STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

September 7, 2010

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Ms. Sarah Hair
NCDOT Coordinator

Dear Madam:

Subject: **Recension of Application for an Individual Section 404 and Section 401 Water Quality Certification** for the widening of NC 49 from East of NC 73 to East of SR 2630 (Cline Road) in Cabarrus County.

and

New Application for an Individual Section 404 and Section 401 Water Quality Certification for the widening of NC 49 from East of NC 73 to East of SR 2630 (Cline Road) in Cabarrus County.

Federal Aid Project No. NHS-0049(26), Division 10, TIP No. R-2533CC. Debit $570 from WBS 34448.1.1.

The North Carolina Department of Transportation (NCDOT) proposes to widen the existing 2-lane section of NC 49 to a 4-lane divided highway. The total length of the project is approximately 2.1 miles. This new permit application addresses changes following review of the previous application (dated April 12, 2010) by the permitting agencies. Incorporated in this application are new impacts and additional avoidance and minimization opportunities suggested by the permitting agencies. Please see the enclosed ENG 4345, NCEEP mitigation acceptance letter, merger 4B and 4C meeting minutes, Rapanos jurisdictional determination form, State Stormwater Management Plan, permit drawings, and design plans for the above referenced project. An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) have been completed and distributed for this project. Also, an Indirect and Cumlative Effects Assessment was completed and distributed in October 2006. Additional copies of these documents are available upon request.

Purpose and Need:
The purpose of this project is to provide a higher level of service for the user and to provide safer and more efficient travel along NC 49. NC 49 from Charlotte to Asheboro, along with US 64 from Asheboro to Raleigh, basically parallels I-85/I-40 from Charlotte to Raleigh. Several widening projects have been developed in NCDOT's Transportation Improvement Program that provide a multi-lane cross section along the NC 49/US 64 corridor between Charlotte and Raleigh. This corridor can act as a relief for the busy I-85/I-40 corridor by providing an alternative high speed route between Raleigh and Charlotte via Asheboro.

Summary of Impacts:
The project will permanently impact 0.31 acres of wetlands, 3,060 linear feet of streams, and temporarily impact 480 linear feet of streams.

Summary of Mitigation: The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the NEPA and design processes. Compensatory mitigation for proposed impacts to jurisdictional streams and wetlands will be accomplished by off-site mitigation provided by NCEEP. It is proposed that no mitigation be required of 49 linear feet of permanent stream impact due to bank stabilization.

NEPA DOCUMENT STATUS

An EA was prepared for the entirety of R-2533 (NC 49 in Harrisburg to the Yadkin River) in March 1994. A FONSI was prepared in October 1994. A reevaluation of these documents as pertaining to Sections CC and CD was completed in August 2009. Additional copies will be provided upon request.

MERGER PROCESS SUMMARY

Due to its limited scope and age, this project was not a part of the formal merger process. However informal 4B and 4C meetings were held with agency personnel on November 19, 2008 and March 18, 2009, respectively, to review the project.

INDEPENDENT UTILITY

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

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

In discussions with Steve Lund (USACE), it was agreed that section CC of this project had independent utility.

PROJECT SCHEDULE

R-2533CC calls for an April 19, 2011 let date, and a review date of March 1, 2011, however the let date may advance as additional funding becomes available. This application provides final design and impacts for the project.

The table below gives the project limits and projected let dates for each section of the NC 49 project.

R-2533 Project Schedule

Section	Project Limits	Let Date
R-2533 A	Harrisburg to east of SR 1155	December 2001 (Complete)
R-2533 B	East of SR 1155 to east of SR 2630	June 2002 (Complete)
R-2533 CC	East of SR 2630 to east of NC 73	April 19, 2011
R-2533 CD	East of NC 73 to SR 2444	Post Year
R-2533 CB	SR 2444 to US 52	Post Year
R-2533 D	US 52 to the Yadkin River	Post Year

RESOURCE STATUS

Wetland delineations:

Potential wetland communities were investigated pursuant to the 1987 Corps of Engineers Wetland Delineation Manual. Ms. Polly Lespinasse of the North Carolina Division of Water Quality visited the site on September 4, 2008. Information from this site visit was forwarded along with follow-up information on March 20, 2009 to Mr. Steve Lund of the U.S. Army Corps of Engineers for a jurisdictional determination. On March 11, 2010 a site visit was conducted with Ms. Sarah Hair (USACE) to review the streams and wetlands on the project. An additional wetland was discovered on May 18, 2010. Corresponding information regarding this wetland was provided to Ms. Hair in a letter dated June 18, 2010. With this application NCDOT requests a jurisdictional determination for R-2533CC.

R-2533CC Stream Classifications

Permit Site No.	Stream Name	Sub-basin	Stream Index No.	Best Usage Classification
1	Adams Creek and UTs	03-07-12	13-17-11-7	C
2	McAllister Creek	03-07-12	13-17-11-7-1	C
4,5,6,7,8,9	UTs to McAllister Creek	03-07-12	13-17-11-7-1	C

All streams impacted in the project area are perennial

Impacts to Waters of the United States

Each impact is described below, in detail. Site and station numbers correspond with the permit (hydraulic) drawings included in this application.

Wetland Impacts

Permit Site No.	Permanent (ac)	Temporary (ac)	Mitigation Ratio
1	0.03	--	2:1
3	0.20	--	2:1
5	0.09		2:1
Total	0.31	--	--

All wetlands impacted are riparian wetlands.

Site 1: There will be 0.025 acre of permanent impact to a wetland due to roadway fill and the placement of 750 mm RCP to handle stormwater. This impact is considered a "total take" of the wetland (Permit Drawing Sheet 12 of 51).

Site 3: There will be 0.20 acre of permanent wetland impact due to roadway fill. This impact is considered a "total take" of the wetland (Permit Drawing Sheet 15 of 51).

Site 5: There will be 0.09 acre of permanent wetland impact due to roadway fill. This impact is considered a "total take" of the wetland (Permit Drawing Sheets 23 of 51 and 33 of 51).

Surface Water Impacts

Permit Site No.	Stream Name	Source of Impact	Permanent (lf)	Temporary (ac)	Mitigation Ratio
1	Adams Creek and UTs	3@3.7x3.7 RCBC	108	0.07	2:1
		Bank Stabilization	98	--	1:1
		UT Channel Relocation	36	--	2:1
2	McAllister Creek	1@11.0x2.7 Bottomless Culvert	46	0.12	2:1
		Bank Stabilization	39*	--	--
4	UT to McAllister Creek	4@2.7x2.7 RCBC	361	0.01	2:1
		Bank Stabilization	46	--	1:1
5	UT to McAllister Creek	1050 mm RCP	837	--	2:1
		Bank Stabilization	10	--	1:1
6	UT to McAllister Creek	4@2.7x2.7 RCBC	390	0.02	2:1
		Bank Stabilization	49	--	1:1
7	UT to McAllister Creek	1@1650mm RCP 1@1800mm RCP 1@450mm RCP	902	0.01	2:1
8	UT to McAllister Creek	1@600mm RCP	10	--	2:1
		Bank Stabilization	10*	--	--
9	UT to McAllister Creek	450mm RCP	118	--	2:1
Total			3060	0.23	--

*No mitigation is proposed for this impact (see Compensation section on page 7 for explanation).

Site 1: There will be 108 linear feet of permanent stream impact and 125 linear feet of temporary impacts to Adams Creek due to the replacement and extension of the existing three barrel culvert. In addition, there will have 98 feet of permanent impact due to bank stabilization on the downstream side of the culvert. Of this, 91 feet of the bank stabilization will be used to construct a floodplain bench on the east side. There will be 36 linear feet of permanent stream impact to a UT to Adams Creek where the channel will be relocated away from the headwall of the proposed new culvert (Permit Drawing Sheet 12 of 51).

Site 2: There will be 46 linear feet of permanent stream impacts and 184 linear feet of temporary stream impacts to McAllister Creek due to the removal of the existing culvert and placement of a bottomless culvert. The permanent impact is due to the areas where the sides of the bottomless culvert comes into contact with the bed of the stream channel. Additionally, there will be 39 linear feet of permanent impact to McAllister Creek due to bank stabilization where ditches tie-in above the inlet of the structure (Permit Drawing Sheet 15 of 51).

Site 4: There will be 361 linear feet of permanent stream impacts and 62 linear feet of temporary stream impacts to a UT to McAllister Creek due to the replacement of existing culverts, the extension of the culvert crossing NC 49 and the relocation of the stream between the two structures. There will be an additional 46 feet of permanent impact to the UT due to bank stabilization where a ditch enters the stream at the inlet of the NC 49 culvert and at the outlet of the culvert crossing the shopping center entrance (Permit Drawing Sheet 20 of 51).

Site 5: There will be 837 linear feet of permanent stream impacts to a UT to McAllister Creek due to the relocation of a stream. An additional 10 linear feet of permanent stream impact will occur due to bank stabilization at the outlet of the pipe (Permit Drawing Sheets 23 of 51 and 33 of 51).

Site 6: There will be 390 linear feet of permanent stream impacts and 89 linear feet of temporary stream impacts to a UT to McAllister Creek due to the replacement and extension of the existing culverts. Two existing culverts will be removed and a single structure will relocate the UT at this site (Permit Drawing Sheet 23 of 51). A side road connecting NC 73 will be relocated away from the existing alignment resulting in the addition of a third culvert on this UT (Permit Drawing Sheet 35 of 51). There will be 49 linear feet of permanent stream impact due to bank stabilization at the outlet end of the new culvert on the side road (Permit Drawing Sheet 35 of 51) and where ditches tie into the UT (Permit Drawing Sheet 23 of 51).

Site 7: There will be 902 linear feet of permanent stream impacts and 43 linear feet of temporary stream impacts to a UT to McAllister Creek due to the relocation of the UT (Permit Drawings Sheets 20 of 51 and 28 of 51).

Site 8: There will be 10 feet of permanent stream impacts to a UT to McAllister Creek due to the replacement and extension of a pipe on Radcliffe Road. Additionally, there will be 10 linear feet of permanent stream impact to the UT due to bank stabilization at the outlet of the pipe (Permit Drawings Sheet 23 of 51).

Site 9: There will be 118 linear feet of permanent stream impacts to a UT to McAllister Creek due to the relocation of the piped section of the stream (Permit Drawing Sheet 18 of 51).

Permanent impacts have increased by 1,015 linear feet of stream and 0.31 acre of wetland from impacts reported in the Environmental Assessment (1994). Differences in stream impacts are attributed to design changes and discovery of a perennial stream on NC 73, while wetland impacts increased due to discovery of wetlands in the project area in subsequent NRTR updates.

Utility Impacts

Utility impacts on this project involve the relocation of an existing 12" ductile iron water line which is currently installed over top of the existing RCBC. The existing culvert located at Station 12+68 –Y1 Rev– (Sheet 19 of 40) will be removed and replaced with a new culvert in the same alignment (Site 6). The new culvert will have new headwalls at locations different that the existing box culvert with an armored open channel on the west side of –Y1 Rev–. The existing water line will be lowered in place below the new armored channel section with a minimum of three feet of cover (below the streambed). This work is being performed in an area already permitted for the aforementioned hydraulics work and causes no additional stream impacts.

PROTECTED SPECIES

Plants and animals with a federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 31, 2008, the U.S. Fish and Wildlife Service (USFWS) lists two federally protected species for Cabarrus County. A survey of suitable habitat for Schwienitz's sunflower in the study area was conducted on September 23, 2008. No specimens were observed. Biological conclusions of "No Effect" were rendered for both species.

Federally protected species listed for Cabarrus County.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Lasmigona decorata	Carolina heelsplitter	E	No	No Effect
Helianthus schweinitzii	Schwienitz's sunflower	E	Yes	No Effect

INDIRECT CUMULATIVE IMPACT ANALYSIS

An Indirect and Cumulative Effects Report was completed for the entire R-2533 project in October, 2006 (URS Corp.). This document provides a detailed assessment of likely future conditions in the project area. Potential changes in future land use as a result of indirect and cumulative effects of the project were analyzed for an area radiating 1 mile along the entire approximately 30-mile project length. The report concluded that the additional roadway capacity provided by the project will improve existing access to the project area. This in turn will likely increase the project area's attractiveness for development, influencing some residential and business location decision-making. The western segment of the R-2533 project, which is adjacent to Charlotte, in Mecklenburg County, is most likely to see large-scale residential and commercial developments. Overall, potential Indirect and Cumulative Effects were found to range from Low to Moderate as summarized in the report's Executive Summary Table below.

Impact Type	No-Action Future Conditions (Conditions Without the Proposed Action)		Impacts of the Proposed Action (Incremental Effect of the Proposed Action)			Cumulative Effect (Future Conditions with the Proposed Action)
	Other Past / Present Action	Other Future Actions	Direct Impacts	Indirect Effects: Encroachment Alteration Effects	Indirect Effects: Induced Growth Effects	
Habitat Fragmentation/ Degradation	Low	Low	Low	Low	Moderate	Moderate
Ecosystem Disruption	Low	Low	Low	Low	Moderate	Moderate
Natural Process Disruption	Low	Low	Low	Low	Moderate	Moderate
Water Quality	Low	Low	Low	Low	Moderate	Moderate
Community Cohesion / Stability	Negligible	Negligible	Low	Low	Low	Low
Alteration of Travel Patterns	Positive	Positive	Positive	Positive	Positive	Positive
KEY: Low Adverse Effect; Moderate Adverse Effect; High Adverse Effect; Positive Effect; Negligible Effect						

As the R-2533 corridor approaches Mount Pleasant, the land is zoned for residential, with only a few scattered sites zoned for commercial, light industrial, and office/institutional. This characteristic is maintained through the city limits of Mount Pleasant. The current proposed project, section CC of R-2533, is located in Cabarrus County, within the municipal boundaries of the Town of Mount Pleasant. Development within Mount Pleasant is guided by the Mount Pleasant Unified Development Ordinance (UDO). This document was completed jointly with Cabarrus County as part of the Eastern Area Land Use Plan. Each governing body retains control over land use within its jurisdiction. The UDO contains zoning, land use, and subdivision regulations as well as site design standards, and environmental controls. The UDO states:

"The Town Board hereby finds that hydrologic conditions in Cabarrus County and Mecklenburg County are similar and that it is in the public interest to maintain a uniform regional procedure for computing the stormwater impacts of new development. Accordingly, the design of stormwater management facilities shall be computed in accordance with *Charlotte Mecklenburg Storm Water Design Manual"*

The following federal, state, and local regulations are in place in the project area to protect surface water quality and accommodate future growth:

- EPA National Pollution Discharge Elimination System (NPDES) - Phase II Stormwater Rules
- North Carolina – Water Supply Watershed Protection Act
- North Carolina – Basinwide Water Quality Planning

- North Carolina - Nonpoint Source Program
- Cabarrus County – Land use and Storm Water Regulations

No currently listed 303(d) streams are located within the vicinity of R-2533CC. Adhering to the regulations for the protection of surface waters should limit any potential direct and indirect effects to surface water resources. Direct impacts will be avoided, minimized, or mitigated. Any potential change in land use as a result of the transportation impact causing activities of this project should be governed by the management practices outlined above. By actively adhering to all regulations and commitments any potential indirect and long-term cumulative effects should not substantially contribute to water quality degradation.

MORATORIUM

No moratoria were proposed by the NCWRC and this project does not occur in trout waters or waters used by anadromous fish.

CULTURAL RESOURCES

Historical Structures & Archaeology:
An architectural survey for structures listed in the National Register or eligible for nomination to the National Register was conducted in the project area. There are no properties in the project area that are eligible for or are listed in the National Register of Historic Places.

No archeological sites are present in the project area.

FEMA COMPLIANCE

The NCDOT Hydraulics Unit will coordinate with the North Carolina Floodplain Mapping Program (FMP), the delegated state agency for administering FEMA's National Flood Insurance Program, to determine the status of the project with regard to the applicability of NCDOT's Memorandum of Agreement with the FMP (dated 6-5-08) or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

WILD AND SCENIC RIVER SYSTEM

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

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

Avoidance and Minimization:
The NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable. Other specific examples of avoidance and minimization measures include:

- The removal of the existing culvert at McAllister Creek and replacement with a bottomless structure.
- Use of 2:1 side slopes in jurisdictional streams.
- Rip rap will be placed on the banks and not in the bottom of channels.
- Use of grass swales.
- Strict adherence to the procedures contained in Best Management Practices for Protection of Surface Waters, as well as NC Department of Environmental and Natural Resources (NCDENR), Division of Land Resources, Land Quality's Section's *North Carolina Erosion and Sediment Control Planning and Design Manual* will aid in avoiding and minimizing impacts to water resources and aquatic communities.

Compensation:
The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. This project will cause 3,060 linear feet of permanent impact to jurisdictional streams and 0.31 acre of permanent impact to wetlands. Mitigation will be acquired through the use of the NCEEP for 3,011 linear feet of stream impact and 0.31 acre of wetland impact. There are 49 linear feet of permanent impacts, due to bank stabilization, for which NCDOT proposes no mitigation. These areas occur at Site 2 and Site 8. Total stream impacts at these two sites do not constitute permanent impacts greater than 150 linear feet combined for one stream. The remaining 203 linear feet of permanent impacts due to bank stabilization will be mitigated at a 1:1 ratio. All other permanent impacts (2,708 linear feet of streams and 0.31 acre of wetland) will be mitigated at a ratio of 2:1.

Site 2: There will be 39 linear feet of bank stabilization to McAllister Creek, where rip rap lining a base ditch enters the creek above the inlet of the culvert. NCDOT proposes no mitigation for the 39 linear feet of permanent impacts to this stream.

Site 8: There will be 10 linear feet of bank stabilization to a UT to McAllister Creek, where rip rap will be placed at the outlet end of a pipe carrying the stream. NCDOT proposes no mitigation for the 10 linear feet of permanent impacts to this stream.

REGULATORY APPROVALS

Section 404: Recension of the original application (dated April 12, 2010) is hereby made for a USACE Individual 404 Permit.

Application is hereby made for a USACE Individual 404 Permit as required for the above-described activities.

Section 401: Recension of the original application (dated April 12, 2010) is hereby requested for the 401 Water Quality Certification from the N.C. Division of Water Quality.

We are hereby requesting a 401 Water Quality Certification from the N. C. Division of Water Quality. In compliance with Section 143 215.3D(e) of the NCAC, we will provide $570.00 to

act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). We are providing five (5) copies of this application to the NCDWQ for their review and approval.
Thank you for your assistance with this project. If you have any questions or need additional information, please contact Mr. Jason Dilday at jldilday@ncdot.gov or (919) 413-6693. A copy of this application will also be posted at http://www.ncdot.org/planning/pe/naturalunit/Permit.html.

Sincerely,

E. L. Lusk

Gregory J. Thorpe, Ph.D., Environmental Management Director
Project Development and Environmental Analysis Branch

W/attachment

Mr. Brian Wrenn, NCDWQ (5 Copies)
Ms. Marella Buncick, USFWS
Ms. Marla Chambers, NCWRC
Ms. Jennifer Derby, USEPA

W/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Dewayne Sykes, P.E., Utilities Unit
Mr. Mark Staley, Roadside Environmental
Mr. Barry Moose, PE (Div. 10), Division Engineer
Mr. Larry Thompson (Div. 10), DEO
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Ms. Beth Harmon, EEP
Mr. Phillip Ayscue, NCDOT External Audit Branch
Mr. Drew Joyner, PE, Human Environment Unit Head
Mr. Clarence W. Coleman, P.E., FHWA
Mr. John Conforti, REM, PDEA Project Development Group Supervisor

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

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

Public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: Rivers and Harbors Act, Section 10, 33 USC 403: Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413, Section 103. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
North Carolina Department of Transportation Project Development & Environmental Analysis	
6. APPLICANT'S ADDRESS	**9. AGENT'S ADDRESS**
1598 Mail Service Center Raleigh, NC 27699-1548	
7. APPLICANT'S PHONE NOs. W/AREA CODE	**10. AGENT'S PHONE NOs. W/AREA CODE**
a. Residence b. Business 919-431-6693	a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OR PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
R-2533CC

13. NAME OF WATERBODY, IF KNOWN (if applicable)
Adams Creek, UTs to Adams Creek,
McAllister Creek and UTs to McAllister Creek

14. PROJECT STREET ADDRESS (if applicable)

15. LOCATION OF PROJECT
Cabarrus NC
COUNTY STATE

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

17. DIRECTIONS TO THE SITE
Please see attached vicinity map and cover letter.

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

Widening the current NC 49 from a two-lane facility to a four-lane divided facility.

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

The purpose of this project is to provide a higher level of service for the user and to provide safer and more efficient travel along NC 49.

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

20. Reason(s) for Discharge

Impacts will result from widening the roadway and shoulders, lengthening/ replacing hydraulic structures and realignment of streams around the interchange of NC 49/73.

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

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

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

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

Please see adjacent property landowners page attached to the permit drawing package.

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
N/A					

* Would include but is not restricted to zoning, building, and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

E.L. Lupke for Gregory J. Thorpe, PhD Sept 7, 2010

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Ecosystem Enhancement PROGRAM

August 16, 2010

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

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-2533CC, Widening NC 49 to a Four-Lane Divided Facility from East of SR 2630 (Cline Road) to East of NC 73, Cabarrus County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on August 11, 2010, the impacts are located in CU 03040105 of the Yadkin River Basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Yadkin 03040105 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	3,011	0.31	0	0	0	0
Mitigation Units (Credits-up to 2:1)	0	0	6,022	0.62	0	0	0	0

This mitigation acceptance letter replaces the mitigation acceptance letters issued on January 26 and February 18, 2010. EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

James B. Stanfield for

William D. Gilmore, P.E.
EEP Director

cc: Ms. Liz Hair, USACE – Asheville Regulatory Field Office
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
File: R-2533CC Revised

Subject: Minutes from Interagency 4B Hydraulic Design Review Meeting
On November 19, 2008 for R-2533CC in Cabarrus County

Team Members:	
Steve Lund-USACOE	(absent)
Polly Lespinasse-NCDWQ	(present-by phone)
Marla Chambers-NCWRC	(present)
Marella Buncick-USFWS	(present)
Kathy Matthews-EPA	(absent)
Chris Militscher-EPA	(present)
Donnie Brew-FHWA	(present)
John Conforti-PDEA	(absent)
Carla Dagnino-NEU	(absent)
Michael Turchy-NEU	(present)
Jason Dilday-NEU	(present)
Tawana Brooks-Div 10	(absent)

Participants:

Marshall Clawson, NCDOT Hydraulics
Bill Zerman, NCDOT Hydraulics
Josh Dalton, Sungate Design Group
Cathy Houser, NCDOT Roadway Design
Dave Scheffel, NCDOT Roadway Design
Bruce Klappenbach, NCDOT Structures

General Comments:

Marshall Clawson started the meeting by introducing the project and stating that the purpose of the meeting was to review the 30% hydraulic designs. PDEA will need to address the concurrence history with the Agencies. Mr. Clawson then handed the meeting over to Josh Dalton.

Mr. Dalton noted that the current plans show the project as R-2533CA and the new CC section of project ends at approximately station 234+00 –L- on Plan Sheet 12. The plans will eventually be renumbered to eliminate the portion of the project that will not be constructed under this contract.

Mr. Dalton also noted that the plans were currently showing the 2004 wetland delineation and there is a new 2008 delineation that is being reviewed. Mr. Dalton then proceeded through the project sheet by sheet explaining the proposed drainage design and fielding questions.

Ms. Houser noted that all right-of-way and easements shown have been purchased.

Plan Sheet 4:

Mr. Dalton noted that there is an existing culvert under NC 49 that will be extended on the downstream end and the headwall will be raised on the upstream end. The existing box culvert is 3 @ 11' x 12' and conveys Adams Creek. Photographs of the stream and culvert were passed around. No comments were noted regarding the proposed culvert extension.

Ms. Lespinasse noted that the channel located left of station 201+45 –L-REV is Jurisdictional (intermittent). Mr. Dalton stated that only riprap toe protection would be used adjacent to this stream.

Per the 2004 delineation, there are two wetlands on the plan sheet. The pocket wetland right of station 201+00 –L- REV is not included in the new 2008 delineation. The other wetland is located right of station 201+30 –L- REV. This wetland was classified as a linear wetland and it located in a channelized area. Mr. Turchy will discuss with Mr. Lund about whether this should be classified as a linear wetland or stream. It was determined that this was the best place to outlet the drainage system as an outlet anywhere else in the vicinity would potentially cause a new channel to be cut by erosion.

Plan Sheets 5 and 6:

No wetlands or jurisdictional streams are located on these plan sheets.

Plan Sheet 7:

Mr. Dalton noted that there is an existing culvert under NC 49 that will be extended on the downstream end and the headwall will be raised on the upstream end. The existing box culvert is 3 @ 10' x 8' and conveys McAllister Creek. McAllister Creek is mostly bedrock and large boulders in the vicinity of the culvert. Photographs of the stream and culvert were passed around. It was noted that the outlet of the culvert was perched. In comments received via email, Mr. Lund stated, "At the proposed crossing, McAllister Creek seems to be a rock bed stream. As such, the installation of a standard box culvert extension buried 1 foot below the bed elevation may be problematic. I request that the NCDOT consider a bottomless structure at this location as an extension of or replacement for the existing structure." Mr. Klappenbach noted that there may be construction issues with extending a traditional four-sided box culvert with a bottomless structure. Several agency members were in opposition to the proposed bend in the culvert extension citing concerns about debris. Mr. Clawson stated that would be a maintenance issue and should not be any worse than it is now. Ms. Chambers noted that the perch needed to be corrected to restore fish passage.

Ms. Chambers and Ms. Buncick requested that a bridge be investigated for this crossing. Mr. Dalton stated that a bridge would dramatically increase the cost of the crossing as the proposed roadway grade would need to be raised by more than five feet to provide freeboard and depth for the bridge superstructure. Also, it was noted that the recent inspection showed this culvert in good condition. It was determined that the use of a bottomless structure was not a good idea for a culvert extension, but a bottomless culvert should be investigated as a replacement option. Chris Militscher stated he would like to see this site in the field.

Mr. Dalton stated that a wetland (2008 delineation) exists right of stations 213+50 to 214+00 –L-REV. This wetland will be considered a total take.

Plan Sheet 8:

No wetlands or jurisdictional streams are located on these plan sheets.

Plan Sheet 9:

Mr. Dalton stated that a Jurisdictional Stream (UT to McAllister Creek) flows through the interchange. The stream flows through several existing culverts.

The existing culvert under NC 49 is a 2 @ 7' x 8' RCBC. Mr. Dalton stated that the culvert would be extended straight on both ends. Due to the widening of NC 49, a portion of the stream that flows adjacent to the existing fill slope will be filled. This channel will be relocated once the culvert has been extended. Ms. Chambers noted that the relocation will not receive credit. Ms. Chambers requested that stability of the stream relocation be investigated to see if the entire section should be armored. The existing culvert (2 @ 72" CMP) downstream of the stream relocation will also need to be replaced with 2 @ 96" CMP.

The existing culvert under NC 73 is a 2 @ 7' x 8' RCBC. Mr. Dalton stated that the culvert would be extended with a structure with multiple bends.

Mr. Dalton stated that there is another jurisdictional stream right of stations 222+60 to 224+60 –L-REV that will be impacted by the construction of Ramp D and Loop D. Mr. Dalton stated that the stream will be conveyed by a proposed 66" RCP which will be buried 1 foot. Instead of crossing NC 49 and NC 73 (which would require a bore and jack), the system is proposed to be installed entirely on the south side of NC 49. This option was considerably cheaper than crossing both roads and was selected since the stream in both options would be considered a total loss.

Plan Sheets 10 and 11:

No wetlands or jurisdictional streams are located on these plan sheets.

Plan Sheet 12:

A wetland is located on this plan sheet but it is beyond the limits of Section CC.

Plan Sheets 27, 28, and 29:

No wetlands or jurisdictional streams are located on these plan sheets.

Plan Sheet 30:

Mr. Dalton stated that a Jurisdictional Stream (UT to McAllister Creek) is located on the plan sheet. The proposed box culvert (2 @ 7' x 8' RCBC) will be added under the proposed relocation of SR 2471 (Radcliff Road). Mr. Dalton stated that the culvert will be buried 1 foot.

Meeting adjourned.

Subject: Minutes from Interagency 4C Permit Drawing Review Meeting
On March 18, 2009 for R-2533CC in Cabarrus County

Team Members:

Steve Lund-USACOE	(present)
Polly Lespinasse-NCDWQ	(present)
Marla Chambers-NCWRC	(present)
Marella Buncick-USFWS	(present)
Kathy Matthews-EPA	(present)
Donnie Brew-FHWA	(present)
John Conforti-PDEA	(present)
Carla Dagnino-NEU	(present)
Jason Dilday-NEU	(present)
Tawana Brooks-Div 10	(absent)

Participants:

Marshall Clawson, NCDOT Hydraulics
Bill Zerman, NCDOT Hydraulics
Josh Dalton, Sungate Design Group
Dave Scheffel, NCDOT Roadway Design
Bruce Klappenbach, NCDOT Structures
Mack Bailey, NCDOT Structures
Mark Staley, NCDOT Roadside Environmental

General Comments:

Marshall Clawson started the meeting by introducing the project and stating that the purpose of the meeting was to review the permit drawings. Mr. Clawson then handed the meeting over to Josh Dalton. Mr. Dalton then proceeded through the permit package sheet by sheet discussing the proposed sites and impacts.

Impact Summary:

On the English Impact Summary, it was noted that the structure sizes are in metric.

Site 1:

Mr. Dalton noted that there is an existing culvert under NC 49. The permit drawings depict a culvert extension, but NCDOT Structures has recommended replacement of the entire culvert. The existing box culvert is 3 @ 11' x 12' and conveys Adams Creek. Photographs of the stream and culvert were passed around. Ms. Chambers expressed her recommendation for a bridge at this location. Mr. Clawson discussed the costs associated with installing a bridge compared to a culvert at this location. A cost estimate was not completed specifically for this location, but a cost estimate was completed for the McAllister Creek crossing which consists of a similar sized culvert. The estimate for the McAllister Creek location was for three options:
Option 1: $250,000.00 (Extend Existing Culvert)
Option 2: $550,000.00 (Replace Entirely with Bottomless Culvert)
Option 3: $1.85m (Replace with Dual Bridges)
Mr. Clawson explained that this location is not viable for a bottomless culvert since bedrock is not present.

Several agency members requested investigating the use of sills and baffles. Mr. Dalton stated that this may not be an option at this location since it is located in a FEMA detailed study area.

Mr. Lund noted that there is a pocket wetland right of station 201+00 –L- REV. Mr. Dilday stated that he would provide the updated wetland file showing this wetland. It was determined that this was the best place to outlet the drainage system as an outlet anywhere else in the vicinity would potentially cause a new channel to be cut by erosion. This site will be included in the final permit drawings as part of Site 1.

Site 2

Mr. Dalton stated that the existing 3 @ 10' x 8' box culvert would be removed and replaced with a bottomless structure. McAllister Creek is mostly bedrock and large boulders in the vicinity of the culvert. The cost of a bridge at this location was discussed and noted that it would be an additional $1.3 million compared to the cost of the bottomless culvert. A preliminary culvert alignment was presented. Several agency members noted issues with channels reconstructed inside bottomless structures. Ms. Buncick noted that bankfull width should be used as a guide to re-establish any portion of the channel.

Site 3

Ms. Lespinasse asked if the wetland hydrology would now be provided by stormwater. Mr. Dalton stated that it would be. Mr. Lund stated that the wetland was hydraulically connected to the floodplain of McAllister Creek. This wetland was considered a total take as agreed to during the 4B meeting.

Site 4

The existing culvert under NC 49 is a 2 @ 7' x 8' RCBC and conveys UT to McAllister Creek. Mr. Dalton stated that the culvert would be removed and replaced with a similar structure. The new structure will be buried one foot. Ms. Chambers asked that sills and baffles be considered during design. Ms. Lespinasse asked about why the relocated channel was lined with riprap. Mr. Dalton stated that riprap was requested during the 4B meeting to protect this portion of the channel. Mr. Dalton stated that the riprap would be on the banks only.

Site 5

No comments.

Site 6

The existing culvert under NC 73 is a 2 @ 7' x 8' RCBC. Mr. Dalton stated that the culvert would be extended with a structure with multiple bends. Ms. Chambers requested that sills and baffles be investigated. Ms. Buncick noted that baffles might not be beneficial at this location since the existing culvert will not have baffles.
A proposed 2 @ 7'x 8' RCBC will be located under –Y16REV- just upstream of the culvert extension noted above. It was requested that sills and baffles be investigated for this site.

Site 7

A jurisdictional stream right of stations 222+60 to 224+60 –L-REV is impacted by the construction of Ramp D and Loop D. Mr. Dalton stated that the stream will be conveyed under Ramp D by a proposed 66" RCP which will be buried 1 foot. The 66" RCP will drain to a riprap channel (on banks only) which will convey the flow to a 72" RCP. The 72" RCP will convey the flow along the south side of NC 49 to the south side of NC 73. This pipe outlets to an open channel that flows adjacent to NC 49. Due to right-of-way constraints, this channel is piped (72" RCP) for a short distance and outlets through the wingwall of the proposed box culvert. A discussion at the Field Inspection is anticipated in regards to obtaining additional right-of-way necessary to construct an open channel.

Meeting adjourned.

Adams Ck.

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: R-2533CC (Widening of NC 49 from East of NC 73 to East of SR2630)

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State:NC County/parish/borough: Cabarrus City: Mount Pleasant
Center coordinates of site (lat/long in degree decimal format): Lat. 35.38490° N, Long. 80.51714° W.
Universal Transverse Mercator:
Name of nearest waterbody: Adams Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Rocky River
Name of watershed or Hydrologic Unit Code (HUC): 03040105

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☒ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: 900 linear feet: 4-15 width (ft) and/or acres.
      Wetlands: 0.02 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Established by OHWM.**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: .

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: Pick List
   Drainage area: Pick List
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☒ Tributary flows directly into TNW.
   ☐ Tributary flows through Pick List tributaries before entering TNW.

   Project waters are Pick List river miles from TNW.
   Project waters are Pick List river miles from RPW.
   Project waters are Pick List aerial (straight) miles from TNW.
   Project waters are Pick List aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

   Identify flow route to TNW[5]: .
   Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☐ Natural
- ☐ Artificial (man-made). Explain: .
- ☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
- Average width: feet
- Average depth: feet
- Average side slopes: Pick List.

Primary tributary substrate composition (check all that apply):
- ☐ Silts
- ☐ Sands
- ☐ Concrete
- ☐ Cobbles
- ☐ Gravel
- ☐ Muck
- ☐ Bedrock
- ☐ Vegetation. Type/% cover:
- ☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: Pick List
Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: Pick List
Estimate average number of flow events in review area/year: Pick List
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: Pick List. Characteristics: .

Subsurface flow: Pick List. Explain findings: .
- ☐ Dye (or other) test performed: .

Tributary has (check all that apply):
- ☐ Bed and banks
- ☐ OHWM[6] (check all indicators that apply):
  - ☐ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☐ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ sediment deposition
  - ☐ water staining
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☐ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
- ■ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ■ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

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[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: Pick List. Explain: .

Surface flow is: Pick List

Characteristics: .

Subsurface flow: Pick List. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are Pick List river miles from TNW.

Project waters are Pick List aerial (straight) miles from TNW.

Flow is from: Pick List.

Estimate approximate location of wetland as within the Pick List floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: Pick List

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☒ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: Adams Creek is a perennial stream and its UTs have NCDWQ stream rating scores greater than 20.
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☒ Tributary waters: **900** linear feet **4 - 15** width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☒ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☒ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **Wetland has hydraulic connection to Adams Creek.**
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

---

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
- ☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

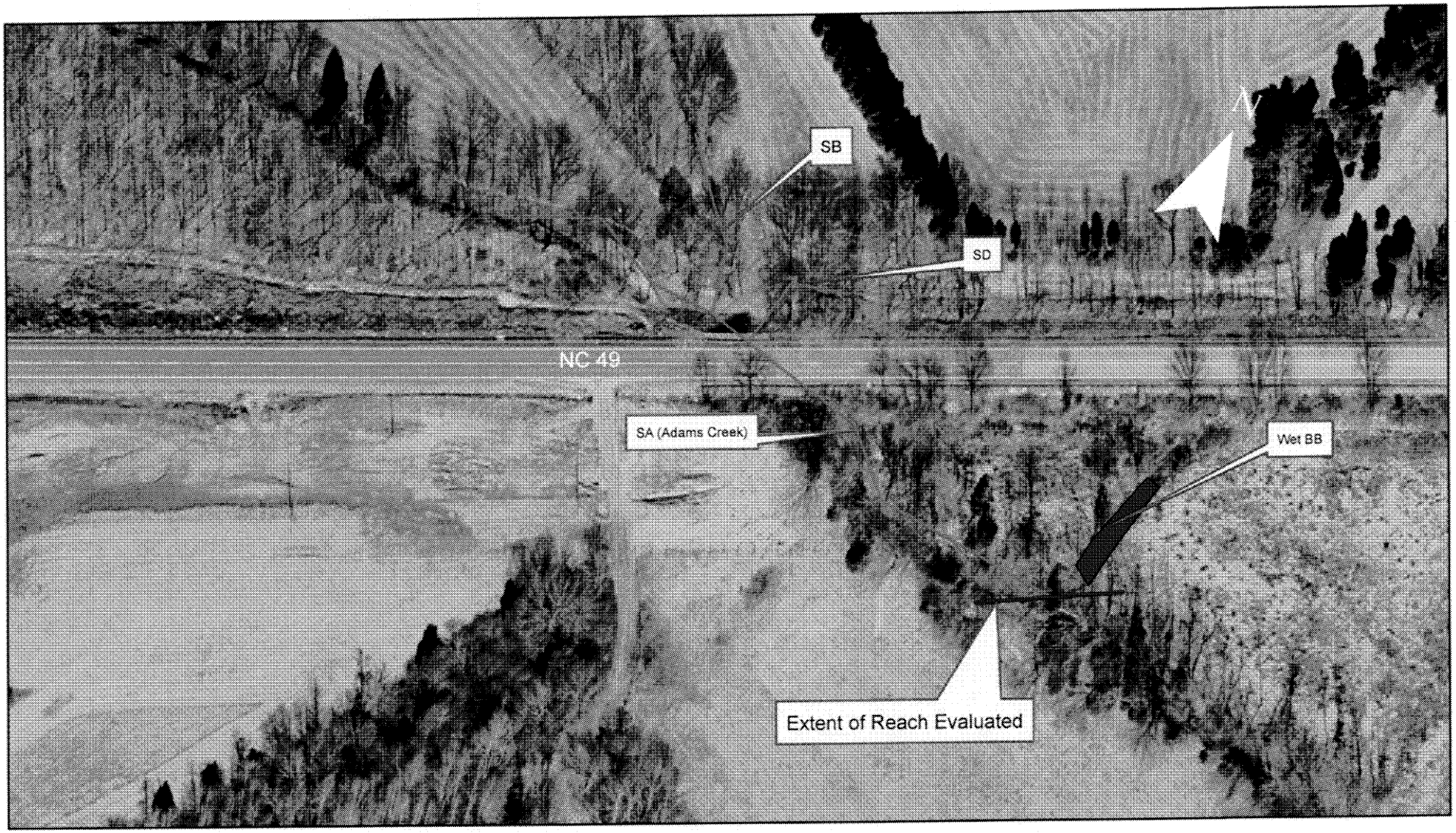
Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☐ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
- ☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☐ U.S. Geological Survey map(s). Cite scale & quad name: .
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
- ☐ National wetlands inventory map(s). Cite name: .
- ☐ State/Local wetland inventory map(s): .
- ☐ FEMA/FIRM maps: .
- ☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
- ☐ Photographs: ☐ Aerial (Name & Date): .
  - or ☐ Other (Name & Date): .
- ☐ Previous determination(s). File no. and date of response letter: .
- ☐ Applicable/supporting case law: .
- ☐ Applicable/supporting scientific literature: .
- ☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

R-2533 CC Rapanos (Adams Creek)



McAllister Creek + UTs

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: R-2533CC (Widening of NC 49 from East of NC 73 to East of SR2630)

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State:NC County/parish/borough: Cabarrus City: Mount Pleasant
Center coordinates of site (lat/long in degree decimal format): Lat. 35.40528° N, Long. 80.45649° W.
Universal Transverse Mercator:
Name of nearest waterbody: McAllister Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Rocky River
Name of watershed or Hydrologic Unit Code (HUC): 03040105
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☒ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 8400 linear feet: 2-20 width (ft) and/or acres.
   Wetlands: 0.29 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Established by OHWM.**
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: .

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: **Pick List**
   Drainage area: **Pick List**
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☒ Tributary flows directly into TNW.
   ☐ Tributary flows through **Pick List** tributaries before entering TNW.

   Project waters are **Pick List** river miles from TNW.
   Project waters are **Pick List** river miles from RPW.
   Project waters are **Pick List** aerial (straight) miles from TNW.
   Project waters are **Pick List** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

   Identify flow route to TNW[5]: .
   Tributary stream order, if known: .

---

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

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[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: 0.20 acres

Wetland type. Explain: Ephemeral wetland.

Wetland quality. Explain:23.

Project wetlands cross or serve as state boundaries. Explain: No.

(b) General Flow Relationship with Non-TNW:

Flow is: **Ephemeral flow**. Explain: Drainage patterns and water stained leaves observed between wetland and McAllister Creek.

Surface flow is: **Discrete**

Characteristics: .

Subsurface flow: **Unknown**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☒ Not directly abutting
  - ☒ Discrete wetland hydrologic connection. Explain: Drainage pattern and water stained leaves.
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **10-15** river miles from TNW.

Project waters are **5-10** aerial (straight) miles from TNW.

Flow is from: **Wetland to navigable waters.**

Estimate approximate location of wetland as within the **50 - 100-year** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: clear.

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☒ Riparian buffer. Characteristics (type, average width):70 ft.
- ☒ Vegetation type/percent cover. Explain:100% forested/native vegetation.
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **1**

Approximately (0.20) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
N	0.20		
Y	0.089		

Summarize overall biological, chemical and physical functions being performed: Wetlands WA and CC function to treat runoff from the adjacent slope and roadway (NC49).

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: li near feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☒ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: McAllister Creek is a perennial stream and its UTs have NCDWQ stream rating scores of 19 or greater.
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☒ Tributary waters: **8400** linear feet **2 - 20** width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: li near feet width (ft).
☐ Other non-wetland waters: acres .
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☒ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **Wetland CC has hydraulic connection to UT to McAllister Creek.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: **0.089** acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: **0.20** acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

---

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet widt h (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
- ☐ Other: (explain, if not covered above): .

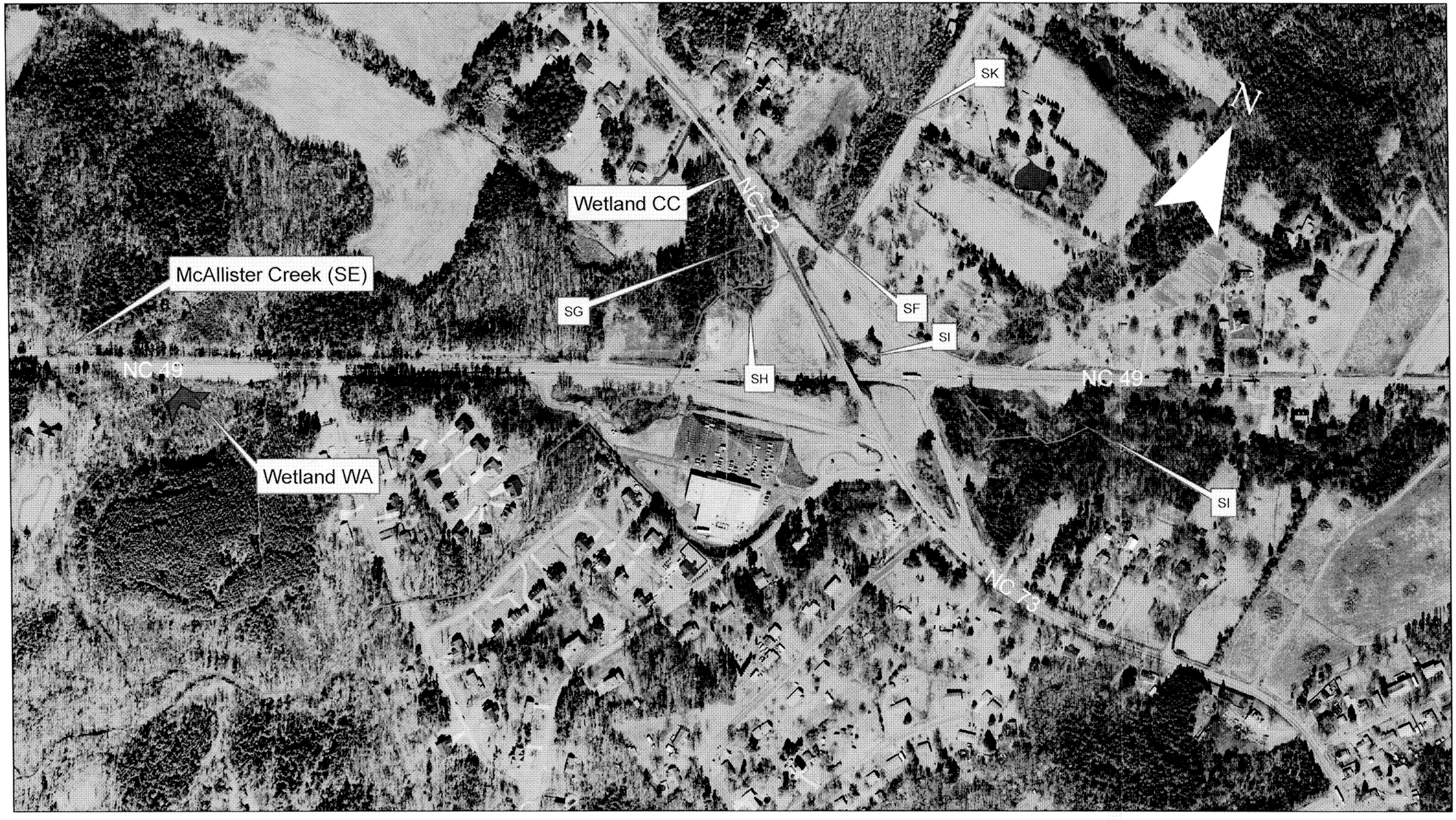
Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): li near feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): li near feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☐ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
- ☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☐ U.S. Geological Survey map(s). Cite scale & quad name: .
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
- ☐ National wetlands inventory map(s). Cite name: .
- ☐ State/Local wetland inventory map(s): .
- ☐ FEMA/FIRM maps: .
- ☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
- ☐ Photographs: ☐ Aerial (Name & Date): .
  - or ☐ Other (Name & Date): .
- ☐ Previous determination(s). File no. and date of response letter: .
- ☐ Applicable/supporting case law: .
- ☐ Applicable/supporting scientific literature: .
- ☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .


McAllister Creek (SE)
Wetland CC
NC 73
SK
N
SG
SF
SI
SH
NC 49
NC 49
Wetland WA
SI
NC 73
0
500
1,000
2,000 Feet

STORMWATER MANAGEMENT PLAN

Project: 34448.1.1
TIP No. R-2533CC
Cabarrus County 05/08/2009

Hydraulics Project Manager: W. Henry Wells Jr., P.E. (Sungate Design Group),
Marshall Clawson, P.E. (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

The project R-2533CC consists of widening NC 49 from east of SR 2630 to east of SR 2421 in Cabarrus County. The total project length is 3.404 kilometers. The project creates impacts to Adams Creek, McAllister Creek, and two unnamed tributaries to McAllister Creek. The project drainage systems consist of grated inlets with associated pipe systems, and rip rap dissipaters at the pipe outlets.

Jurisdictional Streams: Adams Creek, McAllister Creek, UT to McAllister Creek

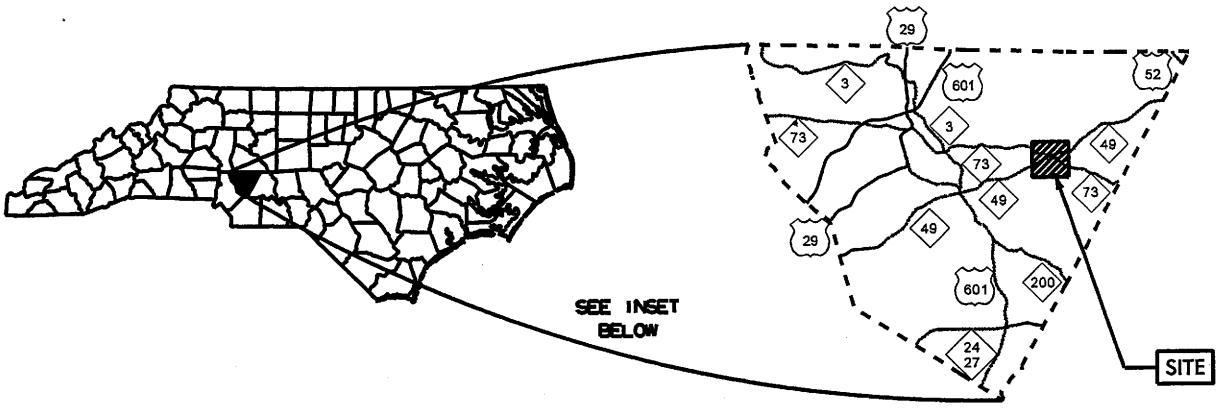
ENVIRONMENTAL DESCRIPTION

The project is located within the Yadkin River Basin in Cabarrus County, which is not a CAMA county. There are two wetlands located within the project limits and both have been considered "total takes" due to impacts from roadway fill. The Yadkin River Basin is not subject to buffer rules; however efforts have been taken to minimize buffer impacts where practicable. Rip rap dissipaters at pipe outlets have been specified and fill slopes have been limited to 2:1 (horizontal to vertical) adjacent to stream to reduce impacts.

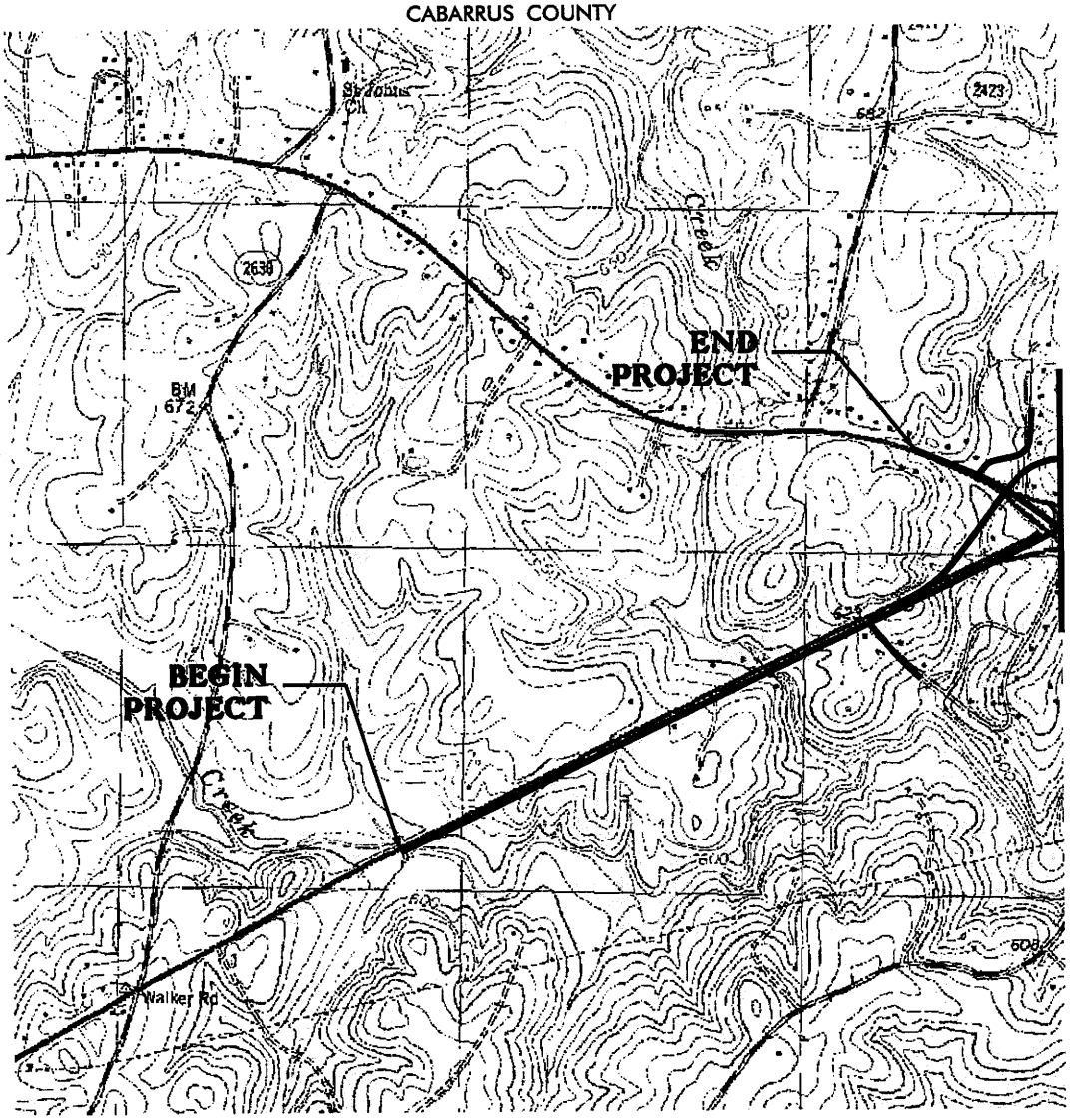
BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

The primary goal of Best Management Practices (BMPs) is to prevent degradation of the states surface waters by the location, construction and operation of the highway system. The BMPs are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMP measures used on this project to reduce stormwater impacts are:

- Rip rap dissipaters at pipe outlets.
- Bottomless culvert at McAllister Creek.
- Grass swales.



CABARRUS COUNTY



WETLAND/STREAM
IMPACTS
(1 OF 2)

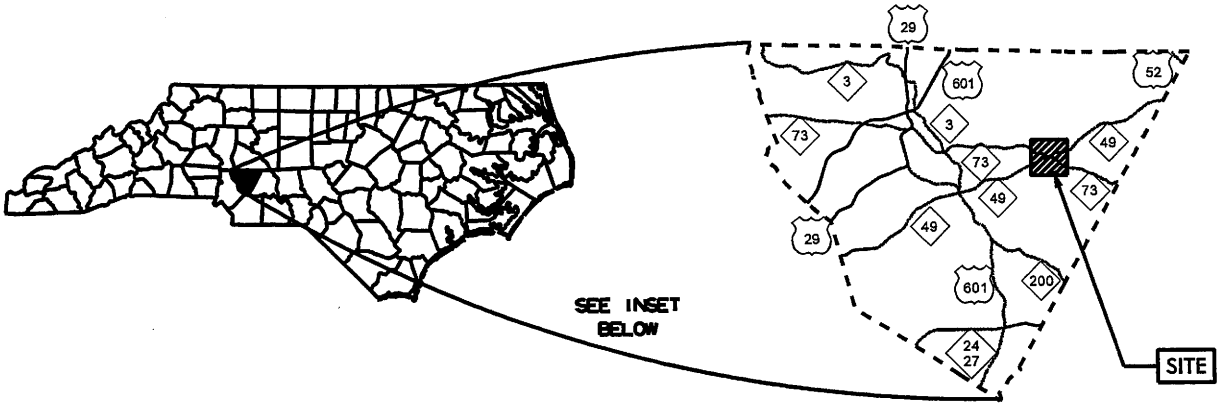
Permit Drawing
Sheet 1 of 51

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

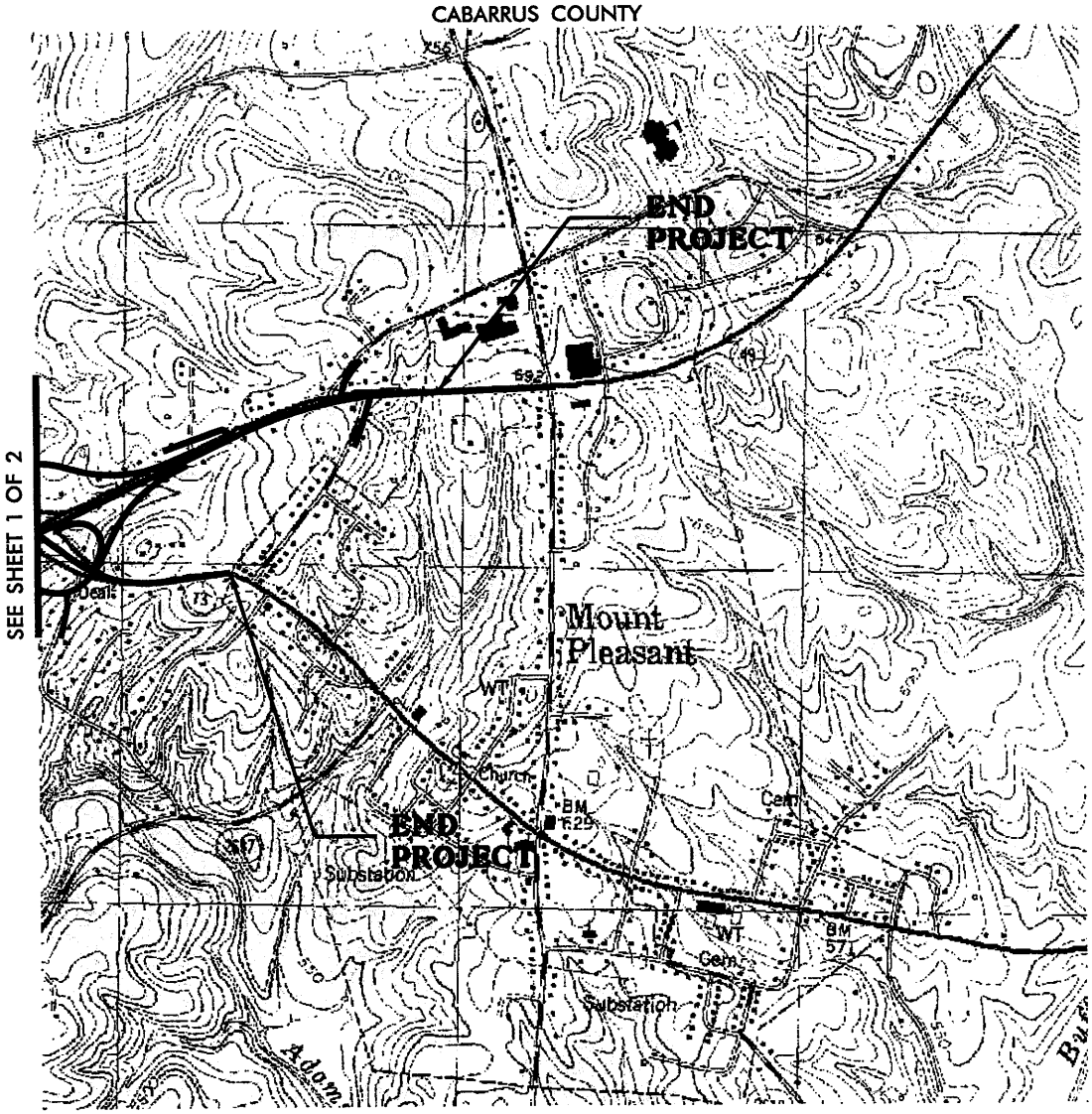
CABARRUS COUNTY

PROJECT:34448.1.1 (R-2533CC)
NC 49 FROM EAST OF SR 2630
TO EAST OF SR 2421

SHEET ___ OF ___ 8-24-09



CABARRUS COUNTY



SEE SHEET 1 OF 2

WETLAND/STREAM
IMPACTS
(2 OF 2)

Permit Drawing
Sheet 2 of 51

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CABARRUS COUNTY

PROJECT:34448.1.1 (R-2533CC)
NC 49 FROM EAST OF SR 2630
TO EAST OF SR 2421

SHEET ___ OF ___ 8-24-09

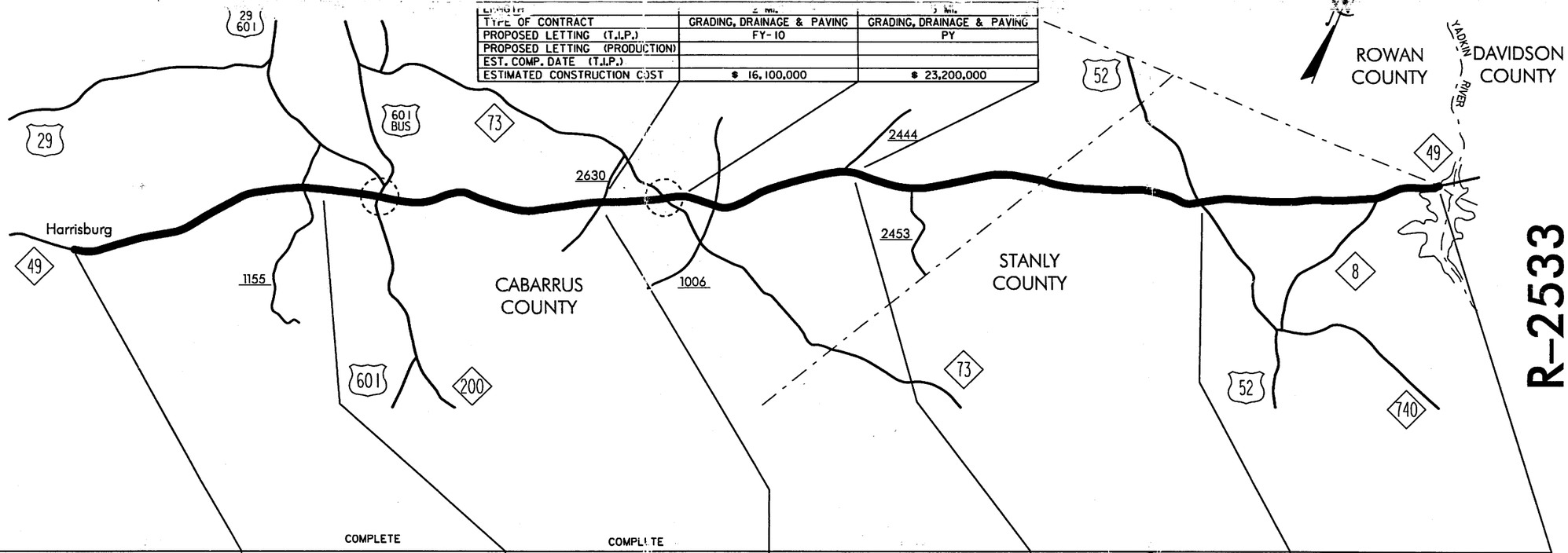
R-2533 CABARRUS & STANLY COUNTIES

NC 49

PROJECT BREAKDOWN MAP

PROJECT SCHEDULES AND COSTS ARE ACCURATE AS OF DATE SHOWN

I.D. NO. / D.S.R. NO.	R-2533 CC	R-2533 CD
WBS	34448	34448
PROJECT ENGINEER	C. HOUSER	C. HOUSER
PROJECT DESCRIPTION	EAST OF SR 2630 TO EAST OF NC 73	EAST OF NC 73 TO EAST OF SR 2444
COUNTY / DIVISION	CABARRUS / DIV. 10	CABARRUS / DIV. 10
LENGTH	2 MI.	3 MI.
TYPE OF CONTRACT	GRADING, DRAINAGE & PAVING	GRADING, DRAINAGE & PAVING
PROPOSED LETTING (T.I.P.)	FY-10	PY
PROPOSED LETTING (PRODUCTION)		
EST. COMP. DATE (T.I.P.)		
ESTIMATED CONSTRUCTION COST	$ 16,100,000	$ 23,200,000



I.D. NO. / D.S.R. NO.	R-2533 A	R-2533 B	R-2533 CA	R-2533 CB	R-2533 D
	COMPLETE	COMPLETE			
WBS	34448	34448	34448	34448	34448
PROJECT ENGINEER	LASSITER	T. HOUSER	C. HOUSER	T. HOUSER	T. HOUSER
PROJECT DESCRIPTION	HARRISBURG TO EAST OF SR 1155	EAST OF SR 1155 TO EAST OF SR 2630	EAST OF SR 2630 TO EAST OF SR 2444	EAST OF SR 2444 TO US 52	US 52 TO YADKIN RIVER
COUNTY / DIVISION	CABARRUS / DIV. 10	CABARRUS / DIV. 10	CABARRUS / DIV. 10	STANLY / DIV. 10	STANLY / DIV. 10
LENGTH	5.57 MI.	6.15 MI.	7.29 MI.	6.6 MI.	5.2 MI.
TYPE OF CONTRACT	GRADING, DRAINAGE & PAVING	GRADING, DRAINAGE & PAVING	ROW ONLY	GRADING, DRAINAGE & PAVING	GRADING, DRAINAGE & PAVING
REMARKS					
BEGIN R/W ACQUISITION (T.I.P.)	2-97	11-98	10-02	PY	PY
BEGIN R/W ACQUISITION (PRODUCTION)					
PROPOSED LETTING (T.I.P.)	12-01	6-03		PY	PY
PROPOSED LETTING (PRODUCTION)					
EST. COMP. DATE (T.I.P.)	9-06	9-05			
ESTIMATED R/W COST	$ 5,850,000	$ 7,600,000	$ 7,800,000	$ 5,500,000	$ 5,500,000
ESTIMATED CONSTRUCTION COST	$ 26,800,000	$ 25,400,000		$ 34,600,000	$ 24,700,000

UPDATED - 9/12/08

R-2533

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	NED C. REESE	1103 ROGERS LK RD KANNAPLOIS, NC 28081
2	CLARENCE A. & HILDA R. ALLMAN	ADDRESSES
11	STEVEN B. COCHRANE	6851 HWY 49 MT. PLEASANT, NC 28124
12	ECB, LLC	ADDRESSES
16	LOUIS M. HELMS, JR	6910 HWY 49 NORTH MT. PLEASANT, NC 28124
13	JOHN RAY NOBLES, JR	577 COVINGTON MILL POND RD BENNETSVILLE, NC 29512
22	H. KENNETH WILLIS & DIANE M. WILLIS J.O. WILLIS & LLAGE HOYLE WILLIS	751 BRAFFORD DR CONCORD, NC 28025
26	GATHA G. AUSTIN	P.O. BOX 307 LOCUST, NC 28097
28	MARSHALL POPLIN	P.O. BOX 818 MT. PLEASANT, NC 28124
43	WILLIAM F. PULLIUM	116 11TH AVE NEW LONDON, NC 28127

WETLAND/ STREAM IMPACTS

Permit Drawing Sheet 4 of 51

NCDOT

DIVISION OF HIGHWAYS

CABARRUS COUNTY

PROJECT: 34448.1.1 (R-2533CC)
NC 49 FROM EAST OF SR 2630
TO EAST OF SR 2421

SHEET 1 OF 2 7/23/10

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
44	FRANCES B. MEDLIN	43 UNION ST SOUTH CONCORD, NC 28025
46	PATRICIA P. HARRINGTON	3852 LAKE AIRE DR NASHVILLE, TN 37217

WETLAND/ STREAM IMPACTS

Permit Drawing Sheet 5 of 51

NCDOT

DIVISION OF HIGHWAYS

CABARRUS COUNTY

PROJECT: 34448.1.1 (R-2533CC)
NC 49 FROM EAST OF SR 2630
TO EAST OF SR 2421

7/23/10

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1 *	200+17/201+21-L-REV	3@3.7 x 3.7 RCBC	0.025					0.11	0.07	108	125	
		Bank Stabilization								98		
		UT Channel Relocation						0.01		36		
2	212+13/212+79 -L-REV	1@11.0 x 2.7 BOTTOMLESS RCBC						0.01	0.12	46	184	
		Bank Stabilization								39		
3 *	213+52/214+02 -L-REV	Roadway Fill	0.200									
4	218+26/219+34 -L-REV	2@2.7 x 2.7 RCBC						0.09	0.01	361	39	
	Shopping Center Access	2@2.7 x 2.7 RCBC										
		Bank Stabilization								46		
5 *	9+90/12+47 -Y1-REV RT	1050mm RCP	0.089					0.06		837		
		Bank Stabilization								10		
6	11+87/12+70 -Y1-REV	2@2.7 x 2.7 RCBC						0.09	0.02	390	89	
	12+11.6 -Y16-REV	2@2.7 x 2.7 RCBC										
		Bank Stabilization								49		
7	219+45/219+59 -L-REV	1 @ 1650mm RCP						0.13	0.01	902	43	
		1 @ 1800mm RCP										
8	11+06-Y16REV-RT	600 RCP						<0.01		10		
		Bank Stabilization								10		
9	220+00/220+28 -L-REV LT	450mm RCP						0.02		118		
TOTALS:			0.31					0.52	0.23	3060	480	

ENGLISH IMPACTS

* WETLAND CONSIDERED TOTAL TAKE.

Permit Drawing
Sheet 6 of 51

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CABARRUS COUNTY
WBS - 34448.1.1 (R-2533CC)

SHEET 8/11/2010

ATN Revised 3/31/05

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation in Wetlands (ha)	Mechanized Clearing in Wetlands (ha)	Hand Clearing in Wetlands (ha)	SURFACE WATER IMPACTS: Permanent SW impacts (ha)	Temp. SW impacts (ha)	Existing Channel Impacts Permanent (m)	Existing Channel Impacts Temp. (m)	Natural Stream Design (m)
1 *	200+17/201+21-L-REV	3@3.7 x 3.7 RCBC	0.010					0.046	0.026	33	38	
		Bank Stabilization								30		
		UT Channel Relocation						0.003		11		
2	212+13/212+79 -L-REV	1@11.0 x 2.7 BOTTOMLESS RCBC						0.007	0.048	14	56	
		Bank Stabilization								12		
3 *	213+52/214+02 -L-REV	Roadway Fill	0.081									
4	218+26/219+34 -L-REV	2@2.7 x 2.7 RCBC						0.037	0.006	110	12	
	Shopping Center Access	2@2.7 x 2.7 RCBC										
		Bank Stabilization								14		
5*	9+90/12+47 -Y1-REV RT	1050mm RCP	0.036					0.026		255		
		Bank Stabilization								3		
6	11+87/12+70 -Y1-REV	2@2.7 x 2.7 RCBC						0.035	0.009	113	27	
	12+11.6 -Y16-REV	2@2.7 x 2.7 RCBC										
		Bank Stabilization								20		
7	219+45/219+59 -L-REV	1 @ 1650mm RCP						0.053	0.005	275	13	
		1 @ 1800mm RCP										
8	11+06-Y16REV-RT	600 RCP						<0.001		3		
		Bank Stabilization								3		
9	220+00/220+28 -L-REV LT	450mm RCP						0.008		36		
TOTALS:			0.127					0.215	0.094	932	146	

METRIC IMPACTS

* WETLAND CONSIDERED A TOTAL TAKE.

Permit Drawing Sheet 7 of 51

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CABARRUS COUNTY
WBS - 34448.1.1 (R-2533CC)

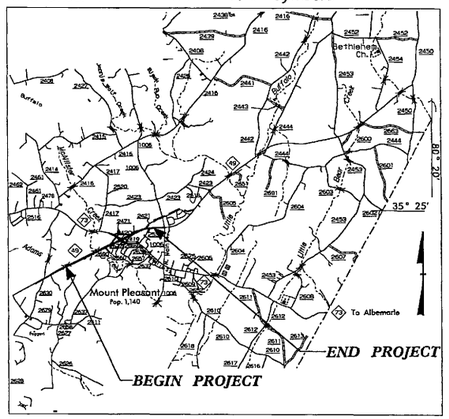
SHEET 8/11/2010

WHE Revised 5/21/2008

TIP: R-2533CC

CONTRACT:

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



VICINITY MAP OF PROJECT R-2533CC

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
CABARRUS COUNTY

LOCATION: NC 49 FROM EAST OF SR 2630 TO EAST OF SR 2421

TYPE OF WORK: GRADING, PAVING, STRUCTURES, CULVERTS, DRAINAGE, SIGNALS, AND SIGNING

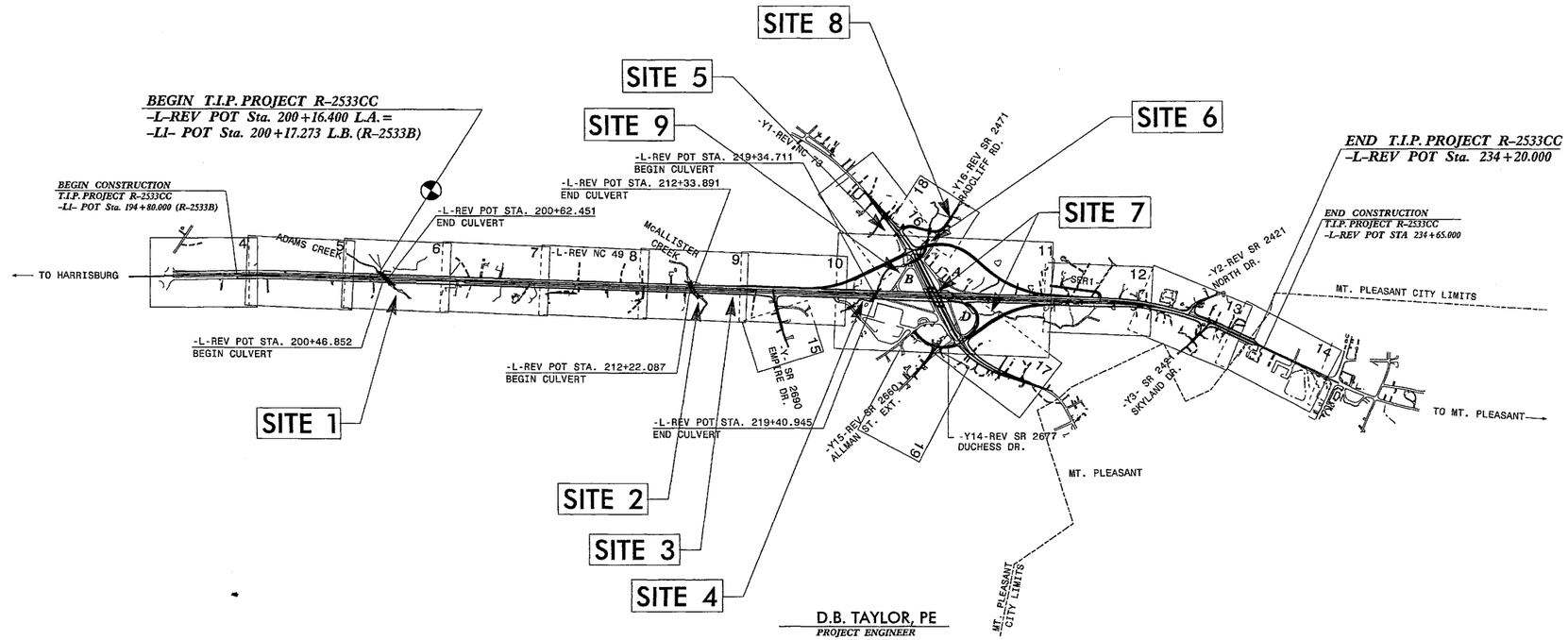
METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND /OR MILLIMETERS UNLESS OTHERWISE NOTED

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2533CC	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
34448.1.1	NHF-28-1(5)	PE	
34448.3.9	NHS-0049(26)	R/W, UTIL	
		CONST	

Permit Drawing
Sheet 8 of 51

NAD 83
NC GRID



WETLAND/STREAM IMPACTS

D.B. TAYLOR, PE
PROJECT ENGINEER
NCDOT CONTACT

CONTROL OF ACCESS IS SHOWN ON PLANS AT THE NC 49 – NC 73 INTERCHANGE

GRAPHIC RATIO

5 0 10
PLANS
5 0 10
PROFILE (HORIZONTAL)
1 0 2
PROFILE (VERTICAL)

DESIGN DATA

ADT 2011 = 10,685
ADT 2031 = 13,531
DHV = 11 %
D = 60 %
T = 13 %
(TTST 7% + DUALS 6%)
–L–REV NBL V = 100 km/h
–L–REV SBL V = 90 km/h
RRR – DESIGN GUIDELINES
FUNCT. CLASS. – ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY PROJECT R-2533CC = 3.370 Km
LENGTH STRUCTURES PROJECT R-2533CC = 0.034 Km
TOTAL LENGTH STATE PROJECT R-2533CC = 3.404 Km

PLANS PREPARED FOR NCDOT DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: October 18, 2002

LETTING DATE: April 19, 2011

K. M. HAUGHEY, PE
EARTH TECH PROJECT MANAGER

N. J. DEAN, PE
PROJECT DESIGN ENGINEER

Prepared in the Office of:

NC FIRM LICENSE No: F-0342
701 Corporate Center Dr.
Suite 475
Raleigh, N.C. 27607
(919)–854–6200
FAX (919)–854–6259

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS JR.

SIGNATURE:

ROADWAY DESIGN

NORTH CAROLINA PROFESSIONAL SEAL 030... ENGINEER KEVIN M. HAUGHEY

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

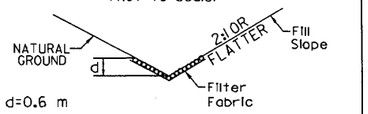
STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

METRIC	PROJ. REFERENCE NO.	SHEET NO.
	R-2533CC	2-J
	HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
5m 0 10m	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST.REV.	Prepared in the Office of: AECOM NC FIRM LICENSE No:F-0342 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 (919) 854-6200 - (919) 854-6259(FAX)	
R/W REV.		

Permit Drawing Sheet 9 of 54

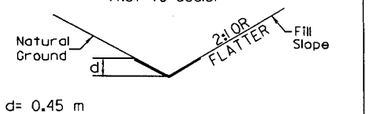
DETAIL 1
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 200+80 TO STA. 202+40 –L–REV LT
FROM STA. 233+30 TO STA. 234+30 –L–REV LT

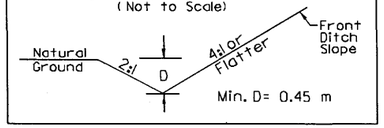
DETAIL 2
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

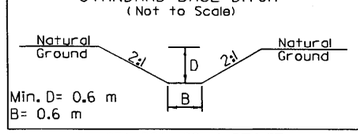
FROM STA. 202+40 TO STA. 202+60 –L–REV LT
FROM STA. 204+25 TO STA. 204+80 –L–REV LT

DETAIL 3
SPECIAL CUT DITCH
(Not to Scale)



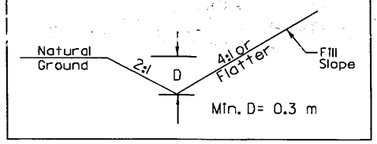
FROM STA. 204+98 TO STA. 206+60 –L–REV LT
FROM STA. 206+00 TO STA. 206+28 –L–REV LT
FROM STA. 206+80 TO STA. 207+81 –L–REV LT
FROM STA. 9+85 TO STA. 10+72 –SER1– LT

DETAIL 4
STANDARD BASE DITCH
(Not to Scale)



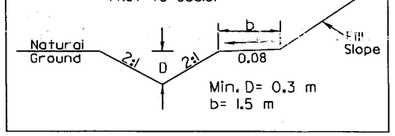
STA. 206+32 –L–REV RT
STA. 207+66 –L–REV RT

DETAIL 5
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



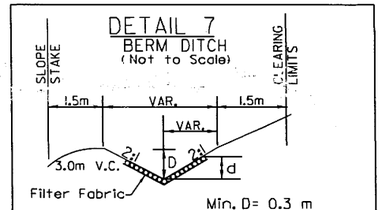
FROM STA. 208+40 TO STA. 208+80 –L–REV LT
FROM STA. 228+60 TO STA. 229+40 –L–REV LT
FROM STA. 16+40 TO STA. 17+00 –Y1–REV RT
FROM STA. 5+50 TO STA. 6+16 RAMP A LT
FROM STA. 0+45 TO STA. 1+20 LOOP D RT

DETAIL 6
LATERAL 'V' DITCH
(Not to Scale)



FROM STA. 208+80 TO STA. 210+80 –L–REV LT
FROM STA. 228+13 TO STA. 228+60 –L–REV LT
FROM STA. 11+19 TO STA. 11+40 –SER1– LT

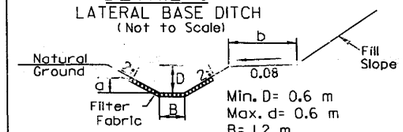
DETAIL 7
BERM DITCH
(Not to Scale)



Type of Liner= Class 'B' Riprap

FROM STA. 211+60 TO STA. 211+95 –L–REV RT
FROM STA. 3+40 TO STA. 3+60 RAMP B LT

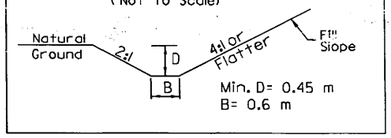
DETAIL 8
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

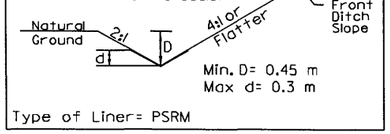
FROM STA. 212+20 TO STA. 213+00 –L–REV LT

DETAIL 9
SPECIAL LATERAL BASE DITCH
(Not to Scale)



FROM STA. 213+00 TO STA. 214+00 –L–REV LT
FROM STA. 218+20 TO STA. 219+00 –L–REV LT

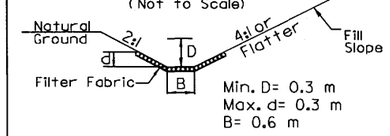
DETAIL 10
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 212+20 TO STA. 212+40 –L–REV RT
FROM STA. 214+00 TO STA. 214+60 –L–REV LT
FROM STA. 16+53 TO STA. 18+00 –Y1–REV LT
FROM STA. 10+05 TO STA. 10+86 –Y14–REV RT
FROM STA. 11+40 TO STA. 11+83 –Y15–REV RT
FROM STA. 11+60 TO STA. 11+84 –Y15–REV RT

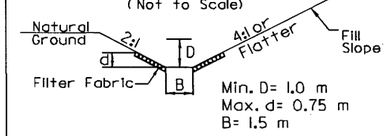
DETAIL 11
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 11+20 TO STA. 12+03 –Y1–REV RT
FROM STA. 12+80 TO STA. 13+60 –Y1–REV LT
FROM STA. 3+60 TO STA. 4+30 –RAMP B– LT

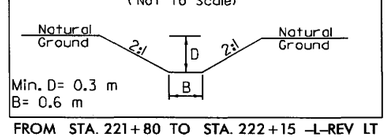
DETAIL 12
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

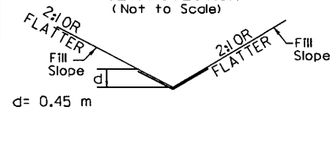
FROM STA. 219+80 TO STA. 221+00 –L–REV RT

DETAIL 13
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 221+80 TO STA. 222+15 –L–REV LT
FROM STA. 222+74 TO STA. 222+85 –L–REV LT
STA. 3+40 RAMP A LT
STA. 2+40 RAMP B RT
STA. 12+07 –Y14– LT

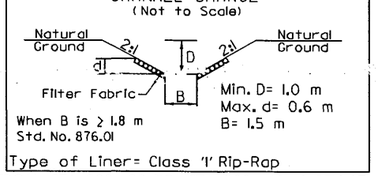
DETAIL 14
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

FROM STA. 1+40 TO STA. 1+80 –LOOP D– LT

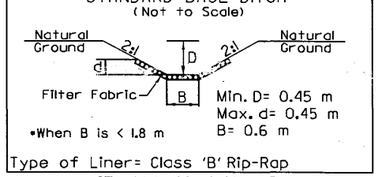
DETAIL 15
CHANNEL CHANGE
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

FROM STA. 200+38 TO STA. 200+48 –L–REV LT
FROM STA. 223+36 TO STA. 224+07 –L–REV RT

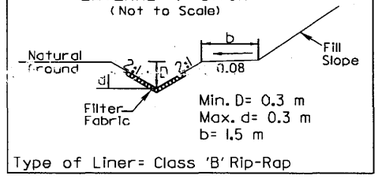
DETAIL 16
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

STA. 224+00 –L–REV RT
STA. 18+50 –Y1–REV RT
STA. 18+60 –Y1–REV LT

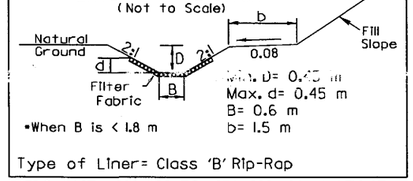
DETAIL 17
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 5+64 TO STA. 5+96 RAMP A RT

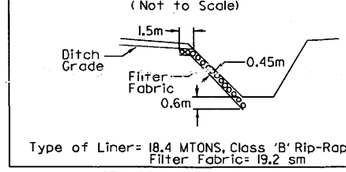
DETAIL 18
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 210+80 TO STA. 212+10 –L–REV LT
FROM STA. 219+00 TO STA. 219+45 –L–REV LT
FROM STA. 233+71 TO STA. 233+97 –L– REV RT
FROM STA. 11+55 TO STA. 12+10 –Y1–REV LT
FROM STA. 6+03 TO STA. 6+45 –RAMPA– RT

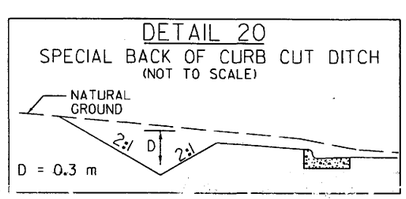
DETAIL 19
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 18.4 MTONS, Class 'B' Rip-Rap
Filter Fabric= 19.2 sm

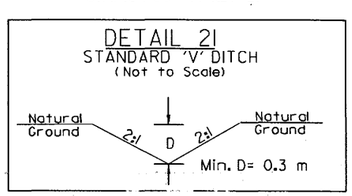
STA. 220+20 –L–REV RT

DETAIL 20
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



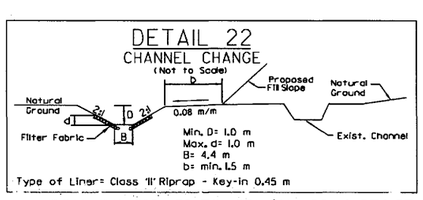
FROM STA. 231+80 TO STA. 232+20 –L–REV LT
FROM STA. 232+30 TO STA. 232+50 –L–REV LT
FROM STA. 232+60 TO STA. 233+04 –L–REV LT

DETAIL 21
STANDARD 'V' DITCH
(Not to Scale)



FROM STA. 11+60 TO STA. 11+80 –Y16–REV LT
STA. 11+00 –Y2–REV RT

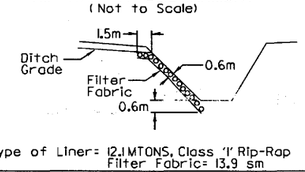
DETAIL 22
CHANNEL CHANGE
(Not to Scale)



Type of Liner= Class 'II' Riprap - Key-in 0.45 m

FROM STA. 218+58 TO STA. 219+20 –L–REV RT

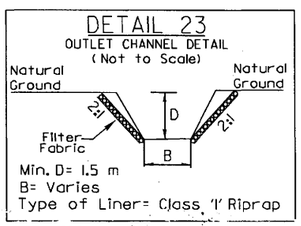
DETAIL 24
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 12.1 MTONS, Class 'I' Rip-Rap
Filter Fabric= 13.9 sm

STA. 212+10 –L–REV LT
STA. 219+45 –L–REV LT

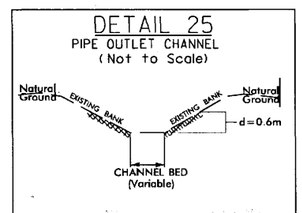
DETAIL 23
OUTLET CHANNEL DETAIL
(Not to Scale)



Type of Liner= Class 'I' Riprap

FROM STA. 218+25 TO STA. 218+38 –L–REV RT
STA. 12+68 –Y1–REV RT
STA. 12+12 –Y16–REV LT

DETAIL 25
PIPE OUTLET CHANNEL
(Not to Scale)



Class 'I' Rip-Rap

STA. 11+07 –Y16–REV RT LENGTH = 3.0m
STA. 4+25 –RPB– RT LENGTH = 5.0m

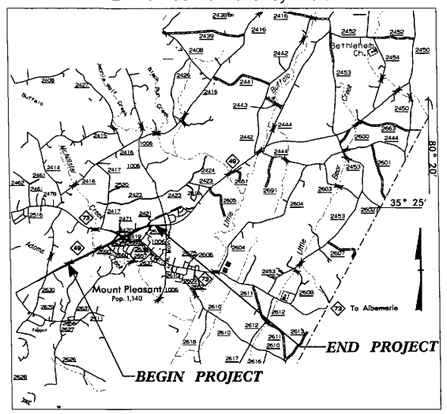
USER: ######
DGN: ######

DATE: ######
FILE: ######

TIP: R-2533CC

CONTRACT:

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

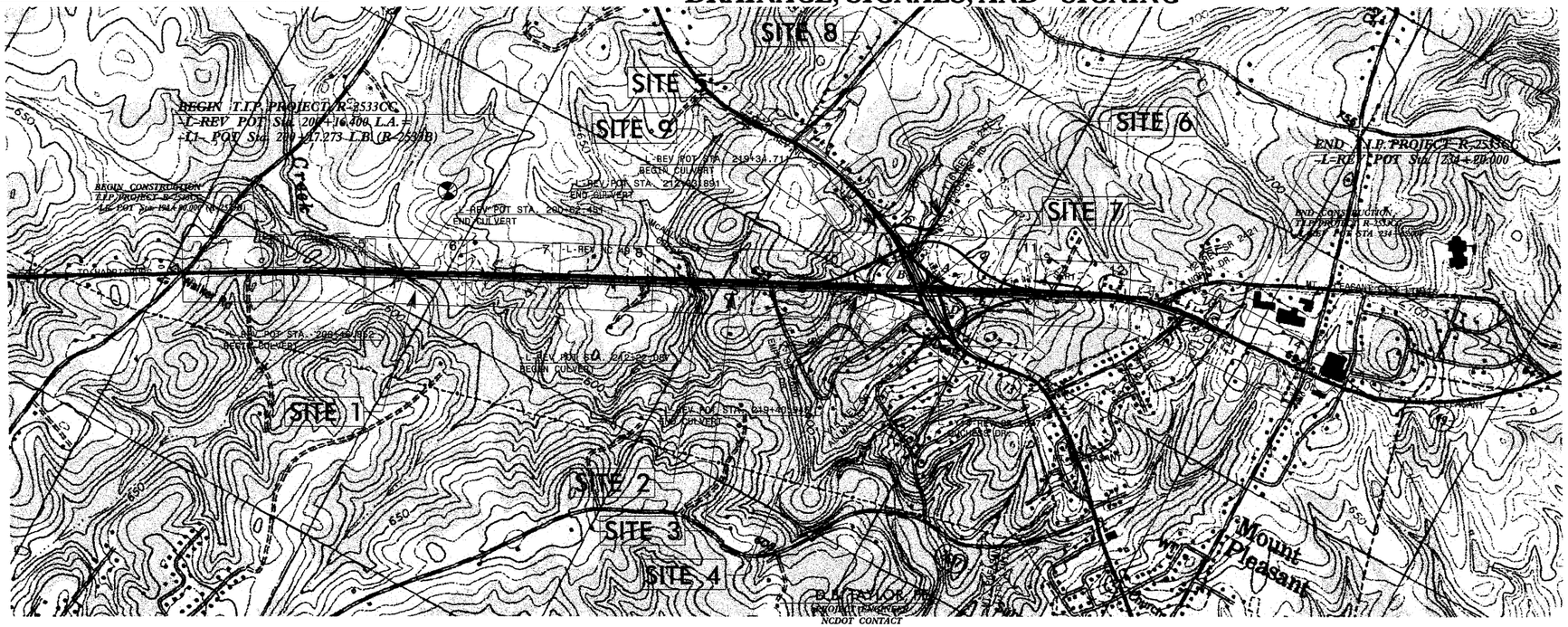


VICINITY MAP OF PROJECT R-2533CC

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
CABARRUS COUNTY

LOCATION: NC 49 FROM EAST OF SR 2630 TO EAST OF SR 2421

TYPE OF WORK: GRADING, PAVING, STRUCTURES, CULVERTS, DRAINAGE, SIGNALS, AND SIGNING



CONTROL OF ACCESS IS SHOWN ON PLANS AT THE NC 49 – NC 73 INTERCHANGE

METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND /OR MILLIMETERS UNLESS OTHERWISE NOTED

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2533CC	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34448.1.1	NHF-28-1(5)	PE
34448.3.9	NHS-0049(26)	R/W, UTIL
		CONST

Permit Drawing
Sheet 10 of 51

NAD 83
NC GRID

WETLAND/STREAM IMPACTS

GRAPHIC RATIO

PLANS 5 0 10

PROFILE (HORIZONTAL) 5 0 10

PROFILE (VERTICAL) 1 0 2

DESIGN DATA

ADT 2011 = 10,685
ADT 2031 = 13,531
DHV = 11 %
D = 60 %
T = 13 %
(TTST 7% + DUALS 6%)
-L-REV NBL V = 100 km/h
-L-REV SBL V = 90 km/h
RRR – DESIGN GUIDELINES
FUNCT. CLASS. – ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY PROJECT R-2533CC = 3.370 Km

LENGTH STRUCTURES PROJECT R-2533CC = 0.034 Km

TOTAL LENGTH STATE PROJECT R-2533CC = 3.404 Km

PLANS PREPARED FOR NCDOT DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: October 18, 2002

LETTING DATE: April 19, 2011

K. M. HAUGHEY, PE
EARTH TECH PROJECT MANAGER

N. J. DEAN, PE
PROJECT DESIGN ENGINEER

Prepared in the Office of:

NC FIRM LICENSE No: F-0342
701 Corporate Center Dr.
Suite 475
Raleigh, N.C. 27607
(919)-854-6200
FAX (919)-854-6259

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER WENDY WELLS

SIGNATURE:

ROADWAY DESIGN

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER N. J. DEAN

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

CHANNEL BENCH DETAIL SHEET

Permit Drawing Sheet 11 of 51

METRIC

5m 0 10m

CONST. REV.

R/W REV.

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	2-Y

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Prepared in the Office of:
AECOM
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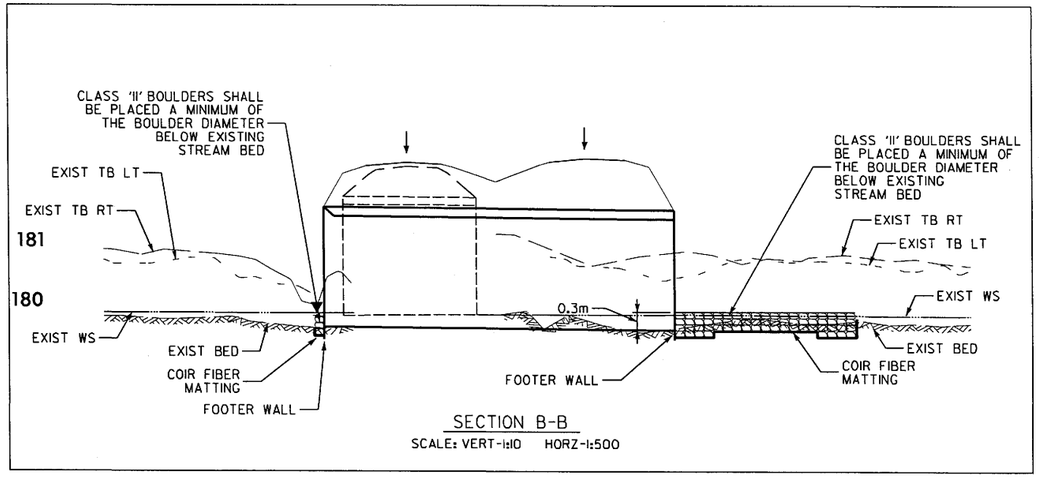
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)



SECTION B-B

SCALE: VERT-1:10 HORZ-1:500

NOTES:

1. A BENCH 0.3m ABOVE THE BED SHALL BE ARMORED WITH BOULDERS AS SHOWN ON THE PLAN VIEW. THE DEPTH OF ARMOR PROTECTION SHOULD EXTEND 0.45m BELOW THE STREAM BED AND LINED WITH COIR FIBER MATTING.

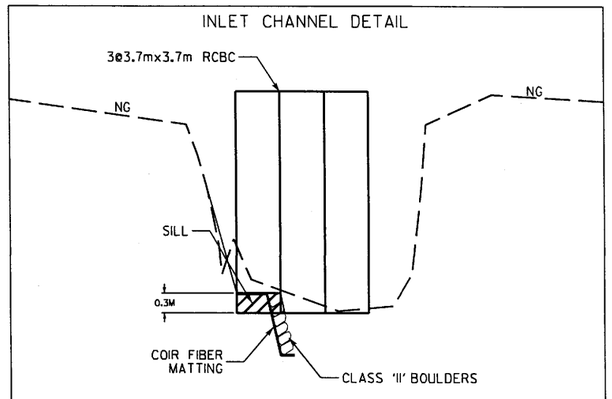
2. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.

3. EDGE ARMOR CAN BE NATURAL STREAM BOULDERS OR EXTRACTED FROM CLASS II RIPRAP OR SHOT ROCK MATERIAL AND CAN BE CUBICAL OR RECTANGULAR IN NATURE.

4. ACCEPTABLE BOULDERS FOR THE EDGE ARMOR SHALL HAVE THE FOLLOWING APPROXIMATE DIMENSIONS; 0.9m x 0.6m x 0.3m. UNSUITABLE EDGE ARMOR MATERIAL THAT REMAINS FROM CLASS II RIP RAP OR SHOT ROCK STORES, MAY BE USED IN BACK FILL OF THE OVER BANK AREA OR DISCARDED.

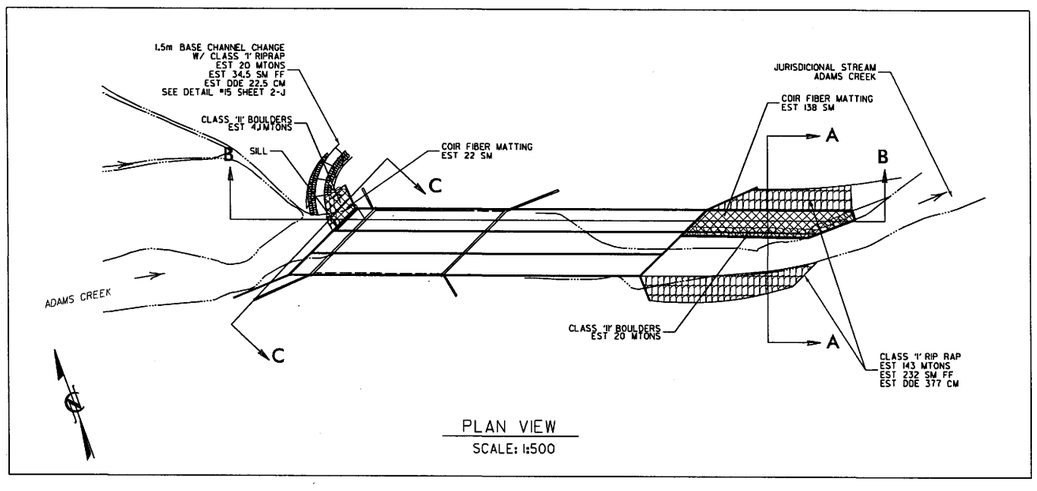
5. COIR FIBER MATTING SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDERS AND ACROSS THE BENCHED AREA TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS.

INLET CHANNEL DETAIL



SECTION C-C

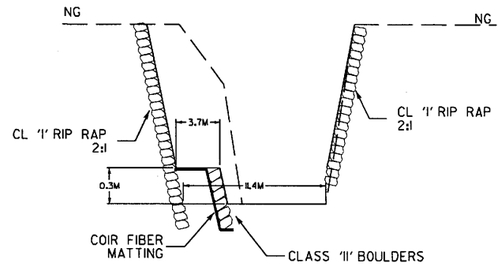
NOT TO SCALE



PLAN VIEW

SCALE: 1:500

OUTLET CHANNEL DETAIL



SECTION A-A

NOT TO SCALE

STA. 200+37 TO STA. 200+98 -L-REV

DATE: $DATE$
TIME: $TIME$
USER: $USER$
DGN: DGN

RW STREET 4

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

NAD 83 / NC GRID

METRIC

5m 0 10m

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	6

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

Prepared in the Office of: AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 (919) 854-6259(FAX)

Permit Drawing
Sheet 12 of 51

BEGIN T.I.P. PROJECT R-2533CC
-L-REV POT Sta 200+16.400 L.A.=
-LI- POT Sta 200+17.273 L.B. (R-2533B)

BEGIN GRADE
-LI- POT Sta 199+95.000 (R-2533B)

JURISDICTIONAL STREAM
ADAMS CREEK

SITE 1

CLASS 'II' BOULDERS
EST 4.1 MTONS
EST 22 SM COIR FIBER MATTING
SEE DETAIL SHEET 2-Y
1.5m BASE CHANNEL CHANGE
W/CLASS 'I' RIPRAP ON BANKS ONLY
EST 20 MTONS RIPRAP
EST 34.5 SM FF
EST DDE 22.5 CM
SEE DETAIL #1

REMOVE EXISTING CULVERT

TOE PROTECTION
STA. 200+80 TO 202+40 -L-REV LT
SEE DETAIL #1
EST 206 MTONS CLASS 'B' RIPRAP
EST 346.1 SM FF

TOE PROTECTION W/PSRM
STA. 202+40 TO 202+60 -L-REV LT
SEE DETAIL #2
EST 40.3 SM PSRM

REMOVE EXISTING GUARDRAIL

3@3.7m x 3.7m RCBC

CHANNEL BENCH W/CLASS 'II' BOULDERS
EST 20 MTONS
EST 138 SM COIR FIBER MATTING
SEE DETAIL SHEET 2-Y

CLASS 'I' RIPRAP
EST 143 MTONS
EST 232 SM FF
EST DDE 377 CM

CLASS 'I' RIPRAP
EST 10 MTONS
EST 18.4 SM FF

JURISDICTIONAL STREAM
ADAMS CREEK

-LI- N 64° 19' 01.3" E

-L-REV N 64° 19' 01.3" E

MATCH LINE -LI- STA.199+00.000 SEE SHEET 5

MATCH LINE -L-REV STA.202+80 SEE SHEET 7

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -LI-/-L-REV PROFILE, SEE SHEETS 20 & 21
FOR -XOVER1- DETAILS, SEE SHEET 2-M
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

R/W REV.
1) REVISED OWNER NAME PARCEL 2 JWD 10/15/03
2) REVISED OWNER NAME PARCEL 2 KJV 7/8/04
3) ADDED PDE TO PARCEL 1 FOR DRAINAGE REV.05/07/09
4) REMOVED PDE & ADDED TDE TO PARCEL 1 FOR EROSION CONTROL CMKR 07/20/09
5) REVISED TDE ON PARCEL 1 TO ELIMINATE OVERLAP OF TDE AND CORRECTED LABELS ON PDE AND TDE ON PARCEL 2 CMKR 05/05/10

DATE: ##DATE##
TIME: ##TIME##
USER: ##USER##
DGN: ##DGN##

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	6

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
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Raleigh, NC 27607
(919) 854-6200 (919) 854-6259 FAX

Permit Drawing
Sheet 13 of 51

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F/F DENOTES FILL IN WETLAND

NAD 83
NC GRID

BEGIN T.I.P. PROJECT R-2533CC
-L-REV POT Sta 200+16.400 L.A.=
-LI- POT Sta 200+17.273 L.B. (R-2533B)

JURISDICTIONAL STREAM
ADAMS CREEK

BEGIN GRADE
-LI- POT Sta 199+95.000 (R-2533B)

SITE 1

CLASS 'II' BOULDERS
EST 4.1 MTONS
EST 22 SM COIR FIBER MATTING
SEE DETAIL SHEET 2-Y
1.5m BASE CHANNEL CHANGE
W/CLASS 'I' RIPRAP ON BANKS ONLY
EST 20 MTONS RIPRAP
EST 34.5 SM FF
EST DDE 22.5 CM
SEE DETAIL #1&2

REMOVE EXISTING CULVERT

TOE PROTECTION
STA. 200+80 TO 202+40 -L-REV LT
SEE DETAIL #1
EST 206 MTONS CLASS 'B' RIPRAP
EST 346.1 SM FF

TOE PROTECTION W/PSRM
STA. 202+40 TO 202+60 -L-REV LT
SEE DETAIL #2
EST 40.3 SM PSRM

REMOVE EXISTING GUARDRAIL

-LI- N, 64° 19' 01.3" E

-L-REV N 64° 19' 01.3" E

3@3.7m x 3.7m RCBC

CHANNEL BENCH W/CLASS 'II' BOULDERS
EST 20 MTONS
EST 138 SM COIR FIBER MATTING
SEE DETAIL SHEET 2-Y

CLASS 'I' RIPRAP
EST 143 MTONS
EST 232 SM FF
EST DDE 377 CM

JURISDICTIONAL STREAM
ADAMS CREEK

CLASS 'I' RIPRAP
EST 10 MTONS
EST 18.4 SM FF

MATCH LINE -LI- STA.199+00.000 SEE SHEET 5

MATCH LINE -L-REV STA.202+80 SEE SHEET 7

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -LI-/-L-REV PROFILE, SEE SHEETS 20 & 21
FOR -XOVER1- DETAILS, SEE SHEET 2-M
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

R/W REV.
1) REVISED OWNER NAME PARCEL 2 JMKD 10/15/03
2) REVISED OWNER NAME PARCEL 2 K.H. 7/8/04
3) ADDED PDE TO PARCEL I FOR DRAINAGE REV.05/07/09
4) REMOVED PDE & ADDED TDE TO PARCEL I FOR EROSION CONTROL CMVR 07/20/09
5) REVISED TDE ON PARCEL I TO ELIMINATE OVERLAP OF TCE AND CORRECTED LABELS ON PDE AND TDE ON PARCEL 2 CMVR 05/05/10

DATE: #DATE#
TIME: ##TIME##
USER: #USER#
DGN: #RDGN##

PROJ. REFERENCE NO. R-2533CC | SHEET NO. 21

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

METRIC

5m 0 10m SCALE

CONST.REV.

R/W REV.

Prepared in the Office of: AECOM
NC FIRM LICENSE No: F-0342
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Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

Permit Drawing Sheet 14 of 51

-L-REV

-L1- STA. 200+00.

-L-REV STA. 200+17.
-L1- STA. 200+17.

BM 113 RR SPIKE IN ROOT OF 375MM TWIN SYCAMORE
-L1- STA 199+91 (40 LT), EL 182.406

SITE 11

IMPACTS IN SURFACE WATER

-L1- STA. 199+95 =
-L1- SBL STA. 199+95
BEGIN GRADE ELEV. 184.764
-L1- NBL STA. 199+95
BEGIN GRADE ELEV. 184.909

BEGIN STATE PROJECT R-2533CC
-L-REV STA. 200+16.400 LA=
-L1- STA. 200+17.273 LB (R-2533B)

-L-REV NBL
PI = 200+85.000
EL = 184.476 m
VC = 160 m
K = 45

-L-REV SBL
PI = 200+85.000
EL = 184.477 m
VC = 180 m
K = 53

PROPOSED GRADE NBL

NBL

-0.4760% NBL
-0.3163% SBL

+3.0741% NBL
+3.0741% SBL

PROPOSED GRADE SBL

EXISTING GROUND

DRAINAGE AREA = 18.8 SQ KM
DESIGN DISCHARGE = 111.6 cms
DESIGN FREQUENCY = 50 Yr
DESIGN HW ELEV. = 185.74
BASE DISCHARGE = 128.4 cms
BASE FREQUENCY = 100 Yr
BASE HW ELEV. = 184.28

OVERTOPPING FLOOD ELEV. = 184.78
FREQUENCY = 500 Yr+
DISCHARGE = +182.4 cms

3 @ 3.7 X 3.7 RCEC W/SILL

+60 +80 200 +20 +40 +60 +80 201 +20 +40 +60 +80 202 +20 +40 +60 +80 203 +20 +40

-L-REV

BM 114 RR SPIKE IN BASE OF 300MM SWEET GUM
-LREV- STA 205+99 (51 RT), EL 196.032

-L-REV NBL
PI = 207+00.020
EL = 203.383 m
VC = 575 m
K = 82

-L-REV SBL
PI = 207+13.000
EL = 203.782 m
VC = 490 m
K = 68

+3.0741% NBL

+4.1348% SBL
+3.0741% SBL
-3.9647% NBL

PROPOSED GRADE SBL

NBL

EXISTING GROUND

PROPOSED GRADE NBL

+00 197.900
+20 197.700
+80 197.620
+00 197.065
+20 196.865
+28 196.925
+40 198.240
+60 198.648
+80 198.670
+00 196.330
+20 198.150
+58 199.750
+20 196.420
+40 196.930
+60 197.260

LT. SIDE LAT. "V" DITCH

RT. SIDE SPECIAL DITCH

45D RCP

600 RCP

DRAINAGE AREA = 1.50 ha
DESIGN DISCHARGE = 0.32 cms
DESIGN FREQUENCY = 50 yr
DESIGN HW ELEV. = 196.28
Q100 DISCHARGE = 0.33 cms
Q100 HW ELEV. = 196.29

OVERTOPPING FLOOD ELEV. = 196.97
FREQUENCY = 500 Yr +
DISCHARGE = 0.36 cms

DRAINAGE AREA = 1.24 ha
DESIGN DISCHARGE = 0.26 cms
DESIGN FREQUENCY = 50 yr
DESIGN HW ELEV. = 198.23
Q100 DISCHARGE = 0.27 cms
Q100 HW ELEV. = 198.25

OVERTOPPING FLOOD ELEV. = 198.23
FREQUENCY = 50 Yr
DISCHARGE = 0.27 cms

FOR -L1-/-L-REV PLAN SEE SHEETS 6, 7 & 8

+40 +60 +80 204 +20 +40 +60 +80 205 +20 +40 +60 +80 206 +20 +40 +60 +80 207 +20

USER: $$USER$$
DGN: $$DGN$$

DATE: $$DATE$$
TIME: $$TIME$$

RW STAGE 1

F/F DENOTES FILL IN WETLAND

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

METRIC

5m 0 10m

CONST.REV.

R/W REV.

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	9

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

Permit Drawing Sheet 15 of 54

EST. 20 ADT IN

NAD 83 NC GRID

MATCH LINE -L-REV STA.210+40 SEE SHEET 8

MATCH LINE -L-REV STA.214+20 SEE SHEET 10

WOODS

211+00

212+00

213+00

214+00

McALISTER CREEK

RIPRAP EMBANKMENT
EST. 12.1 MTONS
EST. 13.9 SM FF
SEE DETAIL #24

SITE 2

I S BK D

TV ANTENNA

1CONC

W/LT

GR

POOL

CONC

1200 CONC

LAT 0.6M BASE DITCH W/CLASS 'B' RIPRAP STA. 210+80 TO 212+10 -L- REV LT
EST 178 CM DDE
EST 164 MTONS RIPRAP
EST 339.7 SM FF
SEE DETAIL #18

LAT V-DITCH STA. 208+80 TO 210+80 -L- REV LT
SEE DETAIL #6

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST 9.2 SM FF

LATERAL 1.2m BASE DITCH W/CLASS 'B' RIPRAP
STA. 212+20 TO 213+00 -L-REV LT
SEE DETAIL #8
EST 242 CM DDE
EST 131 MTONS RIPRAP
EST 235.4 SM FF

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

SPECIAL LAT 0.6m BASE DITCH
STA. 213+00 TO 214+00 -L-REV LT
SEE DETAIL #9

SPECIAL CUT DITCH W/PSRM
STA. 214+00 TO 214+60 -L-REV LT
SEE DETAIL #10
EST 114.5 SM PSRM

REMOVE

EXISTING R/W

CAT-I

3-3.0 X 2.4 CONC

TYPE 350

RETAIN

COLLAR AND EXTEND W/600 RCP

1@11m X 2.7m 3-SIDED BOX CULVERT

REMOVE EXISTING CULVERT

375 RCP

NC 49 7.3 BST

-L-REV N 64°19'01.3" E

375 CMP

2GI

2GI-A FS

150 BK WALL

SHOP CURVED R=6Jm

CAT-K

450 W/ ELBOWS

BDO

450 RCP

C2GI

2GI-A

600

ASBW

14 SOIL & GR

STANDARD BERM DITCH
STA. 210+66 TO 211+60 -L-REV RT
SEE PROFILE FOR GRADE

MTL GATE

BERM DITCH W/CLASS 'B' RIPRAP
STA. 211+60 TO 211+95 -L-REV RT
SEE DETAIL #7
EST 23 MTONS RIPRAP
EST 47 SM FF

3000 BK WALL

CUT EXISTING WALL

CONC

ANTENNA

1½ S BK D

BK

SPECIAL CUT DITCH W/PSRM
STA. 212+20 TO 212+40 -L-REV RT
SEE DETAIL #10
EST 54.4 SM PSRM

WALLACE CREEK

SITE 2

SITE 3

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST 9.2 SM FF

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -L-REV PROFILE, SEE SHEET 22
FOR -XOVER2- DETAILS, SEE SHEET 2-N
FOR TEMP. RAMP B CONNECTOR, SEE SHEET 2-R
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

USER: $$USER$$
DGN: $$DGN$$

DATE: $$DATE$$
TIME: $$TIME$$

F/F DENOTES FILL IN WETLAND

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

NAD 83 NC GRID

METRIC

5m 0 10m

CONST.REV.

R/W REV.

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	9

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

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Permit Drawing Sheet 16 of 51

RIPRAP EMBANKMENT
EST. 12.1 MTONS
EST. 13.9 SM FF
SEE DETAIL #24

SITE 2

SPECIAL LAT 0.6m BASE DITCH
STA. 213+00 TO 214+00 -L-REV LT
SEE DETAIL #9

LATERAL 1.2m BASE DITCH
W/CLASS 'B' RIPRAP
STA. 212+20 TO 213+00 -L-REV LT
SEE DETAIL #8
EST 242 CM DDE
EST 131 MTONS RIPRAP
EST 235.4 SM FF

SPECIAL CUT DITCH W/PSRM
STA. 214+00 TO 214+60 -L-REV LT
SEE DETAIL #10
EST 114.5 SM PSRM

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

LAT 0.6M BASE DITCH
W/CLASS 'B' RIPRAP
STA. 210+80 TO
212+10 -L- REV LT
EST 178 CM DDE
EST 164 MTONS RIPRAP
EST 339.7 SM FF
SEE DETAIL #18

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST 9.2 SM FF

LAT V-DITCH
STA. 208+80 TO 210+80
-L- REV LT
SEE DETAIL #6

RETAIN
COLLAR AND EXTEND
W/600 RCP

1@11m X 2.7m
3-SIDED BOX CULVERT
REMOVE EXISTING CULVERT

REMOVE

-L-REV N 64°19'01.3" E

450 W/ ELBOWS

SHOP CURVED
R=6.1m

450 BK WALL

300 BK WALL

CUT EXISTING WALL

STANDARD BERM DITCH
STA. 210+66 TO 211+60 -L-REV RT
SEE PROFILE FOR GRADE

BERM DITCH
W/CLASS 'B' RIPRAP
STA. 211+60 TO 211+95 -L-REV RT
SEE DETAIL #7
EST 23 MTONS RIPRAP
EST 47 SM FF

SPECIAL CUT DITCH W/PSRM
STA. 212+20 TO 212+40 -L-REV RT
SEE DETAIL #10
EST 54.4 SM PSRM

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST 9.2 SM FF

SITE 2

SITE 3

MATCH LINE -L-REV STA.210+40 SEE SHEET 8

MATCH LINE -L-REV STA.214+20 SEE SHEET 10

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -L-REV- PROFILE, SEE SHEET 22
FOR -XOVER2- DETAILS, SEE SHEET 2-N
FOR TEMP. RAMP B CONNECTOR, SEE SHEET 2-R
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: $$DATE$$
TIME: $$TIME$$

USER: $$USER$$
DGN: $$DGN$$

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	22

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5m 0 10m
SCALE

CONST.REV.
R/W REV.

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Permit Drawing Sheet 17 of 31

-L-REV

-L-REV NBL
PI = 207+00.020
EL = 203.383 m
VC = 575 m
K = 82

-L-REV SBL
PI = 207+13.000
EL = 203.782 m
VC = 490 m
K = 68

-4.1348% SBL
-3.9647% NBL
NBL
LT. SIDE LAT. "V" DITCH
600 RCP
DRAINAGE AREA = 1.46 Ha
DESIGN DISCHARGE = 0.31 cms
DESIGN FREQUENCY = 50 yr
DESIGN HW ELEV. = 197.67
Q100 DISCHARGE = 0.32 cms
Q100 HW ELEV. = 197.69
OVERTOPPING FLOOD ELEV. = 198.16
FREQUENCY = 500 Yr +
DISCHARGE = 0.33 cms
PROPOSED GRADE NBL
PROPOSED GRADE SBL
EXISTING GROUND
RT. SIDE BERM DITCH
+20 198.150
+40 197.930
+60 197.650
+81 197.150
+40 196.715
+80 195.491
+00 194.219
+20 193.294
+40 192.370
+50 192.100
+60 191.445
+80 192.100
+00 192.160
+80 190.400
+20 189.400
+40 188.435
+60 186.940
+65 189.90
+80 185.400

-L-REV

SITE 2 15 RR SPIKE IN BASE OF 375MM OAK TREE
-L-REV- STA 212+45 (36 LT), EL 181.692

IMPACTS IN SURFACE WATER

-L-REV NBL
PI = 212+50.000
EL = 181.578 m
VC = 300 m
K = 45

-L-REV SBL
PI = 212+50.000
EL = 181.578 m
VC = 210 m
K = 31

PROPOSED GRADE NBL
PROPOSED GRADE SBL
EXISTING GROUND
-4.1348% SBL
-3.9647% NBL
+2.7040% NBL
+2.7040% SBL
NBL
SBL
RT. SIDE BERM DITCH
LT. SIDE 1.2m BASE LAT. DITCH W/RIPRAP
LT. SIDE 1.5m BASE SP. LAT. DITCH
LT. SIDE W/ CUT DITCH PERM
DRAINAGE AREA = 6.5+ SQ KM
DESIGN DISCHARGE = 42.6 cms
DESIGN FREQUENCY = 50 Yr
DESIGN HW ELEV. = 180.11
BASE DISCHARGE = 48.2 cms
BASE FREQUENCY = 100 Yr
BASE HW ELEV. = 180.26
OVERTOPPING FLOOD ELEV. = 183.30
FREQUENCY = 500 Yr+
DISCHARGE = 93.0+ cms
1 @ 11.0 X 2.7 BOTTOMLESS RCBC
+60 189.620
+80 188.162
+95 187.300
+20 185.200
+60 183.550
+20 182.880
+40 180.230
+10 179.200
+20 178.770
+30 178.820
+60 179.300
+00 180.470
+20 181.000
+80 182.280
+00 182.960
+20 184.300
+40 185.960
+60 186.392

FOR -L-REV PLAN SEE SHEETS 8, 9 & 10

USER: $$USER$$
DGN: $$DGN$$
DATE: $$DATE$$
TIME: $$TIME$$

Permit Drawing
Sheet 18 of 51

RW Sheet 9

MATCH LINE SEE SHEET 18

DITCH NOTES
1. SPECIAL LAT. 0.6m DITCH W/CLASS 'B' RIP RAP STA. 11 00 TO 11+ 03 -Y1-REV ST SEE DETAIL #11
2. 1.2m BASE DITCH W/CLASS 'B' RIP RAP STA. 14+ 55 TO 13+ 80 -Y1-REV LT SEE DETAIL #18
3. SPECIAL CUT DITCH W/FSBM STA. 11 +60 TO 11+ 80 -Y1-REV LT SEE DETAIL #10
4. SPECIAL CUT DITCH W/FSBM STA. 11+60 TO 12+ 80 -Y1-REV RT SEE DETAIL #10
5. SPECIAL LAT. V-DITCH STA. 16+ 40 TO 17+ 04 -Y1-REV RT SEE DETAIL #5
6. SPECIAL CUT DITCH W/FSBM STA. 16+ 53 TO 18 00 -Y1-REV LT SEE DETAIL #10
7. LAT. W. DITCH W/CLASS 'B' RIPRAP STA. 3+ 44 TO 3+ 60 -RAMP A- RT, EST. 0.9 CM DDE EST. 53 MTONS RIPRAP, EST. 42.9 SM. FF SEE DETAIL #17
8. LAT. 0.6m BASE DITCH W/CLASS 'B' RIP RAP STA. 4+ 03 TO 4 +15 -RAMP A- RT, EST. 0.5 CM. DDE EST. 53 MTONS RIPRAP, EST. 100.7 SM. F.F. SEE DETAIL #18

-Y1-REV
Pt Sta 12+03540
Δ = 9° 51' 12" (RT)
L = 124.863
R = 725.000
Sa = 0.09 m/m

-Y1-REV
Pt Sta 12+127.78
Gs = 2° 30' 24.4"
L = 70.000
R = 2300.000
ST = 23.338

-Y1-REV
Pt Sta 15+80.24
Gs = 6° 30' 19.7"
L = 120.000
R = 900.000
ST = 35.015

-Y1-REV
Pt Sta 16+93.496
Δ = 56° 28' 43.6" (LT)
L = 84.100
R = 85.250
Sa = 0.09 m/m

RAMP B
Pt Sta 14+29.065
Δ = 18° 13' 53.5" (LT)
L = 107.055
R = 340.000
Sa = 0.08 m/m

RAMP B
Pt Sta 21+37.132
Gs = 4° 39' 51.0"
L = 65.000
R = 1230.000
ST = 21.590

RAMP A
Pt Sta 0+98.548
Gs = 10° 26' 29.6"
L = 65.000
R = 549.000
ST = 21.590

RAMP A
Pt Sta 2+23.458
Δ = 83° 09' 09.1" (RT)
L = 83.109
R = 400.000
Sa = 0.08 m/m

RAMP A
Pt Sta 3+44.389
Gs = 4° 39' 51.0"
L = 65.000
R = 1230.000
ST = 21.590

RAMP A
Pt Sta 4+94.442
Gs = 4° 39' 51.0"
L = 65.000
R = 1230.000
ST = 21.590

RAMP A
Pt Sta 5+45.093
Δ = 36° 19' 18.4" (LT)
L = 106.170
R = 900.000
Sa = 0.09 m/m
Rs = 55

RAMP A PRS Sta. 3+87.705

RAMP A SC Sta. 4+42.709

RAMP A CS Sta. 5+22.709

RAMP A PT Sta. 6+30.250

SITE 4
SITE 5
SITE 6
SITE 7
SITE 9

MARSHALL POPLIN
DB 345 PG 106
DB 383 PG 679
DB 255 PG 078

EDWARD L. HONEYCUTT
DB 359 PG 179
PB 15 PG 48

SKETCH SHOWING PROPOSED BRIDGE WIDTH IN RELATION TO PAVEMENT
NOT TO SCALE

METRIC
SCALE
DIRECT REV.
R/W REV.
PROJECT REFERENCE NO. R-2535C
HIGHWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
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ECOM
SHEET NO.

Pt Sta 11+27.829
Δ = 11° 54' 52.2" (LT)
L = 58.055
R = 125.000
Sa = 0.09 m/m
Rs = 57.500

-Y5-REV
Pt Sta 11+55.536
Δ = 5° 27' 02.4" (LT)
L = 54.770
R = 575.000
Sa = 0.08 m/m
Rs = 50.000

-Y1-REV POT Sta. 13+85.855
BEGIN APPROACH SLAB
-Y1-REV POT Sta. 13+93.590
BEGIN BRIDGE
-L-REV POT Sta. 20+142.206 =
-Y1- POT Sta. 14+11.447
-L-REV W. 64°19' 03.3" E
-L-REV POT Sta. 22+70.114 =
-Y1-REV POT Sta. 14+27.361
Δ = 62° 07' 22.2"
-Y1-REV POT Sta. 14+68.410
END BRIDGE
-Y1-REV POT Sta. 14+73.855
END APPROACH SLAB
-Y1-REV PT Sta. 15+08.078
MATCHLINE -Y1S-REV 11+75 SEE SHEET 19

-Y14-REV
Pt Sta 11+27.829
Δ = 11° 54' 52.2" (LT)
L = 58.055
R = 125.000
Sa = 0.09 m/m
Rn = 57.500

-Y14-REV POT Sta. 10+00.000
-Y14- POT 11+80.000
BEGIN CONST.
Δ = 86° 16' 41.8" RT.
-Y14-REV POC Sta. 11+00.000 =
-Y14-REV POT Sta. 11+92.200
Δ = 97° 00' 00.2
-Y14-REV PT Sta. 11+94.048

-Y1-REV POC Sta. 6+58.673 =
-Y1-REV POT Sta. 6+15.493
Δ = 90° 44' 39.6"
-Y1-REV POC Sta. 6+32.522 =
-Y1-REV POT Sta. 4+24.305
Δ = 91° 22' 30.9"

LOOP D
Pt Sta 1+45.576
Gs = 4° 39' 51.0"
L = 65.000
R = 1230.000
ST = 21.590

LOOP D
Pt Sta 1+47.198
Δ = 45° 31' 50.8" (RT)
L = 97.757
R = 123.000
Sa = 0.08 m/m

LOOP D
Pt Sta 1+95.576
Gs = 4° 39' 51.0"
L = 65.000
R = 1230.000
ST = 21.590

RAMP D
Pt Sta 0+43.348
Gs = 4° 39' 51.0"
L = 65.000
R = 1230.000
ST = 21.590

RAMP D
Pt Sta 1+87.691
Δ = 56° 56' 56.5" (LT)
L = 200.184
R = 400.000
Sa = 0.08 m/m

RAMP D
Pt Sta 2+86.925
Gs = 4° 39' 51.0"
L = 65.000
R = 1230.000
ST = 21.590

RAMP D CS Sta. 2+65.124

RAMP D SC Sta. 3+30.124

RAMP D PT Sta. 4+24.305

LOOP D SC Sta. 1+20.000

LOOP D PC Sta. 0+00.000
LOOP D TS Sta. 0+00.000
Δ = 90° 00' 00.0"
Rs = 40.0m RT.
-Y1-REV T.S Sta. 0+40.64

LOOP D CS Sta. 0+80.640

LOOP D ST Sta. 1+20.000

-Y1-REV PC Sta. 10+37.157

-Y1-REV PT Sta. 11+94.048

-Y1-REV SC Sta. 16+15.641

-Y1-REV PT Sta. 17+08.078

-Y1-REV PRC Sta. 17+37.361

-Y1-REV PT Sta. 17+73.855

-Y1-REV PC Sta. 18+00.000

-Y1-REV PT Sta. 18+08.078

-Y1-REV PRC Sta. 18+37.361

-Y1-REV PT Sta. 18+73.855

-Y1-REV PC Sta. 19+00.000

-Y1-REV PT Sta. 19+08.078

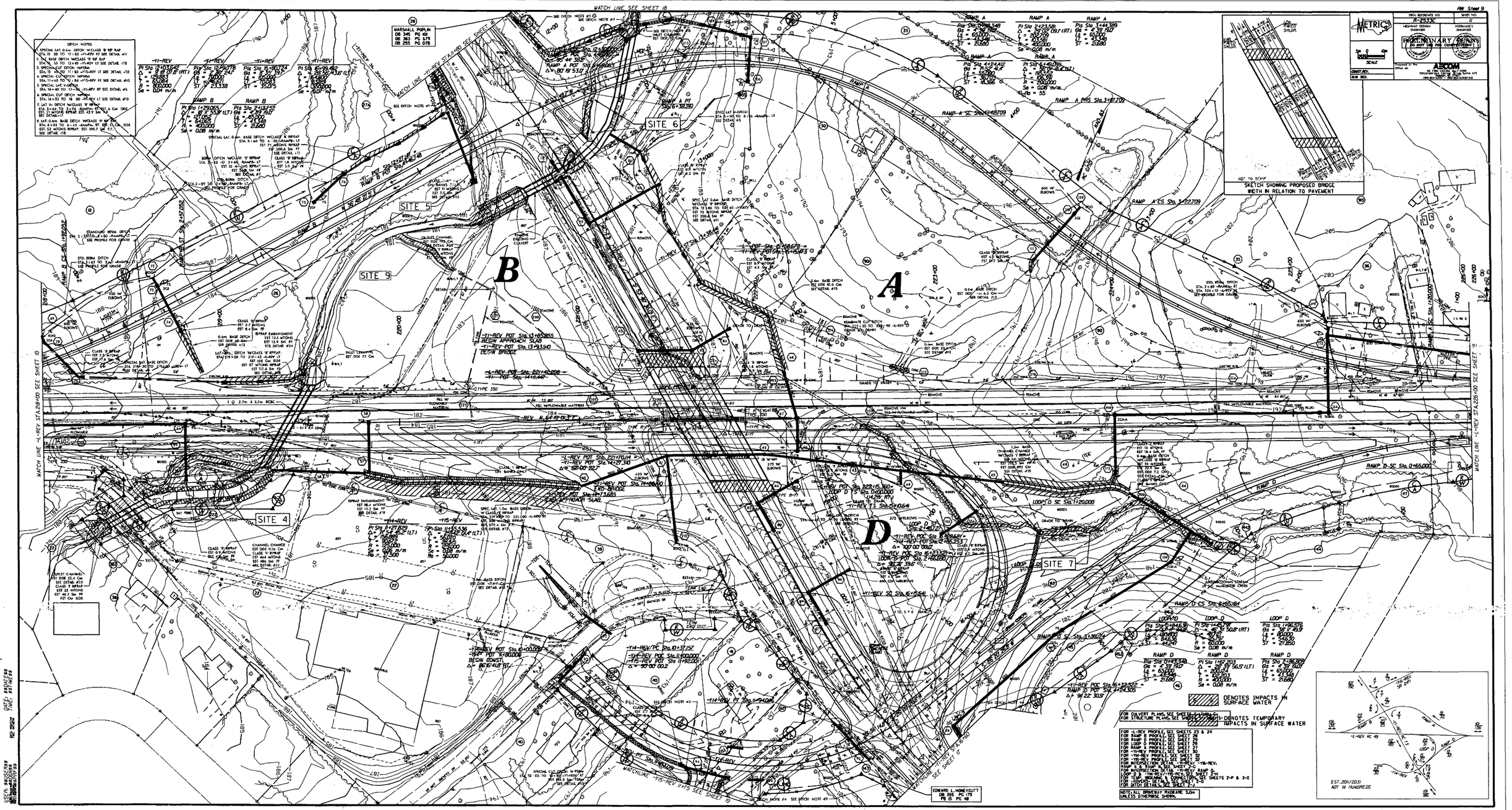
-Y1-REV PRC Sta. 19+37.361

-Y1-REV PT Sta. 19+73.855

-Y1-REV PC Sta. 20+00.000

-Y1-REV PT Sta.

Permit Drawing
Sheet 19 of 51



PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

SHEET 11 BLOW UP

Prepared in the Office of: EarthTech
A Tyco International Ltd. Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

METRIC

5m 0 10m

Permit Drawing
Sheet 20 of 57

70 71 206 54 55 56 57 58 59 38Z 22Z

CLASS 'B' RIPRAP
EST 7.3 MTONS
EST 17.6 SM FF

SPECIAL LAT. BASE DITCH
STA 218+20 TO 219+00 -LREV- LT
SEE DETAIL #9

0.6m BASE DITCH
EST DDE 49 CM
SEE DETAIL #13

RIPRAP EMBANKMENT
EST 12.1 MTONS
EST 13.9 SM FF
SEE DETAIL #24

LAT. BASE DITCH W/CLASS 'B' RIPRAP
STA. 219+00 TO 219+45 -L-REV LT
EST 158 CM DDE
EST 57 MTONS RIPRAP
EST 117.6 SM FF
SEE DETAIL #18

2-@ 2.7m X 2.7m RCBC

REMOVE EXISTING CULVERT

FILL W/ FLOWABLE MATERIAL

REMOVE

375 W/ELBOWS

1800 RCP

OUTLET CHANNEL
EST DDE 32.4 CM
SEE DETAIL #23
CLASS 'I' RIPRAP
EST 35 MTONS
EST 40.7 SM FF
EST CM DDE

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.3 SM FF

2@2.7m x 2.7m RCBC

CHANNEL CHANGE
EST DDE 1176 CM
CLASS 'I' RIPRAP
EST 464 MTONS
EST 486 SM FF
SEE DETAIL #22

RIPRAP EMBANKMENT
EST 18.4 MTONS
EST 19.2 SM FF
SEE DETAIL #19

SITE 4

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

-Y14-REV

PI Sta 11+27.829
Δ = 71° 54' 45.2" (LT)
L = 156.889
T = 90.672
R = 125.000
Se = 0.06 m/m
Rc = 37.500

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

SHEET 11 BLOW UP

METRIC

5m 0 10m

Prepared in the Office of:
EarthTech
A Natural Resource Technology Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259 (FAX)

Permit Drawing Sheet 24 of 31

0.6m BASE DITCH
EST DDE 49 CM
SEE DETAIL #13

RIPRAP EMBANKMENT
EST 12.1 MTONS
EST 13.9 SM FF
SEE DETAIL #24

CLASS 'B' RIPRAP
EST 7.3 MTONS
EST 17.6 SM FF

LAT. BASE DITCH W/CLASS 'B' RIPRAP
STA. 219+00 TO 219+45 -L-REV LT
EST 158 CM DDE
EST 57 MTONS RIPRAP
EST 117.6 SM FF
SEE DETAIL #18

SPECIAL LAT. BASE DITCH
STA 218+20 TO 219+00 -L-REV- LT
SEE DETAIL #9

2 @ 2.7m X 2.7m RCBC

REMOVE

FILL W/ FLOWABLE MATERIAL

REMOVE EXISTING CULVERT

375 W/ELBOWS

1800 RCP

OUTLET CHANNEL
EST DDE 32.4 CM
SEE DETAIL #23
CLASS 'I' RIPRAP
EST 35 MTONS
EST 40.7 SM FF
EST CM DDE

RIPRAP EMBANKMENT
EST 18.4 MTONS
EST 19.2 SM FF
SEE DETAIL #19

SITE 4

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

CHANNEL CHANGE
EST DDE 1176 CM
CLASS 'II' RIPRAP
EST 464 MTONS
EST 486 SM FF
SEE DETAIL #22

2@2.7m x 2.7m RCBC

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

=Y14=REV

PI Sta 11+27.829
Δ = 71° 54' 45.2" (LT)
L = 156.889
T = 90.672
R = 125.000
Se = 0.06 m/m
Ro = 37.500

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	23

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

METRIC

Permit Drawing Sheet 22 of 54

5m 0 10m
SCALE

CONST.REV.

R/W REV.

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AECOM
NC FIRM LICENSE No: F-0342
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Raleigh, NC 27607
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-L-REV

-L-REV NBL
PI = 216+50.000
EL = 192.394 m
VC = 390 m
K = 62

-L-REV SBL
PI = 216+50.000
EL = 192.394 m
VC = 365 m
K = 57

-L- STA. 215+45.180 NBL =
-Y- STA. 10+21.339
ELEV. = 188.789

+00 190.616 LT. SIDE BERM DITCH
+20 191.162
+40 191.982
+60 192.800
+80 193.618
+00 194.480
+20 195.254
+40 196.693

+2.7040% NBL
+2.7040% SBL
-3.7403% SBL
-3.5888% NBL
PROPOSED GRADE SBL
SBL
NBL
PROPOSED GRADE NBL
EXISTING GROUND

BM1 RR SPIKE IN BASE OF 610MM RED OAK
-LREV- STA 217+79 (54 LT), EL 188.489

SITE 4

IMPACTS IN SURFACE WATER

-3.5888% NBL
LT. SIDE BERM DITCH
+80 186.413
+00 185.412
+20 183.730 LT. SIDE 0.6m BASE SP. LAT. DITCH

-L-REV

SITE 4

IMPACTS IN SURFACE WATER

BM2 SOUTHEAST CORNER OF HEADWALL OF NC 73 BRIDGE
-LREV- STA 221+54 (9 RT), EL 192.476

L REV STA. 221+70.114 NBL =
-Y1-REV STA. 14+27.310
ELEV. = 187.279

PROPOSED GRADE NBL
PROPOSED GRADE SBL

-L-REV SBL
PI = 219+63.000
EL = 180.687 m
VC = 210 m
K = 30

-L-REV NBL
PI = 219+70.000
EL = 180.910 m
VC = 250 m
K = 37

EXISTING GROUND

NBL
SBL
-3.5888% NBL
-3.7403% SBL
+3.1852% SBL
+3.1831% NBL

LT. SIDE 0.6m BASE SP. LAT. DITCH
+00 181.480

2 @ 2.7 X 2.7 RCBC

DRAINAGE AREA	=	3.85 SQ KM
DESIGN DISCHARGE	=	31.1 cms
DESIGN FREQUENCY	=	50 Yr
DESIGN HW ELEV.	=	180.31
BASE DISCHARGE	=	35.3 cms
BASE FREQUENCY	=	100 Yr
BASE HW ELEV.	=	180.52
OVERTOPPING FLOOD ELEV.	=	182.49
FREQUENCY	=	500 Yr
DISCHARGE	=	66.2 cms

+45 180.000
+80 180.280
RT. SIDE 1.5m BASE LAT. DITCH
+00 182.080

FOR L-REV PLAN SEE SHEETS 10 & 11

USER: ##USER##
DGN: ##DGN##
DATE: ##DATE##
TIME: ##TIME##

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

Permit Drawing
Sheet 23 of 51

METRIC

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

SHEET 11 BLOW UP

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5m 0 10m

MATCH LINE SEE SHEET 18

MATCH LINE -Y1-REV STA.11+80 SEE SHEET 16

SEE DITCH NOTE #2
SEE DITCH NOTE #7
SEE DITCH NOTE #8
INLET CHANNEL
EST DDE 32 CM

SEE DITCH NOTE #1

-Y1-REV POC Sta. 12+30.000
RAMP B POT Sta. 4+69.107 =
Δ = 95° 44' 38.8"
RAMP A POT Sta. 6+69.063
Δ = 80° 19' 53.0"

S 41° 03' 48.7" W

RAMP A PT
Sta. 6+38.261

-Y1-REV PC Sta. 12+27.147 =
OT Sta 4+46.748

REMOVE BRIDGE

REMOVE
375 CONC

REMOVE

SPEC. LAT V-DITCH
STA. 5+50 TO 6+
SEE DETAIL #5

CLASS 'I' RIP RAP
ON BANKS ONLY
EST 11 MTONS
EST 7.5 SM FF
SEE DETAIL #25

OUTLET CHANNEL
EST DDE 195 CM
SEE DETAIL #23
CLASS 'I' RIPRAP
EST 187 MTONS
EST 201 SM FF

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

SPEC. LAT 0.6M BASE DITCH
W/CLASS 'B' RIPRAP
STA 12+80 TO 13+60 -Y1-REV
EST 75 MTONS RIPRAP
EST 200.6 SM FF
SEE DETAIL #11

SITE 5

SITE 6

375 RCP

375 CLASS IV

2@2.7mX2.7m RCBC

2-2.1 X 2.4 CONC

1050 RCP

900

375 CONC

EXISTING R/W

6.875m TYP.

8.288 R/W (60')

SR 2471

NC 73

WOODS

BST

W/LT

24 GR

900 WD RAIL

FS

DATE: 9/30/2008
TIME: 9:17:16 AM
USER: MJUSER
FILE: R2533CC_SHEET11_BLOWUP.DGN

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

Title Drawing Sheet 24 of 51

METRIC

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

SHEET 11 BLOW UP

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5m 0 10m

MATCH LINE SEE SHEET 18

MATCH LINE -Y1-REV STA.11+80 SEE SHEET 16

SEE DITCH NOTE #2

SEE DITCH NOTE #7

SEE DITCH NOTE #8

INLET CHANNEL
EST DDE 32 CM

REMOVE

-Y1-REV POC Sta. 12+30.000

RAMP B POT Sta. 4+69.107

Δ = 95° 44' 38.8"

RAMP A POT Sta. 6+68.063

Δ = 80° 19' 53.0"

S 41° 03' 48.7" W

RAMP A PT
Sta. 6+38.261

SEE DITCH NOTE #1

HW

REMOVE BRIDGE

2@2.7mX2.7m RCBC

-Y1-REV CS Sta.12+

SITE 6

SPEC. LAT V-DITCH
STA. 5+50 TO 6+
SEE DETAIL #5

Sta. 12+27.147 =
OT Sta. 4+46.748

1050 RCP

CLASS 'I' RIP RAP
ON BANKS ONLY
EST 11 MTONS
EST 7.5 SM FF
SEE DETAIL #25

SITE 5

OUTLET CHANNEL
EST DDE 195 CM
SEE DETAIL #23
CLASS 'I' RIPRAP
EST 187 MTONS
EST 201 SM FF

2-2.1X2.4 CONC

DI

375 CLASS IV

375 RCP

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

REMOVE 375 SGNC

SPEC. LAT 0.6M BASE DITCH
W/CLASS 'B' RIPRAP
STA 12+80 TO 13+60 -Y1-REV
EST 75 MTONS RIPRAP
EST 200.6 SM FF
SEE DETAIL #11

NC 73 BST

SR 2471 BST

EXISTING R/W

WOODS

FS

905

441

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	27

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

METRIC

5m 0 10m
SCALE

CONST.REV.

R/W REV.

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Permit Drawing
Sheet 25 of 51

RAMP A @ -Y1-REV

RAMP A STA. 0+00.000 =
-L-REV STA. 225+90.000 14.2m LT
BEGIN GRADE ELEV 205.998 m

PI = 0+48.000
EL = 204.282 m
VC = 96 m
K = 113

-3.5750%

-1.4216%

PI = 1+35.000
EL = 200.430 m
VC = 78 m
K = 44

-4.4216%

-2.6678%

EXISTING GROUND
RT. SIDE
BERM DITCH

+40
203.134

+20
203.043

PROFILE CONTINUES
ON L-REV
STA. 225+00 LT.

PROPOSED GRADE

204 203 202 201 200 199 198 197 196 195 194 193 192 191 190 189 188 187 186

0 +20 +40 +60 +80 1 +20 +40 +60 +80 2 +20 +40 +60 +80 3 +20 +40 +60 +80

RAMP A @ -Y1-REV

SITE 6

IMPACTS IN SURFACE WATER

RAMP A STA. 6+69.063 =
-Y1-REV STA. 12+30.000
ELEV 185.982 m

RAMP A STA. 6+57.490 =
-Y1-REV STA. 12+31.981 11.4m LT
END GRADE ELEV 186.491 m

PROPOSED GRADE

-2.6678%

-4.3992%

+50
186.410

+60
185.194

+80
185.700

+00
185.100

+64
183.200

+80
181.150

+03
180.000

+36
180.000

+16
184.400

+20
180.475

+45
180.600

LT. SIDE
LAT. "V" DITCH

RT. SIDE
LAT. "V" DITCH

RT. SIDE
0.6 BASE DITCH

2 @ 2.7 X 2.7 RCBC

DRAINAGE AREA = 3.60 SQ KM
DESIGN DISCHARGE = 28.6 cms
DESIGN FREQUENCY = 50 Yr
DESIGN HW ELEV. = 182.60
BASE DISCHARGE = 35.6 cms
BASE FREQUENCY = 100 Yr
BASE HW ELEV. = 182.95

OVERTOPPING FLOOD ELEV. = 186.09
FREQUENCY = 500 yr
DISCHARGE = 62.7 cms

FOR RAMP A @ -Y1-REV PLAN SEE SHEETS 11 & 12

202 201 200 199 198 197 196 195 194 193 192 191 190 189 188 187 186 185 184 183 182 181 180 179 178

+80 4 +20 +40 +60 +80 5 +20 +40 +60 +80 6 +20 +40 +60 +80

USER: $$USER$$
DGN: $$DGN$$

DATE: $$DATE$$
TIME: $$TIME$$

Permit Drawing
Sheet 26 of 57

METRIC

5m 0 10m
SCALE

CONST.REV.
R/W REV.

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	30

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
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SITE 6

-Y1-REV

-Y1-REV STA. 9+71.685
BEGIN CONSTRUCTION

-Y1-REV STA. 9+79.185
BEGIN GRADE ELEV. 190.590

-4.1494%

-Y1-REV STA. 11+37.462 =
-Y16- REV STA. 13+29.905 (9.294m LT)
ELEV. 185.628

PI = 11+83.000
EL = 182.133 m
VC = 250 m
K = 25

PROPOSED GRADE

+20 183.32
RT. SIDE LAT. 'V' DITCH

+40 183.14

+50 182.42

-55 182.16

LT. SIDE 0.6 BASE DITCH

+80 181.40

+03 181.30

+10 180.60

+5.6522%

EXISTING GROUND

IMPACTS IN SURFACE WATER

-Y1-REV STA. 11+30.000 =
RAMP A STA. 6+69.063 =
RAMP B STA. 4+69.107
ELEV. 185.982

+80 184.400

LT. SIDE 0.6 BASE DITCH

+20 185.0000

DRAINAGE AREA = 3.60 ha
DESIGN DISCHARGE = 29.6 cms
DESIGN FREQUENCY= 50 Yr
DESIGN HW ELEV. = 182.68
BASE DISCHARGE = 33.6 cms
BASE FREQUENCY = 100 Yr
BASE HW ELEV. = 182.95

OVERTOPPING FLOOD ELEV = 186.09
FREQUENCY = 500 yr
DISCHARGE = 62.7 cms

2 @ 2.7 X 2.7 RCBC

+80 10 +20 +40 +60 +80 11 +20 +40 +60 +80 12 +20 +40 +60 +80 13 +20 +40

-Y1-REV

PI = 14+34.000
EL = 196.320 m
VC = 175 m
K = 33

-Y1-REV POT Sta. 13+93.910
BEGIN BRIDGE
ELEV. 193.717

+0.4036%

-Y1-REV POT Sta. 14+66.410
END BRIDGE
ELEV. 195.996

PROPOSED GRADE

+5.6522%

-Y1-REV STA. 14+27.310
-L- REV STA. 221+70.114
ELEV. 194.963

2:1

2:1

EXISTING GROUND

+60 186.800

-Y1-REV STA. 16+23.521 =
LOOP D STA. 2+66.690
ELEV. 197.834

PI = 16+00.000
EL = 196.990 m
VC = 100 m
K = 36

-Y1-REV STA. 16+28.621 =
-Y14- REV STA. 12+05.253
ELEV. 197.962

+3.1750%

+2.3325%

PI = 17+04.000
EL = 200.292 m
VC = 60 m
K = 71

+3.1750%

+0.4036%

-Y1-REV STA. 16+32.522 =
RAMP D STA. 4+24.305
ELEV. 198.065

+40 197.52

RT. SIDE LAT. 'V' DITCH

+60 198.1001

+80 199.00

+08 199.910

FOR -Y1-REV PLAN SEE SHEETS 11, 16 & 17

+60 +80 14 +20 +40 +60 +80 15 +20 +40 +60 +80 16 +20 +40 +60 +80 17 +20

USER: $$USER$$
DGN: $$DGN$$
DATE: $$DATE$$
TIME: $$TIME$$

Permit Drawing
Sheet 27 of 51

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	32

METRIC

5m 0 10m
SCALE

CONST. REV.

R/W REV.

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
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-Y14-REV

-Y14-REV STA. 10+00.000 =
-Y14- STA. 11+80.000
ELEV. 191.238

-Y14-REV STA. 10+02.784 =
-Y14- STA. 11+80.185 (RT EOP)
BEGIN GRADE ELEV. 191.208

PI = 10+30.000
EL = 192.266 m
VC = 50 m
K = 25

EXISTING GROUND

PROPOSED GRADE

-10.776%

+3.8874%

+5.8725%

600 RCP

DRAINAGE AREA = 1.96 ha
DESIGN DISCHARGE = 0.39 cms
DESIGN FREQUENCY = 25 yr
DESIGN HW ELEV. = 190.99
Q100 DISCHARGE = 0.43 cms
Q100 HW ELEV. = 191.00

OVERTOPPING FLOOD ELEV. = 191.20
FREQUENCY = 500 Yr +
DISCHARGE = 0.47 cms

-Y14-REV STA. 11+00.000 =
-Y15-REV STA. 11+92.000
ELEV. 196.377

-Y14-REV STA. 11+93.683 =
-Y1-REV STA. 16+26.675
END GRADE ELEV. 198.710

PI = 11+60.000
EL = 199.900 m
VC = 66 m
K = 7

+5.8725%

-3.5329%

-6.4652%

450 RCP

DRAINAGE AREA = 0.57 ha
DESIGN DISCHARGE = 0.11 cms
DESIGN FREQUENCY = 25 yr
DESIGN HW ELEV. = 198.03
Q100 DISCHARGE = 0.13 cms
Q100 HW ELEV. = 198.05

OVERTOPPING FLOOD ELEV. = 198.76
FREQUENCY = 500 Yr +
DISCHARGE = 0.14 cms +

-Y14-REV STA. 12+05.253 =
-Y1-REV STA. 16+28.621
ELEV. 197.962

-Y15-REV

-Y15- STA. 10+46.651
BEGIN CONSTRUCTION

-Y15- STA. 10+54.151 L.B.=
-Y15-REV STA. 10+54.151 L.A.
BEGIN GRADE ELEV. 201.294

PI = 11+18.000
EL = 202.162 m
VC = 126 m
K = 14

EXISTING GROUND

PROPOSED GRADE

+1.3590%

-7.9020%

-6.0000%

-Y15-REV STA. 11+92.000 =
-Y14-REV STA. 11+00.000
ELEV. 196.377

-Y15-REV STA. 11+88.700 =
-Y14-REV STA. 11+04.483 (3.3m RT)
END GRADE ELEV. 196.575

450 RCP

DRAINAGE AREA = 0.29 ha
DESIGN DISCHARGE = 0.058 cms
DESIGN FREQUENCY = 25 yr
DESIGN HW ELEV. = 198.65
Q100 DISCHARGE = 0.064 cms
Q100 HW ELEV. = 198.66

OVERTOPPING FLOOD ELEV. = 197.10
FREQUENCY = 500 Yr +
DISCHARGE = 0.070 cms +

FOR -Y14-REV PLAN SEE SHEET 11
FOR -Y15-REV PLAN SEE SHEETS 11 & 19
FOR -Y16-REV PLAN SEE SHEETS 16 & 18

-Y16-REV

SITE 6

-Y16-REV STA. 10+92.500
BEGIN CONSTRUCTION

-Y16-REV STA. 11+00.000
BEGIN GRADE ELEV. 185.232

PI = 11+35.000
EL = 184.712 m
VC = 50 m
K = 273

-1.4857%

-1.6689%

600 RCP

DRAINAGE AREA = 2.88 ha
DESIGN DISCHARGE = 0.45 cms
DESIGN FREQUENCY = 25 yr
DESIGN HW ELEV. = 184.85
Q100 DISCHARGE = 0.48 cms
Q100 HW ELEV. = 184.90

OVERTOPPING FLOOD ELEV. = 184.85
FREQUENCY = 25 Yr +
DISCHARGE = 0.43 cms +

EXISTING GROUND

IMPACTS IN SURFACE WATER

DRAINAGE AREA = 3.55 SQ KM
DESIGN DISCHARGE = 22.5 cms
DESIGN FREQUENCY = 25 Yr
DESIGN HW ELEV. = 182.51
BASE DISCHARGE = 33.6 cms
BASE FREQUENCY = 100 Yr
BASE HW ELEV. = 183.40

OVERTOPPING FLOOD ELEV. = 184.02
FREQUENCY = 100 Yr +
DISCHARGE = 33.64 cms

PI = 12+25.000
EL = 183.210 m
VC = 130 m
K = 32

PROPOSED GRADE

+1.6689%

+2.4444%

2 @ 2.7 X 2.7 RCBC

-Y16-REV STA. 13+39.080 =
-Y1-REV STA. 11+35.000
ELEV. 185.287

-Y16-REV STA. 13+29.462 =
-Y1-REV STA. 11+37.462 (9.294m LT)
END GRADE ELEV. 185.628

PI = 13+15.000
EL = 185.410 m
VC = 28 m
K = 30

+2.4444%

+1.5014%

DATE: $$DATE$$
TIME: $$TIME$$
USER: $$USER$$
DGN: $$DGN$$

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

SHEET 11 BLOW UP

METRIC

5m 0 10m

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Permit Drawing Sheet 28 of 5X

BLE MATERIAL

150 CURB BST CONC 150 CURB CONC

LT LT 4 GAS PUMPS ABAND

FS 2GI-A

750 RCP

1.5m BASE DITCH
W/CLASS 'I' RIPRAP
EST 141 MTONS
EST 215.5 SM FF
EST DDE 892 CM
SEE DETAIL #15

1800 RCP

65 HW

CLASS 'I' RIPRAP
EST 10 MTONS
EST 18.4 SM FF
0.6m BASE DITCH
W/CLASS 'B' RIPRAP
EST 10 MTONS
EST 20.9 SM FF
EST DDE 7.2 CM
SEE DETAIL #16
CLASS 'I' RIPRAP
ON BANKS ONLY

112 44 103

WOODS WOODS WOODS WOODS

LOOP D SC Sta. 1+20.000

1650 RCP

CB

105 104

OWS

LOOP D ST Sta. 2+48.727

POC Sta 16+28.621 =
EV POT Sta.12+05.253
° 00' 00.0"
Sta 16+23.521
Sta. 2+66.690
.6"

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

GRADE TO DRAIN

TOE PROTECTION W/PSRM
STA 1+40 TO 1+80 LOOPD LT
EST 106.7 SM PSRM
SEE DETAIL #14

LOOP D CS SITE 7

102 HW 101

JB w/Slab Lid

600

100 FS 2GI-A

44Z 2+00

JURISDICTIONAL STREAM
UT TO McALLISTER CREEK

10.833m TYP.

450

43

VS

+15.641

D ABAND

2+00 16+00

10.0m TYP.

125mm CONCRETE ISLAND

RAMP D CS Sta. 2+65.124

46Z

LOOP D
PIs Sta 0+84.636
θs = 57° 17' 44.8"
Ls = 120.000

FS

RAMP D ST Sta. 3+30.124

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

BLE MATERIAL

METRIC

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

SHEET 11 BLOW UP

5m 0 10m

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Permit Drawing Sheet 29 of 54

150 CURB
BST
CONC
150 CURB
CONC
FS
2GI-A
750 RCP
LT
LT
4 GAS PUMPS ABAND
1.5m BASE DITCH
W/CLASS 'I' RIPRAP
EST 141 MTONS
EST 215.5 SM FF
EST DDE 892 CM
SEE DETAIL #15
1800 RCP
65
HW
44
112
CLASS 'I' RIPRAP
EST 10 MTONS
EST 18.4 SM FF
0.6m BASE DITCH
W/CLASS 'B' RIPRAP
EST 10 MTONS
EST 20.9 SM FF
EST DDE 7.2 CM
SEE DETAIL #16
CLASS 'I' RIPRAP
ON BANKS ONLY
WOODS
WOODS
WOODS
WOODS
103
1650 RCP
LOOP D SC Sta. 1+20.000
CB
105
104
LOOP D ST
Sta. 2+48.727
POC Sta 16+28.621 =
EV POT Sta.12+05.253
00' 00.0"
Sta 16+23.521
Sta. 2+66.690
.6" Ø61
GRADE TO DRAIN
TOE PROTECTION W/PSRM
STA 1+40 TO 1+80 LOOPD LT
EST 106.7 SM PSRM
SEE DETAIL #14
CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF
SITE 7
LOOP D CS
JB w/Slab Lid
102
HW
101
600
100
FS
2GI-A
44Z
RAMP D
JURISDICTIONAL STREAM
UT TO McALLISTER CREEK
10.833m TYP.
450
10.0m TYP.
125mm CONCRETE ISLAND
RAMP D CS Sta. 2+65.124
46Z
LOOP D
PIs Sta 0+84.636
Δs = 57° 17' 44.8"
Ls = 120.000
FS
ABAND

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

SHEET 11 BLOW UP

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METRIC

5m 0 10m

Permit Drawing
Sheet 30 of 51

VE

221+00

82

375 W/ ELBOWS
2GI W/ FLAT GRATE

84

375 CLASS IV

83

GRADE TO DRAIN

150 CONC CURB

600 CONC

14+00

211

3.4 SOIL

600 CONC

SITE 7

208

450 CONC

C

CONC

F:C

TYPE B-77

BST

150 CONC

224

REMOVE

CLASS 'B' RIPRAP
EST 1.8 MTONS
EST 5.9 SM FF

68

1.8 X 1.8 CONC

225

NOTE: CAN NOT DETERMINE THE END OF CULVERT

1.2 X 1.2 CONC

SITE 7

GRADE TO DRAIN

450

SLOPE PROTECTION

1350 CONC

209

LOWABLE MATERIAL

1A TYPE B-77

3 - TYPE M-XII

375 RCP

1° 19' 01.3" E

TYPE A-77

TYPE T-77

IMPACT ATTENUATOR TYPE 350

TYPE B-77

67

BST

CURB

226

REMOVE HW
FILL W/ FLOWA

50 WATER

WOODS

2GI

375 CLASS IV

CONC

CURB

62

66

CB

1800 RCP

SLOPE PROTECTION

JB W/MH

JB W/MH

375 W/ ELBOWS

-L-REV POT Sta. 221+70.114 =
-Y1-REV POT Sta. 14+27.310
△ = 62° 00' 22.7"

120 CONC DITCH

61

1800 RCP

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

43

15.0m TYP.

JB W/MH

63

60

450 W/ ELBOWS

-Y1-REV POT Sta. 14+66.410
END BRIDGE

GRADE TO DRAIN

-L-REV POT Sta. 222+15.360=
LOOP D TS Sta. 0+00.000
(14.2m RT)

600

64

86

87

-Y1-REV POT Sta. 14+73.685
ID APPROACH SLAB

NC 73

7.0 BST

375 CLASS IV

TYPE B-77

2GI W/ FLAT GRATE

50 WATER

GRADE TO DRAIN

-Y1-REV TS Sta. 15+10.641

85

DI

375 CLASS IV

88

BST

C:F

REMOVE

STA. 0+45 TO 1+

DENOTES IMPACTS IN SURFACE WATER

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

SHEET 11 BLOW UP

Prepared in the Office of:
EarthTech
A Tyco International Ltd Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

METRIC

5m 0 10m

Permit Drawing
Sheet 31 of 51

VE

375 W/ ELBOWS 2GI W/ FLAT GRATE

GRADE TO DRAIN

375 CLASS IV

REMOVE

CLASS 'B' RIPRAP
EST 1.8 MTONS
EST 5.9 SM FF

1.2 X 1.2 CONC

NOTE: CAN NOT DETERMINE THE END OF CULVERT

SITE 7

SLOPE PROTECTION

LOWABLE MATERIAL

IMPACT ATTENUATOR TYPE 350

TYPE B-77

TYPE A-77

TYPE T-77

3 - TYPE M-XII

-L-REV POT Sta. 221+70.114 =
-Y1-REV POT Sta. 14+27.310
Δ = 62° 00' 22.7"

1800 RCP

450 W/ ELBOWS

-Y1-REV POT Sta. 14+66.410
END BRIDGE
Y1-REV POT Sta. 14+73.685
ID APPROACH SLAB

JB W/MH

375 W/ ELBOWS

CB

2GI

375 CLASS IV

2GI W/ FLAT GRATE

DI

REMOVE HW
FILL W/ FLOWA

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

GRADE TO DRAIN

-L-REV POT Sta. 222+15.360=
LOOP D TS Sta. 0+00.000
(14.2m RT)

-Y1-REV TS Sta. 15+10.641

STA. 0+45 TO 1+

DENOTES IMPACTS IN SURFACE WATER

RAMP D @ -Y1-REV

Permit Drawing Sheet 32 of 51

METRIC

5m 0 10m

SCALE

CONST.REV.

R/W REV.

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	29

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

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Raleigh, NC 27607
(919) 854-6200 (919) 854-6259(FAX)

RAMP D STA. 0+00.000 =
-L-REV STA. 226+52.165 14.2m RT
BEGIN GRADE ELEV 203.970 m

PI = 0+42.000
EL = 202.453 m
VC = 84 m
K = 278

-3.6109%

-3.9132%

PROPOSED GRADE

EXISTING GROUND

SITE 7

IMPACTS IN SURFACE WATER

PI = 2+27.500
EL = 195.194 m
VC = 140 m
K = 32

-3.9132%

+0.5003%

PI = 3+85.000
EL = 195.982 m
VC = 50 m
K = 12

+0.5003%

1650 RCP

DRAINAGE AREA = 23.60 ha
DESIGN DISCHARGE = 4.90 cms
DESIGN FREQUENCY = 50 yr
DESIGN HW ELEV. = 193.45
Q100 DISCHARGE = 5.70 cms
Q100 HW ELEV. = 193.70

OVERTOPPING FLOOD ELEV. = 195.50
FREQUENCY = 500+ Yr
DISCHARGE = 8.80 cms

RAMP D @ -Y1-REV

RAMP D STA. 4+24.305 =
-Y1-REV STA. 16+32.522
ELEV 198.065 m

RAMP D STA. 4+12.902 =
-Y1-REV STA. 16+32.805
11.4m LT
END GRADE ELEV 197.275 m

PROPOSED GRADE

+6.9280%

+6.634%

EXISTING GROUND

LOOP D @ -Y1-REV

SITE 7

IMPACTS IN SURFACE WATER

LOOP D STA. 0+00.000 =
-L-REV STA. 222+15.350 (14.2m RT)
BEGIN GRADE ELEV. 188.648

PI = 0+40.000
EL = 189.921 m
VC = 30 m
K = 26

PROPOSED GRADE

+2.0164%

+3.1830%

RT. SIDE LAT. -Y- DITCH

EXISTING GROUND

1800 RCP

+45 188.05

+70 187.70

+00 188.00

+20 188.30

DRAINAGE AREA = 27.6 ha
DESIGN DISCHARGE = 5.5 cms
DESIGN FREQUENCY = 50 yr
DESIGN HW ELEV. = 189.97
Q100 DISCHARGE = 6.3 cms
Q100 HW ELEV. = 190.23

OVERTOPPING FLOOD ELEV. = 190.53
FREQUENCY = 100+ Yr
DISCHARGE = 8.3 cms

SITE 7

IMPACTS IN SURFACE WATER

PI = 0+95.000
EL = 191.030 m
VC = 80 m
K = 19

+6.2267%

+2.0164%

PI = 1+70.000
EL = 195.700 m
VC = 70 m
K = 12

+0.5000%

LOOP D STA. 2+66.690 =
-Y1-REV STA. 16+23.521
ELEV. 197.834

LOOP D STA. 2+55.290 =
-Y1-REV STA. 16+23.501 (11.4m LT)
END GRADE ELEV. 197.035

PI = 2+30.000
EL = 196.000 m
VC = 50 m
K = 14

+0.5000%

+1.0088%

+1.0925%

FOR RAMP D @ -Y1-REV PLAN SEE SHEETS 11 & 19
FOR LOOP D @ -Y1-REV PLAN SEE SHEET 11

USER: $$USER$$
DGN: $$DGN$$

DATE: $$DATE$$
TIME: $$TIME$$

RW SHEET 14

METRIC	PROJ. REFERENCE NO.	SHEET NO.
	R-2533CC	16
	HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
5m 0 10m	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST.REV.	Prepared in the Office of: AECOM NC FIRM LICENSE No:F-0342 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 (919) 854-6200 - (919) 854-6259(FAX)	
R/W REV.		

Permit Drawing
Sheet 33 of 51

-Y1-
PI STA. 10+89.294
△ = 12° 10' 13.0" (RT)
Lc = 91.762
R = 432.000
T = 46.054

NAD 83
NC GRID

MATCH LINE -Y16-REV STA.13+00 SEE SHEET 18

MATCH LINE -Y1-REV STA.11+80 SEE SHEET 11

BEGIN C/A & BEGIN CHL FENCE -Y1REV- +60.000, 24.000 (78.740') CLASS 'B' RIPRAP EST 4.5 MTONS EST 11.7 SM FF

LATERAL 0.6m BASE DITCH W/CLASS 'B' RIPRAP STA 11+55 TO 12+10 -Y1-REV LT EST 56 CM DDE EST 69 MTONS RIPRAP EST 143.7 SM FF SEE DETAIL #18

CLASS 'I' RIPRAP EST 10 MTONS EST 18.4 SM FF SPEC. LAT. 0.6m DITCH W/CLASS 'B' RIPRAP STA. 11+20 TO 12+03 -Y1-REV RT EST 75 MTONS RIPRAP EST 200.6 SM FF SEE DETAIL #11

+10.00 SEAL ABANDONED WELL -Y1-REV POT STA.10+43.240 = -Y1- PC STA.10+43.240

600 W/ELBOWS

RETAIN

REMOVE

600 RCP

SITE 5

FILL IN WETLANDS
IMPACTS IN SW

FILL IN WETLANDS

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

FOR TRAFFIC DIAGRAM OF -Y16-REV (RADCLIFF RD), SEE SHEET 11

FOR -Y1-REV PROFILE, SEE SHEET 30
FOR -Y16-REV PROFILE, SEE SHEET 32
FOR INTERSECTION DETAIL -Y1-REV/ -Y16-REV, SEE SHEET 2-G
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

R/W REV.
1) REVISED OWNER NAME PARCEL 140,141,142,145,146 & 147 WHO 10-15-03
2) ADDED PARCEL 27A (NEW P/L IN PARCEL 27) WHO 08-30-04
3) ADDED PDE ON PARCEL 27AZ DAE, TO DRAINAGE REV. CMKR 07/22/10

USER: #USER#
DGN: #DGN#
DATE: #DATE#
TIME: #TIME#

Permit Drawing
Sheet 34 of 51

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	16
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5m 0 10m

CONST. REV.
R/W REV.

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Raleigh, NC 27607
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-Y1-
PI STA. 10+89.294
△ = 12° 10' 13.0" (RT)
Lc = 91.762
R = 432.000
T = 46.054

NAD 83
NC GRID

MATCH LINE -Y16-REV STA.13+00 SEE SHEET 18

MATCH LINE -Y1-REV STA.11+80 SEE SHEET 11

+10.00
SEAL
ABANDONED
WELL

-Y1-REV POT STA.10+43.240 =
-Y1190C STA.10+43.240

600 W/ELBOWS

REMOVE

RETAIN

BEGIN C/A & BEGIN CHL FENCE -Y1REV- +60.000, 24.000 (78.740')

CLASS 'B' RIPRAP
EST 4.5 MTONS
EST 11.7 SM FF

LATERAL 0.6m BASE DITCH
W/CLASS 'B' RIPRAP
STA 11+55 TO 12+10 -Y1-REV LT
EST 56 CM DDE
EST 69 MTONS RIPRAP
EST 143.7 SM FF
SEE DETAIL #18

CLASS 'I' RIPRAP
EST 10 MTONS
EST 18.4 SM FF
SPEC. LAT. 0.6m DITCH
W/CLASS 'B' RIPRAP
STA. 11+20 TO 12+03 -Y1-REV RT
EST 75 MTONS RIPRAP
EST. 200.6 SM FF
SEE DETAIL #11

SITE 5

FILL IN WETLANDS
IMPACTS IN SW

FILL IN WETLANDS

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

FOR TRAFFIC DIAGRAM OF -Y16-REV (RADCLIFF RD), SEE SHEET 11

FOR -Y1-REV PROFILE, SEE SHEET 30
FOR -Y16-REV PROFILE, SEE SHEET 32
FOR INTERSECTION DETAIL -Y1-REV/ -Y16-REV, SEE SHEET 2-G
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

R/W REV.
1) REVISED OWNER NAME PARCEL 140,141,142,145,146 & 147 - WHO 10-15-03
2) ADDED PARCEL 27A (NEW P/L IN PARCEL 27) KM 05-30-04
3) ADDED PDE ON PARCEL 27A2 DWE TO DRAINAGE REV. 07/22/10

DATE: ##DATE##
TIME: ##TIME##
USER: ##USER##
DGN: ##DGN##

RW Sheet 18

Permit Drawing Sheet 35 of 51

METRIC

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	18

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5m 0 10m

CONST. REV.

R/W REV.

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MATCH LINE -Y16-REV STA.13+00 SEE SHEET 16

-Y16-REV PC Sta. 12+73.806

S 77° 23' 47.0" W

-Y16-REV
PI Sta 12+91.085
Δ = 38° 07' 47.0" (LT)
L = 33.274
T = 17.280
R = 50.000
Se = 0.06 m/m
Ro = 41.250

-Y16-REV
PI Sta 11+21.266
Δ = 2° 13' 15.9" (RT)
L = 42.527
T = 21.266
R = 1097.028
Se = NC

-Y16-REV
PI Sta 11+77.936
Δ = 70° 36' 40.2" (RT)
L = 61.620
T = 35.409
R = 50.000
Se = 0.08 m/m
Ro = 55.000

-Y16-
PI Sta 10+85.094
Δ = 4° 22' 32.6" (RT)
L = 83.781
T = 41.911
R = 1,097.028

NAD 83
NC GRID

2 @ 2.7m x 2.7m RCBC

SITE 6

SITE 8

OUTLET CHANNEL
SEE DETAIL #23
EST DDE 41.6 CM
CLASS 'I' RIPRAP
EST 35 MTONS
EST 31.6 SM FF

-Y16-REV PT Sta.12+04.141

12+00

-Y16-REV PCC Sta.11+42.527

-Y16- PTSta. 11+26.964

-Y16-REV PCC Sta.11+00.000 L.A.=
-Y16- POC Sta.11+00.000 L.B.

-Y16- POC Sta 10+92.500
BEGIN CONSTRUCTION

CLASS 'B' RIPRAP
EST 20 MTONS
EST 36 SM FF

CLASS 'I' RIPRAP
EST 6.4 MTONS
EST 12.5 SM FF
SEE DETAIL #25

S 1° 35' 48.3" W

-Y16- PCSta. 10+43.183

-Y16- POTSta. 10+00.000

-Y16-REV

-Y16-

TYPE 350

6.0 SOIL&GR

4.9 SOIL & GR

SR 2471 RADCLIFF RD

REMOVE

300 CONC

1000 WD RAIL

REMOVE

335 CONC

SOIL&GR

MATCH LINE SEE SHEET 11

V-DITCH
EST DDE 115 CM
SEE DETAIL #21

ISFD

ISBKD

1500 WW

1200 WW

450W

11+00

S 77° 23' 47.0" W

TS TS DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -Y16-REV PROFILE, SEE SHEET 32
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: ##/##/##
TIME: ##:##:##
USER: ##USER##
DGN: ##DGN##

Permit Drawing
Sheet 36 of 51

METRIC

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	18

HIGHWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5m 0 10m

CONST. REV.

R/W REV.

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Raleigh, NC 27607
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S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE -Y16-REV STA.13+00 SEE SHEET 16

-Y16-REV PC Sta. 12+73.806

S 77° 23' 47.0" W

-Y16-REV
PI Sta 12+91.085
Δ = 38° 07' 47.0" (LT)
L = 33.274
T = 17.280
R = 50.000
Se = 0.06 m/m
Ro = 41.250

-Y16-REV
PI Sta 11+21.266
Δ = 2° 13' 15.9" (RT)
L = 42.527
T = 21.266
R = 1097.028
Se = NC

-Y16-REV
PI Sta 11+77.936
Δ = 70° 36' 40.2" (RT)
L = 61.620
T = 35.409
R = 50.000
Se = 0.08 m/m
Ro = 55.000

-Y16-
PI Sta 10+85.094
Δ = 4° 22' 32.6" (RT)
L = 83.781
T = 41.911
R = 1,097.028

NAD 83
NC GRID

2 @ 2.7m x 2.7m RCBC

OUTLET CHANNEL
SEE DETAIL #23
EST DDE 41.6 CM
CLASS 'I' RIPRAP
EST 35 MTONS
EST 31.6 SM FF

-Y16-REV PT Sta. 12+04.141

-Y16-REV PCC Sta. 11+42.527

-Y16- PT Sta. 11+26.964

-Y16-REV PCC Sta. 11+00.000 L.A.=
-Y16- POC Sta. 11+00.000 L.B.

-Y16- POC Sta 10+92.500
BEGIN CONSTRUCTION

-Y16- PCS Sta. 10+43.183

-Y16- POTS Sta. 10+00.000

CLASS 'B' RIPRAP
EST 20 MTONS
EST 36 SM FF

CLASS 'I' RIPRAP
EST 6.4 MTONS
EST 12.5 SM FF
SEE DETAIL #25

S 1° 35' 48.3" W

SITE 6

SITE 8

TYPE 350

TYPE 350 ΔD

TYPE 350

6.0 SOIL&GR

SR 2471 RADCLIFF RD

4.9 SOIL & GR

REMOVE

300 CONC

1000 WD RAIL

REMOVE

335 CONC

SOIL&GR

ISBKD

ISFD

V-DITCH
EST DDE 115 CM
SEE DETAIL #21

1500 WW

459W

MATCH LINE SEE SHEET 11

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -Y16-REV PROFILE, SEE SHEET 32
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

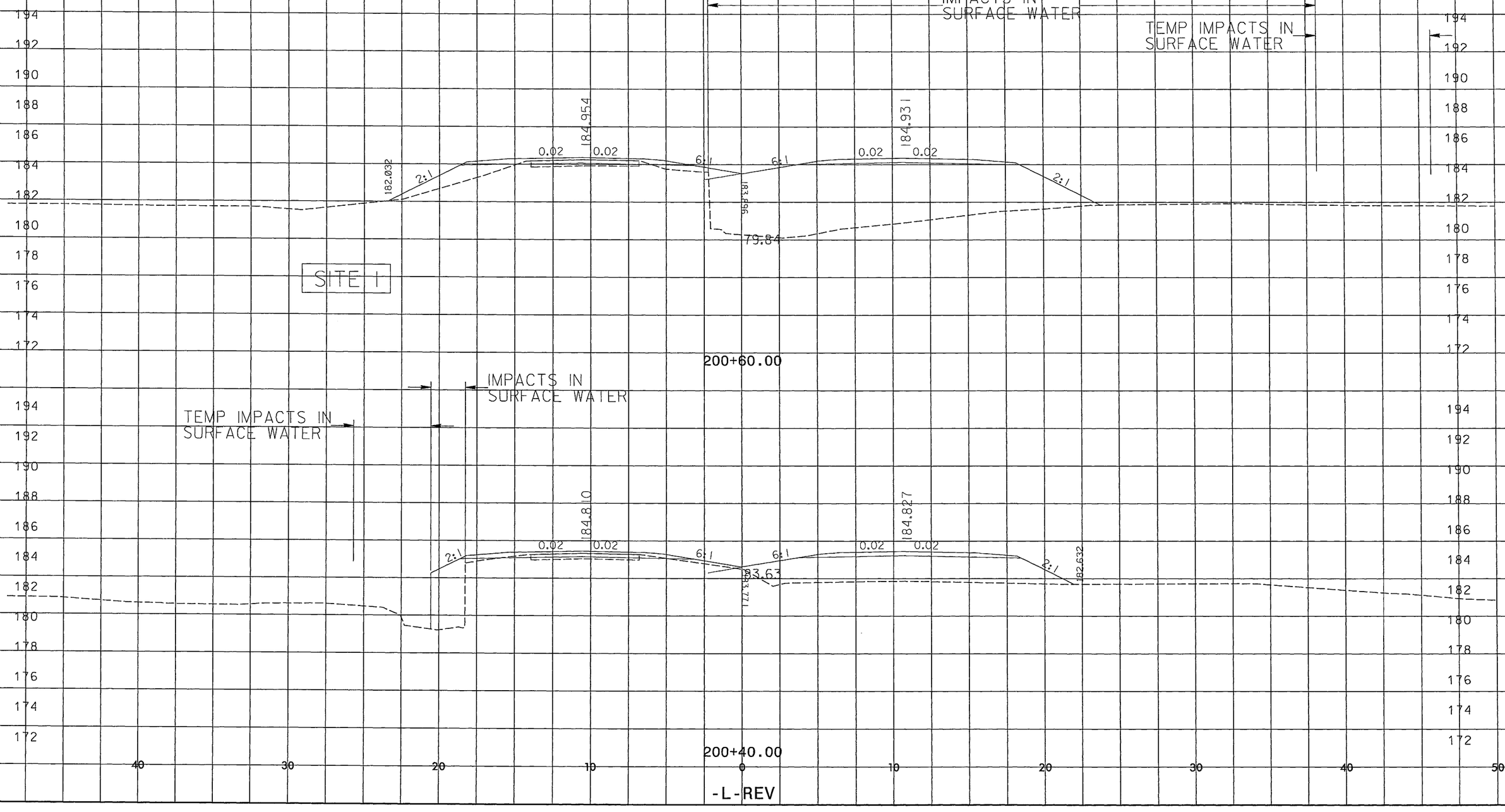
DATE: $$DATE$$ USER: $$USER$$
TIME: $$TIME$$ DGN: $$DGN$$

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-13

2.5 0 2.5 5
30

METRIC

Permit Drawing
Sheet 37 of 51



-L-REV

2.5 0 2.5 5
30

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-49

Permit Drawing
Sheet 38 of 51

SITE 2

TEMP IMPACTS IN SURFACE WATER

183.734
184.368
81.48
0.02
0.02
8:1
4:1
2:1
4:1
4:1

212+20.00

180.592
180.010
184.138
184.672
83.28
3.287:1
0.02
0.02
8:1
4:1
0.02
0.02
6:1
4:1
2:1

212+00.00

-L-REV

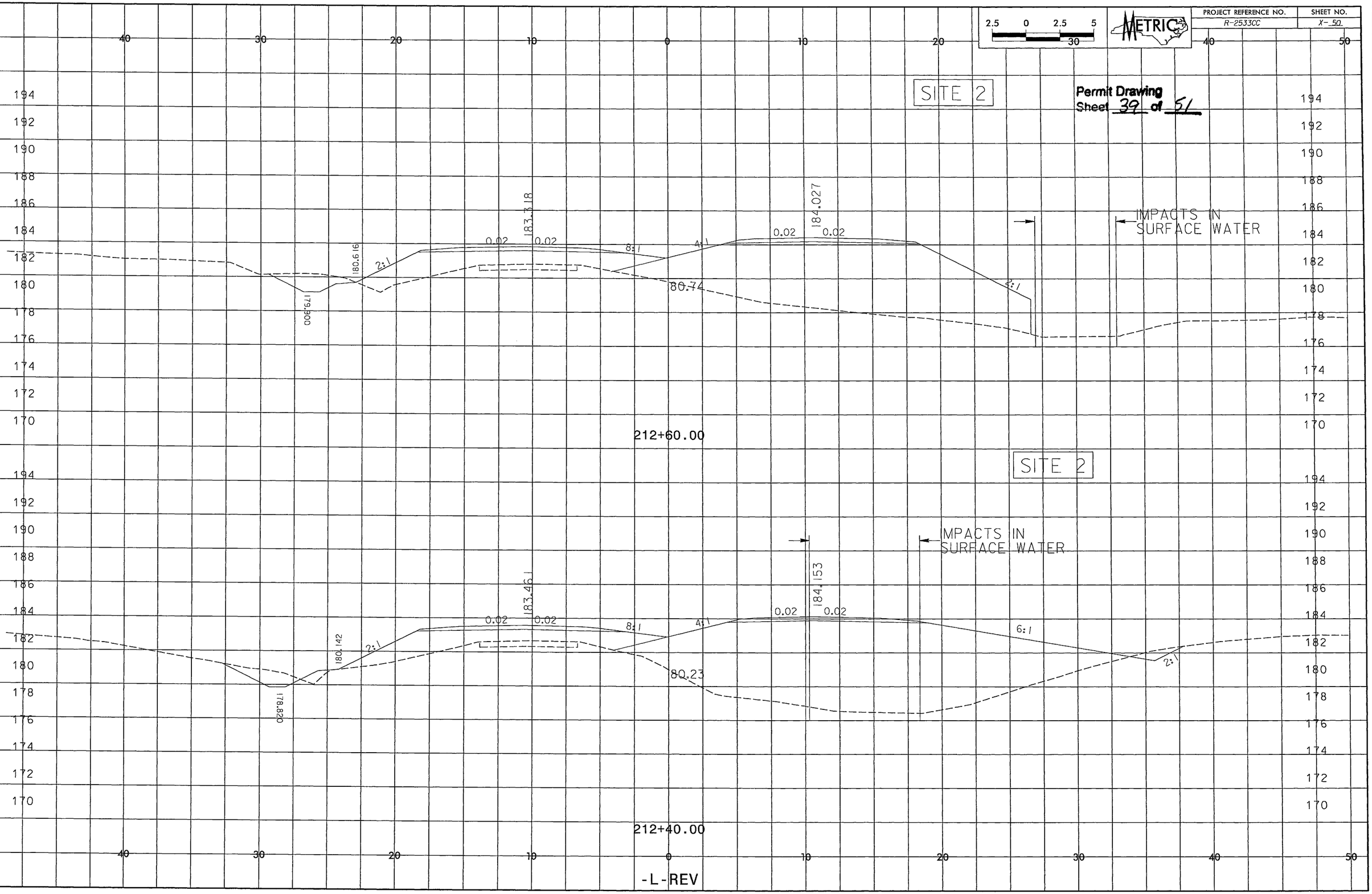
2.5 0 2.5 5

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-50

SITE 2

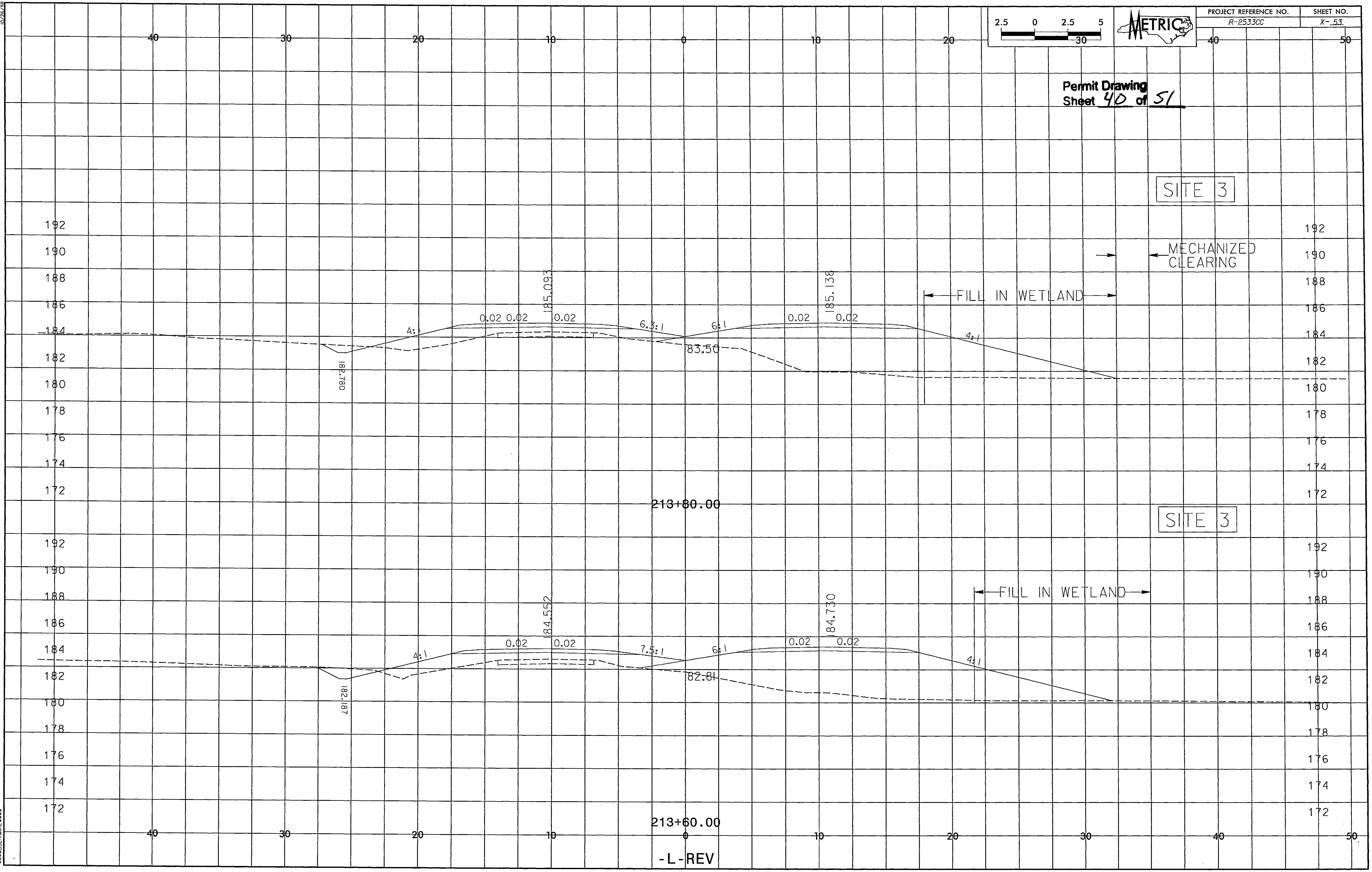
Permit Drawing
Sheet 39 of 51



PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-53

METRIC

Permit Drawing
Sheet 40 of 51



10/26/98

2.5 0 2.5 5
30

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-54

Permit Drawing
Sheet 41 of 54

40 30 20 10 0 10 20 40 50

196 194 192 190 188 186 184 182 180 178 176 174

186.175

0.02 0.02 0.02

4:1

6:1

6:1

0.02 0.02

3.1:1

182.300

85.03

214+20.00

SITE 3

186.634

0.02 0.02 0.02

4:1

6:1

6:1

0.02 0.02

FILL IN WETLAND

4:1

182.960

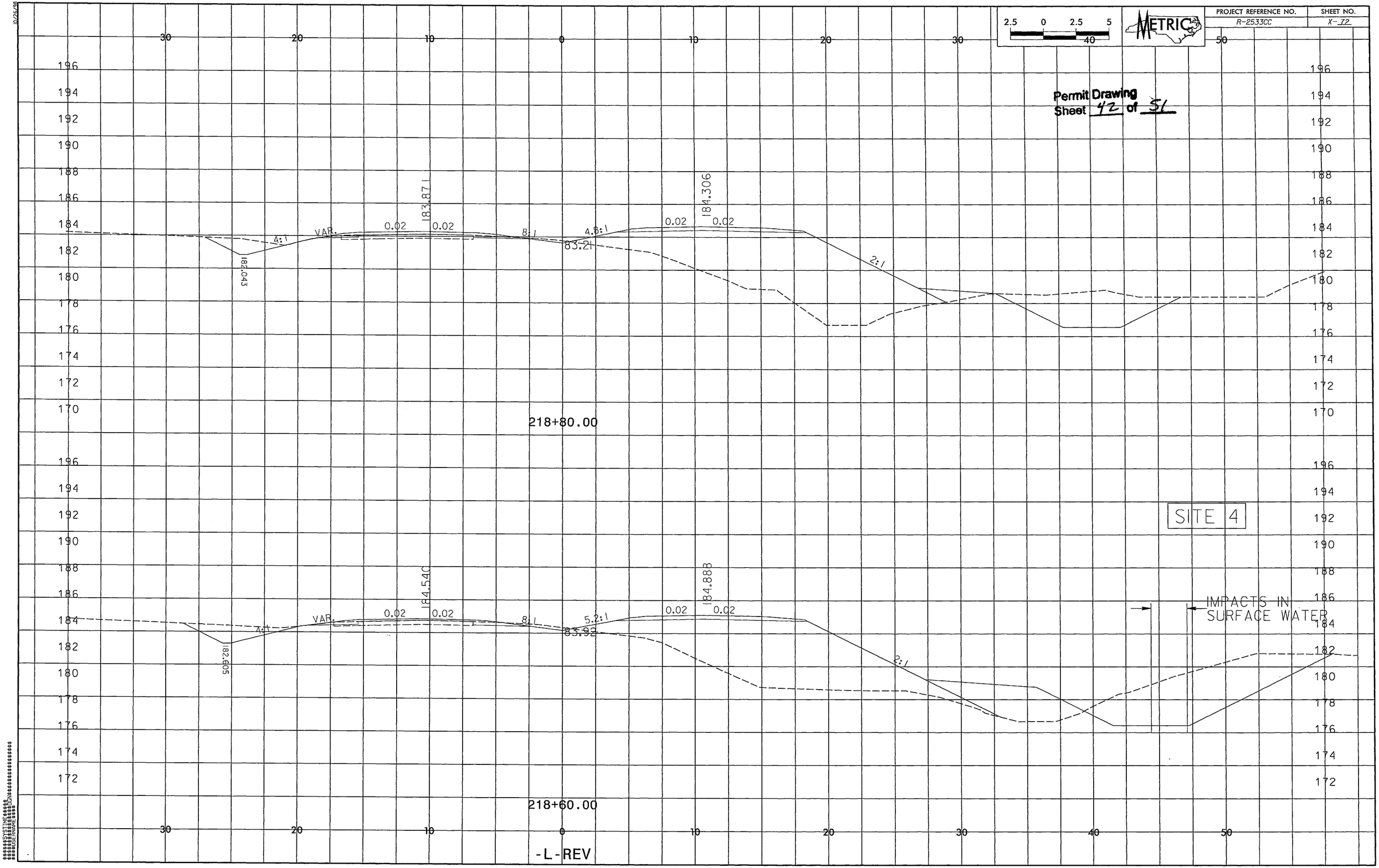
84.26

214+00.00

-L-REV

2.5 0 2.5 5 / 40	METRIC	PROJECT REFERENCE NO. R-2533CC	SHEET NO. X-72

Permit Drawing
Sheet 42 of 51



-L-REV

10/25/23

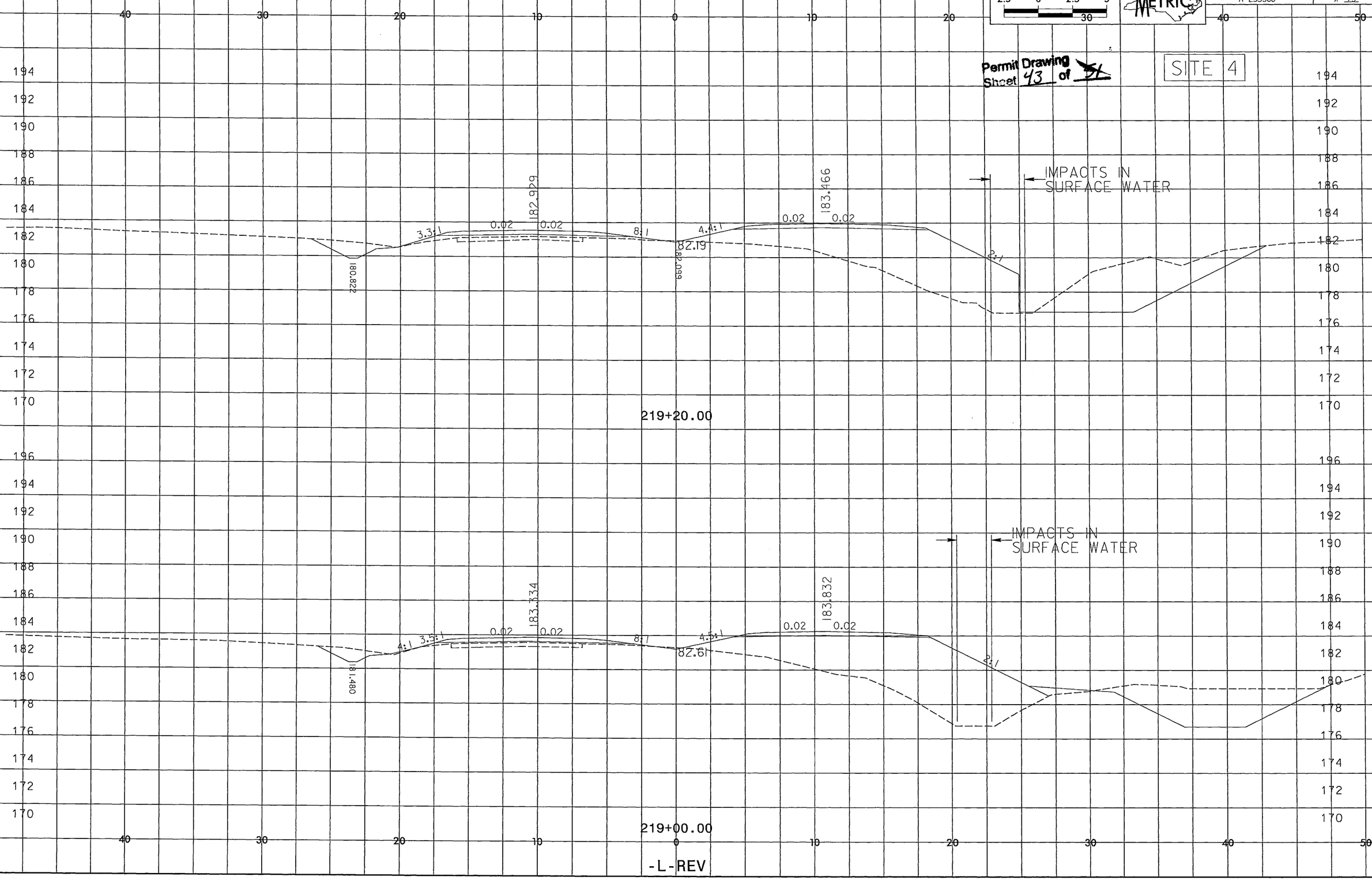
2.5 0 2.5 5

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-13

Permit Drawing Sheet 43 of 54

SITE 4



-L-REV

10/26/98

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-1TQ

2.5 0 2.5 5

METRIC

Permit Drawing
Sheet 44 of 57

40 30 20 10 0 10 20 30 40 50

188 186 184 182

84.60
184.734
183.522
11+20.00

188 186 184

85.67
185.043
11+00.00

IMPACTS IN SURFACE WATER
FILL IN WETLAND
FILL IN WETLAND

SITE 5

190 188 186 184

86.38
185.528
185.297
10+80.00

192 190 188 186 184

87.17
186.200
186.041
10+60.00

192 190 188 186

87.98
186.997
186.878
10+40.00

40 30 20 10 0 10 20 30 40 50

-Y1- REV

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

10/26/98

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-172

Permit Drawing
Sheet 45 of 57

2.5 0 2.5 5

METRIC

13+20.00
84.51

13+00.00
83.67

12+80.00
83.20

12+60.00
80.99

12+40.00

185.500

184.700

184.400

SP
185.700

188.877

188.759

187.769

186.937

186.261

4:1

6:1

VAR.

2:1

0.01

0.02

0.03

0.04

TEMP Y1 WIDENING
2.904
0.022
0.04

TEMP Y1 WIDENING
3.3
0.023
0.04

TEMP Y1 WIDENING
3.3
0.01
0.04

TEMP Y1 WIDENING
3.3
0.016
0.04

TEMP Y1 WIDENING
3.3
0.024
4.7:1

MATCH LINE B

MATCH LINE A

IMPACTS IN SURFACE WATER

SITE 6

SITE 5

INTERSECTION RAMP A

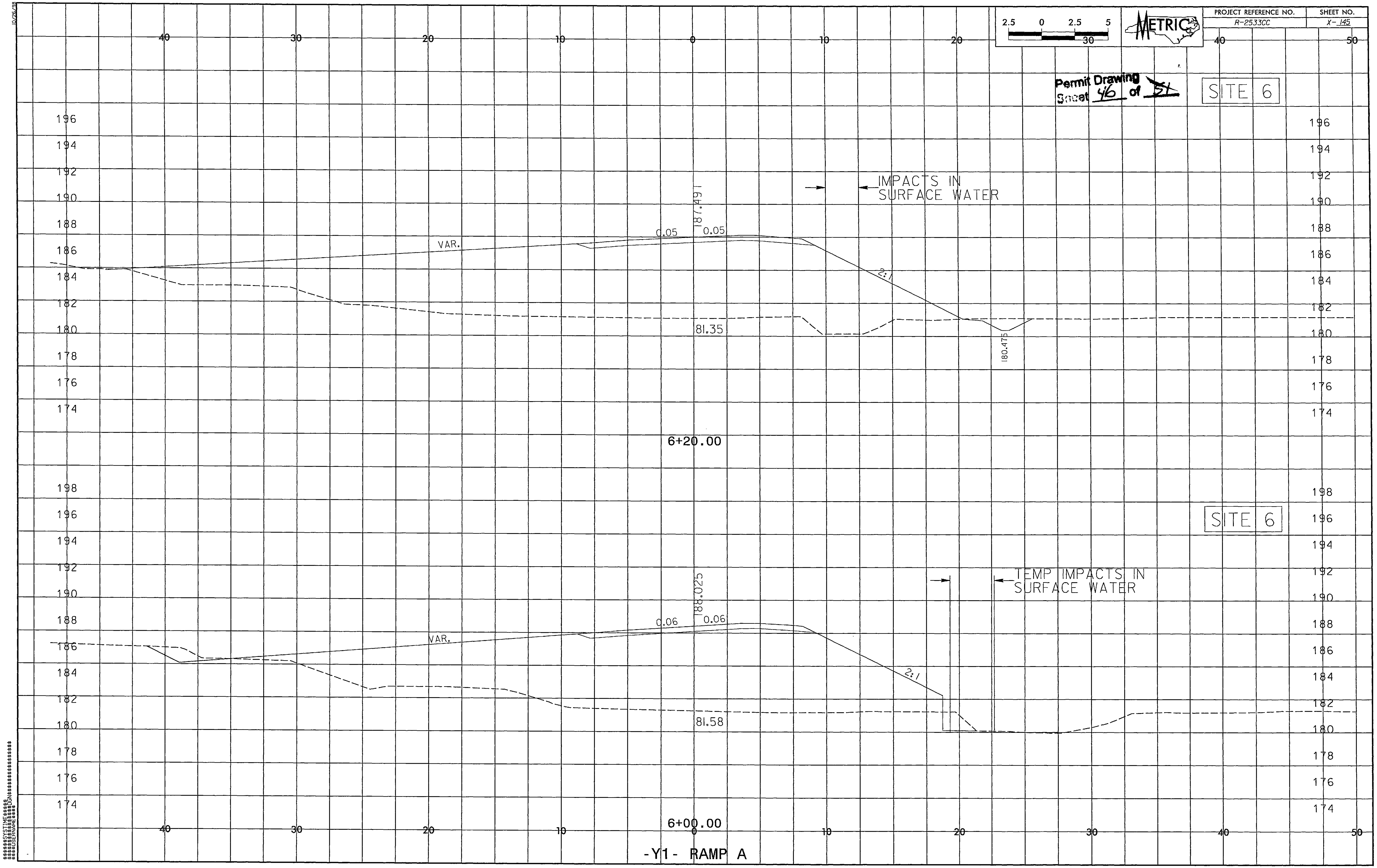
INTERSECTION RAMP B

-Y1- REV

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

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X- 145

Permit Drawing
Sheet 46 of 51



-Y1- RAMP A

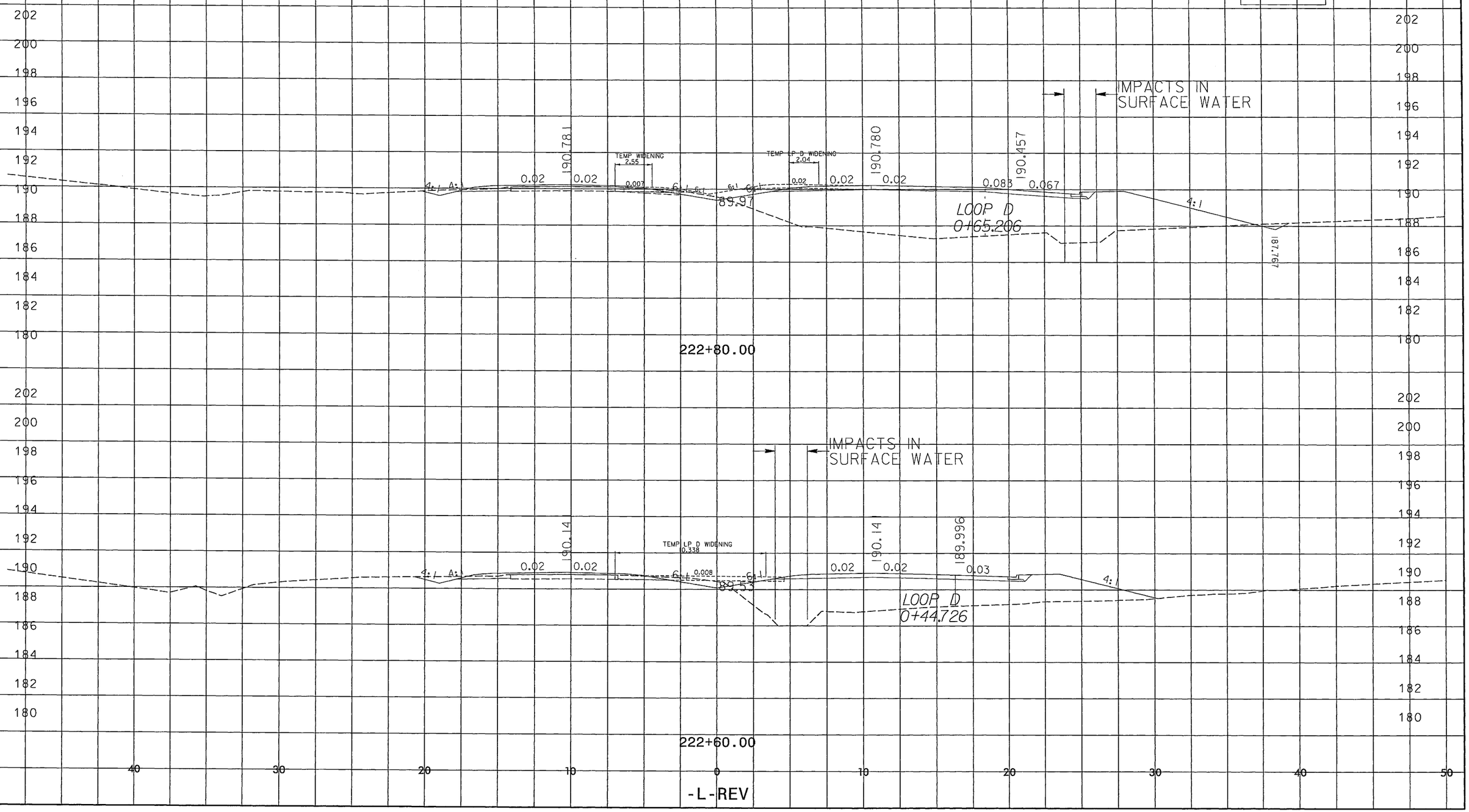
PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-83

METRIC

2.5 0 2.5 5

Permit Drawing
Sheet 47 of 51

SITE 7



10/26/23

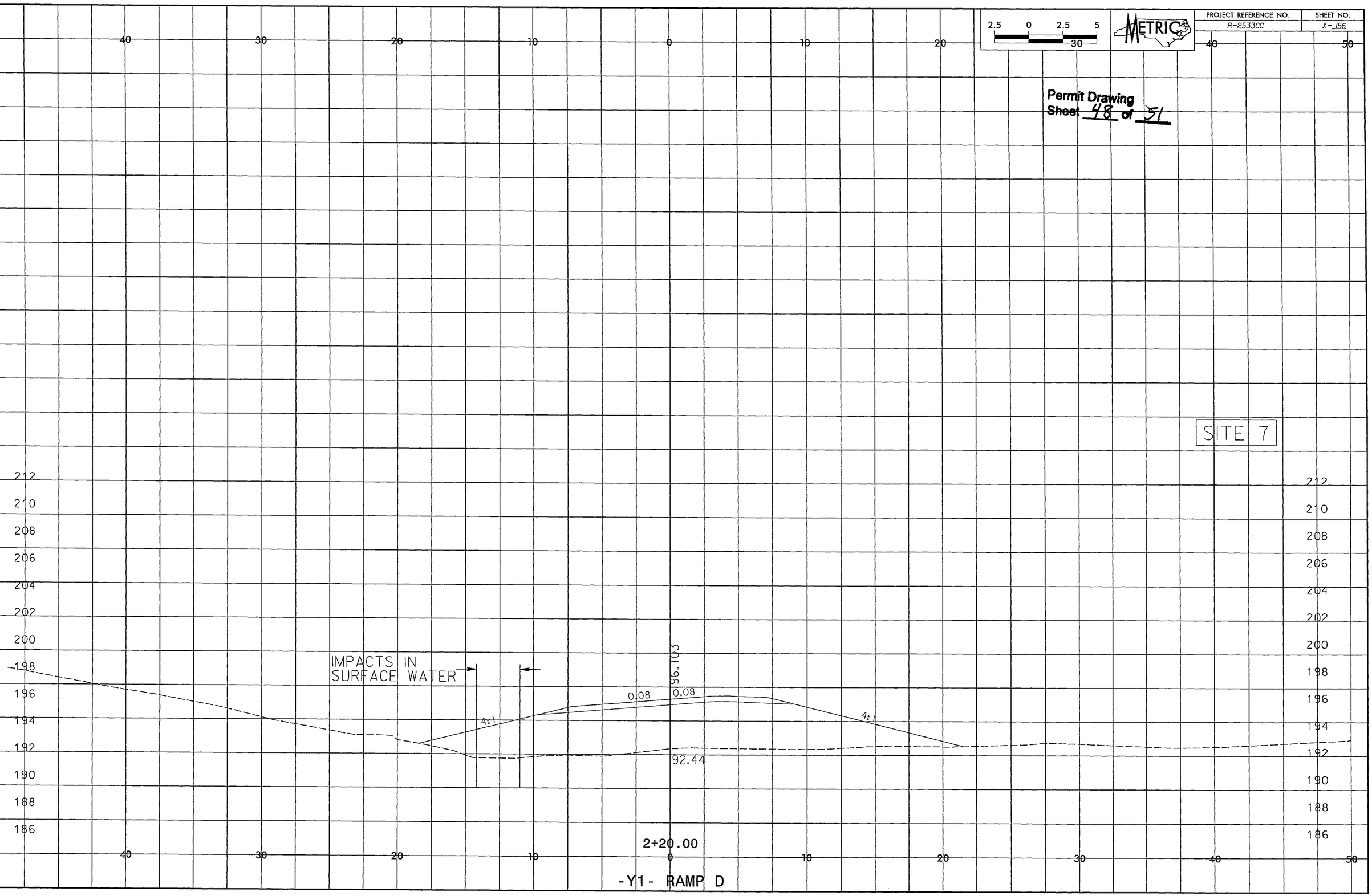
2.5 0 2.5 5
30

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-156

Permit Drawing
Sheet 48 of 51

SITE 7



$$USERNAME$$
$$SYSTIME$$

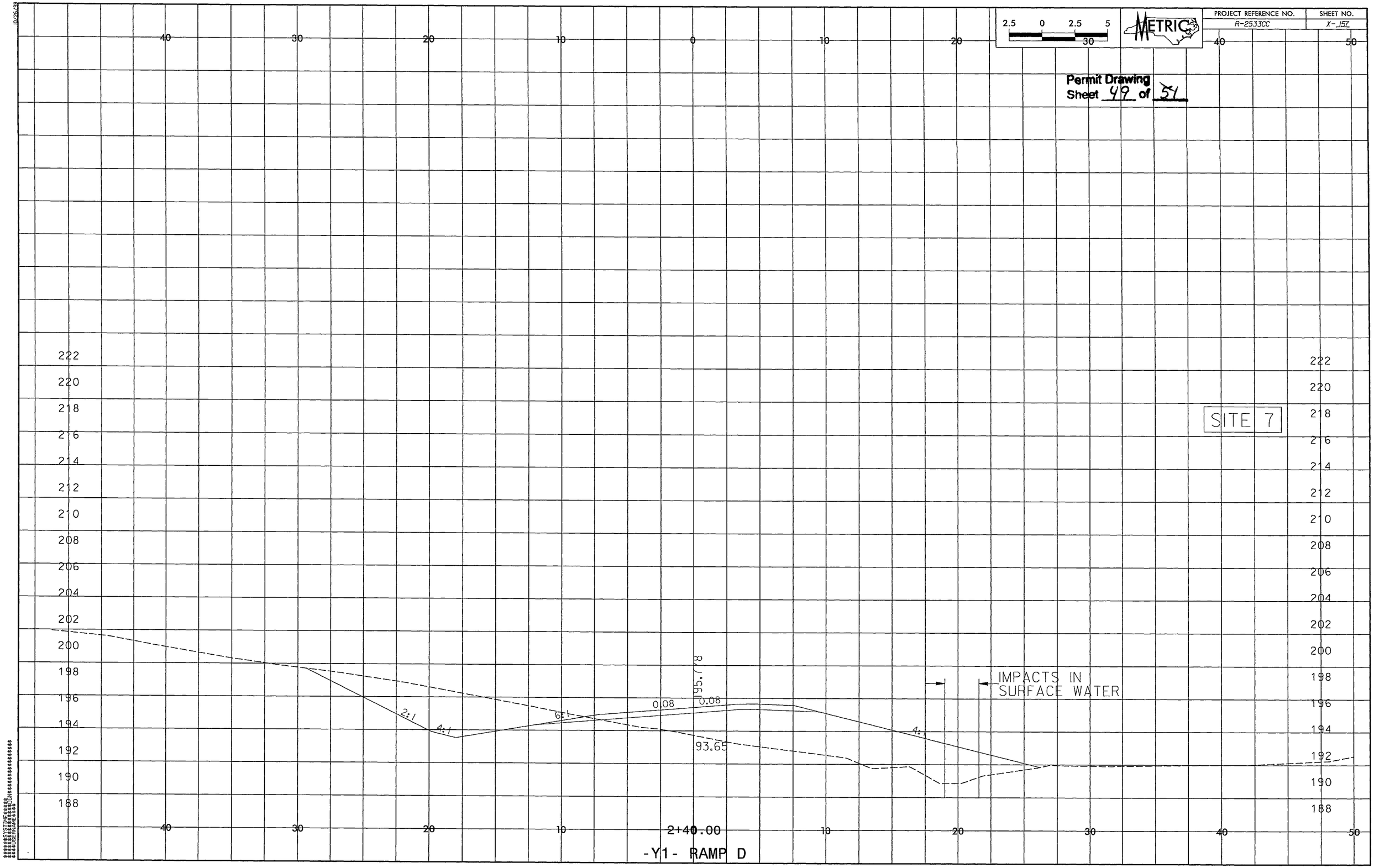
10/26/98

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-15Z

2.5 0 2.5 5 METRIC

Permit Drawing
Sheet 49 of 54

SITE 7



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

10/26/98

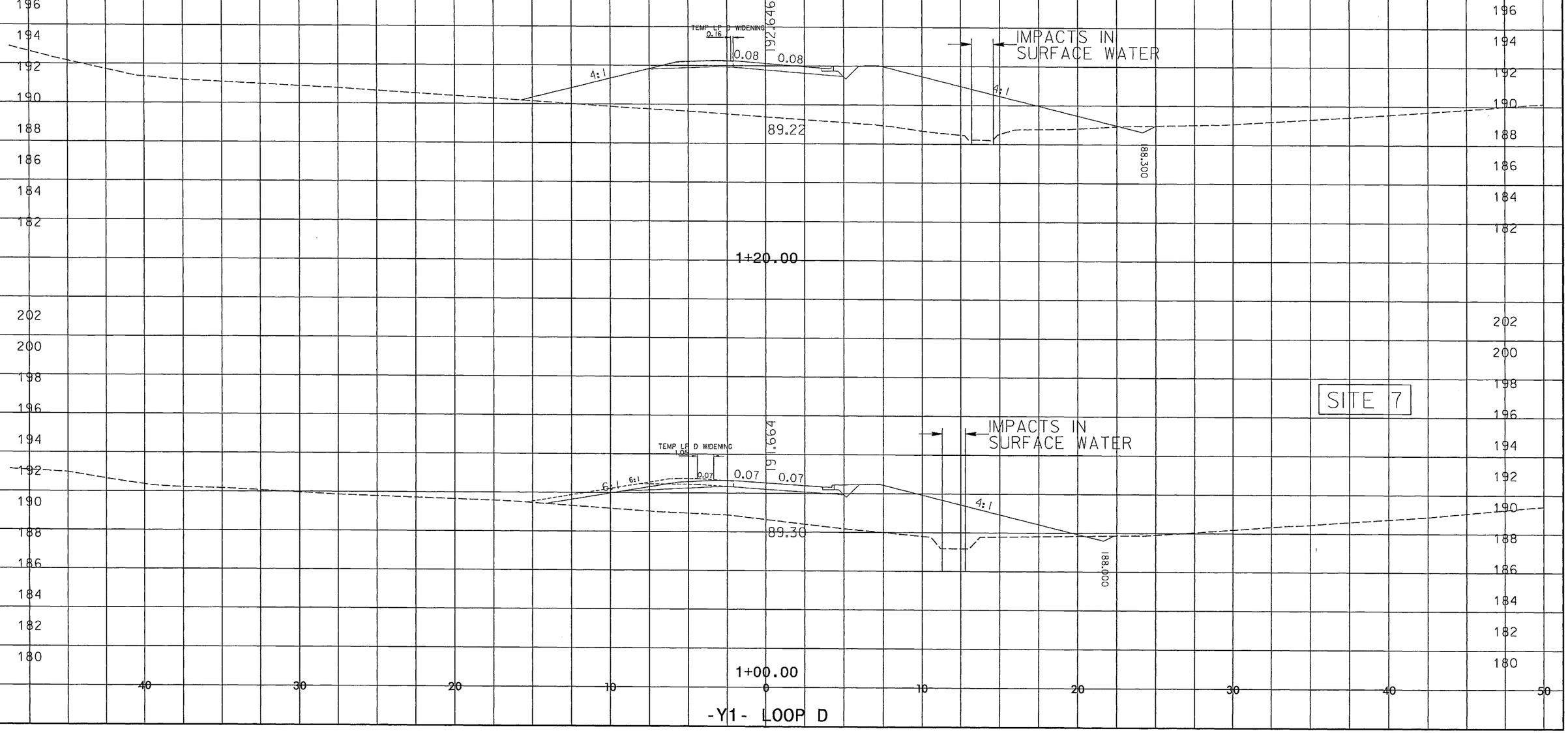
2.5 0 2.5 5
30

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-166

Permit Drawing
Sheet 50 of 51

SITE 7



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

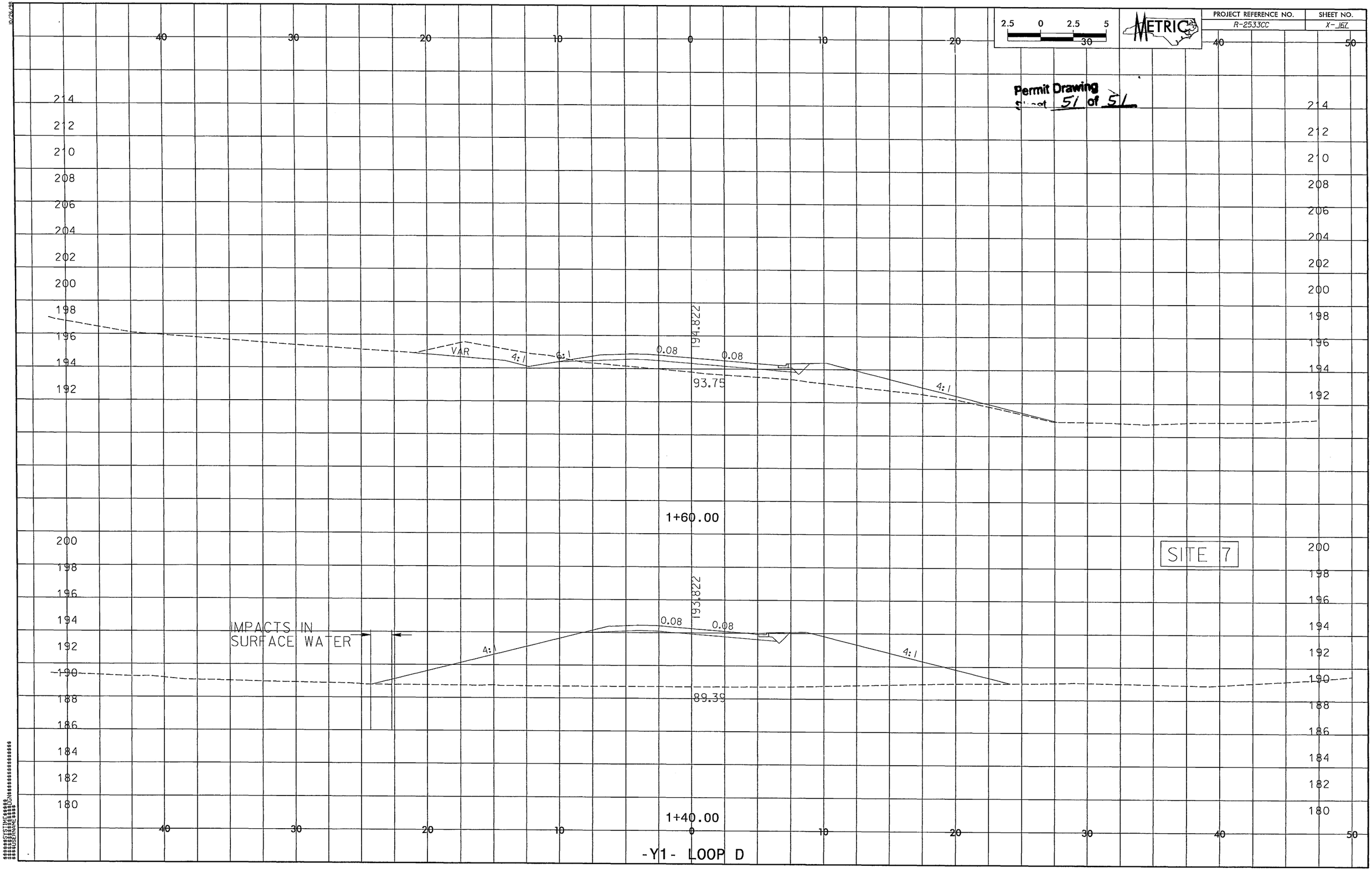
10/26/98

2.5 0 2.5 5
30

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2533CC	X-16Z

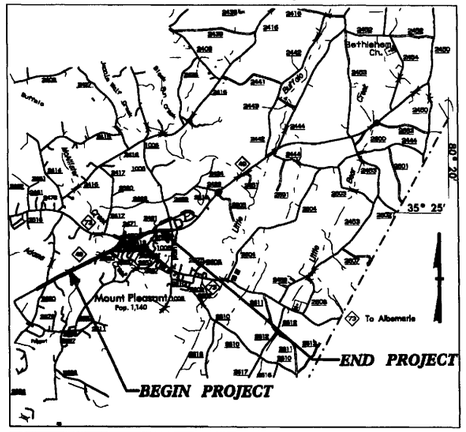
Permit Drawing
Sheet 51 of 51



TIP: R-2533CC

CONTRACT:

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



VICINITY MAP OF PROJECT R-2533CC

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CABARRUS COUNTY

LOCATION: NC 49 FROM EAST OF SR 2630 TO EAST OF SR 2421

TYPE OF WORK: GRADING, PAVING, STRUCTURES, CULVERTS, DRAINAGE, SIGNALS, AND SIGNING

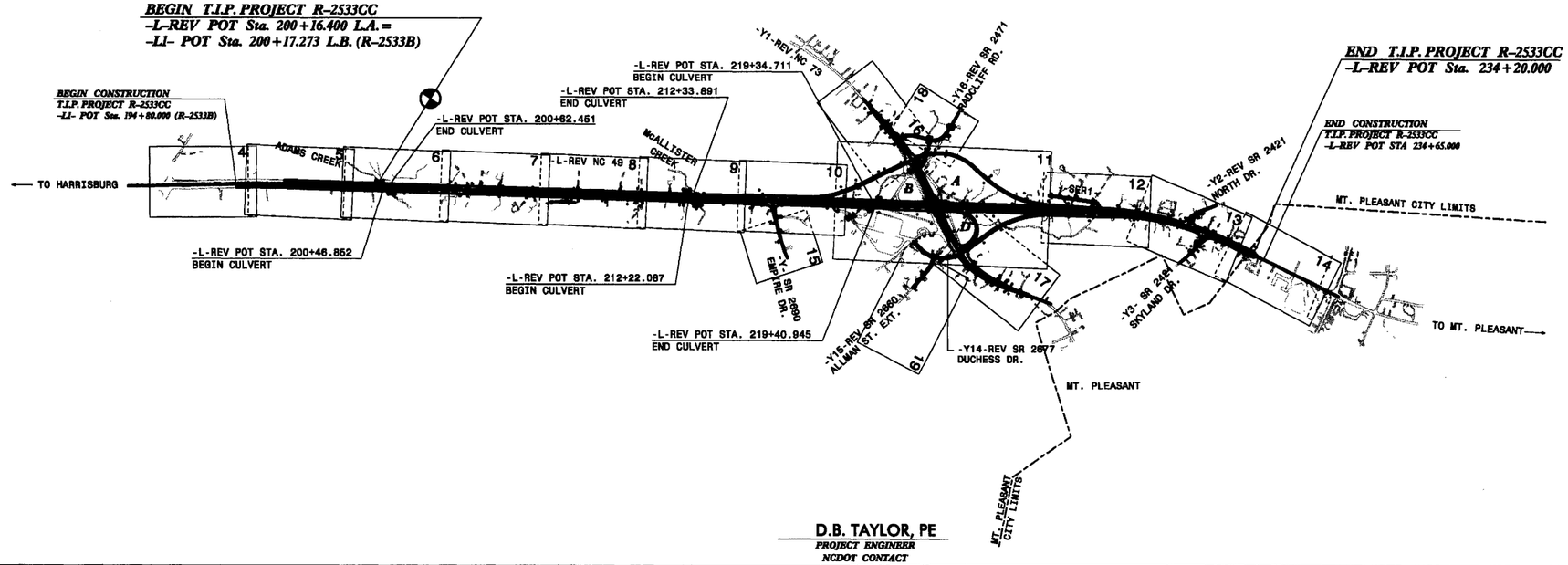
METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND /OR MILLIMETERS UNLESS OTHERWISE NOTED

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2533CC	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34448.1.1	NHF-28-1(5)	PE
34448.3.9	NHS-0049(26)	R/W, UTIL
		CONST

NAD 83
NC GRID



D.B. TAYLOR, PE
PROJECT ENGINEER
NCDOT CONTACT

CONTROL OF ACCESS IS SHOWN ON PLANS AT THE NC 49 – NC 73 INTERCHANGE

GRAPHIC RATIO

PLANS 5 0 10

PROFILE (HORIZONTAL) 5 0 10

PROFILE (VERTICAL) 1 0 2

DESIGN DATA

ADT 2011 = 10,685
ADT 2031 = 13,531
DHV = 11 %
D = 60 %
T = 13 %
(TTST 7% + DUALS 6%)
-L-REV NBL V = 100 km/h
-L-REV SBL V = 90 km/h
RRR – DESIGN GUIDELINES
FUNCT. CLASS. – ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY PROJECT R-2533CC = 3.370 Km

LENGTH STRUCTURES PROJECT R-2533CC = 0.034 Km

TOTAL LENGTH STATE PROJECT R-2533CC = 3.404 Km

PLANS PREPARED FOR NCDOT DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: October 18, 2002

LETTING DATE: April 19, 2011

K. M. HAUGHEY, PE
EARTH TECH PROJECT MANAGER

N. J. DEAN, PE
PROJECT DESIGN ENGINEER

Prepared in the Office of:

AECOM

NC FIRM LICENSE No: F-0342
701 Corporate Center Dr.
Suite 475
Raleigh, N.C. 27607
(919)-854-6200
FAX (919)-854-6259

HYDRAULICS ENGINEER

SIGNATURE:

ROADWAY DESIGN

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	2-J

METRIC

HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

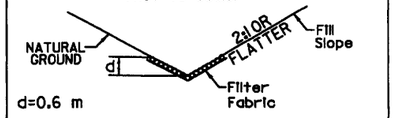
5m 0 10m

CONST. REV.

R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

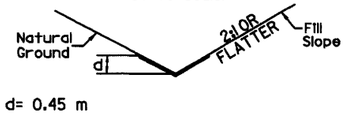
DETAIL 1
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 200+80 TO STA. 202+40 -L-REV LT
FROM STA. 233+30 TO STA. 234+30 -L-REV LT

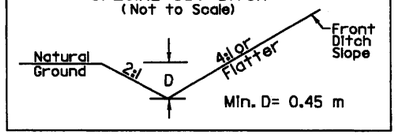
DETAIL 2
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

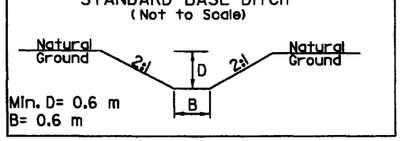
FROM STA. 202+40 TO STA. 202+60 -L-REV LT
FROM STA. 204+25 TO STA. 204+80 -L-REV LT

DETAIL 3
SPECIAL CUT DITCH
(Not to Scale)



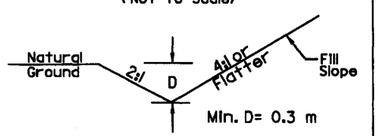
FROM STA. 204+98 TO STA. 206+60 -L-REV LT
FROM STA. 206+00 TO STA. 206+28 -L-REV RT
FROM STA. 206+80 TO STA. 207+81 -L-REV LT
FROM STA. 9+85 TO STA. 10+72 -SER1- LT

DETAIL 4
STANDARD BASE DITCH
(Not to Scale)



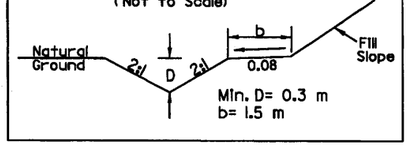
STA. 206+32 -L-REV RT
STA. 207+66 -L-REV RT

DETAIL 5
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



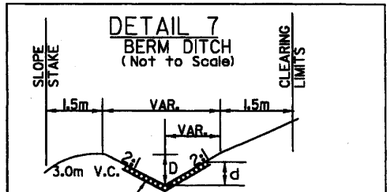
FROM STA. 208+40 TO STA. 208+80 -L-REV LT
FROM STA. 228+60 TO STA. 229+40 -L-REV LT
FROM STA. 16+40 TO STA. 17+00 -Y1-REV RT
FROM STA. 5+50 TO STA. 6+16 RAMP A LT
FROM STA. 0+45 TO STA. 1+20 LOOP D RT

DETAIL 6
LATERAL 'V' DITCH
(Not to Scale)



FROM STA. 208+80 TO STA. 210+80 -L-REV LT
FROM STA. 228+13 TO STA. 228+60 -L-REV LT
FROM STA. 11+19 TO STA. 11+40 -SER1- LT

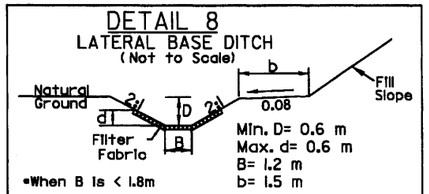
DETAIL 7
BERM DITCH
(Not to Scale)



Type of Liner= Class 'B' Riprap

FROM STA. 211+60 TO STA. 211+95 -L-REV RT
FROM STA. 3+40 TO STA. 3+60 RAMP B LT

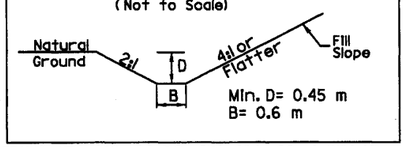
DETAIL 8
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

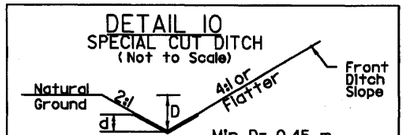
FROM STA. 212+20 TO STA. 213+00 -L-REV LT

DETAIL 9
SPECIAL LATERAL BASE DITCH
(Not to Scale)



FROM STA. 213+00 TO STA. 214+00 -L-REV LT
FROM STA. 218+20 TO STA. 219+00 -L-REV LT

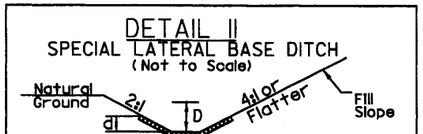
DETAIL 10
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 212+20 TO STA. 212+40 -L-REV RT
FROM STA. 214+00 TO STA. 214+60 -L-REV LT
FROM STA. 16+53 TO STA. 18+00 -Y1-REV LT
FROM STA. 10+05 TO STA. 10+86 -Y14-REV RT
FROM STA. 11+40 TO STA. 11+83 -Y15-REV LT
FROM STA. 11+60 TO STA. 11+84 -Y15-REV RT

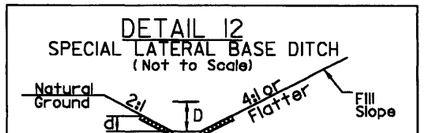
DETAIL 11
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 11+20 TO STA. 12+03 -Y1-REV RT
FROM STA. 12+80 TO STA. 13+60 -Y1-REV LT
FROM STA. 3+60 TO STA. 4+30 -RAMP B- LT

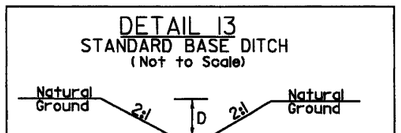
DETAIL 12
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

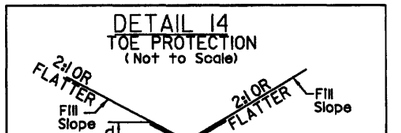
FROM STA. 219+80 TO STA. 221+00 -L-REV RT

DETAIL 13
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 221+80 TO STA. 222+15 -L-REV LT
FROM STA. 222+74 TO STA. 222+85 -L-REV LT
STA. 3+40 RAMP A LT
STA. 2+40 RAMP B RT
STA. 12+07 -Y14- LT

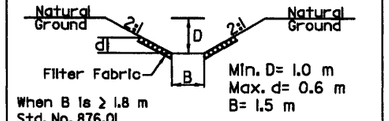
DETAIL 14
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

FROM STA. 1+40 TO STA. 1+80 -LOOP D- LT

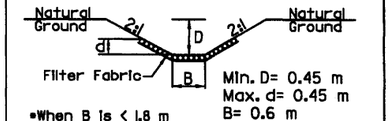
DETAIL 15
CHANNEL CHANGE
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

FROM STA. 200+38 TO STA. 200+48 -L-REV LT
FROM STA. 223+36 TO STA. 224+07 -L-REV RT

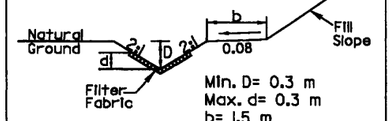
DETAIL 16
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

STA. 224+00 -L-REV RT
STA. 18+50 -Y1-REV RT
STA. 18+60 -Y1-REV LT

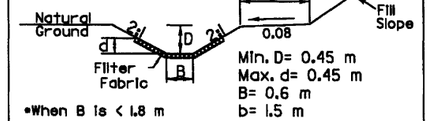
DETAIL 17
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 5+64 TO STA. 5+96 RAMP A RT

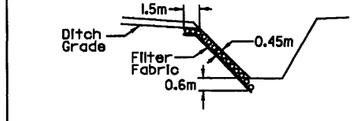
DETAIL 18
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 210+80 TO STA. 212+10 -L-REV LT
FROM STA. 219+00 TO STA. 219+45 -L-REV LT
FROM STA. 233+71 TO STA. 233+97 -L- REV RT
FROM STA. 11+55 TO STA. 12+10 -Y1-REV LT
FROM STA. 6+03 TO STA. 6+45 -RAMPA- RT

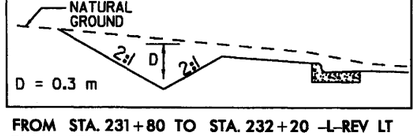
DETAIL 19
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 18.4 MTONS, Class 'B' Rip-Rap
Filter Fabric= 19.2 sm

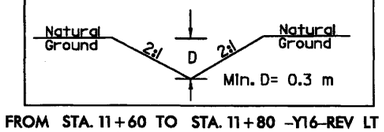
STA. 220+20 -L-REV RT

DETAIL 20
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)



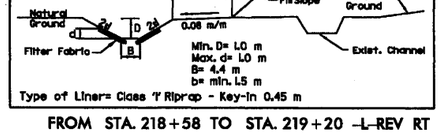
FROM STA. 231+80 TO STA. 232+20 -L-REV LT
FROM STA. 232+30 TO STA. 232+50 -L-REV LT
FROM STA. 232+60 TO STA. 233+04 -L-REV LT

DETAIL 21
STANDARD 'V' DITCH
(Not to Scale)



FROM STA. 11+60 TO STA. 11+80 -Y16-REV LT
STA. 11+00 -Y2-REV RT

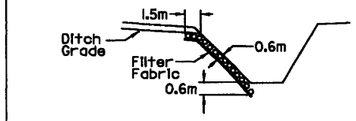
DETAIL 22
CHANNEL CHANGE
(Not to Scale)



Type of Liner= Class 'I' Riprap - Key-in 0.45 m

FROM STA. 218+58 TO STA. 219+20 -L-REV RT

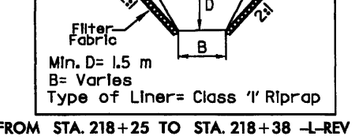
DETAIL 24
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 12.1 MTONS, Class 'I' Rip-Rap
Filter Fabric= 13.9 sm

STA. 212+10 -L-REV LT
STA. 219+45 -L-REV LT

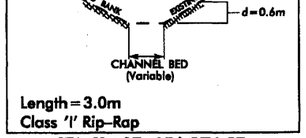
DETAIL 23
OUTLET CHANNEL DETAIL
(Not to Scale)



Type of Liner= Class 'I' Riprap

FROM STA. 218+25 TO STA. 218+38 -L-REV RT
STA. 12+68 -Y1-REV RT
STA. 12+12 -Y16-REV LT

DETAIL 25
PIPE OUTLET CHANNEL
(Not to Scale)



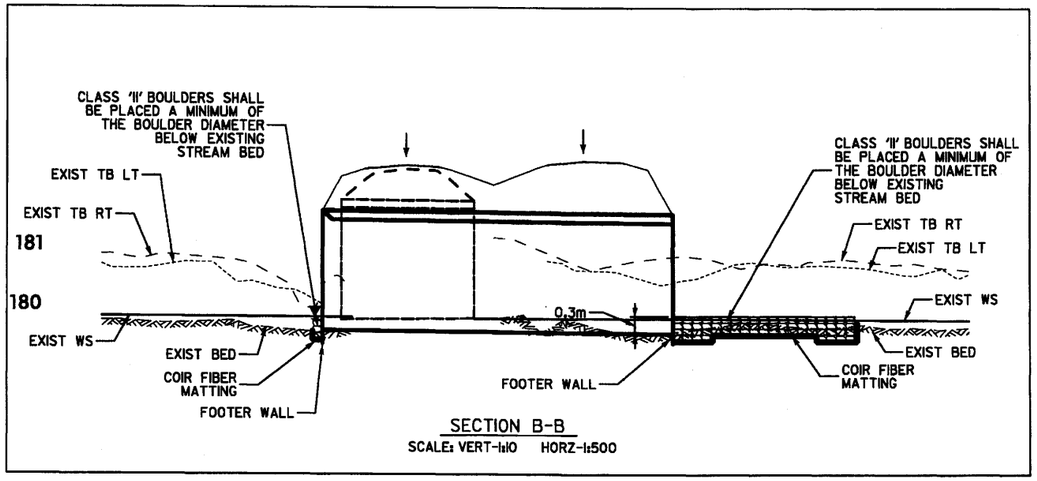
Length = 3.0m
Class 'I' Rip-Rap

STA. 11+07 -Y16-REV RT

DATE: 1/28/2010
USER NAME: tbell
I:\Projects\R-2533CC\roadway\R2533CC_rip_rap_02.dgn

METRIC	PROJ. REFERENCE NO.	SHEET NO.
	R-2533CC	2-Y
5m 0 10m	HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
R/W REV.	Prepared in the Office of: AECOM NC FIRM LICENSE No: F-0342 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 (919) 854-6200 - (919) 854-6259(FAX)	

CHANNEL BENCH DETAIL SHEET



SECTION B-B

SCALE: VERT-1:10 HORZ-1:500

NOTES:

1. A BENCH 0.3m ABOVE THE BED SHALL BE ARMORED WITH BOULDERS AS SHOWN ON THE PLAN VIEW. THE DEPTH OF ARMOR PROTECTION SHOULD EXTEND 0.45m BELOW THE STREAM BED AND LINED WITH COIR FIBER MATTING.

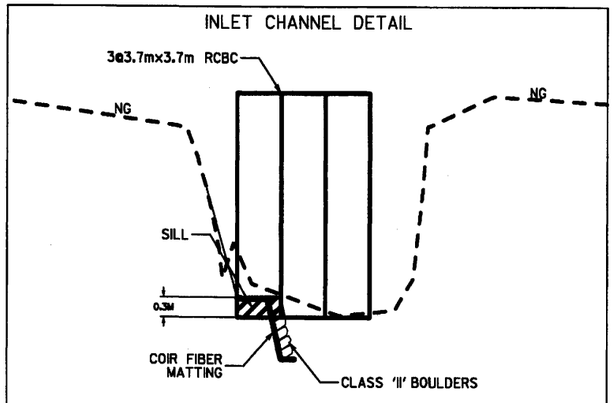
2. DIMENSIONS AND SLOPES MAY BE ADJUSTED TO FIT BY THE ENGINEER.

3. EDGE ARMOR CAN BE NATURAL STREAM BOULDERS OR EXTRACTED FROM CLASS II RIPRAP OR SHOT ROCK MATERIAL AND CAN BE CUBICAL OR RECTANGULAR IN NATURE.

4. ACCEPTABLE BOULDERS FOR THE EDGE ARMOR SHALL HAVE THE FOLLOWING APPROXIMATE DIMENSIONS: 0.9m x 0.6m x 0.3m. UNSUITABLE EDGE ARMOR MATERIAL THAT REMAINS FROM CLASS II RIP RAP OR SHOT ROCK STORES, MAY BE USED IN BACK FILL OF THE OVER BANK AREA OR DISCARDED.

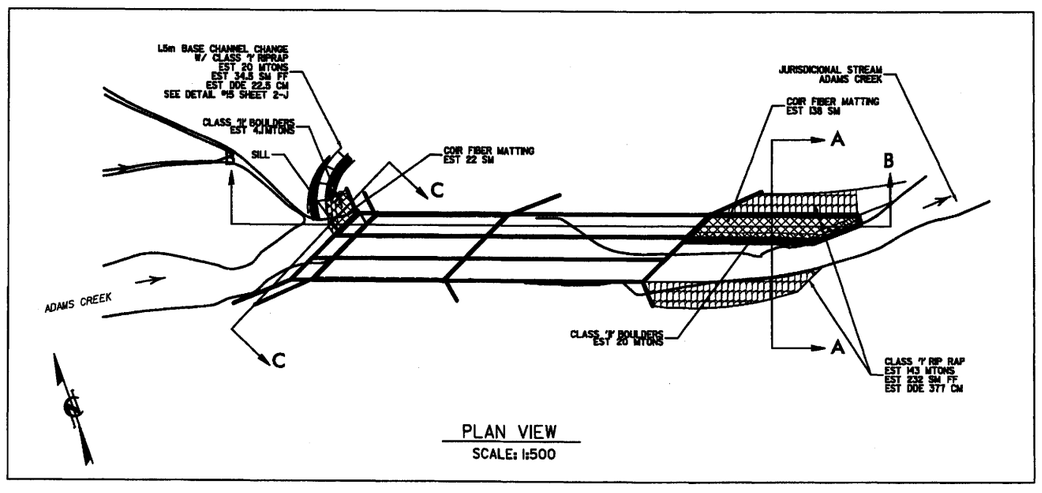
5. COIR FIBER MATTING SHALL EXTEND FROM THE BOTTOM OF THE FOOTER BOULDERS AND ACROSS THE BENCHED AREA TO PREVENT WASHOUT OF SEDIMENT THROUGH BOULDER GAPS.

INLET CHANNEL DETAIL



SECTION C-C

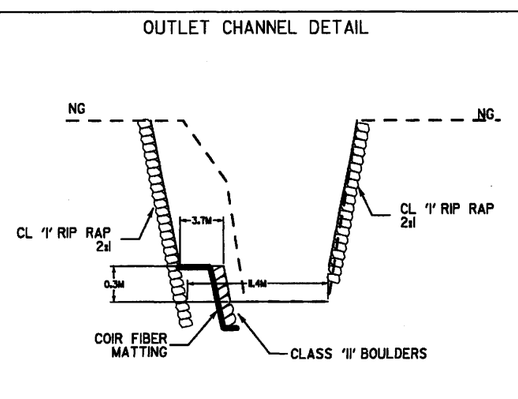
NOT TO SCALE



PLAN VIEW

SCALE: 1:500

OUTLET CHANNEL DETAIL



SECTION A-A

NOT TO SCALE

STA. 200+37 TO STA. 200+98 -L-REV

DATE: 1/29/2010
TIME: 10:40:48 AM
USER: rmoss
DGN: R:\Roadway\proj\r2533cc_rdy_det_rock_ditch.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	3 -J

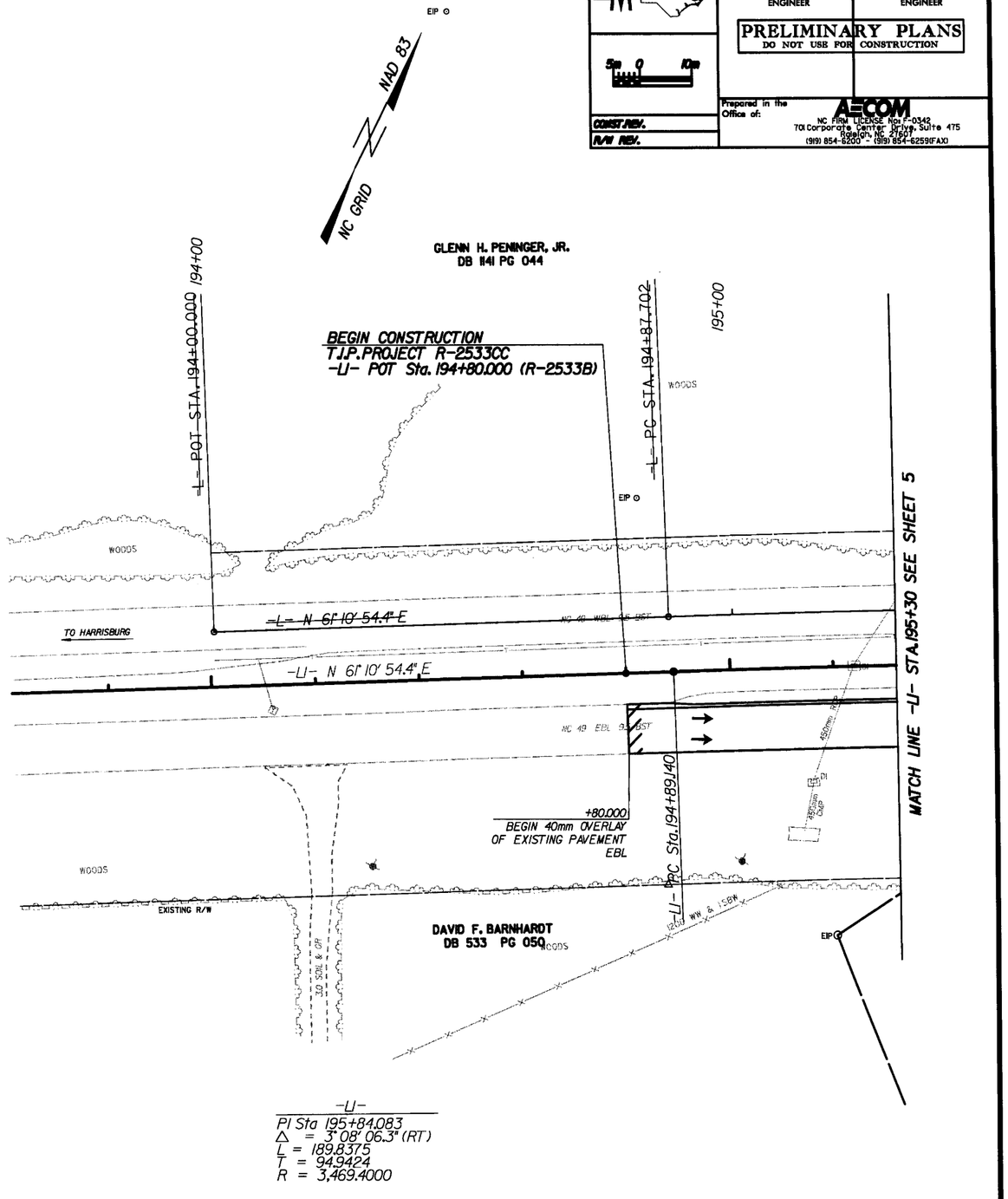
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	5, 6, 7	NED C. REECE
2	6, 7	DENNIS G. HARTLEY
3	7	18.288 ACCESS EASEMENT
4	7	DEAN D. RANALLI
5	7, 8	VIRGINIA McALLISTER SMITH
6	7	CAROLYN M. MOOSE
7	7, 8	THEODORE F. HUNEYCUTT
8	8	GLENN T. JONES & TAMMY H. JONES
9	8	MURLEE A. SHORE
10	8, 9	WESLEY G. DANGERFIELD
11	9	STEVEN B. COCHRANE
12	9, 10, 11	ECB, LLC
13	9, 10	JOHN RAY NOBLES, JR.
14	8, 9	SUE REVELLE GARIFO
15	9	CHARLES GILBERT LENTZ, III
16	9	LOUIS M. HELMS, JR.
17		OMITTED
18		OMITTED
19	10	NCDOT
20	10	HORTON & CO.
21	10	F & H PROPERTIES LLC.
21A	15	JEFFREY W. DEMENT
22	10, 11	HAROLD KENNETH WILLIS
23	10, 15	FENTON L. JONES
24	15	WILLIAM BOYD ALLMON
25	10, 15	FRED M. MILLS
26	11	GATHA G. AUSTIN
27	16	ROBIN ANN McALLISTER
27A	11, 16	GEORGE F. McALLISTER
28	11, 16, 18	MARSHALL POPLIN
905	11	LARRY WAYNE WHITLEY
30	11	M. RAY HORTON
901	11	TIMOTHY E. PAYNE
912	11	ADA ANN LAMBERT
33	11, 18	MILLIS RAY HORTON
34		OMITTED
35	11	CAROL H. ISENHOUR
36	11	SUE H. LAMBERT
913	11, 12	HARRY H. FAGGART
38	11	JACK R. MOORE
39	11	FIRST CHARTER NATIONAL BANK
40	11	ERNEST F. CRUNK
41	11	LISA F. SIGMON
42	11	PROGRESSIVE WATER SYSTEM OF CABARRUS COUNTY
43	11, 17	WILLIAM F. PULLIUM
44	11	FRANCES B. MEDLIN
45	11, 17	JERRY M. COOK
46	11, 17	PATRICIA P. HARRINGTON
47	11, 12	DAVID M. YARBOROUGH
48	12	MATH B. WHITLEY
49	12	LACY B. HURLOCKER
50	12	DB 251 PG 088
51	12	JULIA I. KRIMMINGER
52	12	HMO INVESTMENTS, INC.
53	12	NCDOT
54	12	WALDO E. HELMS
55	12	MARVIN E. WILDER
56	12	HARRY H. FAGGART
57	12, 13	ROBERT E. LEE ALLMAN

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
58	13	JAMES D. HONEYCUTT
59	13	WILLIAM R. HONEYCUTT, JR.
60	13	THYRA E. DRYE
61	13	EDITH H. EAGLE
62	13	BARBARA K.
63	13	JENNIFER R. & HYDRICK STONE
64	13, 14	JEFFERY LEE ALLMAN
65	13	CAROLYN E. EUDY CAROLYN E. EUDY
66	13	ROBERT E. ALLMAN
67	13	OLA MAE McCLESTER
68	13	DOUGLAS H. STEADMAN
69	13, 14	ROBERT E. ALLMAN
70	14	BOARD OF EDUCATION OF CABARRUS COUNTY
71	14	FISHER EARNHARDT OIL CO.
71A	14	FIRST BANK
71B	14	D. G. DEVELOPEMENT PROPERTIES, INC.
73	14	RONALD WAYNE McLESTER
133	16	BOBBY GENE HOOVER
137	16	HELEN SMITH ALLEN
140	17	NEAL GLENN WHICKER, SR.
141	17	CHRISTOPHER M. GILLIN
142	17	RICK L.. EUDY & NANCY E KLUTZ
143	11, 17, 19	EDWARD L. HONEYCUTT
144	17	RONNIE EUGENE SMITH
145	17	BILLIE L. HONEYCUTT
146	17	KAYE S. SIMPSON
147	17	PAM ROWE & JACK LATHAM
148	17	BILLY RAY HATLEY
149	17	GRADY R. BARRINGER
153	19	WILLIE R. LEE
154	19	ZEB V. RINEHARDT
155	19	JANIE T. RITCHIE
156	19	DANIEL R. EUDY

METRIC	PROJ. REFERENCE NO.	SHEET NO.
	R-2533CC	4
5m 0 10m	HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST.REV.	Prepared in the Office of: AECOM NC FIRM LICENSE No: F-0342 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 (919) 854-6200 - (919) 854-6259(FAX)	
R/W REV.		



-LI-
PI Sta 195+84.083
Δ = 3° 08' 06.3" (RT)
L = 189.8375
T = 94.9424
R = 3,469.4000

FOR -LI- PROFILE, SEE SHEET 20
FOR -XOVER1- DETAILS, SEE SHEET 2-M

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	5
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.
R/W REV.

Prepared in the Office of:
A=COM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

BM 112 EL=193.006, N 183663 E 475388
LT STA 195+84 34 LT
RR SPIKE IN ROOT OF 1000MM POPLAR TREE

NAD 83
NC GRID

MATCH LINE -LI- STA.195+30 SEE SHEET 4

MATCH LINE -LI- STA.199+00.000 SEE SHEET 6

BL-1300 -BL- PINC 5+00.000 =
-LI- Sta 195+34.673 (19.728 LT)
EL 196.451

-L-
PI STA. 195+83.506
Δ = 3°09'14.0" (RT)
Lc = 191.559
R = 3,480.000
T = 95.804

GLENN H. PENNINGER, JR.
DB 1141 PG 044

-LI-
PI Sta 195+84.083
Δ = 3°08'06.3" (RT)
L = 189.8375
T = 94.9424
R = 3,469.4000

+65.000
BEGIN 40mm OVERLAY
OF EXISTING PAVEMENT
WBL

3.906
N29°59'06"E
19+632.670
15.207

EIR

15.305
N29°59'10"E

-L- PT STA. 196+79.261

MICHEAL REECE
DB 587 PG 223

WOODS

96.41
S30°01'29"E

BL-1301 -BL- PINC7+93.961 =
-LI- Sta 198+27.843 (19.430 LT)
EL 187.832

NED C. REECE
DB 496 PG 151
DB 794 PG 162

EXISTING R/W

450mm CMP

450mm RCP

-L- N 64°20'09.0"E

-LI- N 64°19'01.3"E

TO MT.PLEASANT

375mm RCP

DAVID F. BARNHARDT
DB 533 PG 050

87.189
N29°59'11"E

-LI- PT Sta.196+78.978

DORA C. BEANE
DB 558 PG 235

GEORGE S. MOORE
DB 600 PG 638

150mm RCP

30 CONC

20.00 WM & 1.50M

303.648
N31°04'49"E

FOR -LI- PROFILE, SEE SHEET 20
FOR -XOVER1- DETAILS, SEE SHEET 2-M

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 7/20/2010
TIME: 10:58:59 AM
USER: rgraves
DGN: R:\2533cc\eng\sht\2533cc_rdy_sht_05.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	6
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

BM 113 EL=182.406, N 183847 E 475753
L1 STA 199+91 40 LT
RR SPIKE IN BASE OF 375MM TWIN SYCAMORE TREE

NAD 83
NC GRID

BEGIN T.I.P. PROJECT R-2533CC
-L-REV POT Sta 200+16.400 LA=
-LI- POT Sta 200+17.273 LB. (R-2533B)

BEGIN GRADE
-LI- POT Sta 199+95.000 (R-2533B)

JURISDICTIONAL STREAM
ADAMS CREEK

BL-1302 -BL- PINC 9+60.070 =
-LI- Sta 199+93.942 (17.588 LT)
EL 184.287

199+00

200+00

201+00

202+00

-LREV-
+50.000
28.716 & 35.000
(94.214' & 114.829')

NED C. REECE
DB 496 PG 151
DB 794 PG 162

+95.00 -LI-
END 40mm OVERLAY
OF EXISTING PAVEMENT
NBL & SBL

ADAMS CREEK

EXISTING R/W

TDE

SILL

-LREV-
+40.000
25.657 & 30.500
(84.175' & 100.066')

CLASS 'II' BOULDERS
EST 4.1 MTONS
EST 22 SM COIR FIBER MATTING
SEE DETAIL SHEET 2-Y

1.5m BASE CHANNEL CHANGE
W/CLASS 'I' RIPRAP ON BANKS ONLY
EST 20 MTONS RIPRAP
EST 34.5 SM FF
EST DDE 22.5 CM
SEE DETAIL #15

REMOVE EXISTING CULVERT

NED C. REECE
DB 496 PG 151
DB 794 PG 162

-LREV-
+00.000
30.500 & 35.000
(100.065' & 114.829')

TOE PROTECTION
STA. 200+80 TO 202+40 -L-REV LT
SEE DETAIL #1
EST 206 MTONS CLASS 'B' RIPRAP
EST 346.1 SM FF

RESET FENCE
-LREV- STA. 200+80+/- TO
-LREV- STA. 202+00+/-

TOE PROTECTION W/PSRM
STA. 202+40 TO 202+60 -L-REV LT
SEE DETAIL #2
EST 40.3 SM PSRM

-LREV-
+00.000
25.206 & 30.500
(84.004 & 100.066')

WOODS

900 WW & 1SRW

1500 WW & 3SRW

350 WW

TYPE 350

12m PAVED SHLDR.

7.2m

3.6m

-L- N 64° 20' 09.0" E

REMOVE EXISTING GUARDRAIL

-L-REV N 64° 19' 01.3" E

-LI- N 64° 19' 01.3" E

+33.453 -LI-
TIE TO EXISTING GUARDRAIL

450 CONC

NC 49 7.3 BST

450mm RCP

375mm RCP

3@3.7m x 3.7m RCBC

3.4m x 0.7 CONC

FS 2GL

750

MTL

-LREV-
+64.577
27.000
(88.582')

-LREV-
+73.754
35.500
(116.470')

-LREV-
+84.730
45.667
(149.825')

CHANNEL BENCH W/CLASS 'II' BOULDERS
EST 20 MTONS
EST 138 SM COIR FIBER MATTING
SEE DETAIL SHEET 2-Y

CLASS 'I' RIPRAP
EST 143 MTONS
EST 232 SM FF
EST DDE 377 CM

JURISDICTIONAL STREAM
ADAMS CREEK

60.388
372.52 SSE

74.568
383.30 SSE

37.868
355.97 SE

55SW & 1S ELEC

2.7 SOIL & GR

-LREV-
+40.000
32.000
(104.986')

-LREV-
+40.000
27.000 & 35.500
(88.582' & 116.469')

-LREV-
+40.000
45.667
(149.825')

CLASS 'I' RIPRAP
EST 10 MTONS
EST 18.4 SM FF

60m TAPER

+57.00

+17.00

CAT-I

-LREV-
+50.000
27.000 & 32.000
(88.582' & 104.986')

-LREV-
+70.000
27.000 & 32.000
(88.582' & 104.986')

GRAVEL

GEORGE S. MOORE
DB 600 PG 638

CLARENCE A. ALLMAN
& wife HILDA R.

MATCH LINE -LI- STA.199+00.000 SEE SHEET 5

MATCH LINE -L-REV STA.202+80 SEE SHEET 7

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -LI-/-L-REV PROFILE, SEE SHEETS 20 & 21
FOR -XOVER1- DETAILS, SEE SHEET 2-M
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 1/28/2010
TIME: 10:56:8 AM
USER: rmoore
DGN: N:\roadway\rd\r2533cc_rdy_set_06.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	7
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST REV.
R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

NAD 83
NC GRID

BM 114 EL=196.032, N 184029 E 476341
LREV STA 205+99 51 RT
RR SPIKE IN BASE OF 300MM SWEET GUM TREE

BL-1303 -BL- PINC 12+58.406 =
-L-REV Sta 202+90.845 (0.674 RT)
EL 190.534

BL-1304 -BL- PINC 15+35.932 =
-L-REV Sta 205+68.335 (3.770 LT)
EL 198.122

MATCH LINE -L-REV STA.202+80 SEE SHEET 6

MATCH LINE -L-REV STA.206+60 SEE SHEET 8

1 NED C. REECE
DB 496 PG 151
DB 794 PG 162

2 CLARENCE A. ALLMAN & wife HILDA R.

3 (60') 18.288 ACCESS EASEMENT
DB 719 PG 084

4 ROBERT J. FOLEY & JUDITH M. DUDLEY
DB 1687 PG 139

5 VIRGINIA McALLISTER SMITH
DB 719 PG 084

6 CAROLYN M. MOOSE
DB 254 PG 255

7 THEODORE F. HUNEYCUTT
DB 2559 PG 135

TOE PROTECTION W/PSRM
STA. 204+25 TO 204+80 -L- REV LT
SEE DETAIL #2

SPECIAL CUT DITCH
STA. 204+98 TO 206+60 -L- REV LT
SEE DETAIL #3

ELIMINATE CUT DITCH
STA. 202+80 TO 203+30 -L-REV RT

DO NOT DISTURB SEWER LINES

SPECIAL CUT DITCH
STA. 206+00 TO 206+28 -L- REV RT
SEE DETAIL #3

0.6m BASE DITCH
EST DDE 9.7cm
SEE DETAIL #4

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST 8.4 SM FF

CLASS 'B' RIPRAP
EST 4.5 MTONS
EST 11.7 SM FF

-L- N 64° 20' 09.0" E

-L-REV N 64° 19' 01.3" E

68.580
N64°15'36"E

N65°40'55"W 86.948

S16°48'24"E 86.600

S6°58'23"E 155.873

S16°56'39"E 13.546

S16°56'19"E 117.480

60m TAPER

FOR -L-REV PROFILE, SEE SHEET 21
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 1/20/2010
USER NAME: USER

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	8
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

COAST REV.
R/W REV.

Prepared in the Office of:
AECOM
NC Firm License No. F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 (919) 854-6259(FAX)

NAD 83
NC GRID

MATCH LINE -L-REV STA.206+60 SEE SHEET 7

MATCH LINE -L-REV STA.210+40 SEE SHEET 9

207+00 208+00 209+00 210+00

-L- PINC STA. 207+51.955

-L- N 64°20'09.0" E

-L- N 64°19'27.0" E

-L-REV, N 64°19'01.3" E

71.621' N64°19'38"E

350.186' N64°19'38"E

(5) VIRGINIA McALLISTER SMITH
DB 719 PG 084

(8) GLENN T. JONES
TAMMY H. JONES
DB 2868 PG 211

(10) ETHELYN SMITH HEGELE
DB 719 PG 090

WESLEY G. DANGERFIELD
DB 1646 PG 120

(9) MURLEE A. SHORE
DB 470 PG 528

(7) THEODORE F. HUNEYCUTT
DB 2559 PG 135

(14) SUE REVELLE GARIFO
DB 957 PG 005
PB 24 PG 19

SPECIAL CUT DITCH
STA. 206+80 TO 207+81 -L-REV LT
SEE DETAIL #3

SPECIAL LAT V-DITCH
STA. 208+40 TO 208+80 -L- REV LT
SEE DETAIL #5

BL-1305 -BL- PINC 17+62.275 =
-L-REV Sta 207+94.202 (18.460 LT)
EL 198.527

LAT V-DITCH
STA. 208+80 TO 210+80 -L- REV LT
SEE DETAIL #6
EST 201 CM DDE

STANDARD BERM DITCH
STA.209+50 TO 210+00 -L- REV- RT
SEE PROFILE FOR GRADE

0.6m BASE DITCH
EST DDE 2.2 cm
SEE DETAIL #4

GRADE TO DRAIN

REMOVE

RELOCATE DRIVE

PRESET FENCE +20.000 40.400

PRESET FENCE +64.797 40.400

PRESET FENCE +99.798 28.900

END PRESET FENCE +70.561 28.900

BEGIN PRESET FENCE +99.704 43.437

CLASS 'B' RIPRAP
EST 4.5 MTONS EA.
EST 11.7 SM FF EA.

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

-LREV- +80.000 27.000 & 41.000 (88.582' & 134.513')

-LREV- +20.000 41.000 (134.51')

-LREV- +00.000 44.000 (144.36')

-LREV- +00.000 29.500 (96.784')

-LREV- +85.000 41.000 (135.51')

-LREV- +75.000 25.444 & 28.500 (83.48' & 93.50')

-LREV- +20.003 27.000 & 29.500 (88.582' & 96.784')

-LREV- +45.000 27.000 & 32.000 (88.582' & 104.99')

-LREV- +60.000 32.000 (104.99')

-LREV- +60.000 27.000 (88.582')

-LREV- +02.826 25.466 & 28.500 (83.55' & 93.50')

-LREV- +33.258 28.500 (93.50')

-LREV- +33.254 25.471 (83.566')

-LREV- +15.000 30.300 & 35.300 (99.409' & 115.81')

-LREV- +40.000 31.800 & 37.500 (104.331' & 123.031')

FOR -L-REV PROFILE, SEE SHEETS 21 & 22
FOR TEMP. RAMP B CONNECTOR, SEE SHEET 2-R
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

NC 49 T.S. DST

USER name
DGN: n:\roadway\proj\r2533cc_rdy_pen.l.dgn
DATE: 7/20/2010
TIME: 10:05:58 AM

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	9

HIGHWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5m 0 10m

CONST. REV.
R/W REV.

Prepared in the Office of: AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 (919) 854-6259(FAX)

BM 115 EL=181.692, N 184387 E 476886
LREV STA 212+45 36 LT
RR SPIKE IN BASE OF 375MM OAK TREE

NAD 83
NC GRID

ETHELYN SMITH HEGELE
DB 719 PG 090

STEVEN B. COCHRANE
DB 624 PG 497

WESLEY G. DANGERFIELD
DB 1646 PG 120

RIPRAP EMBANKMENT
EST. 12.1 MTONS
EST. 13.9 SM FF
SEE DETAIL #24

ECB, LLC
DB 3758 PG 037

JOHN RAY NOBLES, JR.
DB 521 PG 561

BL-1306 -BL- PINC 20+17.160 =
-L-REV Sta 210+49.080 (16.660 LT)
EL 189.386

BL-1307 -BL- PINC 21+82.498 =
-L-REV Sta 212+13.841(2.860 LT)
EL 182.774

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST 9.2 SM FF

LAT V-DITCH
STA. 208+80 TO 210+80
-L- REV LT
SEE DETAIL #6

LAT 0.6M BASE DITCH
W/CLASS 'B' RIPRAP
STA. 210+80 TO
212+10 -L- REV LT
EST 178 CM DDE
EST 164 MTONS RIPRAP
EST 339.7 SM FF
SEE DETAIL #18

LATERAL 1.2m BASE DITCH
W/CLASS 'B' RIPRAP
STA. 212+20 TO 213+00 -L-REV LT
SEE DETAIL #8
EST 242 CM DDE
EST 131 MTONS RIPRAP
EST 235.4 SM FF

SPECIAL LAT 0.6m BASE DITCH
STA. 213+00 TO 214+00 -L-REV LT
SEE DETAIL #9

SPECIAL CUT DITCH W/PSRM
STA. 214+00 TO 214+60 -L-REV LT
SEE DETAIL #10
EST 114.5 SM PSRM

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

-L- N 64°18'27.0" E

-L-REV N 64°19'01.3" E

RETAIN
COLLAR AND EXTEND
W/600 RCP
REMOVE
REMOVE EXISTING CULVERT
1@11m X 2.7m
3-SIDED BOX CULVERT
90.0m TAPER
TYPE 350
450 W/ ELBOWS
SHOP CURVED R=6.1m
CUT EXISTING WALL

STANDARD BERM DITCH
STA. 210+66 TO 211+60 -L-REV RT
SEE PROFILE FOR GRADE

BERM DITCH
W/CLASS 'B' RIPRAP
STA. 211+60 TO 211+95 -L-REV RT
SEE DETAIL #7
EST 23 MTONS RIPRAP
EST 47 SM FF

SPECIAL CUT DITCH W/PSRM
STA. 212+28 TO 212+40 -L-REV RT
SEE DETAIL #10
EST 54.4 SM PSRM

SUE REVELLE GARIFO
DB 957 PG 005
PB 24 PG 19

CHARLES GILBERT LENTZ, III
& wife JANET DIANE LENTZ
DB 3802 PG 116
PB 24 PG 19

LOUIS M. HELMS, JR.
DB 1434 PG 166

MATCH LINE -L-REV STA.210+40 SEE SHEET 8

MATCH LINE -L-REV STA.214+20 SEE SHEET 10

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -L-REV PROFILE, SEE SHEET 22
FOR -XOVER2- DETAILS, SEE SHEET 2-N
FOR TEMP. RAMP B CONNECTOR, SEE SHEET 2-R
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 1/22/2020
USER NAME: USER PROMPT
FILE: C:\Users\...\Roadway\sht\r2533cc_rdy_sht_02.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	10
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Prepared in the Office of: AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 (919) 854-6259(FAX)

SR 2690
EMPIRE DR.
-L-REV
NC 49
107/135 1/1 1/1 106/135
1/2
-Y-
SR 2590
EST. 2011/2031
ADT IN HUNDREDS

SHOPPING CENTER
-L-REV
NC 49
106/135 4/6 4/6 106/135
8/11
SHOPPING CENTER
EST. 2011/2031
ADT IN HUNDREDS

NAD 83
NC GRID

BM 1 EL=188.489, N 184635 E 477358
LREV STA 217+79 54 LT
RR SPIKE IN BASE OF 610MM RED OAK

MATCH LINE -L-REV STA.214+20 SEE SHEET 9

MATCH LINE -L-REV STA.218+00 SEE SHEET 11

MATCH LINE -Y- STA.11+00 SEE SHEET 15

215+00
216+00
217+00
218+00
1+00

BL-1308 -BL- PINC 24+79.008 =
-L-REV Sta 215+10.349 (1.62LT)
EL 187.580

-L- POT STA. 215+41.700 =
-Y- PI STA. 10+00.000
-L-REV POT Sta. 215+43.101 =
-Y- POT Sta. 10+10.537
Δ= 79°01' 27.7"

-L- PI STA. 216+06.473 LB =
-L- PI STA. 10+00.000 LA

-L-REV POT Sta. 216+40.000 =
RAMP B T.S Sta. 0+00.000
(14.2m LT.)

RAMP B SC Sta. 0+65.000

RAMP B
PIs Sta 0+43.348
θs = 4°39'19.0"
Ls = 65.000
LT = 43.348
ST = 21.680

RAMP B
PI Sta 1+29.065
Δ = 18°11'55.9" (LT)
L = 127.052
T = 64.065
R = 400.000
Se = 0.08 m/m

BL-1309 -BL- PINC 26+59.215 =
-L-REV Sta 216+90.527 (4.799 LT)
EL 188.665

-Y- PC Sta.10+12.369

PI STA. 10+56.392
Δ = 05°12'09.0" (LT)
Lc = 87.986
R = 969.000
T = 44.023
Se = 0.03 m/m
Ro = 33

N 64°19'01.3" E
-L- N 64°18'27.0" E LB
-L- N 64°18'27.0" E LA
-L-REV N 64°19'01.3" E

STANDARD BERM DITCH
STA. 215+00 TO 216+40-L-REV LT
SEE PROFILE FOR GRADE

STANDARD BERM DITCH
STA 217+80 TO 218+00 -L-REV LT
SEE PROFILE FOR GRADE

SPECIAL CUT DITCH W/PSRM
STA 214+00 TO 214+60 -L-REV LT
SEE DETAIL #10

-LREV-
+20.000
34.000
(111.549)
BEGIN C/A
BEGIN CHL. FENCE

-RAMP B-
+40.000
42.000
(137.795')

-RAMP B-
+20.000
26.000
(85.302')

PROP. CHL. FENCE

13 JOHN RAY NOBLES, JR.
DB 521 PG 561

12 ECB, LLC
DB 3758 PG 037

20 HORTON & CO.
DB 518 PG 474
PB 14 PG 16

21 F & H PROPERTIES LLC.
DB 2514 PG 200
PB 35 PG 27

22 H. KENNETH WILLIS & wife DIANE M. WILLIS and J. O. WILLIS & wife LLAGE HOYLE WILLIS
DB 1181 PG 106
PB 14 PG 17

19 NCDOT
DB 2158 PG 357

23 FENTON L. JONES
DB 547 PG 192
PB 14 PG 16

25 FRED M. WILLS
DB 546 PG 251
PB 14 PG 16

159 PRESTON A. GRAMMER, JR.
DB 3249 PG 145
PB 35 PG 27

WOODS

450 W/ELBOWS

90.0m TAPER

REMOVE HW
FILL W/FLOWABLE MATERIAL

REMOVE +/- 2m

REMOVE

450 RCP
375 RCP
600
375

2GI
2GI-A
FS
BDG

12m PAVED SHLDR.
7.2m
4.0m MED.
3.6m
7.0m
2.4m

125mm CONCRETE ISLAND

GRADE TO DRAIN

SEAL ABANDONED WELL

30m UNIFORM LT & RT

PINE CROSS DRIVE
5.5 BST

-LREV-
+10.000
28.000
(91.862')

-LREV-
+16.338
33.000
(108.266')

-LREV-
+55.000
28.000 & 33.000 & 35.00
(91.862' & 108.266' & 114.830')

-LREV-
+67.029
63.710
(209.022')

-LREV-
+85.443
40.000
(131.233')

-LREV-
±00.000
40.000
(131.232')

-LREV-
+45.000
31.000
(101.708')

-LREV-
+80.000
31.000 & 38.000
(101.706' & 124.671')

-Y-
+55.000
18.000
(59.055')

-Y-
+86.200
18.458
(60.558')

-Y-
+91.969
17.500
(57.415')

EXISTING R/W

10.833m TYP.

84.592 N64°18'27"E

FOR -L-REV PROFILE, SEE SHEETS 22 & 23
FOR -Y- PROFILE, SEE SHEET 26
FOR RAMP B PROFILE, SEE SHEET 28
FOR INTERSECTION DETAIL -L-REV & -Y-, SEE SHEET 2-G
FOR -XOVER2- DETAILS, SEE SHEET 2-N
FOR TEMP. RAMP B CONNECTOR, SEE SHEET 2-R
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 1/30/2014
USER: mbaldwyn
DGN: V:\2533cc_rdy_set_R.dgn

RW Sheet 9

PROJ. REFERENCE NO. A-2533C
SHEET NO. 11
HIGHWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

PRELIMINARY PLANS
NO RIGHT WAY FOR CONSTRUCTION

SCALE 1:2000 on 914 mm Drawing or 1:2400 on 1067 mm Drawing

CONSTRUCTION
R/W REV.

AECOM
AECOM 2840 Plaza Place Suite 400 Raleigh, NC 27612 919-854-6200 FAX 919-854-6259 www.aecom.com

MATCH LINE SEE SHEET 18

MARSHALL POPLIN DB 345 PG 63 DB 361 PG 679 DB 255 PG 078

DITCH NOTES
1. SPECIAL LAT. 0.6m DITCH W/CLASS 'B' RIP RAP STA. 11+50 TO 12+03 -Y1-REV RT SEE DETAIL #11
2. LAT. BASE DITCH W/CLASS 'B' RIP RAP STA. 11+55 TO 12+10 -Y1-REV LT SEE DETAIL #18
3. SPECIAL CUT DITCH W/SPAN STA. 11 +60 TO 11+83 -Y1-REV RT SEE DETAIL #10
4. SPECIAL CUT DITCH W/SPAN STA. 11 +60 TO 11+84 -Y1-REV RT SEE DETAIL #10
5. SPECIAL LAT. V-DITCH STA. 16+45 TO 17+90 -Y1-REV RT SEE DETAIL #5
6. SPECIAL CUT DITCH W/SPAN STA. 16+53 TO 18+00 -Y1-REV LT SEE DETAIL #10
7. LAT. V- DITCH W/CLASS 'B' RIPRAP STA. 31+60 TO 32+96 -RAMP A- RT, EST. 8 CM DOE EST. 52 METONS RIPRAP, EST. 429 SM F.F. SEE DETAIL#17
8. LAT. 0.6m BASE DITCH W/CLASS 'B' RIP RAP STA. 4+10 TO 4+43 -RAMP A- RT, EST. 51 CM DOE EST. 52 METONS RIPRAP, EST. 1097 SM F.F. SEE DETAIL #18

-Y1-REV
PI Sta 12+03.649
Δ = 124.863°
Lc = 55.004
R = 60.000
Se = 0.04 m/m

-Y1-REV
PI Sta 12+97.078
Δ = 27.041°
Lc = 44.000
R = 93.000
ST = 23.338

-Y1-REV
PI Sta 15+80.724
Δ = 124.863°
Lc = 55.004
R = 60.000
ST = 35.075

-Y1-REV
PI Sta 16+92.496
Δ = 124.863°
Lc = 55.004
R = 60.000
Se = 0.07 m/m

RAMP B
PI Sta 14+29.055
Δ = 27.533° (LT)
Lc = 44.000
R = 91.500
Se = 0.08 m/m

RAMP B
PI Sta 14+73.132
Δ = 124.863°
Lc = 55.004
R = 60.000
ST = 21.880

RAMP A
PI Sta 0+68.548
Δ = 124.863°
Lc = 55.004
R = 60.000
ST = 21.880

RAMP A
PI Sta 2+23.581
Δ = 27.533° (RT)
Lc = 44.000
R = 91.500
Se = 0.08 m/m

RAMP A
PI Sta 3+44.589
Δ = 124.863°
Lc = 55.004
R = 60.000
ST = 21.880

RAMP A
PI Sta 4+24.642
Δ = 124.863°
Lc = 55.004
R = 60.000
ST = 21.880

RAMP A
PI Sta 4+82.796
Δ = 27.533° (LT)
Lc = 44.000
R = 91.500
Se = 0.08 m/m
Ro = 55

RAMP A PRS Sta. 3+87.703

RAMP A SC Sta. 41+42.709

RAMP A CS Sta. 3+22.709

RAMP A SC Sta. 1+20.000

SKETCH SHOWING PROPOSED BRIDGE WIDTH IN RELATION TO PAVEMENT
NOT TO SCALE

ECB, LLC DB 3758 PG 037

STANDARD BERM DITCH STA. 2+20.10 TO 2+80 -RAMP- LT SEE PROFILE FOR GRADE

STD. BERM DITCH STA. 1+63 TO 2+11 -RAMP- LT SEE PROFILE FOR GRADE

RAMP B CS Sta. 1+92.052

RAMP B SC Sta. 2+57.052

GEORGE F. McALLISTER & wife BARBARA C. McALLISTER DB 3384 PG 199

-Y1- PC Sta. 12+05.820

-Y1-REV PI Sta. 12+92.496
-Y1-REV PC Sta. 12+05.820
-Y1-REV PT Sta. 13+80.320

RAMP A PT Sta. 6+30.280
-Y1- PI Sta. 10+48.444
-Y1- PC Sta. 12+00.000

-Y1- PT Sta. 13+80.320

-Y1-REV PI Sta. 13+49.195
-Y1-REV PC Sta. 13+35.820
-Y1-REV PT Sta. 13+80.320

LARRY WAYNE WHITLEY DB 588 PG 196

SPEC LAT V-DITCH STA. 14+50 TO 16+16 -RAMP- LT SEE DETAIL #3

M. RILEY HORTON DB 291 PG 064 DB 510 PG 033

SEAL ABANDONED WELL

-Y1- PI Sta. 10+34.860
Δ = 124.863° (RT)
Lc = 55.004
R = 60.000
Se = 0.08 m/m
Ro = 34.000

MILLS RILEY HORTON DB 548 PG 695

HARRY M. FAGGART DB 239 PG 44 DB 496 PG 68

CAROL W. KENMOUR DB 498 PG 85

SUE ANN LAMBERT DB 496 PG 62

ECB, LLC DB 3758 PG 037

STANDARD BERM DITCH STA. 2+10.10 TO 2+80 -RAMP- LT SEE PROFILE FOR GRADE

STD. BERM DITCH STA. 1+63 TO 2+11 -RAMP- LT SEE PROFILE FOR GRADE

RAMP B CS Sta. 1+92.052

RAMP B SC Sta. 2+57.052

GATHA C. AUSTIN DB 322 PG 242

-Y1-REV PI Sta. 13+49.195
-Y1-REV PC Sta. 13+35.820
-Y1-REV PT Sta. 13+80.320

-Y1-REV PI Sta. 13+80.320
-Y1-REV PC Sta. 13+80.320
-Y1-REV PT Sta. 14+27.340
Δ = 62° 00' 22"

-Y1-REV PI Sta. 14+85.855
BEGIN APPROACH SLAB
-Y1-REV PI Sta. 13+93.190
BEGIN BRIDGE

-L-REV PI Sta. 15+31.495
-L-REV PC Sta. 221+40.200
-Y1- PI Sta. 14+11.441

-L-REV N. 64° 19' 01" E.

-L-REV PI Sta. 221+70.114
-Y1-REV PT Sta. 14+27.340
Δ = 62° 00' 22"

-Y1-REV PT Sta. 14+68.640
END BRIDGE

-L-CRV PT Sta. 14+73.685
APPROACH SLAB

-L-REV PI Sta. 222+15.360
-Y1-REV PC Sta. 14+23.135
Δ = 90° 00' 00"
D = 14.2 m (RT)

-Y1-REV PT Sta. 15+04.641

-Y1-REV PI Sta. 15+15.641
-Y1-REV PC Sta. 15+28.562
-Y1-REV PT Sta. 15+71.562
Δ = 100° 00' 00"

-Y1-REV PI Sta. 16+21.395
-Y1-REV PC Sta. 16+08.562
-Y1-REV PT Sta. 16+51.562
Δ = 90° 01' 39.5"

-Y1-REV SC Sta. 15+15.641

-Y1-REV PI Sta. 10+00.000
-Y1-REV PT Sta. 11+80.000
BEGIN CONST.
Δ = 86° 15' 41.8" (LT)

-Y1-REV PI Sta. 10+37.152
-Y1-REV PC Sta. 10+00.000
-Y1-REV PT Sta. 11+90.000
Δ = 90° 00' 00.2"

-Y1- PI Sta. 11+68.392

-Y1- PI Sta. 11+45.745
Δ = 6° 31' 01.00" (LT)
Lc = 60.054
R = 527.000
ST = 410.587

-Y1- PI Sta. 11+97.809
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 12+55.536
Δ = 26° 42' 14" (LT)
Lc = 58.178
R = 125.000
Se = 0.08 m/m
Ro = 50.000

-Y1- PI Sta. 12+86.866
Δ = 26° 42' 14" (LT)
Lc = 58.178
R = 125.000
Se = 0.08 m/m
Ro = 50.000

-Y1- PI Sta. 13+45.375
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 13+76.745
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 14+08.115
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 14+39.485
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 14+70.855
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 15+02.225
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 15+33.595
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 15+64.965
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 16+96.335
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 16+27.705
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 16+59.075
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 16+90.445
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 17+21.815
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 17+53.185
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 17+84.555
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 18+15.925
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 18+47.295
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 18+78.665
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 19+10.035
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 19+41.405
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 19+72.775
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 20+04.145
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 20+35.515
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 20+66.885
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 21+98.255
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 21+29.625
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 21+60.995
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 21+92.365
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 22+23.735
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 22+55.105
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 22+86.475
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 23+17.845
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 23+49.215
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 23+80.585
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 24+11.955
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 24+43.325
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 25+74.695
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 25+06.065
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 25+37.435
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 25+68.805
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 26+00.175
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 26+31.545
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 26+62.915
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 26+94.285
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 27+25.655
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 27+57.025
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 28+88.395
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 28+19.765
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 28+51.135
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 29+82.505
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 29+13.875
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 29+45.245
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 30+76.615
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 30+07.985
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 30+39.355
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 31+70.725
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 31+02.095
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 31+33.465
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 32+64.835
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 32+96.205
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 33+27.575
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 33+58.945
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 34+90.315
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 34+21.685
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 34+53.055
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 35+84.425
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 35+15.795
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 35+47.165
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 36+78.535
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 36+09.905
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 36+41.275
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 37+72.645
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 37+04.015
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 37+35.385
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 38+66.755
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 38+98.125
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 39+29.495
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 39+60.865
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 40+92.235
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 40+23.605
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 40+54.975
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 41+86.345
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 41+17.715
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 41+49.085
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 42+80.455
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 42+11.825
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 42+43.195
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 43+74.565
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 43+05.935
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 43+37.305
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 44+68.675
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 44+00.045
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 44+31.415
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 45+62.785
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 45+94.155
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 46+25.525
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 46+56.895
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 47+88.265
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 47+19.635
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 47+51.005
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 48+82.375
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 48+13.745
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 48+45.115
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 49+76.485
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 49+07.855
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 49+39.225
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 50+70.595
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 50+01.965
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 50+33.335
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 51+64.705
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 51+96.075
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 52+27.445
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 52+58.815
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 53+90.185
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 53+21.555
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 53+52.925
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 54+84.295
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 54+15.665
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 54+47.035
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 55+78.405
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 55+09.775
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 55+41.145
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 56+72.515
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 56+03.885
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 56+35.255
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 57+66.625
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 57+97.995
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 58+29.365
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 58+60.735
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 59+92.105
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 59+23.475
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 59+54.845
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 60+86.215
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 60+17.585
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 60+48.955
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 61+80.325
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 61+11.695
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 61+43.065
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 62+74.435
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 62+05.805
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 62+37.175
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 63+68.545
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 63+99.915
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 64+31.285
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 64+62.655
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 64+94.025
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 65+25.395
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 65+56.765
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 66+88.135
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 66+19.505
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 66+50.875
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 67+82.245
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 67+13.615
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 67+44.985
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 68+76.355
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 68+07.725
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 68+39.095
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 69+70.465
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 69+01.835
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 69+33.205
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 70+64.575
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 70+95.945
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 71+27.315
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 71+58.685
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 72+90.055
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 72+21.425
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 72+52.795
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 73+84.165
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 73+15.535
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 73+46.905
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 74+78.275
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 74+09.645
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 74+41.015
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 75+72.385
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 75+03.755
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 75+35.125
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 76+66.495
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 76+97.865
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 77+29.235
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 77+60.605
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 77+91.975
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 78+23.345
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 78+54.715
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 78+86.085
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 79+17.455
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 79+48.825
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 80+80.195
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 80+11.565
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 80+42.935
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 81+74.305
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 81+05.675
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 81+37.045
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 82+68.415
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 82+99.785
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 83+31.155
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 83+62.525
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 84+93.895
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 84+25.265
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 84+56.635
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 85+88.005
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 85+19.375
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 85+50.745
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 86+82.115
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 86+13.485
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 86+44.855
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 87+76.225
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 87+07.595
Δ = 71° 54' 42" (LT)
Lc = 56.699
R = 45.000
ST = 32.343

-Y1- PI Sta. 87+38.965
Δ = 71° 54' 42" (

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	12
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

BM A EL=207.539 N 185039 E 478276
-L-REV STA 227+81.21 LT
RR SPIKE IN BASE OF POWER PLANT

NAD 83
NC GRID

-L-REV POT Sta. 226+90.000 = RAMP A POT Sta. 0+00.000 (14.2m LT)
Δ = 2°18'00.0" RT.

-SERI- POT Sta. 9+41.825
BEGIN CONSTRUCTION

RAMP A
PIs Sta 0+98.348
Θs = 4°39'19.0"
Ls = 65.000
LT = 43.348
ST = 21.680

-SERI-
PI Sta 11+33.910
Δ = 83°58'01.5" (RT)
L = 29.310
T = 17.998
R = 20.0000
Se = NC

-SERI-
+15.912
12.000
(39.370')

-L-REV
PIs Sta 228+47.742
Θs = 1°29'40.8"
Ls = 60.000
LT = 40.001
ST = 20.001

-L-REV
PI Sta 230+76.772
Δ = 20°36'14.0" (RT)
L = 413.547
T = 209.031
R = 1150.000
Se = 0.05 m/m

-SERI- PC Sta. 11+15.912

-L- PC STA. 22+04.587

BL-134 -BL- PINC 36+62.144 =
-L-REV Sta 226+91.617 (3.044 LT)
EL 205.496

NCGS TRIBUNE -BL- PINC 38+91.535 =
-L-REV Sta 229+19.814 (15.216 LT)
EL 212.791

-SERI- PT Sta. 11+45.223

-L-REV POT Sta. 0+00.000
RAMP D T.S. Sta. 0+00.000
(14.2m RT.)

-L-REV POT Sta. 228+52.165
-SERI- T.S. Sta. 11+62.168
-L-REV T.S. Sta. 228+07.741

RAMP D
PIs Sta 0+43.348
Θs = 4°39'19.0"
Ls = 65.000
LT = 43.348
ST = 21.680

-L-
PI STA. 24+47.789
Δ = 23°36'10.0" (RT)
Lc = 479.505
R = 1164.000
T = 243.202

DENOTES REMOVAL OF EXISTING PAVEMENT

MARVIN A. WETTER
DB 251 PG 088

COY E. COLEY
DB 405 PG 376
DB 519 PG 247

LACY B. HURLOCKER
DB 399 PG 397

HARRY H. FAGGART
DB 239 PG 44
DB 496 PG 618

MATH B. WHITLEY
DB 296 PG 182

JULIA I. KRIMMINGER
DB 171 PG 187
DB 202 PG 104
DB 198 PG 162

EDITH KATHLEEN HONEYCUTT
DB 258 PG 006
PB 8 PG 38

HUGH VONCANNON
DB 202 PG 083

DAVID M. YARBOROUGH
DB 604 PG 048
DB 616 PG 100

HMO INVESTMENTS, INC.
DB 695 PG 145

NCDOT
DB 795 PG 397

WALDO E. HELMS
DB 623 PG 715

MARVIN E. WILDER
DB 526 PG 168

ROBERT E. LEE ALLMAN
DB 412 PG 313

LAWRENCE E. EUDY
DB 259 PG 298
DB 535 PG 140

EDWARD F. LEGAL
DB 207 PG 11

HARRY H. FAGGART
DB 475 PG 666

ROBERT E. LEE ALLMAN
DB 412 PG 313

SEAL ABANDONED WELL

400 W/ ELBOWS

SPECIAL CUT DITCH
STA. 9+85 TO 10+72 -SERI- LT
SEE DETAIL #3

END C/A & END FENCE
-LREV-
+90.000
25.796
(84.633')

LAT V-DITCH
STA 11+19 TO 11+40 -SERI- LT
SEE DETAIL #6

LAT V-DITCH
STA 228+13 TO 228+60 -L-REV LT
EST 40 CM DDE
SEE DETAIL #6

300m UNIFORM TRANSITION LT. & RT.
MEDIAN

SPEC. LAT. V-DITCH
STA. 228+60 TO 229+40 -L-REV LT
SEE DETAIL #5

REMOVE HW
FILL W/FLOWABLE MATERIAL

REMOVE +/- 5m
FILL W/FLOWABLE MATERIAL

CLASS 'B' RIPRAP
EST 4.5 MTONS
EST 11.7 SM FF

CLASS 'I' RIPRAP
EST 6.4 MTONS
EST 12.5 SM FF

RAMP A TS Sta. 0+55.000

RAMP A S 66°37'01.3" W

-L- N 64°18'27.0" E

-L-REV N 64°19'01.3" E

RAMP D S 64°19'01.3" W

PROP. CHL FENCE 89.0m TAPER

90.0m TAPER-LANE DROP

-L-REV SC Sta. 228+67.41

(15') 4.572 DESIGNATED ALLEY WAY

MATCH LINE -L-REV STA.226+00 SEE SHEET 11

MATCH LINE -L-REV STA.229+80 SEE SHEET 13

FOR TRAFFIC DIAGRAM OF SERVICE ROAD (-SERI-), SEE SHEET 13

FOR -L-REV PROFILE, SEE SHEET 24
FOR -SERI- PROFILE, SEE SHEET 26
FOR RAMP A PROFILE, SEE SHEET 27
FOR RAMP D PROFILE, SEE SHEET 29
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 7/29/2020
FILE: NCDOT_R2533CC_rdy_sht_12.dgn
USER: rrose
DGN: N:\Roadway\proj\2533cc_rdy_sht_12.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	13
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-5259(FAX)

CONST. REV.
R/W REV.

HUGH VONCANNON
DB 202 PG 083

-L-
PI STA. 24+47.789
= 23° 36' 10.0" (RT)
Lc = 479.505
R = 1164.000
T = 243.202

-L-REV
PI Sta 230+76.772
Δ = 20° 36' 14.0" (RT)
L = 413.547
T = 209.031
R = 1150.000
Se = 0.05 m/m

-L-REV
PIs Sta 233+01.289
Θs = 1° 29' 40.8"
Ls = 60.000
LT = 40.001
ST = 20.001

-Y2-REV
PI Sta 10+65.358
Δ = 9° 19' 15.9" (LT)
L = 39.369
T = 19.728
R = 242.000

-Y2-REV
PI Sta 11+22.399
Δ = 32° 05' 59.4" (LT)
L = 72.832
T = 37.399
R = 130.000
Se = 0.06 m/m
Ro = 30

-Y2-
PI STA. 10+85.460
Δ = 18° 41' 33.0" (LT)
Lc = 78.952
R = 242.000
T = 39.830

NAD 83
NC GRID

BEGIN CONSTRUCTION
-Y2-REV POC Sta.10+52.500

DO NOT DISTURB SEPTIC SYSTEM

SEPTIC LEACH LINE LOCATION BY USE OF GROUND PENETRATING RADAR AND PROPERTY OWNER TESTIMONY

-Y2-REV POC Sta.10+60.000

DO NOT DISTURB SEPTIC SYSTEM

-Y2-REV PT Sta.10+20.000

-Y2- PC STA. 10+45.630

-Y2-REV PC Sta.10+45.630

-Y2-REV PCC Sta.10+84.939

-Y2-REV PT Sta.11+57.831

-L-REV POC Sta.231+46.781 =
-Y2-REV PT Sta.11+57.831
Δ= 79° 13' 7.1"

-L-REV CS Sta. 232+81.288

-L-REV POC Sta. 232+36.562 =
-Y3- POT Sta. 10+01.541
Δ= 66° 54' 48.3"

-L- POC STA. 25+31.250 =
-Y2- PI STA. 11+60.000

-L- POC STA. 26+33.400 =
-Y3- PI STA. 10+000

-Y3- PC Sta. 11+02.225

-Y3- POC Sta. 11+07.500
END CONSTRUCTION

-Y3- PT Sta. 11+51.245

-Y3- POT Sta. 11+00.000

-Y3-
PI STA. 11+26.766
Δ = 07° 05' 33.0" (RT)
Lc = 49.020
R = 396.000
T = 24.541

MATCH LINE -L-REV STA 229+80 SEE SHEET 12

MATCH LINE -L-REV STA.233+40 SEE SHEET 14

BM 5 EL=217.201, N 185154 E 478634
LREV STA 231+54 13 LT
RR SPIKE IN BASE OF POWER POLE

SPEC BACK OF CURB CUT DITCH
STA. 231+80 TO 232+20 -L-REV LT
STA. 232+30 TO 232+50 -L-REV LT
STA. 232+60 TO 233+04 -L-REV LT
SEE DETAIL #20

(58) NO CLAIM
JAMES D. HONEYCUTT
DB 240 PG 335
PB 8 PG 36

EDITH KATHLEEN HONEYCUTT
DB 258 PG 006
PB 8 PG 38

(59) WILLIAM R. HONEYCUTT, JR.
DB 258 PG 008
PB 8 PG 38

(60) THYRA E. DRYE
DB 549 PG 184
PB 8 PG 14

JOHN J. HILL
DB 508 PG 618
PB 8 PG 14

VANCE E. MILLER
DB 409 PG 243
PB 8 PG 14

GLORIA PETREA GRIFFIN
DB 537 PG 012
PB 8 PG 14

RETHER FRICK
DB 157 PG 072
PB 8 PG 14

(61) EDITH H. EAGLE
DB 199 PG 152
PB 8 PB 38

(62) BARBARA K. McCLESTER
DB 349 PG 98
PB 8 PB 14

(63) JENNIFER R. & HYDRICK STONE
DB 2566 PG 320
PB 8 PB 14

(64) JEFFERY LEE ALLMAN
DB 862 PG 008
PB 8 PB 14

(65) CAROLYN E. EUDY
DB 261 PG 206
PB 8 PG 13

(66) ROBERT E. ALLMAN
DB 282 PG 069
PB 8 PB 14

(67) OLA MAE McCLESTER
DB 342 PG 244

(68) DOUGLAS H. STEADMAN
DB 2187 PG 220
PB 8 PB 14

(69) ROBERT E. ALLMAN
DB 899 PG 89
PB 8 PB 14

ROBERT E. LEE ALLMAN
DB 412 PG 313

(57) ROBERT E. LEE ALLMAN
DB 412 PG 313

EDITH KATHLEEN HONEYCUTT
DB 258 PG 006
PB 8 PG 38

BL-1316 -BL- PINC 40+98.229 =
-L-REV Sta 24+24.173 (14.089 LT)
EL 216.912

BL-1317 -BL- PINC 42+27.926 =
-L-REV Sta 232+51.077 (12.655 (RT), EL 214.806

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST 8.4 SM FF

CLASS 'B' RIPRAP
EST 2.7 MTONS
EST 9.2 SM FF

REMOVE DI
COLLAR AND EXTEND
W/600 RCP

COLLAR AND EXTEND
W/600 RCP

SR 2421
NORTH DR.
SKYLAND DR.
SERVICE RD.*1

-SER1-
SER. RD.

-Y2-REV
SR 2421

-L-REV
NC 49

-Y3-
SR 2421

EST. 2011/2031
ADT IN HUNDREDS

FOR -L-REV PROFILE, SEE SHEETS 24 & 25
FOR -Y2-REV PROFILE, SEE SHEET 31
FOR -Y3- PROFILE, SEE SHEET 31
FOR INTERSECTION DETAIL -L-REV/ -Y2-REV & -L-REV/ -Y3-, SEE SHEET 2-1
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

USER: mtaylor
DGN: mtaylor\rw\r2533cc_rdy_sht_13.dgn
DATE: 1/28/2014

METRIC	PROJ. REFERENCE NO.	SHEET NO.
5m 0 10m	R-2533CC	14
CONST.REV.	HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R/W REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

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(919) 854-6200 - (919) 854-6259(FAX)

MATCH LINE -L-REV STA.233+40 SEE SHEET 13

JOHN HINSON
DB 246 PG 159
PB 8 PG 14

RETHER FRICK
DB 157 PG 072
PB 8 PG 14

49.512 S82°35'05"W
123.092 S45°58'29"W
EIP

64 JEFFERY LEE ALLMAN
DB 862 PG 008
PB 8 PB 14

122.06 N0°16'55"E

MT. PLEASANT CITY LIMITS

234+00

END T.I.P. PROJECT R-2533CC
-L-REV POT Sta 234+20.000

END CONSTRUCTION
-L-REV POT Sta 234+65.000

-L-REV ST Sta. 233+41.288

TOE PROTECTION
STA. 233+30 TO 234+30 -L-REV LT
EST 129 MTONS CLASS 'B' RIPRAP
EST 268 SM FF
SEE DETAIL #1

CLASS 'B' RIPRAP
EST 0.9 MTONS
EST 4.2 SM FF

REMOVE HEADWALL COLLAR AND EXTEND

REMOVE HEADWALL COLLAR AND EXTEND

-LREV- +20.000 15.240 & 26.000 (49.998' & 85.302')

-LREV- +42.000 23.500 (77.100')

-LREV- +51.000 16.000 (52.493')

100m TAPER

60m TAPER

EXISTING R/W

TYPE 350

375 W/ELBOWS

-L- N 87°54'37.0" E

-L-REV N 87°54'37.0" E

RETAIN

RETAIN

REMOVE EXISTING GUARDRAIL

100m TAPER

20m TAPER LT.& RT.

-LREV- +41.288 19.000 (62.336')

-LREV- +60.000 30.000 (98.425')

-LREV- +60.000 19.000 & 40.000 (62.336' & 131.234')

CLASS 'I' RIPRAP
EST 6.4 MTONS
EST 12.5 SM FF

CLASS 'I' RIPRAP
EST 6.4 MTONS
EST 12.5 SM FF

CLASS 'I' RIPRAP
EST 3.6 MTONS
EST 8.4 SM FF

450 W/ELBOWS

BL-318 -BL- POT 43+90.582 =
-L-REV Sta 234+13.751 29.116 RT)
EL 21.449

-LREV- +20.002 19.000 & 48.000 (62.336' & 131.234')

71A FIRST BANK
DB 4137 PG 069

LAT. 0.6m BASE DITCH
W/CLASS 'B' RIPRAP
STA. 233+71 TO 233+97 -L-REV RT
EST 23 CM DDE
EST 33 MTONS RIPRAP
EST 67.9 SM FF
SEE DETAIL #18

ROBERT E. ALLMAN
DB 282 PG 069
PB 8 PB 14

-L-REV
Pls Sta 233+01.289
Θs = 1°29'40.8"
Ls = 60.000
LT = 40.001
ST = 20.001

69 ROBERT E. ALLMAN
DB 899 PG 89
PB 8 PB 14

ROBERT E. ALLMAN
DB 282 PG 069
PB 8 PB 14

DONALD LUTHER SCOTT
DB 813 PG 392

RONALD McCLESTER
DB 653 PG 252

73 RONALD WAYNE McLESTER
DB 566 PG 267
DB 506 PG 482

D. G. DEVELOPEMENT PROPERTIES, INC.
DB 4788
PG 308

71 FISHER EARNHARDT OIL CO.
DB 381 PG 563

EDWIN L. EARNHARDT SR.
DB 883 PG 180
PB 08 PG 040

JERRY O. GORDON
DB 451 PG 322

RALPH F. EUDY
DB 428
PG 343

70 BOARD OF EDUCATION OF CABARRUS COUNTY
DB 228 PG 192
DB 235 PG 141
DB 212 PG 068

NAD 83 NC GRID

235+00 236+00 237+00

-LREV- +65.000 19.000 (62.336')

-LREV- +40.000 19.357 (63.507')

-LREV- +80.000 17.600 (57.743')

-LREV- +00.000 19.000 (62.336')

-LREV- +20.000 23.808 (81.365')

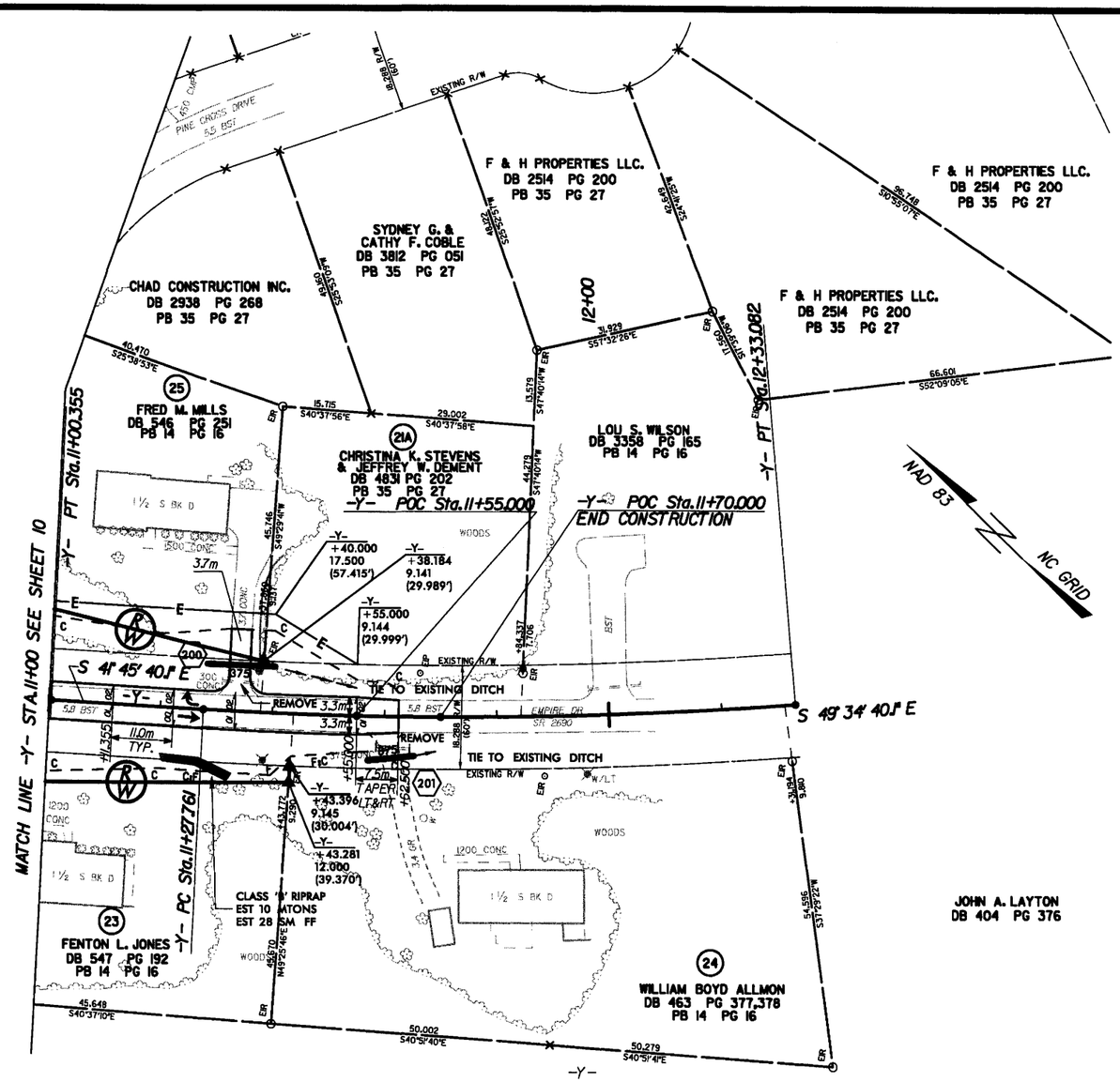
-LREV- +40.000 30.800 (101.050')

-L-REV- +60.000 20.000 (65.617')

FOR -L-REV PROFILE, SEE SHEET 25
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 12/22/2010
TIME: 04:44:44 PM
USER: mmoon
DGN: C:\Documents and Settings\mmoon\Desktop\proj\R-2533cc_rdy_pen_Hdgn



FOR -Y- PROFILE, SEE SHEET 26
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

METRIC

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	15
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5m 0 10m

CONST. REV.
R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259 (FAX)

DATE: 7/20/2010
FILE: U:\Data\R\2533cc\roadway\rdy_path15.dgn
USER: rosec
DGN: N:\Roadway\rdy\R2533cc_rdy_path15.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	16
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259 (FAX)

METRIC

BETTY L. KELLY
DB 711 PG 313

MARGIE CRAMER
78-E-367

-Y1-
PI STA. 10+89.294
Δ = 12° 10' 13.0" (RT)
Lc = 91.762
R = 432.000
T = 46.054

-Y1-REV
PIs Sta 11+15.229
Θs = 2° 30' 24.1"
Ls = 70.000
LT = 46.671
ST = 23.338

-Y1-REV
PI Sta 12+03.642
Δ = 9° 18' 07.8" (RT)
L = 129.883
T = 65.084
R = 800.000
Se = 0.04 m/m

-Y16-REV
PI Sta 12+91.085
Δ = 38° 07' 41.0" (LT)
L = 33.275
T = 17.280
R = 50.000
Se = 0.06 m/m
Ro = 41.25

(137) HELEN SMITH ALLEN
DB 788 PG 102

NAD 83 NC GRID

-Y1-REV TS Sta. 10+68.558

-Y1-REV POT Sta. 9+30.969

-Y1-REV POT Sta. 10+00.000

-Y1-REV POT STA.10+43.240 = -Y1- PC STA.10+43.240

-Y1-REV POT Sta.9+60.000
BEGIN CONSTRUCTION

-Y1-REV POT Sta.9+79.85

-Y1-REV PT STA. 10+90.000

-Y16-REV PT Sta.13+07.080
S 39° 16' 00.0" W

-Y16-REV POT Sta.13+39.080

-Y1-REV POS Sta.11+35.000 = -Y16-REV POT Sta.13+39.080
Δ=74° 59' 58.09"

MATCH LINE -Y16-REV STA.13+00 SEE SHEET 18

MATCH LINE -Y1-REV STA.11+80 SEE SHEET 17

S 67° 58' 31.9" E -Y1-REV

TO CONCORD

RETAIN

REMOVE

600 W/ELBOWS

180m TAPER
600 LANE DROP

60m TAPER
ADD LANE

210m UNIFORM TRANSITION LT.& RT.
MEDIAN

-Y1REV-
+71.685
9.144 & 22.943
(29.999' & 75.288')

-Y1REV-
+60.000
9.144 &13.000
(30.00' & 42.651')

-Y1REV-
+71.685
9.145 &13.00 &23.000
(30.002' &42.651 &75.460')

-Y1REV-
+29.503
23.000
(75.480')

-Y16REV-
+00.000
12.000
(39.370')

-Y1REV-
+00.000
23.000 (75.459')

CLASS 'I' RIPRAP
EST 10 MTONS
EST 18.4 SM FF
SPEC. LAT. 0.6m DITCH
W/CLASS 'B' RIPRAP
STA. 11+20 TO 12+03 -Y1-REV RT
EST 75 MTONS RIPRAP
EST 200.6 SM FF
SEE DETAIL #11

CLASS 'B' RIPRAP
EST 4.5 MTONS
EST 11.7 SM FF

BEGIN C/A &
BEGIN CHL FENCE
-Y1REV-
+60.000,
24.000
(78.740')

BEGIN C/A &
BEGIN CHL FENCE
-Y1REV-
+60.000
28.611
(93.868')

-Y1-REV SC Sta.11+38.558

(28) MARSHALL POPLIN
DB 345 PG 101
DB 383 PG 679
DB 255 PG 078

LATERAL 0.6m BASE DITCH
W/CLASS 'B' RIPRAP
STA 11+55 TO 12+10 -Y1-REV LT
EST 56 CM DDE
EST 69 MTONS RIPRAP
EST 143.7 SM FF
SEE DETAIL #18

GEORGE F.McALLISTER & WIFE
BARBARA C. McALLISTER
DB 3384 PG 199
(27A)

(27) ROBIN ANN McALLISTER
DB 3434 PG 113

(139) D.J. HONEYCUTT
DB 320 PG 090

O.H. GOODMAN
DB 311 PG 064

MARION HYMAN
DB 265 PG 157

FOR TRAFFIC DIAGRAM OF -Y16-REV (RADCLIFF RD), SEE SHEET 11

FOR -Y1-REV PROFILE, SEE SHEET 30
FOR -Y16-REV PROFILE, SEE SHEET 32
FOR INTERSECTION DETAIL -Y1-REV/ -Y16-REV, SEE SHEET 2-G
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 1/22/2014 10:52:20 AM
USER: rmeadows
DGN: N:\roadway\r\r2533cc_rdy_pet_16.dgn

METRIC

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	17

HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

NAD 83
NC GRID

MATCHLINE -Y1-REV STA 16+60 SEE SHEET 11

-Y1-REV CS Sta. 17+80.241

-Y1-REV ST Sta. 18+85.241

-Y1-REV PT STA. 19+00

WILLIAM F. PULLIUM
DB 388 PG 577

(43) EDWARD L. HONEYCUTT
DB 355 PG 179
PB 13 PG 48

(144) RONNIE EUGENE SMITH
DB 407 PG 315
SPEC. LAT. V-DITCH
STA 16+40 TO 17+00 -Y1-REV RT
SEE DETAIL #5

(145) BILLIE L. HONEYCUTT
DB 368 PG 160

(45) JERRY M. COOK
DB 595 PG 418

(46) PATRICIA P. HARRINGTON
DB 569 PG 458

(146) KAYE S. SIMPSON
DB 730 PG 427

(140) NEAL GLENN WHICKER, SR.
DB 3835 PG 3

(141) CHRISTOPHER M. GILLIN
DB 1777 PG 87

(142) RICK L. EUDY & NANCY E KLUTZ
DB 259 PG 298
DB 535 PG 140

(147) PAM ROWE & JACK LATHAM
DB 1909 PG 246

(148) BILLY RAY HATLEY
DB 264 PG 139

(149) GRADY R. BARRINGER
DB 451 PG 101

EDWARD F. LEGAL
DB 207 PG 11

STD. BERM DITCH
STA. 17+70 TO 18+50 -Y1-REV LT

SPEC. CUT DITCH W/PSRM
STA. 16+53 TO 18+00 -Y1-REV LT
EST 280.5 SM PSRM
SEE DETAIL #10

END C/A & CHL. FENCE
-Y1REV-
+08.000
22.000
(72.179')

-Y1REV-
+75.00
33.085
(108.547')

-Y1REV-
+80.241
(22.000')

-Y1REV-
+80.241
20.000
(65.617')

-Y1REV-
+08.000
20.000
(65.617')

-Y1REV-
+08.000
24.000
(78.740')

-Y1REV-
+80.241
24.000
(78.740')

-Y1REV-
+37.003
23.840
(78.214')

-Y1REV-
+85.241
17.000 & 22.000
(55.775' & 72.178')

-Y1REV-
+47.501
9.144 & 17.000
(30.000' & 55.775')

-Y1REV-
+43.919
32.000
(104.967')

-Y1REV-
+35.000
45.000
(147.638')

-Y1REV-
+50.000
45.000
(147.638')

-Y1REV-
+50.000
24.000
(78.740')

-Y1REV-
+64.000
24.000
(78.740')

-Y1REV-
+07.000
16.316
(53.530')

-Y1REV-
+45.000
19.500
(63.976')

-Y1REV-
+47.500
9.144
(30.001')

-Y1REV-
+10.219
20.517
(67.313')

0.6m BASE DITCH
W/CLASS 'B' RIPRAP
EST 8 MTONS
EST 18.2 SM FF
EST DDE 2.4CM
SEE DETAIL #16

0.6m BASE DITCH
W/CLASS 'B' RIPRAP
EST 33.2 MTONS
EST 76.6 SM FF
EST DDE 9.5 CM
SEE DETAIL #16

CLASS 'I' RIPRAP
EST 6.4 MTONS
EST 12.5 SM FF

REMOVE DI COLLAR AND EXTEND

COLLAR AND EXTEND

-Y1REV STa 19+06.583
(46.667 RT) EL 203.839

-Y1-REV POT Sta 19+47.500
END CONSTRUCTION

-Y1-REV POT Sta 19+40.000

NCGS DEAL -BYI- PINC 11+18.674 =
-Y1-REV Sta 17+13.055 (15.134 RT)
EL 200.479

-BYI-323 -BYI- POT 13+15.416 =

-Y1-
PI STA. 16+78.061
Δ = 44°08'03.0" (LT)
Lc = 338.926
R = 440.000
T = 178.371

-Y1-REV
PIs Sta 15+80.724
Θs = 8°35'39.7"
Ls = 105.000
LT = 70.083
ST = 35.075

-Y1-REV
PI Sta 16+99.492
Δ = 26°56'43.6" (LT)
L = 164.600
T = 83.851
R = 350.000
Se = 0.07 m/m

-Y1-REV
PIs Sta 18+15.317
Θs = 8°35'39.7"
Ls = 105.000
LT = 70.083
ST = 35.075

FOR -Y1-REV PROFILE, SEE SHEETS 30 & 31
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWED.

DATE: 1/28/2010
USER NAME: rtowsley
DGN: rtowsley\rtv\r-2533cc_rdy_pet_17.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	18

HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

CONST. REV.

R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE: No. F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

MATCH LINE -Y16-REV STA.13+00 SEE SHEET 16

MATCH LINE SEE SHEET 11

-Y16REV-
+00.000
12.000
(39.370')

-Y16REV PC Sta. 12+73.806

-Y16REV-
+80.000
15.000
(49.212')

SHOP CURVED

S 77° 23' 40.1" W

+84.657

+75.806

+77.64

+43.806

+34.149

+27.061

30.0m TAPER

TYPE 350

-Y16REV-
+24.000
14.000 & 24.000
(45.933' & 78.741')

2 @ 2.7m x 2.7m RCBC

OUTLET CHANNEL
SEE DETAIL #23
EST DDE 41.6 CM
CLASS 'I' RIPRAP
EST 35 MTONS
EST 31.6 SM FF

-Y16REV PT Sta.12+04.147

12+00

-Y16REV-
+04.146
15.000 & 24.000
(49.213' & 78.741')

CLASS 'B' RIPRAP
EST 20 MTONS
EST 36 SM FF

-Y16REV-
+42.527
15.000
(49.213')

42.527m TAPER

-Y16-REV

-Y16REV-
+61.427
+64.000 23.600
15.600
(51.180')
(77.427')

RAMP A
+52.734
30.657
(100.282')

V-DITCH
EST DDE 115 CM
SEE DETAIL #21

SEAL ABANDONED WELL

REMOVE

-Y16REV-
+10.00
9.146 & 18.000
(30.007' & 59.055')

-Y16-REV PCC Sta.11+42.527

-Y16- PTS ta. 11+26.964

-Y16-REV PCC Sta.11+00.000 LA=
-Y16- POC Sta.11+00.000 LB.

-Y16- POC Sta 10+92.500
BEGIN CONSTRUCTION

-Y16REV-
+15.213
12.090
(39.665')

-Y16-REV
+35.702
9.142
(29.993')

CLASS 'I' RIPRAP
EST 6.4 MTONS
EST 12.5 SM FF
SEE DETAIL #25

S 1° 35' 48.3" W

-Y16-REV PI Sta 12+91.085
Δ = 38° 07' 47.0" (LT)
L = 33.274
T = 17.280
R = 50.000
Se = 0.06 m/m
Ro = 41.250

-Y16-REV PI Sta 11+77.936
Δ = 70° 36' 40.2" (RT)
L = 61.620
T = 35.409
R = 50.000
Se = 0.08 m/m
Ro = 55.000

-Y16-REV PI Sta 11+21.266
Δ = 2° 13' 15.9" (RT)
L = 42.527
T = 21.266
R = 1097.028
Se = NC

-Y16- PI Sta 10+85.094
Δ = 4° 22' 32.6" (RT)
L = 83.781
T = 41.911
R = 1,097.028

-Y16- PCS ta. 10+43.183

-Y16- POTS ta. 10+00.000

NAD 83
NC GRID

78.529
N2°21'42"E

N1°49'
N3°13'22"E

N3°30'22"E

36.0m AVE

28 MARSHALL POPLIN
DB 255 PG 078
DB 345 PG 101
DB 383 PG 679

MARSHALL R. POPLIN
DB 697 PG 081

150 JOHN E. BUSBIN
DB 544 PG 324

GRADY CLINE
DB 216 PG 073

33 MILLIS RAY HORTON
DB 546 PG 699

152 LARRY L. CLINE
DB 414 PG 144
DB 445 PG 570

183 375 300 CONC

227 228

4.9 SOIL & GR

6.0 SOIL&GR

SR 2471 RADCLIFF RD

1000 WD RAIL

1500 WW

ISBKD

ISFD

4SBW

DENOTES REMOVAL OF EXISTING PAVEMENT

FOR CULVERT PLANS, SEE SHEETS C-1 THRU C-

FOR -Y16-REV PROFILE, SEE SHEET 32
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 1/28/2010
USER: mmoss
DGN: N:\roadway\proj\R2533cc_rdy_pln_R.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2533CC	19
HIGHWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

5m 0 10m

CONST. REV.
R/W REV.

Prepared in the Office of:
AECOM
NC FIRM LICENSE No: F-0342
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 (919) 854-6259(FAX)

NC GRID
NAD 83

RONNIE EUGENE SMITH
DB 407 PG 315

108.204
S07°20'15"W

(143)
EDWARD L. HONEYCUTT
DB 355 PG 179
PB 13 PG 48

54.350
N17°50'30"E

35.46
N17°50'30"E

SPECIAL CUT DITCH W/PSRM
STA. 11+60 TO 11+84 -Y15-REV RT
SEE DETAIL #10

-Y15- PTS Sta. 11+64.759

-Y15REV-
+56.000
16.619
(54.524')

-Y15REV-
+40.000
17.000
(55.774')

-Y15- PCS Sta. 11+17.236

N16°09'45"W

(153)
WILLIE R. LEE
DB 415 PG 098
PB 13 PG 48

(154)
ZEB V. RINEHARDT
DB 366 PG 042
DB 366 PG 190
PB 13 PG 48

REMOVE

-Y15-REV
+60.795
12.000
(39.370')

20.230
S13°58'45"E

64.739
N59°11'52"E

DONALD LEE EUDY
DB 476 PG 349
PB 13 PG 48

-Y15-REV
+60.751
9.144
(30.000')

MATCHLINE -Y15-REV STA.11+75 SEE SHEET 11

-Y15-REV
PI Sta 11+55.536
Δ = 25° 42' 01.4" (LT)
L = 56.070
T = 28.515
R = 125.000
Se = 0.08 m/m
Ro = 50.000

-Y15-
PI Sta 10+28.475
Δ = 4° 54' 24.4" (LT)
L = 51.382
T = 25.707
R = 599.987

-Y15-
PI Sta 11+41.068
Δ = 10° 25' 43.5" (RT)
L = 47.523
T = 23.832
R = 253.004

-Y15-
PI Sta 12+21.029
Δ = 4° 34' 07.3" (RT)
L = 34.050
T = 17.034
R = 427.020

-Y15-REV PCS Sta. 10+54.51 L.A.
-Y15- PT Sta. 10+54.51 L.A.
-Y15- = POC Sta. 10+46.651
BEGIN CONSTRUCTION

-Y15- PCS Sta. 10+23.68
-Y15- POT Sta. 10+00.000

-Y15-
+46.651
9.140 & 12.000
(29.986' & 39.370')

N 19° 19' 04.7" E

-Y15-REV PCS Sta. 11+97.057

-Y15REV-
+27.021
8.976 & 18.000
(29.450' & 59.055')

-Y14REV-
+83.966
18.000
(59.055')

(155)
JANE T. RITCHIE
DB 387 PG 313
PB 13 PG 48

(156)
DANIEL R. EUDY
DB 560 PG 188
PB 13 PG 48

SPECIAL CUT DITCH W/PSRM
STA. 11+40 TO 11+83 -Y15-REV LT
EST 82.0 SM PSRM
SEE DETAIL #10

RAY H. EUDY
DB 361 PG 021
PB 13 PG 48

ROBERT E. KINARD
DB 564 PG 225
PB 14 PG 17

CABARRUS DEVELOP. CORP.
DB 398 PG 417

ARONALD C. LEWIS
DB 1090 PG 279
PB 14 PG 16

DENOTES REMOVAL OF EXISTING PAVEMENT

FOR -Y15-REV PROFILE, SEE SHEET 32
FOR DITCH DETAILS, SEE SHEET 2-J

NOTE: ALL DRIVEWAY RADII ARE 3.0m UNLESS OTHERWISE SHOWN.

DATE: 7/20/2020
TIME: 11:08:47 AM
USER NAME:
DGN: N:\roadway\proj\R-2533cc_rdy_pan_05.dgn