



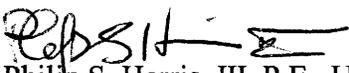
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

May 24, 2006

MEMORANDUM TO: Mr. Jon G. Nance, PE  
Division Five Engineer

FROM:   
Philip S. Harris, III, P.E., Unit Head  
Natural Environment Unit  
Project Development and Environmental Analysis Branch

SUBJECT: Wake County, Davis Drive (SR 1613/SR 1999) from  
Morrisville-Carpenter Road (SR 3014) in Wake County to  
NC 54 in Durham County; T.I.P. Number U-4026; State  
Project 9.8051713

Attached is the U. S. Army Corps of Engineers 404 Individual Permit and the special conditions for the 401 Water Quality Certification for the above referenced project. All environmental permits have been received for the construction of this project.

PSH/gyb

Attachment

Mr. Majed Alghandour, P. E., Programming and TIP  
Mr. Jay Bennett, P.E., Roadway Design  
Dr. David Chang, P.E., Hydraulics  
Mr. Randy Garris, P.E. State Contract Officer  
Mr. Art McMillan, P.E., Highway Design  
Mr. Greg Perfetti, P.E., Structure Design  
Mr. Mark Staley, Roadside Environmental  
Mr. John F. Sullivan, FHWA  
Mr. Eric Midkiff, P.E., PDEA Central Region Unit Head  
Mr. Chris Murray, Division Environmental Officer

## PROJECT COMMITMENTS

Davis Drive (SR 1613/SR 1999)  
from Morrisville-Carpenter Road (SR 3014) in Wake County  
to NC 54 in Durham County  
State Project No. 9.8051713  
TIP Project No. U-4026

### **LIST OF SPECIAL ENVIRONMENTAL COMMITMENTS**

All standard procedures and measures, including North Carolina Department of Transportation's (NCDOT) Best Management Practices for Protection of Surface Waters, will be implemented, as applicable, to avoid or minimize environmental impacts.

Additional Special Project Commitments were identified in the Categorical Exclusion for this project; these commitments are listed below, along with their current status, changes, or additions to the list of commitments (shown in italics).

Please note that additional project commitments may be derived from the permitting process and are not listed in this consultation.

#### **Standard Environmental Commitments**

##### **Project Development and Environmental Analysis (PDEA) Branch, Design Services Unit and Hydraulics Unit**

Wetland impacts will be further minimized during the development of the roadway design plans during the final phase of the project, where practicable.

##### **Highway Division 5**

Geodetic control monuments impacted by the project will be relocated in consultation with the US Department of Commerce and National Geodetic Survey. The cost of relocating any impacted monument will be included in funding for the project.

##### **Hydraulics Unit**

NCDOT will minimize water quality impacts through the use of NCDOT "Best Management Practices (BMPs) for Protection of Surface Waters" (1991).

The Federal Emergency Management Agency (FEMA) will be contacted during final design to approve any floodway modifications required by construction of the proposed project.

### Right of way Branch

Hazardous waste sites or unrecorded Underground Storage Tanks (USTs) discovered during construction phase of the project will be assessed and remediated in accordance with the Environmental Protection Agency (EPA), the NC Department of Environment and Natural Resources, and local policies regarding cleanup procedures.

### Highway Division 5 and Geotechnical Unit

The NCDOT and its contractors will not excavate, fill, or perform land clearing activities within Waters of the United States or any areas under the jurisdiction of the US Army Corps of Engineers (COE), except as authorized by the COE. To ensure that all borrow and waste activities occur on high ground, except as authorized by permit, the NCDOT shall require its contractors to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. Documentation of the location and characteristics of all borrow and disposal sites associated with the project will be available to the COE on request.

### **Special Environmental Commitments**

#### PDEA Branch

The NCDOT will purchase any required wetland and stream mitigation from the North Carolina Department of Environment and Natural Resources' Wetland Restoration Program (WRP).

#### PDEA Branch, Design Services Unit, Hydraulics Unit

The NCDOT will coordinate with the US Army Corps of Engineers (COE), US Fish and Wildlife Service (USFWS), Division of Water Quality (DWQ), and Wildlife Resources Commission (WRC) on stream restorations, relocations, and minimization. The NCDOT commits to (1) site 3A – not clearing the area adjacent to the stream and will indicate on the final design plans as an environmentally sensitive area; (2) site 12 – reconfigure this intermittent stream and plant stream banks with appropriate species where impacted by road widening, and (3) site 15 – investigate the possibility of moving the stream out of the fill slope for minimization and restoration of stream outside of fill for mitigation (see Figure 2 in the CE for site locations).

#### Hydraulics Unit

Runoff from the proposed curb and gutter section will be treated in a reasonable and feasible fashion before directly entering streams.

## **Other Special Commitments**

### Design Services Unit

Coordination with the Research Triangle Park (RTP) will be conducted to determine the status of the South Loop Road and whether a median cut with turn lanes should be included with this project.

*The Design Services Unit stated there will be a break in the median at South Loop Road.*

### Design Services Unit, Hydraulics Unit and Highway Division 5

Coordination with TIP Project R-2000AB will be necessary since mitigation for System 6 is included in the R-2000AB project.

*The Design Services Unit stated they are coordinating the efforts for this project with Roadway Design and Hydraulics and their efforts on the R-2000AB project.*

## **Bicycle Accommodations**

### Design Services Unit and Highway Division 5

The proposed cross sections will provide 14-foot (4.2-meter) outside through travel lanes to accommodate bicycles. The proposed cross sections are described in Section 3.3 and shown in Figures 3A-3C of the CE. The existing five-lane curb and gutter section from south of Hopson Road to just north of Hopson Road already has 14-foot (4.2-meter) outside through travel lanes to accommodate bicycles and will be retained.

*The Design Services Unit stated the bicycle accommodations as described in the CE are included in the design for the project.*

## **Sidewalk and Greenway Accommodations**

### PDEA Branch, Design Services Unit and Program Development Branch

According to NCDOT's Pedestrian Policy Guidelines, NCDOT will replace any existing sidewalks disturbed during project construction and participate in the funding of any new sidewalks provided the sidewalk is adjacent to the improvement project and can be incorporated into the project as proposed. The Town of Cary has requested that sidewalks not be constructed along the section of Davis Drive from Morrisville-Carpenter Road north to Koppers Road/McCrimmons Parkway as a part of this project. Any existing sidewalks that are disturbed because of the project construction in this section of Davis Drive will not be replaced. Sidewalks are not proposed on the remaining sections of the Davis Drive project.

RTP has plans for a greenway (eight-foot [2.4-meters] wide off-road asphalt trail) on the west side of Davis Drive from RTP's boundary just south of George Watts Hill Drive north to RTP's boundary in the vicinity of the five-lane curb and gutter section south of Hopson Road. Portions of this greenway are already built. RTP plans to tie their greenway to the existing sidewalk along Davis Drive at the Keystone Development near Hopson Road. The RTP has a greenway on the west side of Davis Drive from NC 54 south to the entrance to Northern Telecom. The RTP would like to extend this greenway south to Hopson Road but does not own the property in this area. Durham County may participate in the funding of this greenway section and will be contacted.

The Town of Morrisville has requested a multiuse asphalt trail along Davis Drive in their jurisdiction similar to the one in RTP. The Town of Morrisville will have to participate in 20 percent of the construction cost and 100 percent of any additional right of way cost necessary to contain any new sections of multiuse trail, and they must commit to all future maintenance costs. The Town of Morrisville has also requested pedestrian crossings at McCrimmons Parkway and Parkside Valley Drive. The locations of the multiuse trails along the project and pedestrian crossings will be designated during the final design phase of the project. An agreement that outlines the cost sharing and maintenance responsibilities for proposed multiuse trails will be required between NCDOT and the involved jurisdictions.

*On June 10, 2002, letters were sent to the Town of Morrisville, the Town of Cary, Durham County and the Research Triangle Foundation with the approximate location and cost estimates for the above-mentioned pedestrian accommodations along the project. The Town of Cary responded in a June 14, 2002 letter indicating they are not interested in including pedestrian accommodations along the section of Davis Drive in Cary as part of this project. The Research Triangle Foundation responded in a September 26, 2002 letter requesting the multi-use trail along the west side of Davis Drive from Hopson Road to the existing trail at Nortel's entrance be included in this project; and they will participate in the cost for this section of the trail. The Research Triangle Foundation will donate the needed right of way along the frontage of the property it owns for the trail. The Town of Morrisville did not respond to the June 10, 2002 letter.*

*The Design Services Unit stated they will include the section of multi-use trail along the west side of Davis Drive from Hopson Road to the existing trail at Nortel's entrance as part of the project.*

*The Design Services Unit indicated the pedestrian crossings at McCrimmons Parkway and Parkside Valley Drive, requested by the Town of Morrisville, would be considered during final design if the crossings will connect to existing pedestrian accommodations.*

## **Bus System Accommodations**

### Design Services Unit

Provisions for bus queue-jumper lanes and/or bus bay pull-outs will be provided at ten locations. These ten locations are in general agreement with the request made by the Triangle Transit Authority in their February 13, 2001 letter included in Appendix B (see Section 3.16 of the CE).

*The Design Services Unit stated the bus system accommodations as described in the CE are included in the design for the project.*

### **Additional Intersections Capacity Analysis**

#### Traffic Engineering and Safety Systems Branch, Design Services Unit and PDEA Branch

All major driveways and intersecting roadways (including the five major intersections discussed in Section 2.3 of the CE and Parkside Valley Drive/Summer Sky Drive, the entrance to Delta Products and Biogen, Development Drive, and Park Knoll Road) will be analyzed using the Synchro/SimTraffic software to establish a signal timing plan for the proposed project and to establish queue lengths for all turn lanes for the 95<sup>th</sup> percentile traffic volumes.

*The Design Services Unit stated the major driveways and intersecting roadways listed above have been analyzed using Synchro/SimTraffic software and that additional turn lanes at some intersections will be provided.*

### **Hazardous Materials**

#### Design Services Unit, Geotechnical Unit and Right of Way Branch

No hazardous waste problematic sites (underground storage tanks, regulated or unregulated landfills or dumpsites, or superfund sites) were identified along the project. If during the final design of the project any sites are discovered, preliminary site assessments will be performed as soon as possible so that the degree and extent of contamination can be assessed prior to right of way acquisition.

### **Anticipated Design Exceptions**

#### Design Services Unit

No design exceptions are anticipated as a part of the project. If during the final design process, any design exceptions are determined to be necessary, they will be addressed in accordance with the FHWA-NCDOT Design Exception Policy.

### **Individual Permit Conditions**

Standard conditions are contained in the permit

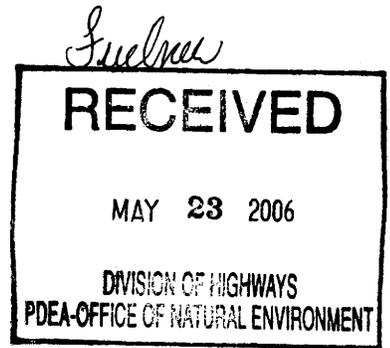


IN REPLY REFER TO

**DEPARTMENT OF THE ARMY  
WILMINGTON DISTRICT, CORPS OF ENGINEERS**

P. O. BOX 1890  
WILMINGTON, NORTH CAROLINA 28402-1890

May 18, 2006



Regulatory Division

Action ID. 200120448; NCOT Tip No. U-4026

Gregory J. Thorpe, Ph.D.  
Environmental Management Director, PDEA  
N.C. Department of Transportation  
1598 Mail Service Center  
Raleigh, NC 27699-1598

Dear Mr. Thorpe

In accordance with the written request of October 25, 2005, and the ensuing administrative record, enclosed is a permit to authorize the discharge of dredged and fill material into waters of the United States, for construction of improvements to Davis Drive (SR1613/SR 1999; T.I.P. No. U-4026), crossing unnamed tributaries to Kit Creek and Burdens Creek, and adjacent wetlands, from Morrisville Carpenter Road (SR 3014) in Wake County, to NC 54 in Durham County, North Carolina.

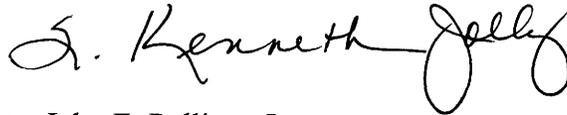
If any change in the authorized work is required because of unforeseen or altered conditions or for any other reason, the plans revised to show the change must be sent promptly to this office. Such action is necessary, as revised plans must be reviewed and the permit modified.

Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant general conditions require that:

- a. You must complete construction before December 31, 2011.
- b. You must notify this office in advance as to when you intend to commence and complete work.
- c. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

You should address all questions regarding this authorization to Mr. Eric Alsmeyer of my Raleigh Regulatory Field Office at (919-876-8441), extension 23.

Sincerely,



*for* John E. Pulliam, Jr.  
Colonel, U.S. Army  
District Engineer

Enclosures

Copy furnished with enclosures:

Chief, Source Data Unit  
NOAA/National Ocean Service  
ATTN: Sharon Tear N/CS261  
1315 East-West Hwy., Rm 7316  
Silver Spring, MD 20910-3282

Copies furnished with special conditions and plans:

Mr. Pete Benjamin, Field Supervisor  
U.S. Fish and Wildlife Service  
Fish and Wildlife Enhancement  
Post Office Box 33726  
Raleigh, North Carolina 27636-3726

Mr. Ron Sechler  
National Marine Fisheries  
Service, NOAA  
Pivers Island  
Beaufort, North Carolina 28516

Mr. David Rackley  
National Marine Fisheries  
Service, NOAA  
219 Fort Johnson Road  
Charleston, South Carolina 29412-9110

Mr. Ronald Mikulak, Chief  
Wetlands Section - Region IV  
Water Management Division  
U.S. Environmental Protection Agency  
Atlanta Federal Center  
61 Forsyth Street, SW  
Atlanta, Georgia 30303

Mr. Doug Huggett  
NC Division of Coastal Management  
Division of Coastal Management  
400 Commerce Avenue  
Morehead City, NC 28557-3421

DEPARTMENT OF THE ARMY PERMIT

**RECEIVED**

Permittee: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
GREGORY J. THORPE, PH.D.

MAY 15 2006

**REGULATORY**  
**WLM. FLD. OFC.**

Permit No: 200120448

Issuing Office: USAED, WILMINGTON

**NOTE:** The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of the office acting under the authority of the commanding officer.

You are authorized to perform work in the accordance with the terms and conditions specified below.

**Project Description:** Place fill material impacting 2,125 linear feet of stream, 0.20 acre of surface water and 0.28 are of wetlands, including 0.06 acre of isolated wetlands not subject Section 404 of the Clean Water Act, for construction of improvements to Davis Drive (SR 1613/SR 1999; T.I.P. No. U-4026), crossing unnamed tributaries to Kit Creek and Burdens Creek, and adjacent wetlands.

**Project Location:** Davis Drive (SR 1613/SR 1999), from Morrisville-Carpenter Road (SR 3014) in Wake County (35.820° N Latitude, 78.848° W Longitude), NC 54 in Durham County (35.890° N Latitude, 78.862° W Longitude), North Carolina.

Permit Conditions:

**General Conditions:**

1. The time Limit for completing the work authorized ends on December 31, 2011. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Conditions 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site eligible for listing in the National Register of Historic Places.

4. If you sell the property associate with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

**Special Conditions:**

\*SEE ATTACHED SPECIAL CONDITIONS

**Further Information:**

1. **Congressional Authorities:** You have been authorized to undertake the activity described above pursuant to:

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S. C. 403).

Section 404 of the clean Water Act (33 U.S.C. 1344).

Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. **Limits of this authorization.**

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. **Limits of Federal Liability.** In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United states in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.



SPECIAL CONDITIONS (Action ID. 200120448; NCDOT/TIP U-4026)

WORK LIMITS

- a) All work authorized by this permit must be performed in strict compliance with the attached plans, which are a part of this permit. Any modification to these plans must be approved by the US Army Corps of Engineers (USACE) prior to implementation.
- b) Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.
- c) Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.

RELATED LAWS

- d) All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-5083, Ext. 526 or (800) 662-7956 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

PROJECT MAINTENANCE

- e) The permittee shall advise the Corps in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.
- f) Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.
- g) The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project
- h) The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar

appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

The permittee shall remove all sediment and erosion control measures placed in wetlands or waters, and shall restore natural grades in those areas, prior to project completion.

During the clearing phase of the project, heavy equipment must not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of nonerodable materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

No fill or excavation for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless it is included on the plan drawings and specifically authorized by this permit.

i) The permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

#### ENFORCEMENT

j) Violations of these conditions or violations of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District U.S. Army Corps of Engineers within 24 hours of the permittee's discovery of the violation.

#### CONSTRUCTION PLANS

k) The permittee will ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Written verification shall be provided that the final construction drawings comply with the attached permit drawings prior to any active construction in waters of the United States, including wetlands. Any deviation in the construction design plans will be brought to the attention of the Corps of Engineers, Raleigh Regulatory Field Office prior to any active construction in waters or wetlands.

l) Prior to commencing construction within jurisdictional waters of the United States for any portion of the proposed project, the permittee shall forward the latest version of project construction drawings to the Corps of Engineers, Raleigh Regulatory Field Office NCDOT Regulatory Project Manager. Half-size drawings will be acceptable.

#### COMPLIANCE WITH SPECIAL CONDITIONS

m) Failure to institute and carry out the details of these special conditions, will result in a directive to cease all ongoing and permitted work within waters and/or wetlands associated with the permitted project, or such other remedies and/or fines as the District Engineer or his authorized representatives may seek.

## WET CONCRETE

n) The permittee shall take measures to prevent live or fresh concrete from coming into contact with any surface waters until the concrete has hardened.

## CULVERTS

o) All authorized culverts will be installed to allow the passage of low stream flows and the continued movement of fish and other aquatic life as well as to prevent headcutting of the streambed. For all box culverts and for pipes greater than 48 inches in diameter, the bottom of the pipe will be buried at least one foot below the bed of the stream unless burial would be impractical and the Corps of Engineers has waived this requirement. For culverts 48 inches in diameter or smaller, the bottom of the pipe must be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the culvert. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in disequilibrium of wetlands or streambeds or banks, adjacent to, upstream or downstream of the structures. In order to allow for the continued movement of bed load and aquatic organisms, existing stream channel widths and depths will be maintained at the inlet and outlet ends of culverts. Riprap armoring of streams at culvert inlets and outlets shall be minimized above the ordinary high water elevation in favor of bioengineering techniques such as bank sloping, erosion control matting and revegetation with deep-rooted, woody plants.

## PRECONSTRUCTION MEETING

p) The permittee shall schedule a preconstruction meeting between its representatives, the contractor's representatives, and the Corps of Engineers, Raleigh Regulatory Field Office, NCDOT Regulatory Project Manager, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all of the terms and conditions contained within this Department of the Army Permit. The permittee shall provide the USACE, Raleigh Regulatory Field Office, NCDOT Regulatory Project Manager, with a copy of the final plans at least two weeks prior to the preconstruction meeting along with a description of any changes that have been made to the project's design, construction methodology or construction timeframe. The permittee shall schedule the preconstruction meeting for a time when the USACE and North Carolina Division of Water Quality (NCDWQ) Project Managers can attend. The permittee shall invite the Corps and NCDWQ Project Managers a minimum of thirty (30) days in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting.

## BORROW AND WASTE

q) To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall provide the USACE with appropriate maps indicating the locations of proposed borrow or waste sites as soon as the permittee has that information. The permittee will coordinate with the USACE before approving any borrow or waste sites that are within 400 feet of any streams or wetlands. All jurisdictional wetland lines on borrow and waste sites shall be verified by the Corps of Engineers and shown on the approved reclamation plans. The permittee shall ensure that all such areas comply with

Special Condition b) of this permit, and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This information will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the Special Condition b). All information will be available to the USACE upon request. NCDOT shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the Corps of Engineers within 30 days of the completion of the reclamation work.

## STREAM RELOCATION

r) **IMPLEMENTATION:** The permittee shall mitigate for 261 linear feet of unavoidable impact to streams with important aquatic function, associated with this project, by completing 261 linear feet of onsite stream relocation, as described in the permit application (Site 9). The stream relocation shall be constructed in accordance with the North Carolina Wildlife Resources Commission's (NCWRC) "Stream Relocation Guidelines." NCDOT shall consult with NCWRC on the stream relocation/restoration and implement all practicable recommendations in the design of specific site requirements for re-establishment of bank vegetation, and placement of meanders and habitat structures. Vegetation shall be used to the maximum extent practicable to stabilize banks, and riprap and other man-made structural measures shall be minimized. The permittee shall construct all channel relocations/restoration in a dry work area, and stabilize the new channel before stream flows are diverted. Whenever possible, the permittee shall allow new channels to stabilize for an entire growing season. The Corps of Engineers, Raleigh Regulatory Field Office will be notified in advance by facsimile transmission or electronic mail of the intended diversion of water into the new channel and approval must be obtained from the USACE prior to the diversion taking place. The banks and buffer area of the relocated channel will be planted with appropriate species of deep-rooted, woody vegetation. A final inspection of the channel relocation by a representative of the Corps of Engineers, Asheville Regulatory Field Office will be conducted prior to completion of the road project. No clearing and grubbing of the existing channel shall take place until the stream has been diverted into the new channel.

s) **AS-BUILT SURVEY:** The permittee shall complete an as-built channel survey within sixty days of completion of the stream relocation construction. The permittee shall document changes in the dimension, pattern, profile, vegetation plantings, and structures installed, of the relocated channel from the proposed design. The permittee shall also include in the as-built survey: photo documentation at representative segments and structures; and a plan view diagram.

t) **MONITORING SCHEDULE:** The permittee shall perform the following components of Level I monitoring each year for the 5-year monitoring period: Reference photos; plant survival (i.e., identify specific problem areas (missing, stressed, damaged or dead plantings), estimated causes, and proposed/required remedial action); visual inspection of channel stability. Physical measurements of channel stability/morphology will not be required. The permittee shall submit the monitoring reports to the USACE, Raleigh Regulatory Field Office Project Manager, within sixty days after completing the monitoring. If less than two bankfull events occur during the first 5 years, the permittee shall continue monitoring until the second bankfull event is documented. The bankfull events must occur during separate monitoring years. In the event that the required bankfull events do not occur during the five-year monitoring period, the USACE, in consultation with the resource agencies, may determine that further monitoring is not required. It is suggested that all bankfull occurrences be monitored and reported through the required monitoring period.

The permittee shall perform and submit photo documentation twice each year (summer and winter) for the 5-year monitoring period, and for any subsequently required monitoring period.

u) MONITORING DATA/REPORT: The permittee shall include the following information in the Level I monitoring report for the site: reference photos; plant survival notes and recommendations, as appropriate; and a report on the visual inspection of channel stability. Physical measurements of channel stability/morphology will not be required. The permittee shall complete the Monitoring Data Record, Sections 1, 2 and 3 (pages 1, 2 and 3, attached), for each representative segment of the channel, and for each year of monitoring (twice each year, summer and winter, for reference photos). The permittee shall include in the monitoring reports a discussion of any deviations from as-built and an evaluation of the significance of these deviations and whether they are indicative of a stabilizing or destabilizing situation.

v) STREAM MITIGATION SUCCESS CRITERIA: The mitigation success criteria, and required remediation actions, will be generally based on the attached Appendix II, and the Photo Documentation, Ecological Function, and Channel Stability criteria in the "Stream Mitigation Guidelines", dated April, 2003 (available on the internet at [http://www.saw.usace.army.mil/wetlands/Mitigation/stream\\_mitigation.html](http://www.saw.usace.army.mil/wetlands/Mitigation/stream_mitigation.html)), pages 24 and 25, under "Success Criteria: ".

#### PROTECTION OF STREAM RELOCATION MITIGATION PROPERTY

w) The stream relocation mitigation property shall be maintained by the permittee in its natural condition, as altered by the mitigation plan, in perpetuity. Prohibited activities within the mitigation area specifically include, but are not limited to, the construction or placement of buildings, signs, or any other structures; the discharge of dredged or fill material, any debris, waste, or garbage; excavation; grading; dredging; leveling or any other earth moving activity; cutting, removal or damage of any vegetation; any activity which would impact the drainage or water quality on the site; except as required by implementation of the mitigation plan. This condition runs with the land. The permittee shall not sell, lease, or otherwise convey any interest in the property making up the mitigation property without first providing 60 days written notice to the Corps of the proposed conveyance. The instrument effecting such conveyance shall include legally binding restrictions on the use of the mitigation property as described in this condition to be enforceable by the permittee as well as the U.S. Army Corps of Engineers, Wilmington District. The instrument establishing such restrictions shall be subject to the approval of the U.S. Army Corps of Engineers. The permittee shall enforce the terms of the required restrictions.

#### EEP MITIGATION

x) Compensatory mitigation for the unavoidable impacts to 1,008 linear feet of warm water stream, and 0.22 acre of riparian, emergent marsh, and bottomland hardwood forest wetlands associated with the proposed project, shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated October 3, 2005 from William D. Gilmore, EEP Director. Pursuant to the EEP Memorandum of Agreement (MOA) between the State of North Carolina and the US Army Corps of Engineers signed on July 22, 2003, the EEP will provide 0.44 acre of restoration equivalent riparian wetlands, and 1,995 linear feet of restoration equivalent warm water stream channel in the Cape Fear River basin (Hydrologic Cataloging Unit 03030002) by one year of the date of this permit. For wetlands, a minimum of 1:1 (impact to mitigation) must be in the form of wetland restoration. The NCDOT shall, within 30 days of the issue date of this

**NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND  
REQUEST FOR APPEAL**

Applicant: NCDOT/TIP U-4026		File Number: 200120448	Date: March 13, 2006
Attached is:		See Section below	
X	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A	
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B	
	PERMIT DENIAL	C	
	APPROVED JURISDICTIONAL DETERMINATION	D	
	PRELIMINARY JURISDICTIONAL DETERMINATION	E	

**SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/inet/functions/cw/cecwo/reg> or Corps regulations at 33 CFR Part 331.**

**A: INITIAL PROFFERED PERMIT:** You may accept or object to the permit.

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

**B: PROFFERED PERMIT:** You may accept or appeal the permit

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**C: PERMIT DENIAL:** You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**D: APPROVED JURISDICTIONAL DETERMINATION:** You may accept or appeal the approved JD or provide new information.

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

**E: PRELIMINARY JURISDICTIONAL DETERMINATION:** You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

**SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT**

**REASONS FOR APPEAL OR OBJECTIONS:** (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

**ADDITIONAL INFORMATION:** The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

If you have questions regarding this decision and/or the appeal process you may contact:  
Mr. Eric C. Alsmeyer, Regulatory Project Manager  
U.S. Army Corps of Engineers, Wilmington District  
Raleigh Regulatory Field Office  
6508 Falls of Neuse Road, Suite 120  
Raleigh, North Carolina 27615-6814

If you only have questions regarding the appeal process you may also contact:  
Mr. Michael Bell, Administrative Appeal Review Officer  
CESAD-ET-CO-R  
U.S. Army Corps of Engineers, South Atlantic Division  
60 Forsyth Street, Room 9M15  
Atlanta, Georgia 30303-8801

**RIGHT OF ENTRY:** Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

<hr/> Signature of appellant or agent.	Date:	Telephone number:
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**DIVISION ENGINEER:**  
**Commander**  
**U.S. Army Engineer Division, South Atlantic**  
**60 Forsyth Street, Room 9M15**  
**Atlanta, Georgia 30303-3490**



Michael F. Easley, Governor  
William G. Ross Jr., Secretary  
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director  
Division of Water Quality

January 26, 2006

**RECEIVED**

JAN 31 2006

RALEIGH REGULATORY FIELD OFFICE

Dr. Gregory J. Thorpe, PhD., Manager  
Planning and Environmental Branch  
North Carolina Department of Transportation  
1548 Mail Service Center  
Raleigh, North Carolina, 27699-1548

Dear Dr. Thorpe:

Re: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act and Isolated Wetlands Permit Pursuant to IWGP100000 for Proposed Widening of Davis Drive (SR 1613/SR 1999) from Morrisville-Carpenter Road to NC 54, Wake and Durham Counties, TIP No. U-4026, State Project No. 9.8051713, USACOE Action ID No. 200120448.  
DWQ Project No. 051972

Attached hereto is a copy of Certification No. 3557 issued to The North Carolina Department of Transportation dated January 26, 2006.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Alan W. Klimek, P.E.  
Director

Attachments

cc: Wilmington District Corps of Engineers  
Mr. Eric Alsmeyer, Corps of Engineers Raleigh Field Office  
Mr. Christopher Militscher, US EPA, Region IV  
Mr. Travis Wilson, NC WRC  
Mr. Gary Jordan, US FWS  
Mr. Jon G. Nance, PE, Division 5 Engineer, 2612 N. Duke St., Durham, NC 27704  
Mr. Chris Murray, Division 5 Environmental Officer, 2612 N. Duke St., Durham, NC 27704  
Mr. Bret Feulner, NEU, 2728-168 Capital Blvd., Parker Lincoln Bldg., Raleigh, NC 27604  
Mr. William Gilmore, Ecosystem Enhancement Program  
NCDWQ Raleigh Regional Office  
Central Files  
File Copy

**APPROVAL OF 401 Water Quality Certification and ISOLATED WETLANDS PERMIT and  
ADDITIONAL CONDITIONS**

**THIS CERTIFICATION** is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H, Section .0500. The project shall be constructed pursuant to the application dated received October 28, 2005, to construct the widening of Davis Drive (SR 1613/SR 1999) from Morrisville-Carpenter Road to NC 54, Wake and Durham Counties. The approved design is that submitted in your application dated October 24, 2005 (dated received October 28, 2005). This certification authorizes the NCDOT to impact 0.22 acres of jurisdictional wetlands, 0.056 acres of isolated wetlands, 2,125 linear feet of stream, and 0.533 acres of surface water (0.412 acres of permanent impact and 0.121 acres of temporary impact) in Wake and Durham Counties. The authorized impacts are as described below:

**Section B Wetland Impacts in the Cape Fear River Basin**

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Area under the Bridge (ac)
6	0.023			0.012		
11	0.014					
12	0.012			0.001		
13	0.020			0.001		
14	0.009			0.002		
18	0.027			0.007		
19	0.013		0.077			
<b>Total</b>	<b>0.118</b>		<b>0.077</b>	<b>0.023</b>		

**Section B Isolated Wetland Impacts in the Cape Fear River Basin**

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)
15	0.013				
16	0.036			0.007	
<b>Total</b>	<b>0.049</b>			<b>0.007</b>	

**Section B Surface Water and Stream Impacts in the Cape Fear River Basin**

Site	Permanent Fill in Surface Water (ac)	Temporary Fill in Surface Water (ac)	Permanent Stream Impacts (ft)	Temporary Stream Impacts (ft)	Stream Impacts Requiring Mitigation (ft)
1	0.017	0.012	216		
2	0.009	0.008	106		
3	0.046	0.024	186		186
4	0.056	0.014	215		215
5	0.079 (pond)	0.037			
6	0.016	0.002	423		
7	0.081		307		307
8	0.003	0.002	21		21
9	0.054	0.008	394		394
10	0.047	0.014	244		244
17	0.003 (pond)				
18	0.001		13		
<b>Total</b>	<b>0.412</b>	<b>0.121</b>	<b>2,125</b>		<b>1,367</b>

The application provides adequate assurance that the discharge of fill material into the waters of the Roanoke River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your application dated October 24, 2005 (dated received October 28, 2005), as described in the Public Notice. Should your project change, you are required to notify the DWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

**Condition(s) of Certification:**

1. Construction will be conducted in such a manner as to prevent a significant increase in turbidity outside the area of construction or construction-related discharge. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to assure compliance with the appropriate turbidity water quality standard.
  - a. The erosion and sediment control measures for the project must equal or exceed the proper design, installation, operation and maintenance outlined in the most recent version of the North Carolina Sediment and Erosion Control Planning and Design Manual. These devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

- b. For borrow pit sites, the erosion and sediment control measures must equal or exceed the proper design, installation, operation and maintenance outlined in the most recent version of the North Carolina Surface Mining Manual. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.
2. All sediment and erosion control measures shall not be placed in wetlands or waters to the maximum extent practicable. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, they shall be removed and the natural grade restored after the Division of Land Resources has released the project.
  3. If an environmental document is required, this Certification is not valid until a FONSI or ROD is issued by the State Clearinghouse. All water quality-related conditions of the FONSI or ROD shall become conditions of this Certification.
  4. No live or fresh concrete shall come into contact with waters of the state until the concrete has hardened.
  5. There shall be no excavation from or waste disposal into jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit. Should waste or borrow sites be located in wetlands or stream, compensatory mitigation will be required since it is a direct impact from road construction activities.
  6. All channel relocations will be constructed in a dry work area, and stabilized before stream flows are diverted. Channel relocations will be completed and stabilized prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. Vegetation used for bank stabilization shall be limited to native woody species, and should include establishment of a 30 foot wide wooded and an adjacent 20 foot wide vegetated buffer on both sides of the relocated channel to the maximum extent practical. A transitional phase incorporating coir fiber and seedling establishment is allowable. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage requested.
  7. Upon completion of the project, the NCDOT shall complete and return the enclosed "Certification of Completion Form" to notify DWQ when all work included in the 401 Certification has been completed. The responsible party shall complete the attached form and return it to the 401/Wetlands Unit of the Division of Water Quality upon completion of the project.
  8. Placement of culverts and other structures in waters, streams, and wetlands must be placed below the elevation of the streambed, unless otherwise authorized by this certification, to allow low flow passage of water and aquatic life unless it can be shown to DWQ that providing passage would be impractical. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium shall be maintained if requested in writing by DWQ.

9. Compensatory mitigation for impacts to 0.22 acres of jurisdictional wetlands shall be done. Total mitigation shall be provided as described below:

*Offsite Compensatory Mitigation*

Compensatory mitigation for the unavoidable impacts to 0.22 acres of riverine wetlands in the Cape Fear River Basin in the Hydrologic Cataloging Unit 03030002, associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated October 3, 2005, and in accordance with the Memorandum of Agreement (MOA) between the State of North Carolina and the US Army Corps of Engineers signed on July 22, 2003.

10. Compensatory mitigation for impacts to 1,367 linear feet of streams shall be done as follows:

*Onsite Compensatory Mitigation*

Compensatory mitigation for impacts to streams shall be done for 261 linear feet of stream impact at a replacement ratio of 1:1. Compensatory mitigation for impacts to jurisdictional streams shall be provided by onsite stream relocations of 261 linear feet of a tributary to Burdens Creek. The onsite stream relocation shall be constructed in accordance with the design submitted in your October 24, 2005 application (dated received October 28, 2005). All stream relocations shall have 50-foot wooded buffers planted on both sides of the stream. As-Builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit within 30 days of the completion of the construction of the relocations. If the parameters of this condition are not met, then the NCDOT shall supply additional stream mitigation for the 261 linear feet of impacts.

*Offsite Compensatory Mitigation*

Compensatory mitigation for impacts to 98 linear feet of stream has previously been mitigated for during the permitting of Site 4 of R-2000 Section AB. Compensatory mitigation for impacts to 987 linear feet of streams, applying a replacement ratio of 2:1, total mitigation for 1,974 linear feet of streams shall be provided in the Cape Fear River Basin, Hydrologic Cataloging Unit 03030002 and for 21 linear feet of streams, applying a replacement ratio of 1:1, total mitigation for 21 linear feet of streams shall be provided in the Cape Fear River Basin, Hydrologic Cataloging Unit 03030002 by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated October 3, 2005, and in accordance with the Memorandum of Agreement (MOA) between the State of North Carolina and the US Army Corps of Engineers signed on July 22, 2003.

11. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers.
12. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1.
13. All temporary fills in wetlands and surface waters shall be removed upon completion of the project. In addition, the post-construction removal of any temporary bridge structures or fill will need to return the project site to its preconstruction contours and elevations. The revegetation of the impacted areas with appropriate native species will be required.
14. The dimension, pattern and profile of the stream above and below the crossing should not be modified by widening the stream channel or reducing the depth of the stream. Disturbed floodplains and streams should be restored to natural geomorphic conditions.
15. Any riprap used must not interfere with thalweg performance and aquatic life passage during low flow conditions.

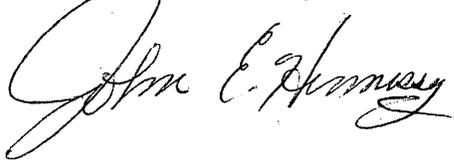
16. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.
17. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.
18. All work shall be performed during low or normal flow conditions.
19. Two copies of the final construction drawings shall be furnished to NCDWQ prior to the pre-construction meeting. Written verification shall be provided to the NC Division of Water Quality that the final construction drawings comply with the attached permit drawings contained in your application dated October 24, 2005 (dated received October 28, 2005).
20. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification.
21. NCDOT, and its authorized agents, shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State law and Federal law. If DWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, DWQ may reevaluate and modify this certification to include conditions appropriate to assure compliance with such standards and requirements in accordance with 15A NCAC 2H.0507(d).
22. A copy of this Water Quality Certification shall be posted on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.
23. DOT shall schedule a preconstruction meeting for this project prior to incurring any impacts in jurisdictional waters including wetlands. The Division of Water Quality shall be notified a minimum of 30 days prior to the preconstruction conference.
24. Culverts that are less than 48-inch in diameter should be buried to a depth equal to or greater than 20% of their size to allow for aquatic life passage, unless otherwise authorized by this certification. Culverts that are 48-inch in diameter or larger should be buried at least 12 inches below the stream bottom to allow natural stream bottom material to become established in the culvert following installation and to provide aquatic life passage during periods of low flow. These measurements must be based on natural thalweg depths.
25. There shall be no excavation from or waste disposal into jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit. Should waste or borrow sites be located in wetlands or stream, compensatory mitigation will be required since it is a direct impact from road construction activities.
26. Any violations, during the construction of the approved project, of this 401 Water Quality Certification or the North Carolina State Water Quality Standards as defined in 15A NCAC 2B .0200 Rules, shall be reported immediately to the North Carolina Division of Water Quality.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 permit issued by the US Army Corps of Engineers.

If this Certification is unacceptable to you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification. This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, P.O. Box 27447, Raleigh, N.C. 27611-7447. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

This the 26<sup>th</sup> day of January 2006

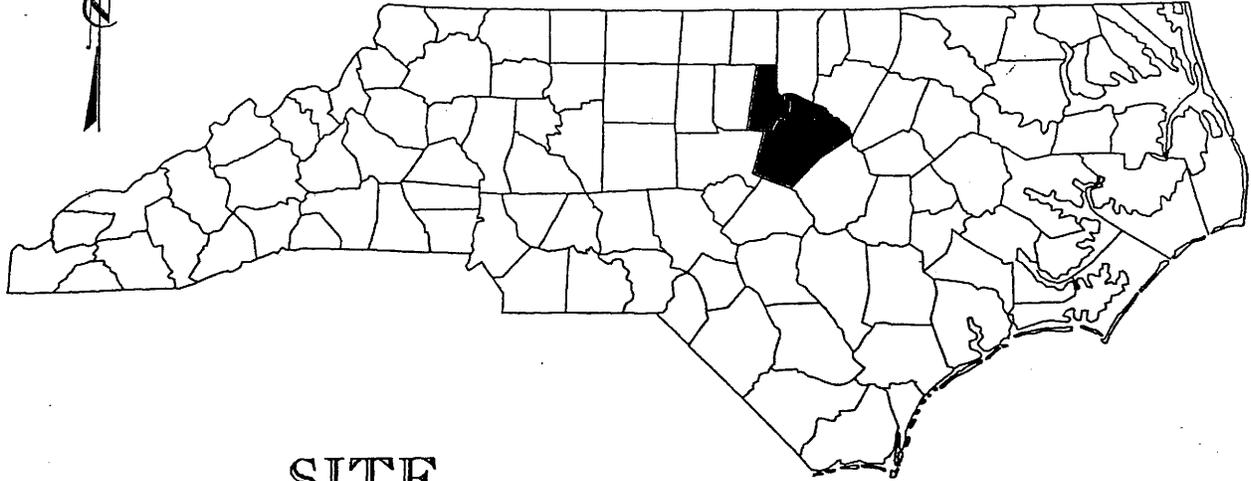
DIVISION OF WATER QUALITY

A handwritten signature in black ink, appearing to read "Alan W. Klimek", written in a cursive style.

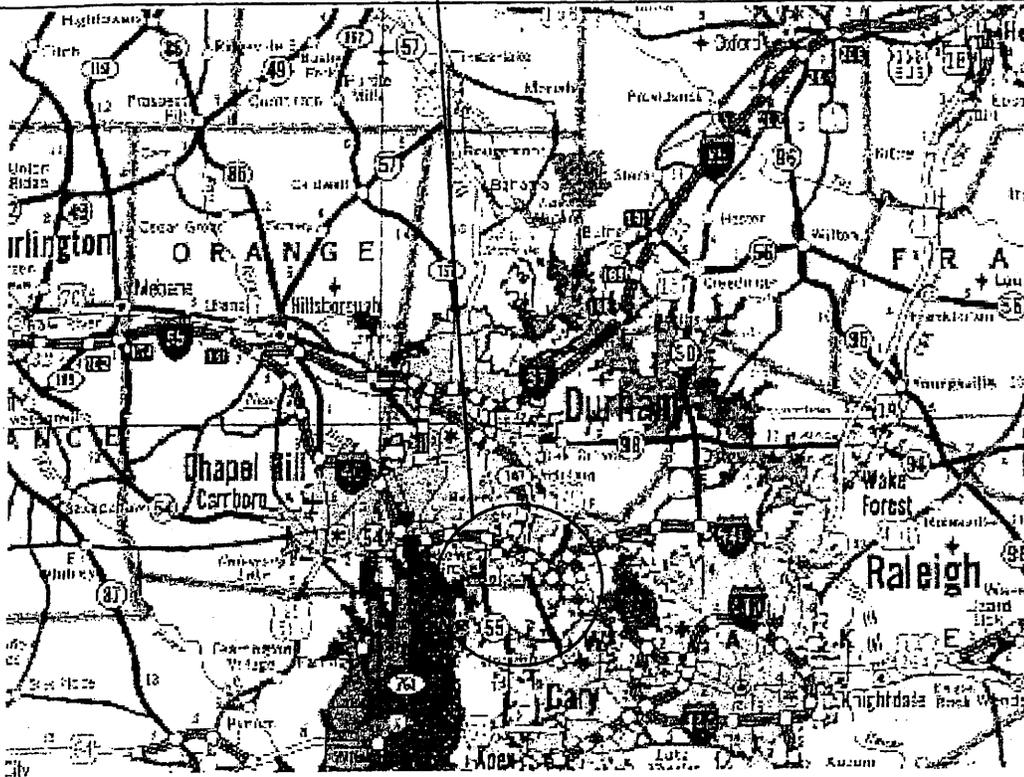
Alan W. Klimek, P.E.  
Director

WQC No. 3557

# NORTH CAROLINA



## SITE



## VICINITY MAP

### NORTH CAROLINA DEPARTMENT OF HIGHWAYS

WAKE - DURHAM COUNTIES  
35018.11(U-4026)

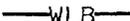
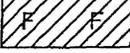
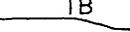
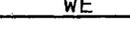
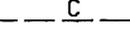
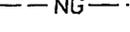
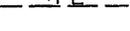
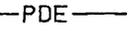
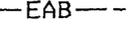
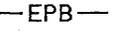
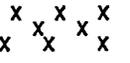
DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

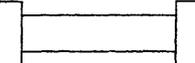
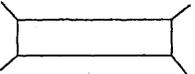
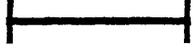
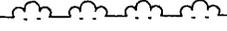
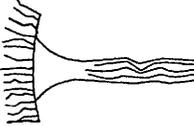
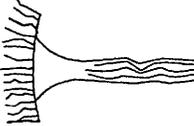
NOT TO SCALE

DATE: 02-04-05

SHEET 1 of 65

# WETLAND LEGEND

-  WLB WETLAND BOUNDARY
-  WLB WETLAND
-  DENOTES FILL IN WETLAND
-  DENOTES FILL IN SURFACE WATER
-  DENOTES FILL IN SURFACE WATER (POND)
-  DENOTES TEMPORARY FILL IN WETLAND
-  DENOTES EXCAVATION IN WETLAND
-  DENOTES TEMPORARY FILL IN SURFACE WATER
-  DENOTES MECHANIZED CLEARING
-  FLOW DIRECTION
-  TB TOP OF BANK
-  WE EDGE OF WATER
-  C PROP. LIMIT OF CUT
-  F PROP. LIMIT OF FILL
-  PROP. RIGHT OF WAY
-  NG NATURAL GROUND
-  PL PROPERTY LINE
-  TDE TEMP. DRAINAGE EASEMENT
-  PDE PERMANENT DRAINAGE EASEMENT
-  EAB EXIST. ENDANGERED ANIMAL BOUNDARY
-  EPB EXIST. ENDANGERED PLANT BOUNDARY
-  WATER SURFACE
-  LIVE STAKES
-  BOULDER
-  CORE FIBER ROLLS

-  PROPOSED BRIDGE
-  PROPOSED BOX CULVERT
-  PROPOSED PIPE CULVERT  
12"-48" PIPES  
(DASHED LINES DENOTE EXISTING STRUCTURES)  
54" PIPES & ABOVE
-  SINGLE TREE
-  WOODS LINE
-  DRAINAGE INLET
-  ROOTWAD
-  RIP RAP
-  5 ADJACENT PROPERTY OWNER OR PARCEL NUMBER (IF AVAILABLE)
-  PREFORMED SCOUR HOLE
-  LEVEL SPREADER (LS)
-  DITCH / GRASS SWALE

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
3501B.LJ (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

NOT TO SCALE

DATE: 02-04-05

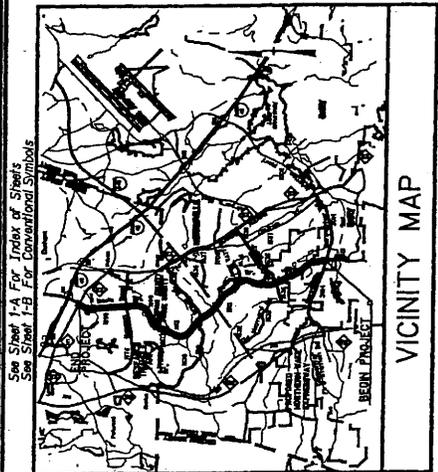
SHEET 2 OF 65

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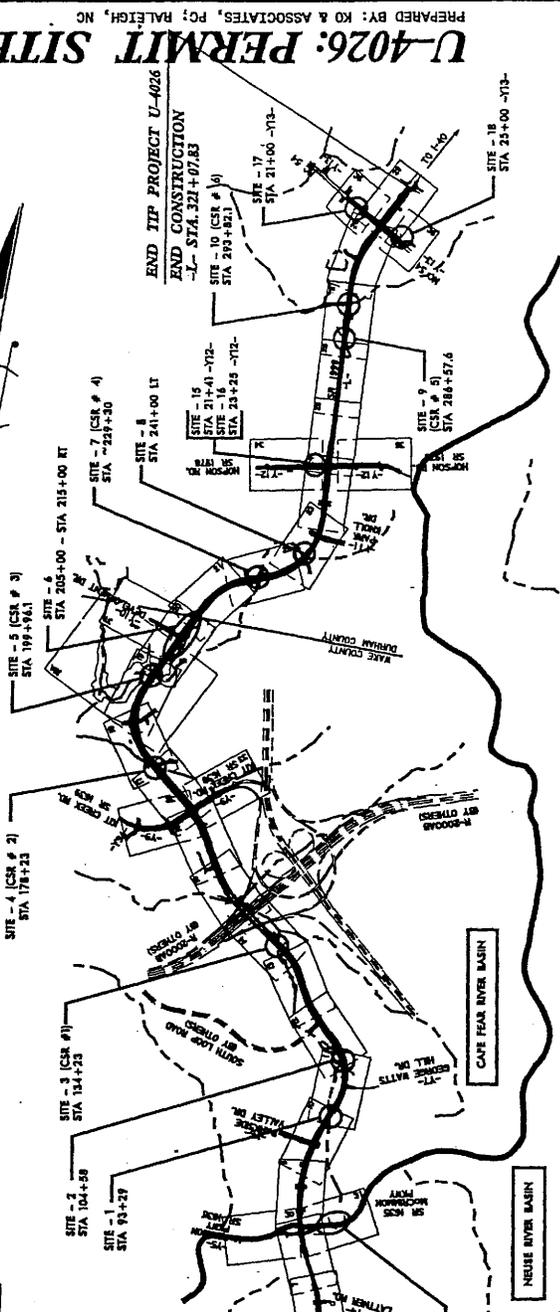


57704

CONTRACT: C200840 TIP PROJECT: U-4026



CONCRETE INVERT BEARING BELOW BSD	OPEN RADIUS	INVERT DEPTH	BELOW BSD
18	18	0.3	0.3
24	24	0.4	0.4
30	30	0.6	0.6
36	36	0.8	0.8
42	42	0.9	0.9
48	48	0.8	0.8
54	54	1.0	1.0
60	60	1.0	1.0
66	66	1.0	1.0
72	72	1.0	1.0



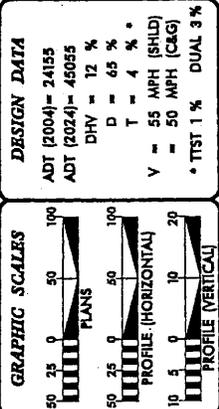
PRELIMINARY PLANS  
As per the final authorization

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA  
ENGINEER: P.E.  
ROADWAY DESIGN  
ENGINEER: P.E.

RIGHT OF WAY DATE:  
U-4026A - APRIL 29, 2003  
U-4026B - JUNE 30, 2003  
LETTING DATE:

DESIGN DATA  
ADT (2004) = 24155  
ADT (2024) = 45055  
D/H/V = 12 %  
D = 65 %  
T = 4 %  
V = 55 MPH (SHLD)  
V = 50 MPH (CAG)  
• TTST 1 % DUAL 3 %

PROJECT LENGTH  
LENGTH ROADWAY TIP PROJECT U-4026 = 5.57 MI  
TOTAL LENGTH OF TIP PROJECT U-4026 = 5.57 MI



NCDDOT CONTACT: TERESA BRUTON, P.E.  
PROJECT SERVICES - ENGINEERING COORDINATION

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

WAKE-DURHAM COUNTIES

LOCATION: DAVIS DRIVE (SR 1613/999) FROM 390' NORTH  
OF MORRISVILLE-CARPENTER ROAD (SR 3014)  
TO NORTH OF NC 54  
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERTS  
AND SIGNALS.

U-4026: PERMIT SITE MAP

U-4026: PERMIT SITE MAP  
PREPARED BY: KO & ASSOCIATES, P.C.; RALEIGH, NC

NO.	DATE	DESCRIPTION
1	1	1

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



7/2/99

REVISIONS

7/18/03 REVISED CE & ADDED PDE TO PARCEL 18  
10/04/04 REVISED NAME AND PARCEL NO. ON PARCEL 18



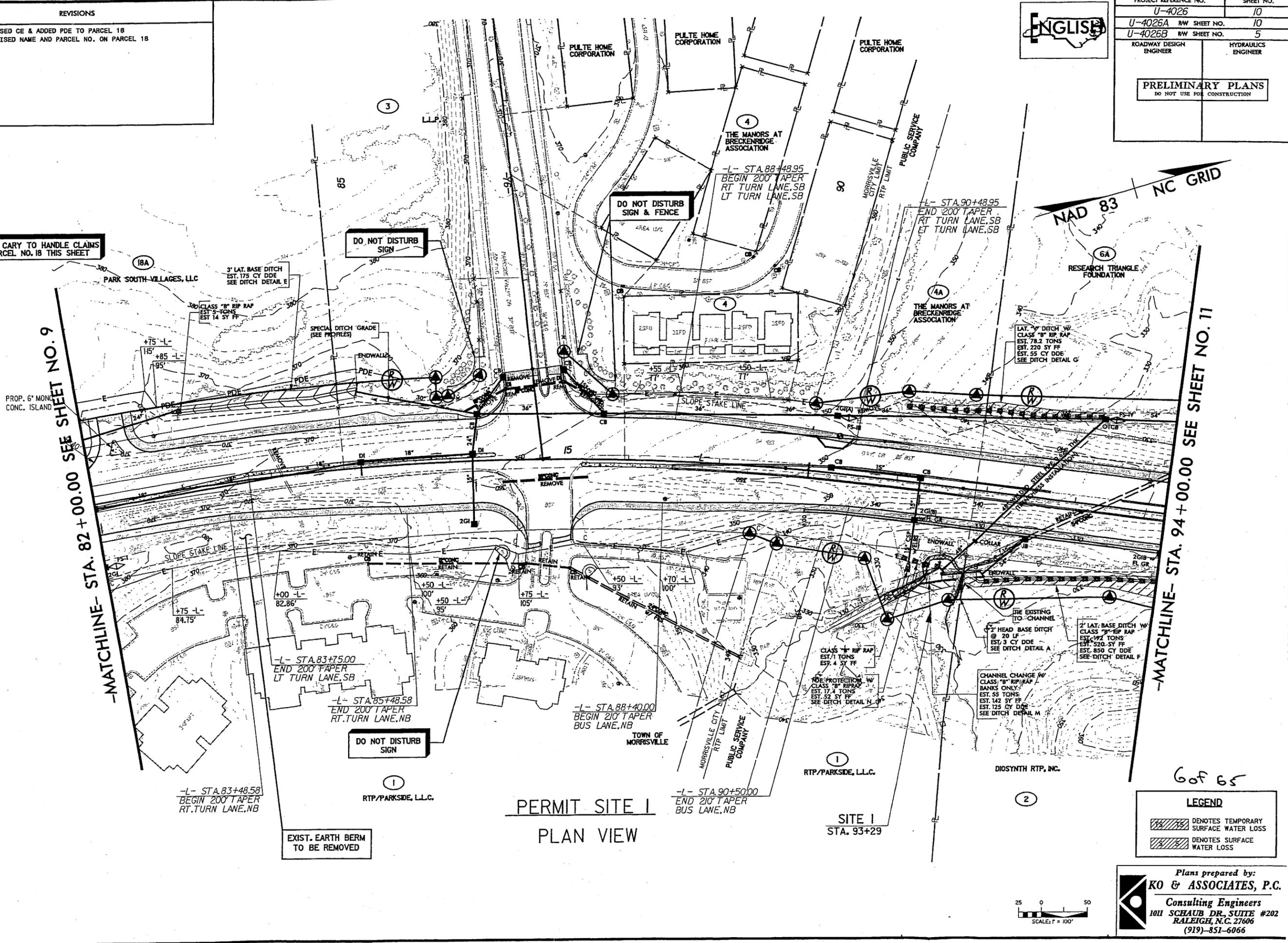
PROJECT REFERENCE NO.	SHEET NO.
U-4026	10
U-4026A RW SHEET NO.	10
U-4026B RW SHEET NO.	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

TOWN OF CARY TO HANDLE CLAIMS ON PARCEL NO. 18 THIS SHEET

-MATCHLINE- STA. 82 + 00.00 SEE SHEET NO. 9

-MATCHLINE- STA. 94 + 00.00 SEE SHEET NO. 11

PROP. 6" MONO CONC. ISLAND



PERMIT SITE I  
PLAN VIEW

SITE I  
STA. 93+29

6 of 65

LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS



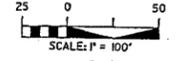
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 1011 SCHAU DR., SUITE #202  
 RALEIGH, N.C. 27606  
 (919)-851-6066

3/22/2005 2:41:26 PM C:\Hydro\Drawn\Permits\1026.parm.t.10.dgn  
K & Associates, P.C.

REVISIONS

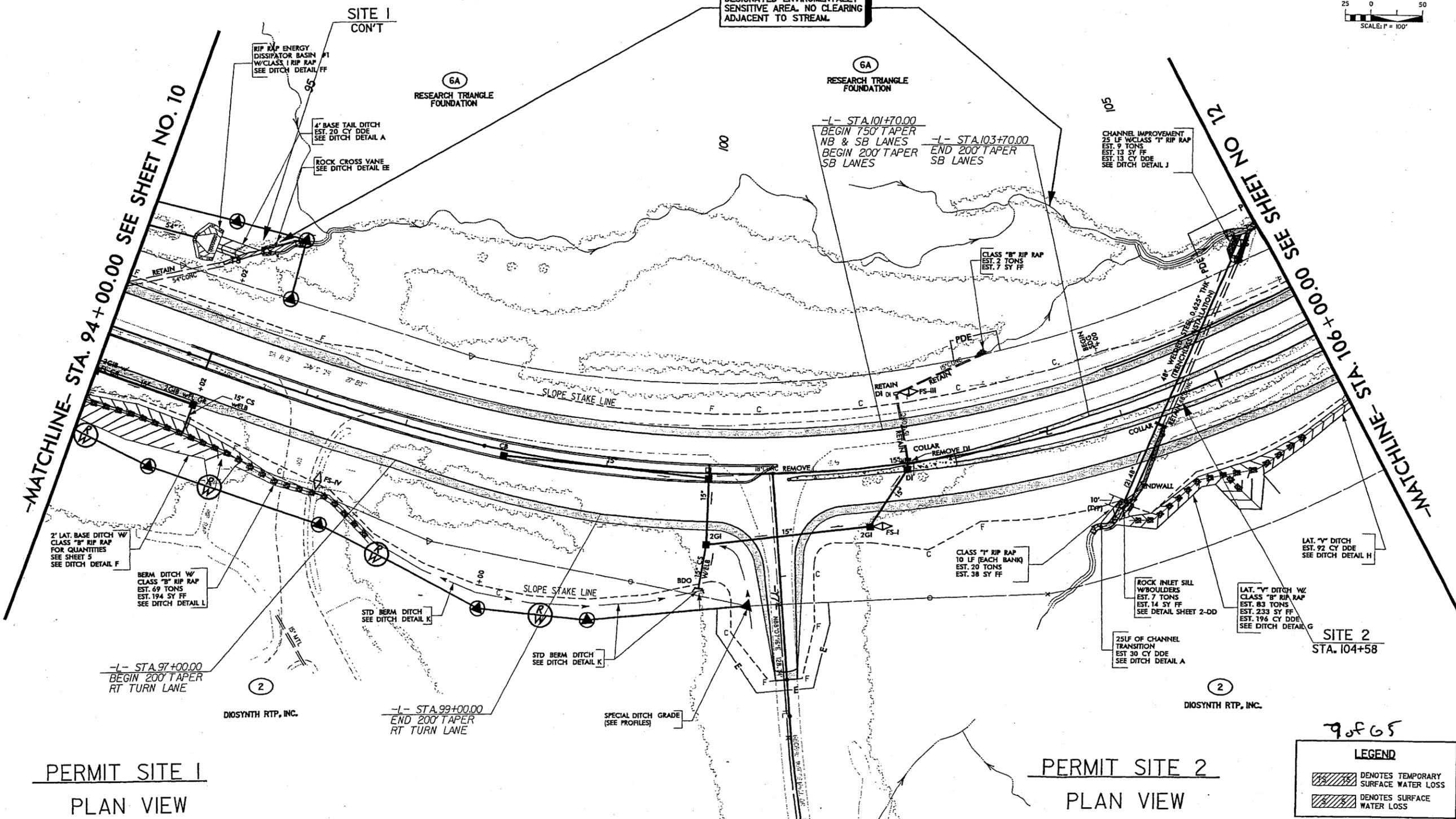
3/16/04 REVISED PARCEL NO. 8 TO PARCEL NO. 6A & 6B  
3/25/04 NAME CHANGE PARCEL NO. 2  
6/24/04 REVISED R/W & CE PARCEL NO. 2 &  
REVISED CE ON PARCEL NO. 6B  
7/9/04 REVISED PARCEL NO. AND OWNER PARCEL 6B  
9/9/04 REVISED PARCEL NO. 2A TO PARCEL NO. 2  
2/16/05 REVISED ACCESS TO LEFT OVER CONDITION AT-Y7-  
2/16/05 REVISED R/W AND TCE ON PARCEL NO. 2

PROJECT REFERENCE NO. U-4026	SHEET NO. 11
U-4026B RW SHEET NO. 6	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



NAD 83 | NC GRID

DESIGNATED ENVIRONMENTALLY SENSITIVE AREA. NO CLEARING ADJACENT TO STREAM.



PERMIT SITE 1  
PLAN VIEW

PERMIT SITE 2  
PLAN VIEW

9265

LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

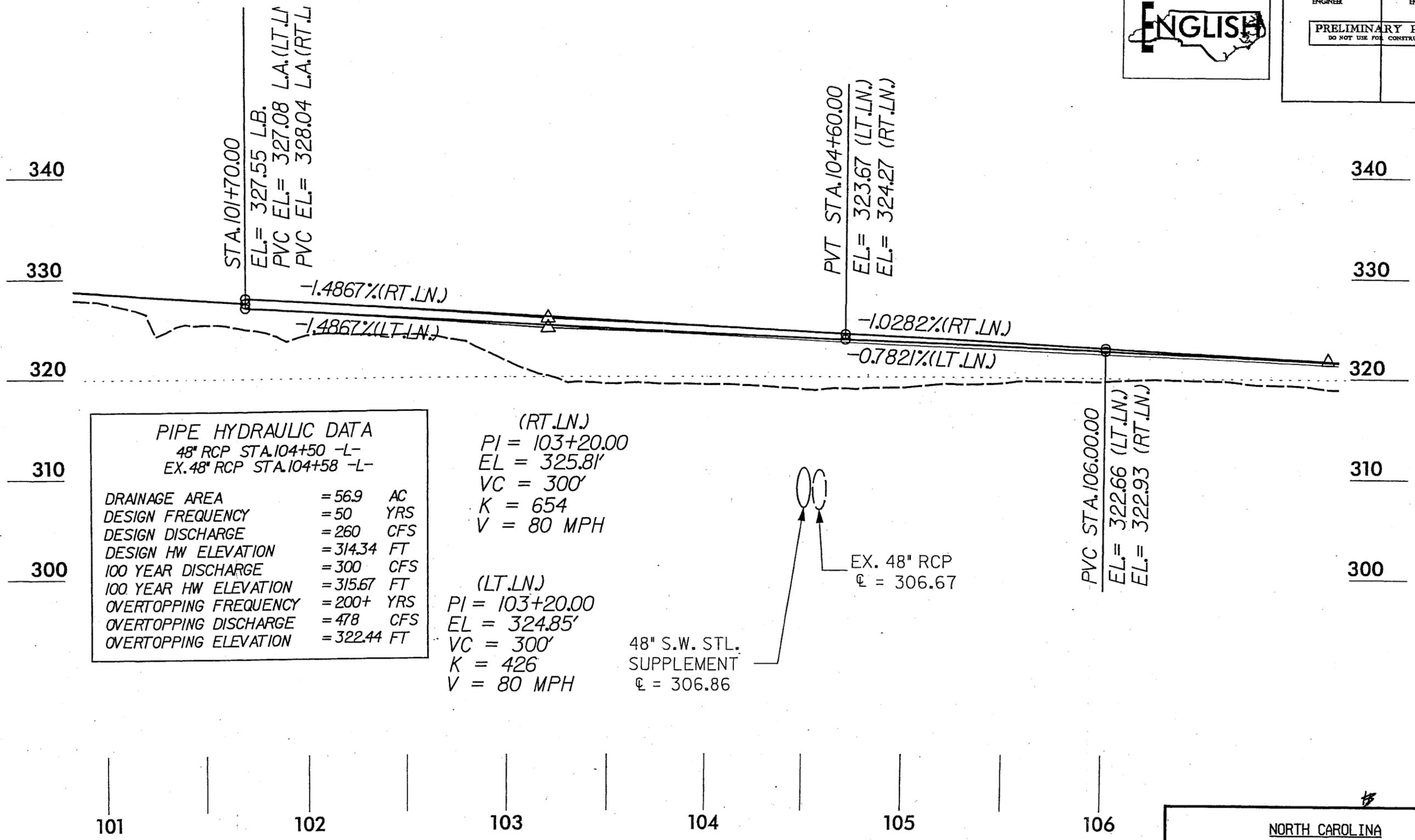
FOR DITCH DETAILS, SEE SHEETS 2-H & 2-I  
FOR INTERSECTION DETAIL, SEE SHEET 2-K  
FOR ROCK INLET SILL DETAIL, SEE SHEET 2-DD  
FOR -L- PROFILE, SEE SHEET 41  
FOR -Y7- PROFILE, SEE SHEET 53

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHaub DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

7/22/99  
3/22/2005  
P:\NTP\U4026-Ko\Hydro\Permits\U4026-permit-11.dgn  
D. S. Associates, P.C.



PROJECT REFERENCE NO. U-4026	SHEET NO. 11-PFL
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



PIPE HYDRAULIC DATA		
48" RCP STA. 104+50 -L-		
EX. 48" RCP STA. 104+58 -L-		
DRAINAGE AREA	= 56.9	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 260	CFS
DESIGN HW ELEVATION	= 314.34	FT
100 YEAR DISCHARGE	= 300	CFS
100 YEAR HW ELEVATION	= 315.67	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 478	CFS
OVERTOPPING ELEVATION	= 322.44	FT

PROFILE ALONG ROADWAY  
SITE 2

**NORTH CAROLINA**  
**DEPARTMENT OF HIGHWAYS**  
 WAKE - DURHAM COUNTIES  
 35018.L1 (U-4026)  
 DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54  
 HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'  
 DATE: 02-04-05  
 SHEET 11 OF 65

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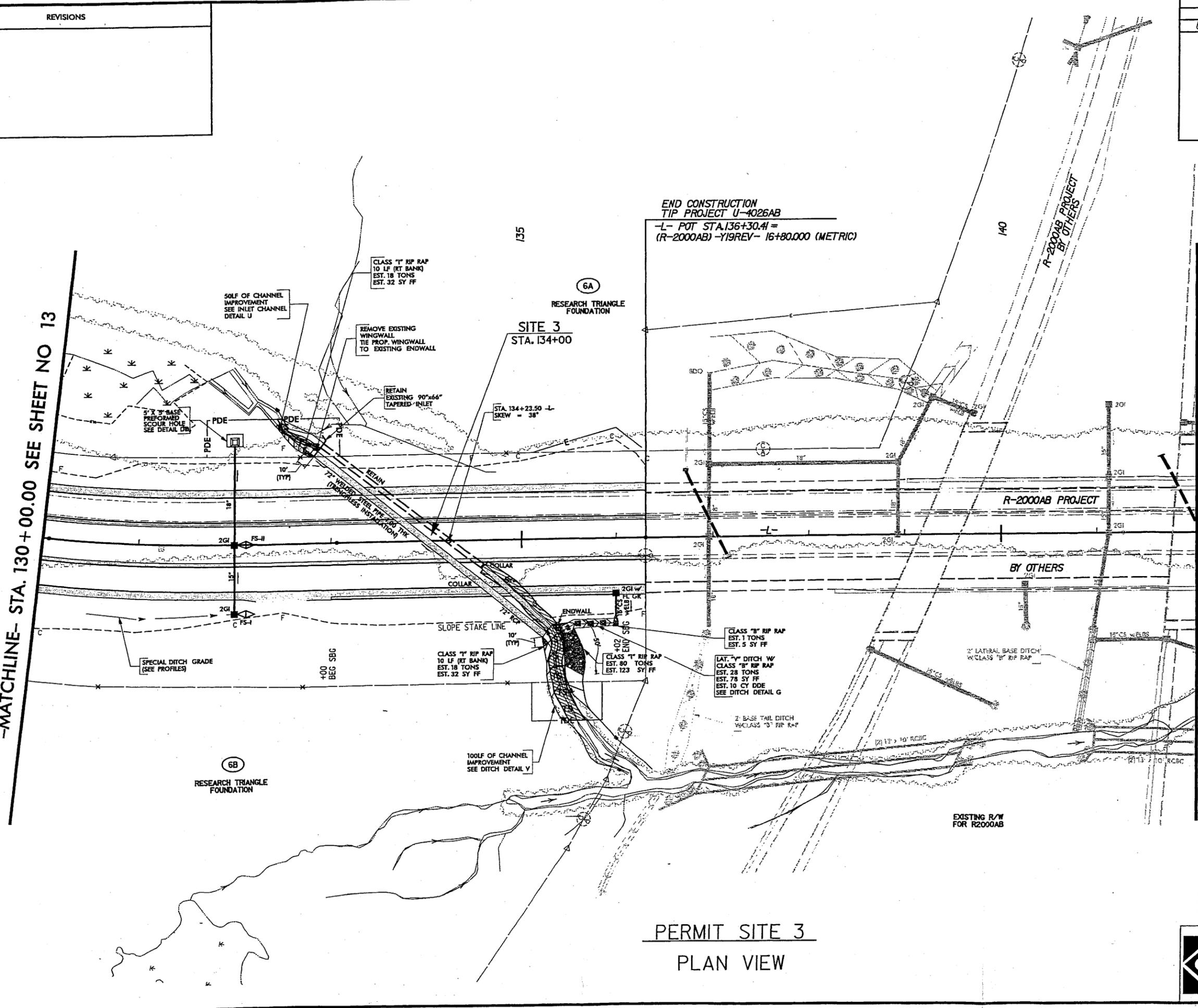
PROJECT REFERENCE NO. U-4026	SHEET NO. 14
U-4026B RW SHEET NO. 9	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



REVISIONS
-----------

-MATCHLINE- STA. 130+00.00 SEE SHEET NO 13

-MATCHLINE- STA. 142+00.00 SEE SHEET NO. 15



END CONSTRUCTION  
TIP PROJECT U-4026AB  
-L- POT STA. 136+30.41 =  
(R-2000AB) -Y19REV- 16+80.000 (METRIC)

135

140

STA. 134+23.50 -L-  
SKEW = 38°

STA. 134+00

CLASS "1" RIP RAP  
10 LF (RT BANK)  
EST. 18 TONS  
EST. 32 SY FF

CLASS "2" RIP RAP  
EST. 1 TONS  
EST. 5 SY FF

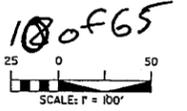
LAT. "A" DITCH W/  
CLASS "1" RIP RAP  
EST. 28 TONS  
EST. 78 SY FF  
EST. 10 CY DDE  
SEE DITCH DETAIL G

CLASS "1" RIP RAP  
EST. 80 TONS  
EST. 123 SY FF

CLASS "1" RIP RAP  
10 LF (RT BANK)  
EST. 18 TONS  
EST. 32 SY FF

2' BASE TAIL DITCH  
W/CLASS "3" RIP RAP

EXISTING R/W  
FOR R2000AB



LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

PERMIT SITE 3  
PLAN VIEW

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919) 851-6066

3/22/05 10:26:26 k:\hydro\dgn\Permits\04026\permit\_14.dgn  
P.O. Box 10000, Raleigh, NC 27606

7/2/99

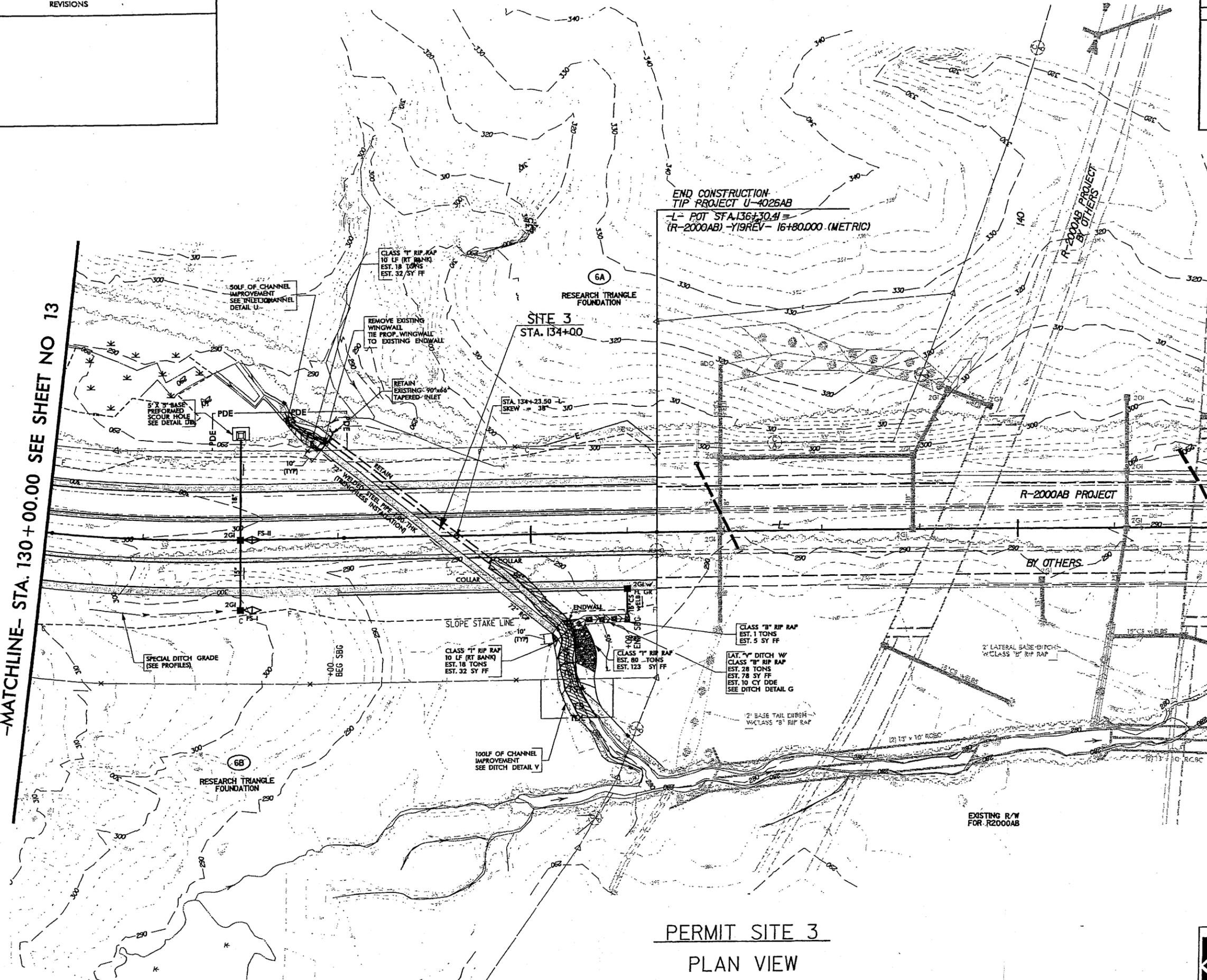
REVISIONS

PROJECT REFERENCE NO. U-4026	SHEET NO. 14
U-4026B RW SHEET NO. 9	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 130+00.00 SEE SHEET NO 13

-MATCHLINE- STA. 142+00.00 SEE SHEET NO. 15



END CONSTRUCTION  
TIP PROJECT U-4026AB  
-L- POT STA. 136+30.41  
(R-2000AB) -Y19REV- 16+80.000 (METRIC)

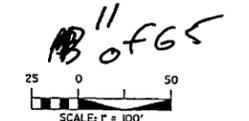
6A  
RESEARCH TRIANGLE  
FOUNDATION  
SITE 3  
STA. 134+00

R-2000AB PROJECT

BY OTHERS

EXISTING R/W  
FOR R2000AB

PERMIT SITE 3  
PLAN VIEW

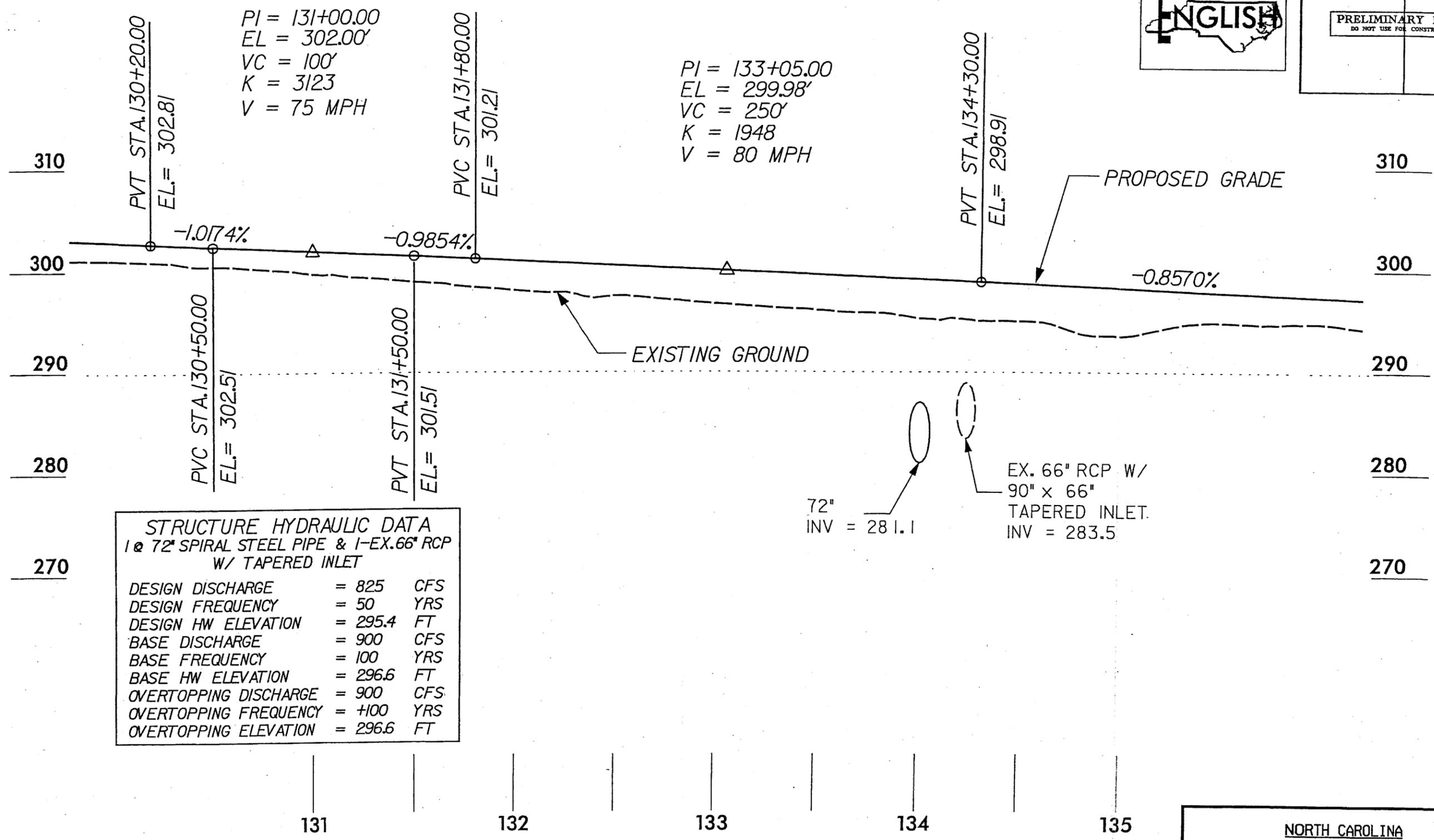
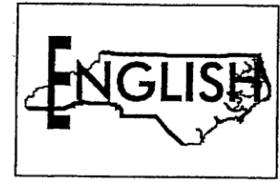


**LEGEND**

	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919) 851-6066

22/2005  
 N:\P\4026-ko\hydro\Dgn\Permits\4026.permit.14.dgn  
 & Associates, P.C.



**STRUCTURE HYDRAULIC DATA**  
1 @ 72" SPIRAL STEEL PIPE & 1-EX. 66" RCP  
W/ TAPERED INLET

DESIGN DISCHARGE	= 825	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 295.4	FT
BASE DISCHARGE	= 900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 296.6	FT
OVERTOPPING DISCHARGE	= 900	CFS
OVERTOPPING FREQUENCY	= +100	YRS
OVERTOPPING ELEVATION	= 296.6	FT

72" INV = 281.1

EX. 66" RCP W/  
90" x 66"  
TAPERED INLET.  
INV = 283.5

**PROFILE ALONG ROADWAY  
SITE 3**

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.L1 (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

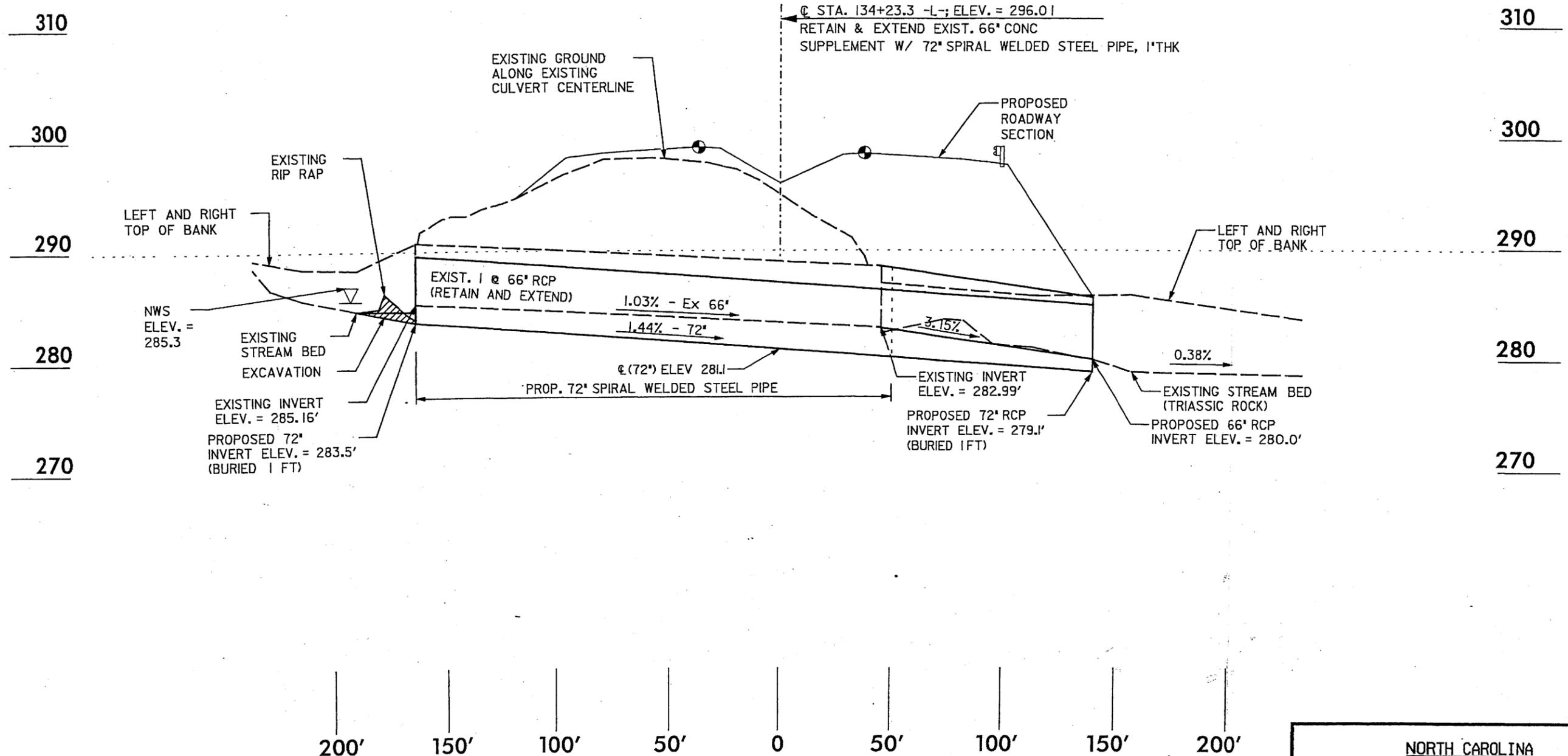
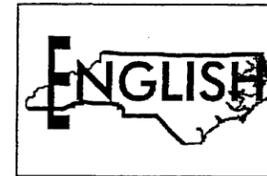
HORIZONTAL SCALE: 1" = 50'  
VERTICAL SCALE: 1" = 10'

DATE: 02-04-05

SHEET 12 OF 65

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PROJECT REFERENCE NO. U-4026	SHEET NO. 14-PAS
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



**PROFILE ALONG STRUCTURE  
SITE 3**

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.L1 (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

HORIZONTAL SCALE: 1" = 50'  
VERTICAL SCALE: 1" = 10'

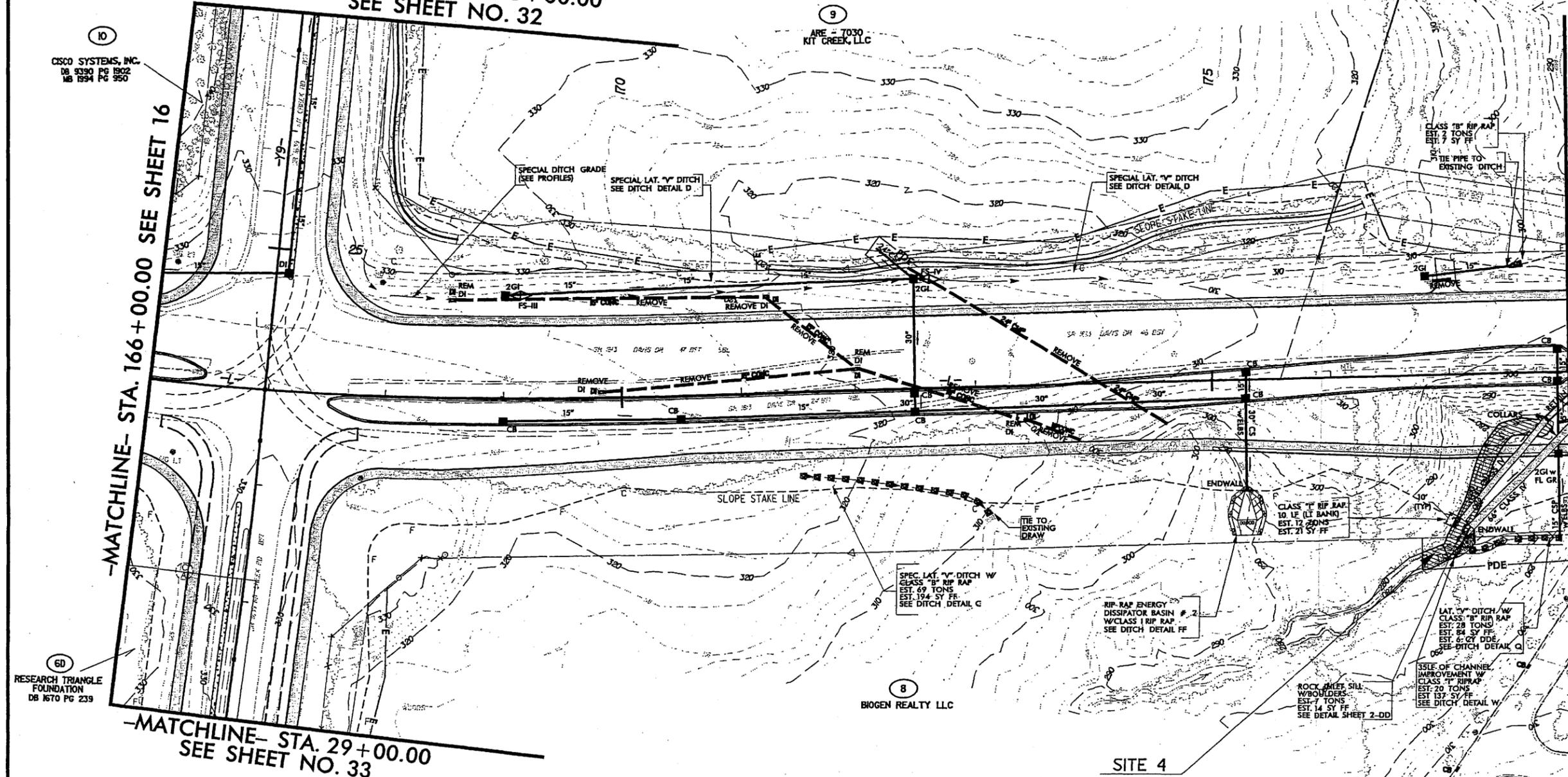
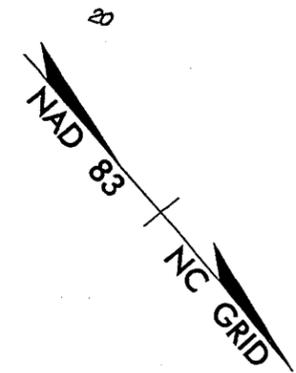
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SHEET 13 OF 65

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REVISIONS	
2/4/04	REVISED CE PARCEL 8
3/16/04	REVISED PARCEL NO. 6 TO PARCEL NO. 6D
3/25/04	REVISED PARCEL NO. 7 TO PARCEL NO. 10 & NAME CHANGE NAME CHANGE PARCEL NO. 9 & CHANGED PARCEL NO. 10 TO 10B

PROJECT REFERENCE NO. U-4026	SHEET NO. 17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 23+00.00  
SEE SHEET NO. 32

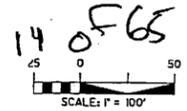
-MATCHLINE- STA. 166+00.00 SEE SHEET 16

-MATCHLINE- STA. 178+00.00 SEE SHEET NO. 18

-MATCHLINE- STA. 29+00.00  
SEE SHEET NO. 33

**PERMIT SITE 4  
PLAN VIEW**

**SITE 4  
STA. 178+23**



LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

7/2/99  
3/22/2005  
P:\1714\4026.ko\Hydro\Dgn\Permits\4026.perm.t.17.dgn  
P.O. N. Associates, P.C.

10  
CISCO SYSTEMS, INC.  
DB 5330 PG 1902  
MB 1994 PG 950

6D  
RESEARCH TRIANGLE  
FOUNDATION  
DB 1670 PG 239

9  
ARE = 7030  
KIT CREEK, LLC

8  
BIOGEN REALTY LLC

10B  
CISCO SYSTEMS, INC.

CLASS "A" RIP RAP  
10 LF (LT BANK)  
EST. 12 TONS  
EST. 21 SY FF

LAT. 1/4" DITCH W/  
CLASS "B" RIP RAP  
EST. 28 TONS  
EST. 84 SY FF  
EST. 6 CY DDE  
SEE DITCH DETAIL C

ROCK SHELF SILL  
W/WOODLICKS  
EST. 20 TONS  
EST. 137 SY FF  
EST. 14 SY FF  
SEE DETAIL SHEET 2-DD

RIP-RAP ENERGY  
DISSIPATOR BASIN # 2  
W/CLASS I RIP RAP  
SEE DITCH DETAIL FF

SPEC. LAT. 1/4" DITCH W/  
CLASS "B" RIP RAP  
EST. 69 TONS  
EST. 194 SY FF  
SEE DITCH DETAIL C

SPECIAL DITCH GRADE  
(SEE PROFILES)

SPECIAL LAT. 1/4" DITCH  
SEE DITCH DETAIL D

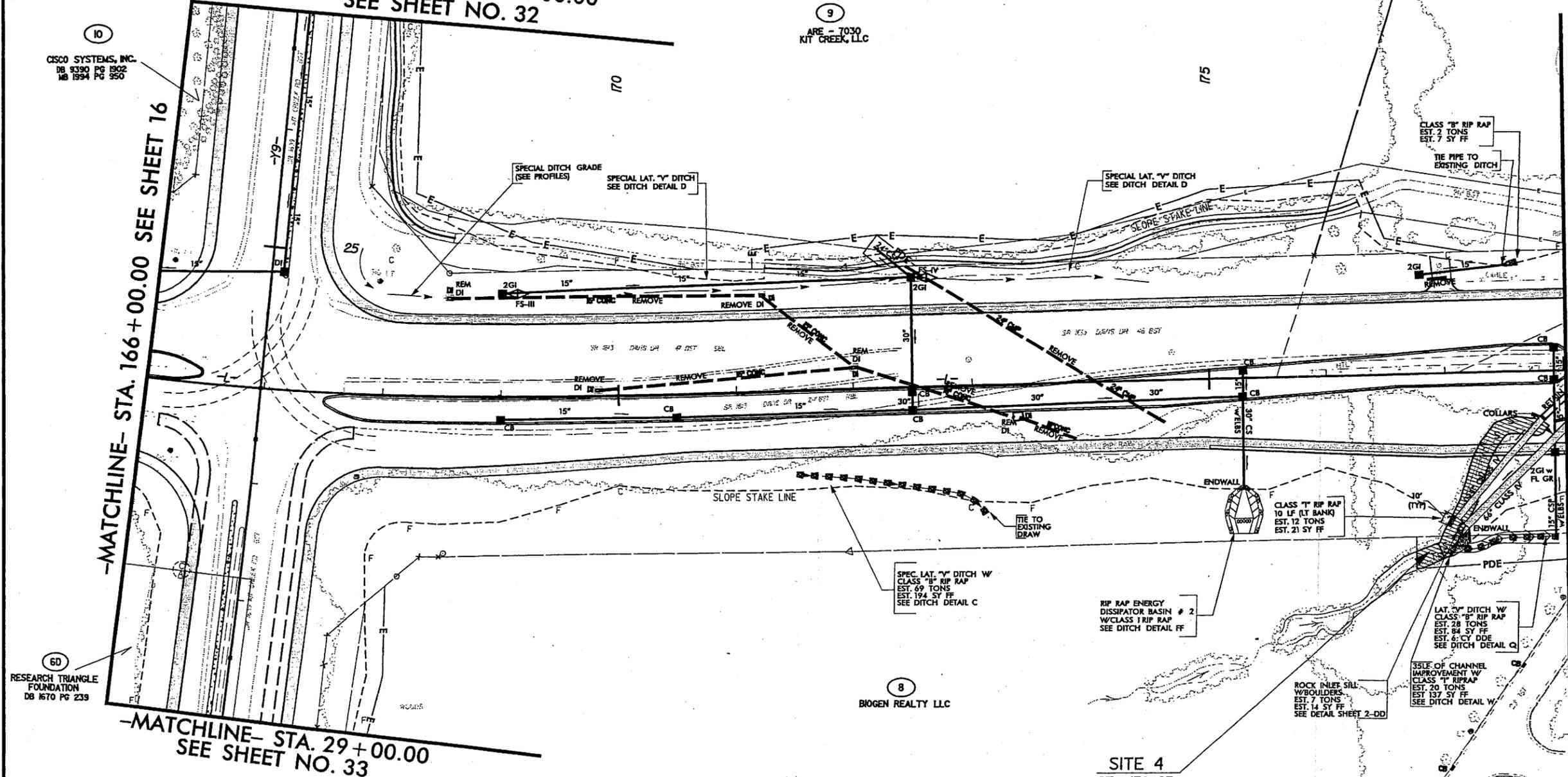
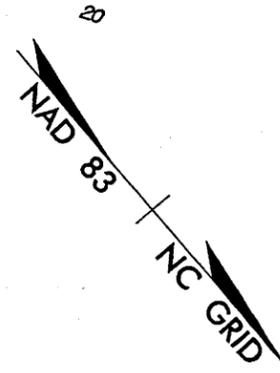
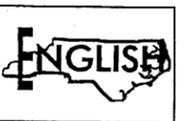
SPECIAL LAT. 1/4" DITCH  
SEE DITCH DETAIL D

CLASS "B" RIP RAP  
EST. 2 TONS  
EST. 7 SY FF  
TIE PIPE TO  
EXISTING DITCH

7/2/99

REVISIONS	
2/4/04	REVISED CE PARCEL 8
3/16/04	REVISED PARCEL NO. 6 TO PARCEL NO. 6D
3/25/04	REVISED PARCEL NO. 7 TO PARCEL NO. 10 & NAME CHANGE NAME CHANGE PARCEL NO. 9 & CHANGED PARCEL NO. 10 TO 10B

PROJECT REFERENCE NO. U-4026	SHEET NO. 17
U-4026B RW SHEET NO.	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



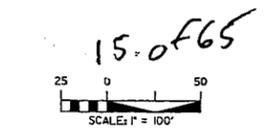
6D  
RESEARCH TRIANGLE  
FOUNDATION  
DB 1670 PG 239

3/27/2005  
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Ko & Associates, P.C.

**PERMIT SITE 4**  
**PLAN VIEW**

**SITE 4**  
STA. 178+23

**-MATCHLINE- STA. 178 + 00.00 SEE SHEET NO. 18**



LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

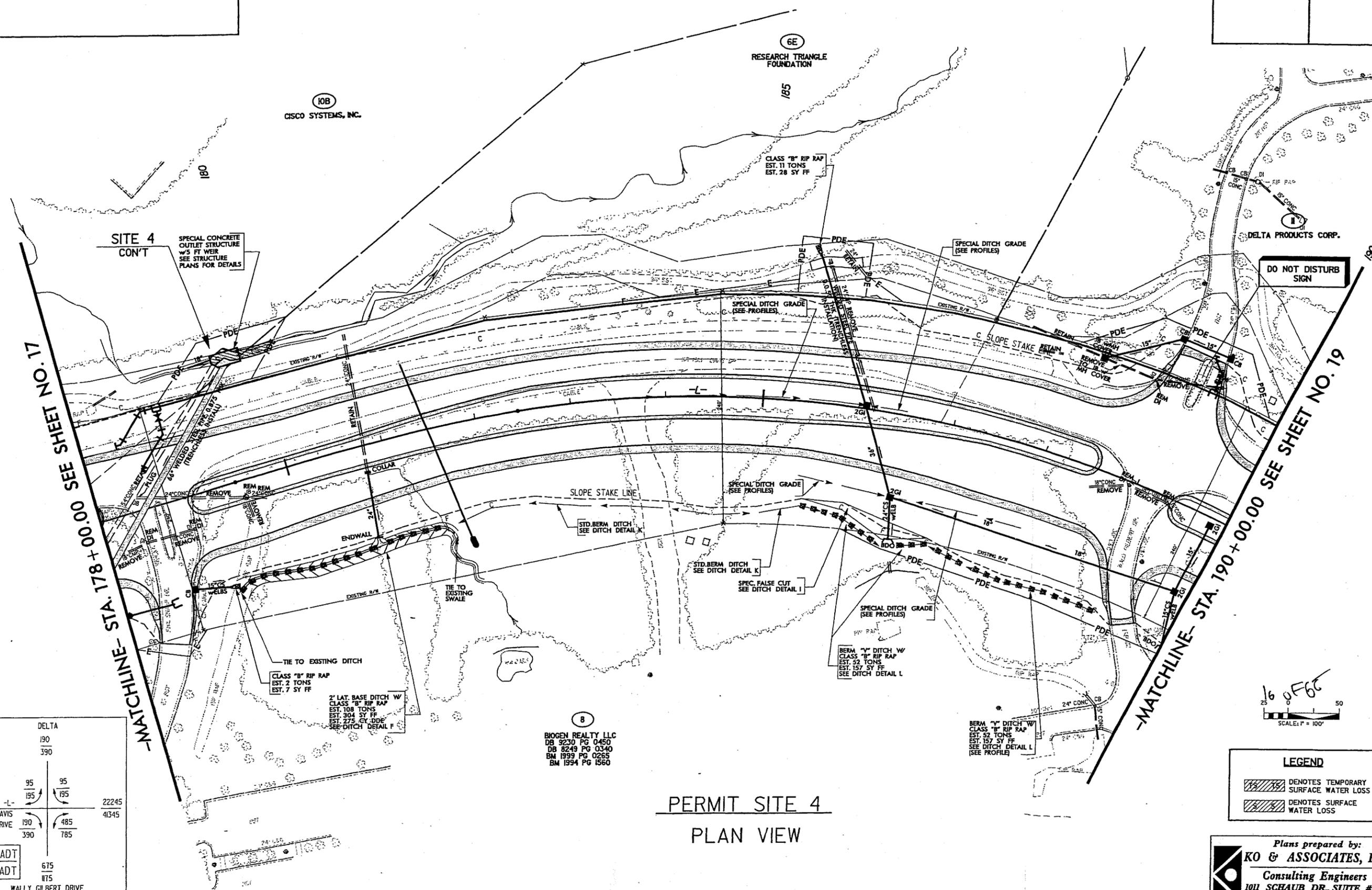
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

PROJECT REFERENCE NO. U-4026 SHEET NO. 18  
 U-4026B RW SHEET NO. 13  
 ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER  
**PRELIMINARY PLANS**  
 DO NOT USE FOR CONSTRUCTION



**REVISIONS**

9/24/03 CHANGED R/W TO PDE ON PARCEL 11  
 2/4/04 PROPERTY NAME CHANGE PARCELS 8  
 3/18/04 REVISED PARCEL NO. 8 TO PARCEL NO. 6E  
 3/25/04 REVISED PARCEL NO. 10 TO PARCEL NO. 10B



DELTA

21950	-L-	95	95	22245
40950	DAVIS DRIVE	190	485	41345
		390	785	

2004 ADT  
 2024 ADT

675  
 1775

WALLY GILBERT DRIVE

PROJECTED TRAFFIC VOLUMES

8  
 BIOGEN REALTY LLC  
 DB 9230 PG 0450  
 DB 8249 PG 0340  
 BM 1939 PG 0265  
 BM 1934 PG 1560

**PERMIT SITE 4**  
**PLAN VIEW**

**LEGEND**

DENOTES TEMPORARY SURFACE WATER LOSS

DENOTES SURFACE WATER LOSS

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 1011 SCHAUB DR. SUITE #202  
 RALEIGH, N.C. 27606  
 (919)-851-6066

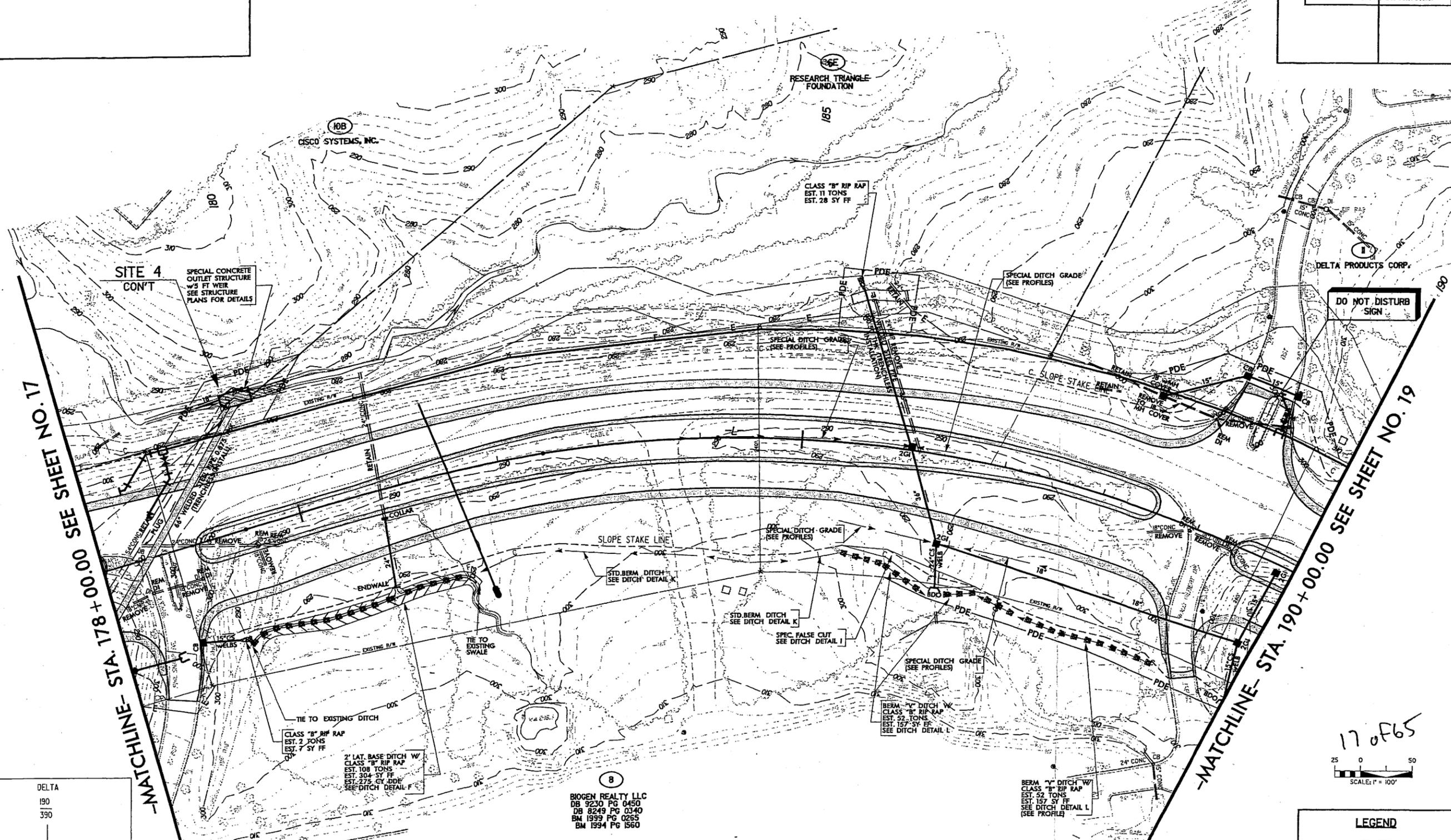
7/2/99  
 3/22/2005  
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 P.C. & Associates, P.C.

REVISIONS

9/24/03 CHANGED R/W TO PDE ON PARCEL 11  
 2/4/04 PROPERTY NAME CHANGE PARCELS 8  
 3/18/04 REVISED PARCEL NO. 8 TO PARCEL NO. 6E  
 3/25/04 REVISED PARCEL NO. 10 TO PARCEL NO. 10B



PROJECT REFERENCE NO. U-4026	SHEET NO. 18
U-4026B RW SHEET NO.	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



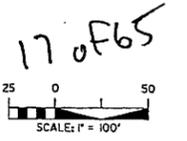
-MATCHLINE- STA. 178+00.00 SEE SHEET NO. 17

-MATCHLINE- STA. 190+00.00 SEE SHEET NO. 19

DELTA	
190	390
95	95
195	195
21950	22245
40950	41345
DAVIS DRIVE	485
190	785
390	785
2004 ADT	675
2024 ADT	875
WALLY GILBERT DRIVE	
PROJECTED TRAFFIC VOLUMES	

8  
 BIOGEN REALTY LLC  
 DB 9230 PG 0450  
 DB 8249 PG 0340  
 BM 1999 PG 0265  
 BM 1994 PG 1560

**PERMIT SITE 4**  
 PLAN VIEW



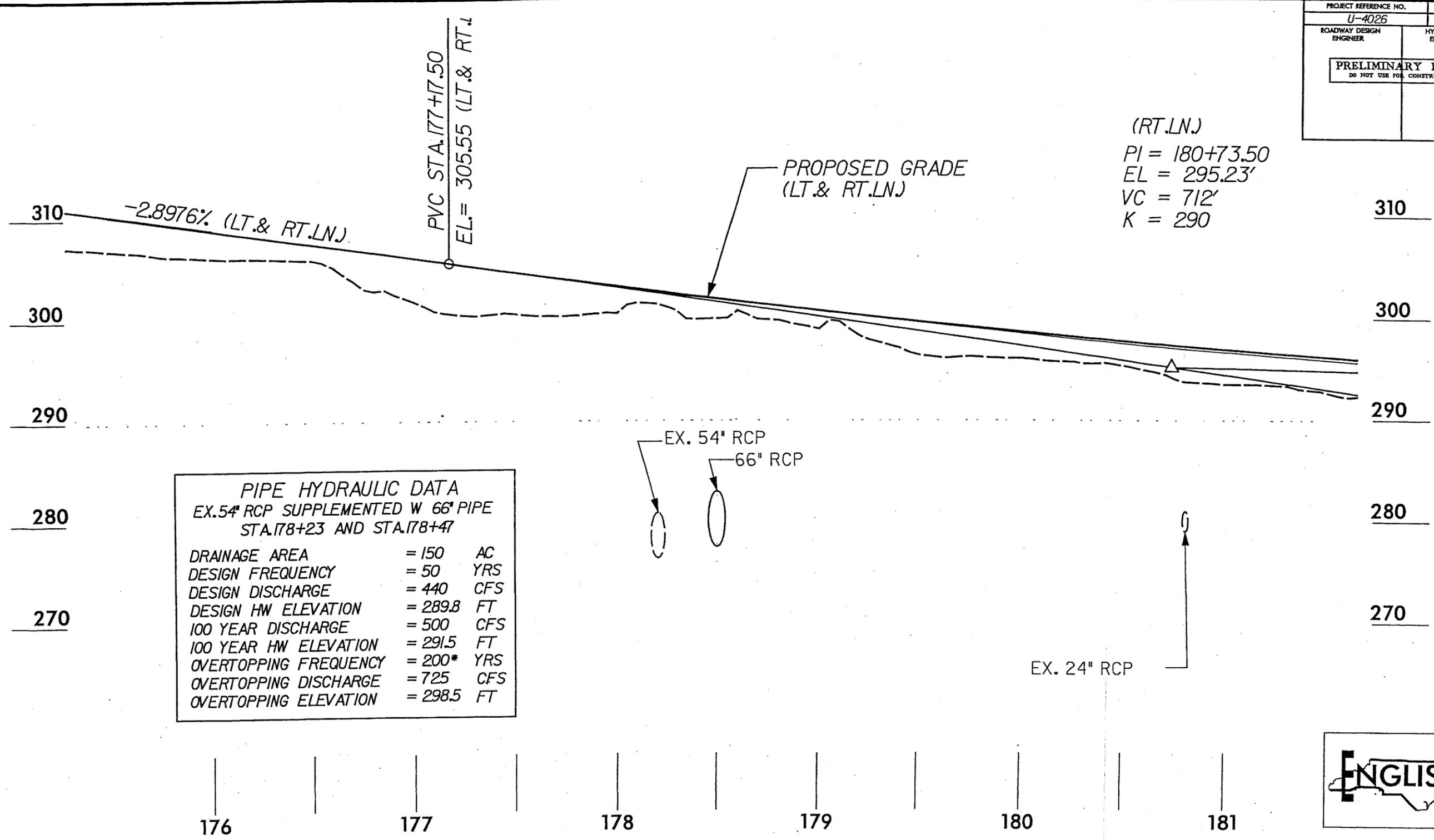
**LEGEND**

	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 1011 SCHAUH DR., SUITE #202  
 RALEIGH, N.C. 27606  
 (919) 851-6066

7/2/09  
 3/22/2005  
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 P. & Associates, P.C.

PROJECT REFERENCE NO. U-4026	SHEET NO. 17&18-PFL
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



PIPE HYDRAULIC DATA		
EX. 54" RCP SUPPLEMENTED W 66" PIPE STA. 178+23 AND STA. 178+47		
DRAINAGE AREA	= 150	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 440	CFS
DESIGN HW ELEVATION	= 289.8	FT
100 YEAR DISCHARGE	= 500	CFS
100 YEAR HW ELEVATION	= 291.5	FT
OVERTOPPING FREQUENCY	= 200*	YRS
OVERTOPPING DISCHARGE	= 725	CFS
OVERTOPPING ELEVATION	= 298.5	FT



**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.JJ (U-4026)

- DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

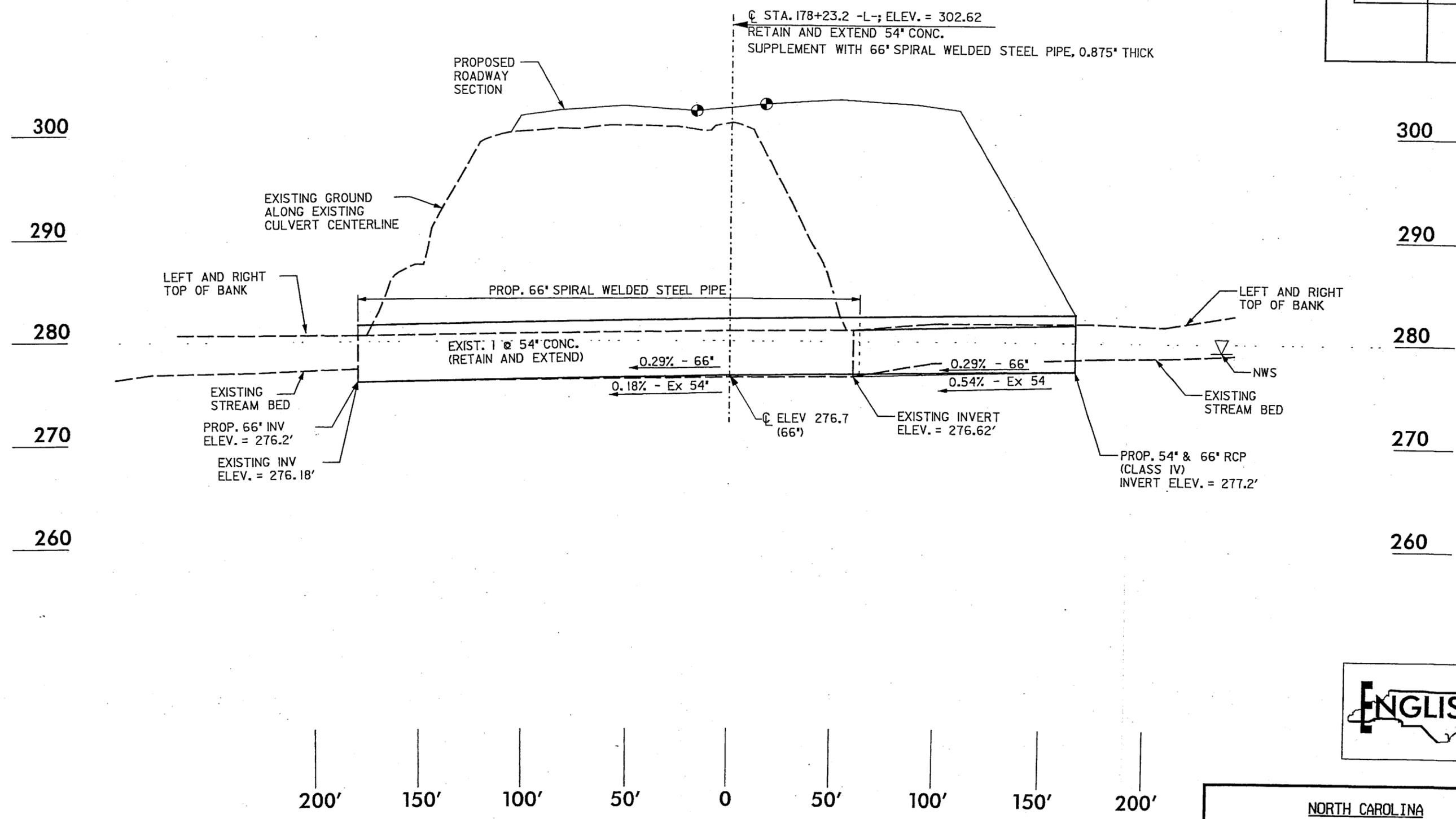
HORIZONTAL SCALE: 1" = 50'  
VERTICAL SCALE: 1" = 10'

DATE: 02-04-05

## PROFILE ALONG ROADWAY SITE 4

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PROJECT REFERENCE NO. U-4026	SHEET NO. 17&18-PAS
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



CL STA. 178+23.2 -L-; ELEV. = 302.62  
 RETAIN AND EXTEND 54" CONC.  
 SUPPLEMENT WITH 66" SPIRAL WELDED STEEL PIPE, 0.875" THICK

**PROFILE ALONG STRUCTURE  
SITE 4**



**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.JJ (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

HORIZONTAL SCALE: 1" = 50'  
VERTICAL SCALE: 1" = 10'

DATE: 02-04-05  
SHEET 19 OF 65

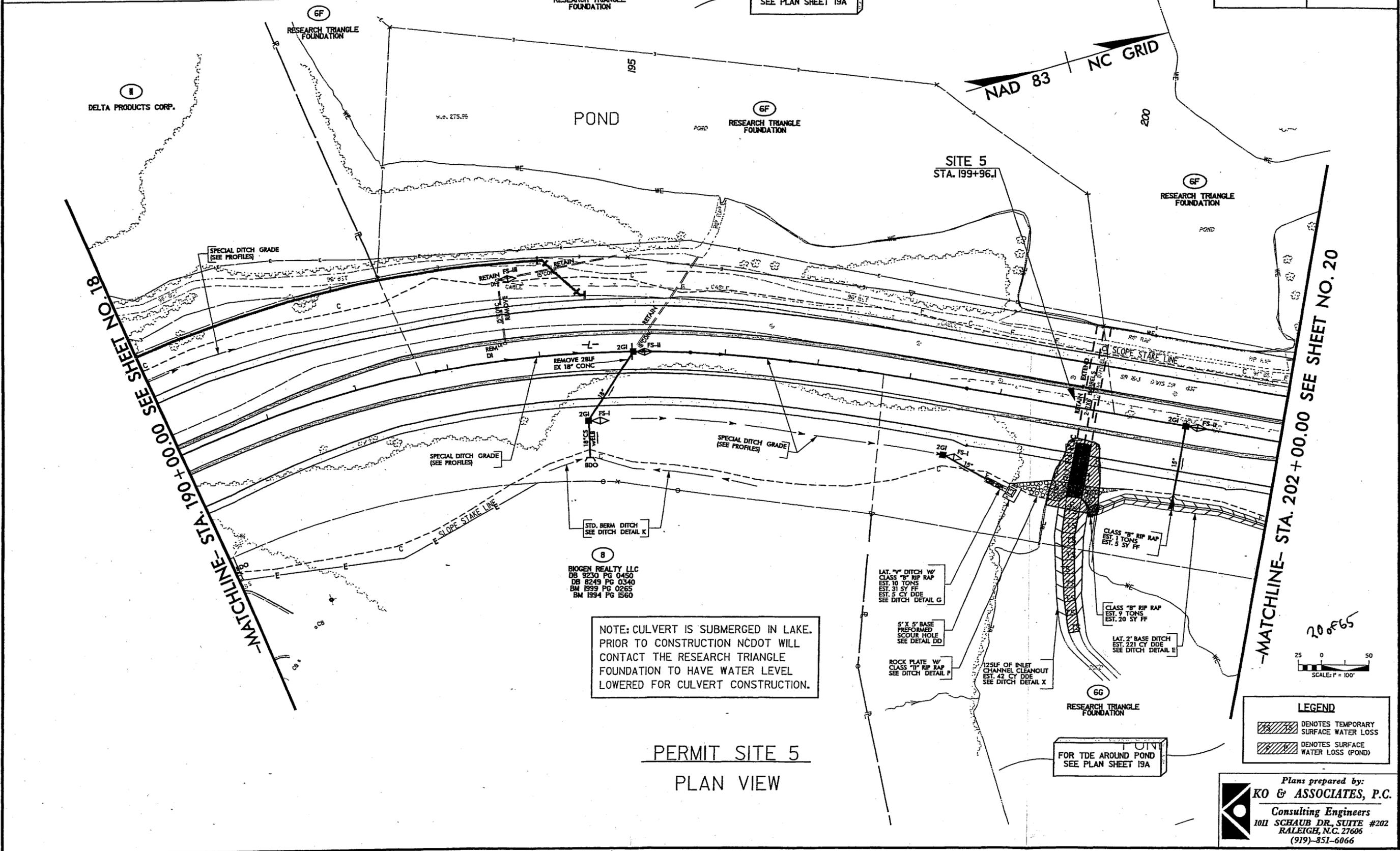
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7/2/99

REVISIONS	
2/4/04	PROPERTY NAME CHANGE PARCEL 8
3/16/04	REVISED PARCEL NO. 6 TO PARCEL NO. 6F & 6G

PROJECT REFERENCE NO.	SHEET NO.
U-4026	19
U-4026B	R/W SHEET NO. 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION



NOTE: CULVERT IS SUBMERGED IN LAKE. PRIOR TO CONSTRUCTION NCDOT WILL CONTACT THE RESEARCH TRIANGLE FOUNDATION TO HAVE WATER LEVEL LOWERED FOR CULVERT CONSTRUCTION.

**PERMIT SITE 5  
PLAN VIEW**

**LEGEND**

	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS (POND)

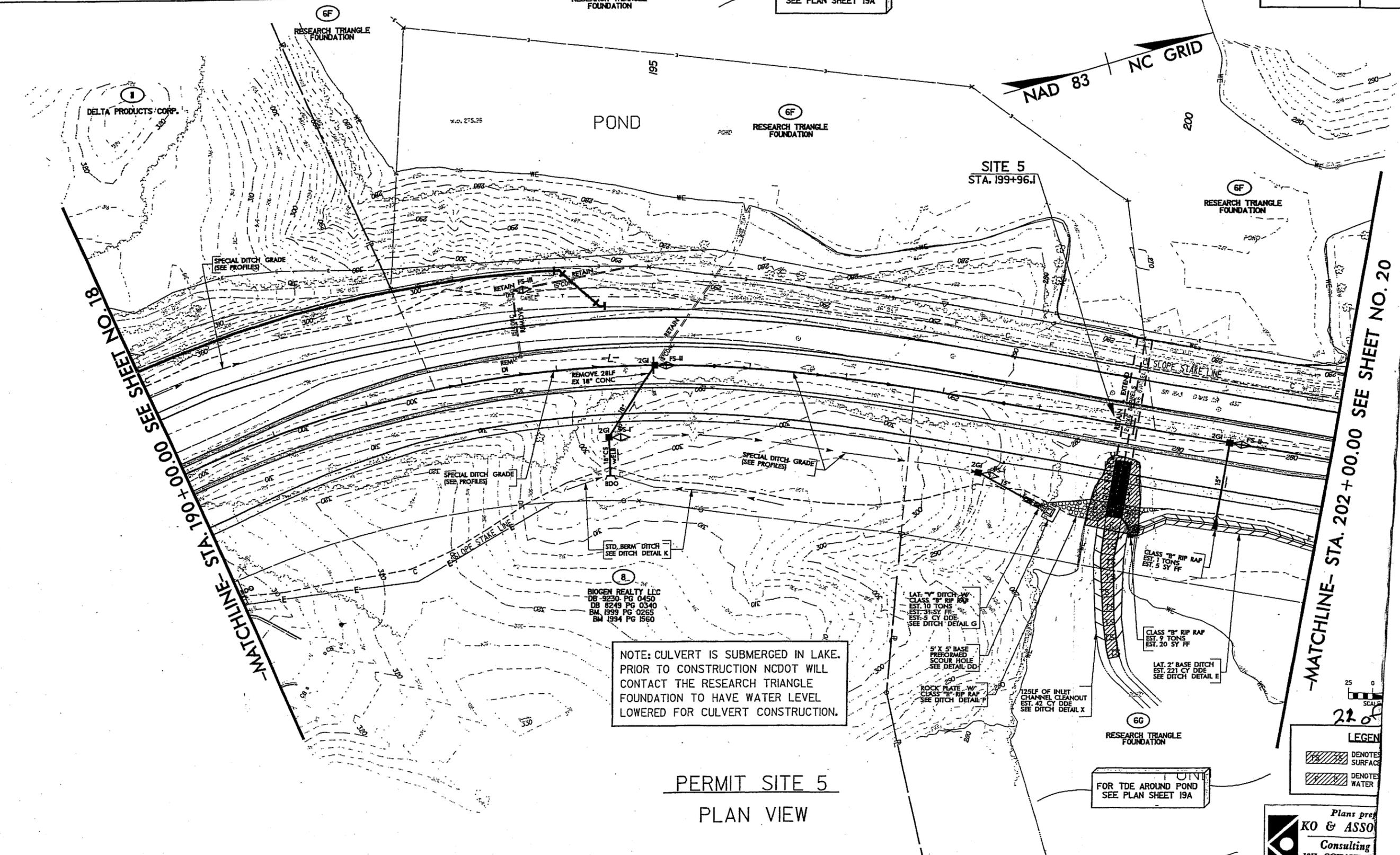
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUH DR. SUITE #202  
RALEIGH, N.C. 27606  
(919) 851-6066

2/23/2005  
C:\N\1\4026.ko\Hydro\Drawings\Permits\4026-permit-19.dgn  
Ko & Associates, P.C.

PROJECT REFERENCE NO.	
U-4026	
U-4026B RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDR ENG
<b>PRELIMINARY PL</b>	
DO NOT USE FOR CONSTRUCTION	

REVISIONS	
2/4/04	PROPERTY NAME CHANGE PARCEL 8
3/16/04	REVISED PARCEL NO. 6 TO PARCEL NO. 6F & 6G

7/2/99



MATCHLINE- STA. 190+00.00 SEE SHEET NO. 18

MATCHLINE- STA. 202+00.00 SEE SHEET NO. 20

NOTE: CULVERT IS SUBMERGED IN LAKE. PRIOR TO CONSTRUCTION NCDOT WILL CONTACT THE RESEARCH TRIANGLE FOUNDATION TO HAVE WATER LEVEL LOWERED FOR CULVERT CONSTRUCTION.

PERMIT SITE 5  
PLAN VIEW

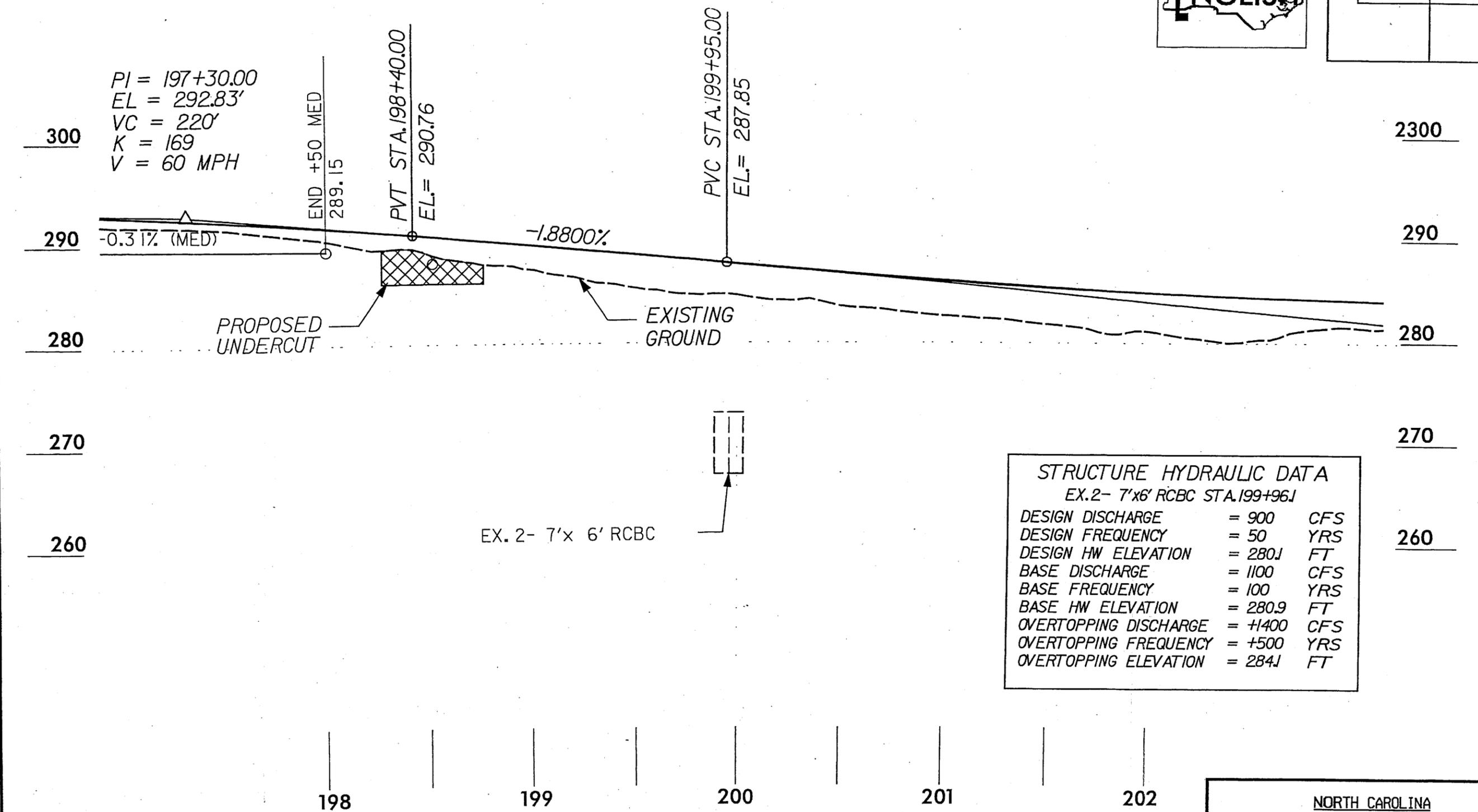
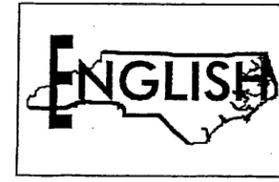
LEGEND

	DENOTES SURFACE
	DENOTES WATER

Plans prepared by  
**KO & ASSO**  
Consulting  
1011 SCHAUB DR  
RALEIGH, NC  
(919)-833-1111

2/23/2005  
P:\Projects\U026.ko\Hydro\Drawings\Permits\U026-permit.t19.dgn  
KO & ASSOCIATES, P.C.

PROJECT REFERENCE NO. U-4026	SHEET NO. 19-PFL
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

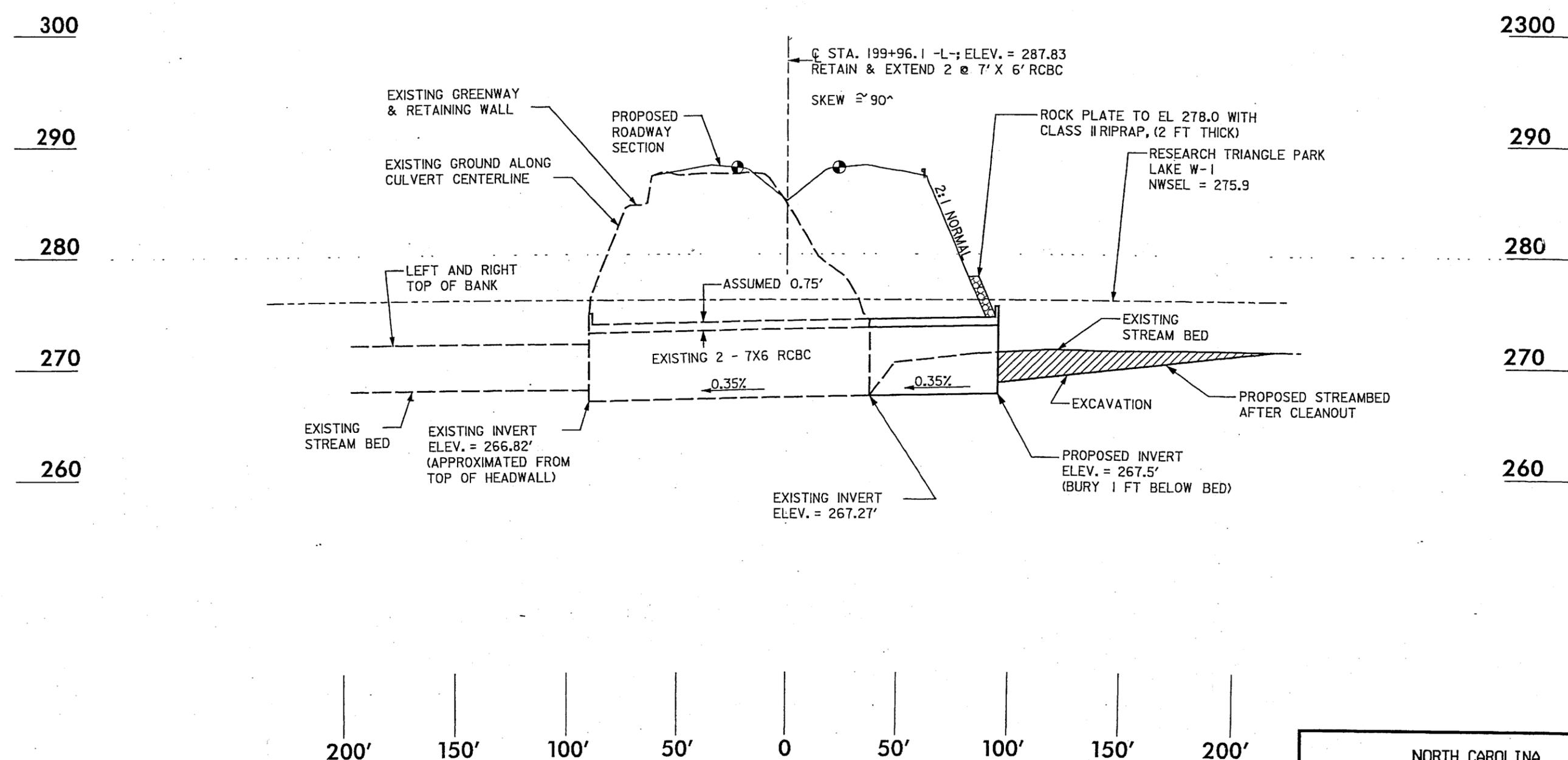


**PROFILE ALONG ROADWAY  
SITE 5**

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**  
  
 WAKE - DURHAM COUNTIES  
 35018.JJ (U-4026)  
  
 DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54  
  
 HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'  
  
 DATE: 02-04-05      SHEET 19 OF 65

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PROJECT REFERENCE NO. U-4026	SHEET NO. 19-PAS
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



**PROFILE ALONG STRUCTURE  
SITE 5**

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.JJ (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

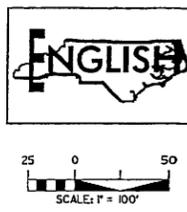
HORIZONTAL SCALE: 1" = 50'  
VERTICAL SCALE: 1" = 10'

DATE: 02-04-05

SHEET 23 OF 65

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PROJECT REFERENCE NO. U-4026	SHEET NO. 20
U-4026B RW SHEET NO. 15	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



**REVISIONS**

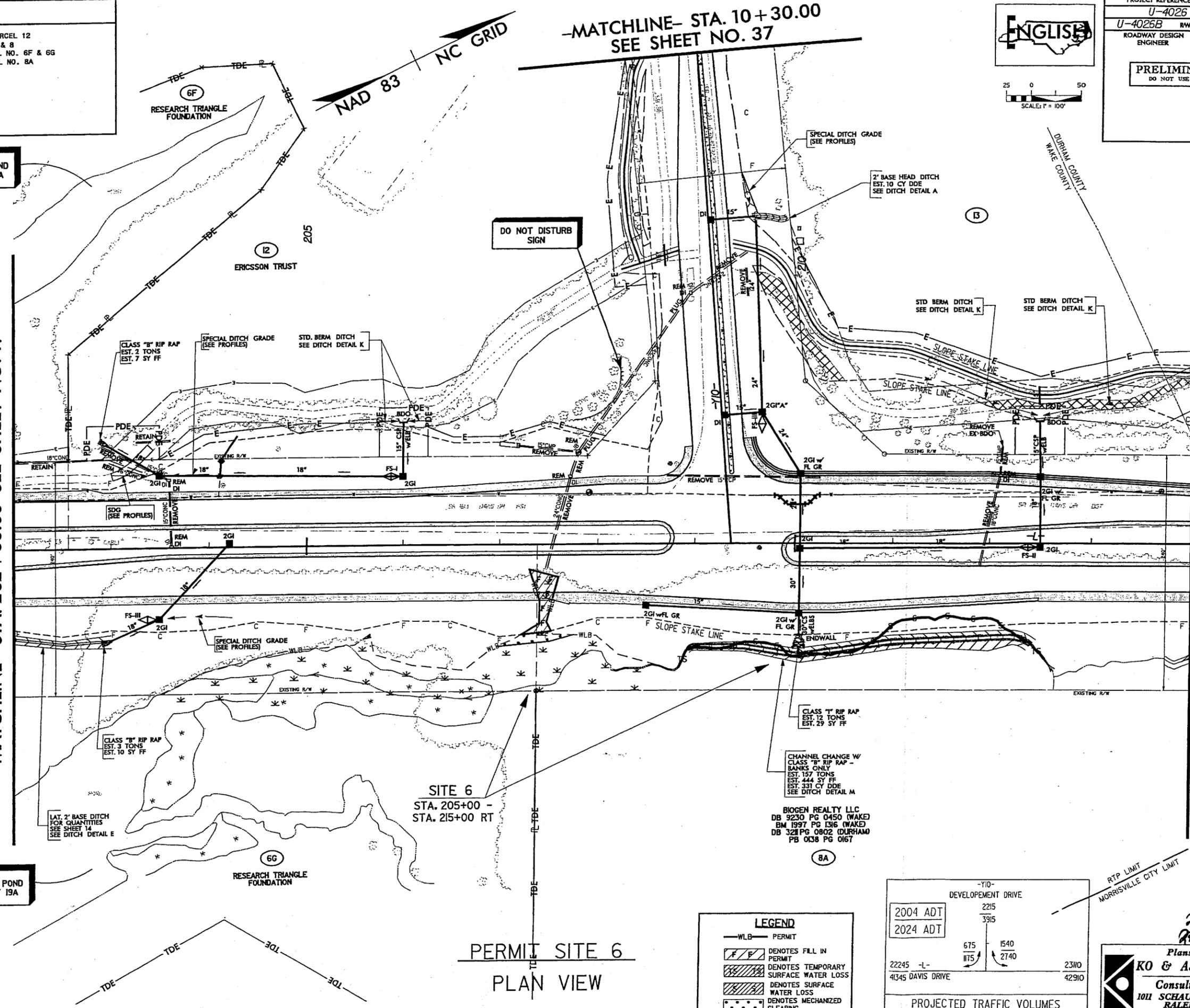
12/29/03 REVISED R/W, CE AND PDE ON PARCEL 12  
 2/4/04 PROPERTY NAME CHANGE PARCELS 6 & 8  
 3/18/04 REVISED PARCEL NO. 6 TO PARCEL NO. 6F & 6G  
 3/29/04 REVISED PARCEL NO. 8 TO PARCEL NO. 8A

FOR TDE AROUND POND  
SEE PLAN SHEET 19A

-MATCHLINE- STA. 202 + 00.00 SEE SHEET NO. 19

-MATCHLINE- STA. 214 + 00.00 SEE SHEET NO. 21

-MATCHLINE- STA. 10 + 30.00  
SEE SHEET NO. 37



FOR TDE AROUND POND  
SEE PLAN SHEET 19A

**PERMIT SITE 6**  
**PLAN VIEW**

**LEGEND**

- WLB- PERMIT
- [Hatched Box] DENOTES FILL IN PERMIT
- [Diagonal Lines Box] DENOTES TEMPORARY SURFACE WATER LOSS
- [Cross-hatched Box] DENOTES SURFACE WATER LOSS
- [Dotted Box] DENOTES MECHANIZED CLEARING

-Y10-  
DEVELOPMENT DRIVE

2004 ADT	2215		
2024 ADT	3915		
	675	1540	
	175	2740	
22245 -L-			2310
41345 DAVIS DRIVE			42910

PROJECTED TRAFFIC VOLUMES

RTP LIMIT  
NORRISVILLE CITY LIMIT

21  
25 of 65

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

7/2/05  
3/22/2005  
p:\p\4026.ko\hydro\Dgn\Permits\4026.permt.20.dgn  
P. S. Associates, P.C.

7/2/99

REVISIONS

12/29/03 REVISED R/W, CE AND PDE ON PARCEL 12  
2/4/04 PROPERTY NAME CHANGE PARCELS 6 & 8  
3/16/04 REVISED PARCEL NO. 6 TO PARCEL NO. 6F & 6G  
3/29/04 REVISED PARCEL NO. 8 TO PARCEL NO. 8A

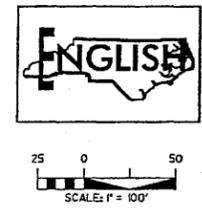
FOR TDE AROUND POND  
SEE PLAN SHEET 19A

-MATCHLINE- STA. 202+00.00 SEE SHEET NO. 19

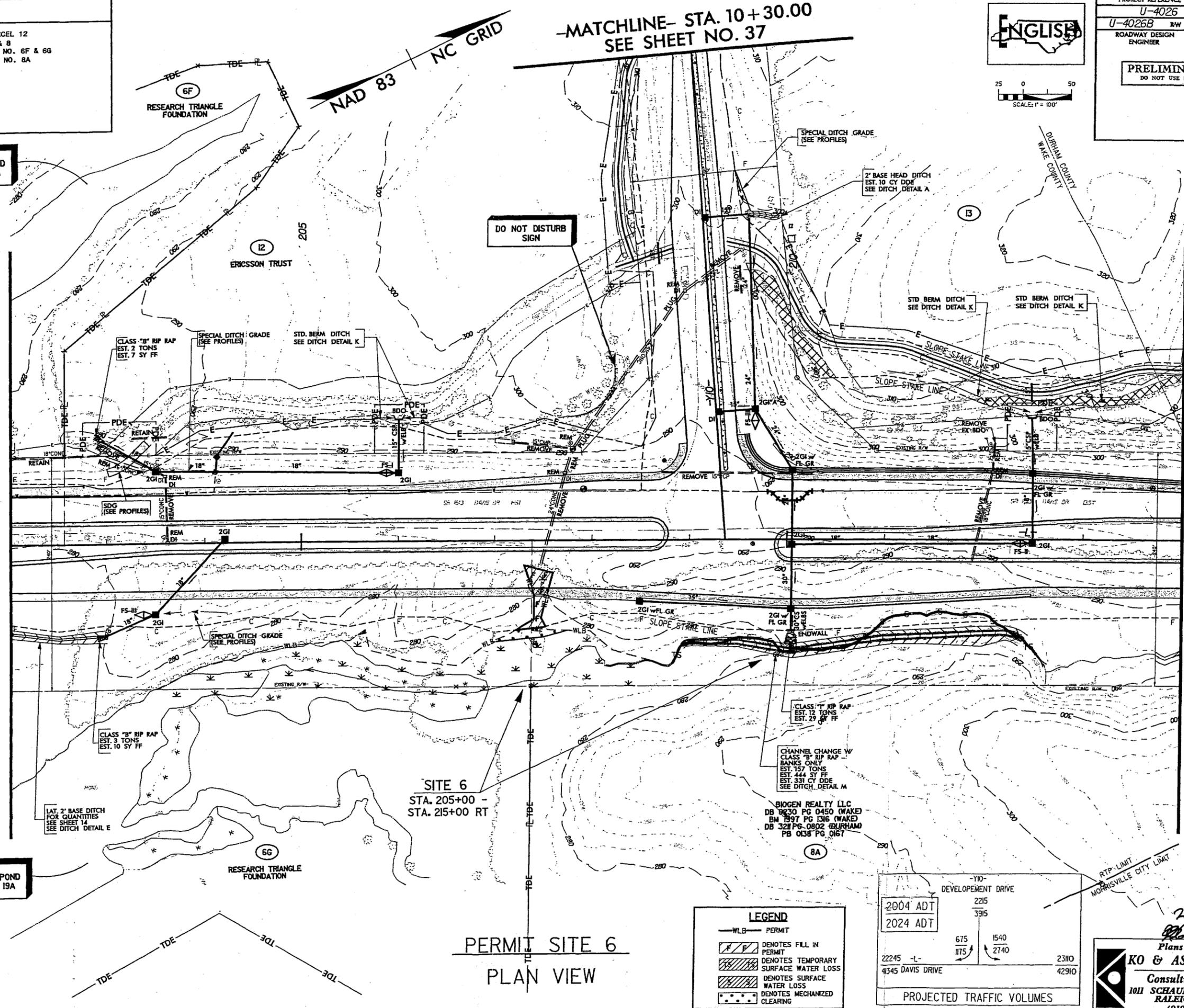
FOR TDE AROUND POND  
SEE PLAN SHEET 19A

PERMIT SITE 6  
PLAN VIEW

-MATCHLINE- STA. 10+30.00  
SEE SHEET NO. 37



PROJECT REFERENCE NO. U-4026	SHEET NO. 20
U-4026B RW SHEET NO. 15	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 214+00.00 SEE SHEET NO. 21

**LEGEND**

— WLB — PERMIT	
[Hatched Box]	DENOTES FILL IN PERMIT
[Diagonal Lines Box]	DENOTES TEMPORARY SURFACE WATER LOSS
[Dotted Box]	DENOTES SURFACE WATER LOSS
[Star Pattern Box]	DENOTES MECHANIZED CLEARING

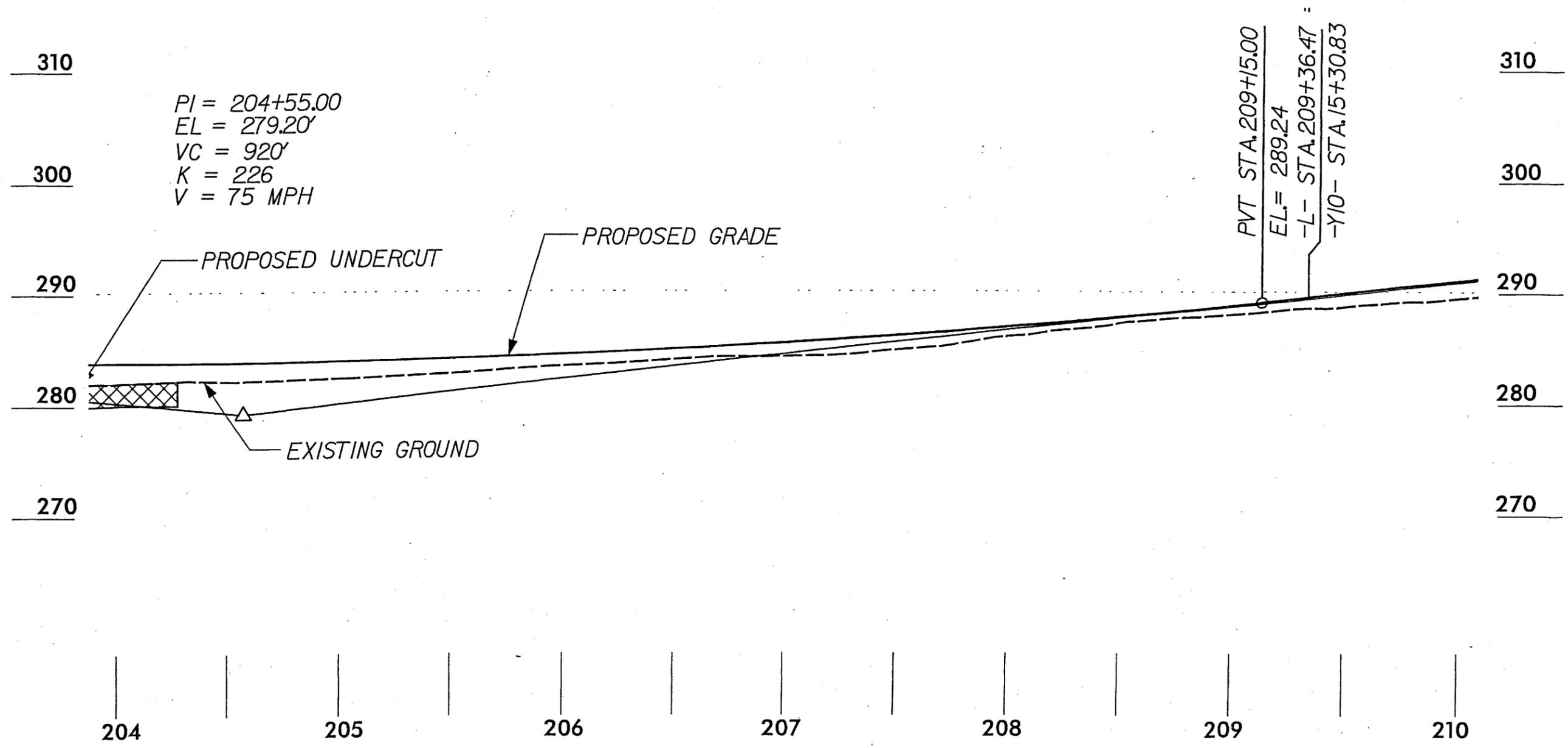
**PROJECTED TRAFFIC VOLUMES**

2004 ADT	2024 ADT
22245 -L-	1175
4345 DAVIS DRIVE	
2310	42910

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR. SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

3/32/2005 P:\V\F\U4026-ko\Hydro\Dgn\Permits\U4026-permit-20.dgn K.O. & Associates, P.C.

PROJECT REFERENCE NO. U-4026	SHEET NO. 20-PFL
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



**PROFILE ALONG ROADWAY  
SITE 6**

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.IJ (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

HORIZONTAL SCALE: 1" = 50'  
VERTICAL SCALE: 1" = 10'

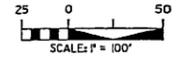
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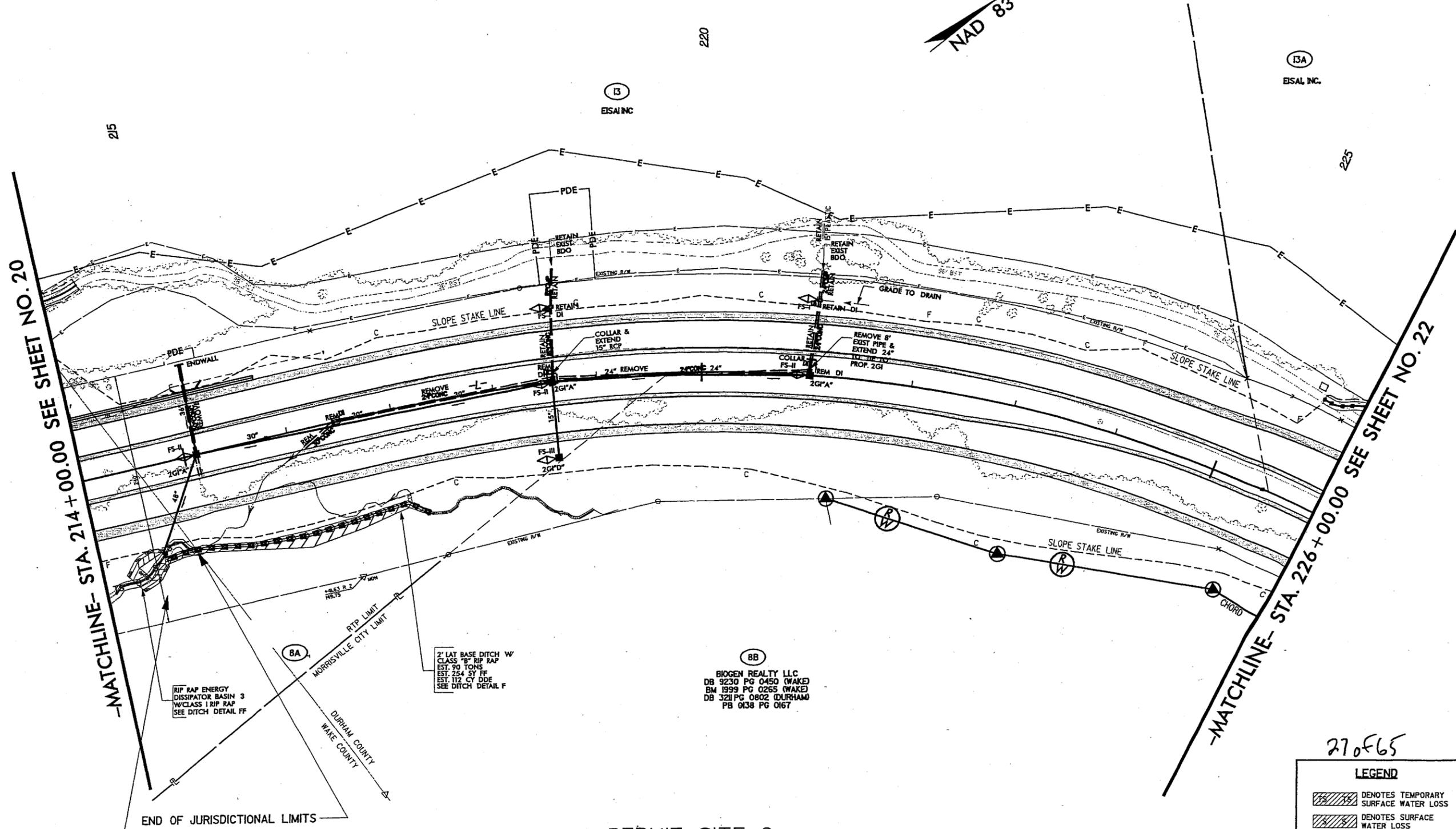
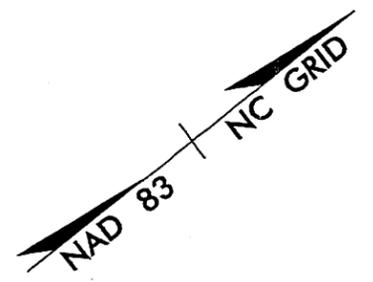
7/2/99

REVISIONS

- 2/4/04 PROPERTY NAME CHANGE PARCELS 6 & 8
- 2/4/04 REVISED R/W PARCELS 6 & 8
- 3/25/04 REVISED PARCEL NO. 14 TO PARCEL NO. 13A & NAME CHANGE
- 3/29/04 REVISED PARCEL NO. 8 TO PARCEL NO. 8A & 8B
- 2/23/05 REVISED TRAIL



PROJECT REFERENCE NO. U-4026	SHEET NO. 21
U-4026B RW SHEET NO. 16	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



PERMIT SITE 6  
PLAN VIEW

270°65

LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

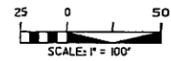
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

3/27/2005  
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K.O. & Associates, P.C.

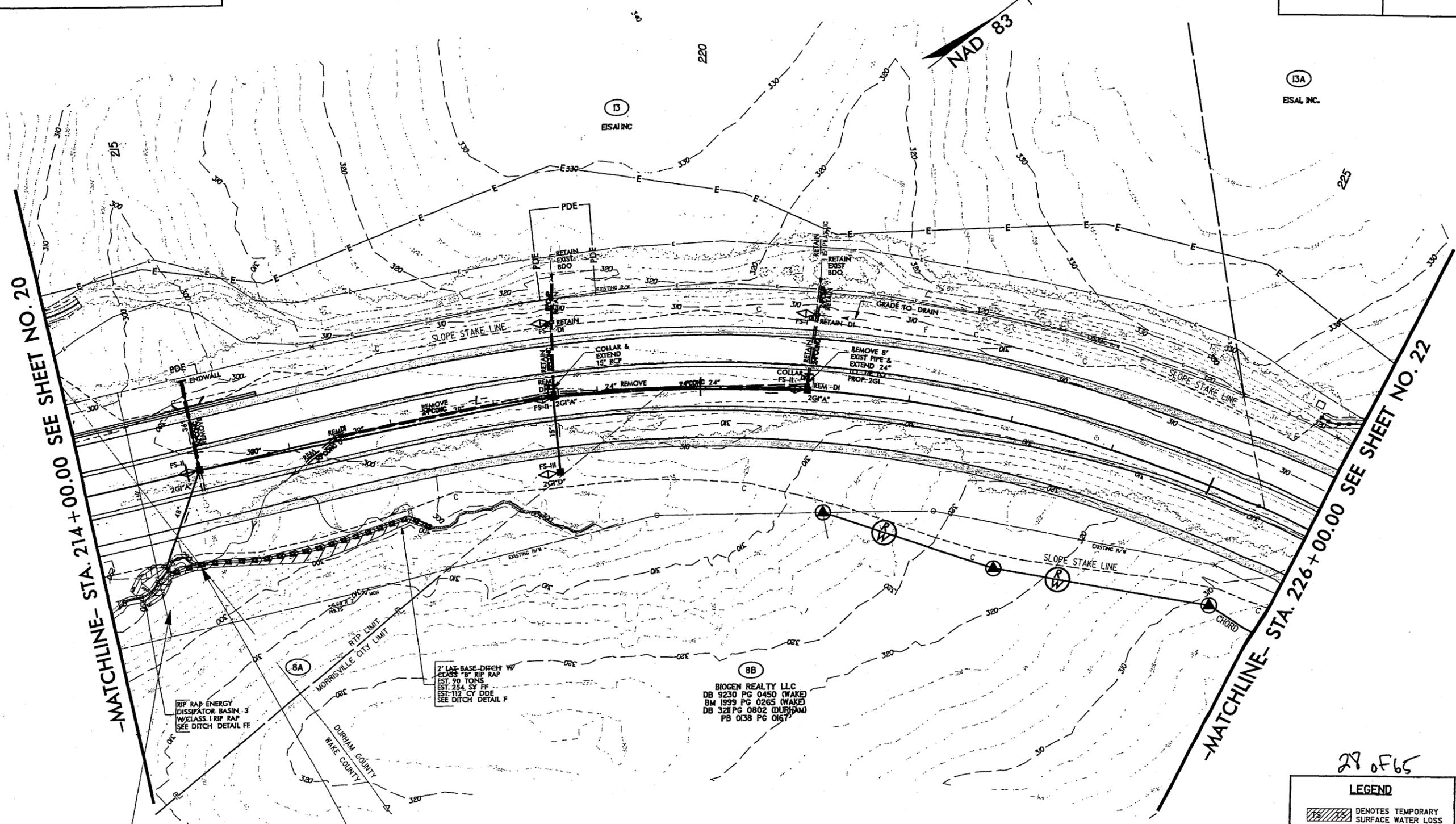
7/2/99

REVISIONS
2/4/04 PROPERTY NAME CHANGE PARCELS 6 & 8
2/4/04 REVISED R/W PARCELS 6 & 8
3/25/04 REVISED PARCEL NO. 14 TO PARCEL NO. 13A & NAME CHANGE
3/29/04 REVISED PARCEL NO. 8 TO PARCEL NO. 8A & 8B
2/23/05 REVISED TRAIL

**ENGLISH**



PROJECT REFERENCE NO. U-4026	SHEET NO. 21
U-4026B R/W SHEET NO. ROADWAY DESIGN ENGINEER	16 HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 214+00.00 SEE SHEET NO. 20

-MATCHLINE- STA. 226+00.00 SEE SHEET NO. 22

SITE 6  
CON'T

### PERMIT SITE 6 PLAN VIEW

28 OF 65

LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

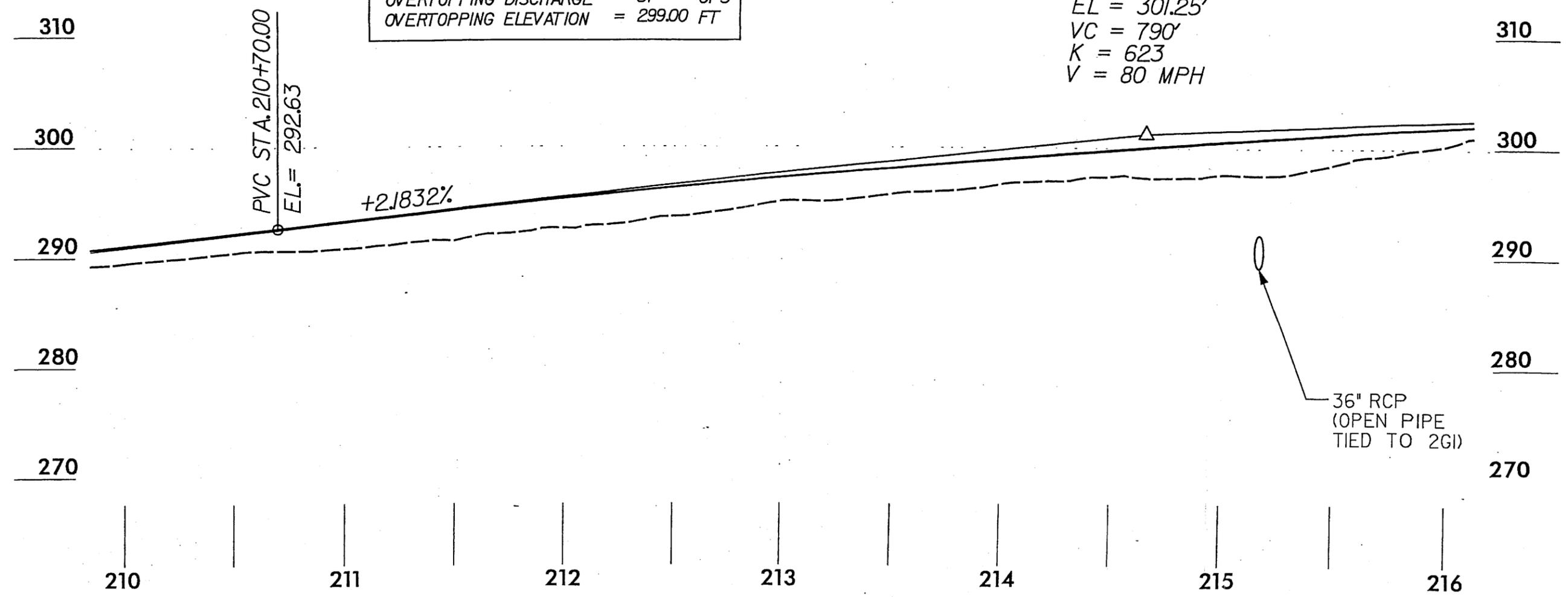
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PROJECT REFERENCE NO. U-4026	SHEET NO. 21-PFL
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



PIPE HYDRAULIC DATA		
36" RCP STA. 215+17 -L-		
DRAINAGE AREA	= 17.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 49	CFS
DESIGN HW ELEVATION	= 298.50	FT
100 YEAR DISCHARGE	= 60	CFS
100 YEAR HW ELEVATION	= 299.45	FT
OVERTOPPING FREQUENCY	= 100-	YRS
OVERTOPPING DISCHARGE	= 57	CFS
OVERTOPPING ELEVATION	= 299.00	FT

PI = 214+65.00  
 EL = 301.25'  
 VC = 790'  
 K = 623  
 V = 80 MPH



**PROFILE ALONG ROADWAY**  
**SITE 6**

**NORTH CAROLINA**  
**DEPARTMENT OF HIGHWAYS**  
 WAKE - DURHAM COUNTIES  
 35018.J1 (U-4026)  
 DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54  
 HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'  
 DATE: 02-04-05

SHEET **29** OF **65**

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7/2/99

REVISIONS

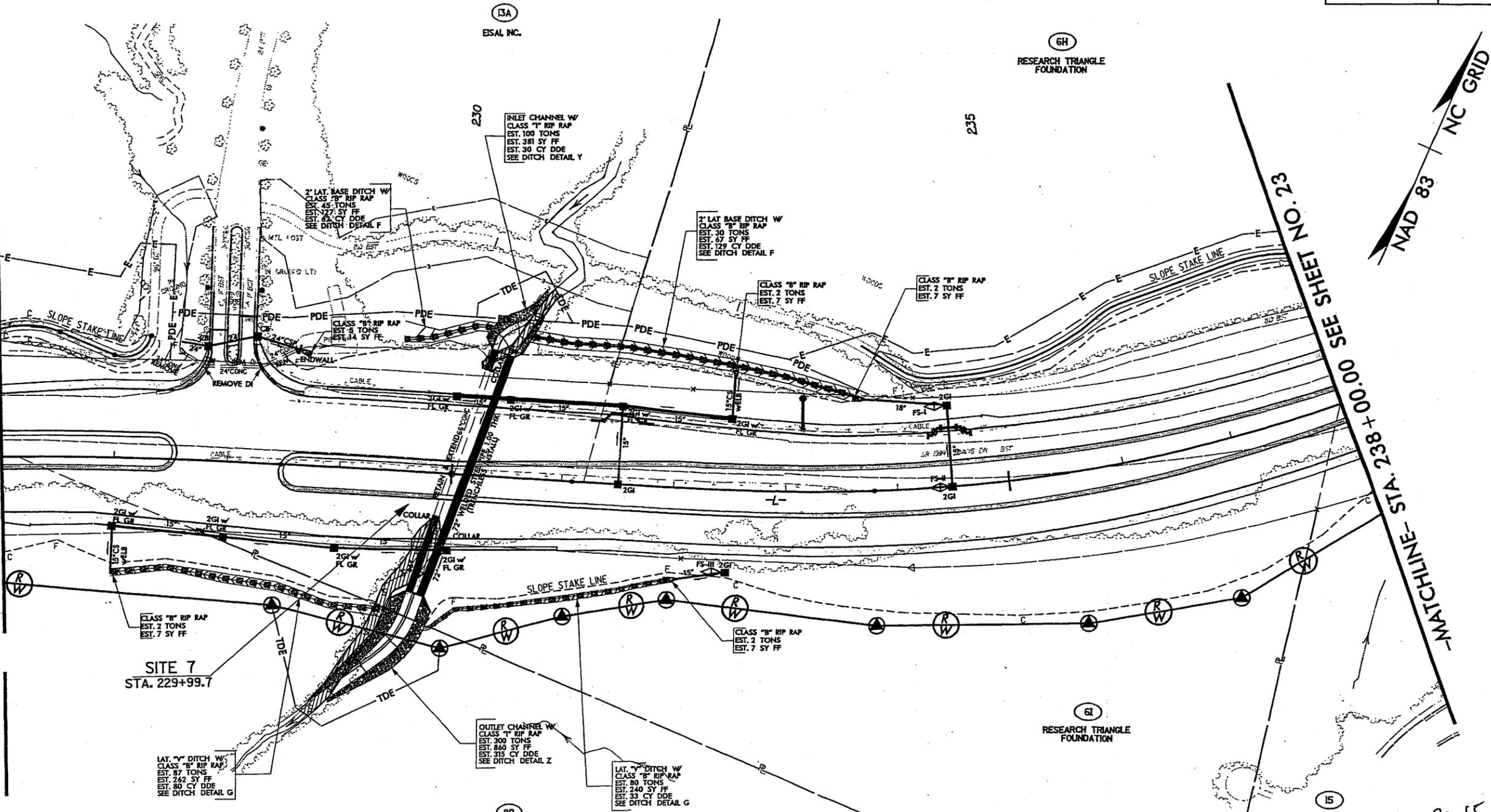
- 2/4/04 PROPERTY NAME CHANGE PARCELS 6 & 8
- 2/4/04 REVISED R/W & TDE PARCELS 6 & 8
- 3/8/04 REVISED R/W & CE TO PDE PARCEL 14
- 3/16/04 REVISED PARCEL NO 6 TO PARCEL NO. 6H & 6I
- 3/25/04 REVISED PARCEL NO 14 TO PARCEL NO. 15A & NAME CHANGE
- 3/29/04 REVISED PARCEL NO 8 TO PARCEL NO. 8B
- 7/2/04 NAME CHANGE PARCEL NO. 15
- 2/23/05 REVISED TRAIL

**ENGLISH**

PROJECT REFERENCE NO. U-4026	SHEET NO. 22
U-4026B RW SHEET NO. 17	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

-MATCHLINE- STA. 226+00.00 SEE SHEET NO. 21

SEE SHEET NO. 23 ON MATCHLINE - STA. 237+83.27



8B  
BIOGEN REALTY LLC  
DB 9230 PG 0450 (WAKED)  
BM 1999 PG 0265 (WAKED)  
DB 328 PG 0802 (DURHAM)  
PB 038 PG 0167

PERMIT SITE 7  
PLAN VIEW

**LEGEND**

	DENOTES SURFACE WATER LOSS
--	----------------------------

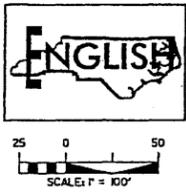
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

2/23/2005  
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 K & Associates, P.C.

7/2/99

REVISIONS

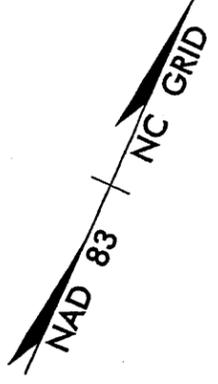
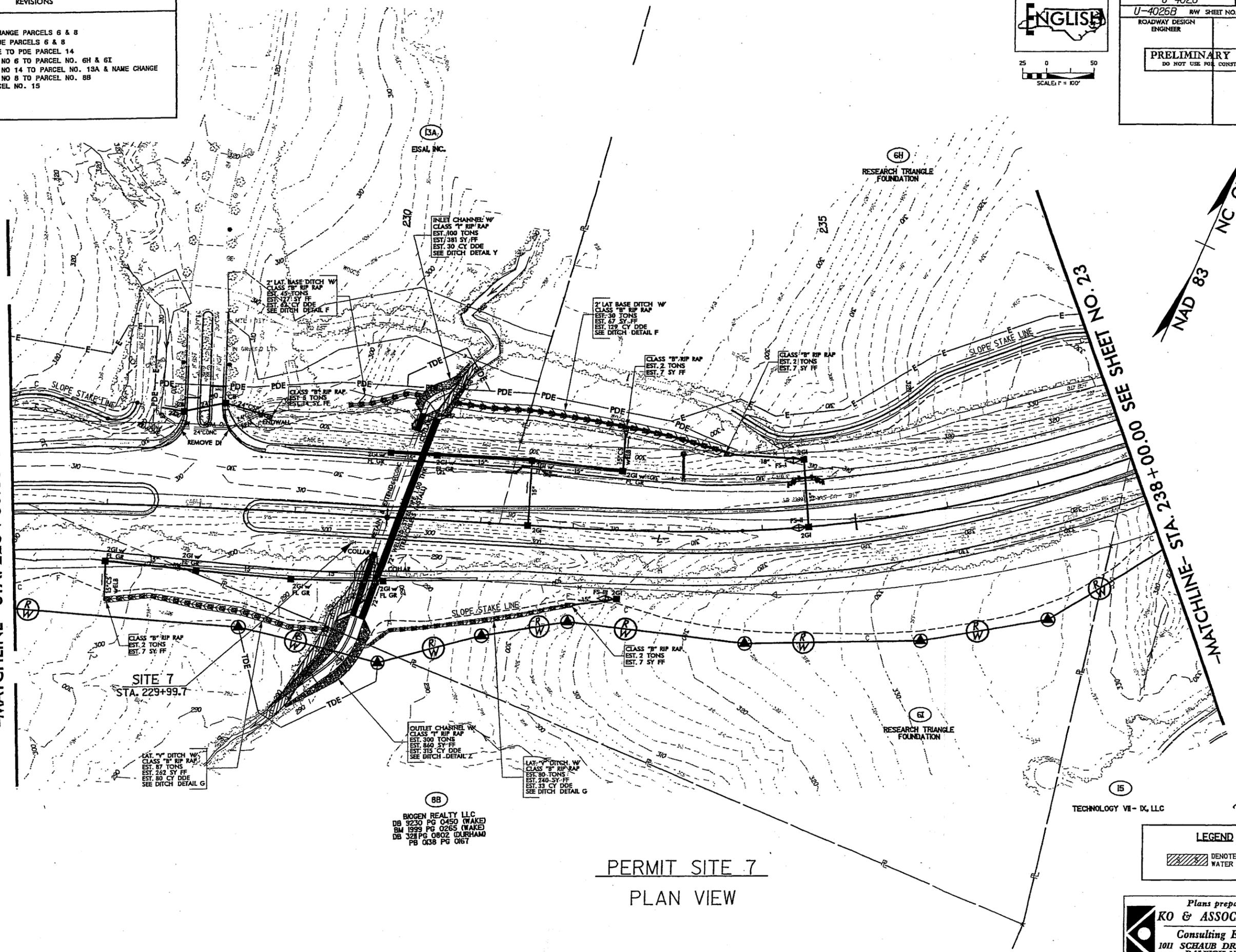
- 2/4/04 PROPERTY NAME CHANGE PARCELS 6 & 8
- 2/4/04 REVISED R/W & TDE PARCELS 6 & 8
- 3/8/04 REVISED R/W & CE TO PDE PARCEL 14
- 3/16/04 REVISED PARCEL NO 6 TO PARCEL NO. 6H & 6I
- 3/25/04 REVISED PARCEL NO 14 TO PARCEL NO. 13A & NAME CHANGE
- 3/29/04 REVISED PARCEL NO 8 TO PARCEL NO. 8B
- 7/2/04 NAME CHANGE PARCEL NO. 15
- 2/23/05 REVISED TRAIL



PROJECT REFERENCE NO. U-4026	SHEET NO. 22
U-4026B RW SHEET NO. 17	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

-MATCHLINE- STA. 226 + 00.00 SEE SHEET NO. 21

-MATCHLINE- STA. 238 + 00.00 SEE SHEET NO. 23



TECHNOLOGY VII - D, LLC

31.65

LEGEND	
	DENOTES SURFACE WATER LOSS

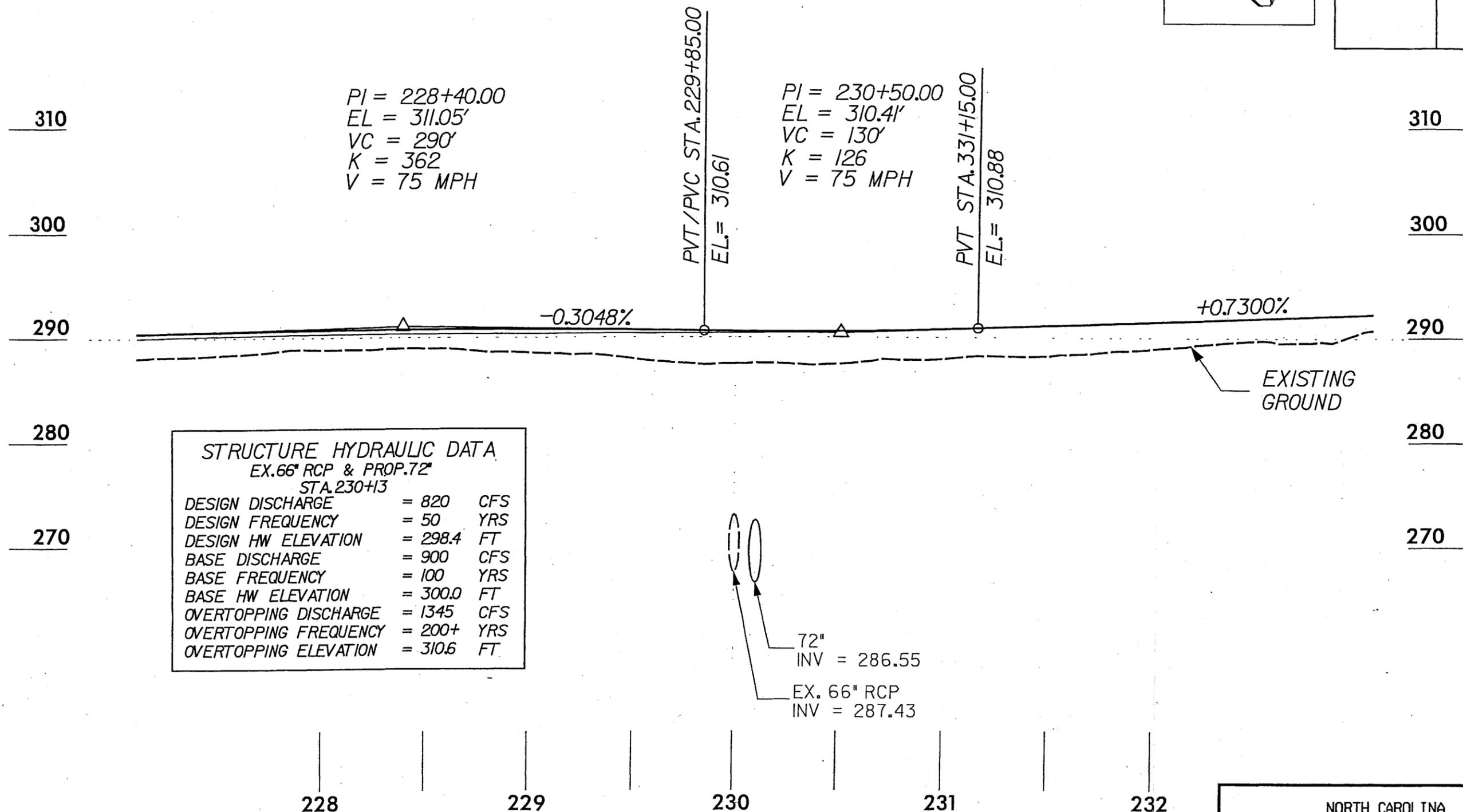
88  
 BIOGEN REALTY LLC  
 DB 5230 PG 0450 (WAKE)  
 BM 1999 PG 0255 (WAKE)  
 DB 324 PG 0802 (DURHAM)  
 PB 038 PG 0167

PERMIT SITE 7  
 PLAN VIEW

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 1011 SCHAUB DR., SUITE #202  
 RALEIGH, N.C. 27606  
 (919)-851-6066

2/23/2005 10:40:26 ko\j\dro\Ugn\Permits\4026\_permit\_22.dgn

PROJECT REFERENCE NO. U-4026	SHEET NO. 22-PFL
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



PROFILE ALONG ROADWAY  
SITE 7

**NORTH CAROLINA**  
**DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
 35018.JJ (U-4026)

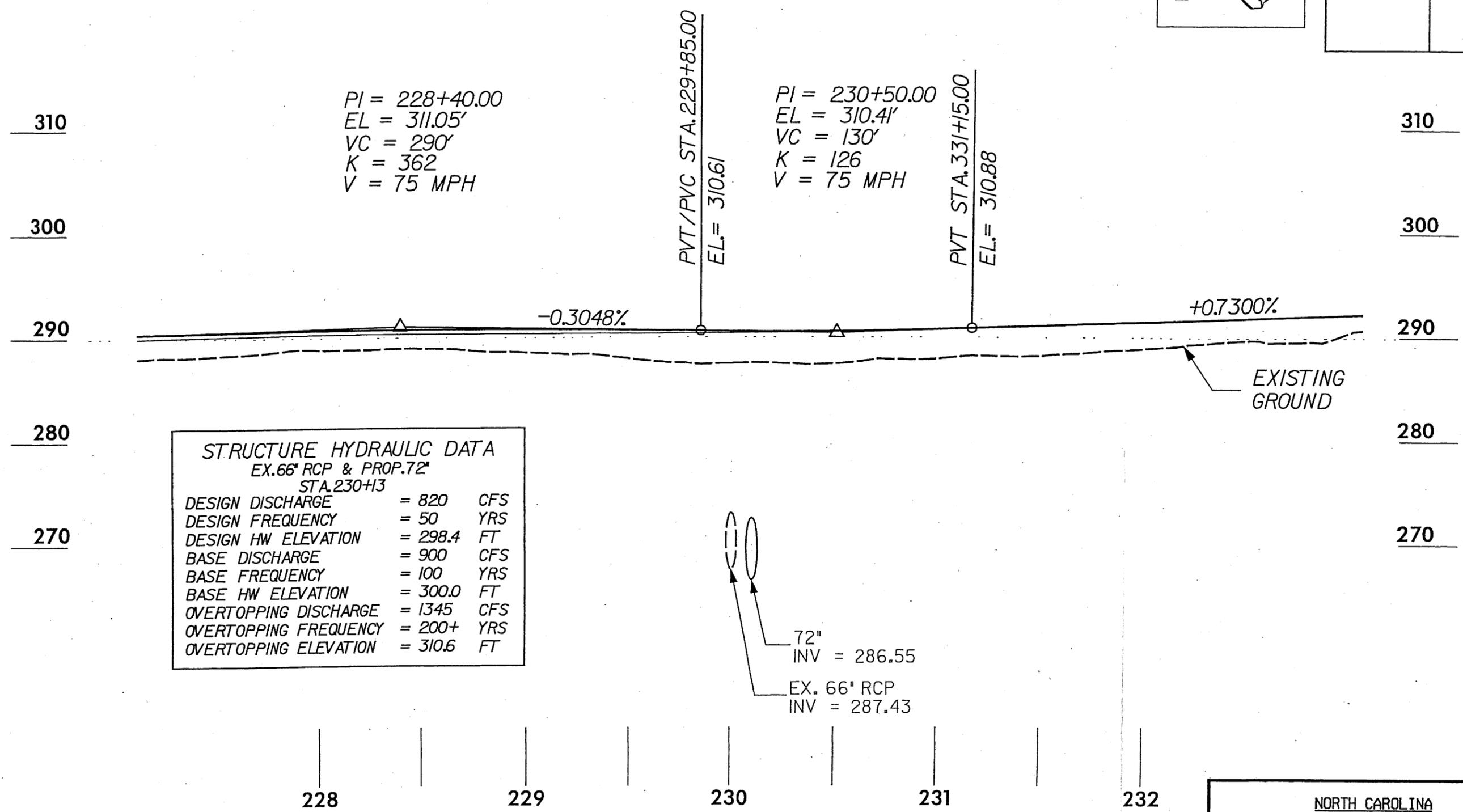
DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'

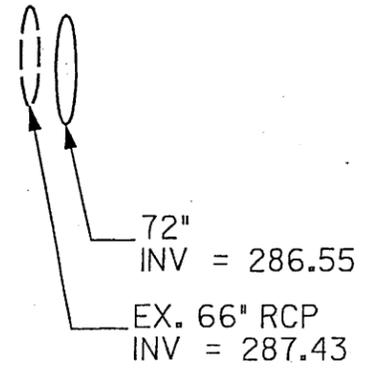
DATE: 07-06-04

SHEET **32** OF **65**

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 2/2/2005 4:31:31 PM



STRUCTURE HYDRAULIC DATA		
EX. 66" RCP & PROP. 72"		
STA. 230+13		
DESIGN DISCHARGE	= 820	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 298.4	FT
BASE DISCHARGE	= 900	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 300.0	FT
OVERTOPPING DISCHARGE	= 1345	CFS
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING ELEVATION	= 310.6	FT



PROFILE ALONG ROADWAY  
SITE 7

**NORTH CAROLINA**  
**DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
 35018.II (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'

DATE: 02-04-05

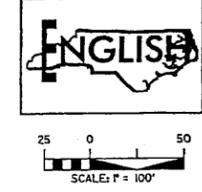
SHEET 33  
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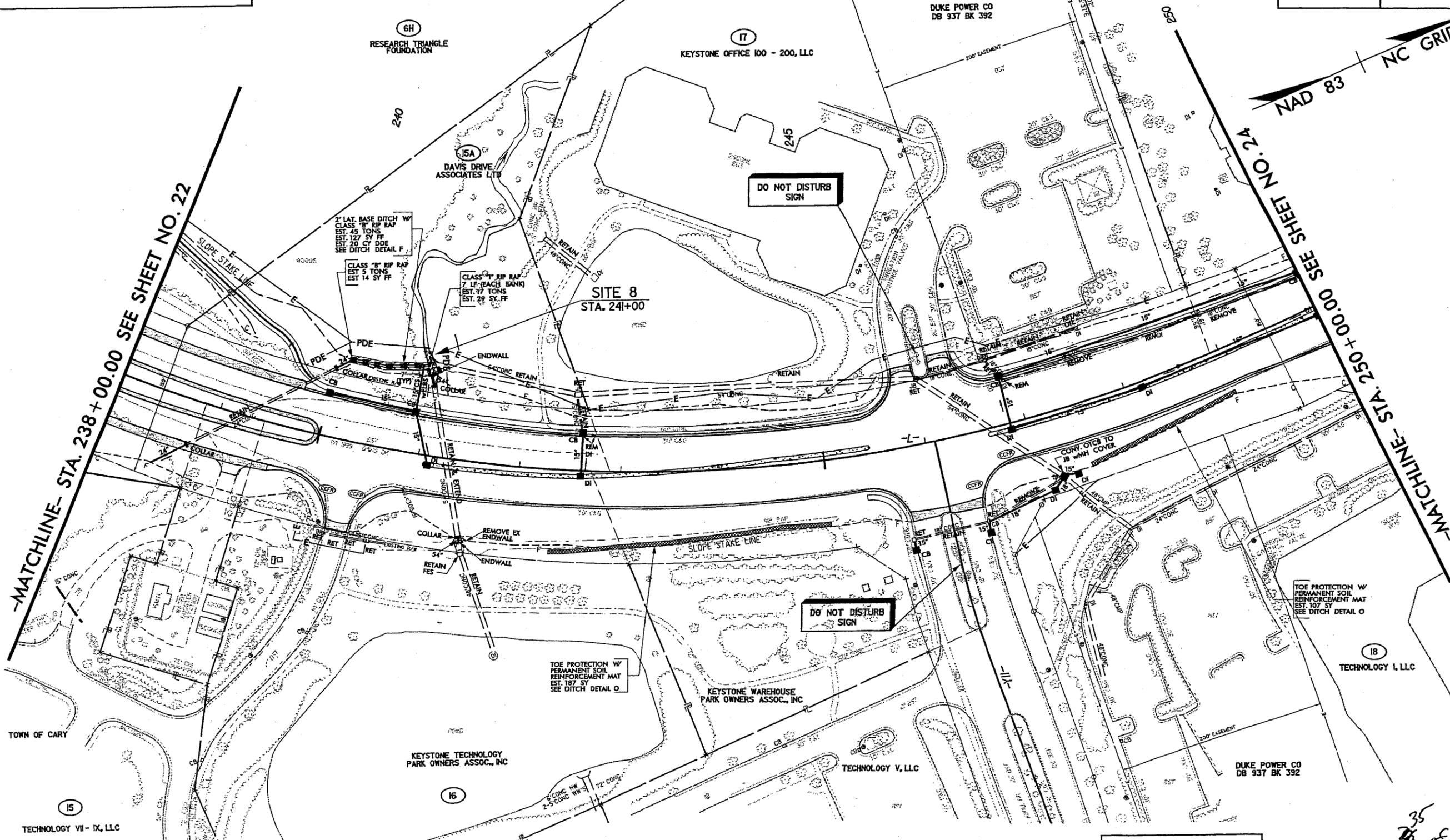


7/2/99

REVISIONS	
3/16/04	REVISED PARCEL NO. 6 TO PARCEL NO. 6H
3/25/04	REVISED PARCEL NO. 15 TO PARCEL NO. 15A & REVISED PARCEL NO. 15 TO PARCEL NO. 17A & NAME CHANGE
7/2/04	NAME CHANGE PARCELS 15, 17 & 17A



PROJECT REFERENCE NO. U-4026	SHEET NO. 23
U-4026B RW SHEET NO. 18	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



**PERMIT SITE 8  
PLAN VIEW**

LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

35  
of 65

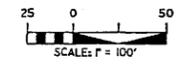
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUH DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

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7/2/99

REVISIONS

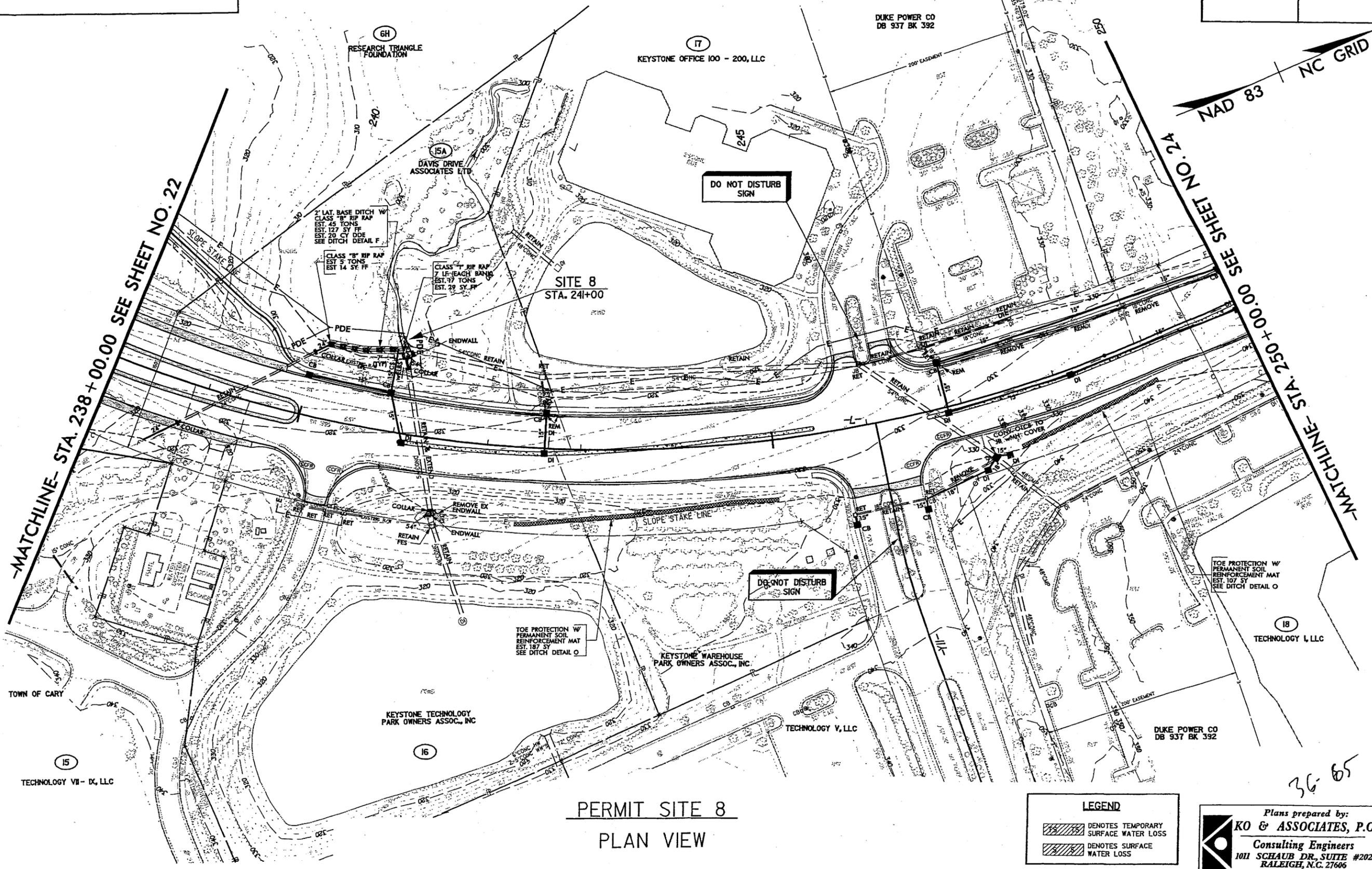
3/16/04 REVISED PARCEL NO. 8 TO PARCEL NO. 6H  
3/25/04 REVISED PARCEL NO. 15 TO PARCEL NO. 15A &  
REVISED PARCEL NO. 15 TO PARCEL NO. 17A & NAME CHANGE  
7/2/04 NAME CHANGE PARCELS 15, 17 & 17A



PROJECT REFERENCE NO. U-4026	SHEET NO. 23
U-4026B RW SHEET NO. 18	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

MATCHLINE- STA. 238+00.00 SEE SHEET NO. 22

MATCHLINE- STA. 250+00.00 SEE SHEET NO. 24



PERMIT SITE 8  
PLAN VIEW

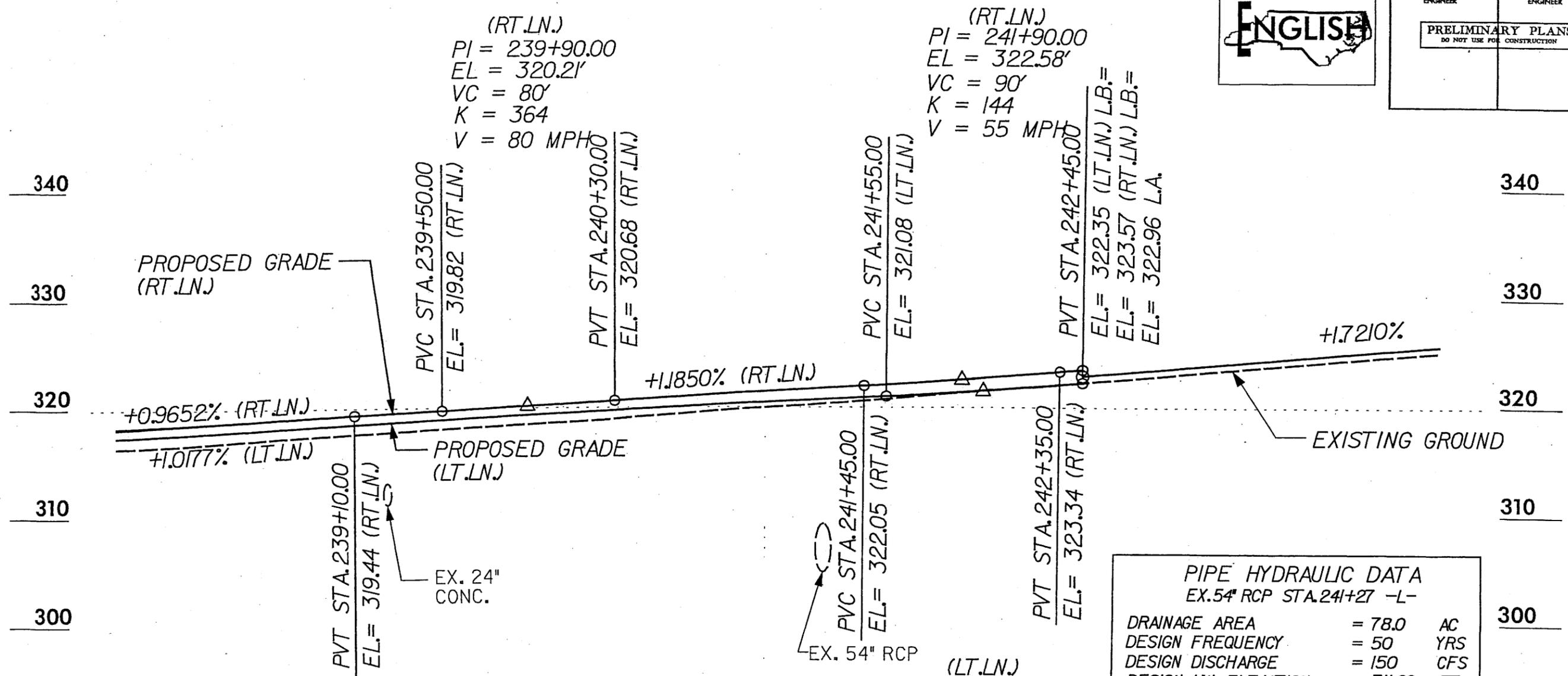
**LEGEND**

	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

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36 65



DRAINAGE AREA	= 2.8	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 10	CFS
DESIGN HW ELEVATION	= 316.91	FT
100 YEAR DISCHARGE	= 12	CFS
100 YEAR HW ELEVATION	= 317.14	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 21	CFS
OVERTOPPING ELEVATION	= 317.90	FT

DRAINAGE AREA	= 78.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 150	CFS
DESIGN HW ELEVATION	= 311.60	FT
100 YEAR DISCHARGE	= 190	CFS
100 YEAR HW ELEVATION	= 313.17	FT
OVERTOPPING FREQUENCY	= 500-	YRS
OVERTOPPING DISCHARGE	= 311	CFS
OVERTOPPING ELEVATION	= 320.00	FT

**PROFILE ALONG ROADWAY  
SITE 8**

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.JI (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

HORIZONTAL SCALE: 1" = 50'  
VERTICAL SCALE: 1" = 10'

DATE: 02-04-05  
SHEET 31 OF 65

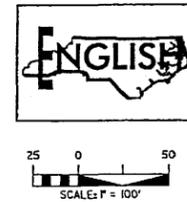
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7/2/99

REVISIONS

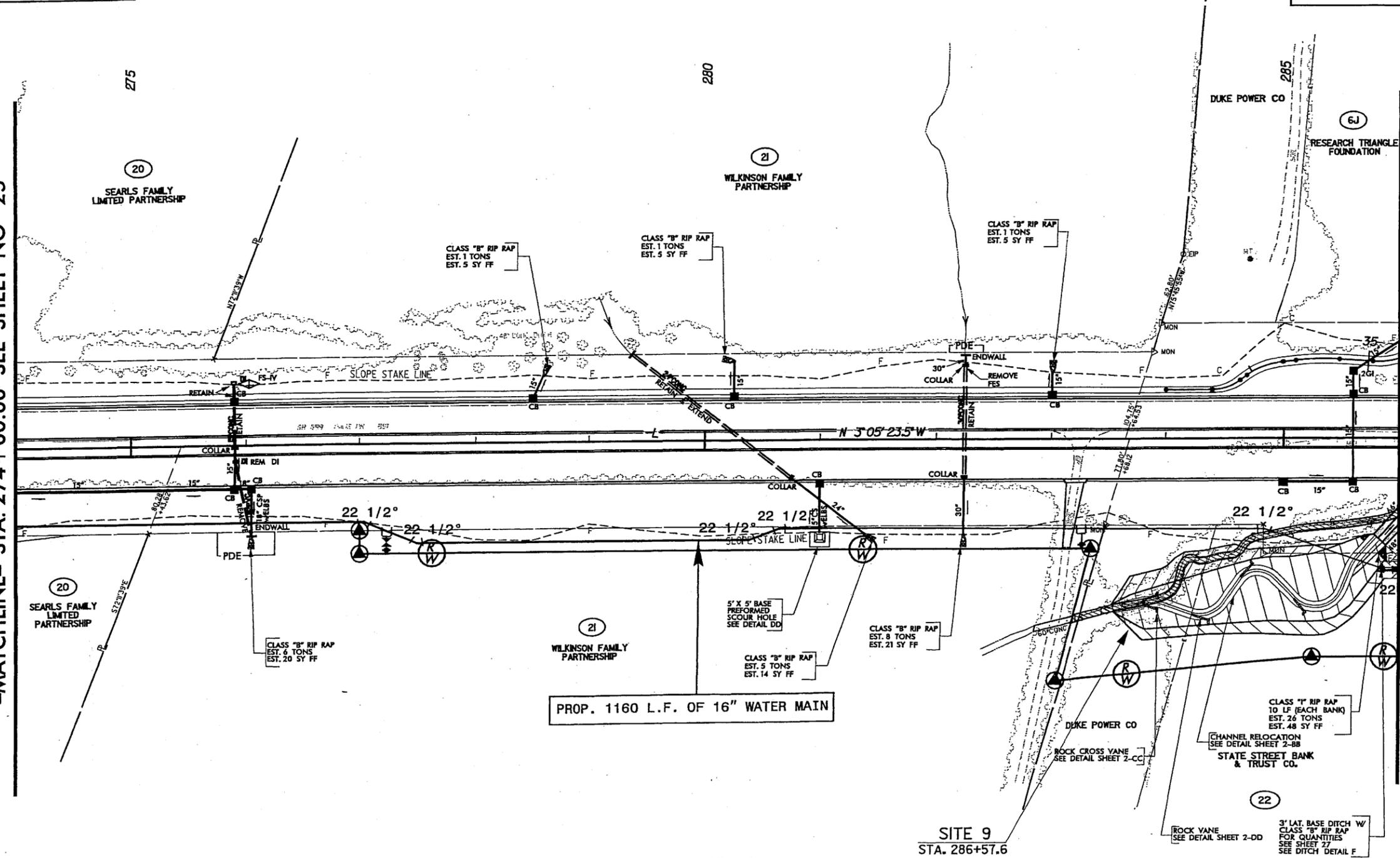
3/16/04 REVISED PARCEL NO. 6 TO PARCEL NO. 6J  
4/19/04 NAME CHANGE PARCEL NO. 22

PROJECT REFERENCE NO. U-4026	SHEET NO. 26
U-4026B RW SHEET NO. 21	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 274 + 00.00 SEE SHEET NO 25

-MATCHLINE- STA. 286 + 00.00 SEE SHEET NO. 27



PERMIT SITE 9  
PLAN VIEW

38065

LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

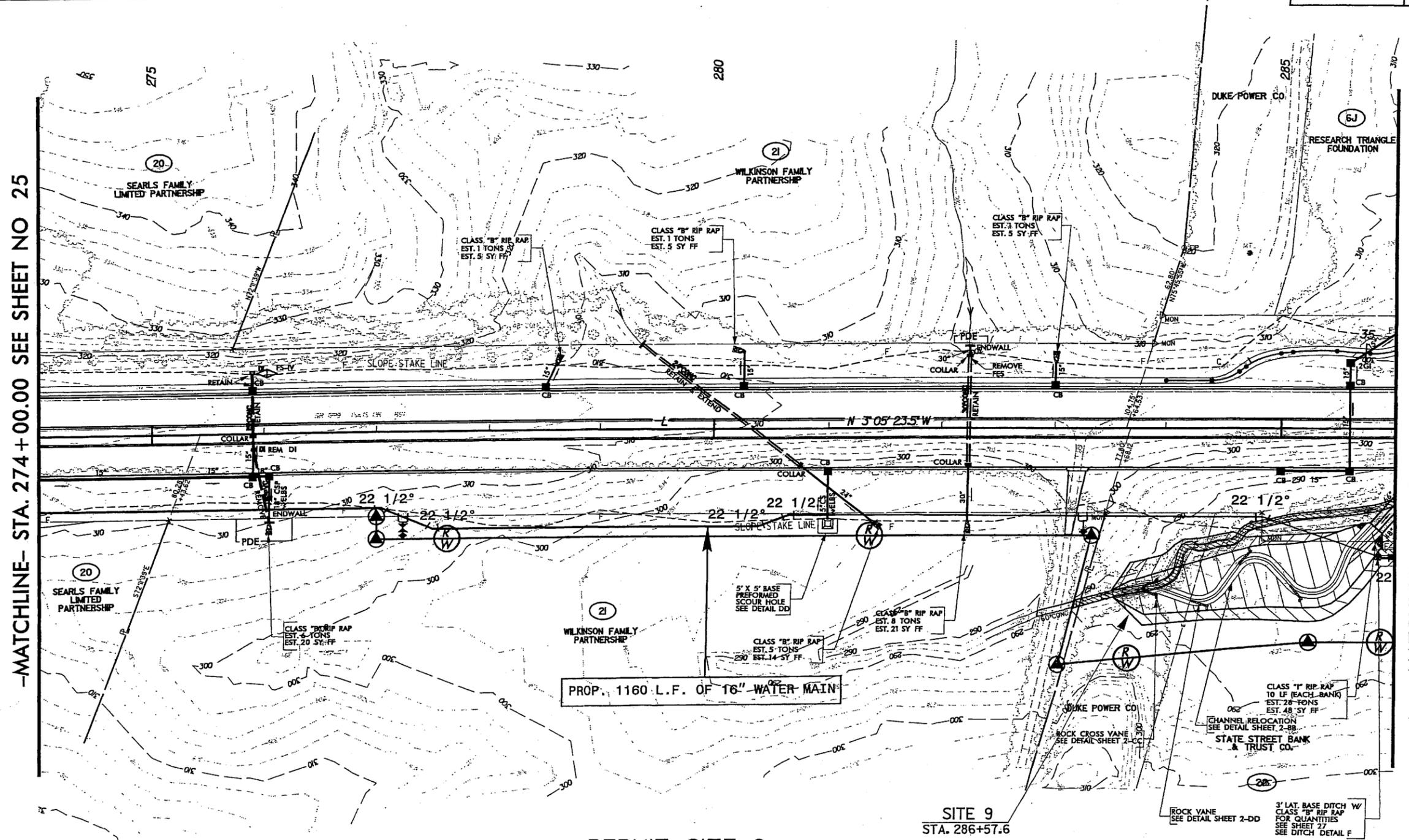
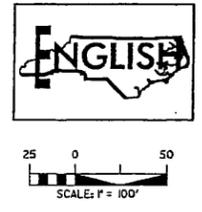
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 1011 SCHAUH DR., SUITE #202  
 RALEIGH, N.C. 27606  
 (919)-851-6066

3:22/2005  
P:\114026-ko\114026.dgn\Permits\114026-permit\_26.dgn  
KO & ASSOCIATES, P.C.

7/2/99

REVISIONS	
3/16/04	REVISED PARCEL NO. 6 TO PARCEL NO. 6J
4/19/04	NME CHANGE PARCEL NO. 22

PROJECT REFERENCE NO. U-4026	SHEET NO. 26
U-4026B RW SHEET NO.	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 274 + 00.00 SEE SHEET NO 25

-MATCHLINE- STA. 286 + 00.00 SEE SHEET NO. 27

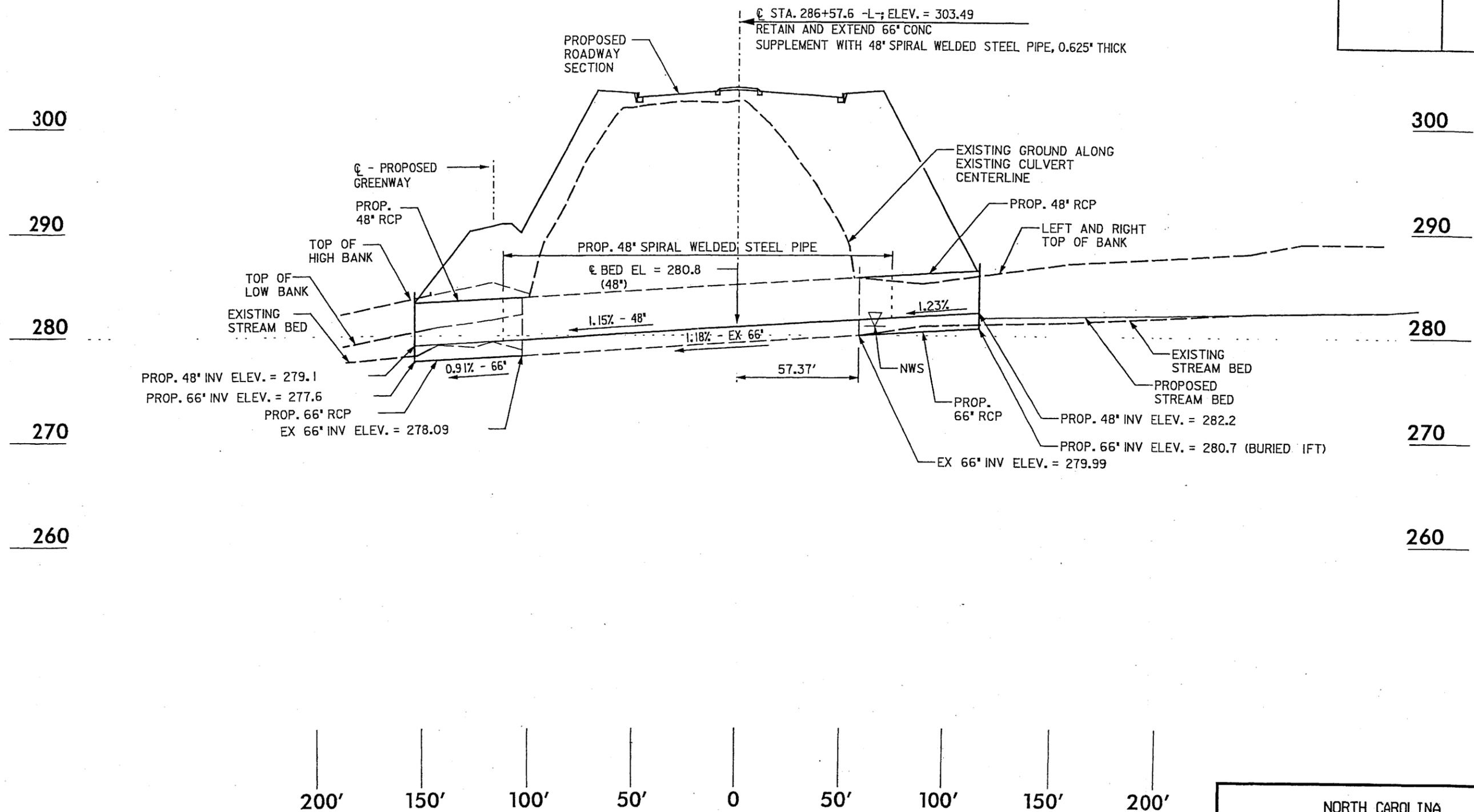
PERMIT SITE 9  
PLAN VIEW

LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

39  
20665  
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919) 851-6066

3:\2\2005\26.ko\hydr\026.permit.26.dgn  
Ko & Associates, P.C.

PROJECT REFERENCE NO. U-4026	SHEET NO. 26&27-PAS19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

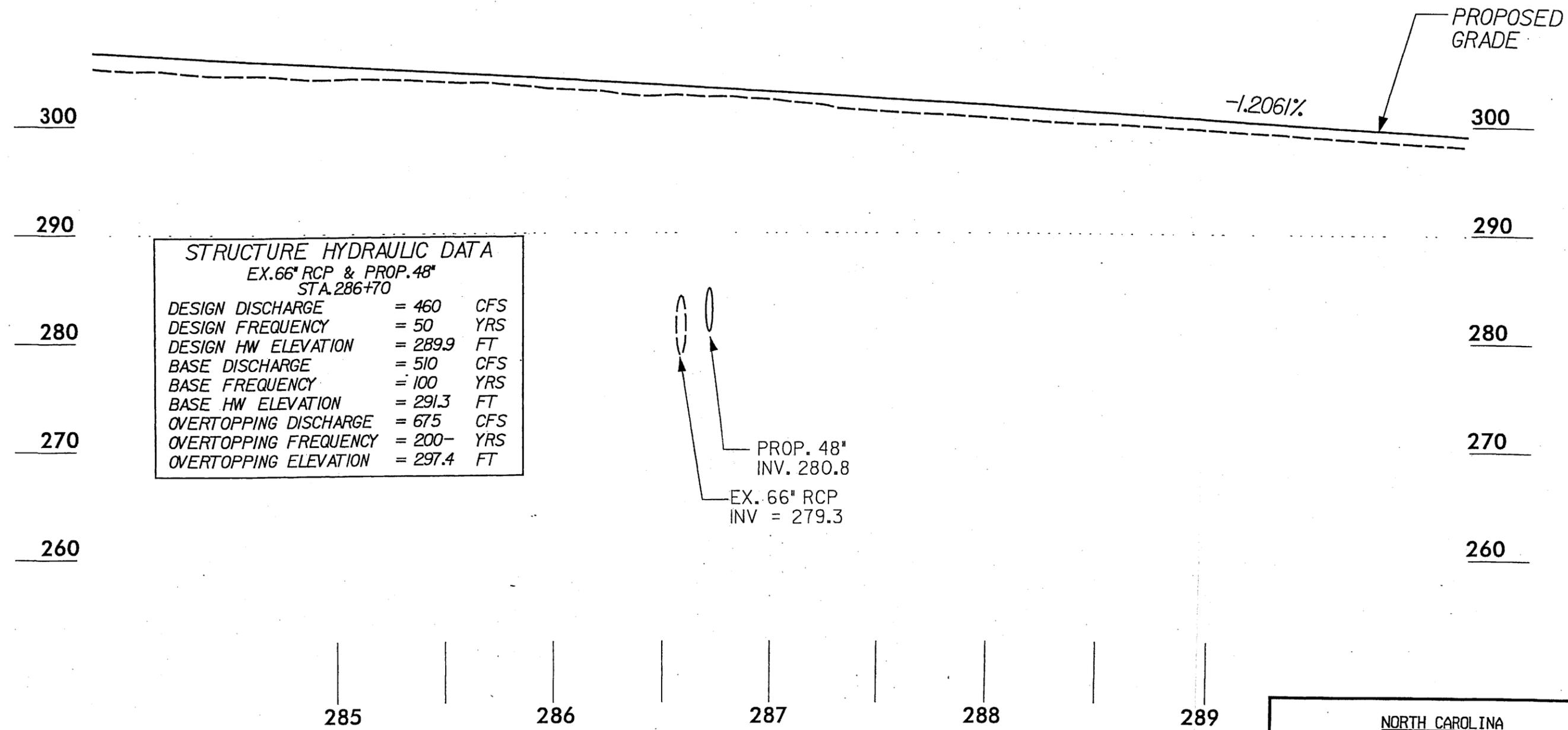
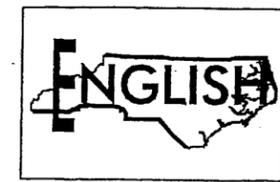


PROFILE ALONG STRUCTURE  
SITE 9

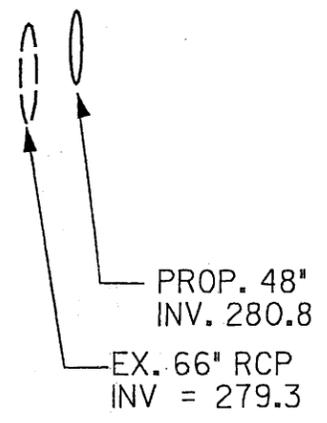
NORTH CAROLINA  
 DEPARTMENT OF HIGHWAYS  
 WAKE - DURHAM COUNTIES  
 35018.JJ (U-4026)  
 DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54  
 HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'  
 DATE: 02-04-05  
 SHEET 40 OF 65

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PROJECT REFERENCE NO. U-4026	SHEET NO. 26&27-PFL19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



STRUCTURE HYDRAULIC DATA		
EX. 66" RCP & PROP. 48" STA. 286+70		
DESIGN DISCHARGE	= 460	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 289.9	FT
BASE DISCHARGE	= 510	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 291.3	FT
OVERTOPPING DISCHARGE	= 675	CFS
OVERTOPPING FREQUENCY	= 200-	YRS
OVERTOPPING ELEVATION	= 297.4	FT



**PROFILE ALONG ROADWAY  
SITE 9**

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.LJ (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

HORIZONTAL SCALE: 1" = 50'  
VERTICAL SCALE: 1" = 10'

DATE: 02-04-05

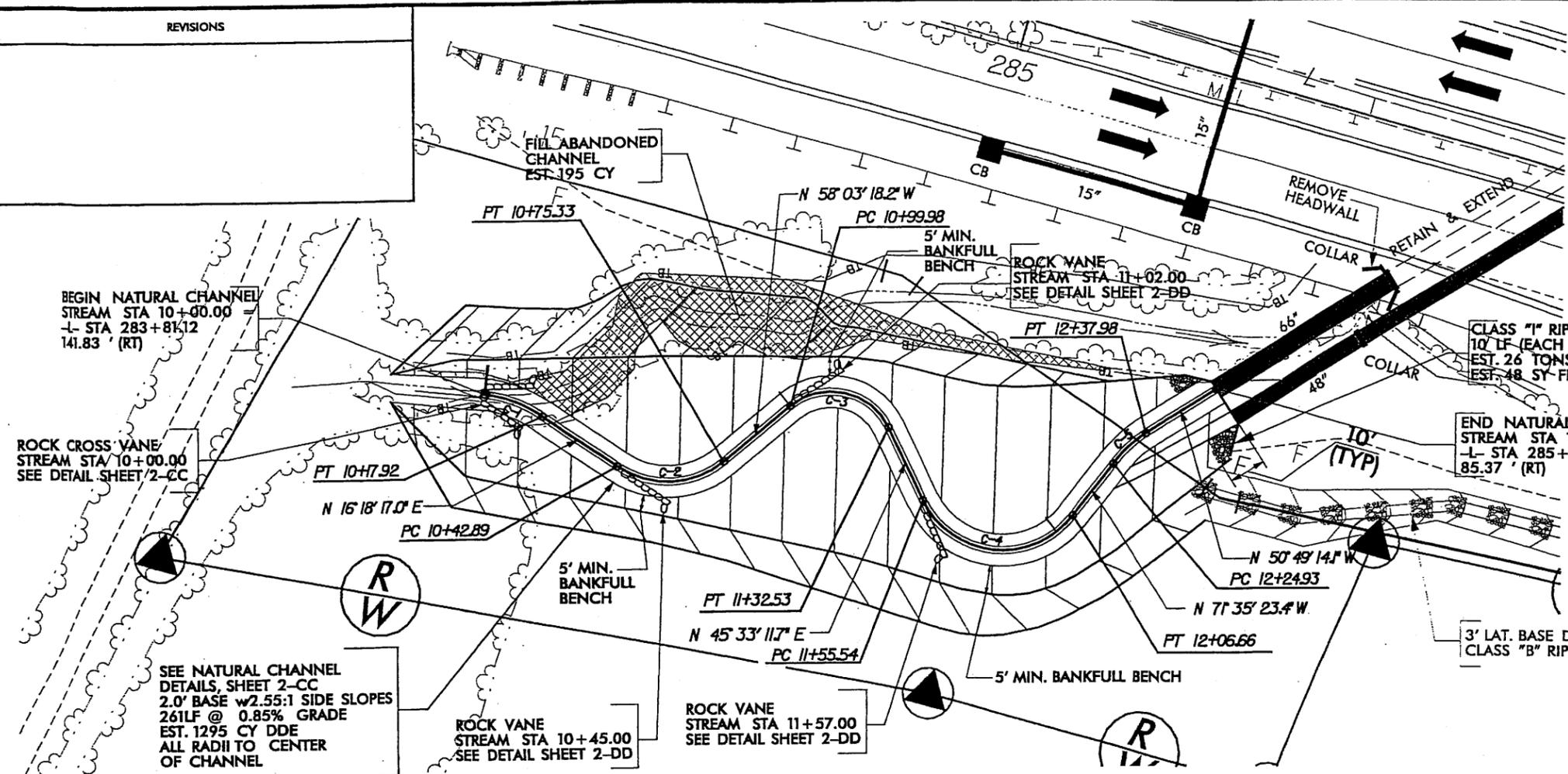
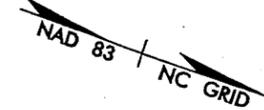
SHEET 41 OF 65

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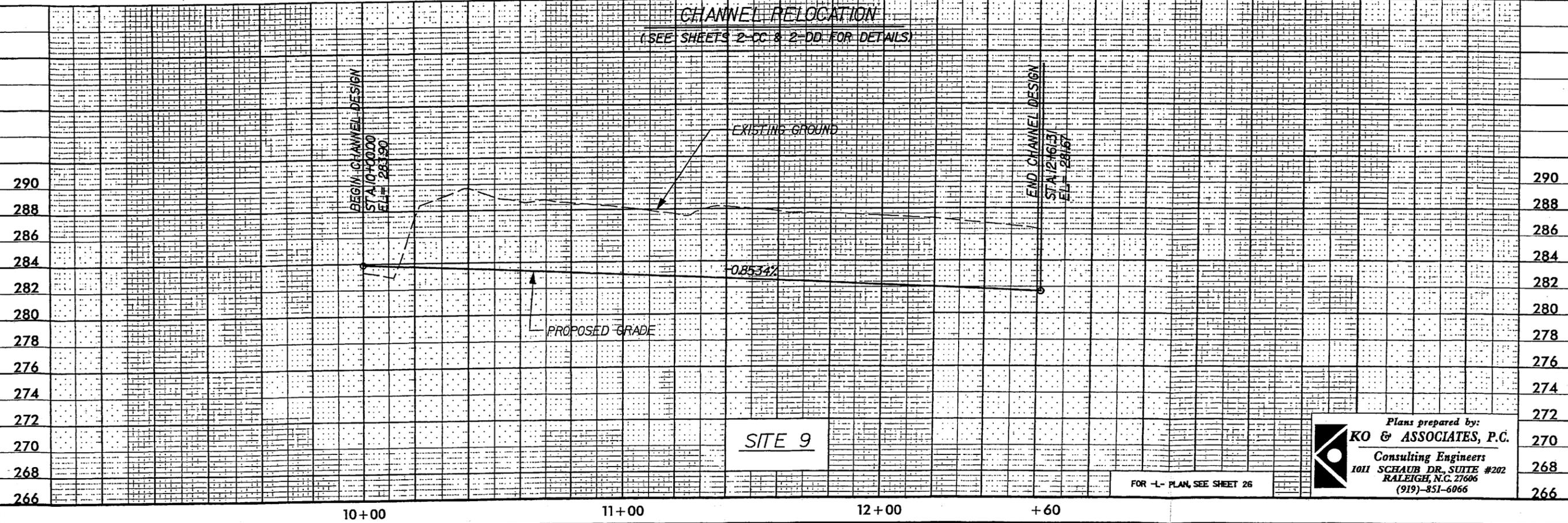
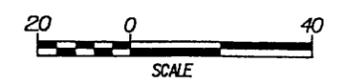
7/2/99

REVISIONS

PROJECT REFERENCE NO. U-4026	SHEET NO. 2-BB
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



<p><b>C-1</b></p> <p>PI Sta 10+09.15  <math>\Delta = 28^\circ 31' 02''</math> (RT)  <math>D = 159' 09' 17.8''</math>  <math>L = 17.92'</math>  <math>T = 9.15'</math>  <math>R = 36.00'</math></p>	<p><b>C-2</b></p> <p>PI Sta 10+61.85  <math>\Delta = 74^\circ 21' 35.2''</math> (LT)  <math>D = 229' 10' 59.2''</math>  <math>L = 32.45'</math>  <math>T = 18.96'</math>  <math>R = 25.00'</math></p>
<p><b>C-3</b></p> <p>PI Sta 11+22.86  <math>\Delta = 103^\circ 36' 29.9''</math> (RT)  <math>D = 318' 18' 35.6''</math>  <math>L = 32.55'</math>  <math>T = 22.88'</math>  <math>R = 18.00'</math></p>	<p><b>C-4</b></p> <p>PI Sta 11+96.45  <math>\Delta = 117^\circ 08' 35.1''</math> (LT)  <math>D = 229' 10' 59.2''</math>  <math>L = 51.11'</math>  <math>T = 40.91'</math>  <math>R = 25.00'</math></p>
<p><b>C-5</b></p> <p>PI Sta 12+31.53  <math>\Delta = 20^\circ 46' 09.3''</math> (RT)  <math>D = 159' 09' 17.8''</math>  <math>L = 13.05'</math>  <math>T = 6.60'</math>  <math>R = 36.00'</math></p>	<p>42-65</p>



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Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 1011 SCHAUB DR, SUITE #202  
 RALEIGH, N.C. 27606  
 (919) 851-6066

FOR L- PLAN, SEE SHEET 26

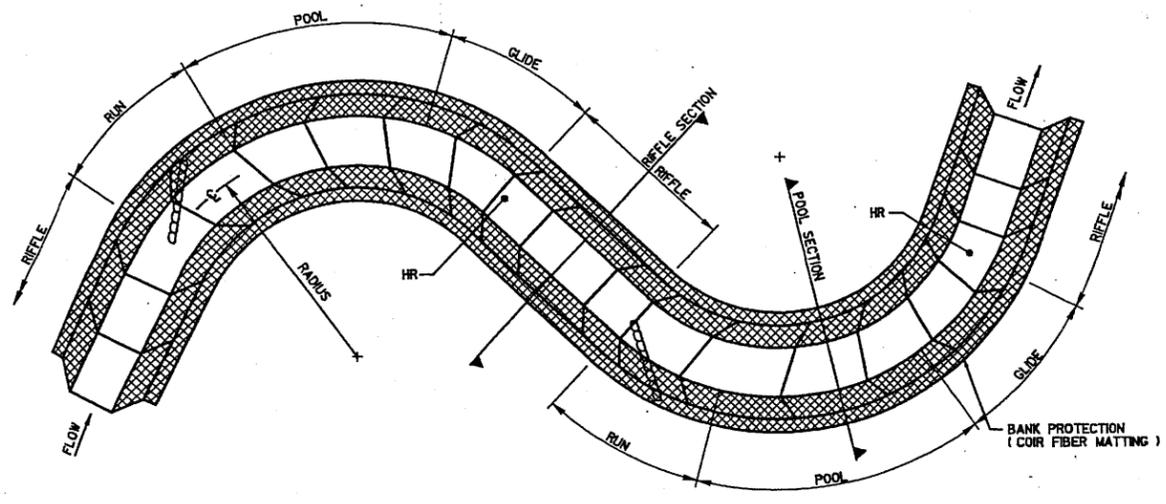
# NATURAL CHANNEL DETAILS

**NOTES:**

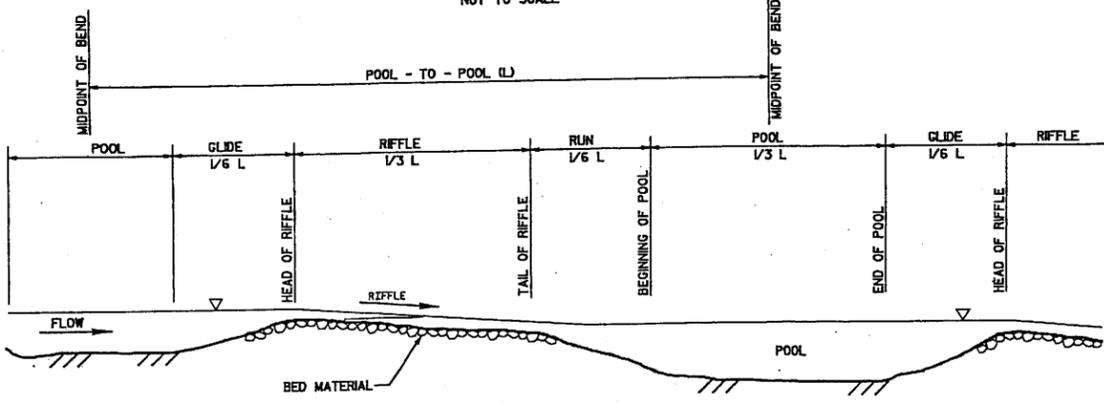
- THE CONTRACTOR SHALL LAYOUT THE CHANNEL ALIGNMENT WHICH SHALL CONSIST OF STAKING OUT THE CENTER OF EACH RADIUS, SCRIBING THE CENTER LINE OF THE CHANNEL FOR EACH BEND USING THE INDICATED RADII, AND SCRIBING CENTERLINE OF THE TANGENT SECTIONS BY CONNECTING SUCCESSIVE BENDS WITH A STRAIGHT LINE.
- FIELD ADJUSTMENTS OF THE ALIGNMENT MAY BE REQUIRED TO AVOID CERTAIN OBSTACLES. APPROVAL BY THE ENGINEER OF THE STAKE-OUT ALIGNMENT SHALL BE REQUIRED PRIOR TO INITIATION OF THE CONSTRUCTION OF THE CHANNEL.
- LOCATE ROCK VANES ACCORDING TO PLAN SHEET.
- BEGIN AND END STREAM ELEVATIONS SHOULD BE CHECKED PRIOR TO CONSTRUCTION TO ENSURE PROPOSED STREAM GRADE (AND ELEVATIONS) ARE ACCURATE. ELEVATIONS MAY VARY FROM PRIOR SURVEYS.

## MORPHOLOGICAL MEASUREMENT TABLE

VARIABLES	EXISTING CHANNEL UT TO HOLLOW CREEK	PROPOSED REACH I UT TO HOLLOW CREEK	REFERENCE REACH SOUTH UNNAMED TRIBUTARY TO MARKS CREEK
1) STREAM TYPE	C3/4	C4	C5
2) DRAINAGE AREA	140Ac	140Ac	65Ac
3) BANKFULL WIDTH	6.1ft	9.0ft	11.1ft
4) BANKFULL MEAN DEPTH	0.7ft	0.9ft	0.7ft
5) WIDTH/DEPTH RATIO	8	10	15.4
6) BANKFULL CROSS-SECTIONAL AREA	4.5sq.ft	8.1sq.ft	8.0sq.ft
7) BANKFULL MEAN VELOCITY	5.1fps	3.0fps	2.1fps
8) BANKFULL DISCHARGE, cfs	23cfs	23cfs	17cfs
9) BANKFULL MAX. DEPTH	1.2ft	1.6ft	1.8ft
10) WIDTH OF FLOODPRONE AREA	7ft	28ft	59ft
11) ENTRENCHMENT RATIO	1.1	3.1	5.3
12) MEANDER LENGTH	13 - 34ft	63 - 108ft	20 - 42ft
13) RATIO OF MEANDER LENGTH TO BANKFULL WIDTH	2.1 - 5.6	7.0 - 12.0	1.8 - 3.8
14) RADIUS OF CURVATURE	5 - 17ft	18 - 36ft	6.6 - 16ft
15) RATIO OF RADIUS OF CURVATURE TO BANKFULL WIDTH	0.8 - 2.8	2.0 - 4.0	0.6 - 1.0
16) BELT WIDTH	23ft	27 - 54ft	38ft
17) MEANDER WIDTH RATIO	3.8	3.0 - 6.0	3.4
18) SINUOSITY (STREAM LENGTH/VALLEY LENGTH)	1.17	1.25	1.23
19) VALLEY SLOPE	0.0172 ft/ft	0.0105 ft/ft	0.018 ft/ft
20) AVERAGE SLOPE	0.0174 ft/ft	0.0084 ft/ft	0.0164 ft/ft
21) POOL SLOPE	0.0000 ft/ft	0.0000 ft/ft	0.0000 ft/ft
22) RATIO OF POOL SLOPE TO AVERAGE SLOPE	0.0 - 0.1	0.00	0.00 - 0.07
23) MAXIMUM POOL DEPTH	1.5ft	2.3ft	2.78ft
24) RATIO OF POOL DEPTH TO AVERAGE BANKFULL DEPTH	2.0	2.5	3.86
25) POOL WIDTH	8.7ft	13.5ft	11.47ft
26) RATIO OF POOL WIDTH TO BANKFULL WIDTH	1.4	1.5	1.03
27) POOL TO POOL SPACING	42 - 53ft	54ft	5 - 47ft
28) RATIO OF POOL TO POOL SPACING TO BANKFULL WIDTH	6.9 - 8.7	6.0	0.4 - 4.3
29) RATIO OF LOWEST BANK HEIGHT TO BANKFULL HEIGHT (or max bankfull depth)	1.1 - 5	1.0	-



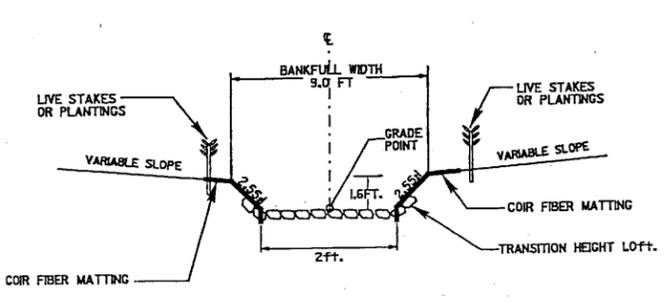
**TYPICAL PLAN**  
NOT TO SCALE



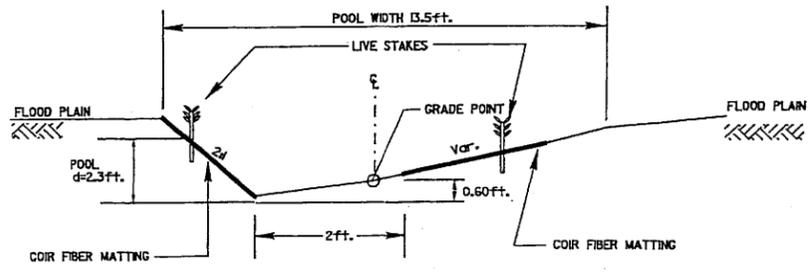
**TYPICAL PROFILE**  
NOT TO SCALE

**NOTES:**

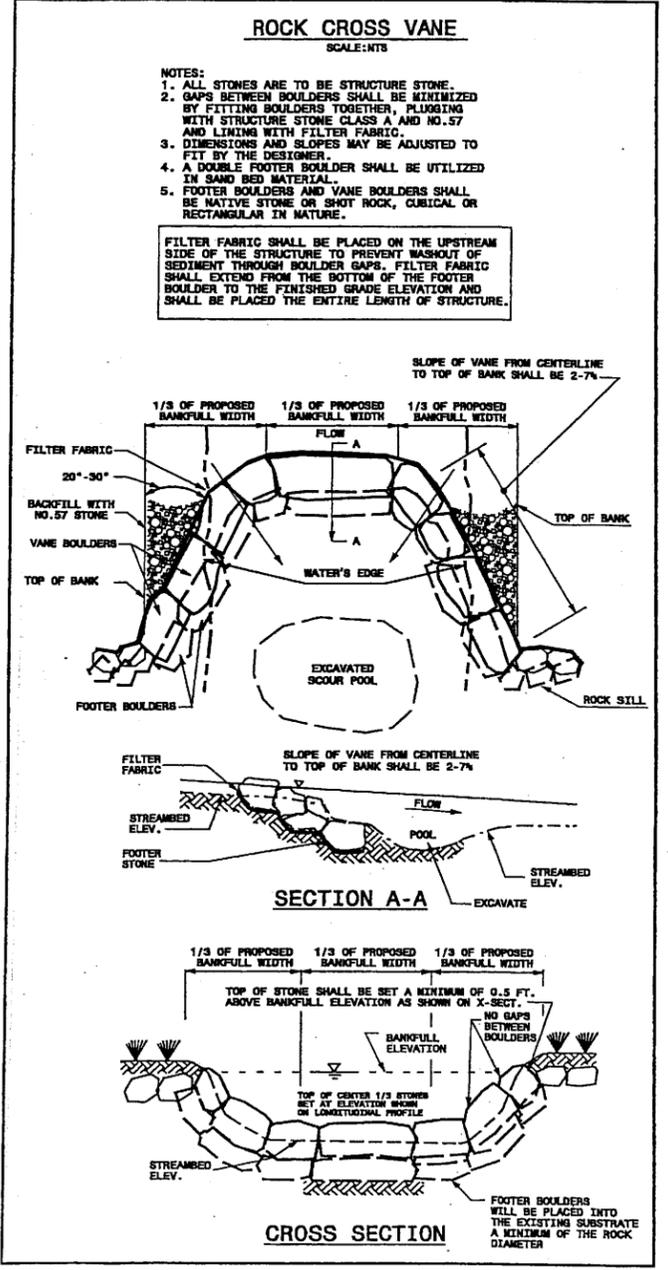
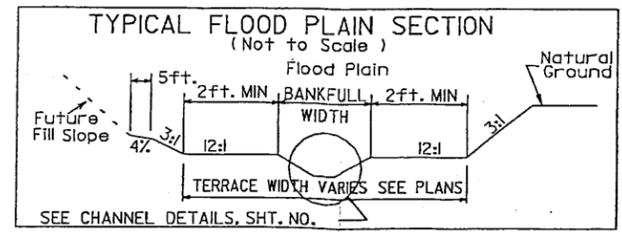
- THE POOL TO POOL SPACING (L) SHALL BE MEASURED AS THE DISTANCE FROM THE MIDPOINT OF THE UPSTREAM BEND TO THE MIDPOINT OF THE DOWNSTREAM BEND.
- REFER TO MORPHOLOGICAL MEASUREMENT TABLE AND PLAN SHEET FOR DIMENSIONS. NOTE THAT POOL TO POOL SPACING VARIES.



**TYPICAL RIFFLE SECTION**  
NOT TO SCALE



**TYPICAL POOL SECTION**  
NOT TO SCALE



**ROCK CROSS VANE**  
SCALE: NTS

- NOTES:**
- ALL STONES ARE TO BE STRUCTURE STONE.
  - GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, PLUGGING WITH STRUCTURE STONE CLASS A AND NO. 57 AND LINING WITH FILTER FABRIC.
  - DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE DESIGNER.
  - A DOUBLE FOOTER BOULDER SHALL BE UTILIZED IN SAND BED MATERIAL.
  - FOOTER BOULDERS AND VANE BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.

FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF STRUCTURE.

43-65  
SITE 9

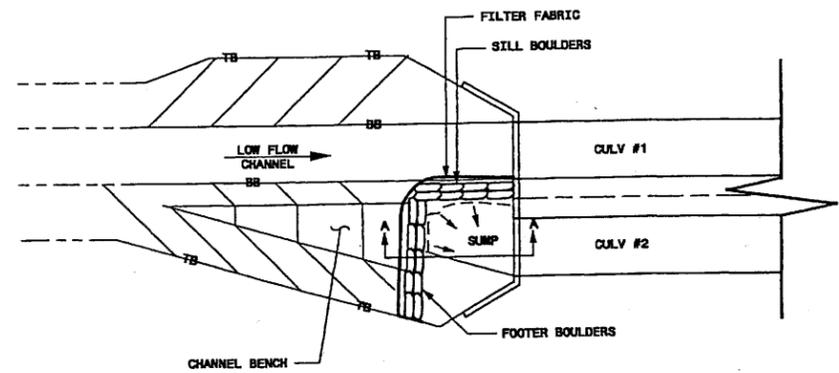
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### ROCK INLET SILL

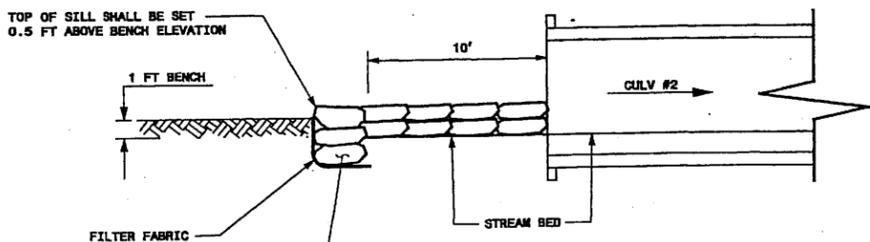
SCALE: NTS

- NOTES:
1. ALL STONES ARE TO BE STRUCTURE STONE.
  2. GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, PLUGGING WITH STRUCTURE STONE CLASS A AND NO.57 AND LINING WITH FILTER FABRIC.
  3. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.
  4. A DOUBLE FOOTER BOULDER SHALL BE UTILIZED IN SAND BED MATERIAL.
  5. FOOTER BOULDERS AND SILL BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.
  6. ACCEPTABLE BOULDERS SHALL HAVE THE FOLLOWING MINIMUM DIMENSIONS; 3' x 2' x 1'.

FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF STRUCTURE.

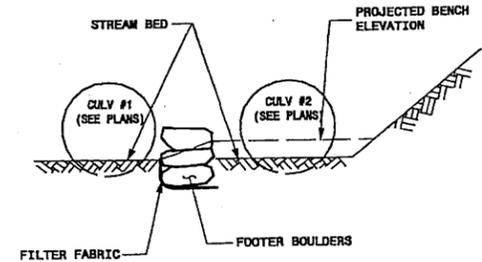


PLAN VIEW



FOOTER BOULDERS WILL BE PLACED INTO THE EXISTING SUBSTRATE A MINIMUM OF THE BOULDER DIAMETER

SECTION A-A



CROSS-SECTION

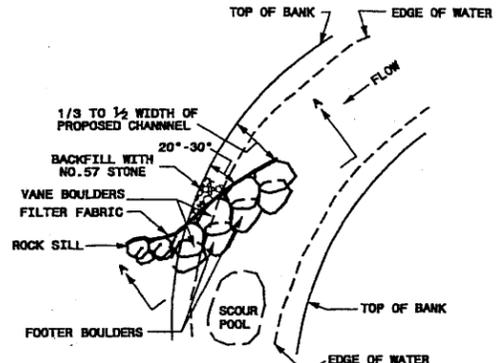
### ROCK VANE

SCALE: NTS

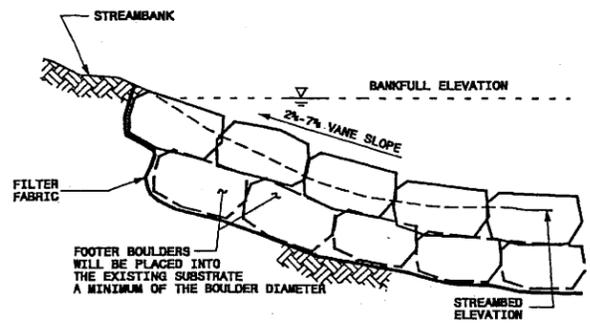
- NOTES:
1. ALL STONES ARE TO BE STRUCTURE STONE.
  2. GAPS BETWEEN BOULDERS SHALL BE MINIMIZED BY FITTING BOULDERS TOGETHER, PLUGGING WITH STRUCTURE STONE CLASS A AND NO.57 AND LINING WITH FILTER FABRIC.
  3. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.
  4. A DOUBLE FOOTER BOULDER SHALL BE UTILIZED IN SAND BED MATERIAL.
  5. FOOTER BOULDERS AND VANE BOULDERS SHALL BE NATIVE STONE OR SHOT ROCK, CUBICAL OR RECTANGULAR IN NATURE.

FILTER FABRIC SHALL BE PLACED ON THE UPSTREAM SIDE OF THE STRUCTURE TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS. FILTER FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF STRUCTURE.

SLOPE OF VANE FROM CENTERLINE TO TOP OF BANK SHALL BE 2-7%



PLAN VIEW



SECTION A-A

Jun 02 2/3/2005 10:40:26 am C:\Users\perry\Documents\Projects\U-4026\pde\taila.dgn

44-65

PROJECT REFERENCE NO. U-4026	SHEET NO. 26-TXT(9)
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

NATURAL CHANNEL DESIGN

UNNAMED TRIBUTARY TO HOLLOW CREEK

Right of Project Station 283+81 to Right of Station 285+80  
Permit Site 9

The widening of Davis Drive from an existing two lane facility to a proposed divided four lane roadway, in Durham County, will require that a portion of an Unnamed Tributary to Hollow Creek be relocated. The relocation of the existing channel will occur from Right of Project Station 283+81 -L- to Right of Station 285+80 -L-, approximately 261 feet in length. The proposed channel relocation is designed according to "natural channel" design principles proposed by Dave Rosgen.

The Tributary's drainage area is mostly rural and wooded in nature. The stream was found to be perennial in nature, having flow through the riffles and pools.

There is no hydraulic gage data available on this stream or on nearby streams. Current discharges were estimated using the NCDOT procedures for rural watersheds.

EXISTING CHANNEL

A representative portion of the existing channel was surveyed in detail for the purpose of channel classification. The existing channel was measured to have an entrenchment ratio of 1.07, a width/depth ratio of 8.27, a sinuosity of 1.17 and an average slope of 0.0174 ft/ft. A pebble count was performed and the channel was determined to be classified as G4 according to the Rosgen classification system. There was cobble identified within the reach surveyed, but it is not present along the entire length of the reach surveyed. It appears that the cobble is part of a narrow band of geology and is acting as armor layer in the pavement. It does not appear that the cobble is being moved by the bankfull event in the downstream direction.

REFERENCE REACH

The reference reach data utilized in the design of this channel is from a previously surveyed reference reach for a NCDOT stream mitigation project. The reference reach channel utilized had a stream classification type C5 according to the Rosgen classification system. The reference reach had an entrenchment ratio of 5.3, a width/depth ratio of 15.4, a sinuosity of 1.23 and an average slope of 0.018 ft/ft. A pebble count was performed and the channel was found to have a classification of sand bottom.

PROPOSED CHANNEL

Based upon the existing valley type and the flood prone width desired, the proposed channel design has a C4 stream type classification. Design data is given in the attached table along with existing reach and reference reach data. A proposed cross-vane will control the channel gradient upstream, while a culvert crossing under Davis Drive will control the gradient downstream. Mean "bankfull" depth was set at 0.9 feet. Above bankfull depth it is proposed to excavate an approximately 35-55 foot wide flood plain (including the channel).

It is believed that by forming a flood plain above bankfull depth channel stability will be enhanced by reducing velocities for those discharges above the bankfull discharge. This should lead to a more stable channel. It is anticipated that the proposed channel will have a sand/gravel bottom. Maximum pool depths of 2.3 feet are proposed at outside bends of meanders.

The affected section has been classified as a G type stream; it is entrenched and has a low width to depth ratio. When converting a channel from a type G to C, the design approach is to reduce the stream power to minimize degradation. The proposed design has reduced the stream power from 25 to 12 (lbs/ft s) and the shear stress from 1.67 to 0.43 (lbs/sq ft). The largest size particle recorded from the pavement during the pebble count was 80mm. Using Rosgen's version of Shields Curve the shear stress to initiate movement of a 80mm particle can be as low as 0.30 (lbs/sq ft). The proposed shear stress of 0.43 (lbs/sq ft) will initiate movement of the largest size particle recorded from the pavement. The proposed type C stream will be a stable channel because the shear stress has been reduced, which will minimize erosion, the addition of a flood plain, which will provide a relief valve for higher than bankfull storm flows and grade control structures at the up and down stream limits of the proposed channel.

Proposed channel stabilization is shown on the attached detail sheet. It is anticipated that channel banks will be planted with native trees and shrubs above bankfull depth. Cross Vane Structures will be utilized to control the near bank shear stress in the meanders, along the proposed roadway.

SITE 9

**NORTH CAROLINA**  
**DEPARTMENT OF HIGHWAYS**  
  
 WAKE - DURHAM COUNTIES  
 35018.JI (U-4026)  
  
 DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54  
  
 HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'  
  
 DATE: 02-04-05

45  
 SHEET 45 OF 65

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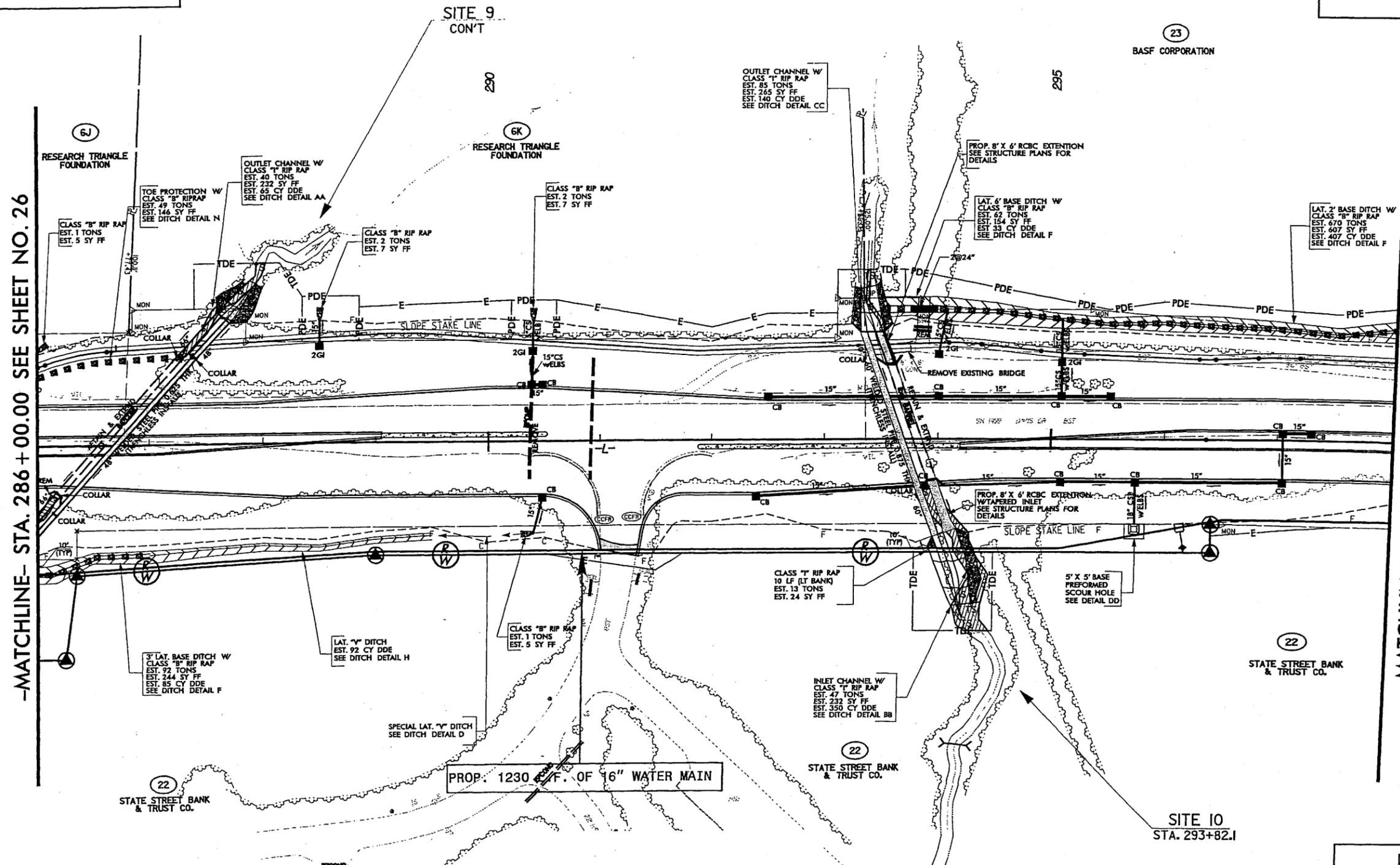


PROJECT REFERENCE NO. U-4026	SHEET NO. 27
U-4026B RW SHEET NO.	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

7/22/99

REVISIONS	
9/23/03	REVISED TDE & PDE ON PARCEL 23
3/16/04	REVISED PARCEL NO. 6 TO PARCEL NO. 6J & 6K
4/19/04	NAME CHANGE PARCEL NO. 22
6/25/04	REVISED CE & PDE ON PARCEL NO. 6K

NAD 83 | NC GRID



-MATCHLINE- STA. 286+00.00 SEE SHEET NO. 26

-MATCHLINE- STA. 298+00.00 SEE SHEET NO. 28

PERMIT SITE 9  
PLAN VIEW

PERMIT SITE 10  
PLAN VIEW

LEGEND	
	DENOTES TEMPORARY SURFACE WATER LOSS
	DENOTES SURFACE WATER LOSS

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUH DR., SUITE #202  
RALEIGH, N.C. 27606  
(919) 851-6066

3/22/2005  
P:\Projects\4026\4026.dgn\Permits\4026-permit-27.dgn  
P.C. Associates, P.C.

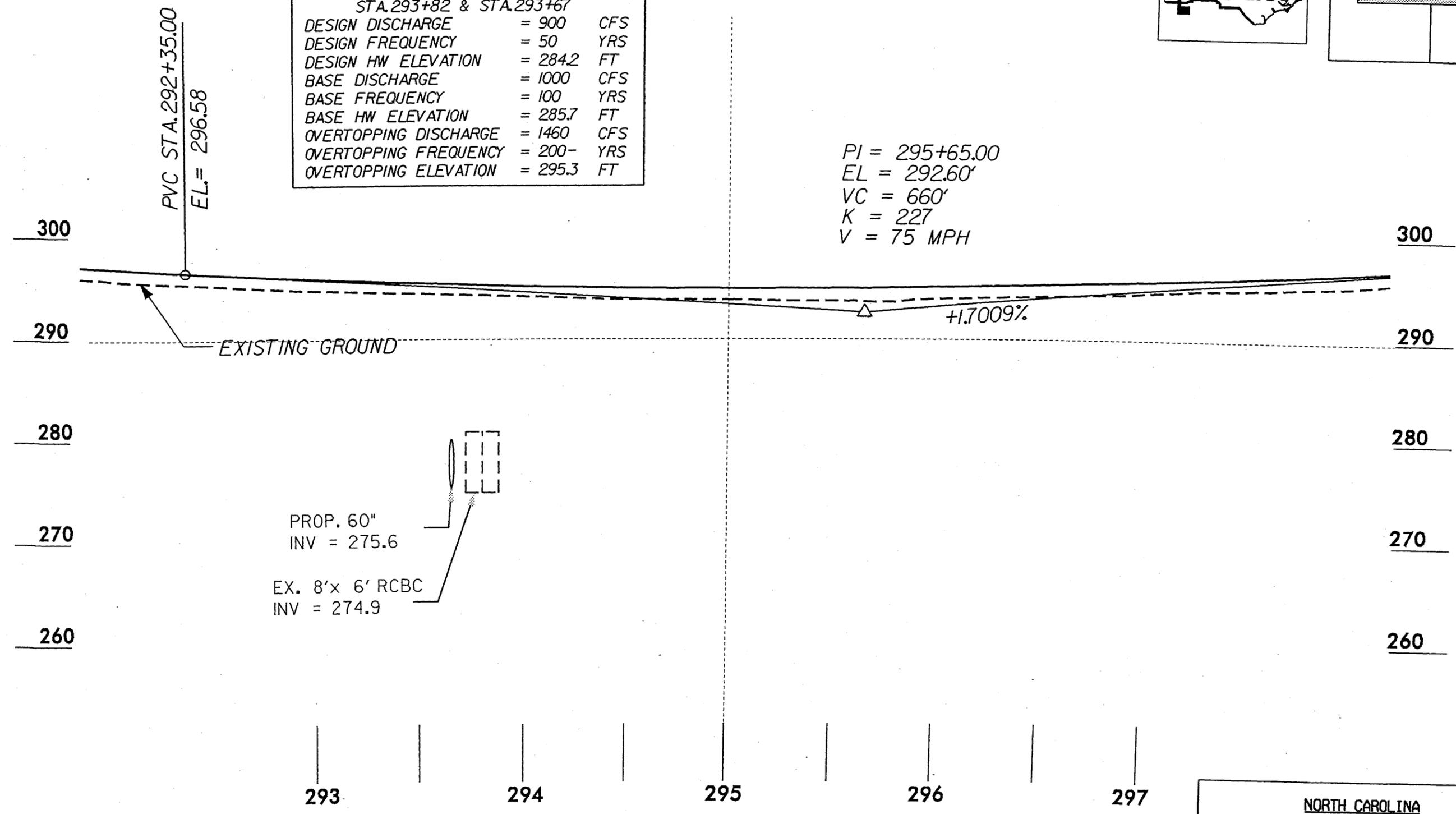


PROJECT REFERENCE NO. U-4026	SHEET NO. 27-PFL(10)
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



STRUCTURE HYDRAULIC DATA		
EX. 8'x6' RCBC W/ 60"		
STA. 293+82 & STA. 293+67		
DESIGN DISCHARGE	= 900	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 284.2	FT
BASE DISCHARGE	= 1000	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 285.7	FT
OVERTOPPING DISCHARGE	= 1460	CFS
OVERTOPPING FREQUENCY	= 200-	YRS
OVERTOPPING ELEVATION	= 295.3	FT

PI = 295+65.00  
 EL = 292.60'  
 VC = 660'  
 K = 227  
 V = 75 MPH



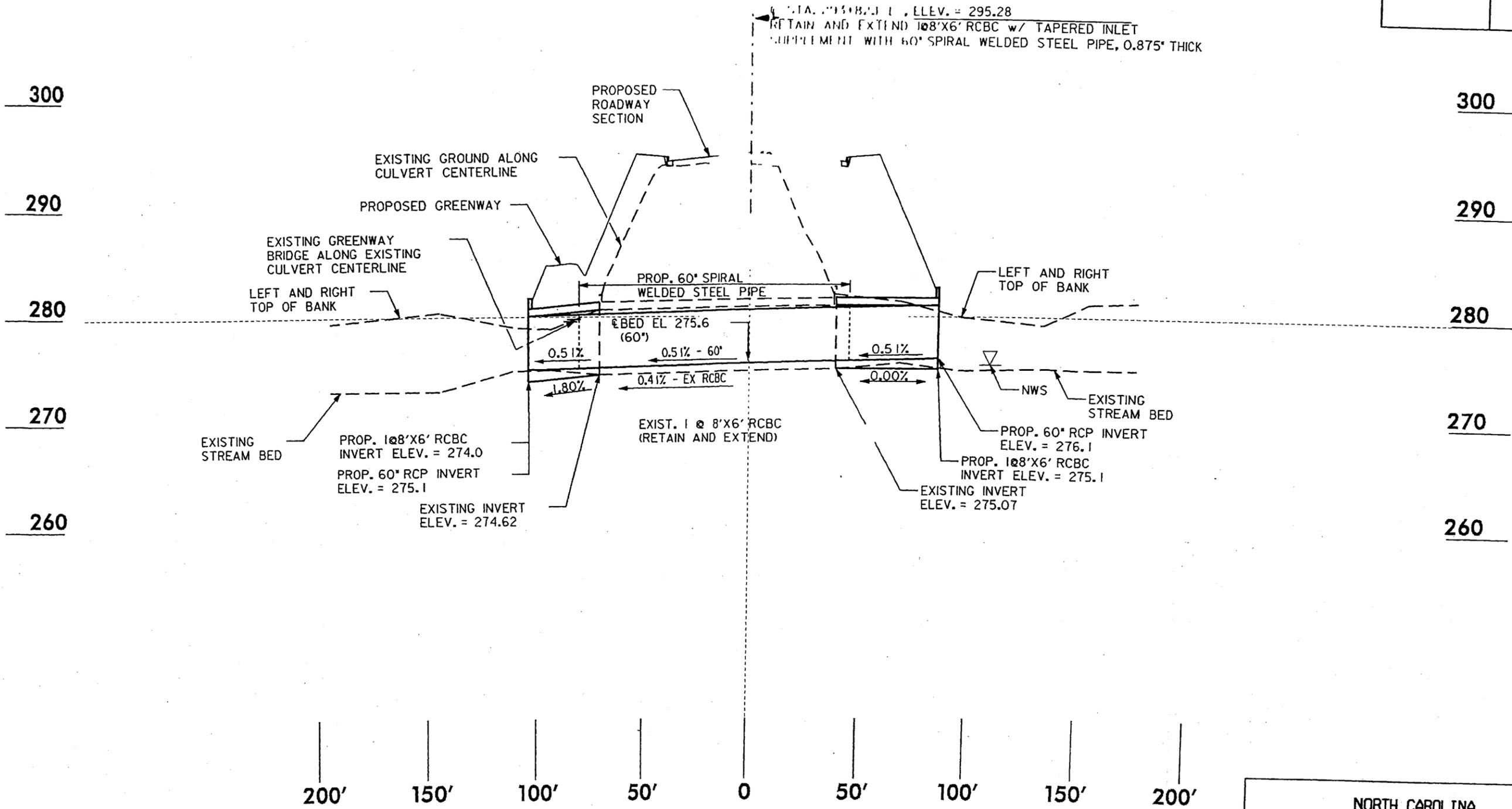
**PROFILE ALONG ROADWAY**  
**SITE 10**

**NORTH CAROLINA**  
**DEPARTMENT OF HIGHWAYS**  
 WAKE - DURHAM COUNTIES  
 35018.JJ (U-4026)  
 DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54  
 HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'  
 DATE: 02-04-05

SHEET 48 OF 65

FILE# DATE# \$TIME\$

PROJECT REFERENCE NO. U-4026	SHEET NO. 27-PAS(10)
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS <small>DO NOT USE FOR CONSTRUCTION</small>	



**PROFILE ALONG STRUCTURE**  
**SITE 10**

**NORTH CAROLINA**  
**DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
 35018.11 (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
 MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

HORIZONTAL SCALE: 1" = 50'  
 VERTICAL SCALE: 1" = 10'

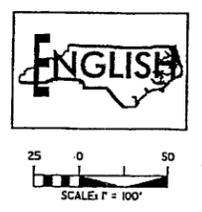
DATE: 02-04-05

SHEET 49 OF 65

FILE\$ DATE\$ TIME\$

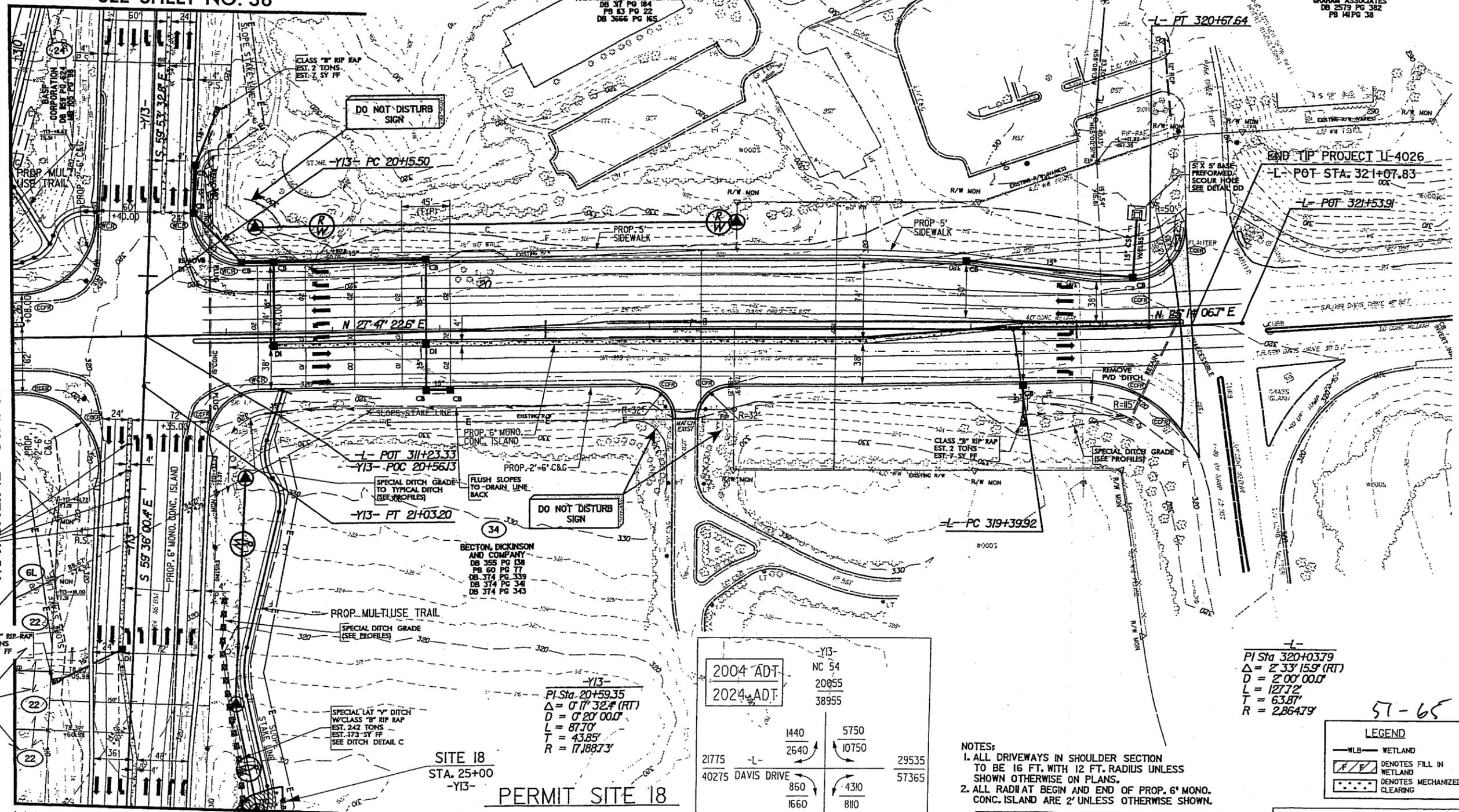


PROJECT REFERENCE NO.	SHEET NO.
U-4026	29
U-4026B RW SHEET NO.	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 17+50.00 -Y13-  
SEE SHEET NO. 36

-MATCHLINE- STA. 310+00.00 SEE SHEET NO. 28



PROVIDE 16\"/>

RESEARCH TRIANGLE FOUNDATION DB 229 PG 376 MB 130 PG 109

STATE STREET BANK & TRUST CO. DB 362 PG 904 CB 5 PG 220

-MATCHLINE- STA. 25+00.00 -Y13-  
SEE SHEET NO. 36

SITE 18  
STA. 25+00  
-Y13-  
**PERMIT SITE 18**  
PLAN VIEW

2004 ADT		-Y13- NC 54	
2024 ADT		20855	
		1440	5750
21775	-L-	2640	10750
40275	DAVIS DRIVE	860	4310
		1660	8110
		18305	
		35335	
PROJECTED TRAFFIC VOLUMES			

-L-  
PI Sta 320+03.79  
 $\Delta = 2' 33'' 15.9''$  (RT)  
 $D = 2' 00'' 00.0''$   
 $L = 127.72'$   
 $T = 63.87'$   
 $R = 2,864.79'$

57-65

- NOTES:
- ALL DRIVEWAYS IN SHOULDER SECTION TO BE 16 FT. WITH 12 FT. RADIUS UNLESS SHOWN OTHERWISE ON PLANS.
  - ALL RADI AT BEGIN AND END OF PROP. 6\"/>

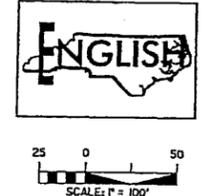
LEGEND	
	WETLAND
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

7/2/99  
7/23/2005  
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K & Associates, P.C.

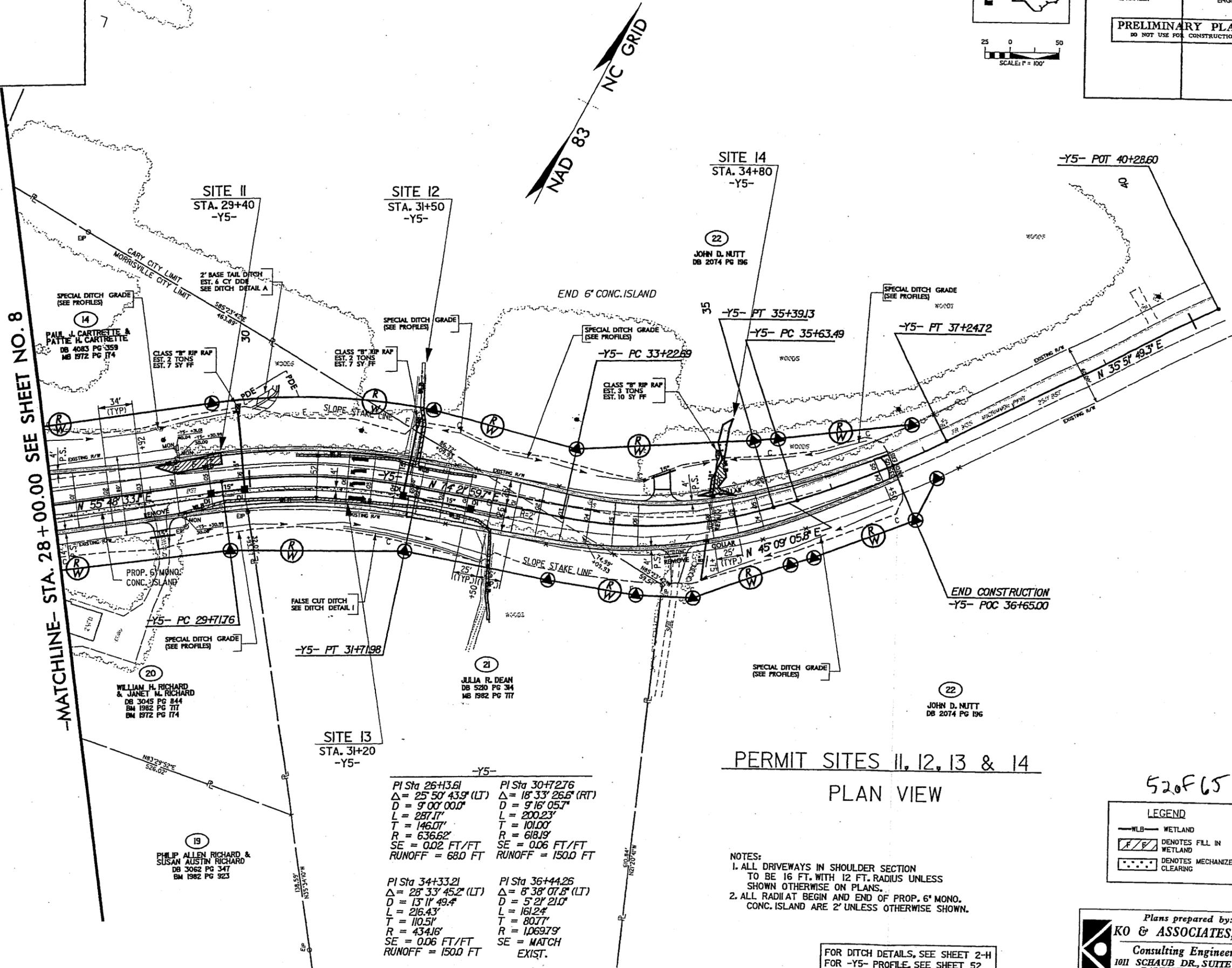
REVISIONS	
10/26/04	REMOVED PDE ON PARCEL 21

TOWN OF CARY TO HANDLE ALL RIGHT OF WAY CLAIMS THIS SHEET



PROJECT REFERENCE NO. U-4026	SHEET NO. 31
U-4026A RW SHEET NO. 12	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

-MATCHLINE- STA. 28 + 00.00 SEE SHEET NO. 8



-Y5-	
PI Sta 26+13.61 Δ = 25° 50' 43.9" (LT) D = 9° 00' 00.0" L = 287.17' T = 146.07' R = 636.62' SE = 0.02 FT/FT RUNOFF = 68.0 FT	PI Sta 30+72.76 Δ = 18° 33' 26.6" (RT) D = 9° 16' 05.7" L = 200.23' T = 101.00' R = 618.19' SE = 0.06 FT/FT RUNOFF = 150.0 FT
PI Sta 34+33.21 Δ = 28° 33' 45.2" (LT) D = 13° 11' 49.4" L = 216.43' T = 110.51' R = 434.16' SE = 0.06 FT/FT RUNOFF = 150.0 FT	PI Sta 36+44.26 Δ = 8° 38' 07.6" (LT) D = 5° 21' 21.0" L = 161.24' T = 80.77' R = 1,069.79' SE = MATCH EXIST.

PERMIT SITES II, 12, 13 & 14  
PLAN VIEW

- NOTES:
- ALL DRIVEWAYS IN SHOULDER SECTION TO BE 16 FT. WITH 12 FT. RADIUS UNLESS SHOWN OTHERWISE ON PLANS.
  - ALL RADIAT BEGIN AND END OF PROP. 6' MONO. CONC. ISLAND ARE 2' UNLESS OTHERWISE SHOWN.

520F65

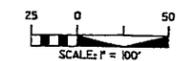
LEGEND	
	WETLAND
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

FOR DITCH DETAILS, SEE SHEET 2-H  
FOR -Y5- PROFILE, SEE SHEET 52

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

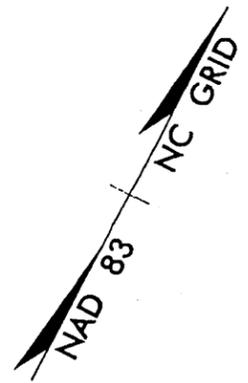
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KO & ASSOCIATES, P.C.

PROJECT REFERENCE NO.	SHEET NO.
U-4026	31
U-4026A RW SHEET NO.	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
DO NOT USE FOR CONSTRUCTION	

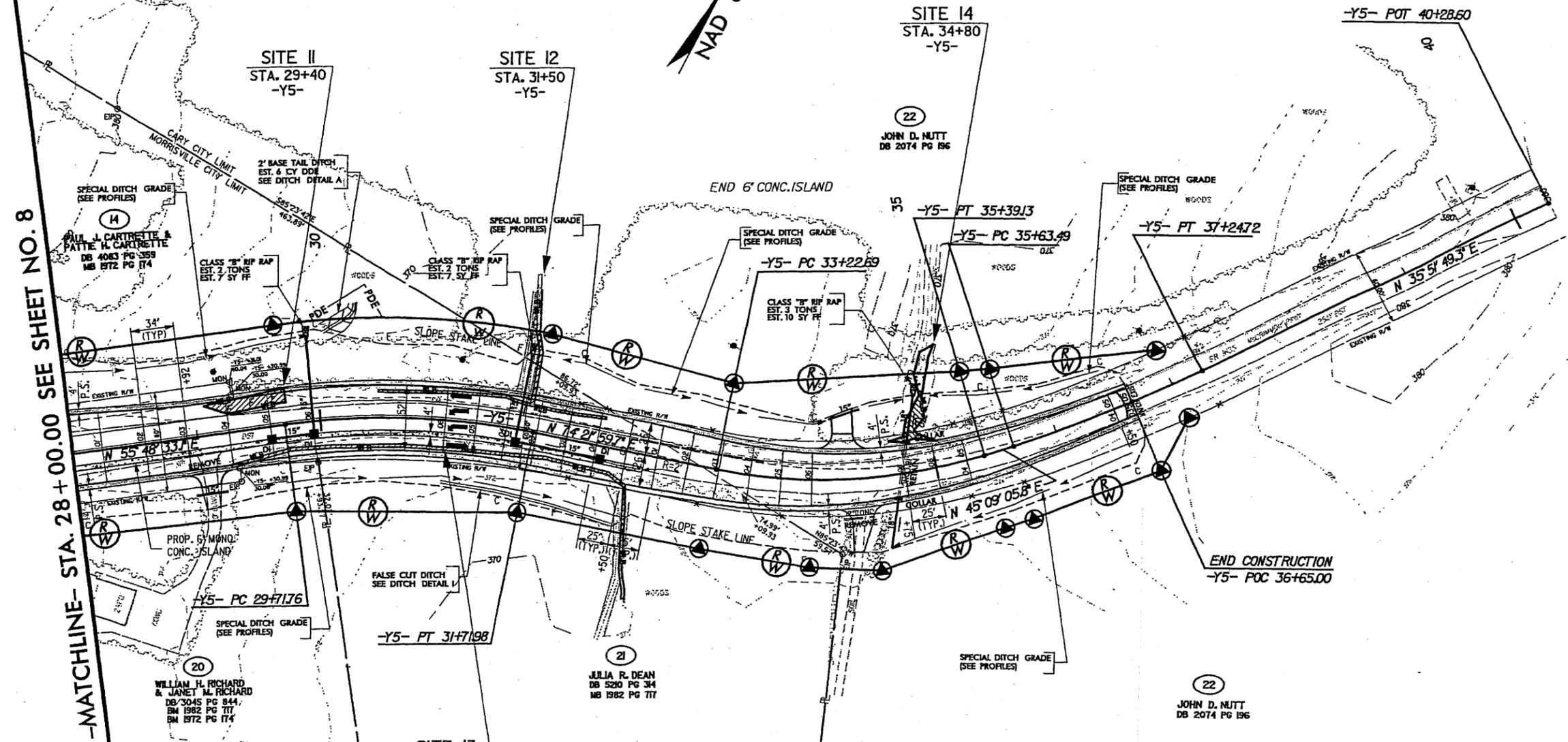


REVISIONS
10/26/04 REMOVED PDE ON PARCEL 21

TOWN OF CARY TO HANDLE ALL RIGHT OF WAY CLAIMS THIS SHEET



-MATCHLINE- STA. 28+00.00 SEE SHEET NO. 8



PI Sta 26+33.61 $\Delta = 25^{\circ} 50' 43.9"$ (LT) $D = 9^{\circ} 00' 00.0"$ $L = 287.17'$ $T = 146.07'$ $R = 636.62'$ $SE = 0.02$ FT/FT $RUNOFF = 68.0$ FT	PI Sta 30+72.76 $\Delta = 18^{\circ} 33' 26.6"$ (RT) $D = 9^{\circ} 16' 05.7"$ $L = 200.23'$ $T = 101.00'$ $R = 618.19'$ $SE = 0.06$ FT/FT $RUNOFF = 150.0$ FT
PI Sta 34+33.21 $\Delta = 28^{\circ} 33' 45.2"$ (LT) $D = 13^{\circ} 11' 49.4"$ $L = 216.43'$ $T = 110.51'$ $R = 434.16'$ $SE = 0.06$ FT/FT $RUNOFF = 150.0$ FT	PI Sta 36+44.26 $\Delta = 8^{\circ} 38' 07.8"$ (LT) $D = 5^{\circ} 21' 21.0"$ $L = 161.24'$ $T = 80.77'$ $R = 1,069.79'$ $SE = MATCH$ $EXIST.$

**PERMIT SITES II, 12, 13 & 14**  
PLAN VIEW

- NOTES:
- ALL DRIVEWAYS IN SHOULDER SECTION TO BE 16 FT. WITH 12 FT. RADIUS UNLESS SHOWN OTHERWISE ON PLANS.
  - ALL RADIAT BEGIN AND END OF PROP. 6" MONO. CONC. ISLAND ARE 2' UNLESS OTHERWISE SHOWN.

**LEGEND**

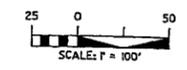
	WETLAND
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

FOR DITCH DETAILS, SEE SHEET 2-H  
FOR -Y5- PROFILE, SEE SHEET 52

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHaub DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

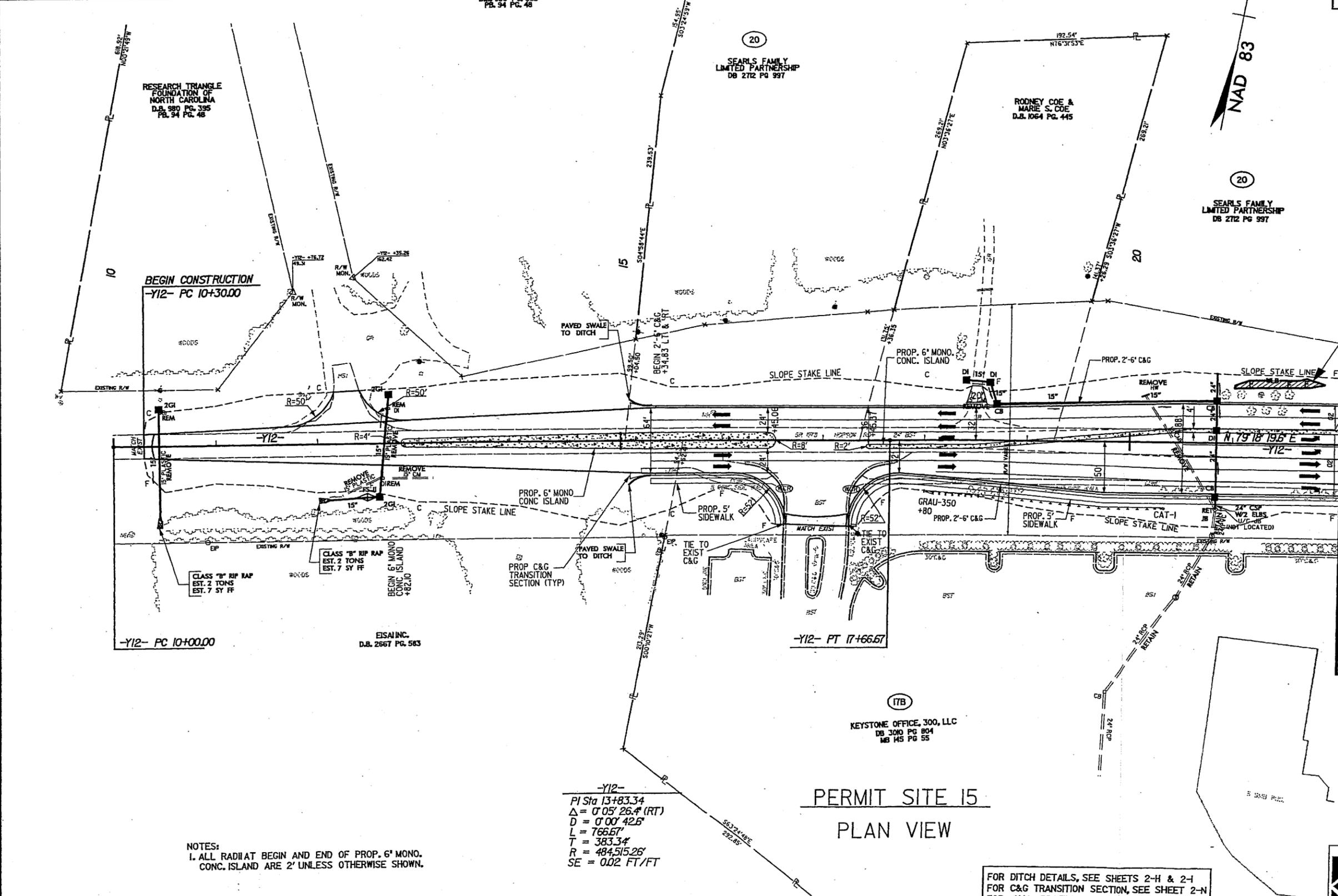
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PROJECT REFERENCE NO. U-4026	SHEET NO. 34
U-4026B RW SHEET NO. 27	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



NAD 83 NC GRID

REVISIONS
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-MATCHLINE- STA. 22 + 00.00 SEE SHEET NO. 24

SITE 15  
STA. 21+41  
-Y12-

54-65

-Y12-  
PI Sta 13+83.34  
 $\Delta = 0'05'26.4''$  (RT)  
 $D = 0'00'42.6''$   
 $L = 766.67'$   
 $T = 383.34'$   
 $R = 484,515.28'$   
 $SE = 0.02$  FT/FT

**PERMIT SITE 15  
PLAN VIEW**

NOTES:  
1. ALL RADIAT BEGIN AND END OF PROP. 6' MONO. CONC. ISLAND ARE 2' UNLESS OTHERWISE SHOWN.

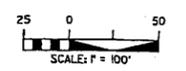
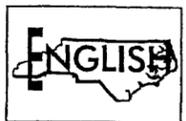
FOR DITCH DETAILS, SEE SHEETS 2-H & 2-I  
FOR C&G TRANSITION SECTION, SEE SHEET 2-N  
FOR -Y12- PROFILE, SEE SHEET 55

LEGEND	
	WLB - WETLAND
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

7/22/99  
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C & Associates, P.C.

PROJECT REFERENCE NO.	SHEET NO.
U-4026	34
U-4026B RW SHEET NO.	27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 22 + 00.00 SEE SHEET NO. 24

SITE 15  
STA. 21+41  
-Y12-

55-65

LEGEND	
	WETLAND
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

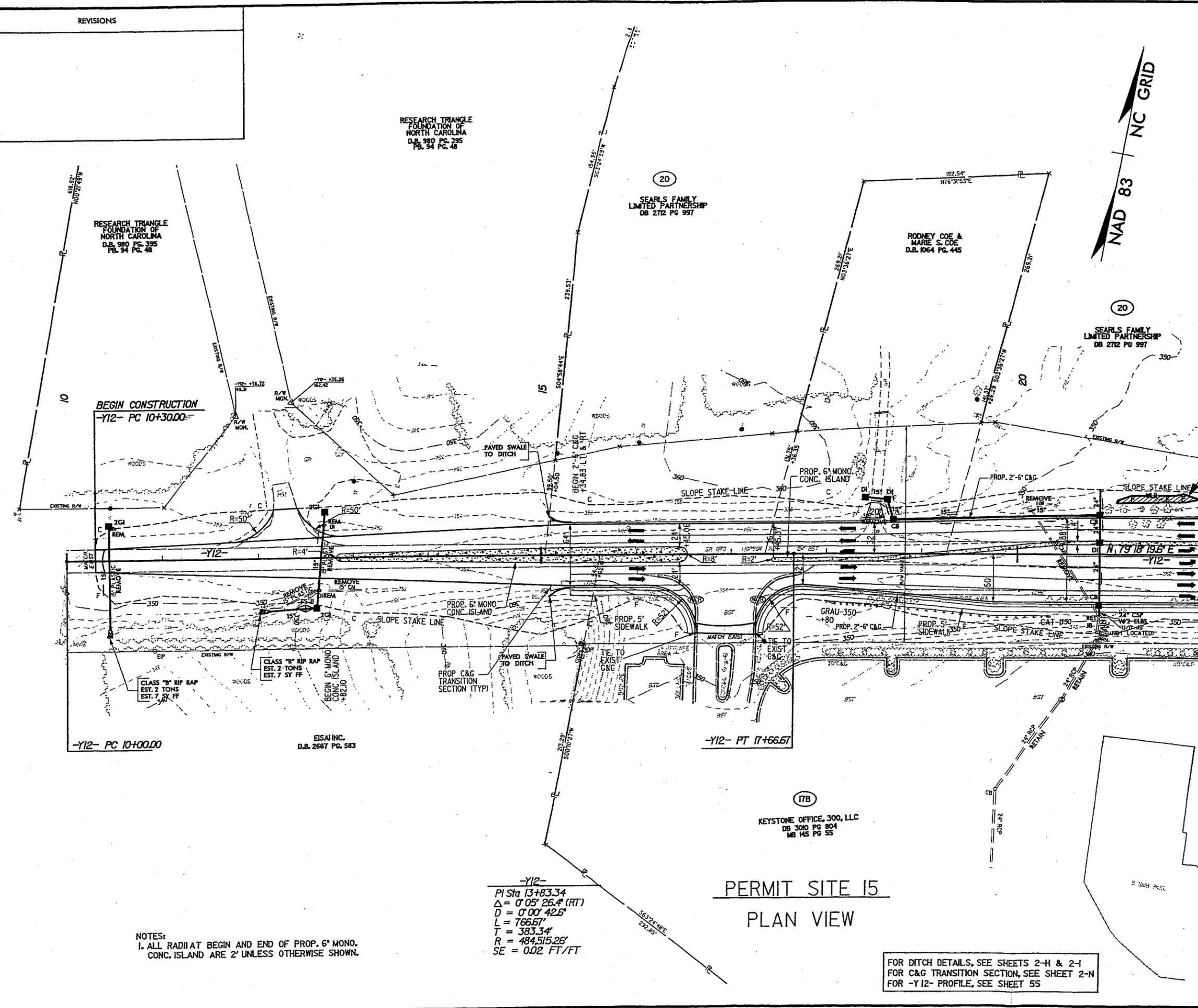
Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

FOR DITCH DETAILS, SEE SHEETS 2-H & 2-I  
FOR C&G TRANSITION SECTION, SEE SHEET 2-N  
FOR -Y12- PROFILE, SEE SHEET 55

## PERMIT SITE 15 PLAN VIEW

-Y12-  
PI Sta 13+83.34  
 $\Delta = 0^{\circ} 05' 26.4''$  (RT)  
D = 0' 00' 42.5"  
L = 166.57'  
T = 383.34'  
R = 484.515.26'  
SE = 0.02 FT/FT

NOTES:  
1. ALL RADII AT BEGIN AND END OF PROP. 6" MONO. CONC. ISLAND ARE 2' UNLESS OTHERWISE SHOWN.



REVISIONS

7/2/99  
2/23/2005  
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KO & Associates, P.C.

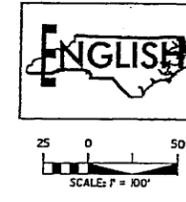
7/22/99  
3/23/2005  
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C. & Associates, P.C.

REVISIONS	

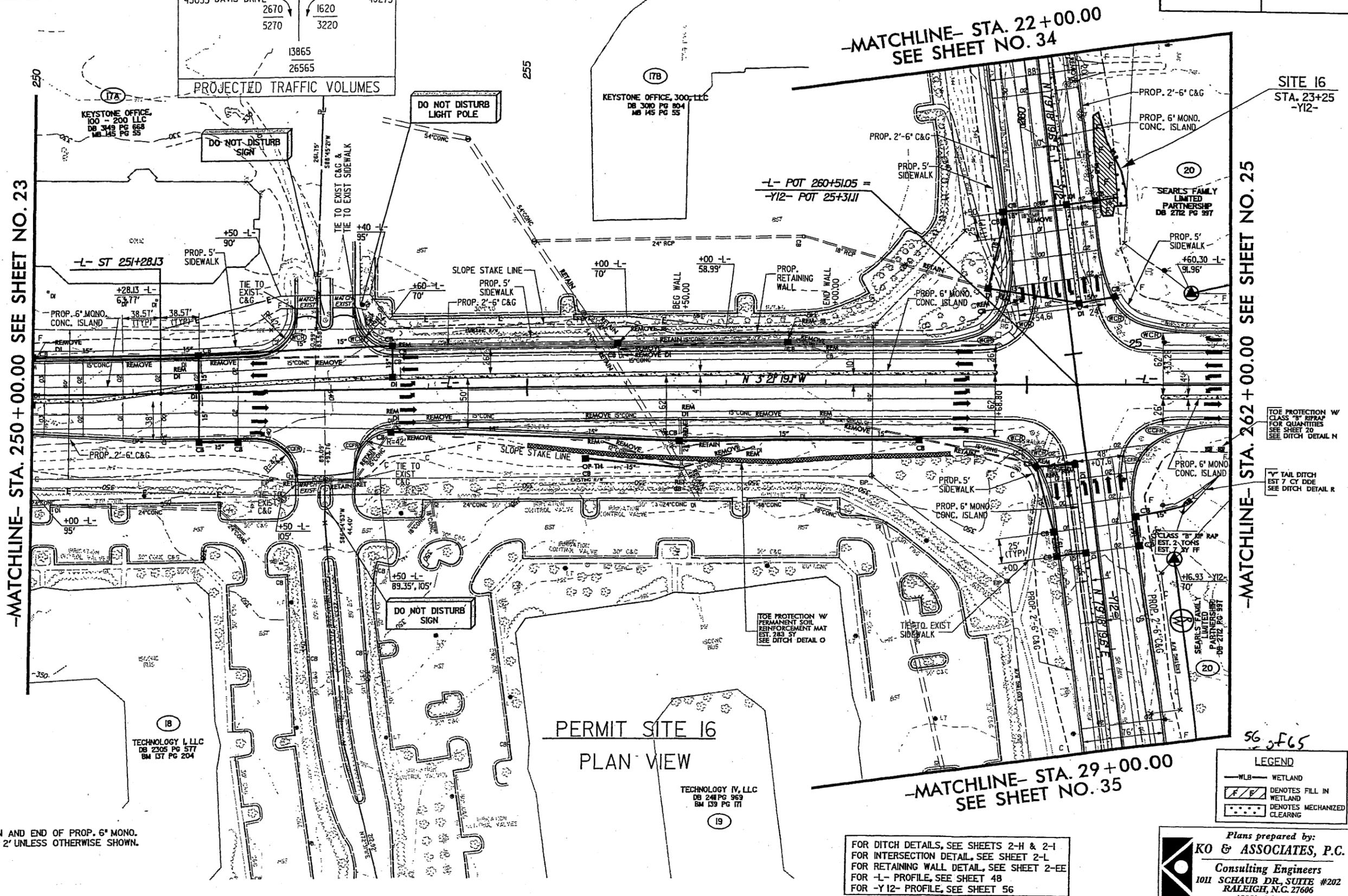
-Y12- SR 1978 (HOPSON RD)	
2004 ADT	16465
2024 ADT	3165
4300	2780
8100	5180
24155 -L-	21775
45055 DAVIS DRIVE	40275
2670	1620
5270	3220
13865	
26565	

PROJECTED TRAFFIC VOLUMES

NAD 83 | NC GRID



PROJECT REFERENCE NO. U-4026	SHEET NO. 24
U-4026B RW SHEET NO. 19	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-MATCHLINE- STA. 250 + 00.00 SEE SHEET NO. 23

-MATCHLINE- STA. 22 + 00.00  
SEE SHEET NO. 34

-MATCHLINE- STA. 262 + 00.00 SEE SHEET NO. 25

-MATCHLINE- STA. 29 + 00.00  
SEE SHEET NO. 35

PERMIT SITE 16  
PLAN VIEW

NOTES:  
1. ALL RADIAT BEGIN AND END OF PROP. 6\"/>

FOR DITCH DETAILS, SEE SHEETS 2-H & 2-I  
FOR INTERSECTION DETAIL, SEE SHEET 2-L  
FOR RETAINING WALL DETAIL, SEE SHEET 2-EE  
FOR -L- PROFILE, SEE SHEET 48  
FOR -Y12- PROFILE, SEE SHEET 56

LEGEND

	WETLAND
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

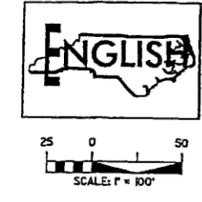
56 of 65

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REVISIONS

-Y12-	
SR 1978 (HOPSON RD)	
2004 ADT	16465
2024 ADT	31165
4300	2780
8100	5180
24155 -L-	21775
45055 DAVIS DRIVE	40275
2670	1620
5270	3220
13865	
26565	
PROJECTED TRAFFIC VOLUMES	

NAD 83 NC GRID

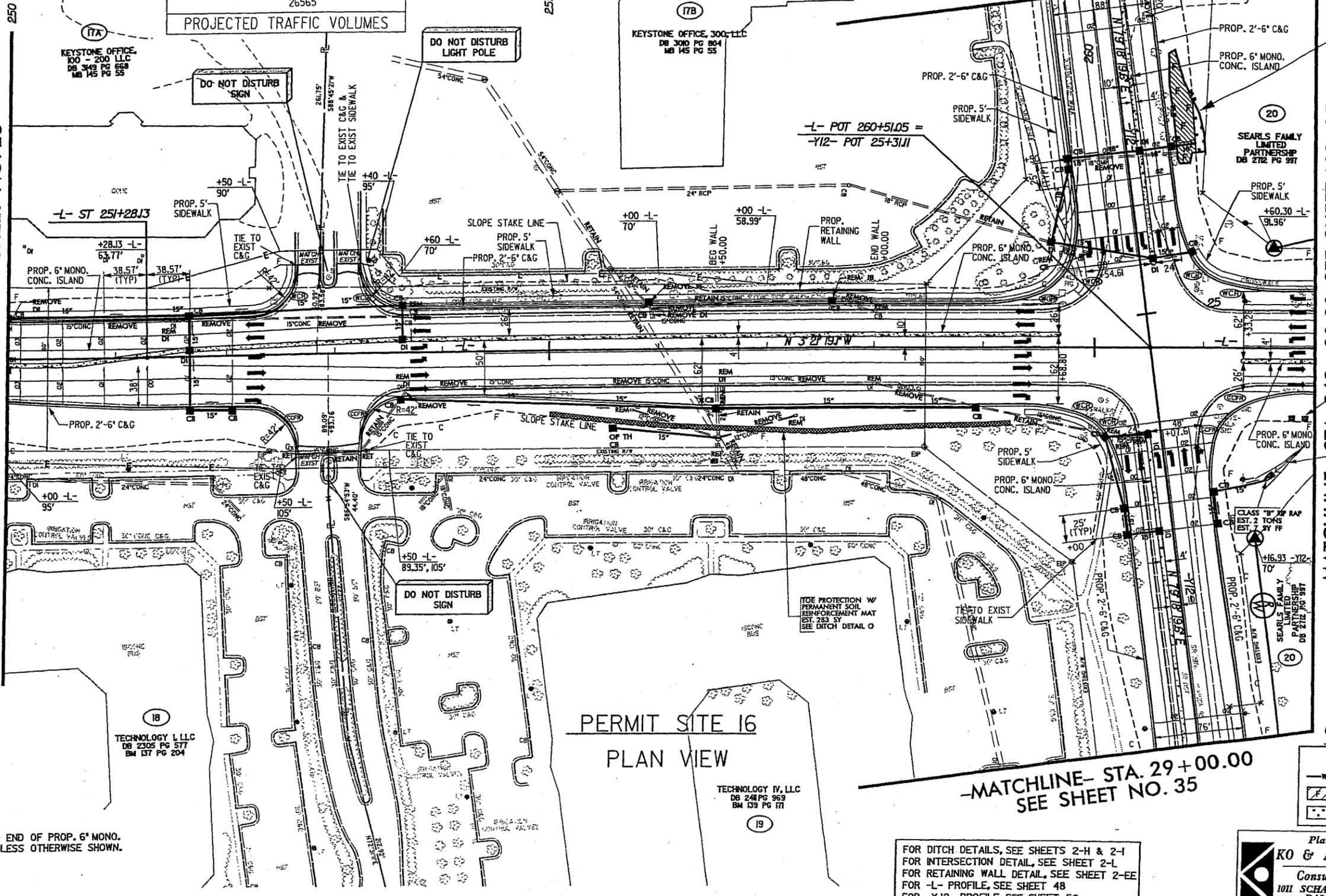


PROJECT REFERENCE NO.	SHEET NO.
U-4026	24
U-4026B RW SHEET NO.	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

-MATCHLINE- STA. 250 + 00.00 SEE SHEET NO. 23

-MATCHLINE- STA. 22 + 00.00  
SEE SHEET NO. 34

-MATCHLINE- STA. 262 + 00.00 SEE SHEET NO. 25



PERMIT SITE 16  
PLAN VIEW

NOTES:  
1. ALL RADIAT BEGIN AND END OF PROP. 6' MONO. CONC. ISLAND ARE 2' UNLESS OTHERWISE SHOWN.

FOR DITCH DETAILS, SEE SHEETS 2-H & 2-I  
FOR INTERSECTION DETAIL, SEE SHEET 2-L  
FOR RETAINING WALL DETAIL, SEE SHEET 2-EE  
FOR -L- PROFILE, SEE SHEET 48  
FOR -Y12- PROFILE, SEE SHEET 56

LEGEND

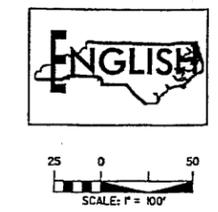
WLB	WETLAND
F/F	DENOTES FILL IN WETLAND
.....	DENOTES MECHANIZED CLEARING

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAU DR., SUITE #202  
RALEIGH, N.C. 27606  
(919)-851-6066

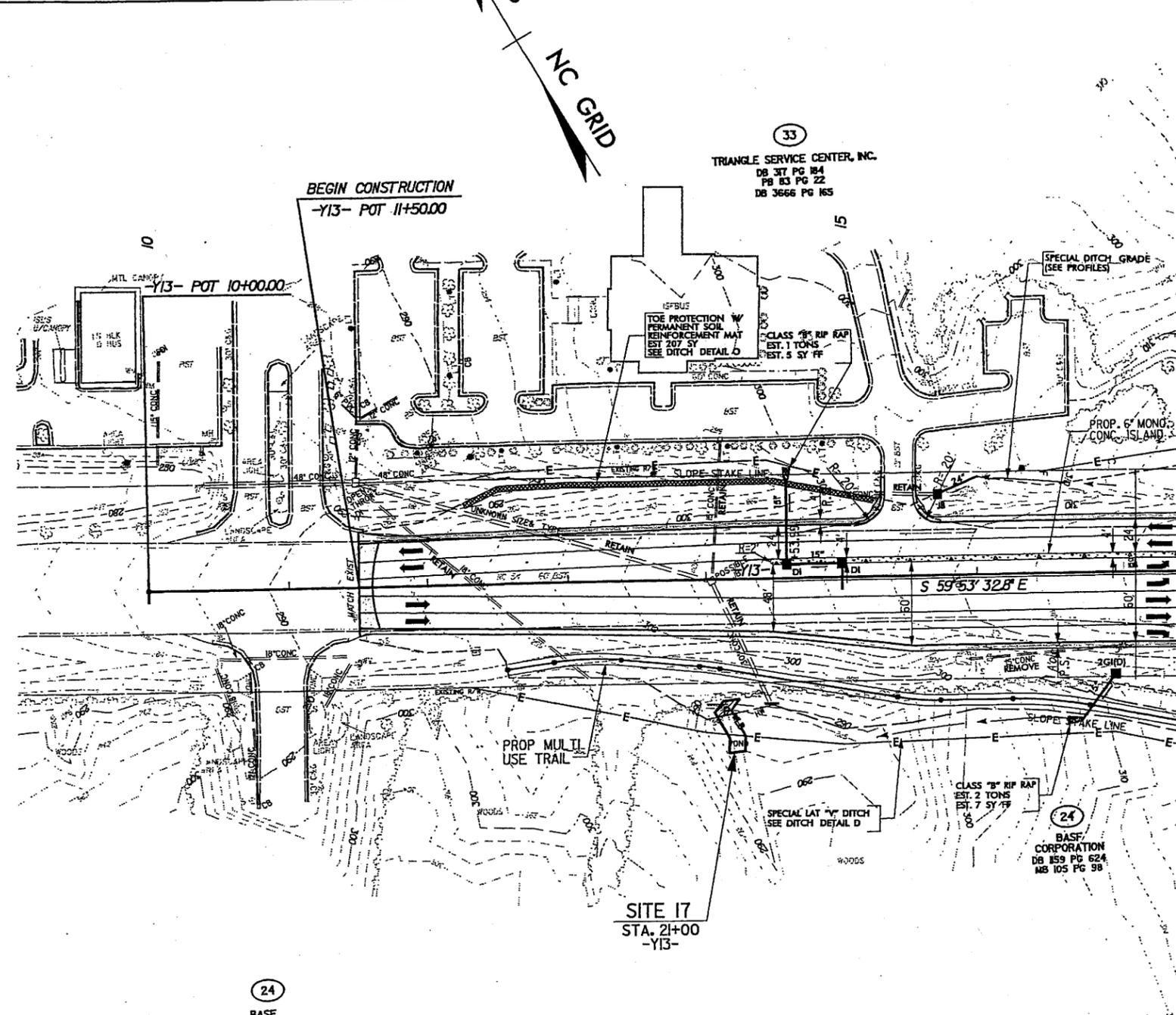
Sheet 57 of 65



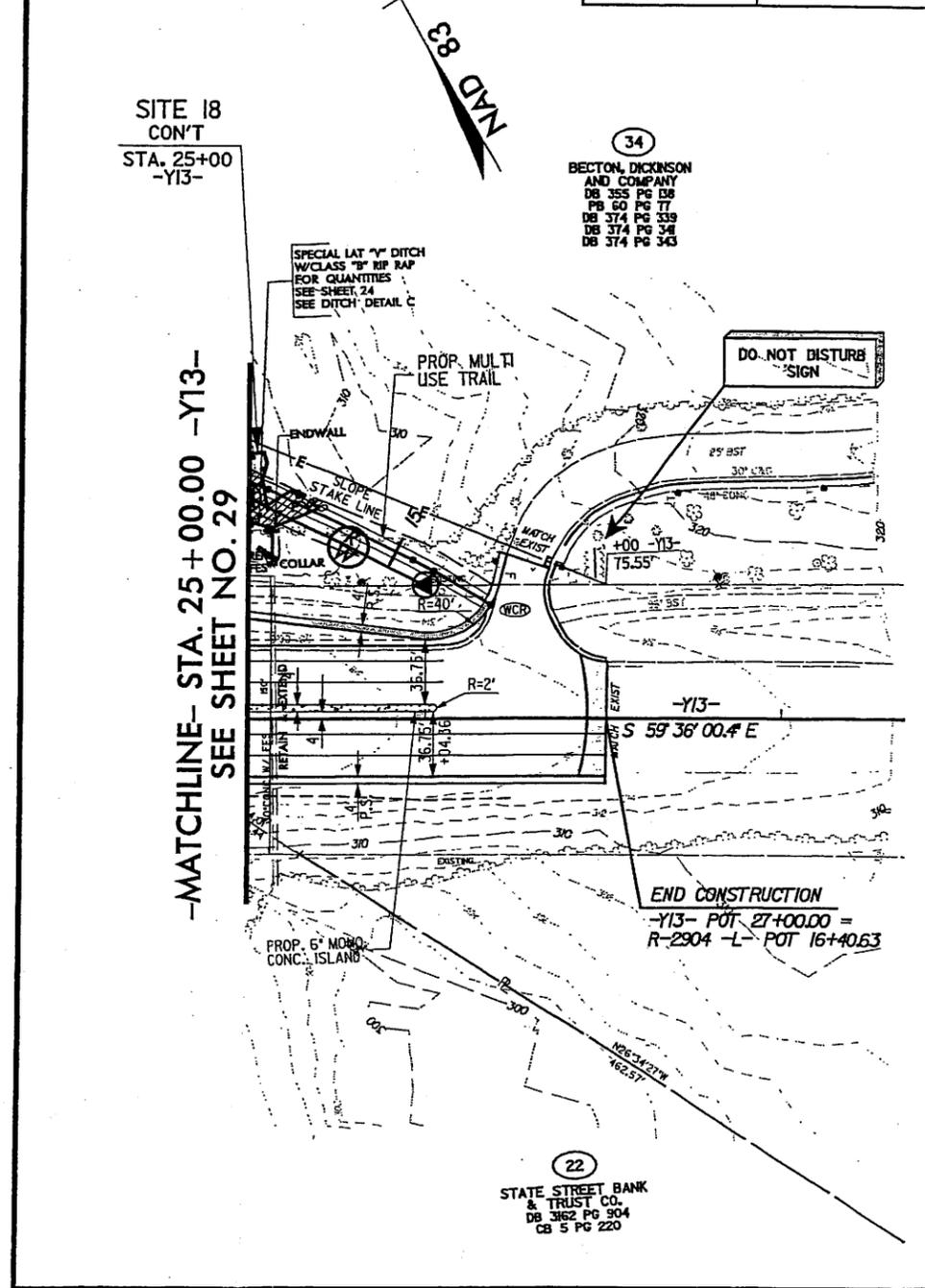
PROJECT REFERENCE NO.	SHEET NO.
U-4026	36
U-4026B RW SHEET NO.	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
DO NOT USE FOR CONSTRUCTION	



REVISIONS



-MATCHLINE- STA. 17 + 50.00 -Y13-  
SEE SHEET NO. 29



-MATCHLINE- STA. 25 + 00.00 -Y13-  
SEE SHEET NO. 29

**PERMIT SITES 17 & 18**  
**PLAN VIEW**

FOR DITCH DETAILS, SEE SHEETS 2-H & 2-I  
FOR C&G TRANSITION, SEE SHEET 2-N  
FOR TRAIL PLANS, SEE SHEETS 2-W & 2-X  
FOR -Y13- PROFILE, SEE SHEET 57

LEGEND	
	WETLAND
	DENOTES FILL IN WETLAND
	DENOTES FILL IN POND
	DENOTES SURFACE WATER LOSS
	DENOTES MECHANIZED CLEARING

59-65

Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
Consulting Engineers  
1011 SCHAUB DR., SUITE #202  
RALEIGH, N.C. 27606  
(919) 851-6066

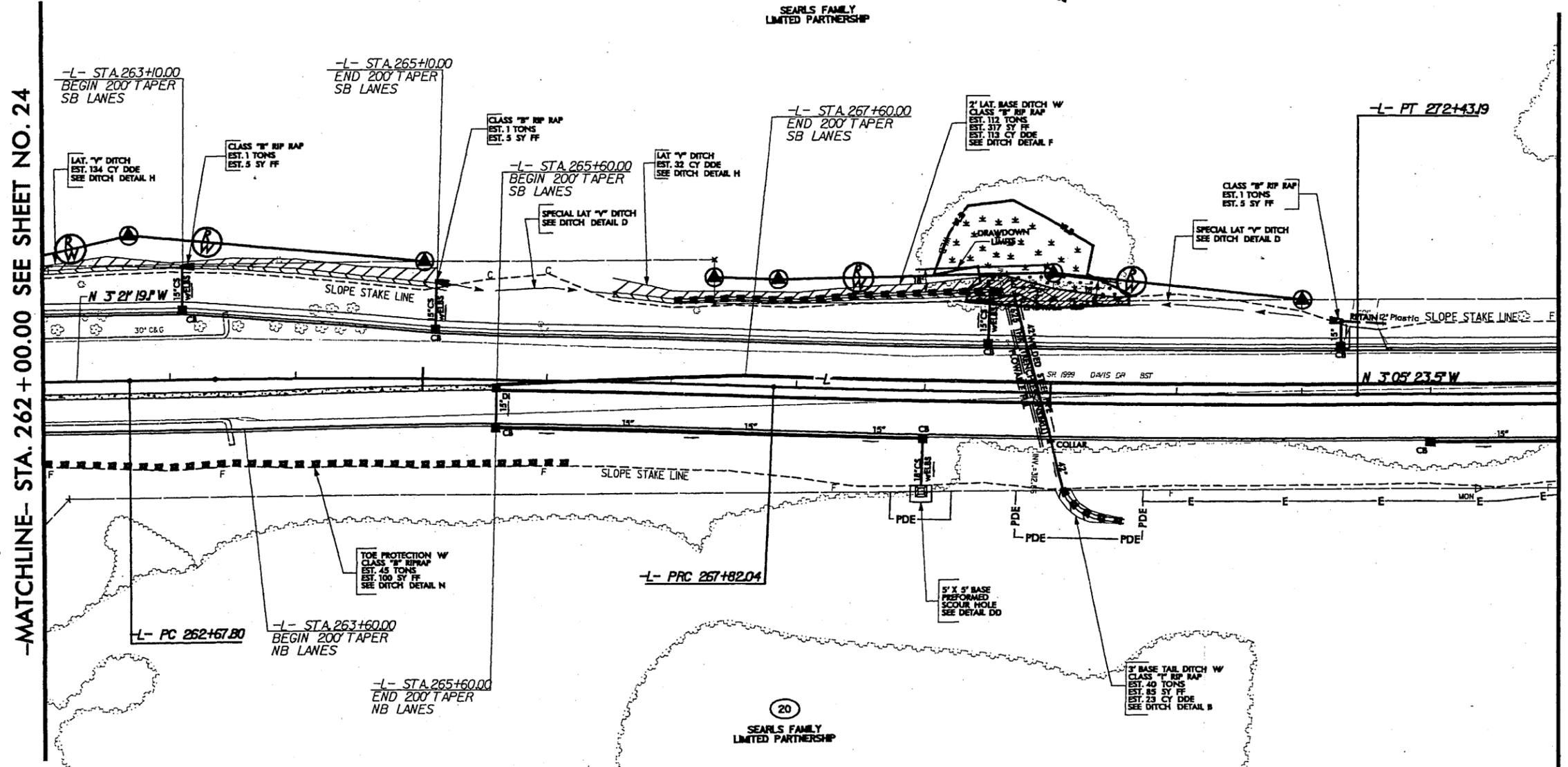
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KO & Associates, P.C.

REVISIONS

PROJECT REFERENCE NO. U-4026	SHEET NO. 25
U-4026B RW SHEET NO.	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NAD 83 | NC GRID

PI Sta 270+42.65  
 $\Delta = 2' 18" 20.7" (LT)$   
 $D = 0' 30" 00.0"$   
 $L = 461.5'$   
 $T = 230.6'$   
 $R = 11,459.16'$   
 $SE = 0.02 FT/FT$



PI Sta 265+24.97  
 $\Delta = 2' 34" 16.3" (RT)$   
 $D = 0' 30" 00.0"$   
 $L = 514.24'$   
 $T = 257.16'$   
 $R = 11,459.16'$   
 $SE = 0.02 FT/FT$

PERMIT SITE 19  
 PLAN VIEW

ADDITIONAL IMPACT DUE TO DRAWDOWN  
 SITE 19 0.009 AC

NOTES:  
 1. ALL RADIAT BEGIN AND END OF PROP. 6" MONO. CONC. ISLAND ARE 2' UNLESS OTHERWISE SHOWN.

LEGEND	
	WETLAND
	DENOTES FILL IN WETLAND
	DENOTES EXCAVATION IN WETLAND
	DENOTES MECHANIZED CLEARING

LEGEND	
	PAVED SHOULDER

FOR DITCH DETAILS, SEE SHEETS 2-H & 2-I  
 FOR -L- PROFILE, SEE SHEET 48

60-65  
 Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 1011 SCHAUH DR. SUITE #202  
 RALEIGH, N.C. 27606  
 (919) 851-6066

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REVISIONS

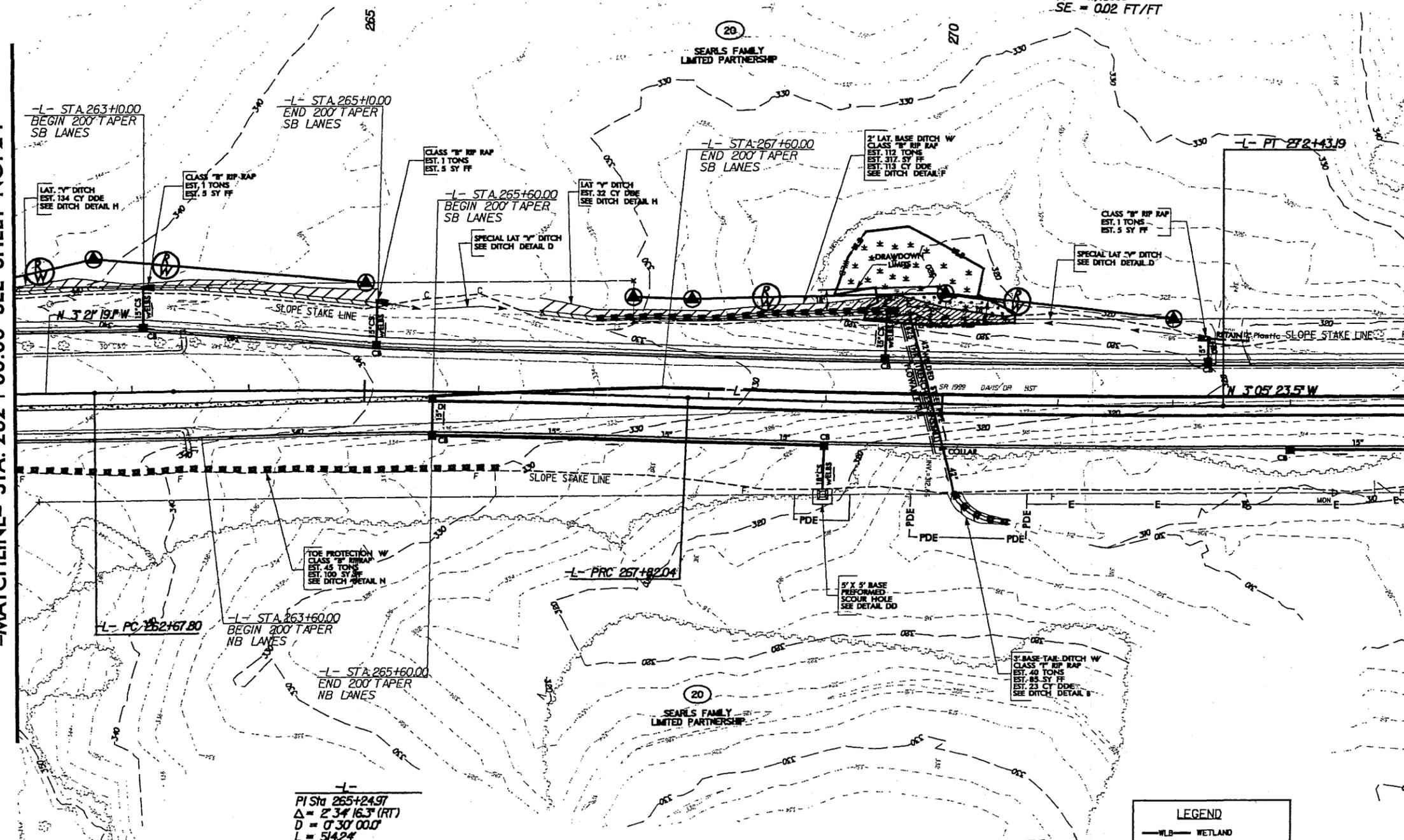
PROJECT REFERENCE NO.	SHEET NO.
U-4026	25
U-4026B RW SHEET NO.	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

NAD 83 | NC GRID

PI Sta 270+1265  
 $\Delta = 2' 18" 207" (LT)$   
 $D = 0' 30" 00.0'$   
 $L = 46115'$   
 $T = 230.61'$   
 $R = 11,459.16'$   
 $SE = 0.02 FT/FT$

-MATCHLINE- STA. 262 + 00.00 SEE SHEET NO. 24

-MATCHLINE- STA. 274 + 00.00 SEE SHEET NO. 26



PI Sta 265+24.97  
 $\Delta = 2' 34" 16.3" (RT)$   
 $D = 0' 30" 00.0'$   
 $L = 51424'$   
 $T = 257.16'$   
 $R = 11,459.16'$   
 $SE = 0.02 FT/FT$

### PERMIT SITE 19 PLAN VIEW

ADDITIONAL IMPACT DUE TO DRAWDOWN  
SITE 19 0.009 AC

NOTES:  
 1. ALL RADI AT BEGIN AND END OF PROP. 6" MONO. CONC. ISLAND ARE 2' UNLESS OTHERWISE SHOWN.

LEGEND

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

LEGEND

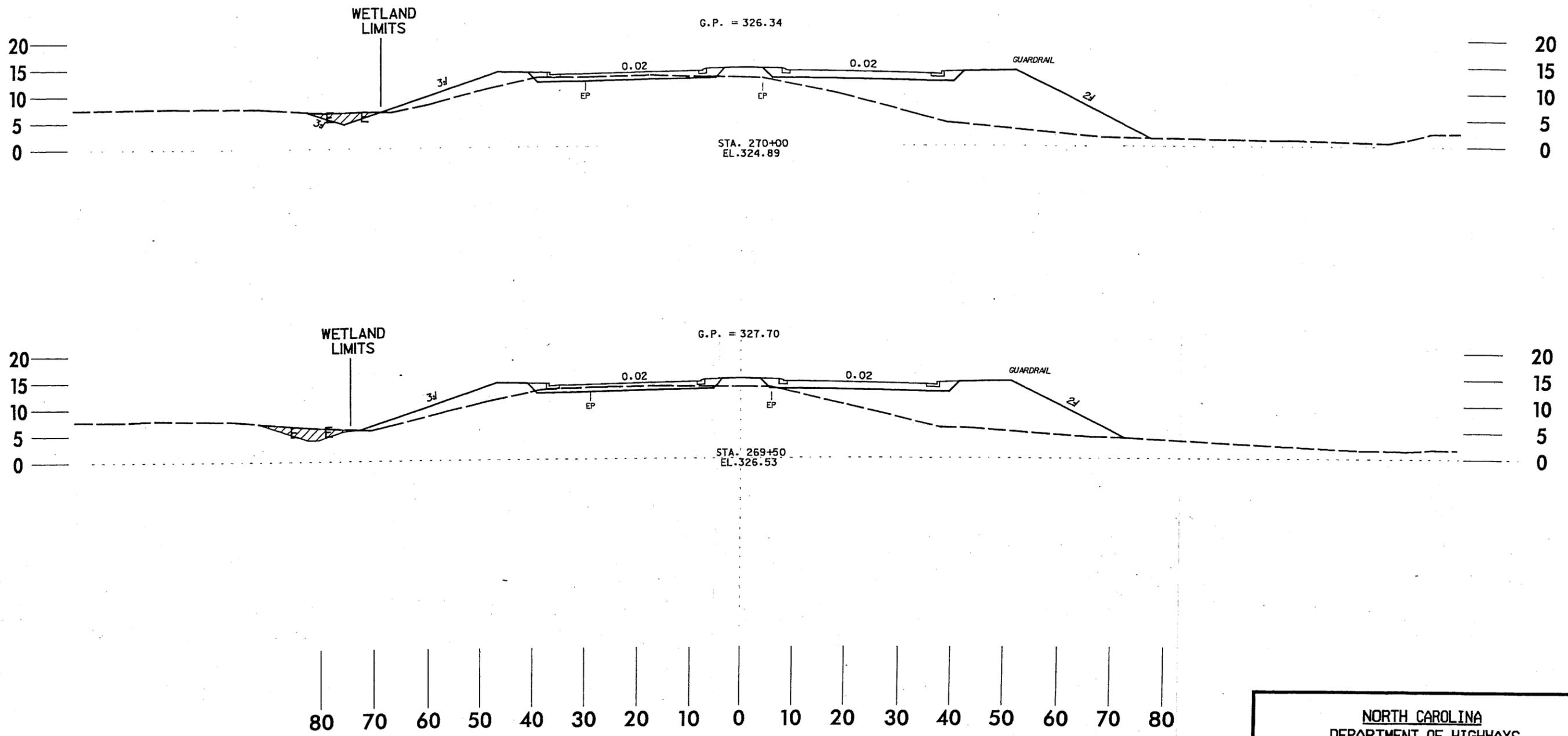
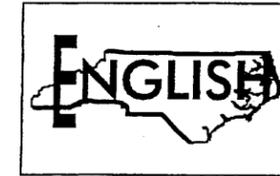
	PAVED SHOULDER
--	----------------

FOR DITCH DETAILS, SEE SHEETS 2-H & 2-I  
FOR -L- PROFILE, SEE SHEET 48

61-65  
 Plans prepared by:  
**KO & ASSOCIATES, P.C.**  
 Consulting Engineers  
 1011 SCHAUB DR., SUITE #202  
 RALEIGH, N.C. 27606  
 (919)-851-6066

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PROJECT REFERENCE NO. U-4026	SHEET NO. 25-XSEC
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



**LEGEND**

—WLB— WETLAND

DENOTES EXCAVATION IN WETLAND

**TYPICAL X-SECTIONS  
SITE 19**

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018JJ (U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

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

DATE: 07-28-05 SHEET 62 OF 65

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**RECEIVED**

OCT 28 2005

**RALEIGH REGULATORY FIELD OFFICE**

**WETLAND PERMIT IMPACT SUMMARY**

Site No.	Rdwy Sht No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS								
				Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (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	10-11	93+29 -L-	54" RCP / 48" SUPPL PIPE													
2	11	104+58 -L-	(2) 48" PIPES													
3	14	134+23 -L-	66" RCP / 72" SUPPL PIPE													
4	17-18	178+23 -L-	54" RCP / 66" SUPPL PIPE													
5	19	199+96 -L-	(2) 7' x 6' RCBC													
6	20-21	205+00 - 215+00 -L-	Embankment / Lateral	0.0230												
7	22	229+99.7 -L-	66" RCP / 72" SUPPL PIPE													
8	23	241+00 -L-	54" RCP													
9	26-27	286+57.6 -L-	66" RCP / 48" SUPPL PIPE													
10	27	293+82.1 -L-	(1) 8' x 6' RCBC / 60" SUPPL PIPE													
11	31	29+40 -Y5-	Embankment	0.0140												
12	31	31+50 -Y5-	15" RCP / Embankment	0.0120												
13	31	31+20 -Y5-	Embankment	0.0198												
14	31	34+80 -Y5-	18" RCP / Embankment	0.0090												
15	34	21+41 -Y12-	Embankment	0.0125												
16	24	23+25 -Y12-	18" RCP / Embankment	0.0361												
17	36	21+00 -Y13-	Embankment													
18	29&36	25+00 -Y13-	30" RCP w EW / Embankment / Trail	0.0267												
19	25	269+05-270+67 -L- Lt	Proposed Ditches	0.0130		0.0770										
<b>TOTALS:</b>				0.1661	0.0000	0.0770	0.0298	0.3282	0.0816	0.1191	2125	261				

\*\* The 0.077 ac of Excavation in Wetlands Sta 269+05 -L- Lt consists of 0.042 Excavated and 0.035 Drained

NC DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

WAKE COUNTY  
PROJECT: 35018.1.1 (U-4026)

Sheet 63 of 65

Form Revised 3/2/01

8/25/2005

# SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
①	RTP / PARKSIDE, L.L.C.	448 VIKING DR STE 220 VIRGINIA BEACH, VA 23452-7331	1
②	DIOSYNTH RTP, INC	100 N COLLEGE ST CHARLOTTE, NC 28255-0001	1
⑥ A,B,G&K	RESEARCH TRIANGLE FOUNDATION	P.O. BOX 12255 RTP, NC 27709	1,2,3,5, 6,7,9 & 10
⑧ A&B	BIOGEN REALTY, LLC	P.O. BOX 12255 DURHAM, NC 27709-2255	4,6 & 7
⑩B	CISCO SYSTEMS, INC	550 W C ST STE 1300 SAN DIEGO, CA 92101-8582	4
⑬A	EISAI, INC	P.O. BOX 12255 DURHAM, NC 27709-2255	7
⑮A	DAVIS DRIVE ASSOCIATES LTD	1002 E CHATHAM ST CARY, NC 27511	8
⑳	SEARLS FAMILY LIMITED PARTNERSHIP	4623 HOPSON RD MORRISVILLE, NC 27560	15, 16 & 19
㉒	NORTHERN TELECOM, INC	DEPT 8413 200 ATHENS WAY NASHVILLE, TN 37228-1397	9 & 10
㉓	BASF CORPORATION	3000 CONTINENTAL DR NORTH MT. OLIVE, NJ 07828	10
㉔	BASF CORPORATION	3000 CONTINENTAL DR NORTH MT. OLIVE, NJ 07828	17
㉔	BECTON, DICKINSON & COMPANY	PO BOX 12016 RTP, NC 27709-2016	18

**NORTH CAROLINA  
DEPARTMENT OF HIGHWAYS**

WAKE - DURHAM COUNTIES  
35018.L1(U-4026)

DAVIS DRIVE (SR 1613/1999) FROM 390' NORTH OF  
MORRISVILLE-CARPENTER RD (SR 3016) TO NC HWY 54

NOT TO SCALE

DATE: 06-29-05

Sheet 64 of 65'

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