



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

BEVERLY PERDUE  
GOVERNOR

EUGENE CONTI  
SECRETARY

December 9, 2010

MEMORANDUM TO: Mr. Pat Ivey, PE  
Division Nine Engineer

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

A handwritten signature in black ink, appearing to read "P. S. Harris, III".

SUBJECT: Rowan- Davidson Counties, North of SR 2120 (Exit 81) in Rowan County to US 29-52-70/I-85 Business (Exit 87); T.I.P. Number I-2304 AC; Federal Aid Project No. NHF-85-3(164)80; State Project No. 8.1631403

Attached are the modifications to the U.S. Army Corps of Engineers Section 404 Individual Permit and N.C. Division of Water Quality Section 401 Individual Water Quality Certification, Section 401 Letter of Correction and Section 404 Letter of Concurrence 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:  
<http://www.ncdot.gov/doh/preconstruct/pe/neu/permit.html>

PSH/gyb

Attachment

Cc: W/attachment  
Mr. Randy Garris, P.E. State Contract Officer  
Ms. Kent Boyer, Division Environmental Officer

Cc: W/o attachment (see website for attachments)  
Mr. Majed Alghandour, P. E., Programming and TIP  
Mr. Jay Bennett, P.E., Roadway Design  
Dr. David Chang, P.E., Hydraulics  
Mr. Art McMillan, P.E., Highway Design  
Mr. Tom Koch, P.E., Structure Design  
Mr. Dewayne Sykes, P.E., Utilities Unit  
Mr. Mark Staley, Roadside Environmental  
Mr. John F. Sullivan, FHWA  
Mr. Ron Hancock, P.E., State Roadway Construction Engineer  
Mr. Mike Robinson, P.E., State Bridge Construction Engineer  
Ms. Beth Harmon, EEP  
Mr. Eric Midkiff, P.E., PDEA Central Region Unit Head

## PROJECT COMMITMENTS

### I-85

North of SR 2120 (Exit 81) in Rowan County to US 29-52-70/I-85 Business (Exit 87)  
in Davidson County, Rowan-Davidson Counties  
Federal Aid Project No. NHF-85-3(164)80  
State Project No. 8.1631403  
WBS Project No. 35871.1.1  
T.I.P. Project No. I-2304 A

### COMMITMENTS DEVELOPED THROUGH PROJECT DEVELOPMENT AND DESIGN

#### Project Development and Environmental Analysis Branch (PDEA)

Because the subject project lies within a Federal Energy Regulatory Commission (FERC)-licensed hydro plant project boundary (the Yadkin Project), approval for land transfer must be obtained by NCDOT in the form of a FERC license revision. Coordination with the proper FERC officials shall take place, and the process to obtain a FERC permit will be followed

*A portion of the subject project lies within the Yadkin Hydroelectric Project boundary. (Project No. 2197), as licensed by the Federal Energy Regulatory Commission (FERC). For this reason, NCDOT must receive prior written permission from Alcoa Power Generating, Incorporated (APGI), before beginning construction. This permission would most likely be in the form of a Construction Permit and/or easement, in accordance with the Yadkin Project Shoreline Management Plan (SMP). More specifically, the Industrial Use Approval Procedures are outlined in Appendix F to the SMP. Because the project is considered a 'new bridge or road,' the SMP requires 1) agency consultation, 2) 45-day prior notices to FERC and 3) APGI written permission (SMP Appendix F, Table 2). The Transportation Program Management Unit will coordinate with the proper APGI officials to obtain a FERC permit revision for this project.*

#### Geotechnical Unit

It is anticipated that the proposed widening of I-85 and interchange reconstruction along I-85 will encroach on one property identified as an underground storage tank (UST) site. The project has been designed to minimize impacts to this UST site to prevent the possibility of long-term, costly remediation. This impacted site will be further evaluated before the project's construction.

## **Project Development and Environmental Analysis Branch**

Due to its historical significance, Bridge # 46, which carries US 29-70 over the Yadkin River in the southbound direction, will remain in place but will be closed to vehicular traffic. The bridge will remain in place to serve pedestrian and bicycle traffic.

Ownership, liability, and maintenance responsibilities are currently being discussed by the Rowan and Davidson County Commissioners, the Transportation Museum, and the State Historic Preservation Office (SHPO). It is anticipated that these issues will be resolved before the project construction. The issues related to ownership, liability, and maintenance responsibilities have not been resolved by the above-mentioned parties. These issues continue to be discussed by the local officials.

*Rehabilitation of Bridge No. 46 (Wil-Cox Bridge) is not an option due to the present state of deterioration. After submission of the Notice of Adverse Effect to the Council in February 2009, FHWA entered into negotiations with NCDOT, NC HPO and other consulting parties to develop a Memorandum of Agreement (MOA) to mitigate the effects of the project on the Yadkin River Crossing Historic District. Davidson and Rowan Counties attended the initial meeting and informed all parties that they may not be able to honor their original intention to take ownership of the historic Wil-Cox Bridge. Rowan County commissioners voted against participating in preservation of the bridge, while Davidson County commissioners have decided to work in good faith with FHWA and NCDOT towards taking ownership of the Wil-Cox Bridge, once the entire I-85 Yadkin River Bridge Project is completed. The ultimate fate of the bridge is unknown at this time, but the attached MOA has been drafted to accommodate for the effects of either outcome.*

## **Right of Way Branch**

It is anticipated that thirteen Geodetic Survey markers will be impacted by this project. The North Carolina Geodetic Survey will be contacted prior to construction regarding the relocation of survey markers along the project.

## **Project Development and Environmental Analysis Branch / Structure Design Unit**

Removal of Bridge #137, which spans the Yadkin River, results in potentially 1,254 cubic yards of temporary fill. NCDOT will implement Best Management Practices for Bridge Demolition and Removal.

*Upon further analysis of the amount of temporary fill resulting from bridge demolition, it was determined that only the amount of fill from the substructure would result in temporary fill. The likely potential amount of fill resulting from bridge demolition will be approximately 430 cubic yards. NCDOT will implement Best Management Practices for Bridge Demolition and Removal.*

## **Project Development and Environmental Analysis Branch**

The project may have an impact on a low income community in the Williams Trailer Park area located along I-85 south of SR 2124 (Hackett Road). During the project development process, no concerns have been raised by the public or local government officials concerning environmental justice issues. NCDOT will aggressively seek participation of this low-income community in the public involvement process.

NCDOT held two meetings with the citizens of the Williams Trailer Park. The first meeting was held in the Spencer Town Hall on 6/19/2001, and the second meeting was held in the North Carolina Transportation Museum on 6/24/2002. During these meetings, the design was presented to the trailer park residents, and their input and concerns related to the project were obtained. In addition to these meetings, a more detailed analysis was performed to determine the impacts to this area, and the determination has been made that this project does not create impacts related to Environmental Justice for the Williams Trailer Park.

*An on-site community studies review and analysis was conducted by the NCDOT Community Studies staff on March 6, 2009. No major area development or land use changes were observed inside the project limits since the Design Public Hearing was held.*

## **Project Development and Environmental Analysis Branch / Design Services Unit**

Based on preliminary studies, five areas were identified as possible noise barrier locations. These noise barriers were determined to be unreasonable, due to the cost of the noise reduction benefits versus the cost of the abatement measures. However, the project will be re-evaluated for noise abatement measures once more detailed designs are complete.

The project was re-evaluated for noise abatement measures. Noise mitigation in the form of a wall was analyzed for several areas along the project. For the I-2304AA section, one location, known as Barrier Location 2, it was determined that a barrier in this location is considered reasonable and feasible by NCDOT guidelines. Hence, a noise wall is recommended in this area. Further coordination with the affected residents and/or business will take place concerning this proposed noise wall.

*One traffic noise barrier is proposed for construction on I-2304AA and is located on the west side of I-85, immediately south of the I-85 Business/I-85 interchange. The projects are proposed to be concurrently let as Design/Build. To facilitate the Design/Build process, NCDOT will revise the existing Design Noise Reports by using the current TNM® versinn2.5 software and incorporating the analytical results for both project sections into one report. The proposed noise barrier is anticipated to remain. Completion of the revised NCDOT Design Noise Report is expected in mid-May 2009*



## **Project Development and Environmental Analysis Branch / Design Services Unit / Construction Unit**

A roadside memorial exists within the project limits; however it is not anticipated to be impacted by this project. This memorial, dedicated in 1929 by the North Carolina

Historic Commission, which currently owns the property, was investigated for its historical significance. It was determined that this Trading Ford Monument is not eligible for the National Register of Historic Places. Based on this site visit and other information compiled by NCDOT, no additional archaeological work was deemed necessary for this site. The Historic Preservation Office has requested that the bronze plaque be returned to them if the monument has to be removed during construction. Additionally, NCDOT will coordinate with local officials and SHPO to determine if there is a more suitable location for the marker.

*According to the current plans, the roadside memorial (Trading Ford Monument) will not be affected by the construction of this project.*

## **Design Services Unit / Structure Design Unit**

In accordance with the FERC requirements, a Construction Permit will be issued to NCDOT once all requested information is reviewed and approved by FERC. The construction permit will contain a condition, among many others, that with regard to existing bridges, that NCDOT will be required to remove all concrete down to the existing muck line so that it will not be a hazard or act as a "catch" for floating debris.

## **Project Development and Environmental Branch**

The biological conclusion for the bald eagle was revised to "Not Likely to Adversely Affect." This conclusion was approved by the USFWS. Because eagles may potentially nest in this area prior to bridge construction, NCDOT will re-survey for bald eagles prior to the project's construction.

As of January 31, 2008, the United States Fish and Wildlife Service (USFWS) lists two federally protected species for Davidson County. Those species are the bog turtle and Schweinitz's sunflower. The USFWS lists one federally protected species for Rowan County, which is Schweinitz's sunflower. No new species have been added by the USFWS since the completion of the Environmental Assessment (EA); however, the bald eagle has been delisted since then. The bald eagle was officially delisted on August 8, 2007 (CFR 50 part 17) and is still afforded protection under the Bald and Golden Eagle Protection Act. The biological conclusion of "No Effect" remains valid for the above mentioned species. The NCDOT Natural Environment Unit will update the project Threatened or Endangered Species Report during the fall 2009 survey window.

*The NCDOT Natural Environment Unit updated the Threatened and Endangered Species Surveys in September 2009. None of the above mentioned threatened species were found during the survey.*

## **COMMITMENTS DEVELOPED THROUGH PERMITTING**

### **SECTION 401 WATER QUALITY CERTIFICATION CONDITIONS FROM 2004 PERMIT**

#### **Division 9, Roadside Environmental Unit (REU)**

Sediment and erosion control measures shall not be placed in wetlands or waters to the maximum extent practicable. If placement of sediment and erosion control devices in wetlands and waters is unavoidable, they shall be removed and the natural grade restored within 30 days after the project has been released.

#### **Division 9**

Stormwater management shall be constructed in accordance with the hydraulic design plans submitted in the February 20, 2004 application.

#### **Hydraulics Unit**

The hazardous spill catch basins (I-2304AA Plan Sheet 9) shall be designed and located to afford ready access to maintenance and emergency response personnel and equipment.

- The volume of spill containment storage provided will be approximately 10,000 gallons plus the estimated runoff volume from rainfall intensity equating to a two year return period event.
- A means will be provided such that the normal free flow of runoff at the basin outlet can be interrupted to cause containment of hazardous runoff. This can be accomplished by providing a mechanical control gate or by constructing a minimum control section in the outlet channel. The mechanical gate alternative will generally be utilized in areas where normal operational activities would allow close scrutiny and control, reducing the potential for problems with vandalism.
- Maintenance plans for constructed basins shall be developed in accordance with Best Management Practices (BMPs) and good engineering practices. Additional guidance for properly maintaining containment basins can be found at 40 CFR Part 112, §112.7, et al. (Spill Prevention Control and Countermeasures).
- Inspections of the hazardous spill catch basin and opening/shutting of the gate should be performed annually at a minimum, and within six (6) months after a spill incident to ensure integrity of the catch basin.
- Repairs should occur in a timely manner.
- NCDOT should provide annually, a site location map of all hazardous spill catch basins and similar devices to Federal (USEPA, USCG), DENR, State Emergency Response Coordinator, and all applicable county and urban center response groups.

- Signage indicating the presence of a hazardous spill catch basin shall be provided.
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### **Roadside Environmental Unit, Division 9**

The removal of vegetation in riparian areas should be minimized. NCDOT is encouraged to use existing on-site vegetation and materials for stream bank stabilization and to minimize the use of rip rap. Rip rap shall not be placed in the stream bottom. Riparian vegetation, using native trees and shrubs, must be re-established within the construction limits of the project by the end of the growing season following completion of construction to re-establish the riparian zone and to provide long-term erosion control.

### **Division 9**

Culverts that are less than 48-inch in diameter should be buried to a depth equal to or greater than 20% of their size to allow for aquatic life passage. Culverts that are 48-inch diameter or larger should be buried at least 12 inches below the stream bottom to allow natural stream bottom material to become established in the culvert following installation and to provide aquatic life passage during periods of low flow. If any of the existing pipes are perched, they shall be removed and replaced, and re-installed correctly, unless demonstrated that this is topographically unfeasible.

### **Project Development and Environmental Analysis Unit**

*Summary of Compensatory Mitigation:* Compensatory mitigation shall be the same as that approved by the US Army Corps of Engineers, as long as the mitigation required equals a ratio of 1: 1 restoration or creation of lost wetland acres as described in 15A NCAC 2H.0506 (h)(6), and consists of the following:

#### **I-2304 Section AA**

- 0.02 acres of on-site riverine wetland restoration within I-2304 Section AA.
- 2644 linear feet of stream impacts will be mitigated through NCDENR Ecosystem Enhancement Program (EEP).
- 1.08 acres of impacts to non-riverine wetlands will be mitigated through EEP.

#### **I-2304 Section AB**

- 1.03 acres of on site riverine wetland restoration within I-2304 Section AA.
- 1811 linear feet of stream will be mitigated through EEP.
- 0.16 acres of impacts to non-riverine wetlands will be mitigated through EEP.

In accordance with 15A NCAC 2R.0500, this contribution will satisfy NC Division of Water Quality's compensatory mitigation requirements under 15A NCAC 2H.0506(h). Until the EEP receives and clears NCDOT's payments, wetland or stream fill shall not occur. The payments to EEP shall be sent within two (2) months of issuance of the 404 permit.

*Payment has been sent to EEP.*

### **Division 9, Design Services Unit, Hydraulics Unit**

Two copies of the final construction drawings shall be furnished to NCDWQ prior to the pre-construction meeting. Written verification shall be provided that the final construction drawings comply with the permit drawings contained in the Application dated February 20, 2004 and May 11, 2004.

### **Division 9**

The dimension, pattern and profile of the stream above and below the crossing should not be modified by widening the stream channel or reducing the depth of the stream. Disturbed floodplains and streams should be restored to natural geomorphic conditions. All stream relocation and restoration activities shall comply with the final natural channel design plans approved by the NC Division of Water Quality.

### **Division 9, Roadside Environmental Unit**

All channel relocations will be constructed in a dry work area, and stabilized before stream flows are diverted. Channel relocations will be completed and stabilized prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. Vegetation used for bank stabilization shall be limited to native woody species, and should include establishment of a 30 foot wide wooded and adjacent 20 foot wide vegetated buffer on both sides of the relocated channel to the maximum extent practical. A transition phase incorporating coir fiber and seeding establishment is allowable. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but NCDOT must provide written justification and any calculations used to determine the extent of rip-rap coverage requested.

All temporary fills in wetlands and surface waters shall be removed upon completion of the project. In addition, the post-construction removal of any temporary bridge structures or fill will need to return the project site to its pre-construction contours and elevations. The revegetation of the impacted areas with appropriate native species will be required.

## **SECTION 404 INDIVIDUAL PERMIT CONDITIONS FROM 2004 PERMIT**

### **Compliance With Plans**

### **Division 9, Design Services Unit**

All work must be performed in strict compliance with the plans, which are a part of the Section 404 permit. Any modification to the permit plans must be approved by the US Army Corps of Engineers (USACE) prior to implementation.

## **Construction Plans**

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

## **Sedimentation and Erosion Control Measures**

### **Division 9, Roadside Environmental Unit**

NCDOT 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.

## **Mitigation**

### **Project Development and Environmental Analysis Unit**

NCDOT shall mitigate for 2.29 acres of wetland impacts, and 4,455 linear feet of impacts to streams with important aquatic function, for this project, as described below (1.05 acres of riverine bottomland hardwood wetland restoration at the Yadkin River Swamp Hardwoods Restoration Mitigation Site. And 2.48 acres of restoration equivalent non-riverine wetlands, and 8,910 linear feet of restoration equivalent warm water stream channel, through EEP, in the Yadkin River basin (Cataloging Unit 03040103).

*The Department of the Army (DA) permit was modified October 7, 2010, to state that NCDOT will provide 2.54 acres of restoration wetland credits from the onsite wetland restoration project instead of the current 1.05 acres of wetland restoration credits.*

## **YADKIN RIVER SWAMP HARDWOODS RESTORATION MITIGATION SITE**

NCDOT shall implement the compensatory wetland mitigation plan entitled "Restoration Plan for Swamp Hardwoods Wetlands At Existing Bridge Causeway of the 1-85 Yadkin River In Rowan County", dated July 12, 2004, to provide the restoration described in conditions below. NCDOT shall complete grading for the mitigation within one year of demolition of the existing 1-85 Yadkin River bridge, and complete planting of the site within the first planting season (November 15 to March 15) after grading is completed. NCDOT shall contact the Corps of Engineers, Raleigh Regulatory Field Office NCDOT Regulatory Project Manager, a minimum of sixty days before completion of grading at the mitigation site, and inform the Project Manager of the expected completion date of the grading.

NCDOT shall mitigate for 1.05 acres of unavoidable impacts to riverine bottomland hardwood forest wetlands associated with this project with 1.05 acres of riverine

bottomland hardwood forest wetland restoration, at the Yadkin River Swamp Hardwoods Restoration Mitigation Site (Yadkin Site).

NCDOT will do a boundary survey of the 1.05 acres of wetland restoration at the Yadkin Site, and submit a copy of the survey to the District Engineer within 90 days after construction of the site is completed.

NCDOT will monitor the site vegetation between June 1 and November 30, inclusively, of each year, and document plant mortality and stress. A minimum of one 0.05-acre sample plots will be established within the 1.05 acre restoration area, and will be placed randomly within a representative position. NCDOT will continue monitoring of the planting area annually until the specified performance criteria is met, as described below.

*The Department of the Army (DA) permit was modified October 7, 2010, to state that NCDOT will provide 2.54 acres of restoration wetland credits from the onsite wetland restoration project instead of the current 1.05 acres of wetland restoration credits.*

## **YADKIN SITE MITIGATION MONITORING**

### **Project Development and Environmental Analysis Unit, Division 9, Roadside Environmental Unit**

Performance criteria for tree planting areas will be met if sample plots demonstrate that for each of the first three complete years of monitoring, 320 target-species trees per acre have survived, such that at the end of three years, 320 three-year old target-species trees per acre have survived on the site, and, in years four and five, 288 and 260 trees per acre, respectively, have survived on the site, such that at the end of year five, 260 five year old target-species trees per acre have survived on the site.

If for any monitoring year, vegetation survival is not favorable, as determined by the Corps of Engineers, any remedial action required by the Corps of Engineers will be performed, the required restoration areas will be replanted, and the five-year monitoring period will begin again with year one.

## **GENERAL WETLANDS MITIGATION**

NCDOT and subsequent property owners shall maintain the Yadkin Site in its natural condition, as altered by work in the mitigation plan, in perpetuity. Prohibited activities within the mitigation site specifically include, but are not limited to: the construction or placement of roads, walkways, buildings, signs, or structures of any kind (i.e., billboards, interior fences, etc.); filling, grading, excavation, leveling, or any other earth moving activity or activity that may alter the drainage patterns on the property; the cutting, mowing, destruction, removal, or other damage of any vegetation; disposal or storage of any debris, trash, garbage, or other waste material; except as may be authorized by the mitigation plans, or subsequent modifications that are approved by the

Corps of Engineers. In addition, NCDOT shall take no action, whether on or off the mitigation property, which will adversely impact the wetlands on the mitigation property, except as specifically authorized by this permit, or subsequent modifications that are approved by the Corps of Engineers.

NCDOT shall make every effort to convey the Yadkin Site property to a nonprofit conservation organization or a natural resource agency, which is willing to hold the areas in perpetuity for conservation purposes, and which is acceptable to the Corps of Engineers. The annual monitoring reports, as required, will include the status of the conveyance efforts.

NCDOT shall not sell or otherwise convey any interest in the property used to satisfy mitigation requirements for this permit, to any third party, without 10 days prior notification to Wilmington District Corps of Engineers in writing, which writing shall reference this permit Action ID number.

Any sale, lease, or other conveyance of the mitigation site property shall include restrictions on the use of the property as described in conditions above, which conditions shall be enforced by the North Carolina Department of Transportation. Such restrictions shall include language providing for third party enforcement rights in favor of the Corps of Engineers. Such restrictions must be approved prior to conveyance by the Corps of Engineers.

## **GENERAL MITIGATION**

### **Project Development and Environmental Analysis Unit**

NCDOT shall contact the Corps of Engineers, Raleigh Regulatory Field Office NCDOT Regulatory Project Manager, to provide that individual with that opportunity to attend the yearly mitigation monitoring efforts.

### **NC-EEP STREAM AND WETLAND MITIGATION:**

### **Project Development and Environmental Analysis Unit**

Compensatory mitigation for the unavoidable impacts to 1.24 acres of non-riverine wetlands, and 4,455 linear feet of stream associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated April 30, 2004 from William D. Gilmore, EEP Transition Manager. Pursuant to the EEP Memorandum of Agreement (MOA) between the State of North Carolina and the

US Army Corps of Engineers signed on July 22, 2003, the EEP will provide 2.48 acres of restoration equivalent non-riverine wetlands, and 8,910 linear feet of restoration equivalent warm water stream channel in the Yadkin River basin (Cataloging Unit 03040103) by one year of the date of this permit. For wetlands, a minimum of 1: 1 (impact to mitigation) must be in the form of wetland restoration. The NCDOT shall, within 30 days of the issue date of this permit, certify that sufficient funds have been

provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA.

*The Department of the Army (DA) permit was modified October 7, 2010, to state that NCDOT will provide 2.54 acres of restoration wetland credits from the onsite wetland restoration project instead of the current 1.05 acres of wetland restoration credits.*

## **Navigation**

### **Division 9, Hydraulics Unit, Structure Design Unit**

The authorized fill and structures, and associated activities, in the Yadkin River must not interfere with the public's right to free navigation on the river. No attempt will be made by NCDOT to prevent the full and free use by the public of the river at or adjacent to the authorized work for reason other than safety. NCDOT shall not modify the design of the temporary work bridges to provide an unobstructed main channel less than fifty feet wide, with no vertical structural obstructions from the work bridges extending into the opening.

## **Construction Plans**

### **Division 9, Hydraulics Unit, Design Services Unit**

Prior to commencing construction within jurisdictional waters of the United States, NCDOT shall forward the latest version of project construction drawings to the USACE, Raleigh Regulatory Field Office NCDOT Regulatory Project Manager. Half-size drawings are acceptable.

## **Historic Property**

### **Division 9, Project Development and Environmental Analysis Unit**

NCDOT shall leave Bridge NO. 46, which currently carries US 29-70 over the Yadkin River in the southbound direction, in place, due to its historical significance. NCDOT shall close the bridge to vehicle traffic, but it will serve pedestrian and bicycle traffic. NCDOT shall work out ownership and maintain responsibilities with the Rowan and Davidson County Commissioners, the Transportation Museum, and the North Carolina State Historic Preservation Office.

## **PERMIT CONDITIONS THROUGH SITES 3 - 13 PERMIT MODIFICATION**

All other conditions written into previous Water Quality Certifications dated March 14, 2004 with a modification issued November 22, 2004, and September 27, 2010 for this project still apply except where they are superseded by this certification.



## **Natural Environmental Unit**

Compensatory mitigation for impacts to 1.07 acres of riverine wetlands will be conducted through on-site mitigation. See table 3 below for tracking of wetland mitigation credits. The permittee shall comply with the on-site wetland mitigation plan submitted on July 30, 2004 dated received August 4, 2004. All on-site mitigation sites shall be protected in perpetuity by a conservation easement or through NCDOT fee simple acquisition and recorded in the NCDOT Natural Environment Unit mitigation geodatabase.

**Table 3: On-site Riparian Wetland Mitigation Restoration Credits Table**

	Total Mitigation generated on-site (acres)	Amount of On-site used from site 2 (acres) no.1 (acres)	Amount of on-site used from sites 3-12 (acres)	Total On-site mitigation remaining (acres)
On-site Mitigation Credits	2.74	1.51	1.07	0.16

Compensatory mitigation for 1640 linear feet of impacts to streams is 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 April 30, 2004 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and Dual-Party MOA signed on April 12, 2004.

## **Hydraulics Unit**

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. This condition shall supersede Condition 4 of Water Quality Certification No. 3455 dated March 19, 2004.

NCDOT shall design, construct, operate and maintain hazardous spill catch basins (HSCBs) at all crossings of the Yadkin River associated with Site 2. These HSCBs shall be designed to function as dry detention basins for post construction stormwater treatment, in accordance with additional information submitted for this permit modifications dated received September 16, 2010, and September 27, 2010. This condition refers only to the I-85 crossing of the Yadkin River at permit site 2.

Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (Hazardous Spill Catch basin-Dry Detention basin combinations) before entering the stream in

accordance with additional information submitted for this permit modifications dated received September 16, 2010, September 27, 2010, and October 13, 2010.

### **Division 9/ Roadside Environmental Unit**

At permit site 5, the portion of the jurisdictional stream that is not to be impacted shall be visually monitored for stability throughout construction and one year post construction. If the stability of this reach is compromised, NCDOT will be required to stabilize the reached through natural channel design. If this is not achievable, then NCDOT will be required to stabilize through other means and mitigate for the impacts.

Turbidity curtains shall be used to isolate all work areas from the stream at the Yadkin River, including pile or casement installation, placement of riprap, excavation or filling. Strict adherence to the Construction and Maintenance Best Management Practices will be required.

### **Division 9**

Bridge piles and bents shall be constructed using driven piles (hammer or vibratory) or drilled shaft construction methods. More specifically, jetting or other methods of pile driving are prohibited without prior written approval from NCDWQ first.

No drill slurry or water that has been in contact with uncured concrete shall be allowed to enter surface waters. This water shall be captured, treated, and disposed of properly.

All bridge construction shall be performed from the existing bridge, temporary work bridges, temporary causeways, or floating or sunken barges. If work conditions require barges, they shall be floated into position and then sunk. The barges shall not be sunk and then dragged into position. Under no circumstances should barges be dragged along the bottom of the surface water.

## Easterly, Sara E

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**From:** Thomas, John T JR SAW [John.T.Thomas.JR@usace.army.mil]  
**Sent:** Thursday, December 02, 2010 10:20 AM  
**To:** Easterly, Sara E  
**Subject:** RE: I-2304AC Sites 3-13 (UNCLASSIFIED)

Classification: UNCLASSIFIED  
Caveats: FOUO

Sara,

Thank you for finding and correcting the actual stream channel impacts associated with the referenced DA permit modification for sites 3-13. I will included this e-mail to our file for the project as documentation of this correction.

John Thomas  
Regulatory Project Manager  
Raleigh Regulatory Field Office  
919 554-4884 ext. 25

-----Original Message-----

From: Easterly, Sara E [mailto:seeasterly@ncdot.gov]  
Sent: Wednesday, December 01, 2010 2:40 PM  
To: Thomas, John T JR SAW  
Subject: I-2304AC Sites 3-13

John,

As per our conversation this morning after I receive the 404 Individual Permit Modification for Sites 3-13 I will correct the 1644 linear feet of stream impacts to reflect the actual impacts of 1640 linear feet. Please see below (from the 401 Individual Permit Modification) the corrected stream impacts:

"Compensatory mitigation for 1640 linear feet of impacts to streams is 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 April 30, 2004 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and Dual-Party MOA signed on April 12, 2004."

I will include your email agreeing with the corrected impact number in the permit package for distribution.

Please let me know if you have any questions.

Thank you,  
Sara

Sara Easterly | Central Region Environmental Specialist | Project Management Group PDEA | Natural Environment Unit | N.C. Department of Transportation  
(919) 431-1605 office | (919) 431-2002 fax | seeasterly@ncdot.gov



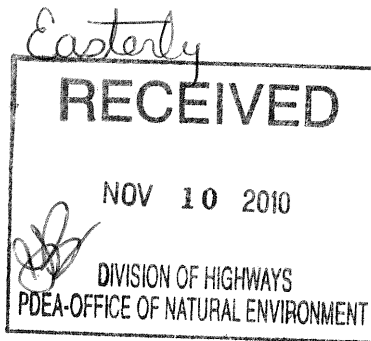
North Carolina Department of Environment and Natural Resources

Division of Water Quality  
Coleen H. Sullins  
Director

Beverly Eaves Perdue  
Governor

Dee Freeman  
Secretary

November 4, 2010



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

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed widening of I-85 from north of SR 2120 (Long Ferry Road) in Rowan County to south of NC 150 in Davidson County, Federal Aid Project No. NHFIMF-85-3(197)81, WBS 34156.3.GV3, TIP No. 1-2304AC, NCDWQ Project No. 2004-0275 v.4.

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. 3455 issued to The North Carolina Department of Transportation (NCDOT) dated March 14, 2004 with modifications issued November 22, 2004 and September 27, 2010.

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

Sincerely,

Coleen H. Sullins  
Director

Attachments

- cc: John Thomas, US Army Corps of Engineers, Raleigh Field Office
- Pat Ivey, PE, Division 9 Engineer
- Kent Boyer, Division 9 Environmental Officer
- Chris Militischer, Environmental Protection Agency (electronic copy only)
- Marla Chambers, NC Wildlife Resources Commission
- Jason Elliott, NCDOT, PDEA- Natural Environmental Unit
- Wetlands/401 Transportation Permitting Unity
- File Copy

**Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS**

**THIS CERTIFICATION** is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (NCDWQ) Regulations in 15 NCAC 2H .0500. This certification authorized the NCDOT to impact 1.06 acres of jurisdictional wetlands (Table 1) and 1882 linear feet of jurisdictional streams (Table 2) in Davidson and Rowan Counties, excluding those impacts authorized in DWQ permit number 2004-0275 v3. The project shall be constructed pursuant to the modification dated received October 13, 2010. The authorized impacts are as described below:

**Table 1: Stream Impacts in the Yadkin-Pee Dee River Basin**

<b>Site</b>	<b>Permanent Fill in Perennial Stream (linear ft)</b>	<b>Temporary Fill in Perennial Stream (linear ft)</b>	<b>Total Stream Impact (linear ft)</b>	<b>Stream Impacts Requiring Mitigation (linear ft)</b>
Previously permitted impacts at Site 3	485	0	485	485
<b>Revised impacts at Site 3</b>	<b>482</b>	<b>0</b>	<b>482</b>	<b>482</b>
Previously permitted impacts at Site 4	190	0	190	190
<b>Revised impacts at Site 4</b>	<b>184</b>	<b>0</b>	<b>184</b>	<b>184</b>
Previously permitted impacts at Site 5	619	0	619	619
<b>Revised impacts at Site 5</b>	<b>554</b>	<b>0</b>	<b>554</b>	<b>554</b>
Previously permitted impacts at Site 6	863	0	863	863
<b>Revised impacts at Site 6</b>	<b>424</b>	<b>0</b>	<b>424</b>	<b>424</b>
Previously permitted impacts at Site 8	97	0	97	97
<b>Revised impacts at Site 8</b>	<b>40</b>	<b>0</b>	<b>40</b>	<b>0</b>
Previously permitted impacts at Site 9	128	0	128	0
<b>Revised impacts at Site 9</b>	<b>128</b>	<b>0</b>	<b>128</b>	<b>0</b>
Previously permitted impacts at Site 10	32	0	32	0
<b>Revised impacts at Site 10</b>	<b>32</b>	<b>0</b>	<b>32</b>	<b>0</b>
Previously permitted impacts at Site 12	0	0	0	0
<b>Revised impacts at Site 12</b>	<b>0</b>	<b>38</b>	<b>38</b>	<b>0</b>
<b>Total Revised Impacts</b>	<b>1844</b>	<b>38</b>	<b>1882</b>	<b>1644</b>

**Total Stream Impact for Project excluding site 2: 1882 linear feet**

**Table 2: Riverine Wetland Impacts in the Yadkin-Pee Dee River Basin**

Site	Fill (ac)	Fill (temporary) (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)
Previously permitted impacts at Site 5	1.04	0	0.04	1.08
<b>Revised impacts at Site 5</b>	<b>0.96</b>	<b>0</b>	<b>0.04</b>	<b>1.00</b>
Previously permitted impacts at Site 12	0	0	0	0
<b>Revised impacts at Site 12</b>	<b>0</b>	<b>0.01</b>	<b>0</b>	<b>0.01</b>
Previously permitted impacts at Site 13	0	0	0	0
<b>Revised impacts at Site 13</b>	<b>0.05</b>	<b>0</b>	<b>0</b>	<b>0.05</b>
<b>Total Revised Impacts</b>	<b>1.01</b>	<b>0.01</b>	<b>0.04</b>	<b>1.06</b>

**Total Wetland Impact for Project excluding site 2: 1.06 acres.**

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

This approval is only valid for the purpose and design that you submitted in your modified application dated received October 13, 2010. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated March 14, 2004 with modifications issued November 22, 2001 and September 27, 2010 still apply except where superseded by this certification. Should your project change, you are required to notify NCDWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

**Condition(s) of Certification:**

1. All other conditions written into previous Water Quality Certifications dated March 14, 2004 with modifications issued November 22, 2001 and September 27, 2010 for this project still apply except where they are superseded by this certification.
2. Compensatory mitigation for impacts to 0.21 acres of riverine wetlands will be conducted through on-site mitigation. See table 3 below for tracking of wetland mitigation credits. The permittee shall comply with the on-site wetland mitigation plan submitted on July 30, 2004 dated received August 4, 2004. All on-site mitigation sites shall be protected in perpetuity by a conservation easement or through NCDOT fee simple acquisition and recorded in the NCDOT Natural Environment Unit mitigation geodatabase.

**Table 3: On-site Riparian Wetland Mitigation Restoration Credits**

	Total Mitigation generated on-site (acres)	Amount of On-site used from site 2 (acres)	Amount of On-site used from sites 3-12 (acres)	Total on-site mitigation remaining (acres)
On-site Mitigation Credits	2.74	1.51	1.07	0.16

3. Compensatory mitigation for 1644 linear feet of impact to streams is 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 April 30, 2004 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and the Dual-Party MOA signed on April 12, 2004.
4. Alls NCDOT shall design, construct, operate and maintain hazardous spill catch basins (HSCBs) at all crossings of the Yadkin River with the exception of site 12. These HSCBs shall be designed to function as dry detention basins for post construction stormwater treatment, in accordance with additional information submitted for this permit modifications dated received September 16, 2010, and September 27, 2010.
5. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means before entering the stream in accordance with additional information submitted for this permit modifications dated received September 16, 2010, September 27, 2010, and October 13, 2010.
6. Post-construction Stormwater shall be treated using appropriate best management practices (e.g., vegetated conveyances, constructed wetlands, detention ponds, etc.) prior to discharging to surface waters in accordance with additional information submitted for this permit modifications dated received September 16, 2010, and September 27, 2010.
7. At permit site 5, the portion of the jurisdictional stream that is not to be impacted shall be visually monitored for stability throughout construction and one year post construction. If the stability of this reach is compromised, NCDOT will be required to stabilize the reaches through natural channel design. If this is not achievable, then NCDOT will be required to stabilize through other measures and mitigate for the impacts.

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:

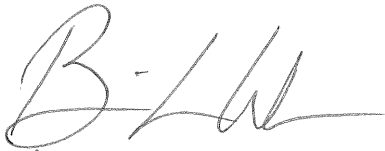
Office of Administrative Hearings  
 6714 Mail Service Center  
 Raleigh, NC 27699-6714  
 Telephone: (919)-733-2698, Facsimile: (919)-733-3478

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

Ms. Mary Penny Thompson, General Counsel  
Department of Environment and Natural Resources  
1601 Mail Service Center  
Raleigh, NC 27699-1601

This the 4th day of November 2010

DIVISION OF WATER QUALITY

A handwritten signature in black ink, appearing to read 'B-L-W' with a horizontal line extending to the right.

*es* Coleen H. Sullins  
Director

WQC No. 3455 v. 4



NCDWQ 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 Quality, 1650 Mail Service Center, Raleigh, NC, 27699-1650. This form may be returned to NCDWQ 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 \_\_\_\_\_



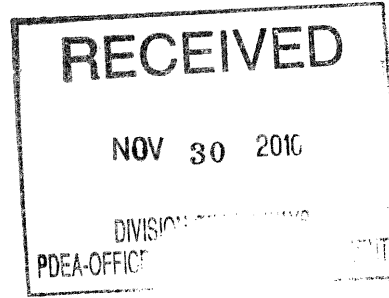
North Carolina Department of Environment and Natural Resources

Division of Water Quality  
Coleen H. Sullins  
Director

Beverly Eaves Perdue  
Governor

Dee Freeman  
Secretary

November 30, 2010



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

Subject: Second Correction to 401 Water Quality Certification No. 3455 v. 4, NCDWQ Project No. 20040275, v. 4, TIP no. I-2304AC.

Dear Dr. Thorpe:

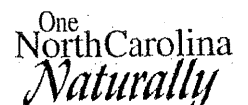
This letter is in regards to the Individual Water Quality Certification No. 3455 v.4 issued November 4, 2010. This letter replaces the correction letter issued November 9, 2010. Please note the changes listed below to stream and wetland impact totals in the text below and tables 1 and 2. Also please note the changes to conditions 1, 2, 3, and 4.

**THIS CERTIFICATION** is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (NCDWQ) Regulations in 15 NCAC 2H .0500. This certification authorized the NCDOT to impact 1.08 acres of jurisdictional wetlands (Table 2) and 1845 linear feet of jurisdictional streams (Table 1) in Davidson and Rowan Counties, excluding those impacts authorized in DWQ permit number 2004-0275 v3. The project shall be constructed pursuant to the modification dated received October 13, 2010. The authorized impacts are as described below:

**Table 1: Stream Impacts in the Yadkin-Pee Dee River Basin**

Site	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
Previously permitted impacts at Site 3	485	0	485	485
<b>Revised impacts at Site 3</b>	<b>482</b>	<b>0</b>	<b>482</b>	<b>482</b>
Previously permitted impacts at Site 4	190	0	190	190
<b>Revised impacts at Site 4</b>	<b>184</b>	<b>0</b>	<b>184</b>	<b>184</b>
Previously permitted impacts at Site 5	619	0	619	619
<b>Revised impacts at Site 5</b>	<b>550</b>	<b>0</b>	<b>550</b>	<b>550</b>

Transportation Permitting Unit  
1650 Mail Service Center, Raleigh, North Carolina 27699-1650  
Location: 2321 Crabtree Blvd., Raleigh, North Carolina 27604  
Phone: 919-733-1786 \ FAX: 919-733-6893  
Internet: <http://h2o.enr.state.nc.us/ncwellands/>



Previously permitted impacts at Site 6	863	0	863	863
<b>Revised impacts at Site 6</b>	<b>424</b>	<b>0</b>	<b>424</b>	<b>424</b>
Previously permitted impacts at Site 8	97	0	97	97
<b>Revised impacts at Site 8</b>	<b>40</b>	<b>0</b>	<b>40</b>	<b>0</b>
Previously permitted impacts at Site 9	128	0	128	0
<b>Revised impacts at Site 9</b>	<b>95</b>	<b>0</b>	<b>95</b>	<b>0</b>
Previously permitted impacts at Site 10	0	0	0	0
<b>Revised impacts at Site 10</b>	<b>32</b>	<b>0</b>	<b>32</b>	<b>0</b>
Previously permitted impacts at Site 12	0	0	0	0
<b>Revised impacts at Site 12</b>	<b>0</b>	<b>38</b>	<b>38</b>	<b>0</b>
<b>Total Revised Impacts</b>	<b>1807</b>	<b>38</b>	<b>1845</b>	<b>1640</b>

**Total Stream Impact for Project excluding site 2: 1845 linear feet**

**Table 2: Riverine Wetland Impacts in the Yadkin-Pee Dee River Basin**

Site	Fill (ac)	Fill (temporary) (ac)	Mechanized Clearing (ac)	Total Wetland Impact (ac)
Previously permitted impacts at Site 5	1.04	0	0.04	1.08
<b>Revised impacts at Site 5</b>	<b>0.96</b>	<b>0</b>	<b>0.04</b>	<b>1.00</b>
Previously permitted impacts at Site 12	0	0	0	0
<b>Revised impacts at Site 12</b>	<b>0</b>	<b>0.01</b>	<b>0</b>	<b>0.01</b>
Previously permitted impacts at Site 13	0.03	0	0.02	0.05
<b>Revised impacts at Site 13</b>	<b>0.05</b>	<b>0</b>	<b>0.02</b>	<b>0.07</b>
<b>Total Revised Impacts</b>	<b>1.01</b>	<b>0.01</b>	<b>0.06</b>	<b>1.08</b>

**Total Wetland Impact for Project excluding site 2: 1.08 acres.**

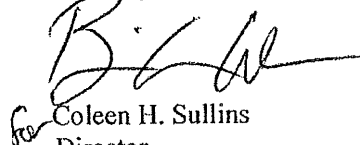
1. All other conditions written into previous Water Quality Certifications dated March 14, 2004 with modifications issued November 22, 2004 and September 27, 2010 for this project still apply except where they are superseded by this certification.
2. Compensatory mitigation for impacts to **1.07** acres of riverine wetlands will be conducted through on-site mitigation. See table 3 below for tracking of wetland mitigation credits. The permittee shall comply with the on-site wetland mitigation plan submitted on July 30, 2004 dated received August 4, 2004. All on-site mitigation sites shall be protected in perpetuity by a conservation easement or through NCDOT fee simple acquisition and recorded in the NCDOT Natural Environment Unit mitigation geodatabase.

	Total Mitigation generated on-site (acres)	Amount of On-site used from site 2 (acres)	Amount of On-site used from sites 3-13 (acres)	Total on-site mitigation remaining (acres)
On-site Mitigation Credits	2.74	1.51	1.07	0.16

3. Compensatory mitigation for 1640 linear feet of impact to streams is 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 April 30, 2004 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and the Dual-Party MOA signed on April 12, 2004.
4. NCDOT shall design, construct, operate and maintain hazardous spill catch basins (HSCBs) at crossings of the Yadkin River **associated with site 2**. These HSCBs shall be designed to function as dry detention basins for post construction stormwater treatment, in accordance with additional information submitted for this permit modifications dated received September 16, 2010, and September 27, 2010.

Please keep a copy of this letter with the original certification. If we can be of further assistance, do not hesitate to contact us.

Sincerely,



Coleen H. Sullins  
Director

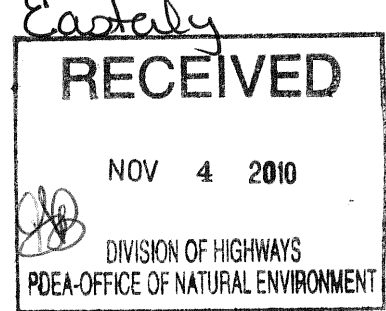
cc: John Thomas, US Army Corps of Engineers, Raleigh Field Office  
Anne Gamber, NCDOT Hydraulics  
Pat Ivey, PE, Division 9 Engineer  
Kent Boyer, Division 9 Environmental Officer  
Chris Militscher, Environmental Protection Agency (electronic copy only)  
Marla Chambers, NC Wildlife Resources Commission  
Jason Elliott, NCDOT, PDEA- Natural Environmental Unit  
File Copy



REPLY TO  
ATTENTION OF:

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

November 1, 2010



Regulatory Division

Action ID. 199821203; TIP No. I-2304A

Dr. Gregory J. Thorpe, Ph.D.  
Environmental Management Director, PDEA  
N.C. Department of Transportation  
1598 Mail Service Center  
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

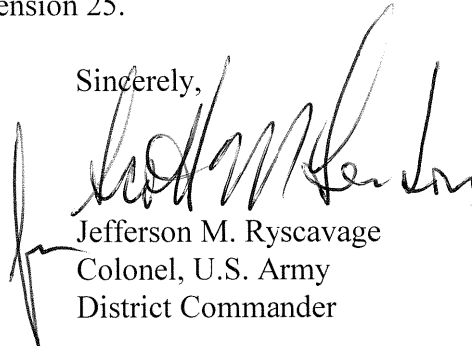
Reference is made to your Department of the Army (DA) permit issued on December 16, 2004, authorizing the discharge of fill material into waters of the United States (jurisdictional waters) for construction of Section A of the Interstate 85 (I-85) Improvements (T.I.P. No. I-2304A), from north of SR 2120 (Exit 81), northeast of Spence, in Rowan County, to north of I-85 Business (Exit 87), southwest of Lexington, in Davidson County, North Carolina. The project is adjacent to jurisdictional waters of the Yadkin River, Potts Creek, and unnamed tributaries of the Yadkin River. Reference also your written request of October 11, 2010, for a modification to your DA permit to authorize changes to impacts to jurisdictional waters as defined by plans dated September 29, 2010, included in your request associated with proposed construction changes for sites 3-13 of the section AC (formally section AA) of the proposed T.I.P. No. I-2304A project. These proposed changes/modifications to the construction plans would result in a net decrease of 0.06 acres of permanent wetland impacts and net decrease of 575 linear feet of stream channel impacts to the jurisdictional waters of the Yadkin River. We concur with your proposal to adjust your provided compensatory mitigation for the project to account for the net decrease of impacts to jurisdictional waters.

We have determined that the proposed changes/modifications to the construction plans including temporary/permanent impacts to jurisdictional waters are minor and therefore a supplemental public notice is not necessary. The permit is hereby modified to include the change in impacts to jurisdictional waters as described in the referenced provided construction plans dated September 29, 2010, included with your October 11, 2010, modification request. It is understood that all other conditions of the original permit and previous modifications remain applicable, including the permit expiration date of December 31, 2013.

If the permitted work is not completed on or before the date herein specified, the authorization, if not previously revoked or specifically further extended, will cease and become null and void. If additional time is required to complete the project, you should contact this office with a request for an additional time extension.

Should you have questions, please contact Mr. John Thomas, Raleigh Regulatory Field Office, telephone (919) 554-4884 extension 25.

Sincerely,

A handwritten signature in black ink, appearing to read "Jefferson M. Ryscavage". The signature is written in a cursive style with a large, sweeping initial "J".

Jefferson M. Ryscavage  
Colonel, U.S. Army  
District Commander



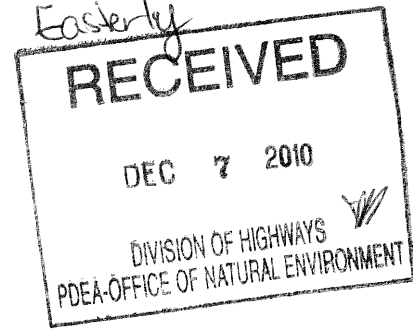
REPLY TO  
ATTENTION OF:

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

November 29, 2010

Regulatory Division

Action ID: SAW-1998-21203; TIP No. I-2304A



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

Dear Dr. Thorpe:

Reference is made to your Department of the Army (DA) permit issued on December 16, 2004, authorizing the discharge of fill material into waters of the United States (jurisdictional waters) for construction of Section A of the Interstate 85 (I-85) Improvements (T.I.P. No. I-2304A), from north of SR 2120 (Exit 81), northeast of Spence, in Rowan County, to north of I-85 Business (Exit 87), southwest of Lexington, in Davidson County, North Carolina. The project is adjacent to jurisdictional waters of the Yadkin River, Potts Creek, and unnamed tributaries of the Yadkin River. Reference also is made to approved modifications to your referenced DA permit for site 2 dated October 7, 2010, and sites 3-13 dated November 1, 2010.

Final reference is made to the NC Division of Water Quality letter of Sec 401 Water Quality Certification (i.e. Water Quality Certification No. 3455) dated November 9, 2010, for your referenced T.I.P. No. I-2304A project. I have reviewed the attached tables included with this referenced letter of Water Certification and concur with reference to the above identified DA permit modifications that these identified tables correctly outline the jurisdictional impacts and required wetland mitigation for your proposed road improvement project (i.e. sites 2-13).

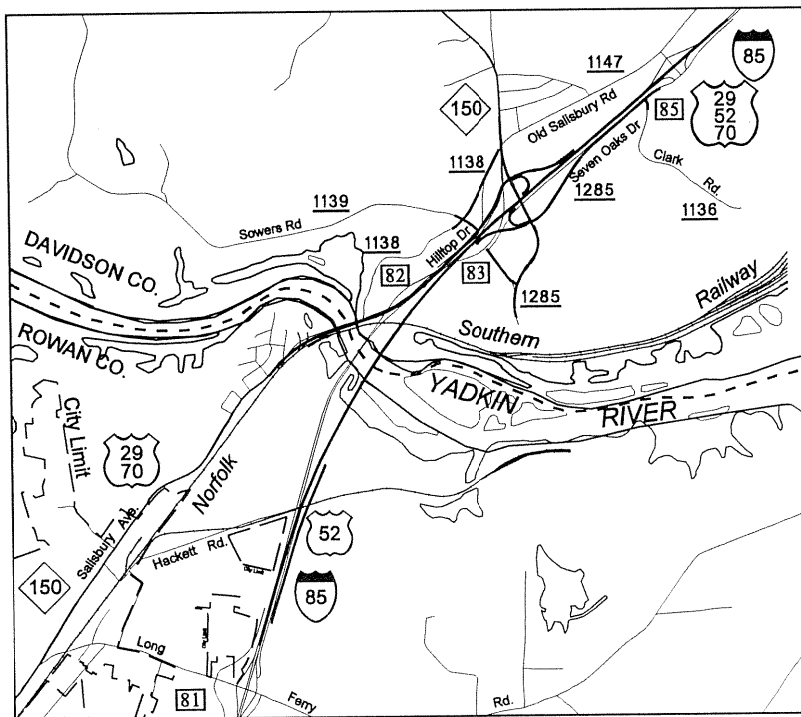
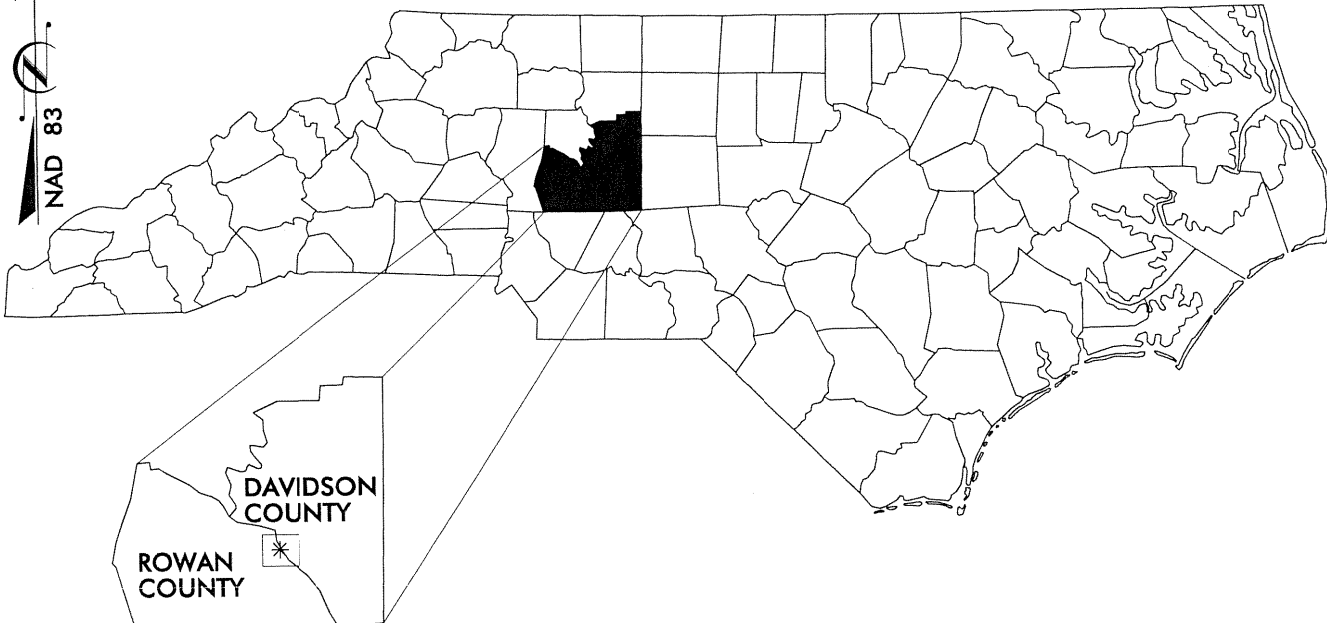
Should you have questions, please contact Mr. John Thomas, Raleigh Regulatory Field Office telephone (919) 554-4884 extension 25.

Sincerely,

John Thomas  
Regulatory Project Manager  
Raleigh Regulatory Field Office

Letter of Concurrence

# NORTH CAROLINA



## VICINITY MAPS

### NORTH CAROLINA

DIVISION OF HIGHWAYS  
ROWAN/DAVIDSON COUNTY

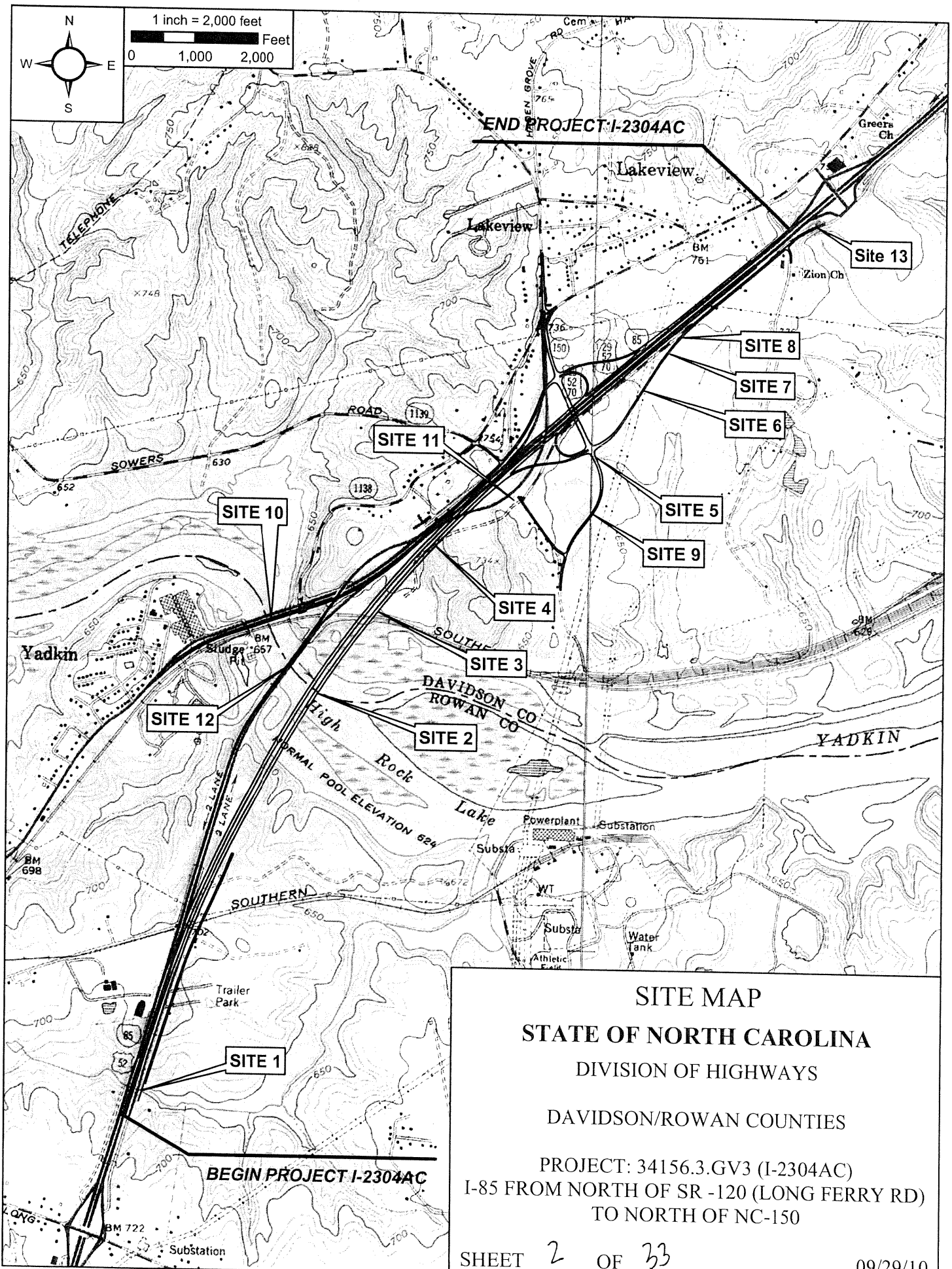
PROJECT: 34156.1.1 / 34156.3.GV3  
(I-2304AC)

RECONSTRUCTION OF I-85 FROM  
NORTH OF SR 2120 IN  
ROWAN COUNTY TO NORTH OF  
NC 150 IN DAVIDSON COUNTY

SHEET 1 OF 33

09 / 29 / 10





**SITE MAP**  
**STATE OF NORTH CAROLINA**  
 DIVISION OF HIGHWAYS  
 DAVIDSON/ROWAN COUNTIES  
 PROJECT: 34156.3.GV3 (I-2304AC)  
 I-85 FROM NORTH OF SR -120 (LONG FERRY RD)  
 TO NORTH OF NC-150  
 SHEET 2 OF 33  
 09/29/10

# PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
1	YADKIN INCORPORATED	P.O. BOX 688 BADIN, NC 28009	2,10
2	ALUMINUM COMPANY OF AMERICA	P.O. BOX 688 BADIN, NC 28009	2
3	TOLIVER ELECTRICAL COMPANY	P.O. BOX 1167 GRANITE QUARRY, NC 28072	3,4
4	JACK C. LITTLE, SUCCESSOR TRUSTEE U/E OF JUNE CARTER LITTLE	P.O. BOX 1420 LEXINGTON, NC 27293	5,6,9
5	SHED TIME, INC	5350 STATESVILLE BLVD. SALISBURY, NC 28147	6
6	EARNHARDT REAL PROPERTIES, LLC	1675 DALE EARNHARDT HWY 3 MOORESVILLE, NC 28115	7,8
7	ROBERT L. GRUBB TRUSTEE OF JUNE C. LITTLE	P.O. BOX 1420 LEXINGTON, NC 27293	13

## NORTH CAROLINA

DIVISION OF HIGHWAYS  
ROWAN/DAVIDSON COUNTY

PROJECT: 34156.1.1 / 34156.3.GV3  
(I-2304AC)

RECONSTRUCTION OF I-85 FROM  
NORTH OF SR 2120 IN  
ROWAN COUNTY TO NORTH OF  
NC 150 IN DAVIDSON COUNTY



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

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**ROWAN & DAVIDSON COUNTY**

LOCATION: FROM -C- STA. 807+00 TO 980+00

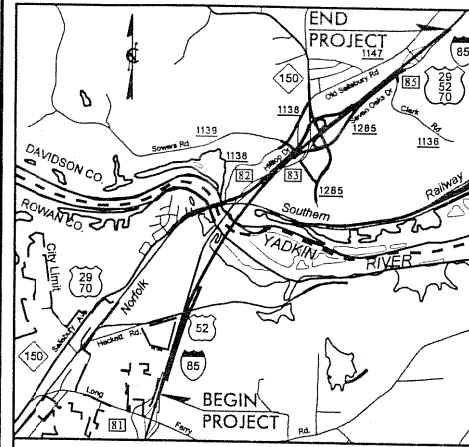
RECONSTRUCTION OF I-85 FROM NORTH OF SR 2120  
IN ROWAN COUNTY TO NORTH OF NC 150 IN DAVIDSON COUNTY

TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, RESURFACING,  
GUARDRAIL, STRUCTURES, & CULVERTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2304AC	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34156.1.1	NHF-85-3-(164)80	PE	
34156.2.4		RW UTL.	
34156.3.GV3	NHFIMF-085-3(197)81	CONST.	

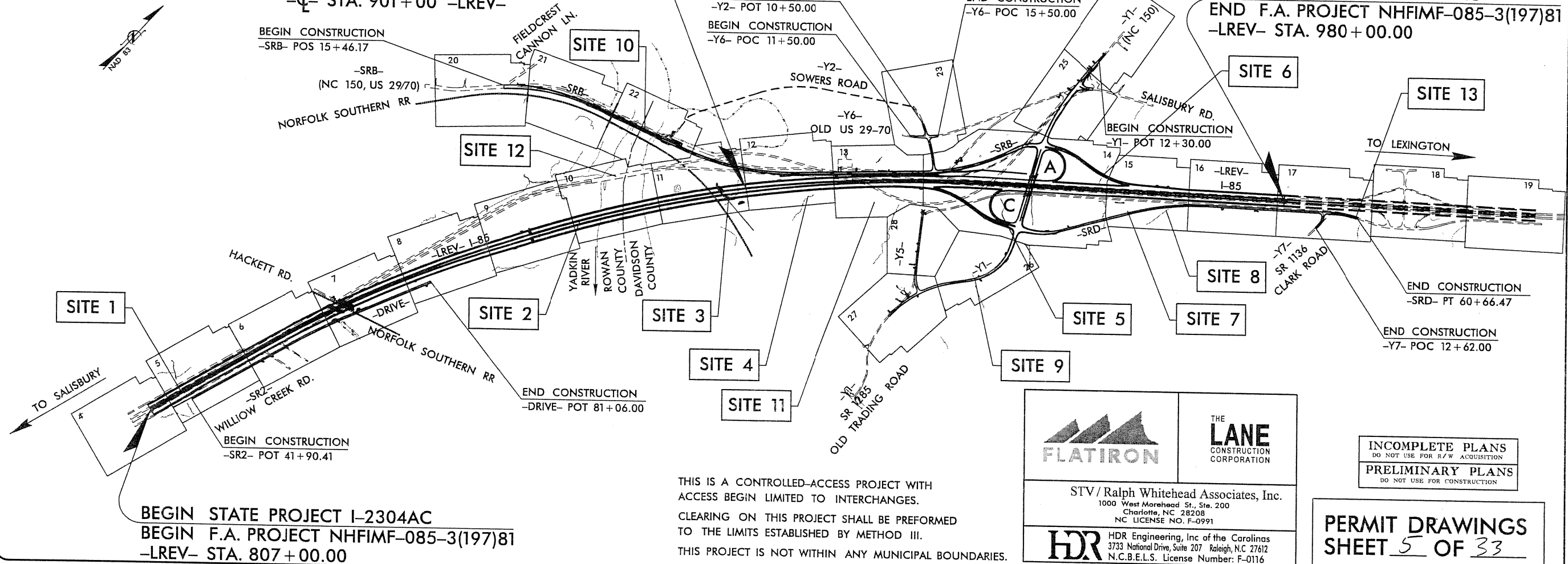
**WETLAND AND  
STREAM IMPACTS**  
SUBMITTED: 09-29-2010

SUBMITTAL #S-033R1



VICINITY MAP  
(NOT TO SCALE)

END CONSTRUCTION SOUTH SECTION  
BEGIN CONSTRUCTION NORTH SECTION  
-C- STA. 901+00 -LREV-



BEGIN STATE PROJECT I-2304AC  
BEGIN F.A. PROJECT NHFIMF-085-3(197)81  
-LREV- STA. 807+00.00

THIS IS A CONTROLLED-ACCESS PROJECT WITH  
ACCESS BEGIN LIMITED TO INTERCHANGES.  
CLEARING ON THIS PROJECT SHALL BE PERFORMED  
TO THE LIMITS ESTABLISHED BY METHOD III.  
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

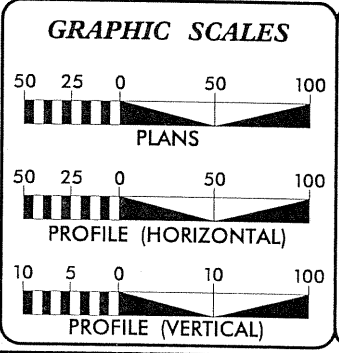
STV / Ralph Whitehead Associates, Inc.  
1000 West Morehead St., Ste. 200  
Charlotte, NC 28208  
NC LICENSE NO. F-0991

HDR Engineering, Inc. of the Carolinas  
3733 National Drive, Suite 207 Raleigh, N.C. 27612  
N.C.B.E.L.S. License Number: F-0116

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

**PERMIT DRAWINGS**  
SHEET 5 OF 33

**CONTRACT: C 202383**      **TIP PROJECT: I-2304AC**



**DESIGN DATA**

ADT 2009 =	58,800
ADT 2035 =	109,200
DHV =	10 %
D =	55 %
T =	25 % *
V =	70 MPH
RURAL INTERSTATE	
* TTST=19%	DUAL=6%

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT I-2304AC =	2.70 MI.
LENGTH STRUCTURE TIP PROJECT I-2304AC =	0.58 MI.
TOTAL LENGTH TIP PROJECT I-2304AC =	3.28 MI.

**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: \_\_\_\_\_

LETTING DATE:  
APRIL 22, 2010

PROJECT ENGINEER: \_\_\_\_\_  
PROJECT DESIGN ENGINEER: \_\_\_\_\_

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA**

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REVISIONS

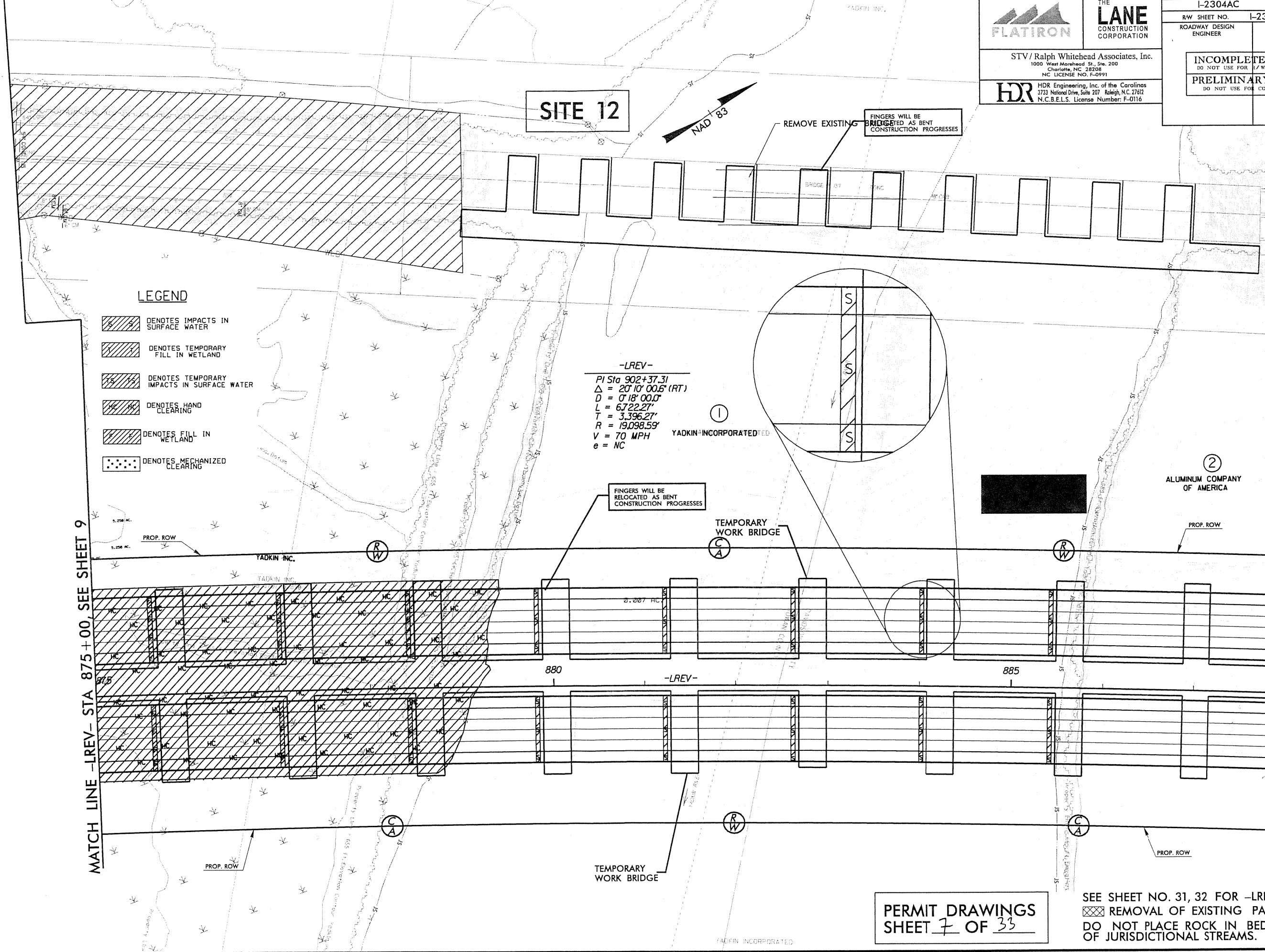


THE LANE CONSTRUCTION CORPORATION

STV / Ralph Whitehead Associates, Inc.  
 1000 West Morehead St., Ste. 200  
 Charlotte, NC 28208  
 NC LICENSE NO. F-0991

HDR HDR Engineering, Inc. of the Carolinas  
 3733 National Drive, Suite 207 Raleigh, NC 27612  
 N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
I-2304AC	10
RW SHEET NO.	I-2304AA PSH 10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR E/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	







MATCH LINE -LREV- STA 875+00, SEE SHEET 9

MATCH LINE -LREV- STA 888+00, SEE SHEET 11

PERMIT DRAWINGS  
 SHEET 7 OF 33

SEE SHEET NO. 31, 32 FOR -LREV- PROFILE.  
 REMOVAL OF EXISTING PAVEMENT  
 DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

**LEGEND**

-  DENOTES TEMPORARY FILL IN WETLAND
-  DENOTES FILL IN WETLAND
-  DENOTES HAND CLEARING
-  DENOTES MECHANIZED CLEARING

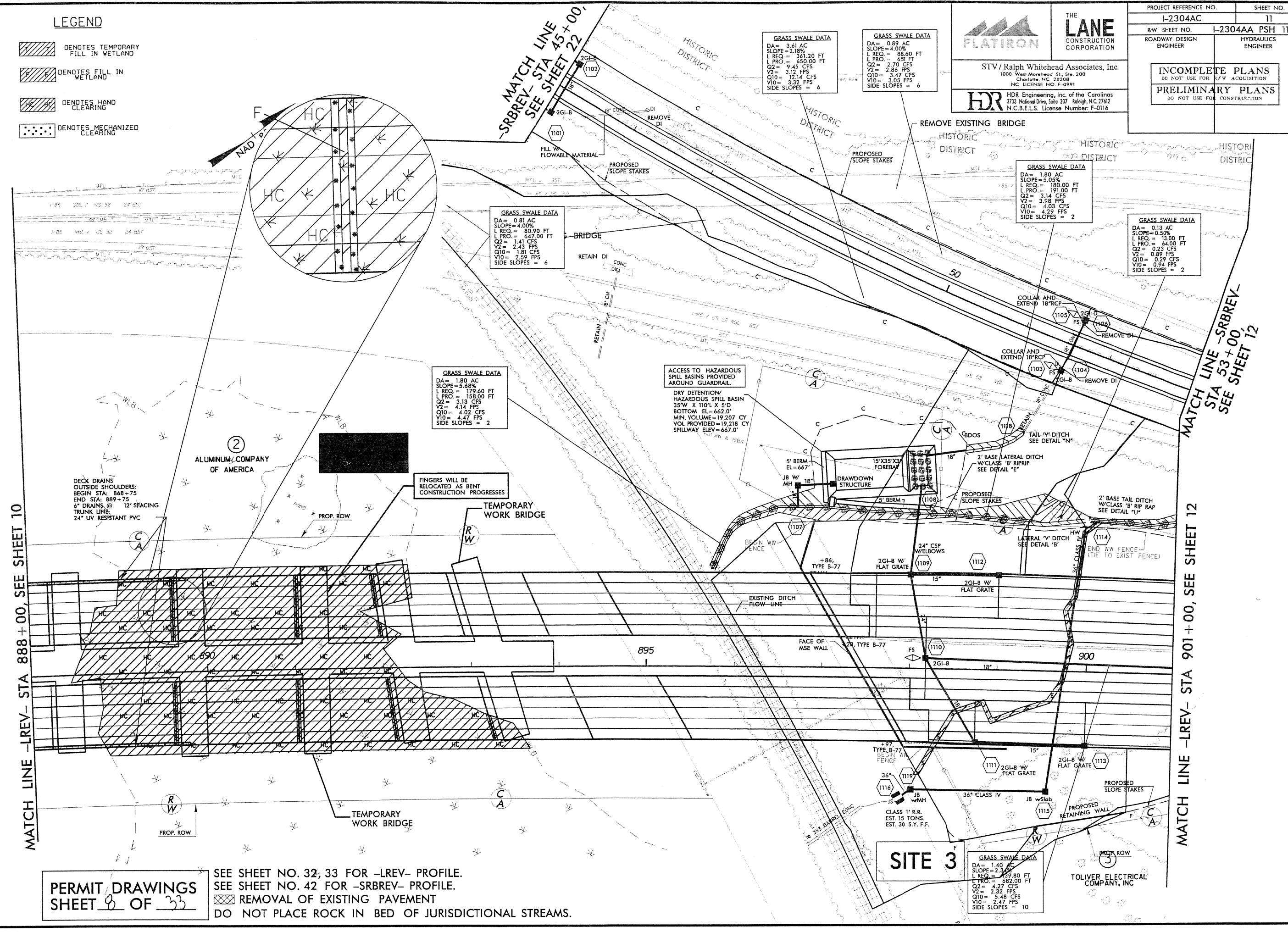


**THE LANE**  
CONSTRUCTION CORPORATION

STV/Ralph Whitehead Associates, Inc.  
1000 West Morehead St., Ste. 200  
Charlotte, NC 28208  
NC LICENSE NO. F-0991

**HDR** HDR Engineering, Inc. of the Carolinas  
3733 National Drive, Suite 207 Raleigh, N.C. 27612  
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	1-2304AC	SHEET NO.	11
R/W SHEET NO.	1-2304AA PSH 11		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION		PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



**GRASS SWALE DATA**  
DA = 0.81 AC  
SLOPE = 4.00%  
L REQ. = 80.90 FT  
L PRO. = 647.00 FT  
Q2 = 1.41 CFS  
V2 = 2.43 FPS  
Q10 = 1.81 CFS  
V10 = 2.59 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 3.61 AC  
SLOPE = 2.18%  
L REQ. = 361.20 FT  
L PRO. = 650.00 FT  
Q2 = 9.45 CFS  
V2 = 3.12 FPS  
Q10 = 12.14 CFS  
V10 = 3.32 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 0.89 AC  
SLOPE = 4.00%  
L REQ. = 88.60 FT  
L PRO. = 651 FT  
Q2 = 2.70 CFS  
V2 = 2.86 FPS  
Q10 = 3.47 CFS  
V10 = 3.05 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 1.80 AC  
SLOPE = 0.05%  
L REQ. = 180.00 FT  
L PRO. = 191.00 FT  
Q2 = 3.14 CFS  
V2 = 3.98 FPS  
Q10 = 4.03 CFS  
V10 = 4.29 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.13 AC  
SLOPE = 0.50%  
L REQ. = 13.00 FT  
L PRO. = 64.00 FT  
Q2 = 0.23 CFS  
V2 = 0.89 FPS  
Q10 = 0.29 CFS  
V10 = 0.94 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 1.80 AC  
SLOPE = 5.68%  
L REQ. = 179.60 FT  
L PRO. = 158.00 FT  
Q2 = 3.13 CFS  
V2 = 4.14 FPS  
Q10 = 4.02 CFS  
V10 = 4.47 FPS  
SIDE SLOPES = 2

**ACCESS TO HAZARDOUS SPILL BASINS PROVIDED AROUND GUARDRAIL**  
DRY DETENTION/HAZARDOUS SPILL BASIN  
35'W X 110'L X 5'D  
BOTTOM EL = 662.0'  
MIN. VOLUME = 19,207 CY  
VOL PROVIDED = 19,218 CY  
SPILLWAY ELEV = 667.0'

**SITE 3**  
**GRASS SWALE DATA**  
DA = 1.40 AC  
SLOPE = 2.30%  
L REQ. = 139.80 FT  
L PRO. = 682.00 FT  
Q2 = 4.27 CFS  
V2 = 2.32 FPS  
Q10 = 5.48 CFS  
V10 = 2.47 FPS  
SIDE SLOPES = 10


MATCH LINE -LREV- STA 888+00, SEE SHEET 10

MATCH LINE -LREV- STA 901+00, SEE SHEET 12

MATCH LINE -SRBREV- STA 45+00, SEE SHEET 22+00

MATCH LINE -SRBREV- STA 53+00, SEE SHEET 12





**PERMIT DRAWINGS**  
SHEET 8 OF 33

SEE SHEET NO. 32, 33 FOR -LREV- PROFILE.  
SEE SHEET NO. 42 FOR -SRBREV- PROFILE.  
 REMOVAL OF EXISTING PAVEMENT  
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

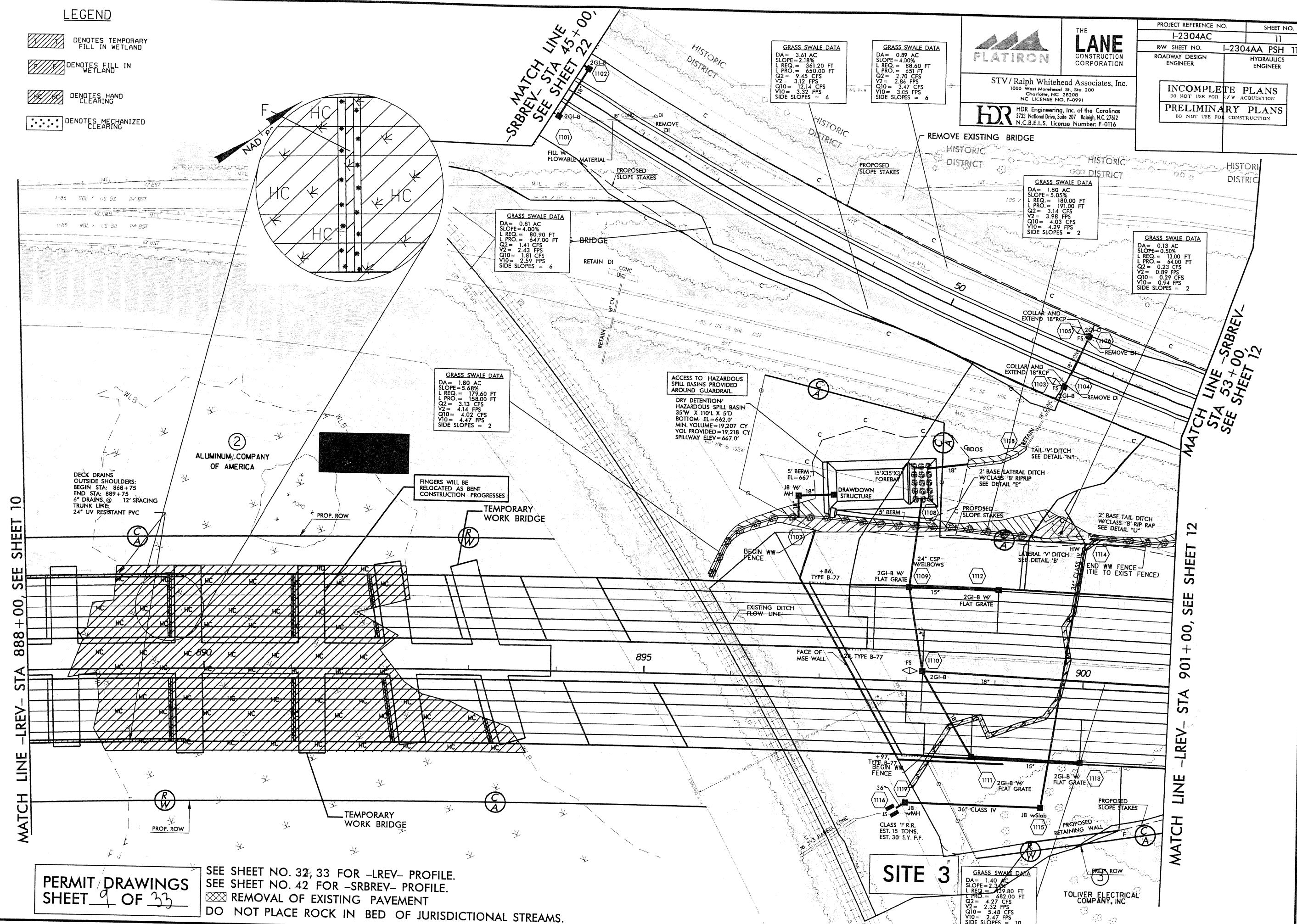
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 DATE: 9/29/2010

REVISIONS

**LEGEND**

-  DENOTES TEMPORARY FILL IN WETLAND
-  DENOTES FILL IN WETLAND
-  DENOTES HAND CLEARING
-  DENOTES MECHANIZED CLEARING

PROJECT REFERENCE NO. I-2304AC		SHEET NO. 11	
RW SHEET NO. I-2304AA PSH 11		ROADWAY DESIGN ENGINEER	
STV / Ralph Whitehead Associates, Inc. 1000 West Morehead St., Ste. 200 Charlotte, NC 28208 NC LICENSE NO. F-0991		HYDRAULICS ENGINEER	
HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116		INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
		PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



MATCH LINE -LREV- STA 888 + 00, SEE SHEET 10

MATCH LINE -SRBREV- STA 53 + 00, SEE SHEET 12

PERMIT DRAWINGS  
SHEET 9 OF 33

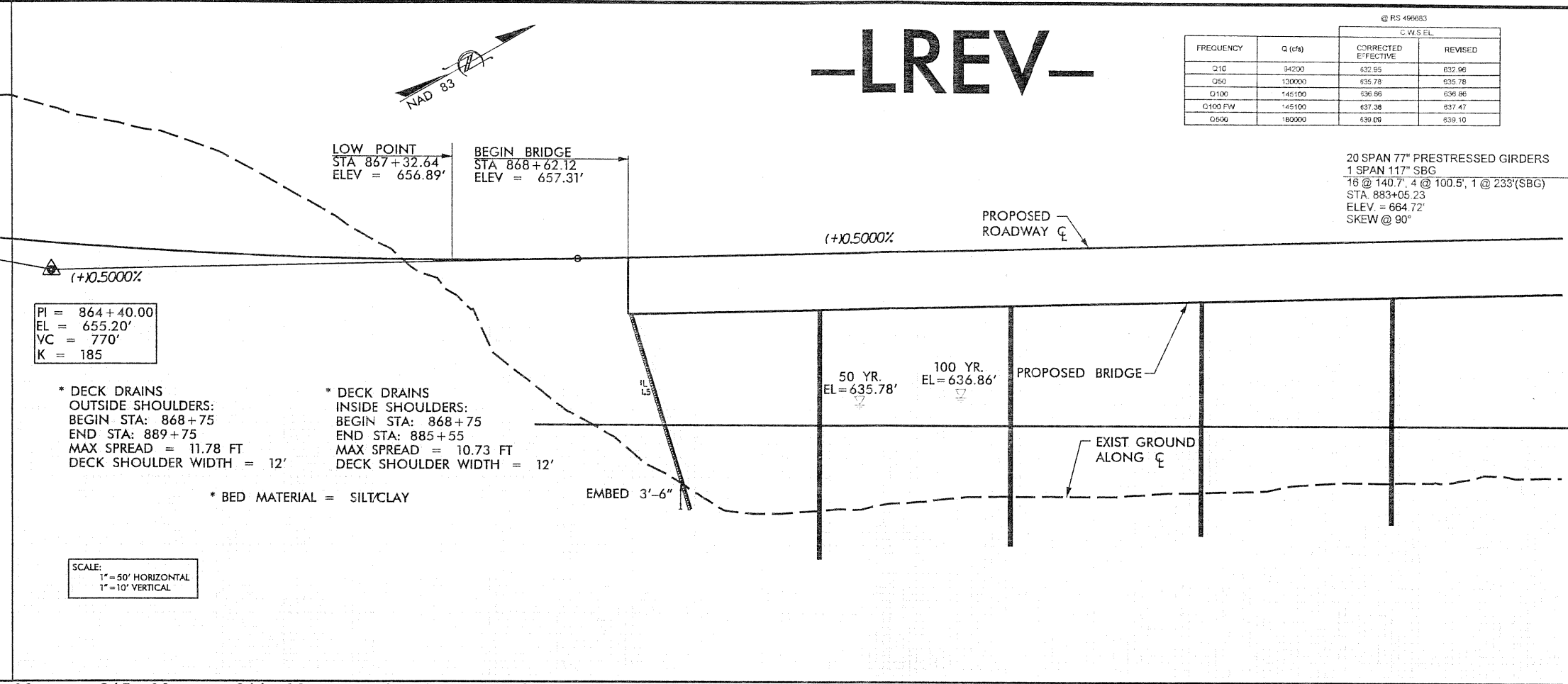
SEE SHEET NO. 32, 33 FOR -LREV- PROFILE.  
SEE SHEET NO. 42 FOR -SRBREV- PROFILE.  
REMOVAL OF EXISTING PAVEMENT  
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

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 REVISIONS  
 PENTABLE: NCD01\_permit.dwg SCALE: 1:100  
 TIME: 9:25:01 AM



5/28/09

700  
675  
665  
655  
645  
635  
625  
615  
605  
595



PROJECT REFERENCE NO. I-2304AC	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

20 SPAN 77" PRESTRESSED GIRDERS  
 1 SPAN 117" SBG  
 16 @ 140.7', 4 @ 100.5', 1 @ 233'(SBG)  
 STA. 883+05.23  
 ELEV. = 664.72'  
 SKEW @ 90°

PI = 864+40.00  
 EL = 655.20'  
 VC = 770'  
 K = 185

\* DECK DRAINS  
 OUTSIDE SHOULDERS:  
 BEGIN STA: 868+75  
 END STA: 889+75  
 MAX SPREAD = 11.78 FT  
 DECK SHOULDER WIDTH = 12'

\* DECK DRAINS  
 INSIDE SHOULDERS:  
 BEGIN STA: 868+75  
 END STA: 885+55  
 MAX SPREAD = 10.73 FT  
 DECK SHOULDER WIDTH = 12'

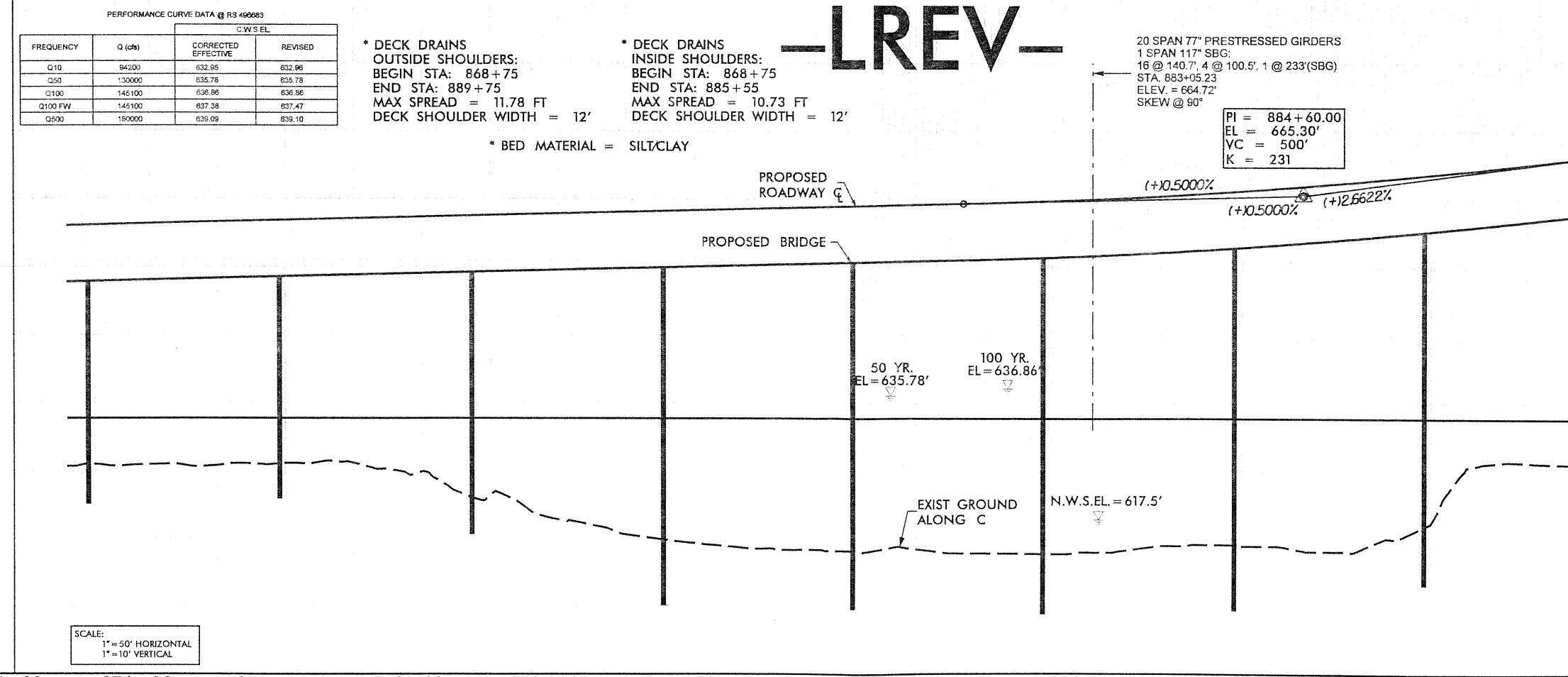
\* BED MATERIAL = SILT/CLAY

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

864+00 865+00 866+00 867+00 868+00 869+00 870+00 871+00 872+00 873+00 874+00 875+00

5/29/2010 G:\pwworking\king\ipm\49226564\I2304AC\_HYD\_PRR1\_PFL.dgn

685  
675  
665  
655  
645  
635  
625  
615  
605  
595



\* DECK DRAINS  
 OUTSIDE SHOULDERS:  
 BEGIN STA: 868+75  
 END STA: 889+75  
 MAX SPREAD = 11.78 FT  
 DECK SHOULDER WIDTH = 12'

\* DECK DRAINS  
 INSIDE SHOULDERS:  
 BEGIN STA: 868+75  
 END STA: 885+55  
 MAX SPREAD = 10.73 FT  
 DECK SHOULDER WIDTH = 12'

\* BED MATERIAL = SILT/CLAY

PI = 884+60.00  
 EL = 665.30'  
 VC = 500'  
 K = 231

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

PERMIT DRAWINGS  
 SHEET 10 OF 33

875+00 876+00 877+00 878+00 879+00 880+00 881+00 882+00 883+00 884+00 885+00 886+00 887+00

5/28/99

PERFORMANCE CURVE DATA @ RS 496683

FREQUENCY	Q (cfs)	CORRECTED EFFECTIVE	REVISED
Q10	94200	832.95	832.98
Q50	130000	836.78	836.78
Q100	145100	836.86	836.86
Q100 FW	145100	837.38	837.47
Q500	180000	839.00	839.10

\* DECK DRAINS  
 OUTSIDE SHOULDERS:  
 BEGIN STA: 868+75  
 END STA: 889+75  
 MAX SPREAD = 11.78 FT  
 DECK SHOULDER WIDTH = 12'

\* DECK DRAINS  
 INSIDE SHOULDERS:  
 BEGIN STA: 868+75  
 END STA: 885+55  
 MAX SPREAD = 10.73 FT  
 DECK SHOULDER WIDTH = 12'

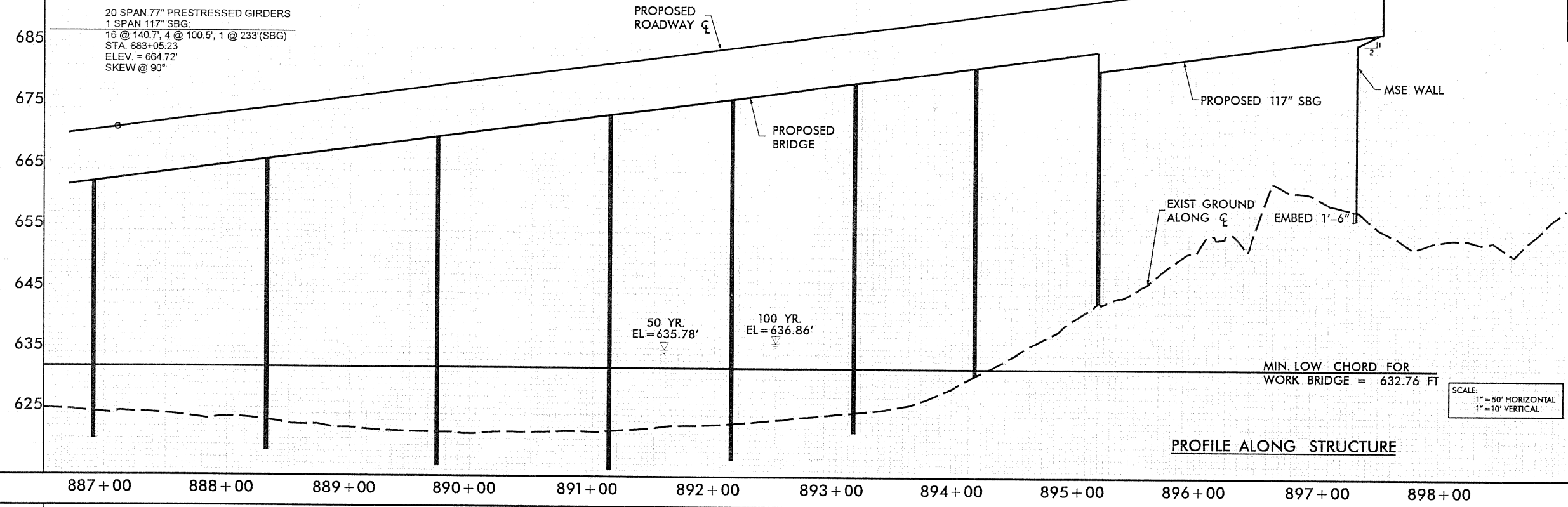
**-LREV-**

END BRIDGE  
 STA 897+48.33  
 ELEV = 699.60'

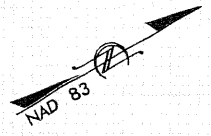
PROJECT REFERENCE NO. I-2304AC	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

20 SPAN 77" PRESTRESSED GIRDERS  
 1 SPAN 117" SBG  
 16 @ 140.7', 4 @ 100.5', 1 @ 233'(SBG)  
 STA. 883+05.23  
 ELEV. = 664.72'  
 SKEW @ 90°

\* BED MATERIAL = SILT/CLAY

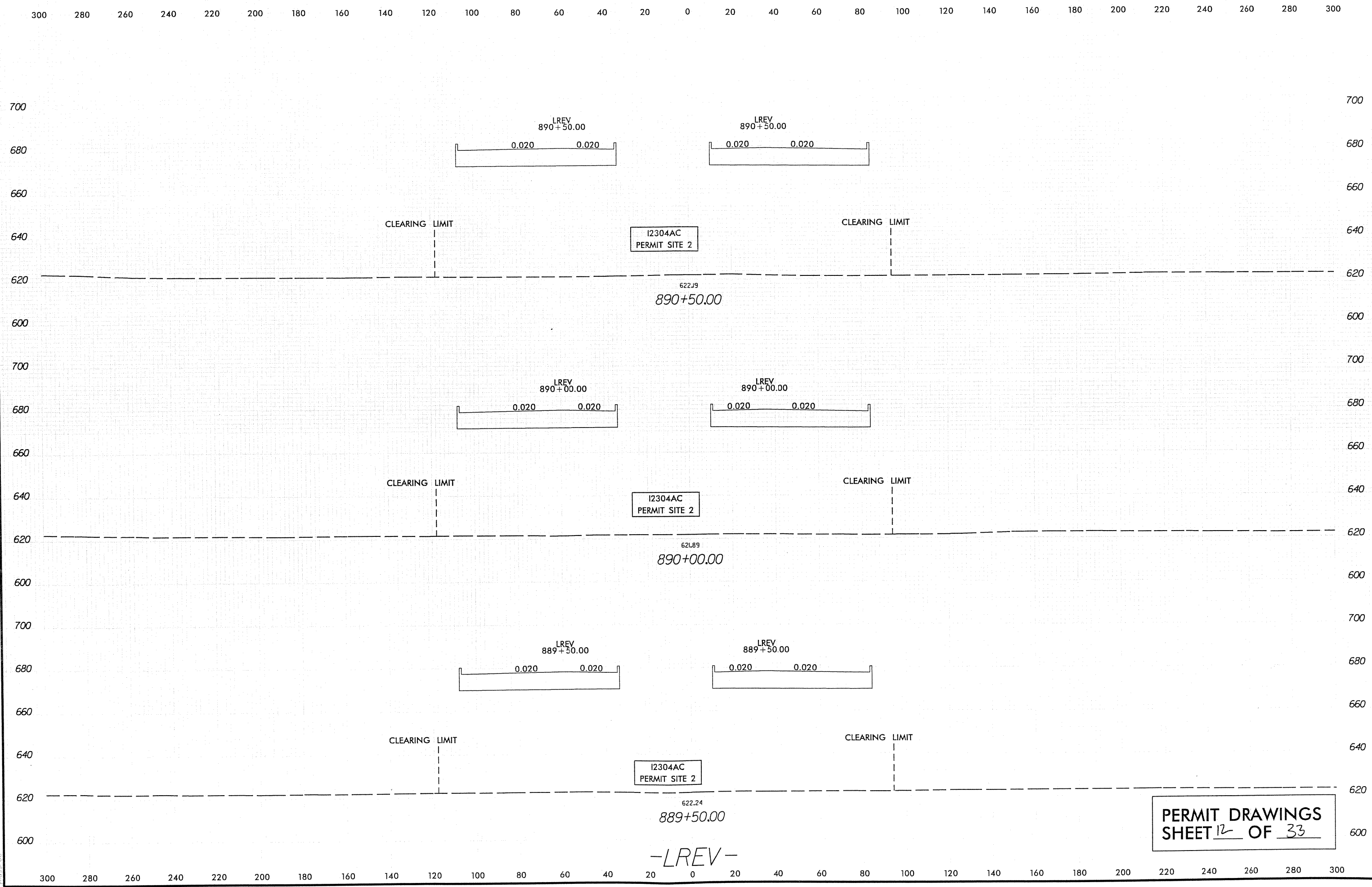


SCALE:  
 1" = 50' HORIZONTAL  
 1" = 10' VERTICAL



3/29/2010  
 c:\pwworking\tpa\0226564\12304AC\_HYD\_PRM\_PFL.dgn

PERMIT DRAWINGS  
 SHEET 11 OF 33



9/28/2010  
 c:\york\king\tpa\0226564\I2304AC\_HVD\_PRM\_XPL\_LREV.dgn  
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PERMIT DRAWINGS  
 SHEET 12 OF 33

-LREV-

LEGEND

Denotes impacts in surface water

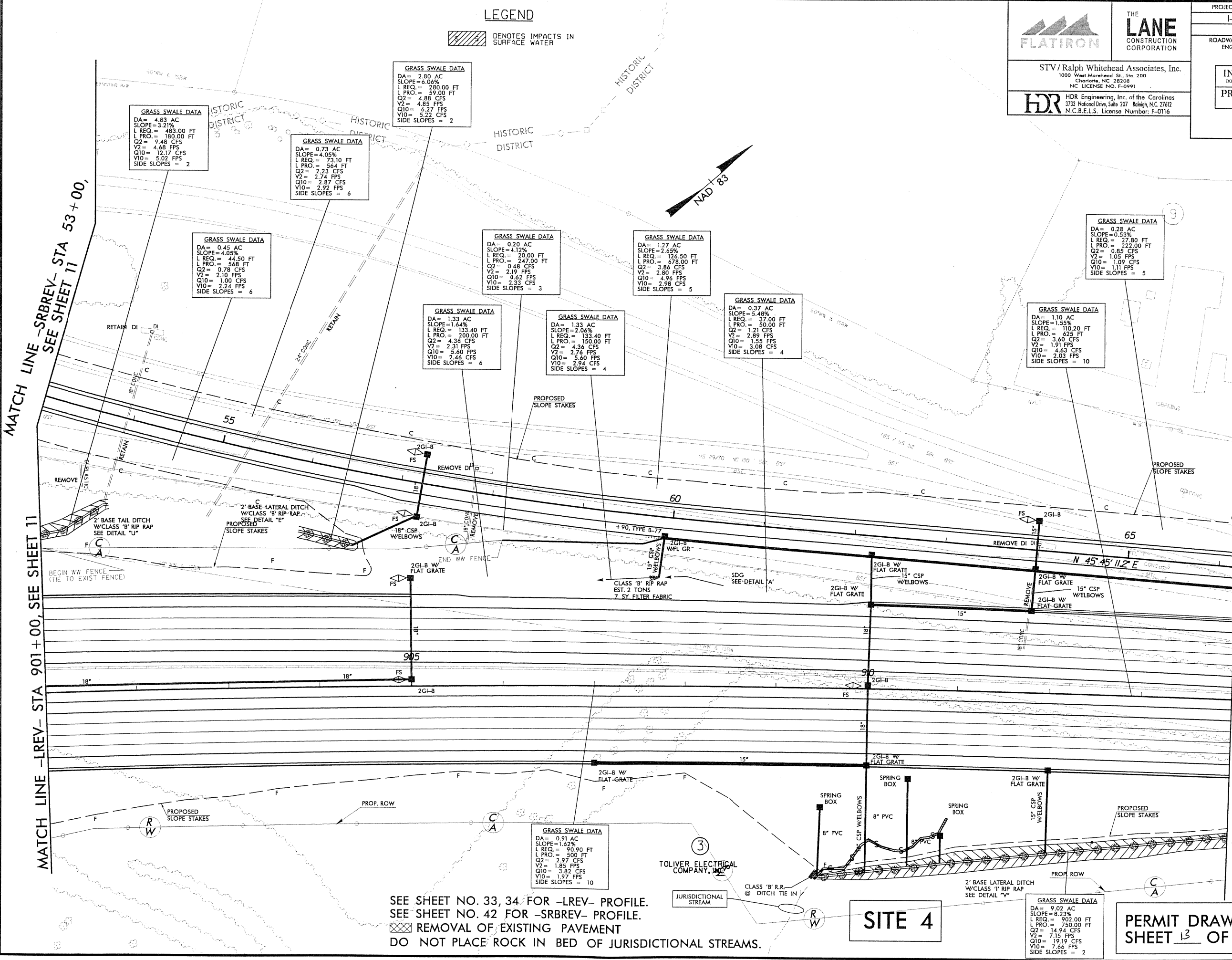


THE LANE CONSTRUCTION CORPORATION

STV/Ralph Whitehead Associates, Inc. 1000 West Morehead St., Ste. 200 Charlotte, NC 28208 NC LICENSE NO. F-0991

HDR HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO. I-2304AC	SHEET NO. 12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



**GRASS SWALE DATA**  
 DA = 4.83 AC  
 SLOPE = 3.21%  
 L REQ. = 483.00 FT  
 L PRO. = 180.00 FT  
 Q2 = 9.48 CFS  
 V2 = 4.68 FPS  
 Q10 = 12.17 CFS  
 V10 = 5.02 FPS  
 SIDE SLOPES = 2

**GRASS SWALE DATA**  
 DA = 0.73 AC  
 SLOPE = 4.05%  
 L REQ. = 73.10 FT  
 L PRO. = 56.4 FT  
 Q2 = 2.23 CFS  
 V2 = 2.74 FPS  
 Q10 = 2.87 CFS  
 V10 = 2.92 FPS  
 SIDE SLOPES = 6

**GRASS SWALE DATA**  
 DA = 0.45 AC  
 SLOPE = 4.05%  
 L REQ. = 44.50 FT  
 L PRO. = 56.8 FT  
 Q2 = 0.78 CFS  
 V2 = 2.10 FPS  
 Q10 = 1.00 CFS  
 V10 = 2.24 FPS  
 SIDE SLOPES = 6

**GRASS SWALE DATA**  
 DA = 0.20 AC  
 SLOPE = 4.12%  
 L REQ. = 20.00 FT  
 L PRO. = 247.00 FT  
 Q2 = 0.48 CFS  
 V2 = 2.19 FPS  
 Q10 = 0.62 CFS  
 V10 = 2.33 CFS  
 SIDE SLOPES = 3

**GRASS SWALE DATA**  
 DA = 1.27 AC  
 SLOPE = 2.65%  
 L REQ. = 126.50 FT  
 L PRO. = 678.00 FT  
 Q2 = 3.86 CFS  
 V2 = 2.80 FPS  
 Q10 = 4.95 CFS  
 V10 = 2.98 CFS  
 SIDE SLOPES = 5

**GRASS SWALE DATA**  
 DA = 1.33 AC  
 SLOPE = 1.64%  
 L REQ. = 133.40 FT  
 L PRO. = 200.00 FT  
 Q2 = 4.36 CFS  
 V2 = 2.31 FPS  
 Q10 = 5.60 FPS  
 V10 = 2.46 CFS  
 SIDE SLOPES = 6

**GRASS SWALE DATA**  
 DA = 1.33 AC  
 SLOPE = 2.06%  
 L REQ. = 133.40 FT  
 L PRO. = 150.00 FT  
 Q2 = 4.36 CFS  
 V2 = 2.76 FPS  
 Q10 = 5.60 FPS  
 V10 = 2.94 CFS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.37 AC  
 SLOPE = 5.48%  
 L REQ. = 37.00 FT  
 L PRO. = 50.00 FT  
 Q2 = 1.21 CFS  
 V2 = 2.89 FPS  
 Q10 = 1.55 CFS  
 V10 = 3.08 CFS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 1.10 AC  
 SLOPE = 1.55%  
 L REQ. = 110.20 FT  
 L PRO. = 625 FT  
 Q2 = 3.60 CFS  
 V2 = 1.91 FPS  
 Q10 = 4.63 CFS  
 V10 = 2.03 FPS  
 SIDE SLOPES = 10

**GRASS SWALE DATA**  
 DA = 0.28 AC  
 SLOPE = 0.53%  
 L REQ. = 27.80 FT  
 L PRO. = 222.00 FT  
 Q2 = 0.85 CFS  
 V2 = 1.05 FPS  
 Q10 = 1.09 CFS  
 V10 = 1.11 FPS  
 SIDE SLOPES = 5

**GRASS SWALE DATA**  
 DA = 0.91 AC  
 SLOPE = 1.62%  
 L REQ. = 90.90 FT  
 L PRO. = 500 FT  
 Q2 = 2.97 CFS  
 V2 = 1.85 FPS  
 Q10 = 3.82 CFS  
 V10 = 1.97 FPS  
 SIDE SLOPES = 10

**GRASS SWALE DATA**  
 DA = 9.02 AC  
 SLOPE = 8.23%  
 L REQ. = 902.00 FT  
 L PRO. = 750.00 FT  
 Q2 = 14.94 CFS  
 V2 = 7.15 FPS  
 Q10 = 19.19 CFS  
 V10 = 7.66 FPS  
 SIDE SLOPES = 2

SEE SHEET NO. 33, 34 FOR -LREV- PROFILE.  
 SEE SHEET NO. 42 FOR -SRBREV- PROFILE.  
 REMOVAL OF EXISTING PAVEMENT  
 DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

SITE 4

PERMIT DRAWINGS SHEET 13 OF 33

REVISIONS  
 PLOT DRIVER: NCD01.pdf\_color\_eng\_100.pdf  
 USER: jmassroc DATE: 9/10/2010  
 FILE: Ralph Whitehead and Associates\RW\Flatiron.Lane\_Xaokio.1.85\I2304AC\Hydraulics\PERMITS\_Environment\Drawings\I2304AC\_HYD\_PRR\_PLANS\SHETS.dgn

MATCH LINE -SRBREV- STA 53+00, SEE SHEET 11


MATCH LINE -LREV- STA 901+00, SEE SHEET 11

MATCH LINE -LREV- STA 914+00, SEE SHEET 13


**LEGEND**

 DENOTES IMPACTS IN SURFACE WATER

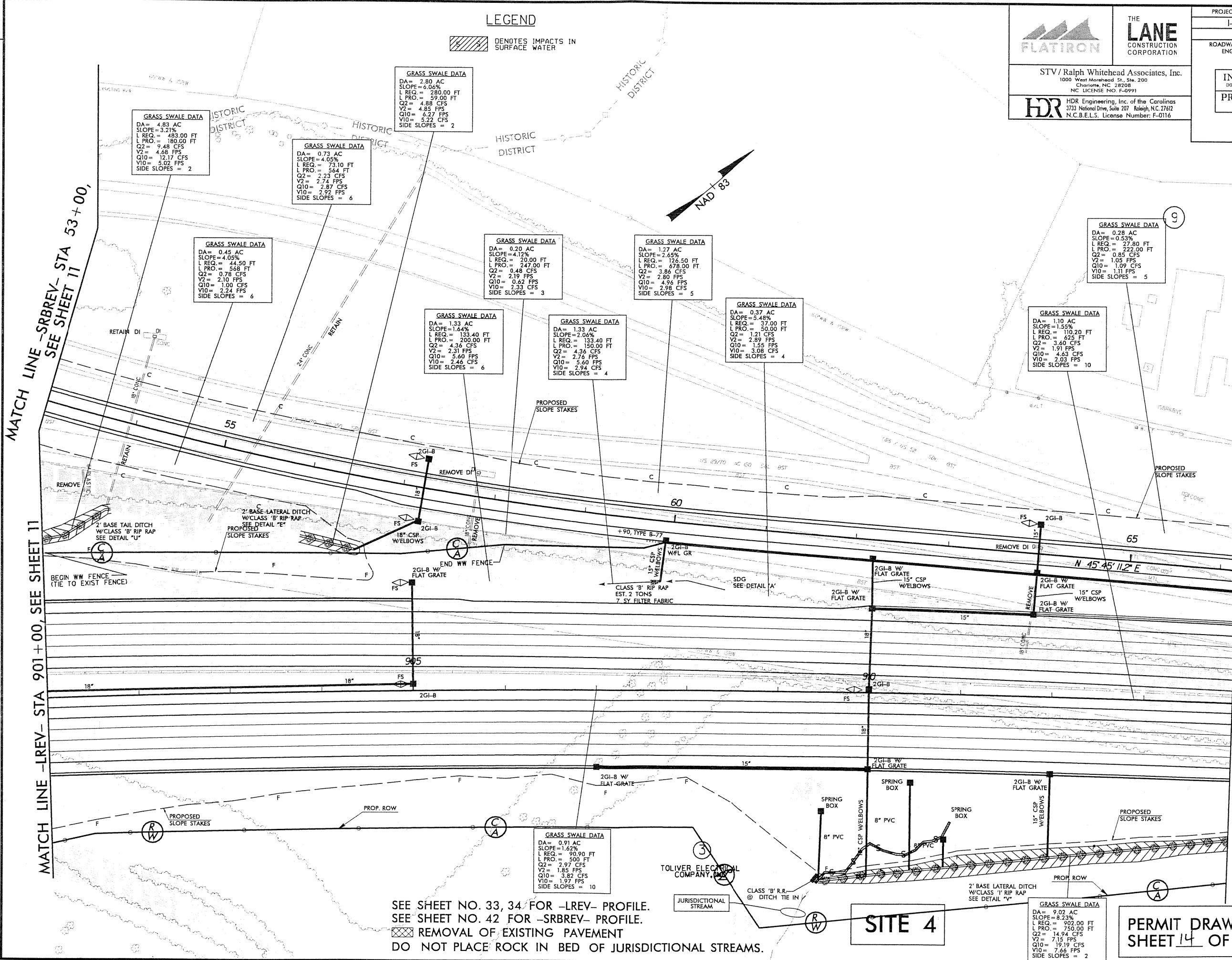
PROJECT REFERENCE NO. I-2304AC		SHEET NO. 12	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			



STV / Ralph Whitehead Associates, Inc.  
1000 West Morehead St., Ste. 200  
Charlotte, NC 28208  
NC LICENSE NO. F-0991




HDR Engineering, Inc. of the Carolinas  
3733 National Drive, Suite 207 Raleigh, N.C. 27612  
N.C.B.E.L.S. License Number: F-0116



MATCH LINE -SRBREV- STA 53+00, SEE SHEET 11

MATCH LINE -LREV- STA 901+00, SEE SHEET 11

MATCH LINE -LREV- STA 914+00, SEE SHEET 13

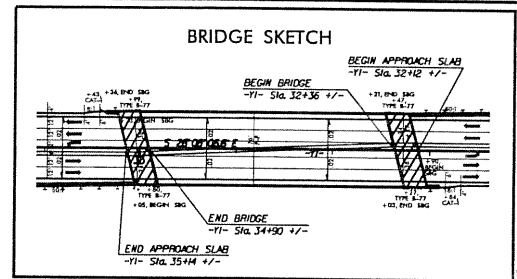
SEE SHEET NO. 33, 34 FOR -LREV- PROFILE.  
SEE SHEET NO. 42 FOR -SRBREV- PROFILE.  
 REMOVAL OF EXISTING PAVEMENT  
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

**SITE 4**

**PERMIT DRAWINGS**  
SHEET 14 OF 33

PLOT DRIVER: NCDOT.plt, color, eng, 100.plt  
 USER: imasroc DATE: 9/10/2010  
 FILE: Ralph.Whitehead.assoc\Drawings\I-2304AC-HYD-PRM-PLANS\Sheet14.dgn  
 REVISIONS





**FLATIRON**

**LANE**  
CONSTRUCTION CORPORATION

STV/Rain Whitbeck Associates, Inc.  
1000 West 10th Street, Suite 100  
Cheyenne, WY 82001  
TEL: 307.634.1111 FAX: 307.634.1112

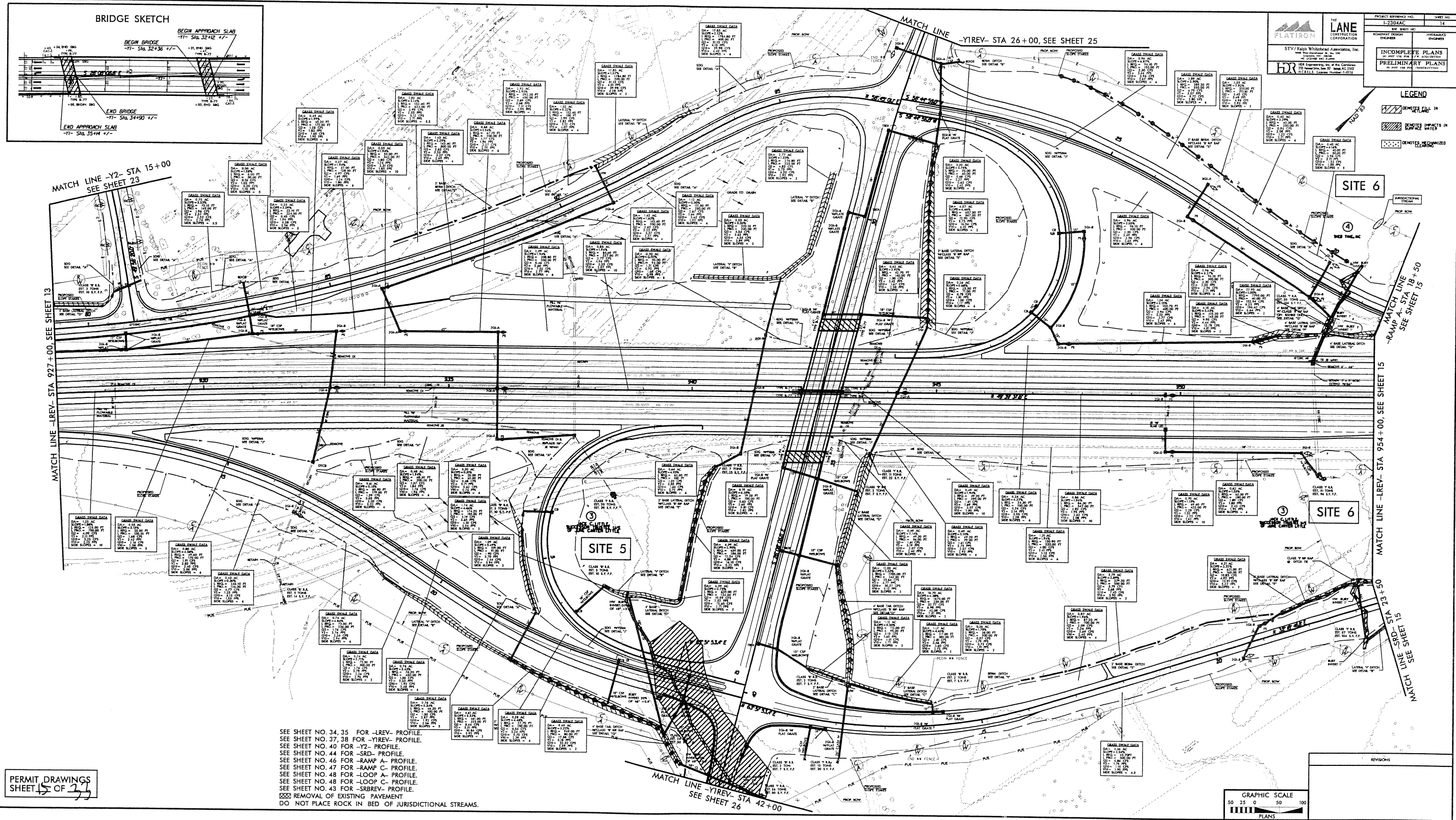
PROJECT REFERENCE NO. L-2304AC

SHEET NO. 14

INCOMPLETE PLANS  
PRELIMINARY PLANS

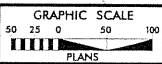
**LEGEND**

- DEMOLITION
- DEMOLITION IMPACTS IN EXISTING WATER
- DEMOLITION MECHANIZED CLEARING



SEE SHEET NO. 34, 35 FOR -LREV- PROFILE.  
SEE SHEET NO. 37, 38 FOR -YREV- PROFILE.  
SEE SHEET NO. 40 FOR -Y2- PROFILE.  
SEE SHEET NO. 44 FOR -SRD- PROFILE.  
SEE SHEET NO. 46 FOR -RAMP A- PROFILE.  
SEE SHEET NO. 47 FOR -RAMP C- PROFILE.  
SEE SHEET NO. 48 FOR -LOOP A- PROFILE.  
SEE SHEET NO. 48 FOR -LOOP C- PROFILE.  
SEE SHEET NO. 43 FOR -SRBREV- PROFILE.  
REMOVAL OF EXISTING PAVEMENT

PERMIT DRAWINGS  
SHEET 15 OF 33



REVISIONS

PROJECT: 10/15/08, 10/20/08, 11/10/08, 11/17/08, 11/24/08, 12/1/08, 12/8/08, 12/15/08, 12/22/08, 12/29/08, 1/5/09, 1/12/09, 1/19/09, 1/26/09, 2/2/09, 2/9/09, 2/16/09, 2/23/09, 2/30/09, 3/6/09, 3/13/09, 3/20/09, 3/27/09, 4/3/09, 4/10/09, 4/17/09, 4/24/09, 5/1/09, 5/8/09, 5/15/09, 5/22/09, 5/29/09, 6/5/09, 6/12/09, 6/19/09, 6/26/09, 7/3/09, 7/10/09, 7/17/09, 7/24/09, 7/31/09, 8/7/09, 8/14/09, 8/21/09, 8/28/09, 9/4/09, 9/11/09, 9/18/09, 9/25/09, 10/2/09, 10/9/09, 10/16/09, 10/23/09, 10/30/09, 11/6/09, 11/13/09, 11/20/09, 11/27/09, 12/4/09, 12/11/09, 12/18/09, 12/25/09, 1/1/10, 1/8/10, 1/15/10, 1/22/10, 1/29/10, 2/5/10, 2/12/10, 2/19/10, 2/26/10, 3/5/10, 3/12/10, 3/19/10, 3/26/10, 4/2/10, 4/9/10, 4/16/10, 4/23/10, 4/30/10, 5/7/10, 5/14/10, 5/21/10, 5/28/10, 6/4/10, 6/11/10, 6/18/10, 6/25/10, 7/2/10, 7/9/10, 7/16/10, 7/23/10, 7/30/10, 8/6/10, 8/13/10, 8/20/10, 8/27/10, 9/3/10, 9/10/10, 9/17/10, 9/24/10, 10/1/10, 10/8/10, 10/15/10, 10/22/10, 10/29/10, 11/5/10, 11/12/10, 11/19/10, 11/26/10, 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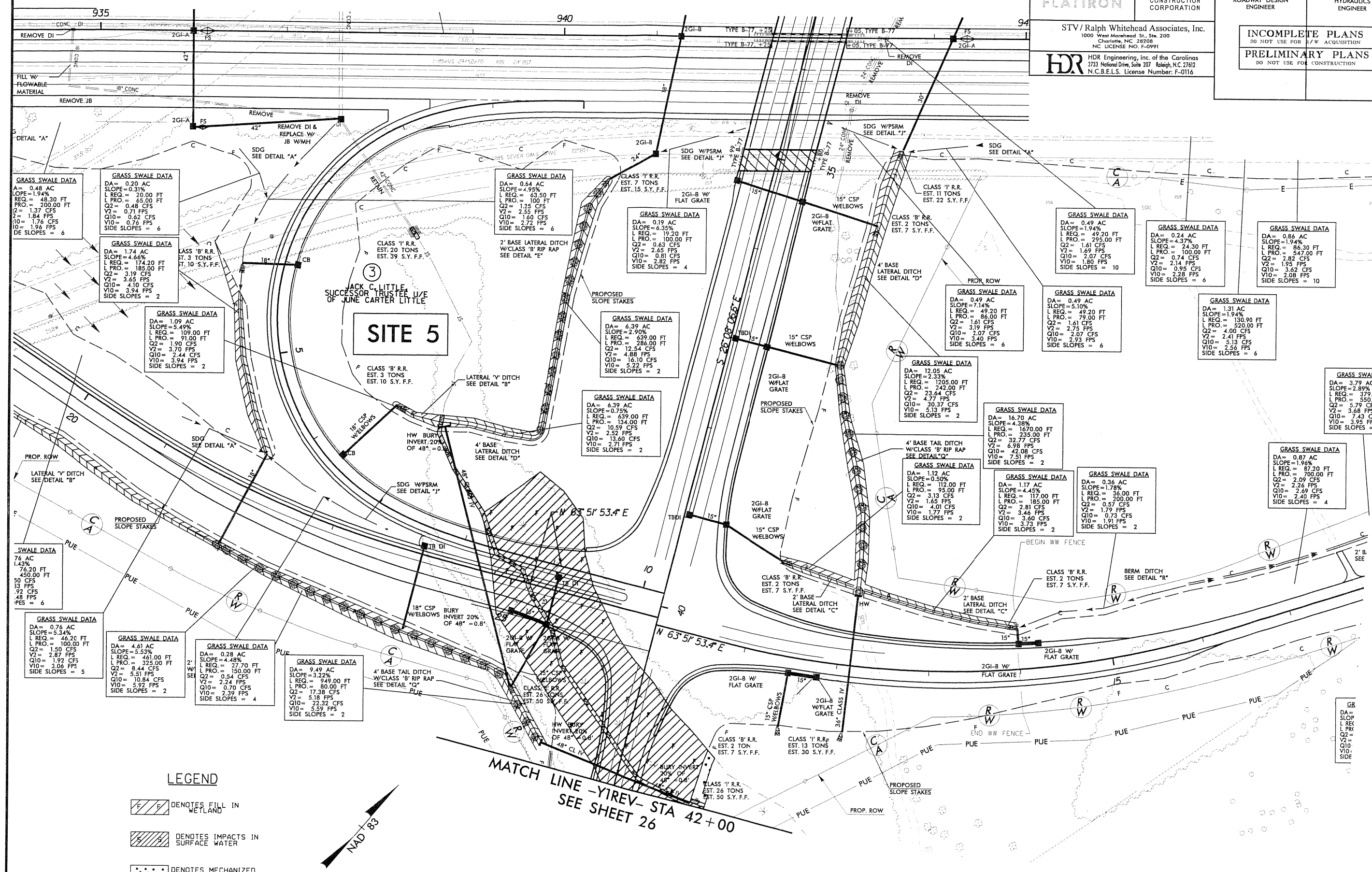


THE  
**LANE**  
CONSTRUCTION  
CORPORATION

STV/Ralph Whitehead Associates, Inc.  
1000 West Morehead St., Ste. 200  
Charlotte, NC 28208  
NC LICENSE NO. F-9991

**HDR** HDR Engineering, Inc. of the Carolinas  
3733 National Drive, Suite 207 Raleigh, NC 27612  
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
I-2304AC	14A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR I/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



**GRASS SWALE DATA**  
DA = 0.48 AC  
SLOPE = 1.94%  
L REQ. = 48.30 FT  
L PRO. = 200.00 FT  
Q2 = 1.37 CFS  
V2 = 1.84 FPS  
Q10 = 1.76 CFS  
V10 = 1.95 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 0.20 AC  
SLOPE = 0.31%  
L REQ. = 20.00 FT  
L PRO. = 45.00 FT  
Q2 = 0.48 CFS  
V2 = 0.71 FPS  
Q10 = 0.62 CFS  
V10 = 0.76 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 1.74 AC  
SLOPE = 4.66%  
L REQ. = 174.20 FT  
L PRO. = 185.00 FT  
Q2 = 3.19 CFS  
V2 = 3.65 FPS  
Q10 = 4.10 CFS  
V10 = 3.94 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 1.09 AC  
SLOPE = 5.49%  
L REQ. = 109.00 FT  
L PRO. = 91.00 FT  
Q2 = 1.90 CFS  
V2 = 3.70 FPS  
Q10 = 2.44 CFS  
V10 = 3.94 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.64 AC  
SLOPE = 4.95%  
L REQ. = 63.50 FT  
L PRO. = 100.00 FT  
Q2 = 1.25 CFS  
V2 = 2.55 FPS  
Q10 = 1.60 CFS  
V10 = 2.72 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 0.19 AC  
SLOPE = 6.35%  
L REQ. = 19.20 FT  
L PRO. = 100.00 FT  
Q2 = 0.63 CFS  
V2 = 2.65 FPS  
Q10 = 0.81 CFS  
V10 = 2.82 FPS  
SIDE SLOPES = 4

**GRASS SWALE DATA**  
DA = 6.39 AC  
SLOPE = 2.90%  
L REQ. = 639.00 FT  
L PRO. = 286.00 FT  
Q2 = 12.54 CFS  
V2 = 4.88 FPS  
Q10 = 16.10 CFS  
V10 = 5.22 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 6.39 AC  
SLOPE = 0.75%  
L REQ. = 639.00 FT  
L PRO. = 134.00 FT  
Q2 = 10.59 CFS  
V2 = 2.52 FPS  
Q10 = 13.60 CFS  
V10 = 2.71 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.49 AC  
SLOPE = 7.14%  
L REQ. = 49.20 FT  
L PRO. = 86.00 FT  
Q2 = 1.61 CFS  
V2 = 3.19 FPS  
Q10 = 2.07 CFS  
V10 = 3.40 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 0.49 AC  
SLOPE = 5.10%  
L REQ. = 49.20 FT  
L PRO. = 79.00 FT  
Q2 = 1.61 CFS  
V2 = 2.75 FPS  
Q10 = 2.07 CFS  
V10 = 2.93 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 1.31 AC  
SLOPE = 1.94%  
L REQ. = 130.90 FT  
L PRO. = 520.00 FT  
Q2 = 4.00 CFS  
V2 = 2.41 FPS  
Q10 = 5.13 CFS  
V10 = 2.56 FPS  
SIDE SLOPES = 6

**GRASS SWALE**  
DA = 3.79 AC  
SLOPE = 2.89%  
L REQ. = 379.20 FT  
L PRO. = 550.00 FT  
Q2 = 5.79 CFS  
V2 = 3.68 FPS  
Q10 = 7.43 CFS  
V10 = 3.95 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 0.87 AC  
SLOPE = 1.96%  
L REQ. = 87.20 FT  
L PRO. = 700.00 FT  
Q2 = 2.09 CFS  
V2 = 2.26 FPS  
Q10 = 2.69 CFS  
V10 = 2.40 FPS  
SIDE SLOPES = 4

**GRASS SWALE DATA**  
DA = 16.70 AC  
SLOPE = 4.38%  
L REQ. = 1670.00 FT  
L PRO. = 235.00 FT  
Q2 = 32.77 CFS  
V2 = 6.98 FPS  
Q10 = 42.08 CFS  
V10 = 7.51 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 1.17 AC  
SLOPE = 4.45%  
L REQ. = 117.00 FT  
L PRO. = 185.00 FT  
Q2 = 2.81 CFS  
V2 = 3.46 FPS  
Q10 = 3.60 CFS  
V10 = 3.73 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.36 AC  
SLOPE = 1.78%  
L REQ. = 36.00 FT  
L PRO. = 200.00 FT  
Q2 = 0.57 CFS  
V2 = 1.79 FPS  
Q10 = 0.73 CFS  
V10 = 1.91 FPS  
SIDE SLOPES = 2

**SWALE DATA**  
74 AC  
1.43%  
76.20 FT  
450.00 FT  
50 CFS  
33 FPS  
92 CFS  
48 FPS  
PES = 6

**GRASS SWALE DATA**  
DA = 0.76 AC  
SLOPE = 5.34%  
L REQ. = 46.20 FT  
L PRO. = 100.00 FT  
Q2 = 1.50 CFS  
V2 = 2.87 FPS  
Q10 = 1.92 CFS  
V10 = 3.06 FPS  
SIDE SLOPES = 5

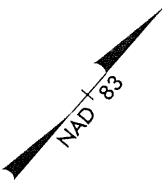
**GRASS SWALE DATA**  
DA = 4.61 AC  
SLOPE = 5.53%  
L REQ. = 461.00 FT  
L PRO. = 325.00 FT  
Q2 = 8.44 CFS  
V2 = 5.51 FPS  
Q10 = 10.84 CFS  
V10 = 5.92 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.28 AC  
SLOPE = 4.48%  
L REQ. = 27.70 FT  
L PRO. = 150.00 FT  
Q2 = 0.54 CFS  
V2 = 2.24 FPS  
Q10 = 0.70 CFS  
V10 = 2.39 FPS  
SIDE SLOPES = 4

**GRASS SWALE DATA**  
DA = 9.49 AC  
SLOPE = 3.22%  
L REQ. = 949.00 FT  
L PRO. = 80.00 FT  
Q2 = 17.08 CFS  
V2 = 5.18 FPS  
Q10 = 22.32 CFS  
V10 = 5.59 FPS  
SIDE SLOPES = 2

**LEGEND**

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING



MATCH LINE - YREV - STA 42+00  
SEE SHEET 26

PLOT DRIVER: NCD01.pdf\_color\_eng\_100.pdf  
USER: jmasbroc DATE: 9/10/2010  
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REVISIONS



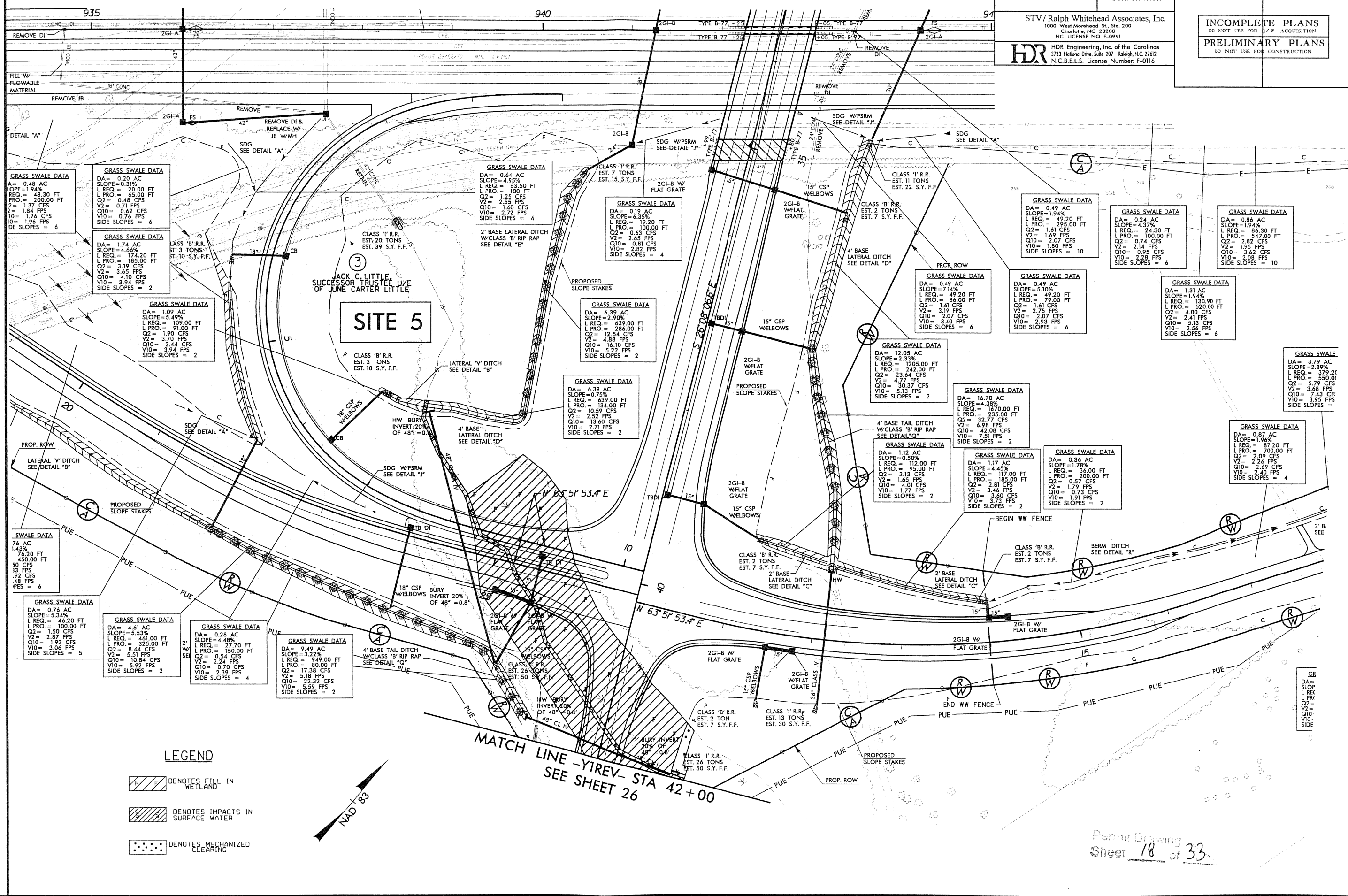


THE LANE CONSTRUCTION CORPORATION

PROJECT REFERENCE NO.	SHEET NO.
I-2304AC	14A
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

STV/Ralph Whitehead Associates, Inc.  
1000 West Morehead St., Ste. 200  
Charlotte, NC 28208  
NC LICENSE NO. F-0991

HDR HDR Engineering, Inc. of the Carolinas  
3733 National Drive, Suite 207 Raleigh, N.C. 27612  
N.C.B.E.L.S. License Number: F-0116



**GRASS SWALE DATA**  
DA = 0.48 AC  
SLOPE = 1.94%  
L REQ. = 48.30 FT  
L PRO. = 200.00 FT  
Q2 = 1.37 CFS  
V2 = 1.84 FPS  
Q10 = 1.74 CFS  
V10 = 1.96 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 0.20 AC  
SLOPE = 0.31%  
L REQ. = 20.00 FT  
L PRO. = 85.00 FT  
Q2 = 0.48 CFS  
V2 = 0.71 FPS  
Q10 = 0.62 CFS  
V10 = 0.76 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 1.74 AC  
SLOPE = 4.66%  
L REQ. = 174.20 FT  
L PRO. = 185.00 FT  
Q2 = 3.19 CFS  
V2 = 3.65 FPS  
Q10 = 4.10 CFS  
V10 = 3.94 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 1.09 AC  
SLOPE = 5.49%  
L REQ. = 109.00 FT  
L PRO. = 91.00 FT  
Q2 = 1.90 CFS  
V2 = 3.70 FPS  
Q10 = 2.44 CFS  
V10 = 3.94 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.64 AC  
SLOPE = 4.95%  
L REQ. = 63.50 FT  
L PRO. = 100 FT  
Q2 = 1.25 CFS  
V2 = 2.55 FPS  
Q10 = 1.60 CFS  
V10 = 2.72 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 0.19 AC  
SLOPE = 6.35%  
L REQ. = 19.20 FT  
L PRO. = 100.00 FT  
Q2 = 0.63 CFS  
V2 = 2.65 FPS  
Q10 = 0.81 CFS  
V10 = 2.82 FPS  
SIDE SLOPES = 4

**GRASS SWALE DATA**  
DA = 6.39 AC  
SLOPE = 0.75%  
L REQ. = 639.00 FT  
L PRO. = 286.00 FT  
Q2 = 12.84 CFS  
V2 = 4.88 FPS  
Q10 = 16.10 CFS  
V10 = 5.22 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 12.05 AC  
SLOPE = 2.33%  
L REQ. = 1205.00 FT  
L PRO. = 242.00 FT  
Q2 = 23.64 CFS  
V2 = 4.77 FPS  
Q10 = 30.37 CFS  
V10 = 5.13 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 16.70 AC  
SLOPE = 4.38%  
L REQ. = 1670.00 FT  
L PRO. = 235.00 FT  
Q2 = 37.77 CFS  
V2 = 6.98 FPS  
Q10 = 42.08 CFS  
V10 = 7.51 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 1.12 AC  
SLOPE = 0.50%  
L REQ. = 112.00 FT  
L PRO. = 95.00 FT  
Q2 = 3.13 CFS  
V2 = 1.65 FPS  
Q10 = 4.01 CFS  
V10 = 1.77 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 1.17 AC  
SLOPE = 4.45%  
L REQ. = 117.00 FT  
L PRO. = 185.00 FT  
Q2 = 3.57 CFS  
V2 = 3.46 FPS  
Q10 = 3.60 CFS  
V10 = 3.73 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.36 AC  
SLOPE = 1.78%  
L REQ. = 36.00 FT  
L PRO. = 200.00 FT  
Q2 = 0.57 CFS  
V2 = 1.79 FPS  
Q10 = 0.73 CFS  
V10 = 1.91 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.87 AC  
SLOPE = 1.96%  
L REQ. = 87.20 FT  
L PRO. = 700.00 FT  
Q2 = 2.09 CFS  
V2 = 2.26 FPS  
Q10 = 2.69 CFS  
V10 = 2.40 FPS  
SIDE SLOPES = 4

**GRASS SWALE DATA**  
DA = 0.86 AC  
SLOPE = 1.94%  
L REQ. = 86.30 FT  
L PRO. = 547.00 FT  
Q2 = 2.82 CFS  
V2 = 1.95 FPS  
Q10 = 3.62 CFS  
V10 = 2.08 FPS  
SIDE SLOPES = 10

**GRASS SWALE DATA**  
DA = 0.24 AC  
SLOPE = 4.37%  
L REQ. = 24.30 FT  
L PRO. = 100.00 FT  
Q2 = 0.74 CFS  
V2 = 2.14 FPS  
Q10 = 2.07 CFS  
V10 = 2.28 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 0.49 AC  
SLOPE = 1.94%  
L REQ. = 49.20 FT  
L PRO. = 195.00 FT  
Q2 = 1.61 CFS  
V2 = 1.69 FPS  
Q10 = 2.07 CFS  
V10 = 1.80 FPS  
SIDE SLOPES = 10

**GRASS SWALE DATA**  
DA = 0.49 AC  
SLOPE = 5.10%  
L REQ. = 49.20 FT  
L PRO. = 86.00 FT  
Q2 = 1.61 CFS  
V2 = 3.19 FPS  
Q10 = 2.07 CFS  
V10 = 2.93 FPS  
SIDE SLOPES = 6

**SWALE DATA**  
76 AC  
1.43%  
76.20 FT  
450.00 FT  
30 CFS  
33 FPS  
92 CFS  
48 FPS  
PES = 6

**GRASS SWALE DATA**  
DA = 0.76 AC  
SLOPE = 5.34%  
L REQ. = 46.20 FT  
L PRO. = 100.00 FT  
Q2 = 1.50 CFS  
V2 = 2.87 FPS  
Q10 = 1.92 CFS  
V10 = 3.06 FPS  
SIDE SLOPES = 5

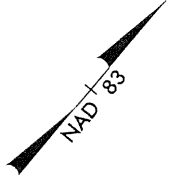
**GRASS SWALE DATA**  
DA = 4.61 AC  
SLOPE = 5.53%  
L REQ. = 461.00 FT  
L PRO. = 325.00 FT  
Q2 = 8.44 CFS  
V2 = 5.51 FPS  
Q10 = 10.84 CFS  
V10 = 5.92 FPS  
SIDE SLOPES = 2

**GRASS SWALE DATA**  
DA = 0.28 AC  
SLOPE = 4.48%  
L REQ. = 27.70 FT  
L PRO. = 150.00 FT  
Q2 = 0.54 CFS  
V2 = 2.24 FPS  
Q10 = 0.70 CFS  
V10 = 2.39 FPS  
SIDE SLOPES = 4

**GRASS SWALE DATA**  
DA = 9.49 AC  
SLOPE = 3.22%  
L REQ. = 949.00 FT  
L PRO. = 80.00 FT  
Q2 = 17.38 CFS  
V2 = 5.18 FPS  
Q10 = 22.32 CFS  
V10 = 5.59 FPS  
SIDE SLOPES = 2

LEGEND



- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING




MATCH LINE -YREV- STA 42+00  
SEE SHEET 26

Permit Drawing  
Sheet 18 of 33

PLOT DRIVER: NCDOT\_paf\_color\_eng.100.ppt  
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 REVISIONS  
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 B:17:09





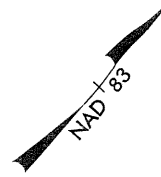
STV/Ralph Whitehead Associates, Inc.  
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 NC LICENSE NO. F-0991


 HDR Engineering, Inc. of the Carolinas  
 3733 National Drive, Suite 207 Raleigh, NC 27612  
 N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	SHEET NO.
I-2304AC	14B
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

**LEGEND**

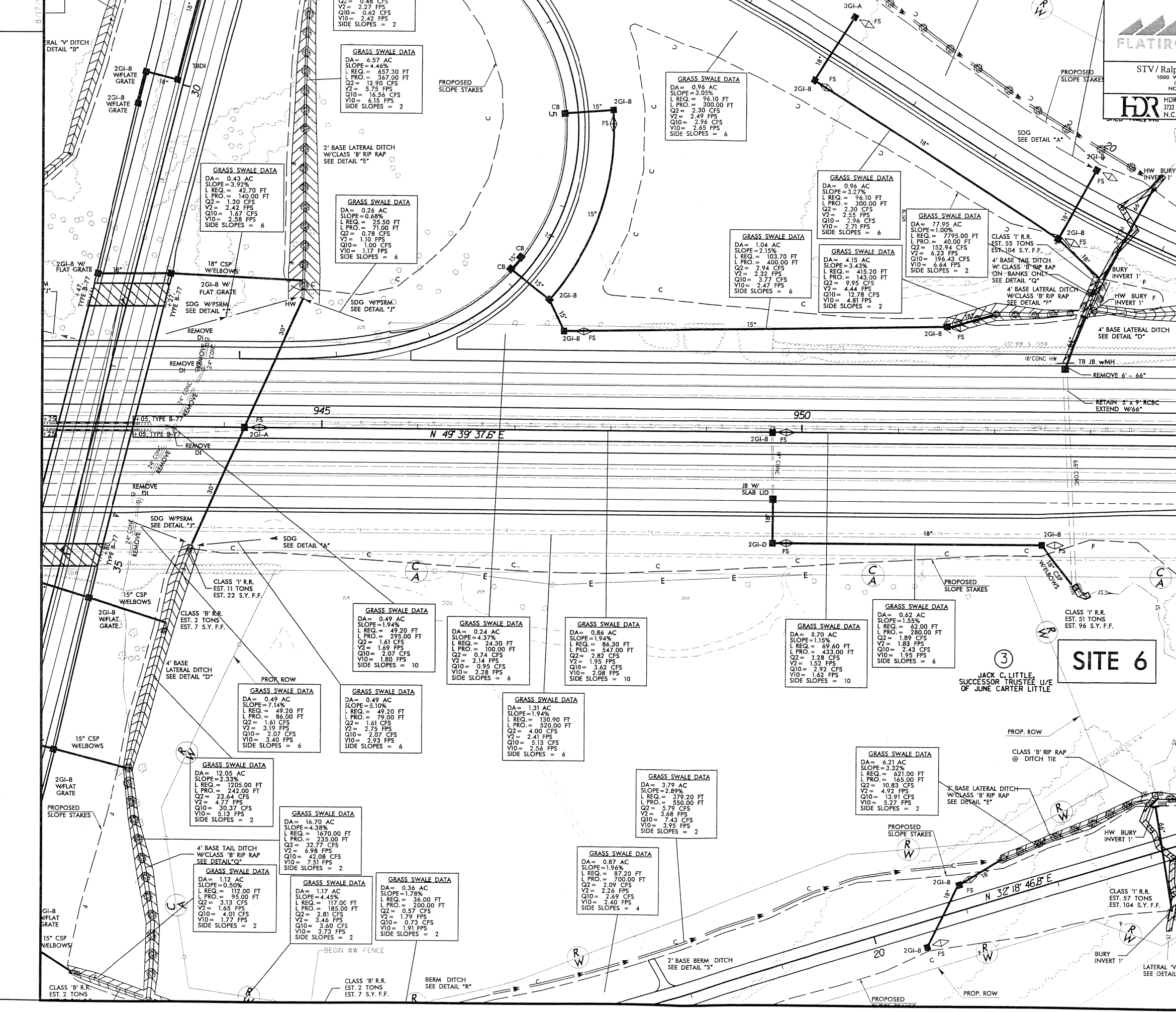
 DENOTES IMPACTS IN SURFACE WATER



MATCH LINE - STA 18+50  
 -RAMP A- STA 18+50  
 SEE SHEET 15

MATCH LINE - LREV - STA 954+00, SEE SHEET 15

MATCH LINE - STA 23+50  
 -SRD- SHEET 15  
 SEE SHEET 15



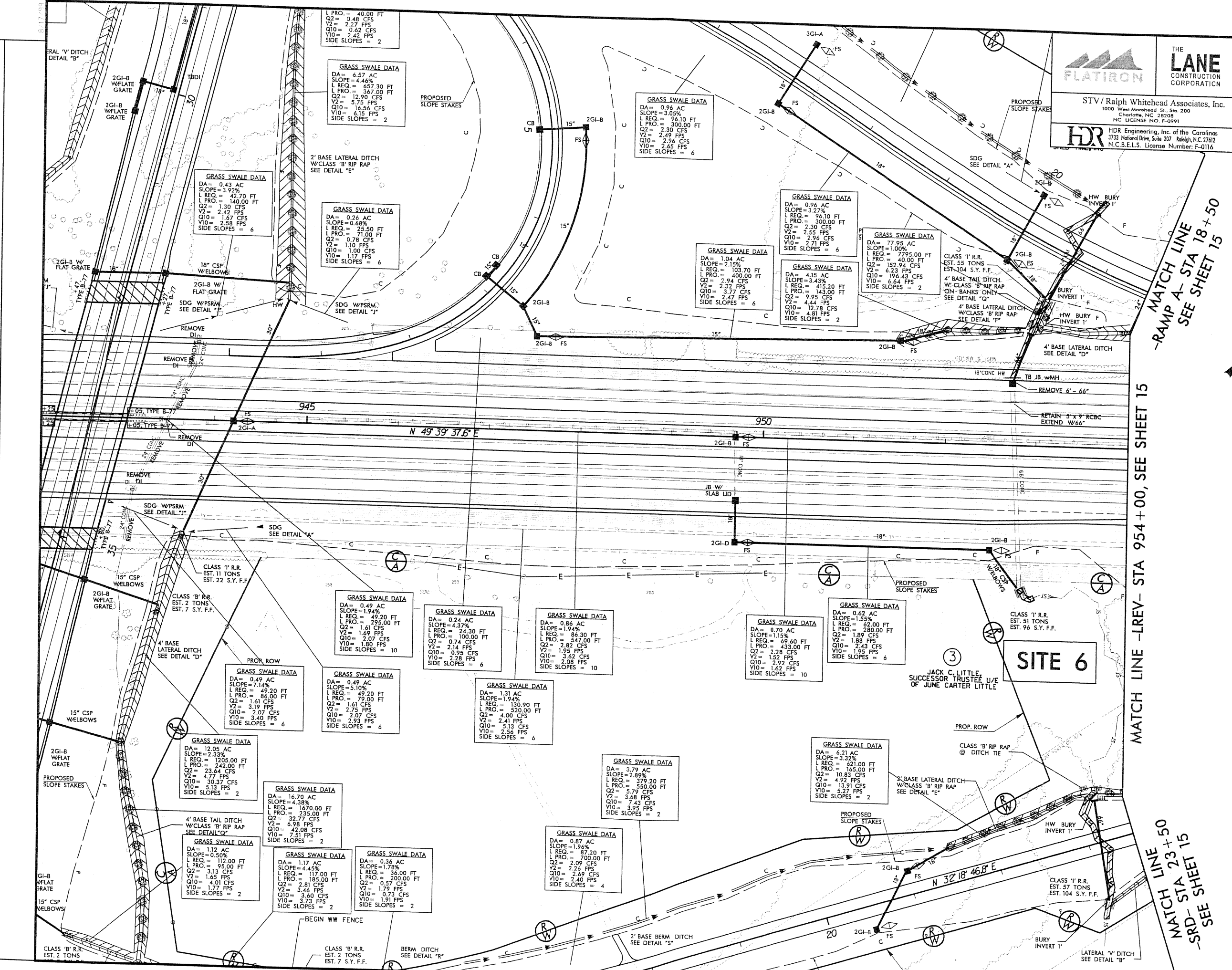
**SITE 6**

JACK C. LITTLE,  
 SUCCESSOR TRUSTEE U/E  
 OF JUNE CARTER LITTLE

PLOT DRIVER: MCDOT.pdf\_color\_eng.100.pdf  
 USER: jmasrloc DATE: 9/10/2010  
 FILE: R:\Rd\p.Whitehead\_and\_Associates\RW\Flatiron\_Lane\_Yadkin\_I\_85\I-2304AC\Hydro\Drawings\I-2304AC\_HYD\_PRRM\_PLANS\SHEETS\14B.dgn

PLOT DRIVER: NCDOT\_color\_eng\_100.plt  
 USER: jmassroc DATE: 9/10/2010  
 FILE: Ralph.Whitehead.assoc\Drawings\12304AC\Hydro\12304AC\_HYD\_PRR\_PLANS\REVISIONS.dwg  
 PENTABLE: NCDOT\_permit.tbl  
 TIME: 7:52:56 AM SCALE: 1:100

REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
I-2304AC	14B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

**FLATRION**

**THE LANE CONSTRUCTION CORPORATION**

STV / Ralph Whitehead Associates, Inc.  
 1000 West Morehead St., Ste. 200  
 Charlotte, NC 28208  
 NC LICENSE NO. F-0991

**HDR** HDR Engineering, Inc. of the Carolinas  
 3733 National Drive, Suite 207 Raleigh, NC 27612  
 N.C.B.E.L.S. License Number: F-0116

**LEGEND**

DENOTES IMPACTS IN SURFACE WATER



MATCH LINE  
 -RAMP A- STA 18+50  
 SEE SHEET 15

MATCH LINE -LREV- STA 954+00, SEE SHEET 15

MATCH LINE  
 -SRD- STA 23+50  
 SEE SHEET 15

**SITE 6**

JACK C. LITTLE,  
 SUCCESSOR TRUSTEE 1/2  
 OF JUNE CARTER LITTLE

Permit Drawing  
 Sheet 20 of 33



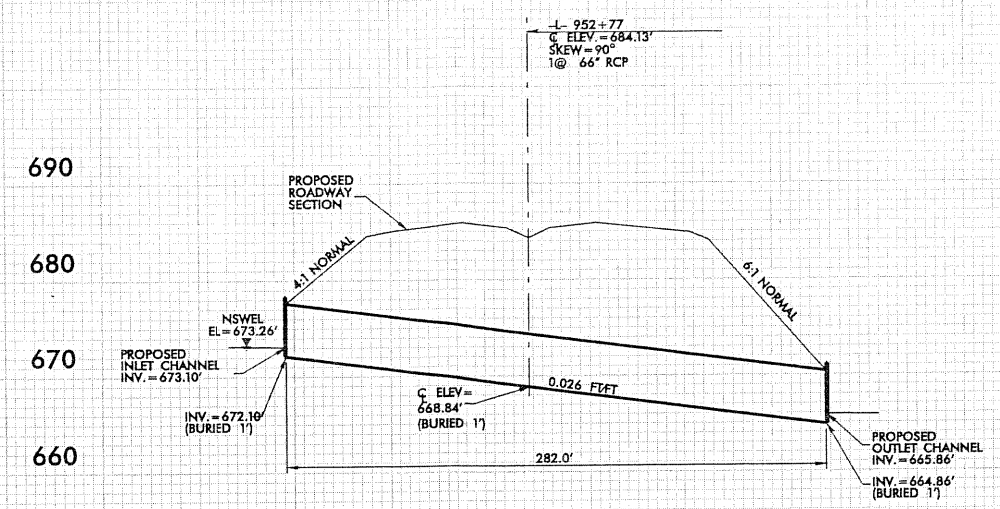
5/28/99

PLOT DRIVER: \$PLTDVRS\$  
USER: \$USERS\$  
DATE: 9/9/2010  
FILE: \$PWVARVAULTPA THDESC\$

PENTABLE: \$PENTBLS\$  
TIME: 3:55:22 PM  
SCALE: \$SCALESHORT\$

PROJECT REFERENCE NO. 1-2304AC	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

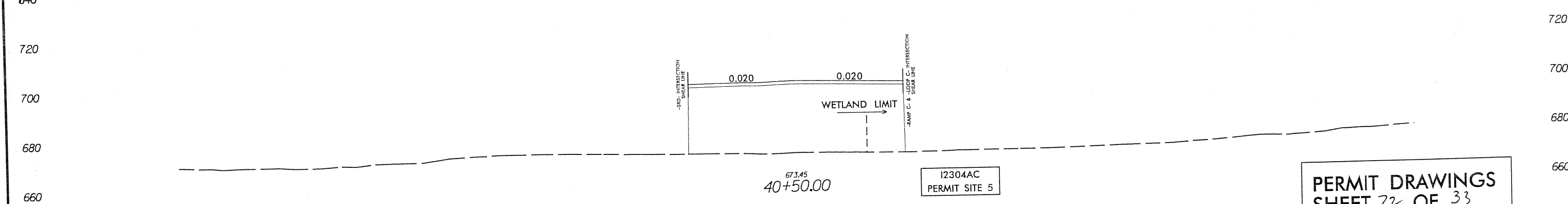
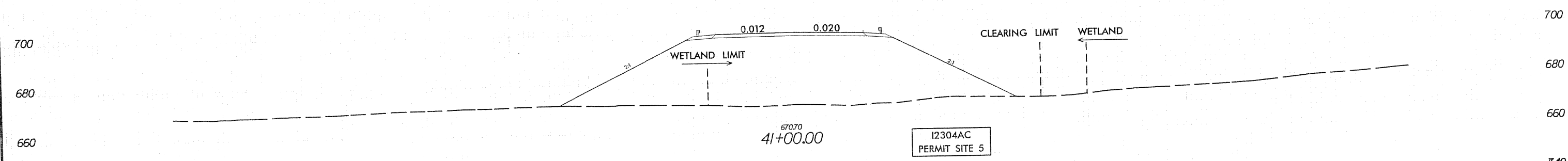
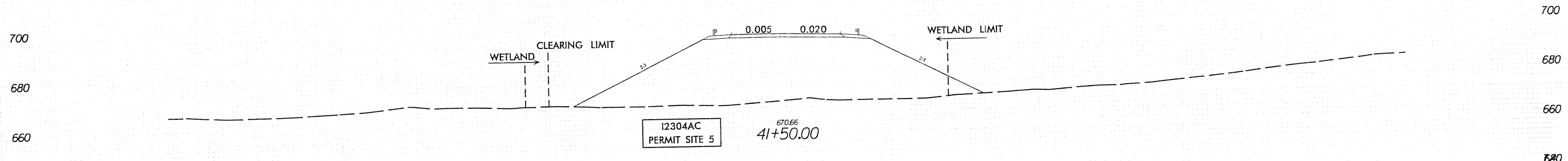
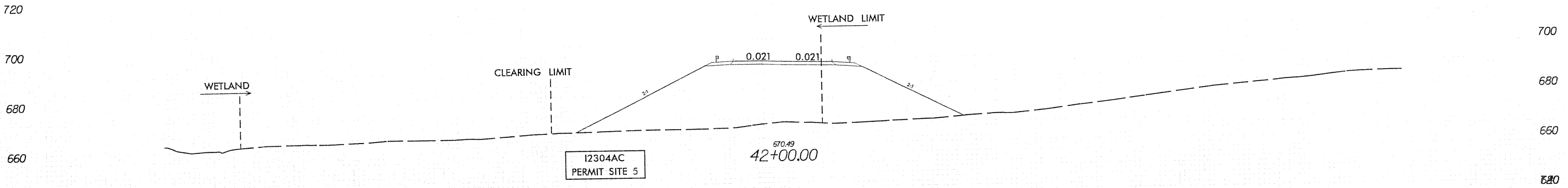
# SITE 6 I-2304AC



PROFILE ALONG C OF 66 IN RCP

PERMIT DRAWINGS  
SHEET 21 OF 33

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





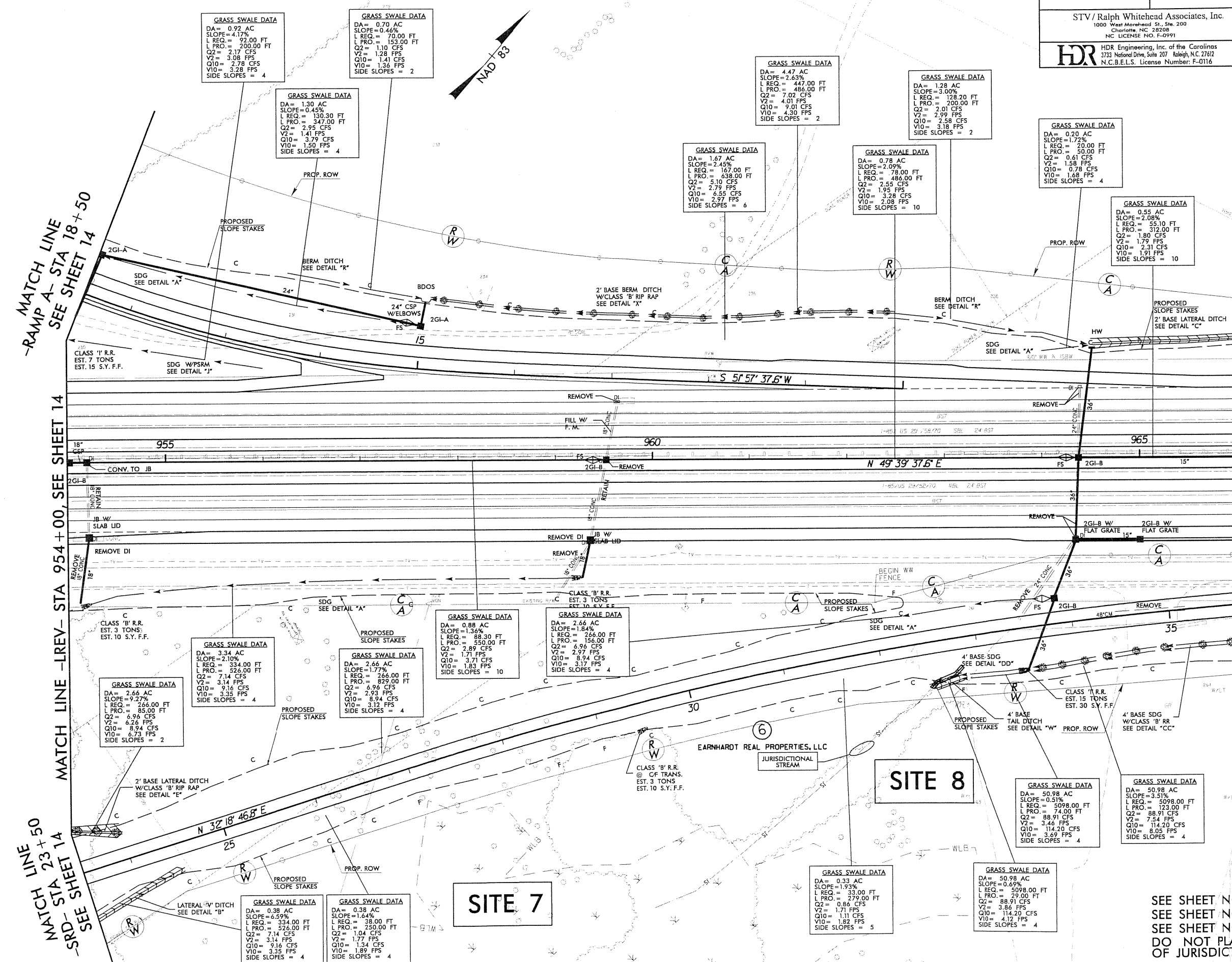
PERMIT DRAWINGS SHEET 22 OF 33

-YIREV-

5/23/2010 c:\pwworking\ipa\0226564\I2304AC\_HYD\_PRRM\_XPL\_YIREV.dgn

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

**LEGEND**  
 DENOTES IMPACTS IN SURFACE WATER  
 DENOTES MECHANIZED CLEARING  
**PERMIT DRAWINGS**  
 SHEET 23 OF 33



MATCH LINE  
 -RAMP A- STA 18+50  
 SEE SHEET 14

MATCH LINE -LREV- STA 954+00, SEE SHEET 14

MATCH LINE  
 -SRD- STA 23+50  
 SEE SHEET 14

MATCH LINE -LREV- STA 966+00, SEE SHEET 16

**SITE 7**

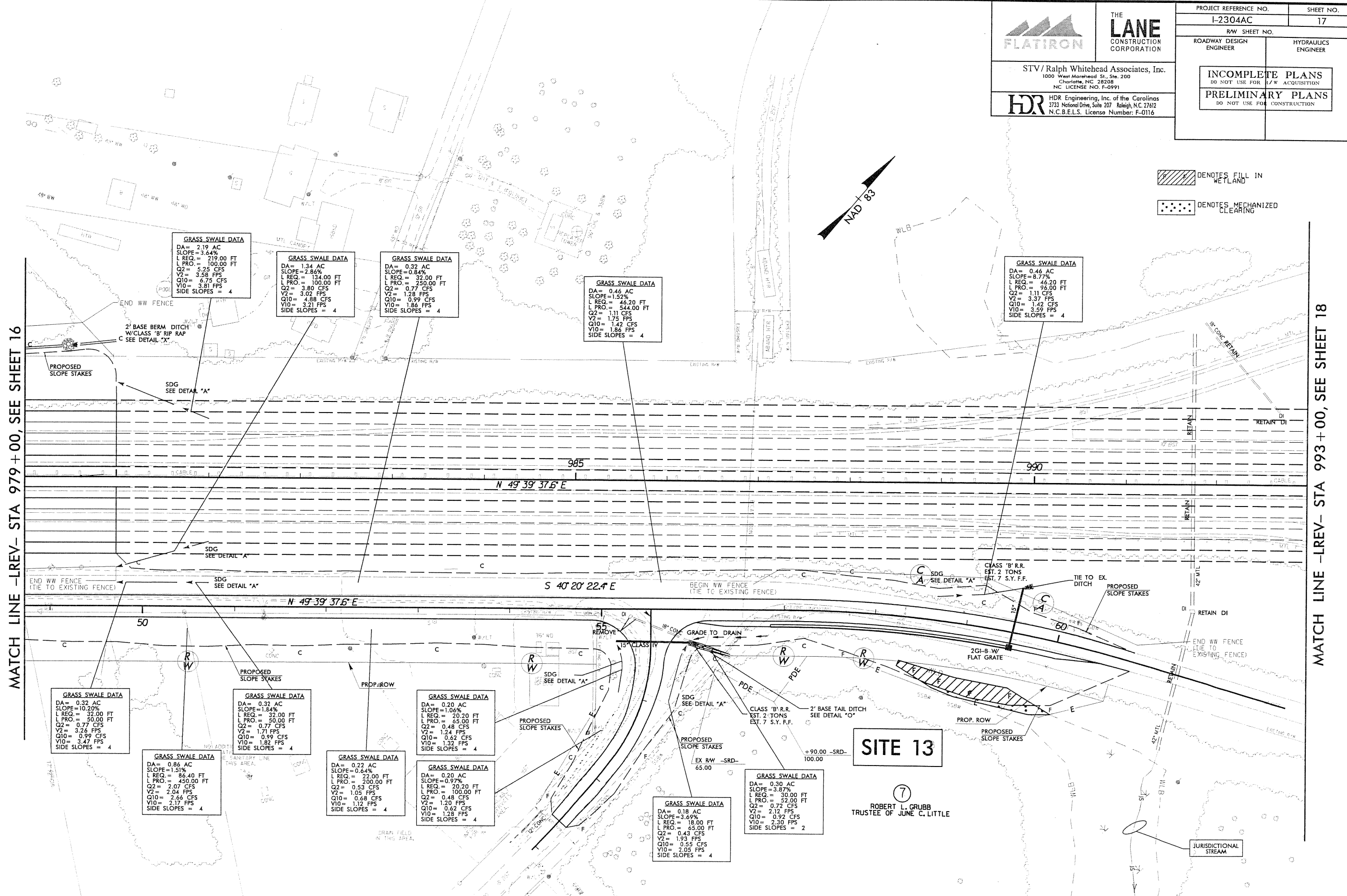
**SITE 8**

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 USER: jmassroc DATE: 9/10/2010  
 FILE: Ralph\_Whitehead\_and\_Associates\RW\Flatiron\_Lorie\_Yadkin\_I\_85\I2304AC\Hydro\quies\PERMITS-Environment\Drawings\I2304AC\_HYD\_PLM\_PLANS\I2304AC.dwg  
 SCALE: 1:100  
 TIME: 7:40:57 AM  
 REVISIONS

SEE SHEET NO. 35 FOR -LREV- PROFILE.  
 SEE SHEET NO. 46 FOR -RAMP A- PROFILE.  
 SEE SHEET NO. 44 FOR -SRD- PROFILE.  
 DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.







MATCH LINE -LREV- STA 979 + 00, SEE SHEET 16

MATCH LINE -LREV- STA 993 + 00, SEE SHEET 18

**GRASS SWALE DATA**  
 DA = 2.19 AC  
 SLOPE = 3.64%  
 L REQ. = 219.00 FT  
 L PRO. = 100.00 FT  
 Q2 = 5.25 CFS  
 V2 = 3.58 FPS  
 Q10 = 6.75 CFS  
 V10 = 3.81 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 1.34 AC  
 SLOPE = 2.86%  
 L REQ. = 134.00 FT  
 L PRO. = 100.00 FT  
 Q2 = 3.80 CFS  
 V2 = 3.02 FPS  
 Q10 = 4.88 CFS  
 V10 = 3.21 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.32 AC  
 SLOPE = 0.84%  
 L REQ. = 32.00 FT  
 L PRO. = 250.00 FT  
 Q2 = 0.77 CFS  
 V2 = 1.28 FPS  
 Q10 = 0.99 CFS  
 V10 = 1.86 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.46 AC  
 SLOPE = 1.52%  
 L REQ. = 46.20 FT  
 L PRO. = 544.00 FT  
 Q2 = 1.11 CFS  
 V2 = 1.75 FPS  
 Q10 = 1.42 CFS  
 V10 = 1.86 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.46 AC  
 SLOPE = 8.77%  
 L REQ. = 46.20 FT  
 L PRO. = 96.00 FT  
 Q2 = 1.11 CFS  
 V2 = 3.37 FPS  
 Q10 = 1.42 CFS  
 V10 = 3.59 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.32 AC  
 SLOPE = 10.20%  
 L REQ. = 32.00 FT  
 L PRO. = 50.00 FT  
 Q2 = 0.77 CFS  
 V2 = 3.26 FPS  
 Q10 = 0.99 CFS  
 V10 = 3.47 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.86 AC  
 SLOPE = 1.51%  
 L REQ. = 86.40 FT  
 L PRO. = 450.00 FT  
 Q2 = 2.07 CFS  
 V2 = 2.04 FPS  
 Q10 = 2.64 CFS  
 V10 = 2.17 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.32 AC  
 SLOPE = 1.84%  
 L REQ. = 32.00 FT  
 L PRO. = 50.00 FT  
 Q2 = 0.77 CFS  
 V2 = 1.71 FPS  
 Q10 = 0.99 CFS  
 V10 = 1.82 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.22 AC  
 SLOPE = 0.64%  
 L REQ. = 22.00 FT  
 L PRO. = 700.00 FT  
 Q2 = 0.53 CFS  
 V2 = 1.05 FPS  
 Q10 = 0.68 CFS  
 V10 = 1.12 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.20 AC  
 SLOPE = 1.06%  
 L REQ. = 20.20 FT  
 L PRO. = 65.00 FT  
 Q2 = 0.48 CFS  
 V2 = 1.24 FPS  
 Q10 = 0.62 CFS  
 V10 = 1.32 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.20 AC  
 SLOPE = 0.97%  
 L REQ. = 20.20 FT  
 L PRO. = 100.00 FT  
 Q2 = 0.48 CFS  
 V2 = 1.20 FPS  
 Q10 = 0.62 CFS  
 V10 = 1.25 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.18 AC  
 SLOPE = 3.69%  
 L REQ. = 18.00 FT  
 L PRO. = 65.00 FT  
 Q2 = 0.43 CFS  
 V2 = 1.93 FPS  
 Q10 = 0.55 CFS  
 V10 = 2.05 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.30 AC  
 SLOPE = 5.87%  
 L REQ. = 30.00 FT  
 L PRO. = 52.00 FT  
 Q2 = 0.77 CFS  
 V2 = 2.12 FPS  
 Q10 = 0.92 CFS  
 V10 = 2.30 FPS  
 SIDE SLOPES = 2

**SITE 13**

ROBERT L. GRUBB  
 TRUSTEE OF JUNE C. LITTLE

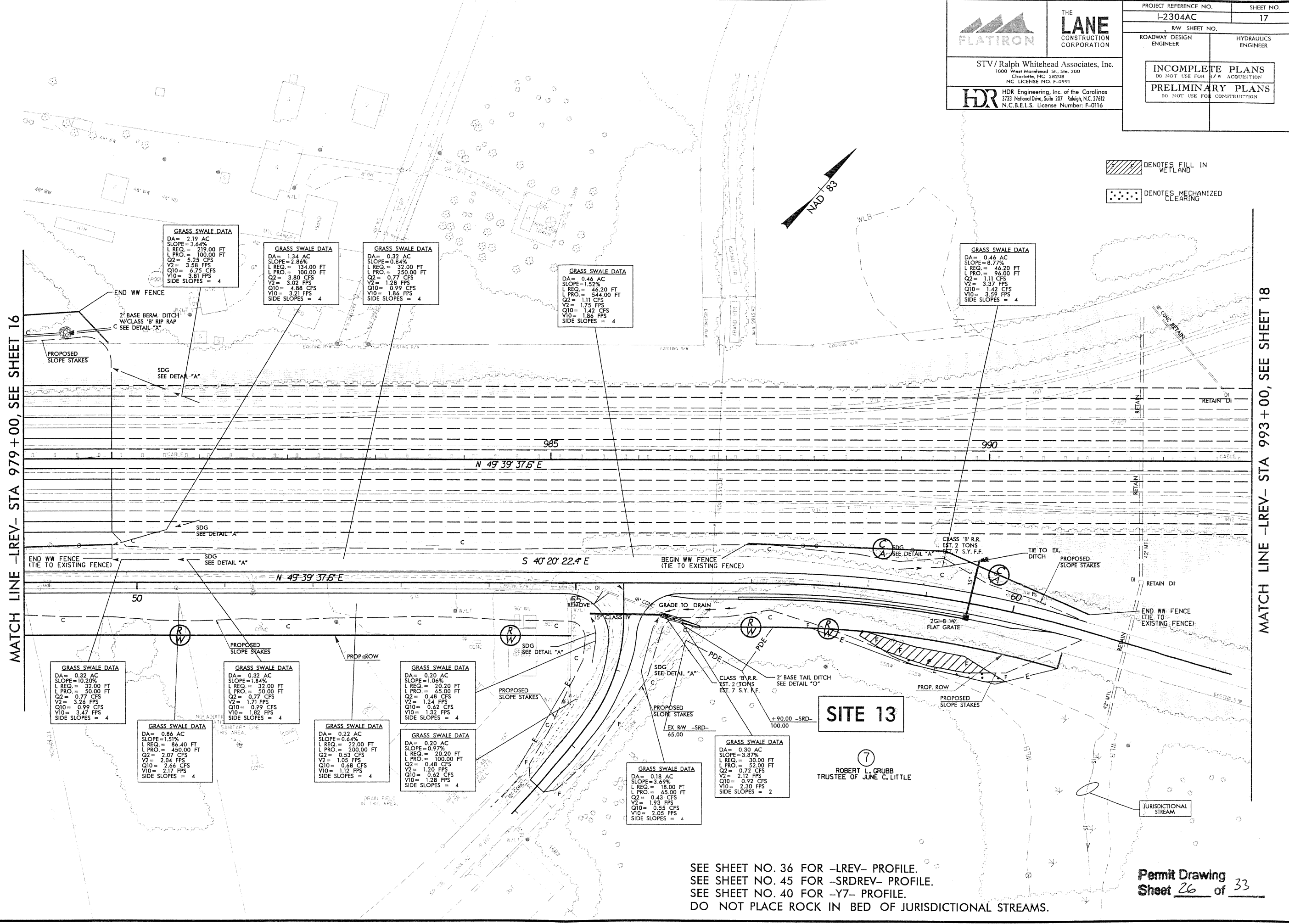
Permit Drawing  
 Sheet 25 of 33

SEE SHEET NO. 36 FOR -LREV- PROFILE.  
 SEE SHEET NO. 45 FOR -SRDREV- PROFILE.  
 SEE SHEET NO. 40 FOR -Y7- PROFILE.  
 DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

PLOT DRIVER: NCD01.pdf\_color\_eng\_100.ppt  
 USER: imassroc DATE: 9/28/2010  
 FILE: Ralph\_Whitehead\_and\_Associates\RW\Flatiron\_Lane\_Tadkin\_I\_85\I2304AC\Hydro\quies\PERMITS\_Environment\Drawings\I2304AC\_HYD\_PRL\_PLANSHEETS.dgn

REVISIONS





**GRASS SWALE DATA**  
 DA = 2.19 AC  
 SLOPE = 3.64%  
 L REQ. = 219.00 FT  
 L PRO. = 100.00 FT  
 Q2 = 5.25 CFS  
 V2 = 3.58 FPS  
 Q10 = 6.75 CFS  
 V10 = 3.81 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 1.34 AC  
 SLOPE = 2.86%  
 L REQ. = 134.00 FT  
 L PRO. = 100.00 FT  
 Q2 = 3.80 CFS  
 V2 = 3.02 FPS  
 Q10 = 4.88 CFS  
 V10 = 3.21 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.32 AC  
 SLOPE = 0.84%  
 L REQ. = 32.00 FT  
 L PRO. = 250.00 FT  
 Q2 = 0.77 CFS  
 V2 = 1.28 FPS  
 Q10 = 0.99 CFS  
 V10 = 1.86 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.46 AC  
 SLOPE = 1.52%  
 L REQ. = 46.20 FT  
 L PRO. = 544.00 FT  
 Q2 = 1.11 CFS  
 V2 = 1.75 FPS  
 Q10 = 1.42 CFS  
 V10 = 1.86 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.46 AC  
 SLOPE = 8.77%  
 L REQ. = 46.20 FT  
 L PRO. = 96.00 FT  
 Q2 = 1.11 CFS  
 V2 = 3.37 FPS  
 Q10 = 1.42 CFS  
 V10 = 3.59 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.32 AC  
 SLOPE = 10.20%  
 L REQ. = 32.00 FT  
 L PRO. = 50.00 FT  
 Q2 = 0.77 CFS  
 V2 = 3.26 FPS  
 Q10 = 0.99 CFS  
 V10 = 3.47 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.86 AC  
 SLOPE = 1.51%  
 L REQ. = 86.40 FT  
 L PRO. = 450.00 FT  
 Q2 = 2.07 CFS  
 V2 = 2.04 FPS  
 Q10 = 2.66 CFS  
 V10 = 2.17 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.32 AC  
 SLOPE = 1.84%  
 L REQ. = 32.00 FT  
 L PRO. = 50.00 FT  
 Q2 = 0.77 CFS  
 V2 = 1.71 FPS  
 Q10 = 0.99 CFS  
 V10 = 1.82 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.22 AC  
 SLOPE = 0.64%  
 L REQ. = 22.00 FT  
 L PRO. = 300.00 FT  
 Q2 = 0.53 CFS  
 V2 = 1.05 FPS  
 Q10 = 0.68 CFS  
 V10 = 1.12 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.20 AC  
 SLOPE = 1.06%  
 L REQ. = 20.20 FT  
 L PRO. = 65.00 FT  
 Q2 = 0.48 CFS  
 V2 = 1.24 FPS  
 Q10 = 0.62 CFS  
 V10 = 1.32 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.20 AC  
 SLOPE = 0.97%  
 L REQ. = 20.20 FT  
 L PRO. = 100.00 FT  
 Q2 = 0.48 CFS  
 V2 = 1.20 FPS  
 Q10 = 0.62 CFS  
 V10 = 1.28 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.18 AC  
 SLOPE = 3.69%  
 L REQ. = 18.00 FT  
 L PRO. = 65.00 FT  
 Q2 = 0.43 CFS  
 V2 = 1.93 FPS  
 Q10 = 0.55 CFS  
 V10 = 2.05 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.30 AC  
 SLOPE = 3.87%  
 L REQ. = 30.00 FT  
 L PRO. = 52.00 FT  
 Q2 = 0.77 CFS  
 V2 = 2.12 FPS  
 Q10 = 0.92 CFS  
 V10 = 2.30 FPS  
 SIDE SLOPES = 2

SEE SHEET NO. 36 FOR -LREV- PROFILE.  
 SEE SHEET NO. 45 FOR -SRDREV- PROFILE.  
 SEE SHEET NO. 40 FOR -Y7- PROFILE.  
 DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

PLOT DRIVER: NCDOT - pdf\_color\_eng\_100.pht  
 USER: jmass-oc  
 FILE: Ralph.Whitehead\_and\_Associates\FW\Flatiron\_Lane\_Yorklyn\_I\_85\I2304AC\Hydro\outlets\PERMIT\I\_85\I2304AC\Hyd\RD\HYD\_PRM\_PLANS\SHETS.dgn  
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 REVISIONS

MATCH LINE -LREV- STA 979+00, SEE SHEET 16

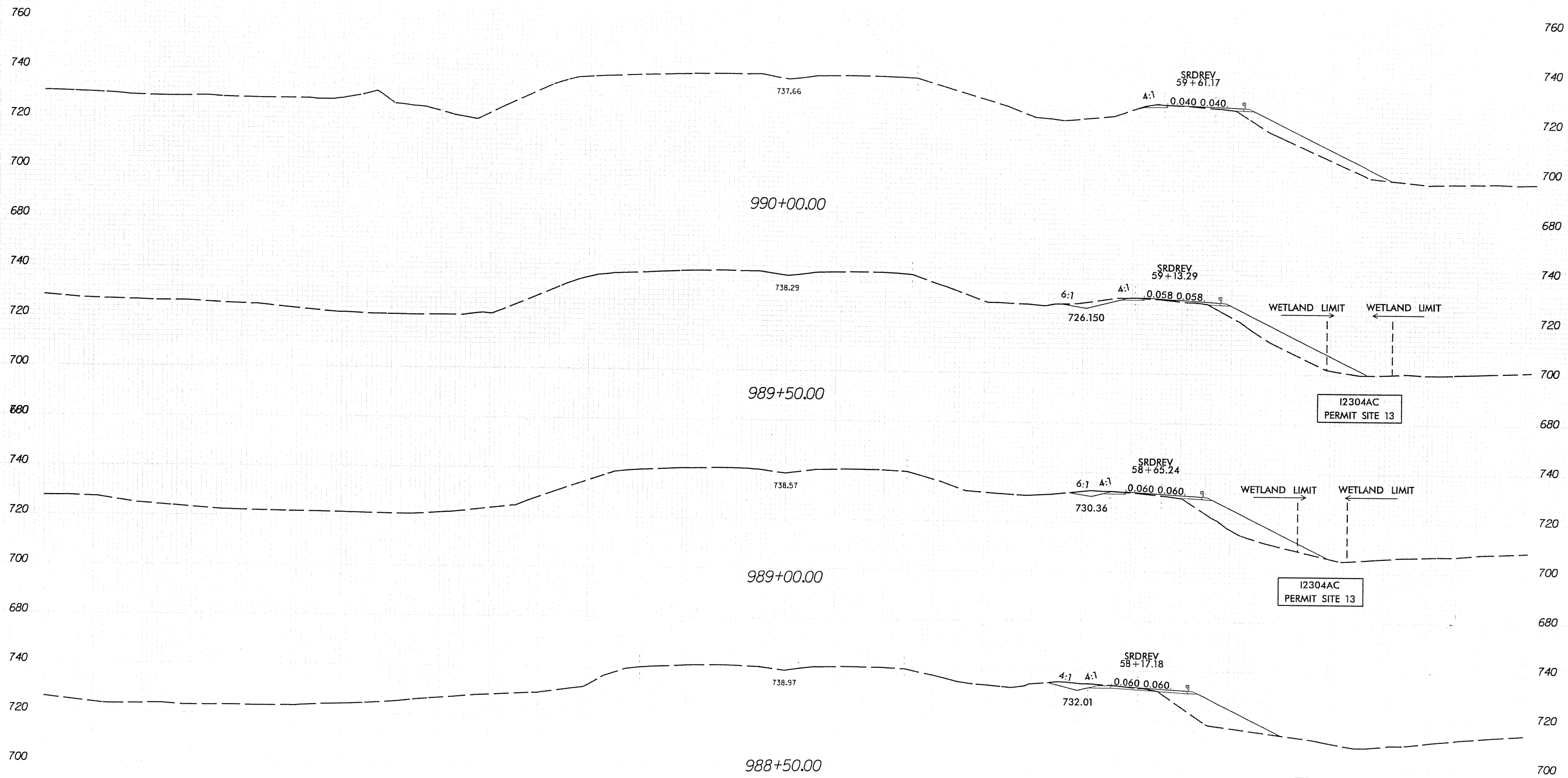
MATCH LINE -LREV- STA 993+00, SEE SHEET 18

8/23/99



PROJ. REFERENCE NO. 1-2304AC SHEET NO. X-82

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



12304AC PERMIT SITE 13

12304AC PERMIT SITE 13

PERMIT DRAWINGS SHEET 27 OF 33

-LREV-

9/29/2010 c:\pwworking\spc\d0226564\12304AC\_HYD\_PRRM\_XPL\_I\_REV.dgn

REVISIONS

MATCH LINE -SRBREV- STA 32+00, SEE SHEET 21

MATCH LINE -SRBREV- STA 45+00, SEE SHEET 11



**THE LANE**  
 CONSTRUCTION CORPORATION

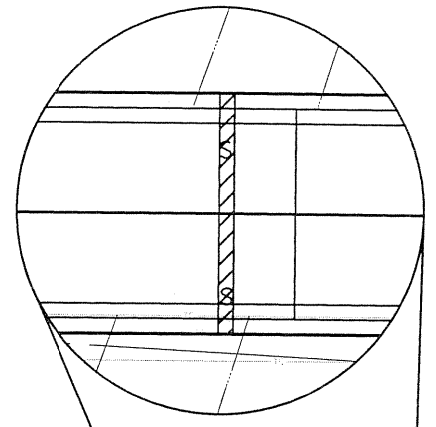
STV / Ralph Whitehead Associates, Inc.  
 1000 West Morehead St., Ste. 200  
 Charlotte, NC 28208  
 NC LICENSE NO. F-0991

**HDR** HDR Engineering, Inc. of the Carolinas  
 3733 National Drive, Suite 207 Raleigh, N.C. 27612  
 N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO.	I-2304AC	SHEET NO.	22
RAW SHEET NO.			
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER		
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION			
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			

LEGEND

DENOTES IMPACTS IN SURFACE WATER



DECK DRAINS  
 INSIDE AND OUTSIDE SHOULDERS:  
 BEGIN STA: 31+60  
 END STA: 39+10  
 6" DRAINS @ 12' SPACING  
 TRUNK LINE: 24" UV RESISTANT PVC

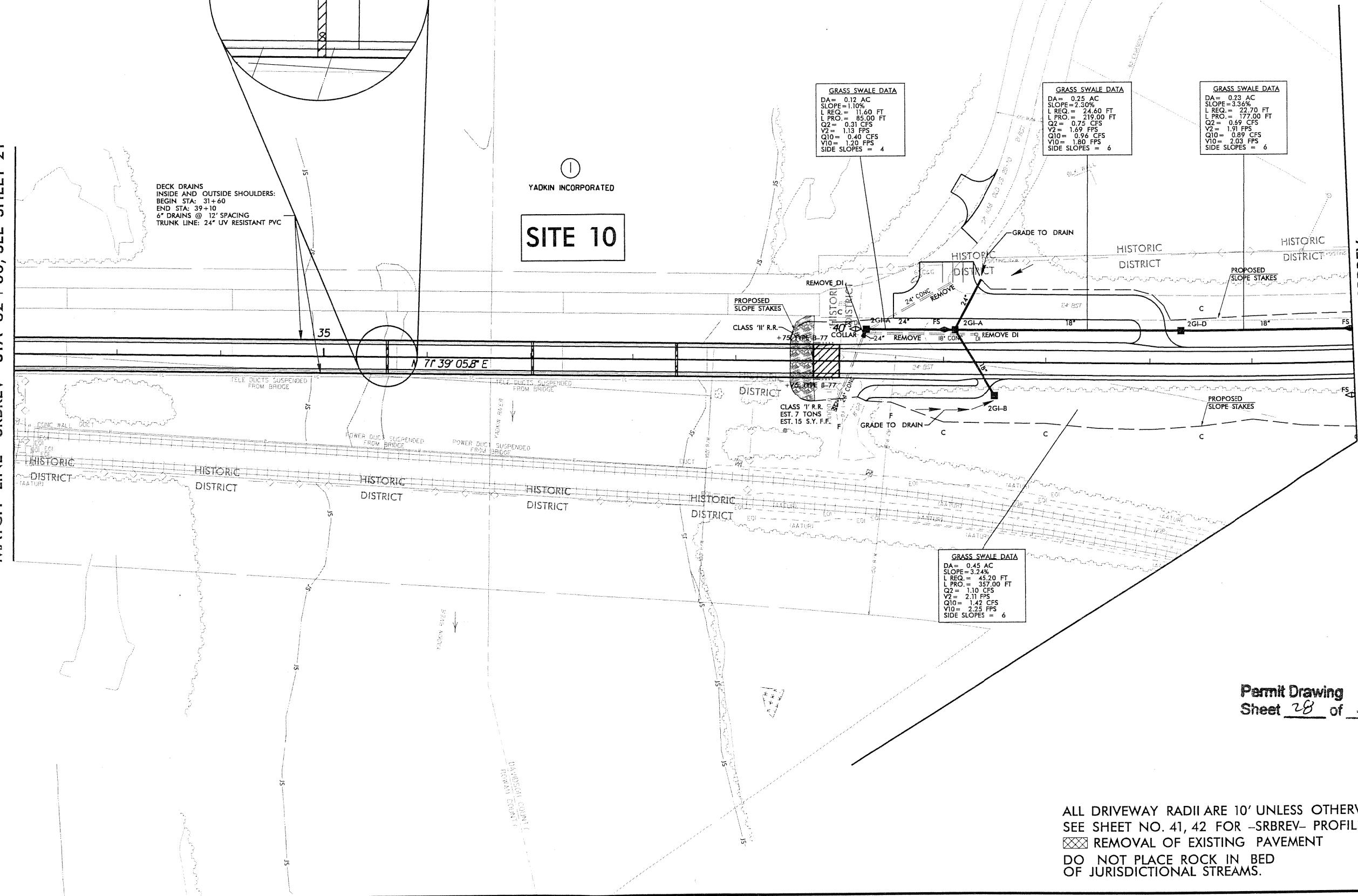
YADKIN INCORPORATED  
**SITE 10**

**GRASS SWALE DATA**  
 DA = 0.12 AC  
 SLOPE = 1.10%  
 L REQ. = 11.60 FT  
 L PRO. = 85.00 FT  
 Q2 = 0.31 CFS  
 V2 = 1.13 FPS  
 Q10 = 0.40 CFS  
 V10 = 1.20 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA = 0.25 AC  
 SLOPE = 2.30%  
 L REQ. = 24.60 FT  
 L PRO. = 219.00 FT  
 Q2 = 0.75 CFS  
 V2 = 1.69 FPS  
 Q10 = 0.96 CFS  
 V10 = 1.80 FPS  
 SIDE SLOPES = 6

**GRASS SWALE DATA**  
 DA = 0.23 AC  
 SLOPE = 3.36%  
 L REQ. = 22.70 FT  
 L PRO. = 177.00 FT  
 Q2 = 0.69 CFS  
 V2 = 1.91 FPS  
 Q10 = 0.89 CFS  
 V10 = 2.03 FPS  
 SIDE SLOPES = 6

**GRASS SWALE DATA**  
 DA = 0.45 AC  
 SLOPE = 3.24%  
 L REQ. = 45.20 FT  
 L PRO. = 357.00 FT  
 Q2 = 1.10 CFS  
 V2 = 2.11 FPS  
 Q10 = 1.42 CFS  
 V10 = 2.25 FPS  
 SIDE SLOPES = 6



Permit Drawing  
 Sheet 28 of 33

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.  
 SEE SHEET NO. 41, 42 FOR -SRBREV- PROFILE.  
 REMOVAL OF EXISTING PAVEMENT  
 DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

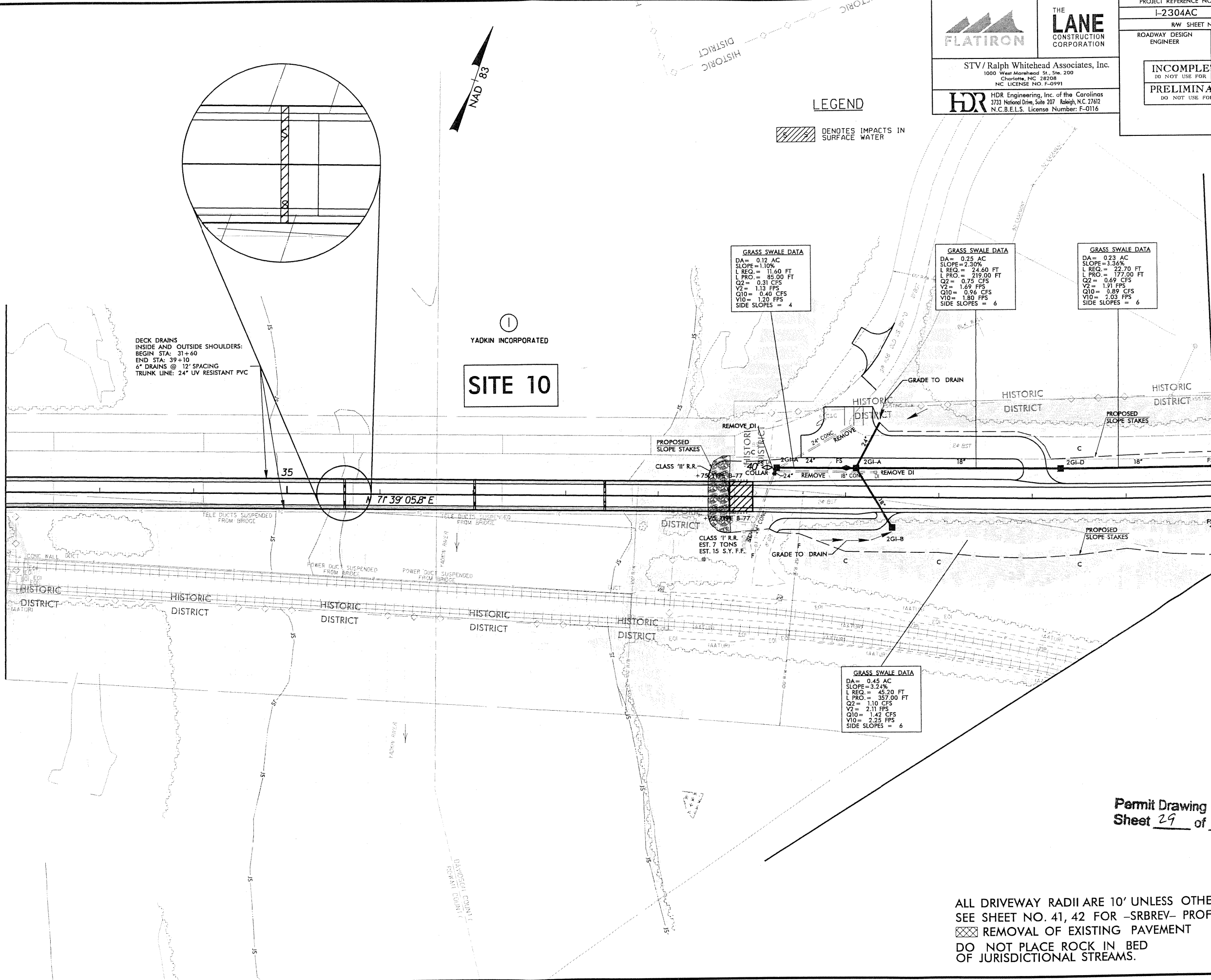
PLOT DRIVER: NCD01\_color\_eng.100.plt  
 USER: jmassroc DATE: 9/10/2010  
 FILE: Ralph.Whitehead\_and\_Associates\RWL\FlatironLane\_Yadkin.I.85\L2304AC\Hydraulics\PERMITS\_Environmental\Drawings\L2304AC\_HYD\_PLM\_PLANSHEETS.dgn

PENTABLE: NCD01\_permits.tbl  
 TIME: 7:51:40 AM SCALE: 1:100

REVISIONS

MATCH LINE -SRBREV- STA 32+00, SEE SHEET 21

MATCH LINE -SRBREV- STA 45+00, SEE SHEET 11



DECK DRAINS  
 INSIDE AND OUTSIDE SHOULDERS:  
 BEGIN STA: 31+60  
 END STA: 39+10  
 6" DRAINS @ 12' SPACING  
 TRUNK LINE: 24" UV RESISTANT PVC

**SITE 10**



**LEGEND**

DENOTES IMPACTS IN SURFACE WATER

**GRASS SWALE DATA**  
 DA= 0.12 AC  
 SLOPE=1.10%  
 L REQ.= 11.60 FT  
 L PRO.= 85.00 FT  
 Q2= 0.31 CFS  
 V2= 1.13 FPS  
 Q10= 0.40 CFS  
 V10= 1.20 FPS  
 SIDE SLOPES = 4

**GRASS SWALE DATA**  
 DA= 0.25 AC  
 SLOPE=3.36%  
 L REQ.= 24.60 FT  
 L PRO.= 219.00 FT  
 Q2= 0.75 CFS  
 V2= 1.69 FPS  
 Q10= 0.96 CFS  
 V10= 1.80 FPS  
 SIDE SLOPES = 6

**GRASS SWALE DATA**  
 DA= 0.23 AC  
 SLOPE=3.36%  
 L REQ.= 22.70 FT  
 L PRO.= 177.00 FT  
 Q2= 0.69 CFS  
 V2= 1.71 FPS  
 Q10= 0.89 CFS  
 V10= 2.03 FPS  
 SIDE SLOPES = 6

**GRASS SWALE DATA**  
 DA= 0.45 AC  
 SLOPE=3.24%  
 L REQ.= 45.20 FT  
 L PRO.= 357.00 FT  
 Q2= 1.10 CFS  
 V2= 2.11 FPS  
 Q10= 1.42 CFS  
 V10= 2.25 FPS  
 SIDE SLOPES = 6

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.  
 SEE SHEET NO. 41, 42 FOR -SRBREV- PROFILE.  
 REMOVAL OF EXISTING PAVEMENT  
 DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

Permit Drawing  
 Sheet 29 of 33

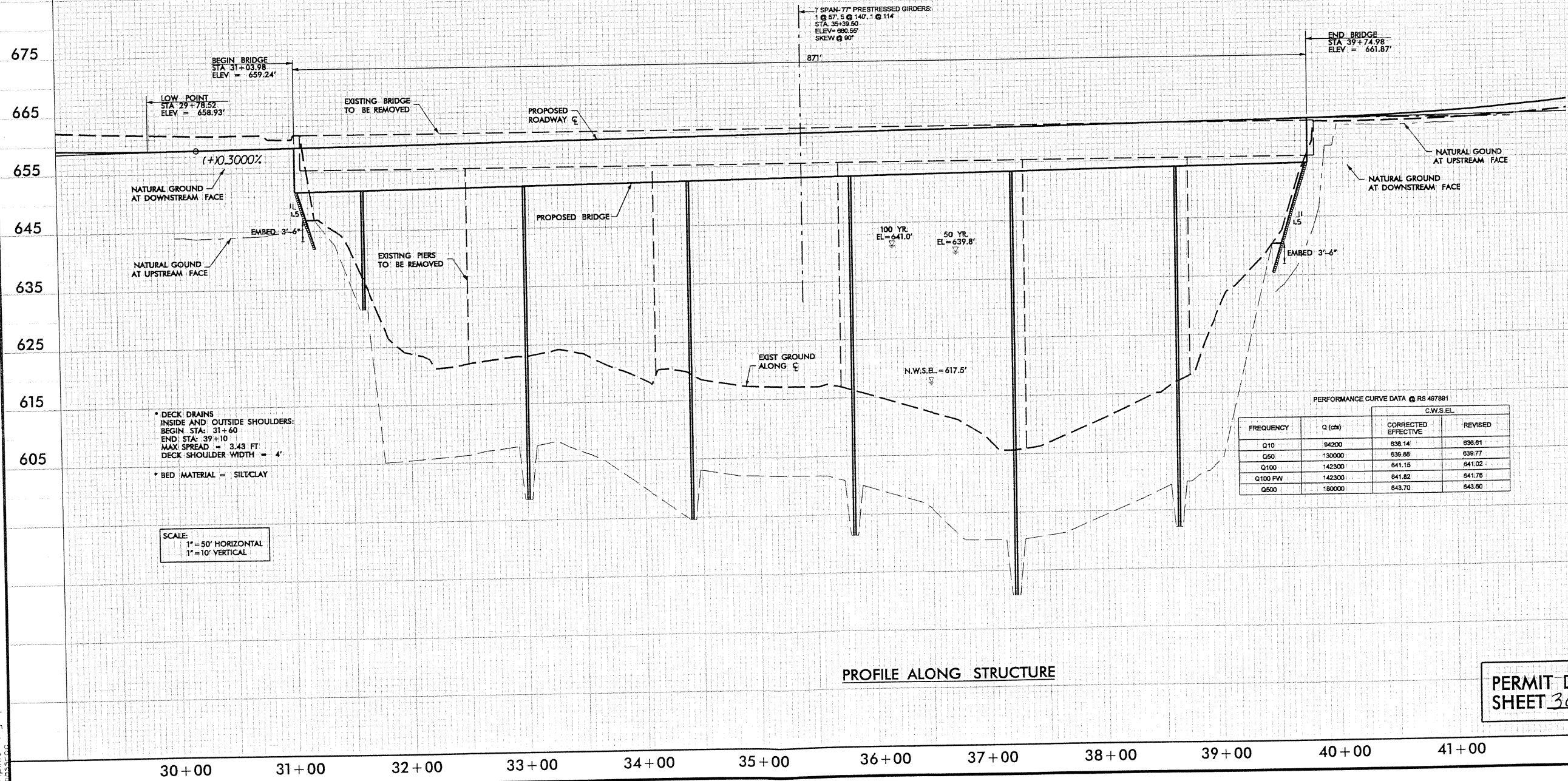
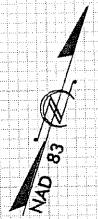
**THE LANE CONSTRUCTION CORPORATION**  
 STV/Ralph Whitehead Associates, Inc.  
 1000 West Morehead St., Ste. 200  
 Charlotte, NC 28208  
 NC LICENSE NO. F-0991

**HDR** HDR Engineering, Inc. of the Carolinas  
 3733 National Drive, Suite 207 Raleigh, N.C. 27612  
 N.C.B.E.L.S. License Number: F-0116

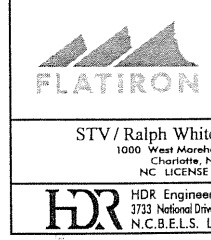
PROJECT REFERENCE NO. I-2304AC	SHEET NO. 22
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



# -SRBREV-



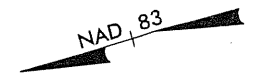
5/14/99  
 9/8/2000  
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PROJECT REFERENCE NO.	SHEET NO.
I-2304AC	26
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

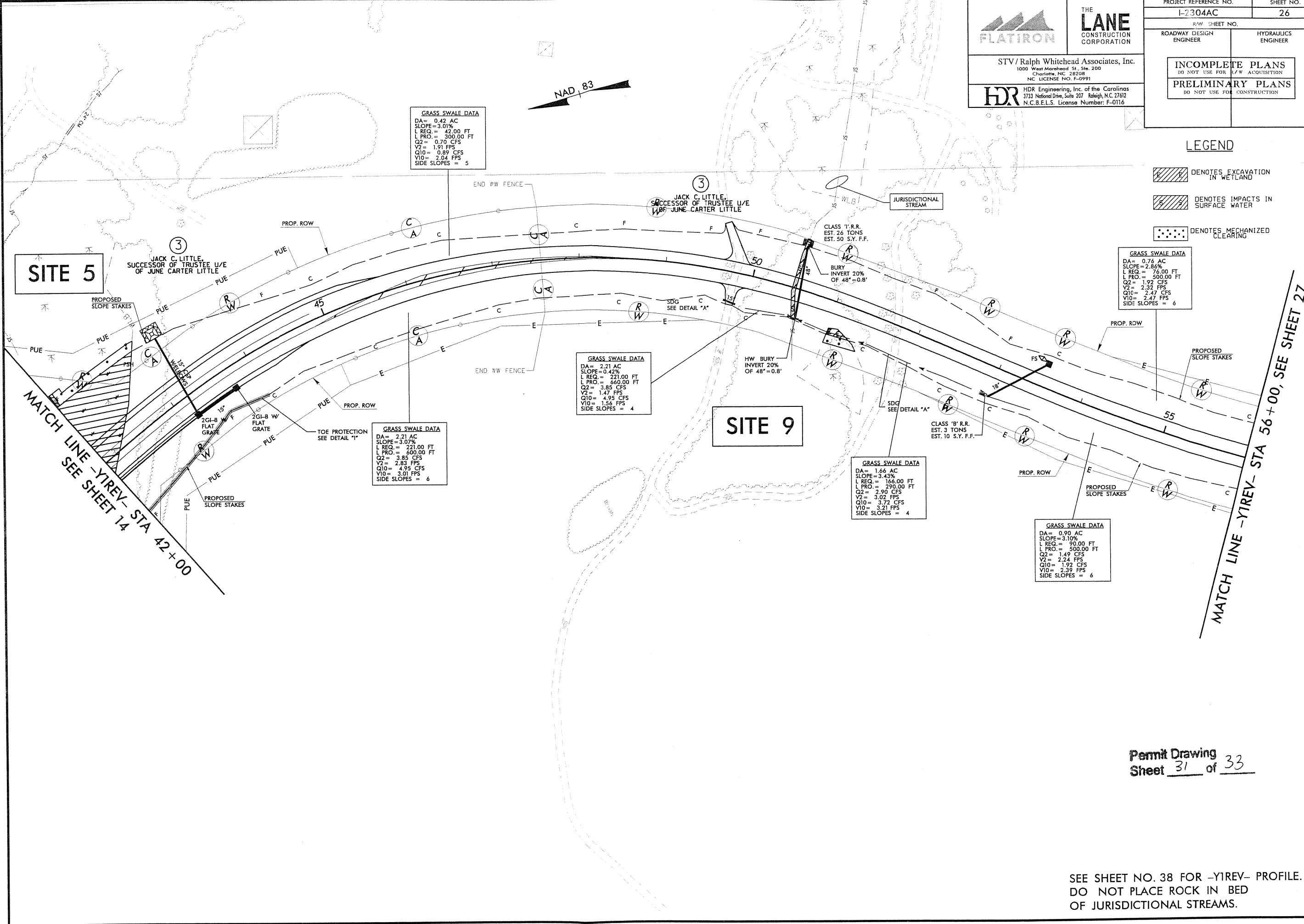
STV/Ralph Whitehead Associates, Inc.  
1000 West Morehead St., Ste. 200  
Charlotte, NC 28208  
NC LICENSE NO. F-0991

HDR Engineering, Inc. of the Carolinas  
3733 National Drive, Suite 207 Raleigh, N.C. 27612  
N.C.B.E.L.S. License Number: F-0116



**LEGEND**

- DENOTES EXCAVATION IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING



**GRASS SWALE DATA**  
DA = 0.42 AC  
SLOPE = 3.01%  
L REQ. = 42.00 FT  
L PRO. = 300.00 FT  
Q2 = 0.70 CFS  
Y2 = 1.91 FPS  
Q10 = 0.89 CFS  
V10 = 2.04 FPS  
SIDE SLOPES = 5

**GRASS SWALE DATA**  
DA = 0.76 AC  
SLOPE = 2.86%  
L REQ. = 76.00 FT  
L PRO. = 500.00 FT  
Q2 = 1.92 CFS  
Y2 = 2.32 FPS  
Q10 = 2.47 CFS  
V10 = 2.47 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 2.21 AC  
SLOPE = 0.42%  
L REQ. = 221.00 FT  
L PRO. = 660.00 FT  
Q2 = 3.85 CFS  
Y2 = 1.47 FPS  
Q10 = 4.95 CFS  
V10 = 1.56 FPS  
SIDE SLOPES = 4

**GRASS SWALE DATA**  
DA = 2.21 AC  
SLOPE = 3.07%  
L REQ. = 221.00 FT  
L PRO. = 660.00 FT  
Q2 = 3.85 CFS  
Y2 = 2.83 FPS  
Q10 = 4.95 CFS  
V10 = 3.01 FPS  
SIDE SLOPES = 6

**GRASS SWALE DATA**  
DA = 1.66 AC  
SLOPE = 3.43%  
L REQ. = 166.00 FT  
L PRO. = 290.00 FT  
Q2 = 2.90 CFS  
Y2 = 3.02 FPS  
Q10 = 3.72 CFS  
V10 = 3.21 FPS  
SIDE SLOPES = 4

**GRASS SWALE DATA**  
DA = 0.90 AC  
SLOPE = 3.10%  
L REQ. = 90.00 FT  
L PRO. = 500.00 FT  
Q2 = 1.49 CFS  
Y2 = 2.24 FPS  
Q10 = 1.92 CFS  
V10 = 2.39 FPS  
SIDE SLOPES = 6

**SITE 5**

**SITE 9**

MATCH LINE -YIREV- STA 42+00  
SEE SHEET 14

MATCH LINE -YIREV- STA 56+00, SEE SHEET 27

Permit Drawing  
Sheet 31 of 33

SEE SHEET NO. 38 FOR -YIREV- PROFILE.  
DO NOT PLACE ROCK IN BED  
OF JURISDICTIONAL STREAMS.

PLOT DRIVER: NCD01.pdf - color - enq - 100.ppt  
 USER: jmassroc DATE: 9/10/2010  
 FILE: Ralph.Whitehead\_and\_Associates\RWI\Flatiron\_Lane\_Yorkin\_1\_85\I2304AC\Hydr-aulics\PERMITS\_Environment\Drawings\I2304AC\_HYD\_PRM\_PLANS\SHEETS.dgn  
 PENTABLE: NCD01\_permits.NCD01.tbl  
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 REVISIONS

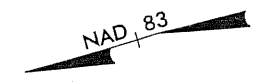


**THE LANE**  
CONSTRUCTION  
CORPORATION

STV/Ralph Whitehead Associates, Inc.  
1000 West Morehead St., Ste. 200  
Charlotte, NC 28208  
NC LICENSE NO. F-0991

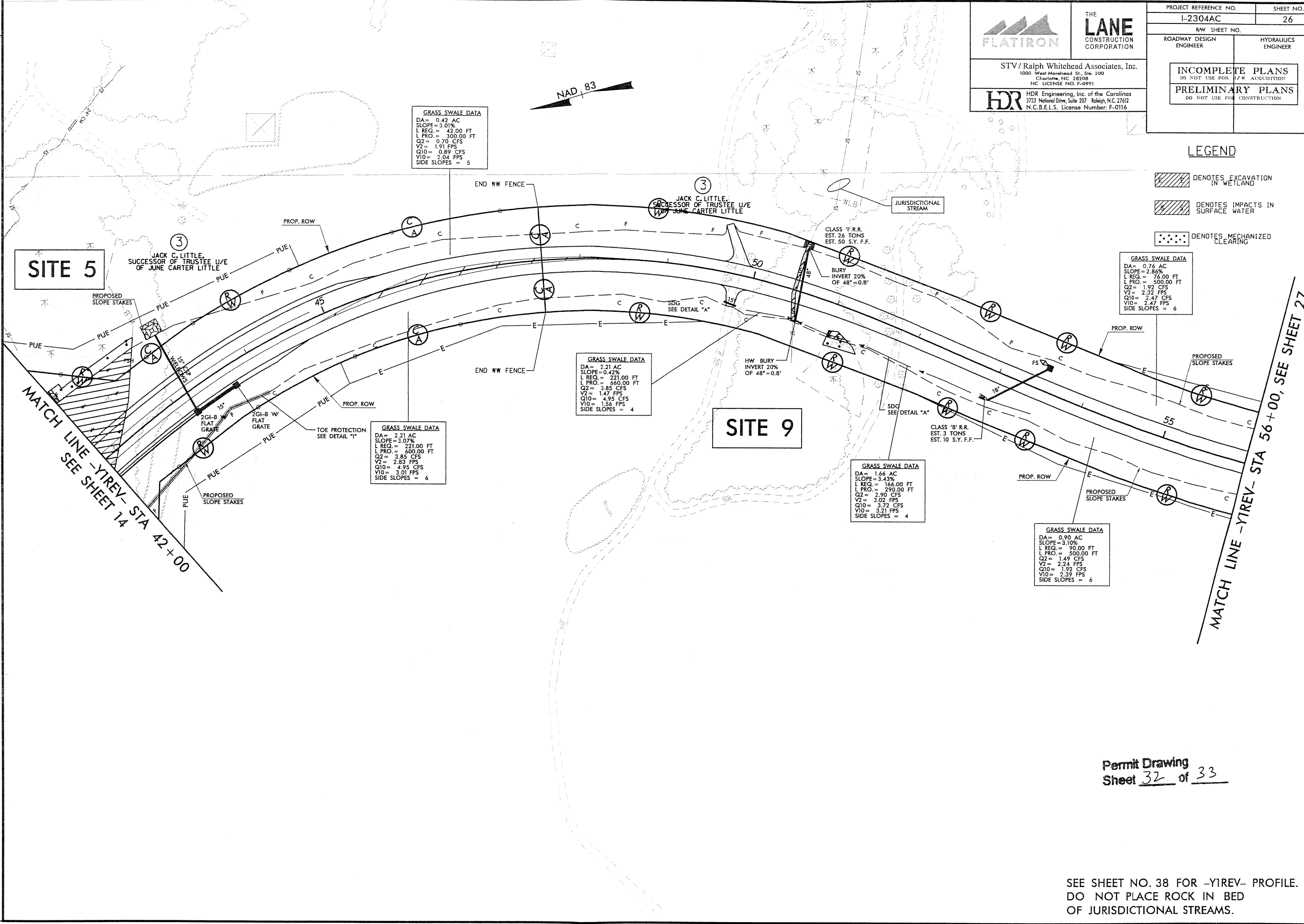
**HDR** HDR Engineering, Inc. of the Carolinas  
3733 National Drive, Suite 207 Raleigh, N.C. 27612  
N.C.B.E.L.S. License Number: F-0116

PROJECT REFERENCE NO. I-2304AC	SHEET NO. 26
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



**LEGEND**

- DENOTES EXCAVATION IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING



**GRASS SWALE DATA**  
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V10 = 2.39 FPS  
SIDE SLOPES = 6

**SITE 5**

**SITE 9**

MATCH LINE - YIREV - STA 42+00  
SEE SHEET 14

MATCH LINE - YIREV - STA 56+00, SEE SHEET 27

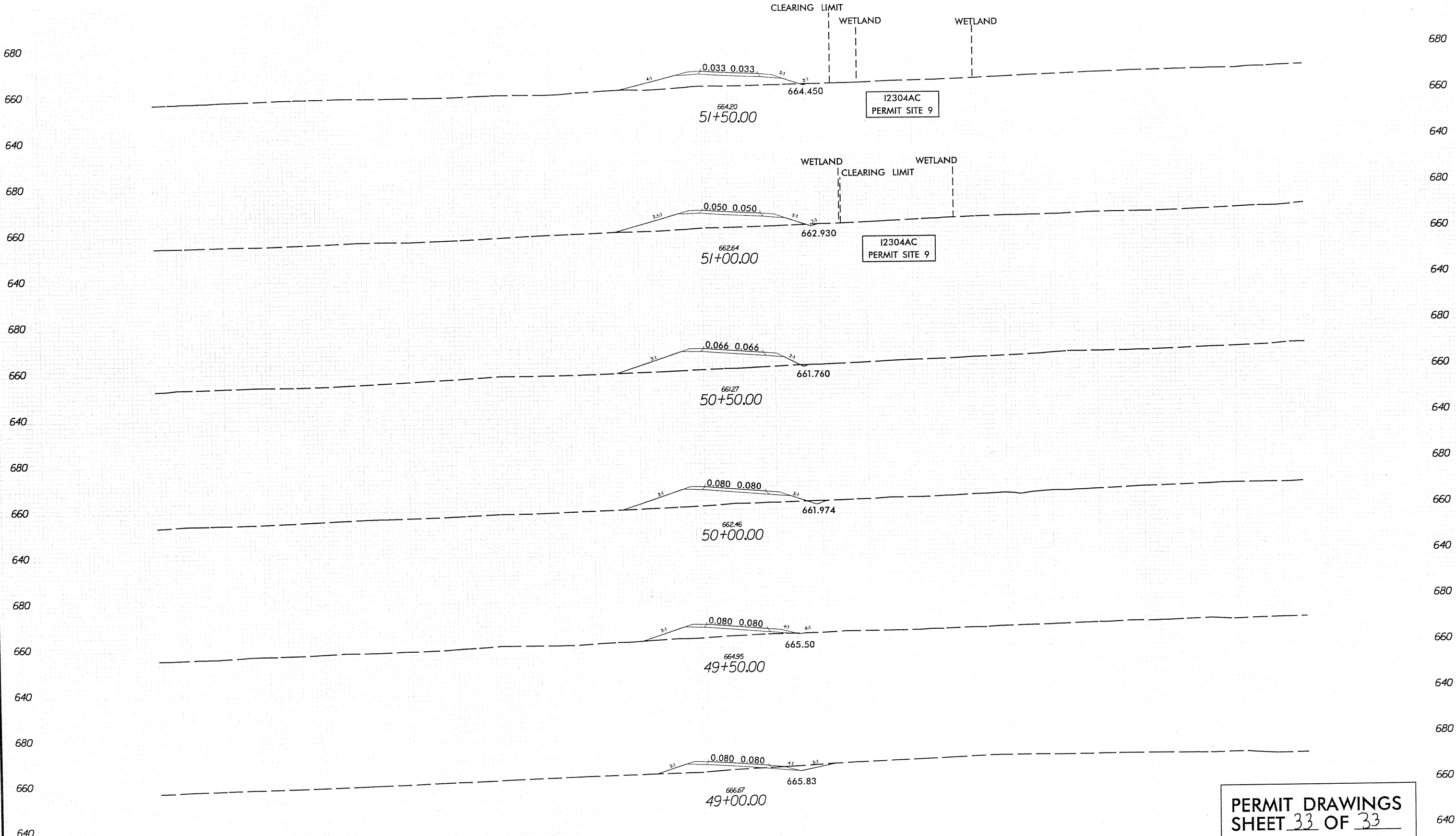
Permit Drawing  
Sheet 32 of 33

SEE SHEET NO. 38 FOR -YIREV- PROFILE.  
DO NOT PLACE ROCK IN BED  
OF JURISDICTIONAL STREAMS.

PLOT DRIVER: NCDOT.pdf\_color\_enh.100.plt  
 USER: jmasser-oc DATE: 9/10/2010  
 FILE: Ralph, Whitehead, and Associates\RRWH\_Flatiron\_Lane\_Yirev\_I-85\I-2304AC\Hydro\civil\SPERMIT\Drawings\I-2304AC\_HYD\_PRRM\_PLANS\I-2304AC.dgn  
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 TIME: 7:52:18 AM SCALE: 1:100  
 REVISIONS

B123799

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-YIREV-

PERMIT DRAWINGS  
SHEET 33 OF 33

9/29/2010  
c:\pwworking\tpa\0226564\12304AC\_HYD\_PRRM\_XPL\_YIREV.dgn  
jmass:oc

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