STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

March 28, 2014

MEMORANDUM TO: Mr. Wally Bowman, PE
Division 5 Engineer

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

SUBJECT: Durham County, Durham East End Connector from NC 147 to north of NC 98; Federal Aid Project No. NHF-76-1(2); WBS Element 34745.1.1; **TIP U-0071**

Please find attached the USACE Section 404 Individual Permit, the NCDWR Section 401 Water Quality Certification, Isolated Wetlands Permit and the NCDWR Buffer Authorization for the above-referenced project. All environmental permits have been received for the construction of this project.

A copy of this permit package will be posted on the NCDOT website at:
https://connect.ncdot.gov/resources/Environmental/Pages/default.aspx

Cc: w/o attachment (see website for attachments):
Mr. Randy Garris, P.E. State Contract Officer
Mr. Chris Murray, Division Environmental Officer
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Jay Bennett, P.E., Roadway Design Unit
Mr. Dewayne Sykes, P.E. Utilities Unit
Mr. Art McMillan, P.E., Hydraulics Unit
Mr. Tom Koch, P.E., Structure Design Unit
Mr. Mark Staley, Roadside Environmental Unit
Mr. Ron Hancock, P.E., State Roadway Construction Engineer
Mr. Mike Robinson, P.E., State Bridge Construction Engineer
Mr. Clarence Coleman, FHWA
Ms. Cynthia Van Der Wiele, EPA
Ms. Beth Harmon, EEP
Mr. Phillip Ayscue, Office of Inspector General
Mr. Eric Midkiff, PDEA

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT & ENVIRONMENTAL ANALYSIS UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1548

TELEPHONE: 919-707-6000
FAX: 919-212-5785
WEBSITE:NCDOT.GOV

LOCATION:
CENTURY CENTER, BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

PROJECT COMMITMENTS

T.I.P. Project No. U-0071
East End Connector from NC 147 (Durham Freeway/Buck Dean Expressway) to
north of NC 98 (Holloway Street) in Durham
Durham County
Federal Aid Project No. NHF-76-1(2)
WBS Element 34745.1.1

COMMITMENTS FROM PROJECT DEVELOPMENT AND DESIGN

PDEA/Roadway Design

The NCDOT will coordinate with the City of Durham regarding providing destination signage along the East End Connector to attractions in east Durham.

The NCDOT will coordinate with the Durham Area Transit Authority (DATA) regarding delays and detours during construction, as well as potential relocations of bus stops on US 70 and Holloway Street.

NCDOT will attach conduit to the East End Connector bridges over Holloway Street and Angier Avenue.

Right-of-Way Branch

The NCDOT will mitigate the acquisition of 0.30 acres of parkland from C. R. Wood Park by acquiring land adjacent to the C. R. Wood Park and donating this land to the City of Durham Parks and Recreation Department in accordance with Section 6(f) of the Land and Water Conservation Fund Act. Prior to land donation, the NCDOT will remove the existing residence currently located on this property.

PDEA/Division 5

The NCDOT will also mitigate the acquisition of 0.30 acres of parkland from C. R. Wood Park by paving the C. R. Wood basketball courts or parking lot, in coordination with the City of Durham Parks and Recreation Department.

COMMITMENTS FROM PERMITTING

Division 5/ Hydraulics Unit

Any modifications to the 401 Water Quality Certification in the Jordan Basin portion that propose additional stream impacts or increased impervious surface requiring additional stormwater management may be subject the Jordan Water Supply Nutrient Strategy (15A

NCAC02B .0267). The NCDOT shall coordinate with the NCDWR prior to submitting a modification request to determine the applicability of the Jordan Water Supply Nutrient Strategy. This condition does not apply to major modifications for additional sections of the project that were covered under the Finding of No Significant Impact or approved in the Avoidance and Minimization stage of the project.

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

REPLY TO
ATTENTION OF

RECEIVED
MAR 2 0 2014
OFFICE ... ENVIRONMENT

March 24, 2014

Regulatory Division/1200A

Action ID: SAW-2011-00796

Mr. Richard Hancock
Environmental Management Director, PDEA
NC Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Richard Hancock:

In accordance with the written request of December 11, 2013, and the ensuing administrative record, enclosed is a Department of the Army Permit to authorize impacts to approximately 0.19 acre of jurisdictional wetlands and 5,596 linear feet of surface waters associated with the NCDOT TIP No. U-0071; East End Connector; from US 147 between Ellis Road and Briggs Avenue, to NC 98 at US 70, in Durham County, North Carolina

Any deviation in the authorized work will likely require modification of this permit. If a change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notified you that your permit has been modified.

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

a. You must complete construction before December 31, 2019.

b. You must notify this office in advance as to when you intend to commence and complete work.

c. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

Printed on Recycled Paper

You should address all questions regarding this authorization to Mr. Eric Alsmeyer in the Raleigh Regulatory Field Office, telephone number (919) 554-4884, extension 23

Thank you in advance for completing our Customer Survey Form. This can be accomplished by visiting our web-site at http://regulatory.usacesurvey.com and completing the survey on-line. We value your comments and appreciate you taking the time to complete a survey each time you interact with our office.

Sincerely,

for Steven A. Baker
Colonel, U.S. Army
District Commander

Enclosures

Copy Furnished (with enclosures):

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

Copies Furnished with special conditions and plans:

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

Mr. Fritz Rohde
Habitat Conservation Division – Atlantic Branch
101 Pivers Island Road
Beaufort, North Carolina 28516

Mr. William Cox
Wetlands and Marine Regulatory Section
U.S. Environmental Protection Agency – Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8931

Mr. Doug Huggett
Division Coastal Management
N.C. Department of Environment
And Natural Resources
400Commerce Avenue
Morehead City, North Carolina 28557

Dr. Pace Wilber
Habitat Conservation Division – Atlantic Branch
NOAA Fisheries Service
219 Fort Johnston Road
Charleston, South Carolina 29412

Mr. Tony Able
Wetlands Regulatory Section
U.S. Environmental Protection Agency – Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303

DEPARTMENT OF THE ARMY PERMIT

Permittee: NORTH CAROLINA DEPARTMENT OF TRANSPORTATION - ATTN: MR. RICHARD HANCOCK

Permit No: SAW-2011-00796

Issuing Office: USAED, WILMINGTON

Project Description: The project, identified as TIP No. U-0071, consists of the construction of the East End Connector from NC 147 (Durham Freeway/Buck Dean Expressway) to north of NC 98 (Holloway Street) in Durham, Durham County, North Carolina, Federal Aid Project No. NHF–76–1(2). Total jurisdictional stream impacts within the Neuse River Basin (HUC 03020101) are 5,447 linear feet of permanent stream impacts, which includes bank stabilization, and 568 linear feet of temporary stream impacts. Of those impacts, a total of 419 linear feet of permanent stream impacts, which includes bank stabilization, and 15 linear feet of temporary stream impacts are to an isolated stream, which is not subject to section 404 of the Clean Water Act. There will be 0.97 acre of surface water impacts to two jurisdictional ponds in the Neuse basin. Total jurisdictional stream impacts within the Cape Fear River Basin (HUC 03030002) include 501 linear feet of permanent stream impacts, which includes bank stabilization, and 68 linear feet of temporary stream impacts. There will be a total of 0.46 acres of permanent wetland impacts and 0.01 acres of temporary wetland impacts within the Neuse River Basin. A total of 0.38 acres of the permanent wetland impacts are to riparian wetlands, which includes 0.19 acres of permanent impacts to isolated wetlands, not subject to Section 404. The remaining 0.08 acres of permanent impacts are to non-riparian wetlands, all of which are isolated wetlands, not subject to Section 404.

In order to compensate for impacts associated with this permit, NCDOT will provide payment to the North Carolina Ecosystem Enhancement Program (NCEEP) for 2,848 warm stream mitigation units within the Neuse River Basin (Cataloging Unit 03020201), to mitigate for permanent loss impacts to 1,424 linear feet of streams with more than minimal function. NCDOT will provide payment to the NCEEP for 0.38 riparian wetland mitigation units within the Neuse River Basin (Cataloging Unit 03020201) for permanent loss impacts to 0.19 acre of riparian wetlands.

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Project Location: The project corridor for the East End Connector is located on the east side of Durham County and extends from US 147 between Ellis Road and Briggs Avenue, to NC 98 at US 70, in Durham County, North Carolina.
Project Length: 4.0 miles Nearest Town: Durham; River Basin: Neuse River and Cape Fear River;
Nearest Waterways: Little Lick Creek and unnamed tributaries, and unnamed tributaries of Northeast Creek
LATITUDE & LONGITUDE: Latitude North: 35.976; Longitude West: -78.8544.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2019**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

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

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

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

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

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

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

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

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

2. Limits of this authorization.

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

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

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

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

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

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

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

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

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

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

*U.S. GOVERNMENT PRINTING OFFICE: 1986 - 717-425

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

03/19/2014

(PERMITTEE) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ATTN: MR. RICHARD HANCOCK

(DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

24 Mar 2014

for *(DISTRICT COMMANDER)* STEVEN A. BAKER, COLONEL

(DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

*U.S. GOVERNMENT PRINTING OFFICE: 1986 - 717-425

SPECIAL CONDITIONS
ACTION ID SAW-2011-00796
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION; TIP U-0071

WORK LIMITS

1. CONSTRUCTION PLANS: Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and fill activities connected with this project. In addition, except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

2. UNAUTHORIZED DREDGE OR FILL: Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.

3. MAINTAIN CIRCULATION AND FLOW OF WATERS: Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.

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

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

RELATED LAWS

6. WATER CONTAMINATION: All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

PROJECT MAINTENANCE

7. NOTIFICATION OF CONSTRUCTION COMMENCEMENT AND COMPLETION: The permittee shall advise the Corps in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

8. CLEAN FILL: Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act.

SPECIAL CONDITIONS
ACTION ID SAW-2011-00796
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION; TIP U-0071

9. PERMIT DISTRIBUTION: The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project.

10. SILT-FENCING: The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

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

12. EROSION CONTROL MEASURES IN WETLANDS: The permittee shall remove all sediment and erosion control measures placed in wetlands or waters, and shall restore natural grades in those areas, prior to project completion.

ENFORCEMENT

13. REPORTING ADDRESS: All reports, documentation and correspondence required by the conditions of this permit shall be submitted to the following address: U.S. Army Corps of Engineers, Regulatory Division, Raleigh Regulatory Field Office, c/o Mr. Eric Alsmeyer, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587, and by telephone at: 919.554.4884, ext. 23. The Permittee shall reference the following permit number, SAW-2011-00796, on all submittals.

SPECIAL CONDITIONS
ACTION ID SAW-2011-00796
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION; TIP U-0071

14. REPORTING VIOLATIONS OF THE CLEAN WATER ACT AND RIVERS AND HARBORS ACT: Violation of these conditions or violation of Section 404 of the Clean Water Act of Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District U.S. Army Corps of Engineers within 24 hours of the permitee's discovery of the violation.

15. COMPLIANCE INSPECTION: A representative of the Corps of Engineers will periodically and randomly inspect the work for compliance with these conditions. Deviations from these procedures may result in an administrative financial penalty and/or directive to cease work until the problem is resolved to the satisfaction of the Corps.

16. COMPENSATORY MITIGATION: In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Forms (two). The requirements of these forms, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.

CONCRETE CONDITION

17. PROHIBITIONS ON CONCRETE: The permittee shall take measures to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with any water in or entering into waters of the United States. Water inside coffer dams or casings that has been in contact with concrete shall only be returned to waters of the United States when it no longer poses a threat to aquatic organisms (concrete is set and cured).

NC DOT STANDARD PERMIT CONDITIONS

18. CULVERTS:

A. Unless otherwise requested in the applicant's application and depicted on the approved work plans, culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage and every effort shall be made to maintain existing channel slope. The bottom

of the culvert must be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Destabilizing the channel and head cutting upstream should be considered in the placement of the culvert.

B. Measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level.

19. TEMPORARY FILLS

Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

20. BORROW AND WASTE

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

B. To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material or to dispose of dredged, fill or waste material. The permittee shall provide the Corps of Engineers with appropriate maps indicating the locations of

proposed borrow or waste sites as soon as such information is available. The permittee will coordinate with the Corps of Engineers before approving any borrow or waste sites that are within 400 feet of any stream or wetland. All jurisdictional wetland delineations on borrow and waste areas shall be verified by the Corps of Engineers and shown on the approved reclamation plans. The permittee shall ensure that all such areas comply with the Special Condition 1 above, of this permit and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This documentation will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with Special Condition 1 above. All information will be available to the Corps of Engineers upon request. The permittee shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the Corps of Engineers within 30 days of the completion of the reclamation work.

U.S. ARMY CORPS OF ENGINEERS
Wilmington District
Compensatory Mitigation Responsibility Transfer Form

Permittee: NC Department of Transportation, Div. of Highways
Action ID: SAW-2011-00796
Project Name: East End Connector; TIP No. U-0071
County: Durham

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Ecosystem Enhancement Program (NCEEP), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that to the U.S. Army Corps of Engineers (USACE) Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate mitigation Sponsors.

Instructions to Sponsor: The Sponsor must verify that the mitigation requirements (credits) shown below are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether or not they have received payment from the Permittee. Once the form is signed, the Sponsor must update the bank ledger and provide a copy of the signed form and the updated bank ledger to the Permittee, the USACE Project Manager, and the Wilmington District Mitigation Office (see contact information on page 2). The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements:

Permitted Impacts Requiring Mitigation* **8-digit HUC and Basin:** 03020201, Neuse River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
1,424				0.19		

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03020201, Neuse River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
2,848				0.38		

Mitigation Site Debited: NCEEP
(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCEEP, list NCEEP. If the NCEEP acceptance letter identifies a specific site, also list the specific site to be debited).

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCEEP), as approved by the USACE, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name: _____

Name of Sponsor's Authorized Representative: _____

_____ _____

Signature of Sponsor's Authorized Representative **Date of Signature**

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the USACE is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the USACE is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. For authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by the Sponsor must be provided to the USACE within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the USACE has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the USACE Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the USACE, the Sponsor must obtain case-by-case approval from the USACE Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the USACE administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions:

This form is not valid unless signed below by the USACE Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the USACE Project Manager at the address below, and 3) the Wilmington District Mitigation Office, Attn: Todd Tugwell, 11405 Falls of Neuse Road, Wake Forest, NC 27587 (email: todd.tugwell@usace.army.mil).*** Questions regarding this form or any of the permit conditions may be directed to the USACE Project Manager below.

USACE Project Manager: Eric Alsmeyer
USACE Field Office: Raleigh Regulatory Field Office
US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
Email: **eric.c.alsmeyer@usace.army.mil**



USACE Project Manager Signature

March 17, 2014
Date of Signature

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at http://ribits.usace.army.mil.

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at our website at http://regulatory.usacesurvey.com/ to complete the survey online.

U.S. ARMY CORPS OF ENGINEERS
Wilmington District
Compensatory Mitigation Responsibility Transfer Form

Permittee: NC Department of Transportation, Div. of Highways
Action ID: SAW-2011-00796
Project Name: East End Connector; TIP No. U-0071
County: Durham

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Ecosystem Enhancement Program (NCEEP), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that to the U.S. Army Corps of Engineers (USACE) Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate mitigation Sponsors.

Instructions to Sponsor: The Sponsor must verify that the mitigation requirements (credits) shown below are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether or not they have received payment from the Permittee. Once the form is signed, the Sponsor must update the bank ledger and provide a copy of the signed form and the updated bank ledger to the Permittee, the USACE Project Manager, and the Wilmington District Mitigation Office (see contact information on page 2). The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements:

Permitted Impacts Requiring Mitigation* **8-digit HUC and Basin:** 03030002, Cape Fear River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
440						

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03030002, Cape Fear River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
880						

Mitigation Site Debited: NCEEP
(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCEEP, list NCEEP. If the NCEEP acceptance letter identifies a specific site, also list the specific site to be debited).

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCEEP), as approved by the USACE, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name: _____

Name of Sponsor's Authorized Representative: _____

_____ _____

Signature of Sponsor's Authorized Representative **Date of Signature**

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the USACE is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the USACE is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. For authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by the Sponsor must be provided to the USACE within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the USACE has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the USACE Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the USACE, the Sponsor must obtain case-by-case approval from the USACE Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the USACE administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions:

This form is not valid unless signed below by the USACE Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the USACE Project Manager at the address below, and 3) the Wilmington District Mitigation Office, Attn: Todd Tugwell, 11405 Falls of Neuse Road, Wake Forest, NC 27587 (email: todd.tugwell@usace.army.mil)***. Questions regarding this form or any of the permit conditions may be directed to the USACE Project Manager below.

USACE Project Manager: Eric Alsmeyer
USACE Field Office: Raleigh Regulatory Field Office
US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
Email: **eric.c.alsmeyer@usace.army.mil**



USACE Project Manager Signature

March 17, 2014
Date of Signature

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NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **NC Dept. of Transportation** **Attn: Mr. Richard W. Hancock, PE**	File Number: **SAW-2011-00796**	Date: **March 17, 2014**

Attached is:	See Section below
☒ INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☐ PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐ PERMIT DENIAL	C
☐ APPROVED JURISDICTIONAL DETERMINATION	D
☐ PRELIMINARY JURISDICTIONAL DETERMINATION	E

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

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

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

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

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

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

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

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

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

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

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

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

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: **District Engineer, Wilmington Regulatory Div.** **Attn: Mr. Eric Alsmeyer** **3331 Heritage Trade Drive** **Raleigh, North Carolina 27587** **Phone: (919) 554-4884, extension 23**	If you only have questions regarding the appeal process you may also contact: **Mr. Jason Steele, Administrative Appeal Review Officer** **CESAD-PDO** **U.S. Army Corps of Engineers, South Atlantic Division** **60 Forsyth Street, Room 10M15** **Atlanta, Georgia 30303-8801** **Phone: (404) 562-5137**

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

_____ Signature of appellant or agent.	Date:	Telephone number:

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, Attn: Eric Alsmeyer, 69 Darlington Avenue, Wilmington, North Carolina 28403

North Carolina Department of Environment and Natural Resources
Division of Water Resources
Water Quality Programs

Pat McCrory
Governor

Thomas A. Reeder
Director

John E. Skvarla, III
Secretary

RECEIVED
FEB 10 2014
OFFICE OF NATURAL ENVIRONMENT

January 28, 2014

Mr. Richard W. Hancock, P.E., Manager
Project Development and Environmental Analysis
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1598

Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act, NEUSE BUFFER RULES, and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000 with ADDITIONAL CONDITIONS for Proposed East End Connector from US 70 to NC 147 in Durham County, Federal Aid Project No. NHF-76-1(2), State Project No.34745.1.1, TIP No U-0071. NCDWR Project No. 20131282.

Dear Mr. Hancock:

Attached hereto is a copy of Certification No. 3980 issued to The North Carolina Department of Transportation (NCDOT) dated January 28, 2014.

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

Sincerely,

for Thomas A. Reeder

Attachments

cc: Eric Alsmeyer, US Army Corps of Engineers, Raleigh Field Office
Chris Murray, Division 5 Environmental Officer
James Mason, NCDOT NEU
Beth Harmon, Ecosystem Enhancement Program
File Copy

Transportation and Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-733-1290
Internet: www.ncwaterquality.org

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401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act and NEUSE BUFFER RULES, and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000 with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500 and 15A NCAC 2B.0233 and ISOLATED WETLANDS PERMIT Pursuant to IWGP100000. This certification authorizes the NCDOT to impact 0.21 acres of jurisdictional wetlands, 0.27 acres of isolated wetlands , 6150 linear feet of jurisdictional streams, 434 linear feet of isolated streams, and 641079 square feet of protected riparian buffers in Durham County. The project shall be constructed pursuant to the application dated received December 12, 2013. The authorized impacts are as described below:

Stream Impacts in the Neuse River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Bank Stabilization to Intermittent Stream (linear ft)	Temporary Impact to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Bank Stabilization to Perennial Stream (linear ft)	Temporary Impact to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	412	0	0	0	0	0	412	0
2	673	20	14	0	0	0	707	0
3	410	0	0	0	0	0	410	0
6	0	0	15	0	0	0	15	0
7	0	0	0	665	250	110	1025	915
8	443	0	0	0	0	0	443	0
9	29	43	0	0	0	0	72	0
12	705	42	132	0	0	0	879	0
17	0	0	0	479	61	39	579	540
17A	0	0	56	0	0	0	56	0
17B	0	0	7	0	0	0	7	0
23	0	0	0	280	79	124	483	359
24	104	0	23	0	0	0	127	0
25	168	35	10	0	0	0	213	0
26	50	50	23	0	0	0	123	0
27	0	0	0	0	10	0	10	10
U-1	0	20	0	0	0	0	20	0
Total	**2994**	**210**	**280**	**1424**	**400**	**273**	**5581**	**1824**

Total Neuse Basin Stream Impact for Project: 5581 linear feet

Stream Impacts in the Cape Fear River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Bank Stabilization to Intermittent Stream (linear ft)	Temporary Impact to Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Bank Stabilization to Perennial Stream (linear ft)	Temporary Impact to Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
20	0	0	0	218	0	17	235	218
21	0	0	0	28	0	0	28	28
22	0	0	0	23	0	0	23	23
28	0	0	0	121	0	20	141	0
29	0	0	0	40	0	0	40	40
30	0	0	0	10	0	0	10	10
31	0	0	0	0	61	22	83	61
32	0	0	9	0	0	0	9	0
Total	**0**	**0**	**9**	**440**	**61**	**59**	**569**	**380**

Total Cape Fear Stream Impact for Project: 569 linear feet

Isolated Stream Impacts in the Neuse River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Bank Stabilization to Intermittent Stream (linear ft)	Temporary Impact to Intermittent Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
4	349	70	15	434	0
Total	**349**	**70**	**15**	**434**	**0**

Total Isolated Stream Impact for Project: 434 linear feet

Wetland Impacts in the Neuse River Basin

Site	Permanent Fill (ac)	Temporary Fill (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)
2	0.08	0	0	0.08
3	0.06	0	0	0.06
8	0.04	0	0	0.04
10	0.01	0.01	0	0.02
11	0	0	0.01	0.01
Total	**0.19**	**0.01**	**0.01**	**0.21**

Total Wetland Impact for Project: 0.21 acres.

Isolated Wetland Impacts in the Neuse River Basin

Site	Permanent Fill (ac)	Temporary Fill (ac)	Total Wetland Impact (ac)
4	0.05	0	0.05
5	0.06	0	0.06
14	0.08	0	0.08
15	0.03	0	0.03
16	0.05	0	0.05
Total	**0.27**	**0**	**0.27**

Total Isolated Wetland Impact for Project: 0.27 acres.

Open Water (Ponds) Impacts in the Neuse River Basin

Site	Permanent Fill in Open Waters (ac)
13	0.78
18	0.19
Total	**0.97**

Total Open Water Impact for Project: 0.97 acres.

Neuse Riparian Buffer Impacts

Site	Zone 1 Impact (sq ft)	*minus* Wetlands in Zone 1 (sq ft)	= Zone 1 Buffers (not wetlands) (sq ft)	Zone 1 Buffer Mitigation Required (using 3:1 ratio)		Zone 2 Impact (sq ft)	*minus* Wetlands in Zone 2 (sq ft)	= Zone 2 Buffers (not wetlands) (sq ft)	Zone 2 Buffer Mitigation Required (using 1.5:1 ratio)
1	41408	2986	38422	115266		26834	431	26403	39604.5
2	22801	2431	20370	61110		15534	268	15266	22899
3	2222	0	2222	N/A		997	0	997	N/A
4	42060	899	41161	123483		34953	969	33984	50976
5	2342	0	2342	N/A		3142	0	3142	N/A
6	61647	0	61647	184941		37348	0	37348	56022
7	24286	616	23670	71010		16780	535	16245	24367.5
8	3438	0	3438	N/A		1805	0	1805	N/A
9	4340	61	4279	12837		6087	132	5955	8932.5
10	977	6	971	2913		1780	0	1780	2670
11	0	0	0	N/A		87	0	87	N/A
12	77205	0	77205	231615		50757	0	50757	76135.5
13	27871	0	27871	83613		20229	0	20229	30343.5
14	7822	0	7822	N/A		3210	0	3210	N/A
15	13171	0	13171	39513		8861	0	8861	13291.5
16	7690	0	7690	N/A		5252	0	5252	N/A
17	36102	0	36102	108306		23110	0	23110	34665
18	2146	0	2146	N/A		1897	0	1897	N/A
U-1	329	0	329	987		1325	0	1325	0
U-2	1706	0	1706	N/A		635	0	635	N/A
U-3	893	0	893	N/A		0	0	0	N/A
Totals	**380456**	**6999**	**373457**	**1035594**		**260623**	**2335**	**258288**	**359907**

Total Buffer Impact for Project: 641079 square feet.

* n/a = Total for Site is less than 1/3 acre and 150 linear feet of impact, no mitigation required

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

This approval is only valid for the purpose and design that you submitted in your application received December 12, 2013. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). Additional buffer impacts may require compensatory mitigation as described in 15A NCAC 2B.0242(9) . For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Conditions of Certification:

1. Compensatory mitigation for 1824 linear feet of impact to streams in the Neuse Basin and 380 linear feet of impact to streams in the Cape Fear Basin are required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. EEP has indicated in a letter dated December 10, 2013 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the EEP Mitigation Banking Instrument signed July 28, 2010.

2. Compensatory mitigation for impacts to 345198 square feet of protected riparian buffers in Zone 1 and 239938 square feet of protected riparian buffers in Zone 2 shall be required. We understand that you have chosen to perform compensatory mitigation for impacts to protected buffers through use of the North Carolina Ecosystem Enhancement Program (EEP). Mitigation for unavoidable impacts to Neuse Riparian Buffers shall be provided in the Neuse River Basin and done in accordance with 15A NCAC 2B.0242(9) . EEP has indicated in a letter dated December 10, 2013 that they will assume responsibility for satisfying the compensatory mitigation requirements for the above-referenced project, in accordance with EEP's Mitigation Banking Instrument signed July 28, 2010.

3. A copy of the final construction drawings shall be furnished to the NCDWR Central Office prior to the pre-construction meeting. The permittee shall provide written verification that the final construction drawings comply with the permit drawings contained in the application dated December 11, 2013. Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Resources.

4. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to biological criteria exceedances shall not discharge stormwater directly to surface waters. Stormwater shall be treated using appropriate best management practices (e.g., vegetated conveyances, constructed wetlands, detention ponds, etc.) prior to discharging to surface waters.

5. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to turbidity shall be designed, constructed, and operated with sediment and erosion control measures that meet Design Standards in Sensitive Watersheds (15A NCAC 4B .0124). However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.

6. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams, shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by the NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required.

7. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

8. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.

9. For any streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species.

10. Any channel relocations shall be completed and stabilized, and approved on site by NCDWR staff, prior to diverting water into the new channel. Stream banks shall be matted with coir-fiber matting. Vegetation used for bank stabilization shall be limited to native riparian vegetation, and should include establishment of a vegetated buffer on both sides of the relocated channel to the maximum extent practical. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage requested.

11. At locations where ponds will be drained, proper measures will be taken to drain the pond with limited impact to upstream and downstream channel stability as well as to native aquatic species. Proper measures will be taken to avoid sediment release and/or sediment accumulation downstream as a result of pond draining. If typical pond draining techniques will create significant disturbance to native aquatic species, additional measures such as collection and relocation may be necessary to prevent a significant fish kill. The permittee shall observe any natural channel re-establishment, or utilize natural channel construction techniques, to ensure that the jurisdictional stream channel above and below the drained pond remain stable, and that no additional impacts occur within the natural stream channel as a result of draining the pond.

12. All stormwater runoff shall be directed as sheetflow through stream buffers at non-erosive velocities, unless otherwise approved by this certification.

13. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction.

14. Pursuant to 15A NCAC 2B.0233(6), sediment and erosion control devices shall not be placed in Zone 1 of any Neuse Buffer without prior approval by the NCDWR. At this time, the NCDWR has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised and that discharge is released as diffuse flow.

15. Any modifications to this 401 Water Quality Certification in the Jordan Basin portion that propose additional stream impacts or increased impervious surface requiring additional stormwater management may be subject the Jordan Water Supply Nutrient Strategy (15A NCAC02B .0267). The NCDOT shall coordinate with the NCDWR prior to submitting a modification request to determine the applicability of the Jordan Water Supply Nutrient Strategy. This condition does not apply to major modifications for additional sections of the project that were covered under the Finding of No Significant Impact or approved in the Avoidance and Minimization stage of the project.

16. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.

17. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers.

18. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.

19. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage.

20. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval.

21. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.

22. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream.

23. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.

24. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.

25. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.

26. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification.

27. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification..

28. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.

29. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification.

30. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

31. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery.

32. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify NCDWR when all work included in the 401 Certification has been completed.

33. Native riparian vegetation (i.e. trees and shrubs native to your geographic region) must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction.

34. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.

35. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:

a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

36. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification.

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

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-431-3000, Facsimile: (919)-431-3100

A copy of the petition must also be served on DENR as follows:

Mr. Lacy Presnell, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center

This the 28th day of January 2014

DIVISION OF WATER RESOURCES

for Thomas A. Reeder

WQC No. 3980

North Carolina Department of Environment and Natural Resources
Division of Water Resources
Water Quality Programs

Pat McCrory
Governor

Thomas A. Reeder
Director

John E. Skvarla, III
Secretary

NCDWR Project No.: _____ **County:** _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion
Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401 Transportation Permitting Unit, North Carolina Division of Water Resources, 1650 Mail Service Center, Raleigh, NC, 27699-1650. This form may be returned to NCDWR by the applicant, the applicant's authorized agent, **or** the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

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

Signature: _____ Date: _____

Agent's Certification

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

Signature: _____ Date: _____

Engineer's Certification

_____ Partial _____ Final

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

Signature _____ Registration No. _____

Date _____

Transportation and Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-733-1290
Internet: www.ncwaterquality.org

An Equal Opportunity \ Affirmative Action Employer

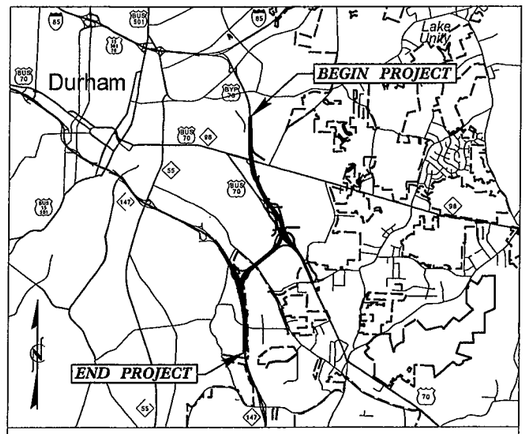
One NorthCarolina Naturally

05/08/99

TIP PROJECT: U-0071

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DURHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-0071	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34745.1.1	NHF-76-1(2)	PE
34745.2.8	NHF-76-1(2)	R/W, UTILITIES

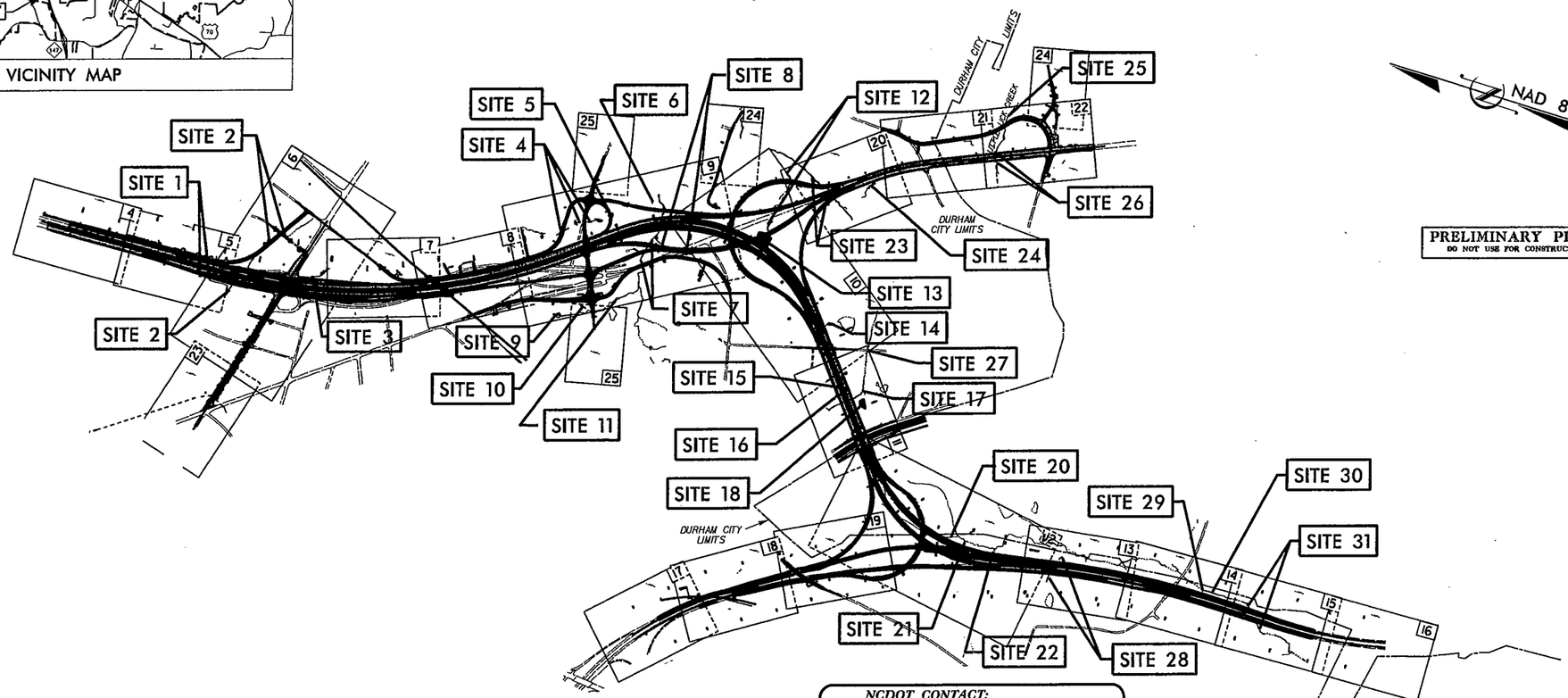
Permit Drawing Sheet 1 of 91

RECEIVED
DEC 16 2013
RALEIGH REGULATORY FIELD OFFICE

WETLAND AND SURFACE WATER IMPACTS PERMIT

LOCATION: *DURHAM EAST END CONNECTOR, FROM NC 147 (BUCK DEAN FREEWAY) TO NORTH OF NC 98*

TYPE OF WORK: *GRADING, DRAINAGE, PAVING, CURB & GUTTER, SIGNALS, STRUCTURES, AND SIGNING*



NAD 83/95

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF DURHAM.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

NCDOT CONTACT:

BRENDA L. MOORE, PE
PROJECT ENGINEER
ROADWAY DESIGN UNIT

2011-00796

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 65,700
ADT 2035 = 116,100
DHV = 10 %
D = 55 %
T = 14 % *
V = 70 MPH
* TTST 8 DUAL 6
FUNCT. CLASS. = INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY PROJECT U-0071 = 3.783 mi.

LENGTH STRUCTURE PROJECT U-0071 = 0.173 mi.

TOTAL LENGTH OF TIP PROJECT U-0071 = 3.956 mi.

LENGTH OF PROJECT BASED ON -L- AND -LDFEB-

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610
By:
M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 13, 2012

LETTING DATE:
APRIL 15, 2014

BURKE EVANS, PE
PROJECT ENGINEER

KEVIN S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

9/20/2013
username
R:\Hydraulics\PERMITS_Environmental\Drawings\U0071_hyd_wet_tsh.dgn

Permit Drawing
Sheet 2 of 91

PROJECT REFERENCE NO.	SHEET NO.
U-0071	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

8/17/99

REVISIONS

R/W REVISION / ROW REMP PARCEL NOS. 13, 14 & 18 COMBINED INTO PARCEL NO. 13.

9/19/2003
15:59:00
BY:H:\projects\PERMITS_Environmental\NEprojects\0071_hwd_prm_wet_rev05.dgn

DENOTES IMPACTS IN SURFACE WATER

NAD 83/95

PAMELA L. HOLLOWAY

MULDEE LIMITED PARTNERSHIP

PRIORITY TERRA SOURCE, LLC

SHELTON A. DAVIS
SHARON T. DAVIS

ABF FREIGHT SYSTEMS, INC. SUCCESSOR BY MERGER TO CAROLINA FREIGHT CARRIERS CORPORATION

BERM DITCH
SEE RDWY STD. 240.01
-SRI- STA 22+95 to 23+35 LT
ISMTLBUS

TAIL BASE DITCH
SEE DETAIL T2
EST 40 CY DDE

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

SURFACE WATER IMPACTS

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 269 TONS CL. I
EST 533 SY GFD

SPECIAL LATERAL BASE DITCH
SEE DETAIL SL2P
EST 149 SY PSRP

LATERAL 'V' DIVERSION DITCH
SEE DETAIL LD1
EST 300 CY DDE

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

LATERAL 'V' DIVERSION DITCH
SEE DETAIL LD1R
EST 85 CY DDE
EST 67 TONS CL. I
EST 166 SY GFD

SPECIAL LATERAL 6' BASE GRASSED SWALE
SEE DETAIL SG6S

LATERAL 'V' DIVERSION DITCH
SEE DETAIL LD1
EST 349 CY DDE

LATERAL 2' BASE DIVERSION DITCH
SEE DETAIL LD2
EST 229 CY DDE
EST 8 TONS CL. I
EST 9 SY GFD

CLASS 'I' RIP RAP
EST. 8 TONS
15 SY GFD

SITE

PERMANENT ROCK CHECK DAMS (50' INTERVALS)
SEE RDY STD. 1633.02

SR 1856 MULDEE ST 21' BST

US 70 WBL 24' BST

US 70 EBL 23' BST

FLOWABLE FILL
EST. 4 CY

MATCH LINE -L- 22+00.00 -SRI- STA. 16+88.10 SEE SHEET NO. 4

MATCH LINE -L- 36+00.00 -SRI- 30+88.53 -RAMPB- 17+26.57 -RAMPC- 19+07.98 SEE SHEET NO. 6

THE CHARLES R. WELLONS FOUNDATION

LARRY D. BOND
ANN W. BOND

JAMES C. FREDERICK
MARY H. FREDERICK

MILLIARD BRONSON
MAXINE L. BRONSON

BLUE VALLEY APARTMENTS, INC.

REAL ESTATE ASSOCIATES INC.

MIRIAM W. THOMAS
CHARLENE W. HAMLETT

REA LANDCOM INC.

PROJECT REFERENCE NO.	SHEET NO.
U-0071	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing Sheet 3 of 7

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

8/17/99

REVISIONS

8/ R/W REVISION / 7202 RRP PARCEL NOS.13,14, & 18 COMBINED INTO PARCEL NO.13.

9/19/2013
username
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NAD 83/95

DENOTES IMPACTS IN SURFACE WATER

PAMELA L. HOLLOWAY

MULDEE LIMITED PARTNERSHIP

PRIORITY TERRA SOURCE, LLC

SHELTON A. DAVIS
SHARON T. DAVIS

ABF FREIGHT SYSTEMS, INC.
SUCCESSOR BY MERGER TO
CAROLINA FREIGHT CARRIERS CORPORATION

THE CHARLES R. WELLONS FOUNDATION

LARRY D. BOND
ANN W. BOND

JAMES C. FREDERICK
MARY H. FREDERICK

MILLIARD BRONSON
MAXINE L. BRONSON

BLUE VALLEY APARTMENTS, INC.

REAL ESTATE ASSOCIATES INC.

MIRIAM W. THOMAS
CHARLENE W. HAMLETT

REA LANDCOM INC.

SITE

SR 1856 MULDEE ST 22' BST

TAIL BASE DITCH
SEE DETAIL T2
EST 40 CY DDE

BERM DITCH
SEE RDWY STD. 240.01
-SRI- STA 22+95 to 23+35 LT

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 269 TONS CL I
EST 533 SY GFD

SPECIAL LATERAL
BASE DITCH
SEE DETAIL SL2R
EST 149 SY FSRM

LATERAL 'V'
DIVERSION DITCH
SEE DETAIL LDI
EST 300 CY DDE

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

LATERAL 'V'
DIVERSION DITCH
SEE DETAIL LDI
EST 85 CY DDE
EST 67 TONS CL I
EST 166 SY GFD

SPECIAL LATERAL 6'
BASE GRASSED SWALE
SEE DETAIL SGSS

LATERAL 'V'
DIVERSION DITCH
SEE DETAIL LDI
EST 349 CY DDE

LATERAL 2' BASE
DIVERSION DITCH
SEE DETAIL LD2
EST 229 CY DDE
EST 8 TONS CL I
EST 5 SY GFD

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

CLASS 'I' RIP RAP
EST. 8 TONS
15 SY GFD

PERMANENT ROCK
CHECK DAMS
(50) INTERVALS
SEE RDY STD. 1633.02

FLOWABLE FILL
EST. 4 CY

SURFACE WATER IMPACTS

MATCH LINE SEE SHEET NO.4 -L- 22+00.00 -SRI- STA.16+88.10

MATCH LINE SEE SHEET NO.6 -L- 36+00.00 -SRI- 30+88.53 -RAMPB- 17+26.57 -RAMPC- 19+07.98

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 11 of 94

-L- (WB)

PI = 33+30.00
EL = 362.62'
VC = 970'
K = 183
V = 70

(-)1.9479%

(+)3.3606%

420 410 400 390 380 370 360 350 340 330

22 23 24 25 26 27 28 29 30 31 32 33 34 35 36

BM • 55
-L- STA. 25+82.24
124.90' LT.
ELEV. 378.28'

-L- (EB)

PI = 33+10.00
EL = 363.45'
VC = 940'
K = 181
V = 70

(-)1.8270%

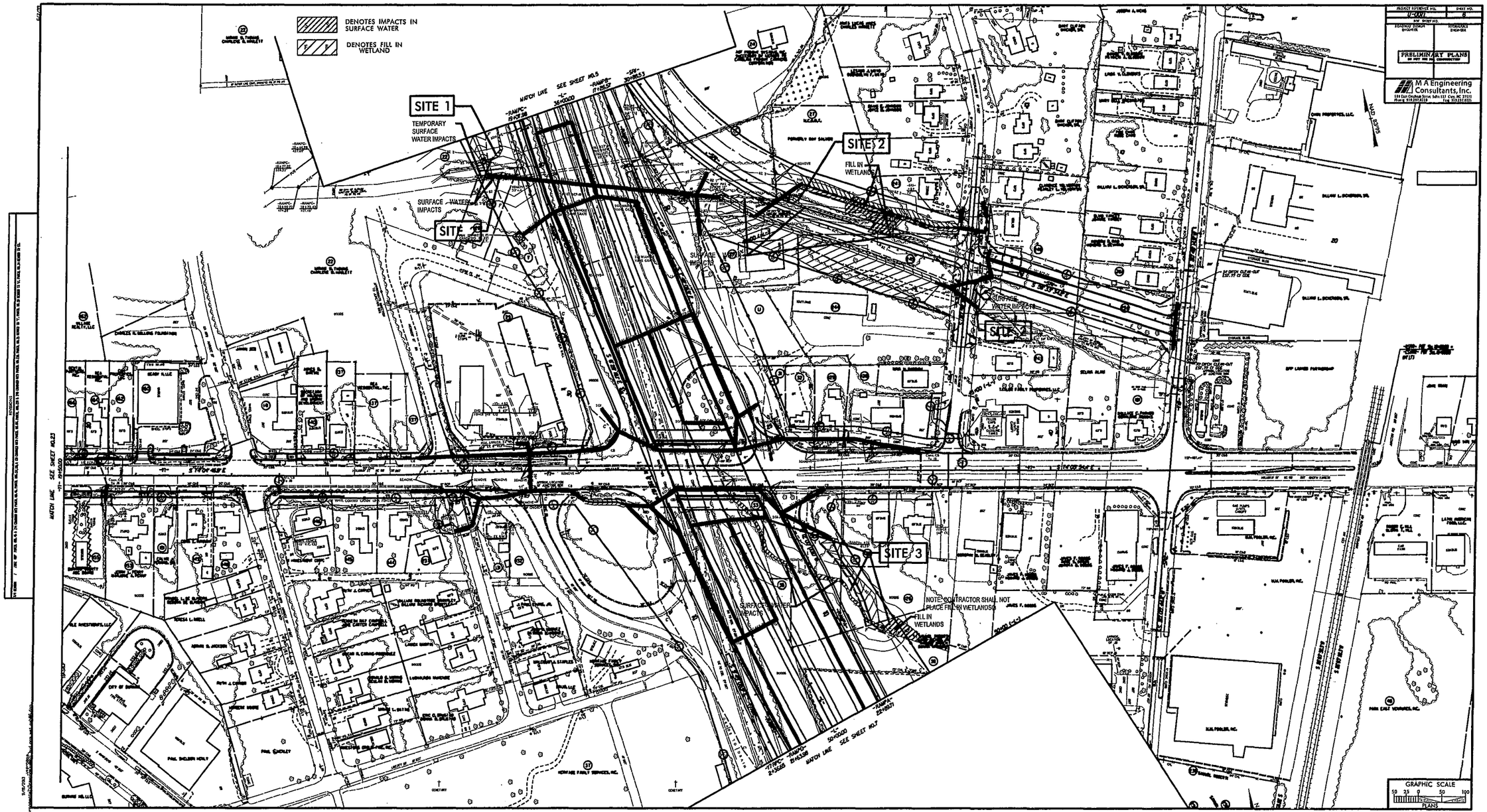
(+)3.3605%

420 410 400 390 380 370 360 350 340 330

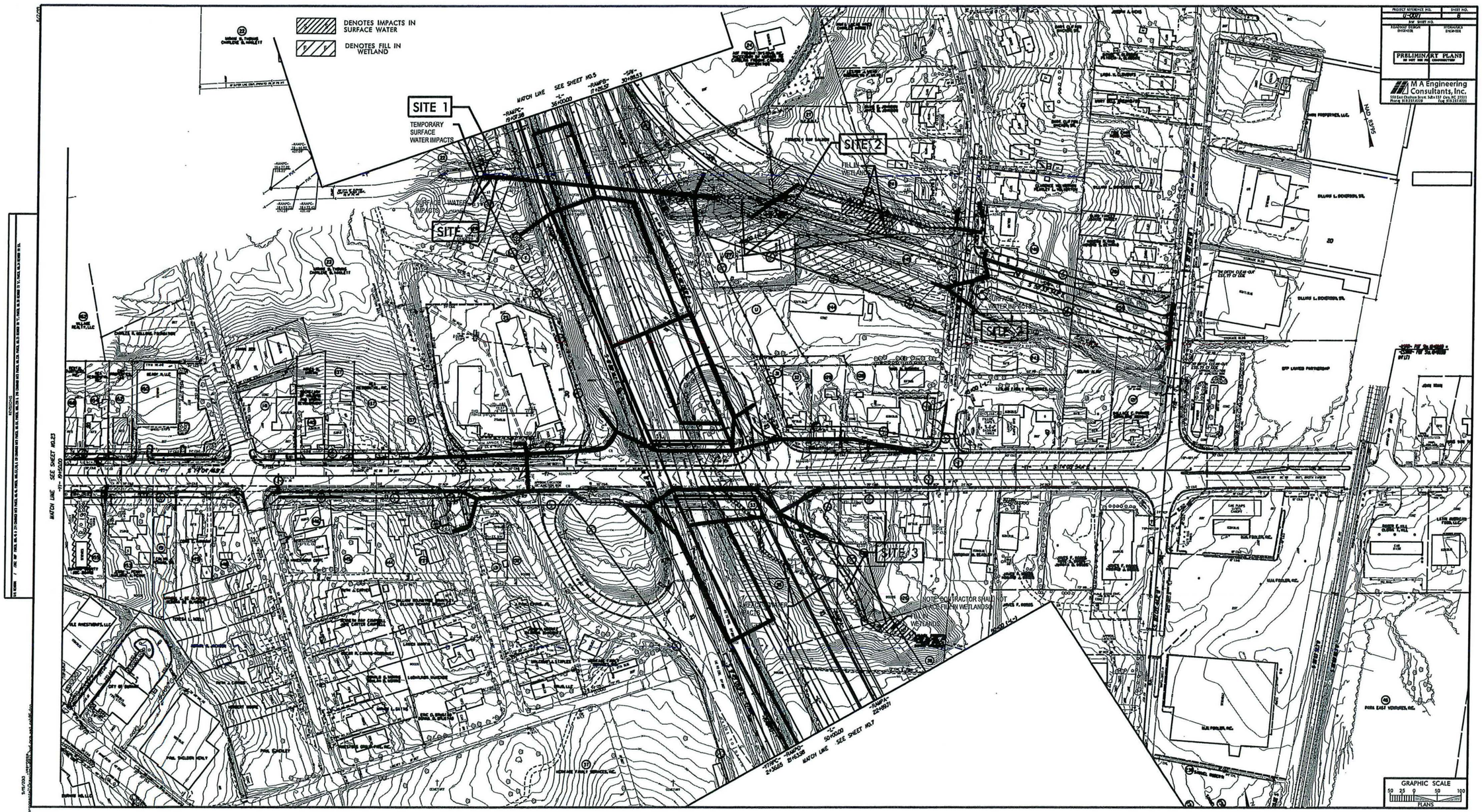
22 23 24 25 26 27 28 29 30 31 32 33 34 35 36

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Permit Drawing
Sheet 5 of 91



Permit Drawing
Sheet 6 of 91



M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 1 of 2

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

-L- (WB)

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.676

DRAINAGE AREA	= 48	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 146.9	CFS
DESIGN HW ELEVATION	= 355.6	FT
100 YEAR DISCHARGE	= 173	CFS
100 YEAR HW ELEVATION	= 356.5	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 400	CFS
OVERTOPPING ELEVATION	= 379.0	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.1019

DRAINAGE AREA	= 101	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 41	CFS
DESIGN HW ELEVATION	= 372.6	FT
100 YEAR DISCHARGE	= 48	CFS
100 YEAR HW ELEVATION	= 373.3	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 61	CFS
OVERTOPPING ELEVATION	= 373.3	FT

PI = 46+00.00
EL = 405.30'
VC = 1,100'
K = 252
V = 70

(+)3.3605%

(+)11.00%

BEGIN SPECIAL DITCH
EL. 369.68'

END SPECIAL DITCH
EL. 369.68'

BRIDGE OVER -Y1-

(-)1.0098%

38" RCP

BM • 56
-L- STA. 43+50.00
9.49' RT.
ELEV. 384.62'

-L- (EB)

PI = 46+00.00
EL = 406.80'
VC = 1,100'
K = 252
V = 70

(+)3.3605%

BRIDGE OVER -Y1-

(-)1.0100%

11/27/2012
T:\roadway\proj\u0071_rdy_profiles.dgn
jsiler

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 8 of 94

-SR1-
MULDEE ST. (SR 1856)

PI = 19+00.00
EL = 381.16'
VC = 740'
K = 199
V = 65

BEGIN GRADE
-SR1- STA.13+00.00
EL.364.80'

BEGIN CONSTRUCTION
-SR1- STA.8+65.00

(+)27.26%

(-)1.0000%

MILL AND RESURFACE 1½" FROM -SR1- STA.8+65 TO STA.13+00 AS DIRECTED BY THE ENGINEER

BEGIN SPECIAL CUT DITCH
-SR1- STA. 12+97.19
EL. 354.46

END SPECIAL CUT DITCH
-SR1- STA. 15+88.19
EL. 362.16

14.1 GPM

400 390 380 370 360 350 340 330

6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

-SR1-
MULDEE ST. (SR 1856)

PI = 31+00.00
EL = 369.16'
VC = 290'
K = 154
V = 60

(-)1.0000%

BEGIN TAIL DITCH
-SR1- STA. 27+14.11
EL. 370.00

END TAIL DITCH
-SR1- STA. 27+18.11
EL. 369.90

(-)12.8824%

64.1 GPM

BEGIN SPECIAL CUT DITCH
-SR1- STA. 30+70.11
EL. 362.90

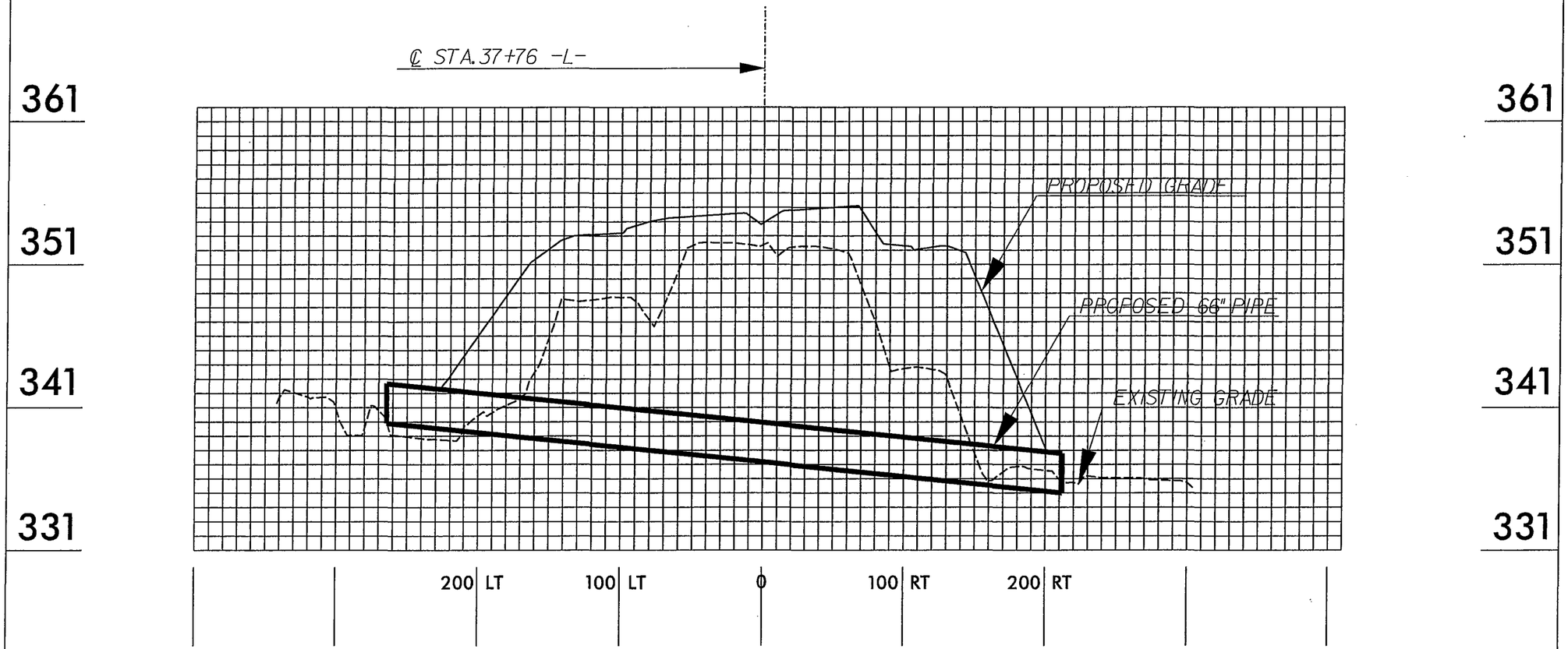
(+) 0.80%

BEGIN BASE DITCH
-SR1- STA. 33+70.11
EL. 349.80

410 400 390 380 370 360 350 340

20 21 22 23 24 25 26 27 28 29 30 31 32 33 34

11/27/2012
1:25 PM BSB
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PROFILE

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO.676		
DRAINAGE AREA	= 48	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 146.9	CFS
DESIGN HW ELEVATION	= 355.6	FT
100 YEAR DISCHARGE	= 173	CFS
100 YEAR HW ELEVATION	= 356.5	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 400	CFS
OVERTOPPING ELEVATION	= 379.0	FT

NCDOT

DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: U-0071
DURHAM EAST END CONNECTOR,
FROM NC 147
(BUCK DEAN FREEWAY) TO
NORTH OF NC 98

SHEET OF 12/27/12

PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing
Sheet 10 of 21

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
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Phone: 919.297.0220 Fax: 919.297.0221

8/17/99

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 1

TEMPORARY SURFACE WATER IMPACTS

SITE 2

Site continued on Sheet 6-B
Complete site shown on Sheet 6

PERMANENT ROCK CHECK DAMS (50' INTERVALS) SEE RDY STD 1633.02

SPECIAL LATERAL 6' BASE GRASSED SWALE SEE DETAIL SG6S 10-YR VELOCITY @ BUFFER=1.95 FT/SEC

CLASS 'I' RIP RAP 2 TONS

-RAMPC- +37.14 138.82'

-RAMPC- 30+23.66

PUE

25' CITY OF DURHAM SANITARY SEWER ESMT. PB 117 PG 147

25.00'

SURFACE WATER IMPACTS

BURY INVERT PIPE 12"

REMOVE

REMOVE 30' +/-

BZ 1

BZ 2

SF

JS

66" RCP-V

15" RCP-III

18" RCP-III

2GI WANGLE VANE GRATE

18" CSP

-RAMPC-

15" RCP-IV

PSH SEE DETAIL P1
GRADE TO EL. 351
EST. EX. 12 C.Y.

W. THOMAS
W. HAMLETT

AYERS

9/19/2003
username
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
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Permit Drawing
Sheet 11 of 47

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 1

TEMPORARY SURFACE WATER IMPACTS

SITE 2

SURFACE WATER IMPACTS

Site continued on Sheet 6-B
Complete site shown on Sheet 6

PERMANENT ROCK CHECK DAMS (50' INTERVALS) SEE RDY STD 1633.02

SPECIAL LATERAL 6' BASE GRASSED SWALE SEE DETAIL SG6S 10-YR VELOCITY @ BUFFER=1.95 FT/SEC

25' CITY OF DURHAM SANITARY SEWER ESMT. PB 117 PG 147

CLASS I RIP RAP 80 TONS

-RAMPC- 348+37.14 138.82'

PSH SEE DETAIL P1 GRADE TO EL. 351 EST. EX. 12 C.Y.

BURY INVERT PIPE 12"

REMOVE

REMOVE 30'+/-

66" RCP-V

66" RCP-IV

18" RCP-III

15" RCP-III

15" RCP-IV

2GI WANGLE VANE GRATE

-RAMPC-

W. THOMAS
W. HAMLETT

AYERS

REVISIONS 8/17/99

9/19/2013
BXW drawing
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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DAVID E. JOHNSON
JOYCE B. JOHNSON

Permit Drawing
Sheet 12 of 9a

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

N.C.D.O.T.

LATERAL BASE DITCH
SEE DETAIL L2R
EST 671 CY DDE
EST 273 TONS CLarld
EST 567 SY GFD

Site continued on Sheet 6-C
Complete site shown on Sheet 6

SITE 2

FILL IN WETLANDS

-SR1- POT Sta. 38+93.08=
-Y17- POT Sta. 12+42.03

RETAIN
BEGIN EXPRWY. GUTTER
-RAMPB- STA.19+00.00

FORMERLY RAY SALMON

BEGIN RETAINING WALL 2
BEG. 2 LINES SINGLE FACED CONC. BARRIER
-L- STA.38+35.00 LT
-RAMPB- STA.19+58.19 RT

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

REMOVE

-SR1-

-Y17-
+44
EX. R/W

ISFD

BZ 2
2GI
BZ 1
BURY PIPE
INVERT 12"
15"
JB
66" RCP III
HW
BZ 1
BZ 2
2GI
4' PS
24" HDPE
18" CMP
INV=384.13'
INV=381.72'
INV=355.71'
30' CITY OF DURHAM SANITARY SEWER ESMT PB 56 PG 87
CLASS 'II' RIP RAP
EST. 32 TONS
64 SY GFD
40+00 (-L-)
SURFACE WATER IMPACTS
27
-RAMPB- ST
Sta. 20+85.43
SPECIAL CUT DITCH
SEE DETAIL S1
SPECIAL BASE DITCH
SEE DETAIL S5
CLASS 'I' RIP RAP
EST. 11 TONS
22 SY GFD
NOTE: RIPRAP PAD TO BE COUNTERSUNK
SOIL
CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD
247
245
244
28
-SR1-
+87
75'
BLK WALL
2SBKD
ISMTLBUS
EX. R/W
S 7°48'06.9" E
EXPRESSWAY GUTTER
RE

REVISIONS

8/17/99

9/19/2013
USER: hgmay
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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DAVID E. JOHNSON
JOYCE B. JOHNSON

Permit Drawing
Sheet 13 of 91

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

N.C.D.O.T.

LATERAL BASE DITCH
SEE DETAIL L2R
EST 671 CY DDE
EST 273 TONS CLarld
EST 567 SY GFD

Site continued on Sheet 6-C
Complete site shown on Sheet 6

SITE 2

FILL IN WETLANDS

-SR1- POT Sta. 38+93.08
-Y1- POT Sta. 12+42.03

FORMERLY RAY SALMON

BEGIN EXPRWY. GUTTER
-RAMPB- STA. 19+00.00

BEGIN RETAINING WALL 2
BEG. 2 LINES SINGLE FACED CONC. BARRIER
-L- STA. 38+35.00 LT
-RAMPB- STA. 19+58.19 RT

RETAIN

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

REMOVE

-SR1-

-Y17-
+44
EX. RW

-SR1-
+87
75'

BZ 1
BURY PIPE
INVERT 12"

66" RCP-III

30" CITY OF DURHAM SANITARY SEWER ESMT PB 56 PG 87

CLASS 'II' RIP RAP
EST. 32 TONS
64 SY GFD

40+00 (-L-)

SURFACE WATER IMPACTS

-RAMPB- ST
Sta. 20+85.43

SPECIAL CUT DITCH
SEE DETAIL S1

SPECIAL BASE DITCH
SEE DETAIL S5

CLASS 'I' RIP RAP
EST. 11 TONS
22 SY GFD
NOTE: RIPRAP PAD TO BE COUNTERSUNK

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

S 7° 48' 06.9" E

EXPRESSWAY GUTTER

ISMTLBUS

BLK WALL

2SBKD

ISFD

REVISIONS

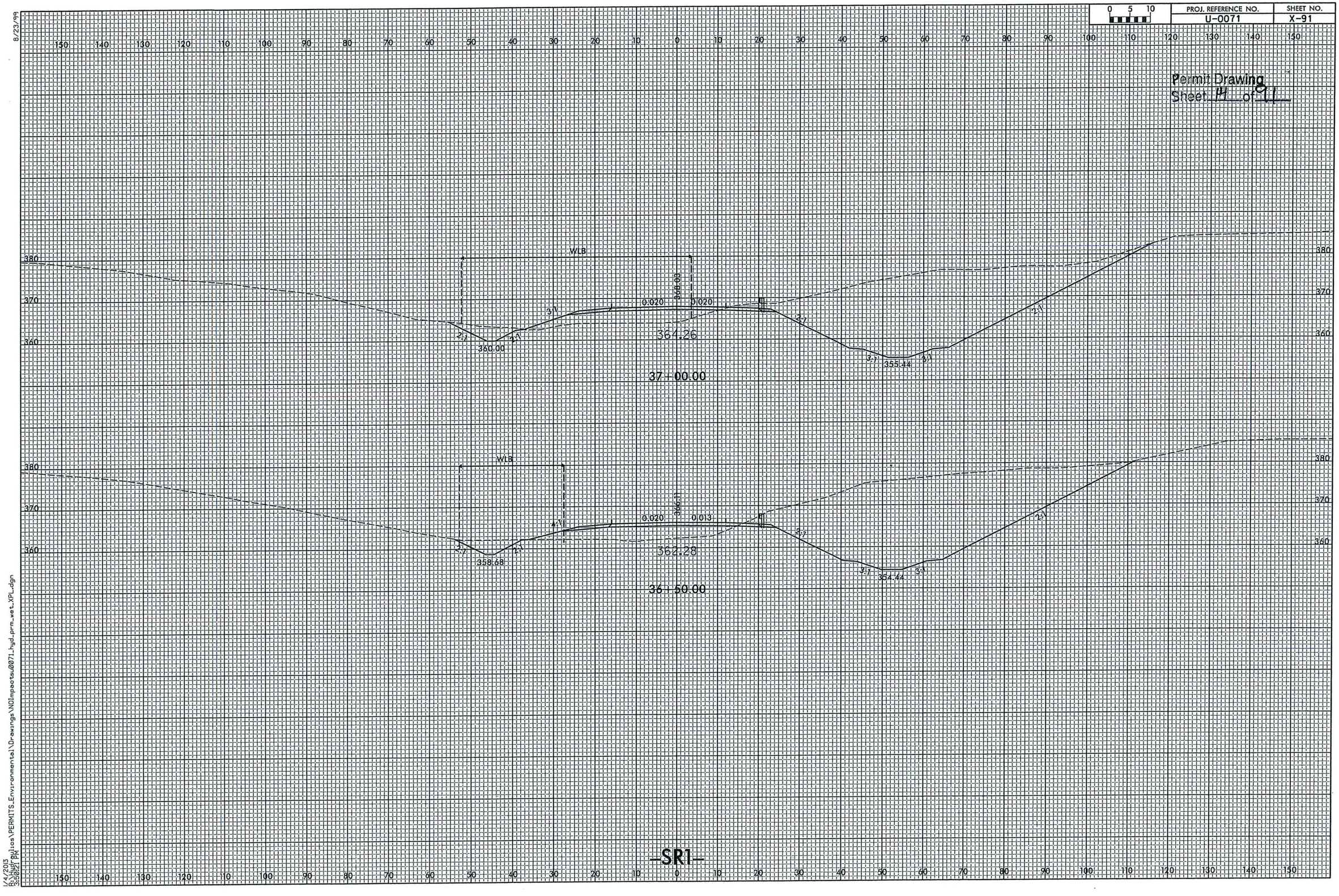
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	U-0071	X-91

Permit Drawing
Sheet 11 of 11



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PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-C
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
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Permit Drawing
Sheet 15 of 91

8/17/99

REVISIONS

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 27 TONS CL I
EST 60 SY GFD

-Y19- PT Sta. 11+77.22

SITE 2

BZ 2 Site continued on Sheet 6-B
Complete site shown on Sheet 6

24" RCP-IV

24" RCP

12" RCP

15" RCP-IV

30"

JB w/MH

CAT-1

-SR1- CB

S 56° 33' 34.2" E

S 20° 59' 20.0" W

SURFACE WATER IMPACTS

PUE

SITE 2

SR1- +46.32
50'

CLASS I' RIP RAP
EST. 4 TONS
9 SY GFD

30' CITY OF DURHAM SANITARY SEWER ESMT. PB 133 PG 204

-Y17- POT Sta. 14+50.00 60" WD

END CONSTRUCTION
-Y17- STA.14+20.00

45+00 (-L-)

GUARDRAIL BARRICADE WITH END OF ROAD MARKERS

END FENCE (48" CL)

TAYLOR FAMILY PROPERTIES, LLC

SELINA ALAM

WALLACE GERALDIN

+08.60
2+83.13
Sta. 34+00.01
POT Sta. 28+23.69
POT Sta. 25+74.01

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

9/19/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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Permit Drawing
Sheet 16 of 91

REVISIONS

8/17/99

9/19/2013

SPECIAL CUT DITCH
SEE DETAIL STR
EST 27 TONS CL I
EST 60 SY GFD

SITE 2

BZ 2 Site continued on Sheet 6-B
Complete site shown on Sheet 6

SITE 2

SURFACE WATER IMPACTS

-Y17- PT Sta. 11+77.22

-Y17- POT Sta. 14+50.00 60' WD

-SR1- S 56° 33' 34.2" E

-SR1- +46.32

END CONSTRUCTION
-Y17- STA.14+20.00

45+00 (-L-)

Sta. 34+00.01
POT Sta. 28+23.69
POT Sta. 25+74.01

+08.60
+83.13

24" RCP-IV
15" RCP IV
30" RCP IV
24" RCP
18" RCP
15" RCP
12" RCP

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

GUARDRAIL BARRICADE WITH END OF ROAD MARKERS

END FENCE (48" CL)

CLASS I RIP RAP
EST. 4 TONS
9 SY GFD

SOUTHERLAND ST

TAYLOR FAMILY PROPERTIES, LLC

SELINA ALAM

WALLACE GERALDIN

KONE KONER

ELM JOAN

36" CITY OF DURHAM SANITARY SEWER ESMT. PB 133 PG 204

ISBKBUS

ISFD

ISBLKD

246

243

261

259

SOIL

CONC

CHL

EIP

BST

PUE

2PUE

SL

SR1

9/19/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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RETAIN
Permit Drawing
Sheet 7 of 91

REVISIONS

8/17/99

REMOVE

30" C&G

CB

24" RCP

30" RCP-III BZ 2

15" RCP-IV

2GI

2GI-A

30" RCP-III END C&G
+70.75

BZ 1

15" RCP-IV

12° 00' 00.0" W

-Y1- +70
60' BST

-RAMPA- +15
81.35'

60" CONC

ISFBUS

END FENCE (48" CL)

Site continued on Sheet 6-C
Complete site shown on Sheet 6

SITE 3

LATERAL BASE DITCH
SEE DETAIL L2
EST ~~420 CY DDE~~

A

NOTE: CONTRACTOR SHALL NOT PLACE FILL IN WETLANDS

VARIABLE

DOROTHY W

36" RCP

15" RCP-IV

SURFACE WATER IMPACTS

-RAMPA-

PROP. CONCRETE EXPRESSWAY GUTTER

WOODS

126

FILL IN WETLANDS

LATERAL CUT DITCH
SEE DETAIL S1P

SAMUEL ROBERTI
DAVID WICKER, JR.
THOMAS UHRICH
DONNA MANSOUR

18" CMP

38

72" CHL & 3SBW

US 70 WBL

US 70 EB

PROP. CO

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

9/19/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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Permit Drawing
Sheet 18 of 91

REVISIONS

8/17/99

9/19/2013
username
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REMOVE

24" RCP

30" C&G

CB

60" CONC

-Y1- +70
60' BST

RW

CA

PUE

ISFBUS

RETAIN

END FENCE (48" CL)

Site continued on Sheet 6-C
Complete site shown on Sheet 6

-RAMPA- +15
81.35'

SITE 3

LATERAL BASE DITCH
SEE DETAIL L2
EST 420 CY DDE

VARIABLE

DOROTHY W

30" RCP-III

15" RCP-IV

2GI

2GI-A

BZ 1

JS

S

30" RCP-III END

10.75

12° 00' 00.0" W

931

127

36" RCP

15" RCP-IV

2GI

15" RCP-W

SURFACE WATER IMPACTS

2GI

US 70 WBL 24' E

US 70 EB

PROP. CONC. EXPRESSWAY GUTTER

-RAMPA- BZ 2

PROP. CONC

WOODS

35

25

S 9

72" CHL & 3SBW

A

NOTE: CONTRACTOR SHALL NOT PLACE FILL IN WETLANDS

126

FILL IN WETLANDS

LATERAL DITCH
SEE DETAIL S1P

SAMUEL ROBERTI
DAVID WICKER, JR.
THOMAS UHRICH
DONNA MANSOUR

18" CMP

38

DOROTHY

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-0071	X-16

Permit Drawing
Sheet 19 of 41

51+00.00

50+50.00

50+00.00

49+50.00

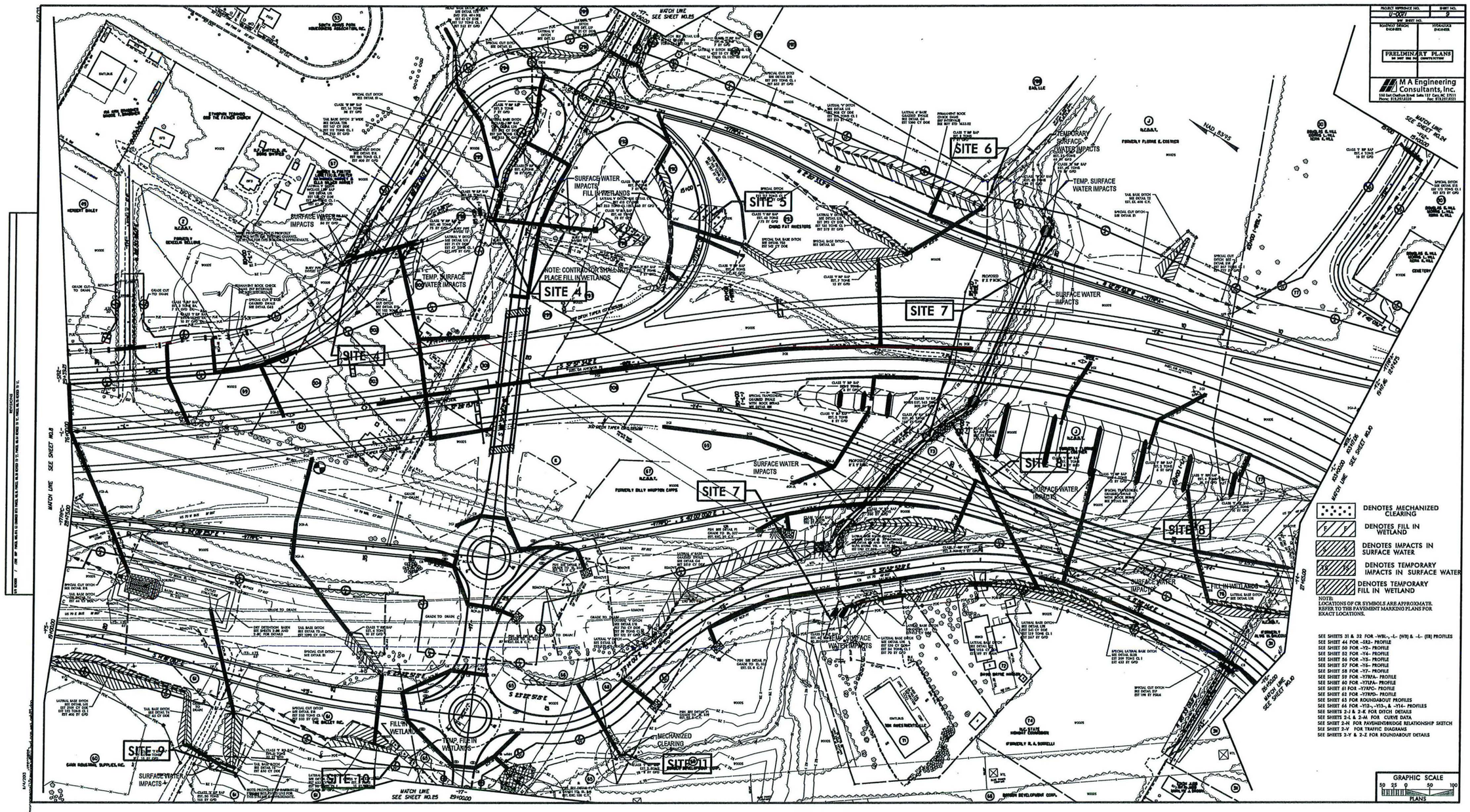
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WLB

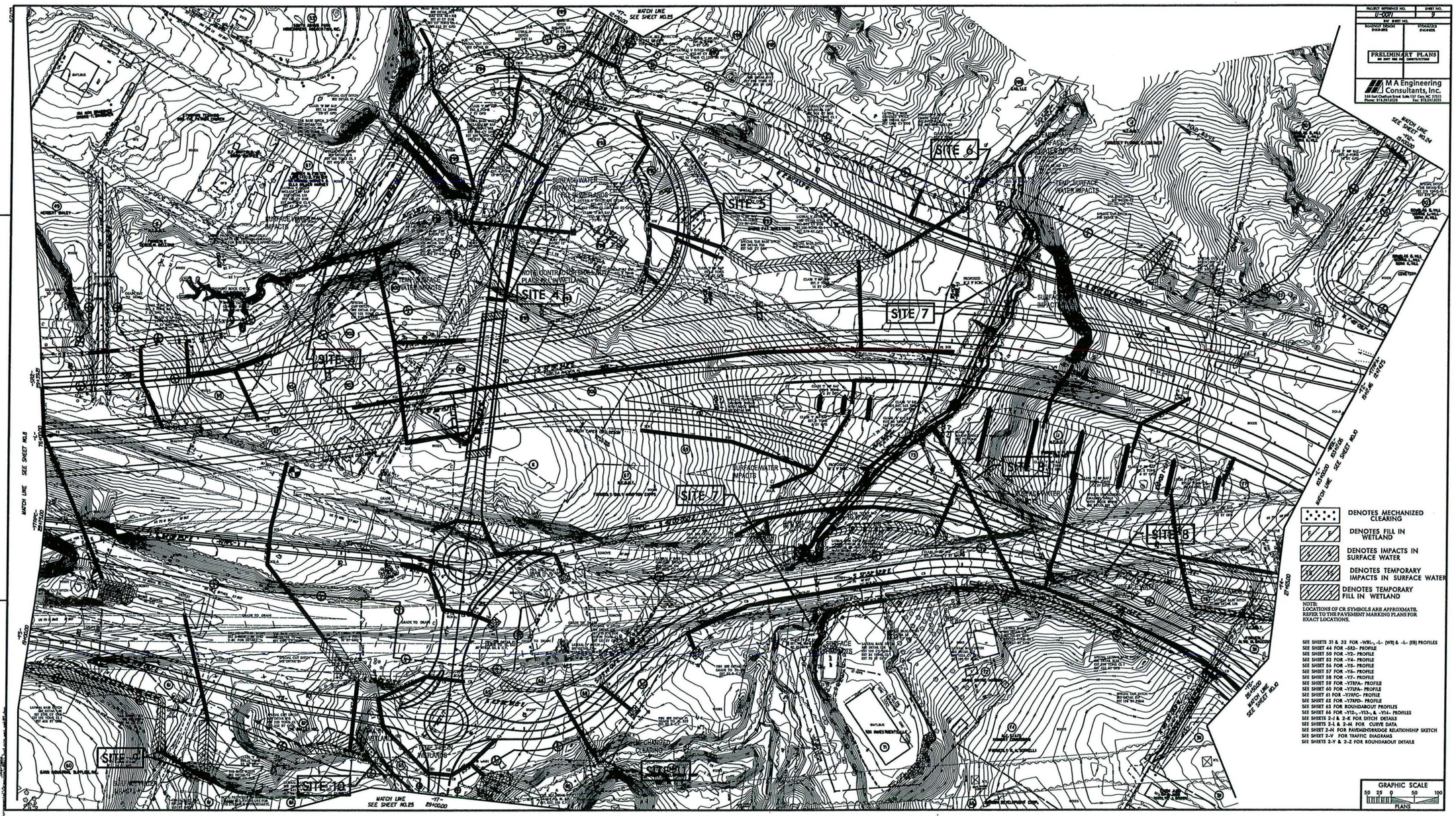
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Permit Drawing
Sheet 20 of 91



Permit Drawing
Sheet 21 of 91



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PROJECT REFERENCE NO.	SHEET NO.
U-0071	31

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 22 of 31

-L- (WB)

-WBL-

-L- (WB) Sta. 81+12.96 (25' LT) LB =
-WBL- Sta. 81+12.96 (25' LT) LA
EL. 361.10'

(-)1.6502%

(-)1.6502%

410 400 390 380 370 360 350 340 330 320

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90

-L- (EB)

(-)1.8463%

(-)1.78%

BEGIN TAIL BASE DITCH
STA. 76+50.00
EL. 356.00'

END TAIL BASE DITCH
-L- STA. 77+00 RT
EL. 355.67'

410 400 390 380 370 360 350 340 330 320

76 77 78 79 80 81 82 83 84 85 86 87 88 89 90

11/27/2012
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	32

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 21 of 91

-WBL-

PI = 92+00.00
EL = 343.16'
VC = 1,000'
K = 377
V = 70

(-)1.6502%

(-)0.90%

(-)0.60%

PROP. 6' x 9' RCSC
-WBL- 95+60.14
SKEW 106°

(+)1.0000%

BEGIN LATERAL BASE DITCH
-WBL- STA. 90+54.04
EL. 330.30

END LATERAL BASE DITCH
-WBL- STA. 91+97.10 RT.
EL. 329.60

END LATERAL BASE DITCH
-WBL- STA. 93+50.38 LT.
EL. 328.00

-L- (EB)

BM • 59
-L- STA. 95+95.85
155.11' LT.
ELEV. 325.43'

PI = 92+50.00
EL = 339.84'
VC = 800'
K = 242
V = 70

(-)11.8463%

(-)1.08%

(-)5.91%

(-)0.50%

(-)0.40%

(+)1.4600%

(+)1.50%

PROP. 8' x 9' RCBC
-L- 95+48.49
SKEW 105°

BEGIN SWALE
-L- STA. 90+50 RT.
EL. 339.54

-L- STA. 91+05 RT.
EL. 339.00

END SWALE
-L- STA. 92+65 RT.
EL. 328.38

END SWALE
-L- STA. 93+60 RT.
EL. 328.80

BEGIN SWALE
-L- STA. 96+50 RT.
EL. 328.00

-L- STA. 98+50 RT.
EL. 329.44

-L- STA. 102+25 RT.
EL. 335.97

BEGIN SWALE
-L- STA. 103+40 RT.
EL. 341.33

END SWALE
-L- STA. 103+90 RT.
EL. 342.43

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PROJECT REFERENCE NO.	SHEET NO.
U-0071	44

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

EXISTING GROUND

PROPOSED GRADE

LEFT DITCH GRADE

RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 25 of 91

-SR2-
HOOVER RD. EXT.

PI = 21+00.00
EL = 384.02'
VC = 800'
K = 842
V = > 80

(-)10.8000%

(-)2.65%

(-)11.7500%

(-)2.00%

(-)1.9530%

BEGIN SPECIAL CUT DITCH
-SR2- STA: 23+50 RT
EL: 375.48

END SPECIAL CUT DITCH
BEGIN SPECIAL CUT DITCH
-SR2- STA: 26+50 LT
EL: 348.02

-SR2- STA: 32+88 LT
EL: 358.18

END SPECIAL CUT DITCH
GRASSED SWALE (6' BASE)
-SR2- STA: 33+45 LT
EL: 366.00

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.9108

DRAINAGE AREA	= 23.6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 70	CFS
DESIGN HW ELEVATION	= 349.9	FT
100 YEAR DISCHARGE	= 85	CFS
100 YEAR HW ELEVATION	= 350.6	FT
OVERTOPPING FREQUENCY	= 100++	YRS
OVERTOPPING DISCHARGE	= 150	CFS
OVERTOPPING ELEVATION	= 354.2	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.9107

DRAINAGE AREA	= 10	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 26	CFS
DESIGN HW ELEVATION	= 355.7	FT
100 YEAR DISCHARGE	= 30	CFS
100 YEAR HW ELEVATION	= 356.0	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 0	CFS
OVERTOPPING ELEVATION	= 356.8	FT

-SR2- ST.A.42+68.26
-ROUND!- ST.A.10+69.66
EL.364.22'

END GRADE
-SR2- ST.A.42+68.24'
EL.363.82'

PI = 39+00.00
EL = 352.52'
VC = 490'
K = 97
V = 50

PI = 42+00.00
EL = 362.45'
VC = 110'
K = 84
V = 50

(-)11.7500%

(+)3.1100%

(+)2.0076%

(+)1.9980%

BEGIN SPECIAL CUT DITCH
-SR2- STA: 35+50 RT
EL: 356.93

END SPECIAL CUT DITCH
BEGIN LATERAL 'V' DITCH
-SR2- STA: 36+50 RT
EL: 350.48

BEGIN LATERAL 'V' DITCH
-SR2- STA: 36+50 LT
EL: 346.00

48" RCP (BURY 0.7')

END LATERAL 'V' DITCH
-SR2- STA: 37+35 RT
EL: 345.00

END LATERAL 'V' DITCH
BEGIN SPECIAL CUT DITCH
-SR2- STA: 37+00 LT
EL: 347.37

END SPECIAL CUT DITCH
-SR2- STA: 39+00 LT
EL: 352.83

BEGIN SPECIAL CUT DITCH
-SR2- STA: 39+50 LT
EL: 355.79

BEGIN LATERAL 'V' DITCH
-SR2- STA: 39+50 RT
EL: 350.28

END HEAD BASE DITCH
-SR2- STA: 40+00
EL: 352.00

BEGIN HEAD BASE DITCH
-SR2- STA: 39+50
EL: 354.46

30" RCP
-SR2- STA: 40+50
EL: 353.10

END LATERAL 'V' DITCH
-SR2- STA: 40+50 LT
EL: 358.93

END SPECIAL CUT DITCH
BEGIN LATERAL 'V' DITCH
-SR2- STA: 41+79
EL: 358.93

END TAIL BASE DITCH
-SR2- STA: 16+80 RT
EL: 344.36

11/27/2012
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5/28/2008

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	52

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

Permit Drawing
Sheet 25 of 91

-Y4-
US 70 E

BEGIN GRADE
-Y4- STA. 10+00.00
EL. 353.84'

PI = 11+30.00
EL = 351.16'
VC = 180'
K = 361
V = 75

PI = 17+50.00
EL = 335.29'
VC = 1,030'
K = 136
V = 60

(-)2.0615%

(-)2.5597%

(+)5.0000%

PROP. 8' x 9' RCBC
-Y4- 19+07.28
SKEW 112°

BEGIN LATERAL BASE DITCH
-Y4- STA. 25+30.00
EL. 330.00'

BM • 60
-Y4- STA. 26+86.12
136.02' RT.
ELEV. 376.94'

-Y4-
US 70 E

(+)5.0000%

BEGIN LATERAL BASE DITCH
-Y4- STA. 24+88.81 RT.
EL. 364.80'

(+)4.1796%

(+)4.5170%

BEGIN LATERAL BASE DITCH
-Y4- STA. 26+00.81 RT.
EL. 361.16'

-Y4- STA. 27+58.21
EL. 353.77' RT.

END LATERAL BASE DITCH
-Y4- STA. 28+25.30
EL. 374.80'

BRIDGE OVER -L- & -WBL-

(-)4.8912%

PI = 30+85.00
EL = 402.04'
VC = 800'
K = 81
V = 45

(+)1.25%

BEGIN LATERAL BASE GRASS SWALE
-RC- STA. 35+30.00
EL. 349.66'

11/27/2012
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BSP

5/28/99

-Y5-
MIAMI BLVD. EXT. (US 70 E BUS)

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Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	56

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 26 of 41

BEGIN GRADE
-Y5- STA 13+00.00
EL 395.26'

BEGIN RESURFACING
-Y5- STA 12+00.00
EL 397.35'

PI = 16+50.00
EL = 385.97'
VC = 200'
K = 226
V = 65

(-)2.65437%

(-)3.54007%

(-)1.44%

(-)1.98%

BEGIN SPECIAL CUT DITCH
-Y5- STA 17+61.90 RT
EL 376.70

END SPECIAL CUT DITCH
-Y5- STA 17+74.24 RT
EL 375.44

END SPECIAL CUT DITCH
-Y5- STA 19+07.90 RT
EL 364.97

410 400 390 380 370 360 350 340

10 11 12 13 14 15 16 17 18 19 20

-Y5-
MIAMI BLVD. EXT. (US 70 E BUS)

END GRADE
-Y5- STA 27+27.73
EL 360.35'

-Y5- STA 27+47.73
-ROUND3- STA 10+70.68
EL 360.75'

PI = 25+00.00
EL = 355.88'
VC = 400'
K = 73
V = 40

(-)3.54007%

(-)1.96429%

(+)12.00007%

(-)1.44%

(-)1.98%

(-)2.69%

(-)1.92%

(-)2.69%

(-)1.92%

(-)3.54%

(-)3.54%

(-)2.69%

(+)3.54%

(+)3.54%

24" RCP

16" RCP @ (-)1.92%

40 LF @ 50 LF @ (-)0.50%

10 LF @ (-)1.92%

30" RCP

END LATERAL BASE DITCH
-Y5- STA 21+50 RT
EL 354.00

END TAIL BASE DITCH
-Y5- STA 22+30.18 RT
EL 351.67

BEGIN TAIL BASE DITCH
-Y5- STA 23+10.75 RT
EL 352.00

-Y5- STA 23+22.13 RT
EL 351.09

END TAIL BASE DITCH
-Y5- STA 23+40.18 RT
EL 350.94

BEGIN SPECIAL CUT DITCH
-Y5- STA 23+50 RT
EL 350.67

BEGIN SPECIAL CUT DITCH
-Y5- STA 24+60 LT
EL 355.69

BEGIN TAIL BASE DITCH
-Y5- STA 25+11 LT
EL 352.55

END SPECIAL CUT DITCH
BEGIN LATERAL BASE DITCH
-Y5- STA 25+31.80 LT
EL 346.31

-Y5- STA 26+00.00 LT
EL 352.00

END TAIL BASE DITCH
-Y5- STA 26+00 LT
EL 352.00

END SPECIAL CUT DITCH
-Y5- STA 27+27 LT
EL 345.27

-Y5- STA 27+00.000 RT
EL 347.01

END LATERAL BASE DITCH
-Y5- STA 27+00.00 RT
EL 342.60

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.903

DRAINAGE AREA	= 14	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 55	CFS
DESIGN HW ELEVATION	= 359.7	FT
100 YEAR DISCHARGE	= 65	CFS
100 YEAR HW ELEVATION	= 360.4	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 130	CFS
OVERTOPPING ELEVATION	= 370.2	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.989

DRAINAGE AREA	= 5.9	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 32	CFS
DESIGN HW ELEVATION	= 355.0	FT
100 YEAR DISCHARGE	= 34	CFS
100 YEAR HW ELEVATION	= 355.2	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 60	CFS
OVERTOPPING ELEVATION	= 358.4	FT

410 400 390 380 370 360 350 340 330 320

20 21 22 23 24 25 26 27

11/27/2002
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M A Engineering Consultants, Inc.	PROJECT REFERENCE NO.	SHEET NO.
598 East Chatham Street Suite 137 Cary, NC 27511	U-0071	57
Phone: 919.297.0220 Fax: 919.297.0221	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 22 of 91

-Y6-
EAST END DR.

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.934

DRAINAGE AREA	= 1.5	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 5.1	CFS
DESIGN HW ELEVATION	= 342.1	FT
100 YEAR DISCHARGE	= 5.4	CFS
100 YEAR HW ELEVATION	= 342.2	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 32	CFS
OVERTOPPING ELEVATION	= 354.0	FT

-Y6- STA.8+84.44
-ROUND3- STA.12+12.06
EL.360.75'

BEGIN GRADE
-Y6- STA.9+16.44
EL.360.11'

(-)12.0000%
(-)13.4095%
(-)7.00%
(-)3.05%
(-)6.45%
(-)3.80%
(-)0.60%
(+)0.5000%
(+)0.50%
(+)3.40%
(+)6.12%
(+)5.6716%

PI = 14+30.00
EL = 342.60'
VC = 310'
K = 79
V = 45

PI = 20+30.00
EL = 345.60'
VC = 350'
K = 68
V = 40

18" R.C.P.
-Y6- STA.11+00 RT
EL.340.90
-Y6- STA.11+00 LT
EL.342.00
-Y6- STA.13+59.79 RT
EL.341.96
-Y6- STA.13+59.79 LT
EL.341.96
-Y6- STA.15+25 LT
EL.340.40
-Y6- STA.17+12.00 RT
EL.338.00
-Y6- STA.17+42 RT
EL.339.38
-Y6- STA.19+37 RT
EL.337.70
-Y6- STA.21+39 RT
EL.346.24
BEGIN LATERAL RIGHT DITCH
-Y6- STA.13+59.79 RT
EL.341.96
END LATERAL BASE DITCH
-Y6- STA.15+25 LT
EL.340.40
BEGIN LATERAL BASE DITCH
-Y6- STA.17+12.00 RT
EL.338.00
BEGIN SPECIAL LATERAL BASE DITCH
-Y6- STA.17+42.00 RT
EL.337.00

BM • 60
-Y6- STA.25+76.54
39.68' LT.
ELEV.376.94'

PI = 27+00.00
EL = 383.64'
VC = 400'
K = 137
V = 55

-Y6- STA.29+30 LT
EL.387.84

(+)12.7522%
(+)5.6716%
(+)6.6716%
(+)3.75%
(+)3.17%

END SPECIAL LATERAL DITCH
-Y6- STA.25+50 RT
EL.377.09'
BEGIN SPECIAL LATERAL DITCH
-Y6- STA.28+38 RT
EL.386.28
END SPECIAL CUT DITCH
-Y6- STA.29+00 LT
EL.387.80
END SPECIAL LATERAL DITCH
-Y6- STA.31+52 RT
EL.394.52

END GRADE
-Y6- STA.31+60.00
EL.396.30'

11/27/2012
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	58
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 28 of 41

-Y7- CARR RD.

BEGIN GRADE
-Y7- STA. 8+85.00
EL. 371.47'

PI = 11+00.00
EL = 374.70'
VC = 310'
K = 45
V = 40

-Y7- STA. 13+92.94
-ROUND1- STA. 10+00.00 =
-ROUND1- STA. 12+82.74
EL. 364.91'

-Y7- STA. 13+72.94
EL. 364.51'

PI = 13+10.00
EL = 363.25'
VC = 100'
K = 13
V = 15

-Y7- STA. 14+82.94
-ROUND1- STA. 11+41.37
EL. 363.50'

-Y7- STA. 15+02.94
EL. 363.10'

PI = 16+00.00
EL = 360.94'
VC = 120'
K = 18
V = 20

(+)1.5023%
(-)5.4524%
(-)5.4524%
(+)2.0019%
(+)2.0000%
(-)1.5667%
(-)12.0000%
(-)12.2254%
(+)4.4989%

BRIDGE OVER -L- & -WBL-

BEGIN LATERAL "C" DITCH -Y7- STA. 12+50.67 EL. 368.67'
BEGIN LATERAL "C" DITCH -Y7- STA. 13+90.47' EL. 364.22'
-Y7- STA. 13+60.47' EL. 364.74'
END LATERAL "C" DITCH -Y7- STA. 13+90.47' EL. 363.98'
END LATERAL "C" DITCH -Y7- STA. 14+40.47' EL. 363.73'
BEGIN LATERAL "B" DITCH -Y7- STA. 14+82.94' EL. 363.50'
END LATERAL "B" DITCH -Y7- STA. 15+82.94' EL. 362.90'
54" RCP BURY 1'

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 9106

DRAINAGE AREA	= 37	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 100	CFS
DESIGN HW ELEVATION	= 367.1	FT
100 YEAR DISCHARGE	= 120	CFS
100 YEAR HW ELEVATION	= 368.1	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 260	CFS
OVERTOPPING ELEVATION	= 366.4	FT

BM • 58
-Y7- STA. 23+74.01
34.37' RT.
ELEV. 375.68'

-Y7- CARR RD.

PI = 20+65.00
EL = 381.86'
VC = 260'
K = 29
V = 35

PI = 23+25.00
EL = 370.47'
VC = 60'
K = 9
V = 15

-Y7- STA. 23+75.68
-ROUND2- STA. 10+00.00 =
-ROUND2- STA. 12+82.74
EL. 371.48'

-Y7- STA. 24+65.68
-ROUND2- STA. 11+41.37
EL. 368.83'

PI = 26+50.00
EL = 361.04'
VC = 60'
K = 9
V = 15

-Y7- STA. 27+05.68
-ROUND3- STA. 10+00.00 =
-ROUND3- STA. 12+82.74
EL. 362.15'

-Y7- STA. 27+95.68
-ROUND3- STA. 11+41.37
EL. 359.50'

-Y7- STA. 23+55.68
EL. 371.08'

-Y7- STA. 24+85.68
EL. 368.43'

-Y7- STA. 26+85.68
EL. 361.75'

-Y7- STA. 28+15.68
EL. 359.10'

END GRADE
-Y7- STA. 28+65.00
EL. 357.13'

(+)4.4989%
(-)4.3808%
(+)2.0000%
(+)1.9883%
(-)2.9444%
(-)12.0000%
(-)4.4973%
(+)2.0000%
(-)2.9444%
(-)12.0000%
(+)1.9899%
(-)3.9875%

BRIDGE OVER -L- & -WBL-

5/28/99
11/27/2012
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M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	59

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 29 of 91

-Y7RPA-

PI = 11+15.00
EL = 361.70'
VC = 210'
K = 151
V = 60

PI = 17+25.00
EL = 354.50'
VC = 550'
K = 359
V = 75

(+)0.208%

(-)1.180%

(-)1.400%

(-)2.712%

BEGIN GRADE
-Y7RPA- STA. 10+00.00
EL. 361.46'

BEGIN RIGHT CUT DITCH
-Y7RPA- STA. 15+22.90 RT
EL. 352.77

BEGIN TAIL DITCH
-Y7RPA- STA. 17+43 RT
EL. 342.7

100 LF @ (-)0.80%

END TAIL DITCH
-Y7RPA- STA. 17+72.40 RT
EL. 342.50

END SPECIAL CUT DITCH
-Y7RPA- STA. 18+33 RT
EL. 344.50

(+)0.50%

PROP. 8' x 9' RCBC
-Y7RPA- 20+41.77
SKEW 95°

BEGIN LATERAL BASE
GRASSED SWALE (4' BASE)
-Y7RPA- STA. 21+80 RT
EL. 318.32

(+)0.50%

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 9132

DRAINAGE AREA	= 49	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 130	CFS
DESIGN HW ELEVATION	= 334.2	FT
100 YEAR DISCHARGE	= 150	CFS
100 YEAR HW ELEVATION	= 334.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 325	CFS
OVERTOPPING ELEVATION	= 342.9	FT

-Y7RPA-

PI = 24+00.00
EL = 336.19'
VC = 800'
K = 104
V = 50

END GRADE
-Y7RPA- STA. 29+53.56
EL. 363.87'

-Y7RPA- STA. 29+86.03
-ROUNDI- STA. 12+33.92
EL. 364.57'

(+)2.558%

(+)5.000%

(-)1.271%

(+)5.718%

(+)2.621%

(+)1.000%

(+)0.308%

64" RCP (BURY 1')

-Y7RPA- STA. 22+30.45 RT
EL. 341.73

BEGIN LATERAL "A" DITCH
-Y7RPA- STA. 22+45.00 RT
EL. 341.80

BEGIN LATERAL "C" DITCH
END GRASSED SWALE (4' BASE)
-Y7RPA- STA. 24+44.40 RT
EL. 337.58

END LATERAL "A" DITCH
-Y7RPA- STA. 25+08.98
EL. 338.98

END SPECIAL CUT DITCH
-Y7RPA- STA. 26+50.00 RT
EL. 337.26

END SPECIAL CUT DITCH
-Y7RPA- STA. 29+88.00 RT
EL. 367.50

11/27/2012
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

8/17/99

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NATHANIEL HARVEY & ELLA MILLER HARVEY

WOODS

LATERAL V DITCH
W/CLASS I RIP RAP
SEE DETAIL L1R
EST 120 CY DDE
EST 55 TONS CL. I
EST 67 SY GFD

-SR2- PT Sta. 36+56.40

TEMP. SURFACE WATER IMPACTS

CLASS 'II' RIP RAP
EST. 24 TONS
50 SY GFD

12" RCP

EIP

END CONC. PIPE

WIDENING

NOTE: PROPOSED PIPE IS PROPERLY ALIGNED WITH THE EXISTING CHANNEL. THE JS LINE FOR THIS STREAM IS APPROXIMATE.

-SR2- PCC Sta. 32+74.44

80+00 (-L-)

BZ 1

BZ 2

PUE

30.00'

BURY PIPE
INVERT 12"

HW

JS

END CONC. MED. BARRIER
-SR2- STA. 34+20.00 RT

PERMANENT ROCK CHECK DAMS (50' INTERVALS)
SEE RDY. STD. 1633.02

SPECIAL CUT 6' BASE GRASSED SWALE
SEE DETAIL G6S

WOODS

35

SURFACE WATER IMPACTS

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 102 TONS CL. I
EST 233 SY GFD

302

-WBL- CS Sta. 81+82.58

N 89° 59' 08" E

30' CITY OF DURHAM SANITARY SEWER ESMT. DB 160, PG 115

CLASS 'II' RIP RAP
EST. 40 TONS
75 SY GFD

BURY PIPE Permit Drawing
INVERT 12" Sheet 32 of 91

LATERAL V DITCH
SEE DETAIL L1R
EST 71 CY DDE
EST 47 TONS CL. I
EST 170 SY GFD

48"

48" RCP-III

JB w/MH

-Y7- PT Sta. 18+19.74

BEGIN APPROACH SLAB
-Y7- STA. 19+03.47

BEGIN BRIDGE
-Y7- STA. 19+17.61

300

SITE 4

SEAL & ABANDON WELL
-L- STA. 84+15
(120' LT)

18"

-WBL- ST
Sta. 84+07.58

ISFD

175' DITCH TAPER (STD. 225.09)

3GI-A

SOIL & GR

REMOVE

301

MAINTAINED RIGHT OF WAY

CARR RD

20' GR

10/31/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 21 of 91

REVISIONS

8/17/99

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NATHANIEL HARVEY & ELLA MILLER HARVEY

LATERAL V DITCH
W/CLASS I RIP RAP
SEE DETAIL L1R
EST 120 CY DDE
EST 55 TONS CL. I
EST 67 SY GFD

CLASS III RIP RAP
EST. 24 TONS
50 SY GFD

-SR2- PT Sta. 36+56.40

TEMP. SURFACE WATER IMPACTS

NOTE: PROPOSED PIPE IS PROPERLY ALIGNED WITH THE EXISTING CHANNEL. THE IS LINE FOR THIS STREAM IS APPROXIMATE.

-SR2- PCC Sta. 32+74.44

CLASS III RIP RAP
EST. 40 TONS
75 SY GFD

BURY PIPE INVERT 12"

LATERAL V DITCH
SEE DETAIL L1R
EST 71 CY DDE
EST 47 TONS CL. I
EST 170 SY GFD

-Y7- PT Sta. 18+19.74

BEGIN APPROACH SLAB
-Y7- Sta. 19+03.47

BEGIN BRIDGE
-Y7- STA. 19+17.61

END CONC. MED. BARRIER
-SR2- STA. 34+20.00 RT

PERMANENT ROCK CHECK DAMS (50' INTERVALS)
SEE RDY. STD. 1633.02

SPECIAL CUT C BASE GRASSED SWALE
SEE DETAIL C6S

SURFACE WATER IMPACTS

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 102 TONS CL. I
EST 233 SY GFD

SEAL & ABANDON WELLS
-L- STA. 84+15
(120' LT)

-WBL- CS Sta. 81+82.58

-WBL- ST Sta. 84+07.58

17' DITCH TAPER (STD. 225.09)

REMOVE

SITE 4

300 301 302

10/31/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing Sheet 22 of 91

8/17/99

REVISIONS

9/19/2003

SURFACE WATER IMPACTS

SITE 5

SITE 4

NOTE: CONTRACTOR SHALL NOT PLACE FILL IN WETLANDS

FILL IN WETLANDS

-Y7LPA- PT Sta. 17+33.03

-Y7+ POT Sta. 14+44.16

-Y7LPA- POT Sta. 18+00.97

-Y7- PC Sta. 16+07.52

-Y7LPA- SC Sta. 12+00.00

-Y7LPA- TS Sta. 10+00.00

-Y7LPA- TS Sta. 87+37.58

CLASS 'I' RIP RAP
EST. 3 TONS
7 SY GFD

CLASS 'II' RIP RAP
EST. 40 TONS
75 SY GFD

LATERAL V DITCH SEE DETAIL L1R
EST 415 CY DDE
EST 223 TONS CL I EST 460 SY GFD

W-CLASS I RIP RAP
SEE DETAIL L2R
EST 202 CY DDE
EST 169 TONS CL I
EST. 352 SY GFD

CLASS 'II' RIP RAP
EST. 28 TONS
SY GFD

GRAU 350

BURY PIPE INVERT 12"

60" RCP-III

36" RCP

12" RCP

18" CB

15" CB

CB

REMOVE

HW

WOODS

25' CITY OF DURHAM SANITARY SEWER ESMT. PB 127 PG 194

8' SOIL

PROP. 4" CONC. S/W

VARIABLE

TYPE-III

CARR RD 20' GR

255' DITCH TAPER (STD. 225.09)

20' TYP.

25' TYP.

+95.00

+85.00

+00.00

15+00

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing Sheet 33 of 91

REVISIONS 8/17/99

9/19/2013
dsteelman
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W CLASS I RIP RAP
SEE DETAIL L2R
EST 202 CY DDE
EST 169 TONS CL I
EST 352 SY GFD

GRAU 350

18" CB

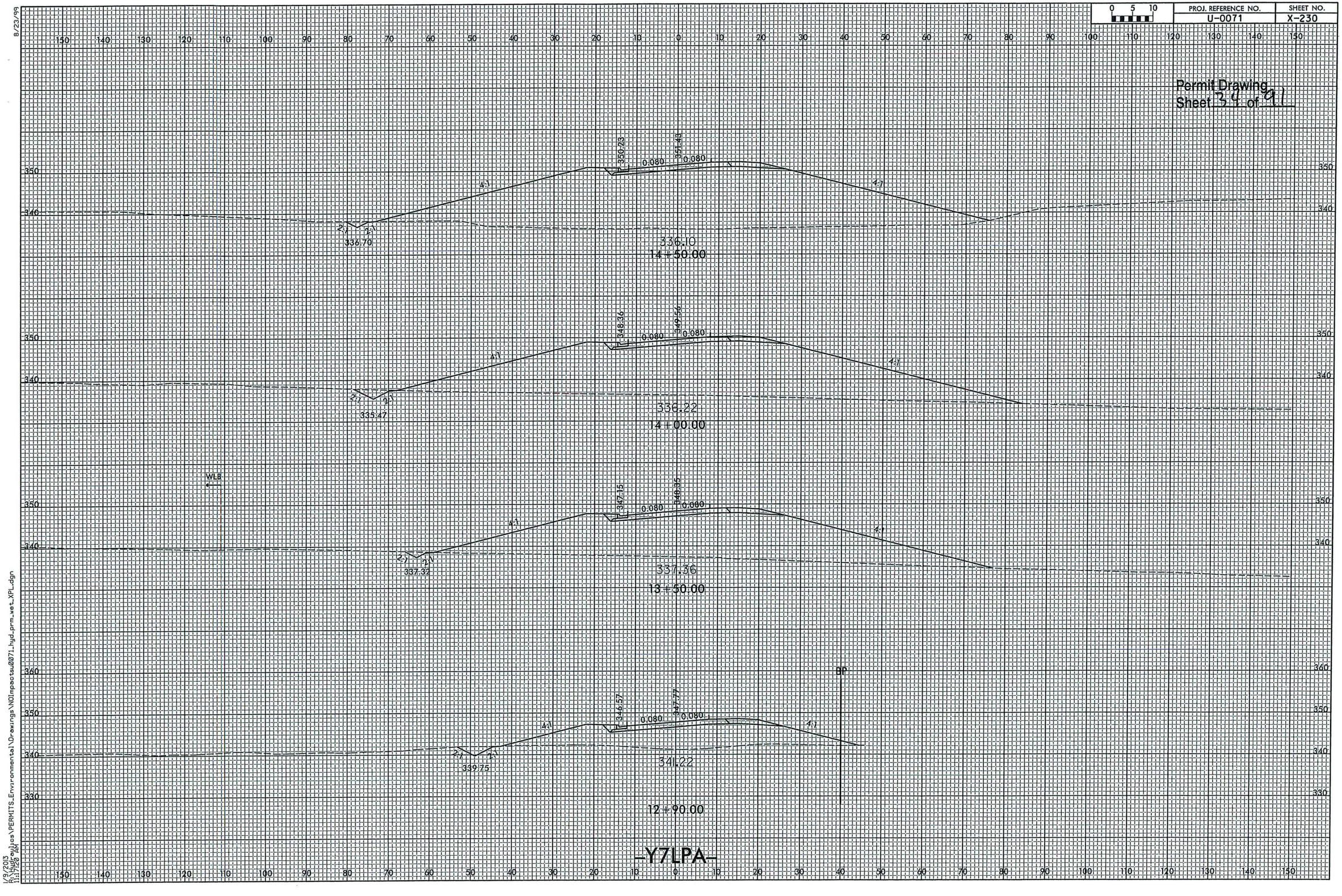
CB

CB

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-0071	X-230

Permit Drawing
Sheet 39 of 41



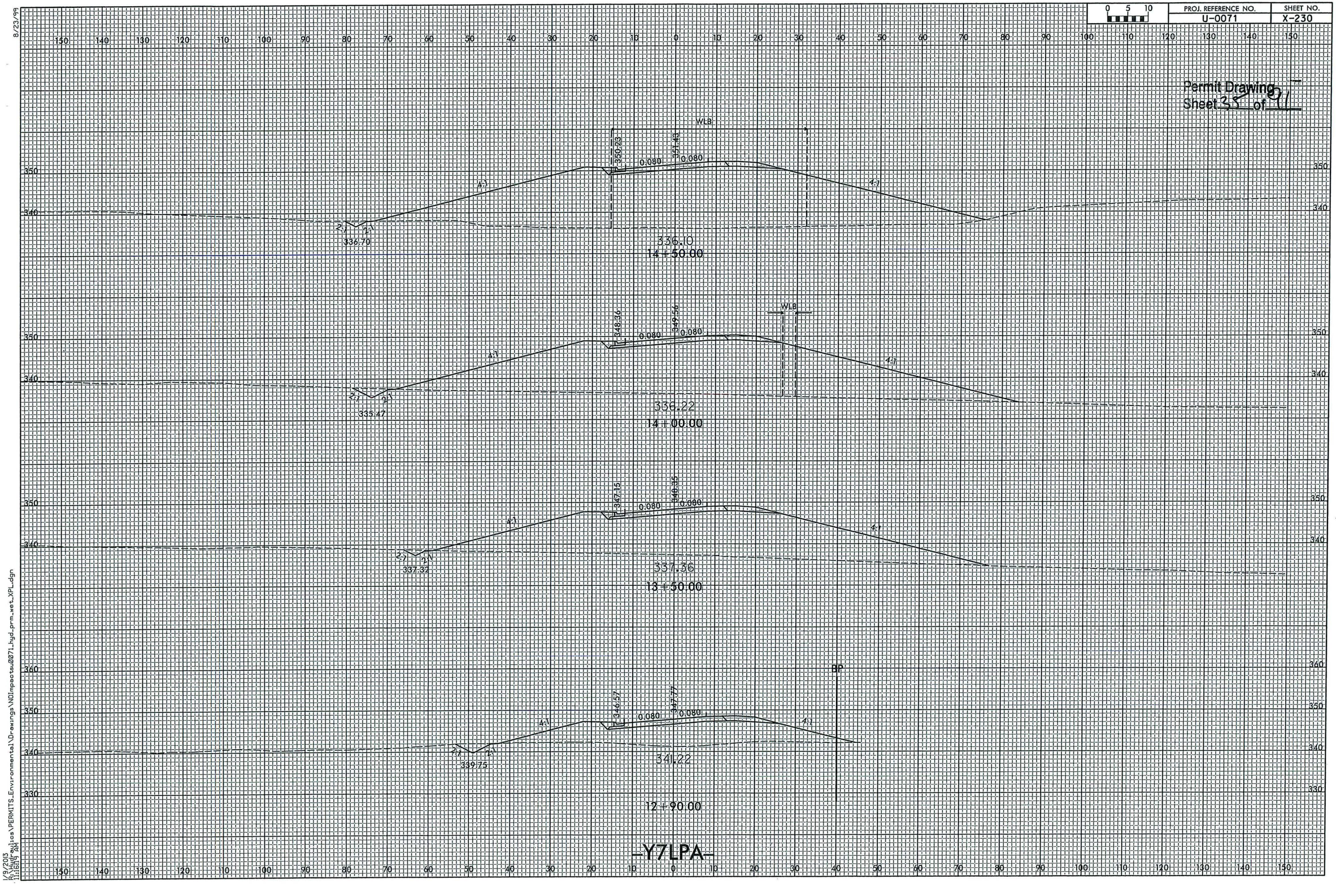
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	U-0071	X-230

Permit Drawing
Sheet 35 of 91



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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing Sheet 36 of 91

Complete site shown on Sheet 9-B

Complete site shown on Sheet 9-B

SITE 4

SITE 5

SITE 6

SITE 7

SITE 8

SITE 8

SITE 7

TEMP. SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

TEMP. SURFACE WATER IMPACTS

FILL IN WETLANDS

-Y2- SC Sta. 12+65.63

-Y2- CS Sta. 10+65.63 =
-WBL- POC Sta. 95+08.63 (61.00' LT)

-WBL- SC Sta. 94+57.58

-L- SC Sta. 93+87.96

-Y4- CS Sta. 17+99.33

-Y4- SRS Sta. 19+99.33

-Y7RPD- TS Sta. 6+37.62

-Y7RPD- SC Sta. 7+97.62

-Y7RPD- CS Sta. 9+14.66

-Y7RPD- SRS Sta. 11+54.66

-Y7RPD- SC Sta. 13+54.66 =
-Y4- POC Sta. 23+97.52 (12' RT)

-Y6- PC Sta. 24+66.24

-Y7LPA- SC Sta. 12+00.00

-Y7RPA- SC Sta. 18+00.97

-Y7RPA- STA. 23+75

END SBG -Y7RPA- STA. 19+35

BEGIN SBG -L- STA. 91+50

BEGIN SBG -Y7RPD- STA. 6+00

END SBG STA. 28+55

PROPOSED 8' X 9' RCBC

PROPOSED 8' X 9' RCBC

PROPOSED 8' X 9' RCBC

PSH SEE DETAIL P1 GRADE TO EL. 337 EST. EXC. 20 C.Y.

PSH SEE DETAIL P1 GRADE TO EL. 335 EST. EX. 8 C.Y.

SEAL & ABANDON WELL -L- STA. 90+00 (140' RT)

CHUNG FAT INVESTORS (293)

DAVID WAYNE HANSON (72)

N.C.D.O.T. (67)

N.C.D.O.T. (69)

N.C.D.O.T. (77)

N.C.D.O.T. (311)

FORMERLY BILLY HAMPTON CAPPS

FORMERLY FLORINE E. COSTNER

(FORMERLY ALVIS M. BAUCOM)

N.C.D.O.T.

SINGLE FACE CONC. BARRIER BETWEEN BARRIER w/STONE AND CONC. COVER TO STA. 85+51 MED

SPECIAL TRAPEZOIDAL GRASSED SWALE WITH ROCK BERMS SEE DETAIL RB1

SPECIAL CUT DITCH SEE DETAIL S1

SPECIAL TAIL BASE DITCH SEE DETAIL TSS EST 142 CY DDE

SPECIAL BASE DITCH SEE DETAIL S5

SPECIAL LATERAL BASE DITCH SEE DETAIL SL2R EST 209 TONS CL I EST 433 SY GFD

LATERAL BASE GRASS SWALE W/ROCK CHECKS @ 25' INTERVALS SEE DETAIL RB AND RDY. STD. 1633.02 10 YR STORM VEL = 1.95 FS EST 1702 CY DDE

LATERAL BASE GRASSED SWALE SEE DETAIL G4 EST 2519 CY DDE

LATERAL BASE DITCH SEE DETAIL L2R EST 120 CY DDE EST 34 TONS CL I EST 70 SY GFD

LATERAL BASE DITCH SEE DETAIL L2R EST 1026 CY DDE EST 189 SY FORM

LATERAL BASE DITCH SEE DETAIL L2R EST 541 CY DDE EST 129 TONS CL I EST 267 SY GFD

LATERAL BASE DITCH SEE DETAIL L2R EST 454 CY DDE EST 181 TONS CL I EST 390 SY GFD

LATERAL V DITCH SEE DETAIL L1R EST 393 CY DDE

TAIL BASE DITCH SEE DETAIL TSS EST. EX. 400 C.Y.

CLASS 'I' RIP RAP EST. 40 TONS 75 SY GFD

CLASS 'I' RIP RAP EST. 40 TONS 89 SY GFD

CLASS 'I' RIP RAP EST. 3 TONS 7 SY GFD

CLASS 'I' RIP RAP EST. 4 TONS 7 SY GFD

CLASS 'I' RIP RAP EST. 7 TONS 15 SY GFD

CLASS 'I' RIP RAP EST. 2 TONS 6 SY GFD

CLASS 'I' RIP RAP EST. 4 TONS 12 SY GFD

CLASS 'I' RIP RAP EST. 3 TONS 7 SY GFD

CLASS 'I' RIP RAP EST. 2 TONS 8 SY GFD

CLASS 'I' RIP RAP EST. 4 TONS 10 SY GFD

CLASS 'I' RIP RAP EST. 2 TONS 6 SY GFD

CLASS 'I' RIP RAP EST. 4 TONS 12 SY GFD

CLASS 'I' RIP RAP EST. 4 TONS 10 SY GFD

CLASS 'II' RIP RAP WOODS EST. 145 TONS 300 SY GFD

CLASS 'II' RIP RAP EST. 80 TONS 168 SY GFD

CLASS 'II' RIP RAP EST. 98 TONS 190 SY GFD

CLASS 'II' RIP RAP EST. 100 TONS 200 SY GFD

CLASS 'II' RIP RAP EST. 40 TONS 80 SY GFD

CLASS 'II' RIP RAP SWALE EST. 75 TONS 170 SY GFD

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

10/9/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 17 of 20

REVISIONS

8/17/99

Complete site shown on Sheet 9-B

SITE 4

SITE 5

SITE 6

SITE 7

SITE 8

TEMP. SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

-Y2- CS Sta. 10+65.63 =
-WBL- POC Sta. 95+08.63 (61.00' LT)
-WBL- SC Sta. 94+57.58

-L- SC Sta. 93+87.56

-X4- CS Sta. 17+99.33

-Y4- SC Sta. 19+99.33

-YTRPD- SC Sta. 7+97.62

-YTRPD- TS Sta. 6+37.62

-YTRPD- CS Sta. 9+14.66

-YTRPD- SRS Sta. 11+54.66

-Y4- SC Sta. 13+54.66

-Y4- POC Sta. 23+91.52 (12' RT)

-Y6- PC Sta. 24+66.24

-Y2- SC Sta. 12+65.63

-YTLPA- SC Sta. 12+00.00

-YZRPA- SC Sta. 19+35

-YTRPA- SC

-WBL- SC Sta. 95+00.00

PROPOSED 8'X 9' RCBC

PROPOSED 18'X 9' RCBC

END SBG -YTRPA- STA. 19+35

BEGIN SBG -YTRPD- STA. 6+00

BEGIN SBG -L- STA. 91+50

SEAL & ABANDON WELL -L- STA. 90+00 (140' RT)

CHUNG FAT INVESTORS

DAVIS, WAYNE HANSON

FORMERLY FLORINE C. OOSTNER

FORMERLY BILLY HAMPTON CAPPS

(FORMERLY ALVIS M. BAUCOM)

FILL IN WETLANDS

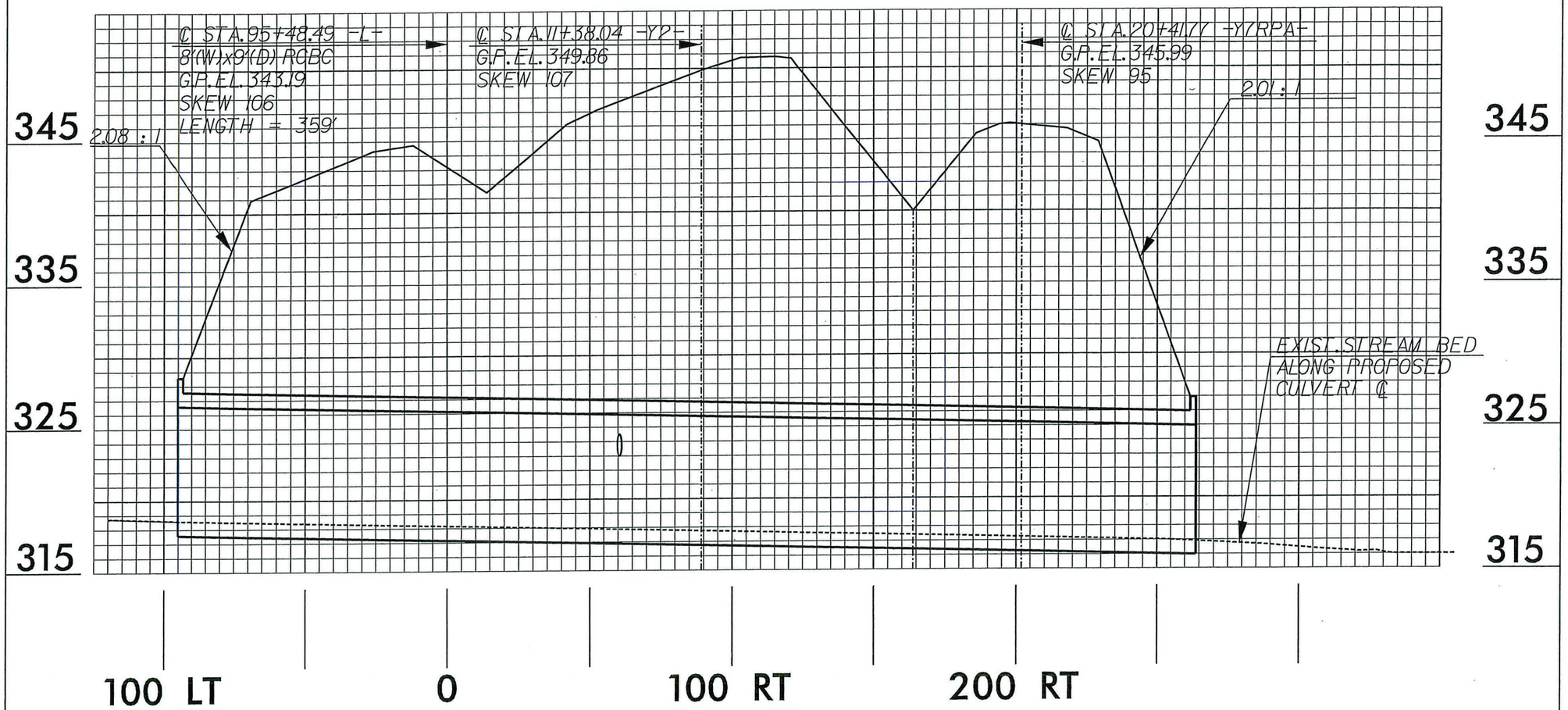
DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

10/9/2013
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Permit Drawing
Sheet 38 of 91



PROFILE

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 611	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 327.7	FT
BASE DISCHARGE	= 689	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 329.0	FT
OVERTOPPING DISCHARGE	= 1400	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 343.1	FT

NCDOT

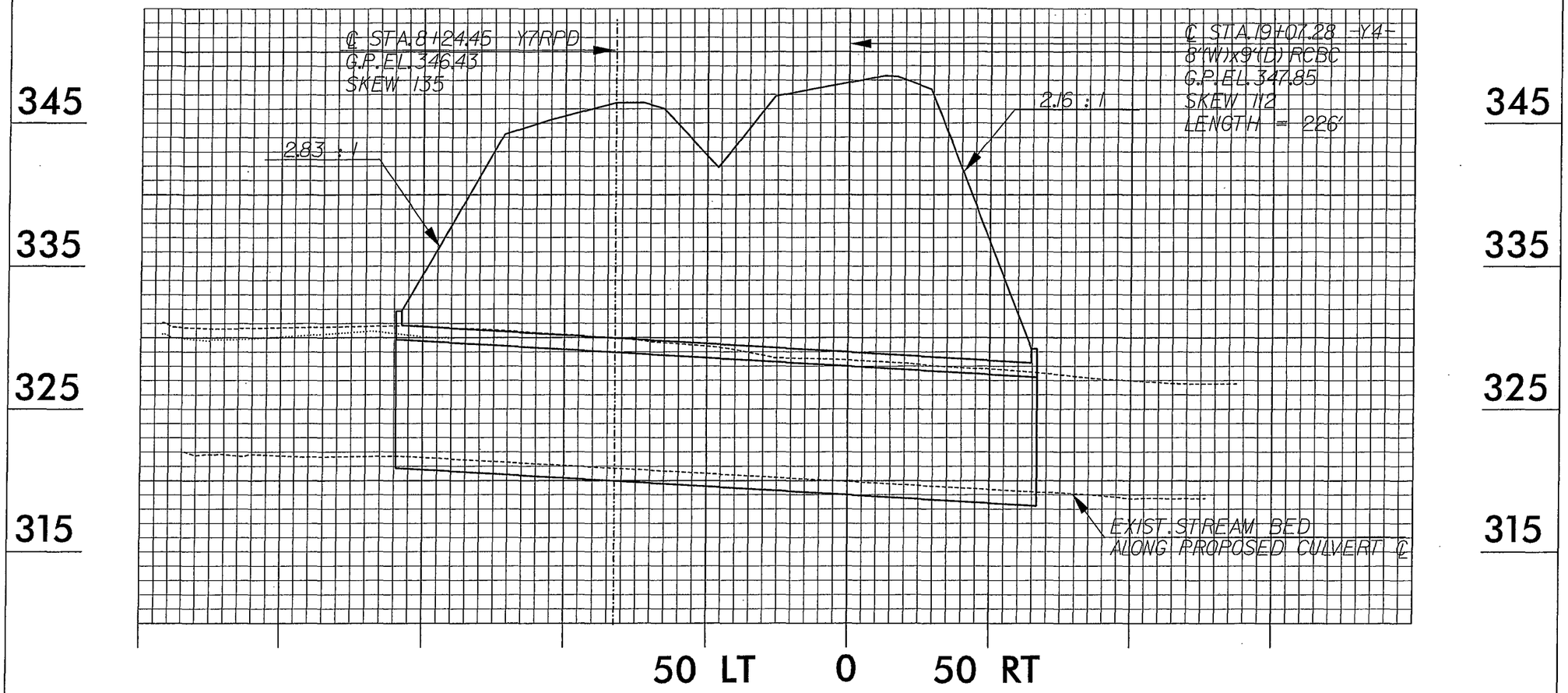
DIVISION OF HIGHWAYS

DURHAM COUNTY

PROJECT: U-0071

DURHAM EAST END CONNECTOR,
FROM NC 147
(BUCK DEAN FREEWAY) TO
NORTH OF NC 98

SHEET OF 12/27/12



PROFILE

CULVERT HYDRAULIC DATA		
DESIGN DISCHARGE	= 611	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 336.2	FT
BASE DISCHARGE	= 689	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 337.1	FT
OVERTOPPING DISCHARGE	= 1000	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 344.0	FT

NCDOT

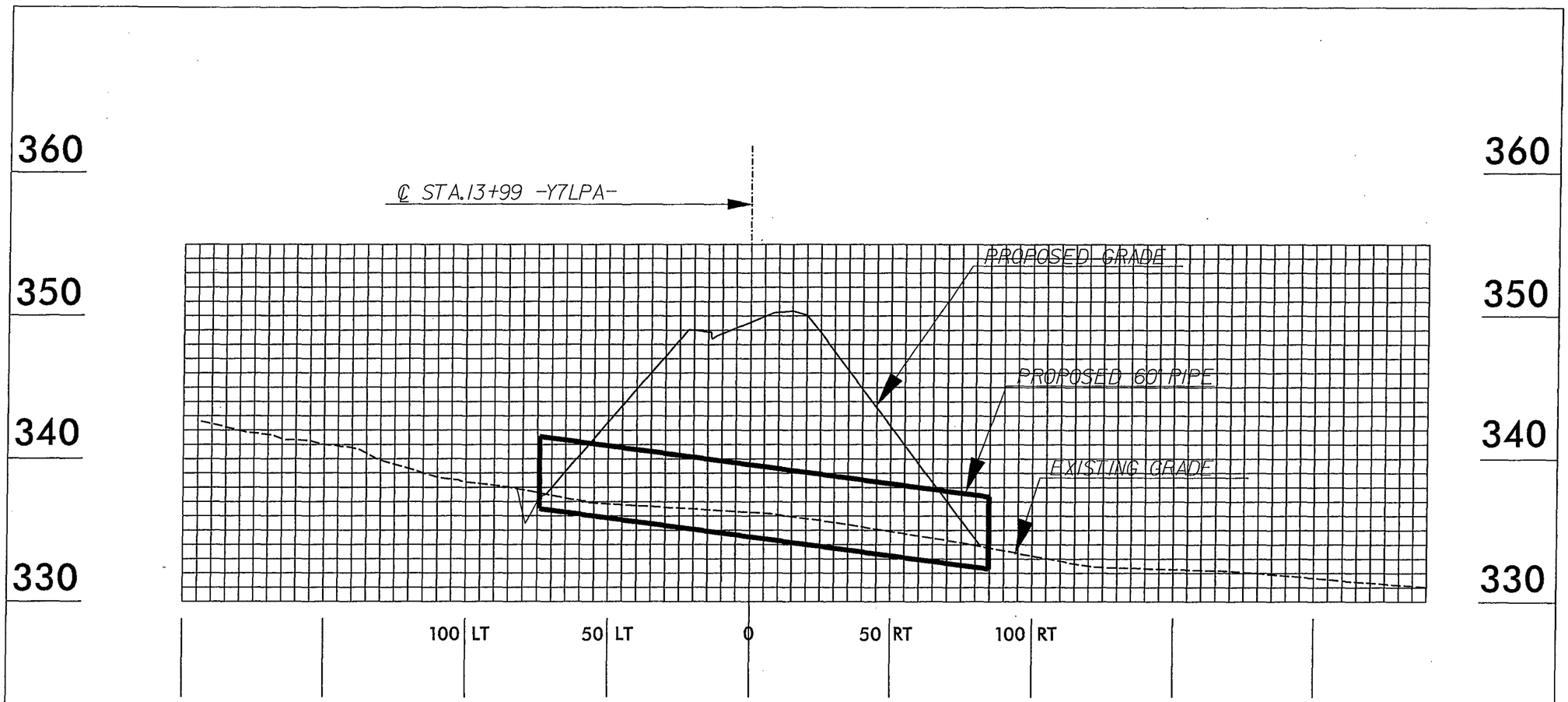
DIVISION OF HIGHWAYS

DURHAM COUNTY

PROJECT: U-0071

DURHAM EAST END CONNECTOR, FROM NC 147 (BUCK DEAN FREEWAY) TO NORTH OF NC 98

SHEET OF 12/27/12

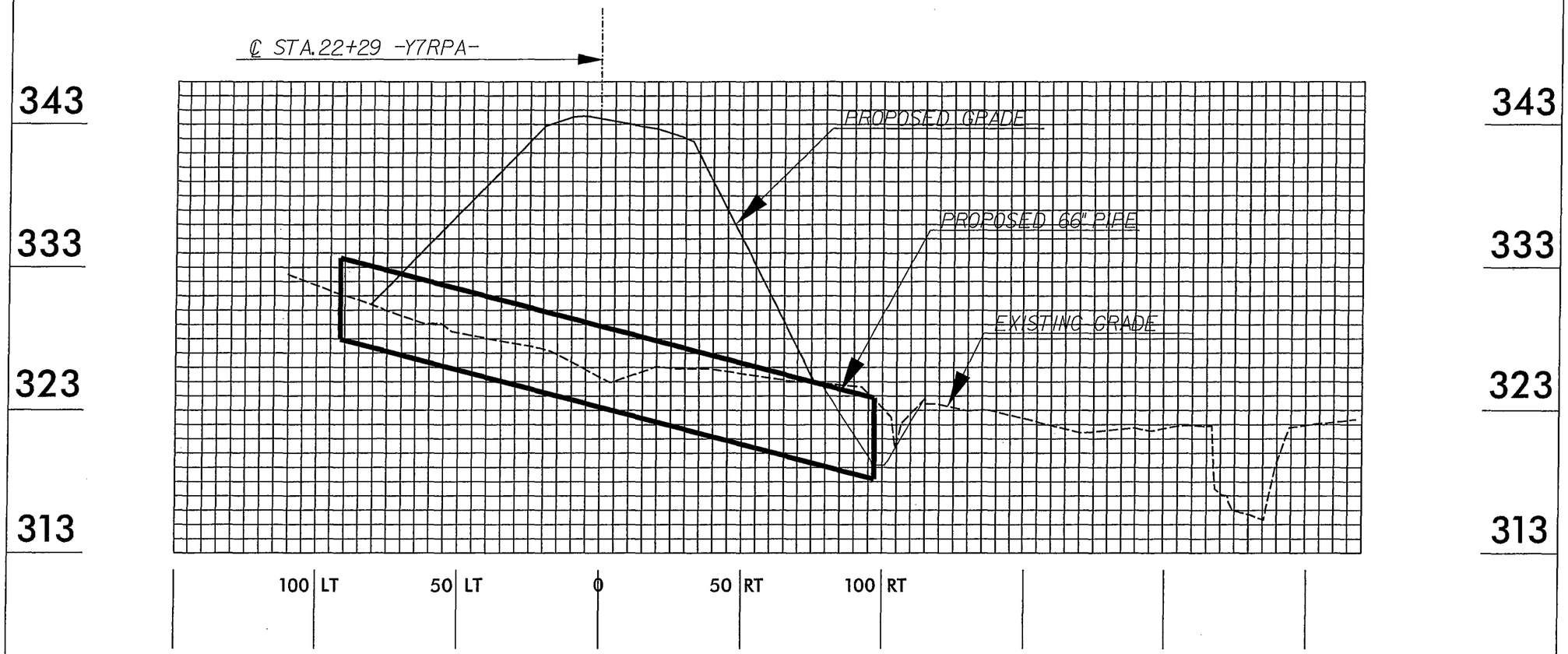


PROFILE

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO. 9124		
DRAINAGE AREA	= 40	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 105	CFS
DESIGN HW ELEVATION	= 342.4	FT
100 YEAR DISCHARGE	= 125	CFS
100 YEAR HW ELEVATION	= 343.3	FT
OVERTOPPING FREQUENCY	= 100++	YRS
OVERTOPPING DISCHARGE	= 200	CFS
OVERTOPPING ELEVATION	= 347.8	FT

NCDOT
DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: U-0071
DURHAM EAST END CONNECTOR,
FROM NC 147
(BUCK DEAN FREEWAY) TO
NORTH OF NC 98

SHEET OF 12/27/12



PROFILE

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO. 9132		
DRAINAGE AREA	= 49	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 130	CFS
DESIGN HW ELEVATION	= 334.2	FT
100 YEAR DISCHARGE	= 150	CFS
100 YEAR HW ELEVATION	= 334.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 325	CFS
OVERTOPPING ELEVATION	= 342.9	FT

NCDOT

DIVISION OF HIGHWAYS

DURHAM COUNTY

PROJECT: U-0071

DURHAM EAST END CONNECTOR, FROM NC 147 (BUCK DEAN FREEWAY) TO NORTH OF NC 98

SHEET OF **12 / 27 / 12**

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-0071	X-138

Permit Drawing
Sheet 41 of 71

8/23/99

WLB

BP

Y6
23+27.10

376.29

0.050 0.050 0.050

3:1 2:1 4:1 2:1

362.75 362.44 362.03

0.020 0.020

4:1 2:1

358.58 358.36

356.80

24+50.00

WLB

BP

Y6
23+78.11

372.79

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365.04 365.36 364.92

0.020 0.020

359.84 361.48

356.94

25+00.00

WLB

BP

Y6
24+29.26

379.39

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362.99 364.61

357.02

25+50.00

-Y4-

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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 43 of 91

REVISIONS 8/17/99

SITE 9

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 233 TONS CL I
EST 533 SY GFD

THE GALLEY INC.

CLASS 'I' RIP RAP
EST. 11 TONS
22 SY GFD

TAIL BASE DITCH
SEE DETAIL T6
EST 650 CY DDE

LATERAL BASE DITCH
SEE DETAIL L33R
EST 633 CY DDE
EST 96 TONS CL I
EST 198 SY GFD

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

CLASS 'II' RIP RAP
EST. 50 TONS
105 SY GFD

NOTE: PROPOSED RIP RAP NOT IN STREAM BED. THE JS LINE FOR THIS STREAM IS APPROXIMATE.

SITE 10

GRADE TO DRAIN

FILL IN WETLANDS

TEMP. FILL IN WETLANDS

SURFACE WATER IMPACTS

DUKE POWER COMPANY

DENOTES TEMPORARY FILL IN WETLAND

DENOTES FILL IN WETLAND

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 9 of 11

REVISIONS

8/17/99

SITE 9

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 233 TONS CL I
EST 533 SY GFD

CLASS 'I' RIP RAP
EST. 11 TONS
22 SY GFD

TAIL BASE DITCH
SEE DETAIL T6
EST 650 CY DDE

LATERAL BASE DITCH
SEE DETAIL L33R
EST 633 CY DDE
EST 96 TONS CL I
EST 198 SY GFD

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

NOTE: PROPOSED RIP RAP NOT IN STREAM BED. THE JS LINE FOR THIS STREAM IS APPROXIMATE.

CLASS 'II' RIP RAP
EST. 50 TONS
105 SY GFD

SITE 10

GRADE TO DRAIN

FILL IN WETLANDS

TEMP. FILL IN WETLANDS

SURFACE WATER IMPACTS

THE GALLEY INC.

DUKE POWER COMPANY

30" RCP-III

24" RCP-III

15" RCP-IV

DENOTES TEMPORARY FILL IN WETLAND

DENOTES FILL IN WETLAND

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

11/4/2013
dgeorge
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
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Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 45 of 91

SITE 11

REMOVE

EST. 370 C.Y. DDE

505

S 73° 14' 01.1" E

CB

15" RCP-IV

66

68

65

F

E

RW

PDE

PSH SEE DETAIL P1
GRADE TO EL. 339
EST. EX. 5 C.Y.

PSH SEE DETAIL P1
GRADE TO EL. 341
EST. EXC. 100 C.Y.

MECHANIZED CLEARING

3° 22' 57.5" E

WOODS

BZ 1

BZ 2

JS

18" RCP-III

CLASS 'I' RIP RAP
EST. 4 TONS
40 SY GFD

BORDEN DEVELOPMENT CORP.

MTL

68.00'

DUKE POWER COMPANY

DUKE POWER COMPANY ESMT.

DENOTES MECHANIZED CLEARING

8/17/99

REVISIONS

9/19/2013
jwynne
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
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Permit Drawing
Sheet 16 of 17

SITE 11

REMOVE EST. 370 C.Y. PIPE

PSH SEE DETAIL P1
GRADE TO EL. 339
EST. EX. 5 C.Y.

PSH SEE DETAIL P1
GRADE TO EL. 341
EST. EXC. 100 C.Y.

MECHANIZED CLEARING

CLASS 'A' RIP RAP
EST. 4 TONS
TO 40 SY GFD

DENOTES MECHANIZED CLEARING

S17°14'01"E

S13°22'57.5"E

15" RCP-IV

18" RCP-III

WOODS

BORDEN DEVELOPMENT CORP.

DUKE POWER COMPANY ESMT.

DUKE POWER COMPANY

MTL

68.00'

REVISIONS

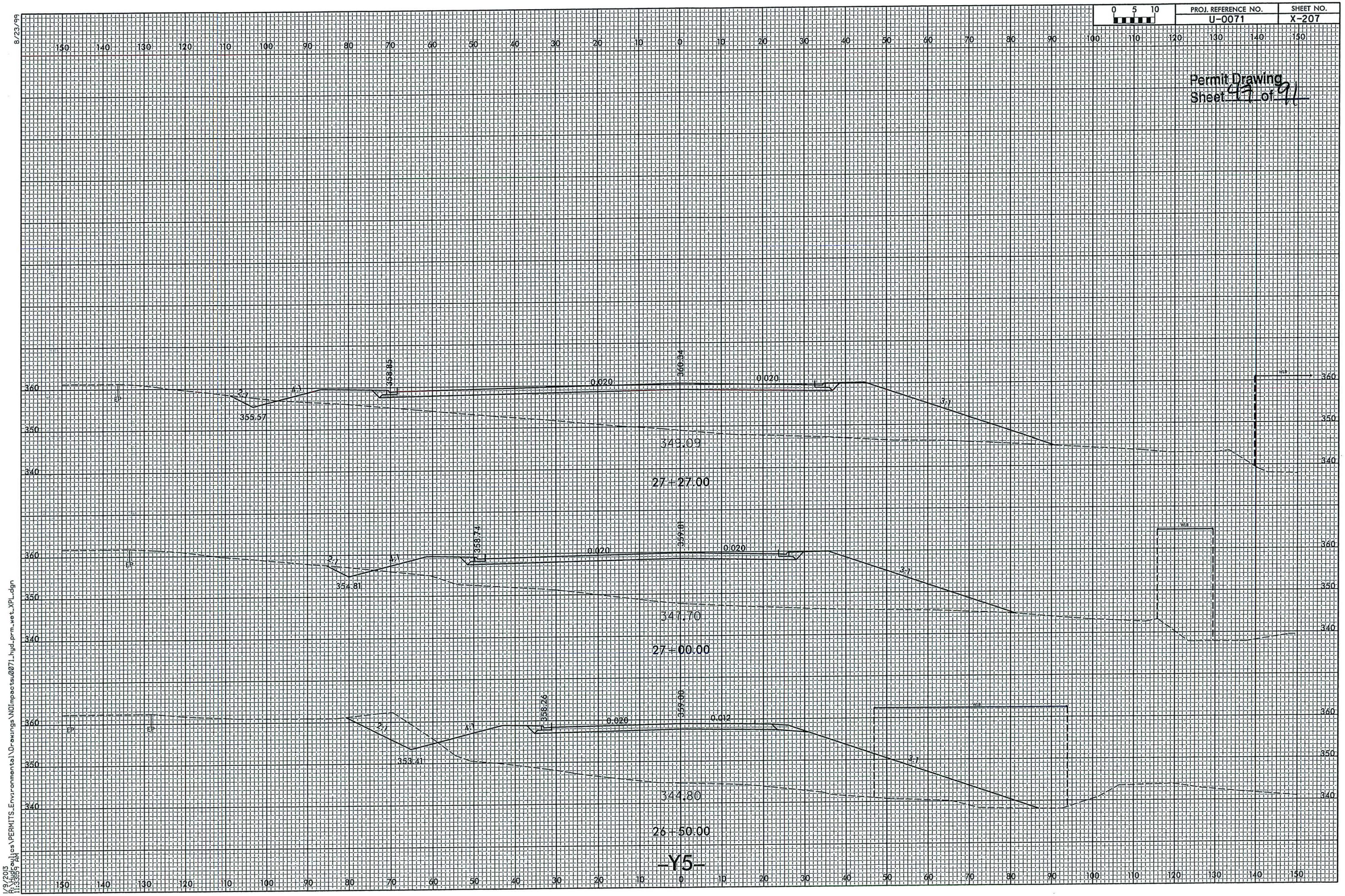
8/17/99

9/19/2013
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8/23/99

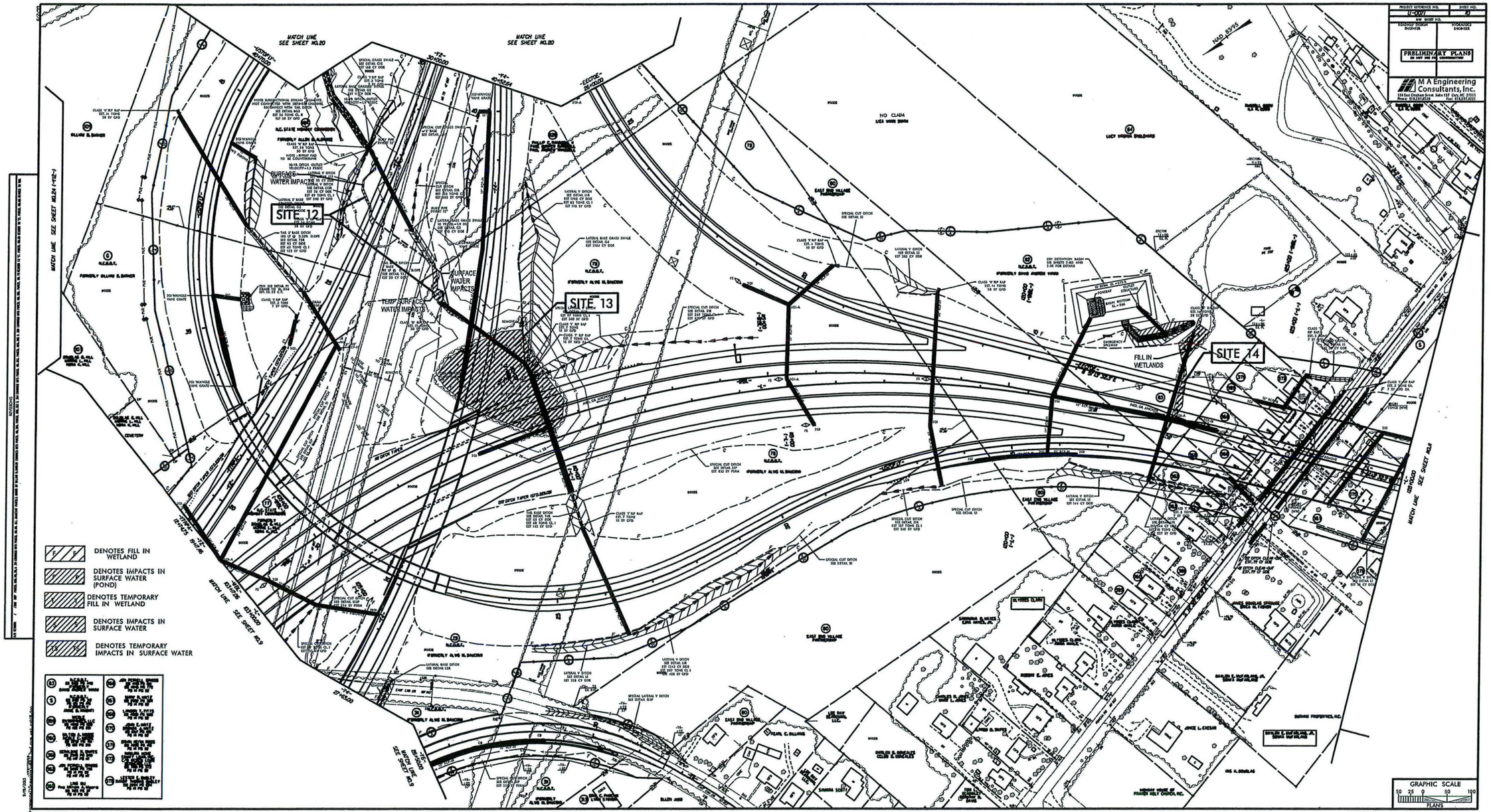
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	U-0071	X-207

Permit Drawing
Sheet 43 of 91

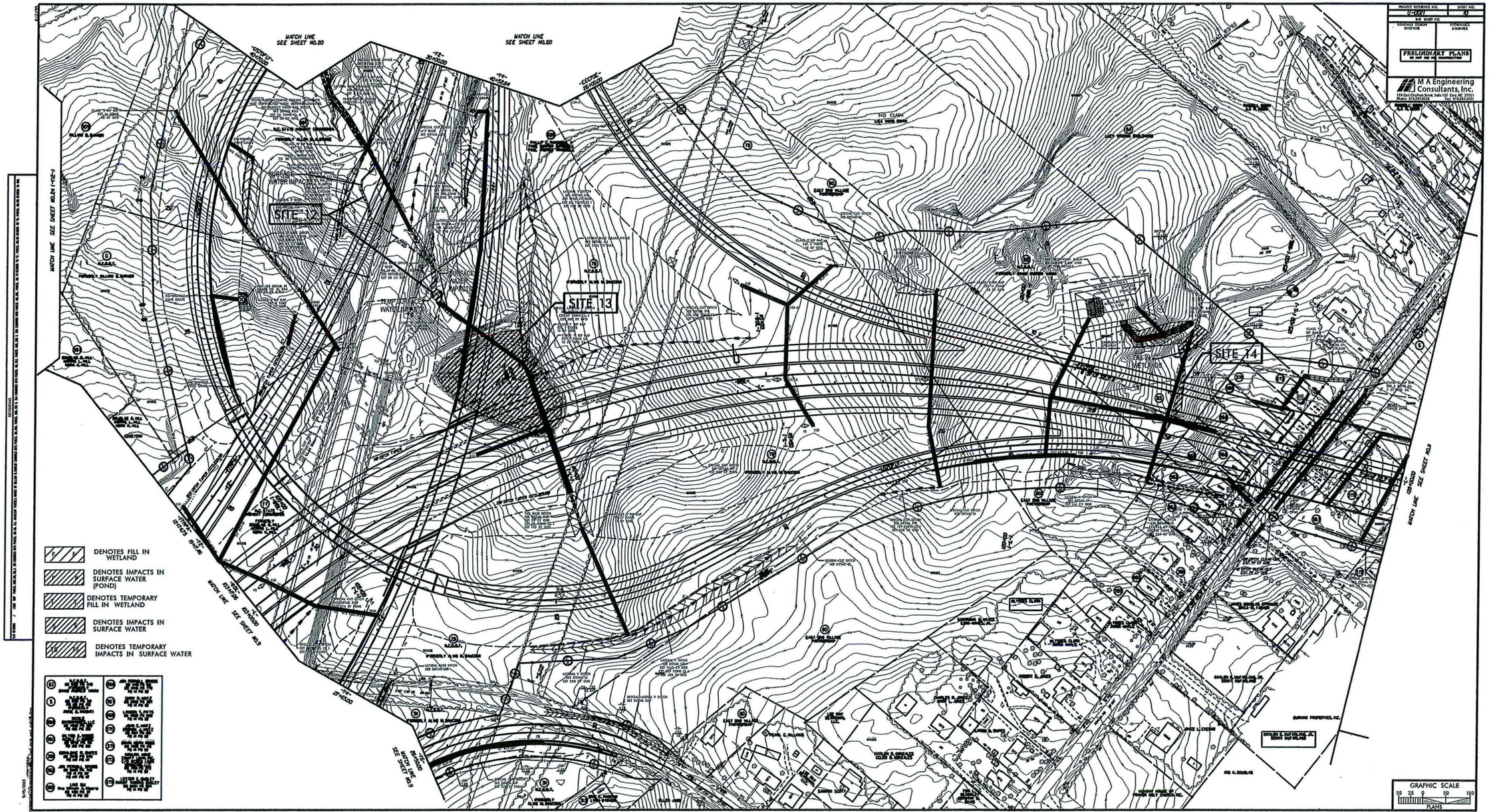


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Permit Drawing
Sheet 48 of 94



Permit Drawing
Sheet 49 of 91



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PROJECT REFERENCE NO.	SHEET NO.
U-0071	50

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 50 of 94

-Y2-
US 70 W

BEGIN GRADE
-Y2- STA.10+65.63
EL.349.61'

PI = 12+70.00
EL = 350.22'
VC = 350'
K = 264
V = 70

PI = 22+20.00
EL = 365.65'
VC = 700'
K = 161
V = 60

(+)0.2985%
(+)1.1624%
(-)12.7219%
(-)1.3932%
(-)1.1085%

PROP. 8' x 9' RCBC
-Y2- 11+38.04
SKEW 10°

BEGIN LATERAL DITCH
-Y2- STA.20+50.00 RT.
EL.368.82

-Y2- STA.21+10.00 RT.
EL.363.50

END LATERAL DITCH
-Y2- STA.23+87.00 RT.
EL.352.00

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1007

DRAINAGE AREA	= 1.8	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 7.5	CFS
DESIGN HW ELEVATION	= 354.5	FT
100 YEAR DISCHARGE	= 7.9	CFS
100 YEAR HW ELEVATION	= 354.7	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 15	CFS
OVERTOPPING ELEVATION	= 356.0	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1061

DRAINAGE AREA	= 17.8	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 59.2	CFS
DESIGN HW ELEVATION	= 344.2	FT
100 YEAR DISCHARGE	= 69.9	CFS
100 YEAR HW ELEVATION	= 345.1	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 91	CFS
OVERTOPPING ELEVATION	= 347.0	FT

BM • 65
-Y2- STA.32+04.12
136.08' RT.
ELEV.342.33'

-Y2-
US 70 W

END GRADE
-Y2- STA.33+71.33
EL.344.91'

BEGIN GRADE
-Y3- STA.33+71.33
EL.345.27'

PI = 29+50.00
EL = 345.78'
VC = 450'
K = 179
V = 65

PI = 36+00.00
EL = 344.80'
VC = 456'
K = 97
V = 50

(-)2.7219%
(-)0.2065%
(-)0.2055%
(+)1.4900%

18" RCP
SKEW 121°

BEGIN TAIL/BASE DITCH
-Y2- STA.25+93.78 (TYP.)
EL.344.00'

END TAIL/BASE DITCH
-Y2- STA.25+93.78 (TYP.)
EL.338.00'

80 LF @ 4.25%

BEGIN TAIL/BASE DITCH
-Y2- STA.26+25.81
EL.343.77'

BEGIN LATERAL DITCH
-Y2- STA.26+00.00 LT.
EL.347.28'

END TAIL/BASE GRASS DITCH
-Y2- STA.27+00.00 LT.
EL.340.00'

80 LF @ 0.96%

(-)1.5%

(-)0.3%

36" RCP
SKEW 128°

(-)1.5%

(-)1.1%

END LATERAL GRASS SWALE
-Y2- STA.27+88.18
EL.337.36'

BEGIN LATERAL GRASS SWALE
-Y2- STA.27+88.18
EL.337.36'

END LATERAL GRASS SWALE
-Y2- STA.29+30.81 LT.
EL.342.00'

(-)1.4%

(-)1.0%

END LATERAL GRASS SWALE
-Y2- STA.29+30.81 LT.
EL.342.00'

BEGIN LATERAL GRASS SWALE
-Y2- STA.29+30.81 LT.
EL.389.41'

-Y2- STA.32+00.00
EL.327.70'

END LATERAL "C" DITCH
-Y2- STA.32+35.41
EL.325.00'

PROP. 8' x 10' RCBC
-Y3- 34+45.00
SKEW 65°

BEGIN GRASS SWALE
-Y3- STA.35+50.00 RT.
EL.335.19'

-Y3-
US 70 W

(+)0.3%

11/27/2012
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	52

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 51 of 94

-Y4-
US 70 E

BEGIN GRADE -Y4- STA. 10+00.00 EL. 353.84'

PI = 11+30.00
EL = 351.16'
VC = 180'
K = 361
V = 75

PI = 17+50.00
EL = 335.29'
VC = 1,030'
K = 136
V = 60

(-)2.06154%

(-)1.25897%

(+)5.00000%

PROP. 8' x 9' RCBC
-Y4- 19+01.28
SKEW 112°

RIGHT LATERAL BASE DITCH
-Y4- STA. 23+00.00
EL. 350.00'

BM • 60
-Y4- STA. 26+86.12
136.02' RT.
ELEV. 376.94'

-Y4-
US 70 E

(+)5.00000%

END LATERAL BASE DITCH
-Y4- STA. 24+39.39 RT
EL. 364.80

(-)1.70%

(-)1.70%

BEGIN LATERAL BASE DITCH
-Y4- STA. 26+00.00 RT
EL. 361.36

-Y4- STA. 27+51.91 RT
EL. 368.50

END LATERAL BASE DITCH
-Y4- STA. 28+25.91 RT
EL. 374.50

(+)1.89124%

BRIDGE OVER -L- & -WBL-

PI = 30+85.00
EL = 402.04'
VC = 800'
K = 81
V = 45

(+)1.25%

BEGIN LATERAL BASE GRASS SWALE
-Y4- STA. 35+00.00 RT
EL. 349.50'

11/27/2012
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	53

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 52 of 91

–Y4–
US 70 E

BM • 65
-EEC70E- STA.42+57.59
57.33' RT.
ELEV. 342.33'

PI = 43+90.00
EL = 338.21'
VC = 650'
K = 82
V = 45

END GRADE
-Y4- STA. 47+37.73
EL. 348.73'

(-)4.89%

(+)3.05%

(+)1.60%

(+)0.80%

(+)0.80%

PROP. 8' x 10' RCBC
-Y4- 45+27.05
SKEW 69°

END LATERAL BASE GRASS SWALE
-Y4- STA. 39+59.41
EL. 357.53

BEGIN LATERAL BASE GRASS SWALE
-Y4- STA. 39+40.85
EL. 349.85

END LATERAL V-DITCH
-Y4- STA. 39+29.23
EL. 357.23

BEGIN SPECIAL CUT GRASS SWALE
-Y4- STA. 39+00.00
EL. 350.00

END SPECIAL CUT GRASS SWALE
-Y4- STA. 40+00.00
EL. 351.46

–US70FLY–
FLYOVER FROM US 70 W TO SB EEC

BEGIN GRADE
-US70FLY- STA.10+00.00
EL. 402.85'

PI = 11+25.00
EL = 399.25'
VC = 195'
K = 164
V = 60

PI = 15+95.00
EL = 380.12'
VC = 680'
K = 79
V = 45

(-)2.88%

(-)4.07%

(-)1.64%

(+)4.52%

(+)4.06%

(+)2.26%

(+)0.40%

(+)1.47%

(+)2.25%

(+)2.25%

(+)4.06%

30" RCP
SKEW: 97°

BEGIN LATERAL V-DITCH
-US70FLY- STA. 10+76.00
EL. 396.56

END LATERAL V-DITCH
-US70FLY- STA. 11+76.00
EL. 397.11

STA. 12+30.39
EL. 376.39

END LATERAL V-DITCH
-US70FLY- STA. 13+98.00
EL. 379.91

STA. 15+21.10
EL. 380.06

STA. 16+80.11
EL. 380.00

END SPECIAL CUT DITCH
-US70FLY- STA. 17+90.00
EL. 385.68

BEGIN SPECIAL CUT DITCH
-US70FLY- STA. 19+50.00
EL. 391.27

END SPECIAL CUT DITCH
-US70FLY- STA. 20+50.00
EL. 391.27

11/27/2012
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	10-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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Permit Drawing
Sheet 52 of 91

REVISIONS

8/17/99

SURFACE WATER IMPACTS

TEMP SURFACE WATER IMPACTS

SITE 12

Site continued on Sheets 10-B and 20

SITE 12

Site continued on Sheets 10-B and 20

TEMP SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

BEGIN USTOM DITCH

TAIL DITCH BG3 SEE DETAIL

SPECIAL GRASS SWALE SEE DETAIL G1S EST 188 CY DDE

CLASS 'I' RIP RAP EST. 3 TONS 7 SY GFD

LATERAL BASE GRASSED SWALE SEE DETAIL G2 EST 11 CY DDE

10-YR DITCH OUTLET VELOCITY = 1.9 FT/SEC

BURY PIPE INVERT 12"

SPECIAL CUT GRASS SWALE w/ 2' BASE SEE DETAIL G2

15" RCP-III

SPECIAL CUT DITCH SEE DETAIL S1R EST 133 TONS CL II EST 303 SY GFD

BURY PIPE INVERT 12"

LATERAL BASE GRASS SWALE 10 YR VEL = 1.9 F/S SEE DETAIL G2 EST 10 CY DDE

2GI W/ANGLE VANE GRATE

48" RCP-III

HW

15" BST

24" RCP

REMOVE

TAIL BASE DITCH 3' BASE 80 LF @ 0.96% SLOPE SEE DETAIL T3 EST 20 CY DDE

CLASS 'II' RIP RAP EST. 15 TONS 30 SY GFD

400' TRANSITION

JURISDICTIONAL STREAM DEFINED CHANNEL DISCONNECTED WITH TAIL DITCH RECONNECT WITH TAIL DITCH SEE DETAIL BG3 EST 26 TONS CL. II EST 50 SY GFD

N.C. STATE HIGHWAY COMMISSION

FORMERLY ALLEN D. ALDRIDGE

CLASS 'II' RIP RAP EST. 26 TONS 50 SY GFD

NOTE: RIPRAP PAD TO BE COUNTERSUNK

10-YR DITCH OUTLET VELOCITY = 1.3 FT/SEC

LATERAL V DITCH SEE DETAIL L13 EST 33 CY DDE

LATERAL V DITCH SEE DETAIL L13R EST 76 CY DDE EST 89 TONS CL. I EST 200 SY GFD

CLASS 'I' RIP RAP EST. 3 TONS 7 SY GFD

2GI W/ANGLE VANE GRATE

15" W/2 ELBOWS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

LATERAL V DITCH SEE DETAIL G2N EST 47 CY DDE

CLASS 'I' RIP RAP EST. 14 TONS 28 SY GFD

TAIL 3' BASE DITCH 3.33% SLOPE @ LF SEE DETAIL T3R CL DDE

WOODS

184

+11.45

10' PS

12' PS

24' PS

24'

-Y4-

-Y2-

-L-

BZ 1

BZ 2

T5

S1

S

F

C

9/19/2013
jay.dearing
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	10-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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Permit Drawing
Sheet 10 of 21

REVISIONS

8/17/99

SURFACE WATER IMPACTS

TEMP SURFACE WATER IMPACTS

SITE 12

Site continued on Sheets 10-B and 20

TEMP SURFACE WATER IMPACTS

SITE 12

Site continued on Sheets 10-B and 20

SURFACE WATER IMPACTS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

SPECIAL GRASS SWALE SEE DETAIL G1S EST 188 CY DDE

CLASS 'I' RIP RAP EST. 3 TONS EST. 5 SY GFD

LATERAL BASE GRASSED SWALE SEE DETAIL G2 EST 11 CY DDE

10-YR DITCH OUTLET VELOCITY = 1.9 FT/SEC

BURY PIPE INVERT 12"

SPECIAL CUT GRASS SWALE w/2' BASE SEE DETAIL G2S

SPECIAL CUT DITCH SEE DETAIL S1R EST 133 TONS CL. I EST 303 SY GFD

LATERAL BASE GRASS SWALE 10 YR VEL = 1.9 FPS SEE DETAIL G2 EST 20 CY DDE

RGI W/ANGLE VANE GRATE

15" RCP III

24" RCP

48" RCP-III

REMOVE

TAIL BASE DITCH 3' BASE @ 0.96% SLOPE 80 LF SEE DETAIL T3 EST 20 CY DDE

TRANSITION

CLASS 'I' RIP RAP EST. 15 TONS 30 SY GFD

JURISDICTIONAL STREAM DEFINED CONNECTED WITH TAIL DITCH RECONNECT WITH TAIL DITCH SEE DETAIL BG3 EST 26 TONS CL. II EST 50 SY GFD

N.C. STATE HIGHWAY COMMISSION (184)

FORMERLY ALLEN D. ALDRIDGE

CLASS 'I' RIP RAP EST. 26 TONS 50 SY GFD

NOTE: RIPRAP PAD TO BE COUNTERSUNK

10-YR DITCH OUTLET VELOCITY = 1.3 FT/SEC

LATERAL V DITCH SEE DETAIL L13 EST 33 CY DDE

LATERAL V DITCH SEE DETAIL L13R EST 76 CY DDE

EST 89 TONS CL. I EST 200 SY GFD

CLASS 'I' RIP RAP EST. 3 TONS 1 SY GFD

15" W/2 ELBOWS

RGI W/ANGLE VANE GRATE

SPECIAL GRASS SWALE SEE DETAIL G2S EST 47 CY DDE

CLASS 'I' RIP RAP EST. 14 TONS 28 SY GFD

3' BASE DITCH SLOPE 3.33% T3R

BURY PIPE 2'

SEE DETAIL BG3

SEE DETAIL BG2

SEE DETAIL BG1

SEE DETAIL BG4

WOODS

9/19/2013
dgrissom
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	10-B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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Permit Drawing
Sheet 35 of 91

N.C.D.O.T.

(FORMERLY ALVIS M. BAUCOM)

WOODS

SITE 13

SPECIAL LATERAL V DITCH
SEE DETAIL SLTR
EST 97 TONS CL. I
EST 300 SY GFD

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

SITE 12

Site continued on Sheet 10-A

% SLOPE

400' PST TRANSITION

300' TRANSITION

15" RCP-III

REMOVE 18" RCP

36" RCP

24" RCP-III

TRIANGLE VANE GRATE

DRAIN POND

TYPE B-77

GRAU 350 8:1 TAPER

MED. GR ANCHOR

PROACH SLAB
OC STA. 33+86.10
IN SBG
- STA. 33+72.21
BRIDGE
POC STA. 33+62.43

WALL
ICTURE

2GI

POC Sta. 32+13.85
07+45.55

BARRIER (61' LT)

DENOTES IMPACTS IN SURFACE WATER (POND)

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

9/19/2013
BY: dcpullias
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	10-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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Permit Drawing
Sheet 56 of 91

N.C.D.O.T.

(FORMERLY ALVIS M. BAUCOM)

WOODS

SITE 13

SPECIAL LATERAL V DITCH
SEE DETAIL SLTR
EST 97 TONS CL. I
EST 300 SY GFD

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

SITE 12

Site continued on Sheet 10-A

REMOVE

400' RST TRANSITION

300' TRANSITION

15" RCP-III

18" RCP-III

24" RCP-III

TBDI WANGLE VANE GRATE

DRAIN POND

POND 2

TYPE B-77

GRAU 350 8:1 TAPER

MED. GR ANCHOR

APPROACH SLAB
POC STA. 33+86.10
IN SBG
- STA. 33+72.21
BRIDGE
POC STA. 33+62.43

POC Sta. 32+13.85
POC Sta. 37+45.55

DENOTES IMPACTS IN SURFACE WATER (POND)

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

9/19/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	10-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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Permit Drawing
Sheet 60 of 97

8/17/99

REVISIONS

9/19/2013
RAN Engineering
J:\Projects\PERMITS_Environmental\Drawings\0071_hyd_pcm_wet_pshl0c.dgn

FOREBAY
STRUCTURE
BASIN BOTTOM
EL. = 366
15"
WOODS
EMERGENCY
SPILLWAY
CLASS 'I'
EST. 14 TONS
28 SY GFD
DENOTES FILL IN WETLAND
TDE
SITE 14
PROP. SBG FROM
-L- STA. 124+55
TO STA. 125+42.58
125+00 (-L-)
END
-Y8-
CLASS 'I'
RIP RAP
EST. 3 TONS
7 SY GFD
LATERAL TO DITCH
SEE DETAIL L1
EST 25 CY DDE
FILL IN
WETLANDS
+45.29
15' TYP.
+70.29
30" RCP-V
70E-
51° 13' 32.3" E
83
371
372
369
366
365
362
MED. GR ANCHOR
P-III
4GI-A
TYPE M350
15" RCP-III
2GI
NOISEWALL
TYPE B-77
REMOVE TYPE B-77
15" W/2 ELBOWS
END FENCE (W&M)
15' GR
18" RCP-III
15" RCP
14' GR
11' GR
12' GR
ISBKD
ISED
EIP
EHBCP
WD RAIL
W/LT
380
379
377
376
22' TYP.

PROJECT REFERENCE NO.	SHEET NO.
U-0071	10-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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Permit Drawing
Sheet 58 of 91

REVISIONS

8/17/99

9/19/2013
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SITE 14

PROP. SBG FROM
-L- STA. 124+55
TO STA. 125+42.58

FILL IN WETLANDS

DENOTES FILL IN WETLAND

CLASS 'I'
EST. 14 TONS
28 SY GFD

CLASS 'I'
RIP RAP
EST. 3 TONS
7 SY GFD

LATERAL V DITCH
SEE DETAIL L1
EST 25 CY DDE

FOREBAY

STRUCTURE

BASIN BOTTOM
EL. = 366

EMERGENCY SPILLWAY

WOODS

30" RCP-V

+45.29

+70.29

TYP.

125+00 (-L-)

END
-Y8-

TDE

TDE

15" RCP-III

2GI

15" W/2 ELBOWS

END FENCE (WD)

TYPE B-77

15' GR

18" RCP-III

14' GR

11' GR

15" RCP

REMOVE TYPE B-77

TYPE B-77

2GI

MED. GR ANCHOR

4GI-A

TYPE M350

15" RCP-III

TYPE M350

4GI-A

NOISEWALL

2GI

END FENCE

ISBKD

ISFD

WD RAIL

W/L T

15" RCP-III

83

362

365

366

369

371

372

70E-
51'13' 32.3" E

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-0071	X-45

Permit Drawing
Sheet 29 of 41

124+50.00

WBL (25' LT)
124+93.38

US70FLY
10+36.13

NOISE WALL
(SEE ENVELOPE FOR TOP ELEV.)

0.018 | 0.025 | 0.025 | 0.025

D.P. 401.26

382.26

380.65

124+00.00

WBL (25' LT)
124+43.26

US70FLY
10+85.52

NOISE WALL
(SEE ENVELOPE FOR TOP ELEV.)

0.011 | 0.025 | 0.032 | 0.032

D.P. 399.94

380.05

383.49

123+50.00

EEC70E
11+34.82

WBL (25' LT)
123+93.28

US70FLY
11+35.44

NOISE WALL
(SEE ENVELOPE FOR TOP ELEV.)

0.004 | 0.004 | 0.004 | 0.025 | 0.050 | 0.050

D.P. 358.71

376.65

380.30

123+00.00

WLB

WLB

EEC70E
11+84.96

WBL (25' LT)
123+43.28

US70FLY
11+84.76

NOISE WALL
(SEE ENVELOPE FOR TOP ELEV.)

0.002 | 0.002 | 0.002 | 0.025 | 0.068 | 0.068

D.P. 397.43

365.63

377.14

357

1/4/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing Sheet 60 of 97

REVISIONS
8/17/99
R/W REVISION / /202 DNP PARCEL NOS. 92 & 101 COMBINED INTO PARCEL NO. 92, AND PARCEL NAME CHANGED TO "DURHAM COCA COLA BOTTLING COMPANY", PARCEL NOS. 375 & 380 COMBINED INTO PARCEL NO. 375, PARCEL NO. 85 REVISED TO "S", PARCEL NO. 87 REVISED TO "L", PARCEL NO. 150 REVISED TO "M", PARCEL NO. 384 REVISED TO "X".

SITE 27
SITE 17A
SITE 17
SITE 18
SITE 15
SITE 16
SITE 17B

TEMP. IMPACTS IN SURFACE WATERS
SURFACE WATER IMPACTS
TEMP. IMPACTS IN SURFACE WATERS
PROPOSED 6' X 7' RCBC
DRY DETENTION BASIN SEE SHEETS 2-BF AND 2-BG FOR DETAILS
BASIN BOTTOM EL.=357
10' BERM EL.=364
FOREBAY
OUTLET STRUCTURE
CLASS 'II' RIP RAP EST. 20 TONS 40 SY GFD
CLASS 'II' RIP RAP EST. 16 TONS 33 SY GFD
CLASS 'II' RIP RAP EST. 12 TONS 25 SY GFD
CLASS 'II' RIP RAP EST. 17 TONS 34 SY GFD
LATERAL 'V' DITCH SEE DETAIL L1R EST 1366 CY DDE EST 276 TONS CL II EST 307 SY GFD
LATERAL BASE DITCH SEE DETAIL L3 EST 509 CY DDE
10-YR VELOCITY @ BUFFER=1.95 FT/SEC
BEGIN FENCE (60' CL)

N.C.D.O.T. (FORMERLY DORIS M. LINDSEY)
N.C.D.O.T. (FORMERLY WILLIAM K. GRAHAM)
N.C.D.O.T. (FORMERLY R.G. FAULKNER)
N.C.D.O.T. (FORMERLY ANNIE D. KNIGHT)
N.C.D.O.T. FORMERLY ALBERT L. HIGHT
N.C.D.O.T. FORMERLY OTIS L. WALLER
ALICE SHAMBLEY YATES
IRIS K. DOUGLAS
WILLIAM A. ROCHELLE BELINDA H. ROCHELLE
DURHAM PROPERTIES, INC.
DURHAM COCA COLA BOTTLING COMPANY

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES FILL IN WETLAND

370 JOHN E. HINTZ, BRENDA J. HINTZ	382 JOSHUA H. MILAN, DEBORAH S. MILAN	383 JAMIE WILLIAM WRENN, CASEY NICHOLAS WRENN
378 LESTER E. DUDLEY, RANDY THOMAS DUDLEY	381 FRANKIE D. WILSON, JOHN L. DILLARD, JR.	

MATCH LINE SEE SHEET NO.10 -L- 128+00.00
MATCH LINE SEE SHEET NO.12 -DFLW- -DFEB- -DFW- -DFLY- 11+84.92 142+25.00 21+84.75

9/19/2013
User:rhamm
P:\Projects\PERMITS_Environmental\Drawings\0071 hyd prm west psh11.dgn

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing Sheet 67 of 91

REVISIONS
8/17/99
R/W REVISION / /2002 RMP PARCEL NOS. 32 & 80 COMBINED INTO PARCEL NO. 32, AND PARCEL NAME CHANGED TO "DURHAM COCA COLA BOTTLING COMPANY". PARCEL NO. 65 REVISED TO "5". PARCEL NO. 67 REVISED TO "1". PARCEL NO. 90 REVISED TO "8". PARCEL NO. 304 REVISED TO "9".

MATCH LINE SEE SHEET NO.10 -L- 128+00.00

MATCH LINE SEE SHEET NO.12 -DFLW- 21+84.75 -DFEB- 142+25.00 -DFLWB- 11+84.67

SITE 27
SITE 17A
SITE 17
SITE 18
SITE 15
SITE 16
SITE 17B

TEMP. IMPACTS IN SURFACE WATERS
SURFACE WATER IMPACTS
TEMP. IMPACTS IN SURFACE WATERS

N.C.D.O.T. (FORMERLY DORIS M. LINDSEY)
N.C.D.O.T. (FORMERLY WILLIAM K. GRAHAM)
N.C.D.O.T. (FORMERLY R.C. FAULKNER)
N.C.D.O.T. (FORMERLY ANNE D. KNIGHT)
ALICE SHAMBLEY YATES
N.C.D.O.T. FORMERLY ALBERT L. HIGHT
N.C.D.O.T. FORMERLY OTIS L. WALLER
IRIS K. DOUGLAS
IRIS K. DOUGLAS
WILLIAM A. ROCHELLE
BELINDA H. ROCHELLE
DURHAM PROPERTIES, INC.
DURHAM COCA COLA BOTTLING COMPANY

DRY DETENTION BASIN SEE SHEETS 2-BF AND 2-BG FOR DETAILS

CLASS 'II' RIP RAP EST. 216 TONS 191 SY GFD
CLASS 'II' RIP RAP EST. 20 TONS 10 SY GFD
CLASS 'II' RIP RAP EST. 12 TONS 28 SY GFD
CLASS 'II' RIP RAP EST. 17 TONS 34 SY GFD

LATERAL 'V' DITCH SEE DETAIL L1E EST 1366 CY DDE EST 226 TONS CL I EST 267 SY GFD

LATERAL BASE DITCH SEE DETAIL L3 EST 509 CY DDE
10-YR VELOCITY @ BUFFER=1.95 FT/SEC

PROPOSED 6'X7' RCBC

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES FILL IN WETLAND

370 JOHN E. HINTZ, BRENDA J. HINTZ	382 JOSHUA H. MILAN, DEBORAH S. MILAN	383 JAMIE WILLIAM WRENN, CASEY NICHOLAS WRENN
378 LESTER E. DUDLEY, RANDY THOMAS DUDLEY	381 FRANKIE D. WILSON, JOHN L. DILLARD, JR.	

9/19/2013
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5/28/1998

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 35 of 41

-DFLW-

-L- (WB) STA.129+00.00 (25' LT.) LB =
-DFLW- (WB) STA.8+59.74 (0' LT.) LA
EL.415.86'

(+)2.9264%

PROP. 6' x 7' RCBC
-DFLW- 12+98.86
SKEW 85°

PI = 18+45.00
EL = 444.69'
VC = 1720'
K = 248
V = 70

(+)2.9264%

(-)4.0000%

BRIDGE OVER -Y15-,NS SWITCHYARD, & -Y16-

EX. R/W (RR)

EX. R/W (RR)

-LDFEB-

-L- (EB) STA.129+00.00 (25' RT.) LB =
-LDFEB- STA.129+00.00 (0' RT.) LA
EL.415.86'

(+)2.9266%

PROP. 6' x 7' RCBC
-LDFEB- 133+45.79
SKEW 66°

PI = 136+25.00
EL = 437.08'
VC = 1,170'
K = 247
V = 70

(-)1.8030%

BRIDGE OVER -Y15-,NS SWITCHYARD, & -Y16-

EX. R/W (RR)

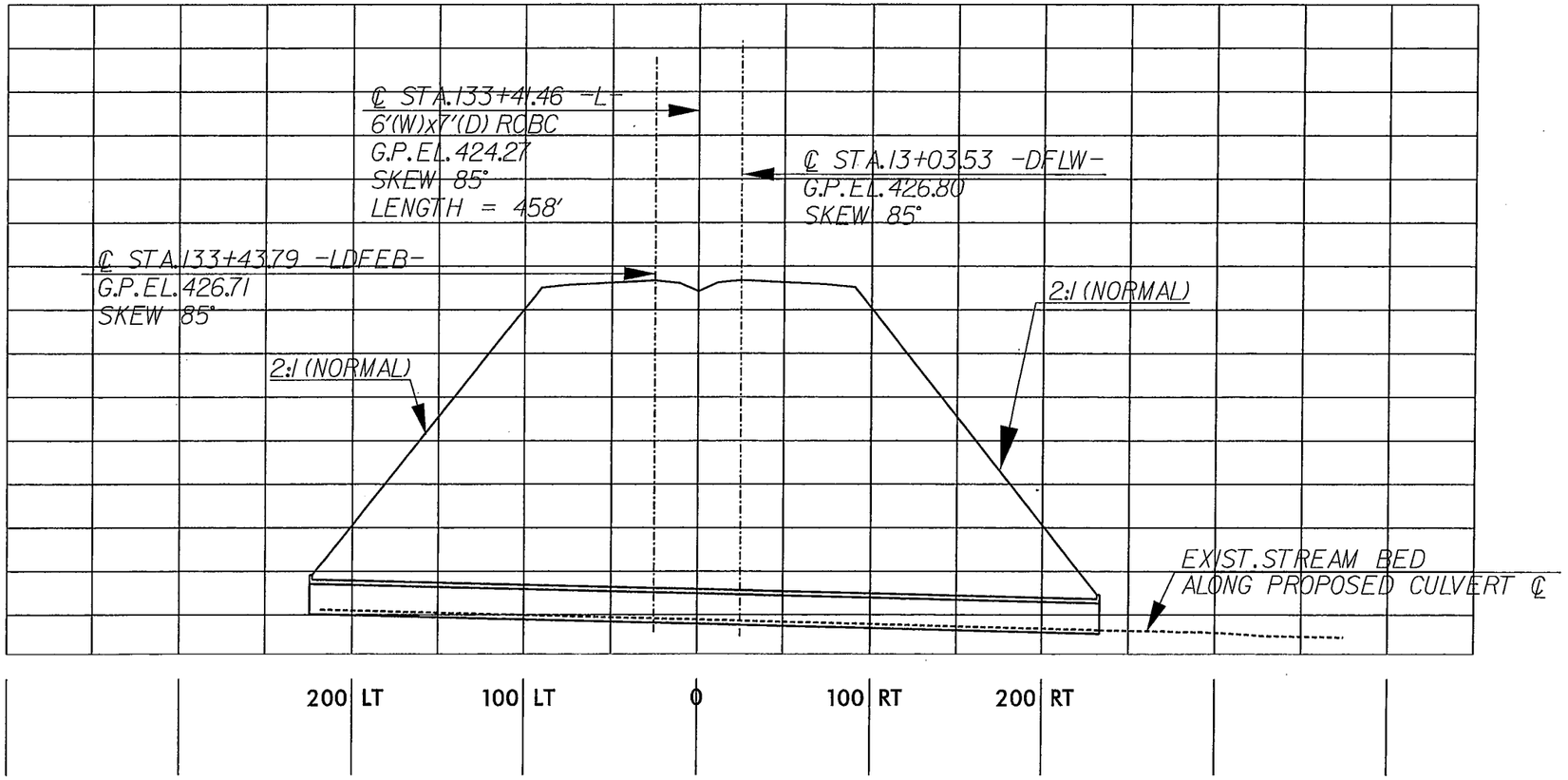
EX. R/W (RR)

BM • 54
-LDFEB- STA.130+35.04
979.40' LT.
ELEV.377.68'

BM • 62
-LDFEB- STA.141+49.93
1,534.47' LT.
ELEV.377.68'

11/27/2002
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Permit Drawing
Sheet 63 of 91



PROFILE

CULVERT HYDRAULIC DATA		
DESIGN DISCHARGE	= 280	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 358.0	FT
BASE DISCHARGE	= 330	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 358.8	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= N/A	FT

NCDOT
DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: U-0071
DURHAM EAST END CONNECTOR,
FROM NC 147
(BUCK DEAN FREEWAY) TO
NORTH OF NC 98

SHEET OF **12/27/12**

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-0071	X-49

Permit Drawing
Sheet 29 of 31

DFLW
12+09.78
-425.08-

UDFEB
132+50.00
-425.21-

NOISE WALL
(SEE ENVELOPE FOR TOP ELEV.)

0.025

D.P. 422.76

361.96

388.33

132+50.00

W.B.

DFLW
11+59.78
-422.02-

UDFEB
132+00.00
-422.02-

0.025

D.P. 421.68

365.09

388.33

132+00.00

DFLW
11+09.78
-422.86-

UDFEB
131+50.00
-422.90-

0.025

D.P. 420.50

370.07

388.33

131+50.00

-L-

4/4/2015
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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-0071	X-49

Permit Drawing
Sheet 65 of 91

WLB

DFLW
12+09.74

LDFEB
132+50.00

NOISE WALL
(SEE ENVELOPE FOR TOP ELEV.)

0.025 | 6:1 | 6:1 | 0.025 | 2:1 | 4:1

D.F. 422.76

364.96

358.33

132+50.00

DFLW
11+99.74

LDFEB
132+00.00

NOISE WALL
(SEE ENVELOPE FOR TOP ELEV.)

0.025 | 6:1 | 6:1 | 0.025 | 2:1 | 4:1

D.F. 421.68

365.09

358.33

132+00.00

DFLW
11+09.74

LDFEB
131+50.00

NOISE WALL
(SEE ENVELOPE FOR TOP ELEV.)

0.025 | 6:1 | 6:1 | 0.025 | 2:1 | 4:1

D.F. 420.50

370.07

366.33

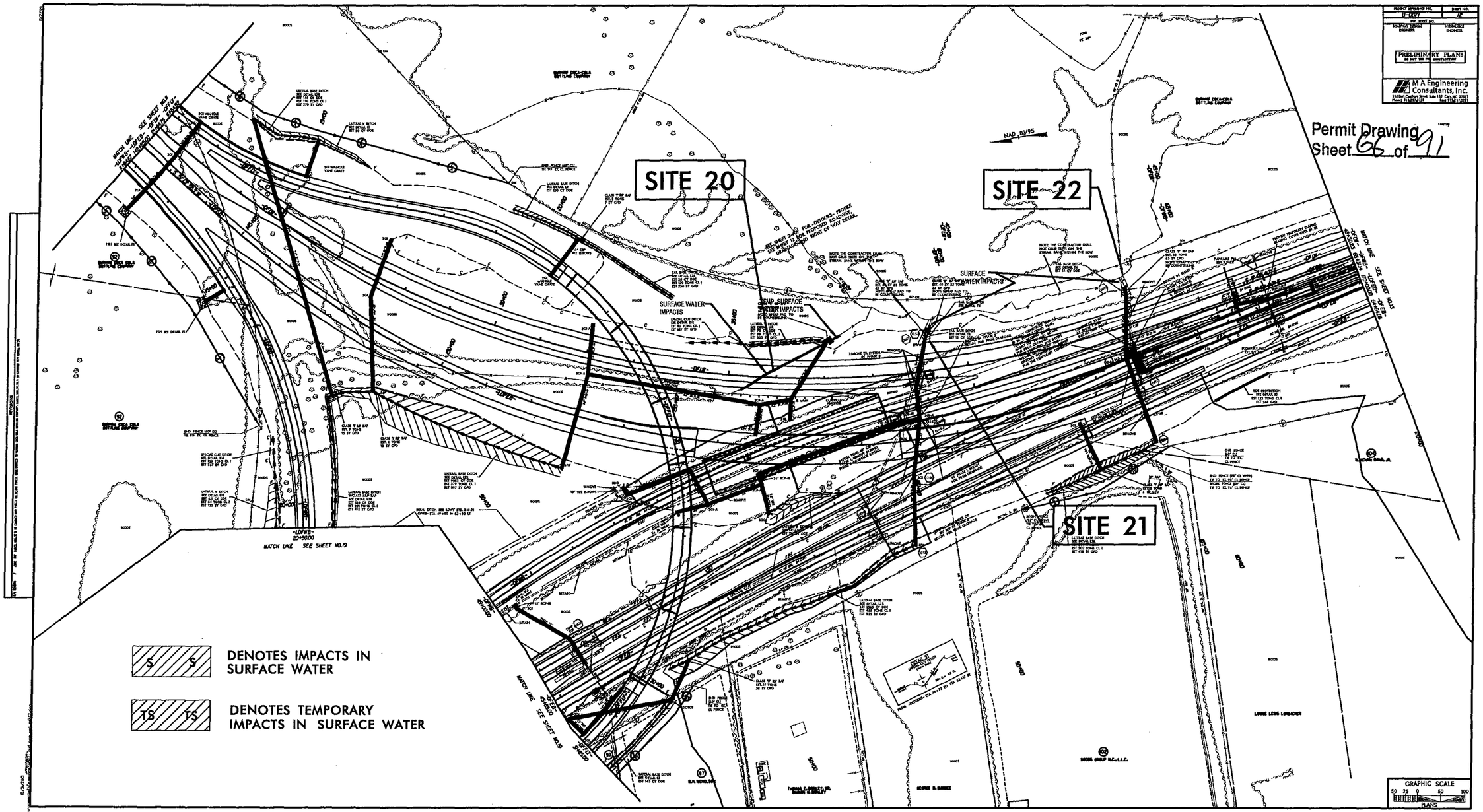
131+50.00

—L—

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

440 430 420 410 400 390 380 370 360

11/9/2013
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Permit Drawing
Sheet 66 of 91

PROJECT REFERENCE NO.	SHEET NO.
U-0071	72
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR BID OR CONSTRUCTION

M A Engineering Consultants, Inc.
131 East Chatham Street Suite 117 Cary, NC 27511
Phone: 919.377.0328 Fax: 919.377.0331

Permit Drawing
Sheet 67 of 91

SITE 20

SITE 22

SITE 21

SURFACE WATER IMPACTS

TEMP. SURFACE WATER IMPACTS

MATCH LINE SEE SHEET NO.8

MATCH LINE SEE SHEET NO.9

-L0FWB-
20+50.00

MATCH LINE SEE SHEET NO.9

MATCH LINE SEE SHEET NO.8

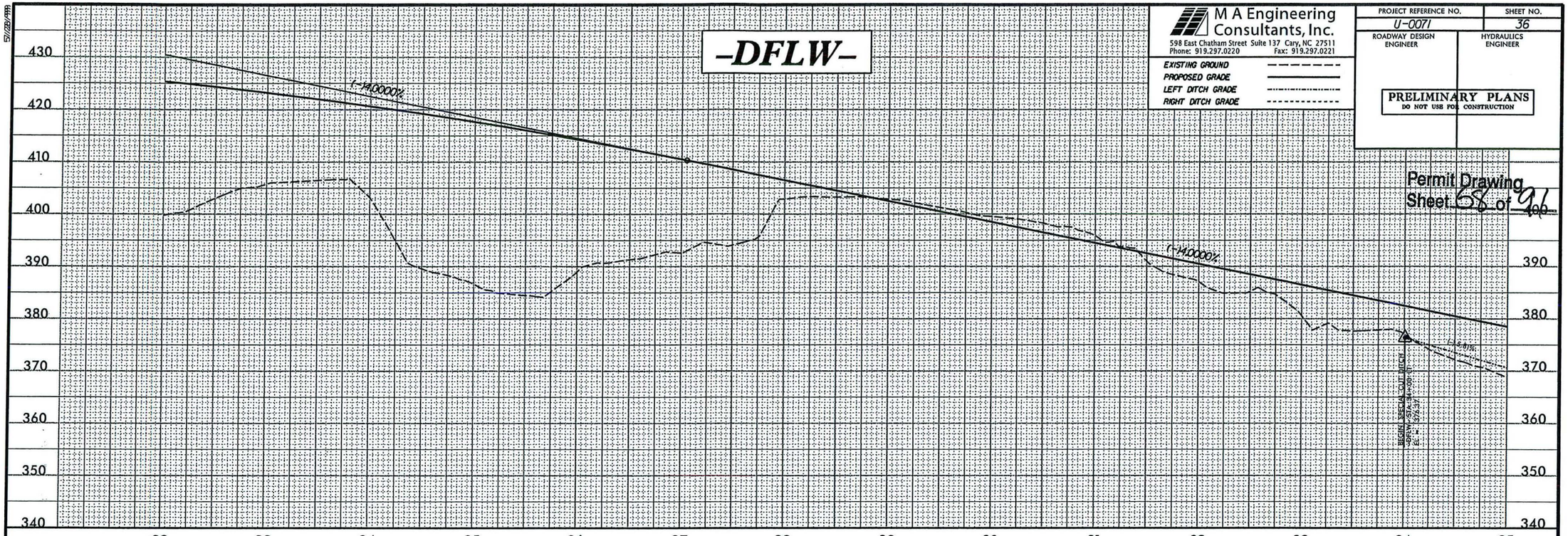
S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE
50 25 0 50 100
PLANS

5/28/1999

-DFLW-



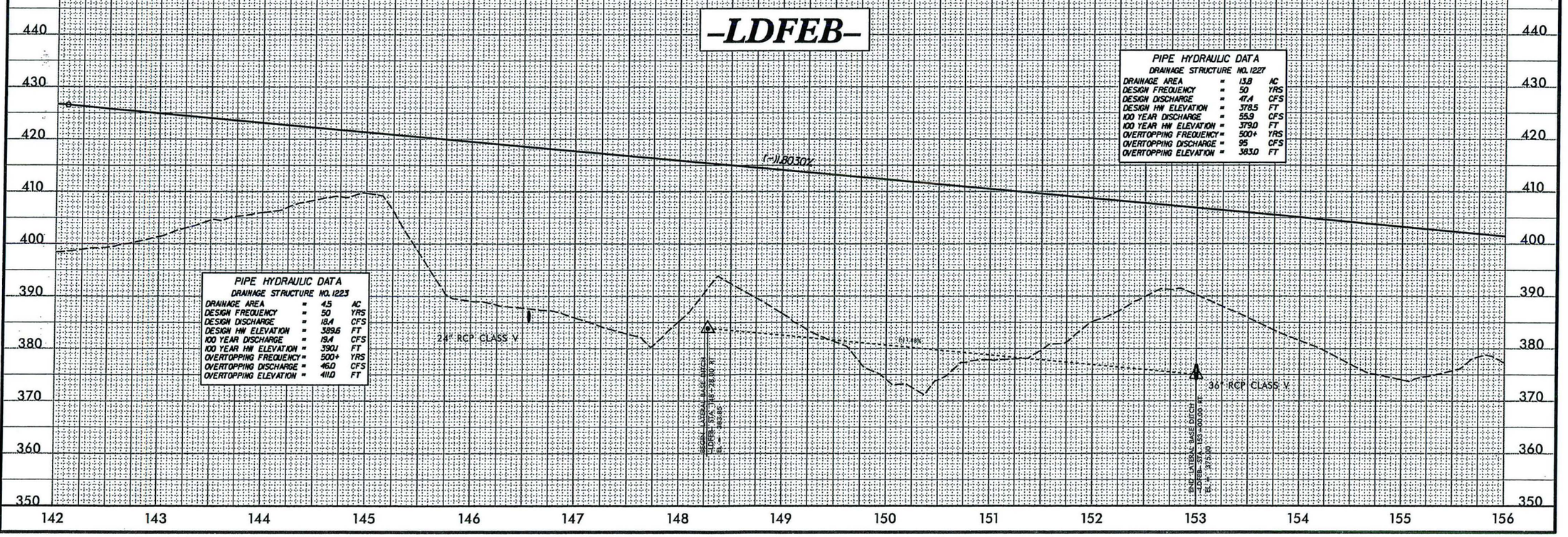
M A Engineering Consultants, Inc.	PROJECT REFERENCE NO.	SHEET NO.
598 East Chatham Street Suite 137 Cary, NC 27511	U-0071	36
Phone: 919.297.0220 Fax: 919.297.0221	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 58 of 91

-LDFEB-



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1223

DRAINAGE AREA	4.5	AC
DESIGN FREQUENCY	50	YRS
DESIGN DISCHARGE	18.4	CFS
DESIGN HW ELEVATION	389.6	FT
100 YEAR DISCHARGE	19.4	CFS
100 YEAR HW ELEVATION	390.1	FT
OVERTOPPING FREQUENCY	500+	YRS
OVERTOPPING DISCHARGE	46.0	CFS
OVERTOPPING ELEVATION	411.0	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1227

DRAINAGE AREA	13.8	AC
DESIGN FREQUENCY	50	YRS
DESIGN DISCHARGE	47.4	CFS
DESIGN HW ELEVATION	378.5	FT
100 YEAR DISCHARGE	55.9	CFS
100 YEAR HW ELEVATION	379.0	FT
OVERTOPPING FREQUENCY	500+	YRS
OVERTOPPING DISCHARGE	95	CFS
OVERTOPPING ELEVATION	383.0	FT

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5/28/99

-DFLW-

M A Engineering Consultants, Inc.
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Phone: 919.297.0220 Fax: 919.297.0221

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PROJECT REFERENCE NO.	SHEET NO.
U-0071	37

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 21 of 21

PI = 40+00.00
EL = 358.49'
VC = 650'
K = 182
V = 70

PI = 49+00.00
EL = 354.71'
VC = 450'
K = 73.7
V = 70

-14.0000%

-10.4200%

END SPECIAL CUT DITCH
BEGIN LATERAL V DITCH
-DFLW- STA. 35+30.00 RT.
EL. = 368.98'

END LATERAL V DITCH
-DFLW- STA. 37+10 LT.
EL = 365.00'

BEGIN TAIL BASE DITCH
-DFLW- STA. 39+15 LT. RP
EL = 360.39'

END TAIL BASE DITCH
-DFLW- STA. 39+22.5 LT. RP
EL = 360.39'

30 LF @ 1.00%

BEGIN TAIL BASE DITCH
-DFLW- STA. 43+68 LT. RP
EL = 347.56'

END TAIL BASE DITCH
-DFLW- STA. 43+90 LT. RP
EL = 347.27'

20 LF @ 1.00%

35 36 37 38 39 40 41 42 43 44 45 46 47 48 49

320 330 340 350 360 370 380 390 400 410

-LDFEB-

BM • 52
-LDFEB- STA. 160+79.14
155.28' RT.
ELEV. 383.98'

PI = 162+95.00
EL = 388.94'
VC = 550'
K = 250
V = 70

-11.8030%

-14.0000%

BRIDGE OVER -DFWB-

BEGIN LATERAL V DITCH
-LDFEB- STA. 157+30.00 RT.
EL. = 384.40'

-LDFEB- STA. 157+50.00 RT.
EL. = 384.53'

END LATERAL V DITCH
-LDFEB- STA. 158+40.00 RT.
EL. = 385.05'

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1242

DRAINAGE AREA	=	38.7	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	109.4	CFS
DESIGN HW ELEVATION	=	360.8	FT
100 YEAR DISCHARGE	=	129.0	CFS
100 YEAR HW ELEVATION	=	361.7	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	300	CFS
OVERTOPPING ELEVATION	=	375.2	FT

48" RCP CLASS IV

156 157 158 159 160 161 162 163 164 165 166 167 168 169 170

320 330 340 350 360 370 380 390 400 410 420

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PROJECT REFERENCE NO.	SHEET NO.
U-0071	12-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 12 of 91

SITE 20

REVISIONS
8/17/99

This stream is not jurisdictional as shown in the planimetric file.

Channel is not jurisdictional upstream of this point.

SURFACE WATER IMPACTS

TEMP. SURFACE WATER IMPACTS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

LATERAL BASE DITCH SEE DETAIL L2 EST 120 CY DDE

CLASS 'I' RIP RAP EST. 3 TONS 7 SY GFD

15" CSP W/2 ELBOWS

2GI W/ANGLE VANE GRATE

TAIL BASE DITCH SEE DETAIL L2R EST 20 CY DDE EST 120 TONS CL I EST 250 SY GFD

SPECIAL CUT DITCH SEE DETAIL S1R EST 90 TONS CL I EST 187 SY GFD

LATERAL V DITCH SEE DETAIL L1R EST 72 CY DDE EST 98 TONS CL. I EST 203 SY GFD

CLASS 'I' RIP RAP EST. 7 TONS 15 SY GFD

CLASS 'I' RIP RAP EST. 4 TONS 10 SY GFD

LATERAL BASE DITCH SEE DETAIL L2R EST 9383 CY DDE EST 379 TONS CL. I EST 807 SY GFD

LATERAL V DITCH SEE DETAIL L1 EST 107 CY DDE

REMOVE 15" W/2 ELBOWS

REMOVE 3GI

REMOVE

Conv 3GI To JB W/MH

GUIDERAIL ANCHOR

DI IN APP. SLAB

NOTE: RIPRAP PAD TO BE COUNTERSUNK

WOODS

VANE GRATE

ECM

-DFLW-

-DFFLY-

-LDFEB-

-LDFWB-

9/19/2013
User name
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	12-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
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Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 21 of 21

SITE 20

This stream is not jurisdictional as shown in the planimetric file.

Channel is not jurisdictional upstream of this point.

SURFACE WATER IMPACTS

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 90 TONS CL.
EST 187 SY GFD

TEMP SURFACE IMPACTS

LATERAL V DITCH
SEE DETAIL L1R
EST 72 CY DDE
EST 98 TONS CL I
EST 203 SY GFD

LATERAL BASE DITCH
SEE DETAIL L2
EST 120 CY DDE

CLASS 'I' RIP RAP
EST. 3 TONS
7 SY GFD

TAIL BASE DITCH
SEE DETAIL L2R
EST 20 CY DDE
EST 120 TONS CL I
EST 250 SY GFD

LATERAL BASE DITCH
SEE DETAIL L2R
EST 9383 CY DDE
EST 375 TONS CL I
EST 807 SY GFD

CLASS 'I' RIP RAP
EST. 7 TONS
15 SY GFD

CLASS 'I' RIP RAP
EST. 4 TONS
10 SY GFD

LATERAL V DITCH
SEE DETAIL L1
EST 107 CY DDE

REMOVE
15" W2 ELBOWS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

9/19/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	12-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
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Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 11 of 91

8/17/99

REVISIONS

SITE 21

SITE 22

DENOTES IMPACTS IN SURFACE WATER

NOTE: THE CONSTRACTOR SHALL NOT GRUB TREES ON THE STREAM BANK WITHIN THE ROW

SURFACE WATER IMPACTS

WOODS

TAIL BASE DITCH
SEE DETAIL T4
EST 14 CY DDE

TAIL BASE DITCH
SEE DETAIL T4
EST 12 CY DDE

40+00 -DFLW-

60+00 -DFWB-

60" CHL

54" RCP-III

48" RCP-III

48" RCP-IV

36" RCP

15" RCP

15" CSP w/2 ELBOWS

REMOVE

REMOV

HW

2GI

2GI-A

CONC. DI.

ASPH. P.S.

CONC. P.S.

ASPH. P.S.

PROPOSED RETAINING WALL

ECM

JS

11/4/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	12-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 22 of 71

8/17/99

REVISIONS

10/31/2013
User name:
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SITE 21

SITE 22

S S DENOTES IMPACTS IN SURFACE WATER

SURFACE WATER IMPACTS

NOTE: THE CONTRACTOR SHALL NOT GRUB TREES ON THE STREAM BANK WITHIN THE ROW

TAIL BASE DITCH
SEE DETAIL T4
EST 14 CY DDE

TAIL BASE DITCH
SEE DETAIL T4
EST 12 CY DDE

40+00 -DFLWL-

60+00 -DFWBL-

60" CMP

54" RCP-III

48" RCP-III

48" RCP-IV

36" RCP

15" RCP

5" W 2 WS CSP

HW

REMOVE

2GI-A

CONC. P.S.

ASPH. P.S.

CONC. DI

PROPOSED RETAINING WALL

WOODS

ECM

JS

BEG. CONC. PVMT.
A. 38+64.69

PROJECT REFERENCE NO.	SHEET NO.
U-0071	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing Sheet 19 of 91

REVISIONS
8/17/99
R/W REVISION / /202 (MP) ALL ADJACENT PARCELS OWNED BY WILLIAM B. BARKER COMBINED INTO PARCEL NO. 309. PARCEL NO. 185 REVISED TO 928.

WILLIAM B. BARKER

LYNN-OXFORD ASSOCIATES

N.C. STATE HIGHWAY COMMISSION
FORMERLY ALLEN D. ALDRIDGE

LIVING WATERS CHRISTIAN COMMUNITY

Site continued on Sheet 10-A and 10B

SITE 12

SITE 23

SITE 24

TEMP. IMPACTS IN SURFACE WATERS

IMPACTS IN SURFACE WATERS

SURFACE WATER IMPACTS

MATCH LINE SEE SHEET NO.10

MATCH LINE SEE SHEET NO.21

NAD 83/95

PHILLIP C. RANSDELL II
PAGE GUNTER RANSDELL
PAUL ANDREW RANSDELL

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

10/31/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	20
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 15 of 91

REVISIONS
8/17/99
10/31/2013
RW REVISION / ROW ADJACENT PARCELS OWNED BY WILLIAM B.BARKER COMBINED INTO PARCEL NO.305, PARCEL NO.185 REVISED TO 928.
RAMP REVISIONS
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MATCH LINE SEE SHEET NO.10
-US70FLY- 40+70.00
-US70FLY-
MATCH LINE SEE SHEET NO.10
-Y2- 30+00.00
-Y2-
-Y3-
-Y4- 40+52.64
-EECTOE-
-EECTOE- 26+00.00
MATCH LINE SEE SHEET NO.10
MATCH LINE SEE SHEET NO.21
-Y3- 43+00.00
-Y3-

TEMP. IMPACTS IN SURFACE WATERS
Site continued on Sheet 10A and 10B
SITE 12
IMPACTS IN SURFACE WATERS
SITE 23
SITE 24
SURFACE WATER IMPACTS
TEMP. IMPACTS IN SURFACE WATERS
IMPACTS IN SURFACE WATERS
TEMP. IMPACTS IN SURFACE WATERS
TEMP. IMPACTS IN SURFACE WATERS

WILLIAM B. BARKER
LYNN-OXFORD ASSOCIATES
N.C. STATE HIGHWAY COMMISSION FORMERLY ALLEN D. McDRIDGE
LIVING WATERS CHRISTIAN COMMUNITY
ISBK LIVING WATERS CHRISTIAN COMMUNITY CHURCH
ISNTL LIVING WATERS CHRISTIAN COMMUNITY CHURCH
PHILLIP C. RANSDELL JR. PAGE GUNTER RANSDELL PAUL ANDREW RANSDELL

BURY PIPE INVERT 12"
CLASS II RIP RAP EST. 41 TONS 82 SY GFD
-US70FLY- 40+70.00
IMPACTS IN SURFACE WATERS
US70FLY- STA. 43+30 LT 115' 50 LF LEVEL SPREADER BASE INV. 320' SEE DETAIL LS1
BURY PIPE INVERT 12" 2GI WARGHE VANE GRATE
TAIL DITCH SEE DETAIL TD
15" RCP-III
S 4° 50' 14.6" E
LATERAL V-DITCH SEE DETAIL LVA EST 237 CY DDE EST 211 TONS CL I EST 248 SY GFD
LATERAL V DITCH SEE DETAIL LVI EST 150 CY DDE EST 119 TONS CL EST 245 GFD
CLASS 'I' RIP RAP EST. 4 TONS 10 SY GFD
SPECIAL GRASS SWALE SEE DETAIL G1S
TOE PROTECTION SEE DETAIL RI EST 115 TONS CL I EST 203 SY GFD
PAVED TAIL DITCH SEE DETAIL VTI EST 23 CY DDE EST 55 SY CONC.
PSH SEE DETAIL PI GRADE TO EL 325 EST EX. 5 CY.
24" CMP
24" CRO
GRASSED SWALE W/4' BASE SEE DETAIL G4 EST 382 CY DDE
RETAIN
S 33° 15' 07.0" E
S 37° 45' 34.7" E
REMOVE
PROPOSED 36" RCP
15" RCP-III
2GI WANGLE VANE GRATE
PSH SEE DETAIL PI GRADE TO EL 328 EST EX. 8 CY.
CLASS II RIP RAP EST. 15 TONS EST 12 SY GFD OVER RIPRAP PAD TO BE COUNTERSUNK
SPECIAL CUT DITCH SEE DETAIL S1R EST 170 TONS CL I EST 363 SY GFD
PLACE PERMANENT ROCK CHECK DAMS @ 25' INTERVALS SEE RDY STD 1633.02
SPECIAL CUT GRASSED SWALE w/6' BASE SEE DETAIL G5S
LATERAL BASE GRASSED SWALE SEE DETAIL G5 EST 859 CY DDE
CLASS 'I' RIP RAP EST. 2 TONS 7 SY GFD
2.5% SHEET FLOW TO RIPRAP PAD SWALE SEE DETAIL G5S
928
PHILLIP C. RANSDELL JR. PAGE GUNTER RANSDELL PAUL ANDREW RANSDELL

S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 76 of 91

–Y3–
US 70 W

PI = 41+00.00
EL = 367.20'
VC = 470'
K = 1093
V = 70

PI = 47+82.00
EL = 400.69'
VC = 450'
K = 41
V = 40

1+44.800%
1+49.106%
(+) 1.5%
(+) 0.50%

END GRASS SWALE
-Y3- STA. 38+10.00 LT
EL. 335.00

BEGIN LATERAL BASE GRASS SWALE
-Y3- STA. 44+47.00 RT
EL. 370.49

BEGIN LATERAL BASE GRASS SWALE
-Y3- STA. 43+25.00 RT
EL. 368.64

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2121

DRAINAGE AREA	= 6.9	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 35.3	CFS
DESIGN HW ELEVATION	= 362.3	FT
100 YEAR DISCHARGE	= 37.4	CFS
100 YEAR HW ELEVATION	= 362.5	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 50	CFS
OVERTOPPING ELEVATION	= 367.5	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2214

DRAINAGE AREA	= 31.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 94.8	CFS
DESIGN HW ELEVATION	= 354.8	FT
100 YEAR DISCHARGE	= 111.8	CFS
100 YEAR HW ELEVATION	= 355.5	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 180	CFS
OVERTOPPING ELEVATION	= 359.4	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2215

DRAINAGE AREA	= 1.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 7.2	CFS
DESIGN HW ELEVATION	= 365.6	FT
100 YEAR DISCHARGE	= 7.8	CFS
100 YEAR HW ELEVATION	= 365.7	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 15	CFS
OVERTOPPING ELEVATION	= 367.5	FT

BM # 66
-Y3- STA. 58+27.63
87.84' LT.
ELEV. 355.49'

PI = 57+55.00
EL = 355.36'
VC = 380'
K = 46
V = 30

(-)4.658%
(-)1.77%
(-)1.41%
(-)1.05%
(-)0.70%
(-)1.78%
(-)1.06%
(-)1.10%
(-)1.78%
(-)1.42%
(-)1.06%
(-)0.71%
(+)3.660%
(+)2.20%
(+)3.08%
(+)1.10%
(+)1.65%
(-)0.8963%

BEGIN SPECIAL CUT DITCH
-Y3- STA. 52+78.61 RT
EL. 367.98

END SPECIAL CUT DITCH
-Y3- STA. 53+45.00 RT
EL. 365.34

BEGIN LATERAL BASE DITCH
-Y3- STA. 54+00.00 LT
EL. 365.34

END TAIL BASE DITCH
-Y3- STA. 54+00.00 RT
EL. 346.50

BEGIN LATERAL BASE DITCH
-Y3- STA. 54+00.00 RT
EL. 346.50

END LATERAL BASE DITCH
-Y3- STA. 55+00.00 LT
EL. 351.00

BEGIN SPECIAL CUT DITCH
-Y3- STA. 55+36.00 RT
EL. 360.18

END SPECIAL CUT DITCH
-Y3- STA. 55+50.00 RT
EL. 360.68

30" RCP
SKEW 126°

60" RCP
SKEW 92°

END GRASSED SWALE
BEGIN LATERAL "Y" DITCH
-Y3- STA. 58+60.00 LT
EL. 346.15

BEGIN GRASSED SWALE
-Y3- STA. 57+76 LT
EL. 345.90

END LATERAL "Y" DITCH
-Y3- STA. 57+76.00 RT
EL. 347.90

END SPECIAL CUT DITCH
-Y3- STA. 59+00.00 RT
EL. 360.07

END SPECIAL CUT DITCH
-Y3- STA. 60+30.00 RT
EL. 360.68

BEGIN LATERAL "V" DITCH
-Y3- STA. 60+30.00 LT
EL. 361.79

END LATERAL "V" DITCH
-Y3- STA. 61+50.00 RT
EL. 364.00

BEGIN TAIL DITCH
-Y3- STA. 61+45 LT
EL. 360.00

END TAIL DITCH
-Y3- STA. 61+45 LT
EL. 359.00

95 LF @ 3.63%
18" RCP
SKEW 95°

END LATERAL "V" DITCH
-Y3- STA. 63+50.00 RT
EL. 365.00

BEGIN SPECIAL CUT DITCH
-Y3- STA. 63+50.00 RT
EL. 364.00

END SPECIAL CUT DITCH
-Y3- STA. 64+00.00 RT
EL. 362.58

PI = 64+65.00
EL = 381.35'
VC = 160'
K = 35
V = 35

END GRADE/
BEGIN RESURFACING
AND WIDENING
-Y3- STA. 66+00.00
EL. 380.14'

END RESURFACING
AND WIDENING
-Y3- STA. 71+00.00

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PROJECT REFERENCE NO.	SHEET NO.
U-0071	54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 77 of 91

-US70FLY-
FLYOVER FROM US 70 W TO SB EEC

PI = 26+50.00
EL = 427.82'
VC = 590'
K = 61
V = 45

(+)4.52(3)%

(-)15.12%

BRIDGE OVER -Y4-, -L-, -WBL-, -Y2-, & -YRPA-

(-)3.26%

(+)1.70%

24" RCP
SKEW 79°

END LATERAL 'V' DITCH
-US70FLY- STA. 25+50 LT
EL. 384.14

BEGIN LATERAL 'V' DITCH
-US70FLY- STA. 23+50 LT
EL. 384.00

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1010

DRAINAGE AREA	= 4.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 21.3	CFS
DESIGN HW ELEVATION	= 383.8	FT
100 YEAR DISCHARGE	= 22.6	CFS
100 YEAR HW ELEVATION	= 384.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 34	CFS
OVERTOPPING ELEVATION	= 386.0	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1025

DRAINAGE AREA	= 7.6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 31.0	CFS
DESIGN HW ELEVATION	= 342.4	FT
100 YEAR DISCHARGE	= 32.8	CFS
100 YEAR HW ELEVATION	= 342.6	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 38	CFS
OVERTOPPING ELEVATION	= 343.0	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2023

DRAINAGE AREA	= 21.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 68.7	CFS
DESIGN HW ELEVATION	= 331.3	FT
100 YEAR DISCHARGE	= 81.1	CFS
100 YEAR HW ELEVATION	= 331.9	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 152	CFS
OVERTOPPING ELEVATION	= 337.0	FT

BM # 65
-US70FLY- STA. 45+56.47
292.29' RT.
ELEV. 342.33'

PI = 51+75.00
EL = 360.25'
VC = 150'
K = 895
V > 80

(+)14.8242%

(+)14.9918%

END GRADE
-US70FLY- STA. 52+53.77
EL. 364.05'

PI = 44+70.00
EL = 334.78'
VC = 710'
K = 89
V = 45

(-)5.00%

(+)2.8785%

(+)14.9918%

(+)9.50%

30" RCP
SKEW 133°

54" RCP
SKEW 84°

BEGIN LATERAL 'V' DITCH
-US70FLY- STA. 43+00 RT
EL. 333.60

BEGIN TAIL DITCH
-US70FLY- STA. 43+20 LT
EL. 326.00

END TAIL DITCH
-US70FLY- STA. 43+30 LT
EL. 322.00

45 LF @ 3.89%

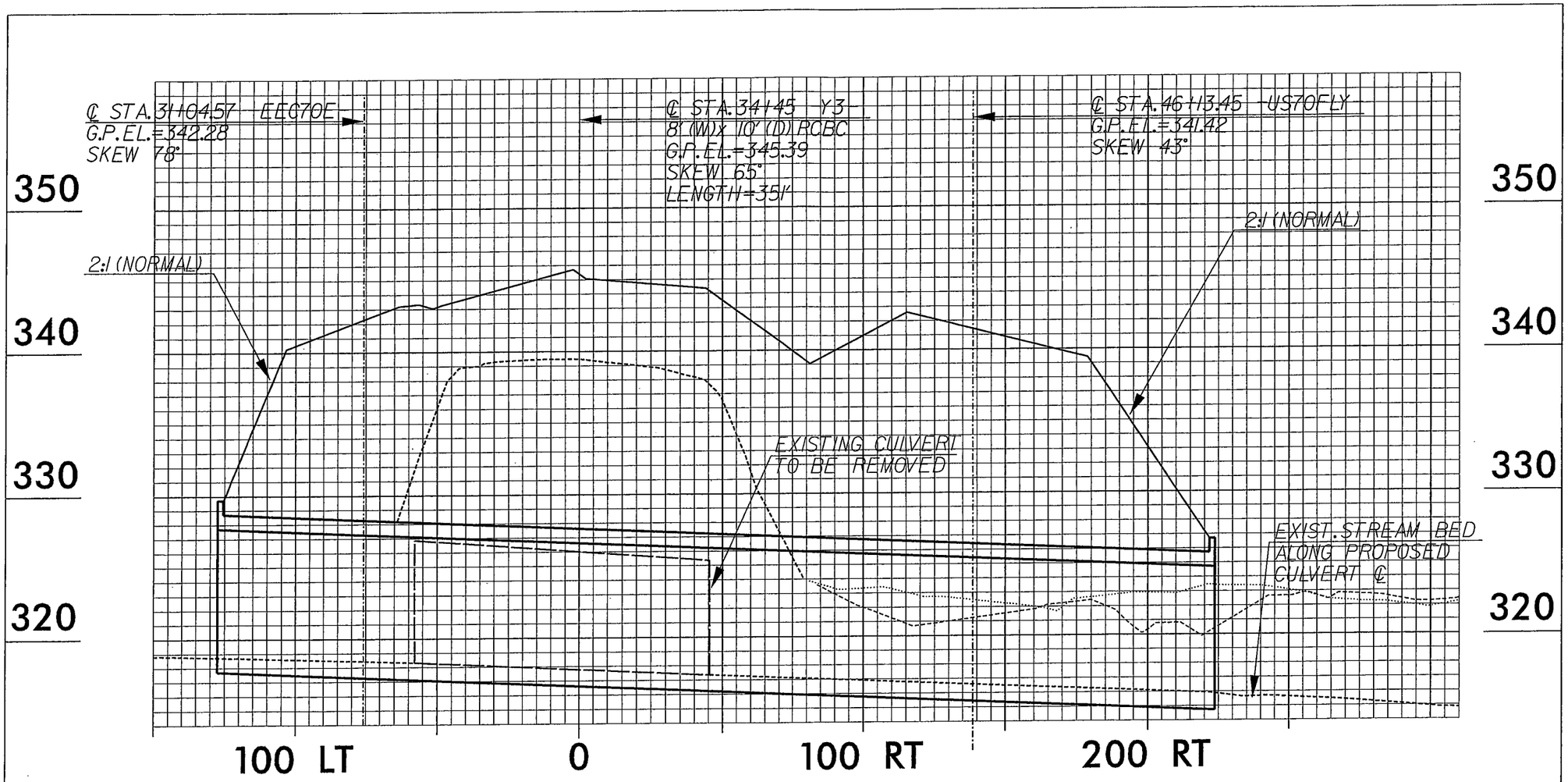
-US70FLY- STA. 44+50 RT
EL. 324.00

END LATERAL 'V' DITCH
-US70FLY- STA. 44+80 RT
EL. 325.00

PROP. 8' x 10' RCBC
-US70FLY- 46+13.45
SKEW 45°

PI = 49+30.00
EL = 348.02'
VC = 210'
K = 99
V = 50

11/27/2012
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PROFILE

CULVERT HYDRAULIC DATA		
DESIGN DISCHARGE	= 662	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 328.5	FT
BASE DISCHARGE	= 746	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 329.3	FT
OVERTOPPING DISCHARGE	= 1650	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 344.9	FT

NCDOT

DIVISION OF HIGHWAYS
DURHAM COUNTY
PROJECT: U-0071
DURHAM EAST END CONNECTOR, FROM NC 147 (BUCK DEAN FREEWAY) TO NORTH OF NC 98

SHEET **OF** **12/27/12**

PROJECT REFERENCE NO.	SHEET NO.
U-0071	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 12 of 21

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

REVISIONS
B/A REVISION / /202 RBP PARCEL NOS.198,199,& 204 COMBINED INTO PARCEL NO.198, PARCEL NOS. 400 & 401 COMBINED INTO PARCEL NO. 400.
B/A REVISION 6 / 21 /202 BBE ADDED SIDEWALK ALONG PARCELS NO. 205 & 206.

9/19/2013
User Name: Bridgette Eatman
P:\Projects\PERMITS Environmental\Projects\00071 hyd pem wet psh22.dgn

MATCH LINE SEE SHEET NO.21 -Y3- 57+00.00

MATCH LINE SEE SHEET NO.21 -Y9- 25+00.00

MATCH LINE SEE SHEET NO.24 -Y11- 12+25.00

-Y10- 11+00.00

WESTWOOD HOLDINGS LLC (196)

WILBURN V. CLAYTON
DOROTHY G. CLAYTON (441)

LEE RAY BERGMAN, LLC (198)

W. VANCE CLAYTON
DOROTHY G. CLAYTON (402)

TSOUMBOS DIMITRIOS (200)

TSOUMBOS ARISTOTELIS (202)

JOHN TUBIOLO
VIDA S. TUBIOLO
dba J&V RENTAL PROPERTIES (201)

GEORGE W. BRIDGERS
KATY BUNTING WALDEN (194)

RICHARD C. NOKES, SR.

RENEE N. McGINLEY
JOSEPH D. McGINLEY

PARKSIDE PROPERTIES LLC. (206)

EUGENE M. EVANS, JR.

LEITHA WHITLEY (400)

MATTHEW M. JOHNSON
FANNIE JOHNSON (398)

BETTY W. CARTHEN (399)

NAEGLE OUTDOOR ADVERTISING, INC. (207)

JOHN CURTIS PICKARD (208)

JAMES RODNEY TAYLOR
SHELIA TAYLOR

FAST FARE MARKETS N.C., INC. (205)

SITE 25

SITE 26

TEMP. SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

LATERAL 'V' DIVERSION DITCH SEE DETAIL LDIR EST 635 CY DDE EST 187 TONS CL. I EST 387 SY GFD

LATERAL 4' BASE GRASSED SWALE SEE DETAIL G4 EST 1151 CY DDE

SPECIAL CUT DITCH SEE DETAIL SIR EST 161 TONS CL. I EST 333 SY GFD

CLASS 'II' RIP RAP EST. 30 TONS EST. 61 SY GFD

CLASS 'I' RIP RAP EST. 11 TONS EST. 22 SY GFD

SEE DETAIL P1

BURY PIPE INVERT 12"

15" RCP-III

18" RCP-III

LATERAL BASE DITCH WOODS SEE DETAIL L2R EST 89 CY DDE EST 95 TONS CL. I EST 197 SY GFD

CLASS 'II' RIP RAP EST. 5 TONS 12 SY GFD

LATERAL V DITCH SEE DETAIL L1 EST 12 CY DDE

TAIL DITCH SEE DETAIL TIR EST 16 CY DDE EST 5 TONS CL. I EST 9 SY GFD

LATERAL V DITCH SEE DETAIL L1K EST 535 CY DDE EST 59 TONS CL. I EST 132 SY GFD

SPECIAL CUT DITCH SEE DETAIL SIR EST 127 TONS CL. I EST 289 SY GFD

LATERAL 4' BASE GRASSED SWALE SEE DETAIL G4 EST 44 CY DDE

CLASS 'II' RIP RAP EST. 20 TONS 40 SY GFD

LATERAL V DITCH SEE DETAIL L1P EST 24 CY DDE EST 65 SY PSRM

CLASS 'I' RIP RAP EST. 5 TONS 10 SY GFD

13' STONE WALL

END FENCE (WW)

TRENCHLESS INSTALLATION 60" WELDED STEEL

FLOWABLE FILL

60" RCP-II

JB wMH

SPECIAL CUT GRASS SWALE w/4' BASE SEE DETAIL G4S

CLASS 'II' RIP RAP EST. 8 TONS 16 SY GFD

SPECIAL CUT GRASS SWALE w/2' BASE SEE DETAIL G2S

SPECIAL CUT DITCH SEE DETAIL SIR EST 90 TONS CL. I EST 200 SY GFD

LATERAL V DITCH SEE DETAIL L1 EST 32 CY DDE

SPECIAL CUT DITCH SEE DETAIL SIR EST 97 TONS CL. I EST 200 SY GFD

GRADE CUT DITCH TO DRAIN

RETAIN SYSTEM

15" SOIL

24" C&G

60' CONC CURB

15" RCP

REMOVE

CONC

CAR WASH

ISBKBUS

CAN

ISFD

FILLER CAPS

BST

CURB

EIP

MTL

LT

DUKE POWER COMPANY

WOODS

NAD 83/95

PROJECT REFERENCE NO.	SHEET NO.
U-0071	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing Sheet 80 of 91

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

MATCH LINE SEE SHEET NO.21 -Y9- 25+00.00

MATCH LINE SEE SHEET NO.24 -Y11- 12+25.00

MATCH LINE SEE SHEET NO.21 -Y3- 57+00.00

SITE 25

SITE 26

SITE 26

TEMP. SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

SURFACE WATER IMPACTS

TEMP. SURFACE WATER IMPACTS

WESTWOOD HOLDINGS, LLC

WILBURN V. CLAYTON
DOROTHY G. CLAYTON

LEE RAY BERGMAN, LLC

W. VANCE CLAYTON
DOROTHY G. CLAYTON

LETHA WHITLEY

MATTHEW M. JOHNSON
FANNIE JOHNSON

BETTY W. CARTHEN

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JAMES RODNEY TAYLOR
SHELIA TAYLOR

JOHN CURTIS PICKARD

FAST FARE MARKETS OF N.C., INC.

TSOUMBOS DIMITRIOS

TSOUMBOS ARISTOTELIS

JOHN TUBIOLO
VIDA SI TUBIOLO
dba J&V RENTAL PROPERTIES

GEORGE W. BRIDGERS
KATTY BUNTING WALDEN

RICHARD C. HOKES, SR.

RENEE N. McGINLEY
JOSEPH D. McGINLEY

PARKSIDE PROPERTIES LLC.

EUGENE M. EVANS, JR.

DUKE POWER COMPANY

NAD 83/95

REVISIONS

8/17/99

R/W REVISION 1/ /202 RBP PARCEL NOS.038,039,& 204 COMBINED INTO PARCEL NO.038, PARCEL NOS. 400 & 401 COMBINED INTO PARCEL NO. 400.

R/W REVISION 6/21/202 BBE ADDED SIDEWALK ALONG PARCELS NO. 205 & 206.

9/19/2013
User Name: Administrator
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M A Engineering Consultants, Inc.
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Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	65
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 61 of 71

EXISTING GROUND
PROPOSED GRADE
LEFT DITCH GRADE
RIGHT DITCH GRADE

BM # 66
-Y9- STA. 25+39.76
261.93' RT.
ELEV. 355.49'

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 2216

DRAINAGE AREA	= 58	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 159.5	CFS
DESIGN HW ELEVATION	= 347.7	FT
100 YEAR DISCHARGE	= 188.1	CFS
100 YEAR HW ELEVATION	= 348.8	FT
OVERTOPPING FREQUENCY	=	YRS
OVERTOPPING DISCHARGE	=	CFS
OVERTOPPING ELEVATION	=	FT

-Y9-
LYNN RD. (SR 1919)

-Y9- STA. 36+53.22
-Y3- STA. 65+02.22
EL. 380.76'

END GRADE
-Y9- STA. 36+07.98
EL. 379.89'

PI = 35+00.00
EL = 376.11'
VC = 210'
K = 80
V = 45

PI = 29+50.00
EL = 342.49'
VC = 730'
K = 82
V = 45

BEGIN SPECIAL CUT DITCH
-Y9- STA. 24+00.11 (120' LT)
EL. 354.76'

-Y9- STA. 24+00.00 (120' LT)
EL. 349.85'

BEGIN LATERAL "C" DITCH
-Y9- STA. 27+40.97 RT.
EL. 341.97'

END LATERAL "C" DITCH
-Y9- STA. 30+00.00 RT.
EL. 344.26'

BEGIN LATERAL SWALE W/ BASE
-Y9- STA. 24+92.51 RT.
EL. 336.10'

-Y9- STA. 28+48.82 LT.
EL. 341.10'

END LATERAL "A" DIVERSION DITCH
-Y9- STA. 28+08 (79.09' LT.)
EL. 334.08'

-Y9- STA. 27+50 (97.01' LT.
EL. 334.25'

END SPECIAL CUT DITCH
BEGIN LATERAL "A"
GRASSED SWALE W/ BASE
-Y9- STA. 24+50.11
EL. 336.74'

END TAIL BASE DITCH
-Y9- STA. 24+07.00 (200' RT)
EL. 348.11'

(+)1.2740%
(-)1.1740%
(-)1.2700%
(-)1.1740%
(-)1.1910%
(-)1.1910%
(-)1.1910%
(-)1.1910%
(-)1.1910%
(-)1.1910%
(+)3.5006%
(-)1.9231%
(+)8.1121%

66" RCP
SKEW 139°

-Y9-
PLEASANT RD. (WEST OF US 70)

-Y9- STA. 36+53.22
-Y3- STA. 65+02.22
EL. 380.76'

BEGIN GRADE
-Y9- STA. 37+00.06
EL. 380.32'

END GRADE
-Y9- STA. 40+22.01'
EL. 386.02'

PI = 39+65.00
EL = 385.68'
VC = 110'
K = 77
V = 45

(-)0.9394%
(+)2.0231%
(+)0.5964%

-Y10-
PLEASANT RD. (EAST OF US 70)

-Y10- STA. 10+00.00
-Y9- STA. 32+36.50
EL. 360.38'

BEGIN GRADE
-Y10- STA. 10+50.00
EL. 362.38'

PI = 11+36.63
EL = 362.81'
VC = 172'
K = 44
V = 40

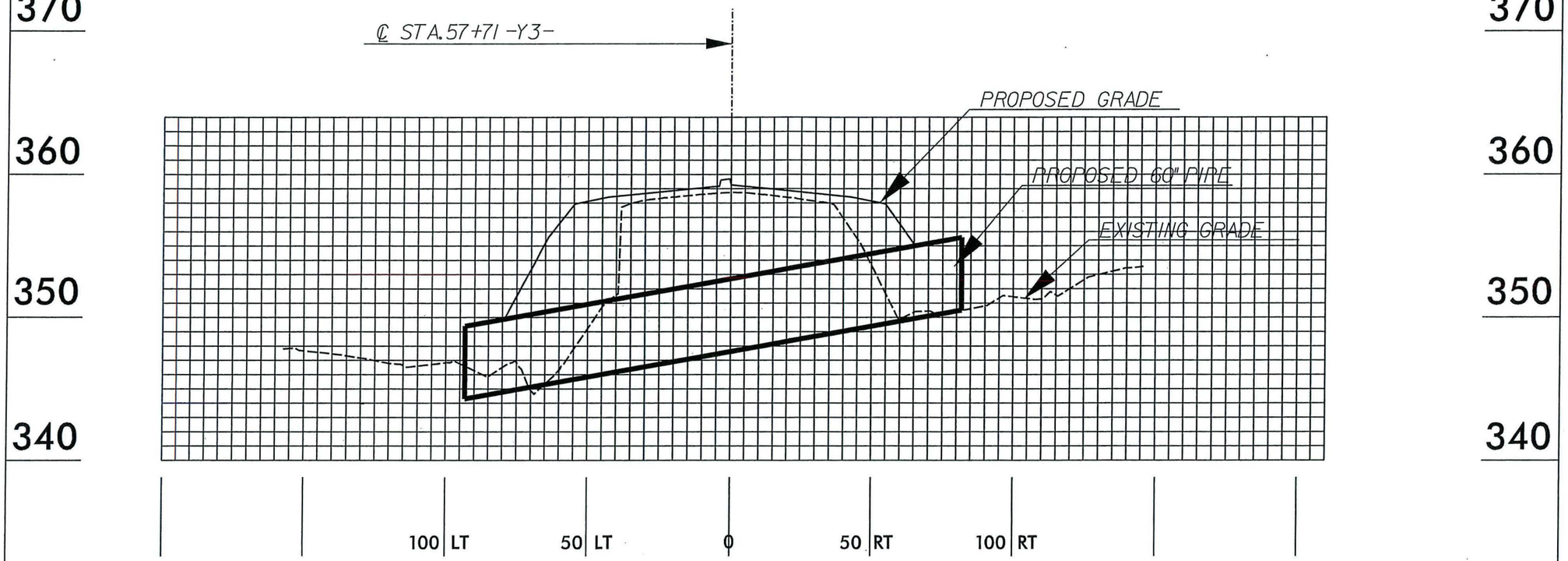
PI = 14+50.00
EL = 352.19'
VC = 180'
K = 217
V = 65

END GRADE
-Y10- STA. 16+02.03
EL. 345.77'

(+)4.00%
(+)0.4964%
(-)3.3890%
(-)1.4222%

11/27/2012
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Permit Drawing
Sheet 82 of 94



PROFILE

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO. 2214		
DRAINAGE AREA	= 31.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 94.8	CFS
DESIGN HW ELEVATION	= 354.8	FT
100 YEAR DISCHARGE	= 111.8	CFS
100 YEAR HW ELEVATION	= 355.5	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 180	CFS
OVERTOPPING ELEVATION	= 359.4	FT

NCDOT

DIVISION OF HIGHWAYS

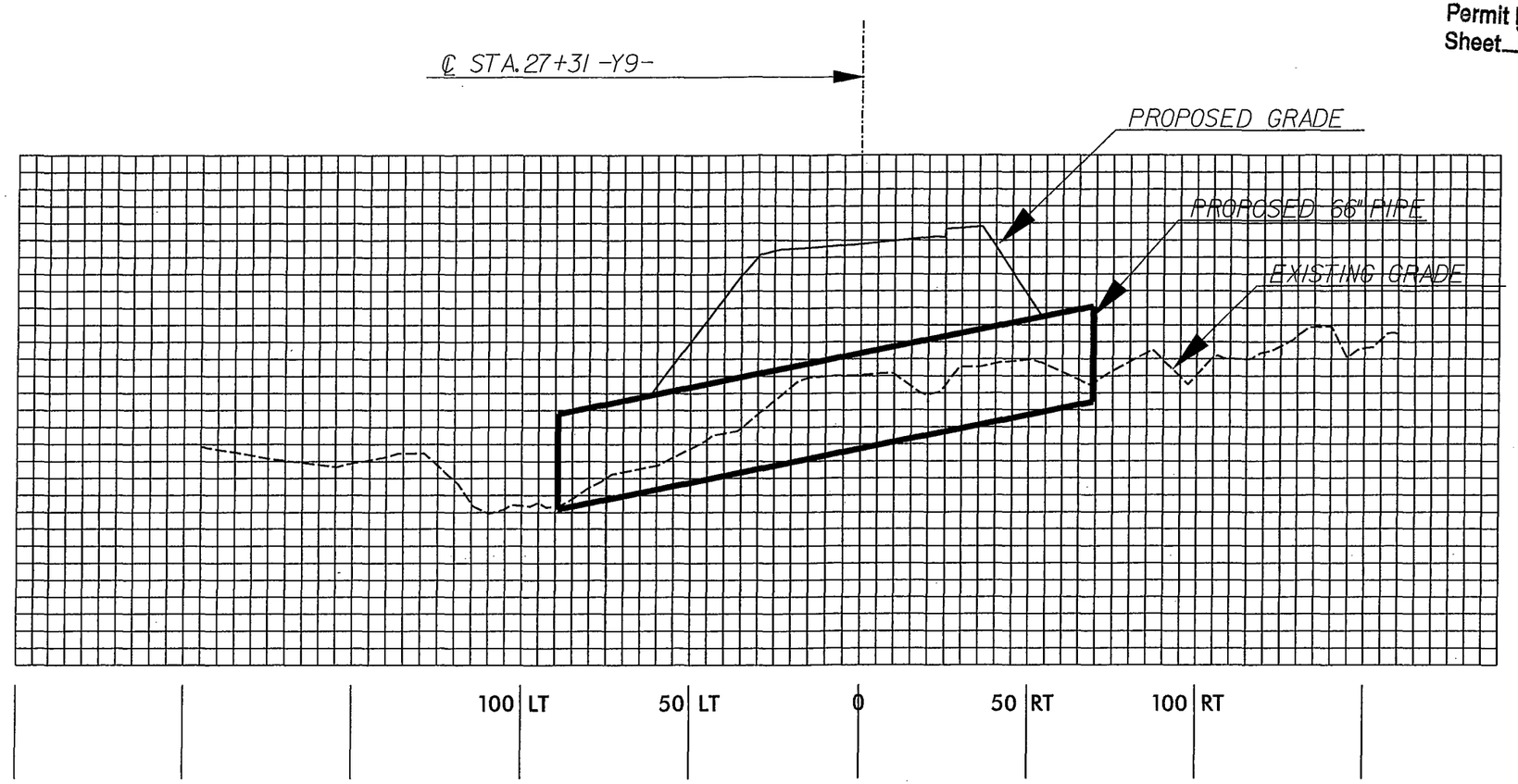
DURHAM COUNTY

PROJECT: U-0071

DURHAM EAST END CONNECTOR, FROM NC 147 (BUCK DEAN FREEWAY) TO NORTH OF NC 98

SHEET OF 12 / 27 / 12

Permit Drawing
Sheet 83 of 91



PROFILE

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO. 2216		
DRAINAGE AREA	= 58	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 159.5	CFS
DESIGN HW ELEVATION	= 347.7	FT
100 YEAR DISCHARGE	= 188.1	CFS
100 YEAR HW ELEVATION	= 348.8	FT
OVERTOPPING FREQUENCY	=	YRS
OVERTOPPING DISCHARGE	=	CFS
OVERTOPPING ELEVATION	=	FT

NCDOT

DIVISION OF HIGHWAYS

DURHAM COUNTY

PROJECT: U-0071

DURHAM EAST END CONNECTOR,
FROM NC 147
(BUCK DEAN FREEWAY) TO
NORTH OF NC 98

SHEET OF 12 / 27 / 12

PROJECT REFERENCE NO.	SHEET NO.
U-0071	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 84 of 91

NAD 83/95

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS 8/17/99

MATCH LINE SEE SHEET NO.12 -DFLW- 48+30.23 -DFWB- 68+31.14 -LDFEB- 170+00.00 -DFEB- 64+64.86

MATCH LINE SEE SHEET NO.14 -DFLW- 62+35.56 -LDFEB- 184+00.00

DURHAM COCA-COLA BOTTLING COMPANY

MYRTLE BOWEN STRAYHORN

W. KENAN RAND, JR.

ARCHIE V. EMORY
DELORES P. EMORY

50+00 -DFLW-

70+00 -DFWB-

55+00

60+00

END PROPOSED RETAINING WALL 9
-LDFEB- STA.171+35.00 (28.5' LT)

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 103 TONS CL. I
EST 235 SY GFD

LATERAL V DITCH
SEE DETAIL L1
EST 43 CY DDE

UNDERGROUND STREAM

CLASS 'II' RIP RAP
EST. 19 TONS
38 SY GFD

36" RCP-III

REMOVE

FLOWABLE FILL
EST 3.7 CY

6' TYP.

RETAIN

-DFLW- S 9° 43' 41.7" E

-DFWB- S 9° 43' 41.7" E

-LDFEB-

-DFEB-

10' BST

NC 147 NBL 24" CONC

NC 147 SBL 24" CONC

15" RCP-III

18" RCP

TBJB wMH
15" RCP-III

APPROX. LOCATION OF JUNCTION BOX

CABLE

JB wMH

DI Conv. 2GI To JB wMH

2GI

FS

REMOVE

24" RCP-III

REMOVE EXISTING BDO

18" W2 ELBOWS

BDO

REMOVE APPROX. 76' OF EXISTING 30" RCP

30" W2 ELBOWS

CLASS 'II' RIP RAP
EST. 14 TONS
28 SY GFD

REMOVE 24' OF 24" RCP

FLOWABLE FILL
EST 12 CY

FLOWABLE FILL
EST 8.8 CY

END SBG
-LDFEB- STA. 171+80

3' BASE HEAD DITCH
SEE DETAIL T3R3
EST 223 CY DDE
EST 58 TONS CL. I
EST 120 SY GFD

BEGIN FENCE (60° CL) TIE TO EX. CL FENCE

END FENCE (60° CL) TIE TO EX. CL FENCE

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 175+00 to 177+60

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 177+60 to 178+00

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 178+00 to 180+75

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 180+75 to 181+75

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 181+75 to 183+85

3' BASE HEAD DITCH
SEE DETAIL T3R3
EST 34 CY DDE
EST 36 TONS CL. I
EST 120 SY GFD

SITE 28

GAIL A. KELLY

POND WE 3'+4'

NO CLAIM

459 JOHN D. DeLONG
REBECCA P. DeLONG

460 SARAH DELMONEGO

461 JOHN F. RICHARDS
ALICE M. RICHARDS

462 DELORES P. EMORY

104 W. KENAN RAND, JR.

65+00 70+00 75+00 170+00 180+00

ARBOR

PLANTER (LANDSCAPE TIMBERS)

SEE SHEET 38 FOR -LDFEB- & -DFLW- PROFILE
SEE SHEET 72 FOR -DFWB- & -DFEB- PROFILE
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-N FOR CURVE DATA
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

10/7/2013
User name: RJ Rondilla
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing Sheet 85 of 91

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/95

REVISIONS

8/17/99

MATCH LINE SEE SHEET NO.12 -DFLW- 48+30.23 -DFWB- 68+31.14 -DFEB- 170+00.00

MATCH LINE SEE SHEET NO.14 -DFLW- 62+39.56 -LDFEB- 184+00.00

DURHAM COCA-COLA BOTTLING COMPANY

WOODS

50+00 -DFLW-

70+00 -DFWB-

45+00

60+00

MYRTLE BOWEN STRAYHORN

W. KENAN RAND, JR.

ARCHIE V. EMORY
DELORES P. EMORY

UNDERGROUND STREAM

END PROPOSED RETAINING WALL 9
-LDFEB- STA. 171+35.00 (28.5' LT)

SPECIAL CUT DITCH
SEE DETAIL STR-
EST 103 TONS CL I
EST 232 SY GFD

LATERAL V DITCH
SEE DETAIL LI
EST 43 CY DDE

CLASS 'II' RIP RAP
EST. 19 TONS
38 SY GFD

CLASS 'II' RIP RAP
EST. 14 TONS
28 SY GFD

REMOVE 24" OF 24" RCP

FLOWABLE FILL
EST 12 CY

HW

JB wMH

36" RCP-III

6' TYP.

REMOVE

FLOWABLE FILL
EST 8.7 CY

RETAIN

-DFLW- S 9° 43' 41.7" E

-DFWB- S 9° 43' 41.8" E

10' BST

NC 147 NBL 24" CONC

15" RCP-III

TBJB wMH
15" RCP-III

APPROX. LOCATION OF JUNCTION BOX

2GI

-LDFEB-

NC 147 SBL 24" CONC

10' BST

-DFEB-

REMOVE

Conv. 2GI To JB wMH

24" RCP-III

REMOVE EXISTING BDO

15" W2 ELBOWS

BDO

REMOVE APPROX. 74' OF EXISTING 30" RCP

30" W2 ELBOWS

FLOWABLE FILL
EST 8.8 CY

END 60' CL -LDFEB- STA 171+80

3' BASE HEAD DITCH
SEE DETAIL T3R3
EST 233 CY DDE
EST 58 TONS CL I
EST 120 SY GFD

BEGIN FENCE (60' CL) TIE TO EX CL FENCE

END FENCE (60' CL) TIE TO EX. CL FENCE

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 175+00 to 177+60

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 177+60 to 178+00

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 178+00 to 180+75

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 180+75 to 181+75

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 181+75 to 183+85

3' BASE HEAD DITCH
SEE DETAIL T3R3
EST 34 CY DDE
EST 36 TONS CL I
EST 120 SY GFD

SITE 28

POND WE 3.1 AC

GAIL A. KELLY

104 W. KENAN RAND, JR.

NO CLAIM

459 JOHN D. DeLONG
REBECCA P. DeLONG

460 SARAH DELMONECO

461 JOHN F. RICHARDS
ALICE M. RICHARDS

462 DELORES P. EMORY

ARBOR

PLANTER (LANDSCAPE TIMBERS)

65+00

70+00

75+00

80+00

170+00

SEE SHEET 38 FOR -LDFEB- & -DFLW- PROFILE
SEE SHEET 72 FOR -DFWB- & -DFEB- PROFILE
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-N FOR CURVE DATA
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

10/7/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 86 of 91

NAD 83/95

SITE 29

SITE 30

MYRTLE BOWEN STRAYHORN
DB 872 PG 344

W. KENAN RAND, JR.
DB 1561 PG 88

JEAN G. GROON
DB 944 PG 101
PB 9 PG 37

65+00

70+00

75+00

WOODS

MTL

ECM

60' CHL

3' CONC WALL

140' DITCH TRANSITION (SEE STD.225.09)

100' DITCH TRANSITION (NON STD)

2.5 x 2.5 CONC BRIDGE COLUMNS

TOE OF CONC SLOPE PROTECTION

68' DUKE POWER COMPANY EASE.

GLOVER RD

S 87°41'18" E 247.64'

N 89°22'45" W 281.77'

20.00'

147.25'

N 01°56'45" E

N 03°25'29" W 86.84'

PROP. ROCK PLATING -DFLW- STA. 72+50 TO 76+00
SEE STANDARD ROCK PLATING DETAIL SHEET 2-FF.
EST. 1100 SY

NOTE: RIPRAP PAD TO BE COUNTERSUNK
CLASS 'II' RIP RAP
EST. 8 TONS
21 SY GFD

CLASS 'I' RIP RAP
EST. 3 TONS
7 SY GFD
NOTE: RIPRAP PAD TO BE COUNTERSUNK

ROD AND LUG W/SLEEVE GASKETS

GRAU 350

15" RCP-III

Conv. 2GI To JB w/MH

CAT-1

RETAIN

REMOVE

-DFLW-

-LDFEB-

NC 147 NBL 24' CONC

NC 147 SBL 24' CONC

10' BST

4' BST

CABLE

MED. GR ANCHOR

ESTIMATED LOCATION OF BLIND JB

BRIDGE 104

555' DITCH/CUT SLOPE TRANSITION (SEE STD.225.09 & CROSS SECTIONS)

PROP. SBG FROM -LDFEB- STA. 187+19 TO 189+21

REMOVE 6' OF 15" CSP

CB (INACCESSIBLE STRUCTURE) TOP=357.86'

40' DITCH CLEAN-OUT
EST. 15 CY DDE

300' DITCH TRANSITION (SEE STD.225.09)

18" W/2 ELBOWS

BDO

REMOVE EXISTING BDO

SPECIAL CUT DITCH
SEE DETAIL S1

LATERAL BASE DITCH
SEE DETAIL L43P
EST 74 CY DDE
EST 57 SY PSRM

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 183+85 to 185+65

ISBKD

ISFD

15' GR

12" RCP

CLINTON RD 27' BST 30' C&G

SR 1940 GLOVER RD WIDTH VARIES

10' CONC

185+00

190+00

195+00

MATCH LINE -LDFEB- 184+00.00

MATCH LINE -DFLW- 62+39.56

MATCH LINE -DFLW- 76+47.78

MATCH LINE -LDFEB- 198+00.00

SEE SHEET NO.13

SEE SHEET NO.15

-LDFEB- PT Sta. 197+58.72

S 1°26'05.9" W

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET 39 FOR -LDFEB- & -DFLW- PROFILES
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-N FOR CURVE DATA
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

REVISIONS 8/17/99

10/3/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 84 of 91

SITE 29

SITE 30

NAD 83/95

MYRTLE BOWEN STRAYHORN
DB 872 PG 344

JEAN G. GROON
DB 944 PG 101
PB 9 PG 37

W. KENAN RAND, JR.
DB 1561PG 88

PROP. ROCK PLATING -DFLW- STA. 72+50 TO 76+00
SEE STANDARD ROCK PLATING DETAIL SHEET 2-FF.
EST. 100 SY

NOTE: RIPRAP PAD TO BE COUNTERSUNK
CLASS 'II' RIP RAP
EST. 8 TONS
21 SY GFD

CLASS 'I' RIP RAP
EST. 3 TONS
7 SY GFD
NOTE: RIPRAP PAD TO BE COUNTERSUNK

ROD AND LUG W/SLEEVE GASKETS

140' DITCH TRANSITION (SEE STD.225.09)

ESTIMATED LOCATION OF BLIND DB

PROP. SDG FROM -DFLW- STA.187+19 TO 189+71

BERM DITCH
SEE RDWY STD. 240.01
-LDFEB- STA 183+85 to 185+65

SPECIAL CUT DITCH
SEE DETAIL S1

LATERAL BASE DITCH
SEE DETAIL L13B
EST 74 LF DIG
EST 37 SY FSRM

-LDFEB- PT Sta. 197+58.72

MATCH LINE -DFLW- 76+78.18
SEE SHEET NO.15

MATCH LINE -LDFEB- 184+00.00
SEE SHEET NO.13

-DFLW- 62+39.56

S 1°26'05.9"W
198.00.00

65+00

75+00

185+00

190+00

195+00

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET 39 FOR -LDFEB- & -DFLW- PROFILES
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-N FOR CURVE DATA
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

REVISIONS

8/17/99

10/31/2013

PROJECT REFERENCE NO.	SHEET NO.
U-0071	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 88 of 91

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/95

SITE 31

SITE 32

-DFLW- PT Sta. 76+60.71

-DFLW- TS Sta. 81+56.74

-DFLW- SC Sta. 84+00.74

80+00

85+00

WOODS

CLASS 'II' RIP RAP EST. 40 TONS 80 SY GFD

CLASS 'II' RIP RAP EST. 20 TONS 40 SY GFD

48" CONC

RETAIN

15" RCP-III

24" CHL

Conv. 3GI To JB wMH

GRAU 350

GRADE CUT DITCH TO DRAIN

F.O. MARKER

10" PINE

CABLE

S 2°03'57.1"W

-DFLW- 76+47.78

MATCH LINE SEE SHEET NO.14

-LDFEB- 198+00.00

FS

DI-20

MED. GR ANCHORS (2 EA)

CONC

3GI-A

REMOVE

S 12°26'05.9"W

-LDFEB-

4' BST

NC 147 NBL 24' CONC

10' BST

NC 147 SBL 24' CONC

MATCH LINE SEE SHEET NO.16

-DFLW- 90+40.44

-LDFEB- 212+00.00

CAT-1

2GI

ELECTRIC METER

15" W/2 ELBOWS

CLASS 'I' RIP RAP EST. 2 TONS 6 SY GFD

CLASS 'II' RIP RAP EST. 12 TONS 25 SY GFD

CLASS 'II' RIP RAP EST. 10 TONS 23 SY GFD

CLASS 'II' RIP RAP EST. 8 TONS 25 SY GFD

MTL

ECM

60" CHL

-LDFEB- +50 121.99'

-LDFEB- +85 120'

-LDFEB- +00 96.98'

-LDFEB- +50 123'

BEGIN FENCE (60" CL) TIE TO EX. CL FENCE

END FENCE (60" CL) TIE TO EX. CL FENCE

REMOVE FENCE

LATERAL BASE DITCH SEE DETAIL L43 EST 673 CY DDE

-LDFEB- TS Sta. 203+71.58

-LDFEB- SC Sta. 206+15.58

200+00

205+00

210+00

JS

SI

SEE SHEET 40 FOR -LDFEB- & -DFLW- PROFILES
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-N FOR CURVE DATA
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

10/7/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 89 of 91

8/17/99

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/95

SITE 31

SITE 32

-DFLW- PT Sta. 76+60.71

-DFLW- TS Sta. 81+56.74

-DFLW- SC Sta. 84+00.74

80+00

85+00

90+00

MATCH LINE SEE SHEET NO.14 -DFLW- 76+47.78 -LDFEB- 198+00.00

MATCH LINE SEE SHEET NO.16 -DFLW- 90+40.44 -LDFEB- 212+00.00

S 2°03'57"W

S 1°26'05"W

-LDFEB- TS Sta. 203+71.58

-LDFEB- SC Sta. 206+15.58

200+00

205+00

210+00

CLASS 'I' RIP RAP EST. 24 TONS 40 SY GFD

CLASS 'I' RIP RAP EST. 12 TONS 25 SY GFD

CLASS 'H' RIP RAP EST. 33 TONS 25 SY GFD

CLASS 'H' RIP RAP EST. 10 TONS 23 SY GFD

CLASS 'I' RIP RAP EST. 2 TONS 10 SY GFD

RETAIN -DFLW-

16' RCP III

GRAU 350

Conv. 350 to 28 WAW

MED. GR ANCHORS (2 EA)

REMOVE

REMOVE FENCE

BEGIN FENCE (60' CL) TIE TO EX. CL FENCE

END FENCE (60' CL) TIE TO EX. CL FENCE

LATERAL BASE DITCH SEE DETAIL L43 EST 673 CY DDE

-LDFEB- +60 121.99'

-LDFEB- +85 120

-LDFEB- +00 96.98'

-LDFEB- +50 123'

GRADE CUT DITCH TO DRAIN

WOODS

MTL

60' CHL

ECM

10/7/2013
username
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SEE SHEET 40 FOR -LDFEB- & -DFLW- PROFILES
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-N FOR CURVE DATA
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

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	L 32+58 to 36+64	FILL						0.04		412		
2	L 37+75 - SR1 34+84 Y17 11+14	66" RCP-IV, 48"RCP-III, 24"RCP-III	0.08					0.07	<0.01	673	14	
		BANK STABILIZATION								20		
3	L 44+53	30" RCP-III	0.06					0.06		410		
* 4	SR2 36+89 Y7 17+24	48" RCP-III, 60" RCP-III	0.05					0.03	<0.01	349	15	
		BANK STABILIZATION								70		
* 5(T)	Y7LPA 13+98	60" RCP-III	0.06									
6	Y7RPA 21+78	66" RCP-III							<0.01		15	
7	Y7RPA 20+75 to Y6 15+90	8'x9' RCBC						0.16	0.02	665	110	
		BANK STABILIZATION								250		
8	Y4 19+63 to 22+30 and Y4 23+04 to 25+59	30" RCP-III, FILL	0.04					0.07		443		
9	Y5 23+20 RT.	30" RCP-III						0.03	<0.01	29	0	
		BANK STABILIZATION								43		
10	Y5 26+62 RT.	FILL	0.01	0.01								
11	Y6 11+15 off 104 RT.	18" RCP-III				<0.01						
12	Y2 26+53 to 27+90 LT.	48" RCP-III & RECHANNELIZATION						0.11	0.03	705	132	
		BANK STABILIZATION								42		
13(T)	Y4 35+48	36" RCP-IV						0.78				
* 14(T)	L 122+93	30" RCP-V	0.08									
* 15(T)	L 132+13	FILL	0.03									
* 16(T)	L 132+33 RT.	FILL	0.05									
17	L 133+41	6'x7' RCBC						0.06	0.01	479	39	
		BANK STABILIZATION								61		
17A	L 133+26 264' LT	FILL							<0.01		56	
SUB-TOTALS (page 1 of 2):			0.46	0.01		<0.01		1.41	0.06	4651	381	

*Rounded totals are sum of actual impacts

NOTES:
* indicates isolated wetland

(T) Indicates Total Take

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
WBS - 34745.1.1 (U-0071)

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)
17B	L 133+69 263' RT	FILL							<0.01		7	
18(T)	L 134+53 LT.	FILL						0.19				
19	not jurisdictional	0										
20	DFLW 27+34 to 38+06	42" RCP-III						0.02	<0.01	218	17	
21	DFLW 39+19	FILL						0.01		28		
22	DFLW 41+62	FILL						0.01		23		
23	Y3 34+45	8'x10' CULVERT						0.08	0.02	280	124	
		BANK STABILIZATION								79		
24	Y3 40+16.69 RT	30" RCP-III						0.04	0.01	104	23	
25	Y9 28+10 LT to 26+85 RT	66" RCP-III						0.01	<0.01	168	10	
		BANK STABILIZATION								35		
26	Y3 57+75 LT to RT	60" RCP-III						0.01	<0.01	50	23	
		BANK STABILIZATION								50		
27	L 129+77 414LT.	BANK STABILIZATION								10		
28	DFLW 52+08 LT & RT	36" RCP						0.02	0.01	121	20	
29	DFLW 72+35 LT	FILL						< 0.01		40		
30	DFLW 73+72 LT	FILL						< 0.01		10		
31	DFLW 78+76 LT& 81+14 RT	BANK STABILIZATION								61		
		Construction Activity							<0.01		22	
32	DFLW 78+79 LT	Construction Activity							<0.01		9	
SUB-TOTALS (page 2 of 2):			0.00	0.00		0.00		0.39	0.04	1277	255	
SUB-TOTALS (page 1 of 2):			0.46	0.01		<0.01		1.41	0.06	4651	381	
TOTALS:			0.46	0.01		<0.01		1.80	0.10	5928	636	

*Rounded totals are sum of actual impacts

NOTES:
* indicates isolated wetland

(T) Indicates Total Take

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

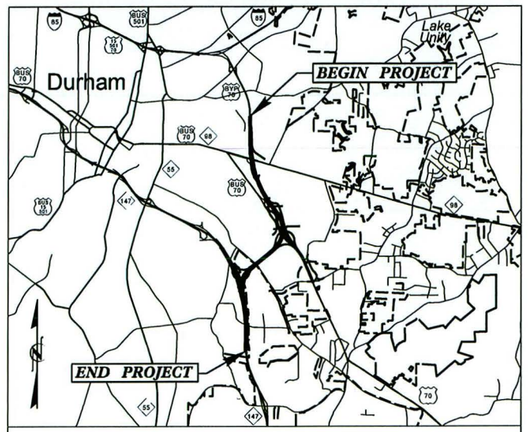
DURHAM COUNTY
WBS - 34745.1.1 (U-0071)

09/08/99

TIP PROJECT: U-0071

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DURHAM COUNTY

LOCATION: DURHAM EAST END CONNECTOR, FROM NC 147 (BUCK DEAN FREEWAY) TO NORTH OF NC 98

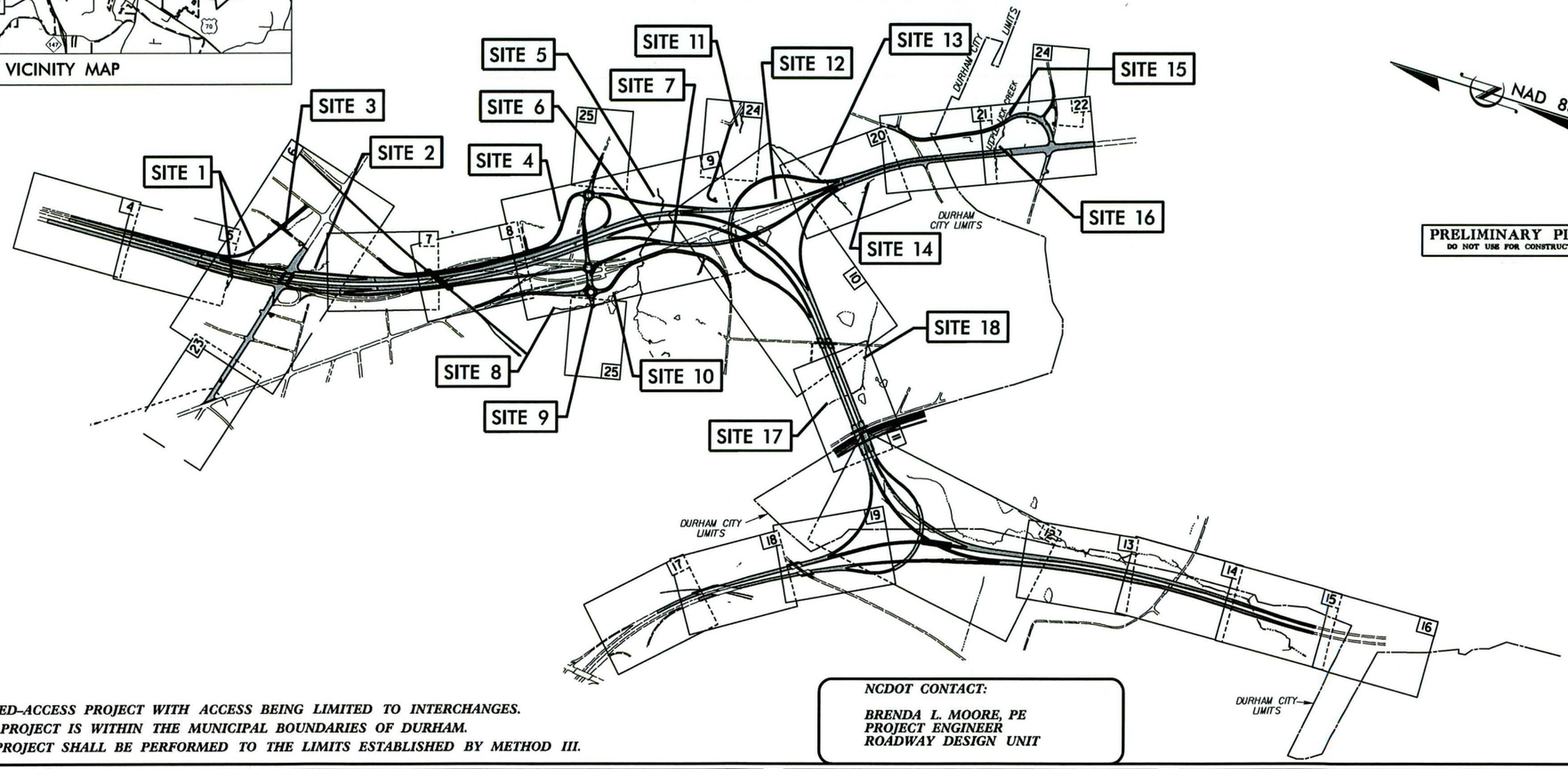
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CURB & GUTTER, SIGNALS, STRUCTURES, AND SIGNING

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-0071	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34745.1.1	NHF-76-1(2)	PE
34745.2.8	NHF-76-1(2)	R/W, UTILITIES

BUFFER IMPACTS PERMIT

BUFFER DRAWING SHEET 1 OF 18



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF DURHAM.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

NCDOT CONTACT:

BRENDA L. MOORE, PE
PROJECT ENGINEER
ROADWAY DESIGN UNIT

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 65,700
ADT 2035 = 116,100
DHV = 10 %
D = 55 %
T = 14 % *
V = 70 MPH
* TTST 8 DUAL 6
FUNCT. CLASS. = INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY PROJECT U-0071 = 3.783 mi.

LENGTH STRUCTURE PROJECT U-0071 = 0.173 mi.

TOTAL LENGTH OF TIP PROJECT U-0071 = 3.956 mi.

LENGTH OF PROJECT BASED ON -L- AND -LDFEB-

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610
By:

M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
APRIL 13, 2012

LETTING DATE:
APRIL 15, 2014

BURKE EVANS, PE
PROJECT ENGINEER

KEVIN S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

9/20/2013
username
R:\Hydraulics\PERMITS_Environmental\Drawings\u0071_hyd_buf_tsh.dgn

ALLOWABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 2

SITE 1

SITE 2

SITE 3

A

B

C

D

MATCH LINE SEE SHEET NO.5

MATCH LINE SEE SHEET NO.7

PROPOSED SIGNAL

SEE SHEET 37 FOR -L- (WB) & -L- (EB) PROFILES
SEE SHEETS 42 & 43 FOR -SR1- PROFILE
SEE SHEET 45 FOR -Y1- PROFILE
SEE SHEET 46 FOR -RAMP A- PROFILE
SEE SHEET 47 FOR -RAMP B- PROFILE
SEE SHEET 48 FOR -RAMP C- PROFILE
SEE SHEET 49 FOR -RAMP D- PROFILE
SEE SHEET 60 FOR -Y7/FC- PROFILE
SEE SHEET 67 FOR -Y1- PROFILE
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-M CURVE DATA
SEE SHEET 2-O FOR PAVEMENT/BRIDGE RELATIONSHIP SKETCH
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS
SEE SHEET 2-K FOR NC 98 / EEC RAMP INTERSECTION DETAILS

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

NOTE:
LOCATIONS OF CR SYMBOLS ARE APPROXIMATE. REFER TO THE PAVEMENT MARKING PLANS FOR EXACT LOCATIONS.

PROJECT REFERENCE NO. U-4911 | SHEET NO. 6
RW SHEET NO.
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

M A Engineering Consultants, Inc.
124 East Chatham Street Suite 137 Cary, NC 27511
Phone 919.237.2020 Fax 919.237.2021

BUFFER DRAWING
SHEET 2 OF 10

NAD 83/96

GRAPHIC SCALE
50 25 0 50 100
PLANS

REVISIONS

5/20/2003

N:\Projects\Active\4911\BUFFER\4911_BUFFER_SHEET_2.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING SHEET 3 OF 18

REVISIONS
5/17/18

MITIGABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 1
SITE 1
SITE 3
ALLOWABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 1
ALLOWABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 2
ALLOWABLE IMPACTS

9/20/2013

PROJECT REFERENCE NO.	SHEET NO.
U-0071	6-B
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING
SHEET 4 OF 18

5/14/99

9/20/2013 username
...\environmental\Drawings\0071_buf_erm_buf_ash06B.dgn

REMOVE
CB
30" RCP-IV
24" RCP
30" C&G
20" RCP-III
15" RCP-IV
18" RCP-IV
2GI
2GI-A
30" RCP-III
END C&G
+70.75
N 12°00'00.0" W
15" RCP-III
36" RCP
CONC
MTL
BST
US 70 WBL
24' BST
16' BST
PROP. CONC EXPRESSWAY GUTTER
RAMP A
PUE
ISFBUS
SITE 2
A
LATERAL BASE DITCH
SEE DETAIL L2
EST 420 CY DDE
SPECIAL CUT
SEE DETAIL S
SAMUEL RC
DAVID WICKE
THOMAS H
DONNA MA
WOODS
72" CHL & 3SBW
NAD 83/96
JS
BZ 1
BZ 2
RW
CA
CR
33
93K
127
126
35
25
38

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

ALLOWABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 2

SITE 4

SITE 5

SITE 6

SITE 7

SITE 8

SITE 9

SITE 10

PROJECT REFERENCE NO. U-XXXX

SHEET NO. 9

PRELIMINARY PLANS

NOT FOR CONSTRUCTION

M A Engineering Consultants, Inc.

BUFFER DRAWING SHEET 5 OF 8

NAD 83/95

NOTE:
LOCATIONS OF CR SYMBOLS ARE APPROXMATE. REFER TO THE PAVEMENT MARKING PLANS FOR EXACT LOCATIONS.

SEE SHEETS 31 & 32 FOR -WBL-, -L- (WB) & -L- (EB) PROFILES
SEE SHEET 44 FOR -SR2- PROFILE
SEE SHEET 50 FOR -Y2- PROFILE
SEE SHEET 52 FOR -Y4- PROFILE
SEE SHEET 56 FOR -Y5- PROFILE
SEE SHEET 57 FOR -Y6- PROFILE
SEE SHEET 58 FOR -Y7- PROFILE
SEE SHEET 59 FOR -Y7RPA- PROFILE
SEE SHEET 60 FOR -Y7LPA- PROFILE
SEE SHEET 61 FOR -Y7RPC- PROFILE
SEE SHEET 62 FOR -Y7RPD- PROFILE
SEE SHEET 63 FOR ROUNDABOUT PROFILES
SEE SHEET 66 FOR -Y12-, -Y13-, & -Y14- PROFILES
SEE SHEETS 2-J & 2-K FOR DITCH DETAILS
SEE SHEETS 2-L & 2-M FOR CURVE DATA
SEE SHEET 2-N FOR PAVEMENT/BRIDGE RELATIONSHIP SKETCH
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS
SEE SHEETS 2-Y & 2-Z FOR ROUNDABOUT DETAILS

GRAPHIC SCALE
50 25 0 50 100
PLANS

PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING SHEET 6 OF 18

8/17/99

REVISIONS

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

SITE 4

SOUTH ADAMS PARK HOMEOWNERS ASSOCIATION, INC.

ETHIOPIAN TEWAHDO GOD THE FATHER CHURCH

R.F. WHITFIELD, JR. DORIS WHITFIED

AUBREY N. FOSTER LORETTA W. FOSTER NATHANIEL HARVEY & ELLA MILLER HARVEY

N.C.D.O.T. FORMERLY GENEELIA WELLONS

CHUNG FAT INVESTORS

N.C.D.O.T. FORMERLY BILLY HAMPTON CAPPS

NOTE 1
TWO LINES SINGLE FACE CONC. BARRIER
FILL AREA BETWEEN BARRIER w/STONE AND CONC. COVER
-L- STA. 85+01 TO 85+51 MED

9/20/2013

PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING SHEET 7 OF 18

ALLOWABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 2

SITE 5

SITE 6

SITE 7

-Y2- CS Sta. 10+65.63
-WBL- POC Sta. 95+08.63 (61.00' LT)
-WBL- SC Sta. 94+57.58

-L- SC Sta. 93+87.96

-Y4- CS Sta. 17+99.33

-Y7RPD- TS Sta. 6+37.62

-Y7RPD- CS Sta. 9+14.66

-Y7RPD- SRS Sta. 11+54.66

-Y7RPD- SC Sta. 13+54.66 =
-Y4- POC Sta. 23+97.52 (12 RT)

-Y4- SC Sta. 21+99.33

-Y4- SRS Sta. 19+99.33

-Y6- PC Sta. 24+66.24

-YTRPA- CS Sta. 13+74.95

-Y2- SRS Sta. 17+30.23

CHUNG FAT INVESTORS

DAVID WAYNE HANSON

N.C.D.O.T. FORMERLY FLORINE E. COSTNER

N.C.D.O.T. (FORMERLY ALVIS M. BAUCOM)

(FORMERLY ALVIS M.

PROPOSED 8' X 9' RCBC

PROPOSED 8' X 9' RCBC

SEAL & ABANDON WELL -L- STA. 90+00 (140' RT)

PSH SEE DETAIL P1 GRADE TO EL. 337 EST. EXC. 20 C.Y.

PSH SEE DETAIL P1 GRADE TO EL. 335 EST. EX. 8 C.Y.

S 37° 52' 52.9" E

S 58° 14.4" E

N 12° 15' 10.2" W -YTRPA-

REVISIONS

8/17/05

9/20/2013

PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING SHEET 8 OF 19

8/17/99

REVISIONS

REMOVE

-Y5- +00
65'

20

REMOVE

C

15" RCP

30" RCP-III

GRADE TO DRAIN

DRY DETENTION BASIN
SEE SHEETS 2-BB AND
2-BC FOR DETAILS

TAIL BASE DITCH
SEE DETAIL T3
EST 1090 CY DDE

-Y5- +75
65'

SPECIAL CUT DITCH
SEE DETAIL S1

NAD 83/95

S 14° 16' 08.7" E

F

EIP
483

61

EIP

F

484

GRADE TO DRAIN

GR

C

EIP

-Y5-

29

PDE

PDE

TAIL BASE DITCH
SEE DETAIL T4
EST 65 CY DDE

SITE 8

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 233 TONS CL I
EST 533 SY GFD

61

THE GALLEY INC.

F

R/W

PDE

PDE

C

PDE

BZ 2

BZ 1

84" CHL & BW

CLASS 'I' RIP RAP
EST. 8 TONS
15 SY GFD

30" RCP-III

EIP

JS

BZ 2

BZ 1

PDE

CLASS 'I' RIP RAP
EST. 11 TONS
22 SY GFD

TAIL BASE DITCH
SEE DETAIL T6
EST 650 CY DDE

SUPPLIES, INC.

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

REMOVE

PDE JS

JS

JS

JS

JS

JS

LATERAL BASE DITCH
SEE DETAIL L33R
EST 633 CY DDE
EST 96 TONS CL I
EST 198 SY GFD

CLASS 'I' RIP
EST. 7 T
15 SY

BZ 1

BZ 2

CLASS 'II' RIP RAP
EST. 50 TONS
105 SY GFD

61

WOODS

61

9/20/2013
R:\Projects\Environmental\PERMITS Environmental\Drawings\0071 bud rem buf oct09SC.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-0071	9-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING
SHEET 9 OF 18

REVISIONS

8/17/95

9/20/2013
dcameron
R:\Hydraulics\...\PERMITS_Environmental\...\0071_bud_pro_buf_pst8x90.dgn

S 23° 22' 57.5" E

S 23° 14' 01.1" E

15" RCP-IV

CB

504

505

66

65

68

10

12

30

WOODS

McLAWHORN AVE.
PB 142 PG 8

30.00

15" RCP-III

18" RCP-III

JB w/MH

PROP. 4" CONC. S/W

PDE

VARIABLE

BZ 1

BZ 2

JS

E

F

RW

SITE 9

SITE 10

PASADENA AVE.
PB 142 PG 8

DUKE POWER COMPANY ESMT.

68.00'

PSH SEE DETAIL P1
GRADE TO EL. 341
EST. EXC. 100 C.Y.

MTL

CLASS 'I' RIP RAP
EST. 4 TONS
40 SY GFD

BORDE

END CONSTRUCTION

NAD 83/95

MITIGABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

PROJECT REFERENCE NO.	SHEET NO.
U-0071	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING
SHEET 10 OF 19

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

SITE 9
Complete site shown on Sheet 9-D

NAD 83/95

H.L. BUNN HEIRS

PAUL W. FOO, TRUSTEE

GENEVA BELL RICHMOND & GEORGE L. RICHMOND

DOROTHY ALSTON-VANHOOK

SARAH L. HARRIS

COUNTY OF DURHAM

DOUGLAS H. BUNN AND CYNTHIA P. BUNN (287)

EAO, LLC (286)

EAO, LLC (285)

ELLEN SATTERFIELD HEIRS (290)

JONATHAN WARREN PERRY (288)

GARY W. PENNY CYNTHIA PENNY (289)

(291)

THE GALLEY INC. (61)

BORDEN DEVELOPMENT CORP. (65)

CARR RD 2070'

-Y7- POT Sta. 7+99.81

BEGIN CONSTRUCTION -Y7- STA.8+85.00

-Y7- PC Sta. 10+04.62

-Y7- PT Sta. 11+72.75

-Y7- 12+50.00

MATCH LINE SEE SHEET NO.9

-Y7- 29+00.00

END CONSTRUCTION -Y7- STA.29+00.00

N 83° 57' 51" W

S 65° 31' 02.5" W

WOODS

DUKE POWER COMPANY

PUE

9/20/2013
I:\ser_name\...\PERMITS_Env\projects\U-0071_hyd_pmp_blf_cat25.dgn

SEE SHEET 65 FOR -Y10- PROFILE
SEE SHEET 66 FOR -Y11- PROFILE
SEE SHEET 66 FOR -Y12- PROFILE
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-N FOR CURVE DATA
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

ALL DRIVEWAY
OTHERWISE

PROJECT REFERENCE NO.	SHEET NO.
U-0071	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING
SHEET 11 OF 18

SITE 11

NAD 83/95

WILBURN V. CLAYTON
DOROTHY G. CLAYTON

W. VANCE CLAYTON
DOROTHY G. CLAYTON

W. VANCE CLAYTON
DOROTHY M. CLAYTON

JEANNE FLETCHER
FAMILY TRUST

HERBERT L. HOLLEMAN
MARIE W. HOLLEMAN

WILBURN V. CLAYTON
DOROTHY G. CLAYTON

DANIEL WOLDEYES
MESKEREM WOLDEYES

J. REMEDIOS
GONZALEZ GARCIA
ESPERANZA
CAMACHO CARDENAZ

BRADFORD S. OWEN

ION L. ZAMAN
ANA ZAMAN

REBECCA B. BURCH

MATTHEW M. JOHNSON
FANNIE JOHNSON

BETTY W. CARTHEN

LETHA WHITLEY

REA RESIDENTIAL, INC.

REAL ESTATE
ASSOC. INC.

LETISHA N. JUDD

WILLIAM B. BARKER

RONNIE G. &
LINDA G.
THOMPSON

NCDOT
PROJECT# 8.1413207

N.C. STATE
HIGHWAY COMMISSION
FORMERLY
DOUGLAS G. HILL
MORRIS L. HILL
NORA K. HILL

DOUGLAS G. HILL
MORRIS L. HILL
NORA K. HILL

N 67° 42' 34" E

S 8° 54' 13" W

N 75° 50' 19" E

N 25° 28' 18" E

-Y10-
11+00.00

-Y11-
12+25.00

-Y12-
15+00.00

20+00

MATCH LINE
SEE SHEET NO.22

MATCH LINE
SEE SHEET NO.9

MATCH LINE
SEE SHEET NO.10

END CONSTRUCTION
-Y10- STA.16+25.00

END CONSTRUCTION
-Y11- STA.11+70.00

END CONSTRUCTION
-Y12- STA.22+75.00

END C&G
TIE TO EX. C&G

BEGIN C&G
TIE TO EX. C&G

45' DITCH CLEAN-OUT
EST. ?? CY DOE

REMOVE

RETAIN

TAIL DITCH
SEE DETAIL T1
EST. EX. 40 C.Y.

PSH SEE DETAIL P1
GRADE TO EL. 319
EST. EXC. 10 C.Y.

ALLOWABLE IMPACTS
ZONE 2

ALLOWABLE IMPACTS ZONE 2

REVISIONS

R/W REVISION / /200 RMP ALL ADJACENT PARCELS OWNED BY WILLIAM B. BARKER COMBINED INTO PARCEL NO. 309, PARCEL NOS. 400 & 401 COMBINED INTO PARCEL NO. 400, PARCEL NOS. 442 & 443 COMBINED INTO PARCEL NO. 442.

8/17/99

9/20/2013
jwilliamson
R:\Highways\Projects\PERMITS_Environmental\Drawings\0071_hwd_prm_buf_psh24.dgn

SEE SHEETS 33 & 34 FOR -WBL-, -L- (WB) & -L- (EB) PROFILES
SEE SHEET 50 FOR -Y2- PROFILE
SEE SHEETS 52 & 53 FOR -Y4- PROFILE
SEE SHEETS 53 & 54 FOR -US70FLY- PROFILE
SEE SHEET 55 FOR -REC70S- PROFILE
SEE SHEET 57 FOR -Y6- PROFILE
SEE SHEET 59 FOR -Y7RPA- PROFILE
SEE SHEET 64 FOR -Y8- PROFILE
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-M CURVE DATA
SEE SHEET 2-O FOR PAVEMENT&BRIDGE RELATIONSHIP SKETCHES
SEE SHEET 2-BI FOR NOISEWALL ENVELOPE
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

PROJECT REFERENCE NO. U-6001 | SHEET NO. 10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

M A Engineering Consultants, Inc.
553 East Chatham Street Suite 137 Cary, NC 27511
Phone: 8134591620 Fax: 8134591621

BUFFER DRAWING
SHEET 12 OF 13

MATCH LINE SEE SHEET NO.8D

MATCH LINE SEE SHEET NO.8D

MATCH LINE SEE SHEET NO.8

MATCH LINE SEE SHEET NO.9

MATCH LINE SEE SHEET NO.9

MATCH LINE SEE SHEET NO.9

SITE 12
Complete site shown on sheet 10-A1

NAD 83/99

NO CLAIM
LUCY MOORE BUILDING

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

GRAPHIC SCALE
50 25 0 50 100
PLANS

9/20/2023

PROJECT REFERENCE NO.	SHEET NO.
U-0071	10-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING SHEET 13 OF 18

8/17/99

REVISIONS

NAD 83/95

SITE 12

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

9/20/2013
K:\Projects\PERMITS Environmental\0-projects\0071 hwd pem buf pgh10a.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-0071	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING SHEET 14 OF 18

REVISIONS
8/8 REVISION / /202 RWP ALL ADJACENT PARCELS OWNED BY WILLIAM G.BARKER COMBINED INTO PARCEL NO.309, PARCEL NO.185 REVISED TO 928.

8/17/99

SITE 12
Complete site shown on Sheet 10-A

SITE 13

SITE 14

WILLIAM B. BARKER

LYNN OXFORD ASSOCIATES

N.C. STATE HIGHWAY COMMISSION
FORMERLY ALLEN D. ALDRIDGE

LIVING WATERS CHRISTIAN COMMUNITY

ISMTL LIVING WATERS CHRISTIAN COMMUNITY CHURCH

ISBR LIVING WATERS CHRISTIAN COMMUNITY CHURCH

PHILLIP C. RANSDELL II
PAGE GUNTER RANSDELL
PAUL ANDREW RANSDELL

NAD 83/95

MATCH LINE SEE SHEET NO.10

MATCH LINE SEE SHEET NO.21

-US70FLY- 40+70.00

-Y2- 30+00.00

-Y4- 40+52.64

-EEC70E- 26+00.00

-Y3- 43+00.00

BEGIN SBG -US70FLY- STA. 43+17

BEGIN SBG -US70FLY- STA. 43+26

END SBG -US70FLY- STA. 47+85

BEGIN SBG -EEC70E- STA. 29+18

END SBG -Y3- STA. 42+20
TRANSITION TO EXPRESSWAY GUTTER
-Y3- STA. 42+30.00

-US70FLY- STA. 43+30 LT 115'
60 LF LEVEL SPREADER
BASE INV. 320'
SEE DETAIL LS1

PAVED TAN DITCH
SEE DETAIL PT1
EST 23 CY RDE
EST 5 SY CONC

PSH SEE DETAIL P1
GRADE TO EL. 325
EST. EX. 5 C.Y.

PSH SEE DETAIL P1
GRADE TO EL. 326
EST. EX. 8 C.Y.

CLASS 'II' RIP RAP
EST. 41 TONS
82 SY GFD

CLASS 'II' RIP RAP
EST. 155 TONS
248 SY GFD

CLASS 'II' RIP RAP
EST. 21 TONS
42 SY GFD

CLASS 'II' RIP RAP
EST. 16 TONS
32 SY GFD
NOTE: RIPRAP PAD TO BE COUNTERSUNK

CLASS 'II' RIP RAP
EST. 8 TONS
16 SY GFD

CLASS 'I' RIP RAP
EST. 4 TONS
10 SY GFD

CLASS 'I' RIP RAP
EST. 3 TONS
7 SY GFD

LATERAL V DITCH SEE DETAIL L1R
EST 237 CY DDE
EST 211 TONS CL I
EST 248 SY GFD

LATERAL V DITCH
SEE DETAIL L1R
EST 150 CY DDE
EST 119 TONS CL. I
EST 245 GFD

SPECIAL GRASS SWALE
SEE DETAIL G1S

TOE PROTECTION
SEE DETAIL R1
EST 115 TONS CL I
EST 233 SY GFD

SPECIAL CUT DITCH
SEE DETAIL S1R
EST 170 TONS CL I
EST 363 SY GFD

PLACE PERMANENT ROCK CHECK DAMS @ 25' INTERVALS
SEE RDY STD 1633.02

SPECIAL CUT GRASSED SWALE w/ 5' BASE
SEE DETAIL G5S

LATERAL BASE GRASSED SWALE
SEE DETAIL G5
EST 859 CY DDE

GRASSED SWALE
W/4' BASE
SEE DETAIL G4
EST 382 CY DDE

PROPOSED 8' X 10' RCBC

REMOVE EXISTING RCBC

REMOVE 48" RCP

2GI WANGLE VANE GRATE

JB wMH

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

SEE SHEETS 50 & 51 FOR -Y2- & -Y3- PROFILES
SEE SHEET 53 FOR -Y4- PROFILE
SEE SHEET 54 FOR -US70FLY- PROFILE
SEE SHEET 55 FOR -EEC70E- PROFILE
SEE SHEETS 2-K & 2-L FOR DITCH DETAILS
SEE SHEET 2-M FOR CURVE DATA
SEE SHEET 2-V FOR TRAFFIC DIAGRAMS

10/31/2013
User:rone-
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING SHEET 15 OF 18

ALLOWABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 2

SITE 15

SITE 16

MATCH LINE SEE SHEET NO.21 -Y9- 25+00.00

MATCH LINE SEE SHEET NO.24 -YII- 12+25.00

MATCH LINE SEE SHEET NO.21 -Y3- 57+00.00

WESTWOOD HOLDINGS LLC

WILBURN V. CLAYTON
DOROTHY G. CLAYTON

LEE RAY BERGMAN, LLC

W. VANCE CLAYTON
DOROTHY G. CLAYTON

LETHA WHITLEY

MATTHEW M. JOHNS
FANNIE JOHNSON

BETTY W. CARTHEN

NAEGLE OUTDOOR ADVERTISING, INC.

JAMES RODNEY TAYLOR
SHELIA TAYLOR

JOHN CURTIS PICKARD

TSOUMBOS DIMITRIOS

TSOUMBOS ARISTOTELIS

FAST FARE MARKETS OF N.C., INC.

JOHN TUBIOLO
VIDA S. TUBIOLO
d/b/a J&V RENTAL PROPERTIES

GEORGE W. BRIDGERS
KATY BUNTING WALDEN

RICHARD C. NOKES, SR.

RENEE N. McGINLEY
JOSEPH D. McGINLEY

PARKSIDE PROPERTIES LLC.

EUGENE M. EVANS, JR.

NAD 83/95

8/17/99

R/W REVISION / /202 (RBP PARCEL NOS. 198, 199, & 204 COMBINED INTO PARCEL NO. 198, PARCEL NOS. 400 & 401 COMBINED INTO PARCEL NO. 400, PARCEL NOS. 205 & 206 COMBINED INTO PARCEL NO. 205, & PARCEL NOS. 207 & 208 COMBINED INTO PARCEL NO. 207)
R/W REVISION 6 / 27 / 202 (BE ADDED SIDEWALK ALONG PARCELS NO. 205 & 206.

9/20/2013
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PROJECT REFERENCE NO.	SHEET NO.
U-0071	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

BUFFER DRAWING SHEET 16 OF 18

SITE 18

SITE 17

NAD 83/95

N.C.D.O.T. (FORMERLY DORIS M. LINDSEY)

N.C.D.O.T. (FORMERLY WILLIAM K. GRAHAM)

ALICE SHAMBLEY YATES

N.C.D.O.T. FORMERLY ALBERT L. HIGHT

N.C.D.O.T. (FORMERLY R.G. FAULKNER)

N.C.D.O.T. (FORMERLY ANNIE D. KNIGHT)

N.C.D.O.T. FORMERLY OTIS L. WALLER

10' BERM EL.=364
FOREBAY
OUTLET STRUCTURE
BASIN BOTTOM EL.=357
DRY DETENTION BASIN SEE SHEETS 2-BF AND 2-BG FOR DETAILS

CLASS 'II' RIP RAP EST. 20 TONS 40 SY GFD
CLASS 'II' RIP RAP EST. 16 TONS 34 SY GFD
DRAIN POND POND WE 360'
POND WE 372'
POND WE 360'

PROPOSED 6' X 7' RCBC

LATERAL 'V' DITCH SEE DETAIL L1R EST 1366 CY DDE EST 224 TONS CLI EST 209 SY GFD

LATERAL BASE DITCH SEE DETAIL L3 EST 509 CY DDE

10-YR VELOCITY @ BUFFER=1.95 FPSEC

CLASS 'II' RIP RAP EST. 12 TONS 25 SY GFD
CLASS 'II' RIP RAP EST. 17 TONS 34 SY GFD

WILLIAM A. ROCHELLE
BELINDA H. ROCHELLE

IRIS K. DOUGLAS

DURHAM PROPERTIES, INC.

CITY OF DURHAM

DURHAM COCA COLA BOTTLING COMPANY

ALLOWABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 2
ALLOWABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 1

370 JOHN E. HINTZ, BRENDA J. HINTZ	382 JOSHUA H. MILAN, DEBORAH S. MILAN	383 JAME WILLIAM WRENN, CASEY NICHOLAS WRENN
378 LESTER E. DUDLEY, RANDY THOMAS DUDLEY	381 FRANKIE D. WILSON, JOHN L. DILLARD, JR.	

MATCH LINE SEE SHEET NO.10 -L- 128+00.00

MATCH LINE SEE SHEET NO.12 -DFLW- -DFLY- -DFLWB- -LDFEB- -DFLW- -DFLY- 11+84.57 142+25.00 21+84.75 11+94.82

REVISIONS
R/W REVISION / /202 RMP PARCEL NOS. 92 & 93 COMBINED INTO PARCEL NO. 92, AND PARCEL NAME CHANGED TO "DURHAM COCA COLA BOTTLING COMPANY", PARCEL NOS. 379 & 380 COMBINED INTO PARCEL NO. 379, PARCEL NO. 85 REVISED TO "5", PARCEL NO. 87 REVISED TO "6", PARCEL NO. 90 REVISED TO "8", PARCEL NO. 384 REVISED TO "8".

8/17/99

9/20/2013
User:name
R:\Hydraulics\PERMITS_Environmental\Projects\U-0071 bud grn buf asbl.dgn

WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (ft^2)	WETLANDS IN BUFFERS ZONE 2 (ft^2)
1	L 36+86RT to 38+71LT		2986	431
2	L 44+95 to 49+16 LT		2431	268
4	SR2 32+99 to Y7 16+51		899	969
7	Y4 21+14		616	535
9	Y7 29+00		61	132
10	Y6 11+09		6	0
TOTAL:			6999	2335

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
PROJECT: 34745.2.8 (U-0071)

10/31/2013
SHEET 17 OF 18

Rev. Jan 2009

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	66" RCP-V	L 36+86RT to 38+71LT	X						41408	26834	68242		
2	30" RCP & 15"RCP	L 44+95 to 49+16 LT	X						22801	15534	38335		
3	30" RCP-III	Y17 12+93 to 13+97	X			2222	997	3219					
4	18", 48" & 60" RCP	SR2 32+99 to Y7 16+51	X						42060	34953	77013		
5	66" RCP-III	Y7RPA 21+27 to 22+32	X			2342	3142	5484					
6	TWO 8'x9' RCBC	Y7RPA 20+32 to Y7RPD 7+62	X						61647	37348	98995		
7	30" RCP-III	Y4 21+14	X						24286	16780	41066		
8	DITCH	Y5 23+24	STORMWATER MANAGEMENT			3438	1805	5243					
9	15" RCP-III	Y7 29+00			X				4340	6087	10427		
10	18" RCP-III	Y6 11+09			X				977	1780	2757		
11	PREFORMED SCOUR HOLE	Y12 10+00	STORMWATER MANAGEMENT				87	87					
12	15", 24", & 36" RCP	L 109+80 to Y2 29+08	X						77205	50757	127962		
13	8'x10' RCBC	Y3 34+44	X						27871	20229	48100		
14	30" RCP	Y3 40+73	X			7822	3210	11032					
15	60" RCP	Y9 27+33	X						13171	8861	22032		
16	60" RCP	Y3 57+71	X			7690	5252	12942					
17	6'x7' RCBC	L 133+41	X						36102	23110	59212		
18	DITCH	L 129+60	STORMWATER MANAGEMENT			2146	1897	4043					
TOTAL:						25660	16390	42050	351868	242273	594141		

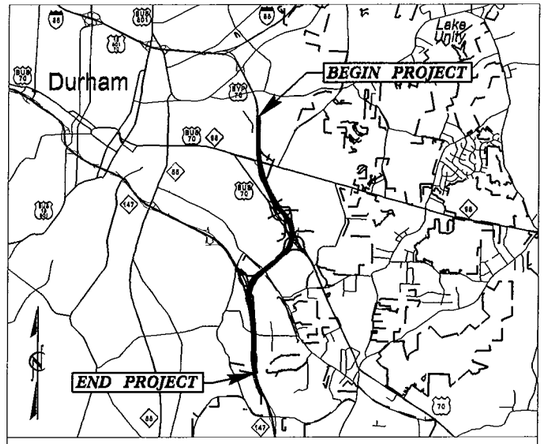
N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
PROJECT: 34745.2.8 (U-0071)

10/31/2013
SHEET 18 OF 18

09/06/99

TIP PROJECT: U-0071



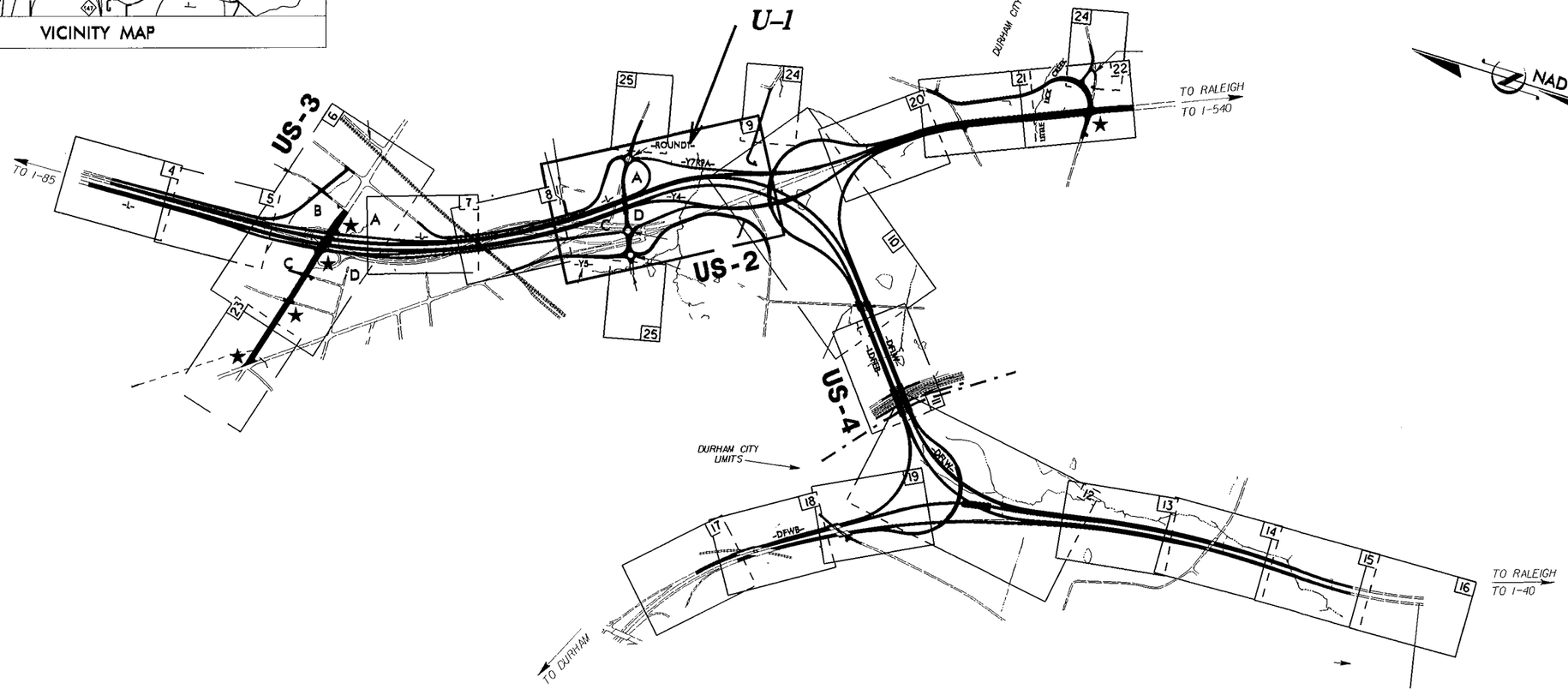
VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITY PERMIT PLANS
DURHAM COUNTY
(SURFACE WATER IMPACT)

T.I.P. NO.	SHEET NO.
U-0071	US-1

Utility Permit Drawing
Sheet 1 of 5
Revised 9/4/13



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

SHEET NO.	*DESCRIPTION*
US-1	*TITLE SHEET*
US-2 ~ US-4	*UTILITY PERMIT SHEET*

WATER AND SEWER OWNERS ON PROJECT

(1) SANITARY GRAVITY SEWER : CITY OF DURHAM

SEAL

PREPARED IN THE OFFICE OF:
DIVISION OF HIGHWAYS
UTILITIES UNIT
UTILITIES ENGINEERING

1555 MAIL SERVICES CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

Roger Worthington, P.E. — *UTILITIES SECTION ENGINEER*
Ron. B. Wilkins, P.E. — *UTILITIES SQUAD LEADER PROJECT ENGINEER*
Jong-Tae Yoon — *UTILITIES PROJECT DESIGNER*

04-SEP-2013 13:07
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$$$USERNAME$$$

PROJECT REFERENCE NO. U-0011 | SHEET NO. B 10 5-2

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

M A Engineering Consultants, Inc.
[illegible]

PERMANENT IMPACT (8" GRAVITY SANITARY SEWER) WITHIN J.S. IMPACT 20 LF.

U-1

Utility Permit Drawing
Sheet 2 of 5
Revised 9/4/13

1.4 FT STREAM WIDTH

BZ 1

8" SS

JSA1

BANK STABLIZATION (PERMANENT IMPACT)

10 LF

10 LF

HYDRO DETAIL
BANK STABLIZATION
(Not to Scale)

4'

2'

3'

Type of Liner= Class 'I' Rip-Rap

SEWER LINE IS GOING TO BE COMPLETELY BURIED. TEMPORARY TRENCHING WILL OCCUR WITHIN THE FOOTPRINT OF THE BANK STABILIZATION.

DENOTES IMPACTS IN SURFACE WATER

GRAPHIC SCALE
50 25 0 50 100
PLANS

MATCH LINE SEE SHEET NO.3

BY2-205

BY2-206

BY2-AB

BY2-474

BY2-475

BL-42

BL-43

BL-44

BL-45

UTILITY IMPACT
(8" GRAVITY SANITARY SEWER)
COVERED WITHIN ROADWAY IMPACT

Utility Permit Drawing
Sheet 3 of 5
Revised 9/4/13

PROJECT REFERENCE NO.	SHEET NO.
U-5011	6 / US-3
RW SHEET NO.	

ROADWAY DESIGN ENGINEER | STRUCTURE DESIGN ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

M A Engineering Consultants, Inc.
193 New Camden Road Suite 110 Conc, SC 29111
Phone 843-423-2211 Fax 843-423-2211

MATCH LINE SEE SHEET NO.23
+/- STA 5+00.00

MATCH LINE SEE SHEET NO.7

GRAPHIC SCALE
80 25 0 50 100
PLANS

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	11 / US-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Utility Permit Drawing
Sheet 4 of 5
Revised 9/4/13

8/17/99

REVISIONS

R/W REVISION / /202 RWP PARCEL NOS. 92 & 93 COMBINED INTO PARCEL NO. 92, AND PARCEL NAME CHANGED TO "DURHAM COCA COLA BOTTLING COMPANY". PARCEL NOS. 379 & 380 COMBINED INTO PARCEL NO. 85 REVISED TO "S". PARCEL NO. 87 REVISED TO "L". PARCEL NO. 99 REVISED TO "M". PARCEL NO. 394 REVISED TO "S".

MATCH LINE -L- 128+00.00 SEE SHEET NO.10

-L- POT Sta. 129+00.00 =
-DFLW- POT Sta. 8+59.74 (25' LT) LA =
-LDFEB- POT Sta. 129+00.00 (25' RT) LA

DRY DETENTION BASIN SEE SHEETS 2-BF AND 2-BG FOR DETAILS

DRAIN POND
POND WE 360'

BEGIN BRIDGE
-DFLW- STA. 11+22.55

BEGIN APPROACH SLAB
-DFLW- STA. 16+98.56

END SBG
-DFLW- STA. 16+93.18

BEGIN APPROACH SLAB
-LDFEB- STA. 137+43.19

BEGIN BRIDGE
-LDFEB- STA. 137+67.19

END SBG -LDFEB-
STA. 137+48.57

END NOISEWALL & SINGLE FACED BARRIER
BEGIN GUARDRAIL & SBG
-L- STA. 132+75

PROPOSED 6' X 7' RCBC

-LDFEB- POT Sta. 138+40.45
-Y15- POC Sta. 11+53.04
-Y15- PC Sta. 9+.7

EP TO FACE OF NOISEWALL

LATERAL 'V' DITCH SEE DETAIL L1R

LATERAL BASE DITCH SEE DETAIL L3

10-YR VELOCITY @ BUFFER = 1.95 FT/SEC

PROP. TEMPORARY IMPACT (16" GRAVITY SANITARY SEWER) DUE TO TRENCHING THAT IS COVERED WITHIN ROADWAY IMPACT.

04-SEP-2013 14:12
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esmith\EPNAME esmith

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Existing Channel Impacts Permanent (ft)	SURFACE WATER IMPACTS: Existing Channel Impacts Temp. (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
U-1	BANK STABLIZATION	8 " SS						0.00	0.00	20		
TOTALS:			0.00	0.00	0.00	0.00	0.00	0.00	0.00	20	0.00	0.00

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
WBS - 34745.1.1 (U-0071)

ATN Revised 3/31/05

SHEET 5 O: 5 9/4/2013

09/06/99

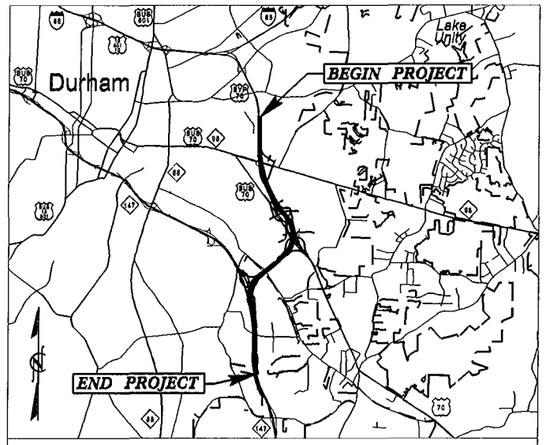
TIP PROJECT: U-0071

T.I.P. NO.	SHEET NO.
U-0071	UB-1

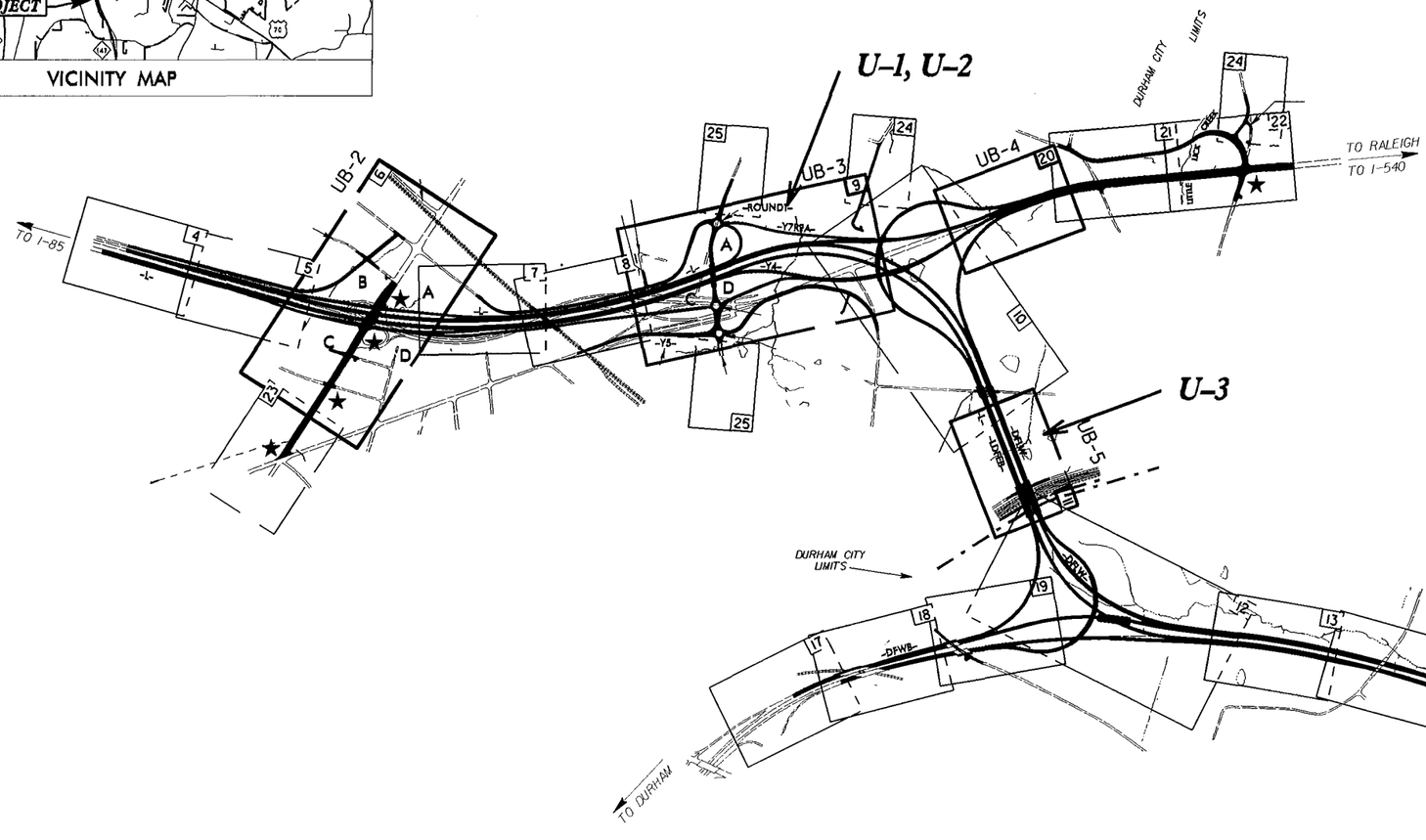
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITY PERMIT PLANS
DURHAM COUNTY
(BUFFER ZONE IMPACT)

Utility Permit Drawing
Sheet 1 of 6
Revised 9/4/13



VICINITY MAP


U-1, U-2
U-3
UB-2
UB-3
UB-4
UB-5
TO I-85
TO RALEIGH
TO I-540
TO RALEIGH
TO I-40
TO DURHAM
DURHAM CITY LIMITS
DURHAM CITY LIMITS
ROUNDT
-Y7/9A-
-Y4-
-Y5-
-DRWB-
-DRWB-
-DRWB-
-DRWB-
-LDRB-
-LDRB-
-LDR

UTILITY IMPACT
(8" GRAVITY SANITARY SEWER)
COVERED WITHIN ROADWAY IMPACT

PROJECT REFERENCE NO.	SHEET NO.
U-0071	6 / UB-2
RW SHEET NO.	
ROADWAY DESIGN ENGR	HYDRAULICS ENGR

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
Tel 919.233.8091
Fax 919.233.8213

Utility Permit Drawing
Sheet 2 of 6
Revised 9/4/13

MATCH LINE SEE SHEET UB-2.3
-Y1- STA. 5+50.00

MATCH LINE SEE SHEET UB-1

GRAPHIC SCALE
50 25 0 50 100
PLANS

BUFFER IMPACT (8"
GRAVITY SANITARY SEWER)
WITHIN BZ1 MITIGABLE 329 SF
BZ2 ALLOWABLE 1325 SF

U-1

U-2

BUFFER IMPACT (8"
GRAVITY SANITARY SEWER)
WITHIN BZ1 ALLOWABLE 1706 SF
BZ2 ALLOWABLE 635 SF

EXISTING CLEARED CITY OF DURHAM EASEMENT AND IS CONSIDERED 'EXISTING USE'.

Utility Permit Drawing
Sheet 3 of 6
Revised 9/4/13

BUFFER IMPACT (12" GRAVITY SANITARY SEWER) COVERED WITHIN HYDRO IMPACT

ALLOWABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

GRAPHIC SCALE
50 25 0 50 100
PLANS

M A Engineering Consultants, Inc.

PROJECT REFERENCE NO.	SHEET NO.
U-0071	20 / UB-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Utility Permit Drawing
Sheet 4 of 6
Revised 9/4/13

NO UTILITY IMPACT (M.H.)WITHIN EXIST CLEARED EASEMENT (CITY OF DURHAM)

THIS PORTION OF UTILITY IMPACT IS OUTSIDE OF HYDRO IMPACT, BUT IS WITHIN EXISTING CLEARED UTILITY EASEMENT AND IS CONSIDERED 'EXISTING USE'

BUFFER UTILITY IMPACT (16"SANITARY GRAVITY SEWER) WITHIN HYDRO BZ IMPACT

BUFFER IMPACT ALREADY COVERED WITHIN THE EXISTING ROADWAY IMPACT

MATCH LINE SEE SHEET NO.10

MATCH LINE SEE SHEET NO.21

REVISIONS
R/W REVISION / 1202 DMF ALL ADJACENT PARCELS OWNED BY WILLIAM B.BARKER COMBINED INTO PARCEL NO.305. PARCEL NO.85 REVISED TO 92%.

8/17/99

24 JAN 2013 13:16
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M A Engineering Consultants, Inc.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.	SHEET NO.
U-0071	11 / UB-5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Utility Permit Drawing
Sheet 5 of 6
Revised 9/4/13

**UTILITY IMPACT(M.H.)
WITHIN EXIST CLEARED EASEMENT
(CITY OF DURHAM) AND
EXISTING ROADWAY IMPACT**

**PROP. UTILITY IMPACT
(16" GRAVITY SANITARY SEWER)
WITHIN PROP. CULVERT IMPACT
, AND BZ1 ALLOWABLE 893 SF**

ALLOWABLE IMPACTS ZONE 1

U-3

MATCH LINE -L- 128+00.00 SEE SHEET NO.10

-L- POT Sta. 129+00.00 =
-DFLW- POT Sta.8+59.74 (25' LT) LA =
-LDFEB- POT Sta.129+00.00 (25' RT) LA

DRY DETENTION BASIN
SEE SHEETS 2-BF AND
2-BG FOR DETAILS

DRAIN POND
POND
WE 360'

BEGIN BRIDGE
-DFLW- STA.17+22.55

BEGIN APPROACH SLAB
-DFLW- STA.16+98.56

END SBG
-DFLW- STA. 16+93.16

BEGIN APPROACH SLAB
-LDFEB- STA.137+43.19

BEGIN BRIDGE
-LDFEB- STA.137+67.19

END SBG -LDFEB-
STA. 137+48.57

-LDFEB- POT, Sta.138+40.45
-Y15- POC Sta.11+53.04

-Y15- PC Sta. 9+7

NOISEWALL
EP TO FACE
OF NOISEWALL

END NOISEWALL &
SINGLE FACED BARRIER
BEGIN GUARDRAIL & SBG
-L- STA. 132+75

PROPOSED
6' X 7' RCBC

LATERAL 'V' DITCH
SEE DETAIL L1R

LATERAL BASE DITCH
SEE DETAIL L1

10-YR VELOCITY
@ BUFFER=1.95 FT/SEC

REVISIONS
8/8 REVISION / /202 RMP PARCEL NOS. 92 & 80 COMBINED INTO PARCEL NO. 92, AND PARCEL NAME CHANGED TO DURHAM COCA COLA BOTTLING COMPANY; PARCEL NOS. 378 & 380 COMBINED INTO PARCEL NO. 85 REVISED TO "S"; PARCEL NO. 87 REVISED TO "L"; PARCEL NO. 90 REVISED TO "R"
PARCEL NO. 384 REVISED TO "R"

8/17/99

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BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
U-1	8" SS	SR2 36+77LT to 37+38LT				0	1325	1325	329	0	329		
U-2	8" SS	Y7RPA 21+63RT to 22+29RT				1706	635	2341	0	0	0		
U-3	PUE for 16" SS	L 133+12RT to 133+84RT				893	0	893	0	0	0		
TOTAL:						2599	1960	4559	329	0	329		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

DURHAM COUNTY
PROJECT: 34745.2.8 (U-0071)

9/4/2013
SHEET 6 OF 6