



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY PERDUE
GOVERNOR

EUGENE CONTI
SECRETARY

March 7, 2011

MEMORANDUM TO: Mr. H. Allen Pope, PE
Division 3 Engineer

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

SUBJECT: New Hanover and Brunswick Counties, Wilmington Bypass from
US 17 in Brunswick County, north of the NC 87 Intersection to US
421 in New Hanover County; T.I.P. Number R-2633A and B;
Federal Aid Project No. NHF-0017 (96) and STM-0017 (97); State
Project 34491.1.3.GV2 and 34491.3.ST1

Attached are the U.S. Army Corps of Engineers Section 404 Permit, N.C. Division of Water Quality Section 401 Water Quality Certification, and CAMA Permit 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/ell

Cc:

Mr. Randy Garriss, P.E. State Contract Officer
Mr. Clay Willis, Division Environ. Officer
Mr. Majed Alghandour, P. E., Program. 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. 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. Phillip Ayscue, NCDOT External Audit
Branch
Mr. Vince Rhea, P.E., PDEA Engineer:
Mr. Rob Hanson, P.E., PDEA Eastern Region
Unit Head

PROJECT COMMITMENTS

Wilmington Bypass, from US 17 in Brunswick County, north of the NC 87 Intersection,
to US 421 in New Hanover County

Federal Aid Project Nos. NHF-0017 (96) and STM-0017 (97)

State Project Nos. 34491.1.3.GV2 and 34491.3.ST1

TIP Nos. R-2633AA/AB and R-2633B

COMMITMENTS DEVELOPED DURING PROJECT DEVELOPMENT AND DESIGN

Project Development and Environmental Analysis Branch

Study proposed noise barrier at the southwest quadrant of the interchange at SR 1430 (Cedar Hill Road). This issue shall be presented for review and comment at the Design Public Hearing to receive input from the residents affected. A decision on whether or not to construct a noise barrier or to implement other noise abatement measures, if any, will be made after the public comment period expires.

Roadway Design Unit/ Structure Design Unit / Geotechnical Engineering Unit/ Roadside Environmental Unit

- 1) Wetlands on the periphery of the Cape Fear River will be bridged to minimize impacts.** USCOE gave concurrence that Alternative 9 represented the Preferred Alternative in March of 1998 on the condition that the Cape Fear River floodplain wetlands be bridged. NCDOT intends to bridge the wetland zones on both banks of the river. Fill slopes will not encroach into the jurisdictional wetland boundaries. The bridge(s) will be constructed such that wetland impacts are minimized and construction practices that minimize impacts to populations of shortnose sturgeon known to utilize the river during spawning season (February to June) will be implemented. In order to protect shortnose sturgeon and other anadromous fish, there shall be no in-water work in the Cape Fear River and Toomers Creek between February 1 and June 15 of any year. For the purposes of this moratorium, in-water is defined as the main channel where the vegetation line meets open water and extending 35 meters (115 feet) into adjacent wetlands on both sides of the channel'.

This condition was developed specifically for this project in coordination with the National Marine Fisheries Service (NMFS), the North Carolina Division of Marine Fishes (NCDMF), and the North Carolina Wildlife Resources Commission (NCWRC). The 35-meter (115-foot) buffer from where the vegetation line meets the open water includes wetlands only and not upland areas. Construction equipment will be allowed to traverse the temporary work bridges during the moratorium period.

2) Fill slopes within the Natural Heritage Program (NHP) US 421 Sand Ridge Significant Natural Heritage Area (SNHA) located east of the Cape Fear River will be minimized to the greatest extent possible so that impacts to populations of Pickering's dawnflower (*Stylisma pickeringii* var. *pickeringii*) will be avoided and minimized. Construction easements within the US 421 Sand Ridge SNHA will be limited to the greatest extent practicable. Several populations of this floral species, which is listed as a Federal Species of Concern and is state-listed as endangered, are present within and along the right of way. Minimizing slope and construction easement footprints and temporary protective fencing will be installed during construction on the south side of the project construction limits from station 208+40 to station 211+00 and from station 212+00 to station 213+00 to ensure that no inadvertent impacts occur outside the limits of the construction easement. Coordination with NHP shall continue well in advance of project construction regarding protection of this species, as NHP may want to relocate populations of this species that would be impacted by the project.

3) Provide temporary protective fencing between project construction area and archaeological site 31NH39.** As currently designed, the proposed highway plans do not directly impact sites 31NH39** and 31BW604. However, because the sites are close to the edge of the proposed highway corridor, temporary protective fencing will be installed during construction on the south side of the project construction limits from station 208+40 to station 211+00 and on the west side of the project construction limits from station 13+75 to station 15+50 to ensure that no inadvertent impacts occur. If the final highway design changes such that avoidance is not possible and if the effect of this alternative on these sites is adverse, pursuant to 36CFR800.5, then appropriate measures to address these adverse effects will be developed.

4) Wildlife passages will be provided at locations agreed to by federal and state resource agencies and the dimensions of each passage shall be constructed as specified on the preliminary design plans. Wildlife passages will be provided at three locations on the mainline: one (a box culvert designed for small animal passage) will be located within a wetland between US 74/76 and SR 1426 and two bridge structures will be located between SR 1414 and US 74/76. Additional wildlife passage will be accommodated by lengthening bridge structures over stream and wetland areas as indicated on the preliminary design plans. Bridge structures and fill slopes will be placed outside jurisdictional wetland boundaries such that sufficient ground-to-structure clearance and dry passage is provided for large-bodied wildlife. The crossing areas under the bridge structures will provide a minimum of eight feet of vertical clearance. The horizontal width is specific to each crossing and is identified on the preliminary design plans. The box culvert crossing will have a vertical clearance of 6 feet and a horizontal clearance of 12 feet. Fencing will be installed for a distance of approximately 2,500 feet on either side of any of the proposed crossings and will be of sufficient height to guide wildlife into the passageways. The final distance and height of the fence shall be determined during final design through coordination between NCDOT, US Fish and Wildlife Service, and the NC Division of Wildlife Resource Conservation. Locations of wildlife crossings and bridge lengths (toe of slope limits at abutments) were determined using a global positioning system (GPS) and through agency coordination.

5) Revise Phase I Environmental Site Assessment. For all sites identified within the corridor ranked low for severity of potential impact, the data accumulated for the initial Phase I Assessment will be revisited prior to project right-of-way acquisition and construction and an updated review of agency files and public records will be conducted to determine if there has been any substantial change in the status since the report was prepared. For those sites ranked with a moderate to high expected severity of impact, a further review of records will be conducted to determine the status of any contamination assessments or remedial actions taking place at those sites. Phase II Site Assessments, including, at a minimum, soil and water sampling, will be conducted as necessary

6) Provide evergreen vegetation along National Register-eligible boundary of the Goodman House and Doctor's Office. Native evergreen vegetation will be planted at the edge of the project right-of-way from station 34 + 50 to station 36 + 00 on the preliminary design plans between the roadway and the Goodman House and Doctor's Office. Best planning practices will be used for tree removal to reduce impacts to the woods adjacent to the Goodman House and Doctor's Office.

Division 3

1) Implement moratorium on construction of the Bridge over the Cape Fear and Toomers Creek from February 1 to June 15. A construction moratorium shall be imposed as follows:

In order to protect shortnose sturgeon and other anadromous fish, there shall be no in-water work in the Cape Fear River and Toomer's Creek between February 1 and June 15 of any year. For the purposes of this moratorium, inwater is defined as the main channel where the vegetation line meets open water and extending 35 meters (115 feet) into adjacent wetlands on both sides of the channel. This condition was developed specifically for this project in coordination with the National Marine Fisheries Service, NC Division of Marine Fisheries and the NC Wildlife Resources Commission and applies to either vibratory or impact pile driving and activities associated with the construction of any temporary work bridge.

The 35-meter (115-foot) buffer from where the vegetation line meets the open water includes wetlands only and not upland areas.

2) Procedures for construction of bridges over wetlands will utilize temporary work bridges to minimize impacts to wetlands. Temporary work bridges will be required to construct the project's bridges over wetland areas at tributaries to Morgan's Branch, Cartwheel Branch, and Cape Fear River/ Toomers Creek. It is anticipated that both single and dual work bridges will be constructed. Finger bridges will be constructed at bent locations. Preliminary work bridge plans, including pile construction information, will be prepared before Concurrence Points 4B and 4C can be achieved. Construction within the main channel of the Cape Fear River may be accomplished using a barge. NCDOT has identified a wetland fill area on the west bank of the Cape Fear River adjacent to the proposed bridge location. This area appears to be an old roadbed leading to the remains of a pier on the river, south of the proposed alignment. NCDOT will consider using this

as a temporary work bridge/construction easement for construction of the proposed bridge and the post construction removal of this fill area as a potential mitigation measure.

3) Fill slopes within the Natural Heritage Program (NHP) US 421 Sand Ridge Significant Natural Heritage Area (SNHA) located east of the Cape Fear River will be minimized to the greatest extent possible so that impacts to populations of Pickering's dawnflower (*Stylisma pickeringii* var. *pickeringii*) will be avoided and minimized. See Number 2) under Roadway Design Unit

4) Provide temporary protective fencing between project construction area and archaeological site 31NH39.** See Number 3) under Roadway Design Unit.

5) The Project Engineer or contractor will inform all personnel associated with the project construction that manatees may be present in the project area during the months of June through October. The Project Engineer will ensure that the Contractor has a copy of the US Fish and Wildlife Service *Guidelines for Avoiding Impacts to the West Indian Manatee - Precautionary Measures for Construction Activities in North Carolina Waters* on-site during construction. A copy of the Guidelines can be found in the Appendix of the Final EIS or at the following website address (<http://nc-es.fws.gov/es/publications.html>). The contractor is responsible for complying with the *Guidelines* and reviewing them with all personnel associated with the project construction.

COMMITMENTS DEVELOPED DURING PERMITTING

Division 3

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 the NCDWQ first.

All pile driving or drilling activities shall be enclosed in turbidity curtains unless otherwise approved by the NCDWQ

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.

The permittee will need to adhere to all appropriate in-water work moratoria (including the use of pile driving or vibration techniques) in Toomer's Creek and the Cape Fear River (both located in Section B of the project) as prescribed by the National Marine Fisheries Service. No in-water work is permitted between February 1 and June 15 of any year, without prior approval from the NC Division of Water Quality and the National Marine Fisheries Service. In addition, the permittee shall conform to the NCDOT policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997) at all times.

Division 3/Roadside Environmental Unit

The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species.

With exception of Creeping Red Fescue (*Festuca rubra*), tall fescue shall not be used in the establishment of temporary or permanent groundcover within riparian areas. For the establishment of permanent herbaceous cover, erosion control matting shall be used in conjunction with appropriate seeding on disturbed soils within the riparian area and on disturbed steep slopes with the following exception. Erosion control matting is not necessary if the area is contained by perimeter erosion control devices such as silt fence, temporary sediment ditches, basins, etc. Matting should be secured in place with staples, stakes, or wherever possible, live stakes of native trees. Erosion control matting placed in riparian areas shall not contain a nylon mesh grid, which can impinge and entrap small animals. For the establishment of temporary groundcover within riparian areas, hydroseeding along with wood or cellulose based hydro mulch applied from a fertilizer- and limestone-free tank is allowable at the appropriate rate in conjunction with the erosion control measures. Discharging hydroseed mixtures and wood or cellulose mulch into surface waters is prohibited. Riparian areas are defined as a distance 25 feet landward from top of stream bank.

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

NCDOT shall use best practices for tree removal to reduce impacts to the woods adjacent to the Goodman House and Doctor's Office and plant the edge of the right of way between stations 34+50 and 36+00 with native evergreens to further screen the new facility from the Goodman House and Doctor's Office, in accordance with the Concurrence Form for Assessment of Effects, agreed to and signed on January 1, 2006.

In accordance with project commitments, archaeological sites 31NH39** and 31BW604** shall be avoided by the installation of temporary protective fencing prior to construction to ensure no inadvertent impacts occur.

Hydraulics Unit/Division 3

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

Equalizer pipes in wetlands shall be installed at grade and shall not be installed below the wetland ground level for purposes of aquatic organism passage.

Natural Environment Unit

The Department must implement the "Stream and Wetland Restoration Plan, Bishop Branch at NC87/Maco Road Brunswick County" dated September 9, 2010 submitted with the application package received October 19, 2010 for R-2633AA. The elevation of the restoration site should be field confirmed by the USACE Wilmington Field Office prior to release of construction equipment so that any field level changes can be completed. The on-site mitigation consists of 2.95 acres of wetland preservation, 570 linear feet of stream preservation, 0.63 acres of wetland restoration, and 66 linear feet of stream restoration. In total this is the equivalent of 0.925 acres of riparian wetland mitigation credits and 123 linear feet of stream restoration credits.

The applicant shall continue to pursue on-site mitigation opportunities as the plans are finalized for R-2633 B.

As requested by the US Fish and Wildlife Service, the Department should conduct golden sedge (*Carex lutea*) surveys within suitable habitat for the New Hanover County portion of the project during the appropriate survey window (mid-April to mid-June) in 2011. *These findings must be provided to the Corps of Engineers and the Service for their review. In the event that golden sedge is found within the project corridor, the permittee will immediately contact a representative of the Corps of Engineers and the US Fish and Wildlife Service in order to determine if consultation under the ESA will be required.*

Section 404 Permit

Compensatory mitigation for the unavoidable impacts (Section AA/AB and B) to 8.09 acres of riparian wetlands, 80.14 acres of non riparian wetlands and 780 linear feet of stream associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated January 21, 2011 from William D. Gilmore, EEP Director. Pursuant to the In-Lieu-Fee Instrument signed July 28, 2010 between the State of North Carolina, Ecosystem Enhancement Program and the US Army Corps of Engineers the EEP will provide 16.19 acres of restoration equivalent riparian wetlands, 160.28 acres of restoration equivalent non-riparian wetlands and 1,560 linear feet of restoration equivalent warm water stream channel in the Cape Fear River Basin (Hydrologic Cataloging Unit 03030005 in accordance with Section F of the instrument. For wetlands, a minimum of 1:1 (impact to mitigation) must be in the form of wetland restoration.

Division/Roadside Environmental/Natural Environment Unit

Section 401 Permit

Mitigation for permanent impacts to 849 linear feet of stream is required. Mitigation will be provided through a combination of both onsite and offsite mitigation. It is understood that impacts and mitigation requirements for Section B are preliminary and may change once final design is completed. Mitigation will be credited as detailed below:

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. Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-

builds for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for the 66 linear feet of restoration.

All channel restoration work will be constructed in a dry work area, will be completed and stabilized, and must be approved on site by NCDWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations shall have a 50-foot wide native wooded buffer planted on both sides of the stream unless otherwise authorized by this Certification. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.

The permittee shall visually monitor the vegetative plantings to assess and ensure complete stabilization of the mitigation stream segments. Riparian area success shall be determined by conducting stem counts to ensure a tree survival rate of at least 320 stems/acre. The monitoring shall be conducted annually for a minimum of 3 years after final planting. Photo documentation shall be utilized to document the success of the riparian vegetation and submitted to NCDWQ in a final report within sixty (60) days after completing monitoring. After 3 years the NCDOT shall contact NCDWQ to schedule a site visit to "close out" the mitigation site.

We understand that you have chosen to perform compensatory mitigation for permanent impacts to 669 linear feet of jurisdictional streams through the North Carolina Ecosystem Enhancement Program (EEP). EEP has indicated in a letter dated October 12, 2010 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.

Mitigation for permanent impacts to 89.17 acres of wetland is required. Mitigation will be provided through a combination of both onsite and off site mitigation. It is understood that impacts and mitigation requirements for Section B are preliminary and may change once final design is completed. Mitigation will be credited as detailed below:

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.

The permittee shall visually monitor the vegetative plantings to assess and ensure complete stabilization of the mitigation restoration area. Vegetative success shall be determined by conducting stem counts to ensure a tree survival rate of at least 320 stems/acre. The monitoring shall be conducted annually for a minimum of 3 years after final planting. Photo documentation shall be utilized to document the success of the riparian vegetation and submitted to NCDWQ in a final report within sixty (60) days after completing monitoring. After 3 years the NCDOT shall contact NCDWQ to schedule a

site visit to "close out" the mitigation site. Success of the mitigation site shall be determined by NCDWQ during an on-site visit at or near the end of the monitoring period.

We understand that you have chosen to perform compensatory mitigation for the remaining 87.94 acres of impact (7.80 acres riparian and 80.14 acres non-riparian) wetlands through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. EEP has indicated in a letter dated October 12, 2010 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.

Natural Environment Unit/Division 3

Impacts to Sections AA and AB of the project authorized when final design plans are completed for R-2633 Section B, a modification to the 401 Water Quality Certification shall be submitted with five copies and fees to the NC Division of Water Quality. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers. No construction activities that impact any wetlands, streams, or surface waters R-2633 Section B shall begin until after the permittee applies for, and receives, a written modification.

The permit plans for R-2633 B dated 10/5/2010, received on 10/19/2010; permit drawings 1-61 or 61 are currently in the preliminary state and, accordingly R-2633B is not authorized for construction at this time. Construction may commence on Section B only after all appropriate and practicable avoidance and minimization measures have been employed, final design has been completed and plans have been approved by the District Commander. Prior to construction a modification request must be submitted to the District Commander. Also prior to authorization of the final project phase, a final JD on the LEDPA corridor must be complete.

Upon completion of the final design plans for R-2633B, the NCDOT shall submit a CAMA Major Permit Application to DCM. No construction may begin on R-2633B until a CAMA permit is issued in accordance with the rules of the NC Coastal Resources Commission and permit modifications to the existing Section 404 and 401 permits.



REPLY TO
ATTENTION OF:

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

February 28, 2011

Regulatory Division

Action ID SAW-1994-03352; Tip No., R-2633

Dr. Gregory J. Thorpe, PhD, Manager
Project Development and Environmental Analysis Branch
N.C. Department of Transportation
Division of Highways
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

Enclosed is a Department of the Army permit to directly discharge fill material into multiple tributaries and wetlands within the Cape Fear River Basin just outside the City limits of Wilmington to complete an urban loop around the subject City, Brunswick/New Hanover Counties, North Carolina. The proposed Wilmington By-Pass sections total approximately 20.2 miles in length.


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

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

- a. You must complete construction before December 31, 2016.
- b. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.
- c. You must notify this office in advance as to when you intend to commence and complete work.

You should address all questions regarding this authorization to Mr. Brad Shaver, Wilmington Regulatory Field Office at (910) 251-4611

Sincerely,


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

Enclosures

Copy furnished (with enclosures):

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

Copies furnished (with special conditions and plans):

Mr. Ronald J. Mikulak, Chief
Water Management Division
Wetlands Regulatory Section
61 Forsyth Street
Atlanta, Georgia 30303

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

Mr. Ron Sechler
National Marine Fisheries Service
Pivers Island
Beaufort, North Carolina 28516

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

Mr. David Rackley
National Marine Fisheries Service
219 Fort Johnson Road
Charleston, South Carolina 29412-9110

DEPARTMENT OF THE ARMY PERMIT

Permittee North Carolina Department of Transportation/Tip No. R-2633(Wilmington By-Pass)

Permit No. SAW-1994-03552

Issuing Office USAED, WILMINGTON

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description: directly discharge fill material into multiple tributaries and wetlands within the Cape Fear River Basin just outside the City limits of Wilmington to complete an urban loop around the subject City, Brunswick/New Hanover Counties, North Carolina. The proposed Wilmington By-Pass sections total approximately 20.2 miles in length.

Project Location: within the Cape Fear River Basin just outside the City limits of Wilmington to complete an urban loop around the subject City, Brunswick/New Hanover Counties, North Carolina.

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2016.** If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

ENG FORM 1721, Nov 86

EDITION OF SEP 82 IS OBSOLETE.

(33 CFR 325 (Appendix A))

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit,

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
 - ~~Section~~ Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 - (x) Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.

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

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

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

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

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

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

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

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

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

E. J. Lusk for Gregory J. Thayer, PhD Feb 28, 2011
(PERMITEE) NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (DATE)

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

S. Kenneth Jolly 3-1-11
(DISTRICT ENGINEER) JEFFERSON M. RYSCAVAGE, COLONEL (DATE)

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

(TRANSFeree) (DATE)

SPECIAL CONDITIONS R 2633 AA/AB/B (Action ID 199403552)

In accordance with 33 U.S.C. 1341(d), all conditions of the North Carolina Division of Water Quality 401 Water Quality Certification #003842 and the North Carolina Division of Coastal Management Consistency Certification (CD11-003) are incorporated as part of the Department of the Army permit.

- a) Failure to institute and carry out the details of the following special conditions below will result in a directive to cease all ongoing and permitted work within waters of the United States, including wetlands, associated with the permitted project, or such other remedies and/or fines as the U.S. Army Corps of Engineers District Commander or his authorized representatives may seek.
- b) All work authorized by this permit must be performed in strict compliance with the plans dated 10/5/2010, received on 10/19/2010 entitled R-2633 AA & AB, permit drawings 1-108 of 108, which are a part of this permit. Any modification to these plans must be approved by the US Army Corps of Engineers (USACE) prior to implementation.
- c) The permit plans for R-2633 B dated 10/5/2010, received on 10/19/2010; permit drawings 1-61 of 61 are currently in the preliminary plan state and, accordingly R-2633B is not authorized for construction at this time. Construction may commence on Section B only after all appropriate and practicable avoidance and minimization measures have been employed, final design has been completed and plans have been approved by the District Commander. Prior to construction a modification request must be submitted to the District Commander. Also prior to authorization of the final project phase, a final JD on the LEDPA corridor must be complete.
- d) The Department must implement the "Stream and Wetland Restoration Plan, Bishop Branch at NC87/Maco Road Brunswick County" dated September 9, 2010 submitted with the application package received October 19, 2010 for R-2633AA. The elevation of the restoration site should be field confirmed by the USACE Wilmington Field Office prior to release of construction equipment so that any field level changes can be completed. The on-site mitigation consists of 2.95 acres of wetland preservation, 570 linear feet of stream preservation, 0.63 acres of wetland restoration, and 66 linear feet of stream restoration. In total this is the equivalent of 0.925 acres of riparian wetland mitigation credits and 123 linear feet of stream restoration credits.
- e) Compensatory mitigation for the unavoidable impacts (Section AA/AB and B) to 8.09 acres of riparian wetlands, 80.14 acres of non riparian wetlands and 780 linear feet of stream associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated January 21, 2011 from William D. Gilmore, EEP Director. Pursuant to the In-Lieu-Fee Instrument signed July 28, 2010 between the State of North Carolina, Ecosystem Enhancement Program and the US Army Corps of Engineers the EEP will provide 16.19 acres of restoration equivalent riparian wetlands, 160.28 acres of restoration equivalent non-riparian wetlands and 1,560 linear feet of restoration equivalent warm water stream channel in the Cape Fear River Basin (Hydrologic Cataloging Unit 03030005 in accordance with Section F of the instrument. For wetlands, a minimum of 1.1 (impact to mitigation) must be in the form of wetland restoration.
- f) The applicant shall continue to pursue on-site mitigation opportunities as the plans are finalized for R-2633 B.
- g) To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent wetlands and streams, except as authorized by this permit, the permittee shall require its contractors and/or agents to identify all areas to be used to borrow material, or to dispose of dredged, fill, or waste material. The permittee shall provide the USACE with appropriate maps indicating the locations of proposed borrow or waste sites as soon as the permittee has that information. **To date all**

necessary borrow and waste sites have been identified to the Corps and there are no temporary or permanent impacts authorized for borrow or waste sites. The permittee will coordinate with the USACE before approving any borrow or waste sites that are within 400 feet of any streams or wetlands.

- h) The Department must fulfill its commitment from the FEIS and ROD regarding the shortnose sturgeon as described in **Section B** of the FEIS. No “in-water” work is authorized in the Cape Fear River and Toomers Creek between February 1 and June 15 of any year, without prior approval from the US Army Corps of Engineers and the National Marine Fisheries Service. “In-water” is defined for this project as the main channel where the vegetation line meets open water and extends 35 meters into adjacent wetlands on both sides of the channel not including uplands. The in-water work moratorium prohibits pile installation (both vibratory and impact) and activities associated with the construction of any temporary work bridge.
- i) The Department must fulfill its commitment from the FEIS and ROD regarding the West Indian manatee as described in **Section B** of the FEIS. The Department must ensure that their staff and/or its contractor have a copy of the US Fish and Wildlife Service Guidelines for Avoiding Impacts to the West Indian Manatee – Precautionary Measures for Construction Activities in North Carolina Waters on-site during construction. The Department will be responsible for complying with the aforementioned Guidelines.
- j) In order to address concerns from the State Historic Preservation Office (SHPO), the Department will install temporary protective fencing prior to construction to ensure that no inadvertent impacts to archaeological sites (31NH39** and 31BW604**) occur.
- k) NCDOT shall use best management practices for tree removal to reduce impacts to the woods adjacent to the Goodman House and Doctor’s Office as well as plant the edge of right of way between stations 34+50 and 36+00(2010 stations 110+00 and 113+75) with native evergreens to further screen the roadway facility from the Goodman House and Doctor’s Office.

As requested by the US Fish and Wildlife Service, the Department should conduct golden sedge (*Carex lutea*) surveys within suitable habitat for the New Hanover County portion of the project during the appropriate survey window (mid-April to mid-June) in 2011. *These findings must be provided to the Corps of Engineers and the Service for their review. In the event that golden sedge is found within the project corridor, the permittee will immediately contact a representative of the Corps of Engineers and the US Fish and Wildlife Service in order to determine if consultation under the ESA will be required.*

- l) Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.
- m) Except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within waters or wetlands or to reduce the reach of waters or wetlands.
- n) All mechanized equipment will be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the N.C. Division of Water Quality at 1(800) 858- 0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

- o) The permittee shall advise the Corps in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.
- p) Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.
- q) The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project
- r) The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).
- s) The permittee shall remove all sediment and erosion control measures placed in wetlands or waters, and shall restore natural grade in those areas, prior to project completion.
- t) The permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.
- u) Violations of these conditions or violations of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District U.S. Army Corps of Engineers within 24 hours of the permittee's discovery of the violation.
- v) The authorized structure and associated activity must not interfere with the public's right to free navigation on all navigable waters of the United States. No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work for reason other than safety (R-2633 B)
- w) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the U.S. Army Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal, relocation, or alteration. The permittee shall notify NOAA/NATIONAL OCEAN SERVICE Chief Source Data Unit N CS261, 1315 E West HWY- RM 7316, Silver Spring, MD 20910-3282 at least two weeks prior to beginning work and upon completion of work. (R-2633 B)
- x) The permittee must install and maintain, at his expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on authorized facilities. For further information, the permittee should contact the U.S. Coast Guard Marine Safety Office at (910) 772-2191. (R-2633 B)

- y) Prior to commencing construction within jurisdictional waters of the United States, the permittee shall forward the latest version of project construction drawings to the USACE, Wilmington Regulatory Field Office NCDOT Regulatory Project Manager or confirm that the permit drawings submitted during application have not changed. Half-size drawings are acceptable.
- z) The permittee shall schedule an environmental preconstruction meeting between its representatives, the contractor's representatives, and the USACE, Wilmington Regulatory Field Office NCDOT Regulatory Project Manager, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all of the terms and conditions contained within this Department of the Army Permit. The permittee shall schedule the environmental preconstruction meeting for a time when the USACE and North Carolina Division of Water Quality (NCDWQ) Project Managers can attend. The permittee shall invite the USACE and NCDWQ Project Managers a minimum of four weeks in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting.
- aa) All authorized culverts will be installed to promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed opening should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gage data, if available. In the absence of such data, bankfull flow can be used as a comparable level. All pipe and culvert bottoms shall be buried at least one foot below normal bed elevation when they are placed in streams appearing as blue lines on United States Geological Survey (USGS) quad sheets. Culverts that must be buried more than one foot should be coordinated with the Corps project manager to consider the possibility of head cutting upstream of the installation. Culverts in wetlands do not have to be buried and can be placed at grade.
- bb) The permittee shall install barrier fencing around all wetlands that are not to be disturbed to make them readily visible and prevent construction equipment from inadvertently entering or disturbing these areas.
- cc) If the permittee discovers any previously unknown historic or archaeological sites while accomplishing the authorized work, he shall immediately stop work and notify the Wilmington District Engineer who will initiate the required State/Federal coordination.



North Carolina Department of Environment and Natural Resources

Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

January 13, 2011

RECEIVED

JAN 19 2011

REG. WILM. FLD. OFC.

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: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with
ADDITIONAL CONDITIONS for the proposed Wilmington Bypass from US 17 in Brunswick County,
north of the NC 87 intersection, to US 421 in New Hanover County, Federal Aid Project Nos. NHF-
0017(96) and STM-0017(97), State Project No. 34491.1.3.GV2 and 34497.3.ST1, Brunswick and New
Hanover Counties, TIPs R-2633AA&AB and R-2633B.

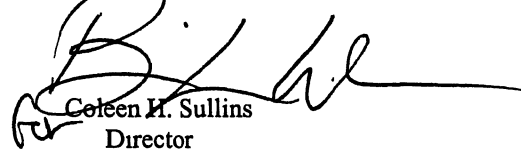
NCDWQ Project No. 20100867 v1
DWQ Certification No. 003842

Dear Dr. Thorpe:

Attached hereto is a **REISSUANCE** copy of Certification No. 003842 issued to The North Carolina Department of
Transportation (NCDOT) dated January 13, 2011. **This Certification supersedes the original Certification issued
dated January 7, 2010.**

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

Sincerely,



Coleen H. Sullins
Director

Attachments

cc: Brad Shaver, US Army Corps of Engineers, Wilmington Office
Allen Pope, PE, Division 3 Engineer
Stoney Mathis, Division 3 Environmental Officer
Chris Militscher, Environmental Protection Agency (electronic copy only)
Travis Wilson, NC Wildlife Resources Commission (electronic copy only)
Jason Elliott, NCDOT, Roadside Environmental Unit
Steve Sollod, Division of Coastal Management
Ecosystem Enhancement Program
Mason Herndon, NCDWQ Fayetteville Regional Office
File Copy

401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act and ISOLATED WETLANDS PERMIT 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 and Isolated Wetlands Permit. This certification authorizes the NCDOT to impact 129.26 acres of jurisdictional wetlands, 0.46 acres of isolated wetlands, and 1,263 linear feet of jurisdictional streams in Brunswick and New Hanover Counties. The project shall be constructed pursuant to the application dated received October 19, 2010. The authorized impacts are as shown below

Stream Impacts in the Cape Fear River Basin

Site	Station	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	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)
SECTION AA & AB							
1	54+00 -Y1-	---	---	248	---	248	248
3	58+30 -SR2- RT	---	---	---	30	30	0
4	101+46 -Y1-	---	---	151	---	151	151
5	115+18 -Y1-	---	---	228	---	228	228
7	60+15 -NBL- RT	16	---	---	---	16	0
7	60+15 -NBL-M	---	70	---	---	70	0
8	98+00 -L- LT	---	45	---	---	45	0
8	97+27/98+26 -L-	---	---	40	---	40	0
14	134+27/138+13 -L-	---	---	12	---	12	0
1/33	54+00 -Y1-/24+00 -Y4-	---	---	---	---	0	0
TOTAL:		16	115	679	30	840	627
SECTION B ¹							
11	194+58/234+57 -L-	---	---	222	---	222	222
15	319+80/387+53	---	---	50	---	50	0
16	399+22/400+87 -L-	---	---	---	---	0	0
19	52+09 -Y7-	---	---	4	39	43	0
	16+45 -Y7 DET-	---	---	---	108	108	0
TOTAL:		0	0	276	147	423	222
PROJECT TOTAL							
TOTAL:		16	115	955	177	1,263	849

¹ Impacts for Section B are based on preliminary projections

Total Stream Impact for Project: 1,263 linear feet

Wetland Impacts in the Cape Fear River Basin

Site	Station	Wetland Type	Permanent Fill (acre)	Temporary Fill (acre)	Excavation (acres)	Mechanized Clearing (acres)	Hand Clearing (acres)	Total Wetland Impact (acre)	Mitigation Required (acres)
SECTION AA & AB									
1	54+00 -Y1-	Riparian	0.14	---	0.03	0.03	---	0.20	0.20
2	77+70-Y1-	Non-Riparian	0.17	---	---	0.01	---	0.18	0.18
3	58+30 -SR2- RT	Riparian	---	0.03	---	---	0.02	0.05	0.00
4	101+46 -Y1-	Riparian	0.31	0.40	0.09	0.09	0.27	1.16	0.49
5	115+18 -Y1-	Riparian	0.03	---	0.11	0.03	0.07	0.24	0.17
6	103+61 -SRVD2-	Non-Riparian	0.13	---	---	<0.01	---	0.13	0.13
8	97+27/98+26 -L-	Riparian	<0.01	---	---	---	0.12	0.12	0.00
9	110+00 -L-	Non-Riparian	0.23	---	---	0.01	---	0.24	0.24
10A	113+92 -L- LT	Non-Riparian	<0.01	---	---	<0.01	---	0.00	0.00
10B	113+92 -L- RT	Riparian	<0.01	---	---	<0.01	---	0.00	0.00
11	120+66 -L-	Riparian	0.11	---	---	0.01	---	0.12	0.12
12	124+84/127+20 -L-	Riparian	1.00	---	---	0.05	---	1.05	1.05
13	129+52/132+63 -L-	Riparian	0.49	---	---	0.02	---	0.51	0.51
14	134+27/138+13 -L-	Riparian	0.73	---	---	0.03	---	0.76	0.76
15	140+25 -L-	Riparian	0.33	---	0.04	0.01	---	0.38	0.38
16	142+50 -L-	Riparian	0.37	---	---	0.02	---	0.39	0.39
17	143+81 -L-	Riparian	0.10	---	---	0.01	0.39	0.50	0.11
18	164+50 -L- LT	Non-Riparian	0.02	---	---	0.01	---	0.03	0.03
19	171+75 -L- RT	Non-Riparian	0.03	---	---	0.01	---	0.04	0.04
20	173+59 -L- LT	Non-Riparian	---	---	<0.01	<0.01	---	0.00	0.00
21	181+45 -L-	Non-Riparian	0.27	---	---	0.02	---	0.29	0.29
22	184+08/186+27 -L-	Non-Riparian	0.09	0.10	---	0.02	0.17	0.38	0.11
23	206+83/209+84 -L-	Non-Riparian	0.54	---	---	0.03	---	0.57	0.57
24	265+81/274+26 -L-	Non-Riparian	3.27	---	---	0.19	0.12	3.58	3.46
25	275+89/279+03 -L-	Non-Riparian	0.61	---	---	0.04	---	0.65	0.65
27	280+70/293+82 -L-	Non-Riparian	4.56	---	---	0.25	---	4.81	4.81
28	304+55/316+77 -L-	Riparian	3.52	---	---	0.24	---	3.76	3.76
29	329+70 -L-	Non-Riparian	0.01	---	---	---	0.15	0.16	0.01
30	21+97/23+48 -RPA1-	Non-Riparian	0.40	---	---	0.04	---	0.44	0.44
31	5+29/7+09 -LPA1-	Non-Riparian	0.53	---	---	0.06	---	0.59	0.59
32	00+00/12.98 -LPD1-	Non-Riparian	4.27	---	0.07	0.30	---	4.64	4.64
33	18+96/25+57 -Y04-	Riparian	0.12	---	---	0.03	0.39	0.54	0.15
34	19+26/20+50 -Y5-	Non-Riparian	0.02	---	---	0.01	---	0.03	0.03
35	22+50 -RP D1-	Non-Riparian	0.16	---	---	0.01	---	0.17	0.17
TOTAL:			22.56	0.53	0.34	1.58	1.70	26.71	24.48
SECTION B ¹									
3	40+57/66+97 -L-	Non-Riparian	9.49	---	---	---	0.68	10.17	9.49
4	22+60 -RP D1-	Non-Riparian	0.07	---	---	---	0.01	0.08	0.07
5	80+35/85+08 -L-	Non-Riparian	1.04	---	---	---	0.11	1.15	1.04
6	99+90/146+00 -L-	Non-Riparian	18.79	---	---	---	2.05	20.84	18.79
7	146+78/165+66 -L-	Non-Riparian	10.62	---	---	---	0.85	11.47	10.62
8	166+60 -L-	Non-Riparian	0.06	---	---	---	0.01	0.07	0.06
9	186+74/191+61 -L-	Non-Riparian	1.10	---	---	---	0.10	1.20	1.10
10	19+20 -PD D2- -LT-	Non-Riparian	0.02	---	---	---	0.10	0.12	0.02
11	194+58/234+57 -L-	Non-Riparian	15.37	---	---	---	1.61	16.98	15.37
12	230+39/242+11 -L-	Non-Riparian	3.31	---	---	---	0.37	3.68	3.31
13	243+53/253+30 -L-	Non-Riparian	3.89	---	---	---	0.44	4.33	3.89
14	264+32/267+10 -L-	Riparian	0.01	0.01	---	---	0.71	0.73	0.01
15	319+80/400+87	Riparian	0.89	0.11	0.02	---	30.10	31.12	0.91
20	46+69/50+52 -Y8-	Riparian	0.01	<0.01	---	---	0.60	0.61	0.01
TOTAL:			64.67	0.12	0.02	0.00	37.74	102.55	64.69
PROJECT TOTAL									
TOTAL:			87.23	0.65	0.36	1.58	39.44	129.26	89.17

¹ Impacts for Section B are based on preliminary projections

Total Wetland Impact for Project: 129.26 acres (89.17 acres are permanent; 40.09 acres are temporary)

Isolated Wetland Impacts in the Cape Fear River Basin

Site	Station	Permanent Fill (acre)	Temporary Fill (acre)	Excavation (acres)	Mechanized Clearing (acres)	Hand Clearing (acres)	Total Wetland Impact (acre)	Mitigation Required (acres)
SECTION AA & AB								
TOTAL:		0	0	0	0	0	0	0
SECTION B¹								
16	399+22/400+87 -L-	0.46	---	---	---	---	0.46	0
TOTAL:		0.46	0	0	0	0	0.46	0
PROJECT TOTAL								
TOTAL:		0.46	0	0	0	0	0.46	0

¹ Impacts for Section B are based on preliminary projections

Total Isolated Wetland Impact for Project: 0.46 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Cape Fear 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 application dated received October 19, 2010. Should your project change, you are required to notify the 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.

Conditions of Certification:

Project Specific Conditions

1. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at permitted sites. NCDWQ staff shall be invited to the pre-construction meeting.
2. The post-construction removal of any temporary bridge structures must return the project site to its pre-construction contours and elevations. The impacted areas shall be revegetated with appropriate native species.
3. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices*.
4. 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 the NCDWQ first.
5. 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.
6. All pile driving or drilling activities shall be enclosed in turbidity curtains unless otherwise approved by the NCDWQ in this certification.

- 7 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.
8. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams, shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by the NCDWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.
9. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.
10. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.
11. The stream channel shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species.
12. The permittee will need to adhere to all appropriate in-water work moratoria (including the use of pile driving or vibration techniques) in Toomer's Creek and the Cape Fear River (both located in Section B of the project) as prescribed by the National Marine Fisheries Service. No in-water work is permitted between February 1 and June 15 of any year, without prior approval from the NC Division of Water Quality and the National Marine Fisheries Service. In addition, the permittee shall conform to the NCDOT policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997) at all times.
13. Adherence to *The Guidelines for Avoiding Impacts to the West Indian Manatee: Precautionary Measures for Construction Activities in North Carolina Waters* will be required throughout construction.
14. Equalizer pipes in wetlands shall be installed at grade and shall not be installed below the wetland ground level for purposes of aquatic organism passage.
15. With exception of Creeping Red Fescue (*Festuca rubra*), tall fescue shall not be used in the establishment of temporary or permanent groundcover within riparian areas. For the establishment of permanent herbaceous cover, erosion control matting shall be used in conjunction with appropriate seeding on disturbed soils within the riparian area and on disturbed steep slopes with the following exception. Erosion control matting is not necessary if the area is contained by perimeter erosion control devices such as silt fence, temporary sediment ditches, basins, etc. Matting should be secured in place with staples, stakes, or wherever possible, live stakes of native trees. Erosion control matting placed in riparian areas shall not contain a nylon mesh grid, which can impinge and entrap small animals. For the establishment of temporary groundcover within riparian areas, hydroseeding along with wood or cellulose based hydro mulch applied from a fertilizer- and limestone-free tank is allowable at the appropriate rate in conjunction with the erosion control measures. Discharging hydroseed mixtures and wood or cellulose mulch into surface waters is prohibited. Riparian areas are defined as a distance 25 feet landward from top of stream bank.
16. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to turbidity shall be designed, constructed, and operated with sediment and erosion control measures that meet Design Standards in Sensitive Watersheds [15A NCAC 4B .0124]. However, due to the size of the project, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres.

17. Mitigation for permanent impacts to 849 linear feet of stream is required. Mitigation will be provided through a combination of both onsite and offsite mitigation. It is understood that impacts and mitigation requirements for Section B are preliminary and may change once final design is completed. Mitigation will be credited as detailed below:

- a. The NCDOT will provide compensatory mitigation for impacts to 180 linear feet of streams to be performed onsite at the Bishop branch Mitigation Site at a required 1:1 ratio. Compensatory mitigation for the above impacts to jurisdictional streams through a combination of restoration and preservation. The NCDOT will restore 66 linear feet of stream via existing culvert removal at a 1:1 credit ratio (66 linear feet). Additionally, 570 linear feet of preservation will occur at a 5:1 ratio for 114 feet of credit. The onsite stream restoration shall be constructed in accordance with the design submitted in your application dated October 18, 2010.
- b. All channel restoration work will be constructed in a dry work area, will be completed and stabilized, and must be approved on site by NCDWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations shall have a 50-foot wide native wooded buffer planted on both sides of the stream unless otherwise authorized by this Certification. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.
- c. 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. Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-builts for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for the 66 linear feet of restoration.
- d. The permittee shall visually monitor the vegetative plantings to assess and ensure complete stabilization of the mitigation stream segments. Riparian area success shall be determined by conducting stem counts to ensure a tree survival rate of at least 320 stems/acre. The monitoring shall be conducted annually for a minimum of 3 years after final planting. Photo documentation shall be utilized to document the success of the riparian vegetation and submitted to NCDWQ in a final report within sixty (60) days after completing monitoring. After 3 years the NCDOT shall contact NCDWQ to schedule a site visit to "close out" the mitigation site.
- e. We understand that you have chosen to perform compensatory mitigation for permanent impacts to 669 linear feet of jurisdictional streams through the North Carolina Ecosystem Enhancement Program (EEP). EEP has indicated in a letter dated October 12, 2010 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.

Based on the above information, stream mitigation can be summarized as follows:

Mitigation Source	Mitigation Required (feet)	Debit Ratio	Debits Required (feet)
Section AA & AB			
EEP	447	1:1	447
On Site Restoration	66	1:1	66
On Site Preservation	114	5:1	570
TOTAL:	627		1,083
Section B			
EEP	222	1:1	222
TOTAL:	222		222
Project Total			
TOTAL:	849		1,305

18. Mitigation for permanent impacts to 89.17 acres of wetland is required. Mitigation will be provided through a combination of both onsite and offsite mitigation. It is understood that impacts and mitigation requirements for Section B are preliminary and may change once final design is completed. Mitigation will be credited as detailed below:

- a. The NCDOT will provide compensatory mitigation impacts for 1.22 acres (0.63 acres restoration and 0.59 acres preservation) on site at the Bishop Branch Mitigation Site. The permittee shall comply with the on-site wetland mitigation plan submitted with the application dated October 18, 2010.
- b. 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.
- c. The permittee shall visually monitor the vegetative plantings to assess and ensure complete stabilization of the mitigation restoration area. Vegetative success shall be determined by conducting stem counts to ensure a tree survival rate of at least 320 stems/acre. The monitoring shall be conducted annually for a minimum of 3 years after final planting. Photo documentation shall be utilized to document the success of the riparian vegetation and submitted to NCDWQ in a final report within sixty (60) days after completing monitoring. After 3 years the NCDOT shall contact NCDWQ to schedule a site visit to "close out" the mitigation site. Success of the mitigation site shall be determined by NCDWQ during an on-site visit at or near the end of the monitoring period.
- d. We understand that you have chosen to perform compensatory mitigation for the remaining 87.94 acres of impact (7.80 acres riparian and 80.14 acres non-riparian) wetlands through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. EEP has indicated in a letter dated October 12, 2010 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.

Based on the above information, wetland mitigation can be summarized as follows:

Mitigation Source	Wetland Type	Mitigation Credits Required	Debit Ratio	Credits or Debits (acres) Required
Section AA & AB				
EEP	Riparian	6.87	2:1	13.74 (credits)
EEP	Non Riparian	16.38	2:1	32.76 (credits)
On Site Restoration	Riparian	0.63	1:1	0.63 (acres)
On Site Preservation	Riparian	0.59	5:1	2.95 (acres)
Section B				
EEP	Riparian	0.93	2:1	1.86 (credits)
EEP	Non Riparian	63.76	2:1	127.52 (credits)

19 This certification only authorizes impacts to Sections AA and AB of the project. When final design plans are completed for R-2633 Section B, a modification to the 401 Water Quality Certification shall be submitted with five copies and fees to the NC Division of Water Quality. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, and other surface waters, and buffers. No construction activities that impact any wetlands, streams, or surface waters R-2633 Section B shall begin until after the permittee applies for, and receives, a written modification of the 401 Water Quality Certification from the NC Division of Water Quality.

General Conditions

20. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less

than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.

21. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.
22. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers.
23. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.
24. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage.
25. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval.
26. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.
27. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream.
28. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.
29. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.
30. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.
31. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If NCDWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, NCDWQ may reevaluate and modify this certification.
32. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification.
33. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification.
34. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

35. Native riparian vegetation must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.
36. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.
37. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:
 - a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
 - b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
 - c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
 - d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.
38. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification.
39. The Permittee shall report any violations of this certification to the Division of Water Quality within 24 hours of discovery.
40. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.
41. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify NCDWQ when all work included in the 401 Certification has been completed.

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

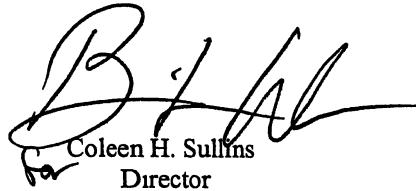
Telephone: (919)-733-2698, Facsimile: (919)-733-3478

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 13th day of January 2011

DIVISION OF WATER QUALITY



Coleen H. Sullins
Director

WQC No. 003842



North Carolina Department of Environment and Natural Resources
Division of Coastal Management

Beverly Eaves Perdue
Governor

James H. Gregson
Director

Dee Freeman
Secretary

January 14, 2011

Gregory J. Thorpe, Ph.D.
Environmental Manager Director
Project Development and Environmental Analysis Branch
NC Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1598

SUBJECT: Conditional Consistency Concurrence - CD11-003
Proposed Wilmington Bypass, from US 17 North of the NC 87 Intersection in
Brunswick County to US 421 in New Hanover County, R-2633AA&AB and R-2633B,
(DCM#20100138)

Dear Dr. Thorpe:

The Division of Coastal Management (DCM) received NC Department of Transportation's (NCDOT) Consistency Determination certifying that the subject project is consistent with the NC Coastal Management Program on October, 2010. DCM printed a public notice in the "Wilmington Star News" on October 22, 2010. NCDOT's Consistency Certification documentation was distributed to State agencies with a regulatory interest for review and to provide DCM with comments on the potential impacts of the project on each agency's resources.

The proposed project, which was taken through the merger process, is a fully controlled access freeway on new alignment from US 17 in Brunswick County, north of the NC 87 intersection, to US 421 in New Hanover County. The project consists of two sections. The first section, R-2633AA & AB, from US 17 in Brunswick County, north of the NC 87 intersection, to north of US 74/76, approximately 8.0 miles in length, is planned for construction in the near future. Section R-2633B, from north of US 74/76 to US 421 in New Hanover County, is approximately 14 miles long and is in the preliminary design stage. Section R-2633B is scheduled to be let for design-bid-build in November 2012.

No CAMA Areas of Environmental Concern (AECs) will be impacted by the construction of R-2633AA&AB, the first section of the project to be constructed. However, R-2633B will cross the Cape Fear River impacting estuarine and public trust waters and shorelines AECs. The bridge over the Cape Fear River will continue over Toomers Creek, a designated Small Surface Water Supply Watershed AEC. It should be noted that the City of Wilmington no longer uses Toomers Creek as a source of drinking water. The City of Wilmington, Water Treatment Division Superintendent, Mike Richardson,

indicated in a letter to NCDOT, dated April 23, 2008, that the water in Toomers Creek is difficult to treat as it tends to be brackish and the pumping station has fallen into disrepair, would require extensive restoration and is not likely to be utilized in the future. The pumps have not operated since 1994. Toomers Creek is also designated as Public Trust Waters and Public Trust Shorelines AECs.

Based on the information contained in the 401 Certification (DWQ Project No. 20100867v1) issued on January 13, 2011, the R-2633AA &AB impacts requiring mitigation are 24.48 riparian and non-riparian wetlands and 627 linear feet of streams. The preliminary impacts requiring mitigation estimated for R-2633B are 64.69 acres of riparian and non-riparian wetlands and 222 linear feet of streams.

NCDOT intends to provide on-site compensatory mitigation, through a combination of restoration and preservation, for impacts to 180 linear feet of stream and 1.22 acres of wetlands as described in NCDOT's "Stream and Wetland Restoration Plan, Bishop Branch at NC 87/Maco Road, Brunswick County", dated September 9, 2010 and updated on December 3, 2010 and in accordance with the 401 Certification (DWQ Project No. 20100867v1) issued on January 13, 2011.

The Ecosystem Enhancement Program (EEP) has agreed to provide the remaining compensatory mitigation required for the project as referenced in the Mitigation Acceptance Letter dated October 12, 2010. This mitigation will cover impacts to 7.80 acres of riparian wetlands, 80.14 acres of non-riparian wetlands, and 723 linear feet of streams for both R-2633AA&AB and R-2633B.

Based on the review of NCDOT's Consistency Certification and the supplementary supporting documentation, comments received from the interested State agencies, and the enforceable policies of the NC Coastal Management Program, DCM concurs, as conditioned below, that the proposed project is consistent, to the maximum extent practicable, with North Carolina's certified coastal management program provided that the following conditions are implemented.

- NCDOT shall comply with the Section 401 Water Quality Certification No. 003842 (DWQ Project No. 20100867 v1), issued by the NC Division of Water Quality (DWQ) on January 13, 2011.
- This project shall conform to all requirements of the NC Sedimentation Pollution Control Act and NCDOT's Memorandum of Agreement with the Division of Land Resources.
- On-site mitigation shall be provided as described in NCDOT's "Stream and Wetland Restoration Plan, Bishop Branch at NC 87/Maco Road, Brunswick County", dated September 9, 2010 and updated on December 3, 2010 and in accordance with the 401 Certification (DWQ Project No. 20100867v1) issued on January 13, 2011, or in accordance with revisions to the plan authorized by DWQ or USACE. Should the Stream and Wetland Restoration Plan be revised, NCDOT shall provide DCM with a copy of the revised plan for additional approval.
- The NC Ecosystem Enhancement Program (EEP) accepted responsibility for satisfying the remaining federal Clean Water Act compensatory mitigation requirements as indicated in the Mitigation Acceptance Letter, dated October 12, 2010. Should any additional mitigation be necessary, NCDOT shall request a revised Mitigation Acceptance Letter from EEP and provide a copy to DCM.

- NCDOT shall adhere to their compensatory mitigation commitments for impacts to jurisdictional wetlands and streams. Any additional mitigation necessary shall be provided as required by the DWQ and USACE. Substantial increases in the estimated impacts may require NCDOT to revise the Consistency Certification for this project. Upon determination of the ultimate final impacts on the remaining section, NCDOT shall contact DCM to determine if any additional actions are necessary to ensure the project remains consistent with the NC Coastal Management Program.
- NCDOT shall use best planning practices for tree removal to reduce impacts to the woods adjacent to the Goodman House and Doctor's Office and plant the edge of the right of way between stations 34+50 and 36+00 with native evergreens to further screen the new facility from the Goodman House and Doctor's Office, in accordance with the Concurrence Form for Assessment of Effects, agreed to and signed on January 1, 2006.
- In accordance with project commitments, archaeological sites 31NH39** and 31BW604** shall be avoided by the installation of temporary protective fencing prior to construction to ensure no inadvertent impacts occur.
- Section R-2633B includes in-water construction. An in-water work moratorium shall be observed in the Cape Fear River and Toomers Creek during the period from February 1st through June 15th. The term "in-water", as defined specifically for this project, includes a distance of 35 meters (115 feet) extending into adjacent wetlands, as determined by coordination with the NC Wildlife Resources Commission and the NC Division of Marine Fisheries.
- Unless specifically altered herein, the environmental commitments made within the Final Environmental Impact Statement, signed by NCDOT on April 5, 2007, and the Record of Decision, dated October 2007, shall be met unless otherwise negotiated with state regulatory agencies. DCM shall be notified of any deviation from the stated commitments and a revised Consistency Determination may be necessary.
- Upon completion of the final design plans for R-2633B, the NCDOT shall submit a CAMA Major Permit Application to DCM. No construction may begin on R-2633B until a CAMA permit is issued in accordance with the rules of the NC Coastal Resources Commission.

These conditions allow DCM to concur with the proposed action. It should be noted, that in accordance with 15 CFR 930.4, if the conditions of concurrence are not met, then this conditional concurrence shall be considered an objection to the action. Should there be disagreement of any stated conditions of concurrence; a response to this correspondence is requested, as soon as possible, to resolve any disagreement with the conditions.

Should the project be modified, a revised Consistency Certification could be necessary. This might take the form of either a supplemental Consistency Determination pursuant to 15 CFR 930.46, or a new Consistency Determination pursuant to 15 CFR 930.36.

If you have any questions on this Conditional Consistency Concurrence, please contact Steve Sollod at (919) 733-2293 x230 or via e-mail at steve.sollod@ncdenr.gov. Thank you for your consideration of the North Carolina Coastal Management Program.

Sincerely,

A handwritten signature in black ink that reads "Doug Huggett". The signature is written in a cursive, slightly slanted style.

Doug Huggett
Manager, Major Permits and Consistency Unit

cc: Rachelle Beauregard, NCDOT
Beth Harmon, EEP
Stephen Lane, DCM
Chris Rivenbark, NCDOT
Stephen Rynas, DCM
Brad Shaver, USACE
Steve Sollod, DCM

WETLAND PERMIT IMPACT SUMMARY												
Site No	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp (ft)	Natural Stream Design (ft)
1	54+00 -Y1-	Triple 72" RCP	0.14		0.03	0.03		0.11		248		
1 & 33	54+00 -Y1-/24+00 -Y04-	Wetland Mitigation										66
2	77+70 -Y1-	24" RCP	0.17			0.01						
*3**	58+30 -SR2- RT	Waterline/Powerline		0.03			0.02		<0.01		30	
*4**	101+46 -Y1-	Triple 72" RCP	0.31	0.40	0.09	0.09	0.27	0.07		151		
5**	115+18 -Y1-	Triple 72" RCP	0.03		0.11	0.03	0.07	0.10		228		
6	103+61 -SRVD2-	24" RCP	0.13			<0.01						
7	60+15 -NBL- RT	Bank Stabilization						<0.01		16		
7	60+15 -NBL-M	Temp. Crossing							<0.01		70	
8	98+00 -L- LT	Temp. Crossing							<0.01		45	
8	97+27 / 98+26 -L-	Bridge	<0.01				0.12					
8	97+27 / 98+26 -L-	Bank Stabilization						<0.01		40		
9	110+00 -L-	24" RCP	0.23			0.01						
10A	113+92 -L- LT	30" RCP	<0.01			<0.01						
10B	113+92 -L- RT	30" RCP	<0.01			<0.01						
11	120+66 -L-	30" RCP	0.11			0.01						
12	124+84 / 127+20-L-	42" RCP	1.00			0.05						
13	129+52 / 132+63 -L-	24" RCP	0.49			0.02						
14	134+27 / 138+13 -L-	36" RCP	0.73			0.03						
14	134+27 / 138+13 -L-	Bank Stabilization						<0.01		12		
15	140+25 -L-	18" RCP	0.33		0.04	0.01						
16	142+50 -L-	Roadway Fill	0.37			0.02						
17	143+81 -L-	Bridge	0.10			0.01	0.39					
18	164+50 -L- LT	Roadway Fill	0.02			0.01						
19	171+75 -L- RT	Roadway Fill	0.03			0.01						
20	173+59 -L- LT	24" RCP			<0.01	<0.01						
21	181+45 -L-	36" RCP	0.27			0.02						
TOTALS			4.46	0.43	0.27	0.34	0.87	0.27	<0.01	695	145	66

- Wetland Mitigation includes 0.63 acres of restoration and 2.97 acres of preservation

* Contains impacts due to 30" waterline relocation

** Hand clearing impacts due to powerline

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BRUNSWICK COUNTY
34491.3 GV2 (R-2633AA&AB)

WETLAND PERMIT IMPACT SUMMARY												
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp (ft)	Natural Stream Design (ft)
22	184+08 / 186+27 -L-	Bridge	0.09			0.02	0.17					
22	184+08 / 186+27 -L-	Temp. Crossing		0 10								
23	206+83 / 209+84 -L-	Roadway Fill	0.54			0.03						
24	265+81 / 274+26 -L-	Roadway Fill	3.27			0.19	0.12					
25	275+89 / 279+03 -L-	Roadway Fill	0.61			0.04						
26	283+43 -L-	36" RCP						0.01		***		
27	280+70 / 293+82 -L-	Roadway Fill	4.56			0.25						
28	304+55 / 316+77 -L-	Roadway Fill	3.52			0.24		0 02		***		
29	329+70 -L-	Bridge	<0.01				0.15					
30	21+97 / 23+48 -RPA1-	Roadway Fill	0 40			0 04						
31	5+29 / 7+09 -LPA1-	Roadway Fill	0 53			0.06						
32	0+00 / 12+98 -LPD1-	Roadway Fill	4.27		0 07	0.30						
33	18+96 / 25+57-Y04-	Bridge	0.12			0.03	0 39					
34	19+26 / 20+50 -Y5-	Roadway Fill	0.02			0.01						
35**	22+50 -RP_D1-	Roadway Fill	0.16			0.01						
TOTALS			18 10	0.10	0.07	1 22	0 84	0 03	0 00	0	0	0
Totals Sheet 1 and 2			22 56	0 54	0.34	1 56	1 70	0 30	<0 01	695	145	66

***Tributary waters of the US contain SW impacts but no channel impacts

BRUNSWICK COUNTY
WBS - 34491 3 GV2 (R-2633AA&AB)

Shaver, Brad E SAW

From: Sollod, Steve [steve.sollod@ncdenr.gov]
Sent: Friday, January 14, 2011 3:05 PM
To: Beauregard, Rachelle; Rivenbark, Chris
Cc: Harmon, Beth; Lane, Stephen; Rynas, Stephen; Shaver, Brad E SAW; Shaver, Brad E SAW; Huggett, Doug
Subject: R-2633, DCM Consistency Concurrence
Attachments: R-2633 Consistency Concurrence CD11-003.pdf

Attached is DCM's Concurrence with NCDOT's Federal Consistency Certification for the Proposed Wilmington Bypass, R-2633AA&AB and R-2633B. I hard copy is being mailed to Greg Thorpe. Let me know if you have any questions.

Steve

Steven D. Sollod

Transportation Project Coordinator

NC Division of Coastal Management

1638 Mail Service Center

Raleigh, NC 27699-1638

919-733-2293 Ext. 230

Shaver, Brad E SAW

From: Miller, Vickie M [Vickie.Miller@hdrinc.com]
Sent: Friday, January 07, 2011 2:58 PM
To: Shaver, Brad E SAW; Beauregard, Rachelle; David Wainwright; Herndon, Mason
Cc: Young, Andrew P; Henderson, Jonathan
Subject: R-2633 AA/AB - Site 4
Attachments: R2633AA&AB_Wetland_Impact_Summary_1_7_2011.pdf; R2633AA&AB_RDY_PSH_10_CON_NEW.PDF

Brad,

During our field visit on Dec. 21st I mentioned to you that there is a pipe increase along US 17. I have included an updated plan sheet and permit impact summary table in which only the pipe size changed at Site 4. The stream (an unnamed tributary to Morgan Branch) is currently being conveyed via two 10x4 reinforced concrete box culverts (RCBC). The permit design on Oct. 18th had this structure being replaced with three 66" reinforced concrete pipes (RCP); however, at the request of the division following storm events in late October, we are now proposing to replace the RCBCs with three 72" RCPs. This minimal pipe size increase does not alter the footprint and the impact numbers will remain the same as noted in the permit application.

If you have any questions or need additional information, please let me know.

Thanks,
Vickie

Vickie Miller, AICP, PWS
Environmental Scientist
HDR ONE COMPANY | Many Solutions
3733 National Drive, Suite 207 | Raleigh, NC | 27612-4845
Phone: 919.232.6637 | Fax: 919.785.1187 | Email: vickie.miller@hdrinc.com



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

GUIDELINES FOR AVOIDING IMPACTS TO THE WEST INDIAN MANATEE Precautionary Measures for Construction Activities in North Carolina Waters

The West Indian manatee (*Trichechus manatus*), also known as the Florida manatee, is a Federally-listed endangered aquatic mammal protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) and the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. 1461 *et seq.*). The manatee is also listed as endangered under the North Carolina Endangered Species Act of 1987 (Article 25 of Chapter 113 of the General Statutes). The U.S. Fish and Wildlife Service (Service) is the lead Federal agency responsible for the protection and recovery of the West Indian manatee under the provisions of the Endangered Species Act.

Adult manatees average 10 feet long and weigh about 2,200 pounds, although some individuals have been recorded at lengths greater than 13 feet and weighing as much as 3,500 pounds. Manatees are commonly found in fresh, brackish, or marine water habitats, including shallow coastal bays, lagoons, estuaries, and inland rivers of varying salinity extremes. Manatees spend much of their time underwater or partly submerged, making them difficult to detect even in shallow water. While the manatee's principal stronghold in the United States is Florida, the species is considered a seasonal inhabitant of North Carolina with most occurrences reported from June through October.

To protect manatees in North Carolina, the Service's Raleigh Field Office has prepared precautionary measures for general construction activities in waters used by the species. Implementation of these measures will allow in-water projects which do not require blasting to proceed without adverse impacts to manatees. In addition, inclusion of these guidelines as conservation measures in a Biological Assessment or Biological Evaluation, or as part of the determination of impacts on the manatee in an environmental document prepared pursuant to the National Environmental Policy Act, will expedite the Service's review of the document for the fulfillment of requirements under Section 7 of the Endangered Species Act. These measures include:

1. The project manager and/or contractor will inform all personnel associated with the project that manatees may be present in the project area, and the need to avoid any harm to these endangered mammals. The project manager will ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water. All construction personnel will be informed that they are responsible for observing water-related activities for the presence of manatees.
2. The project manager and/or the contractor will advise all construction personnel that

there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act and the Endangered Species Act.

3. If a manatee is seen within 100 yards of the active construction and/or dredging operation or vessel movement, all appropriate precautions will be implemented to ensure protection of the manatee. These precautions will include the immediate shutdown of moving equipment if a manatee comes within 50 feet of the operational area of the equipment. Activities will not resume until the manatee has departed the project area on its own volition (i.e., it may not be herded or harassed from the area).

4 Any collision with and/or injury to a manatee will be reported immediately. The report must be made to the U.S. Fish and Wildlife Service (ph. 919.856.4520 ext. 16), the National Marine Fisheries Service (ph. 252.728.8762), and the North Carolina Wildlife Resources Commission (ph. 252.448.1546).

5. A sign will be posted in all vessels associated with the project where it is clearly visible to the vessel operator. The sign should state:

CAUTION: The endangered manatee may occur in these waters during the warmer months, primarily from June through October. Idle speed is required if operating this vessel in shallow water during these months. All equipment must be shut down if a manatee comes within 50 feet of the vessel or operating equipment. A collision with and/or injury to the manatee must be reported immediately to the U.S. Fish and Wildlife Service (919-856-4520 ext. 16), the National Marine Fisheries Service (252.728.8762), and the North Carolina Wildlife Resources Commission (252.448.1546).

6. The contractor will maintain a log detailing sightings, collisions, and/or injuries to manatees during project activities. Upon completion of the action, the project manager will prepare a report which summarizes all information on manatees encountered and submit the report to the Service's Raleigh Field Office.

7. All vessels associated with the construction project will operate at "no wake/idle" speeds at all times while in water where the draft of the vessel provides less than a four foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

8. If siltation barriers must be placed in shallow water, these barriers will be: (a) made of material in which manatees cannot become entangled; (b) secured in a manner that they cannot break free and entangle manatees; and, (c) regularly monitored to ensure that manatees have not become entangled. Barriers will be placed in a manner to allow manatees entry to or exit from essential habitat.

Prepared by (rev 06/2003):
U.S. Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726
919/856-4520

Figure 1 The whole body of the West Indian manatee may be visible in clear water; but in the dark and muddy waters of coastal North Carolina, one normally sees only a small part of the head when the manatee raises its nose to breathe.

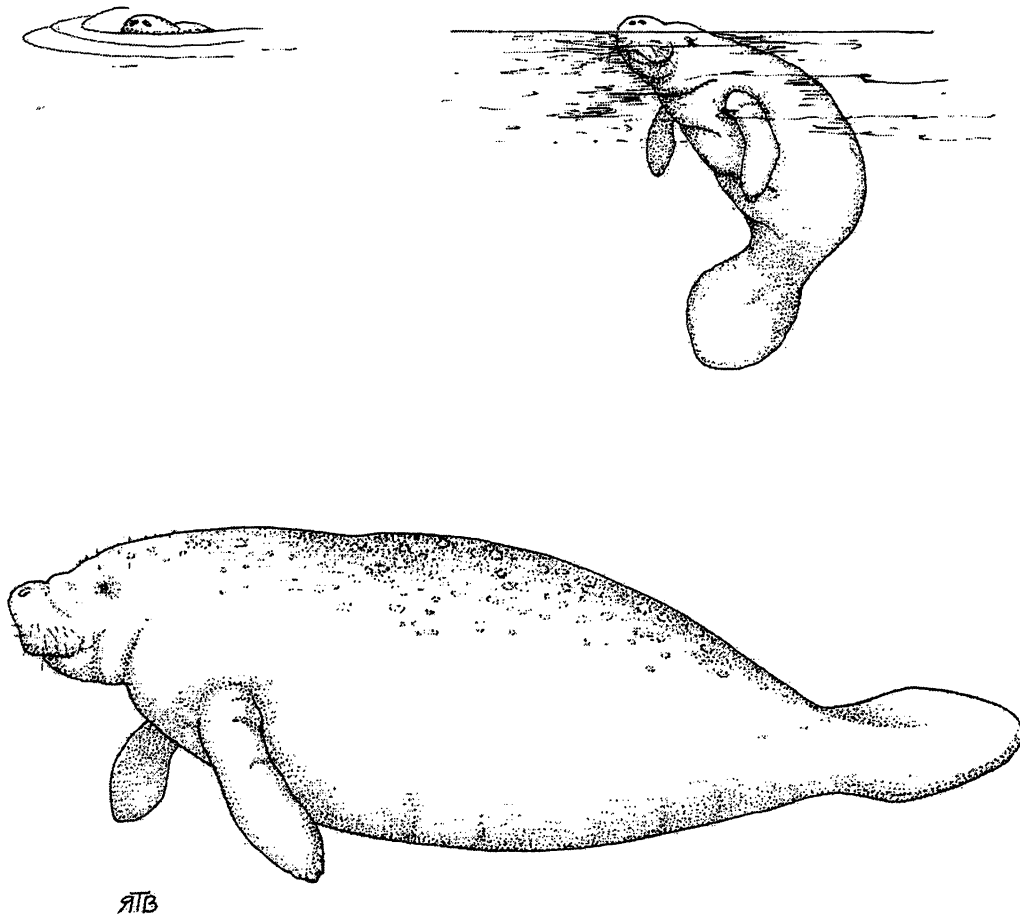


Illustration used with the permission of the North Carolina State Museum of Natural Sciences.
Source: Clark, M. K. 1987 Endangered, Threatened, and Rare Fauna of North Carolina: Part I.
A re-evaluation of the mammals. Occasional Papers of the North Carolina Biological Survey 1987-
3. North Carolina State Museum of Natural Sciences. Raleigh, NC. pp. 52.

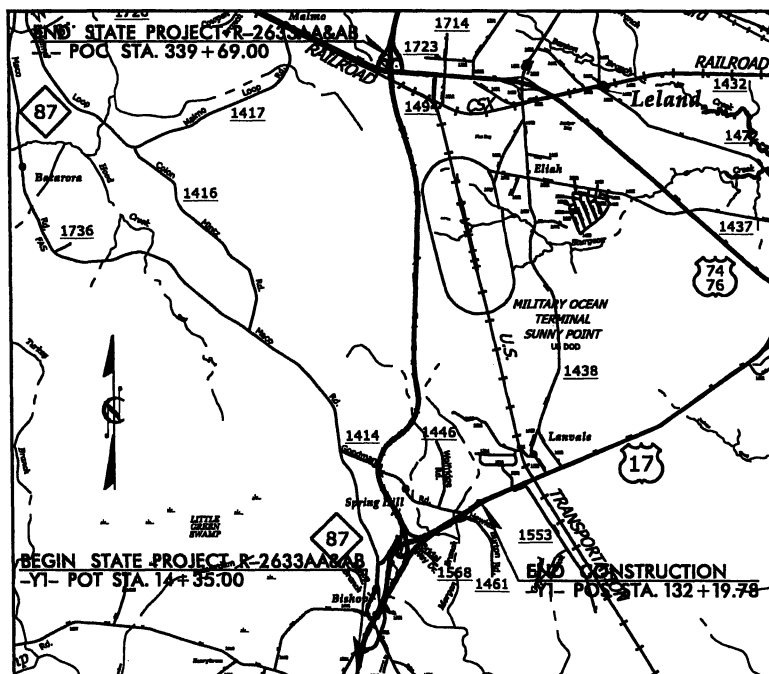
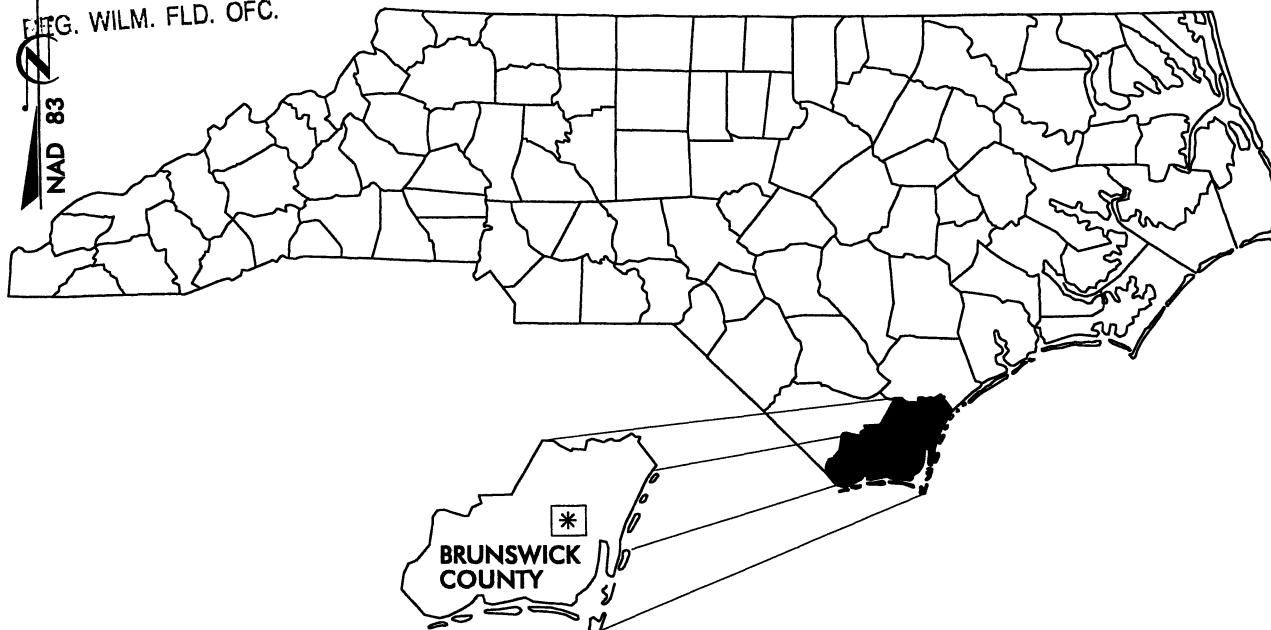
RECEIVED

OCT 19 2010

REG. WILM. FLD. OFC.



NORTH CAROLINA



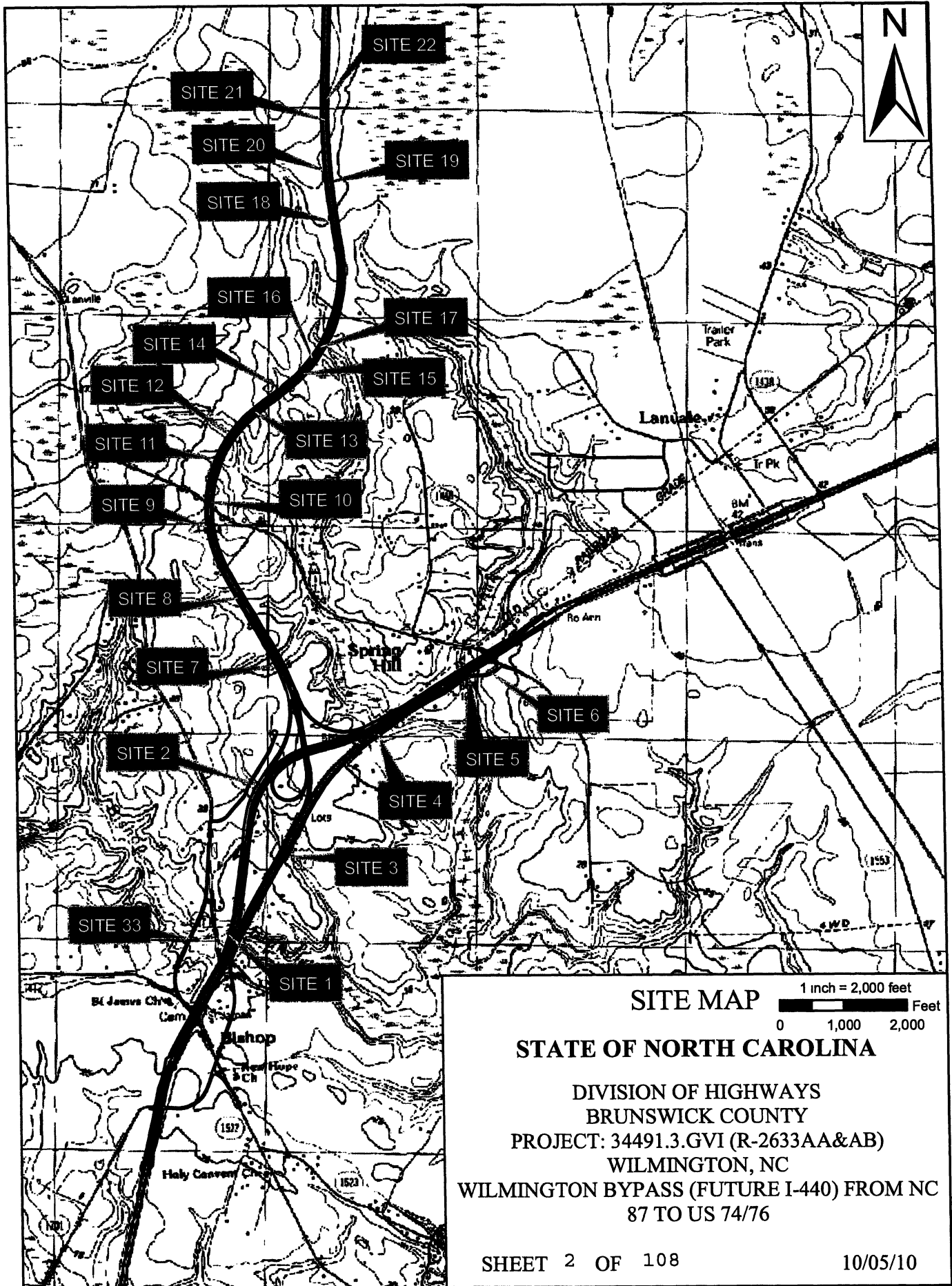
VICINITY MAPS

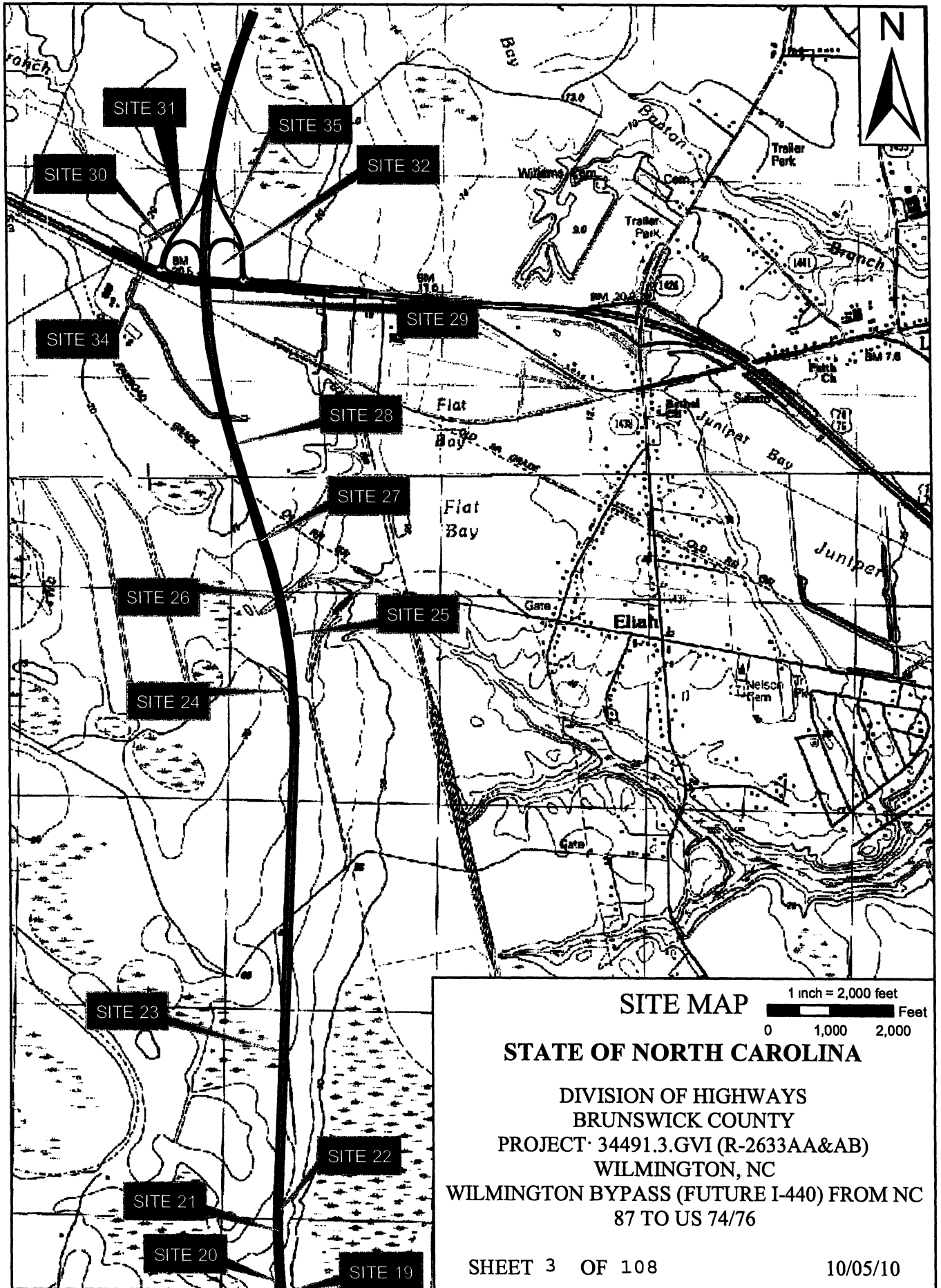
NORTH CAROLINA

DIVISION OF HIGHWAYS
BRUNSWICK COUNTY

PROJECT: 34491.3.GV2 / 34491.3.STI
(R-2633AA&AB)

WILMINGTON BYPASS (FUTURE I-140)
FROM NC 87 TO US 74/76

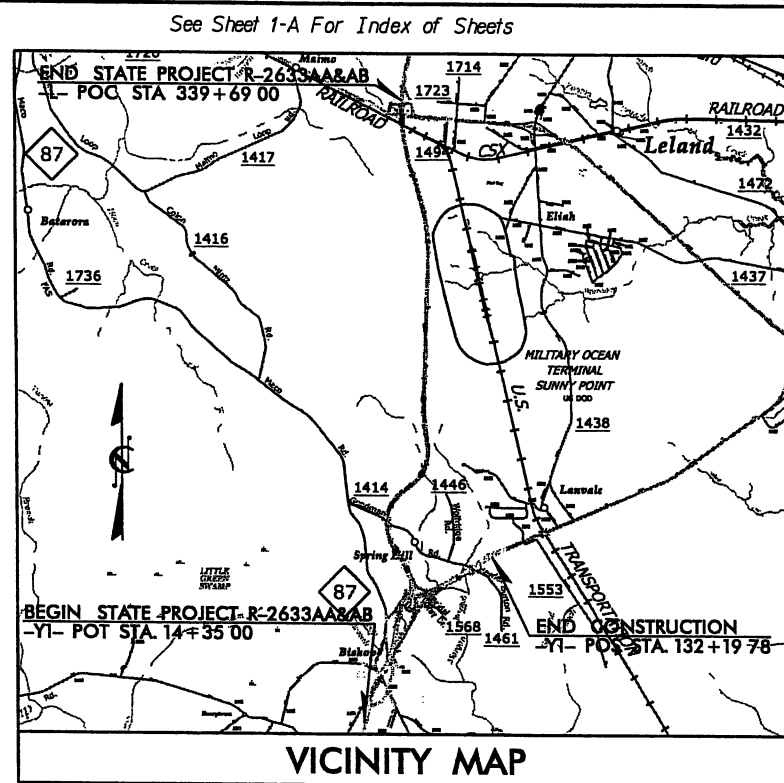




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USER: jmassroc
DATE: 10/3/2010
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CONTRACT: C 202384
TIP PROJECT: R-2633AA&AB

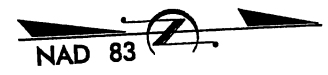


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
BRUNSWICK COUNTY

LOCATION: WILMINGTON BYPASS (FUTURE I-140) FROM NC 87 TO
US 74/76

TYPE OF WORK: DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK
CONTAINED IN THE REQUEST FOR PROPOSALS

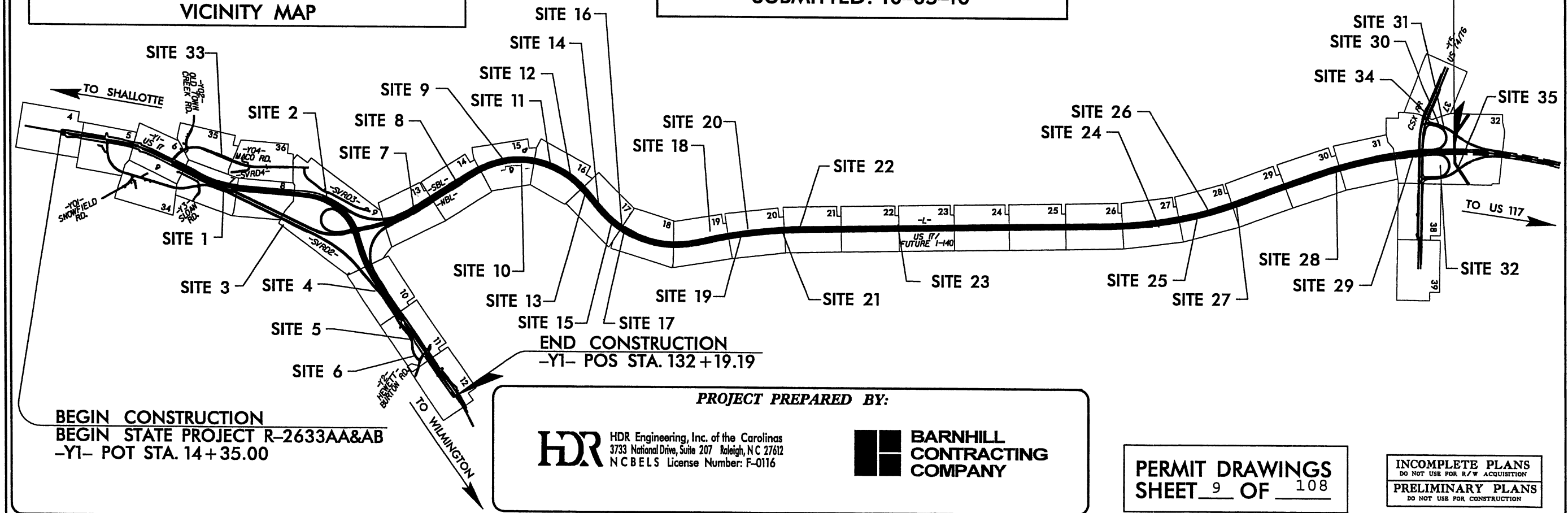
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2633AA&AB	1	
STATE PROJ. NO.	F.A.P.M. NO.	DESCRIPTION	
34491.3.GV2	NHF-0017 (96)	CONSTRUCTION	
34491.3.ST1	STM-0017 (97)	CONSTRUCTION	



**R-2633AA&AB
WETLAND SITE MAP**
SUBMITTED: 10-05-10

END CONSTRUCTION
END STATE PROJECT R-2633AA&AB
-L- POC STA. 339+69.00

BEGIN CONST.
R-2633B



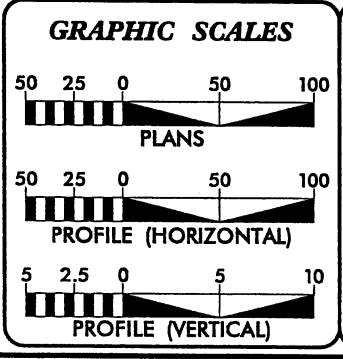
PROJECT PREPARED BY:

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, NC 27612
NCBELS License Number: F-0116

**BARNHILL
CONTRACTING
COMPANY**

PERMIT DRAWINGS
SHEET 9 OF 108

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



DESIGN DATA
-L-

ADT 2010 = 21,615
ADT 2035 = 46,800
DHV = 12 %
D = 60 %
T = 15 % *
V = 70 MPH
* TTST 10 % DUAL 5 %

DESIGN DATA
-YI-

ADT 2010 = 34,081
ADT 2035 = 80,100
DHV = 9 %
D = 55 %
T = 15 % *
V = 60 MPH
* TTST 10 % DUAL 5 %

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2633AA&BB (-YI-, -NBL-, -L-)	= 7 657 MILES
LENGTH STRUCTURE TIP PROJECT R-2633AA&BB (-YI-, -NBL-, -L-)	= 0 320 MILES
TOTAL LENGTH STATE PROJECT R-2633AA&BB (-YI-, -NBL-, -L-)	= 7 977 MILES

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 20, 2008	GREGORY KEMPF, P.E. PROJECT ENGINEER
LETTING DATE: FEBRUARY 16, 2010	PAUL A. MEEHAN, P.E. PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

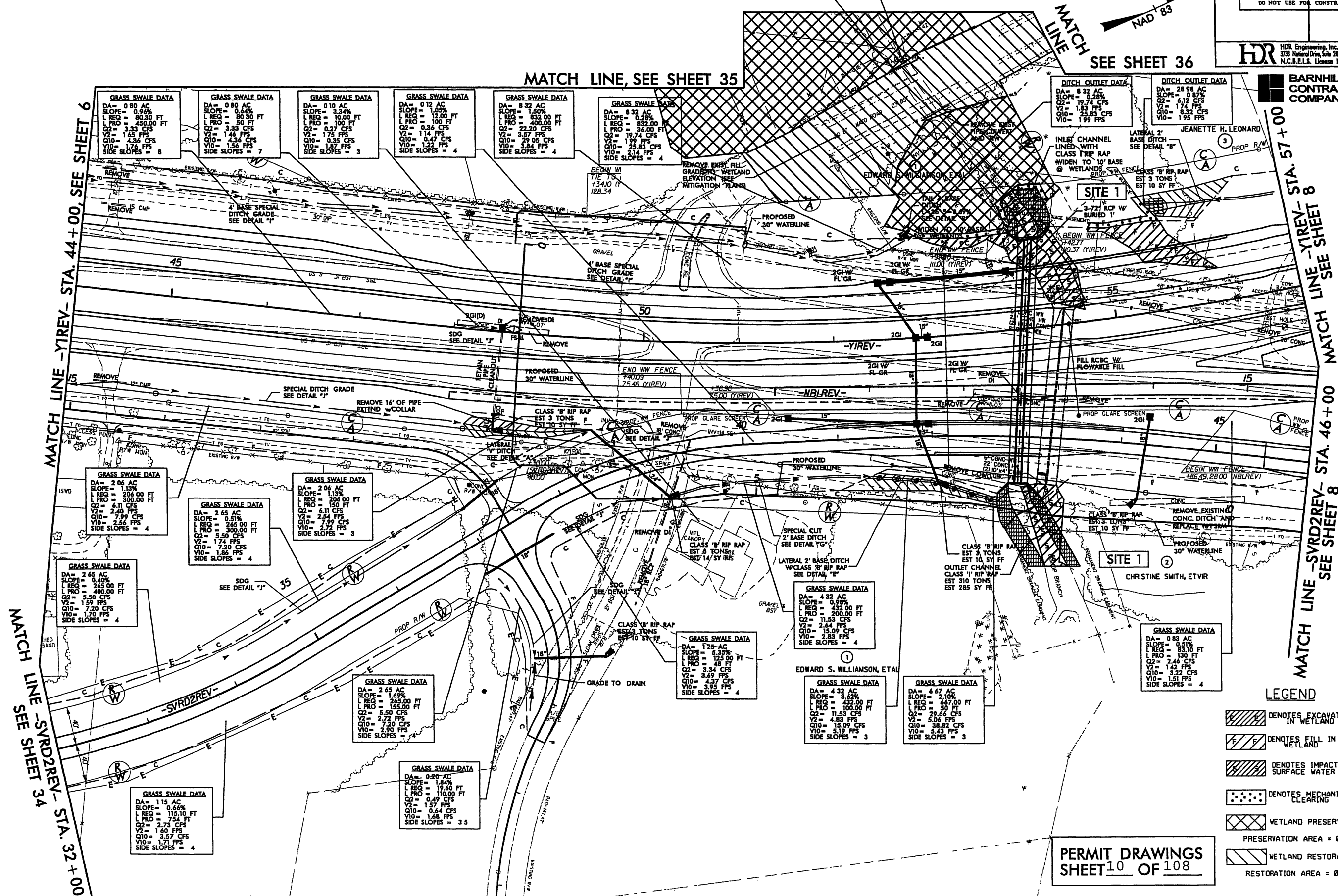
STATE HIGHWAY DESIGN ENGINEER

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
SEE SHEET NO. 40 FOR -NBLREV- PROFILE.
SEE SHEET NO. 75, 76 FOR -SVRD2REV- PROFILE.
SEE SHEET NO. 55, 56, 57 FOR -YIREV- PROFILE.
SEE SHEET NO. 63 FOR -Y3- PROFILE.
SEE SHEET NO. 80 FOR -D2REV- PROFILE.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS



SEE SHEET 36

HDR HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27611
N.C.B.E.L.S. License Number: E-0116


**BARNHILL
CONTRACTING
COMPANY**

8/17/99



W
ATCH
LINE

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










 HED BAND
 MATCH LINE -SYRD2REV-
 SEE SHEET 34

MATCH LINE -SVRD2REV- STA. 46 + 00 MATCH LINE -YREV- STA. 57 + 00
SEE SHEET 8 SEE SHEET 8

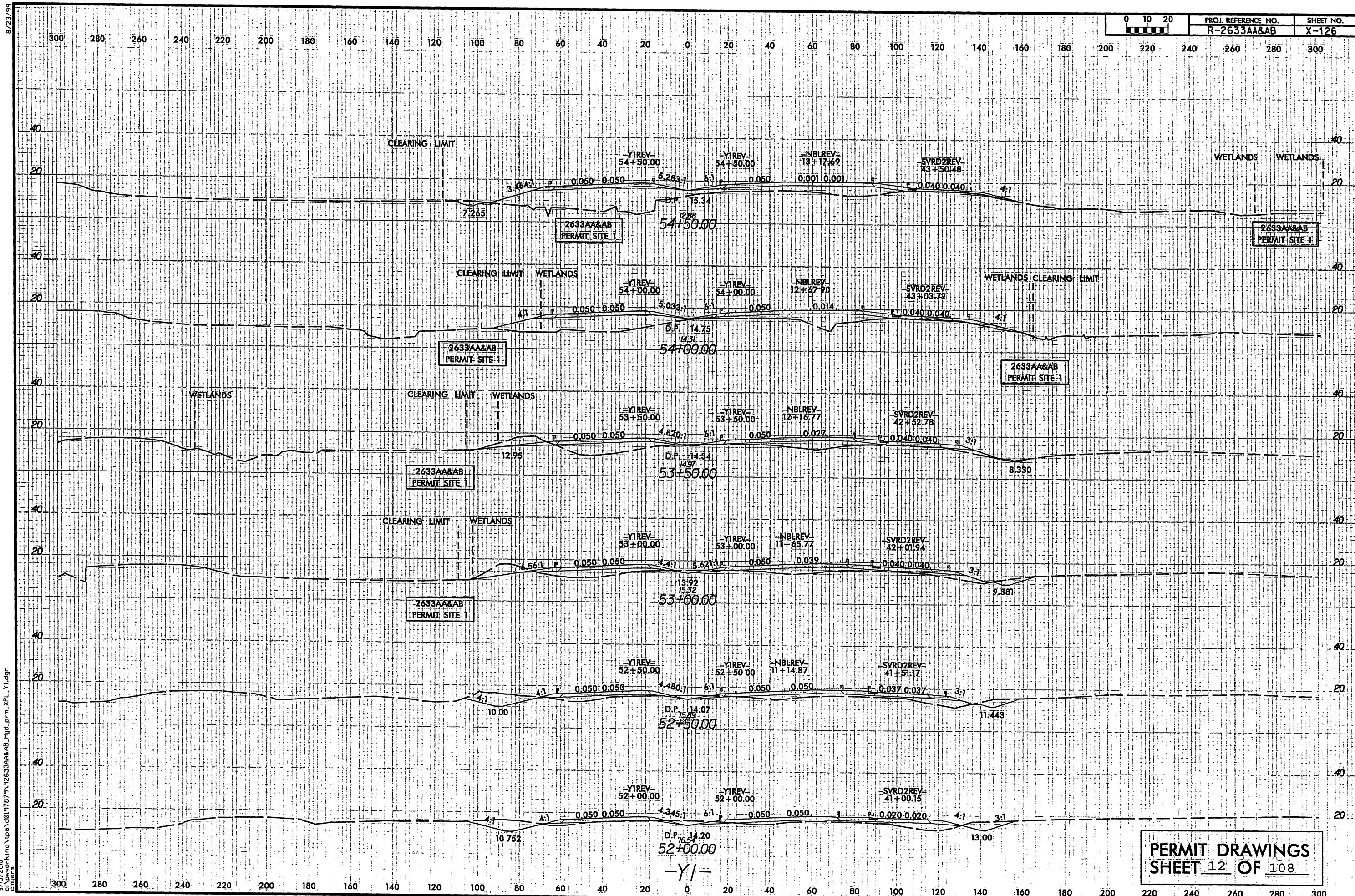
PERMIT DRAWINGS
SHEET 11 OF 108

LEGEND

-  DENOTES EXCAVATION
IN WETLAND
-  DENOTES FILL IN
WETLAND
-  DENOTES IMPACTS IN
SURFACE WATER
-  DENOTES MECHANIZED
CLEARING
-  WETLAND PRESERVATION
PRESERVATION AREA = 0.97 AC.
-  WETLAND RESTORATION
RESTORATION AREA = 0.58 AC.

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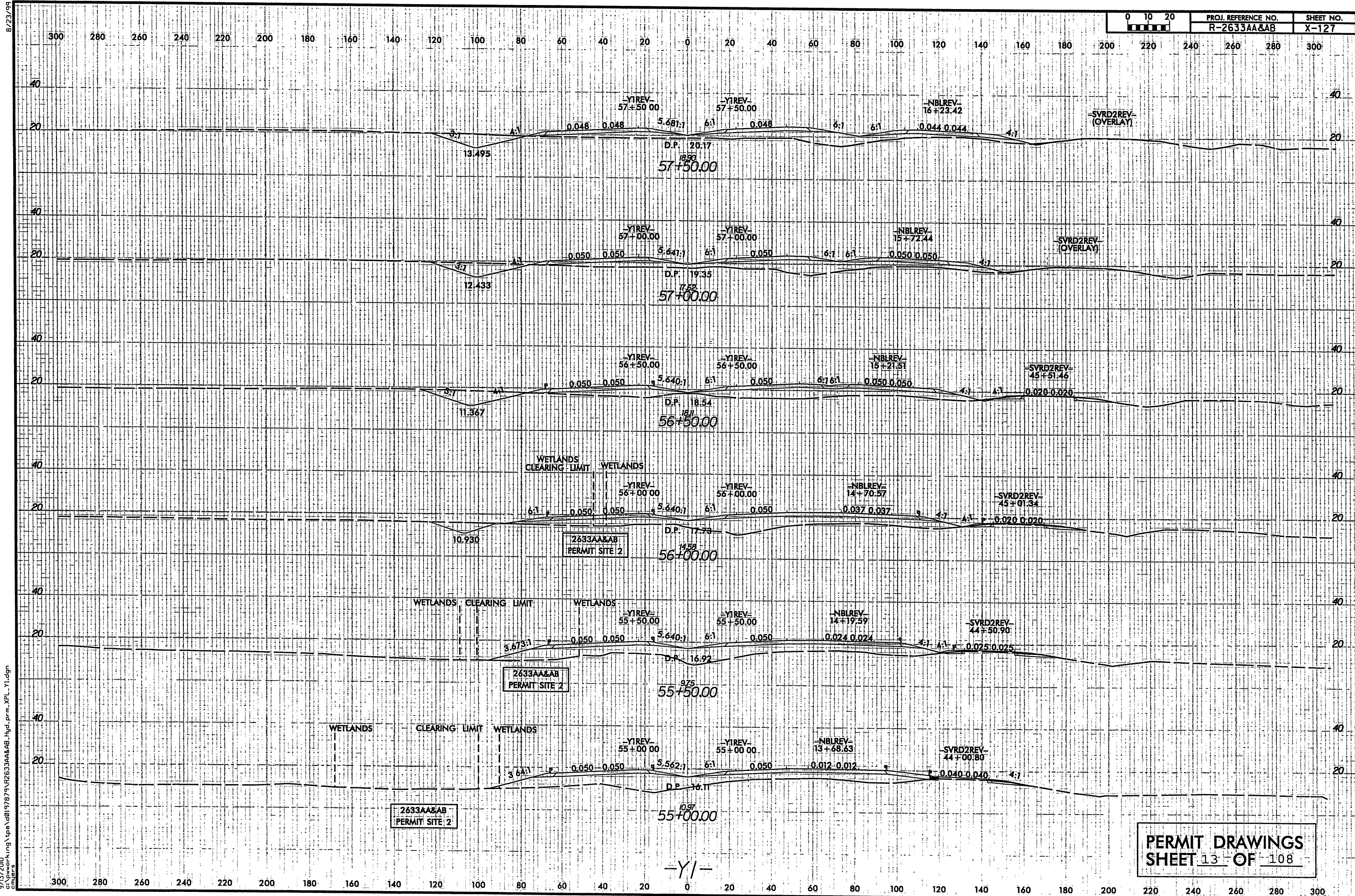


8/23/99



PROJ. REFERENCE NO.
R-2633AA&AB

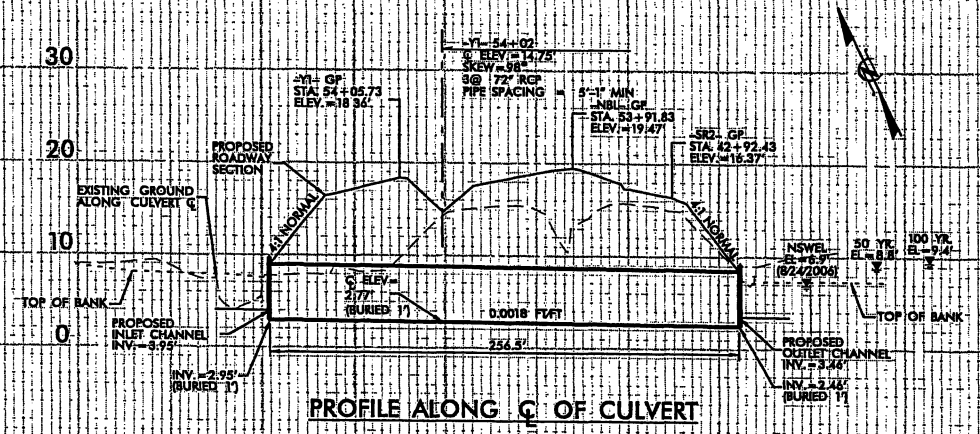
SHEET NO.
X-127



9/13/2010
c:\pwworking\paw\0197879\2633AA&AB_Hyd.prm.XPL.Y1.dgn

5/28/99

SITE T 2633AA&AB



RURAL REGRESSION WSEL TABLE (STA 4720.7)			
YEAR	DISCHARGE (CFS)	NATURAL	PROPOSED
10	210	7.7	7.8
50	370	8.7	8.8
100	460	9.1	9.4
500	660	9.8	10.9

FEMA WSEL TABLE (STA 4720.7)			
YEAR	DISCHARGE (CFS)	CORRECTED EFFECTIVE	REVISED
100	622	10.84	10.60
100 FY	622	11.52	11.28

PROJECT REFERENCE NO.
2633AA&AB

ROADWAY DESIGN
ENGINEER

SHEET NO.
CSR 1

HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

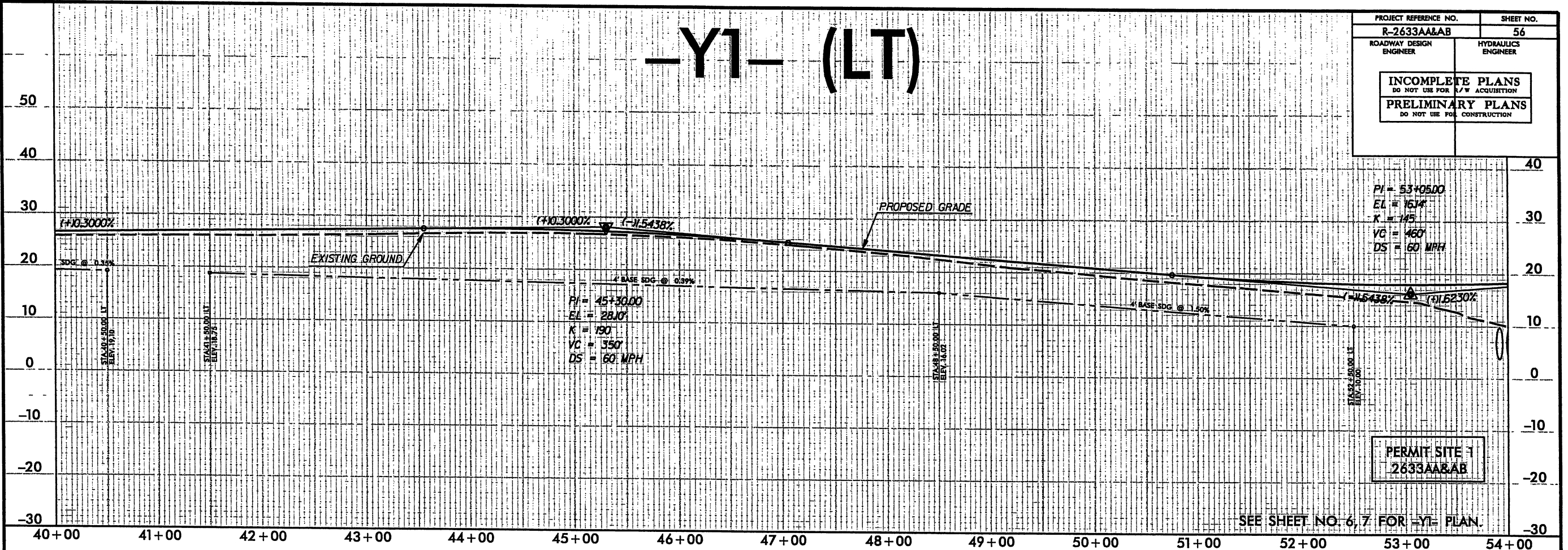
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SCALE: \$SCALE\$SHORT\$

PLOT DRIVER: *PLTDVRS*
USER: *USER\$*
FILE: *PWVAVAU1.TPA1HDEC\$*

5/28/99

9/13/2000
c:\pwworking\tpo\00197879\R2633AA&AB_PRL_PFL_56_CSRI.dgn

-Y1- (LT)

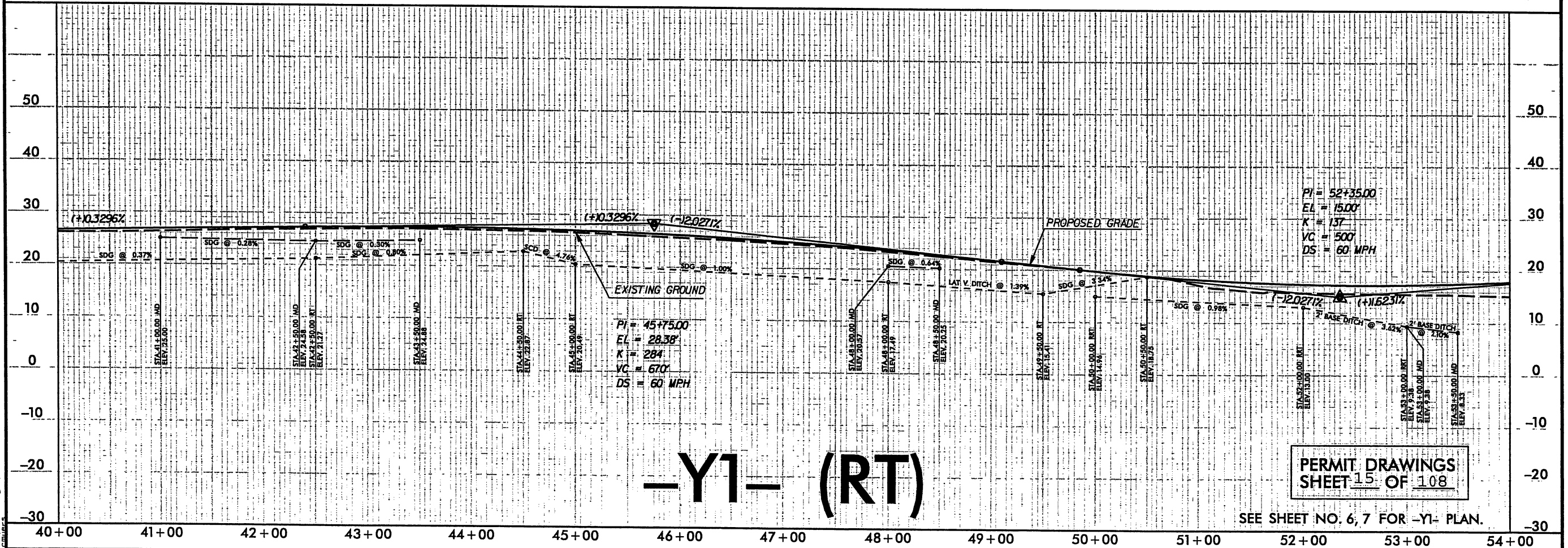


PROJECT REFERENCE NO. R-2633AA&AB	SHEET NO. 56
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT SITE 1
2633AA&AB

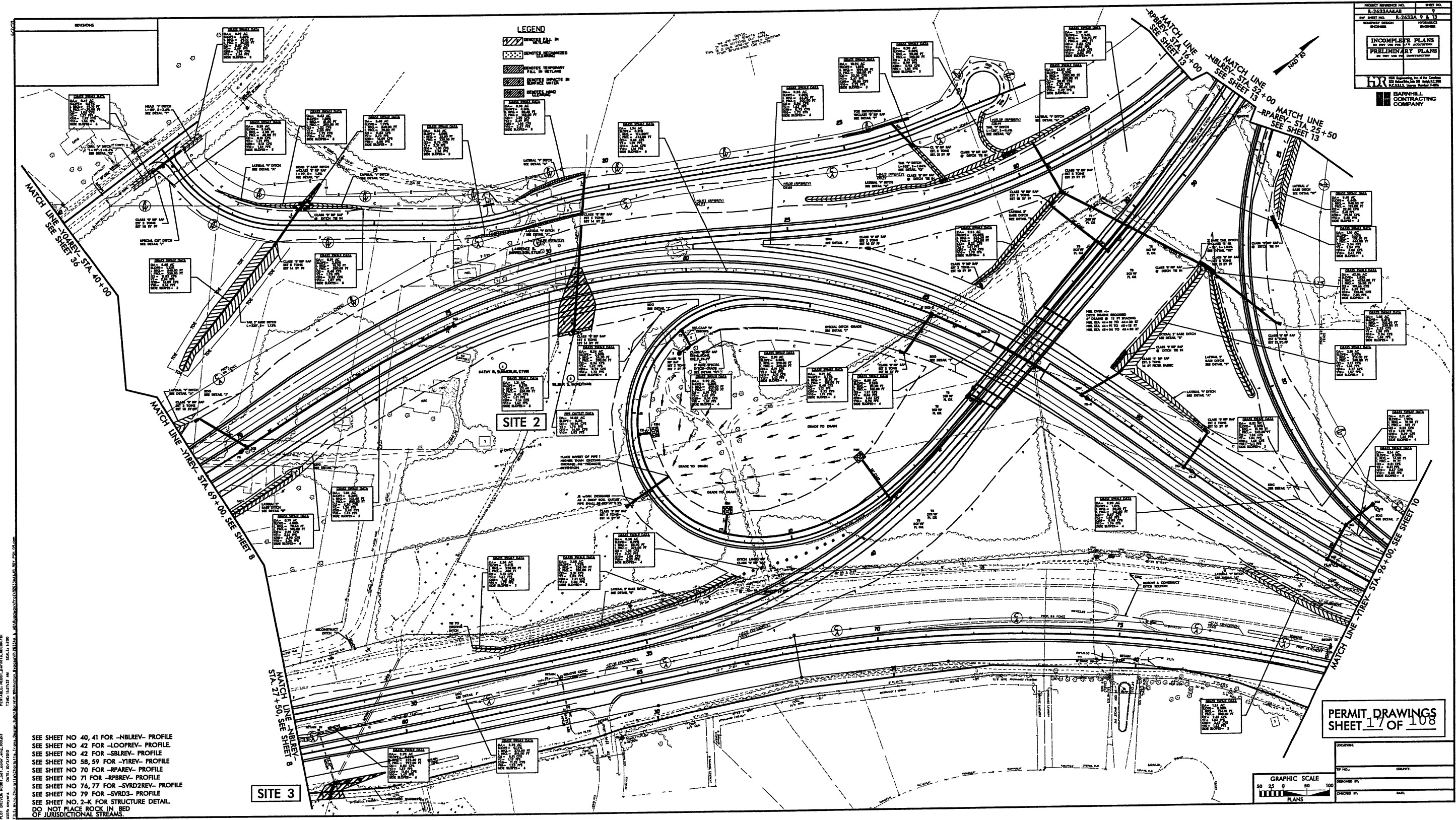
SEE SHEET NO. 6, 7 FOR -Y1- PLAN.

-Y1- (RT)



PERMIT DRAWINGS
SHEET 15 OF 108

SEE SHEET NO. 6, 7 FOR -Y1- PLAN.

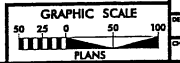


- LEGEND**
- REINFORCED IN
 - REINFORCED
 - REINFORCED TEMPORARY FILL IN WETLAND
 - REINFORCED
 - REINFORCED

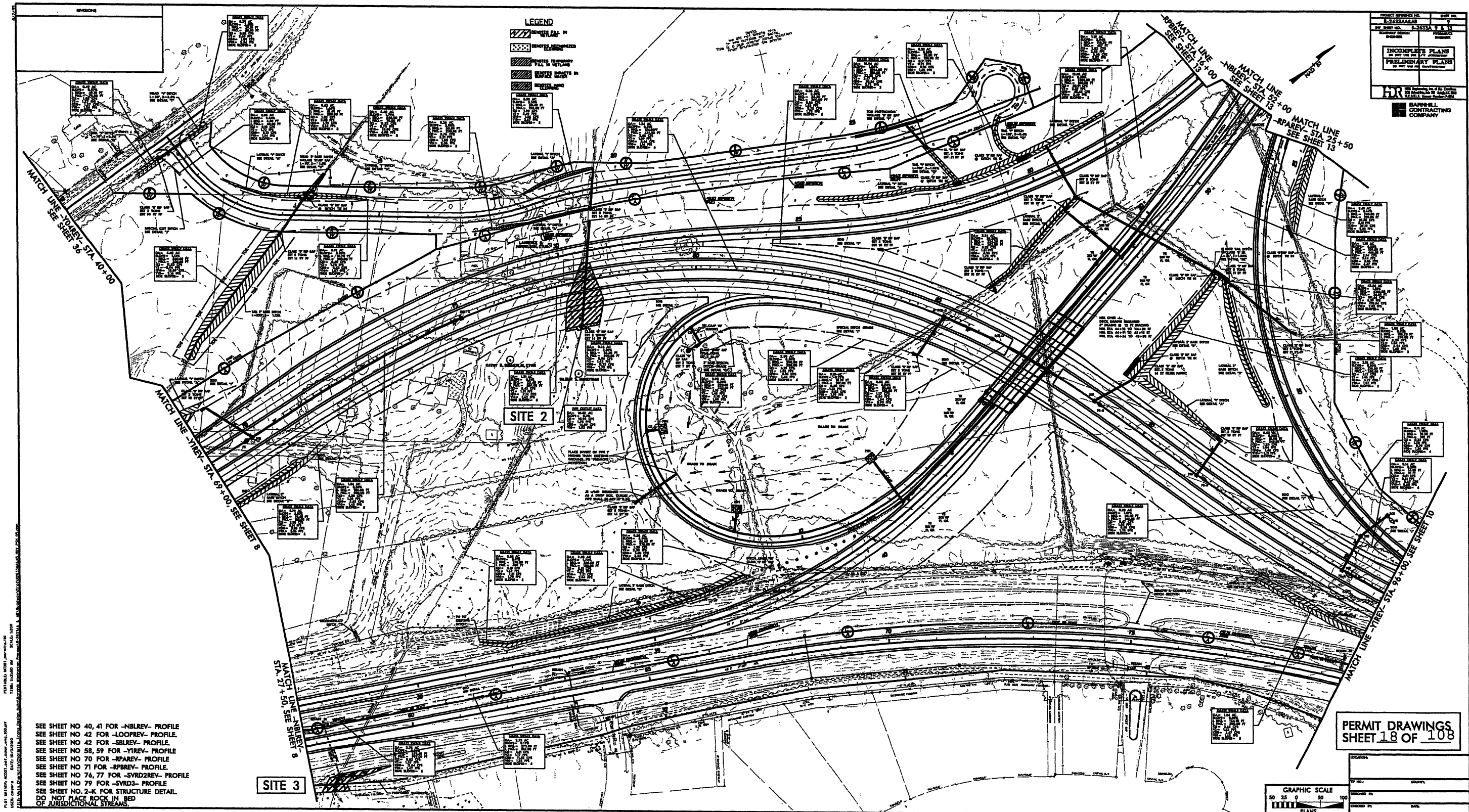
PROJECT REFERENCE NO.	SHEET NO.
2-7633A	9
NO. SHEET NO.	2-7633A 9 & 13
DESIGNED BY	FORWARDER
INCOMPLETE PLANS	PRELIMINARY PLANS
BARNHILL CONTRACTING COMPANY	

PERMIT DRAWINGS
SHEET 17 OF 108

SEE SHEET NO 40, 41 FOR -NBLREV- PROFILE
SEE SHEET NO 42 FOR -LOOPEV- PROFILE
SEE SHEET NO 42 FOR -SBLREV- PROFILE
SEE SHEET NO 58, 59 FOR -YIREV- PROFILE
SEE SHEET NO 70 FOR -RPREV- PROFILE
SEE SHEET NO 71 FOR -RPREV- PROFILE
SEE SHEET NO 76, 77 FOR -SVRD2REV- PROFILE
SEE SHEET NO 79 FOR -SVRD3- PROFILE
SEE SHEET NO. 2-K FOR STRUCTURE DETAIL
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.



PERMIT DRAWINGS
SHEET 17 OF 108

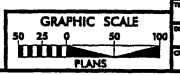


LEGEND

- REINFORCED CONCRETE
- ASPHALT PAVEMENT
- GRAVEL
- EMBANKMENT
- RETAINING WALL
- BRIDGE
- RAILROAD
- WATER
- TOPOGRAPHY
- PROPERTY LINE
- ADJACENT LAND
- ADJACENT ROAD
- ADJACENT RAILROAD
- ADJACENT WATER
- ADJACENT TOPOGRAPHY
- ADJACENT PROPERTY LINE
- ADJACENT ADJACENT LAND
- ADJACENT ADJACENT ROAD
- ADJACENT ADJACENT RAILROAD
- ADJACENT ADJACENT WATER
- ADJACENT ADJACENT TOPOGRAPHY
- ADJACENT ADJACENT PROPERTY LINE

PROJECT NUMBER: E-2533A-9 & 10
SHEET NO.: 18 OF 108
DATE: 10/1/80
BY: [Signature]
CHECKED: [Signature]
APPROVED: [Signature]
INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
BARNHILL CONTRACTING COMPANY

SEE SHEET NO. 40, 41 FOR -NBLREV- PROFILE
SEE SHEET NO. 42 FOR -LOOPREV- PROFILE
SEE SHEET NO. 42 FOR -SBLREV- PROFILE
SEE SHEET NO. 58, 59 FOR -YREV- PROFILE
SEE SHEET NO. 70 FOR -RPAREV- PROFILE
SEE SHEET NO. 71 FOR -RPAREV- PROFILE
SEE SHEET NO. 74, 77 FOR -SYRD2REV- PROFILE
SEE SHEET NO. 79 FOR -SYRD3- PROFILE
SEE SHEET NO. 2-K FOR STRUCTURE DETAIL
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS



PERMIT DRAWINGS
SHEET 18 OF 108

LOCATION: _____
BY: _____ COUNTY: _____
DESIGNED BY: _____
CHECKED BY: _____
DATE: _____

8/17/99

LEGEND

- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING

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

BARNHILL CONTRACTING COMPANY

PROJECT REFERENCE NO.		SHEET NO.
RAW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/V ACQUISITION		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

MATCH LINE -Y04- STA. 40+00

MATCH LINE -Y1- STA. 69+00, SEE SHEET 8

SITE 2

PERMIT DRAWINGS
SHEET 20 OF 108

PLOT DRIVER: NCDOT.pdf_color_eng.100.ppt
USER: jmasroc DATE: 10/3/2010
FILE: Mktg_Charlotte\Trans.Design.Built\Barnhill.Wilmington.Bypass\AR-2633AA & AB\Roadway\Proj\AR2633AA&AB.RDY_PSH.09.dgn

PENTABLE: NCDOT.permits.tbl
TIME: 9:25:51 AM SCALE: 1:100

REVISIONS

GRASS SWALE DATA
DA= 0.49 AC
SLOPE= 0.57%
L REQ= 49.10 FT
L PRO= 70.00 FT
Q2= 1.05 CFS
V2= 1.27 FPS
Q10= 1.37 CFS
V10= 1.36 FPS
SIDE SLOPES= 3

HEAD 'V' DITCH
L=50', S=3.4%
SEE DETAIL 'T'

GRASS SWALE DATA
DA= 0.05 AC
SLOPE= 1.65%
L REQ= 4.50 FT
L PRO= 48.00 FT
Q2= 0.10 CFS
V2= 1.72 FPS
Q10= 0.13 CFS
V10= 1.84 FPS
SIDE SLOPES= 5

GRASS SWALE DATA
DA= 0.62 AC
SLOPE= 1.65%
L REQ= 61.60 FT
L PRO= 200.00 FT
Q2= 1.32 CFS
V2= 2.00 FPS
Q10= 1.72 CFS
V10= 2.14 FPS
SIDE SLOPES= 3

GRASS SWALE DATA
DA= 5.40 AC
SLOPE= 1.79%
L REQ= 540.00 FT
L PRO= 70.00 FT
Q2= 11.53 CFS
V2= 3.73 FPS
Q10= 15.09 CFS
V10= 4.00 FPS
SIDE SLOPES= 3

GRASS SWALE DATA
DA= 0.36 AC
SLOPE= 3.06%
L REQ= 35.80 FT
L PRO= 220.00 FT
Q2= 0.74 CFS
V2= 2.21 FPS
Q10= 1.00 CFS
V10= 2.36 FPS
SIDE SLOPES= 3

GRASS SWALE DATA
DA= 0.50 AC
SLOPE= 3.16%
L REQ= 50.40 FT
L PRO= 155.00 FT
Q2= 1.20 CFS
V2= 2.49 FPS
Q10= 1.56 CFS
V10= 2.57 FPS
SIDE SLOPES= 3

GRASS SWALE DATA
DA= 1.24 AC
SLOPE= 0.31%
L REQ= 124.00 FT
L PRO= 474.00 FT
Q2= 2.65 CFS
V2= 1.09 FPS
Q10= 3.44 CFS
V10= 1.16 FPS
SIDE SLOPES= 6

GRASS SWALE DATA
DA= 5.40 AC
SLOPE= 1.13%
L REQ= 540.00 FT
L PRO= 330.00 FT
Q2= 11.53 CFS
V2= 2.94 FPS
Q10= 15.09 CFS
V10= 3.16 FPS
SIDE SLOPES= 3

GRASS SWALE DATA
DA= 0.19 AC
SLOPE= 2.55%
L REQ= 18.70 FT
L PRO= 200.00 FT
Q2= 0.40 CFS
V2= 1.75 FPS
Q10= 0.52 CFS
V10= 1.87 FPS
SIDE SLOPES= 3

GRASS SWALE DATA
DA= 0.26 AC
SLOPE= 0.50%
L REQ= 26.30 FT
L PRO= 200.00 FT
Q2= 0.54 CFS
V2= 1.42 FPS
Q10= 0.73 CFS
V10= 1.73 FPS
SIDE SLOPES= 6

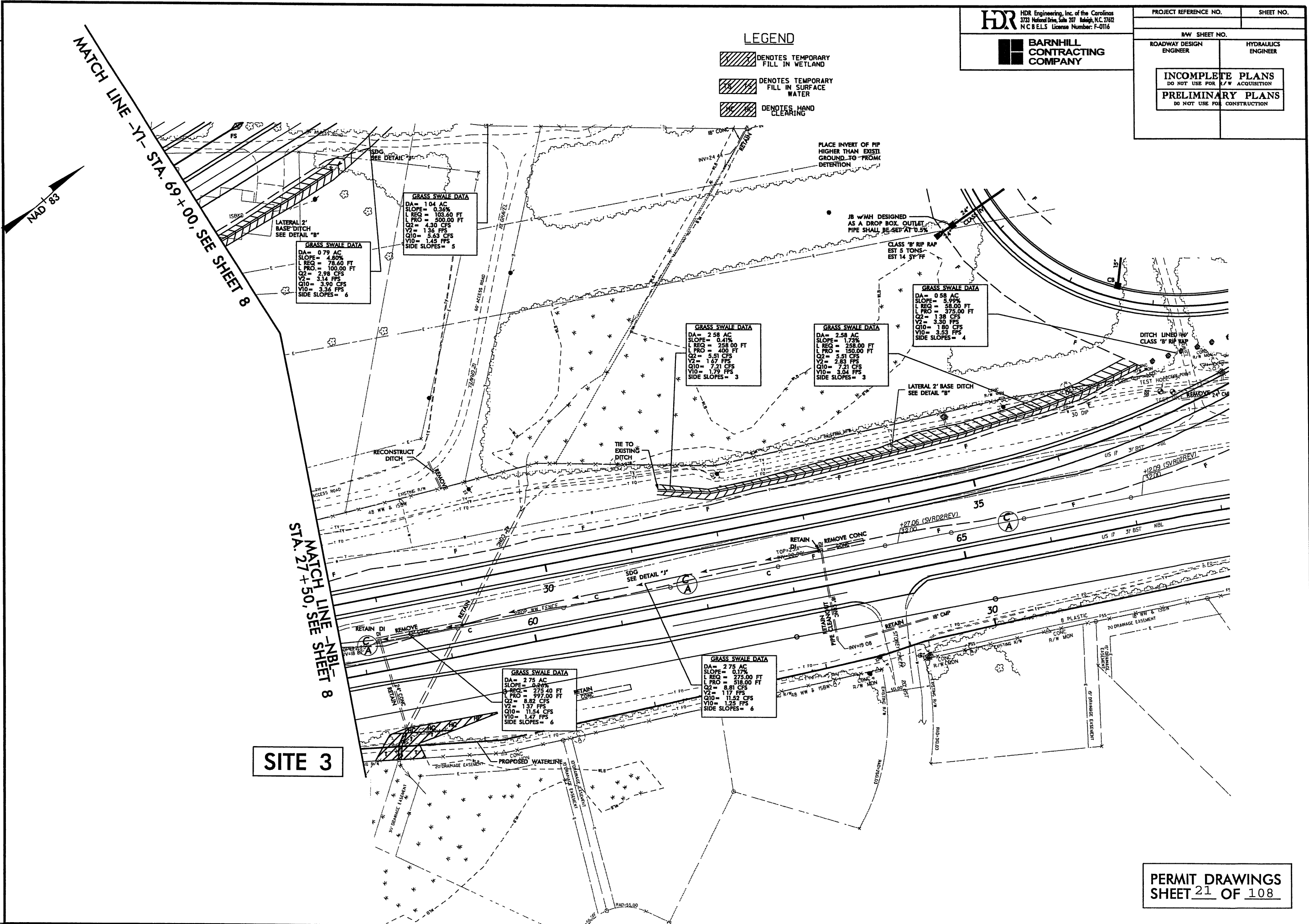
GRASS SWALE DATA
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SLOPE= 0.30%
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L PRO= 233.00 FT
Q2= 6.19 CFS
V2= 1.45 FPS
Q10= 8.10 CFS
V10= 1.55 FPS
SIDE SLOPES= 4

GRASS SWALE DATA
DA= 1.31 AC
SLOPE= 0.31%
L REQ= 131.40 FT
L PRO= 450.00 FT
Q2= 3.45 CFS
V2= 1.51 FPS
Q10= 7.14 CFS
V10= 1.62 FPS
SIDE SLOPES= 5

PIPE OUTLET DATA
DA= 18.02 AC
SLOPE= 0.3%
Q2= 0.96 CFS
V2= 1.76 FPS
Q10= 14.89 CFS
V10= 1.93 FPS

GRASS SWALE DATA
DA= 0.79 AC
SLOPE= 4.50%
L REQ= 78.60 FT
L PRO= 100.00 FT
Q2= 2.98 CFS
V2= 3.14 FPS
Q10= 3.90 CFS
V10= 3.36 FPS
SIDE SLOPES= 6




GRASS SWALE DATA
DA= 1.04 AC
SLOPE= 0.36%
L REQ= 104.00 FT
L PRO= 500.00 FT
Q2= 4.30 CFS
V2= 1.34 FPS
Q10= 5.63 CFS
V10= 1.45 FPS
SIDE SLOPES= 5



MATCH LINE - NBL -
STA. 27 + 50, SEE SHEET 8

SITE 3

LEGEND

-  DENOTES TEMPORARY
FILL IN WETLAND
-  DENOTES TEMPORARY
FILL IN SURFACE
WATER
-  DENOTES HAND
CLEARING

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

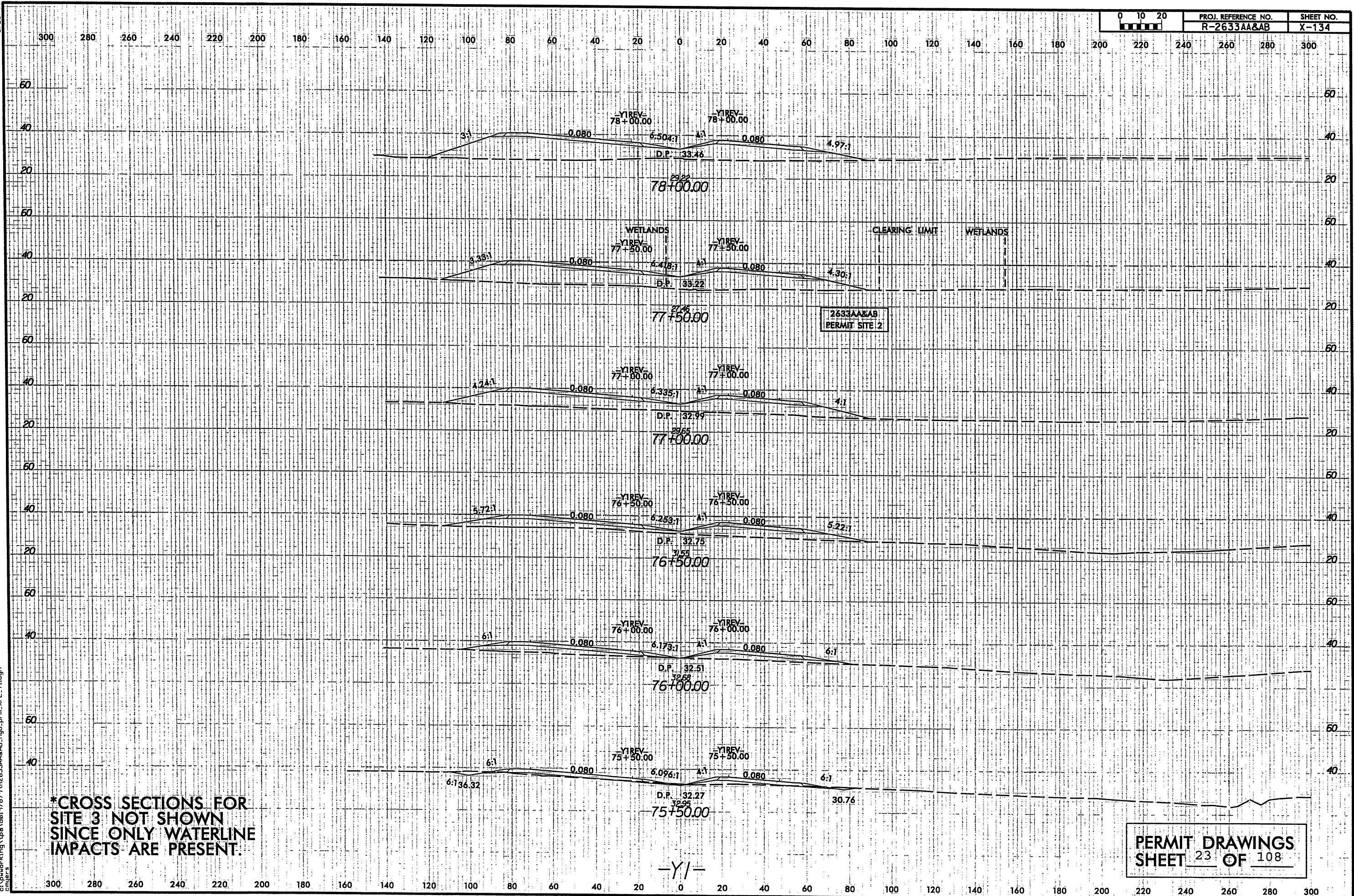

**BARNHILL
CONTRACTING
COMPANY**

PROJECT REFERENCE NO.	SHEET NO.
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>INCOMPLETE PLANS</p> <p>DO NOT USE FOR S/W ACQUISITION</p> </div>	
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>PRELIMINARY PLANS</p> <p>DO NOT USE FOR CONSTRUCTION</p> </div>	

8/23/99

9/13/2000
c:\work\king\p\p\01978\9\2633AA&AB_Hyd.prm_XPL_Y1.dgn
cmiles

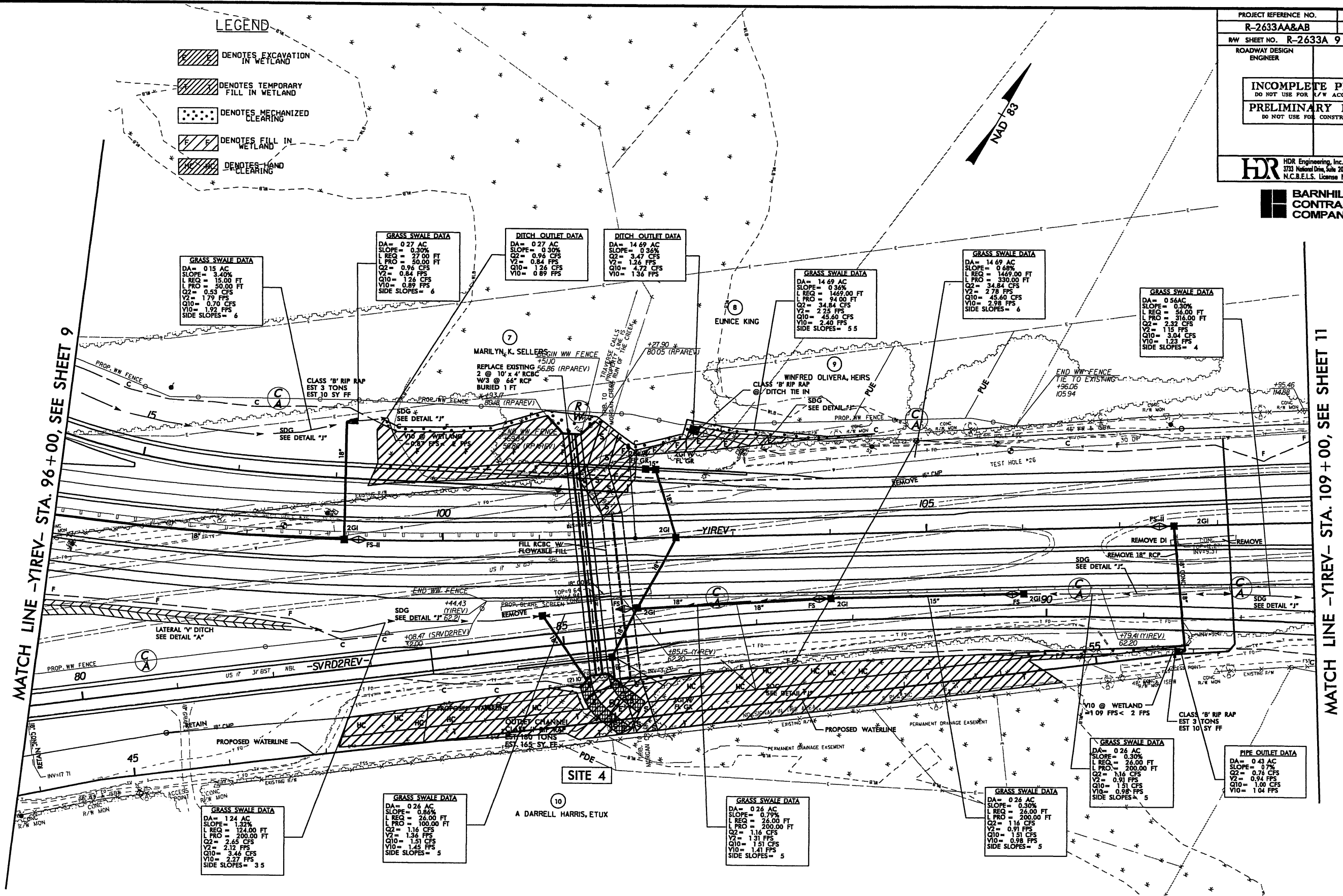
0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2633AA&AB	X-134



*CROSS SECTIONS FOR
SITE 3 NOT SHOWN
SINCE ONLY WATERLINE
IMPACTS ARE PRESENT.

PERMIT DRAWINGS
SHEET 23 OF 108

-Y/-



PROJECT REFERENCE NO. R-2633AA&AB		SHEET NO. 10
R/W SHEET NO. R-2633A 9 & 10		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		
HDR Engineering, Inc. of the Carolinas 1733 National Drive, Suite 207 Raleigh, NC 27612 N.C.B.E.L.S. License Number: F-0116		

**BARNHILL
CONTRACTING
COMPANY**

**PERMIT DRAWINGS
SHEET 24 OF 108**

SEE SHEET NO. 60 FOR -YIREV- PROFILE.
SEE SHEET NO. 77 FOR -SVRD2REV- PROFILE.
SEE SHEET NO. 70 FOR -RPAREV- PROFILE
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

REVISIONS

PLOT: 01/17/2011 1:17:20 PM
USER: cmvcrs
PENTABLE: NCDOT_permit.tbl
TIME: 2:09:06 PM
SCALE: 1:100
FILE: Mktg.CharlotteCharlotte_Trans.Design.BuiltBarnhill_Milington.BypassR-2633AA & AB.RoadwayProjR2633AA&AB_RDY_PSH_ID.dgn

REVISIONS

8/17/99

LEGEND

- DENOTES EXCAVATION IN WETLAND
- DENOTES TEMPORARY FILL IN WETLAND
- DENOTES MECHANIZED FILL

LEGEND

- DENOTES EXCAVATION IN WETLAND
- DENOTES TEMPORARY FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES HAND CLEARING
- DENOTES IMPACTS IN SURFACE WATER

RECEIVED

RECEIVED
JAN 07 2011
REG. WILM. FLD. OFC

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	10
RW SHEET NO.	R-2633AA&AB RW-10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	10
RW SHEET NO.	R-2633AA&AB RW-10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
HDR HDR Engineering, Inc. of the Carolinas 2725 National Drive, Suite 207 Raleigh, NC 27604 N.C.A.E.L.S. License Number: F-0116	
BARNHILL CONTRACTING COMPANY	

MATCH LINE -YIREV- STA. 96+00, SEE SHEET 9

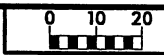
MATCH LINE -YIREV- STA. 109+00, SEE SHEET 11

PERMIT DRAWINGS
SHEET 25 OF 108

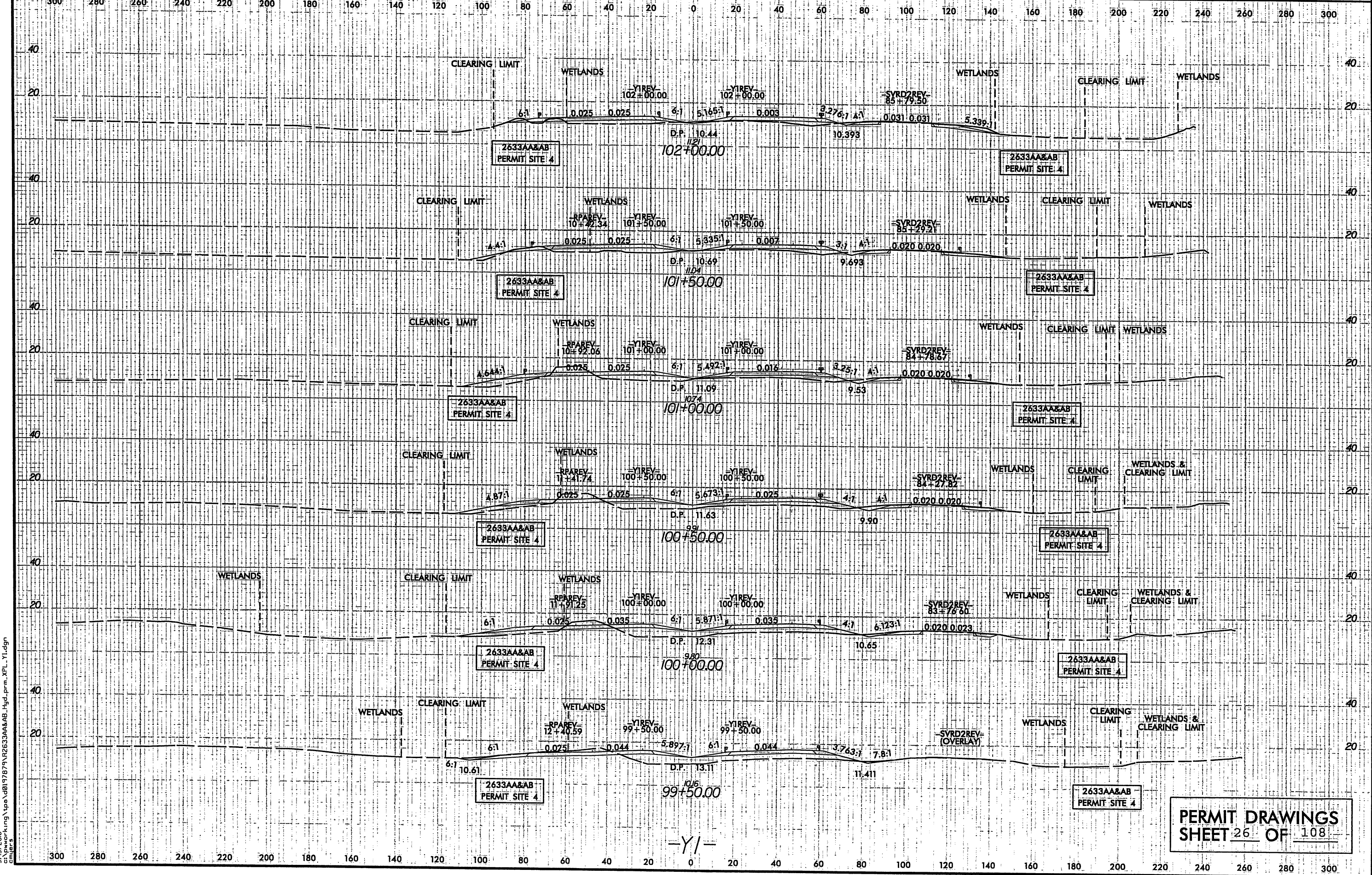
SEE SHEET NO 60 FOR -YIREV- PROFILE
SEE SHEET NO. 77 FOR -SVRD2REV- PROFILE
SEE SHEET NO 70 FOR -RPAREV- PROFILE
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

SEE SHEET NO. 77 FOR -SVRD2REV- PROFILE.
SEE SHEET NO. 70 FOR -RPAREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2633AA&AB	X-142

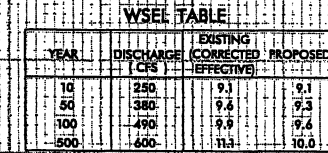


9/13/2000
c:\pwork\king\topo\0197879\2633AA&AB_Hyd.prm_XPL_Y1.dgn
cmjler's

PERMIT DRAWINGS
SHEET 26 OF 108

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 USER: \$USER\$ DATE: 9/13/2010 TIME: 3:13:19 PM SCALE: \$SCALESHT\$
 FILE: \$PWVARVAULTPATHDSC\$

PROJECT REFERENCE NO.		SHEET NO.	
2633AA&AB		CSR 2	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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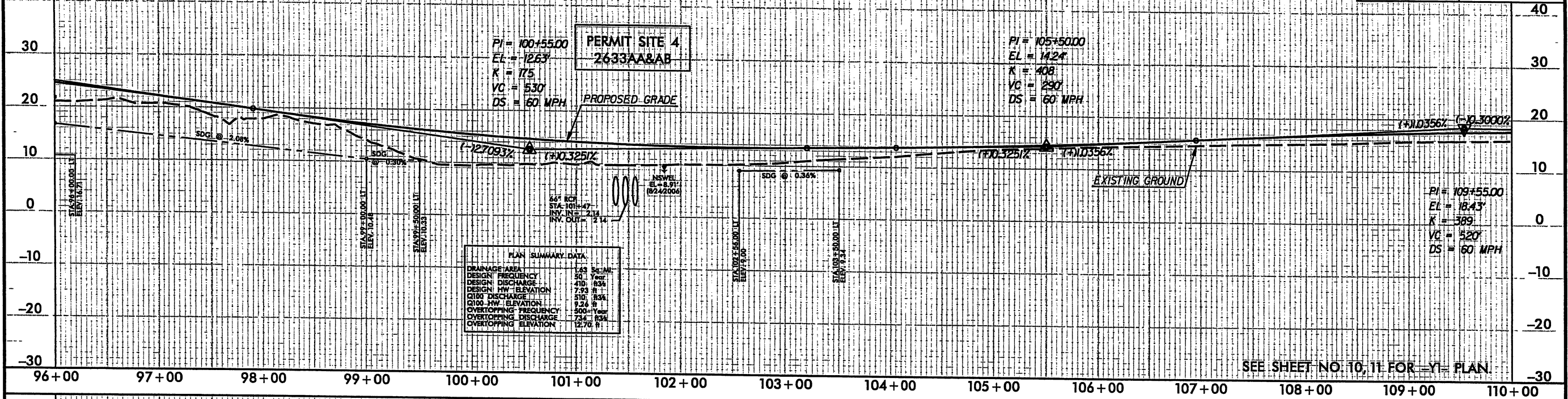


PERMIT DRAWINGS
SHEET 27 OF 108

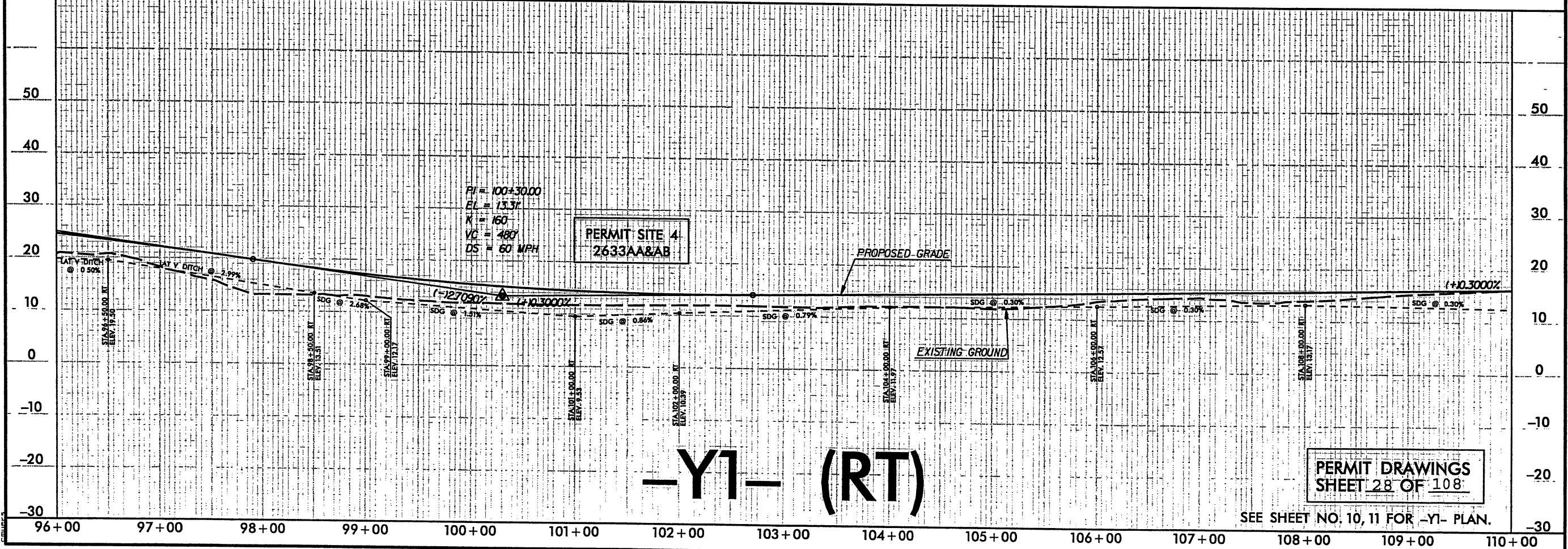
5/28/99

-Y1- (LT)

PROJECT REFERENCE NO. R-2633AA&AB	SHEET NO. 60
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/C ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



-Y1- (RT)

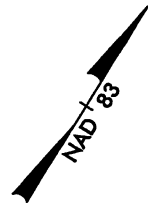


PERMIT DRAWINGS
SHEET 28 OF 108

REVISIONS

8/17/99

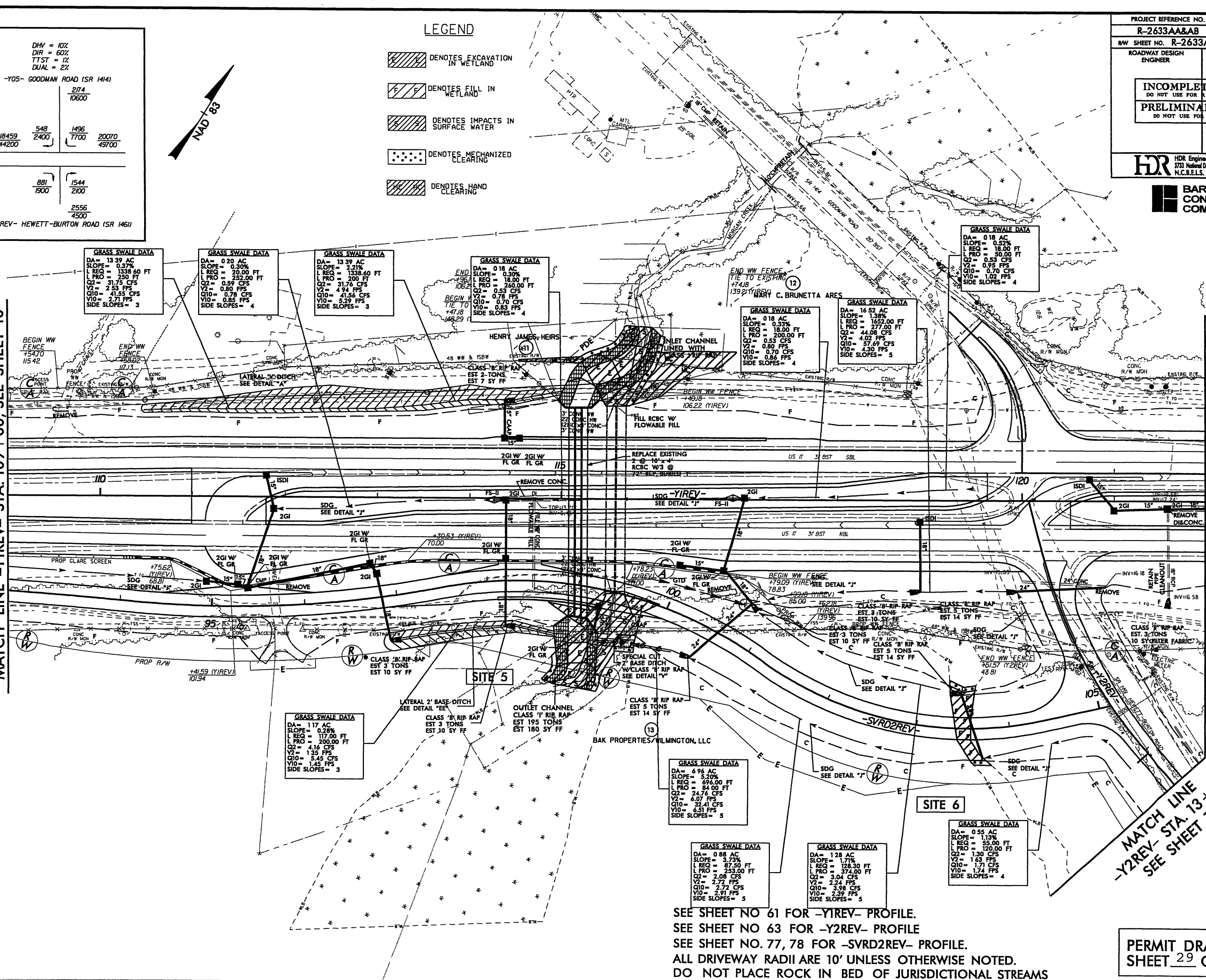
2010 ADT 2035 ADT	DHV = 10% DIR = 60% TTST = 12 DUAL = 2%
-Y05- GOODMAN ROAD (SR 141)	
	2174 10600
DHV = 10% DIR = 60% TTST = 3% DUAL = 4%	18459 548 1496 20070 44200 2400 7700 49700
-YIREV- US I7 SBL	
-YIREV- US I7 NBL	
	881 1544 1900 2100
	2556 4500
-Y2REV- HEWETT-BURTON ROAD (SR 146)	



LEGEND

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

MATCH LINE -YIREV- STA. 109+00, SEE SHEET 10



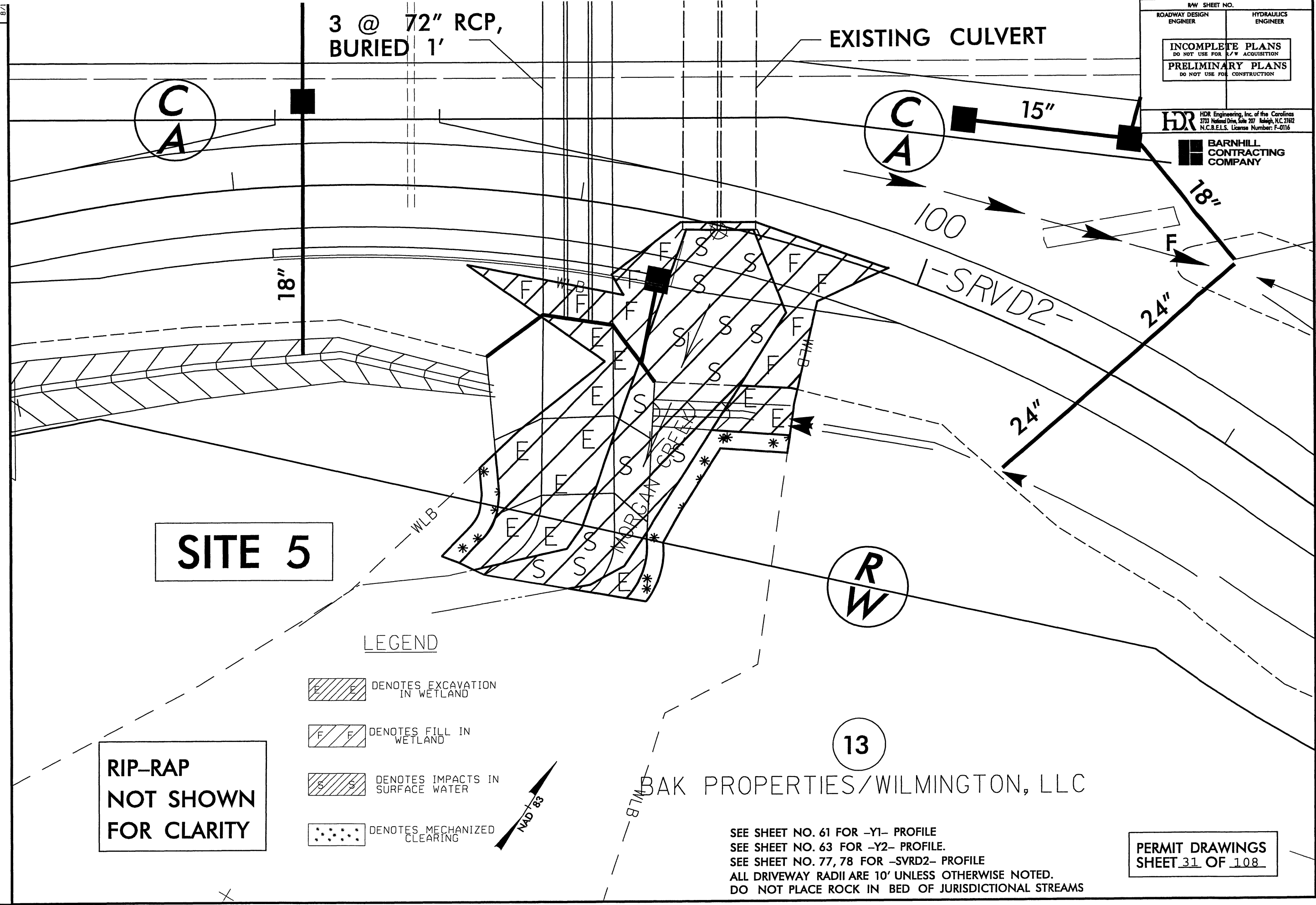
MATCH LINE -YIREV- STA. 122+00, SEE SHEET 12

MATCH LINE
-Y2REV- STA. 13+50
SEE SHEET 12

SEE SHEET NO 61 FOR -YIREV- PROFILE.
SEE SHEET NO 63 FOR -Y2REV- PROFILE
SEE SHEET NO. 77, 78 FOR -SVRD2REV- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS

PERMIT DRAWINGS
SHEET 29 OF 108

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	11
RW SHEET NO. R-2633A PSH 10 & 11	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
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	
BARNHILL CONTRACTING COMPANY	



8/17/99

3 @ 72" RCP,
BURIED 1'

EXISTING CULVERT

C
A

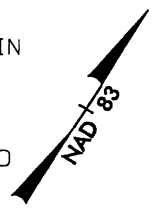
C
A

SITE 5

LEGEND

RIP-RAP
NOT SHOWN
FOR CLARITY

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



BAK PROPERTIES/WILMINGTON, LLC

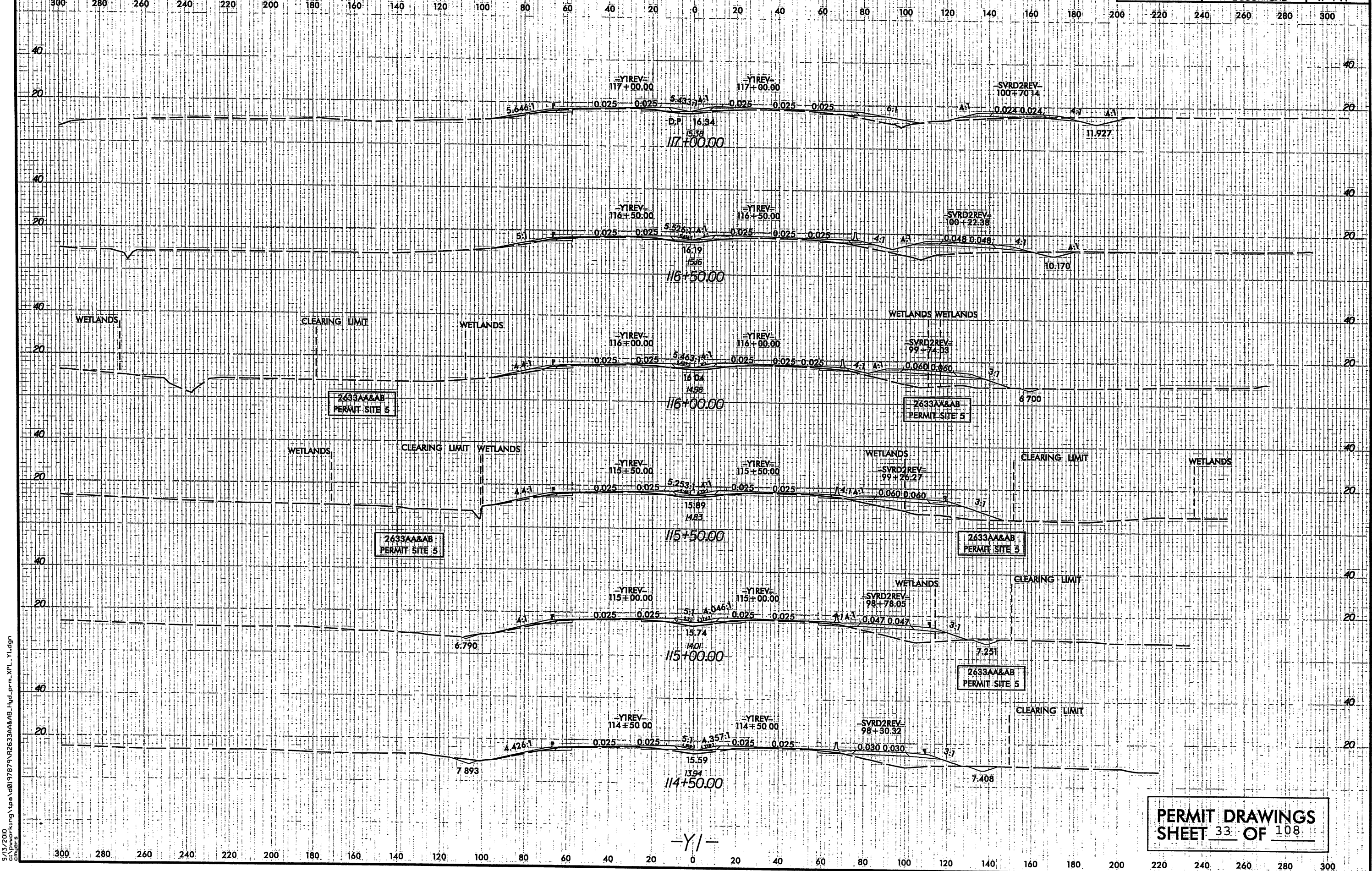
SEE SHEET NO. 61 FOR -Y1- PROFILE.
SEE SHEET NO. 63 FOR -Y2- PROFILE.
SEE SHEET NO. 77, 78 FOR -SYRD2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS

PROJECT REFERENCE NO. R-2633AA&AB		SHEET NO. 11	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR E/V ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, NC 27612 N.C.B.E.L.S. License Number: F-0116			
BARNHILL CONTRACTING COMPANY			

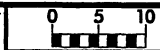
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USER: jmcseroc DATE: 10/3/2010
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REVISIONS

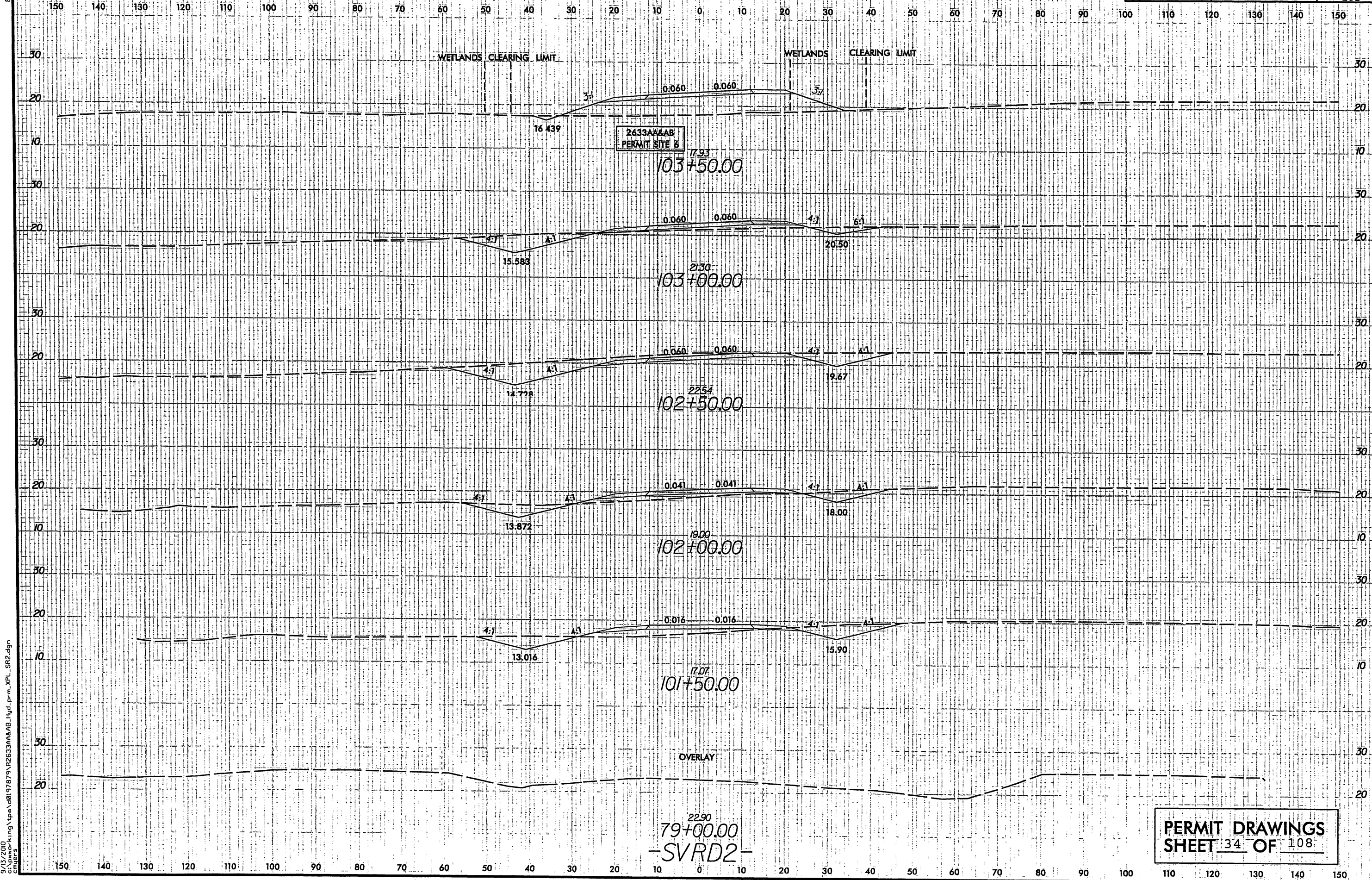


8/23/99



PROJ. REFERENCE NO.
R-2633AA&AB

SHEET NO.
X-232



9/13/2010
C:\working\p2633AA&AB\hyd.prm.XPL_SR2.dgn

PERMIT DRAWINGS
SHEET 34 OF 108

79+00.00
-SVRD2-


```

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PENTABLE: $PENTBL$
USER: $USER$    DATE: 9/13/2010    TIME: 3:13:34 PM    SCALE: $SCALESHORT$
FILE: $PWVARVALU.TPATHDESC$

```

Profile view of the proposed culvert. The vertical axis shows elevation in feet (0, 10, 20). The horizontal axis shows stationing from 1+00 to 1+75. The profile includes the existing ground, the top of the bank, the proposed inlet channel, the culvert structure (C ELEV. = 2.86'), and the proposed outlet channel. Key elevations and stationing points are labeled: YL TIS = 19, C ELEV. = 5.73, SLOW = 90', 3@ 72" NC, PIPE SPACING = 5'-12" MIN., GF - Y1NBL, STA. TIS = 19, ELEV. = 17.78', GF - SYED2, STA. 96+92, ELEV. = 16.54', 50-YL EL = 10.2, 100-YL EL = 10.9', NSWL (8/2504), TOP OF BANK, DISTING. GROUND ALONG CROSS C, PROPOSED INLET CHANNEL ELEV. = 2.00', INV. = 3.00' BURIED 1', C ELEV. = 2.86', 0.0017 FEET, 72", PROPOSED OUTLET CHANNEL ELEV. = 3.69', INV. = 2.69' BURIED 1'.

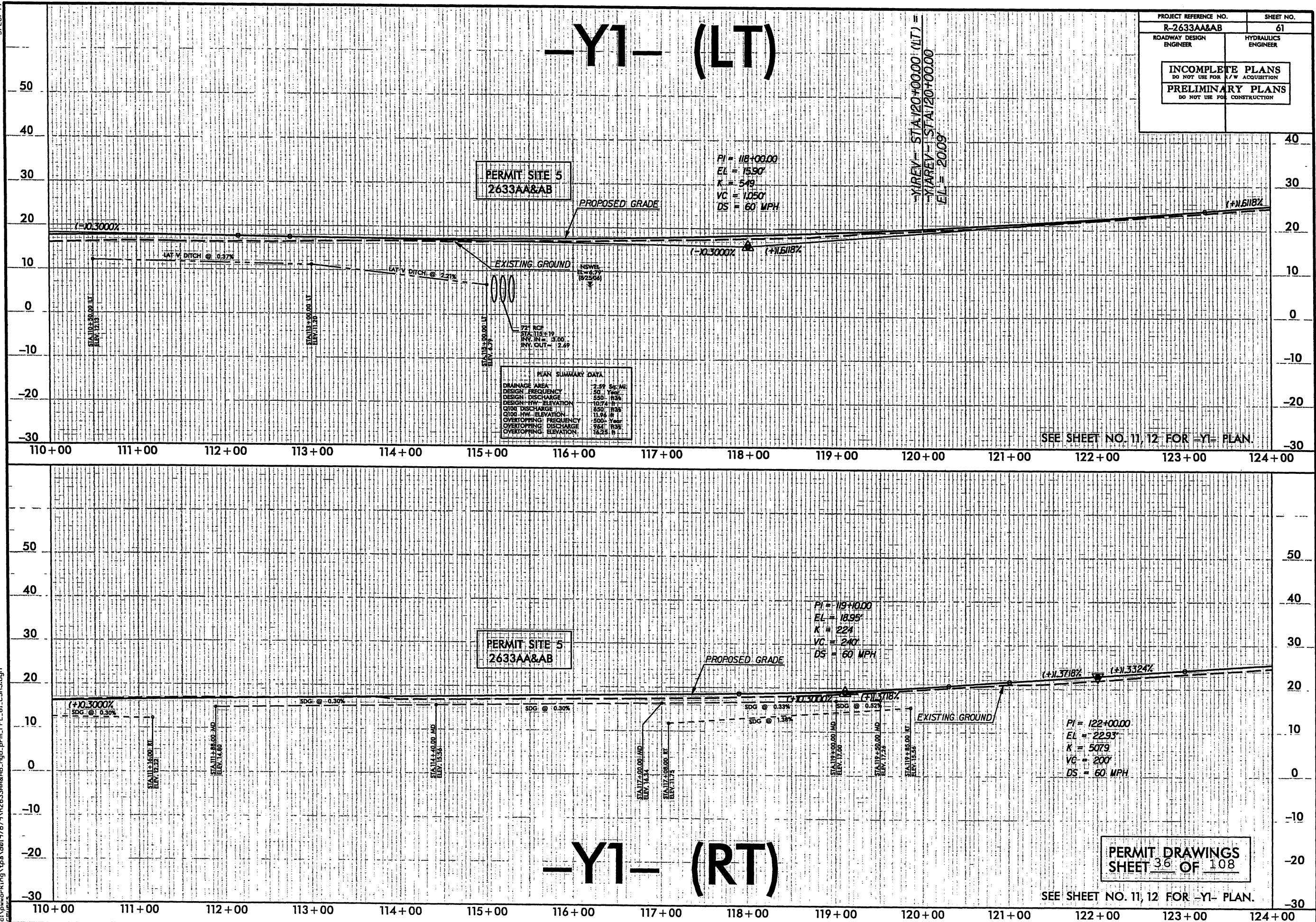
YEAR	DISCHARGE (CFS)	NATURAL	PROPOSED
10	310	9.5	9.7
50	330	10.5	11.6
100	450	11.0	12.7
300	950	11.8	15.7

YEAR	DISCHARGE (CFS)	CORRECTED EFFECTIVE	REVISED
100	1120	16.9	16.9
100 FW	1120	17.2	17.7

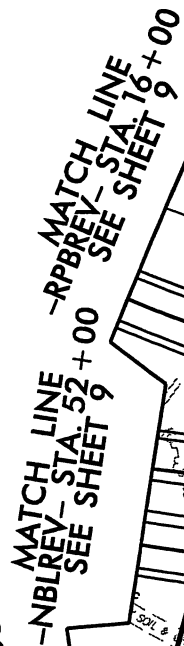
PERMIT DRAWINGS
SHEET 35 OF 108

5/28/99

9/13/2000
c:\pwork\king\paw\019787\9\2633AA&AB_Hyd-prm_PFL_61_CSR3.dgn



REVISIONS



MATCH LINE -REV- 311

PERMIT DRAWINGS
SHEET 37 OF 108

SEE SHEET NO. 44 FOR -LREV- PROFILE.
SEE SHEET NO. 70 FOR -RPAREV- PROFILE.
SEE SHEET NO. 71 FOR -RPBREV- PROFILE.
SEE SHEET NO. 41 FOR -NBLREV- PROFILE.
SEE SHEET NO. 42, 43 FOR -SBLREV- PROFILE
SEE SHEET NO. 2-K FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

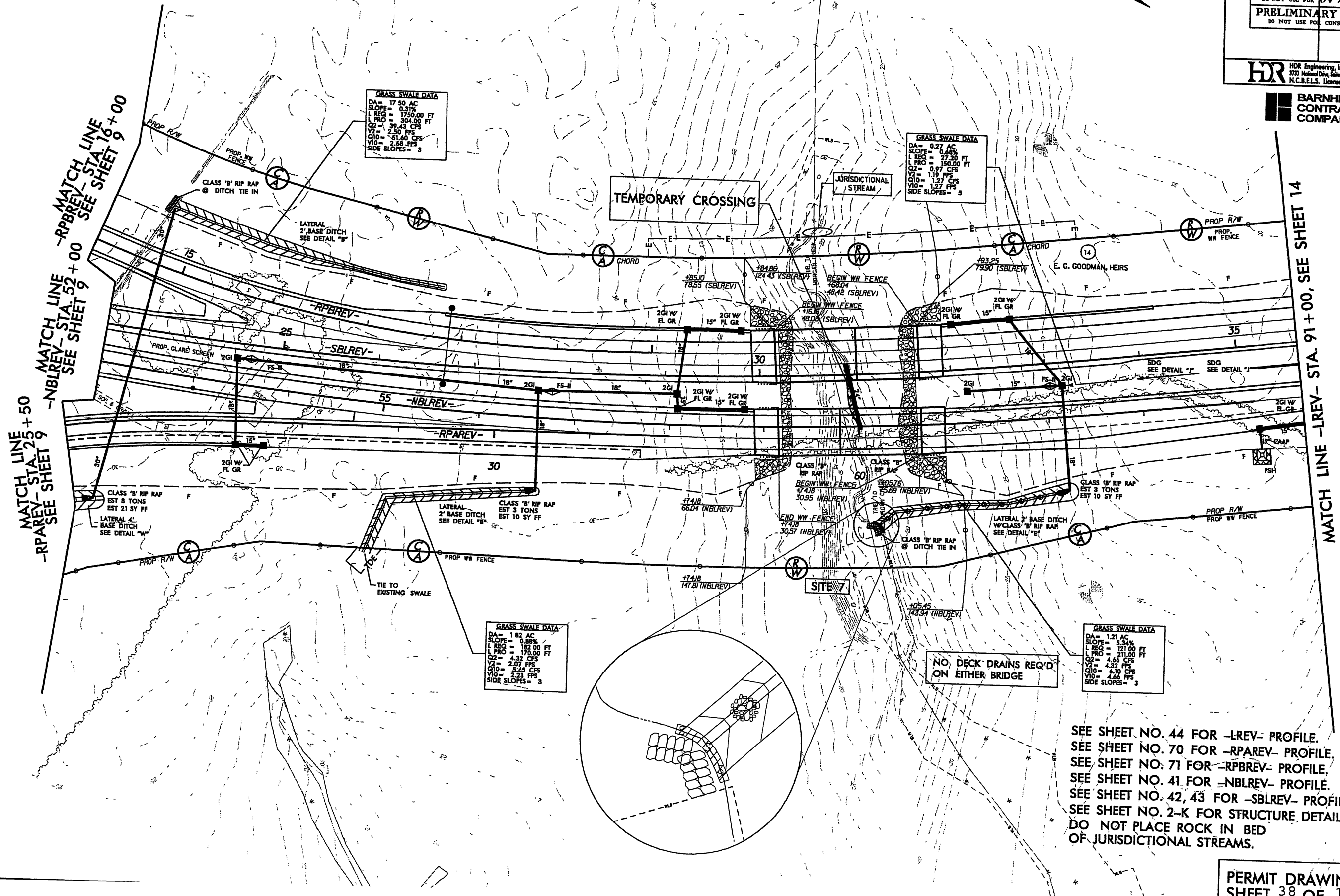
REVISIONS

8/17/99

MATCH LINE -STA. 25+50
-RPAREV- SEE SHEET 9

MATCH LINE -STA. 52+00
-NBLREV- SEE SHEET 9

MATCH LINE -STA. 16+00
-RPBREV- SEE SHEET 9



LEGEND

- Denotes Impacts in Surface Water
- Denotes Temporary Impacts in Surface Water

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	13
R/W SHEET NO. R-2633A PSH 13 & 14	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, NC 27602 N.C.B.E.L.S. License Number: F-0116	

BARNHILL CONTRACTING COMPANY

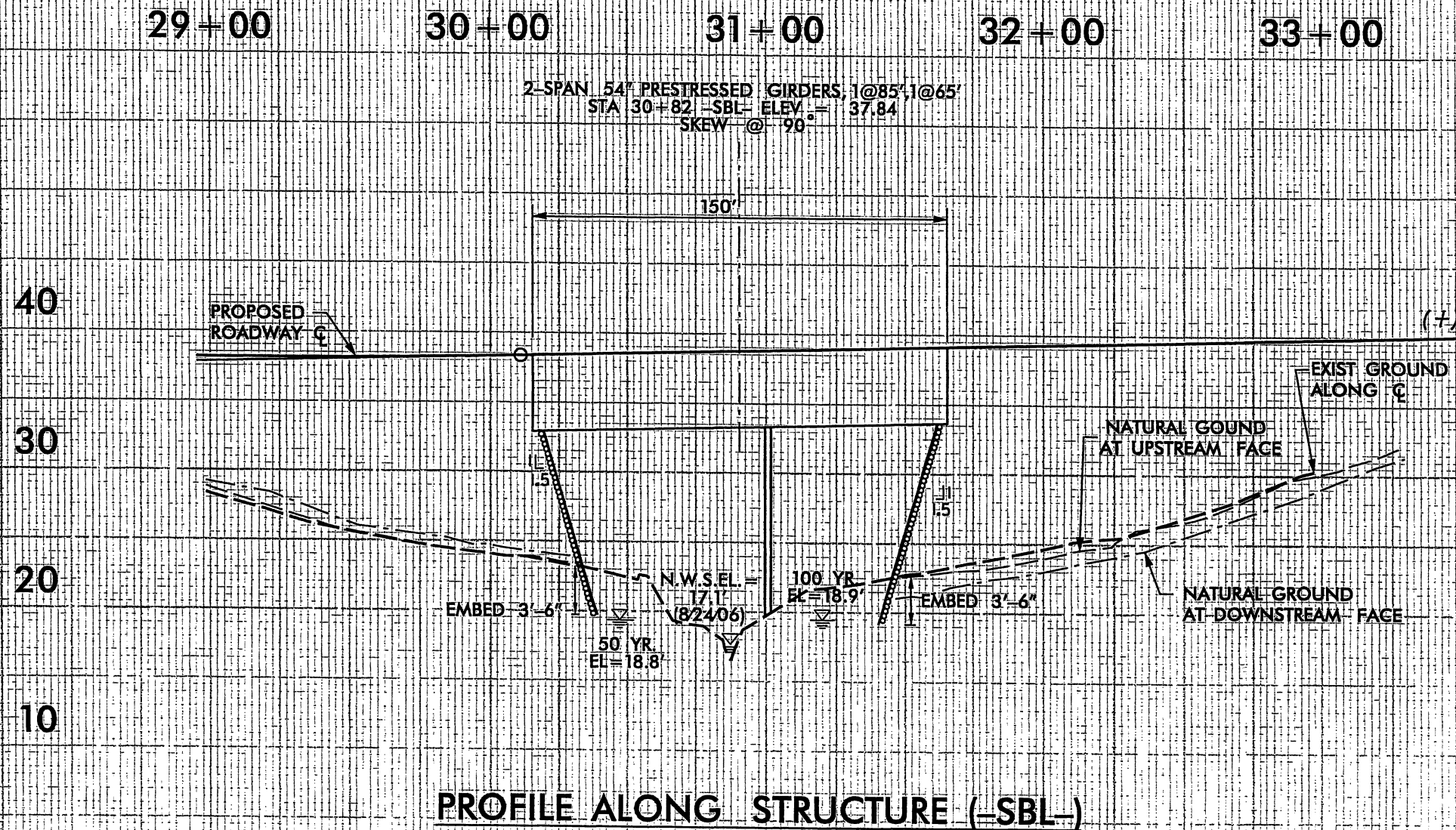
MATCH LINE -STA. 91+00, SEE SHEET 14

SEE SHEET NO. 44 FOR -LREV- PROFILE.
SEE SHEET NO. 70 FOR -RPAREV- PROFILE.
SEE SHEET NO. 71 FOR -RPBREV- PROFILE.
SEE SHEET NO. 41 FOR -NBLREV- PROFILE.
SEE SHEET NO. 42, 43 FOR -SBLREV- PROFILE.
SEE SHEET NO. 2-K FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

5/14/99

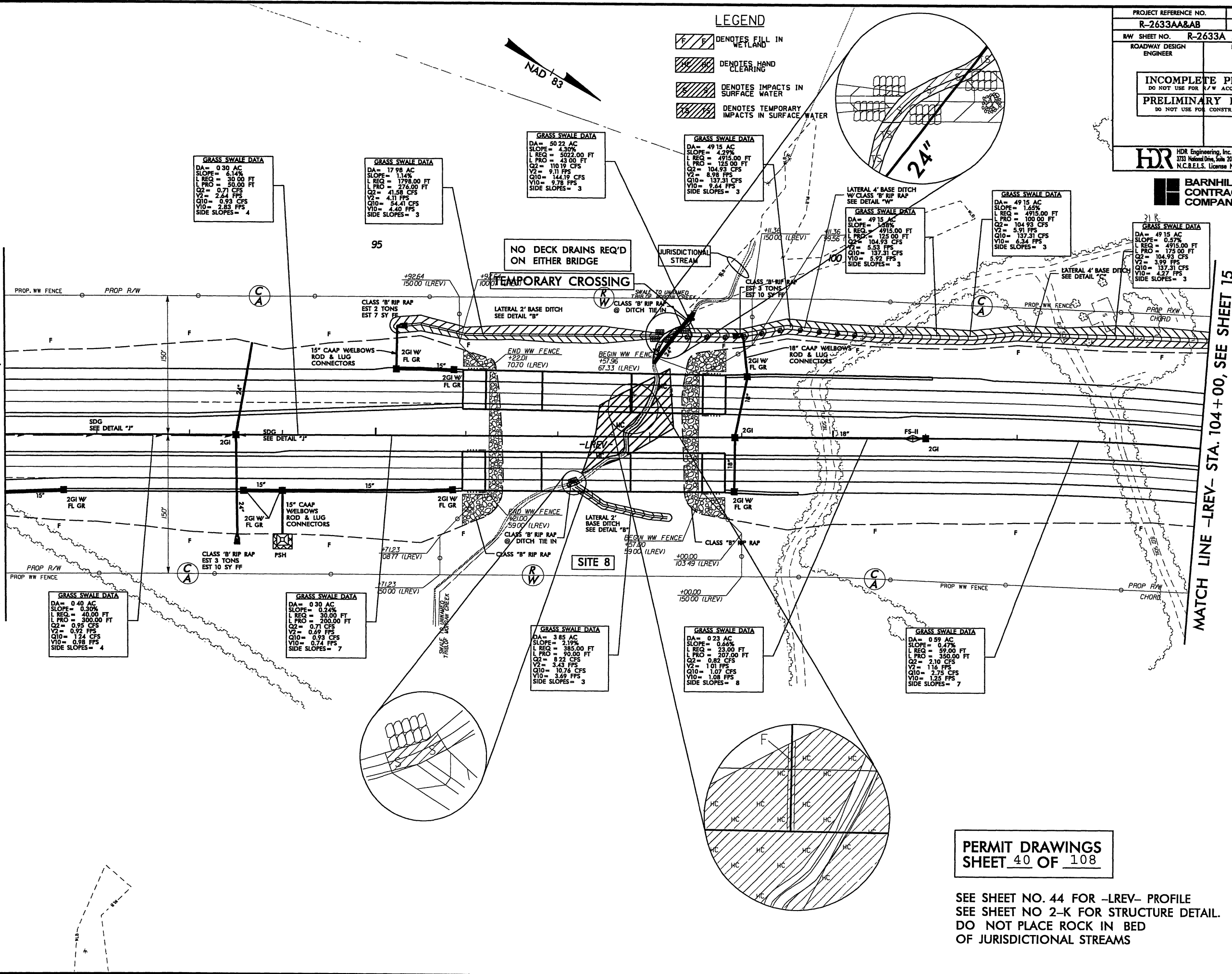
9/13/2000
C:\pwworking\top\01917879\R2633AA&AB.HYD.PRM.BSR2.dgn

PROJECT REFERENCE NO. R-2633AA&AB	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/E ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



PERMIT DRAWINGS
SHEET 39 OF 108

MATCH LINE -LREV- STA. 91+00, SEE SHEET 13



MATCH LINE -LREV- STA. 104+00, SEE SHEET 15

LEGEND

- Denotes FILL IN WETLAND
- Denotes HAND CLEARING
- Denotes IMPACTS IN SURFACE WATER
- Denotes TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	14
RAW SHEET NO.	R-2633A PSH 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

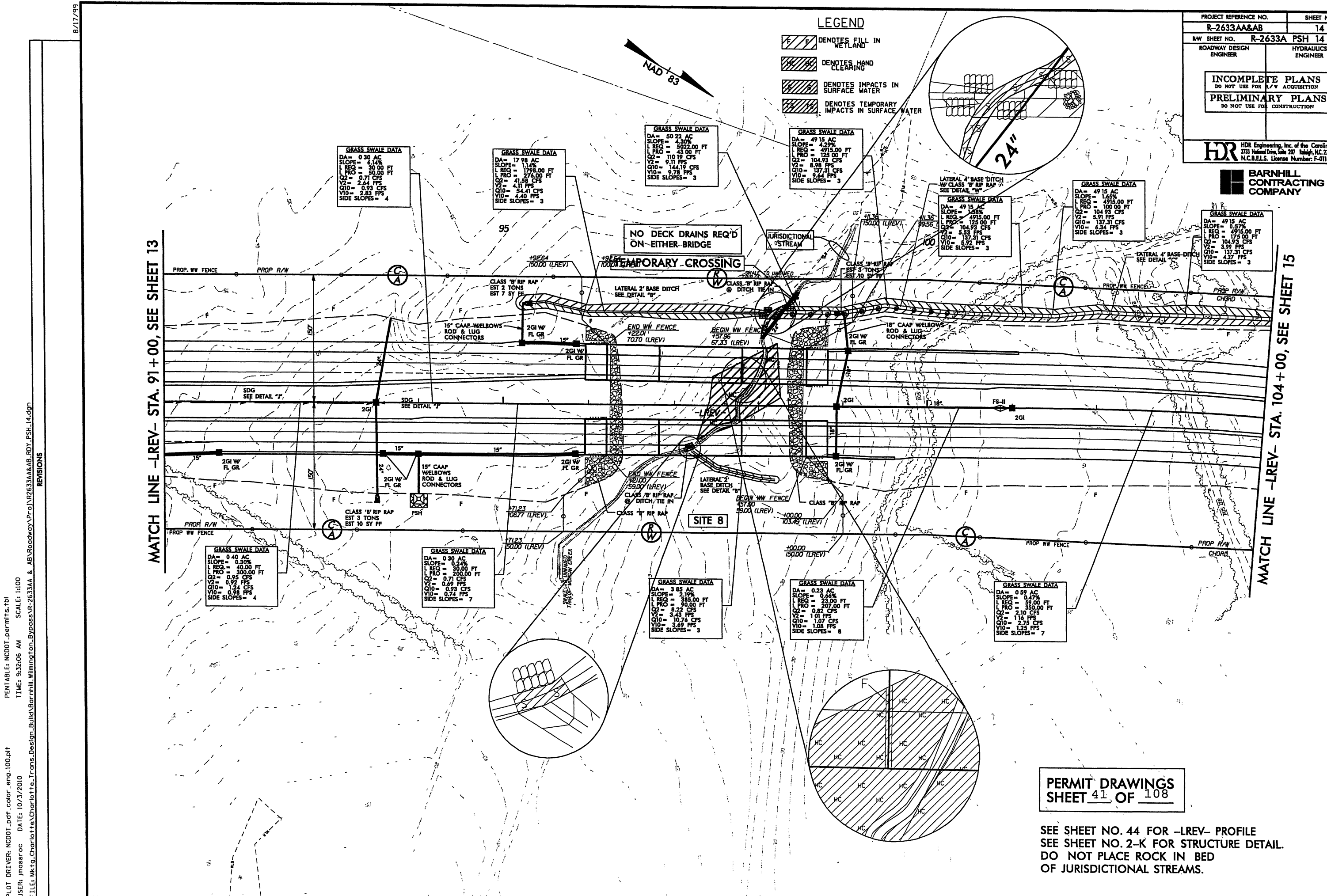
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

BARNHILL CONTRACTING COMPANY

PERMIT DRAWINGS
SHEET 40 OF 108

SEE SHEET NO. 44 FOR -LREV- PROFILE
SEE SHEET NO 2-K FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS



8/17/99

PLOT DRIVER: NCDOT...
PENTABLE: NCDOT...
TIME: 9:32:06 AM
SCALE: 1:100
USER: jmassroc
DATE: 10/3/2010
FILE: Mktg_Charlotte\Charlotte.Trans.Design_Build\Barnhill_R-2633AA & AB\Roadway\Proj\N2633AA&AB_RDY_PSH_14.dgn

REVISIONS

MATCH LINE -LREV- STA. 91+00, SEE SHEET 13

MATCH LINE -LREV- STA. 104+00, SEE SHEET 15

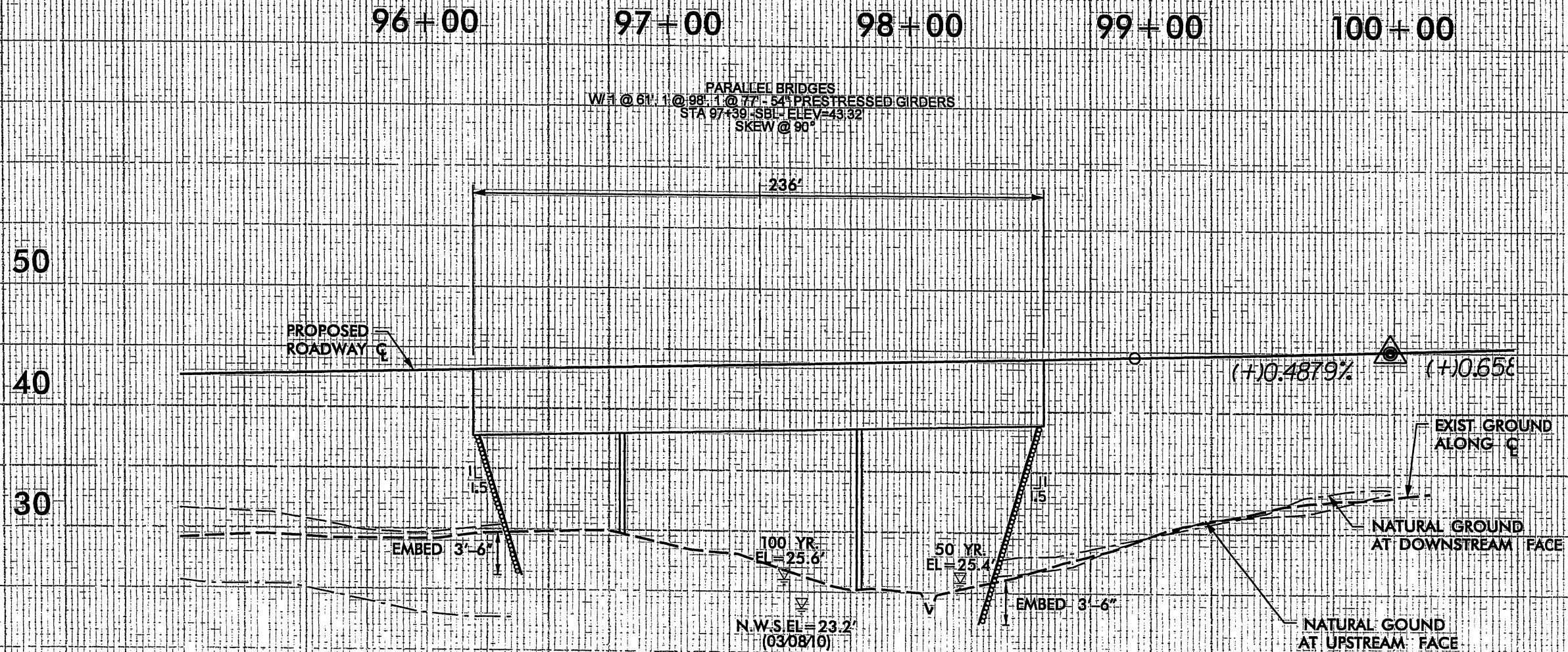
PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	14
RAW SHEET NO.	R-2633A PSH 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116	

BARNHILL CONTRACTING COMPANY

5/14/99

9/13/2010
c:\pwork\king\topo\0197879\2633AA&AB_HYD_PRM_BSR3.dgn


PROJECT REFERENCE NO. R-2633AA&AB	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	




PROFILE ALONG STRUCTURE (SBL)

PERMIT DRAWINGS
SHEET 42 OF 108

LEGEND

 DENOTES FILL IN
WETLAND

 DENOTES MECHANIZED
CLEARING

NAV 83/95

GRASS SWALE DATA
DA = 4915 AC
SLOPE = 1.00%
L REQ = 4915.00 FT
L PRO = 200.00 FT
Q2 = 104.93 CFS
V2 = 4.91 FPS
Q10 = 137.31 CFS
V10 = 5.26 FPS
SIDE SLOPES = 3

GRASS SWALE DATA
DA = 49.15 AC
SLOPE = 0.89%
L REQ = 4915.00 FT
L PRO = 200.00 FT
Q2 = 104.93 CFS
V2 = 4.70 FPS
Q10 = 137.31 CFS
V10 = 5.04 FPS
SIDE SLOPES = 3

GRASS SWALE DATA
DA = 110 AC
SLOPE = 0.41%
L REQ = 110.00 FT
L PRO = 580.00 FT
Q2 = 4.57 CFS
Y2 = 1.42 FPS
Q10 = 5.98 CFS
Y10 = 1.52 FPS
SIDE SLOPES = 5.5

SITE 10A**SITE 10B**

PIPE OUTLET DATA
DA = 44.21 AC
SLOPE = 0.26%
Q2 = 21.18 CFS
V2 = 1.73 FPS
Q10 = 28.78 CFS
V10 = 1.93 FPS

GRASS SWALE DATA
DA = 0.72 AC
SLOPE = 0.56%
L REQ = 72.00 FT
L PRO = 400.00 FT
Q2 = 2.99 CFS
V2 = 1.43 FPS
Q10 = 3.91 CFS
V10 = 1.53 FPS
SIDE SLOPES = 55

GRASS SWALE DATA
DA = 0.32 AC
SLOPE = 0.22%
L REQ = 32.00 FT
L PRO = 170.00 FT
Q2 = 1.33 CFS
V2 = 0.83 FPS
Q10 = 1.74 CFS
V10 = 0.89 FPS
SIDE SLOPES = 5:5

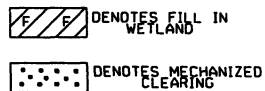
GRASS SWALE DATA
DA = 15 62 AC
SLOPE = 1.26%
L REQ = 1562.00 FT
L PRO = 257.00 FT
Q2 = 32.42 CFS
V2 = 4.01 FPS
Q10 = 42.42 CFS
V10 = 4.30 FPS
SIDE SLOPES = 3

PERMIT DRAWINGS
SHEET 43 OF 108

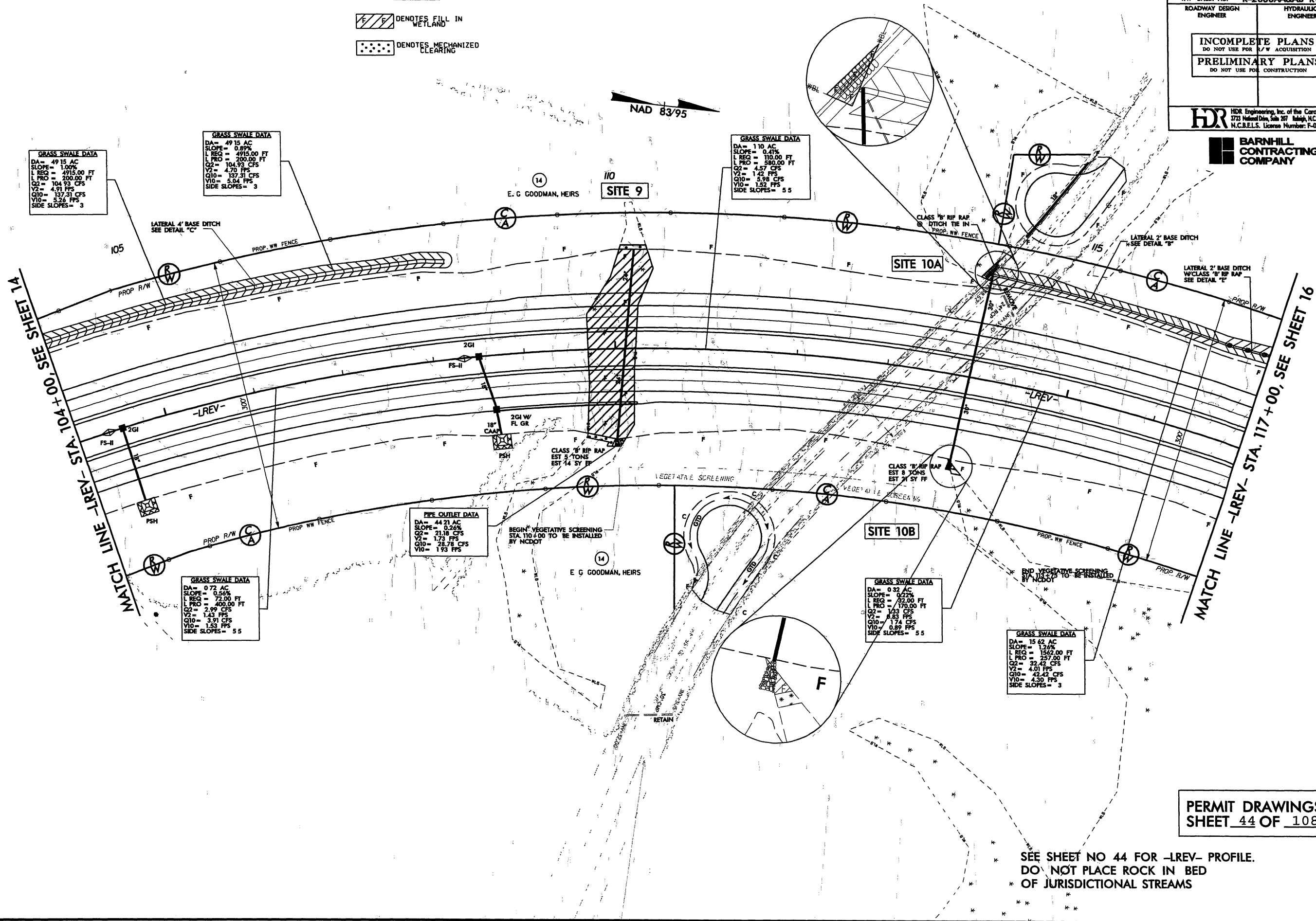
SEE SHEET NO. 44 FOR -LREV- PROFILE
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS

PENTABLE; NCDD01..permlts.NOCON.tbl
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DATE: 10/14/2010

LEGEND



NAD 83/95

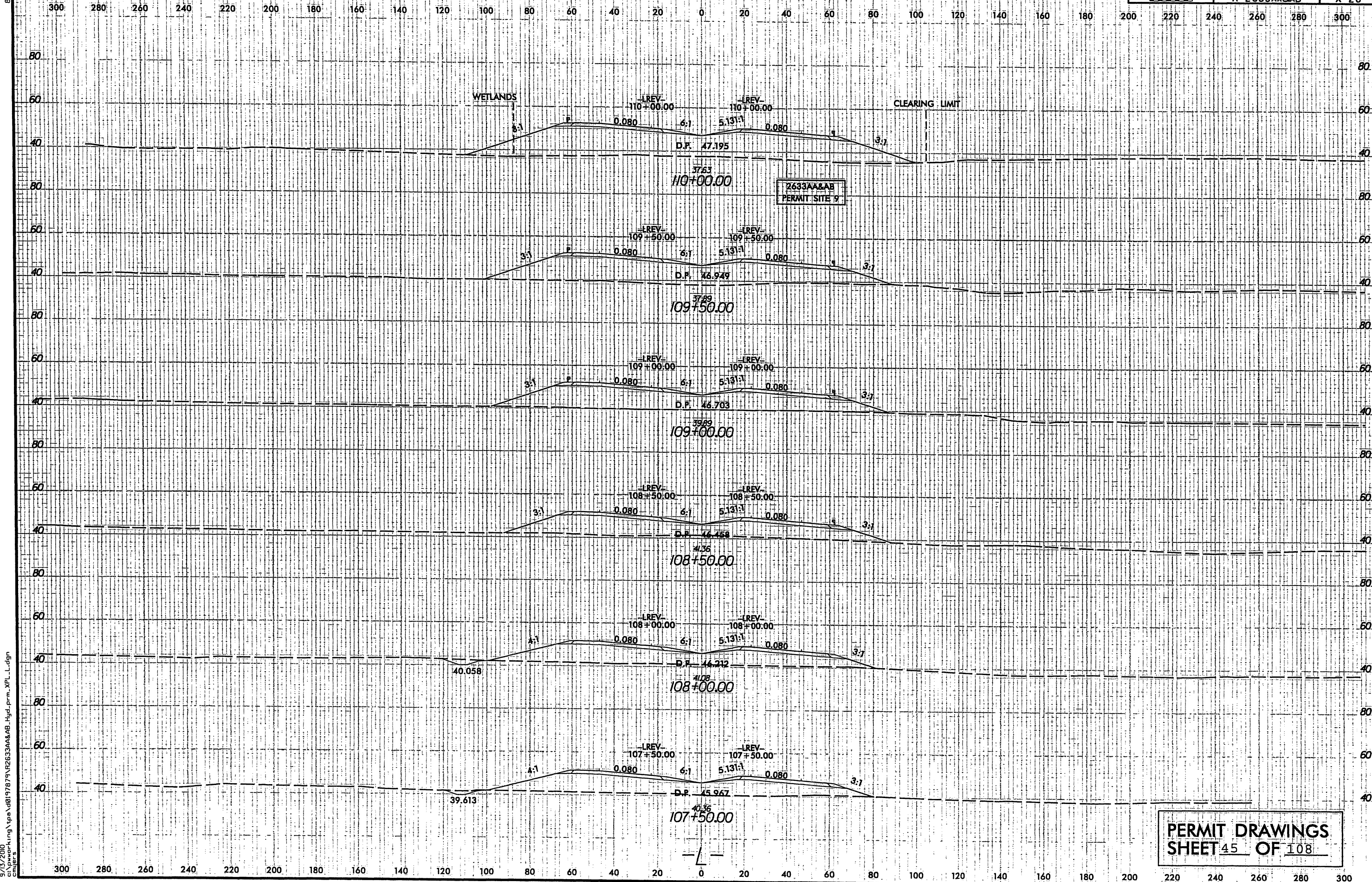


PROJECT REFERENCE NO. R-2633AA&AB		SHEET NO. 15	
RW SHEET NO. R-2633AA&AB RW-15		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
HDR HDR Engineering, Inc. of the Carolinas 3733 Industrial Blvd., Suite 207, Raleigh, NC 27603 N.C.B.E.L.S. License Number: F-0116			
BARNHILL CONTRACTING COMPANY			

8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2633AA&AB	X-26

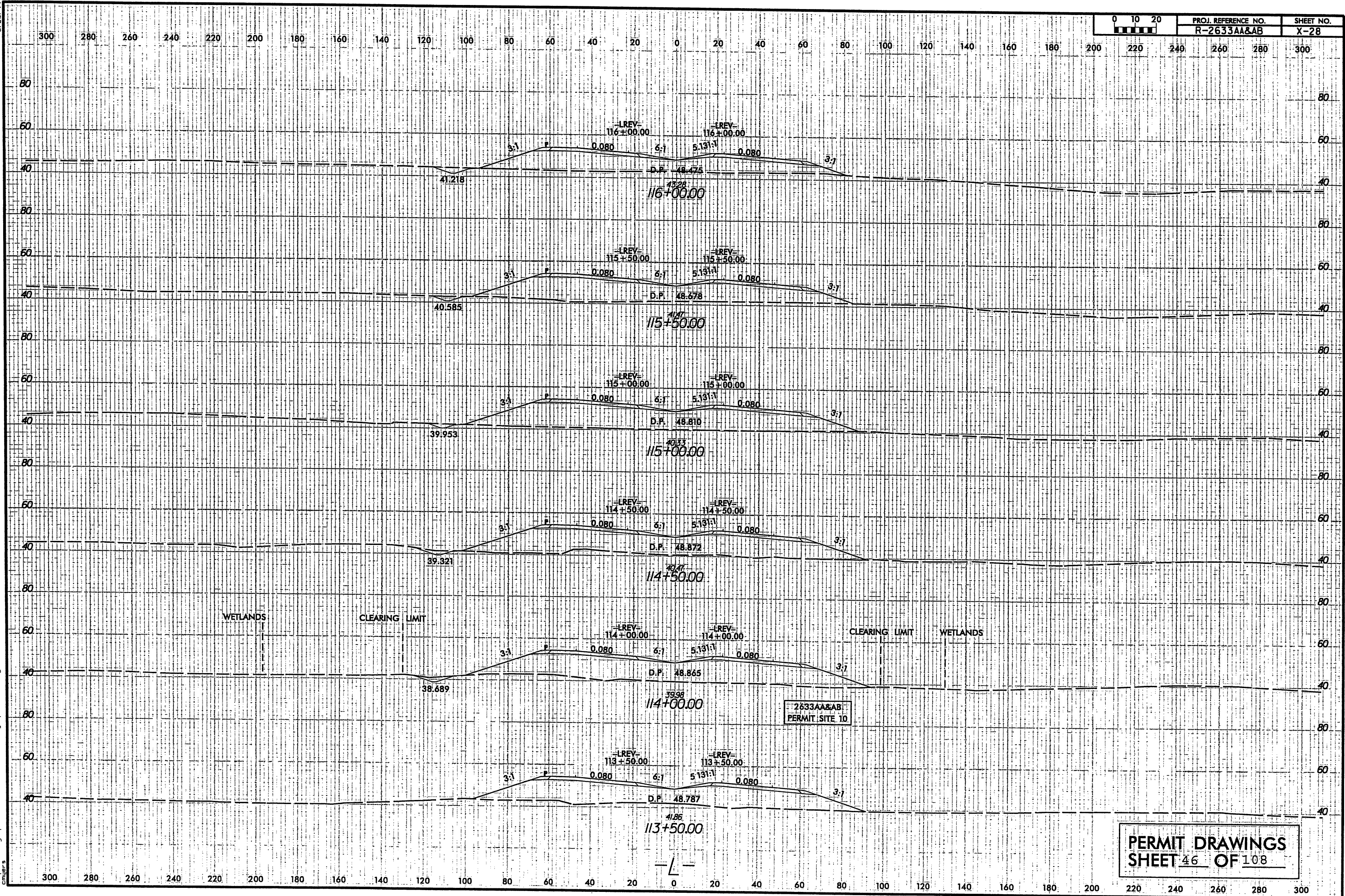


PERMIT DRAWINGS
SHEET 45 OF 108

9/13/2000
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8/23/99

9/13/2000
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Emile's

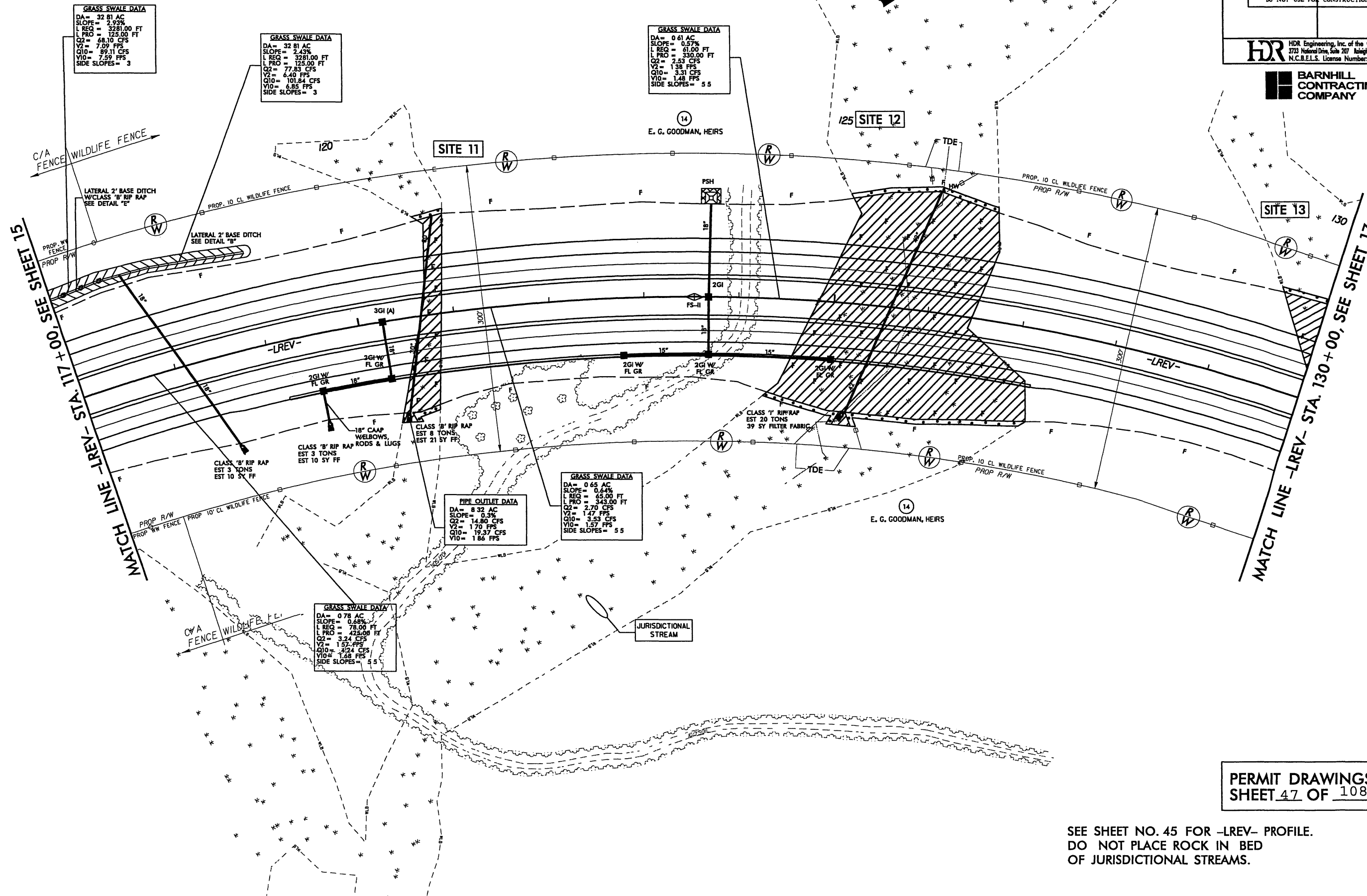


LEGEND



PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	16
R/W SHEET NO. R-2633A PSH 16 & 17	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27602 N.C.B.E.L.S. License Number: F-0116	

BARNHILL CONTRACTING COMPANY







PERMIT DRAWINGS
SHEET 47 OF 108

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

8/17/99

LEGEND

-  DENOTES FILL IN WETLAND
-  DENOTES MECHANIZED CLEARING

PROJECT REFERENCE NO. R-2633AA&AB		SHEET NO. 16	
RW SHEET NO. R-2633A		PSH 16 & 17	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div><div>INCOMPLETE PLANS DO NOT USE FOR P/W ACQUISITION</div><div>PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div></div>			
<div><div> HDR</div><div>HDR Engineering, Inc. of the Carolinas 3753 Noland Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116</div></div>			
<div><div> BARNHILL</div><div>CONTRACTING COMPANY</div></div>			

GRASS SWALE DATA
DA = 32.81 AC
SLOPE = 2.93%
L REQ = 3281.00 FT
L PRO = 125.00 FT
Q2 = 68.10 CFS
V2 = 7.09 FPS
Q10 = 99.11 CFS
V10 = 7.59 FPS
SIDE SLOPES = 3

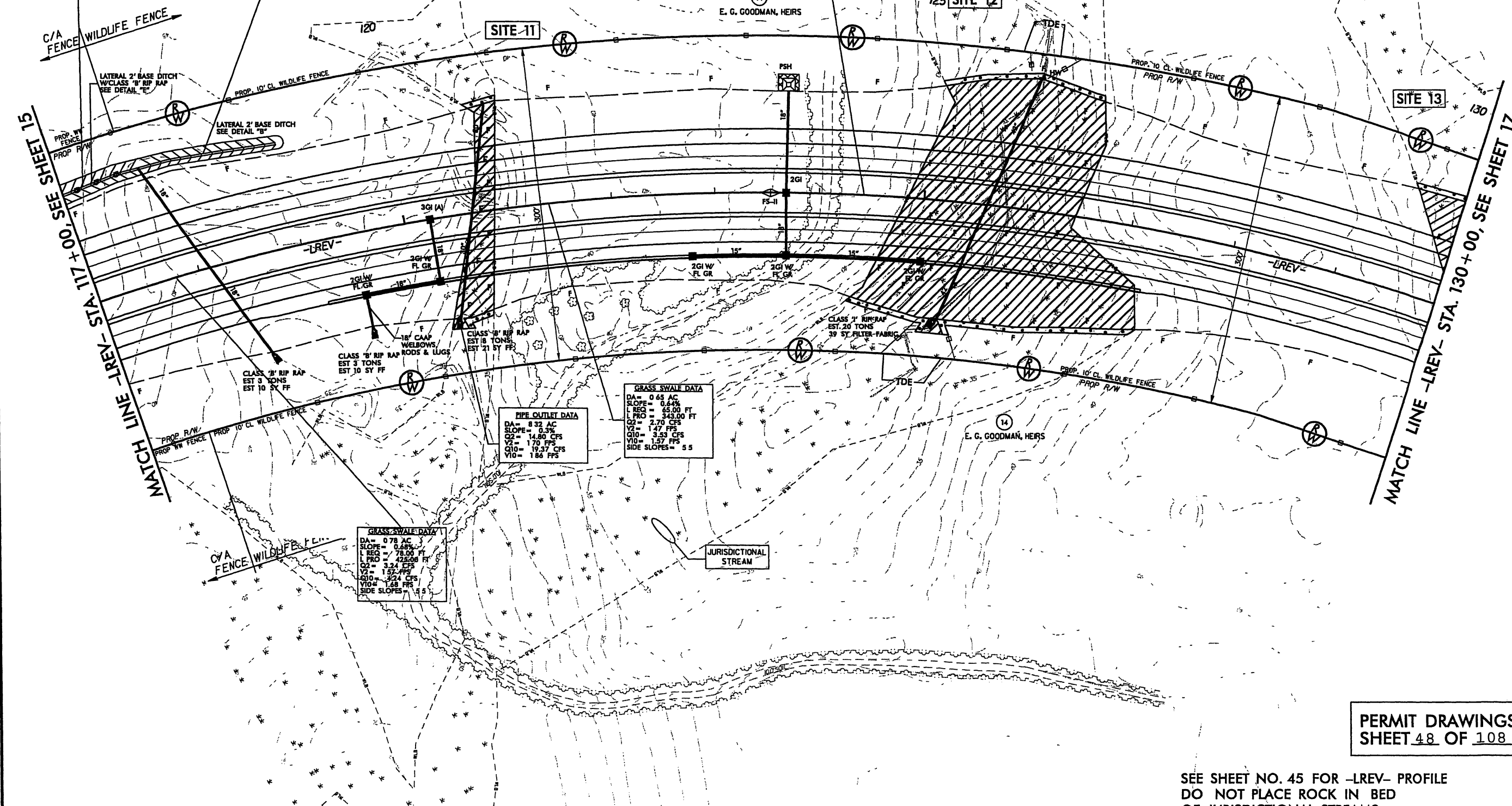
GRASS SWALE DATA
DA = 32.81 AC
SLOPE = 2.43%
L REQ = 3281.00 FT
L PRO = 125.00 FT
Q2 = 77.83 CFS
V2 = 6.40 FPS
Q10 = 101.84 CFS
V10 = 6.85 FPS
SIDE SLOPES = 3

GRASS SWALE DATA
DA = 0.61 AC
SLOPE = 0.57%
L REQ = 61.00 FT
L PRO = 330.00 FT
Q2 = 2.53 CFS
V2 = 1.38 FPS
Q10 = 3.31 CFS
V10 = 1.48 FPS
SIDE SLOPES = 5.5

GRASS SWALE DATA
DA = 0.65 AC
SLOPE = 0.64%
L REQ = 65.00 FT
L PRO = 343.00 FT
Q2 = 2.70 CFS
V2 = 1.47 FPS
Q10 = 3.53 CFS
V10 = 1.57 FPS
SIDE SLOPES = 5.5

PIPE OUTLET DATA
DA = 8.32 AC
SLOPE = 0.3%
Q2 = 14.80 CFS
V2 = 1.70 FPS
Q10 = 19.37 CFS
V10 = 1.84 FPS

GRASS SWALE DATA
DA = 0.78 AC
SLOPE = 0.68%
L REQ = 78.00 FT
L PRO = 425.00 FT
Q2 = 3.24 CFS
V2 = 1.52 FPS
Q10 = 4.24 CFS
V10 = 1.68 FPS
SIDE SLOPES = 4.5



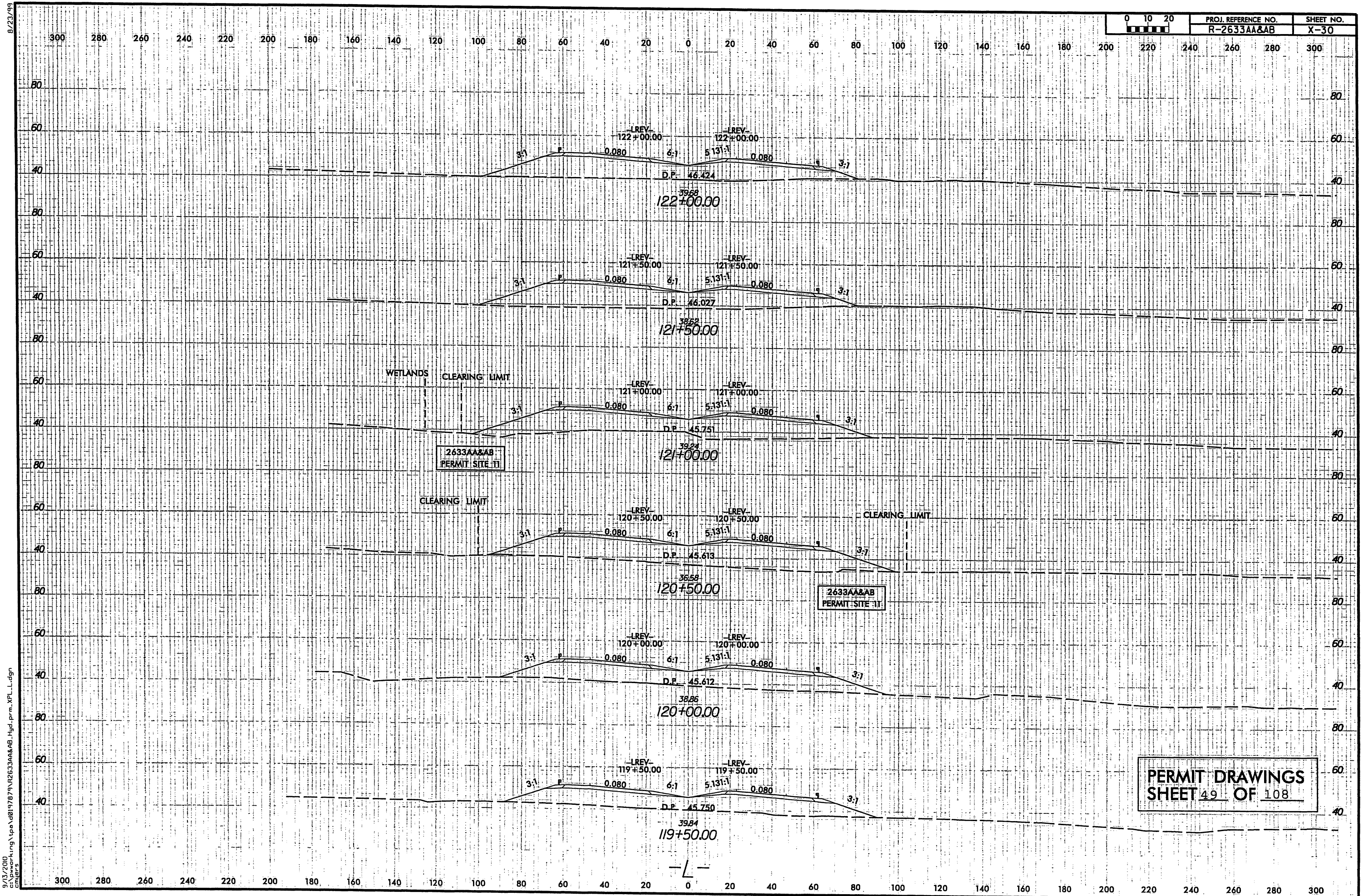
PERMIT DRAWINGS
SHEET 48 OF 108

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

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USER: jmassoc DATE: 10/3/2010
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REVISIONS

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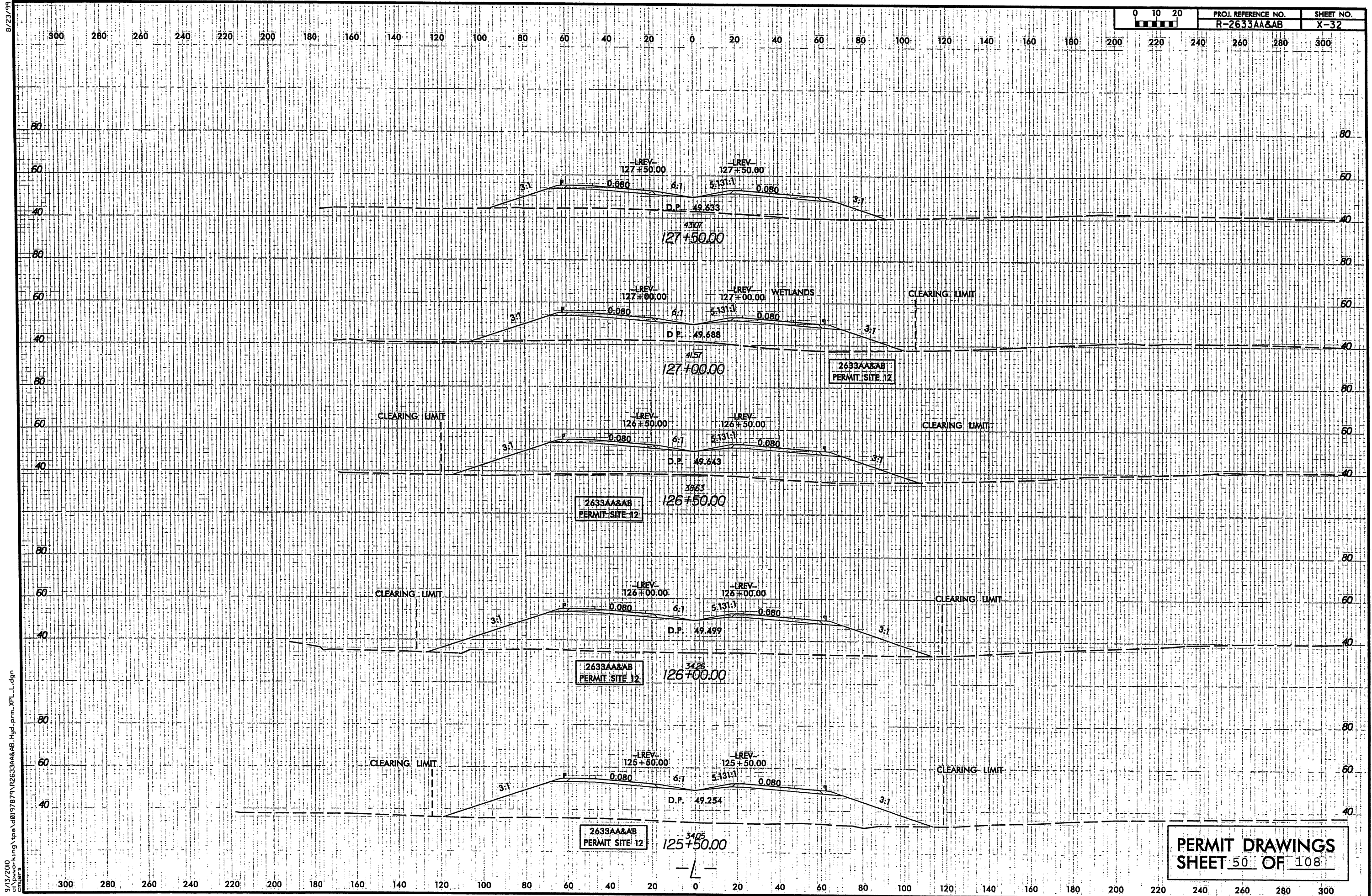


8/23/99



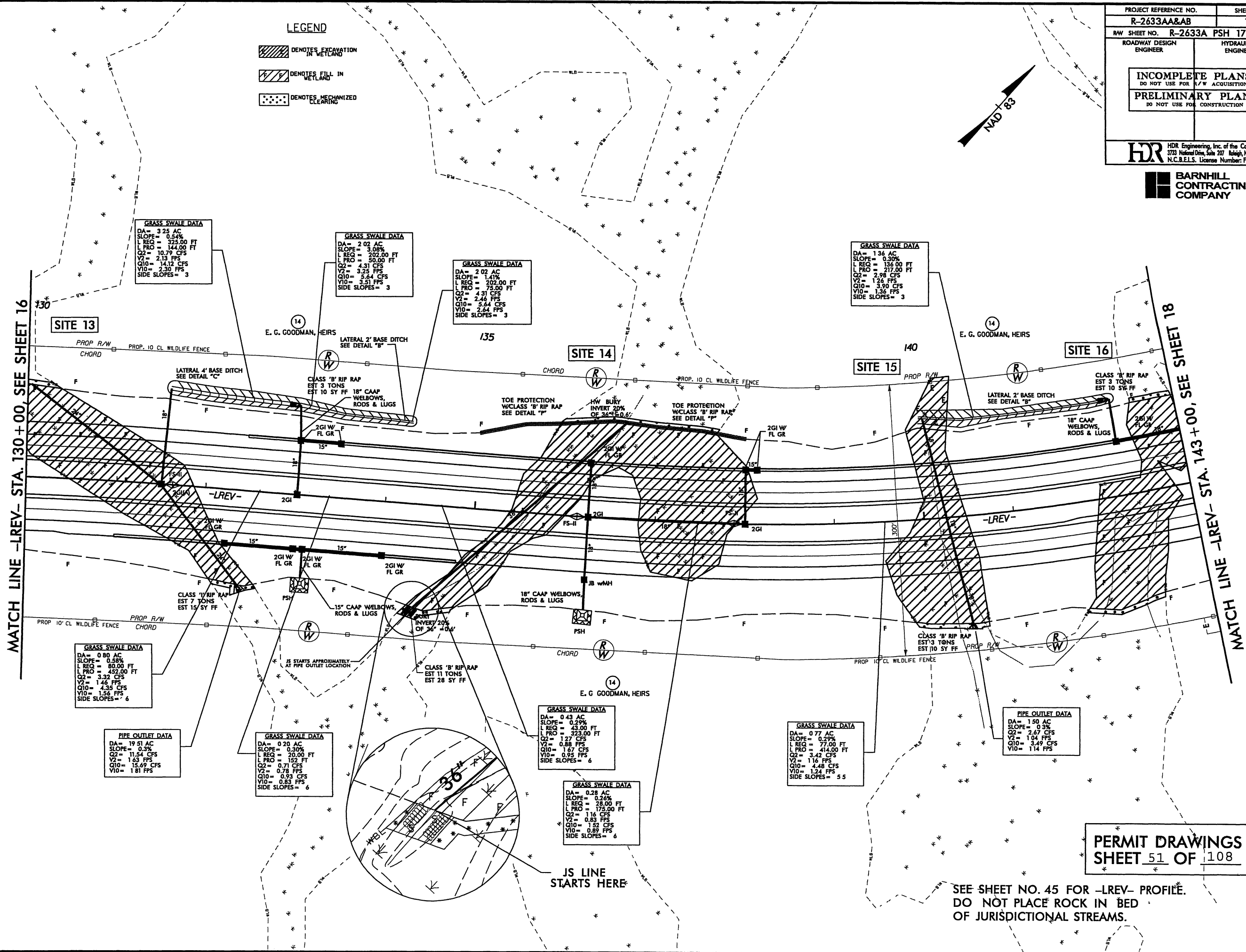
PROJ. REFERENCE NO.
R-2633AA&AB

SHEET NO.
X-32



9/13/2010
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PERMIT DRAWINGS
SHEET 50 OF 108



MATCH LINE -LREV- STA. 130+00, SEE SHEET 16

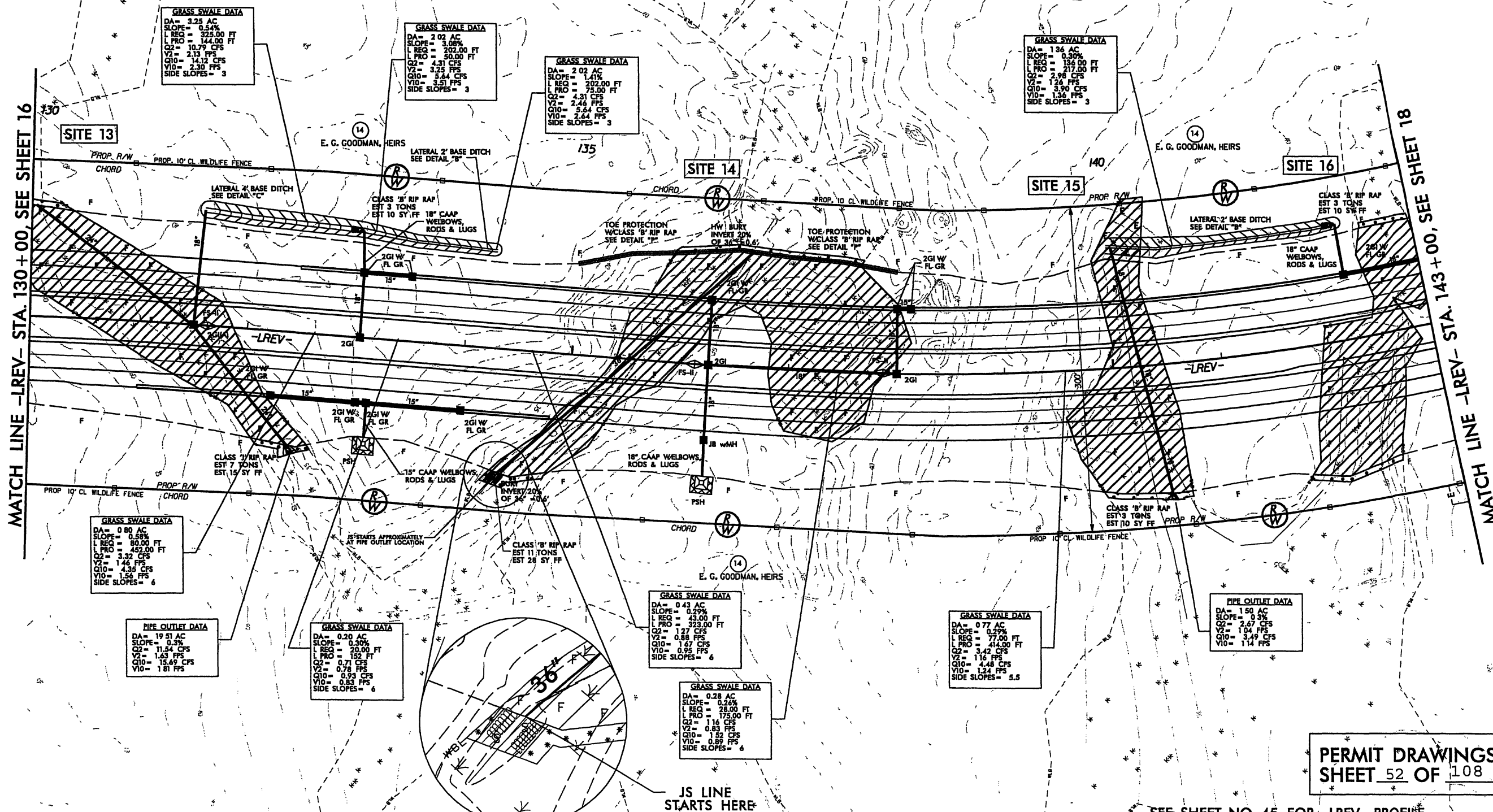
MATCH LINE -LREV- STA. 143+00, SEE SHEET 18

LEGEND

- DENOTES EXCAVATION IN WETLAND
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	17
RAW SHEET NO. R-2633A PSH 17 & 18	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
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	

BARNHILL
CONTRACTING
COMPANY



PERMIT DRAWINGS
SHEET 52 OF 108

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

JS LINE
STARTS HERE

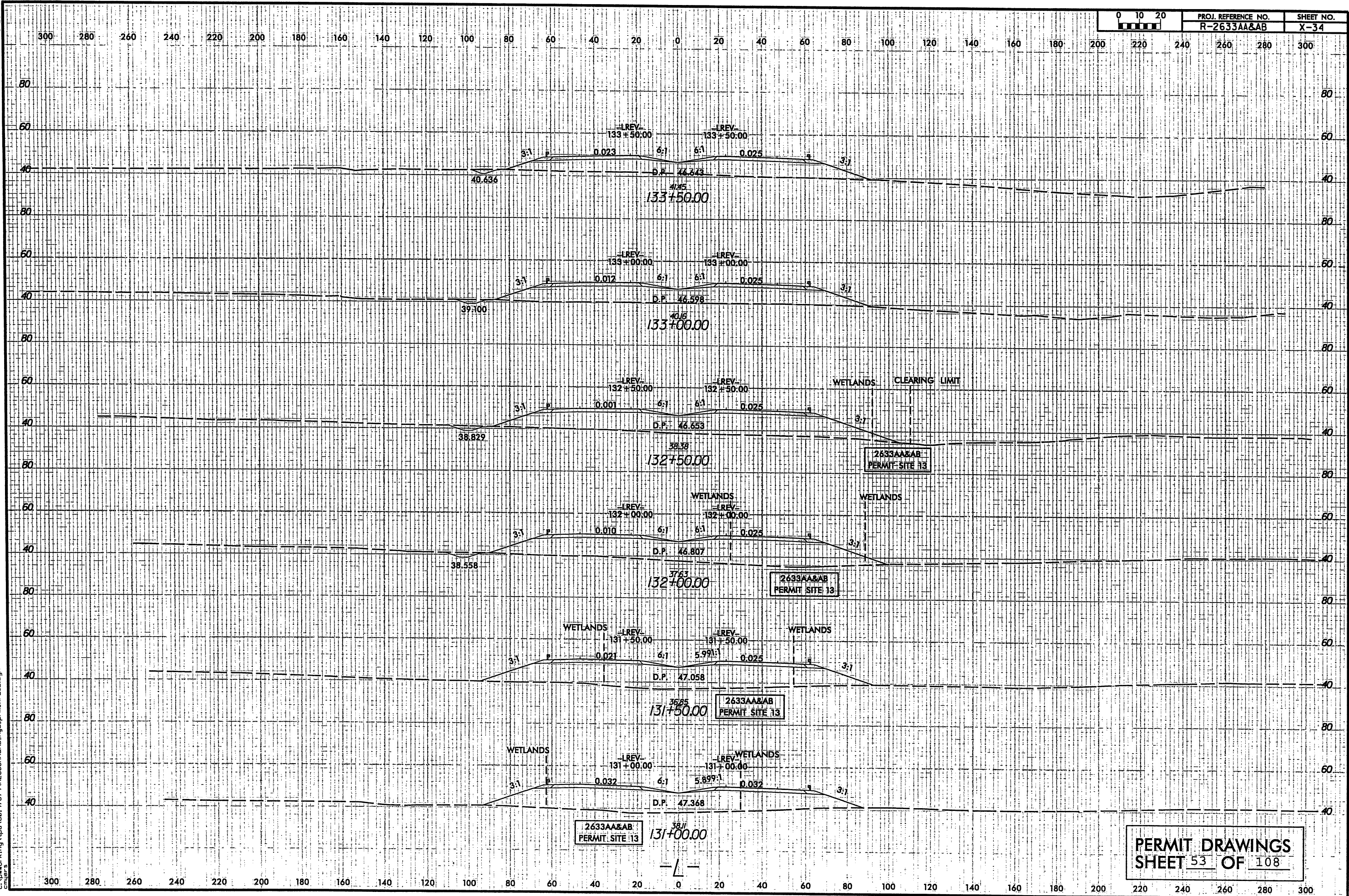
8/23/99

9/13/2000
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PROJ. REFERENCE NO.
R-2633AA&AB

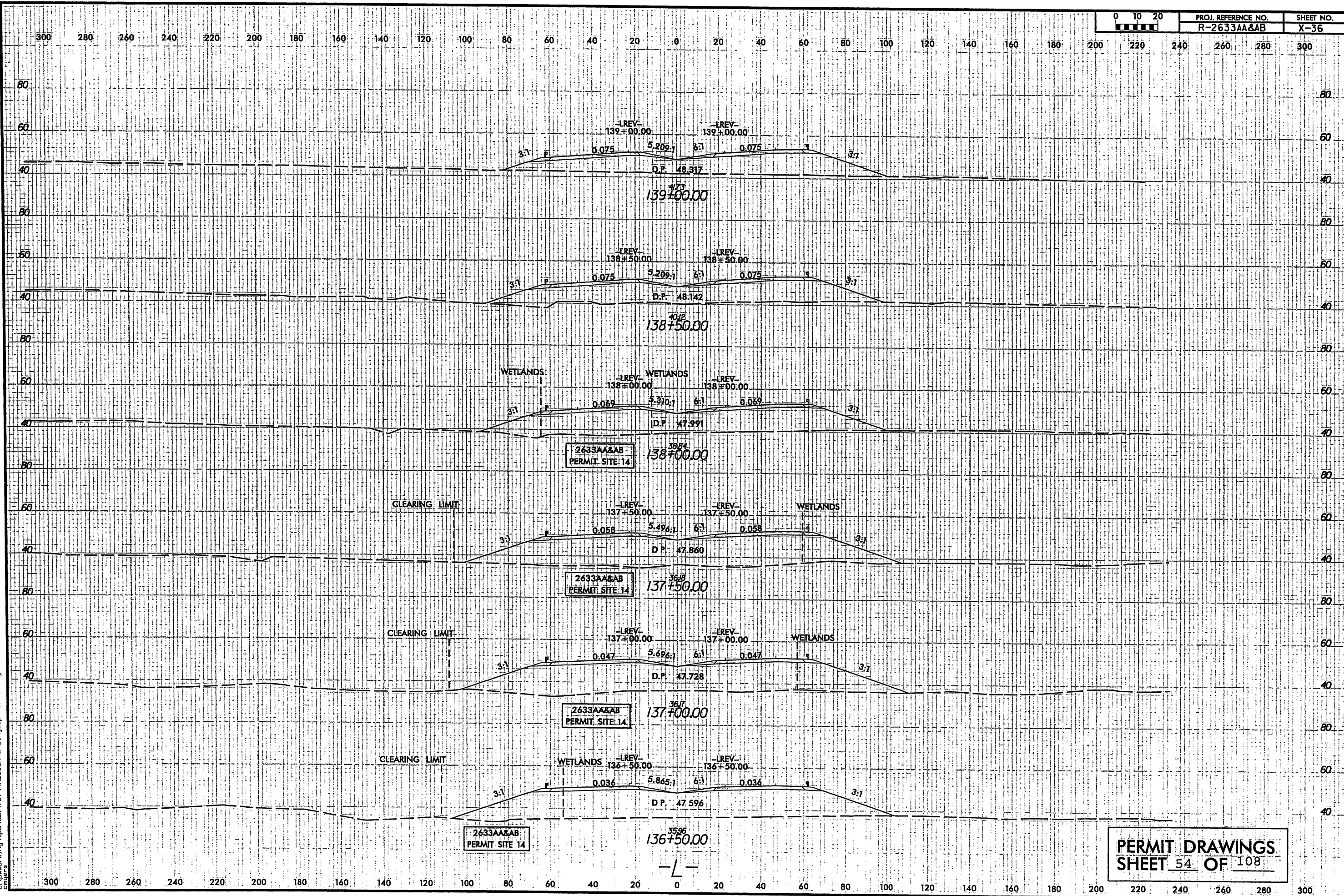
SHEET NO.
X-34



8/23/99

9/13/2010
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gnders

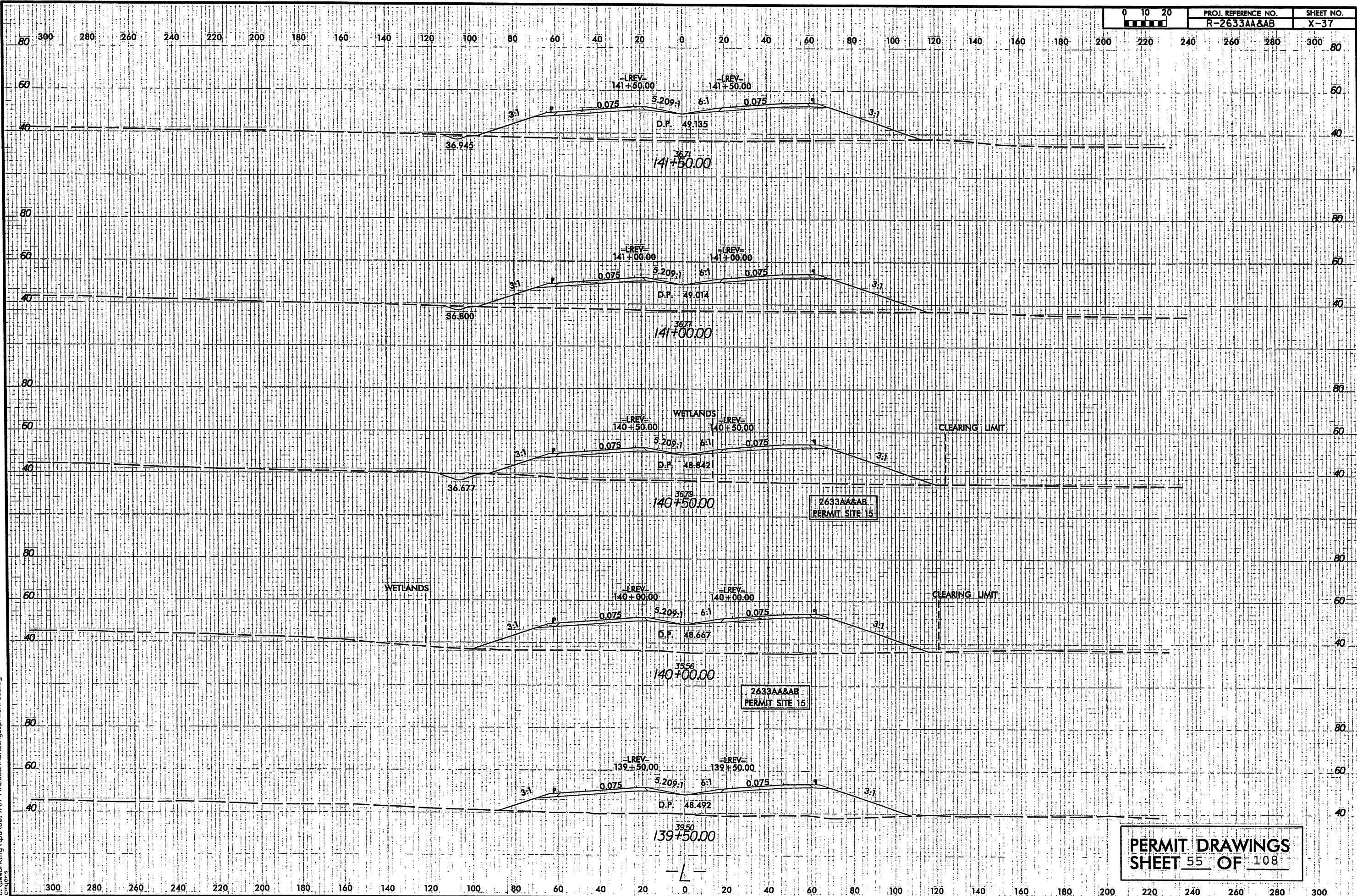
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	R-2633AA&AB	X-36



PERMIT DRAWINGS
SHEET 54 OF 108

8/23/99

9/13/2010
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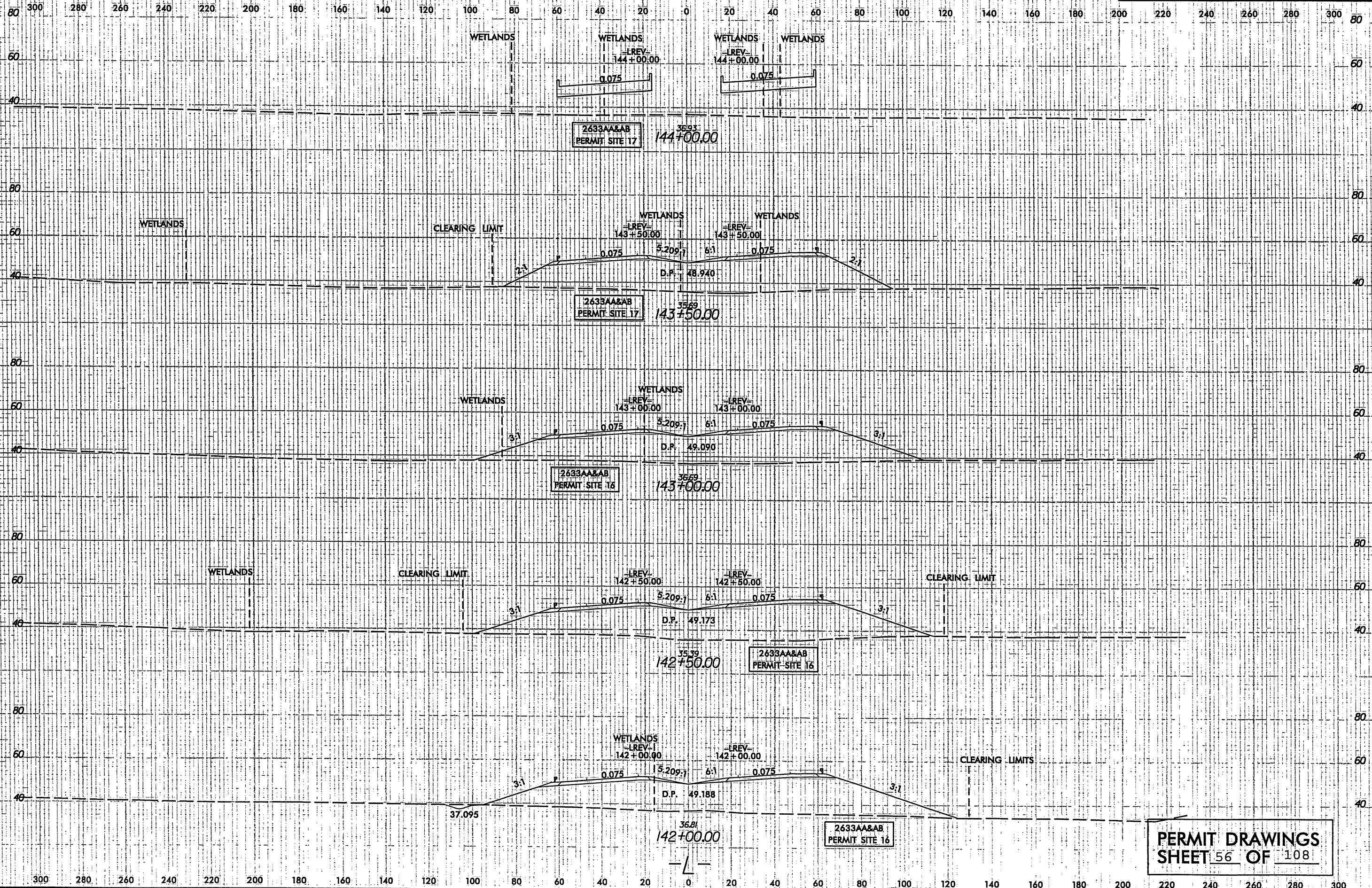


B/23/99

9/13/2010
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cmder's



PROJ. REFERENCE NO.	SHEET NO.
R-2633AA&AB	X-38



REVISIONS

8/17/99

MATCH LINE -LREV- STA. 143+00, SEE SHEET 17

JURISDICTIONAL
STREAM

GRASS SWALE DATA
DA= 0.24 AC
SLOPE= 0.18%
L REQ= 24.00 FT
L PRO= 131.00 FT
Q2= 1.07 CFS
Q10= 1.40 CFS
Q100= 0.77 FPS
SIDE SLOPES= 5.5

NO DECK DRAINS REQ'D
ON EITHER BRIDGE

NOTE:
RUN TO WILDLIFE
UNDER BRIDGE

GRASS SWALE DATA
DA= 0.19 AC
SLOPE= 0.30%
L REQ= 19.00 FT
L PRO= 100.00 FT
Q2= 0.79 CFS
Q10= 1.03 CFS
Q100= 0.87 FPS
SIDE SLOPES= 5.5

GRASS SWALE DATA
DA= 1.00 AC
SLOPE= 0.53%
L REQ= 100.00 FT
L PRO= 550.00 FT
Q2= 4.15 CFS
Q10= 5.45 CFS
Q100= 1.63 FPS
SIDE SLOPES= 5.5

GRASS SWALE DATA
DA= 0.19 AC
SLOPE= 0.58%
L REQ= 19.00 FT
L PRO= 100.00 FT
Q2= 0.79 CFS
Q10= 1.04 CFS
Q100= 1.03 CFS
SIDE SLOPES= 5.5

GRASS SWALE DATA
DA= 0.28 AC
SLOPE= 0.59%
L REQ= 28.00 FT
L PRO= 150.00 FT
Q2= 1.16 CFS
Q10= 1.52 CFS
Q100= 1.23 FPS
SIDE SLOPES= 5.5

SEE SHEET NO. 45, 46 FOR -LREV- PROFILE
SEE SHEET NO. 2-L FOR STRUCTURE DETAIL
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS

PERMIT DRAWINGS
SHEET 57 OF 108

LEGEND

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



PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	18
R/W SHEET NO. R-2633A	PSH 18 & 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
HDR Engineering, Inc. of the Carolinas 1731 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0716	
BARNHILL CONTRACTING COMPANY	




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FILE: Mktg.Charlotte\Charlotte.Trans.Design.Built\Barnhill\Wilmington.Bypass\B-2633AA & AB\Roadway\Pro\N2633AAAB.RDY_PSH_18.dgn

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REVISIONS

8/17/99

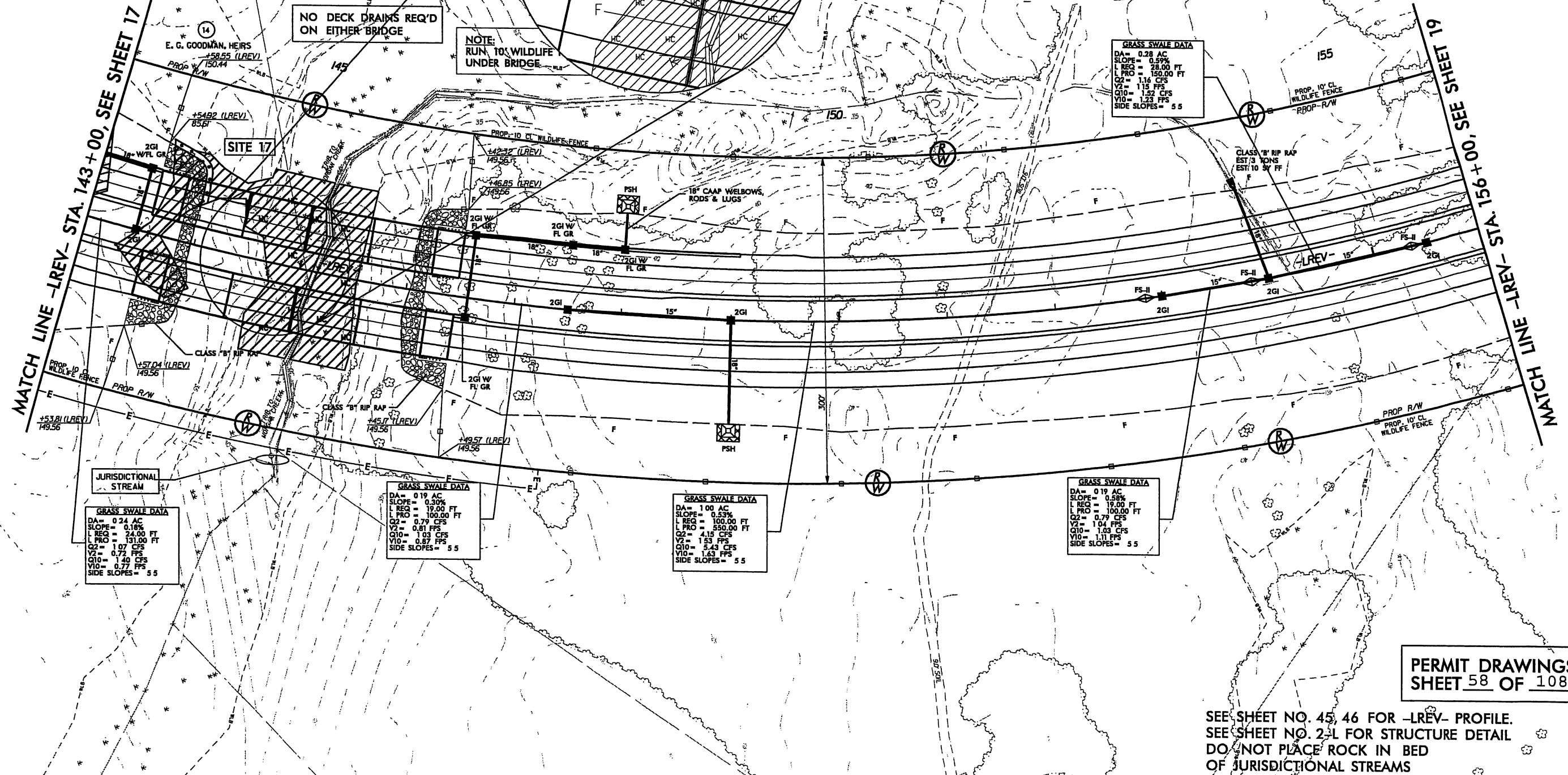
LEGEND

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

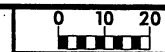


PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	18
R/W SHEET NOW R-2633A PSH 18 & 19	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
 HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116	

 **BARNHILL CONTRACTING COMPANY**

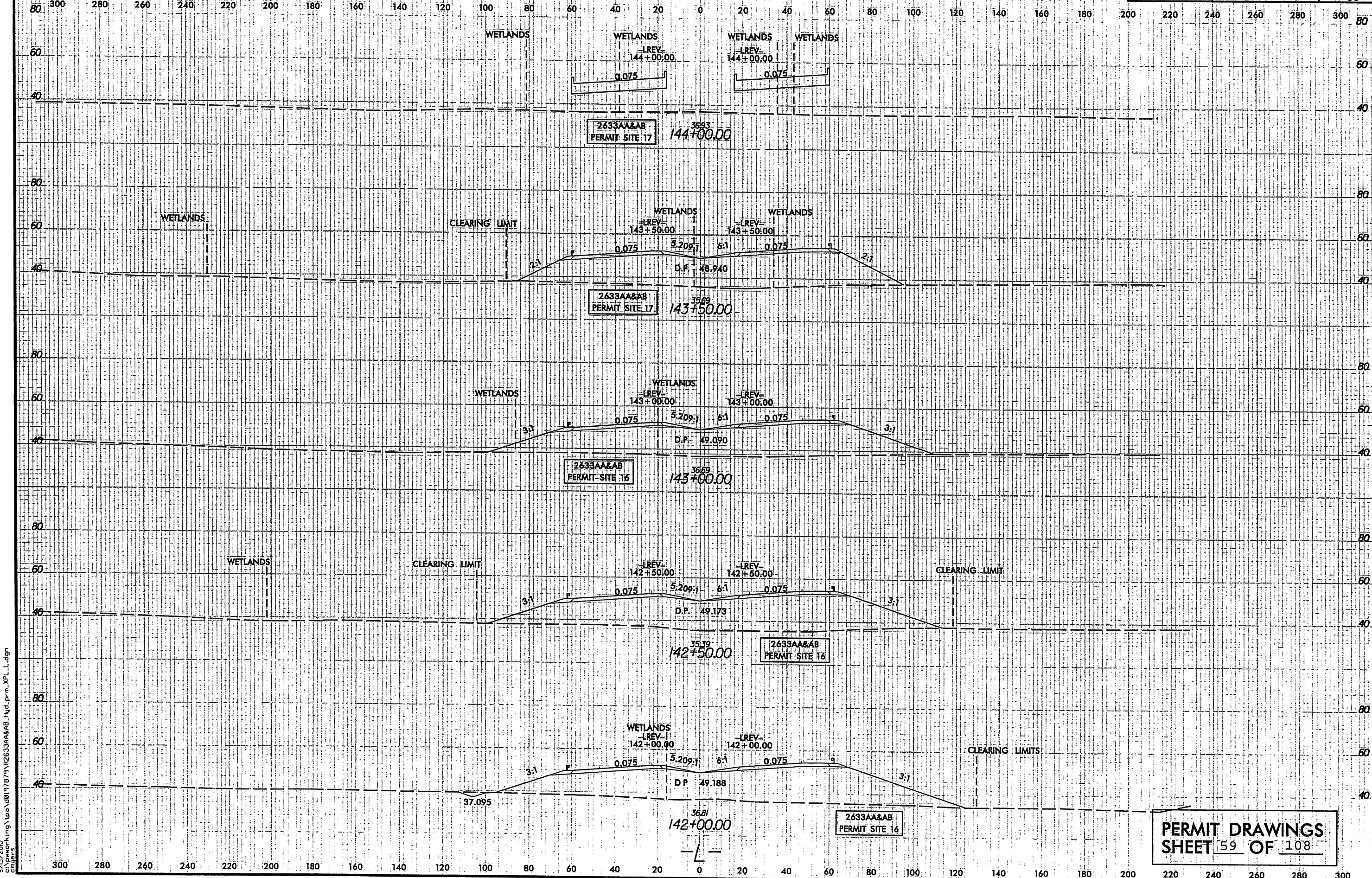


8/23/99



PROJ. REFERENCE NO.
R-2633AA&AB

SHEET NO.
X-38



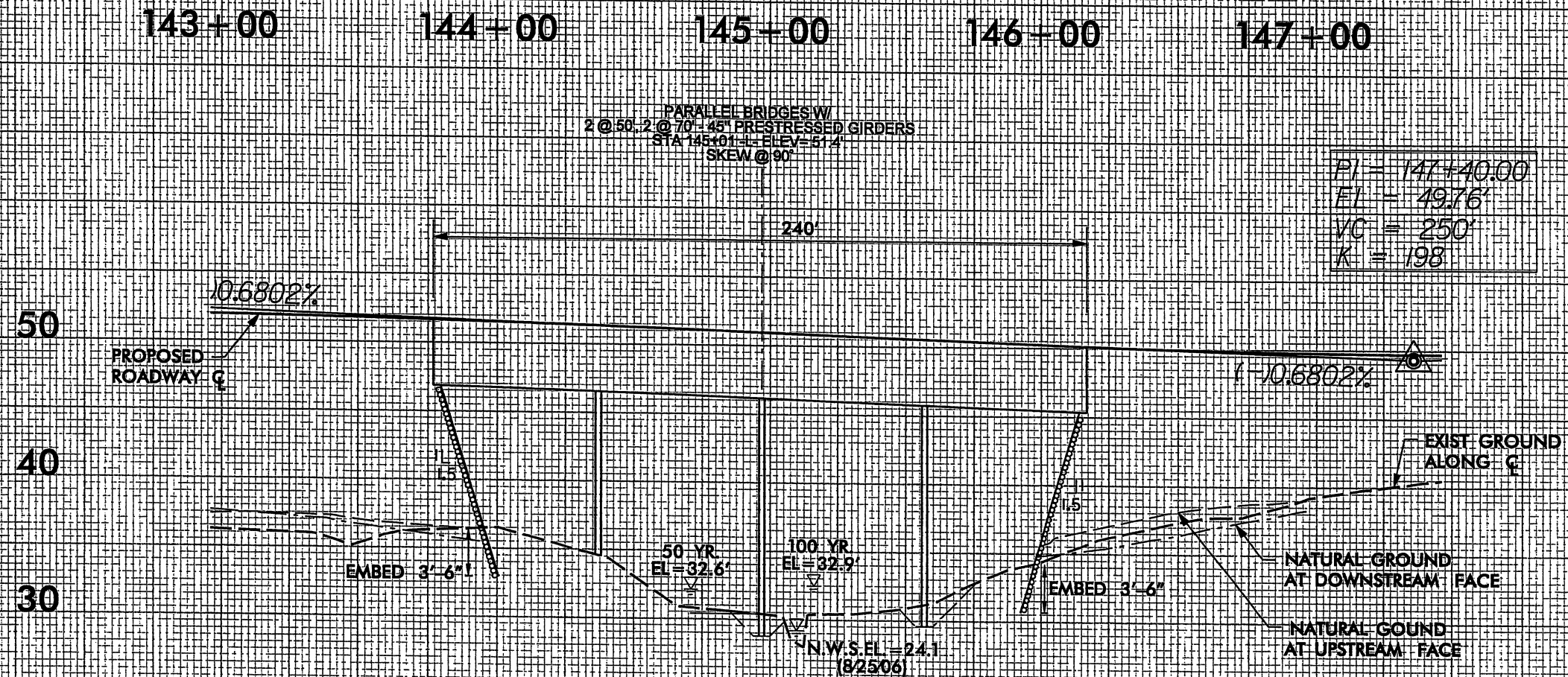
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SHEET 59 OF 108

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5/14/99

9/13/2000
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PROJECT REFERENCE NO.		SHEET NO.	
R-2633AA&AB			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION		PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



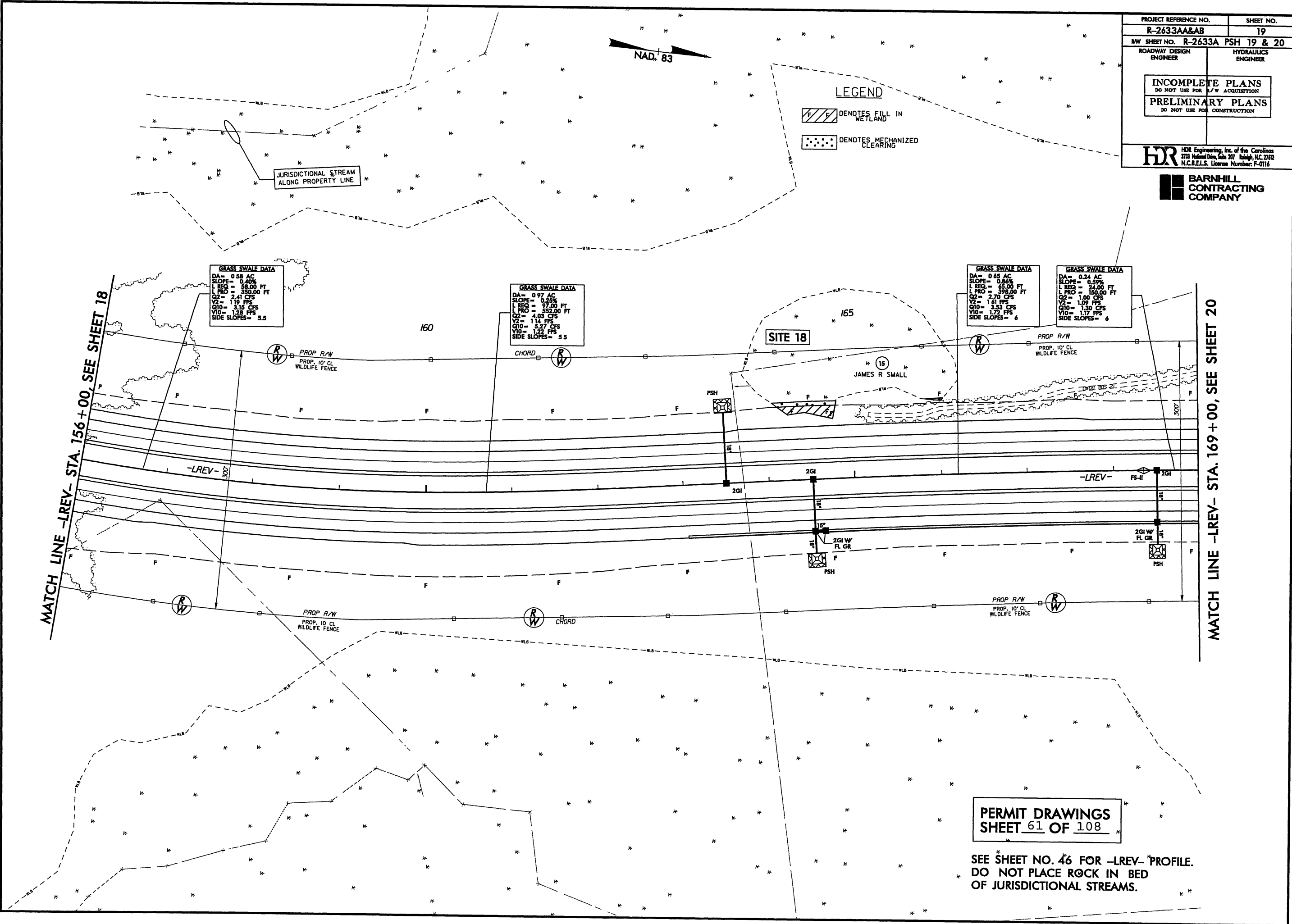
PROFILE ALONG STRUCTURE (-L-)

REVISIONS

8/17/99

MATCH LINE -LREV- STA. 156+00, SEE SHEET 18

MATCH LINE -LREV- STA. 169+00, SEE SHEET 20



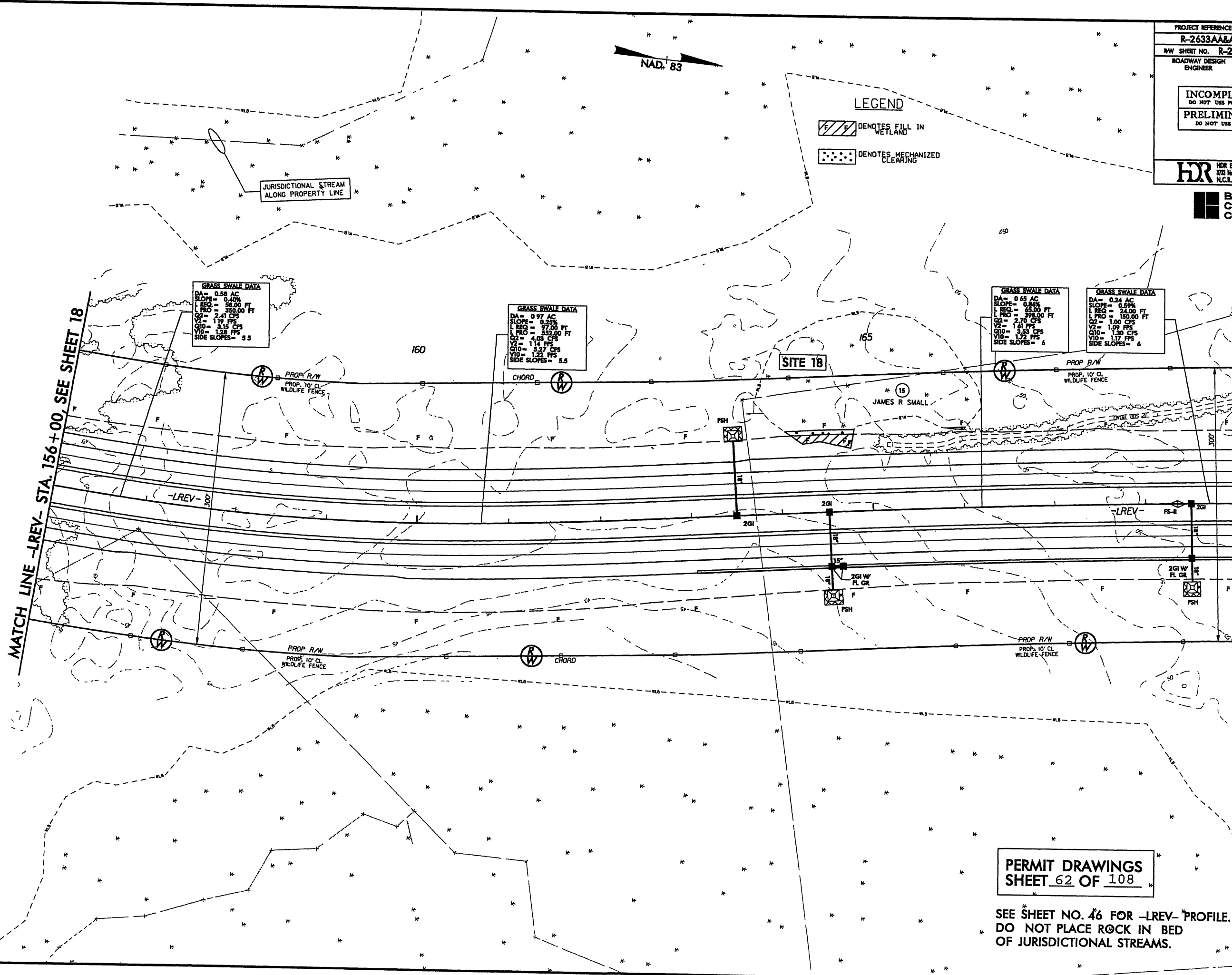
PROJECT REFERENCE NO. R-2633AA&AB		SHEET NO. 19	
HW SHEET NO. R-2633A PSH 19 & 20			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/C ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
HDR HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27602 N.C.B.E.L.S. License Number: F-0116			
BARNHILL CONTRACTING COMPANY			

REVISIONS

8/17/99

MATCH LINE -LREV- STA. 156+00, SEE SHEET 18

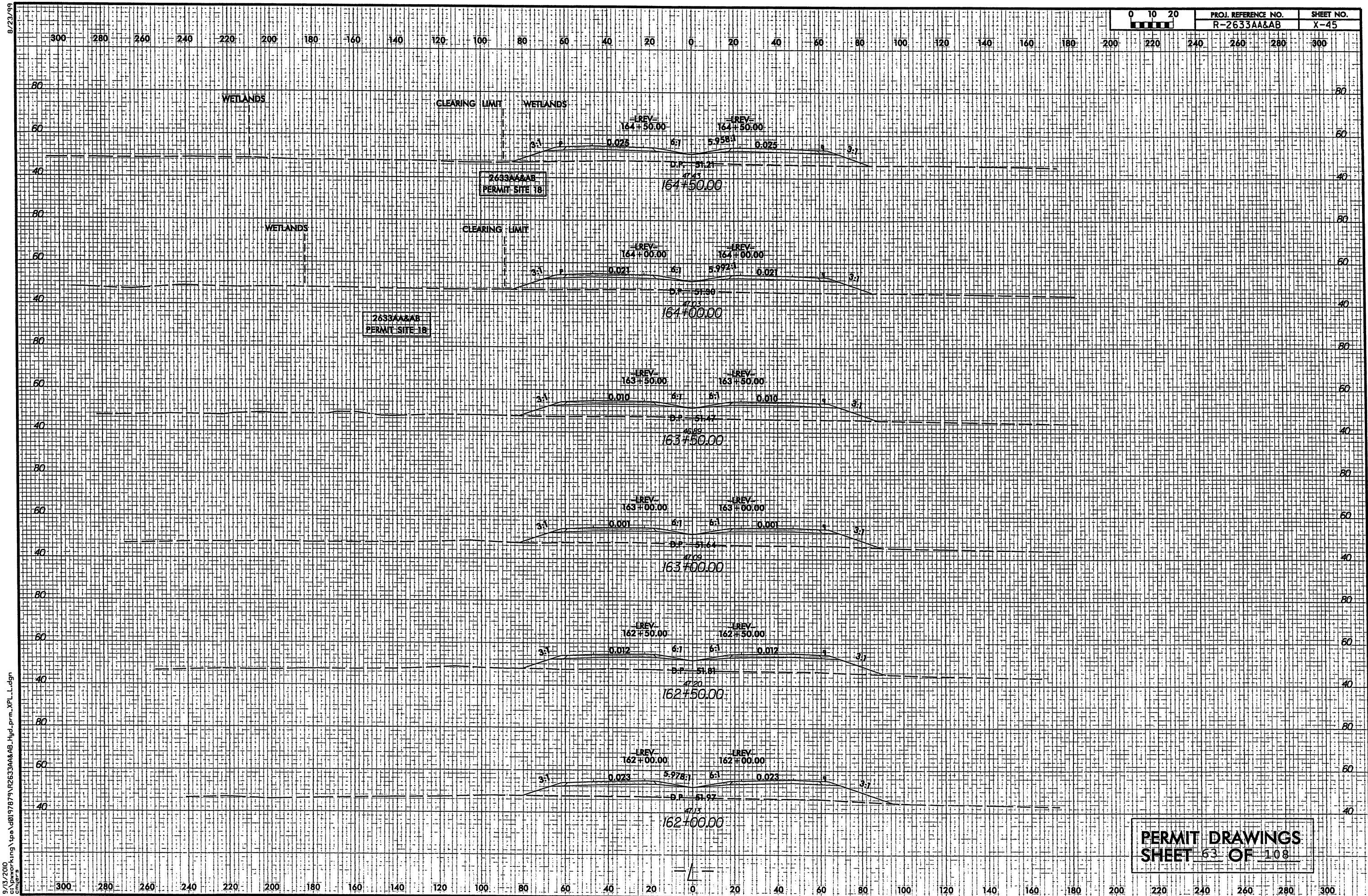
MATCH LINE -LREV- STA. 169+00, SEE SHEET 20



PROJECT REFERENCE NO. R-2633AA&AB		SHEET NO. 19	
RW SHEET NO. R-2633A		PSH 19 & 20	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
HDR HDR Engineering, Inc. of the Carolinas 1733 National Drive, Suite 207 Raleigh, N.C. 27612 N.C. REG. License Number: F-0116			
BARNHILL CONTRACTING COMPANY			

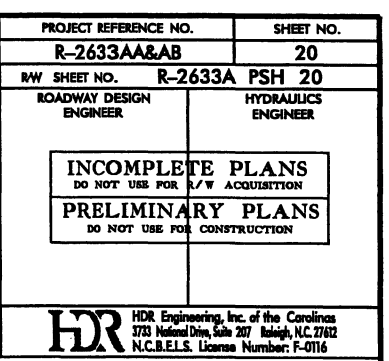
PERMIT DRAWINGS
SHEET 62 OF 108

SEE SHEET NO. 46 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.



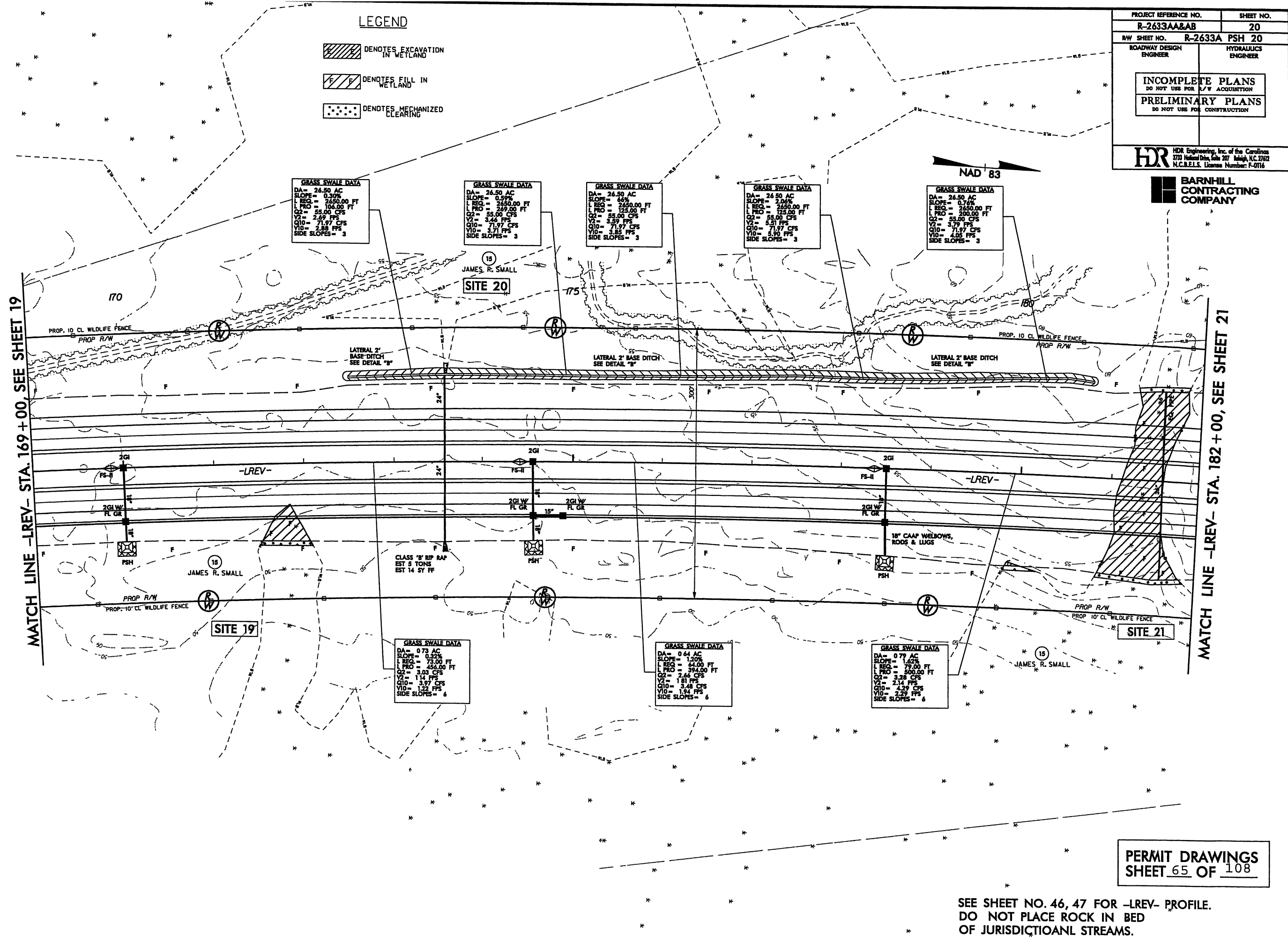
8/17/99

REVISIONS


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COMPANY**

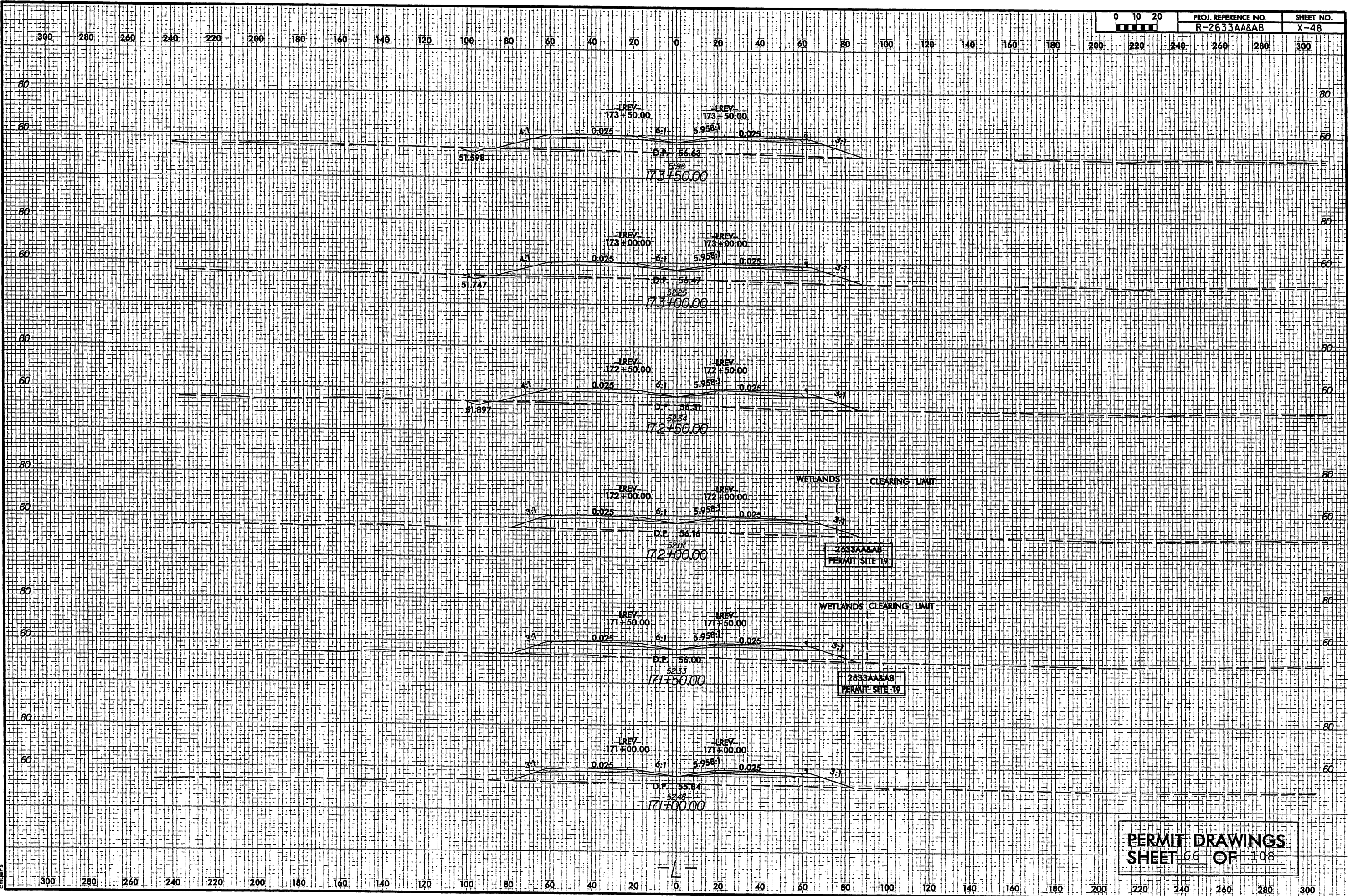
PERMIT DRAWINGS
SHEET 64 OF 108

SEE SHEET NO. 46, 47 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.



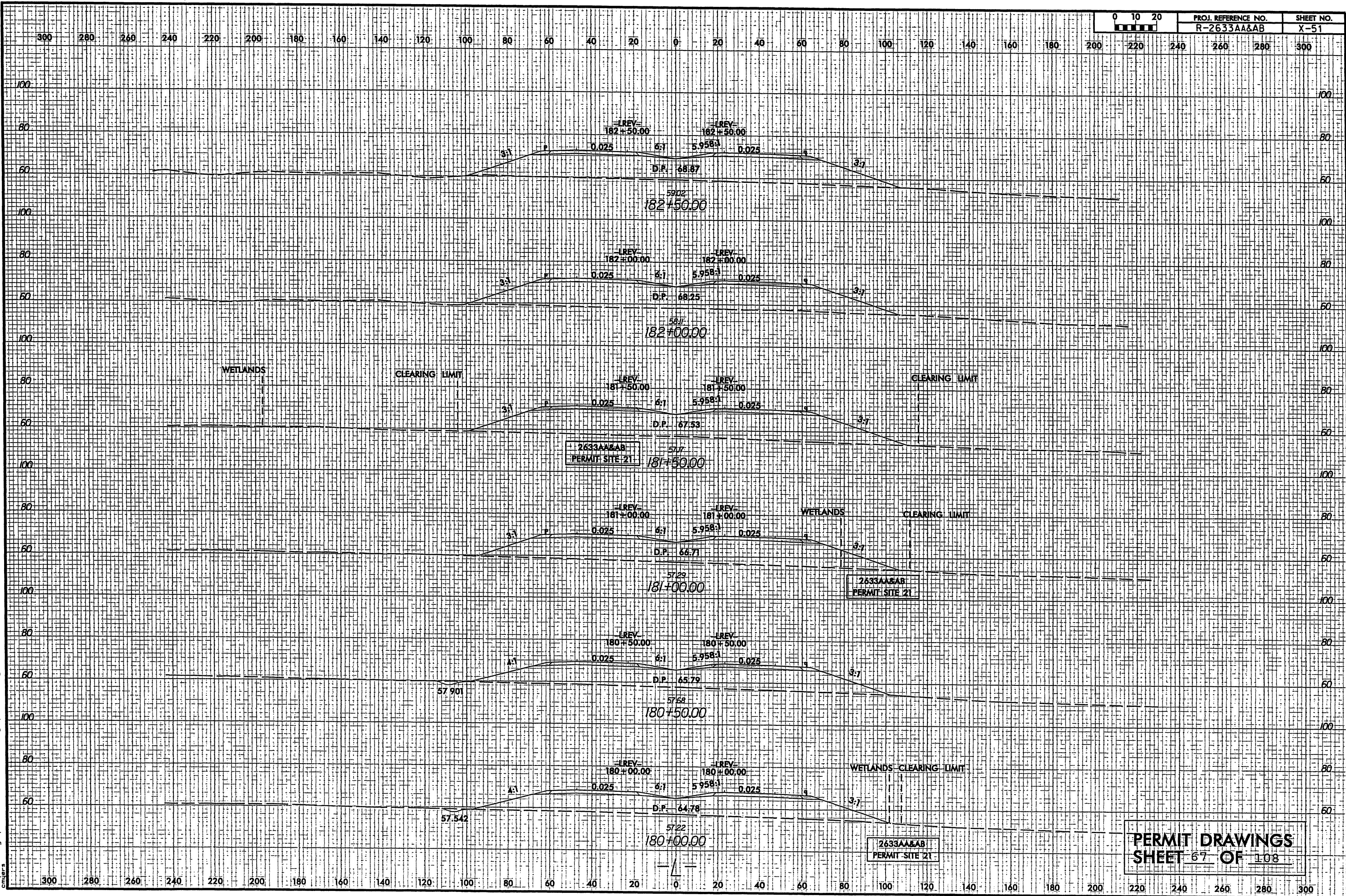
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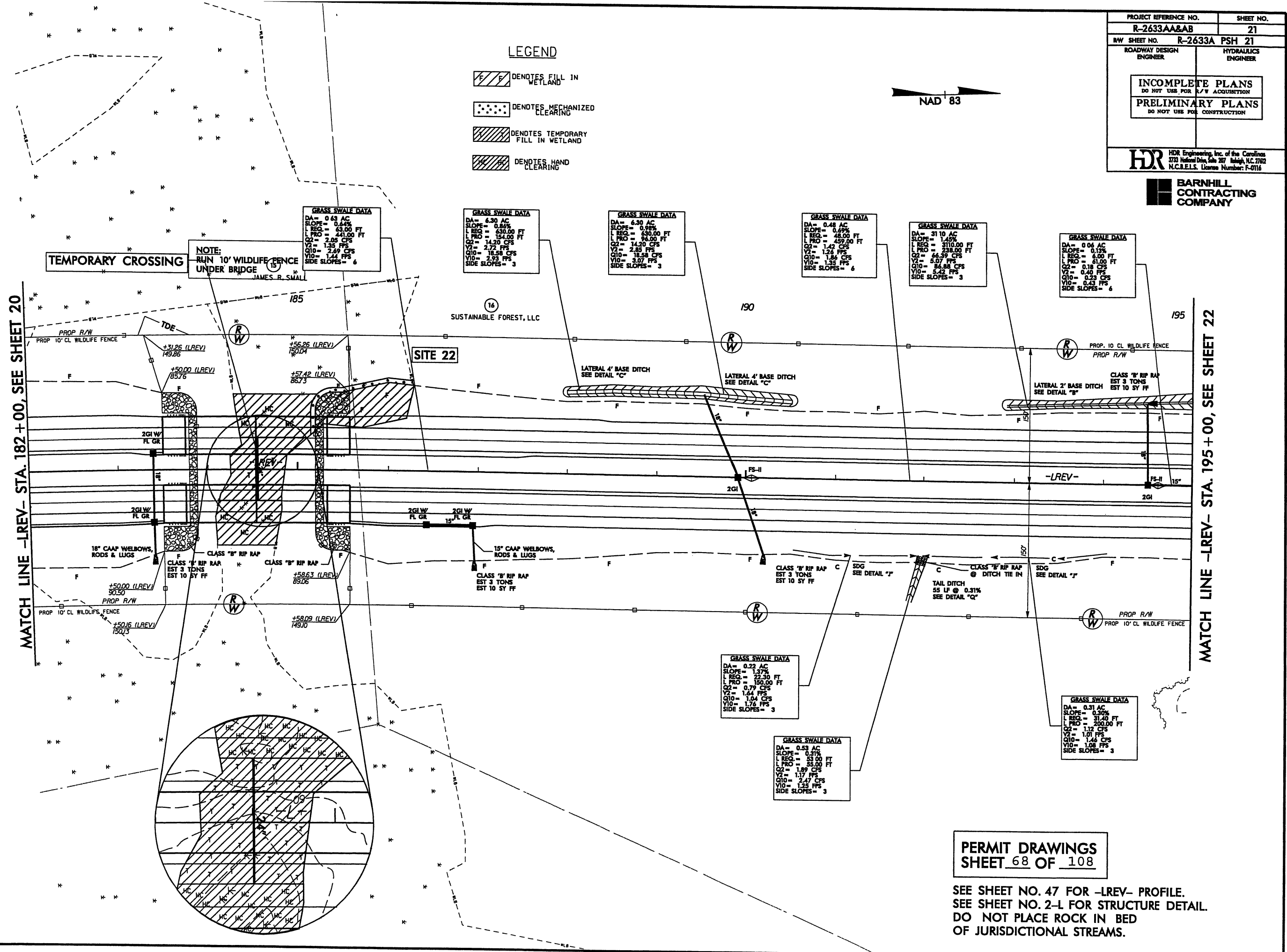
9/13/2000
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C:\Users



8/23/99

9/13/2000
C:\working\tpa\097879\2633AA&AB.Hyd.prm.XPL.L.dgn





PERMIT DRAWINGS
SHEET 68 OF 108

SEE SHEET NO. 47 FOR -LREV- PROFILE.
SEE SHEET NO. 2-L FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.


MATCH LINE -LREV- STA. 182+00, SEE SHEET 20

MATCH LINE -LREV- STA. 195+00, SEE SHEET 22

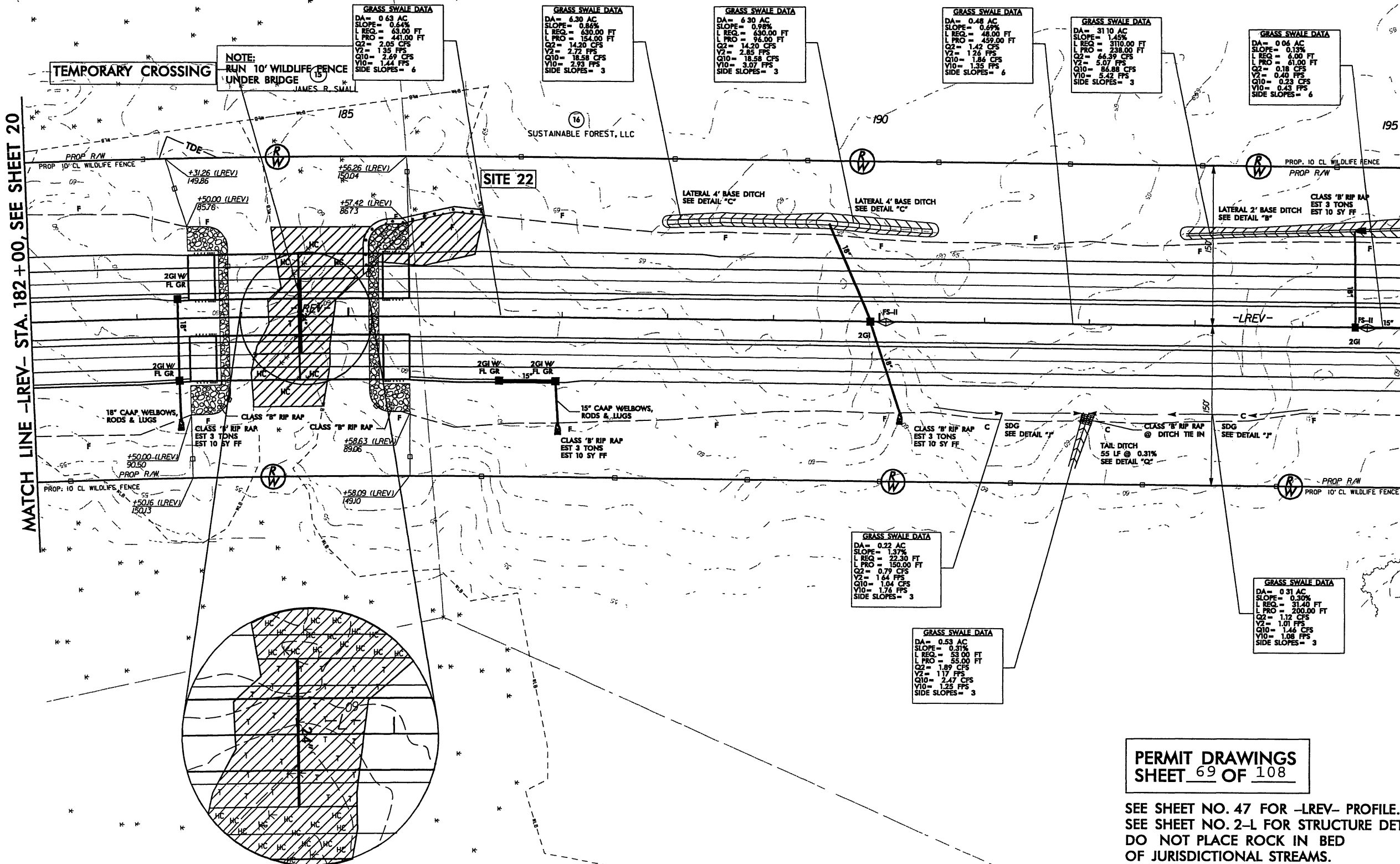
LEGEND

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

NAD '83

PROJECT REFERENCE NO.		SHEET NO.
R-2633AA&AB		21
R/W SHEET NO.	R-2633A	PSH 21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 10px; text-align: center;"><p>INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION</p><p>PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</p></div>		
<div style="display: flex; align-items: center;"><div style="flex: 1;"></div><div style="flex: 2; padding-left: 10px;"><p>HDR Engineering, Inc. of the Carolinas 3731 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116</p></div></div>		

BARNHILL CONTRACTING COMPANY

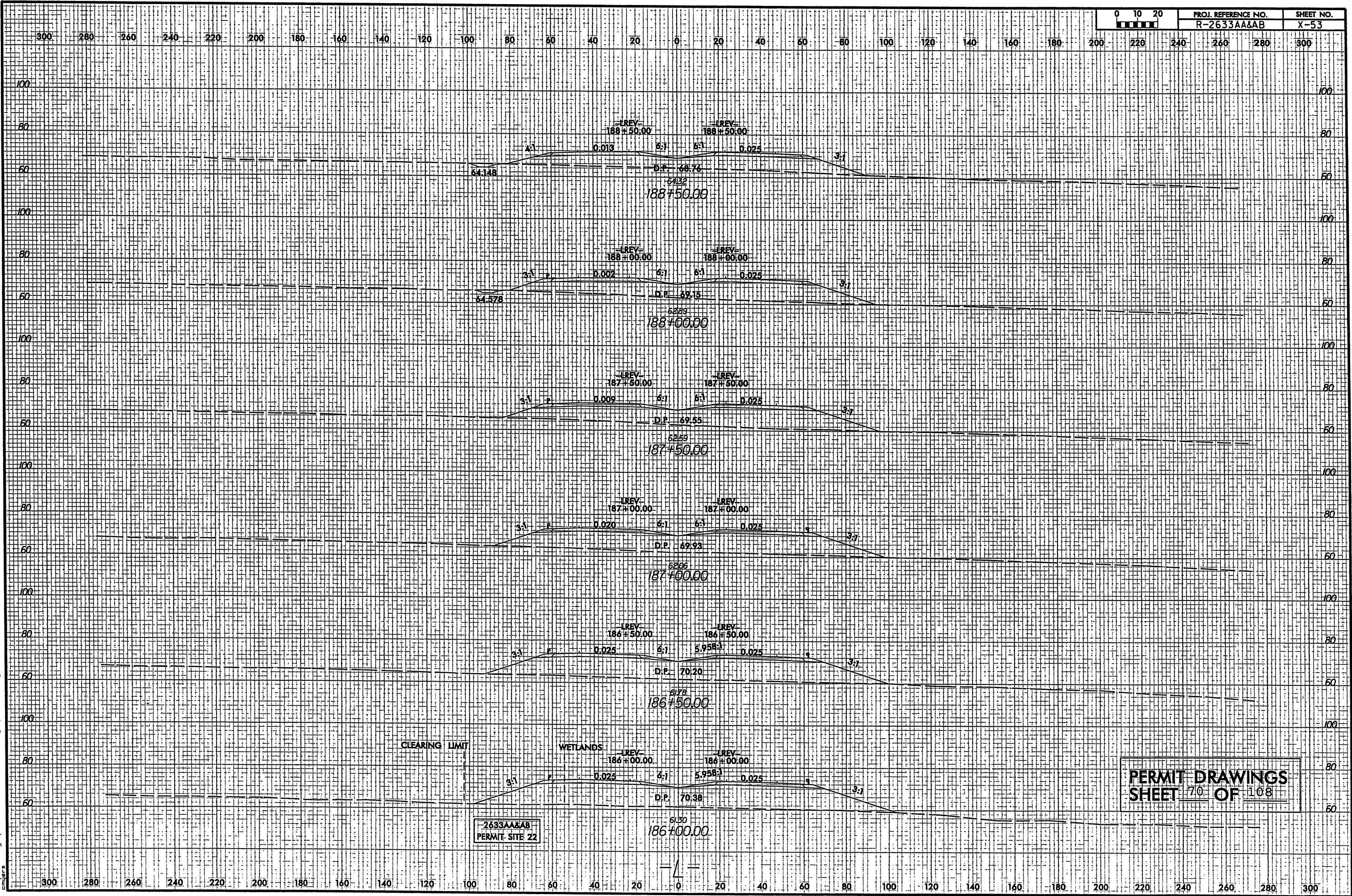


PERMIT DRAWINGS
SHEET 69 OF 108

SEE SHEET NO. 47 FOR -LREV- PROFILE.
SEE SHEET NO. 2-L FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

8/23/99

9/13/2000
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ambers



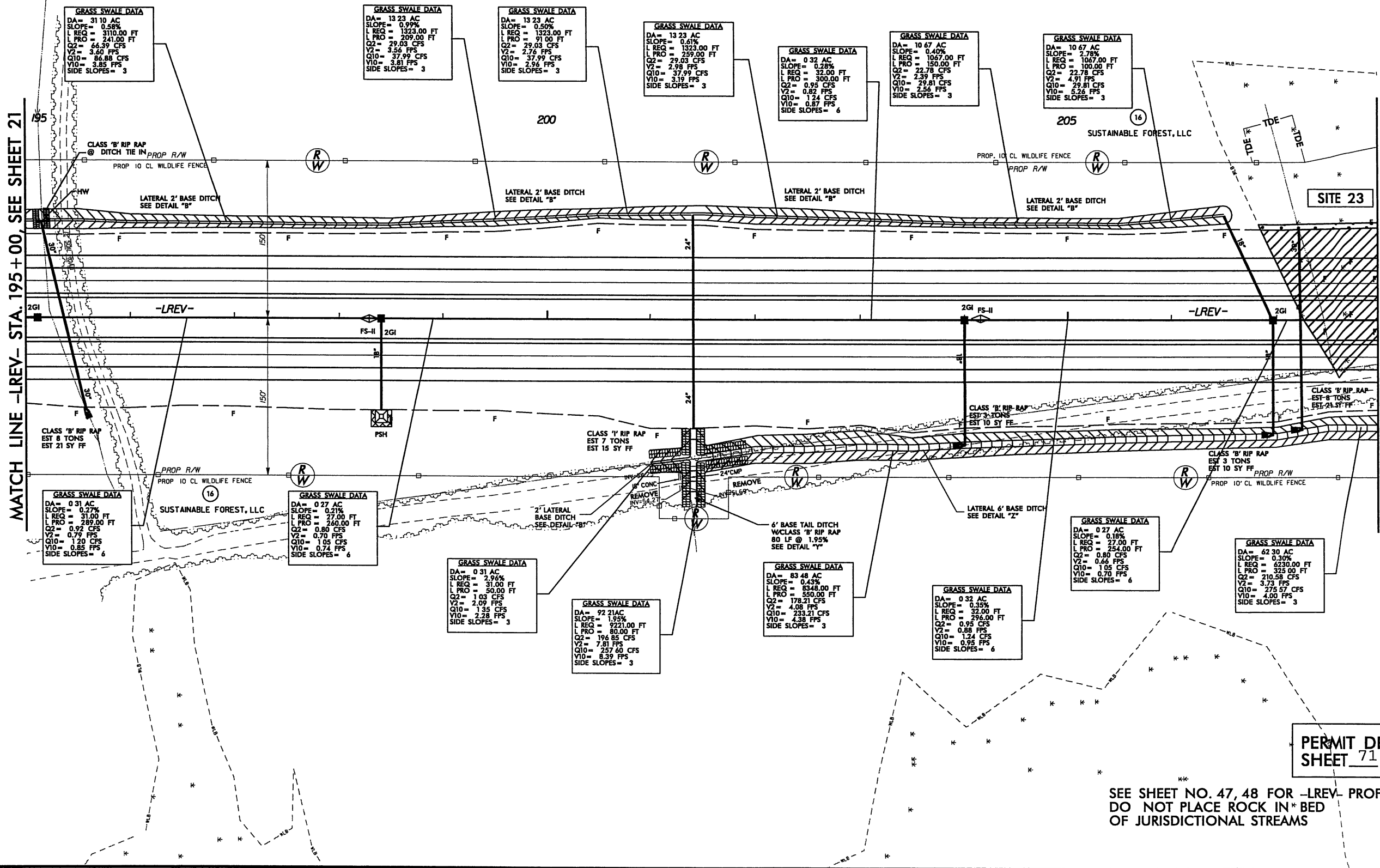
REVISIONS

MATCH LINE -LREV- STA. 208+00, SEE SHEET 23




SEE SHEET NO. 47, 48 FOR ~~-LREV-~~ PROFILE
DO NOT PLACE ROCK IN* BED
OF JURISDICTIONAL STREAMS

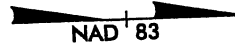
PERMIT DRAWINGS
SHEET 71 OF 108


 DENOTES MECHANIZED CLEARING


**BARNHILL
CONTRACTING
COMPANY**

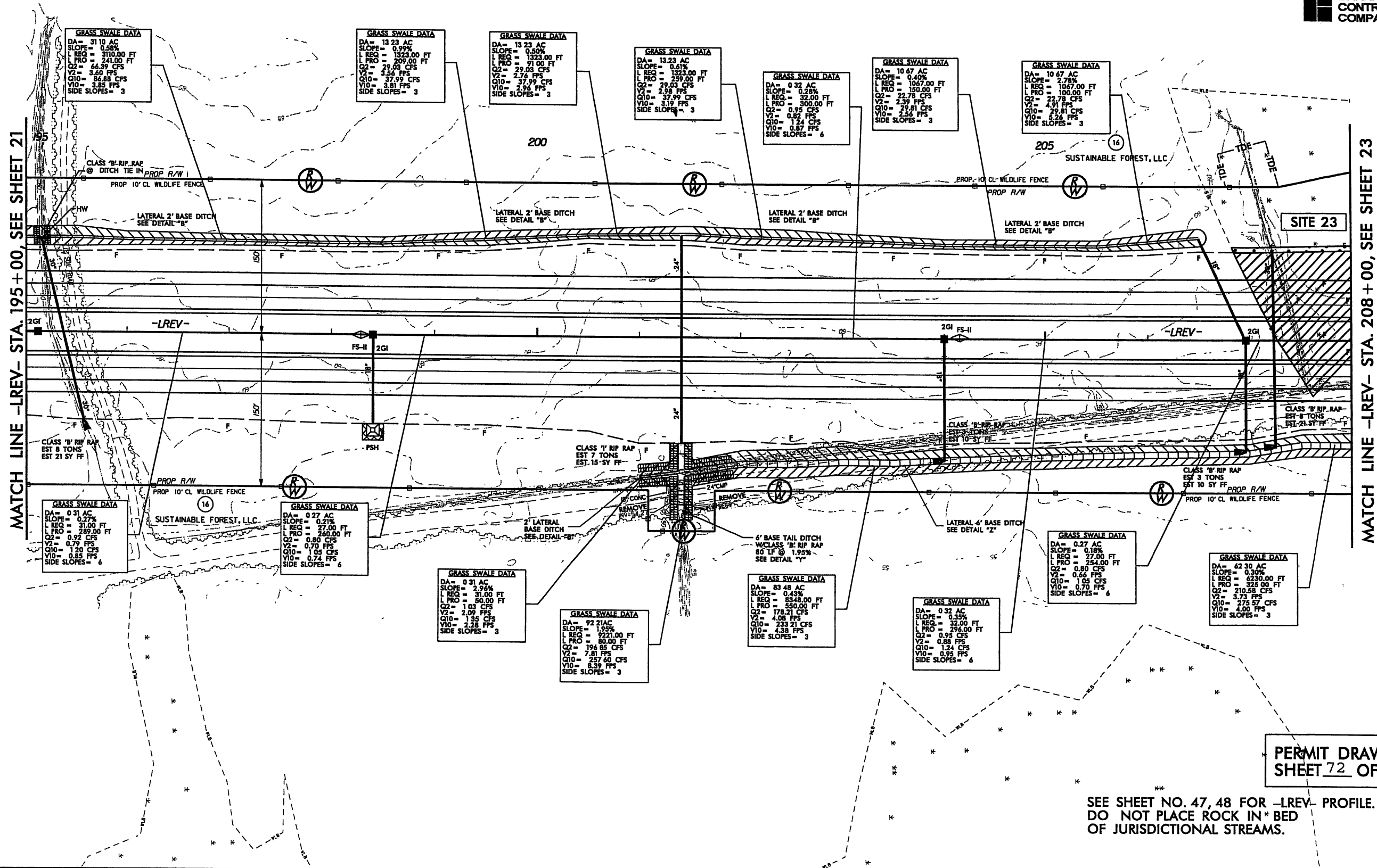
LEGEND

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



PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	22
R/W SHEET NO. R-2633A	PSH 21 & 22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
 HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, NC 27612 N.C.B.E.L.S. License Number: F-0116	

 BARNHILL CONTRACTING COMPANY



PERMIT DRAWINGS
SHEET 72 OF 108

SEE SHEET NO. 47, 48 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN* BED
OF JURISDICTIONAL STREAMS.

REVISIONS


8/17/99

LEGEND

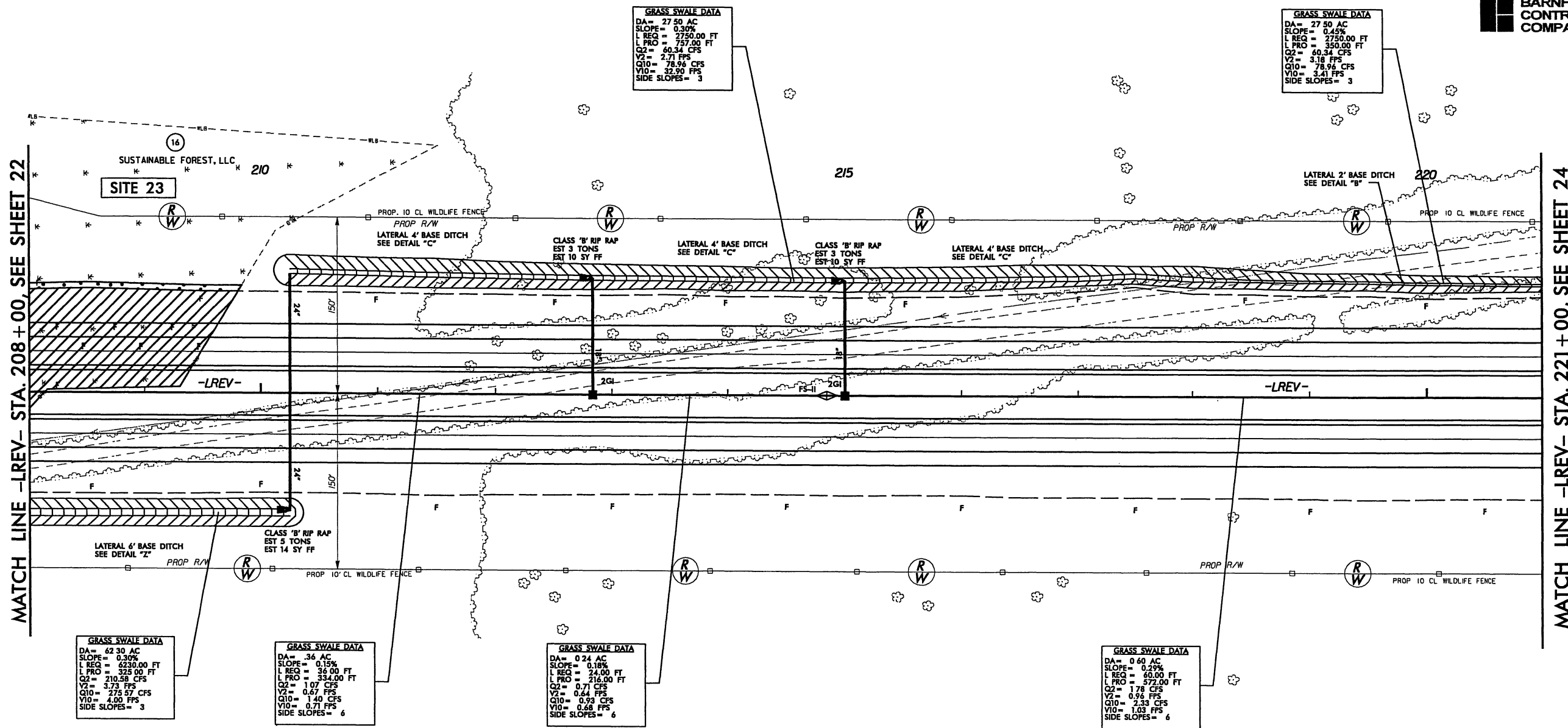
 DENOTES FILL IN WETLAND

 DENOTES MECHANIZED CLEARING

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	23
RW SHEET NO. R-2633A PSH 22 & 23	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
 HDR Engineering, Inc. of the Carolinas 3753 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.E.L.S. License Number: F-0116	

 BARNHILL CONTRACTING COMPANY



PERMIT DRAWINGS
SHEET 73 OF 108

SEE SHEET NO. 48 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.


8/17/99

LEGEND

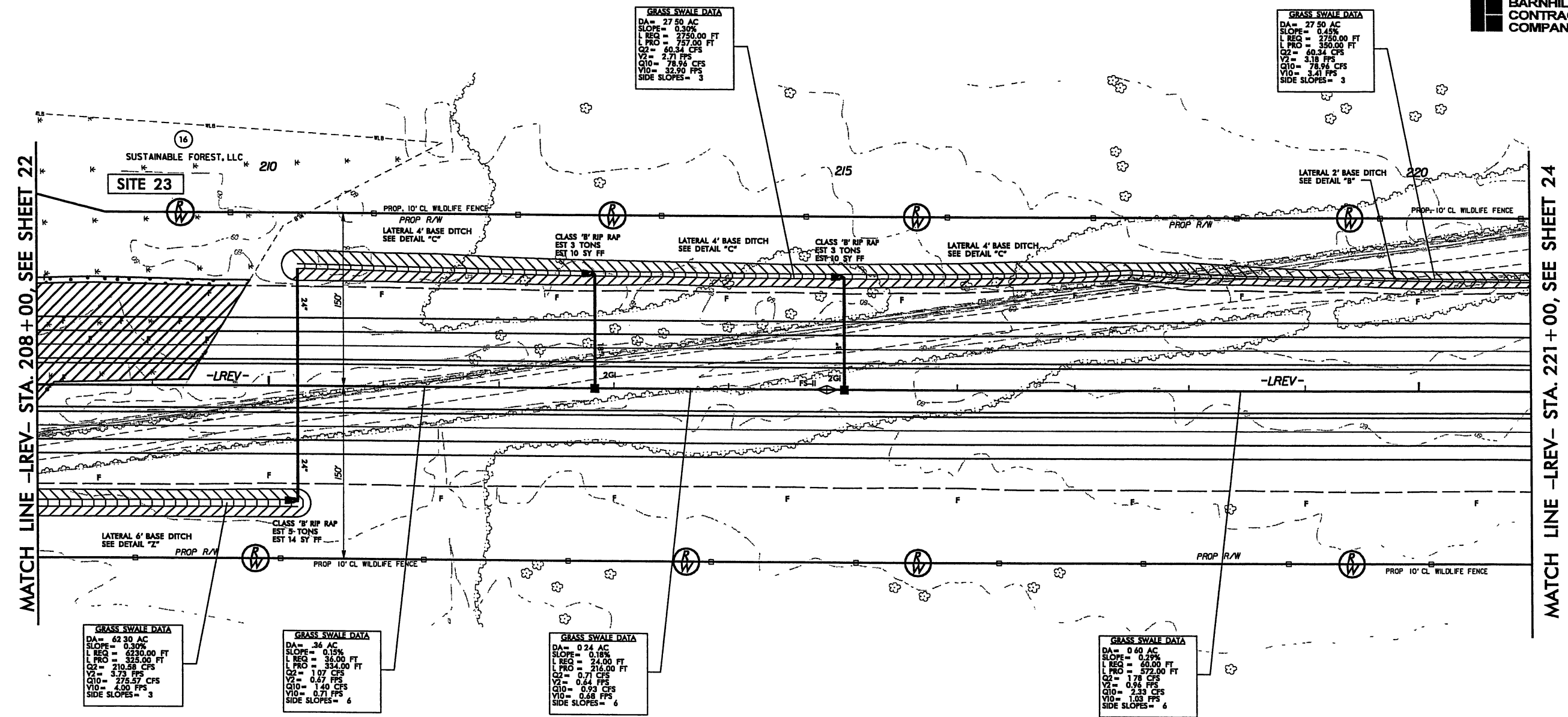
 DENOTES FILL IN WETLAND

 DENOTES MECHANIZED CLEARING



PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	23
NW SHEET NO. R-2633A PSH 22 & 23	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div>INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION</div> <div>PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>	
 HDR Engineering, Inc. of the Carolinas 3733 Midland Drive, Suite 207 Raleigh, NC 27612 N.C.B.E.L.S. License Number: F-0116	

 BARNHILL CONTRACTING COMPANY



GRASS SWALE DATA
DA= 62.30 AC
SLOPE= 0.30%
L REQ= 6230.00 FT
L PRO= 325.00 FT
Q2= 210.58 CFS
V2= 3.73 FPS
Q10= 275.57 CFS
V10= 4.00 FPS
SIDE SLOPES= 3

GRASS SWALE DATA
DA= 36 AC
SLOPE= 0.15%
L REQ= 36.00 FT
L PRO= 334.00 FT
Q2= 0.71 CFS
V2= 0.67 FPS
Q10= 1.40 CFS
V10= 0.71 FPS
SIDE SLOPES= 6

GRASS SWALE DATA
DA= 0.24 AC
SLOPE= 0.18%
L REQ= 24.00 FT
L PRO= 216.00 FT
Q2= 0.71 CFS
V2= 0.64 FPS
Q10= 0.93 CFS
V10= 0.68 FPS
SIDE SLOPES= 6

GRASS SWALE DATA
DA= 0.60 AC
SLOPE= 0.25%
L REQ= 60.00 FT
L PRO= 572.00 FT
Q2= 1.78 CFS
V2= 0.94 FPS
Q10= 2.33 CFS
V10= 1.03 FPS
SIDE SLOPES= 6

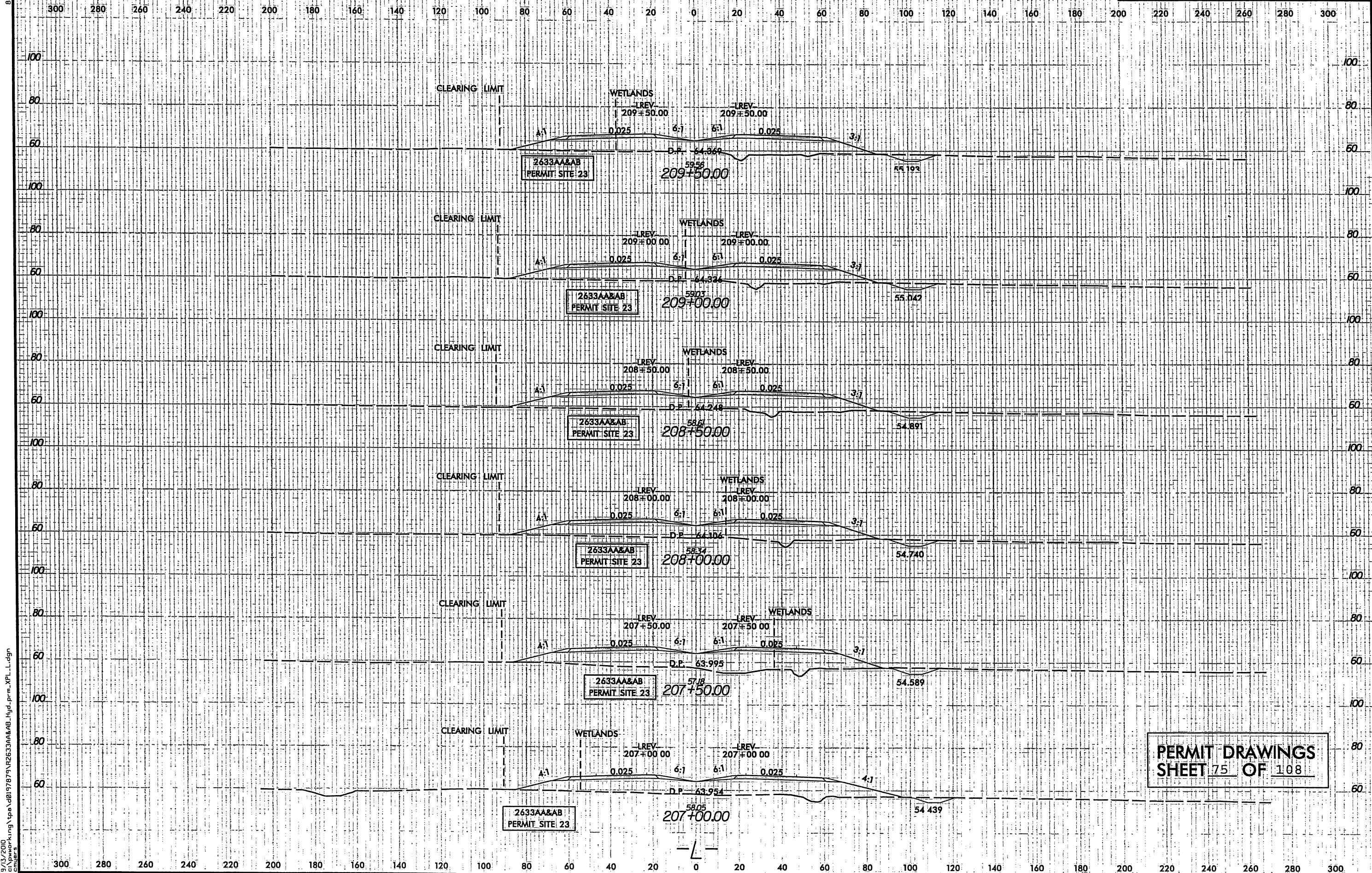
PERMIT DRAWINGS
SHEET 74 OF 108

SEE SHEET NO. 48 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

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REVISIONS

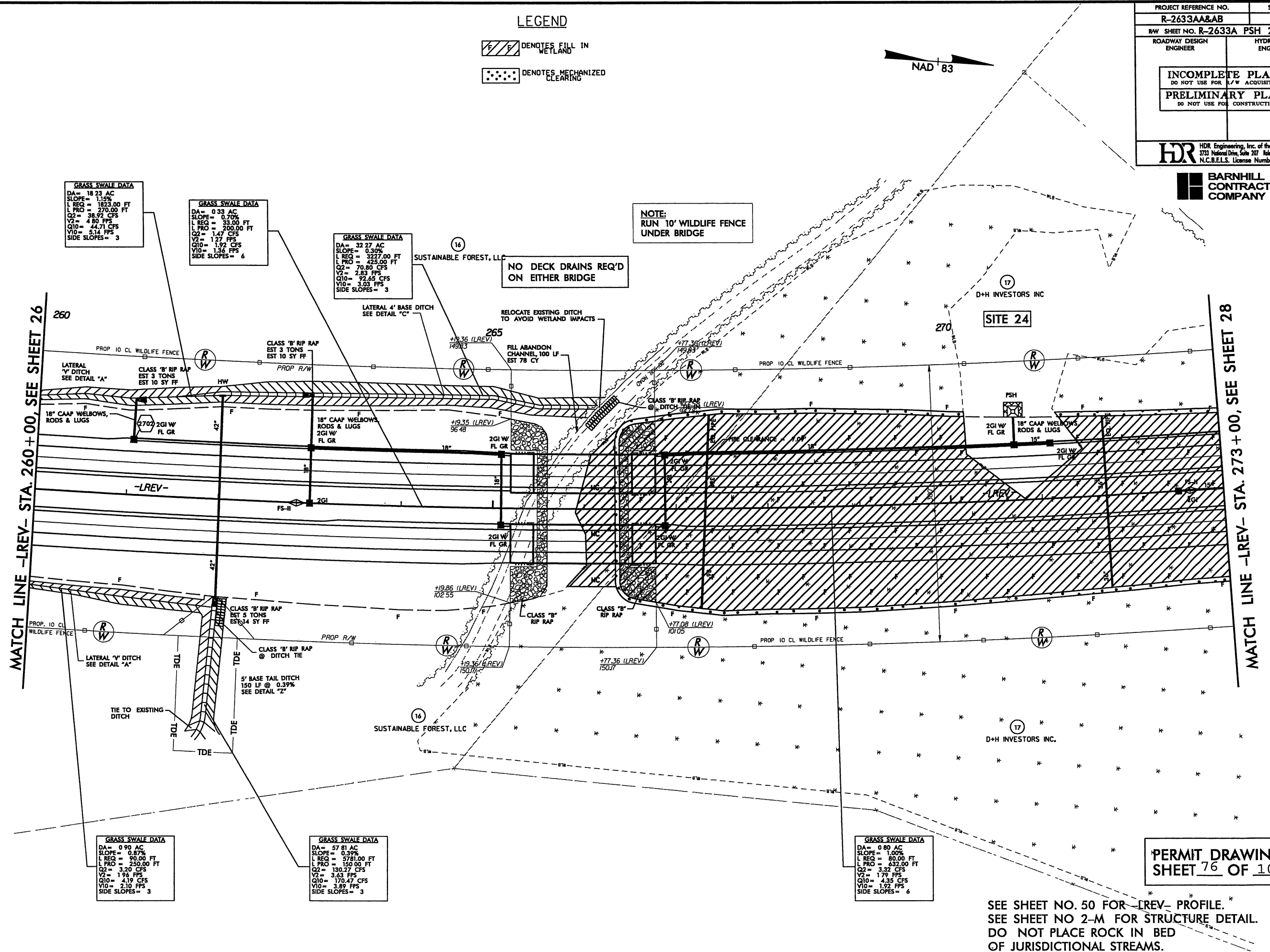
8/23/99



PERMIT DRAWINGS
SHEET 75 OF 108

9/13/2010
c:\pwworking\tpa\0197879\2633AA&AB_Hyd_prm_XPL_L.dgn

SEE SHEET NO. 50 FOR ~~REV~~ PROFILE.
SEE SHEET NO 2-M FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

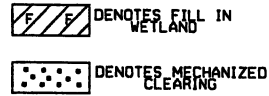


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REVISIONS

8/17/99

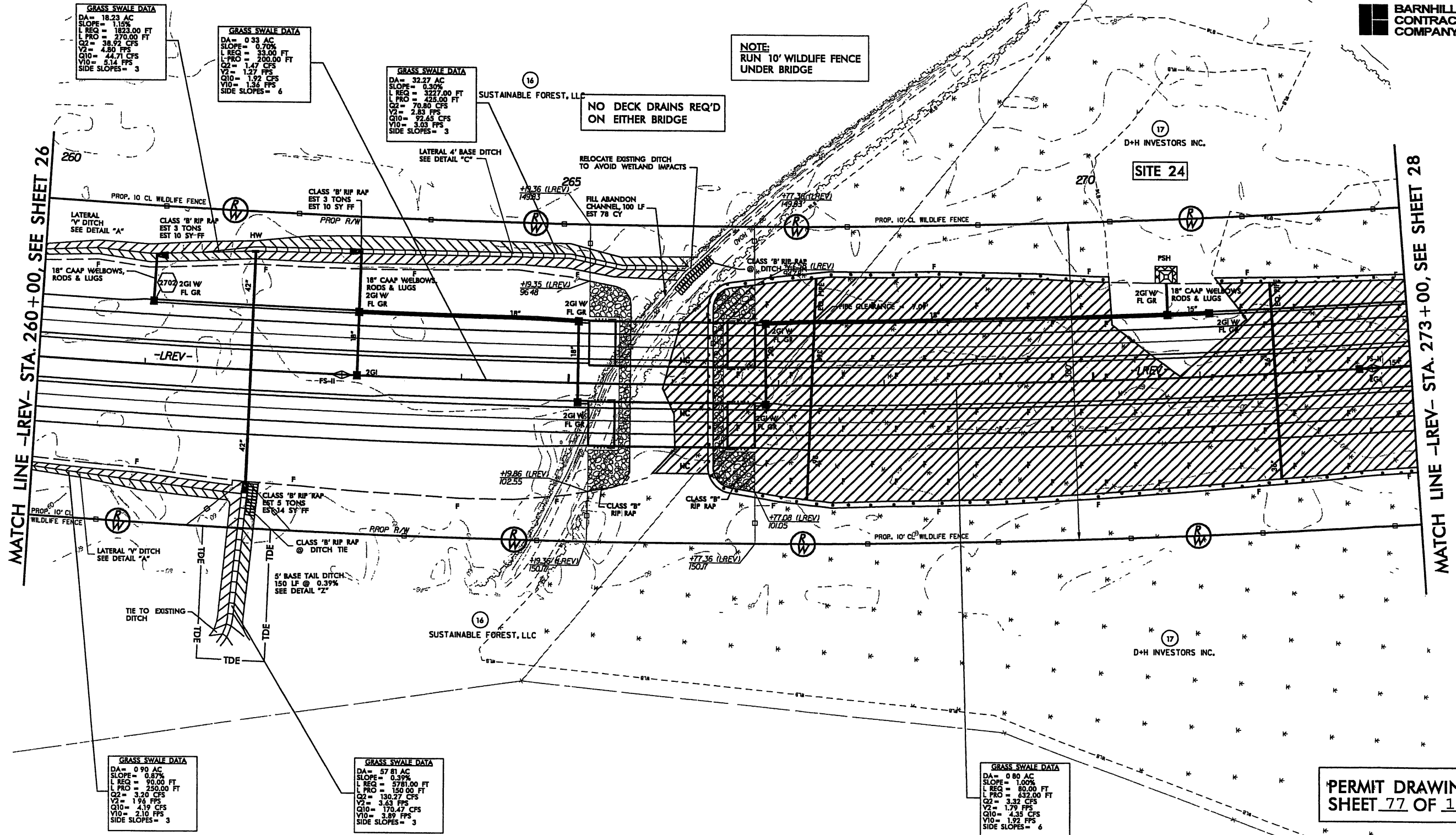
LEGEND



NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	27
RW SHEET NO. R-2633A PSH 26 & 27	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
HDR HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.E.E.L.S. License Number: F-0716	

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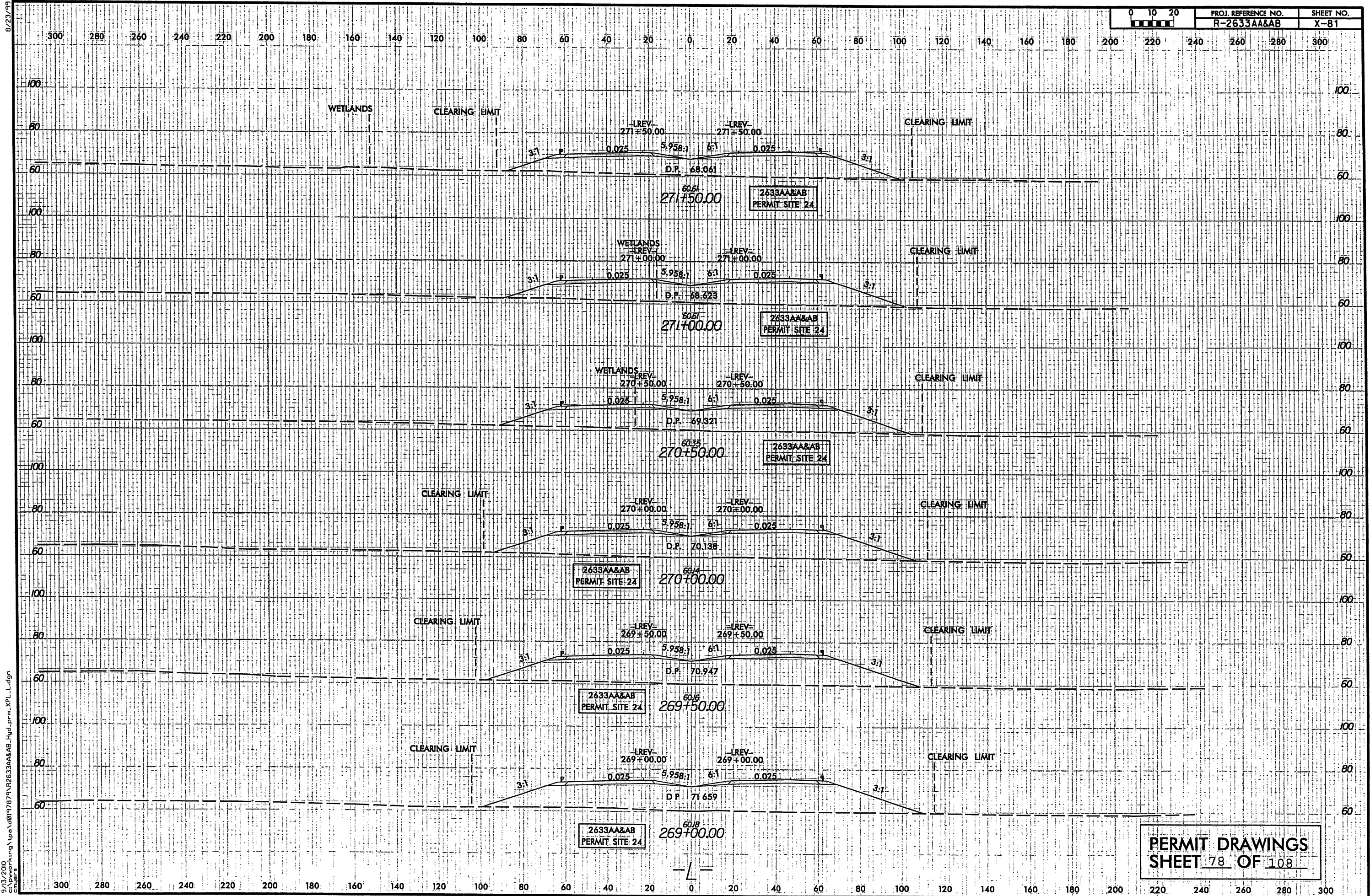
PERMIT DRAWINGS
SHEET 27 OF 108

SEE SHEET NO. 50 FOR LREV PROFILE.
SEE SHEET NO. 2-M FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2633AA&AB	X-81





PERMIT DRAWINGS
SHEET 78 OF 108


9/13/2010
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cmjg

PERMIT DRAWINGS
SHEET 79 OF 108

SEE SHEET NO. 50, 51 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS

 DENOTES FILL IN
WETLAND

 DENOTES IMPACTS IN
SURFACE WATER

 DENOTES MECHANIZED
CLEARING

~~NAD~~ 83

MATCH LINE -REV- STA. 273+00, SEE SHEET 27

MATCH LINE -REV- STA. 286+00, SEE SHEET 29

```

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REVISIONS

8/17/99

LEGEND

DENOTES FILL IN WETLAND

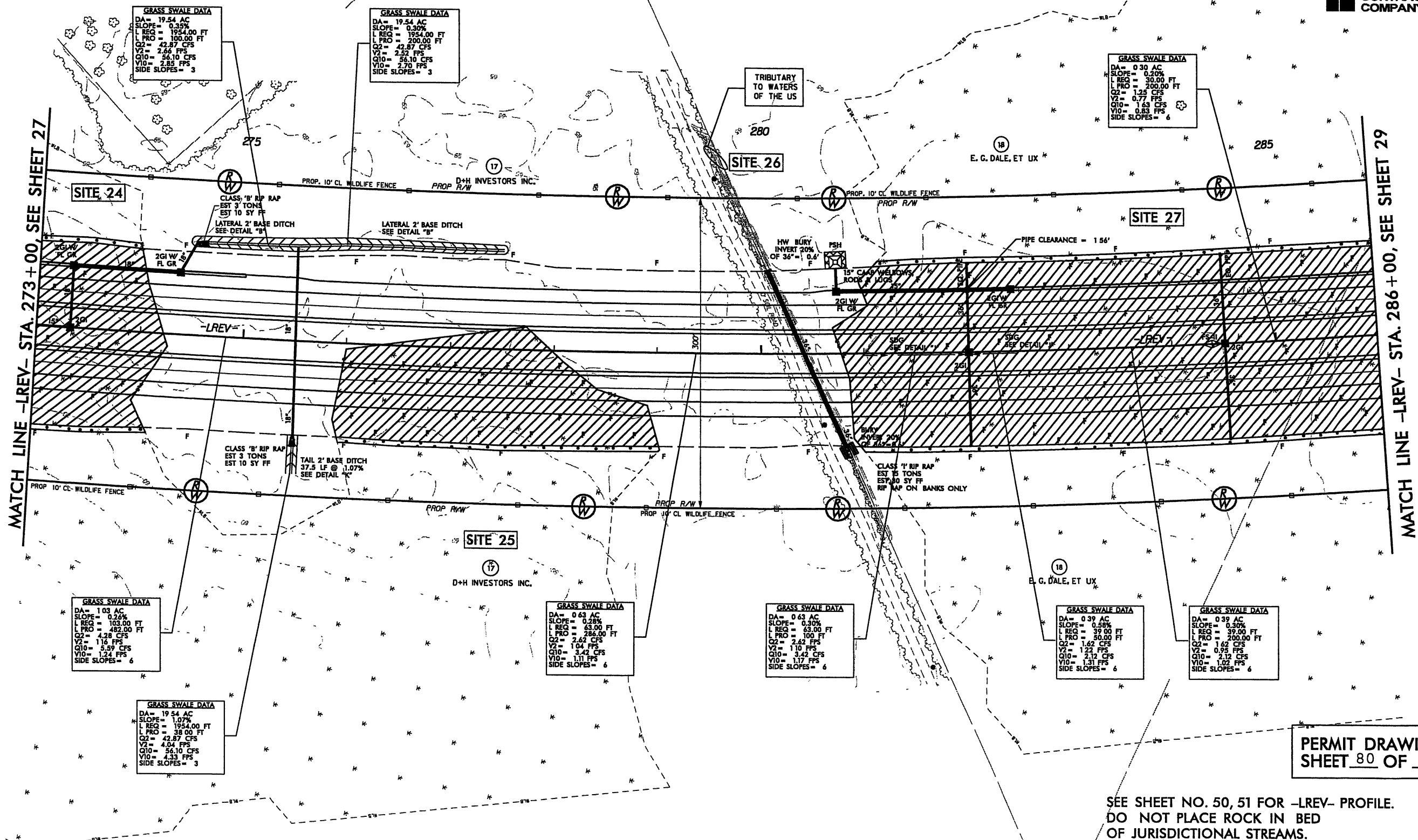
DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	28
R/W SHEET NO. R-2633A PSH 27 & 28	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
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	

BARNHILL CONTRACTING COMPANY

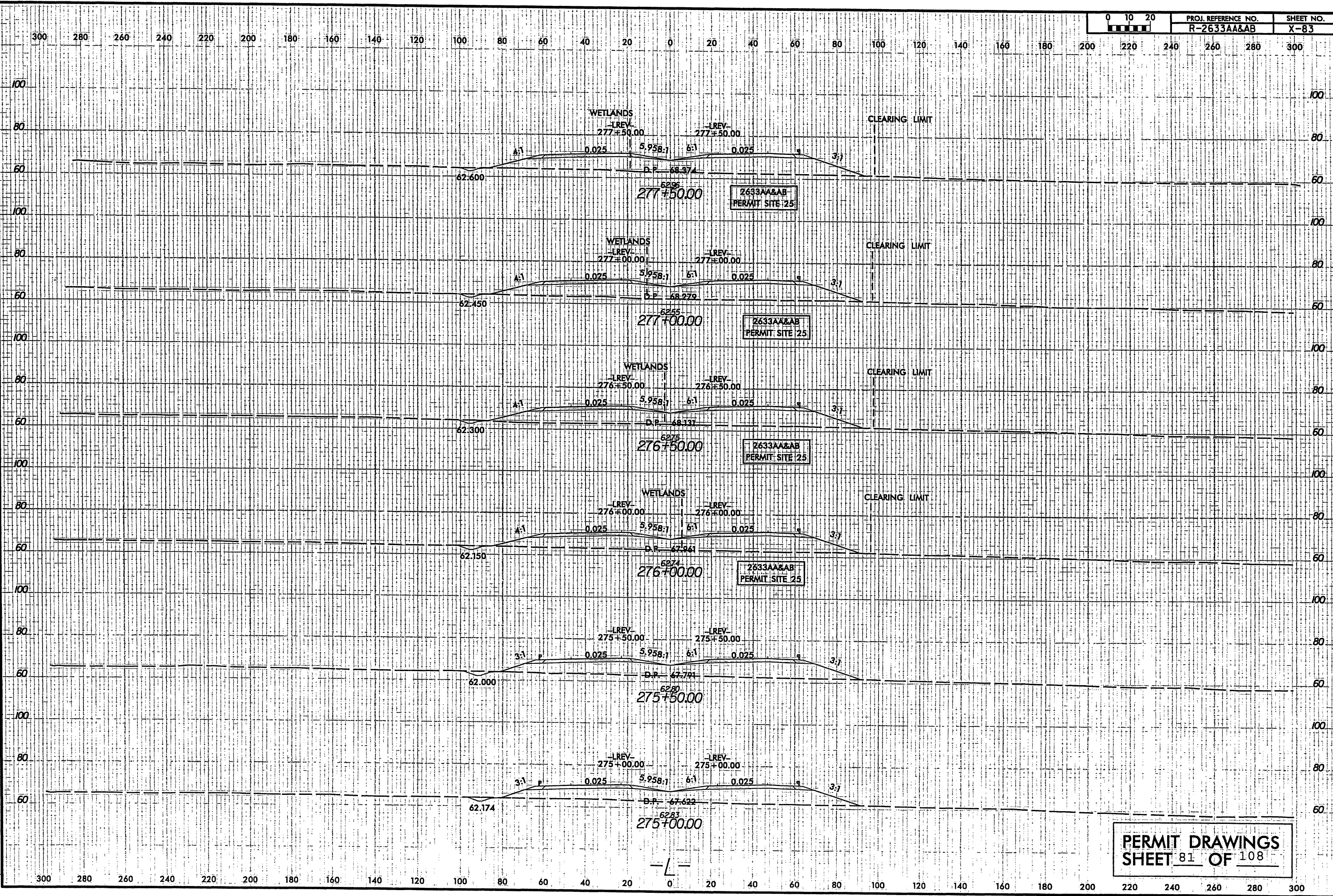


SEE SHEET NO. 50, 51 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

8/23/99



PROJ. REFERENCE NO.	SHEET NO.
R-2633AA&AB	X-83



PERMIT DRAWINGS
SHEET 81 OF 108

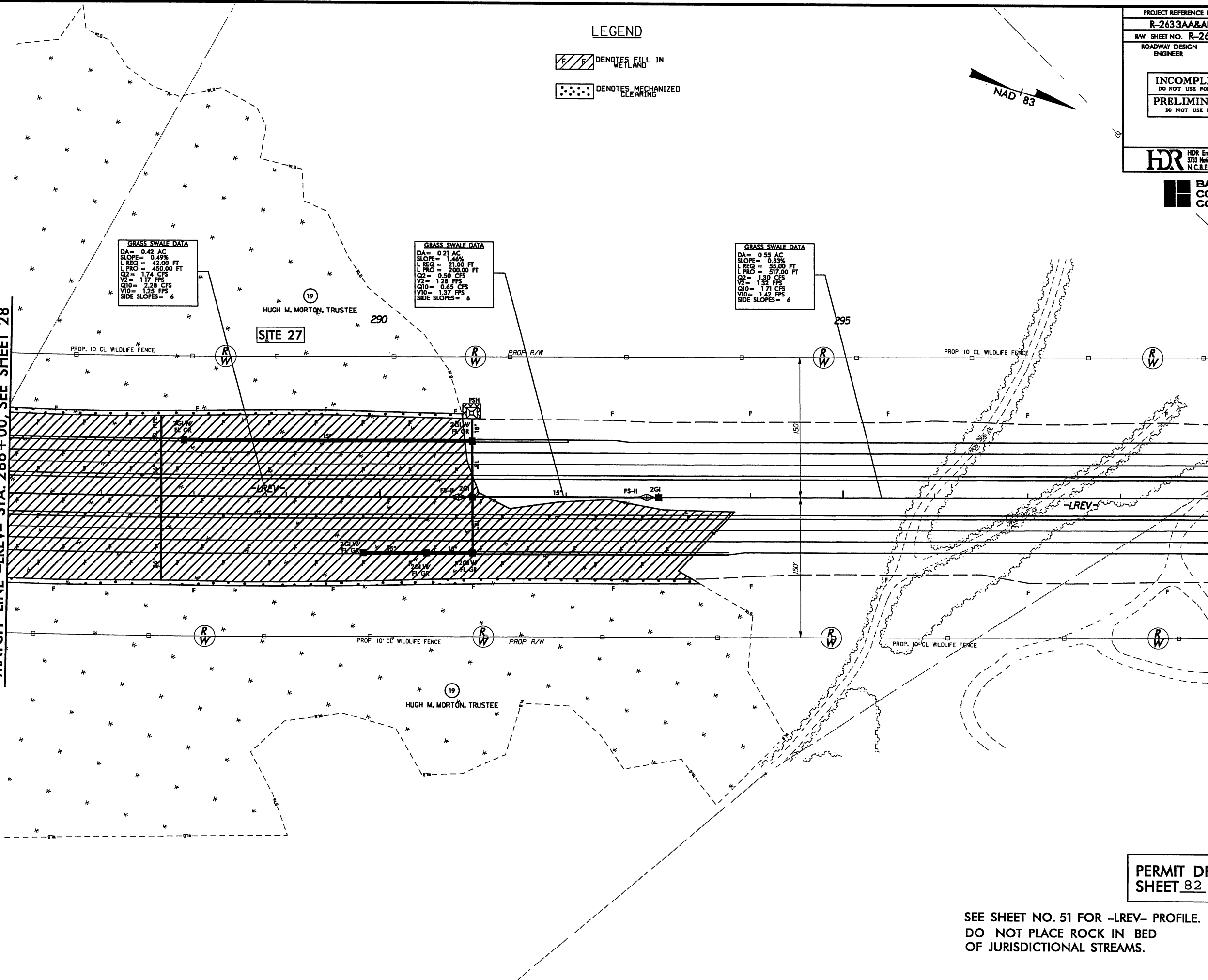
9/13/2010
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REVISIONS

8/17/99

MATCH LINE -LREV- STA. 286 + 00, SEE SHEET 28



LEGEND

- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	29
R/W SHEET NO. R-2633A PSH 28 & 29	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
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	
BARNHILL CONTRACTING COMPANY	

PERMIT DRAWINGS
SHEET 82 OF 108

SEE SHEET NO. 51 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

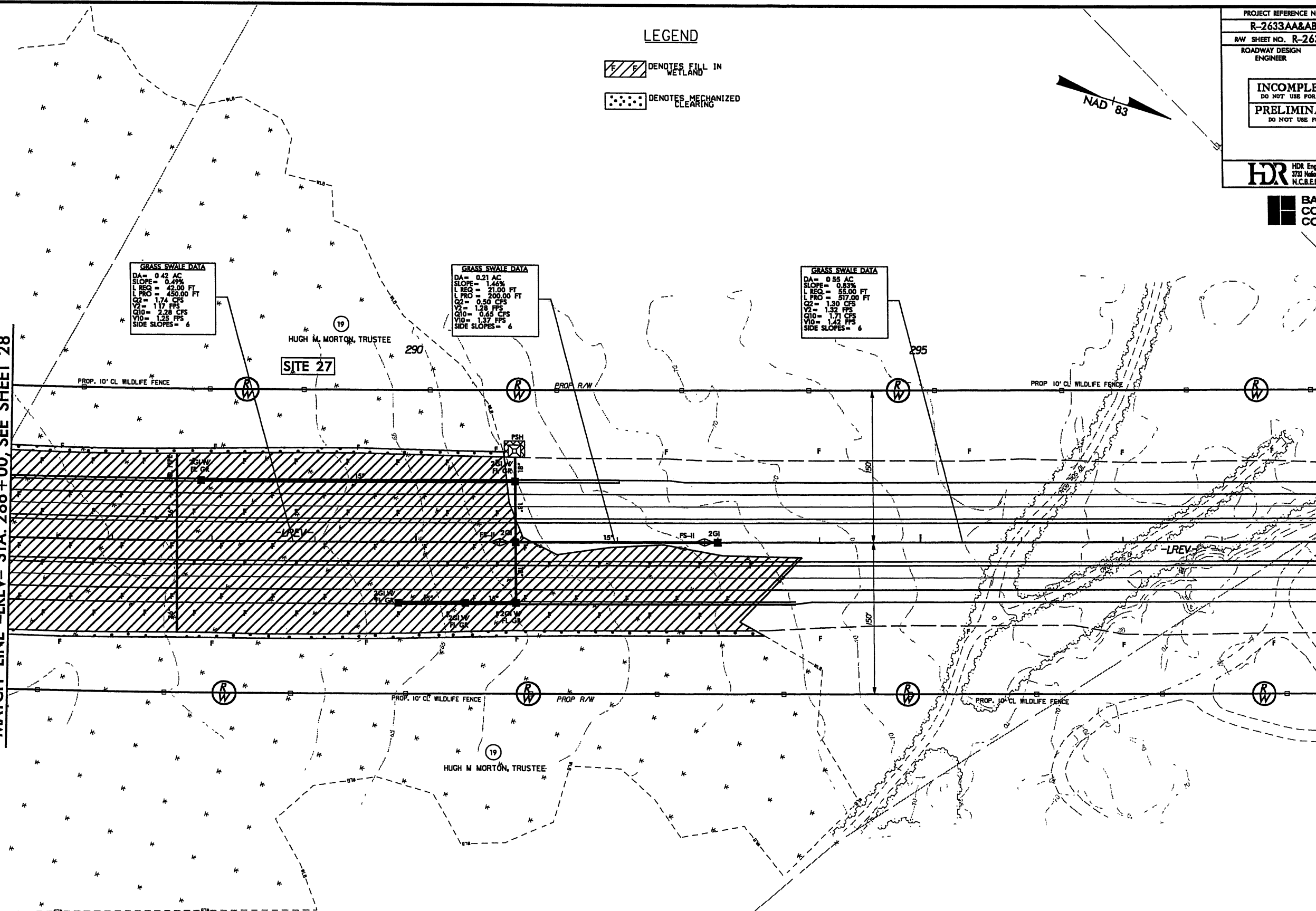
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REVISIONS

8/17/99

MATCH LINE -LREV- STA. 286+00, SEE SHEET 28



LEGEND

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	29
RAW SHEET NO. R-2633A PSH 28 & 29	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
HDR Engineering, Inc. of the Carolinas 3731 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116	

BARNHILL CONTRACTING COMPANY

PERMIT DRAWINGS
SHEET 83 OF 108

SEE SHEET NO 51 FOR -LREV- PROFILE
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS

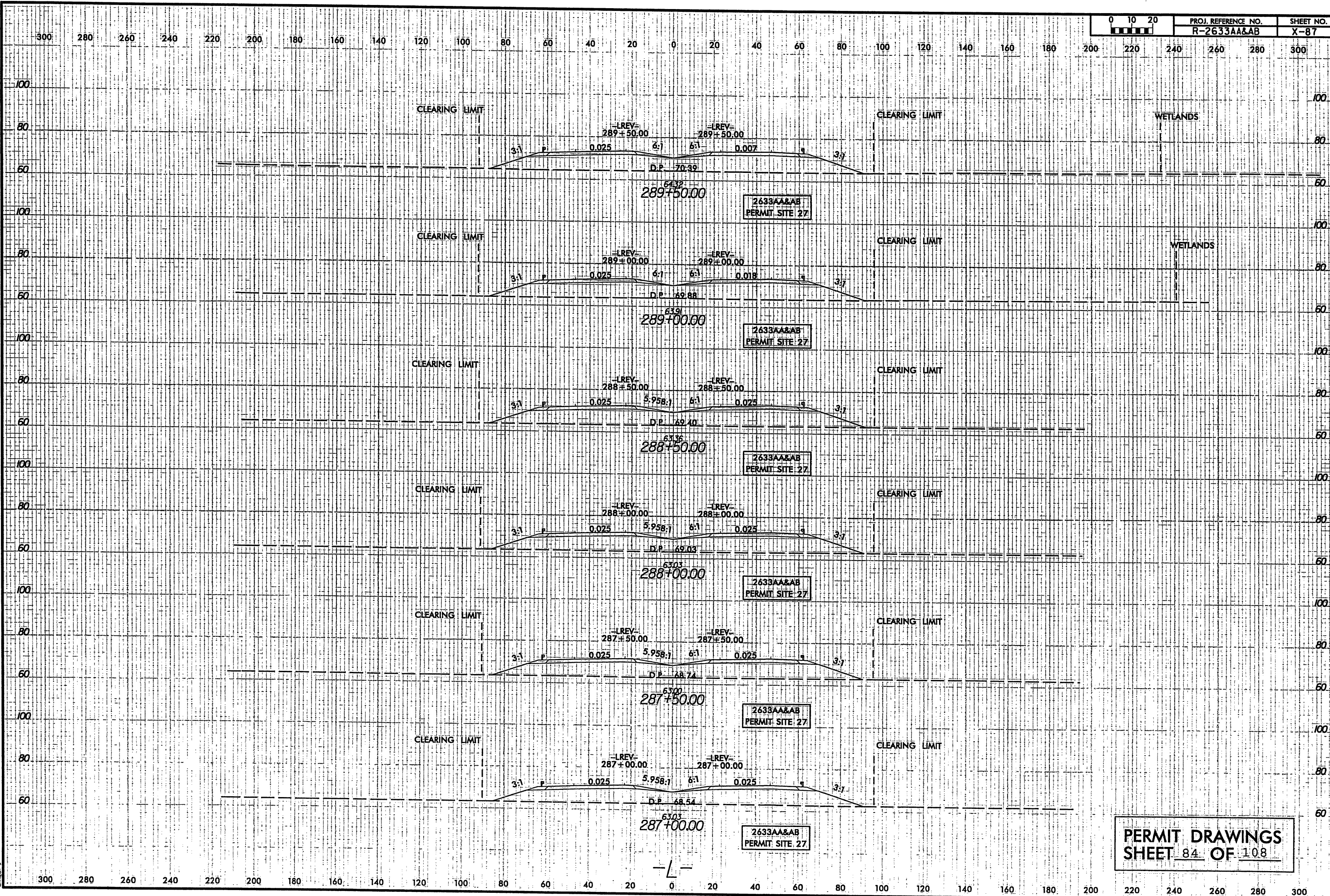
MATCH LINE -LREV- STA. 299+00, SEE SHEET 30

8/23/99

0 10 20

PROJ. REFERENCE NO.
R-2633AA&AB

SHEET NO.
X-87






PERMIT DRAWINGS
SHEET 84 OF 108

MATCH LINE -LREV- STA. 299+00, SEE SHEET 29

MATCH LINE -LREV- STA. 312+00, SEE SHEET 31

LEGEND

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



GRASS SWALE DATA
DA= 0.76 AC
SLOPE= 0.33%
L REQ= 76.00 FT
L PRO= 715.00 FT
Q2= 2.25 CFS
Y2= 1.07 FPS
Q10= 2.95 CFS
Y10= 1.14 FPS
SIDE SLOPES= 6

GRASS SWALE DATA
DA= 0.30 AC
SLOPE= 0.28%
L REQ= 30.00 FT
L PRO= 186.00 FT
Q2= 1.25 CFS
Y2= 0.87 FPS
Q10= 1.63 CFS
Y10= 0.93 FPS
SIDE SLOPES= 6


GRASS SWALE DATA
DA= 0.60 AC
SLOPE= 0.27%
L REQ= 60.00 FT
L PRO= 382.00 FT
Q2= 2.49 CFS
Y2= 1.02 FPS
Q10= 3.26 CFS
Y10= 1.09 FPS
SIDE SLOPES= 6

SITE 28

TRIBUTARY TO WATERS OF THE US

PERMIT DRAWINGS
SHEET 85 OF 108

SEE SHEET NO. 51 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

PROJECT REFERENCE NO. R-2633AA&AB	SHEET NO. 30
RW SHEET NO R-2633A PSH 29 & 30 R-2633B PSH 4 & 5	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
 HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.E.L.S. License Number: F-0116	

 **BARNHILL CONTRACTING COMPANY**

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ER: jmassrcc DATE: 10/3/2010
LE: Mktg.Charlotte\Charlotte.Trans.Design\Build\Barnhill.Wilmington\Bypass\N-2633AA & AB\Roadway\Proj\N2633AA&AB.RDY_PSH_30.dgn

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TIME: 9:48:10 AM SCALE: 1:100




8/17/99

REVISIONS


MATCH LINE -LREV- STA. 299+00, SEE SHEET 29

MATCH LINE -LREV- STA. 312+00, SEE SHEET 31

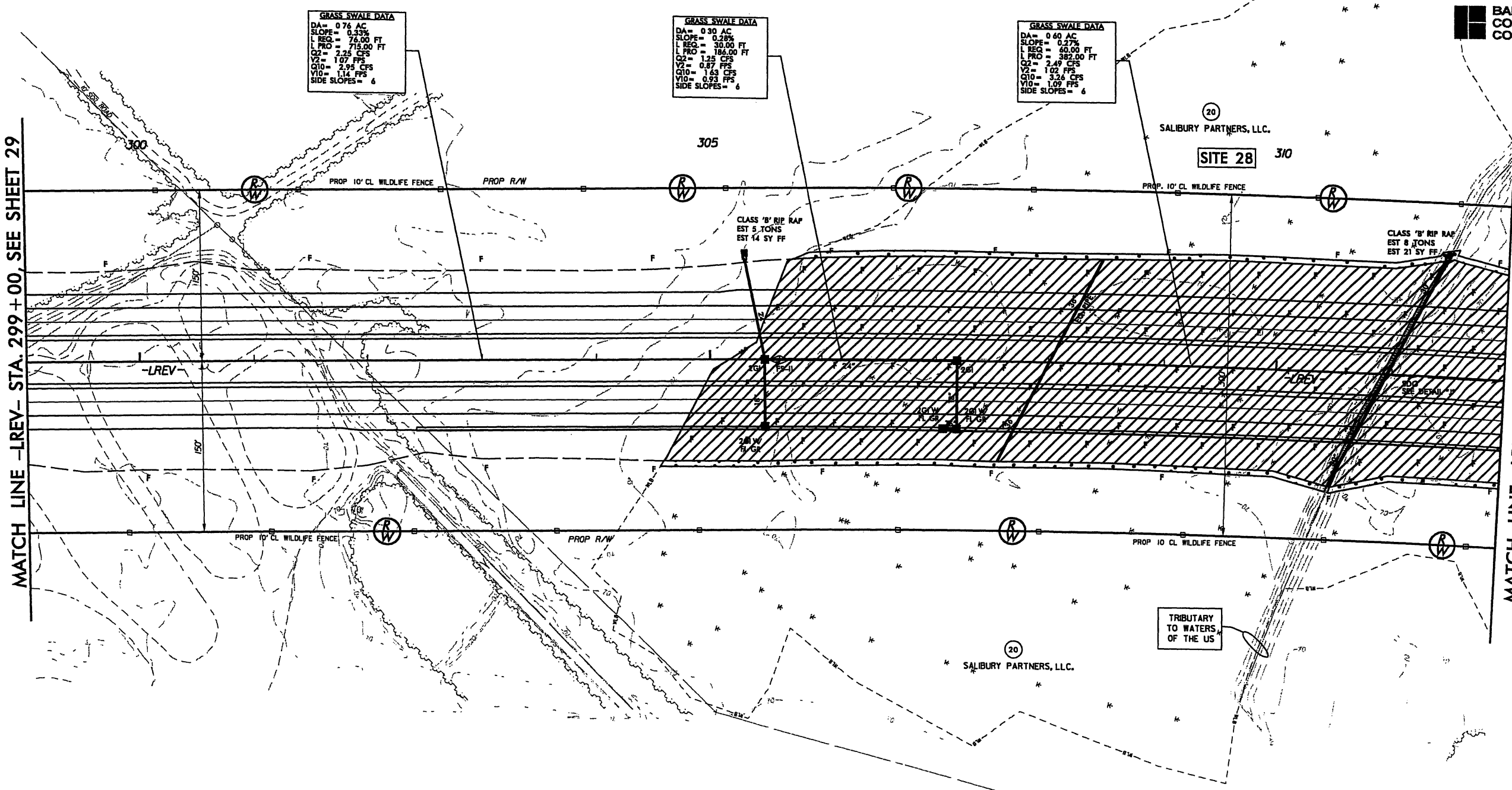
LEGEND

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



PROJECT REFERENCE NO.		SHEET NO.	
R-2633AA&AB		30	
RW SHEET NO		R-2633A PSH 29 & 30 R-2633B PSH 4 & 5	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION</div> <div>PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>			
 HDR Engineering, Inc. of the Carolinas 3733 Midland Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116			

 **BARNHILL CONTRACTING COMPANY**



PERMIT DRAWINGS
SHEET 86 OF 108

SEE SHEET NO 51 FOR -LREV- PROFILE.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS

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8/17/99

REVISIONS

MATCH LINE -LREV- STA. 312 + 00, SEE SHEET 30

MATCH LINE -LREV- STA. 325 + 00, SEE SHEET 32

GRASS SWALE DATA
DA = 0.43 AC
SLOPE = 0.30%
L REQ = 43.00 FT
L PRO = 250.00 FT
Q2 = 1.78 CFS
V2 = 1.04 FPS
Q10 = 2.34 CFS
V10 = 1.11 FPS
SIDE SLOPES = 4:6

GRASS SWALE DATA
DA = 0.39 AC
SLOPE = 1.44%
L REQ = 39.00 FT
L PRO = 200.00 FT
Q2 = 1.62 CFS
V2 = 1.71 FPS
Q10 = 2.12 CFS
V10 = 1.83 FPS
SIDE SLOPES = 6:1

GRASS SWALE DATA
DA = 0.83 AC
SLOPE = 2.56%
L REQ = 83.00 FT
L PRO = 500.00 FT
Q2 = 3.45 CFS
V2 = 2.57 FPS
Q10 = 4.91 CFS
V10 = 2.75 FPS
SIDE SLOPES = 6:1

GRASS SWALE DATA
DA = 0.93 AC
SLOPE = 0.99%
L REQ = 93.00 FT
L PRO = 500.00 FT
Q2 = 4.14 CFS
V2 = 1.88 FPS
Q10 = 5.41 CFS
V10 = 2.01 FPS
SIDE SLOPES = 6:1

GRASS SWALE DATA
DA = 0.39 AC
SLOPE = 2.48%
L REQ = 39.00 FT
L PRO = 50.00 FT
Q2 = 1.62 CFS
V2 = 2.24 FPS
Q10 = 2.12 CFS
V10 = 2.39 FPS
SIDE SLOPES = 4:6

GRASS SWALE DATA
DA = 1.27 AC
SLOPE = 0.68%
L REQ = 127.00 FT
L PRO = 70.00 FT
Q2 = 4.52 CFS
V2 = 1.91 FPS
Q10 = 5.91 CFS
V10 = 2.05 FPS
SIDE SLOPES = 3:1

GRASS SWALE DATA
DA = 5.40 AC
SLOPE = 0.64%
L REQ = 540.00 FT
L PRO = 430.00 FT
Q2 = 13.77 CFS
V2 = 2.42 FPS
Q10 = 18.02 CFS
V10 = 2.60 FPS
SIDE SLOPES = 3:1

LEGEND

- [Hatched Box] DENOTES FILL IN WETLAND
- [Dotted Box] DENOTES MECHANIZED CLEARING

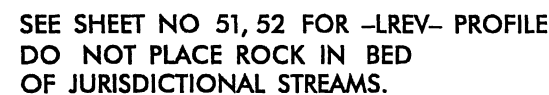


PROJECT REFERENCE NO. R-2633AA&AB		SHEET NO. 31	
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ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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SEE SHEET NO 51, 52 FOR -LREV- PROFILE
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.

PERMIT DRAWINGS
SHEET 87 OF 108

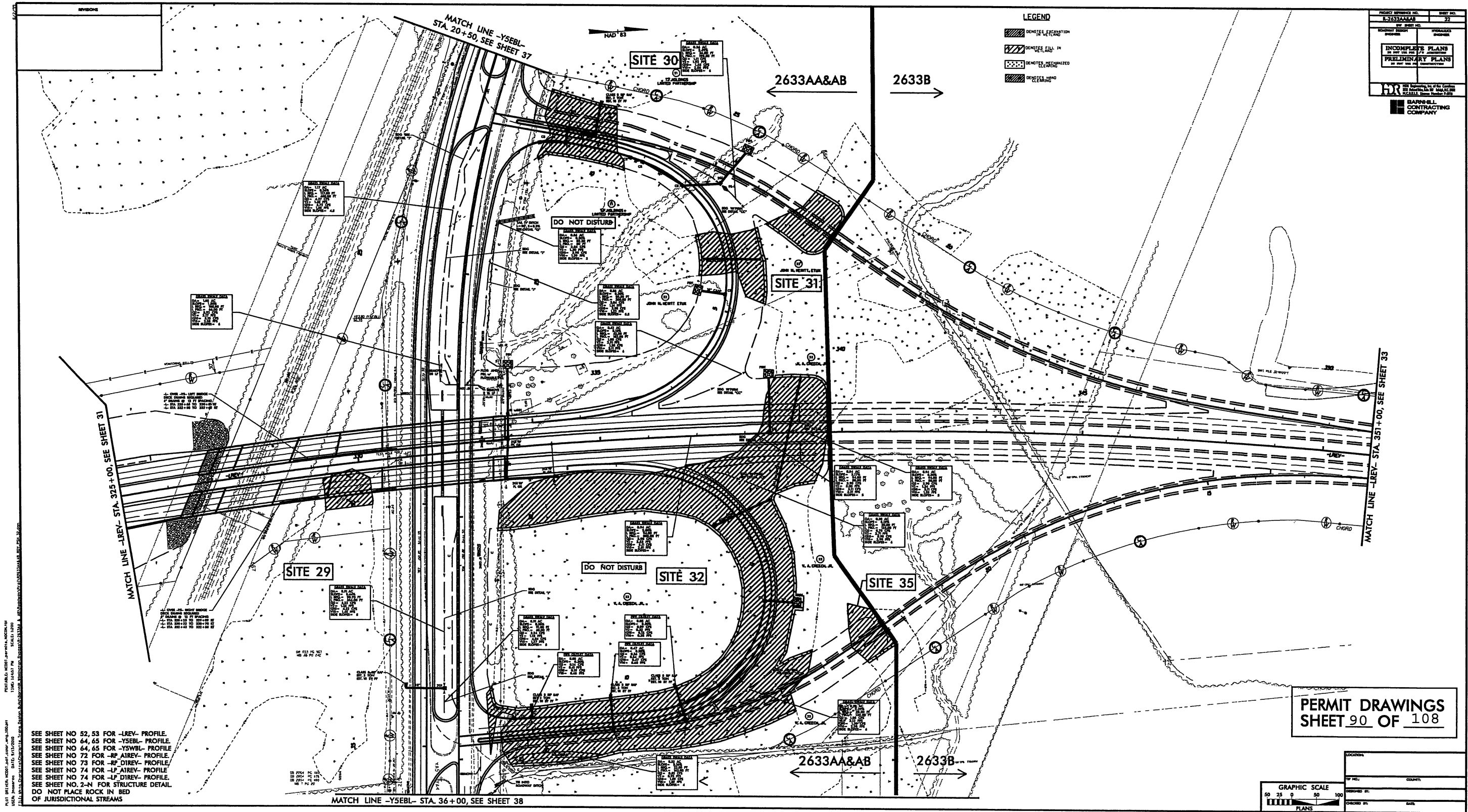
REVISIONS



PERMIT DRAWINGS
SHEET 88 OF 108

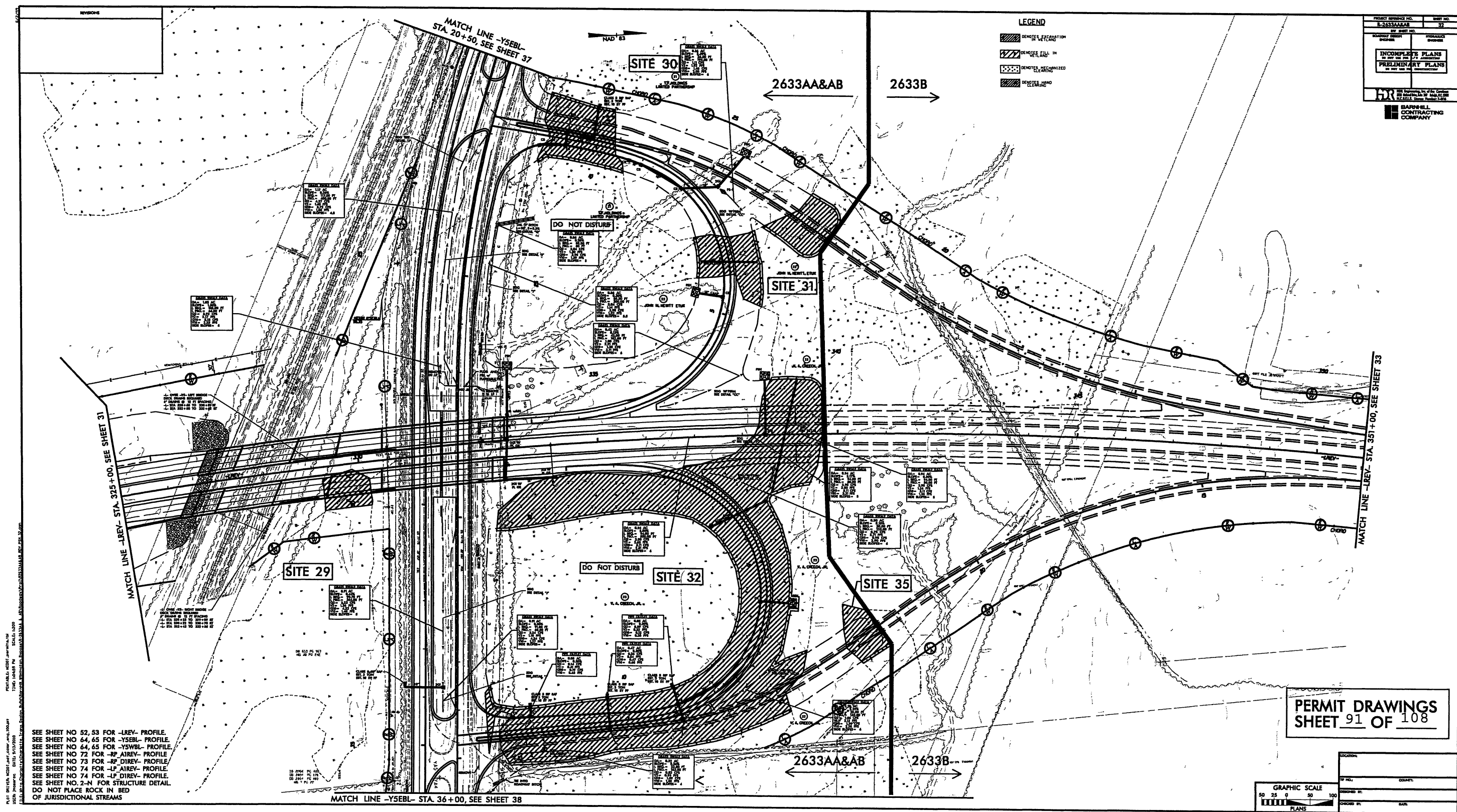
HDR HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27616
N.C.B.E.L.S. License Number: F-0116

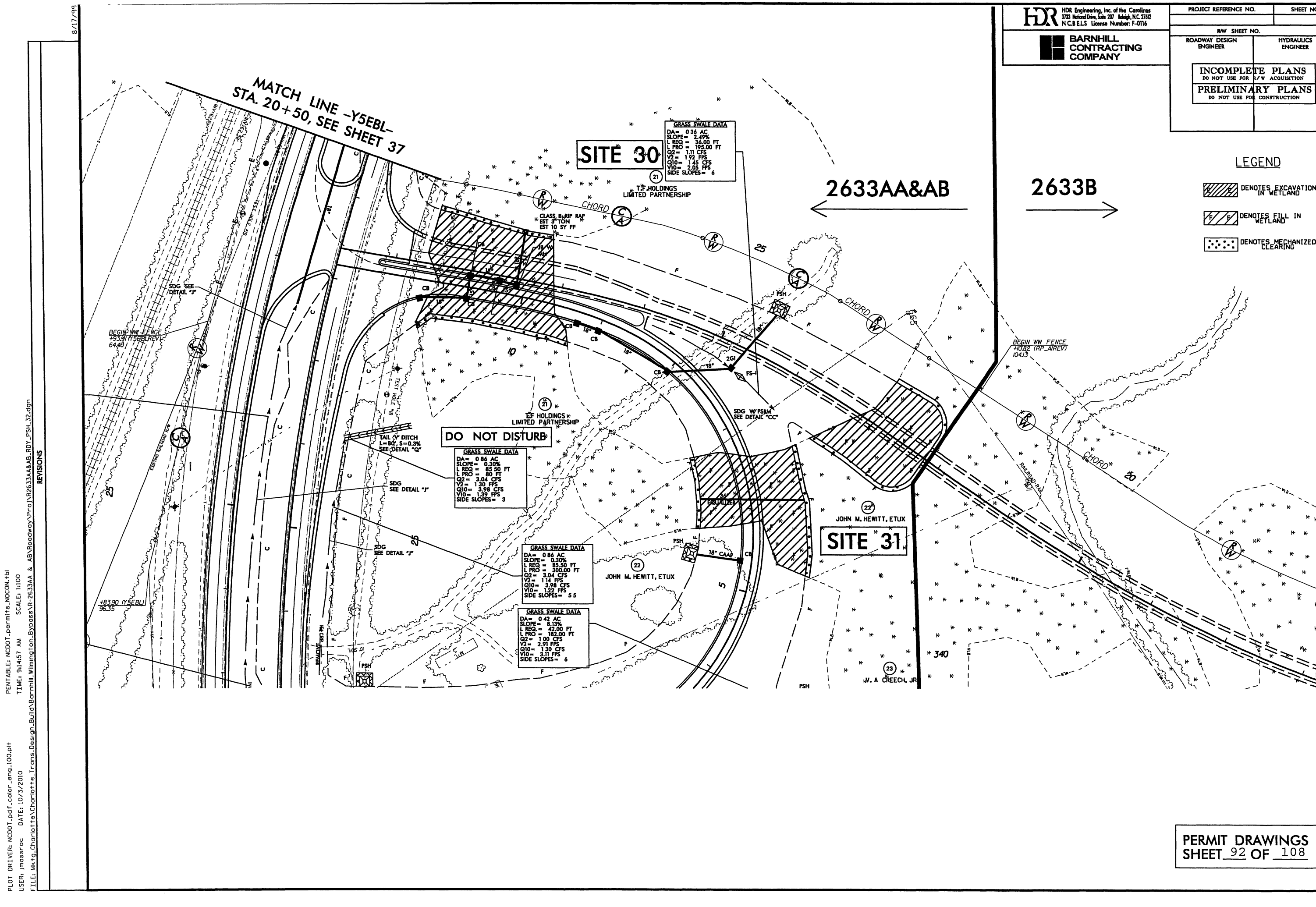

**BARNHILL
CONTRACTING
COMPANY**



SEE SHEET NO. 52, 53 FOR -LREV- PROFILE.
SEE SHEET NO. 64, 65 FOR -YSEBL- PROFILE.
SEE SHEET NO. 64, 65 FOR -YSWBL- PROFILE.
SEE SHEET NO. 72 FOR -RP AIREV- PROFILE.
SEE SHEET NO. 73 FOR -RP DIREV- PROFILE.
SEE SHEET NO. 74 FOR -LP AIREV- PROFILE.
SEE SHEET NO. 74 FOR -LP DIREV- PROFILE.
SEE SHEET NO. 2-N FOR STRUCTURE DETAIL.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS

PROJECT REFERENCE NO.	SHEET NO.
1-2633AA&AB	90
DESIGNED BY	CHECKED BY
DATE	DATE
INCOMPLETE PLANS DO NOT USE FOR CONSTRUCTION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
BARNHILL CONTRACTING COMPANY	





PLOT DRIVER: NCDOT_permit.dwg, color, eng, 100, plot
USER: jmdsroc DATE: 10/3/2010
FILE: Mktg_Charlotte\Charlotte_Trans.Design_Build\Barnhill_2633AA & AB\Roadway\Proj\2633AA&AB_R01_PSH_32.dgn

REVISIONS

HDR

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

BARNHILL
CONTRACTING
COMPANY

PROJECT REFERENCE NO.

SHEET NO.

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR E/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

LEGEND

 DENOTES EXCAVATION
IN WETLAND

 DENOTES FILL IN WETLAND

 DENOTES MECHANIZED CLEARING

**MATCH LINE -Y5EBL-
STA. 20+50, SEE SHEET 37**

SITE 30

GRASS SWALE DATA
DA= 0.36 AC
SLOPE= 2.49%
L REQ= 36.00 FT
L PRO= 195.00 FT
Q2= 1.11 CFS
V2= 1.92 FPS
Q10= 1.45 CFS
V10= 2.05 FPS
SIDE SLOPES= 6

2633AA&AB

2633B

DO NOT DISTURB

GRASS SWALE DATA
DA= 0.86 AC
SLOPE= 0.30%
L REQ = 85.50 FT
L PRO = 80 FT
Q2= 3.04 CFS
V2= 1.30 FPS
Q10= 3.98 CFS
V10= 1.39 FPS
SIDE SLOPES= 3

GRASS SWALE DATA
DA = 0.86 AC
SLOPE = 0.30%
L REQ = 85.50 FT
L PRO = 300.00 FT
Q2 = 3.04 CFS
Y2 = 1.14 FPS
Q10 = 3.98 CFS
V10 = 1.22 FPS
SIDE SLOPES = 5.5

GRASS SWALE DATA
DA = 0.42 AC
SLOPE = 8.13%
L REQ = 42.00 FT
L PRO = 182.00 FT
Q2 = 1.00 CFS
Y2 = 2.91 FPS
Q10 = 1.30 CFS
V10 = 3.11 FPS
SIDE SLOPES = 6

SITE 31

JOHN M. HEWITT, ETUX

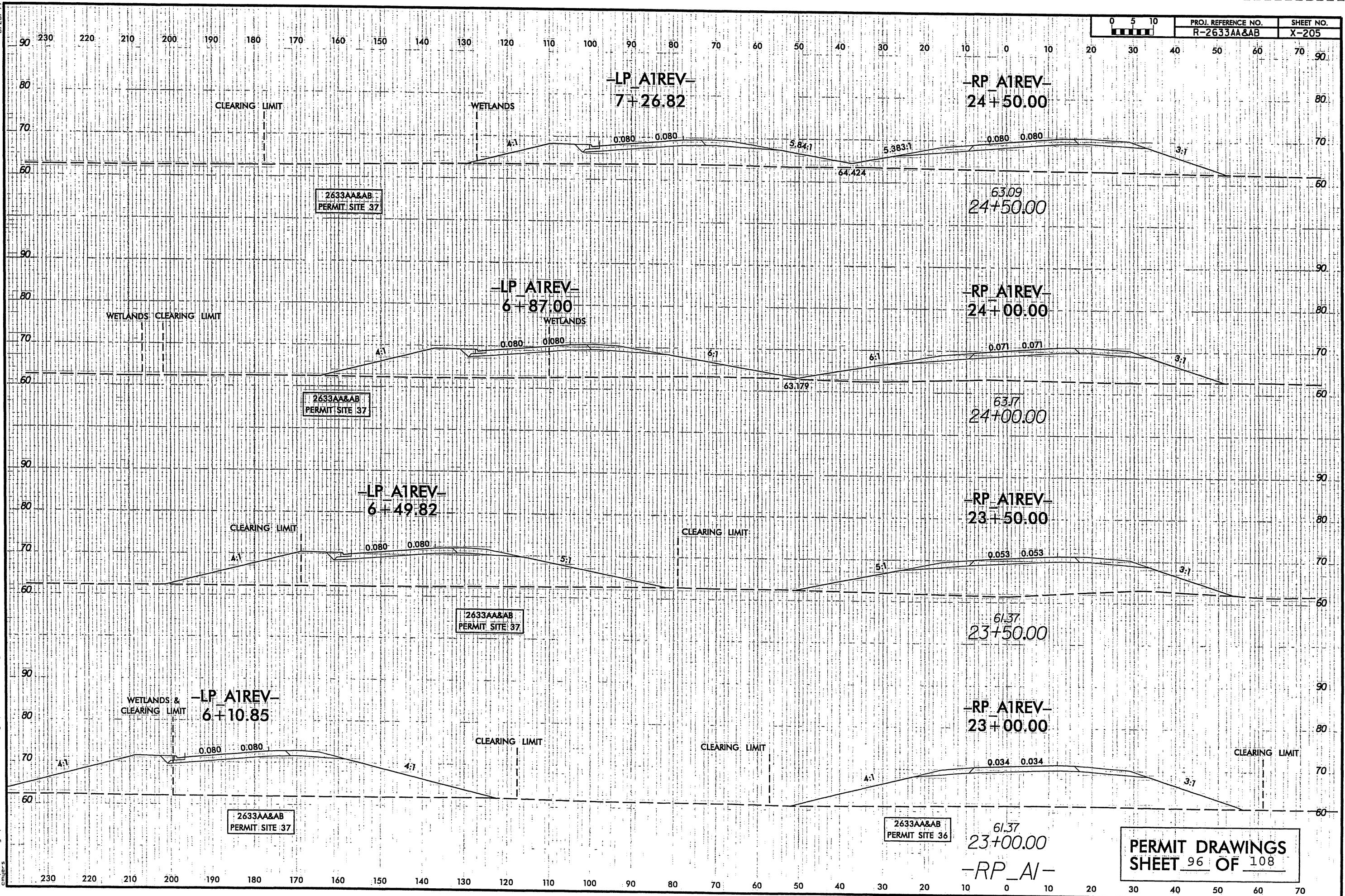
V. A. CREECH, JR

PERMIT DRAWINGS
SHEET 93 OF 108

2633AA&AB

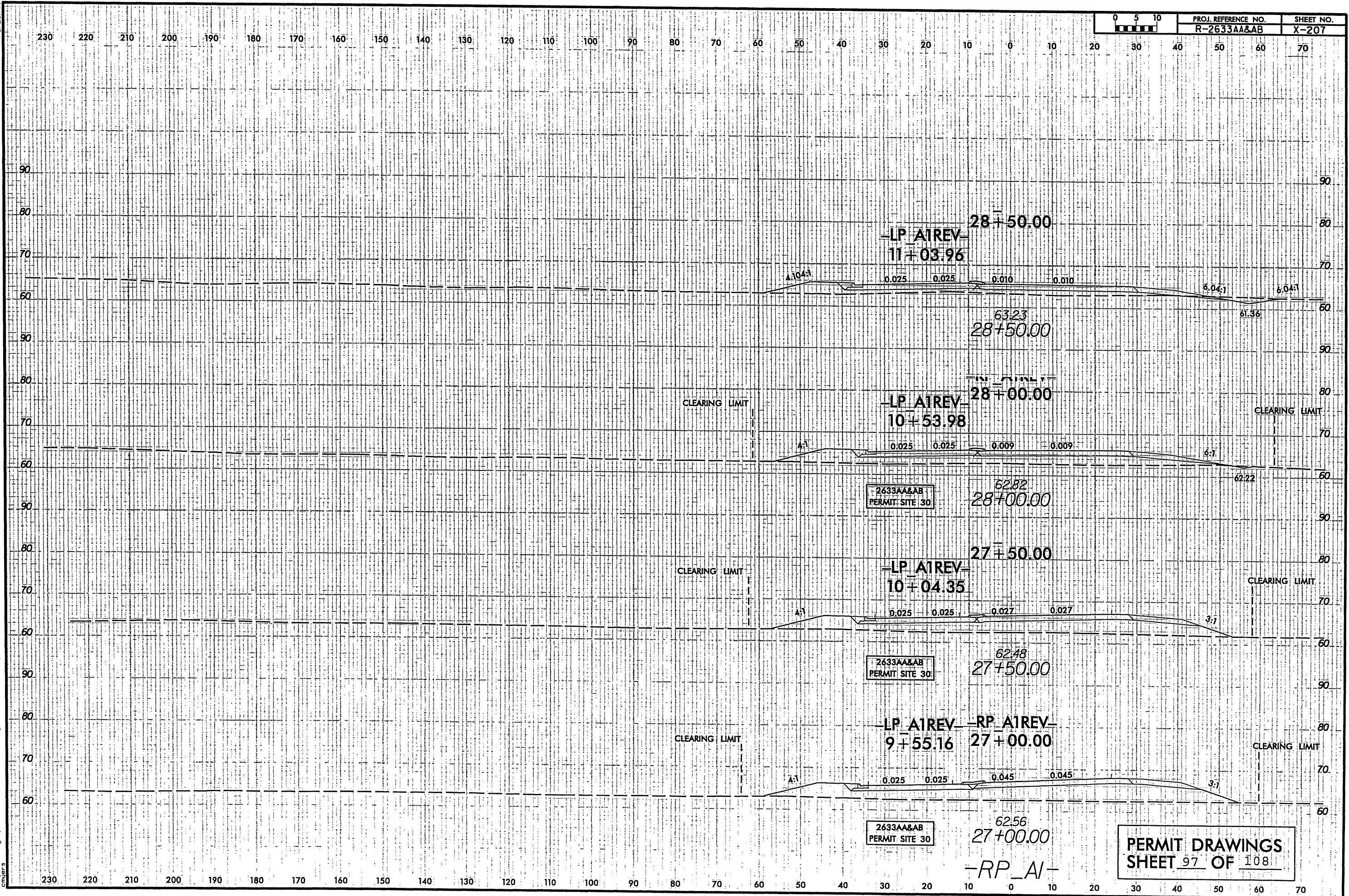
8/23/99

9/13/2010
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USER:2



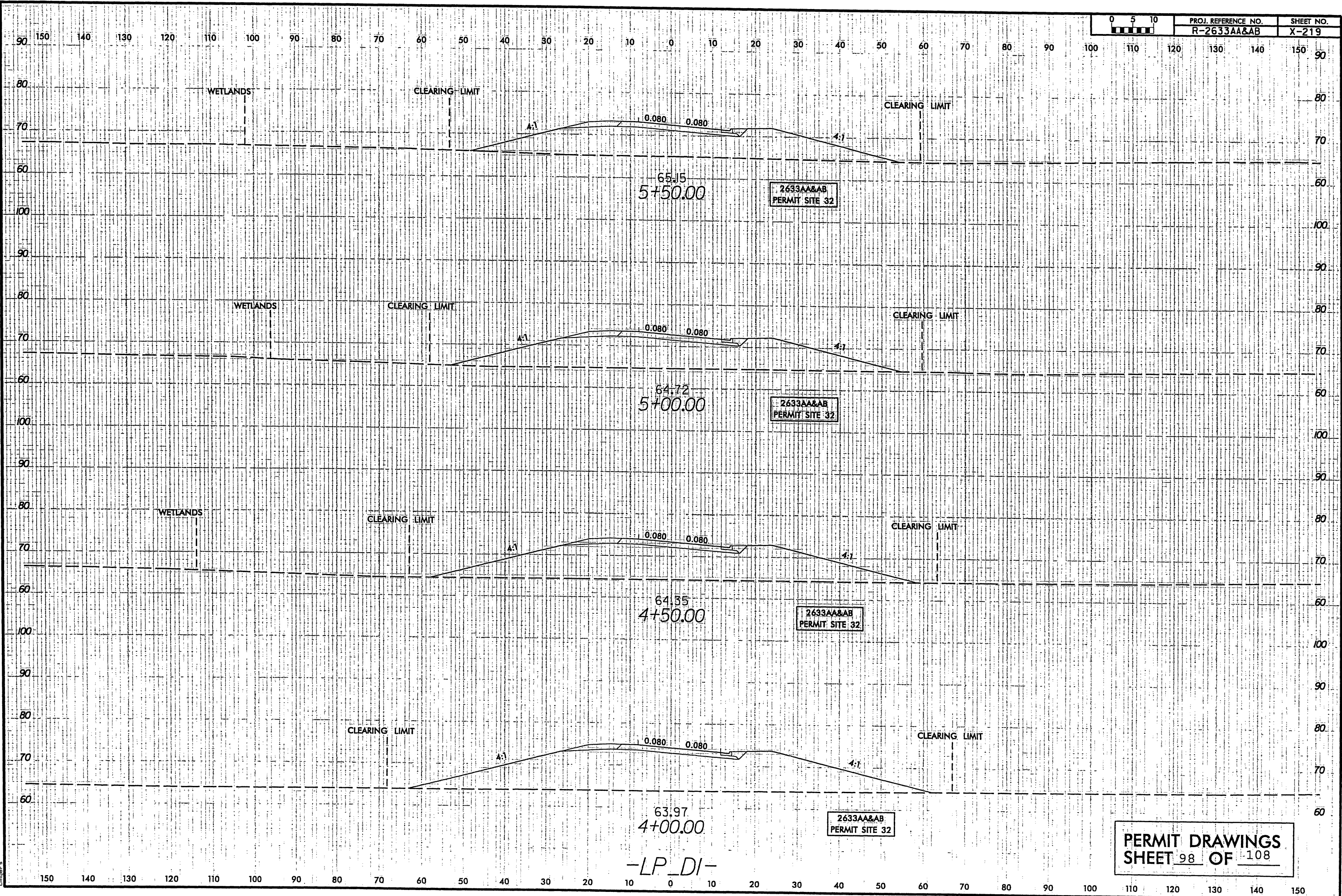
8/23/99

9/13/2000
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8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2633AA&AB	X-219



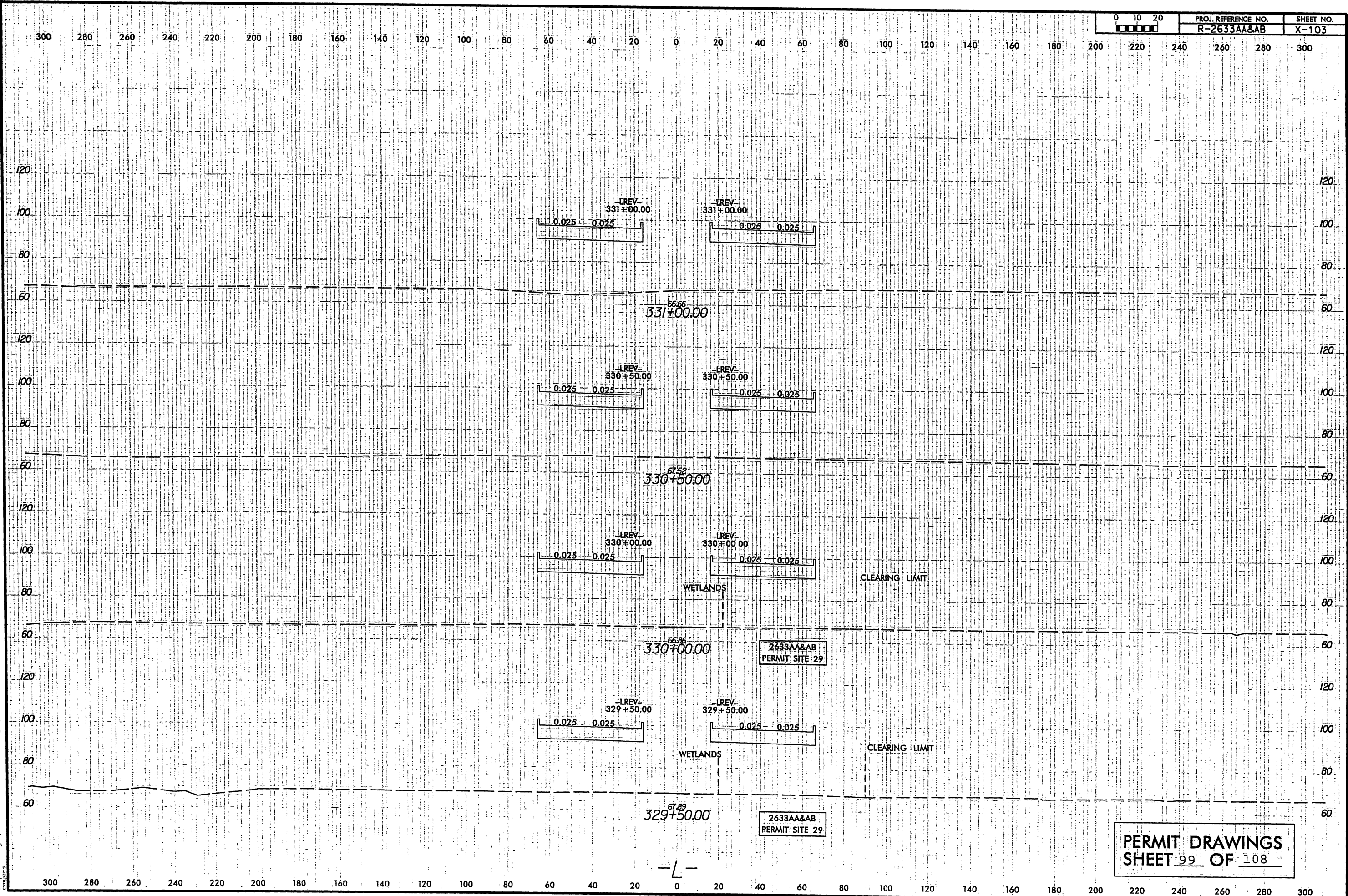
-LP_DI-

PERMIT DRAWINGS
SHEET 98 OF 108

9/13/2010
c:\pwworking\tpa\0197879\2633AA&AB_Hyd.prm_XPL_LP_DI.dgn
cmjg

8/23/99

9/13/2010
c:\pwworking\paw\0197879\2633AA&AB_Hyd_prm_XPL.dgn
cmj



PROJ. REFERENCE NO.
R-2633AA&AB

SHEET NO.
X-103

LREV
331+00.00
0.025 0.025

LREV
331+00.00
0.025 0.025

LREV
330+50.00
0.025 0.025

LREV
330+50.00
0.025 0.025

LREV
330+00.00
0.025 0.025

LREV
330+00.00
0.025 0.025

LREV
329+50.00
0.025 0.025

LREV
329+50.00
0.025 0.025

WETLANDS

CLEARING LIMIT

WETLANDS

CLEARING LIMIT

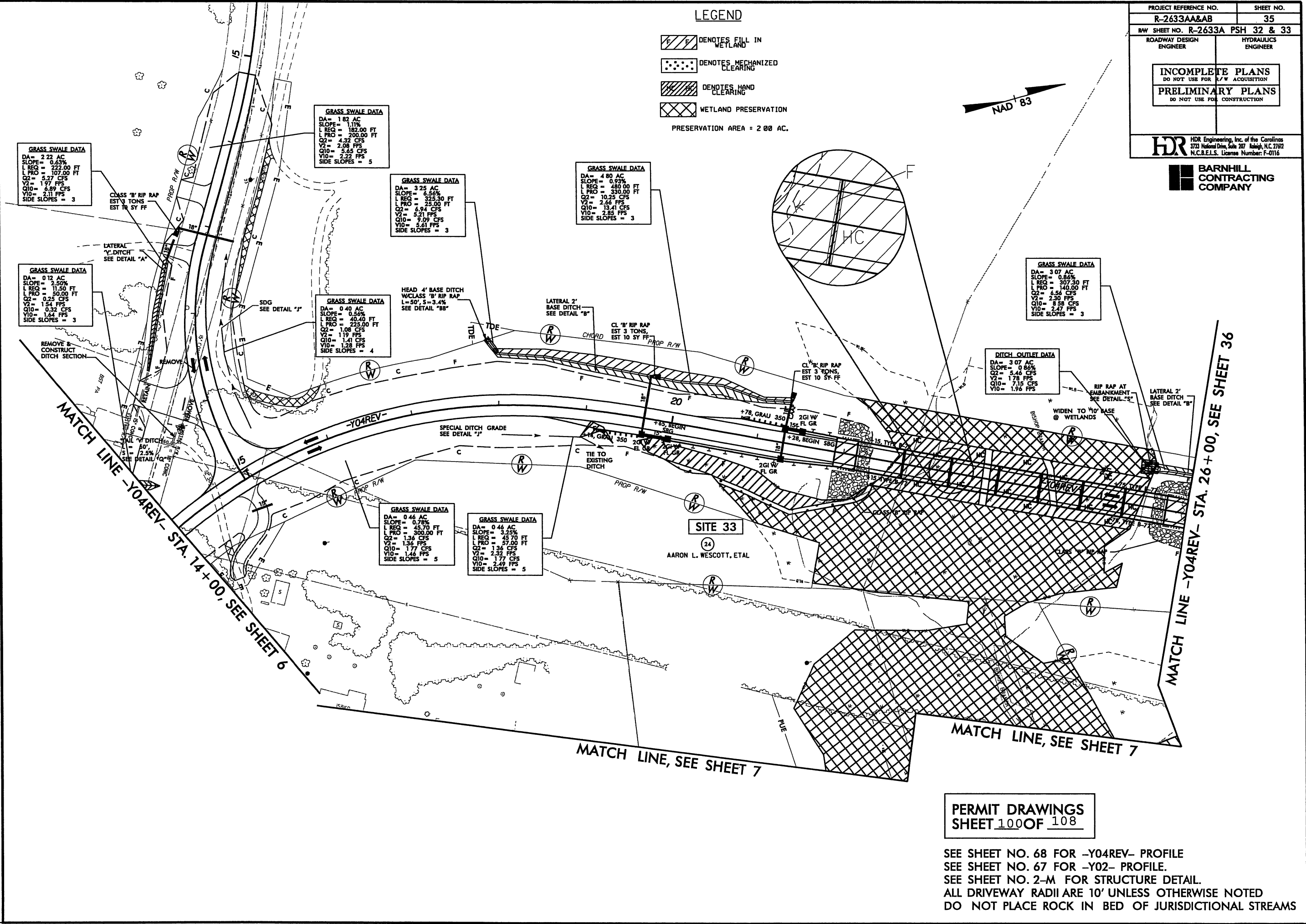
2633AA&AB
PERMIT SITE 29

2633AA&AB
PERMIT SITE 29

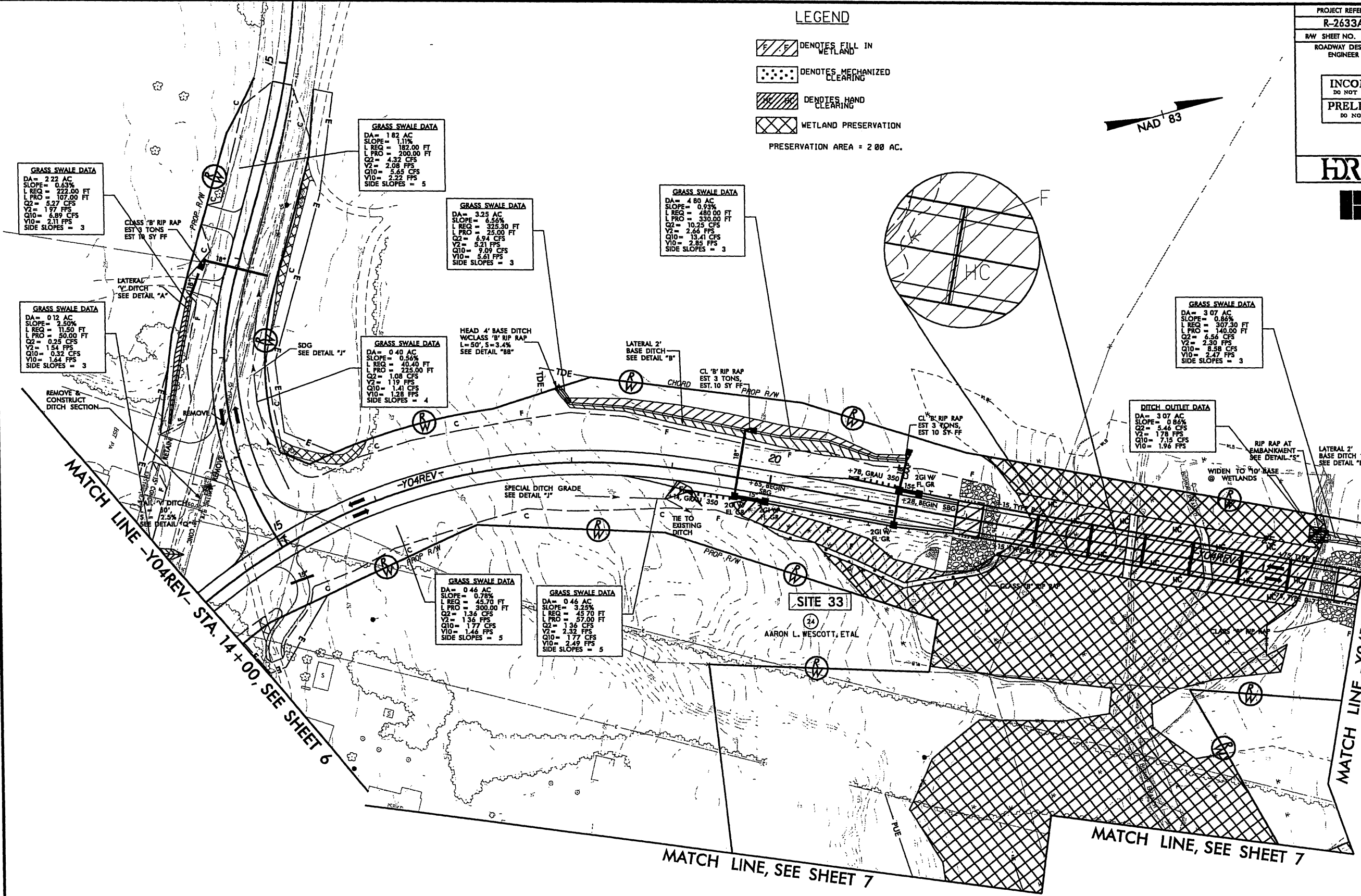
PERMIT DRAWINGS
SHEET 99 OF 108

REVISIONS

8/17/99



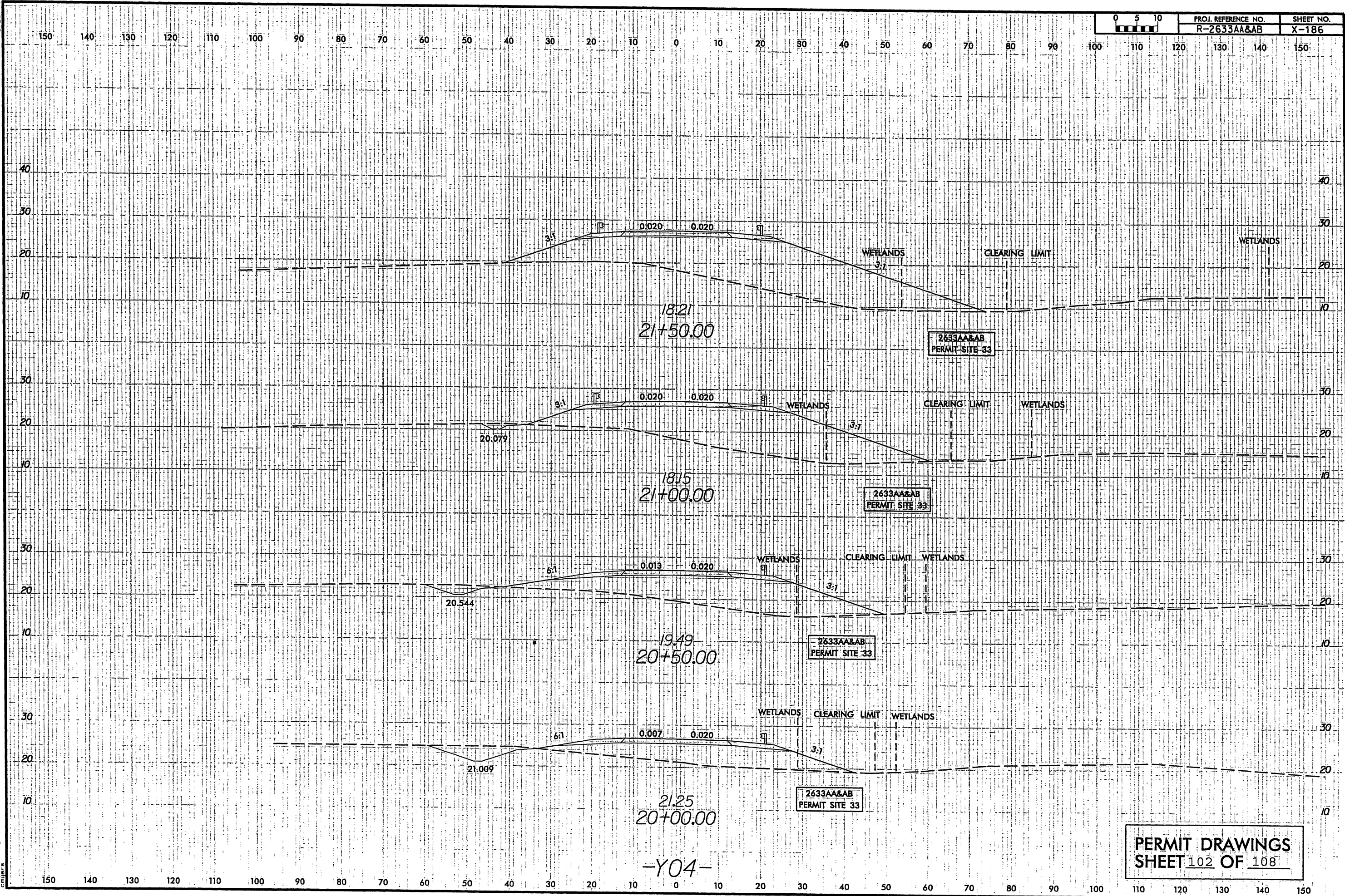
PROJECT REFERENCE NO. R-2633AA&AB		SHEET NO. 35	
RW SHEET NO. R-2633A		PSH 32 & 33	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/V ACQUISITION			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
HDR HDR Engineering, Inc. of the Carolinas 3733 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116			
BARNHILL CONTRACTING COMPANY			



PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	35
R/W SHEET NO. R-2633AA PSH 32 & 33	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
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BARNHILL CONTRACTING COMPANY	

8/23/99

9/13/2010
c:\pwworking\topo\0197879\R2633AA&AB_Hyd.prm_XPL_Y04.dgn
10/15/2010

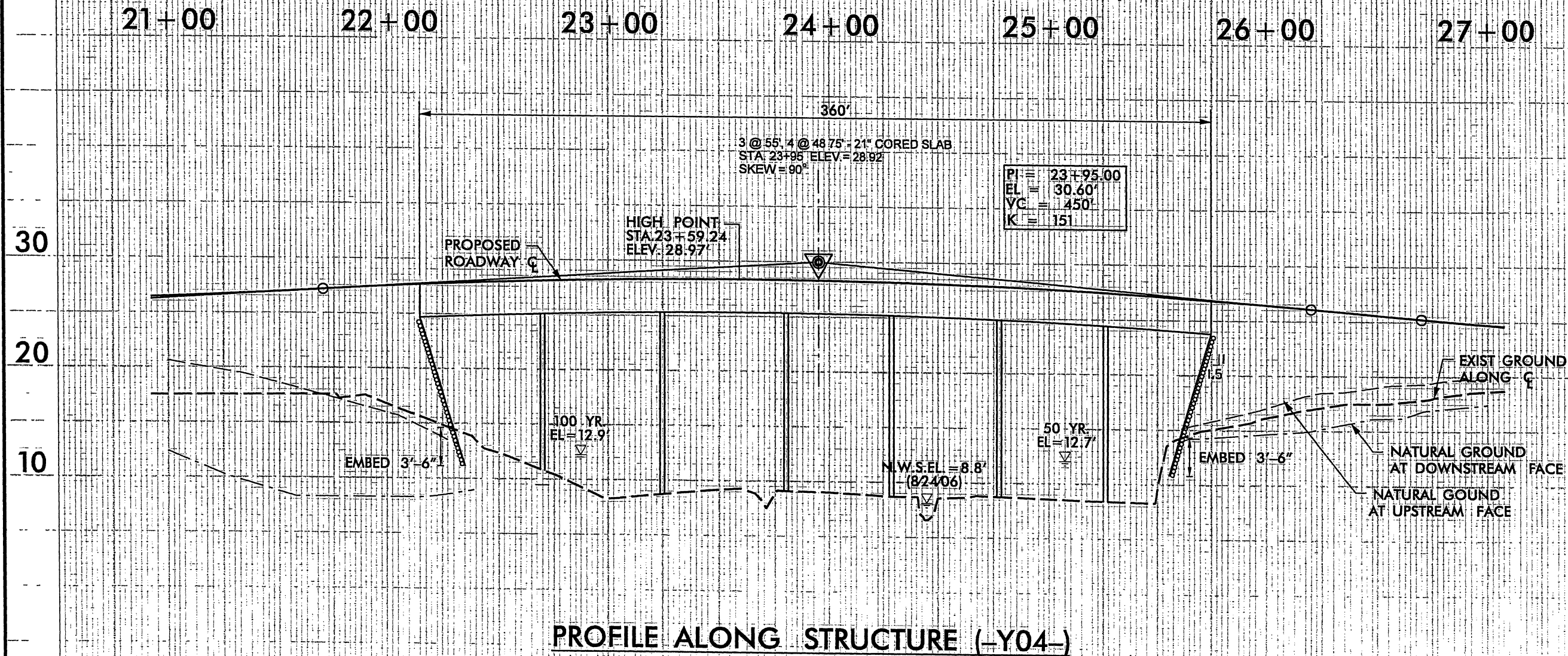


PERMIT DRAWINGS
SHEET 102 OF 108


5/14/99

9/13/2010
c:\pwworking\lpa\0197879\R2633AA&AB_HYD_PIM_BSR1.dgn

PROJECT REFERENCE NO. R-2633AA&AB	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



PERMIT DRAWINGS
SHEET 103 OF 108

 WETLAND RESTORATION
RESTORATION AREA = 0.05 AC

~~NAD 83~~

MATCH LINE - Y04REV- STA. 26 + 00, SEE SHEET 35

MATCH LINE - Y04REV- STA. 40 + 00, SEE SHEET 9

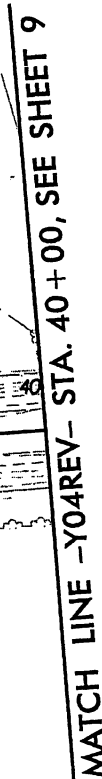
MATCH LINE, SEE SHEET 8

PERMIT DRAWINGS
SHEET 104 OF 108

SEE SHEET NO. 80 FOR -SVRD4REV- PROFILE.
SEE SHEET NO. 68, 69 FOR -Y04REV- PROFILE.
SEE SHEET NO. 80 FOR -D1REV- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS.


PLOT DRIVER: NCDOT_pdf_color_eng.i00.plt
PENTABLE: NCDOT_permits_NCON.tbl
USER: cmvrs DATE: 10/3/2010 TIME: 12:13:01 PM SCALE: 1:100
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8/17/99


**BARNHILL
CONTRACTING
COMPANY**

PERMIT DRAWINGS
SHEET 105 OF 108

SEE SHEET NO 80 FOR -SVRD4REV- PROFILE
SEE SHEET NO 68, 69 FOR -Y04REV- PROFILE.
SEE SHEET NO. 80 FOR -D1REV- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED

 WETLAND RESTORATION
RESTORATION AREA = 0.05 AC.

RESTORATION AREA = 0.05 AC.

~~SECRET~~
NAD 83

MATCH LINE -Y04REV-
STA. 26+00, SEE SHEET 35

MATCH LINE, SEE SHEET 8

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USER: cmayer
DATE: 10/3/2010
TIME: 12:09:52 PM
SCALE: 1:100
FILE: Mktg.Charlotte\Charlotte.Trans.Design.Bulid\Barnhill.Wilmington.Bypass.RR-2633AA & AB.Roadway\Proj\RR2633AA&AB.RDY_PSH_356.dgn

PENTABLE: NCDOT_permits.tbl
TIME: 12:09:52 PM SCALE: 1:100

8/17/99

PROJECT REFERENCE NO.		SHEET NO.	
R-2633AA&AB		37	
RW SHEET NO. R-2633B		PSH 6 & 34	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>INCOMPLETE PLANS</p> <p>DO NOT USE FOR A/E/W ACQUISITION</p> </div>			
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>PRELIMINARY PLANS</p> <p>DO NOT USE FOR CONSTRUCTION</p> </div>			
<div style="border: 1px solid black; padding: 10px;"> <div style="display: flex; align-items: center;"> <div> <p>HDR Engineering, Inc. of the Carolinas</p> <p>3733 National Drive, Suite 207 Raleigh, NC 27612</p> <p>N.C.B.E.L.S. License Number: F-0716</p> </div> </div> </div>			


**BARNHILL
CONTRACTING
COMPANY**

PIPE OUTLET DATA
DA= 17 30 AC
SLOPE= 0.3%
Q2= 10.65 CFS
V2= 1.67 FPS
Q10= 14.47 CFS
V10= 1.84 FPS

T.F. HOLDINGS
LIMITED PARTNERS

SITE 34

CLASS 'B' RIB RAP
EST. 5 TONS
3/4" 5Y FILTER FABRIC
REMOVE 1A RIB

MATCH LINE
-Y5EBL- STA. 20+50, SEE SHEET 32

PERMIT DRAWINGS
SHEET 106 OF 108

SEE SHEET NO 64 FOR -Y5WBL- PROFILE
SEE SHEET NO 64 FOR -Y5EBL- PROFILE
DO NOT PLACE ROCK IN BED
OF JURISDICTIONAL STREAMS

GRASS SWALE DATA
DA = 1.00 AC
SLOPE = 0.30%
L REQ = 99.60 FT
L PRO = 219.00 FT
Q2 = 3.54 CFS
V2 = 1.21 FPS
Q10 = 4.64 CFS
V10 = 1.29 FPS
SIDE SLOPES = 5

GRASS SWALE DATA



DA = 0.23 AC
SLOPE = 0.58%
L REQ = 22.70 FT
L PRO = 106.00 FT
Q2 = 0.81 CFS
Y2 = 1.07 FPS
Q10 = 1.06 CFS
Y10 = 1.15 FPS
SIDE SLOPES = 5


GRASS SWALE DATA
DA= 0.77 AC
SLOPE= 0.38%
L REQ = 77.10 FT
L PRO = 376.00 FT
Q2= 2.74 CFS
V2= 124 FPS
Q10= 3.59 CFS
V10= 1.32 FPS
SIDE SLOPES= 5

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PENTABLE: NCD0T_permits_NOC0N.tbl
USER: jmassoc DATE: 10/3/2010 TIME: 9:18:22 AM SCALE: 1:100
FILE: Mktg.Charlotte\Trans.Design\Barnhill.Wilmington.Bypass\RDY-2633AA & AB\Roadway\Pro\N2633AA\AB_RDY_PSH_37.dgn

8/17/99

LEGEND

-  DENOTES FILL IN WETLAND
-  DENOTES MECHANIZED CLEARING

PROJECT REFERENCE NO.	SHEET NO.
R-2633AA&AB	37
RAW SHEET NO.	R-2633B PSH 6 & 34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
 HDR Engineering, Inc. of the Carolinas 3723 National Drive, Suite 207 Raleigh, N.C. 27612 N.C.B.E.L.S. License Number: F-0116	

 BARNHILL CONTRACTING COMPANY

PIPE OUTLET DATA
DA = 17.30 AC
SLOPE = 0.3%
Q2 = 10.65 CFS
V2 = 1.67 FPS
Q10 = 14.47 CFS
V10 = 1.84 FPS

SITE 34

GRASS SWALE DATA
DA = 1.00 AC
SLOPE = 0.30%
L REQ = 99.60 FT
L PRO = 219.00 FT
Q2 = 3.54 CFS
V2 = 1.21 FPS
Q10 = 4.64 CFS
V10 = 1.29 FPS
SIDE SLOPES = 5

GRASS SWALE DATA
DA = 0.23 AC
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L REQ = 22.70 FT
L PRO = 106.00 FT
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V2 = 1.07 FPS
Q10 = 1.06 CFS
V10 = 1.15 FPS
SIDE SLOPES = 5

GRASS SWALE DATA
DA = 0.77 AC
SLOPE = 0.38%
L REQ = 77.10 FT
L PRO = 376.00 FT
Q2 = 2.74 CFS
V2 = 1.24 FPS
Q10 = 3.59 CFS
V10 = 1.32 FPS
SIDE SLOPES = 5

PERMIT DRAWINGS
SHEET 107 OF 108

SEE SHEET NO. 64 FOR -Y5WBL- PROFILE
SEE SHEET NO. 64 FOR -Y5EBL- PROFILE
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS

MATCH LINE
-Y5EBL- STA. 20+50, SEE SHEET 32

PLOT DRIVER: NDDOT.pdf.color.eng.100.plt
USER: jmassroc
FILE: Mktg_Charlotte\Charlotte.Trans.Design.BUILD\Barnhill_Wilmington.Bypass\B-2633AA & AB\Roadway\Proj\B-2633AA&AB.ROY_PSH_37.dgn
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SCALE: 1:100

REVISIONS

8/17/91

8/23/99

9/11/2010
c:\working\tpa\017879\R2633AA&AB_Hyd.prm_XPL_V5.dgn
cmiller's

