



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

October 18, 2006

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

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

SUBJECT: Wake County, Northern Wake Expressway (I-540) from US
1 to US 64; T.I.P. Number R-2000F&G; Federal Aid
Project F-123-1(1); State Project 8.2401701

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

PSH/gyb

Attachment

Cc:

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

Northern Wake Expressway (I-540) from US 1 to US 64
Wake County
State Project No. 8.2401701
Federal Aid Project No. F-123-1(1)
TIP No.: R-2000F&G

In addition to the standard Individual Section 404 and 401 Permit Conditions, State Consistency Conditions, NCDOT's Guidelines for Best Management Practices for Protection of Surface Waters, the following special commitments have been agreed to by NCDOT:

Commitments Developed through Permit Modifications

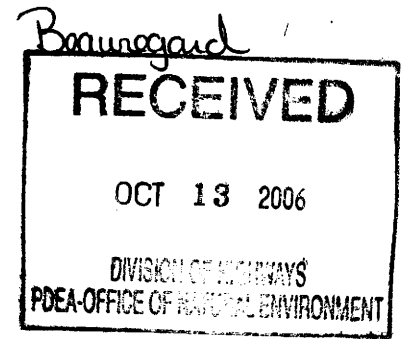
No new special permit conditions are stated in the attached permits. All standard permit conditions apply to this project and all other conditions written into previous Section 404 permits, Section 401 Water Quality Certifications and Neuse River Riparian Buffer Certifications for this project still apply.



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1890
WILMINGTON, NORTH CAROLINA 28402-1890

October 12, 2006



Regulatory Division

Action ID. 199920387

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

Dear Dr. Thorpe:

Reference the permit that the Department of the Army issued on October 10, 1996, for the discharge of dredged and fill material in waters of the United States, including wetlands, to facilitate construction of the Northern Wake Expressway (T.I.P. No. R-2000), Sections A, CA, CB, D, E, F and G, crossing Kit Creek, Lower Bartons Creek, Perry Creek, the Neuse River, Beaverdam Creek, unnamed tributaries, and adjacent wetlands, generally northwest and northeast of Raleigh, in Wake and Durham Counties, North Carolina (Action ID. 199601917). Reference also the subsequent modifications to that permit for the final design for Sections F and G, and your written request of September 6, 2006, for additional permit modification for several changes of impacts to waters, from necessary construction modifications. The modifications impact 0.04 acre of wetlands in a drained pond for excavation, riprap and a cross vane to provide a stable connection through the pond to a tributary (Section G, Site 13), and impact 0.19 acre of wetlands for fill and mechanized clearing related to an unpermitted sewer line crossing (Section G, Site 9).

The permit is hereby modified to include the work as shown on the enclosed revised drawings, subject to the following additional special condition:

Compensatory mitigation for the additional unavoidable impacts to 0.23 acre of non-riparian wetlands, associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated September 11, 2006 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 0.46 acres of restoration equivalent riparian wetlands in the Neuse River basin (Hydrologic Cataloging Unit 03020201) 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 permit, certify that sufficient funds have been provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA.

It is understood that all other conditions of the original permit remain applicable and that the expiration date (December 31, 2007) is unchanged.

If you have questions, please contact Eric Alsmeyer of the Raleigh Regulatory Field Office, at telephone (919) 876-8441, extension 23.

Sincerely,

A handwritten signature in black ink that reads "John E. Pulliam, Jr." The signature is written in a cursive style with a large, looped "J" at the end.

John E. Pulliam, Jr.
Colonel, U.S. Army
District Commander

Enclosure

Copies Furnished with enclosure:

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

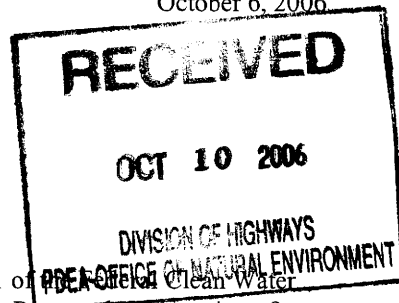
Mr. Jon Nance
Division Engineer
NCDOT
2612 North Duke St
Durham, NC 27704

Mr. Chris Murray
Division Environmental Officer
NCDOT
2612 North Duke St
Durham, NC 27704



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

October 6, 2006



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

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Clean Water Act and NEUSE BUFFER RULES, with ADDITIONAL CONDITIONS for Proposed construction of Northern Wake Expressway (I-540) in Wake County, Federal Aid Project No. F-123-1(1), State Project No. 8.2401701, TIP #R-2000F&G. DWQ Project No. 20030114v.4.

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. 3081 issued to The North Carolina Department of Transportation dated May 5, 2003, and modified November 10, 2004 and May 20, 2005. This modification is applicable only to the additional proposed activities in the application received September 12, 2006. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated May 5, 2003 and subsequent modifications still apply except where superceded by this certification.

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

Sincerely,

Alan W. Klimek, P.E.
Director

Attachments

- cc: Eric Alsmeyer, US Army Corps of Engineers, Raleigh Field Office
- Chris Murray, Division 5 Environmental Officer
- Rachelle Beauregard, NCDOT PDEA, 1598 MSC
- Kathy Matthews, US Environmental Protection Agency
- Travis Wilson, NC Wildlife Resources Commission
- Gary Jordan, US Fish and Wildlife Service
- Beth Harmon, Ecosystem Enhancement Program
- DWQ Raleigh Regional Office copy
- File Copy



Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act and NEUSE BUFFER RULES, with 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 .0500 and 15A NCAC 2B.0233. This certification authorized the NCDOT to impact 0.25 acres of jurisdictional wetlands and 4198 square feet of protected riparian buffers in Wake County. The project shall be constructed pursuant to the modification dated received September 12, 2006. The authorized impacts are as described below:

New Wetland Impacts in the Neuse River Basin

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)
G-13	0	0.02	0.02	0.02	0.06
Utility 9	0.19	0	0	0	0.19
Total	0.19	0.02	0.02	0.02	0.25

Total Wetland Impact for Project: 0.25 acres.

New Neuse Riparian Buffer Impacts

Site	Zone 1 Impact (sq ft)	minus Wetlands in Zone 1 (sq ft)	= Zone 1 Buffers (not wetlands) (sq ft)	Zone 1 Buffer Mitigation Required (using 3:1 ratio)	Zone 2 Impact (sq ft)	minus Wetlands in Zone 2 (sq ft)	= Zone 2 Buffers (not wetlands) (sq ft)	Zone 2 Buffer Mitigation Required (using 1.5:1 ratio)
G-13	786	0	786	2,358	495	0	495	743
Utility 9	1,293	859	434	1,302	1,624	0	1,624	2,436
Totals	2,079	859	1,220	3,660	2,119	0	2,119	3,179

Total Buffer Impact for Project: 4,198 square feet.

The application provides adequate assurance that the discharge of fill material into the waters of the Neuse 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 modified application dated received September 12, 2006. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated May 5, 2003 and all subsequent modifications still apply except where superceded by this certification. 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.



Conditions of Certification:

1. All other conditions written into previous Water Quality Certifications for this project still apply.
2. Compensatory mitigation for impacts to 0.23 acres of wetlands is required. We understand that you have chosen to perform compensatory mitigation for impacts to wetlands through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. EEP has indicated in a letter dated September 11, 2006 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and the Dual-Party MOA signed on April 12, 2004.
3. Compensatory mitigation for impacts to 1,220 square feet of protected riparian buffers in Zone 1 and 2,119 square feet of protected riparian buffers in Zone 2 shall be required. We understand that you have chosen to perform compensatory mitigation for impacts to protected buffers through use of the North Carolina Ecosystem Enhancement Program (EEP). Mitigation for unavoidable impacts to Neuse Riparian Buffers shall be provided in the Neuse River Basin and done in accordance with 15A NCAC 2B.0233. EEP has indicated in a letter dated September 11, 2006 that they will assume responsibility for satisfying the compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and the Dual-Party MOA signed on April 12, 2004.
4. Riprap should not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.
5. All stormwater runoff shall be directed as sheetflow through stream buffers at nonerosive velocities, unless otherwise approved by this certification.
6. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular DOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated, with native woody species before the next growing season following completion of construction.
7. Pursuant to NCAC15A 2B.0233(6), sediment and erosion control devices shall not be placed in Zone 1 of any Neuse Buffer without prior approval by the NCDWQ. At this time, the NCDWQ has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised and that discharge is released as diffuse flow.
8. If concrete is used during construction, a dry work area should be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete should not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.
9. 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.
10. The dimension, pattern and profile of the stream above and below the crossing should not be modified. Disturbed floodplains and streams should be restored to natural geomorphic conditions.
11. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.



12. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream.
13. 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.
14. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.
15. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.
16. The permittee 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 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.
17. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification..
18. 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.
19. 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.
20. Upon completion of the project, the NCDOT Division Engineer shall complete and return the "Certification of Completion Form" to notify DWQ when all work included in the 401 Certification has been completed.
21. Native riparian vegetation must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.
22. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.
23. 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 protect surface waters standards:
 - 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.

24. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, they shall be removed and the natural grade restored upon completion of the project.

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, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. 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 6th day of October 2006

DIVISION OF WATER QUALITY

Alan W. Klimek, P.E.
Director

WQC No. 3081

Certification of Completion

DWQ Project No.: _____ County: _____

Applicant: _____

Project Name: _____

Date of Issuance of Wetland Permit: _____

Certificate of Completion

Upon completion of all work approved within the **401 Water Quality Certification and Buffer Rules**, and any subsequent modifications, the applicant is required to return this certificate to the 401 Oversight/Express Permitting Unit, North Carolina Division of Water Quality, 1650 Mail Service Center, Raleigh, NC, 27699-1650. 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: _____

If this project was designed by a Certified Professional

I, _____, as a duly registered Professional _____ (i.e., Engineer, Landscape Architect, Surveyor, etc.) 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 _____

PLAN VIEW
SITE 12

11

LAMONT M. & DELORIS W. INGE
DB 6285 PG 426

SPECIAL
DITCH
GRADE

LEVEL SPREADER
CANNOT BE UTILIZED
LENGTH = 331m

NON EROSION
VELOCITIES EXIST
FOR THE 2 & 10-YR
EVENT
SEE SHEET 87

PRE-FORMED
SCOUR HOLE
B = 1.40m = 4.59ft
D = 0.30m = 0.98ft
W = 1.20m = 4.72ft
c = 0.15 = 0.5ft

LEVEL SPREADER
CANNOT BE UTILIZED
LENGTH = 150m

RIP RAP AS PER
NCDOT STD. NO. 868.02

0.6 m LAT
BASE DITCH

CLASS I RIP RAP
W/FILTER FABRIC
(CHANNEL BANK ONLY)

JB W/MH COVER

False Sump

DA=1.2 AC
Q10=3.1 CFS
SEE SHEET 87 FOR
GRASS SWALE INFO.

PAUL K. HESTER
PB 1947 PG 4
PSD 009-95-R/W

9

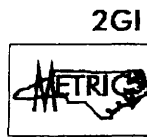
NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

WAKE COUNTY
8.U401727 (R-2000F)
NORTH RALEIGH OUTER LOOP

Revised 5/1/06

SCALE AS SHOWN

SHEET 63 OF 90



- LEGEND**
- WLB — WETLAND
 - [Hatched Box] DENOTES FILL IN WETLAND
 - [Dotted Box] DENOTES MECHANIZED CLEARING
 - NBZ1 — NEUSE BUFFER - ZONE 1
 - NBZ2 — NEUSE BUFFER - ZONE 2

LEVEL SPREADER
5m(L)
16.40ft(L)
DA= 0.21ha
DA= 0.52ac
Q10=0.038cms
Q10=1.34cfs

LAT "V"
DITCH

2GI

+80

375

100 CSP

1200 RCP

11700

EXISTING ROW

WOODS

EXISTING ROW

NBZ2

NBZ1

NBZ1

NBZ2

EXISTING ROW

EXISTING ROW

EXISTING ROW

EXISTING ROW

EXISTING ROW

EXISTING ROW

EXISTING ROW

EXISTING ROW

EXISTING ROW

EXISTING ROW

EXISTING ROW

SCALE

R-2000F Wake Co. Affected Buffer Areas Site # 12
 Discharge is considered to be treated if it meets the following criteria:
 100 ft. of grass swale for every 1 acre of drainage area. AND
 2 yr. velocity is less than or equal to 2 ft./sec.

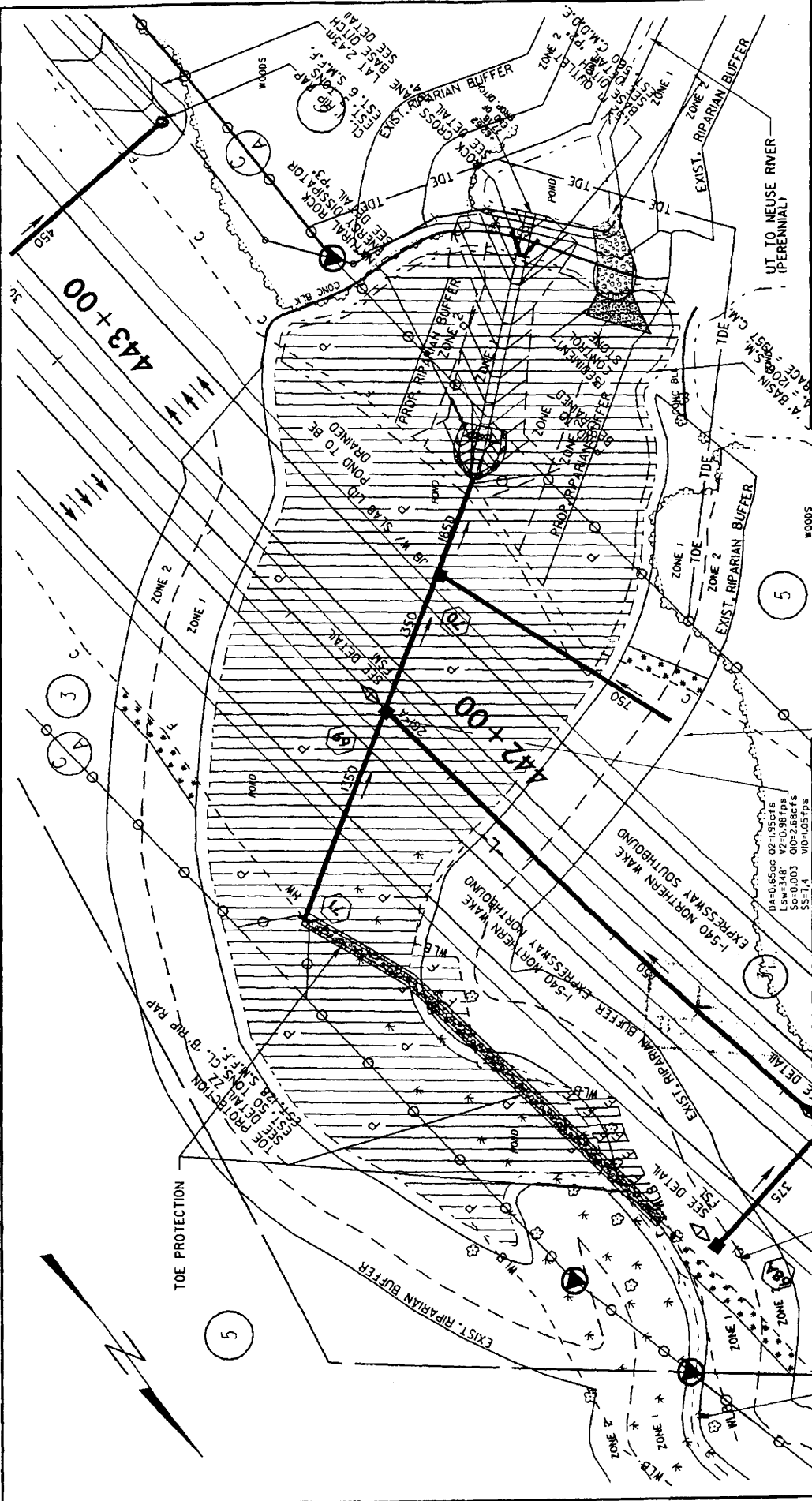
Date: 5/11/2006
 Dsn. By: HAH
 Check: R KW

SHT.	Structure	Station	Type	Total D.A.		Required length for treatment		Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided	Remarks
				ha	(ac)	(ft.)	(m.)										
25		11+20L YIR	DITCH	2.00	4.9	494.2	151	151*Exist	0.01	6	YES	11.65	1.78	16.02	1.93	Wetlands	
25		11+28R YIR	DITCH	0.90	2.2	222.4	68	126	0.048	6	YES	5.24	1.93	7.21	2.09	GS & PSII	
25		11+80L YIR	DITCH	0.48	1.2	118.6	36	55	0.0189	6	YES	2.24	1.93	3.08	2.05	GS	
25		11+60R YIR	DITCH	0.21	0.5	51.9	16	35	0.074	6	NO	0.98	3.51	1.35	3.58	LS	

BDOS = BERM DRAINAGE OUTLET STRUCTURE
 OTCB = OPEN THROAT CATCH BASIN
 OPEN = OPEN END PIPE
 PSH = PRE FORMED SCOUR HOLE
 LS = LEVEL SPREADER
 *EXIST = EXISTING DITCH LENGTH INCLUDED

ZGI = 2 GRATED INLET
 SBG = SHOULDER BERM GUTTER
 CB = CATCH BASIN
 DDB = DRY DETENTION BASIN
 B = BASIN
 GS = GRASS SWALE

R-2000 F
 sheet 87 of 90
 Rev. 5/2/06



N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 WAKE COUNTY
 PROJECT: 8U401712 (R-2000G)
 I-540 NORTHERN WAKE EXPRESSWAY
 10/29/02
 Rev. 5/27/04
 Rev. 6/6/06

SHEET 18 OF 50

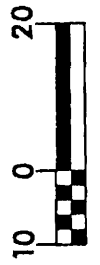
MATCHLINE L- STA. 441+13
PLAN VIEW
SITE 6

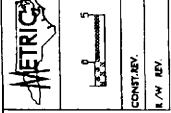
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLANDS
- DENOTES FILL IN SURFACE WATERS (POND)

UT TO NEUSE RIVER (PERENNIAL)
 D=2.16ac 02=3.57cfs
 Lw=1.14cfs VZ=0.98rpps
 S=0.00J 00=1.93cfs
 S3=6.6 V0=1.05rps

D=0.69ac 02=1.95cfs
 Lw=0.38cfs VZ=0.98rpps
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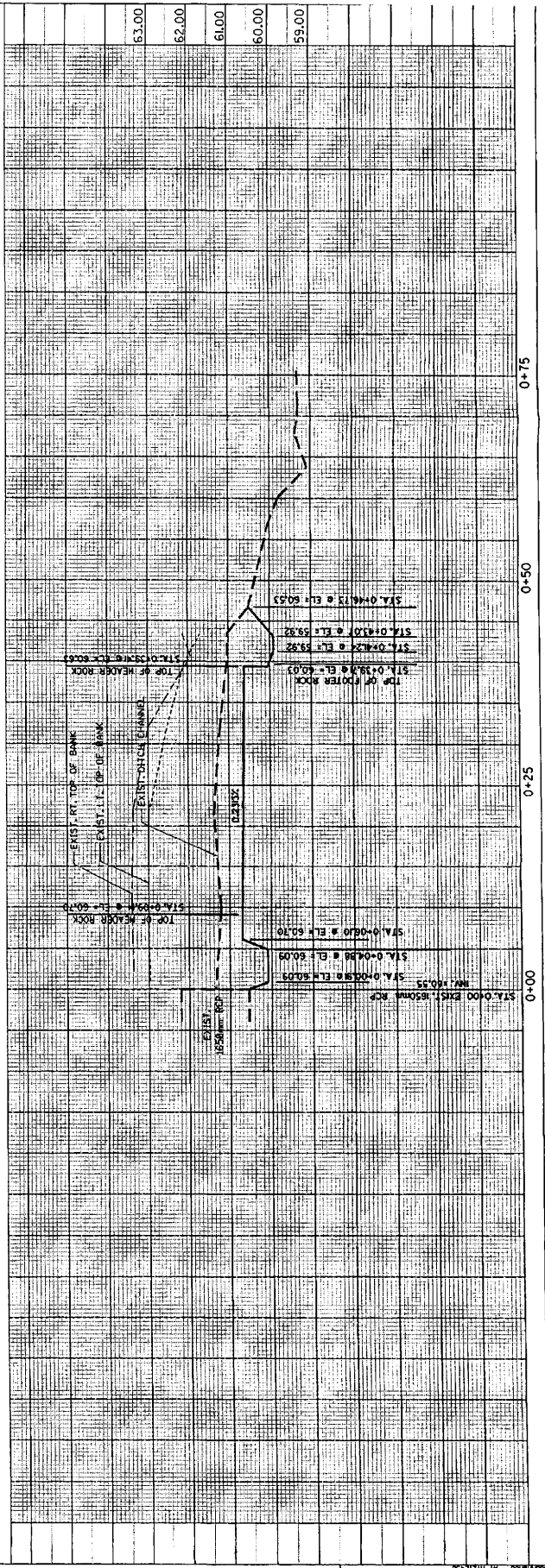
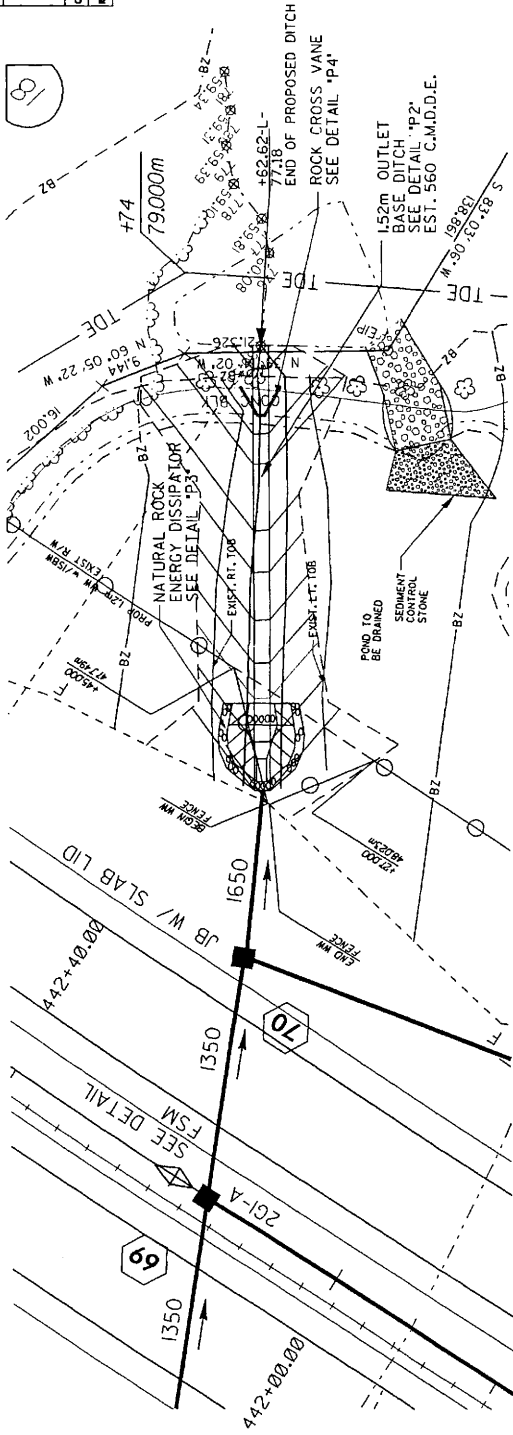
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 S3=6.3 V0=1.05rps



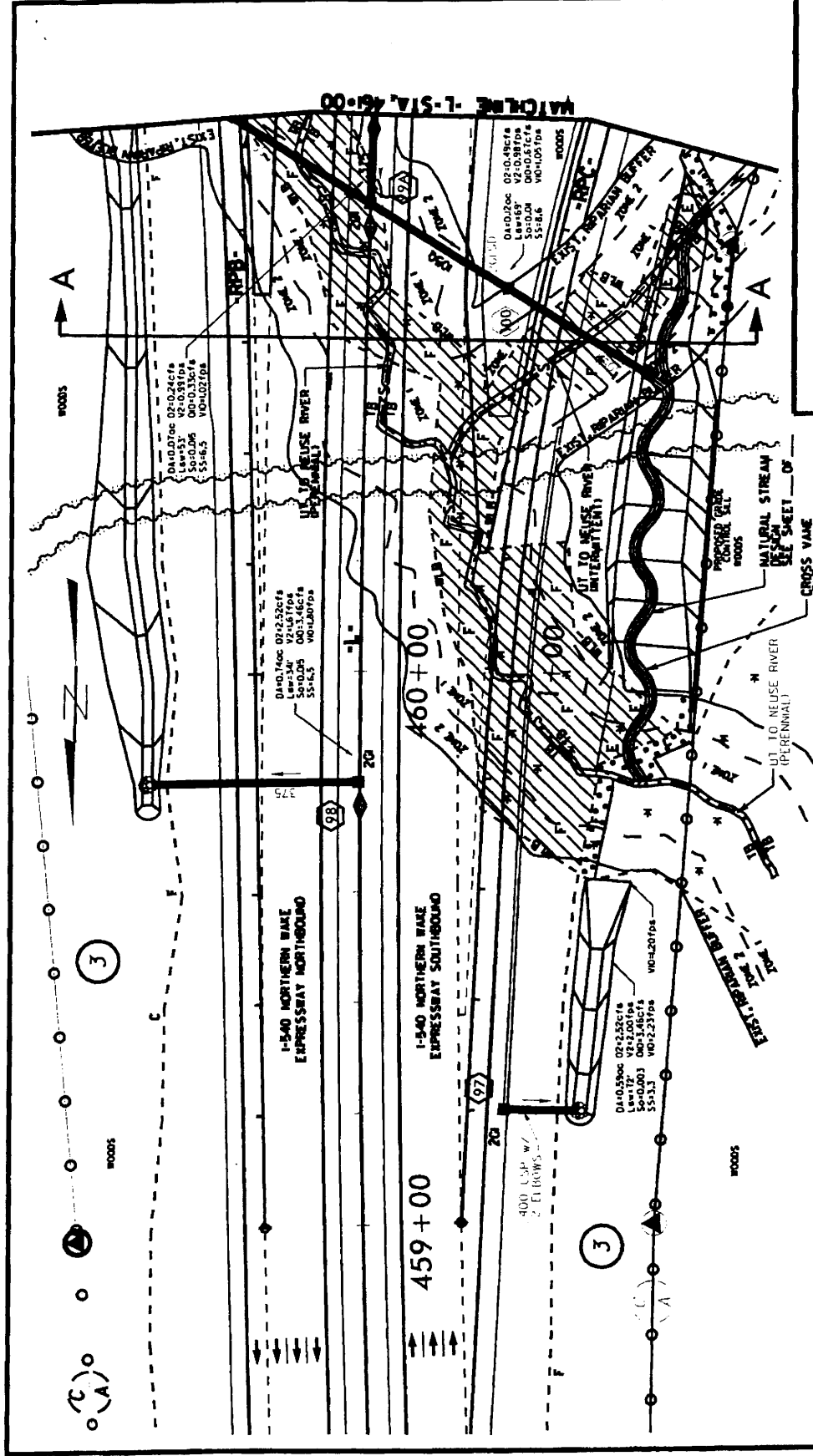


PROJECT REFERENCE NO. R-28000
 R/W SHEET NO. 8/1
 ROADWAY DESIGN ENGINEER
 HYDRAULICS ENGINEER
 COUNTY.
 R/W REV.

8/1



REVISIONS

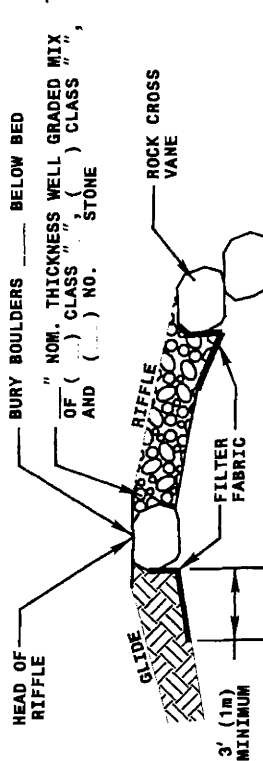


N.C. DEPT. OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 WAKE COUNTY
 PROJECT: 8U/01712 (R-2000G)
 I-840 NORTHERN WAKE EXPRESSWAY
 SHEET 31 OF 50
 6 / 27 / 06

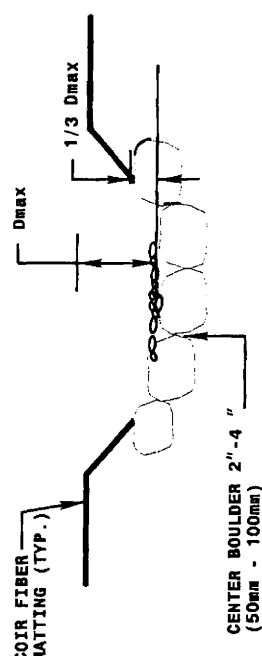
**PLAN VIEW
 SITE 10**

DEMOTES MECHANIZED CLEARING
 DEMOTES FILL IN WETLANDS
 DEMOTES EXCAVATION IN WETLANDS
 DEMOTES FILL IN SURFACE WATERS

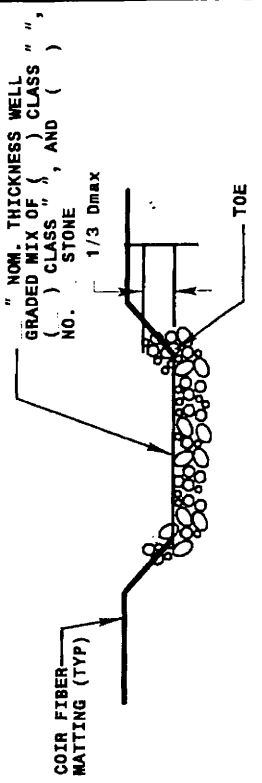




SECTION A-A

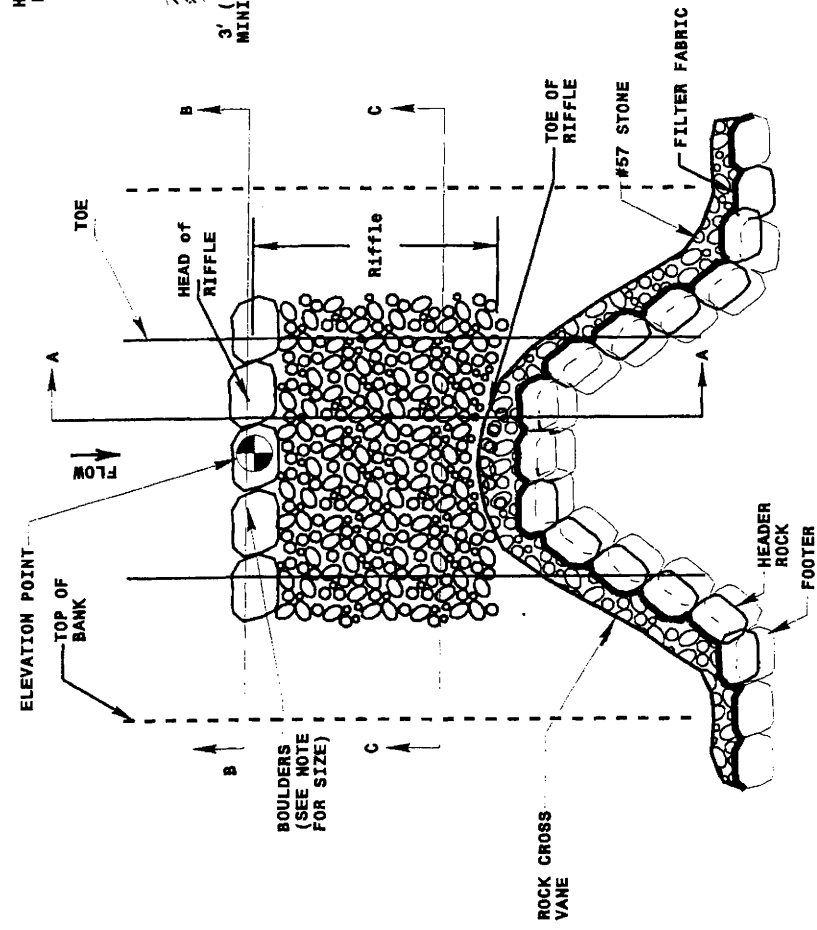


SECTION B-B



SECTION C-C

NOTE:
1. BOULDERS SHOULD BE NATIVE STONES OR SHOT ROCK, ANGULAR AND OBLONG, WITH AN AXIS APPROXIMATELY
LX Wx D

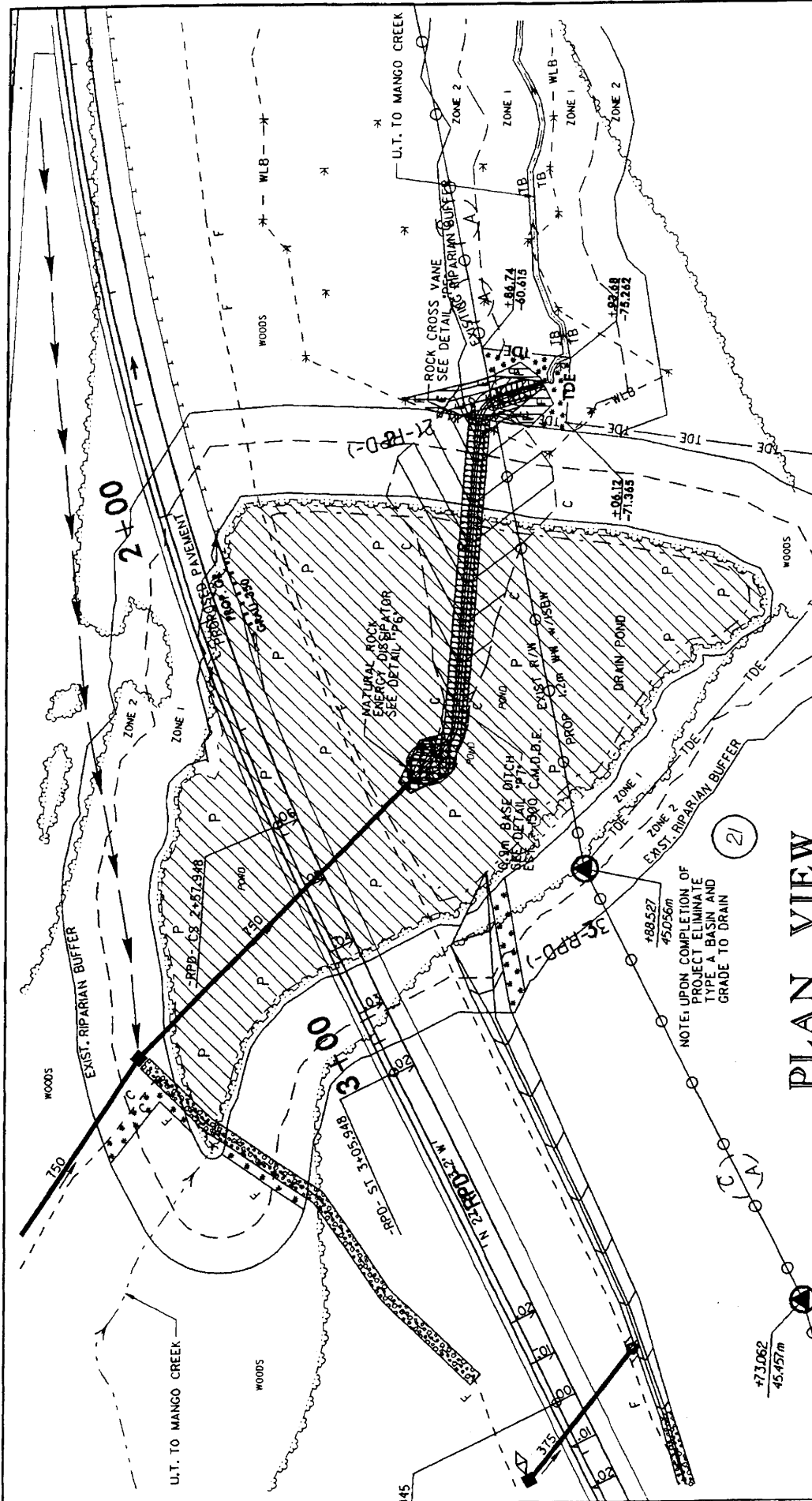


PLAN VIEW

REACH	Wbkf (ft)(m)	Dmax (ft)(m)


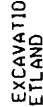


CONSTRUCTED RIFFLE DETAIL
NOT TO SCALE

P-2000 G
Permit Drawing 31a of 50 6/27/06



PLAN VIEW SITE 13

DA	=	2.62 ac.
Q2	=	5.9 cfs
V2	=	2.0 ft/sec
O10	=	8.1 cfs
V10	=	2.2 ft/sec
SWALF	=	295 ft
S	=	3.0%
SS	=	3:1

-  DENOTES EXCAVATION IN WETLAND
-  DENOTES FILL IN WETLAND
-  DENOTES MECHANIZED CLEARING
-  DENOTES FILL IN SURFACE WATER (POND)



N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

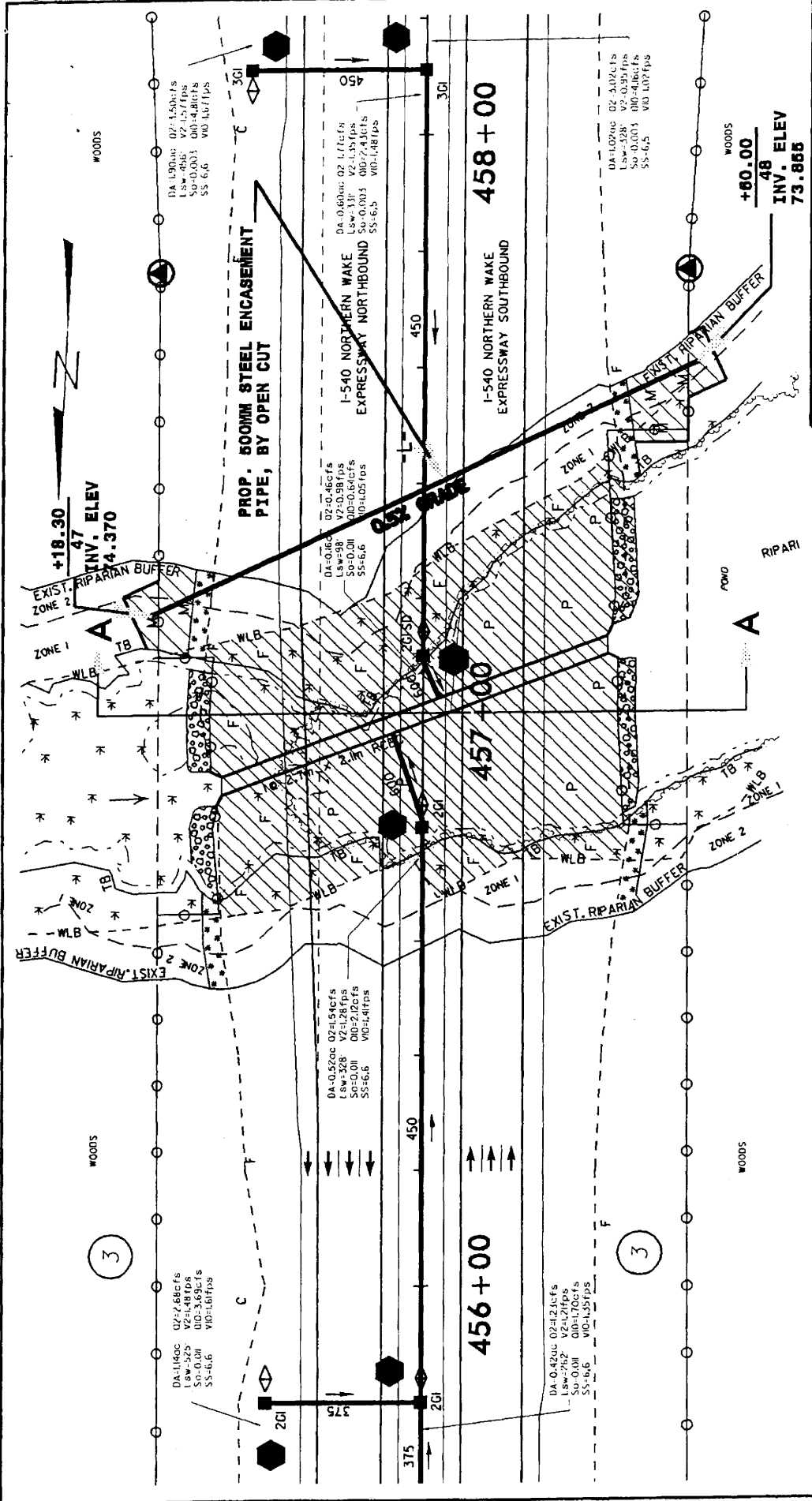
WAKE COUNTY

PROJECT: 8.U401712 (R-2000G)

I-540 NORTHERN WAKE EXPRESSWAY

SHEET 37 OF 50


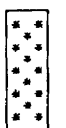

Rev 7/27/06



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

PROJECT: 8.U401712 (R-2000G)
 I-540 NORTHERN WAKE EXPRESSWAY
 Utility Permit Drawing REV. 3/6/06
 SHEET 1 OF 3 10/29/02

UTILITY IMPACT PLAN VIEW SITE 9

-  M
 -  F
 -  P
- DENOTES UTILITY LINE IMPACTS TO RIPARIAN BUFFER AND WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLANDS
- DENOTES FILL IN SURFACE WATERS (POND)



Utility Impact Site 9--Impacts to wetland and riparian buffer

SITE	PROJECT STATION	STRUCTURE TYPE	WETLAND IMPACTS			SURFACE WATER IMPACTS							FILL IN BUFFER	
			FILL IN WETLANDS	TEMPORARY FILL IN WETLANDS	EXCAVATION IN WETLANDS	Mechanized Clearing in Wetlands (Method)	FILL IN SURFACE WATERS (NATURAL)	FILL IN SURFACE WATERS (POND)	TEMP. FILL IN SW	LENGTH OF EXISTING CHANNEL IMPACTED	RELOCATED CHANNEL	ENCLOSED CHANNEL	ZONE 1	ZONE 2
			ac.	ac.	ac.	ac.	ac.	ac.	ac.	ft.	ft.	ft.	sq. ft.	sq. ft.
9	457+20	Box Culvert			0.19								1,934	1,624
TOTAL			0.000	0.000	0.190	0.000	0.000	0.000	0.000	0	0	0	1,934	1,624

NOTE: Wetland impacts are limited to riparian buffer zone 1.

R-2000 G
 Utility Permit Drawing
 2 of 3 8/10/06

Utility Impact Site 9--Neuse River Buffer Impact Mitigation Calculation

Site	9 (sq. ft.)	Totals (sq. ft.)
Zone 1 Impact	1,934	1,934
Wetlands in Zone 1	859	859
Zone 1 - Buffers not Wetlands	1,075	1,075
Zone 1 Impact previously mitigated by Wakefield Associates	641	641
Zone 1 Buffer Mitigation Required	434	434
Zone 1 Buffer Mitigation Required (using 3:1 ratio)	1,302	1,302
Zone 2 Impact	1,624	1,624
Wetlands in Zone 2	0	0
Zone 2 - Buffers not Wetlands	1,624	1,624
Zone 1 Impact previously mitigated by Wakefield Associates	0	0
Zone 2 Buffer Mitigation Required	1,624	1,624
Zone 2 Buffer Mitigation Required (using 1.5:1 ratio)	2,436	2,436
Grand Total Mitigation Required (1,302 + 2,436)		3,738

R-2000 G

Utility Permit Drawing

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9/10/06