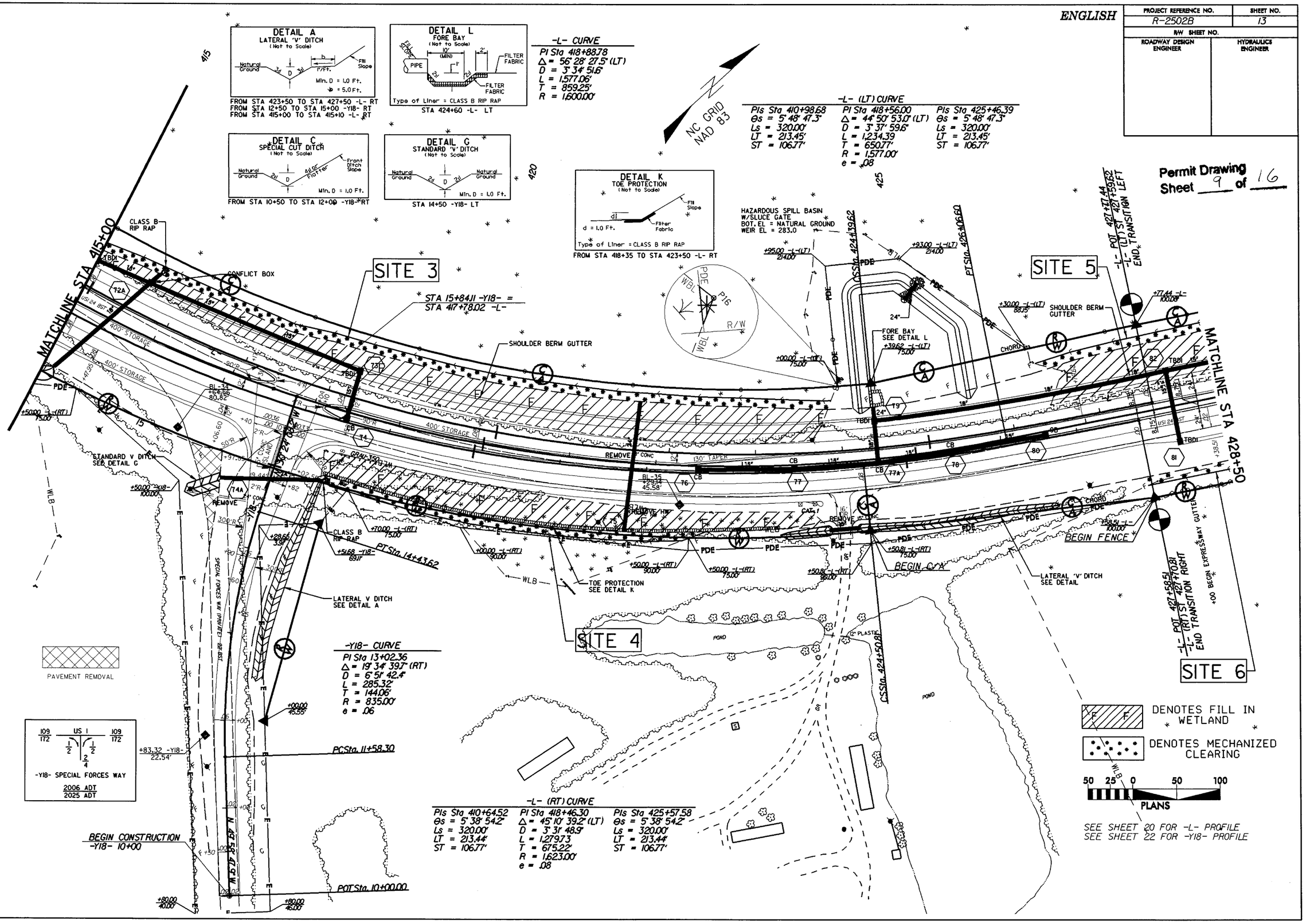
R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 67 & 68.BAM
R/W REVISION - REVISED PROPERTY OWNER NAME ON PARCEL NO.65 & ADDED DRIVEWAY ON PARCEL NO.66.(BAM)



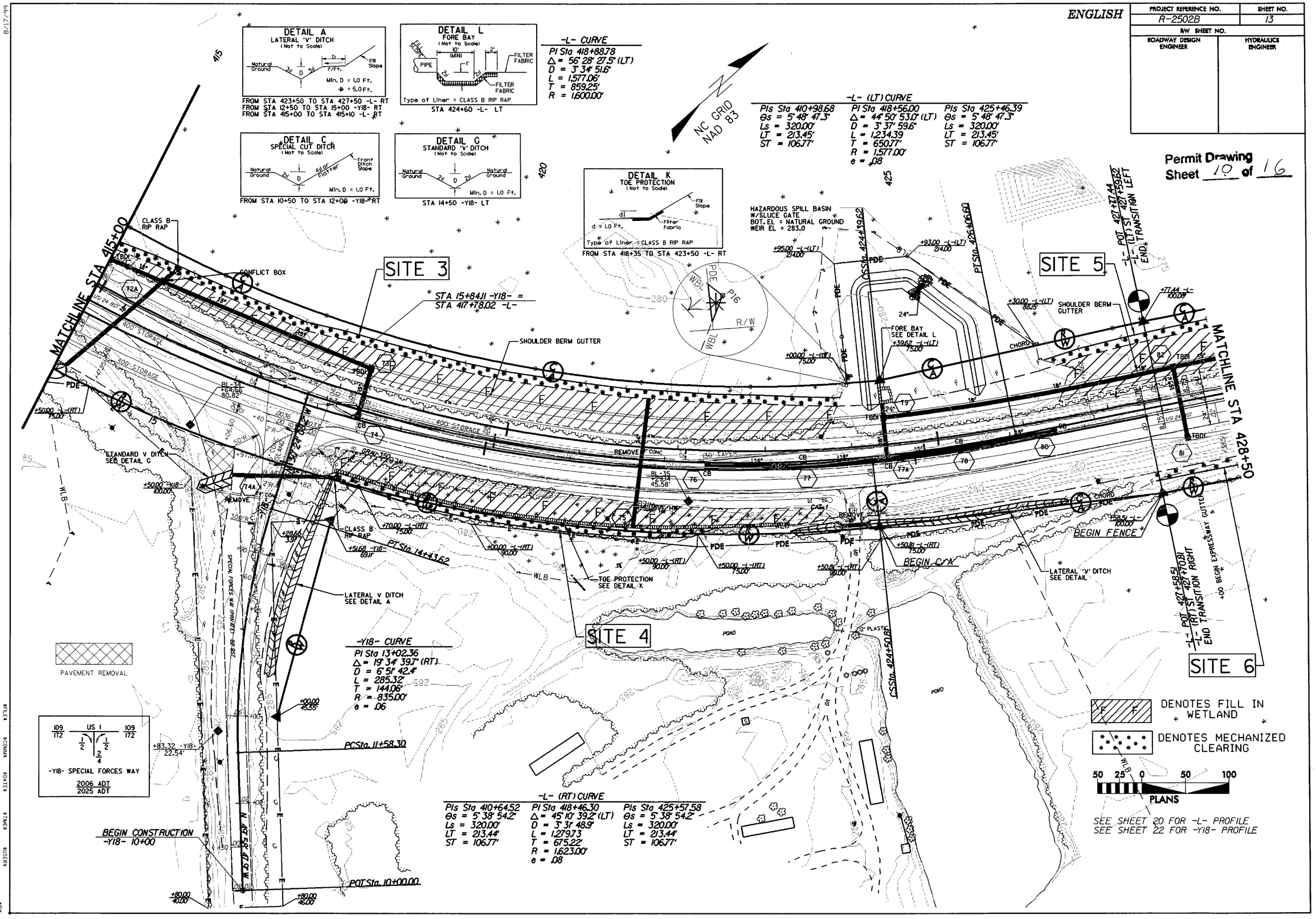
ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing Sheet 9 of 16



8/17/99


ENGLISH
PROJECT REFERENCE NO. R-2502B
SHEET NO. 13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Permit Drawing Sheet 10 of 16
DETAIL A LATERAL 'V' DITCH (Not to Scale)
FROM STA 423+50 TO STA 427+50 -L- RT
FROM STA 12+50 TO STA 15+00 -Y18- RT
FROM STA 415+00 TO STA 415+10 -L- RT
DETAIL L FORE BAY (Not to Scale)
Type of Liner = CLASS B RIP RAP
STA 424+60 -L- LT
DETAIL C SPECIAL CUT DITCH (Not to Scale)
FROM STA 10+50 TO STA 12+00 -Y18- RT
DETAIL G STANDARD 'V' DITCH (Not to Scale)
STA 14+50 -Y18- LT
DETAIL K TOE PROTECTION (Not to Scale)
Type of Liner = CLASS B RIP RAP
FROM STA 418+35 TO STA 423+50 -L- RT
-L- CURVE
PI Sta 418+88.78
Δ = 56° 28' 27.5" (LT)
D = 3° 34' 51.6"
L = 1,577.06'
T = 859.25'
R = 1,600.00'
-L- (LT) CURVE
PIs Sta 410+98.68
Θs = 5° 48' 47.3"
Ls = 320.00'
LT = 213.45'
ST = 106.77'
PI Sta 418+56.00
Δ = 44° 50' 53.0" (LT)
D = 3° 37' 59.6"
L = 1,234.39
T = 650.77'
R = 1,577.00'
e = .08
PIs Sta 425+46.39
Θs = 5° 48' 47.3"
Ls = 320.00'
LT = 213.45'
ST = 106.77'
NC GRID NAD 83
MATCHLINE STA 415+00
MATCHLINE STA 428+50
SITE 3
SITE 4
SITE 5
SITE 6
STA 15+84.11 -Y18- = STA 417+78.02 -L-
CONFLICT BOX
CLASS B RIP RAP
SHOULDER BERM GUTTER
HAZARDOUS SPILL BASIN W/SLUICE GATE
BOT. EL = NATURAL GROUND
WEIR EL = 283.0
FORE BAY SEE DETAIL L
STANDARD V DITCH SEE DETAIL G
LATERAL V DITCH SEE DETAIL A
TOE PROTECTION SEE DETAIL K
LATERAL 'V' DITCH SEE DETAIL
BEGIN FENCE
BEGIN C/A
BEGIN EXPRESSWAY GUTTER
-L- POT 427+77.44
-L- (LT) ST 427+59.62
END TRANSITION LEFT
-L- POT 427+58.51
-L- (RT) ST 427+70.81
END TRANSITION RIGHT
PT Sta. 14+43.62
PC Sta. 11+58.30
POT Sta. 10+00.00
CS Sta. 424+39.62
CS Sta. 424+50.81
PT Sta. 426+06.60
-Y18- CURVE
PI Sta 13+02.36
Δ = 19° 34' 39.7" (RT)
D = 6° 51' 42.4"
L = 285.32'
T = 144.06'
R = 835.00'
e = .06
-L- (RT) CURVE
PIs Sta 410+64.52
Θs = 5° 38' 54.2"
Ls = 320.00'
LT = 213.44'
ST = 106.77'
PI Sta 418+46.30
Δ = 45° 10' 39.2" (LT)
D = 3° 31' 48.9"
L = 1,279.73
T = 675.22'
R = 1,623.00'
e = .08
PIs Sta 425+57.58
Θs = 5° 38' 54.2"
Ls = 320.00'
LT = 213.44'
ST = 106.77'
PAVEMENT REMOVAL
US 1
-Y18- SPECIAL FORCES WAY
2006 ADT
2025 ADT
BEGIN CONSTRUCTION -Y18- 10+00
N 49° 58' 47.9" W
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
50 25 0 50 100
PLANS
SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 22 FOR -Y18- PROFILE

ENGLISH

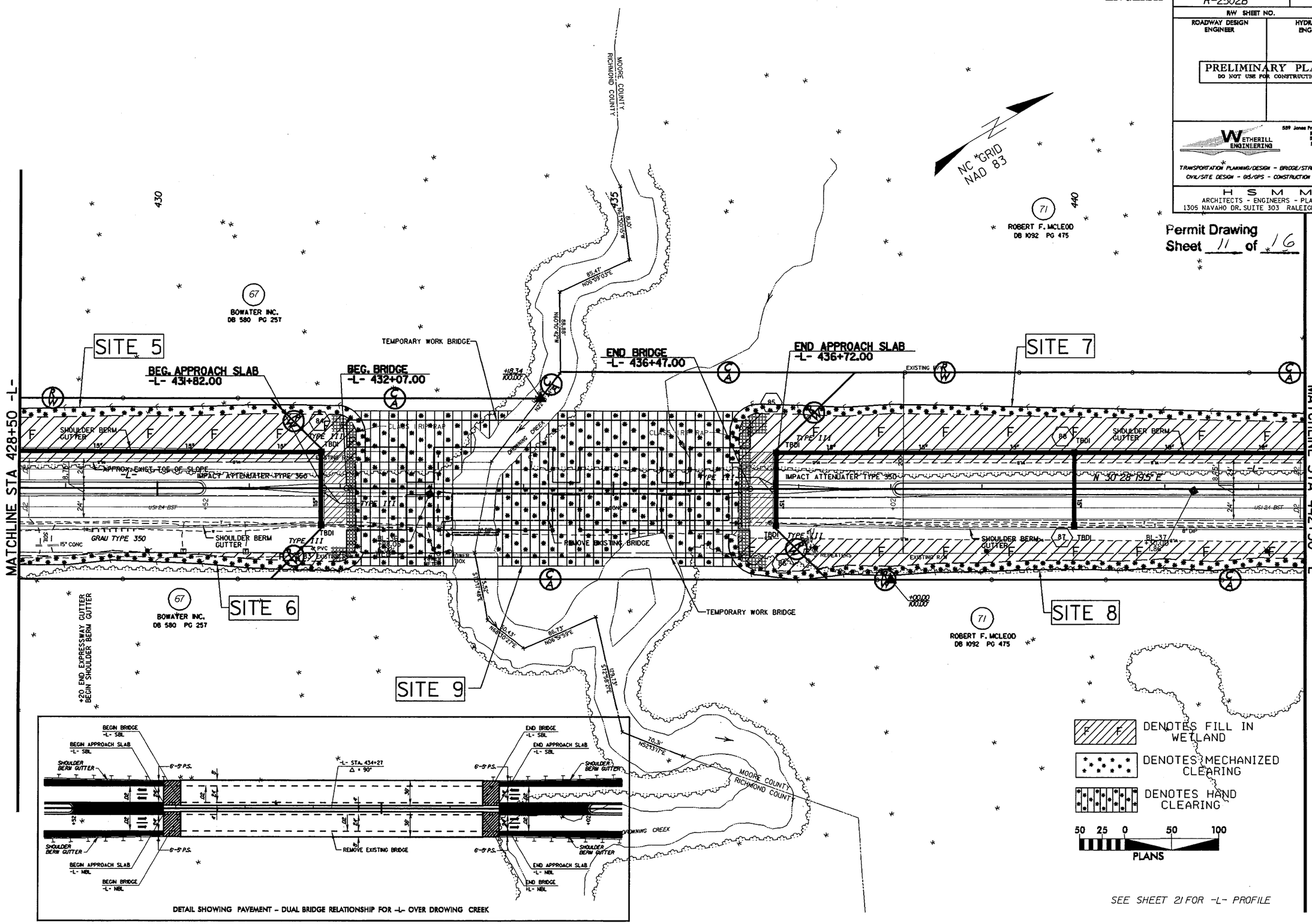
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

Permit Drawing
Sheet 11 of 16



REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 67 & 71, BAM

8/17/99

ENGLISH

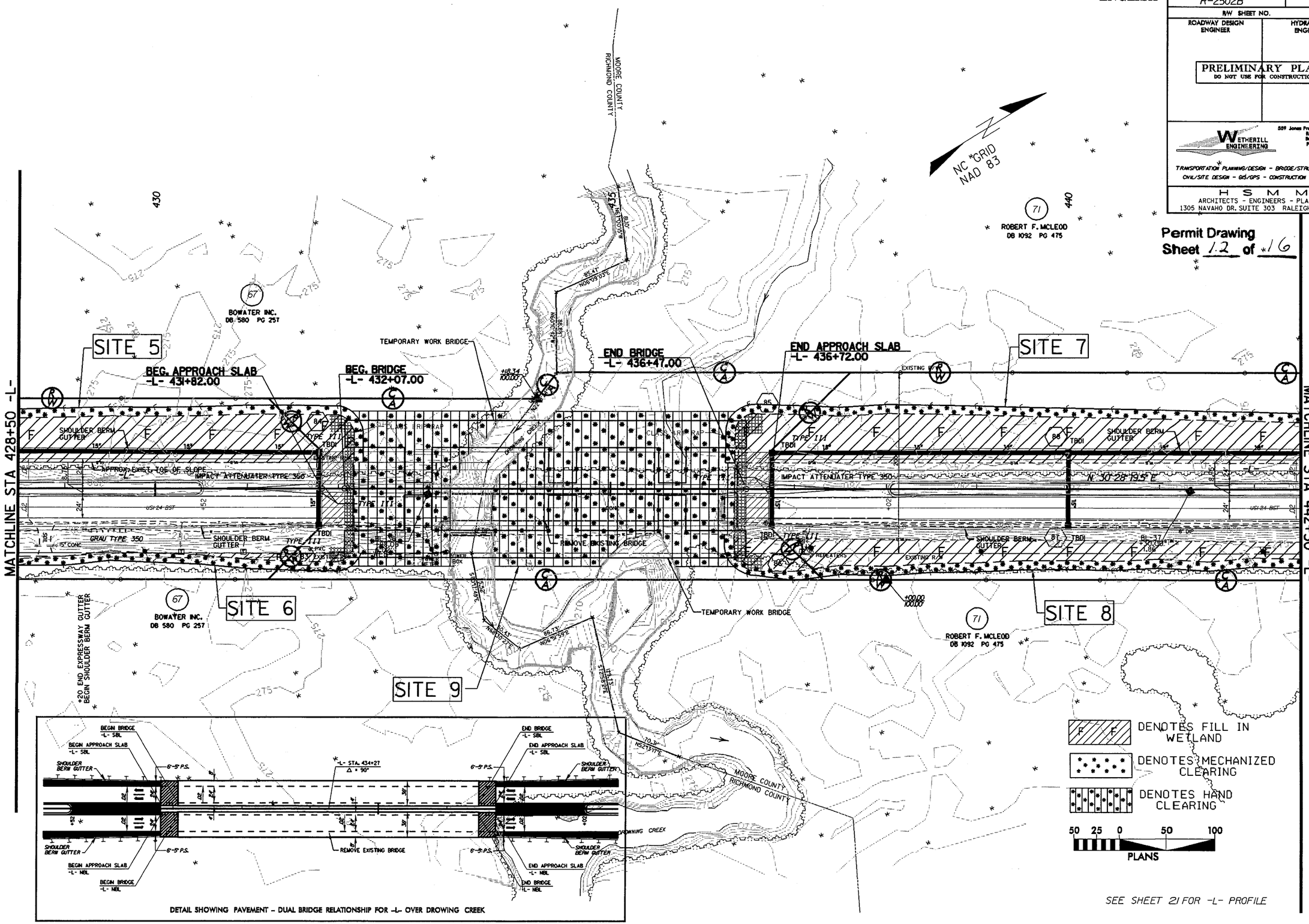
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
859 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8707
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

HSMM
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

Permit Drawing
Sheet 12 of 16



SEE SHEET 21 FOR -L- PROFILE

REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 67 & 71, BAM

8/17/99

ENGLISH

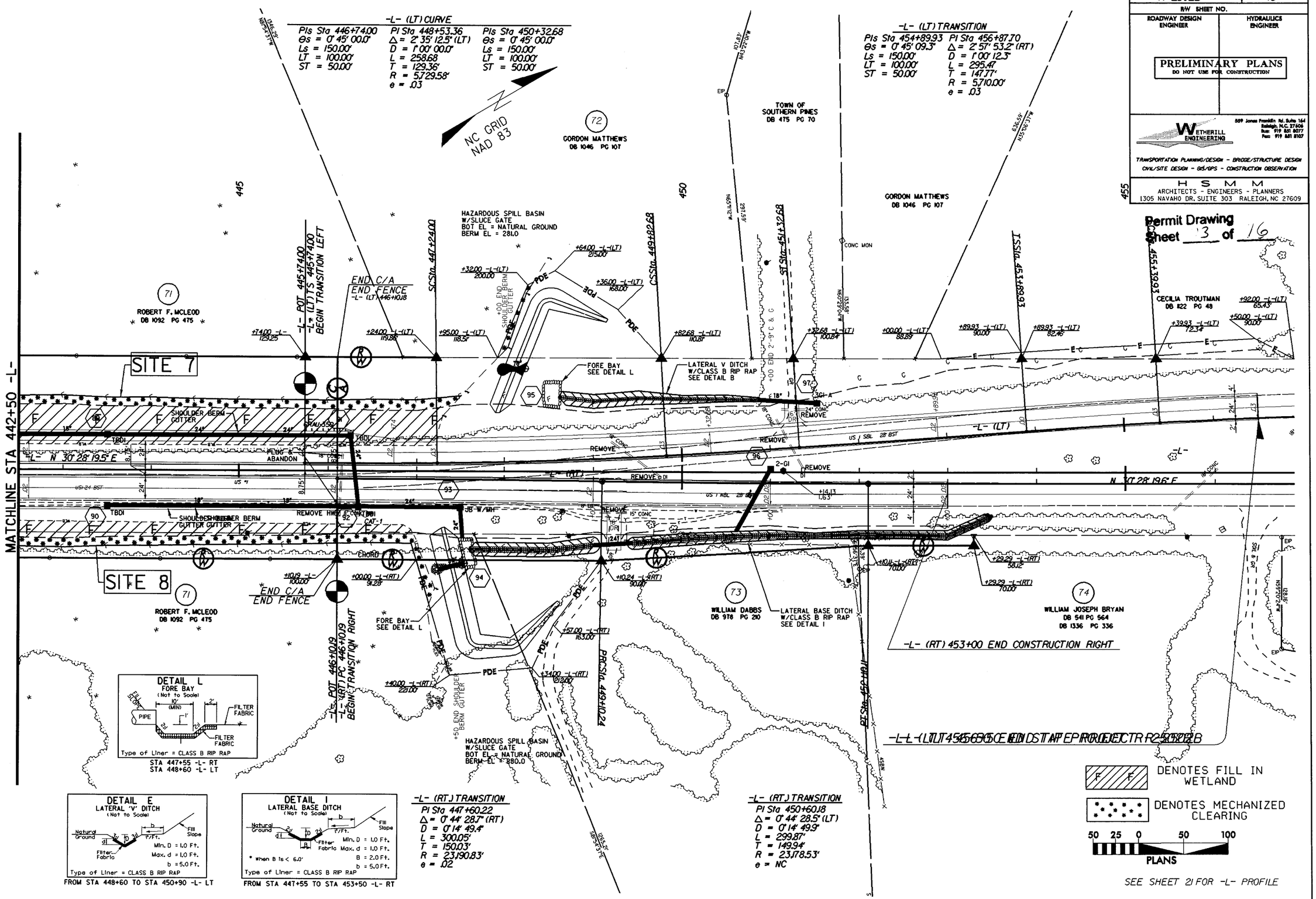
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
589 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

Permit Drawing
Sheet 13 of 16



REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 71,73 & 74. ADDED PARCEL NO.75. BAM

8/17/99

$FILE$ $COMM$ $DATE$ $TIME$ $USER$ HS

ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
5509 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Phone: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

Permit Drawing
Sheet 14 of 16

-L- (LT) CURVE

Pls Sta 446+74.00	PI Sta 448+53.36	Pls Sta 450+32.68
θs = 0° 45' 00.0"	Δ = 2° 35' 12.5" (LT)	θs = 0° 45' 00.0"
Ls = 150.00'	D = 1° 00' 00.0"	Ls = 150.00'
LT = 100.00'	L = 258.68	LT = 100.00'
ST = 50.00'	T = 129.36'	ST = 50.00'
	R = 5,729.58'	
	e = .03	

-L- (LT) TRANSITION

Pls Sta 454+89.93	PI Sta 456+87.70
θs = 0° 45' 09.3"	Δ = 2° 57' 53.2" (RT)
Ls = 150.00'	D = 1° 00' 12.3"
LT = 100.00'	L = 295.47
ST = 50.00'	T = 147.77'
	R = 5,710.00'
	e = .03

NC GRID NAD 83

MATCHLINE STA 442+50 -L-

-L- N 30° 28' 19.5" E

N 30° 28' 19.6" E

-L- (LT)

-L-

-L- (RT) 453+00 END CONSTRUCTION RIGHT

-L- POT 445+74.00
-L- (LT) TS 445+74.00
BEGIN TRANSITION LEFT

-L- POT 446+10.19
-L- (RT) PC 446+10.19
BEGIN TRANSITION RIGHT

END C/A
END FENCE
-L- (LT) 446+10.18

SITE 7

SITE 8

ROBERT F. MCLEOD
DB 1092 PG 475

GORDON MATTHEWS
DB 1046 PG 107

TOWN OF SOUTHERN PINES
DB 475 PG 70

CECILIA TROUTMAN
DB 822 PG 48

WILLIAM DABBS
DB 978 PG 210

WILLIAM JOSEPH BRYAM
DB 541 PG 564
DB 1336 PG 336

HAZARDOUS SPILL BASIN
W/SLUCE GATE
BOT EL = NATURAL GROUND
BERM EL = 281.0

HAZARDOUS SPILL BASIN
W/SLUCE GATE
BOT EL = NATURAL GROUND
BERM EL = 280.0

FORE BAY
SEE DETAIL L

LATERAL V DITCH
W/CLASS B RIP RAP
SEE DETAIL B

LATERAL BASE DITCH
W/CLASS B RIP RAP
SEE DETAIL I

SHOULDER BERM GUTTER

+00 END SHOULDER BERM GUTTER

+50 END SHOULDER BERM GUTTER

PDE

REMOVE

ABANDON

REMOVE HWY & CONTINUE

24" CONC

15" CONC

JB W/ MH

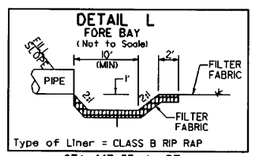
CONC MON

US 24 BST

US 1 NBL 28 BST

US 1 SBL 28 BST

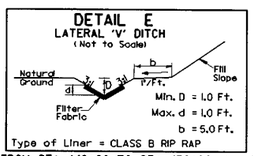
DETAIL L
FORE BAY
(Not to Scale)



Type of Liner = CLASS B RIP RAP

STA 447+55 -L- RT
STA 448+60 -L- LT

DETAIL E
LATERAL 'V' DITCH
(Not to Scale)

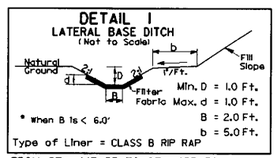


Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
b = 5.0 Ft.

Type of Liner = CLASS B RIP RAP

FROM STA 448+60 TO STA 450+90 -L- LT

DETAIL I
LATERAL BASE DITCH
(Not to Scale)



Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.
b = 5.0 Ft.
* When B is < 6.0'

Type of Liner = CLASS B RIP RAP

FROM STA 447+55 TO STA 453+50 -L- RT

-L- (RT) TRANSITION
PI Sta 447+60.22
Δ = 0° 44' 28.7" (RT)
D = 0° 14' 49.4"
L = 300.05'
T = 150.03'
R = 23,190.83'
e = .02

-L- (RT) TRANSITION
PI Sta 450+60.18
Δ = 0° 44' 28.5" (LT)
D = 0° 14' 49.9"
L = 299.87'
T = 149.94'
R = 23,178.53'
e = NC

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

50 25 0 50 100
PLANS

SEE SHEET 21 FOR -L- PROFILE

REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 71,73 & 74 ADDED PARCEL NO.75. BAW

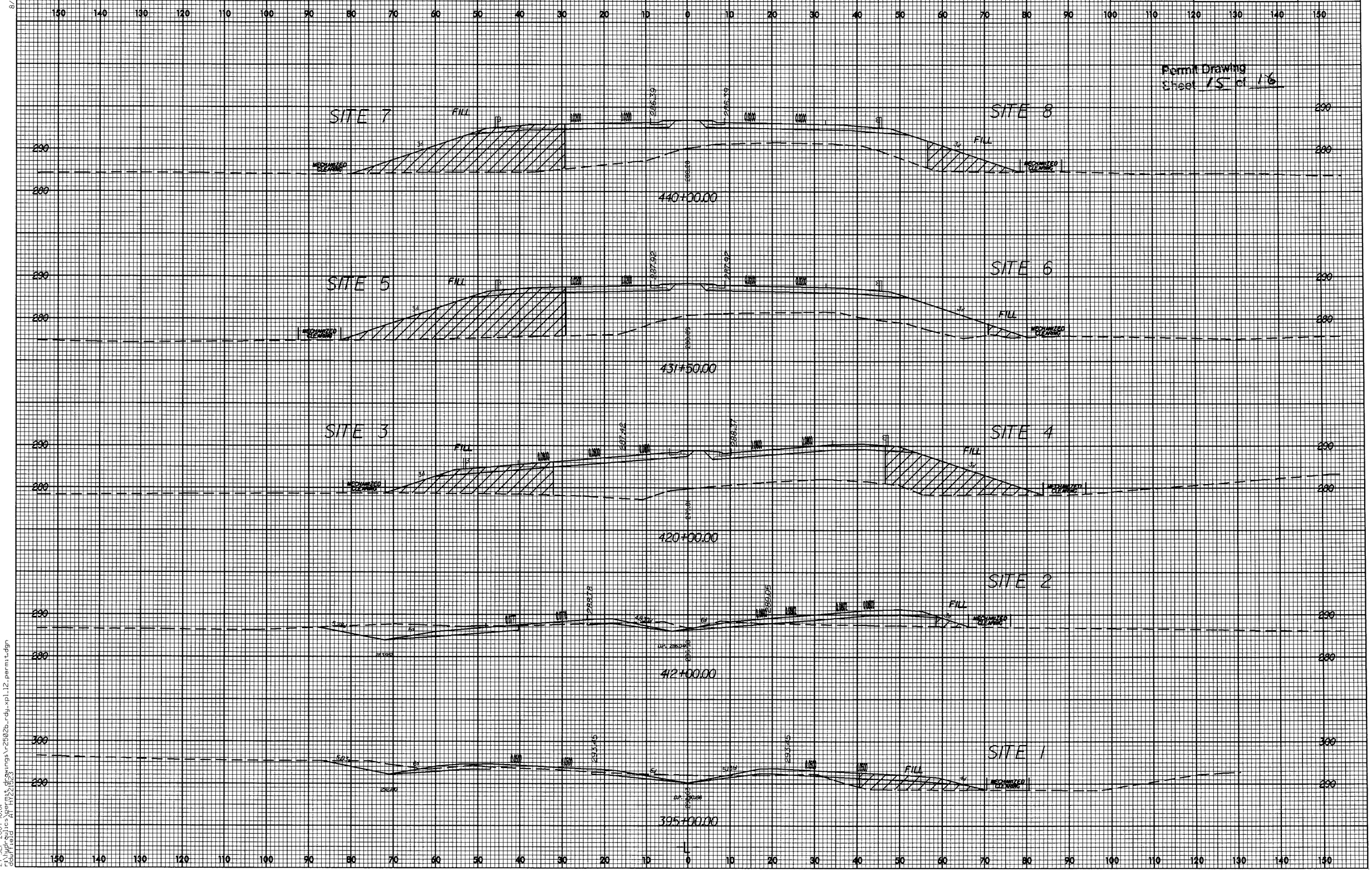
8/17/99

$FILE$ $FONAME$ $DATE$ $TIME$ $USER$ RUN

8/23/99

0 10	PROJ. REFERENCE NO.	SHEET NO.
	R2502B	X-1

Permit Drawing
Sheet 15 of 16



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dduffield AF_HY221623

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

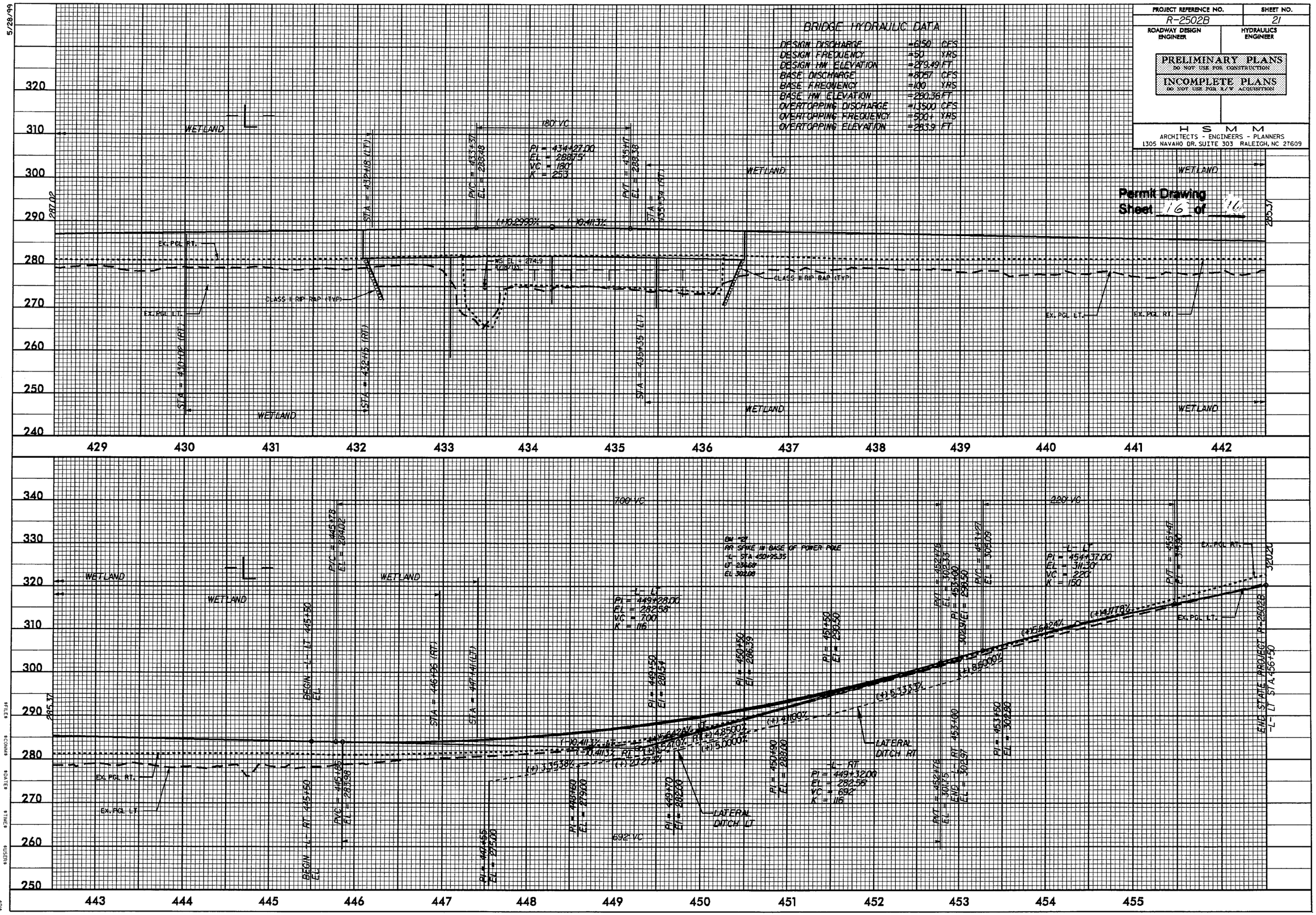
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

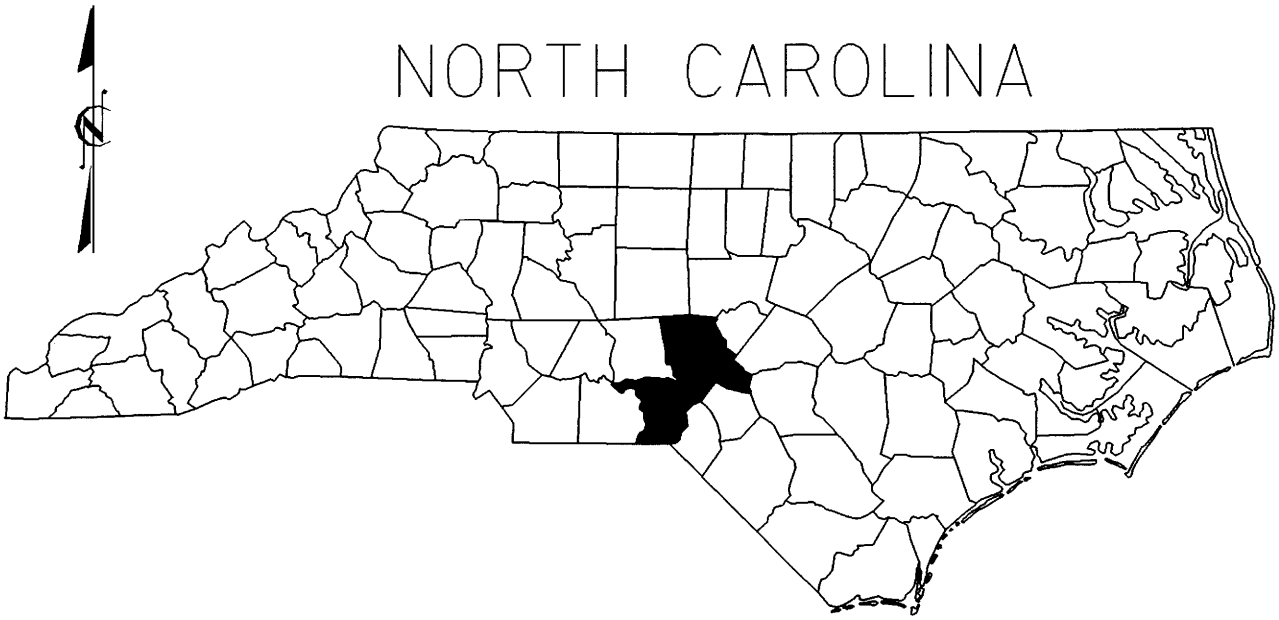
H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

Permit Drawing
Sheet 16 of 16

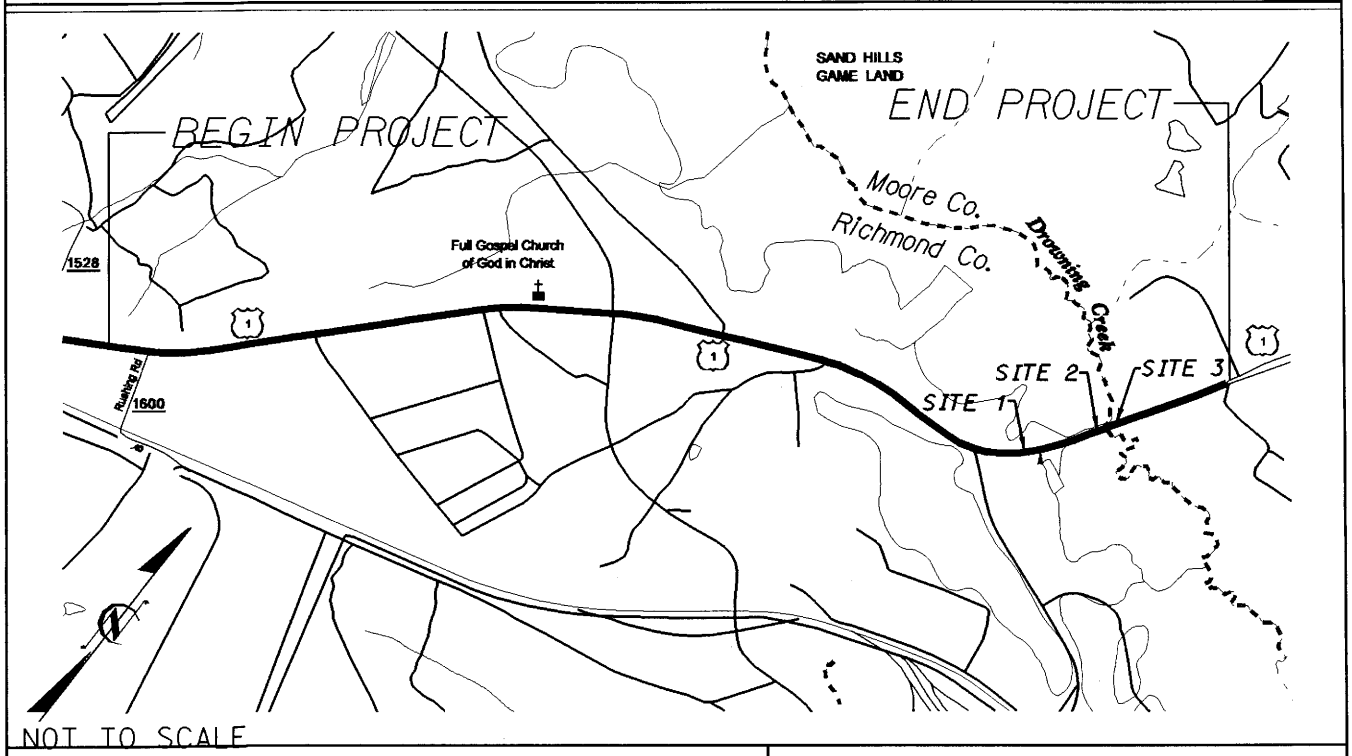
BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=6150 CFS
DESIGN FREQUENCY	=50 YRS
DESIGN HW ELEVATION	=279.49 FT
BASE DISCHARGE	=8057 CFS
BASE FREQUENCY	=100 YRS
BASE HW ELEVATION	=280.36 FT
OVERTOPPING DISCHARGE	=13500 CFS
OVERTOPPING FREQUENCY	=500+ YRS
OVERTOPPING ELEVATION	=283.9 FT





Utility Permit Drawings



SITE MAP

NCDOT

DIVISION OF HIGHWAYS
RICHMOND / MOORE COUNTIES
PROJECT: 34438.1.1 (R-2502B)
WIDENING OF US 1
FROM NORTH OF SR 1528 TO
THE EXISTING DIVIDED FACILITY
NORTH OF THE RICHMOND
COUNTY LINE

SHEET 1 **OF** 6 **06 / 27 / 07**

UTILITY PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Fill In Wetlands (ac)	Fill In Wetlands (sq. ft.)	Excavation In Wetlands (ac)	Hand Clearing (ac)		SURFACE WATER IMPACTS: Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	414+51 To 424+07	3 Utility poles	0.00	5.00		0.23						
2	426+56 To 432+28	3 Utility poles, 2 Guys	0.00	7.00		0.43						
3	436+25 To 447+51	6 Utility Poles	0.00	9.00		1.27						
TOTALS:			0.00	21.00	0.00	1.93	0.00	0.00	0.00	0.00	0.00	0.00

Form Revised 3/22/01

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
RICHMOND/MOORE COUNTIES
PROJECT 34438.1.1 (R-2502B)
WIDENING OF US 1 FROM NORTH OF
SR1528 TO EXISTING DIVIDED FACILITY
NORTH ON THE RICHMOND CO. LINE

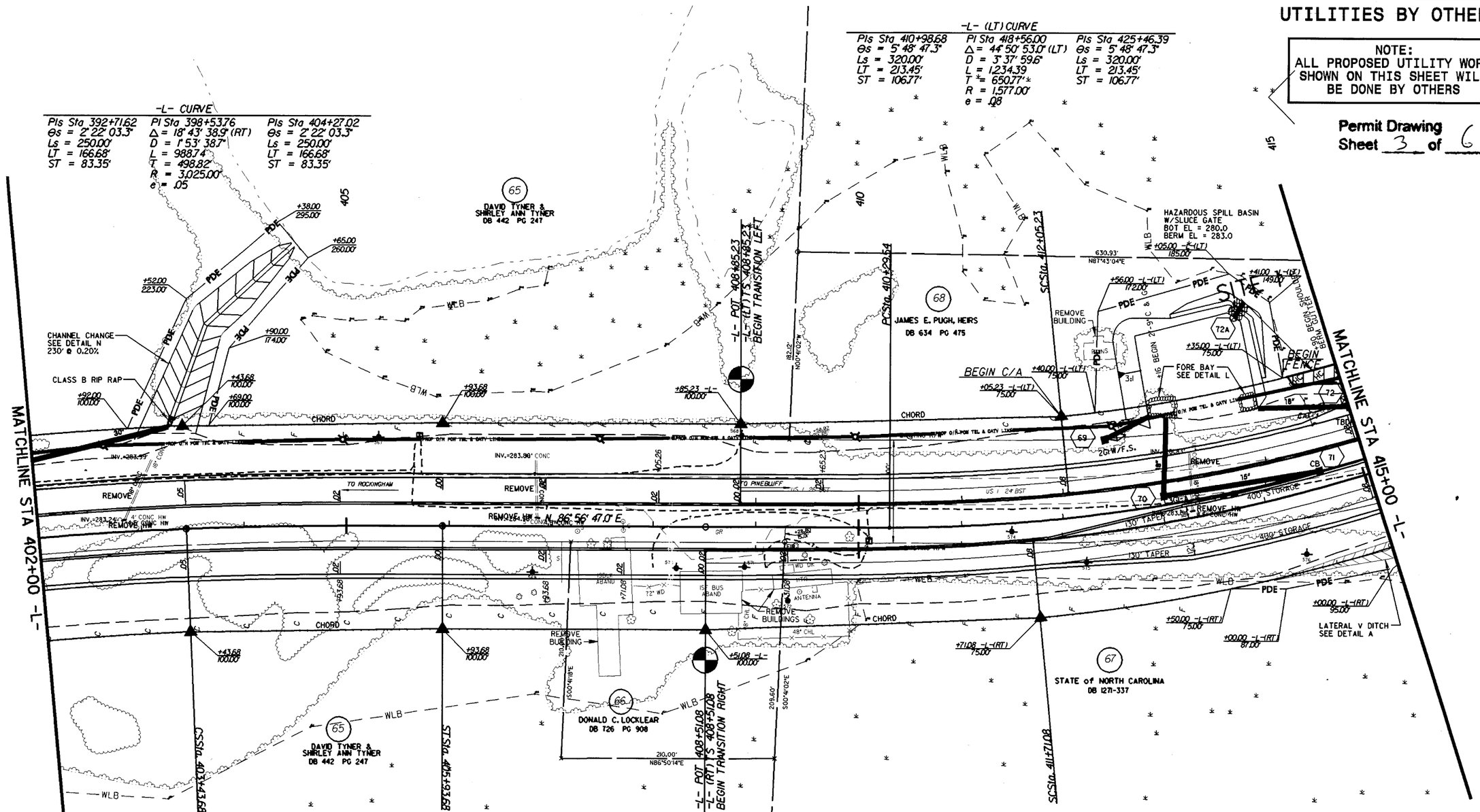
SHEET 2 OF 6 06/27/07

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	4 OF 7

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS

Permit Drawing
Sheet 3 of 6



5/14/99

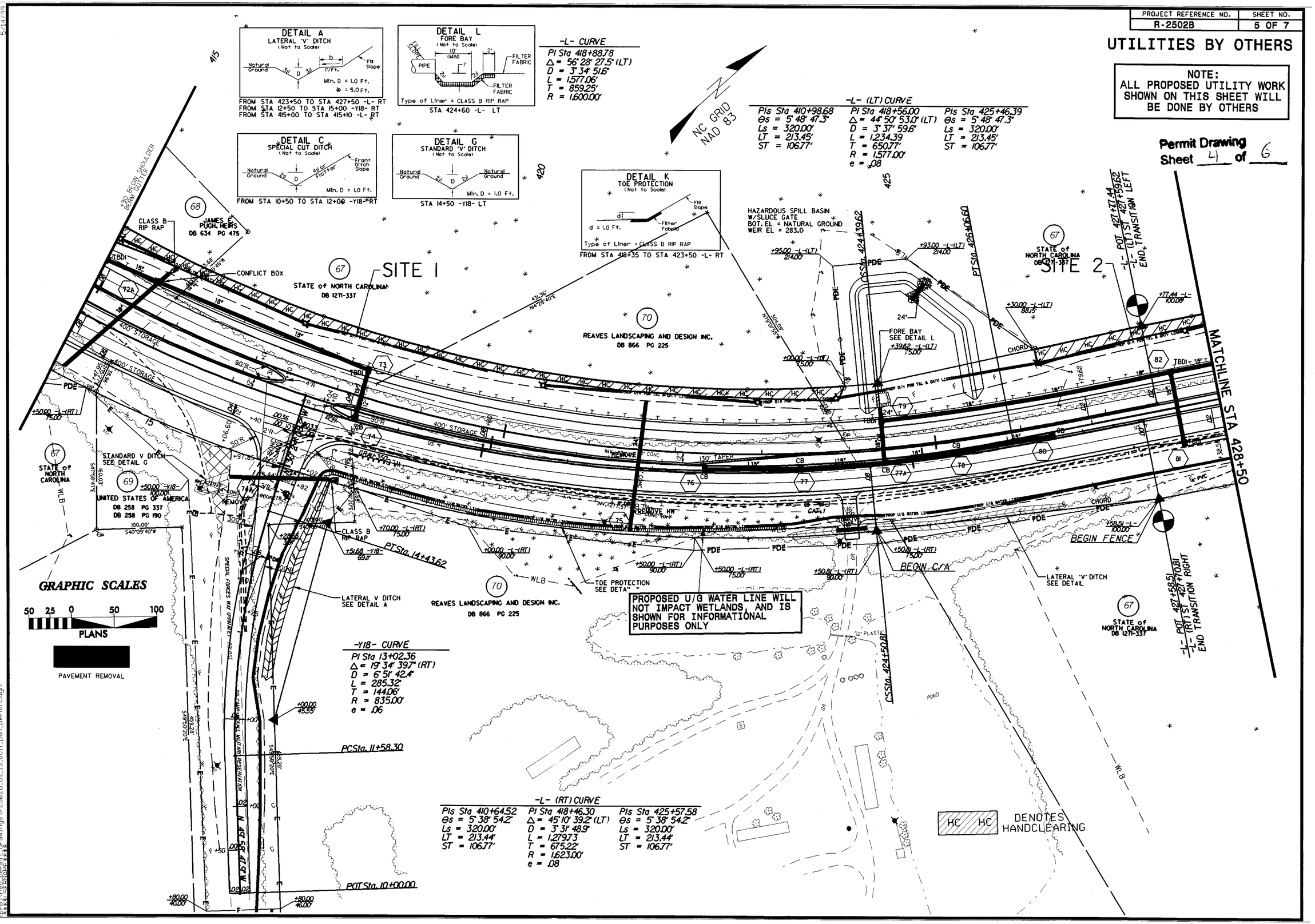
27-JUN-2007 16:37

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	5 OF 7

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS

Permit Drawing Sheet 4 of 6



5/14/99

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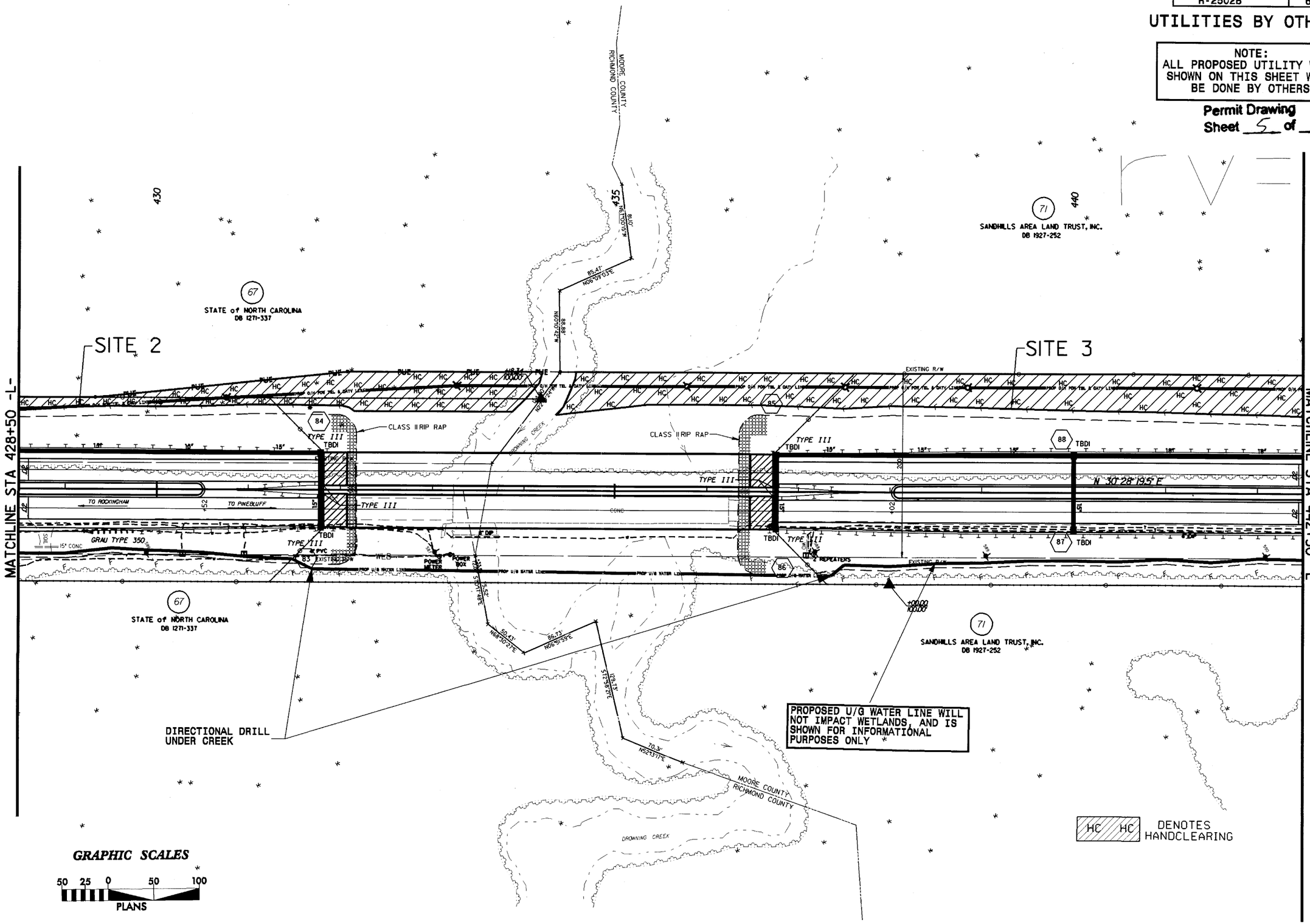
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	6 OF 7

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS

Permit Drawing
Sheet 5 of 6



5/14/99

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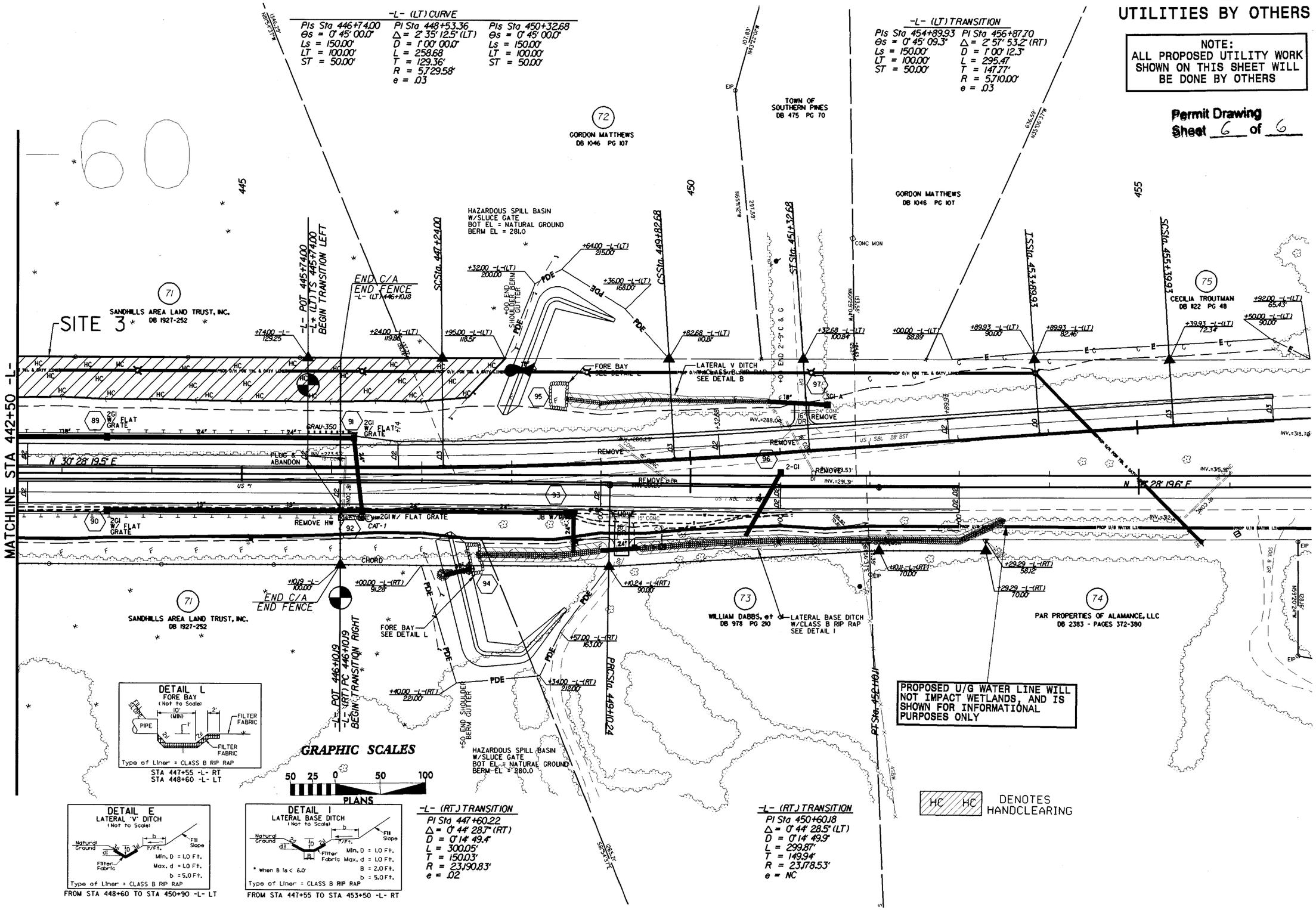
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	7 OF 7

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS

Permit Drawing
Sheet 6 of 6



5/14/99

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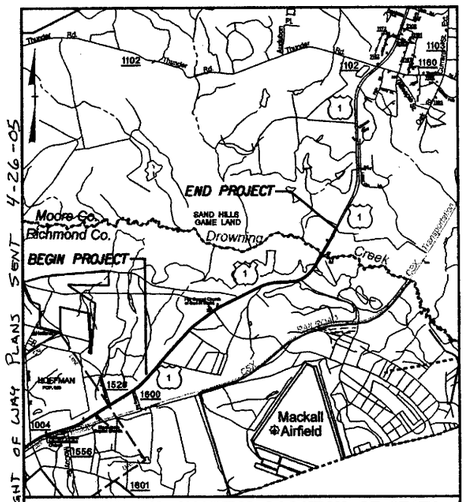
TIP PROJECT: R-2502B

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP SHOWING LOCATION OF STATE PROJECT 34438.1.1

RIGHT OF WAY PLANS SENT 4-26-05

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

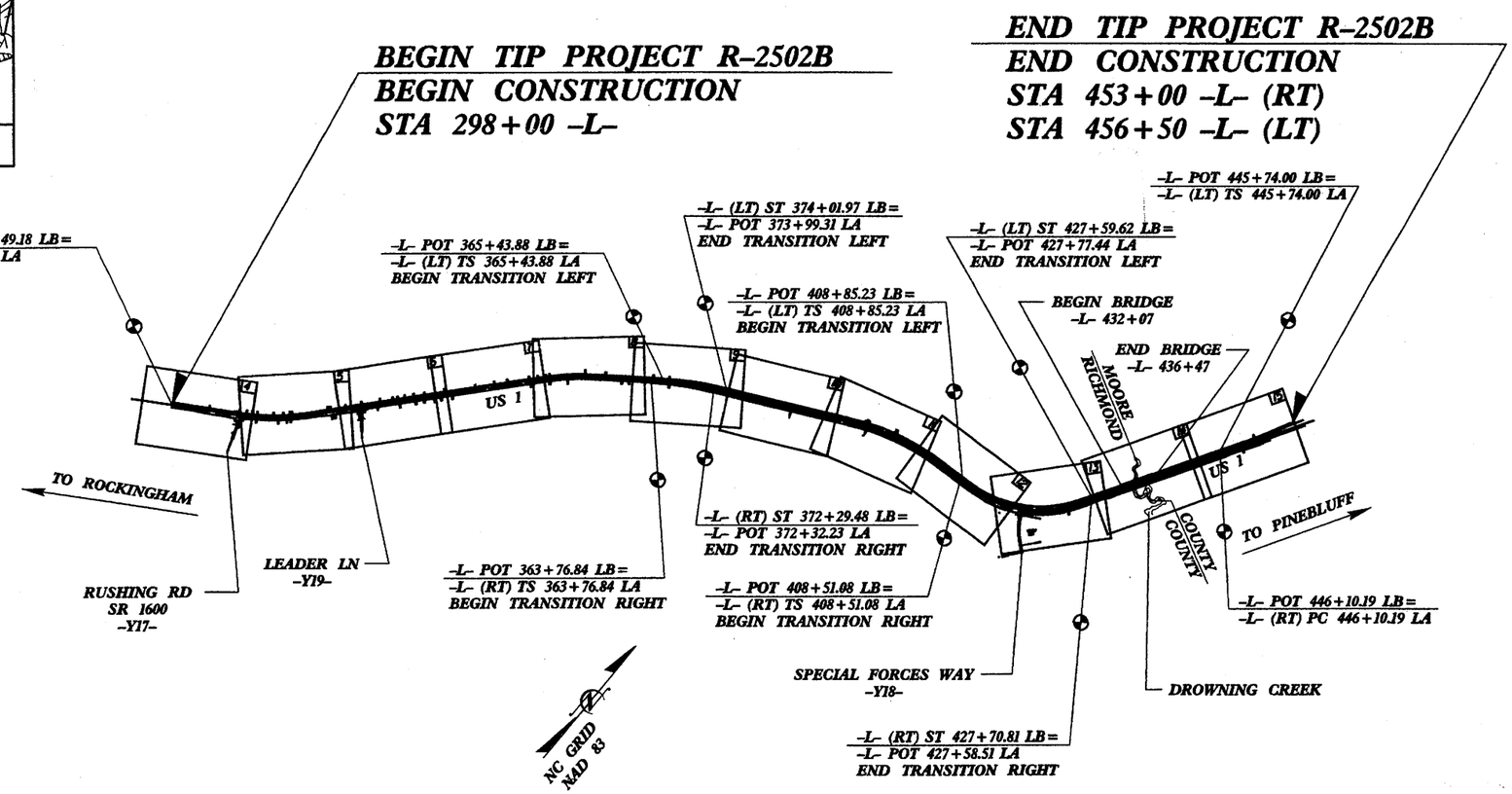
RICHMOND/MOORE COUNTIES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2502B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34438.1.1		PE
34438.1.1		ROW

LOCATION: US 1 FROM NORTH OF SR 1528 JUST NORTH OF HOFFMAN TO THE EXISTING DIVIDED FACILITY NORTH OF THE RICHMOND COUNTY LINE

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES



N.C. DOT CONTACT: Ms. Cathy S. Houser, P.E., Project Engineer

THIS IS PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS

METHOD OF CLEARING - 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 2006	=	10,900
ADT 2025	=	17,200
DHV	=	11 %
D	=	60 %
T	=	10 % *
V	=	60 MPH

* TTST 5% DUAL 5%

FUNC CLASS - ARTERIAL

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT R-2502B =	2.919 MILES
LENGTH STRUCTURE TIP PROJECT R-2502B =	0.083 MILES
TOTAL LENGTH TIP PROJECT R-2502B =	3.002 MILES

Prepared In the Office of:
HSMM
1305 NAVAHO DR., SUITE 303
RALEIGH, NC 27609

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 15, 2005

LETTING DATE:
SEPTEMBER 18, 2007

H. ROY CURRIN, PE
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

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	1B

Note: Not to Scale

**S.U.E. = Subsurface Utility Engineering*

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing High Quality Wetland Boundary — HQ WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Guage — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equaility Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

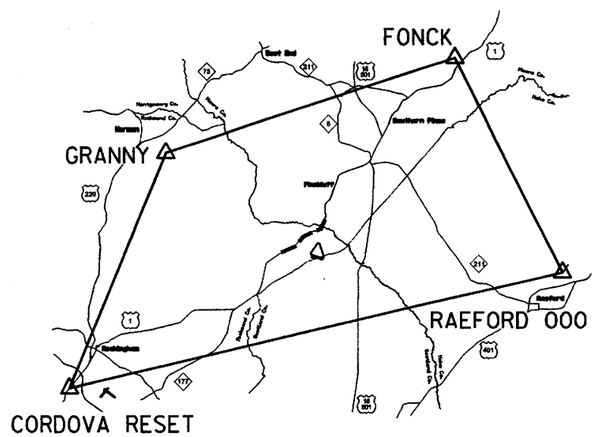
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

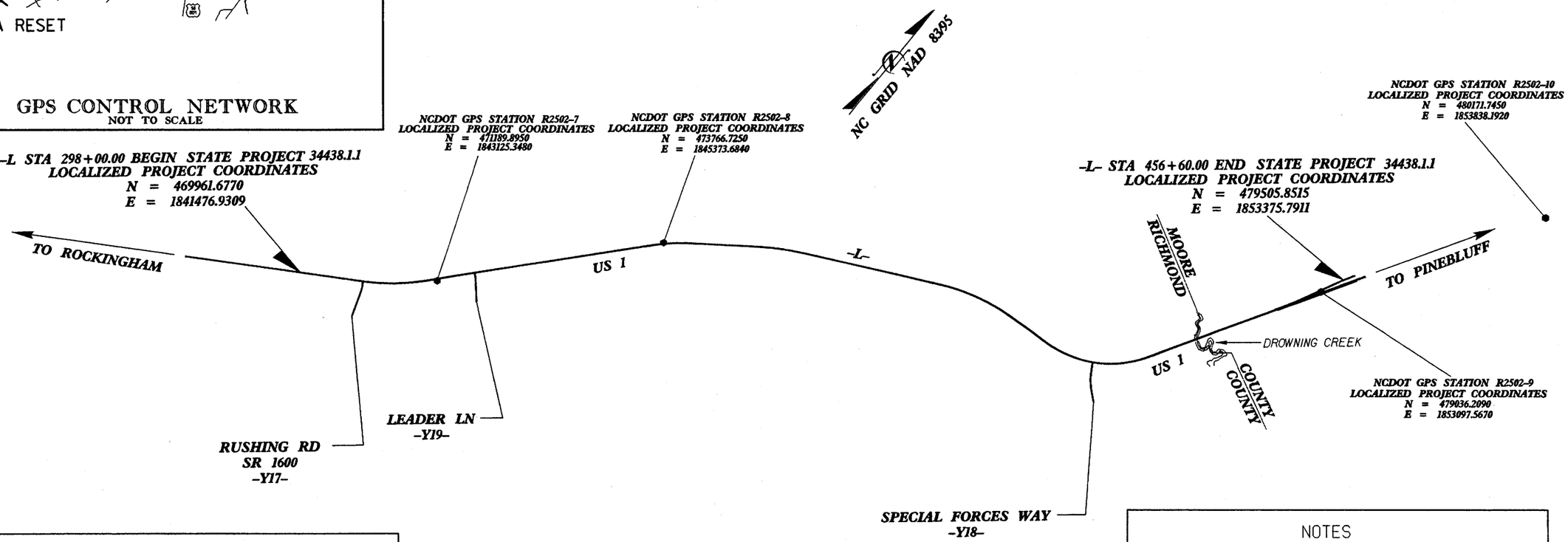
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	1C
Location and Surveys	

SURVEY CONTROL SHEET R-2502B



GPS CONTROL NETWORK
NOT TO SCALE



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "FRUITLAND"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 427332.498(ft) EASTING: 1804014.118(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99986692
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "FRUITLAND" TO -L- STATION 298+00.00 IS
N 41°18'33.21" E 56,751.293'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

HTTP:\WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT

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

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTES

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r2502b_ls_gpscalib_050308.html
r2502b_ls_wgs84_050308.txt
r2502b_ls_local_050308.txt
r2502b_ls_control_050308.txt

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NOTE: DRAWING NOT TO SCALE

$$$$$$$$SYSTIME$$$$$$$$
$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	1D
LOCATION & SURVEYS	

SURVEY CONTROL SHEET R-2502B

GPS CALIBRATION REPORT

PROJECT : R2502

TIP NUMBER	R-2502		
USER NAME	SCRANFORD	DATE & TIME	4:27:46 PM 7/8/03
COORDINATE SYSTEM	US STATE PLANE 1983	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)		
VERTICAL DATUM	NAVD88	GEOID MODEL	GEOID99 (CONUS)
COORDINATE UNITS	US SURVEY FEET		
DISTANCE UNITS	US SURVEY FEET		
HEIGHT UNITS	US SURVEY FEET		

LOCAL SITE INFORMATION

LOCALIZED AROUND	FRUITLAND
LATITUDE	34°55'20.63321" N
LONGITUDE	79°39'13.80534" W
SITE SCALE FACTOR	1.000133098

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION USES A LOCALIZED COORDINATE SYSTEM
WHICH IS VERY SIMILAR TO NORTH CAROLINA ZONE 3200 FROM WHICH IT IS DERIVED.
PLEASE TAKE CARE IN UTILIZING THESE COORDINATES TO ELIMINATE CONFUSION OF THE TWO SYSTEMS.
THIS FILE IS TO AID IN THE USE OF REAL TIME KINEMATIC (RTK) GPS DURING CONSTRUCTION LAYOUT.

DATUM TRANSFORMATION PARAMETERS

DATUM TRANSFORMATION COMPUTATION NOT REQUESTED

UPDATED DEFAULT PROJECTION (TRANSVERSE MERCATOR) DEFINITION

UPDATED DEFAULT PROJECTION NOT REQUESTED

HORIZONTAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ROTATION CENTER	477451.679SFT
EASTING COORDINATE OF ROTATION CENTER	1850096.836SFT
ROTATION ABOUT THE CENTER POINT	0°00'00"
TRANSLATION NORTH	-0.011SFT
TRANSLATION EAST	0.029SFT
SCALE FACTOR	1.00000014

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	450387.519SFT
EASTING COORDINATE OF ORIGIN POINT	1824778.879SFT
VERTICAL SEPARATION AT ORIGIN	0.014SFT
SLOPE NORTH	-1.296PPM
SLOPE EAST	0.541PPM

GEOID MODEL DEFINITION

GEOID99 (CONUS)

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.048SFT	0.008	B3680-1 - WGS84
VERTICAL	0.037SFT	0.005	GRANNY - WGS84
THREE-DIMENSIONAL	0.049SFT	0.009	B3680-1 - WGS84

POINT RESIDUALS
FOR DISPLAY ONLY

WGS84 COORDINATES		CALCULATED POINT		LOCAL COORDINATES	
POINT	R2502-2 - WGS84	NORTHING	450387.519SFT	POINT	R2502-2 - LOCAL
LATITUDE	34°59'09.93850"N	EASTING	1824778.879SFT	NORTHING	450387.526SFT
LONGITUDE	79°35'06.09010"W	ELEVATION	425.964SFT	EASTING	1824778.868SFT
HEIGHT	321.965SFT	HORZ ERROR	0.013SFT	ELEVATION	425.948SFT
		VERT ERROR	0.016SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.020SFT	QUALITY	CONTROL QUALITY
POINT	R2502-3 - WGS84	NORTHING	456838.663SFT	POINT	R2502-3 - LOCAL
LATITUDE	35°00'14.05722"N	EASTING	1830255.718SFT	NORTHING	456838.670SFT
LONGITUDE	79°34'00.71461"W	ELEVATION	431.721SFT	EASTING	1830255.708SFT
HEIGHT	327.660SFT	HORZ ERROR	0.012SFT	ELEVATION	431.712SFT
		VERT ERROR	0.009SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.015SFT	QUALITY	CONTROL QUALITY
POINT	R2502-5 - WGS84	NORTHING	464867.052SFT	POINT	R2502-5 - LOCAL
LATITUDE	35°01'33.59741"N	EASTING	1832685.204SFT	NORTHING	464867.058SFT
LONGITUDE	79°33'32.05509"W	ELEVATION	428.365SFT	EASTING	1832685.193SFT
HEIGHT	324.373SFT	HORZ ERROR	0.013SFT	ELEVATION	428.366SFT
		VERT ERROR	0.001SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.013SFT	QUALITY	CONTROL QUALITY
POINT	R2502-1 - WGS84	NORTHING	448358.248SFT	POINT	R2502-1 - LOCAL
LATITUDE	34°58'49.68521"N	EASTING	1821667.443SFT	NORTHING	448358.250SFT
LONGITUDE	79°35'43.33562"W	ELEVATION	410.376SFT	EASTING	1821667.433SFT
HEIGHT	306.446SFT	HORZ ERROR	0.010SFT	ELEVATION	410.351SFT
		VERT ERROR	0.025SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.027SFT	QUALITY	CONTROL QUALITY
POINT	R2502-4 - WGS84	NORTHING	461797.618SFT	POINT	R2502-4 - LOCAL
LATITUDE	35°01'03.15800"N	EASTING	1831227.739SFT	NORTHING	461797.620SFT
LONGITUDE	79°33'49.36924"W	ELEVATION	434.969SFT	EASTING	1831227.725SFT
HEIGHT	330.967SFT	HORZ ERROR	0.014SFT	ELEVATION	434.967SFT
		VERT ERROR	0.002SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.015SFT	QUALITY	CONTROL QUALITY
POINT	R2502-6 - WGS84	NORTHING	466342.802SFT	POINT	R2502-6 - LOCAL
LATITUDE	35°01'48.31562"N	EASTING	1834898.933SFT	NORTHING	466342.809SFT
LONGITUDE	79°33'05.53704"W	ELEVATION	428.281SFT	EASTING	1834898.922SFT
HEIGHT	324.241SFT	HORZ ERROR	0.013SFT	ELEVATION	428.284SFT
		VERT ERROR	0.003SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.013SFT	QUALITY	CONTROL QUALITY
POINT	R2502-7 - WGS84	NORTHING	471189.894SFT	POINT	R2502-7 - LOCAL
LATITUDE	35°02'36.69608"N	EASTING	1843125.346SFT	NORTHING	471189.895SFT
LONGITUDE	79°31'26.92992"W	ELEVATION	399.156SFT	EASTING	1843125.348SFT
HEIGHT	294.934SFT	HORZ ERROR	0.003SFT	ELEVATION	399.160SFT
		VERT ERROR	0.004SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.005SFT	QUALITY	CONTROL QUALITY
POINT	R2502-8 - WGS84	NORTHING	473766.727SFT	POINT	R2502-8 - LOCAL
LATITUDE	35°03'02.29854"N	EASTING	1845373.675SFT	NORTHING	473766.725SFT
LONGITUDE	79°31'00.05271"W	ELEVATION	373.265SFT	EASTING	1845373.684SFT
HEIGHT	269.022SFT	HORZ ERROR	0.009SFT	ELEVATION	373.271SFT
		VERT ERROR	0.006SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.011SFT	QUALITY	CONTROL QUALITY
POINT	R2502-9 - WGS84	NORTHING	479036.219SFT	POINT	R2502-9 - LOCAL
LATITUDE	35°03'54.80357"N	EASTING	1853097.542SFT	NORTHING	479036.209SFT
LONGITUDE	79°29'27.47041"W	ELEVATION	290.573SFT	EASTING	1853097.567SFT
HEIGHT	186.207SFT	HORZ ERROR	0.027SFT	ELEVATION	290.581SFT
		VERT ERROR	0.008SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.028SFT	QUALITY	CONTROL QUALITY
POINT	R2502-10 - WGS84	NORTHING	480171.756SFT	POINT	R2502-10 - LOCAL
LATITUDE	35°04'06.07060"N	EASTING	1853838.160SFT	NORTHING	480171.745SFT
LONGITUDE	79°29'18.62854"W	ELEVATION	362.097SFT	EASTING	1853838.192SFT
HEIGHT	257.736SFT	HORZ ERROR	0.033SFT	ELEVATION	362.106SFT
		VERT ERROR	0.009SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.035SFT	QUALITY	CONTROL QUALITY
POINT	B3680-1 - WGS84	NORTHING	501326.848SFT	POINT	B3680-1 - LOCAL
LATITUDE	35°07'36.06047"N	EASTING	1870345.885SFT	NORTHING	501326.831SFT
LONGITUDE	79°26'01.15653"W	ELEVATION	326.8303SFT	EASTING	1870345.930SFT
HEIGHT	222.601SFT	HORZ ERROR	0.048SFT	ELEVATION	326.821SFT
		VERT ERROR	0.009SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.049SFT	QUALITY	CONTROL QUALITY
POINT	B3680-2 - WGS84	NORTHING	502645.764SFT	POINT	B3680-2 - LOCAL
LATITUDE	35°07'49.14918"N	EASTING	1871372.484SFT	NORTHING	502645.744SFT
LONGITUDE	79°25'48.86679"W	ELEVATION	327.624SFT	EASTING	1871372.515SFT
HEIGHT	223.408SFT	HORZ ERROR	0.037SFT	ELEVATION	327.615SFT
		VERT ERROR	0.009SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.038SFT	QUALITY	CONTROL QUALITY
POINT	GRANNY - WGS84	NORTHING	504945.872SFT	POINT	GRANNY - LOCAL
LATITUDE	35°08'07.61748"N	EASTING	1794493.463SFT	NORTHING	504945.871SFT
LONGITUDE	79°41'14.58424"W	ELEVATION	557.344SFT	EASTING	1794493.438SFT
HEIGHT	455.370SFT	HORZ ERROR	0.025SFT	ELEVATION	557.381SFT
		VERT ERROR	0.037SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.044SFT	QUALITY	CONTROL QUALITY
POINT	FONCK - WGS84	NORTHING	539284.230SFT	POINT	FONCK - LOCAL
LATITUDE	35°13'52.68559"N	EASTING	1902434.556SFT	NORTHING	539284.244SFT
LONGITUDE	79°19'36.36436"W	ELEVATION	332.786SFT	EASTING	1902434.523SFT
HEIGHT	228.717SFT	HORZ ERROR	0.036SFT	ELEVATION	332.762SFT
		VERT ERROR	0.024SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.043SFT	QUALITY	CONTROL QUALITY
POINT	RAEFORD 000 - WGS84	NORTHING	460815.806SFT	POINT	RAEFORD 000 - LOCAL
LATITUDE	35°00'57.62491"N	EASTING	1941857.951SFT	NORTHING	460815.822SFT
LONGITUDE	79°11'39.30725"W	ELEVATION	290.000SFT	EASTING	1941857.932SFT
HEIGHT	182.719SFT	HORZ ERROR	0.025SFT	ELEVATION	290.026SFT
		VERT ERROR	0.026SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.036SFT	QUALITY	CONTROL QUALITY

DATUM DESCRIPTION

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THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99986692
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NOTES

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PROJECT REFERENCE NO.	SHEET NO.
R-2502B	1E
Location and Surveys	

SURVEY CONTROL SHEET R-2502B

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
24	BL-24	469649.6600	1841045.8940	429.09	292+69.57	42.34 RT
25	BL-25	470386.3240	1842266.7830	406.29	306+95.13	48.33 RT
26	BL-26	470771.7210	1842762.3920	402.33	313+16.25	34.96 RT
107	R2502-7	471189.8950	1843125.3480	399.16	318+66.85	8.34 RT
27	BL-27	471889.3970	1843738.2890	384.25	327+96.87	0.48 RT
28	BL-28	472676.4390	1844437.5610	370.35	338+49.68	1.19 LT
108	R2502-8	473766.7250	1845373.6840	373.27	352+82.57	42.87 LT
29	BL-29	474571.4890	1846429.4260	334.79	366+05.26	50.85 LT
30	BL-30	474968.8120	1847076.7430	331.35	373+56.35	68.50 LT
31	BL-31	475426.7260	1848022.5130	313.64	384+07.07	56.01 LT
32	BL-32	475952.0900	1849090.9590	293.96	395+90.00	71.87 LT
33	BL-33	476099.5300	1849748.0000	287.66	402+50.00	62.43 LT
34	BL-34	476172.2280	1851179.7330	282.41	416+64.56	80.82 RT
35	BL-35	476542.7010	1851632.3030	281.63	422+29.14	45.58 RT
36	BL-36	477467.0910	1852183.1980	281.92	432+98.05	6.02 RT
37	BL-37	478186.2370	1852601.5040	280.67	441+30.00	1.86 RT
109	R2502-9	479036.2090	1853097.5670	290.58	451+14.13	1.63 LT
110	R2502-10	480171.7450	1853838.1920	362.10	OUTSIDE PROJECT LIMITS	

BY17

POINT	DESC.	NORTH	EAST	ELEVATION	Y17 STATION	OFFSET
25	BL-25	470386.3240	1842266.7830	406.29	14+80.41	29.82 LT
59	BY17-59	470083.3860	1842397.0890	401.52	11+44.58	14.31 LT

BY18

POINT	DESC.	NORTH	EAST	ELEVATION	Y18 STATION	OFFSET
34	BL-34	476172.2280	1851179.7330	282.41	15+08.65	119.82 LT
60	BY18-60	475959.4300	1851465.2970	285.11	11+83.32	22.54 LT

****
BM18 ELEVATION = 428.08
N 470008 E 1840950
L STATION 293+74 314 LEFT
RR SPIKE IN BASE OF POWER POLE
****
****
BM19 ELEVATION = 401.83
N 470113 E 1842374
L STATION 306+44 337 RIGHT
RR SPIKE IN BASE OF POWER POLE
****
****
BM20 ELEVATION = 400.55
N 471757 E 1843381
L STATION 324+60 178 LEFT
RR SPIKE IN BASE OF TRIPLE 24" PINE
****
****
BM21 ELEVATION = 371.30
N 473181 E 1845167
L STATION 347+12 207 RIGHT
RR SPIKE IN BASE OF POWER POLE
****
****
BM22 ELEVATION = 340.37
N 474626 E 1846228
L STATION 364+76 214 LEFT
RR SPIKE IN BASE OF 15" PINE
****
****
BM23 ELEVATION = 338.60
N 474984 E 1847552
L STATION 377+89 131 RIGHT
RR SPIKE IN BASE OF 18" PINE
****
****
BM24 ELEVATION = 294.21
N 475610 E 1848917
L STATION 392+94 178 RIGHT
RR SPIKE IN BASE OF 15" OAK
****
****
BM25 ELEVATION = 286.74
N 476306 E 1850433
L STATION 409+40 223 LEFT
RR SPIKE IN BASE OF 15" PINE
****
****
BM26 ELEVATION = 281.11
N 476842 E 1851626
L STATION 424+63 151 LEFT
RR SPIKE IN BASE OF 24" DOUBLE OAK
****
****
BM27 ELEVATION = 302.08
N 479139 E 1852885
L STATION 450+95 237 LEFT
RR SPIKE IN BASE OF POWER POLE
****

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VERTICAL DATUM USED IS NAVD 88

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6/2/99

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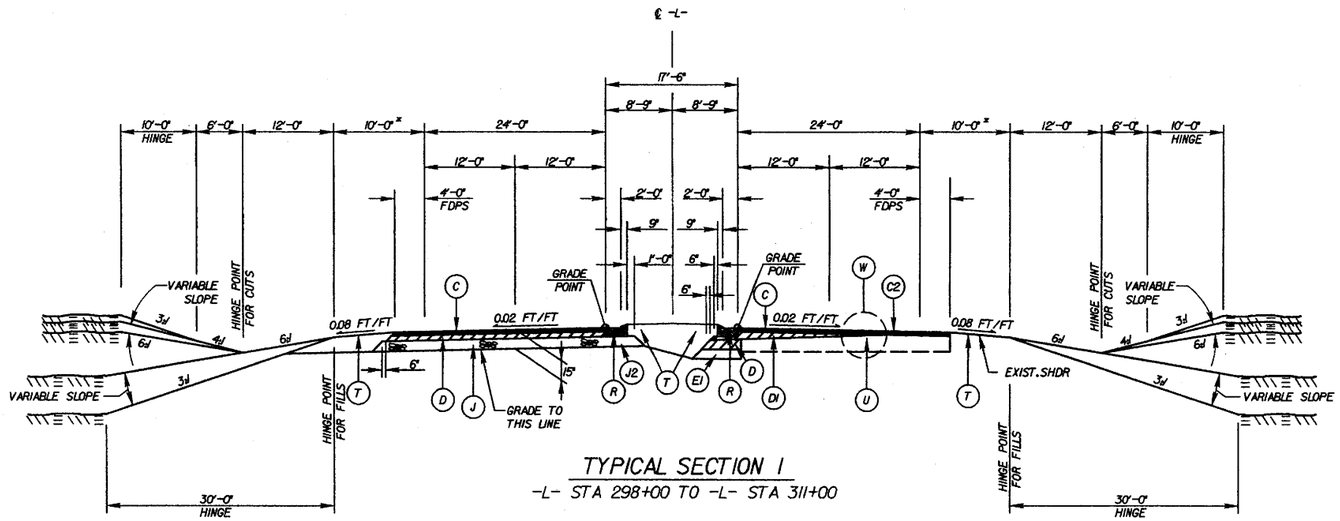
$$$$$$SYSTIME$$$$$$
$$
$$$$$$USERNAME$$$$$$

REVISIONS

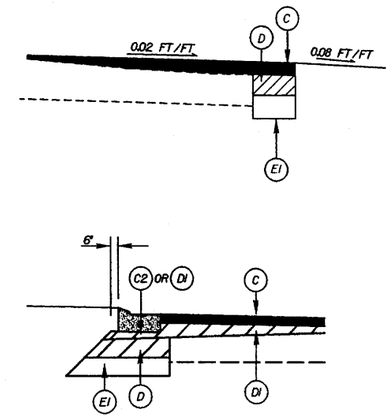
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

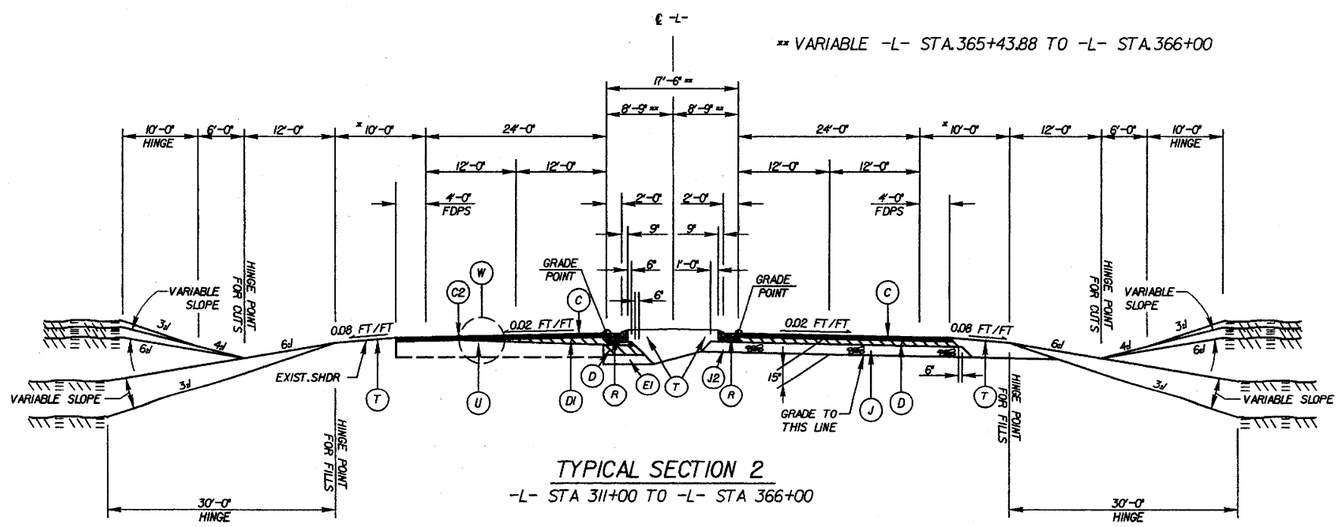
H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



TYPICAL SECTION 1
-L- STA 298+00 TO -L- STA 311+00



DETAIL SHOWING -L- NARROW WIDENING



TYPICAL SECTION 2
-L- STA 311+00 TO -L- STA 366+00

* WIDEN BY 3' WHERE GUARDRAIL IS REQUIRED

PAVEMENT SCHEDULE	
C	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C1	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 140 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½" IN DEPTH.
D	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D1	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2¼" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
J	PROP. 8" AGGREGATE BASE COURSE.
J1	PROP. 6" AGGREGATE BASE COURSE.
J2	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
R	2'-9" CONCRETE CURB AND GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

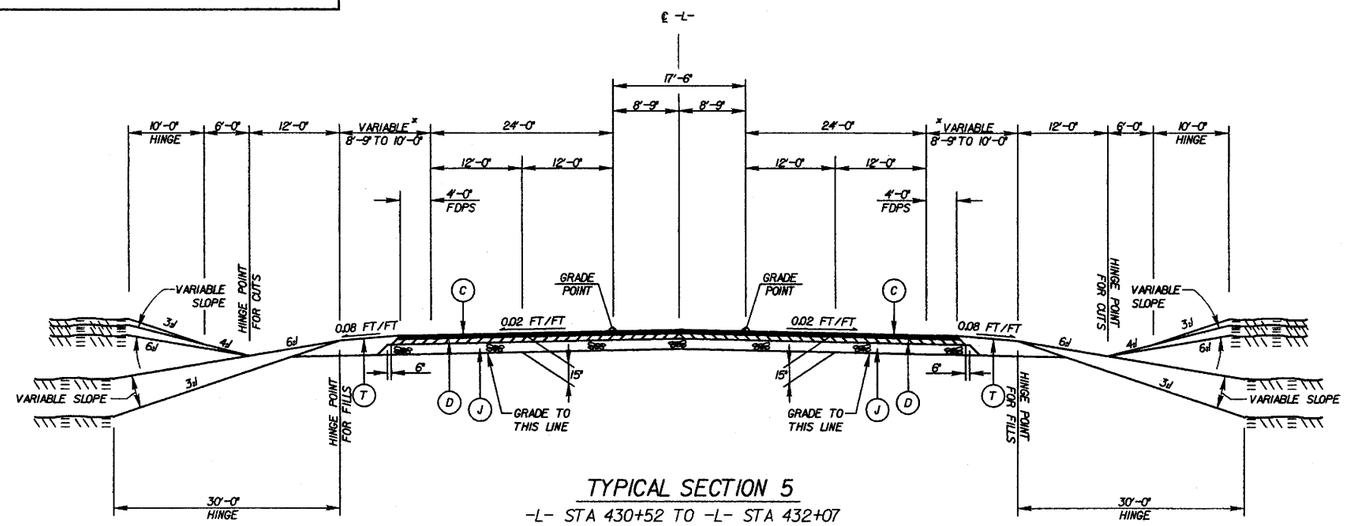
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

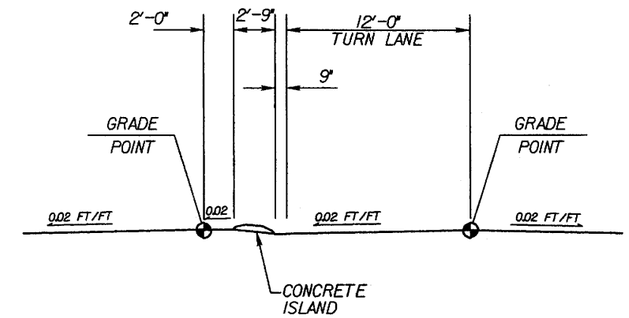
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



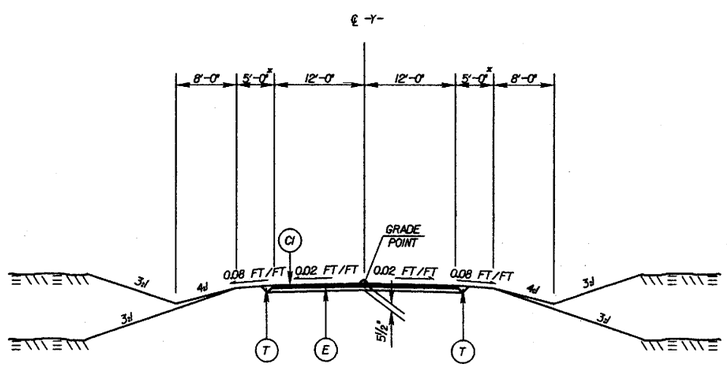
TYPICAL SECTION 5

-L- STA 430+52 TO -L- STA 432+07
-L- STA 436+47 TO -L- STA 438+02



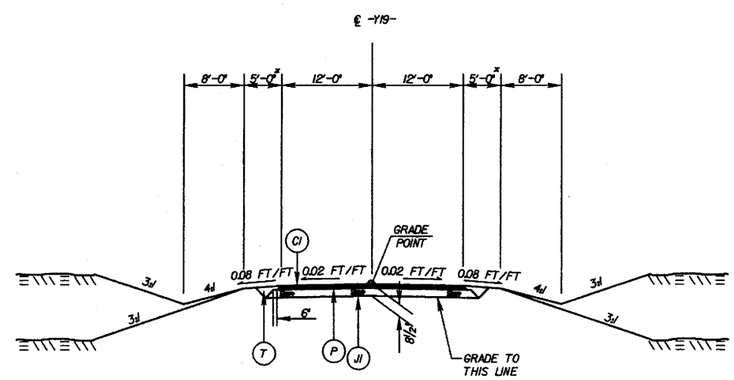
DETAIL OF CONCERETE ISLAND AT TURN LANES

-L- STA 302+26 TO -L- STA 306+70
-L- STA 307+85 TO -L- STA 311+96
-L- STA 318+86 TO -L- STA 323+20
-L- STA 324+30 TO -L- STA 328+44



TYPICAL SECTION 6

-Y17- STA 12+00.00 TO -Y17- STA 14+96.44
-Y18- STA 10+00.00 TO -Y18- STA 15+47.88



TYPICAL SECTION 7

-Y19- STA 11+00.00 TO -Y19- STA 13+81.27

* WIDEN BY 3' WHERE GUARDRAIL IS REQUIRED

PAVEMENT SCHEDULE	
C	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C.
C1	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C.
D	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE.
D1	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE.
E	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C.
J	PROP. 8" AGGREGATE BASE COURSE.
J1	PROP. 6" AGGREGATE BASE COURSE.
J2	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
R	2'-9" CONCRETE CURB AND GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

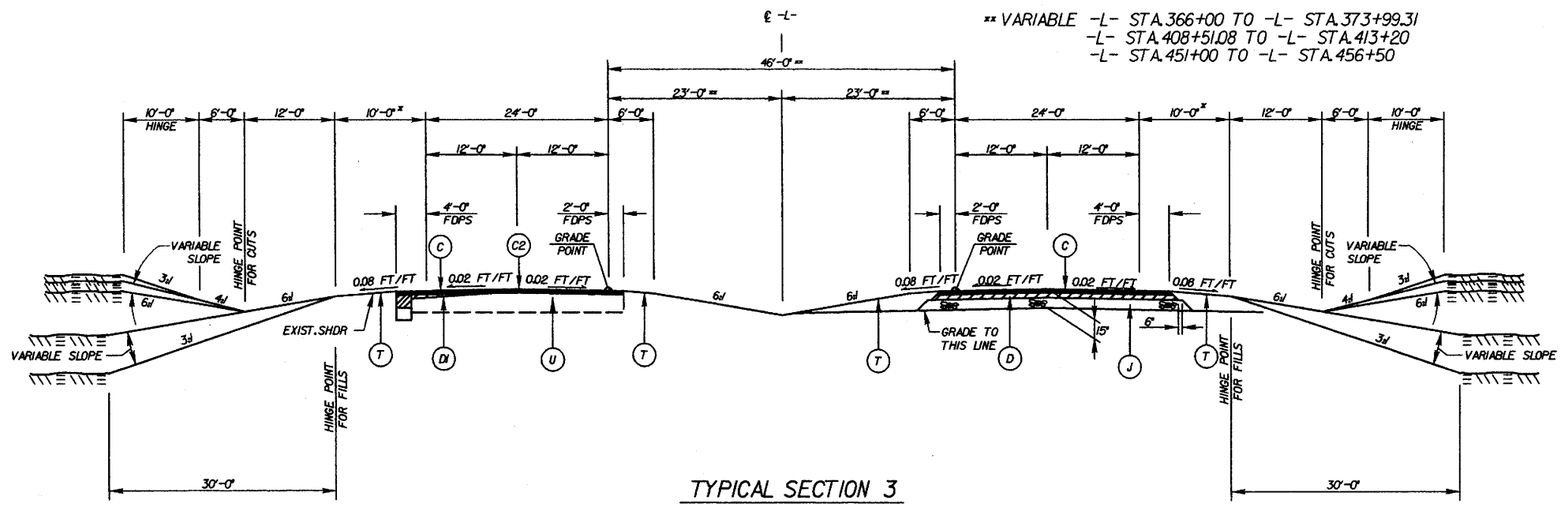
5/28/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

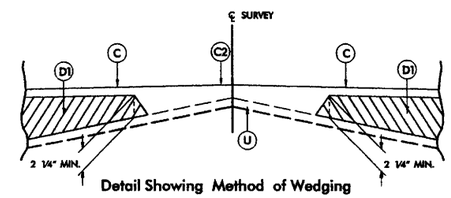
H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



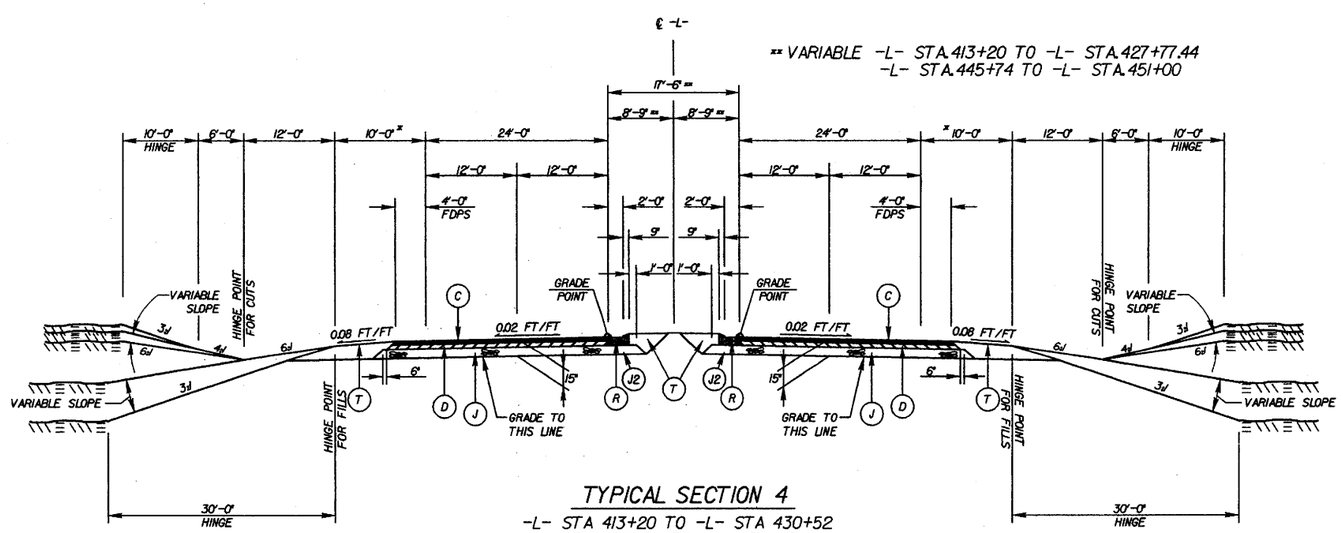
TYPICAL SECTION 3

-L- STA 366+00 TO -L- STA 413+20
-L- STA 451+00 TO -L- STA 456+50

* WIDEN BY 3' WHERE GUARDRAIL IS REQUIRED



Detail Showing Method of Wedging



TYPICAL SECTION 4

-L- STA 413+20 TO -L- STA 430+52
-L- STA 438+02 TO -L- STA 451+00

* WIDEN BY 3' WHERE GUARDRAIL IS REQUIRED

PAVEMENT SCHEDULE	
C	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C.
C1	PROP. APPROX. 2½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C.
D	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE.
D1	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE.
E	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C
J	PROP. 8" AGGREGATE BASE COURSE.
J1	PROP. 6" AGGREGATE BASE COURSE.
J2	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
R	2'-9" CONCRETE CURB AND GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

5/26/99

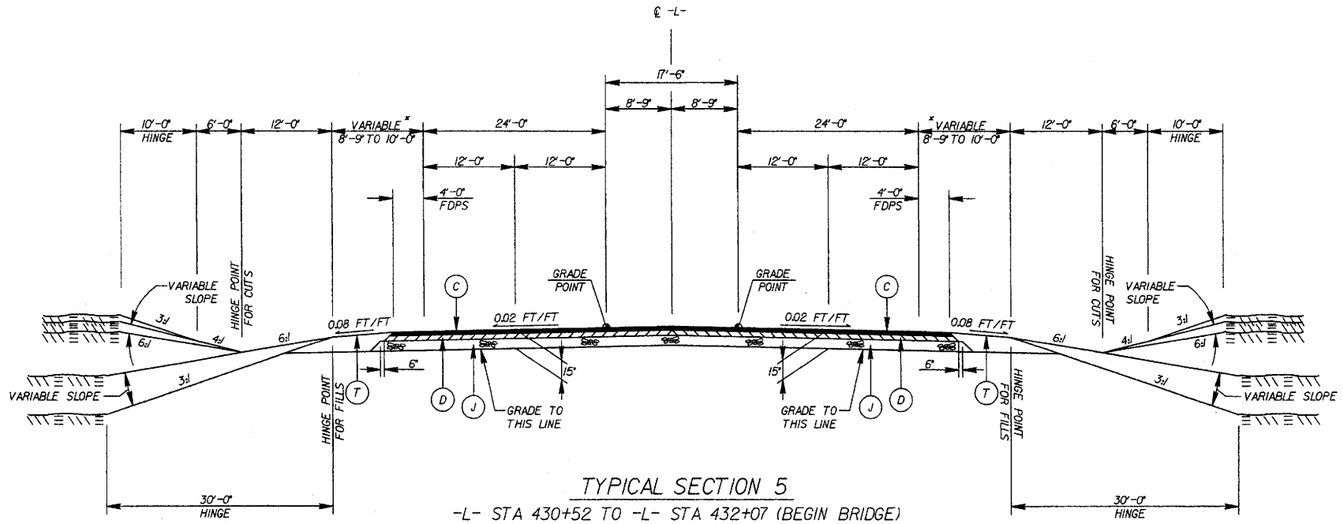
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	2B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

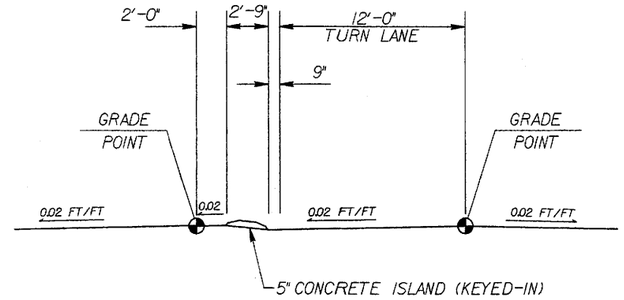
WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



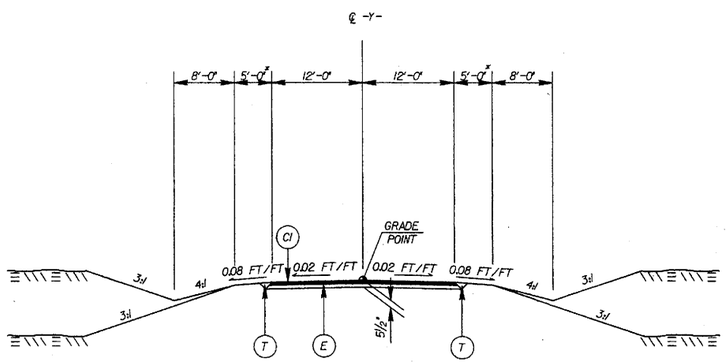
TYPICAL SECTION 5

-L- STA 430+52 TO -L- STA 432+07 (BEGIN BRIDGE)
-L- STA 436+47 (END BRIDGE) TO -L- STA 438+02



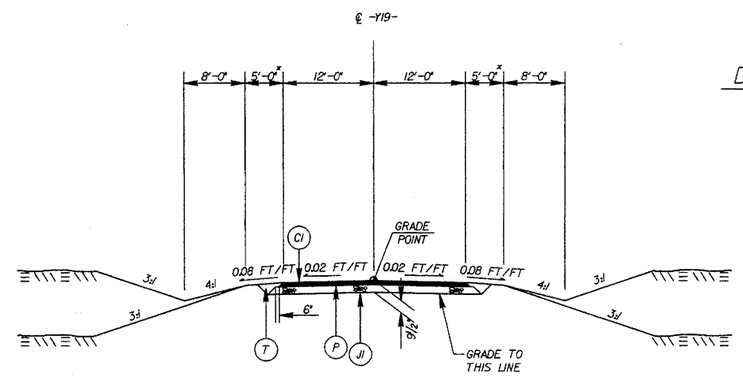
DETAIL OF CONCERETE ISLAND AT TURN LANES

-L- STA 302+26 TO -L- STA 306+70
-L- STA 307+85 TO -L- STA 311+96
-L- STA 318+86 TO -L- STA 323+20
-L- STA 324+30 TO -L- STA 328+44



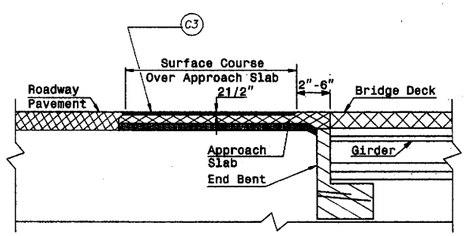
TYPICAL SECTION 6

-Y17- STA 12+00.00 TO -Y17- STA 14+96.44

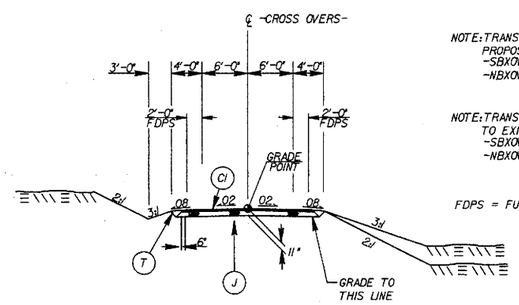


TYPICAL SECTION 7

-Y18- STA 10+00.00 TO -Y18- STA 15+47.88
-Y19- STA 11+00.00 TO -Y19- STA 13+81.27



Detail of Asphalt Wearing Surface on Approach Slab



NOTE: TRANSITION FROM EXIST. PAVEMENT TO PROPOSED CROSSOVER
-SBXOVR- STA.13+85.36 TO STA.15+06.26
-NBXOVR- STA.10+00.00 TO STA.11+37.76

NOTE: TRANSITION FROM PROPOSED CROSSOVER TO EXIST. PAVEMENT
-SBXOVR- STA.18+94.73 TO STA.20+09.49
-NBXOVR- STA.15+37.71 TO STA.16+53.71

FDPS = FULL DEPTH PAVED SHOULDER

TYPICAL SECTION 8

-SBXOVR- STA 15+06.26 TO STA 18+94.73
-NBXOVR- STA 11+37.76 TO STA 15+37.71

* WIDEN BY 3' WHERE GUARDRAIL IS REQUIRED

PAVEMENT SCHEDULE	
C	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C.
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C.
D	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE.
D1	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE.
E	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C.
J	PROP. 8" AGGREGATE BASE COURSE.
J1	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
R	2'-9" CONCRETE CURB AND GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

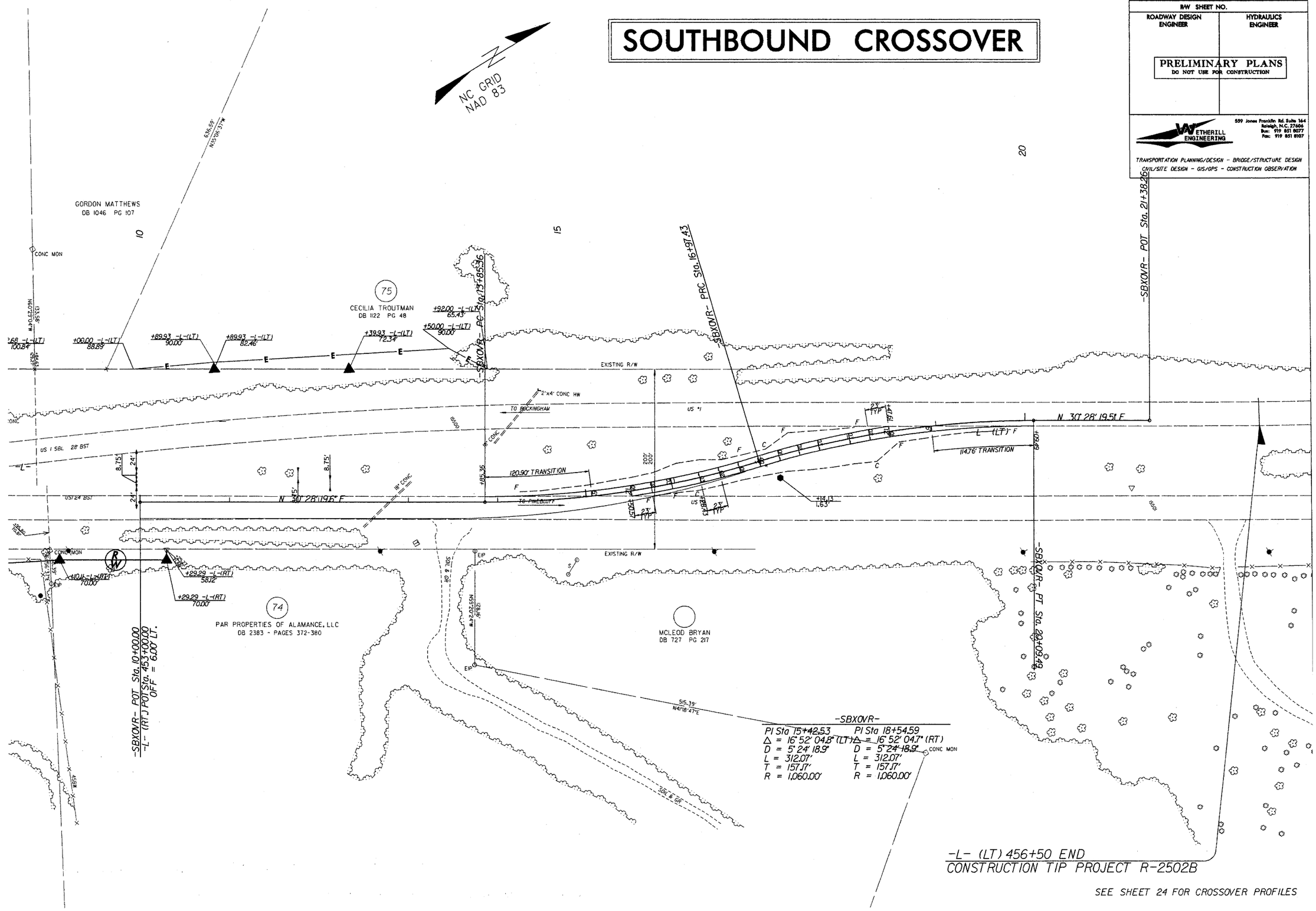
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

SOUTHBOUND CROSSOVER



SEE SHEET 24 FOR CROSSOVER PROFILES

REVISIONS

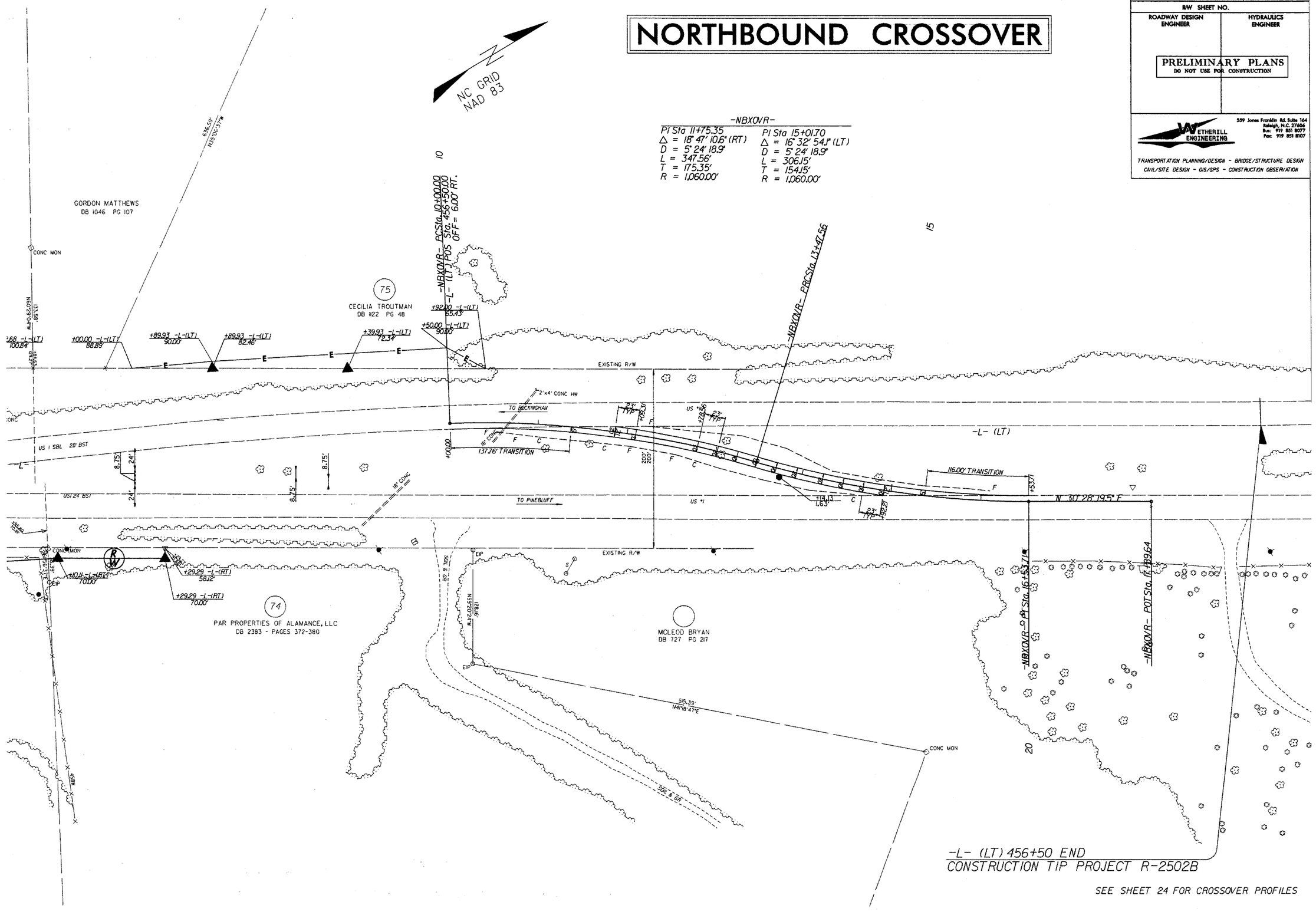
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
509 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

NORTHBOUND CROSSOVER



SEE SHEET 24 FOR CROSSOVER PROFILES

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	2C

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

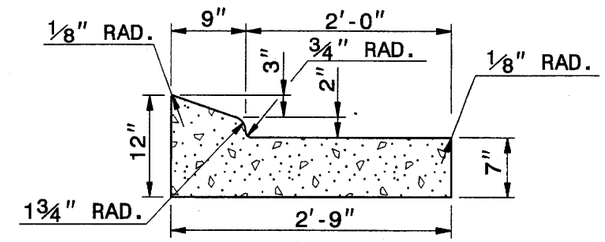
ENGLISH DETAIL DRAWING FOR

2'-9" CONCRETE CURB & GUTTER

SHEET 1 OF 1

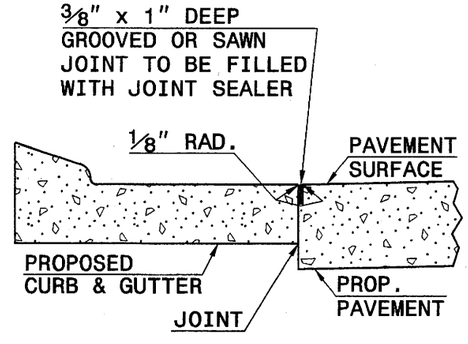
846D01

GENERAL NOTES:
- CONTRACTION JOINTS SHALL BE PLACED AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
- JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
- CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. NON-TEMPLATE FORMED JOINTS SHALL BE A MIN. OF 1½" DEEP.
- ALL CONSTRUCTION JOINTS SHALL BE FILLED WITH JOINT FILLER AND SEALER.
- EXPANSION JOINTS SHALL BE SPACED AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.

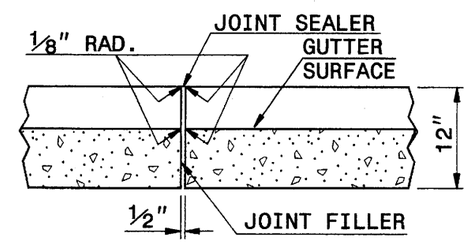


2'-9" CURB AND GUTTER

SECTION VIEW OF CURB AND GUTTER



LONGITUDINAL JOINT



TRANSVERSE EXPANSION JOINT
IN CURB AND GUTTER

SECTION VIEW OF JOINTS

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR

2'-9" CONCRETE CURB & GUTTER

SHEET 1 OF 1

846D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

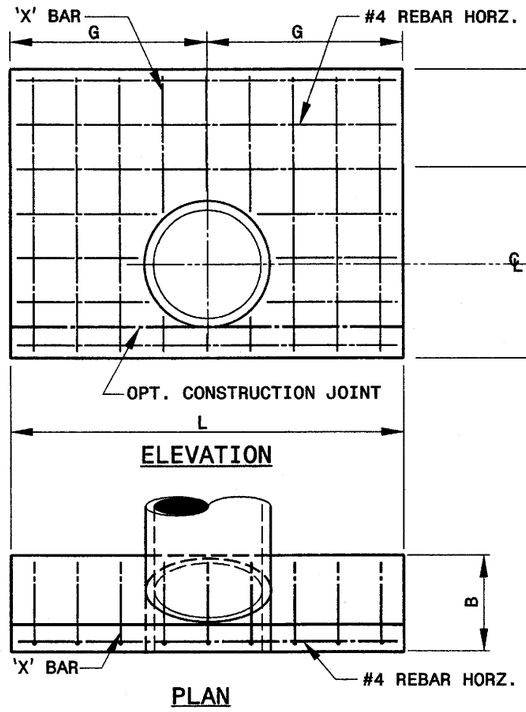
SEE PLATE FOR TITLE

ORIGINAL BY: STD. 846.01 DATE:
MODIFIED BY: E.E. WARD DATE: 8-15-00
CHECKED BY: [signature] DATE: 11/5/04
FILE SPEC.: /usr/details/stand/c&g2'-9".dgn

05-NOV-2004 08:47
W:\Special Details\ericward\usr\details\stand\c&g2'-9.dgn
ericward AT DS212260

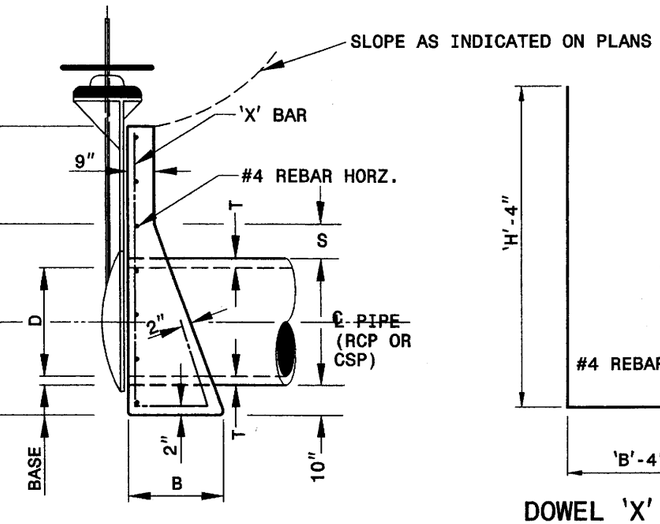
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	2D

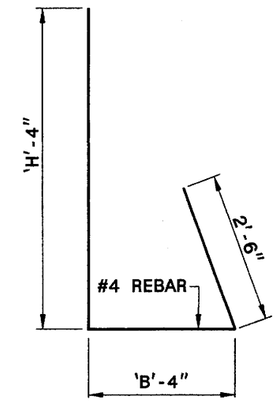


ELEVATION

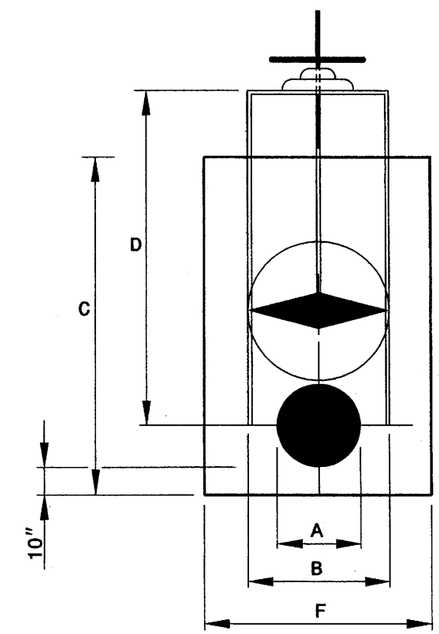
PLAN



END ELEVATION



DOWEL 'X' BAR



NOTE:
- THIS DETAIL FOR THE SLUICE GATE PROVIDES ONLY BASIC INFORMATION FOR PLACEMENT.
- INSTALL THE SLUICE GATE IN ACCORDANCE WITH THE MANUFACTURER'S DIMENSIONS AND SPECIFICATIONS.
- SEE PLANS FOR LOCATIONS AND PIPE SIZES

SLUICE GATE DIMENSIONS						
PIPE DIAMETER	A	15"	18"	24"	30"	36"
GATE DIAMETER	B	22"	25"	32"	38¾"	46"
FRAME HEIGHT, MIN.	C	36"	36"	48"	60"	72"
H. W. HEIGHT, MIN.	D	4'-5½"	4'-7"	5'-10"	7'-1"	8'-4"
H. W. WIDTH	E	5'-6"	6'-4"	8'-0"	9'-2"	11'-0"

DIMENSIONS AND QUANTITIES FOR RCP OR CSP							
CALCULATIONS BASED ON CONCRETE PIPE							
PIPE DIA.	H^1 MINIMUM DIMENSIONS						
D	H^1	B	G	T	S	L	CONC YD^3
15"	3'-3"	1'-8"	2'-9"	2¼"	9½"	5'-6"	0.7
18"	3'-7"	1'-10"	3'-2"	2½"	10"	6'-4"	1.0
24"	4'-2"	2'-1"	4'-0"	3"	10"	8'-0"	1.5
30"	5'-0"	2'-6"	4'-7"	4¼"	11½"	9'-2"	2.3
36"	5'-8"	2'-8"	5'-6"	4¾"	12½"	11'-0"	3.4

H^2 QUANTITES		
PIPE DIA.	PER 1' ADDTIONAL HEIGHT	
D	STEEL LBS.	CONC YD^3
15"	7.5	0.2
18"	8.7	0.2
24"	11.1	0.2
30"	12.6	0.3
36"	15.1	0.3

REBAR IN ENDWALL (H^1 MIN.)							
USE WITH RC OR CS PIPE	PIPE DIA.						
	15"	18"	24"	30"	36"	42"	48"
	QTY	QTY	QTY	QTY	QTY	QTY	QTY
'X' BARS	6	7	9	10	12	14	15
HORZ BARS	4	4	5	6	7	7	8
TOTAL LBS.	41	50	74	112	131	161	195

GENERAL NOTES:
1. LIMIT VARIABLE HEIGHT DIMENSION (H) TO FRAME HEIGHT OF SLUICE GATE, 3' ABOVE THE H^1 DIMENSION OR 10' WHICHEVER IS LESS.
2. ATTACHMENT OF GATE MAY REQUIRE SPECIFIC POSTIONING OF PIPE AND/OR MODIFICATION OF ENDWALL. CONFIRMATION OF GATE DIMENSIONS AND ATTACHMENT METHOD IS RECOMMENDED PRIOR TO CONSTRUCTION OF ENDWALL.
3. PLACE NO. 4 REBAR ON 12" HORIZONTAL AND VERTICAL CENTERS WITH 2" MINIMUM CONCRETE COVERAGE.
4. CONSTRUCT 1" CHAMFER OR RADIUS ON ALL EXTERIOR CORNERS.
5. USE FORMS TO CONSTRUCT THE BOTTOM SLAB.
6. USE WALL THICKNESS (T) TO COMPUTE QUANTITIES, NOT TO INFER SIZE.
7. WHEN THE BASE IS POURED SEPARATELY, LEAVE THE POUR ROUGH.
8. USE CLASS 'B' CONCRETE.
9. CUT OR BEND REBARS AS NEEDED TO ACCOMMODATE PIPE.

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

DETAIL OF ENDWALL AND SLUICE GATE FOR 15" TO 36" PIPE

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: rnbritt DATE: 12-08-04
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/english/hydro/sluice.dgn

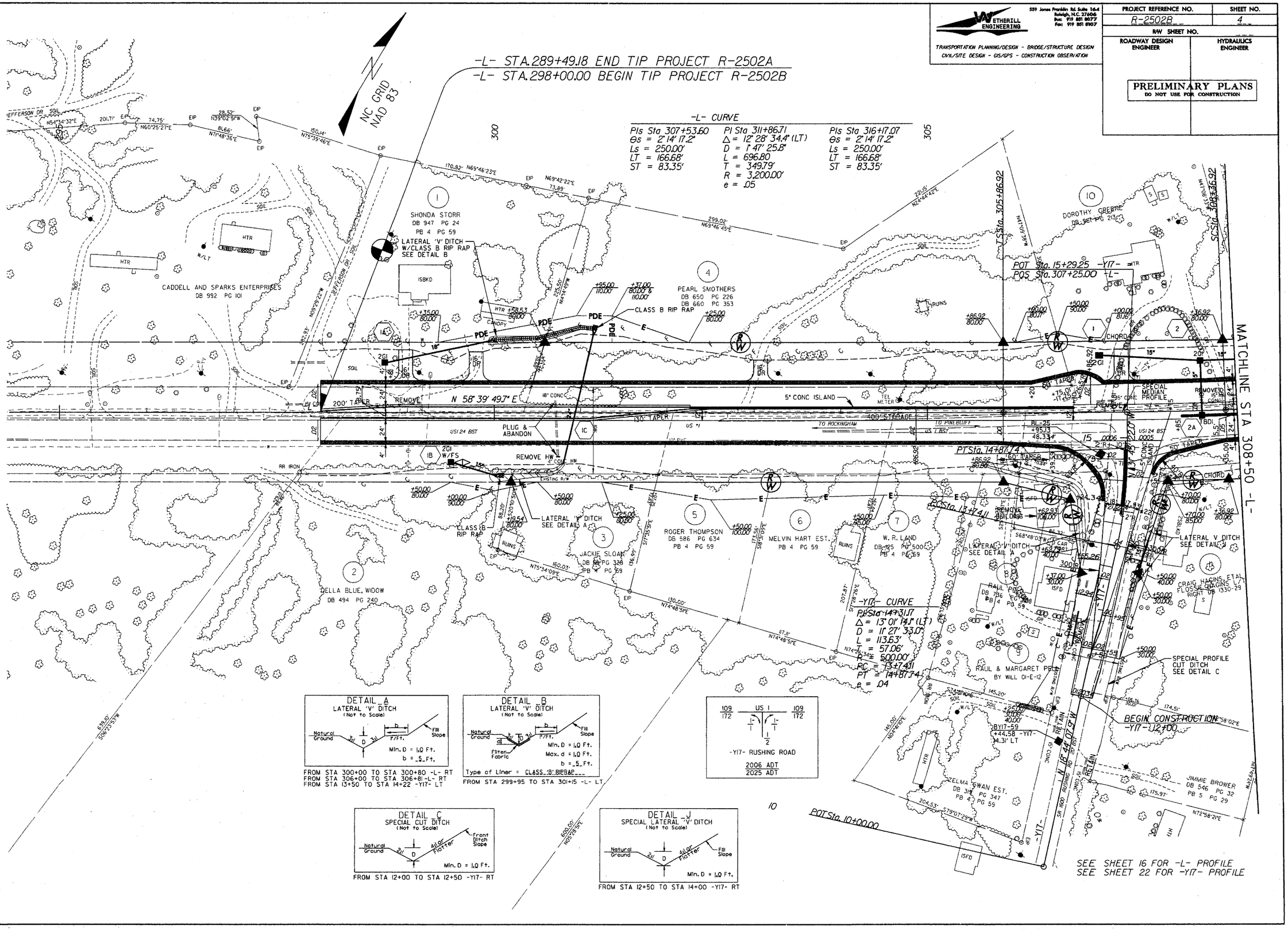
PROJ. REFERENCE NO.	SHEET NO.
R-2502B	3B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	Shonda Storr
2	4	Charles Blue
3	4	Jackie Sloan
4	4	Pearl Smothers
5	4	Roger Thompson
6	4	Melvin Hart Est.
7	4	W.R. Land
8	4	Raul Pell
9	4	Louise Hart
10	4,5	Dorothy Greene
11	4,5	Whitley Hagins
12	5	Gladys Brown
13	5	Charles Smith
14	5	Ammie McKoy
15	5	Bobby Rae Jones
16	5	Raymond McRae
17	5	Sylvester McMillan
18	5	ELR Enterprises, Inc.
19	5	Willie McRae
20	5,6	Andrew White
21	5,6	Melinda R. Hailey
22	6	Ivey Little
23	6	ELR Enterprises, Inc.
24	6	Artis Washington
25	6	Alex Washington
26	6	Curtis Monroe
27	6	Willie Washington
28	6	Ella Little
29	6	Midstate Homes, Inc.
30	6	Grace Stroman
31	6	Hunter V. Easterling
32	6	Oliver V. Stroman
33	6	Olivia Peace
34	6	Gary Albright
35	6	Earnest Collins
36	6	Florence McKeithan
37	6	Lenita Campbell
38	6,7	Olivia Peace
39	6,7	Lonnie Blue Jr.
40	7	Willie Spell
41	7	Carl Brinkley Jr.
42	7	Lowell Deann Johnson
43	7	Thelma Grace McKoy
44	7	Martha B. Rushing
45	7	Carl W. Isaac
46	7	Olivia Peace
47	7,8	Bobby Bethea
48	7,8	Olivia Peace
49	8	Ruth Land
50	8	Elizabeth Scott
51	8	Andrew Rollins
52	8	Rebecca Williams
53	8	Freddie McNeill
54	8	Ella McMillan
55	8	Full Gospel Church of God
56	8	Chester McLendon
57	8	Easement
58	8	Timothy Isaac
59	8,9	Martha B. Rushing

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
60	8	Burnest McRae
61	8,9	Lee Tyner
62	9	Ruth Land
63	9,10	Joseph J. Rosy
64	9,10	Southern Products and Silica
65	10,11,12	Shirley Ann Tyner
66	12	Donald C. Locklear
67	12,13,14	Bowater Inc.
68	12,13	James E. Pugh
69	13	United States of America
70	13	Reaves Landscaping and Design Inc.
71	14,15	Robert F. McLeod
72	15	Gordon Matthews
73	15	William Dabbs
74	15	William Joseph Bryan



REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 2,9 & 11. ADDED TEMPORARY CONST. EASEMENT ON PARCEL 9 ALONG -Y17- BAM

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

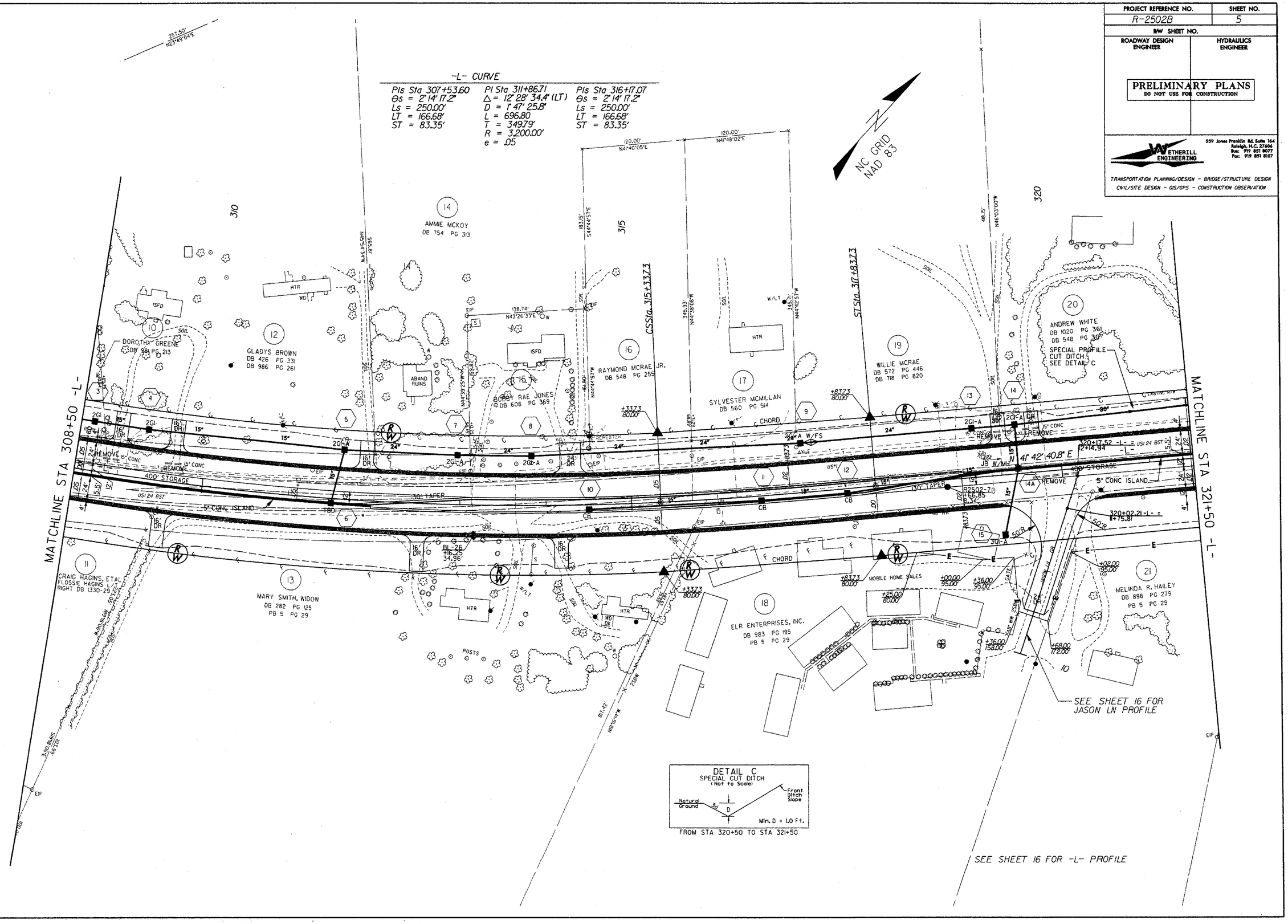
8/17/99

REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 11 & 13. BAM

-L- CURVE

PIs Sta 307+53.60	PI Sta 311+86.71	PIs Sta 316+17.07
Θs = 2° 14' 17.2"	Δ = 12° 28' 34.4" (LT)	Θs = 2° 14' 17.2"
Ls = 250.00'	D = 1° 47' 25.8"	Ls = 250.00'
LT = 166.68'	L = 696.80	LT = 166.68'
ST = 83.35'	T = 349.79'	ST = 83.35'
	R = 3,200.00'	
	e = .05	



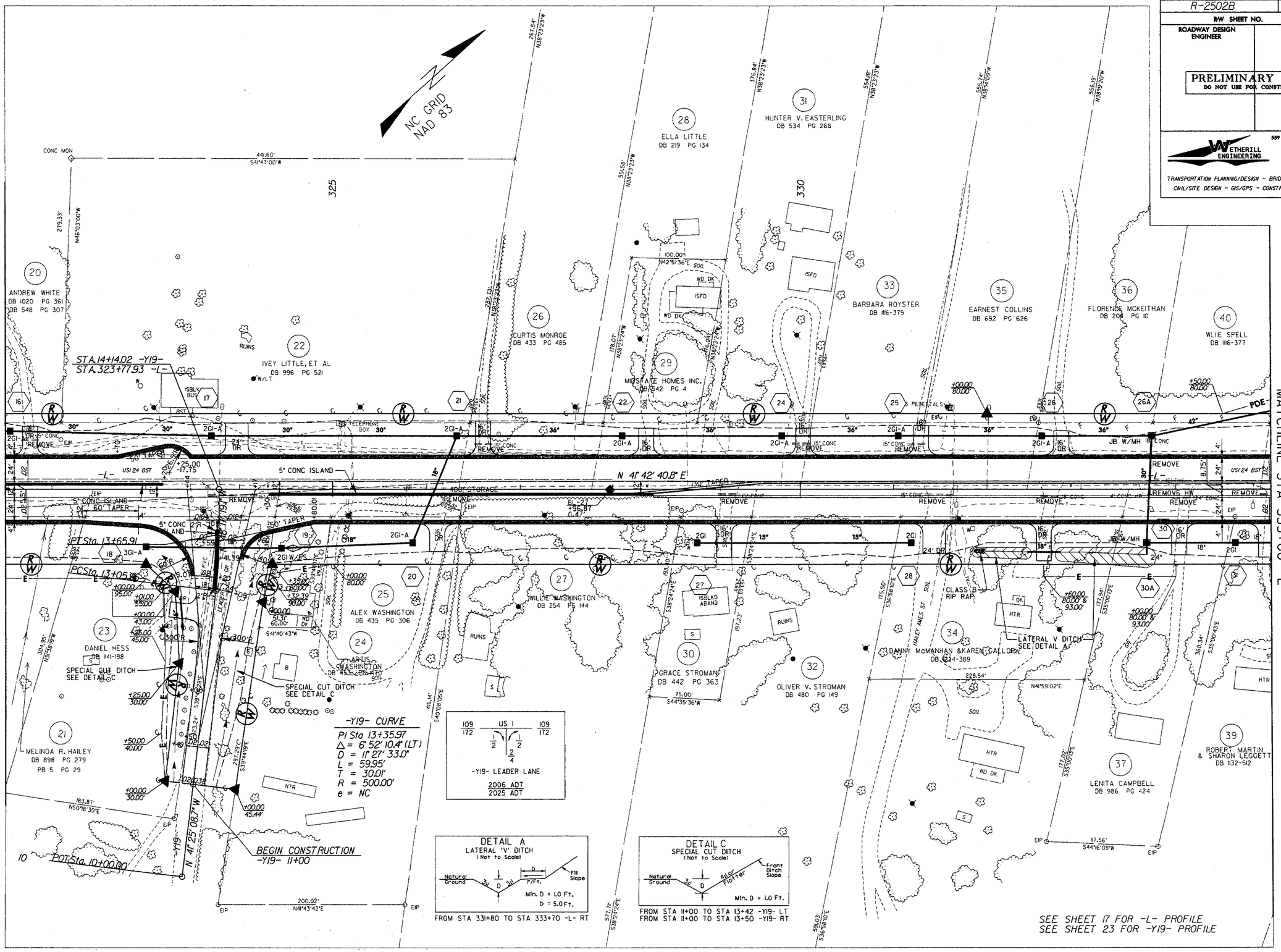
DETAIL C
SPECIAL CUT DITCH
(Not to Scale)

FROM STA 320+50 TO STA 321+50

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 22,23,33,34,39 & 40.BAM 8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

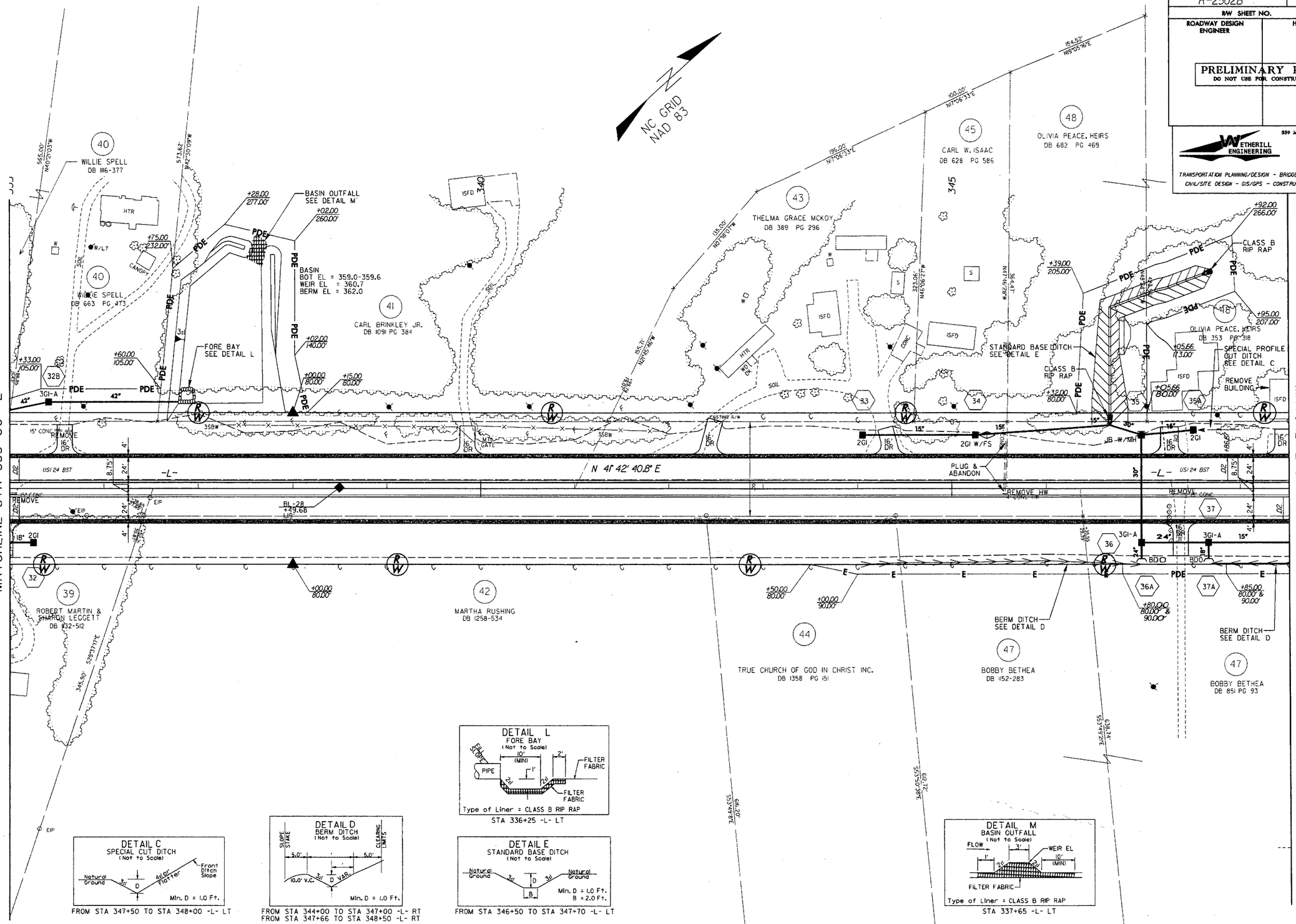
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

8/17/99

REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 39,40,42,47 & 48. ADDED PROPERTY LINE BETWEEN PARCELS 42 & 44. BAM



SEE SHEET 17 FOR -L- PROFILE

$FILE$ $COMM$ $DATE$ $TIME$ $USER$ RUN

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

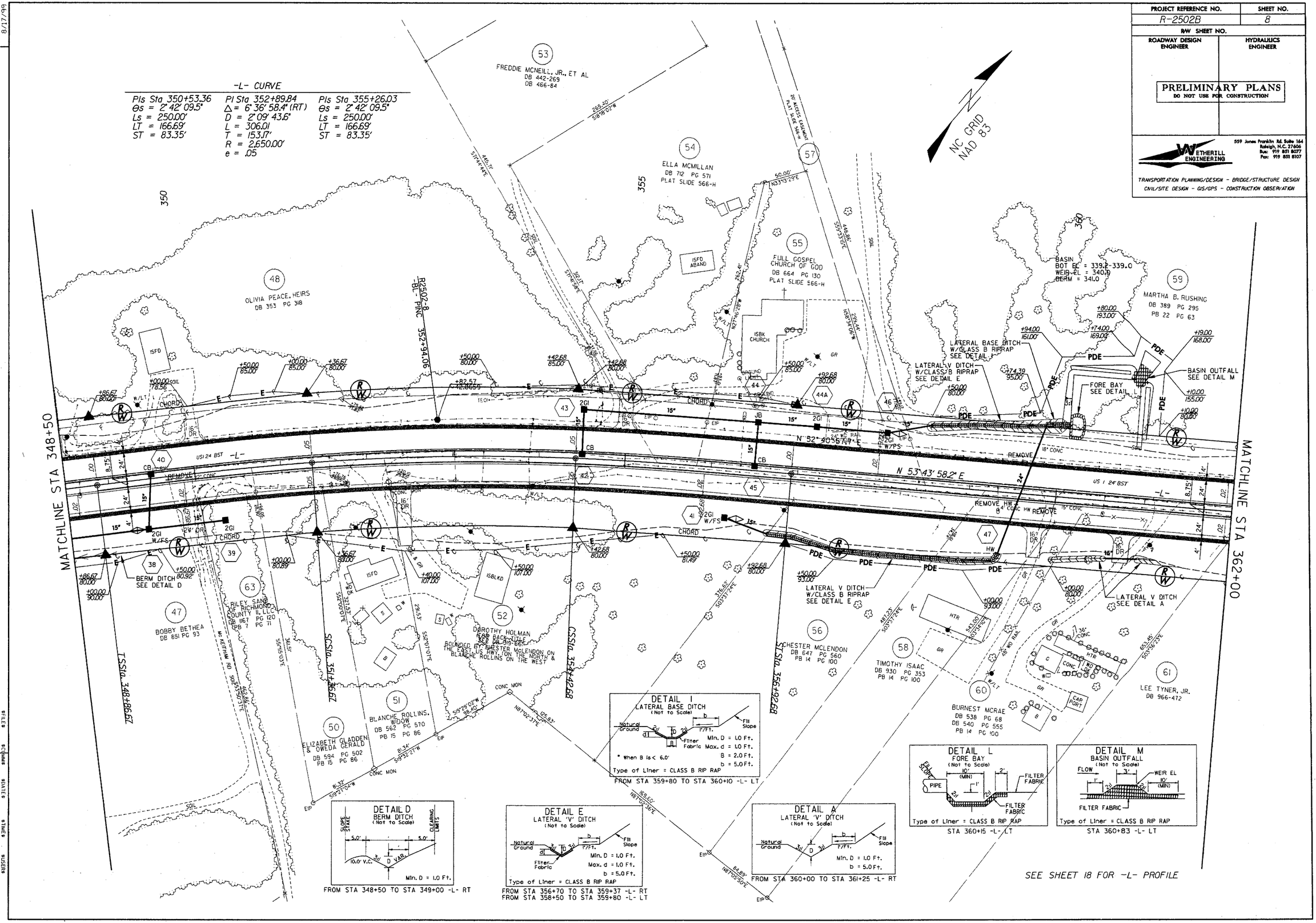
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

8/17/99

REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 48,50,51,52,53,61 & 63.BAM
R/W REVISION - UPDATED PROPERTY LINES FOR PARCEL NO.63. BAM



PROJECT REFERENCE NO.	SHEET NO.
R-2502B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

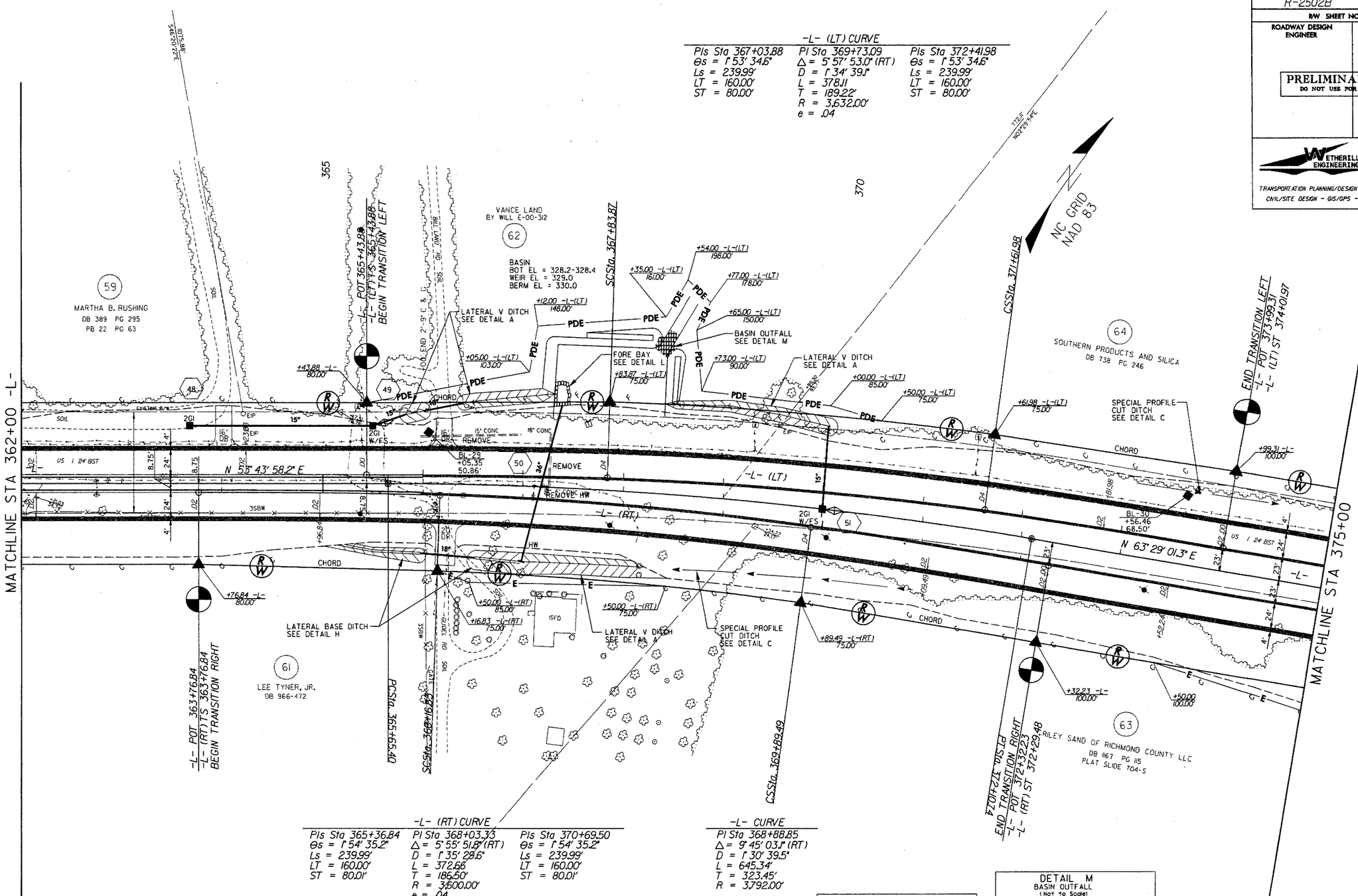
WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

8/17/99

REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCELS 61,62 & 63. BAM
R/E REVISION - UPDATED PROPERTY LINES FOR PARCEL NO.63. BAM



-L- (LT) CURVE

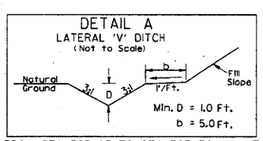
PIs Sta 367+03.88	PI Sta 369+73.09	PIs Sta 372+41.98
Θs = 1° 53' 34.6"	Δ = 5° 57' 53.0" (RT)	Θs = 1° 53' 34.6"
Ls = 239.99'	D = 1° 34' 39.1"	Ls = 239.99'
LT = 160.00'	L = 378.11	LT = 160.00'
ST = 80.00'	T = 189.22'	ST = 80.00'
	R = 3,632.00'	
	e = .04	

-L- (RT) CURVE

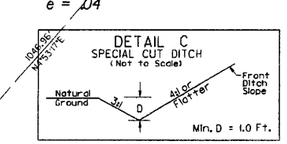
PIs Sta 365+36.84	PI Sta 368+03.33	PIs Sta 370+69.50
Θs = 1° 54' 35.2"	Δ = 5° 55' 51.8" (RT)	Θs = 1° 54' 35.2"
Ls = 239.99'	D = 1° 35' 28.6"	Ls = 239.99'
LT = 160.00'	L = 372.66	LT = 160.00'
ST = 80.01'	T = 186.50'	ST = 80.01'
	R = 3,600.00'	
	e = .04	

-L- CURVE

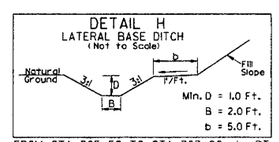
PI Sta 368+88.85
Δ = 9° 45' 03.1" (RT)
D = 1° 30' 39.5"
L = 645.34'
T = 323.45'
R = 3,792.00'



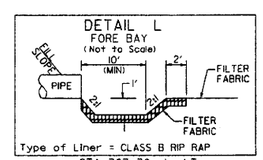
FROM STA 365+85 TO STA 367+30 -L- LT
FROM STA 367+00 TO STA 368+50 -L- RT
FROM STA 368+35 TO STA 370+00 -L- LT



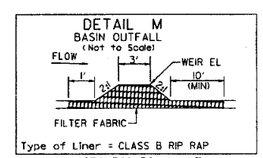
FROM STA 368+50 TO STA 371+00 -L- RT
FROM STA 373+00 TO STA 374+50 -L- LT



FROM STA 365+50 TO STA 367+00 -L- RT



STA 367+30 -L- LT



STA 368+30 -L- LT

SEE SHEET 18 FOR -L- PROFILE

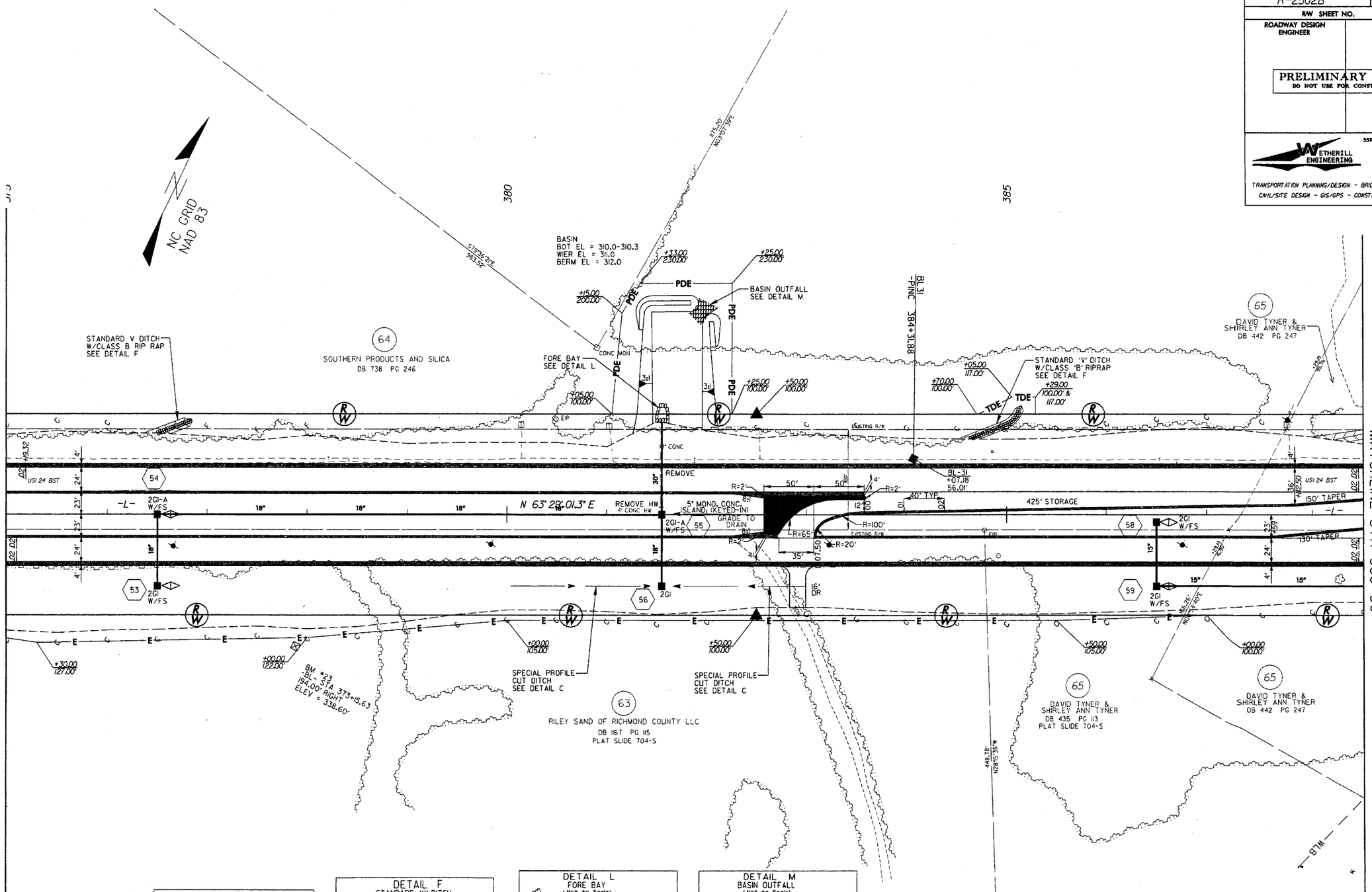
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

REVISIONS

8/17/99 R/W REVISION - REVISED EXISTING PROPERTY LINE FOR PARCELS 63 & 65, REVISED PROPERTY OWNER NAMES ON PARCEL NO 63 & 65.BAM
R/W REVISION - REVISED PROPERTY OWNER NAME ON PARCEL 63 AND PROVIDED LEFT-OVER TO PARCEL 63.BAM
R/W REVISION - UPDATED PROPERTY LINES FOR PARCEL NO.63.BAM



SEE SHEET 19 FOR -L- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

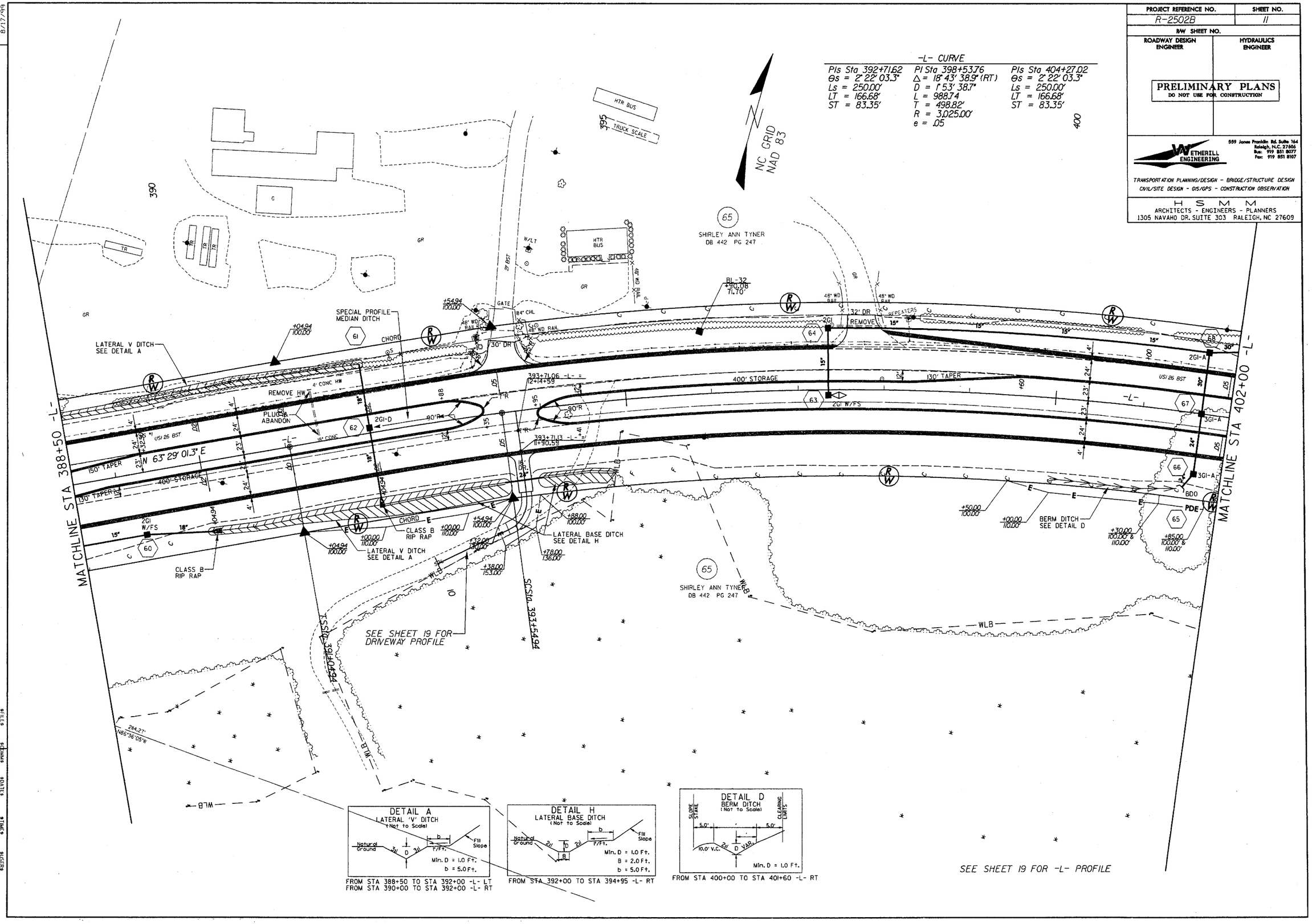
H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

8/17/99

REVISIONS

R/W REVISION - PROVIDED LEFT-OVER ONTO PARCEL 63.BAM

$FILE$ $DGNAME$ $DATE$ $TIME$ $USER$ $RIS

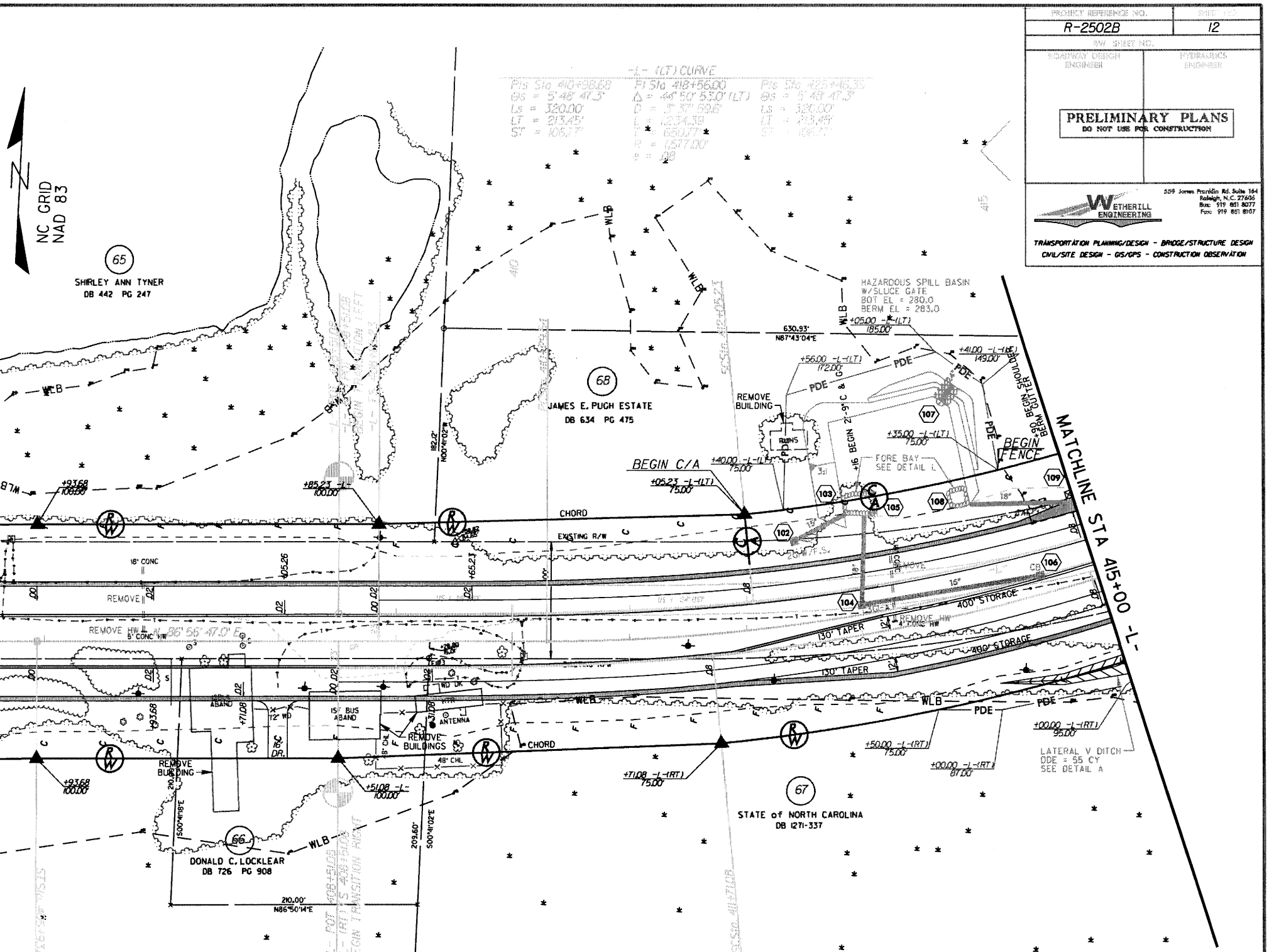


PROJECT REFERENCE NO.	SHEET NO.
R-2502B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
5259 James Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

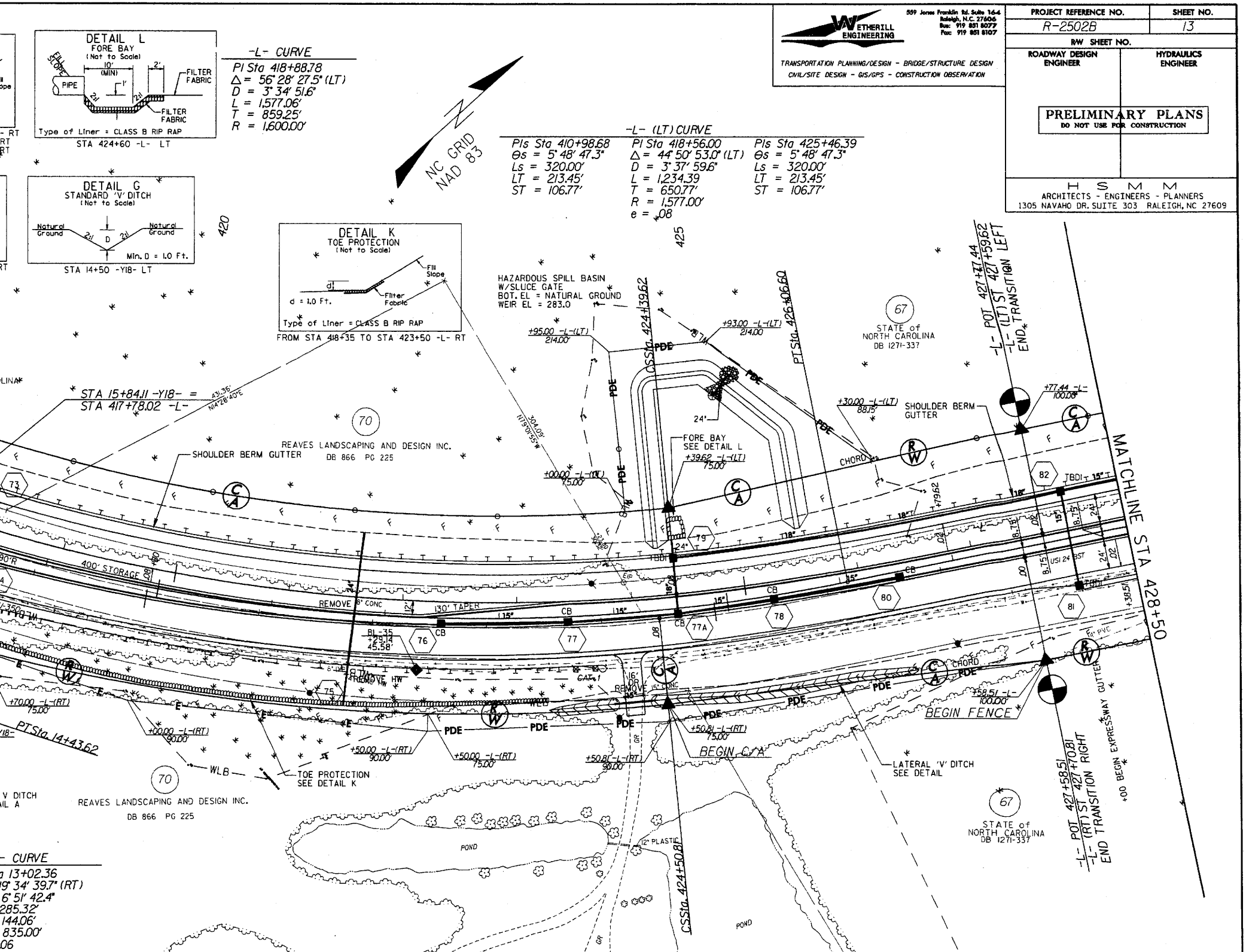


WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



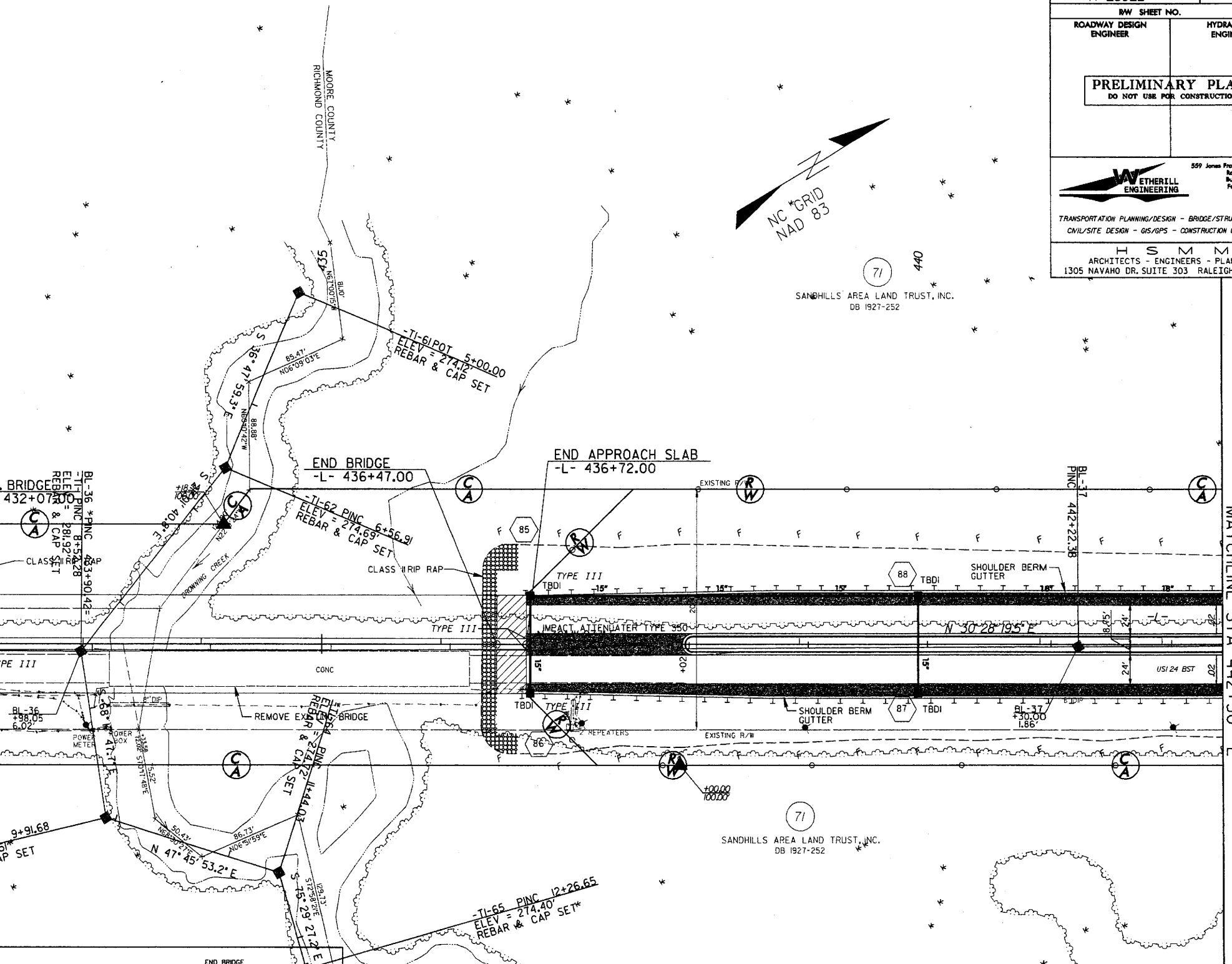
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



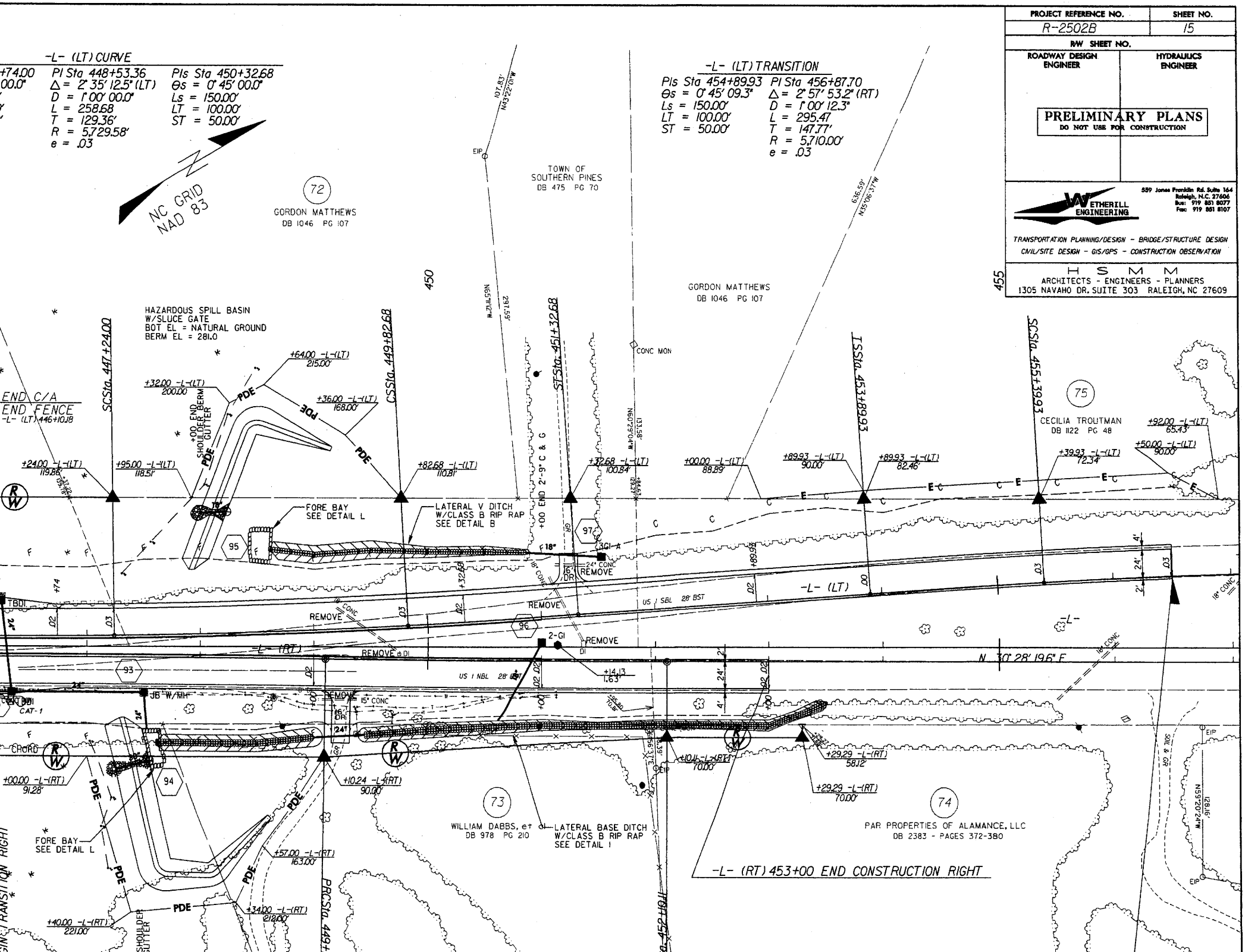
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

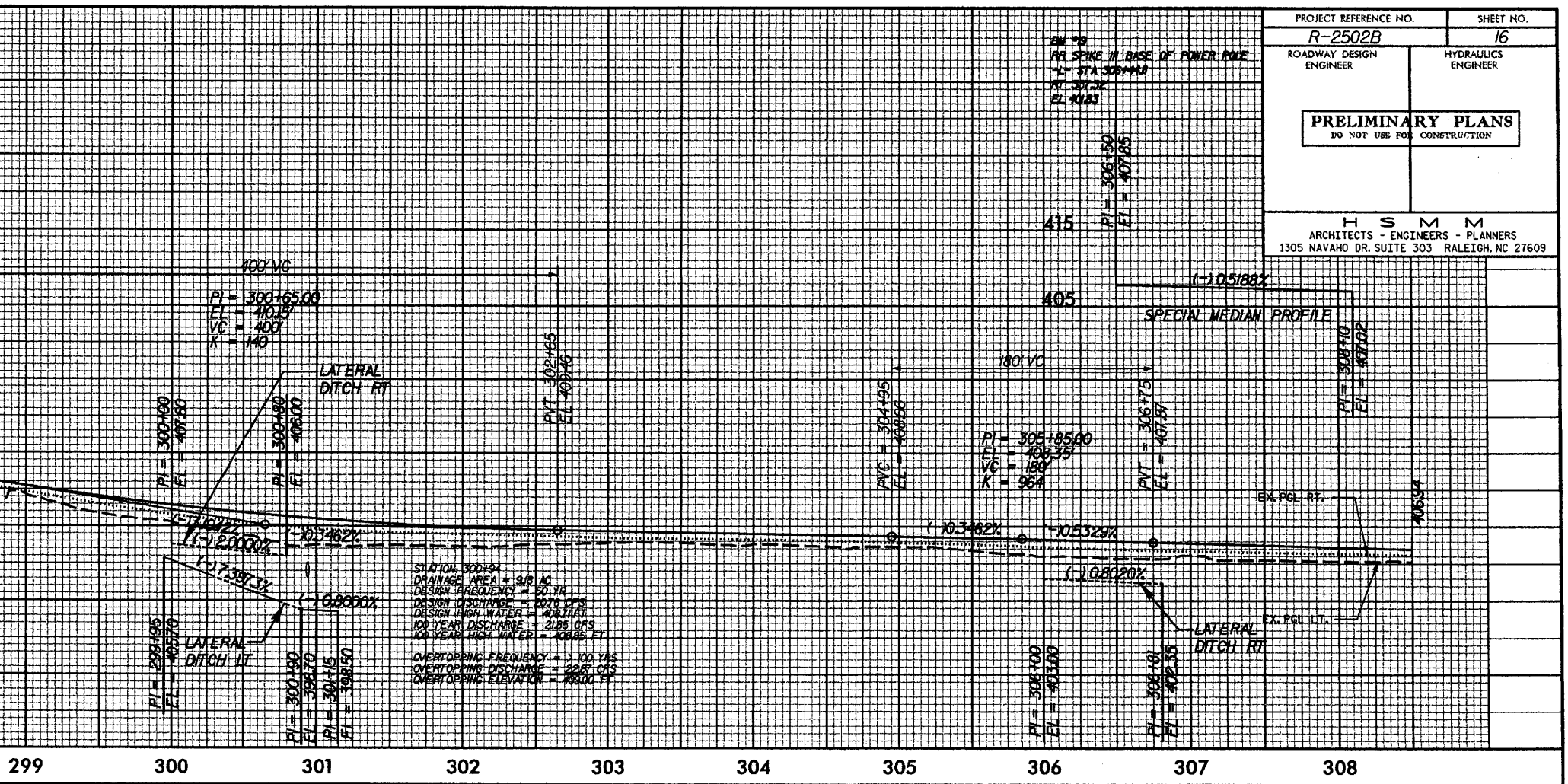
H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

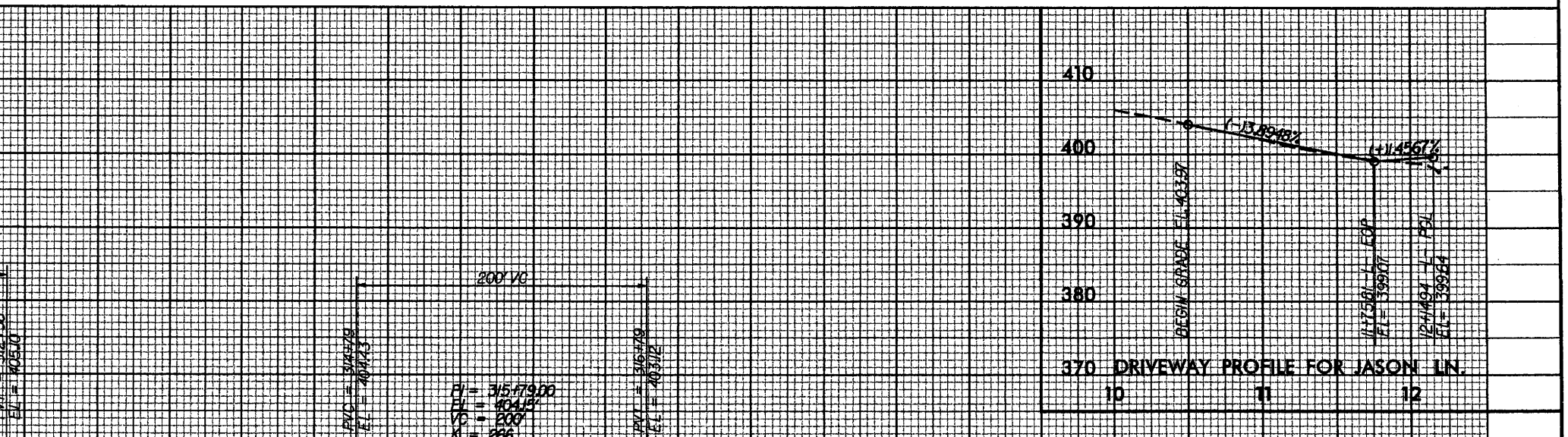


PROJECT REFERENCE NO.	SHEET NO.
R-2502B	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



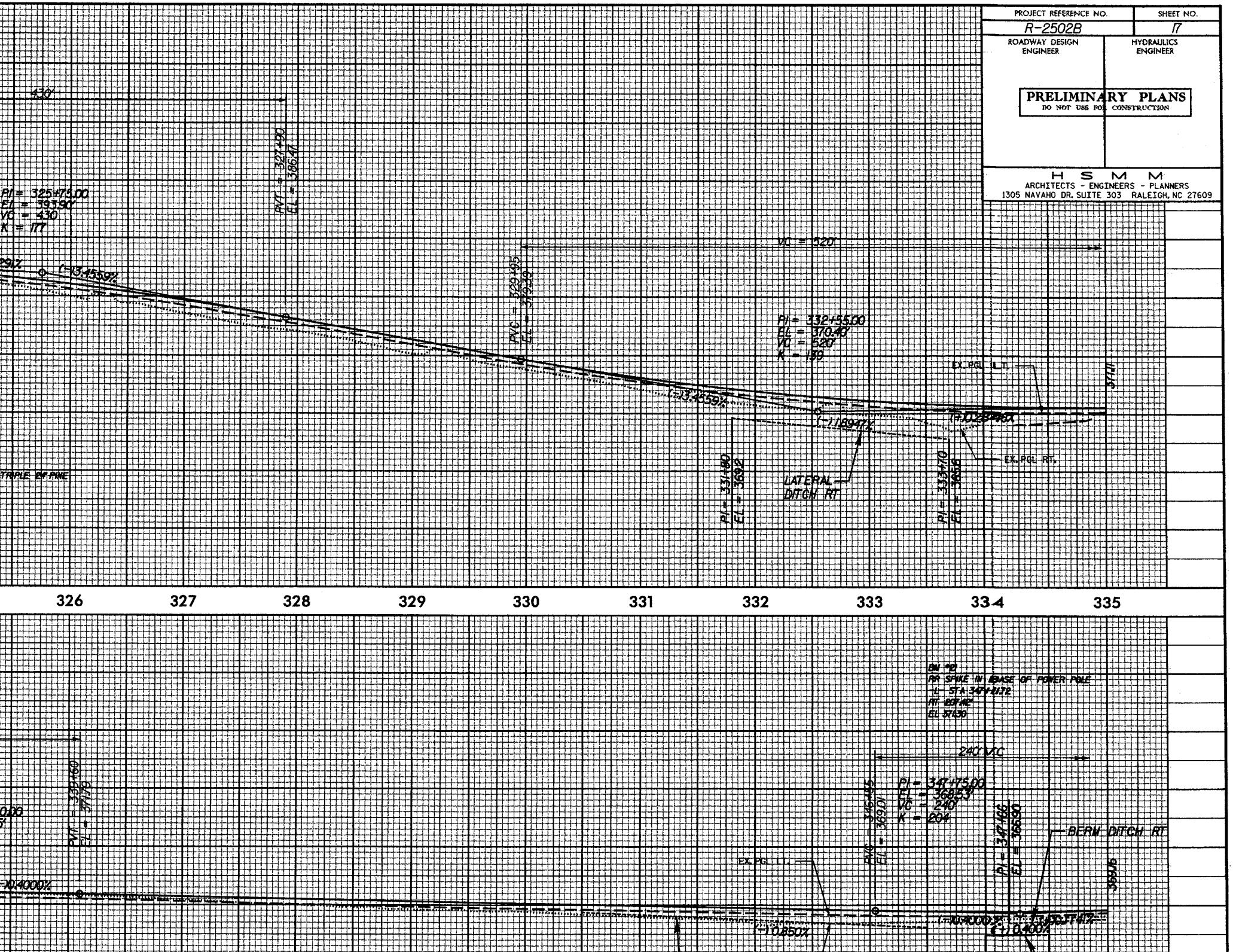


DRIVEWAY PROFILE FOR JASON LN.

PROJECT REFERENCE NO.	SHEET NO.
R-2502B	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



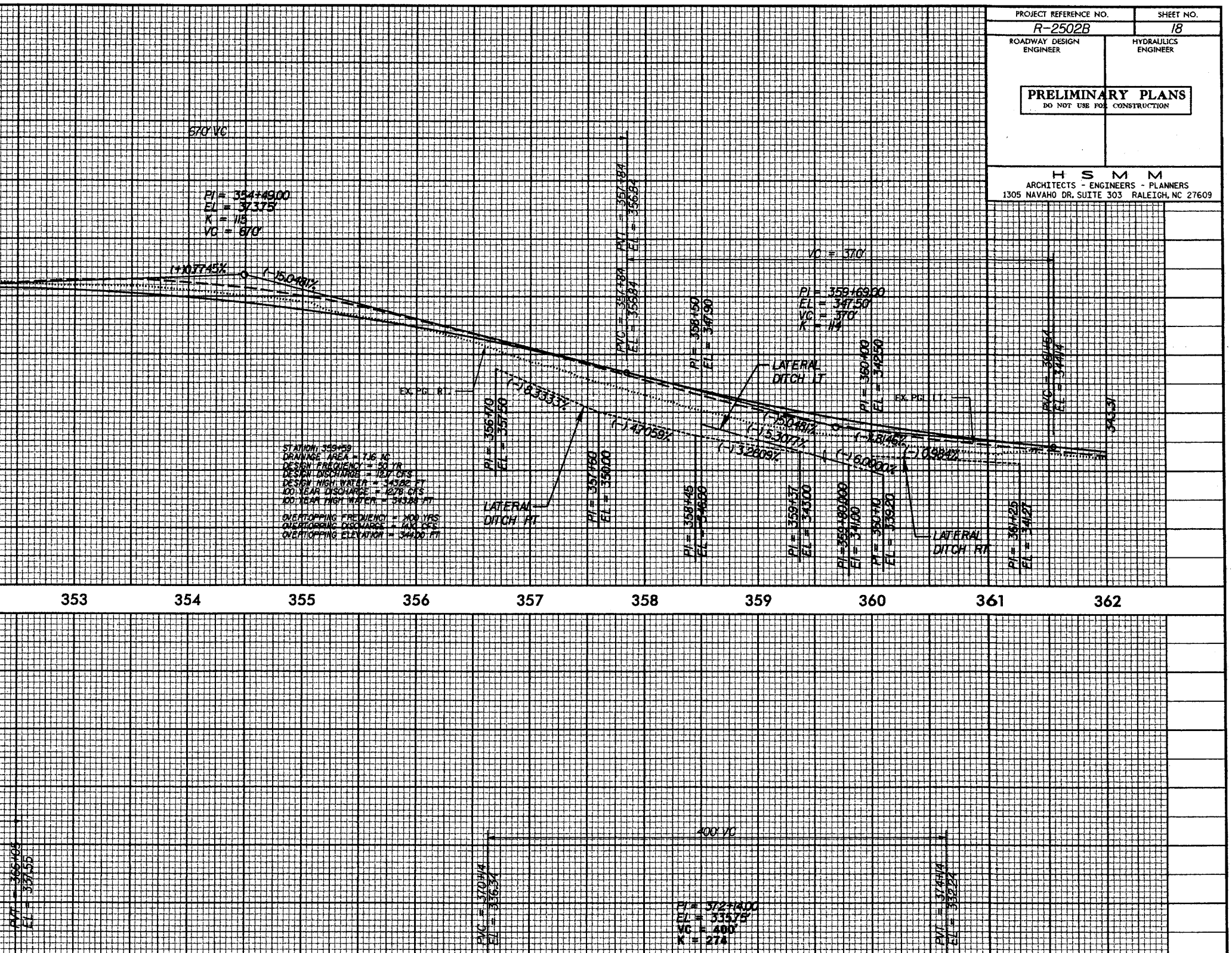
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	18

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

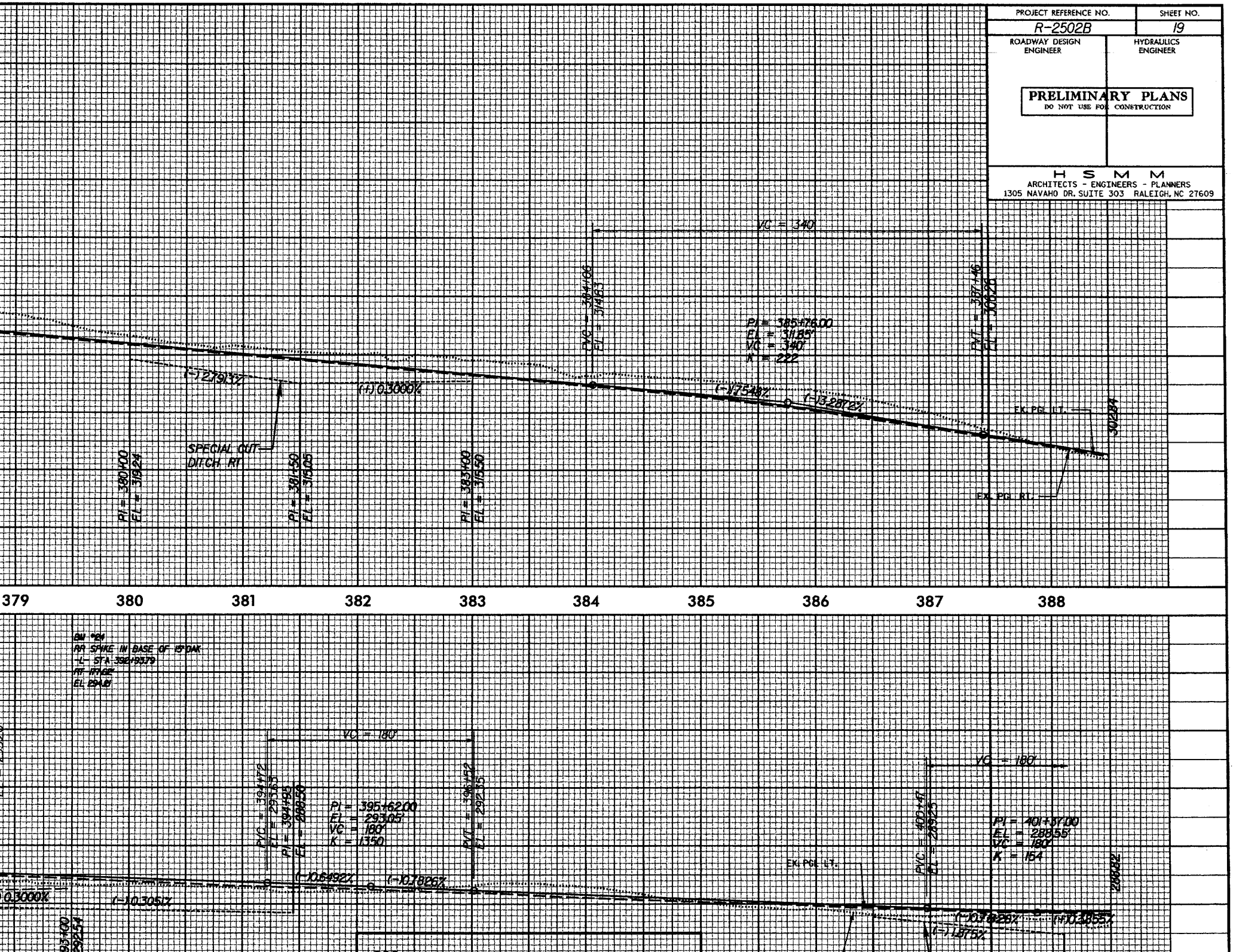
H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



PROJECT REFERENCE NO.	SHEET NO.
R-2502B	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

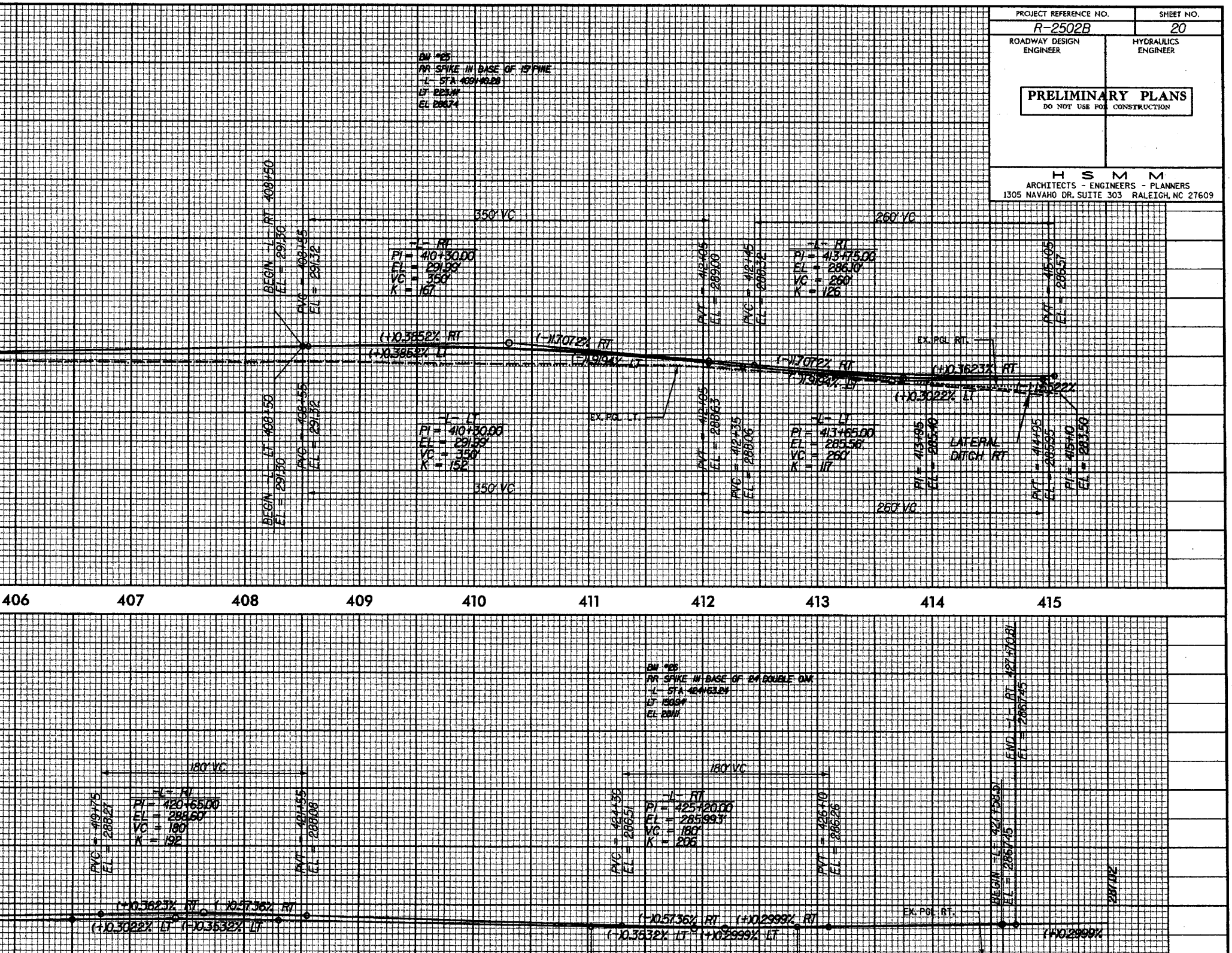
H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



PROJECT REFERENCE NO.	SHEET NO.
R-2502B	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609



PROJECT REFERENCE NO.	SHEET NO.
R-2502B	21

ROADWAY DESIGN ENGINEER

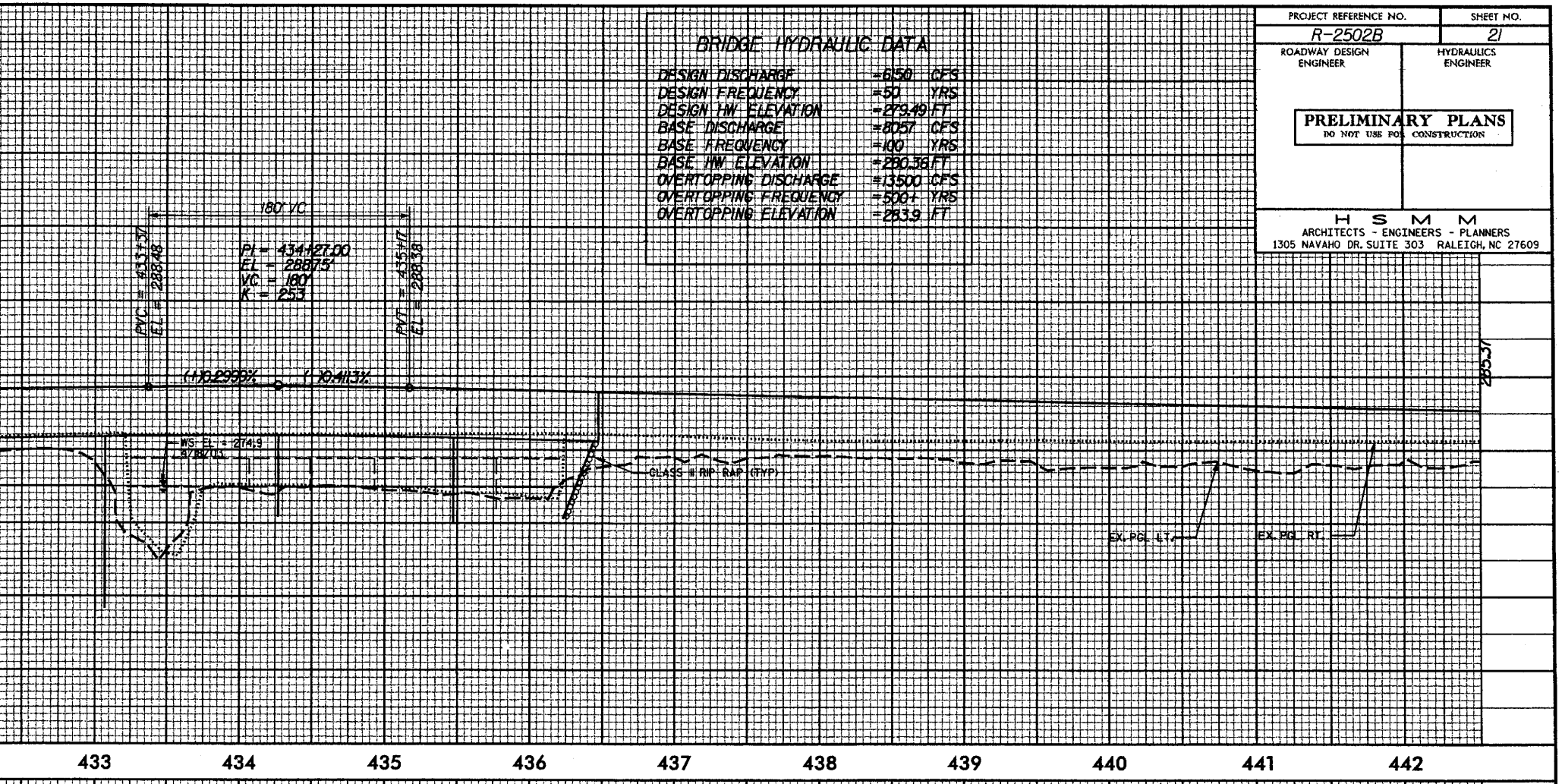
HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=6150	CFS
DESIGN FREQUENCY	=50	YRS
DESIGN HW ELEVATION	=279.49	FT
BASE DISCHARGE	=8057	CFS
BASE FREQUENCY	=100	YRS
BASE HW ELEVATION	=280.36	FT
OVERTOPPING DISCHARGE	=13500	CFS
OVERTOPPING FREQUENCY	=500+	YRS
OVERTOPPING ELEVATION	=283.9	FT



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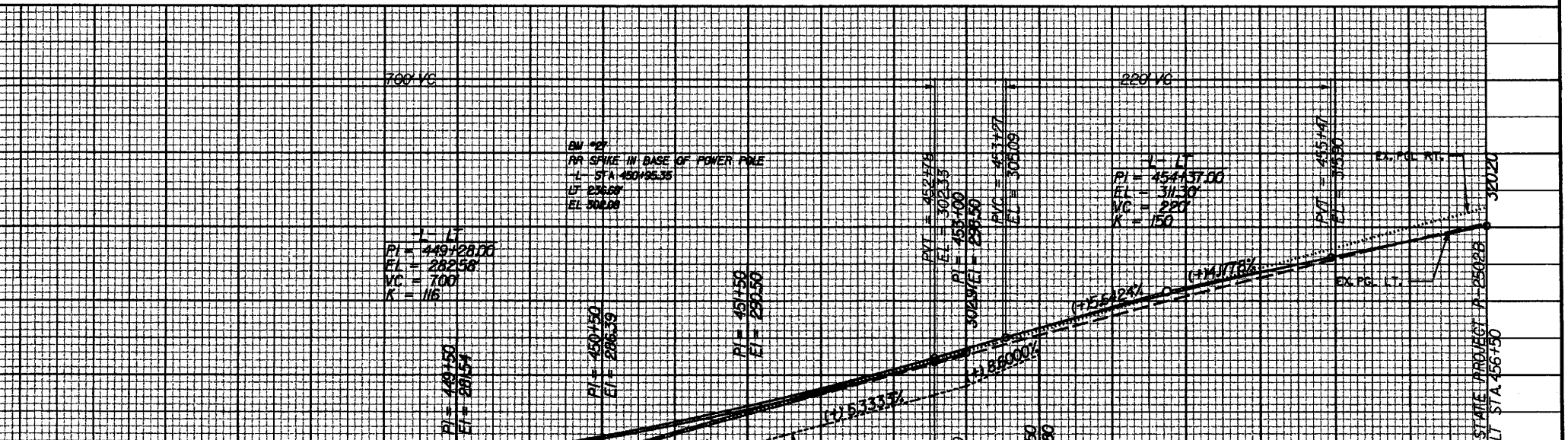
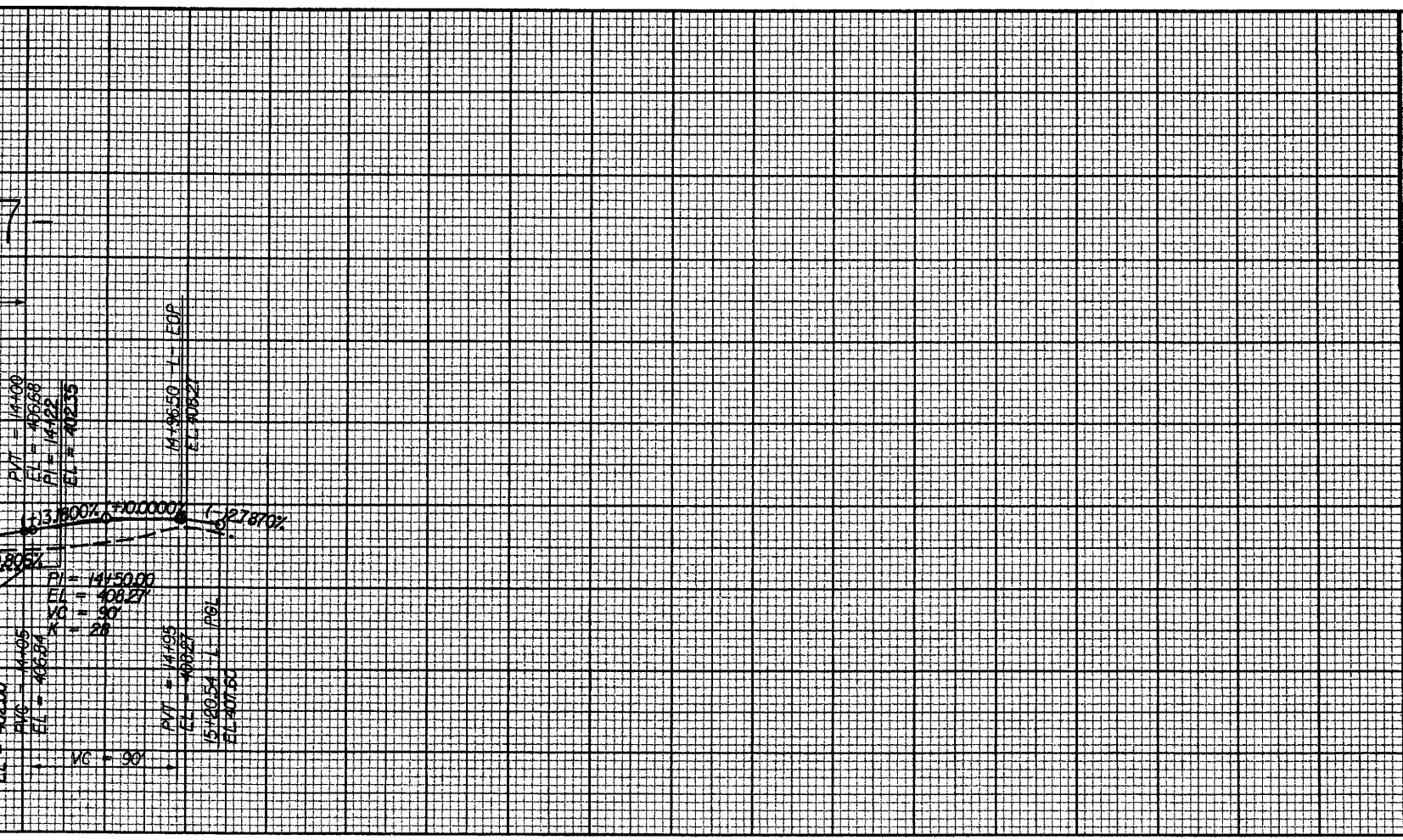
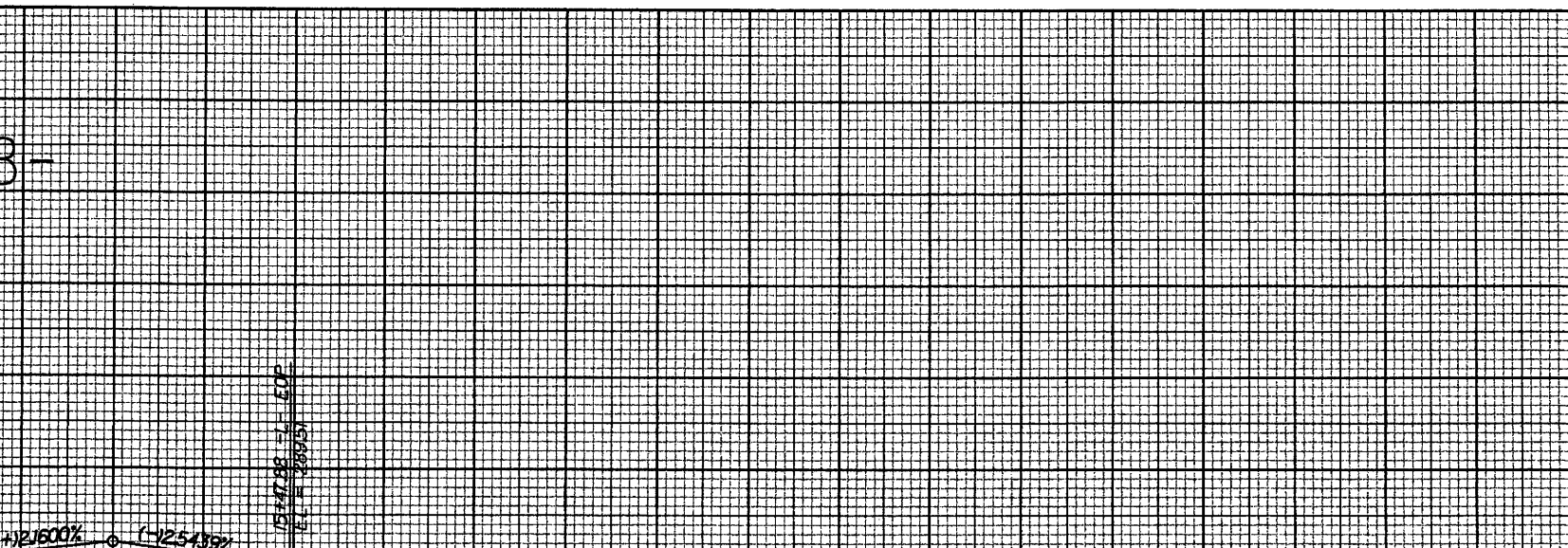


PROJECT REFERENCE NO.	SHEET NO.
R-2502B	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

H S M M
ARCHITECTS - ENGINEERS - PLANNERS
1305 NAVAHO DR. SUITE 303 RALEIGH, NC 27609





RC

Pl

ARCHIT
1305 NAVAHO

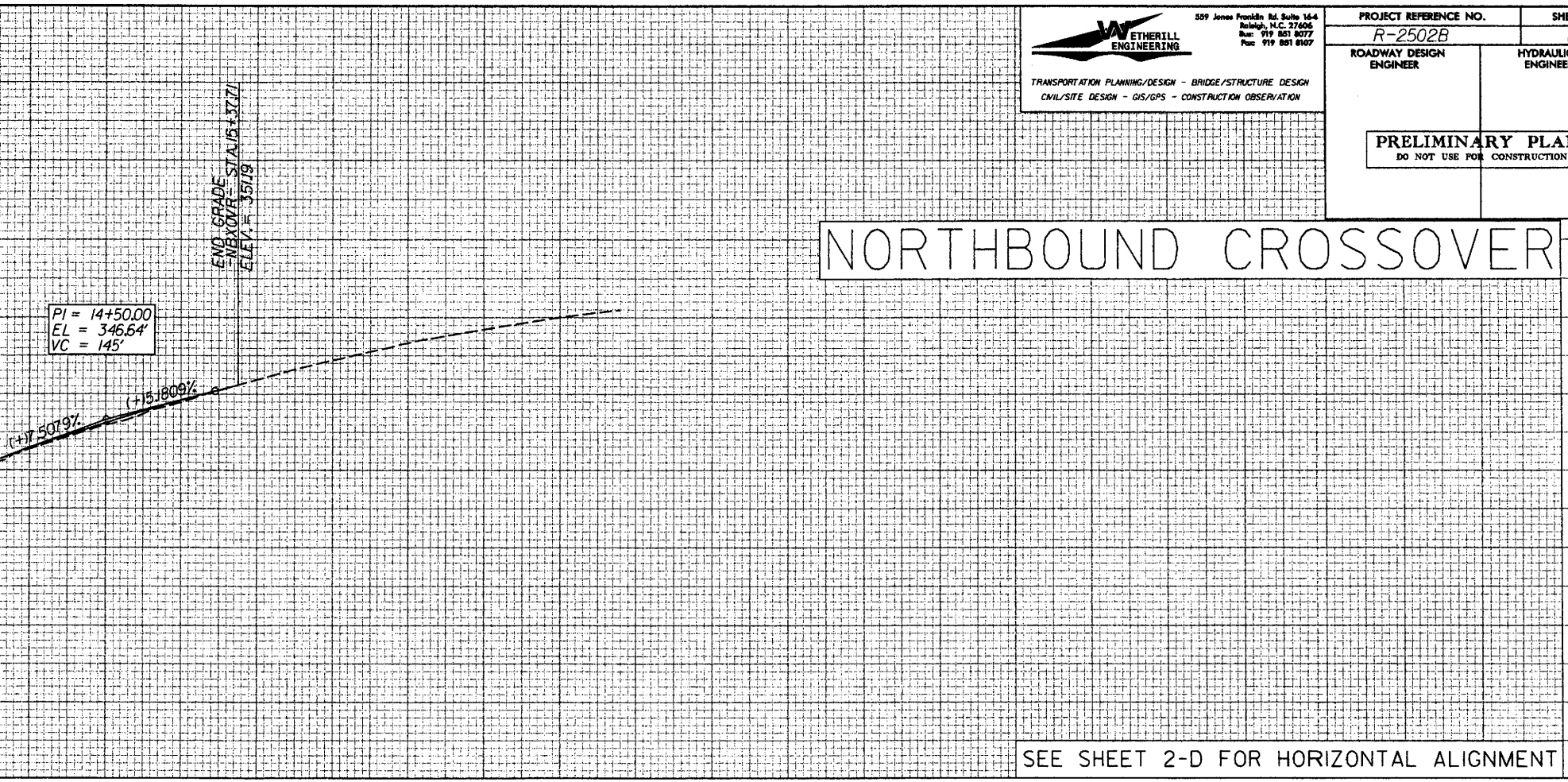
14

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

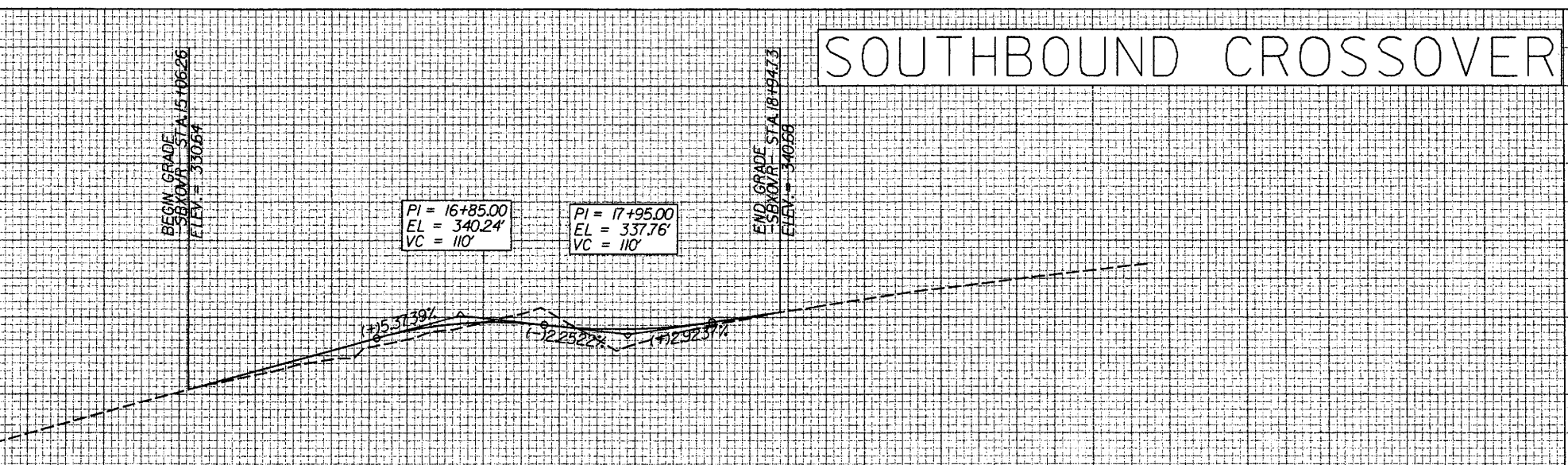
PROJECT REFERENCE NO.	SHEET NO.
R-2502B	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NORTHBOUND CROSSOVER



SEE SHEET 2-D FOR HORIZONTAL ALIGNMENT

14 15 16 17

SOUTHBOUND CROSSOVER