




STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

November 6, 2003

MEMORANDUM TO: Mr. Jon G. Nance, P.E.
Division 5 Engineer

FROM:  Philip S. Harris, III, P.E., Manager
Office of the Natural Environment
Project Development and
Environmental Analysis Branch

SUBJECT: Wake County; NC 98 (Wake Forest Bypass) from West of US 1
to West of US 1A (South Main Street); TIP Number R-2809B;
State Work Order Number 8.1402501

Attached are the U. S. Army Corps of Engineers modified Individual permit and the Division of Water Quality 401 Certification. These permits authorize the construction of Section B only. All environmental permits have been received for the construction of this project.

PSH/eah

Attachment

cc: Ms. Debbie Barbour, P.E.
Mr. Omar Sultan
Mr. Jay Bennett, P.E.
Mr. David Chang, P.E.
Mr. Randy Garris, P.E.
Mr. Greg Perfetti, P.E.
Mr. Mark Staley
Mr. John F. Sullivan, III, FHWA
Mr. Chris Murray, Division 5 DEO

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

TELEPHONE: 919-715-1500
FAX: 919-715-1501

WEBSITE: www.NCDOT.ORG

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

PROJECT COMMITMENTS

NC 98 Bypass from US 1A to Jones Dairy Road
Wake Forest, Wake County
Federal Aid No. STP-98(1)
State Project No. 8.1402501
TIP No. R-2809B

In addition to the standard Section 404 Individual Permit (IP) General Conditions and Section 401 Water Quality Certification (WQC) Conditions, the following special commitments have been agreed to by NCDOT:

Commitments Developed Through Project Development and Design

All standard procedures and measures, including Best Management Practices for the Protection of Surface Waters and Sedimentation, will be implemented to avoid or minimize environmental impacts.

Roadway Design Unit and Hydraulics Unit

Hazardous spill catch basins which are warranted on this project will be installed in accordance with the criteria set forth in Mr. Dorney's (DEM) 5/22/95 memorandum: Streams classified as Outstanding Resource Waters (ORW) or WS-I: and streams within ½ mile of the critical areas in streams classified as WS-II, WS-III or WS-IV. Final determination will be made during final design.

After reviewing the criteria for installation of hazardous spill catch basins during final design, it was determined that these basins were not warranted and will not be constructed. Retention basins will be installed per the Neuse River Riparian Buffer Rules.

Roadway Design Unit and Right of Way Branch

NCDOT will not acquire any right of from the Purefoy-Dunn plantation as currently listed on the National Register until the Keeper of the National Register has approved the requested boundary revision.

No right of way was acquired from the Purefoy-Dunn plantation during the acquisition of right-of-way for this project.

PDEA

Impacts to Waters of the U.S. will be in the form of wetlands and surface water impacts at stream crossings. These impacts require an Department of the Army Section 404 Individual Permit, as well as an Individual Section 401 Water Quality Certification from the NC Division of Water Quality.

Commitments Developed Through Permitting

Division 5 Construction and Road side Environmental

401 Special Condition 7-All channel relocations will be constructed in a dry work area, and stabilized before the 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 on both sides of the channel to the maximum extent practical. A transitional phase incorporating coir fiber and seedling establishment is allowable. Also, rip-rap may be allowable 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.

401 Special Condition 18-Riparian vegetation must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.

Roadside Environmental, Division 5 Construction, and Hydraulics

401 Special Condition 9- Placement of culverts and other structures in waters, streams, and wetlands must be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. 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 stream beds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that the equilibrium shall be maintained if requested in writing by the DWQ.

PDEA

401 Special Condition 10- No additional compensatory mitigation for impacts to streams shall be required.

401 Special Condition 11- Additional compensatory mitigation for impacts to non-riverine wetlands shall be done for 0.02 acres. Applying a replacement ratio of 2:1, total mitigation for 0.04 acres of non-riverine shall be as described below:

Mitigation Site	Acres of Wetland Debited from site	Type of Mitigation	Replacement Ratio	Acres of Mitigation Credited
WRP	0.04	Restoration	1:1	0.04

401 Special Condition 13- Compensatory mitigation for impacts to Neuse Riparian Buffer Rules shall be provided for as described below:

Zone of Impact	Impacts (Square Feet)	Replacement Ratio	Total Square Feet of Mitigation Required
Zone 1	9,727	3:1	29,181
Zone 2	1,040	1.5:1	1,560
Total	10,767		30,741

Mitigation for unavoidable impacts to Neuse Riparian Buffers shall be provided through an in-lieu payment to the North Carolina Wetlands Restoration Program (NCWRP) at a rate of \$0.96 per square feet for the 30,741 square feet of buffer impact. Therefore, a total payment of \$29,511.36 shall be submitted to the NCWRP to offset the impacts for this project. No Construction activities in buffers shall begin until payment for buffer mitigation is made to the NCWRP.

Division 5 Construction and Hydraulics

401 Special Condition 25- 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.

UBF



DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS

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

October 30, 2003

IN REPLY REFER TO

Regulatory Division

SUBJECT: Action ID 199601836; TIP No. R-2809B

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

Dear Dr. Thorpe:

Reference the Department of the Army permit issued on April 4, 2002 (AID 199601836; TIP R-2809; NC 98 Wake Forest Bypass), for the discharges of fill material in waters of the United States, including wetlands, to facilitate construction of Sections A, B and C of the NC 98 Wake Forest Bypass, generally southeast of Wake Forest, in Wake County, North Carolina. Reference also your July 18, 2003 letter requesting modification of the permit, to authorize additional permanent and temporary wetland impacts in Section B of 0.02 acre total, for necessary minor revisions in final construction design to add an energy dissipater.

We have reviewed your proposal and have determined that the additional wetland impacts are minor, and an additional public notice is not necessary. Therefore, the permit is hereby modified to authorize additional impacts in Section B, for 0.009 acre of excavation and 0.008 acre of mechanized clearing in a wetland, as shown on the attached drawings (Sheets 1-26 of 26).

It is understood that all other conditions of the permit, including the expiration date, remain applicable. Should you have questions, contact Mr. Eric Alsmeyer of my Raleigh Field Office regulatory staff at telephone (919) 876-8441, extension 23.

Sincerely,

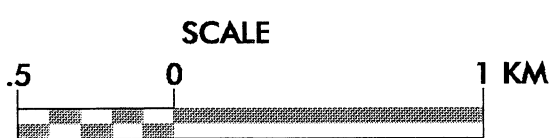
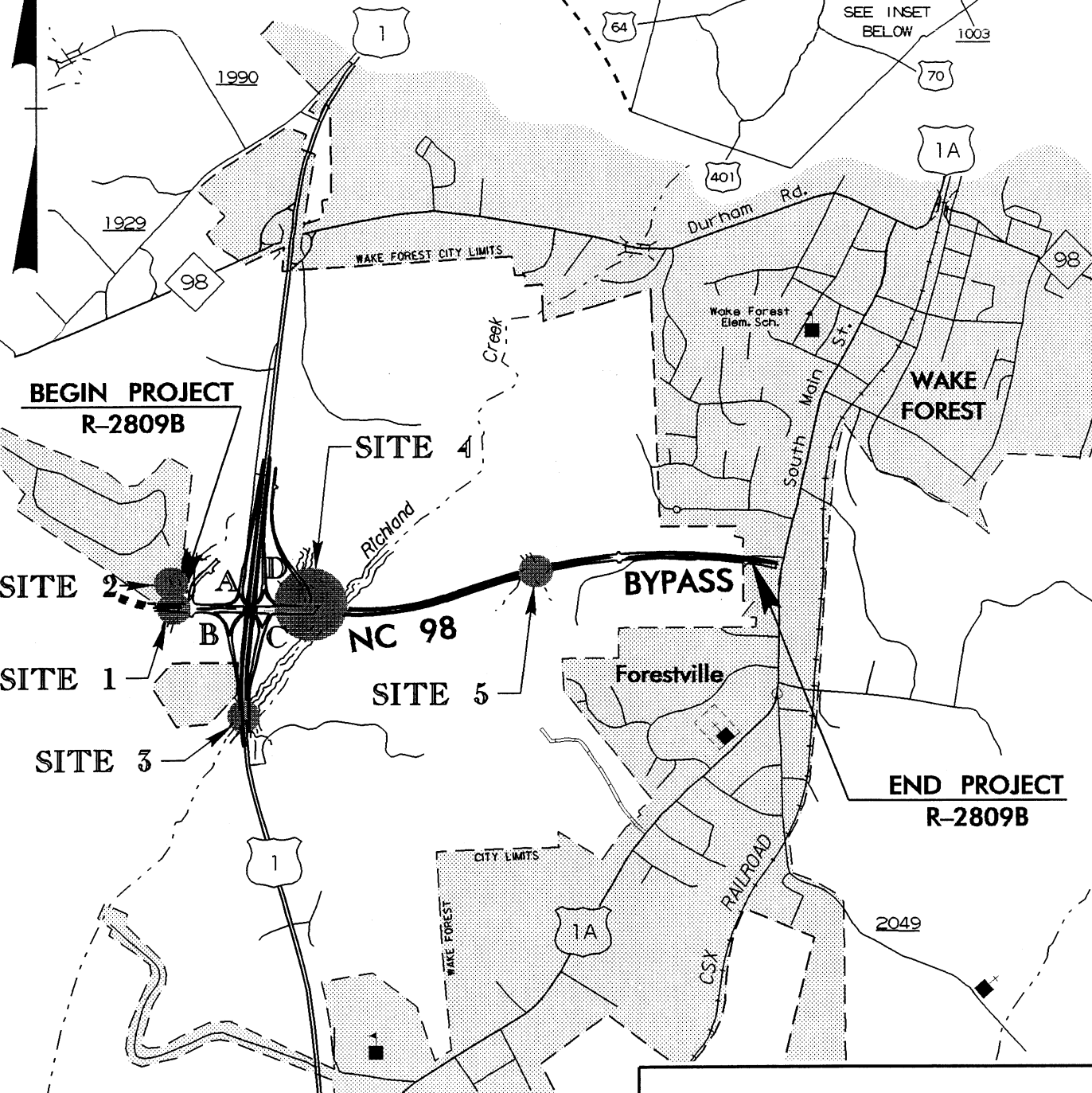
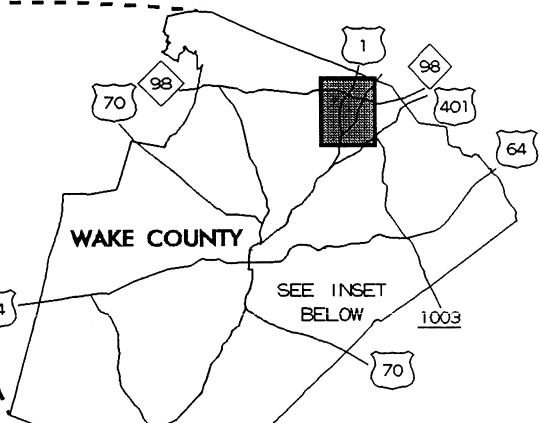
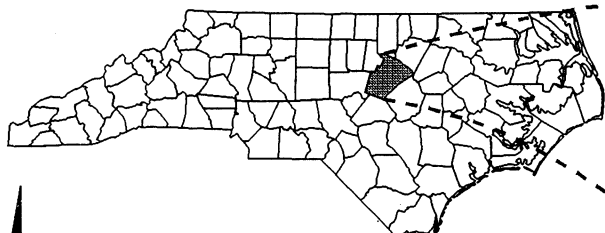
for Charles R. Alexander, Jr.
Colonel, U.S. Army
District Engineer

Copies Furnished (with attachment):

Ms. Emily Lawton
Federal Highway Administration
310 New Bern Ave., Rm. 410
Raleigh, North Carolina 27601-1442

Mr. John Dorney
Division of Water Quality
North Carolina Department of
Environment and Natural Resources
1650 Mail Service Center
Raleigh, NC 27699-1650

NCDOT
Division of Highways
ATTN: Chris Murray
2612 Duke Street
Durham, North Carolina 27704



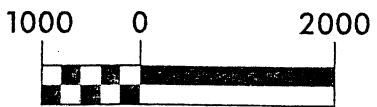
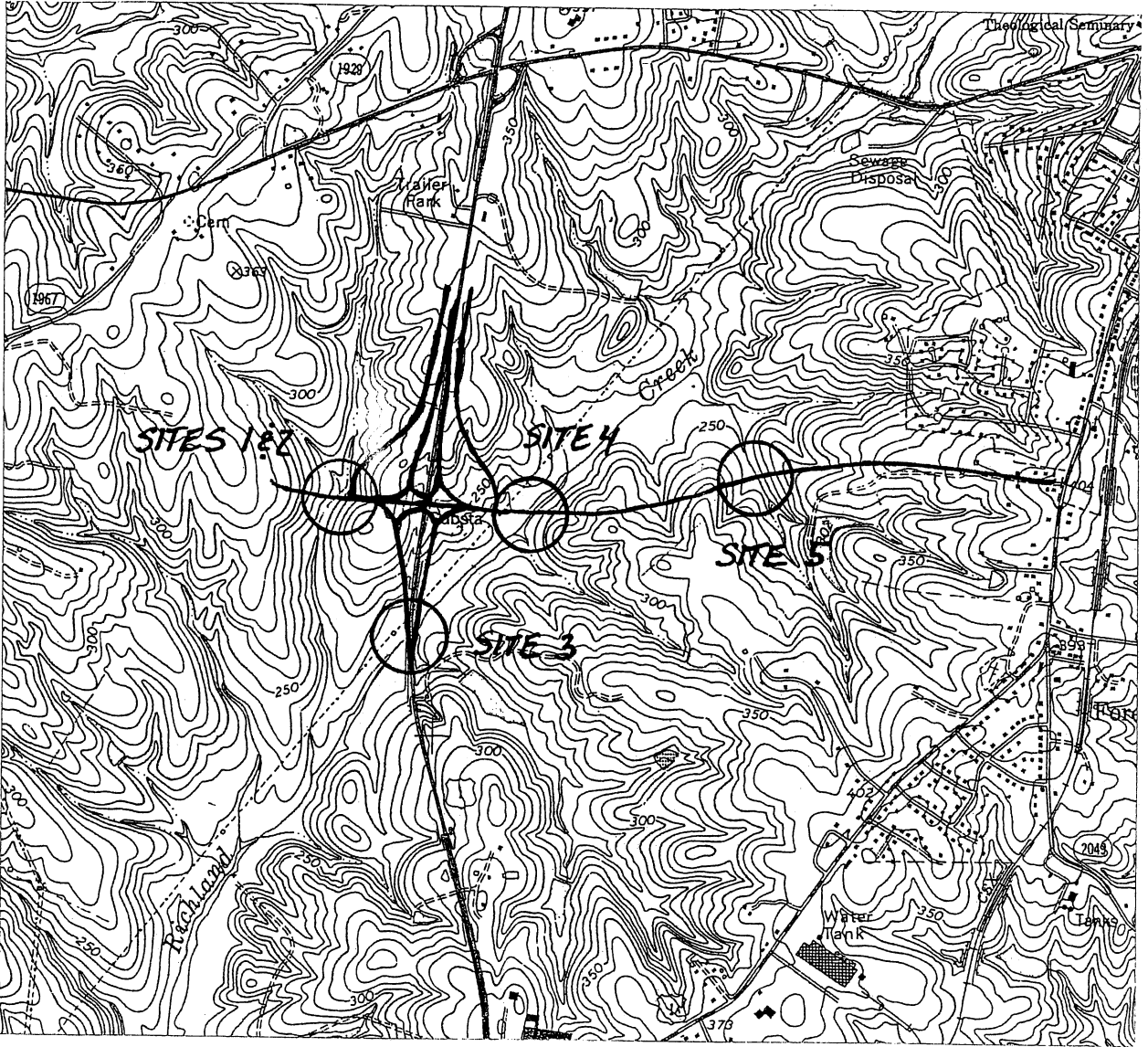
WETLAND

N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)
 NC 98 WAKE FOREST BYPASS

SHEET 1 OF 26 6/03



WETLAND

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

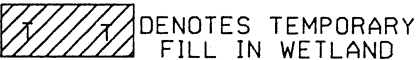
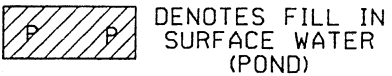
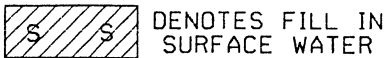
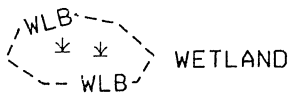
PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS

SHEET 2 OF 26

6/03

LEGEND

---WLB--- WETLAND BOUNDARY



←← 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

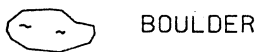
—PDE— PERMANENT DRAINAGE EASEMENT

—EAB— EXIST. ENDANGERED ANIMAL BOUNDARY

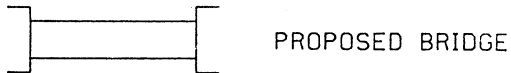
—EPB— EXIST. ENDANGERED PLANT BOUNDARY

▽ WATER SURFACE

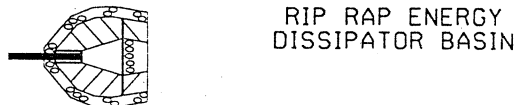
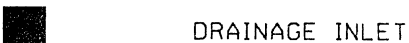
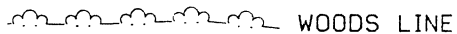
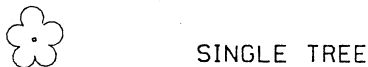
X X X LIVE STAKES



--- COIR FIBER ROLLS



(DASHED LINES DENOTE EXISTING STRUCTURES)



N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

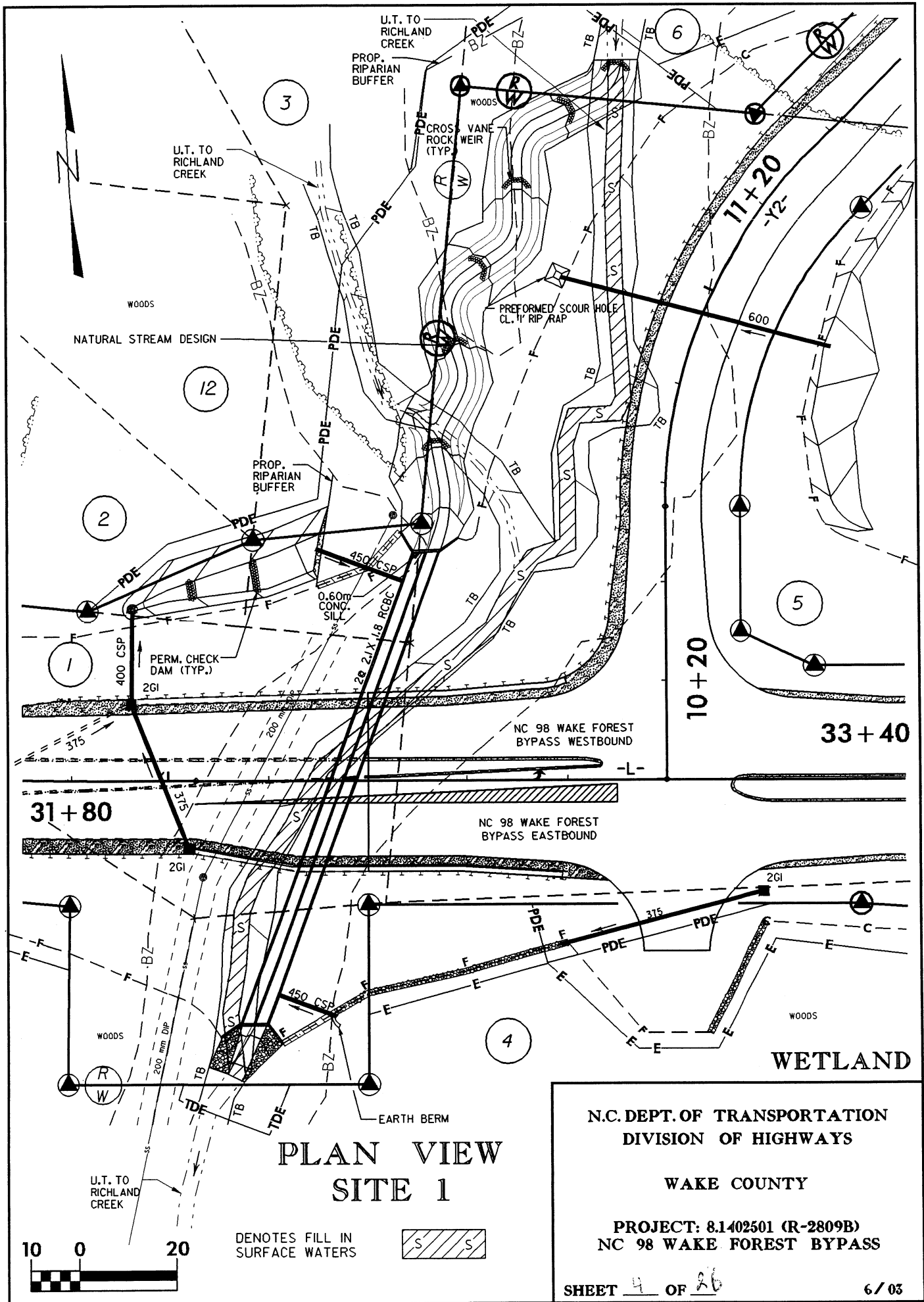
WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)
NC-98 WAKE FOREST BYPASS

WETLAND

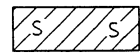
SHEET 3 OF 26

8/03



**PLAN VIEW
SITE 1**

DENOTES FILL IN SURFACE WATERS



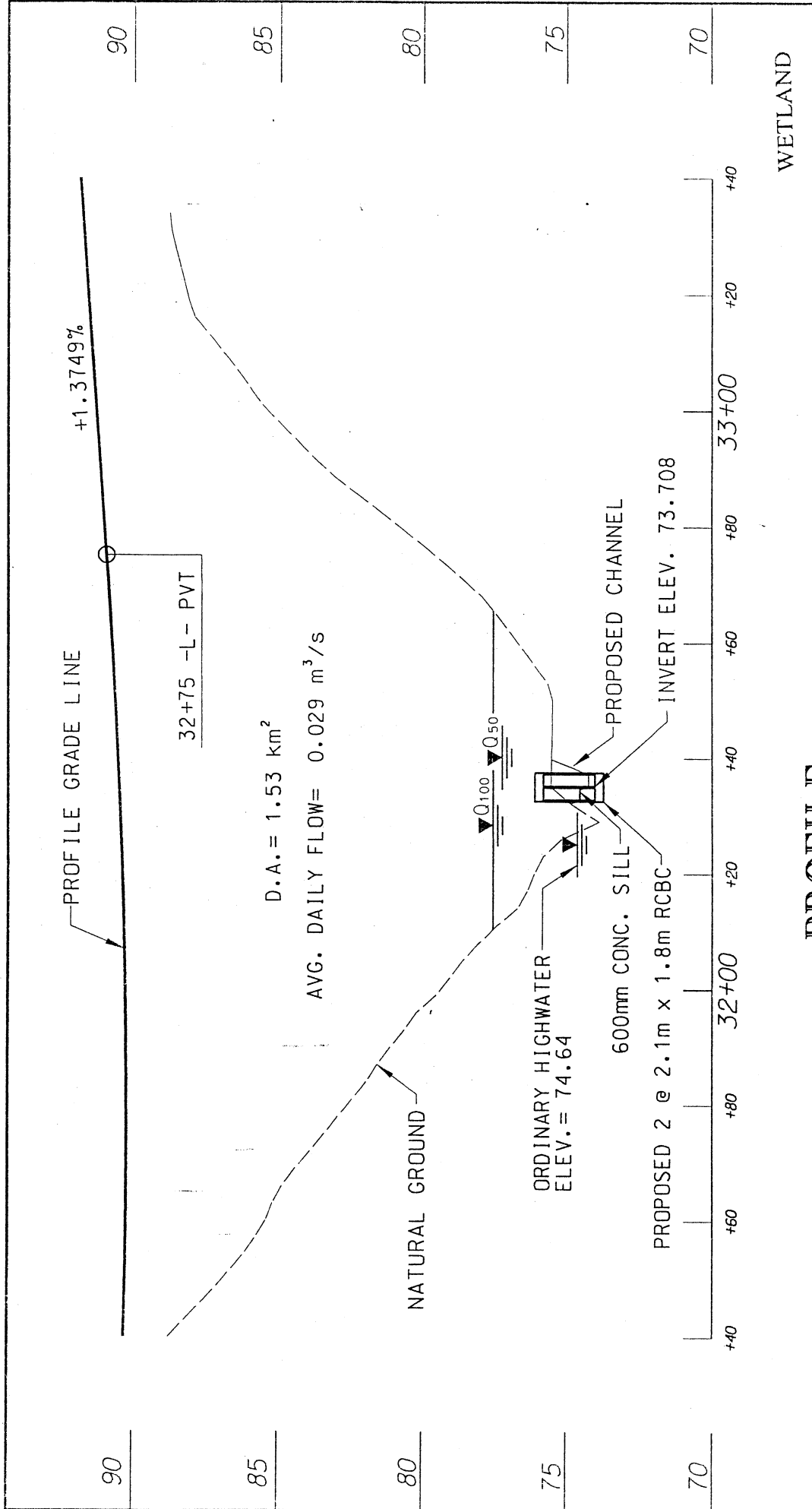
**N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS**

WAKE COUNTY

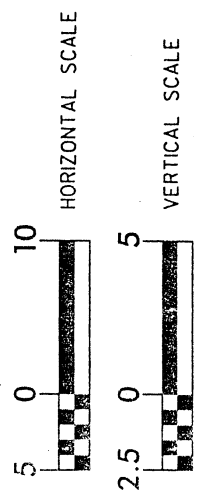
**PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS**

SHEET 4 OF 26

6/03



PROFILE SITE 1



N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS

SHEET 5 OF 26

6/03

NCDOT Project No. 8.1402501
T.I.P. No. R-2809B
Wake County, NC
NC 98 (Wake Forest Bypass) from
West of US 1 to West of US 1A (South Main Street)

NATURAL STREAM DESIGN
UNNAMED TRIBUTARY TO RICHLAND CREEK

Left of -Y2- Project Station 11+25

Prepared by:
TranSite Consulting Engineers, Inc.
1300 Paddock Drive, Suite G-10
Raleigh, NC 27609

NATURAL STREAM DESIGN
UNNAMED TRIBUTARY TO RICHLAND CREEK

Left of -Y2-Project Station 11+25

The construction of NC 98 (Wake Forest Bypass) from West of US 1 to West of US 1A (South Main Street) will require that a portion of an unnamed tributary to Richland Creek be relocated left of -Y2- (Retail Drive). The proposed channel will be 117m (384') in length starting left of -Y2- Station 10+40 at the inlet of the proposed 2 @ 2.1m x 1.8m (2 @ 7'x 6') RCBC and continue upstream to left -Y2- Station 11+25. The proposed channel is designed according to "Natural Channel" design principles proposed by Dave Rosgen.

This unnamed tributary to Richland Creek drains 85 hectares (210 acres) in northern Wake County. Existing and future land uses within the drainage basin are predominantly low to medium density residential with commercial along the major roadway corridors. Currently, there is a large commercial development under construction directly upstream of this proposed design. A review of plans for the development indicates that stormwater detention basins will be constructed to treat and control runoff from the site.

There is no hydraulic data available on this stream. Discharges were estimated using procedures outlined in USGS Water-Resources Report 96-4084, Estimation of Flood-Frequency Characteristics of Small Urban Watersheds in North Carolina.

EXISTING STREAM

A 117.6m (386') section of the existing stream was surveyed in detail to determine morphological characteristics. Those characteristics include bankfull discharge, width, depth and area. This section of stream was chosen because it will be a portion lost due to the construction of -Y2-.

Based on the field survey data gathered, this stream reach was classified as an E4 stream. The bed material for this reach was found to be a medium sand with gravel and cobbles. The HEC-RAS computer model was used to determine the hydraulic characteristics of the stream such as velocity, shear stress and stream power.

REFERENCE STREAM

Since the NC Stream Restoration Institute does not currently have regional curves or equations for urban areas within the piedmont region, the Existing Stream will also be the Reference Reach. Design and morphological data for the Existing/Reference and Proposed streams are shown in the "Morphological Measurement Table".

PROPOSED CHANNEL

The proposed stream was designed to have an E4 classification retaining the bankfull characteristics of the existing/reference stream. The gradient for the proposed stream is controlled upstream by the tie to the existing channel and downstream by the invert of the proposed RCBC. To facilitate formation of a natural streambed through the RCBC, the upstream and downstream inverts will be buried a minimum of 0.3m (1.0'). Additionally, a 0.6m (2.0') concrete sill will be placed in the inlet of the right RCBC barrel to restrict normal flows to one barrel and maintain a relatively normal depth of flow through the structure.

Proposed stream stabilization is shown on the attached detail sheet. It is anticipated that the stream banks will be planted with native trees and shrubs above bankfull depth. To aid in stability and reduce stream gradient, cross vane rock weirs with 0.15m (0.5') channel drops will be placed downstream of all meanders. Along the outside of the bends, root wads will be placed and coir fiber mat will line both stream banks. The stream bottom will match the characteristics of the existing channel.

SEDIMENT TRANSPORT ANALYSIS

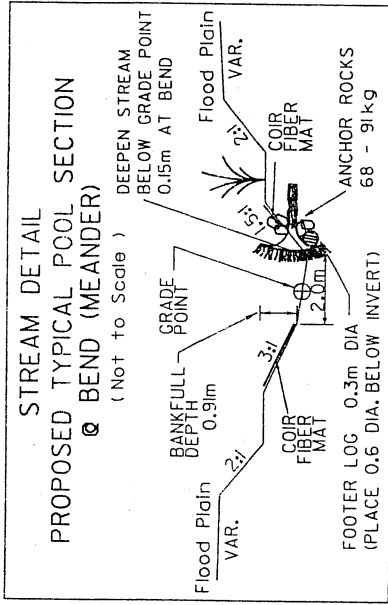
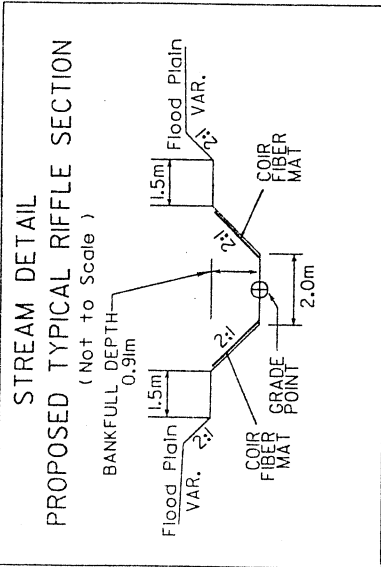
The proposed stream has a bankfull stream power of 1.91 lb/ft-s and a shear stress of 0.59 lb/ft² as compared to 6.26 lb/ft-s and 1.33 lb/ft² for the existing stream. These reduced values indicate that the proposed stream will be more stable than the existing stream and reduce bed and bank degradation.

Appendix B

Morphological Measurement Table
R-2809B, Wake Co.

Variables	Existing Channel	Proposed Reach	USGS Station	Reference Reach
1. Stream Type	E4	E4	-	E4
2. Drainage Area (D.A.)	85 ha / 210 ac	85 ha / 210 ac	-	85 ha / 210 ac
3. Bankfull Width (W_{bkt})	4.18 m / 13.7 ft	5.49 m / 18.0 ft	-	4.18 m / 13.7 ft
4. Bankfull Mean Depth (d_{bkt})	0.55 m / 1.81 ft	0.61 m / 2.00 ft	-	0.55 m / 1.81 ft
5. Width/Depth Ratio (W_{bkt}/d_{bkt})	7.6	9.05	-	7.6
6. Bankfull Cross-Sectional Area (A_{bkt})	2.30 m ² / 24.8 ft ²	3.36 m ² / 36.2 ft ²	-	2.30 m ² / 24.8 ft ²
7. Bankfull Mean Velocity (V_{bkt})	1.43 m/s / 4.70 ft/s	0.98 m/s / 3.22 ft/s	-	1.43 m/s / 4.70 ft/s
8. Bankfull Discharge (Q_{bkt})	3.31 m ³ /s / 117 ft ³ /s	3.31 m ³ /s / 117 ft ³ /s	-	3.31 m ³ /s / 117 ft ³ /s
9. Bankfull Max Depth (d_{mbkt})	0.79 m / 2.60 ft	0.91 m / 3.00 ft	-	0.79 m / 2.60 ft
10. Width of Floodprone Area (W_{fpa})	30 m / 100 ft	23 m / 76 ft	-	30 m / 100 ft
11. Entrenchment Ratio (W_{fpa}/W_{bkt})	7.18	4.19	-	7.18
12. Meander Length (L_m)	27.5 m / 90 ft	35 m / 115 ft	-	27.5 m / 90 ft
13. Ratio of Meander Length to Bankfull Width (L_m/W_{bkt})	6.58	6.38	-	6.58
14. Radius of Curvature (R_c)	7.22 m / 23.7 ft	18.5 m / 60.7 ft	-	7.22 m / 23.7 ft
15. Ratio of Radius of Curvature to Bankfull Width (R_c/W_{bkt})	1.73	3.37	-	1.73
16. Belt Width (W_{bit})	15 m / 50 ft	12 m / 40 ft	-	15 m / 50 ft
17. Meander Width Ratio (W_{bit}/W_{bkt})	3.59	2.19	-	3.59
18. Sinuosity (K) (stream length/valley length)	1.07	1.02	-	1.07
19. Valley Slope (VS)	1.05%	1.05%	-	1.05%
20. Average Slope (CS)	0.98%	1.03%	-	0.98%
21. Pool Slope	0.45%	0.00%	-	0.45%
22. Ratio of Pool Slope to Average Slope	0.46	0.00	-	0.46
23. Maximum Pool Depth (dp_{max})	1.00 m / 3.81 ft	1.06 m / 3.48 ft	-	1.00 m / 3.81 ft
24. Ratio of Pool Depth to Average Bankfull Depth (dp/d_{bkt})	1.82	1.74	-	1.82
25. Pool Width (W_p)	6.15 m / 20.2 ft	6.28 m / 20.6 ft	-	6.15 m / 20.2 ft
26. Ratio of Pool Width to Bankfull Width (W_p/W_{bkt})	1.47	1.19	-	1.47
27. Pool to Pool Spacing	19 m / 62 ft (avg.)	19.5 m / 64 ft	-	19 m / 62 ft (avg.)
28. Ratio of Pool to Pool Spacing to Bankfull Width	4.5	3.6	-	4.5
29. Ratio of Lowest Bank Height to Bankfull Height (or Max Bankfull Depth) (Bh_{low}/d_{mbkt})	0.69	0.67	-	0.69

NATURAL STREAM DESIGN TYPICALS

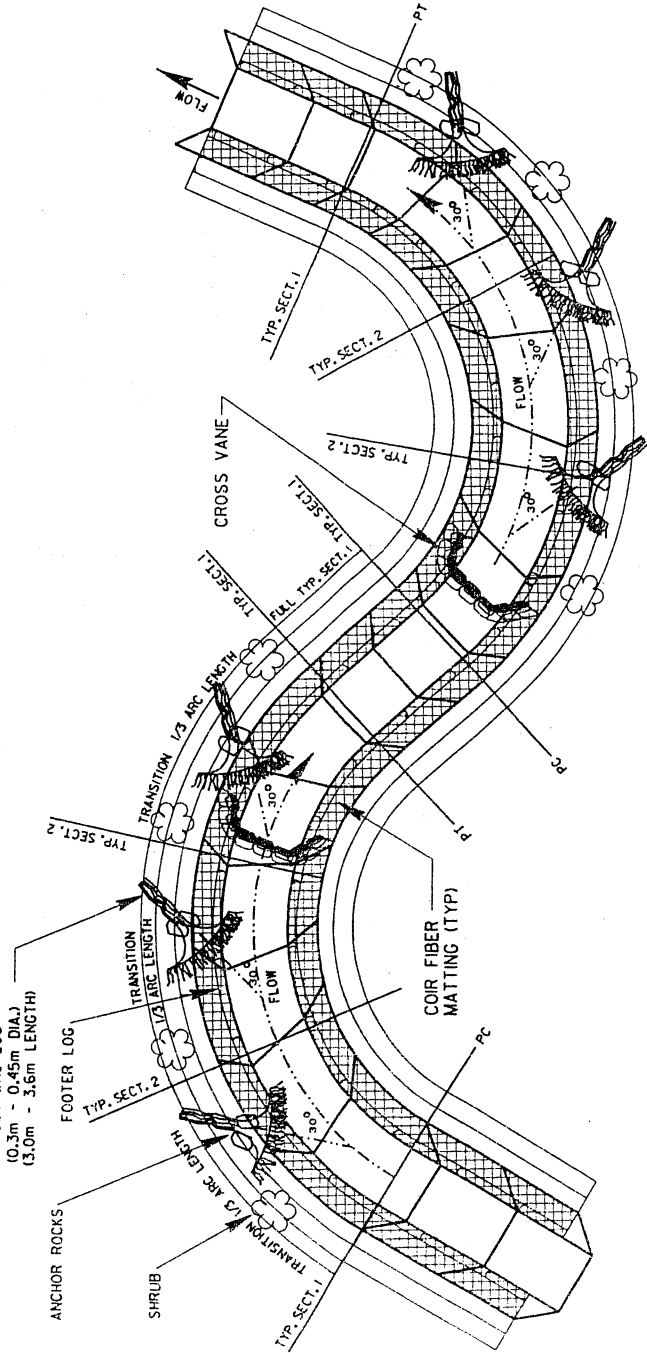


TYPICAL SECTION 1 BETWEEN BENDS

TYPICAL SECTION 2 AT BENDS

ROOT WAD LOG
(0.3m - 0.45m DIA.)
(3.0m - 3.6m LENGTH)

NOTES:
 NUMBER OF ROOTWADS INSTALLED TO BE DETERMINED ON SITE.
 ROOTWADS TO BE SPACED 4x DIAMETER OF ROOT BASE.
 FOOTER LOG ANCHOR ROCK TO BE PLACED ON THE DOWNSTREAM END OF EACH FOOTER LOG SO THAT IT IS LEANING AGAINST THE LOG ON THE SIDE AWAY FROM THE STREAM.
 WHEN BACKFILLING OVER AND AROUND FOOTER LOGS, FOOTWAD LOGS AND ANCHOR ROCKS FIRM UP SECURE ALL COMPONENTS INCLUDING JOINTS, CONNECTIONS AND GAPS.
 PLANTINGS SHOULD BE PLACED ABOVE BANKFULL DEPTH.



WETLAND

N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)
 NC 98 WAKE FORREST BYPASS

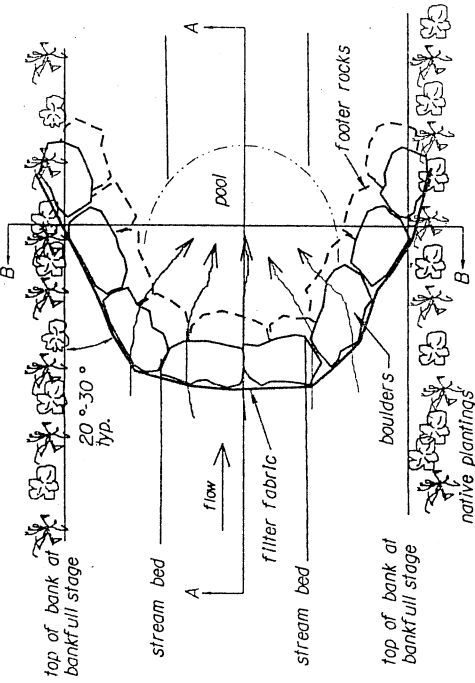
SHEET 10 OF 26

6/03

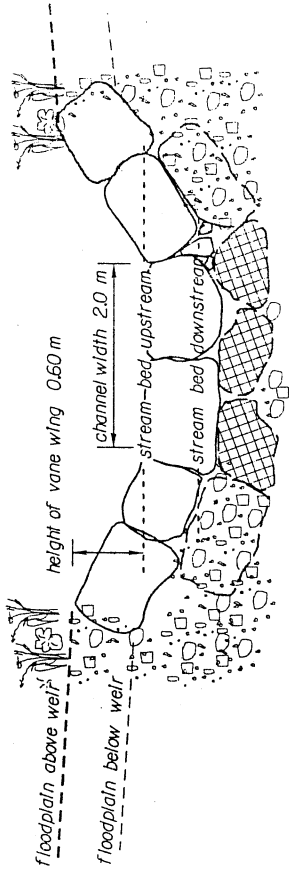
STREAM PLAN VIEW

CROSS VANE ROCK WEIR DETAIL

PLAN VIEW



SECTION B-B



Note: Boulders should be native stone or shot rock, angular and oblong with ax's approximately 0.30m in length

Notes: Rocks should fit tightly.

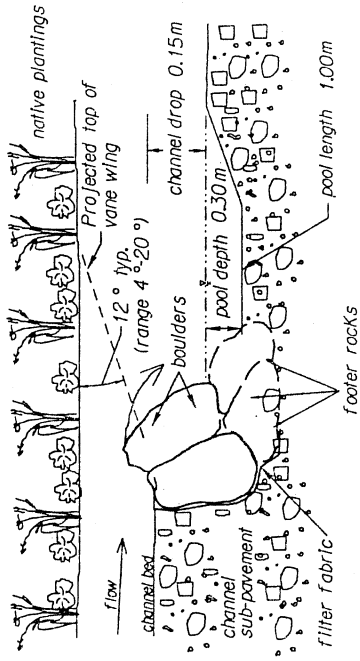
Trim filler fabric flush with top of rocks.

When drop between upstream floodplain and

downstream flood plain exceeds 0.3m, a boulder

sill is recommended in the floodplain.

SECTION A-A



N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

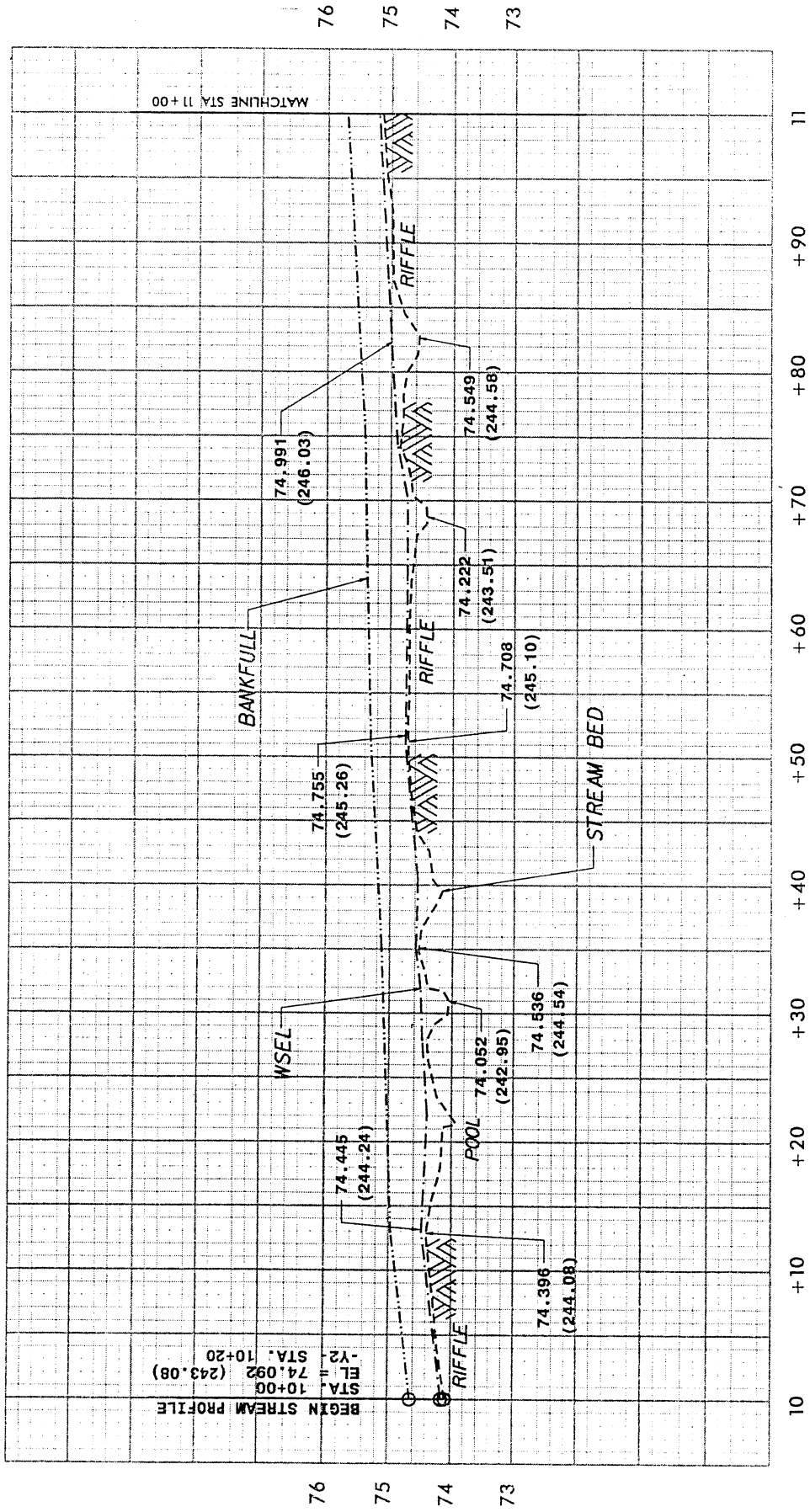
PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS

WETLAND

SHEET 11 OF 26

6/03

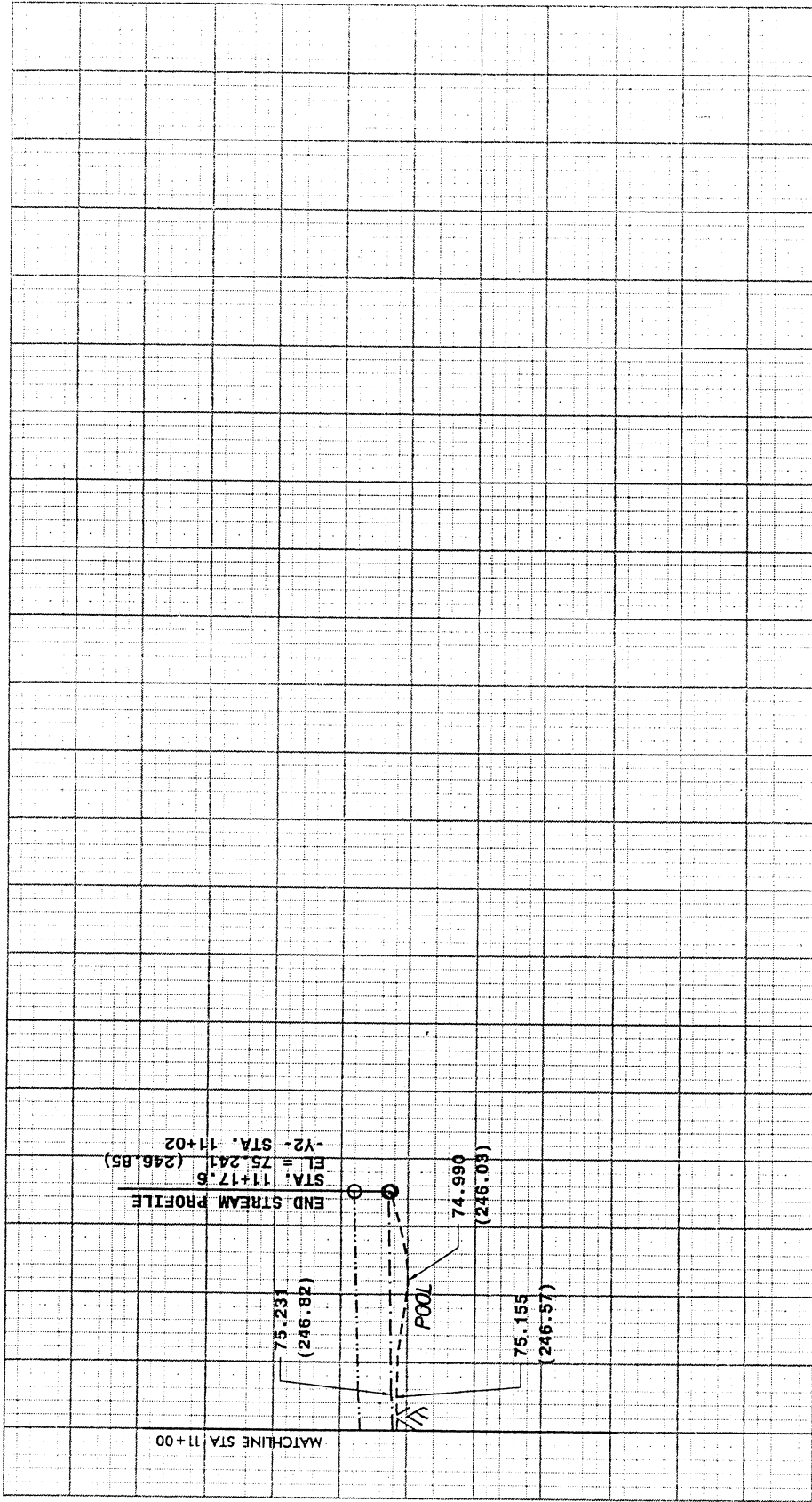
EXISTING/REFERENCE REACH PROFILE



N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 WAKE COUNTY
 PROJECT: 8.1402501 (R-2809B)
 NC 98 WAKE FOREST BYPASS
 SHEET 12 OF 26

WETLAND
 HORIZONTAL SCALE
 VERTICAL SCALE
 NOTE: ELEVATIONS IN () ARE IN FEET. ALL OTHER STATION AND ELEVATION DATA IS IN METERS.

EXISTING/REFERENCE REACH PROFILE



76
75
74
73

11 +10 +20

WETLAND

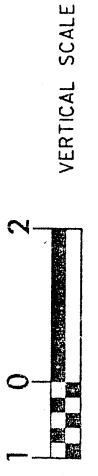
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

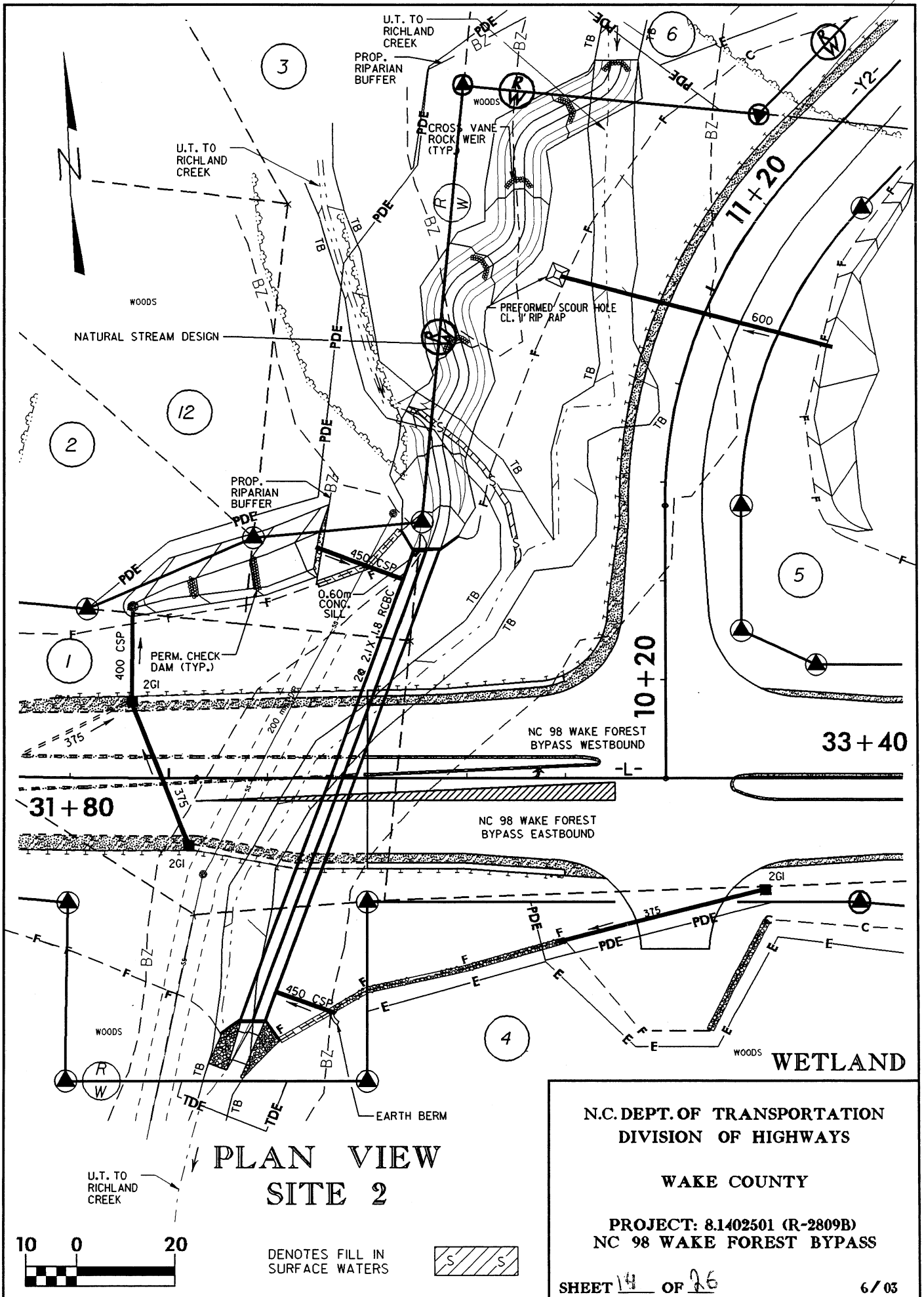
PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS

SHEET 13 OF 26

6/03



NOTE: ELEVATIONS IN () ARE IN FEET. ALL OTHER STATION AND ELEVATION DATA IS IN METERS.



**PLAN VIEW
SITE 2**

**N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS**

WAKE COUNTY

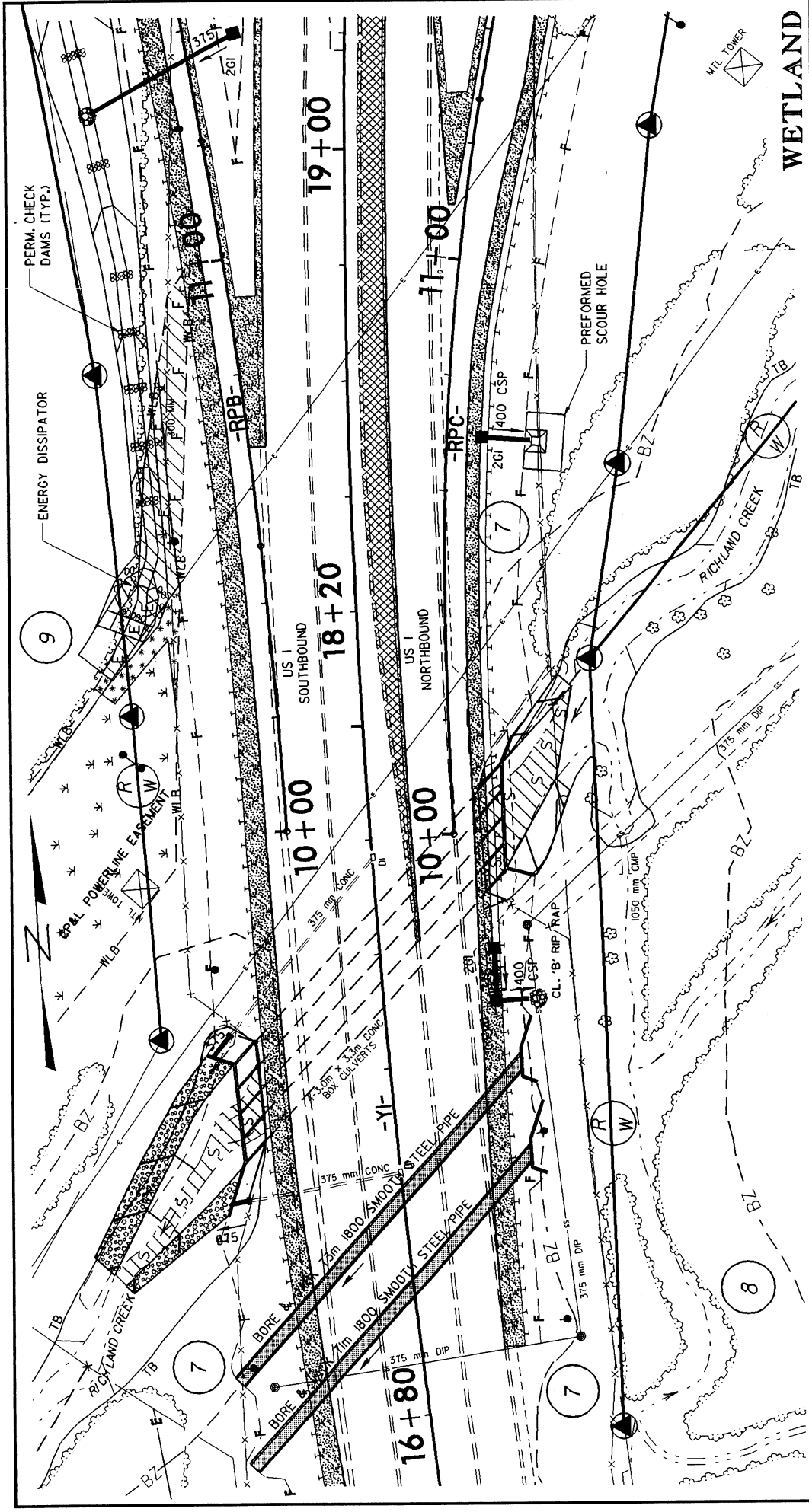
**PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS**

SHEET 14 OF 26

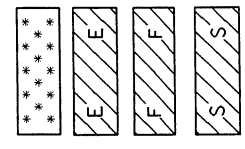
6 / 03

DENOTES FILL IN SURFACE WATERS

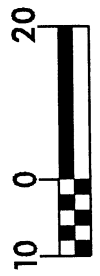


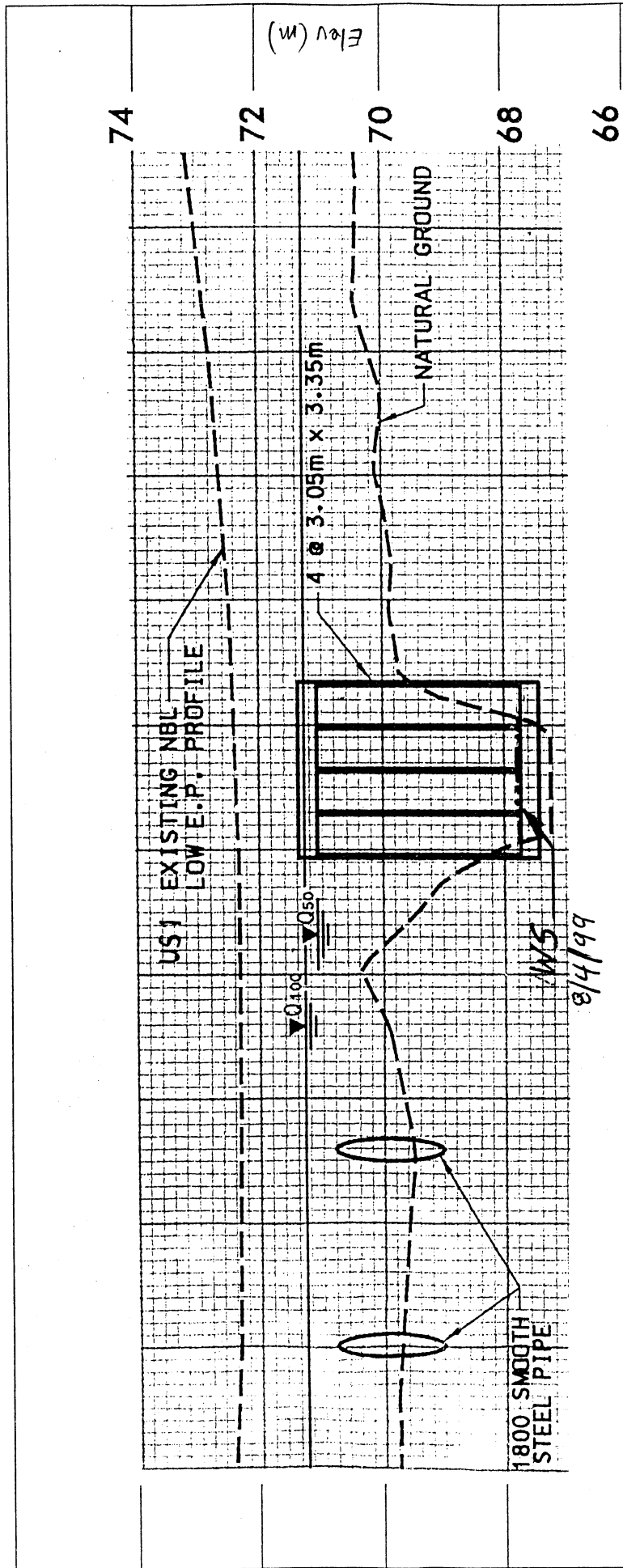


N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 WAKE COUNTY
 PROJECT: 8.1402501 (R-2809B)
 NC 98 WAKE FOREST BYPASS
 SHEET 15 OF 26
 6/08



PLAN VIEW
 SITE 3





+40 +60 +80 +18 +20

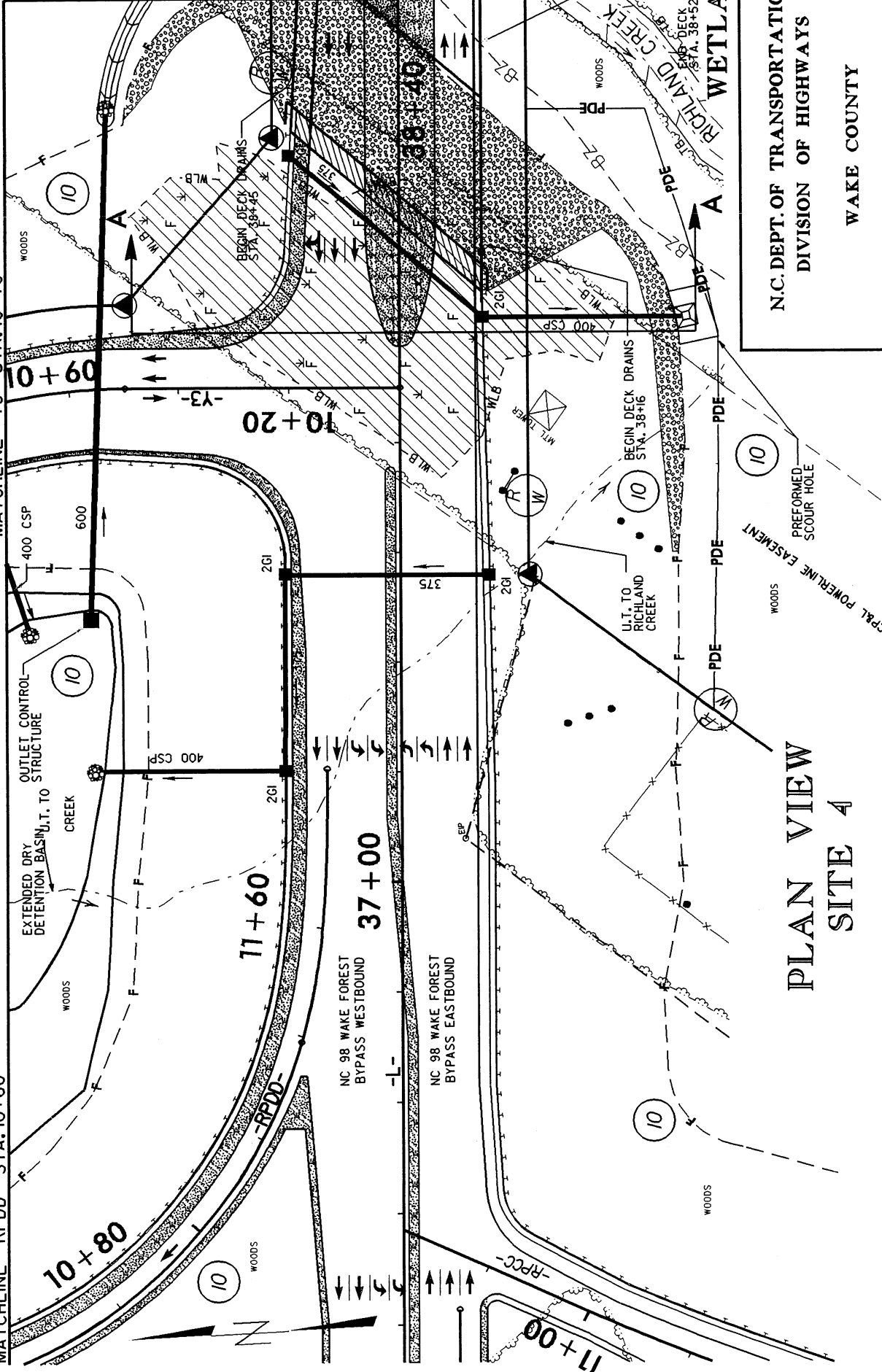
PROFILE
SITE 3

NCDOT
DIVISION OF HIGHWAYS
PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS
SHEET 16 OF 26 6/03

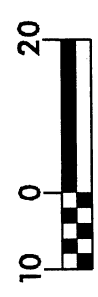
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MATCHLINE -Y3- STA. 10+70

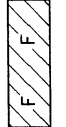
MATCHLINE -L- STA. 38+60



PLAN VIEW SITE 4



10 0 20



DENOTES FILL IN WETLANDS

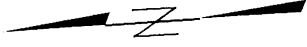
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS

SHEET 17 OF 26

6/03



13

PREFORMED SCOUR HOLE

OUTLET CONTROL STRUCTURE

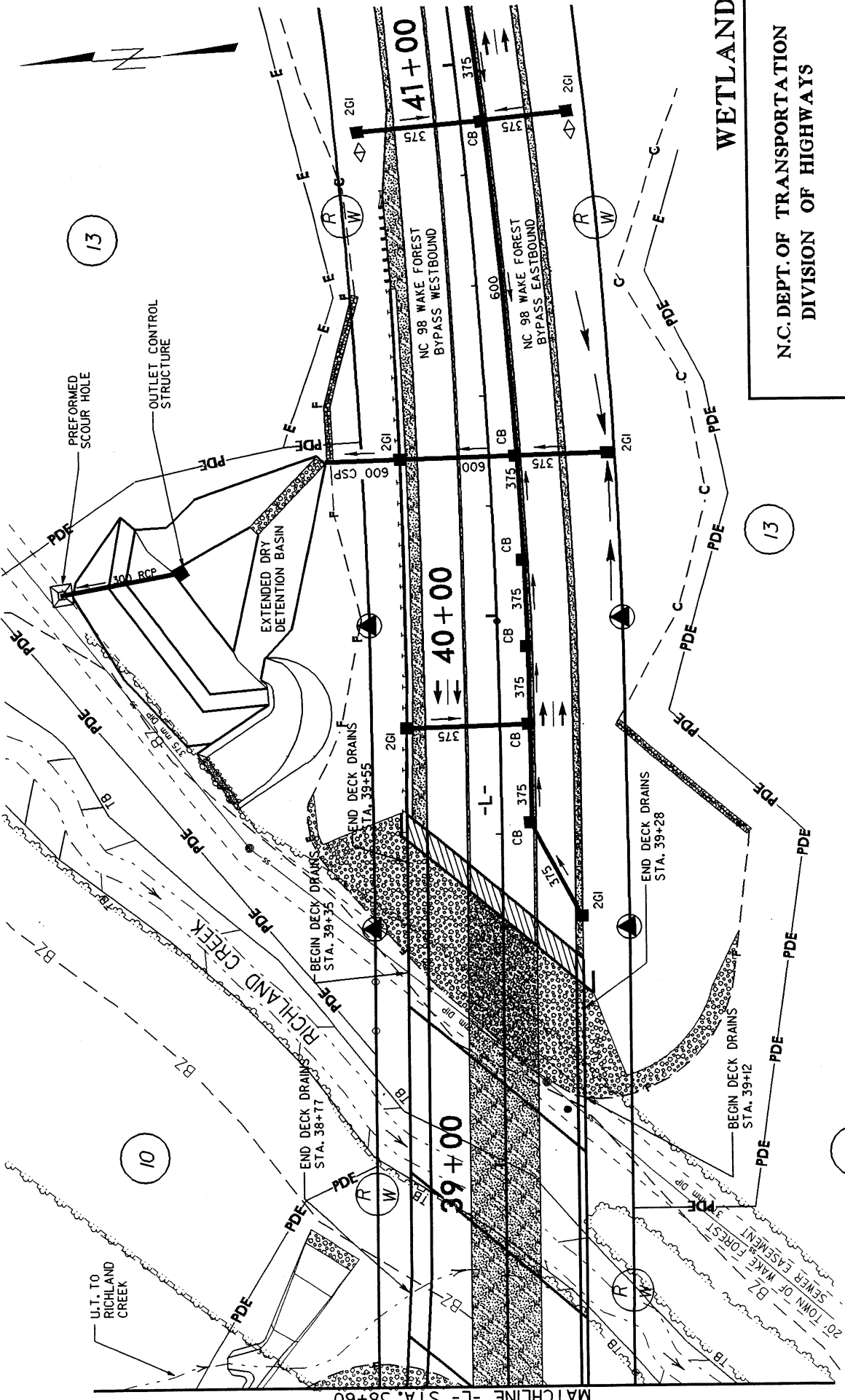
EXTENDED DRY DETENTION BASIN

40+00

41+00

39+00

MATCHLINE -L- STA. 38+60



WETLAND

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS

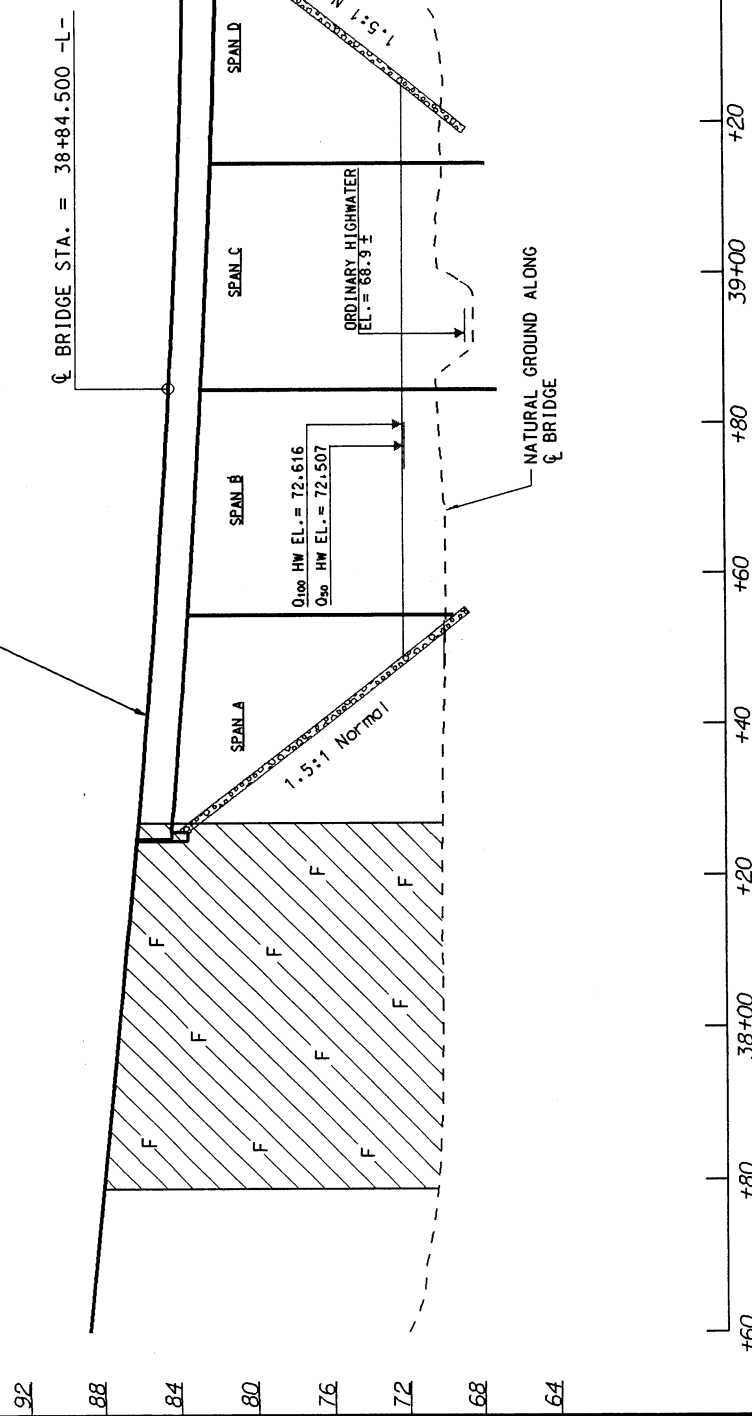
SHEET 18 OF 26 6/03

PLAN VIEW
SITE 4

13



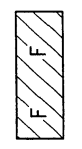
--L- PROFILE GRADE LINE



PROFILE SITE 4

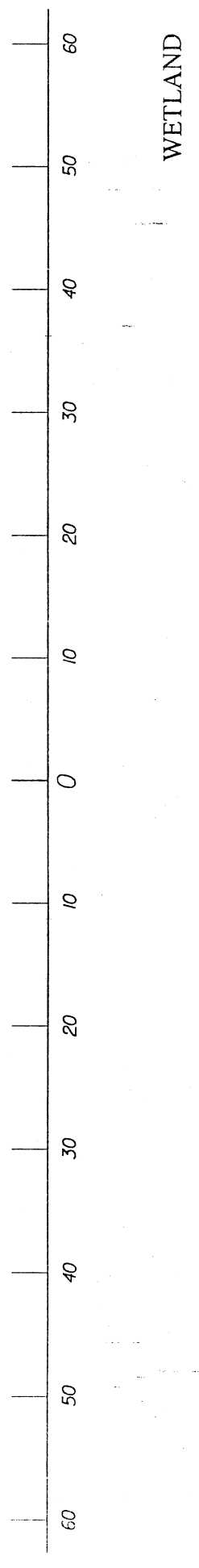
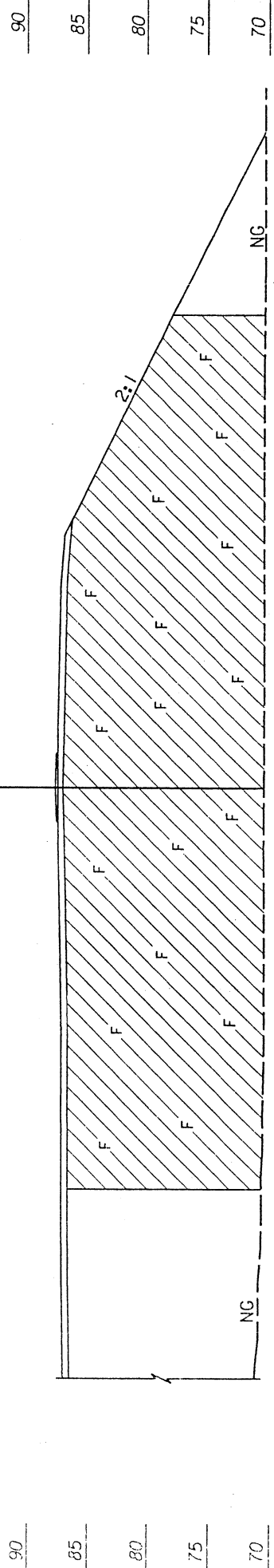


DENOTES FILL IN
 WETLANDS



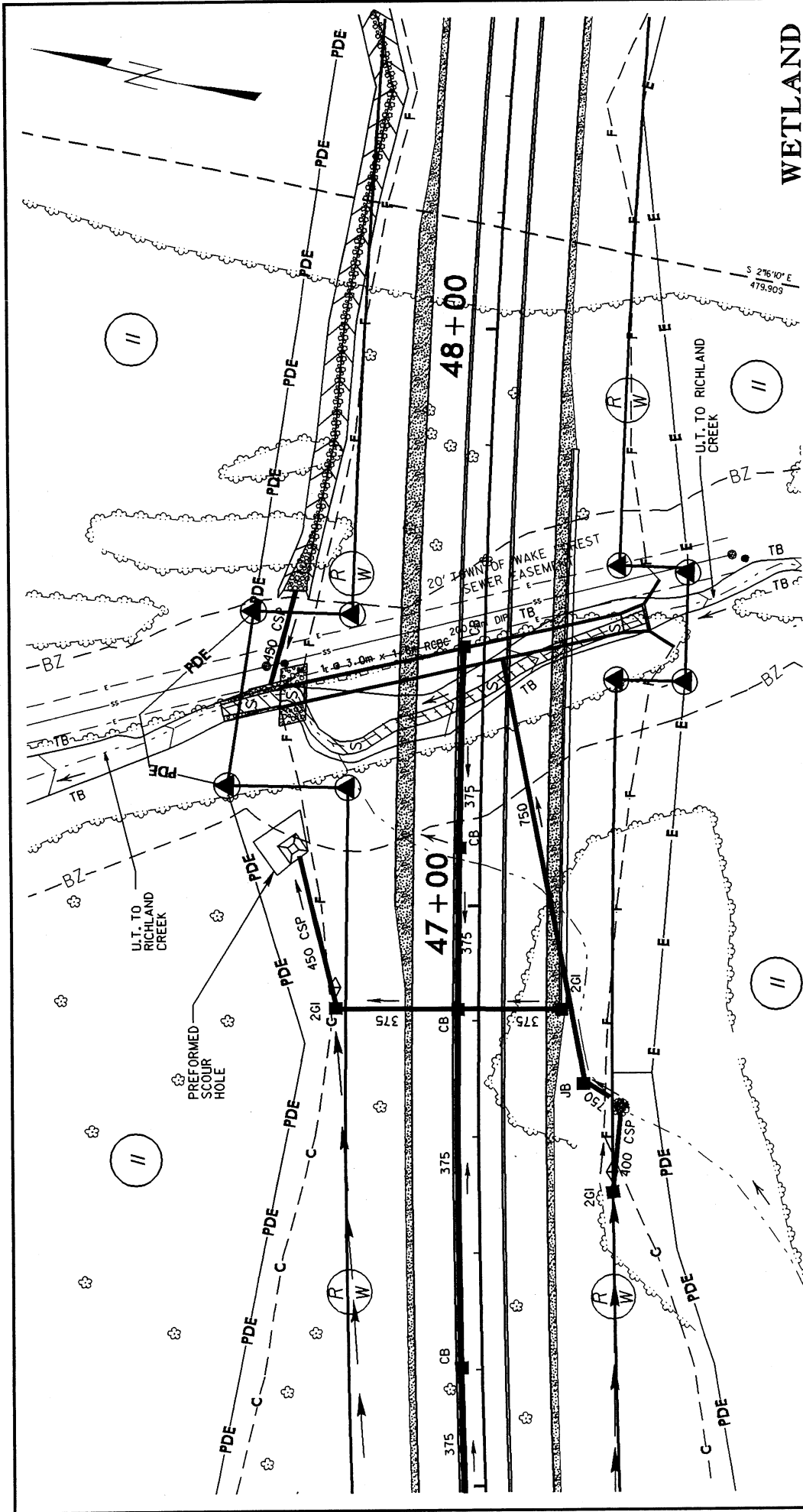
N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 WAKE COUNTY
 PROJECT: 8.1403501 (R-2809B)
 NC 98 WAKE FOREST BYPASS
 SHEET 19 OF 25 6/03

38+00 -L-



SECTION A-A
SITE 4

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
WAKE COUNTY
PROJECT: 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS



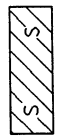
N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)
 NC 98 WAKE FOREST BYPASS

SHEET 21 OF 26

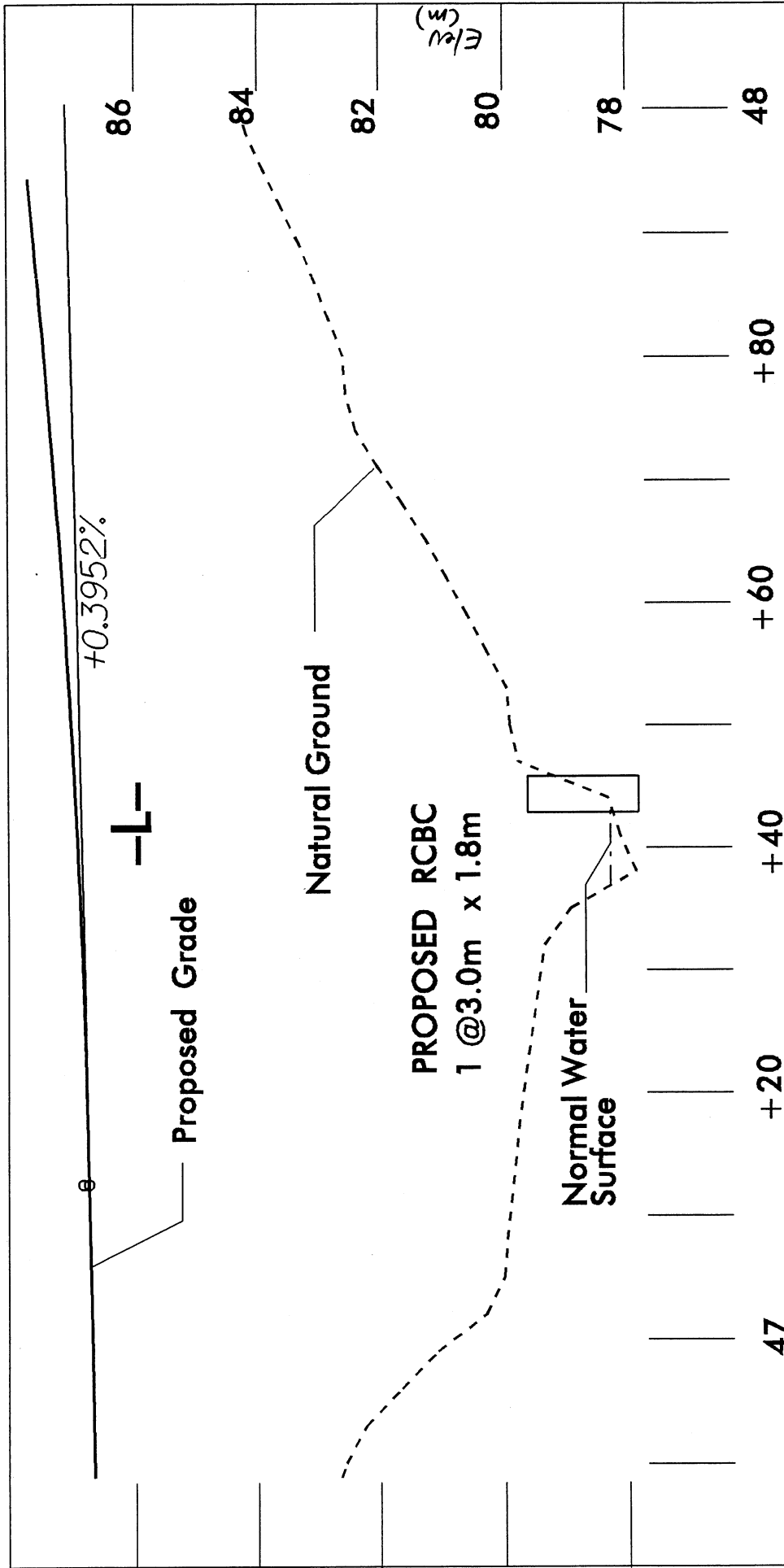
6/03

PLAN VIEW
 SITE 5



DENOTES FILL IN
 SURFACE WATERS





+0.3952%

-L-

Proposed Grade

Natural Ground

PROPOSED RCBC
1 @ 3.0m x 1.8m

Normal Water
Surface

47

+20

+40

+60

+80

48

PROFILE

NCDOT

DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)

NC 98 WAKE FOREST BYPASS

WETLAND PERMIT IMPACT SUMMARY

Site 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	-L- 31+96 / -Y2- 11+38	2 @ 2.1m x 1.8m RCBC	-	-	-	-	0.185	-	-	-	790.0	383.8
2	-Y2- 10+42L / -Y2- 10+89L	-	-	-	-	0.010	-	-	-	-	132.2	-
3	-Y1- 16+88L / -RPB- 11+01L	4 @ 3.2m x 3.2m RCBC	0.059	-	0.052	0.020	0.047	-	-	-	222.4	-
4	-L- 37+74L / 38+34L	-	0.662	-	-	-	-	-	-	-	-	-
5	-L- 47+09L / 47+70R	1 @ 3.0m X 1.8m RCBC	-	-	-	-	0.037	-	-	-	241.8	-
TOTALS:			0.721	0.000	0.052	0.020	0.279	0.000	0.000	0.000	1386.4	383.8

N.C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS

SHEET **23** OF **26**

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From / To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS					
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Natural Stream Design (m)	
1	-L- 31+96 / +Y2- 11+38	2 @ 2.1m x 1.8m RCBC	-	-	-	-	0.075	-	-	-	240.8	117.0
2	-Y2- 10+42L / -Y2- 10+89L	-	-	-	-	0.004	-	-	-	-	40.3	-
3	-Y1- 16+88L / -RPB- 11+01L	4 @ 3.2m x 3.2m RCBC	0.024	-	0.021	0.008	0.019	-	-	-	67.8	-
4	-L- 37+74L / 38+34L	-	0.268	-	-	-	-	-	-	-	-	-
5	-L- 47+09L / 47+70R	1 @ 3.0m X 1.8m RCBC	-	-	-	-	0.015	-	-	-	73.7	-
TOTALS:			0.292	0.000	0.021	0.008	0.113	0.000	0.000	0.000	422.6	117.0

N.C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT 8.1402501 (R-2809B)
NC 98 WAKE FOREST BYPASS

SHEET 24 OF 26

**Project No. 8.1402501 (R-2809B)
Property Owner List
For
Each Site**

Site NO.	Station	Parcel NO.	Name DB and Pg	Address
1	-L- 31+97 Rt. to -L- 32+49 Lt.	①	N C D O T DB 6392 Pg 113 BM 1990 Pg 1192	P.O. Box 25201 Raleigh, N.C. 27611
	-L- 31+90 Lt. to -L- 32+17 Lt.	②	Michael Puszczynski BM 1990 Pg 1192	1522 Deerberry Lane Wake Forest, N.C. 27587
	-L- 32+16 Lt. to -L- 32+50 Lt.	③	Town Of Wake Forest DB 4831 Pg 319 BM 1990 Pg 1192	401 E. Elm St. Wake Forest, N.C. 27587
	-L- 31+96 Rt. to -L- 32+36 Rt.	④	Highwoods Forsyth Ltd Partnership DB 3021 Pg 304 BM 1994 Pg 1621	3100 Smoketree Ct Suite 600 Raleigh, N.C. 27604
	-L- 32+45 Rt. to -Y2- 11+29 Lt.	⑤	William N. Jones & Betty K. Jones DB 2445 Pg 191	5604 Castlebrook Dr. Raleigh, N.C. 27604
	-Y2- 11+18 Lt. to -Y2- 11+38 Lt.	⑥	Wake Forest Granite LLC DB 58625 Pg 400 BM 2001 Pg 1137	401 E. Elm St. Wake Forest, N.C. 27587
	-Y2- 10+45 Lt. to -Y2- 10+50 Lt.	⑫	Ronald A. Zoppo DB 4552 Pg 514 BM 1990 Pg 1192	1519 Deerberry Ln. Wake Forest, N.C. 27587
2	-Y2- 10+50 Lt. to -Y2- 10+89 Lt.	③	Town Of Wake Forest DB 4831 Pg 319 BM 1990 Pg 1192	401 E. Elm St. Wake Forest, N.C. 27587-9166
	-Y2- 10+42 Lt. to -Y2- 10+84 Lt.	⑤	William N. Jones & Betty K. Jones DB 2445 Pg 191	5604 Castlebrook Dr. Raleigh, N.C. 27604

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

ROWAN COUNTY

PROJECT: 8.1631801 (R-2911E)
US 70 WIDENING

SHEET 25 OF 26

6 / 03

Project No. 8.1402501 (R-2809B)
Property Owner List
For
Each Site

Site NO.	Station	Parcel NO.	Name DB and Pg	Address
3	-Y1- 16+88 Lt. to -RPB- 10+51 Rt.	7	N C D O T	P.O. Box 25201 Raleigh, N.C. 27611
	-L- 36+65 Rt. to -RPC- 10+07 Rt.	8	KF US-1, LLC DB 6184 Pg 801 BM 1994 Pg 881	c/o Drucker & Falk 7200 Stonehenge Dr. Raleigh, N.C. 27613
	-RPB- 10+21 Lt. to -RPB- 10+38 Lt.	9	Park Associates, Ltd. DB 6333 Pg 7 BM 1994 Pg 1621	4224 Six Forks Rd. Raleigh, N.C. 27609-5716
4	-L- 37+14 Rt. to -L- 39+59 Lt.	10	Rolls Properties DB 8770 Pg 0471 BM 1997 Pg 60	7104 Thompson Mill Rd. Wake Forest, NC 27587
	-Y3- 10+81 Rt. to -Y3- 10+84 Rt.	13	Bennett Properties LLC DB 8652 Pg 2481 BM 1997 Pg 60	3017 S. Church St. Burlington, NC 27215
5	-L- 47+09 Lt. to -L- 47+70 Rt.	11	Doris C. Forbes Family Ltd Partnership DB 7826 Pg 0566 BM 1935 Pg 12	611 Brooks St. Wake Forest, N.C. 27587

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAKE COUNTY

PROJECT: 8.1402501 (R-2809B)
NC-98 WAKE FOREST BYPASS

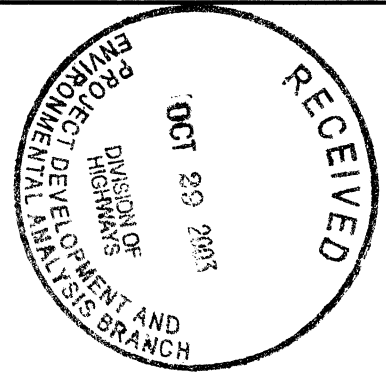


Michael F. Easley, Governor
William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources

Alan W. Klimek, P.E. Director
Division of Water Quality
Coleen H. Sullins, Deputy Director
Division of Water Quality

Handwritten initials/signature

October 22, 2003



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: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act,
Individual Permit in Wake County (TIP R-2809 B).
WQC Project No. 010550

Attached hereto is a copy of modification to Certification No. 3343 issued to The North Carolina Department of Transportation on February 4, 2002.

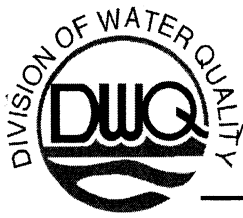
If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Handwritten signature of Alan W. Klimek
Alan W. Klimek, P.E.
Director

Attachments

cc: Wilmington District Corps of Engineers
Corps of Engineers Raleigh Field Office
DWQ Raleigh Regional Office
Central Files
File Copy



**Modification of 401 Water Quality Certification and ADDITIONAL CONDITIONS
 and Neuse River Buffer Rules**

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, and 15 NCAC 2B .0233. This certification authorizes the NCDOT to excavate an additional 0.01 acres of jurisdictional wetlands, excavate an additional 0.01 acres of jurisdictional wetlands, and impact an additional 10,767 square feet of protected Neuse River Riparian Buffers in Wake County. The project shall be constructed pursuant to the application dated on the July 18, 2003 for the Wake Forest Bypass (TIP R-2809) in Wake County. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated February 4, 2002, and the modifications issued February 26, 2002 and September 26, 2003 still apply except where superceded by this certification. The impacts shall occur as described below:

Additional Wetland Impacts in the Neuse River Basin

Section	Isolated Wetlands (acres)	Riverine (acres)	Non-Riverine (acres)	Total (acres)
Section B, Site 1				
Fill	0	0	0	0
Excavation	0	0	0.01	0.01
Mechanized Clearing	0	0	0.01	0.01
Total Section B Impacts	0	0	0.02	0.02

Additional Surface Water Impacts for the Neuse River Basins

Section	Ponds (acres)	Stream Impacts (linear feet)	Stream Impacts Requiring Mitigation (linear feet)	On-Site Natural Channel Design (linear feet)	Mitigation Required
Section B	0	0	0	0	0
Total	0	0	0	0	0

Additional Neuse River Riparian Buffer Impacts & Mitigation

Site	Zone 1 (Square feet)	Zone 2 (Square feet)
Site 1	-2,869	-2,953
Site 2	1,274	184
Site 3	2,877	2,518
Site 4	6,792	943
Site 5	1,653	347
Total Additional Impacts	9,727	1,040

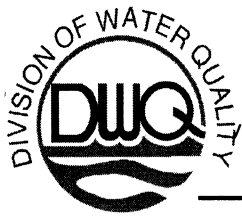


The application provides adequate assurance that the discharge of fill material into the waters of the Neuse and Cape Fear River Basins in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North 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, 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 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 three years from the date of the cover letter from DWQ or on the same day as the expiration date of the corresponding Corps of Engineers Permit, whichever is sooner.

Condition(s) of Certification:

- 1.) No waste, spoil, solids, or fill of any kind shall occur in wetlands, waters, or riparian areas beyond the footprint of the impacts depicted in the application. All construction activities, including the design, installation, operation, and maintenance of sediment and erosion control Best Management Practices, shall be performed so that no violations of state water quality standards, statutes, or rules occur.
- 2.) 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:
 - a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
 - b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The 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.
 - c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
 - d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.
- 3.) 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;
- 4.) 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;



- 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.) No live or fresh concrete shall come into contact with waters of the state until the concrete has hardened;
- 7.) 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.
- 8.) 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.
- 9.) Placement of culverts and other structures in waters, streams, and wetlands must be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. 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 stream beds 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.
- 10.) No additional compensatory mitigation for impacts to streams shall be required.
- 11.) Additional compensatory mitigation for impacts to non-riverine wetlands shall be done for 0.02 acres. Applying a replacement ration of 2:1, total mitigation for 0.04 acres of non-riverine wetlands shall be provided as described below:

Mitigation Site	Acres of WL Debited from Site	Type of Mitigation	Replacement Ratio	Acres of Mitigation Credited
Wetlands Restoration Program	0.04	Restoration	1:1	0.04

- 12.) All stormwater runoff shall be directed to sheetflow through stream buffers at nonerosive velocities, unless approved otherwise by this certification.



13.) Compensatory mitigation for impacts to Neuse Riparian Buffers shall be provided for as described below:

Zone of Impact	Impacts (Square Feet)	Replacement Ratio	Total Square Feet of Mitigation Required
Zone 1	9,727	3:1	29,181
Zone 2	1,040	1.5:1	1,560
Total	10,767		30,741

Mitigation for unavoidable impacts to Neuse Riparian Buffers shall be provided through an in-lieu payment to the North Carolina Wetlands Restoration Program (NCWRP) at a rate of \$0.96 per square foot for 30,741 square feet of buffer impact. Therefore, a total payment of \$29,511.36 shall be submitted to the NCWRP to offset the impacts for the project. No construction activities in buffers shall begin until payment for buffer mitigation is made to the NCWRP.

- 14.) No changes to the horizontal or vertical placement of the stormwater outfall locations, the horizontal or vertical placement of the culverts, the horizontal or vertical placement of bridges, the horizontal or vertical placement of grassed swales, or the horizontal or vertical placement of open ditches is permitted without written approval from the NC Division of Water Quality 401 Wetlands Unit. In addition, no changes to the flow spreader locations or designs, preformed scour hole locations or designs are permitted without written approval from the NC Division of Water Quality 401 Wetlands Unit. Any request for changes to the referenced items above will require submittal of a modification request, with seven copies, and corresponding fees will need to be submitted to the North Carolina Division of Water Quality.
- 15.) When final design plans are completed for R-2809A, a modification to the 401 Water Quality Certification and the Neuse River Riparian Buffer Certification shall be submitted with seven copies and fees to the NC Division of Water Quality. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers. No construction activities that impact any wetlands, streams, surface waters, or buffers located in R-2809A shall begin until after NCDOT applies for, and receives a written modification 401 Water Quality Neuse River Riparian Buffer Certification from the NC Division of Water Quality.
- 16.) 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.
- 17.) All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1.
- 18.) Riparian vegetation must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.
- 19.) Any riprap used must not interfere with thalweg performance and aquatic life passage during low flow conditions.
- 20.) Heavy equipment must be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the likelihood of introducing other pollutants into the stream.
- 21.) 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.
- 22.) The presence of equipment in the channels must be minimized. Under no circumstances must rock, sand or other materials be dredged from the wetted stream channel under authorization of this permit, except in the immediate vicinity of the culverts.



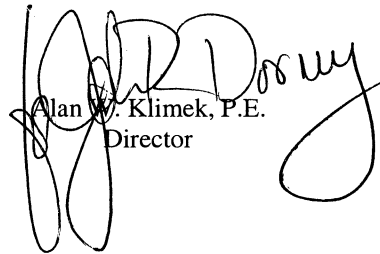
- 23.) Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.
- 24.) Two copies of the final construction drawings shall be furnished to NCDWQ prior to the pre-construction meeting. Written verification shall be provided that the final construction drawings comply with the attached permit drawings contained in the Application dated July 18, 2003.
- 25.) 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.
- 26.) All work in streams shall be performed during normal or low flow conditions.

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 or CAMA permit.

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 22nd day of October 2003

DIVISION OF WATER QUALITY


Alan W. Klimek, P.E.
Director

Modification to WQC No. 3343



DWQ Project No.: _____ County: _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401/Wetlands Unit, North Carolina Division of Water Quality, 1621 Mail Service Center, Raleigh, NC, 27699-1621. This form may be returned to DWQ by the applicant, the applicant's authorized agent, or the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Engineer's Certification

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project, for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____

Date _____